



REGIONAL DISTRICT OF CENTRAL KOOTENAY

Annual Report of Monitoring

Erickson/Arrow Creek Water System

Environmental Services - Utilities

Developed in accordance with the
British Columbia Drinking Water Protection Act

ERICKSON / ARROW CREEK WATER SYSTEM	
Period of Monitoring Covered by this Report:	January 1 - December 31, 2019
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

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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.

A new Water Bylaw was adopted in early 2018 that describes the terms and conditions under which water from the Regional District water systems is supplied, used and regulated. The Bylaw, which complements the existing Utilities Rates, Fees and Charges Bylaw, covers topics such as: ownership, responsibility and access to the water system, water usage and conservation, new servicing and development, cross connection control, and water meter requirements.

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 Authority supports water suppliers to meet these objectives as risk to human health is substantially reduced. The general treatment objectives are:

- 4-log reduction (99.99%) reduction of viruses
- 3-log (99.9%) removal or 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 Monitoring

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. There were no adverse sample results in 2019, which indicates that the Erickson/Arrow Creek water system consistently met guidelines for bacteriological parameters.

4.2. Turbidity

Turbidity is measured on the raw 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 5 days within the reporting period. Figure 1 shows treated water turbidity levels, with the exception of August 1-2, which turbidity levels read 1.30 NTU and 0.89 NTU, respectively. The turbidity analyser was likely out of calibration and reading incorrectly as a cross reference with a handheld turbidimeter demonstrated readings of 0.070 NTU for both days. Figure 2 outlines raw water turbidity levels, demonstrating the effectiveness of membrane filtration to reduce turbidity in source water.

