



# Annual Report of Monitoring Erickson Water System

Developed in accordance with the  
*British Columbia Drinking Water Protection Act*

BALFOUR WATER SYSTEM	
Period of Monitoring Covered by this Report:	January 1 - December 31, 2022
Interior Health Permit to Operate Facility Number:	12-098-00381
EOCP Classification:	WD-II (Erickson) / WT-II (Arrow Creek)
IHA Permit:	Drinking Water System 301 - 10,000 Connections
Location of Water Supply System:	Erickson, BC

**Contact Information:**

Regional District of Central Kootenay  
Box 590, 202 Lakeside Drive  
Nelson, BC V1L 5R4  
PH: (250) 352-8171  
Email: [WaterContact@rdck.bc.ca](mailto:WaterContact@rdck.bc.ca)

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# 1. Introduction

The Erickson water system is located in Erickson just outside the eastern border of Creston, crossing the boundary of RDCK Electoral Areas B and C. The system services approximately 700 active connections and is the largest of the water systems managed by the RDCK. The Erickson Water System consists of two older systems: Erickson Irrigation District with source water from Sullivan Creek, and the East Creston Irrigation District established in 1929 with source water from Arrow Creek. The two Irrigation Districts combined in 1980 to become the Erickson Improvement District. In 2003, the Ministry of Municipal Affairs dissolved the system's Board of Trustees and the system was converted to a RDCK service with a new treatment plant constructed on Arrow Creek in 2005.

As part of the British Columbia Provincial *Drinking Water Protection Act (2001)* and *Drinking Water Protection Regulation (2003)* an annual water system report to water users is required. This annual report summarizes information collected and recorded throughout the reporting period, and details additional relevant information to the water system.

## 2. Water Treatment Objectives

The provincial technical document *Drinking Water Treatment objectives (Microbiological) for Surface Water Supplies in British Columbia (2012)* provides performance targets for water suppliers to ensure the provision of biologically safe drinking water. Interior Health supports water suppliers to meet these objectives as risk to human health is substantially reduced. The general treatment objectives are:

- 4-log (99.99%) removal/inactivation of viruses
- 3-log (99.9%) removal/inactivation of Giardia and Cryptosporidium (oocysts)
- Two separate treatment processes (multi-barrier) for surface water supplies
- Turbidity less than 1 NTU (Nephelometric Turbidity Unit)
- Zero total and fecal coliforms (E. coli)

The Erickson/Arrow Creek water treatment plant provides biologically safe drinking water to its users and achieves the above listed treatment objectives through various system components installed and maintained at the water treatment plant.

### **3. Water System Overview**

The Erickson Water System derives source water from Arrow Creek, which is classified as a Community Watershed. In 2005 a new water treatment plant was commissioned on Arrow Creek. This plant now serves the Erickson community as well as the Town of Creston. The treatment process begins with coarse screening, settling, and fine screening to reduce turbidity. Following this is membrane filtration for further turbidity reduction and physical removal of some microbiological components. Ultraviolet (UV) disinfection and chemical disinfection by chlorination are final treatments for microbiological components prior to water being released into the distribution system. A System Control and Data Acquisition (SCADA) unit allows for remote plant monitoring and operation.

### **4. Monitoring**

The Erickson/Arrow Creek water system includes monitoring for bacteriological testing (total/fecal coliforms), turbidity, chlorine residual (free and total), consumption, and chemical constituents.

#### ***4.1 Bacteriological***

Sampling is done from various locations within the distribution system. In addition to the certified lab sample testing, RDCK staff also conducts weekly in-house Coliform Presence/Absence testing. Tests for total and fecal coliforms are performed in accordance with the methods outlines in the Standard Methods for the Examination of Water and Wastewater (2005). Colony forming units (cfu) per 100 ml are determined for each sample.

#### ***4.2 Turbidity***

Turbidity is measured on the Arrow Creek raw source water and post ultra-filtration water using both in-line and handheld turbidity meters. The Regional District targets a turbidity level post ultrafiltration treatment below 0.10 NTU. Turbidity levels exceeded this target amount on 0 days within the reporting period. Figure 1 outlines raw water turbidity levels, and Figure 2 outlines permeate (treated) water turbidity levels. Comparing these two figures demonstrates the effectiveness of membrane filtration to reduce turbidity in source water.

