

CERTIFICATE OF ANALYSIS

REPORTED TO Mid Shuswap Lumby Water Stewards
1631 Mable Lake Rd
Lumby, BC V0E 2G6

ATTENTION Russ Collins

PO NUMBER Mid Shuswap Lumby Water Stewards
PROJECT Analytical Testing

PROJECT INFO

WORK ORDER 8081768

RECEIVED / TEMP 2018-08-20 09:03 / 8°C
REPORTED 2018-08-27 12:11

COC NUMBER B48330

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.

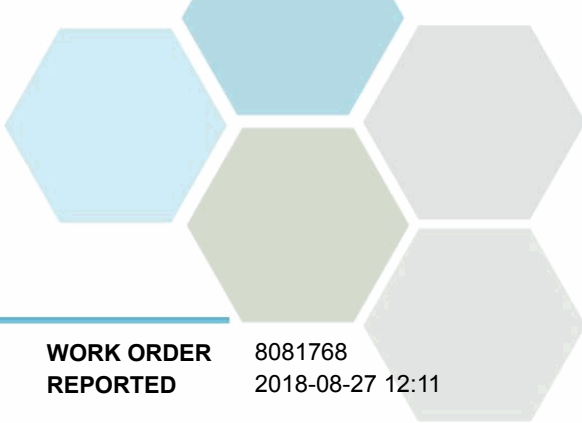
If you have any questions or concerns, please contact me at estclair@caro.ca

Authorized By:

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TEST RESULTS

REPORTED TO PROJECT Mid Shuswap Lumby Water Stewards Analytical Testing

WORK ORDER REPORTED 8081768
2018-08-27 12:11

Analyte	Result	Guideline	RL	Units	Analyzed	Qualifier
Harris Creek (Hwy 6) (8081768-01) Matrix: Water Sampled: 2018-08-19 11:08						FILT, PRES

Anions

Chloride	17.2	AO ≤ 250	0.10	mg/L	2018-08-21	
Nitrate (as N)	0.126	MAC = 10	0.010	mg/L	2018-08-21	
Nitrite (as N)	< 0.010	MAC = 1	0.010	mg/L	2018-08-21	
Sulfate	10.1	AO ≤ 500	1.0	mg/L	2018-08-21	

General Parameters

Ammonia, Total (as N)	0.030	None Required	0.020	mg/L	2018-08-23	
Conductivity (EC)	296	N/A	2.0	µS/cm	2018-08-21	
Nitrogen, Total Kjeldahl	0.137	N/A	0.050	mg/L	2018-08-23	
pH	7.97	7.0-10.5	0.10	pH units	2018-08-21	HT2
Phosphorus, Total (as P)	0.0341	N/A	0.0020	mg/L	2018-08-24	
Phosphorus, Total Dissolved	0.0213	N/A	0.0020	mg/L	2018-08-24	
Turbidity	4.70	OG < 1	0.10	NTU	2018-08-20	

Calculated Parameters

Nitrate+Nitrite (as N)	0.126	N/A	0.0100	mg/L	N/A	
Nitrogen, Total	0.262	N/A	0.0500	mg/L	N/A	

Microbiological Parameters

Coliforms, Total	1200	MAC = 0	1	CFU/100 mL	2018-08-20	
Background Colonies	> 200	N/A	200	CFU/100 mL	2018-08-20	
E. coli	900	MAC = 0	1	CFU/100 mL	2018-08-20	

Shuswap River (Wilsey Dam) (8081768-02) | Matrix: Water | Sampled: 2018-08-19 10:06

FILT, PRES

Anions

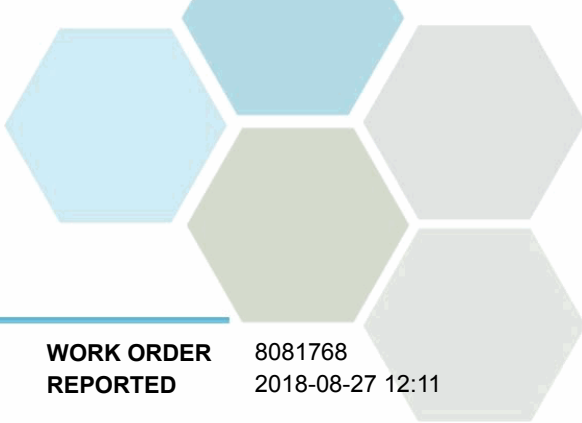
Chloride	0.46	AO ≤ 250	0.10	mg/L	2018-08-21	
Nitrate (as N)	< 0.010	MAC = 10	0.010	mg/L	2018-08-21	
Nitrite (as N)	< 0.010	MAC = 1	0.010	mg/L	2018-08-21	
Sulfate	6.8	AO ≤ 500	1.0	mg/L	2018-08-21	

