



April 9, 2019

Reference No. 088877

Mr. Allan Leuschen  
Senior Environmental Protection Officer Authorizations – South  
Environmental Protection Division Ministry of Environment  
2080 Labieux Road  
Nanaimo, British Columbia V9T 6J9

Dear Mr. Leuschen:

**Re: Groundwater and Surface Water Monitoring Data  
Upland Landfill  
Upland Excavating, Campbell River, British Columbia**

GHD has prepared this letter on behalf of Upland Excavating Ltd. (Upland) to provide a summary of all groundwater and surface water monitoring data for the September 2015 to March 2019 time period. Groundwater and surface water monitoring data has been generated in support of Upland’s Waste Discharge Application submitted to the BC Ministry of Environment & Climate Change Strategy (ENV) for the proposed Upland Landfill (Landfill) located at 7295 Gold River Hwy, Campbell River, British Columbia (BC) (Site).

A total of 49 groundwater and 10 surface water samples were collected as part of nine separate monitoring events completed during the noted time period. Water levels were collected from each well prior to sample collection. The sampling events for each groundwater and surface water sampling location are summarized as follows:

Location	Total No. of Samples	2015	2016	2017	2018	2019
MW1-14	3	XX		X		
MW2-14	8 incl. one duplicate	XXX		XX	XX	X
MW2A-16	8 incl. one duplicate		X	XXX	XX	XX
MW3-14	7	XX		XX	XX	X
MW4A-15	4 incl. one duplicate	XXX		X		
MW4B-15	3	XX		X		
MW5A-15	4 incl. one duplicate	XX		XX		
MW5B-15	2	X		X		
MW6-17	1			X		
MW9-17	1			X		
MW10-17	7 incl. two duplicates			XX	XXXX	X
MW11-19	Scheduled for April 2019					
PZ1-19	Scheduled for April 2019					
RW-98020	1		X			
SW15-01	4 incl. one duplicate	XXX		X		
SW15-02	4 incl. one duplicate	XXX		X		
SW16-03	2		X	X		



The groundwater and surface water sampling locations are illustrated on Figure 1. As summarized above, key monitoring wells located within the immediate landfill footprint area have been sampled seven or eight times during the subject time period.

One new downgradient monitoring well (MW11-19) was installed in April 2019 and will be included in future monitoring events. Two new monitoring wells (MW12 and MW13) are planned for future installation. These three monitoring wells are also shown on Figure 1.

The water level monitoring data is provided as Table 1. During the September 2015 to March 2019 time period, water level measurements have been collected during the months of January, February, March, April, June, September, October and November.

Groundwater quality data is provided as Table 2. Surface water quality data is provided as Table 3. The water quality data for the 2019 Q1 monitoring event has not yet been included in Table 2, but will be added to the GHD database following the project chemist's quality assurance/quality control (QA/QC) assessment.

Please do not hesitate to contact us with any questions on this data.

Sincerely,

GHD

A handwritten signature in blue ink, appearing to read 'Gregory D. Ferraro', is written over a light blue circular stamp.

Gregory D. Ferraro, P.Eng.

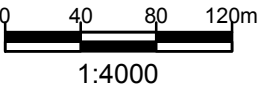
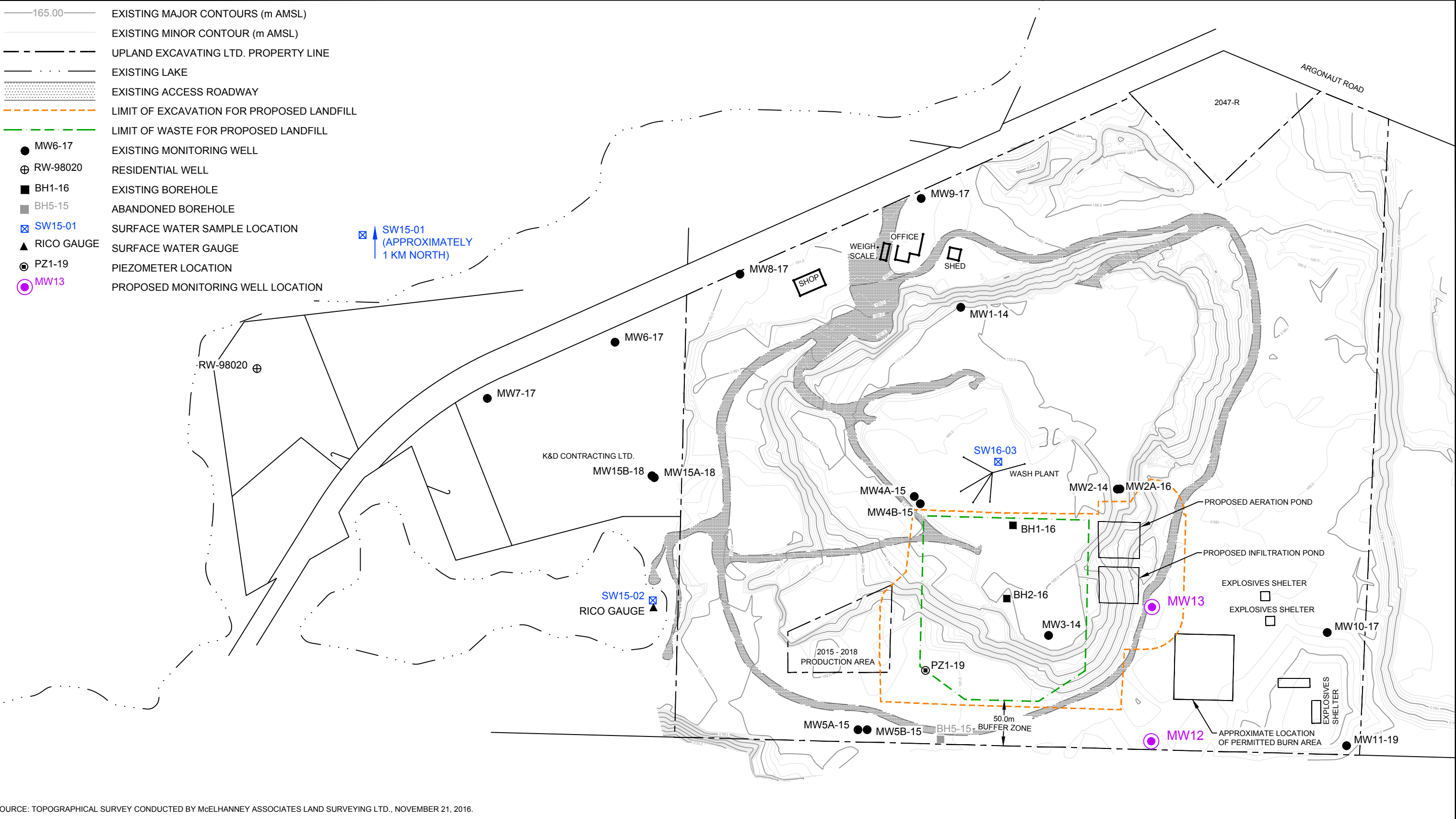
RMR/cs/26

Encl.

cc: Terry Stuart – Upland Excavating Ltd.  
Brian Fagan – Northwin Environmental  
Steve Harris – GHD

**LEGEND**

- 165.00— EXISTING MAJOR CONTOURS (m AMSL)
- EXISTING MINOR CONTOUR (m AMSL)
- - - UPLAND EXCAVATING LTD. PROPERTY LINE
- · - · - EXISTING LAKE
- ▨ EXISTING ACCESS ROADWAY
- - - - - LIMIT OF EXCAVATION FOR PROPOSED LANDFILL
- · - · - - LIMIT OF WASTE FOR PROPOSED LANDFILL
- MW6-17 EXISTING MONITORING WELL
- ⊕ RW-98020 RESIDENTIAL WELL
- BH1-16 EXISTING BOREHOLE
- BH5-15 ABANDONED BOREHOLE
- ⊠ SW15-01 SURFACE WATER SAMPLE LOCATION
- ▲ RICO GAUGE SURFACE WATER GAUGE
- ⊙ PZ1-19 PIEZOMETER LOCATION
- ⊙ MW13 PROPOSED MONITORING WELL LOCATION



UPLAND EXCAVATING LTD.  
PROPOSED UPLAND LANDFILL

BASELINE WATER QUALITY MONITORING LOCATIONS

88877-03  
Apr 8, 2019

FIGURE 1

**Table 1**  
**Water Level Monitoring Data**  
**Upland Landfill**  
**Campbell River, British Columbia**

Monitoring ID	Borehole Depth (m BGS)	Reference Elevation TOR (m AMSL)	Water Elevation (m AMSL)														
			11-Sep-15	17-Sep-15	5-Oct-15	25-Jan-16	29-Jan-16	15-Feb-16	8-Mar-16	15-Mar-17	6-Apr-17	27-Nov-17	7-Jun-18	17-Sep-18	1-Nov-18	6-Mar-19	
<b>Date:</b>																	
MW1-14	11.0	172.9	167.3	166.6	166.9	166.9	-	-	-	164.8	165.2	164.1	162.5	163.0	-	166.4	
MW2-14	21.6	173.8	159.4	159.1	158.6	159.1	-	159.3	-	158.0	158.0	156.9	155.4	156.4	158.9	159.0	
MW2A-16	45.4	173.9	-	-	-	159.3	-	159.3	-	158.0	158.1	156.9	155.5	155.3	158.8	159.1	
MW3-14	18.6	168.6	155.8	155.9	155.8	157.2	-	-	-	156.5	156.4	155.3	153.8	152.5	155.3	157.1	
MW4A-15	21.3	169.3	165.4	165.0	164.4	165.3	-	-	-	163.6	165.9	162.3	161.1	160.9	-	164.8	
MW4B-15	18.3	169.3	165.2	164.8	164.1	165.0	-	-	-	163.3	163.6	162.2	160.9	160.7	-	164.6	
MW5A-15	10.7	191.9	182.9	182.9	183.6	184.6	-	-	-	183.8	184.2	184.1	183.2	182.9	-	183.1	
MW5B-15	8.2	192.0	184.9	184.9	185.0	186.6	-	-	-	184.9	185.9	186.1	183.7	<183.7	-	184.3	
MW6-17	11.3	185.4	-	-	-	-	-	-	-	-	177.9	176.7	176.6	175.1	-	177.4	
MW7-17	4.3	187.5	-	-	-	-	-	-	-	184.2	184.6	184.8	183.7	183.6	-	184.0	
MW8-17	18.8	192.5	-	-	-	-	-	-	-	172.8	172.8	172.8	<172.8	<172.8	-	172.9	
MW9-17	33.5	191.7	-	-	-	-	-	-	-	166.8	167.2	167.1	165.1	166.6	-	168.1	
MW10-17	46.3	189.1	-	-	-	-	-	-	-	-	150.1	148.8	148.1	147.0	148.2	150.0	
MW15A-18	15.2	183.1	-	-	-	-	-	-	-	-	-	-	-	175.4	-	178.5	
MW15B-18	9.0	183.2	-	-	-	-	-	-	-	-	-	-	-	174.3	-	178.2	
RW-98020	61.0	196.9	-	-	-	-	-	179.9	-	-	-	-	-	-	-	-	
Mclvor Lake**	-	-	-	-	-	-	-	177.5	-	177.9	177.6	177.6	-	-	-	176.0	177.5
SW15-02	-	-	-	-	-	-	-	181.2	-	181.2	180.4	180.4	-	-	178.0	178.6	180.3
Rico Lake*	-	180.33	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

**Notes:**

191.88 - Surveys completed by McElhanney on April 6, 2016 and March 16 and 31, 2017

185.4 - Survey completed by Upland Excavating Ltd. on January 29th, 2015, March 8, 2016 and April 6th, 2016. Elevations measured with respect to AMSL.

\*\* Mclvor Lake elevations are based on BC Hydro record of water elevations at Ladore Dam recorded every three hours. ([https://www.bchydro.com/energy-in-bc/our\\_system/transmission\\_reservoir\\_data/previous\\_reservoir\\_elevations/vancouver\\_island/ladore\\_ldr.html](https://www.bchydro.com/energy-in-bc/our_system/transmission_reservoir_data/previous_reservoir_elevations/vancouver_island/ladore_ldr.html))

\* Surface water gauge reference elevation refers to the bottom of the gauge. (0 m on gauge = 180.33 m amsl)

m BGS - metres below ground surface

m AMSL - metres above mean sea level (WGS1984)

