TOWN OF LADYSMITH - ARBUTUS WATER TREATMENT PLANT

FEBRUARY 2025 - MONTHLY REPORT

		Daily Flow			Chlorine	Residual					External	Lab Testing		
Date	Stocking Lake	Holland Creek	Combined Flow	Free Min	Free Max	Free Avg	Total	Ст≁	HPC	E.coli	Total	Aluminum	тнм	HAA
	m³	m³	m³	mg/l	mg/l	mg/l	mg/l	Minutes-mg/l	CFU	MPN	MPN	mg/l	mg/l	mg/l
01-Feb	3170	0	3170	1.03	1.13	0.97	1.13	148						
02-Feb	3139	0	3139	0.99	1.18	0.98	1.18	134						
03-Feb	3386	0	3386	0.96	1.09	0.97	1.09	127						
04-Feb	3022	0	3022	0.96	1.06	0.97	1.06	160						
05-Feb	3111	0	3111	0.94	1.03	0.95	1.03	161						
06-Feb	3220	0	3220	0.97	1.07	0.96	1.07	161						
07-Feb	3373	0	3373	1.00	1.02	0.94	1.02	114						
08-Feb	3105	0	3105	0.94	1.21	0.96	1.21	161	< 1	< 1	< 1	0.0060	0.0165	0.0101
09-Feb	3433	0	3433	0.98	1.14	0.96	1.14	154						
10-Feb	3084	0	3084	0.97	1.01	0.96	1.01	160						
11-Feb	3315	0	3315	0.98	1.13	0.96	1.13	153						
12-Feb	3374	0	3374	0.94	1.08	0.95	1.08	136						
13-Feb	3369	0	3369	0.93	1.03	0.94	1.03	144						
14-Feb	3386	0	3386	0.96	1.06	0.95	1.06	150	< 1	< 1	< 1			
15-Feb	3353	0	3353	0.95	1.03	0.95	1.03	160						
16-Feb	3364	0	3364	0.97	1.08	0.96	1.08	161						
17-Feb	3495	0	3495	0.96	1.01	0.96	1.10	150						
18-Feb	3654	0	3654	0.98	1.07	0.98	1.07	143						
19-Feb	3412	0	3412	0.94	1.06	0.95	1.06	128						
20-Feb	3552	0	3552	0.97	1.04	0.95	1.04	126						
21-Feb	3526	0	3526	0.99	1.03	0.97	1.03	135	< 1	< 1	< 1			
22-Feb	3393	0	3393	1.00	1.13	0.98	1.13	155						
23-Feb	3403	0	3403	1.01	1.12	1.00	1.12	123						
24-Feb	3647	0	3647	1.01	1.06	0.96	1.06	120						
25-Feb	3491	0	3491	0.96	1.03	0.95	1.03	125						
26-Feb	3599	0	3599	0.93	1.01	0.94	1.01	121						
27-Feb	3477	0	3477	0.95	1.02	0.95	1.02	140						
28-Feb	3569	0	3569	0.98	1.03	0.95	1.03	134	< 1	< 1	< 1			
*CT - Record	led as the minimum val	lue at the highest daily	flow ** Manual Resid	ual were not tak	en									
Total	94422	0	94422											





Town of Ladysmith Arbutus DWTP

Monthly LRV and Turbidity Report

01/29/2025 - 03/01/2025

LRV Monthly Average

Asset	Parameter	Health	Avg	Std. De v	Points	LL	L	%In	% betw een L and LL	% < LL	Unit
UF 1	LRV		5.0	0.0	32	4.25	4.5	100 %	0 %	0 %	#
UF 2	LRV		5.0	0.0	33	4.25	4.5	100 %	0 %	0 %	#
UF 3	LRV		5.0	0.0	32	4.25	4.5	100 %	0%	0 %	#

LRV Daily Values

Asset	Parameter	Jan 29	Jan 30	Jan 31	Feb 0 1	Feb 0 2	Feb 0 3	Feb 0 4	Feb 0 5	Feb 0 6	Feb 0 7	Feb 0 8	Feb 0 9
UF 1	LRV	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
UF 2	LRV	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
UF 3	LRV	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0

Asset	Feb 1 0	Feb 1 1	Feb 1 2	Feb 1 3	Feb 1 4	Feb 1 5	Feb 1 6	Feb 1 7	Feb 1 8	Feb 1 9	Feb 2 0	Feb 2 1	Feb 2 2	Feb 2 3	Feb 2 4	Feb 2 5
UF 1	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
UF 2	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
UF 3	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0

Asset	Feb 2 6	Feb 2 7	Feb 2 8	Mar 0 1
UF 1	5.0	5.0	5.0	5.0
UF 2	5.0	5.0	5.0	5.0
UF 3	5.0	5.0	5.0	5.0

LRV Raw Data

UF 1 - LRV (#)







Turbidity Monthly Average

Asset	Parameter	Health	Avg	Std. De v	Points	н	нн	%In	% betw een H and HH	% > HH	Unit
UF 1	PermeateTurbidity		0.015	0.0	45214			100 %	0%	0 %	NTU
UF 2	PermeateTurbidity		0.015	0.0	45214			100 %	0 %	0 %	NTU
UF 3	PermeateTurbidity		0.018	0.0	45214			100 %	0 %	0 %	NTU
UF 1	PermeateTurbidityAfterBP		0.015	0.0	386	0.1	0.3	100 %	0%	0 %	NTU
UF 2	PermeateTurbidityAfterBP		0.015	0.0	393	0.1	0.3	100 %	0 %	0 %	NTU
UF 3	PermeateTurbidityAfterBP		0.018	0.0	375	0.1	0.3	100 %	0 %	0 %	NTU

Turbidity Daily Averages

Asset	Parameter	Jan 29	Jan 30	Jan 31	Feb 01	Feb 02	Feb 03	Feb 04	Feb 05	Feb 06	Feb 07	Feb 08
UF 1	PermeateTurbidity	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015
UF 2	PermeateTurbidity	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015
UF 3	PermeateTurbidity	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017

