Public Water System Annual Report (258.00)
-2020-

Name of the Public Water System: **Yellowhead Regional Water Co-op (YRWC)**

Name of the Legal Owner: **Yellowhead Regional Water Co-op Inc.**

Contact Person: **Operations Manager – Vince Hiebert**
Phone: **(204) 685-2211**

Emergency number: **(204) 871-5137 (YRWC Operations Manager) – Vince Hiebert**
(431) 554-2332 (Westlake-Gladstone) – Hanzel Laus
(204) 841-3742 (Glenella-Lansdowne) – Gary Funk
(204) 871-2073 (MacGregor) – Stacey Knelsen
(204) 871-4968 (Austin) – Ed Sattler
(204) 871-2425 (North Norfolk) – Ryan Palas

Phone during business hours: **(204) 685-2211 (North Norfolk)**
(204) 385-2332 (Westlake-Gladstone)
(204) 352-4281 (Glenella-Lansdowne)

_____
Vince Hiebert
Date Prepared: March 2021 *Yellowhead Regional Water Co-op Inc.*

Table of Contents

1. Introduction: 3

2. Description of the Water System 3

2.1. Water Supply Source 3

2.2 Water Treatment Process 3

2.3 Classification and Certification 5

3. Water System Non-Compliance Incidents 6

4. Drinking Water Safety Orders, Warnings, and Charges 6

5. Major Expenses Incurred 6

6. YRWC System Maintenance 6

7. Future System Expansion 7

8. List of Water Quality Standards 7

Appendix A / Results and Analysis 10

Appendix B / PWTP Process Diagram 22

1. Introduction:

The 2020 Yellowhead Regional Water Co-op Annual Report summarizes the water utility's ability to provide safe potable water and comply with provincial regulations.

2. Description of the Water System

The Yellowhead Regional Water Co-op (YRWC) provides potable drinking water to a population of approximately 3,500 residents. Corrective actions were taken and reported as required for normal minor variations during the course of operations.

The Yellowhead Regional Co-op water system consists of a network of pressure pipelines, booster stations, a pressure reducing station, water storage reservoirs, and meter stations. The YRWC owns the Arden, Austin, MacGregor, Plumas, and Yellowhead (at Gladstone) water storage reservoirs. The Co-op also owns the Lansdowne, Poplar Bluff and Bagot booster stations, as well as the Westbourne reducing station.

2.1 Water Supply Source

The YRWC receives its treated water supply from the City of Portage la Prairie Water Treatment Plant (City of Portage WTP), which uses the Assiniboine River as the raw water supply. The system provides treated water to the Rural Municipalities of North Norfolk, Westlake-Gladstone, Glenella-Lansdowne and the Towns of Gladstone and MacGregor; and the Villages of Austin, Bagot, Rossendale, Westbourne, Plumas and Arden.

2.2 Water Treatment Plant Process (City of Portage)

- *General Plant Description:*
  The City obtains its water from the Assiniboine River. Three 125-hp 265 l/s pumps transfer the raw water from the river impoundment area upstream of the spillway structure to the water treatment plant. The first stage of treatment is a pre-clarification process.
- *Ballasted Flocculation Clarification:*
  Is a unique process, where, in addition to various chemicals that are added to promote the coagulation and flocculation (sticking together in big clumps), very fine sand is added to the mix to make the floc (clumps) settle very quickly. This portion removes a large portion of turbidity, organics, and algae, reducing taste odor issues. Potassium permanganate is added as a pre-oxidant. The pre-clarified water is then passed through to the next process.
- *The softening clarifiers:*
  Are large circular basins, where hydrated lime and synthetic polymers are added for further coagulation and flocculation. Lime raises the pH to a point where calcium and magnesium are settled out, thus removing hardness from the water. Sodium Hydroxide is also added to the softening clarifiers to aid in the removal of non-carbonate hardness lowering the overall water hardness.

- *Re-carbonation:*
  Is the next step, where carbon dioxide is bubbled through the water to form carbonic acid to lower the pH. Stabilizing the pH prevents corrosion or scaling throughout the City's water distribution system. The lowering of the pH also aids in the Ozone process.
- *Ozone:*
  Is a strong oxidant that is effective at destroying parasitic organisms such as giardia lamblia and cryptosporidium cysts, and the breakdown of organics. It is also effective in the elimination of viruses and bacteria. This process involves the bubbling of Ozone gas that is produced on site into the water prior to the filters.
- *Calcium Thiosulphate:*
  Is added after ozonation, for the removal of excess ozone gas after leaving the ozone contactor chamber.
- *Dual Media Filtration:*
  Follows the Ozone disinfection process. The break down of organics promote biologically active filtration which significantly improves further organics removal. The Filters contain Anthracite and Sand media in separate layers for longer filter life and filtering of the water. In 2008 a new stainless-steel under-drain system was installed in the sand filters to promote better filtration and the backwashing of the filters. Organics removal is crucial to the reduction of distribution by-products found in the drinking water supply after chlorination. The filtered water is then passed to a under floor reservoir where the water is then either pumped to the Granular Activated Carbon (GAC) Contactors, continued treatment process, or it is diverted for back washing the dual media filters or the GAC contactors. Using non-chlorinated water for backwashing respects the environment, as the backwash waste is ultimately returned to the River.
- *Granular Activated Carbon Contactors:*
  Are utilized as a final polishing step for the ultimate reduction in organics, and for the final taste and odor elimination. The adsorption of organic matter by the activated carbon reduces the amount of chlorine required for final disinfection, which ultimately minimizes disinfection by-products in the drinking water system. New Granular Activated Carbon was installed in the fall of 2008 and the spent GAC was returned for regeneration and reuse instead of shipping to landfill sites.
- *Disinfection:*
  Occurs in the Storage Reservoir. Final treatment occurs by adding Chlorine and allowing contact time. Chlorine is added for final disinfection, and a residual is maintained in the distribution system to eliminate any re-growth of pathogenic organisms.
- *Hydrofluosilicic Acid – Fluoride*:
  Is added for dental health and an ***Orthophosphate*** is added to reduce corrosion within the distribution system. The orthophosphate creates a thin film on the inside of the piping throughout the distribution system and helps prevent lead from leaching into the water supply.

- *Sodium Hydroxide:*
  Is added to raise the pH and increase the alkalinity of the water prior to entering the distribution system. The City of Portage la Prairie has two Reservoirs; the first is located at the Water Treatment Plant and the second in the Northwest section of the city. The reservoir located at the Water Treatment Plant has five 40 horsepower driven pumps to supply water to the McKay Reservoir and the distribution systems of the City of Portage la Prairie and Regional Water Systems. The Water Treatment Plant reservoir also has three 100 horsepower variable speed driven pumps to supply water to the Poplar Bluff Industrial Park and Regional Water Systems. The McKay Reservoir has eight 40 horsepower driven, 70 L/S pumps to supply water to the City of Portage la Prairie distribution system and other regional water systems. The Reservoir at the Water Treatment Plant has a capacity of 4.64 ML and the McKay Reservoir has 9.25 ML capacity.
- *Residuals Solids Management*
  Is accomplished via sludge drying beds. The waste sludge, comprised of "unwanted" material removed from the raw water, as well as the chemicals and lime used through the treatment process, is collected and pumped to two 45,000 cubic meter ponds. In these ponds, the sludge settles to the bottom and clarified water is returned to the River.
- *Plant Specifications:*
  The Plant type is a Conventional lime softening plant with Pre-clarification, biologically activate dual media filtration, ozone, carbon dioxide for pH adjustment and Granular Activated Carbon filters with chlorine disinfection for the distribution system. Design capacity of 34 million litres/day (net).

