

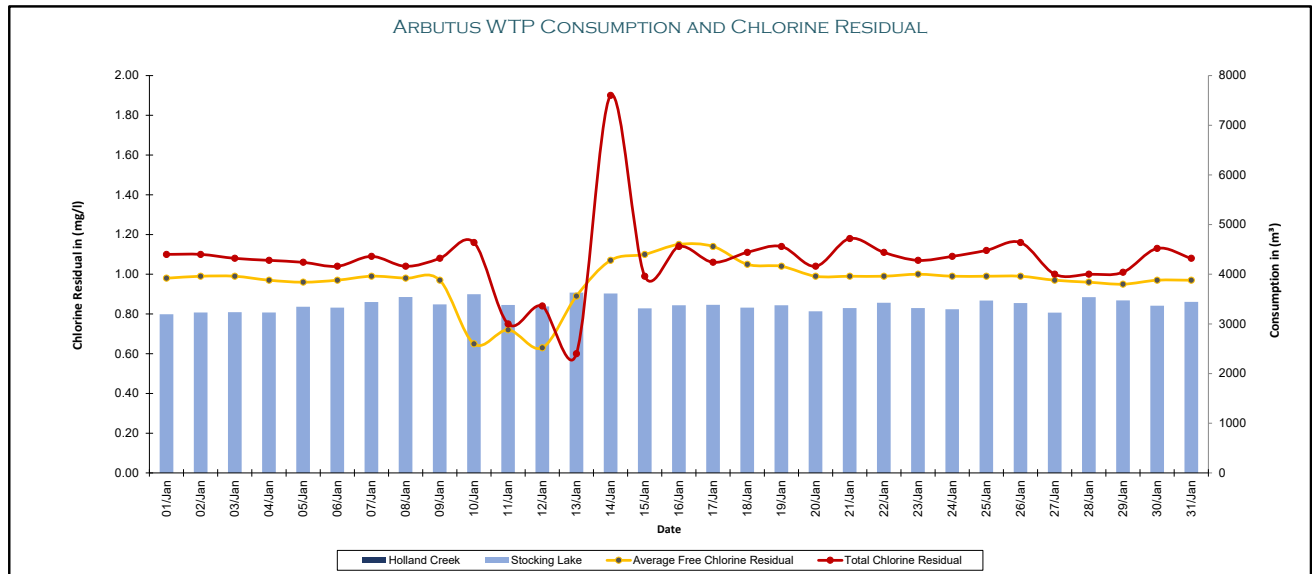
# TOWN OF LADYSMITH - ARBUTUS WATER TREATMENT PLANT

JANUARY 2025 - MONTHLY REPORT

Date	Daily Flow			Chlorine Residual				CT*	External Lab Testing					
	Stocking Lake	Holland Creek	Combined Flow	Free Min	Free Max	Free Avg	Total		HPC	E.coli	Total Coliforms	Aluminum	THM	HAA
	m³	m³	m³	mg/l	mg/l	mg/l	mg/l		CFU	MPN	MPN	mg/l	mg/l	mg/l
01-Jan	3196	0	3196	0.97	1.00	0.98	1.10	121						
02-Jan	3231	0	3231	0.97	1.01	0.99	1.10	154						
03-Jan	3237	0	3237	0.95	0.90	0.99	1.08	159						
04-Jan	3230	0	3230	0.96	0.98	0.97	1.07	145						
05-Jan	3345	0	3345	0.93	0.97	0.96	1.06	153						
06-Jan	3329	0	3329	0.94	0.97	0.97	1.04	159						
07-Jan	3440	0	3440	0.97	0.99	0.99	1.09	162						
08-Jan	3542	0	3542	0.96	0.99	0.98	1.04	127	< 1	< 1	< 1	0.0081	0.0171	0.0102
09-Jan	3393	0	3393	0.96	0.99	0.97	1.08	110						
10-Jan	3598	0	3598	0.83	0.83	0.65	1.16	135						
11-Jan	3382	0	3382	0.44	0.83	0.72	0.75	128						
12-Jan	3351	0	3351	0.63	0.75	0.63	0.84	38						
13-Jan	3632	0	3632	0.51	0.90	0.89	0.60	171						
14-Jan	3614	0	3614	0.88	1.07	1.07	1.90	156	< 1	< 1	< 1			
15-Jan	3314	0	3314	1.05	1.10	1.10	0.99	162						
16-Jan	3377	0	3377	1.07	1.12	1.15	1.14	147						
17-Jan	3383	0	3383	1.09	1.14	1.14	1.06	107						
18-Jan	3327	0	3327	1.01	1.15	1.05	1.11	141						
19-Jan	3375	0	3375	1.01	1.05	1.04	1.14	126						
20-Jan	3255	0	3255	0.96	1.05	0.99	1.04	145						
21-Jan	3320	0	3320	0.96	1.00	0.99	1.18	153	< 1	< 1	< 1			
22-Jan	3425	0	3425	0.96	1.02	0.99	1.11	162						
23-Jan	3318	0	3318	0.97	1.01	1.00	1.07	153						
24-Jan	3295	0	3295	0.98	1.00	0.99	1.09	151						
25-Jan	3469	0	3469	0.98	1.00	0.99	1.12	143						
26-Jan	3419	0	3419	0.98	0.99	0.99	1.16	140						
27-Jan	3228	0	3228	1.00	0.98	0.97	1.00	146						
28-Jan	3539	0	3539	0.94	0.96	0.96	1.00	151	< 1	< 1	< 1			
29-Jan	3473	0	3473	0.93	0.98	0.95	1.01	149						
30-Jan	3368	0	3368	0.95	0.98	0.97	1.13	147						
31-Jan	3443	0	3443	0.95	0.98	0.97	1.08	144						

