Ontario Clean Water Agency
Agence Ontarienne Des Eaux

Englehart Drinking Water System

2016 Annual/Summary Report

Prepared by the Ontario Clean Water Agency
on behalf of the Town of Englehart

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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 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.

Englehart Drinking Water System

Section 11

2016 Annual Report

Section 11 - ANNUAL REPORT

1.0 Introduction

Drinking-Water System Name:	**ENGLEHART DRINKING WATER SYSTEM**
Drinking-Water System No.:	220000353
Drinking-Water System Owner:	The Corporation of the Town of Englehart
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.englehart.ca/

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

Englehart Town Office
61 Fifth Avenue
Englehart, Ontario P0J 1H0

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

The Englehart Drinking Water System provided drinking water to the Town of Englehart and Six neighbouring distribution systems:

1.	Bradley Subdivision	MOE DWS #: 260069927
2.	First St North	MOE DWS #: 260078871
3.	Kap-kig-iwan Road	MOE DWS #: 260078650
4.	Bryans' Road	MOE DWS #: 260080574
5.	Brown's Road	MOE DWS #: 260078663
6.	Clarksville Subdivision	MOE DWS #: 260078741

Note: 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.

The Annual Report was provided to all Drinking Water System owners that are connected to the Englehart Drinking Water System.

The Ontario Clean Water Agency prepared the 2016 Annual/Summary Report for the Englehart Drinking Water System and provided a copy to the system owner; the Town of Englehart. A copy was also provided to the Municipality of Charlton and Dack (Bradley Subdivision and Clarksville Subdivision) and the following list of representatives for the remaining private lines:

1.	Ms. Cindy Kirkbride	First St North
2.	Mr. Len Fisher	Kap-kig-iwan Road
3.	Ms. Marie Bryan	Bryans' Road
4.	Mr. Daryl Rowlandson	Brown's Road

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

- A notice inserted with Water Bill

2.0 Description of the Drinking Water System (DWS No. 220000353)

The Englehart Drinking Water System is owned by the Corporation of the Town of Englehart and consists of a Class 1 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. It is a communal ground water well supply that services the Town of Englehart and six neighbouring distribution systems.

Raw Water Supply

The water treatment plant is located on 56 First Street in Evanturel Township in the district of Timiskaming and is supplied by two deep-drilled wells; Well No. 2 and Well No. 3.

Well No. 2 is located in a separate well house situated approximately 40 meters south of the treatment plant (approximately 52 m east of 1st Street and 15 m north of 6th Avenue). The well is drilled to a depth of 89.3 meters and consists of a stainless steel intake screen and a 400 mm diameter steel casing which reduces to a 200 mm diameter steel casing. It is equipped with vertical turbine pump and fixed-rate control system to pump at the maximum rate of 15.15 L/second. It includes a magnetic flow meter and pump-to-waste provisions.

Well No. 3 is located in a separate well house situated approximately 20 meters east of the treatment plant (approximately 75 m east of 1st Street and 53 m north of 6th Avenue). The well is drilled to a depth of 90.5 meters and consists of stainless steel intake screen and a 300 mm diameter casing that later reduces to a 150 mm diameter steel casing. It is equipped with vertical turbine pump and fixed-rate control system to pump at the maximum rate of 18.9 L/second. It also includes a magnetic flow meter and pump-to-waste provisions.

Water Treatment

The production wells feed the main water treatment plant that has a maximum rated capacity of 2488 cubic meters per day (m^3/d).

The process consists of a Filtronics Electromedia iron and manganese removal/pressure filtration system rated at 2998 m^3/d. It consists of two reaction vessels; one for sodium hypochlorite and one for sodium bisulphite (which is currently not in use) and one filter tank. Sodium hypochlorite is injected into the low lift pumping station prior to the reaction vessels. It is used as an oxidant for iron and manganese removal and as a disinfectant. Primary disinfection is achieved in the filter system and a 210 foot, 8 inch diameter contact pipe and is continuously monitored using a free chlorine residual analyzer. The system is also equipped with a turbidity analyzer, backwash flow meter and a filter backwash pump. The backwash residue discharges to the sanitary sewer. A treated water flow meter is located on the common header just downstream of the pressure filter system.

The sodium hypochlorite feed system consists of two (2) chemical storage tanks with spill containment and two (2) flow paced chemical metering pumps with automatic backup/switch over.

Water Storage and Pumping Capabilities

The reservoir consists of a twin cell underground clear well with a 3 meter depth and an overall storage volume 1360 m^3. Ammonia sulphate is added before entering the clearwell to produce a combined residual before entering the distribution system. The ammonia sulphate system consists of one 730 liter chemical tank with spill containment and two metering pumps (one duty and one shelf spare).

Each cell is vented and is accessible by an access hatch with ladder. A butterfly valve provides isolation of each cell if required. Two vertical turbine high lift pumps and fixed-rate control systems direct water into the distribution system at maximum rates of 37.8 L/second and 45.4 L/second. A distribution water flow meter and a continuous total chlorine analyzer are installed on the high lift discharge header.

