### **metro**vancouver

#### **Bottom Ash Data**

2018 Week 26

The following analytical reports were sent to the Ministry of Environment and Climate Change Strategy on August 10, 2018. The data represents bottom ash composite results for week 26 of 2018 (June 24, 2018 to June 30, 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: 03-JUL-18

Report Date: 19-JUL-18 14:57 (MT)

Version: FINAL

Client Phone: 604-521-1025

# Certificate of Analysis

Lab Work Order #: L2122520

Project P.O. #: VANCO-0000047506

Job Reference: 46693 WEEKLY BOTTOM ASH - SUITE

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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Version: FINAL

		Sample ID Description Sampled Date Sampled Time Client ID	L2122520-1 Soil 27-JUN-18 09:00 BA1826-A-1	L2122520-2 Soil 27-JUN-18 09:00 BA1826-A-2	L2122520-3 Soil 27-JUN-18 09:00 BA1826-A-3	L2122520-4 Soil 27-JUN-18 09:00 BA1826-A-4	L2122520-5 Soil 27-JUN-18 09:00 BA1826-A-5
Grouping	Analyte						
SOIL							
Physical Tests	Moisture (%)		18.7	17.6	16.8	15.4	16.8
	pH (1:2 soil:water) (pH)		11.33	11.35	11.30	11.16	11.21
Metals	Aluminum (Al) (mg/kg)		37500	31200	44200	33300	30300
	Antimony (Sb) (mg/kg)		157	155	157	151	176
	Arsenic (As) (mg/kg)		45.3	48.8	50.1	50.2	50.6
	Barium (Ba) (mg/kg)		566	485	511	557	537
	Beryllium (Be) (mg/kg)		0.44	0.40	0.39	0.38	0.37
	Bismuth (Bi) (mg/kg)		16.2	14.4	15.8	12.0	10.3
	Boron (B) (mg/kg)		397	343	346	391	411
	Cadmium (Cd) (mg/kg)		13.6	13.4	13.0	13.6	15.7
	Calcium (Ca) (mg/kg)		126000	123000	121000	130000	123000
	Chromium (Cr) (mg/kg)		159	163	159	170	3970
	Cobalt (Co) (mg/kg)		767	27.8	30.5	34.8	116
	Copper (Cu) (mg/kg)		3000	1190	3370	1980	2880
	Iron (Fe) (mg/kg)		61000	67300	47200	68500	72500
	Lead (Pb) (mg/kg)		715	1430	22100	612	571
	Lithium (Li) (mg/kg)		20.4	16.5	16.1	17.5	17.3
	Magnesium (Mg) (mg/kg)		11000	11000	10800	11900	11700
	Manganese (Mn) (mg/kg)		780	3730	685	863	2610
	Mercury (Hg) (mg/kg)		<0.050	<0.050	<0.050	<0.050	<0.050
	Molybdenum (Mo) (mg/kg)		88.3	40.4	28.0	26.6	100
	Nickel (Ni) (mg/kg)		156	153	160	145	1760
	Phosphorus (P) (mg/kg)		11300	12500	9950	11200	8990
	Potassium (K) (mg/kg)		5500	5420	5140	5460	5680
	Selenium (Se) (mg/kg)		0.43	0.41	0.37	0.42	0.46
	Silver (Ag) (mg/kg)		7.40	4.44	4.76	5.76	4.66
	Sodium (Na) (mg/kg)		14500	15500	14200	14700	14500
	Strontium (Sr) (mg/kg)		295	285	354	345	311
	Sulfur (S) (mg/kg)		15100	14400	16300	15500	17200
	Thallium (TI) (mg/kg)		0.063	0.059	0.088	0.060	0.057
	Tin (Sn) (mg/kg)		181	219	257	132	503
	Titanium (Ti) (mg/kg)		978	503	1330	729	996
	Tungsten (W) (mg/kg)		4.38	4.91	3.81	5.00	9.64
	Uranium (U) (mg/kg)		4.97	4.86	4.51	23.4	4.58
	Vanadium (V) (mg/kg)		53.8	51.8	53.0	55.9	69.2
	Zinc (Zn) (mg/kg)		5660	6070	4350	5110	6290
	Zirconium (Zr) (mg/kg)		1.5	1.7	2.4	1.4	1.6

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

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Version: FINAL

		Sample ID Description Sampled Date Sampled Time Client ID	L2122520-6 Soil 27-JUN-18 09:00 BA1826-A-6	L2122520-7 Soil 27-JUN-18 09:00 BA1826-A-7	L2122520-8 Soil 27-JUN-18 09:00 BA1826-A-8	L2122520-9 Soil 27-JUN-18 09:00 BA1826-A-9	L2122520-10 Soil 27-JUN-18 09:00 BA1826-A-10
Grouping	Analyte						
SOIL							
Physical Tests	Moisture (%)		17.6	18.1	17.2	15.8	17.6
	pH (1:2 soil:water) (pH)		11.32	11.40	11.10	11.39	11.30
Metals	Aluminum (Al) (mg/kg)		42000	35800	29600	29300	38200
	Antimony (Sb) (mg/kg)		206	166	197	166	156
	Arsenic (As) (mg/kg)		48.5	55.5	57.9	56.7	44.0
	Barium (Ba) (mg/kg)		606	606	596	599	537
	Beryllium (Be) (mg/kg)		0.40	0.42	0.44	0.54	0.42
	Bismuth (Bi) (mg/kg)		11.7	10.2	11.6	12.1	14.8
	Boron (B) (mg/kg)		342	547	616	732	424
	Cadmium (Cd) (mg/kg)		17.4	16.2	15.5	13.8	12.8
	Calcium (Ca) (mg/kg)		119000	130000	125000	124000	122000
	Chromium (Cr) (mg/kg)		193	311	167	183	148
	Cobalt (Co) (mg/kg)		106	24.9	23.8	31.8	41.1
	Copper (Cu) (mg/kg)		2200	8390	3290	3270	1790
	Iron (Fe) (mg/kg)		46300	73700	64900	69200	77500
	Lead (Pb) (mg/kg)		400	466	489	510	501
	Lithium (Li) (mg/kg)		15.6	18.2	17.1	16.9	16.5
	Magnesium (Mg) (mg/kg)		11400	11600	12200	12400	11100
	Manganese (Mn) (mg/kg)		919	881	777	791	832
	Mercury (Hg) (mg/kg)		<0.050	<0.050	<0.050	<0.050	<0.050
	Molybdenum (Mo) (mg/kg)		32.3	42.8	29.2	61.2	102
	Nickel (Ni) (mg/kg)		567	239	133	172	142
	Phosphorus (P) (mg/kg)		9620	9880	9670	9560	9530
	Potassium (K) (mg/kg)		5380	5590	5770	5320	5170
	Selenium (Se) (mg/kg)		0.47	0.41	0.46	0.76	0.45
	Silver (Ag) (mg/kg)		4.97	5.25	6.29	4.72	4.72
	Sodium (Na) (mg/kg)		14000	15900	16900	16000	14700
	Strontium (Sr) (mg/kg)		323	361	307	392	294
	Sulfur (S) (mg/kg)		15200	16200	15700	15000	13800
	Thallium (TI) (mg/kg)		0.064	0.059	0.070	0.066	0.065
	Tin (Sn) (mg/kg)		126	126	1710	137	126
	Titanium (Ti) (mg/kg)		1240	979	993	1030	946
	Tungsten (W) (mg/kg)		4.19	5.93	7.23	4.82	4.03
	Uranium (U) (mg/kg)		5.09	4.72	4.86	5.00	4.88
	Vanadium (V) (mg/kg)		53.9	55.7	55.0	58.1	52.5
	Zinc (Zn) (mg/kg)		6130	4720	6400	7680	5430
	Zirconium (Zr) (mg/kg)		1.7	1.5	1.4	1.3	2.1

