Environment

Defence Construction Canada

PIN-2 Cape Young
Baseline Landfill Monitoring

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AECOM: 2012-01-06

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1. PIN-2 Cape Young

1.1 Introduction

PIN-2, Cape Young, is located on the mainland of Nunavut along the coast of Dolphin and Union Strait, approximately 150 kilometres (km) north of Kugluktuk (formerly Coppermine). The nearest community with an aircraft charter base and a full range of commercial and public services is Cambridge Bay, 465 km to the east. For ease of discussion, the overall site has been broken into three areas: the Station Area, encompassing the majority of the former site infrastructure, including the airstrip and several landfills; the Beach Area, on the shore of Dolphin and Union Strait; and the Station South Area, which includes two landfills, located south of the intersection of the main station access road and the Harding River Road.

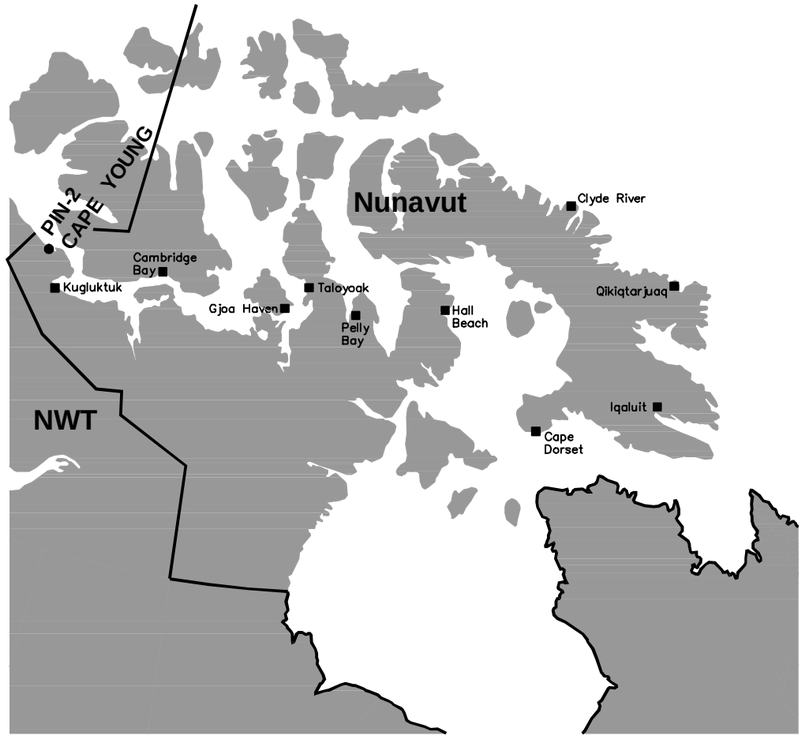
PIN-2 was an auxiliary site within the original DEW Line system (UMA 1991). The station was constructed in the 1950s as part of the Distant Early Warning (DEW) Line and operated until the early 1990s when the DEW Line system was replaced by the more modern North Warning System (NWS). The PIN-2 DEW Line station was decommissioned in the summer of 1993. A NWS short range radar (SRR) site was established approximately 8 km southwest of the DEW Line site, however, two 88 cubic metre (m^3) petroleum, oil and lubricant (POL) tanks associated with the SRR are located at the beach area adjacent to the DEW Line Beach POL area. NWS has a property reserve ("Parcel B") within the area.

Site investigations were completed at PIN-2 in 1990, 1992, 1993, and 2004 as part of an assessment of the environmental status of DEW Line installations. The engineering component of the assessment was completed by AECOM and the environmental component by the Environmental Sciences Group (ESG). Input on traditional land use was provided by Nunavut Tunngavik Incorporated (NTI). Design requirements for landfill closure were based on the geophysical and geotechnical investigations completed by AECOM and EBA Engineering Consultants Ltd. (EBA), and the environmental data provided by ESG.

The environmental cleanup and demolition of facilities, with the exception of the airstrip hangar, commenced in 2009 and was completed in the summer of 2011. The cleanup included the remediation of seven existing landfills as well as the construction of two new engineered facilities: a Non-Hazardous Waste Landfill for the disposal of site debris and demolition waste, and a Tier II Disposal Facility for the disposal of contaminated soil. The existing landfills and new landfills, as shown on the overall site plan, Figure PIN-2.1, include:

- Airstrip Landfill
- USAF Landfill
- Station West Landfill
- Tier II Disposal Facility
- Airstrip South Landfill
- Pallet Line West Landfill
- Non-Hazardous Waste Landfill
- South Landfill – East
- South Borrow Landfill

In accordance with the NTI-DND Cooperation Agreement, landfill monitoring is carried out following cleanup of the site. The landfills where monitoring is required are listed above and identified in Figure PIN-2.1. They are described in further detail below. The monitoring schedule for the PIN-2 Cape Young site is provided in Table 1.1. Bolded italicised rows indicate the monitoring events completed internally by the DEW Line Clean-up project team.

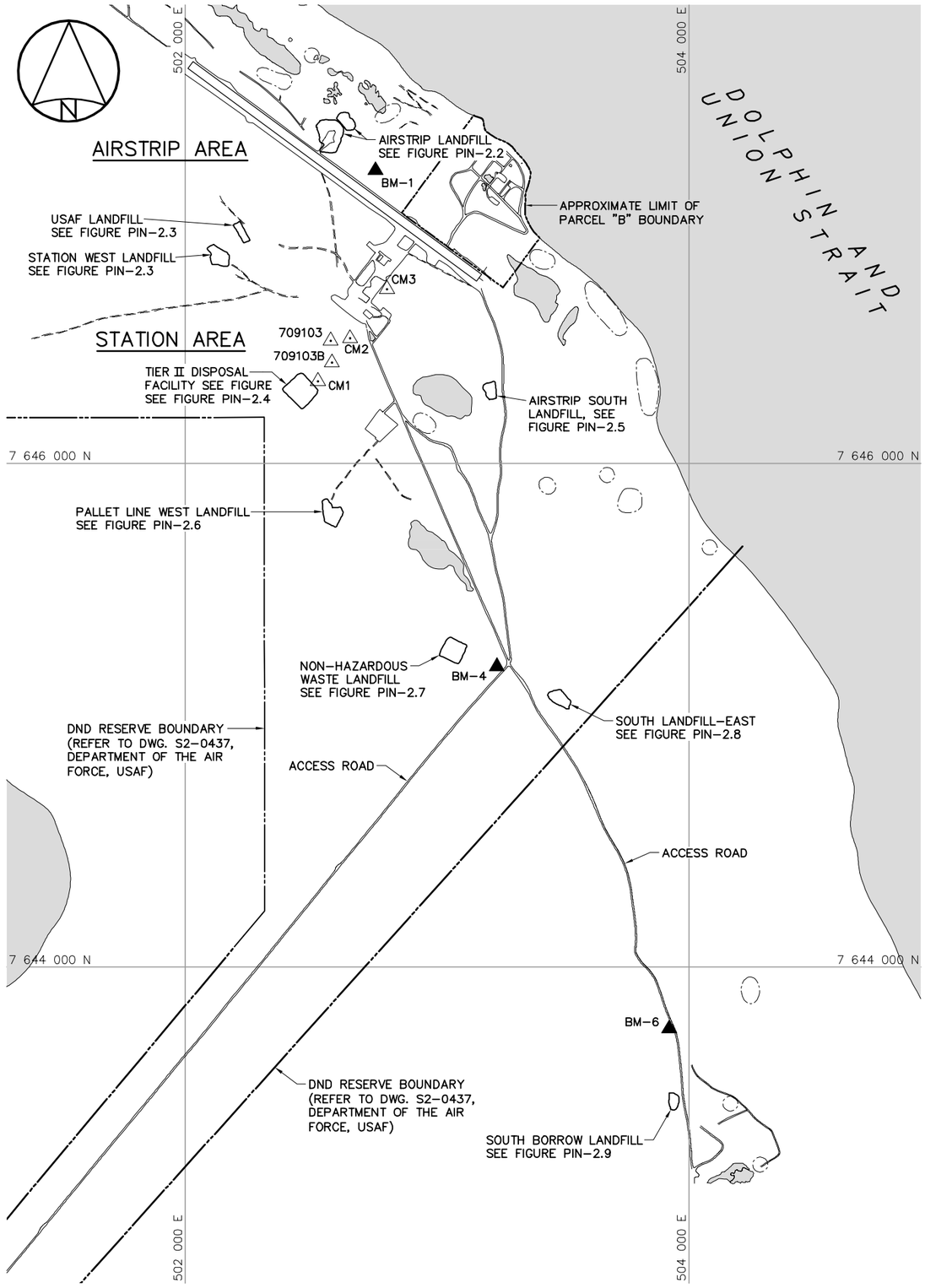


LOCATION OF CAPE YOUNG WITHIN NUNAVUT TERRITORY
SCALE: NTS

SURVEY CONTROL MONUMENTS				
NO.	UTM COORDINATES		ELEV.	DESCRIPTION
	NORTHING	EASTING		
CM1	7 646 327.029	502 525.754	13.804	PIN-2 BASELINE STA. 0+00
CM2	7 646 497.473	502 653.662	13.993	PIN-2 BASELINE STA. 7+00
CM3	7 646 692.507	502 799.974	14.534	PIN-2 BASELINE STA. 15+00
709103	7 646 487.974	502 576.191	13.790	GEODETIC BENCHMARK
709103B	7 646 400.920	502 581.212	13.954	GEODETIC BENCHMARK

NOTE: BASELINE STATIONS SHOWN ARE IN IMPERIAL UNITS.

PERMANENT BENCHMARK (AS-BUILT)				
NO.	UTM COORDINATES		ELEV.	DESCRIPTION
	NORTHING	EASTING		
BM-1	7 647 164.203	502 754.676	14.398	25mm DIA. STEEL PIPE
BM-4	7 645 194.471	503 236.108	17.189	25mm DIA. STEEL PIPE
BM-6	7 643 756.513	503 920.587	13.296	25mm DIA. STEEL PIPE



GENERAL NOTES:

1. ALL COORDINATES ARE REFERENCED TO NAD83 (CSRS), UTM ZONE 11N. ALL ELEVATIONS REFER TO GEODETIC DATUM.
2. ALL DIMENSIONS ARE IN METRES UNLESS NOTED OTHERWISE.

LEGEND:

- △CM1 — SURVEY CONTROL MONUMENT (5)
- ▲BM-1 — PERMANENT BENCHMARK LOCATION (3)
- ARCHAEOLOGICAL FEATURES
- APPROXIMATE LOCATION OF PROPERTY BOUNDARY
- BODY OF WATER

RECORD DRAWING
NOT FOR CONSTRUCTION

0 200 400 m SCALE 1:20000

DEW LINE CLEAN UP
LANDFILL MONITORING PLAN

PIN-2 CAPE YOUNG

LOCATION PLAN

FIGURE PIN-2.1

AECOM

This report has been prepared as a summary of the baseline assessment work carried out at PIN-2 Cape Young, and includes site investigation information as well as sample analytical data collected during the environmental cleanup. Soil and groundwater sampling was done by ESG, with analytical work completed by Queen's University and the Royal Military College laboratories in Kingston, Ontario. The final construction inspection of the landfills was carried out by AECOM.

The following sections provide an overview of the site biophysical environment and traditional land use activities, site background conditions, the general monitoring, and the basis for evaluation of monitoring results.

Table 1.1: Monitoring Schedule – PIN-2 Cape Young

No. Of Years After Construction	Monitoring Event Number	Year
***Prior to and during**	***Baseline**	***1990, 1992, 1993, 2004 & 2009-2011**
***1**	***1**	***2012**
2	2	2013
3	3	2014
4	4	2015
5	5	2016
7	6	2018
10	7	2021
15	8	2026
25	9	2036

* Monitoring events completed by DEW Line Clean-up project team

1.2 Background

1.2.1 Geology and Background Geochemical Conditions

The Cape Young area is underlain by sedimentary rocks, Palaeozoic in age. Surficial geology in the vicinity of the station area is characterized by beach ridge and terrace formation. Bedrock is exposed to the southeast of the station area. Generally, the landscape is poorly drained, and is characterized by gravelly and sandy ridges of low relief, with finer texture sediments in low lying areas. The elevation of Cape Young is approximately 14 metres above sea level (m.a.s.l.).

Three distinct terrain units can be recognized in the area surrounding the PIN-2 Station. Terrain Unit 1 encompasses the main station and the airstrip. It is comprised of flat, low lying vegetated sand units. The surface material is sandy gravel. Terrain Unit 2 is the main coastal area of the Cape Young Peninsula and has been shaped by coastal processes. It consists of a slightly elevated beach, ridges of sand and gravel and flat poorly drained areas of organic terrain. Terrain Unit 3 is comprised of the almost completely vegetated southwest portion of the peninsula.

Soil samples were collected in locations removed from site activities within appropriate terrain units to establish background geochemical conditions in areas investigated at the site. Sample results are presented in Table 1.2. Inorganic element concentrations were well below criteria for all analytes.

1.2.2 Biophysical Environment

The Cape Young DEW Line site is situated by the Amundsen Gulf. Mean annual precipitation is 166.1 millimetres (mm); 93.6 mm is received as rain and 68.4 centimeters (cm) as snow. On average, 61 days per year have measurable precipitation and most of the moisture falls from July to November. Mean annual wind speed is 17.9 kilometres/hour (km/hr). Winds are relatively constant throughout the year and predominantly come from the northwest, except in February and October when the winds are westerly and southeasterly, respectively. Climate normals for the site, from 1961 to 1990, are provided in Table 1.3.

The landscape is poorly drained, and is characterized by gravelly and sandy ridges of low relief, with finer textured sediments in low lying areas. There are two main vegetation communities at Cape Young; dry, upland sites and poorly drained, low-lying sites. The upland sites are characterized by 30 to 60% vegetative cover dominated by lichens. The low-lying sites east of the station are 70 to 90% covered in vegetation mainly consisting of sedges, mosses, and *Salix* spp.

Caribou, grizzly bears and wolves were seen at site during the site investigation and over the course of construction. Other terrestrial mammals seen in the area include arctic fox, arctic ground squirrel, arctic hare, collard lemming and brown lemming. Muskoxen have also been seen at site in the past.

A variety of marine mammals concentrate in the main channel of Lancaster Sound with smaller numbers migrating to Barrow Strait and a few or none penetrating into Viscount Melville Sound. Such mammals include beluga whales, narwhals, bowhead whales, walrus, bearded seals and ringed seals. The whales of the Eastern Arctic prefer the fiords of northern Baffin Island during the summer, any sightings of whales in the vicinity of Cape Young are likely strays. Seals (unidentified) and whales (unidentified) were seen off-shore during the site investigation.

A nesting pair of peregrine falcons and a pair of nesting rough-legged hawk raptors were seen at site during the site investigation. An eider duck nest was identified at the sewage outfall. Cape Young is located 100 km north of the Coppermine River which contains a relatively high density of nesting raptor. A variety of other waterfowl, shore birds and avifauna may also be located in the area.

1.2.3 Traditional Land Use

No ecological sites or special conservation land status are designated in this area.

There are 23 identified archaeological sites containing a significant number of features in the region of the PIN-2 site. The features are represented by various tent rings, hearths, caches, cairn, blinds, a wooden cross at a grave terrace, fox traps, cabins and foundations and various areas of lithic scatter. The majority of the features identified are located near the coast and were well-removed from past station operational areas and remedial activities. Several site areas are located in the vicinity of the Airstrip Landfill, including a child’s grave, located approximately 150 m away from Airstrip Landfill, on the west side of the Pond. Care should be taken to avoid anything suspected to be an archaeological resource.

Table 1.2: PIN-2 Cape Young – Summary of Site Background Soil Analytical Data

Sample #	Surface / Reference Tag #	Location	Date	Depth (cm)	Cu [mg/kg]	Ni [mg/kg]	Co [mg/kg]	Cd [mg/kg]	Pb [mg/kg]	Zn [mg/kg]	Cr [mg/kg]	As [mg/kg]	Hg [mg/kg]	PCBs [mg/kg]	TPH [mg/kg]	TPH Identity		
																F1	F2	F3
P2-041			1990	0		<5		1.7	<10		12	3.6	0.07	<0.01	<5			
P2-042			1990	0		<5		<1	<10		14	3.7	<0.05	<0.01	<5			
04-3840/41	3840		2004	0	11	5.4	<5.0	<1.0	<10	33	<20	2		<0.1				
3842	3840		2004	25	8.3	6.4	<5.0	<1.0	<10	<15	<20	1.5						
3843	3840		2004	70	7.3	6.4	<5.0	<1.0	<10	<15	<20	1.1						
3844	3844		2004	0	15	5.2	<5.0	<1.0	<10	17	<20	1.5						
3845	3844		2004	55	11	7.5	<5.0	<1.0	<10	16	<20	2.0						
3846	3846		2004	20	12	<5.0	<5.0	<1.0	<10	<15	<20	2.7						
3847	3846		2004	50	9	5.3	<5.0	<1.0	<10	<15	<20	1.9						
3848	3846		2004	100	9	5.5	<5.0	<1.0	<10	<15	<20	1.3						
3849	3846		2004	130	8.2	<5.0	<5.0	<1.0	<10	<15	<20	1.5						
04-3850/51	3850		2004	0	14	5.7	<5.0	<1.0	<10	14	<20	1.8		<0.1				
3852	3850		2004	50	7.8	<5.0	<5.0	<1.0	<10	<15	<20	1.5						
3853	3850		2004	90	7.6	<5.0	<5.0	<1.0	<10	<15	<20	1.3						
3854	3854		2004	20	21	8.0	6.3	<1.0	<10	26	<20	11.0						
3855	3854		2004	55	11	6.1	<5.0	<1.0	<10	19	<20	<1.0						
3856	3854		2004	80	13	7.5	<5.0	<1.0	<10	19	<20	1.3						
3857	3854		2004	110	13	6.2	<5.0	<1.0	<10	20	<20	1.5						
3858	3858		2004	0	33	<5.0	<5.0	<1.0	<10	20	<20	1.9						
3859	3858		2004	60	17	<5.0	<5.0	<1.0	<10	<15	<20	1.8						
04-3860/61	3858		2004	120	6.4	<5.0	<5.0	<1.0	<10	<15	<20	1.8		<0.1				
3862	3862		2004	0	11	6.4	<5.0	3	<10	38	<20	2.8						
3863	3863		2004	10	6.4	<5.0	<5.0	<1.0	<10	25	<20	2.0						
3864	3863		2004	40	9.8	<5.0	<5.0	<1.0	<10	16	<20	2.8						
3865	3865		2004	20	5.9	<5.0	<5.0	<1.0	<10	<15	<20	2.6						
3866	3865		2004	50	6.7	<5.0	<5.0	<1.0	<10	<15	<20	2.3						
3867	3865		2004	100	7.2	<5.0	<5.0	<1.0	<10	<15	<20	1.7						
00-3868	00-3868		2004	20	9.6	<5.0	<5.0	<1.0	<10	<15	<20	2.5						
00-3869	00-3868		2004	75	7.5	<5.0	<5.0	<1.0	<10	<15	<20	4.8						
04-3870/71	00-3870		2004	0	5.7	<5.0	<5.0	<1.0	<10	<15	<20	3.7		<0.1				
00-3872	00-3872		2004	10	12	5.4	<5.0	<1.0	<10	19	<20	3.0						
00-3873	00-3872		2004	35	9.3	6.3	<5.0	<1.0	<10	<15	<20	2.7						

