



2014 Summary Report

for the

Town of Minto

PALMERSTON DRINKING WATER SYSTEM

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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 Summary Report for the Palmerston Drinking Water System 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, 2014 to December 31, 2014.

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 Town of Minto to assess the water work's capability to meet existing and future planned uses of the system.

1.3 Description of Drinking Water System

Palmerston is located in the Town of Minto within the northwest corner of Wellington County, along the route of Provincial Hwy. No. 23.

The Palmerston Drinking Water System services a permanent population of approximately 2,579, comprised of approximately 910 residential premises, as well as Industrial, Commercial, Institutional premises. The municipal water system is also used for fire protection.

Palmerston is currently serviced by a waterworks that consists of: four drilled bedrock wells, two wellhouses, an elevated 2500 m³ steel storage tank and a distribution network of watermains, ranging in diameter from 100 mm to 250 mm. There are approximately 102 fire hydrants in the Town of Palmerston. In the event of a prolonged power outage, a portable generator is available to either wellhouse to supply back-up power.

The bedrock wells are equipped with submersible pumps that discharge directly into the William Street Wellhouse (Wells #1 and #2) or the Whites Road Wellhouse (Well #3 and #4). In the wellhouse, the raw water supply is injected with 12% sodium hypochlorite for disinfection and the chemical PW1680 for iron sequestering.

The wells are controlled (*start/stop*) automatically based on elevated storage tank liquid levels and pressures in the distribution system. Each wellhouse is equipped with alarms for chlorination system failure (*and corresponding lockout of well pumps*), low water level and intrusion. Each wellhouse has continuous monitoring analyzers 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 Palmerston Drinking Water System operates under MDWL 106-103, 106-203 Schedule C (proposed alterations), DWWP 106-203 and PTTW #8374-8HSPD5.

2.0 SUMMARY OF UPGRADES

2.1 Upgrades Completed in 2014

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

Typically, maintaining the system includes repairs and/or replacement of individual components as necessary. In 2014, \$830.00 was spent finalizing the addition of Well # 4, \$15,740.00 was spent on valve replacements, \$64,775.00 was spent installing watermain on Lowe St. and Walker St and \$255.00 was spent on the Wellington St. watermain replacement project.

The following purchases were also made on equipment that is shared between all of Minto's water systems. \$13,890.00 on a truck to share with the roads and wastewater departments, \$24,425.00 on new generators, \$225.00 on emergency lights, \$1,115.00 on computer equipment, \$500,000.00 on the water meter installation program and \$3,715.00 on the Water and Wastewater rate study and Financial Plan.

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

2.2 Upgrades Scheduled to be Completed in 2015

In 2015, the Town of Minto is planning to spend \$176,000.00 replacing watermain on James St. and \$26,000 on water tower upgrades and maintenance.

In 2015 the following will be purchased to be shared within the water department.

One vehicle replacement for approximately \$45,000.00, upgrades to the SCADA system at an estimated cost of \$100,000.00, \$30,000.00 on the water meter installation program, \$26,000.00 on a rate study, \$25,000.00 on a vacuum trailer and \$3,500.00 on hydrants.

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 Palmerston's wells be included in the Summary Report. Tables 3.1, 3.2, 3.3 and 3.4 provide a summary of quantities and flow rates supplied during 2014 for Wells #1, #2, #3 and #4 respectively, on a monthly basis. Wells #1 and #2 supply the William Street Wellhouse and the two wells alternate duties as primary supply. As such, Wells #1 and #2 are permitted as one and provide standby duty to each other. Well #3 and #4 supply the White's Road Wellhouse and the two wells alternate duties as primary supply.

