CITY OF HAMILTON

DRINKING WATER SYSTEMS ANNUAL SUMMARY AND WATER QUALITY REPORT

2019

Ontario Regulation 170/03
Section 11 & Schedule 22

Hamilton

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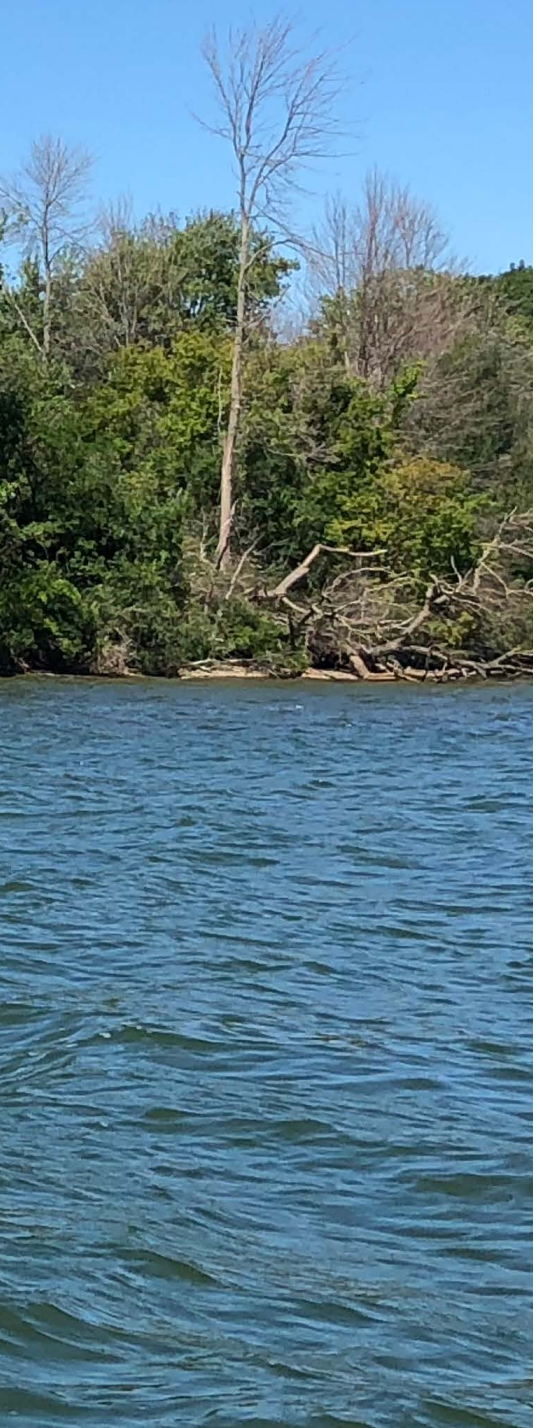


INTRODUCTION

A key priority of the City of Hamilton is to ensure the safe, high quality, consistent supply of drinking water to our residents. This report for municipalities has been prepared in accordance with the Safe Drinking Water Act, Ontario Regulation, 170/03, Section 11 and Schedule 22 for the 2019 reporting period. The City of Hamilton is the Owner of the following five Drinking Water Systems (DWS):

Drinking Water System	Drinking Water System Number	Municipal Drinking Water Licence Number	Drinking Water Works Permit Number	Permit to Take Water Number
Hamilton DWS Woodward	220003118	005-101	005-201	2437-BCLNEJ
Hamilton DWS Fifty Road	260069173	005-101	005-201	N/A
Freelton DWS	220004117	005-102	005-202	4650-BB2HXG (FDF01 & FDF03)
Greensville DWS	220004126	005-103	005-203	2476-9F5KM6 (FDG01)
Carlisle DWS	220004108	005-104	005-204	2373-8F7MMJ (FDC01 & FDC02)
				8228-AJZK9H (FDC03R)
				4207-AJZJ4L (FDC05)
Lynden DWS	250001830	005-105	005-205	0634-ASERU8 (FDL01 & FDL03)

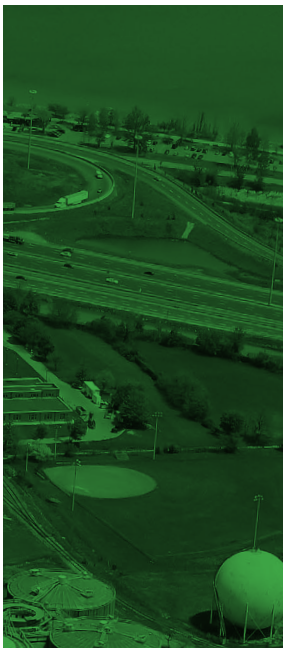
There were no Provincial Officer's Orders issued with regards to drinking water. All Adverse Water Quality Incidents were reported to the Ontario Ministry of Environment, Conservation and Parks (MECP) Spills Action Centre (SAC) and Public Health Services (PHS) and are provided in the report. All water taking quantities and flow rates were within approved rated capacities and provincial water taking limits.

The MECP Inspection Calendar Year is from April 1st to March 31st. The MECP 2017 to 2019 inspection ratings are as follows.

Drinking Water System	2017 - 2018 Inspection Rating	2018 - 2019 Inspection Rating	2019 - 2020 Inspection Rating
Hamilton DWS - Woodward	96.32%	94.85%	Pending in 2020
Hamilton DWS - Fifty Road	100%	100%	99.10%
Freelton	100%	96.74%	100%
Greensville	100%	99.36%	100%
Carlisle	100%	94.40%	100%
Lynden	100%	100%	99.40%

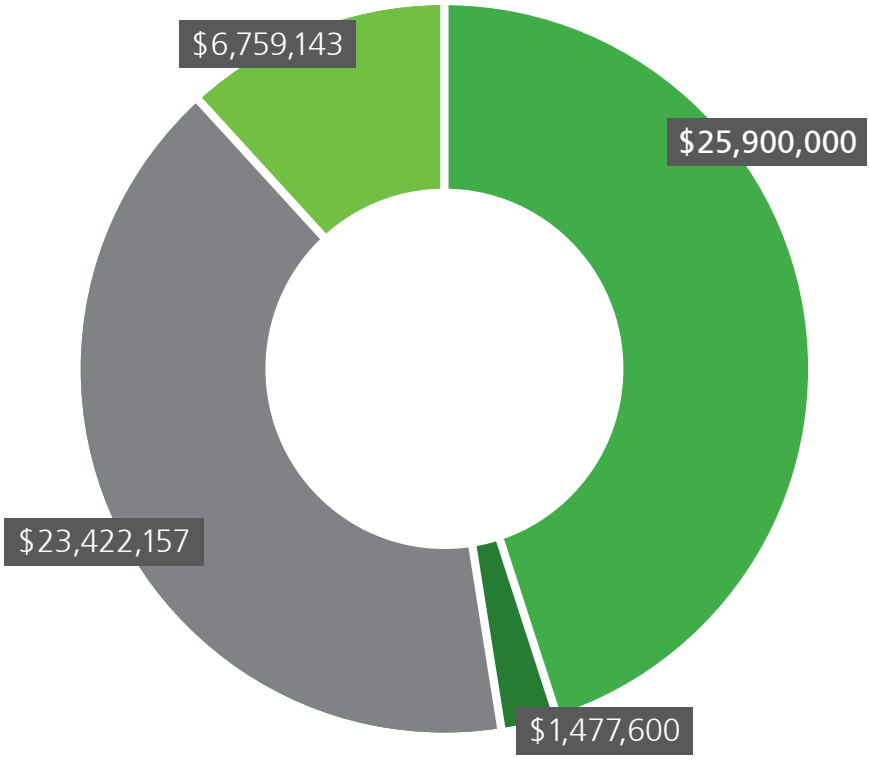
Annual Reports

The Drinking Water Annual Report required under Ontario Regulation 170/03 Section 11 and Schedule 22 is available to the public at no charge at www.hamilton.ca/waterquality and is available for inspection at 700 Woodward Avenue, Administration Building, Compliance Support Group.



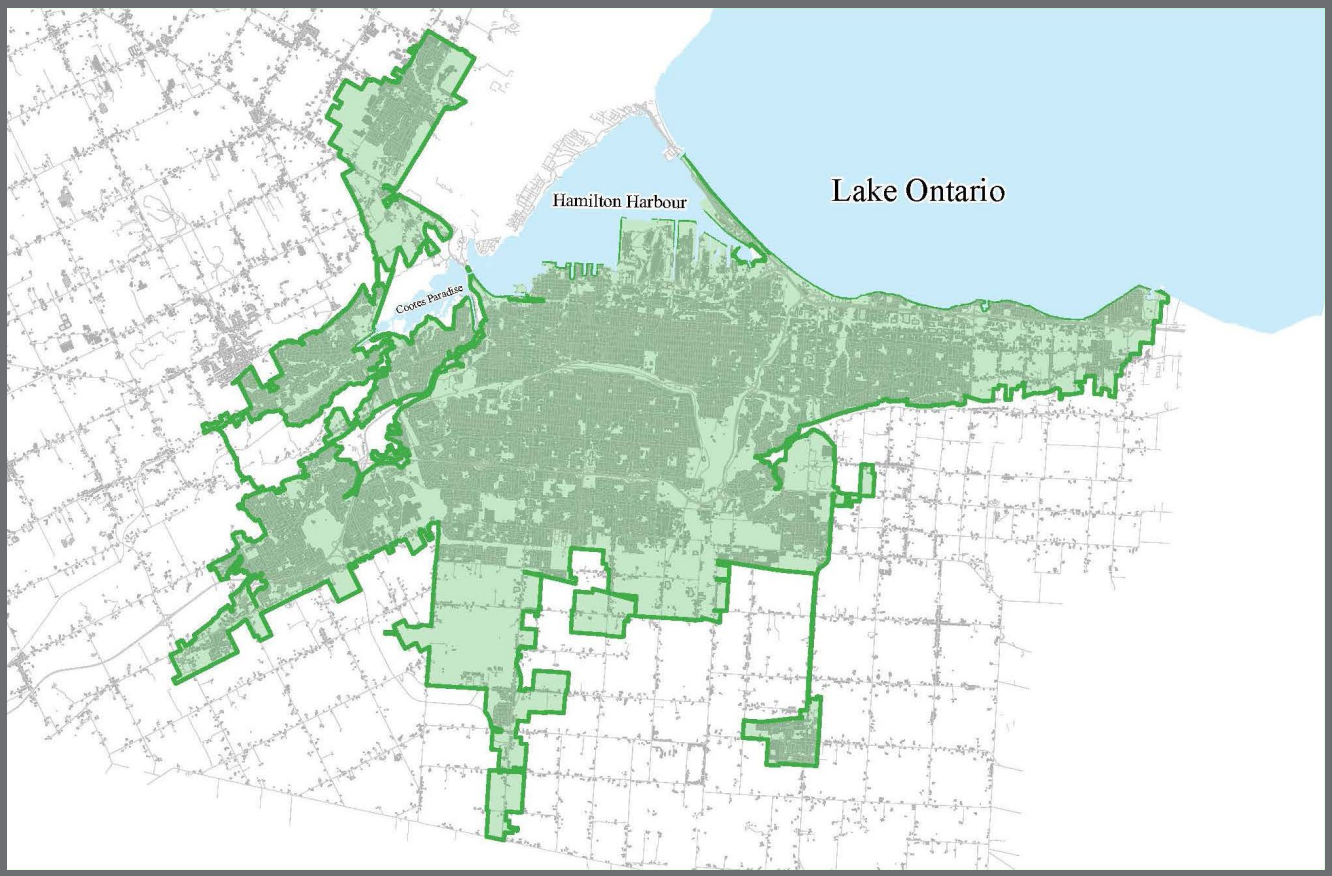
Summay of monetary expenses incurred in 2019

In 2019, significant expenses were incurred for installing, repairing and replacing required equipment. The following expenses were incurred to complete repairs, maintenance and upgrades to the Drinking Water Systems within the City of Hamilton.



- Total DWS - New Development - Expansion of DWS (horizontal and vertical assests)
- Total DWS - Distribution Repair, Rehabilitation and Replacement (horizontal assests)
- Total DWS - Maintenance and Repairs (vertical assests)
- Total DWS - Water Capital Upgrade Projects

WOODWARD AVENUE DRINKING WATER SUBSYSTEM WATER QUALITY ANNUAL REPORT



WOODWARD DRINKING WATER SUBSYSTEM

BCOS
BEYOND COMPLIANCE OPERATING SYSTEM

DEFINITIONS

AWQI: Adverse Water Quality Incident
CFU: Colony Forming Unit
HPC: Heterotrophic Plate Count
MDWL: Municipal Drinking Water Licence
mg/L: milligrams per litre
mL: millilitre
N/A: Not Applicable
PTTW: Permit to Take Water
ug/L: micrograms per litre

General Information

The Woodward Drinking Water Subsystem is a large municipal residental system that supplies a significant portion of Hamilton's population with drinking water including Stoney Creek, Dundas, Ancaster, Waterdown and Glanbrook. The population served is estimated at 536,917. In addition, the treatment system provides treated water to parts of Haldimand County (Caledonia, York and Cayuga) and parts of Halton Region.

The Woodward Water Treatment Facility has three raw water intake pipes (1.22m, 1.52m and 2.44m diameter) of which two intake pipes (2.44m and 1.52m diameter) are currently in use. The raw water is drawn from Lake Ontario at distances of 640m, 915m and 945m to begin the treatment process.

Treatment Process:

- Pre-chlorination of raw water - Chlorine for disinfection can be added at three places: raw water intake, the pretreatment stage, and after the filters.
- Screening.
- Water clarification by coagulation & sedimentation - Polyaluminum chloride is added to coagulate suspended solids that settle out in sedimentation tanks.
- Filtration - The settled water is filtered using dual media filters of Sand/Granular Activated Carbon (GAC) which reduces the presence of taste/odour causing compounds such as Geosmin/MIB in the raw water.
- Chlorine, ammonia, fluoride and phosphoric acid are added before the treated water is sent to the distribution system. Ammonia is added to convert chlorine to mono-chloramine to help maintain stable chlorine residuals in the distribution system. Fluoride is added to the drinking water to promote dental health and phosphoric acid is added to help reduce lead corrosion.
- Highlift pumps push the water from the Woodward Water Treatment Facility to the distribution system.

Distribution:

The Woodward Water Distribution System is comprised of 22 pumping stations, 11 reservoirs, 5 elevated storage tanks, one standpipe and over 2,000kms of watermains.

Sampling & Analysis:

Continuous monitoring equipment such as chlorine analyzers, turbidity meters and fluoride analyzers ensure the maintenance of high quality water. Raw water is sampled and analyzed weekly; treated water is sampled and analyzed 6 days per week; distribution water is sampled and analyzed 5 days per week. In addition, chlorine residual in the distribution system is analyzed daily.

Corrosion Control Program (CCP):

On November 8, 2018, the addition of orthophosphate commenced, including a regulatory post-implementation sampling and monitoring plan to monitor the progress and effectiveness of the program for lead control.

Since implementation of the program, two completed rounds of the Legislated Community Lead Sampling Program, as required by Schedule 15.1 of Ontario Regulation, 170/03 have taken place in the Woodward DWS. The results illustrate a reduction in the range of lead values observed at the tap as well as an overall decreasing trend in the percentage of samples observed to be above the Maximum Acceptable Concentration (MAC) of 10 µg/L, when compared with the sampling rounds from 2008 to 2009, that preceded the implementation of the CCP. Additionally, three Lead Pipe Loops were installed in the Woodward DWSS as an additional tool to monitor the effectiveness of the program, which have shown a decreasing trend in lead levels. The COH also collects customer feedback and water quality complaints to ensure customer safety and satisfaction and since the implementation of the program, there have been no water quality complaints related to the CCP.

The initial post-implementation sampling and monitoring plan results have shown a promising reduction in the levels of lead and other metals within the system. An annual evaluation report was submitted to the MECP in March 2019 assessing the overall effectiveness of the CCP measures in the program. November 2019 marked the one-year mark since the implementation of the program. Based on comparisons of other water utilities that have implemented a phosphate-based treatment approach and the size of the Woodward DWSS distribution system, it is estimated that it will take approximately two years to see the full effects of the program.

Drinking Water System Number	Drinking Water System Name	Drinking Water System Owner	Drinking Water System Category	Period Being Reported
220003118	Woodward Subsystem of Hamilton Drinking Water System	City of Hamilton	Large Municipal Residential	January 1, 2019 to December 31, 2019

Provision of Drinking Water to Other Municipalities

The following is a list of municipal drinking water systems which receive drinking water from the Woodward Drinking Water Subsystem:

Drinking Water System Name	Drinking Water System Number
Caledonia/Cayuga/York Water Distribution System	260004566
North Aldershot Water Distribution System	260086762
Snake Road Water Distribution System	260086775
Bridgeview Community Water Distribution System	260068419

A copy of this annual report is provided to all Drinking Water System owners that are connected to the system and to whom the City provides drinking water.

Our customers are notified through the local newspaper that the annual report is available online free of charge at www.hamilton.ca/waterquality.

Water Treatment Chemicals Used During This Reporting Period

- Polyaluminum Chloride
- Liquid Chlorine
- Aqueous Ammonia
- Hydrofluorosilicic Acid
- Phosphoric Acid

Breakdown of Significant Monetary Expenses

The following table highlights the significant expenses that were incurred for installing, repairing and replacing required equipment in 2019.

Operations, Maintenance and Repairs (horizontal assets) $15,400,000 (City total)
Woodward Water Treatment Plant Process Upgrades $11,243,000
4,513 Metres of Pipe Installed for New Development $6,759,000
Osler Road HD011 Water Pumping Station Upgrades $1,439,000
Security - Water Pumping Station Facilities $905,000
HDR05 Stonechurch / Garth Reservoir Upgrades $734,000
Kenilworth Pumping Station - HD005 Upgrades $1,864,000
6 Kilometres of Pipes Rehabilitated $5,500,000
3.7 Kilometres of Pipes Replaced $5,000,000
Greenhill Pumping Station HD04B & HD05A Upgrades $668,000
Water Treatment Plant - Corrosion Control $663,000
Highlift Water Main Repairs - $516,000
Check Valve Replacement Projects $180,500

Adverse Test Results and Reportable Incidents

The following table outlines the notices submitted in accordance with subsection 18(1) of the Safe Drinking Water Act or section 16-4 of Schedule 16 of O.Reg.170/03 and reported to Spills Action Centre.

Notification Date (y-m-d)	Location of Adverse	Adverse Water Quality Incident	Resolution
2019-05-28	Sir Allan MacNab Recreation Centre, 145 Magnolia Drive	Total Coliforms = NDOGN CFU/100 mL E. coli = NDOGN CFU/100 mL (Regulatory requirement is 0 CFU/100mL) NDOGN: overgrowth of background bacteria with NO countable target bacteria	→ The tap at the adverse location was bagged and tagged with a sign indicating "Do Not Drink" as per Public Health. Resampled adverse location, one upstream and one downstream hydrant - 2 sets of samples 24 to 48 hours apart. All results passed. The bag and sign were removed on May 30th. The adverse was not confirmed.
2019-07-19	Hydrant HB51H003, 1979 Brampton Street	Lead = 0.0444 mg/L (Regulatory requirement is ≤ 0.010 mg/L)	→ Resampled adverse location. Result passed. The adverse was not confirmed.
2019-09-03	Highlift, 700 Woodward Ave.	Total Coliforms = 2 CFU/100mL (Regulatory requirement is 0 CFU/100mL)	→ Resampled adverse location and two downstream locations. All results passed. The adverse was not confirmed.
2019-09-25	SH5 Pumping Station HC005, 592 Old Dundas Road	Total Chlorine = 0.22 mg/L Combined Chlorine = 0.20 mg/L Free Chlorine = 0.02 mg/L (Regulatory requirement is minimum Combined Chlorine of 0.25 mg/L or Free Chlorine of 0.05 mg/L)	→ Watermain was flushed to restore chlorine. On Sept 26th at 17:40, chlorine levels were restored as follows: Total Chlorine: 1.10 mg/L, Combined Chlorine: 1.10 mg/L, Free Chlorine: <0.02 mg/L.
2019-09-27	Hydrant DN12H020, Governors Road	Total Chlorine = 0.11 mg/L Combined Chlorine = 0.09 mg/L Free Chlorine = 0.02 mg/L (Regulatory requirement is minimum Combined Chlorine of 0.25 mg/L or Free Chlorine of 0.05 mg/L)	→ Watermain was flushed to restore chlorine. On Sept 27th at 01:19, chlorine levels were restored as follows: Total Chlorine: 0.42 mg/L, Combined Chlorine: 0.37 mg/L, Free Chlorine: 0.05 mg/L.

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Notification Date (y-m-d)	Location of Adverse	Adverse Water Quality Incident	Resolution
2019-12-20	Stoney Creek Recreation Centre, 45 King Street W.	Total Coliforms = 73 CFU/mL (Regulatory requirement is 0 CFU/100mL)	→ The tap at the adverse location was bagged and tagged with a sign indicating "Do Not Drink" as per Public Health. Resampled adverse location, one upstream and one downstream hydrant. All results passed. The bag and sign were removed on December 21st. The adverse was not confirmed.
2019-12-23	City of Hamilton Administration Building, 700 Woodward Ave.	Total Chlorine = 3.10 mg/L Combined Chlorine = 3.06 mg/L Free Chlorine = 0.04 mg/L (Regulatory requirement is maximum combined chlorine of 3.0mg/L)	→ Adverse location was flushed and re-tested. On Dec 23rd at 14:50, chlorine levels were restored as follows: Total Chlorine: 2.70 mg/L, Combined Chlorine: 2.63 mg/L, Free Chlorine: 0.07 mg/L.