\*CT - Recorded as the minimum value at the highest daily flow \*\* Manual Residual were not taken

Total	104848	0	104848											
Average	3382	0	3382	0.93	0.99	0.97	1.08	141	< 1	< 1	< 1	0.0081	0.0171	0.01020



Town of Ladysmith Arbutus DWTP

Monthly LRV and Turbidity Report

01/01/2025 - 02/01/2025

LRV Monthly Average

Asset	Parameter	Health	Avg	Std. Dev	Points	LL	L	%In	% between L and LL	% < LL	Unit
UF 1	LRV	<div></div>	5.0	0.0	32	4.25	4.5	100 %	0 %	0 %	#
UF 2	LRV	<div></div>	5.0	0.0	32	4.25	4.5	100 %	0 %	0 %	#
UF 3	LRV	<div></div>	5.0	0.0	32	4.25	4.5	100 %	0 %	0 %	#

LRV Daily Values

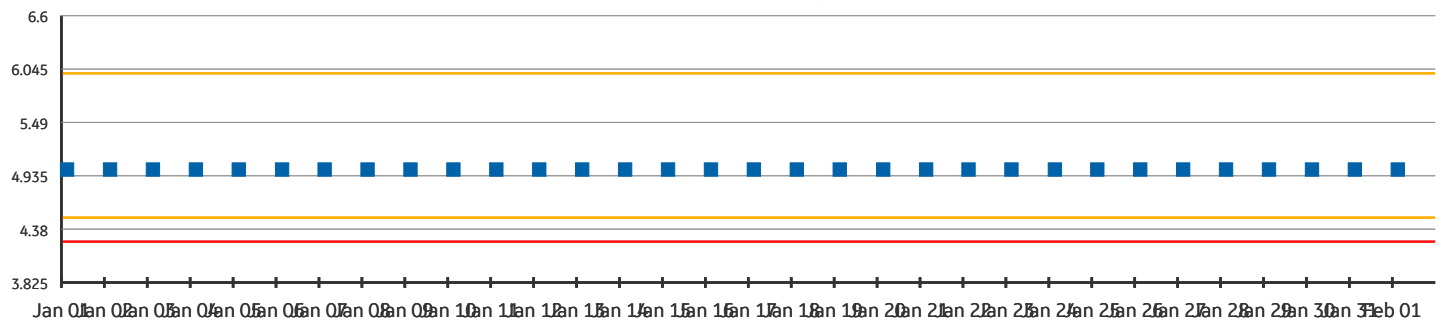
Asset	Parameter	Jan 01	Jan 02	Jan 03	Jan 04	Jan 05	Jan 06	Jan 07	Jan 08	Jan 09	Jan 10	Jan 11	Jan 12
UF 1	LRV	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
UF 2	LRV	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
UF 3	LRV	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0

Asset	Jan 13	Jan 14	Jan 15	Jan 16	Jan 17	Jan 18	Jan 19	Jan 20	Jan 21	Jan 22	Jan 23	Jan 24	Jan 25	Jan 26	Jan 27	Jan 28
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

