CERTIFICATE OF ANALYSIS ▪ COVER PAGE

Global ARD Testing Services Inc.

CLIENT INFORMATION	
Client:	Upland Contracting Ltd.
Consulting Client:	N/A
Project Manager:	Katrina Laviolette
Email Address:	katrina.laviolette@uplandgroup.ca
Mailing Address:	7295 Gold River Highway
	Campbell River, BC, V9H 1P1
Fax No:	(250) 286-1148

COMPANY INFORMATION	
Legal Name:	Global ARD Testing Services Inc.
Mailing Address:	6891 Antrim Avenue, Burnaby, BC, Canada, V5J 4M5.
Contact No:	Main: (604) 428-2730
	Alternate: (604) 603-1359

PROJECT INFORMATION	
Project Name:	Heber River Bridge
Project Number:	4111

RESULTS		
Reported To:	**1**	Katrina Laviolette (katrina.laviolette@uplandgroup.ca)
	2	
	3	
cc:		
Date Reported:	**V1:**	December 2, 2021
	V2:	February 8, 2022

REPORT INFORMATION	
Global Project No:	2172
Report Version:	2
Pages (Including Cover):	4
Report Title:	COA 1 Heber River Bridge Sample (rec'd 4-Nov21)
Analysis Reviewed By:	Prab Bhatia (PBhatia@globalARDtesting.com)
Position:	Project Manager
Report Certified By:	Prab Bhatia
Signature:	

INVOICE		
Submitted To:	**1**	Katrina Laviolette (katrina.laviolette@uplandgroup.ca)
	2	
cc:		
Global Invoice No:		ARD2172-1221A
Date Submitted:		December 2, 2021

NOTES
All samples are stored at no charge for 90 days past reporting date.
HCT, column, custom leach columns (Lysimeters) & SAD column samples
will be stored free for 90 days past kinetic testing program or Closedown.
Please contact the lab if you require additional sample storage time.
Storage charges will apply.

CERTIFICATE OF ANALYSIS ▪ SAMPLE DETAILS

Global ARD Testing Services Inc.

GLOBAL PROJECT NO: 2172

CLIENT: Upland Contracting Ltd.

PROJECT NAME / NO: Heber River Bridge / 4111

REPORT VERSION: 2

S. No.	Sample ID	Sample Type	Condition	Wt. of Sample Rec'd (kg)	Global Notes (if any)
1	Sample-1	Fines	Damp	1.05	

Total wt. of sample rec'd (kg): ***1.05***

SAMPLE RECEIPT INFO:	
Date Samples Received:	November 4, 2021
No. of Samples Received:	1
Samples Received By:	Jeff

ANALYTICAL INSTRUCTIONS:	
From:	Katrina Laviolette
Date:	November 4, 2021

CERTIFICATE OF ANALYSIS ▪ ABA RESULTS

Global ARD Testing Services Inc.

GLOBAL PROJECT NO: 2172
CLIENT: Upland Contracting Ltd.
PROJECT NAME / NO: Heber River Bridge / 4111
REPORT VERSION: 2

S. No.	Sample ID	Paste pH	Fizz Rating	Total Inorganic C	$CaCO_3$ Equivalents*1	Total Sulphur	Sulphate Sulphur	Sulphide Sulphur*2	AP*3	Mod. ABA NP	NNP*4	NPR*5
	Units:	**pH Units**		**wt %**	**kg CaCO3/tonne**	**wt.%**	**wt %**	**wt %**		**kg CaCO3/tonne**		
	Reported Detection Limit:	***0.01***		***0.02***	***1.7***	**0.025**	***0.01***	***0.01***	**0.3**	***0.5***		
1	Sample-1	7.9	None	<0.020	<1.7	<0.025	0.01	<0.01	<0.3	6.5	6.5	N/A
QUALITY ASSURANCE / QUALITY CONTROL												
Replicates:												
Certified Reference Material (CRM) Analysis:												
Certified Reference Material		KZK-1		CaCO3		KZK-1	RTS-3a			1) KZK-1 (Slight) 2) KZK-1 (Moderate)		
CRM True Value		**8.80**		**12.00**		**0.80**	**1.10**			**1) 58.9 2) 61.6**		
Reference Material Results		8.86		10.44		0.76	1.03			1) 59.2 2) N/A		
Tolerance (+/-) or Acceptance Range		***0.09***		***90% - 110%***		***80% - 120%***	***0.20***			***1) 1.1 2) 3.4***		
Method Blank Analysis:												
Method Blank Results				<0.02		<0.025	<0.01					
GLOBAL SOP No. / METHOD:		*ARD-004*	*ARD-005*	*HCl Leach/by CO2-Coulometer*	*Calc.*	*LECO*	*ARD-013 (HCl leach)*	*Calc.*	*Calc.*	*ARD-005*	*Calc.*	*Calc.*

NOTES:
Job No: 21V839735

Date of Analysis: November 23, 2021
pH of DI water (pH Units): 5.61
EC of DI water (µS/cm): 1.03

METHOD:
Total sulphur by Leco.
Total Inorganic Carbon (TIC): HCl leach, evolved CO_2 analysed by CO_2 Coulometer.

ABBREVIATIONS:
R = Rep = Replicate (a replicate is a sub-sample scooped from a single pulp sample bag produced per client sample)
D = Dup = Duplicate (a duplicate is 2nd sub-pulp sample bag produced by processing a 2nd split of the client sample. A duplicate pulp sample is prepared only at client request.
EC = Electric Conductivity
NP = Neutralization Potential
Calc. = Calculation
IND = Indeterminate
COA = Certificate Of Analysis
N/A = Not Applicable
NR = Not Reported

CALCULATIONS:
*1 $CaCO_3$ Equivalents: Is based on TIC (Total Inorganic Carbon)
*2 Sulphide-Sulphur: Total sulphur - Sulphate sulphur
*3 AP (Acid Potential): Sulphide-sulphur x 31.25
*4 NNP (Net Neutralization Potential): NP - AP
*5 NPR (Neutralization Potential Ratio): NP/AP

REFERENCES:
Sample Preparation: ASTM E877-08; MEND Report 1.20.1, Version 0 (2009)
ABA: Air-dried, jaw-crushed, split by riffling and pulverized to 85% passing 200 mesh (75 µm).
Modified ABA (Sobek) NP: MEND Acid Rock Drainage Prediction Manual, MEND Project 1.16.1b (pages 6.2-11 to 17), March 1991.
Paste pH / Fizz Rating: Sobek, A.A., Schuller, W.A., Freeman, J.R. and Smith, R.M.; US EPA-600/2-78-054 (1978).
Sulphur Speciation: Modified ASTM D2492-02 Method. The S extracted is determined by analysing the extract for SO4 using UV-Vis Spectrophotometer (STD Method 4500-SO42- E).

CERTIFICATE OF ANALYSIS ▪ MEND-SHAKE FLASK EXTRACTION RESULTS

Global
ARD Testing Services Inc.

GLOBAL PROJECT NO: 2172
CLIENT: Upland Contracting Ltd.
PROJECT NAME / NO: Heber River Bridge / 4111
REPORT VERSION: 2

Parameter	Method	Unit	RDL	1 Sample-1	Method blank
On Soil Sample:					
Sulphate	CSA A23.2-2B	%	0.05	<0.050	<0.050
Chloride	CSA A23-2-4B	% dry	0.01	<0.010	<0.010
			ID:	*21K3074-01*	

NOTES:
Job No: 21K3074
Date of Analysis (24 h): December 1, 2021