

Annual Report of Monitoring Riondel Water System

Developed in accordance with the
British Columbia Drinking Water Protection Act

RIONDEL WATER SYSTEM	
Period of Monitoring Covered by this Report:	January 1 - December 31, 2024
Interior Health Permit to Operate Facility Number:	12-098-00377
EOCP Classification:	SWS
IHA Permit:	Drinking Water System 15 - 300 Connections
Location of Water Supply System:	Riondel, BC

Contact Information:

Regional District of Central Kootenay
Box 590, 202 Lakeside Drive
Nelson, BC V1L 5R4
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TABLE OF CONTENTS

1. INTRODUCTION 1

2. WATER TREATMENT OBJECTIVES..... 1

3. WATER SYSTEM OVERVIEW 1

4. MONITORING 2

 4.1 BACTERIOLOGICAL 2

 4.2 TURBIDITY 2

 4.3 CHLORINE RESIDUAL 3

 4.4 CONSUMPTION 4

 4.5 CHEMISTRY 5

5. ADVISORIES ISSUED..... 5

6. CAPITAL PROJECTS AND OPERATIONS & MAINTENANCE..... 5

7. WATER CONSERVATION 5

8. PLANNED IMPROVEMENTS 6

 8.1 IMPROVEMENTS REQUIRED BY OPERATING PERMIT OR DRINKING WATER OFFICER..... 6

 8.2 FUTURE IMPROVEMENTS 6

9. TRAINING AND CERTIFICATION 6

10. EMERGENCY RESPONSE AND CONTINGENCY PLAN 6

Table 1 – Notices and Advisories Issued 5

Table 2 – Operator Certification 6

Figure 1 – Raw Water Turbidity Levels for Reporting Period 2

Figure 2 – Post Treatment Turbidity Levels for Reporting Period 3

Figure 3 – Free Chlorine Residual Levels for Reporting Period..... 4

Figure 4 – Treated Water Volumes for Reporting Period 4

Appendix A

Comprehensive Chemistry Analysis Results

Appendix B

Trihalomethanes/Haloacetic Acid and
Volatile Organic Compounds Monitoring Results

1. Introduction

Riondel is a community located on the east Shore of Kootenay Lake with access off of Highway 3A. It is within the RDCK Electoral Area A. The Riondel system was first developed in the mid-1900s to service the Bluebell mine site. It was converted to an RDCK service in 1972 and services 199 active connections.

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 Riondel 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 water system derives source water from Indian Creek. A low, concrete weir with diversion inlets has been built on this creek, which delivers the source water to the treatment plant. Treatment includes a coarse 100-micron self-cleaning screen, followed by membrane filtration for physical removal of some microbiological components and turbidity reduction. Sodium hypochlorite (chlorine) is then added for disinfection of bacteria and viruses prior to entering the 100,000 gallon steel reservoir.

4. Monitoring

The Riondel 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 four times per month from various locations within the distribution system. Tests for total and fecal coliforms are performed in accordance with the methods outlined 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 2024.

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 did not exceed this target within the reporting period. Figure 1 outlines raw water turbidity levels, and Figure 2 outlines treated water turbidity levels. Comparing these two figures demonstrates the effectiveness of membrane filtration to reduce turbidity in source water.

