

# CASTLEGAR

## **Annual Water Quality Report 2023**

**Facility Name:** City of Castlegar Water Distribution System

**Facility Number:** 0210617

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# City of Castlegar

## Annual Water Quality Report 2023

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**Facility Name: City of Castlegar Water Distribution System**  
**Facility Number: 0210617**

### 1.0 Introduction

The City of Castlegar (City) is required under its Operating Permit, issued by the Interior Health Authority (IHA), and mandated by the Drinking Water Protection Act to provide an Annual Water Quality Report. The Annual Water Quality Report also serves to provide water system users with a deeper understanding of their drinking water system.

The City is committed to providing clean, safe drinking water through the responsible management and maintenance of local water infrastructure. This report will provide an overview of the water system including a summary of the existing water distribution system, water treatment and monitoring procedures, system maintenance work, and an overview of recent system improvements.

This report will be submitted to the IHA and posted on the City of Castlegar website.

### 2.0 Castlegar Water Distribution Overview

A map summarizing the City's water system assets and distribution system is provided in **Appendix A** (courtesy of 2018 Water System Optimization Study).

#### 2.1 Source

The City's primary water source is drawn from Lower Arrow Lake, a 230 km long reservoir that is part of the Columbia River watershed. The intake is situated on the west shore of the reservoir, immediately upstream of the Hugh Keenleyside Dam. The water system intake and pumphouse are owned and operated by the Mercer-Celgar pulp mill. The City gets water on a supply agreement. The watershed upstream of this point encompasses an area of 36,500 km<sup>2</sup>.

#### 2.2 Water Treatment Centre

A Mercer-Celgar pumphouse located at the intake delivers water to the Water Treatment Centre, where it undergoes treatment, testing, and quality monitoring before being conveyed to the City's distribution system. The disinfection process uses ultraviolet irradiation (UV) as a primary

disinfectant to inactivate protozoa, as well as chlorine gas as a secondary disinfectant to inactivate viruses. This provides a multi-barrier approach to disinfection by using two different forms of treatment, which is a water quality objective set out by the Drinking Water Treatment Objectives (Microbiological) for Surface Water Supplies in British Columbia.

## 2.3 Reservoirs

The treated water is then directed to and stored within one of eight reservoirs or storage tanks located throughout the City, as below (From North to South):

- Meadowlark
- Merry Creek
- School 1 & 2
- Park 1 & 2
- Meadowbrook
- Blueberry

The total available reservoir storage capacity is 12.6 megaliters.

## 2.4 Distribution System

The City's distribution system consists of approximately 106 km of water distribution piping which is comprised of varied materials, diameters, and ages. The breakdown of existing water distribution infrastructure by material type is approximately as follows:

*Table 1: Pipe Summary and Material Class*

| Pipe Material      | Sum of Pipe Length (km) | % of System   |
|--------------------|-------------------------|---------------|
| Cement             | 61.0                    | 57.8%         |
| Copper             | 0.4                     | 0.4%          |
| Ferrous            | 18.4                    | 16.4%         |
| Plastic            | 26.9                    | 25.4%         |
| <b>Grand Total</b> | <b>105.6</b>            | <b>100.0%</b> |

## 2.5 Pump Stations

### 2.5.1 Meadowlark Pump House

The Meadowlark Pump House consists of eight high-capacity pumps which are split into two stages. Three (Stage I) pumps used to assist in filling the Meadowlark Reservoir but are no longer in use. Five (Stage II) pumps fill the Park and School Reservoirs.

### 2.5.2 Park Pump House

The Park Pump House consists of four high-capacity pumps. The four pumps are referred to as the Stage III pumps. The Stage III pumps fill the Upper Bench reservoirs: Meadowbrook reservoir, Merry Creek reservoir, and Blueberry reservoir.

### **2.5.3 Grandview Booster Station**

The Grandview Booster Pump Station is equipped with two small and two large booster pumps. The pumps provide additional water supply pressure for the Grandview neighbourhood.

### **2.5.4 Highland Drive Booster Station**

The Highland Drive Booster Pump Station is equipped with one pump to increase the water supply pressure to the residents of Highland Drive. This booster pump is needed to increase system pressure during periods of peak water demand.

## **2.6 Pressure zones**

There are ten pressure zones in the City of Castlegar's Distribution System, as outlined below (from North to South):

- North Zone
- Woodland Drive Zone
- School Zone
- Merry Creek Zone
- Park Zone
- Dumont Zone
- Upper Bench Zone
- Twin Rivers Zone
- Trowalex Road Zone
- Blueberry Zone

The system pressure within these zones ranges from 275 kPa to 1034 kPa (40 PSI – 150 PSI).

## **2.7 Emergency Well Water System (North Well)**

The City of Castlegar maintains a well system that can be brought on-line to continue providing water to residents in the event of a water source emergency. The North Well (well tag #109719) and pump are rated for approximately 6 million L/day (1,100 IGPM).

This water is not approved by IHA for potable water use but throughout 2018 and 2019, the City completed upgrades to the North well to work towards gaining approval from the IHA to register the North well as a drinking water source. This approval is still being pursued by the engineering team. Staff complete monthly bacterial testing and an annual comprehensive water quality test. The pump is maintained once a month.

In 2018, the City upgraded the well system, installing a soft starter, transfer switch and generator set plug as part of the larger project of ensuring residents would have a reliable supply of water even in the event of an emergency power failure at the Mercer-Celgar pulp mill or other supply main disruption.

### 3.0 Castlegar Water Supply and Disinfection Requirements

The City supplies water in accordance with the B.C. Drinking Water Protection Act (DWPA) and Drinking Water Protection Regulation (DWPR), which ultimately outline the disinfection requirements the City must provide. The Province of B.C. has published a series of guideline documents to provide guidance on implementing the DWPA and DWPR, including the Drinking Water Treatment Objectives (Microbiological) for Surface Water Supplies in British Columbia (Surface Water Treatment Objectives). These objectives are consistent with the Guidelines for Canadian Drinking Water Quality (GCDWQ).

The general Water Treatment Objectives are comprised of the following:

- **4:** 4 log (99.99%) inactivation of viruses
- **3:** 3 log (99.9%) removal or inactivation of protozoa (Giardia Lamblia and Cryptosporidium Parvum)
- **2:** Minimum of two treatment barriers for microbiological protection
- **1:** Less than 1 NTU Turbidity
- **0:** Zero Fecal Coliforms or E. coli Bacteria

Most disinfection processes require sufficiently clear water to treat effectively. To achieve this, the GCDWQ recommends a treatment process consisting of filtration and one form of disinfection. The City of Castlegar is fortunate to have an excellent quality of raw water supply. It is however classified as a surface water source, and to meet the Objective for a minimum of two treatment barriers for microbiological protection the City would either: a) implement filtration followed by disinfection, or b) apply for filtration exemption and implement two forms of disinfection. A water supply system is permitted to operate with no filtration if the filtration exemption requirements outlined in section 4.3 of the Water Treatment Objectives guideline document are met. The City of Castlegar has been meeting the annual filtration exemption criteria since submitting an application to IHA in 2014.

The City's UV system (commissioned on August 12, 2013) allows the City to meet the requirement for two treatment barriers, and produces safe drinking water that is in compliance with the DWPA and DWPR.

## 4.0 Castlegar Water Supply and Disinfection

The City of Castlegar uses UV light as a primary disinfectant and chlorine gas as a secondary disinfectant. The UV system is designed to maintain a minimum dose of 12.2 mJ/cm<sup>2</sup> to provide the required 3 log (99.9%) protozoan inactivation. The chlorination system operates as the secondary disinfectant, providing the required 4 log (99.99%) inactivation of viruses.

The free chlorine residual is commonly referred to as a Distribution Management Tool, as it leaves a residual disinfectant in the water supply. This residual provides a quantifiable indicator that the water's chlorine concentration is adequate for disinfection and is an important parameter in ensuring that safe potable water is delivered to the residents of the City of Castlegar. The rate of chlorine injection can vary throughout the year depending largely on source water temperature and organic concentrations. The provincial health standard is to maintain a minimum free chlorine residual of 0.20 mg/L at the furthest point of the water distribution system. The chlorine injection rate at the Water Treatment Centre varies from 0.75 mg/L - 1.00 mg/L to achieve a free chlorine residual of 0.20 mg/L.

The free chlorine residual is continuously sampled and analyzed by online instrumentation installed throughout the water distribution system. The measured values are transferred to the City of Castlegar's Supervisory Control and Data Acquisition (SCADA) system, which will initiate an alarm to City personnel if the chlorine concentration is measured to be outside the allowable range. The rate of chlorine injection at the Water Treatment Centre is automatically adjusted to mitigate alerts.

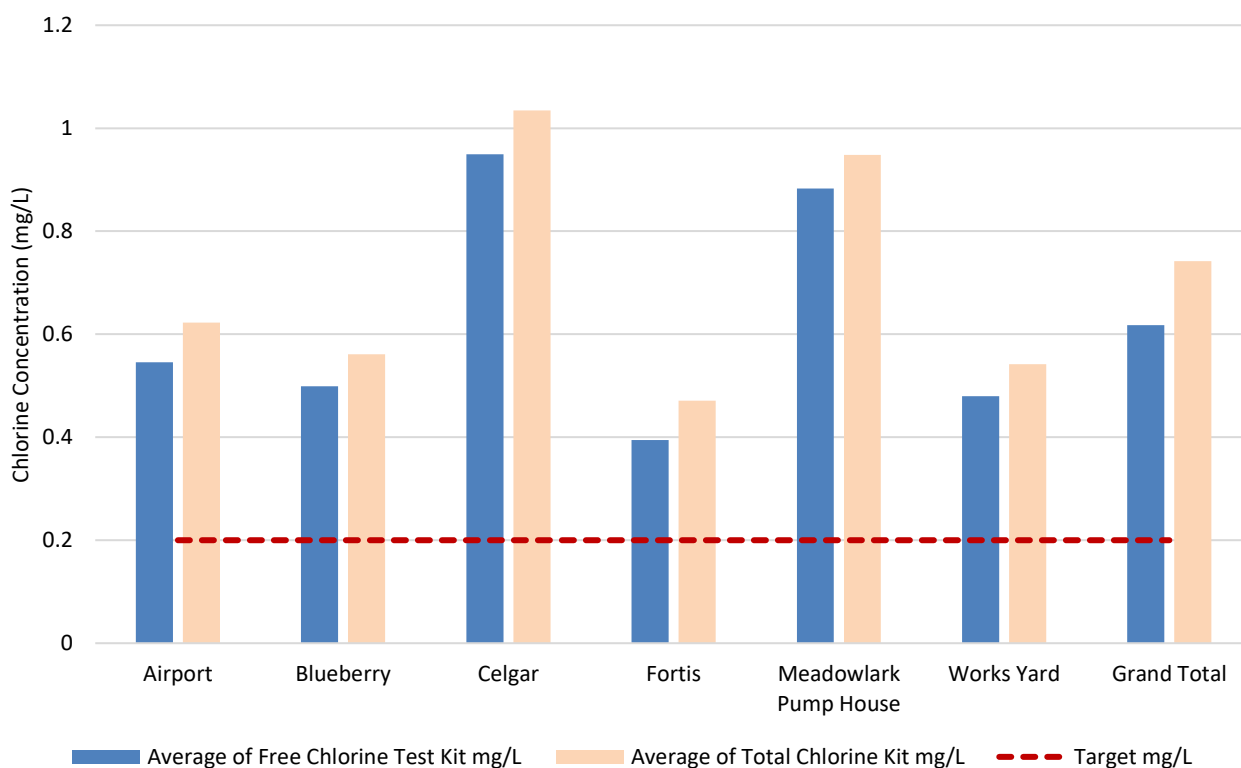
## 5.0 Testing and Monitoring Program

### 5.1 Chlorine Residual Testing

In addition to the online chlorine residual testing, City of Castlegar staff perform manual free chlorine residual testing daily at the Treatment Centre and throughout the distribution system at the Airport, Blueberry, Celgar, Fortis, Meadowlark Pump House, and Civic Works Yard sampling locations. Testing is also performed weekly at the sampling locations shown in **Figure 1** This is done to verify the accuracy of the online instrumentation.

**Figure 1** provides a summary of the free chlorine testing results as annual averages at each sampling point.

The data indicates six sampling dates where the chlorine residual measured was under the target 0.2 mg/L. The residual chlorine concentration at the Blueberry sampling point was 0.17 mg/L, 0.17 mg/L, 0.17 mg/L, and 0.18 mg/L on October 9, 20, 21, and 25, respectively. At the Fortis sampling point the residual chlorine concentration went under 0.2 mg/L on July 17 and June 23 with measurements being 0.16 mg/L and 0.18 mg/L, respectively. For all of these scenarios the residual chlorine levels did not drop significantly below 0.2 mg/L and were resolved within 1-2 days.



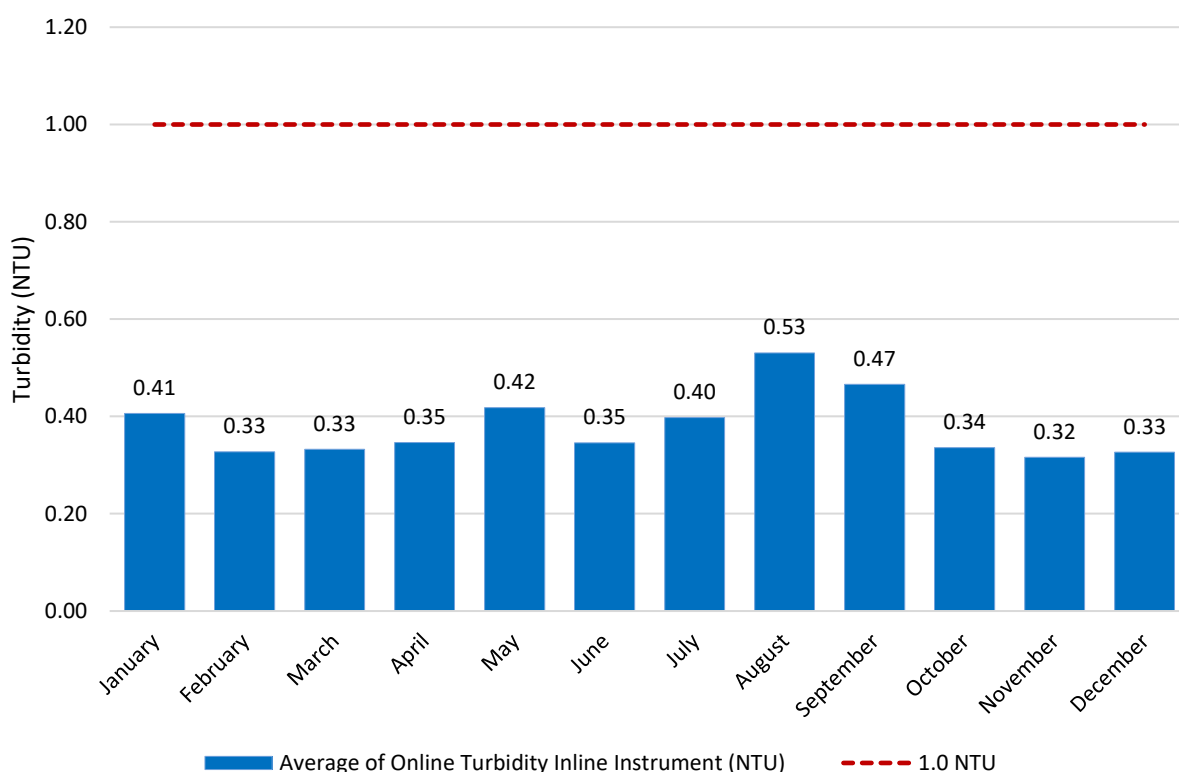
**Figure 1: Free Chlorine Residual Monitoring - Annual Averages in 2023 at Each Sampling Point**

## 5.2 Turbidity Monitoring

The City monitors raw water turbidity levels at the Water Treatment Centre daily. Turbidity is a key parameter in ensuring that the City's water supply follows the filtration exemption conditions outlined in section 4.3 of the Surface Water Treatment Objectives guideline document. The filtration exemption conditions require that average daily raw water turbidity levels be around 1 NTU, but do not exceed 5 NTU for more than two days in a 12-month period.

On September 1, 2023, the turbidity exceeded 1 NTU and measured as 1.41 NTU. A water quality advisory was put out on this day as discussed in section 7.1.

The filtration exemption conditions for turbidity were met throughout 2023. **Figure 2** summarizes the monthly average turbidity readings in 2023.

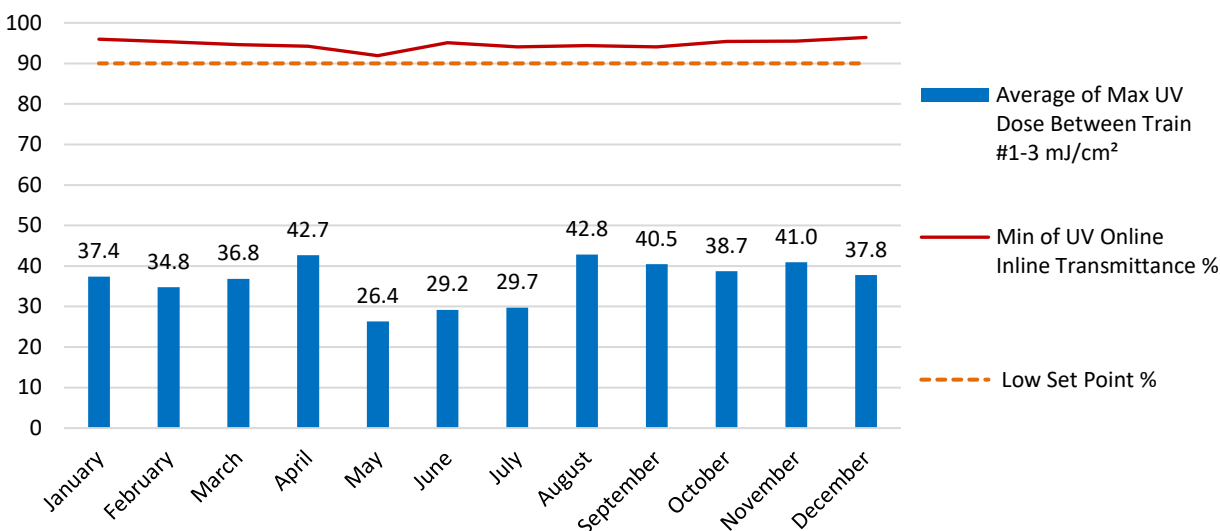


**Figure 2: Monthly Average Raw Water Turbidity Levels Measured at Water Treatment Centre in 2023**

## 5.3 UV Light Dose & Transmittance Monitoring

UV dose and UV transmittance (UVT) values are recorded daily at the Water Treatment Centre. UVT is important as it impacts the effectiveness of UV treatment. When UVT is too low, UV light is not able to penetrate the water and overall effectiveness of protozoa inactivation is reduced. The system's low and low-low UVT set-points are 90% and 88%, respectively. There were no recorded UVT measurements below the low set-point of 90% in 2023.

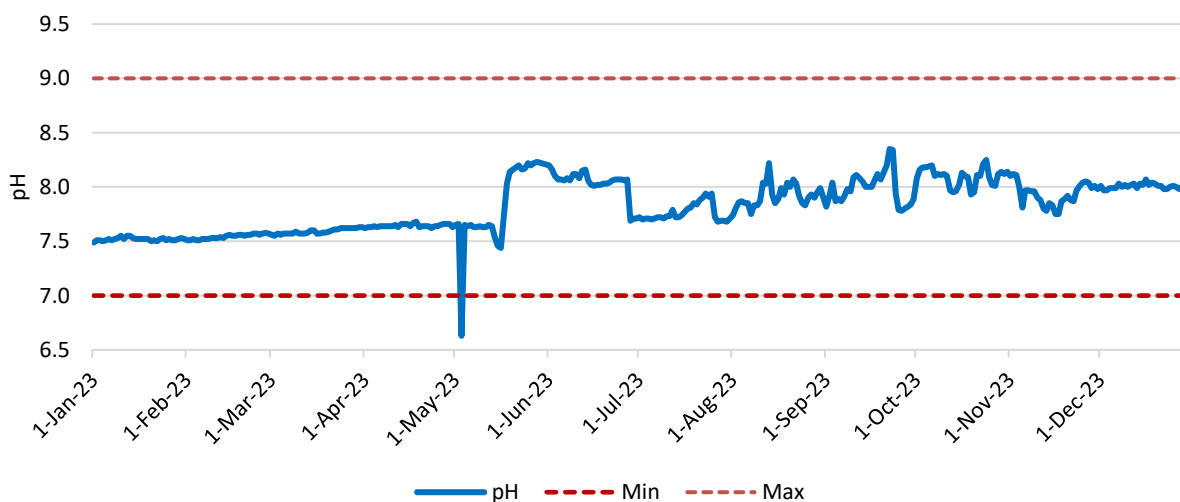
The UV system was designed to maintain a minimum dose of 12.2 mJ/cm<sup>2</sup> to provide the required 3 log (99.9%) protozoan inactivation. In 2023, there were two days the minimum UV dose of 12.2 mJ/cm<sup>2</sup> was not met; a dose of 0 mJ/cm<sup>2</sup> was measured on February 18 and July 7. It is suspected that these measurements were likely due to an error in the monitoring rather than the UV dose being zero. **Figure 3** below provides a summary of the UV doses and UVT throughout 2023.



**Figure 3: Monthly Average UV Dose and Transmittance in 2023**

#### 5.4 pH Monitoring

pH is monitored by operators at the Water Treatment Centre and measurements are recorded each day. The target pH is between 7 and 9, which is within the range recommended by the *Guidelines for Canadian Drinking Water Quality* (pH 7 to 10.5). **Figure 4** provides a summary of pH measurements recorded throughout 2023. All measurements except one were between the target pH range of 7 to 9. On May 3<sup>rd</sup> the pH level dropped to 6.63.



**Figure 4: Daily pH Monitoring Data in 2023**

## 5.5 Bacteriological Testing

As required under the City's Operating Permit, City operators perform weekly bacteriological testing for E. coli and Total Coliform Bacteria throughout the distribution system. Sampling locations are as follows:

- Water Treatment Centre (raw water)
- Meadowlark Pump house
- Airport
- Blueberry
- Civic Works Yard

**Table 2** summarizes the treatment targets required to meet the BC filtration exemption conditions for E. coli and Total Coliform, as well as the City's level of compliance in 2023.

**Table 2: BC Filtration Exemption Conditions & City's Level of Compliance**

| Parameter                     | Filtration Exception Condition                                                                                                                                                                                                                                                                     | Level of Compliance                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|-------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| E. coli                       | "the number of E. coli in raw water does not exceed 20/100 mL (or if E. coli data are not available less than 100/100 mL of total coliform) in at least 90% of the weekly samples from the previous six months."                                                                                   | Throughout 2023, all E. coli test results (raw water) were below the required 20/100mL.                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Total Coliform                | "total coliform objectives are also zero based on one sample in a 30-day period. For more than one sample in a 30-day period, at least 90% of the samples should have no detectable total coliform bacteria per 100 mL and no sample should have more than 10 total coliform bacteria per 100 mL." | <p>Throughout 2023 the total coliforms were below the set limit excluding the following:</p> <p>At the Water Treatment Centre, the tap water samples came back with total coliform values above the suggested values. 17% of the tests showed total coliforms above 10/100 mL, and 38% tests showed total coliforms above 0/100 mL throughout 2023.</p> <p>In the North Well only had one day where the coliform count was above zero. On August 14<sup>th</sup> the test sample reported 30/100 mL total coliforms.</p> |
| Both E. coli & Total Coliform | "Treatment target for all water systems is to contain no detectable E. coli or fecal coliform per 100 mL."                                                                                                                                                                                         | Met for all sample points excluding the scenarios described above for total coliforms.                                                                                                                                                                                                                                                                                                                                                                                                                                   |

## 5.6 Raw Water Full Chemical Analysis Testing

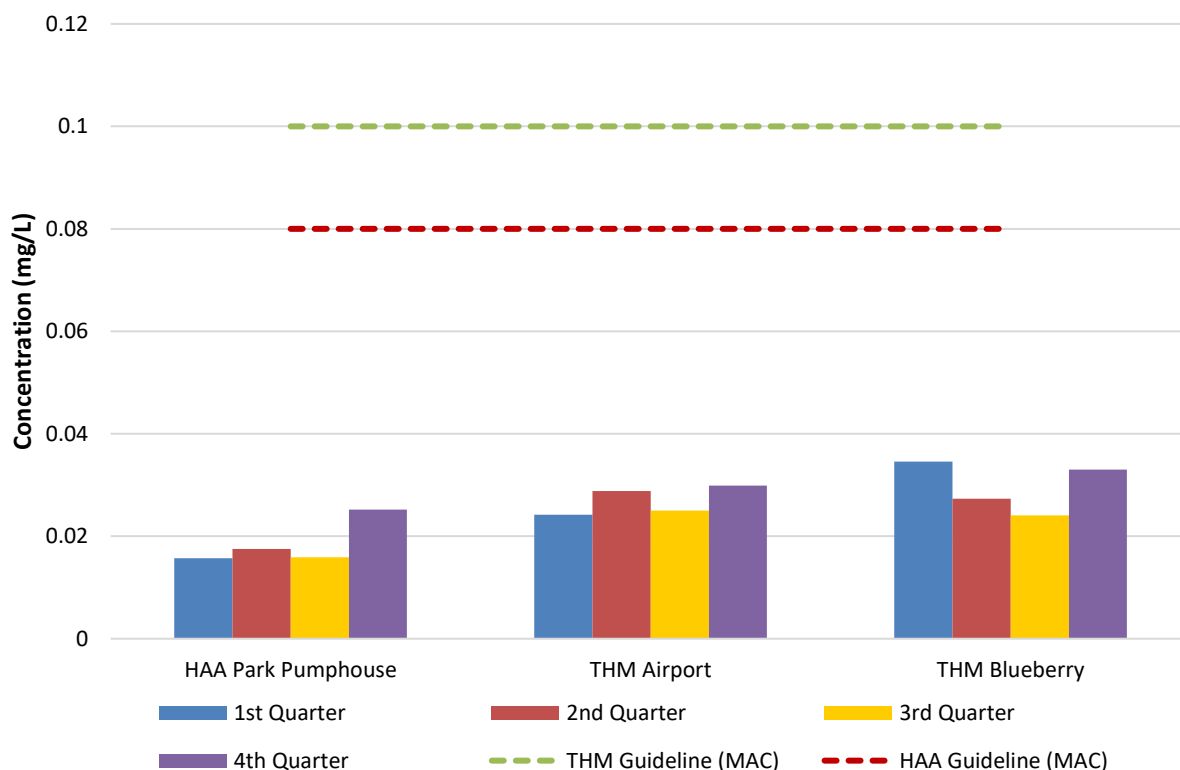
City Staff collect quarterly raw water samples from the raw water tap at the Water Treatment Centre and submit it for a full chemical analysis. Parameters such as alkalinity, hardness, conductivity, pH, fluoride, arsenic, lead, mercury, and turbidity are measured and reported.

Continuous turbidity monitoring, chlorine residual monitoring, and UV dose monitoring is carried out at the Water Treatment Centre. Operators inspect monitoring equipment performance and confirm alarm set points daily. See **Appendix B** for full chemical analysis test results.

## 5.7 Additional Distribution System Testing

On a quarterly basis, City staff collect water samples from the endpoints of the distribution system (Blueberry and the Airport) for total trihalomethane (THM) testing. City operators also collect samples from the mid-point of the distribution system (Park Pumphouse) for haloacetic acid (HAA) testing. **Figure 5** summarizes the THM and HAA test results, including the maximum acceptable concentrations (MAC) for each parameter for reference.

See **Appendix B** for THM & HAA laboratory test results.

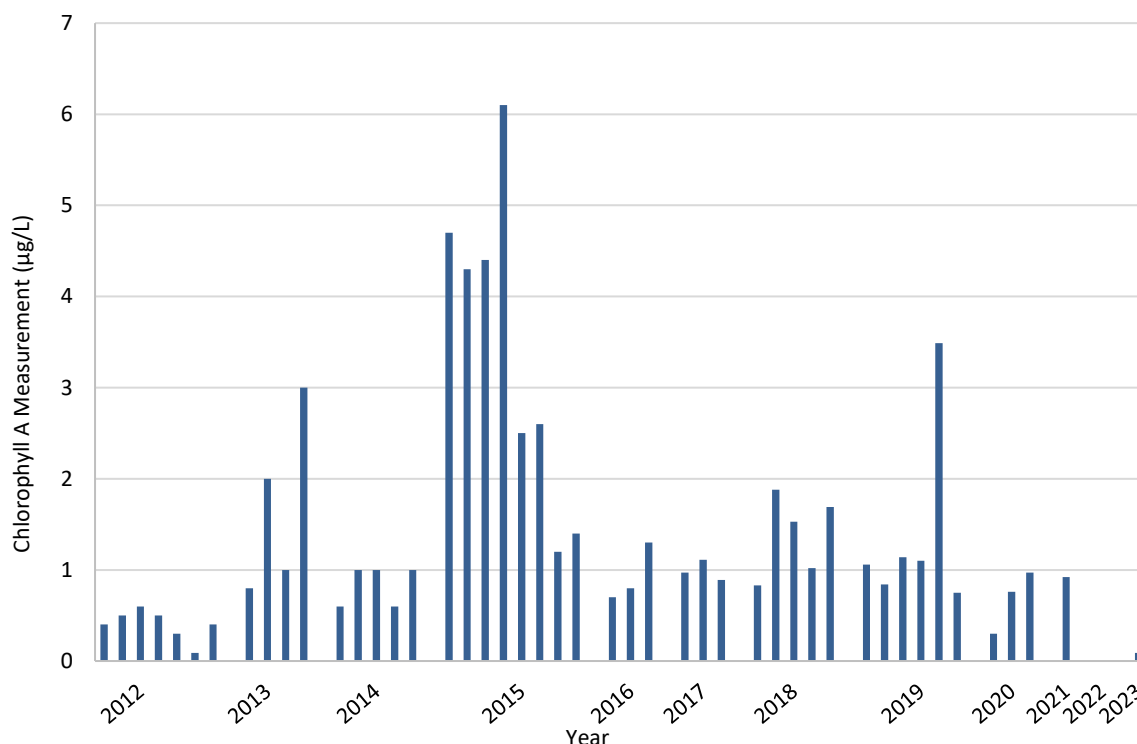


**Figure 5: Quarterly THM and HAA Testing Results with Maximum Acceptable Concentration (MAC) of 0.1 mg/L and 0.08 mg/L for THM and HAA, respectively.**

## 5.8 Algae Blooms and Nutrients

Castlegar's water system has seen the impacts from elevated levels of algae in the raw water supply over the past few years. This algae growth is a result of excess nutrient levels in the Arrow Lakes Reservoir and is thought to be a result of fertilizer runoff from agricultural properties and/or the Province's nutrient enrichment program implemented to support recreational fishing.

In recent years, Chlorophyll A levels have remained below the highest levels seen in 2015 and the trend appears to be relatively stable with some peaks. A summary of Chlorophyll A sampling results from 2012 to 2023 is shown in **Figure 6**. Note, no Chlorophyll A sampling was completed in 2022. The 2023 test result was < 1.0 µg/L Chlorophyll A, see **Appendix C** for the certificate of analysis.



**Figure 6: Chlorophyll A Sampling Results (2012-2023)**

The City has addressed the algae issue within its distribution system through its annual flushing program, which helps to remove algae that tends to settle near the beginning of the distribution system.

## 5.9 North Well Analysis Testing

A full chemical analysis of raw water from the well was conducted in January 2023. Refer to **Appendix D** for the North Well water quality results.

### **5.10 System Control: SCADA**

The City's SCADA (Supervisory Control and Data Acquisition) system continuously monitors the Water Treatment Centre and Water Distribution System for the following parameters:

- Turbidity (Raw and Treated Water)
- UV transmittance
- UV dose
- Chlorine residual
- Flowrate (cumulative daily and instantaneous maximum)
- Temperature
- pH

If a significant change in operating parameters or a component failure is registered by the system, an alarm is issued to the phones of appropriate City personnel and after hours to the City of Castlegar's emergency phone. This provides the City several levels of confidence in addressing alarm conditions.

## **6.0 System Maintenance**

### **6.1 Fire Hydrants**

All fire hydrants are inspected and flushed annually. In addition, the City has established three hydrant maintenance zones to carry out a complete tear down and inspection of internal components on a rotational basis. One zone is inspected each year; therefore, all fire hydrants are inspected every three years.

### **6.2 Emergency Well Water System (North Well)**

The City maintains a groundwater well (North well) for emergency purposes. The well system is rated at approximately 6 million L/day (1,100 USGPM) and is maintained monthly to ensure it is ready for use in an emergency.

### **6.3 Pump Stations**

The Meadowlark Pump House and the Park Pump House are inspected daily. The Grandview booster station and the Highland Drive booster station are inspected weekly. All pumps and motors are serviced as per the manufacturer's specifications.

### **6.4 Castlegar Water Treatment Centre**

The Water Treatment Centre is inspected daily to ensure that the UV and chlorination disinfection systems are operating correctly. Once a month, the electromagnetic flow meter and UV reference sensors are validated for accuracy. Once a year, the UV reference probes are validated by a third party.

## **6.5 Reservoirs**

Reservoirs are inspected bi-weekly to make sure that operation is normal and that the site is secure. All reservoir levels are monitored in real-time on the City's SCADA system. Automatic alarms are issued to operations personnel if reservoir levels register a high level, low level, or drastic level fluctuation.

## **6.6 Pressure Reducing Stations**

The City of Castlegar operates and maintains 11 pressure reducing valves (PRV) stations. The PRV stations are inspected bi-weekly to verify normal operation and to check for any leaks.

## **6.7 Security**

Castlegar's water distribution system is protected by several security measures. The Water Treatment Centre is equipped with a security system and surveillance cameras. All reservoirs are fenced with locked ladder access. Both the Meadowlark and Park Pump houses are equipped with a security system and surveillance cameras. All PRV sites are securely locked.

## **6.8 Unidirectional Flushing (UDF) Program**

In 2013, the City developed a Unidirectional Flush (UDF) program. This is comprised of approximately 250 UDF routes, which are separated into established "flushing zones". To ensure that all areas are flushed regularly, the City carries out system flushing within the zones on an alternating cycle. The last UDF event was in 2020.

## 7.0 Water Quality

### 7.1 Water Quality Issues

One Water Quality Advisory took place on September 1, 2023, where an advisory was issued city-wide due to increased turbidity in the source water. The monitoring program reported 1.41 NTU which is above 1.0 NTU as discussed in section 5.2. This issue was quickly resolved and the advisory was rescinded on September 5, 2023.

