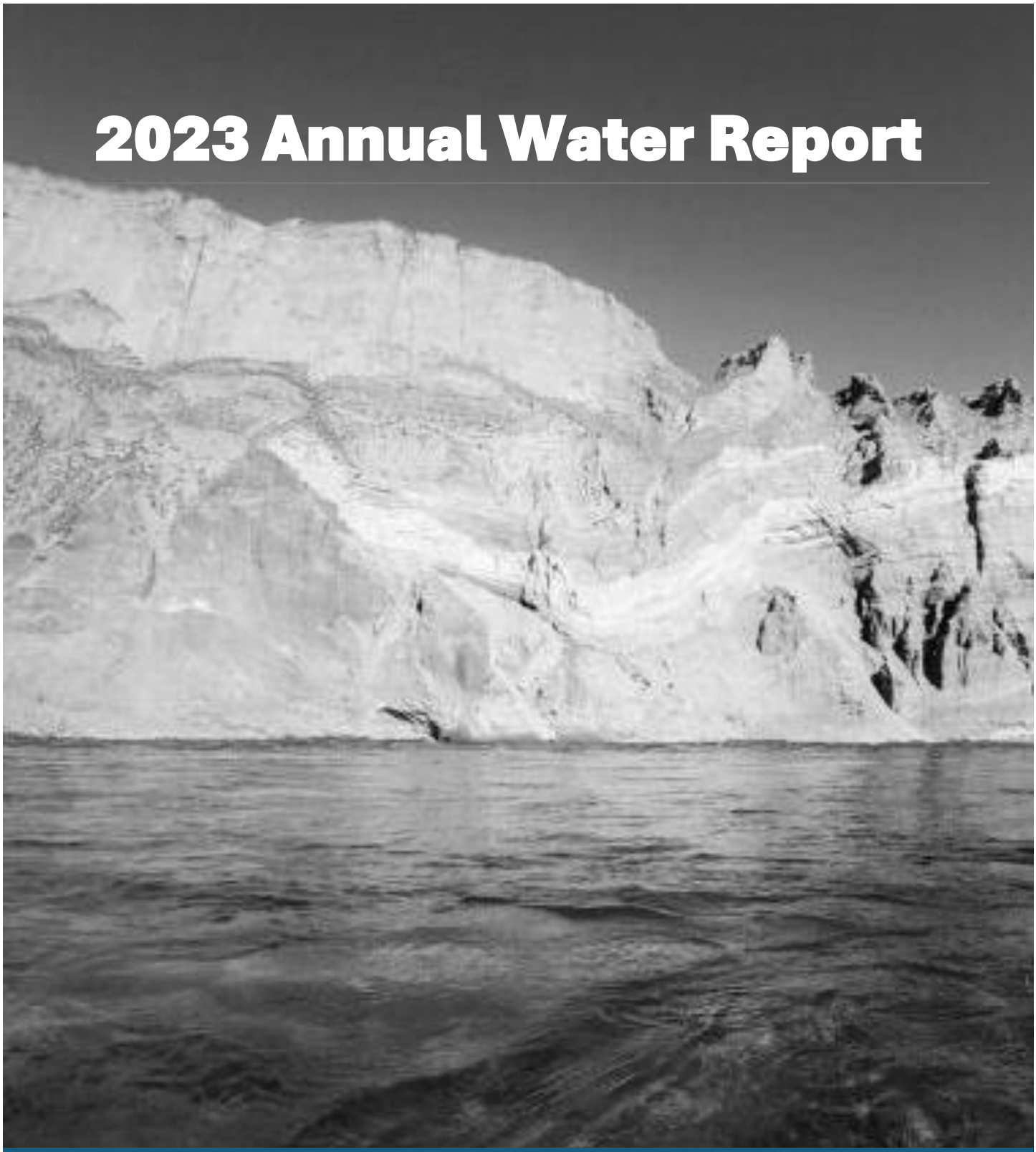
2023 Annual Water Report



Village of Ashcroft

JANUARY 2024

Robert Sidwell
Edwin Aie

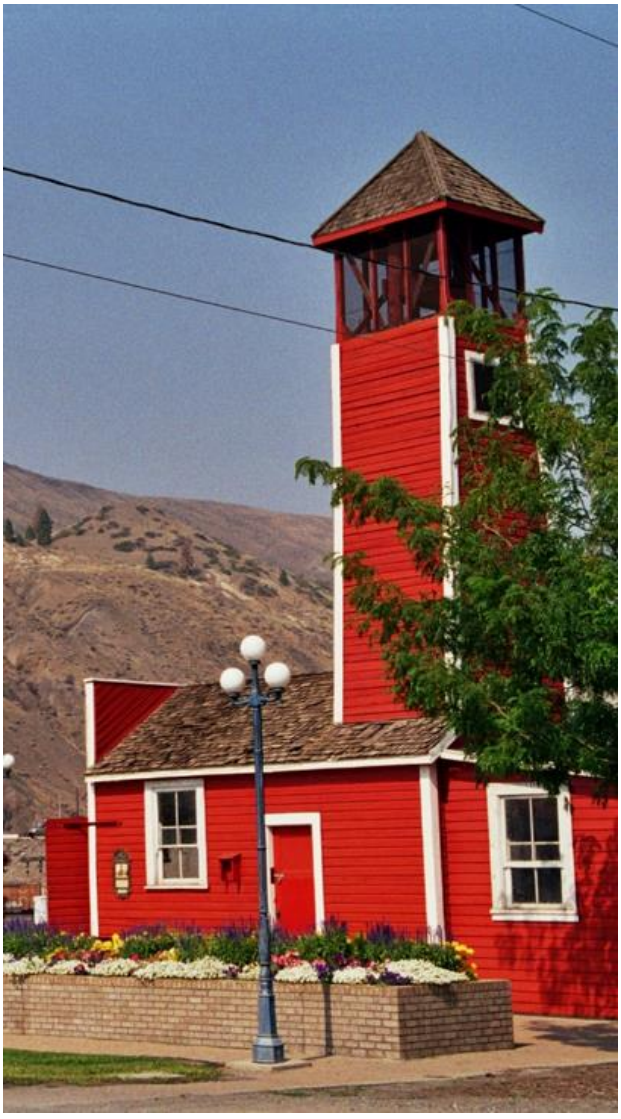
INDEX

OVERVIEW

INTRODUCTION

The Village of Ashcroft provides an annual report to the users of its water treatment and potable water distribution system. Included is an overall summery of this year's production quality, the volume of water provided, and any major Maintenance or improvements made to the system

Ashcroft's distribution permit requires this report be made accessible to the public, and the report be summited to the governing Health authorize (Interior Health.)



SUMMARY

The Ashcroft Water Distribution System consists of only one surface water source, the Thompson River (which is influenced by the Bonaparte River and Deadmans creek.) Being a river and open to atmosphere, this raw water source is at risk of contamination. We treat for harmful pathogens, high organic and inorganic loads, and seasonal fluctuations in quality. We draw from the river bed using two intake pumps.

This water is then treated by being passed through parallel flights of ultra filtration membranes, located in our water treatment building constructed in 2018. These filter membranes insure a 99.9% removal of turbidity and suspended contaminants from the drinking water prior to the disinfectant process.

