



CERTIFICATE OF ANALYSIS

REPORTED TO Black Mountain Irrigation District
285 Gray Avenue
KELOWNA, BC V1X 1W8

ATTENTION BMID Reports

PO NUMBER

PROJECT General Potability

PROJECT INFO

WORK ORDER 8120136

RECEIVED / TEMP 2018-12-04 08:55 / 10°C

REPORTED 2018-12-10 16:21

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 17025:2005 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.

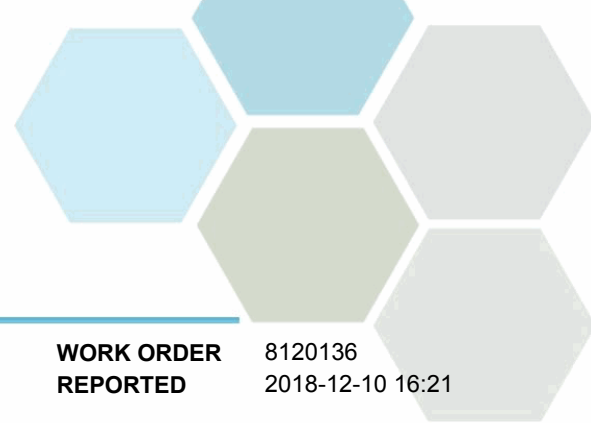
If you have any questions or concerns, please contact me at adobbie@caro.ca

Authorized By:

Alexander Dobbie
Client Service Representative

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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