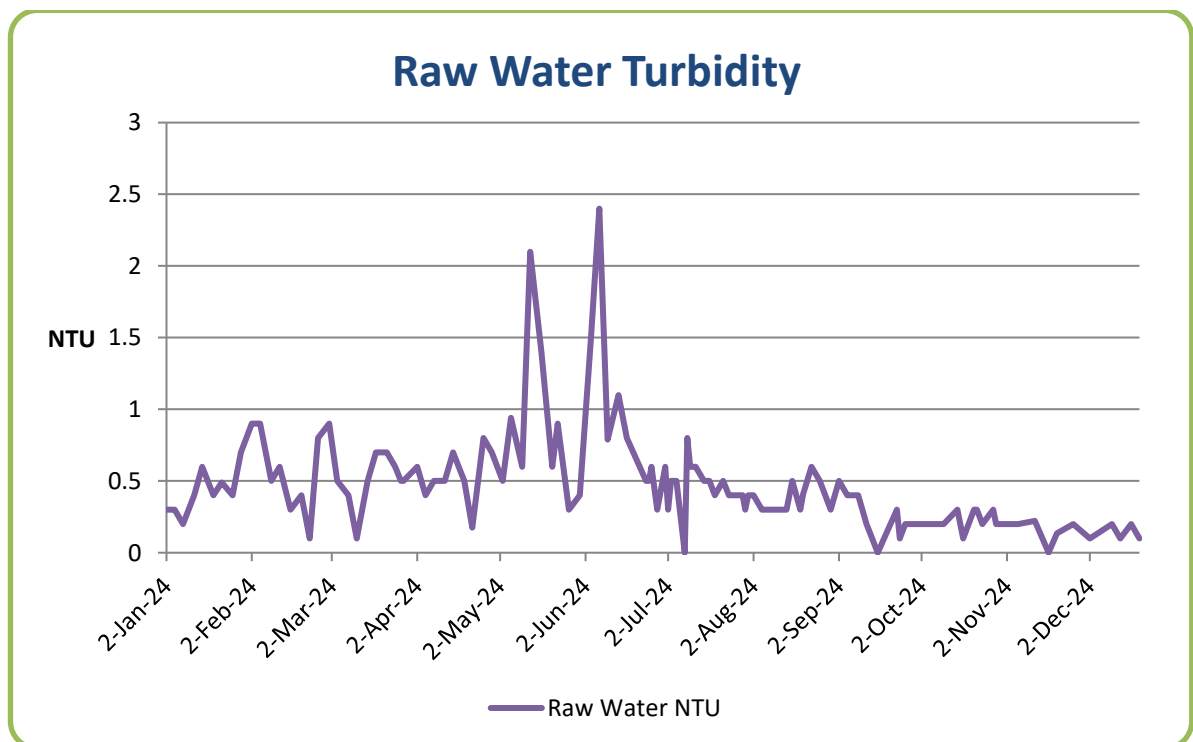


Figure 1 – Raw Water Turbidity Levels for Reporting Period