After filtration we collect the water in our River Pumphouse Wet Well, where it is temporarily stored until a demand is received from the reservoirs. Two vertical highlift pumps are available to push the water uphill towards the #1 reservoir, at which point a dose of sodium hydrochloride is added into the pipeline and provides the disinfectant needed to protect our customers and distribution network. An appropriate dosage of liquid Chlorine with the necessary contact time performs a 99.99% removal of any harmful biology.

From the main reservoir, the water is mechanically moved to adjoining reservoirs, and gravity fed to consumers. The reservoirs serve two main functions, one is to provide flexibility and storage for varying user demand, secondly is to ensure an adequate volume of water in reserve should there be a need to provide water for fire protection.

The water distribution and Treatment System must compete with seasonal variation of customer demand and seasonal variations in raw water characteristics. River water levels both high and low pose a risk to our intake system. Freshet and seasonal rain events greatly increase the number of contaminants is to be found coming from the Thompson and upriver mouth of the Bonaparte. It should also be noted that the local ecology was greatly affected during the 2017 elephant hill fire, and we continue to observe deteriorated water quality. Our distribution system is used to supply the different pressure zones within our municipality. It includes Pump Houses and Booster stations which work to regulate water levels and reserves.

Intake Pumps

Through discussions with Department of Fisheries and Oceans the Village obtained permits to install two submersible pumps in the channel of the river.

