BI-WEEKLY STATUS REPORT

Cobble Hill Landfill Closure

PROJECT # : PRJ18074	**File #:** 18074- BWR-74
REPORT #: 74	**Date:** August 15, 2020
SHA REPRESENTATIVES: Dr. Tony Sperling, P.Eng. Scott Garthwaite Carly Wolfe, EIT	**Owner:** Cobble Hill Holdings Ltd. **Contractor:** Allterra Construction Ltd.

Semi Monthly Reporting Requirements SPO MO1701
Per SPO MO1701 Section 4:
Commencing in the month that closure activities commence pursuant to the approved Updated Final Closure Plan, the Named Parties must submit semi-monthly status reports, certified by a Qualified Professional. The reports must include the status of closure activities, inspection results, quality control and testing results, photographs which support/document the quality control and testing results, inspection reports and other supporting documents as needed to fully document all stages and components of the closure activities.

Per Condition 10 of June 26, 2019 Letter Re: Second Amended Spill Prevention Order MO1701, dated June 29, 2017 – Final Closure Plan:

Identification of any deviations from the quality management plan and the construction activities work plan and implementation schedule referenced in conditions 3 and 4 of this approval; The results of inspections, repairs, quality controls and testing, in accordance with the quality management plan referenced in condition 5 of this approval; The planned activities (and associated timing) for the next reporting cycle; and The environmental monitoring program laboratory reports and tabulated results (Quarterly Only-Submitted quarterly, reviewed annually by others). Copies of all soil relocation documentation as required in condition 7 of this approval.

Status reports must be submitted by the 15th and 30th of each month (or the next business day thereafter if the 15th or 30th of the month is not a business day) until closure activities have been completed. Submissions must be made electronically to the following email inbox: EnvironmentalCompliance@gov.bc.ca.

1. **Status of Closure Activities**
   - Activities related to QMP "Construction Activities" occurred this reporting cycle.
   - Placement of 50 mm thick sand layer on PEA occurred this period.
   - Deployment of 12 oz. non-woven geoxtile over sand layer on PEA occurred this period.
   - Placement of 200 mm thick drainage gravel layer over 12 oz. geotextile on PEA occurred this period.
   - Deployment of 8 oz. non-woven geotextile over gravel drainage layer on PEA occurred this period.
   - Placement and compaction of common fill soil stabilizing wedge at toe of PEA occurred this reporting period.
   - Growing medium importation occurred this reporting period. Source site is 2251 Bear Mountain Parkway.

2. **Inspection Results**
   - Permanent Encapsulation Area (PEA): Liner appears to be in good condition.
   - Soil Management Area (SMA): The SMA is empty and clean and appears to be in good condition.
   - Cut-off ditch upland of PEA: All works are in good condition, ditch still performing well.
   - Pictures detailing inspection results are shown at the end of this report.

3. **Results of Inspections, Repairs, Quality Controls and Testing, in Accordance with the Quality Management Plan**
   - See attached site inspection reports.
   - Western Tank & Lining quality assurance/quality control (QA/QC) package is attached.

4. **Identification of Any Deviations from the Quality Management Plan and the Construction Activities Work Plan and Implementation Schedule**

☐ NO DEVIATIONS OCCURRED THIS REPORTING PERIOD ☒ DEVIATIONS OCCURRED THIS REPORTING PERIOD	Notes: As mentioned in the July 30, 2020 bi-weekly report, SHA and Allterra discussed design solution to address side slopes steeper than 3H:1V on the crest of the PEA. SHA directed Allterra to slope soil stabilizing berm from crest of PEA to outer existing ditch on south and southwest side of PEA, where the slopes are steeper than 3H:1V. SHA representative will be on site August 20th to confirm and provide further direction.

5. **The Planned Activities (and associated timing) for the Next Reporting Cycle**
   - Placement of 8 oz. geotextile layer over drainage gravel layer on PEA is to continue into the

subsequent reporting cycle.

- Placement and compaction of common fill soil stabilizing wedge is to continue into the subsequent reporting cycle.
- Placement of growing medium is to occur in subsequent reporting cycle.
- Construction of surface water ditches are to occur in subsequent reporting cycle.

6. Environmental Monitoring Program Laboratory Reports and Tabulated Results

- No sampling ocurred this reporting period. Analytical results from July 30, 2020 sampling of SW-1 is attached at the end of this report.

7. Copies of All Soil Relocation Documentation

- Origin site land use was assessed via Technical Guidance 10 on Contaminated Sites. Soil quality was confirmed per letters of assurance provided by CSAP to BC ENV.

8. Leachate Volumes Over Reporting Period

- Total Leachate Collected: 6.44 m^3
- Total Leachate Stored: 52.77 m^3
- Total Leachate Transferred: 0 m^3

9. Pictures

Please refer to attached daily site inspection reports.

Report prepared by:

Carly Wolfe, EIT

Report Reviewed by:

Dr. Tony Sperling, P.Eng.

August 15, 2020

Note: Report prepared by Sperling Hansen Associates Inc. If those in attendance have additions or objections to these notes, they should report back to Sperling Hansen Associates (SHA) within 3 days of receipt, otherwise, these notes will be considered a complete and accurate permanent record of this reporting period.

Attachments:

Cobble Hill Landfill Site Inspection Report 2020-07-31
Cobble Hill Landfill Site Inspection Report 2020-08-04
Cobble Hill Landfill Site Inspection Report 2020-08-05
Cobble Hill Landfill Site Inspection Report 2020-08-10
Cobble Hill Landfill Site Inspection Report 2020-08-11
Cobble Hill Landfill Site Inspection Report 2020-08-12
Cobble Hill Landfill Site Inspection Report 2020-08-13
Western Tank & Lining Quality Assurance/Quality Control Report
SW-1 Analytical Results July 30, 2020
COA SW-1 July 30, 2020

SITE INSPECTION REPORT

Cobble Hill Landfill Closure

PROJECT # : 2307

IEL REPRESENTATIVE:

Joel Clarkston, Grad. Tech.

Date: July 30, 2020

Time: 6:30AM –2:00PM

Owner:
Cobble Hill Holdings Ltd.

Contractor:
Allterra Construction Ltd

Weather
Morning: Sun, Clear Skies

Afternoon: Sun, Clear Skies

Construction Activities:

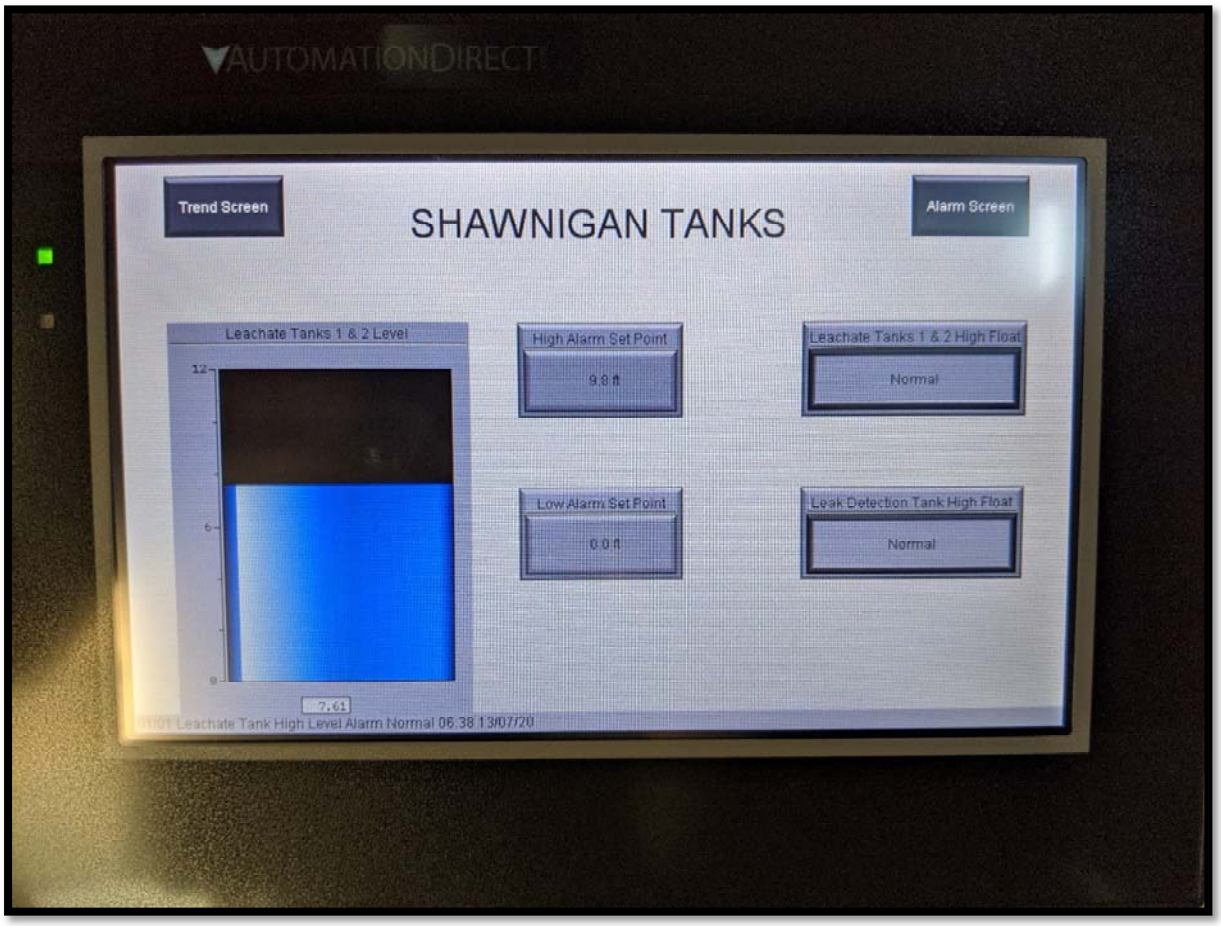
Islander Engineering Ltd (IEL) performed a site inspection on July 30, 2020 at the Cobble Hill Landfill (Landfill) to assess the site construction progress and the implementation of the Closure Plan design. This report summarizes the Landfill site inspection findings and concludes by identifying action items, if applicable.

Picture # 1: Stone-slinger truck being used to distribute the sand course over the PEA membrane top and sides. Approximately 300mm of sand was placed prior to driving the stone-slinger truck onto the PEA membrane.

Picture # 2: Looking north along the west side of the PEA towards sand being placed with a stone-slinger truck.

Picture # 3: Clear 19mm minus crush material stockpiled on site near the eastern access point prior to being loaded into the stone-slinger truck for placement.

Picture # 4: Clear 19mm minus crush material being placed along the western side of the PEA.



Picture # 5: Leachate display – 7.61 ft per tank.

Report prepared by:

Joel Clarkston, Grad Tech.
Islander Engineering Ltd.

SITE INSPECTION REPORT

Cobble Hill Landfill Closure

PROJECT # : 2307

IEL REPRESENTATIVE:

Joel Clarkston, Grad. Tech.

Date: July 31, 2020

Time: 6:50AM –2:15PM

Owner:
Cobble Hill Holdings Ltd.

Contractor:
Allterra Construction Ltd

Weather
Morning: Sun and Cloud Mix

Afternoon: Sun and Cloud Mix

Construction Activities:

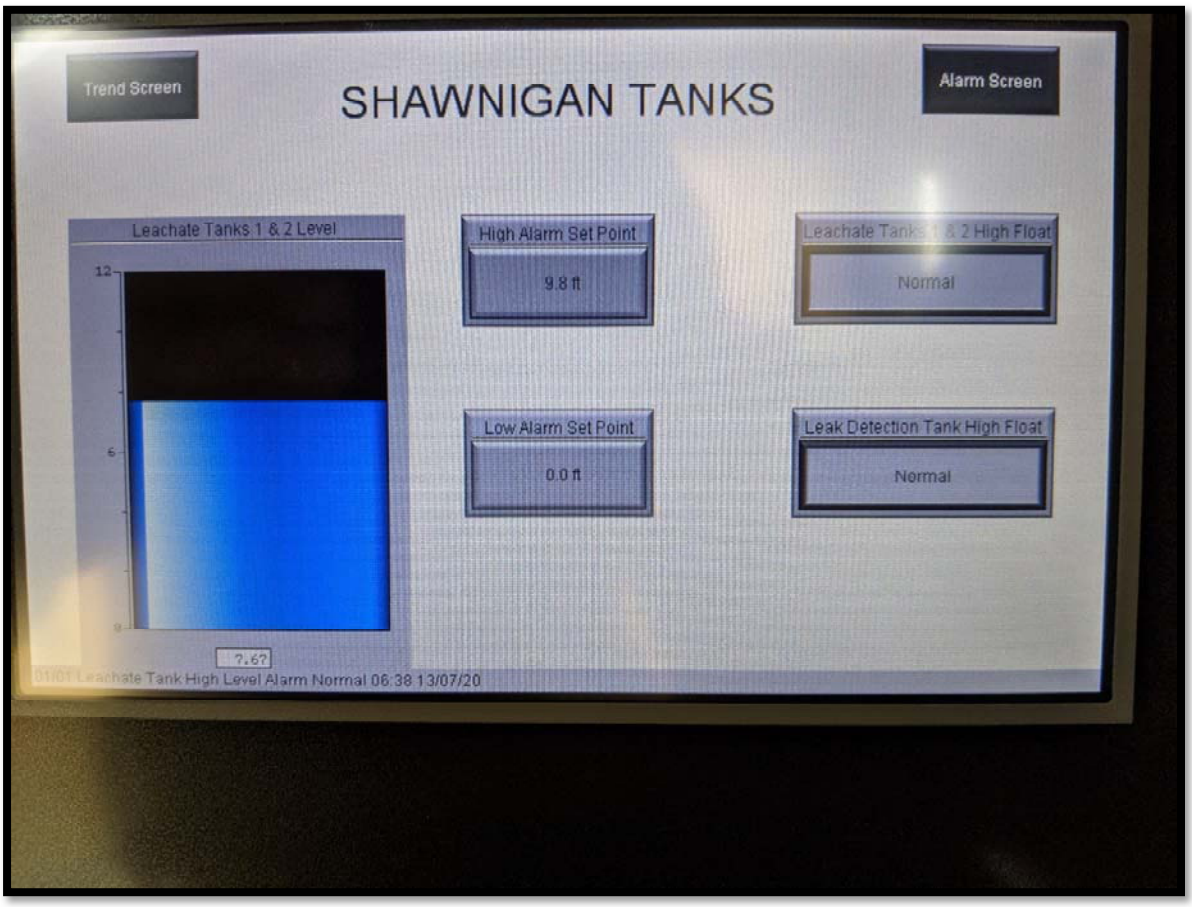
Islander Engineering Ltd (IEL) performed a site inspection on July 31, 2020 at the Cobble Hill Landfill (Landfill) to assess the site construction progress and the implementation of the Closure Plan design. This report summarizes the Landfill site inspection findings and concludes by identifying action items, if applicable.

Picture # 1: A slinger truck continues to be used to place clear granular crush material along the top and sides of the PEA. A single slinger truck was used to place material throughout the day.

Picture # 2: Looking east along previously placed clear granular crush material on the west side of the PEA.

Picture # 3: Looking southeast from the west side of the PEA.

Picture # 4: Previosly stockpiled soil near the south east access road was being hauled over to the east side of the PEA in anticipation of the rock slinging work being completed.



Picture # 5: Leachate display – 7.67 ft per tank.

Report prepared by:

Joel Clarkston, Grad Tech.
Islander Engineering Ltd.

SITE INSPECTION REPORT

Cobble Hill Landfill Closure

PROJECT # : 2307

IEL REPRESENTATIVE:

Joel Clarkston, Grad. Tech.

Date: August 4, 2020

Time: 7:15AM –3:30PM

Owner:
Cobble Hill Holdings Ltd.