Emergency Power

A 100 kW diesel generator was replaced with a 150 kW generator set in October 2014. It is located outside the water treatment building and can maintain all aspects of the operation during a power outage.

Distribution System

The Englehart Drinking Water System is classified as a Large Municipal Residential Drinking Water System and serves an estimated population of 1700 residents. Information regarding the age of the distribution system indicated that it was originally installed in 1914. The water mains consists primarily of 12, 10, 8, and 6 inch diameter ductile iron constructed pipe with approximately 50 fire hydrants connected to the system to aid in fire protection. The Town has

replaced several sections of existing 150mm diameter watermains with new PVC DR18 piping of the same diameter. Residential service connections consist of 1/2, 5/8, and 3/4 inch copper tubing. There are no off site water storage facilities in the system. Additionally, the distribution system does not receive water from other sources but it provides drinking-water to five neighbouring regulated drinking water systems (one small municipal residential system and four non-municipal year-round residential systems) as listed below:

Distribution System	DWS #	Owner/Operating Authority	# of Service Connections
Town of Englehart	220000353	Town of Englehart	750
Bradley Subdivision	260069927	Municipality of Charlton & Dack	17
First St North	260078871	Ms. Cindy Kirkbride	9
Kap-kig-iwan Road	260078650	Mr. Len Fisher	8
Bryan's Road	260080574	Ms. Marie Bryan	13
Brown's Road	260078663	Mr. Daryl Rowlandson	12
Clarksville Subdivision	260078741	Municipality of Charlton & Dack	18

3.0 List of Water Treatment Chemicals Used Over the Reporting Period

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

- Sodium Hypochlorite - Disinfection
- Ammonium Sulphate - Chloramination
- Sodium bisulphite - available at the plant, but is currently not in use.

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.

Significant expenses incurred in the drinking water system include:

- Application for permanent status of the chloramination/ammoniation system
- Spare ammonia pump
- Two spare parts kits for sodium hypochlorite pumps
- Spare parts kits for the ammonia pump
- Repair feed line
- New transformer installation
- Replaced 150mm diameter watermains in various locations the Englehart distribution system

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5.0 Drinking Water System Highlights

- March 6, 2016 – The genset did not start during a power outage due transformer failure (230 V step down transformer). The high lift pumps stopped resulting in a total loss of system pressure. The local Health Unit was notified and no Boil Water Advisory (BWA) was issued. Hydro was called to repair the transformer and Val's Equipment was contacted for a portable genset. Transformer was repaired and pressure was restored at 2330 hrs. The system was flushed and bacteriological samples were collected on March 7th and 8th. Results indicated no detectable total coliforms or *E. coli.*

- The MOECC performed an annual inspection on May 3, 2016. The inspection included a physical assessment of the Englehart water treatment plant and a document review for the period of May 6, 2015 to May 2, 2016. The system received a risk rating of 85.86% having four (4) non-compliance issues identified during 2015 which were all resolved in 2016. Refer to Section 2.0 – *Requirements the System Failed to Meet* on page 14 for details.

- SAI Global conducted a re-accreditation (verification) audit of the Englehart Drinking Water System's Quality and Environmental Management System (QEMS). The system and processes associated with the QEMS were evaluated on May 30, 2016 to ensure implementation of the Operational Plan and procedures and conformance to the Drinking Water Quality Management Standard. Four (4) minor non-conformances and four (4) opportunities for improvement were identified during the audit and have been resolved. Re-accreditation was achieved on August 8, 2016.

- Englehart's Chloramination/ammonation system was approved by the Ministry of the Environment's Approval Branch on May 26th. The system has proven effective in maintaining secondary disinfection and reducing trihalomethane (THM) levels in the Englehart and neighbouring distribution systems.

- 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 5th, 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 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, the Englehart Drinking Water System was in full compliance in 2016 with no adverse water quality incidents reported to the MOE's Spills Action Centre.

7.0 Microbiological Testing Performed During the Reporting Period

Summary of Microbiological Data

Sample Type	No. of Samples	Range of *E. coli* Results *(min to max)*	Range of Total Coliform Results *(min to max)*	# of HPC Samples	Range of HPC Results *(min to max)*
Raw (Well No. 2)	53	0 to 0	0 to 0	0	N/A
Raw (Well No. 3)	53	0 to 0	0 to 0	0	N/A
Treated	53	0 to 0	0 to 0	53	<10 to NDOGHPC
Distribution (Location 1)	53	0 to 0	0 to 0	19	<10 to 60
Distribution (Location 2)	53	0 to 0	0 to 0	17	<10 to <10
Distribution (Location 3)	53	0 to 0	0 to 0	17	<10 to <10

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.
NDOGHPC = No Data, Overgrown with HPC

Notes: One microbiological sample is collected and tested each week from the raw (each well) and treated water supply. A total of three microbiological samples are collected and tested each week from the Englehart distribution system which includes one sample from the Bradley Subdivision.

