APPENDIX B1
ALS METHODS AND RESULTS: L686442 (DRILL HOLES)

ALS Laboratory Group
ANALYTICAL CHEMISTRY & TESTING SERVICES

Environmental Division

Certificate of Analysis

RESCAN ENVIRONMENTAL SERVICES

ATTN: ROLF SCHMITT

SIXTH FLOOR
1111 WEST HASTINGS STREET
VANCOUVER BC V6E 2J3

Reported On: 30-OCT-08 05:59 PM
Revision: 1

Lab Work Order #: L691076 **Date Received:** 03-OCT-08

Project P.O. #:
Job Reference: MORRISON 0793-001-15
Legal Site Desc:
CofC Numbers:

Other Information:

Comments: October 30/08- Saturated Paste Extractables data added to L691076-2, -3, -4, -12, -16, -17, -18, -20 and -21. All other results remain unchanged.

GLENYSS WEEKS
Account Manager

ALS LABORATORY GROUP ANALYTICAL REPORT

Grouping	Analyte	Sample ID: L691076-1 Description: DH07-3 SEP 12 -69ft	L691076-2 DH07-9 SPT 10-64ft	L691076-3 DH07-6 SPT 11-74ft	L691076-4 DH07-5 SPT 10-49ft	L691076-5 DH07-7 SPT 10-64ft
SOIL						
Physical Tests	% Moisture (%)		10.1	9.32	7.92	
	pH (pH)	7.94	8.18	8.22	8.24	8.15
Particle Size	% Gravel (>2mm) (%)	15	18	22	15	16
	% Sand (2.0mm - 0.063mm) (%)	55	36	39	50	37
	% Silt (0.063mm - 4um) (%)	20	24	20	23	25
	% Clay (<4um) (%)	11	22	18	13	22
Organic / Inorganic Carbon	CaCO3 Equivalent (%)	4.3	4.3			
	Inorganic Carbon (%)	0.49	0.49			
Saturated Paste Extractables	Calcium (Ca) (mg/kg)		76.8	77.2	83.7	
	Chloride (Cl) (mg/kg)		4.1	4.8	<20	
	Conductivity (dS/m)	2.39	1.28	1.36	1.59	1.42
	Magnesium (Mg) (mg/kg)		18.6	19.1	24.5	
	Potassium (K) (mg/kg)		<9.0	<9.0	<7.0	
	SAR (SAR)		1.96	2.34	1.59	
	% Saturation (%)		45.7	46.7	36.1	
	Sodium (Na) (mg/kg)		50.0	60.7	38.8	
Metals	Aluminum (Al) (mg/kg)	16600	17900	18700	14000	18800
	Antimony (Sb) (mg/kg)	<10	<10	<10	<10	<10
	Arsenic (As) (mg/kg)	17.5	24.9	19.0	16.4	25.8
	Barium (Ba) (mg/kg)	128	184	160	117	208
	Beryllium (Be) (mg/kg)	0.55	0.70	0.67	0.55	0.71
	Bismuth (Bi) (mg/kg)	<20	<20	<20	<20	<20
	Cadmium (Cd) (mg/kg)	0.64	0.61	<0.50	<0.50	0.52
	Calcium (Ca) (mg/kg)	17100	18500	21700	19500	19300
	Chromium (Cr) (mg/kg)	18.6	24.4	22.5	16.4	23.7
	Cobalt (Co) (mg/kg)	10.5	12.8	12.3	9.0	12.4
	Copper (Cu) (mg/kg)	26.9	32.1	30.5	22.9	32.6
	Iron (Fe) (mg/kg)	29900	36200	35600	29800	36500
	Lead (Pb) (mg/kg)	<30	<30	<30	<30	<30
	Lithium (Li) (mg/kg)	14.6	15.2	15.9	11.5	15.9
	Magnesium (Mg) (mg/kg)	6000	8670	9380	6400	8940
	Manganese (Mn) (mg/kg)	826	962	957	758	1050
	Mercury (Hg) (mg/kg)	0.123	0.111	0.107	0.153	0.142
	Molybdenum (Mo) (mg/kg)	<4.0	<4.0	<4.0	<4.0	<4.0
	Nickel (Ni) (mg/kg)	19.0	26.0	22.9	16.2	25.0
	Phosphorus (P) (mg/kg)	690	663	632	638	649
	Potassium (K) (mg/kg)	920	1430	1370	1130	1660
	Selenium (Se) (mg/kg)	<2.0	<2.0	<2.0	<2.0	<2.0

ALS LABORATORY GROUP ANALYTICAL REPORT

Grouping	Analyte	Sample ID: L691076-6 Description: DH07-5 SPT 12-59ft	L691076-7 DH07-3 SPT 5 24ft	L691076-8 DH07-3 SPT SPT 9-44ft	L691076-9 DH07-5 SPT 8-39ft	L691076-10 DH07-2 SPT 13
SOIL						
Physical Tests	% Moisture (%)					
	pH (pH)	8.12	8.00	8.08	7.98	8.00
Particle Size	% Gravel (>2mm) (%)	6	56	7	43	27
	% Sand (2.0mm - 0.063mm) (%)	16	37	44	37	33
	% Silt (0.063mm - 4um) (%)	32	4	30	11	20
	% Clay (<4um) (%)	46	3	20	9	19
Organic / Inorganic Carbon	CaCO3 Equivalent (%)	3.4	1.1			
	Inorganic Carbon (%)	0.38	0.10			
Saturated Paste Extractables	Calcium (Ca) (mg/kg)					
	Chloride (Cl) (mg/kg)					
	Conductivity (dS/m)	0.827	0.826	0.818	2.05	1.06
	Magnesium (Mg) (mg/kg)					
	Potassium (K) (mg/kg)					
	SAR (SAR)					
	% Saturation (%)					
	Sodium (Na) (mg/kg)					
Metals	Aluminum (Al) (mg/kg)	29700	18900	17500	18100	18300
	Antimony (Sb) (mg/kg)	<10	<10	<10	<10	<10
	Arsenic (As) (mg/kg)	14.0	20.7	16.8	15.7	23.9
	Barium (Ba) (mg/kg)	154	221	187	129	159
	Beryllium (Be) (mg/kg)	0.85	0.71	0.67	0.63	0.75
	Bismuth (Bi) (mg/kg)	<20	<20	<20	<20	<20
	Cadmium (Cd) (mg/kg)	<0.50	<0.50	0.50	<0.50	<0.50
	Calcium (Ca) (mg/kg)	18300	14900	11500	23700	14700
	Chromium (Cr) (mg/kg)	34.2	23.9	24.3	16.0	21.5
	Cobalt (Co) (mg/kg)	19.5	12.4	13.0	9.3	12.2
	Copper (Cu) (mg/kg)	51.6	31.3	32.9	25.0	32.5
	Iron (Fe) (mg/kg)	40900	35500	35600	34900	39600
	Lead (Pb) (mg/kg)	<30	<30	<30	<30	<30
	Lithium (Li) (mg/kg)	22.9	14.7	13.7	16.6	14.8
	Magnesium (Mg) (mg/kg)	12200	7490	6660	8680	7340
	Manganese (Mn) (mg/kg)	684	831	839	898	1020
	Mercury (Hg) (mg/kg)	0.110	0.159	0.060	0.078	0.118
	Molybdenum (Mo) (mg/kg)	<4.0	<4.0	<4.0	<4.0	<4.0
	Nickel (Ni) (mg/kg)	35.6	25.9	27.8	14.1	23.6
	Phosphorus (P) (mg/kg)	596	618	670	625	639
	Potassium (K) (mg/kg)	1570	1660	1280	1340	1500
	Selenium (Se) (mg/kg)	<4.0	<2.0	<2.0	<2.0	<2.0

