



Water Quality Monitoring Report for the District of Hope's Water System's January 1 – December 31, 2022



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Chief Utilities Operator

Foreword

Under the British Columbia Drinking Water Protection Act and the British Columbia Drinking Water Protection Regulation (BCDWPA & BCDWPR) the District of Hope is required to conduct water quality monitoring on the district's distribution system(s) and to publish the results in an annual report. This document fulfills that requirement by presenting a summary and discussion of all water quality sampling results for the year 2021. An overview of projects and events as they relate to drinking water in the District of Hope is also provided in this report.

Please visit the following web sites for further information:

Health Canada

<http://www.hc-sc.gc.ca/ewh-semt/water-eau/drink-potab/guide/index-eng.php>

Ministry of Health

http://www.health.gov.bc.ca/protect/dw_index.html

Health Link BC File #56 - Persons with compromised or Weakened Immune Systems

<https://www.rdn.bc.ca/cms/wpattachments/wpID2360atID5822.pdf>

District of Hope

<http://www.hope.ca>

World Health Organization

<https://www.who.int/news-room/fact-sheets/detail/drinking-water>

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Contents

Links.....	2
Contents.....	3
Acronyms.....	4
Executive Summary	5
1.0..... Water Distribution System Data	6
2.0..... 2022 Event Summary	7
3.0..... Water Main Flushing Program	8
4.0..... Water Quality Sampling and Testing	8,9,10
5.0..... Water Distribution System Projects	10,11
6.0..... Emergency Response Plan	11
Conclusion	11
Works Cited	12
Appendix #1 Bacterial Analysis.....	13
Appendix #2 Metals Analysis.....	14

Acronyms

AO: Aesthetic Objective

BCDWPA: British Columbia Drinking Water Protection Act

BCDWPR: British Columbia Drinking Water Protection

E.coli: Escherichia coli

EOCP: Environmental Operators Certification Program

GCDWQ: Guidelines for Canadian Drinking Water Quality

HAA: Haloacetic Acid

MAC: Maximum Acceptable Concentration

Mg/l: Milligrams per Liter

NTU: Nephelometric Turbidity Units PPB: Parts Per Billion

PPM: Parts Per Million

PRV: Pressure Regulating Valve

PVC: Polyvinyl Chloride

SCADA: Supervisory Control and Data Acquisition

UDF: Uni-directional Flushing

YTD: Year-to-Date

Executive Summary

The District of Hope supplies drinking water to residential and commercial users within District limits. The District of Hope is dedicated to providing high quality, aesthetically pleasing drinking water.

The District of Hope collects drinking water samples from 15 locations within the distribution system on a weekly basis and multiple other locations on a bi-weekly basis. This report includes a summary of the results of all sampling conducted of the district's 4 water distribution systems during 2022 as well as a discussion of projects and events affecting water quality within the District of Hope. A complete record of 2022 water quality sampling results can be found in the appendices of this report.

As part of our commitment to continual improvement, reliable service and high-water quality, the district completes operational and capital projects as well as water quality sampling on an ongoing basis.

In 2022 the District of Hope completed:

- Routine inspection and maintenance of all water distribution facilities
- Dead end and uni-directional water main flushing
- Water Master Plan continues to be implemented
- Water reservoir inspections
- Addition of 250m of new watermain
- Improvements to Thacker Mtn Rd water main
- One new 150mm water connection

- Installation of a new SCADA control panel at Well #10
- Addition (relocation) of 1 water sample station
- Addition of a fully automated bulk water fill station at the Hope #1 firehall

1.0 Water Distribution System Data

1.1 System Infrastructure

This section provides information of the District of Hope's 4 water distribution systems. All of the components listed are operated and maintained by the Hope's operations utilities department.

Critical Asset components of the water distribution system

Asset:

• Fire hydrants	221
• Pressure reducing valves	1
• Wells	7
• Reservoirs	4
• Generators	5
• Underground distribution pipe	55,250m

In addition to the critical components of the water distribution system, there are many other smaller components to the district's water distribution system, including:

- Water meters
- Air valves
- End of line blow off valves
- Line valves
- 23 Water sampling station

All of these components work collaboratively to help the district deliver safe, reliable drinking water.

1.2 Public Response

In 2022 Hope District Operations Department responded to various concerns including: residential water service leaks, 3 water distribution main breaks, pressure checks, water service locates, new service installations as well as various other calls.

1.3 Staff Certification

The District of Hope’s water distribution systems are classified by the Environmental Operators Certification Program (EOCP). The District’s 4 water systems are monitored, operated, and maintained by competent staff who are certified by the EOCP.

Staff Certification

Certification Level	# of Staff
EOCP Water Distribution Level I	2
EOCP Water Distribution Level II	1
EOCP Water Distribution Level III	2
Total Qualified Staff	4

2.0 2021 Event Summary

2.1 Planning for the Future

The District of Hope is a growing community within the Fraser Valley, with an estimated population of 6686 residents (2021 Census). Hope’s water utility consists of 4 separate water systems, 3 of which are supplied by well source(s) and 1 surface water source (Lake of the Woods (also known as Schkam Lake). The water supply and distribution systems are a key focus of Hope’s strategic infrastructure priorities.

3.0 “Flush” Message from the Fraser Health Authority

Fraser Health has revised its metals at the tap “Flush” message. They have asked that all water purveyors include the following message in their annual report:

Anytime the water in a particular faucet has not been used for six hours or longer, “flush” your cold-water pipes by running the water until you notice a change in

temperature. (This could take as little as five to thirty seconds if there has been recent heavy water use such as showering or toilet flushing. Otherwise, it could take two minutes or longer.)

The more time water has been sitting in your home's pipes, the more lead it may contain.

Use only water from the cold-tap for drinking, cooking, and especially making baby formula. Hot water is likely to contain higher levels of lead.

The two actions recommended above are very important to the health of your family. They will probably be effective in reducing lead levels because most of the lead in household water usually comes from the plumbing in your house, not from the local water supply.

Conserving water is still important. Rather than just running the water down the drain you could use the water for things such as watering your plants (Zubel, 2014).

If residents have any questions, they are encouraged to contact the Fraser Health's Drinking Water Program at 604-870-7900 or 1-866-749-7900.

4.0 Water Main Flushing Program

The District of Hope conducts uni-directional and dead-end flushing in order to maintain a high level of water quality in the distribution system. Regularly flushing water mains removes stagnant water and deposits from pipes. Spot flushing is also conducted "as needed" to resolve complaints of poor water quality and sample results indicating positive *total coliform*.

5.0 Water Quality Sampling and Testing

Sampling and analysis for numerous water quality parameters are conducted on the District of Hope's distribution system on a regular basis. Sample schedules for various constituents are broken into sections based on the number of samples recommended by the *GCDWQ* and/or mandated by the *BCDWPR*. Monitoring of drinking water in the

District’s water distribution system is conducted for bacterial, chemical, and physical characteristics.

5.1 Metals

Metals can enter the drinking water system from either the source or in the distribution system itself. The District of Hope monitors the water distribution system for metals.

Sampling is conducted every second year as per the WQMRP. Sampling for metals in 2022 was performed on March 24 2022. *(Metals sampling is scheduled to occur next in 2024)*

A summary of relevant health-based MAC and Aesthetic Objective (AO) standards for metals in drinking water can be found below. This table summarizes only those parameters listed in the *GCDWQ* that are captured by the current version of the *WQMRP*.

MAC and AO Metals Standards Modified from the Guidelines for Canadian Drinking Water Quality (Published September 2022)

Parameter	MAC (mg/l)	AO (mg/l)	Year of Approval
Aluminum	2.9		1998
Antimony	0.006		1997
Arsenic	0.010		2006
Barium	2.0		2020
Cadmium	0.007		2020
Chromium	0.05		2016
Copper	2.0	1.0	2019
Iron		≤0.3	1978 (2005)
Lead	0.005		2019
Manganese	0.12	0.02	2019
Mercury	0.001		1986
Selenium	0.05		2014
Vinyl Chloride	0.002		2013
Zinc		≤5.0	1979 (2005)

5.2 Bacteriological Quality

All bacterial samples collected from municipal distribution systems are analyzed for *total coliform* and *E.coli* bacteria. The District meets or exceeds the minimum required samples per month for each of our 4 water systems. Further samples are collected by District

personnel on an as needed basis in response to water main breaks, operational adjustments, water quality complaints, or where cross-connections are suspected.

Water Quality Standards for Potable Water (Sections 2 & 9)

Parameter:	Standard:
Fecal coliform bacteria	No detectable fecal coliform bacteria per 100ml
Escherichia coli Total coliform bacteria	No detectable Escherichia coli per 100 ml
(a) 1 sample in a 30-day period	No detectable total coliform bacteria per 100 ml
(b) more than 1 sample in a 30-day period	At least 90% of samples have no detectable total coliform bacteria per 100ml and no sample has more than 10 total coliform bacteria per 100ml

(Province of British Columbia, 2011)

Frequency of Monitoring Samples for Prescribed Water Supply Systems (Section 8)

Population Served by the Prescribed Water Supply System:	Number of Samples Per Month:
less than 5,000	4
5,000 to 90,000	1 per 1,000 of population
more than 90,000	90 plus 1 per 10,000 of population in excess of 90,000

(Province of British Columbia, 2011)

6.0 Water Distribution System Projects

6.1 Future Planning

Projects for 2022 include:

1. Continued improvements to our SCADA network
2. Relocation of one water sampling station

3. The addition of backup power to Well 4
4. Working on former 753 system improvements, expecting to complete design and planning in 2023.

7.0 Emergency Response Plan

In the event of an emergency, the district may enact its Water System Emergency Response Plan. The goals of this plan are as follows:

- Rapidly restore service after an emergency
- Ensure adequate water supply for fire protection
- Minimize loss of service to users
- Provide emergency information to public
- Re-establish critical operations

Conclusion

The 2022 year had Operations staff at the District of Hope continue improvements to the day-to-day operations of the water utility and continue to work closely with the Fraser Health Authority to ensure safe, clean potable water for the district's residents.

Every year the district budgets for the study, maintenance, and replacement of critical components of the water distribution system and 2022 was no exception. Continued resource focus on the operation and maintenance of the district's water system along with completing critical infrastructure upgrades, will be pivotal to maintaining a high level of drinking water quality in the years to come.

