



Public Water System Annual Report 2021

Name of the Public Water System: **Cartier Regional Water Co-op (CRWC) – 3 Locations**
36.00 – Cartier Regional Water System
89.40 – Headingley Regional Water System &
162.75 – Peony Farm Reservoir Public Water System

Name of the legal owner: **Cartier Regional Water Co-op Inc.**

Contact person: **Danielle Vaillant, Manager CRWC Inc.**

Phone: **204-832-2555**

Email: **info@crwc.ca**

Website: **crwc.ca**

Water system's emergency number: **Cartier WTP-36.00: 204-353-4055 or**
Headingley WTP-89.40: 204-832-2555

Name of Operator: **Danielle Vaillant, Manager of CRWC**

Phone during business hours: **204-832-3555**

Emergency number: **Cartier WTP-36.00: 204-353-4055 or**
Headingley WTP-89.40: 204-832-2555

Date prepared: **March 28, 2022**

A handwritten signature in black ink, appearing to read 'D Vaillant', is written over a horizontal line.

Danielle Vaillant
Manager CRWC Inc.

Table of Contents

2021	
Public Water System Annual Report.....	1
Table of Contents.....	2
Introduction	3
1. Description of the Water System.....	3
1.1. Water supply source.....	3
1.2. Intake Structures and Storage.....	3
1.3. Water treatment process.....	4
1.4. Distribution system.....	8
1.5. Storage reservoirs.....	11
1.6. Number of connections, population served, and types of water users.....	12
1.7. Classification and Certification.....	13
2. Disinfection System in Use.....	14
2.1. Type of disinfection system used	14
2.2. Equipment redundancy and monitoring requirements.....	14
2.3. Disinfectant residual overall performance/results.....	14
3. List of Water Quality Standards.....	15
3.1. Result Improvement.....	17
4. Water System Incidents and Corrective Actions.....	18
5. Additional records required.....	18
6. Emergencies, Compliance Issues and Operational Issues.....	18
7. Drinking Water Safety Orders on your System and Actions Take.....	18
8. Boil Water Advisories Issued and Actions Taken in Response.....	18
9. Warnings Issued or Charges Laid on the System.....	19
10. Major Expenses Incurred.....	19
11. Future System Expansion and/or Increased Production.....	19
Appendix A: Cartier WTP 36.00 2021 Bacteriological Results.....	21
Appendix B: Headingley WTP 89.40 2021 Bacteriological Results.....	26
Appendix C: RM of Headingley 89.50 2021 Bacteriological Results.....	32
Appendix D: RM of St Francois Xavier 211.50 2021 Bacteriological Results.....	33
Appendix E: Peony Farm Reservoir 162.75 2021 Bacteriological Results.....	34
Appendix F: Cartier and Headingley Regional Water System THM and HAA Results.....	36
Appendix G: Cartier Water Treatment Facility Annual Lab Results.....	38
Appendix H: Headingley Water Treatment Facility Annual Lab Results.....	40
Appendix I: Water Audits 2021.....	41

Introduction

The Cartier Regional Water Co-op owns and operates 2 main water treatment facilities, 10 rural reservoirs, 2 booster stations, 7 truck fill stations, and over 270 km of water main transmission line. The owned reservoir at Peony Farm in Portage la Prairie is supplied with water produced at the city of Portage la Prairie water treatment facility. The CRWC owned and operated water treatment facilities strive to provide high-quality drinking water in sufficient quantity to meet public demand. It is our goal to do so in a safe, cost-effective manner while remaining in compliance with the regulatory requirements governing the provision of drinking water.

We believe that the public has a right to easily access information related to the drinking water they consume and the system through which it is provided. To that end, the Cartier Regional Water Co-op has prepared the following report.

1. *Description of the Water System*

The Cartier Regional Water System provides potable drinking water to a population of approximately 14,556 users. Treated water produced from the Cartier Regional Water Co-op Treatment Facilities (2) meets all health and aesthetic objectives as stated in the Guidelines for Canadian Drinking Water Quality.

1.1. Water source supply

The Cartier Regional Water Treatment Plant (WTP) and Headingley Regional Water Treatment Plant (WTP) receive surface water from the Assiniboine River. The Peony Farm Reservoir location receives its water source from the City of Portage La Prairie Water Treatment Facility. A link to the City of Portage La Prairie annual water system report can be found at [Water & Sewer - City of Portage la Prairie](#).

1.2. Intake structures and storage ponds:

The Cartier WTP has a stainless-steel intake structure that is specially designed to prevent injury to fish. It is located immediately north of the Baie St. Paul Bridge and flows through a 400 mm pipe into a concrete wet well on the East shore of the river. Two submersible pumps are available to pump the raw water through a 300 mm pipe to the WTP. Raw water can be pumped either to the aerated raw water storage ponds or directly to the WTP raw water chamber located beneath the water plant. The normal operational strategy is to pump to the storage north pond, flowing into the south storage pond for pre-settling, and pre-treatment in the summer season when required with aeration and algaecide control. The ponds provide a buffer when river water quality may not be optimal. Currently, the intake is flushed using gravity flow and does not provide a sufficient flow of water to adequately flush the intake screens of silt build-up.

When required, clearing of silt and debris from the intake screen is contracted out. The ponds have a common wet well to help identify levels in both storage ponds.

The Headingley WTP utilizes the existing Headingley Correctional Centre River Intake Building that is located on the HCC grounds. The CRWC has a memorandum of understanding (MOU) with Manitoba Infrastructure (MIT) to own, operate and maintain the intake channel, wet well, pumps and gate valves. The intake channel is made of concrete and directs the flow of the river into the pump house passing through bar screens before entering a pumping chamber. Both chambers are equipped with sluice gate valves that stay open during normal operation. The wet well maintains a static water level and there are two 60 hp pumps that operate on a lead/lag operation and pump water when the raw water storage ponds call for them to fill. As the water is being pumped from the wet well into the service line to the ponds, a low dose of algicide is added to control algae growth and to lower the organic level in the ponds. The river water is pumped through a 400 mm service line into two raw water storage ponds. The raw water storage ponds currently operate in parallel but also can operate in series. There is the ability to isolate one storage pond for maintenance and still supply the WTP with raw water. Both raw water storage ponds are equipped with aeration lines that are fed from blowers that are housed in the Raw Water Pump House (RWPH) located next to the storage ponds. The RWPH also contains a wet well with level control that indicates the level in the raw ponds and provides the controls back to the RIPH pumps. During normal river conditions, the ponds fill regularly. During high flows and high turbidity in the river, the ability to cease filling of the ponds and have plenty of storage to operate the facility is maintained until normal conditions return to the river. Also contained in the wet well are three 100 hp raw water pumps that are called to operate when the WTP is producing water.

1.3. Water treatment process:

Cartier WTP:

Raw water flows from the storage pond into the WTP raw water chamber by gravity. A control valve operates to maintain an ideal, stable level in the raw water chamber. The Raw water is pumped by two 20-HP pumps into the raw water process piping to the three-stage flocculation basins. The raw water flows through the process piping where it is injected with a pH suppressant (Sulphuric Acid) and a coagulant to begin the advanced coagulation process. The coagulated water then passes through 2 inline static mixers and an inline magnetic flow meter before it is deposited into the initial flocculation basin. The three-stage flocculation basins provide additional mixing to aid in the coagulation process before the raw water enters the ultra-filtration (UF) process. The three break tanks provide added mixing and coagulation before the raw water enters the ultra-filtration (UF) process. A pre-filter to the UF skids removes bigger floc (debris) created in the three-stage coagulation process. The UF provides 0.04-micron filtration and removes virtually all particulate matter before reaching the reverse osmosis (RO) process. The UF process is equipped with a common raw water turbidimeter and individual permeate turbidimeters for each UF train.

The permeate turbidimeters are set to alarm at 0.1 NTU and shutdown at 0.29 NTU. The turbidity is monitored continuously, and a value is captured every 5 minutes and reported on a monthly report. The UF Permeate is sent to the UF/RO break tank chambers, where the water is used to feed the RO membranes and as backwash water for the UF membranes. The UF permeate is treated with a low dose of chlorine to eliminate the potential for bio growth in the RO feed chambers. The RO feed pumps supply the UF permeate to the RO membranes during operation. Sodium Bisulphite (SBS) is added upstream of the RO trains to neutralize the remaining chlorine residual before entering the RO membranes. RO treated water is so pure that a RO by-pass line feeding UF permeate water is used to add necessary minerals back into the water to achieve the desired hardness of the finished water and to stabilize water chemistry. During the summer months, when the organic content in the raw water is at its highest, adjustments are made to lower the UF permeate blend ratio into the RO water to help reduce organic content in the finished water. A sequestering agent is added downstream of the ROs before entering the clear well. This is added to help stabilize the water that enters the distribution system.

Turbidity is a measure of the relative clarity of the water and is a key parameter of all drinking water operating licenses. The operating license requires the treatment facility to continuously monitor the turbidity from the ultra-filtration membranes. The Cartier WTP has 24-hour online monitoring of the UF treated water and final plant effluent going to the distribution system. After the RO process, the water pH is adjusted with sodium hydroxide and a small dosage of chlorine is added to kill pathogenic organisms (bacteria, viruses, etc.). The free chlorine residual in the treated water entering the distribution system is also monitored and recorded continuously. Fluoride is added to a dosage of 0.70 mg/L concentration for dental health purposes. See Figures 1 and 2 for the process flow diagram.

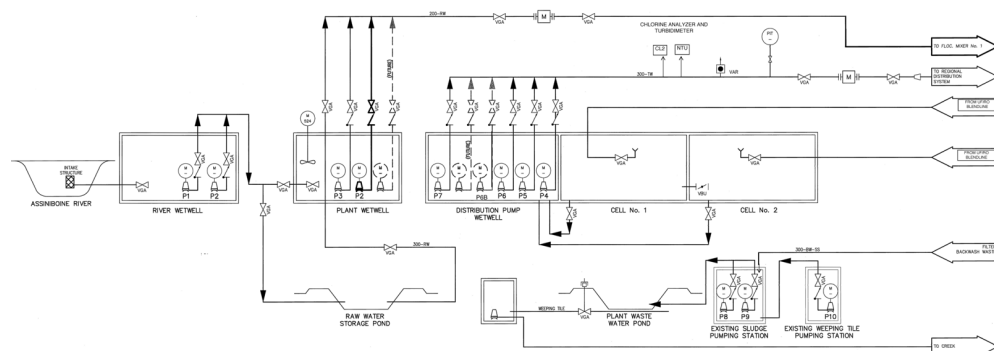


Figure 1 - Cartier WTP Process Flow Diagram 1 of 2

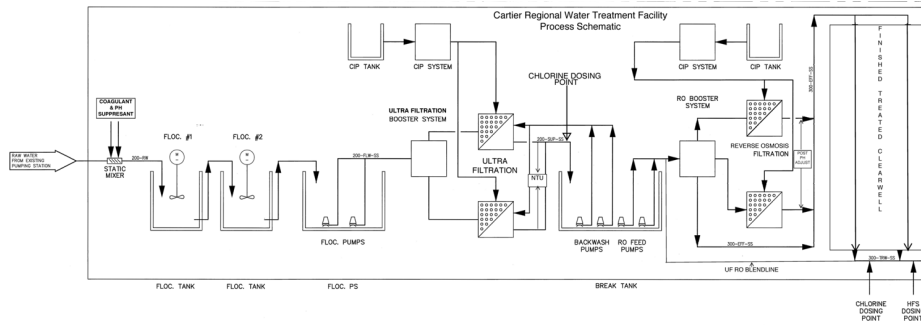


Figure 2 - Cartier WTP Flow Process Diagram 2 of 2

Headingley WTP:

The Headingley WTP operates similarly to the Cartier WTP. They both draw from the same water source and both contain SUEZ membrane equipment for water treatment. The main difference between the facilities regarding treatment is that the finished treated water is not a blend of UF, and RO permeate. Headingley WTP uses calcite contactors that contain calcite media to add hardness/minerals back into the finished water. The raw water flows into the facility and passes through 500-micron filters, 2-static mixers, pre-treated with a coagulant and pH depressed with carbon dioxide. It travels through two chambers that contain mixers. The mixers promote the reaction of coagulation; raw water particles bind together to form a pin floc. The pre-treated raw water flows into the UF feed chamber and UF feed pumps send the water to the UF membranes. The UFs provide 0.04-micron filtration and removes virtually all-particulate matter before reaching the RO membranes. Each UF membrane skid is equipped with a raw and permeate turbidimeter. The permeate turbidimeters are set to alarm at 0.1 NTU and production to shut down at 0.29 NTU. The turbidity is monitored continuously, and a value is captured every 5 minutes and reported on a monthly report. The UF permeate is sent to the UF/RO break tank chambers, where the water is used to feed the RO membranes and as backwash water for the UF membranes. The UF permeate is treated with a low dose of chlorine to eliminate the potential for bio growth in the RO feed chambers. The RO feed pumps supply the RO membranes during operation. SBS is added upstream of the RO membranes to neutralize the chlorine. The RO permeate is produced and pH depressed before 50% of it passes through calcite contactors. The calcite and RO permeate blend to achieve a final water of 40-80 mg/L of hardness (CaCO₃). The Final treated water is pH corrected with sodium hydroxide and disinfected with a small dosage of chlorine to kill pathogenic organisms (bacteria, viruses, etc.) before entering the clear well. The water flows through the clear well to achieve contact time between the treated water and the chlorine for sufficient disinfection before reaching the pump chamber. The free chlorine residual in the treated water entering the distribution system is also monitored and recorded on a monthly report. See Figure 3 for a process overview.