ALS LABORATORY GROUP ANALYTICAL REPORT

Grouping	Analyte	Sample ID: L691076-11 Description: DH07-3 SPT 8-39ft	L691076-12 DH07-2 SPT 11	L691076-13 DH07-3 SPT 6-29ft	L691076-14 DH07-5 SPT 6 29ft	L691076-15 DH07-5 SPT 5-24ft
SOIL						
Physical Tests	% Moisture (%)		13.0			
	pH (pH)	8.04	8.30	8.05	7.98	8.09
Particle Size	% Gravel (>2mm) (%)	14	24	13	28	47
	% Sand (2.0mm - 0.063mm) (%)	41	36	36	40	44
	% Silt (0.063mm - 4um) (%)	26	20	28	18	5
	% Clay (<4um) (%)	19	20	23	14	3
Organic / Inorganic Carbon	CaCO3 Equivalent (%)	2.8				
	Inorganic Carbon (%)	0.30				
Saturated Paste Extractables	Calcium (Ca) (mg/kg)		34.8			
	Chloride (Cl) (mg/kg)		4.4			
	Conductivity (dS/m)	0.977	0.625	0.694	1.42	1.51
	Magnesium (Mg) (mg/kg)		7.30			
	Potassium (K) (mg/kg)		<10			
	SAR (SAR)		2.02			
	% Saturation (%)		53.4			
	Sodium (Na) (mg/kg)		36.7			
Metals	Aluminum (Al) (mg/kg)	18100	20300	20600	19100	18600
	Antimony (Sb) (mg/kg)	<10	<10	<10	<10	<10
	Arsenic (As) (mg/kg)	19.3	22.4	22.3	16.6	20.8
	Barium (Ba) (mg/kg)	233	180	218	136	132
	Beryllium (Be) (mg/kg)	0.68	0.76	0.76	0.63	0.68
	Bismuth (Bi) (mg/kg)	<20	<20	<20	<20	<20
	Cadmium (Cd) (mg/kg)	<0.50	<0.50	<0.50	<0.50	<0.50
	Calcium (Ca) (mg/kg)	13800	15100	18000	22400	23400
	Chromium (Cr) (mg/kg)	25.8	21.9	25.6	15.9	18.6
	Cobalt (Co) (mg/kg)	12.1	12.2	12.9	9.4	10.5
	Copper (Cu) (mg/kg)	31.0	33.1	32.8	31.3	27.6
	Iron (Fe) (mg/kg)	35700	38500	37700	34400	36300
	Lead (Pb) (mg/kg)	<30	<30	<30	<30	<30
	Lithium (Li) (mg/kg)	14.1	15.7	16.1	16.4	16.3
	Magnesium (Mg) (mg/kg)	7020	7380	8060	8070	8380
	Manganese (Mn) (mg/kg)	839	927	922	829	869
	Mercury (Hg) (mg/kg)	0.172	0.138	0.139	0.108	0.092
	Molybdenum (Mo) (mg/kg)	<4.0	<4.0	<4.0	<4.0	<4.0
	Nickel (Ni) (mg/kg)	26.4	24.0	27.3	14.5	17.1
	Phosphorus (P) (mg/kg)	639	669	655	590	656
	Potassium (K) (mg/kg)	1410	1820	1830	1550	1520
	Selenium (Se) (mg/kg)	<2.0	<2.0	<2.0	<2.0	<2.0

ALS LABORATORY GROUP ANALYTICAL REPORT

Grouping	Analyte	Sample ID: L691076-16 Description: DH07-4 SPT 5-24ft	L691076-17 DH07-4 SPT 6-29ft	L691076-18 DH07-2 SPT 9	L691076-19 DH07-4 SPT 8-39ft	L691076-20 DH07-2 SPT 5
SOIL						
Physical Tests	% Moisture (%)	11.9	11.1	10.2		7.92
	pH (pH)	8.00	8.07	8.04	8.01	8.10
Particle Size	% Gravel (>2mm) (%)	11	13	25	10	13
	% Sand (2.0mm - 0.063mm) (%)	37	35	38	48	34
	% Silt (0.063mm - 4um) (%)	24	25	19	21	25
	% Clay (<4um) (%)	28	28	18	21	28
Organic / Inorganic Carbon	CaCO3 Equivalent (%)	3.5		4.2		
	Inorganic Carbon (%)	0.39		0.46		
Saturated Paste Extractables	Calcium (Ca) (mg/kg)	70.0	83.3	55.6		63.7
	Chloride (Cl) (mg/kg)	6.1	3.3	9.5		59.2
	Conductivity (dS/m)	1.09	1.18	0.827	1.09	1.15
	Magnesium (Mg) (mg/kg)	17.2	19.8	13.2		35.0
	Potassium (K) (mg/kg)	<10	<10	<10		<10
	SAR (SAR)	1.42	1.56	1.46		0.85
	% Saturation (%)	48.9	53.6	54.1		52.1
	Sodium (Na) (mg/kg)	35.9	44.7	34.2		24.5
Metals	Aluminum (Al) (mg/kg)	20300	19100	18700	19500	19800
	Antimony (Sb) (mg/kg)	<10	<10	<10	<10	<10
	Arsenic (As) (mg/kg)	20.2	24.9	21.6	24.1	22.9
	Barium (Ba) (mg/kg)	185	184	164	179	203
	Beryllium (Be) (mg/kg)	0.76	0.74	0.71	0.72	0.74
	Bismuth (Bi) (mg/kg)	<20	<20	<20	<20	<20
	Cadmium (Cd) (mg/kg)	0.51	0.54	<0.50	0.52	<0.50
	Calcium (Ca) (mg/kg)	16200	13700	17000	14600	18200
	Chromium (Cr) (mg/kg)	25.7	23.0	20.9	25.6	24.5
	Cobalt (Co) (mg/kg)	13.0	12.8	11.6	13.0	12.5
	Copper (Cu) (mg/kg)	34.3	32.2	30.9	32.9	33.7
	Iron (Fe) (mg/kg)	37800	37900	37400	37200	37200
	Lead (Pb) (mg/kg)	<30	<30	<30	<30	<30
	Lithium (Li) (mg/kg)	16.3	15.4	14.7	15.7	15.1
	Magnesium (Mg) (mg/kg)	8150	7790	7270	7920	8120
	Manganese (Mn) (mg/kg)	928	878	917	852	922
	Mercury (Hg) (mg/kg)	0.130	0.148	0.141	0.131	0.158
	Molybdenum (Mo) (mg/kg)	<4.0	<4.0	<4.0	<4.0	<4.0
	Nickel (Ni) (mg/kg)	27.7	26.1	22.2	27.8	26.1
	Phosphorus (P) (mg/kg)	632	659	651	673	690
	Potassium (K) (mg/kg)	1700	1490	1650	1660	1770
	Selenium (Se) (mg/kg)	<2.0	<2.0	<2.0	<2.0	<2.0

ALS LABORATORY GROUP ANALYTICAL REPORT

Grouping	Analyte	Sample ID: L691076-21 Description: TP08-RS4-9.0M	L691076-22 TP08-RS4-X1-7.5M	L691076-23 TP08-RS7-X1-3.0M		
SOIL						
Physical Tests	% Moisture (%)	10.3				
	pH (pH)	8.57	8.25	5.03		
Particle Size	% Gravel (>2mm) (%)	35	21	56		
	% Sand (2.0mm - 0.063mm) (%)	30	36	35		
	% Silt (0.063mm - 4um) (%)	19	23	6		
	% Clay (<4um) (%)	15	20	2		
Organic / Inorganic Carbon	CaCO3 Equivalent (%)					
	Inorganic Carbon (%)					
Saturated Paste Extractables	Calcium (Ca) (mg/kg)	14.8				
	Chloride (Cl) (mg/kg)	4.8				
	Conductivity (dS/m)	0.411	0.363	0.644		
	Magnesium (Mg) (mg/kg)	5.59				
	Potassium (K) (mg/kg)	<10				
	SAR (SAR)	1.71				
	% Saturation (%)	48.2				
	Sodium (Na) (mg/kg)	21.1				
Metals	Aluminum (Al) (mg/kg)	19000	18800	17000		
	Antimony (Sb) (mg/kg)	<10	<10	<10		
	Arsenic (As) (mg/kg)	14.0	14.7	77.1		
	Barium (Ba) (mg/kg)	268	232	98.1		
	Beryllium (Be) (mg/kg)	0.75	0.74	0.77		
	Bismuth (Bi) (mg/kg)	<20	<20	<20		
	Cadmium (Cd) (mg/kg)	<0.50	0.64	<0.50		
	Calcium (Ca) (mg/kg)	12900	11500	822		
	Chromium (Cr) (mg/kg)	28.5	28.7	42.3		
	Cobalt (Co) (mg/kg)	14.2	14.1	21.0		
	Copper (Cu) (mg/kg)	37.2	37.7	744		
	Iron (Fe) (mg/kg)	35700	35900	53400		
	Lead (Pb) (mg/kg)	<30	<30	70		
	Lithium (Li) (mg/kg)	15.1	15.1	11.9		
	Magnesium (Mg) (mg/kg)	7750	7670	2710		
	Manganese (Mn) (mg/kg)	793	791	510		
	Mercury (Hg) (mg/kg)	0.200	0.153	0.568		
	Molybdenum (Mo) (mg/kg)	<4.0	<4.0	18.1		
	Nickel (Ni) (mg/kg)	36.3	36.9	70.2		
	Phosphorus (P) (mg/kg)	673	631	605		
	Potassium (K) (mg/kg)	1780	1770	1090		
	Selenium (Se) (mg/kg)	<2.0	<2.0	<4.0		

