



2021 Summary Report

for the

Town of Minto

HARRISTON DRINKING WATER SYSTEM

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Date: March 8, 2022

2021 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. This report covers the period from January 1, 2021 to December 31, 2021.

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 2,230 people and approximately 820 residential properties, 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 1,915 m³ steel storage tank and a distribution network of watermains, ranging in diameter from 100 mm to 300 mm. 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 high & low free chlorine residuals (*and corresponding lockout of well pumps*), low water level and intrusion. Each wellhouse has a continuous monitoring analyzer for POE free 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 Issue 3 and DWWP 106-202 Issue 5 and PTTW #3012-A8QRPF.

2.0 SUMMARY OF UPGRADES

2.1 Upgrades Completed in 2021

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

Typically, maintaining the system includes repairs and/or replacement of individual components as necessary. In 2021, \$6,155 was spent replacing the well pump motor in Well #1, \$22,245 was spent to Videolog Wells #1 & #3, \$2,300 to replace a chlorine pump in Well #3 and \$3,055 to replace Well # 3 pumphouse roof. \$8,889 was spent to replace the electrical in Well #2.

The following purchases were also made on equipment that is shared between all of Minto's water systems. \$29,725 on the water meters, \$4,048 on equipment and \$40,625 to replace a truck. \$19,545 on engineering for our future servicing needs and \$2,195 on our computer system upgrade plan.

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

2.2 Upgrades Scheduled to be Completed in 2022

In 2022, the Town of Minto is planning to spend \$100,00 on Well exploration.

The following will also be purchased to be shared within the water department. \$5,000 for computer hardware and software, \$110,000 on the SCADA monitoring system and \$20,000 for water meters. \$100,000 on watermain replacement (location to be determined), \$15,000 on pumps and/or valves \$10,000 on equipment and \$15,000 for engineering of future water system needs.

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 2021 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, 2021 – December 31, 2021

	Raw Water Flow (Max Flow Rate = 11.3 L/s)			Chlorine	Monthly Averages				Distribution System Disinfectant
	Operator Observed Peak Flow (L/s)	Maximum Day Flow (m ³ /day)	Monthly Total (m ³)		Monthly Total (L)	Treated Water Turbidity		Treated Water Disinfectant Point of Entry	
No. of Samples Collected				Monthly Average Turbidity (NTU)		No. of Treated Samples Collected	Monthly Average Residual (mg/L)	No. of Samples Collected	
January	9.5	423	2,664	48	4	0.18	31	1.27	See Harriston Well #3 Data
February	9.4	234	1,903	44	4	0.19	28	1.20	
March	9.6	91	1,770	22	5	0.23	29	1.17	
April	9.7	703	2,668	63	3	0.21	27	1.11	
May	9.6	106	1,503	25	5	0.29	31	1.17	
June	9.7	623	2,753	37	5	0.27	28	1.21	
July	10.2	193	1,939	62	3	0.27	31	1.18	
August	9.6	125	1,726	22	4	0.26	31	1.24	
September	9.4	85	1,297	44	4	0.28	30	1.25	
October	9.7	63	1,218	22	1	0.43	31	1.22	
November	9.6	54	1,111	46	1	0.21	30	1.34	
December	9.5	60	1,164	26	2	0.30	32	1.34	
Total			21,716	461	41		359		
Average			1,810			0.26		1.23	
Maximum	10.2	703							

Disinfectant Compound Used: **12% Sodium Hypochlorite**
 Form of Residual Displayed: **Free**
 Quantity of Disinfectant Used During 2021: **461 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, 2021 – December 31, 2021

Month	Raw Water Flow (Max Flow Rate = 23.9 L/s)			Chlorine Monthly Total (L)	Monthly Averages				Distribution System Disinfectant No. of Samples Collected
	Operator Observed Peak Flow (L/s)	Maximum Day Flow (m ³ /day)	Monthly Total (m ³)		Treated Water Turbidity		Treated Water Disinfectant Point of Entry		
					No. of Samples Collected	Monthly Average Turbidity (NTU)	No. of Treated Samples Collected	Monthly Average Residual (mg/L)	
January	17.1	293	3,985	117	2	0.15	22	1.22	See Harriston Well #3 Data
February	17.1	415	6,090	182	3	0.63	28	1.21	
March	17.0	918	9,322	250	6	0.73	31	1.19	
April	17.0	983	9,178	245	2	0.62	31	1.16	
May	16.9	387	7,154	198	5	0.74	31	1.15	
June	17.0	1,409	10,083	268	4	0.80	30	1.13	
July	17.0	515	7,855	267	2	0.38	31	1.27	
August	17.1	509	7,953	220	5	0.73	31	1.16	
September	17.1	428	6,529	222	3	0.63	30	1.14	
October	16.9	978	8,466	262	2	0.68	31	1.25	
November	17.0	314	7,135	235	0		30	1.32	
December	16.9	294	7,044	219	2	0.79	31	1.32	
Total			90,794	2,685	36		357		
Average			7,566			0.62		1.21	
Maximum	17.1	1,409							