Contractor:
Allterra Construction Ltd

Weather
Morning: Mainly Sunny

Afternoon: Mainly Sunny

Construction Activities:

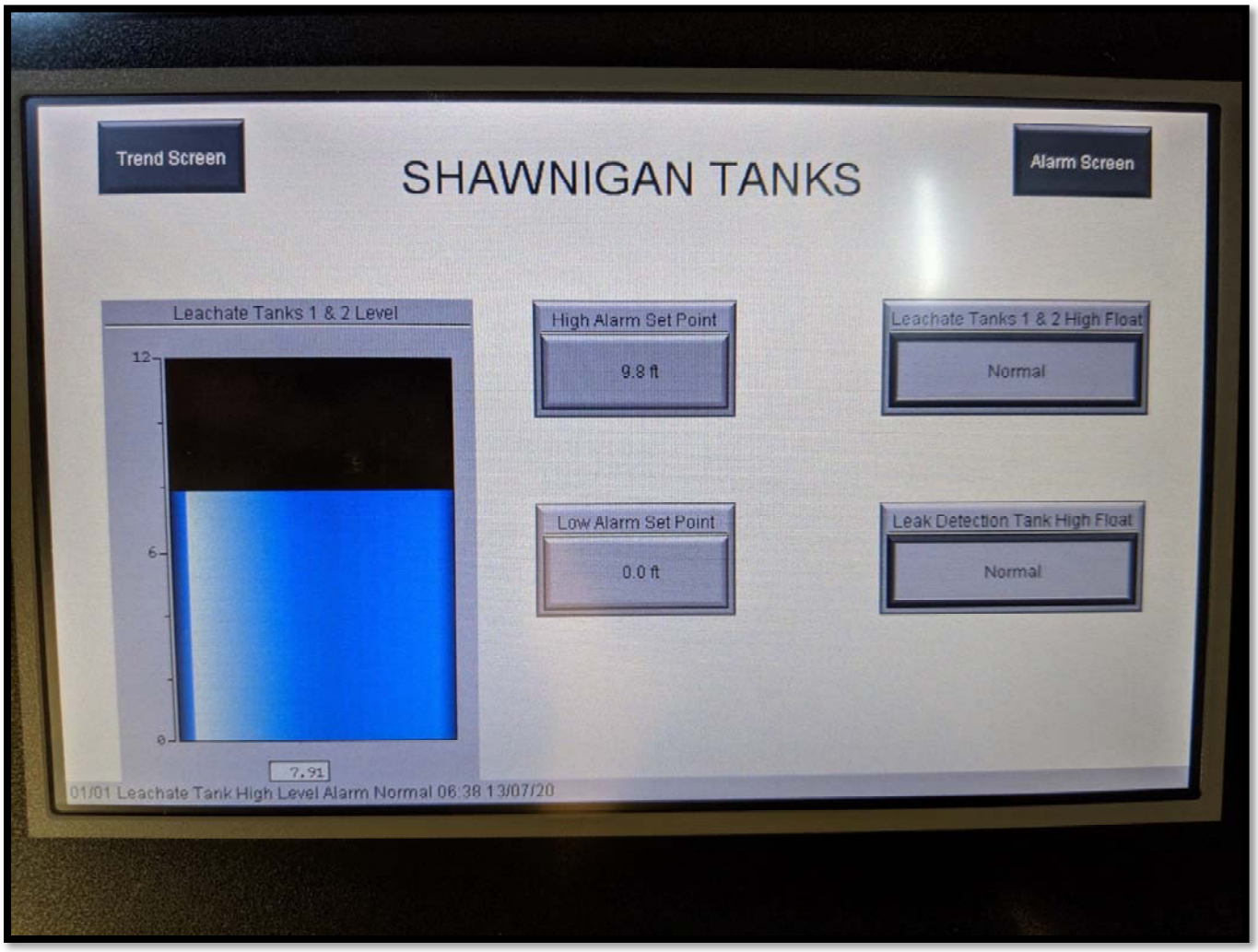
Islander Engineering Ltd (IEL) performed a site inspection on August 4, 2020 at the Cobble Hill Landfill (Landfill) to assess the site construction progress and the implementation of the Closure Plan design. This report summarizes the Landfill site inspection findings and concludes by identifying action items, if applicable.

Picture # 1: A slinger truck continues to be used to place the final amounts of clear granular crush material along the top and sides of the PEA.

Picture # 2: Looking south towards the contractor placing the final amounts of geotextile and clear granular crush material on the PEA.

Picture # 3: Trucks were hauling additional material on site from the Mann construction site on Bear Mountain throughout the day.

Picture # 4: View of the Mann construction site material imported to site today. Material consisted primarily of brown clay mixed with round cobbles varying in size from approximately 25-300mm.



Picture # 5: Leachate display – 7.91 ft per tank.

Report prepared by:

Joel Clarkston, Grad Tech.
Islander Engineering Ltd.

SITE INSPECTION REPORT

Cobble Hill Landfill Closure

PROJECT # : 2307

IEL REPRESENTATIVE:

Joel Clarkston, Grad. Tech.

Date: August 5, 2020

Time: 8:00AM –3:00PM

Owner:
Cobble Hill Holdings Ltd.

Contractor:
Allterra Construction Ltd

Weather
Morning: Sunny, Clear Skies

Afternoon: Sunny, Clear Skies

Construction Activities:

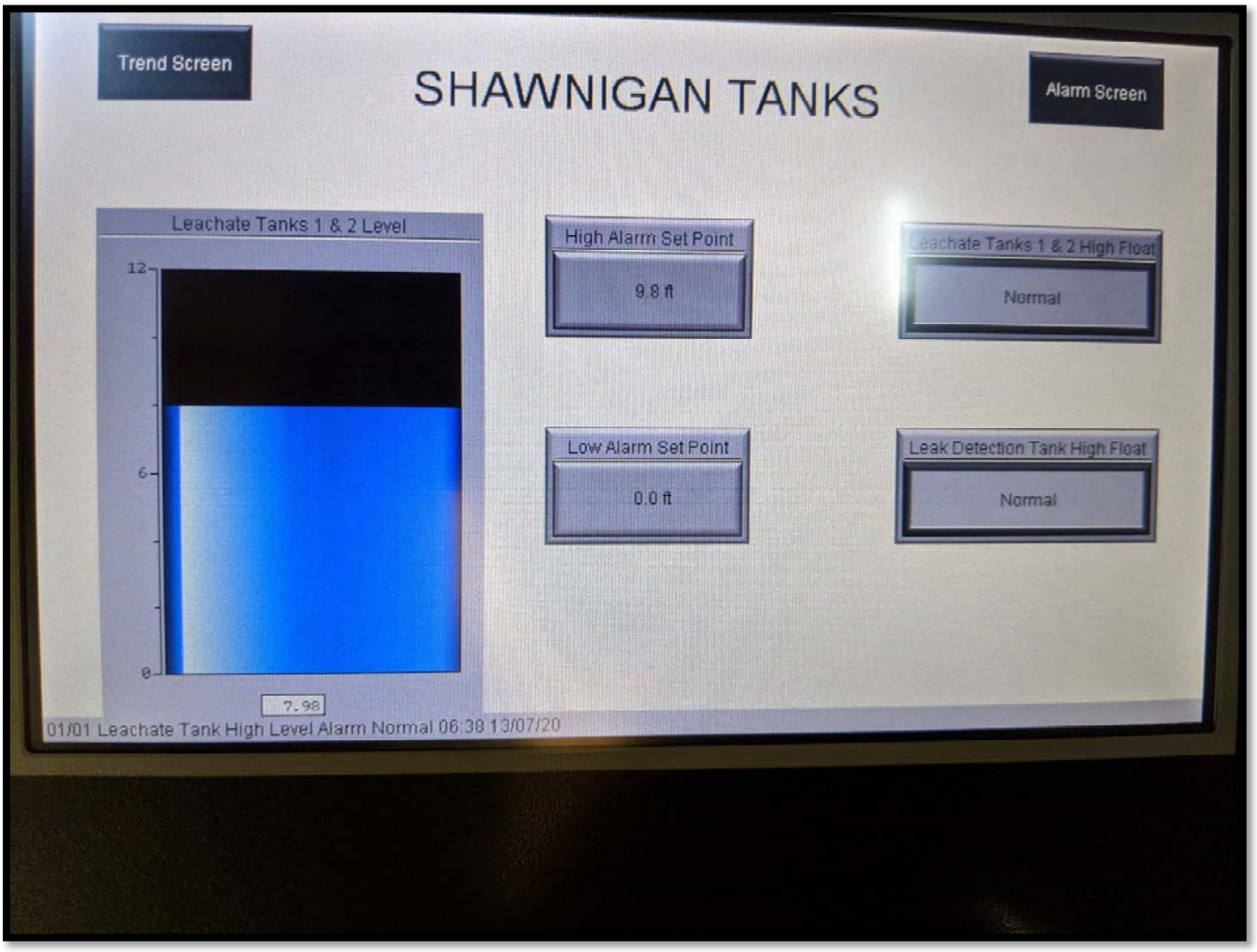
Islander Engineering Ltd (IEL) performed a site inspection on August 5, 2020 at the Cobble Hill Landfill (Landfill) to assess the site construction progress and the implementation of the Closure Plan design. This report summarizes the Landfill site inspection findings and concludes by identifying action items, if applicable.

Picture # 1: Looking east towards previously stockpiled clay material being excavated and loaded for transportaion. Material was transported to the north side of the PEA to be graded out onto the previously installed clear granular crush and geotextile throughout the day.

Picture # 2: Previously stockpiled clay material being transported to the north side of the PEA.

Picture # 3: Looking west towards the northwest corner of the PEA. Previously stockpiled clay material was transported and dumped to be graded out via excavator.

Picture # 4: Looking east from the northwest corner of the PEA towards the excavator used to place transported clay material onto the previously placed clear granular crush and geotextile.



Picture # 5: Leachate display – 7.98 ft per tank.

Report prepared by:

Joel Clarkston, Grad Tech.
Islander Engineering Ltd.

SITE INSPECTION REPORT

Cobble Hill Landfill Closure

PROJECT # : 2307

IEL REPRESENTATIVE:

Sean Babulic, EIT

Date: August 10, 2020

Time: 8:30AM – 3:00PM

Owner:
Cobble Hill Holdings Ltd.

Contractor:
Allterra Construction Ltd

Weather
Morning: Partial Cloud

Afternoon: Partial Cloud

Construction Activities:

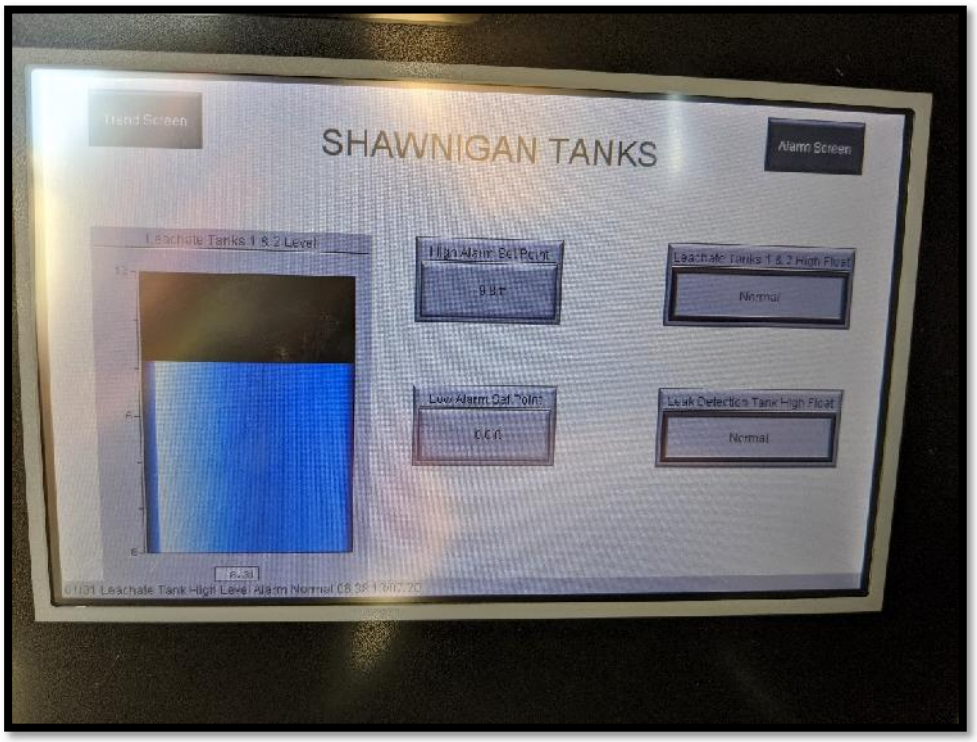
Islander Engineering Ltd (IEL) performed a site inspection on August 10, 2020 at the Cobble Hill Landfill (Landfill) to assess the site construction progress and the implementation of the Closure Plan design. This report summarizes the Landfill site inspection findings and concludes by identifying action items, if applicable.

Construction activities included:

- Relocating stockpiled general fill to PEA cover.
- Contractor spreading some growing medium soils on top of PEA.

Picture # 1: Along the southwest perimeter of the PEA, the contractor has nearly completed initial lift of general fill coverage.

Picture # 2: Excavator loading rock trucks with previously stockpiled soils east of the PEA.



Picture # 3: Leachate level = 8.31 ft.

Picture # 4: Sectional view of stockpiled growing medium soils south of the PEA.

Picture # 5: Contractor using loader to spread growing medium soils from stockpiles south of PEA on top of PEA.

Report prepared by:

Sean Babulic, EIT.
Islander Engineering Ltd.

SITE INSPECTION REPORT

Cobble Hill Landfill Closure

PROJECT # : 2307

IEL REPRESENTATIVE:

Joel Clarkston, Grad. Tech.

Date: August 11, 2020

Time: 8:00AM – 4:00PM

Owner:
Cobble Hill Holdings Ltd.

Contractor:
Allterra Construction Ltd

Weather
Morning: Mainly Sunny

Afternoon: Mainly Sunny, Windy

Construction Activities:

Islander Engineering Ltd (IEL) performed a site inspection on August 11, 2020 at the Cobble Hill Landfill (Landfill) to assess the site construction progress and the implementation of the Closure Plan design. This report summarizes the Landfill site inspection findings and concludes by identifying action items, if applicable.

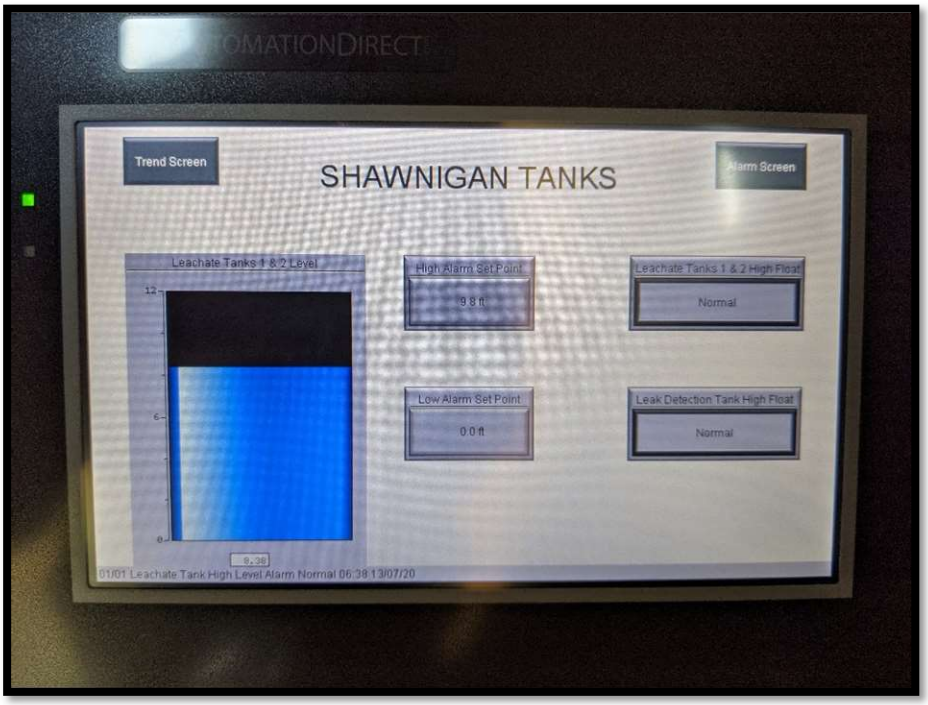
Picture # 1: Looking south towards the contractor loading rock trucks with previously stockpiled clay material. Material was hauled to the north side of the PEA to be graded out with a bulldozer throughout the day.

Picture # 2: Looking north towards previously stockpiled clay material being excavated for transportation to the north side of the PEA.

Picture # 3: Rock trucks bulking clay material on the north side of the PEA. A bulldozer was used to grade the material out to achieve the 5:1 slope as per the closure plan.

Picture # 4: View looking south west of the bulked in clay material prior to being graded out.

Picture # 5: View of the condition of the clay material transported on site throughout the day.



Picture # 6: Leachate display – 8.38 ft per tank.

Report prepared by:

Joel Clarkston, Grad Tech.
Islander Engineering Ltd.

SITE INSPECTION REPORT

Cobble Hill Landfill Closure

PROJECT # : 2307

IEL REPRESENTATIVE:

Joel Clarkston, Grad. Tech.

Date: August 12, 2020

Time: 8:00AM – 4:00PM

Owner:
Cobble Hill Holdings Ltd.

Contractor:
Allterra Construction Ltd

Weather
Morning: Mainly Sunny

Afternoon: Mainly Sunny

Construction Activities:

Islander Engineering Ltd (IEL) performed a site inspection on August 12, 2020 at the Cobble Hill Landfill (Landfill) to assess the site construction progress and the implementation of the Closure Plan design. This report summarizes the Landfill site inspection findings and concludes by identifying action items, if applicable.