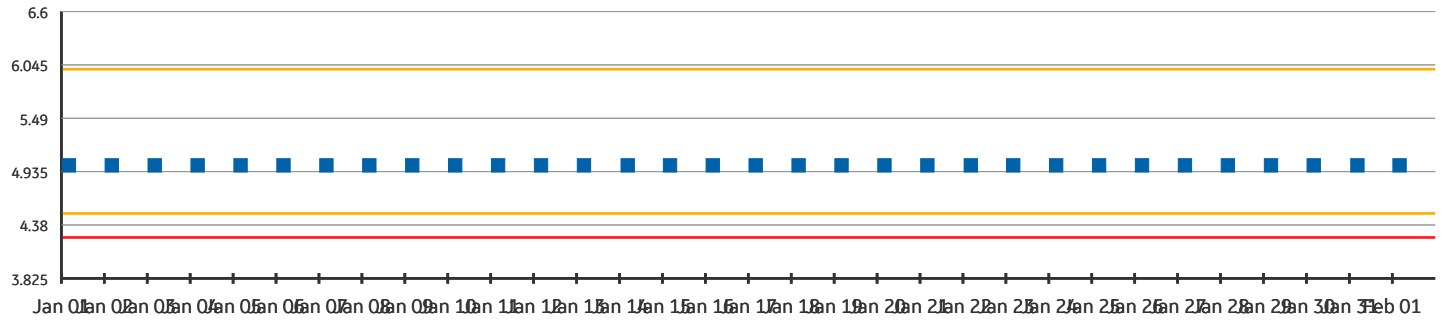
Asset	Jan 29	Jan 30	Jan 31	Feb 01
UF 1	5.0	5.0	5.0	5.0
UF 2	5.0	5.0	5.0	5.0
UF 3	5.0	5.0	5.0	5.0

LRV Raw Data

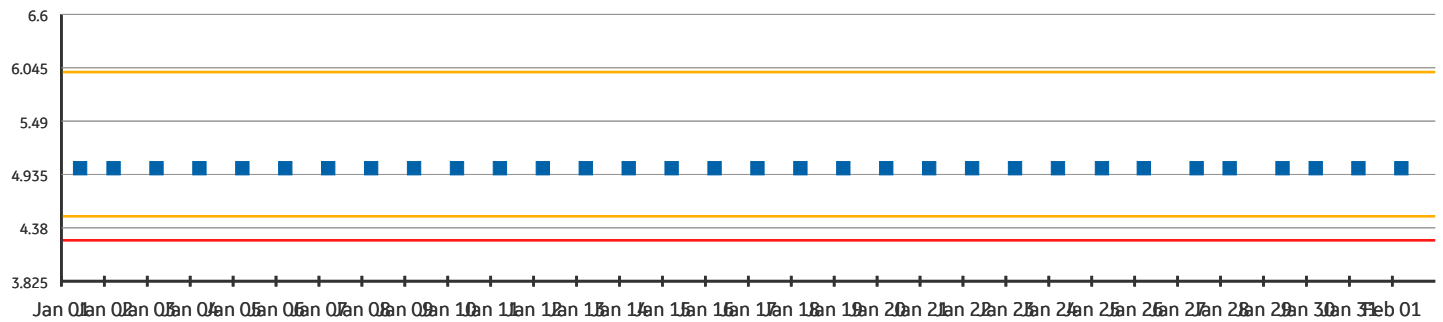
**UF 1 - LRV (#)**



## UF 2 - LRV (#)



### UF 3 - LRV (#)



## Turbidity Monthly Average

Asset	Parameter	Health	Avg	Std. Dev	Points	H	HH	%In	% between H and HH	% > HH	Unit
UF 1	PermeateTurbidity		0.015	0.0	45215	--	--	100 %	0 %	0 %	NTU
UF 2	PermeateTurbidity		0.015	0.0	45215	--	--	100 %	0 %	0 %	NTU
UF 3	PermeateTurbidity		0.015	0.0	45215	--	--	100 %	0 %	0 %	NTU
UF 1	PermeateTurbidityAfterBP	●	0.015	0.0	394	0.1	0.3	100 %	0 %	0 %	NTU
UF 2	PermeateTurbidityAfterBP	●	0.015	0.0	386	0.1	0.3	100 %	0 %	0 %	NTU
UF 3	PermeateTurbidityAfterBP	●	0.015	0.0	372	0.1	0.3	100 %	0 %	0 %	NTU

## Turbidity Daily Averages

[illegible]

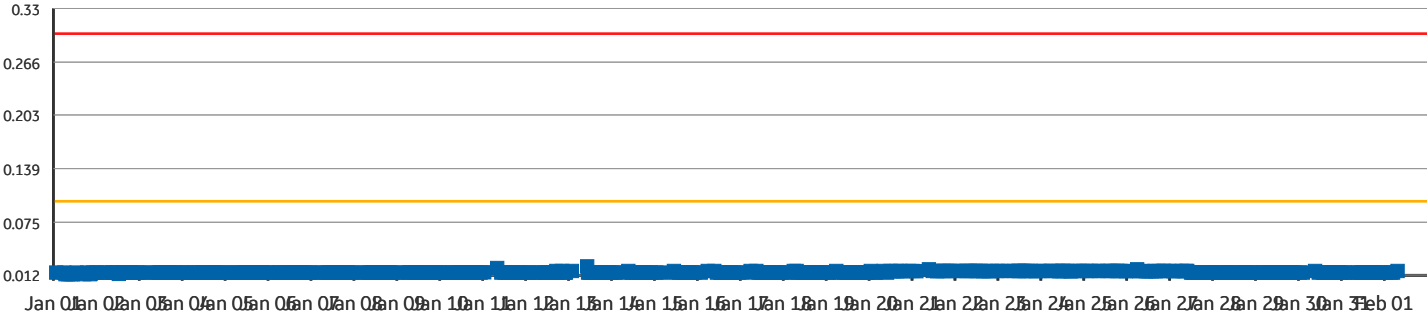
Asset	Parameter	Jan 01	Jan 02	Jan 03	Jan 04	Jan 05	Jan 06	Jan 07	Jan 08	Jan 09	Jan 10	Jan 11
UF 1	PermeateTurbidityAfterBP	0.014	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.016
UF 2	PermeateTurbidityAfterBP	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015
UF 3	PermeateTurbidityAfterBP	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.014	0.014