ALS LABORATORY GROUP ANALYTICAL REPORT

Grouping	Analyte	Sample ID / Description / Sampled Date / Sampled Time / Client ID				
		L691076-1	L691076-2	L691076-3	L691076-4	L691076-5
		DH07-3 SEP 12 -69ft	DH07-9 SPT 10-64ft	DH07-6 SPT 11-74ft	DH07-5 SPT 10-49ft	DH07-7 SPT 10-64ft
SOIL						
Metals	Silver (Ag) (mg/kg)	<2.0	<2.0	<2.0	<2.0	<2.0
	Sodium (Na) (mg/kg)	250	380	530	380	440
	Strontium (Sr) (mg/kg)	51.4	58.0	75.7	49.0	60.8
	Thallium (Tl) (mg/kg)	<1.0	<1.0	<1.0	<1.0	<1.0
	Tin (Sn) (mg/kg)	<5.0	<5.0	<5.0	<5.0	<5.0
	Titanium (Ti) (mg/kg)	506	282	433	344	299
	Vanadium (V) (mg/kg)	52.2	62.9	61.6	47.9	65.0
	Zinc (Zn) (mg/kg)	98.9	135	103	81.8	123

ALS LABORATORY GROUP ANALYTICAL REPORT

Grouping	Analyte	Sample ID / Description / Sampled Date / Sampled Time / Client ID				
		L691076-6	L691076-7	L691076-8	L691076-9	L691076-10
		DH07-5 SPT 12-59ft	DH07-3 SPT 5 24ft	DH07-3 SPT SPT 9-44ft	DH07-5 SPT 8-39ft	DH07-2 SPT 13
SOIL						
Metals	Silver (Ag) (mg/kg)	<2.0	<2.0	<2.0	<2.0	<2.0
	Sodium (Na) (mg/kg)	1250	330	320	570	360
	Strontium (Sr) (mg/kg)	111	65.4	58.7	59.9	63.8
	Thallium (Tl) (mg/kg)	<1.0	<1.0	<1.0	<1.0	<1.0
	Tin (Sn) (mg/kg)	<5.0	<5.0	<5.0	<5.0	<5.0
	Titanium (Ti) (mg/kg)	306	267	235	427	164
	Vanadium (V) (mg/kg)	93.9	60.4	60.2	54.4	59.1
	Zinc (Zn) (mg/kg)	99.6	96.8	96.0	98.8	103

ALS LABORATORY GROUP ANALYTICAL REPORT

Grouping	Analyte	Sample ID: L691076-11 Description: DH07-3 SPT 8-39ft	L691076-12 DH07-2 SPT 11	L691076-13 DH07-3 SPT 6-29ft	L691076-14 DH07-5 SPT 6 29ft	L691076-15 DH07-5 SPT 5-24ft
SOIL						
Metals	Silver (Ag) (mg/kg)	<2.0	<2.0	<2.0	<2.0	<2.0
	Sodium (Na) (mg/kg)	340	390	470	470	570
	Strontium (Sr) (mg/kg)	69.5	62.5	67.3	52.0	51.2
	Thallium (Tl) (mg/kg)	<1.0	<1.0	<1.0	<1.0	<1.0
	Tin (Sn) (mg/kg)	<5.0	<5.0	<5.0	<5.0	<5.0
	Titanium (Ti) (mg/kg)	239	216	221	376	292
	Vanadium (V) (mg/kg)	60.3	62.3	63.9	53.2	57.4
	Zinc (Zn) (mg/kg)	93.4	103	102	93.8	101

ALS LABORATORY GROUP ANALYTICAL REPORT

Grouping	Analyte	Sample ID: L691076-16 Description: DH07-4 SPT 5-24ft Sampled Date Sampled Time Client ID	Sample ID: L691076-17 Description: DH07-4 SPT 6-29ft	Sample ID: L691076-18 Description: DH07-2 SPT 9	Sample ID: L691076-19 Description: DH07-4 SPT 8-39ft	Sample ID: L691076-20 Description: DH07-2 SPT 5
SOIL						
Metals	Silver (Ag) (mg/kg)	<2.0	<2.0	<2.0	<2.0	<2.0
	Sodium (Na) (mg/kg)	370	400	370	390	310
	Strontium (Sr) (mg/kg)	67.5	66.6	60.1	64.3	65.0
	Thallium (Tl) (mg/kg)	<1.0	<1.0	<1.0	<1.0	<1.0
	Tin (Sn) (mg/kg)	<5.0	<5.0	<5.0	<5.0	<5.0
	Titanium (Ti) (mg/kg)	175	152	180	170	186
	Vanadium (V) (mg/kg)	63.2	60.7	58.9	61.5	62.2
	Zinc (Zn) (mg/kg)	101	104	105	102	96.5

ALS LABORATORY GROUP ANALYTICAL REPORT

Grouping	Analyte	Sample ID / Description / Sampled Date / Sampled Time / Client ID	L691076-21 TP08-RS4-9.0M	L691076-22 TP08-RS4-X1-7.5M	L691076-23 TP08-RS7-X1-3.0M		
SOIL							
Metals	Silver (Ag) (mg/kg)		<2.0	<2.0	<2.0		
	Sodium (Na) (mg/kg)		270	260	<200		
	Strontium (Sr) (mg/kg)		79.0	70.2	17.3		
	Thallium (Tl) (mg/kg)		<1.0	<1.0	<1.0		
	Tin (Sn) (mg/kg)		<5.0	<5.0	<5.0		
	Titanium (Ti) (mg/kg)		142	128	169		
	Vanadium (V) (mg/kg)		60.6	60.4	52.8		
	Zinc (Zn) (mg/kg)		92.3	108	92.3		

Reference Information

Additional Comments for Sample Listed:

Samplenum	Matrix	Report Remarks	Sample Comments

Methods Listed (if applicable):

ALS Test Code	Matrix	Test Description	Analytical Method Reference(Based On)
C-INORG-SK	Soil	Inorganic Carbon / Calcium Carbonate	SSSA (1996) P455-456

When carbonates are decomposed with acid in an open system, carbon dioxide is released to the atmosphere. The decrease in sample weight resulting from CO2 loss is proportional to the carbonate content of the soil.

Reference:
Loeppert, R.H. and Suarez, D.L. 1996. Gravimetric Method for Loss of Carbon Dioxide. P. 455-456 In: J.M. Bartels et al. (ed.) Methods of soil analysis: Part 3 Chemical methods. (3rd ed.) ASA and SSSA, Madison, WI. Book series no. 5

CL-PASTE-IC-VA	Soil	Chloride in paste by IC	SOIL SAMPLING AND METHODS OF ANALYSIS

This analysis is adapted from the methods outlined in "Soil Sampling and Methods of Analysis" by M. Carter. In summary, 200 to 500 grams of sample is extracted for a minimum of 4 hours with an amount of deionized water as required to create a saturated paste. The sample is then filtered or centrifuged and decanted to produce an extract that is ready for analysis.

EC-PASTE-VA	Soil	Conductivity of Soil	AS PER METHODOLOGY

This analysis is adapted from the methods outlined in "Soil Sampling and Methods of Analysis" by M. Carter. In summary, 200 to 500 grams of sample is extracted for a minimum of 4 hours with an amount of deionized water as required to create a saturated paste. The sample is then filtered or centrifuged and decanted to produce an extract that is ready for analysis.

HG-CSR-CVAFS-VA	Soil	CVAFS Hg in Soil by CSR SALM	BCMELP CSR SALM Method 8

This analysis is carried out using procedures from CSR Analytical Method 8 "Strong Acid Leachable Metals (SALM) in Soil", BC Ministry of Environment, Lands and Parks, 26 June 2001, and procedures adapted from "Test Methods for Evaluating Solid Waste", SW-846 Method 3050B United States Environmental Protection Agency (EPA). The sample is manually homogenized, dried at 60 degrees Celsius, sieved through a 2 mm (10 mesh) sieve, and a representative subsample of the dry material is weighed. The sample is then digested at 90 degrees Celsius for 2 hours by block digester using a 1:1 ratio of concentrated nitric and hydrochloric acids. Instrumental analysis is by atomic fluorescence spectrophotometry (EPA Method 7000 series).

Method Limitation: This method is not a total digestion technique. It is a very strong acid digestion that is intended to dissolve those metals that may be environmentally available. By design, elements bound in silicate structures are not normally dissolved by this procedure as they are not usually mobile in the environment.

MET-CSR-FULL-ICP-VA	Soil	Metals in Soil by ICPOES (CSR SALM)	BCMELP CSR SALM METHOD 8

This analysis is carried out using procedures from CSR Analytical Method 8 "Strong Acid Leachable Metals (SALM) in Soil", BC Ministry of Environment, Lands and Parks, 26 June 2001, and procedures adapted from "Test Methods for Evaluating Solid Waste", SW-846 Method 3050B United States Environmental Protection Agency (EPA). The sample is manually homogenized, dried at 60 degrees Celsius, sieved through a 2 mm (10 mesh) sieve, and a representative subsample of the dry material is weighed. The sample is then digested at 90 degrees Celsius for 2 hours by block digester using a 1:1 ratio of concentrated nitric and hydrochloric acids. Instrumental analysis is by inductively coupled plasma - optical emission spectrophotometry (EPA Method 6010B).