Table 3.1
Palmerston Drinking Water System – Well #1
Treated Water Flow, Turbidity, and Disinfectant Residual
January 1, 2014 – December 31, 2014

Month	Raw Water Flow (Max Flow Rate = 22.8 L/s)			Chlorine	Monthly Averages				Distribution System Disinfectant	
	Instantaneous Peak Flow (L/s)	Maximum Day Flow (m ³ /day)	Monthly Total (m ³)		Treated Water Turbidity		Treated Water Disinfectant		No. of Dis. Samples Collected	No. of Samples with Detectable Residual
					No. of Samples Collected	Daily Average Turbidity	No. of Treated Samples Collected	Average Residual (mg/L)		
January	13.6	113	1,840	50	17	0.50	31	1.50	See Palmerston Well #2 Data	
February	13.5	119	1,594	34	17	0.50	28	1.50		
March	13.6	91	1,838	43	14	0.49	31	1.42		
April	13.5	92	1,665	39	17	0.53	30	1.39		
May	13.3	89	1,374	42	12	0.65	26	1.51		
June	15.3	100	1,899	23	14	0.59	30	1.41		
July	14.6	144	2,035	15	17	0.57	31	1.36		
August	14.3	101	1,873	65	17	0.66	31	1.41		
September	15.6	87	1,826	21	17	0.61	29	1.35		
October	15.3	214	2,438	84	16	0.54	30	1.45		
November	15.4	143	1,862	44	13	0.53	30	1.32		
December	15.3	126	2,235	20	19	0.53	31	1.23		
Total			22,479	480	190		358			
Average			1,873			0.56		1.40		
Maximum	15.6	214								

Disinfectant Compound Used: 12% Sodium Hypochlorite
Form of Residual Displayed: Free
Quantity of Disinfectant Used During 2014: 480 L
Distribution System Target Residual: 0.2 mg/L

Table 3.2
Palmerston Drinking Water System – Well #2
Treated Water Flow, Turbidity, and Disinfectant Residual
January 1, 2014 – December 31, 2014

Month	Raw Water Flow (Max Flow Rate = 22.8 L/s)			Chlorine	Monthly Averages				Distribution System Disinfectant		
	Instantaneous Peak Flow (L/s)	Maximum Day Flow (m ³ /day)	Monthly Total (m ³)		Monthly Total (L)	Treated Water Turbidity		Treated Water Disinfectant		No. of Dis. Samples Collected	No. of Samples with Detectable Residual
						No. of Samples Collected	Daily Average Turbidity	No. of Treated Samples Collected	Average Residual (mg/L)		
January	17.7	430	7,653	149	18	0.53	31	1.17	49	49	
February	17.9	361	7,023	142	17	0.54	28	1.23	44	44	
March	18.2	326	7,904	154	14	0.59	31	1.25	48	48	
April	18.3	395	7,680	132	17	0.57	30	1.27	45	45	
May	18.4	728	8,618	199	13	0.61	30	1.22	45	45	
June	18.6	356	8,661	142	14	0.59	30	1.14	48	48	
July	17.3	310	7,196	162	17	0.64	31	1.11	46	46	
August	17.5	310.2	7,360	130	17	0.56	31	1.11	48	48	
September	17.6	379.9	7,383	152	17	0.57	30	1.14	48	48	
October	17.1	425	6,417	178	15	0.60	28	1.30	50	50	
November	17.6	341	7,014	111	13	0.63	30	1.25	43	43	
December	17.4	1141	9,881	198	19	0.63	31	1.27	49	49	
Total			92,790	1,849	191		361		563	563	
Average	17.8					0.59		1.21			
Maximum		1,141									

Disinfectant Compound Used: 12% Sodium Hypochlorite
Form of Residual Displayed: Free
Quantity of Disinfectant Used During 2014: 1,849 L
Distribution System Target Residual: 0.2 mg/L

Table 3.3
Palmerston Drinking Water System – Well #3
Treated Water Flow, Turbidity, and Disinfectant Residual
January 1, 2014 – December 31, 2014

