CERTIFICATE OF ANALYSIS

REPORTED TO	Mid Shuswap Lumby Water Stewards 1631 Mable Lake Rd Lumby, BC V0E 2G6		
ATTENTION	Russ Collins	**WORK ORDER**	9110038
PO NUMBER	Mid Shuswap Lumby Water Stewards	**RECEIVED / TEMP**	2019-11-18 08:48 / 4°C
PROJECT	Analytical Testing	**REPORTED**	2019-11-25 09:58
PROJECT INFO		**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 teamcaro@caro.ca

Authorized By:

Team CARO
Client Service Representative

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TEST RESULTS

REPORTED TO	Mid Shuswap Lumby Water Stewards	**WORK ORDER**	9110038
PROJECT	Analytical Testing	**REPORTED**	2019-11-25 09:58

Analyte	Result	Guideline	RL	Units	Analyzed	Qualifier
Harris Creek (Hwy 6) (9110038-01) | Matrix: Water | Sampled: 2019-11-17 10:55						FILT, PRESd
Anions						
Chloride	**2.54**	AO ≤ 250	0.10	mg/L	2019-11-18	
Nitrate (as N)	**0.041**	MAC = 10	0.010	mg/L	2019-11-18	
Nitrite (as N)	< 0.010	MAC = 1	0.010	mg/L	2019-11-18	
Sulfate	**18.8**	AO ≤ 500	1.0	mg/L	2019-11-18	
Calculated Parameters						
Nitrate+Nitrite (as N)	**0.0412**	N/A	0.0100	mg/L	N/A	
Nitrogen, Total	**0.235**	N/A	0.0500	mg/L	N/A	
General Parameters						
Ammonia, Total (as N)	< 0.020	None Required	0.020	mg/L	2019-11-20	
Conductivity (EC)	**205**	N/A	2.0	µS/cm	2019-11-19	
Nitrogen, Total Kjeldahl	**0.194**	N/A	0.050	mg/L	2019-11-19	
pH	**7.86**	7.0-10.5	0.10	pH units	2019-11-19	HT2
Phosphorus, Total (as P)	**0.0457**	N/A	0.0020	mg/L	2019-11-20	
Phosphorus, Total Dissolved	**0.0353**	N/A	0.0020	mg/L	2019-11-20	
Turbidity	**1.71**	OG < 1	0.10	NTU	2019-11-18	
Microbiological Parameters						
Coliforms, Total	**2420**	N/A	1.0	MPN/100 mL	2019-11-18	
E. coli	**130**	N/A	1.0	MPN/100 mL	2019-11-18	
Duteau Creek (Hwy 6) (9110038-02) | Matrix: Water | Sampled: 2019-11-17 10:45						FILT, PRES
Anions						
Chloride	**7.20**	AO ≤ 250	0.10	mg/L	2019-11-18	
Nitrate (as N)	**0.404**	MAC = 10	0.010	mg/L	2019-11-18	
Nitrite (as N)	< 0.010	MAC = 1	0.010	mg/L	2019-11-18	
Sulfate	**25.0**	AO ≤ 500	1.0	mg/L	2019-11-18	
Calculated Parameters						
Nitrate+Nitrite (as N)	**0.404**	N/A	0.0100	mg/L	N/A	
Nitrogen, Total	**0.689**	N/A	0.0500	mg/L	N/A	
General Parameters						
Ammonia, Total (as N)	< 0.020	None Required	0.020	mg/L	2019-11-20	
Conductivity (EC)	**219**	N/A	2.0	µS/cm	2019-11-19	
Nitrogen, Total Kjeldahl	**0.285**	N/A	0.050	mg/L	2019-11-19	
pH	**7.84**	7.0-10.5	0.10	pH units	2019-11-19	HT2
Phosphorus, Total (as P)	**0.0280**	N/A	0.0020	mg/L	2019-11-20	
Phosphorus, Total Dissolved	**0.0138**	N/A	0.0020	mg/L	2019-11-20	
Turbidity	**2.63**	OG < 1	0.10	NTU	2019-11-18	

