



## Public Water System Annual Report

- 2020 -

Name of the Public Water System:	Selkirk Public Water System
Name of the Local Owner:	City of Selkirk
Contact Person:	Dan McDermid Director of Operations
Phone:	785-4932
Email:	dmcdermid@cityofselkirk.com
Website:	MySelkirk.ca

### Water Treatment and Water

Distribution Emergency Number:	785-3943
Name of Operator:	Raven Sharma, Manager of Utilities
Daytime Phone:	785-4943
Cell Phone:	785-3328

Date Report Prepared:	March 22, 2021
-----------------------	----------------

Free printed copies of this report are available at the Operations Department at 739 Sophia Street, Selkirk or can be viewed on the City's website at:  
[www.myselkirk.ca/city-services/public-works/drinking-water](http://www.myselkirk.ca/city-services/public-works/drinking-water)

Prepared by:  
Dan McDermid, Director of Operations  
City of Selkirk

### **Introduction:**

The 2020 Annual Report for the City of Selkirk summarizes the Water Utility's ability to produce safe potable water and meet provincial regulations.

The Selkirk Public Water System provides potable drinking water to an estimated population of 10,278 residents. Treated water produced from the Water Treatment Plant (WTP) meets all health and aesthetic objectives as stated in the Guidelines for Canadian Drinking Water Quality.

### **Source Water:**

The Selkirk WTP has four source wells located within the City and two wells in the RM of St. Andrews to provide raw water for the treatment process. Five of these wells draw water from a deep carbonate bedrock aquifer, which leads to scale build up and gradual loss of productivity. The City has in place a redevelopment regime to maintain production rates. The Tower Well is a shallower well located in the upper part of the aquifer, but still within the bedrock. The raw source water has high hardness and dissolved solids as well as dissolved chloride concentrations. Bacteriological testing typically does not detect total coliform or e.coli bacteria. The details of the six source wells are as follows:

#### **Christie Well (old)**

- Constructed in 1968
- Sustainable pumping rate 21.6 L/s
- Depth 83.2 m
- Redeveloped in 1996 and 2006
- Now used as standby only as new well drilled in 2015

#### **Christie Well (new)**

- Constructed in 2015
- Sustainable pumping rate 19.24 L/s
- Depth 83.5 m

#### **McLean Well**

- Constructed in 1959

- Sustainable pumping rate 12.9 L/s
- Depth 85.3 m
- Redeveloped 1997
- New submersible pump installed in 2006

#### Rosser Well

- Constructed in 1987
- Sustainable pumping rate 7.6 L/s
- Depth 79.3 m
- Redeveloped 1997
- New submersible pump installed in 2004

#### Tower Well

- Constructed in 1997
- Sustainable pumping rate 5.1 L/s
- Depth 14.2 m
- Well is developed in upper aquifer

#### Render Well North

- Commissioned in 2017
- Sustainable pumping rate 50 L/s
- Depth 98 m
- Pumps 30 ft below ground
- 50 Hp submersible pumps (575v)

#### Render Well South

- Commissioned in 2017
- Sustainable pumping rate 50 L/s
- Depth 98 m
- Pumps 30 ft below ground
- 50 Hp submersible pumps (575v)

## Water Treatment:

The Selkirk Water Treatment Plant uses a lime softening treatment process to treat the raw source water before pumping it to the distribution system. The treatment process is comprised of the following components:

- Lime softening clarifier
- Recarbonation basin
- Gravity filters
- Clear well/disinfection basin
- Sludge dewatering

In the past, source water from the four wells was combined at the WTP and conveyed by a 400 mm asbestos cement pipe to the treatment facility. Currently, one of the two Render wells supplies most of the City's water through 9.88 kms of 12" 300 mm HDPE welded pipe with monthly alternating interval wells. Upon reaching the treatment facility, the raw water enters the clarifier where it is mixed with lime and a polymer coagulant. The clarifier has a surface area of 176 m<sup>2</sup> and a design overflow rate of 2.58 m<sup>3</sup>/hr. The reaction with lime forms calcium carbonate and some residual calcium oxide that can precipitate in the clarifier.

The calcium carbonate sludge from the clarifier is collected and pumped into the sludge handling facility. The dewatering facility utilizes two rotating permeable cylinders to concentrate the sludge prior to disposal. A vacuum pump draws water from the sludge through a filter cloth on the exterior of the drum. The extracted water is returned to the clarifier, while the dewatering sludge is scraped off the filter cloth and disposed in a landfill via a tandem dump truck.