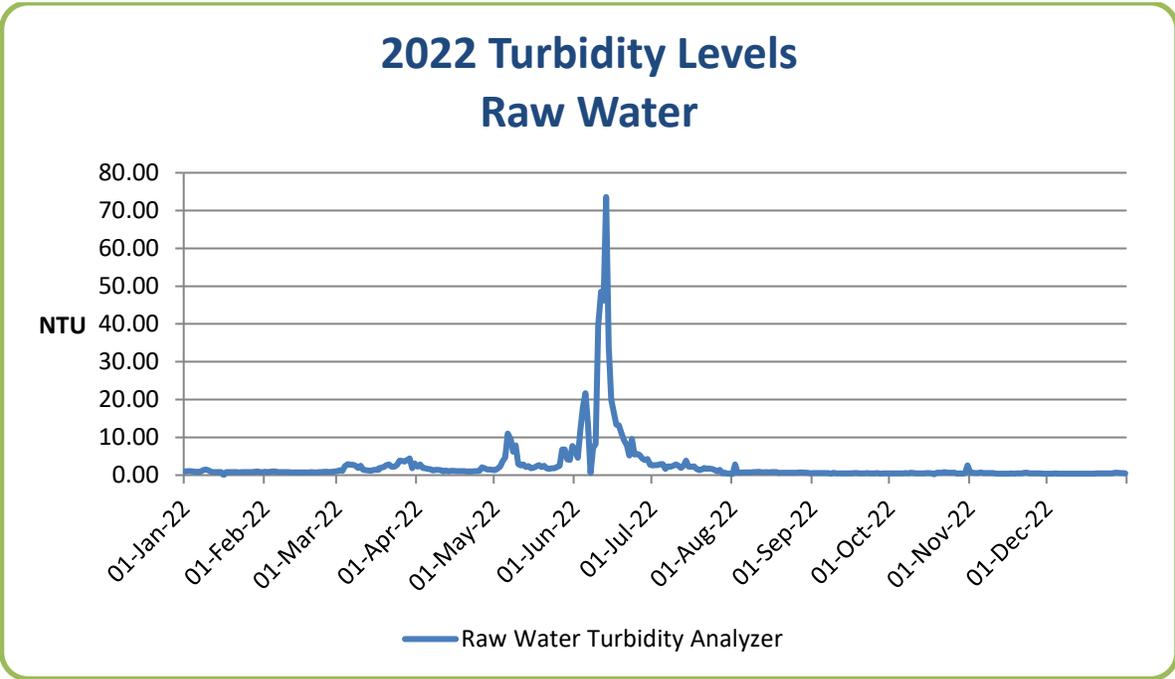


Figure 1 – Raw Water Turbidity Levels for Reporting Period

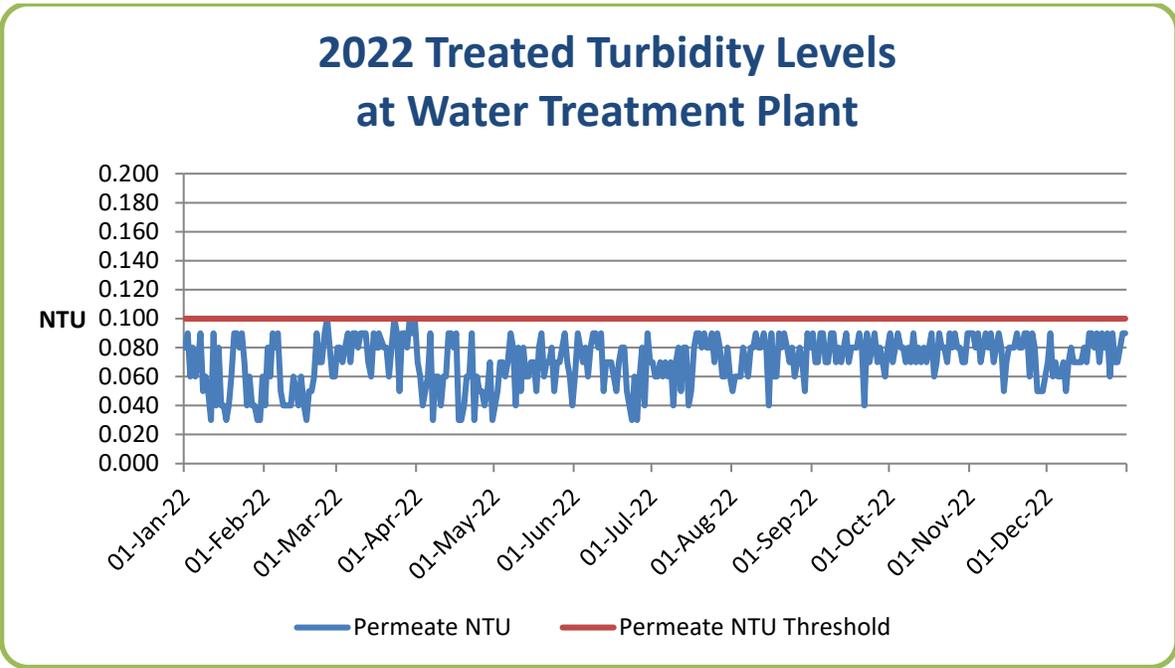


Figure 2 – Permeate (Treated) Water Turbidity Levels for Reporting Period

### 4.3 Chlorine Residual

Chlorine residual levels are measured post reservoir and within the distribution system throughout the year. The Regional District targets a minimum chlorine residual of 0.70 mg/l leaving the reservoir to maintain 0.2 mg/L in all areas of the distribution system as complete loss of residual would result in a water quality concern. There were 7 events of chlorine residual below the target of 0.70 mg/l leaving the treated water storage reservoir. With each instance of below-target residual, operators immediately responded to return residual levels above target. There are some customers near Arrow Creek before the treated water storage reservoir. Based on operating conditions at the time, adequate water treatment and chlorine disinfection would have been provided to these customers and a Water Quality Advisory was not required. Figure 3 shows chlorine residual levels post reservoir.

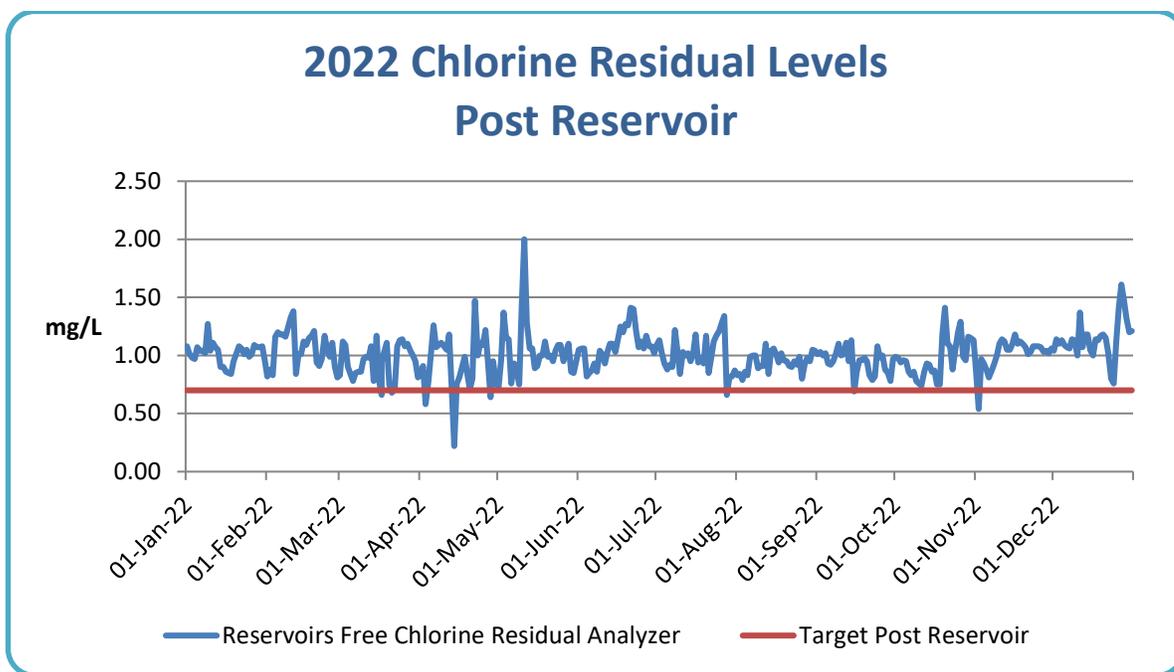


Figure 3 – Free Chlorine Residual Levels for Reporting Period

## 4.4 Consumption

Flow rates are measured for both the Arrow Creek water treatment plant and the Town of Creston. The consumption rate for the Erickson water system is determined from subtracting the two totals. The total recorded volume of treated water for the Arrow Creek water treatment plant in 2022 was 2,859,310 m<sup>3</sup>. The total calculated consumption volume for the Erickson water system in 2022 was 1,226,000 m<sup>3</sup>. Figure 4 shows the volumes per month of both the Arrow Creek water treatment plant and the Erickson water system for the reporting period.

