

## CERTIFICATE OF ANALYSIS

<b>REPORTED TO</b>	Yukon Government - Department of Education 1000 Lewes Blvd. Whitehorse, YT Y1A 6N2	<b>WORK ORDER</b>	9011378
<b>ATTENTION</b>	Miles Hume	<b>RECEIVED / TEMP REPORTED</b>	2019-01-17 13:15 / 7°C 2019-01-29 14:09
<b>PO NUMBER</b>			
<b>PROJECT</b>	Department of Education 2018 Water Testing Program		
<b>PROJECT INFO</b>	Contract No. C00044694		

### 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.

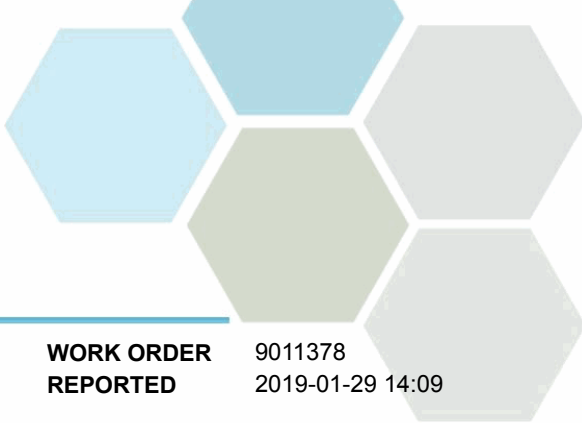
If you have any questions or concerns, please contact me at [bshaw@caro.ca](mailto:bshaw@caro.ca)

#### Authorized By:

Bryan Shaw, Ph.D., P.Chem.  
Client Service Coordinator

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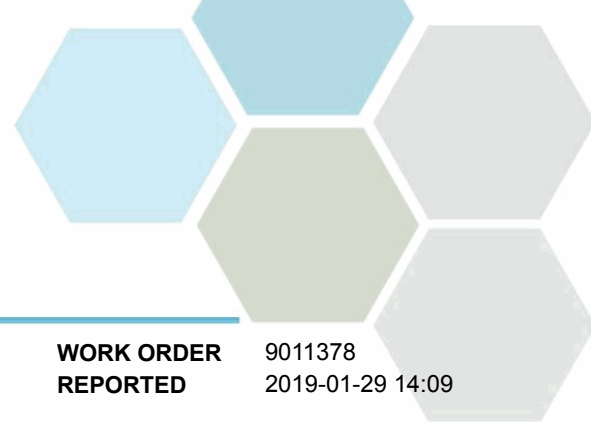


## TEST RESULTS

**REPORTED TO PROJECT** Yukon Government - Department of Education  
Department of Education 2018 Water Testing Program

**WORK ORDER REPORTED** 9011378  
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Analyte	Result	RL	Units	Analyzed	Qualifier
<b>DF-5 (9011378-01)   Matrix: Water   Sampled: 2019-01-08 07:10</b>					
<i>Total Metals</i>					
Lead, total	0.86	0.20	µg/L	2019-01-26	
<b>KS-6 (9011378-02)   Matrix: Water   Sampled: 2019-01-08 07:10</b>					
<i>Total Metals</i>					
Lead, total	15.7	0.20	µg/L	2019-01-26	
<b>CS-6 (9011378-03)   Matrix: Water   Sampled: 2019-01-08 07:10</b>					
<i>Total Metals</i>					
Lead, total	13.2	0.20	µg/L	2019-01-26	
<b>CS-7 (9011378-04)   Matrix: Water   Sampled: 2019-01-08 07:10</b>					
<i>Total Metals</i>					
Lead, total	15.8	0.20	µg/L	2019-01-26	
<b>CS-8a (9011378-05)   Matrix: Water   Sampled: 2019-01-08 07:15</b>					
<i>Total Metals</i>					
Lead, total	30.7	0.20	µg/L	2019-01-26	
<b>CS-9 (9011378-06)   Matrix: Water   Sampled: 2019-01-08 07:15</b>					
<i>Total Metals</i>					
Lead, total	184	0.20	µg/L	2019-01-26	
<b>CS-10 (9011378-07)   Matrix: Water   Sampled: 2019-01-08 07:15</b>					
<i>Total Metals</i>					
Lead, total	78.4	0.20	µg/L	2019-01-26	
<b>CS-11 (9011378-08)   Matrix: Water   Sampled: 2019-01-08 07:15</b>					
<i>Total Metals</i>					
Lead, total	3650	0.20	µg/L	2019-01-26	
<b>CS-12 (9011378-09)   Matrix: Water   Sampled: 2019-01-08 07:15</b>					
<i>Total Metals</i>					