MECP Hamilton Drinking Water System, Woodward Subsystem Inspection Findings and Self-Declared Non-Compliances

A summary of findings that were either issued during the MECP inspection or self-declared during the 2019 calendar year (Inspection date: January 17, 2019):

#	Finding Type	Finding	Status
1	Self-declared Non-Compliance (#2166) also included as a Non-compliance in the Inspection Report	OIT certified Operator operated as an Operator-In-Charge (OIC) on two separate occasions in the Woodward Water Distribution System in January 2019.	→ Actions complete
2	Non-Compliance	Chloride and Sulphate monthly samples were missed in December 2018 as required per the Licence. The Licence requires Studies to be completed under Section 5.0 of Schedule C and sampling as per Table 8 - Monitoring the Effectiveness of Corrosion Control Measures to commence after commissioning and commencement of orthophosphate addition which started in November 2018.	→ Actions complete
3	Non-Compliance	Operator logbooks were not available for at least five (5) years.	→ Actions complete
4	Recommendation	It is recommended that the log calculator be reviewed by a process engineer with experience in drinking water treatment (report signed and stamped) to use for demonstrating primary disinfection as per the drinking water Licence and Procedure for Disinfection.	→ Actions in Process
5	Recommendation	It is recommended that the City continue to review the Operations Manuals and update as needed, due to construction upgrades, to ensure that they contain plans, drawings and process descriptions to meet the requirements of Section 28 of O.Reg. 128 and meet the requirements of the License & Permit (i.e. CT requirements as per RVA report, AWWA C653 etc.).	→ Actions complete

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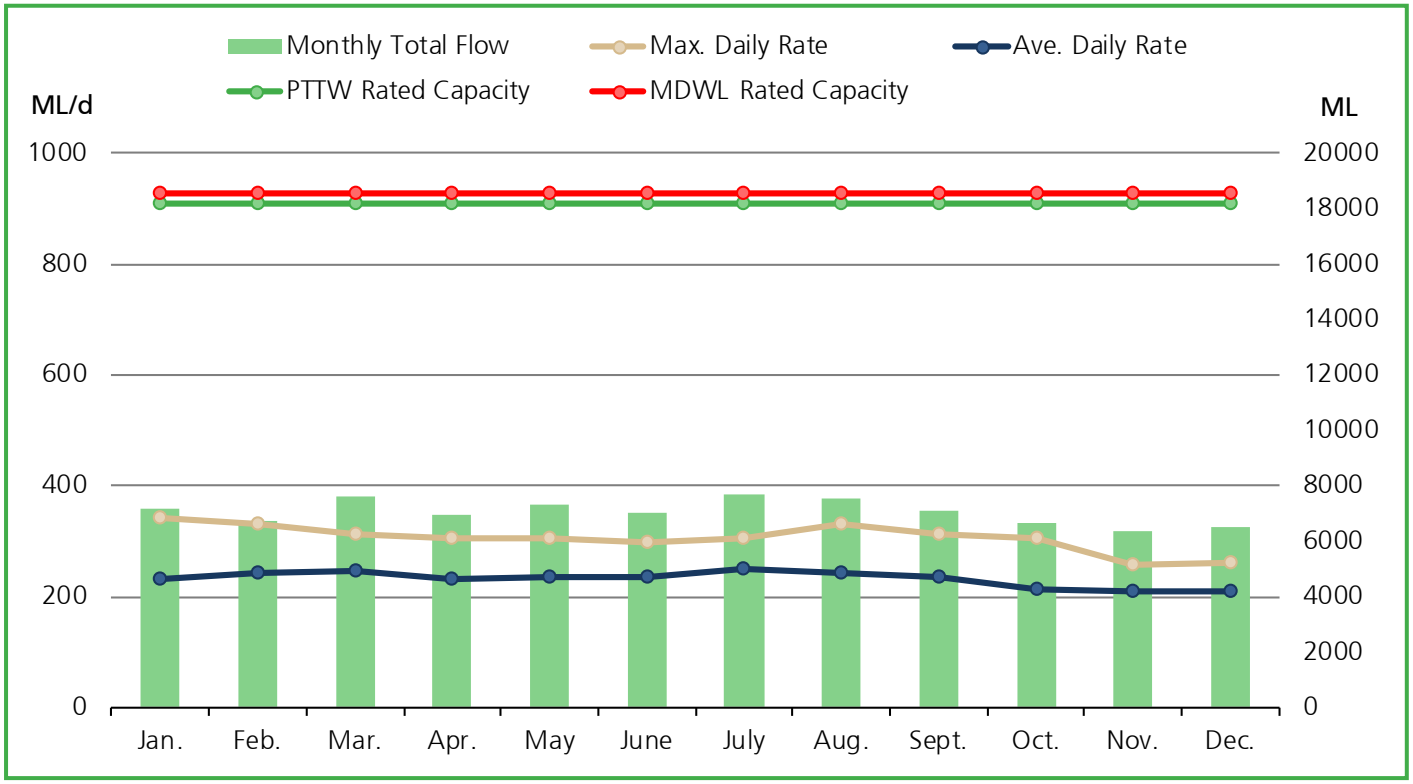
#	Finding Type	Finding	Status
6	Recommendation	The Ministry recommends, regardless of security measures in place, daily visits to a facility's structures to check system integrity.	→ Actions complete
7	Recommendation	Continue to inventory and assess overflow and vent screens to ensure they are present, are of correct mesh size and in good condition to ensure water storage facilities are secure from bug and animals and other potential sources of contamination. Submit the results of an out station overflow and vent screens inventory condition assessment and any maintenance completed or scheduled by September 30, 2019.	→ Actions complete
8	Recommendation	It is recommended, as discussed, that the City continues to develop a Calibration Report extract from the CMMS work order database or the like, to demonstrate compliance and clearly identify analyzer make, model, location, calibration frequency required by manufacture and frequency of calibration adopted by the City.	→ Actions in Process
9	Recommendation	It is recommended that the Turbidity analyzer work orders be reviewed to include procedures for all analyzer verification checks, frequency and triggers for the analyzer adjustment and full calibration, including documentation records by operators and instrumentation, to demonstrate and ensure optimum accuracy of analyzers and margins of error as per Schedule 6, section 6-5(1)10 for chlorine and turbidity.	→ Actions complete
10	Recommendation	It is recommended that the housekeeping/maintenance items, identified during the inspection, be addressed as required and reviewed with the Ministry.	→ Actions pending
11	Self-Declared Non-Compliance (#2205)	Vendor Performance Review of a contractor found two occasions where they tapped into the watermain with no Inspector on-site.	→ Actions complete

Water Production Reports - Summary

The following provides a summary of daily flow rates and instantaneous peak flow rates in comparison to the capacity of the water works as identified in the Permit to Take Water. This information is tabulated in the accompanying tables.

FIGURE 1-1: WOODWARD TREATMENT PLANT - 2019 MONTHLY PRODUCTION (SUMMARY)



MAINTAINED COMPLIANCE

TABLE 1-1: WOODWARD TREATMENT PLANT - 2019 MONTHLY PRODUCTION (SUMMARY)

WOODWARD	UNITS	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.
Monthly Total Flow	ML	7,178	6,754	7,618	6,958	7,289	7,044	7,698	7,556	7,108	6,658	6,337	6,534
Average Daily Rate	ML/d	232	241	246	232	235	235	248	244	237	215	211	211
Maximum Daily Rate	ML/d	343	332	313	304	306	298	306	332	314	305	258	262
PTTW Daily Rated Capacity	ML/d	909	909	909	909	909	909	909	909	909	909	909	909
MDWL Daily Rated Capacity	ML/d	926	926	926	926	926	926	926	926	926	926	926	926

WATER QUALITY DATA

Microbiological testing done under Schedule 10, 11, 12 and 17, 18 of Regulation 170/03, during this reporting period.

SAMPLE TYPE	NUMBER OF SAMPLES	RANGE OF E.COLI RESULTS (MIN #) to (MAX #) CFU/100mL	RANGE OF TOTAL COLIFORM RESULTS (MIN #) to (MAX #) CFU/100mL	NUMBER OF HPC SAMPLES	RANGE OF HPC RESULTS (MIN #) to (MAX #) CFU/1mL
RAW	53	0 to 70	0 to 450	N/A	N/A
TREATED	601	0	0 to 2	351	0 to 83
DISTRIBUTION	1,859	0	0 to 73	1,170	0 to 1,010

Operational testing done under Schedule 7, 8 or 9 of Regulation 170/03 during the period covered by this Annual Report.

NOTE: If results are obtained from continuous monitors, then 8,760 is reported as the number of samples.

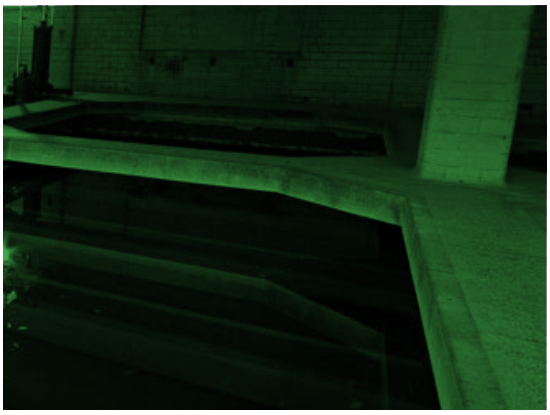
PARAMETER - SAMPLE TYPE	NUMBER OF GRAB SAMPLES	RANGE OF RESULTS (MIN #) to (MAX #)	UNIT OF MEASURE
TURBIDITY - TREATED – FILTER 1	8,760	0.02 – 0.42	NTU
TURBIDITY - TREATED – FILTER 2	8,760	0.02 – 0.15	NTU
TURBIDITY - TREATED – FILTER 3	8,760	0.02 – 0.25	NTU
TURBIDITY - TREATED – FILTER 4	8,760	0.02 – 0.14	NTU
TURBIDITY - TREATED – FILTER 5	8,760	0.02 – 0.11	NTU
TURBIDITY - TREATED – FILTER 6	8,760	0.02 – 0.33	NTU
TURBIDITY - TREATED – FILTER 7	n/a	O/S	NTU
TURBIDITY - TREATED – FILTER 8	8,760	0.01 – 0.29	NTU
TURBIDITY - TREATED – FILTER 9	8,760	0.02 – 0.29	NTU
TURBIDITY - TREATED – FILTER 10	8,760	0.02 – 0.17	NTU
TURBIDITY - TREATED – FILTER 11	8,760	0.02 – 0.23	NTU
TURBIDITY - TREATED – FILTER 12	8,760	0.02 – 0.32	NTU
TURBIDITY - TREATED – FILTER 13	8,760	0.02 – 0.41	NTU
TURBIDITY - TREATED – FILTER 14	8,760	0.01 – 0.24	NTU
TURBIDITY - TREATED – FILTER 15	8,760	0.02 – 0.39	NTU
TURBIDITY - TREATED – FILTER 16	8,760	0.01 – 0.47	NTU
TURBIDITY - TREATED – FILTER 17	8,760	0.01 – 0.14	NTU
TURBIDITY - TREATED – FILTER 18	8,760	0.02 – 0.18	NTU
TURBIDITY - TREATED – FILTER 19	8,760	0.02 – 0.12	NTU
TURBIDITY - TREATED – FILTER 20	8,760	0.03 – 0.11	NTU
TURBIDITY - TREATED – FILTER 21	8,760	0.02 – 0.20	NTU
TURBIDITY - TREATED – FILTER 22	8,760	0.02 – 0.15	NTU
TURBIDITY - TREATED – FILTER 23	8,760	0.02 – 0.15	NTU
TURBIDITY - TREATED – FILTER 24	8,760	0.02 – 0.10	NTU
COMBINED CHLORINE - TREATED	8,760	1.30 – 2.86	mg/L
FREE CHLORINE - DISTRIBUTION	1,975	<0.02 to 0.22	mg/L
COMBINED CHLORINE - DISTRIBUTION	1,975	0.51 to 3.06	mg/L
FLUORIDE – TREATED (IF THE DWS PROVIDES FLUORIDATION)	8,760	0.20 – 0.87	mg/L

****O/S** - OUT OF SERVICE**

Summary of additional testing and sampling carried out in accordance with the requirement of a licence, approval, order or other legal instrument.

PARAMETER	SAMPLE DATE	RESULT VALUE	UNIT OF MEASURE
TREATED – MICROCYSTIN	2019-06-04 to 2019-10-29	<0.15	ug/L
RAW - MICROCYSTIN	2019-01-08 to 2019-12-10	<0.15	ug/L
TREATED - CHLORIDE	2019-01-08 to 2019-12-10	29.1 to 42.6	mg/L
TREATED - SULPHATE	2019-01-08 to 2019-12-10	22.9 to 27.0	mg/L
TREATED - O-PHOSPHATE AS PO4	2019-01-01 to 2019-12-31	<0.15 to 2.69	mg/L
TREATED – COLOUR (APPARENT)	2019-02-04 to 2019-11-08	<2	CU
TREATED – LEAD	2019-02-04 to 2019-11-08	<0.0001	mg/L
TREATED - ALKALINITY	2019-04-29 to 2019-10-28	83 to 88	mg/L
TREATED - IRON	2019-02-04 to 2019-11-08	<0.003	mg/L
TREATED – COPPER	2019-02-04 to 2019-11-08	0.0003 to 0.0006	mg/L
TREATED – TOTAL DISSOLVED SOLIDS	2019-02-04 to 2019-11-08	160 to 232	mg/L
PLUMBING – COPPER	2019-01-07 to 2019-09-30	0.0021 to 0.0931	mg/L
DISTRIBUTION - IRON	2019-02-05 to 2019-11-07	<0.003 to 0.102	mg/L
DISTRIBUTION - O-PHOSPHATE AS PO4	2019-01-03 to 2019-12-30	0.22 to 2.42	mg/L
DISTRIBUTION - FIELD TEMPERATURE	2019-01-03 to 2019-12-30	3.1 to 22.0	°C
DISTRIBUTION - FIELD TURBIDITY	2019-01-03 to 2019-12-30	<0.05 to 1.16	NTU

PARAMETER	NUMBER OF GRAB SAMPLES	RESULT VALUE	UNIT OF MEASURE
TEMPERATURE – RAW	8,760	-1.03 – 20.47	°C
PH – TREATED	8,760	6.67 – 7.64	pH
ORTHOPHOSPHATE – TREATED	8,760	0.20 - 7.81	mg/L



Summary of Inorganic parameters required by Regulation 170/03 and tested during this reporting period.

PARAMETER	SAMPLE DATE	RESULT VALUE	UNIT OF MEASURE	NO. OF AWQIs
ANTIMONY	2019-04-29 to 2019-10-28	0.0001	mg/L	0
ARSENIC	2019-04-29 to 2019-10-28	0.0006	mg/L	0
BARIUM	2019-04-29 to 2019-10-28	0.0211 to 0.0224	mg/L	0
BORON	2019-04-29 to 2019-10-28	0.021 to 0.023	mg/L	0
CADMIUM	2019-04-29 to 2019-10-28	<0.0001	mg/L	0
CHROMIUM	2019-04-29 to 2019-10-28	0.0001 to 0.0002	mg/L	0
FLUORIDE	2019-04-29 to 2019-10-28	0.47 to 0.49	mg/L	0
MERCURY	2019-04-29 to 2019-10-28	<0.05	mg/L	0
NITRATE AS N	2019-01-22 to 2019-10-28	0.24 to 0.46	mg/L	0
NITRITE AS N	2019-01-22 to 2019-10-28	<0.01	mg/L	0
SELENIUM	2019-04-29 to 2019-10-28	0.0001	mg/L	0
SODIUM	2019-04-29 to 2019-10-28	14.9 to 18.2	mg/L	0
URANIUM	2019-04-29	0.219	ug/L	0

Summary of lead testing under Schedule 15.1 during this reporting period.

LOCATION TYPE	NO. OF POINTS SAMPLED	NO. OF LEAD SAMPLES TAKEN	NO. OF pH SAMPLES TAKEN	NO. OF ALKALINITY SAMPLES TAKEN	RANGE OF pH RESULTS (min #) to (max #) pH Units	RANGE OF ALKALINITY RESULTS (min #) to (max #) mg/L	RANGE OF LEAD RESULTS (min #) to (max #) mg/L	NO. OF LEAD AWQIs	NO. OF LEAD EXCEEDANCES
PLUMBING-NR	10	20	10	0	7.41 to 7.72	N/A	0.0006 to 0.0201	N/A	2
PLUMBING-R	84	168	84	0	6.77 to 7.88	N/A	<0.0001 to 0.0331	N/A	7
DISTRIBUTION	18	18	18	18	7.35 to 7.87	82 to 90	<0.0001 to 0.0444	1	N/A

NR - Non Residential R- Residential

Summary of Organic parameters required by Regulation 170/03 and tested during this reporting period.

PARAMETER	SAMPLE DATE	RESULT VALUE	UNIT OF MEASURE	NO. OF AWQIs
		TREATED		
1,1-DICHLOROETHYLENE	2019-04-29 to 2019-10-28	<0.2	ug/L	0
1,2-DICHLOROBENZENE	2019-04-29 to 2019-10-28	<0.2	ug/L	0
1,2-DICHLOROETHANE	2019-04-29 to 2019-10-28	<0.2	ug/L	0
1,4-DICHLOROBENZENE	2019-04-29 to 2019-10-28	<0.2	ug/L	0
BENZENE	2019-04-29 to 2019-10-28	<0.2	ug/L	0
CARBON TETRACHLORIDE	2019-04-29 to 2019-10-28	<0.2	ug/L	0
CHLOROBENZENE	2019-04-29 to 2019-10-28	<0.3	ug/L	0
DICHLOROMETHANE	2019-04-29 to 2019-10-28	<0.5	ug/L	0
ETHYLBENZENE	2019-04-29 to 2019-10-28	<0.2	ug/L	0
TETRACHLOROETHYLENE	2019-04-29 to 2019-10-28	<0.2	ug/L	0
TOLUENE	2019-04-29 to 2019-10-28	<0.2	ug/L	0
TRICHLOROETHYLENE	2019-04-29 to 2019-10-28	<0.2	ug/L	0
VINYL CHLORIDE	2019-04-29 to 2019-10-28	<0.2	ug/L	0
XYLENE	2019-04-29 to 2019-10-28	<0.3	ug/L	0
2,3,4,6-TETRACHLOROPHENOL	2019-04-29	<0.2	ug/L	0
2,4,6-TRICHLOROPHENOL	2019-04-29	<0.25	ug/L	0
2,4-D	2019-04-29	<0.19	ug/L	0
2,4-DICHLOROPHENOL	2019-04-29	<0.15	ug/L	0
ALACHLOR	2019-04-29	<0.02	ug/L	0
ATRAZINE + DESETHYL-ATRAZINE	2019-04-29	0.05	ug/L	0
AZINPHOS-METHYL	2019-04-29	<0.05	ug/L	0
BENZO[A]PYRENE	2019-04-29	<0.004	ug/L	0
BROMOXYNIL	2019-04-29	<0.33	ug/L	0
CARBARYL	2019-04-29	<0.05	ug/L	0
CARBOFURAN	2019-04-29	<0.01	ug/L	0
CHLORPYRIFOS (DURSBAN)	2019-04-29	<0.02	ug/L	0
DIAZINON	2019-04-29	<0.02	ug/L	0
DICAMBA	2019-04-29	<0.20	ug/L	0
DICLOFOP-METHYL	2019-04-29	<0.40	ug/L	0
DIMETHOATE	2019-04-29	<0.06	ug/L	0

...continued on next page

Summary of Organic parameters required by Regulation 170/03 and tested during this reporting period. (continued)...

PARAMETER	SAMPLE DATE	RESULT VALUE	UNIT OF MEASURE	NO. OF AWQIs
DIQUAT	2019-04-29	<1	ug/L	0
DIURON	2019-04-29	<0.03	ug/L	0
GLYPHOSATE	2019-04-29	<1	ug/L	0
MALATHION	2019-04-29	<0.02	ug/L	0
MCPA (2-METHYL-4-CHLOROPHENOXYACETIC ACID)	2019-04-29	<0.00012	mg/L	0
METOLACHLOR	2019-04-29	<0.01	ug/L	0
METRIBUZIN (SENCOR)	2019-04-29	<0.02	ug/L	0
PARAQUAT	2019-04-29	<1	ug/L	0
PCBs TOTAL	2019-04-29	<0.05	ug/L	0
PENTACHLOROPHENOL	2019-04-29	<0.15	ug/L	0
PHORATE	2019-04-29	<0.01	ug/L	0
PICLORAM	2019-04-29	<1	ug/L	0
PROMETRYNE	2019-04-29	<0.03	ug/L	0
SIMAZINE	2019-04-29	<0.01	ug/L	0
TERBUFOS	2019-04-29	<0.01	ug/L	0
TRIALLATE	2019-04-29	<0.01	ug/L	0
TRIFLURALIN	2019-04-29	<0.02	ug/L	0
DISTRIBUTION				
TOTAL TRIHALOMETHANES*	Running annual average for the last four quarters.	21.0	ug/L	0
HALOACETIC ACIDS	2019-01-22 to 2019-10-30	<5.3	ug/L	N/A

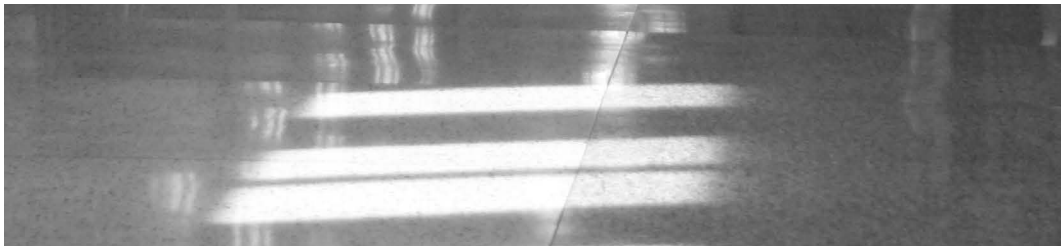
*** The Maximum Acceptable Concentration for Trihalomethanes in the distribution is based on a running average of the results from all sampling events in the past four quarters. This running average can be found in the result value column.**

Parameters Exceeding Prescribed Half-Standard

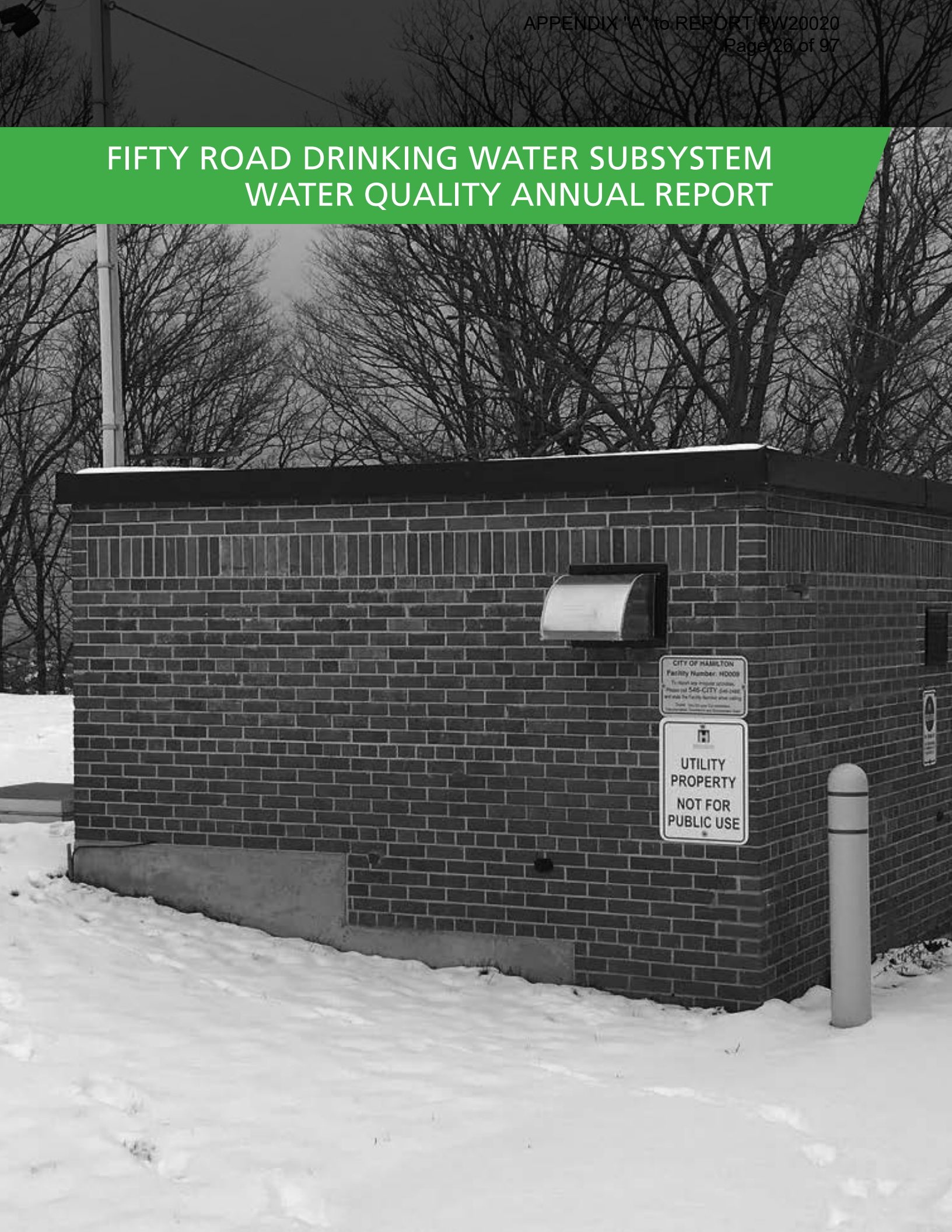
There were no Inorganic or Organic parameter(s) that exceeded half the standard prescribed in Schedule 2 of Ontario Drinking Water Quality Standards (O.Reg. 169/03)

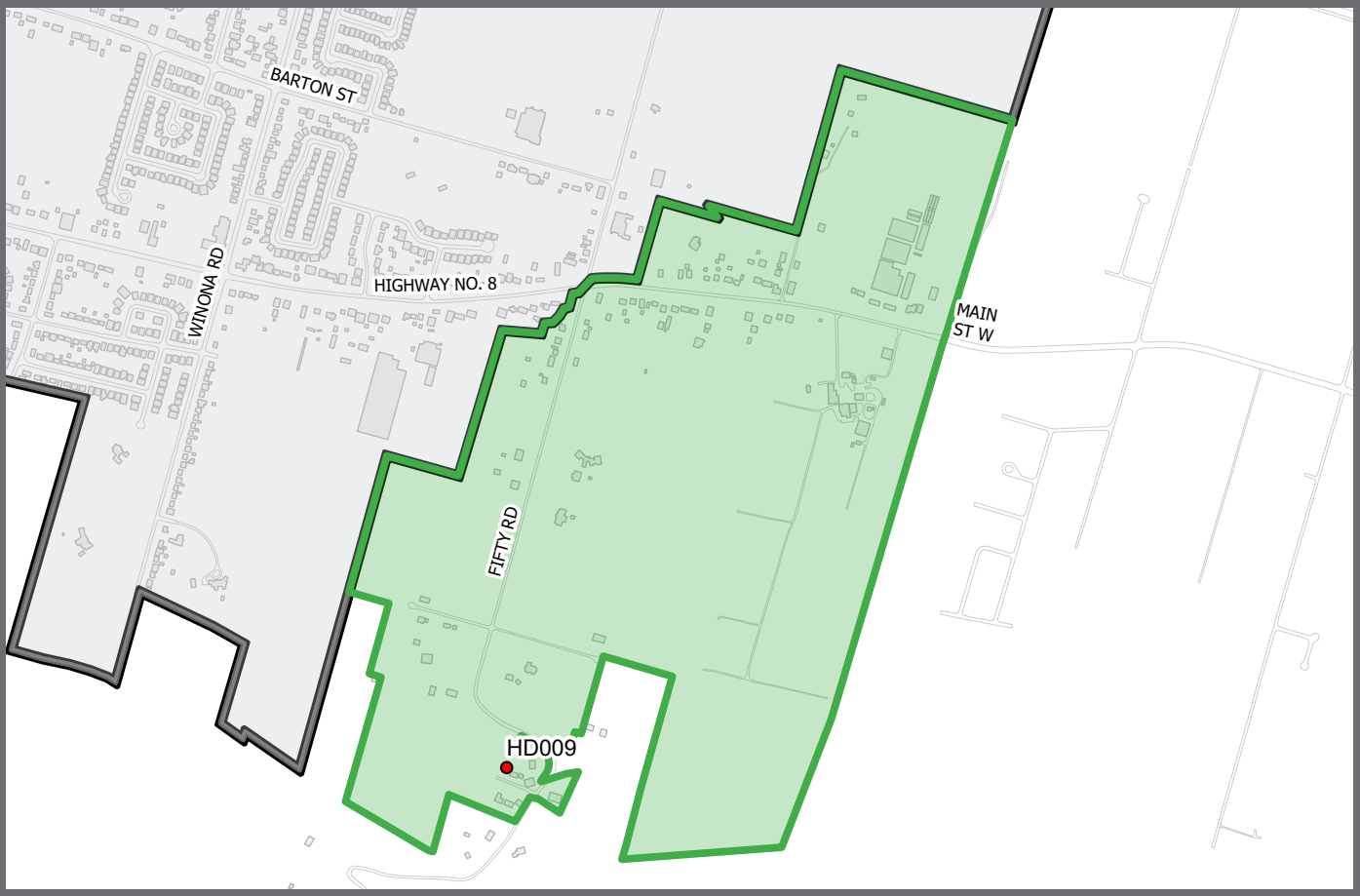

WASH WATER RATE
INCHES RISE PER MINUTE


WASH WATER TANK LEVEL
DEPTH OF WATER IN FEET



FIFTY ROAD DRINKING WATER SUBSYSTEM WATER QUALITY ANNUAL REPORT





FIFTY ROAD DRINKING WATER SUBSYSTEM

BCOS
BEYOND COMPLIANCE OPERATING SYSTEM

DEFINITIONS

AWQI: Adverse Water Quality Incident
CFU: Colony Forming Unit
HPC: Heterotrophic Plate Count
MDWL: Municipal Drinking Water Licence
mg/L: milligrams per litre
mL: millilitre
N/A: Not Applicable
PTTW: Permit to Take Water
ug/L: micrograms per litre

General Information

Drinking Water System Number	Drinking Water System Name	Drinking Water System Owner	Drinking Water System Category	Period Being Reported
260069173	Fifty Road Subsystem of Hamilton Drinking Water System	City of Hamilton	Small Municipal Residential	January 1, 2019 to December 31, 2019

The treated water supply for this area comes from the Town of Grimsby Water Distribution System and serves a population of approximately 200 people. Water is provided from Grimsby west along Highway 8, then south on Fifty Road to Concession Road and to an underground, 1,100m^3 storage reservoir operated by the City of Hamilton. The reservoir supplies water to residences on Reservoir Park Road.