Method Limitation: This method is not a total digestion technique. It is a very strong acid digestion that is intended to dissolve those metals that may be environmentally available. By design, elements bound in silicate structures are not normally dissolved by this procedure as they are not usually mobile in the environment.

MOISTURE-VA	Soil	Moisture content	ASTM METHOD D2794-00

This analysis is carried out gravimetrically by drying the sample at 105 C for a minimum of six hours.

MOISTURE-VA	Soil		ASTM METHOD D2794-00

This analysis is carried out gravimetrically by drying the sample at 105 C for a minimum of six hours.

PH-1:2-VA	Soil	CSR pH by 1:2 Water Leach	BC WLAP METHOD: PH, ELECTROMETRIC, SOIL

This analysis is carried out in accordance with procedures described in the pH, Electrometric in Soil and Sediment method - Section B

Reference Information

Methods Listed (if applicable):

ALS Test Code	Matrix	Test Description	Analytical Method Reference(Based On)

Physical/Inorganic and Misc. Constituents, BC Environmental Laboratory Manual 2007. The procedure involves mixing the dried (at <60°C) and sieved (10 mesh /2mm) sample with deionized/distilled water at a 1:2 ratio of sediment to water. The pH of the solution is then measured using a standard pH probe.

PSA-PIPET+GRAVEL-SK Soil Particle size - Sieve and Pipette FORESTRY CANADA (1991) P. 46-48 MOD

Particle size analysis involves the measurement of the proportions of the various primary soil particle sizes (ie. clay < 0.004 mm, silt 0.004-0.063 mm, sand 0.063-2.0 mm and gravel > 2.0 mm). In this method, the gravel and sand portions are determined by sieving, while the clay portion is determined by sedimentation using Stokes Law, which relates the radius of the particles to the velocity of the sedimentation in water. Silt is calculated as 100% - (sand% + clay%)
Pretreatment of the soil with Calgon (sodium hexametaphosphate) is used to ensure the complete dispersion of the primary soil particles. Additional pretreatment may be necessary to remove cementing materials such as CaCO3 and organic matter.

Reference
Y.P. Kalra, and D.G. Maynard, 1991. Methods Manual For Forest Soil and Plant Analysis,Northwest Region. Forestry Canada (modified sand, silt and clay size ranges)

SAR-CALC-MGKG-ICP-VA Soil Saturated Paste Extraction (ICPOES) BCMELP/EPA SW-846 6010B

Saturated paste sediment extracts are analyzed for metals by inductively coupled plasma optical emission spectrophotometry (EPA Method 6010B). Reported metals results have been converted into milligrams per dry kilogram. Sodium Adsorption Ratio (SAR) is calculated from the Sodium, Calcium, and Magnesium concentrations in the saturated paste extract of a sediment sample. The SAR calculation is described in "Soil Sampling and Methods of Analysis" by M. Carter.

TL-CSR-MS-VA Soil ICPMS Tl in Soil by CSR SALM BCMELP CSR SALM Method 8

This analysis is carried out using procedures from CSR Analytical Method 8 "Strong Acid Leachable Metals (SALM) in Soil", BC Ministry of Environment, Lands and Parks, 26 June 2001, and procedures adapted from "Test Methods for Evaluating Solid Waste", SW-846 Method 3050B United States Environmental Protection Agency (EPA). The sample is manually homogenized, dried at 60 degrees Celsius, sieved through a 2 mm (10 mesh) sieve, and a representative subsample of the dry material is weighed. The sample is then digested at 90 degrees Celsius for 2 hours by either hotplate or block digester using a 1:1 ratio of concentrated nitric and hydrochloric acids. Instrumental analysis is by inductively coupled plasma - mass spectrometry (EPA Method 6020A).

Method Limitation: This method is not a total digestion technique. It is a very strong acid digestion that is intended to dissolve those metals that may be environmentally available. By design, elements bound in silicate structures are not normally dissolved by this procedure as they are not usually mobile in the environment.

** Laboratory Methods employed follow in-house procedures, which are generally based on nationally or internationally accepted methodologies.
The last two letters of the above ALS Test Code column indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location	Laboratory Definition Code	Laboratory Location
SK	ALS LABORATORY GROUP - SASKATOON, SASKATCHEWAN, CANADA	VA	ALS LABORATORY GROUP - VANCOUVER, BC, CANADA

Reference Information

Methods Listed (if applicable):

ALS Test Code	Matrix	Test Description	Analytical Method Reference(Based On)

GLOSSARY OF REPORT TERMS
Surr - A surrogate is an organic compound that is similar to the target analyte(s) in chemical composition and behavior but not normally detected in enviromental samples. Prior to sample processing, samples are fortified with one or more surrogate compounds.
The reported surrogate recovery value provides a measure of method efficiency.
mg/kg (units) - unit of concentration based on mass, parts per million
mg/L (units) - unit of concentration based on volume, parts per million
N/A - Result not available. Refer to qualifier code and definition for explanation

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Although test results are generated under strict QA/QC protocols, any unsigned test reports, faxes, or emails are considered preliminary.

ALS Laboratory Group has an extensive QA/QC program where all analytical data reported is analyzed using approved referenced procedures followed by checks and reviews by senior managers and quality assurance personnel. However, since the results are obtained from chemical measurements and thus cannot be guaranteed, ALS Laboratory Group assumes no liability for the use or interpretation of the results.

Rescan™

Website: www.rescan.com
E-mail: rescan@rescan.com

Vancouver Office:
Rescan Environmental Services Ltd.
6th Floor, 1111 West Hastings Street
Vancouver, B.C. V6E 2J3
Tel: (604) 689-9460 Fax: (604) 687-4277

Yellowknife Office:
Rescan Northern Operations
Suite 908-5201 50th Avenue
Yellowknife, NT X1A 3S9
Tel: (867) 920-2090 Fax: (867) 920-2015

Seattle Office:
Rescan Consultants Inc.
Suite 3200,1001 Fourth Avenue Plaza
Seattle, WA 98154, USA
Tel: (206) 726-2145 Fax: (206) 382-9648

CHAIN OF CUSTODY RECORD

PROJECT NAME: MORRISON

PROJECT #: 0193-001-15

FIELD SCIENTISTS AND/OR ENGINEERS: *(Print Name and Sign)* Laura Koch | Fikre Debela

Laboratory Contact:

Laboratory Address: ALS LABS

Rescan Contact: Rolf Schmitt

STATION NUMBER	DATE	TIME	COMP. SAMPLE	GRAB SAMPLE	SAMPLE IDENTIFICATION (DEPTH, REPLICATE)	NUMBER OF CONTAINERS	EC+pH 1:2 saturation	TEXTURE - 3pt S, S, C*	CaCO3 equivalent	CSR Metals + AL
1 DH07-3	Sep 12	- 69 ft					✓	✓	✓	✓
2 DH07-9	Spt 10	- 64 ft					✓	✓	✓	✓
3 DH07-6	Spt 11	- 24 ft					✓	✓		✓
4 DH07-5	Spt 10	- 49 ft					✓	✓		✓
5 DH07-7	Spt 10	- 64 ft					✓	✓	[illegible]	✓
6 DH07-5	Spt 12	- 59 ft					✓	✓	✓	✓
7 DH07-3	Spt 5	- 24 ft					✓	✓	✓	✓
8 DH07-3	Spt 9	- 44 ft					✓	✓		✓
9 DH07-5	Spt 8	- 39 ft					✓	✓		✓
10 DH07-2	Spt 13						✓	✓		✓
11 DH07-3	Spt 8	- 39 ft					✓	✓	✓	✓
12 DH07-2	- Spt 11	-					✓	✓		✓
13 DH07-3	Spt 6	- 29 ft					✓	✓		✓
14 DH07-5	Spt 6	29 ft					✓	✓		✓
15 DH07-5	Spt 5	- 24 ft					✓	✓		✓
16 DH07-4	Spt 5	- 24 ft					✓	✓	✓	✓
17 DH07-4	Spt 6	- 29 ft					✓	✓		✓
18 DH07-2	Spt 9						✓	✓	2	✓
19 DH07-4	Spt 8	- 39 ft					✓	✓		✓
20 DH07-2	Spt 5						✓	✓		✓
21 TP08-RS4 -		9.0 m					✓	✓		✓

Received by:	Date/Time	Relinquished by:	Date/Time
Company: Name: *(Print and Sign)*	D/M/Y / /	Company: Fikre Debela Name: *(Print and Sign)*	D/M/Y / /