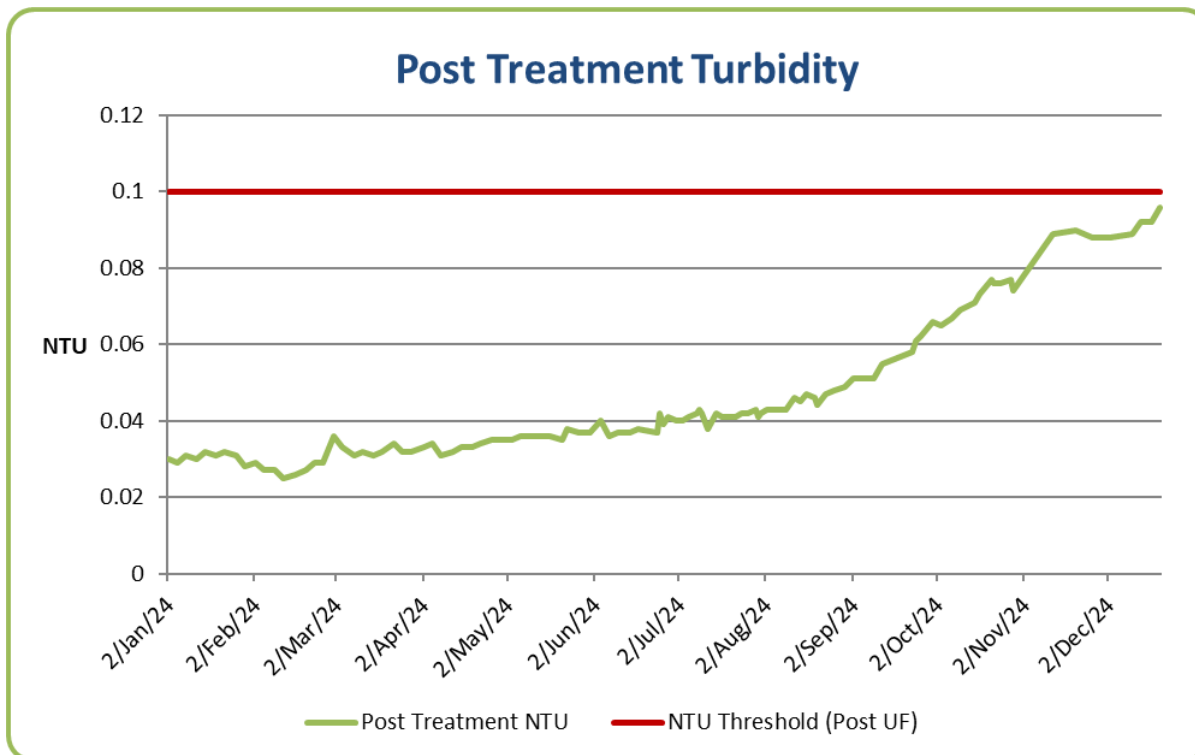
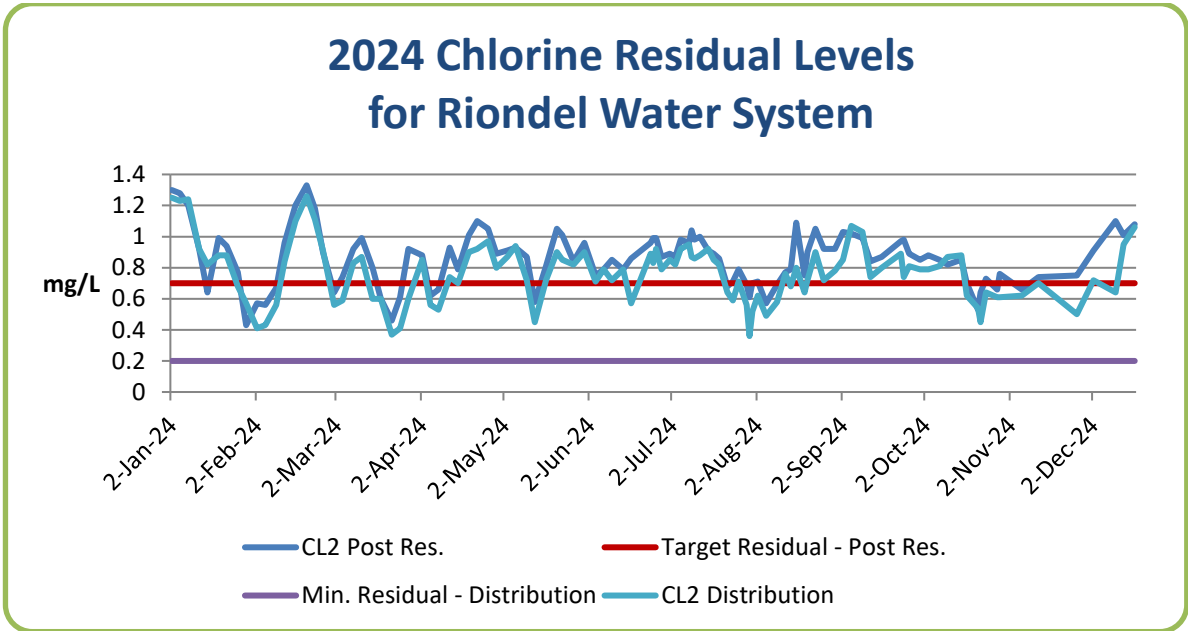