Disinfectant Compound Used: **12% Sodium Hypochlorite**
 Form of Residual Displayed: **Free**
 Quantity of Disinfectant Used During 2021: **2,685 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, 2021 – December 31, 2021

Month	Raw Water Flow (Max Flow Rate = 18.9 L/s)			Chlorine Monthly Total (L)	Monthly Averages				Distribution System Disinfectant No. of Samples Collected
	Operator Observed Peak Flow (L/s)	Maximum Day Flow (m ³ /day)	Monthly Total (m ³)		Treated Water Turbidity		Treated Water Disinfectant Point of Entry		
					No. of Samples Collected	Monthly Average Turbidity (NTU)	No. of Treated Samples Collected	Monthly Average Residual (mg/L)	
January	16.3	809	17,598	390	4	0.15	31	1.17	45
February	16.4	1,020	15,296	338	4	0.17	28	1.07	43
March	16.3	1,002	19,752	471	6	0.19	31	1.15	50
April	16.4	881	14,406	282	4	0.21	27	1.21	48
May	16.7	979	19,474	452	5	0.35	31	1.11	48
June	16.7	1,190	19,326	411	6	0.35	29	1.19	46
July	16.9	899	15,992	393	4	0.24	31	1.22	47
August	16.8	1,014	17,788	384	5	0.32	31	1.17	48
September	16.9	818	15,845	401	4	0.46	30	1.21	45
October	17.2	794	15,666	433	3	0.37	31	1.23	47
November	17.2	1,048	18,532	458	1	0.16	30	1.32	48
December	16.4	795	16,646	401	2	0.45	32	1.17	49
Total			206,321	4,814	48		362		564
Average			17,193			0.28		1.18	
Maximum	17.2	1,190							

Disinfectant Compound Used: **12% Sodium Hypochlorite**
 Form of Residual Displayed: **Free**
 Quantity of Disinfectant Used During 2021: **4,814 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, 2021 – December 31, 2021

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	9.5	16.3	809	20,262	438
February	9.4	16.4	1,020	17,199	382
March	9.6	16.3	1,002	21,522	493
April	9.7	16.4	881	17,074	345
May	9.6	16.7	979	20,977	477
June	9.7	16.7	1,190	22,079	448
July	10.2	16.9	899	17,931	455
August	9.6	16.8	1,014	19,514	406
September	9.4	16.9	818	17,142	445
October	9.7	17.2	794	16,884	455
November	9.6	17.2	1,048	19,643	504
December	9.5	16.4	795	17,810	427
Total				228,037	5,275
Average				19,003	
Maximum	10.2	17.2	1,190		