Works Cited

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Appendix #1 Bacterial Analysis

District Hall, 325
Wallace Street

1-4-2022 11:50:00 AM	LT1	LT1
1-11-2022 11:40:00 AM	LT1	LT1
1-18-2022 10:35:00 AM	LT1	LT1
1-25-2022 11:35:00 AM	LT1	LT1
2-1-2022 11:55:00 AM	LT1	LT1
2-8-2022 11:30:00 AM	LT1	LT1
2-22-2022 11:45:00 AM	LT1	LT1
3-1-2022 11:20:00 AM	LT1	LT1
3-8-2022 11:30:00 AM	LT1	LT1
3-15-2022 11:30:00 AM	LT1	LT1
3-22-2022 11:20:00 AM	LT1	LT1
4-4-2022 11:35:00 AM	LT1	LT1
4-12-2022 11:45:00 AM	LT1	LT1
4-19-2022 11:30:00 AM	LT1	LT1
4-26-2022 11:06:00 AM	3	LT1
5-2-2022 11:45:00 AM	1	LT1
5-10-2022 12:00:00 PM	LT1	LT1
5-16-2022 9:15:00 AM	LT1	LT1
5-24-2022 11:00:00 AM	LT1	LT1
5-31-2022 8:50:00 AM	LT1	LT1
6-7-2022 11:55:00 AM	LT1	LT1
6-14-2022 12:00:00 PM	LT1	LT1
6-21-2022 10:40:00 AM	LT1	LT1
6-28-2022 11:45:00 AM	LT1	LT1
7-5-2022 11:45:00 AM	LT1	LT1
7-12-2022 11:30:00	LT1	LT1

AM			
7-18-2022 11:28:00	LT1	LT1	
AM			
7-26-2022 11:20:00	LT1	LT1	
AM			
8-2-2022 11:45:00	LT1	LT1	
AM			
8-9-2022 12:00:00	LT1	LT1	
PM			
8-16-2022 11:45:00	LT1	LT1	
AM			
8-23-2022 11:35:00	LT1	LT1	
AM			
8-30-2022 10:30:00	LT1	LT1	
AM			
9-6-2022 11:30:00	LT1	LT1	
AM			
9-13-2022 11:50:00	LT1	LT1	
AM			
9-20-2022 11:23:00	LT1	LT1	
AM			
9-27-2022 11:38:00	LT1	LT1	
AM			
10-4-2022 11:15:00	LT1	LT1	
AM			
10-11-2022 11:15:00	LT1	LT1	
AM			
10-18-2022 11:35:00	LT1	LT1	
AM			
10-25-2022 12:00:00	LT1	LT1	
PM			
11-1-2022 12:00:00	LT1	LT1	
PM			
11-8-2022 12:10:00	LT1	LT1	
PM			
11-22-2022 8:00:00	LT1	LT1	
AM			
11-29-2022 11:15:00	QRWRT	QRWRT	
AM			
12-6-2022 11:45:00	LT1	LT1	
AM			
12-13-2022 11:45:00	<u>LT1</u>	<u>LT1</u>	
AM			
Total Positive:	2	1	0

Well #1, Hope Fire
Hall - Third Ave

1-11-2022 7:30:00	LT1	LT1
AM		
2-1-2022 7:30:00 AM	LT1	LT1
3-15-2022 7:40:00	LT1	LT1
AM		
4-26-2022 7:30:00	LT1	LT1
AM		

5-10-2022 7:40:00 AM	1	LT1	
6-14-2022 7:30:00 AM	LT1	LT1	
8-16-2022 8:10:00 AM	LT1	LT1	
9-27-2022 7:25:00 AM	LT1	LT1	
10-11-2022 9:05:00 AM	LT1	LT1	
11-22-2022 7:28:00 AM	<u>LT1</u>	<u>LT1</u>	
Total Positive:	1	0	0

Well #2, 110 King
Street

1-18-2022 11:05:00 AM	LT1	LT1	
1-25-2022 8:15:00 AM	LT1	LT1	
3-29-2022 8:20:00 AM	LT1	LT1	
4-26-2022 10:45:00 AM	LT1	LT1	
5-16-2022 4:15:00 AM	LT1	LT1	
6-22-2022 8:30:00 AM	NSR	NSR	
6-28-2022 8:00:00 AM	LT1	LT1	
7-12-2022 8:15:00 AM	LT1	LT1	
8-16-2022 8:05:00 AM	LT1	LT1	
9-13-2022 8:10:00 AM	LT1	LT1	
10-18-2022 8:15:00 AM	LT1	LT1	
11-8-2022 8:20:00 AM	<u>LT1</u>	<u>LT1</u>	
Total Positive:	1	1	0

7th Avenue
Sampling Port, 225
7th Ave

1-4-2022 11:40:00 AM	LT1	LT1	
1-11-2022 11:20:00 AM	LT1	LT1	
1-18-2022 10:53:00 AM	LT1	LT1	
1-25-2022 8:30:00 AM	LT1	LT1	

2-1-2022 11:45:00 AM	LT1	LT1
2-8-2022 11:20:00 AM	LT1	LT1
2-15-2022 12:05:00 PM	LT1	LT1
2-22-2022 10:00:00 AM	LT1	LT1
3-1-2022 11:10:00 AM	LT1	LT1
3-8-2022 11:15:00 AM	LT1	LT1
3-15-2022 11:20:00 AM	LT1	LT1
3-22-2022 11:10:00 AM	LT1	LT1
3-29-2022 9:35:00 AM	LT1	LT1
4-4-2022 11:25:00 AM	LT1	LT1
4-12-2022 11:25:00 AM	LT1	LT1
4-19-2022 11:20:00 AM	LT1	LT1
4-26-2022 8:55:00 AM	LT1	LT1
5-2-2022 11:40:00 AM	LT1	LT1
5-10-2022 11:55:00 AM	LT1	LT1
5-16-2022 8:17:00 AM	LT1	LT1
5-24-2022 10:50:00 AM	LT1	LT1
5-31-2022 8:23:00 AM	LT1	LT1
6-7-2022 11:45:00 AM	LT1	LT1
6-14-2022 11:50:00 AM	LT1	LT1
6-21-2022 10:20:00 AM	LT1	LT1
6-28-2022 11:35:00 AM	LT1	LT1
7-5-2022 11:35:00 AM	LT1	LT1
7-12-2022 11:15:00 AM	LT1	LT1
7-18-2022 8:12:00 AM	LT1	LT1
7-26-2022 11:05:00 AM	LT1	LT1
8-2-2022 9:40:00 AM	LT1	LT1
8-9-2022 11:55:00 AM	LT1	LT1

8-16-2022 11:35:00 AM	LT1	LT1	
8-23-2022 11:25:00 AM	LT1	LT1	
8-30-2022 10:20:00 AM	LT1	LT1	
9-6-2022 9:30:00 AM	LT1	LT1	
9-13-2022 11:40:00 AM	LT1	LT1	
9-20-2022 8:18:00 AM	LT1	LT1	
9-27-2022 11:25:00 AM	LT1	LT1	
10-4-2022 11:05:00 AM	LT1	LT1	
10-11-2022 8:55:00 AM	LT1	LT1	
10-18-2022 11:25:00 AM	LT1	LT1	
10-25-2022 11:45:00 AM	LT1	LT1	
11-1-2022 11:45:00 AM	LT1	LT1	
11-8-2022 12:00:00 PM	LT1	LT1	
11-15-2022 9:30:00 AM	LT1	LT1	
11-22-2022 8:24:00 AM	LT1	LT1	
11-29-2022 8:55:00 AM	QRWRT	QRWRT	
12-6-2022 11:30:00 AM	LT1	LT1	
12-13-2022 11:25:00 AM	<u>LT1</u>	<u>LT1</u>	
Total Positive:	0	1	0

District Works Yard,
1225 Nelson Ave

1-4-2022 10:00:00 AM	LT1	LT1	
1-11-2022 9:10:00 AM	LT1	LT1	
1-18-2022 8:33:00 AM	LT1	LT1	
1-25-2022 10:35:00 AM	LT1	LT1	
2-1-2022 9:40:00 AM	LT1	LT1	
2-8-2022 9:35:00 AM	LT1	LT1	
2-15-2022 9:45:00 AM	LT1	LT1	
2-22-2022 9:45:00 AM	LT1	LT1	
3-1-2022 9:25:00 AM	LT1	LT1	

3-8-2022 9:15:00 AM	LT1	LT1
3-15-2022 9:15:00 AM	LT1	LT1
3-22-2022 9:15:00 AM	LT1	LT1
3-29-2022 9:20:00 AM	LT1	LT1
4-4-2022 9:25:00 AM	LT1	LT1
4-12-2022 9:25:00 AM	LT1	LT1
4-19-2022 9:35:00 AM	6	LT1
4-26-2022 10:30:00 AM	25	LT1
5-2-2022 9:20:00 AM	LT1	LT1
5-10-2022 9:45:00 AM	LT1	LT1
5-16-2022 4:43:00 AM	LT1	LT1
5-24-2022 9:20:00 AM	LT1	LT1
5-31-2022 10:37:00 AM	LT1	LT1
6-7-2022 9:55:00 AM	LT1	LT1
6-14-2022 9:35:00 AM	LT1	LT1
6-21-2022 8:35:00 AM	LT1	LT1
6-28-2022 9:20:00 AM	LT1	LT1
7-5-2022 9:35:00 AM	LT1	LT1
7-12-2022 9:25:00 AM	LT1	LT1
7-18-2022 9:59:00 AM	LT1	LT1
7-26-2022 8:30:00 AM	LT1	LT1
8-2-2022 9:25:00 AM	LT1	LT1
8-9-2022 9:40:00 AM	LT1	LT1
8-16-2022 8:20:00 AM	LT1	LT1
8-23-2022 9:10:00 AM	LT1	LT1
8-30-2022 8:30:00 AM	LT1	LT1
9-6-2022 9:20:00 AM	LT1	LT1
9-13-2022 9:25:00 AM	LT1	LT1
9-20-2022 10:30:00 AM	LT1	LT1
9-27-2022 9:12:00 AM	LT1	LT1
10-4-2022 10:25:00 AM	LT1	LT1
10-11-2022 9:20:00	LT1	LT1

AM			
10-18-2022 9:30:00	LT1	LT1	
AM			
10-25-2022 9:35:00	LT1	LT1	
AM			
11-1-2022 9:20:00	LT1	LT1	
AM			
11-8-2022 9:50:00	LT1	LT1	
AM			
11-15-2022 8:40:00	LT1	LT1	
AM			
11-22-2022 10:09:00	LT1	LT1	
AM			
11-29-2022 8:25:00	QRWRT	QRWRT	
AM			
12-6-2022 9:45:00	LT1	LT1	
AM			
12-13-2022 8:50:00	<u>LT1</u>	<u>LT1</u>	
AM			
Total Positive:	2	1	0

Well # 10, Kawkawa
Lk Rd

1-18-2022 8:53:00	LT1	LT1	
AM			
2-15-2022 11:45:00	LT1	LT1	
AM			
3-22-2022 10:50:00	LT1	LT1	
AM			
4-26-2022 9:15:00	LT1	LT1	
AM			
5-10-2022 11:45:00	LT1	LT1	
AM			
6-14-2022 11:35:00	LT1	LT1	
AM			
8-23-2022 11:15:00	21	LT1	
AM			
9-13-2022 11:25:00	LT1	LT1	
AM			
9-27-2022 11:15:00	LT1	LT1	
AM			
10-11-2022 9:45:00	LT1	LT1	
AM			
11-15-2022 10:00:00	LT1	LT1	
AM			
12-13-2022 11:15:00	<u>LT1</u>	<u>LT1</u>	
AM			
Total Positive:	1	0	0