The treated water from the clarifier flows by gravity in a channel to the recarbonation basin. The water enters this 39.5 m<sup>3</sup> chamber through an open channel, where carbon dioxide gas is used to neutralize the pH. After neutralization, the water passes through a bank of gravity sand filters. There are three filter beds with a combined surface area of 55.7 m<sup>2</sup>. The backwash uses an

integrated air scour system to improve filter cleaning efficiency. The water used for the backwash is recycled to the front end of the plant. After filtration, the treated water passes to the disinfection chamber where chlorine gas is injected to provide final disinfection before moving to the clearwell. The treated water is then pumped over to the storage reservoir located approximately 100 m to the northwest. Treated water quality from the existing WTP is consistently within the limits for health parameters. The chlorine residual is 0.5 – 1.0 mg/L leaving the plant into the city system.

Water hardness entering the plant is approximately 700 ppm and leaving the plant at approximately 150 ppm.

#### **Water Storage:**

A 643.5 m<sup>3</sup> clear well built underneath the Selkirk Water Treatment Plant, a 9092 m<sup>3</sup> underground reservoir next to the WTP and a 40 m high 945.6 m<sup>3</sup> Water Tower, ensure that enough water is available to meet water users' needs and for fire fighting. The total of 10,681.1 is approximately a maximum 2 days worth of storage. The reservoir is designed so that the water is always moving and never gets stale.

#### **Water Distribution:**

The water distribution system is the network of underground pipes used to carry the treated water from the WTP to the homes and businesses in Selkirk. We have:

- 39.75 km of asbestos cement
- 16.52 km of polyvinyl chloride
- 4.10 km of cast iron

pipework through Selkirk. The piping is interconnected (looped) to ensure that fresh safe water is continuously supplied. We carry out regular maintenance in the distribution system such as seasonal flushing in the summer and fire hydrant testing in cooperation with the Selkirk Volunteer Fire Department.

#### **Water Testing:**

Water tests are taken on a routine basis to ensure that the water is safe, and to monitor how well the treatment facility is performing. We test the water at the WTP, and in the distribution systems, at various locations and times as per Licence requirements. It is a regulatory requirement that all water test results associated with water safety be submitted to the Provincial Office of Drinking Water for review.

Bacterial testing: We test the raw water (well water), treated water (leaving Reservoir II) and the water in the distribution system (within City limits) every week for the presence of Total Coliform and E.coli bacteria. If these bacteria are present in the water, it is an indication that disease causing organisms may also be present.

Disinfectant testing: We test the level of chlorine in the treated water every day to ensure that the water leaving the WTP has enough chlorine to ensure proper disinfection. We also test chlorine levels in the distribution system every time we take water samples for bacterial testing.

Turbidity testing: Turbidity is a measurement of the clarity of water. The new plant tests turbidity. Well water turbidity is almost nonexistent.

Trihalomethane (THM) testing: Trihalomethanes are formed when chlorine reacts with naturally occurring organic matter in the water. Studies have shown a link between high levels of THMs and cancer. As the City does not use surface water, there is no organic material that can cause THM. This testing is not standard in our Licence.

Iron testing: The raw water has naturally occurring iron levels above the aesthetic limits established by Health Canada's Guidelines for Canadian Drinking Water Quality. As per City of Selkirk Ground Water Study by UMA, all metals analyzed were below the CCME and CEQG requirements (0.3 – 2.0 mg/L in raw water) and has not changed over the years. The City still does yearly tests on distribution and wells as per our Licence. Elevated iron levels do not pose a risk to health. However, excessive iron can produce unpleasant tastes and odors in the water and

can cause the water to appear discolored and stain plumbing fixtures and laundry.  
 Tested once per year on effluent and well.

**Results of Testing: Bacterial**

	Regulatory Requirement	Selkirk Public Water System Performance
Number of raw/incoming water samples	52	100%
Number of treated water samples	52	100%
Number of distribution water samples	104	100%
Frequency of testing	Weekly	100%
Total Coliform present in samples	0 TC per 100 mL	0%
<i>E.Coli</i> present in samples	0 EC per 100 mL	0%
No corrective action reporting was required		

**Results of Testing: Disinfection**

	Regulatory Requirement	Selkirk Public Water System Performance
Free chlorine residual entering the distribution system	$\geq 0.5$ mg/L	100%
Frequency of testing entering the distribution system	Daily	100%
Free chlorine residual in the distribution system	$\geq 0.1$ mg/L	100%
Frequency of testing in the distribution system	Weekly	100%
Report submissions	Monthly	100%
Comments: Measurements of disinfection residual were at all times at or above regulatory requirements. No corrective action reporting was required.		