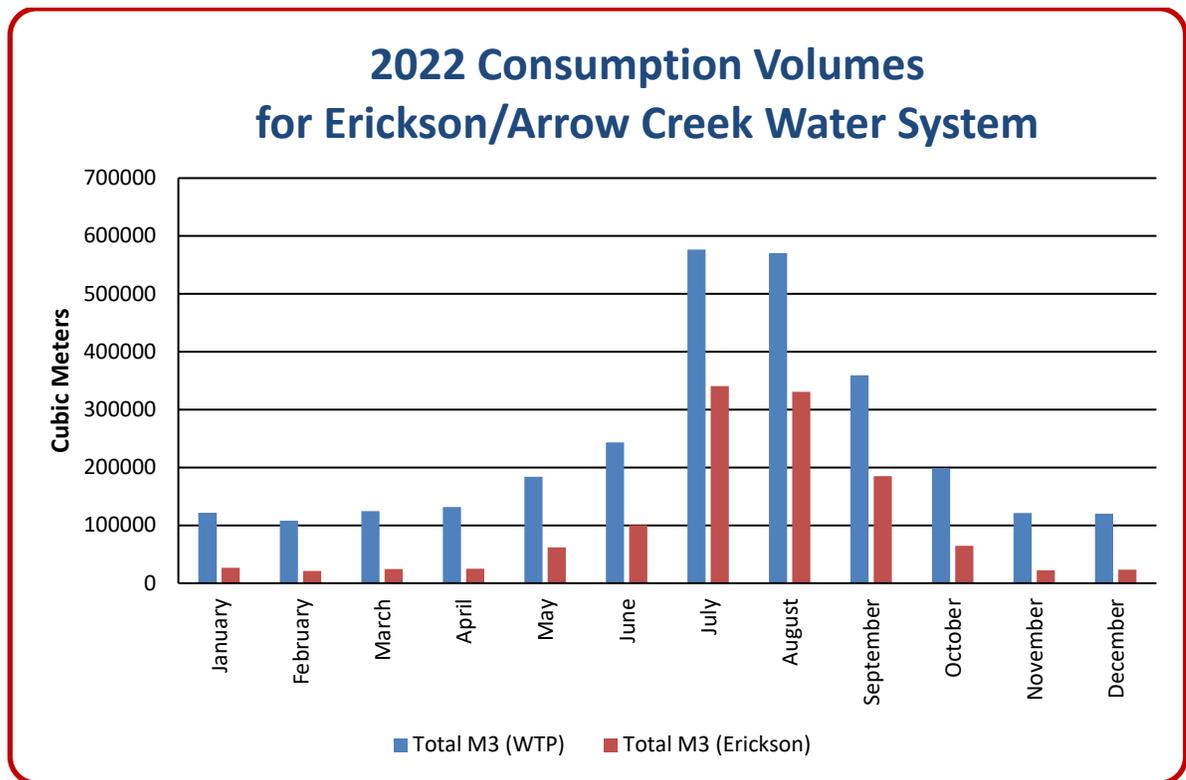


Figure 4 – Treated Water Volumes for Reporting Period

## 4.5 Chemistry

Comprehensive chemical analysis of water constituents was completed in June 2022 (including the assay for haloacetic acids, a chemical disinfection by-product). The results in Appendix A show that chemical parameters are below the Maximum Acceptable Concentration (MAC) as detailed in Health Canada's *Guidelines for Canadian Drinking Water Quality – Summary Table (2017)*.

The RDCK also tested for the chemical disinfection by-products Trihalomethanes and Volatile Organic Compounds in June and November, 2021. These results are presented in Appendix B. The results show that levels are below the MAC as outlined in the *Guidelines*.

## 5. Advisories Issued

The following table describes the Notices and Advisories issued for the reporting period.

Table 1 – Notices and Advisories Issued

Notice/Advisory Type	Dates in Effect	Reason
Boil Water Notice – localized (Beam Rd and 36 <sup>th</sup> Ave)	Jan 20 – 28, 2022	Water main repair
Boil Water Notice – localized (Erickson)	April 28 to May 10, 2022	Fire hydrant installation
Do Not Consume	May 11 – 12, 2022	Failed chlorine disinfection leading to chlorine levels higher than acceptable for consumption.
Boil Water Notice – localized (Connell Rd)	May 24 – June 3 2022	Water main upgrade
Boil Water Notice - localized (Erickson Rd)	June 30 –July 11 2022	Water main repair
Boil Water Notice - localized (Goat Canyon Rd)	Aug 24 – Sept 6, 2022	Water main repair
Boil Water Notice – localized (Connell Rd)	Sept 1 – Sept 9, 2022	Valve replacement

Each Notice/Advisory was issued a Rescind Notice to notify the public once action was completed and water quality sampling results demonstrated good water quality.

## 6. Events and Improvements

The following capital improvement projects were completed in 2020:

- Right of Way agreement finalized and fire hydrant installed on Erickson Rd
- Several services repaired/replaced
- 2 water line upgrades on Erickson Rd
- Upgraded waterline crossing on Connel Rd
- Pressure Reducing Valve upgrade on Connel Rd

A universal meter implementation plan is also underway to be ready for any grant opportunities that may arise.

## 7. Water Conservation

Mandatory Stage 1 water conservation measures are in place from June 1st to September 30th every year. In Stage 1 measures, watering lawns, gardens, trees and shrubs is permitted only from 7pm to 10am daily. Watering using drip irrigation, a watering can or a hand held hose is permitted anytime.