Well # 3,

1-11-2022 11:00:00	LT1	LT1	
AM			
1-25-2022 8:45:00	LT1	LT1	

AM			
3-8-2022 11:00:00	LT1	LT1	
AM			
4-19-2022 11:05:00	LT1	LT1	
AM			
5-16-2022 4:30:00	LT1	LT1	
AM			
6-21-2022 10:00:00	LT1	LT1	
AM			
8-30-2022 8:55:00	LT1	LT1	
AM			
9-27-2022 11:07:00	LT1	LT1	
AM			
10-25-2022 11:30:00	LT1	LT1	
AM			
11-1-2022 11:25:00	LT1	LT1	
AM			
12-6-2022 11:20:00	<u>LT1</u>	<u>LT1</u>	
AM			
Total Positive:	0	0	0

Lakeview Cres
Sampling Port,
Opposite 21256
Lakeview Cres

1-4-2022 11:15:00	LT1	LT1	
AM			
1-18-2022 10:15:00	LT1	LT1	
AM			
1-25-2022 9:45:00	LT1	LT1	
AM			
2-1-2022 11:15:00	LT1	LT1	
AM			
2-8-2022 11:10:00	LT1	LT1	
AM			
2-15-2022 11:15:00	LT1	LT1	
AM			
2-22-2022 11:20:00	LT1	LT1	
AM			
3-1-2022 10:35:00	LT1	LT1	
AM			
3-8-2022 10:40:00	LT1	LT1	
AM			
3-15-2022 10:55:00	LT1	LT1	
AM			
3-22-2022 10:20:00	LT1	LT1	
AM			
4-4-2022 10:55:00	LT1	LT1	
AM			
4-12-2022 10:20:00	LT1	LT1	
AM			
4-19-2022 10:40:00	LT1	LT1	
AM			
4-26-2022 9:40:00	LT1	LT1	

AM		
5-2-2022 10:45:00	LT1	LT1
AM		
5-10-2022 11:20:00	2	LT1
AM		
5-16-2022 5:35:00	2	LT1
AM		
5-31-2022 9:17:00	LT1	LT1
AM		
6-7-2022 11:05:00	LT1	LT1
AM		
6-14-2022 11:05:00	LT1	LT1
AM		
6-21-2022 9:20:00	LT1	LT1
AM		
6-28-2022 10:45:00	LT1	LT1
AM		
7-5-2022 10:40:00	LT1	LT1
AM		
7-12-2022 10:35:00	LT1	LT1
AM		
7-18-2022 8:42:00	LT1	LT1
AM		
7-26-2022 9:30:00	LT1	LT1
AM		
8-2-2022 11:00:00	LT1	LT1
AM		
8-9-2022 11:20:00	LT1	LT1
AM		
8-16-2022 10:30:00	LT1	LT1
AM		
8-23-2022 10:20:00	LT1	LT1
AM		
8-30-2022 9:25:00	LT1	LT1
AM		
9-6-2022 10:40:00	LT1	LT1
AM		
9-13-2022 10:35:00	LT1	LT1
AM		
9-20-2022 9:08:00	LT1	LT1
AM		
9-27-2022 10:50:00	LT1	LT1
AM		
10-4-2022 9:35:00	LT1	LT1
AM		
10-11-2022 10:15:00	LT1	LT1
AM		
10-18-2022 10:40:00	LT1	LT1
AM		
10-25-2022 11:10:00	LT1	LT1
AM		
11-1-2022 10:45:00	LT1	LT1
AM		
11-8-2022 11:25:00	LT1	LT1
AM		

11-15-2022 10:35:00 AM	LT1	LT1	
11-22-2022 9:20:00 AM	LT1	LT1	
11-29-2022 10:25:00 AM	QRWRT	QRWRT	
12-6-2022 11:05:00 AM	LT1	LT1	
12-13-2022 10:25:00 AM	<u>LT1</u>	<u>LT1</u>	
Total Positive:	2	1	0

1300 7th ave, 1300
7th ave

1-4-2022 10:15:00 AM	LT1	LT1	
1-11-2022 9:30:00 AM	LT1	LT1	
1-18-2022 9:02:00 AM	LT1	LT1	
1-25-2022 10:25:00 AM	LT1	LT1	
2-1-2022 10:10:00 AM	LT1	LT1	
2-8-2022 9:45:00 AM	LT1	LT1	
2-15-2022 10:05:00 AM	LT1	LT1	
2-22-2022 11:35:00 AM	LT1	LT1	
3-1-2022 9:35:00 AM	LT1	LT1	
3-8-2022 9:25:00 AM	LT1	LT1	
3-15-2022 9:30:00 AM	LT1	LT1	
3-22-2022 9:00:00 AM	LT1	LT1	
4-4-2022 9:50:00 AM	LT1	LT1	
4-12-2022 9:35:00 AM	LT1	LT1	
4-19-2022 9:45:00 AM	LT1	LT1	
4-26-2022 9:05:00 AM	LT1	LT1	
5-2-2022 9:35:00 AM	LT1	LT1	
5-10-2022 10:05:00 AM	LT1	LT1	
5-16-2022 4:56:00 AM	LT1	LT1	
5-31-2022 10:31:00 AM	LT1	LT1	
6-7-2022 10:10:00 AM	LT1	LT1	
6-14-2022 9:55:00 AM	LT1	LT1	
6-21-2022 8:50:00	LT1	LT1	

AM		
6-28-2022 9:35:00	LT1	LT1
AM		
7-5-2022 9:45:00 AM	LT1	LT1
7-12-2022 9:35:00	LT1	LT1
AM		
7-18-2022 9:45:00	LT1	LT1
AM		
7-26-2022 8:40:00	LT1	LT1
AM		
8-2-2022 11:20:00	LT1	LT1
AM		
8-9-2022 9:55:00 AM	LT1	LT1
8-16-2022 9:35:00	LT1	LT1
AM		
8-23-2022 9:23:00	LT1	LT1
AM		
8-30-2022 8:40:00	LT1	LT1
AM		
9-6-2022 11:15:00	LT1	LT1
AM		
9-13-2022 9:40:00	LT1	LT1
AM		
9-20-2022 9:55:00	LT1	LT1
AM		
9-27-2022 9:25:00	LT1	LT1
AM		
10-4-2022 10:30:00	LT1	LT1
AM		
10-11-2022 9:25:00	LT1	LT1
AM		
10-18-2022 9:40:00	LT1	LT1
AM		
10-25-2022 9:55:00	LT1	LT1
AM		
11-1-2022 9:30:00	LT1	LT1
AM		
11-8-2022 10:10:00	LT1	LT1
AM		
11-15-2022 9:45:00	LT1	LT1
AM		
11-22-2022 10:00:00	LT1	LT1
AM		
11-29-2022 9:15:00	QRWRT	QRWRT
AM		
12-6-2022 10:05:00	LT1	LT1
AM		
12-13-2022 9:10:00	<u>LT1</u>	<u>LT1</u>
AM		
Total Positive:	0	1
		0

21427 Thacker Mtn
Rd, 21427 Thacker
Mtn Rd

1-11-2022 6:45:00 PM	LT1	LT1
1-25-2022 10:00:00 AM	LT1	LT1
2-1-2022 11:25:00 AM	LT1	LT1
2-15-2022 11:25:00 AM	LT1	LT1
3-1-2022 11:00:00 AM	LT1	LT1
3-8-2022 10:55:00 AM	LT1	LT1
3-22-2022 10:35:00 AM	LT1	LT1
4-4-2022 11:05:00 AM	LT1	LT1
4-12-2022 11:00:00 AM	LT1	LT1
4-19-2022 10:55:00 AM	LT1	LT1
4-26-2022 10:15:00 AM	2	LT1
5-2-2022 11:20:00 AM	LT1	LT1
5-10-2022 11:30:00 AM	LT1	LT1
5-16-2022 5:55:00 AM	LT1	LT1
6-7-2022 11:25:00 AM	LT1	LT1
6-14-2022 11:20:00 AM	LT1	LT1
6-28-2022 11:15:00 AM	LT1	LT1
7-5-2022 11:00:00 AM	LT1	LT1
7-12-2022 10:50:00 AM	LT1	LT1
7-26-2022 10:35:00 AM	LT1	LT1
8-9-2022 11:30:00 AM	LT1	LT1
8-16-2022 11:15:00 AM	LT1	LT1
8-23-2022 10:55:00 AM	LT1	LT1
9-6-2022 10:55:00 AM	LT1	LT1
9-13-2022 10:15:00 AM	LT1	LT1
9-20-2022 9:29:00 AM	LT1	LT1
10-4-2022 10:15:00 AM	LT1	LT1
10-11-2022 9:50:00	LT1	LT1

AM			
11-8-2022 11:45:00	<u>LT1</u>	<u>LT1</u>	
AM			
Total Positive:	1	0	0

65573 Dogwood Dr,
65573 Dogwood Dr

1-4-2022 10:45:00	LT1	LT1
AM		
1-11-2022 9:55:00	LT1	LT1
AM		
1-18-2022 9:32:00	LT1	LT1
AM		
2-8-2022 10:25:00	LT1	LT1
AM		
2-22-2022 10:35:00	LT1	LT1
AM		
3-1-2022 10:05:00	LT1	LT1
AM		
3-8-2022 9:55:00 AM	LT1	LT1
3-15-2022 10:05:00	LT1	LT1
AM		
4-4-2022 10:25:00	LT1	LT1
AM		
4-19-2022 10:40:00	LT1	LT1
AM		
4-26-2022 9:30:00	LT1	LT1
AM		
5-2-2022 10:10:00	5	LT1
AM		
5-10-2022 10:50:00	4	LT1
AM		
5-16-2022 5:23:00	LT1	LT1
AM		
6-7-2022 10:35:00	LT1	LT1
AM		
6-14-2022 10:35:00	LT1	LT1
AM		
6-21-2022 9:15:00	LT1	LT1
AM		
7-5-2022 10:10:00	LT1	LT1
AM		
7-12-2022 10:05:00	LT1	LT1
AM		
7-26-2022 9:15:00	LT1	LT1
AM		
8-9-2022 10:30:00	LT1	LT1
AM		
8-16-2022 10:05:00	LT1	LT1
AM		
8-30-2022 10:00:00	LT1	LT1
AM		
9-6-2022 10:00:00	LT1	LT1
AM		

9-13-2022 10:05:00 AM	LT1	LT1	
9-27-2022 9:57:00 AM	LT1	LT1	
10-4-2022 9:50:00 AM	LT1	LT1	
10-18-2022 10:05:00 AM	LT1	LT1	
10-25-2022 10:50:00 AM	LT1	LT1	
11-1-2022 10:15:00 AM	LT1	LT1	
11-8-2022 10:15:00 AM	LT1	LT1	
11-15-2022 10:25:00 AM	LT1	LT1	
12-13-2022 9:50:00 AM	<u>LT1</u>	<u>LT1</u>	
Total Positive:	2	0	0

