### **metro**vancouver

### **Bottom Ash Data**

2018 Week 37

The following analytical reports were sent to the Ministry of Environment and Climate Change Strategy:

- Weekly Composite Results were submitted on October 2, 2018
- Daily Composite Results were submitted on November 2, 2018

This data represents bottom ash results for week 37 of 2018 (September 9, 2018 to September 15, 2018).

The bottom ash meets the requirements of Metro Vancouver's Bottom Ash Management Plan and is suitable for beneficial use during Coquitlam Landfill closure works.





Covanta Burnaby R.E., ULC ATTN: Steve McKinney 5150 Riverbend Drive Burnaby BC V3N 4V3

Date Received: 18-SEP-18

Report Date: 01-OCT-18 15:51 (MT)

Version: FINAL

Client Phone: 604-521-1025

# Certificate of Analysis

Lab Work Order #: L2166261

Project P.O. #: VANCO-000047506

Job Reference: C of C Numbers: Legal Site Desc:

#### Comments:

As per client request, certain samples were re-prepped from scratch and analyzed for TCLP Metals (TCLP Cd) in varying replicate amounts. Results are reported as samples #13-20, and have "REP" in the Client Sample ID field. Fluid determination was not performed for samples #13-20, as per client instructions. The prep data was taken from the original samples but is reported with the re-prepped samples for informational purposes.

Brent Mack, B.Sc. Account Manager

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Version: FINAL

	Sa	Sample ID Description ampled Date ampled Time Client ID	L2166261-1 soil 12-SEP-18 09:00 BA1837-A-1	L2166261-2 soil 12-SEP-18 09:00 BA1837-A-2	L2166261-3 soil 12-SEP-18 09:00 BA1837-A-3	L2166261-4 soil 12-SEP-18 09:00 BA1837-A-4	L2166261-5 soil 12-SEP-18 09:00 BA1837-A-5
Grouping	Analyte						
SOIL							
Physical Tests	Moisture (%)		18.2	18.8	18.6	16.7	19.4
	pH (1:2 soil:water) (pH)		11.73	11.62	11.67	11.59	11.54
Metals	Aluminum (Al) (mg/kg)		35700	35100	35300	35100	38200
	Antimony (Sb) (mg/kg)		82.6	78.8	65.1	77.0	78.2
	Arsenic (As) (mg/kg)		23.4	23.7	25.5	32.7	25.3
	Barium (Ba) (mg/kg)		652	658	575	591	684
	Beryllium (Be) (mg/kg)		0.37	0.44	0.43	0.40	0.44
	Bismuth (Bi) (mg/kg)		5.46	8.43	24.0	4.95	5.28
	Boron (B) (mg/kg)		247	281	277	181	300
	Cadmium (Cd) (mg/kg)		11.7	38.8	11.3	11.4	10.2
	Calcium (Ca) (mg/kg)		105000	119000	100000	107000	113000
	Chromium (Cr) (mg/kg)		327	703	217	346	209
	Cobalt (Co) (mg/kg)		39.6	73.8	25.2	25.7	44.3
	Copper (Cu) (mg/kg)		29600	6170	2500	1490	1430
	Iron (Fe) (mg/kg)		82300	70200	74600	79800	77500
	Lead (Pb) (mg/kg)		1380	352	2190	285	504
	Lithium (Li) (mg/kg)		17.2	18.4	17.0	14.5	20.9
	Magnesium (Mg) (mg/kg)		9790	11300	9290	9950	11900
	Manganese (Mn) (mg/kg)		906	840	953	1330	1270
	Mercury (Hg) (mg/kg)		<0.050	<0.050	<0.050	<0.050	<0.050
	Molybdenum (Mo) (mg/kg)		146	128	66.1	125	92.4
	Nickel (Ni) (mg/kg)		379	224	213	212	232
	Phosphorus (P) (mg/kg)		9260	8370	8230	8260	9810
	Potassium (K) (mg/kg)		3910	4340	4180	4100	4680
	Selenium (Se) (mg/kg)		1.10	1.31	1.20	1.26	1.05
	Silver (Ag) (mg/kg)		8.17	3.63	2.47	2.67	3.07
	Sodium (Na) (mg/kg)		13300	13400	12900	13300	14500
	Strontium (Sr) (mg/kg)		266	313	487	277	610
	Sulfur (S) (mg/kg)		7800	9500	8900	8500	10000
	Thallium (TI) (mg/kg)		0.071	0.084	0.078	0.083	0.090
	Tin (Sn) (mg/kg)		295	197	93.0	118	126
	Titanium (Ti) (mg/kg)		921	1080	642	515	821
	Tungsten (W) (mg/kg)		6.45	9.69	14.9	6.41	11.9
	Uranium (U) (mg/kg)		4.16	4.55	4.49	4.39	4.74
	Vanadium (V) (mg/kg)		58.1	60.8	44.2	41.7	46.4
	Zinc (Zn) (mg/kg)		12100	4140	2750	2930	6150
	Zirconium (Zr) (mg/kg)		1.0	1.2	1.1	1.2	1.1

<sup>\*</sup> Please refer to the Reference Information section for an explanation of any qualifiers detected.

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### ALS ENVIRONMENTAL ANALYTICAL REPORT

Version: FINAL

	Des Sampl Sampl	mple ID cription ed Date ed Time Client ID	L2166261-6 soil 12-SEP-18 09:00 BA1837-A-6	L2166261-7 soil 12-SEP-18 09:00 BA1837-A-7	L2166261-8 soil 12-SEP-18 09:00 BA1837-A-8	L2166261-9 soil 12-SEP-18 09:00 BA1837-A-9	L2166261-10 soil 12-SEP-18 09:00 BA1837-A-10
Grouping	Analyte						
SOIL							
Physical Tests	Moisture (%)		17.9	17.4	18.3	19.0	19.1
	pH (1:2 soil:water) (pH)		11.69	11.71	11.60	11.69	12.00
Metals	Aluminum (Al) (mg/kg)		31600	35600	32700	59200	36200
	Antimony (Sb) (mg/kg)		75.8	68.2	98.7	84.8	104
	Arsenic (As) (mg/kg)		25.3	20.7	35.5	23.5	50.0
	Barium (Ba) (mg/kg)		568	589	656	669	546
	Beryllium (Be) (mg/kg)		0.40	0.37	0.45	0.42	0.45
	Bismuth (Bi) (mg/kg)		6.30	4.10	5.23	3.81	5.43
	Boron (B) (mg/kg)		611	321	250	325	289
	Cadmium (Cd) (mg/kg)		11.4	10.8	14.1	13.1	11.0
	Calcium (Ca) (mg/kg)		111000	100000	112000	109000	112000
	Chromium (Cr) (mg/kg)		155	139	283	201	181
	Cobalt (Co) (mg/kg)		29.7	42.4	146	31.5	52.7
	Copper (Cu) (mg/kg)		1580	1750	7710	4460	2010
	Iron (Fe) (mg/kg)		66700	72100	61600	89400	86600
	Lead (Pb) (mg/kg)		381	267	400	302	287
	Lithium (Li) (mg/kg)		18.9	14.1	16.8	17.5	15.7
	Magnesium (Mg) (mg/kg)		9710	10400	10100	10900	11000
	Manganese (Mn) (mg/kg)		848	788	841	1240	961
	Mercury (Hg) (mg/kg)		<0.050	<0.050	<0.050	<0.050	<0.050
	Molybdenum (Mo) (mg/kg)		51.6	57.0	81.9	45.0	59.1
	Nickel (Ni) (mg/kg)		87.2	100	1050	155	127
	Phosphorus (P) (mg/kg)		10000	9250	11100	8810	9510
	Potassium (K) (mg/kg)		4080	3840	4740	4540	3980
	Selenium (Se) (mg/kg)		1.59	1.14	1.16	1.07	1.09
	Silver (Ag) (mg/kg)		3.70	2.54	2.75	2.94	4.35
	Sodium (Na) (mg/kg)		13700	12700	13600	14300	13800
	Strontium (Sr) (mg/kg)		328	265	340	368	290
	Sulfur (S) (mg/kg)		10700	8500	9000	9000	10400
	Thallium (TI) (mg/kg)		0.079	0.076	0.085	0.081	0.079
	Tin (Sn) (mg/kg)		189	110	232	90.8	102
	Titanium (Ti) (mg/kg)		482	590	500	1650	728
	Tungsten (W) (mg/kg)		8.13	8.86	11.3	11.2	6.65
	Uranium (U) (mg/kg)		4.23	4.25	4.54	4.37	4.67
	Vanadium (V) (mg/kg)		40.3	39.6	46.4	47.4	45.0
	Zinc (Zn) (mg/kg)		4220	3620	10100	5860	4200
	Zirconium (Zr) (mg/kg)		1.0	1.1	1.0	2.1	1.2

<sup>\*</sup> Please refer to the Reference Information section for an explanation of any qualifiers detected.

