

# **CERTIFICATE OF ANALYSIS (GUIDELINE EVALUATION)**

Work Order	: VA22C7286	Page	: 1 of 3
Client	: Vancouver School Board	Laboratory	: Vancouver - Environmental
Contact	: Stephen Thomas	Account Manager	ː Tasnia Tarannum
Address	: 1549 Clark Drive Vancouver BC Canada V5L 3L4	Address	: 8081 Lougheed Highway Burnaby, British Columbia Canada V5A 1W9
Telephone	:	Telephone	: +1 604 253 4188
Project	: Champlain Annex	Date Samples Received	: 09-Nov-2022 15:00
PO	:	Date Analysis Commenced	: 15-Nov-2022
C-O-C number	: 20-1016776	Issue Date	: 17-Nov-2022 09:31
Sampler	: R. Lemay		
Site	:		
Quote number	:		
No. of samples received	: 2		
No. of samples analysed	: 2		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Guideline Comparison

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QC Interpretive report to assist with Quality Review and Sample Receipt Notification (SRN).

### Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	Position	Laboratory Department
Kim Jensen	Department Manager - Metals	Metals, Burnaby, British Columbia



## **No Breaches Found**

#### **General Comments**

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Refer to the ALS Quality Control Interpretive report (QCI) for applicable references and methodology summaries. Reference methods may incorporate modifications to improve performance.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Application of guidelines is provided "as is" without warranty of any kind, either expressed or implied, including, but not limited to fitness for a particular purpose, or non-infringement. ALS assumes no responsibility for errors or omissions in the information. Guidelines are not adjusted for the hardness, pH or temperature of the sample (the most conservative values are used). Measurement uncertainty is not applied to test results prior to comparison with specified criteria values.

Key : LOR: Limit of Reporting (detection limit).

Unit	Description
mg/L	milligrams per litre

>: greater than.

<: less than.

Red shading is applied where the result is greater than the Guideline Upper Limit or the result is lower than the Guideline Lower Limit.

For drinking water samples, Red shading is applied where the result for E.coli, fecal or total coliforms is greater than or equal to the Guideline Upper Limit.



# Analytical Results Evaluation

Matrix:	Client sample ID									
Sampling date/time										
Sub-Matrix										
Analyte	CAS Number	Unit								
		-								
Please refer to the General Commen	Please refer to the General Comments section for an explanation of any qualifiers detected.									
lead, total		7439-92-1	mg/L							

# ALS Canada Ltd.



	QUALITY CONTROL INTERPRETIVE REPORT								
Work Order	:VA22C7286	Page	: 1 of 5						
Client	Vancouver School Board	Laboratory	: Vancouver - Environmental						
Contact	: Stephen Thomas	Account Manager	: Tasnia Tarannum						
Address	: 1549 Clark Drive	Address	: 8081 Lougheed Highway						
	Vancouver BC Canada V5L 3L4		Burnaby, British Columbia Canada V5A 1W9						
Telephone	:	Telephone	: +1 604 253 4188						
Project	: Champlain Annex	Date Samples Received	: 09-Nov-2022 15:00						
PO	:	Issue Date	: 17-Nov-2022 09:38						
C-O-C number	: 20-1016776								
Sampler	: R. Lemay								
Site	:								
Quote number	:								
No. of samples received	:2								
No. of samples analysed	:2								

This report is automatically generated by the ALS LIMS (Laboratory Information Management System) through evaluation of Quality Control (QC) results and other QA parameters associated with this submission, and is intended to facilitate rapid data validation by auditors or reviewers. The report highlights any exceptions and outliers to ALS Data Quality Objectives, provides holding time details and exceptions, summarizes QC sample frequencies, and lists applicable methodology references and summaries.

#### Key

Anonymous: Refers to samples which are not part of this work order, but which formed part of the QC process lot.

CAS Number: Chemical Abstracts Service number is a unique identifier assigned to discrete substances.

DQO: Data Quality Objective.

LOR: Limit of Reporting (detection limit).

RPD: Relative Percent Difference.

## Workorder Comments

Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

# Summary of Outliers Outliers : Quality Control Samples

- No Method Blank value outliers occur.
- No Duplicate outliers occur.
- No Laboratory Control Sample (LCS) outliers occur
- No Matrix Spike outliers occur.
- No Test sample Surrogate recovery outliers exist.

#### **Outliers: Reference Material (RM) Samples**

• No Reference Material (RM) Sample outliers occur.