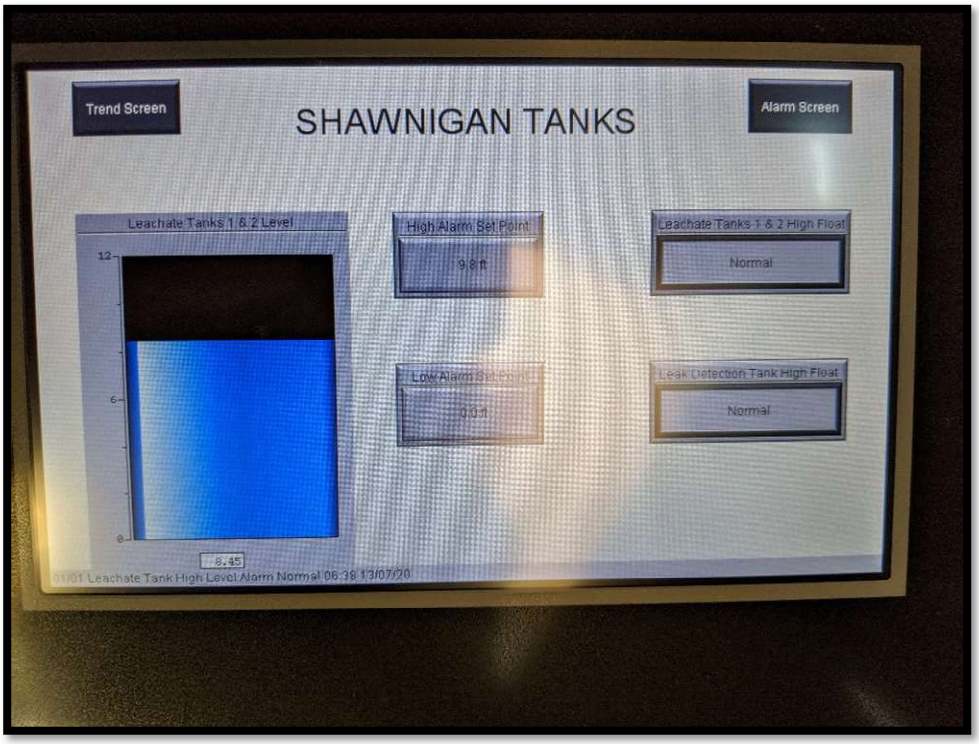
Picture # 1: Overview of today's activity, view is to the west. Previously stockpiled clay material was bulked over to the north side of the PEA to be graded out with a bulldozer.

Picture # 2: Contractor loading a rock truck with previously stockpiled clay material.

Picture # 3: Looking north towards the previously stockpiled clay material to the southwest of the covered storage area. Material was hauled from this location until the stockpiled was depleted. The contractor moved to additional material further to the west afterwards.

Picture # 4: Looking west towards rock trucks bulking clay material to the north side of the PEA.

Picture # 4: Looking east along the bulked in clay material prior to being graded out by the bulldozer.



Picture # 5: Leachate display – 8.45 ft per tank.

Report prepared by:

Joel Clarkston, Grad Tech.
Islander Engineering Ltd.

SITE INSPECTION REPORT

Cobble Hill Landfill Closure

PROJECT # : 2307

IEL REPRESENTATIVE:

Sean Babulic, EIT

Date: August 13, 2020

Time: 8:30AM – 3:00PM

Owner:
Cobble Hill Holdings Ltd.

Contractor:
Allterra Construction Ltd

Weather
Morning: Partial Cloud

Afternoon: Partial Cloud

Construction Activities:

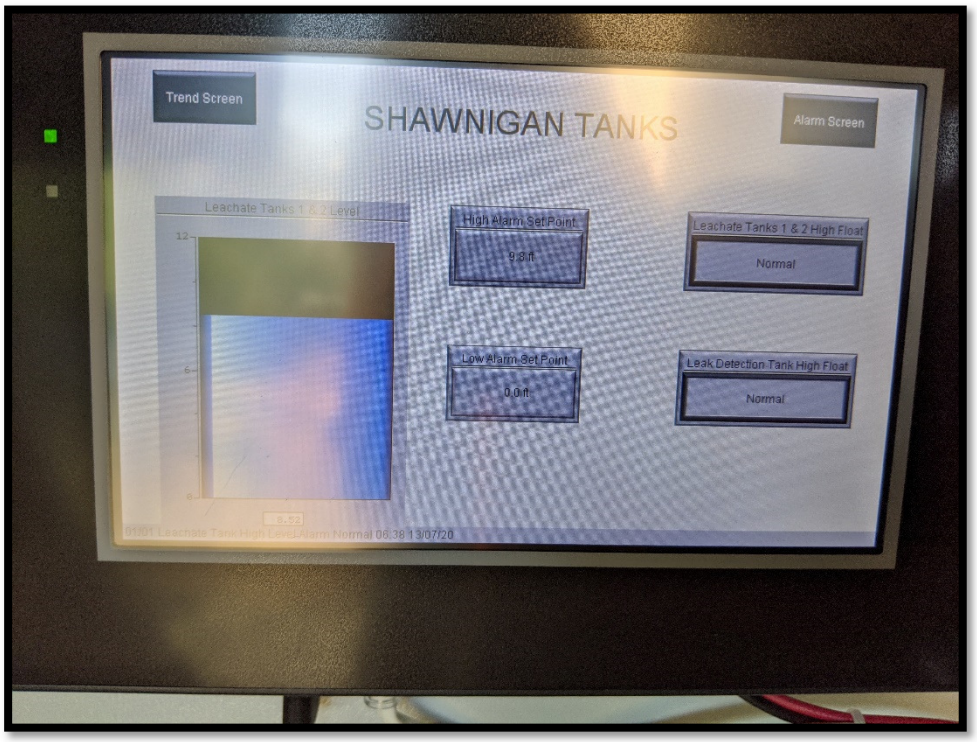
Islander Engineering Ltd (IEL) performed a site inspection on August 13, 2020 at the Cobble Hill Landfill (Landfill) to assess the site construction progress and the implementation of the Closure Plan design. This report summarizes the Landfill site inspection findings and concludes by identifying action items, if applicable.

Construction activities included:

- Relocating stockpiled general fill to PEA cover.

Picture # 1: Loading rock trucks with previously stockpiled clays from east of the PEA.

Picture # 2: D6 dozer spreading and compacting soils along north face of PEA.



Picture # 3: Leachate level = 8.52 ft.

Picture # 4: Offsite discharge point (SW-1) with minimal flow.

Picture # 5: Contractor has swept inside SMA following removal of soils.

Picture # 6: Site overview.

Report prepared by:

Sean Babulic, EIT.
Islander Engineering Ltd.

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Project Details

7192 Vantage Way, Delta, BC V4G 1K7
Tel: 604-241-9487 Fax: 604-241-9485
TFN: 1-800-551-4355
www.wtl.ca

Project Name:	Shawnigan Lake Landfill repair
Project Number:	BCFAR20-10
Location:	Shawnigan Lake
Start Date:	July 23, 2020
End Date:	July 28, 2020
General Contractor:	All Terra
Engineer:	Sperling Hansen

LINER MATERIALS

Type	Description	Supplier	Roll Details				
			Quantity (S.M)	Typical Length	Typical Width	Number Shipped	Number On site
Geomembrane	40 mil LLDPE SMOOTH	SOLMAX					

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Panel Placement

7192 Vantage Way, Delta, BC V4G 1K7
Tel: 604-241-9487 Fax: 604-241-9485
TFN: 1-800-551-4355
www.wtl.ca

Project Name:	**Shawnigan Lake Landfill repair**	**Start Date:**	**24-Jul**
Product Type:	**40 mil LLDPE SMOOTH**	**Finish Date:**	**26-Jul**

Panel #	Date	Roll Number	Work Area	*(M)* Length	*(M)* Width	Area	Comments
1	24/Jul/20	On Site Material	SOUTH AREA	14.00	2.00	28.00	
2	24/Jul/20	On Site Material	SOUTH AREA	11.00	2.00	22.00	
3	24/Jul/20	On Site Material	SOUTH AREA	8.00	2.00	16.00	
4	24/Jul/20	On Site Material	EAST AREA	8.00	2.50	20.00	
5	24/Jul/20	On Site Material	EAST AREA	13.00	2.50	32.50	
6	25/Jul/20	On Site Material	EAST AREA	11.00	2.50	27.50	
7	25/Jul/20	On Site Material	EAST AREA	3.00	3.00	9.00	
8	25/Jul/20	On Site Material	EAST AREA	3.00	3.00	9.00	
9	25/Jul/20	On Site Material	EAST AREA	3.00	3.00	9.00	
10	25/Jul/20	On Site Material	EAST AREA	8.00	3.00	24.00	
11	25/Jul/20	On Site Material	EAST AREA	5.00	3.00	15.00	
12	25/Jul/20	On Site Material	NORTH AREA	4.00	3.00	12.00	
13	25/Jul/20	On Site Material	NORTH AREA	12.00	3.00	36.00	
14	25/Jul/20	On Site Material	NORTH AREA	14.00	3.00	42.00	
15	25/Jul/20	On Site Material	NORTH AREA	15.00	2.00	30.00	
				Total Area		332.00	

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Wedge/Extruder Trials

7192 Vantage Way, Delta, BC V4G 1K7
Tel: 604-241-9487 Fax: 604-241-9485 TFN: 1-800-551-4355
www.wtl.ca

Project Name:	**Shawnigan Lake Landfill repair**	**Start Date:**	24-Jul
Materials Used:	**40 mil LLDPE SMOOTH**	**Finish Date:**	28-Jul
Weld Edge: S.S.-smooth/smooth **T.T.-**Textured/Textured **S.T.-**smooth/textured			

HDPE Seam Strengths(PPI)*GM19*:**			
MIL	**Shear**	**Fusion**	**Ext**
40	**80**	**60**	**50**
60	**120**	**91**	**78**
80	**160**	**121**	**104**
100	**200**	**151**	**130**

LLDPE Seam Strengths (PPI)*GM19*:**			
MIL	**Shear**	**Fusion**	**Ext**
40	**60**	**50**	**44**
60	**90**	**75**	**66**
80	**120**	**100**	**88**
100	**150**	**125**	**114**

Test #	Date	Time	Machine info			Weld Edge	Temp(°C) / Speed (%)	Peel Strength (ppi)						Shear (ppi)			
			Amb (°C)	ID	Type			#	1	2	3	4	5	#	1	2	INFORMATION
1	24-Jul	8:30	18	MDC	WW # 2	SS	400/75	in	68	74	71	74	75	PPI	80	82	COMMENTS
								out	72	72	75	76	70	%	50	50	
								P/F	Pass	Pass	Pass	Pass	Pass	P/F	Pass	Pass	
2	25-Jul	8:50	20	MDC	WW # 2	SS	400/75	in	63	73	75	67	71	PPI	79	79	COMMENTS
								out	75	75	72	57	68	%	50	50	
								P/F	Pass	Pass	Pass	Pass	Pass	P/F	Pass	Pass	
3	25-Jul	9:00	20	MDC	EXT # 15	SS	230/220	EXT	72	75	68	73	65	PPI	70	72	COMMENTS
														%	50	50	
								P/F	Pass	Pass	Pass	Pass	Pass	P/F	Pass	Pass	
4	26-Jul	8:20	18	RG	WW # 2	SS	400/75	in	64	75	58	61	58	PPI	72	73	COMMENTS
								out	76	73	60	62	60	%	50	50	
								P/F	Pass	Pass	Pass	Pass	Pass	P/F	Pass	Pass	
5	26-Jul	8:31	19	RG	EXT # 15	SS	230/220	EXT	67	65	67	63	64	PPI	72	76	COMMENTS
														%	50	50	
								P/F	Pass	Pass	Pass	Pass	Pass	P/F	Pass	Pass	
6	27-Jul	8:15	18	RG	EXT # 15	SS	230/220	EXT	54	70	72	73	78	PPI	82	81	COMMENTS
														%	50	50	
								P/F	Pass	Pass	Pass	Pass	Pass	P/F	Pass	Pass	
7	27-Jul	1:30	27	RG	EXT # 15	SS	230/220	EXT	50	51	52	53	57	PPI	60	61	COMMENTS
														%	50	50	
								P/F	Pass	Pass	Pass	Pass	Pass	P/F	Pass	Pass	
8	28-Jul	6:30	15	RG	EXT # 15	SS	230/220	EXT	65	68	70	72	75	PPI	80	81	COMMENTS
														%	50	50	
								P/F	Pass	Pass	Pass	Pass	Pass	P/F	Pass	Pass	

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Extruder Detail Log

7192 Vantage Way, Delta, BC V4G 1K7
Tel: 604-241-9487 Fax: 604-241-9485
TFN: 1-800-551-4355
www.wtl.ca

Project Name:	**Shawnigan Lake Landfill repair**	**Start Date:**	**25-Jul**
Product Type:	**40 mil LLDPE SMOOTH**	**Finish Date:**	**28-Jul**

Extrude Codes: BS - Penetration / **C** - Capstrip / **DSS** - Destructive Sample / **E** - Extrusion Bead / **EXT** - Extension / **R** - Crease / **P** - Patch / **T** - Three Panel Intersection (Continuous Air channel) / **TE**- Three Panel Intersection (Blocked Air channel) / **O** - Other (Use Comments)

Detail #	Weld Date	Tech	Code	*(m)* Dimensions	*(Panel)* Location	Test Result *(P/F)*	QA Initials	Test Date	Comments
1	25-Jul	RG	TE	6	1/E	P	MDC	27-Jul	
2	25-Jul	RG	P	0.5 X 0.5	1/E	P	MDC	27-Jul	
3	25-Jul	RG	E	2	1/E	P	MDC	27-Jul	
4	25-Jul	RG	P	0.5 X 0.5	1/E	P	MDC	27-Jul	
5	25-Jul	RG	P	0.5 X 0.5	1/E	P	MDC	27-Jul	
6	25-Jul	RG	TE	4.5	1/E	P	MDC	27-Jul	
7	25-Jul	RG	P	1 X 1	1/E	P	MDC	27-Jul	
8	25-Jul	RG	TE	13.8	1/E	P	MDC	27-Jul	
9	25-Jul	RG	E	0.8	1/2	P	MDC	27-Jul	
10	25-Jul	RG	TE	0.3	2/E	P	MDC	27-Jul	
11	25-Jul	RG	TE	3.8	2/E	P	MDC	27-Jul	
12	25-Jul	RG	P	0.5 X 0.5	2/E	P	MDC	27-Jul	
13	25-Jul	RG	E	5	2/E	P	MDC	27-Jul	
14	25-Jul	RG	E	0.8	2/3	P	MDC	27-Jul	
15	25-Jul	RG	TE	11.5	2/3/4/E	P	MDC	27-Jul	

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Extruder Detail Log

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Project Name:	**Shawnigan Lake Landfill repair**	**Start Date:**	**25-Jul**
Product Type:	**40 mil LLDPE SMOOTH**	**Finish Date:**	**28-Jul**

Extrude Codes: BS - Penetration / **C** - Capstrip / **DSS** - Destructive Sample / **E** - Extrusion Bead / **EXT** - Extension / **R** - Crease / **P** - Patch / **T** - Three Panel Intersection (Continuous Air channel) / **TE**- Three Panel Intersection (Blocked Air channel) / **O** - Other (Use Comments)

Detail #	Weld Date	Tech	Code	*(m)* Dimensions	*(Panel)* Location	Test Result *(P/F)*	QA Initials	Test Date	Comments
16	25-Jul	RG	E	4.1	3/E	P	MDC	27-Jul	
17	25-Jul	RG	P	0.5 X 0.5	3/E	P	MDC	27-Jul	
18	26-Jul	RG	P	0.5 X 0.5	3/4/E	P	MDC	27-Jul	
19	26-Jul	RG	P	1 X 1	3/4/E	P	MDC	27-Jul	
20	26-Jul	RG	TE	0.3	4/E	P	MDC	27-Jul	
21	26-Jul	RG	P	0.5 X 0.5	4/E	P	MDC	27-Jul	
22	26-Jul	RG	P	0.5 X 0.5	4/E	P	MDC	27-Jul	
23	26-Jul	RG	E	0.8	4/E	P	MDC	27-Jul	
24	26-Jul	RG	E	1.2	4/5	P	MDC	27-Jul	
25	26-Jul	RG	TE	7.8	4/5E	P	MDC	27-Jul	
26	26-Jul	RG	P	1 X 1	5/E	P	MDC	27-Jul	
27	26-Jul	RG	P	0.5 X 0.5	5/E	P	MDC	27-Jul	
28	26-Jul	RG	E	12.5	5/E	P	MDC	27-Jul	
29	26-Jul	RG	P	1.5 X 1.5	5/E	P	MDC	27-Jul	
30	26-Jul	RG	P	0.3 X 0.3	5/E	P	MDC	27-Jul	
31	26-Jul	RG	E	1.3	5/6	P	MDC	27-Jul	

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Product Type:	**40 mil LLDPE SMOOTH**	**Finish Date:**	**28-Jul**

Extrude Codes: BS - Penetration / **C** - Capstrip / **DSS** - Destructive Sample / **E** - Extrusion Bead / **EXT** - Extension / **R** - Crease / **P** - Patch / **T** - Three Panel Intersection (Continuous Air channel) / **TE**- Three Panel Intersection (Blocked Air channel) / **O** - Other (Use Comments)

Detail #	Weld Date	Tech	Code	*(m)* Dimensions	*(Panel)* Location	Test Result *(P/F)*	QA Initials	Test Date	Comments
32	26-Jul	RG	E	1.2	5/6/E	P	MDC	27-Jul	
33	26-Jul	RG	P	0.5 X 0.5	6/E	P	MDC	27-Jul	
34	26-Jul	RG	P	0.5 X 0.5	6/E	P	MDC	27-Jul	
35	26-Jul	RG	P	0.5 X 0.5	6/E	P	MDC	27-Jul	
36	26-Jul	RG	P	3 X 1.5	6/E	P	MDC	27-Jul	
37	26-Jul	RG	E	1.5	6/7	P	MDC	27-Jul	
38	26-Jul	RG	P	0.5 X 0.5	6/7/E	P	MDC	27-Jul	
39	26-Jul	RG	TE	0.3	6/7/E	P	MDC	27-Jul	
40	26-Jul	RG	E	1.4	7/8	P	MDC	27-Jul	
41	26-Jul	RG	TE	3.2	7/8/9/E	P	MDC	27-Jul	
42	26-Jul	RG	TE	0.3	7/8/E	P	MDC	27-Jul	
43	26-Jul	RG	TE	0.3	8/9/E	P	MDC	27-Jul	
44	26-Jul	RG	TE	0.3	9/E	P	MDC	27-Jul	
45	26-Jul	RG	TE	0.3	9/E	P	MDC	27-Jul	
46	26-Jul	RG	E	1.4	8/9	P	MDC	27-Jul	
47	26-Jul	RG	E	1.4	9/10	P	MDC	27-Jul	