<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

	D <sub>0</sub> Sam	Sample ID escription apled Date pled Time Client ID	L2122520-11 Soil 27-JUN-18 09:00 BA1826-A-11	L2122520-12 Soil 27-JUN-18 09:00 BA1826-A-12	L2122520-13 Soil 27-JUN-18 09:00 BA1826-A-4 REP 1	L2122520-14 Soil 27-JUN-18 09:00 BA1826-A-4 REP 2	L2122520-15 Soil 27-JUN-18 09:00 BA1826-A-4 REP 3
Grouping	Analyte						
SOIL							
Physical Tests	Moisture (%)		18.5	16.6			
	pH (1:2 soil:water) (pH)		11.20	11.32			
Metals	Aluminum (Al) (mg/kg)		27600	30800			
	Antimony (Sb) (mg/kg)		166	156			
	Arsenic (As) (mg/kg)		49.2	52.8			
	Barium (Ba) (mg/kg)		492	619			
	Beryllium (Be) (mg/kg)		0.40	0.42			
	Bismuth (Bi) (mg/kg)		10.7	55.0			
	Boron (B) (mg/kg)		341	513			
	Cadmium (Cd) (mg/kg)		15.8	12.7			
	Calcium (Ca) (mg/kg)		122000	131000			
	Chromium (Cr) (mg/kg)		161	333			
	Cobalt (Co) (mg/kg)		27.4	46.6			
	Copper (Cu) (mg/kg)		4200	6270			
	Iron (Fe) (mg/kg)		64400	60200			
	Lead (Pb) (mg/kg)		735	1000			
	Lithium (Li) (mg/kg)		16.7	17.3			
	Magnesium (Mg) (mg/kg)		12000	11400			
	Manganese (Mn) (mg/kg)		844	1300			
	Mercury (Hg) (mg/kg)		<0.050	<0.050			
	Molybdenum (Mo) (mg/kg)		24.3	29.7			
	Nickel (Ni) (mg/kg)		144	200			
	Phosphorus (P) (mg/kg)		9900	10600			
	Potassium (K) (mg/kg)		5340	5570			
	Selenium (Se) (mg/kg)		0.40	0.41			
	Silver (Ag) (mg/kg)		17.7	4.56			
	Sodium (Na) (mg/kg)		14300	15400			
	Strontium (Sr) (mg/kg)		302	358			
	Sulfur (S) (mg/kg)		16600	14900			
	Thallium (TI) (mg/kg)		0.057	0.061			
	Tin (Sn) (mg/kg)		661	163			
	Titanium (Ti) (mg/kg)		656	949			
	Tungsten (W) (mg/kg)		5.80	6.29			
	Uranium (U) (mg/kg)		4.53	5.28			
	Vanadium (V) (mg/kg)		53.2	57.9			
	Zinc (Zn) (mg/kg)		6660	5340			
	Zirconium (Zr) (mg/kg)		1.3	1.3			

<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	L2122520-16 Soil 27-JUN-18 09:00 BA1826-A-4 REP 4	L2122520-17 Soil 27-JUN-18 09:00 BA1826-A-8 REP 1	L2122520-18 Soil 27-JUN-18 09:00 BA1826-A-8 REP 2	L2122520-19 Soil 27-JUN-18 09:00 BA1826-A-8 REP 3	L2122520-20 Soil 27-JUN-18 09:00 BA1826-A-8 REP 4
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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### ALS ENVIRONMENTAL ANALYTICAL REPORT

Version: FINAL

		Sample ID Description Sampled Date Sampled Time Client ID	L2122520-21 Soil 27-JUN-18 09:00 BA1826-A-10 REP 1	L2122520-22 Soil 27-JUN-18 09:00 BA1826-A-10 REP 2	L2122520-23 Soil 27-JUN-18 09:00 BA1826-A-10 REP 3	L2122520-24 Soil 27-JUN-18 09:00 BA1826-A-10 REP	
Grouping	Analyte		-				
SOIL							
Physical Tests	Moisture (%)						
	pH (1:2 soil:water) (pH)						
Metals	Aluminum (AI) (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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Version: FINAL

