



2017 ANNUAL DRINKING WATER SYSTEM SUMMARY REPORT

Hickson Water System

1. GENERAL INFORMATION

Oxford County prepares a report summarizing system operation and water quality for every municipal drinking water system annually. The reports detail the latest water quality testing results, water quantity statistics and any adverse conditions that may have occurred for the previous year. They are available for review by the end of February on the Oxford County Website at www.oxfordcounty.ca/drinkingwater or by contacting the Public Works Department.

All efforts have been made to ensure the information presented in this report is accurate. If you have any questions or comments concerning the report please contact the County of Oxford at the address and phone number listed below or by email at publicworks@oxfordcounty.ca.

Drinking Water System:	Hickson (King Subdivision) Water System
Drinking Water System Number:	2200006124
Drinking Water System Owner & Contact Information:	Oxford County Public Works Department Water Services P.O. Box 1614 21 Reeve Street Woodstock, ON, N4S 7Y3 Telephone: 519-539-9800 Toll Free: 1-866-537-7778 Email: publicworks@oxfordcounty.ca
Reporting Period:	January 1, 2017 – December 31, 2017

1.1. System Description

The Hickson Water System is a Small Municipal Water system as defined by Regulation 170/03 and serves a population of approximately 102. The system consists of one groundwater well and a treatment facility. The water is treated with sodium hypochlorite (liquid chlorine) for disinfection and in 2017 approximately 0.19 m³ of the chemical was used in the water treatment process. This chemical is certified to meet standards set by the Standards Council of Canada or American National Standards Institute.

The treatment facility houses pumps, monitoring equipment, and a 62 m³ underground reservoir. A standby generator is available to run the facility in the event of a power failure. The system is maintained by licensed water system operators, who operate treatment and monitoring equipment and collect samples as specified by the Regulation. Alarms automatically notify operators in the event of failure of critical operational requirements.

1.2. Major Expenses

The Hickson Water System is one of 14 water systems that have revenues and expenses pooled for economy of scale purposes. The systems are combined into the Township Water financial system and in 2017 had operating and maintenance expenditures of approximately \$2,480,000. In addition to regular operational and maintenance expenditures approximately \$1,300,000 was spent to install or upgrade water meters in the Township systems.

2. MICROBIOLOGICAL TESTING

2.1. *E. coli* and Total Coliforms

Bacteriological tests for *E. coli* and total coliforms are taken weekly from the raw water at the facility and from the distribution system. Samples of water at the treatment facility are not required for Small Municipal systems but may be taken periodically. Extra samples are taken after major repairs or maintenance work. Any *E. coli* or total coliform results above 0 in treated water must be reported to the Ministry of Environment and Climate Change (MOECC) and the Medical Officer of Health (MOH). Resamples and any other required actions are taken as quickly as possible. The results from the 2017 sampling program are shown on the table below. There was one adverse test results from the 52 treated water samples in this reporting period.

	<i>Number of Samples</i>	<i>Range of E. coli Results Min - Max MAC = 0</i>	<i>Range of Total Coliform Results Min - Max MAC = 0</i>
Raw	52	0 - 0	0 - 9
Distribution	52	0 - 0	0 - 2

2.2. Heterotrophic Plate Count (HPC)

HPC analyses are completed weekly from the distribution water for small systems. HPC should be less than 500 colonies per 1 mL. 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 2017 results are shown in the table below.

	<i>Number of Samples</i>	<i>Range of HPC Min - Max</i>
Distribution	52	0 - 5

3. CHEMICAL TESTING

The Safe Drinking Water Act requires periodic testing of the water for approximately 70 different chemical parameters. The latest results for all parameters are provided in Appendix A. The sampling frequency varies for different types and sizes of water systems and chemical parameters. If the concentration of a parameter is above half of the Maximum Allowable Concentration (MAC) under the Ontario Drinking Water Quality Standards, an increased testing frequency of once every three months is required by the Regulation. Where concerns regarding a parameter exist, the MOECC can also require additional sampling be undertaken.

Information on the health effects and allowable limits of components in drinking water may be found on the MOECC web page through the link provided in Appendix A. Additional information on common chemical parameters specific to the Hickson system is provided below.

3.1. Hardness

This is an aesthetic parameters that may affect the appearance of the water but is not related to health. Well water commonly has high levels of hardness and other minerals from being in contact with underground rock formations. Many households have water softeners to help reduce white calcium deposits, improve the efficiency of soaps and reduce iron levels. This information is included here to help set the water softener at the level recommended by the manufacturer. The hardness is 287 mg/L (equivalent to 20 grains/gallon).