2019 Treated Turbidity Levels at Water Treatment Plant

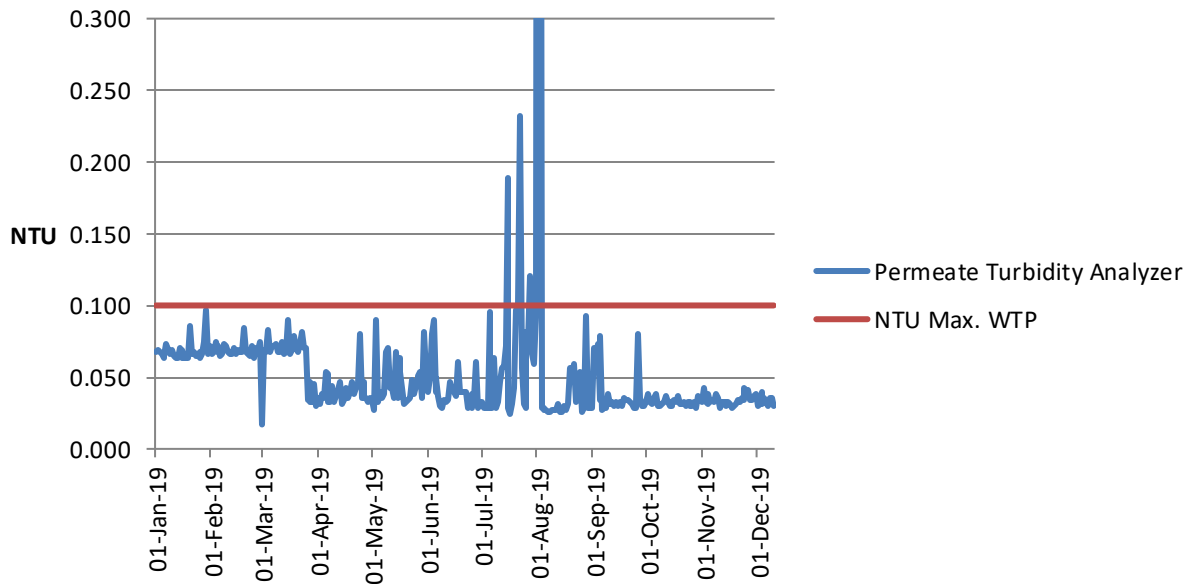


FIGURE 1 – TREATED WATER TURBIDITY LEVELS FOR REPORTING PERIOD

2019 Turbidity Levels Raw Water

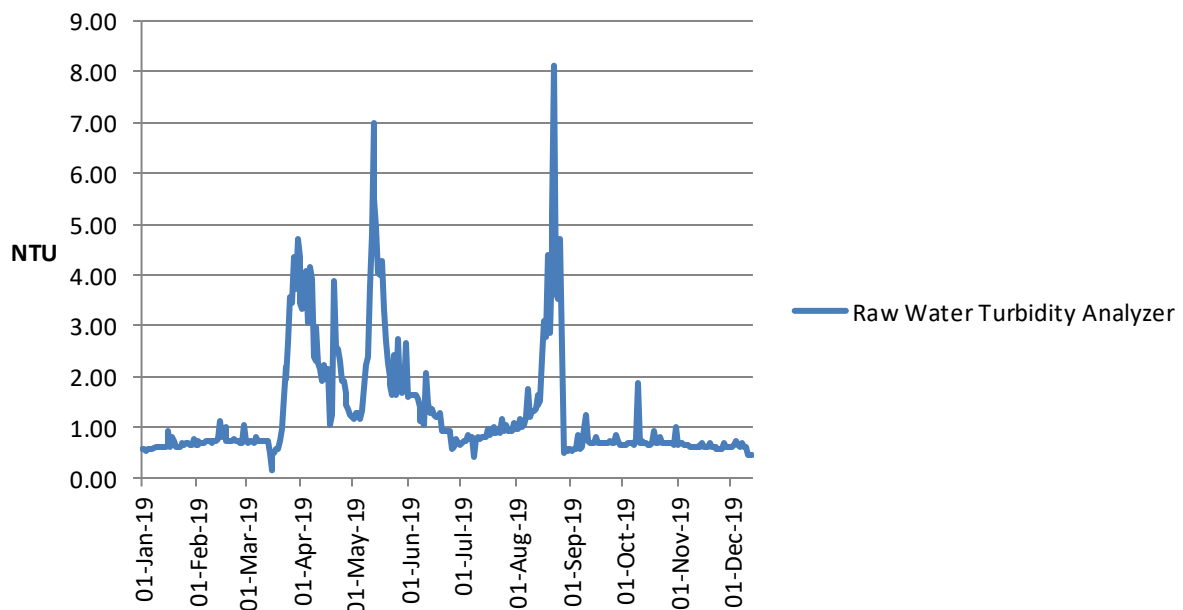


FIGURE 2 – RAW WATER TURBIDITY LEVELS FOR REPORTING PERIOD

4.3. Chlorine Residual Monitoring

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 14 events with a notable drop in residual. With each instance of below-target residual, operators immediately responded to return residual levels above target. These events would not likely affect post distribution system residuals. Figure 2 shows chlorine residual levels post reservoir.