	Sample ID Description Sampled Date Sampled Time Client ID	L2122520-1 Soil 27-JUN-18 09:00 BA1826-A-1	L2122520-2 Soil 27-JUN-18 09:00 BA1826-A-2	L2122520-3 Soil 27-JUN-18 09:00 BA1826-A-3	L2122520-4 Soil 27-JUN-18 09:00 BA1826-A-4	L2122520-5 Soil 27-JUN-18 09:00 BA1826-A-5
Grouping	Analyte					
SOIL						
TCLP Metals	1st Preliminary pH (pH)	11.68	11.72	11.72	11.66	11.69
	2nd Preliminary pH (pH)	10.26	10.28	10.30	10.21	10.28
	Final pH (pH)	6.25	6.03	6.06	6.02	6.06
	Extraction Solution Initial pH (pH)	2.88	2.88	2.88	2.88	2.88
	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)	5.66	5.25	5.06	4.59	5.26
	Cadmium (Cd)-Leachable (mg/L)	0.301	0.161	0.259	0.720	0.195
	Calcium (Ca)-Leachable (mg/L)	2040	1990	2010	1930	1930
	Chromium (Cr)-Leachable (mg/L)	<0.25	<0.25	<0.25	<0.25	<0.25
	Cobalt (Co)-Leachable (mg/L)	0.525	1.65	0.503	0.383	0.513
	Copper (Cu)-Leachable (mg/L)	0.897	1.09	1.53	1.11	2.01
	Iron (Fe)-Leachable (mg/L)	<5.0	<5.0	<5.0	<5.0	<5.0
	Lead (Pb)-Leachable (mg/L)	0.47	<0.25	<0.25	<0.25	0.33
	Magnesium (Mg)-Leachable (mg/L)	125	121	126	117	123
	Mercury (Hg)-Leachable (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Nickel (Ni)-Leachable (mg/L)	0.53	0.60	0.45	0.62	0.53
	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)	41.2	45.4	42.8	95.1	52.1

<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	L2122520-6 Soil 27-JUN-18 09:00 BA1826-A-6	L2122520-7 Soil 27-JUN-18 09:00 BA1826-A-7	L2122520-8 Soil 27-JUN-18 09:00 BA1826-A-8	L2122520-9 Soil 27-JUN-18 09:00 BA1826-A-9	L2122520-10 Soil 27-JUN-18 09:00 BA1826-A-10
Grouping	Analyte					
SOIL						
TCLP Metals	1st Preliminary pH (pH)	11.78	11.66	11.67	11.71	11.78
	2nd Preliminary pH (pH)	10.35	10.18	10.27	9.81	9.92
	Final pH (pH)	6.37	6.28	6.18	5.73	6.17
	Extraction Solution Initial pH (pH)	2.88	2.88	2.88	2.88	2.88
	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)	5.82	5.35	6.82	4.69	6.69
	Cadmium (Cd)-Leachable (mg/L)	0.178	0.163	0.857	0.148	1.99
	Calcium (Ca)-Leachable (mg/L)	2010	2030	2000	1820	2000
	Chromium (Cr)-Leachable (mg/L)	<0.25	<0.25	<0.25	<0.25	<0.25
	Cobalt (Co)-Leachable (mg/L)	0.357	0.900	0.272	0.799	0.447
	Copper (Cu)-Leachable (mg/L)	0.717	1.02	0.968	1.46	0.458
	Iron (Fe)-Leachable (mg/L)	<5.0	<5.0	<5.0	<5.0	<5.0
	Lead (Pb)-Leachable (mg/L)	<0.25	<0.25	0.32	<0.25	<0.25
	Magnesium (Mg)-Leachable (mg/L)	124	128	125	122	126
	Mercury (Hg)-Leachable (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Nickel (Ni)-Leachable (mg/L)	0.47	0.56	0.50	0.97	0.55
	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)	29.2	45.7	51.5	57.9	36.1

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

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#### Version: FINAL

	Sample ID Description Sampled Date Sampled Time Client ID	L2122520-11 Soil 27-JUN-18 09:00 BA1826-A-11	Soil 27-JUN-18 09:00 BA1826-A-12	L2122520-13 Soil 27-JUN-18 09:00 BA1826-A-4 REP 1	L2122520-14 Soil 27-JUN-18 09:00 BA1826-A-4 REP 2	L2122520-15 Soil 27-JUN-18 09:00 BA1826-A-4 REP 3
Grouping	Analyte					
SOIL						
TCLP Metals	1st Preliminary pH (pH)	11.64	11.55	11.66	11.66	11.66
	2nd Preliminary pH (pH)	9.56	9.54	10.21	10.21	10.21
	Final pH (pH)	5.92	5.31	5.59	5.59	5.50
	Extraction Solution Initial pH (pH)	2.88	2.88	2.91	2.91	2.91
	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)	5.66	4.04			
	Cadmium (Cd)-Leachable (mg/L)	0.179	0.163	0.200	0.442	0.207
	Calcium (Ca)-Leachable (mg/L)	1970	1680			
	Chromium (Cr)-Leachable (mg/L)	<0.25	<0.25			
	Cobalt (Co)-Leachable (mg/L)	0.291	1.18			
	Copper (Cu)-Leachable (mg/L)	1.82	6.85			
	Iron (Fe)-Leachable (mg/L)	<5.0	27.4			
	Lead (Pb)-Leachable (mg/L)	0.48	1.58			
	Magnesium (Mg)-Leachable (mg/L)	122	99.4			
	Mercury (Hg)-Leachable (mg/L)	<0.0010	<0.0010			
	Nickel (Ni)-Leachable (mg/L)	0.54	0.76			
	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)	58.9	109			

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

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#### Version: FINAL

	Sample ID Description Sampled Date Sampled Time Client ID	L2122520-16 Soil 27-JUN-18 09:00 BA1826-A-4 REP 4	L2122520-17 Soil 27-JUN-18 09:00 BA1826-A-8 REP 1	L2122520-18 Soil 27-JUN-18 09:00 BA1826-A-8 REP 2	L2122520-19 Soil 27-JUN-18 09:00 BA1826-A-8 REP 3	L2122520-20 Soil 27-JUN-18 09:00 BA1826-A-8 REP 4
Grouping	Analyte					
SOIL						
TCLP Metals	1st Preliminary pH (pH)	11.66	11.67	11.67	11.67	11.67
	2nd Preliminary pH (pH)	10.21	10.27	10.27	10.27	10.27
	Final pH (pH)	5.88	5.67	5.61	5.66	5.96
	Extraction Solution Initial pH (pH)	2.91	2.91	2.91	2.91	2.91
	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)	0.404	12.8	0.275	0.220	4.60
	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)					