Asset		Param	eter	Ja	an 29	Jan 30	Jan	1 31 Fe	eb 01	Feb 02	2 Feb	0 0 3 F	eb 04	Feb O	5 Feb	b 06 I	Feb 07	' Fet	08
UF 1	Permea	ateTurbi	dityAfte	rBP C	.015	0.015	0.0	015 0	.015	0.015	0.0)15	0.015	0.015	0.0	015	0.015	0.0	15
UF 2	Permea	ateTurbi	dityAfte	rBP C	.015	0.015	0.0	015 0	.015	0.015	0.0)15	0.015	0.015	0.0	015	0.015	0.0	15
UF 3	Permea	ateTurbi	dityAfte	rBP C	.017	0.017	0.0	017 0	.017	0.017	0.0)17	0.017	0.017	0.0	017	0.017	0.0	17
					•				•				•				•		
Asset	Feb 09	Feb 10	Feb 11	Feb 1	2 Feb	13 Feb	14	Feb 15	5 Feb	16 Feb) 17	Feb 1	L8 Feb	19 Fe	o 20	Feb	21 Fet	022	Feb 23
UF 1	0.015	0.015	0.015	0.015	0.0	15 0.0	15	0.015	0.0	15 0.0)15	0.01	5 0.0	15 0.	015	0.01	.5 0.0)15	0.015
UF 2	0.015	0.015	0.015	0.015	0.0	15 0.0	15	0.015	0.0	15 0.0)15	0.01	5 0.0	15 0.	015	0.01	.5 0.0)15	0.015
UF 3	0.017	0.017	0.017	0.017	0.0	18 0.0	18	0.019	0.0	18 0.0)18	0.01	9 0.0	19 0.	019	0.01	.9 0.0)19	0.019
UF 1	0.015	0.015	0.015	0.015	0.0	15 0.0	15	0.015	0.0	15 0.0)15	0.01	5 0.0	15 0.0	015	0.01	.5 0.0)15	0.015
UF 2	0.016	0.015	0.015	0.015	0.0	15 0.0	15	0.015	0.0	15 0.0)15	0.01	5 0.0	15 0.0	015	0.01	.5 0.0)15	0.015
UF 3	0.017	0.018	0.018	0.018	0.0	18 0.0	19	0.019	0.0	19 0.0)19	0.01	9 0.0	19 0.	019	0.01	.9 0.0)19	0.019
Asset	Feb 24	Feb 25	Feb 26	Feb 2	7 Feb	28 Mar	· 01												
UF 1	0.015	0.015	0.015	0.015	0.0	15 0.0	15												
UF 2	0.015	0.015	0.015	0.015	0.0	15 0.0	15												
UF 3	0.019	0.019	0.019	0.019	0.0	19 0.0	19												
UF 1	0.015	0.015	0.015	0.015	0.0	15 0.0	16												
UF 2	0.015	0.015	0.015	0.015	0.0	15 0.0	15												
UF 3	0.019	0.019	0.019	0.019	0.0	19 0.0	19												

Turbidity Raw Data

UF 1 - PermeateTurbidityAfterBP (NTU)









CERTIFICATE OF ANALYSIS						
Work Order Client	VA25A2735 Town of Ladysmith	Laboratory	: ALS Environmental - Vancouver			
Address	 410 Esplanade PO Box 220 Ladysmith British Columbia Canada V9G 1A2 	Address	2 8081 Lougheed Highway Burnaby BC Canada V5A 1W9			
Telephone	:	Telephone	: +1 604 253 4188			
Project PO C-O-C number	Arbutus Water Treatment Plant - Weekly Sampling PO #10940	Date Samples Received Date Analysis Commenced Issue Date	: 07-Feb-2025 13:30 : 07-Feb-2025 : 13-Feb-2025 16:08			
Sampler	:					
Site	: Town of Ladysmith					
Quote number No. of samples received No. of samples analysed	Town of Ladysmith Standing Offer 4 4					

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

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
Lindsay Gung	Supervisor - Water Chemistry	Microbiology, Burnaby, British Columbia
Lindsay Gung	Supervisor - Water Chemistry	Inorganics, Burnaby, British Columbia
Monica Ko	Lab Assistant	Inorganics, Burnaby, British Columbia



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.

Please refer to Quality Control Interpretive report (QCI) for information regarding Holding Time compliance.

Key:

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

LOK. Limit of Reporting (detection initit).						
Unit	Description					
CFU/mL	colony forming units per millilitre					
CU	colour units (1 cu = 1 mg/l pt)					
mg/L	milligrams per litre					
MPN/100mL	most probable number per hundred millilitres					
NTU	nephelometric turbidity units					
pH units	pH units					
μS/cm	microsiemens per centimetre					

<: less than.

>: greater than.

Surrogate: An analyte that is similar in behavior to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.

Test results reported relate only to the samples as received by the laboratory.

UNLESS OTHERWISE STATED on SRN or QCI Report, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

Workorder Comments

Sample Treated Water (post reservoir): HPC Exceeded Recommended Holding Time prior to receipt at the lab for Microbiology analysis. Testing will proceed.

Qualifiers

Qualifier	Description
SFP	Sample was filtered and preserved at the laboratory.



