



Underwood Drinking Water System

2018 Annual Water Summary Report

1. INTRODUCTION AND BACKGROUND

The municipality owns and operates drinking water systems to provide residents with safe, potable water. These municipal drinking water systems are regulated under various legislation and legal documents including the Safe Drinking Water Act and Ontario Regulation 170/03 Drinking Water Systems. O. Reg. 170 requires that the municipality complete an annual water report (Section 11) and an annual summary report (Schedule 22).). The information required for each of these reports has been combined into this one report.

The reports are available free of charge on the municipal website at www.kincardine.ca or by contacting the Water Services Department at waterservice@kincardine.ca. Requests will also be received in person or by telephone at the Municipal Administration Centre (1475 Concession 5, 519-396-3468) or the Water Services Office (155 Durham Street, Kincardine, 519-396-4660).

1.1. System Description

Drinking-Water System Number:	220007052
Drinking-Water System Name:	Underwood Drinking Water System
Drinking-Water System Owner:	Municipality of Kincardine
Drinking-Water System Category:	Small Municipal Residential
Period being reported:	Year 2018

The Underwood Drinking Water System (DWS) is a non-GUDI system (which means that it is a secure well and not under the influence of surface water) consisting of a single well located in the hamlet of Underwood. The well is a drilled type with a 203 mm (8 in.) casing and is 122 m (400 ft) deep. It was drilled in August 1972 and is equipped with a submersible pump. Raw and treated water are each metered by mag meters. Sodium hypochlorite (NSF certified) is used for disinfection. There is on-line monitoring of chlorine. There are hydropneumatic tanks located in the control building that provide continuous pressure in the distribution system and allow for intermittent operation of the well pump. A chlorine contact chamber consisting of an 8.3 m length of 600 mm diameter pipe provides the required contact time. This system has a standby generator.

1.2. Major Expenses

The system incurred expenses necessary to install, repair or replace required equipment as follows:

Treatment Equipment (\$1,852.54)

2. WATER QUALITY MONITORING

Each municipal drinking water system is required to do testing to ensure that the water supplied to consumers is safe for consumption. Some of these tests such as chlorine residuals are done on site while others, like microbiological testing, must be performed by a licenced laboratory.

2.1. Microbiological Testing

O. Reg. 170 Schedule 11, requires the Underwood DWS to take a minimum of one sample per month of raw water from the well, and one sample every two weeks of distribution water and have them tested for Escherichia coli (E. coli) and total coliforms. The distribution samples must also be tested for heterotrophic plate count (HPC). Our internal sampling schedule exceeds the minimum requirements by having operations staff collect one treated and one distribution sample every week and have them tested for E. coli, total coliform and HPC.

Any E. coli or total coliform results above zero in treated or distribution water must be reported to the Ministry of Environment, Conservation and Parks (MECP) and Medical Officer of Health (MOH).

Heterotrophic plate count is a colony count of general bacteria population. There is no adverse limit for HPC samples. Results over 500 colonies per 1 mL may indicate a change in water quality but it is not considered an indicator of unsafe water.

The results from the 2018 sampling program are shown in the table below.

Water Source	Number of TC/EC Samples	Range of Total Coliform Results (#-#)	Range of E. coli Results (#-#)	Number of HPC Samples	Range of HPC Results (#-#)
Raw	12	0 – 17	0 – 1	12	0 – 152
Treated	52	0 – 0	0 – 0	52	0 – 3
Distribution	52	0 – 0	0 – 0	52	0 – 12

2.2. Chemical Testing

The Safe Drinking Water Act Reg 170 Schedule 13 requires periodic testing of the water for chemical parameters. The Underwood DWS is required to test for nitrite/nitrate, trihalomethane and Haloacetic Acid on a quarterly basis. The tables below outline other inorganic and organic parameters that are required to be tested every five years and include the date and result of the most recent test. Any result displayed as less than (<) are below the method detection limit of the lab.

Sodium and fluoride levels exceed the Ontario Drinking Water Quality Standards, but they are naturally occurring in the groundwater and do not need to be tested more frequently than every five years.

If the concentration of a parameter is above half of the Maximum Acceptable Concentration (MAC) under the Ontario Drinking Water Quality Standards, an increased testing frequency of once every three months is required by O. Regulation 170. There were previously no parameters above the half MAC but the 2018 arsenic level is just over the 5 ug/L limit and is now required to be tested for quarterly.