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

8.0 Operational Testing Performed During the Reporting Period

Summary of Raw Water Turbidity Data

Parameter	No. of Samples	Range of Results *(min to max)*	Unit of Measure
Turbidity (Well No. 2)	50	0.24 to 1.95	NTU
Turbidity (Well No. 3)	50	0.21 to 1.76	

Note: Samples required once every month.

Continuous Monitoring in the Treatment Process

Parameter	No. of Samples	Range of Results *(min to max)*	Unit of Measure	Standard
Free Chlorine	8760	0.85 to 4.98	mg/L	CT*
Total Chlorine (POE)	8760	0.378 to 3.62	mg/L	N/A

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

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 Englehart water plant if the free chlorine residual level drops below 0.85 mg/L 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	1.10 to 1.96	mg/L	0.25
Combined Chlorine (Location 2)	104	0.78 to 1.99		
Combined Chlorine (Location 3)	104	0.91 to 2.01		
Combined Chlorine (Location 4)	52	0.80 to 2.08		

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. Free chlorine residuals in the distribution system are collected by certified town employees.

Refer to *Appendix B* for a monthly summary of the above operational data.

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	0.26	< 0.03	mg/L	No
April 11	< 0.1	< 0.05	mg/L	No
July 11	< 0.1	< 0.03	mg/L	No
October 3	0.20	< 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	37.1	ug/L	37.6	No
April 11	44.8			
July 11	33.6			
October 3	34.8			

Maximum Allowable Concentration (MAC) for Total Trihalomethanes = 100 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 Englehart 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 11th and October 5th of 2016. Results are summarized in the table below.

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

Date of Sample	No. of Samples	Field pH *(min to max)*	Field Temperature (^{o}C) *(min to max)*	Alkalinity (mg/L) *(min to max)*
April 11	2	7.56 to 7.64	4.3 to 4.5	237 to 240
October 5	2	7.14 to 7.20	10.8 to 11.1	263 to 269

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	416	ug/L	1000	No
Boron	262	ug/L	5000	No
Cadmium	<1.0	ug/L	5	No
Chromium	2.6	ug/L	50	No
Mercury	<0.01	ug/L	1	No
Selenium	<1.0	ug/L	10	No
Uranium	<1.0	ug/L	20	No

Note: Sample required every 36 months (sample date = *October 15, 2014).* Next sampling scheduled for October 2017

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

Parameter	Result Value	Unit of Measure	Standard	Exceedance
Alachlor	<0.50	ug/L	5	No
Aldicarb	<0.50	ug/L	9	No
Aldrin + Dieldrin	<0.004	ug/L	0.7	No
Atrazine + N-dealkylated metobolites	<0.9	ug/L	5	No
Azinphos-methyl	<0.40	ug/L	20	No
Bendiocarb	<1.0	ug/L	40	No
Benzene	<0.20	ug/L	5	No
Benzo(a)pyrene	<0.005	ug/L	0.01	No
Bromoxynil	<0.60	ug/L	5	No
Carbaryl	<1.0	ug/L	90	No
Carbofuran	<1.0	ug/L	90	No
Carbon Tetrachloride	<0.20	ug/L	5	No
Chlordane (Total)	<0.004	ug/L	7	No

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

Parameter	Result Value	Unit of Measure	Standard	Exceedance
Chlorpyrifos	<0.40	ug/L	90	No
Cyanzine	<0.40	ug/L	10	No
Diazinon	<0.40	ug/L	20	No
Dicamba	<0.20	ug/L	120	No
1,2-Dichlorobenzene	<0.20	ug/L	200	No
1,4-Dichlorobenzene	<0.20	ug/L	5	No
Dichlorodiphenyl trichloroethane (DDT) + metabolites	<0.005	ug/L	30	No
1,2-Dichloroethane	<0.20	ug/L	5	No
1,1-Dichloroethylene (vinylidene chloride)	<0.20	ug/L	14	No
Dichloromethane	<1.0	ug/L	50	No
2-4 Dichlorophenol	<0.60	ug/L	900	No
2,4-Dichlorophenoxy acetic acid (2,4-D)	<0.20	ug/L	100	No
Diclofop-methyl	<0.20	ug/L	9	No
Dimethoate	<0.40	ug/L	20	No
Dinoseb	<0.06	ug/L	10	No
Diquat	<7.0	ug/L	70	No
Diuron	<5.0	ug/L	150	No
Glyphosate	<20	ug/L	280	No
Heptachlor + Heptachlor Epoxide	<0.004	ug/L	3	No
Lindane (Total)	<0.0005	ug/L	4	No
Malathion	<0.40	ug/L	190	No
Methoxychlor	<0.001	ug/L	900	No
Metolachlor	<0.20	ug/L	50	No
Metribuzin	<0.20	ug/L	80	No
Monochlorobenzene	<0.20	ug/L	80	No
Paraquat	<1.0	ug/L	10	No
Parathion	<0.20	ug/L	50	No
Pentachlorophenol	<0.06	ug/L	60	No
Phorate	<0.40	ug/L	2	No
Picloram	<0.06	ug/L	190	No
Polychlorinated Biphenyls (PCB)	<0.04	ug/L	3	No
Prometryne	<0.20	ug/L	1	No
Simazine	<0.40	ug/L	10	No
Temephos	<10	ug/L	280	No
Terbufos	<0.20	ug/L	1	No
Tetrachloroethylene	<0.20	ug/L	30	No
2,3,4,6-Tetrachlorophenol	<0.60	ug/L	100	No
Triallate	<0.20	ug/L	230	No
Trichloroethylene	<0.20	ug/L	5	No