2.3 Classification and Certification

The City of Portage WTP is classified as a Class 4 water treatment facility and a Class 2 Water Distribution facility, and the YHRC water distribution is classified as a Class 2 water distribution facility. The facility classifications are used to determine certification requirements for water system operators.

3. Water System Non-Compliance Incidents

DATE	INCIDENT	OUTCOME
February	Failure to maintain a free chlorine residual of at least 0.1mg/L at all times at any point in the water distribution system	Non compliant
March	Failure to take and/or record daily disinfection residual measurement entering the distribution system in accordance to the operating licence	Non compliant
October	Failure to take and/or record daily disinfection residual measurement entering the distribution system in accordance to the operating licence	Non compliant
2020	Failure to meet the trihalomethane standard of less than or equal to 0.10 mg/L	Non compliant

4. Drinking Water Safety Orders, Warnings, and Charges

There were no Drinking Water Safety Orders or warnings issued under the Yellowhead licence (258.00), nor were any charges laid on the system.

5. Major Expenses Incurred

There were no major expenses incurred in the Yellowhead Regional Water Coop in 2020.

6. YRWC system maintenance (Brief Overview)

- Poplar Bluff Booster- A Prominent Chlorine pump was sent away for service. A water leak on the distribution header was repaired with no interruption of service to the system.
- Bagot Booster- No repairs required.
- MacGregor Reservoir (100,000gal) – We repaired one of the 7.5hp distribution town pumps due to a worn impeller. A leak on the bulk water was also repaired, we also installed a space heater in the generator cabinet.
- Austin Reservoir (120,000gal) – The Reservoir was cleaned in the fall of 2020 to ensure quality water supply to customers of the system. The Bulk water fill line was

also moved to the North side of the building to help move heavy traffic off the residential streets.

- Pressure Reducing Station- Routine maintenance to the chlorine pump was performed by the operator when required. Emergency lights were installed inside the building.
- Gladstone Reservoir (500,000 gal)- The Pressure Reducing Valve on the Gladstone Bulk Water system was cleaned, repaired and put back into service. Emergency lighting was updated and electric connections inside the building were improved.
- Lansdowne Booter- Emergency lights were installed inside the building; a space heater was installed inside the generator cabinet.
- Plumas Reservoir (90,000 gal) - Emergency lights were installed inside the building, old outdated wiring was removed and replaced to prevent any future issues, end of life singer valves was removed and replaced on town distribution pumps #2&3
- Arden Reservoir (35,000) - A VFD was replaced due to a power outage in May, also the Bulk water card reader insert was removed and replaced because it stopped working.

7. Future System Expansion

- *POPLAR BLUFF INDUSTRIAL PARK RESERVOIR AND PUMPHOUSE:*

The Yellowhead Water Coop board in cooperation with the Manitoba Water Services Board, City of Portage, and the RM of Portage continue plans to build a water storage reservoir in the RM of Portage la Prairie. This reservoir will increase storage capacity for the city as well as improve the reliability of water supply to the entire YRWC. The new reservoir is to be constructed at the Poplar Bluff Industrial Park (PBIP) site, immediately east of the Roquette site and west of the Portage Diversion channel. The proposed PBIP reservoir will be sized to meet both the industrial and regional demands as well as meet the required residual pressure at the respective facilities based on the supplementary distribution pumping system at this site. In addition, it was also indicated that the existing 450 mm dia. supply pipeline from the City's WTP to new reservoir in PBIP would be twinned. This would ensure an uninterrupted supply of water in case one of the supply lines required repairs

8. List of Water Quality Standards

The Province of Manitoba has adopted a number of water quality standards from the Health Canada *Guidelines for Canadian Drinking Water Quality*. The health-based parameters express the maximum acceptable concentrations for drinking water. Concentration values in excess of the guidelines constitute a health-related issue and require corrective actions. Public water systems are required to monitor chlorine levels and undertake regular bacterial testing.

All health-based parameters were within the limits for 2020 for the YHRC Water System, with the exception of THM's. A compliance plan is required to address elevated THM levels, which mainly consists of the combination of further operational changes and mechanical upgrades to the City of Portage WTP to improve organics removal and reduce THM formation potential. In 2018 the YHRC completed a pilot project to use specific aeration equipment (PAX) to target and decrease THM in the treated water which installed at the Plumas Reservoir. This system is still in operation and continues to lower THM's in Plumas.

The Manitoba health-based standards for THM and HAA are 100 µg/L (micrograms per liter) and 80 µg/L, respectively. Both THM and HAA are by-products of disinfection, where chlorine combines with trace amounts of organics in the water. THM and HAA levels in the YRWC distribution system are sampled every second year, they were last monitored in 2018 and again in 2020. Below are the water quality and treatment standards as well as the water quality monitoring requirements for the Yellowhead Regional Water Coop.

Test results for 2020 are shown in Appendix A.

Water Quality/Treatment Standards

Parameter	Quality Standard	Compliance
Total Coliform	Less than one total coliform bacteria detectable per 100mL in all distributed water	100%
E.Coli	Less than one E.coli bacteria detectable per 100mL in all distributed water	100%
Chlorine Residual	A free Chlorine residual of at least 0.1mg/L at all times at any point in the water distribution system	99%
Total Trihalomethanes (THM's)	Less than or equal to 0.10 mg/L as locational annual average of quarterly samples	Non-Compliant
Total Haloacetic acids (HAA's)	Less than or equal to 0.08 mg/L as locational annual average of quarterly samples	Compliant
Lead	Less than or equal to 0.01 mg/L in the water distribution system	n/a

Water Quality Monitoring Requirements

Parameter	Monitoring Requirement	Compliance
Bacteriological (total coliform and E.coli)	Biweekly sampling program with each set of samples consisting of a minimum of eight (8) distribution samples from the following. • Water entering the reservoir at Gladstone • Water entering the reservoirs at Arden, Austin, MacGregor, and Plumas (two samples shall be alternated each sampling period) • Water leaving the Arden, Austin, Gladstone, MacGregor and Plumas reservoirs Consecutive sample sets to be separated by at least 12 days	100%
Free chlorine (distribution system)	• One sample per day of water entering the Yellowhead distribution system at the Poplar Bluff booster station • One sample per day of water leaving the Arden, Austin, MacGregor and Plumas Reservoirs • Continuous sampling of water entering the regional distribution system from the Gladstone reservoir • A confirmatory sample to be taken daily at the online chlorine analyzer sampling point of water entering the regional distribution system from the Gladstone Reservoir • At the same times and location(s) as bacteriological distribution system sampling	99%
Total chlorine (distribution system)	• One sample per day of water entering the Yellowhead distribution system at the Poplar Bluff booster station • One sample per day of water leaving the Arden, Austin, MacGregor and Plumas reservoir • One confirmatory sample per day of water entering the regional distribution system from the Gladstone reservoir • At the same times and location(s) as bacteriological distribution system sampling	99%
Total trihalomethanes	One preserved distribution system sample taken on a quarterly basis during February, May, August, and November, every second year at the furthest point in the distribution system.	Non-Compliant
Total haloacetic acids (HAA's) (distribution sytem)	One preserved distribution system sample taken on a quarterly basis during February, May, August, and November, every second year at a mid point in the distribution system.	Compliant
Other Parameters	As per the instructions of the Drinking Water Officer	n/a
Lead	As per the instructions of the Drinking Water Officer	n/a

