2020 Annual Water Report

EXECUTIVE SUMMARY

The Town of Oliver operates an extensive Municipal and Rural water system that consists of seven ground water well sites, two surface water sources, and six reservoirs. The water system covers the Town of Oliver itself and a substantial portion of area 'C' of the Regional District of Okanagan-Similkameen. The Town provides domestic water to approximately 2,393 residential and 174 commercial/ industrial connections, which all have water meters to record consumption. Irrigation water is also provided to 601 connections irrigating approximately 5,200 acres of farmland with 1,025 acres of that pumping their own water from the Town's irrigation canal, excluding 455 acres of non-farm land that is also irrigated from this system.

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1.0 INTRODUCTION

The *British Columbia Drinking Water Protection Act* requires that each municipal government that supplies or distributes domestic drinking water must provide a water quality report that is reviewed by the local Drinking Water Officer (Interior Health Authority) and published for public access. This report has been prepared for the community of the Town of Oliver, and in accordance with the requirement in the *Drinking Water Protection Act*.

1.1 HISTORY

In 1918, the Provincial Government, led by "Honest John Oliver", the Premier at that time, purchased over 22,000 acres of land in the South Okanagan to develop an irrigation canal system to convert 8,000 acres of desert land on each side of the Okanagan River into viable agricultural land. This land would then be for sale, at a reasonable cost, designated to the soldiers returning from World War I. This land arrangement was known as the "The Soldiers' Land Act." This project then became SOLP (South Okanagan Lands Project)

Construction of the irrigation system, including the intake dam at the base of McIntyre Bluff, began in 1918. Over the next seven years, the canal, known as "The Ditch", had an overall length of approximately 40 concrete-lined kilometres measuring 5.6m across the top, and 1.5m deep, delivering 6.5m^3 of water per second. The SOLP designed the canal to transport irrigation water from one side of the Valley to the other. To accomplish this, a 2.1m diameter siphon made out of wood stave pipe had to be built underground, which ran approximately 590m long directly beneath the center of Oliver, connecting the north and south parts of the canal.

Over the next forty years, the canal was maintained and run by the provincial government employees (SOLP) until the spring of 1964, as the province decided it was removing itself from the irrigation business. Premiere W.A.C. Bennet passed the canal to the Oliver and Osoyoos Fruit Growers' Association, which volunteered itself to become the cornerstone of the South Okanagan Lands and Irrigation District (SOLID). The district operated and maintained the canal system until 1989 when it was divided into two municipal governments: the Town of Oliver and the Town of Osoyoos. The Town of Oliver was given the responsibility to maintain and operate the canal, which is still a major contributor to the rest of the 100 billion liters of water that Oliver and Osoyoos delivers annually to the parched desert area of the valley.

Today, the Town of Oliver provides domestic water to approximately 2,393 residential (including rural), and 174 commercial and industrial connections. Irrigation water is provided

to 601 connections, irrigating approximately 5,200 acres of farmland with 1,025 acres of that pumping their own water from the Town's irrigation canal. 455 acres of non-farm land is also irrigated from this system. The change in the non-farm arable area from previous years is due to a change in the new Water Regulations Bylaw 1351 where customers previously received a half acre with the payment of their parcel tax.

2.0 WATER SYSTEM OVERVIEW

The Town of Oliver's water system is broken down into seven individual systems, which over time have been inter-connected to provide a more sustainable water supply system as a whole. Each system is defined, or known by, the area and the wells that support it:

(Please See Appendix A: Town of Oliver Water System Map)

- System 1 – also referred to as Rural North – Buchanan Road Pumphouse
- System 2 & 2B – Black Sage Area – Black Sage and Miller Road Pumphouses
- Municipal System – also referred to as System 3 – Rockcliffe and Tucelnuit Pumphouses
- System 4 - 7 – also referred to as Rural South – Fairview and Miller Road 13 Pumphouses

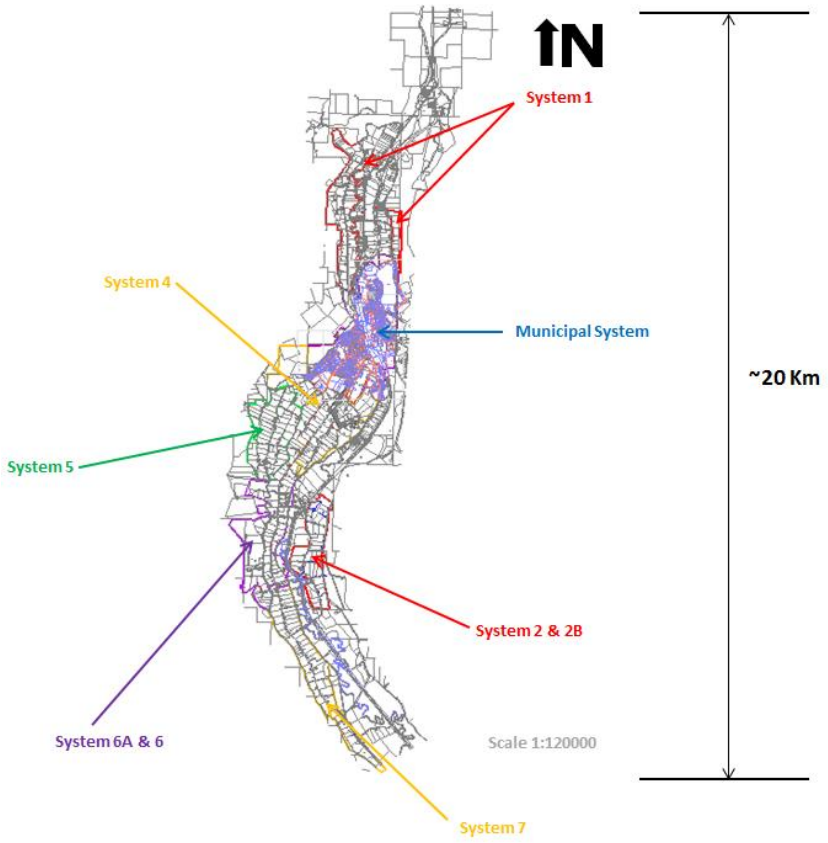


Figure 1: Town of Oliver's 7 Water System Overview

As of 2014, the Town of Oliver uses groundwater for all of its domestic water connections. Therefore, the canal surface water system is providing irrigation only, with the addition of low-pressure users who pump out of the canal using their own private pump houses. Each system is twinned with the exception of System 2 (Black Sage). This system is groundwater only, and there are no current plans to complete the twinning of System 2.

As part of the water distribution system, the Town maintains approximately 143 kilometres of water main. The distribution system consists of Asbestos Concrete (AC), Polyvinyl Chloride (PVC), Cast Iron (CI), and High Density Polyethylene (HDPE) material, with pipe sizes ranging from 50mm to 600mm in diameter.

The age of the water mains ranges from new to approximately 50 years old. The age of the pipe does not necessarily reflect the need to replace it as the various material types and installation conditions make for different average life expectancies. Normal operating pressures range from 60psi to 120psi for standard pressurized services.

2.1 DOMESTIC SYSTEM

The domestic water system storage capacity is 1,025,000 US gallons (US GAL) (3880 cubic metres (m^3)) between four reservoirs. Existing Municipal reservoirs consist of a 360,000 US GAL (1360m^3) reservoir and a newer (constructed in 2010) 500,000 US GAL (2470m^3) reservoir. The other two reservoirs still in use are located in System 6 & 6A; Road 13 reservoir at 150,000 US gallons (568m^3) and Hester Creek reservoir at 15,000 US gallons (57m^3).

2.1.1 SYSTEM 1 DOMESTIC

System 1, also known as "Rural North," supplies domestic water to approximately 161 accounts. System 1 has an irrigation main, and a domestic main that runs approximately 4.5km from the edge of town N. to the end of Sportsman Bowl Road. Buchanan pump station, which is located adjacent to 1748 Buchanan Road and near the east side of the Okanagan River, supplies both irrigation surface water to System 1 and domestic ground water to System 1 and into Municipal System 3. Buchanan pump station has one domestic ground water pump with a total 125 horsepower (hp) that has a pumping capacity of 1,000 gallons per minute (gpm).

2.1.2 SYSTEM 2 & 2B DOMESTIC

System 2, also known as "Black Sage" area, supplies domestic and irrigation water to approximately 52 accounts. System 2 is unique having been separated into two areas, System 2, and 2B. System 2B, along with every other system, is twinned. Whereas System 2 is the only system that does not have separate water sources for both irrigation and domestic water. System 2 and 2B have two domestic pump stations within its boundary, Black Sage pump station, and Miller Well pump station. The Black Sage pump station is located approximately 154m W. from Ryegrass Road between Miller Road and Watters Road. The Black Sage well supplies groundwater to both domestic and irrigation services in System 2 and 2B utilizing three pumps with a total 235hp, and a pumping capacity of 2,600gpm. The Miller Well, located on the west end of Miller Road, approximately 67m E. of the Okanagan River, supplements up to 500gpm of domestic groundwater to System 2 and 2B during the peak demand season, along with Systems 4 thru 7, via Reservoir 13.

2.1.3 MUNICIPAL SYSTEM DOMESTIC

The Municipal System, also known as System 3, supplies domestic groundwater to approximately 2400 accounts. The Municipal System utilizes two pump stations, and one

booster station to supply its users within the Town boundary, Rockcliffe pump station, Tucelnuit pump station, and the Airport Booster station. Rockcliffe is located between the parcels of 781 and 715 Skagit Avenue. Rockcliffe has one pump at 150hp, and a pumping capacity of 1,500gpm. Tucelnuit pump station is located on the SE corner of Merlot Avenue, and Lakeside Drive, W of the Tucelnuit Elementary School. Tucelnuit utilizes two pumps having a total pumping capacity of 1,750gpm. The Airport Booster station is located on the NE corner of the intersection of Airport Street, and Road 1. The Airport Booster is typically set to supply water from within the Municipal boundaries to the rural area south, but can also be used to intake water from the rural area south, and supply the Municipal System depending on demands or if there was a maintenance malfunction of another pump.

2.1.4 SYSTEM 4 - 7 DOMESTIC

System 4 - 7, also known as "Rural South," supplies domestic ground water to approximately 483 accounts. The Systems utilizes the Miller Well pump station, 6A Domestic Booster station, and the Airport Booster station. Miller Well pump station also aids in a supplement supply of domestic groundwater to System 2 during peak demands, and the Road 13 Reservoir. The Miller Well pump has 125hp, and a pumping capacity of 1,000gpm. 6A Domestic Booster feeds Hester Creek Reservoir (6A), while the Airport Booster has the option to alternate between the Municipal System and Rural South to have a continuous loop in the system, and so that each pump is working in its most efficient phase.

2.2 IRRIGATION SYSTEM

Surface water, specifically Okanagan River, is still the primary source for the irrigation water system, but also includes Buchannan well, Fairview well and Black Sage oxbow. The canal system runs from McIntyre Dam (where the diversion is complete with a fish screen to divert fish back to the Okanagan River) north of Town to Road 18, south of Town, where it continues past Road 22 as a piped system. The irrigation system in System 2B is supplied by the Black Sage oxbow, with the remainder of System 2 not being twinned. The Town maintains multiple water licences to allow these surface water diversions. There are five additional irrigation pump stations that pump along the canal: Mud Lake, Rockcliffe, Fairview, Hester Creek, and Mount Kobau.

In January 2016, the irrigation canal siphon located at Gallagher Lake was damaged by a large rock fall event. Following the rock fall, the Town of Oliver engaged Golder Associates to conduct a geotechnical assessment of the area to determine the actions required to enable safe access to the site for repair of the siphon; T&A Rockworks carried out rock scaling. A pipe repair was then completed from within the pipe, during which time a 1.2m (outer diameter)

pipe was grouted into place. This allowed the siphon to operate during the irrigation season with a 32% reduction in supply capacity. While this flow has been sufficient for 2016, 2017, 2018, 2019 and 2020 so far, it may not be adequate during warmer, drier seasons in the future and hinders the Town from incorporating new customers.

The 2020 irrigation season started on April 14th and ended on October 6th. Crews began filling the canal and turning on spray fillers April 8th. The canal diversion was shut down on October 27th. All Town irrigation systems were shut down and winterized by the end of October.

The Town has started working on re-routing this portion of the canal (damaged siphon) with the help of provincial funding and borrowing. In late 2020, tendering and project construction started in the latter half of 2020. There are hopes that this project will be fully complete by early 2022.

Heavier creek flows on many creeks the last few years (2017 & 2018) on the west side of the valley had staff continuing to monitor; Hester, Tinhorn, Reid & Park Rill Creeks as the heavier flow can have an affect on our irrigation system, similar to the 2017 debris run-off into the canal. As in the last two years, staff spent extra time monitoring, working with contractors and periodically removing extra material in creeks or keeping culverts clear that could potentially damage the Town's irrigation infrastructure.

2.2.1 SYSTEM 1 IRRIGATION

System 1 utilizes two pump stations for its irrigation supply, Mud Lake and Buchanan. Mud Lake pump station intakes water from the canal utilizing two pump units at a combined 200hp, and having a pumping capacity of 5,000gpm. Mud Lake is located 90m W of Buchanan Drive. Buchanan irrigation pump is 50hp, and has a capacity of 500gpm. System 1 covers 420 acres of agriculture that is pressure irrigated, excluding low-pressure users in the area.

2.2.2 SYSTEM 2&2B IRRIGATION

As mentioned earlier, System 2 is the only system that is not twinned, having pumps that supply groundwater for both domestic and irrigation uses with a combined 235hp, and having a pumping capacity of 2,600gpm. However, System 2B has its own irrigation pump which is called Black Sage Irrigation pump that intakes from the Black Sage oxbow located 65m S of Road #9, and 100m E of the Okanagan River. This pump has 150hp with a capacity of 1,540gpm. System 2 and 2B provide pressurized irrigation water to approximately 405 acres of agriculture land.

2.2.3 SYSTEM 4-7 IRRIGATION

The second canal pump station is Rockcliffe Irrigation in System 4. This station utilizes three pumps having a combined 500hp, and a pump capacity of 9,100gpm. Rockcliffe supplies pressurized irrigation to approximately 916 acres of agriculture. This pump station is located between the properties of 824 and 760 of Road 2. System 4 also includes a 25,000 US GAL (94m^3) irrigation water reservoir, called System 4 Irrigation Reservoir.

