

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 23K2196

RECEIVED / TEMP 2023-11-20 08:52 / 0.8°C
REPORTED 2023-11-24 18:08

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/IEC 17025:2017 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.

By engaging our services, you are agreeing to CARO Analytical Service's Standard Terms and Conditions outlined here: <https://www.caro.ca/terms-conditions>

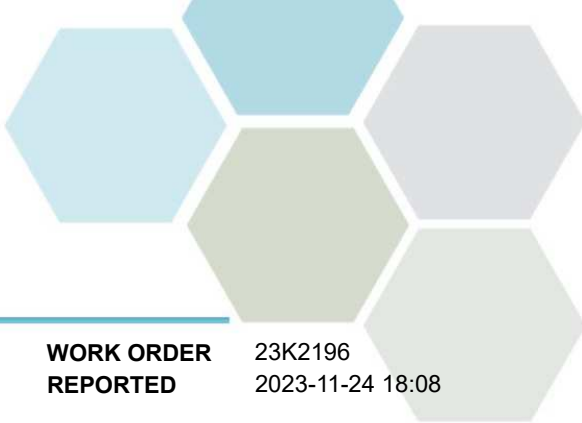
If you have any questions or concerns, please contact me at TeamCaro@caro.ca

Authorized By:

Team CARO
Client Service Representative

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TEST RESULTS

REPORTED TO PROJECT Mid Shuswap Lumby Water Stewards Analytical Testing

WORK ORDER REPORTED 23K2196
2023-11-24 18:08

Analyte	Result	Guideline	RL	Units	Analyzed	Qualifier
Harris Creek (HWY 6) (23K2196-01) Matrix: Water Sampled: 2023-11-19						FILT, PRES

Anions

Chloride	3.90	AO ≤ 250	0.10	mg/L	2023-11-21	
Nitrate (as N)	0.026	MAC = 10	0.010	mg/L	2023-11-21	
Nitrite (as N)	< 0.010	MAC = 1	0.010	mg/L	2023-11-21	
Sulfate	30.1	AO ≤ 500	1.0	mg/L	2023-11-21	

Calculated Parameters

Nitrate+Nitrite (as N)	0.0262	N/A	0.0100	mg/L	N/A	
Nitrogen, Total	0.299	N/A	0.0500	mg/L	N/A	

General Parameters

Ammonia, Total (as N)	0.085	None Required	0.050	mg/L	2023-11-20	
Conductivity (EC)	342	N/A	2.0	µS/cm	2023-11-21	
Nitrogen, Total Kjeldahl	0.273	N/A	0.050	mg/L	2023-11-23	
pH	7.65	7.0-10.5	0.10	pH units	2023-11-21	HT2
Phosphorus, Total (as P)	0.0496	N/A	0.0050	mg/L	2023-11-22	
Phosphorus, Total Dissolved	0.0197	N/A	0.0050	mg/L	2023-11-22	
Turbidity	1.37	OG < 1	0.10	NTU	2023-11-21	

Microbiological Parameters

Coliforms, Total (Q-Tray)	613	MAC = 0	1	MPN/100 mL	2023-11-20	
Coliforms, Fecal (Q-Tray)	50	N/A	1	MPN/100 mL	2023-11-20	
E. coli (Q-Tray)	17	MAC = 0	1	MPN/100 mL	2023-11-20	

Duteau Creek (HWY 6) (23K2196-02) | Matrix: Water | Sampled: 2023-11-19

FILT, PRES

Anions

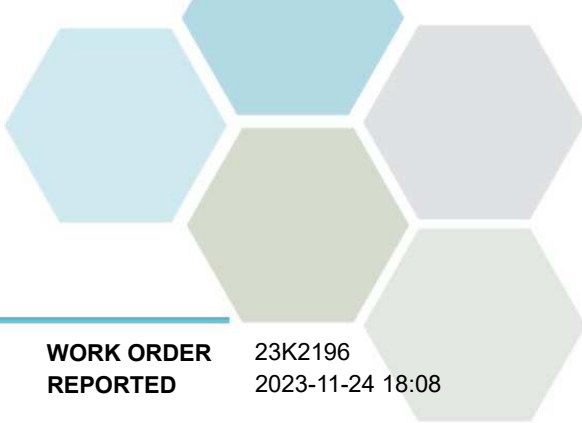
Chloride	11.1	AO ≤ 250	0.10	mg/L	2023-11-21	
Nitrate (as N)	0.491	MAC = 10	0.010	mg/L	2023-11-21	
Nitrite (as N)	< 0.010	MAC = 1	0.010	mg/L	2023-11-21	
Sulfate	22.4	AO ≤ 500	1.0	mg/L	2023-11-21	