As of March 2021, a subterranean chamber has been installed, allowing for extractions and maintenance of the river pumps to occur regardless of river levels.

The Village, after suffering from intake pump failures during the 2023-2024 season, now maintains a third Intake Pump in our inventory and an Emergency submersible pump setup with a cage to be used in the event of an intake system failure.

River Pump House

The Ashcroft River Pumphouse is located at the edge of the downtown area along the Thompson River. It is located beside the Legacy Park campground. The building was constructed in 1992. Originally the plant used infiltration galleries imbedded in the Thompson River, however, after 6 years the filter cloth became inefficient due to a buildup of silt. The River Pump house chlorine room, treats all water with chlorine as it enters the distribution system. The River Pump House has two highlift pumps each one is capable of supplying up to 110 l/s. These pumps are used to move the treated water up into our main reservoir.

Water Treatment Plant

In 2015 the Village was awarded a $5.8 million dollar Federal/Provincial Infrastructure Grant to construct a new water treatment plant.

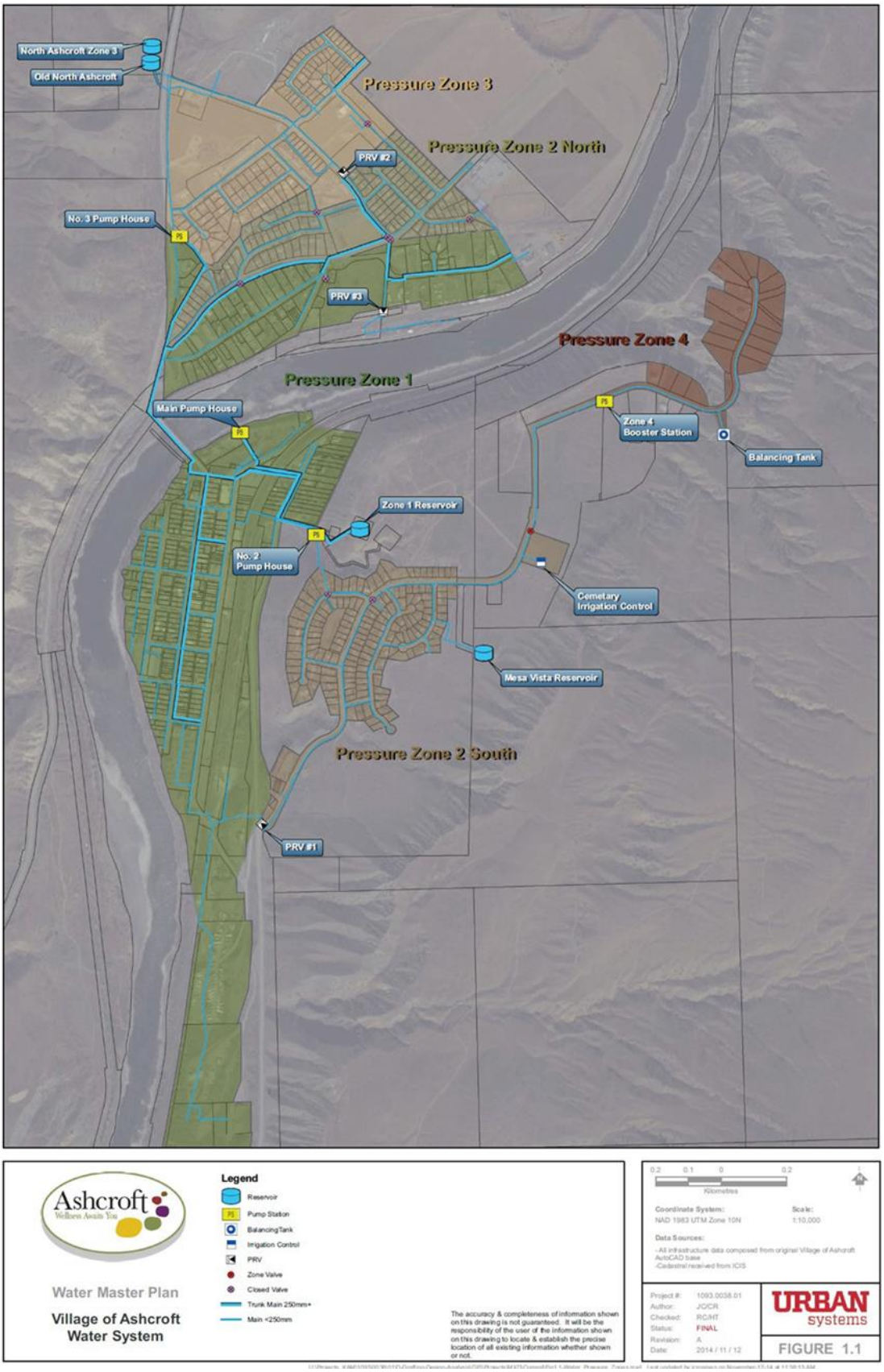
The new plant was commissioned August 2019. The plant purifies the raw water by pumping the raw water through 2 PALL ultra-filtration SKIDS arranged in parallel. This is a mechanical treatment process which uses pressure differential across a series of micron filter straw filaments to capture suspended matter and ensure a 99% log removal of turbidity.