The third canal pump station along the system is Fairview Irrigation pump station, which is located in System 5 on the NE corner of Road 5 and the canal intersection. Fairview utilizes two pumping units with a combined horsepower of 300hp, and having a pumping capacity of 4,400gpm. Fairview Irrigation supplies pressurized irrigation to approximately 467 acres. Another Fairview Irrigation well in System 5, which used to be part of the domestic water system, was changed over to supply the irrigation system when the nitrate levels exceeded the Canadian Drinking Water Standards. Its primary use now is to supply water in the shoulder seasons or low demand portions in the irrigation year but it can also help supplement peak demands. System 5 includes a 50,000 US GAL (189m^3) irrigation water reservoir, called Fairview Irrigation Reservoir.

Hester Creek Irrigation pump station is located in System 6 at the NE corner of the W end of Road 11 and the canal intersection. Hester Creek pump station utilizes two pumping units having a combined horsepower of 175hp, and a pumping capacity of 4,000gpm. Hester Creek Irrigation pump station delivers pressurized irrigation to approximately 426 acres of land. System 6 also contains a booster pump station that has two 15hp pumps, and is utilized during the peak season.

Mt Kobau Irrigation pump station is the most southern in the water system, in System 7, located at the west end of Road 18. Mt Kobau has two pumping units that have a combined total of 150hp, with a capacity of 4,000gpm. Mt Kobau provides pressurized irrigation to approximately 545 acres of land.

3.0 WATER QUALITY, SAMPLING, AND MONITORING PROGRAM

In the past the Town of Oliver utilized two sources of water, surface water (Okanagan River) and groundwater (well water); the surface water is now restricted to irrigation water only. Groundwater is now the **only source** of water used for domestic purposes, and the only source that is **thoroughly monitored** and sampled for quality purposes.

3.1 SAMPLING AND MONITORING

The Town of Oliver works closely with CARO Analytical Services out of Kelowna, BC to monitor drinking water quality in accordance with the *BC Drinking Water Protection Act*, and *Guidelines for Canadian Drinking Water Quality (GCDWQ)*. The Town's staff submits weekly samples from various sampling sites throughout the domestic system for bacteriological testing for Total Coliforms, and E-Coli Bacteria. In conjunction with these submittals, the Town also conducts their own in-house 'presence/absence' tests. The Town also monitors the Nitrate levels in the drinking water sampling six times a year in February, April, June, August, October, and December. Once a year, usually mid-summer, the Town will commence a full spectrum test on the domestic water system. The spectrum analyzes all physical parameters and characteristics of The Town of Oliver's drinking water. The water results are then compared to the *GCDWQ* to ensure compliance.

- *(Please See Appendix A: The Town of Oliver Water System Map for Sampling Sites)*
- *(Please See Appendix B: 2020 Full Spectrum Results and GCDWQ)*
- *(Please See Appendix C: 2020 Weekly Water Sampling Result Table)*

There are seven test stations located in the Municipal boundaries. The Rural Area north of Town has one test station and there are six testing sites (excluding wells) south of Town. When any sample result shows the presence of Total Coliform or E-Coli, the Interior Health Environmental Health Officer is consulted and standard protocols are initiated with a flushing of the contaminated system and a resampling of water where contamination was located. Resampling occurs immediately for lab testing and in-house 'presence/absence' samples are also taken to identify coliforms.

4.0 WATER CONSUMPTION

4.1 TOTAL CONSUMPTION

The water works system is twinned in Oliver, meaning that the groundwater used for domestic purposes has its own pipe network along with the surface water, used for irrigation purposes, also has its own pipe network except for System 2, which is using groundwater for both irrigation and domestic purposes. The Town of Oliver consumed 3,198,948,477 US GAL of water in 2020. That is 12,109,337,261 liters (L) of water or 12,109,337 m^3 of water.

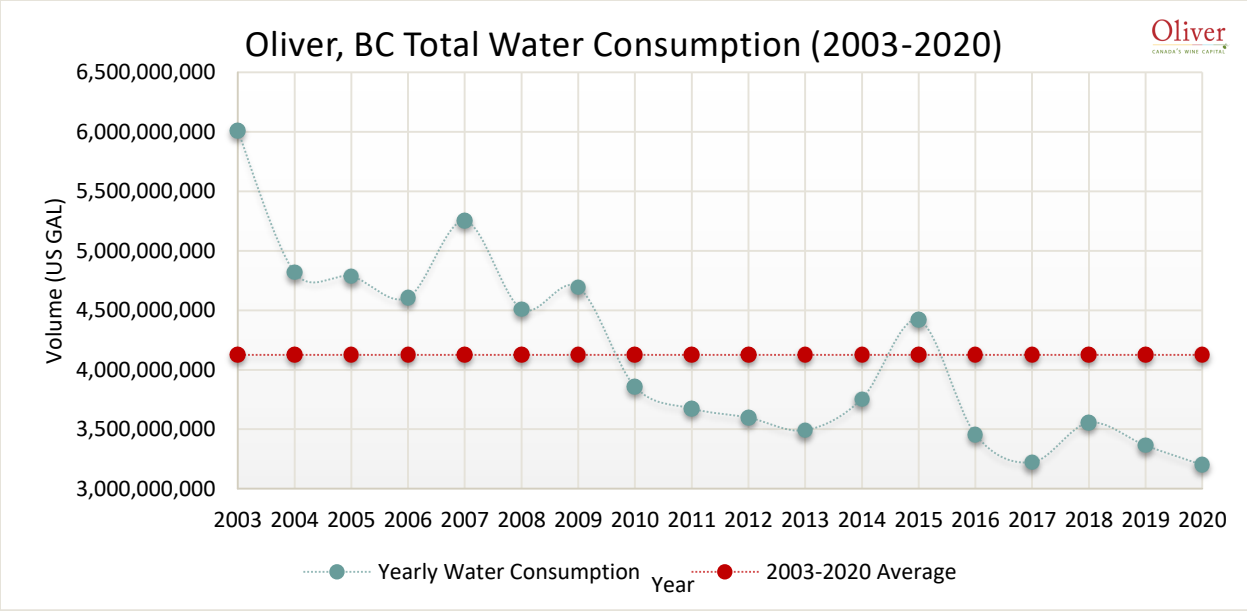


Figure 2: Total Water Consumption 6 Year Trend

As shown in *Figure 2,* Oliver consumed 4.88% more water than the previous year (2019). The seventeen-year average is 4,015,027,591 US GAL. In 2020, Oliver consumed 25.5% less than the seventeen-year average. Water demand is influenced by population and irrigation usage, population has been slightly increasing each year in Oliver and surrounding area. The 2016 Census reported Oliver's population as 4,928, however, the Town of Oliver's water system extends beyond its borders making it difficult to define how many people it actually serves; it is estimated to be over 6,000 people.

Irrigation technology has seen improvements over the years for ground crops, orchards and vineyards; this has had a significant change on the water demand and peak demand decreases. Irrigation practices and water conservation through these practices have been the major influence on the change in water demand; this includes the final twinning stages of the water system in 2014. The other major contributing factor for irrigating is weather and precipitation. In 2015, The South Okanagan was declared, by the government of BC, a drought level 4. In 2016, the South Okanagan did not reach a drought level 4, instead it had a normal snowpack season, and was considered a "dry" year, but did not see the same level of drought as 2015. In 2017, above normal snowpack and late winter/early spring precipitation caused unsuspected flooding throughout the region. In 2018, the Okanagan was in a valley wide emergency state due to flooding again. The snow back in March was 85% above normal, and then April rains came along with high temperatures. The melt increased and creeks that have been dry for years started flowing again. Agriculture development over the years had changed the lay of the land and the natural watercourses, causing the spring runoff to flow

through vineyards and orchards damaging crops. The spring flooding caused Oliver's agriculture season to be a wet one, and the large amount of precipitation influenced the irrigation demand. Oliver's maximum residential domestic water demand was on April 28, 2020. *See Figure 3.* Oliver had a maximum daily water demand peak at 29,236.04m^3, while minimum daily demand occurred on April 04, 2020 at 495.53 m^3.

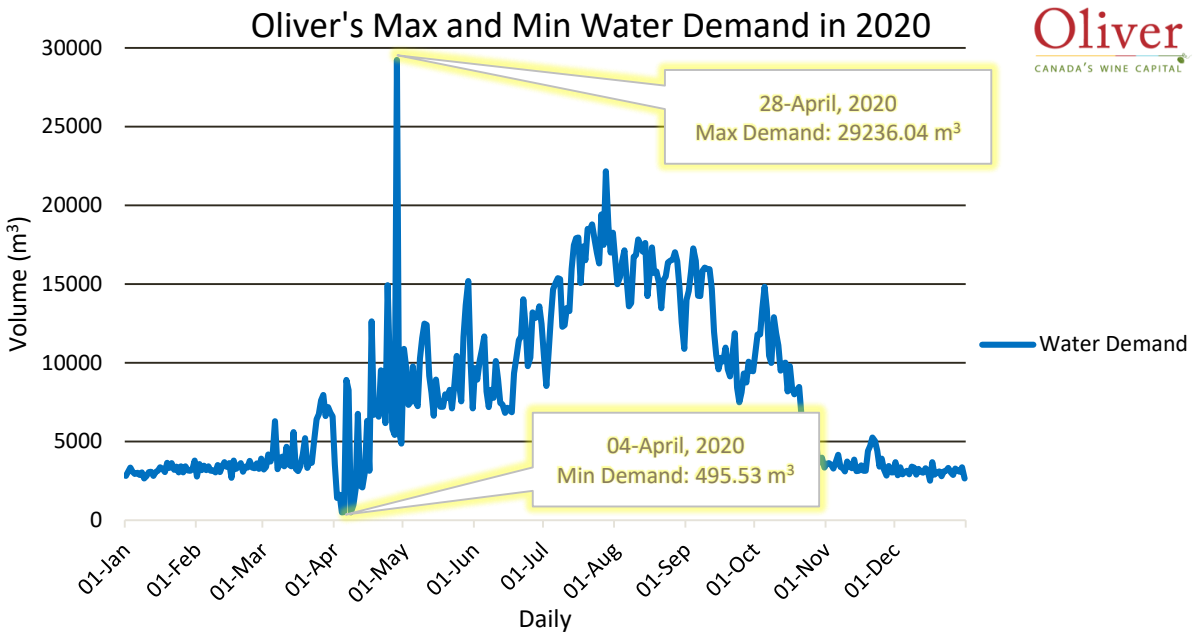


Figure 3: Oliver's 2020 Max and Min Domestic Water Demand

4.2 BREAKDOWN OF CONSUMPTION

The Town of Oliver consumed 772,321,356 US GAL (2,923,554m^3, 2,923,554,362L) of groundwater in 2020. This amount is 24.14% of the total consumption. The remaining 75.86% is surface water, which is primarily used for irrigation, having a total consumption of 2,426,627,121 US GAL (9,185,783m^3, 9,185,782,899L). *See Table 1 below for the breakdown of percentages.*

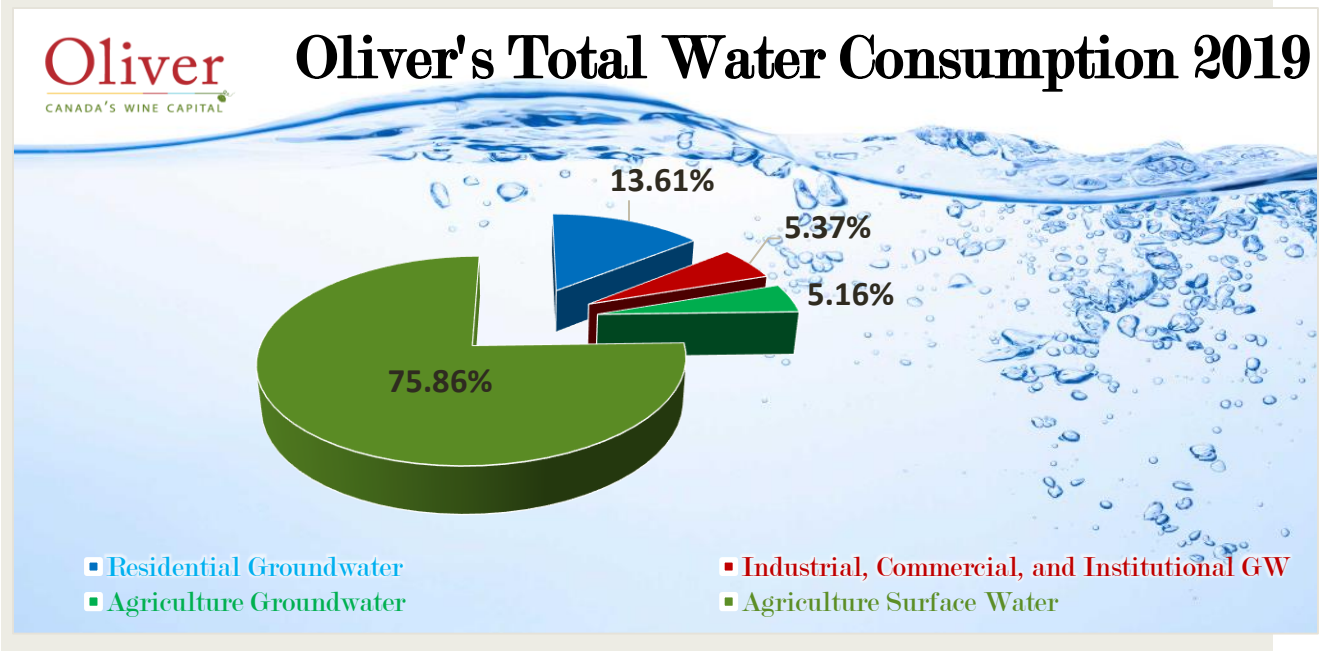


Figure 4: Oliver's Total Water Consumption 2020

WURC CALCULATIONS	US GAL	CUBIC METERS	PERCENTAGE
TOTAL GW USED	772321356.39	2923552.99	24.14%
TOTAL SW USED	2426627120.58	9185778.57	75.86%
TOTAL RES GW	435422543.13	1648252.85	13.61%
TOTAL RES SW	0.00	0.00	0.00%
TOTAL ICI GW	171720738.40	650033.40	5.37%
TOTAL ICI SW	0.00	0.00	0.00%
TOTAL AG GW	165176486.05	625260.72	5.16%
TOTAL AG SW	2426627120.58	9185778.57	75.86%
TOTAL WATER	3198948476.96	12109331.55	100.00%

Table 1: Oliver's Groundwater Breakdown: Groundwater (GW), Surface Water (SW), Residential (RES), Industrial, Commercial, Institutional (ICI), and Agriculture (AG).