HEADINGLEY WATER TREATMENT PLANT

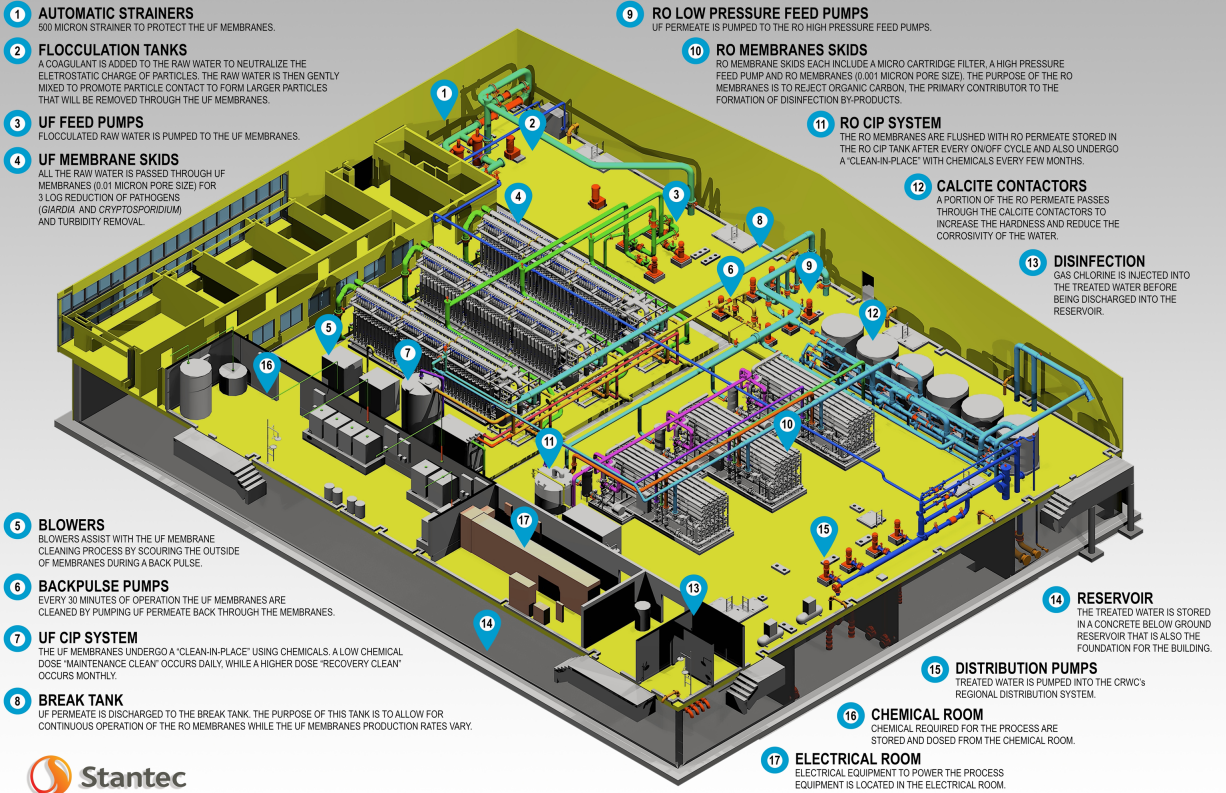


Figure 3 - Headingley WTP Treatment Process Overview

1.4. Distribution system:

Cartier WTP (36.00):

Treated water from the reservoir is pumped throughout the Cartier Regional distribution system via 1-5 horsepower (HP) jockey pump, 2-25 HP duty pumps, 1-30 HP duty pump, & 1-75 HP stand-by pump. These pumps are controlled by variable frequency drives (VFDs). The distribution system is partially looped and has an approximate piped length of 580 kilometers. Piping is comprised of both high-density polyethylene (HDPE) & polyvinylchloride (PVC) pipe. The Cartier Regional Water System services the RM of Cartier, Portage and Grey. Figure 4 outlines the Cartier WTP service area.

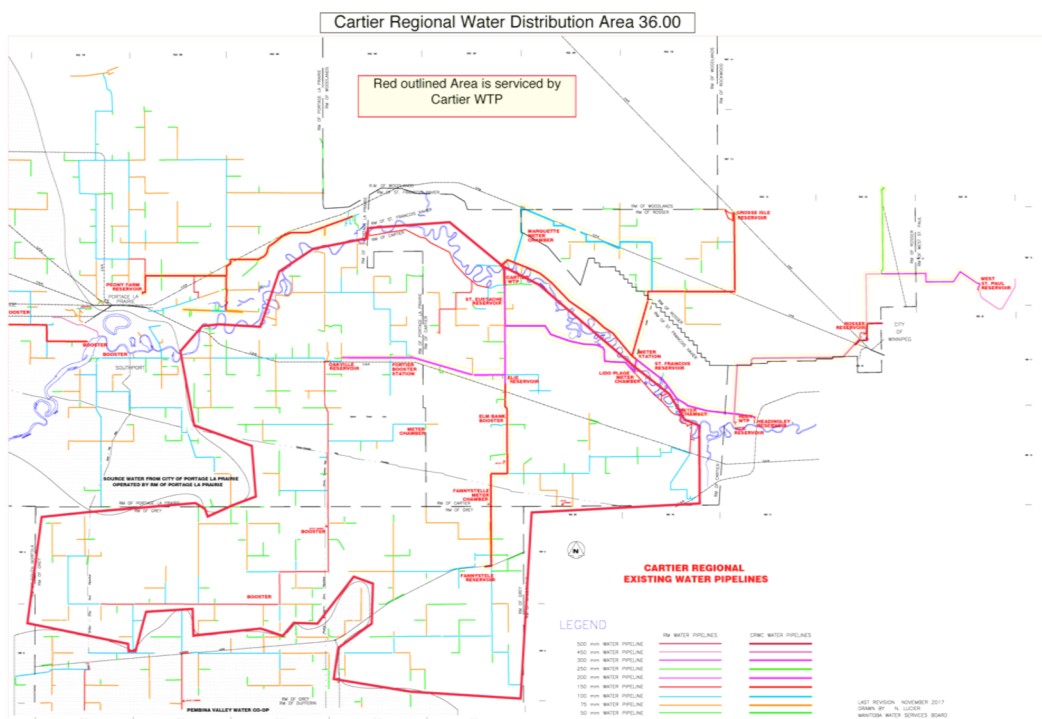


Figure 4 - 36.00 Cartier Regional Water Distribution System Map

Headingley WTP (89.40):

There are (4) distribution pumps that service three main headers that leave the facility into distribution. The Centerport distribution line services the Rosser Reservoir and RM of Rosser. From the Rosser Reservoir, treated water is pumped to the Stoney Mountain Institute and to the West St. Paul Reservoir, which services the RM of WSP. The RM of Headingley line services the Headingley Reservoir, RM of Headingley, St. Francois Xavier Reservoir, RM of St. Francois Xavier, RM of Rosser and Grosse Isle Reservoir. The HCC/WWTP lines service the Headingley Correctional Centre and the RM of Headingley Wastewater Treatment Plant. Figure 5 outlines the Headingley WTP service area.

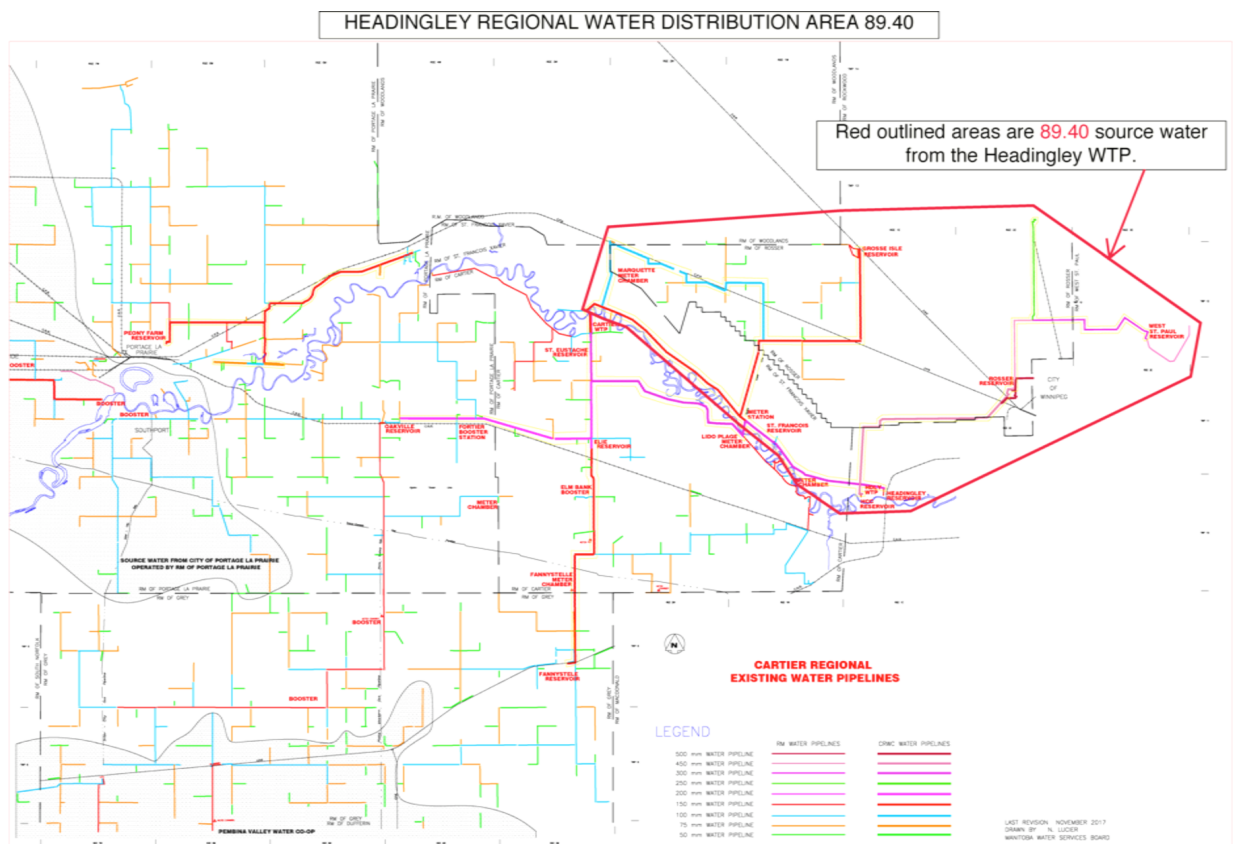


Figure 5 - 89.40 Headingley Regional Water Distribution System Map

Peony Farm (162.75):

The Cartier Regional Water Co-op owns and operates a facility located near the Peony Farm area in the RM of Portage la Prairie. The CRWC purchases treated water from the City of Portage la Prairie to fill the Peony Farm Reservoir. An incoming chlorine analyzer measures the amount of chlorine residual in the receiving water. If necessary, chlorine is added when the reservoir is filling. An outgoing chlorine analyzer measures the chlorine residuals leaving the facility to ensure that all regulations are met. There is a standby Generator that runs the facility in the case of a power event. A program to regularly flush the main lines from the facility to help improve water quality in the system has been implemented. Figure 6 is a map of the service area for the Peony Farm Reservoir (162.75).

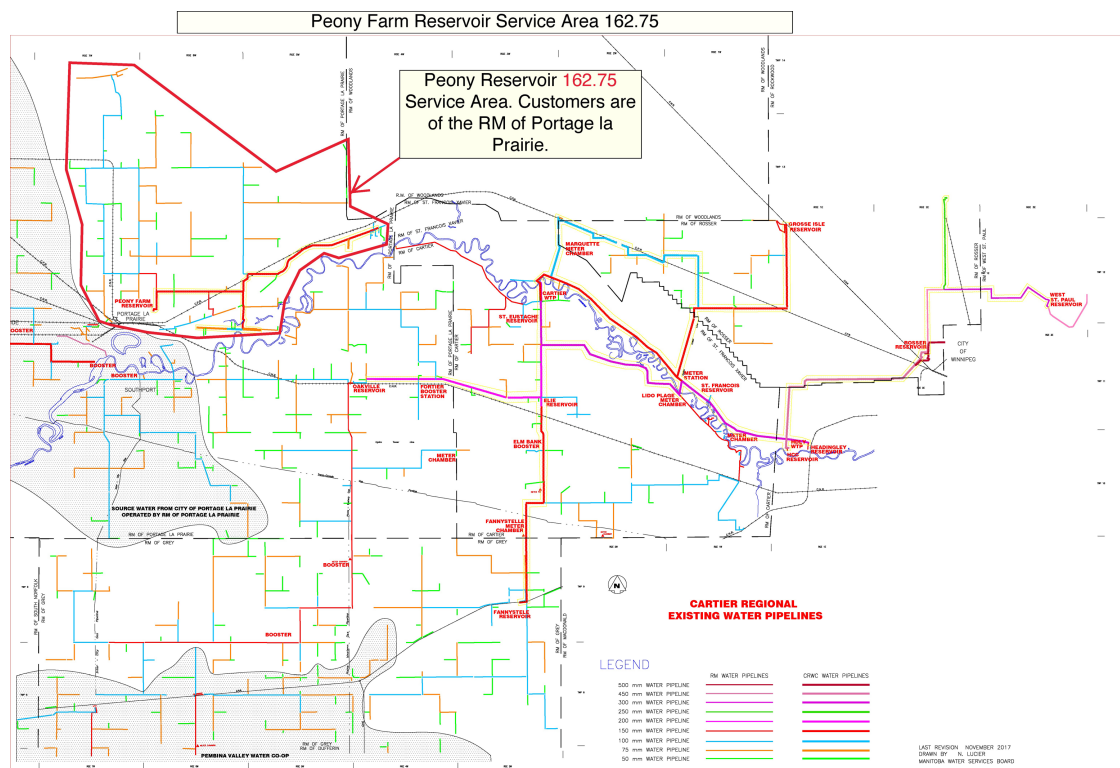


Figure 6 – 162.75 Peony Farm Service Area Map

The CRWC has an agreement for taking in the bacteriological samples for the RM of SFX under 211.50 and RM of Headingley under 89.50. A summary of the results can be found in Appendix C and D.

1.5. Storage reservoirs:

Cartier Regional WTP:	Raw Storage Reservoir Capacity:	60,000 M ³
Cartier Regional WTP:	Treated Reservoir Capacity:	3000 M ³
Elie Reservoir:	Treated Reservoir Capacity:	230 M ³
St. Eustache Reservoir:	Treated Reservoir Capacity:	76 M ³
Oakville Reservoir:	Treated Reservoir Capacity:	670 M ³
Fannystelle Reservoir:	Treated Reservoir Capacity:	150 M ³
Peony Farm Reservoir:	Treated Reservoir Capacity:	230 M ³
Headingley Regional WTP:	Raw Storage Reservoir Capacity:	135,107 M ³
Headingley Regional WTP:	Treated Reservoir Capacity:	4400 M ³
Headingley Reservoir:	Treated Reservoir Capacity:	2400 M ³
SFX Reservoir:	Treated Reservoir Capacity:	400 M ³
Grosse Isle Reservoir:	Treated Reservoir Capacity:	400 M ³
Rosser Reservoir:	Treated Reservoir Capacity:	7600 M ³
West St. Paul Reservoir:	Treated Reservoir Capacity:	4809 M ³

1.6. Number of connections, population served and types of water users:

The Cartier Regional distribution system is comprised of 5162 service connections (all metered) serving a population of greater than 14,556 people in 8 different rural municipalities; the RM of Cartier, RM of Portage la Prairie, RM of St. François Xavier, RM of Headingley, RM of Grey, R.M. of Rockwood, and the RM of Rosser and RM of West St. Paul.