21002 Swallow Pl.
21002 Swallow Pl.
Hope

1-4-2022 10:35:00 AM	LT1	LT1	
1-11-2022 9:50:00 AM	LT1	LT1	
1-18-2022 9:22:00 AM	LT1	LT1	
1-25-2022 8:55:00 AM	LT1	LT1	
2-1-2022 10:30:00 AM	LT1	LT1	
2-8-2022 10:15:00 AM	LT1	LT1	
2-15-2022 10:30:00 AM	LT1	LT1	
2-22-2022 10:25:00 AM	LT1	LT1	
3-1-2022 9:55:00 AM	LT1	LT1	
3-8-2022 9:50:00 AM	LT1	LT1	
3-15-2022 10:00:00 AM	LT1	LT1	
3-22-2022 9:50:00 AM	2	LT1	
3-29-2022 9:55:00 AM	LT1	LT1	
4-4-2022 10:15:00 AM	LT1	LT1	
4-12-2022 9:55:00 AM	LT1	LT1	
4-19-2022 10:00:00 AM	LT1	LT1	
4-26-2022 9:20:00	LT1	LT1	

AM		
5-2-2022 9:55:00 AM	3	LT1
5-10-2022 10:35:00 AM	4	LT1
AM		
5-16-2022 5:10:00 AM	LT1	LT1
AM		
5-24-2022 9:40:00 AM	LT1	LT1
AM		
5-31-2022 9:04:00 AM	LT1	LT1
AM		
6-7-2022 10:20:00 AM	LT1	LT1
AM		
6-14-2022 10:20:00 AM	LT1	LT1
AM		
6-21-2022 9:00:00 AM	LT1	LT1
AM		
6-28-2022 9:50:00 AM	LT1	LT1
AM		
7-5-2022 10:00:00 AM	LT1	LT1
AM		
7-12-2022 9:55:00 AM	LT1	LT1
AM		
7-18-2022 8:30:00 AM	LT1	LT1
AM		
7-26-2022 9:00:00 AM	LT1	LT1
AM		
8-2-2022 10:00:00 AM	LT1	LT1
AM		
8-9-2022 10:15:00 AM	LT1	LT1
AM		
8-16-2022 9:55:00 AM	LT1	LT1
AM		
8-23-2022 9:45:00 AM	LT1	LT1
AM		
8-30-2022 9:05:00 AM	LT1	LT1
AM		
9-6-2022 9:45:00 AM	LT1	LT1
9-13-2022 9:55:00 AM	LT1	LT1
AM		
9-20-2022 8:32:00 AM	LT1	LT1
AM		
9-27-2022 9:47:00 AM	LT1	LT1
AM		
10-4-2022 10:00:00 AM	LT1	LT1
AM		
10-11-2022 10:05:00 AM	LT1	LT1
AM		
10-18-2022 9:55:00 AM	LT1	LT1
AM		
10-25-2022 10:20:00 AM	LT1	LT1
AM		
11-1-2022 10:00:00 AM	LT1	LT1
AM		
11-8-2022 10:30:00 AM	LT1	LT1
AM		

11-15-2022 10:20:00 AM	LT1	LT1	
11-22-2022 8:42:00 AM	LT1	LT1	
11-29-2022 9:45:00 AM	QRWRT	QRWRT	
12-6-2022 10:20:00 AM	LT1	LT1	
12-13-2022 9:35:00 AM	<u>LT1</u>	<u>LT1</u>	
Total Positive:	3	1	0

Thacker Mtn
Sampling Port,
21407 Thacker Mtn
Rd

10-18-2022 11:00:00 AM	LT1	LT1	
11-1-2022 11:15:00 AM	LT1	LT1	
11-15-2022 10:10:00 AM	LT1	LT1	
11-22-2022 9:35:00 AM	LT1	LT1	
11-29-2022 9:30:00 AM	QRWRT	QRWRT	
12-13-2022 10:40:00 AM	<u>LT1</u>	<u>LT1</u>	
Total Positive:	0	1	0

Result Values: E - estimated L - less than G - greater than

Samples that contain total coliform:	15		3.30% of total
Samples that contain e. coli:	9		1.98% of total
Samples that contain fecal coliform:	0		0.00% of total
Number of consecutive samples that contain total coliform:	5		
Number of samples that contain total coliform in last 30 days:	0/0		
Total number of samples:	454		

Comments:

Environmental Health Officer
Feb 1 2023

FOR FURTHER INFORMATION PLEASE CALL: Jessica Hibbs (604) 870-7900

Sample Range Report

Fraser Health Authority

Facility Name: Lake Of The Woods Water System

Date Range: Jan 1 2022 to Dec 31 2022

Operator Kevin Dicken
325 Wallace St

PO Box 609
Hope, BC V0X 1L0

Sampling Site	Date Collected	Total Coliform	E. Coli	Fecal Coliform
<u>Pumphouse Active,</u>				
<u>Ross Rd.</u>				
	1-4-2022 8:20:00 AM	LT1	LT1	
	1-25-2022 8:01:00 AM	LT1	LT1	
	2-1-2022 8:00:00 AM	LT1	LT1	
	2-8-2022 8:10:00 AM	LT1	LT1	
	2-15-2022 7:55:00 AM	LT1	LT1	
	2-22-2022 8:00:00 AM	LT1	LT1	
	3-1-2022 8:00:00 AM	LT1	LT1	
	3-8-2022 8:00:00 AM	LT1	LT1	
	3-15-2022 7:05:00 AM	LT1	LT1	
	3-22-2022 8:00:00 AM	LT1	LT1	
	3-29-2022 8:00:00 AM	LT1	LT1	
	4-4-2022 7:50:00 AM	LT1	LT1	
	4-12-2022 7:55:00 AM	LT1	LT1	
	4-19-2022 8:15:00 AM	LT1	LT1	
	4-26-2022 7:40:00 AM	LT1	LT1	
	5-2-2022 8:00:00 AM	LT1	LT1	
	5-10-2022 8:00:00 AM	LT1	LT1	
	5-16-2022 8:55:00 AM	LT1	LT1	
	5-24-2022 8:00:00 AM	LT1	LT1	
	5-31-2022 8:00:00 AM	LT1 GTR200	LT1 GTR200	
	6-7-2022 8:00:00 AM	ESTCT 8 ESTHCD	LT1	
	6-14-2022 7:55:00 AM	LT1	LT1	
	6-20-2022 10:15:00 AM	LT1	LT1	

6-21-2022 7:36:00 AM	LT1	LT1	
7-5-2022 7:55:00 AM	LT1	LT1	
7-9-2022 7:45:00 AM	LT1	LT1	
7-12-2022 7:45:00 AM	LT1	LT1	
7-18-2022 7:53:00 AM	LT1	LT1	
7-26-2022 7:30:00 AM	LT1	LT1	
8-2-2022 7:45:00 AM	LT1	LT1	
8-16-2022 7:35:00 AM	LT1	LT1	
8-23-2022 7:35:00 AM	LT1	LT1	
8-30-2022 7:30:00 AM	LT1	LT1	
9-6-2022 7:50:00 AM	LT1	LT1	
9-13-2022 7:55:00 AM	LT1	LT1	
9-20-2022 8:02:00 AM	LT1	LT1	
9-27-2022 7:55:00 AM	LT1	LT1	
10-4-2022 8:42:00 AM	LT1	LT1	
10-11-2022 8:25:00 AM	LT1	LT1	
10-18-2022 8:00:00 AM	LT1	LT1	
10-25-2022 7:55:00 AM	LT1	LT1	
11-1-2022 7:55:00 AM	LT1	LT1	
11-8-2022 8:00:00 AM	LT1	LT1	
11-15-2022 9:10:00 AM	LT1	LT1	
11-22-2022 7:42:00 AM	LT1	LT1	
11-29-2022 8:40:00 AM	QRWRT	QRWRT	
12-6-2022 8:05:00 AM	LT1	LT1	
12-13-2022 7:50:00 AM	<u>LT1</u>	<u>LT1</u>	
Total Positive:	1	0	0

Arseneau Rd.

4-12-2022 8:05:00 AM	LT1	LT1
7-12-2022 8:00:00 AM	LT1	LT1
10-11-2022 8:35:00	<u>LT1</u>	<u>LT1</u>

AM
Total Positive: 0 0 0

Result Values: **E - estimated** **L - less than** **G - greater than**

Samples that contain total coliform:	1		1.96% of total
Samples that contain e. coli:	0		0.00% of total
Samples that contain fecal coliform:	0		0.00% of total
Number of consecutive samples that contain total coliform:	0		
Number of samples that contain total coliform in last 30 days:	0/0		
Total number of samples:	51		

Comments:

Environmental Health Officer
Feb 27 2023

FOR FURTHER INFORMATION PLEASE CALL: Jessica Hibbs (604) 870-7900

Appendix #2 Metals Analysis



CERTIFICATE OF ANALYSIS

Work Order : **VA22A6250**
Client : **District of Hope**
Contact : Steve Glasson
Address : 1225 Nelson Ave PO Box 609
Hope BC Canada V0X 1L0
Telephone : ----
Project : ----
PO : 3064
C-O-C number : 20-996930
Sampler : Scott Blake
Site : ----
Quote number : Potable Water
No. of samples received : 4
No. of samples analysed : 4

Page : 1 of 4
Laboratory : Vancouver - Environmental
Account Manager : Sneha Sansare
Address : 8081 Lougheed Highway
Burnaby BC Canada V5A 1W9
Telephone : +1 604 253 4188
Date Samples Received : 25-Mar-2022 14:34
Date Analysis Commenced : 27-Mar-2022
Issue Date : 11-Apr-2022 17:07

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>
Dee Lee	Analyst	Metals, Burnaby, British Columbia
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.

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).

<i>Unit</i>	<i>Description</i>
CU	colour units (1 CU = 1 mg/L Pt)
mg/L	milligrams per litre
NTU	nephelometric turbidity units
pH units	pH units

<: 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.

Qualifiers

<i>Qualifier</i>	<i>Description</i>
DLDS	Detection Limit Raised: Dilution required due to high Dissolved Solids / Electrical Conductivity.