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Extrude Codes: BS - Penetration / **C** - Capstrip / **DSS** - Destructive Sample / **E** - Extrusion Bead / **EXT** - Extension / **R** - Crease / **P** - Patch / **T** - Three Panel Intersection (Continuous Air channel) / **TE**- Three Panel Intersection (Blocked Air channel) / **O** - Other (Use Comments)

Detail #	Weld Date	Tech	Code	*(m)* Dimensions	*(Panel)* Location	Test Result *(P/F)*	QA Initials	Test Date	Comments
48	27-Jul	RG	E	0.2	10/E	P	MDC	27-Jul	
49	27-Jul	RG	P	0.5 X 0.5	10/E	P	MDC	27-Jul	
50	27-Jul	RG	P	0.5 X 0.5	10/E	P	MDC	27-Jul	
51	27-Jul	RG	TE	0.3	10/11/E	P	MDC	27-Jul	
52	27-Jul	RG	TE	0.3	10/11/E	P	MDC	27-Jul	
53	27-Jul	RG	E	1.3	10/11	P	MDC	27-Jul	
54	27-Jul	RG	E	1.4	11/12	P	MDC	27-Jul	
55	27-Jul	RG	P	0.5 X 0.5	11/12/E	P	MDC	27-Jul	
56	27-Jul	RG	TE	0.3	11/12/E	P	MDC	27-Jul	
57	27-Jul	RG	E	1.4	12/13	P	MDC	27-Jul	
58	27-Jul	RG	TE	0.3	12/13/E	P	MDC	27-Jul	
59	27-Jul	RG	TE	0.3	12/13/E	P	MDC	27-Jul	
60	27-Jul	RG	P	0.5 X 0.5	13/E	P	MDC	27-Jul	
61	27-Jul	RG	P	0.5 X 0.5	13/E	P	MDC	27-Jul	
62	27-Jul	RG	P	0.5 X 0.5	13/E	P	MDC	27-Jul	
63	27-Jul	RG	E	0.2	13/E	P	MDC	27-Jul	

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Product Type:	**40 mil LLDPE SMOOTH**	**Finish Date:**	**28-Jul**

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Detail #	Weld Date	Tech	Code	*(m)* Dimensions	*(Panel)* Location	Test Result *(P/F)*	QA Initials	Test Date	Comments
64	27-Jul	RG	E	1.2	13/14	P	MDC	27-Jul	
65	27-Jul	RG	TE	0.3	13/14/E	P	MDC	27-Jul	
66	27-Jul	RG	P	0.5 X 0.5	13/14/E	P	MDC	27-Jul	
67	27-Jul	RG	P	0.5 X 0.5	14/E	P	MDC	28-Jul	
68	27-Jul	RG	P	0.5 X 0.5	14/E	P	MDC	28-Jul	
69	27-Jul	RG	P	0.5 X 0.5	14/E	P	MDC	28-Jul	
70	27-Jul	RG	E	1.1	14/15	P	MDC	28-Jul	
71	27-Jul	RG	TE	0.3	14/15/E	P	MDC	28-Jul	
72	28-Jul	RG	TE	0.3	14/15/E	P	MDC	28-Jul	
73	28-Jul	RG	P	0.5 X 0.5	15/E	P	MDC	28-Jul	
74	28-Jul	RG	P	0.5 X 0.5	15/E	P	MDC	28-Jul	
75	28-Jul	RG	P	1 X 1	15/E	P	MDC	28-Jul	
76	28-Jul	RG	E	0.4	15/E	P	MDC	28-Jul	
77	28-Jul	RG	P	0.5 X 0.5	E	P	MDC	28-Jul	
78	28-Jul	RG	P	0.5 X 0.5	E	P	MDC	28-Jul	
79	28-Jul	RG	P	0.5 X 0.5	E	P	MDC	28-Jul	

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Project Name:	**Shawnigan Lake Landfill repair**	**Start Date:**	**25-Jul**
Product Type:	**40 mil LLDPE SMOOTH**	**Finish Date:**	**28-Jul**

Extrude Codes: BS - Penetration / **C** - Capstrip / **DSS** - Destructive Sample / **E** - Extrusion Bead / **EXT** - Extension / **R** - Crease / **P** - Patch / **T** - Three Panel Intersection (Continuous Air channel) / **TE**- Three Panel Intersection (Blocked Air channel) / **O** - Other (Use Comments)

Detail #	Weld Date	Tech	Code	*(m)* Dimensions	*(Panel)* Location	Test Result (*P/F*)	QA Initials	Test Date	Comments
80	28-Jul	RG	P	0.5 X 0.5	E	P	MDC	28-Jul	
81	28-Jul	RG	P	0.5 X 0.5	E	P	MDC	28-Jul	
82	28-Jul	RG	P	0.5 X 0.5	E	P	MDC	28-Jul	
83	28-Jul	RG	P	0.5 X 0.5	E	P	MDC	28-Jul	
84	28-Jul	RG	P	0.5 X 0.5	E	P	MDC	28-Jul	
85	28-Jul	RG	P	0.5 X 0.5	E	P	MDC	28-Jul	
86	28-Jul	RG	P	0.5 X 0.5	E	P	MDC	28-Jul	
87	28-Jul	RG	P	0.5 X 0.5	E	P	MDC	28-Jul	
88	28-Jul	RG	P	0.5 X 0.5	E	P	MDC	28-Jul	
89	28-Jul	RG	E	10	E	P	MDC	28-Jul	
90	28-Jul	RG	E	8	E	P	MDC	28-Jul	
91	28-Jul	RG	E	9.8	E	P	MDC	28-Jul	
92	28-Jul	RG	E	9.5	E	P	MDC	28-Jul	
93	28-Jul	RG	E	8.4	E	P	MDC	28-Jul	

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Wedge Seam Log

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Tel: 604-241-9487 Fax: 604-241-9485
TFN: 1-800-551-4355
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Project Name:	Shawnigan Lake Landfill repair	**Start Date:**	24-Jul-20	**Destructive Test Specifications**			**Air Test Specifications**		
				Length of Seam/Test:	200	m/Test	Test Pressure:	40	psi
Product Type:	40 mil LLDPE SMOOTH	**Finish Date:**	26-Jul-20	Total Length of Seams:		m/Test	Test Duration:	5	minutes
				Total Tests Required:	0	Tests	Finish:	36	psi

Seam Number	Time	Date	Weld Tech	Welder #	*Seam Length*	Start Time	Start *(psi)*	Finish time	Finish *(psi)*	QA intials	Test Date	Comments	Start Time	Finish time
1/E	10:01	24-Jul	MDC	2	2.5	1:30	40	1:30	40	MDC	27-Jul		1:30	1:30
2/E	10:15	24-Jul	MDC	2	4.0	1:30	40	1:35	40	MDC	27-Jul		1:30	1:35
3/E	10:35	24-Jul	MDC	2	3.6	1:35	40	1:40	40	MDC	27-Jul		1:35	1:40
4/E					2.0	1:41	40	1:46	40	MDC	27-Jul	TEST A	1:41	1:46
4/E	11:05	24-Jul	MDC	2	0.3	EXTRUDED						VTP	EXTRUDED	0:00
4/E					4.5	1:55	40	2:00	40	MDC	27-Jul	TEST B	1:55	2:00
2/E					4.2	2:01	40	2:06	40	MDC	27-Jul	TEST A	2:01	2:06
2/E	9:10	25-Jul	RG	2	0.3	EXTRUDED						VTP	EXTRUDED	0:00
2/E					4.3	2:15	40	2:20	40	MDC	27-Jul	TEST B	2:15	2:20
4/E	9:40	25-Jul	RG	2	7.1	2:20	40	2:25	40	MDC	27-Jul		2:20	2:25
5/E	10:40	25-Jul	RG	2	6.5	2:25	40	2:30	40	MDC	27-Jul		2:25	2:30
6/E					3.0	11:30	40	11:35	40	MDC	28-Jul	TEST A	11:30	11:35
6/E					0.5	EXTRUDED						VTP	EXTRUDED	0:00
6/E	11:05	25-Jul	RG	2	1.5	11:35	40	11:40	40	MDC	28-Jul	TEST B	11:35	11:40
6/E					3.0	EXTRUDED						VTP	EXTRUDED	0:00
6/E					1.5	11:45	40	11:50	40	MDC	28-Jul	TEST C	11:45	11:50
7/E	11:45	25-Jul	RG	2	2.8	11:50	40	11:55	40	MDC	28-Jul		11:50	11:55
9/E	12:45	25-Jul	RG	2	2.8	11:55	40	12:00	40	MDC	28-Jul		11:55	12:00
10/E					2.2	12:05	40	12:10	40	MDC	28-Jul	TEST A	12:05	12:10
10/E					0.5	EXTRUDED						VTP	EXTRUDED	0:00
10/E	1:30	25-Jul	RG	2	2.8	12:10	40	12:15	40	MDC	28-Jul	TEST B	12:10	12:15
10/E					1.0	EXTRUDED						VTP	EXTRUDED	0:00
10/E					1.5	12:15	40	12:20	40	MDC	28-Jul	TEST C	12:15	12:20
11/E	1:50	25-Jul	RG	2	4.8	12:20	40	12:25	40	MDC	28-Jul		12:20	12:25

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Project Name:	Shawnigan Lake Landfill repair	**Start Date:**	24-Jul-20	**Destructive Test Specifications**			**Air Test Specifications**		
				Length of Seam/Test:	200	m/Test	Test Pressure:	40	psi
Product Type:	40 mil LLDPE SMOOTH	**Finish Date:**	26-Jul-20	Total Length of Seams:		m/Test	Test Duration:	5	minutes
				Total Tests Required:	0	Tests	Finish:	36	psi

Seam Number	Time	Date	Weld Tech	Welder #	*Seam Length*	Start Time	Start *(psi)*	Finish time	Finish *(psi)*	QA intials	Test Date	Comments	Start Time	Finish time
15/E					5.0	12:25	40	12:30	40	MDC	28-Jul	TEST A	12:25	12:30
15/E					0.5	EXTRUDED						VTP	EXTRUDED	0:00
15/E					9.0	12:30	40	12:35	40	MDC	28-Jul	TEST B	12:30	12:35
14/15/E					0.3	EXTRUDED						VTP	EXTRUDED	0:00
14/E					4.5	12:35	40	12:40	40	MDC	28-Jul	TEST C	12:35	12:40
14/E					0.5	EXTRUDED						VTP	EXTRUDED	0:00
14/E					6.5	12:50	40	12:55	40	MDC	28-Jul	TEST D	12:50	12:55
14/E	2:30	25-Jul	RG	2	0.5	EXTRUDED						VTP	EXTRUDED	0:00
14/E					2.0	12:55	40	13:00	40	MDC	28-Jul	TEST E	12:55	13:00
13/14/E					0.3	1:05	40	1:10	40	MDC	28-Jul	VTP	1:05	1:10
13/E					7.0	1:10	40	1:15	40	MDC	28-Jul	TEST F	1:10	1:15
13/E					1.2	EXTRUDED						VTP	EXTRUDED	0:00
13/E					3.6	1:15	40	1:20	40	MDC	28-Jul	TEST G	1:15	1:20
12/13/E					0.3	EXTRUDED						VTP	EXTRUDED	0:00
12/E					2.5	1:20	40	1:25	40	MDC	28-Jul	TEST H	1:20	1:25

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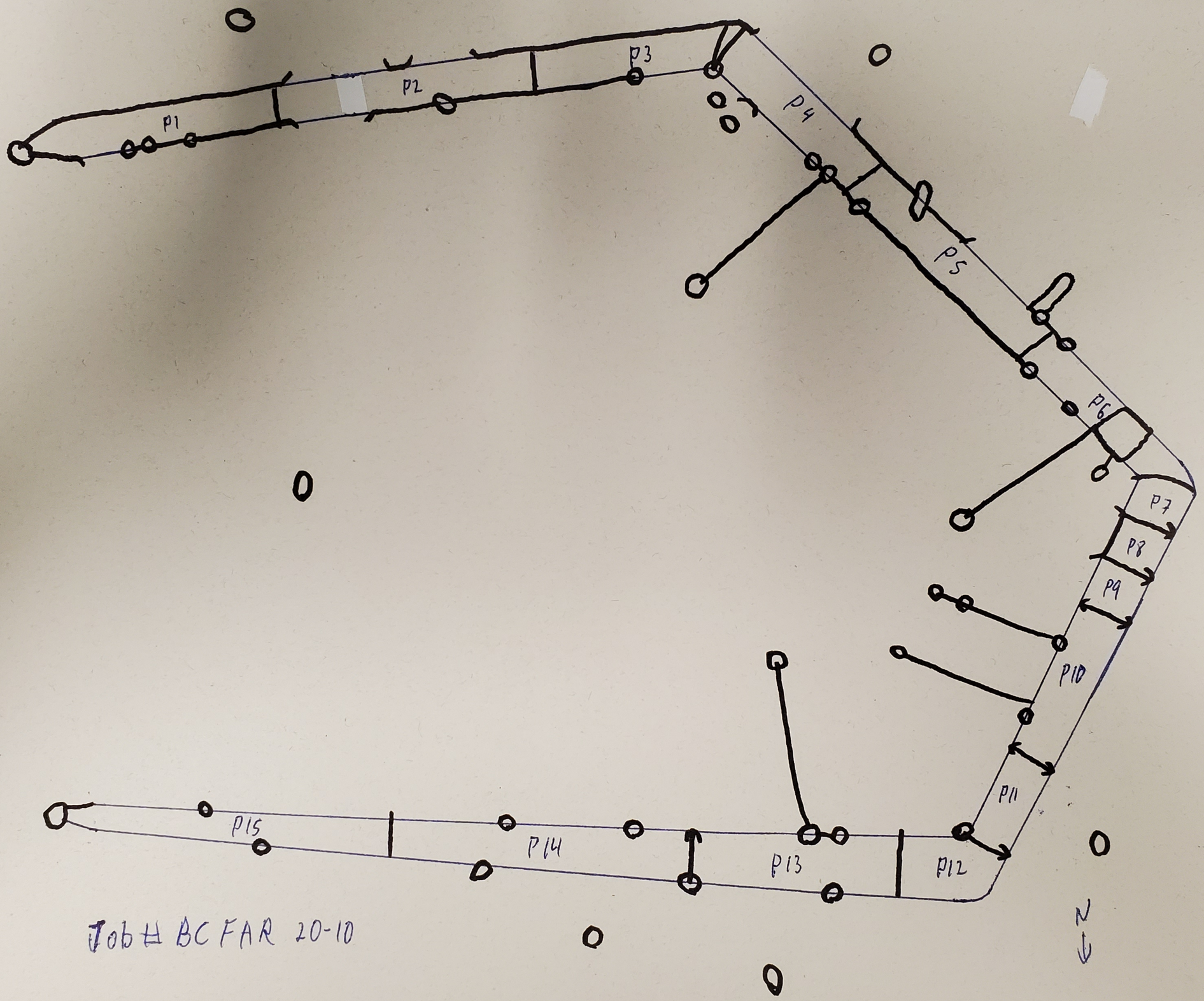
Project Name:	Shawnigan Lake Landfill repair	**Start Date:**	24-Jul-20	**Destructive Test Specifications**			**Air Test Specifications**		
				Length of Seam/Test:	200	m/Test	Test Pressure:	40	psi
Product Type:	40 mil LLDPE SMOOTH	**Finish Date:**	26-Jul-20	Total Length of Seams:		m/Test	Test Duration:	5	minutes
				Total Tests Required:	0	Tests	Finish:	36	psi

