



2017 Summary Report

for the

Town of Minto

HARRISTON DRINKING WATER SYSTEM

TABLE OF CONTENTS

1.0	INTRODUCTION.....	1
1.1	Background.....	1
1.2	Objective	2
1.3	Description of Drinking Water System	2
2.0	SUMMARY OF UPGRADES.....	3
2.1	Upgrades Completed in 2017	3
2.2	Upgrades Scheduled to be Completed in 2018.....	3
3.0	OPERATION OF THE DRINKING WATER SYSTEM	3
3.1	Summary of the Quantities and Flow Rates of Water Supplied	3
3.2	Comparison of Actual Flow and Maximum Allowable Rates	7
3.3	Raw Water Quality and Required Treatment.....	9
3.4	Summary of Treatment Chemicals Used	10
4.0	COMPLIANCE	11
4.1	Assessment of Compliance	11
4.2	Summary of Compliance.....	12

LIST OF TABLES

Table 3.1	Harriston Drinking Water System – Well #1	4
Table 3.2	Harriston Drinking Water System – Well #2	5
Table 3.3	Harriston Drinking Water System – Well #3	6
Table 3.4	Harriston Drinking Water System – Well # 1 & 3 Combined	7
Table 3.5	Comparison of Flow Rates and Flow Capacities	8
Table 3.6	2017 Maximum Water Usage Per Day by Month	8
Table 3.7	2017 Annual Summary of Raw Water Turbidity.....	10
Table 3.8	2017 Annual Summary of Treatment Chemicals Used.....	11
Table 4.1	Adverse Water Quality Incidents	12
Table 4.2	Requirements the System Failed to Meet.....	13

**2017 Summary Report
for the
Town of Minto
HARRISTON DRINKING WATER SYSTEM**

1.0 INTRODUCTION

1.1 Background

In December 2002, the Safe Drinking Water Act (SDWA) was enacted. Subsequently, on June 1, 2003, under the SDWA, a new '*Drinking-Water Systems Regulation*', Ontario Regulation 170/03 (O. Reg. 170/03), was enacted. In addition, several supporting regulations and procedures were also enacted to assist with the administration of O. Reg. 170/03. The list of relevant drinking-water legislation is presented in Appendix A.

The SDWA identifies the responsibilities of owners and operating authorities of municipal drinking water systems (SDWA, Sections 11 and 19). Their duties include ensuring that:

- All water provided by the drinking-water system meets prescribed drinking-water quality standards;
- The drinking-water system is operated in accordance with the Act and regulations and is kept in a good state of repair;
- All facilities are appropriately staffed and supervised;
- All sampling, testing and monitoring requirements are complied with;
- All reporting requirements are complied with; and
- Only persons holding valid operator's certificates operate the drinking-water-system.

O. Reg. 170/03 establishes the standard for protection of drinking water. It includes sets of Schedules, specific to municipal residential systems, that define requirements for:

- Minimum treatment levels;
- Operational checks;
- Chemical and microbiological sampling and testing;
- Adverse results reporting;
- Corrective procedures; and
- Report documentation and retention.

The system's Municipal Drinking Water Licence (MDWL), Drinking Water Works Permit (DWWP) and Permit To Take Water (PTTW) imposes system specific rules and conditions applicable to the standards set out in O. Reg. 170/03.

1.2 Objective

This Harriston Drinking Water System Summary Report is being prepared in fulfillment of Schedule 22 of O. Reg. 170/03, and will be given to Members of the Municipal Council. It covers the period from January 1, 2017 to December 31, 2017.

This Summary Report lists any requirements of the Act, the regulations, the PTTW, the MDWL, the DWWP and any order that the system failed to meet, during the period of this report. For any such failure, the measures that were taken to correct the failure are detailed. The report also includes relevant information that will assist the members of the Municipal Council for the Town, to assess the water work's capability to meet existing and future planned uses of the system.

1.3 Description of Drinking Water System

Harriston is a community with a population of approximately 2108 persons, located within the Town of Minto within the northwest corner of Wellington County, at the intersection of Provincial Hwy. No. 9 and Hwy. No. 89.

Harriston is serviced by a waterworks that consists of: three drilled bedrock wells, three pumphouses, an elevated 1915 m³ steel storage tank and a distribution network of watermains, ranging in diameter from 100 mm to 300mm. In the event of a power outage, pump #1 & #3 is equipped with automatic back-up power supply. Well #2 has the capacity of connecting to a portable generator.