Inorganic Parameter	Sample Date	Result Value	Unit of Measure	Exceedance
Antimony	July 16/18	0.04	ug/L	No
Arsenic	July 16/18	5.5	ug/L	No
Barium	July 16/18	18.5	ug/L	No
Boron	July 16/18	267	ug/L	No
Cadmium	July 16/18	0.014	ug/L	No
Chromium	July 16/18	0.10	ug/L	No
Mercury	July 16/18	< 0.01	ug/L	No
Selenium	July 16/18	< 0.04	ug/L	No
Sodium	Oct 16/17	68.3	mg/L	Yes
	Oct 25/17	56.7		
Uranium	July 16/18	0.443	ug/L	No
Fluoride	April 9/18	1.69	mg/L	Yes
	April 17/18	1.72		
Nitrite	Jan 8/18	< 0.003	mg/L	No
	Apr 9/18	< 0.003		
	July 16/18	< 0.003		
	Oct 15/18	< 0.003		
Nitrate	Jan 8/18	0.042	mg/L	No
	Apr 9/18	0.008		
	July 16/18	0.008		
	Oct 15/18	0.018		

Organic Parameter	Sample Date	Result Value	Unit of Measure	Exceedance
Alachlor	July 16/18	< 0.02	ug/L	No
Atrazine + N-dealkylated metabolites	July 16/18	< 0.01	ug/L	No
Azinphos-methyl	July 16/18	< 0.05	ug/L	No
Benzene	July 16/18	< 0.32	ug/L	No
Benzo(a)pyrene	July 16/18	< 0.004	ug/L	No
Bromoxynil	July 16/18	< 0.33	ug/L	No
Carbaryl	July 16/18	< 0.05	ug/L	No
Carbofuran	July 16/18	< 0.01	ug/L	No
Carbon Tetrachloride	July 16/18	< 0.16	ug/L	No
Chlorpyrifos	July 16/18	< 0.02	ug/L	No
Diazinon	July 16/18	< 0.02	ug/L	No
Dicamba	July 16/18	< 0.20	ug/L	No
1,4-Dichlorobenzene	July 16/18	< 0.36	ug/L	No
1,2-Dichlorobenzene	July 16/18	< 0.41	ug/L	No
1,2-Dichloroethane	July 16/18	< 0.35	ug/L	No
1,1-Dichloroethylene (vinylidene chloride)	July 16/18	< 0.33	ug/L	No
Dichloromethane	July 16/18	< 0.35	ug/L	No
2,4 Dichlorophenol	July 16/18	< 0.15	ug/L	No
2,4-Dichlorophenoxy acetic acid (2,4-D)	July 16/18	< 0.19	ug/L	No
Diclofop-methyl	July 16/18	< 0.40	ug/L	No
Dimethoate	July 16/18	< 0.03	ug/L	No
Diquat	July 16/18	< 1	ug/L	No
Diuron	July 16/18	< 0.03	ug/L	No
Glyphosate	July 16/18	< 1	ug/L	No
Malathion	July 16/18	< 0.02	ug/L	No
2 methyl-4-chlorophenoxyacetic acid (MCPA)	July 16/18	<0.00012	mg/L	No
Metolachlor	July 16/18	< 0.01	ug/L	No
Metribuzin	July 16/18	< 0.02	ug/L	No
Monochlorobenzene	July 16/18	< 0.3	ug/L	No
Paraquat	July 16/18	< 1	ug/L	No
Pentachlorophenol	July 16/18	< 0.15	ug/L	No
Phorate	July 16/18	< 0.01	ug/L	No
Picloram	July 16/18	< 1	ug/L	No
Polychlorinated Biphenyls (PCB)	July 16/18	<0.04	ug/L	No
Prometryne	July 16/18	< 0.03	ug/L	No
Simazine	July 16/18	< 0.01	ug/L	No
Terbufos	July 16/18	< 0.01	ug/L	No
Tetrachloroethylene	July 16/18	< 0.35	ug/L	No
2,3,4,6-Tetrachlorophenol	July 16/18	< 0.20	ug/L	No
Triallate	July 16/18	< 0.01	ug/L	No
Trichloroethylene	July 16/18	< 0.44	ug/L	No
2,4,6-Trichlorophenol	July 16/18	< 0.25	ug/L	No
Trifluralin	July 16/18	< 0.02	ug/L	No
Vinyl Chloride	July 16/18	< 0.17	ug/L	No

Trihalomethane (THM) distribution sampling is required quarterly and must also be expressed as a running annual average. The limit as set in the Ontario Drinking Water Quality Standards is 100 ug/L. THMs are a by-product of the disinfection process.

Date Sampled	THM Result Value (ug/L)	Running Annual Average (ug/L)	Exceedance
January 8/18	40	48.0	No
April 9/18	34	48.3	No
July 16/18	61	51.8	No
October 15/18	39	43.5	No

Sampling and testing for Haloacetic Acid (HAA) in the distribution system is a new requirement in 2017. The limit as set in the Ontario Drinking Water Quality Standards is 80 ug/L and starting in 2020 must also be expressed as a running annual average. HAAs are a by-product of the disinfection process.