A pump, running continuously, maintains the distribution system water pressure. Water pumped in excess of water system demand is circulated back to the reservoir. Fluoridation is not carried out on the water supplied by the Town of Grimsby. The reservoir water chlorine residual is maintained by a rechlorination system at the reservoir. Distribution water is sampled and analyzed one day per week. Chlorine residual in the distribution system is analyzed twice per week.

Provision of Drinking Water to Other Municipalities

The following is a list of municipal drinking water systems which receive drinking water from the Fifty Road Drinking Water Subsystem:

Drinking Water System Name	Drinking Water System Number
None other than Fifty Road Subsystem	260069173

A copy of this annual report is provided to all Drinking Water System owners that are connected to the system and to whom we provide drinking water.

Our customers are notified through the local newspaper that the annual report is available online free of charge at www.hamilton.ca/waterquality.

Water Treatment Chemicals Used During This Reporting Period

- Sodium Hypochlorite

Breakdown of Significant Monetary Expenses

There were no significant expenses incurred for installing, repairing and replacing required equipment in 2019. There were no significant projects initiated or expenses to highlight for the Fifty Road Subsystem in 2019.

Adverse Test Results and Reportable Incidents

The following table outlines the notices submitted in accordance with subsection 18(1) of the Safe Drinking Water Act or section 16-4 of Schedule 16 of O.Reg.170/03 and reported to Spills Action Centre.

Notification Date (y-m-d)	Location of Adverse	Adverse Water Quality Incident	Resolution
2019-08-20	50 Road Sampling Station A	Total Coliform = 1 CFU/100 mL (Regulatory requirement is 0 CFU/100mL)	→ Resampled adverse location, one upstream and one downstream hydrant. All results passed. The adverse was not confirmed.

MECP Hamilton Drinking Water System, Fifty Road Subsystem Inspection Findings and Self-Declared Non-Compliances

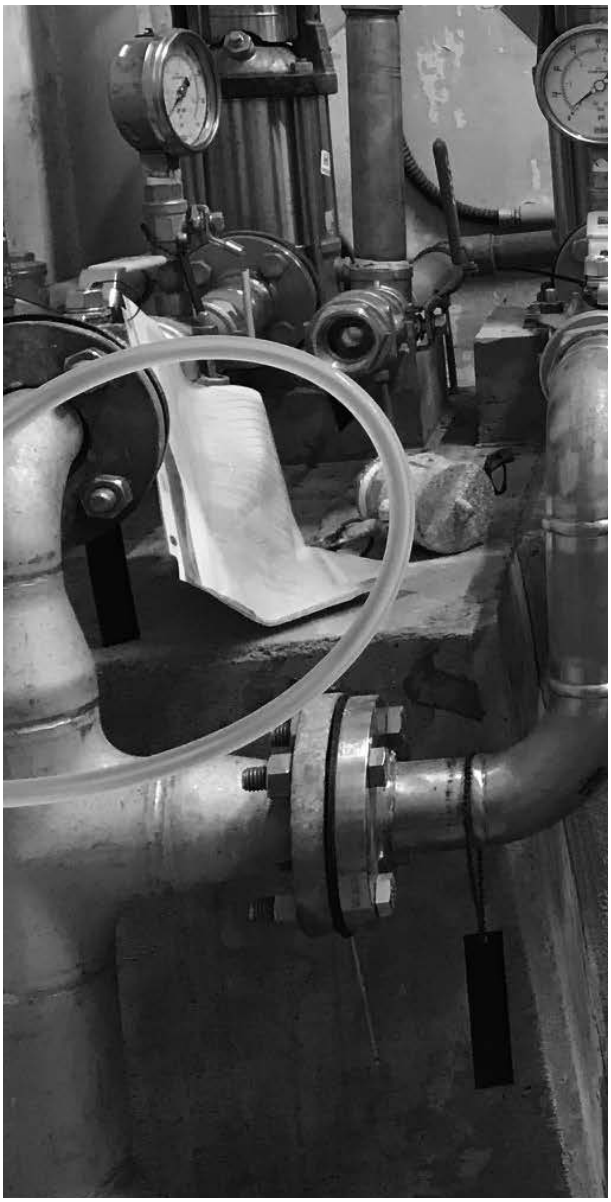
A summary of findings that were either issued during the MECP inspection or self-declared during the 2019 calendar year (Inspection date: May 22, 2019):

#	Finding Type	Finding	Status
1	Non-compliance	The City is advised to ensure that the required information (e.g. rated capacity) is listed in the Summary Report going forward as per O. Reg 170, Schedule 22, section 22-2.	→ Included in the 2019 Annual Summary Report
2	Non-compliance	Reg. 170, Schedule 15.1 requires a letter of notification to include a statement whether the report indicates a result that exceeds any Schedule 2 standard.	→ This statement was included in the original letter of notification
3	Recommendation	The owner had not implemented a program for the flushing of watermains as per industry standards.	→ Actions pending
4	Recommendation	Records did not confirm that disinfectant residuals were routinely checked at the extremities and "dead ends" of the distribution system.	→ Actions pending

Water Production Reports - Summary

The Memorandum of Understanding between Grimsby and Hamilton does not include a rated capacity. Hamilton Water is working with Grimsby to revise the Memoradum of Understanding.


NVC
NVC




NO CONNECTION PERMITTED

WATER QUALITY DATA

Microbiological testing done under Schedule 10, 11, 12 and 17, 18 of Regulation 170/03, during this reporting period.

SAMPLE TYPE	NUMBER OF SAMPLES	RANGE OF E.COLI RESULTS (MIN #) to (MAX #) CFU/100mL	RANGE OF TOTAL COLIFORM RESULTS (MIN #) to (MAX #) CFU/100mL	NUMBER OF HPC SAMPLES	RANGE OF HPC RESULTS (MIN #) to (MAX #) CFU/1mL
DISTRIBUTION	107	0	0 to 1	104	0 to 34

Operational testing done under Schedule 7, 8 or 9 of Regulation 170/03 during the period covered by this Annual Report.

NOTE: If results are obtained from continuous monitors, then 8,760 is reported as the number of samples.

PARAMETER - SAMPLE TYPE	NUMBER OF GRAB SAMPLES	RANGE OF RESULTS (MIN #) to (MAX #)	UNIT OF MEASURE
FREE CHLORINE - DISTRIBUTION	159	0.40 to 1.86	mg/L

Summary of additional testing and sampling carried out in accordance with the requirement of a licence, approval, order or other legal instrument.

PARAMETER	SAMPLE DATE	RESULT VALUE	UNIT OF MEASURE
N/A	-	-	-

Summary of Inorganic parameters required by Regulation 170/03 and tested during this reporting period.

PARAMETER	SAMPLE DATE	RESULT VALUE	UNIT OF MEASURE	NO. OF AWQIs
N/A	-	-	-	-

Summary of lead testing under Schedule 15.1 during this reporting period.

LOCATION TYPE	NO. OF POINTS SAMPLED	NO. OF LEAD SAMPLES TAKEN	NO. OF pH AND ALKALINITY SAMPLES TAKEN	RANGE OF pH RESULTS (min #) to (max #) pH Units	RANGE OF ALKALINITY RESULTS (min #) to (max #) mg/L	RANGE OF LEAD RESULTS (min #) to (max #) mg/L	NO. OF LEAD AWQIs	NO. OF LEAD EXCEEDANCES
PLUMBING-NR	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
PLUMBING-R	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
DISTRIBUTION	2	1	2	7.58 to 7.62	83 to 87	0.0001	0	N/A

NR - Non Residential R- Residential

Summary of Organic parameters required by Regulation 170/03 and tested during this reporting period.

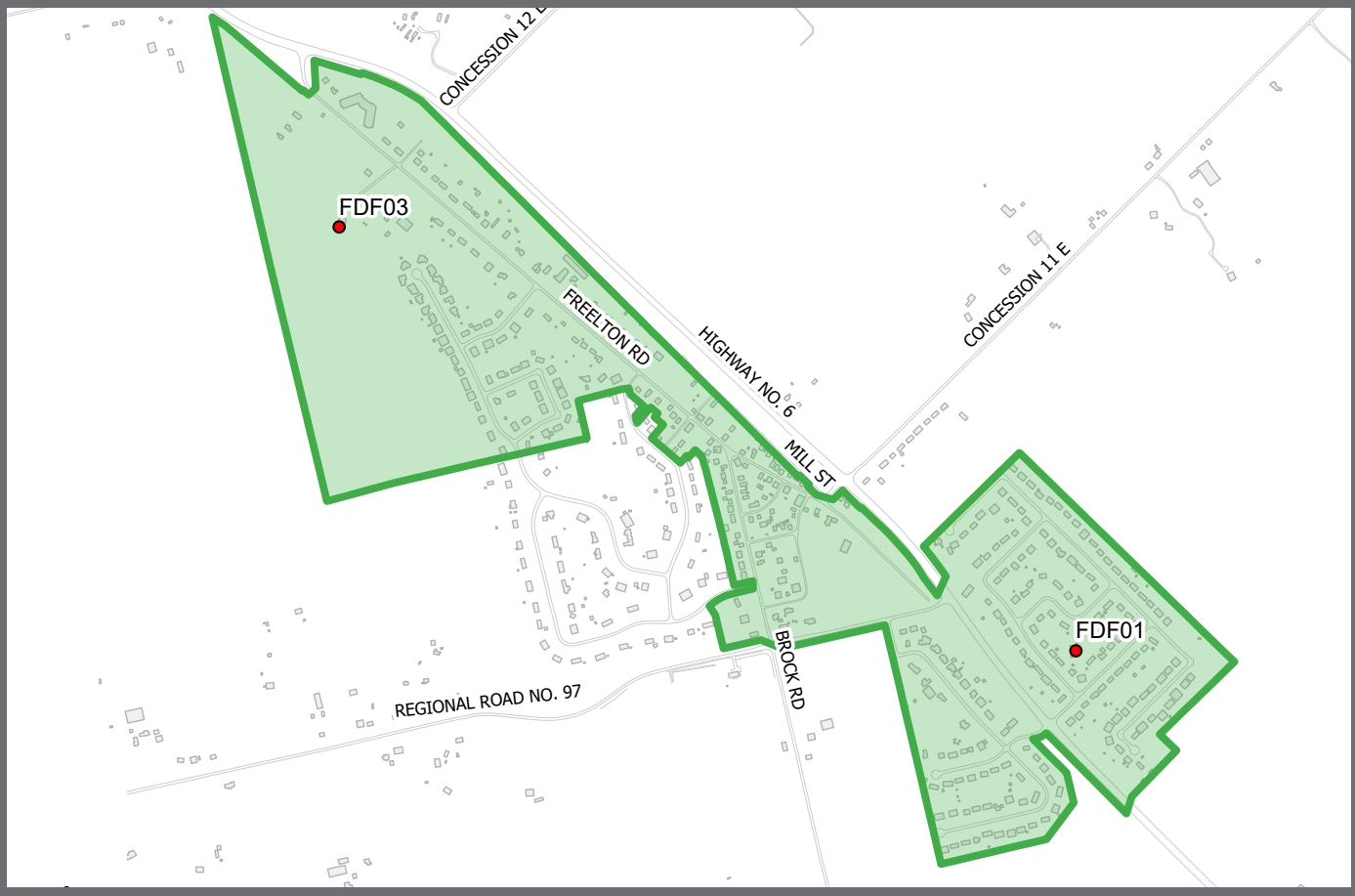
PARAMETER	SAMPLE DATE	RESULT VALUE	UNIT OF MEASURE	NO. OF AWQIs
DISTRIBUTION				
TOTAL TRIHALOMETHANES*	Running annual average for the last four quarters.	31.0	ug/L	0
HALOACETIC ACIDS	2019-01-22 to 2019-10-30	<5.3 to 55.5	ug/L	N/A

*** The Maximum Acceptable Concentration for Trihalomethanes in the distribution is based on a running average of the results from all sampling events in the past four quarters. This running average can be found in the result value column.**

Parameters Exceeding Prescribed Half-Standard

There were no Inorganic or Organic parameter(s) that exceeded half the standard prescribed in Schedule 2 of Ontario Drinking Water Quality Standards (O.Reg. 169/03).

FREELTON DRINKING WATER SYSTEM WATER QUALITY ANNUAL REPORT



FREELTON DRINKING WATER SYSTEM

BCOS
BEYOND COMPLIANCE OPERATING SYSTEM

DEFINITIONS

AWQI: Adverse Water Quality Incident
CFU: Colony Forming Unit
HPC: Heterotrophic Plate Count
MDWL: Municipal Drinking Water Licence
mg/L: milligrams per litre
mL: millilitre
N/A: Not Applicable
PTTW: Permit to Take Water
ug/L: micrograms per litre

General Information

Drinking Water System Number	Drinking Water System Name	Drinking Water System Owner	Drinking Water System Category	Period Being Reported
220004117	Freelton Drinking Water System FDF01, FDF03	City of Hamilton	Large Municipal Residential	January 1, 2019 to December 31, 2019

The Freelton water supply system consists of two wells, one elevated water storage tank, treatment, sampling and analysis which services a population of approximately 800 people. The water source for the community of Freelton is ground water.

Water Wells:

- Freelton Well FDF01 is a 250mm diameter, approximately 21-metre-deep drilled ground water well.
- Freelton Well FDF03 is a 300mm diameter, approximately 50-metre-deep drilled ground water well.

Treatment:

- Sodium hypochlorite (chlorine) is used for disinfection within a chlorine contact chamber to ensure disinfection of the water prior to entering the distribution system.
- Fluoridation is not carried out at any of the Freelton community wells.

Water Storage:

An elevated water storage tank with an operating capacity of 2,840m^3 is available for peak hour water demand equalization as well as fire and emergency storage.

Sampling & Analysis:

All wells are equipped with on-line chlorine residual analyzers and turbidity analyzers that continually monitor the treated water quality. Raw, treated and distribution water is sampled and analyzed weekly. In addition, chlorine residual in the distribution system is analyzed daily.

Provision of Drinking Water to Other Municipalities

The following is a list of municipal drinking water systems which receive drinking water from the Freelton System:

Drinking Water System Name	Drinking Water System Number
None other than Freelton System	220004117

A copy of this annual report is provided to all Drinking Water System owners that are connected to the system and to whom we provide drinking water.

Our customers are notified through the local newspaper that the annual report is available online free of charge at www.hamilton.ca/waterquality.

Water Treatment Chemicals Used During This Reporting Period

- Sodium Hypochlorite

Breakdown of Significant Monetary Expenses

The following table highlights the significant expenses that were incurred for installing, repairing and replacing required equipment in 2019.

Freelton Tower HDT03 Upgrades $218,000

Freelton Well FDF01 Capacity $61,000

Adverse Test Results and Reportable Incidents

The following table outlines the notices submitted in accordance with subsection 18(1) of the Safe Drinking Water Act or section 16-4 of Schedule 16 of O.Reg.170/03 and reported to Spills Action Centre.

Notification Date (y-m-d)	Location of Adverse	Adverse Water Quality Incident	Resolution
2019-08-14	Freelton Sampling Station B	Total Coliforms = 4 CFU/100mL (Regulatory requirement is 0 CFU/100mL)	→ Resampled adverse location, one upstream and one downstream hydrant. All results passed. The adverse was not confirmed.

MECP Freelton Drinking Water System (DWS) Inspection Findings and Self-Declared Non-Compliances

A summary of findings that were either issued during the MECP inspection or self-declared during the 2019 calendar year (Inspection date: November 14, 2019):

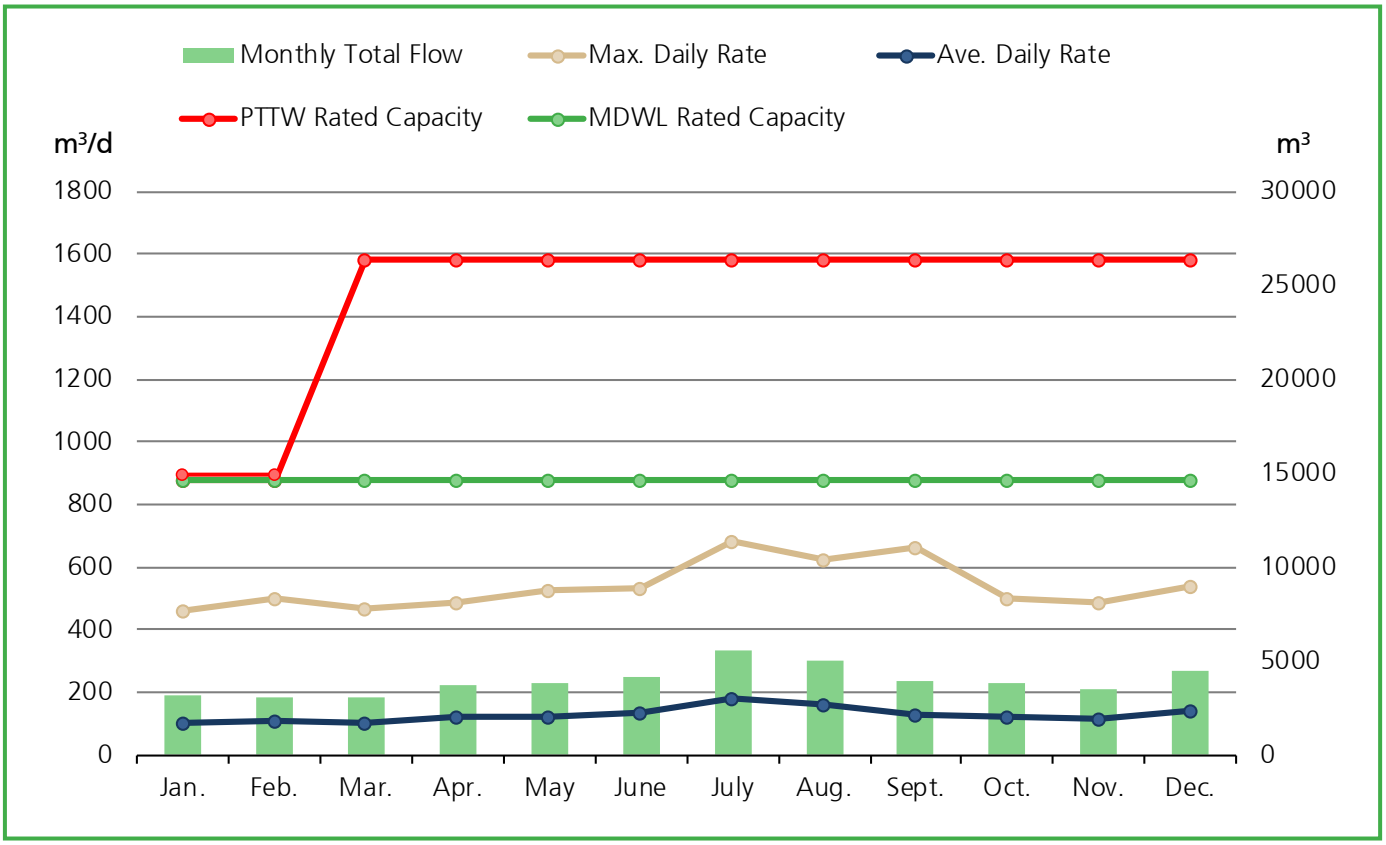
#	Finding Type	Finding	Status

We are pleased to report that there were no Inspection Findings or Self-Declared Non-Compliances.

Water Production Reports - Summary

The following provides a summary of daily flow rates and instantaneous peak flow rates in comparison to the capacity of the water works as identified in the Permit to Take Water. This information is tabulated in the accompanying tables.