Seam Number	Time	Date	Weld Tech	Welder #	*Seam Length*	Start Time	Start *(psi)*	Finish time	Finish *(psi)*	QA intials	Test Date	Comments	Start Time	Finish time
6/E					5.0	1:25	40	1:30	40	MDC	28-Jul	TEST A	1:25	1:30
6/E					3.0	EXTRUDED						VTP	EXTRUDED	0:00
6/E					3.0	1:30	40	1:35	40	MDC	28-Jul	TEST B	1:30	1:35
6/7/E					0.3	EXTRUDED						VTP	EXTRUDED	0:00
7/E					2.8	1:35	40	1:40	40	MDC	28-Jul	TEST C	1:35	1:40
7/8/E					0.3	EXTRUDED						VTP	EXTRUDED	0:00
8/E					2.8	1:45	40	1:50	40	MDC	28-Jul	TEST D	1:45	1:50
8/9/E					0.3	EXTRUDED						VTP	EXTRUDED	0:00
9/E					2.8	1:50	40	1:55	40	MDC	28-Jul	TEST E	1:50	1:55
9/10/E					0.3	EXTRUDED						VTP	EXTRUDED	0:00
10/E					7.8	1:55	40	2:00	40	MDC	28-Jul	TEST F	1:55	2:00
10/11/E					0.3	EXTRUDED						VTP	EXTRUDED	0:00
11/E					4.8	2:01	40	2:06	40	MDC	28-Jul	TEST G	2:01	2:06
11/12/E	8:45	26-Jul	RG	2	0.3	EXTRUDED						VTP	EXTRUDED	0:00
12/E					5.0	2:05	40	2:10	40	MDC	28-Jul	TEST H	2:05	2:10
12/13/E					0.3	EXTRUDED						VTP	EXTRUDED	0:00
13/E					4.0	10:45	40	10:50	40	MDC	28-Jul	TEST I	10:45	10:50
13/E					0.5	EXTRUDED						VTP	EXTRUDED	0:00
13/E					7.5	10:55	40	11:00	40	MDC	28-Jul	TEST J	10:55	11:00
13/14/E					0.5	EXTRUDED						VTP	EXTRUDED	0:00
14/E					10.0	11:05	40	11:10	40	MDC	28-Jul	TEST K	11:05	11:10
14/E					0.5	EXTRUDED						VTP	EXTRUDED	0:00
14/E					3.5	11:10	40	11:15	40	MDC	28-Jul	TEST L	11:10	11:15
14/15/E					0.3	EXTRUDED						VTP	EXTRUDED	0:00
15/E					5.5	11:15	40	11:20	40	MDC	28-Jul	TEST M	11:15	11:20
15/E					0.5	EXTRUDED						VTP	EXTRUDED	0:00
15/E					9.0	11:20	40	11:25	40	MDC	28-Jul	TEST N	11:20	11:25
				Total	189.30									



Job # BC FAR 20-10

Analytical Table Footnotes: Leachate and Surface Water

	All concentrations in mg/L, except pH or as indicated.
"<"	less than the laboratory detection limit indicated.
"-"	means not analyzed or no standard or guideline applies.
*	RPDs are not normally calculated where one or more concentrations are less than five times RDL.
(1)	Guideline of 15 mg/L Pt for Drinking Water. Once background levels are established, colour should also not exceed 5 mg/L above background, to protect for Aquatic Life. This is considered a clearwater system (background less than 20 mg/L Pt.)
(2)	Nitrite BCAWWQG Guideline is Chloride dependent
(3)	Standard is calculated based on the hardness dependent BCAWWQG formula, and has been calculated and shown for each individual result
(4)	pH-dependent maximum where instant pH < 6.5

BOLD, UNDERLINE	Laboratory Detection Limit exceeds one or more applicable Standard
BOLD, BLUE SHADING	Concentration greater than BCAWWQG Guideline
BOLD, BEIGE SHADING	Concentration greater than BCAWWQG Chronic Guideline
BOLD, GREEN SHADING	Concentration greater than BC Ministry of Environment Drinking Water Sources

Table 1: Analytical Results for Nutrients in Surface Water			SHA-SW-1
Laboratory ID	**BC DRINKING WATER QUALITY GUIDELINES**	**BC FRESHWATER AQUATIC LIFE WATER QUALITY GUIDELINES**	**0073181-01**
Sample ID			**SW1**
Date Sampled/Time			**2020-07-30**
Physical Tests			
Total Dissolved Solids (mg/L)	-	-	372
Total Suspended Solids (mg/L)	-	**25 mg/L above background (24-hr during clear flow)**	<2.0
pH	**7-10.5**	**6.5-9**	7.86
Conductivity (uS/cm)	-	-	575
Hardness (as CaCO3)	-	-	286
Turbidity (NTU)	**Δ1 NTU**	**8 NTU above background (24-hr during clear flow**	0.5
Anions and Nutrients mg/L			
Alkalinity Bicarbonate (as CaCO3)	**<10 high sensitivity to acid inputs 10-20 moderate sensitivity to acid inputs >20 low sensitivity to acid inputs**		223
Alkalinity Carbonate (as CaCO3)			<1.0
Acid Sensitivity			
Chloride (Cl)	**250 mg/L**	**600 mg/L (instant max), 150 mg/L (30-day average)**	11.8
Fluoride (F)	**1.5 mg/L (instant max) 1.0 mg/L (30-day average)**	**0.4 (Hardness <10mg/L)**	<0.10
		Hardness-Dependent AW (Hardness is >10mg/L)[3]	**0.31**
Nitrate (as N)	**45 mg/L**	**32.8 mg/L (instant maximum) 3.0 mg/L (30-day average)**	0.113
Nitrite (as N) [2]	**3 mg/L**	**Cl > 10 mg/L 0.6 mg/L (MAX), 0.2 mg/L (30-day average)**	<0.010
Sulfate (SO4) H 0-30 mg/L	**500 mg/L**	**128 mg/L 30-day average)**	
H 31 - 75 mg/L		**218 mg/L (30-day average)**	
H 76 - 180 mg/L		**309 mg/L (30-day average)**	
H 181 - 250 mg/L		**429 mg/L (30-day average)**	91.3
H > 250 mg/L		**TBD**	

Notes: Refer to Table Endnotes (attached)

Table 2: Analytical Results for Total Metals in Surface Water			SHA-SW-1
Laboratory ID	**BC DRINKING WATER QUALITY GUIDELINES**	**BC FRESHWATER AQUATIC LIFE WATER QUALITY GUIDELINES**	**0073181-01**
Sample ID			**SW1**
Date Sampled/Time			**2020-07-30**
Physical Tests			
Hardness (as CaCO3) (mg/L)	-	-	286
pH	**7-10.5**	**6.5-9**	7.86
Total Metals (mg/L)			
Aluminum (Al)-Total	**0.2**	-	0.0311
Antimony (Sb)-Total	-	-	0.00022
Arsenic (As)-Total	**0.01**	**0.005**	<0.00050
Barium (Ba)-Total	-	-	0.0188
Beryllium (Be)-Total	-	-	<0.00010
Bismuth, total	-	-	<0.00010
Boron (B)-Total	**5**	**1.2**	<0.0500
Cadmium (Cd)-Total	-	-	0.000011
Calcium (Ca)-Total	-	-	96.6
Chromium (Cr)-Total	-	-	0.00118
Chromium (Cr(III))	-	-	-
Chromium (Cr(VI))	-	-	-
Cobalt (Co)-Total	-	**0.110 (Short Term), 0.004 (Long Term Average)**	<0.00010
Copper (Cu)-Total	**0.5**	**Hardness-Dependent**[7]	0.00263
		Hardness-Dependent BCAWQG to protect AW [3] (instant max)	0.0118
		Hardness-Dependent BCAWQG to protect AW [3] (30-d average)	0.0020
Iron (Fe)-Total	-	**1**	0.025
Lead (Pb)-Total	**0.01**	**Hardness-Dependent**[3]	<0.00020
		Hardness-Dependent BCAWQG to protect AW [3] (instant max)	0.3100
		Hardness-Dependent BCAWQG to protect AW [3] (30-d average)	0.0150
Lithium (Li)-Total	-	-	0.00016
Magnesium (Mg)-Total	-	-	13.4
Manganese (Mn)-Total	-	**Hardness Dependent** [3]	0.0173
		Hardness-Dependent BCAWQG to protect AW [3] (instant max)	3.7
		Hardness-Dependent BCAWQG to protect AW [3] (30-d average)	1.9
Mercury (Hg)-Total	**0.001**	**0.00002**	
Molybdenum (Mo)-Total	**0.25**	**≤1 (instant max)** **2 (30-d average)**	0.00095
Nickel (Ni)-Total	-	0.025 (Hardness-Dependent [3] BCAWWQG to protect AW H<60mg/L)	0.00105
		Calculated Hardness-Dependent [3] BCAWWQG to protect AW 60≤H≤180 mg/L CaCO3	0.150
Phosphorus(P)-Total	-	-	<0.050
Potassium (K)-Total	-	-	0.87
Selenium (Se)-Total	**0.01**	**0.002**	<0.00050
Silicon (Si)-Total	-	-	7.2
Silver (Ag)-Total	-	**HARDNESS <100mg/L 0.0001 (SHORT TERM), 0.00005 (LONG TERM),** **HARDNESS >100mg/L 0.003 (SHORT TERM), 0.0015 (LONG TERM)**	<0.000050
Sodium (Na)-Total	-	-	9.09
Strontium (Sr)-Total	-	-	0.266
Sulfur (S)-Total	-	-	33.3
Tellurium (Te)-Total	-	-	<0.00050
Thallium (Tl)-Total	-	-	<0.000020
Thorium (Th)-Total	-	-	<0.00010
Tin (Sn)-Total	-	-	<0.00020
Titanium (Ti)-Total	-	-	<0.0050
Tungsten (W)-Total			<0.0010
Uranium (U)-Total	-	-	0.00202
Vanadium (V)-Total	-	-	<0.0010
Zinc (Zn)-Total	**5.0**	**Hardness >90 mg/L**	<0.0040
		Hardness-Dependent BCAWQG to protect AW[3] (instant max)	0.180
		Hardness-Dependent BCAWQG to protect AW [3] (30-d average)	0.150
Zirconium (Zr)-Total	-	-	<0.00010

Table 3: Analytical Results for Dissolved Metals in Surface Water			SHA-SW-1
Laboratory ID	**BC DRINKING WATER QUALITY GUIDELINES**	**BC FRESHWATER AQUATIC LIFE WATER QUALITY GUIDELINES**	**0073181-01**
Sample ID			**SW1**
Date Sampled/Time			**2020-07-30**
Physical Tests			
Hardness (as CaCO3) (mg/L)	-	-	286
pH	**7-10.5**	**6.5-9**	7.86
Dissolved Metals (mg/L)			
Aluminum (Al)-Dissolved	-	**0.05 (30-day average where median pH > 6.5) 0.1 (maximum where instantaneous pH > 6.5) "**" indicates pH-dependent maximum where instant pH ≤ 6.5**	<0.0050
		pH/Hardness Dependent BCAWQG to protect AW [4] (instant max)	**0.100**
		pH/Hardness Dependent BCAWQG to protect AW [4] (30-d Mean)	**0.050**
Antimony (Sb)-Dissolved	-	-	<0.00020
Arsenic (As)-Dissolved	-	-	<0.00050
Barium (Ba)-Dissolved	-	-	0.0163
Beryllium (Be)-Dissolved	-	-	<0.00010
Bismuth (Bi)-Dissolved	-	-	<0.00010
Boron (B)-Dissolved	-	-	0.0585
Cadmium (Cd)-Dissolved	-	**Hardness-Dependent[3]**	<0.000010
	-	**Calculated Hardness-Dependent [3] BCAWWQG to protect AW (short-term max) e[1.03 * ln(Hss) - 5.274] ug/L H<455mg/L**	**0.00170**
	-	**Calculated Hardness-Dependent BCAWQG to protect AW [3] (long-term max) e[0.736 * ln(Hss) - 4.943] ug/L H<285mg/L**	**0.00046**
Calcium (Ca)-Dissolved	-	**up to 4, highly sensitive to acid inputs 4 to 8, moderately sensitive over 8 low sensitivity**	93.1 Low
Chromium (Cr)-Dissolved	-	-	0.00114
Cobalt (Co)-Dissolved	-	-	<0.00010
Copper (Cu)-Dissolved	-	-	0.00236
Iron (Fe)-Dissolved	-	**0.35**	<0.010
Lead (Pb)-Dissolved	-	-	<0.00020
Lithium, dissolved	-		0.00021
Magnesium (Mg)-Dissolved	-	-	12.9
Manganese (Mn)-Dissolved	-	-	0.00152
Mercury (Hg)-Dissolved	-	-	-
Molybdenum (Mo)-Dissolved	-	-	0.00085
Nickel (Ni)-Dissolved	-		0.00098
Phosphorus (P)-Dissolved	-		<0.050
Potassium (K)-Dissolved	-	-	0.77
Selenium (Se)-Dissolved	-	-	<0.00050
Silicon (Si)-Dissolved	-	-	7.1
Silver (Ag)-Dissolved	-	-	<0.000050
Sodium (Na)-Dissolved	-	-	8.2
Strontium (Sr)-dissolved	-	-	0.243
Sulfur (S)-Dissolved	-	-	36
Tellurium (Te)-Dissolved	-	-	<0.00050
Thallium (Ti)-Dissolved	-	-	<0.000020
Thorium (Th)-Dissolved	-	-	<0.00010
Tin (Sn)-Dissolved	-	-	<0.00020
Titanium (Ti)-Dissolved	-	-	<0.0050
Tungsten (W)-Dissolved			<0.0010
Uranium (U)-Dissolved	-	-	0.00183
Vanadium (V)-Dissolved	-	-	<0.0010
Zinc (Zn)-Dissolved	-	-	<0.0040
Zirconium (Zr)-Dissolved	-	-	<0.00010

Notes: Refer to Table Endnotes (attached)

Table 4: Analytical Results for Hydrocarbons and PAHs in Surface Water			SHA-SW-1
Laboratory ID	**BC DRINKING WATER QUALITY GUIDELINES**	**BC FRESHWATER AQUATIC LIFE WATER QUALITY GUIDELINES**	**0073181-01**
Sample ID			**SW1**
Date Sampled/ Time			**2020-07-30**
Hydrocarbons ug/L			
LEPH	-	**-**	<250
HEPH	-	**-**	<250
Polycyclic Aromatic			
Acenaphthene	-	**6 (LONG TERM)**	<0.050
Acenaphthylene	-	**-**	<0.200
Acridine	-	**3 (LONG TERM), 0.05 (PHOTOTOXIC)**	<0.050
Anthracene	-	**4 (LONG TERM), 0.1 (PHOTOTOXIC)**	<0.010
Benz(a)anthracene	**0.01**	**0.1 (LONG TERM), 0.1 (PHOTOTOXIC)**	<0.010
Benzo(a)pyrene	-	**0.01 (LONG TERM)**	<0.010
Benzo(b)fluoranthene	-	**-**	-
Benzo(b+j)fluoranthene	-	**-**	<0.050
Benzo(g,h,i)perylene	-	**-**	<0.050
Benzo(k)fluoranthene	-	**-**	<0.050
2-Chloronaphthalene			<0.100
Chrysene	-	**-**	<0.050
Dibenz(a,h)anthracene	-	**-**	<0.010
Fluoranthene	-	**4 (LONG TERM), 0.2 (PHOTOTOXIC)**	<0.030
Fluorene	-	**12 (LONG TERM)**	<0.050
Indeno(1,2,3-c,d)pyrene	-	**-**	<0.050
1-Methylnaphthalene			<0.100
2-Methylnaphthalene			<0.100
Naphthalene	-	**1 (LONG TERM)**	<0.200
Phenanthrene	-	**0.3 (LONG TERM)**	<0.100
Pyrene	-	**0.02 (PHOTOTOXIC)**	<0.020
Quinoline	-	**-**	<0.050

Notes: Refer to Table Endnotes (attached)

CERTIFICATE OF ANALYSIS

REPORTED TO	Allterra Construction 2158 Millstream Road Victoria, BC V9B 6H4		
ATTENTION	Todd Mizuik	**WORK ORDER**	0073181
PO NUMBER	P15-06 SIRM	**RECEIVED / TEMP**	2020-07-31 12:00 / 14°C
PROJECT	P17-932	**REPORTED**	2020-08-12 15:54
PROJECT INFO		**COC NUMBER**	no #

Introduction:

CARO Analytical Services is a testing laboratory full of smart, engaged scientists driven to make the world a safer and healthier place. Through our clients' projects we become an essential element for a better world. We employ methods conducted in accordance with recognized professional standards using accepted testing methodologies and quality control efforts. CARO is accredited by the Canadian Association for Laboratories Accreditation (CALA) to ISO/IEC 17025:2017 for specific tests listed in the scope of accreditation approved by CALA.

Big Picture Sidekicks

You know that the sample you collected after snowshoeing to site, digging 5 meters, and racing to get it on a plane so you can submit it to the lab for time sensitive results needed to make important and expensive decisions (whew) is VERY important. We know that too.

We've Got Chemistry

It's simple. We figure the more you enjoy working with our fun and engaged team members; the more likely you are to give us continued opportunities to support you.

Ahead of the Curve

Through research, regulation knowledge, and instrumentation, we are your analytical centre for the technical knowledge you need, BEFORE you need it, so you can stay up to date and in the know.