Sample #	Surface / Reference Tag #	Location	Date	Depth (cm)	Cu [mg/kg]	Ni [mg/kg]	Co [mg/kg]	Cd [mg/kg]	Pb [mg/kg]	Zn [mg/kg]	Cr [mg/kg]	As [mg/kg]	Hg [mg/kg]	PCBs [mg/kg]	TPH [mg/kg]	TPH Identity		
																F1	F2	F3
00-3874	00-3874		2004	10	8.8	5.2	<5.0	<1.0	<10	<15	<20	3.2						
00-3875	00-3874		2004	35	12	<5.0	<5.0	<1.0	<10	<15	<20	3.7						
00-3876	00-3876		2004	10	5	<5.0	<5.0	<1.0	<10	<15	<20	2.1						
00-3877	00-3877		2004	10	11	5.6	<5.0	<1.0	<10	43	<20	3.4						
00-3878	00-3877		2004	40	13	6.0	<5.0	<1.0	<10	20	<20	3.3						
00-3879	00-3877		2004	65	9.3	6.8	<5.0	<1.0	<10	23	<20	4.2						
04-3880/81	00-3880		2004	10	6.5	<5.0	<5.0	<1.0	<10	22	<20	2.4		<0.1				
00-3882	00-3880		2004	35	12	7.0	<5.0	<1.0	<10	17	<20	3.8						
00-3883	00-3880		2004	80	8.1	<5.0	<5.0	<1.0	<10	16	<20	2.7						
00-3884	00-3884		2004	5	17	8.3	<5.0	<1.0	<10	21	<20	3.4						
00-3885	00-3884		2004	30	6.3	<5.0	<5.0	<1.0	<10	<15	<20	2.7						
00-3886	00-3884		2004	80	8.2	<5.0	<5.0	<1.0	<10	<15	<20	1.3						
00-3887	00-3887		2004	10	5.4	<5.0	<5.0	<1.0	<10	<15	<20	1.8						
00-3888	00-3887		2004	30	8.7	<5.0	<5.0	<1.0	<10	<15	<20	3.7						
00-3889	00-3889		2004	10	13	5.4	<5.0	<1.0	<10	<15	<20	1.4						
04-3890/91	00-3889		2004	30	4.5	<5.0	<5.0	<1.0	<10	<15	<20	3.9		<0.1				
00-3892	00-3889		2004	70	5	<5.0	<5.0	<1.0	<10	<15	<20	11.0						
00-3893	00-3893		2004	10	9	6.8	<5.0	<1.0	<10	<15	<20	2.8						
00-3894	00-3893		2004	60	10	5.8	<5.0	<1.0	<10	<15	<20	2.0						
00-3895	00-3893		2004	100	11	6.0	<5.0	<1.0	<10	<15	<20	2.0						
00-3896	00-3893		2004	140	15	6.8	<5.0	<1.0	<10	<15	<20	2.4						
00-3897	00-3897		2004	15	6.7	<5.0	<5.0	<1.0	<10	<15	<20	3.8						
00-3898	00-3898		2004	10	4.9	<5.0	<5.0	<1.0	<10	<15	<20	2.2						
00-3899	00-3898		2004	30	3.9	<5.0	<5.0	<1.0	<10	<15	<20	3						
00-3900	00-3900		2004	5	5.9	<5.0	<5.0	<1.0	<10	<15	<20	2.3		<0.1				
04-3901/02	00-3900		2004	35	6.8	<5.0	<5.0	<1.0	<10	<15	<20	2.6						
3903	3903		2004	5	11.0	5.5	<5.0	<1.0	<10	17	<20	1.9						
3904	3903		2004	25	8.9	<5.0	<5.0	<1.0	<10	15	<20	2.4						
3905	3905		2004	5	7.3	<5.0	<5.0	<1.0	<10	<15	<20	1.8						
3906	3905		2004	35	10.0	<5.0	<5.0	<1.0	<10	<15	<20	4						
3907	3907		2004	5	9.7	5.2	<5.0	<1.0	<10	21	<20	2.3						
3908	3907		2004	40	9.1	5.5	<5.0	<1.0	<10	19	<20	3.4						
3909	3909		2004	5	15.0	6.2	<5.0	<1.0	<10	17	<20	1.1						
04-3910/11	3909		2004	35	8.0	<5.0	<5.0	<1.0	<10	<15	<20	1.7		<0.1				

Sample #	Surface / Reference Tag #	Location	Date	Depth (cm)	Cu [mg/kg]	Ni [mg/kg]	Co [mg/kg]	Cd [mg/kg]	Pb [mg/kg]	Zn [mg/kg]	Cr [mg/kg]	As [mg/kg]	Hg [mg/kg]	PCBs [mg/kg]	TPH [mg/kg]	TPH Identity		
																F1	F2	F3
3912	3912		2004	5	10.0	<5.0	<5.0	<1.0	<10	21	<20	2.1						
3913	3913		2004	10	8.1	<5.0	<5.0	<1.0	<10	21	<20	3.1						
3914	3913		2004	30	8.2	5.5	<5.0	<1.0	<10	<15	<20	2.3						
3915	3913		2004	55	5.6	<5.0	<5.0	<1.0	<10	<15	<20	2.4						
3916	3916		2004	5	4.8	<5.0	<5.0	<1.0	<10	<15	<20	2.6						
3917	3916		2004	30	5.2	<5.0	<5.0	<1.0	<10	<15	<20	3						
3918	3916		2004	65	9.9	<5.0	<5.0	<1.0	<10	<15	<20	5.3						
3919	3919		2004	10	4.1	<5.0	<5.0	<1.0	<10	<15	<20	2.5						
04-3920/21	3919		2004	45	3.4	5.7	<5.0	<1.0	<10	<15	33.0	2.3		<0.1				
3922	3919		2004	75	3.5	<5.0	<5.0	<1.0	<10	16	<20	1.9						
3923	3923		2004	20	4.9	<5.0	<5.0	<1.0	<10	<15	<20	4.3						
3924	3923		2004	50	4.0	<5.0	<5.0	<1.0	<10	<15	<20	1						
3925	3923		2004	95	4.6	<5.0	<5.0	<1.0	<10	<15	<20	2.5						
3926	3926		2004	20	6.5	<5.0	<5.0	<1.0	<10	<15	<20	2.5						
3927	3926		2004	80	4.7	<5.0	<5.0	<1.0	<10	<15	<20	2.5						
3928	3928		2004	25	6.1	<5.0	<5.0	<1.0	<10	<15	<20	2.6						
3929	3928		2004	50	12.0	9.3	6.6	<1.0	<10	21	<20	4						
04-3930/31	3928		2004	85	7.5	<5.0	<5.0	<1.0	<10	<15	<20	1.8		<0.1				
3932	3932		2004	50	4.5	<5.0	<5.0	<1.0	<10	<15	<20	2.6						
3933	3932		2004	100	7.8	<5.0	<5.0	<1.0	<10	<15	<20	1.7						
3934	3932		2004	135	13.0	13	<5.0	<1.0	<10	36	<20	20						
3935			2004	10	6.0	<5.0	<5.0	<1.0	<10	<15	<20	4.7						
3936			2004	10	4.3	<5.0	<5.0	<1.0	<10	<15	<20	1.7						
3937			2004	10	8.4	<5.0	<5.0	<1.0	<10	<15	<20	8.5						
3938			2004	10	5.7	<5.0	<5.0	<1.0	<10	<15	<20	3.8						
3939			2004	10	4.1	<5.0	<5.0	<1.0	<10	<15	<20	1.8						
04-3940/41			2004	10	7.4	<5.0	<5.0	<1.0	<10	<15	<20	4.2		<0.1				
		N Value			91	93	91	93	93	91	93	93	2	93	2			
		Average			8.9	<5.0	<5.0	<1.0	<10	<15	<20	3.0	<0.05	<0.1	<5			
		Standard Deviation			4.3							2.4						
		Minimum			3.4	<5.0	<5.0	<1.0		<15	12.0	<1.0	<0.05	<0.01				
		Maximum			33.0	13.0	6.6	3.0	<10	43	33	20.0	0.07	<0.1	<5			
		95% Confidence Limit			0.9							0.5						

Table 1.3: Climate Normals for Cape Young

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Precipitation													
Mean Rainfall	0.0	0.0	0.0	0.0	1.5	14.2	28.6	32.5	16.4	0.4	0.0	0.0	93.6
Mean Snowfall	3.8	3.5	3.4	5.7	6.6	0.8	0.2	1.0	6.5	17.7	12.7	6.5	68.4
Precipitation (mm)	3.8	3.5	3.4	9.2	8.6	15.1	28.8	33.5	23.0	18.0	12.7	6.5	166.1
No. days w/ meas. rain	0	0	0	0	1	4	7	8	6	*	0	0	26
No. days w/ meas. snow	3	2	3	3	3	1	0	1	4	8	6	4	38
Temperature													
Mean Daily Max.	-26.2	-27.7	-23.4	-14.5	-3.3	5.6	10.5	9.8	3.6	-4.5	-15.6	-21.7	-9.0
Mean Daily Min.	-34.2	-34.4	-32.7	-24.4	-11.2	-0.8	2.7	3.1	-0.9	-10.4	-23.5	-30.2	-16.4
Daily Mean	-30.3	-31.6	-27.9	-19.3	-7.2	2.4	6.6	6.5	1.4	-7.5	-19.6	-25.6	-12.7
Extreme Max.	-3.9	-5.5	-5.0	4.4	13.3	23.3	29.4	25.6	20.6	8.3	5.6	-2.8	29.4
Extreme Min.	-48.3	-47.8	-46.7	-43.3	-30.6	-15.0	-4.0	-3.3	-15.0	-30.0	-38.9	-44.0	-48.3
Degree Days													
Above 18°C	X	X	X	0	0	0	0.6	0	0	0	0	0	X
Below 18°C	X	X	X	1117.5	776.8	457	342.3	353.1	493.1	790.3	1139.4	X	X
Above 5°C	X	X	X	0	0.1	23.2	84.4	70.8	7.6	0	0	X	X
Below 0°C	X	X	X	577.5	222.6	15.6	0	0.2	19.5	234.9	599.5	X	X
Month-end Snow Cover (cm)	25	26	28	29	12	0	0	0	3	15	20	25	

X – data exists, but not enough to derive a value.
** -- quantity is less than 1.*
Information as provided by Environment Canada – Climate Normals 1961-1990 for Cape Young, Nunavut.

1.3 Landfill Monitoring Program

The general components of the landfill monitoring program at PIN-2 include:

- Visual inspection
- Surface and shallow depth soil sampling and analyses
- Groundwater sampling and analyses
- Ground temperature monitoring

The requirements for landfill monitoring, as outlined in Environmental Provisions of the NTI-DND Agreement, are summarized in Table 1.4. Detailed landfill monitoring requirements are described in the Landfill Monitoring Plan - Part B - Nunavut Settlement Region.

Table 1.4: General Landfill Monitoring Requirements

Landfill Classification	Visual Inspection	Groundwater Sampling	Soil Sampling	Thermal Monitoring
Existing Landfill, High Potential Environmental Risk (Class A)	Not required, as landfill to be excavated.			
Existing Landfills, Moderate Potential Environmental Risk (Class B)	√	√	√	√
Existing Landfills, Low Potential Environmental Risk (Class C)	√		√	
New Landfill, Non-Hazardous Waste Landfill	√	√	√	
New Landfill, Tier II Disposal Facility	√	√	√	√

A summary of these requirements, as related to the specific landfills at PIN-2, is provided in Table 1.5. The rationale for the monitoring requirement is provided in the landfill-specific sections.

Table 1.5: PIN-2 Cape Young Landfill Monitoring Requirements

Landfill Designation	Visual Inspection	Groundwater Sampling	Soil Sampling	Thermal Monitoring
Airstrip Landfill	√		√	
USAF Landfill	√		√	
Station West Landfill	√		√	
Tier II Disposal Facility	√	√	√	√
Airstrip South Landfill	√		√	
Pallet Line West Landfill	√		√	
Non-Hazardous Waste Landfill	√	√	√	
South Landfill-East	√		√	
South Borrow Landfill	√		√	

1.3.1 Visual Inspection

The physical condition of each landfill is inspected in accordance with the Visual Inspection Checklist provided in the Environmental Provisions of the NTI-DND Agreement. Documented observations include evidence of settlement, ponding, frost action, erosion, and lateral movement, as well as sloughing of berms, and thermal contraction cracks. Documentation of observations is supported using hand drawn sketches, as applicable. Photographic Records are provided to document the general condition of the landfill and to substantiate all recorded observations.

1.3.2 Soil Sampling

Background (naturally occurring) conditions refer to native soil geochemistry and represent soil quality from an area not impacted by site activities. Soil sampling to establish general site background conditions was conducted in 2004. Results are reported in Table 1.2 above.

Baseline conditions refer to existing soil chemistry at the landfill area prior to and during remediation. The baseline landfill monitoring program consists of two phases: samples collected as part of the landfill assessment program which determined whether the landfill posed a potential environmental risk, and samples collected during the construction/closure of the landfill. The results of subsequent landfill monitoring events are compared to baseline and background values to evaluate any potential changes in environmental conditions.

As part of the baseline sampling program, soil samples are collected in areas up-gradient and down-gradient of each landfill. Up-gradient samples are targeted to areas near the landfill, but not influenced by migration of contaminants through the landfill. Up-gradient samples are meant to be representative of contaminant input conditions to the landfill and serve as the primary basis upon which to compare the down-gradient contaminant concentrations.

Down-gradient soil samples are collected at surface/shallow depths from designated areas at the toe of each landfill and from areas of preferential drainage. These soil samples are collected and analyzed to document whether there has been migration of contaminants, either historically or recently, from the landfill area. Although contaminants are primarily transported in water (surface and groundwater), they have a tendency to adsorb to soil particles the water is migrating through. The soil, thus, retains information regarding the historical input of contaminants.

Analytical results of soil samples collected down-gradient of a landfill are compared to contaminant concentrations of samples collected up-gradient. Down-gradient samples are also compared to overall site background contaminant levels because they help in establishing a more broad level of naturally occurring contaminant concentrations that can be found at the site, particularly where different soil or rock types are present. Contaminant concentrations in down-gradient samples that are significantly higher than background or up-gradient concentrations, particularly where there have been changes over time; provide evidence of contaminants having migrated to, and possibly beyond, the soil sampling location. These data, in conjunction with other site-specific information, were used in the assessment of the environmental status of the landfill and the determination of an appropriate remediation solution.

Soil sampling locations are indicated on the site-specific landfill drawings included in the Annexes to this report included in Appendix A.

Samples collected during baseline and subsequent landfill monitoring are analyzed for the following parameters:

- Inorganic elements: arsenic, cadmium, chromium, cobalt, copper, lead, nickel, zinc, and mercury
- PCBs (polychlorinated biphenyls – total Aroclor)
- TPH (Total Petroleum Hydrocarbons) – as represented by the sum of F1 (nC_6 to nC_{10}), F2 (nC_{10} to nC_{16}), and F3 (nC_{16} to nC_{34}), as defined by the CCME Tier I Method – Rev 5, Analyses of Total Petroleum Hydrocarbons in soil

The Method Detection Limit (MDL) for each parameter is specified in Table 1.8.

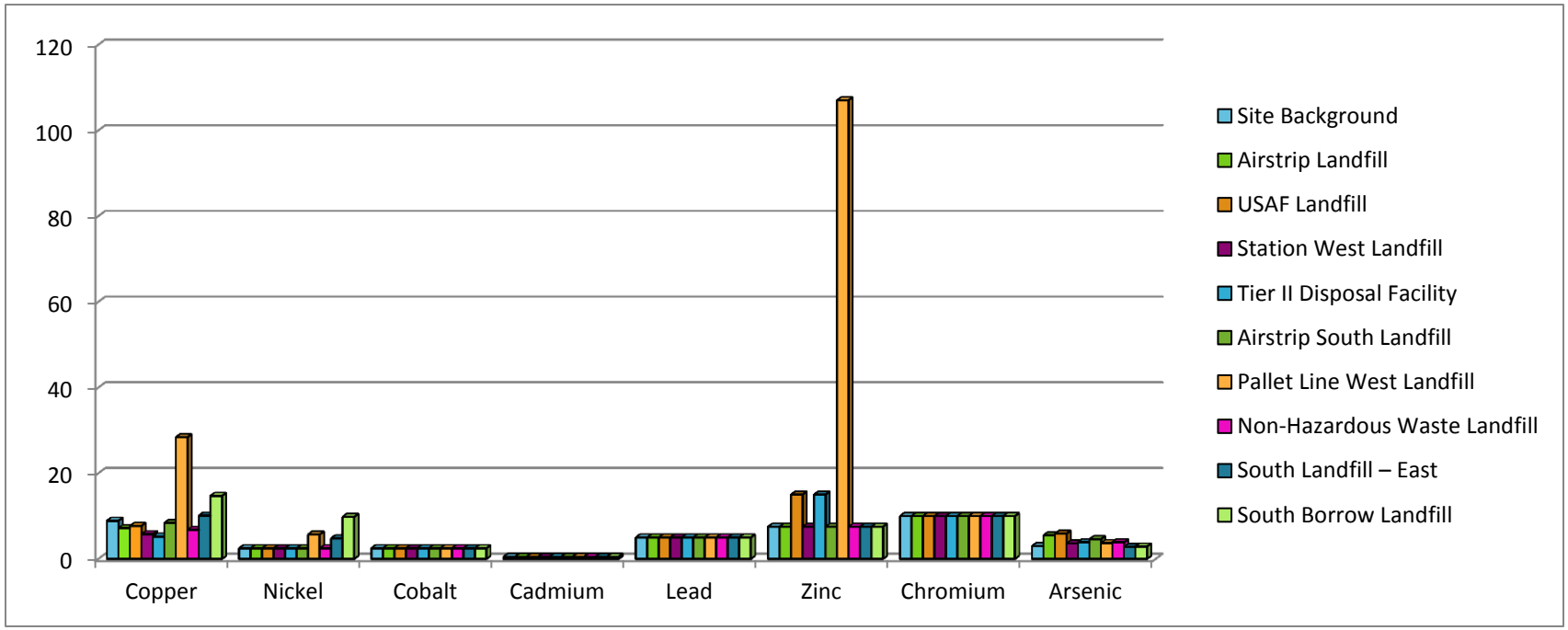
The requirement for the analyses of baseline samples is to provide record information on the environmental status of the landfill should potential problems be identified during the monitoring program. Analytical results are presented under the discussion for each landfill.

To provide a basis for evaluation with subsequent monitoring analytical results, simple statistical analyses were carried out to determine the arithmetic mean, standard deviation, and 95% confidence interval for each inorganic parameter analyzed. In general, for samples in which the concentration was less than the MDL, one-half of the MDL was used in the statistical analyses. However, in cases where the majority of the analytical results fell below the MDL, the arithmetic mean is represented as less than the MDL. It should be noted that MDLs for analyses completed under previous years' landfill assessment programs may not be the same as those specified in Table 1.8, particularly for PCBs. In cases where the contaminant was not detected, the chemical baseline is typically represented as a range over the different MDLs. Summaries of the arithmetic mean of the concentration of inorganic elements in soil are presented in Table 1.6. Additional statistical data is presented under the discussion for each landfill.

