



**Township of Huron-Kinloss
Whitechurch Drinking Water System**



**Water Quality Summary Report
2017**



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2017 Water Quality Summary Report

This is a summary of regulatory compliance for the Whitechurch Drinking Water System in 2017. A complete summary of the flows, sampling results, chemical use, and significant activities, was submitted on February 27, 2018 in the Annual Report.

OVERVIEW AND BACKGROUND:

Safe Drinking Water Act

Following the Walkerton tragedy in 2000, the Ontario Government developed a new, comprehensive legislative paradigm based on a source-to-tap, multi-barrier approach to the protection of drinking water. The *Safe Drinking Water Act (SDWA), 2002*, and its Regulations, contain requirements for Municipalities that provide potable water to their residents.

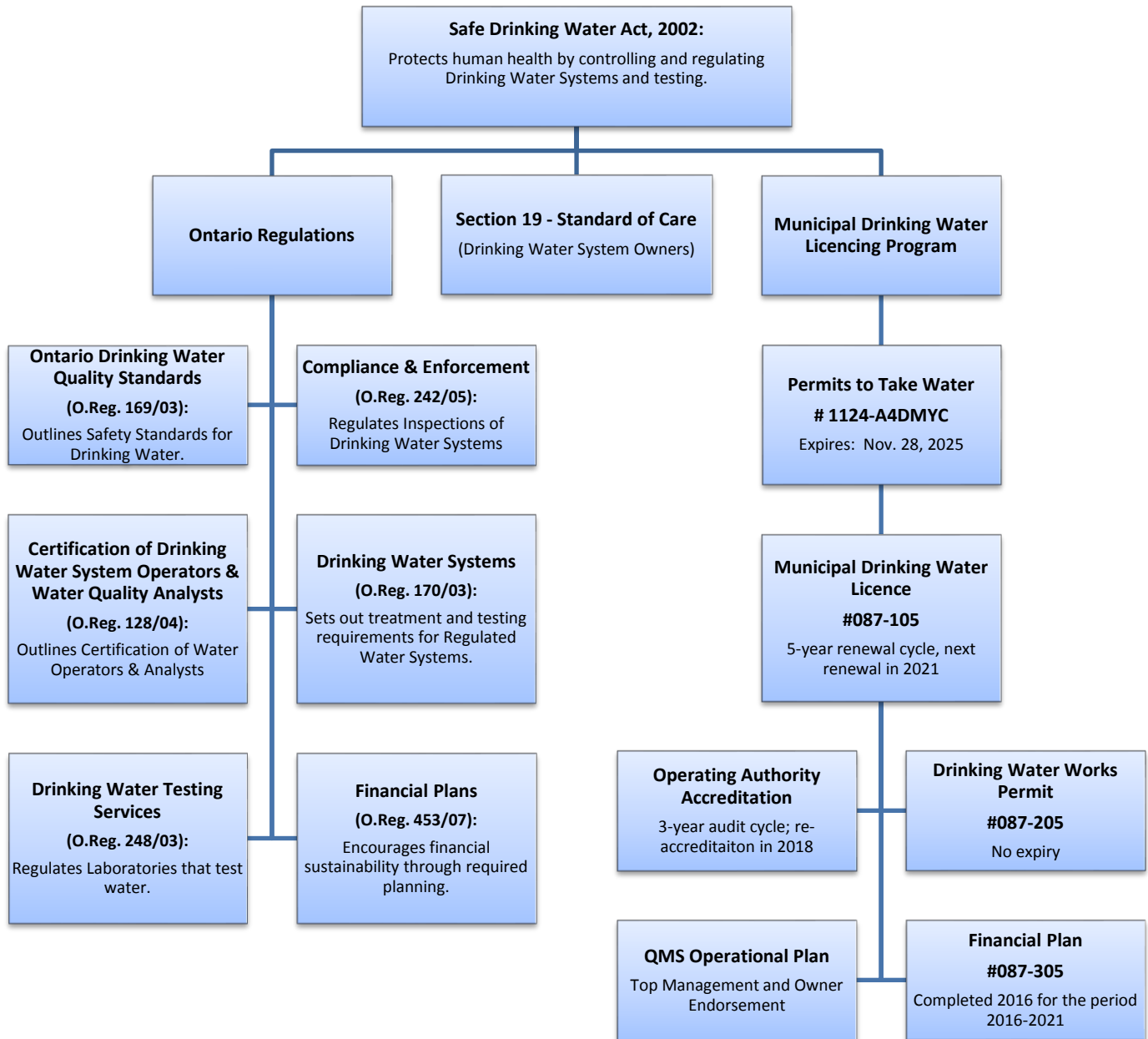
Under Section 19 (Standard of Care of the *SDWA*, owners of a Drinking Water System are required to:

- (a) exercise the level of care, diligence and skill in respect of a Municipal Drinking Water System that a reasonably prudent person would be expected to exercise in a similar situation; and
 - (b) act honestly, competently and with integrity, with a view to ensuring the protection and safety of the users of the Municipal Drinking Water System.
- 2002, c. 32, s. 19(1).

The following chart outlines key aspects of the *SDWA* that relate to Whitechurch's Drinking Water System:



Legislative Framework for the Whitechurch Drinking Water System





REPORTING REQUIREMENTS:

This report intends to provide relevant information to help the Township of Huron-Kinloss its Council, as owners of the Whitechurch Drinking Water System, meet this Standard of Care. Its contents are organized as follows, according to specific reporting requirements under the *SDWA*:

1. **Summary Report:** Schedule 22 of Ontario's *Drinking Water Systems Regulation* (O. Reg. 170/03) requires that a summary report be prepared for the preceding calendar year, and submitted to members of Council to disclose compliance status and provide pertinent water quality data.
2. **Annual Report (Appendix #1):** Section 11 of O. Reg. 170/03 requires that an annual report be prepared for the preceding calendar year, and submitted to members of Council and the Township of Huron-Kinloss. This report summarizes water quality monitoring, corrective actions, and major expenses, and is made available to the public on the Township of Huron-Kinloss website and at the Township office.
3. **MOECC Inspection Report (Appendix #2):** In 2006, the Ministry of the Environment and Climate Change (MOECC) introduced a comprehensive inspection program for Municipal Residential Drinking Water Systems. The objectives of this program are to determine compliance with the *SDWA* and associated regulations; to encourage the continuous improvement of the drinking water system; and to establish a process to measure these improvements.
4. **Municipal Drinking Water Management Review (Appendix #3):** The *SDWA*, through the Municipal Drinking Water Licensing program, requires that the Township maintain an accredited Quality Management System (QMS) for its drinking water system. This review communicates to Council key information related to the QMS and the Municipal Drinking Water Licensing program.
5. **QMS "Operational Plan" (Appendix #4):** The *SDWA*, through the Municipal Drinking Water Licensing program, requires that a Municipal Drinking Water System Owner (Council) endorse the most current version of the QMS Operational Plan. This document, once endorsed, is posted on the Township of Huron-Kinloss website and is available at the Operations Centre.

1. SUMMARY REPORT

1.1 Submission to the Township of Huron-Kinloss

Schedule 22 of Ontario Regulation 170/03 requires, for Small Residential Systems, that a Summary Report be prepared and submitted to the Township of Huron-Kinloss, for distribution to Council by March 31, 2018 for the period from January 1 to December 31, 2017.



1.2 Statement of Compliance

Requirements for owning and operating the Whitechurch Drinking Water System are contained within the SDWA, its applicable regulations, and its approval instruments.

- The MOECC “Drinking Water Ontario” web portal provides the most current version of the Act and its regulations: www.ene.gov.on.ca/environment/dwo
- The Township of Huron-Kinloss is approved by the MOECC to operate a Limited System through its Municipal Drinking Water Licence (MDWL) #087-105, and to alter the system through its Drinking Water Works Permit (DWWP) #087-205.

Compliance with these requirements is evaluated through annual Ministry Inspections. The Whitechurch 2016/2017 Inspection Report (Appendix #3) contains **two incidents of non-compliance** and a **rating of 99.19%**. There have been no Orders issued by the MOECC under the SDWA or Ontario Regulation 170/03 for the period of January 1, 2017 to December 31, 2017.

1.3 Summary of Flow Rates

Under Schedule 22-2(3) of O. Reg. 170/03, the Summary Report must include a summary of flow rates for the purpose of enabling the system owner to assess the capability of the system to meet existing and planned uses.