If you have any questions or concerns, please contact me at nyipp@caro.ca

Authorized By:

Nicole Yipp
Team Lead, Client Service

CARO ANALYTICAL SERVICES

TEST RESULTS

REPORTED TO	Allterra Construction	**WORK ORDER**	0073181
PROJECT	P17-932	**REPORTED**	2020-08-12 15:54

Analyte	Result	RL	Units	Analyzed	Qualifier
SW1 (0073181-01) | Matrix: Water | Sampled: 2020-07-30 09:50					
Anions					
Chloride	**11.8**	0.10	mg/L	2020-08-01	
Fluoride	< 0.10	0.10	mg/L	2020-08-01	
Nitrate (as N)	**0.113**	0.010	mg/L	2020-08-01	
Nitrite (as N)	< 0.010	0.010	mg/L	2020-08-01	
Sulfate	**91.3**	1.0	mg/L	2020-08-01	
BCMOE Aggregate Hydrocarbons					
EPHw10-19	< 250	250	µg/L	2020-08-05	
EPHw19-32	< 250	250	µg/L	2020-08-05	
LEPHw	< 250	250	µg/L	N/A	
HEPHw	< 250	250	µg/L	N/A	
Surrogate: 2-Methylnonane (EPH/F2-4)	*81*	*60-126*	%	*2020-08-05*	
Calculated Parameters					
Hardness, Total (as CaCO3)	**286**	0.500	mg/L	N/A	
Dissolved Metals					
Lithium, dissolved	**0.00021**	0.00010	mg/L	2020-08-09	
Aluminum, dissolved	< 0.0050	0.0050	mg/L	2020-08-09	
Antimony, dissolved	< 0.00020	0.00020	mg/L	2020-08-09	
Arsenic, dissolved	< 0.00050	0.00050	mg/L	2020-08-09	
Barium, dissolved	**0.0163**	0.0050	mg/L	2020-08-09	
Beryllium, dissolved	< 0.00010	0.00010	mg/L	2020-08-09	
Bismuth, dissolved	< 0.00010	0.00010	mg/L	2020-08-09	
Boron, dissolved	**0.0585**	0.0500	mg/L	2020-08-09	
Cadmium, dissolved	< 0.000010	0.000010	mg/L	2020-08-09	
Calcium, dissolved	**93.1**	0.20	mg/L	2020-08-09	
Chromium, dissolved	**0.00114**	0.00050	mg/L	2020-08-09	
Cobalt, dissolved	< 0.00010	0.00010	mg/L	2020-08-09	
Copper, dissolved	**0.00236**	0.00040	mg/L	2020-08-09	
Iron, dissolved	< 0.010	0.010	mg/L	2020-08-09	
Lead, dissolved	< 0.00020	0.00020	mg/L	2020-08-09	
Magnesium, dissolved	**12.9**	0.010	mg/L	2020-08-09	
Manganese, dissolved	**0.00152**	0.00020	mg/L	2020-08-09	
Molybdenum, dissolved	**0.00085**	0.00010	mg/L	2020-08-09	
Nickel, dissolved	**0.00098**	0.00040	mg/L	2020-08-09	
Phosphorus, dissolved	< 0.050	0.050	mg/L	2020-08-09	
Potassium, dissolved	**0.77**	0.10	mg/L	2020-08-09	
Selenium, dissolved	< 0.00050	0.00050	mg/L	2020-08-09	
Silicon, dissolved	**7.1**	1.0	mg/L	2020-08-09	
Silver, dissolved	< 0.000050	0.000050	mg/L	2020-08-09	
Sodium, dissolved	**8.20**	0.10	mg/L	2020-08-09	
Strontium, dissolved	**0.243**	0.0010	mg/L	2020-08-09	
Sulfur, dissolved	**36.0**	3.0	mg/L	2020-08-09	

TEST RESULTS

REPORTED TO	Allterra Construction	**WORK ORDER**	0073181
PROJECT	P17-932	**REPORTED**	2020-08-12 15:54

Analyte	Result	RL	Units	Analyzed	Qualifier
SW1 (0073181-01) | Matrix: Water | Sampled: 2020-07-30 09:50, Continued					
Dissolved Metals, Continued					
Tellurium, dissolved	< 0.00050	0.00050	mg/L	2020-08-09	
Thallium, dissolved	< 0.000020	0.000020	mg/L	2020-08-09	
Thorium, dissolved	< 0.00010	0.00010	mg/L	2020-08-09	
Tin, dissolved	< 0.00020	0.00020	mg/L	2020-08-09	
Titanium, dissolved	< 0.0050	0.0050	mg/L	2020-08-09	
Tungsten, dissolved	< 0.0010	0.0010	mg/L	2020-08-09	
Uranium, dissolved	**0.00183**	0.000020	mg/L	2020-08-09	
Vanadium, dissolved	< 0.0010	0.0010	mg/L	2020-08-09	
Zinc, dissolved	< 0.0040	0.0040	mg/L	2020-08-09	
Zirconium, dissolved	< 0.00010	0.00010	mg/L	2020-08-09	
General Parameters					
Alkalinity, Total (as CaCO3)	**223**	1.0	mg/L	2020-08-05	
Alkalinity, Phenolphthalein (as CaCO3)	< 1.0	1.0	mg/L	2020-08-05	
Alkalinity, Bicarbonate (as CaCO3)	**223**	1.0	mg/L	2020-08-05	
Alkalinity, Carbonate (as CaCO3)	< 1.0	1.0	mg/L	2020-08-05	
Alkalinity, Hydroxide (as CaCO3)	< 1.0	1.0	mg/L	2020-08-05	
Conductivity (EC)	**575**	2.0	µS/cm	2020-08-05	
pH	**7.86**	0.10	pH units	2020-08-05	HT2
Solids, Total Dissolved	**372**	15	mg/L	2020-08-07	HT1
Solids, Total Suspended	< 2.0	2.0	mg/L	2020-08-05	
Turbidity	**0.50**	0.10	NTU	2020-08-04	HT1
Polycyclic Aromatic Hydrocarbons (PAH)					
Acenaphthene	< 0.050	0.050	µg/L	2020-08-06	
Acenaphthylene	< 0.200	0.200	µg/L	2020-08-06	
Acridine	< 0.050	0.050	µg/L	2020-08-06	
Anthracene	< 0.010	0.010	µg/L	2020-08-06	
Benz(a)anthracene	< 0.010	0.010	µg/L	2020-08-06	
Benzo(a)pyrene	< 0.010	0.010	µg/L	2020-08-06	
Benzo(b+j)fluoranthene	< 0.050	0.050	µg/L	2020-08-06	
Benzo(g,h,i)perylene	< 0.050	0.050	µg/L	2020-08-06	
Benzo(k)fluoranthene	< 0.050	0.050	µg/L	2020-08-06	
2-Chloronaphthalene	< 0.100	0.100	µg/L	2020-08-06	
Chrysene	< 0.050	0.050	µg/L	2020-08-06	
Dibenz(a,h)anthracene	< 0.010	0.010	µg/L	2020-08-06	
Fluoranthene	< 0.030	0.030	µg/L	2020-08-06	
Fluorene	< 0.050	0.050	µg/L	2020-08-06	
Indeno(1,2,3-cd)pyrene	< 0.050	0.050	µg/L	2020-08-06	
1-Methylnaphthalene	< 0.100	0.100	µg/L	2020-08-06	
2-Methylnaphthalene	< 0.100	0.100	µg/L	2020-08-06	
Naphthalene	< 0.200	0.200	µg/L	2020-08-06	
Phenanthrene	< 0.100	0.100	µg/L	2020-08-06	
Pyrene	< 0.020	0.020	µg/L	2020-08-06	

TEST RESULTS

REPORTED TO	Allterra Construction	**WORK ORDER**	0073181
PROJECT	P17-932	**REPORTED**	2020-08-12 15:54

Analyte	Result	RL	Units	Analyzed	Qualifier
SW1 (0073181-01) | Matrix: Water | Sampled: 2020-07-30 09:50, Continued					
Polycyclic Aromatic Hydrocarbons (PAH), Continued					
Quinoline	< 0.050	0.050	µg/L	2020-08-06	
Surrogate: Acridine-d9	*85*	*50-140*	%	*2020-08-06*	
Surrogate: Naphthalene-d8	*95*	*50-140*	%	*2020-08-06*	
Surrogate: Perylene-d12	*62*	*50-140*	%	*2020-08-06*	
Total Metals					
Aluminum, total	**0.0311**	0.0050	mg/L	2020-08-08	
Antimony, total	**0.00022**	0.00020	mg/L	2020-08-08	
Arsenic, total	< 0.00050	0.00050	mg/L	2020-08-08	
Barium, total	**0.0188**	0.0050	mg/L	2020-08-08	
Beryllium, total	< 0.00010	0.00010	mg/L	2020-08-08	
Bismuth, total	< 0.00010	0.00010	mg/L	2020-08-08	
Boron, total	< 0.0500	0.0500	mg/L	2020-08-08	
Cadmium, total	**0.000011**	0.000010	mg/L	2020-08-08	
Calcium, total	**96.6**	0.20	mg/L	2020-08-08	
Chromium, total	**0.00118**	0.00050	mg/L	2020-08-08	
Cobalt, total	< 0.00010	0.00010	mg/L	2020-08-08	
Copper, total	**0.00263**	0.00040	mg/L	2020-08-08	
Iron, total	**0.025**	0.010	mg/L	2020-08-08	
Lead, total	< 0.00020	0.00020	mg/L	2020-08-08	
Lithium, total	**0.00016**	0.00010	mg/L	2020-08-08	
Magnesium, total	**13.4**	0.010	mg/L	2020-08-08	
Manganese, total	**0.0173**	0.00020	mg/L	2020-08-08	
Molybdenum, total	**0.00095**	0.00010	mg/L	2020-08-08	
Nickel, total	**0.00105**	0.00040	mg/L	2020-08-08	
Phosphorus, total	< 0.050	0.050	mg/L	2020-08-08	
Potassium, total	**0.87**	0.10	mg/L	2020-08-08	
Selenium, total	< 0.00050	0.00050	mg/L	2020-08-08	
Silicon, total	**7.2**	1.0	mg/L	2020-08-08	
Silver, total	< 0.000050	0.000050	mg/L	2020-08-08	
Sodium, total	**9.09**	0.10	mg/L	2020-08-08	
Strontium, total	**0.266**	0.0010	mg/L	2020-08-08	
Sulfur, total	**33.3**	3.0	mg/L	2020-08-08	
Tellurium, total	< 0.00050	0.00050	mg/L	2020-08-08	
Thallium, total	< 0.000020	0.000020	mg/L	2020-08-08	
Thorium, total	< 0.00010	0.00010	mg/L	2020-08-08	
Tin, total	< 0.00020	0.00020	mg/L	2020-08-08	
Titanium, total	< 0.0050	0.0050	mg/L	2020-08-08	
Tungsten, total	< 0.0010	0.0010	mg/L	2020-08-08	
Uranium, total	**0.00202**	0.000020	mg/L	2020-08-08	
Vanadium, total	< 0.0010	0.0010	mg/L	2020-08-08	
Zinc, total	< 0.0040	0.0040	mg/L	2020-08-08	
Zirconium, total	< 0.00010	0.00010	mg/L	2020-08-08	

TEST RESULTS

REPORTED TO	Allterra Construction	**WORK ORDER**	0073181
PROJECT	P17-932	**REPORTED**	2020-08-12 15:54

Sample Qualifiers:

HT1	The sample was prepared and/or analyzed past the recommended holding time.
HT2	The 15 minute recommended holding time (from sampling to analysis) has been exceeded - field analysis is recommended.

APPENDIX 1: SUPPORTING INFORMATION

REPORTED TO	Allterra Construction	**WORK ORDER**	0073181
PROJECT	P17-932	**REPORTED**	2020-08-12 15:54

Analysis Description	Method Ref.	Technique	Accredited	Location
Alkalinity in Water	SM 2320 B* (2017)	Titration with H2SO4	✓	Kelowna
Anions in Water	SM 4110 B (2017)	Ion Chromatography	✓	Kelowna
Conductivity in Water	SM 2510 B (2017)	Conductivity Meter	✓	Kelowna
Dissolved Metals in Water	EPA 200.8 / EPA 6020B	0.45 µm Filtration / Inductively Coupled Plasma-Mass Spectroscopy (ICP-MS)	✓	Richmond
EPH in Water	EPA 3511* / BCMOE EPHw	Hexane MicroExtraction (Base/Neutral) / Gas Chromatography (GC-FID)	✓	Richmond
Hardness in Water	SM 2340 B (2017)	Calculation: 2.497 [diss Ca] + 4.118 [diss Mg]	✓	N/A
HEPHw in Water	BCMOE LEPH/HEPH	Calculation		N/A
LEPHw in Water	BCMOE LEPH/HEPH	Calculation		N/A
pH in Water	SM 4500-H+ B (2017)	Electrometry	✓	Kelowna
Polycyclic Aromatic Hydrocarbons in Water	EPA 3511* / EPA 8270D	Hexane MicroExtraction (Base/Neutral) / GC-MSD (SIM)	✓	Richmond
Solids, Total Dissolved in Water	SM 2540 C* (2017)	Gravimetry (Dried at 103-105C)	✓	Kelowna
Solids, Total Suspended in Water	SM 2540 D* (2017)	Gravimetry (Dried at 103-105C)	✓	Kelowna
Total Metals in Water	EPA 200.2* / EPA 6020B	HNO3+HCl Hot Block Digestion / Inductively Coupled Plasma-Mass Spectroscopy (ICP-MS)	✓	Richmond
Turbidity in Water	SM 2130 B (2017)	Nephelometry	✓	Kelowna

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

Glossary of Terms:

RL	Reporting Limit (default)
<	Less than the specified Reporting Limit (RL) - the actual RL may be higher than the default RL due to various factors
mg/L	Milligrams per litre
NTU	Nephelometric Turbidity Units
pH units	pH < 7 = acidic, ph > 7 = basic
µg/L	Micrograms per litre
µS/cm	Microsiemens per centimetre
BCMOE	British Columbia Environmental Laboratory Manual, British Columbia Ministry of Environment
EPA	United States Environmental Protection Agency Test Methods
SM	Standard Methods for the Examination of Water and Wastewater, American Public Health Association

APPENDIX 1: SUPPORTING INFORMATION

REPORTED TO	Allterra Construction	**WORK ORDER**	0073181
PROJECT	P17-932	**REPORTED**	2020-08-12 15:54

General Comments:

The results in this report apply to the samples analyzed in accordance with the Chain of Custody document. This analytical report must be reproduced in its entirety. CARO is not responsible for any loss or damage resulting directly or indirectly from error or omission in the conduct of testing. Liability is limited to the cost of analysis. Samples will be disposed of 30 days after the test report has been issued unless otherwise agreed to in writing.

Results in **Bold** indicate values that are above CARO's method reporting limits. Any results that are above regulatory limits are highlighted **red**. Please note that results will only be highlighted red if the regulatory limits are included on the CARO report. Any Bold and/or highlighted results do not take into account method uncertainty. If you would like method uncertainty or regulatory limits to be included on your report, please contact your Account Manager:nyipp@caro.ca

Please note any regulatory guidelines applied to this report are added as a convenience to the client, at their request, to help provide some initial context to analytical results obtained. Although CARO makes every effort to ensure accuracy of the associated regulatory guideline(s) applied, the guidelines applied cannot be assumed to be correct due to a variety of factors and as such CARO Analytical Services assumes no liability or responsibility for the use of those guidelines to make any decisions. The original source of the regulation should be verified and a review of the guideline (s) should be validated as correct in order to make any decisions arising from the comparison of the analytical data obtained to the relevant regulatory guideline for one's particular circumstances. Further, CARO Analytical Services assumes no liability or responsibility for any loss attributed from the use of these guidelines in any way.