The bedrock wells are equipped with submersible pumps. Water from Wells #1 and #3 discharge into pumphouse #3, and water from Well #2 discharges into pumphouse #2, respectively, for flow measurement and treatment. In the pumphouse, the raw water supply is injected with 12% sodium hypochlorite for disinfection and the chemical PW1680, for iron sequestering. The treated water leaves the pumphouse and enters an underground contact pipe and is discharged into the distribution system after adequate contact time is achieved.

The wells are controlled (*start/stop*) automatically based on elevated storage tank liquid levels and pressures in the distribution system. Each pumphouse is equipped with alarms for chlorination system failure (*and corresponding lockout of well pumps*), low water level and intrusion. Each wellhouse has a continuous monitoring analyzer for chlorine.

The treated water leaves the wellhouse and enters an underground contact pipe and is discharged into the distribution system after adequate contact time is achieved.

The Harriston Drinking Water System operates under the MDWL 106-102 and DWWP 106-202 and PTTW #3012-A8QRPF.

2.0 SUMMARY OF UPGRADES

2.1 Upgrades Completed in 2017

The disinfection treatment system in the Harriston Drinking Water System meets all of the standards imposed by O. Reg. 170/03 and the MOECC's *"Procedures for Disinfection of Drinking Water in Ontario"*.

Typically, maintaining the system includes repairs and/or replacement of individual components as necessary. In 2017 \$212,800 was spent on George Street South old watermain replacement and \$6,400 was spent on Well #2 upgrades to increase water quality.

The following purchases were also made on equipment that is shared between all of Minto's water systems. \$11,500 on equipment, \$3,300 on SCADA equipment upgrades to improve data reporting and \$8,600 on the electronic data management system, \$19,600 on the water meter installation program.

Preventative maintenance measures are being followed to ensure proper operation of the Drinking Water System.

2.2 Upgrades Scheduled to be Completed in 2018

In 2018, the Town of Minto will be completing George St. S. for \$170,000 and George St. N. for \$40,000. \$25,000 on Lawrence St. watermain design and \$20,000 on watermain replacement on William St. E.

In 2018 the following will be purchased to be shared within the water department. \$20,000 for water meters and \$90,000.00 on vehicle replacements.

3.0 OPERATION OF THE DRINKING WATER SYSTEM

3.1 Summary of the Quantities and Flow Rates of Water Supplied

O. Reg. 170/03 stipulates that a summary of the quantities and flow rates of the water supplied from each of Harriston's wells be included in the Summary Report. Tables 3.1, 3.2 and 3.3 provide a summary of quantities and flow rates supplied during 2017 for Wells #1, #2 and #3 respectively, on a monthly basis. Well #1 is located in the Young Street wellhouse, but the raw water is directed to the King Street wellhouse for treatment. As such, raw supplies from Well #1 and Well #3 are treated in the King Street wellhouse, and raw water supply from Well #2 is treated in the John Street wellhouse.

Table 3.1
Harriston Drinking Water System – Well #1
Treated Water Flow, Turbidity, and Disinfectant Residual
January 1, 2017 – December 31, 2017

	Raw Water Flow (Max Flow Rate = 11.3 L/s)			Chlorine	Monthly Averages				Distribution System Disinfectant
					Treated Water Turbidity		Treated Water Disinfectant Point of Entry		
Month	Operator Observed Peak Flow (L/s)	Maximum Day Flow (m³/day)	Monthly Total (m³)	Monthly Total (L)	No. of Samples Collected	Monthly Average Turbidity	No. of Treated Samples Collected	Average Residual (mg/L)	No. of Samples Collected
January	10.2	70	1,588	28	5	0.36	31	1.26	See Harriston Well #3 Data
February	10.2	125	1,232	37	6	0.28	28	1.14	
March	10.2	111	1,395	31	10	0.34	31	1.25	
April	10.2	76	1,198	42	4	0.43	29	1.23	
May	10.2	91	1,450	20	6	0.44	31	1.16	
June	10.2	688	2,400	89	12	0.46	29	1.13	
July	10.2	614	3,356	76	21	0.44	31	1.26	
August	10.1	83	1,487	44	23	0.45	31	1.18	
September	10.1	79	1,276	40	7	0.44	29	1.26	
October	10.2	64	1,443	45	10	0.4	31	1.29	
November	10.2	251	1,652	45	10	0.59	30	1.36	
December	10.2	80	1,278	10	4	0.54	31	1.21	
Total			19,755	507	118		362		
Average			1,646			0.43		1.23	
Maximum	10.2	688							