TOR - top of riser

MW15A/B-18 were installed in July 2018

Table 2

**Groundwater Monitoring Data  
Upland Landfill  
Campbell River, British Columbia**

Sample Location:		MW1-14			
		W-88877-091715- TDF-07 9/17/2015	WG-88877- 05102015-TE-01 10/5/2015	WG-88877- 060417-JS-03 4/6/2017	
Sample ID:	BC CSR Schedule 3.2 DW				
Sample Date:					
Parameters	Units				
<b>Field Parameters</b>					
Conductivity, field	uS/cm	--	101	99	103
Dissolved oxygen (DO), field	mg/L	--	10.5	-	9.45
Oxidation reduction potential (ORP), field	millivolts	--	234	226	217
pH, field	s.u.	--	7.45	6.79	7.47
Temperature, field	Deg C	--	13.75	15.68	12.95
Total dissolved solids, field (TDS)	g/L	--	-	0.064	0.067
Turbidity, field	NTU	--	250	91	101
<b>General Chemistry</b>					
%difference/ion balance	none	--	0.99	1.0	-
Alkalinity (as CaCO3 pH=8.3)	mg/L	--	ND (0.50)	ND (0.50)	ND (0.50)
Alkalinity, total (as CaCO3)	mg/L	--	39.1	40.8	41.7
Biochemical oxygen demand (BOD)	mg/L	--	ND (6.0)	ND (6.0)	ND (6.0)
Chemical oxygen demand (COD)	mg/L	--	25	19	10
Chloride (dissolved)	mg/L	250	1.9	3.7	3.2
Conductivity	uS/cm	--	91.2	100	95.5
Cyanide (total)	mg/L	0.2	ND (0.00054)	-	-
Cyanide, weak acid dissociable	mg/L	--	-	ND (0.00050)	-
Hardness (dissolved)	mg/L	--	38.7	43.3	40.8
Hydrogen sulfide	mg/L	0.05	-	0.0070	ND (0.0020)
Hydroxide (as CaCO3)	mg/L	--	ND (0.50)	ND (0.50)	ND (0.50)
Oil and grease	mg/L	--	-	-	-
Orthophosphate	mg/L	--	ND (0.10) J	ND (0.10)	0.0084
pH	s.u.	--	7.65 J	7.85 J	7.79 J
Phenolics (total)	mg/L	--	-	-	ND (0.0010)
Phosphorus	mg/L	--	0.337	0.675	-
Sulfate (dissolved)	mg/L	500	3.17	2.31	3.42
Sulfide	mg/L	0.05 *ref only	ND (0.0050)	0.0062	ND (0.0019)
Total dissolved solids (TDS)	mg/L	--	52 J	ND (72)	52
Total suspended solids (TSS)	mg/L	--	212	717	-
<b>Nutrients</b>					
Ammonia-N	mg/L	--	0.021	0.012	0.018
Bicarbonate (as CaCO3)	mg/L	--	47.7	49.8	50.9
Carbonate (as CaCO3)	mg/L	--	ND (0.50)	ND (0.50)	ND (0.50)
Nitrate (as N)	mg/L	10	0.15	0.26	0.291
Nitrite (as N)	mg/L	1	ND (0.10)	ND (0.10)	ND (0.0050)
Nitrite/Nitrate	mg/L	10	0.15	0.26	0.291
Nitrogen	mg/L	--	0.185	0.303	0.334
Total kjeldahl nitrogen (TKN)	mg/L	--	ND (0.10)	ND (0.10)	0.043
<b>Dissolved Metals</b>					
Aluminum (dissolved)	ug/L	9500	9.0 J	6.6	6.2
Antimony (dissolved)	ug/L	6	ND (0.50)	ND (0.50)	ND (0.50)
Arsenic (dissolved)	ug/L	10	0.13	0.15	0.14
Barium (dissolved)	ug/L	1000	ND (1.0)	ND (1.0)	ND (1.0)
Beryllium (dissolved)	ug/L	8	ND (0.10)	ND (0.10)	ND (0.10)
Bismuth (dissolved)	ug/L	--	ND (1.0)	ND (1.0)	ND (1.0)
Boron (dissolved)	ug/L	5000	ND (50)	ND (50)	ND (50)
Cadmium (dissolved)	ug/L	5	ND (0.010)	ND (0.010)	ND (0.010)
Calcium (dissolved)	ug/L	--	12600	14200	13300
Chromium (dissolved)	ug/L	50	ND (1.0)	ND (1.0)	ND (1.0)
Cobalt (dissolved)	ug/L	20 (i)	ND (0.50)	ND (0.50)	ND (0.20)
Copper (dissolved)	ug/L	1500	0.33	0.44	1.07
Iron (dissolved)	ug/L	6500	53.9	7.5	ND (5.0)
Lead (dissolved)	ug/L	10	ND (0.20)	ND (0.20)	ND (0.20)
Lithium (dissolved)	ug/L	8	ND (5.0)	ND (5.0)	ND (2.0)
Magnesium (dissolved)	ug/L	--	1740	1870	1820
Manganese (dissolved)	ug/L	1500	ND (1.0)	ND (1.0)	ND (1.0)
Mercury (dissolved)	ug/L	1	ND (0.010)	ND (0.010)	ND (0.010)
Molybdenum (dissolved)	ug/L	250	ND (1.0)	ND (1.0)	ND (1.0)
Nickel (dissolved)	ug/L	80	ND (1.0)	ND (1.0)	ND (1.0)
Phosphorus (dissolved)	ug/L	--	-	-	14
Potassium (dissolved)	ug/L	--	181	176	215
Selenium (dissolved)	ug/L	10	0.18	ND (0.10)	ND (0.10)
Silicon (dissolved)	ug/L	--	5310	5500	5670
Silver (dissolved)	ug/L	20	ND (0.020)	ND (0.020)	ND (0.020)
Sodium (dissolved)	ug/L	200000	2850	2620	3550
Strontium (dissolved)	ug/L	2500	21.7	23.0	22.9
Sulfur (dissolved)	ug/L	--	ND (3000)	ND (3000)	ND (3000)
Thallium (dissolved)	ug/L	--	ND (0.050)	ND (0.050)	ND (0.010)
Tin (dissolved)	ug/L	2500	ND (5.0)	ND (5.0)	ND (5.0)
Titanium (dissolved)	ug/L	--	ND (5.0)	ND (5.0)	ND (5.0)
Uranium (dissolved)	ug/L	20	ND (0.10)	0.13	ND (0.10)
Vanadium (dissolved)	ug/L	20	ND (5.0)	ND (5.0)	ND (5.0)
Zinc (dissolved)	ug/L	3000	ND (5.0)	8.7	ND (5.0)
Zirconium (dissolved)	ug/L	--	ND (0.50)	ND (0.50) J	ND (0.10)

**Groundwater Monitoring Data  
Upland Landfill  
Campbell River, British Columbia**

Sample Location:		MW2-14							
Sample ID:	BC CSR	W-88877-091715-	W-88877-091715-	WG-88877-	WG-88877-060417-	WG-88877-271117-	WG-88877-070618-	WG-88877-011118-	
Sample Date:	Schedule 3.2 DW	TDF-05 9/17/2015	TDF-06 9/17/2015 Duplicate	05102015-TE-02 10/5/2015	JS-04 4/6/2017	CR-05 11/27/2017	NT-01 6/7/2018	CR-01 11/1/2018	
Parameters	Units								
<b>Field Parameters</b>									
Conductivity, field	uS/cm	--	180	180	163	143	144	149	129
Dissolved oxygen (DO), field	mg/L	--	10.15	10.15	-	8.11	9.12	8.6	-
Oxidation reduction potential (ORP), field	millivolts	--	222	222	222	233	236	221	267
pH, field	s.u.	--	7.52	7.52	7.05	7.34	6.84	6.12	7.22
Temperature, field	Deg C	--	12.5	12.5	15.74	11.63	9.72	10.58	8.57
Total dissolved solids, field (TDS)	g/L	--	-	-	0.105	0.093	0.093	0.096	0.084
Turbidity, field	NTU	--	ND () NM	ND () NM	561	71.4	14.0	160	13.1
<b>General Chemistry</b>									
%difference/ion balance	none	--	1.0	1.0	1.1	-	-	-	-
Alkalinity (as CaCO3 pH=8.3)	mg/L	--	ND (0.50)	ND (0.50)	ND (0.50)	ND (0.50)	ND (1.0)	ND (1.0)	ND (1.0)
Alkalinity, total (as CaCO3)	mg/L	--	76.2	77.9	71.1	59.4	43.9	43.2	55.6
Biochemical oxygen demand (BOD)	mg/L	--	6.7	7.8	ND (6.0)	ND (6.0)	-	-	-
Chemical oxygen demand (COD)	mg/L	--	60	65	18	ND (10)	-	-	-
Chloride (dissolved)	mg/L	250	3.5	3.0	2.1	4.5	7.2	8.3	2.9
Conductivity	uS/cm	--	178	180	162	141	118	144	127
Cyanide (total)	mg/L	0.2	ND (0.00057)	ND (0.00056)	-	-	-	-	-
Cyanide, weak acid dissociable	mg/L	--	-	-	ND (0.00050)	-	-	-	-
Hardness (dissolved)	mg/L	--	81.1	80.5	77.0	57.9	46.4	60.3	52.4
Hydrogen sulfide	mg/L	0.05	-	-	0.010	ND (0.0020)	ND (0.0019)	ND (0.0020)	ND (0.0020)
Hydroxide (as CaCO3)	mg/L	--	ND (0.50)	ND (0.50)	ND (0.50)	ND (0.50)	ND (1.0)	ND (1.0)	ND (1.0)
Oil and grease	mg/L	--	-	-	-	-	-	-	-
Orthophosphate	mg/L	--	ND (0.10) J	ND (0.10) J	ND (0.10)	0.0273	ND (0.10)	0.0054 J	-
pH	s.u.	--	8.01 J	7.96 J	7.98 J	7.83 J	7.85 J	7.71 J	7.77 J
Phenolics (total)	mg/L	--	-	-	-	ND (0.0010)	-	-	-
Phosphorus	mg/L	--	0.275 J	0.387 J	0.150	-	-	-	-
Sulfate (dissolved)	mg/L	500	8.22	7.72	7.24	7.12	5.6	9.4	3.8
Sulfide	mg/L	0.05 *ref only	ND (0.0050)	ND (0.0075)	0.0093	ND (0.0019)	ND (0.0019)	ND (0.0019)	ND (0.0019)
Total dissolved solids (TDS)	mg/L	--	108 J	100 J	94	76	66	84	76
Total suspended solids (TSS)	mg/L	--	330	362	174	-	-	-	-
<b>Nutrients</b>									
Ammonia-N	mg/L	--	0.058 J	0.034 J	0.20	0.043	ND (0.020)	0.035	ND (0.020)
Bicarbonate (as CaCO3)	mg/L	--	93.0	95.0	86.7	72.5	53.5	52.7	67.9
Carbonate (as CaCO3)	mg/L	--	ND (0.50)	ND (0.50)	ND (0.50)	ND (0.50)	ND (1.0)	ND (1.0)	ND (1.0)
Nitrate (as N)	mg/L	10	0.26	0.24	0.14	0.288	ND (0.10)	0.20	0.21
Nitrite (as N)	mg/L	1	ND (0.10)	ND (0.10)	ND (0.10)	ND (0.0050)	ND (0.10)	ND (0.10)	ND (0.10)
Nitrite/Nitrate	mg/L	10	0.26	0.24	0.14	0.288	ND (0.10)	0.20	0.21
Nitrogen	mg/L	--	0.507	0.446	0.211	0.324	-	-	-
Total kjeldahl nitrogen (TKN)	mg/L	--	0.25	0.21	ND (0.10)	0.037	-	-	-
<b>Dissolved Metals</b>									
Aluminum (dissolved)	ug/L	9500	9.6 J	9.8 J	6.1	ND (3.0)	ND (3.0)	3.6	ND (3.0)
Antimony (dissolved)	ug/L	6	ND (0.50)	ND (0.50)	ND (0.50)	ND (0.50)	ND (0.50)	ND (0.50)	ND (0.50)
Arsenic (dissolved)	ug/L	10	0.18	0.18	0.17	0.13	0.12	ND (0.10)	0.12
Barium (dissolved)	ug/L	1000	1.7	1.7	1.9	1.6	1.2	1.7	1.3
Beryllium (dissolved)	ug/L	8	ND (0.10)	ND (0.10)	ND (0.10)	ND (0.10)	ND (0.10)	ND (0.10)	ND (0.10)
Bismuth (dissolved)	ug/L	--	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
Boron (dissolved)	ug/L	5000	ND (50)	ND (50)	ND (50)	ND (50)	ND (50)	ND (50)	ND (50)
Cadmium (dissolved)	ug/L	5	0.014	0.011	0.017	ND (0.010)	ND (0.010)	ND (0.010)	ND (0.010)
Calcium (dissolved)	ug/L	--	25500	25100	24300	18000	14700	19200	16500
Chromium (dissolved)	ug/L	50	ND (1.0)	ND (1.0)	ND (1.0)	1.8	ND (1.0)	ND (1.0)	ND (1.0)
Cobalt (dissolved)	ug/L	20 (i)	ND (0.50)	ND (0.50)	ND (0.50)	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)
Copper (dissolved)	ug/L	1500	0.72	0.85	0.99	0.50	0.29	0.39	0.38
Iron (dissolved)	ug/L	6500	ND (5.0)	5.1	9.5	ND (5.0)	ND (5.0)	7.5	5.0
Lead (dissolved)	ug/L	10	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)
Lithium (dissolved)	ug/L	8	ND (5.0)	ND (5.0)	ND (5.0)	ND (2.0)	ND (2.0)	ND (2.0)	ND (2.0)
Magnesium (dissolved)	ug/L	--	4250	4300	3920	3140	2370	3000	2730
Manganese (dissolved)	ug/L	1500	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
Mercury (dissolved)	ug/L	1	ND (0.010)	ND (0.010)	ND (0.010)	ND (0.010)	ND (0.010)	ND (0.0020)	0.0053
Molybdenum (dissolved)	ug/L	250	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
Nickel (dissolved)	ug/L	80	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
Phosphorus (dissolved)	ug/L	--	-	-	-	12	-	-	-
Potassium (dissolved)	ug/L	--	291	292	254	269	238	254	232
Selenium (dissolved)	ug/L	10	0.18	0.18	0.11	0.15	0.12	0.11	0.11
Silicon (dissolved)	ug/L	--	6250	6500	6530	6480	5750	6400	5980
Silver (dissolved)	ug/L	20	ND (0.020)	ND (0.020)	ND (0.020)	ND (0.020)	ND (0.020)	ND (0.020)	ND (0.020)
Sodium (dissolved)	ug/L	200000	4720	4630	4370	5240	4550	3740	4300
Strontium (dissolved)	ug/L	2500	36.6	37.8	34.7	29.8	24.6	29.8	26.0
Sulfur (dissolved)	ug/L	--	ND (3000)	ND (3000)	3800	ND (3000)	ND (3000)	3800	ND (3000)
Thallium (dissolved)	ug/L	--	ND (0.050)	ND (0.050)	ND (0.050)	ND (0.010)	ND (0.010)	ND (0.010)	ND (0.010)
Tin (dissolved)	ug/L	2500	5.0	ND (5.0)	ND (5.0)	ND (5.0)	ND (5.0)	ND (5.0)	ND (5.0)
Titanium (dissolved)	ug/L	--	ND (5.0)	ND (5.0)	ND (5.0)	ND (5.0)	ND (5.0)	ND (5.0)	ND (5.0)
Uranium (dissolved)	ug/L	20	ND (0.10)	ND (0.10)	ND (0.10)	ND (0.10)	ND (0.10)	ND (0.10)	ND (0.10)
Vanadium (dissolved)	ug/L	20	ND (5.0)	ND (5.0)	ND (5.0)	ND (5.0)	ND (5.0)	ND (5.0)	ND (5.0)
Zinc (dissolved)	ug/L	3000	ND (5.0)	ND (5.0)	5.0	ND (5.0)	ND (5.0)	ND (5.0)	ND (5.0)
Zirconium (dissolved)	ug/L	--	ND (0.50)	ND (0.50)	ND (0.50) J	ND (0.10)	ND (0.10)	ND (0.10)	ND (0.10)