According to the OBWB, an average person in the Okanagan uses 675L of water each day. That is twice more water than the Canadian average of 329L per day. On average, Oliver domestic system used approximately 860L of water per person per day in 2020, which is 531L above the Canadian average. *See Figure 5.*

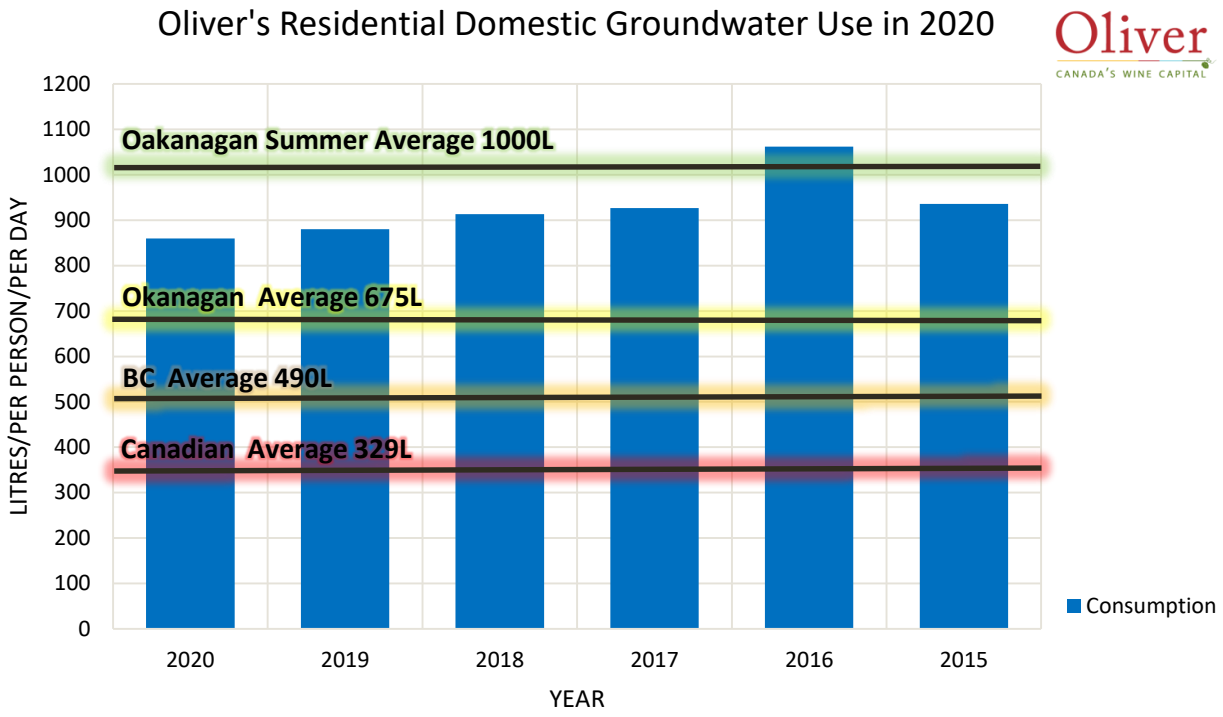


Figure 5: Oliver (2014-2019) vs OBWB Estimated Averages (1996-2006)

During the summer months the average consumption rate exceeds the Okanagan summer average of 1,000L (1m^3) with Oliver using 1157L per person per day while the pumps are in Summer Mode (April to October). However, when the pumps are in Winter Mode (November-March), Oliver used 438L per person per day, which is below the Okanagan average of 675L. These numbers are approximate values and estimates, if a person would like to know their household usage from year to year - take the volume consumed on your monthly water bill, convert it to liters, and divide it by the number of people in the household and the number of days in the month, you will get your answer in liters per person per day. Once you have your results, you can compare your usage each year to your previous years along with the Canadian, BC, Okanagan, and Okanagan Summer Averages. *See Below and Figures 5-7.*

1. $Total\ Volume\ of\ Water\ used\ from\ Water\ Bill\ (cubic\ meters) = x(m^3)$

2. $Convert\ x(m^3)\ to\ (liters\ (l)) = x(m^3) \times 1000 = x(l)$

3. $Divide\ x(l) by\ number\ of\ persons\ in\ household\ (pp) = \dfrac{x(l)}{(\#\ of persons)}$

4. $Then\ Divide\ that\ result\ \left(\dfrac{x(l)}{(pp)}\right)\ by\ the\ number\ of\ days\ the\ water\ bill\ is\ accounting\ for\ (pd) = \dfrac{(x(l/pp\ )}{(\#\ of\ days\ )}$

5. $This\ answer\ is\ your\ final\ result = x(l/pp/pd)$

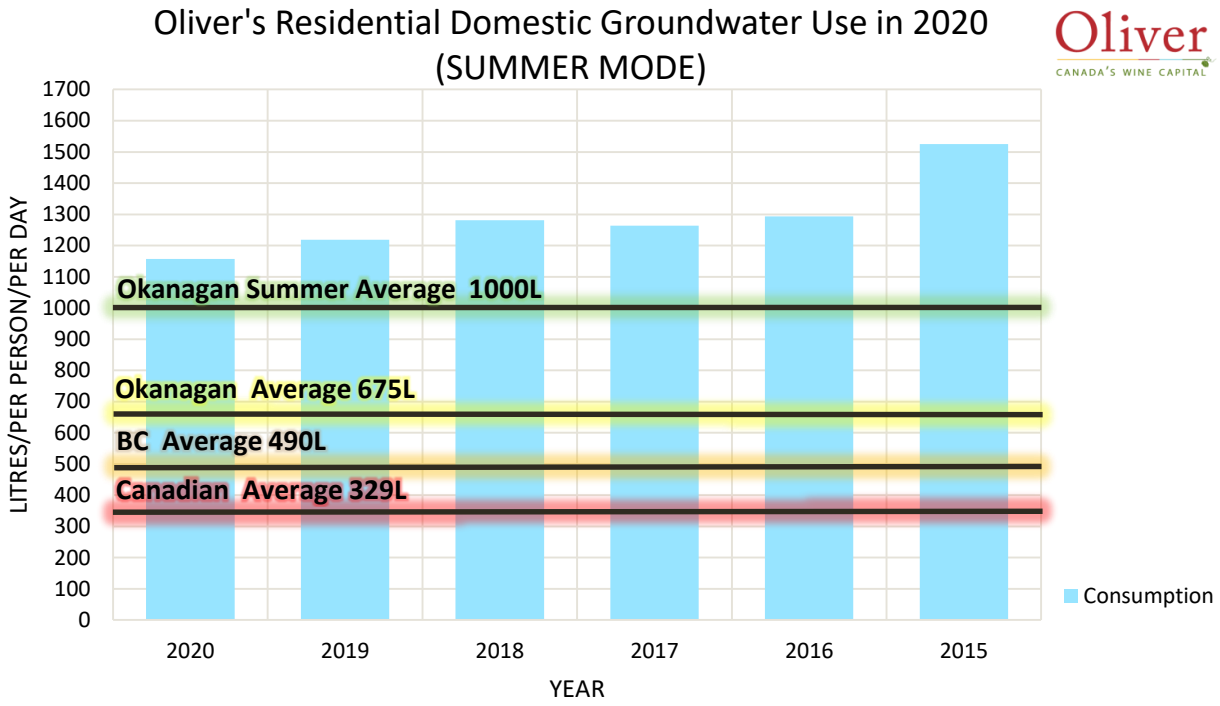


Figure 6: Oliver's (April-October 2015-2020) average vs OBWB Estimated Averages (1996-2006)

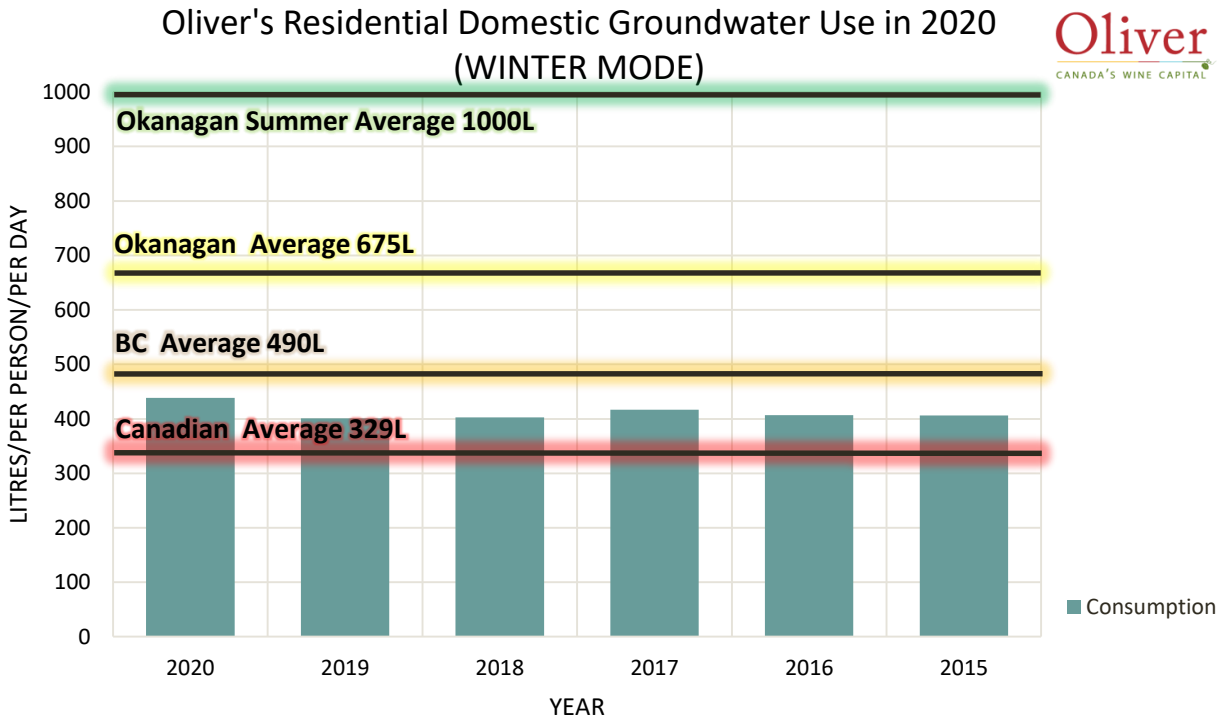


Figure 7: Oliver's (November - March 2015-2020) average vs OBWB Estimate Averages (1996-2006)

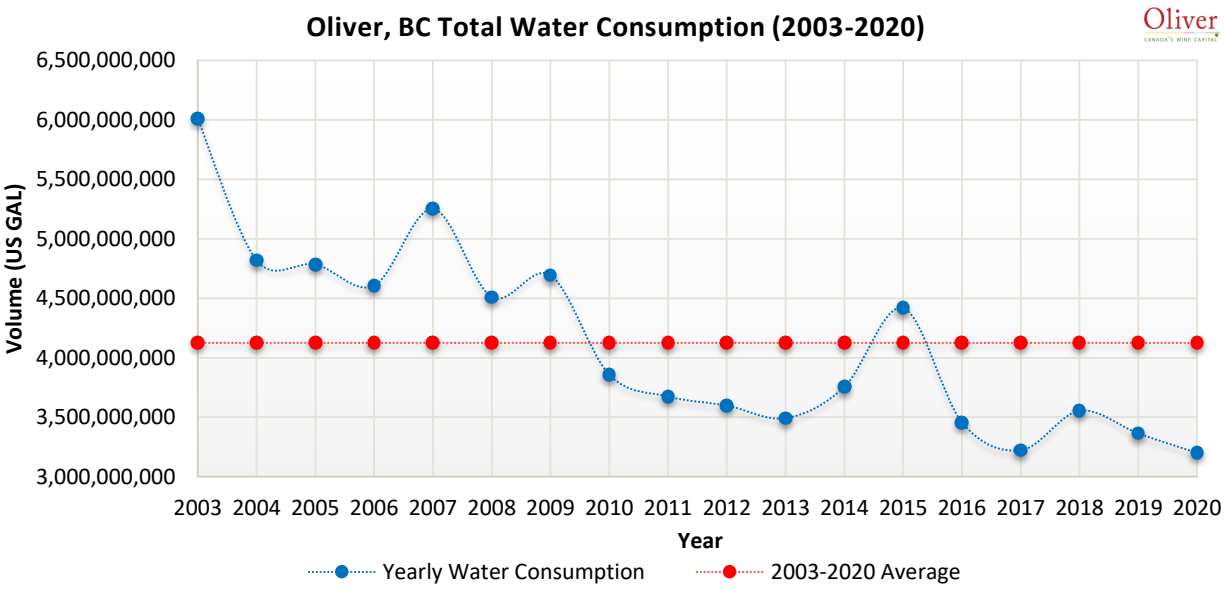


Figure 8: Oliver's Total Groundwater Consumption Trend (2003-2020)