### 7.2 Source Protection Plan

The *Arrow Reservoir Source Assessment Report* (Urban Systems, 2014) identified key recommendations and priorities for protecting the City's drinking water supply. The City continues to work towards implementing the Assessment Report recommendations; however, due to the size of the Arrow Lakes Reservoir and Columbia River watershed, implementing all the recommendations requires significant coordination between various organizations.

To date, the City has carried out the following recommendations from the report:

1. Collaborate with Celgar to construct a security fence around the intake and treatment works at Arrow Lake; and,
2. Ongoing source water monitoring - Develop a water quality sampling schedule, including sampling frequencies, to understand and trend any changes in water quality conditions and to identify possible threats to the source water quality.

## 8.0 Operator Education and Training

The City of Castlegar has established a training program that follows the 'Environmental Operators Certification Program' (EOCP) guidelines for required training. **Table 3** summarizes the current levels of EOCP certification held by City of Castlegar staff.

**Table 3: Operators & EOCP Current Certifications**

| Employee                          | Active Levels            |
|-----------------------------------|--------------------------|
| Aaron Geck – Treatment Foreman    | WWC 1, WWT4              |
| Ian Dudley – Crew                 | WD 1, WT 3               |
| Todd Chahley –Maintenance Foreman | WWT1, WWC 2, WD 2, WT 1  |
| Miroslav Bazgier - Crew           | WT 1                     |
| Kurt Thomson – Crew               | WD 2, WWC 2, WT 1, WWT 1 |
| Dana Boone - Crew                 | WD 2, WWC2               |
| Charles Hesketh                   | WD 1                     |
| Graham Lindsey – Crew             | WD 2, WWC 1              |
| Philip Jago – Crew                | WT 1, WWT 1, WD 1        |

## **9.0 Emergency Response Plan**

Emergency response planning is an essential part of the governance of a drinking water system. As required under the Operating Permit, the City of Castlegar has prepared an Emergency Response Plan for the City's water system (2014) which was reviewed and revised in 2019. The goal of the Plan is to identify potential emergency conditions that could occur and have documented response procedures in place. The Emergency Response Plan has not yet been endorsed by the Castlegar Fire Department or the RCMP.

Moving forward, the City plans to continue to explore the viability of using the North Well as an emergency water source as discussed in section 2.7. The well is registered with the province but does not have a groundwater use license. This was applied for and acknowledged by the province in 2021, but is still being processed. Approval from Interior Health is needed to use it as a drinking water source. For this approval, water assessment is taking place in 2024.

## **10.0 Cross-Connection Control Program**

The City developed and enforces compliance with a Cross Connection Control Program. This program was established to identify and mitigate high risk service connections that could contaminate the City's water supply and is regulated by Bylaw 1014 (City of Castlegar Elimination and Prevention of Cross-connections Bylaw). In 2023, this bylaw was updated to Bylaw 1404 (City of Castlegar Cross-Connection Control Bylaw, 2023). The Bylaw requires all multi-family, commercial, institutional, and industrial properties to have measures in place to control or eliminate cross-connections. These measures typically include the installation of a back flow prevention assembly, which prevents water from flowing back into the City's distribution system, as well as completing backflow assembly and prevention device testing as required by the City. Starting in 2023 the City began a cross-connection survey program to re-assess the cross-connection potential in all commercial, institutional, and industrial properties in the City.

## **11.0 System Improvements and Capital Works Projects**

The City of Castlegar's Water Management Plan (Urban Systems, 2009) provides a comprehensive assessment of the City's water source, treatment, and distribution systems. This report outlined improvements necessary for maintaining a continuously reliable water supply, as well as timelines for such upgrades. The City of Castlegar has accomplished many of the capital works projects identified in the 2009 Water Management Plan, including:

- SCADA system upgrades and optimization.
- Prepare an Emergency Response Plan.
- Replace sections of undersized water mains (pipe replacement program).

- Complete a comprehensive network pipe material condition and anticipated remaining life investigation to support pipe replacement program.
- Install security measures at major facilities.
- Upgrade of various PRV Stations.
- Construct additional storage at the Park Reservoir Site.
- Update the existing cross connection control program to ensure it meets current requirements.

Since the development of the Water Management Plan, the City has worked to complete an Integrated Infrastructure Capital Plan (IICP). The IICP uses a risk-based approach to integrate the potential impacts of climate change with the fundamentals of asset management in order to identify and rank priority upgrades throughout the City.

In addition to the IICP, a Water System Optimization (WSO) report was prepared for the City in early 2019. The WSO used hydraulic modelling to identify upgrades recommended throughout the City to optimize the water system. The City plans to draw on the IICP and WSO reports for guidance regarding ongoing asset renewal decisions to ensure service delivery within a continuously changing environment.

The following includes the recommended optimization projects by area:

- South System Improvements:
  - Upsize Blueberry supply pipe
  - Upgrade south area hydraulics – new PRVs
  - Storage improvement in Upper Bench Zone
  - Blueberry zone pipe renewal and fire flow improvement
- Park Zone Improvements:
  - Decommission school zone tanks
  - Fire flow looping and upsizing (Hwy-Commercial)
  - Twin Park storage steel tank and decommission concrete tank
- Water Treatment Centre to North End Improvements:
  - Install interconnection from Park zone to North zone for emergency fire flow
  - Fire flow looping and upsizing (downtown area of North zone)
  - Supply control update at Water Treatment Centre
- Various PRV upgrades

The most recent upgrade and maintenance projects, as well as planned projects for 2024 (and near future) are listed below.

### **2021 Improvements and Capital Projects**

- Phase 2 of Columbia Avenue water main replacement from 18<sup>th</sup> to 24<sup>th</sup> St.

### **2022 Improvements and Capital Projects**

- 37th St. PRV upgrade and confined space elimination was delayed to 2023 due to supply chain issues.

### **2023 Improvements and Capital Projects**

- 37th St. PRV upgrade and confined space elimination.
- Started renewal of cross-connection control surveys in commercial, institutional, and industrial properties.

### **Planned Improvements and Capital Projects for Near Future**

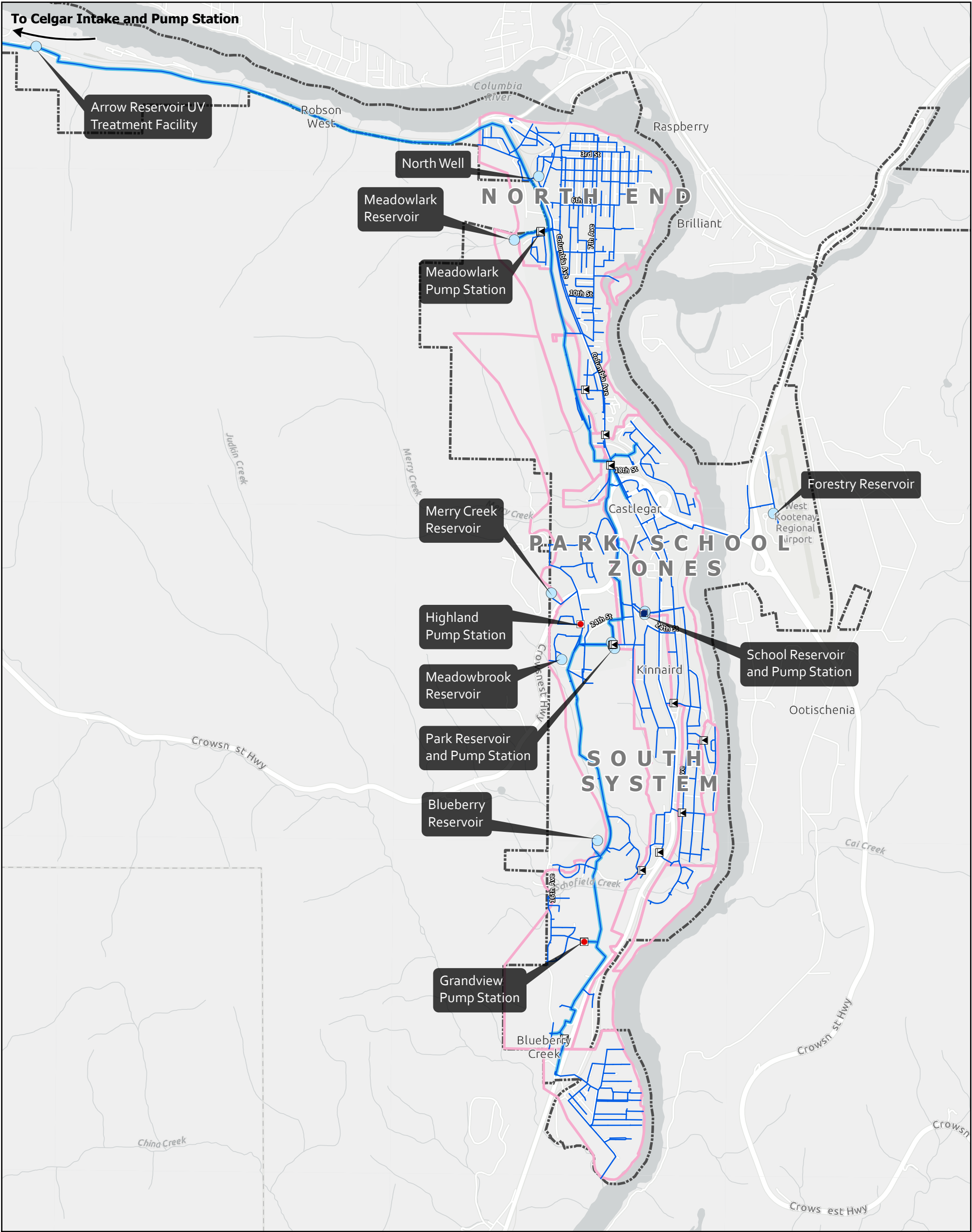
- Detailed design of Phase 3 of Columbia Avenue water main replacement from 17th St. to 18th St. and 11th St. to 13th St. (Construction scheduled for 2025).
- SCADA Upgrades (ongoing).
- Twin Rivers Phase 2 (anticipated completion 2023).
- Selkirk College feeder main (anticipated completion 2023).
- Toba Road (anticipated completion 2023).
- Detailed design of Orchard Avenue Phase 2 including water main installation for road extension and site servicing (construction scheduled for 2024).
- Start development of City Engineering design guidelines to clarify design standards and specifications (including for service installations, PRV designs, metering, modelling, and backflow requirements).
- Continue unidirectional flushing program.
- Complete a full hydraulic water model update including calibration/verification (scheduled for 2024).

## **12. Conclusion**

The City of Castlegar has worked with the local Health Officials to develop a water quality monitoring program that exceeds the Drinking Water Protection Act. The City will continue the monitoring program as part of its commitment to deliver safe potable water to residents in an environmentally and financially sustainable manner.

# **APPENDIX A**

## **Castlegar Water Distribution System**





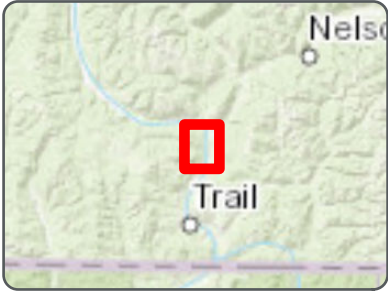
City of Castlegar

Water System Optimization Study  
2018 Water System

**System Assets and Community Layout**

**Legend**

- Altitude Valve
- Pressure Reducing Valve
- Pump
- Network Structure
- Water Main
- Supply / Trunk Mains
- Pressure Zone Boundary



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.

0 250 500 1,000 1,500

Metres

**Coordinate System:**

**Scale:**  
1:35,000

**Data Sources:**  
Data provided by -  
City of Castlegar  
Urban Systems

|            |              |
|------------|--------------|
| Project #: | 0841.0104.01 |
| Author:    | BP           |
| Checked:   | AC           |
| Status:    | <b>FINAL</b> |
| Revision:  | A            |
| Date:      | 2019 / 1 / 9 |



**FIGURE 1**

## **APPENDIX B**

### **Chemical Analysis Lab Test Results**

## CERTIFICATE OF ANALYSIS

**REPORTED TO** Castlegar, City of  
460 Columbia Avenue  
CASTLEGAR, BC V1N 1G7

**ATTENTION** Craig Lincoln

**PO NUMBER** 502

**PROJECT** General Potability

**PROJECT INFO** Quarterly Comprehensive

**WORK ORDER** 23D0403

**RECEIVED / TEMP** 2023-04-05 08:20 / 7.8°C

**REPORTED** 2023-04-17 13:25

**COC NUMBER** No Number

### 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.

By engaging our services, you are agreeing to CARO Analytical Service's Standard Terms and Conditions outlined here:  
<https://www.caro.ca/terms-conditions>

If you have any questions or concerns, please contact me at [bwhitehead@caro.ca](mailto:bwhitehead@caro.ca)

#### Authorized By:

Brent Whitehead  
Account Manager

1-888-311-8846 | [www.caro.ca](http://www.caro.ca)

#110 4011 Viking Way Richmond, BC V6V 2K9 | #102 3677 Highway 97N Kelowna, BC V1X 5C3 | 17225 109 Avenue Edmonton, AB T5S 1H7 |  
#108 4475 Wayburne Drive Burnaby, BC V5G 4X4

## TEST RESULTS

**REPORTED TO PROJECT** Castlegar, City of  
General Potability

**WORK ORDER REPORTED** 23D0403  
2023-04-17 13:25

| Analyte                                                                                                   | Result     | Guideline     | RL Units      | Analyzed   | Qualifier |
|-----------------------------------------------------------------------------------------------------------|------------|---------------|---------------|------------|-----------|
| <b>481E - Water Treatment Center - Raw Water (23D0403-01)   Matrix: Water   Sampled: 2023-04-04 11:40</b> |            |               |               |            |           |
| <b>Anions</b>                                                                                             |            |               |               |            |           |
| Chloride                                                                                                  | 0.32       | AO ≤ 250      | 0.10 mg/L     | 2023-04-05 |           |
| Fluoride                                                                                                  | < 0.10     | MAC = 1.5     | 0.10 mg/L     | 2023-04-05 |           |
| Nitrate (as N)                                                                                            | 0.119      | MAC = 10      | 0.010 mg/L    | 2023-04-05 |           |
| Nitrite (as N)                                                                                            | < 0.010    | MAC = 1       | 0.010 mg/L    | 2023-04-05 |           |
| Sulfate                                                                                                   | 12.6       | AO ≤ 500      | 1.0 mg/L      | 2023-04-05 |           |
| <b>Calculated Parameters</b>                                                                              |            |               |               |            |           |
| Hardness, Total (as CaCO <sub>3</sub> )                                                                   | 68.1       | None Required | 0.500 mg/L    | N/A        |           |
| Langelier Index                                                                                           | -1.5       | N/A           | -5.0          | 2023-04-14 | CT6       |
| Solids, Total Dissolved                                                                                   | 73.7       | AO ≤ 500      | 1.00 mg/L     | N/A        |           |
| <b>General Parameters</b>                                                                                 |            |               |               |            |           |
| Alkalinity, Total (as CaCO <sub>3</sub> )                                                                 | 56.7       | N/A           | 1.0 mg/L      | 2023-04-11 |           |
| Alkalinity, Phenolphthalein (as CaCO <sub>3</sub> )                                                       | < 1.0      | N/A           | 1.0 mg/L      | 2023-04-11 |           |
| Alkalinity, Bicarbonate (as CaCO <sub>3</sub> )                                                           | 56.7       | N/A           | 1.0 mg/L      | 2023-04-11 |           |
| Alkalinity, Carbonate (as CaCO <sub>3</sub> )                                                             | < 1.0      | N/A           | 1.0 mg/L      | 2023-04-11 |           |
| Alkalinity, Hydroxide (as CaCO <sub>3</sub> )                                                             | < 1.0      | N/A           | 1.0 mg/L      | 2023-04-11 |           |
| Colour, True                                                                                              | < 5.0      | AO ≤ 15       | 5.0 CU        | 2023-04-07 |           |
| Conductivity (EC)                                                                                         | 134        | N/A           | 2.0 µS/cm     | 2023-04-11 |           |
| Cyanide, Total                                                                                            | < 0.0020   | MAC = 0.2     | 0.0020 mg/L   | 2023-04-06 |           |
| pH                                                                                                        | 6.93       | 7.0-10.5      | 0.10 pH units | 2023-04-11 | HT2       |
| Temperature, at pH                                                                                        | 22.5       | N/A           | °C            | 2023-04-11 | HT2       |
| Turbidity                                                                                                 | 0.30       | OG < 1        | 0.10 NTU      | 2023-04-06 |           |
| <b>Microbiological Parameters</b>                                                                         |            |               |               |            |           |
| Coliforms, Total                                                                                          | < 1        | MAC = 0       | 1 CFU/100 mL  | 2023-04-05 |           |
| E. coli                                                                                                   | < 1        | MAC = 0       | 1 CFU/100 mL  | 2023-04-05 |           |
| <b>Total Metals</b>                                                                                       |            |               |               |            |           |
| Aluminum, total                                                                                           | 0.0133     | OG < 0.1      | 0.0050 mg/L   | 2023-04-11 |           |
| Antimony, total                                                                                           | < 0.00020  | MAC = 0.006   | 0.00020 mg/L  | 2023-04-11 |           |
| Arsenic, total                                                                                            | < 0.00050  | MAC = 0.01    | 0.00050 mg/L  | 2023-04-11 |           |
| Barium, total                                                                                             | 0.0159     | MAC = 2       | 0.0050 mg/L   | 2023-04-11 |           |
| Boron, total                                                                                              | < 0.0500   | MAC = 5       | 0.0500 mg/L   | 2023-04-11 |           |
| Cadmium, total                                                                                            | < 0.000010 | MAC = 0.007   | 0.000010 mg/L | 2023-04-11 |           |
| Calcium, total                                                                                            | 19.4       | None Required | 0.20 mg/L     | 2023-04-11 |           |
| Chromium, total                                                                                           | < 0.00050  | MAC = 0.05    | 0.00050 mg/L  | 2023-04-11 |           |
| Cobalt, total                                                                                             | < 0.00010  | N/A           | 0.00010 mg/L  | 2023-04-11 |           |
| Copper, total                                                                                             | < 0.00040  | MAC = 2       | 0.00040 mg/L  | 2023-04-11 |           |
| Iron, total                                                                                               | 0.011      | AO ≤ 0.3      | 0.010 mg/L    | 2023-04-11 |           |
| Lead, total                                                                                               | < 0.00020  | MAC = 0.005   | 0.00020 mg/L  | 2023-04-11 |           |
| Magnesium, total                                                                                          | 4.75       | None Required | 0.010 mg/L    | 2023-04-11 |           |
| Manganese, total                                                                                          | 0.00163    | MAC = 0.12    | 0.00020 mg/L  | 2023-04-11 |           |
| Mercury, total                                                                                            | < 0.000010 | MAC = 0.001   | 0.000010 mg/L | 2023-04-13 |           |

## TEST RESULTS

**REPORTED TO PROJECT** Castlegar, City of  
General Potability

**WORK ORDER REPORTED** 23D0403  
2023-04-17 13:25

| Analyte | Result | Guideline | RL | Units | Analyzed | Qualifier |
|---------|--------|-----------|----|-------|----------|-----------|
|---------|--------|-----------|----|-------|----------|-----------|

### 481E - Water Treatment Center - Raw Water (23D0403-01) | Matrix: Water | Sampled: 2023-04-04 11:40, Continued

#### Total Metals, Continued

|                   |           |            |          |      |            |  |
|-------------------|-----------|------------|----------|------|------------|--|
| Molybdenum, total | 0.00045   | N/A        | 0.00010  | mg/L | 2023-04-11 |  |
| Nickel, total     | 0.00058   | N/A        | 0.00040  | mg/L | 2023-04-11 |  |
| Potassium, total  | 0.64      | N/A        | 0.10     | mg/L | 2023-04-11 |  |
| Selenium, total   | < 0.00050 | MAC = 0.05 | 0.00050  | mg/L | 2023-04-11 |  |
| Sodium, total     | 0.82      | AO ≤ 200   | 0.10     | mg/L | 2023-04-11 |  |
| Strontium, total  | 0.125     | MAC = 7    | 0.0010   | mg/L | 2023-04-11 |  |
| Uranium, total    | 0.000415  | MAC = 0.02 | 0.000020 | mg/L | 2023-04-11 |  |
| Zinc, total       | < 0.0040  | AO ≤ 5     | 0.0040   | mg/L | 2023-04-11 |  |

### Blueberry (23D0403-02) | Matrix: Water | Sampled: 2023-04-04 11:00

#### Calculated Parameters

|                       |        |           |         |      |     |  |
|-----------------------|--------|-----------|---------|------|-----|--|
| Total Trihalomethanes | 0.0273 | MAC = 0.1 | 0.00400 | mg/L | N/A |  |
|-----------------------|--------|-----------|---------|------|-----|--|

#### Volatile Organic Compounds (VOC)

|                                 |          |     |        |      |            |  |
|---------------------------------|----------|-----|--------|------|------------|--|
| Bromodichloromethane            | < 0.0010 | N/A | 0.0010 | mg/L | 2023-04-07 |  |
| Bromoform                       | < 0.0010 | N/A | 0.0010 | mg/L | 2023-04-07 |  |
| Chloroform                      | 0.0273   | N/A | 0.0010 | mg/L | 2023-04-07 |  |
| Dibromochloromethane            | < 0.0010 | N/A | 0.0010 | mg/L | 2023-04-07 |  |
| Surrogate: Toluene-d8           | 102      |     | 70-130 | %    | 2023-04-07 |  |
| Surrogate: 4-Bromofluorobenzene | 110      |     | 70-130 | %    | 2023-04-07 |  |

### Airport (23D0403-03) | Matrix: Water | Sampled: 2023-04-04 11:10

#### Calculated Parameters

|                       |        |           |         |      |     |  |
|-----------------------|--------|-----------|---------|------|-----|--|
| Total Trihalomethanes | 0.0288 | MAC = 0.1 | 0.00400 | mg/L | N/A |  |
|-----------------------|--------|-----------|---------|------|-----|--|

#### Volatile Organic Compounds (VOC)

|                                 |          |     |        |      |            |  |
|---------------------------------|----------|-----|--------|------|------------|--|
| Bromodichloromethane            | < 0.0010 | N/A | 0.0010 | mg/L | 2023-04-07 |  |
| Bromoform                       | < 0.0010 | N/A | 0.0010 | mg/L | 2023-04-07 |  |
| Chloroform                      | 0.0288   | N/A | 0.0010 | mg/L | 2023-04-07 |  |
| Dibromochloromethane            | < 0.0010 | N/A | 0.0010 | mg/L | 2023-04-07 |  |
| Surrogate: Toluene-d8           | 96       |     | 70-130 | %    | 2023-04-07 |  |
| Surrogate: 4-Bromofluorobenzene | 108      |     | 70-130 | %    | 2023-04-07 |  |

### Park Pumphouse (23D0403-04) | Matrix: Water | Sampled: 2023-04-04 11:20

#### Haloacetic Acids

|                       |          |     |        |      |            |  |
|-----------------------|----------|-----|--------|------|------------|--|
| Monochloroacetic Acid | < 0.0020 | N/A | 0.0020 | mg/L | 2023-04-12 |  |
| Monobromoacetic Acid  | < 0.0020 | N/A | 0.0020 | mg/L | 2023-04-12 |  |
| Dichloroacetic Acid   | 0.0072   | N/A | 0.0020 | mg/L | 2023-04-12 |  |
| Trichloroacetic Acid  | 0.0103   | N/A | 0.0020 | mg/L | 2023-04-12 |  |

## TEST RESULTS

**REPORTED TO PROJECT** Castlegar, City of  
General Potability

**WORK ORDER REPORTED** 23D0403  
2023-04-17 13:25

| Analyte                                                                                   | Result        | Guideline  | RL      | Units | Analyzed   | Qualifier |
|-------------------------------------------------------------------------------------------|---------------|------------|---------|-------|------------|-----------|
| <b>Park Pumphouse (23D0403-04)   Matrix: Water   Sampled: 2023-04-04 11:20, Continued</b> |               |            |         |       |            |           |
| <i>Haloacetic Acids, Continued</i>                                                        |               |            |         |       |            |           |
| Dibromoacetic Acid                                                                        | < 0.0020      | N/A        | 0.0020  | mg/L  | 2023-04-12 |           |
| Total Haloacetic Acids (HAA5)                                                             | <b>0.0175</b> | MAC = 0.08 | 0.00200 | mg/L  | N/A        |           |
| Surrogate: 2-Bromopropionic Acid                                                          | 95            |            | 70-130  | %     | 2023-04-12 |           |

### Sample Qualifiers:

CT6 Results were based on lab temperature & lab pH.  
HT2 The 15 minute recommended holding time (from sampling to analysis) has been exceeded - field analysis is recommended.

## APPENDIX 1: SUPPORTING INFORMATION

**REPORTED TO PROJECT** Castlegar, City of  
General Potability

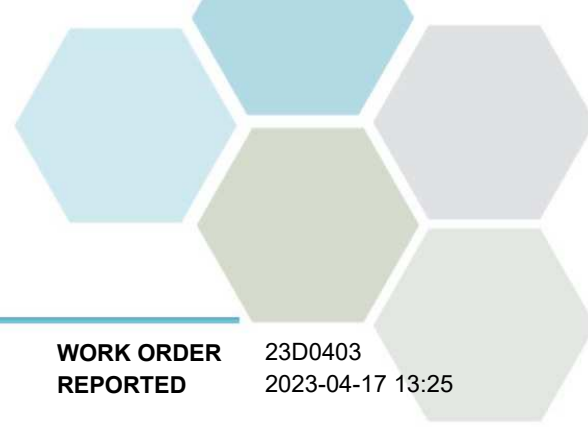
**WORK ORDER REPORTED** 23D0403  
2023-04-17 13:25

| Analysis Description             | Method Ref.           | Technique                                                                                         | Accredited | Location |
|----------------------------------|-----------------------|---------------------------------------------------------------------------------------------------|------------|----------|
| Alkalinity in Water              | SM 2320 B* (2021)     | Titration with H <sub>2</sub> SO <sub>4</sub>                                                     | ✓          | Kelowna  |
| Anions in Water                  | SM 4110 B (2020)      | Ion Chromatography                                                                                | ✓          | Kelowna  |
| Coliforms, Total in Water        | SM 9222* (2015)       | Membrane Filtration / Chromocult Agar                                                             | ✓          | Kelowna  |
| Colour, True in Water            | SM 2120 C (2021)      | Spectrophotometry (456 nm)                                                                        | ✓          | Kelowna  |
| Conductivity in Water            | SM 2510 B (2021)      | Conductivity Meter                                                                                | ✓          | Kelowna  |
| Cyanide, SAD in Water            | ASTM D7511-12         | Flow Injection with In-Line UV Digestion and Amperometry                                          | ✓          | Kelowna  |
| E. coli in Water                 | SM 9222* (2015)       | Membrane Filtration / Chromocult Agar                                                             | ✓          | Kelowna  |
| Haloacetic Acids in Water        | EPA 552.3*            | Liquid-Liquid Microextraction, Derivatization and GC-ECD                                          | ✓          | Richmond |
| Hardness in Water                | SM 2340 B* (2021)     | Calculation: 2.497 [total Ca] + 4.118 [total Mg] (Est)                                            | ✓          | N/A      |
| Langelier Index in Water         | SM 2330 B (2021)      | Calculation                                                                                       |            | N/A      |
| Mercury, total in Water          | EPA 245.7*            | BrCl <sub>2</sub> Oxidation / Cold Vapor Atomic Fluorescence Spectrometry (CVAFS)                 | ✓          | Richmond |
| pH in Water                      | SM 4500-H+ B (2021)   | Electrometry                                                                                      | ✓          | Kelowna  |
| Solids, Total Dissolved in Water | SM 1030 E (2021)      | SM 1030 E                                                                                         |            | N/A      |
| Total Metals in Water            | EPA 200.2 / EPA 6020B | HNO <sub>3</sub> +HCl Hot Block Digestion / Inductively Coupled Plasma-Mass Spectrometry (ICP-MS) | ✓          | Richmond |
| Trihalomethanes in Water         | EPA 5030B / EPA 8260D | Purge&Trap / GC-MSD (SIM)                                                                         | ✓          | Richmond |
| Turbidity in Water               | SM 2130 B (2020)      | Nephelometry                                                                                      | ✓          | Kelowna  |

*Note: An asterisk in the Method Reference indicates that the CARO method has been modified from the reference method*

### Glossary of Terms:

|            |                                                                                                                       |
|------------|-----------------------------------------------------------------------------------------------------------------------|
| RL         | Reporting Limit (default)                                                                                             |
| <          | Less than the specified Reporting Limit (RL) - the actual RL may be higher than the default RL due to various factors |
| °C         | Degrees Celcius                                                                                                       |
| AO         | Aesthetic Objective                                                                                                   |
| CFU/100 mL | Colony Forming Units per 100 millilitres                                                                              |
| CU         | Colour Units (referenced against a platinum cobalt standard)                                                          |
| MAC        | Maximum Acceptable Concentration (health based)                                                                       |
| mg/L       | Milligrams per litre                                                                                                  |
| NTU        | Nephelometric Turbidity Units                                                                                         |
| OG         | Operational Guideline (treated water)                                                                                 |
| pH units   | pH < 7 = acidic, pH > 7 = basic                                                                                       |
| µS/cm      | Microsiemens per centimetre                                                                                           |
| ASTM       | ASTM International Test Methods                                                                                       |
| EPA        | United States Environmental Protection Agency Test Methods                                                            |
| SM         | Standard Methods for the Examination of Water and Wastewater, American Public Health Association                      |



## APPENDIX 1: SUPPORTING INFORMATION

**REPORTED TO** Castlegar, City of  
**PROJECT** General Potability

**WORK ORDER** 23D0403  
**REPORTED** 2023-04-17 13:25

### General Comments:

The results in this report apply to the received samples analyzed in accordance with the Chain of Custody document. This analytical report must be reproduced in its entirety. CARO is not responsible for any loss or damage resulting directly or indirectly from error or omission in the conduct of testing. Liability is limited to the cost of analysis. Caro will dispose of all samples within 30 days of sample receipt, unless otherwise agreed.

Results in **Bold** indicate values that are above CARO's method reporting limits. Any results that are above regulatory limits are highlighted **red**. Please note that results will only be highlighted red if the regulatory limits are included on the CARO report. Any Bold and/or highlighted results do not take into account method uncertainty. If you would like method uncertainty or regulatory limits to be included on your report, please contact your Account Manager: [bwhitehead@caro.ca](mailto:bwhitehead@caro.ca)

*Please note any regulatory guidelines applied to this report are added as a convenience to the client, at their request, to help provide some initial context to analytical results obtained. Although CARO makes every effort to ensure accuracy of the associated regulatory guideline(s) applied, the guidelines applied cannot be assumed to be correct due to a variety of factors and as such CARO Analytical Services assumes no liability or responsibility for the use of those guidelines to make any decisions. The original source of the regulation should be verified and a review of the guideline(s) should be validated as correct in order to make any decisions arising from the comparison of the analytical data obtained to the relevant regulatory guideline for one's particular circumstances. Further, CARO Analytical Services assumes no liability or responsibility for any loss attributed from the use of these guidelines in any way.*

## APPENDIX 2: QUALITY CONTROL RESULTS

**REPORTED TO PROJECT** Castlegar, City of  
General Potability

**WORK ORDER REPORTED** 23D0403  
2023-04-17 13:25

The following section displays the quality control (QC) data that is associated with your sample data. Groups of samples are prepared in "batches" and analyzed in conjunction with QC samples that ensure your data is of the highest quality. Common QC types include:

- **Method Blank (BLK):** A blank sample that undergoes sample processing identical to that carried out for the test samples. Method blank results are used to assess contamination from the laboratory environment and reagents.
- **Duplicate (Dup):** An additional or second portion of a randomly selected sample in the analytical run carried through the entire analytical process. Duplicates provide a measure of the analytical method's precision (reproducibility).
- **Blank Spike (BS):** A sample of known concentration which undergoes processing identical to that carried out for test samples, also referred to as a laboratory control sample (LCS). Blank spikes provide a measure of the analytical method's accuracy.
- **Matrix Spike (MS):** A second aliquot of sample is fortified with a known concentration of target analytes and carried through the entire analytical process. Matrix spikes evaluate potential matrix effects that may affect the analyte recovery.
- **Reference Material (SRM):** A homogenous material of similar matrix to the samples, certified for the parameter(s) listed. Reference Materials ensure that the analytical process is adequate to achieve acceptable recoveries of the parameter(s) tested.