Appendix A

Bacterial, THM & HAA Results

Chlorine Residual Analysis

Water Chemistry Results

Collection Date	Sample identification	TC	EC	CL2	CL2	HPC
M/D/Y				Free	Total	
1/3/2020	Yellowhead 3 Dist - Gladstone Outgoing	0	0	1.67	2.12	
1/3/2020	Yellowhead 3 Dist - Plumas Outgoing	0	0	0.83	1.31	
1/3/2020	Yellowhead 3 Dist - Gladstone Incoming	0	0	0.97	1.51	
1/3/2020	Yellowhead 3 Dist - Plumas Incoming	0	0	0.12	0.49	
1/6/2020	Yellowhead 3 Dist - Arden Outgoing	0	0	0.8	1.9	
1/6/2020	Yellowhead 3 Dist - Austin Outgoing	0	0	1.34	1.71	
1/6/2020	Yellowhead 3 Dist - MacGregor Outgoing	0	0	1.47	2.16	
1/6/2020	Yellowhead 3 Dist - Arden Outgoing	0	0	0.8	1.9	
1/20/2020	Yellowhead 3 Dist - Gladstone Outgoing	0	0	1.12	1.6	
1/20/2020	Yellowhead 3 Dist - Plumus Outgoing	0	0	0.88	1.55	
1/20/2020	Yellowhead 3 Dist - Gladstone Incoming	0	0	0.17	0.67	
1/20/2020	Yellowhead 3 Dist - Plumas Incoming	0	0	0.25	0.88	<10
1/20/2020	Yellowhead 3 Dist - Arden Outgoing	0	0	0.8	1.8	

1/20/2020	Yellowhead 3 Dist - Arden Incoming	0	0	0.2	1	
1/20/2020	Yellowhead 3 Dist - Austin Outgoing	0	0	0.91	1.23	
1/20/2020	Yellowhead 3 Dist - MacGregor Outgoing	0	0	0.95	1.36	
2/3/2020	Yellowhead 3 Dist - Gladstone Outgoing	0	0	1.53	1.98	
2/3/2020	Yellowhead 3 Dist - Plumus Outgoing	0	0	0.83	1.3	
2/3/2020	Yellowhead 3 Dist - Gladstone Incoming	0	0	0.48	1.02	
2/3/2020	Yellowhead 3 Dist - Austin Outgoing	0	0	1.26	1.53	
2/3/2020	Yellowhead 3 Dist - MacGregor Outgoing	0	0	1.05	1.95	
2/3/2020	Yellowhead 3 Dist - Austin Incoming	0	0	0.63	0.91	
2/3/2020	Yellowhead 3 Dist - MacGregor Incoming	0	0	1.05	1.8	
2/5/2020	Yellowhead 3 Dist - Arden Outgoing	0	0	0.9	1.9	
2/18/2020	Yellowhead 3 Dist - Gladstone Outgoing	0	0	1.32	1.63	
2/18/2020	Yellowhead 3 Dist - Plumus Outgoing	0	0	0.51	1.6	
2/18/2020	Yellowhead 3 Dist - Gladstone Incoming	0	0	0.61	0.92	
2/18/2020	Yellowhead 3 Dist - Plumas Incoming	0	0	0.07	0.41	
2/19/2020	Yellowhead 3 Dist - Austin Outgoing	0	0	1.48	1.86	
2/19/2020	Yellowhead 3 Dist - MacGregor Outgoing	0	0	1.09	1.58	
2/19/2020	Yellowhead 3 Dist - Arden Outgoing	0	0	0.9	1.9	
2/19/2020	Yellowhead 3 Dist - Arden Incoming	0	0	0.3	1.1	
3/2/2020	Yellowhead 3 Dist - Austin Outgoing	0	0	1.34	1.75	
3/2/2020	Yellowhead 3 Dist - MacGregor Outgoing	0	0	1.04	1.93	
3/2/2020	Yellowhead 3 Dist - Austin Incoming	0	0	0.59	0.83	
3/2/2020	Yellowhead 3 Dist - MacGregor Incoming	0	0	0.97	1.94	
3/3/2020	Yellowhead 3 Dist - Gladstone Outgoing	0	0	1.34	1.72	
3/3/2020	Yellowhead 3 Dist - Plumus Outgoing	0	0	0.97	1.46	
3/3/2020	Yellowhead 3 Dist - Gladstone Incoming	0	0	0.14	0.54	
3/3/2020	Yellowhead 3 Dist - Arden Outgoing	0	0	0.9	2.1	
3/16/2020	Yellowhead 3 Dist - Austin Outgoing	0	0	1.35	1.81	
3/16/2020	Yellowhead 3 Dist - MacGregor Outgoing	0	0	1.2	1.53	
3/16/2020	Yellowhead 3 Dist - Gladstone Outgoing	0	0	1.19	1.6	
3/16/2020	Yellowhead 3 Dist - Plumus Outgoing	0	0	0.5	0.9	
3/16/2020	Yellowhead 3 Dist - Gladstone Incoming	0	0	0.48	0.87	
3/16/2020	Yellowhead 3 Dist - Plumas Incoming	0	0	0.95	1.56	<10
3/17/2020	Yellowhead 3 Dist - Arden Outgoing	0	0	1	2	
3/17/2020	Yellowhead 3 Dist - Arden Incoming	0	0	0.5	1.1	
3/30/2020	Yellowhead 3 Dist - Gladstone Outgoing	0	0	1.63	1.94	
3/30/2020	Yellowhead 3 Dist - Plumus Outgoing	0	0	0.85	1.38	
3/30/2020	Yellowhead 3 Dist - Gladstone Incoming	0	0	0.39	0.71	
3/30/2020	Yellowhead 3 Dist - Austin Outgoing	0	0	1.22	1.68	
3/30/2020	Yellowhead 3 Dist - MacGregor Outgoing	0	0	1.2	1.62	
3/30/2020	Yellowhead 3 Dist - Austin Incoming	0	0	0.6	1.07	