Disinfectant Compound Used: **12% Sodium Hypochlorite**
Form of Residual Displayed: **Free**
Quantity of Disinfectant Used During 2017: **507 L**
Distribution System Minimum Target Residual: **0.2 mg/L**

Table 3.2
Harriston Drinking Water System – Well #2
Treated Water Flow, Turbidity, and Disinfectant Residual
January 1, 2017 – December 31, 2017

	Raw Water Flow (Max Flow Rate = 23.9 L/s)			Chlorine	Monthly Averages				Distribution System Disinfectant
					Treated Water Turbidity		Treated Water Disinfectant Point of Entry		No. of Samples Collected
Month	Operator Observed Peak Flow (L/s)	Maximum Day Flow (m ³ /day)	Monthly Total (m ³)	Monthly Total (L)	No. of Samples Collected	Monthly Average Turbidity	No. of Treated Samples Collected	Average Residual (mg/L)	
January	17.4	510	8,334	275	5	0.71	31	1.27	See Harriston Well #3 Data
February	17.4	331	7,193	221	4	0.68	28	1.31	
March	17.4	332	7,903	220	11	0.68	31	1.22	
April	17.4	292	7,322	200	4	0.79	29	1.23	
May	17.4	644	8,948	264	7	0.84	30	1.07	
June	17.4	773	10,064	258	11	0.70	32	1.19	
July	17.5	412	9,367	306	21	0.68	31	1.29	
August	17.5	483	9,518	318	23	0.68	23	0.5	
September	17.5	404	7,537	252	9	0.70	31	1.3	
October	17.4	573	10,493	352	8	0.80	31	1.3	
November	17.4	322	7,532	242	7	0.84	30	1.28	
December	17.3	528	8,240	268	3	0.86	31	1.35	
Total			102,451	3,176	113		358		
Average			8,538			0.75		1.19	
Maximum	17.5	773							

Disinfectant Compound Used: **12% Sodium Hypochlorite**
Form of Residual Displayed: **Free**
Quantity of Disinfectant Used During 2017: **3,176 L**
Distribution System Minimum Target Residual: **0.2 mg/L**

Table 3.3
Harriston Drinking Water System – Well #3
Treated Water Flow, Turbidity, and Disinfectant Residual
January 1, 2017 – December 31, 2017

	Raw Water Flow (Max Flow Rate = 18.9 L/s)			Chlorine	Monthly Averages				Distribution System Disinfectant
					Treated Water Turbidity		Treated Water Disinfectant Point of Entry		
Month	Operator Observed Peak Flow (L/s)	Maximum Day Flow (m³/day)	Monthly Total (m³)	Monthly Total (L)	No. of Samples Collected	Monthly Average Turbidity	No. of Treated Samples Collected	Average Residual (mg/L)	No. of Samples Collected
January	16.2	691	14,893	368	6	0.28	31	1.21	49
February	16.2	679	13,777	352	7	0.19	28	1.21	40
March	16.1	716	17,463	410	12	0.35	31	1.22	54
April	16.2	640	13,035	311	4	0.24	29	1.22	43
May	16.1	1,322	16,421	437	9	0.42	31	1.23	49
June	16.2	913	12,522	278	8	0.39	26	1.19	60
July	16.1	748	13,140	351	18	0.52	26	1.25	72
August	16.1	831	14,193	371	23	0.44	31	1.29	56
September	16.0	681	14,199	366	7	0.54	31	1.28	49
October	16.0	720	14,877	390	8	0.43	31	1.16	48
November	16.2	746	15,433	416	7	0.38	30	1.35	46
December	16.2	711	14,413	364	6	0.29	31	1.28	52
Total			174,366	4,414	115		356		618
Average			14,531			0.37		1.24	
Maximum	16.2	1,322							

Disinfectant Compound Used: **12% Sodium Hypochlorite**
Form of Residual Displayed: **Free**
Quantity of Disinfectant Used During 2017: **4,414 L**
Distribution System Minimum Target Residual: **0.2 mg/L**