Figure 2 – Post Treatment Turbidity Levels for Reporting Period

4.3 Chlorine Residual

Chlorine residual levels are measured at the water treatment plant and within the distribution system using both in-line and handheld chlorine meters. Figure 3 shows chlorine residual levels at the water treatment plant and within the distribution system. The Regional District targets a minimum chlorine residual of 0.70 mg/l leaving the reservoir to achieve the required 0.2 mg/L in all areas of the distribution system. This target was not met on Jan 15 and 29, Feb 2, 5 and 9, Mar 1, 18, 22 and 25, April 5 and 8, May 13, July 22, 29 and 30, Aug 5 and 9, Oct 21, 22 and 28, and Nov 6, 2024. In January and February there was a leak in the chlorine injector resulting in below target residuals, this was subsequently repaired. In the spring, there were higher than usual dissolved solids in source water due to precipitation and the freshet. The chlorine multiplier was increased to compensate. In July, analyser integrity began to fail and calibration was not holding. The membrane and electrolyte were changed several times with no improvement, therefore a new analyzer probe was ordered to replace existing. In the fall months, higher precipitation increased dissolved organics which subsequently consumed free chlorine residual. This resulted in a chlorine residual decline in the reservoir. Chlorine dosing was increased as a countermeasure. In all cases, chlorine residual levels within the distribution system did not drop below the 0.2 mg/L minimum during the reporting period. If residual targets are not met the issue is immediately addressed by operators to raise chlorine residual levels to ensure distribution system targets are met.



*Due to entry error, the data source on April 22, 2024 is the handheld Cl2 analyser.

Figure 3 – Free Chlorine Residual Levels for Reporting Period

4.4 Consumption

Flow rates are measured at the ultra-filtration treatment system. The total recorded volume of treated water for the reporting period was 113,021 m3. Figure 4 shows the consumption volume per month for the reporting period.

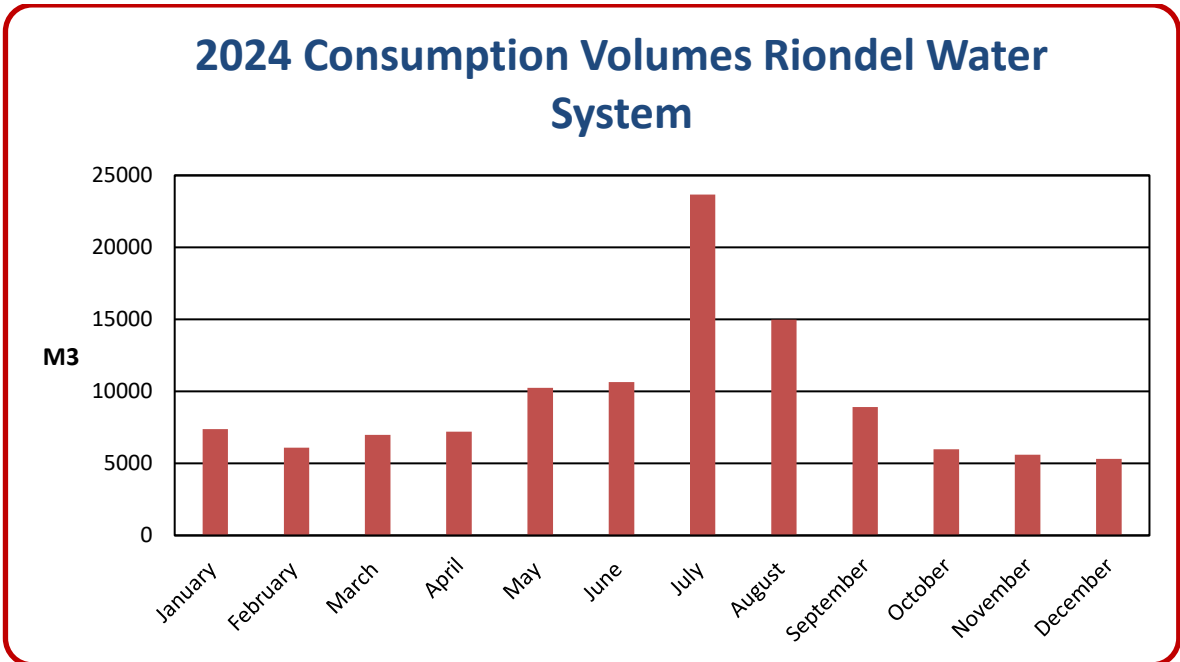


Figure 4 – Treated Water Volumes for Reporting Period

4.5 Chemistry

Comprehensive chemical analysis of water constituents was completed in October 2024. 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 (2024)*.