Sub-Matrix: Water Client sample ID (Matrix: Water) Client sample ID			Raw Water	DAF Effluent	UF Effluent	Treated Water (post reservoir)			
			Client sampling	date / time	06-Feb-2025 10:30	06-Feb-2025 10:30	06-Feb-2025 10:30	06-Feb-2025 10:30	
Analyte	CAS Number	Method/Lab	LOR	Unit	VA25A2735-001	VA25A2735-002	VA25A2735-003	VA25A2735-004	
					Result	Result	Result	Result	
Physical Tests									
Alkalinity, total (as CaCO3)		E290/VA	1.0	mg/L				15.8	
Colour, true		E329/VA	5.0	CU				<5.0	
Conductivity		E100/VA	2.0	µS/cm				63.9	
рН		E108/VA	0.10	pH units				7.08	
Turbidity		E121/VA	0.10	NTU				<0.10	
Organic / Inorganic Carbon									
Carbon, dissolved organic [DOC]		E358-L/VA	0.50	mg/L	1.24 SFP	1.42	1.35 ^{SFP}		
Carbon, total organic [TOC]		E355-L/VA	0.50	mg/L	2.66	1.20	1.15		
Microbiological Tests									
Heterotrophic plate count [HPC]		E020/VA	1	CFU/mL				<1	
Coliforms, Escherichia coli [E. coli]		E010/VA	1	MPN/100 mL				<1	
Coliforms, total		E010/VA	1	MPN/100 mL				<1	

Please refer to the General Comments section for an explanation of any result qualifiers detected.



QUALITY CONTROL INTERPRETIVE REPORT

Work Order	:VA25A2735	Page	: 1 of 7
Client	Town of Ladysmith	Laboratory	: ALS Environmental - Vancouver
Contact	: Shawn Baker	Account Manager	: Kevin Bhikadia
Address	: 410 Esplanade PO Box 220	Address	: 8081 Lougheed Highway
	Ladysmith BC Canada V9G 1A2		Burnaby, British Columbia Canada V5A 1W9
Telephone	;	Telephone	: +1 604 253 4188
Project	: Arbutus Water Treatment Plant - Weekly Sampling	Date Samples Received	: 07-Feb-2025 13:30
PO	: PO #10940	Issue Date	: 13-Feb-2025 16:08
C-O-C number	:		
Sampler	:		
Site	: Town of Ladysmith		
Quote number	: Town of Ladysmith Standing Offer_V2		
No. of samples received	:4		
No. of samples analysed	:4		

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)

• Analysis Holding Time Outliers exist - please see following pages for full details.

Outliers : Frequency of Quality Control Samples

• Quality Control Sample Frequency Outliers occur - please see following pages for full details.



CERTIFICATE OF ANALYSIS						
Work Order Client	· VA25A3032 · Town of Ladysmith	Laboratory	: ALS Environmental - Vancouver			
Contact Address	 Shawn Baker 410 Esplanade PO Box 220 Ladysmith British Columbia Canada V9G 1A2 	Account Manager Address	 Kevin Bhikadia 8081 Lougheed Highway Burnaby BC Canada V5A 1W9 			
Telephone Project PO C-O-C number	Arbutus Water Treatment Plant - Monthly Sampling PO #10940	Telephone Date Samples Received Date Analysis Commenced Issue Date	: +1 604 253 4188 : 12-Feb-2025 12:20 : 12-Feb-2025 : 26-Feb-2025 16:22			
Sampler Site Quote number No. of samples received No. of samples analysed	 Town of Ladysmith Town of Ladysmith Standing Offer 1 1 					

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
- Surrogate Control Limits

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
Ophelia Chiu	Department Manager - Organics	Organics, Burnaby, British Columbia
Sanja Risticevic	Department Manager - LCMS	LCMS, Waterloo, Ontario



General Comments

Key:

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.

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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.

Please refer to Quality Control Interpretive report (QCI) for information regarding Holding Time compliance.

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

Unit	Description
mg/L	milligrams per litre
µg/L	micrograms per litre

<: less than.

>: greater than.

Surrogate: An analyte that is similar in behavior to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.

Test results reported relate only to the samples as received by the laboratory.

UNLESS OTHERWISE STATED on SRN or QCI Report, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.



Sub-Matrix: Water (Matrix: Water)	Client sample IL			sample ID	Treated Water (post reservoir)	 	
			Client sampling	date / time	11-Feb-2025 10:30	 	
Analyte	CAS Number	Method/Lab	LOR	Unit	VA25A3032-001	 	
					Result	 	
Total Metals							
Aluminum, total	7429-90-5	E420/VA	0.0030	mg/L	0.0060	 	
Volatile Organic Compounds [THMs]							
Bromodichloromethane	75-27-4	E611B/VA	1.0	µg/L	1.1	 	
Bromoform	75-25-2	E611B/VA	1.0	µg/L	<1.0	 	
Chloroform	67-66-3	E611B/VA	1.0	µg/L	15.4	 	
Dibromochloromethane	124-48-1	E611B/VA	1.0	µg/L	<1.0	 	
Trihalomethanes [THMs], total		E611B/VA	2.0	µg/L	16.5	 	
Volatile Organic Compounds [THMs] Surrogate	es						
Bromofluorobenzene, 4-	460-00-4	E611B/VA	1.0	%	101	 	
Difluorobenzene, 1,4-	540-36-3	E611B/VA	1.0	%	102	 	
Haloacetic Acids							
Bromochloroacetic acid	5589-96-8	E750/WT	1.00	µg/L	<1.00	 	
Dibromoacetic acid	631-64-1	E750/WT	1.00	µg/L	<1.00	 	
Dichloroacetic acid	79-43-6	E750/WT	1.00	µg/L	4.58	 	
Monobromoacetic acid	79-08-3	E750/WT	1.00	µg/L	<1.00	 	
Monochloroacetic acid	79-11-8	E750/WT	1.00	µg/L	<1.00	 	
Trichloroacetic acid	76-03-9	E750/WT	1.00	µg/L	5.54	 	
Haloacetic acids, total [HAA5]	n/a	E750/WT	5.00	µg/L	10.1	 	

Please refer to the General Comments section for an explanation of any result qualifiers detected.



QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: VA25A3032	Page	: 1 of 5
Client	Town of Ladysmith	Laboratory	: ALS Environmental - Vancouver
Contact	Shawn Baker	Account Manager	: Kevin Bhikadia
Address	: 410 Esplanade PO Box 220	Address	: 8081 Lougheed Highway
	Ladysmith BC Canada V9G 1A2		Burnaby, British Columbia Canada V5A 1W9
Telephone	:	Telephone	: +1 604 253 4188
Project	: Arbutus Water Treatment Plant - Monthly Sampling	Date Samples Received	: 12-Feb-2025 12:20
PO	: PO #10940	Issue Date	: 26-Feb-2025 16:22
C-O-C number	:		
Sampler	:		
Site	: Town of Ladysmith		
Quote number	: Town of Ladysmith Standing Offer_V2		
No. of samples received	:1		
No. of samples analysed	:1		

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Key

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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

- <u>No</u> Method Blank value outliers occur.
- <u>No</u> Duplicate outliers occur.
- <u>No</u> Laboratory Control Sample (LCS) outliers occur
- No Matrix Spike outliers occur.
- No Matrix Spike Duplicate (MSD) outliers occur please see following pages for full details.
- 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

• <u>No</u> Quality Control Sample Frequency Outliers occur.



CERTIFICATE OF ANALYSIS						
Work Order Client Contact	VA25A3026 Town of Ladysmith Shawn Baker	Laboratory Account Manager	: ALS Environmental - Vancouver			
Address	 410 Esplanade PO Box 220 Ladysmith British Columbia Canada V9G 1A2 	Address	8081 Lougheed Highway Burnaby BC Canada V5A 1W9			
Telephone	:	Telephone	: +1 604 253 4188			
Project PO C-O-C number	Arbutus Water Treatment - Weekly Sampling 10880 	Date Samples Received Date Analysis Commenced Issue Date	 12-Feb-2025 12:30 12-Feb-2025 20-Feb-2025 15:27 			
Site Quote number No. of samples received No. of samples analysed	 Town of Ladysmith Town of Ladysmith Standing Offer 4 4 					

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Signatories	Position	Laboratory Department
Caitlin Macey	Team Leader - Inorganics	Microbiology, Burnaby, British Columbia
Lindsay Gung	Supervisor - Water Chemistry	Inorganics, Burnaby, British Columbia
Robin Weeks	Team Leader - Metals	Microbiology, Burnaby, British Columbia



General Comments

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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.

Please refer to Quality Control Interpretive report (QCI) for information regarding Holding Time compliance.

Key:

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

LOR. Limit of Reporting (detection limit)	•
Unit	Description
CFU/mL	colony forming units per millilitre
CU	colour units (1 cu = 1 mg/l pt)
mg/L	milligrams per litre
MPN/100mL	most probable number per hundred millilitres
NTU	nephelometric turbidity units
pH units	pH units
μS/cm	microsiemens per centimetre

<: less than.

>: greater than.

Surrogate: An analyte that is similar in behavior to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.

Test results reported relate only to the samples as received by the laboratory.

UNLESS OTHERWISE STATED on SRN or QCI Report, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

Workorder Comments

HPC Exceeded Recommended Holding Time prior to receipt at the lab for Microbiology analysis.



Sub-Matrix: Water Client sample ID (Matrix: Water)			Raw Water	DAF Effluent	UF Effluent	Treated Water (post reservoir)			
			Client sampling	date / time	11-Feb-2025 10:30	11-Feb-2025 10:30	11-Feb-2025 10:30	11-Feb-2025 10:30	
Analyte	CAS Number	Method/Lab	LOR	Unit	VA25A3026-001	VA25A3026-002	VA25A3026-003	VA25A3026-004	
					Result	Result	Result	Result	
Physical Tests									
Alkalinity, total (as CaCO3)		E290/VA	1.0	mg/L				17.2	
Colour, true		E329/VA	5.0	CU				<5.0	
Conductivity		E100/VA	2.0	µS/cm				65.8	
рН		E108/VA	0.10	pH units				7.44	
Turbidity		E121/VA	0.10	NTU				<0.10	
Organic / Inorganic Carbon									
Carbon, dissolved organic [DOC]		E358-L/VA	0.50	mg/L	3.70	1.63	1.57		
Carbon, total organic [TOC]		E355-L/VA	0.50	mg/L	3.11	1.41	1.17		
Microbiological Tests									
Heterotrophic plate count [HPC]		E020/VA	1	CFU/mL				<1	
Coliforms, Escherichia coli [E. coli]		E010/VA	1	MPN/100 mL				<1	
Coliforms, total		E010/VA	1	MPN/100 mL				<1	

Please refer to the General Comments section for an explanation of any result qualifiers detected.



QUALITY CONTROL INTERPRETIVE REPORT

Work Order	VA25A3026	Page	: 1 of 7
Client	Town of Ladysmith	Laboratory	: ALS Environmental - Vancouver
Contact	Shawn Baker	Account Manager	: Kevin Bhikadia
Address	: 410 Esplanade PO Box 220	Address	: 8081 Lougheed Highway
	Ladysmith BC Canada V9G 1A2		Burnaby, British Columbia Canada V5A 1W9
Telephone	· · · · · · · · · · · · · · · · · · ·	Telephone	+1 604 253 4188
Project	: Arbutus Water Treatment - Weekly Sampling	Date Samples Received	: 12-Feb-2025 12:30
PO	: 10880	Issue Date	: 20-Feb-2025 15:28
C-O-C number	:		
Sampler	:		
Site	: Town of Ladysmith		
Quote number	: Town of Ladysmith Standing Offer_V2		
No. of samples received	:4		
No. of samples analysed	:4		

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

- <u>No</u> 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) Analysis Holding Time Outliers exist - please see following pages for full details.

Outliers : Frequency of Quality Control Samples

• <u>No</u> Quality Control Sample Frequency Outliers occur.