3.2. Additional Testing Required by MOECC

None.

4. OPERATIONAL MONITORING

4.1. Chlorine Residual

Free chlorine levels of the treated water are monitored continuously at the discharge point of the Water Treatment Facility (WTF). In the distribution system free chlorine is checked twice weekly at various locations. As a target, the free chlorine residual within the distribution system should be above 0.20 mg/L. A free chlorine level lower than 0.05 mg/L must be reported and corrective action taken. A summary of the monitoring results for 2017 is provided in the table below. There were no reportable incidents in 2017.

4.2. Turbidity

Turbidity of treated water is continuously monitored at the WTF, as a change in turbidity can indicate an operational problem. The turbidity of untreated water from the well is checked weekly. Turbidity is measured in nephelometric turbidity units (NTU). Under Regulation 170/03 turbidity in groundwater is not reportable however turbidity should be < 1 NTU at the treatment facility and < 5 NTU in the distribution system. A summary of the monitoring results for 2017 is provided in table below.

<i>Parameter</i>	<i>Number of Tests or Monitoring Frequency</i>	<i>Range of Results (Min – Max) and Average</i>
Chlorine residual in distribution (mg/L)	105	(0.47 – 1.28) 0.87
Chlorine residual after treatment (mg/L)	Continuous	(0.38 – 1.71) 1.07
Turbidity after treatment (NTU)	Continuous	(0.06 – 4.00) 0.23

5. WATER QUANTITY

Continuous monitoring of flow rates from supply wells into the treatment system and from the WTF into the distribution system is required by Regulation 170/03. The Municipal Drinking Water License and Permit to Take Water issued by the MOECC regulate the amount of water that can be utilized over a given time period. A summary of the 2017 flows are provided in the table below and presented graphically in Appendix B.

Summary	Quantity
Permit to Take Water Limit	300 m ³ /d
Municipal Drinking Water License Limit	389 m ³ /d
2017 Average Daily Flow	22 m ³ /d
2017 Maximum Daily Flow	52 m ³ /d
2017 Average Monthly Flow	665 m ³
2017 Total Amount of Water Supplied	7,985 m ³

A review of the available supply capacity and the anticipated growth forecasted for the community indicates that the system has sufficient capacity over the 20 year planning horizon.

6. NON-COMPLIANCE FINDINGS AND ADVERSE RESULTS

This section documents any known incidents of non-compliance or adverse results and the associated correction actions taken to resolve the issue. Non-compliance issues are typically identified by either the Operating Authority or the MOECC Drinking Water Inspectors. The issues and associated required actions are documented by the Inspectors in the system's Annual Inspection Report. All non-compliance issues are investigated, corrective actions taken and documented using the County's Drinking Water Quality Management System (DWQMS) procedures.

6.1. Non-Compliance Findings

The 2017 MOECC inspection was completed in April. There was one non-compliance issue identified related to a Form 1 document not being completed at the time of a watermain installation, the Form 1 was subsequently completed. An inspection rating of 99% was received.

6.2. Adverse Results

Any adverse results from bacteriological, chemical samples or observations of operational conditions that indicate adverse water quality are reported as required and corrective actions taken. There was one reportable adverse condition in 2017.

On September 18, a distribution sample taken for bacteriological testing had a positive finding of 2 cfu/100mL for Total Coliforms. The result was reported to both the MOECC and MOH. The resamples taken on September 20 were negative for total coliforms.

APPENDIX A: SUMMARY OF CHEMICAL RESULTS

UNDERSTANDING CHEMICAL TEST RESULTS

The following tables summarize the laboratory results of the chemical testing Oxford County is required to complete. Different types of parameters are required to be tested for at different frequencies as noted below. Explanations on the health impacts of these parameters can be found at the MOECC web site link <http://www.ontla.on.ca/library/repository/mon/14000/263450.pdf> document # 4449e01 titled "Technical Support Document for Ontario Drinking Water Standards, Objectives and Guidelines".

Results are shown as concentrations with units of either milligrams per litre (mg/L) or micrograms per litre (ug/L). 1 mg/L is equal to 1000 ug/L. The Maximum Acceptable Concentration (MAC) is the highest amount of a parameter that is acceptable in Municipal drinking water and can be found in the MOECC Drinking Water Standards. The Method Detection Limit (MDL) is the lowest amount to which the laboratory can confidently measure. A result of "ND" stands for "Not Detected" and means that the concentration of the chemical is lower than the laboratory's equipment is capable of measuring.