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

L2122520 CONTD.... PAGE 11 of 13

19-JUL-18 14:57 (MT) Version: FINAL

	Sample ID Description Sampled Date Sampled Time Client ID	L2122520-21 Soil 27-JUN-18 09:00 BA1826-A-10 REP	L2122520-22 Soil 27-JUN-18 09:00 BA1826-A-10 REP 2	L2122520-23 Soil 27-JUN-18 09:00 BA1826-A-10 REP 3	L2122520-24 Soil 27-JUN-18 09:00 BA1826-A-10 REP	
Grouping	Analyte					
SOIL						
TCLP Metals	1st Preliminary pH (pH)	11.78	11.78	11.78	11.78	
	2nd Preliminary pH (pH)	9.92	9.92	9.92	9.92	
	Final pH (pH)	5.79	5.74	5.84	6.03	
	Extraction Solution Initial pH (pH)	2.91	2.91	2.91	2.91	
	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)	0.193	0.284	0.182	0.183	
	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)					

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

#### L2122520 CONTD.... PAGE 12 of 13

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Version: FINAL

#### **Reference Information**

QC Samples with Qualifiers & Comments:

QC Type Description	Parameter	Qualifier	Applies to Sample Number(s)
Duplicate	Bismuth (Bi)	DUP-H	L2122520-1, -10, -11, -12, -2, -3, -4, -5, -6, -7, -8, -9
Duplicate	Boron (B)	DUP-H	L2122520-1, -10, -11, -12, -2, -3, -4, -5, -6, -7, -8, -9
Duplicate	Cobalt (Co)	DUP-H	L2122520-1, -10, -11, -12, -2, -3, -4, -5, -6, -7, -8, -9
Duplicate	Copper (Cu)	DUP-H	L2122520-1, -10, -11, -12, -2, -3, -4, -5, -6, -7, -8, -9
Duplicate	Molybdenum (Mo)	DUP-H	L2122520-1, -10, -11, -12, -2, -3, -4, -5, -6, -7, -8, -9
Duplicate	Nickel (Ni)	DUP-H	L2122520-1, -10, -11, -12, -2, -3, -4, -5, -6, -7, -8, -9
Duplicate	Silver (Ag)	DUP-H	L2122520-1, -10, -11, -12, -2, -3, -4, -5, -6, -7, -8, -9
Duplicate	Titanium (Ti)	DUP-H	L2122520-1, -10, -11, -12, -2, -3, -4, -5, -6, -7, -8, -9
Duplicate	Zirconium (Zr)	DUP-H,J	L2122520-1, -10, -11, -12, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Calcium (Ca)-Leachable	MS-B	L2122520-1, -10, -11, -12, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Cobalt (Co)-Leachable	MS-B	L2122520-1, -10, -11, -12, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Copper (Cu)-Leachable	MS-B	L2122520-1, -10, -11, -12, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Zinc (Zn)-Leachable	MS-B	L2122520-1, -10, -11, -12, -2, -3, -4, -5, -6, -7, -8, -9

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

Qualifier	Description
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	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.

EPA 1311/245.7

HG-TCLP-CVAFS-VA Soil Mercury by CVAAS (TCLP)

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).

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

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 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).

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

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

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

**Reference Information** 

L2122520 CONTD....
PAGE 13 of 13
19-JUL-18 14:57 (MT)
Version: FINAL

VA

#### **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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ALS	Envir	onme	ent



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ALS	Environme	ntal		i i	L2122	2520-COFC									Page _	of	
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Sample		Sample l	dentification		Date	Time		MET-TCLP-VA (all metals.	MOISTURE		Chrome 6	MET-CSR+FULL-VA (all			1		Number of Containers
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	BA1826-A-1	· ·			27-Jun-18	9:00	Soil	X	х			Х			$\top$		1
	BA1826-A-2				27-Jun-18	9:00	Soil	х	х			х		•			1
	BA1826-A-3				27-Jun-18	9:00	Soil	х	х			Х					1
	BA1826-A-4				27-Jun-18	9:00	Soil	х	х		_	Х					1
	BA1826-A-5				27-Jun-18	9:00	Soil	Х	х			Х					1
	BA1826-A-6				27-Jun-18	9:00	Soil	Х	х			Х					1
	BA1826-A-7				27-Jun-18	9:00	Soil	Х	X			Х					1
	BA1826-A-8				27-Jun-18	9:00	Soil	Х	Х			Х					1
	BA1826-A-9				27-Jun-18	9:00	Soil	X	Х			Х					1
	BA1826-A-10				27-Jun-18	9:00	Soil	Х	Х			X					1
	BA1826-A-11			· · · · · · · · · · · · · · · · · · ·	27-Jun-18	9:00	Soil	Х	Х	_		X					1
	BA1826-A-12				27-Jun-18	9:00	Soil	X	Х			Х					1
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Covanta Burnaby R.E., ULC ATTN: Steve McKinney 5150 Riverbend Drive Burnaby BC V3N 4V3 Date Received: 26-JUL-18

Report Date: 09-AUG-18 17:14 (MT)

Version: FINAL REV. 2

Client Phone: 604-521-1025

# **Certificate of Analysis**

Lab Work Order #: L2136717

Project P.O. #: VANCO-0000047506

Job Reference: WEEKLY BOTTOM ASH-SUITE (INCLUDES 2:1

PH)

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.]

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

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L2136717 CONTD....

PAGE 2 of 6 09-AUG-18 17:14 (MT)

Version: FINAL REV. 2

	Sample ID Description Sampled Date Sampled Time Client ID	L2136717-1 Soil 25-JUN-18 09:00 DBA1826-A-01-01	L2136717-2 Soil 25-JUN-18 09:00 DBA1826-A-01-02	L2136717-3 Soil 25-JUN-18 09:00 DBA1826-A-01-03	L2136717-4 Soil 25-JUN-18 09:00 DBA1826-A-01-04	L2136717-5 Soil 25-JUN-18 09:00 DBA1826-A-01-05
Grouping	Analyte					
SOIL						
Physical Tests	pH (1:2 soil:water) (pH)	11.68	11.70	11.61	11.34	11.52
TCLP Metals	1st Preliminary pH (pH)	11.46	11.45	11.50	11.43	11.28
	2nd Preliminary pH (pH)	9.64	9.72	9.85	9.64	10.00
	Final pH (pH)	6.57	6.62	6.25	6.25	6.58
	Extraction Solution Initial pH (pH)	2.89	2.89	2.89	2.89	2.89
	Cadmium (Cd)-Leachable (mg/L)	0.127	4.35	0.140	0.148	0.193

L2136717 CONTD....