# Outliers : Analysis Holding Time Compliance (Breaches) <u>No</u> Analysis Holding Time Outliers exist.

# Outliers : Frequency of Quality Control Samples • No Quality Control Sample Frequency Outliers occur.



# Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times, which are selected to meet known provincial and /or federal requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by organizations such as CCME, US EPA, APHA Standard Methods, ASTM, or Environment Canada (where available). Dates and holding times reported below represent the first dates of extraction or analysis. If subsequent tests or dilutions exceeded holding times, qualifiers are added (refer to COA).

If samples are identified below as having been analyzed or extracted outside of recommended holding times, measurement uncertainties may be increased, and this should be taken into consideration when interpreting results.

Where actual sampling date is not provided on the chain of custody, the date of receipt with time at 00:00 is used for calculation purposes.

Where only the sample date without time is provided on the chain of custody, the sampling date at 00:00 is used for calculation purposes.

Matrix: Water					Ev	aluation: × =	Holding time excee	edance ; •	🗸 = Within	Holding Time
Analyte Group	Method	Sampling Date	Ext	raction / Pr	eparation		Analysis			
Container / Client Sample ID(s)			Preparation	Holding	g Times	Eval	Analysis Date	Holding	g Times	Eval
			Date	Rec	Actual			Rec	Actual	
Total Metals : Total metals in Water by CRC ICPMS										
HDPE - total (lab preserved) Corr 120 Rm121 Bottle Filter	E420	09-Nov-2022	15-Nov-2022				16-Nov-2022	180 days	7 days	√
Total Metals : Total metals in Water by CRC ICPMS										
HDPE - total (lab preserved) Corr 120 Rm129 SS DF	E420	09-Nov-2022	15-Nov-2022				16-Nov-2022	180 days	7 days	*

Legend & Qualifier Definitions

Rec. HT: ALS recommended hold time (see units).



# **Quality Control Parameter Frequency Compliance**

The following report summarizes the frequency of laboratory QC samples analyzed within the analytical batches (QC lots) in which the submitted samples were processed. The actual frequency should be greater than or equal to the expected frequency.

Matrix: Water	Evaluation: × = QC frequency outside specification; ✓ = QC frequency within speci							
Quality Control Sample Type			Co	ount		)		
Analytical Methods	Method	QC Lot #	QC	Regular	Actual	Expected	Evaluation	
Laboratory Duplicates (DUP)								
Total metals in Water by CRC ICPMS	E420	741412	1	16	6.2	5.0	✓	
Laboratory Control Samples (LCS)								
Total metals in Water by CRC ICPMS	E420	741412	1	16	6.2	5.0	1	
Method Blanks (MB)								
Total metals in Water by CRC ICPMS	E420	741412	1	16	6.2	5.0	✓	
Matrix Spikes (MS)								
Total metals in Water by CRC ICPMS	E420	741412	1	16	6.2	5.0	✓	



# Methodology References and Summaries

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Reference methods may incorporate modifications to improve performance (indicated by "mod").

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Total metals in Water by CRC ICPMS	E420	Water	EPA 200.2/6020B (mod)	Water samples are digested with nitric and hydrochloric acids, and analyzed by Collision/Reaction Cell ICPMS.
	Vancouver - Environmental			Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

# ALS Canada Ltd.



#### **QUALITY CONTROL REPORT** Work Order Page :VA22C7286 : 1 of 3 Client : Vancouver School Board Laboratory : Vancouver - Environmental Stephen Thomas Account Manager : Tasnia Tarannum Contact Address Address : 1549 Clark Drive :8081 Lougheed Highway Vancouver BC Canada V5L 3L4 Burnaby, British Columbia Canada V5A 1W9 Telephone Telephone :+1 604 253 4188 Project : Champlain Annex Date Samples Received :09-Nov-2022 15:00 PO **Date Analysis Commenced** :15-Nov-2022 :----C-O-C number Issue Date :20-1016776 :17-Nov-2022 09:31 Sampler : R. Lemay ----Site · \_\_\_\_ Quote number ----No. of samples received 2 No. of samples analysed 2

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percent Difference (RPD) and Data Quality Objectives
- Matrix Spike (MS) Report; Recovery and Data Quality Objectives
- Method Blank (MB) Report; Recovery and Data Quality Objectives
- Laboratory Control Sample (LCS) Report; Recovery and Data Quality Objectives

# Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	Position	Laboratory Department
Kim Jensen	Department Manager - Metals	Vancouver Metals, Burnaby, British Columbia

Page :	2 of 3
Work Order :	VA22C7286
Client :	Vancouver School Board
Project :	Champlain Annex



### **General Comments**

The ALS Quality Control (QC) report is optionally provided to ALS clients upon request. ALS test methods include comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against predetermined Data Quality Objectives (DQOs) to provide confidence in the accuracy of associated test results. This report contains detailed results for all QC results applicable to this sample submission. Please refer to the ALS Quality Control Interpretation report (QCI) for applicable method references and methodology summaries.