The RDCK implemented Stage 2 Water Conservation Measures on the Erickson water system on July 26<sup>th</sup>, 2022. Stage 2 measures permit watering of lawns, gardens, trees and shrubs ONLY between 6:00am-10:00am and 8:00pm-10:00pm. Watering using drip irrigation, a watering can or a hand held hose is permitted anytime. The RDCK did not implement Stage 3 Water Conservation Measures in the Erickson water system in 2022.

## 8. Planned Improvements

### 8.1 *Improvements Required by Operating Permit or Drinking Water Officer*

The Regional District and Interior Health are in the process of updating Operating Permit Conditions (OPC).

### 8.2 *Future Improvements*

The following future improvements are planned for the system:

- Water main replacement along section of Erickson Rd
- Phase 1 metering (Industrial, Commercial, Institutional (ICI Sector) properties and agricultural properties (5 acres or larger))
- Pressure reducing valve bypass installation to improve servicing in 2023

The universal metering plan will continue into 2023. The plan will establish the implementation strategy and meter rate setting for agricultural and residential customers in order to obtain equitable water rates for the community.

To improve treatment plant operations and better manage Arrow Creek diversion rates, a water treatment plant bypass improvement and water intake diversion improvements are planned over the next couple of years

## 9. Training and Certification

Table 2 – Operator Certification

OPERATOR	ACTIVE EOCP LEVELS
Allan K. Richardson	WD-II, WT-II, WWC-II, MWWT-I, CH
Cody Peck	WT-II, WD-II, CH
Evan Bjarnason	WT-II, WD-II, CH

## 10. Emergency Response Plan

The Emergency Response Plan (ERP) for the Erickson and Arrow Creek systems is updated annually. The ERP includes emergency contact information, a communications plan, and detailed procedures for the following types of incidents:

- broken water main;
- source contamination;
- elevated turbidity levels in treated water;
- fire in a building;
- flood conditions;
- loss of source;
- presence of coliforms or E. coli;
- pump failure;
- power failure;
- UV failure; and
- low chlorine residuals.

The *Drinking Water Protection Regulation (2003)*, under Section 13, requires that water suppliers provide an ERP to address any potential emergencies that may impact the delivery of water and health of those being supplied by the water system. The ERP must be made accessible to the staff of the water supplier and a copy submitted to the local Environmental Health Officer. The RDCK has fulfilled these requirements for the Erickson Water System.

## Appendix A: Comprehensive Chemistry Analysis Results



**CERTIFICATE OF ANALYSIS**

<b>REPORTED TO</b>	Regional District of Central Kootenay - Nelson Box 590 - 202 Lakeside Drive Nelson, BC V1L 5R4	<b>WORK ORDER</b>	22E3635
<b>ATTENTION</b>	RDCK- Nelson	<b>RECEIVED / TEMP REPORTED</b>	2022-05-26 15:50 / 19.7°C
<b>PO NUMBER</b>	RDCK- Nelson	<b>REPORTED</b>	2022-06-06 14:50
<b>PROJECT</b>	Analytical Testing	<b>COC NUMBER</b>	B37914
<b>PROJECT INFO</b>	Arrow Intake		

**Introduction:**

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

*Big Picture Sidekicks*



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

*We've Got Chemistry*



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

*Ahead of the Curve*



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

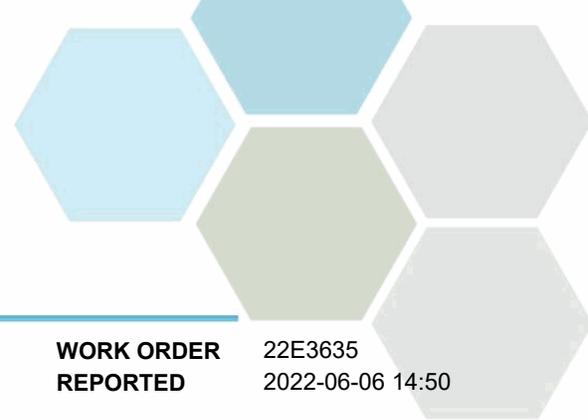
If you have any questions or concerns, please contact me at [bwhitehead@caro.ca](mailto:bwhitehead@caro.ca)

**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** Regional District of Central Kootenay - Nelson  
Analytical Testing

**WORK ORDER REPORTED** 22E3635  
2022-06-06 14:50

Analyte	Result	Guideline	RL Units	Analyzed	Qualifier
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**PRV 3 (22E3635-01) | Matrix: Water | Sampled: 2022-05-24 09:15**

**Anions**

Chloride	2.50	AO ≤ 250	0.10 mg/L	2022-05-27	
Fluoride	< 0.10	MAC = 1.5	0.10 mg/L	2022-05-27	
Nitrate (as N)	< 0.010	MAC = 10	0.010 mg/L	2022-05-27	
Nitrite (as N)	< 0.010	MAC = 1	0.010 mg/L	2022-05-27	
Sulfate	2.1	AO ≤ 500	1.0 mg/L	2022-05-27	

**Calculated Parameters**

Total Trihalomethanes	0.0303	MAC = 0.1	0.00400 mg/L	N/A	
Hardness, Total (as CaCO3)	18.9	None Required	0.500 mg/L	N/A	
Langelier Index	-2.5	N/A	-5.0	2022-06-03	
Solids, Total Dissolved	31.8	AO ≤ 500	1.00 mg/L	N/A	

**General Parameters**

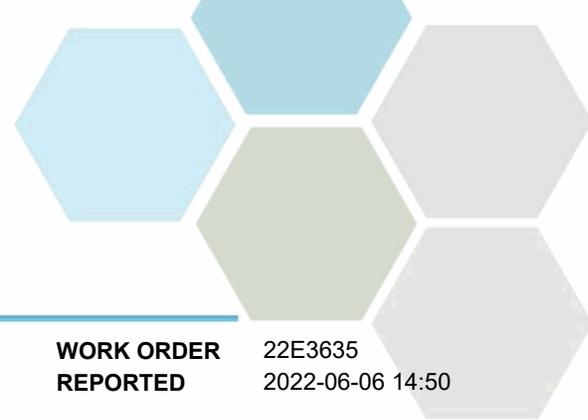
Alkalinity, Total (as CaCO3)	29.0	N/A	1.0 mg/L	2022-05-31	
Alkalinity, Phenolphthalein (as CaCO3)	< 1.0	N/A	1.0 mg/L	2022-05-31	
Alkalinity, Bicarbonate (as CaCO3)	29.0	N/A	1.0 mg/L	2022-05-31	
Alkalinity, Carbonate (as CaCO3)	< 1.0	N/A	1.0 mg/L	2022-05-31	
Alkalinity, Hydroxide (as CaCO3)	< 1.0	N/A	1.0 mg/L	2022-05-31	
Colour, True	< 5.0	AO ≤ 15	5.0 CU	2022-05-27	
Conductivity (EC)	52.4	N/A	2.0 µS/cm	2022-05-31	
Cyanide, Total	< 0.0020	MAC = 0.2	0.0020 mg/L	2022-05-31	
pH	6.80	7.0-10.5	0.10 pH units	2022-05-31	HT2
Temperature, at pH	23.1	N/A	°C	2022-05-31	HT2
Turbidity	< 0.10	OG < 1	0.10 NTU	2022-05-27	HT1