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

Parameter	Result Value	Unit of Measure	Standard	Exceedance
2,4,6-Trichlorophenol	<0.60	ug/L	5	No
2,4,5-Trichlorophenoxy acetic acid (2,4,5-T)	<0.06	ug/L	280	No
Trifluralin	<0.20	ug/L	45	No
Vinyl Chloride	<0.20	ug/L	2	No

Note: Sample required every 36 months (sample date = *October 15, 2014).* Next sampling scheduled for October 2017

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 7, 2015	1	56.9	mg/L	20	Yes
October 16, 2015 (resample)	1	52.8			

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 15, 2015 as required under Schedule 16 of O. Reg. 170/03 (AWQI# 126909).

Most Recent Fluoride Data Sampled at the Water Treatment Plant

Date of Sample	No. of Samples	Result Value	Unit of Measure	Standard	Exceedance
October 7, 2015	1	0.44	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.

A new chloramination/ammoniation pilot project was implemented at the Englehart water treatment plant on April 8, 2015. Condition 2.0 of Schedule C of DWWP No. 209-201 requires the owner to carry out sampling outlined in the document titled “Chloramination Pilot – Work Plan for the Town of Englehart Drinking Water System” prepared by OCWA. The abovementioned report identifies the following additional sampling for the duration of the chloramination pilot program:

1. Chloramines (monochloromine) sampling at various locations within the distribution system, especially the dead-end locations (Bradley and Clarksville subdivisions). OCWA also collected and tested free ammonia every week.
2. Lead, pH and alkalinity sampling to determine the effect of chloramination on lead corrosion. One sample was collected monthly.
3. THM sampling also took place on a monthly basis to assess the effectiveness on the THM reduction.

A summary of the results are provided below.

Permanent implementation of chloramination/ammoniation system was approved by the Ministry of the Environment's Approval Branch on May 26, 2016 after which sampling of additional parameters was no longer a requirement.

Total Trihalomethane Data *(monthly testing)*

Date of Sample	Result Value	Unit of Measure	Running Average	Exceedance
January 6	35.9	ug/L	37.9	No
February 2	43.7			
March 2	35.1			
April 6	42.5			
May 4	31.2			
June 8	38.8			

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

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

Date of Sample	Field pH	Field Temperature (^{o}C)	Alkalinity (mg/L)	Lead (mg/L)
January 6	7.59	8.7	264	<0.1
February 2	7.29	8.7	89.4	0.12
March 2	7.12	7.9	237	<0.1
April 6	7.02	6.9	242	<0.1
May 4	7.32	8.2	242	<0.1
June 8	7.86	9.2	-	<0.1
June 9	7.91	16.9	246	-

Summary of Monochloramine & Free Ammonia Data *(sampled as part of the chloramination trial)*

Sample Type	No. of Monochloramine Samples	Range of Monochloramine Results *(min to max)*	No. of Free Ammonia Samples	Range of Free Ammonia Results *(min to max)*
Englehart (Location 1)	28	0.45 to 1.73	28	0.03 to 0.24
Englehart (Location 2)	23	1.1 to 1.8	23	0.0 to 0.32
Bradley Subdivision	23	0.72 to 1.67	23	0.03 to 0.30
Clarksville Subdivision	28	1.05 to 1.65	28	0.03 to 0.21

Englehart Drinking Water System

Schedule 22

2016 SUMMARY REPORT

FOR MUNICIPALITIES

Schedule 22 - SUMMARY REPORTS FOR MUNICIPALITIES

1.0 Introduction

Drinking-Water System Name:	**ENGLEHART DRINKING WATER SYSTEM**
Municipal Drinking Water Licence (MDWL) No.:	209-101-3 (issued May 19, 2016)
Drinking Water Work Permit (DWWP) No.:	209-201-2 (issued May 19, 2016)
Permit to Take Water (PTTW) No.:	4742-854PPE (issued May 21, 2010)
Period being reported:	January 1, 2016 to December 31, 2016

2.0 Requirements the System Failed to Meet

According to information kept on record by OCWA, the Englehart Drinking Water System has complied with all the requirements set out in the system's MDWL, its DWWP, the Act and its Regulations in 2016. However, in the last MOECC inspection report dated June 30, 2016, there were several non-compliance items listed for 2015. All items were resolved in 2016.