Received by:	Date/Time	Received for Laboratory by:	Date/Time
Company: Name: *(Print and Sign)*	D/M/Y / /	Company: Name: ZU *(Print and Sign)*	D/M/Y Oct 3, 08 11:37 21°C

Routine Analysis: ☑ Rush Analysis: ☐

Remarks: Please weigh 72mm fractions following screening
* Sand - 0.5 - 2mm, clay < 2 um
Silt - 2um - 0.5mm

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Table of Co

Rescan™

Website: www.rescan.com
E-mail: rescan@rescan.com

Vancouver Office:
Rescan Environmental Services Ltd.
6th Floor, 1111 West Hastings Street
Vancouver, B.C. V6E 2J3
Tel: (604) 689-9460 Fax: (604) 687-4277

Yellowknife Office:
Rescan Northern Operations
Suite 908-5201 50th Avenue
Yellowknife, NT X1A 3S9
Tel: (867) 920-2090 Fax: (867) 920-2015

Seattle Office: L691076
Rescan Consultants Inc.
Suite 3200,1001 Fourth Avenue Plaza
Seattle, WA 98154, USA
Tel: (206) 726-2145 Fax: (206) 382-9648

CHAIN OF CUSTODY RECORD

PROJECT NAME: MORRISON

PROJECT #: 0793-001-15

FIELD SCIENTISTS AND/OR ENGINEERS: *(Print Name and Sign)* Laura Koch \ Fixre Debel

Laboratory Contact:

Laboratory Address: ALS LABS

Rescan Contact: Rolf Schmitt

STATION NUMBER	DATE	TIME	COMP. SAMPLE	GRAB SAMPLE	SAMPLE IDENTIFICATION (DEPTH, REPLICATE)	NUMBER OF CONTAINERS:	EC+pH 1:2 Split	Texture 3 Size	CaCO3 eq.	"LSS"	
1 TP08-RS4-X1-7.5m							/	/		/	
2 TP08-RS7-X1-3.0m							/	/		/	
3											
4											
5											
6											
7											
8											
9											
10											
11											
12											
13											
14											
15											
16											
17						9					
18											
19											
20											
21											

Received by: Company: Name: (Print and Sign)	Date/Time D/M/Y / /	Relinquished by: Company: Name: Fixre Debel (Print and Sign)	Date/Time D/M/Y / /
Received by: Company: Name: (Print and Sign)	Date/Time D/M/Y / /	**Received for Laboratory by:** Company: Name: 7U (Print and Sign)	Date/Time D/M/Y 8CT 3/08 11:37 21°C

Routine Analysis: ☑ Rush Analysis: ☐

Remarks: Please weigh >2mm fractions following screening. Silt - 0.5-2um, Sand - 0.5-2mm, clay <2mm

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Page 2 of 2

APPENDIX B2
ALS METHODS AND RESULTS: L691076 (TEST PITS)

ALS Laboratory Group
ANALYTICAL CHEMISTRY & TESTING SERVICES

Environmental Division

Certificate of Analysis

RESCAN ENVIRONMENTAL SERVICES

ATTN: ROLF SCHMITT

SIXTH FLOOR
1111 WEST HASTINGS STREET
VANCOUVER BC V6E 2J3

Reported On: 10-NOV-08 11:38 AM
Revision: 3

Lab Work Order #: L686442 **Date Received:** 23-SEP-08

Project P.O. #:
Job Reference: MORRISON-SOIL-0793-001-15
Legal Site Desc:
CofC Numbers: F 33667, F 33668

Other Information:

Comments: Nov 3/08- Saturated Paste Extractables added to samples L686442-1 and L686442-9. All other results remain unchanged.

Selam Worku
Account Manager

ALS LABORATORY GROUP ANALYTICAL REPORT

	Sample ID	L686442-1	L686442-2	L686442-3	L686442-4	L686442-5
	Description					
	Sampled Date	08-SEP-08	08-SEP-08	08-SEP-08	08-SEP-08	08-SEP-08
	Sampled Time					
	Client ID	RS1-1	RS2-1	RS2-2	RS3-0.8	RS3-2
Grouping	**Analyte**					
SOIL						
Physical Tests	Conductivity (dS/m)	<0.020	<0.020	<0.020	<0.020	0.063
	% Moisture (%)	11.3	12.7	8.34	7.21	10.2
	pH (pH)	6.75	6.02	6.70	6.55	8.06
Particle Size	% Gravel (>2mm) (%)	10	37	10	25	6
	% Sand (2.0mm - 0.063mm) (%)	28	22	66	58	30
	% Silt (0.063mm - 4um) (%)	31	26	19	15	43
	% Clay (<4um) (%)	31	16	5	3	21
Organic / Inorganic Carbon	CaCO3 Equivalent (%)			<0.7	<0.7	2.8
	Inorganic Carbon (%)			<0.09	<0.09	0.29
Saturated Paste Extractables	Calcium (Ca) (mg/kg)	2.82				
	Chloride (Cl) (mg/kg)	2.1				
	Conductivity (dS/m)	0.0099				
	Magnesium (Mg) (mg/kg)	0.896				
	Potassium (K) (mg/kg)	<1.0				
	SAR (SAR)	1.01				
	% Saturation (%)	35.9				
	Sodium (Na) (mg/kg)	4.53				
Metals	Aluminum (Al) (mg/kg)	18400	17700	13400	15500	16400
	Antimony (Sb) (mg/kg)	<10	<10	<10	<10	<10
	Arsenic (As) (mg/kg)	19.4	31.8	21.2	19.5	33.2
	Barium (Ba) (mg/kg)	305	281	164	168	271
	Beryllium (Be) (mg/kg)	0.84	0.76	0.62	0.64	0.68
	Bismuth (Bi) (mg/kg)	<20	<20	<20	<20	<20
	Cadmium (Cd) (mg/kg)	<0.50	<0.50	<0.50	<0.50	<0.50
	Calcium (Ca) (mg/kg)	5210	3820	4500	4660	17900
	Chromium (Cr) (mg/kg)	31.7	30.4	19.4	22.0	27.8
	Cobalt (Co) (mg/kg)	15.6	15.1	11.2	11.9	15.5
	Copper (Cu) (mg/kg)	43.2	624	42.4	39.6	330
	Iron (Fe) (mg/kg)	39900	37600	33600	35100	34800
	Lead (Pb) (mg/kg)	<30	<30	<30	<30	<30
	Lithium (Li) (mg/kg)	13.6	11.9	10.6	12.0	12.0
	Magnesium (Mg) (mg/kg)	6210	5490	5510	6890	6470
	Manganese (Mn) (mg/kg)	1200	994	947	903	920
	Mercury (Hg) (mg/kg)	0.148	0.218	0.156	0.0875	0.195
	Molybdenum (Mo) (mg/kg)	<4.0	4.1	<4.0	<4.0	<4.0
	Nickel (Ni) (mg/kg)	44.2	37.3	27.0	27.0	40.1
	Phosphorus (P) (mg/kg)	616	661	626	533	731
	Potassium (K) (mg/kg)	1010	1220	790	750	1520