The RDCK also tested for the chemical disinfection by-products Trihalomethanes/Haloacetic Acids, and Volatile Organic Compounds in September 2024. 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	Sept 18 – Oct 1, 2024	District meter install and valve chamber repairs

*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. Capital Projects and Operations & Maintenance

The following capital projects were completed in 2024:

- Standby generator procurement and installation
- Reservoir isolation and drain valves replaced
- Installation of post reservoir flow meter
- Electrical upgrades at water treatment plant

The following operations and maintenance items were completed in 2024:

- Water main break repair
- Indian Creek intake box and dam cleaned
- Flushing and valve exercising

7. Water Conservation

Mandatory Stage 1 water conservation measures are in place from June 1 to September 30 every year. Stage 1 measures permit the watering of lawns, gardens, trees and shrubs 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 July 10th, 2024. 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. These measures remained in place until October 2nd, 2024 when all conservation measures were rescinded.

8. Planned Improvements

8.1 Improvements Required by Operating Permit or Drinking Water Officer

Interior Health will provide updated Conditions on Operating Permit in September of 2025.

8.2 Future Improvements

Future planned capital upgrades and actions include the following:

- Storm water drainage replacement along section of Ainsworth Ave. (2025)
- Ainsworth Ave. alley water main installation (2025)
- Indian Creek intake top replacement (2025)

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
Kalen Luck	WT-I

10. Emergency Response and Contingency Plan

An Emergency Response and Contingency Plan (ERCP) for the Riondel Water System is updated annually. This document 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; and
- low chlorine residuals.

The *Drinking Water Protection Regulation (2003)*, under Section 13, requires that water suppliers provide an ERCP to address any potential emergencies that may impact the delivery of water and health of those being supplied by the water system. The ERCP 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 Riondel Water System.

Appendix A: Comprehensive Chemistry Analysis Results

CERTIFICATE OF ANALYSIS

REPORTED TO	Regional District of Central Kootenay - Nelson Box 590 - 202 Lakeside Drive Nelson, BC V1L 5R4	WORK ORDER	24J4105
ATTENTION	Lab Reports	RECEIVED / TEMP REPORTED	2024-10-31 13:28 / 15.4°C 2024-11-26 12:46
PO NUMBER		COC NUMBER	B136124
PROJECT	Riondel/Sanca Creek		
PROJECT INFO			

Introduction:

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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.

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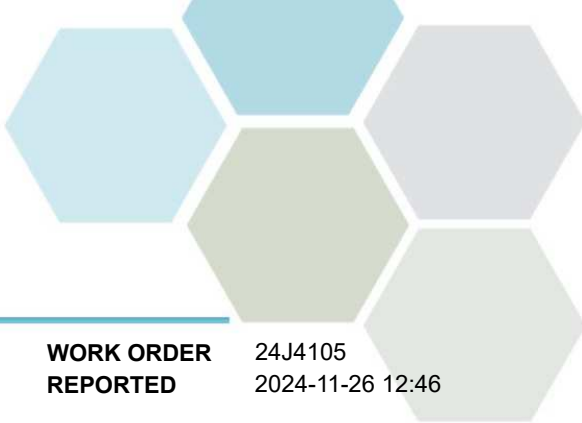
If you have any questions or concerns, please contact me at hhannaoui@caro.ca

Authorized By:

Hanane El Hannaoui
Junior Account Manager

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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 - Nelson
Riondel/Sanca Creek

WORK ORDER REPORTED 24J4105
2024-11-26 12:46

Analyte	Result	Guideline	RL Units	Analyzed	Qualifier
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Riondel Raw (24J4105-01) | Matrix: Water | Sampled: 2024-10-30 09:30