Table 2

**Groundwater Monitoring Data  
Upland Landfill  
Campbell River, British Columbia**

Sample Location:		MW2A-16						
		WG-88877-150216- JS-02 2/15/2016	WG-88877-070417- JS-09 4/7/2017	WG-88877-271117- CR-03 11/27/2017	WG-88877-271117- CR-04 11/27/2017 Duplicate	WG-88877-070618- NT-02 6/7/2018	WG-88877-011118- CR-02 11/1/2018	
Sample ID:	BC CSR							
Sample Date:	Schedule 3.2 DW							
Parameters	Units							
<b>Field Parameters</b>								
Conductivity, field	uS/cm	--	92	72	105	105	73	
Dissolved oxygen (DO), field	mg/L	--	-	8.42	11.43	11.43	11.13	
Oxidation reduction potential (ORP), field	millivolts	--	140	233	213	213	204	
pH, field	s.u.	--	7.39	7.39	7.33	7.33	6.99	
Temperature, field	Deg C	--	12.42	10.99	10.29	10.29	10.59	
Total dissolved solids, field (TDS)	g/L	--	0.061	0.047	0.068	0.068	0.047	
Turbidity, field	NTU	--	OOR	63	44.3	44.3	16.1	
<b>General Chemistry</b>								
%difference/ion balance	none	--	0.96	-	-	-	-	
Alkalinity (as CaCO3 pH=8.3)	mg/L	--	ND (0.50)	ND (0.50)	ND (1.0)	ND (1.0)	ND (1.0)	
Alkalinity, total (as CaCO3)	mg/L	--	38.0	34.2	40.4	43.9	26.6	
Biochemical oxygen demand (BOD)	mg/L	--	ND (6.0)	ND (6.0)	-	-	-	
Chemical oxygen demand (COD)	mg/L	--	25	21	-	-	-	
Chloride (dissolved)	mg/L	250	0.83	0.89	1.5	1.3	1.7	
Conductivity	uS/cm	--	85.7	72.1	86.9	87.9	69.3	
Cyanide (total)	mg/L	0.2	ND (0.00054)	-	-	-	-	
Cyanide, weak acid dissociable	mg/L	--	-	-	-	-	-	
Hardness (dissolved)	mg/L	--	34.9	31.8	40.4	41.1	31.1	
Hydrogen sulfide	mg/L	0.05	-	ND (0.0020)	ND (0.0019)	ND (0.0019)	ND (0.0020)	
Hydroxide (as CaCO3)	mg/L	--	ND (0.50)	ND (0.50)	ND (1.0)	ND (1.0)	ND (1.0)	
Oil and grease	mg/L	--	-	-	-	-	-	
Orthophosphate	mg/L	--	ND (0.10) J	0.0268	ND (0.10)	ND (0.10)	0.017 J	
pH	s.u.	--	7.85 J	7.78 J	7.83 J	7.87 J	7.52 J	
Phenolics (total)	mg/L	--	-	ND (0.0010)	-	-	-	
Phosphorus	mg/L	--	0.121	-	-	-	-	
Sulfate (dissolved)	mg/L	500	4.52	3.90	2.9	2.7	3.1	
Sulfide	mg/L	0.05 *ref only	ND (0.0019)	ND (0.0019)	ND (0.0019)	ND (0.0019)	ND (0.0019)	
Total dissolved solids (TDS)	mg/L	--	60	44	68	66	36	
Total suspended solids (TSS)	mg/L	--	139	-	-	-	-	
<b>Nutrients</b>								
Ammonia-N	mg/L	--	ND (0.0050)	0.022	ND (0.020)	ND (0.020)	ND (0.020)	
Bicarbonate (as CaCO3)	mg/L	--	46.3	41.7	49.3	53.6	32.5	
Carbonate (as CaCO3)	mg/L	--	ND (0.50)	ND (0.50)	ND (1.0)	ND (1.0)	ND (1.0)	
Nitrate (as N)	mg/L	10	ND (0.10) J	0.053	ND (0.10)	ND (0.10)	ND (0.10)	
Nitrite (as N)	mg/L	1	ND (0.10) J	ND (0.0050)	ND (0.10)	ND (0.10)	ND (0.10)	
Nitrite/Nitrate	mg/L	10	ND (0.10) J	0.053	ND (0.10)	ND (0.10)	ND (0.10)	
Nitrogen	mg/L	--	0.095	0.101	-	-	-	
Total kjeldahl nitrogen (TKN)	mg/L	--	ND (0.10)	0.048	-	-	-	
<b>Dissolved Metals</b>								
Aluminum (dissolved)	ug/L	9500	24.2	15.9	8.8	8.7	10.6	
Antimony (dissolved)	ug/L	6	ND (0.50)	ND (0.50)	ND (0.50)	ND (0.50)	ND (0.50)	
Arsenic (dissolved)	ug/L	10	0.83	0.97	0.76	0.77	0.82	
Barium (dissolved)	ug/L	1000	2.8	6.3	5.5	5.6	3.4	
Beryllium (dissolved)	ug/L	8	ND (0.10)	ND (0.10)	ND (0.10)	ND (0.10)	ND (0.10)	
Bismuth (dissolved)	ug/L	--	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	
Boron (dissolved)	ug/L	5000	ND (50)	ND (50)	ND (50)	ND (50)	ND (50)	
Cadmium (dissolved)	ug/L	5	ND (0.010)	ND (0.010)	ND (0.010)	ND (0.010)	ND (0.010)	
Calcium (dissolved)	ug/L	--	11100	10500	13400	13600	10300	
Chromium (dissolved)	ug/L	50	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	
Cobalt (dissolved)	ug/L	20 (i)	ND (0.50)	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)	
Copper (dissolved)	ug/L	1500	ND (0.20)	0.28	ND (0.20)	0.25	ND (0.20)	
Iron (dissolved)	ug/L	6500	ND (5.0)	7.3	ND (5.0)	ND (5.0)	ND (5.0)	
Lead (dissolved)	ug/L	10	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)	
Lithium (dissolved)	ug/L	8	ND (5.0)	ND (2.0)	ND (2.0)	ND (2.0)	ND (2.0)	
Magnesium (dissolved)	ug/L	--	1730	1340	1700	1720	1300	
Manganese (dissolved)	ug/L	1500	16.2	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	
Mercury (dissolved)	ug/L	1	ND (0.010)	ND (0.010)	ND (0.010)	ND (0.010)	ND (0.0020)	
Molybdenum (dissolved)	ug/L	250	8.7	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	
Nickel (dissolved)	ug/L	80	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	
Phosphorus (dissolved)	ug/L	--	17	27	-	-	-	
Potassium (dissolved)	ug/L	--	541	314	247	242	192	
Selenium (dissolved)	ug/L	10	0.20	0.10	ND (0.10)	0.10	ND (0.10)	
Silicon (dissolved)	ug/L	--	4540	4350	4330	4290	4190	
Silver (dissolved)	ug/L	20	ND (0.020)	ND (0.020)	ND (0.020)	ND (0.020)	ND (0.020)	
Sodium (dissolved)	ug/L	200000	2830	1040	1130	1150	926	
Strontium (dissolved)	ug/L	2500	23.7	14.4	17.5	17.1	12.3	
Sulfur (dissolved)	ug/L	--	5500	ND (3000)	ND (3000)	ND (3000)	ND (3000)	
Thallium (dissolved)	ug/L	--	ND (0.050)	ND (0.010)	ND (0.010)	ND (0.010)	ND (0.010)	
Tin (dissolved)	ug/L	2500	ND (5.0)	ND (5.0)	ND (5.0)	ND (5.0)	ND (5.0)	
Titanium (dissolved)	ug/L	--	ND (5.0)	ND (5.0)	ND (5.0)	ND (5.0)	ND (5.0)	
Uranium (dissolved)	ug/L	20	ND (0.10)	ND (0.10)	ND (0.10)	ND (0.10)	ND (0.10)	
Vanadium (dissolved)	ug/L	20	ND (5.0)	6.1	6.2	5.8	6.5	
Zinc (dissolved)	ug/L	3000	ND (5.0)	ND (5.0)	ND (5.0)	ND (5.0)	ND (5.0)	
Zirconium (dissolved)	ug/L	--	ND (0.50)	ND (0.10)	ND (0.10)	ND (0.10)	ND (0.10)	

Table 2

**Groundwater Monitoring Data  
Upland Landfill  
Campbell River, British Columbia**

Sample Location:		MW3-14						
		W-88877-091715- TDF-04 9/17/2015	WG-88877- 05102015-TE-03 10/5/2015	WG-88877-070417- JS-10 4/7/2017	WG-88877-271117- CR-02 11/27/2017	WG-88877-070618- NT-03 6/7/2018	WG-88877-011118- CR-03 11/1/2018	
Sample ID:	BC CSR							
Sample Date:	Schedule 3.2 DW							
Parameters	Units							
<b>Field Parameters</b>								
Conductivity, field	uS/cm	--	251	157	104	165	123	
Dissolved oxygen (DO), field	mg/L	--	10.04	-	9.74	11.67	11.83	
Oxidation reduction potential (ORP), field	millivolts	--	194	231	255	229	236	
pH, field	s.u.	--	7.4	7.06	7.21	6.35	5.85	
Temperature, field	Deg C	--	12.98	14.34	7.65	9.97	7.84	
Total dissolved solids, field (TDS)	g/L	--	-	0.101	0.068	0.109	0.079	
Turbidity, field	NTU	--	ND () NM	00R	72.5	7.0	4.1	
<b>General Chemistry</b>								
%difference/ion balance	none	--	1.0	1.1	-	-	-	
Alkalinity (as CaCO3 pH=8.3)	mg/L	--	ND (0.50)	ND (0.50)	ND (0.50)	ND (1.0)	ND (1.0)	
Alkalinity, total (as CaCO3)	mg/L	--	37.8	40.5	40.8	44.1	38.5	
Biochemical oxygen demand (BOD)	mg/L	--	ND (6.0)	ND (6.0)	ND (6.0)	-	-	
Chemical oxygen demand (COD)	mg/L	--	21	66	29	-	-	
Chloride (dissolved)	mg/L	250	5.3	9.6	3.7	7.7	4.8	
Conductivity	uS/cm	--	111	121	100	133	117	
Cyanide (total)	mg/L	0.2	ND (0.00091)	-	-	-	-	
Cyanide, weak acid dissociable	mg/L	--	-	ND (0.00050)	-	-	-	
Hardness (dissolved)	mg/L	--	47.6	56.1	38.2	45.1	45.2	
Hydrogen sulfide	mg/L	0.05	-	0.029	ND (0.0020)	ND (0.0019)	ND (0.0020)	
Hydroxide (as CaCO3)	mg/L	--	ND (0.50)	ND (0.50)	ND (0.50)	ND (1.0)	ND (1.0)	
Oil and grease	mg/L	--	-	-	-	-	-	
Orthophosphate	mg/L	--	ND (0.10) J	ND (0.10)	0.0050	ND (0.10)	0.0057 J	
pH	s.u.	--	7.83 J	7.73 J	7.50 J	7.67 J	7.70 J	
Phenolics (total)	mg/L	--	-	-	ND (0.0010)	-	-	
Phosphorus	mg/L	--	0.123	1.47	-	-	-	
Sulfate (dissolved)	mg/L	500	5.78	5.62	3.75	5.9	5.1	
Sulfide	mg/L	0.05 *ref only	ND (0.0050)	0.027	ND (0.0019)	ND (0.0019)	ND (0.0019)	
Total dissolved solids (TDS)	mg/L	--	78 J	ND (82)	62	100	62	
Total suspended solids (TSS)	mg/L	--	59.0	882	-	-	-	
<b>Nutrients</b>								
Ammonia-N	mg/L	--	0.017	0.15	0.035	ND (0.020)	ND (0.020)	
Bicarbonate (as CaCO3)	mg/L	--	46.1	49.4	49.7	53.8	47.0	
Carbonate (as CaCO3)	mg/L	--	ND (0.50)	ND (0.50)	ND (0.50)	ND (1.0)	ND (1.0)	
Nitrate (as N)	mg/L	10	0.49	0.54	0.748	1.10	0.69	
Nitrite (as N)	mg/L	1	ND (0.10)	0.11	ND (0.0050)	ND (0.10)	ND (0.10)	
Nitrite/Nitrate	mg/L	10	0.49	0.65	0.748	1.10	0.69	
Nitrogen	mg/L	--	0.584	1.18	0.723	-	-	
Total kjeldahl nitrogen (TKN)	mg/L	--	ND (0.10)	0.54	ND (0.020)	-	-	
<b>Dissolved Metals</b>								
Aluminum (dissolved)	ug/L	9500	127 J	9.4	ND (3.0)	ND (3.0)	ND (3.0)	
Antimony (dissolved)	ug/L	6	ND (0.50)	ND (0.50)	ND (0.50)	ND (0.50)	ND (0.50)	
Arsenic (dissolved)	ug/L	10	0.17	ND (0.10)	ND (0.10)	ND (0.10)	ND (0.10)	
Barium (dissolved)	ug/L	1000	2.9	1.7	1.1	1.5	1.0	
Beryllium (dissolved)	ug/L	8	ND (0.10)	ND (0.10)	ND (0.10)	ND (0.10)	ND (0.10)	
Bismuth (dissolved)	ug/L	--	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	
Boron (dissolved)	ug/L	5000	ND (50)	ND (50)	ND (50)	ND (50)	ND (50)	
Cadmium (dissolved)	ug/L	5	0.016	0.012	ND (0.010)	ND (0.010)	ND (0.010)	
Calcium (dissolved)	ug/L	--	13700	16500	11000	13400	13200	
Chromium (dissolved)	ug/L	50	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	
Cobalt (dissolved)	ug/L	20 (i)	ND (0.50)	ND (0.50)	ND (0.20)	ND (0.20)	ND (0.20)	
Copper (dissolved)	ug/L	1500	1.59	0.30	0.36	0.38	ND (0.20)	
Iron (dissolved)	ug/L	6500	305	10.1	ND (5.0)	ND (5.0)	ND (5.0)	
Lead (dissolved)	ug/L	10	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)	
Lithium (dissolved)	ug/L	8	ND (5.0)	ND (5.0)	ND (2.0)	ND (2.0)	ND (2.0)	
Magnesium (dissolved)	ug/L	--	3230	3620	2590	2830	2960	
Manganese (dissolved)	ug/L	1500	20.0	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	
Mercury (dissolved)	ug/L	1	ND (0.010)	ND (0.010)	ND (0.010)	ND (0.010)	ND (0.0020)	
Molybdenum (dissolved)	ug/L	250	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	
Nickel (dissolved)	ug/L	80	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	
Phosphorus (dissolved)	ug/L	--	-	-	ND (10)	-	-	
Potassium (dissolved)	ug/L	--	212	190	191	271	184	
Selenium (dissolved)	ug/L	10	0.22	0.24	0.17	0.35	0.23	
Silicon (dissolved)	ug/L	--	7700	8240	6010	6600	6840	
Silver (dissolved)	ug/L	20	ND (0.020)	ND (0.020)	ND (0.020)	ND (0.020)	ND (0.020)	
Sodium (dissolved)	ug/L	200000	2910	5150	5210	8530	4550	
Strontium (dissolved)	ug/L	2500	22.6	31.0	20.6	27.2	26.8	
Sulfur (dissolved)	ug/L	--	ND (3000)	ND (3000)	ND (3000)	ND (3000)	ND (3000)	
Thallium (dissolved)	ug/L	--	ND (0.050)	ND (0.050)	ND (0.010)	ND (0.010)	ND (0.010)	
Tin (dissolved)	ug/L	2500	ND (5.0)	ND (5.0)	ND (5.0)	ND (5.0)	ND (5.0)	
Titanium (dissolved)	ug/L	--	9.7	ND (5.0)	ND (5.0)	ND (5.0)	ND (5.0)	
Uranium (dissolved)	ug/L	20	ND (0.10)	ND (0.10)	ND (0.10)	ND (0.10)	ND (0.10)	
Vanadium (dissolved)	ug/L	20	ND (5.0)	ND (5.0)	ND (5.0)	ND (5.0)	ND (5.0)	
Zinc (dissolved)	ug/L	3000	ND (5.0)	ND (5.0)	ND (5.0)	ND (5.0)	ND (5.0)	
Zirconium (dissolved)	ug/L	--	ND (0.50)	ND (0.50) J	ND (0.10)	ND (0.10)	ND (0.10)	