ALS LABORATORY GROUP ANALYTICAL REPORT

	Sample ID	L686442-6	L686442-7	L686442-8	L686442-9	L686442-10
	Description					
	Sampled Date	08-SEP-08	08-SEP-08	08-SEP-08	08-SEP-08	08-SEP-08
	Sampled Time					
	Client ID	RS3-3	RS4-1	RS4-2	RS4-3	RS5-1
Grouping	**Analyte**					
SOIL						
Physical Tests	Conductivity (dS/m)	0.065	<0.020	<0.020	0.070	<0.020
	% Moisture (%)	9.95	16.9	14.1	11.6	12.0
	pH (pH)	8.12	6.29	6.96	8.06	5.30
Particle Size	% Gravel (>2mm) (%)	12	28	13	23	
	% Sand (2.0mm - 0.063mm) (%)	31	50	48	29	
	% Silt (0.063mm - 4um) (%)	36	16	26	28	
	% Clay (<4um) (%)	21	7	13	20	
Organic / Inorganic Carbon	CaCO3 Equivalent (%)	2.6			3.5	
	Inorganic Carbon (%)	0.26			0.38	
Saturated Paste Extractables	Calcium (Ca) (mg/kg)				9.90	
	Chloride (Cl) (mg/kg)				<3.0	
	Conductivity (dS/m)				0.0656	
	Magnesium (Mg) (mg/kg)				4.90	
	Potassium (K) (mg/kg)				<2.0	
	SAR (SAR)				0.72	
	% Saturation (%)				56.5	
	Sodium (Na) (mg/kg)				8.3	
Metals	Aluminum (Al) (mg/kg)	15800	17500	17100	18000	4810
	Antimony (Sb) (mg/kg)	<10	<10	<10	<10	<10
	Arsenic (As) (mg/kg)	77.5	22.4	20.0	17.8	48.2
	Barium (Ba) (mg/kg)	306	206	252	431	85.9
	Beryllium (Be) (mg/kg)	0.66	0.73	0.75	0.76	0.58
	Bismuth (Bi) (mg/kg)	<20	<20	<20	<20	<20
	Cadmium (Cd) (mg/kg)	<0.50	<0.50	<0.50	0.60	<0.50
	Calcium (Ca) (mg/kg)	13600	3300	3550	19900	908
	Chromium (Cr) (mg/kg)	30.5	24.5	24.6	26.2	39.9
	Cobalt (Co) (mg/kg)	16.7	13.0	13.2	20.6	36.6
	Copper (Cu) (mg/kg)	491	31.3	35.7	42.0	1910
	Iron (Fe) (mg/kg)	34800	37000	36400	36700	58600
	Lead (Pb) (mg/kg)	<30	<30	<30	<30	<30
	Lithium (Li) (mg/kg)	11.7	13.5	13.5	13.6	<2.0
	Magnesium (Mg) (mg/kg)	7010	6260	5560	6780	495
	Manganese (Mn) (mg/kg)	927	911	868	1360	483
	Mercury (Hg) (mg/kg)	0.196	0.0845	0.137	0.254	0.320
	Molybdenum (Mo) (mg/kg)	<4.0	<4.0	<4.0	<4.0	31.6
	Nickel (Ni) (mg/kg)	42.2	38.5	35.7	46.5	44.5
	Phosphorus (P) (mg/kg)	741	581	575	736	1280
	Potassium (K) (mg/kg)	1640	810	980	1580	640

ALS LABORATORY GROUP ANALYTICAL REPORT

	Sample ID	L686442-11	L686442-12	L686442-13	L686442-14	L686442-15
	Description					
	Sampled Date	08-SEP-08	08-SEP-08	08-SEP-08	08-SEP-08	08-SEP-08
	Sampled Time					
	Client ID	RS5-2	RS6-1	RS6-2	RS7-1	RS7-2
Grouping	**Analyte**					
SOIL						
Physical Tests	Conductivity (dS/m)	<0.020	<0.020	<0.020	<0.020	<0.020
	% Moisture (%)	10.6	6.03	7.33	8.30	11.0
	pH (pH)	5.20	6.11	6.21	5.95	5.15
Particle Size	% Gravel (>2mm) (%)				33	21
	% Sand (2.0mm - 0.063mm) (%)				45	24
	% Silt (0.063mm - 4um) (%)				16	34
	% Clay (<4um) (%)				7	22
Organic / Inorganic Carbon	CaCO3 Equivalent (%)					
	Inorganic Carbon (%)					
Saturated Paste Extractables	Calcium (Ca) (mg/kg)					
	Chloride (Cl) (mg/kg)					
	Conductivity (dS/m)					
	Magnesium (Mg) (mg/kg)					
	Potassium (K) (mg/kg)					
	SAR (SAR)					
	% Saturation (%)					
	Sodium (Na) (mg/kg)					
Metals	Aluminum (Al) (mg/kg)	4860	8560	9010	11300	14200
	Antimony (Sb) (mg/kg)	<10	<10	<10	<10	<10
	Arsenic (As) (mg/kg)	85.4	20.4	15.7	67.6	45.1
	Barium (Ba) (mg/kg)	52.5	711	781	133	182
	Beryllium (Be) (mg/kg)	0.66	0.51	0.54	0.83	0.76
	Bismuth (Bi) (mg/kg)	<20	<20	<20	<20	<20
	Cadmium (Cd) (mg/kg)	<0.50	<0.50	<0.50	<0.50	<0.50
	Calcium (Ca) (mg/kg)	1130	2180	2570	1630	1980
	Chromium (Cr) (mg/kg)	44.7	25.0	26.9	26.5	26.8
	Cobalt (Co) (mg/kg)	54.4	14.0	16.7	28.8	22.1
	Copper (Cu) (mg/kg)	2140	2860	2780	886	363
	Iron (Fe) (mg/kg)	72300	34100	36600	43900	41400
	Lead (Pb) (mg/kg)	<30	<30	<30	<30	<30
	Lithium (Li) (mg/kg)	<2.0	5.1	5.1	8.4	9.2
	Magnesium (Mg) (mg/kg)	402	4360	4820	4060	3770
	Manganese (Mn) (mg/kg)	1010	412	637	883	731
	Mercury (Hg) (mg/kg)	0.340	0.245	0.357	0.471	0.502
	Molybdenum (Mo) (mg/kg)	90.7	57.5	74.2	27.3	10.2
	Nickel (Ni) (mg/kg)	54.6	33.9	39.3	80.4	58.4
	Phosphorus (P) (mg/kg)	1450	781	802	757	602
	Potassium (K) (mg/kg)	660	1860	1630	870	840

ALS LABORATORY GROUP ANALYTICAL REPORT

		Sample ID	L686442-1	L686442-2	L686442-3	L686442-4	L686442-5
		Description					
		Sampled Date	08-SEP-08	08-SEP-08	08-SEP-08	08-SEP-08	08-SEP-08
		Sampled Time					
		Client ID	RS1-1	RS2-1	RS2-2	RS3-0.8	RS3-2
Grouping	**Analyte**						
SOIL							
Metals	Selenium (Se) (mg/kg)		<0.50	0.55	<0.50	<0.50	<0.50
	Silver (Ag) (mg/kg)		<2.0	<2.0	<2.0	<2.0	<2.0
	Sodium (Na) (mg/kg)		<200	<200	<200	<200	220
	Strontium (Sr) (mg/kg)		40.8	37.5	28.1	26.2	57.4
	Thallium (Tl) (mg/kg)		<1.0	<1.0	<1.0	<1.0	<1.0
	Tin (Sn) (mg/kg)		<5.0	<5.0	<5.0	<5.0	<5.0
	Titanium (Ti) (mg/kg)		93.9	247	294	323	344
	Vanadium (V) (mg/kg)		65.8	63.8	56.7	61.9	60.3
	Zinc (Zn) (mg/kg)		105	96.8	91.9	91.1	95.4

ALS LABORATORY GROUP ANALYTICAL REPORT

Grouping	Analyte	Sample ID	L686442-6	L686442-7	L686442-8	L686442-9	L686442-10
		Description					
		Sampled Date	08-SEP-08	08-SEP-08	08-SEP-08	08-SEP-08	08-SEP-08
		Sampled Time					
		Client ID	RS3-3	RS4-1	RS4-2	RS4-3	RS5-1
SOIL							
Metals	Selenium (Se) (mg/kg)		<0.50	<0.50	<0.50	<0.50	5.43
	Silver (Ag) (mg/kg)		<2.0	<2.0	<2.0	<2.0	<2.0
	Sodium (Na) (mg/kg)		<200	<200	<200	200	<200
	Strontium (Sr) (mg/kg)		54.5	27.5	36.6	73.0	20.1
	Thallium (Tl) (mg/kg)		<1.0	<1.0	<1.0	<1.0	<1.0
	Tin (Sn) (mg/kg)		<5.0	<5.0	<5.0	<5.0	<5.0
	Titanium (Ti) (mg/kg)		359	204	149	123	13.5
	Vanadium (V) (mg/kg)		63.7	61.8	59.7	60.7	77.4
	Zinc (Zn) (mg/kg)		96.0	94.7	90.3	100	53.2

ALS LABORATORY GROUP ANALYTICAL REPORT

Grouping	Analyte	Sample ID	L686442-11	L686442-12	L686442-13	L686442-14	L686442-15
		Description					
		Sampled Date	08-SEP-08	08-SEP-08	08-SEP-08	08-SEP-08	08-SEP-08
		Sampled Time					
		Client ID	RS5-2	RS6-1	RS6-2	RS7-1	RS7-2
SOIL							
Metals	Selenium (Se) (mg/kg)		5.12	0.75	0.90	0.66	1.07
	Silver (Ag) (mg/kg)		<2.0	<2.0	<2.0	<2.0	<2.0
	Sodium (Na) (mg/kg)		<200	<200	<200	<200	<200
	Strontium (Sr) (mg/kg)		26.2	30.7	39.5	17.6	27.5
	Thallium (Tl) (mg/kg)		<1.0	<1.0	<1.0	<1.0	<1.0
	Tin (Sn) (mg/kg)		<5.0	<5.0	<5.0	<5.0	<5.0
	Titanium (Ti) (mg/kg)		13.2	416	446	242	145
	Vanadium (V) (mg/kg)		82.8	48.8	50.8	55.8	54.0
	Zinc (Zn) (mg/kg)		81.2	77.6	80.5	103	86.7

Reference Information

Additional Comments for Sample Listed:

Samplenum	Matrix	Report Remarks	Sample Comments

Methods Listed (if applicable):

ALS Test Code	Matrix	Test Description	Analytical Method Reference(Based On)
C-INORG-SK	Soil	Inorganic Carbon / Calcium Carbonate	SSSA (1996) P455-456

When carbonates are decomposed with acid in an open system, carbon dioxide is released to the atmosphere. The decrease in sample weight resulting from CO2 loss is proportional to the carbonate content of the soil.