Anions

Chloride	0.11	AO ≤ 250	0.10 mg/L	2024-11-01	
Fluoride	< 0.10	MAC = 1.5	0.10 mg/L	2024-11-01	
Nitrate (as N)	0.032	MAC = 10	0.010 mg/L	2024-11-01	
Nitrite (as N)	< 0.010	MAC = 1	0.010 mg/L	2024-11-01	
Sulfate	14.3	AO ≤ 500	1.0 mg/L	2024-11-01	

Calculated Parameters

Hardness, Total (as CaCO3)	103	None Required	0.500 mg/L	N/A	
Solids, Total Dissolved	111	AO ≤ 500	1.00 mg/L	N/A	

General Parameters

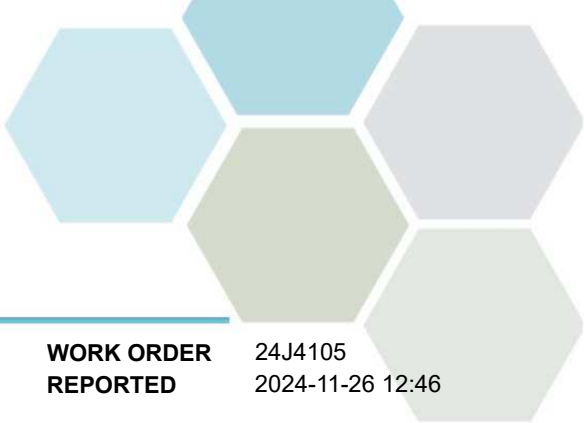
Alkalinity, Total (as CaCO3)	86.7	N/A	1.0 mg/L	2024-10-31	
Alkalinity, Phenolphthalein (as CaCO3)	< 1.0	N/A	1.0 mg/L	2024-10-31	
Alkalinity, Bicarbonate (as CaCO3)	86.7	N/A	1.0 mg/L	2024-10-31	
Alkalinity, Carbonate (as CaCO3)	< 1.0	N/A	1.0 mg/L	2024-10-31	
Alkalinity, Hydroxide (as CaCO3)	< 1.0	N/A	1.0 mg/L	2024-10-31	
Conductivity (EC)	210	N/A	2.0 µS/cm	2024-10-31	
Cyanide, Total	0.0042	MAC = 0.2	0.0020 mg/L	2024-11-04	
pH	7.99	7.0-10.5	0.10 pH units	2024-10-31	HT2
Turbidity	0.12	OG < 1	0.10 NTU	2024-11-01	

Microbiological Parameters

Coliforms, Total (Q-Tray)	194	MAC = 0	1 MPN/100 mL	2024-10-31	
E. coli (Q-Tray)	< 1	MAC = 0	1 MPN/100 mL	2024-10-31	

Total Metals

Aluminum, total	< 0.0050	OG < 0.1	0.0050 mg/L	2024-11-04	
Antimony, total	< 0.00020	MAC = 0.006	0.00020 mg/L	2024-11-04	
Arsenic, total	< 0.00050	MAC = 0.01	0.00050 mg/L	2024-11-04	
Barium, total	0.0444	MAC = 2	0.0050 mg/L	2024-11-04	
Boron, total	< 0.0500	MAC = 5	0.0500 mg/L	2024-11-04	
Cadmium, total	< 0.000010	MAC = 0.007	0.000010 mg/L	2024-11-04	
Calcium, total	34.5	None Required	0.20 mg/L	2024-11-04	
Chromium, total	< 0.00050	MAC = 0.05	0.00050 mg/L	2024-11-04	
Copper, total	0.00318	MAC = 2	0.00040 mg/L	2024-11-04	
Iron, total	< 0.010	AO ≤ 0.3	0.010 mg/L	2024-11-04	
Lead, total	< 0.00020	MAC = 0.005	0.00020 mg/L	2024-11-04	
Magnesium, total	4.05	None Required	0.010 mg/L	2024-11-04	
Manganese, total	0.00057	MAC = 0.12	0.00020 mg/L	2024-11-04	
Potassium, total	3.66	N/A	0.10 mg/L	2024-11-04	
Selenium, total	< 0.00050	MAC = 0.05	0.00050 mg/L	2024-11-04	
Sodium, total	1.04	AO ≤ 200	0.10 mg/L	2024-11-04	
Strontium, total	0.0954	MAC = 7	0.0010 mg/L	2024-11-04	
Uranium, total	0.00154	MAC = 0.02	0.000020 mg/L	2024-11-04	