FIGURE 3-1: FREELTON WELL (FDF01) - 2019 MONTHLY PRODUCTION (SUMMARY)

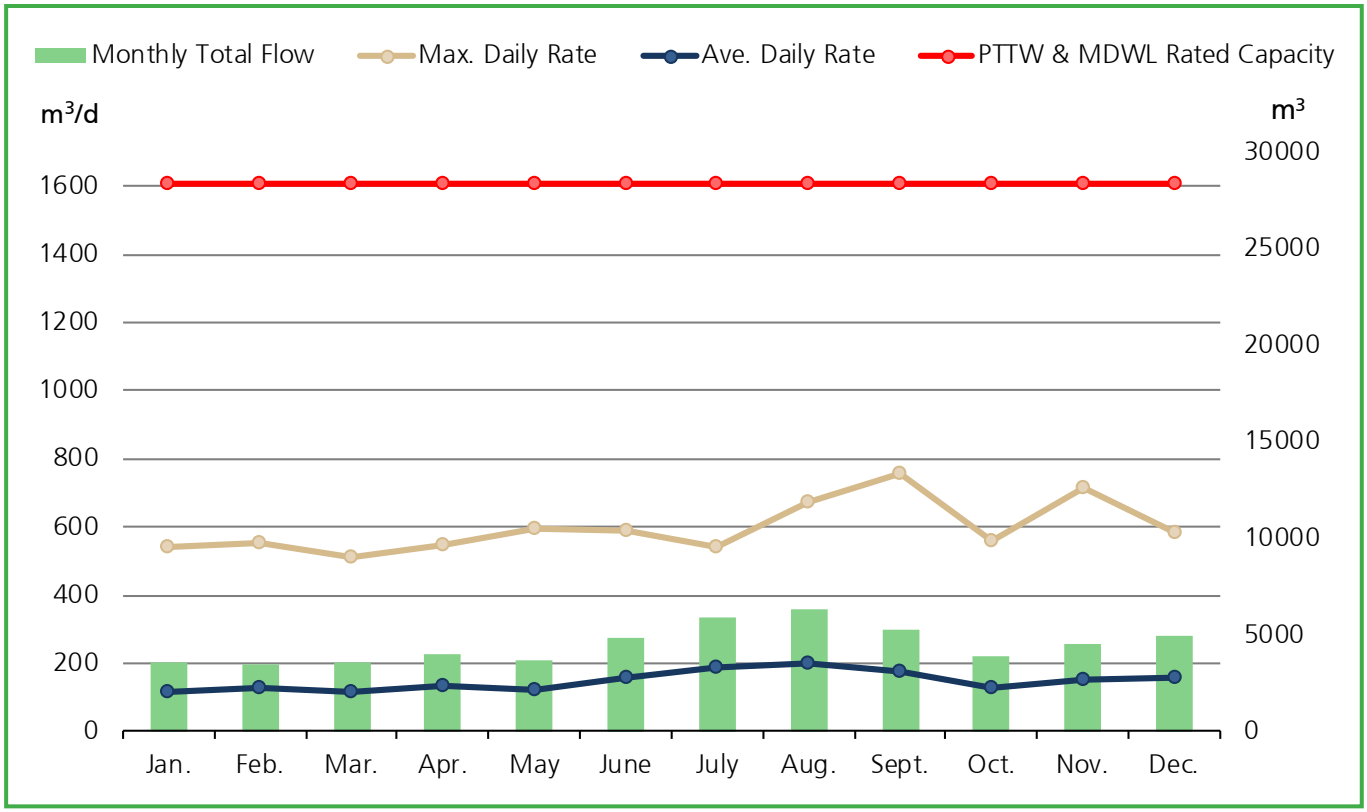


MAINTAINED COMPLIANCE

TABLE 3-1: FREELTON WELL (FDF01) - 2019 MONTHLY PRODUCTION (SUMMARY)

FDF01	UNITS	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.
Total Monthly Flow	m^3	3,203	3,051	3,131	3,713	3,824	4,142	5,584	5,000	3,943	3,888	3,509	4,469
Average Daily Rate	m^3/d	103	109	101	124	123	138	180	161	131	125	117	144
Maximum Daily Rate	m^3/d	461	499	470	487	530	534	683	622	667	501	490	540
PTTW Daily Rated Capacity	m^3/d	878	878	1,584	1,584	1,584	1,584	1,584	1,584	1,584	1,584	1,584	1,584
MDWL Daily Rated Capacity	m^3/d	878	878	878	878	878	878	878	878	878	878	878	878

FIGURE 3-2: FREELTON WELL (FDF03) - 2019 MONTHLY PRODUCTION (SUMMARY)

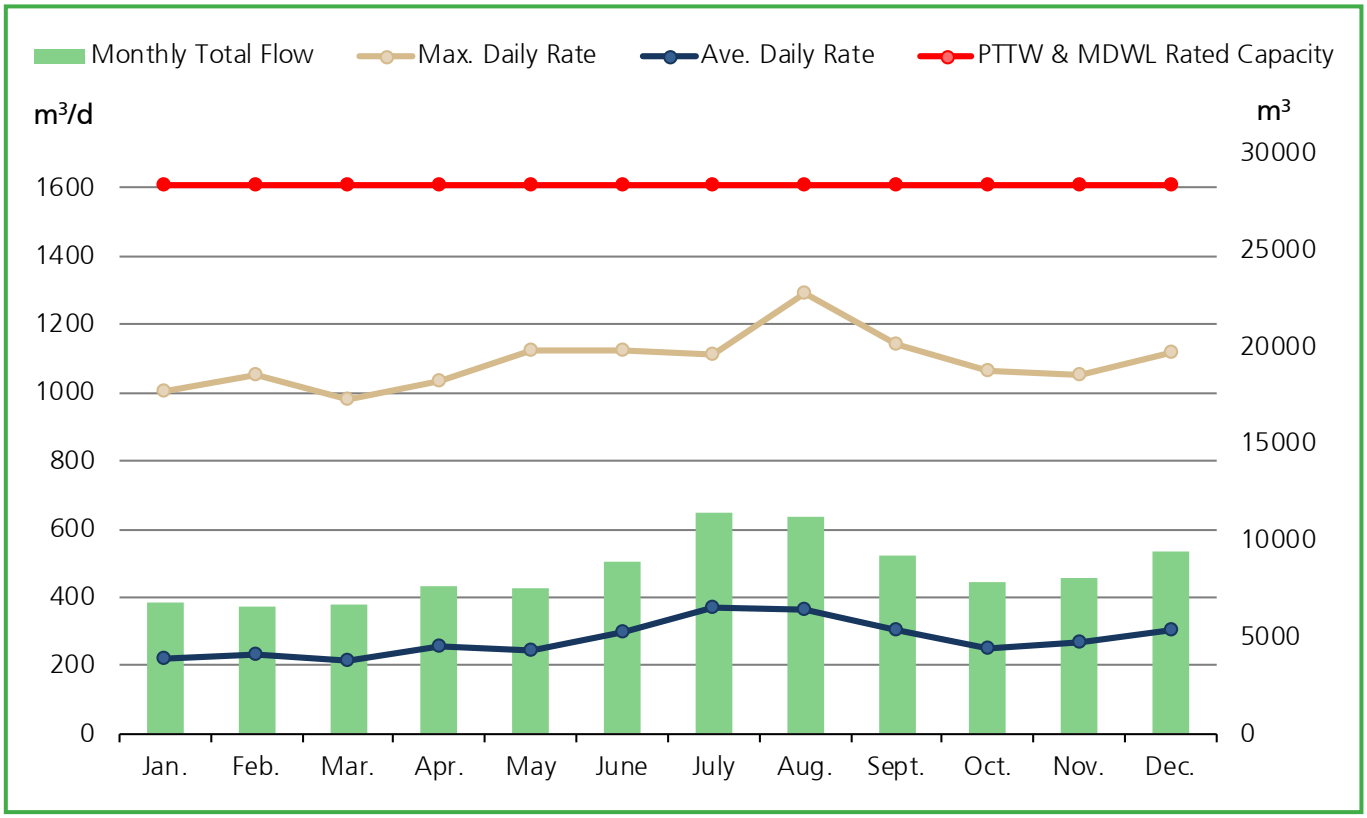


MAINTAINED COMPLIANCE

TABLE 3-2: FREELTON WELL (FDF03) - 2019 MONTHLY PRODUCTION (SUMMARY)

FDF03	UNITS	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.
Total Monthly Flow	m^3	3,571	3,526	3,541	3,963	3,733	4,805	5,897	6,280	5,278	3,926	4,517	4,989
Average Daily Rate	m^3/d	115	126	114	132	120	160	190	203	176	127	151	161
Maximum Daily Rate	m^3/d	544	554	509	548	593	587	542	672	757	562	713	581
PTTW & MDWL Daily Rated Capacity	m^3/d	1,607	1,607	1,607	1,607	1,607	1,607	1,607	1,607	1,607	1,607	1,607	1,607

FIGURE 3-3: FREELTON WELL (FDF01 & FDF03) - 2019 MONTHLY PRODUCTION (SUMMARY)



MAINTAINED COMPLIANCE

TABLE 3-3: FREELTON WELL (FDF01 & FDF03) - 2019 MONTHLY PRODUCTION (SUMMARY)

FDF01 & 03	UNITS	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.
Total Montly Flow	m^3	6,774	6,577	6,672	7,676	7,558	8,947	11,481	11,281	9,221	7,815	8,026	9,459
Average Daily Rate	m^3/d	219	235	215	256	244	298	370	364	307	252	268	305
Maximum Daily Rate	m^3/d	1,005	1,053	979	1.035	1,123	1,122	1,113	1,294	1,143	1,063	1,051	1,120
PTTW Daily Rated Capacity	m^3/d	1,607	1,607	1,607	1,607	1,607	1,607	1,607	1,607	1,607	1,607	1,607	1,607

WATER QUALITY DATA

Microbiological testing done under Schedule 10, 11, 12 and 17, 18 of Regulation 170/03, during this reporting period.

SAMPLE TYPE	NUMBER OF SAMPLES	RANGE OF E.COLI RESULTS (MIN #)-(MAX #) CFU/100mL	RANGE OF TOTAL COLIFORM RESULTS (MIN #)-(MAX #) CFU/100mL	NUMBER OF HPC SAMPLES	RANGE OF HPC RESULTS (MIN #)-(MAX #) CFU/1mL
RAW - FDF01	52	0	0	N/A	N/A
RAW - FDF03	53	0	0	N/A	N/A
TREATED - FDF01	52	0	0	52	0 to 2
TREATED - FDF03	53	0	0	53	0 to 1
DISTRIBUTION	213	0	0 to 4	210	0 to 13

N/A — Not Applicable

Operational testing done under Schedule 7, 8 or 9 of Regulation 170/03 during the period covered by this Annual Report.

NOTE: If results are obtained from continuous monitors, then 8,760 is reported as the number of samples.

PARAMETER - SAMPLE TYPE	NUMBER OF GRAB SAMPLES	RANGE OF RESULTS (MIN #)-(MAX #)	UNIT OF MEASURE
TURBIDITY - RAW - FDF01	51	0.05 – 0.46	NTU
TURBIDITY - RAW - FDF03	53	0.05 – 0.40	NTU
FREE CHLORINE - TREATED - FDF01	8,760	1.26 – 2.28	mg/L
FREE CHLORINE - TREATED - FDF03	8,760	1.29 – 2.37	mg/L
FREE CHLORINE - DISTRIBUTION	365	1.17 – 2.02	mg/L

Summary of additional testing and sampling carried out in accordance with the requirement of a licence, approval, order or other legal instrument.

PARAMETER	SAMPLE DATE	RESULT VALUE	UNIT OF MEASURE
N/A	-	-	-

Summary of Inorganic parameters required by Regulation 170/03 and tested during this reporting period.

PARAMETER	SAMPLE DATE	RESULT VALUE	UNIT OF MEASURE	NO. OF AWQIs
FREELTON WELL FDF01 - TREATED				
ANTIMONY	2019-04-30 to 2019-10-29	<0.0001	mg/L	0
ARSENIC	2019-04-30 to 2019-10-29	0.0001	mg/L	0
BARIUM	2019-04-30 to 2019-10-29	0.0631 to 0.0693	mg/L	0
BORON	2019-04-30 to 2019-10-29	0.018 to 0.021	mg/L	0

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Summary of Inorganic parameters required by Regulation 170/03 and tested during this reporting period. (continued)...

PARAMETER	SAMPLE DATE	RESULT VALUE	UNIT OF MEASURE	NO. OF AWQIs
CADMIUM	2019-04-30 to 2019-10-29	<0.0001	mg/L	0
CHROMIUM	2019-04-30 to 2019-10-29	<0.0001 to 0.0001	mg/L	0
FLUORIDE	2019-04-30 to 2019-10-29	0.08 to 0.10	mg/L	0
MERCURY	2019-04-30 to 2019-10-29	<0.05	mg/L	0
NITRATE AS N	2019-01-23 to 2019-10-29	1.97 to 2.41	mg/L	0
NITRITE AS N	2019-01-23 to 2019-10-29	<0.01	mg/L	0
SELENIUM	2019-04-30 to 2019-10-29	0.0002 to 0.0003	mg/L	0
SODIUM	2019-04-30 to 2019-10-29	53.3 to 59.8	mg/L	0
URANIUM	2019-04-30 to 2019-10-29	0.278 to 0.284	ug/L	0
FREELTON WELL FDF03 - TREATED				
ANTIMONY	2019-04-30 to 2019-10-29	<0.0001	mg/L	0
ARSENIC	2019-04-30 to 2019-10-29	0.0004 to 0.0005	mg/L	0
BARIUM	2019-04-30 to 2019-10-29	0.0663 to 0.0716	mg/L	0
BORON	2019-04-30 to 2019-10-29	0.012 to 0.017	mg/L	0
CADMIUM	2019-04-30 to 2019-10-29	<0.0001	mg/L	0
CHROMIUM	2019-04-30 to 2019-10-29	<0.0001 to 0.0001	mg/L	0
FLUORIDE	2019-04-30 to 2019-10-29	0.16 to 0.18	mg/L	0
MERCURY	2019-04-30 to 2019-10-29	<0.05	mg/L	0
NITRATE AS N	2019-01-23 to 2019-10-29	0.02 to 0.06	mg/L	0
NITRITE AS N	2019-01-23 to 2019-10-29	<0.01	mg/L	0
SELENIUM	2019-04-30 to 2019-10-29	<0.0001	mg/L	0
SODIUM	2019-04-30 to 2019-10-29	34.1 to 48.7	mg/L	0
URANIUM	2019-04-30 to 2019-10-29	0.267 to 0.296	ug/L	0

Summary of lead testing under Schedule 15.1 during this reporting period.

LOCATION TYPE	NO. OF POINTS SAMPLED	NO. OF LEAD SAMPLES TAKEN	NO. OF pH AND ALKALINITY SAMPLES TAKEN	RANGE OF pH RESULTS (min #) to (max #) pH Units	RANGE OF ALKALINITY RESULTS (min #) to (max #) mg/L	RANGE OF LEAD RESULTS (min #) to (max #) mg/L	NO. OF LEAD AWQIs	NO. OF LEAD EXCEEDANCES
PLUMBING-NR	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
PLUMBING-R	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
DISTRIBUTION	4	2	4	7.36 to 7.66	299 to 319	0.0009 to 0.0010	0	N/A

NR - Non Residential R- Residential

Summary of Organic parameters required by Regulation 170/03 and tested during this reporting period.

PARAMETER	SAMPLE DATE	RESULT VALUE	UNIT OF MEASURE	NO. OF AWQIs
FREELTON WELL FDF01 - TREATED				
1,1-DICHLOROETHYLENE	2019-04-30 to 2019-10-29	<0.2	ug/L	0
1,2-DICHLOROBENZENE	2019-04-30 to 2019-10-29	<0.2	ug/L	0
1,2-DICHLOROETHANE	2019-04-30 to 2019-10-29	<0.2	ug/L	0
1,4-DICHLOROBENZENE	2019-04-30 to 2019-10-29	<0.2	ug/L	0
BENZENE	2019-04-30 to 2019-10-29	<0.2	ug/L	0
CARBON TETRACHLORIDE	2019-04-30 to 2019-10-29	<0.2	ug/L	0
CHLOROBENZENE	2019-04-30 to 2019-10-29	<0.3	ug/L	0
DICHLOROMETHANE	2019-04-30 to 2019-10-29	<0.5	ug/L	0
ETHYLBENZENE	2019-04-30 to 2019-10-29	<0.2	ug/L	0
TETRACHLOROETHYLENE	2019-04-30 to 2019-10-29	<0.2	ug/L	0
TOLUENE	2019-04-30 to 2019-10-29	<0.2	ug/L	0
TRICHLOROETHYLENE	2019-04-30 to 2019-10-29	<0.2	ug/L	0
VINYL CHLORIDE	2019-04-30 to 2019-10-29	<0.2	ug/L	0
XYLENE	2019-04-30 to 2019-10-29	<0.3	ug/L	0
2,3,4,6-TETRACHLOROPHENOL	2019-04-30	<0.2	ug/L	0
2,4,6-TRICHLOROPHENOL	2019-04-30	<0.25	ug/L	0
2,4-DICHLOROPHENOXY ACETIC ACID (2,4-D)	2019-04-30	<0.19	ug/L	0
2,4-DICHLOROPHENOL	2019-04-30	<0.15	ug/L	0
ALACHLOR	2019-04-30	<0.02	ug/L	0
ATRAZINE + DESETHYL-ATRAZINE METABOLITES	2019-04-30	<0.01	ug/L	0
AZINPHOS-METHYL	2019-04-30	<0.05	ug/L	0
BENZO[A]PYRENE	2019-04-30	<0.004	ug/L	0
BROMOXYNIL	2019-04-30	<0.33	ug/L	0
CARBARYL	2019-04-30	<0.05	ug/L	0
CARBOFURAN	2019-04-30	<0.01	ug/L	0
CHLORPYRIFOS	2019-04-30	<0.02	ug/L	0
DIAZINON	2019-04-30	<0.02	ug/L	0
DICAMBA	2019-04-30	<0.20	ug/L	0
DICLOFOP-METHYL	2019-04-30	<0.40	ug/L	0
DIMETHOATE	2019-04-30	<0.06	ug/L	0

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Summary of Organic parameters required by Regulation 170/03 and tested during this reporting period. (continued)...

PARAMETER	SAMPLE DATE	RESULT VALUE	UNIT OF MEASURE	NO. OF AWQIs
DIQUAT	2019-04-30	<1	ug/L	0
DIURON	2019-04-30	<0.03	ug/L	0
GLYPHOSATE	2019-04-30	<1	ug/L	0
MALATHION	2019-04-30	<0.02	ug/L	0
MCPA (2-METHYL-4-CHLOROPHENOXYACETIC ACID)	2019-04-30	<0.00012	mg/L	0
METOLACHLOR	2019-04-30	<0.01	ug/L	0
METRIBUZIN (SENCOR)	2019-04-30	<0.02	ug/L	0
PARAQUAT	2019-04-30	<1	ug/L	0
POLYCHLORINATED BIPHENYLS (PCB)	2019-04-30	<0.05	ug/L	0
PENTACHLOROPHENOL	2019-04-30	<0.15	ug/L	0
PHORATE	2019-04-30	<0.01	ug/L	0
PICLORAM	2019-04-30	<1	ug/L	0
PROMETRYNE	2019-04-30	<0.03	ug/L	0
SIMAZINE	2019-04-30	<0.01	ug/L	0
TERBUFOS	2019-04-30	<0.01	ug/L	0
TRIALLATE	2019-04-30	<0.01	ug/L	0
TRIFLURALIN	2019-04-30	<0.02	ug/L	0

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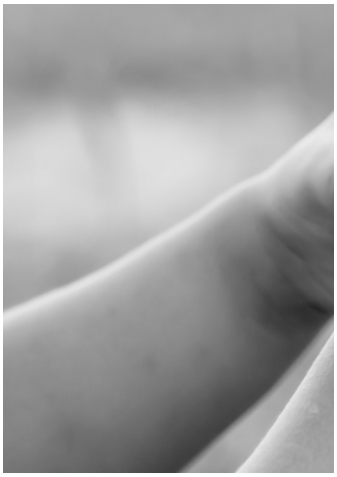

Summary of Organic parameters required by Regulation 170/03 and tested during this reporting period. (continued)...

PARAMETER	SAMPLE DATE	RESULT VALUE	UNIT OF MEASURE	NO. OF AWQIs
FREELTON WELL FDF03 - TREATED				
1,1-DICHLOROETHYLENE	2019-01-30 to 2019-10-29	<0.2	ug/L	0
1,2-DICHLOROBENZENE	2019-01-30 to 2019-10-29	<0.2	ug/L	0
1,2-DICHLOROETHANE	2019-01-30 to 2019-10-29	<0.2	ug/L	0
1,4-DICHLOROBENZENE	2019-01-30 to 2019-10-29	<0.2	ug/L	0
BENZENE	2019-01-30 to 2019-10-29	<0.2	ug/L	0
CARBON TETRACHLORIDE	2019-01-30 to 2019-10-29	<0.2	ug/L	0
CHLOROBENZENE	2019-01-30 to 2019-10-29	<0.3	ug/L	0
DICHLOROMETHANE	2019-01-30 to 2019-10-29	<0.5	ug/L	0
ETHYLBENZENE	2019-01-30 to 2019-10-29	<0.2 to 0.3	ug/L	0
TETRACHLOROETHYLENE	2019-01-30 to 2019-10-29	<0.2	ug/L	0
TOLUENE	2019-01-30 to 2019-10-29	<0.2	ug/L	0
TRICHLOROETHYLENE	2019-01-30 to 2019-10-29	<0.2	ug/L	0
VINYL CHLORIDE	2019-01-30 to 2019-10-29	<0.2	ug/L	0
XYLENE	2019-01-30 to 2019-10-29	<0.3 to 2.0	ug/L	0
2,3,4,6-TETRACHLOROPHENOL	2019-04-30	<0.2	ug/L	0
2,4,6-TRICHLOROPHENOL	2019-04-30	<0.25	ug/L	0
2,4-DICHLOROPHENOXY ACETIC ACID (2,4-D)	2019-04-30	<0.19	ug/L	0
2,4-DICHLOROPHENOL	2019-04-30	<0.15	ug/L	0
ALACHLOR	2019-04-30	<0.02	ug/L	0
ATRAZINE + DESETHYL-ATRAZINE METABOLITES	2019-04-30	<0.01	ug/L	0
AZINPHOS-METHYL	2019-04-30	<0.05	ug/L	0
BENZO[A]PYRENE	2019-04-30	<0.004	ug/L	0
BROMOXYNIL	2019-04-30	<0.33	ug/L	0
CARBARYL	2019-04-30	<0.05	ug/L	0
CARBOFURAN	2019-04-30	<0.01	ug/L	0
CHLORPYRIFOS	2019-04-30	<0.02	ug/L	0
DIAZINON	2019-04-30	<0.02	ug/L	0
DICAMBA	2019-04-30	<0.20	ug/L	0
DICLOFOP-METHYL	2019-04-30	<0.40	ug/L	0

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Summary of Organic parameters required by Regulation 170/03 and tested during this reporting period. (continued)...

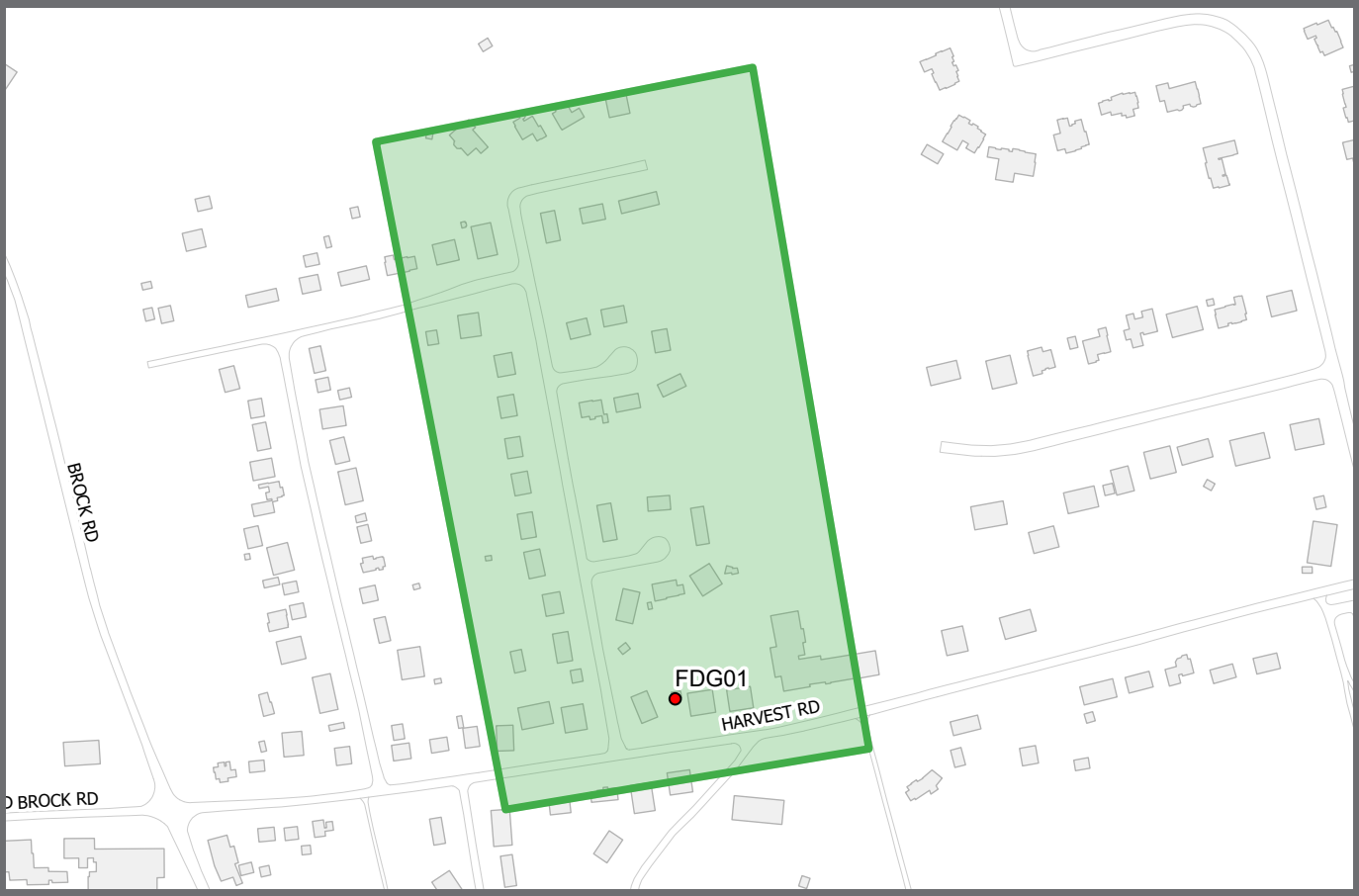
PARAMETER	SAMPLE DATE	RESULT VALUE	UNIT OF MEASURE	NO. OF AWQIs
DIMETHOATE	2019-04-30	<0.06	ug/L	0
DIQUAT	2019-04-30	<1	ug/L	0
DIURON	2019-04-30	<0.03	ug/L	0
GLYPHOSATE	2019-04-30	<1	ug/L	0
MALATHION	2019-04-30	<0.02	ug/L	0
MCPA (2-METHYL-4-CHLOROPHENOXYACETIC ACID)	2019-04-30	<0.00012	mg/L	0
METOLACHLOR	2019-04-30	<0.01	ug/L	0
METRIBUZIN (SENCOR)	2019-04-30	<0.02	ug/L	0
PARAQUAT	2019-04-30	<1	ug/L	0
POLYCHLORINATED BIPHENYLS (PCB)	2019-04-30	<0.05	ug/L	0
PENTACHLOROPHENOL	2019-04-30	<0.15	ug/L	0
PHORATE	2019-04-30	<0.01	ug/L	0
PICLORAM	2019-04-30	<1	ug/L	0
PROMETRYNE	2019-04-30	<0.03	ug/L	0
SIMAZINE	2019-04-30	<0.01	ug/L	0
TERBUFOS	2019-04-30	<0.01	ug/L	0
TRIALLATE	2019-04-30	<0.01	ug/L	0
TRIFLURALIN	2019-04-30	<0.02	ug/L	0
DISTRIBUTION				
TOTAL TRIHALOMETHANES*	Running annual average for the last four quarters	13.2	ug/L	0
HALOACETIC ACIDS	2019-01-23 to 2019-10-29	<5.3	ug/L	N/A

*** The Maximum Acceptable Concentration for Trihalomethanes in the distribution is based on a running average of the results from all sampling events in the past four quarters. This running average can be found in the result value column.**

Parameters Exceeding Prescribed Half-Standard

There were no Inorganic or Organic parameter(s) that exceeded half the standard prescribed in Schedule 2 of Ontario Drinking Water Quality Standards (O.Reg. 169/03).