Analytical Results

Sub-Matrix: Drinking Water
 (Matrix: Water)

Client sample ID

					Silver Cr Water System	District of Hope Water System	LOTW Water System	East Kawkawa Lake Water System	----
Client sampling date / time					24-Mar-2022	24-Mar-2022	24-Mar-2022	24-Mar-2022	----
Analyte	CAS Number	Method	LOR	Unit	VA22A6250-001	VA22A6250-002	VA22A6250-003	VA22A6250-004	-----
					Result	Result	Result	Result	----
Physical Tests									
colour, true	----	E329	5.0	CU	<5.0	<5.0	<5.0	<5.0	----
hardness (as CaCO3), from total Ca/Mg	----	EC100A	0.60	mg/L	56.9	73.2	47.5	56.3	----
pH	----	E108	0.10	pH units	7.74	7.75	7.61	7.65	----
turbidity	----	E121	0.10	NTU	<0.10	<0.10	0.11	<0.10	----
Anions and Nutrients									
fluoride	16984-48-8	E235.F	0.020	mg/L	<0.100 ^{DLDS}	<0.100 ^{DLDS}	<0.100 ^{DLDS}	<0.100 ^{DLDS}	----
nitrate (as N)	14797-55-8	E235.NO3-L	0.0050	mg/L	0.954	0.858	0.205	0.371	----
nitrite (as N)	14797-65-0	E235.NO2-L	0.0010	mg/L	<0.0050 ^{DLDS}	<0.0050 ^{DLDS}	<0.0050 ^{DLDS}	<0.0050 ^{DLDS}	----
Total Metals									
aluminum, total	7429-90-5	E420	0.0030	mg/L	0.0056	<0.0030	<0.0030	<0.0030	----
antimony, total	7440-36-0	E420	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	----
arsenic, total	7440-38-2	E420	0.00010	mg/L	0.00132	0.00037	0.00021	<0.00010	----
barium, total	7440-39-3	E420	0.00010	mg/L	0.0163	0.0127	0.0326	0.0302	----
beryllium, total	7440-41-7	E420	0.000100	mg/L	<0.000100	<0.000100	<0.000100	<0.000100	----
bismuth, total	7440-69-9	E420	0.000050	mg/L	<0.000050	<0.000050	<0.000050	<0.000050	----
boron, total	7440-42-8	E420	0.010	mg/L	<0.010	0.010	<0.010	<0.010	----
cadmium, total	7440-43-9	E420	0.0000050	mg/L	<0.0000050	0.0000062	<0.0000050	0.0000063	----
calcium, total	7440-70-2	E420	0.050	mg/L	16.6	22.0	13.1	16.4	----
cesium, total	7440-46-2	E420	0.000010	mg/L	<0.000010	<0.000010	0.000010	<0.000010	----
chromium, total	7440-47-3	E420	0.00050	mg/L	0.00282	0.00095	<0.00050	0.00126	----
cobalt, total	7440-48-4	E420	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	----
copper, total	7440-50-8	E420	0.00050	mg/L	0.0124	0.00137	0.00516	0.00703	----
iron, total	7439-89-6	E420	0.010	mg/L	0.162	<0.010	0.017	<0.010	----
lead, total	7439-92-1	E420	0.000050	mg/L	0.00124	0.000103	0.000123	0.000546	----
lithium, total	7439-93-2	E420	0.0010	mg/L	0.0016	<0.0010	<0.0010	<0.0010	----
magnesium, total	7439-95-4	E420	0.0050	mg/L	3.75	4.45	3.59	3.73	----
manganese, total	7439-96-5	E420	0.00010	mg/L	0.00098	0.00065	0.00220	0.00011	----
mercury, total	7439-97-6	E508	0.0000050	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	----
molybdenum, total	7439-98-7	E420	0.000050	mg/L	0.000959	0.000625	0.000178	0.000494	----
nickel, total	7440-02-0	E420	0.00050	mg/L	<0.00050	<0.00050	<0.00050	0.00071	----



Analytical Results

Sub-Matrix: Drinking Water

(Matrix: Water)

					Client sample ID	Silver Cr Water System	District of Hope Water System	LOTW Water System	East Kawkawa Lake Water System	----
					Client sampling date / time	24-Mar-2022	24-Mar-2022	24-Mar-2022	24-Mar-2022	----
Analyte	CAS Number	Method	LOR	Unit	VA22A6250-001	VA22A6250-002	VA22A6250-003	VA22A6250-004	-----	
					Result	Result	Result	Result	----	
Total Metals										
phosphorus, total	7723-14-0	E420	0.050	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050	----
potassium, total	7440-09-7	E420	0.050	mg/L	1.38	1.06	0.438	1.61	1.61	----
rubidium, total	7440-17-7	E420	0.00020	mg/L	<0.00020	<0.00020	0.00088	<0.00020	<0.00020	----
selenium, total	7782-49-2	E420	0.000050	mg/L	0.000231	0.000312	0.000095	0.000368	0.000368	----
silicon, total	7440-21-3	E420	0.10	mg/L	7.49	6.85	3.13	7.41	7.41	----
silver, total	7440-22-4	E420	0.000010	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	----
sodium, total	7440-23-5	E420	0.050	mg/L	3.90	5.14	5.15	2.16	2.16	----
strontium, total	7440-24-6	E420	0.00020	mg/L	0.0754	0.0939	0.0741	0.0802	0.0802	----
sulfur, total	7704-34-9	E420	0.50	mg/L	1.73	2.95	1.58	2.88	2.88	----
tellurium, total	13494-80-9	E420	0.00020	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	----
thallium, total	7440-28-0	E420	0.000010	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	----
thorium, total	7440-29-1	E420	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	----
tin, total	7440-31-5	E420	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	----
titanium, total	7440-32-6	E420	0.00030	mg/L	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030	----
tungsten, total	7440-33-7	E420	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	----
uranium, total	7440-61-1	E420	0.000010	mg/L	0.000093	0.000086	<0.000010	0.000148	0.000148	----
vanadium, total	7440-62-2	E420	0.00050	mg/L	0.00065	0.00054	<0.00050	<0.00050	<0.00050	----
zinc, total	7440-66-6	E420	0.0030	mg/L	0.0136	0.0190	0.0077	0.0056	0.0056	----
zirconium, total	7440-67-7	E420	0.00020	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	----

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

QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: VA22A6250	Page	: 1 of 8
Client	: District of Hope	Laboratory	: Vancouver - Environmental
Contact	: Steve Glasson	Account Manager	: Sneha Sansare
Address	: 1225 Nelson Ave PO Box 609 Hope BC Canada V0X 1L0	Address	: 8081 Lougheed Highway Burnaby, British Columbia Canada V5A 1W9
Telephone	: ----	Telephone	: +1 604 253 4188
Project	: ----	Date Samples Received	: 25-Mar-2022 14:34
PO	: 3064	Issue Date	: 11-Apr-2022 17:07
C-O-C number	: 20-996930		
Sampler	: Scott Blake		
Site	: ----		
Quote number	: Potable Water		
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 Services 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

- No Quality Control Sample Frequency Outliers occur.



Analysis Holding Time Compliance

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

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

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

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

Matrix: **Water** Evaluation: * = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Anions and Nutrients : Fluoride in Water by IC										
HDPE District of Hope Water System	E235.F	24-Mar-2022	----	----	----		28-Mar-2022	28 days	5 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE East Kawkawa Lake Water System	E235.F	24-Mar-2022	----	----	----		28-Mar-2022	28 days	5 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE LOTW Water System	E235.F	24-Mar-2022	----	----	----		28-Mar-2022	28 days	5 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE Silver Cr Water System	E235.F	24-Mar-2022	----	----	----		28-Mar-2022	28 days	5 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE District of Hope Water System	E235.NO3-L	24-Mar-2022	----	----	----		28-Mar-2022	3 days	5 days	* EHT
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE East Kawkawa Lake Water System	E235.NO3-L	24-Mar-2022	----	----	----		28-Mar-2022	3 days	5 days	* EHT
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE LOTW Water System	E235.NO3-L	24-Mar-2022	----	----	----		28-Mar-2022	3 days	5 days	* EHT



Matrix: **Water** Evaluation: * = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Anions and Nutrients : Nitrate in Water by IC (Low Level)											
HDPE Silver Cr Water System	E235.NO3-L	24-Mar-2022	----	----	----		28-Mar-2022	3 days	5 days	*	EHT
Anions and Nutrients : Nitrite in Water by IC (Low Level)											
HDPE District of Hope Water System	E235.NO2-L	24-Mar-2022	----	----	----		28-Mar-2022	3 days	5 days	*	EHT
Anions and Nutrients : Nitrite in Water by IC (Low Level)											
HDPE East Kawkawa Lake Water System	E235.NO2-L	24-Mar-2022	----	----	----		28-Mar-2022	3 days	5 days	*	EHT
Anions and Nutrients : Nitrite in Water by IC (Low Level)											
HDPE LOTW Water System	E235.NO2-L	24-Mar-2022	----	----	----		28-Mar-2022	3 days	5 days	*	EHT
Anions and Nutrients : Nitrite in Water by IC (Low Level)											
HDPE Silver Cr Water System	E235.NO2-L	24-Mar-2022	----	----	----		28-Mar-2022	3 days	5 days	*	EHT
Physical Tests : Colour (True) by Spectrometer											
HDPE District of Hope Water System	E329	24-Mar-2022	----	----	----		27-Mar-2022	3 days	4 days	✓	
Physical Tests : Colour (True) by Spectrometer											
HDPE East Kawkawa Lake Water System	E329	24-Mar-2022	----	----	----		27-Mar-2022	3 days	4 days	✓	
Physical Tests : Colour (True) by Spectrometer											
HDPE LOTW Water System	E329	24-Mar-2022	----	----	----		27-Mar-2022	3 days	4 days	✓	
Physical Tests : Colour (True) by Spectrometer											
HDPE Silver Cr Water System	E329	24-Mar-2022	----	----	----		27-Mar-2022	3 days	4 days	✓	



Matrix: **Water** Evaluation: * = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Physical Tests : pH by Meter											
HDPE District of Hope Water System	E108	24-Mar-2022	----	----	----		28-Mar-2022	0.25 hrs	102 hrs	*	EHTR-FM
Physical Tests : pH by Meter											
HDPE East Kawkawa Lake Water System	E108	24-Mar-2022	----	----	----		28-Mar-2022	0.25 hrs	102 hrs	*	EHTR-FM
Physical Tests : pH by Meter											
HDPE LOTW Water System	E108	24-Mar-2022	----	----	----		28-Mar-2022	0.25 hrs	102 hrs	*	EHTR-FM
Physical Tests : pH by Meter											
HDPE Silver Cr Water System	E108	24-Mar-2022	----	----	----		28-Mar-2022	0.25 hrs	102 hrs	*	EHTR-FM
Physical Tests : Turbidity by Nephelometry											
HDPE District of Hope Water System	E121	24-Mar-2022	----	----	----		28-Mar-2022	3 days	4 days	*	EHT
Physical Tests : Turbidity by Nephelometry											
HDPE East Kawkawa Lake Water System	E121	24-Mar-2022	----	----	----		28-Mar-2022	3 days	4 days	*	EHT
Physical Tests : Turbidity by Nephelometry											
HDPE LOTW Water System	E121	24-Mar-2022	----	----	----		28-Mar-2022	3 days	4 days	*	EHT
Physical Tests : Turbidity by Nephelometry											
HDPE Silver Cr Water System	E121	24-Mar-2022	----	----	----		28-Mar-2022	3 days	4 days	*	EHT
Total Metals : Total Mercury in Water by CVAAS											
Glass vial total (hydrochloric acid) District of Hope Water System	E508	24-Mar-2022	----	----	----		29-Mar-2022	28 days	6 days	✓	



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Total Metals : Total Mercury in Water by CVAAS										
Glass vial total (hydrochloric acid) East Kawkawa Lake Water System	E508	24-Mar-2022	----	----	----		29-Mar-2022	28 days	6 days	✔
Total Metals : Total Mercury in Water by CVAAS										
Glass vial total (hydrochloric acid) LOTW Water System	E508	24-Mar-2022	----	----	----		29-Mar-2022	28 days	6 days	✔
Total Metals : Total Mercury in Water by CVAAS										
Glass vial total (hydrochloric acid) Silver Cr Water System	E508	24-Mar-2022	----	----	----		29-Mar-2022	28 days	6 days	✔
Total Metals : Total Metals in Water by CRC ICPMS										
HDPE total (nitric acid) District of Hope Water System	E420	24-Mar-2022	----	----	----		09-Apr-2022	180 days	16 days	✔
Total Metals : Total Metals in Water by CRC ICPMS										
HDPE total (nitric acid) East Kawkawa Lake Water System	E420	24-Mar-2022	----	----	----		09-Apr-2022	180 days	16 days	✔
Total Metals : Total Metals in Water by CRC ICPMS										
HDPE total (nitric acid) LOTW Water System	E420	24-Mar-2022	----	----	----		09-Apr-2022	180 days	16 days	✔
Total Metals : Total Metals in Water by CRC ICPMS										
HDPE total (nitric acid) Silver Cr Water System	E420	24-Mar-2022	----	----	----		09-Apr-2022	180 days	16 days	✔

Legend & Qualifier Definitions

EHTR-FM: Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended

EHT: Exceeded ALS recommended hold time prior to analysis.