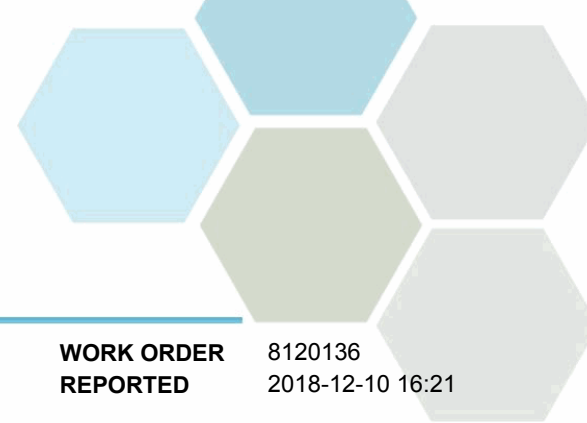


TEST RESULTS

REPORTED TO PROJECT Black Mountain Irrigation District
General Potability

WORK ORDER REPORTED 8120136
2018-12-10 16:21

| Analyte | Result | RL | Units | Analyzed | Qualifier |
|--|------------|----------|------------|------------|-----------|
| Booster #1 (8120136-01) Matrix: Water Sampled: 2018-12-04 08:18 | | | | | |
| Anions | | | | | |
| Chloride | 11.9 | 0.10 | mg/L | 2018-12-04 | |
| Fluoride | < 0.10 | 0.10 | mg/L | 2018-12-04 | |
| Nitrate (as N) | 0.014 | 0.010 | mg/L | 2018-12-04 | |
| Nitrite (as N) | < 0.010 | 0.010 | mg/L | 2018-12-04 | |
| Sulfate | 7.8 | 1.0 | mg/L | 2018-12-04 | |
| Calculated Parameters | | | | | |
| Hardness, Total (as CaCO ₃) | 51.1 | 0.500 | mg/L | N/A | |
| Solids, Total Dissolved | 67.3 | 1.00 | mg/L | N/A | |
| General Parameters | | | | | |
| Alkalinity, Total (as CaCO ₃) | 41.4 | 1.0 | mg/L | 2018-12-04 | |
| Alkalinity, Phenolphthalein (as CaCO ₃) | < 1.0 | 1.0 | mg/L | 2018-12-04 | |
| Alkalinity, Bicarbonate (as CaCO ₃) | 41.4 | 1.0 | mg/L | 2018-12-04 | |
| Alkalinity, Carbonate (as CaCO ₃) | < 1.0 | 1.0 | mg/L | 2018-12-04 | |
| Alkalinity, Hydroxide (as CaCO ₃) | < 1.0 | 1.0 | mg/L | 2018-12-04 | |
| Colour, True | < 5.0 | 5.0 | CU | 2018-12-05 | |
| Conductivity (EC) | 131 | 2.0 | µS/cm | 2018-12-04 | |
| Cyanide, Total | < 0.0020 | 0.0020 | mg/L | 2018-12-07 | |
| Cation-Anion Balance | -100 | | | 2018-12-04 | |
| pH | 7.48 | 0.10 | pH units | 2018-12-04 | HT2 |
| Temperature, at pH | 22.3 | | °C | 2018-12-04 | HT2 |
| Turbidity | 0.40 | 0.10 | NTU | 2018-12-04 | |
| Microbiological Parameters | | | | | |
| Coliforms, Total | < 1 | 1 | CFU/100 mL | 2018-12-04 | |
| E. coli | < 1 | 1 | CFU/100 mL | 2018-12-04 | |
| Total Metals | | | | | |
| Aluminum, total | 0.101 | 0.0050 | mg/L | 2018-12-06 | |
| Antimony, total | < 0.00020 | 0.00020 | mg/L | 2018-12-06 | |
| Arsenic, total | < 0.00050 | 0.00050 | mg/L | 2018-12-06 | |
| Barium, total | 0.0104 | 0.0050 | mg/L | 2018-12-06 | |
| Boron, total | 0.0170 | 0.0050 | mg/L | 2018-12-06 | |
| Cadmium, total | < 0.000010 | 0.000010 | mg/L | 2018-12-06 | |
| Calcium, total | 13.7 | 0.20 | mg/L | 2018-12-06 | |
| Chromium, total | < 0.00050 | 0.00050 | mg/L | 2018-12-06 | |
| Cobalt, total | < 0.00010 | 0.00010 | mg/L | 2018-12-06 | |
| Copper, total | 0.00054 | 0.00040 | mg/L | 2018-12-06 | |
| Iron, total | 0.025 | 0.010 | mg/L | 2018-12-06 | |
| Lead, total | < 0.00020 | 0.00020 | mg/L | 2018-12-06 | |
| Magnesium, total | 4.09 | 0.010 | mg/L | 2018-12-06 | |
| Manganese, total | 0.00682 | 0.00020 | mg/L | 2018-12-06 | |
| Mercury, total | < 0.000010 | 0.000010 | mg/L | 2018-12-06 | |



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| Analyte | Result | RL | Units | Analyzed | Qualifier |
|---|-----------|----------|-------|------------|-----------|
| Booster #1 (8120136-01) Matrix: Water Sampled: 2018-12-04 08:18, Continued | | | | | |
| <i>Total Metals, Continued</i> | | | | | |
| Molybdenum, total | 0.00070 | 0.00010 | mg/L | 2018-12-06 | |
| Nickel, total | < 0.00040 | 0.00040 | mg/L | 2018-12-06 | |
| Potassium, total | 0.68 | 0.10 | mg/L | 2018-12-06 | |
| Selenium, total | < 0.00050 | 0.00050 | mg/L | 2018-12-06 | |
| Sodium, total | 3.81 | 0.10 | mg/L | 2018-12-06 | |
| Strontium, total | 0.0793 | 0.0010 | mg/L | 2018-12-06 | |
| Uranium, total | 0.000225 | 0.000020 | mg/L | 2018-12-06 | |
| Zinc, total | < 0.0040 | 0.0040 | mg/L | 2018-12-06 | |

Well 4 (8120136-02) | Matrix: Water | Sampled: 2018-12-03 08:46

Anions

| | | | | | |
|----------------|---------|-------|------|------------|--|
| Chloride | 11.7 | 0.10 | mg/L | 2018-12-04 | |
| Fluoride | 0.12 | 0.10 | mg/L | 2018-12-04 | |
| Nitrate (as N) | 3.47 | 0.010 | mg/L | 2018-12-04 | |
| Nitrite (as N) | < 0.010 | 0.010 | mg/L | 2018-12-04 | |
| Sulfate | 23.9 | 1.0 | mg/L | 2018-12-04 | |