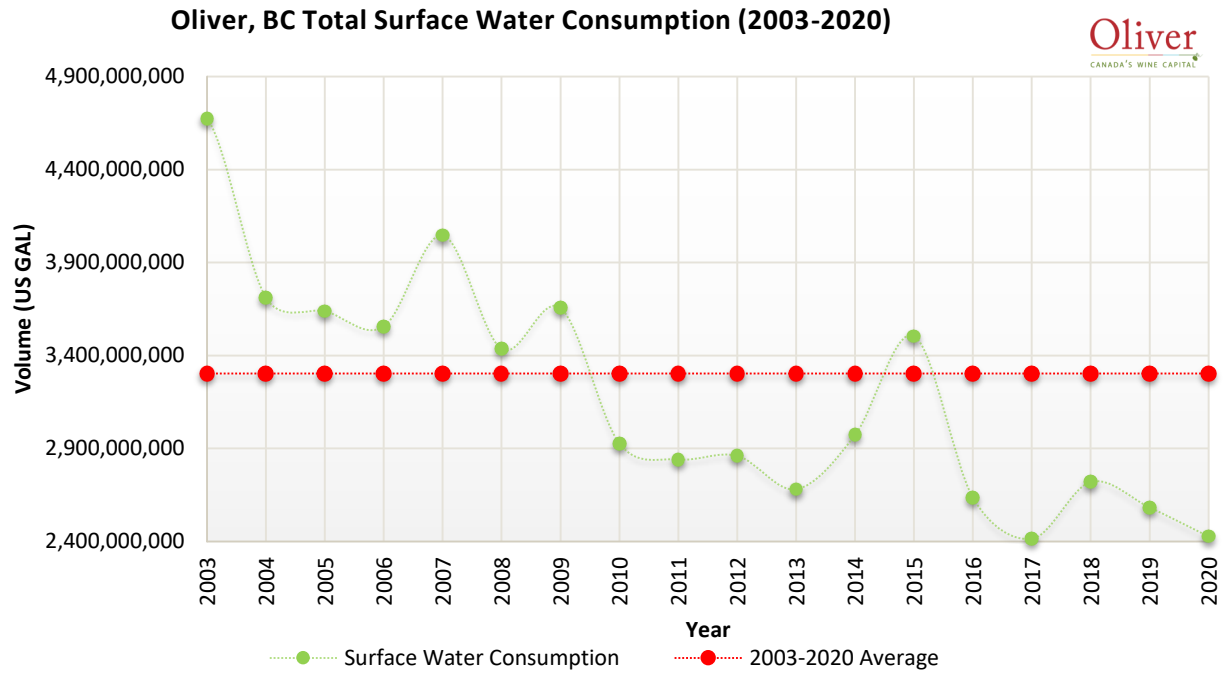


Figure 9: Oliver's Total Surface Water Consumption Trend (2003-2020)

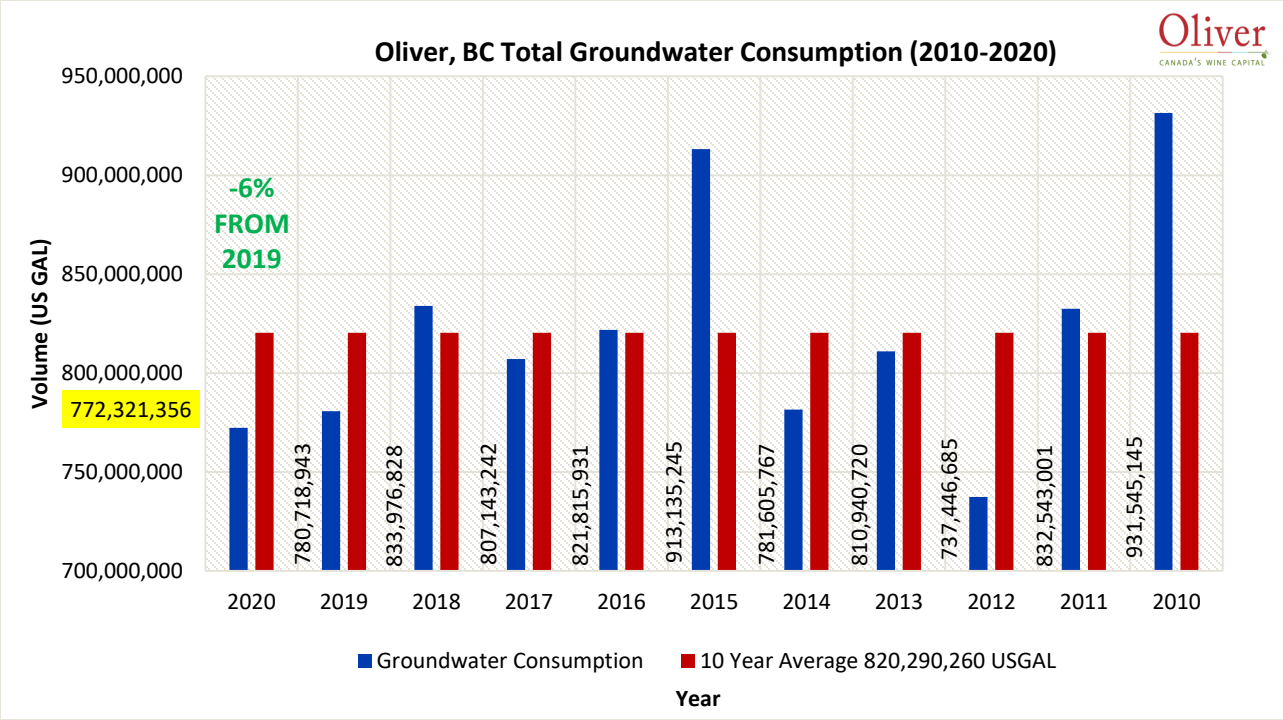


Figure 10: Oliver's Groundwater Consumption (2010-2020)

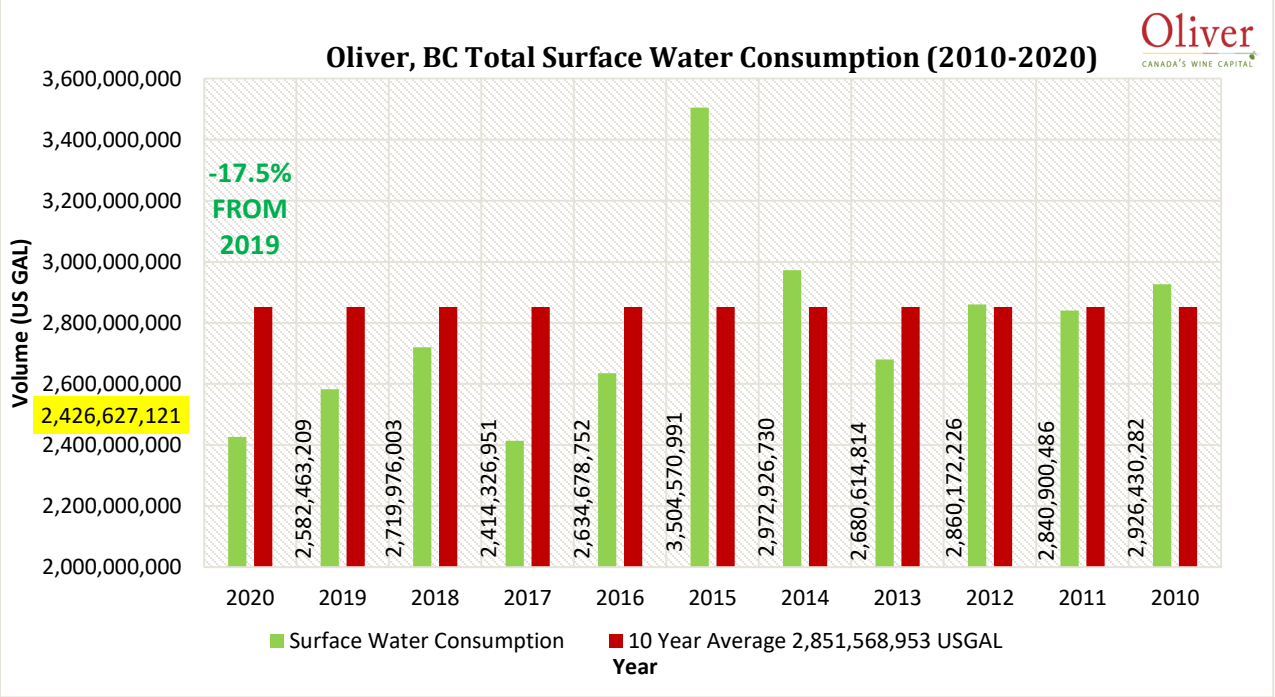


Figure 11: Oliver's Surface Water Consumption (2010-2020)

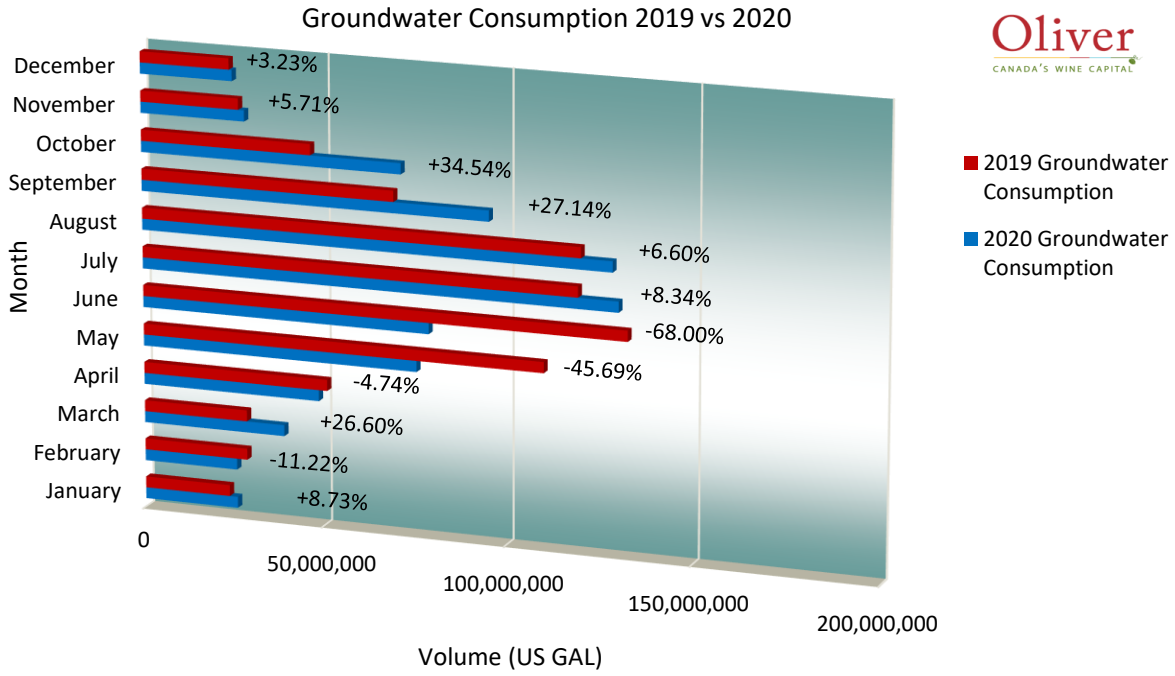


Figure 12: Groundwater Demand Percentages in 2020 Compared to the Previous Year 2019

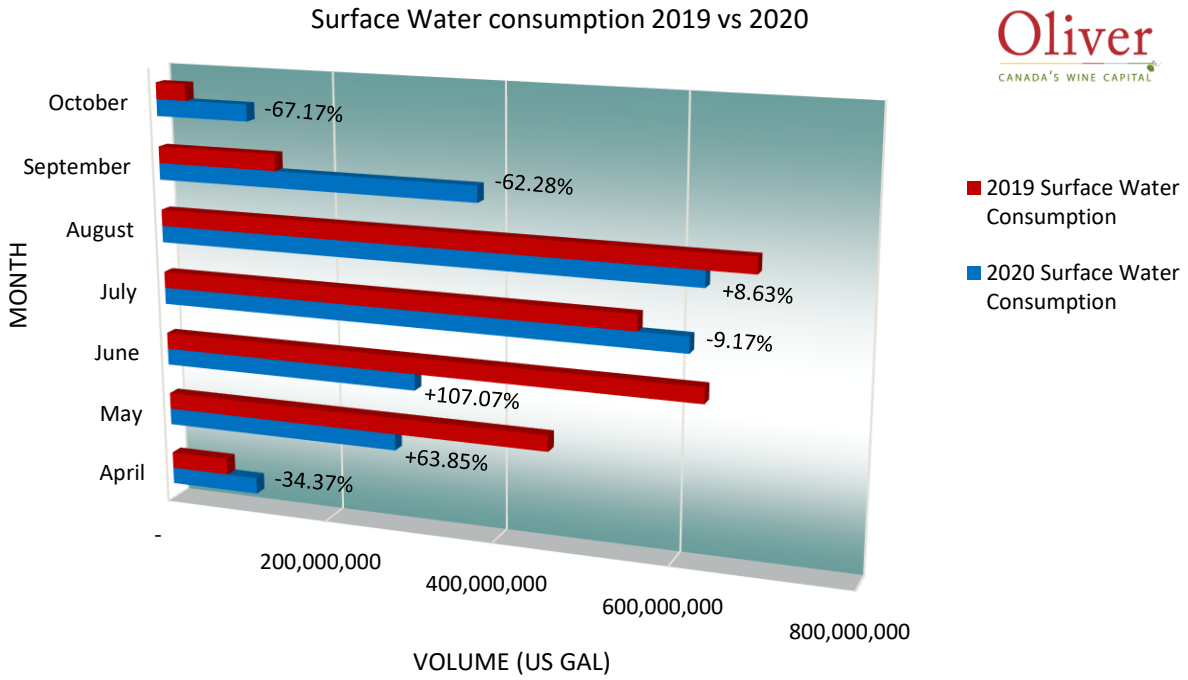


Figure 13: Surface Water Demand Percentages in 2020 Compared to the Previous Year 2019

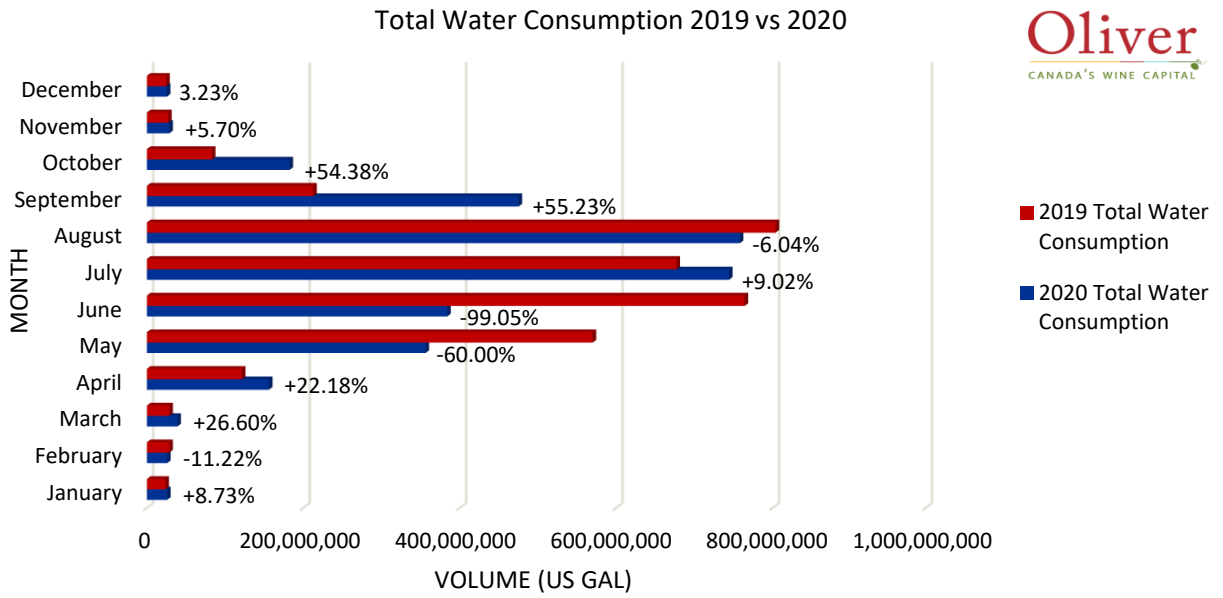


Figure 14: Total Water Demand Percentages in 2020 Compared to the Previous Year 2019

- *(Please See Appendix D: 2019 Pumping Data Table)*
- *(Please See Appendix E: Groundwater and Surface Water Consumption Data Tables)*

4.3 WATER CONSERVATION

The Town of Oliver works closely with the OBWB and its *Okanagan Water Wise* program called "Make Water Work", to spread a valley wide awareness on water conservation in the Okanagan. The program acts as a campaign where residents take water conservation survey pledges. OBWB will bring awareness in 2020 with more Radio Ads, Facebook Ads, Billboards, other social media support, yard signs, posters, and magnets linking the Make Water Work website www.makewaterwork.ca.