PAGE 3 of 6 09-AUG-18 17:14 (MT)

Version: FINAL REV. 2

	Sample ID Description Sampled Date Sampled Time Client ID	L2136717-6 Soil 25-JUN-18 09:00 DBA1826-A-01-06	L2136717-7 Soil 25-JUN-18 09:00 DBA1826-A-01-07	L2136717-8 Soil 25-JUN-18 09:00 DBA1826-A-01-08	L2136717-9 Soil 25-JUN-18 09:00 DBA1826-A-01-09	L2136717-10 Soil 25-JUN-18 09:00 DBA1826-A-01-10
Grouping	Analyte					
SOIL	,					
Physical Tests	pH (1:2 soil:water) (pH)	11.63	11.59	11.72	11.81	11.99
TCLP Metals	1st Preliminary pH (pH)	11.47	11.29	11.41	11.33	11.55
	2nd Preliminary pH (pH)	9.65	9.69	9.79	9.72	9.91
	Final pH (pH)	6.23	6.20	6.70	6.48	6.61
	Extraction Solution Initial pH (pH)	2.89	2.89	2.89	2.89	2.89
	Cadmium (Cd)-Leachable (mg/L)	0.179	0.164	0.136	0.156	0.226

L2136717 CONTD....

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Version: FINAL REV. 2

	Sample ID Description Sampled Date Sampled Time Client ID	L2136717-11 Soil 25-JUN-18 09:00 DBA1826-A-01-11	L2136717-12 Soil 25-JUN-18 09:00 DBA1826-A-01-12	L2136717-13 Soil 25-JUN-18 09:00 DBA1826-A-01-02 REP 1	L2136717-14 Soil 25-JUN-18 09:00 DBA1826-A-01-02 REP 2	L2136717-15 Soil 25-JUN-18 09:00 DBA1826-A-01-02 REP 3
Grouping	Analyte					
SOIL						
Physical Tests	pH (1:2 soil:water) (pH)	11.89	11.93			
TCLP Metals	1st Preliminary pH (pH)	11.29	11.53	11.45	11.45	11.45
	2nd Preliminary pH (pH)	9.83	9.89	9.72	9.72	9.72
	Final pH (pH)	6.58	6.33	6.47	6.57	6.48
	Extraction Solution Initial pH (pH)	2.89	2.89	2.86	2.86	2.86
	Cadmium (Cd)-Leachable (mg/L)	0.146	0.213	0.130	0.153	0.134

L2136717 CONTD.... PAGE 5 of 6

09-AUG-18 17:14 (MT)

### ALS ENVIRONMENTAL ANALYTICAL REPORT

Version: FINAL REV. 2

	Sampled Date Sampled Time Client ID	Soil 25-JUN-18 09:00 DBA1826-A-01-02 REP 4		
Grouping	Analyte			
SOIL	,			
Physical Tests	pH (1:2 soil:water) (pH)			
TCLP Metals	1st Preliminary pH (pH)	11.45		
	2nd Preliminary pH (pH)	9.72		
	Final pH (pH)	6.47		
	Extraction Solution Initial pH (pH)	2.86		
	Cadmium (Cd)-Leachable (mg/L)	0.131		

#### **Reference Information**

L2136717 CONTD.... PAGE 6 of 6 09-AUG-18 17:14 (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:

<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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Address:	5150 Riverbend Dr	ive		E	mail 1:	smckinney@co	vanta.com		<del> </del>					ge - Conta				
	Burnaby BC			E	mail 2:	dskrypnyk@cov	vanta.com							ALS to Co				
Phone:	604-521-1025	Fax:		E	mail 3:	sarah.wellman@	@metrovancouv	er.org				Ar	nalysis	Reques	st			
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By the use of this form the user acknowledges and agrees with the Terms and Conditions as provided on a separate Excel tab.

Also provided on another Excel tab are the ALS location addresses, phone numbers and sample container / preservation / holding time table for common analyses.

SHEMENT RELEASE (client use)

SHIPMENT RECEPTION (lab use only)

SHIPMENT VERIFICATION (lab use only)

Beleased by:

Date: Time: Temperature: Verified by: Date: Time: Observations:

Yes / No ?

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: 26-JUL-18

Report Date: 01-AUG-18 11:20 (MT)

Version: FINAL REV. 2

Client Phone: 604-521-1025

# **Certificate of Analysis**

Lab Work Order #: L2136726

Project P.O. #: VANCO-0000047506

Job Reference: WEEKLY BOTTOM ASH-SUITE (INCLUDES 2:1

PH)

C of C Numbers: Legal Site Desc:

12/ 11/WK

Brent Mack, B.Sc. Account Manager

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L2136726 CONTD....

PAGE 2 of 5 01-AUG-18 11:20 (MT)

Version: FINAL REV. 2

	Sample ID Description Sampled Date Sampled Time Client ID	L2136726-1 Soil 26-JUN-18 09:00 DBA1826-A-02-01	L2136726-2 Soil 26-JUN-18 09:00 DBA1826-A-02-02	L2136726-3 Soil 26-JUN-18 09:00 DBA1826-A-02-03	L2136726-4 Soil 26-JUN-18 09:00 DBA1826-A-02-04	L2136726-5 Soil 26-JUN-18 09:00 DBA1826-A-02-05
Grouping	Analyte					
SOIL						
Physical Tests	pH (1:2 soil:water) (pH)	10.70	10.66	10.75	10.78	10.76
TCLP Metals	1st Preliminary pH (pH)	11.17	11.13	11.12	11.16	10.98
	2nd Preliminary pH (pH)	6.63	7.48	7.41	7.35	8.09
	Final pH (pH)	5.44	5.64	5.64	5.96	6.00
	Extraction Solution Initial pH (pH)	2.91	2.91	2.91	2.91	2.91
	Cadmium (Cd)-Leachable (mg/L)	0.582	0.310	0.254	0.385	0.270

L2136726 CONTD....