Table 1 - CRWC Population Served (as of 30 Jun 21)

All RMs combined		REMARKS
BY METER SIZE		
5/8"	4,541	
3/4"	38	
1"	129	
1.5"	208	
2"	62	
3"	1	
8"	2	
TOTAL	4,981	
ESTIMATED PURPOSE		
Residential	4,803	
Commercial	249	
Industrial	7	
Other	103	
TOTAL	5,162	
Over 500 M3/quarter	48	
2 YEAR FORECAST		
Residential	545	
Commercial	51	
Other	6	
	602	
CONSUMPTION	366.1 million IG	1. July 2020 to June 2021
ESTIMATED SERVED POP	14,556	1. Also includes HCC 549; SMI 797 (per Wikipedia, rated population
FARMS		
Colonies	5	
Crops	0	
Cattle all forms	10	
Hogs	1	
Poultry	0	
Market	3	
Other	1	

1.7 Classification and certification:

Table 2 - Classification and Certification for CRWC Facilities and Operators

Cartier Water Treatment Facility	Water Treatment Water Distribution	Class 4 Class 2
Headingley Water Treatment Facility	Water Treatment Water Distribution	Class 3 Class 2
Danielle Vaillant <i>Manager</i> <i>Cartier Regional Water Co-op</i>	Water Treatment Water Distribution Wastewater Treatment Wastewater Collection	Class 4 Class 2 Class 2 Class 2
Grant McGorman <i>Lead Operator</i> <i>Cartier Regional Water Treatment Facility</i>	Water Treatment Water Distribution Wastewater Treatment Wastewater Collection	Class 4 Class 2 Class 2 Class 2
Jason Tanguay <i>Operator</i> <i>Cartier Regional Water Treatment Facility</i>	Water Treatment Water Distribution Wastewater Treatment Wastewater Collection	Class 3 Class 2 Class 1 Class 1
Travis Reinsch <i>Operator</i> <i>Cartier Regional Water Treatment Facility</i>	Water Treatment Water Distribution	Class 2 Class 2
David Epler <i>Lead Operator</i> <i>Headingley Regional Water Treatment Facility</i>	Water Treatment Water Distribution Wastewater Treatment Wastewater Collection	Class 4 Class 2 Class 2 Class 2
Colter Milne <i>Operator</i> <i>Headingley Regional Water Treatment Facility</i>	Water Treatment Water Distribution	Class 3 Class 2
Nathan Benevides-Harris <i>Operator</i> <i>Headingley Regional Water Treatment Facility</i>	Water Treatment Water Distribution	Class 1 Class 1
Paige Jepsen <i>Safety and Technical Assistant</i> <i>Cartier Regional Water Co-op</i>	Water Treatment Water Distribution	Class 1 Class 1

*Operator and facility classification and certification falls under The Environment Act's Water and Wastewater Facility Operators Regulation.

2. Disinfection System in Use:

The final step in the treatment of safe water is disinfection. Disinfection is the selective destruction or inactivation of potential disease-causing organisms in the water. As per the license issued under the *Drinking Water Safety Act*, the Cartier regional water Co-op must ensure that the water has a measurable free chlorine residual of at least:

- 0.5 mg/L in water entering the distribution system following a minimum contact time of 20 minutes
- 0.1 mg/L at all times at any point in the water distribution system

2.1. Type of disinfection system used:

The Cartier and Headingley Regional Water Treatment Facilities disinfect by adding chlorine gas to the treated water via Regal gas chlorinator systems. Sodium hypochlorite can also be added to all the reservoirs if required.

2.2. Equipment redundancy and monitoring requirements:

As required by the *Drinking Water Safety Act*, the Cartier and Headingley Regional Water Treatment Facilities ensure that continuous disinfection is maintained at the facilities by keeping in stock all spare parts required for the chlorination systems. As an additional backup, a complete spare chlorinator is also kept at the facilities. At the Cartier WTP, two identical trains of UF and RO membranes are in place, each RO with a capacity of 30 liters per second. At the Headingley WTP, 3 identical trains of UF and RO membranes are in place, each RO with a capacity of 50 liters per second.

Disinfectant residuals are monitored continuously, capturing readings every 5 minutes at the water treatment plants and at the reservoirs. Residuals are also monitored on a regular basis when water samples are taken for bacterial analysis in the distribution system and recorded on the appropriate monitoring forms. Monthly chlorination report forms are sent to the regional Drinking Water Officer at the end of each month.

2.3. Disinfectant residual overall performance / results:

The Cartier Regional Water System has met all regulatory requirements in 2021 for monitoring and reporting disinfection residuals leaving the water treatment facilities and in the distribution system.

3. List of Water Quality Standards:

The Province of Manitoba has adopted a number of water quality standards from the [Guidelines for Canadian Drinking Water Quality](#) developed by Health Canada. The health-based parameters express the maximum acceptable concentration. Concentration values in excess constitute a health-related issue and require corrective actions. The 2021 results for the Cartier and Headingley Regional Water System are summarized in the following tables:

Table 3 - Cartier WTP (36.00) Chemistry Results 2021

Parameter	Standard	Frequency	Test Results
Bacterial; TC & EC **	0 TC, 0 EC	Weekly	100 % passed
Disinfectant Residual	WTP (> 0.5 mg/L)	Continuously	100 % compliance
“ “	Distribution (> 0.1 mg/L)	Continuously	100 % compliance
Turbidity	0.10 NTU *	Continuously	100 % compliance
Lead	0.005 mg/L	Annually	See appendix G
Fluoride	1.5 mg/L	“	“
Aluminum	0.1 mg/L	“	“
Arsenic	0.01 mg/L	“	“
Antimony	0.006 mg/L	“	“
Barium	1 mg/L	“	“
Boron	5 mg/L	“	“
Cadmium	0.007 mg/L	“	“
Chromium	0.05 mg/L	“	“
Copper	1 mg/L	“	“
Iron	0.30 mg/L	Regularly	“
Manganese	0.02 mg/L	“	“
Nitrate	As Nitrogen; 10 mg/L	“	“
Selenium	0.05 mg/L	“	“
Uranium	0.02 mg/L	“	“
Trihalomethane (THM) ***	0.100 mg/L	Quarterly	See appendix F
Haloacetic Acids (HAA's) ****	0.08 mg/L	Quarterly	See appendix F

* NTU (Nephelometric turbidity unit)

** Bacterial testing: The raw water (untreated surface water), the treated water (leaving the water treatment facility) and the water in the distribution system is tested weekly (bi-weekly) for the presence of Total Coliform (TC) and *E. coli* (EC) bacteria. If these bacteria are present in the water, it is an indication that disease-causing organisms may also be present. Please see Appendix A, B, C, D, & E for a summary of the results.

*** THM: Trihalomethanes are formed when chlorine reacts with naturally occurring organic matter in the water. Studies have shown a link between high levels of THM's and cancer. For that reason, the province has set a health-based standard for THM's of 0.100 mg/L. The THM standard is based on an average of four samples per year. THM levels in

four locations in the distribution system are tested on a quarterly basis every year. Please see Appendix F for a summary of the results.

****HAA: Halo acetic Acids are formed when chlorine reacts with naturally occurring organic matter in the water. Studies have shown a link between high levels of HAA's and cancer. For that reason, the province has set a health-based standard for HAA's of 0.08 mg/L. The HAA standard is based on an average of four samples per year. HAA levels in four locations in the distribution system are tested on a quarterly basis every year. Please see Appendix F for a summary of the results.

A copy of the annual lab results can be found on our website at [Cartier WTP Chemistry](#)

Table 4 – Headingley WTP (89.40) Chemistry Results 2021

Parameter	Standard	Frequency	Test Results
Bacterial; TC & EC **	0 TC, 0 EC	Biweekly	100 % passed
Disinfectant Residual	WTP (> 0.5 mg/L)	Continuously	100 % compliance
“ “	Distribution (> 0.1 mg/L)	Continuously	100 % compliance
Turbidity	0.10 NTU *	Continuously	100 % compliance
Lead	0.005 mg/L	Annually	See appendix H
Fluoride	1.5 mg/L	“	“
Aluminum	0.1 mg/L	“	“
Arsenic	0.01 mg/L	“	“
Antimony	0.006 mg/L	“	“
Barium	1 mg/L	“	“
Boron	5 mg/L	“	“
Cadmium	0.007 mg/L	“	“
Chromium	0.05 mg/L	“	“
Copper	1 mg/L	“	“
Iron	0.30 mg/L	Regularly	“
Manganese	0.02 mg/L	“	“
Nitrate	As Nitrogen; 10 mg/L	“	“
Selenium	0.05 mg/L	“	“
Uranium	0.02 mg/L	“	“
Trihalomethane (THM) ***	0.100 mg/L	Quarterly	See appendix F
Haloacetic Acids (HAA's) ****	0.08 mg/L	Quarterly	See appendix F

* NTU (Nephelometric turbidity unit)

** Bacterial testing: The raw water (untreated surface water), the treated water (leaving the water treatment facility) and the water in the distribution system is tested weekly (bi-weekly) for the presence of Total Coliform (TC) and *E. coli* (EC) bacteria. If these bacteria are present in the water, it is an indication that disease-causing organisms may also be present. Please see Appendix A, B, C, D, & E for a summary of the results.

*** THM: Trihalomethanes are formed when chlorine reacts with naturally occurring organic matter in the water. Studies have shown a link between high levels of THM's and cancer. For that reason, the province has set a health-based standard for THM's of 0.100

mg/L. The THM standard is based on an average of four samples per year. THM levels in four locations in the distribution system are tested on a quarterly basis every year. Please see Appendix F for a summary of the results.

****HAA: Halo acetic Acids are formed when chlorine reacts with naturally occurring organic matter in the water. Studies have shown a link between high levels of HAA's and cancer. For that reason, the province has set a health-based standard for HAA's of 0.08 mg/L. The HAA standard is based on an average of four samples per year. HAA levels in four locations in the distribution system are tested on a quarterly basis every year. Please see Appendix F for a summary of the results.

A copy of the annual lab results can be found on our website at [Headingley WTP Chemistry](#)

Table 5 – Water Quality and Treatment Standards – Peony Farm Reservoir (PWS 162.75)

Parameter	Quality Standard
Total Coliform	Less than one total coliform bacteria detectable per 100 mL in all distributed water
E. coli	Less than one E. coli bacteria detectable per 100 mL in all distributed water
Chlorine residual	A free chlorine residual of at least 0.10 mg/L at all times at ant point in the distribution system
Total trihalomethanes (THMs)	Less than or equal to 0.10 mg/L as locational annual average of quarterly samples – Sampled Every 2 Years
Total haloacetic acids (HAAs)	Less than or equal to 0.08 mg/L as locational annual average of quarterly samples – Sampled Every 2 Years
Total Metals and Manganese (Distribution System)	One sample every two years at a mid-point in the distribution system
Lead	Less than or equal to 0.005 mg/L in the water distribution system – Sampling done upon direction of the DWO

A summary of the analysis for each of these parameters can be found on the annual water system report for the city of Portage la Prairie. A link to the City of Portage La Prairie annual water system report can be found at [Water & Sewer - City of Portage la Prairie](#)

3.1 Result improvement

The Cartier Regional Water Co-op has been monitoring Trihalomethanes (THM) for the past several years and has met the Provincial and Federal guidelines. The THM standard of 0.1 mg/L is based on a running average of quarterly samples and the health risks associated with elevated THM's are based on lifetime exposure. The average THM result for 2021 was below the 0.100 mg/L regulation. The ODW Audit for Peony Farm indicated a non-compliance with treatment standards for THM due to no treatment barrier. The only tool we have to control THM's in the distribution system is to flush the distribution system seasonally. We have no control over the treatment process of the water that receives into the Peony Farm reservoir. A low Cl₂ residual was recorded on a bacteriological sample due to the line not being in use and it is a long line at the end of the system.

4. *Water System Incidents and Corrective Actions*

There were no major water system incidents in 2021. Corrective actions were taken and reported as required for normal minor variations during the course of routine operations.

5. *Additional Records Required*

As part of Manitoba Health's fluoridation program, which is funded by the Manitoba Health, Seniors and Active Living, the Cartier WTP (36.00) collects water samples daily from the treated water reservoir and is tested on-site. Daily fluoride results are recorded, and a 14-day composite sample is submitted bi-weekly for analysis. The recommended level of fluoride in drinking water is 0.70 mg/L and the operating range set by Manitoba Health is 0.50-0.90 mg/L.

6. *Emergencies, Compliance Issues and Operational Issues*

In 2021, no Emergencies or Operational Issues occurred for the Cartier (36.00) and Headingley Regional Water System (89.40). The annual audit identified a few non-compliance incidents. Headingley Regional Water System (89.40) was non-compliant due to failure to take and/or record turbidity at the same time and location as the bacteriological distribution system sampling. This is due to the region relying on the local certified distribution operators to collect these samples for our community code. Acquiring testing equipment for each facility would be costly. We have discussed with our ODW an action plan to start turbidity testing and the Headingley Regional staff has taken over the testing at all facilities for now. Peony Farm (162.75) was non-compliance with treatment standards for THM due to no treatment barrier. The only tool we have to control THM's in the distribution system is to flush the distribution system seasonally. We have no control over the treatment process of the water that receives into the Peony Farm reservoir. A low Cl₂ residual was recorded on a bacteriological sample due to the line not being in use and it is a long line at the end of the system.

7. *Drinking Water Safety Orders on your System and Actions Taken in Response*

In 2021, no Drinking Water Safety Orders were issued for the Cartier and Headingley Regional Water System.

8. *Boil Water Advisories Issued and Actions Taken in Response*

In 2021, (2) Boil Water Advisories were issued for the Cartier Regional Water System. They were both triggered by construction on the new Elie Reservoir. A scheduled shut down was planned for the new reservoir distribution line to be connected to the existing distribution system and a planned precautionary boil water advisory was issued for the downstream users during that period. Both bacteriological samples passed, and the boil advisory was lifted within a few days. A

few weeks later, the water main was accidentally damaged during further excavation that was needed for the Elie Reservoir construction project. A precautionary boil water advisory was immediately placed on the affected users downstream of the break. Both bacteriological samples passed, and the boil advisory was lifted within a few days. BWA notices can be found on our website crwc.ca

9. *Warnings Issued or Charges Laid on the System in Accordance with The Drinking Water Safety Act:*

In accordance with the Drinking Water Safety Act, no warnings or charges were issued for the Cartier and Headingley Regional Water System in 2021.

10. *Major Expenses Incurred*

Drought Study – Completed and delivered in 2021.

Upgrades and Repairs

Cartier WTP:

- New blower and motor for aeration – \$11748.34
- Caustic Soda fill line improvements – \$4099.90
- Hot Water Tank – \$11,320.60
- Distribution Pump Repair – 21,686.05
- River Pump Repair – \$24,621.89
- River Pump Rental during low flows – \$8,426.25
- New UF Membrane Modules – \$125,548
- Dominion Divers to inspect Pond intake and aeration lines – \$4,830.00
- Repair Fannystelle Flushout Assembly – \$4580.63
- New Raw Cell Mixer Motor – \$7,500.00

Headingley WTP

- Headingley Reservoir Pump Repair – \$23,620.73
- RM of WSP Mainline Repair – \$12,993.16
- WSP Reservoir VFD – \$10,604.77
- CRWC Mainline Repair to Flushout Assembly – 10,703.67
- Raw Tank Cleaning – \$6199.18
- New UF Membranes – \$225,584.80
- New UF Membranes – \$218,272.00
- Headingley Aeration Building Duct Improvement – \$4,592.00

11. *Future System Expansion and/or Increased Production*

Elie Reservoir - In early 2022, the new Elie Reservoir will be fully commissioned and online. The old facility will be decommissioned. This facility is built to satisfy RM development and fire protection needs.