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



Quality Control Parameter Frequency Compliance

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

Matrix: **Water**

Evaluation: * = QC frequency outside specification; ✓ = QC frequency within specification.

Quality Control Sample Type	Method	QC Lot #	Count		Frequency (%)		Evaluation
			QC	Regular	Actual	Expected	
Analytical Methods							
Laboratory Duplicates (DUP)							
Colour (True) by Spectrometer	E329	443601	1	13	7.6	5.0	✓
Fluoride in Water by IC	E235.F	443594	1	15	6.6	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	443597	1	16	6.2	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	443598	1	20	5.0	5.0	✓
pH by Meter	E108	443591	1	19	5.2	5.0	✓
Total Mercury in Water by CVAAS	E508	445260	1	20	5.0	5.0	✓
Total Metals in Water by CRC ICPMS	E420	454220	1	19	5.2	5.0	✓
Turbidity by Nephelometry	E121	444208	1	20	5.0	5.0	✓
Laboratory Control Samples (LCS)							
Colour (True) by Spectrometer	E329	443601	1	13	7.6	5.0	✓
Fluoride in Water by IC	E235.F	443594	1	15	6.6	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	443597	1	16	6.2	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	443598	1	20	5.0	5.0	✓
pH by Meter	E108	443591	1	19	5.2	5.0	✓
Total Mercury in Water by CVAAS	E508	445260	1	20	5.0	5.0	✓
Total Metals in Water by CRC ICPMS	E420	454220	1	19	5.2	5.0	✓
Turbidity by Nephelometry	E121	444208	1	20	5.0	5.0	✓
Method Blanks (MB)							
Colour (True) by Spectrometer	E329	443601	1	13	7.6	5.0	✓
Fluoride in Water by IC	E235.F	443594	1	15	6.6	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	443597	1	16	6.2	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	443598	1	20	5.0	5.0	✓
Total Mercury in Water by CVAAS	E508	445260	1	20	5.0	5.0	✓
Total Metals in Water by CRC ICPMS	E420	454220	1	19	5.2	5.0	✓
Turbidity by Nephelometry	E121	444208	1	20	5.0	5.0	✓
Matrix Spikes (MS)							
Fluoride in Water by IC	E235.F	443594	1	15	6.6	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	443597	1	16	6.2	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	443598	1	20	5.0	5.0	✓
Total Mercury in Water by CVAAS	E508	445260	1	20	5.0	5.0	✓
Total Metals in Water by CRC ICPMS	E420	454220	1	19	5.2	5.0	✓



Methodology References and Summaries

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

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
pH by Meter	E108 Vancouver - Environmental	Water	APHA 4500-H (mod)	pH is determined by potentiometric measurement with a pH electrode, and is conducted at ambient laboratory temperature (normally 20 ± 5°C). For high accuracy test results, pH should be measured in the field within the recommended 15 minute hold time.
Turbidity by Nephelometry	E121 Vancouver - Environmental	Water	APHA 2130 B (mod)	Turbidity is measured by the nephelometric method, by measuring the intensity of light scatter under defined conditions.
Fluoride in Water by IC	E235.F Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrite in Water by IC (Low Level)	E235.NO2-L Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrate in Water by IC (Low Level)	E235.NO3-L Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Colour (True) by Spectrometer	E329 Vancouver - Environmental	Water	APHA 2120 C (mod)	Colour (True Colour) is determined by filtering a sample through a 0.45 micron membrane filter followed by analysis of the filtrate using the platinum-cobalt colourimetric method. Colour measurements can be highly pH dependent, and apply to the pH of the sample as received (at time of testing), without pH adjustment.
Total Metals in Water by CRC ICPMS	E420 Vancouver - Environmental	Water	EPA 200.2/6020B (mod)	Water samples are digested with nitric and hydrochloric acids, and analyzed by Collision/Reaction Cell ICPMS. Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.
Total Mercury in Water by CVAAS	E508 Vancouver - Environmental	Water	EPA 1631E (mod)	Water samples undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS
Hardness (Calculated) from Total Ca/Mg	EC100A Vancouver - Environmental	Water	APHA 2340B	"Hardness (as CaCO ₃), from total Ca/Mg" is calculated from the sum of total Calcium and Magnesium concentrations, expressed in CaCO ₃ equivalents. "Total Hardness" refers to the sum of Calcium and Magnesium Hardness. Hardness is normally or preferentially calculated from dissolved Calcium and Magnesium concentrations, because it is a property of water due to dissolved divalent cations. Hardness from total Ca/Mg is normally comparable to Dissolved Hardness in non-turbid waters.

QUALITY CONTROL REPORT

Work Order : **VA22A6250**

Page : 1 of 10

Client : District of Hope
Contact : Steve Glasson
Address : 1225 Nelson Ave PO Box 609
 Hope BC Canada V0X 1L0
Telephone : ----
Project : ----
PO : 3064
C-O-C number : 20-996930
Sampler : Scott Blake
Site : ----
Quote number : Potable Water
No. of samples received : 4
No. of samples analysed : 4

Laboratory : Vancouver - Environmental
Account Manager : Sneha Sansare
Address : 8081 Lougheed Highway
 Burnaby, British Columbia Canada V5A 1W9
Telephone : +1 604 253 4188
Date Samples Received : 25-Mar-2022 14:34
Date Analysis Commenced : 27-Mar-2022
Issue Date : 11-Apr-2022 17:07

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

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits
- Reference Material (RM) Report; Recovery and Acceptance Limits
- Method Blank (MB) Report; Recovery and Acceptance Limits
- Laboratory Control Sample (LCS) Report; Recovery and Acceptance Limits

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>
Dee Lee	Analyst	Metals, Burnaby, British Columbia
Kim Jensen	Department Manager - Metals	Metals, Burnaby, British Columbia
Lindsay Gung	Supervisor - Water Chemistry	Inorganics, Burnaby, British Columbia

Page : 2 of 10
Work Order : VA22A6250
Client : District of Hope
Project : ----



General Comments

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

Key :

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

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

DQO = Data Quality Objective.

LOR = Limit of Reporting (detection limit).

RPD = Relative Percentage Difference

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

Workorder Comments

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



Laboratory Duplicate (DUP) Report

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

Sub-Matrix: Water					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
Physical Tests (QC Lot: 443591)											
FJ2200755-001	Anonymous	pH	----	E108	0.10	pH units	8.11	8.12	0.123%	4%	----
Physical Tests (QC Lot: 443601)											
FJ2200756-001	Anonymous	colour, true	----	E329	5.0	CU	9.8	9.8	0.02	Diff <2x LOR	----
Physical Tests (QC Lot: 444208)											
VA22A6245-001	Anonymous	turbidity	----	E121	0.10	NTU	0.26	0.25	0.009	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 443594)											
FJ2200755-001	Anonymous	fluoride	16984-48-8	E235.F	0.020	mg/L	0.080	0.080	0.0006	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 443597)											
FJ2200755-001	Anonymous	nitrate (as N)	14797-55-8	E235.NO3-L	0.0050	mg/L	0.483	0.483	0.0180%	20%	----
Anions and Nutrients (QC Lot: 443598)											
FJ2200755-001	Anonymous	nitrite (as N)	14797-65-0	E235.NO2-L	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	----
Total Metals (QC Lot: 445260)											
CG2203433-001	Anonymous	mercury, total	7439-97-6	E508	0.0000050	mg/L	<0.0000050	<0.0000050	0	Diff <2x LOR	----
Total Metals (QC Lot: 454220)											
CG2203725-009	Anonymous	aluminum, total	7429-90-5	E420	0.0060	mg/L	<0.0060	<0.0060	0	Diff <2x LOR	----
		antimony, total	7440-36-0	E420	0.00020	mg/L	0.00040	0.00038	0.00002	Diff <2x LOR	----
		arsenic, total	7440-38-2	E420	0.00020	mg/L	0.00058	0.00055	0.00003	Diff <2x LOR	----
		barium, total	7440-39-3	E420	0.00020	mg/L	0.0115	0.0112	2.67%	20%	----
		beryllium, total	7440-41-7	E420	0.000040	mg/L	<0.000040	<0.000040	0	Diff <2x LOR	----
		bismuth, total	7440-69-9	E420	0.000100	mg/L	<0.000100	<0.000100	0	Diff <2x LOR	----
		boron, total	7440-42-8	E420	0.020	mg/L	0.034	0.032	0.002	Diff <2x LOR	----
		cadmium, total	7440-43-9	E420	0.0000100	mg/L	0.000594	0.000577	2.93%	20%	----
		calcium, total	7440-70-2	E420	0.100	mg/L	267	258	3.50%	20%	----
		cesium, total	7440-46-2	E420	0.000020	mg/L	0.000057	0.000062	0.000005	Diff <2x LOR	----
		chromium, total	7440-47-3	E420	0.00100	mg/L	<0.00100	<0.00100	0	Diff <2x LOR	----
		cobalt, total	7440-48-4	E420	0.00020	mg/L	0.0137	0.0134	2.44%	20%	----
		copper, total	7440-50-8	E420	0.00100	mg/L	<0.00100	<0.00100	0	Diff <2x LOR	----
		iron, total	7439-89-6	E420	0.020	mg/L	0.318	0.314	1.15%	20%	----
		lead, total	7439-92-1	E420	0.000100	mg/L	0.000115	0.000112	0.000003	Diff <2x LOR	----
		lithium, total	7439-93-2	E420	0.0020	mg/L	0.0667	0.0669	0.392%	20%	----
		magnesium, total	7439-95-4	E420	0.0100	mg/L	171	170	0.795%	20%	----