Drinking Water Legislation	Requirement(s) the System Failed to Meet	Duration	Corrective Action(s)	Status
DWWP 209-201	Failed to prepare a ministry's Form 1 for watermain alterations prior to a watermain replacement project in November 2015	November 2015 to June 27, 2016	Form 1 was submitted to MOECC Water Inspector Janet Recoskie on June 27, 2016. OCWA and the Owner will meet throughout the year to discuss any watermain projects and ensure proper paperwork is completed. OCWA has a system in place to track the projects.	Complete
Schedule 1 to O. Reg. 170/03	Primary disinfection (CT) was not achieved on several occasions during the start-up of the chloramination trial for secondary disinfection	Several incidents from April 8, 2015 to November 25, 2015	A contact pipe was installed on November 25, 2015 to increase contact time for primary disinfection. Since this time, no other incidents have occurred.	Complete
Schedule 6 to O. Reg. 170/03	No alarms initiated from continuous monitoring equipment testing free chlorine residuals in water being directed to the next phase of treatment. This occurred on two occasions in 2015.	June 9, 2015 and August 23, 2015	A procedure was developed to ensure that operators regularly check alarm set points and alarm dialer. A plant shutdown feature was also installed on October 9, 2015 to prevent water with low chlorine to be directed to the next	Complete

Drinking Water Legislation	Requirement(s) the System Failed to Meet	Duration	Corrective Action(s)	Status
			phase of treatment.	
Schedule 16 to O. Reg. 170/03	No immediate verbal notification was made to ministry's Spills Action Center and the Medical Officer of Health for a loss of primary disinfection event.	June 11, 2015 and August 30, 2015	Training was performed with OCWA and Town operators. Training records were provided to the MOECC Water Inspector on July 21, 2016	Complete

3.0 Summary of Quantities and Flow Rates

Flow Monitoring

MDWL No. 209-101 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.

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.

Water Usage

Raw Water

2016 - Monthly Summary of Water Takings from the Source (Well No. 2 and Well No. 3)
Regulated by Permit to Take Water (PTTW) #4742-854PPE issued May 21, 2010

Well No. 2

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year to Date
Total Volume (m^3)	5629	7666	6410	6677	7510	6644	7494	7920	5995	7026	6090	6276	81337
Average Volume (m^3/d)	182	264	207	223	242	221	242	255	200	227	203	202	222
Maximum Volume (m^3/d)	243	329	254	266	488	277	215	393	279	286	294	303	488
PTTW - Maximum Allowable Volume (m^3/day)	1205	1205	1205	1205	1205	1205	1205	1205	1205	1205	1205	1205	1205
Maximum Flow Rate (L/min)	646	683	729	505	682	900	515	897	893	649	589	616	900
PTTW - Maximum Allowable Flow Rate (L/min)	909	909	909	909	909	909	909	909	909	909	909	909	909

Well No. 3

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year to Date
Total Volume (m^3)	15270	20719	16994	17834	20506	18230	20426	21349	16125	18920	16015	16606	218994
Average Volume (m^3/d)	493	714	548	594	661	608	659	689	538	610	534	536	599
Maximum Volume (m^3/d)	658	883	675	723	1331	758	859	1058	752	771	783	819	1331
PTTW - Maximum Allowable Volume (m^3/day)	1591	1591	1591	1591	1591	1591	1591	1591	1591	1591	1591	1591	1591
Maximum Flow Rate (L/min)	1434	1273	1187	1407	1183	1500	1318	1287	1500	1232	1202	1213	1500
PTTW - Maximum Allowable Flow Rate (L/min)	1727	1727	1727	1727	1727	1727	1727	1727	1727	1727	1727	1727	1727

Combined Water Taking (Well No. 2 and Well No. 3)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year to Date
Total Volume (m^3)	20899	28385	23404	24511	28016	24874	27920	29269	22120	25946	22105	22842	300291
Average Volume (m^3/d)	674	979	755	817	904	829	901	944	737	837	737	737	821
Maximum Volume (m^3/d)	901	1212	929	989	1819	1035	1174	1451	1031	1057	1077	1122	1819
PTTW - Maximum Allowable Volume (m^3/day)	2796	2796	2796	2796	2796	2796	2796	2796	2796	2796	2796	2796	2796

The system's Permit to Take Water #4742-854PPE allows the Town to withdraw water at the following rates:

Well No. 2:	1204.69 m^3/day / 909 L/minute
Well No. 3	1591.10 m^3/day / 1727 L/minute
Total Combined Daily Volume:	2795.79 m^3/day

A review of the raw water flow data indicates that the total daily volume of water taken from each well never exceeded the allowable limits. The maximum combined volume measured was 1819 m^3 on May 6, 2016. The maximum flow rates were also not exceeded during the reporting point. The maximum flow rate for Well No. 2 was 900 L/minute on June 17th. The maximum flow rate measured for Well No. 3 was 1440 L/minute on June 22nd and September 20th.