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		Sample ID Description Sampled Date Sampled Time Client ID	L2166261-11 soil 12-SEP-18 09:00 BA1837-A-11	L2166261-12 soil 12-SEP-18 09:00 BA1837-A-12	L2166261-13 soil 12-SEP-18 09:00 BA1837-A-10 REP	L2166261-14 soil 12-SEP-18 09:00 BA1837-A-10 REP 2	L2166261-15 soil 12-SEP-18 09:00 BA1837-A-10 REI
Grouping	Analyte						
SOIL	•						
Physical Tests	Moisture (%)		17.8	18.4			
-	pH (1:2 soil:water) (pH)		11.85	11.84			
Metals	Aluminum (Al) (mg/kg)		41400	30000			
	Antimony (Sb) (mg/kg)		312	62.0			
	Arsenic (As) (mg/kg)		59.5	17.5			
	Barium (Ba) (mg/kg)		581	459			
	Beryllium (Be) (mg/kg)		0.79	0.30			
	Bismuth (Bi) (mg/kg)		8.19	3.79			
	Boron (B) (mg/kg)		240	197			
	Cadmium (Cd) (mg/kg)		12.5	8.91			
	Calcium (Ca) (mg/kg)		109000	77300			
	Chromium (Cr) (mg/kg)		186	154			
	Cobalt (Co) (mg/kg)		420	16.5			
	Copper (Cu) (mg/kg)		6580	6580			
	Iron (Fe) (mg/kg)		80500	78800			
	Lead (Pb) (mg/kg)		4230	309			
	Lithium (Li) (mg/kg)		27.1	11.3			
	Magnesium (Mg) (mg/kg)		11900	6750			
	Manganese (Mn) (mg/kg)		939	829			
	Mercury (Hg) (mg/kg)		<0.050	0.151			
	Molybdenum (Mo) (mg/kg)		86.5	70.8			
	Nickel (Ni) (mg/kg)		105	198			
	Phosphorus (P) (mg/kg)		9610	6030			
	Potassium (K) (mg/kg)		4310	2780			
	Selenium (Se) (mg/kg)		1.05	1.03			
	Silver (Ag) (mg/kg)		3.15	5.08			
	Sodium (Na) (mg/kg)		13700	9470			
	Strontium (Sr) (mg/kg)		346	262			
	Sulfur (S) (mg/kg)		9300	6500			
	Thallium (TI) (mg/kg)		0.111	0.170			
	Tin (Sn) (mg/kg)		93.7	173			
	Titanium (Ti) (mg/kg)		642	440			
	Tungsten (W) (mg/kg)		6.73	8.25			
	Uranium (U) (mg/kg)		4.56	3.17			
	Vanadium (V) (mg/kg)		46.3	32.0			
	Zinc (Zn) (mg/kg)		5200	5700			
	Zirconium (Zr) (mg/kg)		1.4	<1.0			

<sup>\*</sup> Please refer to the Reference Information section for an explanation of any qualifiers detected.

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		Sample ID Description Sampled Date Sampled Time Client ID	L2166261-16 soil 12-SEP-18 09:00 BA1837-A-10 REP	L2166261-17 soil 12-SEP-18 09:00 BA1837-A-12 REP	L2166261-18 soil 12-SEP-18 09:00 BA1837-A-12 REP	L2166261-19 soil 12-SEP-18 09:00 BA1837-A-12 REP 3	L2166261-20 soil 12-SEP-18 09:00 BA1837-A-12 REP
Grouping	Analyte						
SOIL							
Physical Tests	Moisture (%)						
	pH (1:2 soil:water) (pH)						
Metals	Aluminum (Al) (mg/kg)						
	Antimony (Sb) (mg/kg)						
	Arsenic (As) (mg/kg)						
	Barium (Ba) (mg/kg)						
	Beryllium (Be) (mg/kg)						
	Bismuth (Bi) (mg/kg)						
	Boron (B) (mg/kg)						
	Cadmium (Cd) (mg/kg)						
	Calcium (Ca) (mg/kg)						
	Chromium (Cr) (mg/kg)						
	Cobalt (Co) (mg/kg)						
	Copper (Cu) (mg/kg)						
	Iron (Fe) (mg/kg)						
	Lead (Pb) (mg/kg)						
	Lithium (Li) (mg/kg)						
	Magnesium (Mg) (mg/kg)						
	Manganese (Mn) (mg/kg)						
	Mercury (Hg) (mg/kg)						
	Molybdenum (Mo) (mg/kg)						
	Nickel (Ni) (mg/kg)						
	Phosphorus (P) (mg/kg)						
	Potassium (K) (mg/kg)						
	Selenium (Se) (mg/kg)						
	Silver (Ag) (mg/kg)						
	Sodium (Na) (mg/kg)						
	Strontium (Sr) (mg/kg)						
	Sulfur (S) (mg/kg)						
	Thallium (TI) (mg/kg)						
	Tin (Sn) (mg/kg)						
	Titanium (Ti) (mg/kg)						
	Tungsten (W) (mg/kg)						
	Uranium (U) (mg/kg)						
	Vanadium (V) (mg/kg)						
	Zinc (Zn) (mg/kg)						
	Zirconium (Zr) (mg/kg)						

<sup>\*</sup> Please refer to the Reference Information section for an explanation of any qualifiers detected.

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	Sample ID Description Sampled Date Sampled Time Client ID	L2166261-1 soil 12-SEP-18 09:00 BA1837-A-1	L2166261-2 soil 12-SEP-18 09:00 BA1837-A-2	L2166261-3 soil 12-SEP-18 09:00 BA1837-A-3	L2166261-4 soil 12-SEP-18 09:00 BA1837-A-4	L2166261-5 soil 12-SEP-18 09:00 BA1837-A-5
Grouping	Analyte					
SOIL						
TCLP Metals	1st Preliminary pH (pH)	11.66	11.63	11.64	11.66	11.60
	2nd Preliminary pH (pH)	8.96	9.18	8.74	9.59	9.10
	Final pH (pH)	5.85	5.88	5.91	5.85	5.70
	Extraction Solution Initial pH (pH)	2.89	2.89	2.89	2.89	2.89
	Antimony (Sb)-Leachable (mg/L)	<1.0	<1.0	<1.0	<1.0	<1.0
	Arsenic (As)-Leachable (mg/L)	<1.0	<1.0	<1.0	<1.0	<1.0
	Barium (Ba)-Leachable (mg/L)	<2.5	<2.5	<2.5	<2.5	<2.5
	Beryllium (Be)-Leachable (mg/L)	<0.025	<0.025	<0.025	<0.025	<0.025
	Boron (B)-Leachable (mg/L)	2.33	2.37	3.52	2.02	2.38
	Cadmium (Cd)-Leachable (mg/L)	0.219	0.287	0.200	0.237	0.227
	Calcium (Ca)-Leachable (mg/L)	1780	1820	1850	1750	1740
	Chromium (Cr)-Leachable (mg/L)	<0.25	<0.25	<0.25	<0.25	<0.25
	Cobalt (Co)-Leachable (mg/L)	1.12	0.547	0.529	0.716	0.620
	Copper (Cu)-Leachable (mg/L)	2.10	1.07	0.427	1.72	1.10
	Iron (Fe)-Leachable (mg/L)	<5.0	<5.0	<5.0	<5.0	<5.0
	Lead (Pb)-Leachable (mg/L)	0.56	<0.25	<0.25	<0.25	0.94
	Magnesium (Mg)-Leachable (mg/L)	110	112	112	109	107
	Mercury (Hg)-Leachable (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Nickel (Ni)-Leachable (mg/L)	0.61	0.65	0.63	0.74	0.71
	Selenium (Se)-Leachable (mg/L)	<1.0	<1.0	<1.0	<1.0	<1.0
	Silver (Ag)-Leachable (mg/L)	<0.050	<0.050	<0.050	<0.050	<0.050
	Thallium (TI)-Leachable (mg/L)	<1.0	<1.0	<1.0	<1.0	<1.0
	Vanadium (V)-Leachable (mg/L)	<0.15	<0.15	<0.15	<0.15	<0.15
	Zinc (Zn)-Leachable (mg/L)	61.4	73.7	47.1	42.5	65.5

<sup>\*</sup> Please refer to the Reference Information section for an explanation of any qualifiers detected.

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## ALS ENVIRONMENTAL ANALYTICAL REPORT

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	Sample ID Description Sampled Date Sampled Time Client ID	L2166261-6 soil 12-SEP-18 09:00 BA1837-A-6	L2166261-7 soil 12-SEP-18 09:00 BA1837-A-7	L2166261-8 soil 12-SEP-18 09:00 BA1837-A-8	L2166261-9 soil 12-SEP-18 09:00 BA1837-A-9	L2166261-10 soil 12-SEP-18 09:00 BA1837-A-10
Grouping	Analyte					
SOIL						
TCLP Metals	1st Preliminary pH (pH)	11.77	11.77	11.66	11.63	11.72
	2nd Preliminary pH (pH)	9.63	9.31	9.17	9.03	8.90
	Final pH (pH)	5.87	5.97	6.11	6.15	6.02
	Extraction Solution Initial pH (pH)	2.89	2.89	2.89	2.89	2.89
	Antimony (Sb)-Leachable (mg/L)	<1.0	<1.0	<1.0	<1.0	<1.0
	Arsenic (As)-Leachable (mg/L)	<1.0	<1.0	<1.0	<1.0	<1.0
	Barium (Ba)-Leachable (mg/L)	<2.5	<2.5	<2.5	<2.5	<2.5
	Beryllium (Be)-Leachable (mg/L)	<0.025	<0.025	<0.025	<0.025	<0.025
	Boron (B)-Leachable (mg/L)	2.13	2.37	2.46	2.59	2.40
	Cadmium (Cd)-Leachable (mg/L)	0.277	0.334	0.289	0.161	1.03
	Calcium (Ca)-Leachable (mg/L)	1790	1810	1730	1800	1710
	Chromium (Cr)-Leachable (mg/L)	<0.25	<0.25	<0.25	<0.25	<0.25
	Cobalt (Co)-Leachable (mg/L)	0.415	1.18	1.11	0.354	0.508
	Copper (Cu)-Leachable (mg/L)	0.790	1.32	1.32	0.681	1.44
	Iron (Fe)-Leachable (mg/L)	<5.0	<5.0	<5.0	<5.0	<5.0
	Lead (Pb)-Leachable (mg/L)	<0.25	0.30	<0.25	<0.25	<0.25
	Magnesium (Mg)-Leachable (mg/L)	112	113	121	113	106
	Mercury (Hg)-Leachable (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Nickel (Ni)-Leachable (mg/L)	0.60	0.54	0.59	0.68	1.03
	Selenium (Se)-Leachable (mg/L)	<1.0	<1.0	<1.0	<1.0	<1.0
	Silver (Ag)-Leachable (mg/L)	<0.050	<0.050	<0.050	<0.050	<0.050
	Thallium (TI)-Leachable (mg/L)	<1.0	<1.0	<1.0	<1.0	<1.0
	Vanadium (V)-Leachable (mg/L)	<0.15	<0.15	<0.15	<0.15	<0.15
	Zinc (Zn)-Leachable (mg/L)	63.4	59.3	131	46.3	60.6

<sup>\*</sup> Please refer to the Reference Information section for an explanation of any qualifiers detected.

