City of Morden
Public Water System Annual Report 2019

This report is available online at the City of Morden website www.mymorden.ca as of March 31st, 2020

Email Town address info@mymorden.ca

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 2019

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 its 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, Haleoacetic acid, Flouride tests, Turbidity and chlorine residuals

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. Halocetic 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 annually.

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 can 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		<0.0020	<0.0020	-	1	Ug/L
Dissolved Fluoride	F	0.306	0.650	-	1.5	Mg/L
Nitrate-N		<0.010	0.029	-	10	Mg/L
Antimony	Sb	0.00068	0.00067	0.00053	0.006	Mg/L
Arsenic	As	0.0102	00.00126	0.00123	0.010	Mg/L
Barium	Ba	0.0266	0.00796	0.0116	1.0	Mg/L
Boron	B	0.125	0.107	0.093	5	Mg/L
Cadmium	Cd	0.0000299	<0.0000050	0.0000105	0.005	Mg/L
Chromium	Cr	0.00031	0.00048	0.00053	0.05	Mg/L
Lead	Pb	0.000117	<0.000050	0.000424	0.01	Mg/L
Selenium	Se	0.00194	0.00121	0.00120	0.01	Mg/L
Strontium	Sr	0.465	0.266	0.241	7.0	Mg/l
Uranium	U	0.00909	0.000345	0.000307	0.02	Mg/L

BI-WEEKLY BACTERIAL TESTS

Date	#1 Raw	#2 Treated	#3 Distribution @PWG	#4 Distribution @PVWC	#5 Distribution @Morden Rec.
January 02, 2019					
Chlorine Free	0	0.95	0.11	0.41	0.34
Chlorine Total	0	1.43	0.40	0.75	0.74
Total Coliforms	15	0	0	0	0
Escherichia Coli	0	0	0	0	0
January 14, 2019					
Chlorine Free	0	1.27	0.25	0.70	0.22
Chlorine Total	0	1.87	0.77	1.37	0.78
Total Coliforms	15	0	0	0	0
Escherichia Coli	0	0	0	0	0
January 28,2019					
Chlorine Free	0	0.93	0.22	0.62	0.26
Chlorine Total	0	1.59	0.79	1.66	0.75
Total Coliforms	8	0	0	0	0
Escherichia Coli	0	0	0	0	0
February 11, 2019					
Chlorine Free	0	1.20	0.34	0.77	0.33
Chlorine Total	0	1.80	0.87	1.47	0.85
Total Coliforms	9	0	0	0	0
Escherichia Coli	0	0	0	0	0
Feb 27, 2019					
Chlorine Free	0	1.28	0.27	0.51	0.22
Chlorine Total	0	1.93	0.81	1.22	0.69
Total Coliforms	3	0	0	0	0
Escherichia Coli	0	0	0	0	0
March 11, 2019					
Chlorine Free	0	1.11	0.80	1.15	0.26
Chlorine Total	0	1.61	1.45	2.01	0.90
Total Coliforms	0	0	0	0	0
Escherichia Coli	0	0	0	0	0
March 25, 2019					
Chlorine Free	0	1.05	0.24	.92	0.35
Chlorine Total	0	1.58	0.76	1.67	0.93
Total Coliforms	5	0	0	0	0
Escherichia Coli	0	0	0	0	0

April 8, 2019					
Chlorine Free	0	1.24	0.29	1.12	0.44
Chlorine Total	0	1.84	.72	1.81	1.07
Total Coliforms	200	0	0	0	0
Escherichia Coli	0	0	0	0	0
April 23, 2019					
Chlorine Free	0	0.98	0.47	0.75	0.36
Chlorine Total	0	1.60	1.03	1.12	0.97
Total Coliforms	>200	0	0	0	0
Escherichia Coli	1	0	0	0	0
May 6, 2019					
Chlorine Free	0	1.07	0.45	1.10	0.49
Chlorine Total	0	1.52	0.99	1.	1.07
Total Coliforms	43	0	0	0	0
Escherichia Coli	1	0	0	0	0
May 21, 2019					
Chlorine Free	0	1.12	0.15	0.60	0.51
Chlorine Total	0	1.62	0.57	0.97	1.01
Total Coliforms	5	0		0	0
Escherichia Coli	0	0		0	0
June 03, 2019					
Chlorine Free	0	1.07	0.10	0.20	0.40
Chlorine Total	0	1.53	0.60	0.83	0.90
Total Coliforms	21	0	0	0	0
Escherichia Coli	0	0	0	0	0
June 17, 2019					
Chlorine Free	0	1.08	0.47	0.93	0.37
Chlorine Total	0	1.61	0.95	1.47	0.82
Total Coliforms	145	0	0	0	0
Escherichia Coli	0	0	0	0	0
July 2, 2019					
Chlorine Free	0	1.80	0.16	0.48	0.30
Chlorine Total	0	2.02	0.56	1.03	0.74
Total Coliforms	>200	0	0	0	0
Escherichia Coli	0	0	0	0	0
July 15, 2019					
Chlorine Free	0	1.03	0.38	0.10	0.50
Chlorine Total	0	1.48	0.85	1.49	0.93
Total Coliforms	>200	0	0	0	0
Escherichia Coli	1	0	0	0	0
July 29, 2019					
Chlorine Free	0	1.07	0.50	0.12	0.49
Chlorine Total	0	1.64	0.78	0.70	1.02
Total Coliforms	>200	0	0	0	0
Escherichia Coli	0	0	0	0	0
August 12, 2019					
Chlorine Free	0	1.19	0.35	0.38	0.32
Chlorine Total	0	1.82	0.82	0.80	0.80
Total Coliforms	>200	0	0	0	0
Escherichia Coli	0	0	0	0	0
August 26, 2019					
Chlorine Free	0	1.24	0.10	0.21	0.36
Chlorine Total	0	1.58	0.54	0.68	0.89
Total Coliforms	>200	0	0	0	0
Escherichia Coli	0	0	0	0	0
September 9, 2019					
Chlorine Free	0	1.20	0..50	0.19	0.46
Chlorine Total	0	1.70	1.08	0.79	0.97
Total Coliforms	>200	0	0	0	0
Escherichia Coli	0	0	0	0	0