Table 1.6: PIN-2 Cape Young – Summary of Arithmetic Mean – Soil Baseline Data

Area	Arithmetic Mean (in mg/kg)								Range
	Copper	Nickel	Cobalt	Cadmium	Lead	Zinc	Chromium	Arsenic	PCBs
Site Background	8.9	<5.0	<5.0	<1.0	<10	<15	<20	3.0	<0.01 to 0.07
Airstrip Landfill	7.2	<5.0	<5.0	<1.0	<10	<15	<20	5.5	<0.050 to 1.1
USAF Landfill	7.7	<5.0	<5.0	<1.0	<10	15	<20	5.9	<0.050 to <0.1
Station West Landfill	5.8	<5.0	<5.0	<1.0	<10	<15	<20	3.6	<0.050 to 0.1
Tier II Disposal Facility	5.2	<5.0	<5.0	<1.0	<10	15	<20	3.9	<0.0030 to <0.05
Airstrip South Landfill	8.4	<5.0	<5.0	<1.0	<10	<15	<20	4.6	<0.050 to <0.1
Pallet Line West Landfill	28.4	5.7	<5.0	<1.0	<10	107	<20	3.7	<0.050 to <0.1
Non-Hazardous Waste Landfill	6.8	<5.0	<5.0	<1.0	<10	<15	<20	3.9	<0.000020 to <0.0030
South Landfill – East	10.1	4.8	<5.0	<1.0	<10	15	<20	2.8	<0.050 to <0.5
South Borrow Landfill	14.7	9.8	<5.0	<1.0	<10	<15	<20	2.9	<0.050 to 0.12

Figure 1.1: PIN-2 Cape Young – Summary of Arithmetic Mean – Soil Baseline Data



1.3.3 Groundwater Sampling

During the construction phase, groundwater monitoring wells are installed at all existing landfills classified as moderate environmental risk (Class B landfills) and new landfills. No existing landfills at PIN-2 had monitoring wells installed, but wells were installed at the two new landfills constructed; the Non-Hazardous Waste Landfill, and the Tier II Disposal Facility. Groundwater monitoring wells were installed hydraulically up-gradient and down-gradient of the landfills as indicated in Table 1.9. Surface and shallow depth soil samples are also collected adjacent to monitoring well locations. Analytical data from water samples collected from wells up and down-gradient are reviewed in conjunction with soil analytical data to evaluate potential impacts associated with the landfill. Baseline groundwater data exists from the site investigation at temporary wells, as well as the site clean-up period. A summary of arithmetic mean baseline data concentrations of contaminants in groundwater is provided in Table 1.7.

For baseline and for future monitoring events, the following physical measurements are recorded prior to the collection of groundwater samples from a monitoring well:

- Water elevation
- Total depth of water
- Height of well stick-up
- Depth to bottom of well
- Presence of hydrocarbons
- Hydrocarbon thickness (if appropriate)

Prior to sampling, monitoring wells are purged until groundwater parameters such as pH, temperature and conductivity stabilize. In the event of low recharge volumes, standing water may be sampled and specifically documented. Water samples are not filtered.

Following withdrawal of a water sample, other physical measurements recorded include:

- Colour, odour
- pH, conductivity, and temperature

Groundwater samples are analyzed for the following parameters:

- Inorganic elements (total concentrations): arsenic, cadmium, chromium, cobalt, copper, lead, nickel, zinc, and mercury
- PCBs (polychlorinated biphenyls – total Aroclor)
- TPH (Total Petroleum Hydrocarbons) – C_6 to C_{32}

Minimum MDLs are specified in Table 1.8. A summary of the PIN-2 landfill monitoring installations/sampling locations is provided in Table 1.9.

Table 1.7: PIN-2 Cape Young – Summary of Arithmetic Mean – Groundwater Baseline Data

Area	Arithmetic Mean (in mg/kg)							
	Copper	Nickel	Cobalt	Cadmium	Lead	Zinc	Chromium	Arsenic
Tier II Disposal Facility	0.027	0.083	<0.0030	<0.0010	<0.010	0.0486	0.1758	0.0050
Non-Hazardous Waste Landfill	0.075	0.049	0.005	<0.0010	0.011	0.481	0.089	0.026

Figure 1.2: PIN-2 Cape Young – Summary of Arithmetic Mean – Groundwater Baseline Data

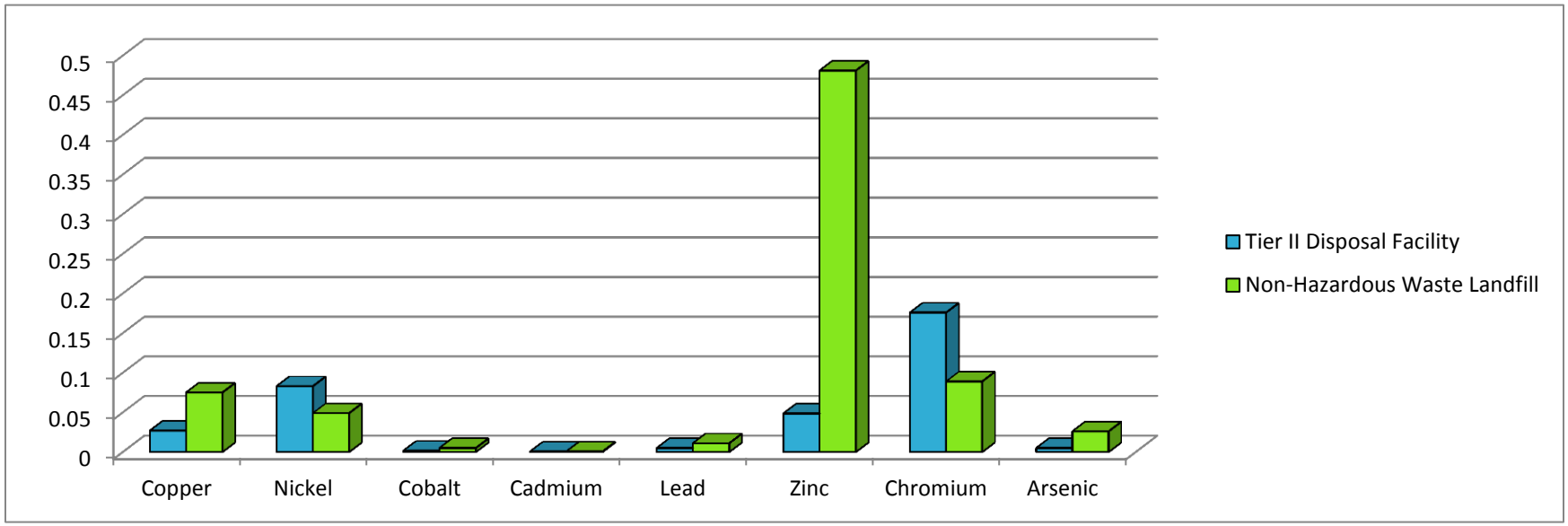


Table 1.8: Detection Limits for Analytical Requirements

Parameter	Soil Samples Minimum Analytical Detection Limit (mg/kg = ppm)	Water Samples Minimum Analytical Detection Limit (mg/L = ppm)
Copper	<3.0	<0.005
Nickel	<5.0	<0.010
Cobalt	<5.0	<0.005
Cadmium	<1.0	<0.001
Lead	<10	<0.01
Zinc	<15	<0.005
Chromium (total)	<20	<0.005
Arsenic	<0.2	<0.05
Mercury	<0.1	<0.001
PCBs	<0.05	<0.003
TPH	<40	<1

1.3.4 Thermal Monitoring

For Class B landfills and Tier II Disposal Facility where a component of the design includes the placement of sufficient fill to promote aggradation of permafrost through the landfill contents, geothermal modeling is conducted to determine the maximum depth of active layer at the landfill, and the amount of fill required on the landfill surface to avoid active layer penetration into the landfill contents following remediation. Geothermal modelling considers soil type, soil thermal properties, presence or absence of insulating cover (vegetation or snow drift), measured ground temperatures at the site or at nearby sites, measured air temperature and climatic data (1956 to 1990 climate normals data from Environment Canada for Cape Young, Nunavut), an estimated 1 in 100 warm year air temperature, an estimated ten consecutive 1 in 100 warm years, and an estimate of the effect of global warming (based on estimates of temperature change reported by the Panel on Energy Research and Development for Environment Canada – PERD – in 1998). At PIN-2, a typical active layer depth based on ten consecutive mean years of climatic data is 2.2 m for the Tier II Soil Disposal Facility. The predicted active layer depth for a 1 in 100 warm year following ten mean years is 2.6 m and for ten consecutive 1 in 100 warm years is 2.8 m. The predictive active layer depth for the landfill after 100 years of global warming (using the best estimate approximation method as opposed to more conservative estimates) is 2.7 m. The active layer depth used for the Tier II Disposal Facility at PIN-2 is the resultant active layer depth from modeling 100 years of global warming plus one 1:100 warm year – a depth of 4.0 m. It is expected to take one year for the landfill contents to freeze back with this depth of cover fill.

During landfill construction, vertical thermistors were installed within the landfill to record ground temperatures. Measured ground temperatures will be compared to the active layer depth and freeze back time modeled during design. It is anticipated that all landfills where freeze back is an integral part of the design will reach thermal equilibrium within approximately five years following closure. If thermal equilibrium is not achieved within five years, it may be necessary to increase the term of the thermal monitoring.

1.4 Scope of Report

The following sections of the report are organized according to landfill designation. For each landfill included in the monitoring program, the following information is provided:

- A brief description of the landfill
- Qualitative assessment of the potential environmental risk associated with the specific landfill
- Summary of the remediation design
- Baseline conditions (as applicable)

Table 1.9: Summary of Landfill Monitoring Installations/Sampling Locations PIN-2 Cape Young

	UTM Coordinates		Elevation
Landfill Designation/Monitoring Locations	**North (m)**	**East (m)**	**(m.a.s.l.)**
Airstrip Landfill			
P2-21 (soil)	7647259.4	502522.7	-
P2-22 (soil)	7647374.4	502534.4	-
P2-23 (soil)	7647376.1	502589.0	-
P2-24 (soil)	7647401.3	502630.7	-
P2-25 (soil)	7647373.2	502649.0	-
P2-26 (soil)	7647317.2	502639.7	-
USAF Landfill			
P2-1 (soil)	7646958.9	502197.6	-
P2-2 (soil)	7646923.4	502248.7	-
P2-3 (soil)	7646867.2	502251.9	-
P2-4 (soil)	7646896.5	502197.3	-
Station West Landfill			
P2-5 (soil)	7646879.8	502095.4	-
P2-6 (soil)	7646789.2	502096.1	-
P2-7 (soil)	7646762.2	502149.3	-
P2-8 (soil)	7646799.9	502200.8	-
Tier II Disposal Facility			
MW-01 (soil and groundwater)	7646319.6	502402.9	11.8
MW-02 (soil and groundwater)	7646239.7	502421.9	11.5
MW-03 (soil and groundwater)	7646236.8	502497.9	12.6
MW-04 (soil and groundwater)	7646319.8	502549.3	13.4
VT-1 (temperature)	7646281.0	502434.2	19.1
VT-2 (temperature)	7646274.2	502465.0	19.2
VT-3 (temperature)	7646307.5	502460.3	20.0
VT-4 (temperature)	7646284.2	502497.4	19.9
Airstrip South Landfill			
P2-13 (soil)	7646266.2	503171.4	-
P2-14 (soil)	7646247.1	503238.0	-
P2-15 (soil)	7646292.9	503248.6	-
P2-16 (soil)	7646337.3	503220.9	-

	UTM Coordinates		Elevation
Landfill Designation/Monitoring Locations	**North (m)**	**East (m)**	**(m.a.s.l.)**
Pallet Line West Landfill			
P2-9 (soil)	7645741.6	502570.5	-
P2-10 (soil)	7645790.2	502630.3	-
P2-11 (soil)	7645843.2	502590.0	-
P2-12 (soil)	7645861.2	502537.2	-
Non-Hazardous Waste Landfill			
MW-05 (soil and groundwater)	7645229.3	503029.4	20.6
MW-06 (soil and groundwater)	7645297.0	503054.2	21.8
MW-07 (soil and groundwater)	7645272.0	503102.0	21.8
MW-08 (soil and groundwater)	7645223.0	503076.6	20.5
South Landfill – East			
P2-17 (soil)	7645060.0	503404.5	-
P2-18 (soil)	7645111.0	503473.2	-
P2-19 (soil)	7645086.7	503533.0	-
P2-20 (soil)	7645058.1	503557.1	-
South Borrow Landfill			
P2-27 (soil)	7643445.0	503881.5	-
P2-28 (soil)	7643474.1	503877.4	-
P2-29 (soil)	7643506.8	503910.6	-
P2-30 (soil)	7643476.5	504053.7	-

2. Airstrip Landfill

The Airstrip Landfill is located 600 m north of the station on the northwest side of the airstrip. It consists of two lobes, covering an area of approximately 8,800 square metres (m^2). The landfill soil is composed primarily of coarse-grained, gravel and cobbles. The material is angular and platy, derived from the limestone and dolomite of a bedrock-controlled ridge. During the assessment, no existing erosion was noted at the landfill.

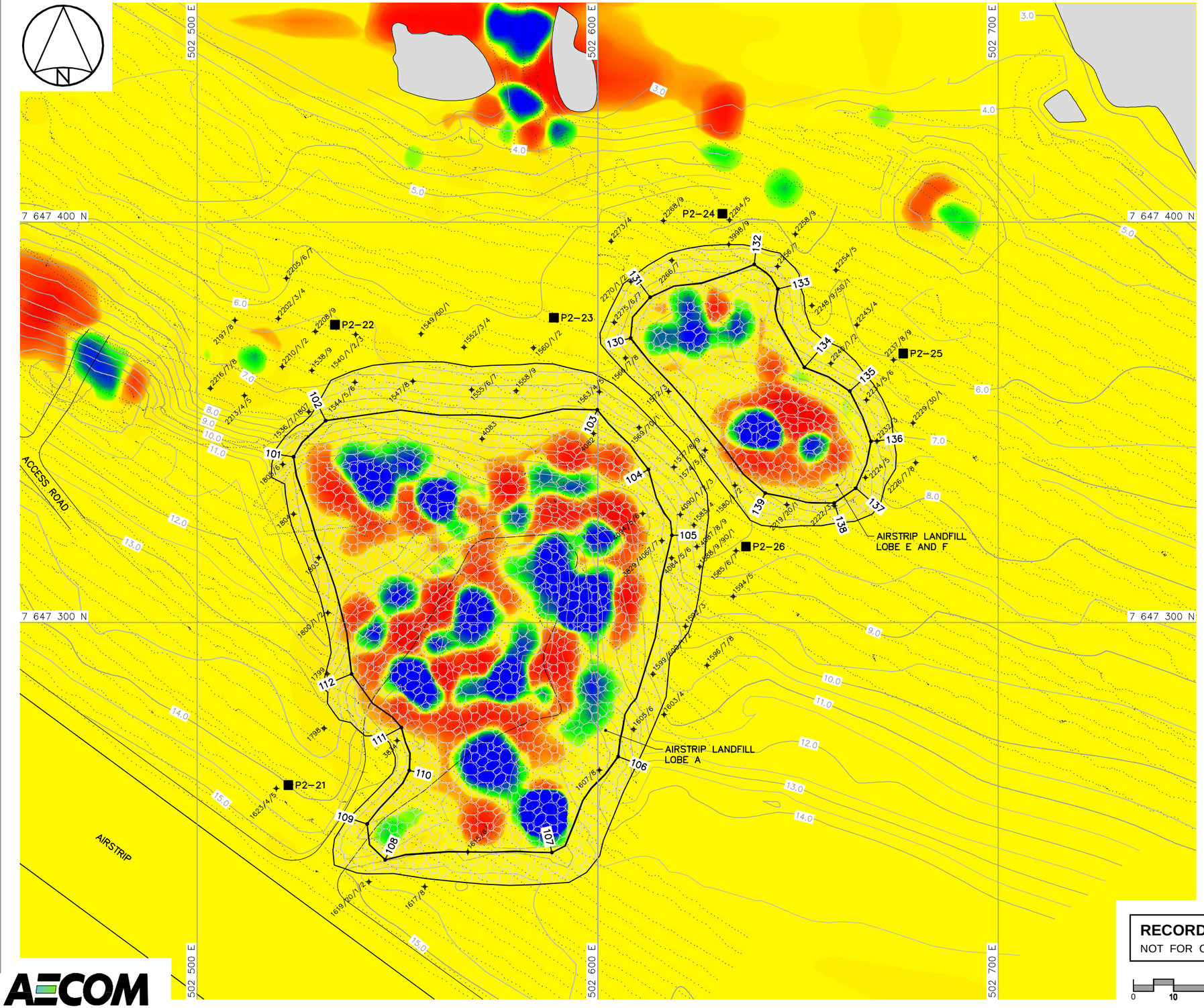
Scattered surface debris consisting of wood, domestic debris, metal and partially buried barrels was observed at the landfill during assessment. Soil samples collected up- and down-gradient of the landfill during assessment showed slightly elevated inorganic elements. Three areas of soil contamination were identified during the assessment, one Type A area, one Tier I PCB/Type A, and one Tier II area contaminated with copper, lead, and zinc.

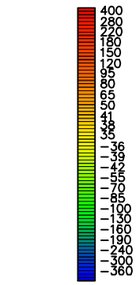
Based on an assessment of the Airstrip Landfill as a contaminant source, the potential for migration, and down-gradient receptors, the landfill was classified as a low potential environmental risk. The Tier II contamination was excavated, and the two remaining contaminated areas were included in the regraded areas. All visible debris was removed. The landfill was regraded with 0.6 m of Type 1 granular fill over 0.4 m of Type 2 granular fill.

The long term monitoring plan consists of visual monitoring and collection of soil samples. Approximate locations for the collection of soil samples are identified on Figure PIN-2.2

2.1 Baseline Data

Sample locations for soil baseline data are shown in Figure PIN-2.2. A summary of the baseline soil analytical data is provided in Table 2.1. Baseline data is comprised of site investigation information collected up and down-gradient of the landfill in 2004 and samples collected at permanent monitoring locations up and down-gradient of the landfill in 2011. Mean soil baseline concentrations of inorganic elements are consistent with or lower than site background levels, with the exception of arsenic and PCB concentrations which are slightly higher than background levels. Low levels of TPH were detected at both the up-gradient and down-gradient sample locations. Concentrations of TPH ranged between <10 milligrams per kilogram (mg/kg) and 14,000 mg/kg.





GENERAL NOTES:

1. ALL COORDINATES ARE REFERENCED TO NAD83 (CSRS), UTM ZONE 11N. ALL ELEVATIONS REFER TO GEODETIC DATUM.
2. ALL DIMENSIONS ARE IN METRES UNLESS NOTED OTHERWISE.