A chemical storage/dosing room can be found in the plant. The standard chemicals we use are 12% Hypochlorite, Citric acid, Sodium hydroxide and a Chlorine neutralizing agent called Captor. Diaphragm pumps are used to accurately dose all processes and treatments, feeding into our mixing tanks on the basement floor.

The lower level of the plant contains our HVAC room, Neutralization Tank, Residuals Tank and CHN SKID. The Neutralization tank holds and chemically contaminated waste water from the treatment process, were it is neutralized and rendered safe to be released into the sewer collection system. The residuals tank is used to hold and settle any waste water produced in the treatment process so long as it is chemical free, feeding any clarified supernatant water into the front water feature and river outlet.

Two cyclone sand separators were installed inline with our raw water inflow, in 2021. These strip the sand and heavy suspended matter from the water before it is fed to the more friction sensitive components of the plant

There is a 674 Kw generator housed in the treatment Plant, used in the event of a power outage. It is designed to be large enough to operator both the water-treatment plant and distribution highlift pumps.


North Ashcroft Zone 3
Old North Ashcroft
Pressure Zone 3
Pressure Zone 2 North
PRV #2
No. 3 Pump House
PS
PRV #3
Pressure Zone 4
Pressure Zone 1
Main Pump House
PS
Zone 4 Booster Station
Balancing Tank
Zone 1 Reservoir
PS
No. 2 Pump House
Cemetary Irrigation Control
Mesa Vista Reservoir
Pressure Zone 2 South
PRV #1
Ashcroft
Wellness Awaits You
Water Master Plan
Village of Ashcroft Water System
Legend
Reservoir
Pump Station
Balancing Tank
Irrigation Control
PRV
Zone Valve
Closed Valve
Trunk Main 250mm+
Main <250mm
The accuracy & completeness of information shown on this drawing is not guaranteed. It will be the responsibility of the user of the information shown on this drawing to locate & establish the precise location of all existing information whether shown or not.
0.2 0.1 0 0.2
Kilometres
Coordinate System:
NAD 1983 UTM Zone 10N
Scale:
1:10,000
Data Sources:
- All infrastructure data composed from original Village of Ashcroft AutoCAD base
-Cadastral received from ICIS
Project #: 1093.0038.01
Author: JC/CR
Checked: RC/MT
Status: FINAL
Revision: A
Date: 2014 / 11 / 12
URBAN systems
FIGURE 1.1

Reservoirs

The Zone 1 reservoir is located in the bench of the Mesa Vista Subdivision. It has a capacity of 1.505 million litres and is at an elevation of 368 meters. All water used in the Ashcroft distribution system passes through this reservoir. This is a concrete, in ground structure that is divided into two separate chambers which allows the Village to empty a section at a time for maintenance and repair purposes.

The Mesa Vista reservoir is located in the bank above Vista Heights Drive. It has a capacity of 1.36 million litres and is at an elevation of 422 meters. This reservoir provides water to the Mesa Vista subdivision as well as to the area known as the Rural Subdivision. This is a concrete, in ground structure however due to some cracking in the 1990's a rubber membrane was installed.

The North Ashcroft reservoir is located off of Highway 97C across from Government Street. It has a capacity of 1.06 million litres with an elevation of 401 meters. It is a concrete, in ground structure. Adjacent to this reservoir is an above ground tank with a capacity of 311,000 liters and an elevation of 399 meters. This tank is only utilized during the summer months and has a rubber membrane liner.