PAGE 3 of 5 01-AUG-18 11:20 (MT)

### Version: FINAL REV. 2

	Sample ID Description Sampled Date Sampled Time Client ID	L2136726-6 Soil 26-JUN-18 09:00 DBA1826-A-02-06	L2136726-7 Soil 26-JUN-18 09:00 DBA1826-A-02-07	L2136726-8 Soil 26-JUN-18 09:00 DBA1826-A-02-08	L2136726-9 Soil 26-JUN-18 09:00 DBA1826-A-02-09	L2136726-10 Soil 26-JUN-18 09:00 DBA1826-A-02-10
Grouping	Analyte					
SOIL	,					
Physical Tests	pH (1:2 soil:water) (pH)	10.72	10.78	11.01	10.83	10.91
TCLP Metals	1st Preliminary pH (pH)	11.22	11.24	11.36	11.29	11.33
	2nd Preliminary pH (pH)	7.86	8.01	7.71	8.01	8.11
	Final pH (pH)	5.63	5.90	5.66	5.97	5.55
	Extraction Solution Initial pH (pH)	2.91	2.91	2.91	2.91	2.91
	Cadmium (Cd)-Leachable (mg/L)	0.324	0.262	0.242	0.262	0.234

L2136726 CONTD.... PAGE 4 of 5

### ALS ENVIRONMENTAL ANALYTICAL REPORT

01-AUG-18 11:20 (MT) Version: FINAL REV. 2

	Sampled Date Sampled Time Client ID	Soil 26-JUN-18 09:00 DBA1826-A-02-11	Soil 26-JUN-18 09:00 DBA1826-A-02-12		
Grouping	Analyte				
SOIL					
Physical Tests	pH (1:2 soil:water) (pH)	10.80	10.90		
TCLP Metals	1st Preliminary pH (pH)	11.24	11.26		
	2nd Preliminary pH (pH)	7.98	8.20		
	Final pH (pH)	5.89	6.00		
	Extraction Solution Initial pH (pH)	2.91	2.91		
	Cadmium (Cd)-Leachable (mg/L)	0.240	0.239		
		0.210	0.200		

#### **Reference Information**

L2136726 CONTD.... PAGE 5 of 5 01-AUG-18 11:20 (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:

<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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Address:	5150 Riverbend D	rive	Email 1:	smckinney@cov	antaenergy.cor	<u>n</u> 0	Emerge	ency (1-2	Buş. Da	ys) - 100	% Surc	:harge	- Conta	ct ALS	to Conf	irm TA	<del></del>	
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Phone:	604-521-1025	Fax:	Email 3:	sarah.wellman@	metrovancouve	er.org	Analysis Request											
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Covanta Burnaby R.E., ULC ATTN: Steve McKinney 5150 Riverbend Drive Burnaby BC V3N 4V3 Date Received: 26-JUL-18

Report Date: 09-AUG-18 17:25 (MT)

Version: FINAL

Client Phone: 604-521-1025

# **Certificate of Analysis**

Lab Work Order #: L2136729

Project P.O. #: VANCO-0000047506

Job Reference: WEEKLY BOTTOM ASH-SUITE (INCLUDES 2:1

PH)

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

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L2136729 CONTD....

PAGE 2 of 6 09-AUG-18 17:25 (MT)

Version: FINAL

					VC13101	
	Sample ID Description Sampled Date Sampled Time Client ID	27-JUN-18	L2136729-2 Soil 27-JUN-18 09:00 DBA1826-A-03-02	L2136729-3 Soil 27-JUN-18 09:00 DBA1826-A-03-03	L2136729-4 Soil 27-JUN-18 09:00 DBA1826-A-03-04	L2136729-5 Soil 27-JUN-18 09:00 DBA1826-A-03-05
Grouping	Analyte					
SOIL	,					
Physical Tests	pH (1:2 soil:water) (pH)	11.41	11.56	11.42	11.35	11.32
TCLP Metals	1st Preliminary pH (pH)	11.40	11.42	11.38	11.47	11.43
	2nd Preliminary pH (pH)	8.59	8.95	8.89	9.32	8.99
	Final pH (pH)	5.44	5.51	5.52	5.91	5.43
	Extraction Solution Initial pH (pH)	2.88	2.88	2.88	2.88	2.88
	Cadmium (Cd)-Leachable (mg/L)	0.141	0.172	0.154	0.172	0.154
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L2136729 CONTD....

PAGE 3 of 6 09-AUG-18 17:25 (MT)

Version: FINAL

	Sample ID Description Sampled Date Sampled Time Client ID	L2136729-6 Soil 27-JUN-18 09:00 DBA1826-A-03-06	L2136729-7 Soil 27-JUN-18 09:00 DBA1826-A-03-07	L2136729-8 Soil 27-JUN-18 09:00 DBA1826-A-03-08	L2136729-9 Soil 27-JUN-18 09:00 DBA1826-A-03-09	L2136729-10 Soil 27-JUN-18 09:00 DBA1826-A-03-10
Grouping	Analyte					
SOIL	,					
Physical Tests	pH (1:2 soil:water) (pH)	11.30	11.54	11.22	11.33	11.43
TCLP Metals	1st Preliminary pH (pH)	11.45	11.50	11.41	11.41	11.45
	2nd Preliminary pH (pH)	9.08	9.26	8.99	8.72	8.67
	Final pH (pH)	5.56	5.41	5.67	5.65	5.67
	Extraction Solution Initial pH (pH)	2.88	2.88	2.88	2.88	2.88
	Cadmium (Cd)-Leachable (mg/L)	2.11	0.109	0.148	0.170	0.136

L2136729 CONTD....

PAGE 4 of 6 09-AUG-18 17:25 (MT)

Version: FINAL

	Sampled Time Client ID	27-JUN-18 09:00 DBA1826-A-03-11	27-JUN-18 09:00 DBA1826-A-03-12	27-JUN-18 09:00 DBA1826-A-03-06 REP 1	27-JUN-18 09:00 DBA1826-A-03-06 REP 2	Soil 27-JUN-18 09:00 DBA1826-A-03-06 REP 3
Grouping	Analyte					
SOIL						
Physical Tests	pH (1:2 soil:water) (pH)	11.30	11.36			
TCLP Metals	1st Preliminary pH (pH)	11.45	11.46	11.45	11.45	11.45
	2nd Preliminary pH (pH)	8.87	8.80	9.08	9.08	9.08
	Final pH (pH)	5.91	5.81	5.21	5.28	5.39
	Extraction Solution Initial pH (pH)	2.88	2.88	2.88	2.88	2.88
	Cadmium (Cd)-Leachable (mg/L)	0.125	0.163	0.168	0.124	0.264

L2136729 CONTD.... PAGE 5 of 6

ALS ENVIRONMENTAL ANALYTICAL REPORT

09-AUG-18 17:25 (MT) Version: FINAL

Grouping Analyte  SOIL  Physical Tests pH (1:2 soil:water) (pH)  TCLP Metals 1st Preliminary pH (pH) 2nd Preliminary pH (pH) Extraction Solution Initial pH (pH) Cadmium (Cd)-Leachable (mg/L)  11.45 9.08 5.38 Extraction Solution Initial pH (pH) 2.88 0.127	
Physical Tests pH (1:2 soil:water) (pH)  TCLP Metals 1st Preliminary pH (pH) 11.45 2nd Preliminary pH (pH) 9.08 Final pH (pH) 5.38 Extraction Solution Initial pH (pH) 2.88	
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Final pH (pH)  5.38  Extraction Solution Initial pH (pH)  2.88	
Extraction Solution Initial pH (pH)  2.88	

### Reference Information

L2136729 CONTD....