CERTIFICATE OF ANALYSIS					
Work Order Client Contact Address	 VA25A3443 Town of Ladysmith Shawn Baker 410 Esplanade PO Box 220 Ladysmith British Columbia Canada V9G 1A2 	Laboratory Account Manager Address	 ALS Environmental - Vancouver Kevin Bhikadia 8081 Lougheed Highway Burnaby BC Canada V5A 1W9 		
Telephone Project PO C-O-C number Sampler Site Quote number No. of samples received No. of samples analysed	Arbutus Water Treatment Plant - Weekly Sampling PO #10940 Town of Ladysmith Town of Ladysmith Standing Offer 4	Telephone Date Samples Received Date Analysis Commenced Issue Date	 +1 604 253 4188 19-Feb-2025 09:50 19-Feb-2025 25-Feb-2025 09:34 		

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

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
Lindsay Gung	Supervisor - Water Chemistry	Inorganics, Burnaby, British Columbia
Lindsay Gung	Supervisor - Water Chemistry	Microbiology, Burnaby, British Columbia



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.

Please refer to Quality Control Interpretive report (QCI) for information regarding Holding Time compliance.

Key:

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

LOR. Limit of Reporting (detection limit)	
Unit	Description
CFU/mL	colony forming units per millilitre
CU	colour units (1 cu = 1 mg/l pt)
mg/L	milligrams per litre
MPN/100mL	most probable number per hundred millilitres
NTU	nephelometric turbidity units
pH units	pH units
μS/cm	microsiemens per centimetre

<: less than.

>: greater than.

Surrogate: An analyte that is similar in behavior to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.

Test results reported relate only to the samples as received by the laboratory.

UNLESS OTHERWISE STATED on SRN or QCI Report, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.



Sub-Matrix: Water Client sample ID (Matrix: Water) Client sample ID			Raw Water	DAF Effluent	UF Effluent	Treated Water (post reservoir)			
			Client sampling	date / time	18-Feb-2025 10:30	18-Feb-2025 10:30	18-Feb-2025 10:30	18-Feb-2025 10:30	
Analyte	CAS Number	Method/Lab	LOR	Unit	VA25A3443-001	VA25A3443-002	VA25A3443-003	VA25A3443-004	
					Result	Result	Result	Result	
Physical Tests									
Alkalinity, total (as CaCO3)		E290/VA	1.0	mg/L				16.1	
Colour, true		E329/VA	5.0	CU				<5.0	
Conductivity		E100/VA	2.0	µS/cm				68.5	
рН		E108/VA	0.10	pH units				7.49	
Turbidity		E121/VA	0.10	NTU				0.12	
Organic / Inorganic Carbon									
Carbon, dissolved organic [DOC]		E358-L/VA	0.50	mg/L	2.95	1.28	1.34		
Carbon, total organic [TOC]		E355-L/VA	0.50	mg/L	3.51	1.46	1.22		
Microbiological Tests									
Heterotrophic plate count [HPC]		E020/VA	1	CFU/mL				<1	
Coliforms, Escherichia coli [E. coli]		E010/VA	1	MPN/100 mL				<1	
Coliforms, total		E010/VA	1	MPN/100 mL				<1	

Please refer to the General Comments section for an explanation of any result qualifiers detected.



QUALITY CONTROL INTERPRETIVE REPORT

Work Order	:VA25A3443	Page	: 1 of 7
Client	Town of Ladysmith	Laboratory	: ALS Environmental - Vancouver
Contact	Shawn Baker	Account Manager	: Kevin Bhikadia
Address	: 410 Esplanade PO Box 220	Address	: 8081 Lougheed Highway
	Ladysmith BC Canada V9G 1A2		Burnaby, British Columbia Canada V5A 1W9
Telephone		Telephone	+1 604 253 4188
Project	: Arbutus Water Treatment Plant - Weekly Sampling	Date Samples Received	: 19-Feb-2025 09:50
PO	: PO #10940	Issue Date	: 25-Feb-2025 09:34
C-O-C number	:		
Sampler	:		
Site	: Town of Ladysmith		
Quote number	: Town of Ladysmith Standing Offer_V2		
No. of samples received	:4		
No. of samples analysed	:4		

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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

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

Outliers: Reference Material (RM) Samples

• No Reference Material (RM) Sample outliers occur.

Outliers : Analysis Holding Time Compliance (Breaches) Analysis Holding Time Outliers exist - please see following pages for full details.

Outliers : Frequency of Quality Control Samples

• <u>No</u> Quality Control Sample Frequency Outliers occur.



CERTIFICATE OF ANALYSIS					
Work Order Client Contact Address	 VA25A3712 Town of Ladysmith Shawn Baker 410 Esplanade PO Box 220 Ladysmith British Columbia Canada V9G 1A2 	Laboratory Account Manager Address	 ALS Environmental - Vancouver Kevin Bhikadia 8081 Lougheed Highway Burnaby BC Canada V5A 1W9 		
Telephone Project PO C-O-C number Sampler Site Quote number No. of samples received No. of samples analysed	Arbutus Water Treatment Plant - Quarterly Lake Sampling 10880 RFP Tender No. 2022-IS-20 Extension Town of Ladysmith Standing Offer 2 2	Telephone Date Samples Received Date Analysis Commenced Issue Date	 +1 604 253 4188 21-Feb-2025 11:02 21-Feb-2025 04-Mar-2025 19:47 		

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
- Surrogate Control Limits

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
Asha Tauckoor	Laboratory Analyst	Organics, Burnaby, British Columbia
Caitlin Macey	Team Leader - Inorganics	Microbiology, Burnaby, British Columbia
Kevin Duarte	Supervisor - Metals ICP Instrumentation	Metals, Burnaby, British Columbia
Lindsay Gung	Supervisor - Water Chemistry	Inorganics, Burnaby, British Columbia



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.