Calculated Parameters

Nitrate+Nitrite (as N)	0.491	N/A	0.0100	mg/L	N/A	
Nitrogen, Total	0.799	N/A	0.0500	mg/L	N/A	

General Parameters

Ammonia, Total (as N)	0.088	None Required	0.050	mg/L	2023-11-20	
Conductivity (EC)	246	N/A	2.0	µS/cm	2023-11-21	
Nitrogen, Total Kjeldahl	0.308	N/A	0.050	mg/L	2023-11-23	
pH	7.68	7.0-10.5	0.10	pH units	2023-11-21	HT2
Phosphorus, Total (as P)	0.0206	N/A	0.0050	mg/L	2023-11-22	
Phosphorus, Total Dissolved	0.0138	N/A	0.0050	mg/L	2023-11-22	
Turbidity	2.33	OG < 1	0.10	NTU	2023-11-21	



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Analyte	Result	Guideline	RL	Units	Analyzed	Qualifier
Duteau Creek (HWY 6) (23K2196-02) Matrix: Water Sampled: 2023-11-19, Continued						FILT, PRES

Microbiological Parameters

Coliforms, Total (Q-Tray)	577	MAC = 0	1	MPN/100 mL	2023-11-20	
Coliforms, Fecal (Q-Tray)	25	N/A	1	MPN/100 mL	2023-11-20	
E. coli (Q-Tray)	24	MAC = 0	1	MPN/100 mL	2023-11-20	

Mid Bessette Creek (23K2196-03) Matrix: Water Sampled: 2023-11-19						FILT, PRES
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Anions

Chloride	10.4	AO ≤ 250	0.10	mg/L	2023-11-21	
Nitrate (as N)	0.037	MAC = 10	0.010	mg/L	2023-11-21	
Nitrite (as N)	< 0.010	MAC = 1	0.010	mg/L	2023-11-21	
Sulfate	33.7	AO ≤ 500	1.0	mg/L	2023-11-21	

Calculated Parameters

Nitrate+Nitrite (as N)	0.0368	N/A	0.0100	mg/L	N/A	
Nitrogen, Total	0.551	N/A	0.0500	mg/L	N/A	

General Parameters

Ammonia, Total (as N)	0.423	None Required	0.050	mg/L	2023-11-20	
Conductivity (EC)	338	N/A	2.0	µS/cm	2023-11-21	
Nitrogen, Total Kjeldahl	0.514	N/A	0.050	mg/L	2023-11-23	
pH	7.97	7.0-10.5	0.10	pH units	2023-11-21	HT2
Phosphorus, Total (as P)	0.0598	N/A	0.0050	mg/L	2023-11-22	
Phosphorus, Total Dissolved	0.0390	N/A	0.0050	mg/L	2023-11-22	
Turbidity	2.64	OG < 1	0.10	NTU	2023-11-21	

Microbiological Parameters

Coliforms, Total (Q-Tray)	344	MAC = 0	1	MPN/100 mL	2023-11-20	
Coliforms, Fecal (Q-Tray)	55	N/A	1	MPN/100 mL	2023-11-20	
E. coli (Q-Tray)	34	MAC = 0	1	MPN/100 mL	2023-11-20	

Lower Bessette Creek (23K2196-04) Matrix: Water Sampled: 2023-11-19						FILT, PRES
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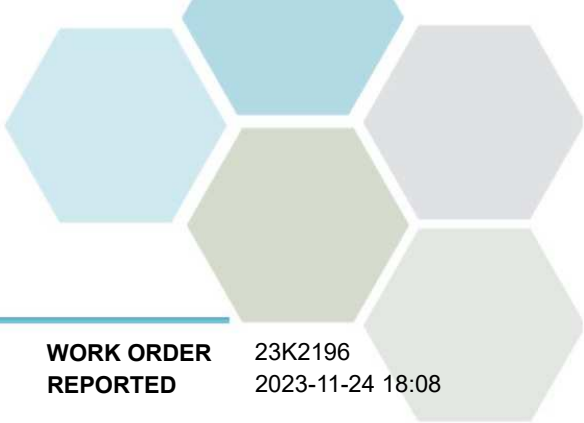
Anions