PAGE 6 of 6

09-AUG-18 17:25 (MT)

Version: FINAL

#### **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 W

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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	Burnaby BC		·	Email 2:	dskrypnyk@cov			Same Day or Weekend Emergency - Contact ALS to Confirm TAT										
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	DBA1826-A-03-08				June 27 2018	9:00	Soil	х									1	
	DBA1826-A-03-09				June 27 2018	9:00	Soil	Х									1	
	DBA1826-A-03-10				June 27 2018	9:00	Soil	Х									1	
	DBA1826-A-03-11				June 27 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: 26-JUL-18

Report Date: 31-JUL-18 14:06 (MT)

Version: FINAL

Client Phone: 604-521-1025

# **Certificate of Analysis**

Lab Work Order #: L2136720

Project P.O. #: VANCO-0000047506

Job Reference: WEEKLY BOTTOM ASH-SUITE (INCLUDES PH)

C of C Numbers: Legal Site Desc:

13 Mack

Brent Mack, B.Sc. Account Manager

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L2136720 CONTD....

PAGE 2 of 5 31-JUL-18 14:06 (MT)

Version: FINAL

(1:2 soil:water) (pH) Preliminary pH (pH)	11.45			İ	DBA1826-A-04-05
Preliminary pH (pH)	11 45				
Preliminary pH (pH)	11 45				
	11.40	11.59	11.48	11.37	11.45
	11.52	11.49	11.57	11.43	11.40
d Preliminary pH (pH)	9.22	9.16	9.24	9.08	9.06
al pH (pH)	5.57	5.62	5.86	5.78	5.63
traction Solution Initial pH (pH)	2.90	2.90	2.90	2.90	2.90
dmium (Cd)-Leachable (mg/L)	0.238	0.309	0.163	0.313	0.163

L2136720 CONTD....

PAGE 3 of 5 31-JUL-18 14:06 (MT)

### Version: FINAL

	Sample ID Description Sampled Date Sampled Time Client ID	L2136720-6 Soil 28-JUN-18 09:00 DBA1826-A-04-06	L2136720-7 Soil 28-JUN-18 09:00 DBA1826-A-04-07	L2136720-8 Soil 28-JUN-18 09:00 DBA1826-A-04-08	L2136720-9 Soil 28-JUN-18 09:00 DBA1826-A-04-09	L2136720-10 Soil 28-JUN-18 09:00 DBA1826-A-04-10
Grouping	Analyte					
SOIL						
Physical Tests	pH (1:2 soil:water) (pH)	11.29	11.39	11.52	11.50	11.52
TCLP Metals	1st Preliminary pH (pH)	11.38	11.42	11.46	11.50	11.39
	2nd Preliminary pH (pH)	8.98	8.91	9.00	9.12	9.01
	Final pH (pH)	5.55	5.69	5.49	5.47	5.48
	Extraction Solution Initial pH (pH)	2.90	2.90	2.90	2.90	2.90
	Cadmium (Cd)-Leachable (mg/L)	0.169	0.212	0.167	0.153	0.185

L2136720 CONTD.... PAGE 4 of 5

31-JUL-18 14:06 (MT) Version: FINAL

	Sample ID Description Sampled Date Sampled Time Client ID	L2136720-11 Soil 28-JUN-18 09:00 DBA1826-A-04-11	L2136720-12 Soil 28-JUN-18 09:00 DBA1826-A-04-12		
Grouping	Analyte				
SOIL					
Physical Tests	pH (1:2 soil:water) (pH)	11.58	11.34		
TCLP Metals	1st Preliminary pH (pH)	11.48	11.45		
	2nd Preliminary pH (pH)	9.10	9.28		
	Final pH (pH)	5.45	5.50		
	Extraction Solution Initial pH (pH)	2.90	2.90		
	Cadmium (Cd)-Leachable (mg/L)	0.170	0.243		
		0.170	0.240		

### Reference Information

L2136720 CONTD....

PAGE 5 of 5
31-JUL-18 14:06 (MT)

Version: FINAL

#### **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.

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

Date Received: 26-JUL-18

Report Date: 01-AUG-18 17:22 (MT)

Version: FINAL

Client Phone: 604-521-1025

# **Certificate of Analysis**

Lab Work Order #: L2136734

Project P.O. #: VANCO-0000047506

Job Reference: WEEKLY BOTTOM ASH-SUITE (INCLUDES 2:1

PH)

C of C Numbers: Legal Site Desc:

126 11/ack

Brent Mack, B.Sc. Account Manager

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L2136734 CONTD....

PAGE 2 of 5 01-AUG-18 17:22 (MT)

Version: FINAL

	Sample ID Description Sampled Date Sampled Time Client ID	L2136734-1 Soil 29-JUN-18 09:00 DBA1826-A-05-01	L2136734-2 Soil 29-JUN-18 09:00 DBA1826-A-05-02	L2136734-3 Soil 29-JUN-18 09:00 DBA1826-A-05-03	L2136734-4 Soil 29-JUN-18 09:00 DBA1826-A-05-04	L2136734-5 Soil 29-JUN-18 09:00 DBA1826-A-05-05
Grouping	Analyte					
SOIL	•					
Physical Tests	pH (1:2 soil:water) (pH)	10.56	10.56	10.62	10.74	10.72
TCLP Metals	1st Preliminary pH (pH)	11.25	11.15	11.23	11.34	11.26
	2nd Preliminary pH (pH)	6.02	7.66	6.36	6.55	6.06
	Final pH (pH)	5.37	5.50	5.33	5.59	5.32
	Extraction Solution Initial pH (pH)	2.92	2.92	2.92	2.92	2.92
	Cadmium (Cd)-Leachable (mg/L)	0.228	0.313	0.154	0.288	0.191

L2136734 CONTD....