General Parameters

Ammonia, Total (as N)	0.023	None Required	0.020	mg/L	2018-08-23	
Conductivity (EC)	115	N/A	2.0	µS/cm	2018-08-21	
Nitrogen, Total Kjeldahl	< 0.050	N/A	0.050	mg/L	2018-08-23	
pH	6.47	7.0-10.5	0.10	pH units	2018-08-21	HT2
Phosphorus, Total (as P)	< 0.0020	N/A	0.0020	mg/L	2018-08-24	
Phosphorus, Total Dissolved	< 0.0020	N/A	0.0020	mg/L	2018-08-24	
Turbidity	0.38	OG < 1	0.10	NTU	2018-08-20	

Calculated Parameters

Nitrate+Nitrite (as N)	< 0.0100	N/A	0.0100	mg/L	N/A	
Nitrogen, Total	< 0.0500	N/A	0.0500	mg/L	N/A	



TEST RESULTS

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2018-08-27 12:11

Analyte	Result	Guideline	RL	Units	Analyzed	Qualifier
Shuswap River (Wilsey Dam) (8081768-02) Matrix: Water Sampled: 2018-08-19 10:06, Continued						FILT, PRES

Microbiological Parameters

Coliforms, Total	≥ 260	MAC = 0	1	CFU/100 mL	2018-08-20	
Background Colonies	> 200	N/A	200	CFU/100 mL	2018-08-20	
E. coli	12	MAC = 0	1	CFU/100 mL	2018-08-20	

Vance Creek (Mabel Lake Road) (8081768-03) | Matrix: Water | Sampled: 2018-08-19 10:45

FILT, PRES

Anions

Chloride	3.44	AO ≤ 250	0.10	mg/L	2018-08-21	
Nitrate (as N)	0.056	MAC = 10	0.010	mg/L	2018-08-21	
Nitrite (as N)	< 0.010	MAC = 1	0.010	mg/L	2018-08-21	
Sulfate	33.7	AO ≤ 500	1.0	mg/L	2018-08-21	

General Parameters

Ammonia, Total (as N)	0.028	None Required	0.020	mg/L	2018-08-23	
Conductivity (EC)	404	N/A	2.0	µS/cm	2018-08-21	
Nitrogen, Total Kjeldahl	< 0.050	N/A	0.050	mg/L	2018-08-23	
pH	7.28	7.0-10.5	0.10	pH units	2018-08-21	HT2
Phosphorus, Total (as P)	< 0.0040	N/A	0.0020	mg/L	2018-08-24	
Phosphorus, Total Dissolved	< 0.0020	N/A	0.0020	mg/L	2018-08-24	
Turbidity	0.36	OG < 1	0.10	NTU	2018-08-20	

Calculated Parameters

Nitrate+Nitrite (as N)	0.0556	N/A	0.0100	mg/L	N/A	
Nitrogen, Total	0.0556	N/A	0.0500	mg/L	N/A	

Microbiological Parameters

Coliforms, Total	≥ 300	MAC = 0	1	CFU/100 mL	2018-08-20	
Background Colonies	> 200	N/A	200	CFU/100 mL	2018-08-20	
E. coli	27	MAC = 0	1	CFU/100 mL	2018-08-20	