### Water Quality and Treatment Standards:

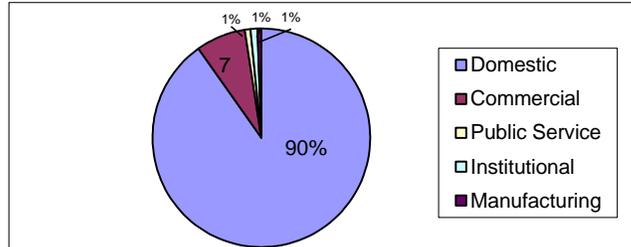
As per Selkirk's Public Water System Operating Licence #PWS-08-152-02, the City operates the water system in a manner that achieves the water quality/treatment standards specified below:

Parameter	Quality Standard
Total coliform	Less than one total coliform bacteria detectable per 100 mL in all treated and distributed water
<i>E. coli</i>	Less than one <i>E. coli</i> detectable per 100 mL in all treated and distributed water
Chlorine residual	A free chlorine residual of at least 0.5 mg/L in water entering the distribution system following a minimum contact time of 20 minutes A free chlorine residual of at least 0.1 mg/L at all times at any point in the water distribution system
Arsenic	Less than or equal to 0.01 mg/L
Benzene	Less than or equal to 0.005 mg/L
Ethylbenzene	Less than or equal to 0.14 mg/L
Fluoride	Less than or equal to 1.5 mg/L
Lead	Less than or equal to 0.01 mg/L in the water distribution system
Nitrate	Less than or equal to 45 mg/L measured as nitrate (10 mg/L measured as nitrogen)
Nitrite	Less than or equal to 3 mg/L measured as nitrite (1 mg/L measured as nitrogen)
Trichlorethylene	Less than or equal to 0.005 mg/L
Tetrachloroethylene	Less than or equal to 0.01 mg/L
Toluene	Less than or equal to 0.06 mg/L
Total xylenes	Less than or equal to 0.09 mg/L
Uranium	Less than or equal to 0.02 mg/L

**Distribution Connections and Users:**

The City of Selkirk distribution system is comprised of 3,539 connections (as of December 31, 2020). All service connections are metered.

Domestic	3,190
Commercial	259
Public Service	32
Institutional	37
Manufacturing	21



**Classification and Certification:**

Certification and classification requirements are regulated through the Water and Wastewater Facility Operators Regulation under the Environment Act.

The City of Selkirk has the following classifications and certifications:

- Class 3 Water Treatment Facility Classification
- Class 2 Water Distribution Classification
- Certification level of operators

	Water Treatment	Water Distribution
Raven Sharma	II	II
Troy Grobb	III	II
Jeremie Crawford	III	II
Derek Buchel	III	II
Dan McDermid	II	II
Ken Burke	II	II
Jeremy Canada	II	II
David Lagimodiere		II

**Water Rates:**

The Public Utilities Board (PUB) approves municipal water rates. The next water rate adjustment, if approved, will be in 2022.

**Water System Incidents and Corrective Actions: 3 in 2020**

- 1) **Date:** August 7, 2020  
**Location:** Eveline Street and Taylor Avenue  
**Type of Problem:** Watermain break  
**Length of Time Required to Correct Problem:** 4 days  
**Number of Homes/Businesses Affected:** 19 houses  
**Was Water Tested after Problem Corrected:** yes **Reading:** 0.54
  
- 2) **Date:** October 27, 2020  
**Location:** 200 Block Toronto Avenue  
**Type of Problem:** Watermain break  
**Length of Time Required to Correct Problem:** 2 days  
**Number of Homes/Businesses Affected:** 2 businesses, 20 houses  
**Was Water Tested after Problem Corrected:** yes **Reading:** 0.71
  
- 3) **Date:** November 11, 2020  
**Location:** 200 Block Taylor Avenue  
**Type of Problem:** Watermain break  
**Length of Time Required to Correct Problem:** 5 days  
**Number of Homes/Businesses Affected:** 15 houses  
**Was Water Tested after Problem Corrected:** yes **Reading:** 0.6

**Major Expenses incurred in 2020:**

- Water line extensions on Main Street south at a cost of \$300,000
- Watermain liner on Main Street from Manitoba Avenue to Lake Avenue at a cost of \$366,000

**Future System Expansion or Expenses:**

- Exterior painting of the Water Tower at a cost of \$450,000 (postponed from 2020)
- Remove and replace old clarifier at a cost of \$815,000
- Back-up generator and electrical upgrades at Water Treatment Plant at a cost of \$700,000

- Second channel installation from clarifier to CO2 chamber at a cost of \$80,000
- Water line re-lining/replacements at a cost of \$300,000 annually
- Phase 2 of Industrial Park at a cost of \$1,530,000 (currently in construction phase)