Asset	Jan 12	Jan 13	Jan 14	Jan 15	Jan 16	Jan 17	Jan 18	Jan 19	Jan 20	Jan 21	Jan 22	Jan 23	Jan 24	Jan 25	Jan 26
UF 1	0.015	0.016	0.015	0.015	0.015	0.015	0.015	0.015	0.016	0.017	0.017	0.017	0.017	0.017	0.017
UF 2	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015
UF 3	0.014	0.014	0.013	0.014	0.013	0.014	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015
UF 1	0.015	0.016	0.015	0.015	0.015	0.015	0.015	0.015	0.016	0.017	0.017	0.017	0.017	0.017	0.017
UF 2	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015
UF 3	0.015	0.014	0.014	0.014	0.014	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015

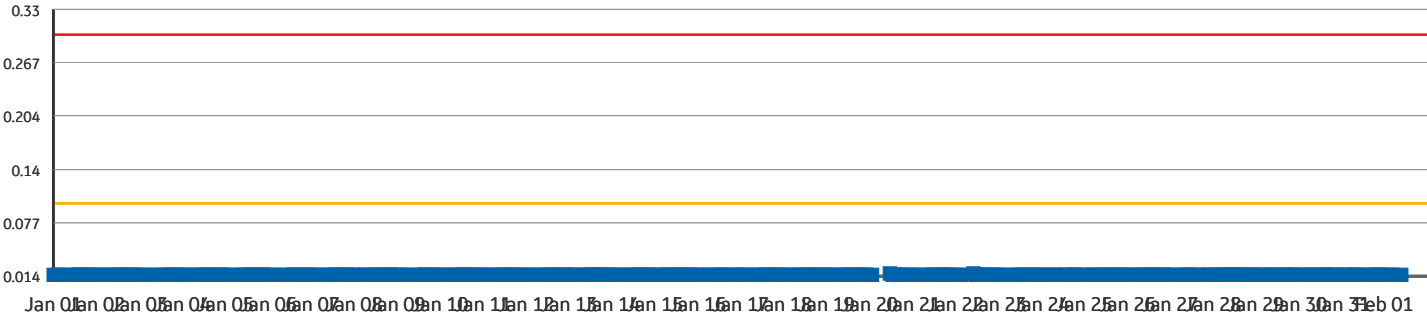
Asset	Jan 27	Jan 28	Jan 29	Jan 30	Jan 31	Feb 01
UF 1	0.016	0.015	0.015	0.015	0.015	0.015
UF 2	0.015	0.015	0.015	0.015	0.015	0.015
UF 3	0.016	0.017	0.017	0.017	0.017	0.017
UF 1	0.016	0.015	0.015	0.015	0.015	0.015
UF 2	0.015	0.015	0.015	0.015	0.015	0.015
UF 3	0.016	0.017	0.017	0.017	0.017	0.017

Turbidity Raw Data

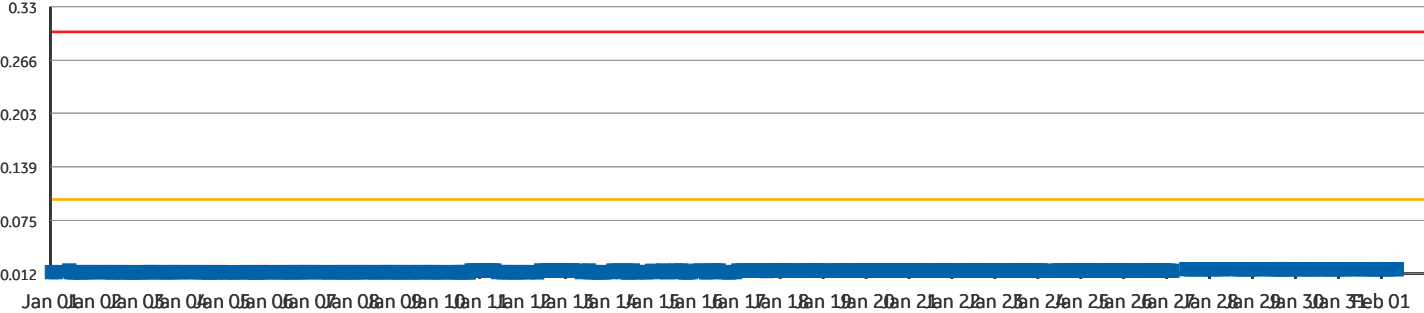
UF 1 - PermeateTurbidityAfterBP (NTU)



