

2022 Summary Report

for the

Town of Minto

HARRISTON DRINKING WATER SYSTEM

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Date: March 14, 2023

2022 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, 2022 to December 31, 2022.

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 2022

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 2022 \$19,381 was spent on pumphouse/watermain repairs & maintenance, \$1,620 was spent on engineering to create a servicing strategy for future system needs, \$8,510 on connecting Well #1 & #3 to the SCADA system, \$17,220 was spent replacing the well pump motor in Well #3, \$13,440 on well exploration and \$11,690 on electrical inspection and replacement of the Aircraft Warning light on the water tower. The following purchase was also made on equipment that is shared between all of Minto's water systems. \$17,780 on the water meters.

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

2.2 Upgrades Scheduled to be Completed in 2023

In 2023, the Town of Minto is planning to spend \$100,00 on Well exploration and \$20,000 to Videolog Well #2.

The following will also be purchased to be shared within the water department. \$100,000 on vehicle replacement, \$50,000 on the SCADA monitoring system and \$20,000 for water meters. \$182,000 on watermain replacement (location to be determined), \$5,000 on radio upgrades 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 2022 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, 2022 – December 31, 2022

					Monthly Averages				Distribution
	Raw Water Flow (Max Flow Rate = 11.3 L/s)			Chlorine		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 (NTU)	No. of Treated Samples Collected	Monthly Average Residual (mg/L)	No. of Samples Collected
January	9.6	72	1,258	24	1	0.08	31	1.33	
February	9.6	74	1.301	42	1	0.08	28	1.39	-
March	9.5	73	1,252	37	10	0.21	31	1.32	
April	9.5	224	1,511	37	8	0.21	31	1.26	
May	9.6	92	1,479	32	6	0.20	31	1.21	See
June	9.5	165	1,440	44	5	0.28	30	1.27	Harriston Well
July	9.6	147	1,584	45	4	0.42	31	1.25	#3
August	9.4	88	1,383	22	6	0.28	31	1.23	Data
September	9.4	74	1,457	50	6	0.28	30	1.29	
October	9.5	735	6,750	197	4	0.32	31	1.29	
November	9.5	155	1,981	22	4	0.29	30	1.30	
December	9.5	101	1,239	43	4	0.26	31	1.32	
Total			22,635	595	59		366		
Average			1,886			0.24		1.29	
Maximum	9.6	735	•						

Disinfectant Compound Used: 12% Sodium Hypochlorite

Form of Residual Displayed: Free

Quantity of Disinfectant Used During 2022: **595** 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, 2022 – December 31, 2022

		D. M				Monthly A	verages		Distribution
	Raw Water Flow (Max Flow Rate = 23.9 L/s)			Chlorine	Treated Turb		Treated Disinfe Point of	ctant	System Disinfectant
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 (NTU)	No. of Treated Samples Collected	Monthly Average Residual (mg/L)	No. of Samples Collected
lonuon/	16.9	417	7,374	222	1	0.25	31	1.31	
January	16.8	385	8,298	268	1	0.25	28	1.35	1
February		+	,		7		30		1
March	16.9	362	8,451	301	•	0.69		1.29	-
April	17.0	652	8,280	257	8	0.54	31	1.44	-
May	16.9	454	7,964	239	7	0.60	31	1.39	See
June	16.8	379	7,548	241	4	0.65	30	1.23	Harriston Well
July	16.7	482	7,299	224	4	0.82	31	1.14	#3
August	16.7	599	8,139	246	5	0.79	31	1.19	Data
September	16.7	399	7,608	240	6	0.79	30	1.21	
October	16.6	1,266	11,265	320	6	0.70	31	1.39	
November	16.6	843	8,984	307	3	0.81	30	1.38	
December	16.7	466	7,220	234	4	0.74	31	1.34	
Total			98,430	3,099	56		365		
Average			8,203			0.64		1.31	
Maximum	17.0	1,266							

Disinfectant Compound Used: 12% Sodium Hypochlorite

Form of Residual Displayed: Free

Quantity of Disinfectant Used During 2022: **3,099 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, 2022 – December 31, 2022

						Monthly A	verages		Distribution
	Raw Water Flow (Max Flow Rate = 18.9 L/s)			Chlorine	Treated Turb		Treated Disinfe Point of	ctant	System Disinfectant
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 (NTU)	No. of Treated Samples Collected	Monthly Average Residual (mg/L)	No. of Samples Collected
January	16.2	852	15.771	331	2	0.17	31	1.16	47
February	16.3	742	12,329	310	1	0.46	28	1.25	43
March	16.3	695	14,850	397	12	0.20	31	1.27	47
April	16.1	691	13,058	326	8	0.21	31	1.33	47
May	16.1	880	16,123	358	6	0.14	31	1.17	48
June	16.3	956	18,524	485	5	0.23	30	1.25	49
July	16.3	686	14,301	400	5	0.25	31	1.30	44
August	16.4	742	15,934	407	5	0.34	31	1.24	50
September	16.1	815	14,910	377	6	0.20	30	1.17	48
October	16.6	767	9,477	169	4	0.30	16	1.17	47
November	16.8	670	13,648	319	4	0.89	27	1.23	45
December	16.3	728	14,060	378	4	0.46	31	1.32	47
Total			172,985	4,257	62		348		562
Average			14,415			0.32		1.24	
Maximum	16.8	956							