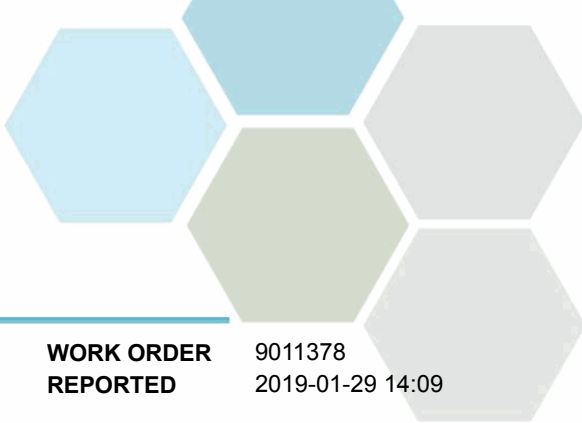


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Analyte	Result	RL	Units	Analyzed	Qualifier
<b>CS-12 (9011378-09)   Matrix: Water   Sampled: 2019-01-08 07:15, Continued</b>					
<i>Total Metals, Continued</i>					
Lead, total	16.5	0.20	µg/L	2019-01-26	
<b>CS-13 (9011378-10)   Matrix: Water   Sampled: 2019-01-08 07:20</b>					
<i>Total Metals</i>					
Lead, total	14.0	0.20	µg/L	2019-01-26	
<b>CS-14 (9011378-11)   Matrix: Water   Sampled: 2019-01-08 07:20</b>					
<i>Total Metals</i>					
Lead, total	16.4	0.20	µg/L	2019-01-26	
<b>CS-15 (9011378-12)   Matrix: Water   Sampled: 2019-01-08 07:20</b>					
<i>Total Metals</i>					
Lead, total	37.6	0.20	µg/L	2019-01-26	
<b>CS-16 (9011378-13)   Matrix: Water   Sampled: 2019-01-08 07:20</b>					
<i>Total Metals</i>					
Lead, total	9.79	0.20	µg/L	2019-01-26	
<b>CS-17 (9011378-14)   Matrix: Water   Sampled: 2019-01-08 07:25</b>					
<i>Total Metals</i>					
Lead, total	11.8	0.20	µg/L	2019-01-26	
<b>CS-18 (9011378-15)   Matrix: Water   Sampled: 2019-01-08 07:25</b>					
<i>Total Metals</i>					
Lead, total	15.7	0.20	µg/L	2019-01-26	
<b>CS-19 (9011378-16)   Matrix: Water   Sampled: 2019-01-08 07:25</b>					
<i>Total Metals</i>					
Lead, total	30.9	0.20	µg/L	2019-01-26	
<b>CS-20 (9011378-17)   Matrix: Water   Sampled: 2019-01-08 07:25</b>					
<i>Total Metals</i>					

