



City of Morden **Public Water System Annual Report 2016**

This report is available online at the City of Morden website - www.mordenmb.com as of March 31st, 2016

Email Town address is: tmorden@mordenmb.com

Paper copies are available at the Morden Civic Center office at 100-195 Stephen St.

Notifications will be in the quarterly water bills, the Quarterly Newsletter and on the City of Morden website, indicating how users can acquire copies of the report.



City of Morden Annual Water System Operation Report 2016

Where does our water come from?

The City of Morden gets its water supply from Lake Minnewasta. Lake Minnewasta is a reservoir created by the construction of a PFRA dam on Dead horse Creek. The reservoir is approximately 1.4 km long and 500m wide at its widest point. The watershed of the creek upstream from the reservoir encompasses about 130 sq km of land area.

Why do we treat our water?

We treat our water to ensure that safe and pleasing drinking water is supplied to the homes and businesses in the City of Morden. Provincial Regulations have set health based drinking water standards for all public water systems and are becoming more stringent all the time. The City of Morden is committed to meeting or exceeding these new standards set by the province to provide the best tap water possible to the City of Morden.

What type of treatment do we use?

Due to the high hardness count (400- 900 Mg/l) of Morden's raw water supply we use a Lime- Soda Ash softening process followed by filtration. These processes are designed to soften and clarify the water and remove microbial contaminants, such as bacteria and organic materials that are naturally found in lake waters.

Why and how do we disinfect our water?

The final step in the treatment of safe drinking water is disinfection. Disinfection is the selective destruction or inactivation of disease causing organisms in water. The Drinking Water Safety Act and Office Of Drinking Water require that water is disinfected to a set standard before it leaves the water treatment plant and that an adequate amount is maintained in the distribution system to ensure the water is safe right to the consumer's tap. The City of Morden disinfects its water through chlorination. Chlorine is added to kill bacteria and viruses that are commonly found in surface waters such as rivers and lakes. An adequate amount of Chlorine is added before the water leaves the treatment plant to ensure an effective kill of bacteria and to provide a disinfectant residual throughout the distribution system to

combat any contamination in the system.

In 2016 the City of Morden added UV light disinfection as an added barrier of disinfection to treat pathogens- bacteria that are resistant to chlorine.

Are chemicals added to our water? Why?

We add Powder Activated Carbon and Fluoride to the water

Powder Activated Carbon is added to the water to help control taste and odour issues caused by Algae etc.

Fluoride is added as part of the Provincial Fluoridation Program at regulated levels to help prevent tooth decay. This process is monitored by Manitoba Health and Healthy Living. Note the optimum level of Fluoride in water used to be 1 mg/l (part per million) with a Maximum containment level of 1.5 mg/l. As of March 15, 2011 Manitoba Health changed the optimum level to 0.7 ppm with a range of 0.5 to 0.9 ppm. This change was brought about to acknowledge the fact that consumers are getting other sources of Fluoride such as toothpastes and mouthwashes etc. While there is naturally occurring Fluoride in our source water this is taken into account and the final total amount is kept as close to .7ppm as possible.

How much water storage do we have?

When the new water plant was built a 450,000 gal reservoir was built underneath it. We also had a water tower and elevated standpipe with a combined capacity of 750,000 gals for a total capacity of 1.2 million gallons. As a result of having the towers inspected, it was recommended to us that the elevated tower needed extensive repairs to remain in operation. The tower was deemed to have reached it's service length and was removed from service. This reduced our current water storage capacity by 250,000 gals. This had reduced our total storage capacity to 950,000 gals. At peak levels of water use that works out to approx 1 days worth of storage. Associated Engineering was hired to do a study on Morden's water supply and as a result were commissioned to design and build a new 880,000 gal inground cement water reservoir. Construction on the reservoir commenced in the fall of 2013 with expectations that it would be put into service by May 2014. Construction was completed on schedule and with the addition of this new reservoir we now have 1.8 million gals in reserve which should address the City of Morden's water storage needs for years to come. It has now been two years since the new reservoir was put into service and it has been operating as designed with no issues.

What is the "distribution system"?

The system is a network of underground pipes that supply water to all areas of City. The chart shown below identifies the type and length of watermain piping in service.

Type of Waterline	Total Meters
Asbestos cement	36273.21
Ductile iron	1760.08
Plastic	30,101

The mains are flushed through hydrants and regular maintenance including hydrant testing is done annually usually in fall.

Is our water tested? What for? When?