**Groundwater Monitoring Data  
Upland Landfill  
Campbell River, British Columbia**

Sample Location:		MW4A-15				
		W-88877-091715- TDF-01 9/17/2015	WG-88877- 06102015-TE-08 10/6/2015	WG-88877- 06102015-TE-09 10/6/2015 Duplicate	WG-88877-070417- JS-12 4/7/2017	
Sample ID:	BC CSR Schedule 3.2 DW					
Sample Date:						
Parameters	Units					
<b>Field Parameters</b>						
Conductivity, field	uS/cm	--	221	323	323	436
Dissolved oxygen (DO), field	mg/L	--	2.1	0.00	0.00	6.84
Oxidation reduction potential (ORP), field	millivolts	--	131	89	89	285
pH, field	s.u.	--	7.97	7.7	7.7	6.33
Temperature, field	Deg C	--	17.61	11.5	11.5	7.95
Total dissolved solids, field (TDS)	g/L	--	-	0.21	0.21	0.283
Turbidity, field	NTU	--	8.1	2.6	2.6	4
<b>General Chemistry</b>						
%difference/ion balance	none	--	1.0	1.0	1.1	-
Alkalinity (as CaCO3 pH=8.3)	mg/L	--	ND (0.50)	ND (0.50)	ND (0.50)	ND (0.50)
Alkalinity, total (as CaCO3)	mg/L	--	91.4	72.0 J	102 J	81.7
Biochemical oxygen demand (BOD)	mg/L	--	ND (6.0)	ND (6.0)	ND (6.0)	ND (6.0)
Chemical oxygen demand (COD)	mg/L	--	ND (10)	ND (10)	ND (10)	ND (10)
Chloride (dissolved)	mg/L	250	24	27	26	50
Conductivity	uS/cm	--	283	251 J	309 J	379
Cyanide (total)	mg/L	0.2	0.00078	-	-	-
Cyanide, weak acid dissociable	mg/L	--	-	ND (0.00050)	ND (0.00050)	-
Hardness (dissolved)	mg/L	--	43.0	23.5 J	52.2 J	54.7
Hydrogen sulfide	mg/L	0.05	-	ND (0.0019)	ND (0.0019)	ND (0.0020)
Hydroxide (as CaCO3)	mg/L	--	ND (0.50)	ND (0.50)	ND (0.50)	ND (0.50)
Oil and grease	mg/L	--	ND (1.0)	-	-	-
Orthophosphate	mg/L	--	ND (0.10) J	ND (0.10)	ND (0.10)	0.0125
pH	s.u.	--	8.12 J	8.00 J	8.16 J	7.76 J
Phenolics (total)	mg/L	--	ND (0.0010)	-	-	ND (0.0010)
Phosphorus	mg/L	--	0.0162	0.0184 J	0.0108 J	-
Sulfate (dissolved)	mg/L	500	6.30	6.26	6.84	13.5
Sulfide	mg/L	0.05 *ref only	ND (0.0078)	ND (0.0019)	ND (0.0019)	ND (0.0019)
Total dissolved solids (TDS)	mg/L	--	146 J	158 J	204 J	206
Total suspended solids (TSS)	mg/L	--	ND (4.0)	ND (4.0)	ND (4.0)	-
<b>Nutrients</b>						
Ammonia-N	mg/L	--	0.018	0.020	0.017	0.024
Bicarbonate (as CaCO3)	mg/L	--	112	87.9 J	124 J	99.7
Carbonate (as CaCO3)	mg/L	--	ND (0.50)	ND (0.50)	ND (0.50)	ND (0.50)
Nitrate (as N)	mg/L	10	0.90	0.77 J	1.11 J	3.52
Nitrite (as N)	mg/L	1	ND (0.10)	ND (0.10)	ND (0.10)	ND (0.0050)
Nitrite/Nitrate	mg/L	10	0.90	0.77 J	1.11 J	3.52
Nitrogen	mg/L	--	0.928	0.990 J	1.31 J	3.37
Total kjeldahl nitrogen (TKN)	mg/L	--	ND (0.10)	0.22	0.20	ND (0.10)
<b>Dissolved Metals</b>						
Aluminum (dissolved)	ug/L	9500	10.6 J	16.6 J	8.5 J	ND (3.0)
Antimony (dissolved)	ug/L	6	ND (0.50)	ND (0.50)	ND (0.50)	ND (0.50)
Arsenic (dissolved)	ug/L	10	0.56	0.26 J	0.42 J	0.13
Barium (dissolved)	ug/L	1000	12.4	2.1 J	15.5 J	7.2
Beryllium (dissolved)	ug/L	8	ND (0.10)	ND (0.10)	ND (0.10)	ND (0.10)
Bismuth (dissolved)	ug/L	--	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
Boron (dissolved)	ug/L	5000	ND (50)	ND (50)	ND (50)	ND (50)
Cadmium (dissolved)	ug/L	5	0.010	0.019	0.025	ND (0.010)
Calcium (dissolved)	ug/L	--	14500	7280 J	17900 J	16800
Chromium (dissolved)	ug/L	50	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
Cobalt (dissolved)	ug/L	20 (i)	ND (0.50)	ND (0.50)	ND (0.50)	ND (0.20)
Copper (dissolved)	ug/L	1500	0.36	0.54	0.43	3.25
Iron (dissolved)	ug/L	6500	5.9	17.5 J	6.1 J	ND (5.0)
Lead (dissolved)	ug/L	10	ND (0.20)	ND (0.20)	ND (0.20)	0.20
Lithium (dissolved)	ug/L	8	ND (5.0)	ND (5.0)	ND (5.0)	ND (2.0)
Magnesium (dissolved)	ug/L	--	1630	1300 J	1820 J	3080
Manganese (dissolved)	ug/L	1500	42.4	1.8 J	19.8 J	ND (1.0)
Mercury (dissolved)	ug/L	1	ND (0.010)	ND (0.010)	ND (0.010)	ND (0.010)
Molybdenum (dissolved)	ug/L	250	1.0	ND (1.0)	ND (1.0)	ND (1.0)
Nickel (dissolved)	ug/L	80	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
Phosphorus (dissolved)	ug/L	--	-	-	-	ND (10)
Potassium (dissolved)	ug/L	--	435	288 J	476 J	425
Selenium (dissolved)	ug/L	10	0.38	0.46	0.56	1.09
Silicon (dissolved)	ug/L	--	8010	8810	8730	8770
Silver (dissolved)	ug/L	20	ND (0.020)	ND (0.020)	ND (0.020)	ND (0.020)
Sodium (dissolved)	ug/L	200000	44200	45000	49100	57500
Strontium (dissolved)	ug/L	2500	40.5	42.3	50.8	98.7
Sulfur (dissolved)	ug/L	--	ND (3000)	4500	4600	4200
Thallium (dissolved)	ug/L	--	ND (0.050)	ND (0.050)	ND (0.050)	ND (0.010)
Tin (dissolved)	ug/L	2500	ND (5.0)	ND (5.0)	ND (5.0)	ND (5.0)
Titanium (dissolved)	ug/L	--	ND (5.0)	ND (5.0)	ND (5.0)	ND (5.0)
Uranium (dissolved)	ug/L	20	0.12	ND (0.10)	ND (0.10)	ND (0.10)
Vanadium (dissolved)	ug/L	20	ND (5.0)	ND (5.0)	ND (5.0)	ND (5.0)
Zinc (dissolved)	ug/L	3000	ND (5.0)	ND (5.0)	ND (5.0)	ND (5.0)
Zirconium (dissolved)	ug/L	--	ND (0.50)	ND (0.50) J	ND (0.50) J	ND (0.10)