Chloride	10.3	AO ≤ 250	0.10	mg/L	2023-11-21	
Nitrate (as N)	0.040	MAC = 10	0.010	mg/L	2023-11-21	
Nitrite (as N)	< 0.010	MAC = 1	0.010	mg/L	2023-11-21	
Sulfate	36.2	AO ≤ 500	1.0	mg/L	2023-11-21	

Calculated Parameters

Nitrate+Nitrite (as N)	0.0399	N/A	0.0100	mg/L	N/A	
Nitrogen, Total	0.379	N/A	0.0500	mg/L	N/A	

General Parameters



TEST RESULTS

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Analyte	Result	Guideline	RL	Units	Analyzed	Qualifier
Lower Bessette Creek (23K2196-04) Matrix: Water Sampled: 2023-11-19, Continued						FILT, PRES

General Parameters, Continued

Ammonia, Total (as N)	0.148	None Required	0.050	mg/L	2023-11-20	
Conductivity (EC)	348	N/A	2.0	µS/cm	2023-11-21	
Nitrogen, Total Kjeldahl	0.339	N/A	0.050	mg/L	2023-11-23	
pH	8.06	7.0-10.5	0.10	pH units	2023-11-21	HT2
Phosphorus, Total (as P)	0.0436	N/A	0.0050	mg/L	2023-11-22	
Phosphorus, Total Dissolved	0.0279	N/A	0.0050	mg/L	2023-11-22	
Turbidity	3.11	OG < 1	0.10	NTU	2023-11-21	

Microbiological Parameters

Coliforms, Total (Q-Tray)	342	MAC = 0	1	MPN/100 mL	2023-11-20	
Coliforms, Fecal (Q-Tray)	12	N/A	1	MPN/100 mL	2023-11-20	
E. coli (Q-Tray)	11	MAC = 0	1	MPN/100 mL	2023-11-20	

Shuswap River (Wilsey Dam) (23K2196-05) | Matrix: Water | Sampled: 2023-11-19

PRES, FILT

Anions

Chloride	0.45	AO ≤ 250	0.10	mg/L	2023-11-21	
Nitrate (as N)	0.040	MAC = 10	0.010	mg/L	2023-11-21	
Nitrite (as N)	< 0.010	MAC = 1	0.010	mg/L	2023-11-21	
Sulfate	6.8	AO ≤ 500	1.0	mg/L	2023-11-21	

Calculated Parameters

Nitrate+Nitrite (as N)	0.0395	N/A	0.0100	mg/L	N/A	
Nitrogen, Total	0.204	N/A	0.0500	mg/L	N/A	

General Parameters

Ammonia, Total (as N)	< 0.050	None Required	0.050	mg/L	2023-11-20	
Conductivity (EC)	107	N/A	2.0	µS/cm	2023-11-21	
Nitrogen, Total Kjeldahl	0.164	N/A	0.050	mg/L	2023-11-23	
pH	7.74	7.0-10.5	0.10	pH units	2023-11-21	HT2
Phosphorus, Total (as P)	< 0.0050	N/A	0.0050	mg/L	2023-11-22	
Phosphorus, Total Dissolved	< 0.0050	N/A	0.0050	mg/L	2023-11-22	
Turbidity	0.44	OG < 1	0.10	NTU	2023-11-21	

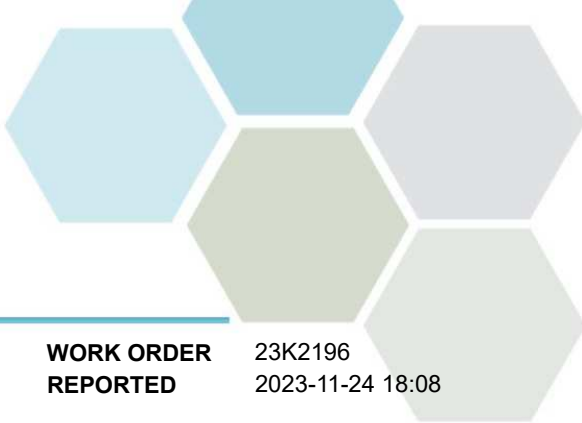
Microbiological Parameters

Coliforms, Total (Q-Tray)	225	MAC = 0	1	MPN/100 mL	2023-11-20	
Coliforms, Fecal (Q-Tray)	1	N/A	1	MPN/100 mL	2023-11-20	
E. coli (Q-Tray)	1	MAC = 0	1	MPN/100 mL	2023-11-20	