Water tests are taken on a routine basis to ensure the quality and safety of our water and to monitor how well the treatment facility is operating. We daily test the water at the water plant for: Chlorine residual, hardness, PH, turbidity, Alkalinity, Fluoride. All water test results associated with water safety are submitted to the Office Of Drinking Water for review. The tests sent to The Office of Drinking Water are: Bacterial tests, Trihalomethane , Fluoride tests, Turbidity and Chlorine

Bacterial testing: We test the raw water (untreated lake water), the treated water leaving the plant, and the water in the distribution system, every two weeks for the presence of Total coliforms and E-Coli bacteria at a provincially accredited lab in Wpg.

Disinfectant testing is done daily on the treated water leaving the water plant and chlorine levels are also tested in the distribution system every time we take samples for bacterial sampling to ensure there is a proper Chlorine residual in the system.

Turbidity testing is done via on-line continuously monitoring equipment and verified daily by desktop testing. Turbidity is measurement of the clarity of the water and is used to determine how well our treatment system is working.

Trihalomethane (THM) testing: Trihalomethanes are formed when chlorine reacts with naturally occurring organic matter in the water. The province has set a standard based on an average of four samples per year. We test THM levels in two locations on a quarterly basis.

Haloacetic Acid testing: The Office of Drinking Water initiated a Haloacetic Acid testing program in 2016. Haloacetic Acid is a disinfection by- product formed by a reaction with Chlorine. Testing is done at the same time as THMs on a quarterly basis.

Fluoride sampling: Daily sampling of Fluoride levels are done at the water plant and every two weeks a composite sample for that period is submitted for testing and verification at a provincially credited lab

In addition to the above a detailed chemical analysis is performed each year.

What are the results of the tests? Are copies available?

As a result of the testing the Office of Drinking Water has determined that “ The City of Morden has been fulfilling its obligations with regard to bacteriological and disinfection monitoring and reporting”

Copies of test results are kept at the Water plant and copies can be made available by contacting the foreman at the Water plant. Ph# 204-822-5707.

Below are the test results for components that have Maximum Acceptable Concentration limits. The rest of the tests results taken have an Aesthetic Objective. For a copy of the complete analysis report contact the above number.

ANNUAL WATER ANALYSIS

Type	Raw	Treated	Distribution	Max Acceptable Concentration	Units

Nitrite-N		<0.0050	<0.0020	-	1	Ug/L
Dissolved Fluoride	F	0.37	0.754	-	1.5	Mg/L
Nitrate-N		<0.025	0.014	-	10	Mg/L
Antimony	Sb	0.00072	0.00060	-	0.006	Mg/L
Arsenic	As	0.00989	0.00132	-	0.010	Mg/L
Barium	Ba	0.0278	0.00632	-	1.0	Mg/L
Boron	B	0.154	0.104	-	5	Mg/L
Cadmium	Cd	0.000053	0.000078	-	0.005	Mg/L
Chromium	Cr	< 0.0010	<0.0010	-	0.05	Mg/L
Lead	Pb	0.000216	0.000315	-	0.01	Mg/L
Selenium	Se	0.0020	0.0013	-	0.01	Mg/L
Uranium	U	0.0107	0.00017	-	0.02	Mg/L

BI-WEEKLY BACTERIAL TESTS

Date	#1 Raw	#2 Treated	#3 Distribution @PWG	#4 Distribution @PVWC	#5 Distribution @Morden Rec.
January 04, 2016					
Chlorine Free	0	1.04	0.41	0.93	0.47
Chlorine Total	0	1.65	0.91	1.41	0.94
Total Coliforms	8	0	0	0	0
Escherichia Coli	0	0	0	0	0
January 18, 2016					
Chlorine Free	0	1.04	0.81	0.48	0.53
Chlorine Total	0	1.65	1.39	1.00	1.02
Total Coliforms	5	0	0	0	0
Escherichia Coli	0	0	0	0	0
February 1, 2016					
Chlorine Free	0	1.05	0.56	0.67	0.48
Chlorine Total	0	1.59	1.09	1.36	0.95
Total Coliforms	12	0	0	0	0
Escherichia Coli	0	0	0	0	0
February 16, 2016					
Chlorine Free	0	.90	0.19	0.68	0.55
Chlorine Total	0	1.45	0.71	1.21	0.98
Total Coliforms	8	0	0	0	0
Escherichia Coli	0	0	0	0	0
Feb 29, 2016					
Chlorine Free	0	0.94	0.76	0.76	0.55
Chlorine Total	0	1.45	1.32	1.32	0.98
Total Coliforms	4	0	0	0	0
Escherichia Coli	0	0	0	0	0
March 14, 2016					
Chlorine Free	0	.93	0.54	0.19	0.52
Chlorine Total	0	1.57	1.09	1.71	1.11
Total Coliforms	5	0	0	0	0
Escherichia Coli	0	0	0	0	0
March 29, 2016					
Chlorine Free	0	.93	0.34	.80	0.35
Chlorine Total	0	1.57	0.75	1.30	0.85
Total Coliforms	3	0	0	0	0
Escherichia Coli	0	0	0	0	0
April 11, 2016					
Chlorine Free	0	.99	0.34	1.15	0.35
Chlorine Total	0	1.36	.74	1.73	0.86
Total Coliforms	12	0	0	0	0
Escherichia Coli	0	0	0	0	0
April 25, 2016					
Chlorine Free	0	0.75	0.34	1.17	0.35