Table 1 is a summary of the quantities and flow rates of the water supplied during the period covered by the report, including monthly average.

Table 1: 2017 Summary of Flows for Whitechurch

Whitechurch Well # 1:

Month	Raw Flow Daily Max (L/s)	Raw Flow Monthly Avg (L/s)	Raw Volume Monthly Total (m ³)	Raw Volume Daily Max (m ³)	Raw Volume Monthly Avg (m ³)	Capacity Monthly Max (%)
January	2.80	2.00	383.84	14.99	12.38	5.77
February	2.81	2.01	261.93	13.83	9.35	5.32
March	2.82	1.98	267.18	17.03	8.62	6.55
April	2.85	2.00	304.64	20.89	10.15	8.03
May	2.85	2.06	384.16	28.06	12.39	10.79
June	2.82	1.99	303.53	18.66	10.12	7.18
July	2.97	1.99	304.71	12.35	9.83	4.75
August	2.99	2.00	305.84	11.69	9.87	4.50
September	2.99	1.96	261.45	11.98	8.72	4.61
October	2.99	1.97	258.62	15.11	8.34	5.81
November	2.80	2.00	228.76	11.54	7.63	4.44
December	3.05	2.00	259.33	10.92	8.37	4.20
PTTW Max	3.283	3.283	7,908.33	260.00	--	--
Annual Max		--	384.16	28.06	--	10.79
Annual Avg		2.00	293.67	--	9.65	--
Annual Total		--	3,523.99	--	--	--



Whitechurch Well # 2:

Month	Raw Flow Daily Max (L/s)	Raw Flow Monthly Avg (L/s)	Raw Volume Monthly Total (m ³)	Raw Volume Daily Max (m ³)	Raw Volume Monthly Avg (m ³)	Capacity Monthly Max (%)
January	2.75	1.95	385.03	15.35	12.42	5.90
February	2.75	1.95	260.54	14.10	9.31	5.42
March	2.75	1.91	266.28	16.73	8.59	6.43
April	2.89	1.96	297.12	19.09	9.91	7.34
May	2.95	2.02	382.00	34.20	12.32	13.15
June	2.86	1.97	321.22	18.14	10.71	6.98
July	2.82	1.96	301.06	12.37	9.71	4.76
August	2.74	1.95	301.44	11.38	9.72	4.38
September	2.74	1.94	261.13	11.79	8.70	4.53
October	2.94	1.96	258.31	14.07	8.33	5.41
November	2.74	1.97	227.30	11.23	7.58	4.32
December	2.91	1.95	261.24	10.59	8.43	4.07
PTTW Max	3.283	3.283	7,908.33	260.00	--	--
Annual Max	2.95	--	385.03	34.20	--	13.15
Annual Avg	--	1.96	293.56	--	9.64	--
Annual Total	--	--	3,522.70	--	--	--

Whitechurch Wells # 1 and # 2 Combined:

Month	Treated Volume Monthly Total (m ³)	Treated Volume Daily Max (m ³)	Treated Volume Monthly Avg (m ³)	Capacity Daily Max (%)
January	768.87	30.12	24.80	11.58
February	522.47	27.93	18.66	10.74
March	533.46	33.76	17.21	12.98
April	601.79	39.98	20.06	15.38
May	766.16	54.05	24.71	20.79
June	624.78	36.80	20.83	14.15
July	605.77	24.72	19.54	9.51
August	607.28	23.05	19.59	8.87
September	522.58	23.77	17.42	9.14
October	516.93	29.18	16.68	11.22
November	456.06	22.77	15.20	8.76
December	515.33	21.06	16.62	8.10
PTTW Max	7,908.33	260.00	--	--
Annual Max	768.87	54.05	--	20.79
Annual Avg	586.79	--	19.28	--
Annual Total	7,041.45	--	--	--