TEST RESULTS

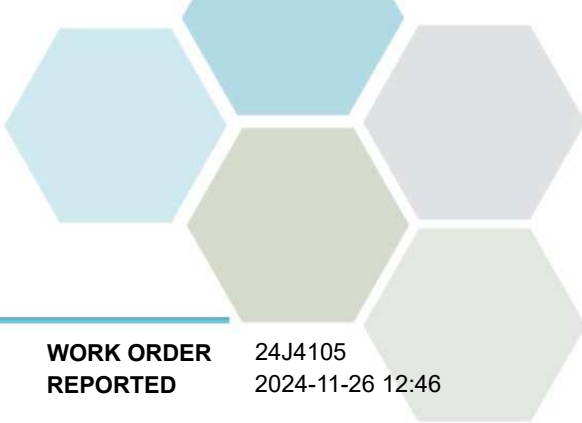
REPORTED TO PROJECT Regional District of Central Kootenay - Nelson
Riondel/Sanca Creek

WORK ORDER REPORTED 24J4105
2024-11-26 12:46

Analyte	Result	Guideline	RL	Units	Analyzed	Qualifier
Riondel Raw (24J4105-01) Matrix: Water Sampled: 2024-10-30 09:30, Continued						
<i>Total Metals, Continued</i>						
Zinc, total	0.0150	AO ≤ 5	0.0040	mg/L	2024-11-04	

Sample Qualifiers:

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
Riondel/Sanca Creek

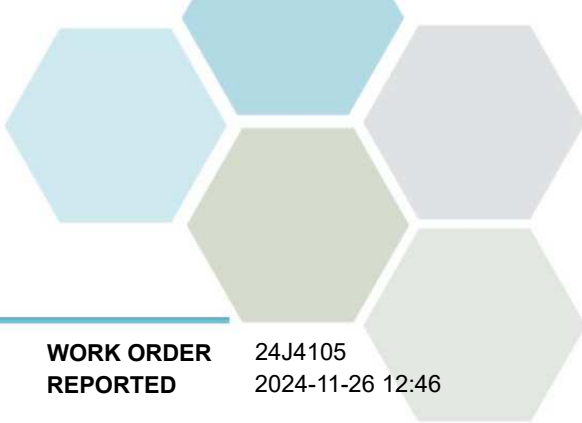
WORK ORDER REPORTED 24J4105
2024-11-26 12:46

Analysis Description	Method Ref.	Technique	Accredited	Location
Alkalinity in Water	SM 2320 B* (2021)	Titration with H2SO4	✓	Kelowna
Anions in Water	SM 4110 B (2020)	Ion Chromatography	✓	Kelowna
Coliforms, Total in Water	SM 9223 (2016)	Quanti-Tray / Enzyme Substrate Endo Agar	✓	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 9223 (2016)	Quanti-Tray / Enzyme Substrate Endo Agar	✓	Kelowna
Hardness in Water	SM 2340 B* (2021)	Calculation: 2.497 [total Ca] + 4.118 [total Mg] (Est)	✓	N/A
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	HNO3+HCl Hot Block Digestion / Inductively Coupled Plasma-Mass Spectroscopy (ICP-MS)	✓	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
AO	Aesthetic Objective
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



APPENDIX 1: SUPPORTING INFORMATION

REPORTED TO PROJECT Regional District of Central Kootenay - Nelson
Riondel/Sanca Creek