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## ALS ENVIRONMENTAL ANALYTICAL REPORT

Version: FINAL

	Sample ID Description Sampled Date Sampled Time Client ID	L2166261-11 soil 12-SEP-18 09:00 BA1837-A-11	L2166261-12 soil 12-SEP-18 09:00 BA1837-A-12	L2166261-13 soil 12-SEP-18 09:00 BA1837-A-10 REP	L2166261-14 soil 12-SEP-18 09:00 BA1837-A-10 REP 2	L2166261-15 soil 12-SEP-18 09:00 BA1837-A-10 REP
Grouping	Analyte					
SOIL						
TCLP Metals	1st Preliminary pH (pH)	11.66	11.55	11.72	11.72	11.72
	2nd Preliminary pH (pH)	8.33	8.32	8.90	8.90	8.90
	Final pH (pH)	6.03	5.79	6.01	5.97	5.88
	Extraction Solution Initial pH (pH)	2.89	2.89	2.89	2.89	2.89
	Antimony (Sb)-Leachable (mg/L)	<1.0	<1.0			
	Arsenic (As)-Leachable (mg/L)	<1.0	<1.0			
	Barium (Ba)-Leachable (mg/L)	<2.5	<2.5			
	Beryllium (Be)-Leachable (mg/L)	<0.025	<0.025			
	Boron (B)-Leachable (mg/L)	2.55	1.90			
	Cadmium (Cd)-Leachable (mg/L)	0.194	0.656	3.35	0.223	0.218
	Calcium (Ca)-Leachable (mg/L)	1750	1680			
	Chromium (Cr)-Leachable (mg/L)	<0.25	<0.25			
	Cobalt (Co)-Leachable (mg/L)	0.697	1.31			
	Copper (Cu)-Leachable (mg/L)	1.07	0.988			
	Iron (Fe)-Leachable (mg/L)	<5.0	<5.0			
	Lead (Pb)-Leachable (mg/L)	1.12	2.16			
	Magnesium (Mg)-Leachable (mg/L)	110	102			
	Mercury (Hg)-Leachable (mg/L)	<0.0010	<0.0010			
	Nickel (Ni)-Leachable (mg/L)	0.48	0.89			
	Selenium (Se)-Leachable (mg/L)	<1.0	<1.0			
	Silver (Ag)-Leachable (mg/L)	<0.050	<0.050			
	Thallium (TI)-Leachable (mg/L)	<1.0	<1.0			
	Vanadium (V)-Leachable (mg/L)	<0.15	<0.15			
	Zinc (Zn)-Leachable (mg/L)	40.3	73.9			

<sup>\*</sup> Please refer to the Reference Information section for an explanation of any qualifiers detected.

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01-OCT-18 15:51 (MT)

### ALS ENVIRONMENTAL ANALYTICAL REPORT Version: FINAL

	Sample ID Description Sampled Date Sampled Time Client ID	L2166261-16 soil 12-SEP-18 09:00 BA1837-A-10 REP	L2166261-17 soil 12-SEP-18 09:00 BA1837-A-12 REP	L2166261-18 soil 12-SEP-18 09:00 BA1837-A-12 REP 2	L2166261-19 soil 12-SEP-18 09:00 BA1837-A-12 REP 3	L2166261-20 soil 12-SEP-18 09:00 BA1837-A-12 REP
Grouping	Analyte	-				
SOIL						
TCLP Metals	1st Preliminary pH (pH)	11.72	11.55	11.55	11.55	11.55
	2nd Preliminary pH (pH)	8.90	8.32	8.32	8.32	8.32
	Final pH (pH)	5.90	5.71	5.63	5.81	5.99
	Extraction Solution Initial pH (pH)	2.89	2.89	2.89	2.89	2.89
	Antimony (Sb)-Leachable (mg/L)					
	Arsenic (As)-Leachable (mg/L)					
	Barium (Ba)-Leachable (mg/L)					
	Beryllium (Be)-Leachable (mg/L)					
	Boron (B)-Leachable (mg/L)					
	Cadmium (Cd)-Leachable (mg/L)	1.71	0.244	0.291	0.217	0.236
	Calcium (Ca)-Leachable (mg/L)					
	Chromium (Cr)-Leachable (mg/L)					
	Cobalt (Co)-Leachable (mg/L)					
	Copper (Cu)-Leachable (mg/L)					
	Iron (Fe)-Leachable (mg/L)					
	Lead (Pb)-Leachable (mg/L)					
	Magnesium (Mg)-Leachable (mg/L)					
	Mercury (Hg)-Leachable (mg/L)					
	Nickel (Ni)-Leachable (mg/L)					
	Selenium (Se)-Leachable (mg/L)					
	Silver (Ag)-Leachable (mg/L)					
	Thallium (TI)-Leachable (mg/L)					
	Vanadium (V)-Leachable (mg/L)					
	Zinc (Zn)-Leachable (mg/L)					
1						
1						
1						

<sup>\*</sup> Please refer to the Reference Information section for an explanation of any qualifiers detected.

# L2166261 CONTD.... PAGE 10 of 11

01-OCT-18 15:51 (MT) Version: FINΔI

### **Reference Information**

#### QC Samples with Qualifiers & Comments:

QC Type Description	Parameter	Qualifier	Applies to Sample Number(s)
Method Blank	Copper (Cu)	В	L2166261-1, -10, -11, -12, -2, -3, -4, -5, -6, -7, -8, -9
Duplicate	Antimony (Sb)	DUP-H	L2166261-1, -10, -11, -12, -2, -3, -4, -5, -6, -7, -8, -9
Duplicate	Chromium (Cr)	DUP-H	L2166261-1, -10, -11, -12, -2, -3, -4, -5, -6, -7, -8, -9
Duplicate	Cobalt (Co)	DUP-H	L2166261-1, -10, -11, -12, -2, -3, -4, -5, -6, -7, -8, -9
Duplicate	Copper (Cu)	DUP-H	L2166261-1, -10, -11, -12, -2, -3, -4, -5, -6, -7, -8, -9
Duplicate	Molybdenum (Mo)	DUP-H	L2166261-1, -10, -11, -12, -2, -3, -4, -5, -6, -7, -8, -9
Duplicate	Nickel (Ni)	DUP-H	L2166261-1, -10, -11, -12, -2, -3, -4, -5, -6, -7, -8, -9
Duplicate	Silver (Ag)	DUP-H	L2166261-1, -10, -11, -12, -2, -3, -4, -5, -6, -7, -8, -9
Duplicate	Strontium (Sr)	DUP-H	L2166261-1, -10, -11, -12, -2, -3, -4, -5, -6, -7, -8, -9
Duplicate	Tin (Sn)	DUP-H	L2166261-1, -10, -11, -12, -2, -3, -4, -5, -6, -7, -8, -9
Duplicate	Tungsten (W)	DUP-H	L2166261-1, -10, -11, -12, -2, -3, -4, -5, -6, -7, -8, -9
Duplicate	Zinc (Zn)	DUP-H	L2166261-1, -10, -11, -12, -2, -3, -4, -5, -6, -7, -8, -9
Duplicate	Selenium (Se)	DUP-H,J	L2166261-1, -10, -11, -12, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Cadmium (Cd)-Leachable	MS-B	L2166261-1, -10, -11, -12, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Calcium (Ca)-Leachable	MS-B	L2166261-1, -10, -11, -12, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Cobalt (Co)-Leachable	MS-B	L2166261-1, -10, -11, -12, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Zinc (Zn)-Leachable	MS-B	L2166261-1, -10, -11, -12, -2, -3, -4, -5, -6, -7, -8, -9

#### Qualifiers for Individual Parameters Listed:

Qualifier	Description
В	Method Blank exceeds ALS DQO. Associated sample results which are < Limit of Reporting or > 5 times blank level are considered reliable.
DUP-H	Duplicate results outside ALS DQO, due to sample heterogeneity.
DUP-H,J	Duplicate results outside ALS DQO, due to sample heterogeneity. Duplicate results and limits are expressed in terms of absolute difference.
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.