Each QC type is analyzed at a 5-10% frequency, i.e. one blank/duplicate/spike for every 10-20 samples. For all types of QC, the specified recovery (% Rec) and relative percent difference (RPD) limits are derived from long-term method performance averages and/or prescribed by the reference method.

| Analyte | Result | RL Units | Spike Level | Source Result | % REC | REC Limit | % RPD | RPD Limit | Qualifier |
|---------|--------|----------|-------------|---------------|-------|-----------|-------|-----------|-----------|
|---------|--------|----------|-------------|---------------|-------|-----------|-------|-----------|-----------|

### Anions, Batch B3D0377

|                             |         |            |                                            |  |     |        |  |  |  |
|-----------------------------|---------|------------|--------------------------------------------|--|-----|--------|--|--|--|
| <b>Blank (B3D0377-BLK1)</b> |         |            | Prepared: 2023-04-05, Analyzed: 2023-04-05 |  |     |        |  |  |  |
| Chloride                    | < 0.10  | 0.10 mg/L  |                                            |  |     |        |  |  |  |
| Fluoride                    | < 0.10  | 0.10 mg/L  |                                            |  |     |        |  |  |  |
| Nitrate (as N)              | < 0.010 | 0.010 mg/L |                                            |  |     |        |  |  |  |
| Nitrite (as N)              | < 0.010 | 0.010 mg/L |                                            |  |     |        |  |  |  |
| Sulfate                     | < 1.0   | 1.0 mg/L   |                                            |  |     |        |  |  |  |
| <b>LCS (B3D0377-BS1)</b>    |         |            | Prepared: 2023-04-05, Analyzed: 2023-04-05 |  |     |        |  |  |  |
| Chloride                    | 16.2    | 0.10 mg/L  | 16.0                                       |  | 101 | 90-110 |  |  |  |
| Fluoride                    | 4.01    | 0.10 mg/L  | 4.00                                       |  | 100 | 88-108 |  |  |  |
| Nitrate (as N)              | 4.05    | 0.010 mg/L | 4.00                                       |  | 101 | 90-110 |  |  |  |
| Nitrite (as N)              | 2.03    | 0.010 mg/L | 2.00                                       |  | 101 | 85-115 |  |  |  |
| Sulfate                     | 16.0    | 1.0 mg/L   | 16.0                                       |  | 100 | 90-110 |  |  |  |

### General Parameters, Batch B3D0512

|                               |          |             |                                            |  |     |        |     |    |  |
|-------------------------------|----------|-------------|--------------------------------------------|--|-----|--------|-----|----|--|
| <b>Blank (B3D0512-BLK1)</b>   |          |             | Prepared: 2023-04-06, Analyzed: 2023-04-06 |  |     |        |     |    |  |
| Cyanide, Total                | < 0.0020 | 0.0020 mg/L |                                            |  |     |        |     |    |  |
| <b>LCS (B3D0512-BS1)</b>      |          |             | Prepared: 2023-04-06, Analyzed: 2023-04-06 |  |     |        |     |    |  |
| Cyanide, Total                | 0.0204   | 0.0020 mg/L | 0.0200                                     |  | 102 | 82-120 |     |    |  |
| <b>LCS Dup (B3D0512-BSD1)</b> |          |             | Prepared: 2023-04-06, Analyzed: 2023-04-06 |  |     |        |     |    |  |
| Cyanide, Total                | 0.0203   | 0.0020 mg/L | 0.0200                                     |  | 101 | 82-120 | < 1 | 10 |  |

### General Parameters, Batch B3D0591

|                             |        |          |                                            |  |     |        |  |  |  |
|-----------------------------|--------|----------|--------------------------------------------|--|-----|--------|--|--|--|
| <b>Blank (B3D0591-BLK1)</b> |        |          | Prepared: 2023-04-06, Analyzed: 2023-04-06 |  |     |        |  |  |  |
| Turbidity                   | < 0.10 | 0.10 NTU |                                            |  |     |        |  |  |  |
| <b>Blank (B3D0591-BLK2)</b> |        |          | Prepared: 2023-04-06, Analyzed: 2023-04-06 |  |     |        |  |  |  |
| Turbidity                   | < 0.10 | 0.10 NTU |                                            |  |     |        |  |  |  |
| <b>LCS (B3D0591-BS1)</b>    |        |          | Prepared: 2023-04-06, Analyzed: 2023-04-06 |  |     |        |  |  |  |
| Turbidity                   | 146    | 0.10 NTU | 140                                        |  | 104 | 90-110 |  |  |  |

## APPENDIX 2: QUALITY CONTROL RESULTS

**REPORTED TO PROJECT** Castlegar, City of  
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**WORK ORDER REPORTED** 23D0403  
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| Analyte | Result | RL Units | Spike Level | Source Result | % REC | REC Limit | % RPD | RPD Limit | Qualifier |
|---------|--------|----------|-------------|---------------|-------|-----------|-------|-----------|-----------|
|---------|--------|----------|-------------|---------------|-------|-----------|-------|-----------|-----------|

### General Parameters, Batch B3D0591, Continued

|                          |     |          |                                            |  |     |        |  |  |  |
|--------------------------|-----|----------|--------------------------------------------|--|-----|--------|--|--|--|
| <b>LCS (B3D0591-BS2)</b> |     |          | Prepared: 2023-04-06, Analyzed: 2023-04-06 |  |     |        |  |  |  |
| Turbidity                | 147 | 0.10 NTU | 140                                        |  | 105 | 90-110 |  |  |  |

### General Parameters, Batch B3D0651

|                             |       |        |                                            |  |    |        |  |  |  |
|-----------------------------|-------|--------|--------------------------------------------|--|----|--------|--|--|--|
| <b>Blank (B3D0651-BLK1)</b> |       |        | Prepared: 2023-04-07, Analyzed: 2023-04-07 |  |    |        |  |  |  |
| Colour, True                | < 5.0 | 5.0 CU |                                            |  |    |        |  |  |  |
| <b>LCS (B3D0651-BS1)</b>    |       |        | Prepared: 2023-04-07, Analyzed: 2023-04-07 |  |    |        |  |  |  |
| Colour, True                | 18    | 5.0 CU | 20.0                                       |  | 90 | 85-115 |  |  |  |

### General Parameters, Batch B3D0722

|                                                     |       |               |                                            |  |     |        |  |  |  |
|-----------------------------------------------------|-------|---------------|--------------------------------------------|--|-----|--------|--|--|--|
| <b>Blank (B3D0722-BLK1)</b>                         |       |               | Prepared: 2023-04-11, Analyzed: 2023-04-11 |  |     |        |  |  |  |
| Alkalinity, Total (as CaCO <sub>3</sub> )           | < 1.0 | 1.0 mg/L      |                                            |  |     |        |  |  |  |
| Alkalinity, Phenolphthalein (as CaCO <sub>3</sub> ) | < 1.0 | 1.0 mg/L      |                                            |  |     |        |  |  |  |
| Alkalinity, Bicarbonate (as CaCO <sub>3</sub> )     | < 1.0 | 1.0 mg/L      |                                            |  |     |        |  |  |  |
| Alkalinity, Carbonate (as CaCO <sub>3</sub> )       | < 1.0 | 1.0 mg/L      |                                            |  |     |        |  |  |  |
| Alkalinity, Hydroxide (as CaCO <sub>3</sub> )       | < 1.0 | 1.0 mg/L      |                                            |  |     |        |  |  |  |
| Conductivity (EC)                                   | < 2.0 | 2.0 µS/cm     |                                            |  |     |        |  |  |  |
| Temperature, at pH                                  | 23.3  | °C            |                                            |  |     |        |  |  |  |
| <b>LCS (B3D0722-BS1)</b>                            |       |               | Prepared: 2023-04-11, Analyzed: 2023-04-11 |  |     |        |  |  |  |
| Alkalinity, Total (as CaCO <sub>3</sub> )           | 108   | 1.0 mg/L      | 100                                        |  | 108 | 80-120 |  |  |  |
| <b>LCS (B3D0722-BS2)</b>                            |       |               | Prepared: 2023-04-11, Analyzed: 2023-04-11 |  |     |        |  |  |  |
| Conductivity (EC)                                   | 1420  | 2.0 µS/cm     | 1410                                       |  | 100 | 95-105 |  |  |  |
| <b>Reference (B3D0722-SRM1)</b>                     |       |               | Prepared: 2023-04-11, Analyzed: 2023-04-11 |  |     |        |  |  |  |
| pH                                                  | 7.01  | 0.10 pH units | 7.01                                       |  | 100 | 98-102 |  |  |  |

### Haloacetic Acids, Batch B3D0755

|                                  |          |             |                                            |  |     |        |     |    |  |
|----------------------------------|----------|-------------|--------------------------------------------|--|-----|--------|-----|----|--|
| <b>Blank (B3D0755-BLK1)</b>      |          |             | Prepared: 2023-04-11, Analyzed: 2023-04-12 |  |     |        |     |    |  |
| Monochloroacetic Acid            | < 0.0020 | 0.0020 mg/L |                                            |  |     |        |     |    |  |
| Monobromoacetic Acid             | < 0.0020 | 0.0020 mg/L |                                            |  |     |        |     |    |  |
| Dichloroacetic Acid              | < 0.0020 | 0.0020 mg/L |                                            |  |     |        |     |    |  |
| Trichloroacetic Acid             | < 0.0020 | 0.0020 mg/L |                                            |  |     |        |     |    |  |
| Dibromoacetic Acid               | < 0.0020 | 0.0020 mg/L |                                            |  |     |        |     |    |  |
| Surrogate: 2-Bromopropionic Acid | 0.0116   | mg/L        | 0.0117                                     |  | 98  | 70-130 |     |    |  |
| <b>LCS (B3D0755-BS1)</b>         |          |             | Prepared: 2023-04-11, Analyzed: 2023-04-12 |  |     |        |     |    |  |
| Monochloroacetic Acid            | 0.0569   | 0.0020 mg/L | 0.0564                                     |  | 101 | 75-117 |     |    |  |
| Monobromoacetic Acid             | 0.0376   | 0.0020 mg/L | 0.0374                                     |  | 101 | 83-113 |     |    |  |
| Dichloroacetic Acid              | 0.0563   | 0.0020 mg/L | 0.0558                                     |  | 101 | 78-112 |     |    |  |
| Trichloroacetic Acid             | 0.0187   | 0.0020 mg/L | 0.0186                                     |  | 101 | 81-110 |     |    |  |
| Dibromoacetic Acid               | 0.0189   | 0.0020 mg/L | 0.0187                                     |  | 101 | 89-112 |     |    |  |
| Surrogate: 2-Bromopropionic Acid | 0.0118   | mg/L        | 0.0117                                     |  | 101 | 70-130 |     |    |  |
| <b>LCS Dup (B3D0755-BSD1)</b>    |          |             | Prepared: 2023-04-11, Analyzed: 2023-04-12 |  |     |        |     |    |  |
| Monochloroacetic Acid            | 0.0556   | 0.0020 mg/L | 0.0564                                     |  | 99  | 75-117 | 2   | 30 |  |
| Monobromoacetic Acid             | 0.0375   | 0.0020 mg/L | 0.0374                                     |  | 100 | 83-113 | < 1 | 30 |  |
| Dichloroacetic Acid              | 0.0559   | 0.0020 mg/L | 0.0558                                     |  | 100 | 78-112 | < 1 | 30 |  |
| Trichloroacetic Acid             | 0.0187   | 0.0020 mg/L | 0.0186                                     |  | 100 | 81-110 | < 1 | 30 |  |
| Dibromoacetic Acid               | 0.0187   | 0.0020 mg/L | 0.0187                                     |  | 100 | 89-112 | < 1 | 30 |  |
| Surrogate: 2-Bromopropionic Acid | 0.0115   | mg/L        | 0.0117                                     |  | 98  | 70-130 |     |    |  |

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| Analyte                                          | Result | RL Units     | Spike Level | Source Result                              | % REC | REC Limit | % RPD | RPD Limit | Qualifier |
|--------------------------------------------------|--------|--------------|-------------|--------------------------------------------|-------|-----------|-------|-----------|-----------|
| <b>Microbiological Parameters, Batch B3D0368</b> |        |              |             |                                            |       |           |       |           |           |
| <b>Blank (B3D0368-BLK1)</b>                      |        |              |             | Prepared: 2023-04-05, Analyzed: 2023-04-05 |       |           |       |           |           |
| Coliforms, Total                                 | < 1    | 1 CFU/100 mL |             |                                            |       |           |       |           |           |
| E. coli                                          | < 1    | 1 CFU/100 mL |             |                                            |       |           |       |           |           |
| <b>Blank (B3D0368-BLK2)</b>                      |        |              |             | Prepared: 2023-04-05, Analyzed: 2023-04-05 |       |           |       |           |           |
| Coliforms, Total                                 | < 1    | 1 CFU/100 mL |             |                                            |       |           |       |           |           |
| E. coli                                          | < 1    | 1 CFU/100 mL |             |                                            |       |           |       |           |           |
| <b>Blank (B3D0368-BLK3)</b>                      |        |              |             | Prepared: 2023-04-05, Analyzed: 2023-04-05 |       |           |       |           |           |
| Coliforms, Total                                 | < 1    | 1 CFU/100 mL |             |                                            |       |           |       |           |           |
| E. coli                                          | < 1    | 1 CFU/100 mL |             |                                            |       |           |       |           |           |
| <b>Blank (B3D0368-BLK4)</b>                      |        |              |             | Prepared: 2023-04-05, Analyzed: 2023-04-05 |       |           |       |           |           |
| Coliforms, Total                                 | < 1    | 1 CFU/100 mL |             |                                            |       |           |       |           |           |
| E. coli                                          | < 1    | 1 CFU/100 mL |             |                                            |       |           |       |           |           |
| <b>Blank (B3D0368-BLK5)</b>                      |        |              |             | Prepared: 2023-04-05, Analyzed: 2023-04-05 |       |           |       |           |           |
| Coliforms, Total                                 | < 1    | 1 CFU/100 mL |             |                                            |       |           |       |           |           |
| E. coli                                          | < 1    | 1 CFU/100 mL |             |                                            |       |           |       |           |           |
| <b>Blank (B3D0368-BLK6)</b>                      |        |              |             | Prepared: 2023-04-05, Analyzed: 2023-04-05 |       |           |       |           |           |
| Coliforms, Total                                 | < 1    | 1 CFU/100 mL |             |                                            |       |           |       |           |           |
| E. coli                                          | < 1    | 1 CFU/100 mL |             |                                            |       |           |       |           |           |
| <b>Blank (B3D0368-BLK7)</b>                      |        |              |             | Prepared: 2023-04-05, Analyzed: 2023-04-05 |       |           |       |           |           |
| Coliforms, Total                                 | < 1    | 1 CFU/100 mL |             |                                            |       |           |       |           |           |
| E. coli                                          | < 1    | 1 CFU/100 mL |             |                                            |       |           |       |           |           |
| <b>Blank (B3D0368-BLK8)</b>                      |        |              |             | Prepared: 2023-04-05, Analyzed: 2023-04-05 |       |           |       |           |           |
| Coliforms, Total                                 | < 1    | 1 CFU/100 mL |             |                                            |       |           |       |           |           |
| E. coli                                          | < 1    | 1 CFU/100 mL |             |                                            |       |           |       |           |           |
| <b>Blank (B3D0368-BLK9)</b>                      |        |              |             | Prepared: 2023-04-05, Analyzed: 2023-04-05 |       |           |       |           |           |
| Coliforms, Total                                 | < 1    | 1 CFU/100 mL |             |                                            |       |           |       |           |           |
| E. coli                                          | < 1    | 1 CFU/100 mL |             |                                            |       |           |       |           |           |
| <b>Blank (B3D0368-BLKA)</b>                      |        |              |             | Prepared: 2023-04-05, Analyzed: 2023-04-05 |       |           |       |           |           |
| Coliforms, Total                                 | < 1    | 1 CFU/100 mL |             |                                            |       |           |       |           |           |
| E. coli                                          | < 1    | 1 CFU/100 mL |             |                                            |       |           |       |           |           |
| <b>Blank (B3D0368-BLKB)</b>                      |        |              |             | Prepared: 2023-04-05, Analyzed: 2023-04-05 |       |           |       |           |           |
| Coliforms, Total                                 | < 1    | 1 CFU/100 mL |             |                                            |       |           |       |           |           |
| E. coli                                          | < 1    | 1 CFU/100 mL |             |                                            |       |           |       |           |           |
| <b>Blank (B3D0368-BLKC)</b>                      |        |              |             | Prepared: 2023-04-05, Analyzed: 2023-04-05 |       |           |       |           |           |
| Coliforms, Total                                 | < 1    | 1 CFU/100 mL |             |                                            |       |           |       |           |           |
| E. coli                                          | < 1    | 1 CFU/100 mL |             |                                            |       |           |       |           |           |
| <b>Blank (B3D0368-BLKD)</b>                      |        |              |             | Prepared: 2023-04-05, Analyzed: 2023-04-05 |       |           |       |           |           |
| Coliforms, Total                                 | < 1    | 1 CFU/100 mL |             |                                            |       |           |       |           |           |
| E. coli                                          | < 1    | 1 CFU/100 mL |             |                                            |       |           |       |           |           |
| <b>Blank (B3D0368-BLKE)</b>                      |        |              |             | Prepared: 2023-04-05, Analyzed: 2023-04-05 |       |           |       |           |           |
| Coliforms, Total                                 | < 1    | 1 CFU/100 mL |             |                                            |       |           |       |           |           |
| E. coli                                          | < 1    | 1 CFU/100 mL |             |                                            |       |           |       |           |           |

**Total Metals, Batch B3D0742**

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| Analyte | Result | RL Units | Spike Level | Source Result | % REC | REC Limit | % RPD | RPD Limit | Qualifier |
|---------|--------|----------|-------------|---------------|-------|-----------|-------|-----------|-----------|
|---------|--------|----------|-------------|---------------|-------|-----------|-------|-----------|-----------|

### Total Metals, Batch B3D0742, Continued

#### Blank (B3D0742-BLK1)

Prepared: 2023-04-11, Analyzed: 2023-04-11

|                   |            |               |  |  |  |  |  |  |  |
|-------------------|------------|---------------|--|--|--|--|--|--|--|
| Aluminum, total   | < 0.0050   | 0.0050 mg/L   |  |  |  |  |  |  |  |
| Antimony, total   | < 0.00020  | 0.00020 mg/L  |  |  |  |  |  |  |  |
| Arsenic, total    | < 0.00050  | 0.00050 mg/L  |  |  |  |  |  |  |  |
| Barium, total     | < 0.0050   | 0.0050 mg/L   |  |  |  |  |  |  |  |
| Boron, total      | < 0.0500   | 0.0500 mg/L   |  |  |  |  |  |  |  |
| Cadmium, total    | < 0.000010 | 0.000010 mg/L |  |  |  |  |  |  |  |
| Calcium, total    | < 0.20     | 0.20 mg/L     |  |  |  |  |  |  |  |
| Chromium, total   | < 0.00050  | 0.00050 mg/L  |  |  |  |  |  |  |  |
| Cobalt, total     | < 0.00010  | 0.00010 mg/L  |  |  |  |  |  |  |  |
| Copper, total     | < 0.00040  | 0.00040 mg/L  |  |  |  |  |  |  |  |
| Iron, total       | < 0.010    | 0.010 mg/L    |  |  |  |  |  |  |  |
| Lead, total       | < 0.00020  | 0.00020 mg/L  |  |  |  |  |  |  |  |
| Magnesium, total  | < 0.010    | 0.010 mg/L    |  |  |  |  |  |  |  |
| Manganese, total  | < 0.00020  | 0.00020 mg/L  |  |  |  |  |  |  |  |
| Molybdenum, total | < 0.00010  | 0.00010 mg/L  |  |  |  |  |  |  |  |
| Nickel, total     | < 0.00040  | 0.00040 mg/L  |  |  |  |  |  |  |  |
| Potassium, total  | < 0.10     | 0.10 mg/L     |  |  |  |  |  |  |  |
| Selenium, total   | < 0.00050  | 0.00050 mg/L  |  |  |  |  |  |  |  |
| Sodium, total     | < 0.10     | 0.10 mg/L     |  |  |  |  |  |  |  |
| Strontium, total  | < 0.0010   | 0.0010 mg/L   |  |  |  |  |  |  |  |
| Uranium, total    | < 0.000020 | 0.000020 mg/L |  |  |  |  |  |  |  |
| Zinc, total       | < 0.0040   | 0.0040 mg/L   |  |  |  |  |  |  |  |

#### LCS (B3D0742-BS1)

Prepared: 2023-04-11, Analyzed: 2023-04-11

|                   |        |               |        |     |        |
|-------------------|--------|---------------|--------|-----|--------|
| Aluminum, total   | 3.98   | 0.0050 mg/L   | 4.00   | 100 | 80-120 |
| Antimony, total   | 0.0393 | 0.00020 mg/L  | 0.0400 | 98  | 80-120 |
| Arsenic, total    | 0.393  | 0.00050 mg/L  | 0.400  | 98  | 80-120 |
| Barium, total     | 0.0385 | 0.0050 mg/L   | 0.0400 | 96  | 80-120 |
| Boron, total      | 0.428  | 0.0500 mg/L   | 0.400  | 107 | 80-120 |
| Cadmium, total    | 0.0386 | 0.000010 mg/L | 0.0400 | 97  | 80-120 |
| Calcium, total    | 4.01   | 0.20 mg/L     | 4.00   | 100 | 80-120 |
| Chromium, total   | 0.0398 | 0.00050 mg/L  | 0.0400 | 100 | 80-120 |
| Cobalt, total     | 0.0397 | 0.00010 mg/L  | 0.0400 | 99  | 80-120 |
| Copper, total     | 0.0393 | 0.00040 mg/L  | 0.0400 | 98  | 80-120 |
| Iron, total       | 4.01   | 0.010 mg/L    | 4.00   | 100 | 80-120 |
| Lead, total       | 0.0398 | 0.00020 mg/L  | 0.0400 | 100 | 80-120 |
| Magnesium, total  | 4.01   | 0.010 mg/L    | 4.00   | 100 | 80-120 |
| Manganese, total  | 0.0398 | 0.00020 mg/L  | 0.0400 | 99  | 80-120 |
| Molybdenum, total | 0.0384 | 0.00010 mg/L  | 0.0400 | 96  | 80-120 |
| Nickel, total     | 0.0388 | 0.00040 mg/L  | 0.0400 | 97  | 80-120 |
| Potassium, total  | 4.05   | 0.10 mg/L     | 4.00   | 101 | 80-120 |
| Selenium, total   | 0.384  | 0.00050 mg/L  | 0.400  | 96  | 80-120 |
| Sodium, total     | 3.96   | 0.10 mg/L     | 4.00   | 99  | 80-120 |
| Strontium, total  | 0.0404 | 0.0010 mg/L   | 0.0400 | 101 | 80-120 |
| Uranium, total    | 0.0400 | 0.000020 mg/L | 0.0400 | 100 | 80-120 |
| Zinc, total       | 0.387  | 0.0040 mg/L   | 0.400  | 97  | 80-120 |

### Total Metals, Batch B3D1024

#### Blank (B3D1024-BLK1)

Prepared: 2023-04-13, Analyzed: 2023-04-13

|                |            |               |
|----------------|------------|---------------|
| Mercury, total | < 0.000010 | 0.000010 mg/L |
|----------------|------------|---------------|

#### Blank (B3D1024-BLK2)

Prepared: 2023-04-13, Analyzed: 2023-04-13

|                |            |               |
|----------------|------------|---------------|
| Mercury, total | < 0.000010 | 0.000010 mg/L |
|----------------|------------|---------------|

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| Analyte                                                | Result     | RL Units      | Spike Level | Source Result                              | % REC | REC Limit | % RPD | RPD Limit | Qualifier |
|--------------------------------------------------------|------------|---------------|-------------|--------------------------------------------|-------|-----------|-------|-----------|-----------|
| <b>Total Metals, Batch B3D1024, Continued</b>          |            |               |             |                                            |       |           |       |           |           |
| <b>Blank (B3D1024-BLK3)</b>                            |            |               |             | Prepared: 2023-04-13, Analyzed: 2023-04-13 |       |           |       |           |           |
| Mercury, total                                         | < 0.000010 | 0.000010 mg/L |             |                                            |       |           |       |           |           |
| <b>LCS (B3D1024-BS1)</b>                               |            |               |             | Prepared: 2023-04-13, Analyzed: 2023-04-13 |       |           |       |           |           |
| Mercury, total                                         | 0.000285   | 0.000010 mg/L | 0.000250    |                                            | 114   | 80-120    |       |           |           |
| <b>LCS (B3D1024-BS2)</b>                               |            |               |             | Prepared: 2023-04-13, Analyzed: 2023-04-13 |       |           |       |           |           |
| Mercury, total                                         | 0.000255   | 0.000010 mg/L | 0.000250    |                                            | 102   | 80-120    |       |           |           |
| <b>LCS (B3D1024-BS3)</b>                               |            |               |             | Prepared: 2023-04-13, Analyzed: 2023-04-13 |       |           |       |           |           |
| Mercury, total                                         | 0.000270   | 0.000010 mg/L | 0.000250    |                                            | 108   | 80-120    |       |           |           |
| <b>Volatile Organic Compounds (VOC), Batch B3D0601</b> |            |               |             |                                            |       |           |       |           |           |
| <b>Blank (B3D0601-BLK1)</b>                            |            |               |             | Prepared: 2023-04-06, Analyzed: 2023-04-06 |       |           |       |           |           |
| Bromodichloromethane                                   | < 0.0010   | 0.0010 mg/L   |             |                                            |       |           |       |           |           |
| Bromoform                                              | < 0.0010   | 0.0010 mg/L   |             |                                            |       |           |       |           |           |
| Chloroform                                             | < 0.0010   | 0.0010 mg/L   |             |                                            |       |           |       |           |           |
| Dibromochloromethane                                   | < 0.0010   | 0.0010 mg/L   |             |                                            |       |           |       |           |           |
| Surrogate: Toluene-d8                                  | 0.0250     | mg/L          | 0.0250      |                                            | 100   | 70-130    |       |           |           |
| Surrogate: 4-Bromofluorobenzene                        | 0.0277     | mg/L          | 0.0249      |                                            | 111   | 70-130    |       |           |           |
| <b>LCS (B3D0601-BS1)</b>                               |            |               |             | Prepared: 2023-04-06, Analyzed: 2023-04-06 |       |           |       |           |           |
| Bromodichloromethane                                   | 0.0234     | 0.0010 mg/L   | 0.0201      |                                            | 117   | 70-130    |       |           |           |
| Bromoform                                              | 0.0238     | 0.0010 mg/L   | 0.0201      |                                            | 118   | 70-130    |       |           |           |
| Chloroform                                             | 0.0227     | 0.0010 mg/L   | 0.0201      |                                            | 113   | 70-130    |       |           |           |
| Dibromochloromethane                                   | 0.0234     | 0.0010 mg/L   | 0.0201      |                                            | 116   | 70-130    |       |           |           |
| Surrogate: Toluene-d8                                  | 0.0251     | mg/L          | 0.0250      |                                            | 100   | 70-130    |       |           |           |
| Surrogate: 4-Bromofluorobenzene                        | 0.0267     | mg/L          | 0.0249      |                                            | 107   | 70-130    |       |           |           |

**QC Qualifiers:**

## CERTIFICATE OF ANALYSIS

**REPORTED TO** Castlegar, City of  
460 Columbia Avenue  
CASTLEGAR, BC V1N 1G7

**ATTENTION** Craig Lincoln

**PO NUMBER** 502

**PROJECT** General Potability

**PROJECT INFO**

**WORK ORDER** 23G0192

**RECEIVED / TEMP** 2023-07-05 09:14 / 16.8°C

**REPORTED** 2023-07-12 14:35

**COC NUMBER** No Number

### 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.

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<https://www.caro.ca/terms-conditions>

If you have any questions or concerns, please contact me at [bwhitehead@caro.ca](mailto:bwhitehead@caro.ca)

#### Authorized By:

Brent Whitehead  
Account Manager

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## TEST RESULTS

**REPORTED TO PROJECT** Castlegar, City of  
General Potability

**WORK ORDER REPORTED** 23G0192  
2023-07-12 14:35

| Analyte                                                                                                   | Result     | Guideline     | RL Units       | Analyzed   | Qualifier |
|-----------------------------------------------------------------------------------------------------------|------------|---------------|----------------|------------|-----------|
| <b>481E - Water Treatment Center - Raw Water (23G0192-01)   Matrix: Water   Sampled: 2023-07-04 10:30</b> |            |               |                |            |           |
| <b>Anions</b>                                                                                             |            |               |                |            |           |
| Chloride                                                                                                  | 0.24       | AO ≤ 250      | 0.10 mg/L      | 2023-07-06 |           |
| Fluoride                                                                                                  | < 0.10     | MAC = 1.5     | 0.10 mg/L      | 2023-07-06 |           |
| Nitrate (as N)                                                                                            | 0.030      | MAC = 10      | 0.010 mg/L     | 2023-07-06 |           |
| Nitrite (as N)                                                                                            | < 0.010    | MAC = 1       | 0.010 mg/L     | 2023-07-06 |           |
| Sulfate                                                                                                   | 11.3       | AO ≤ 500      | 1.0 mg/L       | 2023-07-06 |           |
| <b>Calculated Parameters</b>                                                                              |            |               |                |            |           |
| Hardness, Total (as CaCO <sub>3</sub> )                                                                   | 66.6       | None Required | 0.500 mg/L     | N/A        |           |
| Langelier Index                                                                                           | -1.3       | N/A           | -5.0           | 2023-07-10 | CT6       |
| Solids, Total Dissolved                                                                                   | 73.6       | AO ≤ 500      | 1.00 mg/L      | N/A        |           |
| <b>General Parameters</b>                                                                                 |            |               |                |            |           |
| Alkalinity, Total (as CaCO <sub>3</sub> )                                                                 | 60.5       | N/A           | 1.0 mg/L       | 2023-07-07 |           |
| Alkalinity, Phenolphthalein (as CaCO <sub>3</sub> )                                                       | < 1.0      | N/A           | 1.0 mg/L       | 2023-07-07 |           |
| Alkalinity, Bicarbonate (as CaCO <sub>3</sub> )                                                           | 60.5       | N/A           | 1.0 mg/L       | 2023-07-07 |           |
| Alkalinity, Carbonate (as CaCO <sub>3</sub> )                                                             | < 1.0      | N/A           | 1.0 mg/L       | 2023-07-07 |           |
| Alkalinity, Hydroxide (as CaCO <sub>3</sub> )                                                             | < 1.0      | N/A           | 1.0 mg/L       | 2023-07-07 |           |
| Colour, True                                                                                              | < 5.0      | AO ≤ 15       | 5.0 CU         | 2023-07-05 | HT1       |
| Conductivity (EC)                                                                                         | 120        | N/A           | 2.0 µS/cm      | 2023-07-07 |           |
| Cyanide, Total                                                                                            | < 0.0020   | MAC = 0.2     | 0.0020 mg/L    | 2023-07-07 |           |
| pH                                                                                                        | 7.16       | 7.0-10.5      | 0.10 pH units  | 2023-07-06 | HT2       |
| Temperature, at pH                                                                                        | 21.2       | N/A           | °C             | 2023-07-06 | HT2       |
| Turbidity                                                                                                 | 0.23       | OG < 1        | 0.10 NTU       | 2023-07-05 |           |
| <b>Microbiological Parameters</b>                                                                         |            |               |                |            |           |
| Coliforms, Total                                                                                          | ≥ 28       | MAC = 0       | 1 CFU/100 mL   | 2023-07-05 | MD-2      |
| Background Colonies                                                                                       | >200       | N/A           | 200 CFU/100 mL | 2023-07-05 | MD-2      |
| E. coli                                                                                                   | < 1        | MAC = 0       | 1 CFU/100 mL   | 2023-07-05 | MD-2      |
| <b>Total Metals</b>                                                                                       |            |               |                |            |           |
| Aluminum, total                                                                                           | 0.0141     | OG < 0.1      | 0.0050 mg/L    | 2023-07-08 |           |
| Antimony, total                                                                                           | < 0.00020  | MAC = 0.006   | 0.00020 mg/L   | 2023-07-08 |           |
| Arsenic, total                                                                                            | < 0.00050  | MAC = 0.01    | 0.00050 mg/L   | 2023-07-08 |           |
| Barium, total                                                                                             | 0.0165     | MAC = 2       | 0.0050 mg/L    | 2023-07-08 |           |
| Boron, total                                                                                              | < 0.0500   | MAC = 5       | 0.0500 mg/L    | 2023-07-08 |           |
| Cadmium, total                                                                                            | < 0.000010 | MAC = 0.007   | 0.000010 mg/L  | 2023-07-08 |           |
| Calcium, total                                                                                            | 18.7       | None Required | 0.20 mg/L      | 2023-07-08 |           |
| Chromium, total                                                                                           | < 0.00050  | MAC = 0.05    | 0.00050 mg/L   | 2023-07-08 |           |
| Cobalt, total                                                                                             | < 0.00010  | N/A           | 0.00010 mg/L   | 2023-07-08 |           |
| Copper, total                                                                                             | < 0.00040  | MAC = 2       | 0.00040 mg/L   | 2023-07-08 |           |
| Iron, total                                                                                               | < 0.010    | AO ≤ 0.3      | 0.010 mg/L     | 2023-07-08 |           |
| Lead, total                                                                                               | < 0.00020  | MAC = 0.005   | 0.00020 mg/L   | 2023-07-08 |           |
| Magnesium, total                                                                                          | 4.82       | None Required | 0.010 mg/L     | 2023-07-08 |           |
| Manganese, total                                                                                          | 0.00101    | MAC = 0.12    | 0.00020 mg/L   | 2023-07-08 |           |

## TEST RESULTS

**REPORTED TO PROJECT** Castlegar, City of  
General Potability

**WORK ORDER REPORTED** 23G0192  
2023-07-12 14:35

| Analyte | Result | Guideline | RL | Units | Analyzed | Qualifier |
|---------|--------|-----------|----|-------|----------|-----------|
|---------|--------|-----------|----|-------|----------|-----------|

### 481E - Water Treatment Center - Raw Water (23G0192-01) | Matrix: Water | Sampled: 2023-07-04 10:30, Continued

#### Total Metals, Continued

|                   |                 |             |          |      |            |  |
|-------------------|-----------------|-------------|----------|------|------------|--|
| Mercury, total    | < 0.000010      | MAC = 0.001 | 0.000010 | mg/L | 2023-07-12 |  |
| Molybdenum, total | <b>0.00044</b>  | N/A         | 0.00010  | mg/L | 2023-07-08 |  |
| Nickel, total     | <b>0.00049</b>  | N/A         | 0.00040  | mg/L | 2023-07-08 |  |
| Potassium, total  | <b>0.66</b>     | N/A         | 0.10     | mg/L | 2023-07-08 |  |
| Selenium, total   | < 0.00050       | MAC = 0.05  | 0.00050  | mg/L | 2023-07-08 |  |
| Sodium, total     | <b>0.83</b>     | AO ≤ 200    | 0.10     | mg/L | 2023-07-08 |  |
| Strontium, total  | <b>0.129</b>    | MAC = 7     | 0.0010   | mg/L | 2023-07-08 |  |
| Uranium, total    | <b>0.000385</b> | MAC = 0.02  | 0.000020 | mg/L | 2023-07-08 |  |
| Zinc, total       | < 0.0040        | AO ≤ 5      | 0.0040   | mg/L | 2023-07-08 |  |

### Blueberry (23G0192-02) | Matrix: Water | Sampled: 2023-07-04 08:10

#### Calculated Parameters

|                       |               |           |         |      |     |  |
|-----------------------|---------------|-----------|---------|------|-----|--|
| Total Trihalomethanes | <b>0.0241</b> | MAC = 0.1 | 0.00400 | mg/L | N/A |  |
|-----------------------|---------------|-----------|---------|------|-----|--|

#### Volatile Organic Compounds (VOC)

|                                 |               |     |        |      |            |  |
|---------------------------------|---------------|-----|--------|------|------------|--|
| Bromodichloromethane            | < 0.0010      | N/A | 0.0010 | mg/L | 2023-07-11 |  |
| Bromoform                       | < 0.0010      | N/A | 0.0010 | mg/L | 2023-07-11 |  |
| Chloroform                      | <b>0.0241</b> | N/A | 0.0010 | mg/L | 2023-07-11 |  |
| Dibromochloromethane            | < 0.0010      | N/A | 0.0010 | mg/L | 2023-07-11 |  |
| Surrogate: Toluene-d8           | 100           |     | 70-130 | %    | 2023-07-11 |  |
| Surrogate: 4-Bromofluorobenzene | 91            |     | 70-130 | %    | 2023-07-11 |  |

### Airport (23G0192-03) | Matrix: Water | Sampled: 2023-07-04 11:45

#### Calculated Parameters

|                       |               |           |         |      |     |  |
|-----------------------|---------------|-----------|---------|------|-----|--|
| Total Trihalomethanes | <b>0.0250</b> | MAC = 0.1 | 0.00400 | mg/L | N/A |  |
|-----------------------|---------------|-----------|---------|------|-----|--|

#### Volatile Organic Compounds (VOC)

|                                 |               |     |        |      |            |  |
|---------------------------------|---------------|-----|--------|------|------------|--|
| Bromodichloromethane            | < 0.0010      | N/A | 0.0010 | mg/L | 2023-07-11 |  |
| Bromoform                       | < 0.0010      | N/A | 0.0010 | mg/L | 2023-07-11 |  |
| Chloroform                      | <b>0.0250</b> | N/A | 0.0010 | mg/L | 2023-07-11 |  |
| Dibromochloromethane            | < 0.0010      | N/A | 0.0010 | mg/L | 2023-07-11 |  |
| Surrogate: Toluene-d8           | 95            |     | 70-130 | %    | 2023-07-11 |  |
| Surrogate: 4-Bromofluorobenzene | 87            |     | 70-130 | %    | 2023-07-11 |  |

### Park Pumphouse (23G0192-04) | Matrix: Water | Sampled: 2023-07-04 08:50

#### Haloacetic Acids

|                       |               |     |        |      |            |  |
|-----------------------|---------------|-----|--------|------|------------|--|
| Monochloroacetic Acid | < 0.0020      | N/A | 0.0020 | mg/L | 2023-07-12 |  |
| Monobromoacetic Acid  | < 0.0020      | N/A | 0.0020 | mg/L | 2023-07-12 |  |
| Dichloroacetic Acid   | <b>0.0077</b> | N/A | 0.0020 | mg/L | 2023-07-12 |  |

## TEST RESULTS

**REPORTED TO PROJECT** Castlegar, City of  
General Potability

**WORK ORDER REPORTED** 23G0192  
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| Analyte                                                                                   | Result        | Guideline  | RL            | Units | Analyzed          | Qualifier |
|-------------------------------------------------------------------------------------------|---------------|------------|---------------|-------|-------------------|-----------|
| <b>Park Pumphouse (23G0192-04)   Matrix: Water   Sampled: 2023-07-04 08:50, Continued</b> |               |            |               |       |                   |           |
| <i>Haloacetic Acids, Continued</i>                                                        |               |            |               |       |                   |           |
| Trichloroacetic Acid                                                                      | <b>0.0083</b> | N/A        | 0.0020        | mg/L  | 2023-07-12        |           |
| Dibromoacetic Acid                                                                        | < 0.0020      | N/A        | 0.0020        | mg/L  | 2023-07-12        |           |
| Total Haloacetic Acids (HAA5)                                                             | <b>0.0159</b> | MAC = 0.08 | 0.00200       | mg/L  | N/A               |           |
| <i>Surrogate: 2-Bromopropionic Acid</i>                                                   | <i>104</i>    |            | <i>70-130</i> | %     | <i>2023-07-12</i> |           |

### Sample Qualifiers:

CT6 Results were based on lab temperature & lab pH.