5.0 STAFF

According to EOCP (Environmental Operator Certification Program), Oliver's Water Distribution System is classified as Class III. In 2020 Oliver's operations has four certified Water Distribution Operators on staff; two Level I, two Level II, and one Level III.

The Town of Oliver is also classified as a Level I Water Treatment facility (at multiple locations). We currently have three Operators with Level I and two working on receiving their Level I.

All Operators are required to keep up with their education and to maintain 2.4 certified education units (CEU's) every two years, monitored by the EOCP. Various accredited courses were put on at the Town regarding safe work practices.

6.0 CAPITAL PROJECTS AND IMPROVEMENTS

6.1 PROJECTS COMPLETED IN 2020

The Town of Oliver continues to make minor and major improvements to the Town's water system every year and works with the Interior Health Authority (IHA) to prioritize some of these goals. Here are the main projects that were completed or started in 2020:

Flume No. 3 Seismic Structural Remediation

- This project started in late 2019 and finished in 2020; Town staff, Engineering Consultants and Greyback Construction Ltd., had worked on a variety of tasks in order to get this project completed by the middle of 2020. It reinforces the concrete and steel structure to withstand some seismic activity and less chance of failure because it is a critical component of the irrigation canal system.

Kobau Irrigation Control & Electrical Upgrades

- This project started in late 2019 and completed in 2020. Kobau had some electrical problems that were safety related. New soft starts (for pumps) replaced the old starts that can no longer find replacement parts for, instrumentation for the 'Supervisory Control and Data Acquisition (SCADA) system at this site, wiring upgrades in pumphouse & motors were completed. The Stations power upgrades from 480 volt to 600 volt helped eliminate some power problems to station (outages) and restore proper disconnects for power to the building.

6.2 CONTINUING PROJECTS INTO 2020

Gallagher Siphon Re-route

- This project continued in 2020, Town staff and Engineering Consultants have been working on a variety of tasks in order to get the physical construction started in November 2020. Environmental & archeological assessments, land acquisitions, and other permitting and design changes were completed throughout the year. The Town also put out a "Request for Qualifications" so contractors could apply to bid on the final work and pricing. This was done to ensure that the final four contractors that bid on the project would be capable, experienced and offer money saving solutions to final designs. Out of the final four contractors picked, H & M Excavating Ltd. was awarded the contract ad their submittal was the best overall value (scored highest) from the other candidates. H&M Excavating Ltd. started on removal and replacement

of the structure in Vaseux Creek and had their sub-contractor (Cumming Construction) start on the new Low Head Pumphouse on the canal, in late 2020.

Outfall Culvert Repair (Road 11)

- This project started in late 2020 and will continue into early 2021. It involved pulling a slightly smaller pipe (HDPE) through an existing culvert pipe that was damaged from 2017 flooding materials (rock & debris). This 'Hester Creek Spillway' is tied to the canal system and to Hester Creek itself, so it serves two purposes and is critical to the Town's infrastructure.

Canal Lining Rehabilitation Continued

- Town staff worked with contractors to overlay 300m section of existing canal floor and walls south of the canal flume 3 location near Vineyard Road and Oliver Readi-mix property. This project was completed in late March 2020. We also brush along the edges of the canal in this section for easier access and keep roots from damaging the concrete. A new section is completed each year when possible.

Drain Pipe Replacement from Reservoir (small section)

- This project was started in late 2020, wooden boards were removed from the inside of the pipe, this pipe was originally a wood stave pipe that was then covered in concrete. With all the wooden boards removed, the risk of blockage has decreased, life expectancy has no increase, but will need further investigation to ensure that the life expectancy is adequate.

Water Meter Replacements

- This project started in 2020 and scheduled for several years in order to complete. The water meters are coming to the end of their useful life and our Finance Department is looking at upgrading $150,000 (or as needed) worth for each year. The new replacement meters have less moving parts, are less susceptible to any damages and have longer battery life for sending data signals for reading.

System #5 Reservoir Communication Improvements

- We improved the communication between our System #5 irrigation reservoir and the Fairview Irrigation Pumphouse with a wireless system. We also made improvements to fencing and access to reservoir equipment and access hatch.

Risk Assessments & Potential Hazards on Canal System

- A previous canal assessment of our canal system from Allnorth Engineering recommended that the Town undertake a canal risk assessment in various areas where the public and properties could be at risk, this includes animal encroachment. The Town has now started this process.

Miller Road Pumphouse Chlorine Pump Replacements

- The Town had to replace two existing pumps used in the chlorine treatment process at our Miller Well pumphouse.

Tucelnuit Pumphouse Radio Modem Upgrade

- The older communication equipment is now obsolete and we have replaced with newer equipment.

6.3 LONG TERM IMPROVEMENT PLANS

The Town has a 5 year budgeted capital plan for known upgrades and new infrastructure and/or projects. These projects include canal rehabilitation on an annual basis:

Other projects for 2021

- Gallagher Siphon Repair & Re-route Continued
- Canal Lining Rehabilitation Continued
- Water Meter Replacements Continued
- Risk Assessments & Potential Hazards on Canal System Continued
- Town Siphon Load & Stress Assessment
- Analysis of Canal Cover/Pipe
- Hillside Street Water Main Looping
- Station Street PH2 Water Mainline Upgrade
- Booster Station (6A) & Communication Upgrades
- Sawmill Road Rehabilitation Water Upgrades
- Designs for various projects

2022

- Gallagher Siphon Repair & Re-route Continued
- Water Meter Replacements Continued
- New control panel and improvements for Fairview Irrigation PH
- Canal Lining Rehabilitation Continued
- Kootenay Street Rehabilitation – Water Upgrades
- Okanagan Street Rehabilitation – Water Upgrades

- School Avenue Rehabilitation – Water Upgrades
- W1: Okanagan River Xing at Sawmill Road

2023

- Water Meter Replacements Continued
- Modify Turnouts on Canal System
- Okanagan Street & School Avenue Water Upgrades
- Canal Lining Rehabilitation Continued
- Sawmill Road Extension Water Upgrades
- W2: Park Drive Looping

2024

- Water Meter Replacements Continued
- Canal Lining Rehabilitation Continued
- Canal Modify Turnouts on Canal
- Trash Rack Upgrade on Canal
- W3: Main Street North Looping
- W4: Tuc-el-nuit PH Back-up Power

2025

- Water Meter Replacements Continued
- Canal Lining Rehabilitation Continued
- Sawmill Rd- Pine to Similkameen Upgrades
- Pine and Spruce Avenues Upgrades
- Canal Check Gate Upgrades
- Canal Spillway Upgrade

7.0 EMERGENCY RESPONSE PLAN

The Town of Oliver has an *Emergency Response Plan* pertaining to any natural disaster, and the water system. The *Emergency Response Plan* identifies a number of potential emergencies that could occur and provides a systematic approach on how the Town will respond to the emergency.

8.0 CROSS CONNECTION CONTROL PROGAM

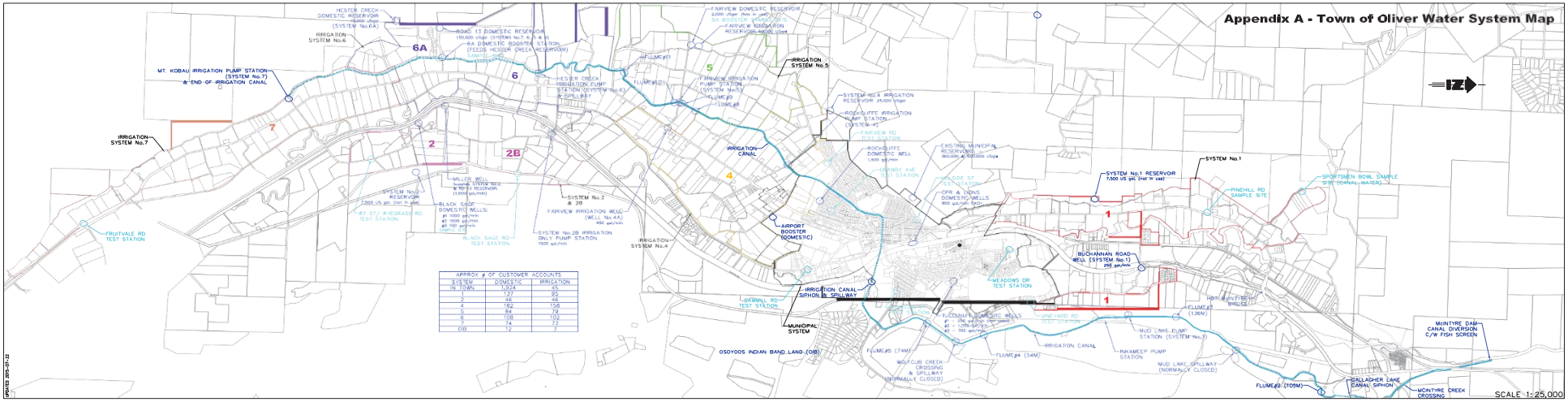
Cross connection is an actual or potential connection between a potable water supply and a non-potable source, where it is possible for a contaminant to enter the drinking water supply. The Town's Cross Connection Control Program continues to work towards addressing the potential for the water system to be compromised by service connections, which could introduce contaminated water into the domestic water system. The program is used to

monitor Backflow devices and cross connections through the FAST Program (Facility Assessment & Survey Technology) by the Town staff, focusing on premise isolation for commercial and industrial customers. In 2020, there were 300 testable backflow assemblies in service (including agricultural devices) being tracked.

9.0 CONCLUSION

The Town of Oliver works hard to maintain water quality and quantity for their residents as well as numerous customers in the Regional District of Okanagan Similkameen Area 'C'. Efforts are made to ensure appropriate water usage and to educate the public whenever possible. Without these ongoing efforts, the area would not be the robust agricultural community that it is today. If you have any comments regarding this report or other information that you would like to see included, please email works@oliver.ca or request a customer concern form at the Town Hall.

APPENDIX A: THE TOWN OF OLIVER WATER SYSTEM MAP FOR SAMPLING SITES



APPENDIX B: 2020 FULL SPECTRUM

CERTIFICATE OF ANALYSIS

REPORTED TO	Oliver, Town of 5971 Sawmill Road, PO Box 638 Oliver, BC V0H 1T0		
ATTENTION	Patti Hannas	**WORK ORDER**	0080257
PO NUMBER		**RECEIVED / TEMP**	2020-08-05 09:25 / 14°C
PROJECT	Full Spectrum Analysis	**REPORTED**	2020-08-11 13:24
PROJECT INFO	A.1.	**COC NUMBER**	B74872

Introduction:

CARO Analytical Services is a testing laboratory full of smart, engaged scientists driven to make the world a safer and healthier place. Through our clients' projects we become an essential element for a better world. We employ methods conducted in accordance with recognized professional standards using accepted testing methodologies and quality control efforts. CARO is accredited by the Canadian Association for Laboratories Accreditation (CALA) to ISO/IEC 17025:2017 for specific tests listed in the scope of accreditation approved by CALA.

Big Picture Sidekicks

You know that the sample you collected after snowshoeing to site, digging 5 meters, and racing to get it on a plane so you can submit it to the lab for time sensitive results needed to make important and expensive decisions (whew) is VERY important. We know that too.

We've Got Chemistry

It's simple. We figure the more you enjoy working with our fun and engaged team members; the more likely you are to give us continued opportunities to support you.

Ahead of the Curve

Through research, regulation knowledge, and instrumentation, we are your analytical centre for the technical knowledge you need, BEFORE you need it, so you can stay up to date and in the know.