GREENSVILLE DRINKING WATER SYSTEM
WATER QUALITY ANNUAL REPORT



GREENSVILLE DRINKING WATER SYSTEM

BCOS
BEYOND COMPLIANCE OPERATING SYSTEM

DEFINITIONS

AWQI: Adverse Water Quality Incident
CFU: Colony Forming Unit
HPC: Heterotrophic Plate Count
MDWL: Municipal Drinking Water Licence
mg/L: milligrams per litre
mL: millilitre
N/A: Not Applicable
PTTW: Permit to Take Water
ug/L: micrograms per litre

General Information

Drinking Water System Number	Drinking Water System Name	Drinking Water System Owner	Drinking Water System Category	Period Being Reported
220004126	Greensville Drinking Water System FDG01	City of Hamilton	Small Municipal Residential	January 1, 2019 to December 31, 2019

The Greensville water supply system consists of one well, one well station, treatment, sampling and analysis which services a population of approximately 108 people.

Water Well:

Greensville Well FDG01 is a 150mm diameter, approximately 12-metre-deep drilled ground water well under the influence of surface water (GUDI).

Treatment:

Water passes through 2 stage cartridge filters, is disinfected using ultraviolet light and sodium hypochlorite (chlorine) prior to entering the distribution system. A chlorine contact chamber is used to ensure disinfection of the water. Fluoridation is not carried out at the Greensville community well.

Well Station:

Within the Well Station, water treatment takes place, well water level, discharge pressure and flow are monitored. Hydropneumatic pressure tanks are used to control system pressures.

Sampling & Analysis:

The well is equipped with on-line chlorine residual and turbidity analyzers that continually monitor the treated water quality at the well station. Raw, treated and distribution water is sampled and analyzed weekly. In addition, chlorine residual in the distribution system is analyzed daily.

Provision of Drinking Water to Other Municipalities

The following is a list of municipal drinking water systems which receive drinking water from the Greensville System:

Drinking Water System Name	Drinking Water System Number
None other than Greensville System	220004126

A copy of this annual report is provided to all Drinking Water System owners that are connected to the system and to whom we provide drinking water.

Our customers are notified through the local newspaper that the annual report is available online free of charge at www.hamilton.ca/waterquality.

Water Treatment Chemicals Used During This Reporting Period

- Sodium Hypochlorite

Breakdown of Significant Monetary Expenses

The following table highlights the significant expenses that were incurred for replacing required equipment in 2019. There were no significant expenses related to the installation or repair of equipment in 2019.

New Greensville Communal Well Project $2,400 (spent in 2019 of a multi-year project)

Adverse Test Results and Reportable Incidents

The following table outlines the notices submitted in accordance with subsection 18(1) of the Safe Drinking Water Act or section 16-4 of Schedule 16 of O.Reg.170/03 and reported to Spills Action Centre.

Notification Date (y-m-d)	Location of Adverse	Adverse Water Quality Incident	Resolution
2019-09-04	Greensville Drinking Water System	Duty to report other observations. Intermittent communication issues	An operator was dispatched to the site to monitor the situation and remained until communication was up and running. A cellular line of communication was hooked up temporarily. Fibre line was restored at 23:30 on Sept 4th. There were no concerns regarding the quality of water being provided.

MECP Greensville Drinking Water System (DWS) Inspection Findings and Self-Declared Non-Compliances

A summary of findings that were either issued during the MECP inspection or self-declared during the 2019 calendar year (Inspection date: September 5, 2019):

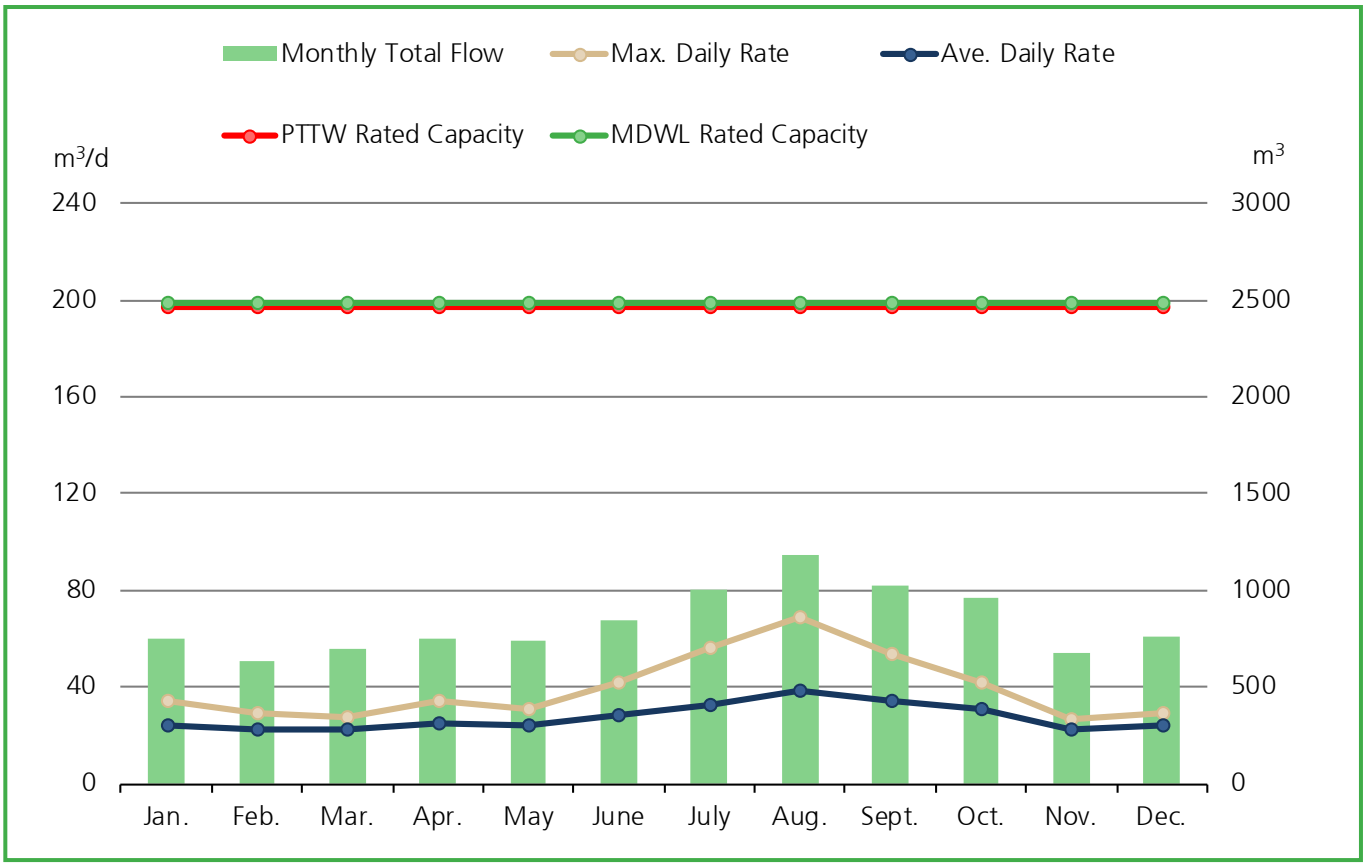
#	Finding Type	Finding	Status

We are pleased to report that there were no Inspection Findings or Self-Declared Non-Compliances.

Water Production Reports - Summary

The following provides a summary of daily flow rates and instantaneous peak flow rates in comparison to the capacity of the water works as identified in the Permit to Take Water. This information is tabulated in the accompanying tables.

FIGURE 4-1: GREENSVILLE WELL (FDG01) - 2019 MONTHLY PRODUCTION (SUMMARY)



MAINTAINED COMPLIANCE

TABLE 4-1: GREENSVILLE WELL (FDG01) - 2019 MONTHLY PRODUCTION (SUMMARY)

FDG01	UNITS	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.
Monthly Total Flow	m^3	752	631	695	752	742	843	1,001	1,183	1,020	957	677	756
Average Daily Rate	m^3/d	24	23	22	25	24	28	32	38	34	31	23	24
Maximum Daily Rate	m^3/d	34	29	28	34	31	42	56	69	53	42	26	29
PTTW Daily Rated Capacity	m^3/d	197	197	197	197	197	197	197	197	197	197	197	197
MDWL Daily Rated Capacity	m^3/d	199	199	199	199	199	199	199	199	199	199	199	199

WATER QUALITY DATA

Microbiological testing done under Schedule 10, 11, 12 and 17, 18 of Regulation 170/03, during this reporting period.

SAMPLE TYPE	NUMBER OF SAMPLES	RANGE OF E.COLI RESULTS (MIN #) to (MAX #) CFU/100mL	RANGE OF TOTAL COLIFORM RESULTS (MIN #) to (MAX #) CFU/100mL	NUMBER OF HPC SAMPLES	RANGE OF HPC RESULTS (MIN #) to (MAX #) CFU/1mL
RAW	52	0 to 6	0 to 46	N/A	N/A
TREATED	52	0	0	52	0 to 1
DISTRIBUTION	104	0	0	104	0 to 2

Operational testing done under Schedule 7, 8 or 9 of Regulation 170/03 during the period covered by this Annual Report.

NOTE: If results are obtained from continuous monitors, then 8,760 is reported as the number of samples.

PARAMETER - SAMPLE TYPE	NUMBER OF GRAB SAMPLES	RANGE OF RESULTS (MIN #) to (MAX #)	UNIT OF MEASURE
TURBIDITY - TREATED	8,760	0.02 – 0.34	NTU
FREE CHLORINE - TREATED	8,760	1.73 – 2.48	mg/L
FREE CHLORINE - DISTRIBUTION	364	1.21 – 2.68	mg/L

Summary of additional testing and sampling carried out in accordance with the requirement of a licence, approval, order or other legal instrument.

PARAMETER	SAMPLE DATE	RESULT VALUE	UNIT OF MEASURE
N/A	-	-	-

Summary of Inorganic parameters required by Regulation 170/03 and tested during this reporting period.

PARAMETER	SAMPLE DATE	RESULT VALUE	UNIT OF MEASURE	NO. OF AWQIs
GREENSVILLE WELL TREATED				
ANTIMONY	2019-05-01 to 2019-10-30	<0.0001	mg/L	0
ARSENIC	2019-05-01 to 2019-10-30	<0.0001	mg/L	0
BARIUM	2019-05-01 to 2019-10-30	0.117 to 0.134	mg/L	0
BORON	2019-05-01 to 2019-10-30	0.029 to 0.033	mg/L	0
CADMIUM	2019-05-01 to 2019-10-30	<0.0001	mg/L	0
CHROMIUM	2019-05-01 to 2019-10-30	0.0003 to 0.0004	mg/L	0
FLUORIDE	2019-05-01 to 2019-10-30	0.11 to 0.12	mg/L	0
MERCURY	2019-05-01 to 2019-10-30	<0.05	mg/L	0
NITRATE AS N	2019-01-02 to 2019-12-04	5.02 to 6.29	mg/L	0
NITRITE AS N	2019-01-02 to 2019-12-04	<0.01	mg/L	0
SELENIUM	2019-05-01 to 2019-10-30	0.0002 to 0.0003	mg/L	0
SODIUM	2019-05-01 to 2019-10-30	112 to 122	mg/L	0
URANIUM	2019-05-01 to 2019-10-30	0.599 to 0.615	ug/L	0

Summary of lead testing under Schedule 15.1 during this reporting period.

LOCATION TYPE	NO. OF POINTS SAMPLED	NO. OF LEAD SAMPLES TAKEN	NO. OF pH AND ALKALINITY SAMPLES TAKEN	RANGE OF pH RESULTS (min #) to (max #) pH Units	RANGE OF ALKALINITY RESULTS (min #) to (max #) mg/L	RANGE OF LEAD RESULTS (min #) to (max #) mg/L	NO. OF LEAD AWQIs	NO. OF LEAD EXCEEDANCES
PLUMBING-NR	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
PLUMBING-R	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
DISTRIBUTION	2	1	2	7.27 to 7.42	329 to 334	<0.0001	0	N/A

NR - Non Residential R- Residential

Summary of Organic parameters required by Regulation 170/03 and tested during this reporting period.

PARAMETER	SAMPLE DATE	RESULT VALUE	UNIT OF MEASURE	NO. OF AWQIs
GREENSVILLE WELL TREATED				
1,1-DICHLOROETHYLENE	2019-05-01 to 2019-10-30	<0.2	ug/L	0
1,2-DICHLOROBENZENE	2019-05-01 to 2019-10-30	<0.2	ug/L	0
1,2-DICHLOROETHANE	2019-05-01 to 2019-10-30	<0.2	ug/L	0
1,4-DICHLOROBENZENE	2019-05-01 to 2019-10-30	<0.2	ug/L	0
BENZENE	2019-05-01 to 2019-10-30	<0.2	ug/L	0
CARBON TETRACHLORIDE	2019-05-01 to 2019-10-30	<0.2	ug/L	0
CHLOROBENZENE	2019-05-01 to 2019-10-30	<0.3	ug/L	0
DICHLOROMETHANE	2019-05-01 to 2019-10-30	<0.5	ug/L	0
ETHYLBENZENE	2019-05-01 to 2019-10-30	<0.2	ug/L	0
TETRACHLOROETHYLENE	2019-05-01 to 2019-10-30	<0.2	ug/L	0
TOLUENE	2019-05-01 to 2019-10-30	<0.2	ug/L	0
TRICHLOROETHYLENE	2019-05-01 to 2019-10-30	<0.2	ug/L	0
VINYL CHLORIDE	2019-05-01 to 2019-10-30	<0.2	ug/L	0
XYLENE	2019-05-01 to 2019-10-30	<0.3	ug/L	0
2,3,4,6-TETRACHLOROPHENOL	2019-05-01	<0.2	ug/L	0
2,4,6-TRICHLOROPHENOL	2019-05-01	<0.25	ug/L	0
2,4-DICHLOROPHENOXY ACETIC ACID (2,4-D)	2019-05-01	<0.19	ug/L	0
2,4-DICHLOROPHENOL	2019-05-01	<0.15	ug/L	0
ALACHLOR	2019-05-01	<0.02	ug/L	0
ATRAZINE + DESETHYL-ATRAZINE METABOLITES	2019-05-01	<0.01	ug/L	0
AZINPHOS-METHYL	2019-05-01	<0.05	ug/L	0
BENZO[A]PYRENE	2019-05-01	<0.004	ug/L	0
BROMOXYNIL	2019-05-01	<0.33	ug/L	0
CARBARYL	2019-05-01	<0.05	ug/L	0
CARBOFURAN	2019-05-01	<0.01	ug/L	0
CHLORPYRIFOS	2019-05-01	<0.02	ug/L	0
DIAZINON	2019-05-01	<0.02	ug/L	0
DICAMBA	2019-05-01	<0.20	ug/L	0
DICLOFOP-METHYL	2019-05-01	<0.40	ug/L	0

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Summary of Organic parameters required by Regulation 170/03 and tested during this reporting period. (continued)...

PARAMETER	SAMPLE DATE	RESULT VALUE	UNIT OF MEASURE	NO. OF AWQIs
DIMETHOATE	2019-05-01	<0.06	ug/L	0
DIQUAT	2019-05-01	<1	ug/L	0
DIURON	2019-05-01	<0.03	ug/L	0
GLYPHOSATE	2019-05-01	<1	ug/L	0
MALATHION	2019-05-01	<0.02	ug/L	0
MCPA (2-METHYL-4-CHLOROPHENOXYACETIC ACID)	2019-05-01	<0.00012	mg/L	0
METOLACHLOR	2019-05-01	<0.01	ug/L	0
METRIBUZIN (SENCOR)	2019-05-01	<0.02	ug/L	0
PARAQUAT	2019-05-01	<1	ug/L	0
POLYCHLORINATED BIPHENYLS (PCB)	2019-05-01	<0.05	ug/L	0
PENTACHLOROPHENOL	2019-05-01	<0.15	ug/L	0
PHORATE	2019-05-01	<0.01	ug/L	0
PICLORAM	2019-05-01	<1	ug/L	0
PROMETRYNE	2019-05-01	<0.03	ug/L	0
SIMAZINE	2019-05-01	<0.01	ug/L	0
TERBUFOS	2019-05-01	<0.01	ug/L	0
TRIALLATE	2019-05-01	<0.01	ug/L	0
TRIFLURALIN	2019-05-01	<0.02	ug/L	0
DISTRIBUTION				
TOTAL TRIHALOMETHANES*	Running annual average for the last four quarters.	17.7	ug/L	0
HALOACETIC ACIDS	2019-01-24 to 2019-10-30	<5.3 to 5.7	ug/L	N/A

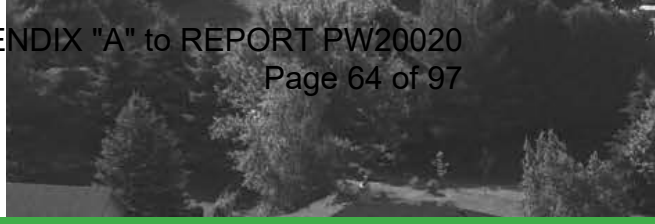
*** The Maximum Acceptable Concentration for Trihalomethanes in the distribution is based on a running average of the results from all sampling events in the past four quarters. This running average can be found in the result value column.**

Parameters Exceeding Prescribed Half-Standard

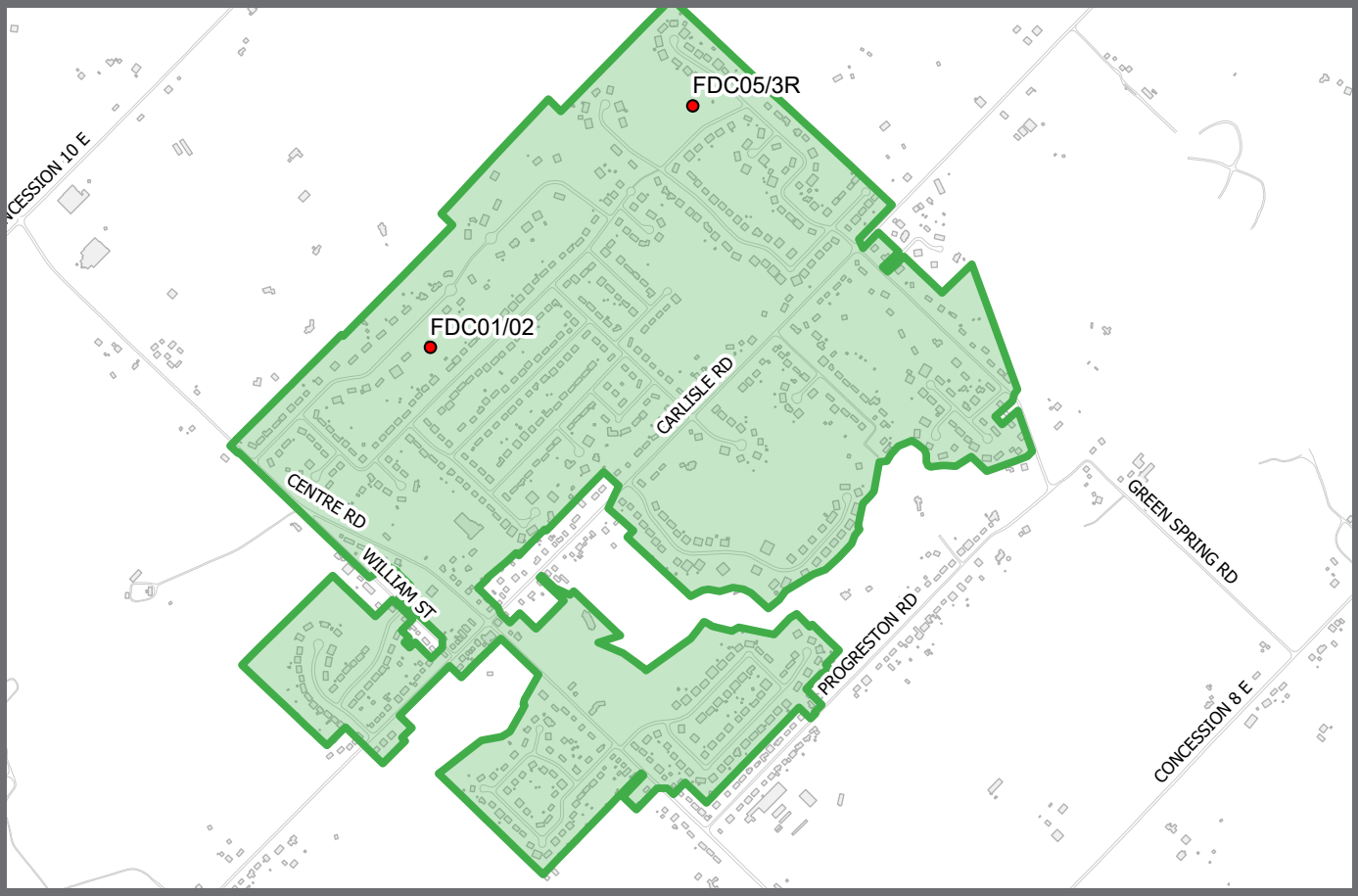
Summary of Inorganic or Organic parameter(s) that exceeded half the standard prescribed in Schedule 2 of Ontario Drinking Water Quality Standards (O.Reg. 169/03).

PARAMETER	SAMPLE DATE	RESULT VALUE	UNIT OF MEASURE
NITRATE	2019-01-02	5.64	mg/L
NITRATE	2019-01-24	5.84	mg/L
NITRATE	2019-02-06	6.29	mg/L
NITRATE	2019-03-06	5.80	mg/L
NITRATE	2019-04-03	5.13	mg/L
NITRATE	2019-05-01	5.10	mg/L
NITRATE	2019-05-01	5.02	mg/L
NITRATE	2019-06-05	5.29	mg/L
NITRATE	2019-07-03	5.28	mg/L
NITRATE	2019-07-17	5.25	mg/L
NITRATE	2019-08-07	5.33	mg/L
NITRATE	2019-09-04	5.48	mg/L
NITRATE	2019-10-02	5.65	mg/L
NITRATE	2019-10-30	5.67	mg/L
NITRATE	2019-11-06	5.46	mg/L
NITRATE	2019-12-04	5.56	mg/L

(Only if DWS category is large municipal residential, small municipal residential, large municipal non residential, non municipal year round residential, large non municipal non residential)



CARLISLE DRINKING WATER SYSTEM WATER QUALITY ANNUAL REPORT



CARLISLE DRINKING WATER SYSTEM

BCOS
BEYOND COMPLIANCE OPERATING SYSTEM

DEFINITIONS

AWQI: Adverse Water Quality Incident
CFU: Colony Forming Unit
HPC: Heterotrophic Plate Count
MDWL: Municipal Drinking Water Licence
mg/L: milligrams per litre
mL: millilitre
N/A: Not Applicable
PTTW: Permit to Take Water
ug/L: micrograms per litre

General Information

Drinking Water System Number	Drinking Water System Name	Drinking Water System Owner	Drinking Water System Category	Period Being Reported
220004108	Carlisle Drinking Water System FDC01, FDC02, FDC03(R), FDC05	City of Hamilton	Large Municipal Residential	January 1, 2019 to December 31, 2019

The Carlisle water supply system consists of four wells, one elevated water storage tank, treatment, sampling and analysis, which services a population of approximately 1,833 people. The water source for the community of Carlisle is ground water.

