



CERTIFICATE OF ANALYSIS

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

ATTENTION BMID Reports

PO NUMBER

PROJECT Comprehensive

PROJECT INFO

WORK ORDER 7120351

RECEIVED / TEMP 2017-12-05 08:45 / 6°C

REPORTED 2017-12-12 15:11

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.

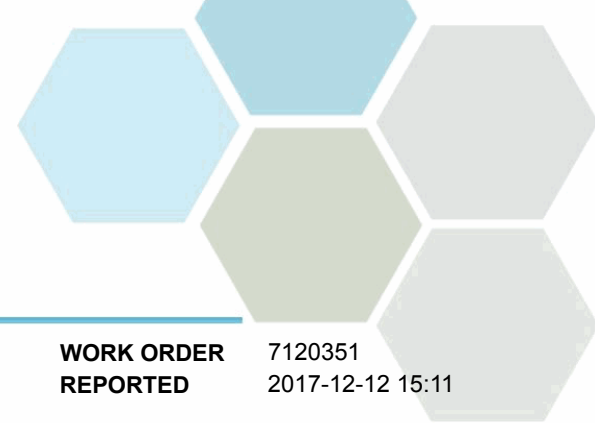
If you have any questions or concerns, please contact me at jshanko@caro.ca

Authorized By:

Jennifer Shanko, A.Sc.T.
Account Manager

1-888-311-8846 | 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

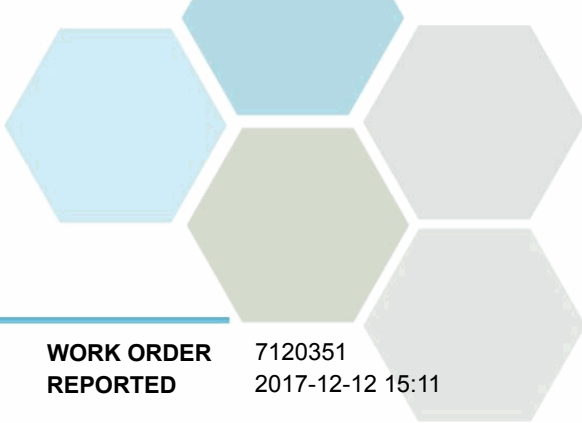


TEST RESULTS

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2017-12-12 15:11

Analyte	Result	RL	Units	Analyzed	Qualifier
Booster #1 (7120351-01) Matrix: Water Sampled: 2017-12-05 08:08					
Anions					
Chloride	8.70	0.10	mg/L	2017-12-07	
Fluoride	< 0.10	0.10	mg/L	2017-12-07	
Nitrate (as N)	0.022	0.010	mg/L	2017-12-07	
Nitrite (as N)	< 0.010	0.010	mg/L	2017-12-07	
Sulfate	10.1	1.0	mg/L	2017-12-07	
General Parameters					
Alkalinity, Total (as CaCO ₃)	67.0	1.0	mg/L	2017-12-07	
Alkalinity, Phenolphthalein (as CaCO ₃)	< 1.0	1.0	mg/L	2017-12-07	
Alkalinity, Bicarbonate (as CaCO ₃)	67.0	1.0	mg/L	2017-12-07	
Alkalinity, Carbonate (as CaCO ₃)	< 1.0	1.0	mg/L	2017-12-07	
Alkalinity, Hydroxide (as CaCO ₃)	< 1.0	1.0	mg/L	2017-12-07	
Colour, True	< 5.0	5.0	CU	2017-12-08	
Conductivity (EC)	176	2.0	µS/cm	2017-12-07	
Cyanide, Total	< 0.0020	0.0020	mg/L	2017-12-07	
pH	7.40	0.10	pH units	2017-12-07	HT2
Temperature, at pH	21		°C	2017-12-07	HT2
Turbidity	0.38	0.10	NTU	2017-12-07	
Calculated Parameters					
Hardness, Total (as CaCO ₃)	82.3	0.500	mg/L	N/A	
Langelier Index	-0.9	-5.0	-	2017-12-12	
Solids, Total Dissolved	95.7	1.00	mg/L	N/A	
Total Metals					
Aluminum, total	0.0595	0.0050	mg/L	2017-12-09	
Antimony, total	< 0.00020	0.00020	mg/L	2017-12-09	
Arsenic, total	< 0.00050	0.00050	mg/L	2017-12-09	
Barium, total	0.0134	0.0050	mg/L	2017-12-09	
Boron, total	< 0.0050	0.0050	mg/L	2017-12-09	
Cadmium, total	< 0.000010	0.000010	mg/L	2017-12-09	
Calcium, total	22.5	0.20	mg/L	2017-12-09	
Chromium, total	< 0.00050	0.00050	mg/L	2017-12-09	
Cobalt, total	< 0.00010	0.00010	mg/L	2017-12-09	
Copper, total	0.00051	0.00040	mg/L	2017-12-09	
Iron, total	0.054	0.010	mg/L	2017-12-09	
Lead, total	< 0.00020	0.00020	mg/L	2017-12-09	
Magnesium, total	6.30	0.010	mg/L	2017-12-09	
Manganese, total	0.00946	0.00020	mg/L	2017-12-09	
Mercury, total	< 0.000010	0.000010	mg/L	2017-12-11	
Molybdenum, total	0.00107	0.00010	mg/L	2017-12-09	
Nickel, total	< 0.00040	0.00040	mg/L	2017-12-09	
Potassium, total	1.06	0.10	mg/L	2017-12-09	