HT1 The sample was prepared and/or analyzed past the recommended holding time.

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

MD-2 Test method deviation - Total Coliform and E.coli analysis were run using Chromocult Coliform Agar. Results are estimates.

## APPENDIX 1: SUPPORTING INFORMATION

**REPORTED TO PROJECT** Castlegar, City of  
General Potability

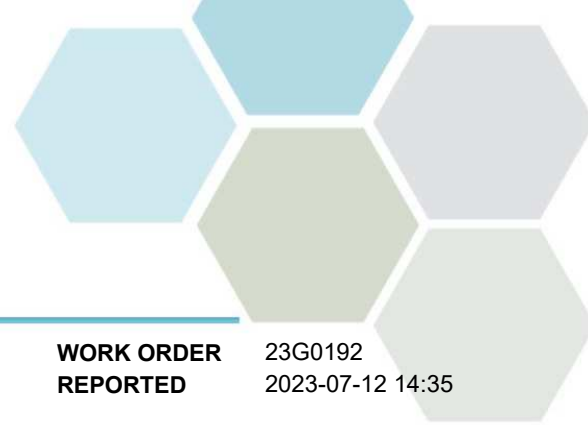
**WORK ORDER REPORTED** 23G0192  
2023-07-12 14:35

| Analysis Description             | Method Ref.           | Technique                                                                                         | Accredited | Location |
|----------------------------------|-----------------------|---------------------------------------------------------------------------------------------------|------------|----------|
| Alkalinity in Water              | SM 2320 B* (2021)     | Titration with H <sub>2</sub> SO <sub>4</sub>                                                     | ✓          | Kelowna  |
| Anions in Water                  | SM 4110 B (2020)      | Ion Chromatography                                                                                | ✓          | Kelowna  |
| Coliforms, Total in Water        | SM 9222* (2015)       | Membrane Filtration / Chromocult Agar                                                             | ✓          | Kelowna  |
| Colour, True in Water            | SM 2120 C (2021)      | Spectrophotometry (456 nm)                                                                        | ✓          | Kelowna  |
| Conductivity in Water            | SM 2510 B (2021)      | Conductivity Meter                                                                                | ✓          | Kelowna  |
| Cyanide, SAD in Water            | ASTM D7511-12         | Flow Injection with In-Line UV Digestion and Amperometry                                          | ✓          | Kelowna  |
| E. coli in Water                 | SM 9222* (2015)       | Membrane Filtration / Chromocult Agar                                                             | ✓          | Kelowna  |
| Haloacetic Acids in Water        | EPA 552.3*            | Liquid-Liquid Microextraction, Derivatization and GC-ECD                                          | ✓          | Richmond |
| Hardness in Water                | SM 2340 B* (2021)     | Calculation: 2.497 [total Ca] + 4.118 [total Mg] (Est)                                            | ✓          | N/A      |
| Langelier Index in Water         | SM 2330 B (2021)      | Calculation                                                                                       |            | N/A      |
| Mercury, total in Water          | EPA 245.7*            | BrCl <sub>2</sub> Oxidation / Cold Vapor Atomic Fluorescence Spectrometry (CVAFS)                 | ✓          | Richmond |
| pH in Water                      | SM 4500-H+ B (2021)   | Electrometry                                                                                      | ✓          | Kelowna  |
| Solids, Total Dissolved in Water | SM 1030 E (2021)      | SM 1030 E                                                                                         |            | N/A      |
| Total Metals in Water            | EPA 200.2 / EPA 6020B | HNO <sub>3</sub> +HCl Hot Block Digestion / Inductively Coupled Plasma-Mass Spectroscopy (ICP-MS) | ✓          | Richmond |
| Trihalomethanes in Water         | EPA 5030B / EPA 8260D | Purge&Trap / GC-MSD (SIM)                                                                         | ✓          | Richmond |
| Turbidity in Water               | SM 2130 B (2020)      | Nephelometry                                                                                      | ✓          | Kelowna  |

*Note: An asterisk in the Method Reference indicates that the CARO method has been modified from the reference method*

### Glossary of Terms:

|            |                                                                                                                       |
|------------|-----------------------------------------------------------------------------------------------------------------------|
| RL         | Reporting Limit (default)                                                                                             |
| <          | Less than the specified Reporting Limit (RL) - the actual RL may be higher than the default RL due to various factors |
| >=         | Greater than or equal to the specified Result                                                                         |
| >2         | Greater than the specified Result                                                                                     |
| °C         | Degrees Celcius                                                                                                       |
| AO         | Aesthetic Objective                                                                                                   |
| CFU/100 mL | Colony Forming Units per 100 millilitres                                                                              |
| CU         | Colour Units (referenced against a platinum cobalt standard)                                                          |
| MAC        | Maximum Acceptable Concentration (health based)                                                                       |
| mg/L       | Milligrams per litre                                                                                                  |
| NTU        | Nephelometric Turbidity Units                                                                                         |
| OG         | Operational Guideline (treated water)                                                                                 |
| pH units   | pH < 7 = acidic, pH > 7 = basic                                                                                       |
| µS/cm      | Microsiemens per centimetre                                                                                           |
| ASTM       | ASTM International Test Methods                                                                                       |
| EPA        | United States Environmental Protection Agency Test Methods                                                            |
| SM         | Standard Methods for the Examination of Water and Wastewater, American Public Health Association                      |



## APPENDIX 1: SUPPORTING INFORMATION

**REPORTED TO PROJECT** Castlegar, City of  
General Potability

**WORK ORDER REPORTED** 23G0192  
2023-07-12 14:35

### General Comments:

The results in this report apply to the received samples analyzed in accordance with the Chain of Custody document. This analytical report must be reproduced in its entirety. CARO is not responsible for any loss or damage resulting directly or indirectly from error or omission in the conduct of testing. Liability is limited to the cost of analysis. Caro will dispose of all samples within 30 days of sample receipt, unless otherwise agreed.

Results in **Bold** indicate values that are above CARO's method reporting limits. Any results that are above regulatory limits are highlighted **red**. Please note that results will only be highlighted red if the regulatory limits are included on the CARO report. Any Bold and/or highlighted results do not take into account method uncertainty. If you would like method uncertainty or regulatory limits to be included on your report, please contact your Account Manager: [bwhitehead@caro.ca](mailto:bwhitehead@caro.ca)

*Please note any regulatory guidelines applied to this report are added as a convenience to the client, at their request, to help provide some initial context to analytical results obtained. Although CARO makes every effort to ensure accuracy of the associated regulatory guideline(s) applied, the guidelines applied cannot be assumed to be correct due to a variety of factors and as such CARO Analytical Services assumes no liability or responsibility for the use of those guidelines to make any decisions. The original source of the regulation should be verified and a review of the guideline(s) should be validated as correct in order to make any decisions arising from the comparison of the analytical data obtained to the relevant regulatory guideline for one's particular circumstances. Further, CARO Analytical Services assumes no liability or responsibility for any loss attributed from the use of these guidelines in any way.*

## APPENDIX 2: QUALITY CONTROL RESULTS

**REPORTED TO PROJECT** Castlegar, City of  
General Potability

**WORK ORDER REPORTED** 23G0192  
2023-07-12 14:35

The following section displays the quality control (QC) data that is associated with your sample data. Groups of samples are prepared in "batches" and analyzed in conjunction with QC samples that ensure your data is of the highest quality. Common QC types include:

- **Method Blank (Blk):** A blank sample that undergoes sample processing identical to that carried out for the test samples. Method blank results are used to assess contamination from the laboratory environment and reagents.
- **Duplicate (Dup):** An additional or second portion of a randomly selected sample in the analytical run carried through the entire analytical process. Duplicates provide a measure of the analytical method's precision (reproducibility).
- **Blank Spike (BS):** A sample of known concentration which undergoes processing identical to that carried out for test samples, also referred to as a laboratory control sample (LCS). Blank spikes provide a measure of the analytical method's accuracy.
- **Matrix Spike (MS):** A second aliquot of sample is fortified with a known concentration of target analytes and carried through the entire analytical process. Matrix spikes evaluate potential matrix effects that may affect the analyte recovery.
- **Reference Material (SRM):** A homogenous material of similar matrix to the samples, certified for the parameter(s) listed. Reference Materials ensure that the analytical process is adequate to achieve acceptable recoveries of the parameter(s) tested.

Each QC type is analyzed at a 5-10% frequency, i.e. one blank/duplicate/spike for every 10-20 samples. For all types of QC, the specified recovery (% Rec) and relative percent difference (RPD) limits are derived from long-term method performance averages and/or prescribed by the reference method.

| Analyte | Result | RL Units | Spike Level | Source Result | % REC | REC Limit | % RPD | RPD Limit | Qualifier |
|---------|--------|----------|-------------|---------------|-------|-----------|-------|-----------|-----------|
|---------|--------|----------|-------------|---------------|-------|-----------|-------|-----------|-----------|

### Anions, Batch B3G0214

|                                   |         |            |                                            |         |                                            |        |     |  |    |
|-----------------------------------|---------|------------|--------------------------------------------|---------|--------------------------------------------|--------|-----|--|----|
| <b>Blank (B3G0214-BLK1)</b>       |         |            | Prepared: 2023-07-05, Analyzed: 2023-07-05 |         |                                            |        |     |  |    |
| Chloride                          | < 0.10  | 0.10 mg/L  |                                            |         |                                            |        |     |  |    |
| Fluoride                          | < 0.10  | 0.10 mg/L  |                                            |         |                                            |        |     |  |    |
| Nitrate (as N)                    | < 0.010 | 0.010 mg/L |                                            |         |                                            |        |     |  |    |
| Nitrite (as N)                    | < 0.010 | 0.010 mg/L |                                            |         |                                            |        |     |  |    |
| Sulfate                           | < 1.0   | 1.0 mg/L   |                                            |         |                                            |        |     |  |    |
| <b>LCS (B3G0214-BS1)</b>          |         |            | Prepared: 2023-07-05, Analyzed: 2023-07-05 |         |                                            |        |     |  |    |
| Chloride                          | 16.0    | 0.10 mg/L  | 16.0                                       |         | 100                                        | 90-110 |     |  |    |
| Fluoride                          | 4.05    | 0.10 mg/L  | 4.00                                       |         | 101                                        | 88-108 |     |  |    |
| Nitrate (as N)                    | 4.04    | 0.010 mg/L | 4.00                                       |         | 101                                        | 90-110 |     |  |    |
| Nitrite (as N)                    | 1.98    | 0.010 mg/L | 2.00                                       |         | 99                                         | 85-115 |     |  |    |
| Sulfate                           | 16.0    | 1.0 mg/L   | 16.0                                       |         | 100                                        | 90-110 |     |  |    |
| <b>Duplicate (B3G0214-DUP1)</b>   |         |            | <b>Source: 23G0192-01</b>                  |         | Prepared: 2023-07-05, Analyzed: 2023-07-05 |        |     |  |    |
| Chloride                          | 0.25    | 0.10 mg/L  |                                            | 0.24    |                                            |        |     |  | 10 |
| Fluoride                          | < 0.10  | 0.10 mg/L  |                                            | < 0.10  |                                            |        |     |  | 10 |
| Nitrate (as N)                    | 0.030   | 0.010 mg/L |                                            | 0.030   |                                            |        |     |  | 10 |
| Nitrite (as N)                    | < 0.010 | 0.010 mg/L |                                            | < 0.010 |                                            |        |     |  | 15 |
| Sulfate                           | 11.3    | 1.0 mg/L   |                                            | 11.3    |                                            |        | < 1 |  | 10 |
| <b>Matrix Spike (B3G0214-MS1)</b> |         |            | <b>Source: 23G0192-01</b>                  |         | Prepared: 2023-07-05, Analyzed: 2023-07-05 |        |     |  |    |
| Chloride                          | 15.6    | 0.10 mg/L  | 16.0                                       | 0.24    | 96                                         | 75-125 |     |  |    |
| Fluoride                          | 3.86    | 0.10 mg/L  | 4.00                                       | < 0.10  | 96                                         | 75-125 |     |  |    |
| Nitrate (as N)                    | 4.18    | 0.010 mg/L | 4.00                                       | 0.030   | 104                                        | 75-125 |     |  |    |
| Nitrite (as N)                    | 1.85    | 0.010 mg/L | 2.00                                       | < 0.010 | 92                                         | 80-120 |     |  |    |
| Sulfate                           | 27.1    | 1.0 mg/L   | 16.0                                       | 11.3    | 99                                         | 75-125 |     |  |    |

### General Parameters, Batch B3G0296

|                             |       |        |                                            |  |     |        |  |  |     |
|-----------------------------|-------|--------|--------------------------------------------|--|-----|--------|--|--|-----|
| <b>Blank (B3G0296-BLK1)</b> |       |        | Prepared: 2023-07-05, Analyzed: 2023-07-05 |  |     |        |  |  |     |
| Colour, True                | < 5.0 | 5.0 CU |                                            |  |     |        |  |  | HT1 |
| <b>LCS (B3G0296-BS1)</b>    |       |        | Prepared: 2023-07-05, Analyzed: 2023-07-05 |  |     |        |  |  |     |
| Colour, True                | 21    | 5.0 CU | 20.0                                       |  | 103 | 85-115 |  |  | HT1 |

## APPENDIX 2: QUALITY CONTROL RESULTS

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| Analyte                                             | Result   | RL Units      | Spike Level | Source Result                              | % REC | REC Limit | % RPD | RPD Limit | Qualifier |
|-----------------------------------------------------|----------|---------------|-------------|--------------------------------------------|-------|-----------|-------|-----------|-----------|
| <b>General Parameters, Batch B3G0343</b>            |          |               |             |                                            |       |           |       |           |           |
| <b>Blank (B3G0343-BLK1)</b>                         |          |               |             | Prepared: 2023-07-05, Analyzed: 2023-07-05 |       |           |       |           |           |
| Turbidity                                           | < 0.10   | 0.10 NTU      |             |                                            |       |           |       |           |           |
| <b>LCS (B3G0343-BS1)</b>                            |          |               |             | Prepared: 2023-07-05, Analyzed: 2023-07-05 |       |           |       |           |           |
| Turbidity                                           | 14.6     | 0.10 NTU      | 14.6        |                                            | 100   | 90-110    |       |           |           |
| <b>General Parameters, Batch B3G0403</b>            |          |               |             |                                            |       |           |       |           |           |
| <b>Blank (B3G0403-BLK1)</b>                         |          |               |             | Prepared: 2023-07-06, Analyzed: 2023-07-06 |       |           |       |           |           |
| pH                                                  | 5.56     | 0.10 pH units |             |                                            |       |           |       |           |           |
| Temperature, at pH                                  | 22.1     | °C            |             |                                            |       |           |       |           |           |
| <b>Blank (B3G0403-BLK2)</b>                         |          |               |             | Prepared: 2023-07-06, Analyzed: 2023-07-06 |       |           |       |           |           |
| pH                                                  | 5.59     | 0.10 pH units |             |                                            |       |           |       |           |           |
| Temperature, at pH                                  | 23.2     | °C            |             |                                            |       |           |       |           |           |
| <b>Reference (B3G0403-SRM1)</b>                     |          |               |             | Prepared: 2023-07-06, Analyzed: 2023-07-06 |       |           |       |           |           |
| pH                                                  | 7.02     | 0.10 pH units | 7.01        |                                            | 100   | 98-102    |       |           |           |
| <b>Reference (B3G0403-SRM2)</b>                     |          |               |             | Prepared: 2023-07-06, Analyzed: 2023-07-06 |       |           |       |           |           |
| pH                                                  | 7.02     | 0.10 pH units | 7.01        |                                            | 100   | 98-102    |       |           |           |
| <b>General Parameters, Batch B3G0548</b>            |          |               |             |                                            |       |           |       |           |           |
| <b>Blank (B3G0548-BLK1)</b>                         |          |               |             | Prepared: 2023-07-07, Analyzed: 2023-07-07 |       |           |       |           |           |
| Cyanide, Total                                      | < 0.0020 | 0.0020 mg/L   |             |                                            |       |           |       |           |           |
| <b>LCS (B3G0548-BS1)</b>                            |          |               |             | Prepared: 2023-07-07, Analyzed: 2023-07-07 |       |           |       |           |           |
| Cyanide, Total                                      | 0.0223   | 0.0020 mg/L   | 0.0200      |                                            | 112   | 82-120    |       |           |           |
| <b>LCS Dup (B3G0548-BSD1)</b>                       |          |               |             | Prepared: 2023-07-07, Analyzed: 2023-07-07 |       |           |       |           |           |
| Cyanide, Total                                      | 0.0209   | 0.0020 mg/L   | 0.0200      |                                            | 104   | 82-120    | 7     | 10        |           |
| <b>General Parameters, Batch B3G0573</b>            |          |               |             |                                            |       |           |       |           |           |
| <b>Blank (B3G0573-BLK1)</b>                         |          |               |             | Prepared: 2023-07-07, Analyzed: 2023-07-07 |       |           |       |           |           |
| Alkalinity, Total (as CaCO <sub>3</sub> )           | < 1.0    | 1.0 mg/L      |             |                                            |       |           |       |           |           |
| Alkalinity, Phenolphthalein (as CaCO <sub>3</sub> ) | < 1.0    | 1.0 mg/L      |             |                                            |       |           |       |           |           |
| Alkalinity, Bicarbonate (as CaCO <sub>3</sub> )     | < 1.0    | 1.0 mg/L      |             |                                            |       |           |       |           |           |
| Alkalinity, Carbonate (as CaCO <sub>3</sub> )       | < 1.0    | 1.0 mg/L      |             |                                            |       |           |       |           |           |
| Alkalinity, Hydroxide (as CaCO <sub>3</sub> )       | < 1.0    | 1.0 mg/L      |             |                                            |       |           |       |           |           |
| Conductivity (EC)                                   | < 2.0    | 2.0 µS/cm     |             |                                            |       |           |       |           |           |
| <b>LCS (B3G0573-BS1)</b>                            |          |               |             | Prepared: 2023-07-07, Analyzed: 2023-07-07 |       |           |       |           |           |
| Alkalinity, Total (as CaCO <sub>3</sub> )           | 104      | 1.0 mg/L      | 100         |                                            | 104   | 80-120    |       |           |           |
| Alkalinity, Phenolphthalein (as CaCO <sub>3</sub> ) | 40.5     | 1.0 mg/L      | 50.0        |                                            | 81    | 0-200     |       |           |           |
| <b>LCS (B3G0573-BS2)</b>                            |          |               |             | Prepared: 2023-07-07, Analyzed: 2023-07-07 |       |           |       |           |           |
| Conductivity (EC)                                   | 1410     | 2.0 µS/cm     | 1410        |                                            | 100   | 95-105    |       |           |           |
| <b>Haloacetic Acids, Batch B3G0922</b>              |          |               |             |                                            |       |           |       |           |           |
| <b>Blank (B3G0922-BLK1)</b>                         |          |               |             | Prepared: 2023-07-11, Analyzed: 2023-07-12 |       |           |       |           |           |
| Monochloroacetic Acid                               | < 0.0020 | 0.0020 mg/L   |             |                                            |       |           |       |           |           |
| Monobromoacetic Acid                                | < 0.0020 | 0.0020 mg/L   |             |                                            |       |           |       |           |           |
| Dichloroacetic Acid                                 | < 0.0020 | 0.0020 mg/L   |             |                                            |       |           |       |           |           |

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| Analyte                                           | Result   | RL Units     | Spike Level | Source Result                              | % REC | REC Limit | % RPD | RPD Limit | Qualifier |
|---------------------------------------------------|----------|--------------|-------------|--------------------------------------------|-------|-----------|-------|-----------|-----------|
| <b>Haloacetic Acids, Batch B3G0922, Continued</b> |          |              |             |                                            |       |           |       |           |           |
| <b>Blank (B3G0922-BLK1), Continued</b>            |          |              |             | Prepared: 2023-07-11, Analyzed: 2023-07-12 |       |           |       |           |           |
| Trichloroacetic Acid                              | < 0.0020 | 0.0020 mg/L  |             |                                            |       |           |       |           |           |
| Dibromoacetic Acid                                | < 0.0020 | 0.0020 mg/L  |             |                                            |       |           |       |           |           |
| Surrogate: 2-Bromopropionic Acid                  | 0.0114   | mg/L         | 0.0116      |                                            | 98    | 70-130    |       |           |           |
| <b>LCS (B3G0922-BS1)</b>                          |          |              |             | Prepared: 2023-07-11, Analyzed: 2023-07-12 |       |           |       |           |           |
| Monochloroacetic Acid                             | 0.0559   | 0.0020 mg/L  | 0.0564      |                                            | 99    | 75-117    |       |           |           |
| Monobromoacetic Acid                              | 0.0368   | 0.0020 mg/L  | 0.0374      |                                            | 98    | 83-113    |       |           |           |
| Dichloroacetic Acid                               | 0.0558   | 0.0020 mg/L  | 0.0558      |                                            | 100   | 78-112    |       |           |           |
| Trichloroacetic Acid                              | 0.0186   | 0.0020 mg/L  | 0.0186      |                                            | 100   | 81-110    |       |           |           |
| Dibromoacetic Acid                                | 0.0182   | 0.0020 mg/L  | 0.0187      |                                            | 97    | 89-112    |       |           |           |
| Surrogate: 2-Bromopropionic Acid                  | 0.0113   | mg/L         | 0.0116      |                                            | 97    | 70-130    |       |           |           |
| <b>LCS Dup (B3G0922-BSD1)</b>                     |          |              |             | Prepared: 2023-07-11, Analyzed: 2023-07-12 |       |           |       |           |           |
| Monochloroacetic Acid                             | 0.0566   | 0.0020 mg/L  | 0.0564      |                                            | 100   | 75-117    | 1     | 30        |           |
| Monobromoacetic Acid                              | 0.0384   | 0.0020 mg/L  | 0.0374      |                                            | 103   | 83-113    | 4     | 30        |           |
| Dichloroacetic Acid                               | 0.0564   | 0.0020 mg/L  | 0.0558      |                                            | 101   | 78-112    | 1     | 30        |           |
| Trichloroacetic Acid                              | 0.0189   | 0.0020 mg/L  | 0.0186      |                                            | 101   | 81-110    | 2     | 30        |           |
| Dibromoacetic Acid                                | 0.0194   | 0.0020 mg/L  | 0.0187      |                                            | 104   | 89-112    | 7     | 30        |           |
| Surrogate: 2-Bromopropionic Acid                  | 0.0120   | mg/L         | 0.0116      |                                            | 103   | 70-130    |       |           |           |
| <b>Microbiological Parameters, Batch B3G0284</b>  |          |              |             |                                            |       |           |       |           |           |
| <b>Blank (B3G0284-BLK1)</b>                       |          |              |             | Prepared: 2023-07-05, Analyzed: 2023-07-05 |       |           |       |           |           |
| Coliforms, Total                                  | < 1      | 1 CFU/100 mL |             |                                            |       |           |       |           |           |
| E. coli                                           | < 1      | 1 CFU/100 mL |             |                                            |       |           |       |           |           |
| <b>Blank (B3G0284-BLK2)</b>                       |          |              |             | Prepared: 2023-07-05, Analyzed: 2023-07-05 |       |           |       |           |           |
| Coliforms, Total                                  | < 1      | 1 CFU/100 mL |             |                                            |       |           |       |           |           |
| E. coli                                           | < 1      | 1 CFU/100 mL |             |                                            |       |           |       |           |           |
| <b>Blank (B3G0284-BLK3)</b>                       |          |              |             | Prepared: 2023-07-05, Analyzed: 2023-07-05 |       |           |       |           |           |
| Coliforms, Total                                  | < 1      | 1 CFU/100 mL |             |                                            |       |           |       |           |           |
| E. coli                                           | < 1      | 1 CFU/100 mL |             |                                            |       |           |       |           |           |
| <b>Blank (B3G0284-BLK4)</b>                       |          |              |             | Prepared: 2023-07-05, Analyzed: 2023-07-05 |       |           |       |           |           |
| Coliforms, Total                                  | < 1      | 1 CFU/100 mL |             |                                            |       |           |       |           |           |
| E. coli                                           | < 1      | 1 CFU/100 mL |             |                                            |       |           |       |           |           |
| <b>Blank (B3G0284-BLK5)</b>                       |          |              |             | Prepared: 2023-07-05, Analyzed: 2023-07-05 |       |           |       |           |           |
| Coliforms, Total                                  | < 1      | 1 CFU/100 mL |             |                                            |       |           |       |           |           |
| E. coli                                           | < 1      | 1 CFU/100 mL |             |                                            |       |           |       |           |           |
| <b>Blank (B3G0284-BLK6)</b>                       |          |              |             | Prepared: 2023-07-05, Analyzed: 2023-07-05 |       |           |       |           |           |
| Coliforms, Total                                  | < 1      | 1 CFU/100 mL |             |                                            |       |           |       |           |           |
| E. coli                                           | < 1      | 1 CFU/100 mL |             |                                            |       |           |       |           |           |
| <b>Blank (B3G0284-BLK7)</b>                       |          |              |             | Prepared: 2023-07-05, Analyzed: 2023-07-05 |       |           |       |           |           |
| Coliforms, Total                                  | < 1      | 1 CFU/100 mL |             |                                            |       |           |       |           |           |
| E. coli                                           | < 1      | 1 CFU/100 mL |             |                                            |       |           |       |           |           |
| <b>Blank (B3G0284-BLK8)</b>                       |          |              |             | Prepared: 2023-07-05, Analyzed: 2023-07-05 |       |           |       |           |           |
| Coliforms, Total                                  | < 1      | 1 CFU/100 mL |             |                                            |       |           |       |           |           |
| E. coli                                           | < 1      | 1 CFU/100 mL |             |                                            |       |           |       |           |           |
| <b>Blank (B3G0284-BLK9)</b>                       |          |              |             | Prepared: 2023-07-05, Analyzed: 2023-07-05 |       |           |       |           |           |
| Coliforms, Total                                  | < 1      | 1 CFU/100 mL |             |                                            |       |           |       |           |           |
| E. coli                                           | < 1      | 1 CFU/100 mL |             |                                            |       |           |       |           |           |

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| Analyte                                                     | Result | RL Units     | Spike Level | Source Result                              | % REC | REC Limit | % RPD | RPD Limit | Qualifier |
|-------------------------------------------------------------|--------|--------------|-------------|--------------------------------------------|-------|-----------|-------|-----------|-----------|
| <b>Microbiological Parameters, Batch B3G0284, Continued</b> |        |              |             |                                            |       |           |       |           |           |
| <b>Blank (B3G0284-BLKA)</b>                                 |        |              |             | Prepared: 2023-07-05, Analyzed: 2023-07-05 |       |           |       |           |           |
| Coliforms, Total                                            | < 1    | 1 CFU/100 mL |             |                                            |       |           |       |           |           |
| E. coli                                                     | < 1    | 1 CFU/100 mL |             |                                            |       |           |       |           |           |
| <b>Blank (B3G0284-BLKB)</b>                                 |        |              |             | Prepared: 2023-07-05, Analyzed: 2023-07-05 |       |           |       |           |           |
| Coliforms, Total                                            | < 1    | 1 CFU/100 mL |             |                                            |       |           |       |           |           |
| E. coli                                                     | < 1    | 1 CFU/100 mL |             |                                            |       |           |       |           |           |
| <b>Blank (B3G0284-BLKC)</b>                                 |        |              |             | Prepared: 2023-07-05, Analyzed: 2023-07-05 |       |           |       |           |           |
| Coliforms, Total                                            | < 1    | 1 CFU/100 mL |             |                                            |       |           |       |           |           |
| E. coli                                                     | < 1    | 1 CFU/100 mL |             |                                            |       |           |       |           |           |
| <b>Blank (B3G0284-BLKD)</b>                                 |        |              |             | Prepared: 2023-07-05, Analyzed: 2023-07-05 |       |           |       |           |           |
| Coliforms, Total                                            | < 1    | 1 CFU/100 mL |             |                                            |       |           |       |           |           |
| E. coli                                                     | < 1    | 1 CFU/100 mL |             |                                            |       |           |       |           |           |
| <b>Blank (B3G0284-BLKE)</b>                                 |        |              |             | Prepared: 2023-07-05, Analyzed: 2023-07-05 |       |           |       |           |           |
| Coliforms, Total                                            | < 1    | 1 CFU/100 mL |             |                                            |       |           |       |           |           |
| E. coli                                                     | < 1    | 1 CFU/100 mL |             |                                            |       |           |       |           |           |
| <b>Blank (B3G0284-BLKF)</b>                                 |        |              |             | Prepared: 2023-07-05, Analyzed: 2023-07-05 |       |           |       |           |           |
| Coliforms, Total                                            | < 1    | 1 CFU/100 mL |             |                                            |       |           |       |           |           |
| E. coli                                                     | < 1    | 1 CFU/100 mL |             |                                            |       |           |       |           |           |
| <b>Blank (B3G0284-BLKG)</b>                                 |        |              |             | Prepared: 2023-07-05, Analyzed: 2023-07-05 |       |           |       |           |           |
| Coliforms, Total                                            | < 1    | 1 CFU/100 mL |             |                                            |       |           |       |           |           |
| E. coli                                                     | < 1    | 1 CFU/100 mL |             |                                            |       |           |       |           |           |
| <b>Blank (B3G0284-BLKH)</b>                                 |        |              |             | Prepared: 2023-07-05, Analyzed: 2023-07-05 |       |           |       |           |           |
| Coliforms, Total                                            | < 1    | 1 CFU/100 mL |             |                                            |       |           |       |           |           |
| E. coli                                                     | < 1    | 1 CFU/100 mL |             |                                            |       |           |       |           |           |
| <b>Blank (B3G0284-BLKI)</b>                                 |        |              |             | Prepared: 2023-07-05, Analyzed: 2023-07-05 |       |           |       |           |           |
| Coliforms, Total                                            | < 1    | 1 CFU/100 mL |             |                                            |       |           |       |           |           |
| E. coli                                                     | < 1    | 1 CFU/100 mL |             |                                            |       |           |       |           |           |

### Total Metals, Batch B3G0692

|                             |            |               |  |                                            |  |  |  |  |  |
|-----------------------------|------------|---------------|--|--------------------------------------------|--|--|--|--|--|
| <b>Blank (B3G0692-BLK1)</b> |            |               |  | Prepared: 2023-07-08, Analyzed: 2023-07-08 |  |  |  |  |  |
| Aluminum, total             | < 0.0050   | 0.0050 mg/L   |  |                                            |  |  |  |  |  |
| Antimony, total             | < 0.00020  | 0.00020 mg/L  |  |                                            |  |  |  |  |  |
| Arsenic, total              | < 0.00050  | 0.00050 mg/L  |  |                                            |  |  |  |  |  |
| Barium, total               | < 0.0050   | 0.0050 mg/L   |  |                                            |  |  |  |  |  |
| Boron, total                | < 0.0500   | 0.0500 mg/L   |  |                                            |  |  |  |  |  |
| Cadmium, total              | < 0.000010 | 0.000010 mg/L |  |                                            |  |  |  |  |  |
| Calcium, total              | < 0.20     | 0.20 mg/L     |  |                                            |  |  |  |  |  |
| Chromium, total             | < 0.00050  | 0.00050 mg/L  |  |                                            |  |  |  |  |  |
| Cobalt, total               | < 0.00010  | 0.00010 mg/L  |  |                                            |  |  |  |  |  |
| Copper, total               | < 0.00040  | 0.00040 mg/L  |  |                                            |  |  |  |  |  |
| Iron, total                 | < 0.010    | 0.010 mg/L    |  |                                            |  |  |  |  |  |
| Lead, total                 | < 0.00020  | 0.00020 mg/L  |  |                                            |  |  |  |  |  |
| Magnesium, total            | < 0.010    | 0.010 mg/L    |  |                                            |  |  |  |  |  |
| Manganese, total            | < 0.00020  | 0.00020 mg/L  |  |                                            |  |  |  |  |  |
| Molybdenum, total           | < 0.00010  | 0.00010 mg/L  |  |                                            |  |  |  |  |  |
| Nickel, total               | < 0.00040  | 0.00040 mg/L  |  |                                            |  |  |  |  |  |
| Potassium, total            | < 0.10     | 0.10 mg/L     |  |                                            |  |  |  |  |  |
| Selenium, total             | < 0.00050  | 0.00050 mg/L  |  |                                            |  |  |  |  |  |
| Sodium, total               | < 0.10     | 0.10 mg/L     |  |                                            |  |  |  |  |  |