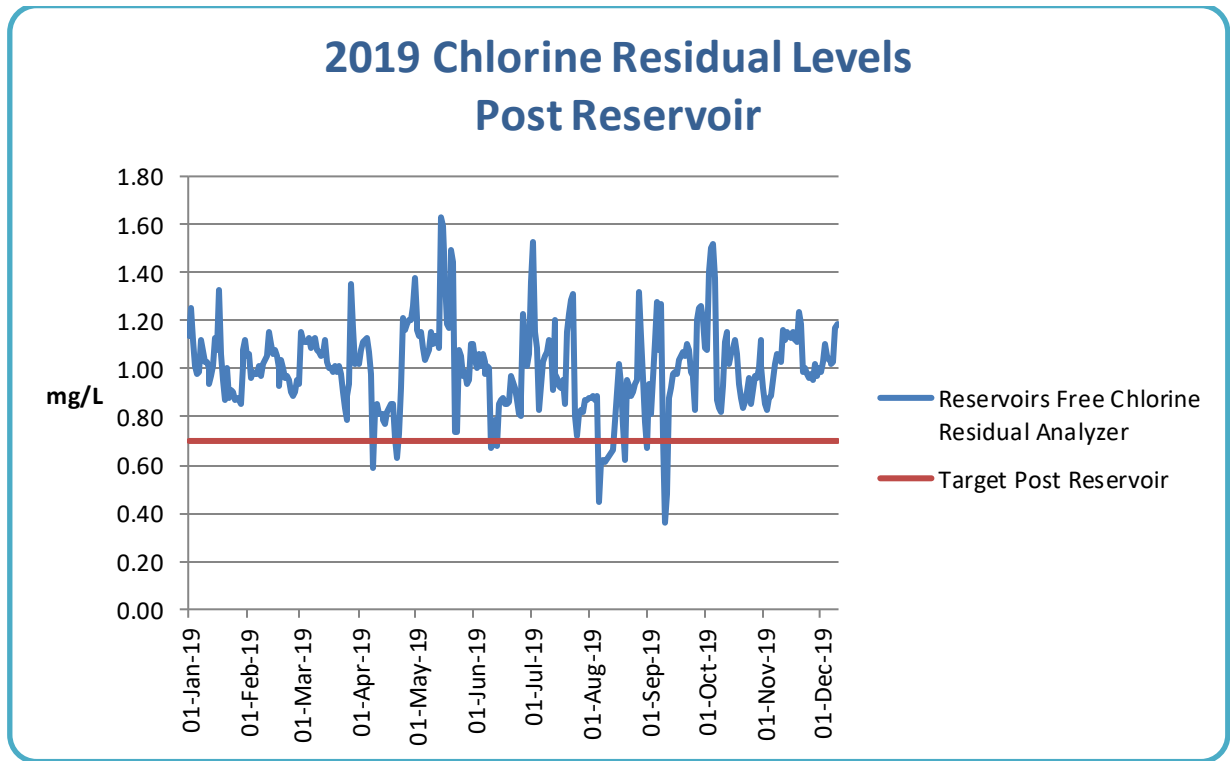


FIGURE 3 – CHLORINE RESIDUAL LEVELS FOR REPORTING PERIOD

4.4. Consumption

Flow rates are measured at the water treatment system. The total recorded volume of treated water for the water treatment plant (WTP) was 2,784,150 cubic meters. The total recorded volume of treated water for Erickson was 1,359,500 cubic meters.