Elie By-pass - A by-pass was installed and completed and will be ready when the new Elie Reservoir is due to go online.

System Capacity Study & St. Eustache Reservoir Upgrade Study - The CRWC is currently undergoing a comprehensive Capacity Study for the entire system to review its current and future capacity to service the co-op region. Under the same agreement, an upgrade study for the St. Eustache reservoir will be completed. In the future, we anticipate this reservoir to undergo a complete upgrade to help better service the town of St. Eustache, MB. The RM of WSP and Centreport in the RM of Rosser are the fastest growing areas that the CRWC services. Under the study, each RM will be identifying their community growth projections.

Membrane Fouling Study – WSP Engineering will complete a membrane fouling study.

Security Upgrades – Surveillance cameras have been approved for the Cartier WTP location.

SCADA Upgrade – CRWC will undergo a SCADA and computer upgrade in 2022.

Headingley WTP – another set of UF Membranes were purchased in early 2022 and will be installed before peak season.

The bulk water rate will increase from \$3.72 per cubic meter to \$3.91 per cubic meter as of April 1, 2022.

Appendix A: Cartier WTP 36.00 2021 Bacteriological Results

Date Sampled	Sample Identification	TC	EC	Free CL2	Total CL2
5-Jan-21	CARTIER REGIONAL 1 - RAW	2	0	-	-
5-Jan-21	CARTIER REGIONAL 2 - TREATED	0	0	1.37	1.54
5-Jan-21	CARTIER REGIONAL 3 - DIST - ELIE RES IN	0	0	1.43	1.61
5-Jan-21	CARTIER REGIONAL 3 - DIST - ST. EUSTACHE OUT	0	0	1.36	1.50
5-Jan-21	CARTIER REGIONAL 3 - DIST - ELIE OUT	0	0	1.34	1.49
5-Jan-21	CARTIER REGIONAL 3 - DIST - FANNYSTELLE OUT	0	0	1.12	1.27
5-Jan-21	CARTIER REGIONAL 3 - DIST - OAKVILLE OUT	0	0	1.09	1.23
19-Jan-21	CARTIER REGIONAL 1 - RAW	2	0	-	-
19-Jan-21	CARTIER REGIONAL 2 - TREATED	0	0	1.31	1.51
19-Jan-21	CARTIER REGIONAL 3 - DIST @ ST. EUSTACHE RES IN	0	0	1.49	1.65
19-Jan-21	CARTIER REGIONAL 3 - DIST - ST. EUSTACHE OUT	0	0	1.13	1.29
19-Jan-21	CARTIER REGIONAL 3 - DIST - ELIE OUT	0	0	1.38	1.55
19-Jan-21	CARTIER REGIONAL 3 - DIST - FANNYSTELLE OUT	0	0	1.10	1.23
19-Jan-21	CARTIER REGIONAL 3 - DIST - OAKVILLE OUT	0	0	1.11	1.32
2-Feb-21	CARTIER REGIONAL 1 - RAW	4	0	-	-
2-Feb-21	CARTIER REGIONAL 2 - TREATED	0	0	1.36	1.55
2-Feb-21	CARTIER REGIONAL 3 - DIST - ST. EUSTACHE OUT	0	0	1.29	1.60
2-Feb-21	CARTIER REGIONAL 3 - DIST - ELIE OUT	0	0	1.38	1.56
2-Feb-21	CARTIER REGIONAL 3 - DIST - FANNYSTELLE OUT	0	0	1.15	1.36
2-Feb-21	CARTIER REGIONAL 3 - DIST - OAKVILLE OUT	0	0	1.21	1.41
2-Feb-21	CARTIER REGIONAL 3- DIST @ -----> ELM BANK BOOSTER	0	0	1.34	1.55
16-Feb-21	CARTIER REGIONAL 1 - RAW	4	0	-	-
16-Feb-21	CARTIER REGIONAL 2 - TREATED	0	0	1.68	1.88
16-Feb-21	CARTIER REGIONAL 3 - DIST @ OAKVILLE RESERVOIR IN	0	0	1.42	1.67
16-Feb-21	CARTIER REGIONAL 3 - DIST - ST. EUSTACHE OUT	0	0	1.41	1.70
16-Feb-21	CARTIER REGIONAL 3 - DIST - ELIE OUT	0	0	1.61	1.77
16-Feb-21	CARTIER REGIONAL 3 - DIST - FANNYSTELLE OUT	0	0	1.17	1.41
16-Feb-21	CARTIER REGIONAL 3 - DIST - OAKVILLE OUT	0	0	1.38	1.60
16-Feb-21	CARTIER REGIONAL 1 - RAW - UF BREAK TANK	0	0	0.20	0.55
2-Mar-21	CARTIER REGIONAL 1 - RAW	3	0	-	-
2-Mar-21	CARTIER REGIONAL 2 - TREATED	0	0	1.38	1.64
2-Mar-21	CARTIER REGIONAL 3 - DIST - FANNYSTELLE RES IN	0	0	1.16	1.30
2-Mar-21	CARTIER REGIONAL 3 - DIST - ST. EUSTACHE OUT	0	0	1.38	1.52
2-Mar-21	CARTIER REGIONAL 3 - DIST - ELIE OUT	0	0	1.34	1.50
2-Mar-21	CARTIER REGIONAL 3 - DIST - FANNYSTELLE OUT	0	0	1.15	1.26
2-Mar-21	CARTIER REGIONAL 3 - DIST - OAKVILLE OUT	0	0	1.17	1.35
16-Mar-21	CARTIER REGIONAL 1 - RAW	9	0	-	-
16-Mar-21	CARTIER REGIONAL 2 - TREATED	0	0	1.51	1.70
16-Mar-21	CARTIER REGIONAL 3 - DIST - ELIE RES IN	0	0	1.61	1.77
16-Mar-21	CARTIER REGIONAL 3 - DIST - ST. EUSTACHE OUT	0	0	1.55	1.69

16-Mar-21	CARTIER REGIONAL 3 - DIST - ELIE OUT	0	0	1.57	1.72
16-Mar-21	CARTIER REGIONAL 3 - DIST - FANNYSTELLE OUT	0	0	1.25	1.41
16-Mar-21	CARTIER REGIONAL 3 - DIST - OAKVILLE OUT	0	0	1.36	1.54
30-Mar-21	CARTIER REGIONAL 1 - RAW	2	0	-	-
30-Mar-21	CARTIER REGIONAL 2 - TREATED	0	0	1.51	1.68
30-Mar-21	CARTIER REGIONAL 3 - DIST @ ST. EUSTACHE IN	0	0	1.59	1.85
30-Mar-21	CARTIER REGIONAL 3 - DIST - ST. EUSTACHE OUT	0	0	1.56	1.82
30-Mar-21	CARTIER REGIONAL 3 - DIST - ELIE OUT	0	0	1.60	1.83
30-Mar-21	CARTIER REGIONAL 3 - DIST - FANNYSTELLE OUT	0	0	1.46	1.63
30-Mar-21	CARTIER REGIONAL 3 - DIST - OAKVILLE OUT	0	0	1.42	1.63
13-Apr-21	CARTIER REGIONAL 1 - RAW	6	0	-	-
13-Apr-21	CARTIER REGIONAL 2 - TREATED	0	0	1.63	1.80
13-Apr-21	CARTIER REGIONAL 3 - DIST - ST. EUSTACHE OUT	0	0	1.53	1.67
13-Apr-21	CARTIER REGIONAL 3 - DIST - ELIE OUT	0	0	1.56	1.68
13-Apr-21	CARTIER REGIONAL 3 - DIST - FANNYSTELLE OUT	0	0	1.20	1.30
13-Apr-21	CARTIER REGIONAL 3 - DIST - OAKVILLE OUT	0	0	1.27	1.47
13-Apr-21	CARTIER REGIONAL 3- DIST @ -----> FORTIER BOOSTER	0	0	1.58	1.79
27-Apr-21	CARTIER REGIONAL 1 - RAW	3	1	-	-
27-Apr-21	CARTIER REGIONAL 2 - TREATED	0	0	1.57	1.76
27-Apr-21	CARTIER REGIONAL 3 - DIST @ OAKVILLE RES IN	0	0	1.33	1.50
27-Apr-21	CARTIER REGIONAL 3 - DIST - ST. EUSTACHE OUT	0	0	1.37	1.54
27-Apr-21	CARTIER REGIONAL 3 - DIST - ELIE OUT	0	0	1.51	1.67
27-Apr-21	CARTIER REGIONAL 3 - DIST - FANNYSTELLE OUT	0	0	1.43	1.58
27-Apr-21	CARTIER REGIONAL 3 - DIST - OAKVILLE OUT	0	0	1.32	1.54
27-Apr-21	CARTIER REGIONAL 1 - RAW - UF BREAK TANK	0	0	0.14	0.30
11-May-21	CARTIER REGIONAL 1 - RAW	4	0	-	-
11-May-21	CARTIER REGIONAL 2 - TREATED	0	0	1.51	1.65
11-May-21	CARTIER REGIONAL 3 - DIST - FANNYSTELLE RES IN	0	0	1.44	1.62
11-May-21	CARTIER REGIONAL 3 - DIST - ST. EUSTACHE OUT	0	0	1.42	1.59
11-May-21	CARTIER REGIONAL 3 - DIST - ELIE OUT	0	0	1.42	1.68
11-May-21	CARTIER REGIONAL 3 - DIST - FANNYSTELLE OUT	0	0	1.41	1.58
11-May-21	CARTIER REGIONAL 3 - DIST - OAKVILLE OUT	0	0	1.37	1.58
11-May-21	CARTIER REGIONAL 1 - RAW- UF BREAKTANK	0	0	0.17	0.41
25-May-21	CARTIER REGIONAL 1 - RAW	56	6	-	-
25-May-21	CARTIER REGIONAL 2 - TREATED	0	0	1.27	1.43
25-May-21	CARTIER REGIONAL 3 - DIST - ELIE RES IN	0	0	1.32	1.49
25-May-21	CARTIER REGIONAL 3 - DIST - ST. EUSTACHE OUT	0	0	1.31	1.41
25-May-21	CARTIER REGIONAL 3 - DIST - ELIE OUT	0	0	1.27	1.45
25-May-21	CARTIER REGIONAL 3 - DIST - FANNYSTELLE OUT	0	0	1.04	1.20
25-May-21	CARTIER REGIONAL 3 - DIST - OAKVILLE OUT	0	0	1.11	1.30
8-Jun-21	CARTIER REGIONAL 1 - RAW	53	4	-	-
8-Jun-21	CARTIER REGIONAL 2 - TREATED	0	0	1.49	1.61
8-Jun-21	CARTIER REGIONAL 3 - DIST @ ST. EUSTACHE RESERVOIR IN	0	0	1.41	1.57
8-Jun-21	CARTIER REGIONAL 3 - DIST - ST. EUSTACHE OUT	0	0	1.24	1.88
8-Jun-21	CARTIER REGIONAL 3 - DIST - ELIE OUT	0	0	1.30	1.42

8-Jun-21	CARTIER REGIONAL 3 - DIST - FANNYSTELLE OUT	0	0	1.22	1.35
8-Jun-21	CARTIER REGIONAL 3 - DIST - OAKVILLE OUT	0	0	1.02	1.24
22-Jun-21	CARTIER REGIONAL 1 - RAW	>200	0	-	-
22-Jun-21	CARTIER REGIONAL 2 - TREATED	0	0	1.38	1.42
22-Jun-21	CARTIER REGIONAL 3 - DIST - ST. EUSTACHE OUT	0	0	1.23	1.17
22-Jun-21	CARTIER REGIONAL 3 - DIST - ELIE OUT	0	0	1.17	1.33
22-Jun-21	CARTIER REGIONAL 3 - DIST - FANNYSTELLE OUT	0	0	1.02	1.10
22-Jun-21	CARTIER REGIONAL 3 - DIST - OAKVILLE OUT	0	0	1.12	1.26
22-Jun-21	CARTIER REGIONAL 3- DIST @ -----> ELM BANK BOOSTER	0	0	1.15	1.28
6-Jul-21	CARTIER REGIONAL 1 - RAW	>200	1	-	-
6-Jul-21	CARTIER REGIONAL 2 - TREATED	0	0	1.13	1.33
6-Jul-21	CARTIER REGIONAL 3 - DIST @ OAKVILLE RES IN	0	0	0.91	1.10
6-Jul-21	CARTIER REGIONAL 3 - DIST - ST. EUSTACHE OUT	0	0	1.15	1.28
6-Jul-21	CARTIER REGIONAL 3 - DIST - ELIE OUT	0	0	1.09	1.28
6-Jul-21	CARTIER REGIONAL 3 - DIST - FANNYSTELLE OUT	0	0	0.98	1.17
6-Jul-21	CARTIER REGIONAL 3 - DIST - OAKVILLE OUT	0	0	0.95	1.20
6-Jul-21	CARTIER REGIONAL 1 - RAW - UF BREAK TANK	0	0	0.01	0.20
20-Jul-21	CARTIER REGIONAL 1 - RAW	>200	8	-	-
20-Jul-21	CARTIER REGIONAL 2 - TREATED	0	0	1.45	1.55
20-Jul-21	CARTIER REGIONAL 3 - DIST - FANNYSTELLE RES RN	0	0	1.12	1.38
20-Jul-21	CARTIER REGIONAL 3 - DIST - ST. EUSTACHE OUT	0	0	1.09	1.33
20-Jul-21	CARTIER REGIONAL 3 - DIST - ELIE OUT	0	0	1.13	1.31
20-Jul-21	CARTIER REGIONAL 3 - DIST - FANNYSTELLE OUT	0	0	1.04	1.13
23-Jul-21	CARTIER REGIONAL 3 - DIST - OAKVILLE OUT	0	0	1.01	1.26
3-Aug-21	CARTIER REGIONAL 1 - RAW	>200	1	-	-
3-Aug-21	CARTIER REGIONAL 2 - TREATED	0	0	1.39	1.59
3-Aug-21	CARTIER REGIONAL 3 - DIST - ELIE RES IN	0	0	1.31	1.47
3-Aug-21	CARTIER REGIONAL 3 - DIST - ST. EUSTACHE OUT	0	0	1.15	1.43
3-Aug-21	CARTIER REGIONAL 3 - DIST - ELIE OUT	0	0	1.23	1.38
3-Aug-21	CARTIER REGIONAL 3 - DIST - FANNYSTELLE OUT	0	0	1.02	1.16
3-Aug-21	CARTIER REGIONAL 3 - DIST - OAKVILLE OUT	0	0	1.16	1.24
17-Aug-21	CARTIER REGIONAL 1 - RAW	>200	4	-	-
17-Aug-21	CARTIER REGIONAL 2 - TREATED	0	0	1.37	1.56
17-Aug-21	CARTIER REGIONAL 3 - DIST @ ST EUSTACHE IN	0	0	1.38	1.53
17-Aug-21	CARTIER REGIONAL 3 - DIST - ST. EUSTACHE OUT	0	0	1.31	1.49
17-Aug-21	CARTIER REGIONAL 3 - DIST - ELIE OUT	0	0	1.27	1.47
17-Aug-21	CARTIER REGIONAL 3 - DIST - FANNYSTELLE OUT	0	0	1.03	1.17
17-Aug-21	CARTIER REGIONAL 3 - DIST - OAKVILLE OUT	0	0	1.37	1.52
1-Sep-21	CARTIER REGIONAL 1 - RAW	>200	4	-	-
1-Sep-21	CARTIER REGIONAL 2 - TREATED	0	0	1.65	1.83
1-Sep-21	CARTIER REGIONAL 3 - DIST - ST. EUSTACHE OUT	0	0	1.55	1.73
1-Sep-21	CARTIER REGIONAL 3 - DIST - ELIE OUT	0	0	1.54	1.75
1-Sep-21	CARTIER REGIONAL 3 - DIST - FANNYSTELLE OUT	0	0	1.12	1.27
1-Sep-21	CARTIER REGIONAL 3 - DIST - OAKVILLE OUT	0	0	1.33	1.57
1-Sep-21	CARTIER REGIONAL 3- DIST @ ELMBANK RES IN	0	0	1.42	1.65