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| Analyte | Result | RL Units | Spike Level | Source Result | % REC | REC Limit | % RPD | RPD Limit | Qualifier |
|---------|--------|----------|-------------|---------------|-------|-----------|-------|-----------|-----------|
|---------|--------|----------|-------------|---------------|-------|-----------|-------|-----------|-----------|

### Total Metals, Batch B3G0692, Continued

#### Blank (B3G0692-BLK1), Continued

Prepared: 2023-07-08, Analyzed: 2023-07-08

|                  |            |               |  |  |  |  |  |  |  |
|------------------|------------|---------------|--|--|--|--|--|--|--|
| Strontium, total | < 0.0010   | 0.0010 mg/L   |  |  |  |  |  |  |  |
| Uranium, total   | < 0.000020 | 0.000020 mg/L |  |  |  |  |  |  |  |
| Zinc, total      | < 0.0040   | 0.0040 mg/L   |  |  |  |  |  |  |  |

#### LCS (B3G0692-BS1)

Prepared: 2023-07-08, Analyzed: 2023-07-10

|                   |        |               |        |  |     |        |  |  |  |
|-------------------|--------|---------------|--------|--|-----|--------|--|--|--|
| Aluminum, total   | 4.03   | 0.0050 mg/L   | 4.00   |  | 101 | 80-120 |  |  |  |
| Antimony, total   | 0.0398 | 0.00020 mg/L  | 0.0400 |  | 99  | 80-120 |  |  |  |
| Arsenic, total    | 0.395  | 0.00050 mg/L  | 0.400  |  | 99  | 80-120 |  |  |  |
| Barium, total     | 0.0397 | 0.0050 mg/L   | 0.0400 |  | 99  | 80-120 |  |  |  |
| Boron, total      | 0.426  | 0.0500 mg/L   | 0.400  |  | 106 | 80-120 |  |  |  |
| Cadmium, total    | 0.0390 | 0.000010 mg/L | 0.0400 |  | 97  | 80-120 |  |  |  |
| Calcium, total    | 4.13   | 0.20 mg/L     | 4.00   |  | 103 | 80-120 |  |  |  |
| Chromium, total   | 0.0405 | 0.00050 mg/L  | 0.0400 |  | 101 | 80-120 |  |  |  |
| Cobalt, total     | 0.0397 | 0.00010 mg/L  | 0.0400 |  | 99  | 80-120 |  |  |  |
| Copper, total     | 0.0396 | 0.00040 mg/L  | 0.0400 |  | 99  | 80-120 |  |  |  |
| Iron, total       | 4.03   | 0.010 mg/L    | 4.00   |  | 101 | 80-120 |  |  |  |
| Lead, total       | 0.0395 | 0.00020 mg/L  | 0.0400 |  | 99  | 80-120 |  |  |  |
| Magnesium, total  | 4.02   | 0.010 mg/L    | 4.00   |  | 100 | 80-120 |  |  |  |
| Manganese, total  | 0.0399 | 0.00020 mg/L  | 0.0400 |  | 100 | 80-120 |  |  |  |
| Molybdenum, total | 0.0383 | 0.00010 mg/L  | 0.0400 |  | 96  | 80-120 |  |  |  |
| Nickel, total     | 0.0396 | 0.00040 mg/L  | 0.0400 |  | 99  | 80-120 |  |  |  |
| Potassium, total  | 3.99   | 0.10 mg/L     | 4.00   |  | 100 | 80-120 |  |  |  |
| Selenium, total   | 0.405  | 0.00050 mg/L  | 0.400  |  | 101 | 80-120 |  |  |  |
| Sodium, total     | 4.06   | 0.10 mg/L     | 4.00   |  | 101 | 80-120 |  |  |  |
| Strontium, total  | 0.0399 | 0.0010 mg/L   | 0.0400 |  | 100 | 80-120 |  |  |  |
| Uranium, total    | 0.0404 | 0.000020 mg/L | 0.0400 |  | 101 | 80-120 |  |  |  |
| Zinc, total       | 0.392  | 0.0040 mg/L   | 0.400  |  | 98  | 80-120 |  |  |  |

### Total Metals, Batch B3G0945

#### Blank (B3G0945-BLK1)

Prepared: 2023-07-11, Analyzed: 2023-07-12

|                |            |               |  |  |  |  |  |  |  |
|----------------|------------|---------------|--|--|--|--|--|--|--|
| Mercury, total | < 0.000010 | 0.000010 mg/L |  |  |  |  |  |  |  |
|----------------|------------|---------------|--|--|--|--|--|--|--|

#### Blank (B3G0945-BLK2)

Prepared: 2023-07-11, Analyzed: 2023-07-12

|                |            |               |  |  |  |  |  |  |  |
|----------------|------------|---------------|--|--|--|--|--|--|--|
| Mercury, total | < 0.000010 | 0.000010 mg/L |  |  |  |  |  |  |  |
|----------------|------------|---------------|--|--|--|--|--|--|--|

#### LCS (B3G0945-BS1)

Prepared: 2023-07-11, Analyzed: 2023-07-12

|                |          |               |          |  |    |        |  |  |  |
|----------------|----------|---------------|----------|--|----|--------|--|--|--|
| Mercury, total | 0.000248 | 0.000010 mg/L | 0.000250 |  | 99 | 80-120 |  |  |  |
|----------------|----------|---------------|----------|--|----|--------|--|--|--|

#### LCS (B3G0945-BS2)

Prepared: 2023-07-11, Analyzed: 2023-07-12

|                |          |               |          |  |    |        |  |  |  |
|----------------|----------|---------------|----------|--|----|--------|--|--|--|
| Mercury, total | 0.000246 | 0.000010 mg/L | 0.000250 |  | 98 | 80-120 |  |  |  |
|----------------|----------|---------------|----------|--|----|--------|--|--|--|

### Volatile Organic Compounds (VOC), Batch B3G0789

#### Blank (B3G0789-BLK1)

Prepared: 2023-07-10, Analyzed: 2023-07-10

|                                 |          |             |        |  |    |        |  |  |  |
|---------------------------------|----------|-------------|--------|--|----|--------|--|--|--|
| Bromodichloromethane            | < 0.0010 | 0.0010 mg/L |        |  |    |        |  |  |  |
| Bromoform                       | < 0.0010 | 0.0010 mg/L |        |  |    |        |  |  |  |
| Chloroform                      | < 0.0010 | 0.0010 mg/L |        |  |    |        |  |  |  |
| Dibromochloromethane            | < 0.0010 | 0.0010 mg/L |        |  |    |        |  |  |  |
| Surrogate: Toluene-d8           | 0.0220   | mg/L        | 0.0250 |  | 88 | 70-130 |  |  |  |
| Surrogate: 4-Bromofluorobenzene | 0.0206   | mg/L        | 0.0249 |  | 83 | 70-130 |  |  |  |

#### LCS (B3G0789-BS1)

Prepared: 2023-07-10, Analyzed: 2023-07-10

|                      |        |             |        |  |     |        |  |  |  |
|----------------------|--------|-------------|--------|--|-----|--------|--|--|--|
| Bromodichloromethane | 0.0195 | 0.0010 mg/L | 0.0201 |  | 97  | 70-130 |  |  |  |
| Bromoform            | 0.0235 | 0.0010 mg/L | 0.0201 |  | 117 | 70-130 |  |  |  |
| Chloroform           | 0.0200 | 0.0010 mg/L | 0.0201 |  | 99  | 70-130 |  |  |  |

## APPENDIX 2: QUALITY CONTROL RESULTS

**REPORTED TO PROJECT** Castlegar, City of  
General Potability

**WORK ORDER REPORTED** 23G0192  
2023-07-12 14:35

| Analyte                                                           | Result | RL Units    | Spike Level | Source Result | % REC                                      | REC Limit | % RPD | RPD Limit | Qualifier |
|-------------------------------------------------------------------|--------|-------------|-------------|---------------|--------------------------------------------|-----------|-------|-----------|-----------|
| <b>Volatile Organic Compounds (VOC), Batch B3G0789, Continued</b> |        |             |             |               |                                            |           |       |           |           |
| <b>LCS (B3G0789-BS1), Continued</b>                               |        |             |             |               | Prepared: 2023-07-10, Analyzed: 2023-07-10 |           |       |           |           |
| Dibromochloromethane                                              | 0.0233 | 0.0010 mg/L | 0.0201      |               | 116                                        | 70-130    |       |           |           |
| Surrogate: Toluene-d8                                             | 0.0289 | mg/L        | 0.0250      |               | 115                                        | 70-130    |       |           |           |
| Surrogate: 4-Bromofluorobenzene                                   | 0.0293 | mg/L        | 0.0249      |               | 118                                        | 70-130    |       |           |           |

### QC Qualifiers:

HT1 The sample was prepared and/or analyzed past the recommended holding time.

## CERTIFICATE OF ANALYSIS

**REPORTED TO** Castlegar, City of  
460 Columbia Avenue  
CASTLEGAR, BC V1N 1G7

**ATTENTION** Craig Lincoln

**PO NUMBER** 502

**PROJECT** General Potability

**PROJECT INFO**

**WORK ORDER** 23J0289

**RECEIVED / TEMP** 2023-10-04 12:19 / 11.1°C

**REPORTED** 2023-10-16 13:36

**COC NUMBER** No Number

### 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.

By engaging our services, you are agreeing to CARO Analytical Service's Standard Terms and Conditions outlined here:  
<https://www.caro.ca/terms-conditions>

If you have any questions or concerns, please contact me at [bwhitehead@caro.ca](mailto:bwhitehead@caro.ca)

#### Authorized By:

Brent Whitehead  
Account Manager

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#108 4475 Wayburne Drive Burnaby, BC V5G 4X4

## TEST RESULTS

**REPORTED TO PROJECT** Castlegar, City of  
General Potability

**WORK ORDER REPORTED** 23J0289  
2023-10-16 13:36

| Analyte                                                                                                   | Result     | Guideline     | RL Units      | Analyzed   | Qualifier |
|-----------------------------------------------------------------------------------------------------------|------------|---------------|---------------|------------|-----------|
| <b>481E - Water Treatment Center - Raw Water (23J0289-01)   Matrix: Water   Sampled: 2023-10-03 09:00</b> |            |               |               |            |           |
| <b>Anions</b>                                                                                             |            |               |               |            |           |
| Chloride                                                                                                  | 0.20       | AO ≤ 250      | 0.10 mg/L     | 2023-10-05 |           |
| Fluoride                                                                                                  | < 0.10     | MAC = 1.5     | 0.10 mg/L     | 2023-10-05 |           |
| Nitrate (as N)                                                                                            | 0.085      | MAC = 10      | 0.010 mg/L    | 2023-10-05 |           |
| Nitrite (as N)                                                                                            | < 0.010    | MAC = 1       | 0.010 mg/L    | 2023-10-05 |           |
| Sulfate                                                                                                   | 9.8        | AO ≤ 500      | 1.0 mg/L      | 2023-10-05 |           |
| <b>Calculated Parameters</b>                                                                              |            |               |               |            |           |
| Hardness, Total (as CaCO <sub>3</sub> )                                                                   | 59.7       | None Required | 0.500 mg/L    | N/A        |           |
| Langelier Index                                                                                           | -1.7       | N/A           | -5.0          | 2023-10-11 | CT6       |
| Solids, Total Dissolved                                                                                   | 69.3       | AO ≤ 500      | 1.00 mg/L     | N/A        |           |
| <b>General Parameters</b>                                                                                 |            |               |               |            |           |
| Alkalinity, Total (as CaCO <sub>3</sub> )                                                                 | 59.5       | N/A           | 1.0 mg/L      | 2023-10-07 |           |
| Alkalinity, Phenolphthalein (as CaCO <sub>3</sub> )                                                       | < 1.0      | N/A           | 1.0 mg/L      | 2023-10-07 |           |
| Alkalinity, Bicarbonate (as CaCO <sub>3</sub> )                                                           | 59.5       | N/A           | 1.0 mg/L      | 2023-10-07 |           |
| Alkalinity, Carbonate (as CaCO <sub>3</sub> )                                                             | < 1.0      | N/A           | 1.0 mg/L      | 2023-10-07 |           |
| Alkalinity, Hydroxide (as CaCO <sub>3</sub> )                                                             | < 1.0      | N/A           | 1.0 mg/L      | 2023-10-07 |           |
| Colour, True                                                                                              | < 5.0      | AO ≤ 15       | 5.0 CU        | 2023-10-05 |           |
| Conductivity (EC)                                                                                         | 115        | N/A           | 2.0 µS/cm     | 2023-10-07 |           |
| Cyanide, Total                                                                                            | < 0.0020   | MAC = 0.2     | 0.0020 mg/L   | 2023-10-06 |           |
| pH                                                                                                        | 6.84       | 7.0-10.5      | 0.10 pH units | 2023-10-07 | HT2       |
| Temperature, at pH                                                                                        | 22.2       | N/A           | °C            | 2023-10-07 | HT2       |
| Turbidity                                                                                                 | 0.53       | OG < 1        | 0.10 NTU      | 2023-10-06 |           |
| <b>Microbiological Parameters</b>                                                                         |            |               |               |            |           |
| Coliforms, Total                                                                                          | 82         | MAC = 0       | 1 CFU/100 mL  | 2023-10-04 | HT3       |
| E. coli                                                                                                   | 1          | MAC = 0       | 1 CFU/100 mL  | 2023-10-04 | HT3       |
| <b>Total Metals</b>                                                                                       |            |               |               |            |           |
| Aluminum, total                                                                                           | 0.0120     | OG < 0.1      | 0.0050 mg/L   | 2023-10-10 |           |
| Antimony, total                                                                                           | < 0.00020  | MAC = 0.006   | 0.00020 mg/L  | 2023-10-10 |           |
| Arsenic, total                                                                                            | < 0.00050  | MAC = 0.01    | 0.00050 mg/L  | 2023-10-10 |           |
| Barium, total                                                                                             | 0.0164     | MAC = 2       | 0.0050 mg/L   | 2023-10-10 |           |
| Boron, total                                                                                              | < 0.0500   | MAC = 5       | 0.0500 mg/L   | 2023-10-10 |           |
| Cadmium, total                                                                                            | < 0.000010 | MAC = 0.007   | 0.000010 mg/L | 2023-10-10 |           |
| Calcium, total                                                                                            | 17.4       | None Required | 0.20 mg/L     | 2023-10-10 |           |
| Chromium, total                                                                                           | < 0.00050  | MAC = 0.05    | 0.00050 mg/L  | 2023-10-10 |           |
| Cobalt, total                                                                                             | < 0.00010  | N/A           | 0.00010 mg/L  | 2023-10-10 |           |
| Copper, total                                                                                             | 0.00047    | MAC = 2       | 0.00040 mg/L  | 2023-10-10 |           |
| Iron, total                                                                                               | < 0.010    | AO ≤ 0.3      | 0.010 mg/L    | 2023-10-10 |           |
| Lead, total                                                                                               | < 0.00020  | MAC = 0.005   | 0.00020 mg/L  | 2023-10-10 |           |
| Magnesium, total                                                                                          | 3.97       | None Required | 0.010 mg/L    | 2023-10-10 |           |
| Manganese, total                                                                                          | 0.00116    | MAC = 0.12    | 0.00020 mg/L  | 2023-10-10 |           |
| Mercury, total                                                                                            | < 0.000010 | MAC = 0.001   | 0.000010 mg/L | 2023-10-10 |           |

## TEST RESULTS

**REPORTED TO PROJECT** Castlegar, City of  
General Potability

**WORK ORDER REPORTED** 23J0289  
2023-10-16 13:36

| Analyte                                                                                                              | Result    | Guideline  | RL       | Units | Analyzed   | Qualifier |
|----------------------------------------------------------------------------------------------------------------------|-----------|------------|----------|-------|------------|-----------|
| <b>481E - Water Treatment Center - Raw Water (23J0289-01)   Matrix: Water   Sampled: 2023-10-03 09:00, Continued</b> |           |            |          |       |            |           |
| <i>Total Metals, Continued</i>                                                                                       |           |            |          |       |            |           |
| Molybdenum, total                                                                                                    | 0.00055   | N/A        | 0.00010  | mg/L  | 2023-10-10 |           |
| Nickel, total                                                                                                        | 0.00043   | N/A        | 0.00040  | mg/L  | 2023-10-10 |           |
| Potassium, total                                                                                                     | 0.59      | N/A        | 0.10     | mg/L  | 2023-10-10 |           |
| Selenium, total                                                                                                      | < 0.00050 | MAC = 0.05 | 0.00050  | mg/L  | 2023-10-10 |           |
| Sodium, total                                                                                                        | 0.75      | AO ≤ 200   | 0.10     | mg/L  | 2023-10-10 |           |
| Strontium, total                                                                                                     | 0.108     | MAC = 7    | 0.0010   | mg/L  | 2023-10-10 |           |
| Uranium, total                                                                                                       | 0.000347  | MAC = 0.02 | 0.000020 | mg/L  | 2023-10-10 |           |
| Zinc, total                                                                                                          | < 0.0040  | AO ≤ 5     | 0.0040   | mg/L  | 2023-10-10 |           |

### Blueberry (23J0289-02) | Matrix: Water | Sampled: 2023-10-03 08:20

|                                         |          |           |         |      |            |  |
|-----------------------------------------|----------|-----------|---------|------|------------|--|
| <i>Calculated Parameters</i>            |          |           |         |      |            |  |
| Total Trihalomethanes                   | 0.0330   | MAC = 0.1 | 0.00400 | mg/L | N/A        |  |
| <i>Volatile Organic Compounds (VOC)</i> |          |           |         |      |            |  |
| Bromodichloromethane                    | < 0.0010 | N/A       | 0.0010  | mg/L | 2023-10-10 |  |
| Bromoform                               | < 0.0010 | N/A       | 0.0010  | mg/L | 2023-10-10 |  |
| Chloroform                              | 0.0330   | N/A       | 0.0010  | mg/L | 2023-10-10 |  |
| Dibromochloromethane                    | < 0.0010 | N/A       | 0.0010  | mg/L | 2023-10-10 |  |
| Surrogate: Toluene-d8                   | 90       |           | 70-130  | %    | 2023-10-10 |  |
| Surrogate: 4-Bromofluorobenzene         | 113      |           | 70-130  | %    | 2023-10-10 |  |

### Airport (23J0289-03) | Matrix: Water | Sampled: 2023-10-03 10:05

|                                         |          |           |         |      |            |  |
|-----------------------------------------|----------|-----------|---------|------|------------|--|
| <i>Calculated Parameters</i>            |          |           |         |      |            |  |
| Total Trihalomethanes                   | 0.0299   | MAC = 0.1 | 0.00400 | mg/L | N/A        |  |
| <i>Volatile Organic Compounds (VOC)</i> |          |           |         |      |            |  |
| Bromodichloromethane                    | < 0.0010 | N/A       | 0.0010  | mg/L | 2023-10-10 |  |
| Bromoform                               | < 0.0010 | N/A       | 0.0010  | mg/L | 2023-10-10 |  |
| Chloroform                              | 0.0299   | N/A       | 0.0010  | mg/L | 2023-10-10 |  |
| Dibromochloromethane                    | < 0.0010 | N/A       | 0.0010  | mg/L | 2023-10-10 |  |
| Surrogate: Toluene-d8                   | 89       |           | 70-130  | %    | 2023-10-10 |  |
| Surrogate: 4-Bromofluorobenzene         | 110      |           | 70-130  | %    | 2023-10-10 |  |

### Park Pumphouse (23J0289-04) | Matrix: Water | Sampled: 2023-10-03 11:05

|                         |          |     |        |      |            |  |
|-------------------------|----------|-----|--------|------|------------|--|
| <i>Haloacetic Acids</i> |          |     |        |      |            |  |
| Monochloroacetic Acid   | < 0.0020 | N/A | 0.0020 | mg/L | 2023-10-08 |  |
| Monobromoacetic Acid    | < 0.0020 | N/A | 0.0020 | mg/L | 2023-10-08 |  |
| Dichloroacetic Acid     | 0.0117   | N/A | 0.0020 | mg/L | 2023-10-08 |  |
| Trichloroacetic Acid    | 0.0136   | N/A | 0.0020 | mg/L | 2023-10-08 |  |

## TEST RESULTS

**REPORTED TO PROJECT** Castlegar, City of  
General Potability

**WORK ORDER REPORTED** 23J0289  
2023-10-16 13:36

| Analyte                                                                                   | Result        | Guideline  | RL      | Units | Analyzed   | Qualifier |
|-------------------------------------------------------------------------------------------|---------------|------------|---------|-------|------------|-----------|
| <b>Park Pumphouse (23J0289-04)   Matrix: Water   Sampled: 2023-10-03 11:05, Continued</b> |               |            |         |       |            |           |
| <i>Haloacetic Acids, Continued</i>                                                        |               |            |         |       |            |           |
| Dibromoacetic Acid                                                                        | < 0.0020      | N/A        | 0.0020  | mg/L  | 2023-10-08 |           |
| Total Haloacetic Acids (HAA5)                                                             | <b>0.0252</b> | MAC = 0.08 | 0.00200 | mg/L  | N/A        |           |
| Surrogate: 2-Bromopropionic Acid                                                          | 101           |            | 70-130  | %     | 2023-10-08 |           |

### Sample Qualifiers:

CT6 Results were based on lab temperature & lab pH.

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

HT3 Microbiological analysis was initiated beyond the maximum holding time of 30 hours. Results may not be valid.

## APPENDIX 1: SUPPORTING INFORMATION

**REPORTED TO PROJECT** Castlegar, City of  
General Potability

**WORK ORDER REPORTED** 23J0289  
2023-10-16 13:36

| Analysis Description             | Method Ref.           | Technique                                                                                         | Accredited | Location |
|----------------------------------|-----------------------|---------------------------------------------------------------------------------------------------|------------|----------|
| Alkalinity in Water              | SM 2320 B* (2021)     | Titration with H <sub>2</sub> SO <sub>4</sub>                                                     | ✓          | Kelowna  |
| Anions in Water                  | SM 4110 B (2020)      | Ion Chromatography                                                                                | ✓          | Kelowna  |
| Coliforms, Total in Water        | SM 9222* (2015)       | Membrane Filtration / Chromocult Agar                                                             | ✓          | Kelowna  |
| Colour, True in Water            | SM 2120 C (2021)      | Spectrophotometry (456 nm)                                                                        | ✓          | Kelowna  |
| Conductivity in Water            | SM 2510 B (2021)      | Conductivity Meter                                                                                | ✓          | Kelowna  |
| Cyanide, SAD in Water            | ASTM D7511-12         | Flow Injection with In-Line UV Digestion and Amperometry                                          | ✓          | Kelowna  |
| E. coli in Water                 | SM 9222* (2015)       | Membrane Filtration / Chromocult Agar                                                             | ✓          | Kelowna  |
| Haloacetic Acids in Water        | EPA 552.3*            | Liquid-Liquid Microextraction, Derivatization and GC-ECD                                          | ✓          | Richmond |
| Hardness in Water                | SM 2340 B* (2021)     | Calculation: 2.497 [total Ca] + 4.118 [total Mg] (Est)                                            | ✓          | N/A      |
| Langelier Index in Water         | SM 2330 B (2021)      | Calculation                                                                                       |            | N/A      |
| Mercury, total in Water          | EPA 245.7*            | BrCl <sub>2</sub> Oxidation / Cold Vapor Atomic Fluorescence Spectrometry (CVAFS)                 | ✓          | Richmond |
| pH in Water                      | SM 4500-H+ B (2021)   | Electrometry                                                                                      | ✓          | Kelowna  |
| Solids, Total Dissolved in Water | SM 1030 E (2021)      | SM 1030 E                                                                                         |            | N/A      |
| Total Metals in Water            | EPA 200.2 / EPA 6020B | HNO <sub>3</sub> +HCl Hot Block Digestion / Inductively Coupled Plasma-Mass Spectrometry (ICP-MS) | ✓          | Richmond |
| Trihalomethanes in Water         | EPA 5030B / EPA 8260D | Purge&Trap / GC-MSD (SIM)                                                                         | ✓          | Richmond |
| Turbidity in Water               | SM 2130 B (2020)      | Nephelometry                                                                                      | ✓          | Kelowna  |

*Note: An asterisk in the Method Reference indicates that the CARO method has been modified from the reference method*

### Glossary of Terms:

|            |                                                                                                                       |
|------------|-----------------------------------------------------------------------------------------------------------------------|
| RL         | Reporting Limit (default)                                                                                             |
| <          | Less than the specified Reporting Limit (RL) - the actual RL may be higher than the default RL due to various factors |
| °C         | Degrees Celcius                                                                                                       |
| AO         | Aesthetic Objective                                                                                                   |
| CFU/100 mL | Colony Forming Units per 100 millilitres                                                                              |
| CU         | Colour Units (referenced against a platinum cobalt standard)                                                          |
| MAC        | Maximum Acceptable Concentration (health based)                                                                       |
| mg/L       | Milligrams per litre                                                                                                  |
| NTU        | Nephelometric Turbidity Units                                                                                         |
| OG         | Operational Guideline (treated water)                                                                                 |
| pH units   | pH < 7 = acidic, pH > 7 = basic                                                                                       |
| µS/cm      | Microsiemens per centimetre                                                                                           |
| ASTM       | ASTM International Test Methods                                                                                       |
| EPA        | United States Environmental Protection Agency Test Methods                                                            |
| SM         | Standard Methods for the Examination of Water and Wastewater, American Public Health Association                      |

## APPENDIX 1: SUPPORTING INFORMATION

**REPORTED TO** Castlegar, City of  
**PROJECT** General Potability

**WORK ORDER** 23J0289  
**REPORTED** 2023-10-16 13:36

### General Comments:

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## APPENDIX 2: QUALITY CONTROL RESULTS

**REPORTED TO PROJECT** Castlegar, City of  
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The following section displays the quality control (QC) data that is associated with your sample data. Groups of samples are prepared in "batches" and analyzed in conjunction with QC samples that ensure your data is of the highest quality. Common QC types include:

- **Method Blank (Blk):** A blank sample that undergoes sample processing identical to that carried out for the test samples. Method blank results are used to assess contamination from the laboratory environment and reagents.
- **Duplicate (Dup):** An additional or second portion of a randomly selected sample in the analytical run carried through the entire analytical process. Duplicates provide a measure of the analytical method's precision (reproducibility).
- **Blank Spike (BS):** A sample of known concentration which undergoes processing identical to that carried out for test samples, also referred to as a laboratory control sample (LCS). Blank spikes provide a measure of the analytical method's accuracy.
- **Matrix Spike (MS):** A second aliquot of sample is fortified with a known concentration of target analytes and carried through the entire analytical process. Matrix spikes evaluate potential matrix effects that may affect the analyte recovery.
- **Reference Material (SRM):** A homogenous material of similar matrix to the samples, certified for the parameter(s) listed. Reference Materials ensure that the analytical process is adequate to achieve acceptable recoveries of the parameter(s) tested.

Each QC type is analyzed at a 5-10% frequency, i.e. one blank/duplicate/spike for every 10-20 samples. For all types of QC, the specified recovery (% Rec) and relative percent difference (RPD) limits are derived from long-term method performance averages and/or prescribed by the reference method.

| Analyte                           | Result  | RL Units   | Spike Level                                | Source Result | % REC                                      | REC Limit | % RPD | RPD Limit | Qualifier |
|-----------------------------------|---------|------------|--------------------------------------------|---------------|--------------------------------------------|-----------|-------|-----------|-----------|
| <b>Anions, Batch B3J0299</b>      |         |            |                                            |               |                                            |           |       |           |           |
| <b>Blank (B3J0299-BLK1)</b>       |         |            | Prepared: 2023-10-05, Analyzed: 2023-10-05 |               |                                            |           |       |           |           |
| Chloride                          | < 0.10  | 0.10 mg/L  |                                            |               |                                            |           |       |           |           |
| Fluoride                          | < 0.10  | 0.10 mg/L  |                                            |               |                                            |           |       |           |           |
| Nitrate (as N)                    | < 0.010 | 0.010 mg/L |                                            |               |                                            |           |       |           |           |
| Nitrite (as N)                    | < 0.010 | 0.010 mg/L |                                            |               |                                            |           |       |           |           |
| Sulfate                           | < 1.0   | 1.0 mg/L   |                                            |               |                                            |           |       |           |           |
| <b>Blank (B3J0299-BLK2)</b>       |         |            | Prepared: 2023-10-06, Analyzed: 2023-10-06 |               |                                            |           |       |           |           |
| Chloride                          | < 0.10  | 0.10 mg/L  |                                            |               |                                            |           |       |           |           |
| Fluoride                          | < 0.10  | 0.10 mg/L  |                                            |               |                                            |           |       |           |           |
| Nitrate (as N)                    | < 0.010 | 0.010 mg/L |                                            |               |                                            |           |       |           |           |
| Nitrite (as N)                    | < 0.010 | 0.010 mg/L |                                            |               |                                            |           |       |           |           |
| Sulfate                           | < 1.0   | 1.0 mg/L   |                                            |               |                                            |           |       |           |           |
| <b>LCS (B3J0299-BS1)</b>          |         |            | Prepared: 2023-10-05, Analyzed: 2023-10-05 |               |                                            |           |       |           |           |
| Chloride                          | 15.9    | 0.10 mg/L  | 16.0                                       |               | 99                                         | 90-110    |       |           |           |
| Fluoride                          | 4.00    | 0.10 mg/L  | 4.00                                       |               | 100                                        | 88-108    |       |           |           |
| Nitrate (as N)                    | 3.95    | 0.010 mg/L | 4.00                                       |               | 99                                         | 90-110    |       |           |           |
| Nitrite (as N)                    | 2.03    | 0.010 mg/L | 2.00                                       |               | 101                                        | 85-115    |       |           |           |
| Sulfate                           | 15.6    | 1.0 mg/L   | 16.0                                       |               | 98                                         | 90-110    |       |           |           |
| <b>LCS (B3J0299-BS2)</b>          |         |            | Prepared: 2023-10-06, Analyzed: 2023-10-06 |               |                                            |           |       |           |           |
| Chloride                          | 15.9    | 0.10 mg/L  | 16.0                                       |               | 99                                         | 90-110    |       |           |           |
| Fluoride                          | 4.01    | 0.10 mg/L  | 4.00                                       |               | 100                                        | 88-108    |       |           |           |
| Nitrate (as N)                    | 3.82    | 0.010 mg/L | 4.00                                       |               | 96                                         | 90-110    |       |           |           |
| Nitrite (as N)                    | 2.01    | 0.010 mg/L | 2.00                                       |               | 100                                        | 85-115    |       |           |           |
| Sulfate                           | 16.0    | 1.0 mg/L   | 16.0                                       |               | 100                                        | 90-110    |       |           |           |
| <b>Duplicate (B3J0299-DUP1)</b>   |         |            | <b>Source: 23J0289-01</b>                  |               | Prepared: 2023-10-05, Analyzed: 2023-10-05 |           |       |           |           |
| Chloride                          | 0.20    | 0.10 mg/L  |                                            | 0.20          |                                            |           |       |           | 10        |
| Fluoride                          | < 0.10  | 0.10 mg/L  |                                            | < 0.10        |                                            |           |       |           | 10        |
| Nitrate (as N)                    | 0.082   | 0.010 mg/L |                                            | 0.085         |                                            |           | 4     |           | 10        |
| Nitrite (as N)                    | < 0.010 | 0.010 mg/L |                                            | < 0.010       |                                            |           |       |           | 15        |
| Sulfate                           | 9.8     | 1.0 mg/L   |                                            | 9.8           |                                            |           | < 1   |           | 10        |
| <b>Matrix Spike (B3J0299-MS1)</b> |         |            | <b>Source: 23J0289-01</b>                  |               | Prepared: 2023-10-05, Analyzed: 2023-10-05 |           |       |           |           |
| Chloride                          | 15.9    | 0.10 mg/L  | 16.0                                       | 0.20          | 98                                         | 75-125    |       |           |           |
| Fluoride                          | 3.84    | 0.10 mg/L  | 4.00                                       | < 0.10        | 95                                         | 75-125    |       |           |           |

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| Analyte                                      | Result | RL Units                  | Spike Level | Source Result                              | % REC | REC Limit | % RPD | RPD Limit | Qualifier |
|----------------------------------------------|--------|---------------------------|-------------|--------------------------------------------|-------|-----------|-------|-----------|-----------|
| <b>Anions, Batch B3J0299, Continued</b>      |        |                           |             |                                            |       |           |       |           |           |
| <b>Matrix Spike (B3J0299-MS1), Continued</b> |        | <b>Source: 23J0289-01</b> |             | Prepared: 2023-10-05, Analyzed: 2023-10-05 |       |           |       |           |           |
| Nitrate (as N)                               | 3.86   | 0.010 mg/L                | 4.00        | 0.085                                      | 94    | 75-125    |       |           |           |
| Nitrite (as N)                               | 1.97   | 0.010 mg/L                | 2.00        | < 0.010                                    | 98    | 80-120    |       |           |           |
| Sulfate                                      | 25.3   | 1.0 mg/L                  | 16.0        | 9.8                                        | 97    | 75-125    |       |           |           |

### General Parameters, Batch B3J0287

|                             |       |                                            |      |  |    |        |  |  |  |
|-----------------------------|-------|--------------------------------------------|------|--|----|--------|--|--|--|
| <b>Blank (B3J0287-BLK1)</b> |       | Prepared: 2023-10-05, Analyzed: 2023-10-05 |      |  |    |        |  |  |  |
| Colour, True                | < 5.0 | 5.0 CU                                     |      |  |    |        |  |  |  |
| <b>Blank (B3J0287-BLK2)</b> |       | Prepared: 2023-10-05, Analyzed: 2023-10-05 |      |  |    |        |  |  |  |
| Colour, True                | < 5.0 | 5.0 CU                                     |      |  |    |        |  |  |  |
| <b>LCS (B3J0287-BS1)</b>    |       | Prepared: 2023-10-05, Analyzed: 2023-10-05 |      |  |    |        |  |  |  |
| Colour, True                | 19    | 5.0 CU                                     | 20.0 |  | 96 | 85-115 |  |  |  |
| <b>LCS (B3J0287-BS2)</b>    |       | Prepared: 2023-10-05, Analyzed: 2023-10-05 |      |  |    |        |  |  |  |
| Colour, True                | 19    | 5.0 CU                                     | 20.0 |  | 95 | 85-115 |  |  |  |