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Key:

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

LOR. LIMIT OF Reporting (detection limit)	l.
Unit	Description
% T/cm	% transmittance per centimetre
AU/cm	absorbance units per centimetre
CU	colour units (1 cu = 1 mg/l pt)
mg/L	milligrams per litre
MPN/100mL	most probable number per hundred millilitres
NTU	nephelometric turbidity units
pH units	pH units
μg/L	micrograms per litre

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>: greater than.

Surrogate: An analyte that is similar in behavior to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.

Test results reported relate only to the samples as received by the laboratory.

UNLESS OTHERWISE STATED on SRN or QCI Report, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.





CERTIFICATE OF ANALYSIS					
Work Order Client Contact Address	 VA25A4115 Town of Ladysmith Shawn Baker 410 Esplanade PO Box 220 Ladysmith British Columbia Canada V9G 1A2 	Laboratory Account Manager Address	 ALS Environmental - Vancouver Kevin Bhikadia 8081 Lougheed Highway Burnaby BC Canada V5A 1W9 		
Telephone Project PO C-O-C number Sampler Site Quote number No. of samples received No. of samples analysed	 Arbutus Water Treatment Plant - Quarterly DT Sampling 10880 RFP Tender No. 2022-IS-20 Extension Town of Ladysmith Standing Offer 4 4 	Telephone Date Samples Received Date Analysis Commenced Issue Date	 +1 604 253 4188 26-Feb-2025 11:25 27-Feb-2025 05-Mar-2025 15:38 		

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

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
Lindsay Gung	Supervisor - Water Chemistry	Inorganics, Burnaby, British Columbia



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.

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Key:

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

LOR: Limit of Reporting (detection limi	t). Description
mg/L	milligrams per litre
pH units	pH units

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>: greater than.

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Sub-Matrix: Water (Matrix: Water)		Client	sample ID	FJCC	Town Hall	Fire Depatment	RCMP	
		Client sampling	date / time	25-Feb-2025 11:00	25-Feb-2025 11:00	25-Feb-2025 11:00	25-Feb-2025 11:00	
Analyte CAS Number	Method/Lab	LOR	Unit	VA25A4115-001	VA25A4115-002	VA25A4115-003	VA25A4115-004	
				Result	Result	Result	Result	
Physical Tests								
Alkalinity, total (as CaCO3)	E290/VA	1.0	mg/L	17.4	16.7	17.3	17.5	
рН	E108/VA	0.10	pH units	7.46	7.35	7.43	7.44	
Solids, total dissolved [TDS]	E162/VA	10	mg/L	44	47	44	46	
Total Metals								
Aluminum, total 7429-90-5	E420/VA	0.0030	mg/L	0.0052	0.0061	0.0065	0.0149	
Antimony, total 7440-36-0	E420/VA	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	
Arsenic, total 7440-38-2	E420/VA	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	
Barium, total 7440-39-3	E420/VA	0.00010	mg/L	0.00284	0.00288	0.00320	0.00308	
Beryllium, total 7440-41-7	E420/VA	0.000020	mg/L	<0.000020	<0.000020	<0.000020	<0.000020	
Bismuth, total 7440-69-9	E420/VA	0.000050	mg/L	<0.000050	<0.000050	<0.000050	<0.000050	
Boron, total 7440-42-8	E420/VA	0.010	mg/L	0.021	0.021	0.022	0.023	
Cadmium, total 7440-43-9	E420/VA	0.0000050	mg/L	<0.000050	<0.000050	<0.0000050	<0.0000050	
Calcium, total 7440-70-2	E420/VA	0.050	mg/L	3.55	3.53	3.70	3.42	
Cesium, total 7440-46-2	E420/VA	0.000010	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	
Chromium, total 7440-47-3	E420/VA	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	
Cobalt, total 7440-48-4	E420/VA	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	
Copper, total 7440-50-8	E420/VA	0.00050	mg/L	0.0382	0.0526	0.203	0.478	
Iron, total 7439-89-6	E420/VA	0.010	mg/L	<0.010	<0.010	0.012	0.210	
Lead, total 7439-92-1	E420/VA	0.000050	mg/L	0.000510	0.000206	0.00145	0.00184	
Lithium, total 7439-93-2	E420/VA	0.0010	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	
Magnesium, total 7439-95-4	E420/VA	0.0050	mg/L	0.412	0.421	0.415	0.552	



Sub-Matrix: Water (Matrix: Water)	Client sample ID					Town Hall	Fire Depatment	RCMP	
			Client sampling	date / time	25-Feb-2025 11:00	25-Feb-2025 11:00	25-Feb-2025 11:00	25-Feb-2025 11:00	
Analyte	CAS Number	Method/Lab	LOR	Unit	VA25A4115-001	VA25A4115-002	VA25A4115-003	VA25A4115-004	
					Result	Result	Result	Result	
Total Metals									
Manganese, total	7439-96-5	E420/VA	0.00010	mg/L	0.00024	0.00030	0.00036	0.00167	
Molybdenum, total	7439-98-7	E420/VA	0.000050	mg/L	0.000120	0.000128	0.000118	0.000116	
Nickel, total	7440-02-0	E420/VA	0.00050	mg/L	<0.00050	<0.00050	<0.00050	0.00076	
Phosphorus, total	7723-14-0	E420/VA	0.050	mg/L	<0.050	<0.050	<0.050	<0.050	
Potassium, total	7440-09-7	E420/VA	0.050	mg/L	0.223	0.220	0.221	0.230	
Rubidium, total	7440-17-7	E420/VA	0.00020	mg/L	0.00050	0.00053	0.00052	0.00053	
Selenium, total	7782-49-2	E420/VA	0.000050	mg/L	<0.000050	<0.000050	<0.000050	<0.000050	
Silicon, total	7440-21-3	E420/VA	0.10	mg/L	1.79	1.76	1.81	1.75	
Silver, total	7440-22-4	E420/VA	0.000010	mg/L	<0.000010	<0.000010	<0.000010	0.000015	
Sodium, total	7440-23-5	E420/VA	0.050	mg/L	8.73	8.62	8.59	8.57	
Strontium, total	7440-24-6	E420/VA	0.00020	mg/L	0.0105	0.0104	0.0114	0.0106	
Sulfur, total	7704-34-9	E420/VA	0.50	mg/L	0.50	<0.50	<0.50	<0.50	
Tellurium, total	13494-80-9	E420/VA	0.00020	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	
Thallium, total	7440-28-0	E420/VA	0.000010	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	
Thorium, total	7440-29-1	E420/VA	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	
Tin, total	7440-31-5	E420/VA	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	
Titanium, total	7440-32-6	E420/VA	0.00030	mg/L	<0.00030	<0.00030	<0.00030	<0.00030	
Tungsten, total	7440-33-7	E420/VA	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	
Uranium, total	7440-61-1	E420/VA	0.000010	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	
Vanadium, total	7440-62-2	E420/VA	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	
Zinc, total	7440-66-6	E420/VA	0.0030	mg/L	0.0048	<0.0030	0.0056	0.0141	