Pump Houses

The main pumping station or River Pump House, is at the water source along the banks of the Thompson River. The pump house was constructed in 1992 and houses two 200 hp pumps. These pumps supply all of the water used in the system.

#2 Pump House is located off of Highway 97C below the Mesa Vista subdivision. This pump house ensures that the Mesa Vista reservoir levels are maintained. This Station contains three 30 Hp pumps. As of 2022, a backup generator has been added to the station.

#3 Pump House is located off of Highway 97C just below Government Street. This pump house ensures that the north Ashcroft reservoir levels are maintained. This station contains two 50ph pumps and one 25ph pump.

A booster pump station is located on Mesa Vista Drive in the rural subdivision. This booster pump station ensures that the small reservoir that services the rural area is filled. In 2014 this pump station was upgraded to allow additional chlorination in the winter months due to the low use flows.

Pressure Zones

The Village is divided into 4 pressure zones. The system pressure in each zone ranges from 65 psi to 105 psi. As part of its Water Regulations Bylaw the Village requires all service connections to the Village's water system to have a pressure reducing valve where the service line enters into the premises, as well as back flow protection.

Distribution System

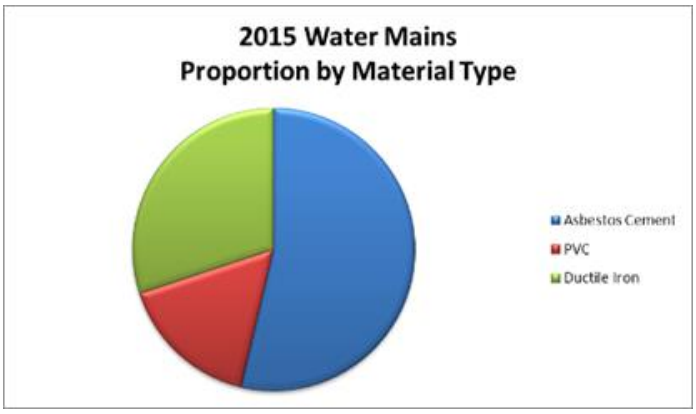
The Village of Ashcroft has 844 residential and 147 commercial water connections serving the citizens of Ashcroft. These users get their drinking water from the Thompson River.

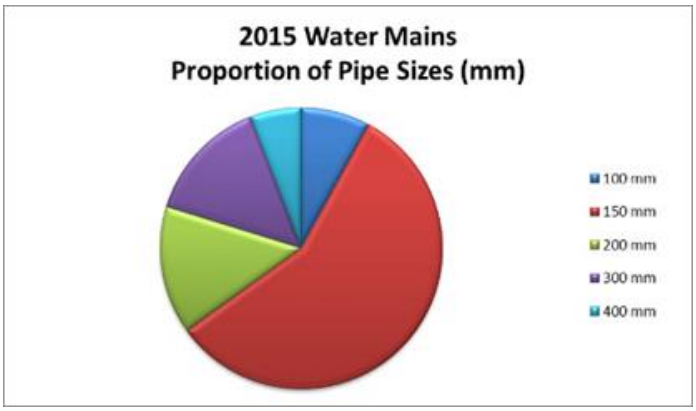
As part of the water distribution system the Village maintains 21 kms of water lines, 5 in ground reservoirs, 1 above ground steel tank, 3 pump stations and 1 booster pump station.

The Village's distribution system is 21.4 km long and is made up of 6,429 m of ductile iron pipe, 11,488 m of asbestos cement pipe and 3,471 m of PVC pipe. Pipe sizes range from 100mm to 400 mm 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 have different life expectancies. For example, cast iron pipe can last up to 100 years where as galvanized pipe is only expected to last up to 40 years.

The Village does not currently have a pipe replacement policy.






Routine
Maintenance
Program

Distribution

Fire hydrants are inspected and flushed annually. The water mains are flushed to remove any buildup of silt in the lines and to identify areas where blockages may be forming. Since the commissioning of the water treatment plant in 2019, the quality of water being distributed has reduced our need for water main flushing.
The Village has 1 employee that hold the Water Distribution Level 1 certification and 1 employee with their Water Distribution Level 2 certification. Ongoing education for certification is encouraged.