**Groundwater Monitoring Data  
Upland Landfill  
Campbell River, British Columbia**

Sample Location:	BC CSR Schedule 3.2 DW	MW4B-15			MW5A-15				
		W-88877-091715- TDF-02 9/17/2015	WG-88877- 06102015-TE-07 10/6/2015	WG-88877-070417- JS-11 4/7/2017	W-88877-091715- TDF-03 9/17/2015	WG-88877- 05102015-TE-05 10/5/2015	WG-88877-060417- JS-06 4/6/2017	WG-88877-060417- JS-07 4/6/2017 Duplicate	
<b>Field Parameters</b>	<b>Units</b>								
Conductivity, field	uS/cm	--	238	283	402	459	329	599	599
Dissolved oxygen (DO), field	mg/L	--	1.8	0.00	8.99	6.61	-	3.09	3.09
Oxidation reduction potential (ORP), field	millivolts	--	174	92	287	162	177	212	212
pH, field	s.u.	--	7.83	6.95	6.35	7.92	7.98	7.36	7.36
Temperature, field	Deg C	--	15.52	11.92	8.02	14.12	16.61	9.26	9.26
Total dissolved solids, field (TDS)	g/L	--	-	0.184	0.262	-	0.216	0.383	0.383
Turbidity, field	NTU	--	7.4	2.5	8.6	500	92	630	630
<b>General Chemistry</b>									
%difference/ion balance	none	--	1.1	1.1	-	1.0	1.0	-	-
Alkalinity (as CaCO3 pH=8.3)	mg/L	--	ND (0.50)	ND (0.50)	ND (0.50)	ND (0.50)	ND (0.50)	ND (0.50)	ND (0.50)
Alkalinity, total (as CaCO3)	mg/L	--	66.4	15.4	79.4	117	121	97.7	96.7
Biochemical oxygen demand (BOD)	mg/L	--	ND (6.0)	ND (6.0)	ND (6.0)	6.5	ND (6.0)	ND (6.0)	ND (6.0)
Chemical oxygen demand (COD)	mg/L	--	ND (10)	12	ND (10)	163	26	56 J	41 J
Chloride (dissolved)	mg/L	250	24	6.2	55	20	15	4.6	4.6
Conductivity	uS/cm	--	240	55.5	397	487	342	589	579
Cyanide (total)	mg/L	0.2	ND (0.00080)	-	-	ND (0.00119)	-	-	-
Cyanide, weak acid dissociable	mg/L	--	-	ND (0.00050)	-	-	ND (0.00050)	-	-
Hardness (dissolved)	mg/L	--	21.2	16.8	54.3	135	126	226	228
Hydrogen sulfide	mg/L	0.05	-	ND (0.0019)	ND (0.0020)	-	0.011	0.011 J	0.0070 J
Hydroxide (as CaCO3)	mg/L	--	ND (0.50)	ND (0.50)	ND (0.50)	ND (0.50)	ND (0.50)	ND (0.50)	ND (0.50)
Oil and grease	mg/L	--	ND (1.0)	-	-	-	ND (1.0)	-	-
Orthophosphate	mg/L	--	ND (0.10) J	ND (0.10)	0.0226	ND (0.10) J	ND (0.10)	0.0104	0.0108
pH	s.u.	--	7.80 J	7.48 J	7.78 J	8.15 J	8.13 J	8.01 J	8.00 J
Phenolics (total)	mg/L	--	ND (0.0010)	-	ND (0.0010)	-	ND (0.0010)	0.0012	ND (0.0010)
Phosphorus	mg/L	--	0.0200	ND (0.0050)	-	2.64	0.0746	-	-
Sulfate (dissolved)	mg/L	500	5.68	ND (0.50)	14.2	87.5	31.4	5.79	5.85
Sulfide	mg/L	0.05 *ref only	ND (0.0058)	ND (0.0019)	ND (0.0019)	ND (0.0050)	0.010	0.010 J	0.0064 J
Total dissolved solids (TDS)	mg/L	--	162	ND (58)	224	292 J	222	420	414
Total suspended solids (TSS)	mg/L	--	ND (4.0)	ND (4.0)	-	4540	280	-	-
<b>Nutrients</b>									
Ammonia-N	mg/L	--	0.015	0.012	0.014	0.026	0.019	0.050	0.048
Bicarbonate (as CaCO3)	mg/L	--	80.9	18.8	96.8	143	148	119	118
Carbonate (as CaCO3)	mg/L	--	ND (0.50)	ND (0.50)	ND (0.50)	ND (0.50)	ND (0.50)	ND (0.50)	ND (0.50)
Nitrate (as N)	mg/L	10	0.90	ND (0.10)	3.50	ND (0.10)	0.29	47.0	46.9
Nitrite (as N)	mg/L	1	ND (0.10)	ND (0.10)	ND (0.0050)	ND (0.10)	ND (0.10)	0.341	0.344
Nitrite/Nitrate	mg/L	10	0.90	ND (0.10)	3.50	ND (0.10)	0.29	47.4	47.2
Nitrogen	mg/L	--	0.950	0.154	3.30	1.26	0.388	54.7	45.7
Total kjeldahl nitrogen (TKN)	mg/L	--	ND (0.10)	0.15	ND (0.10)	1.26	ND (0.10)	7.3 J	ND (2.0) J
<b>Dissolved Metals</b>									
Aluminum (dissolved)	ug/L	9500	9.9 J	18.4	ND (3.0)	17.2 J	12.0	11.4 J	3.5 J
Antimony (dissolved)	ug/L	6	ND (0.50)	ND (0.50)	ND (0.50)	ND (0.50)	ND (0.50)	ND (0.50)	ND (0.50)
Arsenic (dissolved)	ug/L	10	0.21	0.15	ND (0.10)	0.91	0.89	0.40	0.43
Barium (dissolved)	ug/L	1000	2.8	2.1	3.3	16.0	12.2	50.3	48.8
Beryllium (dissolved)	ug/L	8	ND (0.10)	ND (0.10)	ND (0.10)	ND (0.10)	ND (0.10)	ND (0.10)	ND (0.10)
Bismuth (dissolved)	ug/L	--	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
Boron (dissolved)	ug/L	5000	ND (50)	ND (50)	ND (50)	78	90	100	97
Cadmium (dissolved)	ug/L	5	0.019	0.011	0.013	0.027	0.029	0.012	0.013
Calcium (dissolved)	ug/L	--	6660	4770	16100	40000	36600	62500	63500
Chromium (dissolved)	ug/L	50	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
Cobalt (dissolved)	ug/L	20 (i)	ND (0.50)	ND (0.50)	ND (0.20)	0.50	ND (0.50)	0.55	0.54
Copper (dissolved)	ug/L	1500	1.26	1.02	0.34	1.00	1.59	0.79 J	0.32 J
Iron (dissolved)	ug/L	6500	9.9	162	ND (5.0)	8.2	14.7	17.0 J	ND (5.0) J
Lead (dissolved)	ug/L	10	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)
Lithium (dissolved)	ug/L	8	ND (5.0)	ND (5.0)	ND (2.0)	ND (5.0)	ND (5.0)	ND (2.0)	ND (2.0)
Magnesium (dissolved)	ug/L	--	1120	1190	3410	8570	8480	17000	17000
Manganese (dissolved)	ug/L	1500	7.1	24.0	ND (1.0)	167	163	94.9	93.1
Mercury (dissolved)	ug/L	1	ND (0.010)	ND (0.010)	ND (0.010)	ND (0.010)	ND (0.010)	0.061	0.066
Molybdenum (dissolved)	ug/L	250	ND (1.0)	ND (1.0)	ND (1.0)	6.0	2.8	ND (1.0)	ND (1.0)
Nickel (dissolved)	ug/L	80	ND (1.0)	2.2	ND (1.0)	2.4	1.8	ND (1.0)	ND (1.0)
Phosphorus (dissolved)	ug/L	--	-	-	10	-	-	15	14
Potassium (dissolved)	ug/L	--	237	187	408	1670	1280	936	928
Selenium (dissolved)	ug/L	10	0.47	ND (0.10)	1.07	1.07	0.53	0.26	0.25
Silicon (dissolved)	ug/L	--	7940	1480	8390	5010	6810	7480	7460
Silver (dissolved)	ug/L	20	ND (0.020)	ND (0.020)	ND (0.020)	ND (0.020)	ND (0.020)	ND (0.020)	ND (0.020)
Sodium (dissolved)	ug/L	200000	44800	4700	59700	46000	23200	15600	15400
Strontium (dissolved)	ug/L	2500	36.3	15.1	115	125	101	208	207
Sulfur (dissolved)	ug/L	--	ND (3000)	3600	4800	24500	12500	ND (3000)	ND (3000)
Thallium (dissolved)	ug/L	--	ND (0.050)	ND (0.050)	ND (0.010)	ND (0.050)	ND (0.050)	0.013	0.012
Tin (dissolved)	ug/L	2500	ND (5.0)	ND (5.0)	ND (5.0)	ND (5.0)	ND (5.0)	ND (5.0)	ND (5.0)
Titanium (dissolved)	ug/L	--	ND (5.0)	ND (5.0)	ND (5.0)	ND (5.0)	ND (5.0)	ND (5.0)	ND (5.0)
Uranium (dissolved)	ug/L	20	ND (0.10)	ND (0.10)	ND (0.10)	1.80	0.77	0.19	0.19
Vanadium (dissolved)	ug/L	20	ND (5.0)	ND (5.0)	ND (5.0)	ND (5.0)	ND (5.0)	ND (5.0)	ND (5.0)
Zinc (dissolved)	ug/L	3000	7.7	ND (5.0)	ND (5.0)	ND (5.0)	10.7	ND (5.0)	ND (5.0)
Zirconium (dissolved)	ug/L	--	ND (0.50)	ND (0.50) J	ND (0.10)	ND (0.50)	ND (0.50) J	ND (0.10)	ND (0.10)

**Groundwater Monitoring Data  
Upland Landfill  
Campbell River, British Columbia**

Sample Location:		MW10-17					
		WG-88877-060417- JS-01 4/6/2017	WG-88877-271117- CR-01 11/27/2017	WG-88877-070618- NT-04 6/7/2018	WG-88877-070618- NT-05 6/7/2018 Duplicate	WG-88877-011118- CR-04 11/1/2018	WG-88877-011118- CR-05 11/1/2018 Duplicate
Sample ID:	BC CSR						
Sample Date:	Schedule 3.2 DW						
Parameters	Units						
<b>Field Parameters</b>							
Conductivity, field	uS/cm	--	131	191	149	149	133
Dissolved oxygen (DO), field	mg/L	--	9.97	7.93	11.1	11.1	-
Oxidation reduction potential (ORP), field	millivolts	--	214	222	152	152	231
pH, field	s.u.	--	7.74	6.98	6.73	6.73	8.00
Temperature, field	Deg C	--	10.39	11.05	10.44	10.44	9.80
Total dissolved solids, field (TDS)	g/L	--	0.085	0.124	0.097	0.097	0.086
Turbidity, field	NTU	--	24.3	65.8	6.2	6.2	35.1
<b>General Chemistry</b>							
%difference/ion balance	none	--	-	-	-	-	-
Alkalinity (as CaCO3 pH=8.3)	mg/L	--	ND (0.50)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
Alkalinity, total (as CaCO3)	mg/L	--	49.7	60.5	51.0	49.9	54.1
Biochemical oxygen demand (BOD)	mg/L	--	ND (6.0)	-	-	-	-
Chemical oxygen demand (COD)	mg/L	--	ND (10)	-	-	-	-
Chloride (dissolved)	mg/L	250	7.3	7.8	5.9	5.8	5.3
Conductivity	uS/cm	--	128	155	142	141	136
Cyanide (total)	mg/L	0.2	-	-	-	-	-
Cyanide, weak acid dissociable	mg/L	--	-	-	-	-	-
Hardness (dissolved)	mg/L	--	51.9	66.0	60.1	60.1	55.9
Hydrogen sulfide	mg/L	0.05	ND (0.0020)	ND (0.0019)	ND (0.0020)	ND (0.0020)	0.0020
Hydroxide (as CaCO3)	mg/L	--	ND (0.50)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
Oil and grease	mg/L	--	-	-	-	-	-
Orthophosphate	mg/L	--	0.0335	ND (0.10)	0.011 J	0.0090 J	-
pH	s.u.	--	7.93 J	7.97 J	7.74 J	7.82 J	7.88 J
Phenolics (total)	mg/L	--	ND (0.0010)	-	-	-	-
Phosphorus	mg/L	--	-	-	-	-	-
Sulfate (dissolved)	mg/L	500	5.19	6.6	5.9	5.9	4.8
Sulfide	mg/L	0.05 *ref only	ND (0.0019)	ND (0.0019)	ND (0.0019)	ND (0.0019)	0.0023
Total dissolved solids (TDS)	mg/L	--	74	98	92	76	74
Total suspended solids (TSS)	mg/L	--	-	-	-	-	-
<b>Nutrients</b>							
Ammonia-N	mg/L	--	0.037	ND (0.020)	0.047 J	ND (0.020) J	ND (0.020)
Bicarbonate (as CaCO3)	mg/L	--	60.7	73.8	62.2	60.8	66.0
Carbonate (as CaCO3)	mg/L	--	ND (0.50)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
Nitrate (as N)	mg/L	10	0.081	0.26	0.10	ND (0.10)	0.27
Nitrite (as N)	mg/L	1	ND (0.0050)	ND (0.10)	ND (0.10)	ND (0.10)	ND (0.10)
Nitrite/Nitrate	mg/L	10	0.081	0.26	0.10	ND (0.10)	0.27
Nitrogen	mg/L	--	0.146	-	-	-	-
Total kjeldahl nitrogen (TKN)	mg/L	--	0.065	-	-	-	-
<b>Dissolved Metals</b>							
Aluminum (dissolved)	ug/L	9500	9.8	5.4	3.8	4.5	5.9
Antimony (dissolved)	ug/L	6	ND (0.50)	ND (0.50)	ND (0.50)	ND (0.50)	ND (0.50)
Arsenic (dissolved)	ug/L	10	0.61	0.44	0.45	0.46	0.45
Barium (dissolved)	ug/L	1000	10.8	6.1	4.0	4.1	3.7
Beryllium (dissolved)	ug/L	8	ND (0.10)	ND (0.10)	ND (0.10)	ND (0.10)	ND (0.10)
Bismuth (dissolved)	ug/L	--	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
Boron (dissolved)	ug/L	5000	ND (50)	ND (50)	ND (50)	ND (50)	ND (50)
Cadmium (dissolved)	ug/L	5	ND (0.010)	ND (0.010)	ND (0.010)	ND (0.010)	ND (0.010)
Calcium (dissolved)	ug/L	--	16500	21300	19500	19300	18100
Chromium (dissolved)	ug/L	50	ND (1.0)	3.1	ND (1.0)	ND (1.0)	ND (1.0)
Cobalt (dissolved)	ug/L	20 (i)	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)
Copper (dissolved)	ug/L	1500	0.43	0.31	ND (0.20)	ND (0.20)	ND (0.20)
Iron (dissolved)	ug/L	6500	ND (5.0)	ND (5.0)	ND (5.0)	ND (5.0)	5.7
Lead (dissolved)	ug/L	10	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)
Lithium (dissolved)	ug/L	8	ND (2.0)	ND (2.0)	ND (2.0)	ND (2.0)	ND (2.0)
Magnesium (dissolved)	ug/L	--	2620	3090	2790	2870	2580
Manganese (dissolved)	ug/L	1500	12.5	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
Mercury (dissolved)	ug/L	1	ND (0.010)	ND (0.010)	ND (0.0020)	ND (0.0020)	ND (0.0020) J
Molybdenum (dissolved)	ug/L	250	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	1.8
Nickel (dissolved)	ug/L	80	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
Phosphorus (dissolved)	ug/L	--	15	-	-	-	-
Potassium (dissolved)	ug/L	--	491	413	355	367	339
Selenium (dissolved)	ug/L	10	0.20	0.17	0.18	0.21	0.15
Silicon (dissolved)	ug/L	--	6300	6640	6430	6320	6430
Silver (dissolved)	ug/L	20	ND (0.020)	ND (0.020)	ND (0.020)	ND (0.020)	ND (0.020)
Sodium (dissolved)	ug/L	200000	4320	4870	4630	4790	4970
Strontium (dissolved)	ug/L	2500	26.2	31.6	24.7	25.5	23.2
Sulfur (dissolved)	ug/L	--	ND (3000)	ND (3000)	ND (3000)	ND (3000)	ND (3000)
Thallium (dissolved)	ug/L	--	ND (0.010)	ND (0.010)	ND (0.010)	ND (0.010)	ND (0.010)
Tin (dissolved)	ug/L	2500	ND (5.0)	ND (5.0)	ND (5.0)	ND (5.0)	ND (5.0)
Titanium (dissolved)	ug/L	--	ND (5.0)	ND (5.0)	ND (5.0)	ND (5.0)	ND (5.0)
Uranium (dissolved)	ug/L	20	ND (0.10)	ND (0.10)	ND (0.10)	ND (0.10)	ND (0.10)
Vanadium (dissolved)	ug/L	--	ND (5.0)	5.0	ND (5.0)	ND (5.0)	5.1
Zinc (dissolved)	ug/L	3000	ND (5.0)	ND (5.0)	ND (5.0)	ND (5.0)	ND (5.0)
Zirconium (dissolved)	ug/L	--	ND (0.10)	ND (0.10)	ND (0.10)	ND (0.10)	ND (0.10)