Sub-Matrix: **Water**

Laboratory Duplicate (DUP) Report

Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
Total Metals (QC Lot: 454220) - continued											
CG2203725-009	Anonymous	manganese, total	7439-96-5	E420	0.00020	mg/L	0.368	0.362	1.66%	20%	----
		molybdenum, total	7439-98-7	E420	0.000100	mg/L	0.0173	0.0165	4.51%	20%	----
		nickel, total	7440-02-0	E420	0.00100	mg/L	0.0529	0.0524	0.908%	20%	----
		phosphorus, total	7723-14-0	E420	0.100	mg/L	<0.100	<0.100	0	Diff <2x LOR	----
		potassium, total	7440-09-7	E420	0.100	mg/L	5.06	4.97	1.75%	20%	----
		rubidium, total	7440-17-7	E420	0.00040	mg/L	0.00499	0.00468	6.39%	20%	----
		selenium, total	7782-49-2	E420	0.100	mg/L	3.30 µg/L	0.00348	5.22%	20%	----
		silicon, total	7440-21-3	E420	0.20	mg/L	3.30	3.21	2.59%	20%	----
		silver, total	7440-22-4	E420	0.000020	mg/L	<0.000020	<0.000020	0	Diff <2x LOR	----
		sodium, total	7440-23-5	E420	0.100	mg/L	7.69	7.71	0.321%	20%	----
		strontium, total	7440-24-6	E420	0.00040	mg/L	0.409	0.391	4.53%	20%	----
		sulfur, total	7704-34-9	E420	1.00	mg/L	317	312	1.49%	20%	----
		tellurium, total	13494-80-9	E420	0.00040	mg/L	<0.00040	<0.00040	0	Diff <2x LOR	----
		thallium, total	7440-28-0	E420	0.000020	mg/L	0.000099	0.000092	0.000007	Diff <2x LOR	----
		thorium, total	7440-29-1	E420	0.00020	mg/L	<0.00020	<0.00020	0	Diff <2x LOR	----
		tin, total	7440-31-5	E420	0.00020	mg/L	<0.00020	<0.00020	0	Diff <2x LOR	----
		titanium, total	7440-32-6	E420	0.00060	mg/L	<0.00060	<0.00060	0	Diff <2x LOR	----
		tungsten, total	7440-33-7	E420	0.00020	mg/L	<0.00020	<0.00020	0	Diff <2x LOR	----
		uranium, total	7440-61-1	E420	0.000020	mg/L	0.0121	0.0117	3.50%	20%	----
		vanadium, total	7440-62-2	E420	0.00100	mg/L	<0.00100	<0.00100	0	Diff <2x LOR	----
		zinc, total	7440-66-6	E420	0.0060	mg/L	0.0222	0.0217	0.0005	Diff <2x LOR	----
		zirconium, total	7440-67-7	E420	0.00040	mg/L	<0.00040	<0.00040	0	Diff <2x LOR	----



Method Blank (MB) Report

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

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Physical Tests (QCLot: 443601)						
colour, true	----	E329	5	CU	<5.0	----
Physical Tests (QCLot: 444208)						
turbidity	----	E121	0.1	NTU	<0.10	----
Anions and Nutrients (QCLot: 443594)						
fluoride	16984-48-8	E235.F	0.02	mg/L	<0.020	----
Anions and Nutrients (QCLot: 443597)						
nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	<0.0050	----
Anions and Nutrients (QCLot: 443598)						
nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	<0.0010	----
Total Metals (QCLot: 445260)						
mercury, total	7439-97-6	E508	0.000005	mg/L	<0.0000050	----
Total Metals (QCLot: 454220)						
aluminum, total	7429-90-5	E420	0.003	mg/L	<0.0030	----
antimony, total	7440-36-0	E420	0.0001	mg/L	<0.00010	----
arsenic, total	7440-38-2	E420	0.0001	mg/L	<0.00010	----
barium, total	7440-39-3	E420	0.0001	mg/L	<0.00010	----
beryllium, total	7440-41-7	E420	0.00002	mg/L	<0.000020	----
bismuth, total	7440-69-9	E420	0.00005	mg/L	<0.000050	----
boron, total	7440-42-8	E420	0.01	mg/L	<0.010	----
cadmium, total	7440-43-9	E420	0.000005	mg/L	<0.0000050	----
calcium, total	7440-70-2	E420	0.05	mg/L	<0.050	----
cesium, total	7440-46-2	E420	0.00001	mg/L	<0.000010	----
chromium, total	7440-47-3	E420	0.0005	mg/L	<0.00050	----
cobalt, total	7440-48-4	E420	0.0001	mg/L	<0.00010	----
copper, total	7440-50-8	E420	0.0005	mg/L	<0.00050	----
iron, total	7439-89-6	E420	0.01	mg/L	<0.010	----
lead, total	7439-92-1	E420	0.00005	mg/L	<0.000050	----
lithium, total	7439-93-2	E420	0.001	mg/L	<0.0010	----
magnesium, total	7439-95-4	E420	0.005	mg/L	<0.0050	----
manganese, total	7439-96-5	E420	0.0001	mg/L	<0.00010	----
molybdenum, total	7439-98-7	E420	0.00005	mg/L	<0.000050	----
nickel, total	7440-02-0	E420	0.0005	mg/L	<0.00050	----
phosphorus, total	7723-14-0	E420	0.05	mg/L	<0.050	----



Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Total Metals (QCLot: 454220) - continued						
potassium, total	7440-09-7	E420	0.05	mg/L	<0.050	----
rubidium, total	7440-17-7	E420	0.0002	mg/L	<0.00020	----
selenium, total	7782-49-2	E420	0.00005	mg/L	<0.000050	----
silicon, total	7440-21-3	E420	0.1	mg/L	<0.10	----
silver, total	7440-22-4	E420	0.00001	mg/L	<0.000010	----
sodium, total	7440-23-5	E420	0.05	mg/L	<0.050	----
strontium, total	7440-24-6	E420	0.0002	mg/L	<0.00020	----
sulfur, total	7704-34-9	E420	0.5	mg/L	<0.50	----
tellurium, total	13494-80-9	E420	0.0002	mg/L	<0.00020	----
thallium, total	7440-28-0	E420	0.00001	mg/L	<0.000010	----
thorium, total	7440-29-1	E420	0.0001	mg/L	<0.00010	----
tin, total	7440-31-5	E420	0.0001	mg/L	<0.00010	----
titanium, total	7440-32-6	E420	0.0003	mg/L	<0.00030	----
tungsten, total	7440-33-7	E420	0.0001	mg/L	<0.00010	----
uranium, total	7440-61-1	E420	0.00001	mg/L	<0.000010	----
vanadium, total	7440-62-2	E420	0.0005	mg/L	<0.00050	----
zinc, total	7440-66-6	E420	0.003	mg/L	<0.0030	----
zirconium, total	7440-67-7	E420	0.0002	mg/L	<0.00020	----



Laboratory Control Sample (LCS) Report

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

Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Physical Tests (QCLot: 443591)									
pH	----	E108	----	pH units	7 pH units	100	98.0	102	----
Physical Tests (QCLot: 443601)									
colour, true	----	E329	5	CU	100 CU	100	85.0	115	----
Physical Tests (QCLot: 444208)									
turbidity	----	E121	0.1	NTU	200 NTU	96.5	85.0	115	----
Anions and Nutrients (QCLot: 443594)									
fluoride	16984-48-8	E235.F	0.02	mg/L	1 mg/L	102	90.0	110	----
Anions and Nutrients (QCLot: 443597)									
nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	2.5 mg/L	103	90.0	110	----
Anions and Nutrients (QCLot: 443598)									
nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	0.5 mg/L	103	90.0	110	----
Total Metals (QCLot: 445260)									
mercury, total	7439-97-6	E508	0.000005	mg/L	0.0001 mg/L	96.3	80.0	120	----
Total Metals (QCLot: 454220)									
aluminum, total	7429-90-5	E420	0.003	mg/L	2 mg/L	101	80.0	120	----
antimony, total	7440-36-0	E420	0.0001	mg/L	1 mg/L	109	80.0	120	----
arsenic, total	7440-38-2	E420	0.0001	mg/L	1 mg/L	104	80.0	120	----
barium, total	7440-39-3	E420	0.0001	mg/L	0.25 mg/L	102	80.0	120	----
beryllium, total	7440-41-7	E420	0.00002	mg/L	0.1 mg/L	98.9	80.0	120	----
bismuth, total	7440-69-9	E420	0.00005	mg/L	1 mg/L	102	80.0	120	----
boron, total	7440-42-8	E420	0.01	mg/L	1 mg/L	98.1	80.0	120	----
cadmium, total	7440-43-9	E420	0.000005	mg/L	0.1 mg/L	101	80.0	120	----
calcium, total	7440-70-2	E420	0.05	mg/L	50 mg/L	101	80.0	120	----
cesium, total	7440-46-2	E420	0.00001	mg/L	0.05 mg/L	105	80.0	120	----
chromium, total	7440-47-3	E420	0.0005	mg/L	0.25 mg/L	100	80.0	120	----
cobalt, total	7440-48-4	E420	0.0001	mg/L	0.25 mg/L	100	80.0	120	----
copper, total	7440-50-8	E420	0.0005	mg/L	0.25 mg/L	99.1	80.0	120	----
iron, total	7439-89-6	E420	0.01	mg/L	1 mg/L	104	80.0	120	----
lead, total	7439-92-1	E420	0.00005	mg/L	0.5 mg/L	105	80.0	120	----
lithium, total	7439-93-2	E420	0.001	mg/L	0.25 mg/L	98.1	80.0	120	----
magnesium, total	7439-95-4	E420	0.005	mg/L	50 mg/L	101	80.0	120	----
manganese, total	7439-96-5	E420	0.0001	mg/L	0.25 mg/L	101	80.0	120	----



Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		Qualifier
					Concentration	LCS	Low	High	
Total Metals (QCLot: 454220) - continued									
molybdenum, total	7439-98-7	E420	0.00005	mg/L	0.25 mg/L	110	80.0	120	----
nickel, total	7440-02-0	E420	0.0005	mg/L	0.5 mg/L	99.8	80.0	120	----
phosphorus, total	7723-14-0	E420	0.05	mg/L	10 mg/L	103	80.0	120	----
potassium, total	7440-09-7	E420	0.05	mg/L	50 mg/L	106	80.0	120	----
rubidium, total	7440-17-7	E420	0.0002	mg/L	0.1 mg/L	103	80.0	120	----
selenium, total	7782-49-2	E420	0.00005	mg/L	1 mg/L	103	80.0	120	----
silicon, total	7440-21-3	E420	0.1	mg/L	10 mg/L	112	80.0	120	----
silver, total	7440-22-4	E420	0.00001	mg/L	0.1 mg/L	101	80.0	120	----
sodium, total	7440-23-5	E420	0.05	mg/L	50 mg/L	102	80.0	120	----
strontium, total	7440-24-6	E420	0.0002	mg/L	0.25 mg/L	108	80.0	120	----
sulfur, total	7704-34-9	E420	0.5	mg/L	50 mg/L	104	80.0	120	----
tellurium, total	13494-80-9	E420	0.0002	mg/L	0.1 mg/L	99.5	80.0	120	----
thallium, total	7440-28-0	E420	0.00001	mg/L	1 mg/L	106	80.0	120	----
thorium, total	7440-29-1	E420	0.0001	mg/L	0.1 mg/L	103	80.0	120	----
tin, total	7440-31-5	E420	0.0001	mg/L	0.5 mg/L	102	80.0	120	----
titanium, total	7440-32-6	E420	0.0003	mg/L	0.25 mg/L	100	80.0	120	----
tungsten, total	7440-33-7	E420	0.0001	mg/L	0.1 mg/L	107	80.0	120	----
uranium, total	7440-61-1	E420	0.00001	mg/L	0.005 mg/L	106	80.0	120	----
vanadium, total	7440-62-2	E420	0.0005	mg/L	0.5 mg/L	102	80.0	120	----
zinc, total	7440-66-6	E420	0.003	mg/L	0.5 mg/L	101	80.0	120	----
zirconium, total	7440-67-7	E420	0.0002	mg/L	0.1 mg/L	102	80.0	120	----