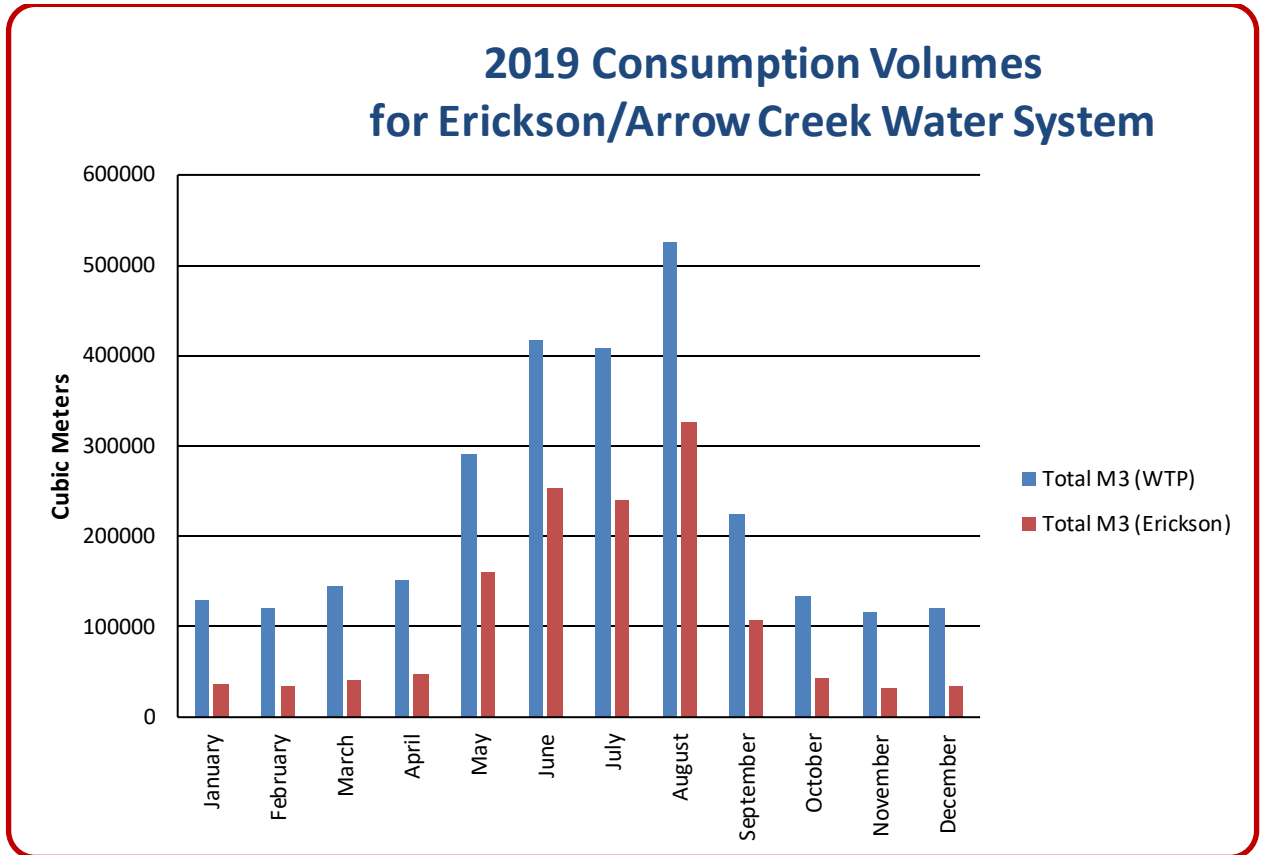


FIGURE 4 – CONSUMPTION RATES FOR THE REPORTING PERIOD

4.5. Chemistry

Comprehensive chemical analysis of water constituents is completed once every five years. The last full comprehensive water quality analysis was taken on April 15, 2019. 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)*.

5. 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.

Stage 2 measures include watering of lawns, gardens, trees and shrubs permitted only between 6am-10am and 8pm-10pm. Watering using drip irrigation, a watering can or a hand held hose is permitted anytime.

Stage 2 water conservation measures were implemented for the Erickson Water System on August 2nd as a proactive measure for the anticipated extended hot weather and declining reservoir levels due to high usage. These measures remained in place until September 20th.

6. Advisories Issued

The following table outlines the notices and water quality advisories issued for the reporting period.

Table 1 – Notices and Advisories Issued

Notice/Advisory Type	Dates in Effect	Reason
Boil water notice and service interruptions – localized	February 1 – 7	Water main repair and precautionary measure as the loss of pressure may affect water quality for a portion of the system
Boil water notice – localized	May 27 – June 3	Water main repair and precautionary measure as the loss of pressure may affect water quality for a portion of the system
Boil water notice – localized	June 25 – June 28	Water main repair and precautionary measure as the loss of pressure may affect water quality for a portion of the system
Service interruptions – localized	July 9 -11	Water main leak repairs
Stage 2 water conservation measures	August 2 – September 20	A proactive measure for the anticipated extended hot weather and declining reservoir levels due to high usage
Boil water notice and service interruptions – localized	November 5– 15	Water main repair and precautionary measure as the loss of pressure may affect water quality for a portion of the system
Boil water notice and service interruptions – localized	November 20 - 25	Water main work and precautionary measure as the loss of pressure may affect water quality for a portion of the system

7. Events and Improvements

The following capital improvement projects were completed in 2019:

- The Erickson Road water main replacement project completed
- The remaining 25% of the original Arrow Creek treatment plant membrane filters replaced
- The Arrow Creek treatment plant filtration and operations review underway

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

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). It is anticipated that new OPC will be issued in 2020.