Month	Raw Water Flow (Max Flow Rate = 26.7 L/s)			Chlorine Monthly Total (L)	Monthly Averages				Distribution System Disinfectant	
	Instantaneous Peak Flow (L/s)	Maximum Day Flow (m ³ /day)	Monthly Total (m ³)		Treated Water Turbidity		Treated Water Disinfectant		No. of Dis. Samples Collected	No. of Samples with Detectable Residual
					No. of Samples Collected	Daily Average Turbidity	No. of Treated Samples Collected	Average Residual (mg/L)		
January	22.6	545	12,673	286	18	0.41	31	1.32		
February	22.0	518	12,620	293	17	0.37	28	1.46		
March	23.6	623	15,094	282	14	0.60	32	1.39		
April	22.5	601	13,997	312	17	0.50	30	1.36		
May	22.6	608	12,785	260	14	0.63	31	1.26		
June	21.9	549	14,234	277	13	0.60	30	1.31		
July	21.8	605	13,680	291	17	0.41	31	1.20		
August	22.9	583	13,618	328	17	0.64	31	1.29		
September	22.2	557	12,682	303	17	0.63	30	1.38		
October	23.8	710	14,550	324	16	0.57	31	1.37		
November	22.3	620	12,656	285	14	0.56	30	1.26		
December	22.3	539	10,339	331	11	0.57	20	1.29		
Total			158,928	3,572	185		355			
Average	22.5		13,244			0.54				1.32
Maximum		710								

Disinfectant Compound Used: 12% Sodium Hypochlorite
Form of Residual Displayed: Free
Quantity of Disinfectant Used During 2014: 3,572 L
Distribution System Target Residual: 0.2 mg/L

Table 3.4
Palmerston Drinking Water System – Well #4
Treated Water Flow, Turbidity, and Disinfectant Residual
January 1, 2014 – December 31, 2014

Month	Raw Water Flow (Max Flow Rate = 26.7 L/s)			Chlorine	Monthly Averages				Distribution System Disinfectant	
	Instantaneous Peak Flow (L/s)	Maximum Day Flow (m ³ /day)	Monthly Total (m ³)		Monthly Total (L)	Treated Water Turbidity	Treated Water Disinfectant	No. of Samples Collected	Average Residual (mg/L)	No. of Dis. Samples Collected
January	21.2	147	2,669	See Palmerston Well #3 Data	17	0.38	31	1.36		
February	21.2	151	2,300		17	0.42	28	1.51		
March	22.3	130	2,872		14	0.50	30	1.40		
April	22.4	104	3,577		17	0.47	30	1.24		
May	22.5	250	2,751		15	0.52	31	1.23		
June	23.3	927	2,733		12	0.72	30	1.51		
July	23.8	150	2,874		17	0.40	31	1.25		
August	24.5	139	2,963		17	0.59	31	1.28		
September	24.1	391	3,134		18	0.54	29	1.36		
October	23.7	206	2,895		16	0.52	31	1.41		
November	23.7	191	2,746		13	0.45	30	1.28		
December	23.9	946	8,253		19	0.62	31	1.30		
Total			39,767						363	
Average			3,314						0.51	
Maximum	24.5	946								

Disinfectant Compound Used: 12% Sodium Hypochlorite
 Form of Residual Displayed: Free
 Quantity of Disinfectant Used During 2014:
 Distribution System Target Residual: 0.2 mg/L

3.2 Comparison of Actual Flow and Maximum Allowable Rates

O. Reg. 170/O3 stipulates that a summary of the quantities and flow rates of the water supplied from each of Palmerston’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 3.6. Table 3.5 and Table 3.6 reflect the comparisons between the PTTW and MDWL.

Table 3.5
Palmerston Drinking Water System
Well #1 & 2 Combined
Treated Water Flow
January 1, 2014 – December 31, 2014

Month	Treated Water Flow			Chlorine
	Instantaneous Peak flow (L/s)	Maximum Day Flow (m ³ /day)	Monthly Total (m ³)	
January	17.7	430	9,493	199
February	17.9	361	8,617	176
March	18.2	326	9,742	197
April	18.3	395	9,345	171
May	18.4	728	9,992	241
June	18.6	356	10,560	165
July	17.3	310	9,231	177
August	17.5	310	9,233	195
September	17.6	380	9,209	173
October	17.1	425	8,855	262
November	17.6	341	8,876	155
December	17.4	1141	12,116	218
Total			115,269	2,329
Average			9,606	
Maximum	18.6	1,141		

Table 3.6
Palmerston Drinking Water System
Well #3 & 4 Combined
Treated Water Flow
January 1, 2014 – December 31, 2014