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TEST RESULTS

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Analyte	Result	Guideline	RL	Units	Analyzed	Qualifier
Duteau Creek (Hwy 6) (9110038-02) | Matrix: Water | Sampled: 2019-11-17 10:45, Continued						FILT, PRES
Microbiological Parameters						
Coliforms, Total	**1990**	N/A	1.0	MPN/100 mL	2019-11-18	
E. coli	**12.2**	N/A	1.0	MPN/100 mL	2019-11-18	
Mid Bessette Creek (9110038-03) | Matrix: Water | Sampled: 2019-11-17 10:20						FILT, PRESa
Anions						
Chloride	**6.43**	AO ≤ 250	0.10	mg/L	2019-11-18	
Nitrate (as N)	**0.192**	MAC = 10	0.010	mg/L	2019-11-18	
Nitrite (as N)	< 0.010	MAC = 1	0.010	mg/L	2019-11-18	
Sulfate	**28.9**	AO ≤ 500	1.0	mg/L	2019-11-18	
Calculated Parameters						
Nitrate+Nitrite (as N)	**0.192**	N/A	0.0100	mg/L	N/A	
Nitrogen, Total	**0.458**	N/A	0.0500	mg/L	N/A	
General Parameters						
Ammonia, Total (as N)	< 0.020	None Required	0.020	mg/L	2019-11-20	
Conductivity (EC)	**285**	N/A	2.0	µS/cm	2019-11-19	
Nitrogen, Total Kjeldahl	**0.265**	N/A	0.050	mg/L	2019-11-19	
pH	**8.00**	7.0-10.5	0.10	pH units	2019-11-19	HT2
Phosphorus, Total (as P)	**0.0551**	N/A	0.0020	mg/L	2019-11-20	
Phosphorus, Total Dissolved	**0.0400**	N/A	0.0020	mg/L	2019-11-20	
Turbidity	**2.87**	OG < 1	0.10	NTU	2019-11-18	
Microbiological Parameters						
Coliforms, Total	**2420**	N/A	1.0	MPN/100 mL	2019-11-18	
E. coli	**67.0**	N/A	1.0	MPN/100 mL	2019-11-18	
Lower Bessette Creek (9110038-04) | Matrix: Water | Sampled: 2019-11-17 10:05						FILT, PRES
Anions						
Chloride	**6.18**	AO ≤ 250	0.10	mg/L	2019-11-18	
Nitrate (as N)	**0.156**	MAC = 10	0.010	mg/L	2019-11-18	
Nitrite (as N)	< 0.010	MAC = 1	0.010	mg/L	2019-11-18	
Sulfate	**28.5**	AO ≤ 500	1.0	mg/L	2019-11-18	
Calculated Parameters						
Nitrate+Nitrite (as N)	**0.156**	N/A	0.0100	mg/L	N/A	
Nitrogen, Total	**0.392**	N/A	0.0500	mg/L	N/A	
General Parameters						
Ammonia, Total (as N)	< 0.020	None Required	0.020	mg/L	2019-11-20	