If you have any questions or concerns, please contact me at acrump@caro.ca

Authorized By:

Alana Crump
Team Lead, Client Service

CARO ANALYTICAL SERVICES

TEST RESULTS

REPORTED TO Oliver, Town of
PROJECT Full Spectrum Analysis

WORK ORDER 0080257
REPORTED 2020-08-11 13:24

Analyte	Result	Guideline	RL	Units	Analyzed	Qualifier
Tucelnuit #2 (0080257-01) | Matrix: Water | Sampled: 2020-08-04 10:15						
Anions						
Chloride	**8.71**	AO ≤ 250	0.10	mg/L	2020-08-05	
Fluoride	**0.41**	MAC = 1.5	0.10	mg/L	2020-08-05	
Nitrate (as N)	**1.22**	MAC = 10	0.010	mg/L	2020-08-05	
Nitrite (as N)	< 0.010	MAC = 1	0.010	mg/L	2020-08-05	
Sulfate	**44.0**	AO ≤ 500	1.0	mg/L	2020-08-05	
Calculated Parameters						
Hardness, Total (as CaCO3)	**198**	None Required	0.500	mg/L	N/A	
Nitrate+Nitrite (as N)	**1.22**	N/A	0.0200	mg/L	N/A	
General Parameters						
Alkalinity, Total (as CaCO3)	**185**	N/A	1.0	mg/L	2020-08-07	
Alkalinity, Phenolphthalein (as CaCO3)	< 1.0	N/A	1.0	mg/L	2020-08-07	
Alkalinity, Bicarbonate (as CaCO3)	**185**	N/A	1.0	mg/L	2020-08-07	
Alkalinity, Carbonate (as CaCO3)	< 1.0	N/A	1.0	mg/L	2020-08-07	
Alkalinity, Hydroxide (as CaCO3)	< 1.0	N/A	1.0	mg/L	2020-08-07	
Colour, True	< 5.0	AO ≤ 15	5.0	CU	2020-08-06	
Conductivity (EC)	**458**	N/A	2.0	µS/cm	2020-08-07	
pH	**8.05**	7.0-10.5	0.10	pH units	2020-08-07	HT2
Solids, Total Dissolved	**264**	AO ≤ 500	15	mg/L	2020-08-07	
Turbidity	< 0.10	OG < 1	0.10	NTU	2020-08-05	
Total Metals						
Aluminum, total	< 0.0050	OG < 0.1	0.0050	mg/L	2020-08-10	
Antimony, total	< 0.00020	MAC = 0.006	0.00020	mg/L	2020-08-10	
Arsenic, total	**0.00364**	MAC = 0.01	0.00050	mg/L	2020-08-10	
Barium, total	**0.0685**	MAC = 2	0.0050	mg/L	2020-08-10	
Beryllium, total	< 0.00010	N/A	0.00010	mg/L	2020-08-10	
Bismuth, total	< 0.00010	N/A	0.00010	mg/L	2020-08-10	
Boron, total	**0.127**	MAC = 5	0.0500	mg/L	2020-08-10	
Cadmium, total	< 0.000010	MAC = 0.005	0.000010	mg/L	2020-08-10	
Calcium, total	**53.2**	None Required	0.20	mg/L	2020-08-10	
Chromium, total	< 0.00050	MAC = 0.05	0.00050	mg/L	2020-08-10	
Cobalt, total	< 0.00010	N/A	0.00010	mg/L	2020-08-10	
Copper, total	**0.0106**	MAC = 2	0.00040	mg/L	2020-08-10	
Iron, total	< 0.010	AO ≤ 0.3	0.010	mg/L	2020-08-10	
Lead, total	< 0.00020	MAC = 0.005	0.00020	mg/L	2020-08-10	
Lithium, total	**0.00740**	N/A	0.00010	mg/L	2020-08-10	
Magnesium, total	**15.9**	None Required	0.010	mg/L	2020-08-10	
Manganese, total	**0.00094**	MAC = 0.12	0.00020	mg/L	2020-08-10	
Molybdenum, total	**0.00464**	N/A	0.00010	mg/L	2020-08-10	
Nickel, total	< 0.00040	N/A	0.00040	mg/L	2020-08-10	
Phosphorus, total	**0.077**	N/A	0.050	mg/L	2020-08-10	
Potassium, total	**3.85**	N/A	0.10	mg/L	2020-08-10	

CARO ANALYTICAL SERVICES

TEST RESULTS

REPORTED TO Oliver, Town of
PROJECT Full Spectrum Analysis

WORK ORDER 0080257
REPORTED 2020-08-11 13:24

Analyte	Result	Guideline	RL	Units	Analyzed	Qualifier
Tucelnuit #2 (0080257-01) | Matrix: Water | Sampled: 2020-08-04 10:15, Continued						
Total Metals, Continued						
Selenium, total	**0.00275**	MAC = 0.05	0.00050	mg/L	2020-08-10	
Silicon, total	**12.4**	N/A	1.0	mg/L	2020-08-10	
Silver, total	< 0.000050	None Required	0.000050	mg/L	2020-08-10	
Sodium, total	**16.0**	AO ≤ 200	0.10	mg/L	2020-08-10	
Strontium, total	**0.655**	7	0.0010	mg/L	2020-08-10	
Sulfur, total	**18.2**	N/A	3.0	mg/L	2020-08-10	
Tellurium, total	< 0.00050	N/A	0.00050	mg/L	2020-08-10	
Thallium, total	< 0.000020	N/A	0.000020	mg/L	2020-08-10	
Thorium, total	< 0.00010	N/A	0.00010	mg/L	2020-08-10	
Tin, total	< 0.00020	N/A	0.00020	mg/L	2020-08-10	
Titanium, total	< 0.0050	N/A	0.0050	mg/L	2020-08-10	
Tungsten, total	< 0.0010	N/A	0.0010	mg/L	2020-08-10	
Uranium, total	**0.00560**	MAC = 0.02	0.000020	mg/L	2020-08-10	
Vanadium, total	**0.0020**	N/A	0.0010	mg/L	2020-08-10	
Zinc, total	**0.0050**	AO ≤ 5	0.0040	mg/L	2020-08-10	
Zirconium, total	< 0.00010	N/A	0.00010	mg/L	2020-08-10	
Tucelnuit #3 (0080257-02) | Matrix: Water | Sampled: 2020-08-04 10:25						
Anions						
Chloride	**20.0**	AO ≤ 250	0.10	mg/L	2020-08-05	
Fluoride	**0.28**	MAC = 1.5	0.10	mg/L	2020-08-05	
Nitrate (as N)	**2.84**	MAC = 10	0.010	mg/L	2020-08-05	
Nitrite (as N)	< 0.010	MAC = 1	0.010	mg/L	2020-08-05	
Sulfate	**48.1**	AO ≤ 500	1.0	mg/L	2020-08-05	
Calculated Parameters						
Hardness, Total (as CaCO3)	**263**	None Required	0.500	mg/L	N/A	
Nitrate+Nitrite (as N)	**2.84**	N/A	0.0200	mg/L	N/A	
General Parameters						
Alkalinity, Total (as CaCO3)	**215**	N/A	1.0	mg/L	2020-08-07	
Alkalinity, Phenolphthalein (as CaCO3)	< 1.0	N/A	1.0	mg/L	2020-08-07	
Alkalinity, Bicarbonate (as CaCO3)	**215**	N/A	1.0	mg/L	2020-08-07	
Alkalinity, Carbonate (as CaCO3)	< 1.0	N/A	1.0	mg/L	2020-08-07	
Alkalinity, Hydroxide (as CaCO3)	< 1.0	N/A	1.0	mg/L	2020-08-07	
Colour, True	< 5.0	AO ≤ 15	5.0	CU	2020-08-06	
Conductivity (EC)	**576**	N/A	2.0	µS/cm	2020-08-07	
pH	**8.09**	7.0-10.5	0.10	pH units	2020-08-07	HT2
Solids, Total Dissolved	**346**	AO ≤ 500	15	mg/L	2020-08-07	
Turbidity	< 0.10	OG < 1	0.10	NTU	2020-08-05	
Total Metals						
Aluminum, total	< 0.0050	OG < 0.1	0.0050	mg/L	2020-08-10	

TEST RESULTS

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Analyte	Result	Guideline	RL	Units	Analyzed	Qualifier
Tucelnuit #3 (0080257-02) | Matrix: Water | Sampled: 2020-08-04 10:25, Continued						
Total Metals, Continued						
Antimony, total	< 0.00020	MAC = 0.006	0.00020	mg/L	2020-08-10	
Arsenic, total	**0.00341**	MAC = 0.01	0.00050	mg/L	2020-08-10	
Barium, total	**0.109**	MAC = 2	0.0050	mg/L	2020-08-10	
Beryllium, total	< 0.00010	N/A	0.00010	mg/L	2020-08-10	
Bismuth, total	< 0.00010	N/A	0.00010	mg/L	2020-08-10	
Boron, total	**0.0916**	MAC = 5	0.0500	mg/L	2020-08-10	
Cadmium, total	< 0.000010	MAC = 0.005	0.000010	mg/L	2020-08-10	
Calcium, total	**68.6**	None Required	0.20	mg/L	2020-08-10	
Chromium, total	**0.00076**	MAC = 0.05	0.00050	mg/L	2020-08-10	
Cobalt, total	< 0.00010	N/A	0.00010	mg/L	2020-08-10	
Copper, total	**0.00877**	MAC = 2	0.00040	mg/L	2020-08-10	
Iron, total	< 0.010	AO ≤ 0.3	0.010	mg/L	2020-08-10	
Lead, total	< 0.00020	MAC = 0.005	0.00020	mg/L	2020-08-10	
Lithium, total	**0.00981**	N/A	0.00010	mg/L	2020-08-10	
Magnesium, total	**22.1**	None Required	0.010	mg/L	2020-08-10	
Manganese, total	< 0.00020	MAC = 0.12	0.00020	mg/L	2020-08-10	
Molybdenum, total	**0.00371**	N/A	0.00010	mg/L	2020-08-10	
Nickel, total	**0.00045**	N/A	0.00040	mg/L	2020-08-10	
Phosphorus, total	**0.081**	N/A	0.050	mg/L	2020-08-10	
Potassium, total	**5.62**	N/A	0.10	mg/L	2020-08-10	
Selenium, total	**0.00510**	MAC = 0.05	0.00050	mg/L	2020-08-10	
Silicon, total	**15.5**	N/A	1.0	mg/L	2020-08-10	
Silver, total	< 0.000050	None Required	0.000050	mg/L	2020-08-10	
Sodium, total	**28.0**	AO ≤ 200	0.10	mg/L	2020-08-10	
Strontium, total	**1.03**	7	0.0010	mg/L	2020-08-10	
Sulfur, total	**25.9**	N/A	3.0	mg/L	2020-08-10	
Tellurium, total	< 0.00050	N/A	0.00050	mg/L	2020-08-10	
Thallium, total	< 0.000020	N/A	0.000020	mg/L	2020-08-10	
Thorium, total	< 0.00010	N/A	0.00010	mg/L	2020-08-10	
Tin, total	< 0.00020	N/A	0.00020	mg/L	2020-08-10	
Titanium, total	< 0.0050	N/A	0.0050	mg/L	2020-08-10	
Tungsten, total	< 0.0010	N/A	0.0010	mg/L	2020-08-10	
Uranium, total	**0.00859**	MAC = 0.02	0.000020	mg/L	2020-08-10	
Vanadium, total	**0.0026**	N/A	0.0010	mg/L	2020-08-10	
Zinc, total	**0.0062**	AO ≤ 5	0.0040	mg/L	2020-08-10	
Zirconium, total	< 0.00010	N/A	0.00010	mg/L	2020-08-10	
Buchanan (0080257-03) | Matrix: Water | Sampled: 2020-08-04 10:12						
Anions						
Chloride	**4.77**	AO ≤ 250	0.10	mg/L	2020-08-05	
Fluoride	**0.18**	MAC = 1.5	0.10	mg/L	2020-08-05	
Nitrate (as N)	< 0.010	MAC = 10	0.010	mg/L	2020-08-05	

CARO ANALYTICAL SERVICES

TEST RESULTS

REPORTED TO Oliver, Town of
PROJECT Full Spectrum Analysis

WORK ORDER 0080257
REPORTED 2020-08-11 13:24

Analyte	Result	Guideline	RL	Units	Analyzed	Qualifier
Buchanan (0080257-03) | Matrix: Water | Sampled: 2020-08-04 10:12, Continued						
Anions, Continued						
Nitrite (as N)	< 0.010	MAC = 1	0.010	mg/L	2020-08-05	
Sulfate	**23.2**	AO ≤ 500	1.0	mg/L	2020-08-05	
Calculated Parameters						
Hardness, Total (as CaCO3)	**121**	None Required	0.500	mg/L	N/A	
Nitrate+Nitrite (as N)	< 0.0200	N/A	0.0200	mg/L	N/A	
General Parameters						
Alkalinity, Total (as CaCO3)	**138**	N/A	1.0	mg/L	2020-08-07	
Alkalinity, Phenolphthalein (as CaCO3)	< 1.0	N/A	1.0	mg/L	2020-08-07	
Alkalinity, Bicarbonate (as CaCO3)	**138**	N/A	1.0	mg/L	2020-08-07	
Alkalinity, Carbonate (as CaCO3)	< 1.0	N/A	1.0	mg/L	2020-08-07	
Alkalinity, Hydroxide (as CaCO3)	< 1.0	N/A	1.0	mg/L	2020-08-07	
Colour, True	< 5.0	AO ≤ 15	5.0	CU	2020-08-06	
Conductivity (EC)	**286**	N/A	2.0	µS/cm	2020-08-07	
pH	**7.94**	7.0-10.5	0.10	pH units	2020-08-07	HT2
Solids, Total Dissolved	**161**	AO ≤ 500	15	mg/L	2020-08-07	
Turbidity	< 0.10	OG < 1	0.10	NTU	2020-08-05	
Total Metals						
Aluminum, total	< 0.0050	OG < 0.1	0.0050	mg/L	2020-08-10	
Antimony, total	< 0.00020	MAC = 0.006	0.00020	mg/L	2020-08-10	
Arsenic, total	**0.00132**	MAC = 0.01	0.00050	mg/L	2020-08-10	
Barium, total	**0.0578**	MAC = 2	0.0050	mg/L	2020-08-10	
Beryllium, total	< 0.00010	N/A	0.00010	mg/L	2020-08-10	
Bismuth, total	< 0.00010	N/A	0.00010	mg/L	2020-08-10	
Boron, total	< 0.0500	MAC = 5	0.0500	mg/L	2020-08-10	
Cadmium, total	**0.000021**	MAC = 0.005	0.000010	mg/L	2020-08-10	
Calcium, total	**33.2**	None Required	0.20	mg/L	2020-08-10	
Chromium, total	< 0.00050	MAC = 0.05	0.00050	mg/L	2020-08-10	
Cobalt, total	< 0.00010	N/A	0.00010	mg/L	2020-08-10	
Copper, total	**0.0100**	MAC = 2	0.00040	mg/L	2020-08-10	
Iron, total	**0.103**	AO ≤ 0.3	0.010	mg/L	2020-08-10	
Lead, total	**0.00044**	MAC = 0.005	0.00020	mg/L	2020-08-10	
Lithium, total	**0.00412**	N/A	0.00010	mg/L	2020-08-10	
Magnesium, total	**9.23**	None Required	0.010	mg/L	2020-08-10	
Manganese, total	**0.0362**	MAC = 0.12	0.00020	mg/L	2020-08-10	
Molybdenum, total	**0.00272**	N/A	0.00010	mg/L	2020-08-10	
Nickel, total	< 0.00040	N/A	0.00040	mg/L	2020-08-10	
Phosphorus, total	< 0.050	N/A	0.050	mg/L	2020-08-10	
Potassium, total	**2.60**	N/A	0.10	mg/L	2020-08-10	
Selenium, total	< 0.00050	MAC = 0.05	0.00050	mg/L	2020-08-10	
Silicon, total	**6.5**	N/A	1.0	mg/L	2020-08-10	
Silver, total	< 0.000050	None Required	0.000050	mg/L	2020-08-10	

TEST RESULTS

REPORTED TO	Oliver, Town of	**WORK ORDER**	0080257
PROJECT	Full Spectrum Analysis	**REPORTED**	2020-08-11 13:24

Analyte	Result	Guideline	RL	Units	Analyzed	Qualifier
Buchanan (0080257-03) | Matrix: Water | Sampled: 2020-08-04 10:12, Continued						
Total Metals, Continued						
Sodium, total	**11.4**	AO ≤ 200	0.10	mg/L	2020-08-10	
Strontium, total	**0.363**	7	0.0010	mg/L	2020-08-10	
Sulfur, total	**9.7**	N/A	3.0	mg/L	2020-08-10	
Tellurium, total	< 0.00050	N/A	0.00050	mg/L	2020-08-10	
Thallium, total	< 0.000020	N/A	0.000020	mg/L	2020-08-10	
Thorium, total	< 0.00010	N/A	0.00010	mg/L	2020-08-10	
Tin, total	< 0.00020	N/A	0.00020	mg/L	2020-08-10	
Titanium, total	< 0.0050	N/A	0.0050	mg/L	2020-08-10	
Tungsten, total	< 0.0010	N/A	0.0010	mg/L	2020-08-10	
Uranium, total	**0.00166**	MAC = 0.02	0.000020	mg/L	2020-08-10	
Vanadium, total	< 0.0010	N/A	0.0010	mg/L	2020-08-10	
Zinc, total	**0.0060**	AO ≤ 5	0.0040	mg/L	2020-08-10	
Zirconium, total	< 0.00010	N/A	0.00010	mg/L	2020-08-10	

Sample Qualifiers:

HT2 The 15 minute recommended holding time (from sampling to analysis) has been exceeded - field analysis is recommended.