Shuswap River (Odd Fellows) (23K2196-06) | Matrix: Water | Sampled: 2023-11-19 09:15

FILT, PRES

Anions



TEST RESULTS

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Analyte	Result	Guideline	RL	Units	Analyzed	Qualifier
Shuswap River (Odd Fellows) (23K2196-06) Matrix: Water Sampled: 2023-11-19 09:15, Continued						FILT, PRES

Anions, Continued

Chloride	0.76	AO ≤ 250	0.10	mg/L	2023-11-21	
Nitrate (as N)	0.045	MAC = 10	0.010	mg/L	2023-11-21	
Nitrite (as N)	< 0.010	MAC = 1	0.010	mg/L	2023-11-21	
Sulfate	8.2	AO ≤ 500	1.0	mg/L	2023-11-21	

Calculated Parameters

Nitrate+Nitrite (as N)	0.0448	N/A	0.0100	mg/L	N/A	
Nitrogen, Total	0.205	N/A	0.0500	mg/L	N/A	

General Parameters

Ammonia, Total (as N)	0.053	None Required	0.050	mg/L	2023-11-20	
Conductivity (EC)	123	N/A	2.0	µS/cm	2023-11-21	
Nitrogen, Total Kjeldahl	0.160	N/A	0.050	mg/L	2023-11-23	
pH	7.59	7.0-10.5	0.10	pH units	2023-11-21	HT2
Phosphorus, Total (as P)	0.0061	N/A	0.0050	mg/L	2023-11-22	
Phosphorus, Total Dissolved	< 0.0050	N/A	0.0050	mg/L	2023-11-22	
Turbidity	0.68	OG < 1	0.10	NTU	2023-11-21	

Microbiological Parameters

Coliforms, Total (Q-Tray)	210	MAC = 0	1	MPN/100 mL	2023-11-20	
Coliforms, Fecal (Q-Tray)	< 1	N/A	1	MPN/100 mL	2023-11-20	
E. coli (Q-Tray)	< 1	MAC = 0	1	MPN/100 mL	2023-11-20	

Vance Creek (Mabel Lake Rd) (23K2196-07) | Matrix: Water | Sampled: 2023-11-19

FILT, PRES

Anions

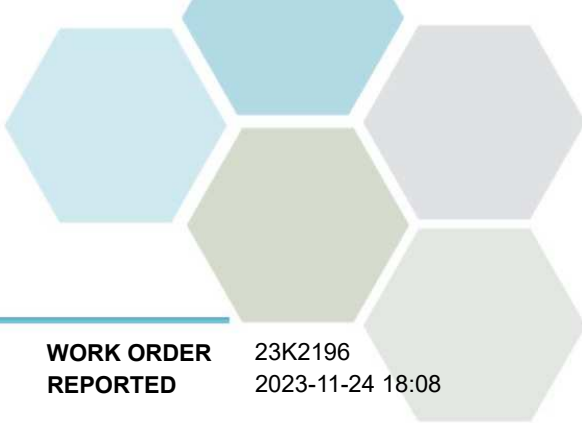
Chloride	4.05	AO ≤ 250	0.10	mg/L	2023-11-21	
Nitrate (as N)	0.031	MAC = 10	0.010	mg/L	2023-11-21	
Nitrite (as N)	< 0.010	MAC = 1	0.010	mg/L	2023-11-21	
Sulfate	42.1	AO ≤ 500	1.0	mg/L	2023-11-21	

Calculated Parameters

Nitrate+Nitrite (as N)	0.0308	N/A	0.0100	mg/L	N/A	
Nitrogen, Total	0.133	N/A	0.0500	mg/L	N/A	

General Parameters

Ammonia, Total (as N)	< 0.050	None Required	0.050	mg/L	2023-11-20	
Conductivity (EC)	415	N/A	2.0	µS/cm	2023-11-21	
Nitrogen, Total Kjeldahl	0.102	N/A	0.050	mg/L	2023-11-23	
pH	8.16	7.0-10.5	0.10	pH units	2023-11-21	HT2
Phosphorus, Total (as P)	0.0181	N/A	0.0050	mg/L	2023-11-22	
Phosphorus, Total Dissolved	< 0.0050	N/A	0.0050	mg/L	2023-11-22	
Turbidity	0.42	OG < 1	0.10	NTU	2023-11-21	