September 23, 2019					
Chlorine Free	0	1.04	0.34	0.41	0.32
Chlorine Total	0	1.53	0.79	1.00	0.77
Total Coliforms	200	0	0	0	0
Escherichia Coli	0	0	0	0	0
October 7, 2019					
Chlorine Free	0	1.20	0.64	0.39	1.25
Chlorine Total	0	1.76	1.10	0.93	1.98
Total Coliforms	>200	0	0	0	0
Escherichia Coli	16	0	0	0	0
October 21, 2019					
Chlorine Free	0	1.33	0.54	0.33	0.41
Chlorine Total	0	1.80	1.03	0.81	0.88
Total Coliforms	>200	0	0	0	0
Escherichia Coli	74	0	0	0	0
November 04, 2019					
Chlorine Free	0	1.08	0.42	0.22	0.48
Chlorine Total	0	1.40	0100	0.71	0.86
Total Coliforms	>200	0	0	0	0
Escherichia Coli	3	0	0	0	0
November 18, 2019					
Chlorine Free	0	1.07	0.40	0.57	0.47
Chlorine Total	0	1.42	0.76	1.15	0.84
Total Coliforms	130	0	0	0	0
Escherichia Coli	1	0	0	0	0
December 2, 2019					
Chlorine Free	0	1.23	0.46	0.78	0.57
Chlorine Total	0	1.57	1.00	1.40	0.98
Total Coliforms	83	0	0	0	0
Escherichia Coli	1	0	0	0	0
December 17, 2019					
Chlorine Free	0	1.19	0.29	0.81	0.62
Chlorine Total	0	1.64	0.71	1.19	1.09
Total Coliforms	70	0	0	0	0
Escherichia Coli	0	0	0	0	0
December 30, 2019					
Chlorine Free	0	1.27	0.25	0.49	0.91
Chlorine Total	9	1.67	0.50	1.02	1.27
Total Coliforms	0	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 0.1 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 0.124 and 0.116 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 11, 2019 THM Preserved • Bromodichloromethane mg/l • Bromoform mg/l • Chloroform mg/l • Chlorodibromomethane mg/l • Difluorobenzene • **THMs mg/l** • **Total Haloacetic Acid**	0.0176 <0.00050 0.0560 0.00640 101.8 **0.0800** **0.0504**	0.0167 <0.00050 0.0534 0.00612 99.8 **0.0762** **0.0494**
May 04,2019 THM Preserved • Bromodichloromethane mg/l • Bromoform mg/l • Chloroform mg/l • Chlorodibromomethane mg/l • **THMs mg/l** • **Total Haloacetic acid**	0.0250 <0.00050 0.102 0.00476 **0.132** **0.0729**	0.0220 <0.00050 0.0909 0.00477 **0.118** **0.0741**
August 12, 2019 THM Preserved • Bromodichloromethane mg/l • Bromoform mg/l • Chloroform mg/l • Chlorodibromomethane mg/l • **THMs mg/l** • **Total Haloacetic Acid**	0.0288 <0.0010 0.126 0.00755 **0.162** **0.0535**	0.0262 <0.0010 0..122 0.00686 **0.155** **0.0813**
November 04, 2019 THM Preserved • Bromodichloromethane mg/l • Bromoform mg/l • Chloroform mg/l • Chlorodibromomethane mg/l • **THMs mg/l** • **Total Haloacetic Acid**	0.0195 <0.0010 0.0996 0.00390 **0.123** **0.0516**	0.0185 <0.0010 0.0957 0.00385 **0.118** **0.0558 here**

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 three certified Level II operators.

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 2019?
There were no regulatory compliance issues in 2019 other than the THMs.

The following water main and related incidents were as follows:

- Feb 28 – 1st @ Rampton a water main leak was isolated and repaired later.
- April 4 – water main was shut down to install a water tie in for the Best Western Hotel.
- June 4 – 200 block of 9th street water main was shut down to replace fire hydrant and isolation valve that were leaking.
- June 20 – Loren drive water main was shut down to install 3 new fire hydrants.
- July 5 9th street south water main was shut down to complete a water tie in for an apartment complex.
- July 7 – North Railway a section of the water main was shut down to replace the fire hydrant and water main valve at 7th and North Railway.
- July 22 – Stephen Street between 8th and Nelson the water main was shut down to complete a water tie in for an apartment complex.
- Oct 3 – Rampton street water main was shut down to install a new fire hydrant and water main valve.

Were there any major expenses incurred in 2019?

None not accounted for in the budget

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.

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 info@mymorden.ca