UF 2 - PermeateTurbidityAfterBP (NTU)



UF 3 - PermeateTurbidityAfterBP (NTU)



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**CERTIFICATE OF ANALYSIS**

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**Work Order** : **VA25A0439**  
**Client** : **Town of Ladysmith**  
**Contact** : Shawn Baker  
**Address** : 410 Esplanade PO Box 220  
Ladysmith British Columbia Canada V9G 1A2  
**Telephone** : ----  
**Project** : Arbutus Water Treatment - Monthly Sampling  
**PO** : 10880  
**C-O-C number** : ----  
**Sampler** : ----  
**Site** : Town of Ladysmith  
**Quote number** : VA22-GMSM100-001 Tender# 2022-IS-20  
**No. of samples received** : 1  
**No. of samples analysed** : 1

**Laboratory** : ALS Environmental - Vancouver  
**Account Manager** : Thomas Chang  
**Address** : 8081 Lougheed Highway  
Burnaby BC Canada V5A 1W9  
**Telephone** : +1 604 253 4188  
**Date Samples Received** : 09-Jan-2025 12:45  
**Date Analysis Commenced** : 10-Jan-2025  
**Issue Date** : 20-Jan-2025 07:51

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).

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**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.

<i>Signatories</i>	<i>Position</i>	<i>Laboratory Department</i>
Dan Gebert	Supervisor - Metals Mercury & Speciation	Metals, Burnaby, British Columbia
Rebecca Sit	Supervisor - Organics Extractions	Organics, Burnaby, British Columbia
Stephanie Pinheiro	Team Leader - LCMS	LCMS, Waterloo, Ontario



## 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
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.



## Analytical Results

Sub-Matrix: Water  
 (Matrix: Water)

Client sample ID					Treated Water (post reservoir)	----	----	----	----
Client sampling date / time					08-Jan-2025 10:00	----	----	----	----
Analyte	CAS Number	Method/Lab	LOR	Unit	VA25A0439-001	----	----	----	----
Result					----	----	----	----	----
Total Metals									
Aluminum, total	7429-90-5	E420/VA	0.0030	mg/L	0.0081	----	----	----	----
Volatile Organic Compounds [THMs]									
Bromodichloromethane	75-27-4	E611B/VA	1.0	µg/L	1.3	----	----	----	----
Bromoform	75-25-2	E611B/VA	1.0	µg/L	<1.0	----	----	----	----
Chloroform	67-66-3	E611B/VA	1.0	µg/L	15.8	----	----	----	----
Dibromochloromethane	124-48-1	E611B/VA	1.0	µg/L	<1.0	----	----	----	----
Trihalomethanes [THMs], total	----	E611B/VA	2.0	µg/L	17.1	----	----	----	----
Volatile Organic Compounds [THMs] Surrogates									
Bromofluorobenzene, 4-	460-00-4	E611B/VA	1.0	%	100	----	----	----	----
Difluorobenzene, 1,4-	540-36-3	E611B/VA	1.0	%	101	----	----	----	----
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	4.41	----	----	----	----
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	5.82	----	----	----	----
Haloacetic acids, total [HAA5]	n/a	E750/WT	5.00	µg/L	10.2	----	----	----	----

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



## QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: <b>VA25A0439</b>	Page	: 1 of 5
Client	: <b>Town of Ladysmith</b>	Laboratory	: ALS Environmental - Vancouver
Contact	: Shawn Baker	Account Manager	: Thomas Chang
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 - Monthly Sampling	Date Samples Received	: 09-Jan-2025 12:45
PO	: 10880	Issue Date	: 20-Jan-2025 07:50
C-O-C number	: ----		
Sampler	: ----		
Site	: Town of Ladysmith		
Quote number	: VA22-GMSM100-001 Tender# 2022-IS-20		
No. of samples received	: 1		
No. of samples analysed	: 1		

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 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)***

- No Analysis Holding Time Outliers exist.

### ***Outliers : Frequency of Quality Control Samples***

- No Quality Control Sample Frequency Outliers occur.