3/30/2020	Yellowhead 3 Dist - MacGregor Incoming	0	0	0.88	1.53	
3/30/2020	Yellowhead 3 Dist - Arden Outgoing	0	0	0.7	1.7	
4/14/2020	Yellowhead 3 Dist - Gladstone Outgoing	0	0	1.72	2.03	
4/14/2020	Yellowhead 3 Dist - Plumus Outgoing	0	0	0.73	1.24	
4/14/2020	Yellowhead 3 Dist - Gladstone Incoming	0	0	1.04	1.29	
4/14/2020	Yellowhead 3 Dist - Plumas Incoming	0	0	0.48	1.08	
4/15/2020	Yellowhead 3 Dist - Arden Outgoing	0	0	1.3	2.4	
4/15/2020	Yellowhead 3 Dist - Arden Incoming	0	0	0.4	1.4	
4/15/2020	Yellowhead 3 Dist - Austin Outgoing	0	0	1.85	2.12	<10
4/15/2020	Yellowhead 3 Dist - MacGregor Outgoing	0	0	1.04	1.39	
4/27/2020	Yellowhead 3 Dist - Gladstone Outgoing	0	0	1.41	1.86	
4/27/2020	Yellowhead 3 Dist - Plumus Outgoing	0	0	1.11	1.58	
4/27/2020	Yellowhead 3 Dist - Gladstone Incoming	0	0	0.14	0.34	
4/27/2020	Yellowhead 3 Dist - Austin Outgoing	0	0	1.24	1.54	
4/27/2020	Yellowhead 3 Dist - MacGregor Outgoing	0	0	0.9	1.47	
4/27/2020	Yellowhead 3 Dist - Austin Incoming	0	0	0.93	1.28	
4/27/2020	Yellowhead 3 Dist - MacGregor Incoming	0	0	0.99	1.63	
4/27/2020	Yellowhead 3 Dist - Arden Outgoing	0	0	0.7	1.7	
5/12/2020	Yellowhead 3 Dist - Gladstone Outgoing	0	0	1.68	2.03	
5/12/2020	Yellowhead 3 Dist - Plumus Outgoing	0	0	0.64	1.05	
5/12/2020	Yellowhead 3 Dist - Gladstone Incoming	0	0	0.8	1.1	
5/12/2020	Yellowhead 3 Dist - Plumas Incoming	0	0	0.66	1.1	
5/11/2020	Yellowhead 3 Dist - Austin Outgoing	0	0	1.55	1.79	
5/11/2020	Yellowhead 3 Dist - MacGregor Outgoing	0	0	1.14	1.55	
5/12/2020	Yellowhead 3 Dist - Arden Outgoing	0	0	0.9	1.8	
5/12/2020	Yellowhead 3 Dist - Arden Incoming	0	0	0.3	1.1	
5/25/2020	Yellowhead 3 Dist - Gladstone Outgoing	0	0	1.69	2.2	
5/25/2020	Yellowhead 3 Dist - Plumus Outgoing	0	0	0.71	1.11	
5/25/2020	Yellowhead 3 Dist - Gladstone Incoming	0	0	1.4	1.86	
5/25/2020	Yellowhead 3 Dist - Austin Outgoing	0	0	1.55	1.95	
5/25/2020	Yellowhead 3 Dist - MacGregor Outgoing	0	0	0.92	1.3	
5/25/2020	Yellowhead 3 Dist - Austin Incoming	0	0	0.64	1.04	
5/25/2020	Yellowhead 3 Dist - MacGregor Incoming	0	0	1.19	1.68	
5/28/2020	Yellowhead 3 Dist - Arden Outgoing	0	0	1.2	2	
6/10/2020	Yellowhead 3 Dist - Gladstone Outgoing	0	0	1.39	2.01	
6/10/2020	Yellowhead 3 Dist - Plumus Outgoing	0	0	0.76	1.2	
6/10/2020	Yellowhead 3 Dist - Gladstone Incoming	0	0	0.79	1.14	
6/10/2020	Yellowhead 3 Dist - Plumas Incoming	0	0	1.15	1.66	
6/10/2020	Yellowhead 3 Dist - Arden Outgoing	0	0	2	3.2	
6/10/2020	Yellowhead 3 Dist - Arden Incoming	0	0	2.2	3.4	
6/10/2020	Yellowhead 3 Dist - Austin Outgoing	0	0	1.43	1.77	

6/10/2020	Yellowhead 3 Dist - MacGregor Outgoing	0	0	0.84	1.41	
6/10/2020	Yellowhead 3 Dist - Austin Incoming	0	0	1.22	1.37	
6/10/2020	Yellowhead 3 Dist - MacGregor Incoming	0	0	1.16	1.85	
6/23/2020	Yellowhead 3 Dist - Gladstone Outgoing	0	0	1.07	1.34	
6/23/2020	Yellowhead 3 Dist - Plumus Outgoing	0	0	0.57	0.75	
6/23/2020	Yellowhead 3 Dist - Gladstone Incoming	0	0	0.85	1.05	
6/23/2020	Yellowhead 3 Dist - Plumas Incoming	0	0	n/a	n/a	
6/23/2020	Yellowhead 3 Dist - Arden Outgoing	0	0	2.1	3.1	
6/24/2020	Yellowhead 3 Dist - Austin Outgoing	0	0	1.36	1.84	
6/24/2020	Yellowhead 3 Dist - MacGregor Outgoing	0	0	1.49	1.64	
6/29/2020	Yellowhead 3 Dist - Austin Incoming	0	0	1.13	1.21	
6/29/2020	Yellowhead 3 Dist - MacGregor Incoming	0	0	1.07	1.46	
7/6/2020	Yellowhead 3 Dist - Austin Outgoing	0	0	1.64	1.88	
7/6/2020	Yellowhead 3 Dist - MacGregor Outgoing	0	0	0.5	0.89	
7/7/2020	Yellowhead 3 Dist - Gladstone Outgoing	0	0	0.78	1	
7/7/2020	Yellowhead 3 Dist - Plumus Outgoing	0	0	0.62	1.01	
7/7/2020	Yellowhead 3 Dist - Gladstone Incoming	0	0	1.48	1.59	
7/7/2020	Yellowhead 3 Dist - Arden Outgoing	0	0	1.7	2.8	
7/7/2020	Yellowhead 3 Dist - Arden Incoming	0	0	2.7	3.6	
7/20/2020	Yellowhead 3 Dist - Arden Outgoing	0	0	1.1	1.8	
7/21/2020	Yellowhead 3 Dist - Gladstone Outgoing	0	0	1.2	1.55	
7/21/2020	Yellowhead 3 Dist - Plumus Outgoing	0	0	0.73	1.15	
7/21/2020	Yellowhead 3 Dist - Gladstone Incoming	0	0	0.33	0.61	
7/21/2020	Yellowhead 3 Dist - Plumas Incoming	0	0	0.8	1.31	
7/22/2020	Yellowhead 3 Dist - Austin Outgoing	0	0	1.7	2.04	
7/22/2020	Yellowhead 3 Dist - MacGregor Outgoing	0	0	1.24	1.46	
7/22/2020	Yellowhead 3 Dist - Austin Incoming	0	0	0.51	0.73	
7/22/2020	Yellowhead 3 Dist - MacGregor Incoming	0	0	0.43	0.89	
8/5/2020	Yellowhead 3 Dist - Austin Outgoing	0	0	1.33	1.8	
8/5/2020	Yellowhead 3 Dist - MacGregor Outgoing	0	0	1.18	1.56	
8/4/2020	Yellowhead 3 Dist - Gladstone Outgoing	0	0	1.33	1.87	
8/4/2020	Yellowhead 3 Dist - Plumus Outgoing	0	0	0.5	0.9	
8/4/2020	Yellowhead 3 Dist - Gladstone Incoming	0	0	0.77	1.27	
8/4/2020	Yellowhead 3 Dist - Plumas Incoming	0	0	0.45	0.97	
8/6/2020	Yellowhead 3 Dist - Arden Outgoing	0	0	1.5	2	
8/6/2020	Yellowhead 3 Dist - Arden Incoming	0	0	0.3	1.1	
8/17/2020	Yellowhead 3 Dist - Austin Outgoing	0	0	1.32	1.62	
8/17/2020	Yellowhead 3 Dist - MacGregor Outgoing	0	0	1.18	1.35	
8/17/2020	Yellowhead 3 Dist - Austin Incoming	0	0	0.88	1.19	
8/17/2020	Yellowhead 3 Dist - MacGregor Incoming	0	0	0.68	1.03	
8/18/2020	Yellowhead 3 Dist - Gladstone Outgoing	0	0	1.39	1.9	