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Booster #1 (7120351-01) | Matrix: Water | Sampled: 2017-12-05 08:08, Continued

Total Metals, Continued

Selenium, total	< 0.00050	0.00050	mg/L	2017-12-09	
Sodium, total	6.07	0.10	mg/L	2017-12-09	
Strontium, total	0.118	0.0010	mg/L	2017-12-09	
Uranium, total	0.000436	0.000020	mg/L	2017-12-09	
Zinc, total	< 0.0040	0.0040	mg/L	2017-12-09	

Microbiological Parameters

Coliforms, Total	< 1	1	CFU/100 mL	2017-12-06	
E. coli	< 1	1	CFU/100 mL	2017-12-06	

Well 5 (7120351-02) | Matrix: Water | Sampled: 2017-12-05 08:32

Anions

Chloride	10.2	0.10	mg/L	2017-12-07	
Fluoride	0.12	0.10	mg/L	2017-12-07	
Nitrate (as N)	3.64	0.010	mg/L	2017-12-07	
Nitrite (as N)	< 0.010	0.010	mg/L	2017-12-07	
Sulfate	25.9	1.0	mg/L	2017-12-07	

General Parameters

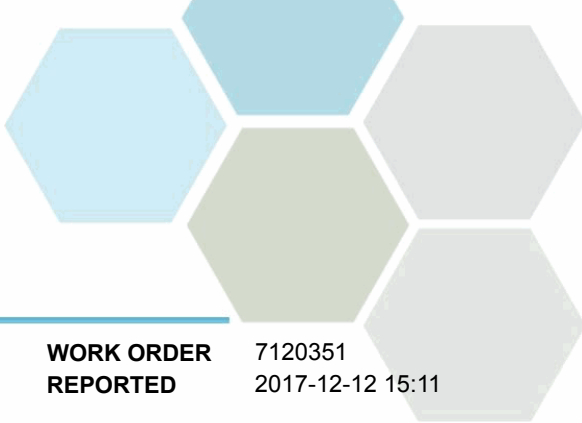
Alkalinity, Total (as CaCO3)	215	1.0	mg/L	2017-12-07	
Alkalinity, Phenolphthalein (as CaCO3)	< 1.0	1.0	mg/L	2017-12-07	
Alkalinity, Bicarbonate (as CaCO3)	215	1.0	mg/L	2017-12-07	
Alkalinity, Carbonate (as CaCO3)	< 1.0	1.0	mg/L	2017-12-07	
Alkalinity, Hydroxide (as CaCO3)	< 1.0	1.0	mg/L	2017-12-07	
Colour, True	< 5.0	5.0	CU	2017-12-08	
Conductivity (EC)	495	2.0	µS/cm	2017-12-07	
Cyanide, Total	< 0.0020	0.0020	mg/L	2017-12-07	
pH	7.86	0.10	pH units	2017-12-07	HT2
Temperature, at pH	22		°C	2017-12-07	HT2
Turbidity	< 0.10	0.10	NTU	2017-12-07	