Table 2: 2017 Summary of Exceedances for Whitechurch

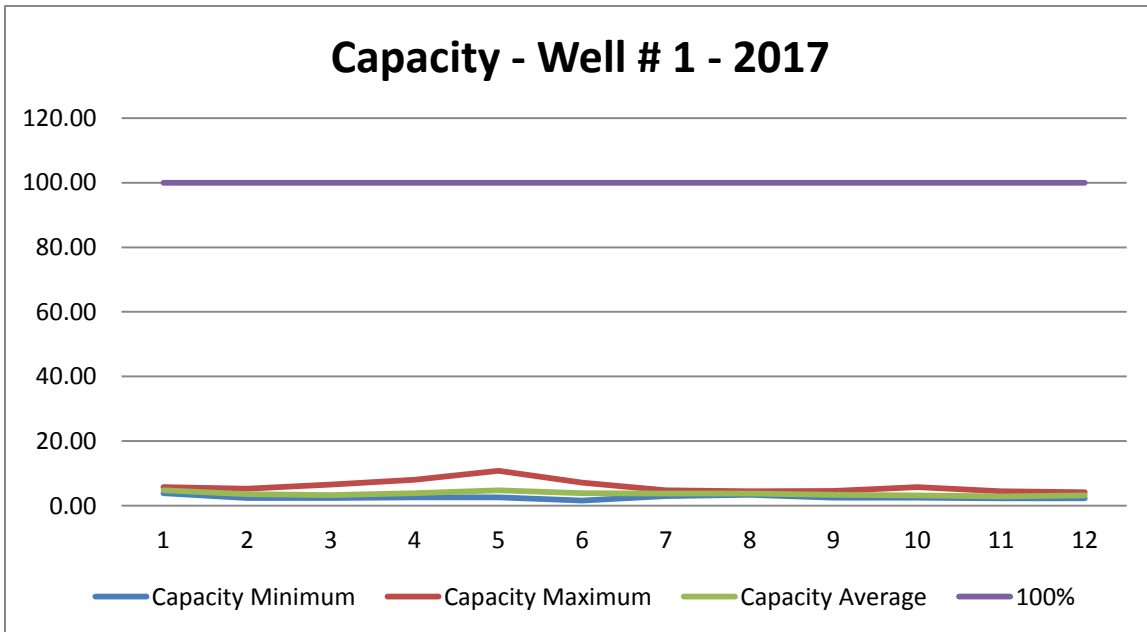
Date	Flow Peak L/s	Begin Time	End Time	Duration Minutes	Total Volume m3	Reason	Retention Time minutes	CT4 Req'd mg/L	Actual min mg/L	Comments
23-May	2.8	15:28:00	15:30:00	2	25.42	UPS failure, control failure	10.17	0.4	0.48	