**Groundwater Monitoring Data  
Upland Landfill  
Campbell River, British Columbia**

Sample Location:	BC CSR Schedule 3.2 DW	MW5B-15		MW6-17	MW9-17	RW-98020	
		WG-88877- 05102015-TE-04	WG-88877-060417- JS-08	WG-88877-060417- JS-05	WG-88877-060417- JS-02	WG-88877-150216- JS-01	
Sample ID:		10/5/2015	4/6/2017	4/6/2017	4/6/2017	2/15/2016	
Sample Date:							
Parameters	Units						
<b>Field Parameters</b>							
Conductivity, field	uS/cm	--	404	285	543	60	135
Dissolved oxygen (DO), field	mg/L	--	-	7.55	5.91	9.71	6.61
Oxidation reduction potential (ORP), field	millivolts	--	229	229	235	192	333
pH, field	s.u.	--	7	7.16	7.16	7.84	6.58
Temperature, field	Deg C	--	16.99	8.61	8.66	8.21	8.05
Total dissolved solids, field (TDS)	g/L	--	0.264	0.185	0.347	0.039	0.088
Turbidity, field	NTU	--	36.1	950	OOR	4.8	6.2
<b>General Chemistry</b>							
%difference/ion balance	none	--	0.94	-	-	-	0.98
Alkalinity (as CaCO3 pH=8.3)	mg/L	--	ND (0.50)	ND (0.50)	ND (0.50)	ND (0.50)	ND (0.50)
Alkalinity, total (as CaCO3)	mg/L	--	160	42.0	119	28.6	58.6
Biochemical oxygen demand (BOD)	mg/L	--	ND (6.0)	ND (6.0)	ND (6.0)	ND (6.0)	ND (6.0)
Chemical oxygen demand (COD)	mg/L	--	ND (10)	50	94	ND (10)	ND (10)
Chloride (dissolved)	mg/L	250	3.0	2.2	88	1.0	2.4
Conductivity	uS/cm	--	338	280	535	59.0	124
Cyanide (total)	mg/L	0.2	-	-	-	-	ND (0.00057)
Cyanide, weak acid dissociable	mg/L	--	ND (0.00050)	-	-	-	-
Hardness (dissolved)	mg/L	--	141	101	200	26.6	53.3
Hydrogen sulfide	mg/L	0.05	ND (0.0019)	0.013	0.010	ND (0.0020)	-
Hydroxide (as CaCO3)	mg/L	--	ND (0.50)	ND (0.50)	ND (0.50)	ND (0.50)	ND (0.50)
Oil and grease	mg/L	--	ND (1.0)	-	-	-	-
Orthophosphate	mg/L	--	ND (0.10)	ND (0.0050)	0.0058	0.0059	ND (0.10) J
pH	s.u.	--	8.03 J	7.21 J	8.06 J	7.69 J	7.14 J
Phenolics (total)	mg/L	--	ND (0.0010)	ND (0.0010)	ND (0.0010)	ND (0.0010)	-
Phosphorus	mg/L	--	ND (0.0050)	-	-	-	0.0130
Sulfate (dissolved)	mg/L	500	3.32	79.7	8.47	2.75	3.72
Sulfide	mg/L	0.05 *ref only	ND (0.0019)	0.012	0.0093	ND (0.0019)	ND (0.0019)
Total dissolved solids (TDS)	mg/L	--	186	166	354	28	58
Total suspended solids (TSS)	mg/L	--	30.5	-	-	-	13.8
<b>Nutrients</b>							
Ammonia-N	mg/L	--	0.021	0.065	0.017	0.034	ND (0.0050)
Bicarbonate (as CaCO3)	mg/L	--	195	51.3	146	34.9	71.4
Carbonate (as CaCO3)	mg/L	--	ND (0.50)	ND (0.50)	ND (0.50)	ND (0.50)	ND (0.50)
Nitrate (as N)	mg/L	10	1.33	1.93	0.193	ND (0.020)	0.15 J
Nitrite (as N)	mg/L	1	ND (0.10)	ND (0.0050)	0.0457	ND (0.0050)	ND (0.10) J
Nitrite/Nitrate	mg/L	10	1.33	1.93	0.239	ND (0.020)	0.15 J
Nitrogen	mg/L	--	1.75	2.65	0.441	0.042	0.155
Total kjeldahl nitrogen (TKN)	mg/L	--	0.41	0.713	0.202	0.042	ND (0.10)
<b>Dissolved Metals</b>							
Aluminum (dissolved)	ug/L	9500	16.3	30.8	5.1	8.8	10.6
Antimony (dissolved)	ug/L	6	ND (0.50)	ND (0.50)	ND (0.50)	ND (0.50)	ND (0.50)
Arsenic (dissolved)	ug/L	10	0.22	ND (0.10)	0.74	0.24	1.10
Barium (dissolved)	ug/L	1000	23.2	8.8	30.3	4.3	4.4
Beryllium (dissolved)	ug/L	8	ND (0.10)	ND (0.10)	ND (0.10)	ND (0.10)	ND (0.10)
Bismuth (dissolved)	ug/L	--	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
Boron (dissolved)	ug/L	5000	ND (50)	ND (50)	ND (50)	ND (50)	ND (50)
Cadmium (dissolved)	ug/L	5	0.059	0.013	0.012	ND (0.010)	ND (0.010)
Calcium (dissolved)	ug/L	--	49700	34700	56200	8980	16000
Chromium (dissolved)	ug/L	50	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	1.4
Cobalt (dissolved)	ug/L	20 (i)	0.67	0.29	0.25	ND (0.20)	ND (0.50)
Copper (dissolved)	ug/L	1500	0.97	1.14	0.85	0.39	1.71
Iron (dissolved)	ug/L	6500	ND (5.0)	20.5	ND (5.0)	ND (5.0)	20.1
Lead (dissolved)	ug/L	10	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)
Lithium (dissolved)	ug/L	8	ND (5.0)	ND (2.0)	2.4	ND (2.0)	ND (5.0)
Magnesium (dissolved)	ug/L	--	4010	3400	14400	1010	3230
Manganese (dissolved)	ug/L	1500	226	9.6	151	1.9	8.5
Mercury (dissolved)	ug/L	1	ND (0.010)	ND (0.010)	ND (0.010)	ND (0.010)	ND (0.010)
Molybdenum (dissolved)	ug/L	250	ND (1.0)	ND (1.0)	3.1	ND (1.0)	ND (1.0)
Nickel (dissolved)	ug/L	80	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
Phosphorus (dissolved)	ug/L	--	-	ND (10)	ND (10)	ND (10)	ND (10)
Potassium (dissolved)	ug/L	--	489	240	1970	241	132
Selenium (dissolved)	ug/L	10	0.23	2.60	0.24	ND (0.10)	0.68
Silicon (dissolved)	ug/L	--	4720	3290	10900	3110	6480
Silver (dissolved)	ug/L	20	ND (0.020)	ND (0.020)	ND (0.020)	ND (0.020)	ND (0.020)
Sodium (dissolved)	ug/L	200000	9350	11500	18000	820	5130
Strontium (dissolved)	ug/L	2500	67.2	59.5	163	12.2	73.0
Sulfur (dissolved)	ug/L	--	3000	27700	3100	ND (3000)	5500
Thallium (dissolved)	ug/L	--	ND (0.050)	ND (0.010)	0.014	ND (0.010)	ND (0.050)
Tin (dissolved)	ug/L	2500	ND (5.0)	ND (5.0)	ND (5.0)	ND (5.0)	ND (5.0)
Titanium (dissolved)	ug/L	--	ND (5.0)	ND (5.0)	ND (5.0)	ND (5.0)	ND (5.0)
Uranium (dissolved)	ug/L	20	0.16	ND (0.10)	0.82	ND (0.10)	ND (0.10)
Vanadium (dissolved)	ug/L	20	ND (5.0)	ND (5.0)	ND (5.0)	ND (5.0)	ND (5.0)
Zinc (dissolved)	ug/L	3000	6.5	ND (5.0)	ND (5.0)	ND (5.0)	ND (5.0)
Zirconium (dissolved)	ug/L	--	3.67 J	ND (0.10)	ND (0.10)	ND (0.10)	ND (0.50)

Groundwater Monitoring Data - VOCs  
Upland Landfill  
Campbell River, British Columbia

Sample Location:			MW4A-15	MW4B-15	MW5A-15	MW5B-15
Sample ID:		BC CSR	W-88877-091715- TDF-01	W-88877-091715- TDF-02	WG-88877- 05102015-TE-05	WG-88877- 05102015-TE-04
Sample Date:		Schedule 3.2 DW	9/17/2015	9/17/2015	10/5/2015	10/5/2015
Parameters	Units					
<b>Petroleum Products</b>						
EPHw10-19	ug/L	5000	ND (200)	ND (200)	ND (200)	ND (200)
EPHw19-32	ug/L	--	ND (200)	ND (200)	ND (200)	ND (200)
HEPHw	ug/L	--	ND (200)	ND (200)	ND (200)	ND (200)
LEPHw	ug/L	--	ND (200)	ND (200)	ND (200)	ND (200)
VHw6-10	ug/L	15000	ND (300)	ND (300)	-	-
VPHw	ug/L	--	ND (300)	ND (300)	-	-
<b>Volatile Organic Compounds</b>						
1,1,1,2-Tetrachloroethane	ug/L	6	ND (0.50)	ND (0.50)	-	-
1,1,1-Trichloroethane	ug/L	8000	ND (0.50)	ND (0.50)	-	-
1,1,2,2-Tetrachloroethane	ug/L	0.8	ND (0.50)	ND (0.50)	-	-
1,1,2-Trichloroethane	ug/L	3	ND (0.50)	ND (0.50)	-	-
1,1-Dichloroethane	ug/L	30	ND (0.50)	ND (0.50)	-	-
1,1-Dichloroethene	ug/L	14	ND (0.50)	ND (0.50)	-	-
1,2,3-Trichlorobenzene	ug/L	3	ND (2.0)	ND (2.0)	-	-
1,2,4-Trichlorobenzene	ug/L	5.5	ND (2.0)	ND (2.0)	-	-
1,2-Dibromoethane (Ethylene dibromide)	ug/L	0.5	ND (0.20)	ND (0.20)	-	-
1,2-Dichlorobenzene	ug/L	200	ND (0.50)	ND (0.50)	-	-
1,2-Dichloroethane	ug/L	5	ND (0.50)	ND (0.50)	-	-
1,2-Dichloropropane	ug/L	4.5	ND (0.50)	ND (0.50)	-	-
1,3-Butadiene	ug/L	1	ND (5.0)	ND (5.0)	-	-
1,3-Dichlorobenzene	ug/L	--	ND (0.50)	ND (0.50)	-	-
1,4-Dichlorobenzene	ug/L	5	ND (0.50)	ND (0.50)	-	-
Benzene	ug/L	5	ND (0.40)	ND (0.40)	-	-
Bromobenzene	ug/L	30	ND (2.0)	ND (2.0)	-	-
Bromodichloromethane	ug/L	100	ND (1.0)	ND (1.0)	-	-
Bromoform	ug/L	100	ND (1.0)	ND (1.0)	-	-
Bromomethane (Methyl bromide)	ug/L	5.5	ND (1.0)	ND (1.0)	-	-
Carbon tetrachloride	ug/L	2	ND (0.50)	ND (0.50)	-	-
Chlorobenzene	ug/L	80	ND (0.50)	ND (0.50)	-	-
Chloroethane	ug/L	--	ND (1.0)	ND (1.0)	-	-
Chloroform (Trichloromethane)	ug/L	100	ND (1.0)	ND (1.0)	-	-
Chloromethane (Methyl chloride)	ug/L	--	ND (1.0)	ND (1.0)	-	-
cis-1,2-Dichloroethene	ug/L	8	ND (1.0)	ND (1.0)	-	-
cis-1,3-Dichloropropene	ug/L	--	ND (1.0)	ND (1.0)	-	-
Dibromochloromethane	ug/L	100	ND (1.0)	ND (1.0)	-	-
Dibromomethane	ug/L	--	ND (0.90)	ND (0.90)	-	-
Dichlorodifluoromethane (CFC-12)	ug/L	800	ND (2.0)	ND (2.0)	-	-
Ethylbenzene	ug/L	140	ND (0.40)	ND (0.40)	-	-
Hexachlorobutadiene	ug/L	2	ND (0.50)	ND (0.50)	-	-
m&p-Xylenes	ug/L	--	ND (0.40)	ND (0.40)	-	-
Methyl tert butyl ether (MTBE)	ug/L	95	ND (4.0)	ND (4.0)	-	-
Methylene chloride	ug/L	50	ND (2.0)	ND (2.0)	-	-
o-Xylene	ug/L	--	ND (0.40)	ND (0.40)	-	-
Styrene	ug/L	800	ND (0.50)	ND (0.50)	-	-
Tetrachloroethene	ug/L	30	ND (0.50)	ND (0.50)	-	-
Toluene	ug/L	60	ND (0.40)	ND (0.40)	-	-
trans-1,2-Dichloroethene	ug/L	80	ND (1.0)	ND (1.0)	-	-
trans-1,3-Dichloropropene	ug/L	--	ND (1.0)	ND (1.0)	-	-
Trichloroethene	ug/L	5	ND (0.50)	ND (0.50)	-	-
Trichlorofluoromethane (CFC-11)	ug/L	1000	ND (4.0)	ND (4.0)	-	-
Trifluorotrchloroethane (CFC-113)	ug/L	100000	ND (2.0)	ND (2.0)	-	-
Vinyl chloride	ug/L	2	ND (0.50)	ND (0.50)	-	-
Xylenes (total)	ug/L	90	ND (0.40)	ND (0.40)	-	-
<b>PAHs</b>						
2-Methylnaphthalene	ug/L	15	ND (0.10)	ND (0.10)	ND (0.10)	ND (0.10)
Acenaphthene	ug/L	250	ND (0.050)	ND (0.050)	ND (0.050)	ND (0.050)
Acenaphthylene	ug/L	--	ND (0.050)	ND (0.050)	ND (0.050)	ND (0.050)
Acridine	ug/L	--	ND (0.050)	ND (0.050)	ND (0.050)	ND (0.050)
Anthracene	ug/L	1000	ND (0.010)	ND (0.010)	ND (0.010)	ND (0.010)
Benzo(a)anthracene	ug/L	0.07	ND (0.010)	ND (0.010)	ND (0.010)	ND (0.010)
Benzo(a)pyrene	ug/L	0.01	ND (0.0090)	ND (0.0090)	ND (0.0090)	ND (0.0090)
Benzo(b)fluoranthene/Benzo(j)fluoranthene	ug/L	0.07	ND (0.050)	ND (0.050)	ND (0.050)	ND (0.050)
Benzo(b)pyridine (Quinoline)	ug/L	0.05	ND (0.24)	ND (0.24)	ND (0.24)	ND (0.24)
Benzo(g,h,i)perylene	ug/L	--	ND (0.050)	ND (0.050)	ND (0.050)	ND (0.050)
Benzo(k)fluoranthene	ug/L	--	ND (0.050)	ND (0.050)	ND (0.050)	ND (0.050)
Chrysene	ug/L	7	ND (0.050)	ND (0.050)	ND (0.050)	ND (0.050)
Dibenz(a,h)anthracene	ug/L	0.01	ND (0.050)	ND (0.050)	ND (0.050)	ND (0.050)
Fluoranthene	ug/L	150	ND (0.020)	ND (0.020)	ND (0.020)	ND (0.020)
Fluorene	ug/L	150	ND (0.050)	ND (0.050)	ND (0.050)	ND (0.050)
Indeno(1,2,3-cd)pyrene	ug/L	--	ND (0.050)	ND (0.050)	ND (0.050)	ND (0.050)
Naphthalene	ug/L	80	ND (0.10)	ND (0.10)	ND (0.10)	ND (0.10)
PAH high molecular weight	ug/L	--	ND (0.050)	ND (0.050)	ND (0.050)	ND (0.050)
PAH low molecular weight	ug/L	--	ND (0.24)	ND (0.24)	ND (0.24)	ND (0.24)
Phenanthrene	ug/L	--	ND (0.050)	ND (0.050)	ND (0.050)	ND (0.050)
Pyrene	ug/L	100	ND (0.020)	ND (0.020)	ND (0.020)	ND (0.020)
Total PAH	ug/L	--	ND (0.24)	ND (0.24)	ND (0.24)	ND (0.24)