Duteau Creek (Hwy 6) (8081768-04) | Matrix: Water | Sampled: 2018-08-19 11:00

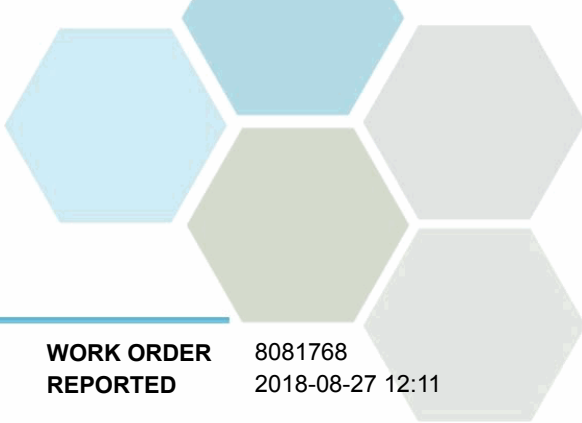
FILT, PRES

Anions

Chloride	19.6	AO ≤ 250	0.10	mg/L	2018-08-21	
Nitrate (as N)	0.271	MAC = 10	0.010	mg/L	2018-08-21	
Nitrite (as N)	< 0.010	MAC = 1	0.010	mg/L	2018-08-21	
Sulfate	7.0	AO ≤ 500	1.0	mg/L	2018-08-21	

General Parameters

Ammonia, Total (as N)	0.034	None Required	0.020	mg/L	2018-08-23	
Conductivity (EC)	140	N/A	2.0	µS/cm	2018-08-21	
Nitrogen, Total Kjeldahl	0.593	N/A	0.050	mg/L	2018-08-23	



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Analyte	Result	Guideline	RL	Units	Analyzed	Qualifier
Duteau Creek (Hwy 6) (8081768-04) Matrix: Water Sampled: 2018-08-19 11:00, Continued						FILT, PRES

General Parameters, Continued

pH	7.86	7.0-10.5	0.10	pH units	2018-08-21	HT2
Phosphorus, Total (as P)	0.0128	N/A	0.0020	mg/L	2018-08-24	
Phosphorus, Total Dissolved	0.0077	N/A	0.0020	mg/L	2018-08-24	
Turbidity	1.61	OG < 1	0.10	NTU	2018-08-20	

Calculated Parameters

Nitrate+Nitrite (as N)	0.271	N/A	0.0100	mg/L	N/A	
Nitrogen, Total	0.864	N/A	0.0500	mg/L	N/A	

Microbiological Parameters

Coliforms, Total	≥ 320	MAC = 0	1	CFU/100 mL	2018-08-20	
Background Colonies	> 200	N/A	200	CFU/100 mL	2018-08-20	
E. coli	77	MAC = 0	1	CFU/100 mL	2018-08-20	

Mid Bessette Creek (8081768-05) | Matrix: Water | Sampled: 2018-08-19 10:35

FILT, PRES

Anions

Chloride	14.4	AO ≤ 250	0.10	mg/L	2018-08-21	
Nitrate (as N)	0.326	MAC = 10	0.010	mg/L	2018-08-21	
Nitrite (as N)	< 0.010	MAC = 1	0.010	mg/L	2018-08-21	
Sulfate	19.9	AO ≤ 500	1.0	mg/L	2018-08-21	

General Parameters

Ammonia, Total (as N)	0.057	None Required	0.020	mg/L	2018-08-23	
Conductivity (EC)	281	N/A	2.0	µS/cm	2018-08-21	
Nitrogen, Total Kjeldahl	0.290	N/A	0.050	mg/L	2018-08-23	
pH	8.07	7.0-10.5	0.10	pH units	2018-08-21	HT2
Phosphorus, Total (as P)	0.0240	N/A	0.0020	mg/L	2018-08-24	
Phosphorus, Total Dissolved	0.0163	N/A	0.0020	mg/L	2018-08-24	
Turbidity	1.79	OG < 1	0.10	NTU	2018-08-20	

Calculated Parameters

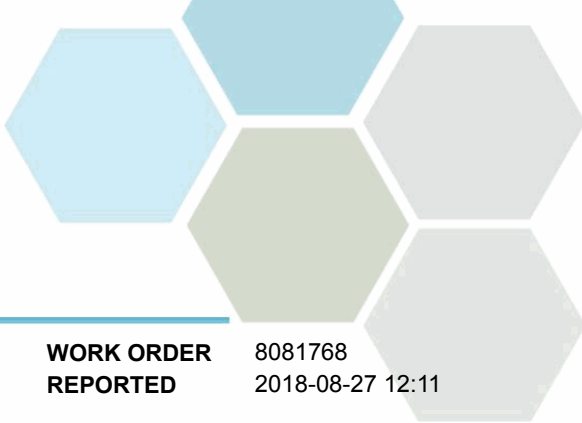
Nitrate+Nitrite (as N)	0.326	N/A	0.0100	mg/L	N/A	
Nitrogen, Total	0.616	N/A	0.0500	mg/L	N/A	