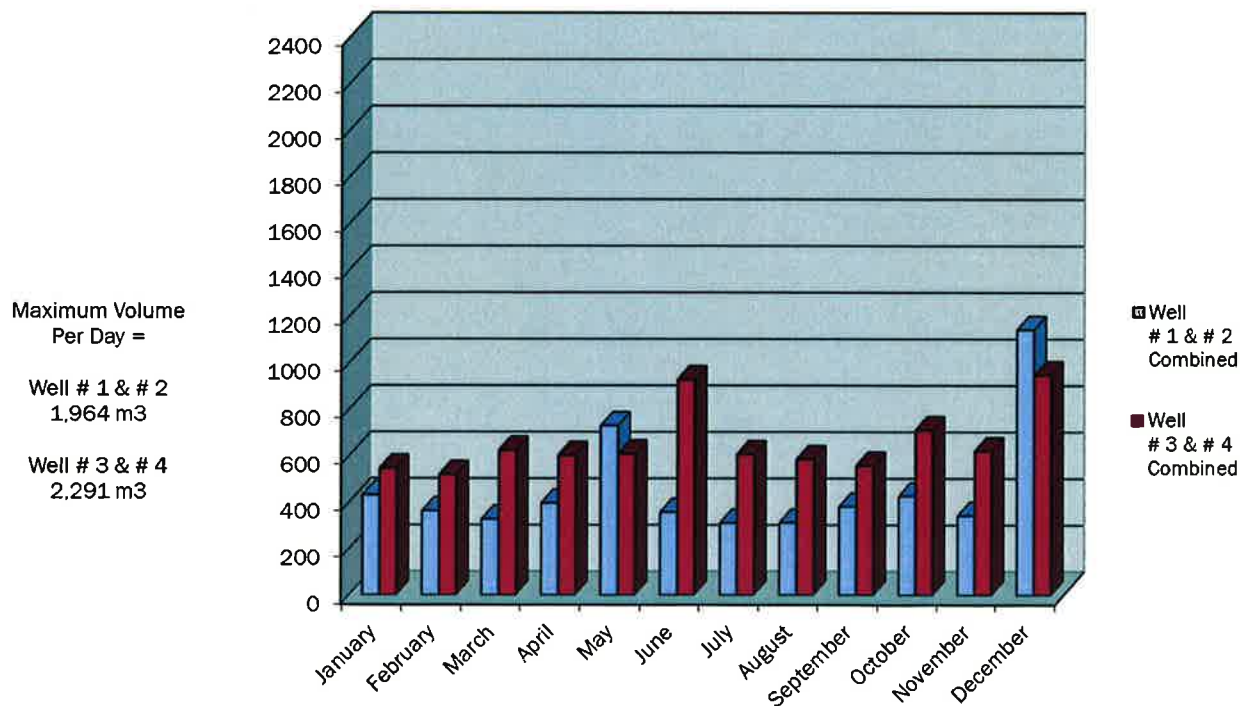
Month	Treated Water Flow			Chlorine
	Instantaneous Peak flow (L/s)	Maximum Day Flow (m ³ /day)	Monthly Total (m ³)	
January	22.6	545	15342	286
February	22.0	518	14920	293
March	23.6	623	17966	282
April	22.5	601	17574	312
May	22.6	608	15536	260
June	23.3	927	16967	277
July	23.8	605	16554	291
August	24.5	583	16581	328
September	24.1	557	15816	303
October	23.8	710	17445	324
November	23.7	620	15402	285
December	23.9	946	18592	331
Total			198,695	3,572
Average			16,558	
Maximum	24.5	946		

Table 3.7
Comparison of Flow Rates and Flow Capacities
To
Rated Flow Rate (PTTW) and Rated Capacity (MDWL)

Well Supply	PTTW Max. Flow Rate	Maximum Instantaneous Peak Flow	Percent of Maximum Allowable	MDWL Schedule C Maximum Daily Quantity	PTTW Maximum Daily Flow	Percent of Maximum Allowable
	L/s	L/s	%	m ³ /day	m ³ /day	%
Well #1	22.8	15.6	68	1,964	214	11
Well #2	22.8	18.6	81	1,964	1,141	58
Well #3	26.7	23.8	89	2,291	710	31
Well #4	26.7	24.5	107	2,291	946	48

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 3.8
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 Palmerston Drinking Water System.