#### **Test Method References:**

ALS Test Code	Matrix	Test Description	Method Reference**
HG-200.2-CVAF-VA	Soil	Mercury in Soil by CVAAS	EPA 200.2/1631E (mod)

Soil samples are digested with hot nitric and hydrochloric acids, followed by CVAAS analysis. This method is fully compliant with the BC SALM strong acid leachable metals digestion method.

**HG-TCLP-CVAFS-VA** Soil Mercury by CVAAS (TCLP) EPA 1311/245.7

This analysis is carried out in accordance with the extraction procedure outlined in "Test Methods for Evaluating Solid Waste - Physical/Chemical Methods Volume 1C" SW-846 EPA Method 1311, published by the United States Environmental Protection Agency (EPA). In summary, the sample is extracted at a 20:1 liquid to solids ratio for 16 to 20 hours using either extraction fluid #1 (glacial acetic acid, water and sodium hydroxide) or extraction fluid #2 (glacial acetic acid), depending on the pH of the original sample. The extract is then filtered through a 0.6 to 0.8 micron glass fibre filter and analysed using atomic absorption spectrophotometry (EPA 245.7).

EPA 200.2/6020A (mod) MET-200.2-CCMS-VA Metals in Soil by CRC ICPMS

This method uses a heated strong acid digestion with HNO3 and HCl and is intended to liberate metals that may be environmentally available. Silicate minerals are not solubilized. Dependent on sample matrix, some metals may be only partially recovered, including Al, Ba, Be, Cr, Sr, Ti, Tl, V, W, and Zr. Volatile forms of sulfur (including sulfide) may not be captured, as they may be lost during sampling, storage, or digestion. Analysis is by Collision/Reaction Cell ICPMS.

MET-TCLP-ICP-VA Metals by ICPOES (TCLP) EPA 1311/6010B Soil

This analysis is carried out in accordance with the extraction procedure outlined in "Test Methods for Evaluating Solid Waste - Physical/Chemical Methods Volume 1C" SW-846 EPA Method 1311, published by the United States Environmental Protection Agency (EPA). In summary, the sample is extracted at a 20:1 liquid to solids ratio for 16 to 20 hours using either extraction fluid #1 (glacial acetic acid, water and sodium hydroxide) or extraction fluid #2 (glacial acetic acid), depending on the pH of the original sample. The extract is then filtered through a 0.6 to 0.8 micron glass fibre filter and analysed using inductively coupled plasma - optical emission spectrophotometry (EPA Method 6010B).

MOISTURE-VA Soil CWS for PHC in Soil - Tier 1 Moisture content

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

pH in Soil (1:2 Soil:Water Extraction) BC WLAP METHOD: PH, ELECTROMETRIC, SOIL PH-1:2-VA

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 (No. 10 / 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

### **Reference Information**

L2166261 CONTD....
PAGE 11 of 11
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Version: FINAL

probe.

\*\* ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code Laboratory Location

VA ALS ENVIRONMENTAL - VANCOUVER, BRITISH COLUMBIA, CANADA

#### **Chain of Custody Numbers:**

#### **GLOSSARY OF REPORT TERMS**

Surrogate - A compound that is similar in behaviour to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.

mg/kg - milligrams per kilogram based on dry weight of sample.

mg/kg wwt - milligrams per kilogram based on wet weight of sample.

mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight of sample.

mg/L - milligrams per litre.

< - Less than.

D.L. - The reported Detection Limit, also known as the Limit of Reporting (LOR).

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.

Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

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Covanta Burnaby R.E., ULC ATTN: Steve McKinney 5150 Riverbend Drive Burnaby BC V3N 4V3

Date Received: 05-OCT-18

Report Date: 23-OCT-18 18:20 (MT)

Version: FINAL REV. 2

Client Phone: 604-521-1025

# Certificate of Analysis

Lab Work Order #: L2176793

Project P.O. #: VANCO-000047506

Job Reference: C of C Numbers: Legal Site Desc:

#### Comments:

As per client request, certain samples were re-prepped from scratch and analyzed for TCLP Metals (TCLP Cd) in varying replicate amounts. Results are reported as samples #13-16, and have "REP" in the Client Sample ID field. Fluid determination was not performed for samples #13-16, as per client instructions. The prep data was taken from the original samples but is reported with the re-prepped samples for informational purposes.

Brent Mack, B.Sc. Account Manager

[This report shall not be reproduced except in full without the written authority of the Laboratory.]

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PAGE 2 of 6 23-OCT-18 18:20 (MT)

# Version: FINAL REV. 2

	Sample ID Description Sampled Date Sampled Time Client ID	Soil 10-SEP-18 09:00	L2176793-2 Soil 10-SEP-18 09:00 DBA1837-A-01-02	L2176793-3 Soil 10-SEP-18 09:00 DBA1837-A-01-03	L2176793-4 Soil 10-SEP-18 09:00 DBA1837-A-01-04	L2176793-5 Soil 10-SEP-18 09:00 DBA1837-A-01-05
Grouping	Analyte					
SOIL						
Physical Tests	pH (1:2 soil:water) (pH)	10.98	10.89	10.78	10.93	10.89
TCLP Metals	1st Preliminary pH (pH)	11.31	11.47	11.42	11.42	11.51
	2nd Preliminary pH (pH)	8.39	7.67	8.02	7.86	8.41
	Final pH (pH)	6.13	6.17	5.97	6.07	6.01
	Extraction Solution Initial pH (pH)	2.90	2.90	2.90	2.90	2.90
	Cadmium (Cd)-Leachable (mg/L)	0.162	0.271	0.175	0.207	0.143

<sup>\*</sup> Please refer to the Reference Information section for an explanation of any qualifiers detected.

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# Version: FINAL REV. 2

	Sample ID Description Sampled Date Sampled Time Client ID	L2176793-6 Soil 10-SEP-18 09:00 DBA1837-A-01-06	L2176793-7 Soil 10-SEP-18 09:00 DBA1837-A-01-07	L2176793-8 Soil 10-SEP-18 09:00 DBA1837-A-01-08	L2176793-9 Soil 10-SEP-18 09:00 DBA1837-A-01-09	L2176793-10 Soil 10-SEP-18 09:00 DBA1837-A-01-10
Grouping	Analyte					
SOIL						
Physical Tests	pH (1:2 soil:water) (pH)	11.06	10.87	10.83	10.98	11.23
TCLP Metals	1st Preliminary pH (pH)	11.46	11.59	11.44	11.51	11.47
	2nd Preliminary pH (pH)	7.87	8.20	8.00	8.19	7.70
	Final pH (pH)	5.99	6.00	6.20	5.91	6.22
	Extraction Solution Initial pH (pH)	2.90	2.90	2.90	2.90	2.90
	Cadmium (Cd)-Leachable (mg/L)	0.143	0.143	0.181	1.05	0.107

<sup>\*</sup> Please refer to the Reference Information section for an explanation of any qualifiers detected.

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Version: FINAL REV. 2

	Sample ID Description Sampled Date Sampled Time Client ID	L2176793-11 Soil 10-SEP-18 09:00 DBA1837-A-01-11	L2176793-12 Soil 10-SEP-18 09:00 DBA1837-A-01-12	L2176793-13 Soil 10-SEP-18 09:00 DBA1837-A-01-09 REP1	L2176793-14 Soil 10-SEP-18 09:00 DBA1837-A-01-09 REP2	L2176793-15 Soil 10-SEP-18 09:00 DBA1837-A-01-09 REP3
Grouping	Analyte					
SOIL						
Physical Tests	pH (1:2 soil:water) (pH)	10.90	10.92			
TCLP Metals	1st Preliminary pH (pH)	11.52	11.54	11.51	11.51	11.51
	2nd Preliminary pH (pH)	7.11	8.03	8.19	8.19	8.19
	Final pH (pH)	6.02	6.11	6.01	5.93	5.64
	Extraction Solution Initial pH (pH)	2.90	2.90	2.90	2.90	2.90
	Cadmium (Cd)-Leachable (mg/L)	0.142	0.315	0.162	0.151	0.164

<sup>\*</sup> Please refer to the Reference Information section for an explanation of any qualifiers detected.

L2176793 CONTD.... PAGE 5 of 6

23-OCT-18 18:20 (MT) Version: FINAL REV. 2

### ALS ENVIRONMENTAL ANALYTICAL REPORT

L2176793-16 Sample ID Description Soil 10-SEP-18 Sampled Date 09:00 Sampled Time DBA1837-A-01-09 REP4 Client ID Grouping Analyte SOIL **Physical Tests** pH (1:2 soil:water) (pH) **TCLP Metals** 1st Preliminary pH (pH) 11.51 2nd Preliminary pH (pH) 8.19 Final pH (pH) 5.36 Extraction Solution Initial pH (pH) 2.90 Cadmium (Cd)-Leachable (mg/L) 0.197

<sup>\*</sup> Please refer to the Reference Information section for an explanation of any qualifiers detected.

### **Reference Information**

L2176793 CONTD.... PAGE 6 of 6 23-OCT-18 18:20 (MT)

Version: FINAL REV. 2

#### QC Samples with Qualifiers & Comments:

QC Type Desc	cription	Parameter	Qualifier	Applies to Sample Number(s)
Matrix Spike		Cadmium (Cd)-Leachable	MS-B	L2176793-13, -14, -15, -16
Qualifiers for	Individual Parameters Lis	sted:		
Qualifier	Description			
MS-B	Matrix Spike recovery co	ould not be accurately calculated due to	high analyte	background in sample.