Water Wells:

- Carlisle Well FDC01 has a diameter of 157mm and a depth of approximately 42 metres.
- Carlisle Well FDC02 has a diameter of 300mm at a depth of 2.6 metres and a diameter of 250mm to a depth of 36 metres.
- Carlisle Well FDC03R has a diameter of 200mm and a depth of approximately 33.5 metres. It is a drilled ground water well under the influence of surface water (GUDI).
- Carlisle Well FDC05 has a diameter of 214mm and a depth of approximately 28 metres. It is a drilled ground water well under the influence of surface water (GUDI).

Treatment:

- Within a treatment well house, both wells, FDC01 and FDC02 are joined to a common header for flow metering and disinfection. Sodium hypochlorite (chlorine) within a chlorine contact chamber is used to ensure disinfection of the water.
- Within the well house, both FDC03R and FDC05 discharges have separate flow metering, filtration and ultraviolet light disinfection streams. The flows are combined for treatment by sodium hypochlorite (chlorine) within a chlorine contact chamber to ensure disinfection of the water prior to entering the distribution system.
- Fluoridation is not carried out at any of the Carlisle community wells.

Water Storage:

An elevated water storage tank is located at the same site as wells FDC01 and FDC02. The storage tank has an operating capacity of 1,400m^3. It was designed for peak hour water demand equalization as well as fire and emergency storage.

Sampling & Analysis:

All wells are equipped with on-line chlorine residual and turbidity analyzers that continually monitor the treated water quality. Raw, treated and distribution water is sampled and analyzed weekly. In addition, chlorine residual in the distribution system is analyzed daily.

Provision of Drinking Water to Other Municipalities

The following is a list of municipal drinking water systems which receive drinking water from the Carlisle System:

Drinking Water System Name	Drinking Water System Number
None other than Carlisle System	220004108

A copy of this annual report is provided to all Drinking Water System owners that are connected to the system and to whom we provide drinking water.

Our customers are notified through the local newspaper that the annual report is available online free of charge at www.hamilton.ca/waterquality.

Water Treatment Chemicals Used During This Reporting Period

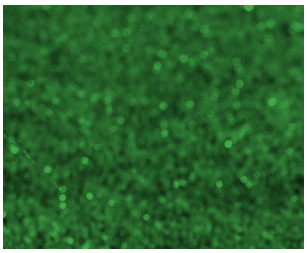
- Sodium Hypochlorite

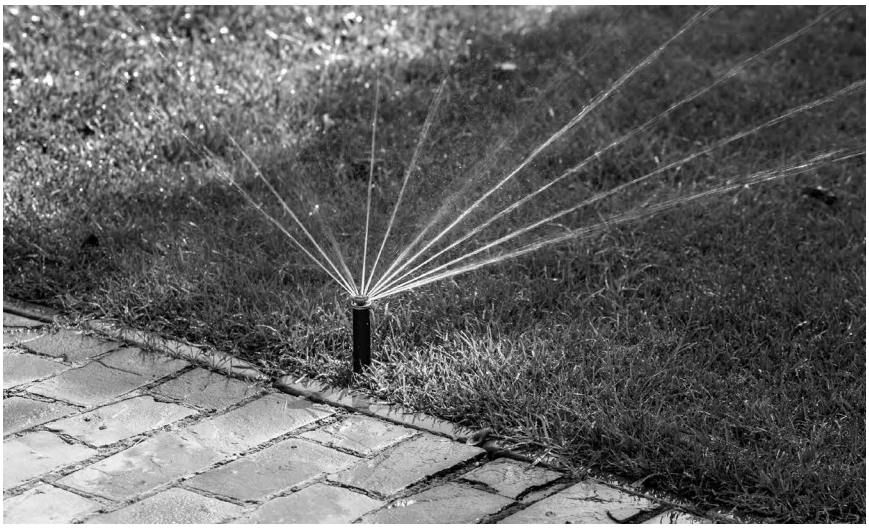
Breakdown of Significant Monetary Expenses

The following table highlights the significant expenses that were incurred for the replacement of required equipment in 2019. There were no significant expenses related to the installation or repair of equipment in 2019.

Replacement of communal well pump - $33,000

Replacement of standby UPS for standby ultraviolet - $8,000






Adverse Test Results and Reportable Incidents

The following table outlines the notices submitted in accordance with subsection 18(1) of the Safe Drinking Water Act or section 16-4 of Schedule 16 of O.Reg.170/03 and reported to Spills Action Centre.

Notification Date (y-m-d)	Location of Adverse	Adverse Water Quality Incident	Resolution

We are pleased to announce that there were no Adverse Water Quality Incidents for the period of January to December 2019.

MECP Carlisle Drinking Water System (DWS) Inspection Findings and Self-Declared Non-Compliances

A summary of findings that were either issued during the MECP inspection or self-declared during the 2019 calendar year (Inspection date: October 15, 2019):

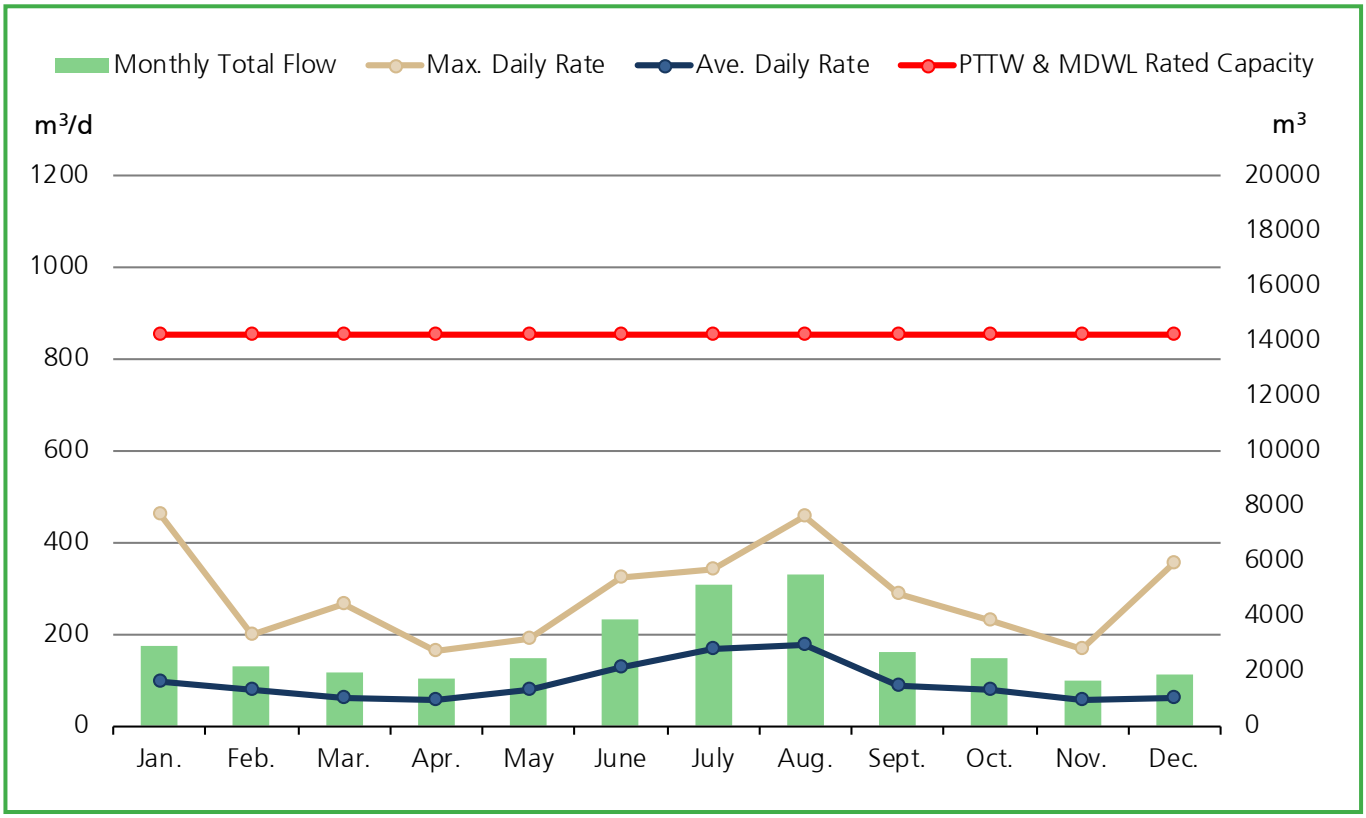
#	Finding Type	Finding	Status

We are pleased to report that there were no Inspection Findings or Self-Declared Non-Compliances.

Water Production Reports - Summary

The following provides a summary of daily flow rates and instantaneous peak flow rates in comparison to the capacity of the water works as identified in the Permit to Take Water. This information is tabulated in the accompanying tables.

FIGURE 5-1: CARLISLE WELLS (FDC01 & FDC02) - 2019 MONTHLY PRODUCTION (SUMMARY)

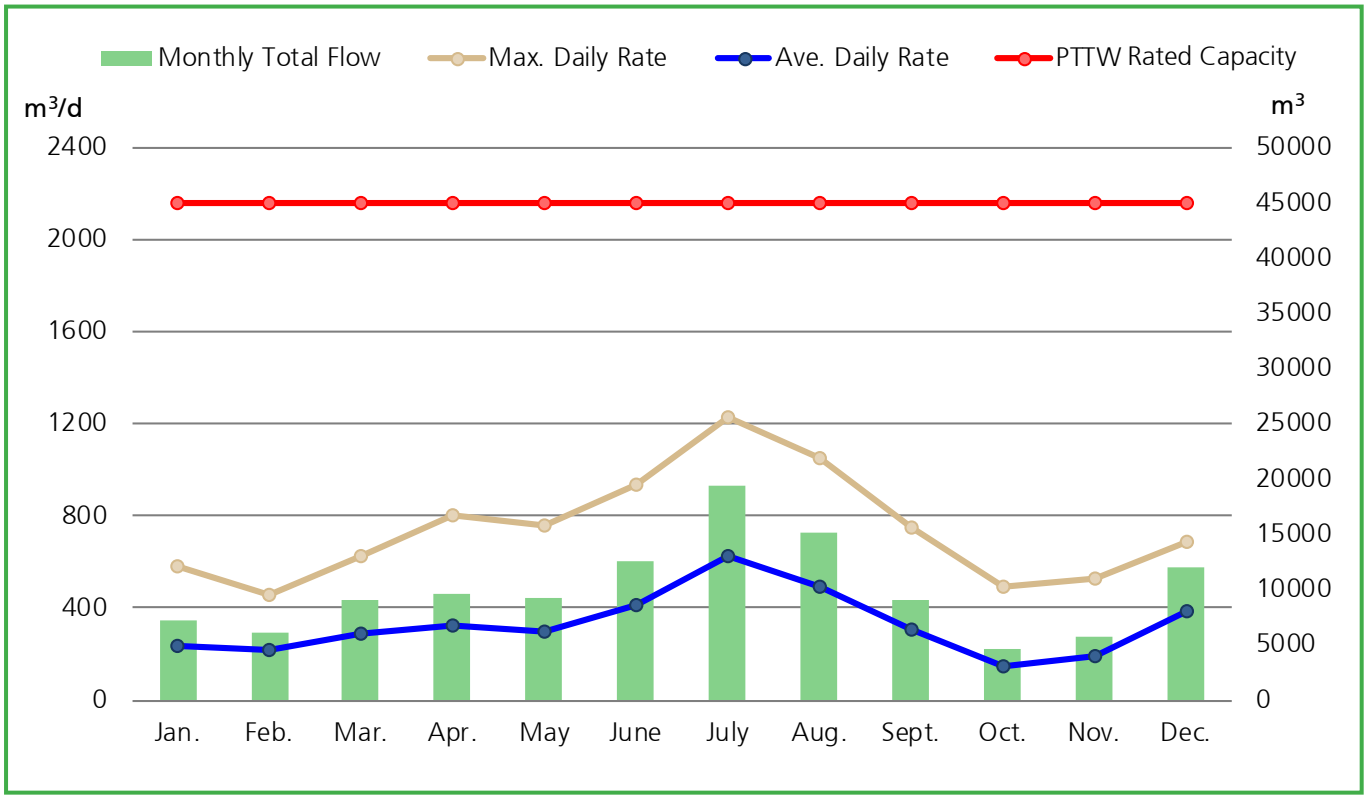


MAINTAINED COMPLIANCE

TABLE 5-1: CARLISLE WELLS (FDC01 & FDC02) - 2019 MONTHLY PRODUCTION (SUMMARY)

FDC01 & 02	UNITS	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.
Monthly Total Flow	m^3	2,931	2,166	1,924	1,726	2,443	3,870	5,136	5,501	2,667	2,436	1,644	1,875
Average Daily Rate	m^3/d	95	77	62	58	79	129	166	177	89	79	55	60
Maximum Daily Rate	m^3/d	459	197	263	161	191	321	339	455	287	228	167	355
PTTW & MDWL Daily Rated Capacity	m^3/d	851	851	851	851	851	851	851	851	851	851	851	851

FIGURE 5-2: CARLISLE WELL (FDC03R) - 2019 MONTHLY PRODUCTION (SUMMARY)



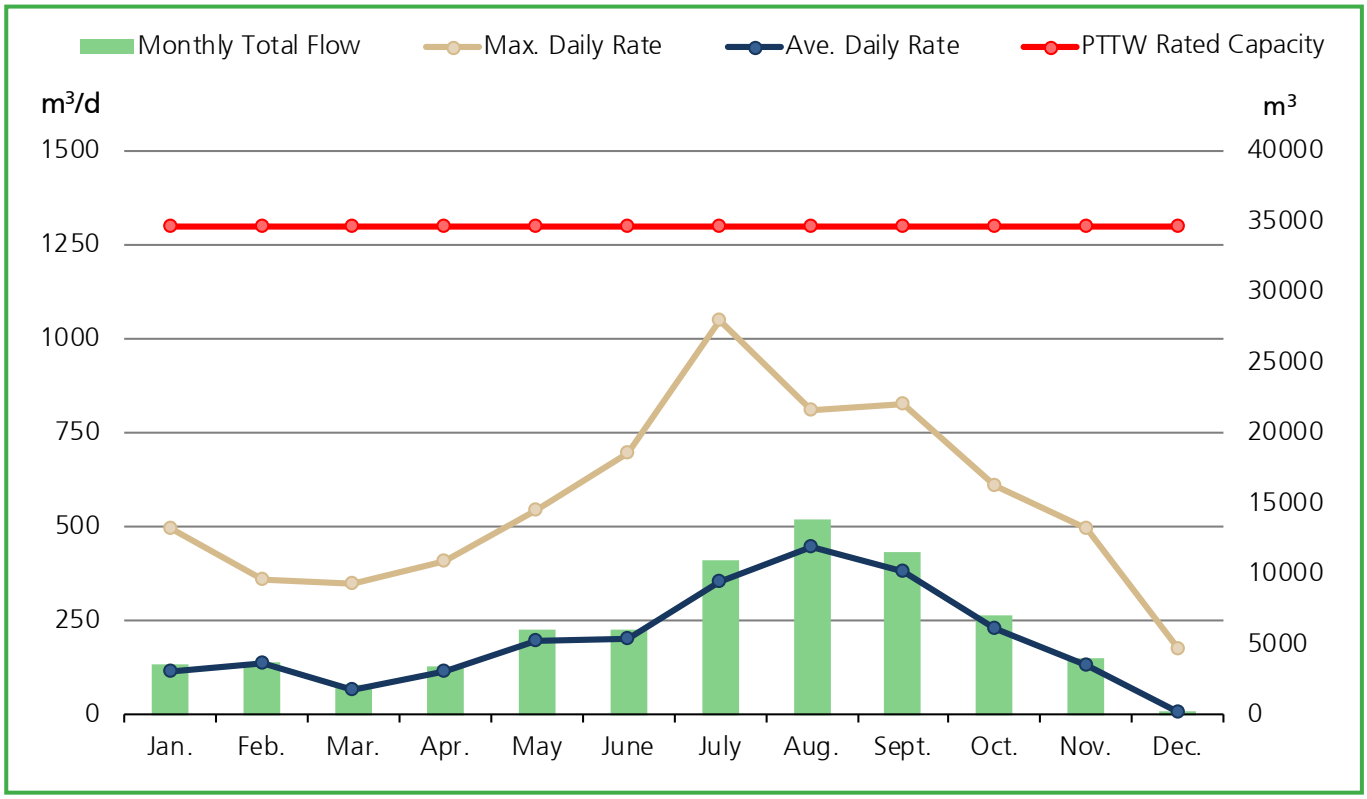
MAINTAINED COMPLIANCE

TABLE 5-2: CARLISLE WELL (FDC03R) - 2019 MONTHLY PRODUCTION (SUMMARY)

FDC03R	UNITS	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.
Monthly Total Flow	m^3	7,286	6,073	9,002	9,633	9,165	12,484	19,344	15,160	9,088	4,605	5,805	12,085
Average Daily Rate	m^3/d	235	217	290	321	296	416	624	489	303	149	193	390
Maximum Daily Rate	m^3/d	581	453	625	802	761	940	1,229	1,047	751	488	527	684
PTTW Daily Rated Capacity	m^3/d	2,160	2,160	2,160	2,160	2,160	2,160	2,160	2,160	2,160	2,160	2,160	2,160

Note: Carlisle DWS FDC03R and FDC05 have a combined rated capacity of 3456m^3/day as per MDWL.

FIGURE 5-3: CARLISLE WELL (FDC05) - 2019 MONTHLY PRODUCTION (SUMMARY)



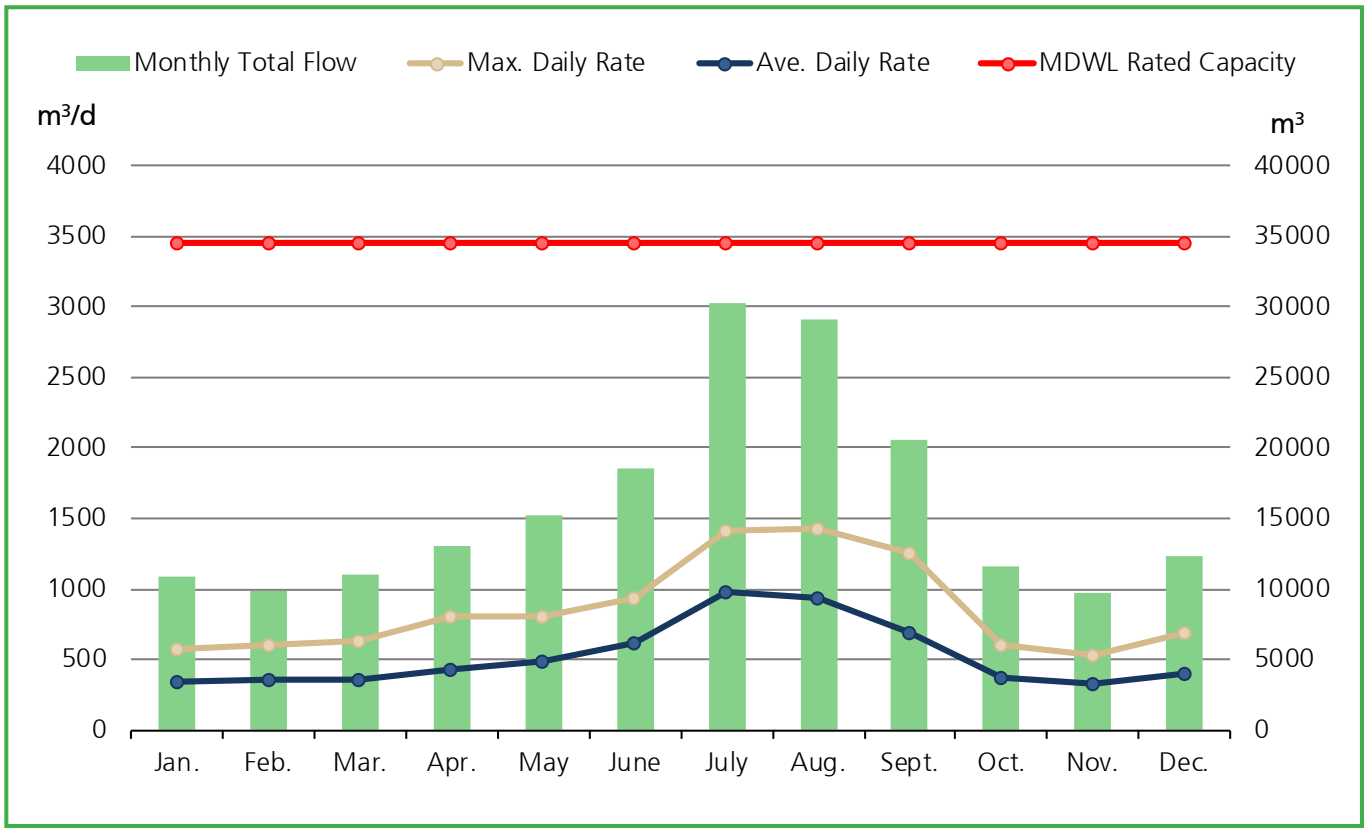
MAINTAINED COMPLIANCE

TABLE 5-3: CARLISLE WELL (FDC05) - 2019 MONTHLY PRODUCTION (SUMMARY)

FDC05	UNITS	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.
Monthly Total Flow	m^3	3,551	3,746	2,067	3,392	6,036	6,079	10,967	13,889	11,487	7,016	3,956	176
Average Daily Rate	m^3/d	115	134	67	113	195	203	354	448	383	226	132	6
Maximum Daily Rate	m^3/d	495	361	350	405	545	697	1,050	810	823	607	496	176
PTTW Daily Rated Capacity	m^3/d	1,296	1,296	1,296	1,296	1,296	1,296	1,296	1,296	1,296	1,296	1,296	1,296

Note: Carlisle DWS FDC03R and FDC05 have a combined rated capacity of 3456m^3/day as per MDWL.

FIGURE 5-4: CARLISLE WELL (FDC03R & FDC05) - 2019 MONTHLY PRODUCTION (SUMMARY)



MAINTAINED COMPLIANCE

TABLE 5-4: CARLISLE WELL (FDC03R & FDC05) - 2019 MONTHLY PRODUCTION (SUMMARY)

FDC03R & FDC05	UNITS	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.
Monthly Total Flow	m^3	10,837	9,819	11,070	13,025	15,200	18,563	30,311	29,049	20,575	11,621	9,761	12,261
Average Daily Rate	m^3/d	350	351	357	434	490	619	978	937	686	375	325	396
Maximum Daily Rate	m^3/d	581	601	625	802	812	940	1,414	1,433	1,247	607	527	684
PTTW Daily Rated Capacity FDC03R	m^3/d	2,160	2,160	2,160	2,160	2,160	2,160	2,160	2,160	2,160	2,160	2,160	2,160
PTTW Daily Rated Capacity FDC05	m^3/d	1,296	1,296	1,296	1,296	1,296	1,296	1,296	1,296	1,296	1,296	1,296	1,296
MDWL Daily Rated Capacity	m^3/d	3,456	3,456	3,456	3,456	3,456	3,456	3,456	3,456	3,456	3,456	3,456	3,456

WATER QUALITY DATA

Microbiological testing done under Schedule 10, 11, 12 and 17, 18 of Regulation 170/03, during this reporting period.

SAMPLE TYPE	NUMBER OF SAMPLES	RANGE OF E.COLI RESULTS (MIN #) to (MAX #) CFU/100mL	RANGE OF TOTAL COLIFORM RESULTS (MIN #) to (MAX #) CFU/100mL	NUMBER OF HPC SAMPLES	RANGE OF HPC RESULTS (MIN #) to (MAX #) CFU/1mL
RAW - FDC01	53	0	0	N/A	N/A
RAW - FDC02	53	0	0	N/A	N/A
RAW - FDC03(R)	52	0	0	N/A	N/A
RAW - FDC05	48	0	0	N/A	N/A
TREATED - FDC01	53	0	0	53	0 to 4
TREATED - FDC02	53	0	0	53	0 to 1
TREATED - FDC03(R)	52	0	0	52	0 to 1
TREATED - FDC05	48	0	0	48	0 to 6
DISTRIBUTION	208	0	0	208	0 to 13

Operational testing done under Schedule 7, 8 or 9 of Regulation 170/03 during the period covered by this Annual Report.