Reference:
Loeppert, R.H. and Suarez, D.L. 1996. Gravimetric Method for Loss of Carbon Dioxide. P. 455-456 In: J.M. Bartels et al. (ed.) Methods of soil analysis: Part 3 Chemical methods. (3rd ed.) ASA and SSSA, Madison, WI. Book series no. 5

CL-PASTE-COLOR-VA	Soil	Chloride in paste by Colourimetric	SOIL SAMPLING AND METHODS OF ANALYSIS

This analysis is adapted from the methods outlined in "Soil Sampling and Methods of Analysis" by M. Carter. In summary, 200 to 500 grams of sample is extracted for a minimum of 4 hours with an amount of deionized water as required to create a saturated paste. The sample is then filtered or centrifuged and decanted to produce an extract that is ready for analysis.

EC-LEACH-VA	Soil	Conductivity on Soil leach (1:10, dS/m)	BC MINISTRY OF ENERGY AND MINES

Leachable Anions in Sediment/Soil Method analysis is carried out using a leaching procedure which involves the gentle tumbling of the sample in a specified leaching solution (typically deionized water) for a specific length of time. The resulting extract is then analysed using procedures adapted from APHA Method 2510 "Conductivity". Conductivity is determined using a conductivity electrode.

EC-PASTE-VA	Soil	Conductivity of Soil	AS PER METHODOLOGY

This analysis is adapted from the methods outlined in "Soil Sampling and Methods of Analysis" by M. Carter. In summary, 200 to 500 grams of sample is extracted for a minimum of 4 hours with an amount of deionized water as required to create a saturated paste. The sample is then filtered or centrifuged and decanted to produce an extract that is ready for analysis.

HG-CCME-CVAFS-VA	Soil	CVAFS Hg in Soil (CCME)	CCME

This analysis is carried out using procedures from CSR Analytical Method 8 "Strong Acid Leachable Metals (SALM) in Soil", BC Ministry of Environment, Lands and Parks, 26 June 2001, and procedures adapted from "Test Methods for Evaluating Solid Waste", SW-846 Method 3050B United States Environmental Protection Agency (EPA). The sample is manually homogenized, dried at 60 degrees Celsius, sieved through a 2 mm (10 mesh) sieve, and a representative subsample of the dry material is weighed. The sample is then digested at 90 degrees Celsius for 2 hours by block digester using a 1:1 ratio of concentrated nitric and hydrochloric acids. Instrumental analysis is by atomic fluorescence spectrophotometry (EPA Method 7000 series).

Method Limitation: This method is not a total digestion technique. It is a very strong acid digestion that is intended to dissolve those metals that may be environmentally available. By design, elements bound in silicate structures are not normally dissolved by this procedure as they are not usually mobile in the environment.

MET-CSR-FULL-ICP-VA	Soil	Metals in Soil by ICPOES (CSR SALM)	BCMELP CSR SALM METHOD 8

This analysis is carried out using procedures from CSR Analytical Method 8 "Strong Acid Leachable Metals (SALM) in Soil", BC Ministry of Environment, Lands and Parks, 26 June 2001, and procedures adapted from "Test Methods for Evaluating Solid Waste", SW-846 Method 3050B United States Environmental Protection Agency (EPA). The sample is manually homogenized, dried at 60 degrees Celsius, sieved through a 2 mm (10 mesh) sieve, and a representative subsample of the dry material is weighed. The sample is then digested at 90 degrees Celsius for 2 hours by block digester using a 1:1 ratio of concentrated nitric and hydrochloric acids. Instrumental analysis is by inductively coupled plasma - optical emission spectrophotometry (EPA Method 6010B).

Method Limitation: This method is not a total digestion technique. It is a very strong acid digestion that is intended to dissolve those metals that may be environmentally available. By design, elements bound in silicate structures are not normally dissolved by this procedure as they are not usually mobile in the environment.

MOISTURE-VA	Soil	Moisture content	ASTM METHOD D2794-00

This analysis is carried out gravimetrically by drying the sample at 105 C for a minimum of six hours.

Reference Information

Methods Listed (if applicable):

ALS Test Code	Matrix	Test Description	Analytical Method Reference(Based On)
MOISTURE-VA	Soil		ASTM METHOD D2794-00

This analysis is carried out gravimetrically by drying the sample at 105 C for a minimum of six hours.

PH-1:2-VA	Soil	CSR pH by 1:2 Water Leach	BC WLAP METHOD: PH, ELECTROMETRIC, SOIL

This analysis is carried out in accordance with procedures described in the pH, Electrometric in Soil and Sediment method - Section B Physical/Inorganic and Misc. Constituents, BC Environmental Laboratory Manual 2007. The procedure involves mixing the dried (at <60°C) and sieved (10 mesh /2mm) sample with deionized/distilled water at a 1:2 ratio of sediment to water. The pH of the solution is then measured using a standard pH probe.

PSA-PIPET+GRAVEL-SK	Soil	Particle size - Sieve and Pipette	FORESTRY CANADA (1991) P. 46-48 MOD

Particle size analysis involves the measurement of the proportions of the various primary soil particle sizes (ie. clay < 0.004 mm, silt 0.004-0.063 mm, sand 0.063-2.0 mm and gravel > 2.0 mm). In this method, the gravel and sand portions are determined by sieving, while the clay portion is determined by sedimentation using Stokes Law, which relates the radius of the particles to the velocity of the sedimentation in water. Silt is calculated as 100% - (sand% + clay%)
Pretreatment of the soil with Calgon (sodium hexametaphosphate) is used to ensure the complete dispersion of the primary soil particles. Additional pretreatment may be necessary to remove cementing materials such as CaCO3 and organic matter.

Reference
Y.P. Kalra, and D.G. Maynard, 1991. Methods Manual For Forest Soil and Plant Analysis,Northwest Region. Forestry Canada (modified sand, silt and clay size ranges)

SAR-CALC-MGKG-ICP-VA	Soil	Saturated Paste Extraction (ICPOES)	BCMELP/EPA SW-846 6010B

Saturated paste sediment extracts are analyzed for metals by inductively coupled plasma optical emission spectrophotometry (EPA Method 6010B). Reported metals results have been converted into milligrams per dry kilogram. Sodium Adsorption Ratio (SAR) is calculated from the Sodium, Calcium, and Magnesium concentrations in the saturated paste extract of a sediment sample. The SAR calculation is described in "Soil Sampling and Methods of Analysis" by M. Carter.

SE-CSR-HVAAS-VA	Soil	Se in Soil by HVAAS (CSR SALM)	BCMELP CSR SALM Method 8

This analysis is carried out using procedures from CSR Analytical Method 8 "Strong Acid Leachable Metals (SALM) in Soil", BC Ministry of Environment, Lands and Parks, 26 June 2001, and procedures adapted from "Test Methods for Evaluating Solid Waste", SW-846 Method 3050B United States Environmental Protection Agency (EPA). The sample is manually homogenized, dried at 60 degrees Celsius, sieved through a 2 mm (10 mesh) sieve, and a representative subsample of the dry material is weighed. The sample is then digested at 90 degrees Celsius for 2 hours by block digester using a 1:1 ratio of concentrated nitric and hydrochloric acids. Instrumental analysis is by atomic absorption spectrophotometry (EPA Method 7000 series).

Method Limitation: This method is not a total digestion technique. It is a very strong acid digestion that is intended to dissolve those metals that may be environmentally available. By design, elements bound in silicate structures are not normally dissolved by this procedure as they are not usually mobile in the environment.

TL-CSR-MS-VA	Soil	ICPMS Tl in Soil by CSR SALM	BCMELP CSR SALM Method 8

This analysis is carried out using procedures from CSR Analytical Method 8 "Strong Acid Leachable Metals (SALM) in Soil", BC Ministry of Environment, Lands and Parks, 26 June 2001, and procedures adapted from "Test Methods for Evaluating Solid Waste", SW-846 Method 3050B United States Environmental Protection Agency (EPA). The sample is manually homogenized, dried at 60 degrees Celsius, sieved through a 2 mm (10 mesh) sieve, and a representative subsample of the dry material is weighed. The sample is then digested at 90 degrees Celsius for 2 hours by either hotplate or block digester using a 1:1 ratio of concentrated nitric and hydrochloric acids. Instrumental analysis is by inductively coupled plasma - mass spectrometry (EPA Method 6020A).