Table 3  
Surface Water Monitoring Data  
Upland Landfill  
Campbell River, British Columbia

Sample Location:	BC CSR Schedule 3.2		BC WQG		SW15-01 McIvor Lake				SW15-02 Rico Lake				SW16-03 Wash Plant		
	DW a	FAW b	DW c	FAW d	W-88877-091815-TDF-08	WS-88877-06102015-TE-10	WS-88877-06102015-TE-11	WS-88877-060417-JS-03	W-88877-091815-TDF-09	W-88877-091815-TDF-10	WS-88877-05102015-TE-06	WS-88877-060417-JS-02	SW-88877-290116-JS-01	WS-88877-060417-JS-01	
					9/18/2015	10/6/2015	10/6/2015	4/6/2017	9/18/2015	9/18/2015	10/5/2015	4/6/2017	1/29/2016	4/6/2017	
Parameters	Units						Duplicate			Duplicate					
<b>Field Parameters</b>															
Dissolved Oxygen, Field	mg/L	--	--	--	--	>5		10	8.09	8.09	12.4	6.6	6.6	2.58 <sup>d</sup>	9.05
ORP, Field	millivolts	--	--	--	--	--		219	262	262	228	231	231	220	222
pH, Field	s.u.	--	--	--	--	6.5-9.0		7.73	6.82	6.82	7.47	7.52	7.52	6.96	7.5
Specific Conductance, Field	uS/cm	--	--	--	--	--		71	73	73	48	69	69	56	58
Temperature, Field	Deg C	--	--	15 AO	18 (12 spring/fall) (c) (STM)			18.11 <sup>cd</sup>	15.09 <sup>e</sup>	15.09 <sup>e</sup>	5.65	16.38 <sup>e</sup>	16.38 <sup>e</sup>	19.9 <sup>cd</sup>	7.56
Total dissolved solids, field (TDS)	g/L	--	--	--	--	--		-	0.046	0.046	0.031	-	-	0.037	0.038
Turbidity, Field	NTU	--	--	(c)	(c)			11.8	0	0	0	2.1	2.1	3	1.8
<b>General Chemistry</b>															
%difference/ion balance	none	--	--	--	--	--		-	0.92	-	-	-	-	1.0	-
Alkalinity (as CaCO3 pH=8.3)	mg/L	--	--	--	--	--		ND (0.50)	ND (0.50)	ND (0.50)	ND (0.50)	ND (0.50)	ND (0.50)	ND (0.50)	ND (0.50)
Alkalinity, total (as CaCO3)	mg/L	--	--	--	--	[e] w		22.5	22.0	21.2	21.9	14.9	14.7	105	14.5
Dissolved Calcium < 4 mg/L	mg/L	--	--	--	--	< 10 w		22.5 <sup>d</sup>	22.0 <sup>d</sup>	21.2 <sup>d</sup>	21.9 <sup>d</sup>	14.9 <sup>d</sup>	14.7 <sup>d</sup>	105 <sup>d</sup>	14.5 <sup>d</sup>
Dissolved Calcium > 8 mg/L	mg/L	--	--	--	--	> 20 w									33.7 <sup>d</sup>
Biochemical oxygen demand (BOD)	mg/L	--	--	--	--	--		ND (6.0)	ND (6.0)	ND (6.0)	ND (6.0)	ND (6.0)	ND (6.0)	ND (6.0)	ND (6.0)
Chemical oxygen demand (COD)	mg/L	--	--	--	--	--		ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)
Chloride (dissolved)	mg/L	250	1500	--	--	--		1.0	1.6	0.90	0.65	5.8	5.6	25	6.7
Conductivity	uS/cm	--	--	--	--	--		53.1	47.1	47.8	47.8	55.3	56.5	317	59.7
Cyanide (total)	mg/L	0.2	0.05	0.2	--	--		ND (0.00062)	-	-	-	ND (0.00050)	-	-	-
Cyanide, weak acid dissociable	mg/L	--	--	--	--	0.005		-	ND (0.00050)	-	-	-	ND (0.00050)	-	-
Hardness	mg/L	--	--	--	--	--		24.8	24.5	-	22.2	16.3	-	51.6	16.9
Hardness (dissolved)	mg/L	--	--	--	--	--		-	22.4	-	21.8	-	-	48.3	16.3
Hydrogen sulfide	mg/L	0.05	0.02	--	--	--		-	ND (0.0019)	-	ND (0.0020)	-	-	ND (0.0019)	ND (0.0020)
Hydroxide (as CaCO3)	mg/L	--	--	--	--	--		ND (0.50)	ND (0.50)	ND (0.50)	ND (0.50)	ND (0.50)	ND (0.50)	ND (0.50)	ND (0.50)
Oil and grease	mg/L	--	--	--	--	--		ND (1.0)	-	-	-	ND (1.0)	-	-	-
Orthophosphate	mg/L	--	--	--	--	--		ND (0.10)	ND (0.10)	ND (0.10)	ND (0.0050)	ND (0.10)	ND (0.10)	ND (0.10)	ND (0.0050)
pH	s.u.	--	--	--	--	6.5-9.0		7.52 J	7.54 J	7.46 J	7.56 J	7.45 J	7.33 J	8.18 J	7.25 J
Phenolics (total)	mg/L	--	--	--	--	--		ND (0.0010)	-	-	ND (0.0010)	ND (0.0010)	-	-	ND (0.0010)
Phosphorus	mg/L	--	--	0.01 AO for lakes	0.005			ND (0.0050)	ND (0.0050)	-	-	0.0056 <sup>d</sup>	0.0053 <sup>d</sup>	0.0098 <sup>d</sup>	-
Sulfide	mg/L	0.05 *ref only	0.02 *ref only	--	0.002 w			0.0068 <sup>d</sup>	ND (0.0019)	-	ND (0.0019)	0.0085 <sup>d</sup>	-	ND (0.0019)	ND (0.0019)
Sulphate (Dissolved)	mg/L	500	[b]	--	--			3.04	2.22	3.02	2.79	0.75	1.12	8.51	1.52
Hardness <= 30 mg/L	mg/L	--	1280	--	--			3.04	2.22	3.02	2.79	0.75	1.12	1.52	1.52
Hardness 31 - 75 mg/L	mg/L	--	2180	--	--									8.51	1.52
Total dissolved solids (TDS)	mg/L	--	--	--	--			26	ND (51)	ND (51)	18	32 J	44 J	192	32
Total kjeldahl nitrogen (TKN)	mg/L	--	--	--	--			0.11	ND (0.10)	-	0.066	0.16	0.17	0.25	0.148
Total suspended solids (TSS)	mg/L	--	--	--	(c)			ND (4.0)	ND (4.0) J	ND (4.0) J	ND (4.0)	ND (4.0)	ND (4.0)	ND (4.0)	ND (4.0)
<b>Nutrients</b>															
Ammonia-N	mg/L	--	[a]	--	[d]			0.016	0.020	-	0.019	0.019	0.017	0.018	0.022
Varies with pH and Temperature	mg/L	--	[a]	--	[d]			0.016	0.020	-	0.019	0.019	0.017	0.018	0.022
pH < 7.0	mg/L	--	18.4	--	[d]				0.020	-	-			0.018	-
pH 7.0 - < 7.5	mg/L	--	18.5	--	[d]					-	0.019				
pH 7.5 - < 8.0	mg/L	--	11.3	--	[d]			0.016				0.019	0.017		0.022
pH 8.0 - < 8.5	mg/L	--	3.7	--	[d]										
Bicarbonate (as CaCO3)	mg/L	--	--	--	--			27.5	26.8	25.9	26.7	18.2	17.9	128	17.7
Carbonate (as CaCO3)	mg/L	--	--	--	--			ND (0.50)	ND (0.50)	ND (0.50)	ND (0.50)	ND (0.50)	ND (0.50)	ND (0.50)	ND (0.50)
Nitrate (as N)	mg/L	10	400	10	3.0			ND (0.10)	ND (0.10)	ND (0.10)	0.031	ND (0.10)	ND (0.10)	1.16	0.045
Nitrite (as N)	mg/L	1	[c]	1	[c]			ND (0.10)	ND (0.10)	ND (0.10)	ND (0.0050)	ND (0.10)	ND (0.10)	ND (0.10)	ND (0.0050)
Chloride < 2 mg/L	mg/L	--	0.2	--	0.02			ND (0.10)	ND (0.10)	ND (0.10)	ND (0.0050)				
Chloride 2 - < 4 mg/L	mg/L	--	0.4	--	0.04										
Chloride 4 - < 6 mg/L	mg/L	--	0.6	--	0.06										
Chloride 6 - < 8 mg/L	mg/L	--	0.8	--	0.08										
Chloride >= 10 mg/L	mg/L	--	2	--	0.20										
Nitrite/Nitrate	mg/L	10	400	--	--			ND (0.10)	ND (0.10)	ND (0.10)	0.031	ND (0.10)	ND (0.10)	1.16	0.045
Nitrogen	mg/L	--	--	--	--			0.107	0.074	-	0.097	0.159	0.175	1.41	0.193

Table 3  
Surface Water Monitoring Data  
Upland Landfill  
Campbell River, British Columbia

Sample Location:	Units	BC CSR Schedule 3.2		BC WQG		SW15-01 Mclvor Lake				SW15-02 Rico Lake				SW16-03 Wash Plant	
		DW	FAW	DW	FAW	W-88877-091815- TDF-08 9/18/2015	WS-88877- 06102015-TE-10 10/6/2015	WS-88877- 06102015-TE-11 10/6/2015 Duplicate	WS-88877-060417- JS-03 4/6/2017	W-88877-091815- TDF-09 9/18/2015	W-88877-091815- TDF-10 9/18/2015 Duplicate	WS-88877- 05102015-TE-06 10/5/2015	WS-88877-060417- JS-02 4/6/2017	SW-88877-290116- JS-01 1/29/2016	WS-88877-060417- JS-01 4/6/2017
		a	b	c	d										
<b>Parameters</b>															
<b>Dissolved Metals</b>															
Aluminum (dissolved)	mg/L	9.5	--	--	[a]	-	-	-	-	-	-	-	-	0.0532	-
pH >= 6.5	mg/L				0.05									0.0532 <sup>d</sup>	
Antimony (dissolved)	mg/L	0.006	0.09	--	--	-	-	-	-	-	-	-	-	ND (0.0005)	-
Arsenic (dissolved)	mg/L	0.01	0.05	--	--	-	-	-	-	-	-	-	-	0.00018	-
Barium (dissolved)	mg/L	1	10	--	--	-	-	-	-	-	-	-	-	0.002	-
Beryllium (dissolved)	mg/L	0.008	0.0015	--	--	-	-	-	-	-	-	-	-	ND (0.0001)	-
Bismuth (dissolved)	mg/L	--	--	--	--	-	-	-	-	-	-	-	-	ND (0.001)	-
Boron (dissolved)	mg/L	5	12	--	--	-	-	-	-	-	-	-	-	ND (0.05)	-
Cadmium (dissolved)	mg/L	0.005	[b]	--	[b]	-	-	-	-	-	-	-	-	ND (0.00001)	-
Hardness < 30 mg/L	mg/L		0.0005											ND (0.00001)	-
Hardness 3.4 - 285 mg/L	mg/L				[b] calcb									ND (0.00001)	-
Calcium (dissolved)	mg/L	--	--	--	--	-	-	-	-	-	-	-	-	8.13	-
Chromium (dissolved)	mg/L	0.05	0.01	--	--	-	-	-	-	-	-	-	-	ND (0.001)	-
Cobalt (dissolved)	mg/L	0.020 (i)	0.04	--	--	-	-	-	-	-	-	-	-	ND (0.0005)	-
Copper (dissolved)	mg/L	1.5	[b]	--	--	-	-	-	-	-	-	-	-	0.00038	-
Hardness < 50 mg/L	mg/L		0.02											0.00038	-
Iron (dissolved)	mg/L	6.5	--	--	0.35 (STM)	-	-	-	-	-	-	-	-	0.0118	-
Lead (dissolved)	mg/L	0.01	[b]	--	--	-	-	-	-	-	-	-	-	ND (0.0002)	-
Hardness < 50 mg/L	mg/L		0.04											ND (0.0002)	-
Lithium (dissolved)	mg/L	0.008	--	--	--	-	-	-	-	-	-	-	-	ND (0.005)	-
Magnesium (dissolved)	mg/L	--	--	--	--	-	-	-	-	-	-	-	-	1.58	-
Manganese (dissolved)	mg/L	1.5	--	--	--	-	-	-	-	-	-	-	-	0.0209	-
Mercury (dissolved)	mg/L	0.001	0.00025	--	--	-	-	-	-	-	-	-	-	ND (0.00001)	-
Molybdenum (dissolved)	mg/L	0.250	--	--	--	-	-	-	-	-	-	-	-	ND (0.001)	-
Nickel (dissolved)	mg/L	0.08	[b]	--	--	-	-	-	-	-	-	-	-	ND (0.001)	-
Hardness < 60 mg/L	mg/L		0.25											ND (0.001)	-
Potassium (dissolved)	mg/L	--	--	--	--	-	-	-	-	-	-	-	-	0.231	-
Selenium (dissolved)	mg/L	0.01	0.02	--	--	-	-	-	-	-	-	-	-	0.00012	-
Silicon (dissolved)	mg/L	--	--	--	--	-	-	-	-	-	-	-	-	1.11	-
Silver (dissolved)	mg/L	0.02	[b]	--	--	-	-	-	-	-	-	-	-	ND (0.00002)	-
Hardness <= 100 mg/L	mg/L		0.0005											ND (0.00002)	-
Sodium (dissolved)	mg/L	200	--	--	--	-	-	-	-	-	-	-	-	3.10	-
Strontium (dissolved)	mg/L	2.50	--	--	--	-	-	-	-	-	-	-	-	0.0187	-
Sulphur (Dissolved)	mg/L	--	--	--	--	-	-	-	-	-	-	-	-	ND (3.0)	-
Thallium (dissolved)	mg/L	--	0.003	--	--	-	-	-	-	-	-	-	-	ND (0.00005)	-
Tin (dissolved)	mg/L	2.50	--	--	--	-	-	-	-	-	-	-	-	ND (0.005)	-
Titanium (dissolved)	mg/L	--	1	--	--	-	-	-	-	-	-	-	-	ND (0.005)	-
Uranium (dissolved)	mg/L	0.02	0.085	--	--	-	-	-	-	-	-	-	-	ND (0.0001)	-
Vanadium (dissolved)	mg/L	0.02	--	--	--	-	-	-	-	-	-	-	-	ND (0.005)	-
Zinc (dissolved)	mg/L	3	[b]	--	--	-	-	-	-	-	-	-	-	ND (0.005)	-
Hardness < 90 mg/L	mg/L		0.075											ND (0.005)	-
Zirconium (dissolved)	mg/L	--	--	--	--	-	-	-	-	-	-	-	-	ND (0.0005)	-