Date Sampled	HAA Result Value (ug/L)	Running Annual Average (ug/L)	Exceedance
January 8/18	6.5	6.6	No
April 9/18	6.6	6.9	No
July 16/18	6.0	7.1	No
October 15/18	< 5.3	6.1	No

The Underwood DWS does not have significant levels of lead and so is currently under a reduced-sampling program. Under this sampling program, O. Reg 170 Schedule 15.1 requires sampling for lead every three years and lead-related parameters every year Lead was required to be sampled in 2018.

Parameter	Location Type	Number of Samples	Range of Results
Lead (ug/L)	Distribution	2	0.34 – 2.62
pH	Distribution	2	7.79 – 8.14
Alkalinity (mg/L)	Distribution	2	106 – 108

2.3. Operational Monitoring

Sodium hypochlorite is used for primary and secondary disinfection. The free chlorine residual is monitored continuously on the treated water and must be checked a minimum of twice per week in the distribution system.

The Ministry of the Environment, Conservation and Parks *Procedure for Disinfection of Drinking Water in Ontario* outlines the minimum chlorine residual for adequate treatment.

Free Chlorine Residual	Number of Grab Samples	Range of Results (#-#)
Treated Water	Continuous monitoring	0.24 – 3.35
Distribution Water	365	0.42 – 1.62

O. Reg 170 Schedule 7 requires that turbidity in the raw water is tested at least once every month. Consistent turbidity results greater than 5 NTU could indicate surface water influence on the well.

Raw Water	Number of Grab Samples	Range of Results (#-#)
Turbidity	52	0.11 – 0.56

3. WATER QUANTITY

The following tables list the quantities and flow rates of the water supplied to the distribution system during the reporting period covered by this report, including monthly average and maximum daily flows and a comparison to the rated capacity specified in the system Municipal Drinking Water Licence. The rated capacity of the treatment system is 90.8 m³/day. There is no maximum flow rate specified for water supplied to the distribution system.

Month	Average Daily Flow (m³/day)	% Average Day/Rated Capacity (m³/day)	Maximum Daily Flow (m³/day)	% Maximum Day/Rated Capacity (m³/day)
January	15	19%	23	30%
February	15	19%	19	25%
March	16	20%	19	24%
April	16	20%	24	31%
May	16	20%	28	37%
June	17	22%	26	33%
July	16	20%	22	28%
August	20	26%	30	39%
September	25	32%	29	38%
October	30	38%	37	47%
November	35	45%	47	60%
December	27	34%	43	55%
Annual	20	26%	47	60%

Month	Average Daily Flow Rate (L/s)	Maximum Daily Flow Rate (L/s)
January	0.17	1.28
February	0.18	1.37
March	0.18	2.14
April	0.18	3.09
May	0.18	2.92
June	0.20	2.84
July	0.18	3.09
August	0.23	1.86
September	0.29	1.51
October	0.34	1.57
November	0.40	3.09
December	0.31	3.05
Annual	0.24	3.09

4. ADVERSE WATER QUALITY INCIDENTS AND NON-COMPLIANCE FINDINGS

Any adverse results from microbiological samples, chemical samples or observations of operational conditions that indicate adverse water quality are reported to the Spills Action Centre (SAC) of the Ministry Of The Environment, Conservation And Parks and the Medical Officer of Health (MOH). All adverse conditions are responded to immediately and corrective actions taken. For fluoride, a result above 1.5 mg/L must be reported. The municipality notifies residents of the elevated fluoride annually in the first water bill each year.

Incident Date	Parameter	Result	Unit of Measure	Corrective Action	Corrective Action Date
April 11, 2018 #139071	Fluoride	1.69	mg/L	Resample	April 17, 2018

The annual MECP Inspection took place on April 10, 2018. The inspection report did not identify any non-compliance issues and the system received a final inspection rating of 100%.

O. Reg 170 Schedule 22 requires the municipality to identify any requirements of the Act, Regulations, Drinking Water Works Permit, Municipal Drinking Water Licence and any Order that the system failed to meet during the reporting period. These are detailed in the following table including the duration and the measures taken to correct each failure.

Drinking Water Legislation	Requirements the System Failed to Meet	Duration	Corrective Actions
O. Reg. 170, Schedule 13, Section 13-5(1)	Sampling for Arsenic was not completed three months after the July 2018 sample exceeded half of the standard concentration of 10 ug/L	October 2018	Arsenic has been added to the Chain of Custody for sampling every 3 months