NOTE: If results are obtained from continuous monitors, then 8,760 is reported as the number of samples.

PARAMETER - SAMPLE TYPE	NUMBER OF GRAB SAMPLES	RANGE OF RESULTS (MIN #) to (MAX #)	UNIT OF MEASURE
TURBIDITY - RAW - FDC01	52	0.05 – 0.22	NTU
TURBIDITY - RAW - FDC02	53	0.06 – 0.32	NTU
TURBIDITY - RAW - FDC03(R)	8,760	0.03 – 0.35	NTU
TURBIDITY - RAW - FDC05	8,760	0.02 – 0.13	NTU
FREE CHLORINE - TREATED - FDC01 AND FDC02	8,760	1.27 – 2.87	mg/L
FREE CHLORINE - TREATED - FDC03(R) AND FDC05	8,760	1.38 – 2.48	mg/L
FREE CHLORINE - DISTRIBUTION	365	1.25 – 2.30	mg/L

Summary of additional testing and sampling carried out in accordance with the requirement of a licence, approval, order or other legal instrument.

PARAMETER	SAMPLE DATE	RESULT VALUE	UNIT OF MEASURE
N/A	-	-	-

Summary of Inorganic parameters required by Regulation 170/03 and tested during this reporting period.

PARAMETER	SAMPLE DATE	RESULT VALUE	UNIT OF MEASURE	NO. OF AWQIs
CARLISLE WELL FDC01 - TREATED				
ANTIMONY	2019-04-30 to 2019-10-29	<0.0001	mg/L	0
ARSENIC	2019-04-30 to 2019-10-29	0.0001 to 0.0002	mg/L	0
BARIUM	2019-04-30 to 2019-10-29	0.0856 to 0.0858	mg/L	0
BORON	2019-04-30 to 2019-10-29	<0.010 to 0.019	mg/L	0
CADMIUM	2019-04-30 to 2019-10-29	<0.0001	mg/L	0
CHROMIUM	2019-04-30 to 2019-10-29	<0.0001 to 0.0002	mg/L	0
FLUORIDE	2019-04-30 to 2019-10-29	0.08	mg/L	0
MERCURY	2019-04-30 to 2019-10-29	<0.05	mg/L	0
NITRATE AS N	2019-01-23 to 2019-10-29	1.39 to 3.27	mg/L	0
NITRITE AS N	2019-01-23 to 2019-10-29	<0.01	mg/L	0
SELENIUM	2019-04-30 to 2019-10-29	0.0002	mg/L	0
SODIUM	2019-04-30 to 2019-10-29	16.9 to 21.6	mg/L	0
URANIUM	2019-04-30 to 2019-10-29	0.443 to 0.477	ug/L	0
CARLISLE WELL FDC02 - TREATED				
ANTIMONY	2019-04-30 to 2019-10-29	<0.0001	mg/L	0
ARSENIC	2019-04-30 to 2019-10-29	0.0001 to 0.0002	mg/L	0
BARIUM	2019-04-30 to 2019-10-29	0.0870 to 0.0905	mg/L	0
BORON	2019-04-30 to 2019-10-29	0.011 to 0.018	mg/L	0
CADMIUM	2019-04-30 to 2019-10-29	<0.0001	mg/L	0
CHROMIUM	2019-04-30 to 2019-10-29	0.0002 to 0.0006	mg/L	0
FLUORIDE	2019-04-30 to 2019-10-29	0.07 to 0.08	mg/L	0
MERCURY	2019-04-30 to 2019-10-29	<0.05	mg/L	0
NITRATE AS N	2019-01-23 to 2019-10-29	2.29 to 2.99	mg/L	0
NITRITE AS N	2019-01-23 to 2019-10-29	<0.01	mg/L	0
SELENIUM	2019-04-30 to 2019-10-29	0.0002	mg/L	0
SODIUM	2019-04-30 to 2019-10-29	20.6 to 31.1	mg/L	0
URANIUM	2019-04-30 to 2019-10-29	0.374 to 0.416	ug/L	0

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Summary of Inorganic parameters required by Regulation 170/03 and tested during this reporting period.
(continued)...

PARAMETER	SAMPLE DATE	RESULT VALUE	UNIT OF MEASURE	NO. OF AWQIs
CARLISLE WELL FDC03(R) - TREATED				
ANTIMONY	2019-04-30 to 2019-10-29	0.0001 to 0.0002	mg/L	0
ARSENIC	2019-04-30 to 2019-10-29	0.0004 to 0.0005	mg/L	0
BARIUM	2019-04-30 to 2019-10-29	0.0772 to 0.0816	mg/L	0
BORON	2019-04-30 to 2019-10-29	0.019 to 0.024	mg/L	0
CADMIUM	2019-04-30 to 2019-10-29	<0.0001	mg/L	0
CHROMIUM	2019-04-30 to 2019-10-29	<0.0001 to 0.0004	mg/L	0
FLUORIDE	2019-04-30 to 2019-10-29	0.07 to 0.08	mg/L	0
MERCURY	2019-04-30 to 2019-10-29	<0.05	mg/L	0
NITRATE AS N	2019-01-23 to 2019-10-29	0.01 to 0.77	mg/L	0
NITRITE AS N	2019-01-23 to 2019-10-29	<0.01	mg/L	0
SELENIUM	2019-04-30 to 2019-10-29	<0.0001	mg/L	0
SODIUM	2019-04-30 to 2019-10-29	53.9 to 55.5	mg/L	0
URANIUM	2019-04-30 to 2019-10-29	0.683 to 0.697	ug/L	0
CARLISLE WELL FDC05 - TREATED				
ANTIMONY	2019-04-30 to 2019-10-29	<0.0001 to 0.0001	mg/L	0
ARSENIC	2019-04-30 to 2019-10-29	0.0005 to 0.0008	mg/L	0
BARIUM	2019-04-30 to 2019-10-29	0.0758 to 0.0823	mg/L	0
BORON	2019-04-30 to 2019-10-29	0.019 to 0.023	mg/L	0
CADMIUM	2019-04-30 to 2019-10-29	<0.0001	mg/L	0
CHROMIUM	2019-04-30 to 2019-10-29	<0.0001	mg/L	0
FLUORIDE	2019-04-30 to 2019-10-29	0.08	mg/L	0
MERCURY	2019-04-30 to 2019-10-29	<0.05	mg/L	0
NITRATE AS N	2019-01-23 to 2019-10-29	<0.01 to 0.26	mg/L	0
NITRITE AS N	2019-01-23 to 2019-10-29	<0.01	mg/L	0
SELENIUM	2019-04-30 to 2019-10-29	<0.0001	mg/L	0
SODIUM	2019-04-30 to 2019-10-29	51.6 to 59.6	mg/L	0
URANIUM	2019-04-30 to 2019-10-29	0.555 to 0.613	ug/L	0

Summary of lead testing under Schedule 15.1 during this reporting period.

LOCATION TYPE	NO. OF POINTS SAMPLED	NO. OF LEAD SAMPLES TAKEN	NO. OF pH AND ALKALINITY SAMPLES TAKEN	RANGE OF pH RESULTS (min #) to (max #) pH Units	RANGE OF ALKALINITY RESULTS (min #) to (max #) mg/L	RANGE OF LEAD RESULTS (min #) to (max #) mg/L	NO. OF LEAD AWQIs	NO. OF LEAD EXCEEDANCES
PLUMBING-NR	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
PLUMBING-R	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
DISTRIBUTION	4	2	4	7.25 to 7.44	322 to 328	0.0006 to 0.0008	0	N/A

NR - Non Residential R- Residential

Summary of Organic parameters required by Regulation 170/03 and tested during this reporting period.

PARAMETER	SAMPLE DATE	RESULT VALUE	UNIT OF MEASURE	NO. OF AWQIs
CARLISLE WELL FDC01 - TREATED				
1,1-DICHLOROETHYLENE	2019-04-30 to 2019-10-29	<0.2	ug/L	0
1,2-DICHLOROBENZENE	2019-04-30 to 2019-10-29	<0.2	ug/L	0
1,2-DICHLOROETHANE	2019-04-30 to 2019-10-29	<0.2	ug/L	0
1,4-DICHLOROBENZENE	2019-04-30 to 2019-10-29	<0.2	ug/L	0
BENZENE	2019-04-30 to 2019-10-29	<0.2	ug/L	0
CARBON TETRACHLORIDE	2019-04-30 to 2019-10-29	<0.2	ug/L	0
CHLOROBENZENE	2019-04-30 to 2019-10-29	<0.3	ug/L	0
DICHLOROMETHANE	2019-04-30 to 2019-10-29	<0.5	ug/L	0
ETHYLBENZENE	2019-04-30 to 2019-10-29	<0.2	ug/L	0
TETRACHLOROETHYLENE	2019-04-30 to 2019-10-29	<0.2	ug/L	0
TOLUENE	2019-04-30 to 2019-10-29	<0.2	ug/L	0
TRICHLOROETHYLENE	2019-04-30 to 2019-10-29	<0.2	ug/L	0
VINYL CHLORIDE	2019-04-30 to 2019-10-29	<0.2	ug/L	0
XYLENE	2019-04-30 to 2019-10-29	<0.3	ug/L	0
2,3,4,6-TETRACHLOROPHENOL	2019-04-30	<0.2	ug/L	0
2,4,6-TRICHLOROPHENOL	2019-04-30	<0.25	ug/L	0
2,4-DICHLOROPHENOXY ACETIC ACID (2,4-D)	2019-04-30	<0.19	ug/L	0
2,4-DICHLOROPHENOL	2019-04-30	<0.15	ug/L	0
ALACHLOR	2019-04-30	<0.02	ug/L	0
ATRAZINE + DESETHYL-ATRAZINE METABOLITES	2019-04-30	<0.01	ug/L	0
AZINPHOS-METHYL	2019-04-30	<0.05	ug/L	0
BENZO[A]PYRENE	2019-04-30	<0.004	ug/L	0
BROMOXYNIL	2019-04-30	<0.33	ug/L	0
CARBARYL	2019-04-30	<0.05	ug/L	0
CARBOFURAN	2019-04-30	<0.01	ug/L	0
CHLORPYRIFOS	2019-04-30	<0.02	ug/L	0
DIAZINON	2019-04-30	<0.02	ug/L	0
DICAMBA	2019-04-30	<0.20	ug/L	0
DICLOFOP-METHYL	2019-04-30	<0.40	ug/L	0
DIMETHOATE	2019-04-30	<0.06	ug/L	0

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Summary of Organic parameters required by Regulation 170/03 and tested during this reporting period.
(continued)...

PARAMETER	SAMPLE DATE	RESULT VALUE	UNIT OF MEASURE	NO. OF AWQIs
DIQUAT	2019-04-30	<1	ug/L	0
DIURON	2019-04-30	<0.03	ug/L	0
GLYPHOSATE	2019-04-30	<1	ug/L	0
MALATHION	2019-04-30	<0.02	ug/L	0
MCPA (2-METHYL-4-CHLOROPHENOXYACETIC ACID)	2019-04-30	<0.00012	mg/L	0
METOLACHLOR	2019-04-30	<0.01	ug/L	0
METRIBUZIN (SENCOR)	2019-04-30	<0.02	ug/L	0
PARAQUAT	2019-04-30	<1	ug/L	0
POLYCHLORINATED BIPHENYLS (PCB)	2019-04-30	<0.05	ug/L	0
PENTACHLOROPHENOL	2019-04-30	<0.15	ug/L	0
PHORATE	2019-04-30	<0.01	ug/L	0
PICLORAM	2019-04-30	<1	ug/L	0
PROMETRYNE	2019-04-30	<0.03	ug/L	0
SIMAZINE	2019-04-30	<0.01	ug/L	0
TERBUFOS	2019-04-30	<0.01	ug/L	0
TRIALLATE	2019-04-30	<0.01	ug/L	0
TRIFLURALIN	2019-04-30	<0.02	ug/L	0
CARLISLE WELL FDC02 - TREATED				
1,1-DICHLOROETHYLENE	2019-04-30 to 2019-10-29	<0.2	ug/L	0
1,2-DICHLOROBENZENE	2019-04-30 to 2019-10-29	<0.2	ug/L	0
1,2-DICHLOROETHANE	2019-04-30 to 2019-10-29	<0.2	ug/L	0
1,4-DICHLOROBENZENE	2019-04-30 to 2019-10-29	<0.2	ug/L	0
BENZENE	2019-04-30 to 2019-10-29	<0.2	ug/L	0
CARBON TETRACHLORIDE	2019-04-30 to 2019-10-29	<0.2	ug/L	0
CHLOROBENZENE	2019-04-30 to 2019-10-29	<0.3	ug/L	0
DICHLOROMETHANE	2019-04-30 to 2019-10-29	<0.5	ug/L	0
ETHYLBENZENE	2019-04-30 to 2019-10-29	<0.2	ug/L	0
TETRACHLOROETHYLENE	2019-04-30 to 2019-10-29	<0.2	ug/L	0
TOLUENE	2019-04-30 to 2019-10-29	<0.2	ug/L	0
TRICHLOROETHYLENE	2019-04-30 to 2019-10-29	<0.2	ug/L	0
VINYL CHLORIDE	2019-04-30 to 2019-10-29	<0.2	ug/L	0

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Summary of Organic parameters required by Regulation 170/03 and tested during this reporting period. (continued)...

PARAMETER	SAMPLE DATE	RESULT VALUE	UNIT OF MEASURE	NO. OF AWQIs
XYLENE	2019-04-30 to 2019-10-29	<0.3	ug/L	0
2,3,4,6-TETRACHLOROPHENOL	2019-04-30	<0.2	ug/L	0
2,4,6-TRICHLOROPHENOL	2019-04-30	<0.25	ug/L	0
2,4-DICHLOROPHENOXY ACETIC ACID (2,4-D)	2019-04-30	<0.19	ug/L	0
2,4-DICHLOROPHENOL	2019-04-30	<0.15	ug/L	0
ALACHLOR	2019-04-30	<0.02	ug/L	0
ATRAZINE + DESETHYL-ATRAZINE METABOLITES	2019-04-30	<0.01	ug/L	0
AZINPHOS-METHYL	2019-04-30	<0.05	ug/L	0
BENZO[A]PYRENE	2019-04-30	<0.004	ug/L	0
BROMOXYNIL	2019-04-30	<0.33	ug/L	0
CARBARYL	2019-04-30	<0.05	ug/L	0
CARBOFURAN	2019-04-30	<0.01	ug/L	0
CHLORPYRIFOS	2019-04-30	<0.02	ug/L	0
DIAZINON	2019-04-30	<0.02	ug/L	0
DICAMBA	2019-04-30	<0.20	ug/L	0
DICLOFOP-METHYL	2019-04-30	<0.40	ug/L	0
DIMETHOATE	2019-04-30	<0.06	ug/L	0
DIQUAT	2019-04-30	<1	ug/L	0
DIURON	2019-04-30	<0.03	ug/L	0
GLYPHOSATE	2019-04-30	<1	ug/L	0
MALATHION	2019-04-30	<0.02	ug/L	0
MCPA (2-METHYL-4-CHLOROPHENOXYACETIC ACID)	2019-04-30	<0.00012	mg/L	0
METOLACHLOR	2019-04-30	<0.01	ug/L	0
METRIBUZIN (SENCOR)	2019-04-30	<0.02	ug/L	0
PARAQUAT	2019-04-30	<1	ug/L	0
POLYCHLORINATED BIPHENYLS (PCB)	2019-04-30	<0.05	ug/L	0
PENTACHLOROPHENOL	2019-04-30	<0.15	ug/L	0
PHORATE	2019-04-30	<0.01	ug/L	0
PICLORAM	2019-04-30	<1	ug/L	0
PROMETRYNE	2019-04-30	<0.03	ug/L	0

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Summary of Organic parameters required by Regulation 170/03 and tested during this reporting period. (continued)...

PARAMETER	SAMPLE DATE	RESULT VALUE	UNIT OF MEASURE	NO. OF AWQIs
SIMAZINE	2019-04-30	<0.01	ug/L	0
TERBUFOS	2019-04-30	<0.01	ug/L	0
TRIALLATE	2019-04-30	<0.01	ug/L	0
TRIFLURALIN	2019-04-30	<0.02	ug/L	0
CARLISLE WELL FDC03(R) - TREATED				
1,1-DICHLOROETHYLENE	2019-04-30 to 2019-10-29	<0.2	ug/L	0
1,2-DICHLOROBENZENE	2019-04-30 to 2019-10-29	<0.2	ug/L	0
1,2-DICHLOROETHANE	2019-04-30 to 2019-10-29	<0.2	ug/L	0
1,4-DICHLOROBENZENE	2019-04-30 to 2019-10-29	<0.2	ug/L	0
BENZENE	2019-04-30 to 2019-10-29	<0.2	ug/L	0
CARBON TETRACHLORIDE	2019-04-30 to 2019-10-29	<0.2	ug/L	0
CHLOROBENZENE	2019-04-30 to 2019-10-29	<0.3	ug/L	0
DICHLOROMETHANE	2019-04-30 to 2019-10-29	<0.5	ug/L	0
ETHYLBENZENE	2019-04-30 to 2019-10-29	<0.2	ug/L	0
TETRACHLOROETHYLENE	2019-04-30 to 2019-10-29	<0.2	ug/L	0
TOLUENE	2019-04-30 to 2019-10-29	<0.2	ug/L	0
TRICHLOROETHYLENE	2019-04-30 to 2019-10-29	<0.2	ug/L	0
VINYL CHLORIDE	2019-04-30 to 2019-10-29	<0.2	ug/L	0
XYLENE	2019-04-30 to 2019-10-29	<0.3	ug/L	0
2,3,4,6-TETRACHLOROPHENOL	2019-04-30	<0.2	ug/L	0
2,4,6-TRICHLOROPHENOL	2019-04-30	<0.25	ug/L	0
2,4-DICHLOROPHENOXY ACETIC ACID (2,4-D)	2019-04-30	<0.19	ug/L	0
2,4-DICHLOROPHENOL	2019-04-30	<0.15	ug/L	0
ALACHLOR	2019-04-30	<0.02	ug/L	0
ATRAZINE + DESETHYL-ATRAZINE METABOLITES	2019-04-30	<0.01	ug/L	0
AZINPHOS-METHYL	2019-04-30	<0.05	ug/L	0
BENZO[A]PYRENE	2019-04-30	<0.004	ug/L	0
BROMOXYNIL	2019-04-30	<0.33	ug/L	0
CARBARYL	2019-04-30	<0.05	ug/L	0
CARBOFURAN	2019-04-30	<0.01	ug/L	0

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Summary of Organic parameters required by Regulation 170/03 and tested during this reporting period. (continued)...

PARAMETER	SAMPLE DATE	RESULT VALUE	UNIT OF MEASURE	NO. OF AWQIs
CHLORPYRIFOS	2019-04-30	<0.02	ug/L	0
DIAZINON	2019-04-30	<0.02	ug/L	0
DICAMBA	2019-04-30	<0.20	ug/L	0
DICLOFOP-METHYL	2019-04-30	<0.40	ug/L	0
DIMETHOATE	2019-04-30	<0.06	ug/L	0
DIQUAT	2019-04-30	<1	ug/L	0
DIURON	2019-04-30	<0.03	ug/L	0
GLYPHOSATE	2019-04-30	<1	ug/L	0
MALATHION	2019-04-30	<0.02	ug/L	0
MCPA (2-METHYL-4-CHLOROPHENOXYACETIC ACID)	2019-04-30	<0.00012	mg/L	0
METOLACHLOR	2019-04-30	<0.01	ug/L	0
METRIBUZIN (SENCOR)	2019-04-30	<0.02	ug/L	0
PARAQUAT	2019-04-30	<1	ug/L	0
POLYCHLORINATED BIPHENYLS (PCB)	2019-04-30	<0.05	ug/L	0
PENTACHLOROPHENOL	2019-04-30	<0.15	ug/L	0
PHORATE	2019-04-30	<0.01	ug/L	0
PICLORAM	2019-04-30	<1	ug/L	0
PROMETRYNE	2019-04-30	<0.03	ug/L	0
SIMAZINE	2019-04-30	<0.01	ug/L	0
TERBUFOS	2019-04-30	<0.01	ug/L	0
TRIALLATE	2019-04-30	<0.01	ug/L	0
TRIFLURALIN	2019-04-30	<0.02	ug/L	0
CARLISLE WELL FDC05 - TREATED				
1,1-DICHLOROETHYLENE	2019-04-30 to 2019-10-29	<0.2	ug/L	0
1,2-DICHLOROBENZENE	2019-04-30 to 2019-10-29	<0.2	ug/L	0
1,2-DICHLOROETHANE	2019-04-30 to 2019-10-29	<0.2	ug/L	0
1,4-DICHLOROBENZENE	2019-04-30 to 2019-10-29	<0.2	ug/L	0
BENZENE	2019-04-30 to 2019-10-29	<0.2	ug/L	0
CARBON TETRACHLORIDE	2019-04-30 to 2019-10-29	<0.2	ug/L	0
CHLOROBENZENE	2019-04-30 to 2019-10-29	<0.3	ug/L	0

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Summary of Organic parameters required by Regulation 170/03 and tested during this reporting period. (continued)...

PARAMETER	SAMPLE DATE	RESULT VALUE	UNIT OF MEASURE	NO. OF AWQIs
DICHLOROMETHANE	2019-04-30 to 2019-10-29	<0.5	ug/L	0
ETHYLBENZENE	2019-04-30 to 2019-10-29	<0.2	ug/L	0
TETRACHLOROETHYLENE	2019-04-30 to 2019-10-29	<0.2	ug/L	0
TOLUENE	2019-04-30 to 2019-10-29	<0.2	ug/L	0
TRICHLOROETHYLENE	2019-04-30 to 2019-10-29	<0.2	ug/L	0
VINYL CHLORIDE	2019-04-30 to 2019-10-29	<0.2	ug/L	0
XYLENE	2019-04-30 to 2019-10-29	<0.3	ug/L	0
2,3,4,6-TETRACHLOROPHENOL	2019-04-30	<0.2	ug/L	0
2,4,6-TRICHLOROPHENOL	2019-04-30	<0.25	ug/L	0
2,4-DICHLOROPHENOXY ACETIC ACID (2,4-D)	2019-04-30	<0.19	ug/L	0
2,4-DICHLOROPHENOL	2019-04-30	<0.15	ug/L	0
ALACHLOR	2019-04-30	<0.02	ug/L	0
ATRAZINE + DESETHYL-ATRAZINE METABOLITES	2019-04-30	<0.01	ug/L	0
AZINPHOS-METHYL	2019-04-30	<0.05	ug/L	0
BENZO[A]PYRENE	2019-04-30	<0.004	ug/L	0
BROMOXYNIL	2019-04-30	<0.33	ug/L	0
CARBARYL	2019-04-30	<0.05	ug/L	0
CARBOFURAN	2019-04-30	<0.01	ug/L	0
CHLORPYRIFOS	2019-04-30	<0.02	ug/L	0
DIAZINON	2019-04-30	<0.02	ug/L	0
DICAMBA	2019-04-30	<0.20	ug/L	0
DICLOFOP-METHYL	2019-04-30	<0.40	ug/L	0
DIMETHOATE	2019-04-30	<0.06	ug/L	0
DIQUAT	2019-04-30	<1	ug/L	0
DIURON	2019-04-30	<0.03	ug/L	0
GLYPHOSATE	2019-04-30	<1	ug/L	0
MALATHION	2019-04-30	<0.02	ug/L	0
MCPA (2-METHYL-4-CHLOROPHENOXYACETIC ACID)	2019-04-30	<0.00012	mg/L	0
METOLACHLOR	2019-04-30	<0.01	ug/L	0
METRIBUZIN (SENCOR)	2019-04-30	<0.02	ug/L	0

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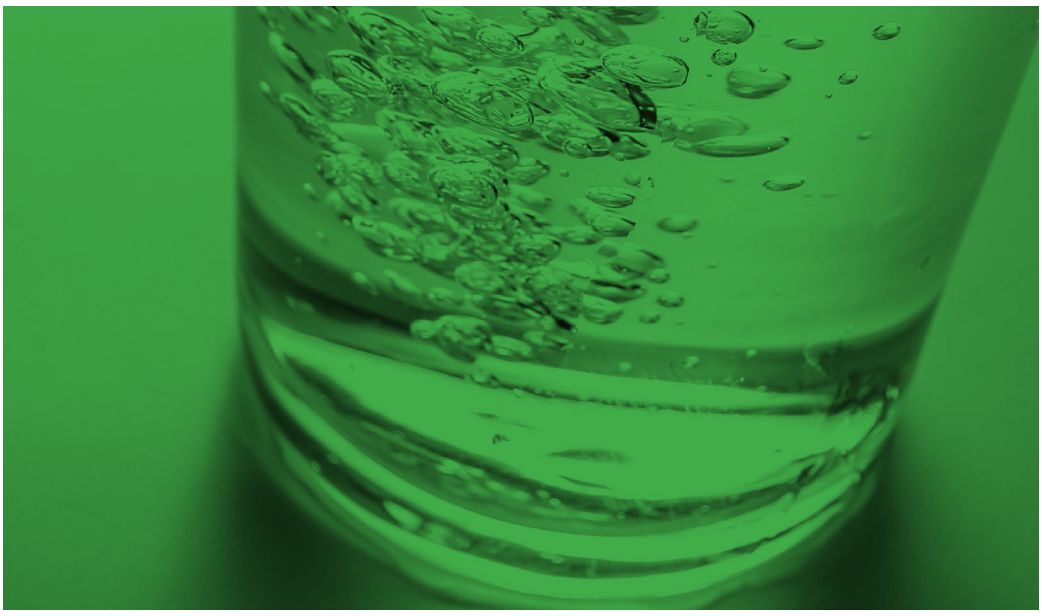
Summary of Organic parameters required by Regulation 170/03 and tested during this reporting period. (continued)...