PAGE 3 of 5 01-AUG-18 17:22 (MT)

Version: FINAL

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	Sample ID Description Sampled Date Sampled Time Client ID	29-JUN-18	L2136734-7 Soil 29-JUN-18 09:00 DBA1826-A-05-07	L2136734-8 Soil 29-JUN-18 09:00 DBA1826-A-05-08	L2136734-9 Soil 29-JUN-18 09:00 DBA1826-A-05-09	L2136734-10 Soil 29-JUN-18 09:00 DBA1826-A-05-10
Grouping	Analyte					
SOIL	,					
Physical Tests	pH (1:2 soil:water) (pH)	10.84	10.88	10.77	10.68	10.68
TCLP Metals	1st Preliminary pH (pH)	11.42	11.34	11.25	11.02	10.97
	2nd Preliminary pH (pH)	6.40	6.25	6.90	6.97	6.78
	Final pH (pH)	5.32	5.44	5.35	5.45	5.47
	Extraction Solution Initial pH (pH)	2.92	2.92	2.92	2.92	2.92
	Cadmium (Cd)-Leachable (mg/L)	0.181	0.241	0.231	0.315	0.312

L2136734 CONTD.... PAGE 4 of 5

## ALS ENVIRONMENTAL ANALYTICAL REPORT

01-AUG-18 17:22 (MT) Version: FINAL

	Sample ID Description Sampled Date Sampled Time Client ID	L2136734-11 Soil 29-JUN-18 09:00 DBA1826-A-05-11	L2136734-12 Soil 29-JUN-18 09:00 DBA1826-A-05-12		
Grouping	Analyte				
SOIL					
Physical Tests	pH (1:2 soil:water) (pH)	10.76	10.70		
TCLP Metals	1st Preliminary pH (pH)	11.06	10.98		
	2nd Preliminary pH (pH)	6.94	7.07		
	Final pH (pH)	5.46	5.51		
	Extraction Solution Initial pH (pH)	2.92	2.92		
	Cadmium (Cd)-Leachable (mg/L)	0.322	0.493		
		0.022	0.100		

### Reference Information

L2136734 CONTD....

PAGE 5 of 5

01-AUG-18 17:22 (MT)

Version: FINAL

#### **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.

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

Date Received: 26-JUL-18

Report Date: 02-AUG-18 17:46 (MT)

Version: FINAL REV. 2

Client Phone: 604-521-1025

# **Certificate of Analysis**

Lab Work Order #: L2136730

Project P.O. #: VANCO-0000047506

Job Reference: WEEKLY BOTTOM ASH-SUITE (INCLUDES 2:1

PH)

C of C Numbers: Legal Site Desc:

#### Comments:

2-AUG-2018 This report replaces the previous version and contains an updated Final pH result for 1 sample.

Brent Mack, B.Sc.

Account Manager

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

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



L2136730 CONTD....

PAGE 2 of 5 02-AUG-18 17:46 (MT)

Version: FINAL REV. 2

	Sample ID Description Sampled Date Sampled Time Client ID	L2136730-1 Soil 30-JUN-18 09:00 DBA1826-A-06-01	L2136730-2 Soil 30-JUN-18 09:00 DBA1826-A-06-02	L2136730-3 Soil 30-JUN-18 09:00 DBA1826-A-06-03	L2136730-4 Soil 30-JUN-18 09:00 DBA1826-A-06-04	L2136730-5 Soil 30-JUN-18 09:00 DBA1826-A-06-05
Grouping	Analyte					
SOIL	,					
Physical Tests	pH (1:2 soil:water) (pH)	10.87	10.91	11.12	11.09	11.28
TCLP Metals	1st Preliminary pH (pH)	11.37	11.36	11.60	11.45	11.59
	2nd Preliminary pH (pH)	8.28	8.46	8.93	8.75	8.85
	Final pH (pH)	5.40	5.51	5.51	5.83	5.66
	Extraction Solution Initial pH (pH)	2.89	2.89	2.89	2.89	2.89
	Cadmium (Cd)-Leachable (mg/L)	0.214	0.337	0.179	0.213	0.129

L2136730 CONTD....

PAGE 3 of 5 02-AUG-18 17:46 (MT)

Version: FINAL REV. 2

	Sample ID Description Sampled Date Sampled Time Client ID	30-JUN-18	L2136730-7 Soil 30-JUN-18 09:00 DBA1826-A-06-07	L2136730-8 Soil 30-JUN-18 09:00 DBA1826-A-06-08	L2136730-9 Soil 30-JUN-18 09:00 DBA1826-A-06-09	L2136730-10 Soil 30-JUN-18 09:00 DBA1826-A-06-10
Grouping	Analyte	-				
SOIL	,					
Physical Tests	pH (1:2 soil:water) (pH)	11.15	10.94	11.09	10.98	10.97
TCLP Metals	1st Preliminary pH (pH)	11.46	11.31	11.34	11.32	11.21
	2nd Preliminary pH (pH)	9.09	8.16	8.62	8.16	7.98
	Final pH (pH)	5.79	5.29	5.69	5.54	5.64
	Extraction Solution Initial pH (pH)	2.89	2.89	2.89	2.89	2.89
	Cadmium (Cd)-Leachable (mg/L)	0.281	0.151	0.170	0.158	0.174

L2136730 CONTD....

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### ALS ENVIRONMENTAL ANALYTICAL REPORT

Version: FINAL REV. 2

	Sample ID Description Sampled Date Sampled Time Client ID	L2136730-11 Soil 30-JUN-18 09:00 DBA1826-A-06-11	L2136730-12 Soil 30-JUN-18 09:00 DBA1826-A-06-12		
Grouping	Analyte				
SOIL					
Physical Tests	pH (1:2 soil:water) (pH)	11.00	10.87		
TCLP Metals	1st Preliminary pH (pH)	11.34	11.17		
	2nd Preliminary pH (pH)	8.57	8.04		
	Final pH (pH)	5.73	5.39		
	Extraction Solution Initial pH (pH)	2.89	2.89		
	Cadmium (Cd)-Leachable (mg/L)	0.613	0.155		
	, ,	0.013	0.155		

### **Reference Information**

L2136730 CONTD.... PAGE 5 of 5 02-AUG-18 17:46 (MT)

Version: FINAL REV. 2

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

ALS Test Code Matrix Test Description		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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