Microbiological Parameters

Coliforms, Total	≥ 570	MAC = 0	1	CFU/100 mL	2018-08-20	
Background Colonies	> 200	N/A	200	CFU/100 mL	2018-08-20	
E. coli	270	MAC = 0	1	CFU/100 mL	2018-08-20	

Lower Bessette Creek (8081768-06) | Matrix: Water | Sampled: 2018-08-19 10:20

FILT, PRES



TEST RESULTS

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Analyte	Result	Guideline	RL Units	Analyzed	Qualifier
Lower Bessette Creek (8081768-06) Matrix: Water Sampled: 2018-08-19 10:20, Continued					FILT, PRES

Anions

Chloride	9.71	AO ≤ 250	0.10 mg/L	2018-08-21	
Nitrate (as N)	0.205	MAC = 10	0.010 mg/L	2018-08-21	
Nitrite (as N)	< 0.010	MAC = 1	0.010 mg/L	2018-08-21	
Sulfate	27.7	AO ≤ 500	1.0 mg/L	2018-08-21	

General Parameters

Ammonia, Total (as N)	0.050	None Required	0.020 mg/L	2018-08-23	
Conductivity (EC)	309	N/A	2.0 µS/cm	2018-08-21	
Nitrogen, Total Kjeldahl	0.228	N/A	0.050 mg/L	2018-08-23	
pH	8.18	7.0-10.5	0.10 pH units	2018-08-21	HT2
Phosphorus, Total (as P)	0.0169	N/A	0.0020 mg/L	2018-08-24	
Phosphorus, Total Dissolved	0.0067	N/A	0.0020 mg/L	2018-08-24	
Turbidity	2.95	OG < 1	0.10 NTU	2018-08-20	

Calculated Parameters

Nitrate+Nitrite (as N)	0.205	N/A	0.0100 mg/L	N/A	
Nitrogen, Total	0.433	N/A	0.0500 mg/L	N/A	

Microbiological Parameters

Coliforms, Total	≥ 510	MAC = 0	1 CFU/100 mL	2018-08-20	
Background Colonies	> 200	N/A	200 CFU/100 mL	2018-08-20	
E. coli	230	MAC = 0	1 CFU/100 mL	2018-08-20	

Shuswap River (Odd Fellows) (8081768-07) | Matrix: Water | Sampled: 2018-08-19 09:35

FILT, PRES

Anions

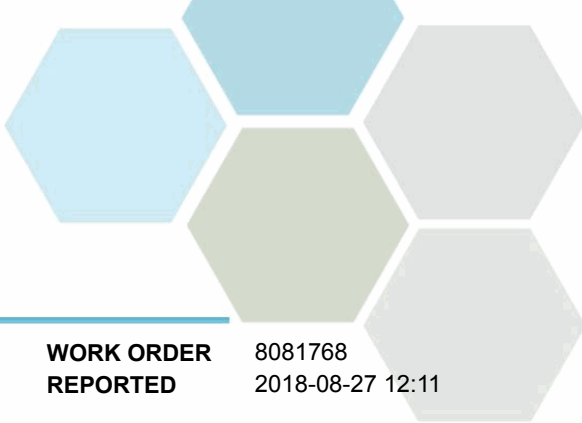
Chloride	0.75	AO ≤ 250	0.10 mg/L	2018-08-21	
Nitrate (as N)	< 0.010	MAC = 10	0.010 mg/L	2018-08-21	
Nitrite (as N)	< 0.010	MAC = 1	0.010 mg/L	2018-08-21	
Sulfate	9.4	AO ≤ 500	1.0 mg/L	2018-08-21	

General Parameters

Ammonia, Total (as N)	0.028	None Required	0.020 mg/L	2018-08-23	
Conductivity (EC)	129	N/A	2.0 µS/cm	2018-08-21	
Nitrogen, Total Kjeldahl	< 0.050	N/A	0.050 mg/L	2018-08-23	
pH	7.96	7.0-10.5	0.10 pH units	2018-08-21	HT2
Phosphorus, Total (as P)	< 0.0020	N/A	0.0020 mg/L	2018-08-24	
Phosphorus, Total Dissolved	< 0.0020	N/A	0.0020 mg/L	2018-08-24	
Turbidity	0.58	OG < 1	0.10 NTU	2018-08-20	