## CERTIFICATE OF ANALYSIS

<b>Work Order</b>	: <b>VA25A0436</b>		
<b>Client</b>	: <b>Town of Ladysmith</b>	<b>Laboratory</b>	: ALS Environmental - Vancouver
<b>Contact</b>	: Shawn Baker	<b>Account Manager</b>	: Thomas Chang
<b>Address</b>	: 410 Esplanade PO Box 220 Ladysmith British Columbia Canada V9G 1A2	<b>Address</b>	: 8081 Lougheed Highway Burnaby BC Canada V5A 1W9
<b>Telephone</b>	: ----	<b>Telephone</b>	: +1 604 253 4188
<b>Project</b>	: Arbutus Water Treatment Plant - Weekly Sampling	<b>Date Samples Received</b>	: 09-Jan-2025 12:45
<b>PO</b>	: 10880	<b>Date Analysis Commenced</b>	: 09-Jan-2025
<b>C-O-C number</b>	: ----	<b>Issue Date</b>	: 14-Jan-2025 10:31
<b>Sampler</b>	: ----		
<b>Site</b>	: Town of Ladysmith		
<b>Quote number</b>	: VA22-GMSM100-001 Tender# 2022-IS-20		
<b>No. of samples received</b>	: 4		
<b>No. of samples analysed</b>	: 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.

<i>Signatories</i>	<i>Position</i>	<i>Laboratory Department</i>
Lindsay Gung	Supervisor - Water Chemistry	Inorganics, Burnaby, British Columbia
Lindsay Gung	Supervisor - Water Chemistry	Microbiology, 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.

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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.

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

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



## Analytical Results

Sub-Matrix: Water  
 (Matrix: Water)

Sub-Matrix: Water (Matrix: Water)					Client sample ID	Raw Water	DAF Effluent	UF Effluent	Treated Water (post reservoir)	----
Client sampling date / time					08-Jan-2025 10:00	08-Jan-2025 10:00	08-Jan-2025 10:00	08-Jan-2025 10:00	----	
Analyte	CAS Number	Method/Lab	LOR	Unit	VA25A0436-001	VA25A0436-002	VA25A0436-003	VA25A0436-004	----	
					Result	Result	Result	Result	----	
Physical Tests										
Alkalinity, total (as CaCO3)	----	E290/VA	1.0	mg/L	----	----	----	17.1	----	
Colour, true	----	E329/VA	5.0	CU	----	----	----	<5.0	----	
Conductivity	----	E100/VA	2.0	µS/cm	----	----	----	68.0	----	
pH	----	E108/VA	0.10	pH units	----	----	----	7.43	----	
Turbidity	----	E121/VA	0.10	NTU	----	----	----	<0.10	----	
Organic / Inorganic Carbon										
Carbon, dissolved organic [DOC]	----	E358-L/VA	0.50	mg/L	2.52	1.17	1.10	----	----	
Carbon, total organic [TOC]	----	E355-L/VA	0.50	mg/L	2.70	1.10	1.03	----	----	
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	: <b>VA25A0436</b>	Page	: 1 of 7
Client	: <b>Town of Ladysmith</b>	Laboratory	: ALS Environmental - Vancouver
Contact	: Shawn Baker	Account Manager	: Thomas Chang
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	: 09-Jan-2025 12:45
PO	: 10880	Issue Date	: 14-Jan-2025 10:31
C-O-C number	: ----		
Sampler	: ----		
Site	: Town of Ladysmith		
Quote number	: VA22-GMSM100-001 Tender# 2022-IS-20		
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.

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**DQO:** Data Quality Objective.

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

**RPD:** Relative Percent Difference.

### **Workorder Comments**

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### **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

<b>Work Order</b>	: <b>VA25A0885</b>		
<b>Client</b>	: <b>Town of Ladysmith</b>	<b>Laboratory</b>	: ALS Environmental - Vancouver
<b>Contact</b>	: Shawn Baker	<b>Account Manager</b>	: Thomas Chang
<b>Address</b>	: 410 Esplanade PO Box 220 Ladysmith British Columbia Canada V9G 1A2	<b>Address</b>	: 8081 Lougheed Highway Burnaby BC Canada V5A 1W9
<b>Telephone</b>	: ----	<b>Telephone</b>	: +1 604 253 4188
<b>Project</b>	: Arbutus Water Treatment Plant-Weekly Sampling	<b>Date Samples Received</b>	: 15-Jan-2025 13:17
<b>PO</b>	: 10880	<b>Date Analysis Commenced</b>	: 15-Jan-2025
<b>C-O-C number</b>	: ----	<b>Issue Date</b>	: 21-Jan-2025 08:54
<b>Sampler</b>	: ----		
<b>Site</b>	: Town of Ladysmith		
<b>Quote number</b>	: VA22-GMSM100-001 Tender# 2022-IS-20		
<b>No. of samples received</b>	: 4		
<b>No. of samples analysed</b>	: 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.