3.2 Comparison of Actual Flow and Maximum Allowable Rates

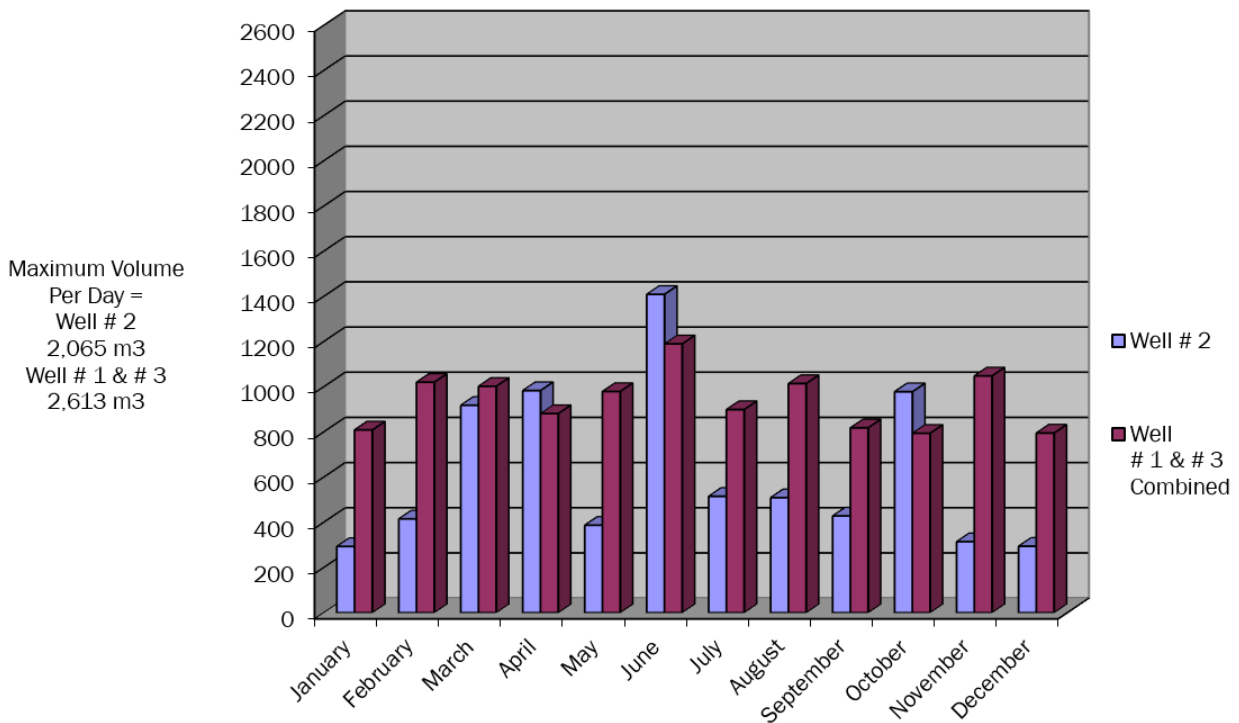
O. Reg. 170/03 stipulates that a summary of the quantities and flow rates of the water supplied from each of Harriston’s wells be included in the Summary Report and compared against the rated capacity and flow rate for the system. As such, a comparison of the instantaneous peak flow to the PTTW’s rated 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	89	979	703	72
Well #2	23.9	17.1	72	2,065	1,409	68
Well #3	18.9	17.2	91	1,634	1,190	73

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.

The time and duration of any flow exceedance is recorded for each event along with the reason for the occurrence. There were no extended exceedances or exceedances over the daily permitted rate 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 concentration) or IMAC (interim maximum acceptable concentration). 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 for high and low free chlorine. In the event of a high and/or low chlorine residual 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 turbidity readings exceeding 1.0 NTU during 2021. 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 3.7.

The free chlorine residual in the distribution system ranged between 0.44 mg/L and 1.39 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
2021 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	0.09	0.85
	Maximum	0.67	1.98
	Average	0.33	1.23
Well #2	Minimum	0.09	0.44
	Maximum	0.65	1.61
	Average	0.29	1.21
Well #3	Minimum	0.16	0.66
	Maximum	0.89	1.66
	Average	0.36	1.18

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 2021, 7,960 L of 12% Sodium Hypochlorite was used. The average dosage rates are presented in Table 3.8.

In 2021, 1,400 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
2021 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	461	55.3	21,716	2.55
	Well # 2	2,685	322.2	90,794	3.55
	Well # 3	4,814	577.7	206,321	2.80
	Total	7,960	955.2	318,831	3.00
PW1680	Well #1 & Well #3	255	356.7	228,037	1.56
	Well # 2	1,145	1,603	90,794	17.66
	Total	1,400	1,960	318,831	6.15

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 MECP order that the system failed to meet from January 1, 2021 to December 31, 2021, and the corresponding corrective measure(s) taken. Compliance was assessed as follows:

- MECP Completed Inspection of the Harriston DWS was completed September 28, 2021. Final inspection rating 100%
- There were **no MECP Orders** issued to the Harriston Drinking Water System in 2021.
- 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
N/A			

4.2 Summary of Compliance

The Town of Minto works diligently to maintain compliance with all of the requirements of the SDWA, O. Reg. 170/03, as well as the Harriston Water Work's MDWL 106-102 Issue 3, DWWP 106-202 Issue 5 and PTTW #3012-A8QRPF.

Table 4.2 identifies any non-compliances related to the following: SDWA, O. Reg. 170/03, 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 Issue 3	<i>Harriston Drinking Water System is in compliance with all of the requirements of the MDWL</i>	
DWWP # 106-202 Issue 5	<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>	
PTTW #3012-A8QRPF	<i>Harriston Drinking Water System is in compliance with all of the requirements of the PTTW</i>	

Dated this 8th day of March 2022

A handwritten signature in black ink, appearing to read "Todd Rogers", written over a horizontal line.

Todd Rogers
Water Services Manager