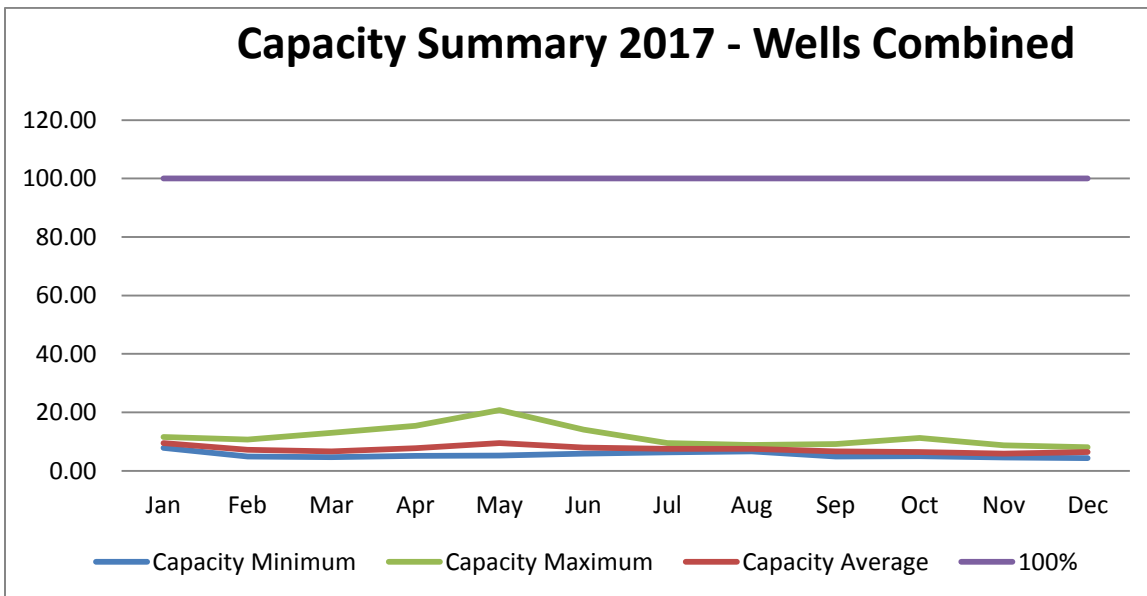
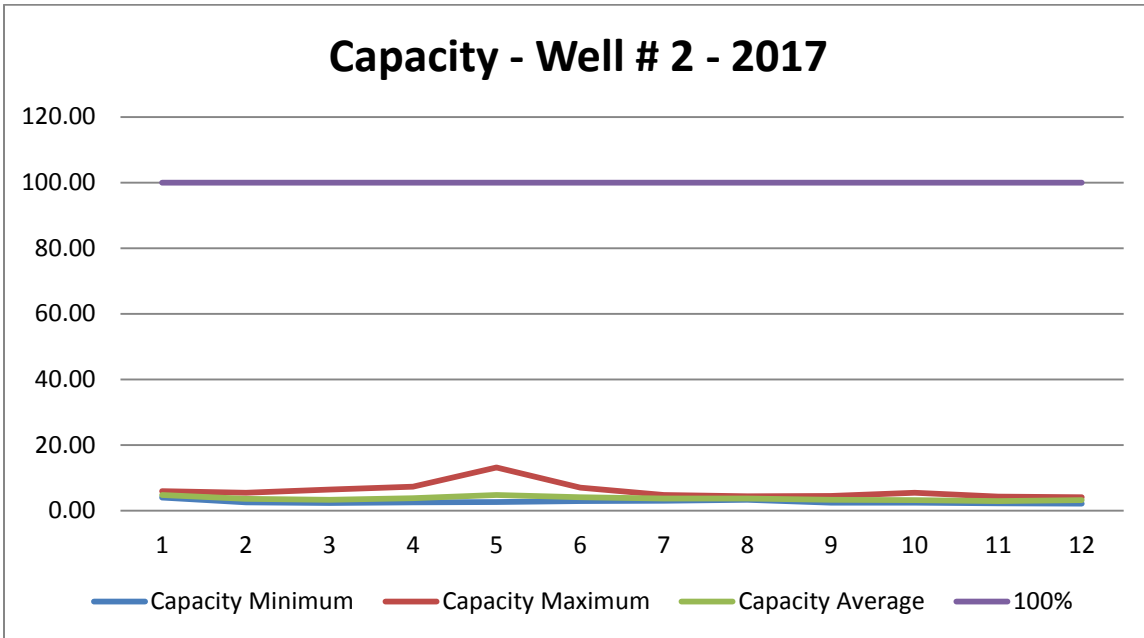
1.4 Comparison of Flow Rates vs. Rated Capacity

Under Schedule 22-2(3) of O. Reg. 170/03, the Summary Report must also include a comparison of the summary referred to in paragraph 1 to the rated capacity and flow rates approved in the system’s approval, drinking water works permit or municipal drinking water licence.

Table 3 is a summary of the quantities and flow rates of the water supplied during the period covered by the report, including monthly average, from the well house. The total system capacity is shown in the last graph. It represents the percentage capacity of sum of all the water produced in relation to the total system volume permitted.

Table 3: 2017 Flow Summary Compared to Rated Capacity





Annual Whitechurch Rated Capacity, PTTW (m³)	94,900.00 m ³
Annual Whitechurch Total Volume, Actual (m³)	7,041.45 m ³
Annual Whitechurch Total Capacity %	7.42 %



1.4 Responsibility for Water Supply, Treatment and Storage

Provincial Legislation sets out the responsibility for the Whitechurch Drinking Water Supply. Under the *Municipal Act, 2001*, the Township of Huron-Kinloss is responsible for the treatment and storage of water for the Hamlet of Whitechurch. Veolia Water has been retained by the Township of Huron-Kinloss as the Operating Authority for the Whitechurch Drinking Water System.

1.5 System Description

The Whitechurch water system is characterized as a “secure ground water” system, and is categorized as a Limited System. It is classified as a Small Municipal Residential Drinking Water System as per O. Reg. 170/03. The system has a daily maximum capacity to deliver 260 cubic metres of potable water to the Hamlet of Whitechurch.