LEGEND:

- 101 — COORDINATE POINT
- ■ — MONITORING SOIL SAMPLE LOCATION (6)
- 2264 — SOIL SAMPLE TAG LOCATION
- BODY OF WATER

AIRSTRIP LANDFILL (LOBE A) REGRADED (AS-BUILT)

NO.	UTM COORDINATES		ELEV.
	NORTHING	EASTING	
101	7 647 341.4	502 524.0	10.4
102	7 647 350.4	502 532.0	8.7
103	7 647 353.1	502 599.9	7.9
104	7 647 338.3	502 612.6	8.8
105	7 647 321.8	502 618.5	9.1
106	7 647 266.6	502 605.1	13.9
107	7 647 242.6	502 588.5	15.1
108	7 647 240.8	502 546.9	15.1
109	7 647 249.7	502 542.4	16.0
110	7 647 263.1	502 552.9	15.8
111	7 647 273.8	502 550.9	15.8
112	7 647 287.2	502 538.5	13.9

AIRSTRIP LANDFILL (LOBES E & F) REGRADED (AS-BUILT)

NO.	UTM COORDINATES		ELEV.
	NORTHING	EASTING	
130	7 647 371.1	502 608.2	7.4
131	7 647 381.2	502 613.1	7.4
132	7 647 389.5	502 639.1	6.8
133	7 647 383.3	502 644.9	7.0
134	7 647 363.7	502 651.6	7.5
135	7 647 357.8	502 663.0	7.6
136	7 647 345.3	502 668.2	8.2
137	7 647 333.6	502 664.4	9.2
138	7 647 329.9	502 659.0	9.2
139	7 647 332.4	502 641.8	9.0

RECORD DRAWING
NOT FOR CONSTRUCTION

0 10 20 m SCALE 1:1000

DEW LINE CLEAN UP
LANDFILL MONITORING PLAN

PIN-2 CAPE YOUNG

AIRSTRIP LANDFILL LOBES A, E, F

FIGURE PIN-2.2

AECOM

Table 2.1: Airstrip Landfill – Baseline Soil Data

Sample #	Surface / Reference Tag #	Location	Date	Depth (cm)	Cu [mg/kg]	Ni [mg/kg]	Co [mg/kg]	Cd [mg/kg]	Pb [mg/kg]	Zn [mg/kg]	Cr [mg/kg]	As [mg/kg]	Hg [mg/kg]	PCBs [mg/kg]	TPH [mg/kg]	TPH Identity		
																F1	F2	F3
Up-gradient Soil Samples																		
04-1619	1619		2004	0	17	6.4	<5.0	<1.0	<10	17	<20	2.3		<0.1				
04-1620/21	1619		2004	30	9.9	<5.0	<5.0	<1.0	<10	<15	<20	3.2		<0.1				
04-1622	1619		2004	50	29	<5.0	<5.0	<1.0	<10	<15	<20	2.5		<0.1				
04-1623	1623		2004	0	7.3	<5.0	<5.0	<1.0	<10	<15	<20	2.6		<0.1				
04-1624	1623		2004	40	9.7	<5.0	<5.0	<1.0	<10	<15	<20	2.9		<0.1				
04-1625	1623		2004	80	11	<5.0	<5.0	<1.0	<10	<15	<20	2.5		<0.1				
04-1617	1617		2004	0	8	<5.0	<5.0	<1.0	<10	<15	<20	3.6		<0.1				
04-1618	1617		2004	50	8.5	<5.0	<5.0	<1.0	<10	<15	<20	4		<0.1				
04-1798	1798		2004	30	8.2	<5.0	<5.0	<1.0	<10	<15	<20	3.3		<0.1				
11-6913*/14	6913	P2-21	2011	0-10	<3.0	<5.0	<5.0	<1.0	<10	<15	<20	3.5	<0.10	<0.050	<10	<10	<4.0	<9.0
11-6915*/16	6913	P2-21	2011	30-40	<3.0	<5.0	<5.0	<1.0	<10	<15	<20	3.4	<0.10	<0.050	<10	<10	<4.0	<9.0
Down-gradient Soil Samples																		
04-1536	1807		2004	40	6.5	<5.0	<5.0	<1.0	<10	<15	<20	4.3		<0.1				
04-1537	1807		2004	70	5.7	<5.0	<5.0	<1.0	<10	<15	<20	5		<0.1				
04-1538	1538		2004	10														
04-1539	1538		2004	40														
04-1540/41	1540		2004	10														
04-1542	1540		2004	40														
04-1543	1540		2004	60														
04-1544	1544		2004	10	5.1	<5.0	<5.0	<1.0	<10	<15	<20	4.4		<0.1				
04-1545	1544		2004	40	6.6	<5.0	<5.0	<1.0	<10	<15	<20	5.2		<0.1				
04-1546	1544		2004	80	7.3	<5.0	<5.0	<1.0	<10	<15	<20	5.7		<0.1				
04-1547	1547		2004	10	8.3	<5.0	<5.0	<1.0	<10	<15	<20	2.6		<0.1				
04-1548	1547		2004	50	7.3	<5.0	<5.0	<1.0	<10	<15	<20	5.5		<0.1				
04-1549	1549		2004	0														

Sample #	Surface / Reference Tag #	Location	Date	Depth (cm)	Cu [mg/kg]	Ni [mg/kg]	Co [mg/kg]	Cd [mg/kg]	Pb [mg/kg]	Zn [mg/kg]	Cr [mg/kg]	As [mg/kg]	Hg [mg/kg]	PCBs [mg/kg]	TPH [mg/kg]	TPH Identity		
																F1	F2	F3
04-1550/51	1549		2004	40														
04-1552	1552		2004	0	6.1	<5.0	<5.0	<1.0	<10	<15	<20	6.8		<0.1	<40			
04-1553	1552		2004	50	6.2	<5.0	<5.0	<1.0	<10	<15	<20	5.0		<0.1	<40			
04-1554	1552		2004	100	5.5	<5.0	<5.0	<1.0	<10	<15	<20	4.9		<0.1	<40			
04-1555	1555		2004	0	7.4	<5.0	<5.0	<1.0	<10	<15	<20	9.3		<0.1	<40			
04-1556	1555		2004	40	6.6	<5.0	<5.0	<1.0	<10	<15	<20	4.9		<0.1	<40			
04-1557	1555		2004	100	6.5	<5.0	<5.0	<1.0	<10	<15	<20	4.8		<0.1	<40			
04-1558	1558		2004	0	6.6	<5.0	<5.0	<1.0	<10	<15	<20	3.1		<0.1				
04-1559	1558		2004	40	6.3	<5.0	<5.0	<1.0	<10	<15	<20	4.9		<0.1				
04-1560/61	1560		2004	0	5.7	<5.0	<5.0	<1.0	<10	<15	<20	6.7		<0.1				
04-1562	1560		2004	40	5.9	<5.0	<5.0	<1.0	<10	<15	<20	5.7		<0.1				
04-1563	1563		2004	0	6.9	<5.0	<5.0	<1.0	10	26	<20	6.5		<0.1	14000			
04-1564	1563		2004	50	7.7	<5.0	<5.0	<1.0	<10	<15	<20	4.7		<0.1	1100			
04-1565	1563		2004	90	16	<5.0	<5.0	<1.0	<10	21	<20	4.1		<0.1	870			
04-1566	1566		2004	0	16	<5.0	<5.0	<1.0	<10	<15	<20	7.0		<0.1	<40			
04-1567	1566		2004	40	5.7	<5.0	<5.0	<1.0	<10	<15	<20	5.6		<0.1	<40			
04-1568	1566		2004	80	6.1	<5.0	<5.0	<1.0	<10	<15	<20	5.5		<0.1	<40			
04-1569	1569		2004	0	10	<5.0	<5.0	<1.0	<10	42	<20	7.6		<0.1				
04-1570/71	1569		2004	40	6	<5.0	<5.0	<1.0	<10	<15	<20	5.3		<0.1				
04-1572	1572		2004	10	8	<5.0	<5.0	<1.0	<10	<15	<20	7.7		<0.1				
04-1573	1572		2004	40	7.5	<5.0	<5.0	<1.0	<10	15	<20	6.4		<0.1				
04-1574	1574		2004	0														
04-1575	1574		2004	20														
04-1576	1574		2004	40														
04-1577	1577		2004	0	7.0	<5.0	<5.0	<1.0	<10	<15	<20	6.7		<0.1				
04-1578	1577		2004	30	7.1	<5.0	<5.0	<1.0	<10	<15	<20	5.8		<0.1				
04-1579	1577		2004	80	5.7	<5.0	<5.0	<1.0	<10	<15	<20	5.3		<0.1				
04-1580/81	1580		2004	0														

Sample #	Surface / Reference Tag #	Location	Date	Depth (cm)	Cu [mg/kg]	Ni [mg/kg]	Co [mg/kg]	Cd [mg/kg]	Pb [mg/kg]	Zn [mg/kg]	Cr [mg/kg]	As [mg/kg]	Hg [mg/kg]	PCBs [mg/kg]	TPH [mg/kg]	TPH Identity		
																F1	F2	F3
04-1582	1580		2004	40														
04-1583	1583		2004	10	7.8	<5.0	<5.0	<1.0	<10	<15	<20	5.9		<0.1				
04-1584	1583		2004	40	8.4	<5.0	<5.0	<1.0	<10	<15	<20	7.3		1.1				
04-1585	1585		2004	0														
04-1586	1585		2004	30														
04-1587	1585		2004	60														
04-1588	1588		2004	0	6.2	<5.0	<5.0	<1.0	<10	<15	<20	5.7		<0.1				
04-1589	1588		2004	40	6.4	<5.0	<5.0	<1.0	<10	<15	<20	5.5		<0.1				
04-1590/91	1588		2004	60	8.2	<5.0	<5.0	<1.0	<10	<15	<20	4.5		<0.1				
04-1592	1592		2004	0	7.2	<5.0	<5.0	<1.0	<10	<15	<20	3.2		<0.1				
04-1593	1592		2004	40	5.3	<5.0	<5.0	<1.0	<10	<15	<20	4.2		<0.1				
04-1594	1594		2004	0														
04-1595	1594		2004	45														
04-1596	1596		2004	0														
04-1597	1596		2004	40														
04-1598	1596		2004	85														
04-1599	1599		2004	0	14.0	<5.0	<5.0	<1.0	<10	<15	<20	5.5		<0.1				
04-1600/01	1599		2004	40	6.0	<5.0	<5.0	<1.0	<10	<15	<20	5.1		<0.1				
04-1602	1599		2004	80	7.8	<5.0	<5.0	<1.0	<10	<15	<20	4.9		<0.1				
04-1603	1603		2004	0														
04-1604	1603		2004	40														
04-1605	1605		2004	0	8.8	<5.0	<5.0	<1.0	12	37	<20	3.7		<0.1				
04-1606	1605		2004	50	7.0	<5.0	<5.0	<1.0	<10	<15	<20	4.5		<0.1				
04-1607	1607		2004	0	10.0	<5.0	<5.0	<1.0	<10	<15	<20	3.8		<0.1				
04-1608	1607		2004	50	6.8	<5.0	<5.0	<1.0	<10	<15	<20	5.3		<0.1				
04-1615	1615		2004	0	10.0	<5.0	<5.0	<1.0	<10	<15	<20	3.9		<0.1				
04-1616	1615		2004	40	9.2	<5.0	<5.0	<1.0	<10	<15	<20	3.3		<0.1				
04-1617	1617		2004	0	8.0	<5.0	<5.0	<1.0	<10	<15	<20	3.6		<0.1				

Sample #	Surface / Reference Tag #	Location	Date	Depth (cm)	Cu [mg/kg]	Ni [mg/kg]	Co [mg/kg]	Cd [mg/kg]	Pb [mg/kg]	Zn [mg/kg]	Cr [mg/kg]	As [mg/kg]	Hg [mg/kg]	PCBs [mg/kg]	TPH [mg/kg]	TPH Identity		
																F1	F2	F3
04-1618	1617		2004	50	8.5	<5.0	<5.0	<1.0	<10	<15	<20	4		<0.1				
04-1799	1799		2004	30	7.0	<5.0	<5.0	<1.0	<10	<15	<20	3.6		<0.1				
04-1800/01	1800		2004	0	5.7	<5.0	<5.0	<1.0	<10	11	<20	3.7		<0.1				
04-1802	1800		2004	90	17.0	13	7.8	<1.0	<10	27	<20	3.5		<0.1				
04-1803	1803		2004	20	6.5	<5.0	<5.0	<1.0	<10	<15	<20	4		<0.1				
04-1804	1804		2004	20	5.5	<5.0	<5.0	<1.0	<10	<15	<20	4.5		<0.1				
04-1805	1805		2004	0	3.7	<5.0	<5.0	<1.0	<10	<15	<20	4.5		<0.1				
04-1806	1805		2004	40	5.0	<5.0	<5.0	<1.0	<10	<15	<20	3.6		<0.1				
04-1807	1807		2004	10	6.8	<5.0	<5.0	<1.0	<10	<15	<20	2.3		<0.1				
04-3829	3829		2004	20	5.8	<5.0	<5.0	<1.0	<10	<15	<20	5.8		0.6	44			
04-3834	3834		2004	0	<40				<30	<30				<0.1	< 40			
04-4076	3829		2004	60	6.2	<5.0	<5.0	<1.0	<10	17	<20	5.9		0.8	4700			
04-4077	3829		2004	90	6.0	<5.0	<5.0	<1.0	<10	18	<20	5.4		0.9	3600			
04-4082	4082		2004	0	8.2	<5.0	<5.0	<1.0	<10	22	<20	6.3		<0.1	<40			
04-4083	4083		2004	0	6.0	<5.0	<5.0	<1.0	<10	17	<20	7.2		<0.1	<40			
04-4084	4084		2004	15	4.8	<5.0	<5.0	<1.0	<10	<15	<20	4.2		<0.1	<40			
04-4085	4084		2004	40	6.5	<5.0	<5.0	<1.0	<10	<15	<20	5.9		<0.1	<40			
04-4086	4084		2004	70	5.8	<5.0	<5.0	<1.0	<10	<15	<20	5.4		<0.1	<40			
04-4087	4087		2004	10	4.9	<5.0	<5.0	<1.0	<10	<15	<20	5.7		<0.1	<40			
04-4088	4087		2004	40	5.9	<5.0	<5.0	<1.0	<10	<15	<20	5.5		<0.1	<40			
04-4089	4087		2004	70	7.4	<5.0	<5.0	<1.0	<10	<15	<20	5.1		<0.1	<40			
04-4090/91	4090		2004	0	6.8	<5.0	<5.0	<1.0	<10	<15	<20	6.3		<0.1	<40			
04-4092	4090		2004	50	5.5	<5.0	<5.0	<1.0	<10	<15	<20	6.2		<0.1	<40			
04-4093	4090		2004	90	5.8	<5.0	<5.0	<1.0	<10	<15	<20	7		<0.1	<40			
04-4094	4094		2004	15	9.4	<5.0	<5.0	<1.0	<10	16	<20	5.3		<0.1	<40			
04-4095	4094		2004	40	5.6	<5.0	<5.0	<1.0	<10	<15	<20	5.2		<0.1	<40			
04-4096	4094		2004	70	6.1	<5.0	<5.0	<1.0	<10	<15	<20	5.4		<0.1	<40			
04-2197	2197		2004	0	6.2	<5.0	<5.0	<1.0	<10	<15	<20	5.5		<0.1				

Sample #	Surface / Reference Tag #	Location	Date	Depth (cm)	Cu [mg/kg]	Ni [mg/kg]	Co [mg/kg]	Cd [mg/kg]	Pb [mg/kg]	Zn [mg/kg]	Cr [mg/kg]	As [mg/kg]	Hg [mg/kg]	PCBs [mg/kg]	TPH [mg/kg]	TPH Identity		
																F1	F2	F3
04-2198	2197		2004	40	6.1	<5.0	<5.0	<1.0	<10	<15	<20	5.2		<0.1				
04-2202	2202		2004	0	5.0	<5.0	<5.0	<1.0	<10	<15	<20	4.9		<0.1				
04-2203	2202		2004	30	5.4	<5.0	<5.0	<1.0	<10	<15	<20	5.1		<0.1				
04-2204	2202		2004	70	4.9	<5.0	<5.0	<1.0	<10	<15	<20	4.8		<0.1				
04-2205	2205		2004	0														
04-2206	2205		2004	30														
04-2207	2205		2004	70														
04-2208	2208		2004	0														
04-2209	2208		2004	45														
04-2210/11	2210		2004	0	6.3	<5.0	<5.0	<1.0	<10	<15	<20	5.7		<0.1				
04-2212	2210		2004	70	5.3	<5.0	<5.0	<1.0	<10	<15	<20	5.3		<0.1				
04-2213	2213		2004	20	7.6	<5.0	<5.0	<1.0	<10	<15	<20	2.5		<0.1				
04-2214	2213		2004	40	5.5	<5.0	<5.0	<1.0	<10	<15	<20	4.2		<0.1				
04-2215	2213		2004	60	5.6	<5.0	<5.0	<1.0	<10	<15	<20	4.2		<0.1				
04-2216	2216		2004	30	6.3	<5.0	<5.0	<1.0	<10	<15	<20	2.3		<0.1				
04-2217	2216		2004	50	5.7	<5.0	<5.0	<1.0	<10	<15	<20	4.7		<0.1				
04-2218	2216		2004	70	5.5	<5.0	<5.0	<1.0	<10	<15	<20	3.5		<0.1				
04-2219	2219		2004	10	6.5	<5.0	<5.0	<1.0	<10	15	<20	8.3		<0.1				
04-2220/21	2219		2004	70	5.9	<5.0	<5.0	<1.0	<10	<15	<20	6.9		<0.1				
04-2222	2222		2004	0	6.3	<5.0	<5.0	<1.0	<10	<15	<20	5.9		<0.1				
04-2223	2222		2004	65	6.5	<5.0	<5.0	<1.0	<10	<15	<20	6.5		<0.1				
04-2224	2224		2004	10	5.8	<5.0	<5.0	<1.0	<10	<15	<20	5.5		<0.1				
04-2225	2224		2004	70	5.4	<5.0	<5.0	<1.0	<10	<15	<20	5.7		<0.1				
04-2226	2226		2004	0														
04-2227	2226		2004	30														
04-2228	2226		2004	65														
04-2229	2229		2004	15														
04-2230/31	2229		2004	40														

Sample #	Surface / Reference Tag #	Location	Date	Depth (cm)	Cu [mg/kg]	Ni [mg/kg]	Co [mg/kg]	Cd [mg/kg]	Pb [mg/kg]	Zn [mg/kg]	Cr [mg/kg]	As [mg/kg]	Hg [mg/kg]	PCBs [mg/kg]	TPH [mg/kg]	TPH Identity		
																F1	F2	F3
04-2232	2232		2004	0	6.1	<5.0	<5.0	<1.0	<10	<15	<20	6.5		<0.1				
04-2233	2232		2004	40	6.2	<5.0	<5.0	<1.0	<10	<15	<20	6.7		<0.1				
04-2234	2234		2004	0	6.0	<5.0	<5.0	<1.0	<10	<15	<20	9.3		<0.1				
04-2235	2234		2004	40	9.6	<5.0	<5.0	<1.0	11	<15	<20	17		<0.1				
04-2236	2234		2004	75	8.2	<5.0	<5.0	<1.0	<10	<15	<20	9.7		<0.1				
04-2237	2237		2004	0														
04-2238	2237		2004	40														
04-2239	2237		2004	80														
04-2240/41	2240		2004	5	7.8	<5.0	<5.0	<1.0	<10	<15	<20	7.3		<0.1				
04-2242	2240		2004	40	8.3	<5.0	<5.0	<1.0	<10	<15	<20	8.2		<0.1				
04-2243	2243		2004	0														
04-2244	2243		2004	40														
04-2248	2248		2004	10	7.2	<5.0	<5.0	<1.0	<10	15	<20	6.1		<0.1				
04-2249	2248		2004	40	9.9	<5.0	<5.0	<1.0	<10	24	<20	6.3		<0.1				
04-2250/51	2248		2004	90	14.0	<5.0	<5.0	<1.0	<10	<15	<20	5.5		<0.1				
04-2254	2254		2004	0														
04-2255	2254		2004	80														
04-2256	2256		2004	25	8.3	<5.0	<5.0	<1.0	<10	17	<20	6.9		<0.1	<40			
04-2257	2256		2004	50	7.6	<5.0	<5.0	<1.0	<10	28	<20	6.4		<0.1	<40			
04-2258	2258		2004	25	10.0	<5.0	<5.0	<1.0	<10	19	<20	7.4		<0.1	<40			
04-2259	2258		2004	70	8.9	<5.0	<5.0	<1.0	<10	<15	<20	7.1		<0.1	<40			
04-2264	2264		2004	30	6.2	<5.0	<5.0	<1.0	<10	<15	<20	5.1		<0.1	<40			
04-2265	2264		2004	80	7.8	<5.0	<5.0	<1.0	<10	<15	<20	9.9		<0.1	<40			
04-2266	2266		2004	0	6.9	<5.0	<5.0	<1.0	<10	<15	<20	6.5		<0.1	<40			
04-2267	2266		2004	40	6.7	<5.0	<5.0	<1.0	<10	<15	<20	5.7		<0.1	<40			
04-2268	2268		2004	0	7.3	<5.0	<5.0	<1.0	<10	<15	<20	7		<0.1	<40			
04-2269	2268		2004	40	9.1	<5.0	<5.0	<1.0	<10	<15	<20	5.9		<0.1	<40			
04-2270/71	2270		2004	0	7.5	<5.0	<5.0	<1.0	48	<15	<20	6.2		<0.1				