APPENDIX C: 2020 WEEKLY WATER SAMPLING

2020 WEEKLY CHLORINE RESIDUAL & COLIFORMS SAMPLING

(Target 0.2 to 1.50 - Chlorine Residual)

	RURAL NORTH				BLACK SAGE				RURAL SOUTH														MUNICIPAL			
	System #1				System #2				System #4				System #5				System #6				System #7							
	Surface Water Source				Groundwater Source				Ground Water Source				Groundwater Source				Groundwater Source				Groundwater Source				Groundwater Source			
	Chlorine	Sample	Coliform		Chlorine	Sample	Coliform		Chlorine	Sample	Coliform		Chlorine	Sample	Coliform		Chlorine	Sample	Coliform		Chlorine	Sample	Coliform		Chlorine	Sample	Coliform	
DATE	Residual	Location	Total	Ecoli	Residual	Location	Total	Ecoli	Residual	Location	Total	Ecoli	Residual	Location	Total	Ecoli	Residual	Location	Total	Ecoli	Residual	Location	Total	Ecoli	Residual	Location	Total	Ecoli
Jan 6	0.17	Mike's	<1	<1									0.05	5A Booster	<1	<1									0.05	Hillside	<1	<1
Jan 14	0.19	Mike's	<1	<1													0.05	6A Booster	<1	<1					0.20	Meadows	<1	<1
Jan 20	0.25	Pinehill	<1	<1					0.44	Snowbrush	<1	<1													0.24	Yineyard	<1	<1
Jan 27	0.32	McGowan	<1	<1																	0.09	Fruitvale	<1	<1	0.28	Wolfcub	<1	<1
Feb 3	0.10	Mike's	<1	<1													0.18	6A Booster	<1	<1					0.18	Sawmill	<1	<1
Feb 10	0.13	McGowan	<1	<1					0.18	Snowbrush	<1	<1													0.19	Granby	<1	<1
Feb 18	0.26	Pinehill	<1	<1																	0.06	Fruitvale	<1	<1	0.32	Fairview	<1	<1
Feb 24	0.16	Mikes	<1	<1													0.09	6A Booster	<1	<1					0.14	Hillside	<1	<1
Mar 2	0.29	Pinehill	<1	<1									0.18	5A Booster	<1	<1									0.40	Meadows	<1	<1
Mar 9	0.25	McGowan	<1	<1					0.16	Snowbrush	<1	<1													0.35	Vineyard	<1	<1
Mar 16	0.16	Mikes	<1	<1																	0.06	Fruitvale	<1	<1	0.21	Wolfcub	<1	<1
Mar 25*	0.26	Pinehill	<1	<1													0.11	6A Booster	<1	<1					0.16	Sawmill	<1	<1
Mar 30	0.11	McGowan	<1	<1									0.09	5A Booster	<1	<1									0.34	Granby	<1	<1
Apr 6	0.22	Mikes	<1	<1					0.20	Snowbrush	<1	<1													0.22	Fairview	<1	<1
April 14	0.14	Pinehill	<1	<1																	0.12	Fruitvale	<1	<1	0.13	Hillside	<1	<1
April 20	0.19	McGowan	<1	<1	0.21	Ryegrass	<1	<1									0.08	6A Booster	<1	<1					0.34	Meadows	<1	<1
April 27	0.17	Mikes	<1	<1	0.24	Blacksage	<1	<1					0.11	5A Booster	<1	<1									0.14	Vineyard	<1	<1
May 4	0.35	Pinehill	<1	<1	0.41	Ryegrass	<1	<1	0.13	Snowbrush	<1	<1													0.29	Wolfcub	<1	<1
May 11	0.20	McGowan	<1	<1	0.20	Blacksage	<1	<1													0.09	Fruitvale	<1	<1	0.25	Sawmill	<1	<1
May 19	0.17	Mikes	<1	<1	0.25	Ryegrass	<1	<1									0.11	6A Booster	<1	<1					0.34	Granby	<1	<1
May 25	0.10	Pine	<1	<1	0.29	Blacksage	<1	<1					0.16	5A Booster	<1	<1									0.15	Fairview	<1	<1
June 1	0.09	McGowan	<1	<1	0.26	Ryegrass	<1	<1	0.14	Snowbrush	<1	<1													0.00	Hillside	<1	<1
June 8	0.34	Mikes	<1	<1	0.20	Blacksage	<1	<1													0.13	Fruitvale	<1	<1	0.18	Hillside	<1	<1
																									0.28	Meadows	<1	<1
June 15	0.25	Pinehill	<1	<1	0.17	Ryegrass	<1	<1					0.10	5A Booster	<1	<1									0.36	Vineyard	<1	<1
June 22	0.27	McGowans	<1	<1	0.30	Blacksage	<1	<1	0.14	Snowbrush	<1	<1													0.21	Wolfcub	<1	<1
June 29	0.25	Mikes	<1	<1	0.30	Ryegrass	<1	<1													0.13	Fruitvale	<1	<1	0.21	Sawmill	<1	<1
July 6	0.18	Pinehill	<1	<1	0.27	Blacksage	<1	<1									0.14	6A Booster	<1	<1					0.26	Granby	<1	<1

July 13	0.21	McGowan	<1	<1	0.25	Ryegrass	<1	<1					0.16	5A Booster	<1	<1									0.19	Fairview	<1	<1
July 20	0.15	Mike's	<1	<1	0.23	Blacksage	<1	<1	0.25	Snowbrush	<1	<1													0.21	Hillside	<1	<1
July 27	0.18	Pinehill	<1	<1	0.45	Ryegrass	<1	<1													0.15	Fruitvale	<1	<1	0.23	Meadows	<1	<1
Aug 4	0.15	Mikes	<1	<1	0.20	Blacksage	<1	<1					0.16	5A Booster	<1	<1									0.16	Vineyard	<1	<1
Aug 10	0.16	Pinehill	<1	<1	0.31	Ryegrass	<1	<1	0.21	Snowbrush	<1	<1													0.25	Wolfcub	<1	<1
Aug 17	0.24	McGowan	<1	<1	0.16	Blacksage	<1	<1													0.14	Fruitvale	<1	<1	0.21	Sawmill	<1	<1
Aug 24	0.36	Mikes	<1	<1	0.32	Ryegrass	<1	<1									0.17	6A Booster	<1	<1					0.22	Granby	<1	<1
Aug 31	0.19	Pinehill	<1	<1	0.26	Blacksage	<1	<1					0.17	5A Booster	<1	<1									0.21	Fairview	<1	<1
Sept 8	0.28	McGown	<1	<1	0.18	Ryegrass	<1	<1	0.32	Snowbrush	<1	<1													0.26	Meadows	<1	<1
`Sept 14	0.32	Mikes	<1	<1	0.18	Blacksage	<1	<1													0.16	Fruitvale	<1	<1	0.16	Hillside	<1	<1
																									1.15	New Town R	<1	<1
Sept 21	0.17	Pinehill	<1	<1	0.33	Ryegrass	<1	<1									0.15	6A Booster	<1	<1					0.15	Vineyard	<1	<1
Sept 28	0.21	McGowan	<1	<1	0.27	BlackSage	<1	<1					0.16	5A Booster	<1	<1									0.40	Wolfcub	<1	<1
Oct 5	0.16	Mikes	<1	<1	0.23	Ryegrass	<1	<1	0.26	Snowbrush	<1	<1													0.15	Sawmill	<1	<1
Oct 13	0.19	Pinehill	<1	<1	0.27	BlackSage	<1	<1													0.17	Fruitvale	<1	<1	0.22	Granby	<1	<1
Oct 19	0.16	McGowan	<1	<1		BlackSage	<1	<1													0.15	Fruitvale	<1	<1	0.18	Fairview	<1	<1
Oct 26	0.26	Mikes	<1	<1									0.16	5A Booster	<1	<1									0.06	Hillside	<1	<1
Nov 2	0.26	Pinehill	<1	<1					0.17	Snowbrush	<1	<1													0.12	Meadows	<1	<1
Nov 9	0.26	Mikes	<1	<1																	0.13	Fruitvale	<1	<1	0.24	Vineyard	<1	<1
Nov 16	0.19	McGowan	<1	<1					0.15	Snowbrush	<1	<1													0.21	Wolfcub	<1	<1
Nov 24	0.22	Pinehill	<1	<1													0.15	6A Booster	<1	<1					0.15	Sawmill	<1	<1
Nov 30	0.20	Mikes	<1	<1									0.23	5A Booster	<1	<1									0.27	Granby	<1	<1
Dec 7	0.22	Pinehill	<1	<1					0.26	Snowbrush	<1	<1													0.21	Fairview	<1	<1
Dec 14	0.26	McGowan	<1	<1																	0.11	Fruitvale	<1	<1	0.17	Hillside	<1	<1
Dec 21	0.27	Mikes	<1	<1													0.14	6A Booster	<1	<1					0.22	Meadows	<1	<1
Dec 31	0.20	Pinehill	<1	<1									0.17	5A Booser	<1	<1									0.10	Tuc El Nuit	<1	<1

APPENDIX D: 2020 PUMPING DATA

2020 MONTHLY TOTALS

TOWN OF OLIVER - PUMPING STATIONS
WATER CONSUMPTION DATA

US GALLONS

DAY	GROUNDWATER SOURCES (US GALLONS)													SURFACE WATER SOURCE (US GALLONS)							TOTAL WATER USED
	Scada ROCKCLIFFE DOMESTIC PS Mun used for DOMESTIC	Scada TUCELNUIT PS 2 Mun used for DOMESTIC	Scada TUCELNUIT PS 3 Mun used for DOMESTIC	Scada BUCHANAN DOM WELL Sys 1 used for DOMESTIC	Scada MILLER RD RD 13 4,5,6,7 used for DOMESTIC	TOTAL GROUNDWATER USED FOR DOMESTIC	Scada MILLER RD DOM/IRR PS Sys 2 used for BOTH	Scada BLACK SAGE DOM/IRR PS Sys 2 used for BOTH	Scada TOTAL GROUNDWATER USED FOR Both	Scada FAIRVIEW IRR WELL Sys 5A used for AGRICULTURE	Scada BUCHANAN ROAD PS * Sys 1 used for AGRICULTURE	TOTAL GROUNDWATER USED FOR AGRICULTURE	TOTAL GROUNDWATER USED	Scada MUD LAKE PS Sys 1 used for AGRICULTURE	Scada ROCKCLIFFE IRR PS Sys 4 used for AGRICULTURE	Scada FAIRVIEW IRR PS Sys 5 used for AGRICULTURE	Scada HESTER CREEK PS Sys 6 used for AGRICULTURE	Scada MT KOBAU PS Sys 7 used for AGRICULTURE	Scada BLK SAGE IRR PS Sys 2B used for AGRICULTURE	TOTAL SURFACE WATER USED	
January	7,974,963	0	8,800,941	5,965,911	3,051,184	25,792,998	2,471	0	2,471	0	0	0	25,795,469	0	0	0	0	0	0	0	25,795,469
Feburary	12,637,109	0	5,627,772	4,604,074	2,811,604	25,680,559	0	0	0	0	0	0	25,680,559	0	0	0	0	0	0	0	25,680,559
March	9,537,423	0	9,356,627	8,852,270	3,492,528	31,238,848	5,220	7,695,455	7,700,675	0	0	0	38,939,523	0	0	0	0	0	0	0	38,939,523
April	7,716,081	575,866	2,482,151	5,072,700	10,695,615	26,542,413	279,818	20,424,521	20,704,339	0	1,371,704	1,371,704	48,618,456	16,696,000	48,522,000	17,420,000	9,001,198	13,669,000	1,997,000	107,305,198	155,923,654
May	25,067,467	16,998,150	3,600,658	643,529	5,734,800	52,044,604	590,261	19,525,161	20,115,422	0	3,330,635	3,330,635	75,490,661	36,002,000	122,407,000	48,726,000	21,846,580	36,225,000	15,319,000	280,525,580	356,016,241
June	20,524,294	22,127,211	3,272,726	3,159,185	9,702,900	58,786,316	244,600	18,267,877	18,512,477	0	1,530,416	1,530,416	78,829,209	29,918,398	109,737,824	52,048,000	61,068,834	34,321,270	17,831,184	304,925,510	383,754,718
July	23,606,705	25,256,666	10,682,675	11,559,198	7,815,863	78,921,107	124,198	41,903,233	42,027,431	4,883,000	4,141,283	9,024,283	129,972,821	77,920,562	204,880,512	92,966,000	106,137,176	96,066,470	36,050,654	614,021,375	743,994,196
August	24,778,994	25,633,689	11,854,405	8,501,347	8,466,500	79,234,936	419,551	40,331,058	40,750,609	0	8,344,399	8,344,399	128,329,944	78,763,183	224,266,666	87,590,000	106,632,357	97,168,979	34,960,434	629,381,619	757,711,563
September	24,396,172	18,907,360	5,283,799	6,267,709	6,711,200	61,566,240	214,098	25,638,919	25,853,017	0	7,794,333	7,794,333	95,213,591	42,202,161	139,299,062	56,888,000	66,937,515	51,664,276	22,727,986	379,719,000	474,932,590
October	15,168,892	11,157,904	3,975,480	5,223,796	4,712,500	40,238,573	164,032	14,639,723	14,803,755	12,438,351	3,904,337	16,342,688	71,385,016	17,567,598	39,393,951	21,938,000	15,338,327	13,349,986	3,160,978	110,748,840	182,133,856
November	421,246	12,829,566	4,731,909	5,972,418	4,716,200	28,671,338	0	0	0	0	0	0	28,671,338	0	0	0	0	0	0	0	28,671,338
December	0	12,146,420	6,862,880	4,754,940	1,630,530	25,394,770	0	0	0	0	0	0	25,394,770	0	0	0	0	0	0	0	25,394,770
TOTALS	171,829,345	145,632,831	76,532,023	70,577,078	69,541,425	534,112,702	2,044,248	188,425,948	190,470,196	17,321,351	30,417,108	47,738,459	772,321,356	299,069,902	888,507,015	377,576,000	386,961,987	342,464,980	132,047,236	2,426,627,121	3,198,948,477
WHEN ACTIVE						double-check 534,112,702						double-check 47,738,459	772,321,356							double-check 2,426,627,121	3,198,948,477
YTD Max Flow	1,915,588	1,644,167	970,763	1,230,000	2,001,093	3,350,880	195,700	7,066,767	7,066,767	831,000	909,600	909,600	7,723,348	3,580,215	8,564,490	4,596,000	4,310,919	4,192,067	1,520,981	24,853,342	30,219,307
YTD Min Flow	0	0	0	0	0	128,835	0	0	0	0	0	0	128,835	0	0	0	0	0	0	0	128,835
Avg Year Flow	469,479	397,904	209,104	192,834	191,048	1,459,324	5,585	514,825	520,410	89,285	83,107	130,433	2,110,168	817,131	2,427,615	1,034,455	1,066,011	938,260	361,773	6,630,129	8,740,296