WORK ORDER REPORTED 24J4105
2024-11-26 12:46

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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: hhannaoui@caro.ca

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



CERTIFICATE OF ANALYSIS

REPORTED TO	Regional District of Central Kootenay - Nelson Box 590 - 202 Lakeside Drive Nelson, BC V1L 5R4	WORK ORDER	2411513
ATTENTION	Alex Divakovski	RECEIVED / TEMP REPORTED	2024-09-11 09:47 / 18.3°C 2024-09-19 17:59
PO NUMBER	RDCK- Riondel	COC NUMBER	No Number
PROJECT	Riondel		
PROJECT INFO			

Introduction:

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Big Picture Sidekicks



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

Authorized By:

Brent Whitehead
Account Manager

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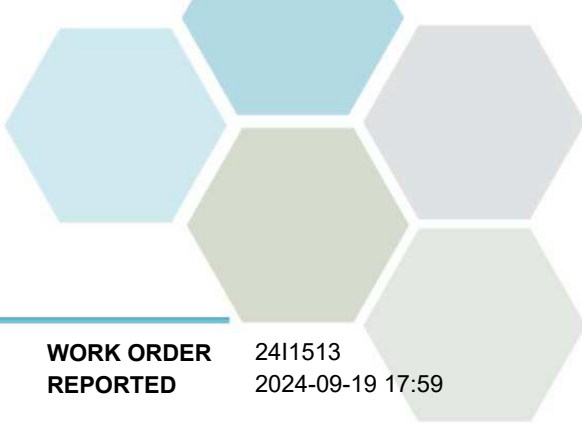
#110 4011 Viking Way Richmond, BC V6V 2K9 | #102 3677 Highway 97N Kelowna, BC V1X 5C3 | 17225 109 Avenue Edmonton, AB T5S 1H7 | #108 4475 Wayburne Drive Burnaby, BC V5G 4X4

TEST RESULTS

REPORTED TO PROJECT Regional District of Central Kootenay - Nelson
Riondel

WORK ORDER REPORTED 2411513
2024-09-19 17:59

Analyte	Result	Guideline	RL	Units	Analyzed	Qualifier
Riondel (2411513-01) Matrix: Water Sampled: 2024-09-03 09:00						
Calculated Parameters						
Total Trihalomethanes	0.0227	MAC = 0.1	0.00400	mg/L		N/A
Haloacetic Acids						
Monochloroacetic Acid	< 0.0020	N/A	0.0020	mg/L		2024-09-17
Monobromoacetic Acid	< 0.0020	N/A	0.0020	mg/L		2024-09-17
Dichloroacetic Acid	0.0113	N/A	0.0020	mg/L		2024-09-17
Trichloroacetic Acid	0.0095	N/A	0.0020	mg/L		2024-09-17
Dibromoacetic Acid	< 0.0020	N/A	0.0020	mg/L		2024-09-17
Total Haloacetic Acids (HAA5)	0.0208	MAC = 0.08	0.00200	mg/L		N/A
Surrogate: 2-Bromopropionic Acid	84		70-130	%		2024-09-17
Volatile Organic Compounds (VOC)						
Bromodichloromethane	< 0.0010	N/A	0.0010	mg/L		2024-09-15
Bromoform	< 0.0010	N/A	0.0010	mg/L		2024-09-15
Chloroform	0.0227	N/A	0.0010	mg/L		2024-09-15
Dibromochloromethane	< 0.0010	N/A	0.0010	mg/L		2024-09-15
Surrogate: Toluene-d8	85		70-130	%		2024-09-15
Surrogate: 4-Bromofluorobenzene	72		70-130	%		2024-09-15



APPENDIX 1: SUPPORTING INFORMATION

REPORTED TO PROJECT Regional District of Central Kootenay - Nelson
Riondel

WORK ORDER REPORTED 2411513
2024-09-19 17:59

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 \(Health Canada, September 2022\)](#)

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:

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