CARO ANALYTICAL SERVICES

TEST RESULTS

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Analyte	Result	Guideline	RL	Units	Analyzed	Qualifier
Lower Bessette Creek (9110038-04) | Matrix: Water | Sampled: 2019-11-17 10:05, Continued						FILT, PRES
General Parameters, Continued						
Conductivity (EC)	**262**	N/A	2.0	µS/cm	2019-11-19	
Nitrogen, Total Kjeldahl	**0.236**	N/A	0.050	mg/L	2019-11-19	
pH	**8.03**	7.0-10.5	0.10	pH units	2019-11-19	HT2
Phosphorus, Total (as P)	**0.0493**	N/A	0.0020	mg/L	2019-11-20	
Phosphorus, Total Dissolved	**0.0281**	N/A	0.0020	mg/L	2019-11-20	
Turbidity	**4.92**	OG < 1	0.10	NTU	2019-11-18	
Microbiological Parameters						
Coliforms, Total	**2420**	N/A	1.0	MPN/100 mL	2019-11-18	
E. coli	**77.1**	N/A	1.0	MPN/100 mL	2019-11-18	
Shuswap River (Wilsey Dam) (9110038-05) | Matrix: Water | Sampled: 2019-11-17 10:00						FILT, PRES
Anions						
Chloride	**0.38**	AO ≤ 250	0.10	mg/L	2019-11-18	
Nitrate (as N)	**0.035**	MAC = 10	0.010	mg/L	2019-11-18	
Nitrite (as N)	< 0.010	MAC = 1	0.010	mg/L	2019-11-18	
Sulfate	**6.5**	AO ≤ 500	1.0	mg/L	2019-11-18	
Calculated Parameters						
Nitrate+Nitrite (as N)	**0.0349**	N/A	0.0100	mg/L	N/A	
Nitrogen, Total	< 0.0500	N/A	0.0500	mg/L	N/A	
General Parameters						
Ammonia, Total (as N)	**0.026**	None Required	0.020	mg/L	2019-11-20	
Conductivity (EC)	**105**	N/A	2.0	µS/cm	2019-11-19	
Nitrogen, Total Kjeldahl	< 0.050	N/A	0.050	mg/L	2019-11-19	
pH	**7.71**	7.0-10.5	0.10	pH units	2019-11-19	HT2
Phosphorus, Total (as P)	**0.0062**	N/A	0.0020	mg/L	2019-11-20	
Phosphorus, Total Dissolved	**0.0038**	N/A	0.0020	mg/L	2019-11-20	
Turbidity	**1.12**	OG < 1	0.10	NTU	2019-11-18	
Microbiological Parameters						
Coliforms, Total	**1200**	N/A	1.0	MPN/100 mL	2019-11-18	
E. coli	**4.1**	N/A	1.0	MPN/100 mL	2019-11-18	
Shuswap River (Odd Fellows) (9110038-06) | Matrix: Water | Sampled: 2019-11-17 09:30						FILT, PRESb
Anions						
Chloride	**0.70**	AO ≤ 250	0.10	mg/L	2019-11-18	
Nitrate (as N)	**0.037**	MAC = 10	0.010	mg/L	2019-11-18	
Nitrite (as N)	< 0.010	MAC = 1	0.010	mg/L	2019-11-18	