3.3 Raw Water Quality and Required Treatment

The Palmerston Drinking Water System has no naturally occurring chemical parameters that exceed MAC or IMAC limits. The Palmerston 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.

The William Street Wellhouse (Well #1 and #2) and the Whites Road Wellhouse (Well #3 and #4) are equipped with continuous monitoring analyzers for measuring free chlorine residual. The chlorine analyzers are equipped with alarms. In the event of an adverse 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, 3.3 and 3.4 for Well #1, Well #2, Well # 3 and Well # 4, respectively.

There were no high turbidity readings (>1.0 NTU) experienced in 2014. The minimum, maximum and average turbidity readings for raw water from each well are presented in Table 3.9.

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 3.9. Also included in Table 3.9 is the range of free chlorine residual within the distribution system.

The free chlorine residual in the distribution system ranged between 0.68 mg/L and 1.57 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 with the distribution system, a free chlorine residual of 0.2 mg/L ...". The Palmerston Drinking Water System meets both of these requirements.

Table 3.9
Palmerston Drinking Water System
2014 Annual Summary of
Raw Water Turbidity and Free Chlorine Residual

Location	Range	Raw Water Turbidity	Free Chlorine Residual at POE
		NTU	mg/L
Well #1	Minimum	0.18	0.90
	Maximum	0.91	2.03
	Average	0.53	1.40
Well #2	Minimum	0.24	0.82
	Maximum	0.85	1.93
	Average	0.51	1.21
Well #3	Minimum	0.11	0.88
	Maximum	0.86	1.71
	Average	0.49	1.32
Well #4	Minimum	0.22	0.96
	Maximum	0.88	1.97
	Average	0.56	1.34

3.4 Summary of Treatment Chemicals Used

The disinfectant chemical used in the Palmerston Drinking Water System is 12% Sodium Hypochlorite. Measurements of free chlorine residual are recorded on a continuous basis. In 2014, 5,901 L of 12% Sodium Hypochlorite was used. The average dosage rates are presented in Table 3.10.

In 2014, 3,571 L of PW1680 was used for the sequestering of iron. Wells #1 and #2 share a common tank of PW1680. The average dosage rates are presented in Table 3.10.

**Table 3.10
 Palmerston Drinking Water System
 2014 Annual Summary of
 Treatment Chemicals Used**

Treatment Chemical	Well	Volume Used	Mass Used	Annual Flow	Dosage Rate
		L	kg	m ³	mg/L
12 % Sodium Hypochlorite (NaOCl)	Well #1	480	57.6	22,479	2.56
	Well #2	1,849	221.9	92,790	2.39
	Well #3 & 4	3,572	428.6	198,695	2.16
	Total	5,901	708.1	313,964	2.26
PW1680	Well #1 & Well #2	2,127	2,956.5	115,269	25.65
	Well #3 & Well #4	1,444	2,007.2	198,695	10.10
	Total	3,571	4,963.7	313,964	15.81

- Note:
- Wells #1 and #2 share the same PW1680 storage container; 2,365 L is the combined PW1680 usage for both wells
 - Wells #3 and #4 share the same PW1680 storage container; 2,285 L is the combined PW1680 usage for both wells
 - 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 MOE Order that the system failed to meet from January 1, 2014 to December 31, 2014, and the corresponding corrective measure(s) taken. Compliance was assessed as follows:

- There were **no MOE Orders** issued to the Palmerston Drinking Water System in 2014.
- 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.

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 Palmerston Water Work's MDWL 106-103, DWWP 106-203 and PTTW #8374-8HSPD5. 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 4.1 identifies all of the requirements of the SDWA, the regulations, the MDWL, the DWWP and the PTTW.

**Table 4.1
 Palmerston 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 # 106-103	<i>Palmerston Drinking Water System is in compliance with all of the requirements of the MDWL</i>	
DWWP # 106-203	<i>Palmerston Drinking Water System is in compliance with all of the requirements of the DWWP.</i>	
O. Reg. 170/03	<i>Palmerston Drinking Water System is in compliance with all of the requirements of O. Reg. 170/03.</i>	
SDWA	<i>Palmerston Drinking Water System is in compliance with all of the requirements of the SDWA.</i>	

Dated this 12th day of March 2015.



 Brian Hansen
 Public Works Director