Nitrite and nitrate samples are required every 3 months in normal operation.

<i>Parameter</i>	<i>Result Range Min - Max (mg/L)</i>	<i>Average Result (mg/L)</i>	<i>MAC (mg/L)</i>	<i>MDL (mg/L)</i>
Nitrite	ND	ND	1.0	0.003
Nitrate	ND - 0.02	0.009	10.0	0.006

Trihalomethanes (THM) and total Haloacetic Acids (HAA) samples are by-products of the disinfection process. The samples are required every 3 months from the distribution system.

<i>Parameter</i>	<i>Annual Average</i>	<i>Result Value (ug/L)</i>	<i>MAC (ug/L)</i>	<i>MDL (ug/L)</i>
Trihalomethanes (THM)	2017	14	100	0.37
Haloacetic Acids (HAA)	2017	ND	80	5.3

The following Table summarizes the most recent test results for Sodium and Fluoride. Testing and reporting any adverse results is required every 5 years.

<i>Parameter</i>	<i>Sample Date</i>	<i>Result Value (mg/L)</i>	<i>MAC (mg/L)</i>	<i>MDL (mg/L)</i>
Sodium	Aug 20, 2016	10.7	20.0*	0.01
Fluoride	Aug 20, 2016	1.34	1.5**	0.06

*Sodium levels between 20 – 200 mg/L must be reported every 5 years.

**Natural levels of fluoride between 1.5 – 2.4 mg/L must be reported every 5 years.

The following Table summarizes the most recent results for the Lead Testing Program. Lead samples are taken every 3 years. Levels of alkalinity and pH are monitored twice per year in the distribution system to ensure water quality is consistent and does not facilitate leaching of lead into the water.

<i>Parameter</i>	<i>Result Range (Min - Max)</i>	<i>Number of Samples</i>	<i>Acceptable Level</i>
Distribution Alkalinity	232 - 239	2	30 - 500 (mg/L)
Distribution pH	7.1 - 7.4	2	6.5 - 8.5
Distribution Lead 2015	0.17 - 0.18	2	10 ug/L MAC