APPENDIX 2: QUALITY CONTROL RESULTS

REPORTED TO	Allterra Construction	**WORK ORDER**	0073181
PROJECT	P17-932	**REPORTED**	2020-08-12 15:54

The following section displays the quality control (QC) data that is associated with your sample data. Groups of samples are prepared in "batches" and analyzed in conjunction with QC samples that ensure your data is of the highest quality. Common QC types include:

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

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

Analyte	Result	RL	Units	Spike Level	Source Result	% REC	REC Limit	% RPD	RPD Limit	Qualifier
Anions, Batch B0G2871										
Blank (B0G2871-BLK1)				Prepared: 2020-08-01, Analyzed: 2020-08-01						
Chloride	< 0.10	0.10	mg/L							
Fluoride	< 0.10	0.10	mg/L							
Nitrate (as N)	< 0.010	0.010	mg/L							
Nitrite (as N)	< 0.010	0.010	mg/L							
Sulfate	< 1.0	1.0	mg/L							
LCS (B0G2871-BS1)				Prepared: 2020-08-01, Analyzed: 2020-08-01						
Chloride	16.0	0.10	mg/L	16.0		100	90-110			
Fluoride	4.05	0.10	mg/L	4.00		101	88-108			
Nitrate (as N)	4.01	0.010	mg/L	4.00		100	90-110			
Nitrite (as N)	2.04	0.010	mg/L	2.00		102	85-115			
Sulfate	16.1	1.0	mg/L	16.0		100	90-110			
BCMOE Aggregate Hydrocarbons, Batch B0H0286										
Blank (B0H0286-BLK1)				Prepared: 2020-08-05, Analyzed: 2020-08-05						
EPHw10-19	< 250	250	µg/L							
EPHw19-32	< 250	250	µg/L							
Surrogate: 2-Methylnonane (EPH/F2-4)	*409*		*µg/L*	444		*92*	*60-126*			
LCS (B0H0286-BS2)				Prepared: 2020-08-05, Analyzed: 2020-08-05						
EPHw10-19	15000	250	µg/L	15500		97	70-117			
EPHw19-32	22400	250	µg/L	22200		101	70-113			
Surrogate: 2-Methylnonane (EPH/F2-4)	*318*		*µg/L*	444		*72*	*60-126*			
LCS Dup (B0H0286-BSD2)				Prepared: 2020-08-05, Analyzed: 2020-08-05						
EPHw10-19	14400	250	µg/L	15500		93	70-117	4	20	
EPHw19-32	20200	250	µg/L	22200		91	70-113	10	20	
Surrogate: 2-Methylnonane (EPH/F2-4)	*345*		*µg/L*	444		*78*	*60-126*			
Dissolved Metals, Batch B0H0624										
Blank (B0H0624-BLK1)				Prepared: 2020-08-09, Analyzed: 2020-08-09						
Lithium, dissolved	< 0.00010	0.00010	mg/L							
Aluminum, dissolved	< 0.0050	0.0050	mg/L							

APPENDIX 2: QUALITY CONTROL RESULTS

REPORTED TO	Allterra Construction	**WORK ORDER**	0073181
PROJECT	P17-932	**REPORTED**	2020-08-12 15:54

Analyte	Result	RL	Units	Spike Level	Source Result	% REC	REC Limit	% RPD	RPD Limit	Qualifier
Dissolved Metals, Batch B0H0624, Continued										
Blank (B0H0624-BLK1), Continued				Prepared: 2020-08-09, Analyzed: 2020-08-09						
Antimony, dissolved	< 0.00020	0.00020	mg/L							
Arsenic, dissolved	< 0.00050	0.00050	mg/L							
Barium, dissolved	< 0.0050	0.0050	mg/L							
Beryllium, dissolved	< 0.00010	0.00010	mg/L							
Bismuth, dissolved	< 0.00010	0.00010	mg/L							
Boron, dissolved	< 0.0500	0.0500	mg/L							
Cadmium, dissolved	< 0.000010	0.000010	mg/L							
Calcium, dissolved	< 0.20	0.20	mg/L							
Chromium, dissolved	< 0.00050	0.00050	mg/L							
Cobalt, dissolved	< 0.00010	0.00010	mg/L							
Copper, dissolved	< 0.00040	0.00040	mg/L							
Iron, dissolved	< 0.010	0.010	mg/L							
Lead, dissolved	< 0.00020	0.00020	mg/L							
Magnesium, dissolved	< 0.010	0.010	mg/L							
Manganese, dissolved	< 0.00020	0.00020	mg/L							
Molybdenum, dissolved	< 0.00010	0.00010	mg/L							
Nickel, dissolved	< 0.00040	0.00040	mg/L							
Phosphorus, dissolved	< 0.050	0.050	mg/L							
Potassium, dissolved	< 0.10	0.10	mg/L							
Selenium, dissolved	< 0.00050	0.00050	mg/L							
Silicon, dissolved	< 1.0	1.0	mg/L							
Silver, dissolved	< 0.000050	0.000050	mg/L							
Sodium, dissolved	< 0.10	0.10	mg/L							
Strontium, dissolved	< 0.0010	0.0010	mg/L							
Sulfur, dissolved	< 3.0	3.0	mg/L							
Tellurium, dissolved	< 0.00050	0.00050	mg/L							
Thallium, dissolved	< 0.000020	0.000020	mg/L							
Thorium, dissolved	< 0.00010	0.00010	mg/L							
Tin, dissolved	< 0.00020	0.00020	mg/L							
Titanium, dissolved	< 0.0050	0.0050	mg/L							
Tungsten, dissolved	< 0.0010	0.0010	mg/L							
Uranium, dissolved	< 0.000020	0.000020	mg/L							
Vanadium, dissolved	< 0.0010	0.0010	mg/L							
Zinc, dissolved	< 0.0040	0.0040	mg/L							
Zirconium, dissolved	< 0.00010	0.00010	mg/L							
LCS (B0H0624-BS1)				Prepared: 2020-08-09, Analyzed: 2020-08-09						
Lithium, dissolved	0.0220	0.00010	mg/L	0.0200		110	80-120			
Aluminum, dissolved	0.0223	0.0050	mg/L	0.0199		112	80-120			
Antimony, dissolved	0.0197	0.00020	mg/L	0.0200		98	80-120			
Arsenic, dissolved	0.0219	0.00050	mg/L	0.0200		110	80-120			
Barium, dissolved	0.0199	0.0050	mg/L	0.0198		100	80-120			
Beryllium, dissolved	0.0223	0.00010	mg/L	0.0198		112	80-120			
Bismuth, dissolved	0.0197	0.00010	mg/L	0.0200		98	80-120			
Boron, dissolved	< 0.0500	0.0500	mg/L	0.0200		118	80-120			
Cadmium, dissolved	0.0203	0.000010	mg/L	0.0199		102	80-120			
Calcium, dissolved	2.05	0.20	mg/L	2.02		102	80-120			
Chromium, dissolved	0.0214	0.00050	mg/L	0.0198		108	80-120			
Cobalt, dissolved	0.0208	0.00010	mg/L	0.0199		104	80-120			
Copper, dissolved	0.0210	0.00040	mg/L	0.0200		105	80-120			
Iron, dissolved	2.08	0.010	mg/L	2.02		103	80-120			
Lead, dissolved	0.0193	0.00020	mg/L	0.0199		97	80-120			
Magnesium, dissolved	2.06	0.010	mg/L	2.02		102	80-120			
Manganese, dissolved	0.0200	0.00020	mg/L	0.0199		101	80-120			
Molybdenum, dissolved	0.0195	0.00010	mg/L	0.0200		98	80-120			
Nickel, dissolved	0.0216	0.00040	mg/L	0.0200		108	80-120			

APPENDIX 2: QUALITY CONTROL RESULTS

REPORTED TO	Allterra Construction	**WORK ORDER**	0073181
PROJECT	P17-932	**REPORTED**	2020-08-12 15:54

Analyte	Result	RL	Units	Spike Level	Source Result	% REC	REC Limit	% RPD	RPD Limit	Qualifier
Dissolved Metals, Batch B0H0624, Continued										
LCS (B0H0624-BS1), Continued				Prepared: 2020-08-09, Analyzed: 2020-08-09						
Phosphorus, dissolved	1.98	0.050	mg/L	2.00		99	80-120			
Potassium, dissolved	2.02	0.10	mg/L	2.02		100	80-120			
Selenium, dissolved	0.0209	0.00050	mg/L	0.0200		104	80-120			
Silicon, dissolved	2.4	1.0	mg/L	2.00		120	80-120			
Silver, dissolved	0.0199	0.000050	mg/L	0.0200		100	80-120			
Sodium, dissolved	2.01	0.10	mg/L	2.02		100	80-120			
Strontium, dissolved	0.0205	0.0010	mg/L	0.0200		103	80-120			
Sulfur, dissolved	6.0	3.0	mg/L	5.00		119	80-120			
Tellurium, dissolved	0.0210	0.00050	mg/L	0.0200		105	80-120			
Thallium, dissolved	0.0196	0.000020	mg/L	0.0199		99	80-120			
Thorium, dissolved	0.0180	0.00010	mg/L	0.0200		90	80-120			
Tin, dissolved	0.0197	0.00020	mg/L	0.0200		98	80-120			
Titanium, dissolved	0.0218	0.0050	mg/L	0.0200		109	80-120			
Tungsten, dissolved	0.0177	0.0010	mg/L	0.0200		89	80-120			
Uranium, dissolved	0.0197	0.000020	mg/L	0.0200		99	80-120			
Vanadium, dissolved	0.0210	0.0010	mg/L	0.0200		105	80-120			
Zinc, dissolved	0.0233	0.0040	mg/L	0.0200		117	80-120			
Zirconium, dissolved	0.0200	0.00010	mg/L	0.0200		100	80-120			
Reference (B0H0624-SRM1)				Prepared: 2020-08-09, Analyzed: 2020-08-09						
Lithium, dissolved	0.115	0.00010	mg/L	0.100		115	70-130			
Aluminum, dissolved	0.264	0.0050	mg/L	0.235		112	70-130			
Antimony, dissolved	0.0451	0.00020	mg/L	0.0431		105	70-130			
Arsenic, dissolved	0.492	0.00050	mg/L	0.423		116	70-130			
Barium, dissolved	3.01	0.0050	mg/L	3.30		91	70-130			
Beryllium, dissolved	0.241	0.00010	mg/L	0.209		115	70-130			
Boron, dissolved	1.51	0.0500	mg/L	1.65		91	70-130			
Cadmium, dissolved	0.227	0.000010	mg/L	0.221		103	70-130			
Calcium, dissolved	8.13	0.20	mg/L	7.72		105	70-130			
Chromium, dissolved	0.468	0.00050	mg/L	0.434		108	70-130			
Cobalt, dissolved	0.134	0.00010	mg/L	0.124		108	70-130			
Copper, dissolved	0.884	0.00040	mg/L	0.815		108	70-130			
Iron, dissolved	1.35	0.010	mg/L	1.27		106	70-130			
Lead, dissolved	0.108	0.00020	mg/L	0.110		99	70-130			
Magnesium, dissolved	7.09	0.010	mg/L	6.59		108	70-130			
Manganese, dissolved	0.361	0.00020	mg/L	0.342		105	70-130			
Molybdenum, dissolved	0.417	0.00010	mg/L	0.404		103	70-130			
Nickel, dissolved	0.900	0.00040	mg/L	0.835		108	70-130			
Phosphorus, dissolved	0.612	0.050	mg/L	0.499		123	70-130			
Potassium, dissolved	3.18	0.10	mg/L	2.88		110	70-130			
Selenium, dissolved	0.0364	0.00050	mg/L	0.0324		112	70-130			
Sodium, dissolved	19.5	0.10	mg/L	18.0		108	70-130			
Strontium, dissolved	0.954	0.0010	mg/L	0.935		102	70-130			
Thallium, dissolved	0.0388	0.000020	mg/L	0.0385		101	70-130			
Uranium, dissolved	0.240	0.000020	mg/L	0.258		93	70-130			
Vanadium, dissolved	0.920	0.0010	mg/L	0.873		105	70-130			
Zinc, dissolved	1.00	0.0040	mg/L	0.848		118	70-130			
General Parameters, Batch B0H0106										
Blank (B0H0106-BLK1)				Prepared: 2020-08-04, Analyzed: 2020-08-04						
Turbidity	< 0.10	0.10	NTU							
LCS (B0H0106-BS1)				Prepared: 2020-08-04, Analyzed: 2020-08-04						
Turbidity	37.2	0.10	NTU	40.0		93	90-110			

APPENDIX 2: QUALITY CONTROL RESULTS

REPORTED TO Allterra Construction
PROJECT P17-932

WORK ORDER 0073181
REPORTED 2020-08-12 15:54

Analyte	Result	RL	Units	Spike Level	Source Result	% REC	REC Limit	% RPD	RPD Limit	Qualifier
General Parameters, Batch B0H0106, Continued										
Duplicate (B0H0106-DUP1)		**Source: 0073181-01**		Prepared: 2020-08-04, Analyzed: 2020-08-04						
Turbidity	0.52	0.10	NTU		0.50			3	15	
General Parameters, Batch B0H0200										
Blank (B0H0200-BLK1)				Prepared: 2020-08-05, Analyzed: 2020-08-05						
Solids, Total Suspended	< 2.0	2.0	mg/L							
Blank (B0H0200-BLK2)				Prepared: 2020-08-05, Analyzed: 2020-08-05						
Solids, Total Suspended	< 2.0	2.0	mg/L							
LCS (B0H0200-BS1)				Prepared: 2020-08-05, Analyzed: 2020-08-05						
Solids, Total Suspended	91.0	10.0	mg/L	100		91	85-115			
LCS (B0H0200-BS2)				Prepared: 2020-08-05, Analyzed: 2020-08-05						
Solids, Total Suspended	99.0	10.0	mg/L	100		99	85-115			
General Parameters, Batch B0H0277										
Blank (B0H0277-BLK1)				Prepared: 2020-08-05, Analyzed: 2020-08-05						
Alkalinity, Total (as CaCO3)	< 1.0	1.0	mg/L							
Alkalinity, Phenolphthalein (as CaCO3)	< 1.0	1.0	mg/L							
Alkalinity, Bicarbonate (as CaCO3)	< 1.0	1.0	mg/L							
Alkalinity, Carbonate (as CaCO3)	< 1.0	1.0	mg/L							
Alkalinity, Hydroxide (as CaCO3)	< 1.0	1.0	mg/L							
Conductivity (EC)	< 2.0	2.0	µS/cm							
Blank (B0H0277-BLK2)				Prepared: 2020-08-05, Analyzed: 2020-08-05						
Alkalinity, Total (as CaCO3)	< 1.0	1.0	mg/L							
Alkalinity, Phenolphthalein (as CaCO3)	< 1.0	1.0	mg/L							
Alkalinity, Bicarbonate (as CaCO3)	< 1.0	1.0	mg/L							
Alkalinity, Carbonate (as CaCO3)	< 1.0	1.0	mg/L							
Alkalinity, Hydroxide (as CaCO3)	< 1.0	1.0	mg/L							
Conductivity (EC)	< 2.0	2.0	µS/cm							
LCS (B0H0277-BS1)				Prepared: 2020-08-05, Analyzed: 2020-08-05						
Alkalinity, Total (as CaCO3)	102	1.0	mg/L	100		102	80-120			
LCS (B0H0277-BS2)				Prepared: 2020-08-05, Analyzed: 2020-08-05						
Alkalinity, Total (as CaCO3)	102	1.0	mg/L	100		102	80-120			
LCS (B0H0277-BS3)				Prepared: 2020-08-05, Analyzed: 2020-08-05						
Conductivity (EC)	1420	2.0	µS/cm	1410		101	95-104			
LCS (B0H0277-BS4)				Prepared: 2020-08-05, Analyzed: 2020-08-05						
Conductivity (EC)	1430	2.0	µS/cm	1410		102	95-104			
Reference (B0H0277-SRM1)				Prepared: 2020-08-06, Analyzed: 2020-08-06						
pH	6.99	0.10	pH units	7.01		100	98-102			
Reference (B0H0277-SRM2)				Prepared: 2020-08-05, Analyzed: 2020-08-05						
pH	7.00	0.10	pH units	7.01		100	98-102			
General Parameters, Batch B0H0531										
Blank (B0H0531-BLK1)				Prepared: 2020-08-07, Analyzed: 2020-08-07						
Solids, Total Dissolved	< 15	15	mg/L							

APPENDIX 2: QUALITY CONTROL RESULTS

REPORTED TO	Allterra Construction	**WORK ORDER**	0073181
PROJECT	P17-932	**REPORTED**	2020-08-12 15:54

Analyte	Result	RL	Units	Spike Level	Source Result	% REC	REC Limit	% RPD	RPD Limit	Qualifier
General Parameters, Batch B0H0531, Continued										
LCS (B0H0531-BS1)				Prepared: 2020-08-07, Analyzed: 2020-08-07						
Solids, Total Dissolved	228	15	mg/L	240		95	85-115			
Polycyclic Aromatic Hydrocarbons (PAH), Batch B0H0286										
Blank (B0H0286-BLK1)				Prepared: 2020-08-05, Analyzed: 2020-08-05						
Acenaphthene	< 0.050	0.050	µg/L							
Acenaphthylene	< 0.200	0.200	µg/L							
Acridine	< 0.050	0.050	µg/L							
Anthracene	< 0.010	0.010	µg/L							
Benz(a)anthracene	< 0.010	0.010	µg/L							
Benzo(a)pyrene	< 0.010	0.010	µg/L							
Benzo(b+j)fluoranthene	< 0.050	0.050	µg/L							
Benzo(g,h,i)perylene	< 0.050	0.050	µg/L							
Benzo(k)fluoranthene	< 0.050	0.050	µg/L							
2-Chloronaphthalene	< 0.100	0.100	µg/L							
Chrysene	< 0.050	0.050	µg/L							
Dibenz(a,h)anthracene	< 0.010	0.010	µg/L							
Fluoranthene	< 0.030	0.030	µg/L							
Fluorene	< 0.050	0.050	µg/L							
Indeno(1,2,3-cd)pyrene	< 0.050	0.050	µg/L							
1-Methylnaphthalene	< 0.100	0.100	µg/L							
2-Methylnaphthalene	< 0.100	0.100	µg/L							
Naphthalene	< 0.200	0.200	µg/L							
Phenanthrene	< 0.100	0.100	µg/L							
Pyrene	< 0.020	0.020	µg/L							
Quinoline	< 0.050	0.050	µg/L							
Surrogate: Acridine-d9	*2.29*		*µg/L*	4.47		*51*	*50-140*			
Surrogate: Naphthalene-d8	*3.76*		*µg/L*	4.47		*84*	*50-140*			
Surrogate: Perylene-d12	*3.49*		*µg/L*	4.47		*78*	*50-140*			
LCS (B0H0286-BS1)				Prepared: 2020-08-05, Analyzed: 2020-08-05						
Acenaphthene	3.51	0.050	µg/L	4.44		79	55-137			
Acenaphthylene	3.66	0.200	µg/L	4.44		82	53-140			
Acridine	2.39	0.050	µg/L	4.44		54	50-120			
Anthracene	3.45	0.010	µg/L	4.44		78	64-130			
Benz(a)anthracene	3.28	0.010	µg/L	4.44		74	57-140			
Benzo(a)pyrene	3.59	0.010	µg/L	4.44		81	63-133			
Benzo(b+j)fluoranthene	7.45	0.050	µg/L	8.89		84	60-129			
Benzo(g,h,i)perylene	3.88	0.050	µg/L	4.44		87	52-139			
Benzo(k)fluoranthene	3.22	0.050	µg/L	4.44		72	50-138			
2-Chloronaphthalene	3.30	0.100	µg/L	4.38		75	50-139			
Chrysene	3.20	0.050	µg/L	4.44		72	59-140			
Dibenz(a,h)anthracene	3.63	0.010	µg/L	4.44		82	53-136			
Fluoranthene	3.65	0.030	µg/L	4.44		82	67-135			
Fluorene	3.35	0.050	µg/L	4.44		75	57-134			
Indeno(1,2,3-cd)pyrene	3.87	0.050	µg/L	4.44		87	52-129			
1-Methylnaphthalene	3.26	0.100	µg/L	4.44		73	50-140			
2-Methylnaphthalene	3.42	0.100	µg/L	4.44		77	50-140			
Naphthalene	3.60	0.200	µg/L	4.44		81	50-140			
Phenanthrene	3.74	0.100	µg/L	4.44		84	61-134			
Pyrene	3.64	0.020	µg/L	4.44		82	66-131			
Quinoline	9.04	0.050	µg/L	4.44		204	50-140			SPK1
Surrogate: Acridine-d9	*2.39*		*µg/L*	4.47		*54*	*50-140*			
Surrogate: Naphthalene-d8	*3.52*		*µg/L*	4.47		*79*	*50-140*			
Surrogate: Perylene-d12	*3.21*		*µg/L*	4.47		*72*	*50-140*			