### General Parameters, Batch B3J0480

|                                   |          |                                            |        |                                            |     |        |     |    |  |
|-----------------------------------|----------|--------------------------------------------|--------|--------------------------------------------|-----|--------|-----|----|--|
| <b>Blank (B3J0480-BLK1)</b>       |          | Prepared: 2023-10-06, Analyzed: 2023-10-06 |        |                                            |     |        |     |    |  |
| Cyanide, Total                    | < 0.0020 | 0.0020 mg/L                                |        |                                            |     |        |     |    |  |
| <b>Blank (B3J0480-BLK2)</b>       |          | Prepared: 2023-10-06, Analyzed: 2023-10-06 |        |                                            |     |        |     |    |  |
| Cyanide, Total                    | < 0.0020 | 0.0020 mg/L                                |        |                                            |     |        |     |    |  |
| <b>LCS (B3J0480-BS1)</b>          |          | Prepared: 2023-10-06, Analyzed: 2023-10-06 |        |                                            |     |        |     |    |  |
| Cyanide, Total                    | 0.0192   | 0.0020 mg/L                                | 0.0200 |                                            | 96  | 82-120 |     |    |  |
| <b>LCS (B3J0480-BS2)</b>          |          | Prepared: 2023-10-06, Analyzed: 2023-10-06 |        |                                            |     |        |     |    |  |
| Cyanide, Total                    | 0.0204   | 0.0020 mg/L                                | 0.0200 |                                            | 102 | 82-120 |     |    |  |
| <b>LCS Dup (B3J0480-BSD1)</b>     |          | Prepared: 2023-10-06, Analyzed: 2023-10-06 |        |                                            |     |        |     |    |  |
| Cyanide, Total                    | 0.0192   | 0.0020 mg/L                                | 0.0200 |                                            | 96  | 82-120 | < 1 | 10 |  |
| <b>LCS Dup (B3J0480-BSD2)</b>     |          | Prepared: 2023-10-06, Analyzed: 2023-10-06 |        |                                            |     |        |     |    |  |
| Cyanide, Total                    | 0.0219   | 0.0020 mg/L                                | 0.0200 |                                            | 110 | 82-120 | 8   | 10 |  |
| <b>Matrix Spike (B3J0480-MS2)</b> |          | <b>Source: 23J0289-01</b>                  |        | Prepared: 2023-10-06, Analyzed: 2023-10-06 |     |        |     |    |  |
| Cyanide, Total                    | 0.0457   | 0.0020 mg/L                                | 0.0400 | < 0.0020                                   | 112 | 70-130 |     |    |  |

### General Parameters, Batch B3J0528

|                             |        |                                            |      |  |     |        |  |  |  |
|-----------------------------|--------|--------------------------------------------|------|--|-----|--------|--|--|--|
| <b>Blank (B3J0528-BLK1)</b> |        | Prepared: 2023-10-06, Analyzed: 2023-10-06 |      |  |     |        |  |  |  |
| Turbidity                   | < 0.10 | 0.10 NTU                                   |      |  |     |        |  |  |  |
| <b>Blank (B3J0528-BLK2)</b> |        | Prepared: 2023-10-06, Analyzed: 2023-10-06 |      |  |     |        |  |  |  |
| Turbidity                   | < 0.10 | 0.10 NTU                                   |      |  |     |        |  |  |  |
| <b>LCS (B3J0528-BS1)</b>    |        | Prepared: 2023-10-06, Analyzed: 2023-10-06 |      |  |     |        |  |  |  |
| Turbidity                   | 1.75   | 0.10 NTU                                   | 1.69 |  | 104 | 90-110 |  |  |  |
| <b>LCS (B3J0528-BS2)</b>    |        | Prepared: 2023-10-06, Analyzed: 2023-10-06 |      |  |     |        |  |  |  |
| Turbidity                   | 15.3   | 0.10 NTU                                   | 14.6 |  | 105 | 90-110 |  |  |  |

### General Parameters, Batch B3J0689

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| Analyte                                             | Result | RL Units      | Spike Level | Source Result                              | % REC | REC Limit                                  | % RPD | RPD Limit | Qualifier |
|-----------------------------------------------------|--------|---------------|-------------|--------------------------------------------|-------|--------------------------------------------|-------|-----------|-----------|
| <b>General Parameters, Batch B3J0689, Continued</b> |        |               |             |                                            |       |                                            |       |           |           |
| <b>Blank (B3J0689-BLK1)</b>                         |        |               |             | Prepared: 2023-10-07, Analyzed: 2023-10-07 |       |                                            |       |           |           |
| Alkalinity, Total (as CaCO <sub>3</sub> )           | < 1.0  | 1.0 mg/L      |             |                                            |       |                                            |       |           |           |
| Alkalinity, Phenolphthalein (as CaCO <sub>3</sub> ) | < 1.0  | 1.0 mg/L      |             |                                            |       |                                            |       |           |           |
| Alkalinity, Bicarbonate (as CaCO <sub>3</sub> )     | < 1.0  | 1.0 mg/L      |             |                                            |       |                                            |       |           |           |
| Alkalinity, Carbonate (as CaCO <sub>3</sub> )       | < 1.0  | 1.0 mg/L      |             |                                            |       |                                            |       |           |           |
| Alkalinity, Hydroxide (as CaCO <sub>3</sub> )       | < 1.0  | 1.0 mg/L      |             |                                            |       |                                            |       |           |           |
| Conductivity (EC)                                   | < 2.0  | 2.0 µS/cm     |             |                                            |       |                                            |       |           |           |
| Temperature, at pH                                  | 22.4   | °C            |             |                                            |       |                                            |       |           |           |
| <b>Blank (B3J0689-BLK2)</b>                         |        |               |             | Prepared: 2023-10-07, Analyzed: 2023-10-07 |       |                                            |       |           |           |
| Alkalinity, Total (as CaCO <sub>3</sub> )           | < 1.0  | 1.0 mg/L      |             |                                            |       |                                            |       |           |           |
| Alkalinity, Phenolphthalein (as CaCO <sub>3</sub> ) | < 1.0  | 1.0 mg/L      |             |                                            |       |                                            |       |           |           |
| Alkalinity, Bicarbonate (as CaCO <sub>3</sub> )     | < 1.0  | 1.0 mg/L      |             |                                            |       |                                            |       |           |           |
| Alkalinity, Carbonate (as CaCO <sub>3</sub> )       | < 1.0  | 1.0 mg/L      |             |                                            |       |                                            |       |           |           |
| Alkalinity, Hydroxide (as CaCO <sub>3</sub> )       | < 1.0  | 1.0 mg/L      |             |                                            |       |                                            |       |           |           |
| Conductivity (EC)                                   | < 2.0  | 2.0 µS/cm     |             |                                            |       |                                            |       |           |           |
| Temperature, at pH                                  | 23.0   | °C            |             |                                            |       |                                            |       |           |           |
| <b>Blank (B3J0689-BLK3)</b>                         |        |               |             | Prepared: 2023-10-07, Analyzed: 2023-10-07 |       |                                            |       |           |           |
| Alkalinity, Total (as CaCO <sub>3</sub> )           | < 1.0  | 1.0 mg/L      |             |                                            |       |                                            |       |           |           |
| Alkalinity, Phenolphthalein (as CaCO <sub>3</sub> ) | < 1.0  | 1.0 mg/L      |             |                                            |       |                                            |       |           |           |
| Alkalinity, Bicarbonate (as CaCO <sub>3</sub> )     | < 1.0  | 1.0 mg/L      |             |                                            |       |                                            |       |           |           |
| Alkalinity, Carbonate (as CaCO <sub>3</sub> )       | < 1.0  | 1.0 mg/L      |             |                                            |       |                                            |       |           |           |
| Alkalinity, Hydroxide (as CaCO <sub>3</sub> )       | < 1.0  | 1.0 mg/L      |             |                                            |       |                                            |       |           |           |
| Conductivity (EC)                                   | < 2.0  | 2.0 µS/cm     |             |                                            |       |                                            |       |           |           |
| Temperature, at pH                                  | 23.4   | °C            |             |                                            |       |                                            |       |           |           |
| <b>LCS (B3J0689-BS1)</b>                            |        |               |             | Prepared: 2023-10-07, Analyzed: 2023-10-07 |       |                                            |       |           |           |
| Alkalinity, Total (as CaCO <sub>3</sub> )           | 110    | 1.0 mg/L      | 100         |                                            | 110   | 80-120                                     |       |           |           |
| Alkalinity, Phenolphthalein (as CaCO <sub>3</sub> ) | 55.1   | 1.0 mg/L      | 50.0        |                                            | 110   | 0-200                                      |       |           |           |
| <b>LCS (B3J0689-BS2)</b>                            |        |               |             | Prepared: 2023-10-07, Analyzed: 2023-10-07 |       |                                            |       |           |           |
| Alkalinity, Total (as CaCO <sub>3</sub> )           | 109    | 1.0 mg/L      | 100         |                                            | 109   | 80-120                                     |       |           |           |
| Alkalinity, Phenolphthalein (as CaCO <sub>3</sub> ) | 56.1   | 1.0 mg/L      | 50.0        |                                            | 112   | 0-200                                      |       |           |           |
| <b>LCS (B3J0689-BS3)</b>                            |        |               |             | Prepared: 2023-10-07, Analyzed: 2023-10-07 |       |                                            |       |           |           |
| Alkalinity, Total (as CaCO <sub>3</sub> )           | 110    | 1.0 mg/L      | 100         |                                            | 110   | 80-120                                     |       |           |           |
| Alkalinity, Phenolphthalein (as CaCO <sub>3</sub> ) | 51.4   | 1.0 mg/L      | 50.0        |                                            | 103   | 0-200                                      |       |           |           |
| <b>LCS (B3J0689-BS4)</b>                            |        |               |             | Prepared: 2023-10-07, Analyzed: 2023-10-07 |       |                                            |       |           |           |
| Conductivity (EC)                                   | 1380   | 2.0 µS/cm     | 1410        |                                            | 98    | 95-105                                     |       |           |           |
| <b>LCS (B3J0689-BS5)</b>                            |        |               |             | Prepared: 2023-10-07, Analyzed: 2023-10-07 |       |                                            |       |           |           |
| Conductivity (EC)                                   | 1400   | 2.0 µS/cm     | 1410        |                                            | 99    | 95-105                                     |       |           |           |
| <b>LCS (B3J0689-BS6)</b>                            |        |               |             | Prepared: 2023-10-07, Analyzed: 2023-10-07 |       |                                            |       |           |           |
| Conductivity (EC)                                   | 1400   | 2.0 µS/cm     | 1410        |                                            | 99    | 95-105                                     |       |           |           |
| <b>Duplicate (B3J0689-DUP2)</b>                     |        |               |             | <b>Source: 23J0289-01</b>                  |       | Prepared: 2023-10-07, Analyzed: 2023-10-07 |       |           |           |
| Alkalinity, Total (as CaCO <sub>3</sub> )           | 56.9   | 1.0 mg/L      |             | 59.5                                       |       | 4                                          | 10    |           |           |
| Alkalinity, Phenolphthalein (as CaCO <sub>3</sub> ) | < 1.0  | 1.0 mg/L      |             | < 1.0                                      |       |                                            | 10    |           |           |
| Alkalinity, Bicarbonate (as CaCO <sub>3</sub> )     | 56.9   | 1.0 mg/L      |             | 59.5                                       |       | 4                                          | 10    |           |           |
| Alkalinity, Carbonate (as CaCO <sub>3</sub> )       | < 1.0  | 1.0 mg/L      |             | < 1.0                                      |       |                                            | 10    |           |           |
| Alkalinity, Hydroxide (as CaCO <sub>3</sub> )       | < 1.0  | 1.0 mg/L      |             | < 1.0                                      |       |                                            | 10    |           |           |
| Conductivity (EC)                                   | 114    | 2.0 µS/cm     |             | 115                                        |       | < 1                                        | 5     |           |           |
| pH                                                  | 6.90   | 0.10 pH units |             | 6.84                                       |       | < 1                                        | 4     |           | HT2       |
| <b>Reference (B3J0689-SRM1)</b>                     |        |               |             | Prepared: 2023-10-07, Analyzed: 2023-10-07 |       |                                            |       |           |           |
| pH                                                  | 7.04   | 0.10 pH units | 7.01        |                                            | 100   | 98-102                                     |       |           |           |

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| Analyte | Result | RL Units | Spike Level | Source Result | % REC | REC Limit | % RPD | RPD Limit | Qualifier |
|---------|--------|----------|-------------|---------------|-------|-----------|-------|-----------|-----------|
|---------|--------|----------|-------------|---------------|-------|-----------|-------|-----------|-----------|

### General Parameters, Batch B3J0689, Continued

|                                 |      |               |                                            |  |     |        |  |  |  |
|---------------------------------|------|---------------|--------------------------------------------|--|-----|--------|--|--|--|
| <b>Reference (B3J0689-SRM2)</b> |      |               | Prepared: 2023-10-07, Analyzed: 2023-10-07 |  |     |        |  |  |  |
| pH                              | 7.04 | 0.10 pH units | 7.01                                       |  | 100 | 98-102 |  |  |  |
| <b>Reference (B3J0689-SRM3)</b> |      |               | Prepared: 2023-10-07, Analyzed: 2023-10-07 |  |     |        |  |  |  |
| pH                              | 7.04 | 0.10 pH units | 7.01                                       |  | 100 | 98-102 |  |  |  |

### Haloacetic Acids, Batch B3J0700

|                                  |          |             |                                            |  |     |        |   |    |  |
|----------------------------------|----------|-------------|--------------------------------------------|--|-----|--------|---|----|--|
| <b>Blank (B3J0700-BLK1)</b>      |          |             | Prepared: 2023-10-08, Analyzed: 2023-10-08 |  |     |        |   |    |  |
| Monochloroacetic Acid            | < 0.0020 | 0.0020 mg/L |                                            |  |     |        |   |    |  |
| Monobromoacetic Acid             | < 0.0020 | 0.0020 mg/L |                                            |  |     |        |   |    |  |
| Dichloroacetic Acid              | < 0.0020 | 0.0020 mg/L |                                            |  |     |        |   |    |  |
| Trichloroacetic Acid             | < 0.0020 | 0.0020 mg/L |                                            |  |     |        |   |    |  |
| Dibromoacetic Acid               | < 0.0020 | 0.0020 mg/L |                                            |  |     |        |   |    |  |
| Surrogate: 2-Bromopropionic Acid | 0.0116   | mg/L        | 0.0116                                     |  | 100 | 70-130 |   |    |  |
| <b>LCS (B3J0700-BS1)</b>         |          |             | Prepared: 2023-10-08, Analyzed: 2023-10-08 |  |     |        |   |    |  |
| Monochloroacetic Acid            | 0.0567   | 0.0020 mg/L | 0.0564                                     |  | 101 | 75-117 |   |    |  |
| Monobromoacetic Acid             | 0.0380   | 0.0020 mg/L | 0.0374                                     |  | 102 | 83-113 |   |    |  |
| Dichloroacetic Acid              | 0.0573   | 0.0020 mg/L | 0.0558                                     |  | 103 | 78-112 |   |    |  |
| Trichloroacetic Acid             | 0.0192   | 0.0020 mg/L | 0.0186                                     |  | 103 | 81-110 |   |    |  |
| Dibromoacetic Acid               | 0.0189   | 0.0020 mg/L | 0.0187                                     |  | 101 | 89-112 |   |    |  |
| Surrogate: 2-Bromopropionic Acid | 0.0118   | mg/L        | 0.0116                                     |  | 102 | 70-130 |   |    |  |
| <b>LCS Dup (B3J0700-BSD1)</b>    |          |             | Prepared: 2023-10-08, Analyzed: 2023-10-08 |  |     |        |   |    |  |
| Monochloroacetic Acid            | 0.0558   | 0.0020 mg/L | 0.0564                                     |  | 99  | 75-117 | 2 | 30 |  |
| Monobromoacetic Acid             | 0.0371   | 0.0020 mg/L | 0.0374                                     |  | 99  | 83-113 | 3 | 30 |  |
| Dichloroacetic Acid              | 0.0549   | 0.0020 mg/L | 0.0558                                     |  | 98  | 78-112 | 4 | 30 |  |
| Trichloroacetic Acid             | 0.0182   | 0.0020 mg/L | 0.0186                                     |  | 98  | 81-110 | 5 | 30 |  |
| Dibromoacetic Acid               | 0.0187   | 0.0020 mg/L | 0.0187                                     |  | 100 | 89-112 | 1 | 30 |  |
| Surrogate: 2-Bromopropionic Acid | 0.0114   | mg/L        | 0.0116                                     |  | 98  | 70-130 |   |    |  |

### Microbiological Parameters, Batch B3J0228

|                             |     |              |                                            |  |  |  |  |  |  |
|-----------------------------|-----|--------------|--------------------------------------------|--|--|--|--|--|--|
| <b>Blank (B3J0228-BLK1)</b> |     |              | Prepared: 2023-10-04, Analyzed: 2023-10-04 |  |  |  |  |  |  |
| Coliforms, Total            | < 1 | 1 CFU/100 mL |                                            |  |  |  |  |  |  |
| E. coli                     | < 1 | 1 CFU/100 mL |                                            |  |  |  |  |  |  |
| <b>Blank (B3J0228-BLK2)</b> |     |              | Prepared: 2023-10-04, Analyzed: 2023-10-04 |  |  |  |  |  |  |
| Coliforms, Total            | < 1 | 1 CFU/100 mL |                                            |  |  |  |  |  |  |
| E. coli                     | < 1 | 1 CFU/100 mL |                                            |  |  |  |  |  |  |
| <b>Blank (B3J0228-BLK3)</b> |     |              | Prepared: 2023-10-04, Analyzed: 2023-10-04 |  |  |  |  |  |  |
| Coliforms, Total            | < 1 | 1 CFU/100 mL |                                            |  |  |  |  |  |  |
| E. coli                     | < 1 | 1 CFU/100 mL |                                            |  |  |  |  |  |  |
| <b>Blank (B3J0228-BLK4)</b> |     |              | Prepared: 2023-10-04, Analyzed: 2023-10-04 |  |  |  |  |  |  |
| Coliforms, Total            | < 1 | 1 CFU/100 mL |                                            |  |  |  |  |  |  |
| E. coli                     | < 1 | 1 CFU/100 mL |                                            |  |  |  |  |  |  |
| <b>Blank (B3J0228-BLK5)</b> |     |              | Prepared: 2023-10-04, Analyzed: 2023-10-04 |  |  |  |  |  |  |
| Coliforms, Total            | < 1 | 1 CFU/100 mL |                                            |  |  |  |  |  |  |
| E. coli                     | < 1 | 1 CFU/100 mL |                                            |  |  |  |  |  |  |
| <b>Blank (B3J0228-BLK6)</b> |     |              | Prepared: 2023-10-04, Analyzed: 2023-10-04 |  |  |  |  |  |  |
| Coliforms, Total            | < 1 | 1 CFU/100 mL |                                            |  |  |  |  |  |  |
| E. coli                     | < 1 | 1 CFU/100 mL |                                            |  |  |  |  |  |  |

## APPENDIX 2: QUALITY CONTROL RESULTS

| REPORTED TO PROJECT                                  |        | Castlegar, City of General Potability |            | WORK ORDER REPORTED                        |               |       | 23J0289<br>2023-10-16 13:36 |       |           |           |
|------------------------------------------------------|--------|---------------------------------------|------------|--------------------------------------------|---------------|-------|-----------------------------|-------|-----------|-----------|
| Analyte                                              | Result | RL                                    | Units      | Spike Level                                | Source Result | % REC | REC Limit                   | % RPD | RPD Limit | Qualifier |
| Microbiological Parameters, Batch B3J0228, Continued |        |                                       |            |                                            |               |       |                             |       |           |           |
| Blank (B3J0228-BLK7)                                 |        |                                       |            | Prepared: 2023-10-04, Analyzed: 2023-10-04 |               |       |                             |       |           |           |
| Coliforms, Total                                     | < 1    | 1                                     | CFU/100 mL |                                            |               |       |                             |       |           |           |
| E. coli                                              | < 1    | 1                                     | CFU/100 mL |                                            |               |       |                             |       |           |           |
| Blank (B3J0228-BLK8)                                 |        |                                       |            | Prepared: 2023-10-04, Analyzed: 2023-10-04 |               |       |                             |       |           |           |
| Coliforms, Total                                     | < 1    | 1                                     | CFU/100 mL |                                            |               |       |                             |       |           |           |
| E. coli                                              | < 1    | 1                                     | CFU/100 mL |                                            |               |       |                             |       |           |           |
| Blank (B3J0228-BLK9)                                 |        |                                       |            | Prepared: 2023-10-04, Analyzed: 2023-10-04 |               |       |                             |       |           |           |
| Coliforms, Total                                     | < 1    | 1                                     | CFU/100 mL |                                            |               |       |                             |       |           |           |
| E. coli                                              | < 1    | 1                                     | CFU/100 mL |                                            |               |       |                             |       |           |           |
| Blank (B3J0228-BLKA)                                 |        |                                       |            | Prepared: 2023-10-04, Analyzed: 2023-10-04 |               |       |                             |       |           |           |
| Coliforms, Total                                     | < 1    | 1                                     | CFU/100 mL |                                            |               |       |                             |       |           |           |
| E. coli                                              | < 1    | 1                                     | CFU/100 mL |                                            |               |       |                             |       |           |           |
| Blank (B3J0228-BLKB)                                 |        |                                       |            | Prepared: 2023-10-04, Analyzed: 2023-10-04 |               |       |                             |       |           |           |
| Coliforms, Total                                     | < 1    | 1                                     | CFU/100 mL |                                            |               |       |                             |       |           |           |
| E. coli                                              | < 1    | 1                                     | CFU/100 mL |                                            |               |       |                             |       |           |           |
| Blank (B3J0228-BLKC)                                 |        |                                       |            | Prepared: 2023-10-04, Analyzed: 2023-10-04 |               |       |                             |       |           |           |
| Coliforms, Total                                     | < 1    | 1                                     | CFU/100 mL |                                            |               |       |                             |       |           |           |
| E. coli                                              | < 1    | 1                                     | CFU/100 mL |                                            |               |       |                             |       |           |           |
| Blank (B3J0228-BLKD)                                 |        |                                       |            | Prepared: 2023-10-04, Analyzed: 2023-10-04 |               |       |                             |       |           |           |
| Coliforms, Total                                     | < 1    | 1                                     | CFU/100 mL |                                            |               |       |                             |       |           |           |
| E. coli                                              | < 1    | 1                                     | CFU/100 mL |                                            |               |       |                             |       |           |           |
| Blank (B3J0228-BLKE)                                 |        |                                       |            | Prepared: 2023-10-04, Analyzed: 2023-10-04 |               |       |                             |       |           |           |
| Coliforms, Total                                     | < 1    | 1                                     | CFU/100 mL |                                            |               |       |                             |       |           |           |
| E. coli                                              | < 1    | 1                                     | CFU/100 mL |                                            |               |       |                             |       |           |           |
| Blank (B3J0228-BLKF)                                 |        |                                       |            | Prepared: 2023-10-04, Analyzed: 2023-10-04 |               |       |                             |       |           |           |
| Coliforms, Total                                     | < 1    | 1                                     | CFU/100 mL |                                            |               |       |                             |       |           |           |
| E. coli                                              | < 1    | 1                                     | CFU/100 mL |                                            |               |       |                             |       |           |           |
| Blank (B3J0228-BLKG)                                 |        |                                       |            | Prepared: 2023-10-04, Analyzed: 2023-10-04 |               |       |                             |       |           |           |
| Coliforms, Total                                     | < 1    | 1                                     | CFU/100 mL |                                            |               |       |                             |       |           |           |
| E. coli                                              | < 1    | 1                                     | CFU/100 mL |                                            |               |       |                             |       |           |           |
| Blank (B3J0228-BLKH)                                 |        |                                       |            | Prepared: 2023-10-04, Analyzed: 2023-10-04 |               |       |                             |       |           |           |
| Coliforms, Total                                     | < 1    | 1                                     | CFU/100 mL |                                            |               |       |                             |       |           |           |
| E. coli                                              | < 1    | 1                                     | CFU/100 mL |                                            |               |       |                             |       |           |           |
| Blank (B3J0228-BLKI)                                 |        |                                       |            | Prepared: 2023-10-04, Analyzed: 2023-10-04 |               |       |                             |       |           |           |
| Coliforms, Total                                     | < 1    | 1                                     | CFU/100 mL |                                            |               |       |                             |       |           |           |
| E. coli                                              | < 1    | 1                                     | CFU/100 mL |                                            |               |       |                             |       |           |           |
| Blank (B3J0228-BLKJ)                                 |        |                                       |            | Prepared: 2023-10-04, Analyzed: 2023-10-04 |               |       |                             |       |           |           |
| Coliforms, Total                                     | < 1    | 1                                     | CFU/100 mL |                                            |               |       |                             |       |           |           |
| E. coli                                              | < 1    | 1                                     | CFU/100 mL |                                            |               |       |                             |       |           |           |
| Blank (B3J0228-BLKK)                                 |        |                                       |            | Prepared: 2023-10-04, Analyzed: 2023-10-04 |               |       |                             |       |           |           |
| Coliforms, Total                                     | < 1    | 1                                     | CFU/100 mL |                                            |               |       |                             |       |           |           |
| E. coli                                              | < 1    | 1                                     | CFU/100 mL |                                            |               |       |                             |       |           |           |
| Blank (B3J0228-BLKL)                                 |        |                                       |            | Prepared: 2023-10-04, Analyzed: 2023-10-04 |               |       |                             |       |           |           |
| Coliforms, Total                                     | < 1    | 1                                     | CFU/100 mL |                                            |               |       |                             |       |           |           |
| E. coli                                              | < 1    | 1                                     | CFU/100 mL |                                            |               |       |                             |       |           |           |

## APPENDIX 2: QUALITY CONTROL RESULTS

**REPORTED TO PROJECT** Castlegar, City of  
General Potability

**WORK ORDER REPORTED** 23J0289  
2023-10-16 13:36

| Analyte | Result | RL Units | Spike Level | Source Result | % REC | REC Limit | % RPD | RPD Limit | Qualifier |
|---------|--------|----------|-------------|---------------|-------|-----------|-------|-----------|-----------|
|---------|--------|----------|-------------|---------------|-------|-----------|-------|-----------|-----------|

### Microbiological Parameters, Batch B3J0228, Continued

#### Blank (B3J0228-BLKM)

Prepared: 2023-10-04, Analyzed: 2023-10-04

|                  |     |              |  |  |  |  |  |  |  |
|------------------|-----|--------------|--|--|--|--|--|--|--|
| Coliforms, Total | < 1 | 1 CFU/100 mL |  |  |  |  |  |  |  |
| E. coli          | < 1 | 1 CFU/100 mL |  |  |  |  |  |  |  |

### Total Metals, Batch B3J0763

#### Blank (B3J0763-BLK1)

Prepared: 2023-10-10, Analyzed: 2023-10-10

|                |            |               |  |  |  |  |  |  |  |
|----------------|------------|---------------|--|--|--|--|--|--|--|
| Mercury, total | < 0.000010 | 0.000010 mg/L |  |  |  |  |  |  |  |
|----------------|------------|---------------|--|--|--|--|--|--|--|

#### Blank (B3J0763-BLK2)

Prepared: 2023-10-10, Analyzed: 2023-10-10

|                |            |               |  |  |  |  |  |  |  |
|----------------|------------|---------------|--|--|--|--|--|--|--|
| Mercury, total | < 0.000010 | 0.000010 mg/L |  |  |  |  |  |  |  |
|----------------|------------|---------------|--|--|--|--|--|--|--|

#### LCS (B3J0763-BS1)

Prepared: 2023-10-10, Analyzed: 2023-10-10

|                |          |               |          |     |        |  |  |  |  |
|----------------|----------|---------------|----------|-----|--------|--|--|--|--|
| Mercury, total | 0.000269 | 0.000010 mg/L | 0.000250 | 107 | 80-120 |  |  |  |  |
|----------------|----------|---------------|----------|-----|--------|--|--|--|--|

#### LCS (B3J0763-BS2)

Prepared: 2023-10-10, Analyzed: 2023-10-10

|                |          |               |          |     |        |  |  |  |  |
|----------------|----------|---------------|----------|-----|--------|--|--|--|--|
| Mercury, total | 0.000267 | 0.000010 mg/L | 0.000250 | 107 | 80-120 |  |  |  |  |
|----------------|----------|---------------|----------|-----|--------|--|--|--|--|

### Total Metals, Batch B3J0825

#### Blank (B3J0825-BLK1)

Prepared: 2023-10-10, Analyzed: 2023-10-10

|                   |            |               |  |  |  |  |  |  |  |
|-------------------|------------|---------------|--|--|--|--|--|--|--|
| Aluminum, total   | < 0.0050   | 0.0050 mg/L   |  |  |  |  |  |  |  |
| Antimony, total   | < 0.00020  | 0.00020 mg/L  |  |  |  |  |  |  |  |
| Arsenic, total    | < 0.00050  | 0.00050 mg/L  |  |  |  |  |  |  |  |
| Barium, total     | < 0.0050   | 0.0050 mg/L   |  |  |  |  |  |  |  |
| Boron, total      | < 0.0500   | 0.0500 mg/L   |  |  |  |  |  |  |  |
| Cadmium, total    | < 0.000010 | 0.000010 mg/L |  |  |  |  |  |  |  |
| Calcium, total    | < 0.20     | 0.20 mg/L     |  |  |  |  |  |  |  |
| Chromium, total   | < 0.00050  | 0.00050 mg/L  |  |  |  |  |  |  |  |
| Cobalt, total     | < 0.00010  | 0.00010 mg/L  |  |  |  |  |  |  |  |
| Copper, total     | < 0.00040  | 0.00040 mg/L  |  |  |  |  |  |  |  |
| Iron, total       | < 0.010    | 0.010 mg/L    |  |  |  |  |  |  |  |
| Lead, total       | < 0.00020  | 0.00020 mg/L  |  |  |  |  |  |  |  |
| Magnesium, total  | < 0.010    | 0.010 mg/L    |  |  |  |  |  |  |  |
| Manganese, total  | < 0.00020  | 0.00020 mg/L  |  |  |  |  |  |  |  |
| Molybdenum, total | < 0.00010  | 0.00010 mg/L  |  |  |  |  |  |  |  |
| Nickel, total     | < 0.00040  | 0.00040 mg/L  |  |  |  |  |  |  |  |
| Potassium, total  | < 0.10     | 0.10 mg/L     |  |  |  |  |  |  |  |
| Selenium, total   | < 0.00050  | 0.00050 mg/L  |  |  |  |  |  |  |  |
| Sodium, total     | < 0.10     | 0.10 mg/L     |  |  |  |  |  |  |  |
| Strontium, total  | < 0.0010   | 0.0010 mg/L   |  |  |  |  |  |  |  |
| Uranium, total    | < 0.000020 | 0.000020 mg/L |  |  |  |  |  |  |  |
| Zinc, total       | < 0.0040   | 0.0040 mg/L   |  |  |  |  |  |  |  |

#### LCS (B3J0825-BS1)

Prepared: 2023-10-10, Analyzed: 2023-10-10

|                 |        |               |        |     |        |  |  |  |  |
|-----------------|--------|---------------|--------|-----|--------|--|--|--|--|
| Aluminum, total | 4.02   | 0.0050 mg/L   | 4.00   | 100 | 80-120 |  |  |  |  |
| Antimony, total | 0.0408 | 0.00020 mg/L  | 0.0400 | 102 | 80-120 |  |  |  |  |
| Arsenic, total  | 0.401  | 0.00050 mg/L  | 0.400  | 100 | 80-120 |  |  |  |  |
| Barium, total   | 0.0406 | 0.0050 mg/L   | 0.0400 | 102 | 80-120 |  |  |  |  |
| Boron, total    | 0.443  | 0.0500 mg/L   | 0.400  | 111 | 80-120 |  |  |  |  |
| Cadmium, total  | 0.0397 | 0.000010 mg/L | 0.0400 | 99  | 80-120 |  |  |  |  |
| Calcium, total  | 3.92   | 0.20 mg/L     | 4.00   | 98  | 80-120 |  |  |  |  |
| Chromium, total | 0.0403 | 0.00050 mg/L  | 0.0400 | 101 | 80-120 |  |  |  |  |
| Cobalt, total   | 0.0404 | 0.00010 mg/L  | 0.0400 | 101 | 80-120 |  |  |  |  |
| Copper, total   | 0.0402 | 0.00040 mg/L  | 0.0400 | 100 | 80-120 |  |  |  |  |
| Iron, total     | 4.10   | 0.010 mg/L    | 4.00   | 102 | 80-120 |  |  |  |  |
| Lead, total     | 0.0400 | 0.00020 mg/L  | 0.0400 | 100 | 80-120 |  |  |  |  |

## APPENDIX 2: QUALITY CONTROL RESULTS

**REPORTED TO PROJECT** Castlegar, City of  
General Potability

**WORK ORDER REPORTED** 23J0289  
2023-10-16 13:36

| Analyte                                       | Result | RL Units      | Spike Level | Source Result | % REC                                      | REC Limit | % RPD | RPD Limit | Qualifier |
|-----------------------------------------------|--------|---------------|-------------|---------------|--------------------------------------------|-----------|-------|-----------|-----------|
| <b>Total Metals, Batch B3J0825, Continued</b> |        |               |             |               |                                            |           |       |           |           |
| <b>LCS (B3J0825-BS1), Continued</b>           |        |               |             |               | Prepared: 2023-10-10, Analyzed: 2023-10-10 |           |       |           |           |
| Magnesium, total                              | 4.14   | 0.010 mg/L    | 4.00        |               | 103                                        | 80-120    |       |           |           |
| Manganese, total                              | 0.0404 | 0.00020 mg/L  | 0.0400      |               | 101                                        | 80-120    |       |           |           |
| Molybdenum, total                             | 0.0392 | 0.00010 mg/L  | 0.0400      |               | 98                                         | 80-120    |       |           |           |
| Nickel, total                                 | 0.0406 | 0.00040 mg/L  | 0.0400      |               | 101                                        | 80-120    |       |           |           |
| Potassium, total                              | 3.93   | 0.10 mg/L     | 4.00        |               | 98                                         | 80-120    |       |           |           |
| Selenium, total                               | 0.399  | 0.00050 mg/L  | 0.400       |               | 100                                        | 80-120    |       |           |           |
| Sodium, total                                 | 4.01   | 0.10 mg/L     | 4.00        |               | 100                                        | 80-120    |       |           |           |
| Strontium, total                              | 0.0404 | 0.0010 mg/L   | 0.0400      |               | 101                                        | 80-120    |       |           |           |
| Uranium, total                                | 0.0417 | 0.000020 mg/L | 0.0400      |               | 104                                        | 80-120    |       |           |           |
| Zinc, total                                   | 0.390  | 0.0040 mg/L   | 0.400       |               | 98                                         | 80-120    |       |           |           |

### Volatile Organic Compounds (VOC), Batch B3J0784

|                                 |          |             |        |  |                                            |        |  |  |  |
|---------------------------------|----------|-------------|--------|--|--------------------------------------------|--------|--|--|--|
| <b>Blank (B3J0784-BLK1)</b>     |          |             |        |  | Prepared: 2023-10-10, Analyzed: 2023-10-10 |        |  |  |  |
| Bromodichloromethane            | < 0.0010 | 0.0010 mg/L |        |  |                                            |        |  |  |  |
| Bromoform                       | < 0.0010 | 0.0010 mg/L |        |  |                                            |        |  |  |  |
| Chloroform                      | < 0.0010 | 0.0010 mg/L |        |  |                                            |        |  |  |  |
| Dibromochloromethane            | < 0.0010 | 0.0010 mg/L |        |  |                                            |        |  |  |  |
| Surrogate: Toluene-d8           | 0.0219   | mg/L        | 0.0250 |  | 87                                         | 70-130 |  |  |  |
| Surrogate: 4-Bromofluorobenzene | 0.0266   | mg/L        | 0.0249 |  | 107                                        | 70-130 |  |  |  |
| <b>LCS (B3J0784-BS1)</b>        |          |             |        |  | Prepared: 2023-10-10, Analyzed: 2023-10-10 |        |  |  |  |
| Bromodichloromethane            | 0.0228   | 0.0010 mg/L | 0.0200 |  | 114                                        | 70-130 |  |  |  |
| Bromoform                       | 0.0254   | 0.0010 mg/L | 0.0201 |  | 127                                        | 70-130 |  |  |  |
| Chloroform                      | 0.0227   | 0.0010 mg/L | 0.0201 |  | 113                                        | 70-130 |  |  |  |
| Dibromochloromethane            | 0.0238   | 0.0010 mg/L | 0.0201 |  | 118                                        | 70-130 |  |  |  |
| Surrogate: Toluene-d8           | 0.0258   | mg/L        | 0.0250 |  | 103                                        | 70-130 |  |  |  |
| Surrogate: 4-Bromofluorobenzene | 0.0322   | mg/L        | 0.0249 |  | 129                                        | 70-130 |  |  |  |

#### QC Qualifiers:

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

## **APPENDIX C**

### **Chlorophyll A Certificate of Analysis**

## CERTIFICATE OF ANALYSIS

**REPORTED TO** Castlegar, City of  
460 Columbia Avenue  
CASTLEGAR, BC V1N 1G7

**ATTENTION** Craig Lincoln

**PO NUMBER** 502

**PROJECT** General Potability

**PROJECT INFO**

**WORK ORDER** 23I2611

**RECEIVED / TEMP** 2023-09-21 08:48 / 7.3°C

**REPORTED** 2023-09-27 11:19

**COC NUMBER** No Number

### 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



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<https://www.caro.ca/terms-conditions>

If you have any questions or concerns, please contact me at [bwhitehead@caro.ca](mailto:bwhitehead@caro.ca)

#### Authorized By:

Brent Whitehead  
Account Manager



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TEST RESULTS

|                     |                                          |                     |                             |
|---------------------|------------------------------------------|---------------------|-----------------------------|
| REPORTED TO PROJECT | Castlegar, City of<br>General Potability | WORK ORDER REPORTED | 23I2611<br>2023-09-27 11:19 |
|---------------------|------------------------------------------|---------------------|-----------------------------|

| Analyte                                                                         | Result | Guideline | RL   | Units | Analyzed   | Qualifier |
|---------------------------------------------------------------------------------|--------|-----------|------|-------|------------|-----------|
| 481e - WTC - Raw Water (23I2611-01)   Matrix: Water   Sampled: 2023-09-20 10:45 |        |           |      |       |            |           |
| General Parameters                                                              |        |           |      |       |            |           |
| Chlorophyll a                                                                   | < 1.00 | N/A       | 0.10 | µg/L  | 2023-09-26 |           |

## APPENDIX 1: SUPPORTING INFORMATION

**REPORTED TO PROJECT** Castlegar, City of  
General Potability

**WORK ORDER REPORTED** 2312611  
2023-09-27 11:19

| Analysis Description   | Method Ref.       | Technique         | Accredited | Location |
|------------------------|-------------------|-------------------|------------|----------|
| Chlorophyll-A in Water | SM 10200 H (2022) | Spectrophotometry |            | Kelowna  |

### Glossary of Terms:

|      |                                                                                                                       |
|------|-----------------------------------------------------------------------------------------------------------------------|
| RL   | Reporting Limit (default)                                                                                             |
| <    | Less than the specified Reporting Limit (RL) - the actual RL may be higher than the default RL due to various factors |
| µg/L | Micrograms per litre                                                                                                  |
| SM   | Standard Methods for the Examination of Water and Wastewater, American Public Health Association                      |

### Guidelines Referenced in this Report:

[Guidelines for Canadian Drinking Water Quality \(Health Canada, September 2022\)](#)

*Note: In some cases, the values displayed on the report represent the lowest guideline and are to be verified by the end user*

### General Comments:

The results in this report apply to the received samples analyzed in accordance with the Chain of Custody document. This analytical report must be reproduced in its entirety. CARO is not responsible for any loss or damage resulting directly or indirectly from error or omission in the conduct of testing. Liability is limited to the cost of analysis. Caro will dispose of all samples within 30 days of sample receipt, unless otherwise agreed.