8/18/2020	Yellowhead 3 Dist - Plumus Outgoing	0	0	0.79	1.23	
8/18/2020	Yellowhead 3 Dist - Gladstone Incoming	0	0	1.71	2.13	
8/20/2020	Yellowhead 3 Dist - Austin Outgoing	0	0	1.1	2.2	
9/1/2020	Yellowhead 3 Dist - Arden Outgoing	0	0	1.2	2.4	
9/1/2020	Yellowhead 3 Dist - Arden Incoming	0	0	1.2	2.4	
9/2/2020	Yellowhead 3 Dist - Austin Outgoing	0	0	1.45	1.73	
9/2/2020	Yellowhead 3 Dist - MacGregor Outgoing	0	0	1.13	1.54	
9/3/2020	Yellowhead 3 Dist - Gladstone Outgoing	0	0	0.85	1.23	
9/3/2020	Yellowhead 3 Dist - Plumus Outgoing	0	0	0.54	0.94	
9/3/2020	Yellowhead 3 Dist - Gladstone Incoming	0	0	0.57	0.9	
9/3/2020	Yellowhead 3 Dist - Plumas Incoming	0	0	0.61	0.99	
9/14/2020	Yellowhead 3 Dist - Gladstone Outgoing	0	0	1.72	2.04	
9/14/2020	Yellowhead 3 Dist - Plumus Outgoing	0	0	0.5	0.92	
9/14/2020	Yellowhead 3 Dist - Gladstone Incoming	0	0	0.62	0.9	
9/14/2020	Yellowhead 3 Dist - Plumas Incoming	0	0	0.23	0.77	
9/14/2020	Yellowhead 3 Dist - Austin Outgoing	0	0	1.62	2.08	
9/14/2020	Yellowhead 3 Dist - MacGregor Outgoing	0	0	1.12	1.52	
9/14/2020	Yellowhead 3 Dist - Austin Incoming	0	0	1.1	1.38	
9/14/2020	Yellowhead 3 Dist - MacGregor Incoming	0	0	0.91	1.46	
9/16/2020	Yellowhead 3 Dist - Arden Outgoing	0	0	0.9	1.7	
9/22/2020	Austin Reservoir Cleaning - Pumping Cell	0	0	1.7	2	
9/22/2020	Austin Reservoir Cleaning - Cell # 1	0	0	1	1.26	
9/22/2020	Austin Reservoir Cleaning - Cell # 2	0	0	0.15	0.36	
9/22/2020	Austin Reservoir Cleaning - Cell # 3	0	0	0.13	0.36	
9/23/2020	Austin Reservoir Cleaning - Pumping Cell	0	0	1.82	2.11	
9/28/2020	Yellowhead 3 Dist - Austin Outgoing	0	0	1.63	1.82	
9/28/2020	Yellowhead 3 Dist - MacGregor Outgoing	0	0	0.89	1.47	
9/29/2020	Yellowhead 3 Dist - Gladstone Outgoing	0	0	1.26	1.64	
9/29/2020	Yellowhead 3 Dist - Plumus Outgoing	0	0	1.66	2.15	
9/29/2020	Yellowhead 3 Dist - Gladstone Incoming	0	0	0.55	0.9	
9/29/2020	Yellowhead 3 Dist - Plumas Incoming	0	0	0.64	1.08	
9/30/2020	Yellowhead 3 Dist - Arden Outgoing	0	0	1	2	
9/30/2020	Yellowhead 3 Dist - Arden Incoming	0	0	1	1.9	
9/30/2020	Austin Reservoir Cleaning - Cell # 1	0	0	2.2	2.2	
9/30/2020	Austin Reservoir Cleaning - Cell # 2	0	0	1.33	1.42	
9/30/2020	Austin Reservoir Cleaning - Cell # 3	0	0	0.67	1.06	
10/1/2020	Austin Reservoir Cleaning - Cell # 1	0	0	1.46	2.07	
10/1/2020	Austin Reservoir Cleaning - Cell # 2	0	0	0.71	1.26	
10/1/2020	Austin Reservoir Cleaning - Cell # 3	0	0	0.73	1.17	
10/13/2020	Yellowhead 3 Dist - Gladstone Outgoing	0	0	1.48	1.84	
10/13/2020	Yellowhead 3 Dist - Plumus Outgoing	0	0	1.52	1.94	