Table 3.4
Harriston Drinking Water System – Well #1 & 3 Combined
Treated Water Flow
January 1, 2017 – December 31, 2017

Month	Treated Water Flow (Well #1 Max Flow Rate = 11.3 L/s) (Well #3 Max Flow Rate = 18.9 L/s) (Max Daily Volume = 2,613 m ³ /d)				Chlorine
	Operator Observed Peak Flow (L/s)	Operator Observed Peak Flow (L/s)	Maximum Day Flow (m ³ /day)	Monthly Total (m ³)	Monthly Total (l)
January	10.2	16.2	691	16,481	396
February	10.2	16.2	679	15,009	389
March	10.2	16.1	716	18,858	441
April	10.2	16.2	640	14,233	353
May	10.2	16.1	1,322	17,871	457
June	10.2	16.2	913	14,922	367
July	10.2	16.1	748	16,496	427
August	10.1	16.1	831	15,680	415
September	10.1	16.0	681	15,475	406
October	10.2	16.0	720	16,320	435
November	10.2	16.2	746	17,085	461
December	10.2	16.2	711	15,691	374
Total				194,121	4,921
Average				16,177	
Maximum	10.2	16.2	1,322		

3.2 Comparison of Actual Flow and Maximum Allowable Rates

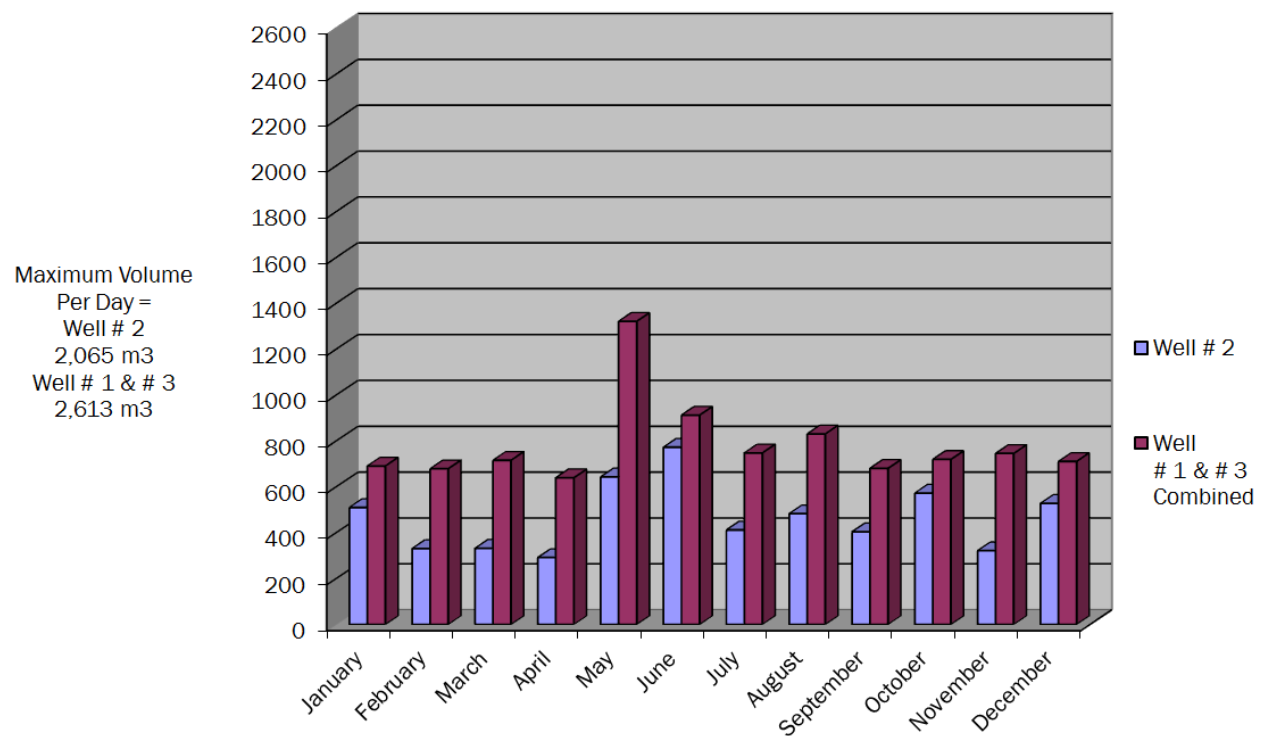
O. Reg. 170/03 stipulates that a summary of the quantities and flow rates of the water supplied from each of Harriston's wells be included in the Summary Report and compared against the rated capacity and flow rate for the system. As such, a comparison of the instantaneous peak flow to the PTTW's rated capacity is included and a comparison of the maximum daily flow to the MDWL's rated capacity is included in Table 3.5. Table 3.4 reflects the comparisons between the PTTW and MDWL.