Intake

The Village carries out a regular preventative maintenance program at the water intake. The program includes a daily site visit that includes ensuring the pumps are operating properly, an inspection of the chlorination system and the turbidity monitor. Abnormalities in any of these systems are investigated and repaired as soon as possible. At the end of March, the diving company, Aqua-Bility, perform their annual inspection and cleaning of the pumps, river intake screens and security, repairing some security chains. These inspections are recorded and retained for future reference.

Reservoirs

The Village reservoirs are inspected regularly to ensure that the site and structures are secure. The reservoir levels are adjusted seasonally to ensure that the turnover of water is rapid enough to ensure the chlorine levels and fire protection needs are maintained.

Water Treatment Plant

Ashcroft's water treatment plant is classified as a level 2 ultra-filtration membrane plant. The purification system is designed by PALL and is maintained using their standardized cleaning and upkeep processes, such as EFMs and CIPs.

The Village monitors the water treatment plant every day of the year. We inspect the site for any vandalism, damage, or failures. Daily bench tests are performed on both our raw and filtered samples, in order to determine turbidity, dissolved organics, hardness, pH and temperature.

Integrity tests are performed and recorded daily. These results identify if there are any breaches in our filter system that could be a cause for health concerns. These readings are submitted to IHA along with outlet turbidity in order to ensure consistent quality control. The village is equipped with a automated alarm system to call out an operator in the event that any failures occur.

The Village has 1 employee that holds the Water Treatment Level 1 certification and 2 employees with their Water Treatment Level 2 certification.

Pump Houses

All of the Village's 3 pump houses are inspected daily. All pumps and motors are inspected regularly and serviced annually.

2023 Maintenance:

Dec 1,2022 - Both intake pumps stopped being able to produce the volume of flow needed to feed our treatment system and distribution. River levels were exceptionally low, the normally submerged horizonal pumps were partially above the water level, and the temperatures were below zero. At this time, we leased a submersible pump set up and placed it in the river were we still have adequate depth for pumping.

Dec 7,2022 - We pulled both our intake pumps out of the river and had them sent for diagnostics and repair.

May 12 - Both intake pumps crashed once again. This time during medium seasonal water levels, at the time of spring freshet. We placed the new emergency submersible pump set up into the river. After flushing the lining and cages that surround our intake pumps, we discovered large pieces of debris and wood.

2024 Capital Plan:

1. Intake pump cage review and improvements
2. Reservoir cleaning/repair/flushing
3. Water supply to the AIB
4. Double Block and Bleed installations

There has been a total of $160,000 allocated to these improvements scheduled for the coming year.

2023 Expense Breakdown	
Water Treatment Plant	**$178,746**
Water Purification	**$35,031**
Wells and Reservoirs	**$16,563**
Water Distribution	**$27,626**
Water Collection	**$12,297**
Hydrant Maintenance	**$314**

Other costs of operation include hydroelectricity, employee training, operator wages, facility security systems, etc. Taking all this into consideration, the sum cost for our water supply network was **$555,632.28** for the 2023 year.

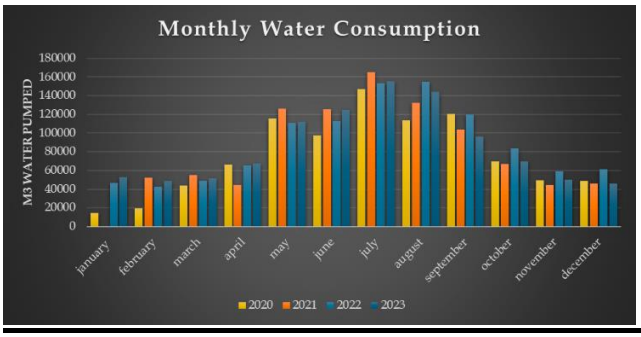
Water Consumption

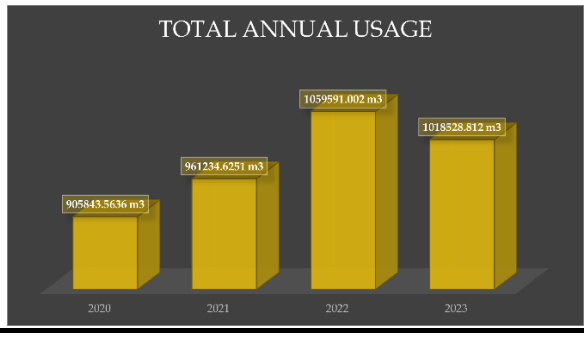
In 2023 the Village treated just over 1 million cubic meters of water July was our highest demand month and December was our lowest demand month. Our highest demand in a 24 hour period was on July 17th when we pumped 5521.1 m3. Our lowest demand in a 24 hour period was on December 23th when we pumped 1353.8 m3.

