

CERTIFICATE OF ANALYSIS

REPORTED TO Grand Forks, City of
PO Box 220
GRAND FORKS, BC V0H 1H0

ATTENTION Dean Chapman

PO NUMBER
PROJECT Drinking Water

PROJECT INFO

WORK ORDER 9032004

RECEIVED / TEMP 2019-03-26 08:30 / 6°C
REPORTED 2019-04-02 14:30

COC NUMBER 40837.5581

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.

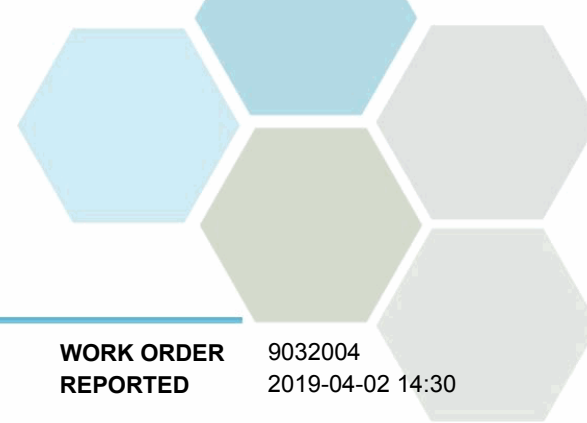
If you have any questions or concerns, please contact me at estclair@caro.ca

Authorized By:

Eilish St.Clair, B.Sc., C.I.T.
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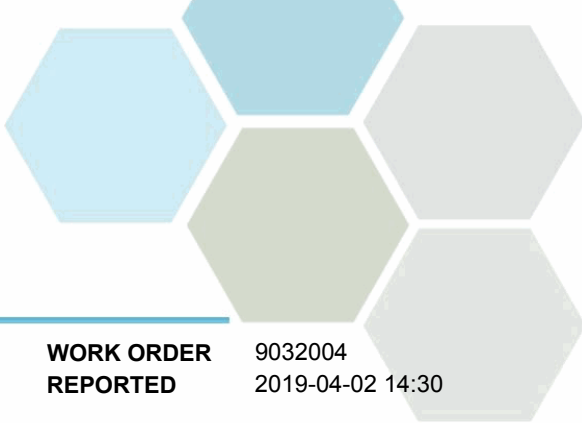


TEST RESULTS

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Analyte	Result	Guideline	RL Units	Analyzed	Qualifier
City Hall (9032004-01) Matrix: Water Sampled: 2019-03-25 09:10					
Anions					
Chloride	2.56	AO ≤ 250	0.10 mg/L	2019-03-26	
Fluoride	0.61	MAC = 1.5	0.10 mg/L	2019-03-26	
Nitrate (as N)	0.274	MAC = 10	0.010 mg/L	2019-03-26	
Nitrite (as N)	< 0.010	MAC = 1	0.010 mg/L	2019-03-26	
Sulfate	19.7	AO ≤ 500	1.0 mg/L	2019-03-26	
Calculated Parameters					
Hardness, Total (as CaCO ₃)	133	None Required	0.500 mg/L	N/A	
Langelier Index	0.4	N/A	-5.0	2019-04-02	
Solids, Total Dissolved	163	AO ≤ 500	1.00 mg/L	N/A	
General Parameters					
Alkalinity, Total (as CaCO ₃)	139	N/A	1.0 mg/L	2019-03-27	
Alkalinity, Phenolphthalein (as CaCO ₃)	< 1.0	N/A	1.0 mg/L	2019-03-27	
Alkalinity, Bicarbonate (as CaCO ₃)	139	N/A	1.0 mg/L	2019-03-27	
Alkalinity, Carbonate (as CaCO ₃)	< 1.0	N/A	1.0 mg/L	2019-03-27	
Alkalinity, Hydroxide (as CaCO ₃)	< 1.0	N/A	1.0 mg/L	2019-03-27	
Colour, True	< 5.0	AO ≤ 15	5.0 CU	2019-03-26	
Conductivity (EC)	292	N/A	2.0 µS/cm	2019-03-27	
Cyanide, Total	< 0.0020	MAC = 0.2	0.0020 mg/L	2019-03-27	
pH	8.15	7.0-10.5	0.10 pH units	2019-03-27	HT2
Temperature, at pH	22.0	N/A	°C	2019-03-27	HT2
Turbidity	< 0.10	OG < 1	0.10 NTU	2019-03-26	
Microbiological Parameters					
Coliforms, Total	< 1	MAC = 0	1 CFU/100 mL	2019-03-26	
E. coli	< 1	MAC = 0	1 CFU/100 mL	2019-03-26	
Total Metals					
Aluminum, total	< 0.0050	OG < 0.1	0.0050 mg/L	2019-03-29	
Antimony, total	< 0.00020	MAC = 0.006	0.00020 mg/L	2019-03-29	
Arsenic, total	0.00522	MAC = 0.01	0.00050 mg/L	2019-03-29	
Barium, total	0.0209	MAC = 1	0.0050 mg/L	2019-03-29	
Boron, total	0.0097	MAC = 5	0.0050 mg/L	2019-03-29	
Cadmium, total	< 0.000010	MAC = 0.005	0.000010 mg/L	2019-03-29	
Calcium, total	37.3	None Required	0.20 mg/L	2019-03-29	
Chromium, total	< 0.00050	MAC = 0.05	0.00050 mg/L	2019-03-29	
Cobalt, total	< 0.00010	N/A	0.00010 mg/L	2019-03-29	
Copper, total	0.0422	AO ≤ 1	0.00040 mg/L	2019-03-29	
Iron, total	< 0.010	AO ≤ 0.3	0.010 mg/L	2019-03-29	
Lead, total	< 0.00020	MAC = 0.01	0.00020 mg/L	2019-03-29	
Magnesium, total	9.79	None Required	0.010 mg/L	2019-03-29	
Manganese, total	0.00201	AO ≤ 0.05	0.00020 mg/L	2019-03-29	
Mercury, total	< 0.000010	MAC = 0.001	0.000010 mg/L	2019-03-29	