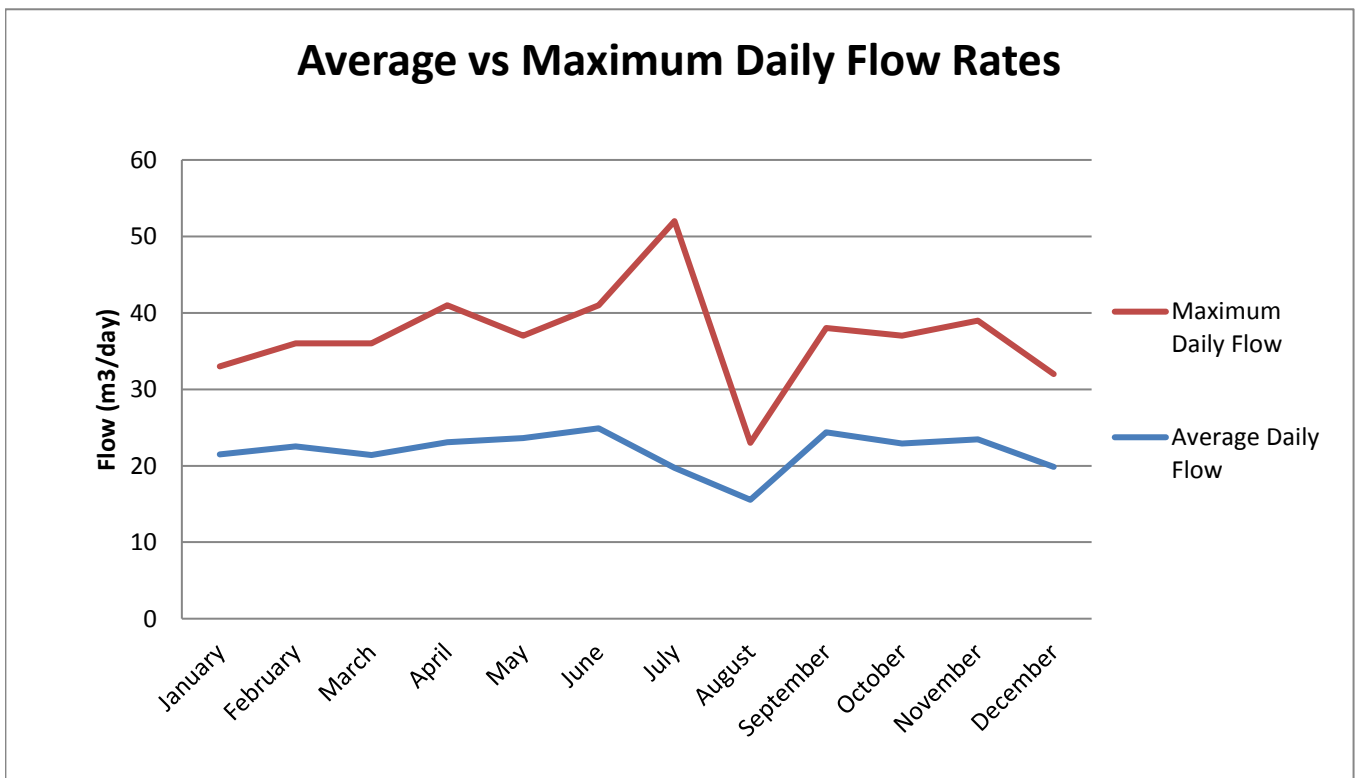
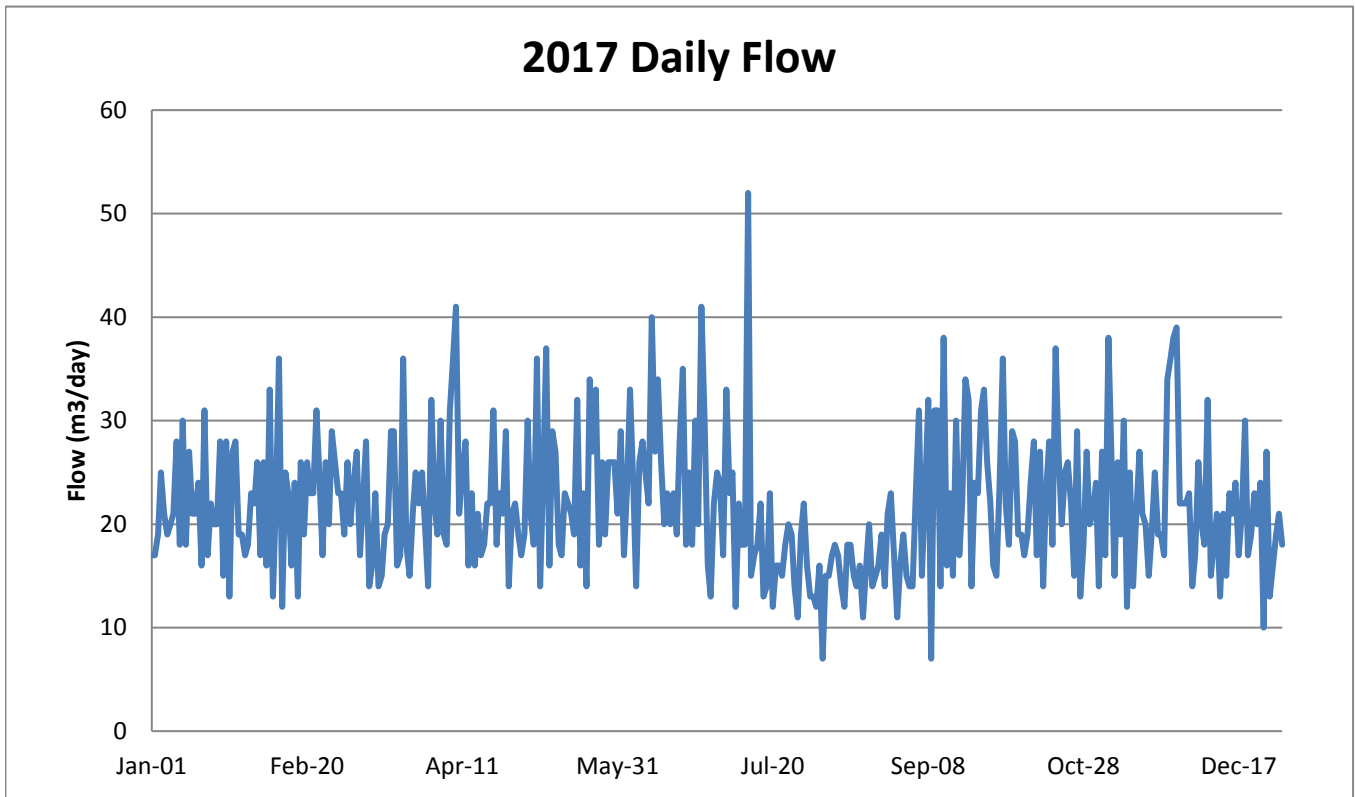
The following Table summarizes the most recent test results for Schedules 23 and 24. Testing is required every 5 years for secure groundwater wells.