Sample #	Surface / Reference Tag #	Location	Date	Depth (cm)	Cu [mg/kg]	Ni [mg/kg]	Co [mg/kg]	Cd [mg/kg]	Pb [mg/kg]	Zn [mg/kg]	Cr [mg/kg]	As [mg/kg]	Hg [mg/kg]	PCBs [mg/kg]	TPH [mg/kg]	TPH Identity		
																F1	F2	F3
04-2272	2270		2004	50	5.0	<5.0	<5.0	<1.0	<10	<15	<20	3.8		<0.1				
04-2273	2273		2004	10														
04-2274	2273		2004	50														
04-2275	2275		2004	0	6.8	<5.0	<5.0	<1.0	<10	<15	<20	6		<0.1				
04-2276	2275		2004	40	5.3	<5.0	<5.0	<1.0	<10	<15	<20	4.3		<0.1				
04-2277	2275		2004	70	6.0	<5.0	<5.0	<1.0	<10	<15	<20	3.7		<0.1				
11-6917*/18	6917	P2-22	2011	0-10	<3.0	<5.0	<5.0	<1.0	<10	<15	<20	7	<0.10	<0.050	<10	<10	<4.0	<9.0
11-6919*/20*	6917	P2-22	2011	30-40	<3.0	<5.0	<5.0	<1.0	<10	<15	<20	6.4	<0.10	<0.050	<10	<10	<4.0	<9.0
11-6921*/22	6921	P2-23	2011	0-10	5.0	<5.0	<5.0	<1.0	<10	<15	<20	8	<0.10	<0.050	<10	<10	<4.0	<9.0
11-6923*/24	6921	P2-23	2011	30-40	4.6	<5.0	<5.0	<1.0	<10	<15	<20	7.8	<0.10	<0.050	<10	<10	<4.0	<9.0
11-6925*/26	6925	P2-24	2011	0-10	4.2	<5.0	<5.0	<1.0	<10	<15	<20	8	<0.10	<0.050	23	<10	<4.0	23
11-6927*/28	6925	P2-24	2011	30-40	4.2	<5.0	<5.0	<1.0	11	25	<20	7.4	<0.10	<0.050	<10	<10	<4.0	<9.0
11-6929*/30*	6929	P2-25	2011	0-10	4.6	6	<5.0	<1.0	<10	<15	<20	7.3	<0.10	<0.050	15	<10	<4.0	15
11-6931*/32	6929	P2-25	2011	30-40	4.8	4.3	<5.0	<1.0	<10	<15	<20	8.4	<0.10	<0.050	<10	<10	<4.0	<9.0
11-6933*/34	6933	P2-26	2011	0-10	3.6	8.9	<5.0	<1.0	<10	<15	<20	6.2	<0.10	<0.050	<10	<10	<4.0	<9.0
11-6935*/36	6933	P2-26	2011	30-40	4.8	<5.0	<5.0	<1.0	<10	35	<20	6	<0.10	<0.050	<10	<10	<4.0	<9.0
		N Value			139	138	138	138	139	139	138	138	12	139	63			
		Average			7.2	<5.0	<5.0	<1.0	<10	<15	<20	5.5	<0.10	<0.050	<10			
		Standard Deviation			3.3							1.9						
		Minimum			<3.0	<5.0	<5.0	<1.0	<10	11	<20	2.3	<0.10	<0.050	<10			
		Maximum			29.0	13.0	7.8		48	42		17.0		1.1	14000			
		95% Confidence Limit			0.6							0.3						

3. USAF Landfill

The USAF Landfill is located approximately 500 m northwest of the main Station Area with a connecting road to the Station Area. The landfill is approximately 1,120 m^2, is elevated 0.5 m above the surrounding grade, and was constructed with a liner over the landfill surface during operation and closure. The landfill consists of two cells and is covered with gravel combined with sand. During assessment no surface staining was present, and soil sampling indicated one Tier II arsenic exceedance and one elevated arsenic sample was identified at the landfill. Both arsenic results are considered to be naturally occurring.

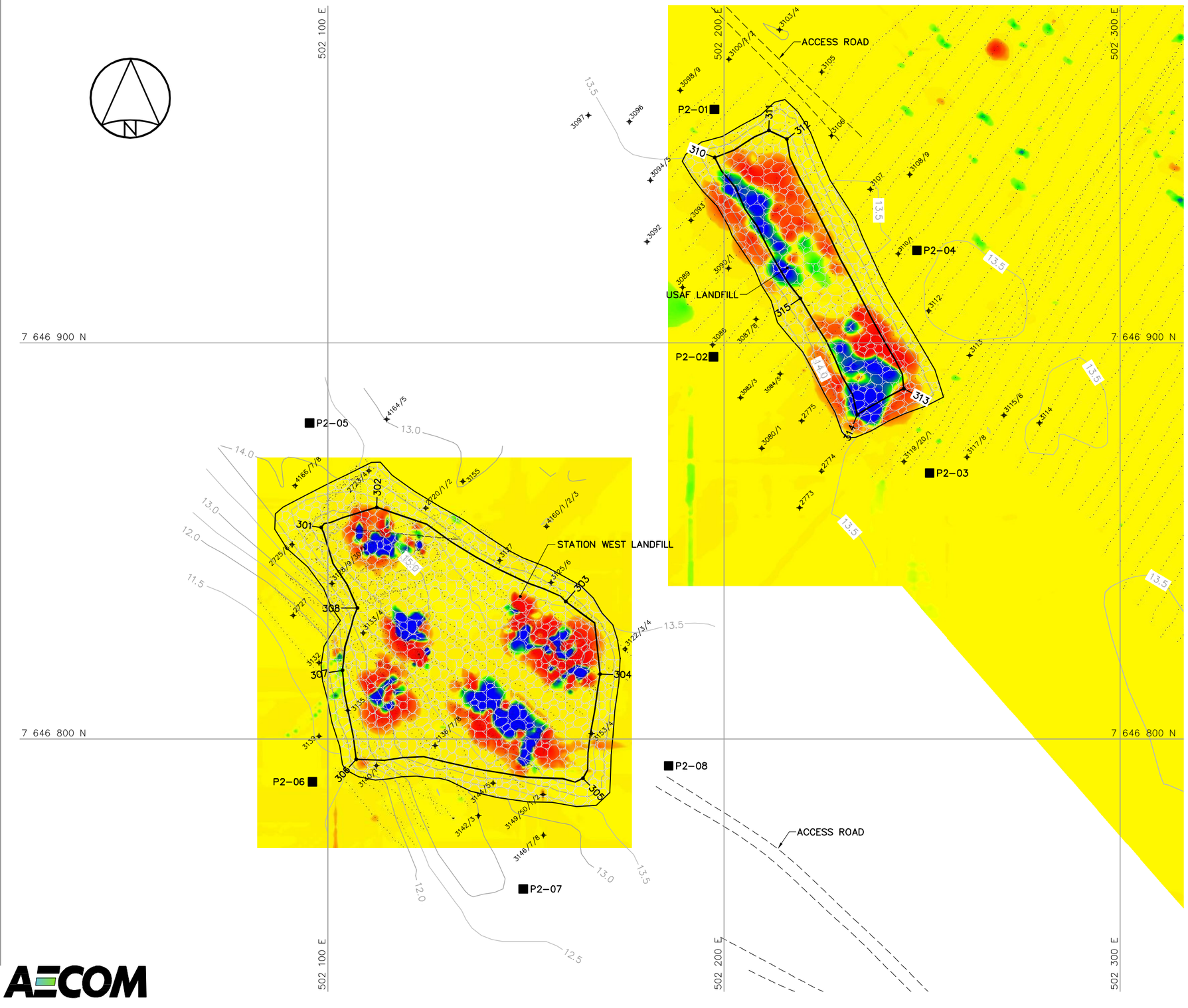
Surface runoff potential is low with slight troughs to the northeast and southwest. The surface of the landfill and the immediate surrounding area are relatively flat. Minor surface debris (wood, strapping, electrical plug box) thought to have been entrained in the gravel cover and the geomembrane liner was visible in some locations. The surface debris was removed prior to remediation.

Based on an assessment of the USAF Landfill as a contaminant source, the potential for migration, and down-gradient receptors, the landfill was classified as a low potential environmental risk. Accordingly, surface and partially exposed debris was removed, and the landfill was regraded with 0.75 m of Type 2 granular fill.

The long term monitoring plan consists of visual monitoring and collection of soil samples. Approximate locations for the collection of soil samples are identified on Figure PIN-2.3.

3.1 Baseline Data

Sample locations for soil baseline data are shown in Figure PIN-2.3. A summary of the baseline soil analytical data is provided in Table 3.1. Baseline data is comprised of site investigation information collected up and down-gradient of the landfill in 2004 and samples collected at permanent monitoring locations up and down-gradient of the landfill in 2011. Mean soil baseline concentrations of inorganic elements are consistent with or lower than site background levels, with the exception of zinc and arsenic concentrations which are slightly higher than background levels. All PCB results were non-detect. Low levels of TPH were detected at down-gradient sample locations. Concentrations of TPH ranged between <10 mg/kg and 15 mg/kg.



GENERAL NOTES:

1. ALL COORDINATES ARE REFERENCED TO NAD83 (CSRS), UTM ZONE 11N. ALL ELEVATIONS REFER TO GEODETIC DATUM.
2. ALL DIMENSIONS ARE IN METRES UNLESS NOTED OTHERWISE.

LEGEND:

- 301 — COORDINATE POINT
- ■ — MONITORING SOIL SAMPLE LOCATION (8)
- 3107 — SOIL SAMPLE TAG LOCATION

STATION WEST LANDFILL REGRADED (AS-BUILT)			
NO.	UTM COORDINATES		ELEV.
	NORTHING	EASTING	
301	7 646 853.4	502 098.3	15.4
302	7 646 858.5	502 112.4	14.7
303	7 646 834.7	502 160.0	14.4
304	7 646 816.4	502 168.7	14.5
305	7 646 790.1	502 164.4	14.7
306	7 646 794.9	502 107.2	12.3
307	7 646 817.4	502 103.7	12.8
308	7 646 833.1	502 107.5	14.6

USAF LANDFILL REGRADED (AS-BUILT)			
NO.	UTM COORDINATES		ELEV.
	NORTHING	EASTING	
310	7 646 946.8	502 197.6	14.4
311	7 646 953.6	502 211.3	14.6
312	7 646 951.5	502 215.8	14.7
313	7 646 888.5	502 245.4	14.7
314	7 646 881.9	502 233.6	14.7
315	7 646 911.2	502 219.3	14.6

MAGNETIC GRADIENT (gammas/m)
400, 280, 220, 180, 150, 120, 95, 80, 65, 50, 41, 36, 33, −36, −39, −42, −55, −70, −85, −100, −130, −160, −190, −240, −300, −360

RECORD DRAWING
NOT FOR CONSTRUCTION

0 10 20 m SCALE 1:1000

DEW LINE CLEAN UP
LANDFILL MONITORING PLAN

PIN-2 CAPE YOUNG

STATION WEST LANDFILL AND USAF LANDFILL

FIGURE PIN-2.3

AECOM

Table 3.1: USAF Landfill – Baseline Soil Data

Sample #	Surface/ Reference Tag #	Location	Date	Depth (cm)	Cu [mg/kg]	Ni [mg/kg]	Co [mg/kg]	Cd [mg/kg]	Pb [mg/kg]	Zn [mg/kg]	Cr [mg/kg]	As [mg/kg]	Hg [mg/kg]	PCBs [mg/kg]	TPH [mg/kg]	TPH Identity		
																F1	F2	F3
Upgradient Soil Samples																		
04-3094	3094		2004	0	10.0	<5.0	<5.0	<1.0	<10	31	<20	5.9		<0.1				
04-3095	3094		2004	10	9.5	6	<5.0	<1.0	<10	16	<20	10		<0.1				
04-3096	3096		2004	0	7.7	<5.0	<5.0	<1.0	<10	22	<20	3.2		<0.1				
04-3097	3097		2004	0														
04-3098	3098		2004	0	7.2	<5.0	<5.0	<1.0	<10	17	<20	2.5		<0.1				
04-3099	3098		2004	45	7.8	<5.0	<5.0	<1.0	<10	<15	<20	2.4		<0.1				
04-3100/01	3100		2004	0	8.7	<5.0	<5.0	<1.0	<10	18	<20	2.9		<0.1				
04-3102	3100		2004	40	5.3	<5.0	<5.0	<1.0	<10	<15	<20	1.8		<0.1				
04-3103	3103		2004	10	7.3	<5.0	<5.0	<1.0	<10	27	<20	2.7		<0.1				
04-3104	3103		2004	40	8.2	6.3	<5.0	<1.0	<10	<15	<20	2.8		<0.1				
04-3105	3105		2004	20	5.1	<5.0	<5.0	<1.0	<10	<15	<20	2		<0.1				
11-6778*/79	6778	P2-01	2011	0-10	7.1	5.6	<5.0	<1.0	<10	24	<20	4.6	<0.10	<0.050	15	<10	<4.0	15
11-6780*/81	6778	P2-01	2011	30-40	12	5.1	<5.0	<1.0	<10	17	<20	2.5	<0.10	<0.050	11	<10	<4.0	11
Downgradient Soil Samples																		
04-2773	2773		2004	0														
04-2774	2774		2004	0	4.8	<5.0	<5.0	<1.0	<10	15	<20	3.1		<0.1				
04-2775	2775		2004	20	5.9	9.7	<5.0	<1.0	<10	<15	<20	3.3		<0.1				
04-3080/81	3080		2004	0														
04-3082	3082		2004	0														
04-3083	3082		2004	30														
04-3084	3084		2004	0	8.2	<5.0	<5.0	<1.0	<10	22	<20	3.6		<0.1				

Sample #	Surface/ Reference Tag #	Location	Date	Depth (cm)	Cu [mg/kg]	Ni [mg/kg]	Co [mg/kg]	Cd [mg/kg]	Pb [mg/kg]	Zn [mg/kg]	Cr [mg/kg]	As [mg/kg]	Hg [mg/kg]	PCBs [mg/kg]	TPH [mg/kg]	TPH Identity		
																F1	F2	F3
04-3085	3084		2004	30	6.7	<5.0	<5.0	<1.0	<10	<15	<20	4		<0.1				
04-3086	3086		2004	0														
04-3087	3087		2004	0	7.3	<5.0	<5.0	<1.0	<10	<15	<20	2.8		<0.1				
04-3088	3087		2004	30	7.4	<5.0	<5.0	<1.0	<10	<15	<20	5.7		<0.1				
04-3089	3089		2004	0														
04-3090/91	3090		2004	0	6.5	<5.0	<5.0	<1.0	<10	19	<20	2.6		<0.1				
04-3092	3092		2004															
04-3093	3093		2004	0	10.0	<5.0	<5.0	<1.0	<10	27	<20	3.6		<0.1				
04-3106	3106		2004	0	8.5	<5.0	<5.0	<1.0	<10	17	<20	3.7		<0.1				
04-3107	3107		2004	0	7.3	<5.0	<5.0	<1.0	<10	<15	<20	2.1		<0.1				
04-3108	3108		2004	0														
04-3109	3108		2004	40														
04-3110/11	3110		2004	0	7.7	<5.0	<5.0	<1.0	<10	<15	<20	5.4		<0.1				
04-3112	3112		2004	0	5.6	<5.0	<5.0	<1.0	16	<15	<20	1.7		<0.1				
04-3113	3113		2004	0	6.6	<5.0	<5.0	<1.0	<10	<15	<20	3.6		<0.1				
04-3114	3114		2004	0	12.0	7.1	<5.0	<1.0	11	<15	<20	80		<0.1				
04-3115	3115		2004	0	5.8	<5.0	<5.0	<1.0	<10	<15	<20	4.7		<0.1				
04-3116	3115		2004	30	9.2	6.9	<5.0	<1.0	<10	<15	<20	26		<0.1				
04-3117	3117		2004	0	19.0	7.7	<5.0	<1.0	<10	22	<20	2.8		<0.1				
04-3118	3117		2004	40	6.5	<5.0	<5.0	<1.0	<10	<15	<20	1.4		<0.1				
04-3119	3119		2004	0	14.0	5.8	<5.0	<1.0	<10	21	<20	2.9		<0.1				
04-3120/21	3119		2004	40	8.3	<5.0	<5.0	<1.0	<10	<15	<20	1.5		<0.1				
11-6782*/83	6782	P2-02	2011	0-10	4.7	5.6	<5.0	<1.0	<10	25	<20	2.6	<0.10	<0.050	<10	<10	<4.0	<9.0
11-6784*/85	6782	P2-02	2011	30-40	4.0	<5.0	<5.0	<1.0	<10	17	<20	1.4	<0.10	<0.050	<10	<10	<4.0	<9.0

Sample #	Surface/ Reference Tag #	Location	Date	Depth (cm)	Cu [mg/kg]	Ni [mg/kg]	Co [mg/kg]	Cd [mg/kg]	Pb [mg/kg]	Zn [mg/kg]	Cr [mg/kg]	As [mg/kg]	Hg [mg/kg]	PCBs [mg/kg]	TPH [mg/kg]	TPH Identity		
																F1	F2	F3
11-6786*/87	6786	P2-03	2011	0-10	3.8	<5.0	<5.0	<1.0	<10	17	<20	1.8	<0.10	<0.050	<10	<10	<4.0	<9.0
11-6788*/89	6786	P2-03	2011	30-40	6.2	<5.0	<5.0	<1.0	<10	17	<20	3	<0.10	<0.050	<10	<10	<4.0	<9.0
11-6774*/75	6774	P2-04	2011	0-10	6.5	62	<5.0	<1.0	18	23	140.0	4.9	<0.10	0.09	<10	<10	<4.0	<9.0
11-6776*/77	6774	P2-04	2011	30-40	4.3	7.3	<5.0	<1.0	<10	16	<20	3.3	<0.10	<0.050	<10	<10	<4.0	<9.0
		N Value			38	38	38	38	38	38	38	38	8	38	8			
		Average			7.7	<5.0	<5.0	<1.0	<10	15	<20	5.9	<0.10	<0.1	<10			
		Standard Deviation			2.9					7		13.0						
		Minimum			3.8	<5.0			<10	<15	<20	1.4		<0.050	<10			
		Maximum			19.0	62.0	<5.0	<1.0	18	31	140	80.0	<0.10	<0.1	15			
		95% Confidence Limit			0.9					2		4.1						

4. Station West Landfill

The Station West Landfill is located approximately 100 m southwest of the USAF Landfill, and covers an area of 1,050 m^2, as identified by geophysical survey. There is a minor trail heading southeast from the landfill, but no road exists that connects the landfill to the Station Area. The landfill consists of four lobes of buried debris with areas of partially exposed debris and some scattered surface debris. Soil staining was not identified at surface and PCB, hydrocarbon and inorganic element levels in down-gradient samples were all comparable to site background levels.

Runoff from the landfill surface drains to the west into a low-lying vegetated area at the base of the landfill. The down-gradient vegetation was identified to be approximately 80%. The overall vegetation and habitat use of the area surrounding the landfill was estimated to be moderate.

Based on an assessment of the Station West Landfill as a contaminant source, the potential for migration, and down-gradient receptors, the landfill was classified as a low potential environmental risk. Accordingly, surface and partially exposed debris was removed, and the landfill was regraded with 0.75 m of Type 2 granular fill.

The long term monitoring plan consists of visual monitoring and collection of soil samples. Approximate locations for the collection of soil samples are identified on Figure PIN-2.3

4.1 Baseline Data

Sample locations for soil baseline data are shown in Figure PIN-2.3. A summary of the baseline soil analytical data is provided in Table 4.1. Baseline data is comprised of site investigation information collected up and down-gradient of the landfill in 2004 and samples collected at permanent monitoring locations up and down-gradient of the landfill in 2011. Mean soil baseline concentrations of inorganic elements are consistent with or lower than site background levels, with the exception of arsenic concentrations which are slightly higher than background levels. All PCB and TPH results were not detectable.