8.2. Future Improvements

The following future improvements are planned for the system:

- The Tooze Road water main replacement project to be completed in 2020
- Sections of asbestos concrete and steel water mains that are at or nearing end-of-life are planned for replacement beginning 2022
- Smaller capital projects include: open reservoir decommissioning, water treatment plant equipment replacement, safety upgrades, Erickson reservoir overflow, and Arrow Creek intake improvements are planned for 2021
- Hydrant infilling planned for 2022

The universal metering plan will continue into 2022. 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	WWC-II, WD-II, MWWT-I, WT-II, CH
Cody Peck	CH, WT-II, WD-II
Evan Bjarnason	CH, WT-II, WD-II

10. Emergency Response Plan

The Erickson and Arrow Creek systems do not currently have water system specific Emergency Response Plan in place. Emergency Response Plans for other Regional District systems will be adapted for Erickson and Arrow. The work is anticipated to be complete in 2020. The plan will include emergency contact

information, a communications plan, and detailed procedures for the following types of incidents:

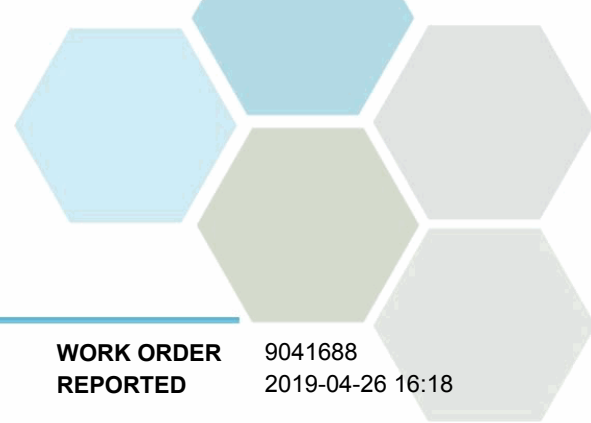
- broken water main;
- source contamination;
- elevated turbidity levels in treated water;
- fire in a building;
- flood conditions;
- loss of source;
- presence of coliforms or E. coli;
- pump failure;
- power failure; and
- low chlorine residuals.

The ERP will be made accessible to the staff of the water supplier and a copy submitted to the local Environmental Health Officer.

11. Source Protection Plan

Having a source water protection plan is good practice. A comprehensive source water protection plan has not yet been developed but source water protection area signs have been posted.

Appendix A: Comprehensive Chemistry Analysis Results

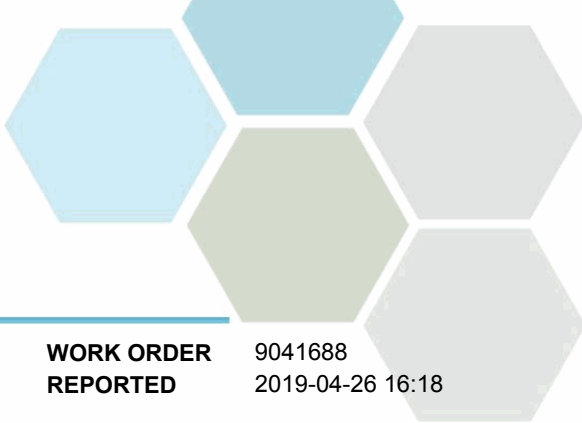


TEST RESULTS

REPORTED TO PROJECT Regional District of Central Kootenay - Erickson
Erickson Water Service