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TEST RESULTS

REPORTED TO	Mid Shuswap Lumby Water Stewards	**WORK ORDER**	9110038
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Analyte	Result	Guideline	RL	Units	Analyzed	Qualifier
Shuswap River (Odd Fellows) (9110038-06) | Matrix: Water | Sampled: 2019-11-17 09:30, Continued						FILT, PRESb
Anions, Continued						
Sulfate	**8.4**	AO ≤ 500	1.0	mg/L	2019-11-18	
Calculated Parameters						
Nitrate+Nitrite (as N)	**0.0368**	N/A	0.0100	mg/L	N/A	
Nitrogen, Total	< 0.0500	N/A	0.0500	mg/L	N/A	
General Parameters						
Ammonia, Total (as N)	**0.031**	None Required	0.020	mg/L	2019-11-20	
Conductivity (EC)	**121**	N/A	2.0	µS/cm	2019-11-19	
Nitrogen, Total Kjeldahl	< 0.050	N/A	0.050	mg/L	2019-11-19	
pH	**7.74**	7.0-10.5	0.10	pH units	2019-11-19	HT2
Phosphorus, Total (as P)	**0.0064**	N/A	0.0020	mg/L	2019-11-20	
Phosphorus, Total Dissolved	**0.0063**	N/A	0.0020	mg/L	2019-11-20	
Turbidity	**1.09**	OG < 1	0.10	NTU	2019-11-18	
Microbiological Parameters						
Coliforms, Total	**517**	N/A	1.0	MPN/100 mL	2019-11-18	
E. coli	**2.0**	N/A	1.0	MPN/100 mL	2019-11-18	
Vance Creek (Mabel Lake Road) (9110038-07) | Matrix: Water | Sampled: 2019-11-17 09:30						FILT, PRESc
Anions						
Chloride	**2.81**	AO ≤ 250	0.10	mg/L	2019-11-18	
Nitrate (as N)	**0.028**	MAC = 10	0.010	mg/L	2019-11-18	
Nitrite (as N)	< 0.010	MAC = 1	0.010	mg/L	2019-11-18	
Sulfate	**35.4**	AO ≤ 500	1.0	mg/L	2019-11-18	
Calculated Parameters						
Nitrate+Nitrite (as N)	**0.0285**	N/A	0.0100	mg/L	N/A	
Nitrogen, Total	**0.0865**	N/A	0.0500	mg/L	N/A	
General Parameters						
Ammonia, Total (as N)	< 0.020	None Required	0.020	mg/L	2019-11-20	
Conductivity (EC)	**354**	N/A	2.0	µS/cm	2019-11-19	
Nitrogen, Total Kjeldahl	**0.058**	N/A	0.050	mg/L	2019-11-19	
pH	**8.20**	7.0-10.5	0.10	pH units	2019-11-19	HT2
Phosphorus, Total (as P)	**0.0073**	N/A	0.0020	mg/L	2019-11-20	
Phosphorus, Total Dissolved	**0.0039**	N/A	0.0020	mg/L	2019-11-20	
Turbidity	**0.98**	OG < 1	0.10	NTU	2019-11-18	
Microbiological Parameters						
Coliforms, Total	**127**	N/A	1.0	MPN/100 mL	2019-11-18	
E. coli	**2.0**	N/A	1.0	MPN/100 mL	2019-11-18	

TEST RESULTS

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Analyte	Result	Guideline	RL	Units	Analyzed	Qualifier

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, NH3, TKN in the laboratory and the holding time has been extended.
PRESa	Sample has been preserved for DP, TP, TKN, NH3 in the laboratory and the holding time has been extended.
PRESb	Sample has been preserved for TKN, DP, TP, NH3 in the laboratory and the holding time has been extended.
PRESc	Sample has been preserved for TKN, NH3, DP, TP in the laboratory and the holding time has been extended.
PRESd	Sample has been preserved for TP, DP, TKN, NH3 in the laboratory and the holding time has been extended.

APPENDIX 1: SUPPORTING INFORMATION

REPORTED TO	Mid Shuswap Lumby Water Stewards	**WORK ORDER**	9110038
PROJECT	Analytical Testing	**REPORTED**	2019-11-25 09:58

Analysis Description	Method Ref.	Technique	Location
Ammonia, Total in Water	SM 4500-NH3 G* (2017)	Automated Colorimetry (Phenate)	Kelowna
Anions in Water	SM 4110 B (2017)	Ion Chromatography	Kelowna
Coliforms, Total in Water	NA / SM 9223 (2017)	Quanti-Tray / Enzyme Substrate Endo Agar	Kelowna
Conductivity in Water	SM 2510 B (2017)	Conductivity Meter	Kelowna
E. coli in Water	NA / SM 9223 (2017)	Quanti-Tray / Enzyme Substrate Endo Agar	Kelowna
Nitrogen, Total Kjeldahl in Water	SM 4500-Norg D* (2017)	Block Digestion and Flow Injection Analysis	Kelowna
pH in Water	SM 4500-H+ B (2017)	Electrometry	Kelowna
Phosphorus, Total Dissolved in Water	SM 4500-P B.5* (2011) / SM 4500-P F (2017)	Persulfate Digestion / Automated Colorimetry (Ascorbic Acid)	Kelowna
Phosphorus, Total in Water	SM 4500-P B.5* (2011) / SM 4500-P F (2017)	Persulfate Digestion / Automated Colorimetry (Ascorbic Acid)	Kelowna
Turbidity in Water	SM 2130 B (2017)	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
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

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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:teamcaro@caro.ca