Table 4.1: Station West Landfill – Baseline Soil Data

Sample #	Surface/ Reference Tag #	Location	Date	Depth (cm)	Cu [mg/kg]	Ni [mg/kg]	Co [mg/kg]	Cd [mg/kg]	Pb [mg/kg]	Zn [mg/kg]	Cr [mg/kg]	As [mg/kg]	Hg [mg/kg]	PCBs [mg/kg]	TPH [mg/kg]	TPH Identity		
																F1	F2	F3
Up-gradient Soil Samples																		
04-4164	4154		2004	0														
04-4165	4164		2004	40														
04-4166	4166		2004	0	6	<5.0	<5.0	<1.0	<10	<15	<20	3.2		<0.1				
04-4167	4166		2004	30	6.9	<5.0	<5.0	<1.0	<10	<15	<20	3.5		<0.1				
04-4168	4166		2004	80	6.9	<5.0	<5.0	<1.0	<10	<15	<20	2.9		<0.1				
11-6790*/91	6790	P2-05	2011	0-10	<3.0	<5.0	<5.0	<1.0	<10	<15	<20	2.8	<0.10	<0.050	<40	<40	<4.0	<9.0
11-6792*/93	6790	P2-05	2011	30-40	<3.0	<5.0	<5.0	<1.0	<10	<15	<20	2.8	<0.10	<0.050	<40	<40	<4.0	<9.0
Down-gradient Soil Samples																		
04-2720/21	2720		2004	5	3.7	<5.0	<5.0	<1.0	<10	<15	<20	2.9		<0.1				
04-2722	2720		2004	45	7.7	<5.0	<5.0	<1.0	<10	<15	<20	2.1		<0.1				
04-2723	2723		2004	0	6.4	<5.0	<5.0	<1.0	<10	23	<20	1.1		<0.1				
04-2724	2723		2004	30	4.5	<5.0	<5.0	<1.0	<10	<15	<20	3.7		0.1				
04-2725	2725		2004	40	5.2	<5.0	<5.0	<1.0	<10	<15	<20	5.1		<0.1				
04-2726	2725		2004	80	7.1	<5.0	<5.0	<1.0	<10	<15	<20	3.8		<0.1				
04-2727	2727		2004	0														
04-3122	3122		2004	0	5.4	<5.0	<5.0	<1.0	<10	<15	<20	2.8		<0.1				
04-3123	3122		2004	50	7.6	<5.0	<5.0	<1.0	<10	<15	<20	3		<0.1				
04-3124	3122		2004	115	10.0	6.1	<5.0	<1.0	<10	<15	<20	2.5		<0.1				
04-3125	3125		2004	0	8.5	<5.0	<5.0	<1.0	<10	<15	<20	1.3		<0.1				
04-3126	3125		2004	25	7.2	<5.0	<5.0	<1.0	<10	<15	<20	5.2		<0.1				
04-3127	3127		2004	0	8.0	<5.0	<5.0	<1.0	<10	<15	<20	3.4		<0.1				
04-3128	3128		2004	0	7.1	<5.0	<5.0	<1.0	<10	<15	<20	5		<0.1				

Sample #	Surface/ Reference Tag #	Location	Date	Depth (cm)	Cu [mg/kg]	Ni [mg/kg]	Co [mg/kg]	Cd [mg/kg]	Pb [mg/kg]	Zn [mg/kg]	Cr [mg/kg]	As [mg/kg]	Hg [mg/kg]	PCBs [mg/kg]	TPH [mg/kg]	TPH Identity		
																F1	F2	F3
04-3129	3128		2004	40	7.6	<5.0	<5.0	<1.0	<10	<15	<20	3.1		<0.1				
04-3130/31	3128		2004	70	12.0	5.7	<5.0	<1.0	<10	<15	<20	2.1		<0.1				
04-3132	3132		2004	0	7.0	<5.0	<5.0	<1.0	<10	17	<20	4.6		<0.1				
04-3133	3133		2004	0	6.0	<5.0	<5.0	<1.0	<10	<15	<20	5.2		<0.1	<40			
04-3134	3133		2004	50	9.1	5.1	<5.0	<1.0	<10	16	<20	4.3		<0.1	<40			
04-3135	3135		2004	5	5.0	<5.0	<5.0	<1.0	<10	17	<20	3.4		<0.1				
04-3136	3136		2004	0	5.1	<5.0	<5.0	<1.0	<10	20	<20	5.3		<0.1				
04-3137	3136		2004	50	4.8	<5.0	<5.0	<1.0	<10	<15	<20	5		<0.1				
04-3138	3136		2004	90	6.2	<5.0	<5.0	<1.0	<10	<15	<20	4.7		<0.1				
04-3139	3139		2004	0	4.6	<5.0	<5.0	<1.0	<10	<15	<20	4.5		<0.1				
04-3140/41	3140		2004	0	6.4	<5.0	<5.0	<1.0	<10	<15	<20	3.3		<0.1				
04-3142	3142		2004	20														
04-3143	3142		2004	40														
04-3144	3144		2004	5	5.1	<5.0	<5.0	<1.0	<10	<15	<20	4		<0.1				
04-3145	3144		2004	40	5.7	<5.0	<5.0	<1.0	<10	<15	<20	4		<0.1				
04-3146	3146		2004	0														
04-3147	3146		2004	50														
04-3148	3146		2004	70														
04-3149	3149		2004	5	5.0	<5.0	<5.0	<1.0	<10	<15	<20	5		<0.1				
04-3150/51	3149		2004	50	5.4	<5.0	<5.0	<1.0	<10	<15	<20	4.1		<0.1				
04-3152	3149		2004	100	5.6	<5.0	<5.0	<1.0	<10	<15	<20	3.4		<0.1				
04-3153	3153		2004	10	4.5	<5.0	<5.0	<1.0	<10	<15	<20	3.1		<0.1				
04-3154	3153		2004	70	6.6	<5.0	<5.0	<1.0	<10	<15	<20	2.7		<0.1				
04-3155	3155		2004	0														
04-4160/01	4160		2004	0														

Sample #	Surface/ Reference Tag #	Location	Date	Depth (cm)	Cu [mg/kg]	Ni [mg/kg]	Co [mg/kg]	Cd [mg/kg]	Pb [mg/kg]	Zn [mg/kg]	Cr [mg/kg]	As [mg/kg]	Hg [mg/kg]	PCBs [mg/kg]	TPH [mg/kg]	TPH Identity		
																F1	F2	F3
04-4162	4160		2004	30														
04-4163	4160		2004	70														
04-4164	4154		2004	0														
11-6794*/95	6794	P2-06	2011	0-10	3.7	6.1	<5.0	<1.0	<10	18	<20	3	<0.10	<0.050	<40	<40	<4.0	<9.0
11-6796*/97	6794	P2-06	2011	30-40	3.3	<5.0	<5.0	<1.0	<10	19	<20	4.1	<0.10	<0.050	<40	<40	<4.0	9
11-6798*/99	6798	P2-07	2011	0-10	3.7	<5.0	<5.0	<1.0	<10	<15	<20	5.3	<0.10	<0.050	<40	<40	<4.0	<9.0
11-6800*/01	6798	P2-07	2011	30-40	<3.0	<5.0	<5.0	<1.0	<10	<15	<20	2.1	<0.10	<0.050	<40	<40	<4.0	<9.0
11-6802*/03	6802	P2-08	2011	0-10	3.7	<5.0	<5.0	<1.0	<10	<15	<20	3.1	<0.10	<0.050	<40	<40	<4.0	<9.0
11-6804*/05	6802	P2-08	2011	30-40	3.5	<5.0	<5.0	<1.0	<10	<15	<20	3.2	<0.10	<0.050	<40	<40	<4.0	<9.0
		N Value			42	42	42	42	42	42	42	42	8	42	10			
		Average			5.8	<5.0	<5.0	<1.0	<10	<15	<20	3.6	<0.10	<0.1	<40			
		Standard Deviation			2.2							1.1						
		Minimum			<3.0	<5.0				<15		1.1		<0.050				
		Maximum			12.0	6.1	<5.0	<1.0	<10	23	<20	5.3	<0.10	0.1	<40			
		95% Confidence Limit			0.7							0.3						

5. Tier II Disposal Facility

A Tier II Disposal Facility has been constructed at the PIN-2 site for the disposal of Tier II contaminated soil excavated during the clean-up. The facility is located 300 m southwest of the Station Area.

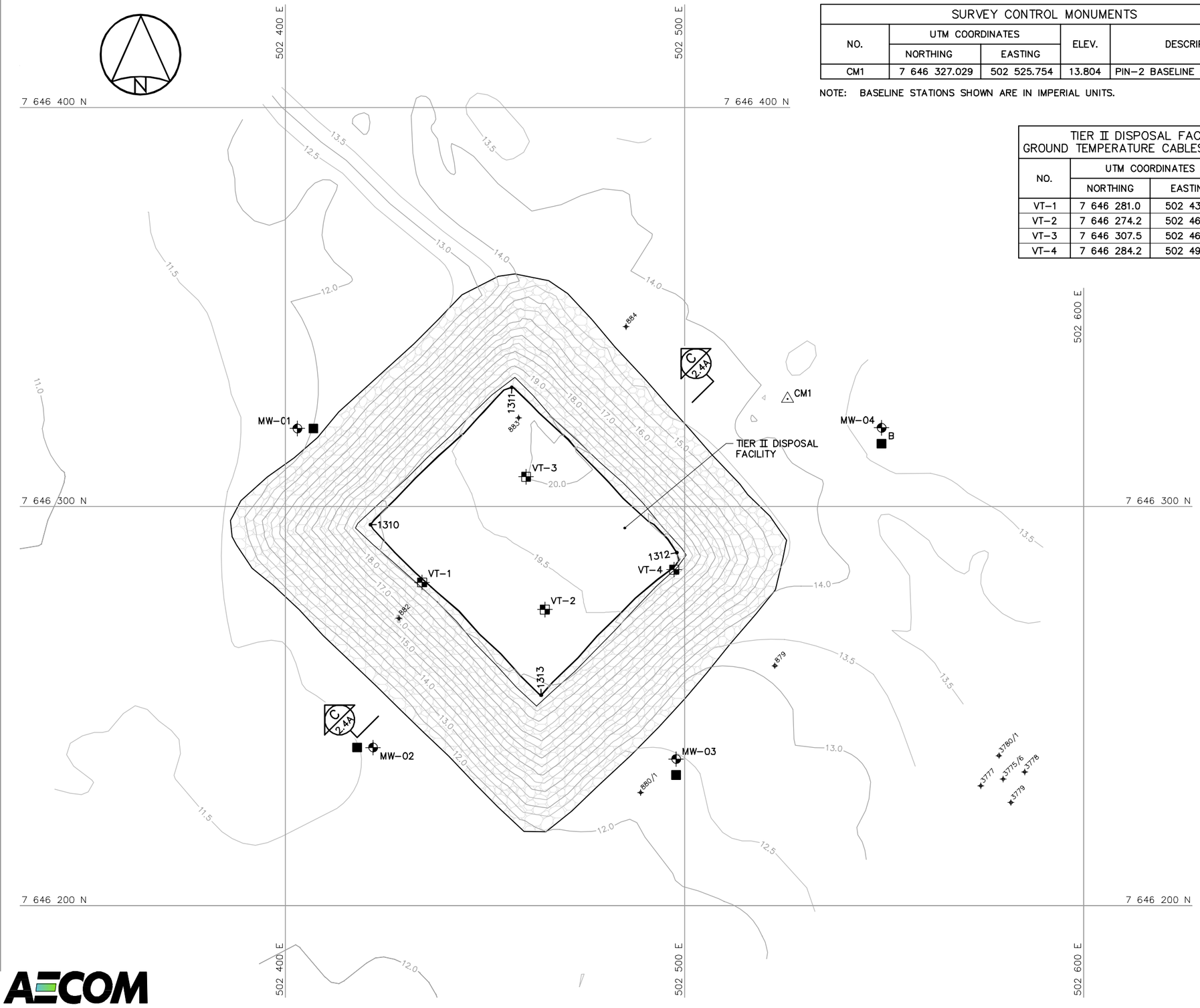
The Tier II Disposal Facility design is a double containment system. The landfill was constructed with the placement of low-permeability, saturated, compacted berms keyed into frozen/saturated ground below existing ground, the installation of a liner system over the berms and along the landfill base, and the placement of a surface liner system over the landfill contents with the placement of sufficient overlying granular fill to promote freeze back of landfill contents. Four groundwater monitoring wells were installed at the landfill perimeter, and four thermistors were installed within the landfill to monitor ground temperatures.

The long term monitoring plan consists of visual monitoring, periodic collection of soil and groundwater samples, and monitoring of subsurface ground temperatures in the berms and in the main body of the disposal facility. Locations for the collection of soil and groundwater samples and thermistors installations are identified on Figure PIN-2.4.

5.1 Baseline Data

Sample locations for the baseline soil samples are shown on Figure PIN-2.4. A summary of the baseline soil analytical data is provided in Table 5.1. Baseline soil data is comprised of samples collected in the vicinity of the Tier II Disposal Facility during the site investigation in 2004, and samples collected at permanent monitoring locations during 2010 and 2011. Zinc and arsenic soil baseline concentrations are slightly elevated above the background levels. The remaining inorganic elements are consistent, or below, the background levels. PCB concentrations were below detection limits. Low level TPH concentrations (F2 and F3 fractions) were detected at several of the sample locations. Hydrocarbon concentrations ranged between <10 mg/kg to 45 mg/kg.

A summary of baseline groundwater data is provided in Table 5.2. Baseline data was collected from permanent monitoring locations in 2010 and 2011. Low level copper, nickel, zinc, chromium, and arsenic were detected in all wells. Cobalt, cadmium, lead, mercury, PCB, and TPH concentrations were below detection limits.



SURVEY CONTROL MONUMENTS				
NO.	UTM COORDINATES		ELEV.	DESCRIPTION
	NORTHING	EASTING		
CM1	7 646 327.029	502 525.754	13.804	PIN-2 BASELINE STA. 0+00

NOTE: BASELINE STATIONS SHOWN ARE IN IMPERIAL UNITS.

TIER II DISPOSAL FACILITY GROUND TEMPERATURE CABLES (AS-BUILT)			
NO.	UTM COORDINATES		ELEV.
	NORTHING	EASTING	
VT-1	7 646 281.0	502 434.2	19.1
VT-2	7 646 274.2	502 465.0	19.2
VT-3	7 646 307.5	502 460.3	20.0
VT-4	7 646 284.2	502 497.4	19.9

GENERAL NOTES:

1. ALL COORDINATES ARE REFERENCED TO NAD83 (CSRS), UTM ZONE 11N. ALL ELEVATIONS REFER TO GEODETIC DATUM.
2. ALL DIMENSIONS ARE IN METRES UNLESS NOTED OTHERWISE.

LEGEND:

- 1310 — COORDINATE POINT
- MONITORING WELL LOCATION (3)
- B — BACKGROUND MONITORING WELL LOCATION (1)
- GROUND TEMPERATURE CABLE LOCATION (4)
- MONITORING SOIL SAMPLE LOCATION (4)
- 884 — SOIL SAMPLE TAG LOCATION

TIER II DISPOSAL FACILITY MONITORING WELLS (AS-BUILT)			
NO.	UTM COORDINATES		ELEV.
	NORTHING	EASTING	
MW-01	7 646 319.6	502 402.9	11.8
MW-02	7 646 239.7	502 421.9	11.5
MW-03	7 646 236.8	502 497.9	12.6
MW-04	7 646 319.8	502 549.3	13.4

TIER II DISPOSAL FACILITY FINAL GRADING (AS-BUILT)			
NO.	UTM COORDINATES		ELEV.
	NORTHING	EASTING	
1310	7 646 295.5	502 421.3	18.9
1311	7 646 329.9	502 456.7	19.8
1312	7 646 288.5	502 498.0	20.0
1313	7 646 252.8	502 464.0	18.9

NOTE:
COORDINATE POINTS AND ELEVATIONS PROVIDED ARE TO THE FINAL GRADE OF TYPE 2 GRANULAR FILL PRIOR TO THE PLACEMENT OF TYPE 1 GRANULAR FILL ON SIDE SLOPES.

RECORD DRAWING
NOT FOR CONSTRUCTION

0 10 20 m SCALE 1:1000

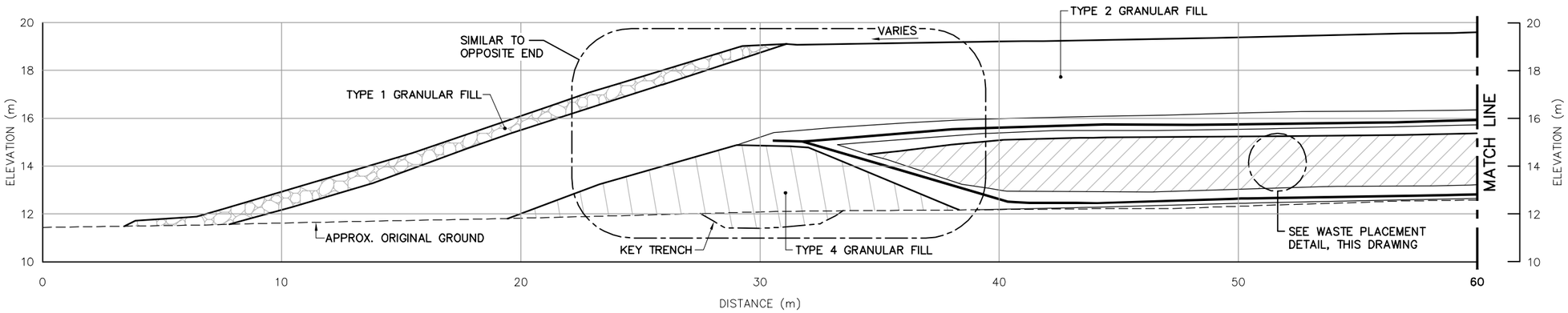
DEW LINE CLEAN UP
LANDFILL MONITORING PLAN

PIN-2 CAPE YOUNG

TIER II DISPOSAL FACILITY

FIGURE PIN-2.4

AECOM

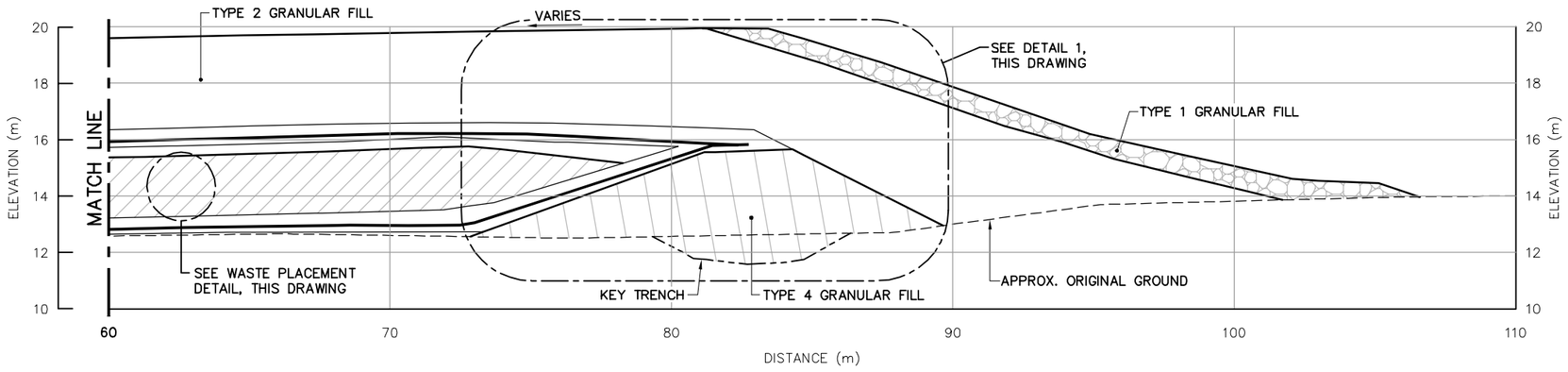


GENERAL NOTES:

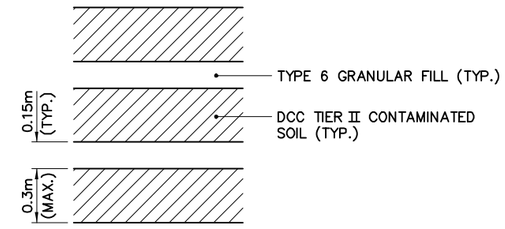
1. ALL ELEVATIONS REFER TO GEODETIC DATUM.
2. ALL DIMENSIONS ARE IN METRES UNLESS NOTED OTHERWISE.
3. KEY TRENCH WAS EXCAVATED TO SOUND BEDROCK (APPROX. 0.6–1.0m). EXCAVATION DEPTH WAS FIELD CONFIRMED BY THE SITE ENGINEER.