The water sources are two secure deep bed rock wells, not under the influence of surface water. Both wells are located at the Whitechurch well house property. The equipment in the well house is SCADA controlled from a central computer in Ripley at the Township Office. The well house is equipped with two well pumps and two chlorinators; one for each well pump. There is a common chlorine contact watermain and on-line monitoring. The system is supplied on-demand with pressure switch control for the well pumps. From the well pump discharge header, the water is pumped to the chlorine contact watermain (10 m x 466 mm ID = 1,708.8 L).

The well house was constructed in 2007. Improvements to the SCADA system were initiated in 2007. Eramosa began to replace the obsolete SCADA in August of 2014. The well house is equipped with backup power from an on-site diesel generator located adjacent to the well house in a sound attenuated, weather-proof enclosure.

The well cap on Whitechurch Well # 1 was replaced in January 2016. A pre-chlorine contact analyzer was installed in January 2016 as an early warning for chlorine system failures. In September 2016, two chlorine contact mixing tanks were installed to aid in the prevention of low chlorine residuals during low pressure or flushing activities.

The attached distribution system was upgraded in 2017 to 4-inch PVC.

A raw water assessment was completed in 2015 and it was concluded that no trends in the raw water quality were observed and the characteristics are characteristic of “groundwater”. Whitechurch is included in the Ausable Bayfield Maitland Valley Source Protection Region and is part of the Maitland Valley Source Protection Plan.

The raw water from each well is disinfected using sodium hypochlorite (12%) and serves primarily as a measure to prevent microbiological growth within the raw water pipeline and distribution system. The Whitechurch Drinking Water System achieves a minimum of **2-log removal or inactivation of viruses** as outlined in the MOECC *Procedure for Disinfection of Drinking Water in Ontario* with the respective chlorine contact watermains.

In 2017, the chlorine dosages ranged from 5.02 mg/L to 6.09 mg/L depending on the demand of the raw water. The free chlorine residual was monitored at the point of entry to the distribution system with a target residual of > 1.30 mg/L and < 1.70 mg/L. A full summary of each well’s chemical dosage is contained with Annual Report in the attached tables of that report.



Chemical testing of the Whitechurch treated water was conducted in 2016 as outlined in the *MOECC Technical Support Document for Ontario Drinking Water Standards, Objectives and Guidelines, June 2006*. Results indicated that the drinking water contains high levels of naturally occurring iron at 744 µg/L. The Aesthetic Objective for iron is 300 µg/L. Iron sequestering is achieved in the Whitechurch Drinking Water System through the use of Sodium Silicate. Iron sequestering does not remove the iron, but instead, it creates a chemical bond with the dissolved iron and keeps it in suspension to prevent oxidation and precipitation. In 2017, dosages of sodium silicate ranged between 22.14 mg/L and 27.96 mg/L.

The Whitechurch treated water is also classified as ‘very hard’, with 292 mg/L as calcium carbonate (CaCO₃) or 17.04 grains per gallon. This is considered to be poor but tolerable as defined in the Technical Support Document. The aesthetic objective for hardness is 80-100 mg/L as CaCO₃. There is no treatment for hardness removal at the well house.

1.6 Licences and Permits

The Whitechurch drinking water system has the following licences and permits:

Whitechurch PTTW:	# 1124-A4DMYC	Issued: December 11, 2015	Expires: November 28, 2025
MDWL:	# 087-105	Issued: May 20, 2016	Expires: May 19, 2021
DWWP:	# 087-205	Issued: May 20, 2016	Expires: No expiry

1.7 System Infrastructure

The Whitechurch Drinking Water System has a distribution network of 1 km, with 2 blow-offs, and 58 service connections. The distribution system is PVC DR-18 with 4-inch diameter.

Semi-annual flushing is performed in Spring and Fall, along with annual valve turning. Periodic flushing of dead-ends occurs as necessary.

1.8 Water Sampling and Testing

The purpose of sampling and testing is to confirm that water is safe for human consumption and to provide a comprehensive track record.