14-Sep-21	CARTIER REGIONAL 1 - RAW	>200	6	-	-
14-Sep-21	CARTIER REGIONAL 2 - TREATED	0	0	1.69	1.87
14-Sep-21	CARTIER REGIONAL 3 - DIST @ OAKVILLE RES IN	0	0	1.53	1.71
14-Sep-21	CARTIER REGIONAL 3 - DIST - ST. EUSTACHE OUT	0	0	1.58	1.78
14-Sep-21	CARTIER REGIONAL 3 - DIST - ELIE OUT	0	0	1.63	1.85
14-Sep-21	CARTIER REGIONAL 3 - DIST - FANNYSTELLE OUT	0	0	1.38	1.52
14-Sep-21	CARTIER REGIONAL 3 - DIST - OAKVILLE OUT	0	0	1.37	1.58
14-Sep-21	CARTIER REGIONAL 1 - RAW - UF BREAK TANK	0	0	0.18	0.52
28-Sep-21	CARTIER REGIONAL 1 - RAW	145	2	-	-
28-Sep-21	CARTIER REGIONAL 2 - TREATED	0	0	1.73	1.88
28-Sep-21	CARTIER REGIONAL 3 - DIST - FANNYSTELLE RES IN	0	0	1.51	1.68
28-Sep-21	CARTIER REGIONAL 3 - DIST - ST. EUSTACHE OUT	0	0	1.61	1.82
28-Sep-21	CARTIER REGIONAL 3 - DIST - ELIE OUT	0	0	1.64	1.82
28-Sep-21	CARTIER REGIONAL 3 - DIST - FANNYSTELLE OUT	0	0	1.49	1.65
28-Sep-21	CARTIER REGIONAL 3 - DIST - OAKVILLE OUT	0	0	1.40	1.57
12-Oct-21	CARTIER REGIONAL 1 - RAW	>200	24	-	-
12-Oct-21	CARTIER REGIONAL 2 - TREATED	0	0	1.67	1.93
12-Oct-21	CARTIER REGIONAL 3 - DIST - ELIE RES IN	0	0	1.71	1.87
12-Oct-21	CARTIER REGIONAL 3 - DIST - ST. EUSTACHE OUT	0	0	1.55	1.71
12-Oct-21	CARTIER REGIONAL 3 - DIST - ELIE OUT	0	0	1.64	1.79
12-Oct-21	CARTIER REGIONAL 3 - DIST - FANNYSTELLE OUT	0	0	1.66	1.82
12-Oct-21	CARTIER REGIONAL 3 - DIST - OAKVILLE OUT	0	0	1.54	1.74
26-Oct-21	CARTIER REGIONAL 1 - RAW	41	1	-	-
26-Oct-21	CARTIER REGIONAL 2 - TREATED	0	0	1.78	1.97
26-Oct-21	CARTIER REGIONAL 3 - DIST @ ST EUSTACHE IN	0	0	1.78	1.93
26-Oct-21	CARTIER REGIONAL 3 - DIST - ST. EUSTACHE OUT	0	0	1.75	1.90
26-Oct-21	CARTIER REGIONAL 3 - DIST - ELIE OUT	0	0	1.82	1.97
26-Oct-21	CARTIER REGIONAL 3 - DIST - FANNYSTELLE OUT	0	0	1.57	1.76
26-Oct-21	CARTIER REGIONAL 3 - DIST - OAKVILLE OUT	0	0	1.67	1.92
9-Nov-21	CARTIER REGIONAL 1 - RAW	15	1	-	-
9-Nov-21	CARTIER REGIONAL 2 - TREATED	0	0	1.75	1.96
9-Nov-21	CARTIER REGIONAL 3 - DIST - ST. EUSTACHE OUT	0	0	1.72	1.90
9-Nov-21	CARTIER REGIONAL 3 - DIST - ELIE OUT	0	0	1.77	1.94
9-Nov-21	CARTIER REGIONAL 3 - DIST - FANNYSTELLE OUT	0	0	1.46	1.64
9-Nov-21	CARTIER REGIONAL 3 - DIST - OAKVILLE OUT	0	0	1.50	1.72
9-Nov-21	CARTIER REGIONAL 3- DIST @ -----> ELMBANK	0	0	1.65	1.80
23-Nov-21	CARTIER REGIONAL 1 - RAW	3	0	-	-
23-Nov-21	CARTIER REGIONAL 2 - TREATED	0	0	1.77	1.93
23-Nov-21	CARTIER REGIONAL 3 - DIST @ OAKVILLE RES IN	0	0	1.64	1.77
23-Nov-21	CARTIER REGIONAL 3 - DIST - ST. EUSTACHE OUT	0	0	1.65	1.85
23-Nov-21	CARTIER REGIONAL 3 - DIST - ELIE OUT	0	0	1.64	1.86
23-Nov-21	CARTIER REGIONAL 3 - DIST - FANNYSTELLE OUT	0	0	1.46	1.66
23-Nov-21	CARTIER REGIONAL 3 - DIST - OAKVILLE OUT	0	0	1.49	1.69
23-Nov-21	CARTIER REGIONAL 1 - RAW - UF BREAK TANK	0	0	0.19	0.61
7-Dec-21	CARTIER REGIONAL 1 - RAW	4	0	-	-

7-Dec-21	CARTIER REGIONAL 2 - TREATED	0	0	1.72	1.93
7-Dec-21	CARTIER REGIONAL 3 - DIST - FANNYSTELLE RES IN	0	0	1.46	1.64
7-Dec-21	CARTIER REGIONAL 3 - DIST - ST. EUSTACHE OUT	0	0	1.67	1.84
7-Dec-21	CARTIER REGIONAL 3 - DIST - ELIE OUT	0	0	1.65	1.82
7-Dec-21	CARTIER REGIONAL 3 - DIST - FANNYSTELLE OUT	0	0	1.43	1.56
7-Dec-21	CARTIER REGIONAL 3 - DIST - OAKVILLE OUT	0	0	1.48	1.71
21-Dec-21	CARTIER REGIONAL 1 - RAW	2	0	-	-
21-Dec-21	CARTIER REGIONAL 2 - TREATED	0	0	1.66	1.86
21-Dec-21	CARTIER REGIONAL 3 - DIST - ELIE RES IN	0	0	1.65	1.86
21-Dec-21	CARTIER REGIONAL 3 - DIST - ST. EUSTACHE OUT	0	0	1.60	1.78
21-Dec-21	CARTIER REGIONAL 3 - DIST - ELIE OUT	0	0	1.62	1.79
21-Dec-21	CARTIER REGIONAL 3 - DIST - FANNYSTELLE OUT	0	0	1.33	1.46
21-Dec-21	CARTIER REGIONAL 3 - DIST - OAKVILLE OUT	0	0	1.44	1.71

Appendix B: Headingley WTP 89.40 2021 Bacteriological Results

Date Sampled	Sample Identification	TC	EC	Free Cl2	Total Cl2
12-Jan-21	HEADINGLEY REGIONAL 1 - RAW	5	0	-	-
12-Jan-21	HEADINGLEY REGIONAL 2 - TREATED	0	0	1.39	1.44
12-Jan-21	HEADINGLEY REGIONAL 3 - DIST @ -----> CO-OP GAS BAR	0	0	0.35	0.45
12-Jan-21	HEADINGLEY REGIONAL 3 - DIST - HDLY OUT	0	0	1.56	1.65
12-Jan-21	HEADINGLEY REGIONAL 3 - DIST - ROSSER OUT	0	0	1.45	1.53
12-Jan-21	HEADINGLEY REGIONAL 3 - DIST - ST. FX OUT	0	0	1.44	1.55
12-Jan-21	HEADINGLEY REGIONAL 3 - DIST - GI OUT	0	0	1.22	1.27
12-Jan-21	HEADINGLEY REGIONAL 1 - RAW - UF BREAK TANK	0	0	0.28	0.68
12-Jan-21	HEADINGLEY REGIONAL 3 - DIST - WSP OUT	0	0	1.30	1.36
25-Jan-21	HEADINGLEY REGIONAL 1 - RAW	6	1	-	-
25-Jan-21	HEADINGLEY REGIONAL 2 - TREATED	0	0	1.47	1.53
26-Jan-21	HEADINGLEY REGIONAL 3 - DIST @ -----> W.S.P. RES. IN	0	0	1.49	1.56
25-Jan-21	HEADINGLEY REGIONAL 3 - DIST - HDLY OUT	0	0	1.50	1.55
26-Jan-21	HEADINGLEY REGIONAL 3 - DIST - ROSSER OUT	0	0	1.43	1.47
25-Jan-21	HEADINGLEY REGIONAL 3 - DIST - ST. FX OUT	0	0	1.47	1.52
26-Jan-21	HEADINGLEY REGIONAL 3 - DIST - GI OUT	0	0	1.21	1.28
26-Jan-21	HEADINGLEY REGIONAL 3 - DIST - WSP OUT	0	0	1.32	1.36
9-Feb-21	HEADINGLEY REGIONAL 1 - RAW	3	0	-	-
9-Feb-21	HEADINGLEY REGIONAL 2 - TREATED	0	0	1.39	1.48
9-Feb-21	HEADINGLEY REGIONAL 3 - DIST @ -----> HDLY RES IN	0	0	1.52	1.57
9-Feb-21	HEADINGLEY REGIONAL 3 - DIST - HDLY OUT	0	0	1.46	1.58
9-Feb-21	HEADINGLEY REGIONAL 3 - DIST - ROSSER OUT	0	0	1.50	1.55
9-Feb-21	HEADINGLEY REGIONAL 3 - DIST - ST. FX OUT	0	0	1.49	1.56
9-Feb-21	HEADINGLEY REGIONAL 3 - DIST - GI OUT	0	0	1.18	1.25
9-Feb-21	HEADINGLEY REGIONAL 3 - DIST - WSP OUT	0	0	1.31	1.41
24-Feb-21	HEADINGLEY REGIONAL 1 - RAW	3	0	-	-
24-Feb-21	HEADINGLEY REGIONAL 2 - TREATED	0	0	1.40	1.48
24-Feb-21	HEADINGLEY REGIONAL 3 - DIST @ -----> ROSSER RES IN	0	0	1.48	1.56
24-Feb-21	HEADINGLEY REGIONAL 3 - DIST - HDLY OUT	0	0	1.49	1.58
24-Feb-21	HEADINGLEY REGIONAL 3 - DIST - ROSSER OUT	0	0	1.45	1.53
24-Feb-21	HEADINGLEY REGIONAL 3 - DIST - ST. FX OUT	0	0	1.55	1.60
24-Feb-21	HEADINGLEY REGIONAL 3 - DIST - GI OUT	0	0	1.26	1.32
24-Feb-21	HEADINGLEY REGIONAL 3 - DIST - WSP OUT	0	0	1.29	1.37
9-Mar-21	HEADINGLEY REGIONAL 1 - RAW	38	3	-	-
9-Mar-21	HEADINGLEY REGIONAL 2 - TREATED	0	0	1.42	1.50
9-Mar-21	HEADINGLEY REGIONAL 3 - DIST @ -----> SFX RES IN	0	0	1.51	1.58
9-Mar-21	HEADINGLEY REGIONAL 3 - DIST - HDLY OUT	0	0	1.45	1.56
9-Mar-21	HEADINGLEY REGIONAL 3 - DIST - ROSSER OUT	0	0	1.41	1.50

9-Mar-21	HEADINGLEY REGIONAL 3 - DIST - ST. FX OUT	0	0	1.45	1.52
9-Mar-21	HEADINGLEY REGIONAL 3 - DIST - GI OUT	0	0	1.27	1.34
9-Mar-21	HEADINGLEY REGIONAL 1 - RAW - UF BREAK TANK	0	0	0.55	0.70
9-Mar-21	HEADINGLEY REGIONAL 3 - DIST - WSP OUT	0	0	1.37	1.44
23-Mar-21	HEADINGLEY REGIONAL 1 - RAW	5	0	-	-
23-Mar-21	HEADINGLEY REGIONAL 2 - TREATED	0	0	1.47	1.54
23-Mar-21	HEADINGLEY REGIONAL 3 - DIST @ -----> G.I. RES IN	0	0	1.28	1.35
23-Mar-21	HEADINGLEY REGIONAL 3 - DIST - HDLY OUT	0	0	1.53	1.59
23-Mar-21	HEADINGLEY REGIONAL 3 - DIST - ROSSER OUT	0	0	1.49	1.55
23-Mar-21	HEADINGLEY REGIONAL 3 - DIST - ST. FX OUT	0	0	1.45	1.55
23-Mar-21	HEADINGLEY REGIONAL 3 - DIST - GI OUT	0	0	1.27	1.35
23-Mar-21	HEADINGLEY REGIONAL 3 - DIST - WSP OUT	0	0	1.31	1.36
6-Apr-21	HEADINGLEY REGIONAL 1 - RAW	1	0	-	-
6-Apr-21	HEADINGLEY REGIONAL 2 - TREATED	0	0	1.31	1.36
6-Apr-21	HEADINGLEY REGIONAL 3 - DIST @ -----> HCC IN	0	0	1.49	1.55
6-Apr-21	HEADINGLEY REGIONAL 3 - DIST - HDLY OUT	0	0	1.44	1.50
6-Apr-21	HEADINGLEY REGIONAL 3 - DIST - ROSSER OUT	0	0	1.41	1.47
6-Apr-21	HEADINGLEY REGIONAL 3 - DIST - ST. FX OUT	0	0	1.44	1.48
6-Apr-21	HEADINGLEY REGIONAL 3 - DIST - GI OUT	0	0	1.25	1.32
6-Apr-21	HEADINGLEY REGIONAL 3 - DIST - WSP OUT	0	0	1.34	1.36
19-Apr-21	HEADINGLEY REGIONAL 1 - RAW	0	0	-	-
19-Apr-21	HEADINGLEY REGIONAL 2 - TREATED	0	0	1.44	1.50
19-Apr-21	HEADINGLEY REGIONAL 3 - DIST @ -----> HDLY W.W.T.P.	0	0	1.39	1.55
19-Apr-21	HEADINGLEY REGIONAL 3 - DIST - HDLY OUT	0	0	1.47	1.57
20-Apr-21	HEADINGLEY REGIONAL 3 - DIST - ROSSER OUT	0	0	1.39	1.45
19-Apr-21	HEADINGLEY REGIONAL 3 - DIST - ST. FX OUT	0	0	1.47	1.55
20-Apr-21	HEADINGLEY REGIONAL 3 - DIST - GI OUT	0	0	1.26	1.32
20-Apr-21	HEADINGLEY REGIONAL 3 - DIST - WSP OUT	0	0	1.32	1.39
4-May-21	HEADINGLEY REGIONAL 1 - RAW	0	0	-	-
4-May-21	HEADINGLEY REGIONAL 2 - TREATED	0	0	1.36	1.43
4-May-21	HEADINGLEY REGIONAL 3 - DIST @ -----> COOP GAS BAR	0	0	0.38	0.42
4-May-21	HEADINGLEY REGIONAL 3 - DIST - HDLY OUT	0	0	1.48	1.54
4-May-21	HEADINGLEY REGIONAL 3 - DIST - ROSSER OUT	0	0	1.36	1.43
4-May-21	HEADINGLEY REGIONAL 3 - DIST - ST. FX OUT	0	0	1.43	1.50
4-May-21	HEADINGLEY REGIONAL 3 - DIST - GI OUT	0	0	1.25	1.30
4-May-21	HEADINGLEY REGIONAL 1 - RAW - UF BREAK TANK	0	0	0.22	0.42
4-May-21	HEADINGLEY REGIONAL 3 - DIST - WSP OUT	0	0	1.34	1.38
17-May-21	HEADINGLEY REGIONAL 1 - RAW	10	2	-	-
17-May-21	HEADINGLEY REGIONAL 2 - TREATED	0	0	1.34	1.35
19-May-21	HEADINGLEY REGIONAL 3 - DIST @ -----> W.S.P. RES. IN	0	0	1.39	1.44
17-May-21	HEADINGLEY REGIONAL 3 - DIST - HDLY OUT	0	0	1.48	1.55