LEGEND:

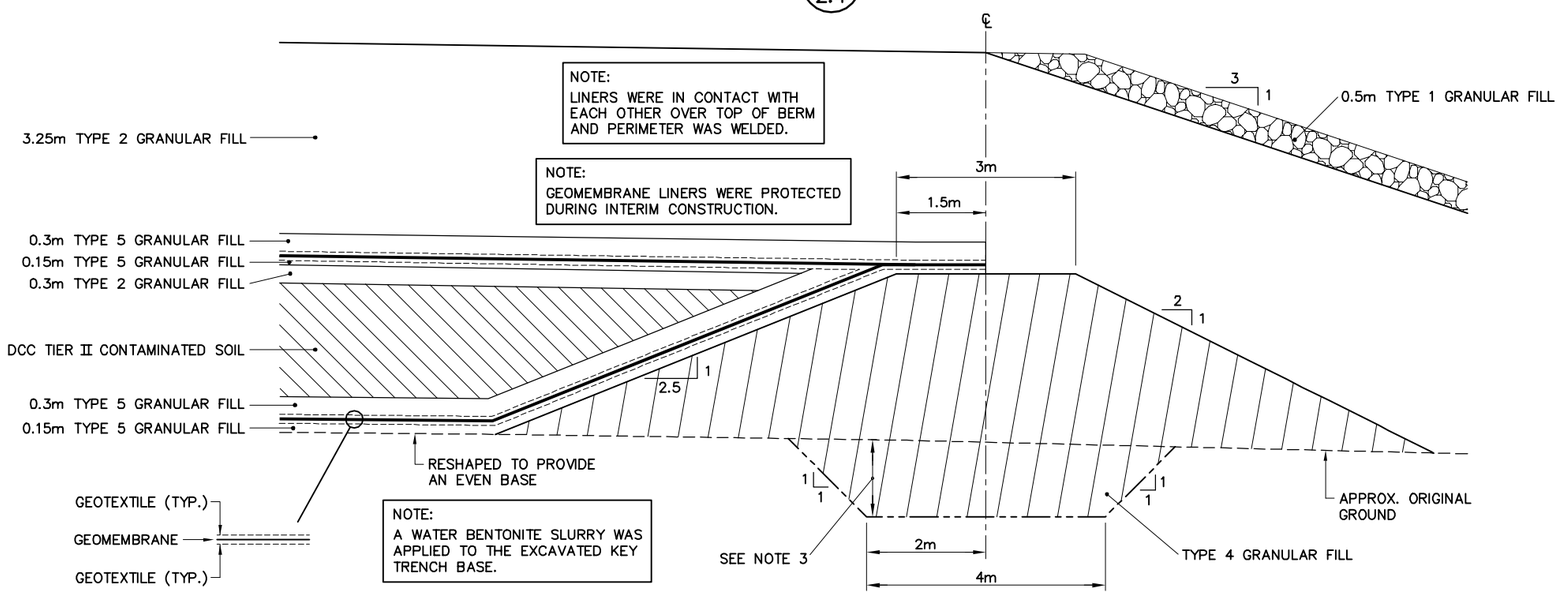
GENERATED BASED ON AS–BUILT SURVEY INFORMATION



SECTION C 2.4



WASTE PLACEMENT DETAIL
SCALE: NTS



DETAIL 1 2.4A
SCALE: NTS

RECORD DRAWING
NOT FOR CONSTRUCTION

0 2 4 m SCALE 1:200

DEW LINE CLEAN UP
LANDFILL MONITORING PLAN

PIN-2 CAPE YOUNG

TIER II DISPOSAL FACILITY CROSS SECTION AND DETAILS

FIGURE PIN-2.4A

AECOM

Table 5.1: Tier II Disposal Facility – Baseline Soil Data

Sample #	Surface/ Reference Tag #	Location	Date	Depth (cm)	Cu [mg/kg]	Ni [mg/kg]	Co [mg/kg]	Cd [mg/kg]	Pb [mg/kg]	Zn [mg/kg]	Cr [mg/kg]	As [mg/kg]	Hg [mg/kg]	PCBs [mg/kg]	TPH [mg/kg]	TPH Identity		
																F1	F2	F3
Up-gradient Soil Samples																		
10-4986*/87	4986	BMW-4	2010	0-10	3.0	<5.0	<5.0	<1.0	<10	18	<20	2.0	<0.10	<0.0030	16	<10	4.1	16
10-4988*/89	4986	BMW-4	2010	30-40	3.2	<5.0	<5.0	<1.0	<10	<15	<20	2.75	<0.10	<0.0030	<10	<10	4.9	<9.0
11-6897*/98	6897	BMW-4	2011	0-10	<3.0	<5.0	<5.0	<1.0	<10	<15	<20	2.1	<0.10	<0.05	<10	<10	<4.0	<9.0
11-6899*/00*	6897	BMW-4	2011	30-40	<3.0	<5.0	<5.0	<1.0	<10	<15	<20	2.9	<0.10	<0.05	<10	<10	<4.0	<9.0
Down-gradient Soil Samples																		
10-4990*/91*	4990	MW-1	2010	0-10	9.1	8.0	<5.0	<1.0	<10	21	<20	10.0	<0.10	<0.0030	35	<10	5.3	30
10-4992*/93	4990	MW-1	2010	30-40	3.6	<5.0	<5.0	<1.0	<10	<15	<20	4.0	<0.10	<0.0030	30	<10	<4.0	30
10-4994*/95	4994	MW-2	2010	0-10	12.6	7.75	<5.0	<1.0	<10	23	<20	5.995	<0.10	<0.0030	45	<10	<4.0	45
10-4996*/97	4994	MW-2	2010	30-40	10.6	7.91	<5.0	<1.0	<10	19	<20	4.685	<0.10	<0.0030	31	<10	<4.0	31
10-4982*/83	4982	MW-3	2010	0-10	4.1	<5.0	<5.0	<1.0	<10	26	<20	3.185	<0.10	<0.0030	35	<10	6.9	28
10-4984*/85	4982	MW-3	2010	30-40	6.8	<5.0	<5.0	<1.0	<10	22	<20	2.75	<0.10	<0.0030	17	<10	5.4	12
11-6901*/02	6901	MW-1	2011	0-10	<3.0	<5.0	<5.0	<1.0	<10	<15	<20	3.7	<0.10	<0.05	12	<10	<4.0	12
11-6903*/04	6901	MW-1	2011	30-40	<3.0	<5.0	<5.0	<1.0	<10	16	<20	3.4	<0.10	<0.05	43	<10	<4.0	43
11-6905*/06	6905	MW-2	2011	0-10	11.0	5.4	<5.0	<1.0	<10	<15	<20	4.8	<0.10	<0.05	14	<10	<4.0	14
11-6907*/08	6905	MW-2	2011	30-40	5.8	6.8	5.2	<1.0	<10	24	<20	5.1	<0.10	<0.05	<10	<10	<4.0	<9.0
11-6909*/10	6909	MW-3	2011	0-10	5.2	<5.0	<5.0	<1.0	<10	19	<20	2.5	<0.10	<0.05	11	<10	<4.0	11
11-6911*/12	6909	MW-3	2011	30-40	<3.0	<5.0	<5.0	<1.0	<10	<15	<20	2.6	<0.10	<0.05	<10	<10	<4.0	<9.0
		N Value			16	16	16	16	16	16	16	16	16	16	16			
		Average			5.2	<5.0	<5.0	<1.0	<10	15	<20	3.9	<0.10	<0.05	20			
		Standard Deviation			3.8					7		2.0			15			
		Minimum			<3.0	<5.0	<5.0			16		2.0		<0.0030	<10			
		Maximum			12.6	8.0	5.2	<1.0	<10	26	<20	10.0	<0.10	<0.05	45			
		95% Confidence Limit			1.9					4		1.0			7			

Table 5.2: Tier II Disposal Facility – Baseline Groundwater Data

Sample #	Location	Date	Cu [mg/L]	Ni [mg/L]	Co [mg/L]	Cd [mg/L]	Pb [mg/L]	Zn [mg/L]	Cr [mg/L]	As [mg/L]	Hg [mg/L]	PCBs [mg/L]	TPH [mg/L]	TPH Identity		
														F1	F2	F3
Up-gradient Groundwater Samples																
10-5014	BMW-4	2010	0.025	0.0611	<0.0030	<0.0010	<0.010	0.0148	0.1020	0.0063	<0.00040	<0.000020	<1.0	<0.050	<0.50	<1.0
11-6960/61	BMW-4	2011	0.0078	0.0096	<0.0030	<0.0010	<0.010	0.028	0.066	<0.0030	<0.00040	<0.0030	<1.0	<0.050	<0.50	<1.0
Down-gradient Groundwater Samples																
10-5018	MW-1	2010	0.077	0.3175	0.0074	<0.0010	<0.010	0.0195	0.6080	0	<0.00040	<0.000020	<1.0	<0.050	<0.50	<1.0
10-5017	MW-2	2010	0.030	0.055	<0.0030	<0.0010	<0.010	0.0122	0.1000	<0.0030	<0.00040	<0.000020	<1.0	<0.050	<0.50	<1.0
10-5015	MW-3	2010	0.030	0.108	0.0036	<0.0010	<0.010	0.0420	0.2010	0.0088	<0.00040	<0.000020	<1.0	<0.050	<0.50	<1.0
11-6962	MW-1	2011	0.019	0.086	<0.0030	<0.0010	<0.010	<0.010	0.2160	<0.0030	<0.00040	<0.0030	<1.0	<0.050	<0.50	<1.0
11-6959	MW-2	2011	<0.0050	<0.0050	<0.0030	<0.0010	<0.010	0.2470	<0.0050	<0.0030	<0.00040	<0.0030	<1.0	<0.050	<0.50	<1.0
11-6958	MW-3	2011	0.023	0.027	<0.0030	<0.0010	<0.010	0.02	0.1110	0.0110	<0.00040	<0.0030	<1.0	<0.050	<0.50	<1.0
N Value			8	8	8	8	8	8	8	8	8	8	8			
Average			0.027	0.083	<0.0030	<0.0010	<0.010	0.0486	0.1758	0.0050	<0.00040	<0.0030	<1.0			
Standard Deviation			0.023	0.101				0.0809	0.1877	0.0040						
Minimum			<0.0050	<0.0050	<0.0030			<0.010	<0.0050	0.0063		<0.000020				
Maximum			0.077	0.318	0.0074	<0.0010	<0.010	0.2470	0.6080	0.0110	<0.00040	<0.0030	<1.0			
95% Confidence Limit			0.016	0.070				0.0561	0.1300	0.0028						

6. Airstrip South Landfill

The Airstrip South Landfill is located within a former borrow area southwest of the station and south of the airstrip. A geophysical survey identified an anomaly of buried debris 1,420 m^2 in size.

Historically, the ground has been quite wet in August and likely has standing water during spring runoff. The area west and north of the west toe of the landfill is partially vegetated. There was limited buried debris exposure consisting of a drum, wood, copper pipes, and domestic debris. A very small oil stain was noted at the landfill.

Soil sampling during assessment identified one Tier II copper area near a copper pipe on the surface of the landfill. Down-gradient of the landfill, one soil sample exceeded arsenic Tier II criteria. Elevated levels of PCB and TPH were noted down-gradient of the landfill. None of these incidents is thought to be an indicator of contaminant migration from the landfill.

The Airstrip South Landfill is classified as a low potential environmental risk. Contaminant source and pathways components were low due to the restricted potential for contaminant migration and low quantity of debris exposure. The receptors component was also low, due to low receptor sensitivity proximal to the landfill area. Accordingly, the landfill was remediated by excavating the Tier II soils, removing the surface debris and regrading the landfill with 0.4 m of Type 1 granular fill over 0.4 m of Type 2 granular fill.

The long term monitoring plan will consist of visual monitoring and periodic collection of soil samples. Approximate locations for the collection of soil samples are identified of Figure PIN-2.5.

6.1 Baseline Data

Sample locations for soil baseline data are shown in Figure PIN-2.5. A summary of the baseline soil analytical data is provided in Table 6.1. Baseline data is comprised of site investigation information collected up and down-gradient of the landfill in 2004 and samples collected at permanent monitoring locations up and down-gradient of the landfill in 2011. Mean soil baseline concentrations of inorganic elements are consistent with or lower than site background levels, with the exception of arsenic concentrations which are slightly higher than background levels. All PCB results were not detectable. Low level TPH concentrations (F2 and F3 fractions) were detected at several of the sample locations. Hydrocarbon concentrations ranged between <10 mg/kg to 730 mg/kg.

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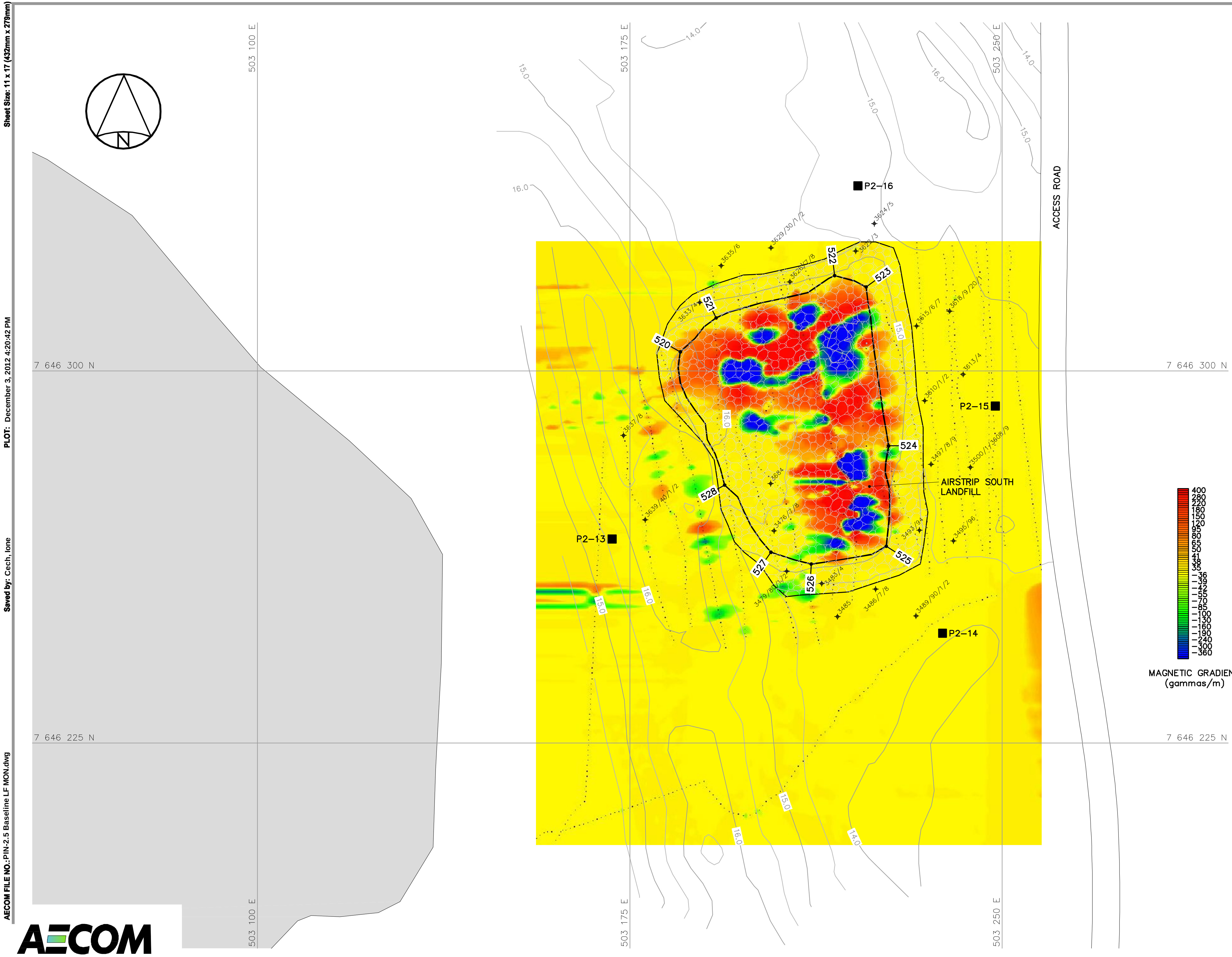
AECOM FILE NO.:PIN-2.5 Baseline LF MON.dwg



GENERAL NOTES:

1. ALL COORDINATES ARE REFERENCED TO NAD83 (CSRS), UTM ZONE 11N. ALL ELEVATIONS REFER TO GEODETIC DATUM.
2. ALL DIMENSIONS ARE IN METRES UNLESS NOTED OTHERWISE.