Sub-Matrix: Water (Matrix: Water)	Client sample ID				FJCC	Town Hall	Fire Depatment	RCMP	
			Client sampling	date / time	25-Feb-2025 11:00	25-Feb-2025 11:00	25-Feb-2025 11:00	25-Feb-2025 11:00	
Analyte	CAS Number	Method/Lab	LOR	Unit	VA25A4115-001	VA25A4115-002	VA25A4115-003	VA25A4115-004	
					Result	Result	Result	Result	
Total Metals									
Zirconium, total	7440-67-7	E420/VA	0.00020	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	

Please refer to the General Comments section for an explanation of any result qualifiers detected.



QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: VA25A4115	Page	: 1 of 7
Client	Town of Ladysmith	Laboratory	: ALS Environmental - Vancouver
Contact	: Shawn Baker	Account Manager	: Kevin Bhikadia
Address	:410 Esplanade PO Box 220	Address	: 8081 Lougheed Highway
	Ladysmith BC Canada V9G 1A2		Burnaby, British Columbia Canada V5A 1W9
Telephone	:	Telephone	: +1 604 253 4188
Project	: Arbutus Water Treatment Plant - Quarterly DT Sampling	Date Samples Received	: 26-Feb-2025 11:25
PO	: 10880	Issue Date	: 05-Mar-2025 15:36
C-O-C number	:		
Sampler	:		
Site	: RFP Tender No. 2022-IS-20 Extension		
Quote number	: Town of Ladysmith Standing Offer_V2		
No. of samples received	:4		
No. of samples analysed	:4		

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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

- <u>No</u> 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) Analysis Holding Time Outliers exist - please see following pages for full details.

Outliers : Frequency of Quality Control Samples

• <u>No</u> Quality Control Sample Frequency Outliers occur.



CERTIFICATE OF ANALYSIS (GUIDELINE EVALUATION)

Work Order	: VA25A4112	Page	: 1 of 4
Client	: Town of Ladysmith	Laboratory	: ALS Environmental - Vancouver
Contact	: Shawn Baker	Account Manager	E Kevin Bhikadia
Address	: 410 Esplanade PO Box 220 Ladysmith BC Canada V9G 1A2	Address	: 8081 Lougheed Highway Burnaby, British Columbia Canada V5A 1W9
Telephone	:	Telephone	: +1 604 253 4188
Project	: Arbutus Water Treatment Plant - Weekly Sampling	Date Samples Received	: 26-Feb-2025 11:25
PO	: 10880	Date Analysis Commenced	: 26-Feb-2025
C-O-C number	:	Issue Date	: 03-Mar-2025 14:26
Sampler	:		
Site	: Town of Ladysmith		
Quote number	: Town of Ladysmith Standing Offer_V2		
No. of samples received	: 4		
No. of samples analysed	: 4		

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
Lindsay Gung	Supervisor - Water Chemistry	Inorganics, Burnaby, British Columbia
Lindsay Gung	Supervisor - Water Chemistry	Microbiology, Burnaby, British Columbia
Miles Gropen	Department Manager - Inorganics	Inorganics, 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.

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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
µS/cm	microsiemens per centimetre
CFU/mL	colony forming units per millilitre
CU	colour units (1 cu = 1 mg/l pt)
mg/L	milligrams per litre
MPN/100mL	most probable number per hundred millilitres
NTU	nephelometric turbidity units
pH units	pH units

>: greater than.

<: less than.

Red shading is applied where the result or the LOR is greater than the Guideline Upper Limit (or lower than the Guideline Lower Limit, if applicable). 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.



Workorder Comments

Sample(s) 004: Exceeded Recommended Holding Time prior to receipt at the lab for HPC analysis.

Analytical Results Evaluation

	Client	sample ID	Raw Water	DAF Effluent	UF Effluent	Treated Water	 	
Matrix: water						(post reservoir)		
	Samplin	g date/time	25-Feb-2025 10:30	25-Feb-2025 10:30	25-Feb-2025 10:30	25-Feb-2025 10:30	 	
		Sub-Matrix	Water	Water	Water	Water	 	
Analyte CAS Nu.	aber Method/Lab	Unit	VA25A4112-001	VA25A4112-002	VA25A4112-003	VA25A4112-004	 	
Physical Tests								
Alkalinity, total (as CaCO3)	E290/VA	mg/L				16.9	 	
Colour, true	E329/VA	CU				<5.0	 	
Conductivity	E100/VA	µS/cm				68.1	 	
рН	E108/VA	pH units				7.31	 	
Turbidity	E121/VA	NTU				<0.10	 	
Organic / Inorganic Carbon								
Carbon, dissolved organic [DOC]	E358-L/VA	mg/L	2.86	1.45	1.28		 	
Carbon, total organic [TOC]	E355-L/VA	mg/L	2.87	1.38	1.21		 	
Microbiological Tests								
Heterotrophic plate count [HPC]	E020/VA	CFU/mL				<1	 	
Coliforms, Escherichia coli [E. coli]	E010/VA	MPN/100 mL				<1	 	
Coliforms, total	E010/VA	MPN/10 0mL				<1	 	

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.