TEST RESULTS

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Analytical Testing

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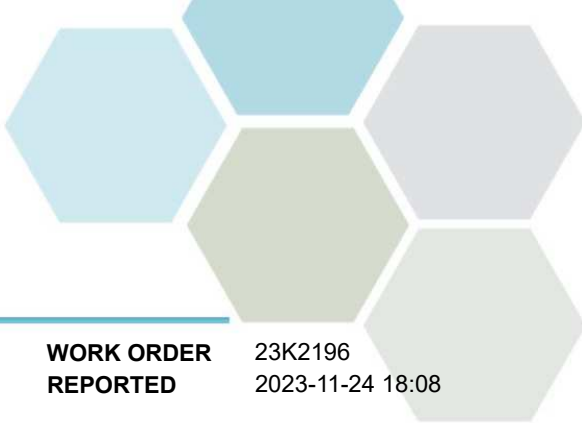
Analyte	Result	Guideline	RL	Units	Analyzed	Qualifier
Vance Creek (Mabel Lake Rd) (23K2196-07) Matrix: Water Sampled: 2023-11-19, Continued						FILT, PRES

Microbiological Parameters

Coliforms, Total (Q-Tray)	135	MAC = 0	1	MPN/100 mL	2023-11-20	
Coliforms, Fecal (Q-Tray)	17	N/A	1	MPN/100 mL	2023-11-20	
E. coli (Q-Tray)	15	MAC = 0	1	MPN/100 mL	2023-11-20	

Sample Qualifiers:

FILT The sample has been filtered for TDP 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 TDP 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 23K2196
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Analysis Description	Method Ref.	Technique	Accredited	Location
Ammonia, Total in Water	SM 4500-NH3 G* (2021)	Automated Colorimetry (Phenate)	✓	Kelowna
Anions in Water	SM 4110 B (2020)	Ion Chromatography	✓	Kelowna
Coliforms, Fecal in Water	SM 9223 (2016)	Quanti-Tray / Enzyme Substrate Endo Agar	✓	Kelowna
Coliforms, Total in Water	SM 9223 (2016)	Quanti-Tray / Enzyme Substrate Endo Agar	✓	Kelowna
Conductivity in Water	SM 2510 B (2021)	Conductivity Meter	✓	Kelowna
E. coli in Water	SM 9223 (2016)	Quanti-Tray / Enzyme Substrate Endo Agar	✓	Kelowna
Nitrogen, Total Kjeldahl in Water	SM 4500-Norg D* (2021)	Block Digestion and Flow Injection Analysis	✓	Kelowna
pH in Water	SM 4500-H+ B (2021)	Electrometry	✓	Kelowna
Phosphorus, Total Dissolved in Water	SM 4500-P B.5* (2011) / SM 4500-P F (2021)	Persulfate Digestion / Automated Colorimetry (Ascorbic Acid)	✓	Kelowna
Phosphorus, Total in Water	SM 4500-P B.5* (2011) / SM 4500-P F (2021)	Persulfate Digestion / Automated Colorimetry (Ascorbic Acid)	✓	Kelowna
Turbidity in Water	SM 2130 B (2020)	Nephelometry	✓	Kelowna

Note: An asterisk in the Method Reference indicates that the CARO method has been modified from the reference method

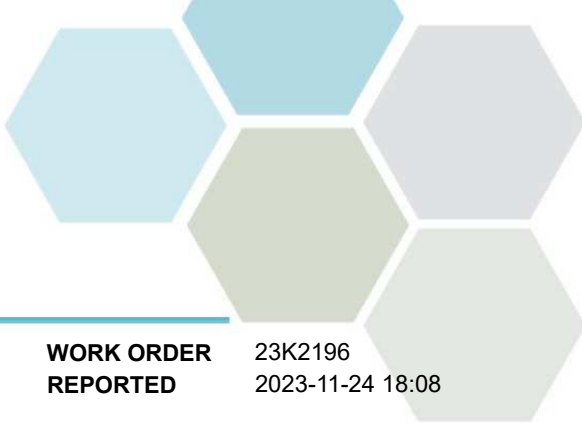
Glossary of Terms:

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 \(Health Canada, September 2022\)](#)

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:

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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

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