18-May-21	HEADINGLEY REGIONAL 3 - DIST - ROSSER OUT	0	0	1.39	1.45
17-May-21	HEADINGLEY REGIONAL 3 - DIST - ST. FX OUT	0	0	1.45	1.52
18-May-21	HEADINGLEY REGIONAL 3 - DIST - GI OUT	0	0	1.27	1.32
19-May-21	HEADINGLEY REGIONAL 3 - DIST - WSP OUT	0	0	1.34	1.39
31-May-21	HEADINGLEY REGIONAL 1 - RAW	0	8	-	-
31-May-21	HEADINGLEY REGIONAL 2 - TREATED	0	0	1.39	1.43
31-May-21	HEADINGLEY REGIONAL 3 - DIST @ -----> HDLY RES IN	0	0	1.49	1.54
31-May-21	HEADINGLEY REGIONAL 3 - DIST - HDLY OUT	0	0	1.47	1.53
1-Jun-21	HEADINGLEY REGIONAL 3 - DIST - ROSSER OUT	0	0	1.29	1.42
31-May-21	HEADINGLEY REGIONAL 3 - DIST - ST. FX OUT	0	0	1.40	1.48
1-Jun-21	HEADINGLEY REGIONAL 3 - DIST - GI OUT	0	0	1.26	1.34
1-Jun-21	HEADINGLEY REGIONAL 3 - DIST - WSP OUT	0	0	1.36	1.43
14-Jun-21	HEADINGLEY REGIONAL 1 - RAW	45	3	-	-
14-Jun-21	HEADINGLEY REGIONAL 2 - TREATED	0	0	1.31	1.34
15-Jun-21	HEADINGLEY REGIONAL 3 - DIST @ -----> ROSSER RES IN	0	0	1.36	1.44
14-Jun-21	HEADINGLEY REGIONAL 3 - DIST - HDLY OUT	0	0	1.42	1.50
15-Jun-21	HEADINGLEY REGIONAL 3 - DIST - ROSSER OUT	0	0	1.28	1.36
14-Jun-21	HEADINGLEY REGIONAL 3 - DIST - ST. FX OUT	0	0	1.37	1.49
15-Jun-21	HEADINGLEY REGIONAL 3 - DIST - GI OUT	0	0	1.22	1.25
15-Jun-21	HEADINGLEY REGIONAL 3 - DIST - WSP OUT	0	0	1.25	1.30
28-Jun-21	HEADINGLEY REGIONAL 1 - RAW	118	1	-	-
28-Jun-21	HEADINGLEY REGIONAL 2 - TREATED	0	0	1.37	1.41
28-Jun-21	HEADINGLEY REGIONAL 3 - DIST @ -----> SFX RES IN	0	0	1.41	1.49
28-Jun-21	HEADINGLEY REGIONAL 3 - DIST - HDLY OUT	0	0	1.45	1.52
28-Jun-21	HEADINGLEY REGIONAL 3 - DIST - ROSSER OUT	0	0	1.20	1.31
28-Jun-21	HEADINGLEY REGIONAL 3 - DIST - ST. FX OUT	0	0	1.36	1.45
28-Jun-21	HEADINGLEY REGIONAL 3 - DIST - GI OUT	0	0	1.14	1.22
28-Jun-21	HEADINGLEY REGIONAL 1 - RAW - UF BREAK TANK	0	0	0.09	0.93
29-Jun-21	HEADINGLEY REGIONAL 3 - DIST - WSP OUT	0	0	1.26	1.31
12-Jul-21	HEADINGLEY REGIONAL 1 - RAW	>200	1	-	-
12-Jul-21	HEADINGLEY REGIONAL 2 - TREATED	0	0	1.37	1.41
13-Jul-21	HEADINGLEY REGIONAL 3 - DIST @ -----> G.I. RES IN	0	0	1.34	1.40
12-Jul-21	HEADINGLEY REGIONAL 3 - DIST - HDLY OUT	0	0	1.44	1.56
13-Jul-21	HEADINGLEY REGIONAL 3 - DIST - ROSSER OUT	0	0	1.35	1.41
12-Jul-21	HEADINGLEY REGIONAL 3 - DIST - ST. FX OUT	0	0	1.40	1.49
13-Jul-21	HEADINGLEY REGIONAL 3 - DIST - GI OUT	0	0	1.03	1.11
13-Jul-21	HEADINGLEY REGIONAL 3 - DIST - WSP OUT	0	0	1.23	1.30
26-Jul-21	HEADINGLEY REGIONAL 1 - RAW	>200	2	-	-
26-Jul-21	HEADINGLEY REGIONAL 2 - TREATED	0	0	1.40	1.44
26-Jul-21	HEADINGLEY REGIONAL 3 - DIST @ -----> HCC IN	0	0	1.33	1.48
26-Jul-21	HEADINGLEY REGIONAL 3 - DIST - HDLY OUT	0	0	1.57	1.62

27-Jul-21	HEADINGLEY REGIONAL 3 - DIST - ROSSER OUT	0	0	1.36	1.45
26-Jul-21	HEADINGLEY REGIONAL 3 - DIST - ST. FX OUT	0	0	1.44	1.51
27-Jul-21	HEADINGLEY REGIONAL 3 - DIST - GI OUT	0	0	1.02	1.09
27-Jul-21	HEADINGLEY REGIONAL 3 - DIST - WSP OUT	0	0	1.20	1.29
9-Aug-21	HEADINGLEY REGIONAL 1 - RAW	>200	38	-	-
9-Aug-21	HEADINGLEY REGIONAL 2 - TREATED	0	0	1.48	1.53
9-Aug-21	HEADINGLEY REGIONAL 3 - DIST @ -----> HDLY W.W.T.P.	0	0	1.48	1.54
9-Aug-21	HEADINGLEY REGIONAL 3 - DIST - HDLY OUT	0	0	1.52	1.59
10-Aug-21	HEADINGLEY REGIONAL 3 - DIST - ROSSER OUT	0	0	1.41	1.47
9-Aug-21	HEADINGLEY REGIONAL 3 - DIST - ST. FX OUT	0	0	1.47	1.56
10-Aug-21	HEADINGLEY REGIONAL 3 - DIST - GI OUT	0	0	0.98	1.08
10-Aug-21	HEADINGLEY REGIONAL 3 - DIST - WSP OUT	0	0	1.26	1.29
23-Aug-21	HEADINGLEY REGIONAL 1 - RAW	>200	118	-	-
23-Aug-21	HEADINGLEY REGIONAL 2 - TREATED	0	0	1.31	1.35
23-Aug-21	HEADINGLEY REGIONAL 3 - DIST @ COOP GAS BAR	0	0	0.43	0.56
23-Aug-21	HEADINGLEY REGIONAL 3 - DIST - HDLY OUT	0	0	1.45	1.51
24-Aug-21	HEADINGLEY REGIONAL 3 - DIST - ROSSER OUT	0	0	1.36	1.45
23-Aug-21	HEADINGLEY REGIONAL 3 - DIST - ST. FX OUT	0	0	1.44	1.50
24-Aug-21	HEADINGLEY REGIONAL 3 - DIST - GI OUT	0	0	0.92	1.01
23-Aug-21	HEADINGLEY REGIONAL 1 - RAW - UF BREAK TANK	0	0	0.35	0.41
24-Aug-21	HEADINGLEY REGIONAL 3 - DIST - WSP OUT	0	0	1.24	1.39
7-Sep-21	HEADINGLEY REGIONAL 1 - RAW	>200	200	-	-
7-Sep-21	HEADINGLEY REGIONAL 2 - TREATED	0	0	1.36	1.40
7-Sep-21	HEADINGLEY REGIONAL 3 - DIST @ -----> W.S.P. RES. IN	0	0	1.32	1.40
7-Sep-21	HEADINGLEY REGIONAL 3 - DIST - HDLY OUT	0	0	1.45	1.55
7-Sep-21	HEADINGLEY REGIONAL 3 - DIST - ROSSER OUT	0	0	1.34	1.42
7-Sep-21	HEADINGLEY REGIONAL 3 - DIST - ST. FX OUT	0	0	1.46	1.52
7-Sep-21	HEADINGLEY REGIONAL 3 - DIST - GI OUT	0	0	0.94	1.02
7-Sep-21	HEADINGLEY REGIONAL 3 - DIST - WSP OUT	0	0	1.19	1.24
20-Sep-21	HEADINGLEY REGIONAL 1 - RAW	>200	>200	-	-
20-Sep-21	HEADINGLEY REGIONAL 2 - TREATED	0	0	1.36	1.40
20-Sep-21	HEADINGLEY REGIONAL 3 - DIST @ -----> HDLY RES IN	0	0	1.41	1.52
20-Sep-21	HEADINGLEY REGIONAL 3 - DIST - HDLY OUT	0	0	1.32	1.39
21-Sep-21	HEADINGLEY REGIONAL 3 - DIST - ROSSER OUT	0	0	1.38	1.46
20-Sep-21	HEADINGLEY REGIONAL 3 - DIST - ST. FX OUT	0	0	1.43	1.50
21-Sep-21	HEADINGLEY REGIONAL 3 - DIST - GI OUT	0	0	1.02	1.11
21-Sep-21	HEADINGLEY REGIONAL 3 - DIST - WSP OUT	0	0	1.27	1.34
4-Oct-21	HEADINGLEY REGIONAL 1 - RAW	>200	83	-	-
4-Oct-21	HEADINGLEY REGIONAL 2 - TREATED	0	0	1.35	1.41
5-Oct-21	HEADINGLEY REGIONAL 3 - DIST @ -----> ROSSER RES IN	0	0	1.34	1.43
4-Oct-21	HEADINGLEY REGIONAL 3 - DIST - HDLY OUT	0	0	1.38	1.49

5-Oct-21	HEADINGLEY REGIONAL 3 - DIST - ROSSER OUT	0	0	1.28	1.35
4-Oct-21	HEADINGLEY REGIONAL 3 - DIST - ST. FX OUT	0	0	1.35	1.40
5-Oct-21	HEADINGLEY REGIONAL 3 - DIST - GI OUT	0	0	0.99	1.08
5-Oct-21	HEADINGLEY REGIONAL 3 - DIST - WSP OUT	0	0	1.32	1.35
18-Oct-21	HEADINGLEY REGIONAL 1 - RAW	43	14	-	-
18-Oct-21	HEADINGLEY REGIONAL 2 - TREATED	0	0	1.42	1.45
18-Oct-21	HEADINGLEY REGIONAL 3 - DIST @ -----> SFX RES IN	0	0	1.50	1.55
18-Oct-21	HEADINGLEY REGIONAL 3 - DIST - HDLY OUT	0	0	1.51	1.56
19-Oct-21	HEADINGLEY REGIONAL 3 - DIST - ROSSER OUT	0	0	1.35	1.40
18-Oct-21	HEADINGLEY REGIONAL 3 - DIST - ST. FX OUT	0	0	1.42	1.48
19-Oct-21	HEADINGLEY REGIONAL 3 - DIST - GI OUT	0	0	1.02	1.11
18-Oct-21	HEADINGLEY REGIONAL 1 - RAW - UF BREAK TANK	0	0	0.93	1.56
19-Oct-21	HEADINGLEY REGIONAL 3 - DIST - WSP OUT	0	0	1.20	1.25
1-Nov-21	HEADINGLEY REGIONAL 1 - RAW	53	15	-	-
1-Nov-21	HEADINGLEY REGIONAL 2 - TREATED	0	0	1.39	1.48
2-Nov-21	HEADINGLEY REGIONAL 3 - DIST @ -----> G.I. RES IN	0	0	1.21	1.33
1-Nov-21	HEADINGLEY REGIONAL 3 - DIST - HDLY OUT	0	0	1.48	1.55
2-Nov-21	HEADINGLEY REGIONAL 3 - DIST - ROSSER OUT	0	0	1.30	1.37
1-Nov-21	HEADINGLEY REGIONAL 3 - DIST - ST. FX OUT	0	0	1.47	1.51
2-Nov-21	HEADINGLEY REGIONAL 3 - DIST - GI OUT	0	0	1.10	1.17
3-Nov-21	HEADINGLEY REGIONAL 3 - DIST - WSP OUT	0	0	1.27	1.36
15-Nov-21	HEADINGLEY REGIONAL 1 - RAW	2	29	-	-
15-Nov-21	HEADINGLEY REGIONAL 2 - TREATED	0	0	1.39	1.45
15-Nov-21	HEADINGLEY REGIONAL 3 - DIST @ -----> HCC IN	0	0	1.43	1.55
15-Nov-21	HEADINGLEY REGIONAL 3 - DIST - HDLY OUT	0	0	1.39	1.46
16-Nov-21	HEADINGLEY REGIONAL 3 - DIST - ROSSER OUT	0	0	1.33	1.41
15-Nov-21	HEADINGLEY REGIONAL 3 - DIST - ST. FX OUT	0	0	1.43	1.50
16-Nov-21	HEADINGLEY REGIONAL 3 - DIST - GI OUT	0	0	1.06	1.15
16-Nov-21	HEADINGLEY REGIONAL 3 - DIST - WSP OUT	0	0	1.20	1.25
29-Nov-21	HEADINGLEY REGIONAL 1 - RAW	4	0	-	-
29-Nov-21	HEADINGLEY REGIONAL 2 - TREATED	0	0	1.41	1.49
29-Nov-21	HEADINGLEY REGIONAL 3 - DIST - HDLY OUT	0	0	1.54	1.60
30-Nov-21	HEADINGLEY REGIONAL 3 - DIST - ROSSER OUT	0	0	1.41	1.50
29-Nov-21	HEADINGLEY REGIONAL 3 - DIST - ST. FX OUT	0	0	1.52	1.57
30-Nov-21	HEADINGLEY REGIONAL 3 - DIST - GI OUT	0	0	1.05	1.14
29-Nov-21	HEADINGLEY REGIONAL 3 - DIST @ HDLY W.W.T.P.	0	0	1.49	1.66
30-Nov-21	HEADINGLEY REGIONAL 3 - DIST - WSP OUT	0	0	1.28	1.36
13-Dec-21	HEADINGLEY REGIONAL 1 - RAW	5	0	-	-
13-Dec-21	HEADINGLEY REGIONAL 2 - TREATED	0	0	1.43	1.48
13-Dec-21	HEADINGLEY REGIONAL 3 - DIST - HDLY OUT	0	0	1.48	1.55
14-Dec-21	HEADINGLEY REGIONAL 3 - DIST - ROSSER OUT	0	0	1.42	1.46