Requirement:

O. Reg. 170/03 stipulates the minimum number and frequency of sampling for Whitechurch’s distribution system. Based on an estimated potential population of 96 residents, Whitechurch must meet the following annual sampling requirements:

Parameter	Description	Required # of Samples	Requirement Source
Chlorine Residual (grab)	For monitoring amount of residual in system, and confirming of water quality following maintenance	104	O. Reg. 170/03, Sch. 7, S. 7-2
E. Coli Total Coliform Heterotrophic Plate Count (HPC)	For testing presence of microbiological activity	26	O. Reg. 170/03, Sch. 10
Trihalomethanes (THMs)	For testing presence of disinfection by-products	4	O. Reg. 170/03, Sch. 13, S. 13-6
Lead (Pb)	For testing presence of lead in the distribution system only – not private side	* reduced sampling in effect for 2017	O. Reg. 170/03, Sch. 15; MDWL # 087-102, Sch. D
Haloacetic Acids (HAAs)	For monitoring the formation of disinfection by-products (DBPs)	4	O. Reg. 170/03, Sch. 13, S. 13-6.1



Sampling Frequency and Location:

Currently, operators collect water samples for microbiological analysis on a weekly basis, and perform grab chlorine residuals on a daily basis. Operators may use Township buildings, businesses, sample stations, and residential homes to collect samples, depending on access to sample taps.

In 2017, staff collected 368 distribution chlorine residuals and 58 microbiological samples. Chlorine residuals are measured with each distribution sample collected, as well as on a daily basis. Microbiological samples are sent primarily to E3 Laboratories in Niagara-on-the-Lake, but on occasion they are sent to SGS Environmental in London. Staff also collected 4 pH and alkalinity samples, and 4 THMs through this reporting period.

1.9 Communications When Adverse Water Samples Are Identified

Requirement – Laboratory:

A water sample that does not meet Provincial water quality standards is considered “adverse”. When adverse water quality is detected, the accredited laboratory conducting the testing will immediately notify the Operating Authority, the Spills Action Centre (SAC), and the Grey Bruce Medical Officer of Health, and occasionally the Huron County Medical Officer of Health (as necessary). This notification is made by telephone through live communication to a person in authority. In addition to the phone calls, a fax is sent to the three agencies to verify the live communication made earlier.

Requirement – Drinking Water System Owner/Operating Authority:

The SDWA also requires the drinking water system Owner/Operating Authority to immediately notify the MOECC, the Owner, and the Grey Bruce Medical Officer of Health that the laboratory notice has been received and that “corrective actions” are being initiated. The method of contact is by telephone to a person of authority. The Operating Authority also faxes both agencies first to verify the previous live communication, and to confirm that corrective actions have been completed and the issue resolved.

This reporting system provides assurance that the water works owner is complying with the applicable regulations and that appropriate corrective actions are being taken and are being reported.

2.0 ANNUAL REPORT

The Annual Report is appended to this report as *Appendix #1*. Section 11 of Ontario Regulation 170/03 requires that an Annual Report be prepared by February 28th each year for the preceding calendar year. As well, the Annual Report must be made available to the public, free of charge. To meet this requirement, the Whitechurch 2017 Annual Report will be posted on the Township website and shall be available at the Township Office. The Annual Report must include:

- A brief description of the water system.
- A summary of chemical usage for treatment.
- A summary of expenses incurred to make improvements to the water system.
- A summary of water quality testing results for microbiological, inorganic chemical and organic chemical parameters.
- A summary of adverse water quality reports.
- A description of how the Annual Report has been distributed and where the Annual Report and Summary Report required under O. Reg. 170/03 Schedule 22, will be located in order to be accessible to the public.



3.0 MOECC INSPECTION REPORT

There was an MOECC Drinking Water Inspection performed in June 2017. At this time, MOECC staff conducted an 'unannounced focused inspection' of the Whitechurch Drinking Water System. The inspection included a review of operating manuals, logbooks, staff certification and training, and water quality monitoring. It also includes an audit of the SCADA alarm history, data collection, summary and incident reports, and the operator log-in history.

The entire process concludes with an Inspection Report that includes required actions, recommended actions, and a final inspection rating. A low inspection rating does not necessarily mean that the drinking water provided is unsafe; however, it does indicate the degree to which there is room for improvement in meeting the Provincial regulatory requirements. These findings are used as a tool to track progress towards the Chief Drinking Water Inspector's goal of achieving 100% compliance with the regulatory framework on a Province wide basis.