<i>Signatories</i>	<i>Position</i>	<i>Laboratory Department</i>
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.

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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).

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(s) Treated Water (post reservoir): Exceeded Recommended Holding Time prior to receipt at the lab for HPC analysis.**



## Analytical Results

Sub-Matrix: Water  
 (Matrix: Water)

Sub-Matrix: Water (Matrix: Water)					Client sample ID	Raw Water	DAF Effluent	UF Effluent	Treated Water (post reservoir)	----
Client sampling date / time					14-Jan-2025 10:00	14-Jan-2025 10:00	14-Jan-2025 10:00	14-Jan-2025 10:00	----	
Analyte	CAS Number	Method/Lab	LOR	Unit	VA25A0885-001	VA25A0885-002	VA25A0885-003	VA25A0885-004	----	
					Result	Result	Result	Result	----	
Physical Tests										
Alkalinity, total (as CaCO3)	----	E290/VA	1.0	mg/L	----	----	----	16.6	----	
Colour, true	----	E329/VA	5.0	CU	----	----	----	<5.0	----	
Conductivity	----	E100/VA	2.0	µS/cm	----	----	----	62.9	----	
pH	----	E108/VA	0.10	pH units	----	----	----	7.35	----	
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	1.18	----	----	
Carbon, total organic [TOC]	----	E355-L/VA	0.50	mg/L	2.79	1.21	1.02	----	----	
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	: <b>VA25A0885</b>	Page	: 1 of 8
Client	: <b>Town of Ladysmith</b>	Laboratory	: ALS Environmental - Vancouver
Contact	: Shawn Baker	Account Manager	: Thomas Chang
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	: 15-Jan-2025 13:17
PO	: 10880	Issue Date	: 21-Jan-2025 08:53
C-O-C number	: ----		
Sampler	: ----		
Site	: Town of Ladysmith		
Quote number	: VA22-GMSM100-001 Tender# 2022-IS-20		
No. of samples received	: 4		
No. of samples analysed	: 4		

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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 Laboratory Control Sample (LCS) outliers occur
- No Matrix Spike outliers occur.
- Duplicate 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)***

- 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**

---

<b>Work Order</b>	: <b>VA25A1414</b>		
<b>Client</b>	: <b>Town of Ladysmith</b>	<b>Laboratory</b>	: ALS Environmental - Vancouver
<b>Contact</b>	: Shawn Baker	<b>Account Manager</b>	: Gulraj Dhanaua
<b>Address</b>	: 410 Esplanade PO Box 220 Ladysmith British Columbia Canada V9G 1A2	<b>Address</b>	: 8081 Lougheed Highway Burnaby BC Canada V5A 1W9
<b>Telephone</b>	: ----	<b>Telephone</b>	: +1 604 253 4188
<b>Project</b>	: Arbutus Water Treatment Plant - Weekly Sampling	<b>Date Samples Received</b>	: 22-Jan-2025 12:00
<b>PO</b>	: 10880	<b>Date Analysis Commenced</b>	: 22-Jan-2025
<b>C-O-C number</b>	: ----	<b>Issue Date</b>	: 27-Jan-2025 16:55
<b>Sampler</b>	: ----		
<b>Site</b>	: Town of Ladysmith		
<b>Quote number</b>	: Town of Ladysmith Standing Offer		
<b>No. of samples received</b>	: 4		
<b>No. of samples analysed</b>	: 4		

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---

**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.

<i>Signatories</i>	<i>Position</i>	<i>Laboratory Department</i>
Kim Jensen	Department Manager - Metals	Inorganics, Burnaby, British Columbia
Miles Gropen	Department Manager - Inorganics	Microbiology, Burnaby, British Columbia
Monica Ko	Lab Assistant	Microbiology, Burnaby, British Columbia



## General Comments

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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.