13-Dec-21	HEADINGLEY REGIONAL 3 - DIST - ST. FX OUT	0	0	1.42	1.48
14-Dec-21	HEADINGLEY REGIONAL 3 - DIST - GI OUT	0	0	1.10	1.20
13-Dec-21	HEADINGLEY REGIONAL 3 – DIST @ COOP GAS BAR	0	0	0.37	0.42
13-Dec-21	HEADINGLEY REGIONAL 1 - RAW - UF BREAK TANK	0	0	0.22	0.50
14-Dec-21	HEADINGLEY REGIONAL 3 - DIST - WSP OUT	0	0	1.36	1.38
29-Dec-21	HEADINGLEY REGIONAL 1 - RAW	9	0	-	-
29-Dec-21	HEADINGLEY REGIONAL 2 - TREATED	0	0	1.31	1.36
30-Dec-21	HEADINGLEY REGIONAL 3 - DIST @ -----> W.S.P. RES. IN	0	0	1.39	1.58
29-Dec-21	HEADINGLEY REGIONAL 3 - DIST - HDLY OUT	0	0	1.42	1.47
29-Dec-21	HEADINGLEY REGIONAL 3 - DIST - ROSSER OUT	0	0	1.34	1.41
29-Dec-21	HEADINGLEY REGIONAL 3 - DIST - ST. FX OUT	0	0	1.36	1.41
29-Dec-21	HEADINGLEY REGIONAL 3 - DIST - GI OUT	0	0	1.10	1.22
30-Dec-21	HEADINGLEY REGIONAL 3 - DIST - WSP OUT	0	0	1.23	1.39

Appendix C: RM of Headingley 89.50 2021 Bacteriological Results

Date Sampled	Sample Identification	TC	EC	Free Cl2	Total Cl2
12-Jan-21	HEADINGLEY 3 - DIST @ --> MATIX LUMBER	0	0	1.59	1.65
25-Jan-21	HEADINGLEY 3 - DIST @ --> HDLY SPORT SHOP	0	0	1.47	1.53
9-Feb-21	HEADINGLEY 3 - DIST @ --> TAILLIEU CONST.	0	0	1.25	1.38
24-Feb-21	HEADINGLEY 3 - DIST @ --> PHOENIX SCHOOL	0	0	1.41	1.48
9-Mar-21	HEADINGLEY 3 - DIST @ --> COLUMBIA INSURANCE	0	0	1.47	1.53
23-Mar-21	HEADINGLEY 3 - DIST @ --> LIBRARY	0	0	1.51	1.55
6-Apr-21	HEADINGLEY 3 - DIST @ --> MOTEL 6	0	0	1.43	1.52
19-Apr-21	HEADINGLEY 3 - DIST @ --> HDLY SPORT SHOP	0	0	1.50	1.58
4-May-21	HEADINGLEY 3 - DIST @ --> BREEZY BEND G.C.	0	0	1.39	1.45
17-May-21	HEADINGLEY 3 - DIST @ --> TAILLIEU CONST.	0	0	0.98	1.06
31-May-21	HEADINGLEY 3 - DIST @ --> GLENAT ENT.	0	0	1.41	1.48
14-Jun-21	HEADINGLEY 3 - DIST @ --> PHOENIX SCHOOL	0	0	1.26	1.34
28-Jun-21	HEADINGLEY 3 - DIST @ --> MOTEL 6	0	0	1.25	1.33
12-Jul-21	HEADINGLEY 3 - DIST @ --> FLYING J	0	0	1.27	1.35
26-Jul-21	HEADINGLEY 3 - DIST @ --> HDLY SPORT SHOP	0	0	1.49	1.57
9-Aug-21	HEADINGLEY 3 - DIST @ --> TAILLIEU CONST.	0	0	1.31	1.41
23-Aug-21	HEADINGLEY 3 - DIST @ --> PHOENIX SCHOOL	0	0	1.04	1.12
7-Sep-21	HEADINGLEY 3 - DIST @ --> GLENAT ENT.	0	0	1.42	1.52
20-Sep-21	HEADINGLEY 3 - DIST @ --> LIBRARY	0	0	1.42	1.50
4-Oct-21	HEADINGLEY 3 - DIST @ --> BREEZY BEND G.C.	0	0	1.33	1.42
18-Oct-21	HEADINGLEY 3 - DIST @ --> HDLY SPORT SHOP	0	0	1.46	1.54
1-Nov-21	HEADINGLEY 3 - DIST @ --> MOTEL 6	0	0	1.44	1.50
15-Nov-21	HEADINGLEY 3 - DIST @ --> FLYING J	0	0	1.21	1.26
29-Nov-21	HEADINGLEY 3 - DIST @ --> PHOENIX SCHOOL	0	0	1.10	1.36
13-Dec-21	HEADINGLEY 3 - DIST @ --> TAILLIEU CONST.	0	0	1.22	1.28
29-Dec-21	HEADINGLEY 3 - DIST @ --> COLUMBIA INSURANCE	0	0	1.40	1.48

Appendix D: RM of St Francois Xavier 211.50 2021 Bacteriological Results

Date Sampled	Sample Identification	TC	EC	Free Cl2	Total Cl2
12-Jan-21	ST. FRANCOIS XAVIER 3 - DIST @ ---> CAISSE POPULAIRE	0	0	1.45	1.53
25-Jan-21	ST. FRANCOIS XAVIER 3 - DIST @ ---> COUNTRY STORE	0	0	1.46	1.53
9-Feb-21	ST. FRANCOIS XAVIER 3 - DIST @ ---> RM OFFICE	0	0	1.49	1.57
24-Feb-21	ST. FRANCOIS XAVIER 3 - DIST @ ---> SFX ELEMENTARY SCHOOL	0	0	1.41	1.51
9-Mar-21	ST. FRANCOIS XAVIER 3 - DIST @ ---> ESSO	0	0	1.33	1.52
23-Mar-21	ST. FRANCOIS XAVIER 3 - DIST @ ---> COUNTRY KIDS LEARNING CENTER	0	0	1.45	1.55
6-Apr-21	ST. FRANCOIS XAVIER 3 - DIST @ ---> COUNTRY STORE	0	0	1.39	1.49
19-Apr-21	ST. FRANCOIS XAVIER 3 - DIST @ ---> VET	0	0	1.48	1.52
4-May-21	ST. FRANCOIS XAVIER 3 - DIST @ ---> CAISSE POPULAIRE	0	0	1.48	1.60
17-May-21	ST. FRANCOIS XAVIER 3 - DIST @ ---> RM OFFICE	0	0	1.50	1.57
31-May-21	ST. FRANCOIS XAVIER 3 - DIST @ ---> ESSO	0	0	1.38	1.46
14-Jun-21	ST. FRANCOIS XAVIER 3 - DIST @ ---> SFX ELEMENTARY SCHOOL	0	0	1.33	1.40
28-Jun-21	ST. FRANCOIS XAVIER 3 - DIST @ ---> COUNTRY STORE	0	0	1.36	1.41
12-Jul-21	ST. FRANCOIS XAVIER 3 - DIST @ ---> COUNTRY KIDS LEARNING CENTER	0	0	1.37	1.48
26-Jul-21	ST. FRANCOIS XAVIER 3 - DIST @ ---> VET CLINIC	0	0	1.45	1.51
9-Aug-21	ST. FRANCOIS XAVIER 3 - DIST @ ---> RM OFFICE	0	0	1.36	1.46
23-Aug-21	ST. FRANCOIS XAVIER 3 - DIST @ ---> COUNTRY STORE	0	0	1.41	1.46
7-Sep-21	ST. FRANCOIS XAVIER 3 - DIST @ ---> SFX ELEMENTARY SCHOOL	0	0	0.92	0.98
20-Sep-21	ST. FRANCOIS XAVIER 3 - DIST @ ---> ESSO	0	0	1.39	1.45
4-Oct-21	ST. FRANCOIS XAVIER 3 - DIST @ ---> COUNTRY KIDS LEARNING CENTER	0	0	1.31	1.39
18-Oct-21	ST. FRANCOIS XAVIER 3 - DIST @ ---> RM OFFICE	0	0	1.46	1.52
1-Nov-21	ST. FRANCOIS XAVIER 3 - DIST @ ---> COUNTRY STORE	0	0	1.47	1.57
15-Nov-21	ST. FRANCOIS XAVIER 3 - DIST @ ---> VET	0	0	1.22	1.49
29-Nov-21	ST. FRANCOIS XAVIER 3 - DIST @ ---> SFX ELEMENTARY SCHOOL	0	0	1.32	1.48
13-Dec-21	ST. FRANCOIS XAVIER 3 - DIST @ ---> ESSO	0	0	1.47	1.54
29-Dec-21	ST. FRANCOIS XAVIER 3 - DIST @ ---> COUNTRY STORE	0	0	1.33	1.47

Appendix E: Peony Farm Reservoir 162.75 2021 Bacteriological Results

Date Sampled	Sample Identification	TC	EC	Free CL2	Total CL2
11-Jan-21	PEONY FARM 3 - DIST - PF OUTGOING	0	0	1.11	1.53
11-Jan-21	PEONY FARM 3 - DIST - PP @ RINK	0	0	0.14	0.26
26-Jan-21	PEONY FARM 3 - DIST - PF OUTGOING	0	0	0.99	1.53
26-Jan-21	PEONY FARM 3 - DIST - PP @ RINK	0	0	0.16	0.31
8-Feb-21	PEONY FARM 3 - DIST - PF OUTGOING	0	0	0.99	1.34
8-Feb-21	PEONY FARM 3 - DIST - PP @ RINK	0	0	0.12	0.27
22-Feb-21	PEONY FARM 3 - DIST - PF OUTGOING	0	0	1.39	1.73
22-Feb-21	PEONY FARM 3 - DIST - PP @ RINK	0	0	0.12	0.26
9-Mar-21	PEONY FARM 3 - DIST - PF OUTGOING	0	0	1.75	1.99
9-Mar-21	PEONY FARM 3 - DIST - PP @ RINK	0	0	0.58	0.72
22-Mar-21	PEONY FARM 3 - DIST - PF OUTGOING	0	0	1.00	1.13
22-Mar-21	PEONY FARM 3 - DIST - PP @ RINK	0	0	0.71	0.89
6-Apr-21	PEONY FARM 3 - DIST - PF OUTGOING	0	0	1.24	1.50
6-Apr-21	PEONY FARM 3 - DIST - PP @ RINK	0	0	0.58	0.71
19-Apr-21	PEONY FARM 3 - DIST - PF OUTGOING	0	0	1.28	1.73
19-Apr-21	PEONY FARM 3 - DIST - PP @ RINK	0	0	0.34	0.55
3-May-21	PEONY FARM 3 - DIST - PF OUTGOING	0	0	1.08	1.38
3-May-21	PEONY FARM 3 - DIST - PP @ RINK	0	0	0.51	0.78
17-May-21	PEONY FARM 3 - DIST - PF OUTGOING	0	0	1.16	1.37
17-May-21	PEONY FARM 3 - DIST - PP @ RINK	0	0	0.49	1.02
31-May-21	PEONY FARM 3 - DIST - PF OUTGOING	0	0	1.19	1.47
31-May-21	PEONY FARM 3 - DIST - PP @ RINK	0	0	0.33	0.69
14-Jun-21	PEONY FARM 3 - DIST - PF OUTGOING	0	0	1.14	1.39
14-Jun-21	PEONY FARM 3 - DIST - PP @ RINK	0	0	0.37	0.51
30-Jun-21	PEONY FARM 3 - DIST - PF OUTGOING	0	0	1.32	1.64
30-Jun-21	PEONY FARM 3 - DIST - PP @ RINK	0	0	0.14	0.27
12-Jul-21	PEONY FARM 3 - DIST - PF OUTGOING	0	0	0.97	1.25
12-Jul-21	PEONY FARM 3 - DIST - PP @ RINK	0	0	0.29	0.47
26-Jul-21	PEONY FARM 3 - DIST - PF OUTGOING	0	0	1.29	1.60
26-Jul-21	PEONY FARM 3 - DIST - PP @ RINK	0	0	0.68	0.72
9-Aug-21	PEONY FARM 3 - DIST - PF OUTGOING	0	0	1.38	1.65
9-Aug-21	PEONY FARM 3 - DIST - PP @ RINK	0	0	0.33	0.51
23-Aug-21	PEONY FARM 3 - DIST - PF OUTGOING	0	0	1.78	1.99
23-Aug-21	PEONY FARM 3 - DIST - PP @ RINK	0	0	0.58	0.92
7-Sep-21	PEONY FARM 3 - DIST - PF OUTGOING	0	0	1.35	1.52
7-Sep-21	PEONY FARM 3 - DIST - PP @ RINK	0	0	0.36	0.71
20-Sep-21	PEONY FARM 3 - DIST - PF OUTGOING	0	0	1.19	1.41
20-Sep-21	PEONY FARM 3 - DIST - PP @ RINK	0	0	0.29	0.38
4-Oct-21	PEONY FARM 3 - DIST - PF OUTGOING	0	0	1.24	1.36
4-Oct-21	PEONY FARM 3 - DIST - PP @ RINK	0	0	0.17	0.31