Table 3.5
Comparison of Flow Rates and Flow Capacities
To
Rated Flow Rate (PTTW) and Rated Capacity (MDWL)

Well Supply	PTTW Max. Flow Rate	Operator Observed Peak Flow	Percent of Maximum Allowable	MDWL Schedule C Maximum Daily Quantity	Maximum Daily Flow	Percent of Maximum Allowable
	L/s	L/s	%	m ³ /day	m ³ /day	%
Well #1	11.3	10.2	90	979	688	70
Well #2	23.9	17.5	73	2,065	773	37
Well #3	18.9	16.2	86	1,634	1,322	83

The MDWL stipulates, “*The maximum daily volume of treated water that flows from the treatment subsystem to the distribution system shall not exceed the value identified as the rated capacity in Schedule C Table 1.*”

Table 3.6
Maximum Water Usage Per Day by Month



Short-term peaks, in excess of permitted values, may occur at pump start up, while doing specific maintenance procedures or during emergency demand situations. An occurrence of this nature is not considered an exceedance.

The time and duration of any flow exceedance is recorded for each event along with the reason for the occurrence. There were **no exceedances** of the allowable flow rates in the Harriston Drinking Water System.

3.3 Raw Water Quality and Required Treatment

The Harriston Drinking Water System has no chemical parameters that exceed MAC (maximum acceptable limit) or IMAC (interim maximum acceptable limit). The Harriston Drinking Water System uses PW1680 to improve the disinfection process by controlling corrosion in water that is considered very hard and or contains high levels of iron. This is considered an aesthetic issue which is included in the technical support document for Ontario's Drinking Water Standards, Objectives and Guidelines.

The Harriston Drinking Water System utilizes continuous monitoring analyzers for free chlorine residual. The chlorine analyzer is equipped with an alarm. In the event of an adverse chlorine residuals reading, a signal is sent to the SCADA system, which in turn, shuts down the respective well pump. The average monthly turbidity and free chlorine residual measurements for treated water are presented in Tables 3.1, 3.2 and 3.3 for Well #1, Well #2 and Well # 3, respectively.

There were no high turbidity readings (>1.0 NTU) experienced during 2017. The minimum, maximum and average turbidity readings for raw water from each well are presented in Table 3.7.

12% sodium hypochlorite is the disinfectant used. Free chlorine residual is monitored continuously at the "Point of Entry" (POE) into the distribution system. Additional "grab samples" are taken daily (*excluding weekends and holidays*) within the distribution system and tested for the free chlorine residual. The minimum, maximum and average values of free chlorine residual at the POE are presented Table 3.5. Also included in Table 3.5 is the range of free chlorine residual within the distribution system.

The free chlorine residual in the distribution system ranged between 0.42 mg/L and 1.42 mg/L. O. Reg. 170/03, Schedule 1-2 stipulates that the free chlorine residual can never be less than 0.05 mg/L. In addition, O. Reg. 170-03, Schedule 1-4 stipulates that the water treatment equipment must be "...capable of achieving, at all locations within the distribution system, a free chlorine residual of 0.2 mg/L ...". The Harriston Drinking Water System meets both of these requirements.

Table 3.7
2017 Annual Summary of
Raw Water Turbidity and Free Chlorine Residual
for Harriston Drinking Water System

Location	Range	Raw Water Turbidity	Free Chlorine Residual at POE
		NTU	mg/L
Well #1	Minimum	0.11	0.88
	Maximum	0.83	1.55
	Average	0.37	1.23
Well #2	Minimum	0.13	0.69
	Maximum	1.48	1.64
	Average	0.52	1.19
Well #3	Minimum	0.11	0.81
	Maximum	0.9	1.64
	Average	0.40	1.24

3.4 Summary of Treatment Chemicals Used

The disinfectant chemical used in the Harriston Drinking Water System is 12% Sodium Hypochlorite. Measurements of free chlorine are recorded on a continuous basis. In 2017, 8,097 L of 12% Sodium Hypochlorite was used. The average dosage rates are presented in Table 3.8.