PARAMETER	SAMPLE DATE	RESULT VALUE	UNIT OF MEASURE	NO. OF AWQIs
PARAQUAT	2019-04-30	<1	ug/L	0
POLYCHLORINATED BIPHENYLS (PCB)	2019-04-30	<0.05	ug/L	0
PENTACHLOROPHENOL	2019-04-30	<0.15	ug/L	0
PHORATE	2019-04-30	<0.01	ug/L	0
PICLORAM	2019-04-30	<1	ug/L	0
PROMETRYNE	2019-04-30	<0.03	ug/L	0
SIMAZINE	2019-04-30	<0.01	ug/L	0
TERBUFOS	2019-04-30	<0.01	ug/L	0
TRIALLATE	2019-04-30	<0.01	ug/L	0
TRIFLURALIN	2019-04-30	<0.02	ug/L	0
DISTRIBUTION				
TOTAL TRIHALOMETHANES*	Running annual average for the last four quarters.	13.2	ug/L	0
HALOACETIC ACIDS	2019-01-23 to 2019-10-29	<5.3	ug/L	N/A

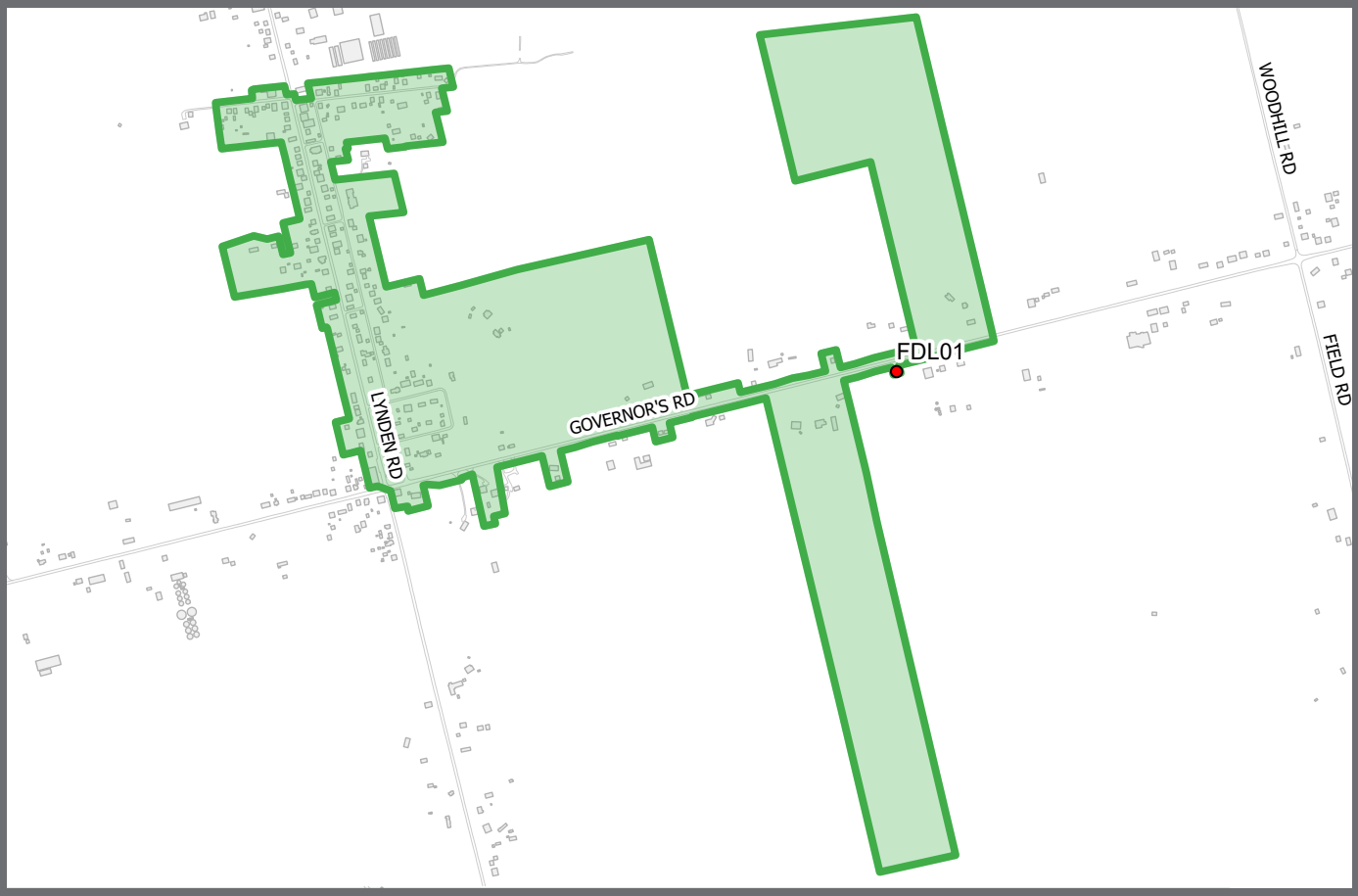
* The Maximum Acceptable Concentration for Trihalomethanes in the distribution is based on a running average of the results from all sampling events in the past four quarters. This running average can be found in the result value column.

Parameters Exceeding Prescribed Half-Standard

There were no Inorganic or Organic parameter(s) that exceeded half the standard prescribed in Schedule 2 of Ontario Drinking Water Quality Standards (O.Reg. 169/03)



LYNDEN DRINKING WATER SYSTEM
WATER QUALITY ANNUAL REPORT



LYNDEN DRINKING WATER SYSTEM

BCOS
BEYOND COMPLIANCE OPERATING SYSTEM

DEFINITIONS

AWQI: Adverse Water Quality Incident
CFU: Colony Forming Unit
HPC: Heterotrophic Plate Count
MDWL: Municipal Drinking Water Licence
mg/L: milligrams per litre
mL: millilitre
N/A: Not Applicable
PTTW: Permit to Take Water
ug/L: micrograms per litre

General Information

Drinking Water System Number	Drinking Water System Name	Drinking Water System Owner	Drinking Water System Category	Period Being Reported
250001830	Lynden Drinking Water System FDL01	City of Hamilton	Large Municipal Residential	January 1, 2019 to December 31, 2019

The Lynden ground water supply system consists of one well, one well station, treatment, sampling and analysis which services a population of approximately 390 people.

Water Well:

Lynden Well FDL01 is a 200 mm diameter, approximately 54-meter-deep drilled ground water well.

Treatment:

Water enters a dual cell reservoir in which compressed air is diffused into the first cell to reduce the levels of hydrogen sulfide in the water before sodium hypochlorite (chlorine) disinfection is carried out in the second cell. A secondary chlorine injection point is provided after primary disinfection to boost chlorine residual levels, when necessary, before the treated water goes to the distribution system. Fluoridation is not carried out at the Lynden communal well system.

Sampling & Analysis:

Continuous chlorine residual analyzers and a turbidity analyzer are provided to monitor water quality at the well station. Raw, treated and distribution water is sampled and analyzed weekly. In addition, chlorine residual in the distribution system is analyzed daily.

Provision of Drinking Water to Other Municipalities

The following is a list of municipal drinking water systems which receive drinking water from the Lynden System:

Drinking Water System Name	Drinking Water System Number
None other than Lynden System	250001830

A copy of this annual report is provided to all Drinking Water System owners that are connected to the system and to whom we provide drinking water.

Our customers are notified through the local newspaper that the annual report is available online free of charge at www.hamilton.ca/waterquality.

Water Treatment Chemicals Used During This Reporting Period

- Sodium Hypochlorite

Breakdown of Significant Monetary Expenses

The following table highlights the significant expenses that were incurred for the installation of required equipment in 2019. There were no significant expenses related to the replacement or repair of equipment in 2019.

Lynden Additional Water Supply $3,848,000

Adverse Test Results and Reportable Incidents

The following table outlines the notices submitted in accordance with subsection 18(1) of the Safe Drinking Water Act or section 16-4 of Schedule 16 of O.Reg.170/03 and reported to Spills Action Centre.

Notification Date (y-m-d)	Location of Adverse	Adverse Water Quality Incident	Resolution
2019-07-04	Lynden Sampling Station A	Total Coliforms = 9 CFU/100mL (Regulatory requirement is 0 CFU/100mL)	→ Resampled adverse location, one upstream and one downstream location. All results passed. The adverse was not confirmed.
2019-11-01	Lynden Entry Point	Lead = 0.0287 mg/L (Regulatory requirement is ≤ 0.010 mg/L)	→ Ongoing resolution. Drinking Water Advisory is still in effect. The adverse was not confirmed.

MECP Lynden Drinking Water System (DWS) Inspection Findings and Self-Declared Non-Compliances

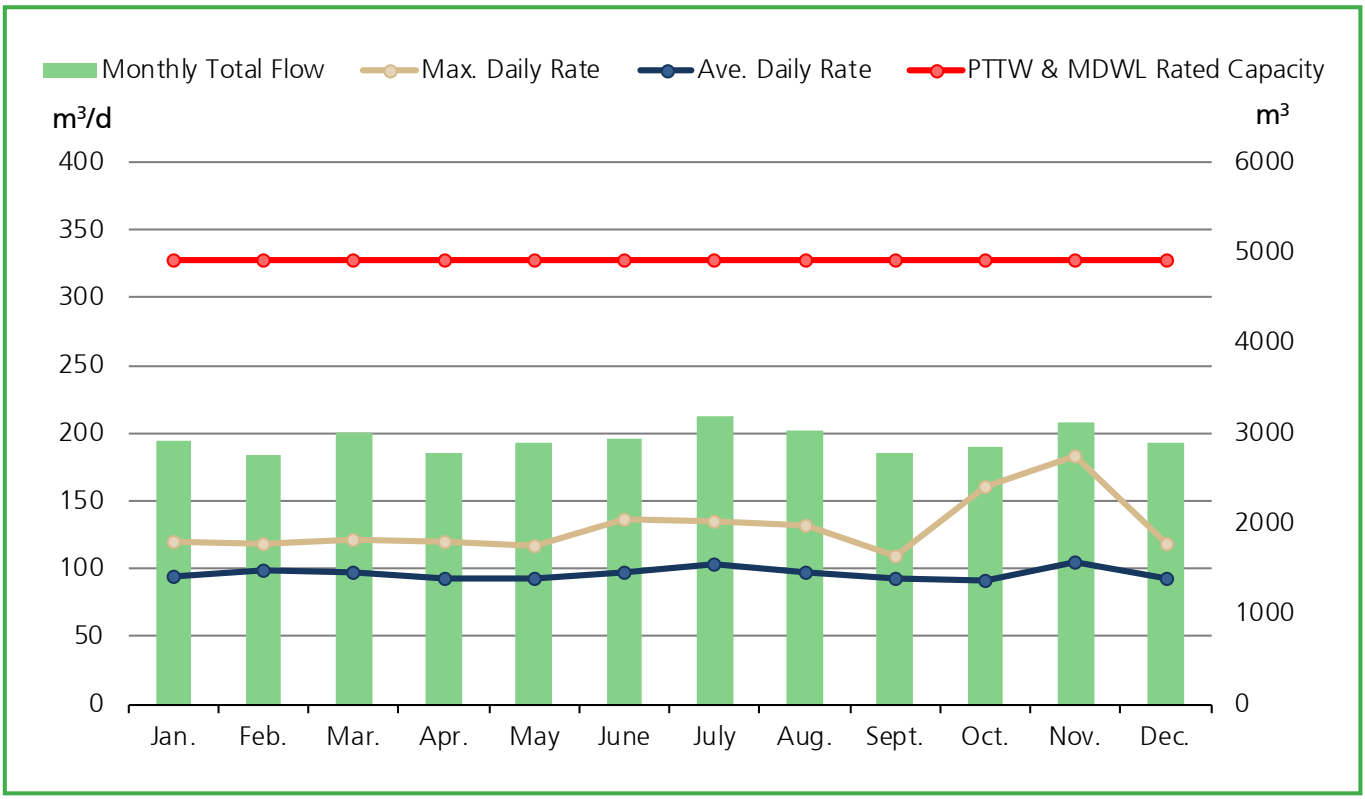
A summary of findings that were either issued during the MECP inspection or self-declared during the 2019 calendar year (Inspection date: July 25, 2019):

#	Finding Type	Finding	Status
1	Non-compliance	The City is advised to ensure that the required information (e.g. rated capacity) is listed in the Summary Report going forward as per O. Reg 170, Schedule 22, section 22-2.	→ Included in the 2019 Annual Summary Report
2	Recommendation	The owner had not implemented a program for the flushing of watermains as per industry standards.	→ Actions pending
3	Recommendation	Records did not confirm that disinfectant residuals were routinely checked at the extremities and "dead ends" of the distribution system.	→ Actions pending

Water Production Reports - Summary

The following provides a summary of daily flow rates and instantaneous peak flow rates in comparison to the capacity of the water works as identified in the Permit to Take Water. This information is tabulated in the accompanying tables.

FIGURE 6-1: LYNDEN WELL (FDL01) - 2019 MONTHLY PRODUCTION (SUMMARY)



MAINTAINED COMPLIANCE

TABLE 6-1: LYNDEN WELL (FDL01) - 2019 MONTHLY PRODUCTION (SUMMARY)

FDL01	UNITS	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.
Monthly Total Flow	m^3	2,908	2,758	3,016	2,770	2,899	2,934	3,195	3,019	2,789	2,844	3,130	2,890
Average Daily Rate	m^3/d	94	99	97	92	94	98	103	97	93	92	104	93
Maximum Daily Rate	m^3/d	120	119	121	120	116	136	136	133	109	161	183	118
PTTW & MDWL Daily Rated Capacity	m^3/d	327	327	327	327	327	327	327	327	327	327	327	327

WATER QUALITY DATA

Microbiological testing done under Schedule 10, 11, 12 and 17, 18 of Regulation 170/03, during this reporting period.

SAMPLE TYPE	NUMBER OF SAMPLES	RANGE OF E.COLI RESULTS (MIN #) to (MAX #) CFU/100mL	RANGE OF TOTAL COLIFORM RESULTS (MIN #) to (MAX #) CFU/100mL	NUMBER OF HPC SAMPLES	RANGE OF HPC RESULTS (MIN #) to (MAX #) CFU/1mL
RAW	52	0	0	N/A	N/A
TREATED	53	0	0	52	0 to 12
DISTRIBUTION	155	0	0 to 9	153	0 to 17

Operational testing done under Schedule 7, 8 or 9 of Regulation 170/03 during the period covered by this Annual Report.

NOTE: If results are obtained from continuous monitors, then 8,760 is reported as the number of samples.

PARAMETER - SAMPLE TYPE	NUMBER OF GRAB SAMPLES	RANGE OF RESULTS (MIN #) to (MAX #)	UNIT OF MEASURE
TURBIDITY - TREATED	52	0.07 – 0.30	NTU
FREE CHLORINE - TREATED	8,760	0.42 – 2.68	mg/L
FREE CHLORINE - DISTRIBUTION	365	0.40 – 2.18	mg/L

Summary of additional testing and sampling carried out in accordance with the requirement of a licence, approval, order or other legal instrument.

PARAMETER	NO. OF SAMPLES	SAMPLE DATE	RESULT VALUE	UNIT OF MEASURE
LEAD - TREATED	24	2019-01-09 to 2019-12-18	<0.0001 to 0.0045	mg/L
LEAD - DISTRIBUTION	72	2019-01-09 to 2019-12-18	<0.0001 to 0.0003	mg/L

Summary of Inorganic parameters required by Regulation 170/03 and tested during this reporting period.

PARAMETER	SAMPLE DATE	RESULT VALUE	UNIT OF MEASURE	NO. OF AWQIs
LYNDEN WELL TREATED				
ANTIMONY	2019-05-01 to 2019-10-31	<0.0001 to 0.0001	mg/L	0
ARSENIC	2019-05-01 to 2019-10-31	0.0001 to 0.0004	mg/L	0
BARIUM	2019-05-01 to 2019-10-31	0.605 to 0.805	mg/L	0
BORON	2019-05-01 to 2019-10-31	0.454 to 0.462	mg/L	0
CADMIUM	2019-05-01 to 2019-10-31	<0.0001 to 0.0001	mg/L	0
CHROMIUM	2019-05-01 to 2019-10-31	0.0004 to 0.0040	mg/L	0
FLUORIDE	2019-05-01 to 2019-10-31	0.64 to 0.66	mg/L	0
MERCURY	2019-05-01 to 2019-10-31	<0.05	mg/L	0
NITRATE AS N	2019-01-24 to 2019-10-31	0.02	mg/L	0
NITRITE AS N	2019-01-24 to 2019-10-31	<0.01	mg/L	0
SELENIUM	2019-05-01 to 2019-10-31	<0.0001	mg/L	0
SODIUM	2019-05-01 to 2019-10-31	58.1 to 60.9	mg/L	0
URANIUM	2019-05-01 to 2019-10-31	<0.002 to 0.006	ug/L	0

Summary of lead testing under Schedule 15.1 during this reporting period.

LOCATION TYPE	NO. OF POINTS SAMPLED	NO. OF LEAD SAMPLES TAKEN	NO. OF pH AND ALKALINITY SAMPLES TAKEN	RANGE OF pH RESULTS (min #) to (max #) pH Units	RANGE OF ALKALINITY RESULTS (min #) to (max #) mg/L	RANGE OF LEAD RESULTS (min #) to (max #) mg/L	NO. OF LEAD AWQIs	NO. OF LEAD EXCEEDANCES
PLUMBING-NR	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
PLUMBING-R	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
DISTRIBUTION	2	1	2	8.66 to 8.69	94	0.0008	0	N/A

NR - Non Residential R- Residential

Summary of Organic parameters required by Regulation 170/03 and tested during this reporting period.

PARAMETER	SAMPLE DATE	RESULT VALUE	UNIT OF MEASURE	NO. OF AWQIs
LYNDEN WELL TREATED				
1,1-DICHLOROETHYLENE	2019-05-01 to 2019-10-31	<0.2	ug/L	0
1,2-DICHLOROBENZENE	2019-05-01 to 2019-10-31	<0.2	ug/L	0
1,2-DICHLOROETHANE	2019-05-01 to 2019-10-31	<0.2	ug/L	0
1,4-DICHLOROBENZENE	2019-05-01 to 2019-10-31	<0.2	ug/L	0
BENZENE	2019-05-01 to 2019-10-31	<0.2	ug/L	0
CARBON TETRACHLORIDE	2019-05-01 to 2019-10-31	<0.2	ug/L	0
CHLOROBENZENE	2019-05-01 to 2019-10-31	<0.3	ug/L	0
DICHLOROMETHANE	2019-05-01 to 2019-10-31	<0.5	ug/L	0
ETHYLBENZENE	2019-05-01 to 2019-10-31	<0.2	ug/L	0
TETRACHLOROETHYLENE	2019-05-01 to 2019-10-31	<0.2	ug/L	0
TOLUENE	2019-05-01 to 2019-10-31	<0.2	ug/L	0
TRICHLOROETHYLENE	2019-05-01 to 2019-10-31	<0.2	ug/L	0
VINYL CHLORIDE	2019-05-01 to 2019-10-31	<0.2	ug/L	0
XYLENE	2019-05-01 to 2019-10-31	<0.3	ug/L	0
2,3,4,6-TETRACHLOROPHENOL	2019-05-01	<0.2	ug/L	0
2,4,6-TRICHLOROPHENOL	2019-05-01	<0.25	ug/L	0
2,4-D	2019-05-01	<0.19	ug/L	0
2,4-DICHLOROPHENOL	2019-05-01	<0.15	ug/L	0
ALACHLOR	2019-05-01	<0.02	ug/L	0
ATRAZINE + DESETHYL-ATRAZINE	2019-05-01	<0.01	ug/L	0
AZINPHOS-METHYL	2019-05-01	<0.05	ug/L	0
BENZO[A]PYRENE	2019-05-01	<0.004	ug/L	0
BROMOXYNIL	2019-05-01	<0.33	ug/L	0
CARBARYL	2019-05-01	<0.05	ug/L	0
CARBOFURAN	2019-05-01	<0.01	ug/L	0
CHLORPYRIFOS (DURSBAN)	2019-05-01	<0.02	ug/L	0
DIAZINON	2019-05-01	<0.02	ug/L	0
DICAMBA	2019-05-01	<0.20	ug/L	0
DICLOFOP-METHYL	2018-2019-05-01-16	<0.40	ug/L	0

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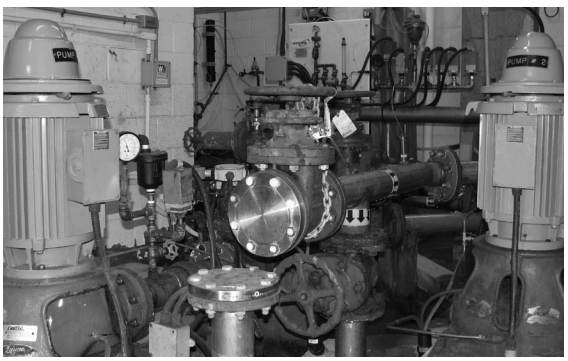
Summary of Organic parameters required by Regulation 170/03 and tested during this reporting period. (continued)...

PARAMETER	SAMPLE DATE	RESULT VALUE	UNIT OF MEASURE	NO. OF AWQIs
DIMETHOATE	2019-05-01	<0.06	ug/L	0
DIQUAT	2019-05-01	<1	ug/L	0
DIURON	2019-05-01	<0.03	ug/L	0
GLYPHOSATE	2019-05-01	<1	ug/L	0
MALATHION	2019-05-01	<0.02	ug/L	0
MCPA (2-METHYL-4-CHLOROPHENOXYACETIC ACID)	2019-05-01	<0.00012	mg/L	0
METOLACHLOR	2019-05-01	<0.01	ug/L	0
METRIBUZIN (SENCOR)	2019-05-01	<0.02	ug/L	0
PARAQUAT	2019-05-01	<1	ug/L	0
PCBSTOTAL	2019-05-01	<0.05	ug/L	0
PENTACHLOROPHENOL	2019-05-01	<0.15	ug/L	0
PHORATE	2019-05-01	<0.01	ug/L	0
PICLORAM	2019-05-01	<1	ug/L	0
PROMETRYNE	2019-05-01	<0.03	ug/L	0
SIMAZINE	2019-05-01	<0.01	ug/L	0
TERBUFOS	2019-05-01	<0.01	ug/L	0
TRIALLATE	2019-05-01	<0.01	ug/L	0
TRIFLURALIN	2019-05-01	<0.02	ug/L	0
DISTRIBUTION				
TOTAL TRIHALOMETHANES*	Running annual average for the last four quarters.	56.8	ug/L	0
HALOACETIC ACIDS	2019-01-24 to 2019-10-31	<5.3 to 9.2	ug/L	N/A

* The Maximum Acceptable Concentration for Trihalomethanes in the distribution is based on a running average of the results from all sampling events in the past four quarters. This running average can be found in the result value column.



Parameters Exceeding Prescribed Half-Standard

Summary of Inorganic or Organic parameter(s) that exceeded half the standard prescribed in Schedule 2 of Ontario Drinking Water Quality Standards (O.Reg. 169/03).

PARAMETER	SAMPLE DATE	RESULT VALUE	UNIT OF MEASURE
DISTRIBUTION - TOTAL TRIHALOMETHANES	2019-07-17	86	ug/L
DISTRIBUTION - TOTAL TRIHALOMETHANES	2019-10-31	55	ug/L
TREATED - BARIUM	2019-01-24	0.605	mg/L
TREATED - BARIUM	2019-05-01	0.612	mg/L
TREATED - BARIUM	2019-07-17	0.608	mg/L
TREATED - BARIUM	2019-10-31	0.805	mg/L

(Only if DWS category is large municipal residential, small municipal residential, large municipal non residential, non municipal year round residential, large non municipal non residential)