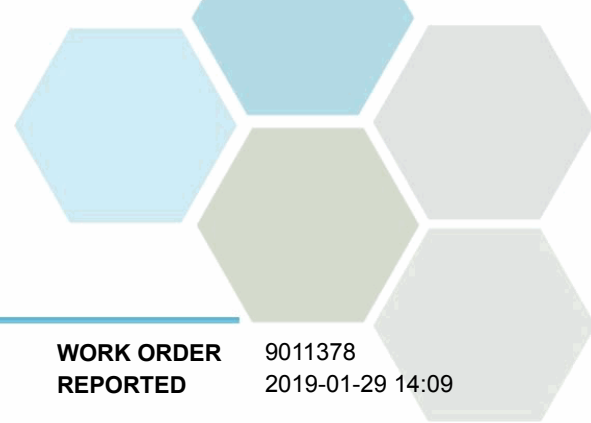


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Analyte	Result	RL	Units	Analyzed	Qualifier
<b>CS-20 (9011378-17)   Matrix: Water   Sampled: 2019-01-08 07:25, Continued</b>					
<i>Total Metals, Continued</i>					
Lead, total	4.63	0.20	µg/L	2019-01-26	
<b>BS-2 (9011378-18)   Matrix: Water   Sampled: 2019-01-08 07:25</b>					
<i>Total Metals</i>					
Lead, total	24.4	0.20	µg/L	2019-01-26	
<b>BS-4 (9011378-19)   Matrix: Water   Sampled: 2019-01-08 07:30</b>					
<i>Total Metals</i>					
Lead, total	24.5	0.20	µg/L	2019-01-26	
<b>BS-5 (9011378-20)   Matrix: Water   Sampled: 2019-01-08 07:30</b>					
<i>Total Metals</i>					
Lead, total	25.5	0.20	µg/L	2019-01-26	
<b>BS-6 (9011378-21)   Matrix: Water   Sampled: 2019-01-08 07:30</b>					
<i>Total Metals</i>					
Lead, total	14.2	0.20	µg/L	2019-01-26	
<b>BS-7 (9011378-22)   Matrix: Water   Sampled: 2019-01-08 07:30</b>					
<i>Total Metals</i>					
Lead, total	7.08	0.20	µg/L	2019-01-26	
<b>BS-8 (9011378-23)   Matrix: Water   Sampled: 2019-01-08 07:30</b>					
<i>Total Metals</i>					
Lead, total	7.44	0.20	µg/L	2019-01-26	
<b>BS-9 (9011378-24)   Matrix: Water   Sampled: 2019-01-08 07:35</b>					
<i>Total Metals</i>					
Lead, total	10.2	0.20	µg/L	2019-01-26	
<b>BS-10 (9011378-25)   Matrix: Water   Sampled: 2019-01-08 07:35</b>					
<i>Total Metals</i>					

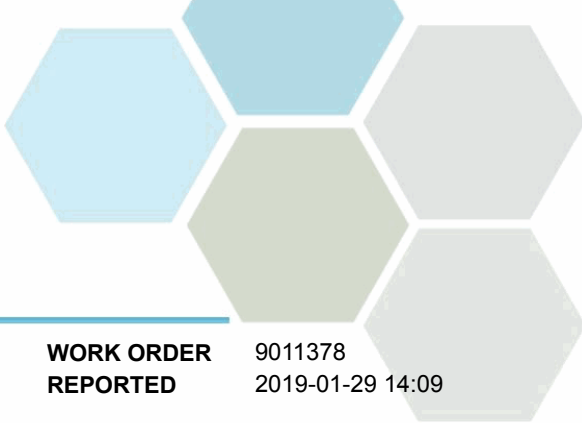


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Analyte	Result	RL	Units	Analyzed	Qualifier
<b>BS-10 (9011378-25)   Matrix: Water   Sampled: 2019-01-08 07:35, Continued</b>					
<i>Total Metals, Continued</i>					
Lead, total	28.3	0.20	µg/L	2019-01-26	
<b>BS-11 (9011378-26)   Matrix: Water   Sampled: 2019-01-08 07:35</b>					
<i>Total Metals</i>					
Lead, total	27.1	0.20	µg/L	2019-01-26	
<b>BS-12 (9011378-27)   Matrix: Water   Sampled: 2019-01-08 07:35</b>					
<i>Total Metals</i>					
Lead, total	30.8	0.20	µg/L	2019-01-26	
<b>BS-13 (9011378-28)   Matrix: Water   Sampled: 2019-01-08 07:40</b>					
<i>Total Metals</i>					
Lead, total	59.0	0.20	µg/L	2019-01-26	
<b>BS-14 (9011378-29)   Matrix: Water   Sampled: 2019-01-08 07:40</b>					
<i>Total Metals</i>					
Lead, total	14.0	0.20	µg/L	2019-01-26	
<b>BS-15 (9011378-30)   Matrix: Water   Sampled: 2019-01-08 07:40</b>					
<i>Total Metals</i>					
Lead, total	17.0	0.20	µg/L	2019-01-26	
<b>BS-16 (9011378-31)   Matrix: Water   Sampled: 2019-01-08 07:40</b>					
<i>Total Metals</i>					
Lead, total	23.8	0.20	µg/L	2019-01-26	
<b>BS-17 (9011378-32)   Matrix: Water   Sampled: 2019-01-08 07:45</b>					
<i>Total Metals</i>					
Lead, total	16.4	0.20	µg/L	2019-01-26	
<b>BS-18 (9011378-33)   Matrix: Water   Sampled: 2019-01-08 07:45</b>					
<i>Total Metals</i>					