2020 MONTHLY TOTALS

TOWN OF OLIVER - PUMPING STATIONS
WATER CONSUMPTION DATA

CUBIC METERS

DAY	GROUNDWATER SOURCES													SURFACE WATER SOURCE							TOTAL WATER USED
	Scada ROCKCLIFFE DOMESTIC PS Mun used for DOMESTIC	Scada TUCELNUIT PS 2 Mun used for DOMESTIC	Scada TUCELNUIT PS 3 Mun used for DOMESTIC	Scada BUCHANAN DOM WELL Sys 1 used for DOMESTIC	Scada MILLER RD RD 13 4,5,6,7 used for DOMESTIC	TOTAL GROUNDWATER USED FOR DOMESTIC	Scada MILLER RD DOM/IRR PS Sys 2 used for BOTH	Scada BLACK SAGE DOM/IRR PS Sys 2 used for BOTH	Scada TOTAL GROUNDWATER USED FOR Both	Scada FAIRVIEW IRR WELL Sys 5A used for AGRICULTURE	Scada BUCHANAN ROAD PS * Sys 1 used for AGRICULTURE	TOTAL GROUNDWATER USED FOR AGRICULTURE	TOTAL GROUNDWATER USED	Scada MUD LAKE PS Sys 1 used for AGRICULTURE	Scada ROCKCLIFFE IRR PS Sys 4 used for AGRICULTURE	Scada FAIRVIEW IRR PS Sys 5 used for AGRICULTURE	Scada HESTER CREEK PS Sys 6 used for AGRICULTURE	Scada MT KOBAU PS Sys 7 used for AGRICULTURE	Scada BLK SAGE IRR PS Sys 2B used for AGRICULTURE	TOTAL SURFACE WATER USED	
January	30,189	-	33,315	22,583	11,550	97,637	2	-	2	-	-	-	97,639	-	-	-	-	-	-	-	97,639
Feburary	47,837	-	21,303	17,428	10,643	97,211	-	-	-	-	-	-	97,211	-	-	-	-	-	-	-	97,211
March	36,103	-	35,419	33,509	13,221	118,252	20	29,130	29,150	-	-	-	147,402	-	-	-	-	-	-	-	147,402
April	29,209	2,180	9,396	19,202	40,487	100,474	1,059	77,315	78,374	-	5,192	5,192	184,041	63,201	183,676	65,942	34,073	51,743	7,559	406,194	590,235
May	94,891	64,345	13,630	2,436	21,709	197,010	2,234	73,911	76,145	-	12,608	12,608	285,763	136,282	463,361	184,448	82,698	137,126	57,989	1,061,904	1,347,667
June	77,693	83,761	12,389	11,959	36,729	222,530	926	69,151	70,077	-	5,793	5,793	298,401	113,253	415,403	197,023	231,171	129,920	67,498	1,154,268	1,452,669
July	89,262	85,478	39,316	43,756	26,501	284,313	470	154,749	155,219	18,484	15,199	33,683	473,216	285,362	738,956	334,596	381,481	352,489	129,096	2,221,980	2,695,196
August	93,799	97,034	44,874	32,181	32,049	299,937	1,588	152,670	154,258	-	31,587	31,587	485,781	298,151	848,941	331,564	403,647	367,824	132,340	2,382,467	2,868,249
September	92,350	71,572	20,001	23,726	25,405	233,053	810	97,054	97,864	-	29,505	29,505	360,422	159,752	527,304	215,344	253,386	195,570	86,035	1,437,392	1,797,815
October	57,420	42,237	15,049	19,774	17,839	152,319	621	55,417	56,038	47,084	14,780	61,864	270,222	66,501	149,122	83,044	58,062	50,535	11,966	419,230	689,451
November	1,595	48,565	17,912	22,608	17,853	108,533	-	-	-	-	-	-	108,533	-	-	-	-	-	-	-	108,533
December	-	45,979	25,979	17,999	6,172	96,130	-	-	-	-	-	-	96,130	-	-	-	-	-	-	-	96,130
TOTALS	650,345	541,151	288,583	267,163	260,157	2,007,400	7,731	709,397	717,128	65,568	114,664	180,232	2,904,761	1,122,503	3,326,763	1,411,962	1,444,518	1,285,208	492,483	9,083,436	11,988,197
WHEN ACTIVE																					
YTD Max Flow	7,251	6,224	3,675	4,656	7,575	12,684	741	26,751	26,751	3,146	3,443	3,443	29,236	13,553	32,420	17,398	16,319	15,869	5,758	94,080	114,392
YTD Min Flow	-	-	-	-	-	488	-	-	-	-	-	-	488	-	-	-	-	-	-	-	488
Avg Year Flow	48,174	42,903	23,347	20,961	19,711	150,935	573	52,548	53,121	4,857	8,494	12,430	212,822	83,148	246,427	104,590	107,001	95,201	36,480	626,444	839,266

APPENDIX E: 2020 GROUNDWATER AND SURFACE WATER CONSUMPTION DATA

Town of Oliver

Groundwater Consumption Data

US GALLONS

YEAR	January	February	March	April	May	June	July	August	September	October	November	December	YTD	10 YR Average	Average
2020	25,795,469	25,680,559	38,939,523	48,618,456	75,490,661	78,829,209	129,972,821	128,329,944	95,213,591	71,385,016	28,671,338	25,394,770	772,321,356	820,290,260	978,425,598
2019	23,543,266	28,561,243	28,581,167	50,920,567	109,979,293	132,432,802	119,129,918	119,860,386	69,368,736	46,730,582	27,035,693	24,575,289	780,718,943	820,290,260	978,425,598
2018	25,693,865	23,678,138	32,157,774	48,096,882	102,453,177	117,372,052	157,067,454	138,706,689	81,652,713	55,774,737	27,718,659	23,604,690	833,976,828	820,290,260	978,425,598
2017	27,531,385	26,935,811	32,381,863	33,127,917	69,692,881	105,839,743	156,311,916	147,447,499	92,667,928	64,715,211	25,437,142	25,053,945	807,143,242	820,290,260	978,425,598
2016	26,495,703	25,304,817	29,968,727	64,556,558	114,449,576	105,588,928	126,590,568	139,721,723	84,497,704	52,219,628	26,892,706	25,529,293	821,815,931	820,290,260	978,425,598
2015	24,995,670	22,331,907	28,348,130	69,828,360	107,509,652	134,080,260	163,478,571	140,709,274	101,276,667	68,802,269	26,439,576	25,334,906	913,135,245	820,290,260	978,425,598
10 Yr Average	**26,985,601**	**25,646,629**	**32,086,767**	**51,148,173**	**91,187,855**	**107,433,881**	**141,947,585**	**138,608,595**	**89,208,717**	**63,139,295**	**27,410,448**	**25,486,716**	**820,290,260**		
Average	***30,669,400***	***29,143,148***	***35,054,837***	***64,083,435***	***109,708,283***	***129,188,980***	***174,111,435***	***165,180,905***	***108,441,821***	***72,125,572***	***31,795,228***	***28,922,554***	***978,425,598***		

CUBIC METERS

YEAR	January	February	March	April	May	June	July	August	September	October	November	December	YTD	10 YR Average	Average
2020	97,646	97,211	147,402	184,041	285,763	298,401	492,000	485,781	360,422	270,222	108,533	96,130	2,923,553	3,063,020	3,703,742
2019	89,121	108,116	108,191	192,755	416,317	501,312	450,956	453,721	262,589	176,894	102,341	93,028	2,955,341	3,063,020	3,703,742
2018	97,262	89,631	121,730	182,066	387,827	444,301	594,565	525,062	309,089	211,130	104,926	89,353	3,156,944	3,063,020	3,703,742
2017	104,218	101,963	122,579	125,403	263,816	400,647	591,705	558,149	350,786	244,974	96,290	94,839	3,055,368	3,063,020	3,703,742
2016	100,297	95,789	113,444	244,373	433,239	399,697	479,197	528,904	319,858	197,673	101,800	96,639	3,110,910	3,063,020	3,703,742
2015	94,619	84,535	107,309	264,329	406,968	507,549	618,833	532,642	383,374	260,445	100,085	95,903	3,456,591	3,063,020	3,703,742
10 Yr Average	**98,487**	**94,993**	**119,066**	**190,641**	**349,750**	**400,897**	**520,190**	**517,484**	**340,532**	**233,467**	**102,549**	**94,964**	**3,063,020**		
Average	***116,096***	***110,319***	***132,697***	***242,582***	***415,291***	***489,033***	***659,083***	***625,277***	***410,497***	***273,025***	***120,358***	***109,484***	***3,703,742***		

Town of Oliver

Surface Water Consumption Data

US GALLONS

YEAR	January	February	March	April	May	June	July	August	September	October	November	December	YTD	10 YR Average	Average
2020	0	0	0	107,305,198	280,525,580	304,925,510	614,021,375	629,381,619	379,719,000	110,748,840	0	0	2,426,627,121	2,851,568,953	3,303,066,055
2019	0	0	0	70424042.85	459652685.8	631412787.1	557726718	683650532.7	143240570.7	36355871.47	0	0	2,582,463,209	2,851,568,953	3,303,066,055
2018	0	0	0	28,796,595	449,315,489	472,710,593	680,783,618	632,482,659	363,156,943	92,730,107	0	0	2,719,976,003	2,851,568,953	3,303,066,055
2017	0	0	0	25,906,471	159,593,999	441,096,535	687,142,179	604,322,130	365,509,904	130,755,733	0	0	2,414,326,951	2,851,568,953	3,303,066,055
2016	0	0	0	195,820,565	424,420,450	369,144,236	517,489,259	674,696,799	320,877,783	132,229,659	0	0	2,634,678,752	2,851,568,953	3,303,066,055
2015	0	0	0	242,341,115	487,581,169	653,959,751	763,431,674	667,904,291	465,978,262	223,374,730	0	0	3,504,570,991	2,851,568,953	3,303,066,055
10 Yr Average	**0**	**0**	**0**	**102,504,073**	**388,054,881**	**480,035,297**	**686,889,302**	**683,566,277**	**371,284,433**	**139,234,689**	**0**	**0**	**2,851,568,953**		
Average	***0***	***0***	***0***	***136,857,767***	***451,948,623***	***540,988,281***	***794,343,126***	***767,601,170***	***466,088,176***	***145,238,913***	***0***	***0***	***3,303,066,055***		

CUBIC METERS

YEAR	January	February	March	April	May	June	July	August	September	October	November	December	YTD	10 YR Average	Average
2020	0	0	0	406,194	1,061,904	1,154,268	2,324,323	2,382,467	1,437,392	419,230	0	0	9,185,779	10,461,835	12,503,459
2019	0	0	0	266,584	1,739,974	2,390,156	2,111,224	2,587,898	542,224	137,622	0	0	9,775,682	10,461,835	12,503,459
2018	0	0	0	109,007	1,700,843	1,789,403	2,577,045	2,394,206	1,374,698	351,021	0	0	10,296,224	10,461,835	12,503,459
2017	0	0	0	98,067	604,129	1,669,731	2,601,115	2,287,607	1,383,605	494,964	0	0	9,139,217	10,461,835	12,503,459
2016	0	0	0	741,261	1,606,605	1,397,362	1,958,909	2,554,004	1,214,654	500,543	0	0	9,973,339	10,461,835	12,503,459
2015	0	0	0	917,360	1,845,695	2,475,506	2,889,902	2,528,292	1,763,919	845,565	0	0	13,266,238	10,461,835	12,503,459
10 Yr Average	**0**	**0**	**0**	**351,232**	**1,430,708**	**1,760,150**	**2,505,562**	**2,540,742**	**1,389,426**	**484,015**	**0**	**0**	**10,461,835**		
Average	***0***	***0***	***0***	***518,063***	***1,710,811***	***2,047,862***	***3,006,914***	***2,905,685***	***1,764,335***	***549,789***	***0***	***0***	***12,503,459***		