WORK ORDER REPORTED 9041688
2019-04-26 16:18

Analyte	Result	Guideline	RL Units	Analyzed	Qualifier
40th St Tap (9041688-01) Matrix: Water Sampled: 2019-04-15 10:20					
Anions					
Chloride	1.52	AO ≤ 250	0.10 mg/L	2019-04-18	
Fluoride	< 0.10	MAC = 1.5	0.10 mg/L	2019-04-18	
Nitrate (as N)	< 0.010	MAC = 10	0.010 mg/L	2019-04-18	
Nitrite (as N)	< 0.010	MAC = 1	0.010 mg/L	2019-04-18	
Sulfate	2.7	AO ≤ 500	1.0 mg/L	2019-04-18	
Calculated Parameters					
Hardness, Total (as CaCO3)	25.6	None Required	0.500 mg/L	N/A	
Langelier Index	-1.5	N/A	-5.0	2019-04-26	
Solids, Total Dissolved	33.5	AO ≤ 500	1.00 mg/L	N/A	
General Parameters					
Alkalinity, Total (as CaCO3)	28.5	N/A	1.0 mg/L	2019-04-18	
Alkalinity, Phenolphthalein (as CaCO3)	< 1.0	N/A	1.0 mg/L	2019-04-18	
Alkalinity, Bicarbonate (as CaCO3)	28.5	N/A	1.0 mg/L	2019-04-18	
Alkalinity, Carbonate (as CaCO3)	< 1.0	N/A	1.0 mg/L	2019-04-18	
Alkalinity, Hydroxide (as CaCO3)	< 1.0	N/A	1.0 mg/L	2019-04-18	
Colour, True	< 5.0	AO ≤ 15	5.0 CU	2019-04-18	
Conductivity (EC)	65.0	N/A	2.0 µS/cm	2019-04-18	
Cyanide, Total	0.0022	MAC = 0.2	0.0020 mg/L	2019-04-18	
pH	7.61	7.0-10.5	0.10 pH units	2019-04-18	HT2
Temperature, at pH	22.7	N/A	°C	2019-04-18	HT2
Turbidity	< 0.10	OG < 1	0.10 NTU	2019-04-18	
Total Metals					
Aluminum, total	0.0088	OG < 0.1	0.0050 mg/L	2019-04-25	
Antimony, total	< 0.00020	MAC = 0.006	0.00020 mg/L	2019-04-25	
Arsenic, total	< 0.00050	MAC = 0.01	0.00050 mg/L	2019-04-25	
Barium, total	0.0132	MAC = 1	0.0050 mg/L	2019-04-25	
Boron, total	0.0143	MAC = 5	0.0050 mg/L	2019-04-25	
Cadmium, total	< 0.000010	MAC = 0.005	0.000010 mg/L	2019-04-25	
Calcium, total	7.04	None Required	0.20 mg/L	2019-04-25	
Chromium, total	< 0.00050	MAC = 0.05	0.00050 mg/L	2019-04-25	
Cobalt, total	< 0.00010	N/A	0.00010 mg/L	2019-04-25	
Copper, total	0.00179	AO ≤ 1	0.00040 mg/L	2019-04-25	
Iron, total	< 0.010	AO ≤ 0.3	0.010 mg/L	2019-04-25	
Lead, total	< 0.00020	MAC = 0.005	0.00020 mg/L	2019-04-25	
Magnesium, total	1.94	None Required	0.010 mg/L	2019-04-25	
Manganese, total	0.00028	AO ≤ 0.05	0.00020 mg/L	2019-04-25	
Mercury, total	< 0.000010	MAC = 0.001	0.000010 mg/L	2019-04-23	
Molybdenum, total	0.00012	N/A	0.00010 mg/L	2019-04-25	
Nickel, total	< 0.00040	N/A	0.00040 mg/L	2019-04-25	
Potassium, total	0.36	N/A	0.10 mg/L	2019-04-25	



TEST RESULTS

REPORTED TO PROJECT Regional District of Central Kootenay - Erickson
Erickson Water Service

WORK ORDER REPORTED 9041688
2019-04-26 16:18

Analyte	Result	Guideline	RL	Units	Analyzed	Qualifier
40th St Tap (9041688-01) Matrix: Water Sampled: 2019-04-15 10:20, Continued						
<i>Total Metals, Continued</i>						
Selenium, total	< 0.00050	MAC = 0.05	0.00050	mg/L	2019-04-25	
Sodium, total	2.57	AO ≤ 200	0.10	mg/L	2019-04-25	
Strontium, total	0.0246	N/A	0.0010	mg/L	2019-04-25	
Uranium, total	0.000049	MAC = 0.02	0.000020	mg/L	2019-04-25	
Zinc, total	0.0132	AO ≤ 5	0.0040	mg/L	2019-04-25	

Sample Qualifiers:

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