Results in **Bold** indicate values that are above CARO's method reporting limits. Any results that are above regulatory limits are highlighted **red**. Please note that results will only be highlighted red if the regulatory limits are included on the CARO report. Any Bold and/or highlighted results do not take into account method uncertainty. If you would like method uncertainty or regulatory limits to be included on your report, please contact your Account Manager: [bwhitehead@caro.ca](mailto:bwhitehead@caro.ca)

*Please note any regulatory guidelines applied to this report are added as a convenience to the client, at their request, to help provide some initial context to analytical results obtained. Although CARO makes every effort to ensure accuracy of the associated regulatory guideline(s) applied, the guidelines applied cannot be assumed to be correct due to a variety of factors and as such CARO Analytical Services assumes no liability or responsibility for the use of those guidelines to make any decisions. The original source of the regulation should be verified and a review of the guideline(s) should be validated as correct in order to make any decisions arising from the comparison of the analytical data obtained to the relevant regulatory guideline for one's particular circumstances. Further, CARO Analytical Services assumes no liability or responsibility for any loss attributed from the use of these guidelines in any way.*

## APPENDIX 2: QUALITY CONTROL RESULTS

**REPORTED TO PROJECT** Castlegar, City of  
General Potability

**WORK ORDER REPORTED** 23I2611  
2023-09-27 11:19

The following section displays the quality control (QC) data that is associated with your sample data. Groups of samples are prepared in "batches" and analyzed in conjunction with QC samples that ensure your data is of the highest quality. Common QC types include:

- **Method Blank (Blk):** A blank sample that undergoes sample processing identical to that carried out for the test samples. Method blank results are used to assess contamination from the laboratory environment and reagents.
- **Duplicate (Dup):** An additional or second portion of a randomly selected sample in the analytical run carried through the entire analytical process. Duplicates provide a measure of the analytical method's precision (reproducibility).
- **Blank Spike (BS):** A sample of known concentration which undergoes processing identical to that carried out for test samples, also referred to as a laboratory control sample (LCS). Blank spikes provide a measure of the analytical method's accuracy.
- **Matrix Spike (MS):** A second aliquot of sample is fortified with a known concentration of target analytes and carried through the entire analytical process. Matrix spikes evaluate potential matrix effects that may affect the analyte recovery.
- **Reference Material (SRM):** A homogenous material of similar matrix to the samples, certified for the parameter(s) listed. Reference Materials ensure that the analytical process is adequate to achieve acceptable recoveries of the parameter(s) tested.

Each QC type is analyzed at a 5-10% frequency, i.e. one blank/duplicate/spike for every 10-20 samples. For all types of QC, the specified recovery (% Rec) and relative percent difference (RPD) limits are derived from long-term method performance averages and/or prescribed by the reference method.

| Analyte | Result | RL Units | Spike Level | Source Result | % REC | REC Limit | % RPD | RPD Limit | Qualifier |
|---------|--------|----------|-------------|---------------|-------|-----------|-------|-----------|-----------|
|---------|--------|----------|-------------|---------------|-------|-----------|-------|-----------|-----------|

### General Parameters, Batch B3I2111

|                             |        |           |                                            |  |  |  |  |  |  |
|-----------------------------|--------|-----------|--------------------------------------------|--|--|--|--|--|--|
| <b>Blank (B3I2111-BLK1)</b> |        |           | Prepared: 2023-09-21, Analyzed: 2023-09-26 |  |  |  |  |  |  |
| Chlorophyll a               | < 0.10 | 0.10 µg/L |                                            |  |  |  |  |  |  |

## **APPENDIX D**

### **North Well Chemical Analysis**

## CERTIFICATE OF ANALYSIS

**REPORTED TO** Castlegar, City of  
460 Columbia Avenue  
CASTLEGAR, BC V1N 1G7

**ATTENTION** Craig Lincoln

**PO NUMBER** 502

**PROJECT** General Potability

**PROJECT INFO**

**WORK ORDER** 23A0185

**RECEIVED / TEMP** 2023-01-04 10:47 / 4.9°C

**REPORTED** 2023-01-12 12:22

**COC NUMBER** No Number

### 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



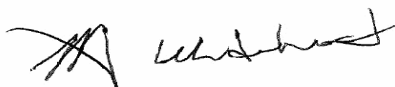
Through research, regulation knowledge, and instrumentation, we are your analytical centre for the technical knowledge you need, BEFORE you need it, so you can stay up to date and in the know.

By engaging our services, you are agreeing to CARO Analytical Service's Standard Terms and Conditions outlined here:  
<https://www.caro.ca/terms-conditions>

If you have any questions or concerns, please contact me at [bwhitehead@caro.ca](mailto:bwhitehead@caro.ca)

#### Authorized By:

Brent Whitehead  
Account Manager



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#108 4475 Wayburne Drive Burnaby, BC V5G 4X4

## TEST RESULTS

**REPORTED TO PROJECT** Castlegar, City of  
General Potability

**WORK ORDER REPORTED** 23A0185  
2023-01-12 12:22

| Analyte                                                                                | Result     | Guideline     | RL       | Units      | Analyzed   | Qualifier |
|----------------------------------------------------------------------------------------|------------|---------------|----------|------------|------------|-----------|
| <b>481E - WTC - Raw Water (23A0185-01)   Matrix: Water   Sampled: 2023-01-03 10:30</b> |            |               |          |            |            |           |
| <b>Anions</b>                                                                          |            |               |          |            |            |           |
| Chloride                                                                               | 0.29       | AO ≤ 250      | 0.10     | mg/L       | 2023-01-05 |           |
| Fluoride                                                                               | < 0.10     | MAC = 1.5     | 0.10     | mg/L       | 2023-01-05 |           |
| Nitrate (as N)                                                                         | 0.118      | MAC = 10      | 0.010    | mg/L       | 2023-01-05 |           |
| Nitrite (as N)                                                                         | < 0.010    | MAC = 1       | 0.010    | mg/L       | 2023-01-05 |           |
| Sulfate                                                                                | 11.5       | AO ≤ 500      | 1.0      | mg/L       | 2023-01-05 |           |
| <b>Calculated Parameters</b>                                                           |            |               |          |            |            |           |
| Hardness, Total (as CaCO <sub>3</sub> )                                                | 63.1       | None Required | 0.500    | mg/L       | N/A        |           |
| Langelier Index                                                                        | -0.4       | N/A           | -5.0     |            | 2023-01-11 | CT6       |
| Solids, Total Dissolved                                                                | 77.7       | AO ≤ 500      | 1.00     | mg/L       | N/A        |           |
| <b>General Parameters</b>                                                              |            |               |          |            |            |           |
| Alkalinity, Total (as CaCO <sub>3</sub> )                                              | 67.8       | N/A           | 1.0      | mg/L       | 2023-01-05 |           |
| Alkalinity, Phenolphthalein (as CaCO <sub>3</sub> )                                    | < 1.0      | N/A           | 1.0      | mg/L       | 2023-01-05 |           |
| Alkalinity, Bicarbonate (as CaCO <sub>3</sub> )                                        | 67.8       | N/A           | 1.0      | mg/L       | 2023-01-05 |           |
| Alkalinity, Carbonate (as CaCO <sub>3</sub> )                                          | < 1.0      | N/A           | 1.0      | mg/L       | 2023-01-05 |           |
| Alkalinity, Hydroxide (as CaCO <sub>3</sub> )                                          | < 1.0      | N/A           | 1.0      | mg/L       | 2023-01-05 |           |
| Colour, True                                                                           | < 5.0      | AO ≤ 15       | 5.0      | CU         | 2023-01-05 |           |
| Conductivity (EC)                                                                      | 138        | N/A           | 2.0      | µS/cm      | 2023-01-05 |           |
| Cyanide, Total                                                                         | < 0.0020   | MAC = 0.2     | 0.0020   | mg/L       | 2023-01-06 |           |
| pH                                                                                     | 8.10       | 7.0-10.5      | 0.10     | pH units   | 2023-01-05 | HT2       |
| Temperature, at pH                                                                     | 20.8       | N/A           |          | °C         | 2023-01-05 | HT2       |
| Turbidity                                                                              | 0.31       | OG < 1        | 0.10     | NTU        | 2023-01-05 |           |
| <b>Microbiological Parameters</b>                                                      |            |               |          |            |            |           |
| Coliforms, Total                                                                       | 1          | MAC = 0       | 1        | CFU/100 mL | 2023-01-04 |           |
| E. coli                                                                                | < 1        | MAC = 0       | 1        | CFU/100 mL | 2023-01-04 |           |
| <b>Total Metals</b>                                                                    |            |               |          |            |            |           |
| Aluminum, total                                                                        | 0.0130     | OG < 0.1      | 0.0050   | mg/L       | 2023-01-11 |           |
| Antimony, total                                                                        | < 0.00020  | MAC = 0.006   | 0.00020  | mg/L       | 2023-01-11 |           |
| Arsenic, total                                                                         | < 0.00050  | MAC = 0.01    | 0.00050  | mg/L       | 2023-01-11 |           |
| Barium, total                                                                          | 0.0157     | MAC = 2       | 0.0050   | mg/L       | 2023-01-11 |           |
| Boron, total                                                                           | < 0.0500   | MAC = 5       | 0.0500   | mg/L       | 2023-01-11 |           |
| Cadmium, total                                                                         | < 0.000010 | MAC = 0.005   | 0.000010 | mg/L       | 2023-01-11 |           |
| Calcium, total                                                                         | 18.4       | None Required | 0.20     | mg/L       | 2023-01-11 |           |
| Chromium, total                                                                        | < 0.00050  | MAC = 0.05    | 0.00050  | mg/L       | 2023-01-11 |           |
| Cobalt, total                                                                          | < 0.00010  | N/A           | 0.00010  | mg/L       | 2023-01-11 |           |
| Copper, total                                                                          | 0.00044    | MAC = 2       | 0.00040  | mg/L       | 2023-01-11 |           |
| Iron, total                                                                            | 0.012      | AO ≤ 0.3      | 0.010    | mg/L       | 2023-01-11 |           |
| Lead, total                                                                            | < 0.00020  | MAC = 0.005   | 0.00020  | mg/L       | 2023-01-11 |           |
| Magnesium, total                                                                       | 4.16       | None Required | 0.010    | mg/L       | 2023-01-11 |           |
| Manganese, total                                                                       | 0.00156    | MAC = 0.12    | 0.00020  | mg/L       | 2023-01-11 |           |
| Mercury, total                                                                         | < 0.000010 | MAC = 0.001   | 0.000010 | mg/L       | 2023-01-10 |           |

## TEST RESULTS

**REPORTED TO PROJECT** Castlegar, City of  
General Potability

**WORK ORDER REPORTED** 23A0185  
2023-01-12 12:22

| Analyte                                                                                           | Result    | Guideline  | RL       | Units | Analyzed   | Qualifier |
|---------------------------------------------------------------------------------------------------|-----------|------------|----------|-------|------------|-----------|
| <b>481E - WTC - Raw Water (23A0185-01)   Matrix: Water   Sampled: 2023-01-03 10:30, Continued</b> |           |            |          |       |            |           |
| <i>Total Metals, Continued</i>                                                                    |           |            |          |       |            |           |
| Molybdenum, total                                                                                 | 0.00046   | N/A        | 0.00010  | mg/L  | 2023-01-11 |           |
| Nickel, total                                                                                     | 0.00057   | N/A        | 0.00040  | mg/L  | 2023-01-11 |           |
| Potassium, total                                                                                  | 0.62      | N/A        | 0.10     | mg/L  | 2023-01-11 |           |
| Selenium, total                                                                                   | < 0.00050 | MAC = 0.05 | 0.00050  | mg/L  | 2023-01-11 |           |
| Sodium, total                                                                                     | 0.78      | AO ≤ 200   | 0.10     | mg/L  | 2023-01-11 |           |
| Strontium, total                                                                                  | 0.120     | MAC = 7    | 0.0010   | mg/L  | 2023-01-11 |           |
| Uranium, total                                                                                    | 0.000382  | MAC = 0.02 | 0.000020 | mg/L  | 2023-01-11 |           |
| Zinc, total                                                                                       | < 0.0040  | AO ≤ 5     | 0.0040   | mg/L  | 2023-01-11 |           |

### Blueberry (23A0185-02) | Matrix: Water | Sampled: 2023-01-03 11:30

|                                         |          |           |         |      |            |  |
|-----------------------------------------|----------|-----------|---------|------|------------|--|
| <i>Calculated Parameters</i>            |          |           |         |      |            |  |
| Total Trihalomethanes                   | 0.0346   | MAC = 0.1 | 0.00400 | mg/L | N/A        |  |
| <i>Volatile Organic Compounds (VOC)</i> |          |           |         |      |            |  |
| Bromodichloromethane                    | < 0.0010 | N/A       | 0.0010  | mg/L | 2023-01-10 |  |
| Bromoform                               | < 0.0010 | N/A       | 0.0010  | mg/L | 2023-01-10 |  |
| Chloroform                              | 0.0346   | N/A       | 0.0010  | mg/L | 2023-01-10 |  |
| Dibromochloromethane                    | < 0.0010 | N/A       | 0.0010  | mg/L | 2023-01-10 |  |
| Surrogate: Toluene-d8                   | 108      |           | 70-130  | %    | 2023-01-10 |  |
| Surrogate: 4-Bromofluorobenzene         | 106      |           | 70-130  | %    | 2023-01-10 |  |

### Airport (23A0185-03) | Matrix: Water | Sampled: 2023-01-03 12:00

|                                         |          |           |         |      |            |  |
|-----------------------------------------|----------|-----------|---------|------|------------|--|
| <i>Calculated Parameters</i>            |          |           |         |      |            |  |
| Total Trihalomethanes                   | 0.0242   | MAC = 0.1 | 0.00400 | mg/L | N/A        |  |
| <i>Volatile Organic Compounds (VOC)</i> |          |           |         |      |            |  |
| Bromodichloromethane                    | < 0.0010 | N/A       | 0.0010  | mg/L | 2023-01-10 |  |
| Bromoform                               | < 0.0010 | N/A       | 0.0010  | mg/L | 2023-01-10 |  |
| Chloroform                              | 0.0242   | N/A       | 0.0010  | mg/L | 2023-01-10 |  |
| Dibromochloromethane                    | < 0.0010 | N/A       | 0.0010  | mg/L | 2023-01-10 |  |
| Surrogate: Toluene-d8                   | 118      |           | 70-130  | %    | 2023-01-10 |  |
| Surrogate: 4-Bromofluorobenzene         | 116      |           | 70-130  | %    | 2023-01-10 |  |

### Park Pumphouse (23A0185-04) | Matrix: Water | Sampled: 2023-01-03 11:00

|                         |          |     |        |      |            |  |
|-------------------------|----------|-----|--------|------|------------|--|
| <i>Haloacetic Acids</i> |          |     |        |      |            |  |
| Monochloroacetic Acid   | < 0.0020 | N/A | 0.0020 | mg/L | 2023-01-11 |  |
| Monobromoacetic Acid    | < 0.0020 | N/A | 0.0020 | mg/L | 2023-01-11 |  |
| Dichloroacetic Acid     | 0.0065   | N/A | 0.0020 | mg/L | 2023-01-11 |  |
| Trichloroacetic Acid    | 0.0092   | N/A | 0.0020 | mg/L | 2023-01-11 |  |
| Dibromoacetic Acid      | < 0.0020 | N/A | 0.0020 | mg/L | 2023-01-11 |  |

## TEST RESULTS

**REPORTED TO PROJECT** Castlegar, City of  
General Potability

**WORK ORDER REPORTED** 23A0185  
2023-01-12 12:22

| Analyte | Result | Guideline | RL | Units | Analyzed | Qualifier |
|---------|--------|-----------|----|-------|----------|-----------|
|---------|--------|-----------|----|-------|----------|-----------|

### Park Pumphouse (23A0185-04) | Matrix: Water | Sampled: 2023-01-03 11:00, Continued

#### Haloacetic Acids, Continued

|                                  |        |            |         |      |            |  |
|----------------------------------|--------|------------|---------|------|------------|--|
| Total Haloacetic Acids (HAA5)    | 0.0157 | MAC = 0.08 | 0.00200 | mg/L | N/A        |  |
| Surrogate: 2-Bromopropionic Acid | 103    |            | 70-130  | %    | 2023-01-11 |  |

### North Well (23A0185-05) | Matrix: Water | Sampled: 2023-01-03 10:50

#### Anions

|                |         |           |       |      |            |  |
|----------------|---------|-----------|-------|------|------------|--|
| Chloride       | 20.4    | AO ≤ 250  | 0.10  | mg/L | 2023-01-05 |  |
| Fluoride       | 0.18    | MAC = 1.5 | 0.10  | mg/L | 2023-01-05 |  |
| Nitrate (as N) | 1.56    | MAC = 10  | 0.010 | mg/L | 2023-01-05 |  |
| Nitrite (as N) | < 0.010 | MAC = 1   | 0.010 | mg/L | 2023-01-05 |  |
| Sulfate        | 48.1    | AO ≤ 500  | 1.0   | mg/L | 2023-01-05 |  |

#### Calculated Parameters

|                                         |     |               |       |      |            |     |
|-----------------------------------------|-----|---------------|-------|------|------------|-----|
| Hardness, Total (as CaCO <sub>3</sub> ) | 205 | None Required | 0.500 | mg/L | N/A        |     |
| Langelier Index                         | 0.4 | N/A           | -5.0  |      | 2023-01-11 | CT6 |
| Solids, Total Dissolved                 | 279 | AO ≤ 500      | 1.00  | mg/L | N/A        |     |

#### General Parameters

|                                                     |          |           |        |          |            |     |
|-----------------------------------------------------|----------|-----------|--------|----------|------------|-----|
| Alkalinity, Total (as CaCO <sub>3</sub> )           | 178      | N/A       | 1.0    | mg/L     | 2023-01-05 |     |
| Alkalinity, Phenolphthalein (as CaCO <sub>3</sub> ) | < 1.0    | N/A       | 1.0    | mg/L     | 2023-01-05 |     |
| Alkalinity, Bicarbonate (as CaCO <sub>3</sub> )     | 178      | N/A       | 1.0    | mg/L     | 2023-01-05 |     |
| Alkalinity, Carbonate (as CaCO <sub>3</sub> )       | < 1.0    | N/A       | 1.0    | mg/L     | 2023-01-05 |     |
| Alkalinity, Hydroxide (as CaCO <sub>3</sub> )       | < 1.0    | N/A       | 1.0    | mg/L     | 2023-01-05 |     |
| Colour, True                                        | < 5.0    | AO ≤ 15   | 5.0    | CU       | 2023-01-05 |     |
| Conductivity (EC)                                   | 488      | N/A       | 2.0    | µS/cm    | 2023-01-05 |     |
| Cyanide, Total                                      | < 0.0020 | MAC = 0.2 | 0.0020 | mg/L     | 2023-01-06 |     |
| pH                                                  | 7.91     | 7.0-10.5  | 0.10   | pH units | 2023-01-05 | HT2 |
| Temperature, at pH                                  | 20.8     | N/A       |        | °C       | 2023-01-05 | HT2 |
| Turbidity                                           | 4.09     | OG < 1    | 0.10   | NTU      | 2023-01-05 |     |

#### Microbiological Parameters

|                           |     |         |   |            |            |  |
|---------------------------|-----|---------|---|------------|------------|--|
| Coliforms, Total (Q-Tray) | < 1 | MAC = 0 | 1 | MPN/100 mL | 2023-01-04 |  |
| E. coli (Q-Tray)          | < 1 | MAC = 0 | 1 | MPN/100 mL | 2023-01-04 |  |

#### Total Metals

|                 |           |               |          |      |            |  |
|-----------------|-----------|---------------|----------|------|------------|--|
| Aluminum, total | 0.172     | OG < 0.1      | 0.0050   | mg/L | 2023-01-11 |  |
| Antimony, total | < 0.00020 | MAC = 0.006   | 0.00020  | mg/L | 2023-01-11 |  |
| Arsenic, total  | < 0.00050 | MAC = 0.01    | 0.00050  | mg/L | 2023-01-11 |  |
| Barium, total   | 0.100     | MAC = 2       | 0.0050   | mg/L | 2023-01-11 |  |
| Boron, total    | < 0.0500  | MAC = 5       | 0.0500   | mg/L | 2023-01-11 |  |
| Cadmium, total  | 0.000027  | MAC = 0.005   | 0.000010 | mg/L | 2023-01-11 |  |
| Calcium, total  | 65.3      | None Required | 0.20     | mg/L | 2023-01-11 |  |
| Chromium, total | 0.00114   | MAC = 0.05    | 0.00050  | mg/L | 2023-01-11 |  |
| Cobalt, total   | 0.00018   | N/A           | 0.00010  | mg/L | 2023-01-11 |  |

## TEST RESULTS

**REPORTED TO PROJECT** Castlegar, City of  
General Potability

**WORK ORDER REPORTED** 23A0185  
2023-01-12 12:22

| Analyte                                                                               | Result     | Guideline     | RL       | Units | Analyzed   | Qualifier |
|---------------------------------------------------------------------------------------|------------|---------------|----------|-------|------------|-----------|
| <b>North Well (23A0185-05)   Matrix: Water   Sampled: 2023-01-03 10:50, Continued</b> |            |               |          |       |            |           |
| <i>Total Metals, Continued</i>                                                        |            |               |          |       |            |           |
| Copper, total                                                                         | 0.0163     | MAC = 2       | 0.00040  | mg/L  | 2023-01-11 |           |
| Iron, total                                                                           | 0.394      | AO ≤ 0.3      | 0.010    | mg/L  | 2023-01-11 |           |
| Lead, total                                                                           | 0.00158    | MAC = 0.005   | 0.00020  | mg/L  | 2023-01-11 |           |
| Magnesium, total                                                                      | 10.2       | None Required | 0.010    | mg/L  | 2023-01-11 |           |
| Manganese, total                                                                      | 0.0130     | MAC = 0.12    | 0.00020  | mg/L  | 2023-01-11 |           |
| Mercury, total                                                                        | < 0.000040 | MAC = 0.001   | 0.000040 | mg/L  | 2023-01-11 | HG1       |
| Molybdenum, total                                                                     | 0.00292    | N/A           | 0.00010  | mg/L  | 2023-01-11 |           |
| Nickel, total                                                                         | 0.00132    | N/A           | 0.00040  | mg/L  | 2023-01-11 |           |
| Potassium, total                                                                      | 3.71       | N/A           | 0.10     | mg/L  | 2023-01-11 |           |
| Selenium, total                                                                       | 0.00169    | MAC = 0.05    | 0.00050  | mg/L  | 2023-01-11 |           |
| Sodium, total                                                                         | 16.0       | AO ≤ 200      | 0.10     | mg/L  | 2023-01-11 |           |
| Strontium, total                                                                      | 0.412      | MAC = 7       | 0.0010   | mg/L  | 2023-01-11 |           |
| Uranium, total                                                                        | 0.00561    | MAC = 0.02    | 0.000020 | mg/L  | 2023-01-11 |           |
| Zinc, total                                                                           | 0.0273     | AO ≤ 5        | 0.0040   | mg/L  | 2023-01-11 |           |

### Sample Qualifiers:

CT6 Results were based on lab temperature & lab pH.

HG1 Sample bottle and preservation submitted is not suitable for Mercury analysis and analyte stability may be affected.

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

## APPENDIX 1: SUPPORTING INFORMATION

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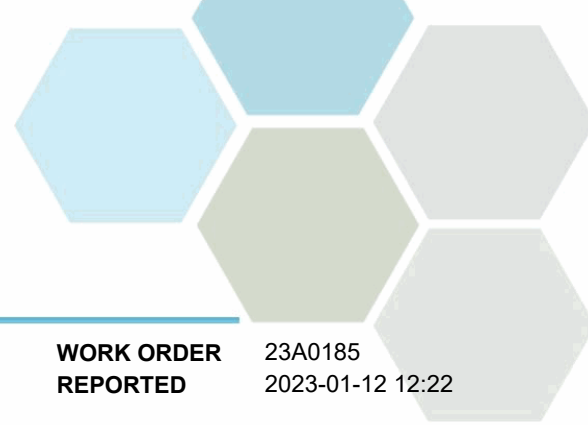
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| Analysis Description             | Method Ref.           | Technique                                                                           | Accredited | Location |
|----------------------------------|-----------------------|-------------------------------------------------------------------------------------|------------|----------|
| Alkalinity in Water              | SM 2320 B* (2017)     | Titration with H <sub>2</sub> SO <sub>4</sub>                                       | ✓          | Kelowna  |
| Anions in Water                  | SM 4110 B (2017)      | Ion Chromatography                                                                  | ✓          | Kelowna  |
| Coliforms, Total in Water        | SM 9222* (2017)       | Membrane Filtration / Chromocult Agar                                               | ✓          | Kelowna  |
| Colour, True in Water            | SM 2120 C (2017)      | Spectrophotometry (456 nm)                                                          | ✓          | Kelowna  |
| Conductivity in Water            | SM 2510 B (2017)      | Conductivity Meter                                                                  | ✓          | Kelowna  |
| Cyanide, SAD in Water            | ASTM D7511-12         | Flow Injection with In-Line UV Digestion and Amperometry                            | ✓          | Kelowna  |
| E. coli in Water                 | SM 9222* (2017)       | Membrane Filtration / Chromocult Agar                                               | ✓          | Kelowna  |
| Haloacetic Acids in Water        | EPA 552.3*            | Liquid-Liquid Microextraction, Derivatization and GC-ECD                            | ✓          | Richmond |
| Hardness in Water                | SM 2340 B* (2017)     | Calculation: 2.497 [total Ca] + 4.118 [total Mg] (Est)                              | ✓          | N/A      |
| Langelier Index in Water         | SM 2330 B (2017)      | Calculation                                                                         |            | N/A      |
| pH in Water                      | SM 4500-H+ B (2017)   | Electrometry                                                                        | ✓          | Kelowna  |
| Solids, Total Dissolved in Water | SM 1030 E (2017)      | SM 1030 E (2011)                                                                    |            | N/A      |
| Total Metals in Water            | EPA 6020B             | BrCl <sub>2</sub> Oxidation / Inductively Coupled Plasma-Mass Spectroscopy (ICP-MS) | ✓          | Richmond |
| Trihalomethanes in Water         | EPA 5030B / EPA 8260D | Purge&Trap / GC-MSD (SIM)                                                           | ✓          | Richmond |
| Turbidity in Water               | SM 2130 B (2017)      | Nephelometry                                                                        | ✓          | Kelowna  |

*Note: An asterisk in the Method Reference indicates that the CARO method has been modified from the reference method*

### Glossary of Terms:

|            |                                                                                                                       |
|------------|-----------------------------------------------------------------------------------------------------------------------|
| RL         | Reporting Limit (default)                                                                                             |
| <          | Less than the specified Reporting Limit (RL) - the actual RL may be higher than the default RL due to various factors |
| °C         | Degrees Celcius                                                                                                       |
| AO         | Aesthetic Objective                                                                                                   |
| CFU/100 mL | Colony Forming Units per 100 millilitres                                                                              |
| CU         | Colour Units (referenced against a platinum cobalt standard)                                                          |
| MAC        | Maximum Acceptable Concentration (health based)                                                                       |
| mg/L       | Milligrams per litre                                                                                                  |
| MPN/100 mL | Most Probable Number per 100 millilitres                                                                              |
| NTU        | Nephelometric Turbidity Units                                                                                         |
| OG         | Operational Guideline (treated water)                                                                                 |
| pH units   | pH < 7 = acidic, pH > 7 = basic                                                                                       |
| µS/cm      | Microsiemens per centimetre                                                                                           |
| ASTM       | ASTM International Test Methods                                                                                       |
| EPA        | United States Environmental Protection Agency Test Methods                                                            |
| SM         | Standard Methods for the Examination of Water and Wastewater, American Public Health Association                      |



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### General Comments:

The results in this report apply to the received samples analyzed in accordance with the Chain of Custody document. This analytical report must be reproduced in its entirety. CARO is not responsible for any loss or damage resulting directly or indirectly from error or omission in the conduct of testing. Liability is limited to the cost of analysis. Samples will be disposed of 30 days after the test report has been issued or once samples expire, whichever comes first. Longer hold is possible if agreed to in writing.

Results in **Bold** indicate values that are above CARO's method reporting limits. Any results that are above regulatory limits are highlighted **red**. Please note that results will only be highlighted red if the regulatory limits are included on the CARO report. Any Bold and/or highlighted results do not take into account method uncertainty. If you would like method uncertainty or regulatory limits to be included on your report, please contact your Account Manager: [bwhitehead@caro.ca](mailto:bwhitehead@caro.ca)

*Please note any regulatory guidelines applied to this report are added as a convenience to the client, at their request, to help provide some initial context to analytical results obtained. Although CARO makes every effort to ensure accuracy of the associated regulatory guideline(s) applied, the guidelines applied cannot be assumed to be correct due to a variety of factors and as such CARO Analytical Services assumes no liability or responsibility for the use of those guidelines to make any decisions. The original source of the regulation should be verified and a review of the guideline(s) should be validated as correct in order to make any decisions arising from the comparison of the analytical data obtained to the relevant regulatory guideline for one's particular circumstances. Further, CARO Analytical Services assumes no liability or responsibility for any loss attributed from the use of these guidelines in any way.*

## APPENDIX 2: QUALITY CONTROL RESULTS

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The following section displays the quality control (QC) data that is associated with your sample data. Groups of samples are prepared in "batches" and analyzed in conjunction with QC samples that ensure your data is of the highest quality. Common QC types include:

- **Method Blank (Blk):** A blank sample that undergoes sample processing identical to that carried out for the test samples. Method blank results are used to assess contamination from the laboratory environment and reagents.
- **Duplicate (Dup):** An additional or second portion of a randomly selected sample in the analytical run carried through the entire analytical process. Duplicates provide a measure of the analytical method's precision (reproducibility).
- **Blank Spike (BS):** A sample of known concentration which undergoes processing identical to that carried out for test samples, also referred to as a laboratory control sample (LCS). Blank spikes provide a measure of the analytical method's accuracy.
- **Matrix Spike (MS):** A second aliquot of sample is fortified with a known concentration of target analytes and carried through the entire analytical process. Matrix spikes evaluate potential matrix effects that may affect the analyte recovery.
- **Reference Material (SRM):** A homogenous material of similar matrix to the samples, certified for the parameter(s) listed. Reference Materials ensure that the analytical process is adequate to achieve acceptable recoveries of the parameter(s) tested.