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

## Qualifiers

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



Analytical Results

Sub-Matrix: Water (Matrix: Water)					Client sample ID	Raw Water	DAF Effluent	UF Effluent	Treated Water (post reservoir)	----
Client sampling date / time						21-Jan-2025 10:30	21-Jan-2025 10:30	21-Jan-2025 10:30	21-Jan-2025 10:30	----
Analyte	CAS Number	Method/Lab	LOR	Unit	VA25A1414-001	VA25A1414-002	VA25A1414-003	VA25A1414-004	----	----
					Result	Result	Result	Result		----
Physical Tests										
Alkalinity, total (as CaCO3)	----	E290/VA	1.0	mg/L	----	----	----	16.0	----	----
Colour, true	----	E329/VA	5.0	CU	----	----	----	<5.0	----	----
Conductivity	----	E100/VA	2.0	µS/cm	----	----	----	66.6	----	----
pH	----	E108/VA	0.10	pH units	----	----	----	7.45	----	----
Turbidity	----	E121/VA	0.10	NTU	----	----	----	<0.10	----	----
Organic / Inorganic Carbon										
Carbon, dissolved organic [DOC]	----	E358-L/VA	0.50	mg/L	2.92 <sup>SFP</sup>	1.18 <sup>SFP</sup>	1.11 <sup>SFP</sup>	----	----	----
Carbon, total organic [TOC]	----	E355-L/VA	0.50	mg/L	3.07	1.30	1.09	----	----	----
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	: <b>VA25A1414</b>	Page	: 1 of 7
Client	: <b>Town of Ladysmith</b>	Laboratory	: ALS Environmental - Vancouver
Contact	: Shawn Baker	Account Manager	: Gulraj Dhanaua
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	: 22-Jan-2025 12:00
PO	: 10880	Issue Date	: 27-Jan-2025 16:55
C-O-C number	: ----		
Sampler	: ----		
Site	: Town of Ladysmith		
Quote number	: Town of Ladysmith Standing Offer		
No. of samples received	: 4		
No. of samples analysed	: 4		

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### **Summary of Outliers**

#### **Outliers : Quality Control Samples**

- No Method Blank value outliers occur.
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- 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***

- No Quality Control Sample Frequency Outliers occur.

---

**CERTIFICATE OF ANALYSIS**

---

<b>Work Order</b>	: <b>VA25A1946</b>		
<b>Client</b>	: <b>Town of Ladysmith</b>	<b>Laboratory</b>	: ALS Environmental - Vancouver
<b>Contact</b>	: Shawn Baker	<b>Account Manager</b>	: Kevin Bhikadia
<b>Address</b>	: 410 Esplanade PO Box 220 Ladysmith British Columbia Canada V9G 1A2	<b>Address</b>	: 8081 Lougheed Highway Burnaby BC Canada V5A 1W9
<b>Telephone</b>	: ----	<b>Telephone</b>	: +1 604 253 4188
<b>Project</b>	: Arbutus Water Treatment Plant - Weekly Sampling	<b>Date Samples Received</b>	: 29-Jan-2025 12:40
<b>PO</b>	: 10880	<b>Date Analysis Commenced</b>	: 29-Jan-2025
<b>C-O-C number</b>	: ----	<b>Issue Date</b>	: 04-Feb-2025 13:34
<b>Sampler</b>	: ----		
<b>Site</b>	: Town of Ladysmith		
<b>Quote number</b>	: Town of Ladysmith Standing Offer		
<b>No. of samples received</b>	: 4		
<b>No. of samples analysed</b>	: 4		

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---

**Signatories**

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<i>Signatories</i>	<i>Position</i>	<i>Laboratory Department</i>
Lindsay Gung	Supervisor - Water Chemistry	Microbiology, Burnaby, British Columbia
Monica Ko	Lab Assistant	Inorganics, Burnaby, British Columbia



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## Workorder Comments

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



## Analytical Results

Sub-Matrix: Water  
 (Matrix: Water)

Sub-Matrix: Water (Matrix: Water)					Client sample ID	Raw Water	DAF Effluent	UF Effluent	Treated Water (post reservoir)	----
Client sampling date / time					28-Jan-2025 10:00	28-Jan-2025 10:00	28-Jan-2025 10:00	28-Jan-2025 10:00	----	
Analyte	CAS Number	Method/Lab	LOR	Unit	VA25A1946-001	VA25A1946-002	VA25A1946-003	VA25A1946-004	----	
					Result	Result	Result	Result	----	
Physical Tests										
Alkalinity, total (as CaCO3)	----	E290/VA	1.0	mg/L	----	----	----	15.7	----	
Colour, true	----	E329/VA	5.0	CU	----	----	----	<5.0	----	
Conductivity	----	E100/VA	2.0	µS/cm	----	----	----	64.4	----	
pH	----	E108/VA	0.10	pH units	----	----	----	7.46	----	
Turbidity	----	E121/VA	0.10	NTU	----	----	----	0.15	----	
Organic / Inorganic Carbon										
Carbon, dissolved organic [DOC]	----	E358-L/VA	0.50	mg/L	2.82	1.10	1.06	----	----	
Carbon, total organic [TOC]	----	E355-L/VA	0.50	mg/L	2.82	1.05	1.02	----	----	
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	----	

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## QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: <b>VA25A1946</b>	Page	: 1 of 7
Client	: <b>Town of Ladysmith</b>	Laboratory	: ALS Environmental - Vancouver
Contact	: Shawn Baker	Account Manager	: 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	: 29-Jan-2025 12:40
PO	: 10880	Issue Date	: 04-Feb-2025 13:34
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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### **Summary of Outliers**

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- 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***

- No Quality Control Sample Frequency Outliers occur.