Treated Water

2016 - Monthly Summary of Treated Water Supplied to the Distribution System

Regulated by Municipal Drinking Water Licence (MDWL) #209-101 - Issue 3, dated May 19, 2016

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year to Date
Total Volume (m^3)	18824	26545	21271	22312	25689	22841	25865	27733	20273	24150	20196	21032	276731
Average Volume (m^3/d)	607	915	686	744	829	761	834	895	676	779	673	678	756
Maximum Volume (m^3/d)	873	1166	782	818	1629	940	1062	1366	853	1063	989	1111	1629
MDWL/C of A - Rated Capacity (m^3/day)	2488	2488	2488	2488	2488	2488	2488	2488	2488	2488	2488	2488	2488

Schedule C, Section 1.1 of MDWL No. 209-101 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 2488 m^3/day. The Englehart DWS complied with this limit having a recorded maximum volume of 1629 m^3/day on May 6, 2016, which is 65.5% 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. This information enables the Owner to assess the system's existing and future planned water usage needs.

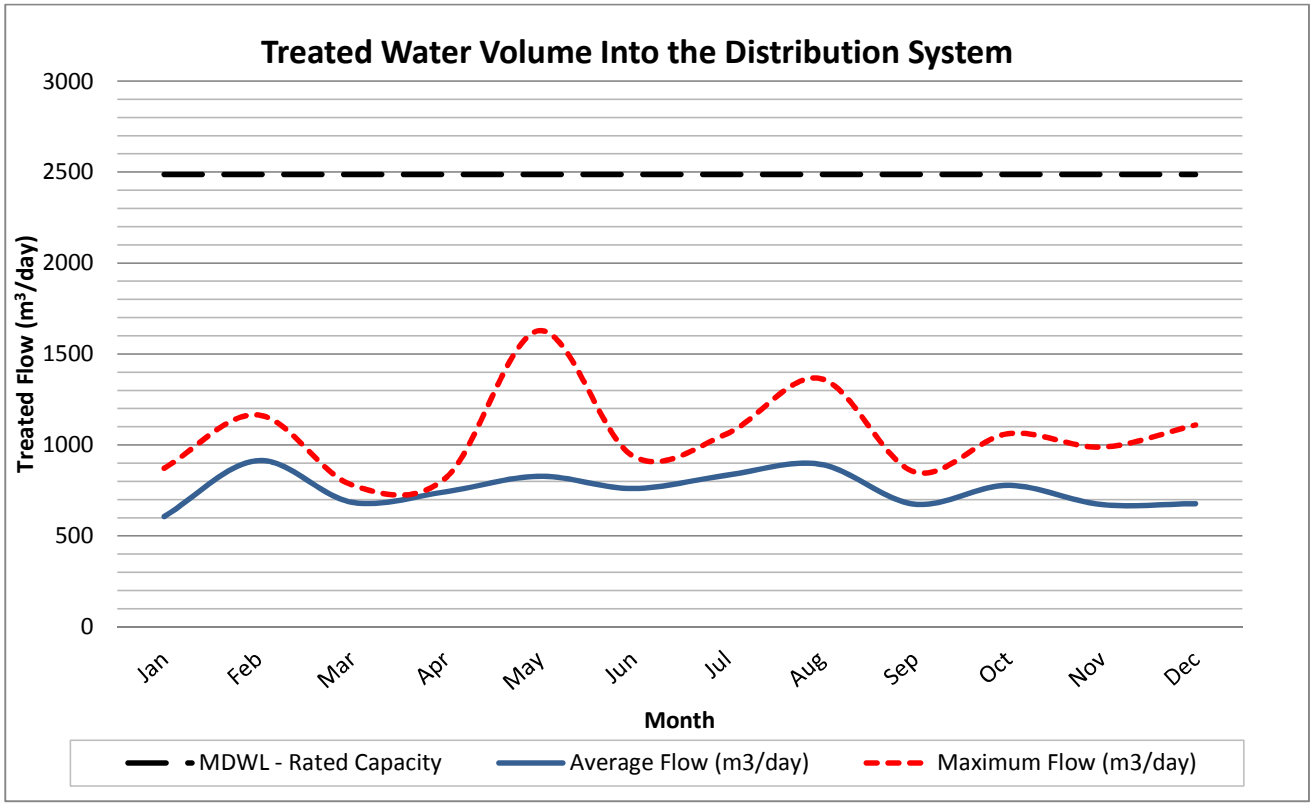
Comparison of the Flow Summary to the Systems Licence & Permit