Our water is treated with liquid 12% sodium hypochlorite and in 2023 we used a total of 12,300L.

Figure 3 indicates that in 2023 the monthly consumption followed the expected trend in usage, however, there was an overall use increase. Possible reasons for the increase include a longer and hotter summer than we have experienced in the past few years.

Figure 4 shows that the volume of water treated had continuously increased from 2020 to 2022 and then decreased in 2023. In 2020 the Village treated 905,844 m3, in 2021 the volume was 961,234 m3. and in 2022 the volume increased to 1,059,591 m3, 2023 was just below at 1,018,528 m3.

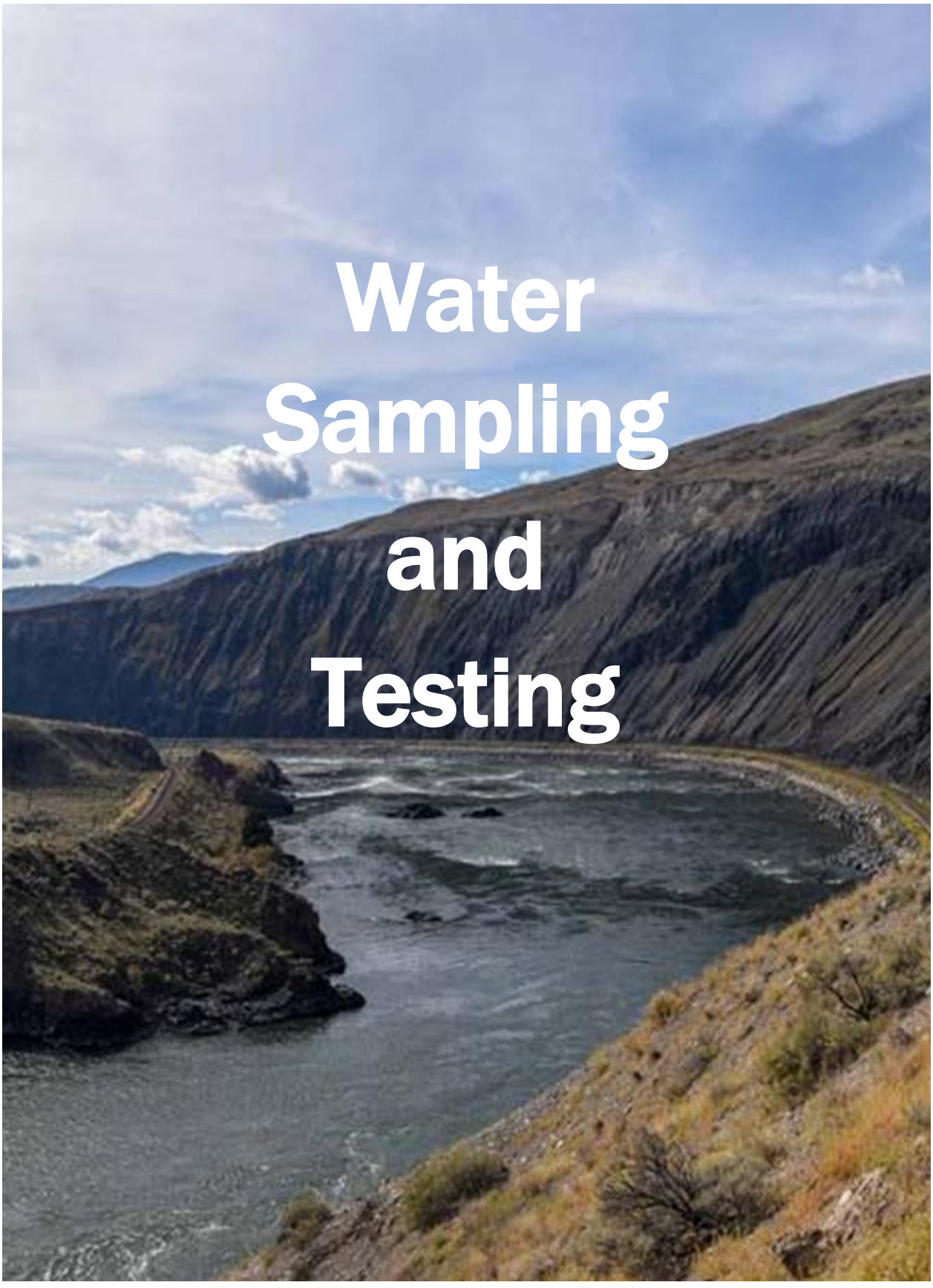




Water Conservation

In 2015 the Village passed a water conservation bylaw that introduces watering restrictions annually on May 1st. Residences will be restricted to watering on even/odd days depending upon their house number. In addition, the times that residences may water has been reduced and varies depending upon the type of irrigation system in ground automated systems vs. hose and sprinklers. The bylaw permits further reductions in watering if there are drought conditions or power outages.

During seasonal periods of low raw water quality and limited water treatment plant production, temporary water restrictions will be published and enforced through bylaws that limit the public demand and ensure we can prioritize necessary services, such as fire prevention


Water
Sampling
and
Testing

Bacteriological

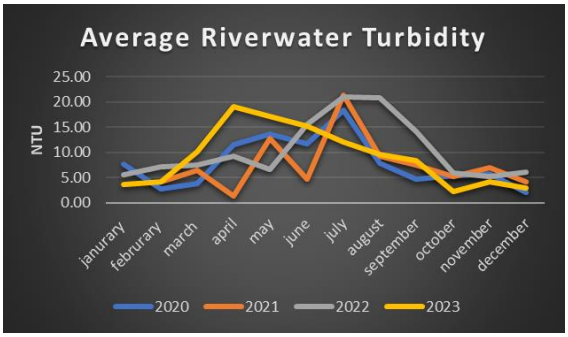
As required by the Drinking Water Protection Act and Regulation, Village staff send weekly samples of the water to an independent laboratory for bacteriological testing for Total Coliforms and E-coli Bacteria. There are three different sampling sites used throughout Ashcroft. In addition, water samples are taken from within project areas after any work on the infrastructure. In addition, the Village does regular in-house testing of our dead-end services to ensure that the treatment is adequate and residual cl2 levels are maintained.