#### **Test Method References:**

ALS Test Code	Matrix	Test Description	Method Reference**
MET-TCLP-ICP-VA	Soil	Metals by ICPOES (TCLP)	EPA 1311/6010B

This analysis is carried out in accordance with the extraction procedure outlined in "Test Methods for Evaluating Solid Waste - Physical/Chemical Methods Volume 1C" SW-846 EPA Method 1311, published by the United States Environmental Protection Agency (EPA). In summary, the sample is extracted at a 20:1 liquid to solids ratio for 16 to 20 hours using either extraction fluid #1 (glacial acetic acid, water and sodium hydroxide) or extraction fluid #2 (glacial acetic acid), depending on the pH of the original sample. The extract is then filtered through a 0.6 to 0.8 micron glass fibre filter and analysed using inductively coupled plasma - optical emission spectrophotometry (EPA Method 6010B).

PH-1:2-VA Soil pH in Soil (1:2 Soil:Water Extraction) 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 (No. 10 / 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.

\*\* ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

<b>Laboratory Definition Code</b>	Laboratory Location
VA	ALS ENVIRONMENTAL - VANCOUVER, BRITISH COLUMBIA, CANADA

#### **Chain of Custody Numbers:**

#### **GLOSSARY OF REPORT TERMS**

Surrogate - A compound that is similar in behaviour to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.

mg/kg - milligrams per kilogram based on dry weight of sample.

mg/kg wwt - milligrams per kilogram based on wet weight of sample.

mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight of sample.

mg/L - milligrams per litre.

< - Less than.

D.L. - The reported Detection Limit, also known as the Limit of Reporting (LOR).

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.

Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.





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Contact:	Steve Mckinney / D	an Skrypnyk	_	✓ PDF	Excel	☐ Digital	Fax O	Priority (	(2-4 Busir	ness Day	s) - 50% Su	rcharge -	Contact AL	.S to Conf	irm TAT	
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	DBA1837-A-01-06				10-Sep-18	9:00	Soil	X			1		$\perp \perp$	_		1
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Covanta Burnaby R.E., ULC ATTN: Steve McKinney 5150 Riverbend Drive Burnaby BC V3N 4V3

Date Received: 05-OCT-18

Report Date: 15-OCT-18 18:40 (MT)

Version: FINAL

Client Phone: 604-521-1025

# Certificate of Analysis

Lab Work Order #: L2176797

Project P.O. #: VANCO-000047506

Job Reference: C of C Numbers: Legal Site Desc:

15 Hack

Brent Mack, B.Sc. Account Manager

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ADDRESS: 8081 Lougheed Hwy, Suite 100, Burnaby, BC V5A 1W9 Canada | Phone: +1 604 253 4188 | Fax: +1 604 253 6700 ALS CANADA LTD Part of the ALS Group An ALS Limited Company



PAGE 2 of 5 15-OCT-18 18:40 (MT)

Version: FINAL

	Sample ID Description Sampled Date Sampled Time Client ID	L2176797-1 Soil 12-SEP-18 09:00 DBA1837-A-02-01	L2176797-2 Soil 12-SEP-18 09:00 DBA1837-A-02-02	L2176797-3 Soil 12-SEP-18 09:00 DBA1837-A-02-03	L2176797-4 Soil 12-SEP-18 09:00 DBA1837-A-02-04	L2176797-5 Soil 12-SEP-18 09:00 DBA1837-A-02-05
Grouping	Analyte					
SOIL						
TCLP Metals	1st Preliminary pH (pH)	11.10	11.07	11.05	11.02	11.14
	2nd Preliminary pH (pH)	7.91	7.82	7.83	6.71	6.77
	Final pH (pH)	5.70	5.69	5.67	5.82	5.64
	Extraction Solution Initial pH (pH)	2.92	2.92	2.92	2.92	2.92
	Cadmium (Cd)-Leachable (mg/L)	0.198	0.429	0.204	0.208	0.171

PAGE 3 of 5 15-OCT-18 18:40 (MT)

Version: FINAL

	Sample ID Description Sampled Date Sampled Time Client ID	L2176797-6 Soil 12-SEP-18 09:00 DBA1837-A-02-06	L2176797-7 Soil 12-SEP-18 09:00 DBA1837-A-02-07	L2176797-8 Soil 12-SEP-18 09:00 DBA1837-A-02-08	L2176797-9 Soil 12-SEP-18 09:00 DBA1837-A-02-09	L2176797-10 Soil 12-SEP-18 09:00 DBA1837-A-02-10
Grouping	Analyte					
SOIL						
TCLP Metals	1st Preliminary pH (pH)	11.03	11.11	11.09	10.99	10.99
	2nd Preliminary pH (pH)	8.13	7.85	7.52	7.09	8.41
	Final pH (pH)	5.62	5.76	5.70	5.54	5.78
	Extraction Solution Initial pH (pH)	2.92	2.92	2.92	2.92	2.92
	Cadmium (Cd)-Leachable (mg/L)	0.205	0.180	0.219	0.242	0.176

L2176797 CONTD.... PAGE 4 of 5

# ALS ENVIRONMENTAL ANALYTICAL REPORT

15-OCT-18 18:40 (MT) Version: FINAL

	Sample ID Description Sampled Date Sampled Time Client ID	L2176797-11 Soil 12-SEP-18 09:00 DBA1837-A-02-11	L2176797-12 Soil 12-SEP-18 09:00 DBA1837-A-02-12		
Grouping	Analyte				
SOIL					
TCLP Metals	1st Preliminary pH (pH)	10.98	11.15		
	2nd Preliminary pH (pH)	6.78	6.09		
	Final pH (pH)	5.77	5.95		
	Extraction Solution Initial pH (pH)	2.92	2.92		
	Cadmium (Cd)-Leachable (mg/L)	0.207	0.182		
		0.20.	002		

L2176797 CONTD....

PAGE 5 of 5

15-OCT-18 18:40 (MT)

Version: FINAL

#### **Reference Information**

#### **Test Method References:**

ALS Test Code	Matrix	Test Description	Method Reference**				
MET-TCLP-ICP-VA	Soil	Metals by ICPOES (TCLP)	EPA 1311/6010B				

This analysis is carried out in accordance with the extraction procedure outlined in "Test Methods for Evaluating Solid Waste - Physical/Chemical Methods Volume 1C" SW-846 EPA Method 1311, published by the United States Environmental Protection Agency (EPA). In summary, the sample is extracted at a 20:1 liquid to solids ratio for 16 to 20 hours using either extraction fluid #1 (glacial acetic acid, water and sodium hydroxide) or extraction fluid #2 (glacial acetic acid), depending on the pH of the original sample. The extract is then filtered through a 0.6 to 0.8 micron glass fibre filter and analysed using inductively coupled plasma - optical emission spectrophotometry (EPA Method 6010B).

\*\* ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location
VA	ALS ENVIRONMENTAL - VANCOUVER, BRITISH COLUMBIA, CANADA

#### **Chain of Custody Numbers:**

#### **GLOSSARY OF REPORT TERMS**

Surrogate - A compound that is similar in behaviour to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.

mg/kg - milligrams per kilogram based on dry weight of sample.

mg/kg wwt - milligrams per kilogram based on wet weight of sample.

mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight of sample.

mg/L - milligrams per litre.

< - Less than.

D.L. - The reported Detection Limit, also known as the Limit of Reporting (LOR).

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.

Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

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	DBA1837-A-02-08			sept 12 2018	9:00	Soil	Х									1
	DBA1837-A-02-09			sept 12 2018	9:00	Soil	Х									1
	DBA1837-A-02-10			sept 12 2018	9:00	Soil	Х									1
	DBA1837-A-02-11			sept 12 2018	9:00	Soil	X									1
	DBA1837-A-02-12			sept 12 2018	9:00	Soil	X									1
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Covanta Burnaby R.E., ULC ATTN: Steve McKinney 5150 Riverbend Drive Burnaby BC V3N 4V3

Date Received: 05-OCT-18

Report Date: 31-OCT-18 14:29 (MT)

Version: FINAL REV. 2

Client Phone: 604-521-1025

# Certificate of Analysis

Lab Work Order #: L2176795

Project P.O. #: VANCO-000047506

Job Reference: C of C Numbers: Legal Site Desc:

#### Comments:

As per client request, certain samples were re-prepped from scratch and analyzed for TCLP Metals (TCLP Cd) in varying replicate amounts. Results are reported as samples #13-24, and have "REP" in the Client Sample ID field. Fluid determination was not performed for samples #13-24, as per client instructions. The prep data was taken from the original samples but is reported with the re-prepped samples for informational purposes.