Chlorine Total	0	1.23	0.74	1.58	0.86
Total Coliforms	66	0	0	0	0
Escherichia Coli	1	0	0	0	0
May 16, 2016					
Chlorine Free	0	0.86	0.29	0.67	0.24
Chlorine Total	0	1.33	0.70	1.07	0.70
Total Coliforms	24	0	0	0	0
Escherichia Coli	0	0	0	0	0
May 24, 2016					
Chlorine Free	0	1.05	0.34	0.60	0.24
Chlorine Total	0	1.52	0.79	0.97	0.70
Total Coliforms	200	0	0	0	0
Escherichia Coli	2	0	0	0	0
June 06, 2016					
Chlorine Free	0	0.97	0.19	0.57	0.42
Chlorine Total	0	1.46	0.31	1.00	0.90
Total Coliforms	>200	0	0	0	0
Escherichia Coli	0	0	0	0	0
June 20, 2016					
Chlorine Free	0	0.94	0.23	0.65	0.42
Chlorine Total	0	1.48	0.67	1.19	0.90
Total Coliforms	200	0	0	0	0
Escherichia Coli	0	0	0	0	0
July 4, 2016					
Chlorine Free	0	0.69	0.24	0.82	0.35
Chlorine Total	0	1.13	0.59	1.27	0.83
Total Coliforms	>200	0	0	0	0
Escherichia Coli	1	0	0	0	0
July 18, 2016					
Chlorine Free	0	0.75	0.10	0.70	0.18
Chlorine Total	0	1.27	0.53	1.12	0.60
Total Coliforms	>200	0	0	0	0
Escherichia Coli	1	0	0	0	0
Aug 2, 2016					
Chlorine Free	0	0.79	0.50	0.70	0.21
Chlorine Total	0	1.36	0.95	1.12	0.66
Total Coliforms	>200	0	0	0	0
Escherichia Coli	1	0	0	0	0
August 15, 2016					
Chlorine Free	0	1.18	0.13	0.25	0.40
Chlorine Total	0	1.91	0.46	0.78	0.79
Total Coliforms	>200	0	0	0	0
Escherichia Coli	0	0	0	0	0
August 29, 2016					
Chlorine Free	0	0.82	0.17	0.43	0.12
Chlorine Total	0	1.29	0.68	0.88	0.55
Total Coliforms	200	0	0	0	0
Escherichia Coli	0	0	0	0	0
September 12, 2016					
Chlorine Free	0	0.87	0.17	0.77	0.16
Chlorine Total	0	1.30	0.68	1.14	0.71
Total Coliforms	>200	0	0	0	0
Escherichia Coli	1	0	0	0	0
September 26, 2014					
Chlorine Free	0	1.15	0.17	0.59	0.12
Chlorine Total	0	1.53	0.51	1.07	0.44
Total Coliforms	>200	0	0	0	0
Escherichia Coli	0	0	0	0	0
October 11, 2016					
Chlorine Free	0	1.13	0.22	0.23	0.14

Chlorine Total	0	1.72	0.73	0.71	0.58
Total Coliforms	59	0	0	0	0
Escherichia Coli	0	0	0	0	0
October 24, 2016					
Chlorine Free	0	1.15	0.20	0.48	0.14
Chlorine Total	0	1.39	0.66	1.14	0.59
Total Coliforms	25	0	0	0	0
Escherichia Coli	0	0	0	0	0
November 07, 2016					
Chlorine Free	0	1.12	0.29	0.31	0.14
Chlorine Total	0	1.71	0.81	0.88	0.61
Total Coliforms	48	0	0	0	0
Escherichia Coli	0	0	0	0	0
November 21, 2016					
Chlorine Free	0	1.04	0.29	0.51	0.16
Chlorine Total	0	1.52	0.81	1.05	0.70
Total Coliforms	9	0	0	0	0
Escherichia Coli	0	0	0	0	0
December 5, 2016					
Chlorine Free	0	.22	0.96	0.22	0.22
Chlorine Total	0	0.79	1.49	0.85	0.85
Total Coliforms	145	0	0	0	0
Escherichia Coli	0	0	0	0	0
December 19, 2016					
Chlorine Free	0	0.98	0.12	0.22	0.25
Chlorine Total	0	1.52	0.69	0.70	0.81
Total Coliforms	34	0	0	0	0
Escherichia Coli	0	0	0	0	0