**Haloacetic Acids**

Monochloroacetic Acid	< 0.0020	N/A	0.0020 mg/L	2022-06-02	
Monobromoacetic Acid	< 0.0020	N/A	0.0020 mg/L	2022-06-02	
Dichloroacetic Acid	0.0141	N/A	0.0020 mg/L	2022-06-02	
Trichloroacetic Acid	0.0191	N/A	0.0020 mg/L	2022-06-02	
Dibromoacetic Acid	< 0.0020	N/A	0.0020 mg/L	2022-06-02	
Total Haloacetic Acids (HAA5)	0.0332	MAC = 0.08	0.00200 mg/L	N/A	
Surrogate: 2-Bromopropionic Acid	101		70-130 %	2022-06-02	

**Total Metals**

Aluminum, total	0.0097	OG < 0.1	0.0050 mg/L	2022-05-30	
Antimony, total	< 0.00020	MAC = 0.006	0.00020 mg/L	2022-05-30	
Arsenic, total	< 0.00050	MAC = 0.01	0.00050 mg/L	2022-05-30	
Barium, total	0.0109	MAC = 2	0.0050 mg/L	2022-05-30	
Boron, total	< 0.0500	MAC = 5	0.0500 mg/L	2022-05-30	
Cadmium, total	< 0.000010	MAC = 0.005	0.000010 mg/L	2022-05-30	
Calcium, total	5.14	None Required	0.20 mg/L	2022-05-30	
Chromium, total	< 0.00050	MAC = 0.05	0.00050 mg/L	2022-05-30	
Cobalt, total	< 0.00010	N/A	0.00010 mg/L	2022-05-30	



## TEST RESULTS

**REPORTED TO PROJECT** Regional District of Central Kootenay - Nelson Analytical Testing

**WORK ORDER REPORTED** 22E3635  
2022-06-06 14:50

Analyte	Result	Guideline	RL Units	Analyzed	Qualifier
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**PRV 3 (22E3635-01) | Matrix: Water | Sampled: 2022-05-24 09:15, Continued**

**Total Metals, Continued**

Copper, total	0.00184	MAC = 2	0.00040 mg/L	2022-05-30	
Iron, total	0.017	AO ≤ 0.3	0.010 mg/L	2022-05-30	
Lead, total	< 0.00020	MAC = 0.005	0.00020 mg/L	2022-05-30	
Magnesium, total	1.47	None Required	0.010 mg/L	2022-05-30	
Manganese, total	0.00072	MAC = 0.12	0.00020 mg/L	2022-05-30	
Mercury, total	< 0.000010	MAC = 0.001	0.000010 mg/L	2022-06-01	
Molybdenum, total	< 0.00010	N/A	0.00010 mg/L	2022-05-30	
Nickel, total	< 0.00040	N/A	0.00040 mg/L	2022-05-30	
Potassium, total	0.25	N/A	0.10 mg/L	2022-05-30	
Selenium, total	< 0.00050	MAC = 0.05	0.00050 mg/L	2022-05-30	
Sodium, total	2.71	AO ≤ 200	0.10 mg/L	2022-05-30	
Strontium, total	0.0169	MAC = 7	0.0010 mg/L	2022-05-30	
Uranium, total	0.000035	MAC = 0.02	0.000020 mg/L	2022-05-30	
Zinc, total	< 0.0040	AO ≤ 5	0.0040 mg/L	2022-05-30	

**Volatile Organic Compounds (VOC)**

Bromodichloromethane	< 0.0010	N/A	0.0010 mg/L	2022-05-30	
Bromoform	< 0.0010	N/A	0.0010 mg/L	2022-05-30	
Chloroform	0.0303	N/A	0.0010 mg/L	2022-05-30	
Dibromochloromethane	< 0.0010	N/A	0.0010 mg/L	2022-05-30	
Surrogate: Toluene-d8	102		70-130 %	2022-05-30	
Surrogate: 4-Bromofluorobenzene	104		70-130 %	2022-05-30	

**Arrow Intake (Raw) (22E3635-02) | Matrix: Water | Sampled: 2022-05-24 10:00**

**Anions**

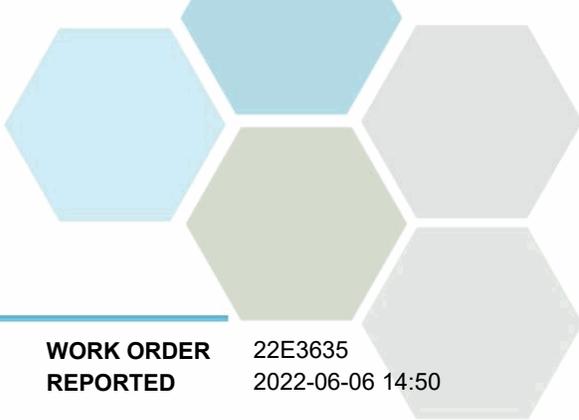
Chloride	0.10	AO ≤ 250	0.10 mg/L	2022-05-27	
Fluoride	< 0.10	MAC = 1.5	0.10 mg/L	2022-05-27	
Nitrate (as N)	< 0.010	MAC = 10	0.010 mg/L	2022-05-27	
Nitrite (as N)	< 0.010	MAC = 1	0.010 mg/L	2022-05-27	
Sulfate	2.1	AO ≤ 500	1.0 mg/L	2022-05-27	