<i>Parameter</i>	<i>Sample Date</i>	<i>Result Value (ug/L)</i>	<i>MAC (ug/L)</i>	<i>MDL (ug/L)</i>
Antimony	June 9, 2014	ND	6	0.02
Arsenic	"	0.3	25	0.20
Barium	"	47.5	1000	0.02
Boron	"	22.5	5000	0.20
Cadmium	"	0.008	5	0.003
Chromium	"	0.22	50	0.03
Mercury	"	ND	1	0.01
Selenium	"	ND	5	1.0
Uranium	"	0.040	20	0.002

<i>Parameter</i>	<i>Sample Date</i>	<i>Result Value (ug/L)</i>	<i>MAC (ug/L)</i>	<i>MDL (ug/L)</i>
Alachlor	May 30, 2016	ND	5	0.02
Aldicarb *	May 24, 2011	ND	9	0.01
Aldrin + Dieldrin *	May 24, 2011	ND	0.7	0.01
Atrazine + N-dealkylated metabolites	May 30, 2016	ND	5	0.01
Azinphos-methyl	"	ND	20	0.05
Benzene	"	ND	1	0.32
Bendiocarb *	May 24, 2011	ND	40	0.01
Benzo(a)pyrene	May 30, 2016	ND	0.01	0.004
Bromoxynil	"	ND	5	0.33
Carbaryl	"	ND	90	0.05
Carbofuran	"	ND	90	0.01
Carbon Tetrachloride	"	ND	2	0.16
Chlordane (Total) *	May 24, 2011	ND	7	0.02
Chlorpyrifos	May 30, 2016	ND	90	0.02
Cyanazine *	May 24, 2011	ND	10	0.18
Diazinon	May 30, 2016	ND	20	0.02
Dicamba	"	ND	120	0.20
1,2-Dichlorobenzene	"	ND	200	0.41
1,4-Dichlorobenzene	"	ND	5	0.36
Dichlorodiphenyltrichloroethane (DDT) + metabolites *	May 24, 2011	ND	30	0.01
1,2-Dichloroethane	May 30, 2016	ND	5	0.35
1,1-Dichloroethylene (vinylidene chloride)	"	ND	14	0.33
Dichloromethane	"	ND	50	0.35
2-4 Dichlorophenol	"	ND	900	0.15
2,4-Dichlorophenoxy acetic acid (2,4-D)	"	ND	100	0.19
Diclofop-methyl	"	ND	9	0.40
Dimethoate	"	ND	20	0.03
Dinoseb *	May 24, 2011	ND	10	0.36
Diquat	May 30, 2016	ND	70	1
Diuron	"	ND	150	0.03
Glyphosate	"	ND	280	1
Heptachlor + Heptachlor Epoxide *	May 24, 2011	ND	3	0.01
Lindane (Total) *	"	ND	4	0.01
Malathion	May 30, 2016	ND	190	0.02
Methoxychlor *	May 24, 2011	ND	900	0.01
Metolachlor	May 30, 2016	ND	50	0.01
Metribuzin	"	ND	80	0.02
Monochlorobenzene	"	ND	80	0.30
Paraquat	"	ND	10	1
Parathion *	May 24, 2011	ND	50	0.02
Pentachlorophenol	May 30, 2016	ND	60	0.15
Phorate	"	ND	2	0.01
Picloram	"	ND	190	1
Polychlorinated Biphenyls (PCB)	"	ND	3	0.04
Prometryne	"	ND	1	0.03
Simazine	"	ND	10	0.01
Temephos *	May 24, 2011	ND	280	0.01
Terbufos	May 30, 2016	ND	1	0.01
Tetrachloroethylene	"	ND	10	0.35
2,3,4,6-Tetrachlorophenol	"	ND	100	0.2
Triallate	"	ND	230	0.01
Trichloroethylene	"	ND	5	0.44
2,4,6-Trichlorophenol	"	ND	5	0.25
2,4,5-Trichlorophenoxy acetic acid (2,4,5-T) *	May 24, 2011	ND	280	0.22
Trifluralin	May 30, 2016	ND	45	0.02
Vinyl Chloride	"	ND	1	0.17

*Note: Parameter removed from Schedule 24 sample requirements in 2016.

APPENDIX B: 2017 WATER QUANTITY SUMMARY



Hickson Water System Capacity 389 m³/day