APPENDIX 2: QUALITY CONTROL RESULTS

REPORTED TO Allterra Construction
PROJECT P17-932
WORK ORDER 0073181
REPORTED 2020-08-12 15:54

Analyte	Result	RL	Units	Spike Level	Source Result	% REC	REC Limit	% RPD	RPD Limit	Qualifier
Polycyclic Aromatic Hydrocarbons (PAH), Batch B0H0286, Continued										
LCS Dup (B0H0286-BSD1)				Prepared: 2020-08-05, Analyzed: 2020-08-05						
Acenaphthene	3.48	0.050	µg/L	4.44		78	55-137	< 1	18	
Acenaphthylene	3.62	0.200	µg/L	4.44		81	53-140	1	20	
Acridine	2.41	0.050	µg/L	4.44		54	50-120	< 1	30	
Anthracene	3.45	0.010	µg/L	4.44		78	64-130	< 1	15	
Benz(a)anthracene	3.27	0.010	µg/L	4.44		74	57-140	< 1	25	
Benzo(a)pyrene	3.61	0.010	µg/L	4.44		81	63-133	< 1	18	
Benzo(b+j)fluoranthene	7.44	0.050	µg/L	8.89		84	60-129	< 1	17	
Benzo(g,h,i)perylene	3.89	0.050	µg/L	4.44		87	52-139	< 1	22	
Benzo(k)fluoranthene	3.22	0.050	µg/L	4.44		72	50-138	< 1	26	
2-Chloronaphthalene	3.22	0.100	µg/L	4.38		74	50-139	2	23	
Chrysene	3.20	0.050	µg/L	4.44		72	59-140	< 1	23	
Dibenz(a,h)anthracene	3.65	0.010	µg/L	4.44		82	53-136	< 1	21	
Fluoranthene	3.68	0.030	µg/L	4.44		83	67-135	< 1	18	
Fluorene	3.34	0.050	µg/L	4.44		75	57-134	< 1	18	
Indeno(1,2,3-cd)pyrene	3.84	0.050	µg/L	4.44		87	52-129	< 1	21	
1-Methylnaphthalene	3.21	0.100	µg/L	4.44		72	50-140	1	20	
2-Methylnaphthalene	3.41	0.100	µg/L	4.44		77	50-140	< 1	21	
Naphthalene	3.55	0.200	µg/L	4.44		80	50-140	2	22	
Phenanthrene	3.75	0.100	µg/L	4.44		84	61-134	< 1	17	
Pyrene	3.70	0.020	µg/L	4.44		83	66-131	2	19	
Quinoline	9.81	0.050	µg/L	4.44		221	50-140	8	14	SPK1
Surrogate: Acridine-d9	*2.42*		*µg/L*	4.47		*54*	*50-140*			
Surrogate: Naphthalene-d8	*3.44*		*µg/L*	4.47		*77*	*50-140*			
Surrogate: Perylene-d12	*3.21*		*µg/L*	4.47		*72*	*50-140*			
Total Metals, Batch B0H0495										
Blank (B0H0495-BLK1)				Prepared: 2020-08-07, Analyzed: 2020-08-08						
Aluminum, total	< 0.0050	0.0050	mg/L							
Antimony, total	< 0.00020	0.00020	mg/L							
Arsenic, total	< 0.00050	0.00050	mg/L							
Barium, total	< 0.0050	0.0050	mg/L							
Beryllium, total	< 0.00010	0.00010	mg/L							
Bismuth, total	< 0.00010	0.00010	mg/L							
Boron, total	< 0.0500	0.0500	mg/L							
Cadmium, total	< 0.000010	0.000010	mg/L							
Calcium, total	< 0.20	0.20	mg/L							
Chromium, total	< 0.00050	0.00050	mg/L							
Cobalt, total	< 0.00010	0.00010	mg/L							
Copper, total	< 0.00040	0.00040	mg/L							
Iron, total	< 0.010	0.010	mg/L							
Lead, total	< 0.00020	0.00020	mg/L							
Lithium, total	< 0.00010	0.00010	mg/L							
Magnesium, total	< 0.010	0.010	mg/L							
Manganese, total	< 0.00020	0.00020	mg/L							
Molybdenum, total	< 0.00010	0.00010	mg/L							
Nickel, total	< 0.00040	0.00040	mg/L							
Phosphorus, total	< 0.050	0.050	mg/L							
Potassium, total	< 0.10	0.10	mg/L							
Selenium, total	< 0.00050	0.00050	mg/L							
Silicon, total	< 1.0	1.0	mg/L							
Silver, total	< 0.000050	0.000050	mg/L							
Sodium, total	< 0.10	0.10	mg/L							
Strontium, total	< 0.0010	0.0010	mg/L							
Sulfur, total	< 3.0	3.0	mg/L							
Tellurium, total	< 0.00050	0.00050	mg/L							

APPENDIX 2: QUALITY CONTROL RESULTS

REPORTED TO	Allterra Construction	**WORK ORDER**	0073181
PROJECT	P17-932	**REPORTED**	2020-08-12 15:54

Analyte	Result	RL	Units	Spike Level	Source Result	% REC	REC Limit	% RPD	RPD Limit	Qualifier
Total Metals, Batch B0H0495, Continued										
Blank (B0H0495-BLK1), Continued				Prepared: 2020-08-07, Analyzed: 2020-08-08						
Thallium, total	< 0.000020	0.000020	mg/L							
Thorium, total	< 0.00010	0.00010	mg/L							
Tin, total	< 0.00020	0.00020	mg/L							
Titanium, total	< 0.0050	0.0050	mg/L							
Tungsten, total	< 0.0010	0.0010	mg/L							
Uranium, total	< 0.000020	0.000020	mg/L							
Vanadium, total	< 0.0010	0.0010	mg/L							
Zinc, total	< 0.0040	0.0040	mg/L							
Zirconium, total	< 0.00010	0.00010	mg/L							
LCS (B0H0495-BS1)				Prepared: 2020-08-07, Analyzed: 2020-08-08						
Aluminum, total	0.0215	0.0050	mg/L	0.0199		108	80-120			
Antimony, total	0.0219	0.00020	mg/L	0.0200		110	80-120			
Arsenic, total	0.0212	0.00050	mg/L	0.0200		106	80-120			
Barium, total	0.0209	0.0050	mg/L	0.0198		106	80-120			
Beryllium, total	0.0217	0.00010	mg/L	0.0198		110	80-120			
Bismuth, total	0.0210	0.00010	mg/L	0.0200		105	80-120			
Boron, total	< 0.0500	0.0500	mg/L	0.0200		120	80-120			
Cadmium, total	0.0207	0.000010	mg/L	0.0199		104	80-120			
Calcium, total	2.07	0.20	mg/L	2.02		102	80-120			
Chromium, total	0.0209	0.00050	mg/L	0.0198		106	80-120			
Cobalt, total	0.0209	0.00010	mg/L	0.0199		105	80-120			
Copper, total	0.0218	0.00040	mg/L	0.0200		109	80-120			
Iron, total	2.06	0.010	mg/L	2.02		102	80-120			
Lead, total	0.0206	0.00020	mg/L	0.0199		103	80-120			
Lithium, total	0.0213	0.00010	mg/L	0.0200		107	80-120			
Magnesium, total	2.22	0.010	mg/L	2.02		110	80-120			
Manganese, total	0.0219	0.00020	mg/L	0.0199		110	80-120			
Molybdenum, total	0.0209	0.00010	mg/L	0.0200		104	80-120			
Nickel, total	0.0215	0.00040	mg/L	0.0200		107	80-120			
Phosphorus, total	2.02	0.050	mg/L	2.00		101	80-120			
Potassium, total	2.20	0.10	mg/L	2.02		109	80-120			
Selenium, total	0.0214	0.00050	mg/L	0.0200		107	80-120			
Silicon, total	2.4	1.0	mg/L	2.00		118	80-120			
Silver, total	0.0209	0.000050	mg/L	0.0200		104	80-120			
Sodium, total	2.24	0.10	mg/L	2.02		111	80-120			
Strontium, total	0.0218	0.0010	mg/L	0.0200		109	80-120			
Sulfur, total	4.6	3.0	mg/L	5.00		92	80-120			
Tellurium, total	0.0206	0.00050	mg/L	0.0200		103	80-120			
Thallium, total	0.0209	0.000020	mg/L	0.0199		105	80-120			
Thorium, total	0.0197	0.00010	mg/L	0.0200		99	80-120			
Tin, total	0.0216	0.00020	mg/L	0.0200		108	80-120			
Titanium, total	0.0207	0.0050	mg/L	0.0200		103	80-120			
Tungsten, total	0.0205	0.0010	mg/L	0.0200		102	80-120			
Uranium, total	0.0206	0.000020	mg/L	0.0200		103	80-120			
Vanadium, total	0.0199	0.0010	mg/L	0.0200		100	80-120			
Zinc, total	0.0211	0.0040	mg/L	0.0200		106	80-120			
Zirconium, total	0.0207	0.00010	mg/L	0.0200		103	80-120			
Reference (B0H0495-SRM1)				Prepared: 2020-08-07, Analyzed: 2020-08-08						
Aluminum, total	0.294	0.0050	mg/L	0.299		98	70-130			
Antimony, total	0.0534	0.00020	mg/L	0.0517		103	70-130			
Arsenic, total	0.131	0.00050	mg/L	0.119		110	70-130			
Barium, total	0.812	0.0050	mg/L	0.801		101	70-130			
Beryllium, total	0.0549	0.00010	mg/L	0.0501		110	70-130			
Boron, total	3.62	0.0500	mg/L	4.11		88	70-130			
Cadmium, total	0.0523	0.000010	mg/L	0.0503		104	70-130			

APPENDIX 2: QUALITY CONTROL RESULTS

REPORTED TO	Allterra Construction	**WORK ORDER**	0073181
PROJECT	P17-932	**REPORTED**	2020-08-12 15:54

Analyte	Result	RL	Units	Spike Level	Source Result	% REC	REC Limit	% RPD	RPD Limit	Qualifier
Total Metals, Batch B0H0495, Continued										
Reference (B0H0495-SRM1), Continued				Prepared: 2020-08-07, Analyzed: 2020-08-08						
Calcium, total	10.5	0.20	mg/L	10.7		99	70-130			
Chromium, total	0.260	0.00050	mg/L	0.250		104	70-130			
Cobalt, total	0.0409	0.00010	mg/L	0.0384		106	70-130			
Copper, total	0.517	0.00040	mg/L	0.487		106	70-130			
Iron, total	0.514	0.010	mg/L	0.504		102	70-130			
Lead, total	0.288	0.00020	mg/L	0.278		104	70-130			
Lithium, total	0.438	0.00010	mg/L	0.398		110	70-130			
Magnesium, total	3.89	0.010	mg/L	3.59		108	70-130			
Manganese, total	0.113	0.00020	mg/L	0.111		102	70-130			
Molybdenum, total	0.208	0.00010	mg/L	0.196		106	70-130			
Nickel, total	0.264	0.00040	mg/L	0.248		106	70-130			
Phosphorus, total	0.251	0.050	mg/L	0.213		118	70-130			
Potassium, total	6.41	0.10	mg/L	5.89		109	70-130			
Selenium, total	0.132	0.00050	mg/L	0.120		110	70-130			
Sodium, total	9.52	0.10	mg/L	8.71		109	70-130			
Strontium, total	0.413	0.0010	mg/L	0.393		105	70-130			
Thallium, total	0.0819	0.000020	mg/L	0.0787		104	70-130			
Uranium, total	0.0339	0.000020	mg/L	0.0344		99	70-130			
Vanadium, total	0.403	0.0010	mg/L	0.391		103	70-130			
Zinc, total	2.73	0.0040	mg/L	2.50		109	70-130			

QC Qualifiers:

SPK1 The recovery of this analyte was outside of established control limits. The data was accepted based on performance of other batch QC.

CARO ANALYTICAL SERVICES
Caring About Results... Obviously

Clear Form | Print a Copy | Save a Copy | CARO Website | CARO BC COC, Rev 2015-09

CHAIN OF CUSTODY RECORD

COC# _____ PAGE 1 OF 1

RELINQUISHED BY:	DATE:	RECEIVED BY:	DATE:
Joel Clarkston	2020 07 30	MAX. Express TL	07/31
	TIME: 14:30		TIME: 7:00

PROJECT: 17-932

PROJECT INFO:

REPORT TO:
COMPANY: Allterra Construction Ltd.
ADDRESS: 2158 Millstream Rd
Victoria BC V9B 6H9
CONTACT:
TEL/FAX:
DELIVERY METHOD: EMAIL ☑ MAIL ☐ OTHER* ☐
DATA FORMAT: EXCEL ☑ WATERTRAX ☐ ESdat ☐ EQuIS ☐ BC EMS ☐ OTHER* ☐
EMAIL 1: Raymond@allterraconstruction.ca
EMAIL 2: Rgaidhar@islanderengineering.com
EMAIL 3: sbabulic@islanderengineering.com

INVOICE TO: SAME AS REPORT TO ☑
COMPANY:
ADDRESS:
CONTACT:
TEL/FAX:
DELIVERY METHOD: EMAIL ☐ MAIL ☐ OTHER* ☐
EMAIL 1:
EMAIL 2:
EMAIL 3:
PO #: 17-932

** NEW ** If you would like to sign up for ClientConnect and/or EnviroChain, CARO's online service offerings, check here: ☐

TURNAROUND TIME REQUESTED:
Routine: (5-7 Days) ☑
Rush: 1 Day* ☐ 2 Day* ☐ 3 Day* ☐
Other* _____
*Contact Lab To Confirm. Surcharge May Apply

REGULATORY APPLICATION:
Canadian Drinking Water Quality Guidelines ☐
BC Drinking Water Protection Act / Reg. ☐
BC CSR ☐ AB TIER 1 ☐ CCME ☐ OTHER* ☐
AL ☐ PL ☐ RL ☐ CL ☐ IL ☐ AW ☐ IW ☐ LW ☐
Regs on Report? ☐

SAMPLED BY: JC

CLIENT SAMPLE ID:	MATRIX: DRINKING WATER	OTHER WATER	SOIL	OTHER	# CONTAINERS	SAMPLING: DATE DD-MMM-YY	TIME HH:MM	COMMENTS: CHLORINATED	FILTERED	PRESERVED	(e.g. flow/volume media ID/notes)
SW1		X			5	30-07-20	09:50		✓	✓	

ANALYSES REQUESTED:

CLIENT SAMPLE ID:	BTEX ☐ VPH ☐ PHC F1 ☐	VOC ☐ VPH ☐	EPH ☐ PHC F2-F4 ☐	PAH ☐ L/HEPH ☐	PHENOLS Chlorinated ☐ Non-Chlor. ☐	PCB ☐ GLYCOLS ☐ HAA ☐	PESTICIDES ☐ ACID HERBICIDES ☐	METALS - WATER TOTAL ☐ Hg	METALS - WATER DISSOLVED ☐ Hg	METALS - SOIL (SALM) ☐ inc. pH ☐	pH ☐ EC ☐ ALK ☐	TSS ☐ VSS ☐ TDS ☐	BOD ☐ COD ☐	TOG ☐ MOG ☐	FECAL COLIFORMS ☐ HPC ☐	TOTAL COLIFORMS ☐ E. coli ☐	ASBESTOS	HARDNESS	TURBIDITY	ANIONS & NUTRIENTS					HOLD
SW1				X				X	X		X	X						X	X	X					

SHIPPING INSTRUCTIONS: Return Cooler(s) ☐
Supplies Needed:

SAMPLE RETENTION INSTRUCTIONS (Discarded 30 days after Report unless otherwise specified):
60 Days ☐ 90 Days ☐ Longer Date (Surcharges will Apply): _____
*** OTHER INSTRUCTIONS:**

PAYMENT:
CHEQUE ☐
CREDIT ☐
DEBIT ☐
CASH ☐
INVOICE ☐

SAMPLE RECEIPT CONDITION:
COOLER 1 (°C): 13.8 ICE: Y ☑ N ☐
COOLER 2 (°C): _____ ICE: Y ☐ N ☐
COOLER 3 (°C): _____ ICE: Y ☐ N ☐
CUSTODY SEALS INTACT: NA ☐ Y ☐ N ☐