**Calculated Parameters**

Hardness, Total (as CaCO3)	18.4	None Required	0.500 mg/L	N/A	
Langelier Index	-2.7	N/A	-5.0	2022-06-03	
Solids, Total Dissolved	24.9	AO ≤ 500	1.00 mg/L	N/A	

**General Parameters**

Alkalinity, Total (as CaCO3)	25.0	N/A	1.0 mg/L	2022-05-31	
Alkalinity, Phenolphthalein (as CaCO3)	< 1.0	N/A	1.0 mg/L	2022-05-31	
Alkalinity, Bicarbonate (as CaCO3)	25.0	N/A	1.0 mg/L	2022-05-31	
Alkalinity, Carbonate (as CaCO3)	< 1.0	N/A	1.0 mg/L	2022-05-31	
Alkalinity, Hydroxide (as CaCO3)	< 1.0	N/A	1.0 mg/L	2022-05-31	
Colour, True	7.1	AO ≤ 15	5.0 CU	2022-05-27	



# TEST RESULTS

**REPORTED TO PROJECT** Regional District of Central Kootenay - Nelson Analytical Testing

**WORK ORDER REPORTED** 22E3635  
2022-06-06 14:50

Analyte	Result	Guideline	RL Units	Analyzed	Qualifier
<b>Arrow Intake (Raw) (22E3635-02)   Matrix: Water   Sampled: 2022-05-24 10:00, Continued</b>					
<i>General Parameters, Continued</i>					
Conductivity (EC)	41.7	N/A	2.0 µS/cm	2022-05-31	
Cyanide, Total	< 0.0020	MAC = 0.2	0.0020 mg/L	2022-05-31	
pH	6.58	7.0-10.5	0.10 pH units	2022-05-31	HT2
Temperature, at pH	23.2	N/A	°C	2022-05-31	HT2
Turbidity	0.50	OG < 1	0.10 NTU	2022-05-27	HT1

**Total Metals**

Aluminum, total	0.0193	OG < 0.1	0.0050 mg/L	2022-05-30	
Antimony, total	< 0.00020	MAC = 0.006	0.00020 mg/L	2022-05-30	
Arsenic, total	< 0.00050	MAC = 0.01	0.00050 mg/L	2022-05-30	
Barium, total	0.0100	MAC = 2	0.0050 mg/L	2022-05-30	
Boron, total	< 0.0500	MAC = 5	0.0500 mg/L	2022-05-30	
Cadmium, total	< 0.000010	MAC = 0.005	0.000010 mg/L	2022-05-30	
Calcium, total	5.01	None Required	0.20 mg/L	2022-05-30	
Chromium, total	< 0.00050	MAC = 0.05	0.00050 mg/L	2022-05-30	
Cobalt, total	< 0.00010	N/A	0.00010 mg/L	2022-05-30	
Copper, total	0.00084	MAC = 2	0.00040 mg/L	2022-05-30	
Iron, total	0.015	AO ≤ 0.3	0.010 mg/L	2022-05-30	
Lead, total	< 0.00020	MAC = 0.005	0.00020 mg/L	2022-05-30	
Magnesium, total	1.42	None Required	0.010 mg/L	2022-05-30	
Manganese, total	0.00071	MAC = 0.12	0.00020 mg/L	2022-05-30	
Mercury, total	< 0.000010	MAC = 0.001	0.000010 mg/L	2022-06-01	
Molybdenum, total	< 0.00010	N/A	0.00010 mg/L	2022-05-30	
Nickel, total	< 0.00040	N/A	0.00040 mg/L	2022-05-30	
Potassium, total	0.24	N/A	0.10 mg/L	2022-05-30	
Selenium, total	< 0.00050	MAC = 0.05	0.00050 mg/L	2022-05-30	
Sodium, total	0.86	AO ≤ 200	0.10 mg/L	2022-05-30	
Strontium, total	0.0158	MAC = 7	0.0010 mg/L	2022-05-30	
Uranium, total	0.000041	MAC = 0.02	0.000020 mg/L	2022-05-30	
Zinc, total	< 0.0040	AO ≤ 5	0.0040 mg/L	2022-05-30	

**Sample Qualifiers:**

- 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.



## APPENDIX 1: SUPPORTING INFORMATION

**REPORTED TO PROJECT** Regional District of Central Kootenay - Nelson  
Analytical Testing

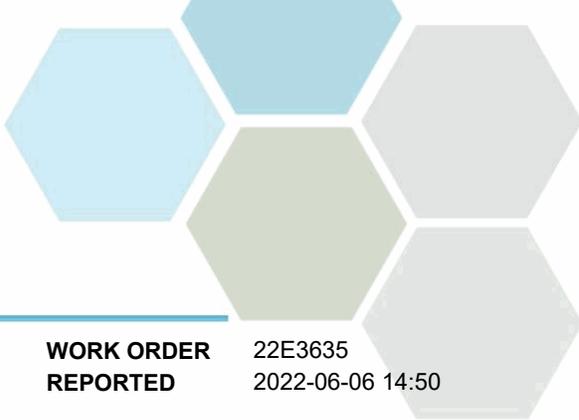
**WORK ORDER REPORTED** 22E3635  
2022-06-06 14:50

Analysis Description	Method Ref.	Technique	Accredited	Location
Alkalinity in Water	SM 2320 B* (2017)	Titration with H2SO4	✓	Kelowna
Anions in Water	SM 4110 B (2017)	Ion Chromatography	✓	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
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
Mercury, total in Water	EPA 245.7*	BrCl2 Oxidation / Cold Vapor Atomic Fluorescence Spectrometry (CVAFS)	✓	Richmond
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 200.2 / EPA 6020B	HNO3+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 (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
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** Regional District of Central Kootenay - Nelson  
Analytical Testing

**WORK ORDER REPORTED** 22E3635  
2022-06-06 14:50

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## Appendix B: Trihalomethanes/Haloacetic Acid and Volatile Organic Compounds Monitoring Results



## CERTIFICATE OF ANALYSIS

<b>REPORTED TO</b>	Regional District of Central Kootenay - Erickson 531B 16th Ave. South CRESTON, BC V0B 1G5	<b>WORK ORDER</b>	21F3838
<b>ATTENTION</b>	Allan Richardson	<b>RECEIVED / TEMP REPORTED</b>	2021-06-29 15:10 / 25.0°C 2021-07-05 15:34
<b>PO NUMBER</b>	RDCK- Erickson	<b>COC NUMBER</b>	B37911
<b>PROJECT</b>	THM Analysis		
<b>PROJECT INFO</b>			

### Introduction:

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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.