19-Oct-21	PEONY FARM 3 - DIST - PF OUTGOING	0	0	1.29	1.42
19-Oct-21	PEONY FARM 3 - DIST - PP @ RINK	0	0	0.53	0.64
1-Nov-21	PEONY FARM 3 - DIST - PF OUTGOING	0	0	1.40	1.75
1-Nov-21	PEONY FARM 3 - DIST - PP @ RINK	0	0	0.39	0.56
17-Nov-21	PEONY FARM 3 - DIST - PF OUTGOING	0	0	1.47	1.96
17-Nov-21	PEONY FARM 3 - DIST - PP @ RINK	0	0	0.21	0.38
29-Nov-21	PEONY FARM 3 - DIST - PF OUTGOING	0	0	1.31	1.42
29-Nov-21	PEONY FARM 3 - DIST - PP @ RINK	0	0	0.13	0.30
13-Dec-21	PEONY FARM 3 - DIST - PF OUTGOING	0	0	1.30	1.50
13-Dec-21	PEONY FARM 3 - DIST - PP @ RINK	0	0	0.15	0.44
18-Dec-21	PEONY FARM 3 - DIST - PF OUTGOING	0	0	1.26	1.64
18-Dec-21	PEONY FARM 3 - DIST - PP @ RINK	0	0	0.03	0.37

Appendix F: Cartier and Headingley Regional Water System THM and HAA Results

Disinfection By-product Report - THMs and HAAs

Water System Name: **Cartier Regional Water Co-op** Water System Code: **36.00**
 Year: **2021** Operator -in-charge (Print): **Danielle Vaillant/Grant McGorman**

Total Trihalomethanes (THMs) [mg/L]	
Sampling Location #1: Oakville In	
1st Quarter	0.0401
2nd Quarter	0.0345
3rd Quarter	0.0593
4th Quarter	0.0280
Yearly Average (mg/L)	0.04048
Yearly Average (ug/L)	40.48
Sampling Location #2: Fannystelle In	
1st Quarter	0.0446
2nd Quarter	0.0352
3rd Quarter	0.0704
4th Quarter	0.0350
Yearly Average (mg/L)	0.04630
Yearly Average (ug/L)	46.30

Total Halo Acetic Acids (HAAs) [mg/L]	
Sampling Location #1: Fortier Booster	
1st Quarter	0.0207
2nd Quarter	0.0205
3rd Quarter	0.0283
4th Quarter	0.0109
Yearly Average (mg/L)	0.02010
Yearly Average (ug/L)	20.10
Sampling Location #2: Elm Bank Booster	
1st Quarter	0.0228
2nd Quarter	0.0250
3rd Quarter	0.0233
4th Quarter	0.0118
Yearly Average (mg/L)	0.02073
Yearly Average (ug/L)	20.73

Disinfection By-product Report - THMs and HAAs

Water System Name: **Headingley Regional Water System** Water System Code: **89.40**

Year: **2021**

Operator -in-charge (Print): **Danielle Vaillant/Dave Epler**

Total Trihalomethanes (THMs) [mg/L]

Sampling Location #1: GROSSE ISLE IN

1st Quarter	0.0186
2nd Quarter	0.0130
3rd Quarter	0.0483
4th Quarter	0.0462
Yearly Average (mg/L)	0.03153
Yearly Average (ug/L)	31.53

Sampling Location #2: WEST ST. PAUL IN

1st Quarter	0.0082
2nd Quarter	0.0094
3rd Quarter	0.0243
4th Quarter	0.0127
Yearly Average (mg/L)	0.01365
Yearly Average (ug/L)	13.65

Total Halo Acetic Acids (HAAs) [mg/L]

*lower than (<)

Sampling Location #1: SFX IN

1st Quarter	0.0054	*
2nd Quarter	0.0054	*
3rd Quarter	0.0035	*
4th Quarter	0.0018	*
Yearly Average (mg/L)	0.00403	*
Yearly Average (ug/L)	4.03	*

*lower than (<)

Sampling Location #2: ROSSER IN

1st Quarter	0.0054	*
2nd Quarter	0.0022	*
3rd Quarter	0.0035	*
4th Quarter	0.0018	*
Yearly Average (mg/L)	0.00323	*
Yearly Average (ug/L)	3.23	*

Appendix G: Cartier Water Treatment Facility Annual Lab Results

Results Summary L2575900

Job Reference	CARTIER REGIONAL - PWS 36.00
Report To	GRANT MCGORMAN, Manitoba Water Services Board - CRWC
Date Received	13-Apr-2021 12:15
Report Date	19-Apr-2021 16:15
Report Version	1
	Guideline:
	Category:

Client Sample ID				CARTIER REGIONAL 1 - RAW	CARTIER REGIONAL 2 TREATED
Date Sampled				13-Apr-2021	13-Apr- 2021
Time Sampled				9:15	9:20
ALS Sample ID				L2575900-1	L2575900- 2
Parameter	Guideline Limit	Lowest Detection Limit	Units	Water	Water

Physical Tests (Water)

Colour, True	5.0	CU	15.9	<5.0
Conductivity	1.0	umhos/cm	794	261
Hardness (as CaCO3)	0.20	mg/L	358	72.9
Langelier Index (4 C)		-	1.2	-0.61
Langelier Index (60 C)		-	1.9	0.16
pH	0.10	pH units	8.65	7.98
Total Dissolved Solids	20	mg/L	494	135
Transmittance, UV (254 nm)	1.0	%T/cm	72.1	95.7
Turbidity	0.10	NTU	6.74	<0.10

Anions and Nutrients (Water)

Alkalinity, Total (as CaCO3)	1.0	mg/L	238	67.8
Ammonia, Total (as N)	0.010	mg/L	<0.010	<0.010
Bicarbonate (HCO3)	1.2	mg/L	257	82.7
Bromide (Br)	0.010	mg/L	0.050	<0.010
Carbonate (CO3)	0.60	mg/L	16.4	<0.60
Chloride (Cl)	0.10	mg/L	22.7	8.03
Fluoride (F)	0.020	mg/L	0.137	0.382
Hydroxide (OH)	0.34	mg/L	<0.34	<0.34
Nitrate (as N)	0.0050	mg/L	<0.0050	<0.0050
Nitrite (as N)	0.0010	mg/L	<0.0010	<0.0010
Sulfate (SO4)	0.30	mg/L	179	46.7

Organic / Inorganic Carbon (Water)

Dissolved Organic Carbon	0.50	mg/L	8.07	1.27
Total Organic Carbon	0.50	mg/L	8.95	1.71

Total Metals (Water)

Aluminum (Al)-Total	0.0030	mg/L	0.109	<0.0030
Antimony (Sb)-Total	0.00010	mg/L	0.00014	<0.00010
Arsenic (As)-Total	0.00010	mg/L	0.00267	0.00049
Barium (Ba)-Total	0.00010	mg/L	0.0759	0.0147
Beryllium (Be)-Total	0.00010	mg/L	<0.00010	<0.00010

Bismuth (Bi)-Total	0.000050	mg/L	<0.000050	<0.000050
Boron (B)-Total	0.010	mg/L	0.096	0.082
Cadmium (Cd)-Total	0.0000050	mg/L	0.0000164	<0.0000050
Calcium (Ca)-Total	0.050	mg/L	78.0	15.9
Cesium (Cs)-Total	0.000010	mg/L	0.000018	<0.000010
Chromium (Cr)-Total	0.00010	mg/L	0.00019	<0.00010
Cobalt (Co)-Total	0.00010	mg/L	0.00017	<0.00010
Copper (Cu)-Total	0.00050	mg/L	0.0118	0.0205
Iron (Fe)-Total	0.010	mg/L	0.133	<0.010
Lead (Pb)-Total	0.000050	mg/L	0.000152	<0.000050
Lithium (Li)-Total	0.0010	mg/L	0.0518	0.0151
Magnesium (Mg)-Total	0.0050	mg/L	39.6	8.09
Manganese (Mn)-Total	0.00010	mg/L	0.0169	0.00036
Molybdenum (Mo)-Total	0.000050	mg/L	0.00250	0.000506
Nickel (Ni)-Total	0.00050	mg/L	0.00231	0.00051
Phosphorus (P)-Total	0.030	mg/L	0.127	0.371
Potassium (K)-Total	0.050	mg/L	11.2	2.96
Rubidium (Rb)-Total	0.00020	mg/L	0.00245	0.00057
Selenium (Se)-Total	0.000050	mg/L	0.000322	0.000063
Silicon (Si)-Total	0.10	mg/L	5.62	1.53
Silver (Ag)-Total	0.000010	mg/L	<0.000010	<0.000010
Sodium (Na)-Total	0.050	mg/L	45.3	27.2
Strontium (Sr)-Total	0.00020	mg/L	0.290	0.0590
Sulfur (S)-Total	0.50	mg/L	63.6	15.7
Tellurium (Te)-Total	0.00020	mg/L	<0.00020	<0.00020
Thallium (Tl)-Total	0.000010	mg/L	<0.000010	<0.000010
Thorium (Th)-Total	0.00010	mg/L	<0.00010	<0.00010
Tin (Sn)-Total	0.00010	mg/L	<0.00010	<0.00010
Titanium (Ti)-Total	0.00030	mg/L	0.00363	<0.00030
Tungsten (W)-Total	0.00010	mg/L	<0.00010	<0.00010
Uranium (U)-Total	0.000010	mg/L	0.00241	0.000388
Vanadium (V)-Total	0.00050	mg/L	0.00123	<0.00050
Zinc (Zn)-Total	0.0030	mg/L	0.0127	<0.0030
Zirconium (Zr)-Total	0.00020	mg/L	0.00022	<0.00020

Appendix H: Headingley Water Treatment Facility Annual Lab Results

Results Summary L2630173

Job Reference	HEADINGLEY REGIONAL - PWS 89.40
Report To	DAVID EPLER, Cartier Regional Water Co-op - Headingley Regional - PWS
Date Received	23-Aug-2021 12:25
Report Date	27-Aug-2021 12:03
Report Version	1

Client Sample ID			HEADINGLEY REGIONAL 1 - RAW	HEADINGLEY REGIONAL 2 - TREATED
Date Sampled			23-Aug-2021	23-Aug-2021
Time Sampled			11:00	11:00
ALS Sample ID			L2630173-1	L2630173-2
Parameter	Lowest Detection Limit	Units	Water	Water

Physical Tests (Water)

Colour, True	5.0	CU	19.6	6.3
Conductivity	1.0	umhos/cm	1030	180
Hardness (as CaCO ₃)	0.20	mg/L	390	68.6
Langelier Index (4 C)		-	0.89	-0.65
Langelier Index (60 C)		-	1.6	0.12
pH	0.10	pH units	8.46	7.81
Total Dissolved Solids	13	mg/L	680	100
Transmittance, UV (254 nm)	1.0	%T/cm	65.3	98.6
Turbidity	0.10	NTU	9.65	0.66

Anions and Nutrients (Water)

Alkalinity, Total (as CaCO ₃)	1.0	mg/L	228	51.7
Ammonia, Total (as N)	0.010	mg/L	0.127	0.011
Bicarbonate (HCO ₃)	1.2	mg/L	258	63.1
Bromide (Br)	0.010	mg/L	0.107	<0.010
Carbonate (CO ₃)	0.60	mg/L	9.96	<0.60
Chloride (Cl)	0.10	mg/L	44.6	4.66
Fluoride (F)	0.020	mg/L	0.167	<0.020
Hydroxide (OH)	0.34	mg/L	<0.34	<0.34
Nitrate (as N)	0.0050	mg/L	0.171	0.0502
Nitrite (as N)	0.0010	mg/L	0.0057	<0.0010
Sulfate (SO ₄)	0.30	mg/L	257	28.2

Organic / Inorganic Carbon (Water)

Dissolved Organic Carbon	0.50	mg/L	8.81	<0.50
Total Organic Carbon	0.50	mg/L	8.59	<0.50

Total Metals (Water)

Aluminum (Al)-Total	0.0030	mg/L	0.330	0.0039
Antimony (Sb)-Total	0.00010	mg/L	0.00055	<0.00010
Arsenic (As)-Total	0.00010	mg/L	0.00855	0.00014
Barium (Ba)-Total	0.00010	mg/L	0.0840	0.00116
Beryllium (Be)-Total	0.00010	mg/L	<0.00010	<0.00010
Bismuth (Bi)-Total	0.000050	mg/L	<0.000050	<0.000050
Boron (B)-Total	0.010	mg/L	0.152	0.129
Cadmium (Cd)-Total	0.0000050	mg/L	0.0000227	<0.0000050
Calcium (Ca)-Total	0.050	mg/L	67.7	26.6
Cesium (Cs)-Total	0.000010	mg/L	0.000044	<0.000010
Chromium (Cr)-Total	0.00010	mg/L	0.00052	<0.00010
Cobalt (Co)-Total	0.00010	mg/L	0.00047	<0.00010
Copper (Cu)-Total	0.00050	mg/L	0.0278	0.0161
Iron (Fe)-Total	0.010	mg/L	0.402	<0.010
Lead (Pb)-Total	0.000050	mg/L	0.000277	0.000119
Lithium (Li)-Total	0.0010	mg/L	0.0748	0.0063
Magnesium (Mg)-Total	0.0050	mg/L	53.7	0.534
Manganese (Mn)-Total	0.00010	mg/L	0.0777	0.00622
Molybdenum (Mo)-Total	0.000050	mg/L	0.00507	<0.000050
Nickel (Ni)-Total	0.00050	mg/L	0.00394	<0.00050
Phosphorus (P)-Total	0.030	mg/L	0.157	<0.030
Potassium (K)-Total	0.050	mg/L	17.2	1.13
Rubidium (Rb)-Total	0.00020	mg/L	0.00441	0.00026
Selenium (Se)-Total	0.000050	mg/L	0.000569	<0.000050
Silicon (Si)-Total	0.10	mg/L	8.77	0.74
Silver (Ag)-Total	0.000010	mg/L	<0.000010	<0.000010
Sodium (Na)-Total	0.050	mg/L	77.9	6.33
Strontium (Sr)-Total	0.00020	mg/L	0.368	0.0280
Sulfur (S)-Total	0.50	mg/L	95.1	10.3
Tellurium (Te)-Total	0.00020	mg/L	<0.00020	<0.00020
Thallium (Tl)-Total	0.000010	mg/L	0.000011	<0.000010
Thorium (Th)-Total	0.00010	mg/L	<0.00010	<0.00010
Tin (Sn)-Total	0.00010	mg/L	<0.00010	<0.00010
Titanium (Ti)-Total	0.00030	mg/L	0.00962	<0.00030
Tungsten (W)-Total	0.00010	mg/L	<0.00010	<0.00010
Uranium (U)-Total	0.000010	mg/L	0.00316	0.000018
Vanadium (V)-Total	0.00050	mg/L	0.00591	<0.00050
Zinc (Zn)-Total	0.0030	mg/L	<0.0030	0.0049
Zirconium (Zr)-Total	0.00020	mg/L	0.00048	<0.00020

Appendix I: Cartier Regional Water Audits 2021

For all CRWC DWO Audits please use the following link: [Annual ODW Audits](#)

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

For general questions during regular business hours, contact the:

Cartier Water Treatment Plant (204-353-4055) or email cartierwtp@crwc.ca

Headingley Water Treatment Plant (204-832-2555) or email headingleywtp@crwc.ca