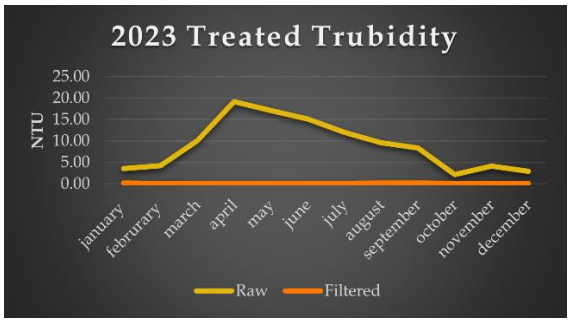
Turbidity

As the Village uses surface water for our source, turbidity is a concern.

Prior to 2019 then the water treatment plant was commissioned and put into production, the village of Ashcroft often need to post water quality and boil water notices during seasonal periods of high turbidity. Today, the water being distributed to the public is unaffected by high turbidity, as the new PALL filtration system was specifically chosen because of it's efficacy is removing suspended solids and provides a constant outflow quality of NTU (turbidity) under 0.1.

The Thompson River has continued to experience peaks of turbidity during times of spring melt/freshet, as well as during heavy rain weather events. These waves of poor raw water turbidity are also influenced by the seasonal cycles of the upstream Bonaparte River. Over the 2023 season the highest recorded raw water value was 100 NTU in March.





Full Spectrum Analysis

The Village has a full spectrum raw water analysis done every year. This test is considerably more complex and tests for alkalinity, and metals.

Cross Connection Program

The Village has a cross connection Bylaw. Those properties that have been assessed and have back flow protection devices, are required to have them inspected and tested yearly. These reports are to be forwarded to the village of Ashcroft, to be filed on record. All new buildings structures are to conform to the Village Bylaw and building code.

Emergency Response Plan

The Village has an emergency response plan that was prepared in 2004, 2013 and completely redone in 2019. The plan is reviewed annually thereafter in accordance with the Drinking Water Protection Act and Regulation.

Ashcroft
Wellness Awaits You