Key :

Anonymous = Refers to samples which are not part of this work order, but which formed part of the QC process lot. CAS Number = Chemical Abstracts Service number is a unique identifier assigned to discrete substances.

DQO = Data Quality Objective.

LOR = Limit of Reporting (detection limit).

RPD = Relative Percent Difference

# = Indicates a QC result that did not meet the ALS DQO.

#### Workorder Comments

Holding times are displayed as "----" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

# Laboratory Duplicate (DUP) Report

A Laboratory Duplicate (DUP) is a randomly selected intralaboratory replicate sample. Laboratory Duplicates provide information regarding method precision and sample heterogeneity. ALS DQOs for Laboratory Duplicates are expressed as test-specific limits for Relative Percent Difference (RPD), or as an absolute difference limit of 2 times the LOR for low concentration duplicates within ~ 4-10 times the LOR (cut-off is test-specific).

Sub-Matrix: Water			Laboratory Duplicate (DUP) Report								
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
Total Metals (QC Lo	Total Metals (QC Lot: 741412)										
FJ2203172-001	Anonymous	lead, total	7439-92-1	E420	0.000050	mg/L	0.000211	0.000225	0.000015	Diff <2x LOR	

# Method Blank (MB) Report

A Method Blank is an analyte-free matrix that undergoes sample processing identical to that carried out for test samples. Method Blank results are used to monitor and control for potential contamination from the laboratory environment and reagents. For most tests, the DQO for Method Blanks is for the result to be < LOR.

Sub-Matrix: Water

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Total Metals (QCLot: 741412)						
lead, total	7439-92-1	E420	0.00005	mg/L	<0.000050	



# Laboratory Control Sample (LCS) Report

A Laboratory Control Sample (LCS) is an analyte-free matrix that has been fortified (spiked) with test analytes at known concentration and processed in an identical manner to test samples. LCS results are expressed as percent recovery, and are used to monitor and control test method accuracy and precision, independent of test sample matrix.

Sub-Matrix: Water					Laboratory Control Sample (LCS) Report						
					Spike Recovery (%)		Recovery				
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier		
Total Metals (QCLot: 741412)											
lead, total	7439-92-1	E420	0.00005	mg/L	0.5 mg/L	102	80.0	120			

# Matrix Spike (MS) Report

A Matrix Spike (MS) is a randomly selected intra-laboratory replicate sample that has been fortified (spiked) with test analytes at known concentration, and processed in an identical manner to test samples. Matrix Spikes provide information regarding analyte recovery and potential matrix effects. MS DQO exceedances due to sample matrix may sometimes be unavoidable; in such cases, test results for the associated sample (or similar samples) may be subject to bias. ND – Recovery not determined, background level >= 1x spike level.

Sub-Matrix: Water					Matrix Spike (MS) Report								
						ike	Recovery (%) Recovery Lin		imits (%)				
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier			
Total Metals (QC	Lot: 741412)												
FJ2203175-001	Anonymous	lead, total	7439-92-1	E420	0.0358 mg/L	0.04 mg/L	89.6	70.0	130				



COC Number: 20 - 1016776

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#### Canada Toll Free: 1 800 668 9878

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Contact:	Stephen Thomas		Merge QC/QCI Reports with COA I YES NO N/A				4 day [P4] if received by 3pm M-F - 20% rush surcharge minimum						· .	6 M	in the second	ers Ma	1756	5881. 		
Phone:	604 713-5637		Compare Results to Criteria on Report - provide details below if box checked				3 day [P3] if received by 3pm M-F - 25% rush surcharge minimum						~ 物	AFFIX ALS BARCODE LABEL HERE (ALS use only)						
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REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

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Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY. By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy.

1. If any water samples are taken from a Regulated Drinking Water (DW) System, please submit using an Authorized DW COC form.

# Results Summary VA22C7286

Project	Champlain Annex								
Report To	Stephen Thomas, Vancouver School Board								
Date Received	09-Nov-2022 15:00								
Issue Date	17-Nov-2022 09:31								
Amendment	0								
Client Sample ID Date Sampled			Corr 120 Rm121 Bottle Filter 09-Nov-2022	Corr 120 Rm129 SS DF 09-Nov-2022					
Time Sampled			08:09	08:12					
ALS Sample ID			VA22C7286-001	VA22C7286-002					
Analyte	Lowest Detection Limit	Units	Sub-Matrix: Water	Sub-Matrix: Water					
Total Metals (Matrix: Water)	0.000050	ma/l	0.00071	0.00226					
lead, total	0.000050	mg/L	0.000071	0.00236					