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

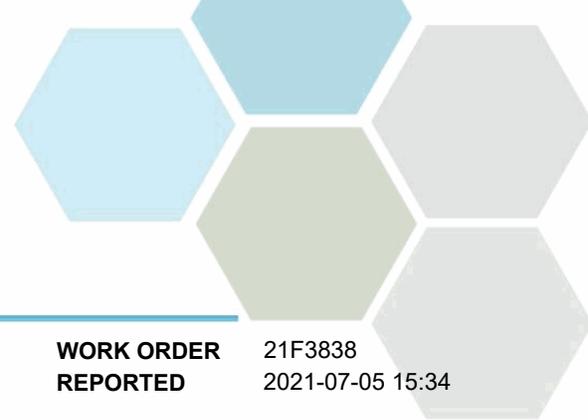
If you have any questions or concerns, please contact me at [bwhitehead@caro.ca](mailto:bwhitehead@caro.ca)

#### Authorized By:

Brent Whitehead  
Client Scientist - Team Lead

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#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** Regional District of Central Kootenay - Erickson  
THM Analysis

**WORK ORDER REPORTED** 21F3838  
2021-07-05 15:34

Analyte	Result	Guideline	RL	Units	Analyzed	Qualifier
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### #3 PRV Sample Tap (21F3838-01) | Matrix: Water | Sampled: 2021-06-28 08:55

#### Calculated Parameters

Total Trihalomethanes	0.0246	MAC = 0.1	0.00400	mg/L	N/A	
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#### Haloacetic Acids

Monochloroacetic Acid	< 0.0020	N/A	0.0020	mg/L	2021-07-01	
Monobromoacetic Acid	< 0.0020	N/A	0.0020	mg/L	2021-07-01	
Dichloroacetic Acid	0.0073	N/A	0.0020	mg/L	2021-07-01	
Trichloroacetic Acid	0.0059	N/A	0.0020	mg/L	2021-07-01	
Dibromoacetic Acid	< 0.0020	N/A	0.0020	mg/L	2021-07-01	
Total Haloacetic Acids (HAA5)	0.0131	MAC = 0.08	0.00200	mg/L	N/A	
Surrogate: 2-Bromopropionic Acid	104		70-130	%	2021-07-01	

#### Volatile Organic Compounds (VOC)

Bromodichloromethane	< 0.0010	N/A	0.0010	mg/L	2021-07-03	
Bromoform	< 0.0010	N/A	0.0010	mg/L	2021-07-03	
Chloroform	0.0246	N/A	0.0010	mg/L	2021-07-03	
Dibromochloromethane	< 0.0010	N/A	0.0010	mg/L	2021-07-03	
Surrogate: Toluene-d8	81		70-130	%	2021-07-03	
Surrogate: 4-Bromofluorobenzene	78		70-130	%	2021-07-03	

### Ja-co Sample Tap (21F3838-02) | Matrix: Water | Sampled: 2021-06-28 10:05

#### Calculated Parameters

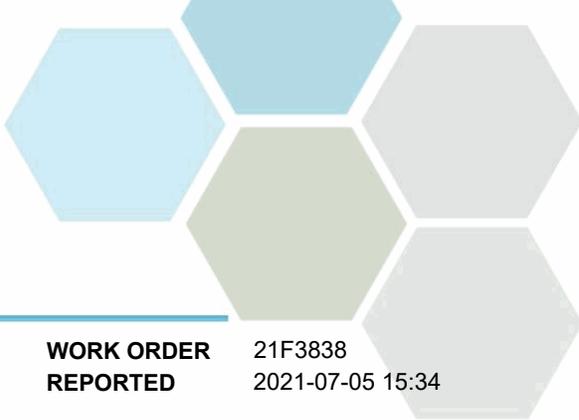
Total Trihalomethanes	0.0250	MAC = 0.1	0.00400	mg/L	N/A	
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#### Haloacetic Acids

Monochloroacetic Acid	< 0.0020	N/A	0.0020	mg/L	2021-07-01	
Monobromoacetic Acid	< 0.0020	N/A	0.0020	mg/L	2021-07-01	
Dichloroacetic Acid	0.0076	N/A	0.0020	mg/L	2021-07-01	
Trichloroacetic Acid	0.0065	N/A	0.0020	mg/L	2021-07-01	
Dibromoacetic Acid	< 0.0020	N/A	0.0020	mg/L	2021-07-01	
Total Haloacetic Acids (HAA5)	0.0142	MAC = 0.08	0.00200	mg/L	N/A	
Surrogate: 2-Bromopropionic Acid	102		70-130	%	2021-07-01	

#### Volatile Organic Compounds (VOC)

Bromodichloromethane	< 0.0010	N/A	0.0010	mg/L	2021-07-03	
Bromoform	< 0.0010	N/A	0.0010	mg/L	2021-07-03	
Chloroform	0.0250	N/A	0.0010	mg/L	2021-07-03	
Dibromochloromethane	< 0.0010	N/A	0.0010	mg/L	2021-07-03	
Surrogate: Toluene-d8	81		70-130	%	2021-07-03	
Surrogate: 4-Bromofluorobenzene	78		70-130	%	2021-07-03	



## APPENDIX 1: SUPPORTING INFORMATION

**REPORTED TO PROJECT** Regional District of Central Kootenay - Erickson  
THM Analysis

**WORK ORDER REPORTED** 21F3838  
2021-07-05 15:34

Analysis Description	Method Ref.	Technique	Accredited	Location
Haloacetic Acids in Water	EPA 552.3*	Liquid-Liquid Microextraction, Derivatization and GC-ECD	✓	Richmond
Trihalomethanes in Water	EPA 5030B / EPA 8260D	Purge&Trap / GC-MSD (SIM)	✓	Richmond

*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
MAC	Maximum Acceptable Concentration (health based)
mg/L	Milligrams per litre
EPA	United States Environmental Protection Agency Test Methods

### Guidelines Referenced in this Report:

[Guidelines for Canadian Drinking Water Quality \(Health Canada, June 2019\)](#)