In 2017, 1,037 L of PW1680 was used for the sequestering of iron. Wells #1 and #3 share a common tank of PW1680. The average dosage rates are presented in Table 3.8.

Table 3.8
2017 Annual Summary of
Treatment Chemicals Used
for Harriston Drinking Water System

Treatment Chemical	Well	Volume Used	Mass Used	Annual Flow	Dosage Rate
		L	kg	m ³	mg/L
12 % Sodium Hypochlorite (NaOCl)	Well #1	507	60.8	19,755	3.08
	Well # 2	3,176	381.1	102,451	3.72
	Well # 3	4,414	529.7	174,366	3.04
	Total	8,097	971.6	296,572	3.28
Treatment Chemical	Well	Volume Used	Mass Used	Annual Flow	Dosage Rate
		L	kg	m ³	mg/L
PW1680	Well #1 & Well #3	229	320.6	194,121	1.65
	Well # 2	808	1,131	102,451	11.04
	Total	1,037	1,452	296,572	4.90

Note:

- 12% Sodium Hypochlorite = 120,000 mg/L = 120 kg/m³
- PW1680 has a specific gravity = 1.4

4.0 COMPLIANCE

4.1 Assessment of Compliance

The objective of the Summary Report is to list any requirements of the Act, the regulations, the PTTW, the MDWL, the DWWP and any MOECC order that the system failed to meet from January 1, 2017 to December 31, 2017, and the corresponding corrective measure(s) taken. Compliance was assessed as follows:

- MOECC Completed Inspection of the Harriston system completed May 31/17, Final inspection rating 100%
- There were **no MOECC Orders** issued to the Harriston Drinking Water System in 2017.
- The MDWL imposes the specific rules and conditions governing the standards set out in O. Reg. 170/03. It is an important instrument in defining the requirements of compliance of a Drinking Water System.

- O. Reg. 170/03 establishes the standard for protection of drinking water; specifically, through 12 schedules that municipal residential drinking systems must follow to meet the requirements of the regulation.
- The SDWA identifies the responsibilities of owners and operating authorities of municipal drinking water systems. It places a recommended statutory standard of care on those who have oversight of municipal drinking-water systems. In essence, the standard of care has two themes: be informed and exercise diligent oversight.
- Adverse Test Results reported under the Safe Drinking Water Act, 18(1) or O Reg.170/03, Schedule 16-4
 - a) Adverse Water Quality Incidents (AWQI) refer to any unusual test results that do not meet provincial water quality standard or situation where the disinfection of the drinking water may be compromised.

Table 4.1
Adverse Water Quality Incidents

AWQI #	Date	Issue	Corrective Action
133081	May 15/17	Sodium result of 20.8mg/L at Well #1 limit is 20 mg/L.	Resampled Well #1 May 17, 2017 Result 7.12 mg/L closer to historic values.
133576	June 23/17	Severe flooding in Harriston Boil Water imposed	Source water sampled and boil water lifted June 27/17 when results received. Well #3 was not put back online until July 6/17 under direction from MOECC.

4.2 Summary of Compliance

To the best of our knowledge and ability we are in, or diligently working towards, compliance with all of the requirements of the SDWA, O. Reg. 170/03, as well as the Harriston Water Work's MDWL 106-102, DWWP 106-202 and PTTW #3012-A8QRPF. Every attempt has been made to ensure this document is an accurate representation of how the Drinking Water System is operated.

To the best of our knowledge, Table 4.2 identifies all of the requirements of the SDWA, the regulations, the MDWL, the DWWP and the PTTW.

Table 4.2
HARRISTON DRINKING WATER SYSTEM
Requirements the System Failed to Meet

Compliance With	Description of Item the System Failed to Meet	Correction of This Situation How/When
MDWL # 106-102	<i>Harriston Drinking Water System is in compliance with all of the requirements of the MDWL</i>	
DWWP # 106-202	<i>Harriston Drinking Water System is in compliance with all of the requirements of the DWWP</i>	
O. Reg. 170/03	<i>Harriston Drinking Water System is in compliance with all of the requirements of O. Reg. 170/03</i>	
SDWA	<i>Harriston Drinking Water System is in compliance with all of the requirements of the SDWA</i>	

Dated this 2nd day of March 2018.

Wayne Metzger
Water Foreman