Calculated Parameters

Hardness, Total (as CaCO3)	267	0.500	mg/L	N/A	
Langelier Index	0.6	-5.0	-	2017-12-12	
Solids, Total Dissolved	294	1.00	mg/L	N/A	

Total Metals

Aluminum, total	< 0.0050	0.0050	mg/L	2017-12-09	
Antimony, total	< 0.00020	0.00020	mg/L	2017-12-09	
Arsenic, total	< 0.00050	0.00050	mg/L	2017-12-09	
Barium, total	0.0203	0.0050	mg/L	2017-12-09	
Boron, total	0.0197	0.0050	mg/L	2017-12-09	



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Well 5 (7120351-02) | Matrix: Water | Sampled: 2017-12-05 08:32, Continued

Total Metals, Continued

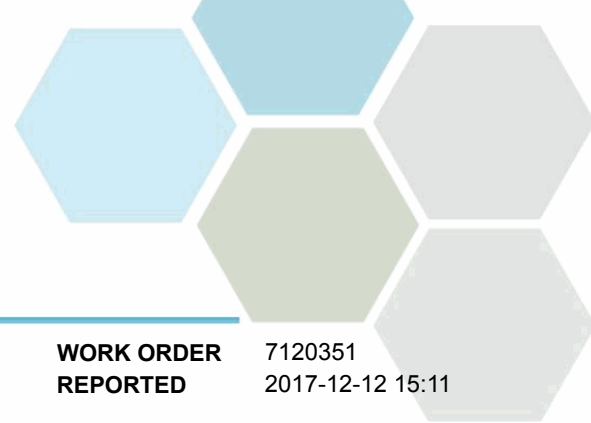
Cadmium, total	< 0.000010	0.000010	mg/L	2017-12-09	
Calcium, total	78.3	0.20	mg/L	2017-12-09	
Chromium, total	< 0.00050	0.00050	mg/L	2017-12-09	
Cobalt, total	< 0.00010	0.00010	mg/L	2017-12-09	
Copper, total	0.00385	0.00040	mg/L	2017-12-09	
Iron, total	< 0.010	0.010	mg/L	2017-12-09	
Lead, total	< 0.00020	0.00020	mg/L	2017-12-09	
Magnesium, total	17.2	0.010	mg/L	2017-12-09	
Manganese, total	< 0.00020	0.00020	mg/L	2017-12-09	
Mercury, total	< 0.000010	0.000010	mg/L	2017-12-11	
Molybdenum, total	0.00146	0.00010	mg/L	2017-12-09	
Nickel, total	0.00048	0.00040	mg/L	2017-12-09	
Potassium, total	2.19	0.10	mg/L	2017-12-09	
Selenium, total	0.00146	0.00050	mg/L	2017-12-09	
Sodium, total	12.5	0.10	mg/L	2017-12-09	
Strontium, total	0.338	0.0010	mg/L	2017-12-09	
Uranium, total	0.00150	0.000020	mg/L	2017-12-09	
Zinc, total	0.0093	0.0040	mg/L	2017-12-09	

Microbiological Parameters

Coliforms, Total	< 1	1	CFU/100 mL	2017-12-06	
E. coli	< 1	1	CFU/100 mL	2017-12-06	

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
Langelier Index in Water	SM 2330 B (2010)	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 (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:

The results in this report apply to the 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 unless otherwise agreed to in writing. The quality control (QC) data is available upon request