TEST RESULTS

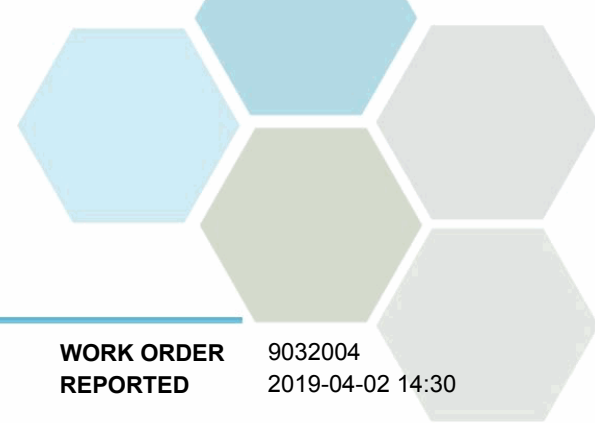
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Analyte	Result	Guideline	RL	Units	Analyzed	Qualifier
City Hall (9032004-01) Matrix: Water Sampled: 2019-03-25 09:10, Continued						
<i>Total Metals, Continued</i>						
Molybdenum, total	0.00277	N/A	0.00010	mg/L	2019-03-29	
Nickel, total	< 0.00040	N/A	0.00040	mg/L	2019-03-29	
Potassium, total	1.38	N/A	0.10	mg/L	2019-03-29	
Selenium, total	< 0.00050	MAC = 0.05	0.00050	mg/L	2019-03-29	
Sodium, total	6.51	AO ≤ 200	0.10	mg/L	2019-03-29	
Strontium, total	0.358	N/A	0.0010	mg/L	2019-03-29	
Uranium, total	0.00234	MAC = 0.02	0.000020	mg/L	2019-03-29	
Zinc, total	< 0.0040	AO ≤ 5	0.0040	mg/L	2019-03-29	

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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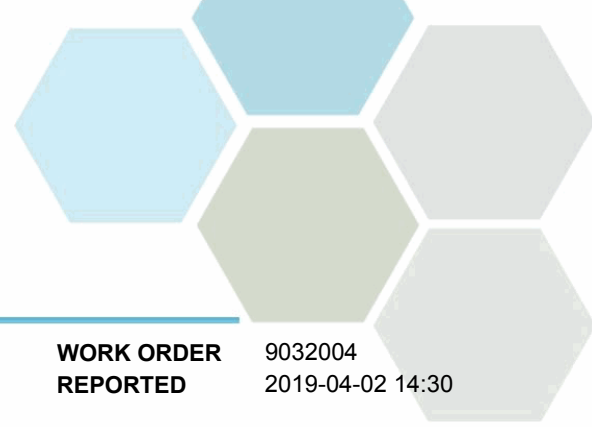
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Analysis Description	Method Ref.	Technique	Location
Alkalinity in Water	SM 2320 B* (2011)	Titration with H2SO4	Kelowna
Anions in Water	SM 4110 B (2011)	Ion Chromatography	Kelowna
Coliforms, Total in Water	SM 9222* (2006)	Membrane Filtration / Chromocult 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
AO	Aesthetic Objective
CFU/100 mL	Colony Forming Units per 100 millilitres
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



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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

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: estclair@caro.ca