Table 3  
Surface Water Monitoring Data  
Upland Landfill  
Campbell River, British Columbia

Sample Location:	BC CSR Schedule 3.2		BC WQG		SW15-01 Mclvor Lake				SW15-02 Rico Lake				SW16-03 Wash Plant	
					W-88877-091815- TDF-08 9/18/2015	WS-88877- 06102015-TE-10 10/6/2015	WS-88877- 06102015-TE-11 10/6/2015 Duplicate	WS-88877-060417- JS-03 4/6/2017	W-88877-091815- TDF-09 9/18/2015	W-88877-091815- TDF-10 9/18/2015 Duplicate	WS-88877- 05102015-TE-06 10/5/2015	WS-88877-060417- JS-02 4/6/2017	SW-88877-290116- JS-01 1/29/2016	WS-88877-060417- JS-01 4/6/2017
					DW a	FAW b	DW c	FAW d						
<b>Parameters</b>	<b>Units</b>													
<b>Volatile Organic Compounds</b>														
1,1,1,2-Tetrachloroethane	ug/L	6	--	--	--	--	--	ND (0.50)	-	-	-	-	-	-
1,1,1-Trichloroethane	ug/L	8000	--	--	--	--	--	ND (0.50)	-	-	-	-	-	-
1,1,2,2-Tetrachloroethane	ug/L	0.8	--	--	--	--	--	ND (0.50)	-	-	-	-	-	-
1,1,2-Trichloroethane	ug/L	3	--	--	--	--	--	ND (0.50)	-	-	-	-	-	-
1,1-Dichloroethane	ug/L	30	--	--	--	--	--	ND (0.50)	-	-	-	-	-	-
1,1-Dichloroethene	ug/L	14	--	--	--	--	--	ND (0.50)	-	-	-	-	-	-
1,2,3-Trichlorobenzene	ug/L	3	80	--	8 w	--	--	ND (2.0)	-	-	-	-	-	-
1,2,4-Trichlorobenzene	ug/L	5.5	240	--	24 w	--	--	ND (2.0)	-	-	-	-	-	-
1,2-Dibromoethane (Ethylene dibromide)	ug/L	0.5	--	--	--	--	--	ND (0.20)	-	-	-	-	-	-
1,2-Dichlorobenzene	ug/L	200	7	--	0.7 w	--	--	ND (0.50)	-	-	-	-	-	-
1,2-Dichloroethane	ug/L	5	1000	--	100 w	--	--	ND (0.50)	-	-	-	-	-	-
1,2-Dichloropropane	ug/L	4.5	--	--	--	--	--	ND (0.50)	-	-	-	-	-	-
1,3-Butadiene	ug/L	1	--	--	--	--	--	ND (5.0)	-	-	-	-	-	-
1,3-Dichlorobenzene	ug/L	--	1500	--	150 w	--	--	ND (0.50)	-	-	-	-	-	-
1,4-Dichlorobenzene	ug/L	5	260	--	26 w	--	--	ND (0.50)	-	-	-	-	-	-
Benzene	ug/L	5	400	5	40 Revised Interim	--	--	ND (0.40)	-	-	-	-	-	-
Bromobenzene	ug/L	30	--	--	--	--	--	ND (2.0)	-	-	-	-	-	-
Bromodichloromethane	ug/L	100	--	--	--	--	--	ND (1.0)	-	-	-	-	-	-
Bromoform	ug/L	100	--	--	--	--	--	ND (1.0)	-	-	-	-	-	-
Bromomethane (Methyl bromide)	ug/L	5.5	--	--	--	--	--	ND (1.0)	-	-	-	-	-	-
Carbon tetrachloride	ug/L	2	130	--	13.3 w	--	--	ND (0.50)	-	-	-	-	-	-
Chlorobenzene	ug/L	80	13	--	1.3 w	--	--	ND (0.50)	-	-	-	-	-	-
Chloroethane	ug/L	--	--	--	--	--	--	ND (1.0)	-	-	-	-	-	-
Chloroform (Trichloromethane)	ug/L	100	20	--	1.8 w	--	--	ND (1.0)	-	-	-	-	-	-
Chloromethane (Methyl chloride)	ug/L	--	--	--	--	--	--	ND (1.0)	-	-	-	-	-	-
cis-1,2-Dichloroethene	ug/L	8	--	--	--	--	--	ND (1.0)	-	-	-	-	-	-
cis-1,3-Dichloropropene	ug/L	--	--	--	--	--	--	ND (1.0)	-	-	-	-	-	-
Dibromochloromethane	ug/L	100	--	--	--	--	--	ND (1.0)	-	-	-	-	-	-
Dibromomethane	ug/L	--	--	--	--	--	--	ND (0.90)	-	-	-	-	-	-
Dichlorodifluoromethane (CFC-12)	ug/L	800	--	--	--	--	--	ND (2.0)	-	-	-	-	-	-
Ethylbenzene	ug/L	140	2000	140 / 1.6 MAC/AO	200 Interim	--	--	ND (0.40)	-	-	-	-	-	-
Hexachlorobutadiene	ug/L	2	15	--	1.3 w	--	--	ND (0.50)	-	-	-	-	-	-
m&p-Xylenes	ug/L	--	--	--	30	--	--	ND (0.40)	-	-	-	-	-	-
Methyl tert butyl ether (MTBE)	ug/L	95	34000	15 AO	3.4 (STM)	--	--	ND (4.0)	-	-	-	-	-	-
Methylene chloride	ug/L	50	--	--	98.1 w	--	--	ND (2.0)	-	-	-	-	-	-
o-Xylene	ug/L	--	--	--	30	--	--	ND (0.40)	-	-	-	-	-	-
Styrene	ug/L	800	720	--	72 w	--	--	ND (0.50)	-	-	-	-	-	-
Tetrachloroethene	ug/L	30	1100	--	110 w	--	--	ND (0.50)	-	-	-	-	-	-
Toluene	ug/L	60	5	60 / 24 MAC/AO	0.5	--	--	ND (0.40)	-	-	-	-	-	-
trans-1,2-Dichloroethene	ug/L	80	--	--	--	--	--	ND (1.0)	-	-	-	-	-	-
trans-1,3-Dichloropropene	ug/L	--	--	--	--	--	--	ND (1.0)	-	-	-	-	-	-
Trichloroethene	ug/L	5	200	--	21 w	--	--	ND (0.50)	-	-	-	-	-	-
Trichlorofluoromethane (CFC-11)	ug/L	1000	--	--	--	--	--	ND (4.0)	-	-	-	-	-	-
Trifluorotrchloroethane (Freon 113)	ug/L	100000	--	--	--	--	--	ND (2.0)	-	-	-	-	-	-
Vinyl chloride	ug/L	2	--	--	--	--	--	ND (0.50)	-	-	-	-	-	-
Xylenes (total)	ug/L	90	300	90 / 20 MAC/AO	30	--	--	ND (0.40)	-	-	-	-	-	-

Table 3  
 Surface Water Monitoring Data  
 Upland Landfill  
 Campbell River, British Columbia

Sample Location:	BC CSR Schedule 3.2	BC WQG	SW15-01 Mclvor Lake				SW15-02 Rico Lake				SW16-03 Wash Plant	
			W-88877-091815- TDF-08 9/18/2015	WS-88877- 06102015-TE-10 10/6/2015	WS-88877- 06102015-TE-11 10/6/2015 Duplicate	WS-88877-060417- JS-03 4/6/2017	W-88877-091815- TDF-09 9/18/2015	W-88877-091815- TDF-10 9/18/2015 Duplicate	WS-88877- 05102015-TE-06 10/5/2015	WS-88877-060417- JS-02 4/6/2017	SW-88877-290116- JS-01 1/29/2016	WS-88877-060417- JS-01 4/6/2017
			DW a	FAW b	DW c	FAW d						
<b>Parameters</b>	<b>Units</b>											
<b>PAHs</b>												
2-Methylnaphthalene	ug/L	15	--	--	--	ND (0.10)	-	-	-	-	-	
Acenaphthene	ug/L	250	60	--	6	ND (0.050)	-	-	-	-	-	
Acenaphthylene	ug/L	--	--	--	--	ND (0.050)	-	-	-	-	-	
Acridine	ug/L	--	0.5	--	3	ND (0.050)	-	-	-	-	-	
Anthracene	ug/L	1000	1	--	4	ND (0.010)	-	-	-	-	-	
Benzo(a)anthracene	ug/L	0.07	1	--	0.1	ND (0.010)	-	-	-	-	-	
Benzo(a)pyrene	ug/L	0.01	0.1	0.01	0.01	ND (0.0090)	-	-	-	-	-	
Benzo(b)fluoranthene/Benzo(j)fluoranthene	ug/L	0.07	--	--	--	ND (0.050)	-	-	-	-	-	
Benzo(b)pyridine (Quinoline)	ug/L	0.05	34	--	3.4 w	ND (0.24)	-	-	-	-	-	
Benzo(g,h,i)perylene	ug/L	--	--	--	--	ND (0.050)	-	-	-	-	-	
Benzo(k)fluoranthene	ug/L	--	--	--	--	ND (0.050)	-	-	-	-	-	
Chrysene	ug/L	7	1	--	--	ND (0.050)	-	-	-	-	-	
Dibenz(a,h)anthracene	ug/L	0.01	--	--	--	ND (0.050)	-	-	-	-	-	
Fluoranthene	ug/L	150	2	--	4	ND (0.020)	-	-	-	-	-	
Fluorene	ug/L	150	120	--	12	ND (0.050)	-	-	-	-	-	
Indeno(1,2,3-cd)pyrene	ug/L	--	--	--	--	ND (0.050)	-	-	-	-	-	
Naphthalene	ug/L	80	10	--	1	ND (0.10)	-	-	-	-	-	
Phenanthrene	ug/L	--	3	--	0.3	ND (0.050)	-	-	-	-	-	
Pyrene	ug/L	100	0.2	--	--	ND (0.020)	-	-	-	-	-	
PAH high molecular weight	ug/L	--	--	--	--	ND (0.050)	-	-	-	-	-	
PAH low molecular weight	ug/L	--	--	--	--	ND (0.24)	-	-	-	-	-	
Total PAH	ug/L	--	--	--	--	ND (0.24)	-	-	-	-	-	

Notes

**Upland Landfill  
Campbell River, British Columbia**

CSR - British Columbia Contaminated Sites Regulation, Stage 11 Amendment Nov. 1, 2017

BC CSR - Schedule 3.2 Generic Numerical Water Quality Standards - Column 6 Drinking Water (DW)

BC WQG - British Columbia Approved and Working Water Quality Guidelines, latest update December 19, 2017

ND - Not detected at the associated reporting limit.

J - Estimated concentration.

ND (0.24) Detection limit is greater than the applicable Standard

(i) - Cobalt concentrations in groundwater do not exceed the referenced cobalt interim background groundwater concentration estimate. Standard confirmed in email received from ENV, November 7, 2017.

47.0 Groundwater concentration is greater than the applicable BC CSR Generic Numerical Water Quality Standards - Column 6 Drinking Water (DW)

0.0149<sup>a</sup> Surface water concentration is greater than the applicable BC CSR Generic Numerical Water Quality Standards - Column 6 Drinking Water (DW)

0.0149<sup>b</sup> Surface water concentration is greater than the applicable BC CSR Generic Numerical Water Quality Standards - Column 3 Aquatic Life for Freshwater (FAW)

0.0149<sup>c</sup> Surface water concentration is greater than the applicable BC WQG for Drinking Water (DW)

0.0149<sup>d</sup> Surface water concentration is greater than the applicable BC WQG for Freshwater Aquatic Life (FAW)

[a] - Limit varies with pH.

[b] - Limit varies with Hardness.

[c] - Limit varies with Chloride (mg/L).

[d] - Limit varies with pH and Temperature.

[e] - Limit varies with Dissolved Calcium.

[f] - Limit varies with Methyl Mercury.

calc<sup>b</sup> -  $\text{EXP}(0.736 \cdot \text{LN}(\text{Hardness}) - 4.943)$  ug/L

calc<sup>c</sup> -  $0.04 \cdot \text{Hardness}$  ug/L

calc<sup>d</sup> -  $3.31 + (\text{Exp}(1.273 \cdot \text{LOG}(\text{Hardness}) - 4.704))$  ug/L

calc<sup>e</sup> -  $0.0044 \cdot \text{Hardness} + 0.605$  mg/L