Matrix Spike (MS) Report

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

Sub-Matrix: **Water**

Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		Qualifier
					Concentration	Target	MS	Low	High	
Anions and Nutrients (QCLot: 443594)										
FJ2200755-002	Anonymous	fluoride	16984-48-8	E235.F	10.1 mg/L	10 mg/L	101	75.0	125	----
Anions and Nutrients (QCLot: 443597)										
FJ2200755-002	Anonymous	nitrate (as N)	14797-55-8	E235.NO3-L	25.2 mg/L	25 mg/L	101	75.0	125	----
Anions and Nutrients (QCLot: 443598)										
FJ2200755-002	Anonymous	nitrite (as N)	14797-65-0	E235.NO2-L	5.13 mg/L	5 mg/L	103	75.0	125	----
Total Metals (QCLot: 445260)										
CG2203433-002	Anonymous	mercury, total	7439-97-6	E508	0.0000985 mg/L	0.0001 mg/L	98.5	70.0	130	----
Total Metals (QCLot: 454220)										
KS2201067-001	Anonymous	aluminum, total	7429-90-5	E420	ND mg/L	0.2 mg/L	ND	70.0	130	----
		antimony, total	7440-36-0	E420	0.0210 mg/L	0.02 mg/L	105	70.0	130	----
		arsenic, total	7440-38-2	E420	0.0200 mg/L	0.02 mg/L	99.9	70.0	130	----
		barium, total	7440-39-3	E420	ND mg/L	0.02 mg/L	ND	70.0	130	----
		beryllium, total	7440-41-7	E420	0.0382 mg/L	0.04 mg/L	95.6	70.0	130	----
		bismuth, total	7440-69-9	E420	0.00912 mg/L	0.01 mg/L	91.2	70.0	130	----
		boron, total	7440-42-8	E420	0.089 mg/L	0.1 mg/L	88.6	70.0	130	----
		cadmium, total	7440-43-9	E420	0.00384 mg/L	0.004 mg/L	96.0	70.0	130	----
		calcium, total	7440-70-2	E420	ND mg/L	4 mg/L	ND	70.0	130	----
		cesium, total	7440-46-2	E420	0.0103 mg/L	0.01 mg/L	103	70.0	130	----
		chromium, total	7440-47-3	E420	0.0388 mg/L	0.04 mg/L	97.0	70.0	130	----
		cobalt, total	7440-48-4	E420	0.0187 mg/L	0.02 mg/L	93.6	70.0	130	----
		copper, total	7440-50-8	E420	ND mg/L	0.02 mg/L	ND	70.0	130	----
		iron, total	7439-89-6	E420	ND mg/L	2 mg/L	ND	70.0	130	----
		lead, total	7439-92-1	E420	0.0188 mg/L	0.02 mg/L	93.8	70.0	130	----
		lithium, total	7439-93-2	E420	0.0907 mg/L	0.1 mg/L	90.7	70.0	130	----
		magnesium, total	7439-95-4	E420	ND mg/L	1 mg/L	ND	70.0	130	----
		manganese, total	7439-96-5	E420	ND mg/L	0.02 mg/L	ND	70.0	130	----
		molybdenum, total	7439-98-7	E420	0.0212 mg/L	0.02 mg/L	106	70.0	130	----
		nickel, total	7440-02-0	E420	0.0364 mg/L	0.04 mg/L	91.1	70.0	130	----
phosphorus, total	7723-14-0	E420	9.89 mg/L	10 mg/L	98.9	70.0	130	----		
potassium, total	7440-09-7	E420	ND mg/L	4 mg/L	ND	70.0	130	----		



Sub-Matrix: **Water**

					<i>Matrix Spike (MS) Report</i>					
					<i>Spike</i>		<i>Recovery (%)</i>	<i>Recovery Limits (%)</i>		
<i>Laboratory sample ID</i>	<i>Client sample ID</i>	<i>Analyte</i>	<i>CAS Number</i>	<i>Method</i>	<i>Concentration</i>	<i>Target</i>	<i>MS</i>	<i>Low</i>	<i>High</i>	<i>Qualifier</i>
Total Metals (QCLot: 454220) - continued										
KS2201067-001	Anonymous	rubidium, total	7440-17-7	E420	0.0195 mg/L	0.02 mg/L	97.6	70.0	130	----
		selenium, total	7782-49-2	E420	0.0398 mg/L	0.04 mg/L	99.4	70.0	130	----
		silicon, total	7440-21-3	E420	ND mg/L	10 mg/L	ND	70.0	130	----
		silver, total	7440-22-4	E420	0.00419 mg/L	0.004 mg/L	105	70.0	130	----
		sodium, total	7440-23-5	E420	ND mg/L	2 mg/L	ND	70.0	130	----
		strontium, total	7440-24-6	E420	ND mg/L	0.02 mg/L	ND	70.0	130	----
		sulfur, total	7704-34-9	E420	ND mg/L	20 mg/L	ND	70.0	130	----
		tellurium, total	13494-80-9	E420	0.0391 mg/L	0.04 mg/L	97.8	70.0	130	----
		thallium, total	7440-28-0	E420	0.00381 mg/L	0.004 mg/L	95.3	70.0	130	----
		thorium, total	7440-29-1	E420	0.0201 mg/L	0.02 mg/L	101	70.0	130	----
		tin, total	7440-31-5	E420	0.0196 mg/L	0.02 mg/L	97.8	70.0	130	----
		titanium, total	7440-32-6	E420	ND mg/L	0.04 mg/L	ND	70.0	130	----
		tungsten, total	7440-33-7	E420	ND mg/L	0.02 mg/L	ND	70.0	130	----
		uranium, total	7440-61-1	E420	ND mg/L	0.004 mg/L	ND	70.0	130	----
		vanadium, total	7440-62-2	E420	0.0984 mg/L	0.1 mg/L	98.4	70.0	130	----
		zinc, total	7440-66-6	E420	0.369 mg/L	0.4 mg/L	92.4	70.0	130	----
		zirconium, total	7440-67-7	E420	0.0409 mg/L	0.04 mg/L	102	70.0	130	----



www.alsglobal.com

Chain of Custody (COC) / Analytical Request Form

Canada Toll Free: 1 800 668 9878

COC Number: 20 - 996930

Page of

Environmental Division
Vancouver
Work Order Reference
VA22A6250



Telephone: +1 604 253 4188

Report To
 Company: DISTRICT OF HOPE
 Contact: STEVE GLASSON
 Phone: 604-860-9527
 Company address below will appear on the final report
 Street: 1225 NELSON AVE
 City/Province: HOPE BC
 Postal Code: V0X 1L0
 Invoice To: YES NO
 Same as Report To: YES NO
 Copy of Invoice with Report: YES NO

Reports / Recipients
 Select Report Format: PDF EXCEL BDD (DIGITAL)
 Merge COC/COC: Reports with COA YES NO N/A
 Compare Results to Criteria on Report - provide details below. If box checked
 Select Distribution: EMAIL MAIL FAX
 Email 1 or Fax: SCOTT BLAKE @ HOPE .CA
 Email 2: SGLASSON @ HOPE .CA
 Email 3: TFOSTER @ HOPE .CA

Invoice Recipients
 Select Invoice Distribution: EMAIL MAIL FAX
 Email 1 or Fax: SCOTT BLAKE @ HOPE .CA
 Email 2: SGLASSON @ HOPE .CA
 Oil and Gas Required Fields (client use)
 AFE/Cost Center: _____ PO#: _____
 Major/Minor Code: _____ Routing Code: _____
 Requisitioner: _____
 Location: _____

Project Information
 ALS Account # / Quote #: _____
 Job #: 3064
 PO / AFE: 3064
 LSD: _____
 ALS Lab Work Order # (ALS use only): A6250
 Sample Identification and/or Coordinates (This description will appear on the report)

ALS Sample # (ALS use only)	Date (dd-mm-yy)	Time (hh:mm)	Sample Type
<u>SILVER CR WATER SYSTEM</u>	<u>24/03/00</u>		
<u>DISTRICT OF HOPE WATER SYSTEM</u>	<u>24/03/00</u>		
<u>LOTW WATER SYSTEM</u>	<u>24/03/00</u>		
<u>EAST KAWAWA LAKE WATER SYSTEM</u>	<u>24/03/00</u>		

SCOTT
 1 - EXTRA 200ml BOTTLE SAMPLE
 From EPCC SYSTEM TO BE
 COLLECTED & LABELLED.
 NOTE ON THE LABEL EXTRA
 SAMPLE TAKEN FOR LAB
 IN CASE JUES RESERVE IT.

Turnaround Time (TAT) Requested
 Routine (R) if received by 3pm M-F - no surcharges apply
 4 day (P4) if received by 3pm M-F - 20% rush surcharge minimum
 3 day (P3) if received by 3pm M-F - 25% rush surcharge minimum
 2 day (P2) if received by 3pm M-F - 50% rush surcharge minimum
 1 day (E) if received by 3pm M-F - 100% rush surcharge minimum
 Same day (E2) if received by 10am M-S - 200% rush surcharge. Addit may apply for rush requests on weekends, statutory holidays and non-ro

Date and Time Required for all ERP TATs:
 For all tests with rush TATs requested, please c
 Indicate Filtered (F), Preserved (P) or Filtered ar

NUMBER OF CONTAINERS	TOTAL METERS	PH WARDNESS	TURBIDITY/COLOR	TOTAL MERCURY	NITRATE/NITRITE	FLUORIDE

SHIPPING RECEPTION (ALS use only)
 ICE ICE PACKS FROZEN COOLING INITIATED
 on Sample Receipt Notification: YES NO
 YES N/A Sample Custody Seals Intact: YES NO
 YES N/A Sample Custody Seals Intact: YES NO
 FINAL COOLER TEMPERATURES °C: _____
 FINAL SHIPMENT RECEPTION (ALS use only)
 Date: 3/25 Time: 29