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## CERTIFICATE OF ANALYSIS

<b>REPORTED TO</b>	Regional District of Central Kootenay - Erickson 531B 16th Ave. South CRESTON, BC V0B 1G5	<b>WORK ORDER</b>	21K1632
<b>ATTENTION</b>	Allan Richardson	<b>RECEIVED / TEMP REPORTED</b>	2021-11-10 08:45 / 5.3°C 2021-11-19 14:11
<b>PO NUMBER</b>	RDCK- Erickson	<b>COC NUMBER</b>	B37913
<b>PROJECT</b>	THM Analysis		
<b>PROJECT INFO</b>			

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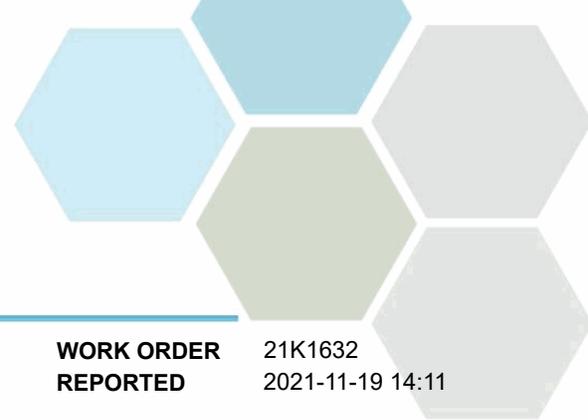
If you have any questions or concerns, please contact me at [bwhitehead@caro.ca](mailto:bwhitehead@caro.ca)

#### Authorized By:

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Client Scientist - Team Lead

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## TEST RESULTS

**REPORTED TO PROJECT** Regional District of Central Kootenay - Erickson  
THM Analysis

**WORK ORDER REPORTED** 21K1632  
2021-11-19 14:11

Analyte	Result	Guideline	RL	Units	Analyzed	Qualifier
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### #2 PRV Sample Tap (21K1632-01) | Matrix: Water | Sampled: 2021-11-08 09:00

#### Calculated Parameters

Total Trihalomethanes	0.0815	MAC = 0.1	0.00400	mg/L	N/A	
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#### Haloacetic Acids

Monochloroacetic Acid	< 0.0020	N/A	0.0020	mg/L	2021-11-19	
Monobromoacetic Acid	< 0.0020	N/A	0.0020	mg/L	2021-11-19	
Dichloroacetic Acid	0.0245	N/A	0.0020	mg/L	2021-11-19	
Trichloroacetic Acid	0.0302	N/A	0.0020	mg/L	2021-11-19	
Dibromoacetic Acid	< 0.0020	N/A	0.0020	mg/L	2021-11-19	
Total Haloacetic Acids (HAA5)	0.0547	MAC = 0.08	0.00200	mg/L	N/A	
Surrogate: 2-Bromopropionic Acid	106		70-130	%	2021-11-19	

#### Volatile Organic Compounds (VOC)

Bromodichloromethane	< 0.0010	N/A	0.0010	mg/L	2021-11-17	
Bromoform	< 0.0010	N/A	0.0010	mg/L	2021-11-17	
Chloroform	0.0804	N/A	0.0010	mg/L	2021-11-17	
Dibromochloromethane	0.0011	N/A	0.0010	mg/L	2021-11-17	
Surrogate: Toluene-d8	101		70-130	%	2021-11-17	
Surrogate: 4-Bromofluorobenzene	80		70-130	%	2021-11-17	

### #3 PRV Sample Tap (21K1632-02) | Matrix: Water | Sampled: 2021-11-08 09:15

#### Calculated Parameters

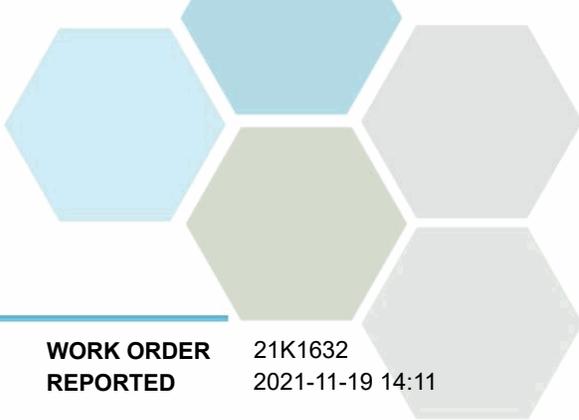
Total Trihalomethanes	0.0888	MAC = 0.1	0.00400	mg/L	N/A	
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#### Haloacetic Acids

Monochloroacetic Acid	< 0.0020	N/A	0.0020	mg/L	2021-11-19	
Monobromoacetic Acid	< 0.0020	N/A	0.0020	mg/L	2021-11-19	
Dichloroacetic Acid	0.0071	N/A	0.0020	mg/L	2021-11-19	
Trichloroacetic Acid	0.0258	N/A	0.0020	mg/L	2021-11-19	
Dibromoacetic Acid	< 0.0020	N/A	0.0020	mg/L	2021-11-19	
Total Haloacetic Acids (HAA5)	0.0329	MAC = 0.08	0.00200	mg/L	N/A	
Surrogate: 2-Bromopropionic Acid	119		70-130	%	2021-11-19	

#### Volatile Organic Compounds (VOC)

Bromodichloromethane	0.0010	N/A	0.0010	mg/L	2021-11-17	
Bromoform	< 0.0010	N/A	0.0010	mg/L	2021-11-17	
Chloroform	0.0878	N/A	0.0010	mg/L	2021-11-17	
Dibromochloromethane	< 0.0010	N/A	0.0010	mg/L	2021-11-17	
Surrogate: Toluene-d8	99		70-130	%	2021-11-17	
Surrogate: 4-Bromofluorobenzene	78		70-130	%	2021-11-17	



## APPENDIX 1: SUPPORTING INFORMATION

**REPORTED TO PROJECT** Regional District of Central Kootenay - Erickson  
THM Analysis

**WORK ORDER REPORTED** 21K1632  
2021-11-19 14:11

Analysis Description	Method Ref.	Technique	Accredited	Location
Haloacetic Acids in Water	EPA 552.3*	Liquid-Liquid Microextraction, Derivatization and GC-ECD	✓	Richmond
Trihalomethanes in Water	EPA 5030B / EPA 8260D	Purge&Trap / GC-MSD (SIM)	✓	Richmond

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