Method Limitation: This method is not a total digestion technique. It is a very strong acid digestion that is intended to dissolve those metals that may be environmentally available. By design, elements bound in silicate structures are not normally dissolved by this procedure as they are not usually mobile in the environment.

** Laboratory Methods employed follow in-house procedures, which are generally based on nationally or internationally accepted methodologies.
The last two letters of the above ALS Test Code column indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location	Laboratory Definition Code	Laboratory Location
SK	ALS LABORATORY GROUP - SASKATOON, SASKATCHEWAN, CANADA	VA	ALS LABORATORY GROUP - VANCOUVER, BC, CANADA

Reference Information

Methods Listed (if applicable):

ALS Test Code	Matrix	Test Description	Analytical Method Reference(Based On)

GLOSSARY OF REPORT TERMS
Surr - A surrogate is an organic compound that is similar to the target analyte(s) in chemical composition and behavior but not normally detected in enviromental samples. Prior to sample processing, samples are fortified with one or more surrogate compounds.
The reported surrogate recovery value provides a measure of method efficiency.
mg/kg (units) - unit of concentration based on mass, parts per million
mg/L (units) - unit of concentration based on volume, parts per million
N/A - Result not available. Refer to qualifier code and definition for explanation

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Although test results are generated under strict QA/QC protocols, any unsigned test reports, faxes, or emails are considered preliminary.

ALS Laboratory Group has an extensive QA/QC program where all analytical data reported is analyzed using approved referenced procedures followed by checks and reviews by senior managers and quality assurance personnel. However, since the results are obtained from chemical measurements and thus cannot be guaranteed, ALS Laboratory Group assumes no liability for the use or interpretation of the results.

Lab ID	L686442-1	L686442-2	L686442-3	L686442-4	L686442-5	L686442-6	L686442-7	L686442-8	L686442-9	L686442-14	L686442-15
Weight Soil >2mm (g)	14.0865	53.0056	15.7367	38.3251	9.3475	17.717	59.2076	24.9492	31.0541	47.6001	28.0514
Weight Soil <2mm (g)	125.656	91.9806	142.7736	116.9158	141.5377	132.4353	153.951	166.0265	101.886	97.6777	108.4108

ALS Maxxam Analytics Inc

L586442

8577 Commerce Court
Burnaby, BC V5A 4N5
www.maxxamanalytics.com

Phone: (604) 444-4808
Fax: (604) 444-4511
Toll Free: 1-800-440-4808

CHAIN-OF-CUSTODY RECORD AND ANALYSIS REQUEST

PAGE 1 OF 2

ANALYSIS REQUEST F 33667

COMPANY NAME: RESCAN

PH. #:
E-mail: rschmitt@rescan.com
FAX #: lkoch@rescan.com

COMPANY ADDRESS: 6th floor · 1111 W Hastings St Vancouver BC

CLIENT PROJECT ID: (#) MORRISSON – SOIL 0793-001-15

SAMPLER NAME (PRINT): LAURA KOCH

PROJECT MANAGER: ROLF SCHMITT

	FIELD SAMPLE ID	MAXXAM LAB # (Lab Use Only)	MATRIX: GROUND WATER	SURFACE WATER	SOIL	OTHER	# CONTAINERS	SAMPLING: DATE DD/MM/YY	TIME	HEADSPACE VAPOUR	EC + pH 1:2 Soil/Water	Texture < 2 mm fraction	$CaCO_2$ EQUIVALENCE	ICSR' METALS – AL
1	RS1-1				X			8/9/08			✓	✓		✓
2	RS2-1										✓	✓		✓
3	RS2-2										✓	✓	✓	✓
4	RS3-0.8										✓	✓	✓	✓
5	RS3-2										✓	✓	✓	✓
6	RS3-3										✓	✓	✓	✓
7	RS4-1										✓	✓		✓
8	RS4-2										✓	✓		✓
9	RS4-3										✓	✓	✓	✓
10	RS5-1										✓			✓
11	RS5-2										✓			✓
12	RS6-1										✓			✓

TAT (Turnaround Time)

<5 DAY TAT MUST HAVE PRIOR APPROVAL

*some exceptions apply please contact lab

STANDARD	5 BUSINESS DAYS	☑
RUSH	3 BUSINESS DAYS	☐
RUSH	2 BUSINESS DAYS	☐
URGENT	1 BUSINESS DAY	☐

OTHER BUSINESS DAYS _____

CUSTODY RECORD

P.O. NUMBER / QUOTE NUMBER:

ACCOUNTING CONTACT:

SPECIAL DETECTION LIMITS / CONTAMINANT TYPE:

TEXTURE
Sand > 0.5 – 2 mm
Silt ~~4 0.05~~ to > 2 µm to 0.5 mm
Clay ~~0.05 mm~~ · 0 – 2 µm

SPECIAL REPORTING OR BILLING INSTRUCTIONS:

→ Please weigh +2mm and –2mm fractions following screening.

☐ CCME
☐ CSR
☐ ALBERTA TIER 1
☐ OTHER

JARS USED:

LAB USE ONLY

ARRIVAL TEMPERATURE °C:	DUE DATE:	LOG IN CHECK:
17°C		

RELINQUISHED BY SAMPLER: L Koch	DATE: DD/MM/YY 5Sep08	TIME: 15:47	RECEIVED BY: Rojan	
RELINQUISHED BY:	DATE: DD/MM/YY	TIME:	RECEIVED BY:	
RELINQUISHED BY:	DATE: DD/MM/YY	TIME:	RECEIVED BY LABORATORY:	

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Maxxam Analytics Inc

8577 Commerce Court
Burnaby, BC V5A 4N5
www.maxxamanalytics.com

Phone: (604) 444-4808
Fax: (604) 444-4511
Toll Free: 1-800-440-4808

CHAIN-OF-CUSTODY RECORD AND ANALYSIS REQUEST

ANALYSIS REQUEST F 33668

COMPANY NAME: RESCAN	PH. #: rschmitt@rescan.com E-mail: lkoch@rescan.com. FAX #:
COMPANY ADDRESS: 6th fl - 1111 W. Hastings St Vancouver BC	CLIENT PROJECT ID: (#) MORRISON - SOIL 0793-001-15
SAMPLER NAME (PRINT): LAURA KOCH	PROJECT MANAGER: ROLF SCHMITT.

	FIELD SAMPLE ID	MAXXAM LAB # (Lab Use Only)	MATRIX: GROUND WATER	SURFACE WATER	SOIL	OTHER	# CONTAINERS	SAMPLING: DATE DD/MM/YY	TIME	HEADSPACE VAPOUR	EC + pH 1:2 Soil/Water	Texture < 2mm fraction	CaCO3 EQUIVALENCE	ICSE Metals - 'AL'
1	RS6-2				X			8/9/08			✓	✓	✓	✓
2	RS7-1				↓			↓			✓	✓		✓
3	RS7-2				↓			↓			✓	✓		✓
4					↓									
5					↓									
6					↓									
7					↓									
8					↓									
9					↓									
10					↓									
11					↓									
12					↓									

TAT (Turnaround Time)

<5 DAY TAT MUST HAVE PRIOR APPROVAL

*some exceptions apply please contact lab

STANDARD	5 BUSINESS DAYS	☑
RUSH	3 BUSINESS DAYS	☐
RUSH	2 BUSINESS DAYS	☐
URGENT	1 BUSINESS DAY	☐

OTHER BUSINESS DAYS _____

CUSTODY RECORD

P.O. NUMBER / QUOTE NUMBER:

SPECIAL DETECTION LIMITS / CONTAMINANT TYPE:
Texture: Sand > 0.5 to 2 mm
Silt ~~0.05~~ to > 2 µm to 0.5 mm
Clay ~~0.5~~ 2 µm -

ACCOUNTING CONTACT:

SPECIAL REPORTING OR BILLING INSTRUCTIONS:
→ Please weigh +2mm and -2mm fractions from screening.

☐ CCME
☐ CSR
☐ ALBERTA TIER 1
☐ OTHER

JARS USED:

LAB USE ONLY

ARRIVAL TEMPERATURE °C:	DUE DATE:	LOG IN CHECK:

RELINQUISHED BY SAMPLER: L. Koch.	DATE: DD/MM/YY 8 SEP 08	TIME: 15:47	RECEIVED BY:	
RELINQUISHED BY:	DATE: DD/MM/YY	TIME:	RECEIVED BY:	
RELINQUISHED BY:	DATE: DD/MM/YY	TIME:	RECEIVED BY LABORATORY:	

COCFORM - BC - 01/05

ORIGINAL - MAXXAM YELLOW - MAXXAM PINK - CLIENT