Brent Mack, B.Sc. Account Manager

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ADDRESS: 8081 Lougheed Hwy, Suite 100, Burnaby, BC V5A 1W9 Canada | Phone: +1 604 253 4188 | Fax: +1 604 253 6700

ALS CANADA LTD Part of the ALS Group An ALS Limited Company



PAGE 2 of 7 31-OCT-18 14:29 (MT)

Version: FINAL REV. 2

	Sample ID Description Sampled Date Sampled Time Client ID	L2176795-1 Soil 13-SEP-18 09:00 DBA1837-A-03-01	L2176795-2 Soil 13-SEP-18 09:00 DBA1837-A-03-02	L2176795-3 Soil 13-SEP-18 09:00 DBA1837-A-03-03	L2176795-4 Soil 13-SEP-18 09:00 DBA1837-A-03-04	L2176795-5 Soil 13-SEP-18 09:00 DBA1837-A-03-05
Grouping	Analyte					
SOIL	•					
Physical Tests	pH (1:2 soil:water) (pH)	12.24	12.33	12.38	12.36	12.32
TCLP Metals	1st Preliminary pH (pH)	11.76	11.73	11.72	11.76	11.77
	2nd Preliminary pH (pH)	9.36	9.21	9.07	9.10	9.18
	Final pH (pH)	5.92	5.81	5.90	6.01	5.90
	Extraction Solution Initial pH (pH)	2.89	2.89	2.89	2.89	2.89
	Cadmium (Cd)-Leachable (mg/L)	0.552	0.185	0.240	0.178	0.181

PAGE 3 of 7 31-OCT-18 14:29 (MT)

### Version: FINAL REV. 2

	Sample ID Description Sampled Date Sampled Time Client ID	L2176795-6 Soil 13-SEP-18 09:00 DBA1837-A-03-06	L2176795-7 Soil 13-SEP-18 09:00 DBA1837-A-03-07	L2176795-8 Soil 13-SEP-18 09:00 DBA1837-A-03-08	L2176795-9 Soil 13-SEP-18 09:00 DBA1837-A-03-09	L2176795-10 Soil 13-SEP-18 09:00 DBA1837-A-03-10
Grouping	Analyte					
SOIL	,					
Physical Tests	pH (1:2 soil:water) (pH)	12.34	12.20	12.04	12.15	12.34
TCLP Metals	1st Preliminary pH (pH)	11.82	11.75	11.76	11.72	11.83
	2nd Preliminary pH (pH)	9.56	9.03	8.90	9.06	9.45
	Final pH (pH)	5.97	6.07	5.70	5.84	6.02
	Extraction Solution Initial pH (pH)	2.89	2.89	2.89	2.89	2.89
	Cadmium (Cd)-Leachable (mg/L)	0.225	0.187	0.201	0.434	2.50

PAGE 4 of 7 31-OCT-18 14:29 (MT)

Version: FINAL REV. 2

	Sample ID Description Sampled Date Sampled Time Client ID	13-SEP-18	L2176795-12 Soil 13-SEP-18 09:00 DBA1837-A-03-12	L2176795-13 Soil 13-SEP-18 09:00 DBA1837-A-03-01 REP1	L2176795-14 Soil 13-SEP-18 09:00 DBA1837-A-03-01 REP2	L2176795-15 Soil 13-SEP-18 09:00 DBA1837-A-03-01 REP3
Grouping	Analyte					
SOIL						
Physical Tests	pH (1:2 soil:water) (pH)	12.30	12.04			
TCLP Metals	1st Preliminary pH (pH)	11.75	11.77	12.24	12.24	12.24
	2nd Preliminary pH (pH)	9.33	9.00	11.76	11.76	11.76
	Final pH (pH)	6.01	5.81	6.53	6.53	6.61
	Extraction Solution Initial pH (pH)	2.89	2.89	2.89	2.89	2.89
	Cadmium (Cd)-Leachable (mg/L)	0.182	0.173	0.156	0.167	0.129

PAGE 5 of 7 31-OCT-18 14:29 (MT)

Version: FINAL REV. 2

	Sample ID Description Sampled Date Sampled Time Client ID	Soil 13-SEP-18 09:00	L2176795-17 Soil 13-SEP-18 09:00 DBA1837-A-03-10 REP1	L2176795-18 Soil 13-SEP-18 09:00 DBA1837-A-03-10 REP2	L2176795-19 Soil 13-SEP-18 09:00 DBA1837-A-03-10 REP3	L2176795-20 Soil 13-SEP-18 09:00 DBA1837-A-03-10 REP4
Grouping	Analyte					
SOIL						
Physical Tests	pH (1:2 soil:water) (pH)	-				
TCLP Metals	1st Preliminary pH (pH)	12.24	12.34	12.34	12.34	12.34
	2nd Preliminary pH (pH)	11.76	11.83	11.83	11.83	11.83
	Final pH (pH)	6.98	6.91	6.45	6.52	6.24
	Extraction Solution Initial pH (pH)	2.89	2.89	2.89	2.89	2.89
	Cadmium (Cd)-Leachable (mg/L)	1.87	0.295	0.160	0.133	0.216

PAGE 6 of 7 31-OCT-18 14:29 (MT)

# ALS ENVIRONMENTAL ANALYTICAL REPORT

Version: FINAL REV. 2

	Sample ID Description Sampled Date Sampled Time Client ID	L2176795-21 Soil 13-SEP-18 09:00 DBA1837-A-03-01 REP5	L2176795-22 Soil 13-SEP-18 09:00 DBA1837-A-03-01 REP6	L2176795-23 Soil 13-SEP-18 09:00 DBA1837-A-03-10 REP5	L2176795-24 Soil 13-SEP-18 09:00 DBA1837-A-03-10 REP6	
Grouping	Analyte					
SOIL	•					
Physical Tests	pH (1:2 soil:water) (pH)					
TCLP Metals	1st Preliminary pH (pH)	11.83	11.83	11.83	11.83	
	2nd Preliminary pH (pH)	9.45	9.45	9.45	9.45	
	Final pH (pH)	5.93	5.91	5.90	5.97	
	Extraction Solution Initial pH (pH)	2.89	2.89	2.89	2.89	
	Cadmium (Cd)-Leachable (mg/L)	0.173	0.228	0.306	0.168	

### **Reference Information**

L2176795 CONTD.... PAGE 7 of 7 31-OCT-18 14:29 (MT)

Version: FINAL REV. 2

#### **Test Method References:**

ALS Test Code	Matrix	Test Description	Method Reference**	
MET-TCLP-ICP-VA	Soil	Metals by ICPOES (TCLP)	EPA 1311/6010B	

This analysis is carried out in accordance with the extraction procedure outlined in "Test Methods for Evaluating Solid Waste - Physical/Chemical Methods Volume 1C" SW-846 EPA Method 1311, published by the United States Environmental Protection Agency (EPA). In summary, the sample is extracted at a 20:1 liquid to solids ratio for 16 to 20 hours using either extraction fluid #1 (glacial acetic acid, water and sodium hydroxide) or extraction fluid #2 (glacial acetic acid), depending on the pH of the original sample. The extract is then filtered through a 0.6 to 0.8 micron glass fibre filter and analysed using inductively coupled plasma - optical emission spectrophotometry (EPA Method 6010B).

PH-1:2-VA Soil pH in Soil (1:2 Soil:Water Extraction) 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 (No. 10 / 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.

\*\* ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

 Laboratory Definition Code
 Laboratory Location

 VA
 ALS ENVIRONMENTAL - VANCOUVER, BRITISH COLUMBIA, CANADA

#### Chain of Custody Numbers:

#### **GLOSSARY OF REPORT TERMS**

Surrogate - A compound that is similar in behaviour to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.

mg/kg - milligrams per kilogram based on dry weight of sample.

mg/kg wwt - milligrams per kilogram based on wet weight of sample.

mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight of sample.

mg/L - milligrams per litre.

< - Less than.

D.L. - The reported Detection Limit, also known as the Limit of Reporting (LOR).

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.

Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

Covanta Energy

Burnaby BC

604-521-1025

Same as Report ?

DBA1837-A-03-01

DBA1837-A-03-02

DBA1837-A-03-03

DBA1837-A-03-04

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DBA1837-A-03-07

DBA1837-A-03-08

DBA1837-A-03-09

DBA1837-A-03-10

DBA1837-A-03-11

Hardcopy of Invoice with Report?

Lab Work Order #

(lab use only)

5150 Riverbend Drive

Steve Mckinney / Dan Skrypnyk

Fax:

Fax:

Sample Identification

(This description will appear on the report)

☐ No

No

Yes

Yes

Report To

Company:

Contact:

Address:

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smckinney@covantaenergy.com

sarah.wellman@metrovancouver.org

brent.kirkpatrick@metrovancouver.org

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dskrypnyk@covanta.com

rjohnson4@covanta.com

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Client / Project Information

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DBA1837-A-03-12 sept 13 2018 9:00 Soil Special Instructions / Regulations with water or land use (CCME-Freshwater Aquatic Life/BC CSR - Commerce Failure to complete all portions of this form may delay analysis. Please fill in the By the use of this form the user acknowledges and agrees with the Terms and Conditions as p Also provided on another Excel tab are the ALS location addresses, phone numbers and sample container / pres SHIPMENT RELEASE (client use) SHIPMENT RECEPTION (lab use only) Released by: Date (dd-mmm-yy) Time (hh-mm) Received by: Date: Temperature: 1015 19 ITA 1111500 If Yes add SIF GENF 20.00 Front



Covanta Burnaby R.E., ULC ATTN: Steve McKinney 5150 Riverbend Drive Burnaby BC V3N 4V3

Date Received: 05-OCT-18

Report Date: 31-OCT-18 13:29 (MT)

Version: FINAL REV. 2

Client Phone: 604-521-1025

# Certificate of Analysis

Lab Work Order #: L2176794

Project P.O. #: VANCO-000047506

Job Reference: C of C Numbers: Legal Site Desc:

#### Comments:

As per client request, certain samples were re-prepped from scratch and analyzed for TCLP Metals (TCLP Cd) in varying replicate amounts. Results are reported as samples #13-28, and have "REP" in the Client Sample ID field. Fluid determination was not performed for samples #13-28, as per client instructions. The prep data was taken from the original samples but is reported with the re-prepped samples for informational purposes.