10/13/2020	Yellowhead 3 Dist - Gladstone Incoming	0	0	0.58	0.94	
10/14/2020	Yellowhead 3 Dist - Arden Outgoing	0	0	1	1.8	
10/14/2020	Yellowhead 3 Dist - Austin Outgoing	0	0	2.01	2.2	
10/14/2020	Yellowhead 3 Dist - MacGregor Outgoing	0	0	1.21	1.58	
10/27/2020	Yellowhead 3 Dist - Gladstone Outgoing	0	0	1.05	1.45	
10/27/2020	Yellowhead 3 Dist - Plumus Outgoing	0	0	0.72	1.06	
10/27/2020	Yellowhead 3 Dist - Gladstone Incoming	0	0	0.77	1.19	
10/27/2020	Yellowhead 3 Dist - Plumas Incoming	0	0	0.75	1.12	
10/28/2020	Yellowhead 3 Dist - Austin Outgoing	0	0	2.12	2.8	
10/28/2020	Yellowhead 3 Dist - MacGregor Outgoing	0	0	1.06	1.58	
10/28/2020	Yellowhead 3 Dist - Austin Incoming	0	0	1.2	1.41	
10/28/2020	Yellowhead 3 Dist - MacGregor Incoming	0	0	1.24	1.39	
10/28/2020	Yellowhead 3 Dist - Arden Outgoing	0	0	1	1.6	
10/28/2020	Yellowhead 3 Dist - Arden Incoming	0	0	0.5	1.2	
11/12/2020	Yellowhead 3 Dist - Gladstone Outgoing	0	0	1.47	2.01	<10
11/12/2020	Yellowhead 3 Dist - Plumus Outgoing	0	0	0.79	1.05	<10
11/12/2020	Yellowhead 3 Dist - Gladstone Incoming	0	0	0.96	1.55	<10
11/12/2020	Yellowhead 3 Dist - Arden Outgoing	0	0	0.9	2	
11/16/2020	Yellowhead 3 Dist - Austin Outgoing	0	0	1.16	1.31	
11/16/2020	Yellowhead 3 Dist - MacGregor Outgoing	0	0	1.14	1.74	
11/16/2020	Yellowhead 3 Dist - Austin Incoming	0	0	0.73	1.02	
11/16/2020	Yellowhead 3 Dist - MacGregor Incoming	0	0	0.75	1.32	
11/23/2020	Yellowhead 3 Dist - Austin Outgoing	0	0	1.26	1.64	
11/23/2020	Yellowhead 3 Dist - MacGregor Outgoing	0	0	1.19	1.66	
11/24/2020	Yellowhead 3 Dist - Gladstone Outgoing	0	0	1.13	1.63	
11/24/2020	Yellowhead 3 Dist - Plumus Outgoing	0	0	1.04	1.39	
11/24/2020	Yellowhead 3 Dist - Gladstone Incoming	0	0	0.38	0.88	
11/24/2020	Yellowhead 3 Dist - Plumas Incoming	0	0	0.87	1.3	
11/25/2020	Yellowhead 3 Dist - Arden Outgoing	0	0	1	1.6	
11/25/2020	Yellowhead 3 Dist - Arden Incoming	0	0	1.1	2.2	
12/7/2020	Yellowhead 3 Dist - Austin Outgoing	0	0	1.43	1.59	
12/7/2020	Yellowhead 3 Dist - MacGregor Outgoing	0	0	1.22	1.53	
12/7/2020	Yellowhead 3 Dist - Austin Incoming	0	0	0.98	1.23	
12/7/2020	Yellowhead 3 Dist - MacGregor Incoming	0	0	0.92	1.41	
12/8/2020	Yellowhead 3 Dist - Gladstone Outgoing	0	0	1.2	1.73	
12/8/2020	Yellowhead 3 Dist - Plumus Outgoing	0	0	0.7	1.19	
12/8/2020	Yellowhead 3 Dist - Gladstone Incoming	0	0	0.17	0.61	
12/9/2020	Yellowhead 3 Dist - Arden Outgoing	0	0	0.8	1.7	
12/21/2020	Yellowhead 3 Dist - Austin Outgoing	0	0	1.77	2.1	
12/21/2020	Yellowhead 3 Dist - MacGregor Outgoing	0	0	1.36	1.76	
12/21/2020	Yellowhead 3 Dist - Arden Outgoing	0	0	0.9	1.8	

12/21/2020	Yellowhead 3 Dist - Arden Incoming	0	0	0.8	1.7	
12/22/2020	Yellowhead 3 Dist - Gladstone Outgoing	0	0	1.12	1.57	
12/22/2020	Yellowhead 3 Dist - Plumus Outgoing	0	0	0.65	1.14	
12/22/2020	Yellowhead 3 Dist - Gladstone Incoming	0	0	1.08	1.74	
12/22/2020	Yellowhead 3 Dist - Plumas Incoming	0	0	0.74	1.8	

- Yellowhead Distribution Samples for Alternating Reservoirs shown highlighted

- ABSENT: Allowable holding time for sample was exceeded, so only a bacteria Presence/Absence test was performed.

- CL2: Reported in units of mg/L

- TC/EC/HPC: Reported in units of MPN/100 mL

Trihalomethane (THM) 2020 results

** Next Sampling Year 2022**

WATER SYSTEM NAME	CODE	FEB	MAY	AUG	NOV	AVG THM (µg/L)
Municipality of North Norfolk	151.50	136	81.4	153	73.1	110.9
Municipality of Glenella-Lansdowne (@ Arden)	6.25	234	173	124	109	160
Municipality of Westlake-Gladstone (@ Plumas)	247.20	55.3	48.5	69.4	55.6	57.2
Yellowhead Regional	258.00	195	161	128	153	159.3
(Source - City PLaP - 171.00)						

Notes:

- All results reported in µg/l
- THM Annual Average Maximum Allowable Concentration = 100 µg/l

Haloacetic Acids (HAA) 2020 results

** Next Sampling Year 2022**

WATER SYSTEM NAME	CODE	FEB	MAY	AUG	NOV	AVG HAA (µg/L)
Municipality of North Norfolk	151.50	38.9	26.9	54	22.1	35.48
Municipality of Glenella-Lansdowne (@ Arden)	6.25	84	83.4	53.1	22.7	60.8
Municipality of Westlake-Gladstone (@ Plumas)	247.20	71.8	69.9	88.1	40.9	67.68
Yellowhead Regional	258.00	34.7	28.8	67.2	29	39.9
(Source - City PLaP - 171.00)						

Notes:
- All results reported in µg/l
- HAA Annual Average Maximum Allowable Concentration = 80 µg/l

Water Chemistry Results

City of Portage la Prairie - Portage la Prairie Regional
ATTN: MICHAEL SANDNEY
Portage la Prairie Regional - PWS
97 Saskatchewan Avenue East
Portage la Prairie MB R1N 0L8

Date Received: 28-OCT-20
Report Date: 09-NOV-20 15:28 (MT)
Version: FINAL

Client Phone: 204-239-8372

Certificate of Analysis

Lab Work Order #: L2522593
Project P.O. #: NOT SUBMITTED
Job Reference: PORTAGE LA PRAIRIE - PWS 171.00
C of C Numbers:
Legal Site Desc: 28564

Hua Wo
Chemistry Laboratory Manager

ADDRESS: 1329 Niakwa Road East, Unit 12, Winnipeg, MB R2J 3T4 Canada | Phone: +1 204 255 9720 | Fax: +1 204 255 9721
ALS CANADA LTD Part of the ALS Group An ALS Limited Company

Physical Tests (WATER)

				ALS ID	L2522593-1		L2522593-2	
				Sampled Date	28-OCT-20		28-OCT-20	
				Sampled Time	08:00		08:00	
				Sample ID	PORTAGE LA PRAIRIE 1 - RAW		PORTAGE LA PRAIRIE 2 - TREATED	
Analyte	Unit	Guide Limit #1	Guide Limit #2					
Colour, True	CU	15	-		11.0		<5.0	
Conductivity	umhos/cm	-	-		940		738	
Hardness (as CaCO3)	mg/L	-	-		396	HTC	233	HTC
Langelier Index (4 C)	No Unit	-	-		1.1		0.24	
Langelier Index (60 C)	No Unit	-	-		1.9		1.0	
pH	pH units	7.00-10.5	-		8.50		8.10	
Total Dissolved Solids	mg/L	500	-		575		445	
Transmittance, UV (254 nm)	%T/cm	-	-		67.6		87.3	
Turbidity	NTU	-	-		49.9		0.16	

Federal Guidelines for Canadian Drinking Water Quality (JAN, 2020)
#1: GCDWQ - Aesthetic Objective/Other Value (Jan.2020)
#2: GCDWQ - Maximum Acceptable Concentrations (MACs-Jan.2020)

Anions and Nutrients (WATER)