Rated Capacity of the Plant (MDWL)	2,488 m^3/day	
Average Daily Flow for 2016	756 m^3/day	30.4 % of the rated capacity
Maximum Daily Flow for 2016	1,629 m^3/day	65.5 % of the rated capacity
Total Treated Water Produced in 2016	276,731 m^3	

The Englehart water treatment plant is rated to produce 2,488 cubic meters of water per day as specified in the system's Municipal Drinking Water Licence. The average daily flow was 756 m^3 per day, which is 30.4% 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^3/day)	607	915	686	744	829	761	834	895	676	779	673	678
Maximum Flow (m^3/day)	873	1166	782	818	1629	940	1062	1366	853	1063	989	1111
MDWL - Rated Capacity	2488	2488	2488	2488	2488	2488	2488	2488	2488	2488	2488	2488
% Rated Capacity	35	47	31	33	65	38	43	55	34	43	40	45



CONCLUSION

In 2016, the Englehart drinking water system (DWS) provided safe and reliable drinking water to the community of Englehart and neighbouring distribution systems. The system complied with the regulatory requirements of the Safe Drinking Water Act and its Regulations and 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. Four non-compliance items were identified for 2015 in annual MOECC inspection report and are listed in Section 2.0 *Requirements the System Failed to Meet.* All incidents have been resolved.

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.

APPENDIX A

Monthly Summary of Microbiological Test Results

ENGLEHART DRINKING WATER SYSTEM
MONTHLYSUMMARY OF MICROBIOLOGICAL TEST RESULTS

Facility Org Number: 6213
Facility Works Number: 220000353
Facility Name: ENGLEHART DRINKING WATER SYSTEM
Facility Owner: Municipality: Town of Englehart
Facility Classification: Class 1 Water Treatment
Service Population: 1700.0
Total Design Capacity: 2488.0 m3/day
From: 01/01/2016 to 31/12/2016

RAW WATER

	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
Well 2 / Total Coliform: TC - cfu/100mL																
Count Lab	4	5	5	4	5	4	4	5	4	5	4	4	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
Well 2 / E. Coli: EC - cfu/100mL																
Count Lab	4	5	5	4	5	4	4	5	4	5	4	4	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
Well 3 / Total Coliform: TC - cfu/100mL																
Count Lab	4	5	5	4	5	4	4	5	4	5	4	4	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
Well 3 / E. Coli: EC - cfu/100mL																
Count Lab	4	5	5	4	5	4	4	5	4	5	4	4	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

	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
Treated Water (POE) / Total Coliform: TC - cfu/100mL																
Count Lab	4	5	5	4	5	4	4	5	4	5	4	4	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	4	5	5	4	5	4	4	5	4	5	4	4	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	4	5	5	4	5	4	4	5	4	5	4	4	53			
Max Lab	< 60	< 20	< 10	< 30	< 10	< 10	< 10	NDOGHPC	< 10	180	< 10	< 10			NDOGHPC	
Mean Lab	< 22.5	< 12	< 10	< 15	< 10	< 10	< 10	< 10	< 10	< 44	< 10	< 10		< 14.808		
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
DISTRIBUTION WATER																
E-3 (Bacti) / Total Coliform: TC - cfu/100mL																
Count Lab	4	5	5	4	5	4	4	5	4	5	4	4	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
E-3 (Bacti) / E. Coli - cfu/100mL																
Count Lab	4	5	5	4	5	4	4	5	4	5	4	4	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
E-3 (Bacti) / HPC - cfu/mL																
Count Lab	2	2	2	1	2	1	2	1	1	2	1	2	19			
Max Lab	< 10	< 10	< 10	60	< 10	10	< 10	< 10	10	< 10	< 10	< 10			60	
Mean Lab	< 10	< 10	< 10	60	< 10	10	< 10	< 10	10	< 10	< 10	< 10		< 12.632		
Min Lab	< 10	< 10	< 10	60	< 10	10	< 10	< 10	10	< 10	< 10	< 10				< 10
E-4 (Bacti) / Total Coliform: TC - cfu/100mL																
Count Lab	4	5	5	4	5	4	4	5	4	5	4	4	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
E-4 (Bacti) / E. Coli - cfu/100mL																
Count Lab	4	5	5	4	5	4	4	5	4	5	4	4	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
E-4 (Bacti) / HPC - cfu/mL																
Count Lab	1	2	1	2	2	1	1	2	2	1	1	1	17			
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
E-5 (Bacti) / Total Coliform: TC - cfu/100mL																
Count Lab	4	5	5	4	5	4	4	5	4	5	4	4	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
E-5 (Bacti) / E. Coli - cfu/100mL																
Count Lab	4	5	5	4	5	4	4	5	4	5	4	4	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
E-5 (Bacti) / HPC - cfu/mL																
Count Lab	1	1	2	1	1	2	1	2	1	2	2	1	17			
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

Notes:

NDOGHPC = No Data, Overgrown with HPC

APPENDIX B

Monthly Summary of Operational Data

ENGLEHART DRINKING WATER SYSTEM
MONTHLYSUMMARY OF OPERATIONAL DATA

Facility Org Number: 6213
Facility Works Number: 220000353
Facility Name: ENGLEHART DRINKING WATER SYSTEM
Facility Owner: Municipality: Town of Englehart
Facility Classification: Class 1 Water Treatment
Service Population: 1700.0
Total Design Capacity: 2488.0 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
RAW WATER																
Well 2 / Turbidity - NTU																
Count IH	4	3	4	5	4	3	5	5	4	5	4	4	50			
Max IH	0.37	0.5	1.43	1.21	1.51	0.76	0.49	0.7	0.68	0.72	1.95	1.1			1.95	
Mean IH	0.305	0.353	0.633	0.504	0.633	0.473	0.362	0.398	0.498	0.452	0.81	0.623		0.501		
Min IH	0.24	0.25	0.29	0.28	0.29	0.33	0.28	0.28	0.39	0.34	0.31	0.33				0.24
Well 3 / Turbidity - NTU																
Count IH	4	3	4	5	4	3	5	5	4	5	4	4	50			
Max IH	0.24	0.51	1.47	0.5	1.07	0.68	0.38	0.58	0.71	0.51	1.76	0.98			1.76	
Mean IH	0.225	0.35	0.568	0.314	0.46	0.437	0.356	0.352	0.46	0.366	0.675	0.448		0.413		
Min IH	0.21	0.26	0.22	0.24	0.25	0.3	0.3	0.28	0.34	0.29	0.27	0.26				0.21
TREATED WATER																
Filter / Cl Residual: Free-CT (0.85 mg/L) - mg/L																
Max OL	4.976	4.977	4.977	4.977	4.976	4.977	4.975	4.973	4.973	4.973	4.973	4.974			4.98	
Mean OL	1.459	1.519	1.531	1.586	1.619	1.8	1.689	1.755	1.73	2.02	1.942	2.217		1.74		
Min OL	1.06	1.00	1.02	1.14	1.15	0.97	0.85	0.95	0.85	1.18	1.22	1.4				0.85
Treated Water (POE) / Cl Residual: Total - mg/L																
Max OL	2.387	2.277	3.62	1.89	1.903	3.588	2.04	2.136	2.149	2.259	2.2	2.206			3.62	
Mean OL	1.632	1.618	1.628	1.694	1.738	1.829	1.862	1.873	1.903	1.997	1.984	1.895		1.80		
Min OL	0.378	0.468	0.755	1.514	1.158	1.476	1.688	1.488	1.696	1.746	1.779	1.346				0.378
DISTRIBUTION WATER																
Residual No. 1 / Cl Residual: Combined - mg/L																
Count IH	8	9	9	8	9	9	8	9	9	9	8	9	104			
Max IH	1.66	1.49	1.53	1.64	1.62	1.83	1.66	1.83	1.66	1.96	1.82	1.95			1.96	
Mean IH	1.461	1.344	1.398	1.499	1.508	1.629	1.547	1.646	1.514	1.627	1.641	1.722		1.55		
Min IH	1.34	1.1	1.24	1.3	1.37	1.41	1.37	1.55	1.34	1.31	1.29	1.5				1.10
Residual No. 2 / Cl Residual: Combined - mg/L																
Count IH	8	9	9	8	9	9	8	9	9	9	8	9	104			
Max IH	1.55	1.55	1.63	1.61	1.69	1.79	1.82	1.84	1.98	1.98	1.88	1.99			1.99	
Mean IH	1.453	1.373	1.534	1.48	1.569	1.49	1.624	1.688	1.646	1.797	1.744	1.738		1.60		
Min IH	1.32	1.2	1.45	1.19	1.41	0.78	1.43	1.49	1.51	1.61	1.57	1.29				0.78
Residual No. 3 / Cl Residual: Combined - mg/L																
Count IH	8	9	9	8	9	9	8	9	9	9	8	9	104			
Max IH	1.52	1.5	1.67	1.74	1.67	1.75	1.87	1.9	1.83	1.97	1.85	2.01			2.01	
Mean IH	1.415	1.334	1.499	1.561	1.542	1.537	1.621	1.54	1.619	1.762	1.71	1.703		1.57		
Min IH	1.35	0.91	1.32	1.37	1.42	1.37	1.47	1.13	1.38	1.59	1.45	1.19				0.91
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	1.69	1.53	1.63	1.7	1.72	1.71	1.8	1.88	1.89	1.97	2.01	2.08			2.08	
Mean IH	1.57	1.408	1.545	1.635	1.592	1.588	1.68	1.768	1.543	1.85	1.793	1.865		1.65		
Min IH	1.47	1.29	1.46	1.56	1.41	1.38	1.4	1.55	0.8	1.66	1.54	1.69				0.80