Summary of Guideline Limits

Analyte	CAS Number	Unit	BCDWQG	BCDWQG	BCDWQG		
			AO	MAC	OG		
Physical Tests							
Alkalinity, total (as CaCO3)		mg/L					
Colour, true		CU	15 CU				
Conductivity		μS/cm					
рН		pH units			7 - 10.5 pH		
					units		
Turbidity		NTU		1 NTU			
Organic / Inorganic Carbon							
Carbon, dissolved organic [DOC]		mg/L					
Carbon, total organic [TOC]		mg/L					
Microbiological Tests							
Coliforms, Escherichia coli [E. coli]		MPN/100mL		1 MPN/100mL			
Coliforms, total		MPN/100mL		1 MPN/100mL			
Heterotrophic plate count [HPC]		CFU/mL					

Please refer to the General Comments section for an explanation of any qualifiers detected.

Key:

BCDWQG		British Columbia Drinking Water Quality Guidelines (JAN, 2023)
	AO	Aesthetic Objective/Other Value
	MAC	Maximium Acceptable Concentrations
	OG	Operational Guidance



CERTIFICATE OF ANALYSIS					
Work Order Client Contact Address	 VA25A4112 Town of Ladysmith Shawn Baker 410 Esplanade PO Box 220 Ladysmith British Columbia Canada V9G 142 	Laboratory Account Manager Address	 ALS Environmental - Vancouver Kevin Bhikadia 8081 Lougheed Highway Burnaby BC Canada V5A 1W0 		
Telephone Project PO C-O-C number Sampler Site Quote number No. of samples received No. of samples analysed	Arbutus Water Treatment Plant - Weekly Sampling 10880 Town of Ladysmith Town of Ladysmith Standing Offer 4 4	Telephone Date Samples Received Date Analysis Commenced Issue Date	: +1 604 253 4188 : 26-Feb-2025 11:25 : 26-Feb-2025 : 03-Mar-2025 14:27		

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

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.

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Lindsay Gung	Supervisor - Water Chemistry	Microbiology, Burnaby, British Columbia
Miles Gropen	Department Manager - Inorganics	Inorganics, Burnaby, British Columbia



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.

Please refer to Quality Control Interpretive report (QCI) for information regarding Holding Time compliance.

Key:

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

Unit	Description
CELI/ml	colony forming units per millilitre
CU	colour units (1 cu = 1 mg/l pt)
mg/L	milligrams per litre
MPN/100mL	most probable number per hundred millilitres
NTU	nephelometric turbidity units
pH units	pH units
μS/cm	microsiemens per centimetre
NTU pH units μS/cm	nephelometric turbidity units pH units microsiemens per centimetre

<: less than.

>: greater than.

Surrogate: An analyte that is similar in behavior to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.

Test results reported relate only to the samples as received by the laboratory.

UNLESS OTHERWISE STATED on SRN or QCI Report, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

Workorder Comments

Sample(s) 004: Exceeded Recommended Holding Time prior to receipt at the lab for HPC analysis.



Sub-Matrix: Water Client sample IE Client sample IE				sample ID	Raw Water	DAF Effluent	UF Effluent	Treated Water (post reservoir)		
Client sampling date / time					25-Feb-2025 10:30	25-Feb-2025 10:30	25-Feb-2025 10:30	25-Feb-2025 10:30		
Analyte	CAS Number	Method/Lab	LOR	Unit	VA25A4112-001	VA25A4112-002	VA25A4112-003	VA25A4112-004		
					Result	Result	Result	Result		
Physical Tests										
Alkalinity, total (as CaCO3)		E290/VA	1.0	mg/L				16.9		
Colour, true		E329/VA	5.0	CU				<5.0		
Conductivity		E100/VA	2.0	μS/cm				68.1		
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Turbidity		E121/VA	0.10	NTU				<0.10		
Organic / Inorganic Carbon										
Carbon, dissolved organic [DOC]		E358-L/VA	0.50	mg/L	2.86	1.45	1.28			
Carbon, total organic [TOC]		E355-L/VA	0.50	mg/L	2.87	1.38	1.21			
Microbiological Tests										
Heterotrophic plate count [HPC]		E020/VA	1	CFU/mL				<1		
Coliforms, Escherichia coli [E. coli]		E010/VA	1	MPN/100 mL				<1		
Coliforms, total		E010/VA	1	MPN/100 mL				<1		

Please refer to the General Comments section for an explanation of any result qualifiers detected.



QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: VA25A4112	Page	: 1 of 7
Client	Town of Ladysmith	Laboratory	: ALS Environmental - Vancouver
Contact	: Shawn Baker	Account Manager	: Kevin Bhikadia
Address	: 410 Esplanade PO Box 220	Address	: 8081 Lougheed Highway
	Ladysmith BC Canada V9G 1A2		Burnaby, British Columbia Canada V5A 1W9
Telephone	:	Telephone	: +1 604 253 4188
Project	: Arbutus Water Treatment Plant - Weekly Sampling	Date Samples Received	: 26-Feb-2025 11:25
PO	: 10880	Issue Date	: 03-Mar-2025 14:26
C-O-C number	:		
Sampler	:		
Site	: Town of Ladysmith		
Quote number	: Town of Ladysmith Standing Offer_V2		
No. of samples received	:4		
No. of samples analysed	:4		

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

- <u>No</u> 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) Analysis Holding Time Outliers exist - please see following pages for full details.

Outliers : Frequency of Quality Control Samples

• <u>No</u> Quality Control Sample Frequency Outliers occur.