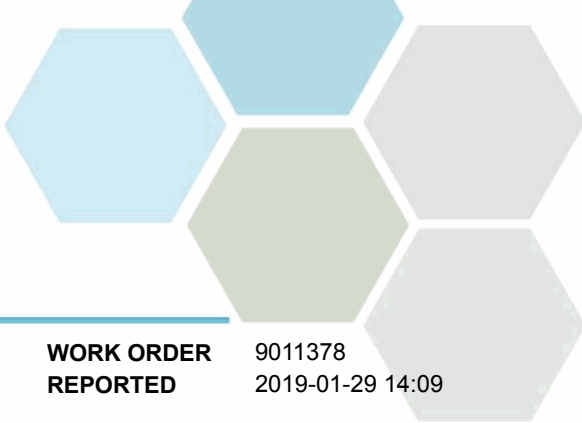


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Analyte	Result	RL	Units	Analyzed	Qualifier
<b>BS-18 (9011378-33)   Matrix: Water   Sampled: 2019-01-08 07:45, Continued</b>					
<i>Total Metals, Continued</i>					
Lead, total	11.5	0.20	µg/L	2019-01-26	
<b>BS-21 (9011378-34)   Matrix: Water   Sampled: 2019-01-08 07:45</b>					
<i>Total Metals</i>					
Lead, total	18.0	0.20	µg/L	2019-01-26	
<b>BS-24 (9011378-35)   Matrix: Water   Sampled: 2019-01-08 07:45</b>					
<i>Total Metals</i>					
Lead, total	12.4	0.20	µg/L	2019-01-26	
<b>DF99-New Fountain in Boys Change Room (9011378-36)   Matrix: Water   Sampled: 2019-01-08 07:45</b>					
<i>Total Metals</i>					
Lead, total	12.4	0.20	µg/L	2019-01-26	
<b>CS24 (9011378-37)   Matrix: Water   Sampled: 2019-01-08 07:45</b>					
<i>Total Metals</i>					
Lead, total	20.1	0.20	µg/L	2019-01-26	



## APPENDIX 1: SUPPORTING INFORMATION

**REPORTED TO PROJECT** Yukon Government - Department of Education  
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Analysis Description	Method Ref.	Technique	Location
Total Metals in Water	EPA 200.2* / EPA 6020B	HNO <sub>3</sub> +HCl Hot Block Digestion / Inductively Coupled Plasma-Mass Spectroscopy (ICP-MS)	Richmond

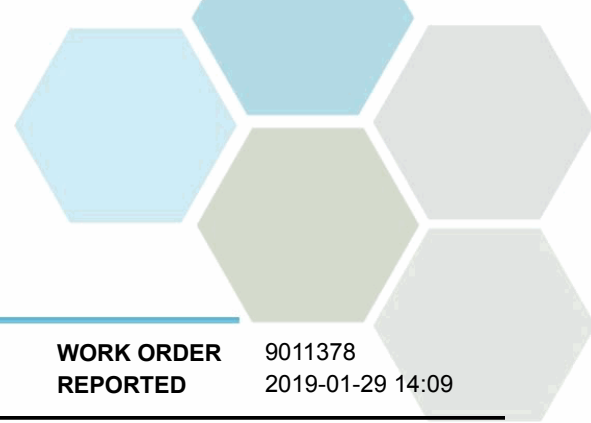
*Note: An asterisk in the Method Reference indicates that the CARO method has been modified from the reference method*

### Glossary of Terms:

RL	Reporting Limit (default)
µg/L	Micrograms per litre
EPA	United States Environmental Protection Agency Test Methods

### 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.



## APPENDIX 2: QUALITY CONTROL RESULTS

**REPORTED TO PROJECT** Yukon Government - Department of Education  
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The following section displays the quality control (QC) data that is associated with your sample data. Groups of samples are prepared in "batches" and analyzed in conjunction with QC samples that ensure your data is of the highest quality. Common QC types include:

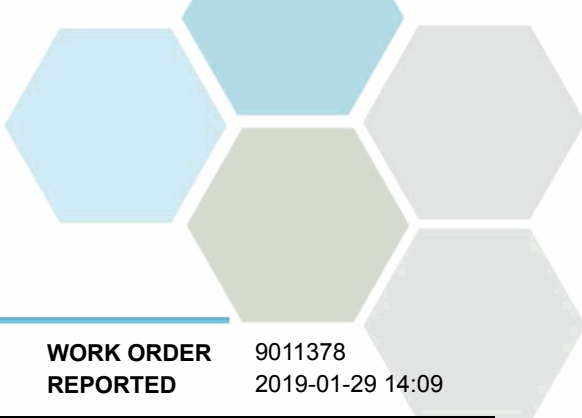
- **Method Blank (Blk):** A blank sample that undergoes sample processing identical to that carried out for the test samples. Method blank results are used to assess contamination from the laboratory environment and reagents.
- **Duplicate (Dup):** An additional or second portion of a randomly selected sample in the analytical run carried through the entire analytical process. Duplicates provide a measure of the analytical method's precision (reproducibility).
- **Blank Spike (BS):** A sample of known concentration which undergoes processing identical to that carried out for test samples, also referred to as a laboratory control sample (LCS). Blank spikes provide a measure of the analytical method's accuracy.
- **Matrix Spike (MS):** A second aliquot of sample is fortified with with a known concentration of target analytes and carried through the entire analytical process. Matrix spikes evaluate potential matrix effects that may affect the analyte recovery.
- **Reference Material (SRM):** A homogenous material of similar matrix to the samples, certified for the parameter(s) listed. Reference Materials ensure that the analytical process is adequate to achieve acceptable recoveries of the parameter(s) tested.