The Operating Authority achieved a rating of 99.19% on the 2017 Whitechurch Inspection Report – an improvement from the previous 2016 Whitechurch Inspection Report (94.92%).

Precautionary Boil Water Notices

There were no Precautionary Boil Water Notices issued by the Operating Authority in 2017 on the Whitechurch Drinking Water System.

Boil Water Advisory

There were no Boil Water Advisories issued by the Grey Bruce or Huron County MOH on the Whitechurch Drinking Water System in 2017.

Compliance

There were two adverse water quality incident reports (AWQI) filed with the MOECC and the Grey Bruce Health Unit in 2017.

- AWQI # 132996, May 4, 2017: UPS/Well Pump controller failure
- AWQI # 133587, June 25, 2017: Well Pump failure, no pressure for 1h26min

Non-Compliances

- SCADA data gaps

Chemical Exceedances

- Barium

O. Reg. 169/03 (the Ontario Drinking Water Standard) has a MAC (maximum allowable concentration) of 1.0 mg/L (1000 µg/L) for Barium. Since the samples collected exceed the Half-MAC, one water sample is collected from point of entry at least once in every 3 months (quarterly) and tested for Barium. Samples were collected for this analysis in February, May, August, and November. The results from 2017 were as follows:

Whitechurch Treated Water: 904, 801, 877, 883 µg/L

4.0 MUNICIPAL DRINKING WATER MANAGEMENT REVIEW:

The Township of Huron-Kinloss received the first Municipal Drinking Water License and Drinking Water Works Permit for the Whitechurch Drinking Water System on August 4, 2011. According to the five-year renewal cycle, these documents were due for renewal prior to August 4, 2016. Renewal submissions were made early in 2016, and these documents were renewed. The MDWL will now expire in May 2021.



Under the Licensing program, the Township of Huron-Kinloss is required to maintain a drinking water Quality Management System (QMS). *Appendix 3* contains information and updates related to the QMS that, in accordance with the Provincial Drinking Water Quality Management Standard (DWQMS), must be communicated to Council on an annual basis.

Note: For QMS Roles and Responsibilities, see Organizational Chart and Roles & Responsibilities Table in Appendix 4 – Operational Plan.

- a. QMS Management Review Outcomes – includes action items from the most recent Management Review meeting
- b. Infrastructure Review Outcomes and Infrastructure Programs Summary – includes a summary of the infrastructure review process and of infrastructure repair, rehabilitation, and renewal programming.

Infrastructure Assessment

Regular contact is maintained with the Huron-Kinloss representative and also a written monthly report is submitted. The JobsPlus program is continually updated with preventative and corrective maintenance issues. A complete summary can be forwarded to the client upon their request. Through regular communication between the operating authority and the client, capital items are discussed. A list of capital items and concerns was forwarded to the Huron-Kinloss representative on October 31, 2017.

The annual Management Review was conducted by the operating authority on May 25, 2017, as per the DWQMS requirement in Element 14. These regular discussions between the client and the operating authority for this water system are continued throughout the year by emails, phone calls, monthly reports, and meetings as per the requirements of Element 15 of the DWQMS.

The S1 Surveillance Audit was conducted by SAI on June 30, 2016. The 36-month Risk Assessment was completed October 20, 2016 and the Internal Audit was completed on December 5-6, 2017. The staff was involved with an Emergency Response exercise on December 20, 2017, which involved a chemical spill near a wellhead.

5.0 QMS OPERATIONAL PLAN

The Township of Huron-Kinloss must document its QMS in an Operational Plan, which must be endorsed by QMS Top Management and Huron-Kinloss Council, and made available to the public. The Operational Plan was reviewed in 2017 as part of the Risk Assessment. *Appendix 4* contains the Whitechurch Drinking Water System QMS Operational Plan.

Attachments:

- Appendix 1 – 2017 Annual Report
- Appendix 2 – 2017 MOECC Inspection Reports
- Appendix 3 – QMS Management Review
- Appendix 4 – QMS Operational Plan

John Graham, Project Manager

Veolia Water Canada, Inc.

100 Cove Road, P.O. Box 185

Goderich, Ontario

N7A 3Z2

Tel 519-524-6583 ext 310

Fax 519-524-9358

www.veoliawaterna.com