Each QC type is analyzed at a 5-10% frequency, i.e. one blank/duplicate/spike for every 10-20 samples. For all types of QC, the specified recovery (% Rec) and relative percent difference (RPD) limits are derived from long-term method performance averages and/or prescribed by the reference method.

| Analyte | Result | RL Units | Spike Level | Source Result | % REC | REC Limit | % RPD | RPD Limit | Qualifier |
|---------|--------|----------|-------------|---------------|-------|-----------|-------|-----------|-----------|
|---------|--------|----------|-------------|---------------|-------|-----------|-------|-----------|-----------|

### Anions, Batch B3A0211

|                             |         |            |                                            |  |  |  |  |  |  |
|-----------------------------|---------|------------|--------------------------------------------|--|--|--|--|--|--|
| <b>Blank (B3A0211-BLK1)</b> |         |            | Prepared: 2023-01-05, Analyzed: 2023-01-05 |  |  |  |  |  |  |
| Chloride                    | < 0.10  | 0.10 mg/L  |                                            |  |  |  |  |  |  |
| Fluoride                    | < 0.10  | 0.10 mg/L  |                                            |  |  |  |  |  |  |
| Nitrate (as N)              | < 0.010 | 0.010 mg/L |                                            |  |  |  |  |  |  |
| Nitrite (as N)              | < 0.010 | 0.010 mg/L |                                            |  |  |  |  |  |  |
| Sulfate                     | < 1.0   | 1.0 mg/L   |                                            |  |  |  |  |  |  |

|                          |      |            |                                            |  |     |        |  |  |  |
|--------------------------|------|------------|--------------------------------------------|--|-----|--------|--|--|--|
| <b>LCS (B3A0211-BS1)</b> |      |            | Prepared: 2023-01-05, Analyzed: 2023-01-05 |  |     |        |  |  |  |
| Chloride                 | 16.1 | 0.10 mg/L  | 16.0                                       |  | 101 | 90-110 |  |  |  |
| Fluoride                 | 4.00 | 0.10 mg/L  | 4.00                                       |  | 100 | 88-108 |  |  |  |
| Nitrate (as N)           | 3.89 | 0.010 mg/L | 4.00                                       |  | 97  | 90-110 |  |  |  |
| Nitrite (as N)           | 1.98 | 0.010 mg/L | 2.00                                       |  | 99  | 85-115 |  |  |  |
| Sulfate                  | 15.5 | 1.0 mg/L   | 16.0                                       |  | 97  | 90-110 |  |  |  |

### General Parameters, Batch B3A0251

|                                                     |       |           |                                            |  |  |  |  |  |  |
|-----------------------------------------------------|-------|-----------|--------------------------------------------|--|--|--|--|--|--|
| <b>Blank (B3A0251-BLK1)</b>                         |       |           | Prepared: 2023-01-05, Analyzed: 2023-01-05 |  |  |  |  |  |  |
| Alkalinity, Total (as CaCO <sub>3</sub> )           | < 1.0 | 1.0 mg/L  |                                            |  |  |  |  |  |  |
| Alkalinity, Phenolphthalein (as CaCO <sub>3</sub> ) | < 1.0 | 1.0 mg/L  |                                            |  |  |  |  |  |  |
| Alkalinity, Bicarbonate (as CaCO <sub>3</sub> )     | < 1.0 | 1.0 mg/L  |                                            |  |  |  |  |  |  |
| Alkalinity, Carbonate (as CaCO <sub>3</sub> )       | < 1.0 | 1.0 mg/L  |                                            |  |  |  |  |  |  |
| Alkalinity, Hydroxide (as CaCO <sub>3</sub> )       | < 1.0 | 1.0 mg/L  |                                            |  |  |  |  |  |  |
| Conductivity (EC)                                   | < 2.0 | 2.0 µS/cm |                                            |  |  |  |  |  |  |
| Temperature, at pH                                  | 21.1  | °C        |                                            |  |  |  |  |  |  |

|                                                     |       |           |                                            |  |  |  |  |  |  |
|-----------------------------------------------------|-------|-----------|--------------------------------------------|--|--|--|--|--|--|
| <b>Blank (B3A0251-BLK2)</b>                         |       |           | Prepared: 2023-01-05, Analyzed: 2023-01-05 |  |  |  |  |  |  |
| Alkalinity, Total (as CaCO <sub>3</sub> )           | < 1.0 | 1.0 mg/L  |                                            |  |  |  |  |  |  |
| Alkalinity, Phenolphthalein (as CaCO <sub>3</sub> ) | < 1.0 | 1.0 mg/L  |                                            |  |  |  |  |  |  |
| Alkalinity, Bicarbonate (as CaCO <sub>3</sub> )     | < 1.0 | 1.0 mg/L  |                                            |  |  |  |  |  |  |
| Alkalinity, Carbonate (as CaCO <sub>3</sub> )       | < 1.0 | 1.0 mg/L  |                                            |  |  |  |  |  |  |
| Alkalinity, Hydroxide (as CaCO <sub>3</sub> )       | < 1.0 | 1.0 mg/L  |                                            |  |  |  |  |  |  |
| Conductivity (EC)                                   | < 2.0 | 2.0 µS/cm |                                            |  |  |  |  |  |  |
| Temperature, at pH                                  | 21.9  | °C        |                                            |  |  |  |  |  |  |

|                                           |      |          |                                            |  |    |        |  |  |  |
|-------------------------------------------|------|----------|--------------------------------------------|--|----|--------|--|--|--|
| <b>LCS (B3A0251-BS1)</b>                  |      |          | Prepared: 2023-01-05, Analyzed: 2023-01-05 |  |    |        |  |  |  |
| Alkalinity, Total (as CaCO <sub>3</sub> ) | 98.8 | 1.0 mg/L | 100                                        |  | 99 | 80-120 |  |  |  |

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| Analyte                                             | Result   | RL Units      | Spike Level | Source Result                              | % REC | REC Limit | % RPD | RPD Limit | Qualifier |
|-----------------------------------------------------|----------|---------------|-------------|--------------------------------------------|-------|-----------|-------|-----------|-----------|
| <b>General Parameters, Batch B3A0251, Continued</b> |          |               |             |                                            |       |           |       |           |           |
| <b>LCS (B3A0251-BS2)</b>                            |          |               |             | Prepared: 2023-01-05, Analyzed: 2023-01-05 |       |           |       |           |           |
| Alkalinity, Total (as CaCO <sub>3</sub> )           | 98.8     | 1.0 mg/L      | 100         |                                            | 99    | 80-120    |       |           |           |
| <b>Reference (B3A0251-SRM1)</b>                     |          |               |             | Prepared: 2023-01-05, Analyzed: 2023-01-05 |       |           |       |           |           |
| pH                                                  | 7.01     | 0.10 pH units | 7.01        |                                            | 100   | 98-102    |       |           |           |
| <b>Reference (B3A0251-SRM2)</b>                     |          |               |             | Prepared: 2023-01-05, Analyzed: 2023-01-05 |       |           |       |           |           |
| pH                                                  | 7.00     | 0.10 pH units | 7.01        |                                            | 100   | 98-102    |       |           |           |
| <b>Reference (B3A0251-SRM3)</b>                     |          |               |             | Prepared: 2023-01-05, Analyzed: 2023-01-05 |       |           |       |           |           |
| Conductivity (EC)                                   | 515      | 2.0 µS/cm     | 1410        |                                            | 36    | 0-200     |       |           |           |
| <b>Reference (B3A0251-SRM4)</b>                     |          |               |             | Prepared: 2023-01-05, Analyzed: 2023-01-05 |       |           |       |           |           |
| Conductivity (EC)                                   | 513      | 2.0 µS/cm     | 1410        |                                            | 36    | 0-200     |       |           |           |
| <b>General Parameters, Batch B3A0269</b>            |          |               |             |                                            |       |           |       |           |           |
| <b>Blank (B3A0269-BLK1)</b>                         |          |               |             | Prepared: 2023-01-05, Analyzed: 2023-01-05 |       |           |       |           |           |
| Colour, True                                        | < 5.0    | 5.0 CU        |             |                                            |       |           |       |           |           |
| <b>LCS (B3A0269-BS1)</b>                            |          |               |             | Prepared: 2023-01-05, Analyzed: 2023-01-05 |       |           |       |           |           |
| Colour, True                                        | 19       | 5.0 CU        | 20.0        |                                            | 96    | 85-115    |       |           |           |
| <b>General Parameters, Batch B3A0271</b>            |          |               |             |                                            |       |           |       |           |           |
| <b>Blank (B3A0271-BLK1)</b>                         |          |               |             | Prepared: 2023-01-05, Analyzed: 2023-01-05 |       |           |       |           |           |
| Turbidity                                           | < 0.10   | 0.10 NTU      |             |                                            |       |           |       |           |           |
| <b>LCS (B3A0271-BS1)</b>                            |          |               |             | Prepared: 2023-01-05, Analyzed: 2023-01-05 |       |           |       |           |           |
| Turbidity                                           | 15.2     | 0.10 NTU      | 14.6        |                                            | 104   | 90-110    |       |           |           |
| <b>General Parameters, Batch B3A0318</b>            |          |               |             |                                            |       |           |       |           |           |
| <b>Blank (B3A0318-BLK1)</b>                         |          |               |             | Prepared: 2023-01-06, Analyzed: 2023-01-06 |       |           |       |           |           |
| Cyanide, Total                                      | < 0.0020 | 0.0020 mg/L   |             |                                            |       |           |       |           |           |
| <b>Blank (B3A0318-BLK2)</b>                         |          |               |             | Prepared: 2023-01-06, Analyzed: 2023-01-06 |       |           |       |           |           |
| Cyanide, Total                                      | < 0.0020 | 0.0020 mg/L   |             |                                            |       |           |       |           |           |
| <b>LCS (B3A0318-BS1)</b>                            |          |               |             | Prepared: 2023-01-06, Analyzed: 2023-01-06 |       |           |       |           |           |
| Cyanide, Total                                      | 0.0194   | 0.0020 mg/L   | 0.0200      |                                            | 97    | 82-120    |       |           |           |
| <b>LCS (B3A0318-BS2)</b>                            |          |               |             | Prepared: 2023-01-06, Analyzed: 2023-01-06 |       |           |       |           |           |
| Cyanide, Total                                      | 0.0190   | 0.0020 mg/L   | 0.0200      |                                            | 95    | 82-120    |       |           |           |
| <b>LCS Dup (B3A0318-BSD1)</b>                       |          |               |             | Prepared: 2023-01-06, Analyzed: 2023-01-06 |       |           |       |           |           |
| Cyanide, Total                                      | 0.0196   | 0.0020 mg/L   | 0.0200      |                                            | 98    | 82-120    | 1     | 10        |           |
| <b>LCS Dup (B3A0318-BSD2)</b>                       |          |               |             | Prepared: 2023-01-06, Analyzed: 2023-01-06 |       |           |       |           |           |
| Cyanide, Total                                      | 0.0198   | 0.0020 mg/L   | 0.0200      |                                            | 99    | 82-120    | 4     | 10        |           |
| <b>Haloacetic Acids, Batch B3A0826</b>              |          |               |             |                                            |       |           |       |           |           |
| <b>Blank (B3A0826-BLK1)</b>                         |          |               |             | Prepared: 2023-01-11, Analyzed: 2023-01-11 |       |           |       |           |           |
| Monochloroacetic Acid                               | < 0.0020 | 0.0020 mg/L   |             |                                            |       |           |       |           |           |
| Monobromoacetic Acid                                | < 0.0020 | 0.0020 mg/L   |             |                                            |       |           |       |           |           |
| Dichloroacetic Acid                                 | < 0.0020 | 0.0020 mg/L   |             |                                            |       |           |       |           |           |

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| Analyte                                           | Result   | RL Units     | Spike Level | Source Result                              | % REC | REC Limit | % RPD | RPD Limit | Qualifier |
|---------------------------------------------------|----------|--------------|-------------|--------------------------------------------|-------|-----------|-------|-----------|-----------|
| <b>Haloacetic Acids, Batch B3A0826, Continued</b> |          |              |             |                                            |       |           |       |           |           |
| <b>Blank (B3A0826-BLK1), Continued</b>            |          |              |             | Prepared: 2023-01-11, Analyzed: 2023-01-11 |       |           |       |           |           |
| Trichloroacetic Acid                              | < 0.0020 | 0.0020 mg/L  |             |                                            |       |           |       |           |           |
| Dibromoacetic Acid                                | < 0.0020 | 0.0020 mg/L  |             |                                            |       |           |       |           |           |
| Surrogate: 2-Bromopropionic Acid                  | 0.0111   | mg/L         | 0.0117      |                                            | 94    | 70-130    |       |           |           |
| <b>LCS (B3A0826-BS1)</b>                          |          |              |             | Prepared: 2023-01-11, Analyzed: 2023-01-11 |       |           |       |           |           |
| Monochloroacetic Acid                             | 0.0572   | 0.0020 mg/L  | 0.0564      |                                            | 101   | 75-117    |       |           |           |
| Monobromoacetic Acid                              | 0.0380   | 0.0020 mg/L  | 0.0374      |                                            | 102   | 83-113    |       |           |           |
| Dichloroacetic Acid                               | 0.0568   | 0.0020 mg/L  | 0.0558      |                                            | 102   | 78-112    |       |           |           |
| Trichloroacetic Acid                              | 0.0187   | 0.0020 mg/L  | 0.0186      |                                            | 100   | 81-110    |       |           |           |
| Dibromoacetic Acid                                | 0.0190   | 0.0020 mg/L  | 0.0187      |                                            | 102   | 89-112    |       |           |           |
| Surrogate: 2-Bromopropionic Acid                  | 0.0119   | mg/L         | 0.0117      |                                            | 102   | 70-130    |       |           |           |
| <b>LCS Dup (B3A0826-BSD1)</b>                     |          |              |             | Prepared: 2023-01-11, Analyzed: 2023-01-11 |       |           |       |           |           |
| Monochloroacetic Acid                             | 0.0554   | 0.0020 mg/L  | 0.0564      |                                            | 98    | 75-117    | 3     | 30        |           |
| Monobromoacetic Acid                              | 0.0372   | 0.0020 mg/L  | 0.0374      |                                            | 99    | 83-113    | 2     | 30        |           |
| Dichloroacetic Acid                               | 0.0554   | 0.0020 mg/L  | 0.0558      |                                            | 99    | 78-112    | 2     | 30        |           |
| Trichloroacetic Acid                              | 0.0188   | 0.0020 mg/L  | 0.0186      |                                            | 101   | 81-110    | < 1   | 30        |           |
| Dibromoacetic Acid                                | 0.0186   | 0.0020 mg/L  | 0.0187      |                                            | 99    | 89-112    | 2     | 30        |           |
| Surrogate: 2-Bromopropionic Acid                  | 0.0113   | mg/L         | 0.0117      |                                            | 97    | 70-130    |       |           |           |
| <b>Microbiological Parameters, Batch B3A0182</b>  |          |              |             |                                            |       |           |       |           |           |
| <b>Blank (B3A0182-BLK1)</b>                       |          |              |             | Prepared: 2023-01-04, Analyzed: 2023-01-04 |       |           |       |           |           |
| Coliforms, Total                                  | < 1      | 1 CFU/100 mL |             |                                            |       |           |       |           |           |
| E. coli                                           | < 1      | 1 CFU/100 mL |             |                                            |       |           |       |           |           |
| <b>Blank (B3A0182-BLK2)</b>                       |          |              |             | Prepared: 2023-01-04, Analyzed: 2023-01-04 |       |           |       |           |           |
| Coliforms, Total                                  | < 1      | 1 CFU/100 mL |             |                                            |       |           |       |           |           |
| E. coli                                           | < 1      | 1 CFU/100 mL |             |                                            |       |           |       |           |           |
| <b>Blank (B3A0182-BLK3)</b>                       |          |              |             | Prepared: 2023-01-04, Analyzed: 2023-01-04 |       |           |       |           |           |
| Coliforms, Total                                  | < 1      | 1 CFU/100 mL |             |                                            |       |           |       |           |           |
| E. coli                                           | < 1      | 1 CFU/100 mL |             |                                            |       |           |       |           |           |
| <b>Blank (B3A0182-BLK4)</b>                       |          |              |             | Prepared: 2023-01-04, Analyzed: 2023-01-04 |       |           |       |           |           |
| Coliforms, Total                                  | < 1      | 1 CFU/100 mL |             |                                            |       |           |       |           |           |
| E. coli                                           | < 1      | 1 CFU/100 mL |             |                                            |       |           |       |           |           |
| <b>Blank (B3A0182-BLK5)</b>                       |          |              |             | Prepared: 2023-01-04, Analyzed: 2023-01-04 |       |           |       |           |           |
| Coliforms, Total                                  | < 1      | 1 CFU/100 mL |             |                                            |       |           |       |           |           |
| E. coli                                           | < 1      | 1 CFU/100 mL |             |                                            |       |           |       |           |           |
| <b>Blank (B3A0182-BLK6)</b>                       |          |              |             | Prepared: 2023-01-04, Analyzed: 2023-01-04 |       |           |       |           |           |
| Coliforms, Total                                  | < 1      | 1 CFU/100 mL |             |                                            |       |           |       |           |           |
| E. coli                                           | < 1      | 1 CFU/100 mL |             |                                            |       |           |       |           |           |
| <b>Blank (B3A0182-BLK7)</b>                       |          |              |             | Prepared: 2023-01-04, Analyzed: 2023-01-04 |       |           |       |           |           |
| Coliforms, Total                                  | < 1      | 1 CFU/100 mL |             |                                            |       |           |       |           |           |
| E. coli                                           | < 1      | 1 CFU/100 mL |             |                                            |       |           |       |           |           |
| <b>Blank (B3A0182-BLK8)</b>                       |          |              |             | Prepared: 2023-01-04, Analyzed: 2023-01-04 |       |           |       |           |           |
| Coliforms, Total                                  | < 1      | 1 CFU/100 mL |             |                                            |       |           |       |           |           |
| E. coli                                           | < 1      | 1 CFU/100 mL |             |                                            |       |           |       |           |           |
| <b>Blank (B3A0182-BLK9)</b>                       |          |              |             | Prepared: 2023-01-04, Analyzed: 2023-01-04 |       |           |       |           |           |
| Coliforms, Total                                  | < 1      | 1 CFU/100 mL |             |                                            |       |           |       |           |           |
| E. coli                                           | < 1      | 1 CFU/100 mL |             |                                            |       |           |       |           |           |

## APPENDIX 2: QUALITY CONTROL RESULTS

**REPORTED TO PROJECT** Castlegar, City of  
General Potability

**WORK ORDER REPORTED** 23A0185  
2023-01-12 12:22

| Analyte | Result | RL Units | Spike Level | Source Result | % REC | REC Limit | % RPD | RPD Limit | Qualifier |
|---------|--------|----------|-------------|---------------|-------|-----------|-------|-----------|-----------|
|---------|--------|----------|-------------|---------------|-------|-----------|-------|-----------|-----------|

### Microbiological Parameters, Batch B3A0182, Continued

|                             |     |                                            |  |  |  |  |  |  |  |
|-----------------------------|-----|--------------------------------------------|--|--|--|--|--|--|--|
| <b>Blank (B3A0182-BLKA)</b> |     | Prepared: 2023-01-04, Analyzed: 2023-01-04 |  |  |  |  |  |  |  |
| Coliforms, Total            | < 1 | 1 CFU/100 mL                               |  |  |  |  |  |  |  |
| E. coli                     | < 1 | 1 CFU/100 mL                               |  |  |  |  |  |  |  |
| <b>Blank (B3A0182-BLKB)</b> |     | Prepared: 2023-01-04, Analyzed: 2023-01-04 |  |  |  |  |  |  |  |
| Coliforms, Total            | < 1 | 1 CFU/100 mL                               |  |  |  |  |  |  |  |
| E. coli                     | < 1 | 1 CFU/100 mL                               |  |  |  |  |  |  |  |
| <b>Blank (B3A0182-BLKC)</b> |     | Prepared: 2023-01-04, Analyzed: 2023-01-04 |  |  |  |  |  |  |  |
| Coliforms, Total            | < 1 | 1 CFU/100 mL                               |  |  |  |  |  |  |  |
| E. coli                     | < 1 | 1 CFU/100 mL                               |  |  |  |  |  |  |  |
| <b>Blank (B3A0182-BLKD)</b> |     | Prepared: 2023-01-04, Analyzed: 2023-01-04 |  |  |  |  |  |  |  |
| Coliforms, Total            | < 1 | 1 CFU/100 mL                               |  |  |  |  |  |  |  |
| E. coli                     | < 1 | 1 CFU/100 mL                               |  |  |  |  |  |  |  |
| <b>Blank (B3A0182-BLKE)</b> |     | Prepared: 2023-01-04, Analyzed: 2023-01-04 |  |  |  |  |  |  |  |
| Coliforms, Total            | < 1 | 1 CFU/100 mL                               |  |  |  |  |  |  |  |
| E. coli                     | < 1 | 1 CFU/100 mL                               |  |  |  |  |  |  |  |

### Microbiological Parameters, Batch B3A0204

|                             |     |                                            |  |  |  |  |  |  |  |
|-----------------------------|-----|--------------------------------------------|--|--|--|--|--|--|--|
| <b>Blank (B3A0204-BLK1)</b> |     | Prepared: 2023-01-04, Analyzed: 2023-01-04 |  |  |  |  |  |  |  |
| Coliforms, Total (Q-Tray)   | < 1 | 1 MPN/100 mL                               |  |  |  |  |  |  |  |
| E. coli (Q-Tray)            | < 1 | 1 MPN/100 mL                               |  |  |  |  |  |  |  |
| <b>Blank (B3A0204-BLK3)</b> |     | Prepared: 2023-01-04, Analyzed: 2023-01-04 |  |  |  |  |  |  |  |
| Coliforms, Total (Q-Tray)   | < 1 | 1 MPN/100 mL                               |  |  |  |  |  |  |  |
| E. coli (Q-Tray)            | < 1 | 1 MPN/100 mL                               |  |  |  |  |  |  |  |
| <b>Blank (B3A0204-BLK4)</b> |     | Prepared: 2023-01-04, Analyzed: 2023-01-04 |  |  |  |  |  |  |  |
| E. coli (Q-Tray)            | < 1 | 1 MPN/100 mL                               |  |  |  |  |  |  |  |
| <b>Blank (B3A0204-BLK5)</b> |     | Prepared: 2023-01-04, Analyzed: 2023-01-04 |  |  |  |  |  |  |  |
| Coliforms, Total (Q-Tray)   | < 1 | 1 MPN/100 mL                               |  |  |  |  |  |  |  |
| E. coli (Q-Tray)            | < 1 | 1 MPN/100 mL                               |  |  |  |  |  |  |  |

### Total Metals, Batch B3A0683

|                             |            |                                            |  |  |  |  |  |  |  |
|-----------------------------|------------|--------------------------------------------|--|--|--|--|--|--|--|
| <b>Blank (B3A0683-BLK1)</b> |            | Prepared: 2023-01-10, Analyzed: 2023-01-11 |  |  |  |  |  |  |  |
| Aluminum, total             | < 0.0050   | 0.0050 mg/L                                |  |  |  |  |  |  |  |
| Antimony, total             | < 0.00020  | 0.00020 mg/L                               |  |  |  |  |  |  |  |
| Arsenic, total              | < 0.00050  | 0.00050 mg/L                               |  |  |  |  |  |  |  |
| Barium, total               | < 0.0050   | 0.0050 mg/L                                |  |  |  |  |  |  |  |
| Boron, total                | < 0.0500   | 0.0500 mg/L                                |  |  |  |  |  |  |  |
| Cadmium, total              | < 0.000010 | 0.000010 mg/L                              |  |  |  |  |  |  |  |
| Calcium, total              | < 0.20     | 0.20 mg/L                                  |  |  |  |  |  |  |  |
| Chromium, total             | < 0.00050  | 0.00050 mg/L                               |  |  |  |  |  |  |  |
| Cobalt, total               | < 0.00010  | 0.00010 mg/L                               |  |  |  |  |  |  |  |
| Copper, total               | < 0.00040  | 0.00040 mg/L                               |  |  |  |  |  |  |  |
| Iron, total                 | < 0.010    | 0.010 mg/L                                 |  |  |  |  |  |  |  |
| Lead, total                 | < 0.00020  | 0.00020 mg/L                               |  |  |  |  |  |  |  |
| Magnesium, total            | < 0.010    | 0.010 mg/L                                 |  |  |  |  |  |  |  |
| Manganese, total            | < 0.00020  | 0.00020 mg/L                               |  |  |  |  |  |  |  |
| Mercury, total              | < 0.000040 | 0.000040 mg/L                              |  |  |  |  |  |  |  |
| Molybdenum, total           | < 0.00010  | 0.00010 mg/L                               |  |  |  |  |  |  |  |
| Nickel, total               | < 0.00040  | 0.00040 mg/L                               |  |  |  |  |  |  |  |

## APPENDIX 2: QUALITY CONTROL RESULTS

**REPORTED TO PROJECT** Castlegar, City of  
General Potability

**WORK ORDER REPORTED** 23A0185  
2023-01-12 12:22

| Analyte | Result | RL Units | Spike Level | Source Result | % REC | REC Limit | % RPD | RPD Limit | Qualifier |
|---------|--------|----------|-------------|---------------|-------|-----------|-------|-----------|-----------|
|---------|--------|----------|-------------|---------------|-------|-----------|-------|-----------|-----------|

### Total Metals, Batch B3A0683, Continued

#### Blank (B3A0683-BLK1), Continued

Prepared: 2023-01-10, Analyzed: 2023-01-11

|                  |            |               |  |  |  |  |  |  |  |
|------------------|------------|---------------|--|--|--|--|--|--|--|
| Potassium, total | < 0.10     | 0.10 mg/L     |  |  |  |  |  |  |  |
| Selenium, total  | < 0.00050  | 0.00050 mg/L  |  |  |  |  |  |  |  |
| Sodium, total    | < 0.10     | 0.10 mg/L     |  |  |  |  |  |  |  |
| Strontium, total | < 0.0010   | 0.0010 mg/L   |  |  |  |  |  |  |  |
| Uranium, total   | < 0.000020 | 0.000020 mg/L |  |  |  |  |  |  |  |
| Zinc, total      | < 0.0040   | 0.0040 mg/L   |  |  |  |  |  |  |  |

#### LCS (B3A0683-BS1)

Prepared: 2023-01-10, Analyzed: 2023-01-11

|                   |         |               |         |  |     |        |  |  |  |
|-------------------|---------|---------------|---------|--|-----|--------|--|--|--|
| Aluminum, total   | 3.81    | 0.0050 mg/L   | 4.00    |  | 95  | 80-120 |  |  |  |
| Antimony, total   | 0.0381  | 0.00020 mg/L  | 0.0400  |  | 95  | 80-120 |  |  |  |
| Arsenic, total    | 0.388   | 0.00050 mg/L  | 0.400   |  | 97  | 80-120 |  |  |  |
| Barium, total     | 0.0377  | 0.0050 mg/L   | 0.0400  |  | 94  | 80-120 |  |  |  |
| Boron, total      | 0.403   | 0.0500 mg/L   | 0.400   |  | 101 | 80-120 |  |  |  |
| Cadmium, total    | 0.0380  | 0.000010 mg/L | 0.0400  |  | 95  | 80-120 |  |  |  |
| Calcium, total    | 3.88    | 0.20 mg/L     | 4.00    |  | 97  | 80-120 |  |  |  |
| Chromium, total   | 0.0389  | 0.00050 mg/L  | 0.0400  |  | 97  | 80-120 |  |  |  |
| Cobalt, total     | 0.0388  | 0.00010 mg/L  | 0.0400  |  | 97  | 80-120 |  |  |  |
| Copper, total     | 0.0389  | 0.00040 mg/L  | 0.0400  |  | 97  | 80-120 |  |  |  |
| Iron, total       | 3.92    | 0.010 mg/L    | 4.00    |  | 98  | 80-120 |  |  |  |
| Lead, total       | 0.0369  | 0.00020 mg/L  | 0.0400  |  | 92  | 80-120 |  |  |  |
| Magnesium, total  | 3.71    | 0.010 mg/L    | 4.00    |  | 93  | 80-120 |  |  |  |
| Manganese, total  | 0.0392  | 0.00020 mg/L  | 0.0400  |  | 98  | 80-120 |  |  |  |
| Mercury, total    | 0.00372 | 0.000040 mg/L | 0.00400 |  | 93  | 80-120 |  |  |  |
| Molybdenum, total | 0.0375  | 0.00010 mg/L  | 0.0400  |  | 94  | 80-120 |  |  |  |
| Nickel, total     | 0.0385  | 0.00040 mg/L  | 0.0400  |  | 96  | 80-120 |  |  |  |
| Potassium, total  | 3.94    | 0.10 mg/L     | 4.00    |  | 99  | 80-120 |  |  |  |
| Selenium, total   | 0.388   | 0.00050 mg/L  | 0.400   |  | 97  | 80-120 |  |  |  |
| Sodium, total     | 3.93    | 0.10 mg/L     | 4.00    |  | 98  | 80-120 |  |  |  |
| Strontium, total  | 0.0393  | 0.0010 mg/L   | 0.0400  |  | 98  | 80-120 |  |  |  |
| Uranium, total    | 0.0372  | 0.000020 mg/L | 0.0400  |  | 93  | 80-120 |  |  |  |
| Zinc, total       | 0.385   | 0.0040 mg/L   | 0.400   |  | 96  | 80-120 |  |  |  |

### Total Metals, Batch B3A0728

#### Blank (B3A0728-BLK1)

Prepared: 2023-01-10, Analyzed: 2023-01-10

|                |            |               |  |  |  |  |  |  |  |
|----------------|------------|---------------|--|--|--|--|--|--|--|
| Mercury, total | < 0.000010 | 0.000010 mg/L |  |  |  |  |  |  |  |
|----------------|------------|---------------|--|--|--|--|--|--|--|

#### LCS (B3A0728-BS1)

Prepared: 2023-01-10, Analyzed: 2023-01-10

|                |         |               |         |  |     |        |  |  |      |
|----------------|---------|---------------|---------|--|-----|--------|--|--|------|
| Mercury, total | 0.00111 | 0.000010 mg/L | 0.00100 |  | 111 | 80-120 |  |  | SPK1 |
|----------------|---------|---------------|---------|--|-----|--------|--|--|------|

#### Duplicate (B3A0728-DUP1)

Source: 23A0185-01

Prepared: 2023-01-10, Analyzed: 2023-01-10

|                |            |               |            |  |  |  |  |    |  |
|----------------|------------|---------------|------------|--|--|--|--|----|--|
| Mercury, total | < 0.000010 | 0.000010 mg/L | < 0.000010 |  |  |  |  | 20 |  |
|----------------|------------|---------------|------------|--|--|--|--|----|--|

### Volatile Organic Compounds (VOC), Batch B3A0702

#### Blank (B3A0702-BLK1)

Prepared: 2023-01-10, Analyzed: 2023-01-10

|                                 |          |             |        |  |     |        |  |  |  |
|---------------------------------|----------|-------------|--------|--|-----|--------|--|--|--|
| Bromodichloromethane            | < 0.0010 | 0.0010 mg/L |        |  |     |        |  |  |  |
| Bromoform                       | < 0.0010 | 0.0010 mg/L |        |  |     |        |  |  |  |
| Chloroform                      | < 0.0010 | 0.0010 mg/L |        |  |     |        |  |  |  |
| Dibromochloromethane            | < 0.0010 | 0.0010 mg/L |        |  |     |        |  |  |  |
| Surrogate: Toluene-d8           | 0.0321   | mg/L        | 0.0250 |  | 128 | 70-130 |  |  |  |
| Surrogate: 4-Bromofluorobenzene | 0.0316   | mg/L        | 0.0249 |  | 127 | 70-130 |  |  |  |

#### LCS (B3A0702-BS1)

Prepared: 2023-01-10, Analyzed: 2023-01-10

|                      |        |             |        |  |    |        |  |  |  |
|----------------------|--------|-------------|--------|--|----|--------|--|--|--|
| Bromodichloromethane | 0.0199 | 0.0010 mg/L | 0.0201 |  | 99 | 70-130 |  |  |  |
| Bromoform            | 0.0176 | 0.0010 mg/L | 0.0201 |  | 88 | 70-130 |  |  |  |

## APPENDIX 2: QUALITY CONTROL RESULTS

**REPORTED TO PROJECT** Castlegar, City of  
General Potability

**WORK ORDER REPORTED** 23A0185  
2023-01-12 12:22

| Analyte                                                           | Result | RL Units    | Spike Level | Source Result | % REC                                      | REC Limit | % RPD | RPD Limit | Qualifier |
|-------------------------------------------------------------------|--------|-------------|-------------|---------------|--------------------------------------------|-----------|-------|-----------|-----------|
| <b>Volatile Organic Compounds (VOC), Batch B3A0702, Continued</b> |        |             |             |               |                                            |           |       |           |           |
| <b>LCS (B3A0702-BS1), Continued</b>                               |        |             |             |               | Prepared: 2023-01-10, Analyzed: 2023-01-10 |           |       |           |           |
| Chloroform                                                        | 0.0211 | 0.0010 mg/L | 0.0201      |               | 105                                        | 70-130    |       |           |           |
| Dibromochloromethane                                              | 0.0190 | 0.0010 mg/L | 0.0201      |               | 95                                         | 70-130    |       |           |           |
| Surrogate: Toluene-d8                                             | 0.0309 | mg/L        | 0.0250      |               | 124                                        | 70-130    |       |           |           |
| Surrogate: 4-Bromofluorobenzene                                   | 0.0307 | mg/L        | 0.0249      |               | 123                                        | 70-130    |       |           |           |

### QC Qualifiers:

SPK1 The recovery of this analyte was outside of established control limits. The data was accepted based on performance of other batch QC.

# APPENDIX E

## Interior Health Operating Permit



Interior Health

Health Protection

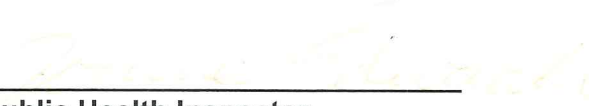
# Permit To Operate

**Drinking Water System 301 - 10,000 Connection - Annual**

**Facility Number:** 0210617  
**Name of Facility:** City of Castlegar Water System  
**Address:** 460 Columbia Avenue  
Castlegar, BC V1N 1G7  
**Owner:** City of Castlegar  
**Conditions:**

April 1, 2004

**Effective Date**

  
**Public Health Inspector**

*This permit is nontransferable and must be displayed in a  
conspicuous place*