Each QC type is analyzed at a 5-10% frequency, i.e. one blank/duplicate/spike for every 10-20 samples. For all types of QC, the specified recovery (% Rec) and relative percent difference (RPD) limits are derived from long-term method performance averages and/or prescribed by the reference method.

Analyte	Result	RL Units	Spike Level	Source Result	% REC	REC Limit	% RPD	RPD Limit	Qualifier
<b>Total Metals, Batch B9A1665</b>									
<b>Blank (B9A1665-BLK1)</b>			Prepared: 2019-01-24, Analyzed: 2019-01-26						
Lead, total	< 0.20	0.20 µg/L							
<b>Blank (B9A1665-BLK2)</b>			Prepared: 2019-01-24, Analyzed: 2019-01-26						
Lead, total	< 0.20	0.20 µg/L							
<b>Blank (B9A1665-BLK3)</b>			Prepared: 2019-01-24, Analyzed: 2019-01-26						
Lead, total	< 0.20	0.20 µg/L							
<b>LCS (B9A1665-BS1)</b>			Prepared: 2019-01-24, Analyzed: 2019-01-26						
Lead, total	21.1	0.20 µg/L	20.0		106	80-120			
<b>Reference (B9A1665-SRM1)</b>			Prepared: 2019-01-24, Analyzed: 2019-01-26						
Lead, total	79.7	0.20 µg/L	81.6		98	90-110			
<b>Total Metals, Batch B9A1666</b>									
<b>Blank (B9A1666-BLK1)</b>			Prepared: 2019-01-24, Analyzed: 2019-01-26						
Lead, total	< 0.20	0.20 µg/L							
<b>Blank (B9A1666-BLK2)</b>			Prepared: 2019-01-24, Analyzed: 2019-01-26						
Lead, total	< 0.20	0.20 µg/L							
<b>Blank (B9A1666-BLK3)</b>			Prepared: 2019-01-24, Analyzed: 2019-01-26						
Lead, total	< 0.20	0.20 µg/L							
<b>LCS (B9A1666-BS1)</b>			Prepared: 2019-01-24, Analyzed: 2019-01-26						
Lead, total	20.8	0.20 µg/L	20.0		104	80-120			
<b>Duplicate (B9A1666-DUP1)</b>			Source: 9011378-17 Prepared: 2019-01-24, Analyzed: 2019-01-26						
Lead, total	4.71	0.20 µg/L		4.63			2	20	
<b>Reference (B9A1666-SRM1)</b>			Prepared: 2019-01-24, Analyzed: 2019-01-26						
Lead, total	80.4	0.20 µg/L	81.6		99	90-110			

**Total Metals, Batch B9A1667**





## APPENDIX 2: QUALITY CONTROL RESULTS

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Analyte	Result	RL Units	Spike Level	Source Result	% REC	REC Limit	% RPD	RPD Limit	Qualifier
<b>Total Metals, Batch B9A1667, Continued</b>									
<b>Blank (B9A1667-BLK1)</b>			Prepared: 2019-01-24, Analyzed: 2019-01-26						
Lead, total	< 0.20	0.20 µg/L							
<b>Blank (B9A1667-BLK2)</b>			Prepared: 2019-01-24, Analyzed: 2019-01-26						
Lead, total	< 0.20	0.20 µg/L							
<b>Blank (B9A1667-BLK3)</b>			Prepared: 2019-01-24, Analyzed: 2019-01-26						
Lead, total	< 0.20	0.20 µg/L							
<b>LCS (B9A1667-BS1)</b>			Prepared: 2019-01-24, Analyzed: 2019-01-26						
Lead, total	20.7	0.20 µg/L	20.0		103	80-120			
<b>Duplicate (B9A1667-DUP1)</b>			Source: 9011378-37 Prepared: 2019-01-24, Analyzed: 2019-01-26						
Lead, total	18.6	0.20 µg/L		20.1			7	20	
<b>Reference (B9A1667-SRM1)</b>			Prepared: 2019-01-24, Analyzed: 2019-01-26						
Lead, total	80.0	0.20 µg/L	81.6		98	90-110			