Brent Mack, B.Sc. Account Manager

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PAGE 2 of 8 31-OCT-18 13:29 (MT)

## ALS ENVIRONMENTAL ANALYTICAL REPORT

Version: FINAL REV. 2

	Sample ID Description Sampled Date Sampled Time Client ID	L2176794-1 Soil 14-SEP-18 09:00 DBA1837-A-04-01	L2176794-2 Soil 14-SEP-18 09:00 DBA1837-A-04-02	L2176794-3 Soil 14-SEP-18 09:00 DBA1837-A-04-03	L2176794-4 Soil 14-SEP-18 09:00 DBA1837-A-04-04	L2176794-5 Soil 14-SEP-18 09:00 DBA1837-A-04-05
Grouping	Analyte					
SOIL						
Physical Tests	pH (1:2 soil:water) (pH)	12.46	12.47	12.45	12.43	12.51
TCLP Metals	1st Preliminary pH (pH)	11.89	11.79	11.78	11.81	11.83
	2nd Preliminary pH (pH)	7.85	7.46	6.03	6.46	6.42
	Final pH (pH)	5.90	5.94	5.97	5.93	5.87
	Extraction Solution Initial pH (pH)	2.90	2.90	2.90	2.90	2.90
	Cadmium (Cd)-Leachable (mg/L)	0.309	0.326	0.675	0.403	0.517

<sup>\*</sup> Please refer to the Reference Information section for an explanation of any qualifiers detected.

PAGE 3 of 8 31-OCT-18 13:29 (MT)

Version: FINAL REV. 2

	Sample ID Description Sampled Date Sampled Time Client ID	L2176794-6 Soil 14-SEP-18 09:00 DBA1837-A-04-06	L2176794-7 Soil 14-SEP-18 09:00 DBA1837-A-04-07	L2176794-8 Soil 14-SEP-18 09:00 DBA1837-A-04-08	L2176794-9 Soil 14-SEP-18 09:00 DBA1837-A-04-09	L2176794-10 Soil 14-SEP-18 09:00 DBA1837-A-04-10
Grouping	Analyte					
SOIL						
Physical Tests	pH (1:2 soil:water) (pH)	12.39	12.29	12.22	12.21	12.13
TCLP Metals	1st Preliminary pH (pH)	11.76	11.77	11.80	11.84	11.81
	2nd Preliminary pH (pH)	6.20	5.65	5.98	6.50	6.68
	Final pH (pH)	6.00	6.06	6.07	6.04	6.16
	Extraction Solution Initial pH (pH)	2.90	2.90	2.90	2.90	2.90
	Cadmium (Cd)-Leachable (mg/L)	0.391	0.321	0.371	0.368	0.315

<sup>\*</sup> Please refer to the Reference Information section for an explanation of any qualifiers detected.

PAGE 4 of 8 31-OCT-18 13:29 (MT)

Version: FINAL REV. 2

	Sample ID Description Sampled Date Sampled Time Client ID	L2176794-11 Soil 14-SEP-18 09:00 DBA1837-A-04-11	L2176794-12 Soil 14-SEP-18 09:00 DBA1837-A-04-12	L2176794-13 Soil 14-SEP-18 09:00 DBA1837-A-04-03 REP1	L2176794-14 Soil 14-SEP-18 09:00 DBA1837-A-04-03 REP2	L2176794-15 Soil 14-SEP-18 09:00 DBA1837-A-04-03 REP3
Grouping	Analyte					
SOIL						
Physical Tests	pH (1:2 soil:water) (pH)	12.21	12.22			
TCLP Metals	1st Preliminary pH (pH)	11.78	11.80	11.78	11.78	11.78
	2nd Preliminary pH (pH)	6.22	6.58	6.03	6.03	6.03
	Final pH (pH)	6.07	5.94	6.00	5.95	5.87
	Extraction Solution Initial pH (pH)	2.90	2.90	2.90	2.90	2.90
	Cadmium (Cd)-Leachable (mg/L)	0.797	0.610	0.378	0.323	0.341

<sup>\*</sup> Please refer to the Reference Information section for an explanation of any qualifiers detected.

PAGE 5 of 8 31-OCT-18 13:29 (MT)

## ALS ENVIRONMENTAL ANALYTICAL REPORT

Version: FINAL REV. 2

	Sampled Date Sampled Time Client ID	14-SEP-18 09:00 DBA1837-A-04-03 REP4	Soil 14-SEP-18 09:00 DBA1837-A-04-11 REP1	Soil 14-SEP-18 09:00 DBA1837-A-04-11 REP2	Soil 14-SEP-18 09:00 DBA1837-A-04-11 REP3	Soil 14-SEP-18 09:00 DBA1837-A-04-11 REP4
Grouping	Analyte					
SOIL						
Physical Tests	pH (1:2 soil:water) (pH)					
TCLP Metals	1st Preliminary pH (pH)	11.78	11.78	11.78	11.78	11.78
	2nd Preliminary pH (pH)	6.03	6.22	6.22	6.22	6.22
	Final pH (pH)	5.93	5.89	5.91	6.12	6.01
	Extraction Solution Initial pH (pH)	2.90	2.90	2.90	2.90	2.90
	Cadmium (Cd)-Leachable (mg/L)	0.291	0.324	0.491	0.389	0.439

<sup>\*</sup> Please refer to the Reference Information section for an explanation of any qualifiers detected.

PAGE 6 of 8 31-OCT-18 13:29 (MT)

## ALS ENVIRONMENTAL ANALYTICAL REPORT 31-OCT-18 13:29 (MT) Version: FINAL REV. 2

SOIL  Physical Tests pH (1  TCLP Metals 1st Pr 2nd P Final Extrace	Sampled Date Sampled Time Client ID	14-SEP-18 09:00 DBA1837-A-04-12 REP1	14-SEP-18 09:00 DBA1837-A-04-12 REP2	14-SEP-18 09:00 DBA1837-A-04-12 REP3	Soil 14-SEP-18 09:00 DBA1837-A-04-12 REP4	DBA1837-A-04-05 REP1
SOIL  Physical Tests pH (1  TCLP Metals 1st Pr 2nd P Final Extrace	nalyte					
Physical Tests pH (1  TCLP Metals 1st Property 2nd Proper	•					
TCLP Metals 1st Program 2nd Program Final Extractions of the second seco	(1:2 soil:water) (pH)					
Final Extrac	Preliminary pH (pH)	11.80	11.80	11.80	11.80	11.83
Final Extrac	Preliminary pH (pH)	6.58	6.58	6.58	6.58	6.42
Extrac	al pH (pH)	6.14	6.02	6.18	6.03	6.09
Cadm	raction Solution Initial pH (pH)	2.90	2.90	2.90	2.90	2.89
	lmium (Cd)-Leachable (mg/L)	0.280	0.292	1.01	0.335	0.349

<sup>\*</sup> Please refer to the Reference Information section for an explanation of any qualifiers detected.

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## ALS ENVIRONMENTAL ANALYTICAL REPORT

Version: FINAL REV. 2

	Sample ID Description Sampled Date Sampled Time Client ID	L2176794-26  DBA1837-A-04-05  REP2	L2176794-27  DBA1837-A-04-05  REP3	L2176794-28  DBA1837-A-04-05  REP4	
Grouping	Analyte				
SOIL					
Physical Tests	pH (1:2 soil:water) (pH)				
TCLP Metals	1st Preliminary pH (pH)	11.83	11.83	11.83	
	2nd Preliminary pH (pH)	6.42	6.42	6.42	
	Final pH (pH)	6.08	6.10	6.03	
	Extraction Solution Initial pH (pH)	2.89	2.89	2.89	
	Cadmium (Cd)-Leachable (mg/L)				
		0.397	0.336	0.352	

<sup>\*</sup> Please refer to the Reference Information section for an explanation of any qualifiers detected.

L2176794 CONTD.... PAGE 8 of 8

Version: FINAL REV. 2

PAGE 8 of 8 31-OCT-18 13:29 (MT)

### **Reference Information**

### QC Samples with Qualifiers & Comments:

QC Type Description	Parameter	Qualifier	Applies to Sample Number(s)
Matrix Spike	Cadmium (Cd)-Leachable	MS-B	L2176794-1, -10, -11, -12, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Cadmium (Cd)-Leachable	MS-B	L2176794-13, -14, -15, -16, -17, -18, -19, -20, -21, -22, -23, -24

### **Qualifiers for Individual Parameters Listed:**

Qualifier	Description
Qualifici	Description

MS-B Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.

### **Test Method References:**

ALS Test Code	Matrix	Test Description	Method Reference**
MET-TCLP-ICP-VA	Soil	Metals by ICPOES (TCLP)	EPA 1311/6010B

This analysis is carried out in accordance with the extraction procedure outlined in "Test Methods for Evaluating Solid Waste - Physical/Chemical Methods Volume 1C" SW-846 EPA Method 1311, published by the United States Environmental Protection Agency (EPA). In summary, the sample is extracted at a 20:1 liquid to solids ratio for 16 to 20 hours using either extraction fluid #1 (glacial acetic acid, water and sodium hydroxide) or extraction fluid #2 (glacial acetic acid), depending on the pH of the original sample. The extract is then filtered through a 0.6 to 0.8 micron glass fibre filter and analysed using inductively coupled plasma - optical emission spectrophotometry (EPA Method 6010B).

PH-1:2-VA

Soil

pH in Soil (1:2 Soil:Water Extraction)

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 (No. 10 / 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.