How do we plan to meet Standards for Trihalomethanes? (THM's)

As stated previously Trihalomethanes are formed when chlorine reacts with naturally occurring organic matter in the water. Because of the nature of Lime Soda-Ash softening plants and the amount of chemicals we need to add for softening the water. Treating surface water to meet trihalomethane standards can be challenging. The standard for total THMS is 1 mg/l based on a running average of quarterly samples. The City of Morden is currently exceeding this standard based on the running average of our quarterly samples with results of 0.138 and 0.145 mg/l which are above the regulated limit.

As a result of this The City of Morden initiated a Water Treatment Study and has engaged the services of Associated Engineering to explore the possibilities of process enhancement or alternative treatment options to bring our THMs residuals into compliance with current ODW regulations.

Trihalomethane Test Results

Date	#1 Public Works Garage	#2 Recreation Centre
February 16, 2016		
THM Preserved		
• Bromodichloromethane mg/l	0.0167	0.0340
• Bromoform mg/l	<0.00050	<0.00050
• Chloroform mg/l	0.101	0.104
• Chlorodibromomethane mg/l	0.00287	0.00118

<ul style="list-style-type: none"> • Difluorobenzene • THMs mg/l • Total Haloacetic Acid 	101.1 0.120 0.0510	100.6 0.150 0.0518
May 26, 2016 THM Preserved <ul style="list-style-type: none"> • Bromodichloromethane mg/l • Bromoform mg/l • Chloroform mg/l • Chlorodibromomethane mg/l • THMs mg/l • Total Haloacetic acid 	0.0231 0.00064 0.0777 0.0111 0.113 0.0480	0.0208 0.00066 0.0681 0.00997 0.0995 0.0584
August 16, 2016 THM Preserved <ul style="list-style-type: none"> • Bromodichloromethane mg/l • Bromoform mg/l • Chloroform mg/l • Chlorodibromomethane mg/l • THMs mg/l • Total Haloacetic Acid 	0.0295 <0.0010 0.115 0.0071 0.188 0.0895	0.0282 <0.0010 0.114 0.0072 0.186 0.0874
November 22, 2016 THM Preserved <ul style="list-style-type: none"> • Bromodichloromethane mg/l • Bromoform mg/l • Chloroform mg/l • Chlorodibromomethane mg/l • THMs mg/l • Total Haloacetic Acid 	0.0313 0.00062 0.0900 0.0105 0.132 0.0494	0.0342 0.00067 0.0978 0.0114 0.144 0.0647

Does the City of Morden have certified trained personnel?

The water plant is a Level III Water Treatment Facility. We currently have Three Certified Level III WT / Level II Dist operators
 The distribution system is a Level II facility. We currently have two certified Level II operators and one in training.

How do we alert Public Works Staff to water emergencies?

The Public Works Department has staff on call 24 hrs. When emergencies arise after hours, residents who call the regular office no. are transferred to the on call staff.

Were there emergencies, regulatory compliance issues or other operational issues to report for 2016?

There were no regulatory compliance issues in 2016 other than the THMs.

The following water main and related incidents were as follows:

- 16 water main valves were replaced (3 – 8" & 13 – 6")
- 6 fire hydrants were replaced
- Excavated and repaired water main leak @ 448 9th Street
- Excavated and repaired water main leak @ 452 5th Street
- Excavated and repaired 8 different water service line leaks

Were there any major expenses incurred in 2016?

No there were no major expenses otherwise.

Future system expansion or expenses expected?

The THM study has been completed. The City of Morden is currently evaluating the options recommended in this study.

The City of Morden is working with a consultant to determine distribution improvements , THM will be part of the overall project. Costs are not known at this time.

Who can we call with questions or concerns regarding drinking water?

For general questions during business hours , call the City of Morden office from 9:00 a.m. to 4:30 p.m. or email tmorden@mordenmb.com