				ALS ID	L2522593-1		L2522593-2	L2522593-3
				Sampled Date	28-OCT-20		28-OCT-20	28-OCT-20
				Sampled Time	08:00		08:00	08:00
				Sample ID	PORTAGE LA PRAIRIE 1 - RAW		PORTAGE LA PRAIRIE 2 - TREATED	PORTAGE LA PRAIRIE 2 - TREATED
Analyte	Unit	Guide Limit #1	Guide Limit #2					
Alkalinity, Total (as CaCO3)	mg/L	-	-		292		129	
Ammonia, Total (as N)	mg/L	-	-		0.055		<0.010	
Bicarbonate (HCO3)	mg/L	-	-		330		157	
Bromate	ug/L	-	10					<0.30
Bromide (Br)	mg/L	-	-		0.055		<0.010	
Carbonate (CO3)	mg/L	-	-		13.2		<0.60	
Chloride (Cl)	mg/L	250	-		21.7		27.0	
Fluoride (F)	mg/L	-	1.5		0.158		0.802	
Hydroxide (OH)	mg/L	-	-		<0.34		<0.34	
Nitrate (as N)	mg/L	-	10		0.125		0.146	
Nitrite (as N)	mg/L	-	1		0.0019		<0.0010	
Sulfate (SO4)	mg/L	500	-		199		201	

Federal Guidelines for Canadian Drinking Water Quality (JAN, 2020)
#1: GCDWQ - Aesthetic Objective/Other Value (Jan.2020)
#2: GCDWQ - Maximum Acceptable Concentrations (MACs-Jan.2020)

Organic / Inorganic Carbon (WATER)

				ALS ID	L2522593-1		L2522593-2	
				Sampled Date	28-OCT-20		28-OCT-20	
				Sampled Time	08:00		08:00	
				Sample ID	PORTAGE LA PRAIRIE 1 - RAW		PORTAGE LA PRAIRIE 2 - TREATED	
Analyte	Unit	Guide Limit #1	Guide Limit #2					
Dissolved Organic Carbon	mg/L	-	-		8.17		4.43	
Total Organic Carbon	mg/L	-	-		10.1		5.52	

Federal Guidelines for Canadian Drinking Water Quality (JAN, 2020)
#1: GCDWQ - Aesthetic Objective/Other Value (Jan.2020)
#2: GCDWQ - Maximum Acceptable Concentrations (MACs-Jan.2020)

Detection Limit for result exceeds Guide Limit. Assessment against Guide Limit cannot be made.
Analytical result for this parameter exceeds Guide Limit listed on this report.
* Please refer to the Reference Information section for an explanation of any qualifiers noted.

ANALYTICAL REPORT

Total Metals (WATER)

			ALS ID	L2522593-1	L2522593-2	L2522593-4
			Sampled Date	28-OCT-20	28-OCT-20	27-OCT-20
			Sampled Time	08:00	08:00	14:30
			Sample ID	PORTAGE LA PRAIRIE 1 - RAW	PORTAGE LA PRAIRIE 2 - TREATED	PORTAGE LA PRAIRIE 3 - DISTRIBUTION (TIM HORTONS)
Analyte	Unit	Guide Limit #1	Guide Limit #2			
Aluminum (Al)-Total	mg/L	0.1	-	1.08	0.0070	0.0040
Antimony (Sb)-Total	mg/L	-	0.006	0.00026	0.00019	0.00018
Arsenic (As)-Total	mg/L	-	0.01	0.00497	0.00093 RRV	0.00108
Barium (Ba)-Total	mg/L	-	2	0.107	0.0182	0.0179
Beryllium (Be)-Total	mg/L	-	-	<0.00010	<0.00010	<0.00010
Bismuth (Bi)-Total	mg/L	-	-	<0.000050	<0.000050	<0.000050
Boron (B)-Total	mg/L	-	5	0.098	0.063	0.048
Cadmium (Cd)-Total	mg/L	-	0.005	0.0000580	0.0000052	0.0000135
Calcium (Ca)-Total	mg/L	-	-	82.0	55.8	49.0
Cesium (Cs)-Total	mg/L	-	-	0.000238	0.000024	0.000022
Chromium (Cr)-Total	mg/L	-	0.05	0.00186	0.00053	0.00059
Cobalt (Co)-Total	mg/L	-	-	0.00122	<0.00010	<0.00010
Copper (Cu)-Total	mg/L	1	2	0.00355	0.0252	0.324
Iron (Fe)-Total	mg/L	0.3	-	2.19	<0.010	0.019
Lead (Pb)-Total	mg/L	-	0.005	0.00122	<0.000050	0.000090
Lithium (Li)-Total	mg/L	-	-	0.0554	0.0530	0.0526
Magnesium (Mg)-Total	mg/L	-	-	46.5	22.8	15.8
Manganese (Mn)-Total	mg/L	0.02	0.12	0.262	0.00051	0.00055
Molybdenum (Mo)-Total	mg/L	-	-	0.00297	0.00338	0.00324
Nickel (Ni)-Total	mg/L	-	-	0.00657	0.00106 RRV	0.00161 RRV
Phosphorus (P)-Total	mg/L	-	-	0.130	0.478	0.399
Potassium (K)-Total	mg/L	-	-	8.98	9.10	8.76
Rubidium (Rb)-Total	mg/L	-	-	0.00394	0.00234	0.00252
Selenium (Se)-Total	mg/L	-	0.05	0.000450	0.000358	0.000351
Silicon (Si)-Total	mg/L	-	-	9.69	5.13	3.16
Silver (Ag)-Total	mg/L	-	-	0.000014	<0.000010	<0.000010
Sodium (Na)-Total	mg/L	200	-	47.1	49.1	48.8
Strontium (Sr)-Total	mg/L	-	7	0.334	0.191	0.162
Sulfur (S)-Total	mg/L	-	-			65.2
Tellurium (Te)-Total	mg/L	-	-	<0.00020	<0.00020	<0.00020
Thallium (Tl)-Total	mg/L	-	-	0.000032	<0.000010	<0.000010
Thorium (Th)-Total	mg/L	-	-	0.00021	<0.00010	<0.00010
Tin (Sn)-Total	mg/L	-	-	<0.00010	<0.00010	<0.00010

Federal Guidelines for Canadian Drinking Water Quality (JAN, 2020)
#1: GCDWQ - Aesthetic Objective/Other Value (Jan.2020)
#2: GCDWQ - Maximum Acceptable Concentrations (MACs-Jan.2020)

Detection Limit for result exceeds Guide Limit. Assessment against Guide Limit cannot be made.
Analytical result for this parameter exceeds Guide Limit listed on this report.
* Please refer to the Reference Information section for an explanation of any qualifiers noted.