Calculated Parameters

| | | | | | |
|----------------------------|-----|-------|------|-----|--|
| Hardness, Total (as CaCO3) | 216 | 0.500 | mg/L | N/A | |
| Solids, Total Dissolved | 272 | 1.00 | mg/L | N/A | |

General Parameters

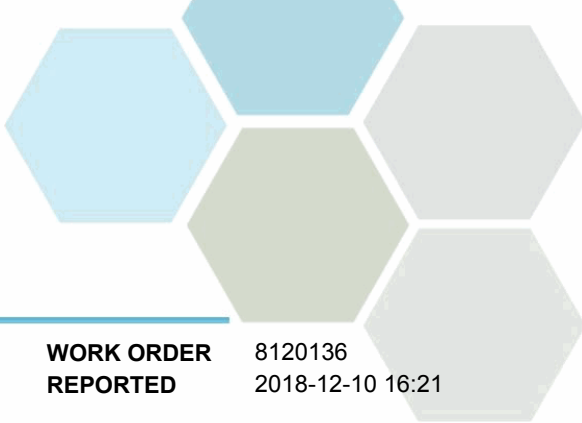
| | | | | | |
|--|----------|--------|----------|------------|-----|
| Alkalinity, Total (as CaCO3) | 215 | 1.0 | mg/L | 2018-12-04 | |
| Alkalinity, Phenolphthalein (as CaCO3) | < 1.0 | 1.0 | mg/L | 2018-12-04 | |
| Alkalinity, Bicarbonate (as CaCO3) | 215 | 1.0 | mg/L | 2018-12-04 | |
| Alkalinity, Carbonate (as CaCO3) | < 1.0 | 1.0 | mg/L | 2018-12-04 | |
| Alkalinity, Hydroxide (as CaCO3) | < 1.0 | 1.0 | mg/L | 2018-12-04 | |
| Colour, True | < 5.0 | 5.0 | CU | 2018-12-05 | |
| Conductivity (EC) | 484 | 2.0 | µS/cm | 2018-12-04 | |
| Cyanide, Total | < 0.0020 | 0.0020 | mg/L | 2018-12-07 | |
| Cation-Anion Balance | -100 | | | 2018-12-04 | |
| pH | 7.83 | 0.10 | pH units | 2018-12-04 | HT2 |
| Temperature, at pH | 22.4 | | °C | 2018-12-04 | HT2 |
| Turbidity | < 0.10 | 0.10 | NTU | 2018-12-04 | |

Microbiological Parameters

| | | | | | |
|------------------|-----|---|------------|------------|--|
| Coliforms, Total | < 1 | 1 | CFU/100 mL | 2018-12-04 | |
| E. coli | < 1 | 1 | CFU/100 mL | 2018-12-04 | |

Total Metals

| | | | | | |
|-----------------|-----------|---------|------|------------|--|
| Aluminum, total | < 0.0050 | 0.0050 | mg/L | 2018-12-06 | |
| Antimony, total | < 0.00020 | 0.00020 | mg/L | 2018-12-06 | |