\*\* ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

<b>Laboratory Definition Code</b>	Laboratory Location
VA	ALS ENVIRONMENTAL - VANCOUVER, BRITISH COLUMBIA, CANADA

### **Chain of Custody Numbers:**

### **GLOSSARY OF REPORT TERMS**

Surrogate - A compound that is similar in behaviour to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.

mg/kg - milligrams per kilogram based on dry weight of sample.

mg/kg wwt - milligrams per kilogram based on wet weight of sample.

mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight of sample.

mg/L - milligrams per litre.

< - Less than.

D.L. - The reported Detection Limit, also known as the Limit of Reporting (LOR).

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.

Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

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	DBA1837-A-04-02			Sept 14 2018	9:00	Soil	Х								1
	DBA1837-A-04-03			Sept 14 2018	9:00	Soil	Х								1
	DBA1837-A-04-04			Sept 14 2018	9:00	Soil	Х								1
	DBA1837-A-04-05			Sept 14 2018	9:00	Soil	Х								1
	DBA1837-A-04-06			Sept 14 2018	9:00	Soil	<b>X</b>								1
	DBA1837-A-04-07			Sept 14 2018	9:00	Soil	X						$\downarrow \downarrow \downarrow$		1
	DBA1837-A-04-08			Sept 14 2018	9:00	Soil	Х					_	$\perp \perp$	_	1
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	DBA1837-A-04-10			Sept 14 2018	9:00	Soil	X						+-+		1
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	DBA1837-A-04-12			Sept 14 2018	9:00	Soil	X			4-X / Ha		o Dotail			1
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Covanta Burnaby R.E., ULC ATTN: Steve McKinney 5150 Riverbend Drive Burnaby BC V3N 4V3

Date Received: 05-OCT-18

Report Date: 24-OCT-18 17:45 (MT)

Version: FINAL

Client Phone: 604-521-1025

# Certificate of Analysis

Lab Work Order #: L2176799

Project P.O. #: VANCO-000047506

Job Reference: C of C Numbers: Legal Site Desc:

Comments: ADDITIONAL 17-OCT-18 18:51

Brent Mack, B.Sc. Account Manager

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PAGE 2 of 6 24-OCT-18 17:45 (MT)

Version: FINAL

	Sample ID Description Sampled Date Sampled Time Client ID	L2176799-1 Soil 15-SEP-18 09:00 DBA1837-A-05-01	L2176799-2 Soil 15-SEP-18 09:00 DBA1837-A-05-02	L2176799-3 Soil 15-SEP-18 09:00 DBA1837-A-05-03	L2176799-4 Soil 15-SEP-18 09:00 DBA1837-A-05-04	L2176799-5 Soil 15-SEP-18 09:00 DBA1837-A-05-05
Grouping	Analyte					
SOIL						
Physical Tests	pH (1:2 soil:water) (pH)	10.34	10.29	10.33	10.32	10.31
TCLP Metals	1st Preliminary pH (pH)	11.22	11.08	11.09	11.03	11.16
	2nd Preliminary pH (pH)	6.76	7.04	6.95	6.64	6.60
	Final pH (pH)	5.22	5.38	5.22	5.33	5.29
	Extraction Solution Initial pH (pH)	2.88	2.88	2.88	2.88	2.88
	Cadmium (Cd)-Leachable (mg/L)	0.254	0.225	0.901	0.189	0.798

<sup>\*</sup> Please refer to the Reference Information section for an explanation of any qualifiers detected.

PAGE 3 of 6 24-OCT-18 17:45 (MT)

## ALS ENVIRONMENTAL ANALYTICAL REPORT

Version: FINAL

	Sample ID Description Sampled Date Sampled Time Client ID	L2176799-6 Soil 15-SEP-18 09:00 DBA1837-A-05-06	L2176799-7 Soil 15-SEP-18 09:00 DBA1837-A-05-07	L2176799-8 Soil 15-SEP-18 09:00 DBA1837-A-05-08	L2176799-9 Soil 15-SEP-18 09:00 DBA1837-A-05-09	L2176799-10 Soil 15-SEP-18 09:00 DBA1837-A-05-10
Grouping	Analyte					
SOIL						
Physical Tests	pH (1:2 soil:water) (pH)	10.39	10.41	10.41	10.42	10.35
TCLP Metals	1st Preliminary pH (pH)	11.05	11.20	11.09	11.13	11.01
	2nd Preliminary pH (pH)	6.61	6.90	6.73	8.19	9.02
	Final pH (pH)	5.44	5.33	5.52	6.05	5.92
	Extraction Solution Initial pH (pH)	2.88	2.88	2.88	2.88	2.88
	Cadmium (Cd)-Leachable (mg/L)	0.199	0.211	0.630	0.153	0.241

<sup>\*</sup> Please refer to the Reference Information section for an explanation of any qualifiers detected.

PAGE 4 of 6 24-OCT-18 17:45 (MT)

Version: FINAL

	Sample ID Description Sampled Date Sampled Time Client ID	L2176799-11 Soil 15-SEP-18 09:00 DBA1837-A-05-11	L2176799-12 Soil 15-SEP-18 09:00 DBA1837-A-05-12	L2176799-13 Soil 15-SEP-18 09:00 DBA1837-A-05-03 REP1	L2176799-14 Soil 15-SEP-18 09:00 DBA1837-A-05-03 REP2	L2176799-15 Soil 15-SEP-18 09:00 DBA1837-A-05-03 REP3
Grouping	Analyte					
SOIL						
Physical Tests	pH (1:2 soil:water) (pH)	10.39	10.48			
TCLP Metals	1st Preliminary pH (pH)	11.07	10.96	11.09	11.09	11.09
	2nd Preliminary pH (pH)	8.12	7.61	6.95	6.95	6.95
	Final pH (pH)	5.32	5.27	5.44	5.30	5.32
	Extraction Solution Initial pH (pH)	2.88	2.88	2.89	2.89	2.89
	Cadmium (Cd)-Leachable (mg/L)	0.238	0.297	0.183	0.283	0.180

<sup>\*</sup> Please refer to the Reference Information section for an explanation of any qualifiers detected.

PAGE 5 of 6 24-OCT-18 17:45 (MT)

Version: FINAL

	Sample ID Description Sampled Date Sampled Time Client ID	L2176799-16 Soil 15-SEP-18 09:00 DBA1837-A-05-03 REP4	L2176799-17 Soil 15-SEP-18 09:00 DBA1837-A-05-05 REP1	L2176799-18 Soil 15-SEP-18 09:00 DBA1837-A-05-05 REP2	L2176799-19 Soil 15-SEP-18 09:00 DBA1837-A-05-05 REP3	L2176799-20 Soil 15-SEP-18 09:00 DBA1837-A-05-05 REP4
Grouping	Analyte					
SOIL						
Physical Tests	pH (1:2 soil:water) (pH)					
TCLP Metals	1st Preliminary pH (pH)	11.09	11.16	11.16	11.16	11.16
	2nd Preliminary pH (pH)	6.95	6.60	6.60	6.60	6.60
	Final pH (pH)	5.37	5.30	5.39	5.37	5.37
	Extraction Solution Initial pH (pH)	2.89	2.89	2.89	2.89	2.89
	Cadmium (Cd)-Leachable (mg/L)	0.149	0.178	0.718	0.159	0.371

<sup>\*</sup> Please refer to the Reference Information section for an explanation of any qualifiers detected.

## Reference Information

L2176799 CONTD....

PAGE 6 of 6

24-OCT-18 17:45 (MT)

Version: FINAL

### QC Samples with Qualifiers & Comments:

QC Type Description	Parameter	Qualifier	Applies to Sample Number(s)								
Matrix Spike	Cadmium (Cd)-Leachable	MS-B	L2176799-1, -10, -11, -12, -2, -3, -4, -5, -6, -7, -8, -9								
Qualifiers for Individual Parameters Li	Qualifiers for Individual Parameters Listed:										

Qualifier Description

MS-B Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.

### **Test Method References:**

ALS Test Code	Matrix	Test Description	Method Reference**
MET-TCLP-ICP-VA	Soil	Metals by ICPOES (TCLP)	EPA 1311/6010B

This analysis is carried out in accordance with the extraction procedure outlined in "Test Methods for Evaluating Solid Waste - Physical/Chemical Methods Volume 1C" SW-846 EPA Method 1311, published by the United States Environmental Protection Agency (EPA). In summary, the sample is extracted at a 20:1 liquid to solids ratio for 16 to 20 hours using either extraction fluid #1 (glacial acetic acid, water and sodium hydroxide) or extraction fluid #2 (glacial acetic acid), depending on the pH of the original sample. The extract is then filtered through a 0.6 to 0.8 micron glass fibre filter and analysed using inductively coupled plasma - optical emission spectrophotometry (EPA Method 6010B).

PH-1:2-VA

Soil

pH in Soil (1:2 Soil:Water Extraction)

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 (No. 10 / 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.

\*\* ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

<b>Laboratory Definition Code</b>	Laboratory Location
VA	ALS ENVIRONMENTAL - VANCOUVER, BRITISH COLUMBIA, CANADA

### **Chain of Custody Numbers:**

### **GLOSSARY OF REPORT TERMS**

Surrogate - A compound that is similar in behaviour to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.

mg/kg - milligrams per kilogram based on dry weight of sample.

mg/kg wwt - milligrams per kilogram based on wet weight of sample.

mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight of sample.

mg/L - milligrams per litre.

< - Less than.

D.L. - The reported Detection Limit, also known as the Limit of Reporting (LOR).

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.

Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

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