ANALYTICAL REPORT

Total Metals (WATER)

Analyte	Unit	Guide Limit #1	Guide Limit #2	L2522593-1 28-OCT-20 08:00 PORTAGE LA PRAIRIE 1 - RAW	L2522593-2 28-OCT-20 08:00 PORTAGE LA PRAIRIE 2 - TREATED	L2522593-4 27-OCT-20 14:30 PORTAGE LA PRAIRIE 3 - DISTRIBUTION (TIM HORTONS)
Titanium (Ti)-Total	mg/L	-	-	0.0297	<0.00030	<0.00030
Tungsten (W)-Total	mg/L	-	-	<0.00010	<0.00010	<0.00010
Uranium (U)-Total	mg/L	-	0.02	0.00296	0.000185	0.000085
Vanadium (V)-Total	mg/L	-	-	0.00615	0.00190 RRV	0.00123 RRV
Zinc (Zn)-Total	mg/L	5	-	0.0091	0.0030	0.0339
Zirconium (Zr)-Total	mg/L	-	-	0.00085	<0.00020	<0.00020

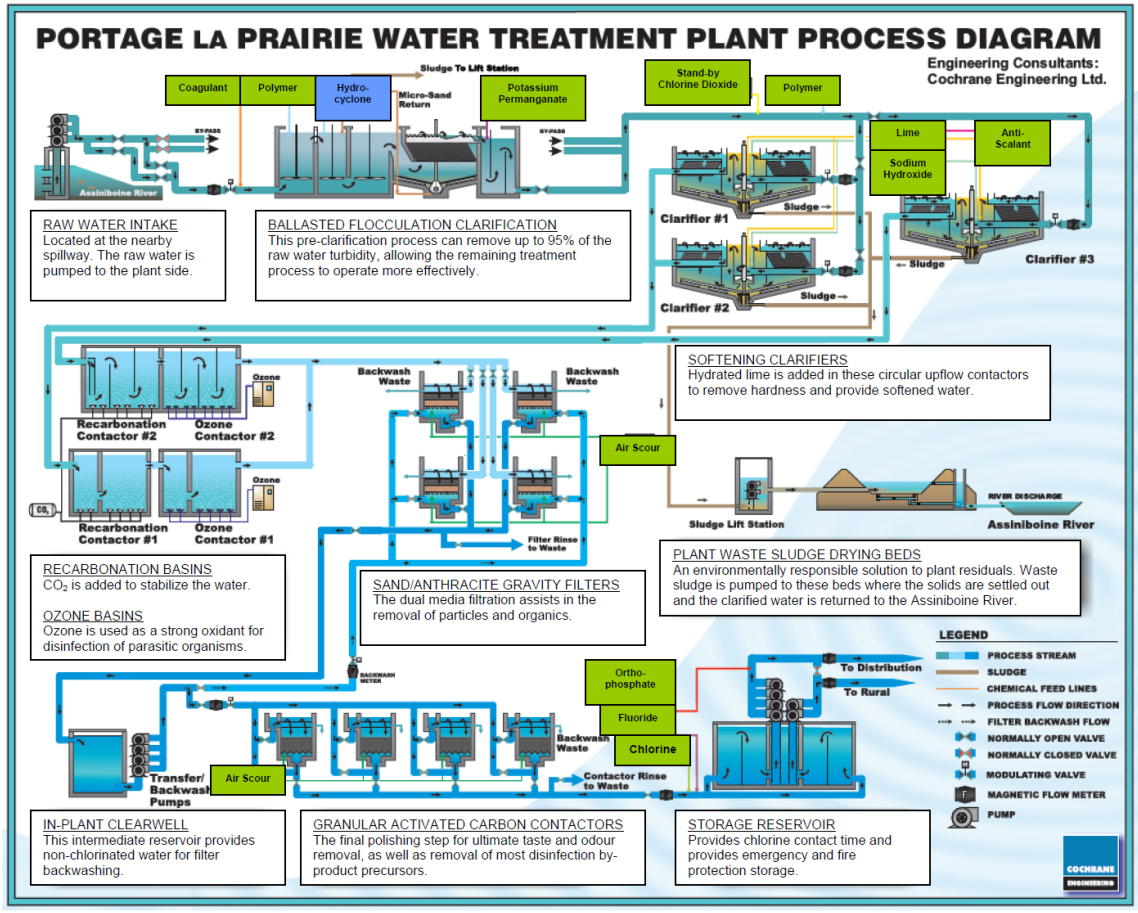
Federal Guidelines for Canadian Drinking Water Quality (JAN, 2020)
#1: GCDWQ - Aesthetic Objective/Other Value (Jan.2020)
#2: GCDWQ - Maximum Acceptable Concentrations (MACs-Jan.2020)

Detection Limit for result exceeds Guide Limit. Assessment against Guide Limit cannot be made.
Analytical result for this parameter exceeds Guide Limit listed on this report.
* Please refer to the Reference Information section for an explanation of any qualifiers noted.

Appendix B

Water Treatment Plant Process Diagram[1]

[1] Obtained from WSP (Formerly Genivar)


PORTAGE LA PRAIRIE WATER TREATMENT PLANT PROCESS DIAGRAM
Engineering Consultants:
Cochrane Engineering Ltd.
Coagulant
Polymer
Hydro-cyclone
Sludge To Lift Station
Micro-Sand Return
Potassium Permanganate
Stand-by Chlorine Dioxide
Polymer
Lime
Sodium Hydroxide
Anti-Scalant
Assiniboine River
BY-PASS
Clarifier #1
Clarifier #2
Clarifier #3
Sludge
RAW WATER INTAKE
Located at the nearby spillway. The raw water is pumped to the plant side.
BALLASTED FLOCCULATION CLARIFICATION
This pre-clarification process can remove up to 95% of the raw water turbidity, allowing the remaining treatment process to operate more effectively.
SOFTENING CLARIFIERS
Hydrated lime is added in these circular upflow contactors to remove hardness and provide softened water.
Ozone
Recarbonation Contactor #2
Ozone Contactor #2
Recarbonation Contactor #1
Ozone Contactor #1
CO2
Backwash Waste
Air Scour
Filter Rinse to Waste
Sludge Lift Station
RIVER DISCHARGE
Assiniboine River
RECARBONATION BASINS
CO2 is added to stabilize the water.
OZONE BASINS
Ozone is used as a strong oxidant for disinfection of parasitic organisms.
SAND/ANTHRACITE GRAVITY FILTERS
The dual media filtration assists in the removal of particles and organics.
PLANT WASTE SLUDGE DRYING BEDS
An environmentally responsible solution to plant residuals. Waste sludge is pumped to these beds where the solids are settled out and the clarified water is returned to the Assiniboine River.
LEGEND
PROCESS STREAM
SLUDGE
CHEMICAL FEED LINES
PROCESS FLOW DIRECTION
FILTER BACKWASH FLOW
NORMALLY OPEN VALVE
NORMALLY CLOSED VALVE
MODULATING VALVE
MAGNETIC FLOW METER
PUMP
Ortho-phosphate
Fluoride
Chlorine
To Distribution
To Rural
Transfer/ Backwash Pumps
Air Scour
Contactor Rinse to Waste
IN-PLANT CLEARWELL
This intermediate reservoir provides non-chlorinated water for filter backwashing.
GRANULAR ACTIVATED CARBON CONTACTORS
The final polishing step for ultimate taste and odour removal, as well as removal of most disinfection by-product precursors.
STORAGE RESERVOIR
Provides chlorine contact time and provides emergency and fire protection storage.
COCHRANE ENGINEERING