TEST RESULTS

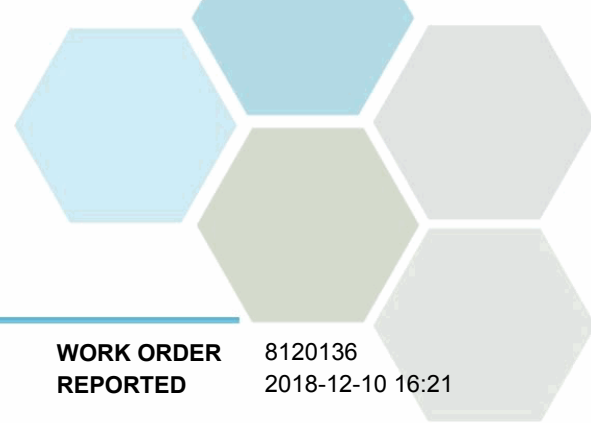
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|---|----------------|----------|-------|------------|-----------|
| Well 4 (8120136-02) Matrix: Water Sampled: 2018-12-03 08:46, Continued | | | | | |
| <i>Total Metals, Continued</i> | | | | | |
| Arsenic, total | < 0.00050 | 0.00050 | mg/L | 2018-12-06 | |
| Barium, total | 0.0139 | 0.0050 | mg/L | 2018-12-06 | |
| Boron, total | 0.0244 | 0.0050 | mg/L | 2018-12-06 | |
| Cadmium, total | < 0.000010 | 0.000010 | mg/L | 2018-12-06 | |
| Calcium, total | 62.3 | 0.20 | mg/L | 2018-12-06 | |
| Chromium, total | < 0.00050 | 0.00050 | mg/L | 2018-12-06 | |
| Cobalt, total | < 0.00010 | 0.00010 | mg/L | 2018-12-06 | |
| Copper, total | 0.00485 | 0.00040 | mg/L | 2018-12-06 | |
| Iron, total | < 0.010 | 0.010 | mg/L | 2018-12-06 | |
| Lead, total | 0.00028 | 0.00020 | mg/L | 2018-12-06 | |
| Magnesium, total | 14.5 | 0.010 | mg/L | 2018-12-06 | |
| Manganese, total | 0.00022 | 0.00020 | mg/L | 2018-12-06 | |
| Mercury, total | < 0.000010 | 0.000010 | mg/L | 2018-12-06 | |
| Molybdenum, total | 0.00131 | 0.00010 | mg/L | 2018-12-06 | |
| Nickel, total | < 0.00040 | 0.00040 | mg/L | 2018-12-06 | |
| Potassium, total | 1.70 | 0.10 | mg/L | 2018-12-06 | |
| Selenium, total | 0.00090 | 0.00050 | mg/L | 2018-12-06 | |
| Sodium, total | 10.8 | 0.10 | mg/L | 2018-12-06 | |
| Strontium, total | 0.290 | 0.0010 | mg/L | 2018-12-06 | |
| Uranium, total | 0.00104 | 0.000020 | mg/L | 2018-12-06 | |
| Zinc, total | < 0.0040 | 0.0040 | mg/L | 2018-12-06 | |

Sample Qualifiers:

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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| Analysis Description | Method Ref. | Technique | Location |
|----------------------------------|------------------------|---|----------|
| Alkalinity in Water | SM 2320 B* (2011) | Titration with H2SO4 | Kelowna |
| Anions in Water | SM 4110 B (2011) | Ion Chromatography | Kelowna |
| Coliforms, Total in Water | SM 9222* (2006) | Membrane Filtration / Chromocult Agar | Kelowna |
| Colour, True in Water | SM 2120 C (2011) | Spectrophotometry (456 nm) | Kelowna |
| Conductivity in Water | SM 2510 B (2011) | 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* (2006) | Membrane Filtration / Chromocult Agar | Kelowna |
| Hardness in Water | SM 2340 B* (2011) | Calculation: 2.497 [total Ca] + 4.118 [total Mg] (Est) | 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 (2011) | Electrometry | Kelowna |
| Solids, Total Dissolved in Water | SM 1030 E (2011) | Calculation: $100 \times \frac{[\text{Cations}] - [\text{Anions}]}{[\text{Cations}] + [\text{Anions}]}$ | 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 (2011) | 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 |
| CFU/100 mL | Colony Forming Units per 100 millilitres |
| CU | Colour Units (referenced against a platinum cobalt standard) |
| mg/L | Milligrams per litre |
| NTU | Nephelometric Turbidity Units |
| 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 |

General Comments:

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