Disinfectant Compound Used: 12% Sodium Hypochlorite

Form of Residual Displayed: Free

Quantity of Disinfectant Used During 2022: **4,257 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, 2022 – December 31, 2022

	(Chlorine			
Month	Operator Observed Peak Flow Operator Observed Peak Flow Operator Observed Flow Flow Operator Observed Flow Flow Operator Observed Flow Operator Observed Flow Operator Observed Flow Operator Operator Observed Ob				Monthly Total
	(L/s)	(L/s)	(m ³ /day)	(m³)	(L)
January	9.6	16.2	852	17,029	355
February	9.6	16.3	742	13,630	352
March	9.5	16.3	695	16,102	434
April	9.5	16.1	691	14,569	363
May	9.6	16.1	880	17,602	390
June	9.5	16.3	956	19,964	529
July	9.6	16.3	686	15,885	445
August	9.4	16.4	742	17,317	429
September	9.4	16.1	815	16,367	427
October	9.5	16.6	767	16,227	366
November	9.5	16.8	670	15,629	341
December	9.5	16.3	728	15,299	421
Total				195,620	4,852
Average				16,302	
Maximum	9.6	16.8	956		

3.2 Comparison of Actual Flow and Maximum Allowable Rates

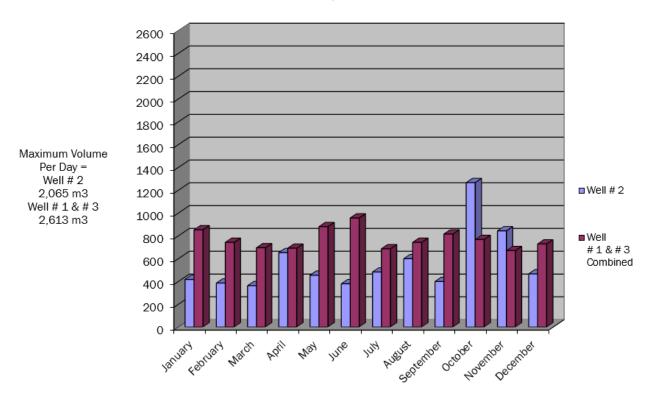
O. Reg. 170/03 stipulates that a summary of the quantities and flow rates of the water supplied from each of Harriston's wells be included in the Summary Report and compared against the rated capacity and flow rate for the system. As such, a comparison of the instantaneous peak flow to the PTTW's rated 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	%	m³/day	m³/day	%
Well #1	11.3	9.6	85	979	735	75
Well #2	23.9	17.0	71	2,065	1,266	61
Well #3	18.9	16.8	89	1,634	956	59

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 2022. 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 0.53 mg/L and 1.81 mg/L. 0. Reg. 170/03, Schedule 1-2 stipulates that the free chlorine residual can never be less than 0.05 mg/L. In addition, 0. 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 2022 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
	Minimum	0.06	0.60
Well #1	Maximum	0.83	1.73
	Average	0.34	1.29
	Minimum	0.09	0.91
Well #2	Maximum	0.75	1.66
	Average	0.30	1.31
	Minimum	0.09	0.74
Well #3	Maximum	0.97	1.79
	Average	0.37	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 2022, 7,951 L of 12% Sodium Hypochlorite was used. The average dosage rates are presented in Table 3.8.

In 2022, 1,488 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 2022 Annual Summary of Treatment Chemicals Used for Harriston Drinking Water System

Treatment	Well	Volume Used	Mass Used	Annual Flow	Dosage Rate
Chemical		L	kg	m³	mg/L
	Well #1	595	71.4	22,635	3.15
12 % Sodium	Well # 2	3,099	371.9	98,430	3.78
Hypochlorite	Well # 3	4,257	510.8	172,985	2.95
(NaOCI)	Total	7,951	954.1	294,050	3.24
	Well #1 & Well #3	279	390.6	195,620	2.00
PW1680	Well # 2	1,209	1,693	98,430	17.20
2000	Total	1,488	2,083	294,050	7.08

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, 2022 to December 31, 2022, and the corresponding corrective measure(s) taken. Compliance was assessed as follows:

- MECP Completed Inspection of the Harriston DWS was completed June 16, 2022. Final inspection rating 100%
- There were **no MECP Orders** issued to the Harriston Drinking Water System in 2022.
- 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	Parameter	Result	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	Harriston Drinking Water System is in compliance with all of the requirements of the MDWL		
DWWP # 106-202 Issue 5	Harriston Drinking Water System is in compliance with all of the requirements of the DWWP		
O. Reg. 170/03	em is in compliance with all of O. Reg. 170/03		
SDWA	Harriston Drinking Water System is in compliance with all of the requirements of the SDWA		
PTTW #3012-A8QRPF	Harriston Drinking Water System is in compliance with all of the requirements of the PTTW		

Dated this 14th day of March 2023

Todd Rogers

Water Services Manager