Calculated Parameters

Nitrate+Nitrite (as N)	< 0.0100	N/A	0.0100 mg/L	N/A	
Nitrogen, Total	< 0.0500	N/A	0.0500 mg/L	N/A	



TEST RESULTS

REPORTED TO PROJECT Mid Shuswap Lumby Water Stewards
Analytical Testing

WORK ORDER REPORTED 8081768
2018-08-27 12:11

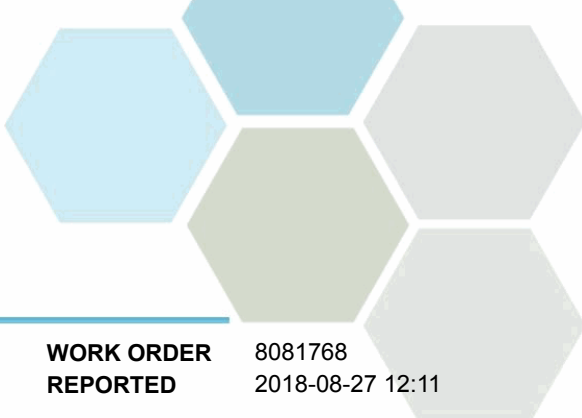
Analyte	Result	Guideline	RL	Units	Analyzed	Qualifier
Shuswap River (Odd Fellows) (8081768-07) Matrix: Water Sampled: 2018-08-19 09:35, Continued						FILT, PRES

Microbiological Parameters

Coliforms, Total	≥ 160	MAC = 0	1	CFU/100 mL	2018-08-20	
Background Colonies	> 200	N/A	200	CFU/100 mL	2018-08-20	
E. coli	37	MAC = 0	1	CFU/100 mL	2018-08-20	

Sample Qualifiers:

FILT The sample has been filtered for DP in the laboratory. Results may not reflect conditions at the time of sampling.
 HT2 The 15 minute recommended holding time (from sampling to analysis) has been exceeded - field analysis is recommended.
 PRES Sample has been preserved for DP, TP, TKN in the laboratory and the holding time has been extended.



APPENDIX 1: SUPPORTING INFORMATION

REPORTED TO PROJECT Mid Shuswap Lumby Water Stewards
Analytical Testing

WORK ORDER REPORTED 8081768
2018-08-27 12:11

Analysis Description	Method Ref.	Technique	Location
Ammonia, Total in Water	SM 4500-NH3 G* (2011)	Automated Colorimetry (Phenate)	Kelowna
Anions in Water	SM 4110 B (2011)	Ion Chromatography	Kelowna
Coliforms, Total in Water	SM 9222 B (2006)	Membrane Filtration / m-Endo Agar	Kelowna
Conductivity in Water	SM 2510 B (2011)	Conductivity Meter	Kelowna
E. coli in Water	SM 9222 G (2006)	Membrane Filtration / Nutrient Agar with MUG	Kelowna
Nitrogen, Total Kjeldahl in Water	SM 4500-Norg D* (2011)	Block Digestion and Flow Injection Analysis	Kelowna
pH in Water	SM 4500-H+ B (2011)	Electrometry	Kelowna
Phosphorus, Total Dissolved in Water	SM 4500-P B.5* (2011) / SM 4500-P F (2011)	Persulfate Digestion / Automated Colorimetry (Ascorbic Acid)	Kelowna
Phosphorus, Total in Water	SM 4500-P B.5* (2011) / SM 4500-P F (2011)	Persulfate Digestion / Automated Colorimetry (Ascorbic Acid)	Kelowna
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
>	Greater than the specified Result
>=	Greater than or equal to the specified Result
AO	Aesthetic Objective
CFU/100 mL	Colony Forming Units per 100 millilitres
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
SM	Standard Methods for the Examination of Water and Wastewater, American Public Health Association

Guidelines Referenced in this Report:

[Guidelines for Canadian Drinking Water Quality \(Health Canada, Feb 2017\)](#)

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:

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