LEGEND:

- 520 COORDINATE POINT
- MONITORING SOIL SAMPLE LOCATION (4)
- 3497 SOIL SAMPLE TAG LOCATION
- BODY OF WATER

AIRSTRIP SOUTH LANDFILL REGRADED (AS–BUILT)

NO.	UTM COORDINATES		ELEV.
	NORTHING	EASTING	
520	7 646 303.9	503 185.2	16.0
521	7 646 310.7	503 192.4	15.6
522	7 646 319.2	503 216.2	15.1
523	7 646 316.9	503 222.6	15.4
524	7 646 284.9	503 227.1	15.3
525	7 646 264.7	503 226.6	15.0
526	7 646 261.1	503 211.5	15.1
527	7 646 263.5	503 203.4	15.3
528	7 646 277.0	503 194.1	15.8

RECORD DRAWING
NOT FOR CONSTRUCTION

0 7.5 15 m SCALE 1:750

DEW LINE CLEAN UP
LANDFILL MONITORING PLAN

PIN-2 CAPE YOUNG

AIRSTRIP SOUTH LANDFILL

FIGURE PIN-2.5

Table 6.1: Airstrip South Landfill – Baseline Soil Data

Sample #	Surface/ Reference Tag #	Location	Date	Depth (cm)	Cu [mg/kg]	Ni [mg/kg]	Co [mg/kg]	Cd [mg/kg]	Pb [mg/kg]	Zn [mg/kg]	Cr [mg/kg]	As [mg/kg]	Hg [mg/kg]	PCBs [mg/kg]	TPH [mg/kg]	TPH Identity		
																F1	F2	F3
Up-gradient Soil Samples																		
04-3637	3637		2004	10	5.6	<5.0	<5.0	<1.0	<10	<15	<20	3.2		<0.1				
04-3638	3637		2004	70	12	<5.0	<5.0	<1.0	<10	<15	<20	2.8		<0.1				
04-3639	3639		2004	0	8.6	<5.0	<5.0	<1.0	<10	<15	<20	2.9		<0.1				
04-3640/41	3639		2004	50	6.7	<5.0	<5.0	<1.0	<10	<15	<20	1.9		<0.1				
04-3642	3639		2004	120	7	<5.0	<5.0	<1.0	<10	<15	<20	1.9		<0.1				
11-6849*/50	6849	P2-13	2011	0-10	7.7	<5.0	<5.0	<1.0	<10	23	<20	2.5	<0.10	<0.050		<10	< 4.0	24
11-6851*/52	6849	P2-13	2011	30-40	7.3	5.8	<5.0	<1.0	<10	<15	<20	3.6	<0.10	<0.050		<10	< 4.0	16
Down-gradient Soil Samples																		
04-3476	3476		2004	0	21	8.2	5.6	<1.0	<10	20	<20	1.8		<0.1	<40			
04-3477	3476		2004	20	19	9.1	5.4	<1.0	<10	21	<20	1.9		<0.1	<40			
04-3478	3476		2004	40	14	7.6	<5.0	<1.0	<10	22	<20	1.6		<0.1	<40			
04-3479	3479		2004	0	16	7	<5.0	<1.0	<10	19	<20	1.7		<0.1	<40			
04-3480/81	3479		2004	30	15	7.3	<5.0	<1.0	<10	19	<20	1.8		<0.1	<40			
04-3482	3479		2004	60	14	6.9	<5.0	<1.0	<10	17	<20	1.7		<0.1	<40			
04-3483	3483		2004	0	13	7.3	<5.0	<1.0	<10	26	<20	1.8		0.4	730			
04-3484	3483		2004	30	15	7	<5.0	<1.0	<10	19	<20	1.4		<0.1	<40			
04-3485	3485		2004	0	8.5	<5.0	<5.0	<1.0	<10	<15	<20	2.5		<0.1	<40			
04-3486	3486		2004	0	5.2	<5.0	<5.0	<1.0	<10	15	<20	6.2		<0.1	220			
04-3487	3486		2004	20	5.6	<5.0	<5.0	<1.0	<10	<15	<20	1.8		<0.1	<40			
04-3488	3486		2004	50	5.3	<5.0	<5.0	<1.0	<10	<15	<20	7.9		<0.1	<40			
04-3489	3489		2004	0	5.6	<5.0	<5.0	<1.0	<10	<15	<20	4.1						
04-3490/91	3489		2004	40	6.1	<5.0	<5.0	<1.0	<10	<15	<20	3.7						
04-3492	3489		2004	60	5.4	<5.0	<5.0	<1.0	<10	<15	<20	3.6						
04-3493	3493		2004	0	7.1	6.2	6.2	<1.0	<10	21	<20	80		<0.1	<40			
04-3494	3493		2004	25	5.3	<5.0	<5.0	<1.0	<10	<15	<20	11		<0.1	<40			
04-3495	3495		2004	0	6.1	<5.0	<5.0	<1.0	<10	<15	<20	3.1						

Sample #	Surface/ Reference Tag #	Location	Date	Depth (cm)	Cu [mg/kg]	Ni [mg/kg]	Co [mg/kg]	Cd [mg/kg]	Pb [mg/kg]	Zn [mg/kg]	Cr [mg/kg]	As [mg/kg]	Hg [mg/kg]	PCBs [mg/kg]	TPH [mg/kg]	TPH Identity		
																F1	F2	F3
04-3496	3495		2004	40	5.3	<5.0	<5.0	<1.0	<10	<15	<20	3.2						
04-3497	3497		2004	0	4	<5.0	<5.0	<1.0	<10	<15	<20	3.3		<0.1	<40			
04-3498	3497		2004	40	4.6	<5.0	<5.0	<1.0	<10	<15	<20	2.2		<0.1	<40			
04-3499	3497		2004	90	3.9	5.6	<5.0	<1.0	<10	<15	<20	1.6		<0.1	<40			
04-3500/01	3500		2004	0	5.5	<5.0	<5.0	<1.0	<10	<15	<20	3.6						
04-3608	3500		2004	40	5.7	<5.0	<5.0	<1.0	<10	<15	<20	3.2						
04-3609	3500		2004	90	5	<5.0	<5.0	<1.0	<10	<15	<20	3						
04-3610/11	3610		2004	0	9.9	<5.0	<5.0	<1.0	<10	16	<20	2.9		<0.1	<40			
04-3612	3610		2004	40	10	<5.0	<5.0	<1.0	<10	21	<20	1.4		<0.1				
04-3613	3613		2004	0														
04-3614	3613		2004	40														
04-3615	3615		2004	5	7.9	<5.0	<5.0	<1.0	<10	19	<20	2.3		<0.1				
04-3616	3615		2004	30	4.1	<5.0	<5.0	<1.0	<10	<15	<20	2.6		<0.1				
04-3617	3615		2004	80	3.5	<5.0	<5.0	<1.0	<10	<15	<20	2.4		<0.1				
04-3618	3618		2004	0														
04-3619	3618		2004	30														
04-3620/21	3618		2004	80														
04-3622	3622		2004	0	7.4	<5.0	<5.0	<1.0	<10	17	<20	3.3		<0.1				
04-3623	3622		2004	40	3.7	<5.0	<5.0	<1.0	<10	<15	<20	3.4		<0.1				
04-3624	3624		2004	0														
04-3625	3624		2004	40														
04-3626	3626		2004	0	14	8.1	<5.0	<1.0	<10	16	<20	2.3		<0.1	<40			
04-3627	3626		2004	30	6.3	<5.0	<5.0	<1.0	<10	<15	<20	7.6		<0.1	<40			
04-3628	3626		2004	80	12	6.1	<5.0	<1.0	<10	<15	<20	1.1		<0.1	<40			
04-3629	3629		2004	0														
04-3630/31	3629		2004	50														
04-3632	3629		2004	100														
04-3633	3633		2004	0	12	5.1	<5.0	<1.0	<10	21	<20	3		<0.1				

Sample #	Surface/ Reference Tag #	Location	Date	Depth (cm)	Cu [mg/kg]	Ni [mg/kg]	Co [mg/kg]	Cd [mg/kg]	Pb [mg/kg]	Zn [mg/kg]	Cr [mg/kg]	As [mg/kg]	Hg [mg/kg]	PCBs [mg/kg]	TPH [mg/kg]	TPH Identity		
																F1	F2	F3
04-3634	3633		2004	30	11	5.3	<5.0	<1.0	<10	<15	<20	1.9		<0.1				
04-3635	3635		2004	0														
04-3636	3635		2004	40														
04-3684	3684		2004	0	30	9.4	5.6	<1.0	<10	20	<20	2.5		<0.1				
11-6853*/54	6853	P2-14	2011	0-10	14	6.9	<5.0	<1.0	<10	<15	<20	2.2	<0.10	<0.050	21	<10	< 4.0	21
11-6855*/56*	6853	P2-14	2011	30-40	<3.0	<5.0	<5.0	<1.0	<10	<15	<20	3.2	<0.10	<0.050	12	<10	< 4.0	12
11-6857*/58	6857	P2-15	2011	0-10	<3.0	<5.0	<5.0	<1.0	<10	<15	<20	3.7	<0.10	<0.050	<10	<10	< 4.0	9.5
11-6859*/60*	6857	P2-15	2011	30-40	<3.0	<5.0	<5.0	<1.0	<10	<15	<20	4.2	<0.10	<0.050	20	<10	< 4.0	20
11-6861*/62	6861	P2-16	2011	0-10	<3.0	<5.0	<5.0	<1.0	<10	27	<20	3.6	<0.10	<0.050	20	<10	< 4.0	20
11-6863*/64	6861	P2-16	2011	30-40	<3.0	<5.0	<5.0	<1.0	<10	16	<20	3.8	<0.10	<0.050	10	<10	< 4.0	10
		N Value			51	51	51	51	51	51	51	51	8	43	27			
		Average			8.4	<5.0	<5.0	<1.0	<10	<15	<20	4.6	<0.10	<0.1	<40			
		Standard Deviation			5.6							10.9						
		Minimum			3.5	<5.0	<5.0			<15		1.1		<0.050	<10			
		Maximum			30.0	9.4	6.2	<1.0	<10	27	<20	80.0	<0.10	<0.1	730			
		95% Confidence Limit			1.5							3.0						

7. Pallet Line West Landfill

The Pallet Line West Landfill is located approximately 330 m southwest of the main pallet line for the Station. There is a trail from the southwest corner of the pallet line leading to the area. The pallet line itself is located along the Station Access Road, approximately 350 m south of the Station. The overall area is very cobbly, with shallow bedrock. Vegetation density is low to moderate and locally more developed near the landfill along the southwest perimeter of the area. Surface debris was common throughout the overall area during the assessment, and particularly near each of the landfill lobes. Groundwater seepage was not encountered in any of the test pits.

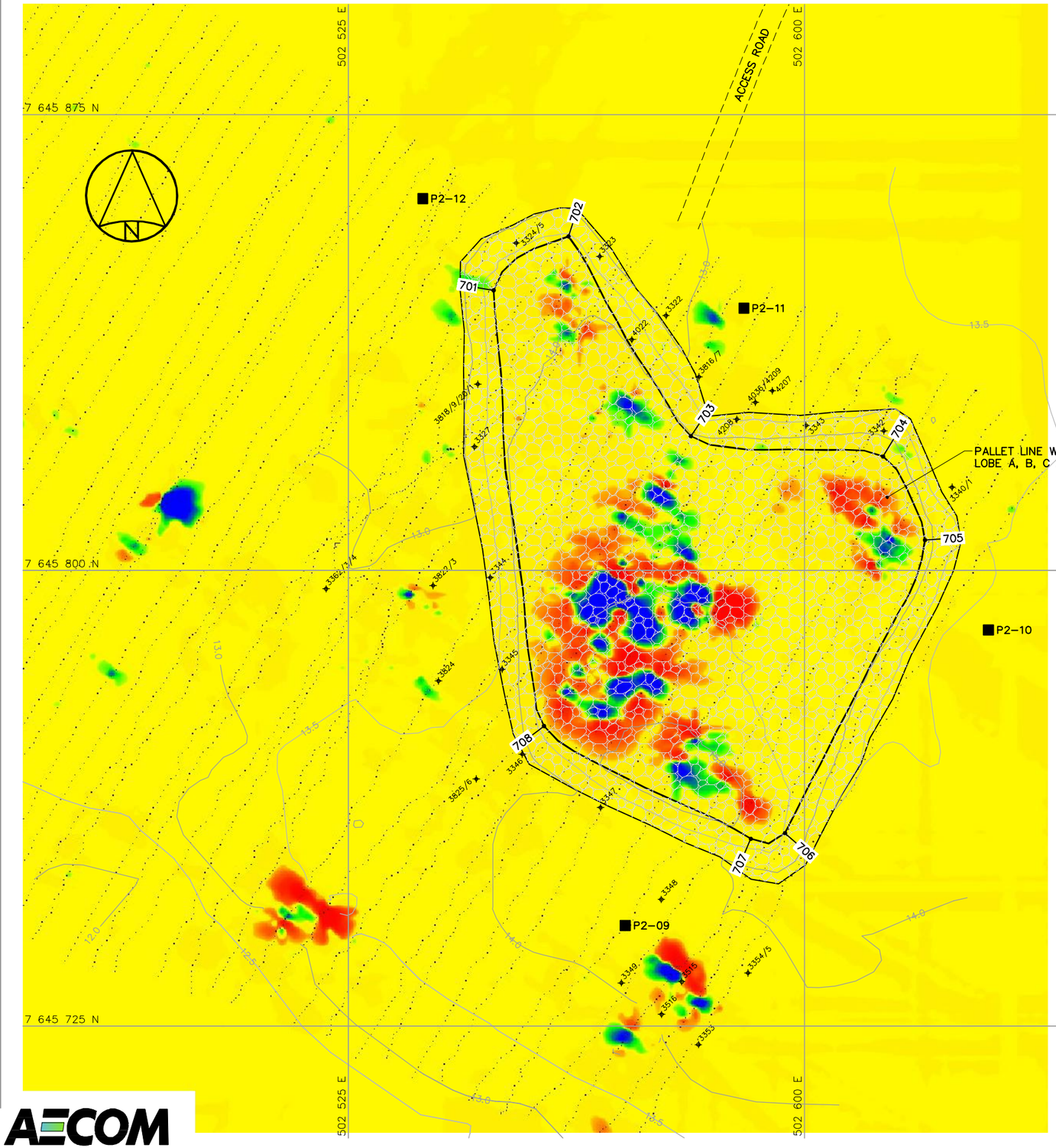
The site assessment soil sampling identified three Tier II areas and one Tier I lead area and elevated levels of zinc. None of these incidents is thought to be an indicator of contaminant migration from the landfill.

The Pallet Line West Landfill is classified as a low potential environmental risk. Contaminant source was a high potential environmental risk due to presence of contaminated soil and surface debris. The pathways and receptors were low because of low potential for contaminant migration and lack of sensitive receptors nearby. Accordingly, the landfill was remediated by excavating the Tier II soils, removing the surface debris and regrading the landfill with 0.4 m of Type 1 granular fill over 0.4 m of Type 2 granular fill.

The long term monitoring plan will consist of visual monitoring and periodic collection of soil samples. Approximate locations for the collection of soil samples are identified of Figure PIN-2.6.

7.1 Baseline Data

Sample locations for soil baseline data are shown in Figure PIN-2.6. A summary of the baseline soil analytical data is provided in Table 7.1. Baseline data is comprised of site investigation information collected up and down-gradient of the landfill in 2004 and samples collected at permanent monitoring locations up and down-gradient of the landfill in 2011. Mean soil baseline concentrations of inorganic elements are consistent with or lower than site background levels, with the exception of copper, zinc, and arsenic concentrations which are higher than background levels. All PCB results were not detectable. TPH concentrations (F2 and F3 fractions) were detected at several of the sample locations. Hydrocarbon concentrations ranged between 17 mg/kg to 580 mg/kg.



GENERAL NOTES:

1. ALL COORDINATES ARE REFERENCED TO NAD83 (CSRS), UTM ZONE 11N. ALL ELEVATIONS REFER TO GEODETIC DATUM.
2. ALL DIMENSIONS ARE IN METRES UNLESS NOTED OTHERWISE.

LEGEND:

- 701 — COORDINATE POINT
- ■ — MONITORING SOIL SAMPLE LOCATION (4)
- 3343 — SOIL SAMPLE TAG LOCATION

400
280
220
180
150
120
95
80
65
50
41
35
−35
−39
−42
−55
−70
−85
−100
−130
−160
−190
−240
−300
−360

MAGNETIC GRADIENT (gammas/m)

PALLET LINE WEST LANDFILL (LOBES A,B,C,D) REGRADED (AS–BUILT)

NO.	UTM COORDINATES		ELEV.
	NORTHING	EASTING	
701	7 645 846.1	502 548.8	13.6
702	7 645 855.0	502 561.2	13.6
703	7 645 822.1	502 581.3	14.0
704	7 645 818.8	502 612.9	14.4
705	7 645 805.0	502 619.8	14.1
706	7 645 756.8	502 596.8	14.5
707	7 645 755.9	502 591.2	14.8
708	7 645 774.4	502 557.1	14.7

RECORD DRAWING
NOT FOR CONSTRUCTION

0 7.5 15 m SCALE 1:750

DEW LINE CLEAN UP
LANDFILL MONITORING PLAN

PIN-2 CAPE YOUNG

PALLET LINE WEST LANDFILL LOBES A, B, C, D

FIGURE PIN-2.6

AECOM

Table 7.1: Pallet Line West Landfill – Baseline Soil Data

Sample #	Surface/ Reference Tag #	Location	Date	Depth (cm)	Cu [mg/kg]	Ni [mg/kg]	Co [mg/kg]	Cd [mg/kg]	Pb [mg/kg]	Zn [mg/kg]	Cr [mg/kg]	As [mg/kg]	Hg [mg/kg]	PCBs [mg/kg]	TPH [mg/kg]	TPH Identity		
																F1	F2	F3
Up-gradient Soil Samples																		
04-3346	3346		2004	30	5.2	<5.0	<5.0	<1.0	<10	<15	<20	2.6		<0.1				
04-3347	3347		2004	20	7.7	<5.0	<5.0	<1.0	<10	<15	<20	2.7		<0.1				
04-3348	3348		2004	30	5.8	<5.0	<5.0	<1.0	<10	<15	<20	3.0		<0.1				
04-3349	3349		2004	20	6.5	<5.0	<5.0	<1.0	<10	<15	<20	3.3		<0.1				
04-3353	3353		2004	10	4.8	<5.0	<5.0	<1.0	<10	<15	<20	2.1		<0.1				
04-3354	3354		2004	0	9.8	6.5	<5.0	<1.0	<10	16	<20	2.5		<0.1				
04-3355	3354		2004	70	7.1	<5.0	<5.0	<1.0	<10	<15	<20	2.4		<0.1				
04-3362	3362		2004	0	420.0	13.0	<5.0	<1.0	37	1300	<20	5.0		<0.1				
04-3363	3362		2004	20	21.0	10.0	5.2	<1.0	11	210	<20	4.5		<0.1				
04-3364	3362		2004	40	5.7	<5.0	<5.0	<1.0	<10	17	<20	3.5		<0.1				
04-3515	3515		2004	0	<40				<30	<30								
04-3516	3516		2004	0	<40				<30	<30								
04-3822	3822		2004	0														
04-3823	3822		2004	30														
04-3824	3824		2004	0														
04-3825	3825		2004	0														
04-3826	3825		2004	30														
11-6833*/34	6833	P2-09	2011	0-10	12	6.1	<5.0	<1.0	<10	110	<20	3	<0.10	<0.050	23	<10	<4.0	23
11-6835*/36	6833	P2-09	2011	30-40	25	11.0	<5.0	<1.0	<10	59	<20	2.2	<0.10	<0.050	20	<10	<4.0	20
Down-gradient Soil Samples																		
04-3322	3322		2004	0	8.8	5.0	<5.0	<1.0	<10	20	<20	3.5		<0.1	<40			
04-3323	3323		2004	0	7.0	<5.0	<5.0	<1.0	<10	<15	<20	2.0		<0.1	<40			
04-3324	3324		2004	15	6.9	<5.0	<5.0	<1.0	<10	<15	<20	2.2		<0.1	<40			
04-3325	3324		2004	50	12.0	7.0	<5.0	<1.0	<10	<15	<20	24.0		<0.1	<40			
04-3327	3327		2004	0														

Sample #	Surface/ Reference Tag #	Location	Date	Depth (cm)	Cu [mg/kg]	Ni [mg/kg]	Co [mg/kg]	Cd [mg/kg]	Pb [mg/kg]	Zn [mg/kg]	Cr [mg/kg]	As [mg/kg]	Hg [mg/kg]	PCBs [mg/kg]	TPH [mg/kg]	TPH Identity		
																F1	F2	F3
04-3340/41	3340		2004	10	13.0	7.1	<5.0	<1.0	<10	17	<20	4.1		<0.1				
04-3342	3342		2004	20	16.0	7.3	<5.0	<1.0	<10	37	<20	2.7		<0.1				
04-3343	3343		2004	10	7.7	<5.0	<5.0	<1.0	<10	16	<20	2.4		<0.1				
04-3344	3344		2004	5	13.0	<5.0	<5.0	<1.0	<10	42	<20	3.0		<0.1				
04-3345	3345		2004	10	6.9	<5.0	<5.0	<1.0	<10	<15	<20	1.7		<0.1				
04-3816	3816		2004	0	6.2	<5.0	<5.0	<1.0	<10	29	<20	1.8		<0.1	<40			
04-3817	3816		2004	30	5.7	<5.0	<5.0	<1.0	<10	<15	<20	2.7		<0.1	<40			
04-3818	3818		2004	0														
04-3819	3818		2004	40														
04-3820/21	3818		2004	60														
04-4036	4036		2004	0	110.0				570	730								
04-4207	4207		2004	0	42.0	12	<5.0	1.5	67	490	<20	3.5						
04-4208	4208		2004	0	90.0	5.8	<5.0	<1.0	30	200	<20	2.2						
04-4209	4208		2004	10	20.0	6.9	<5.0	<1.0	22	70	<20	2.6						
04-4022	4022		2004	0	<40				<30	140								
11-6837*/38	6837	P2-10	2011	0-10	12.0	15	<5.0	<1.0	<10	22	24	5	<0.10	<0.050	580	<10	<4.0	580
11-6839*/40*	6837	P2-10	2011	30-40	<3.0	7.2	<5.0	<1.0	<10	29	<20	12	<0.10	<0.050	18	<10	<4.0	18
11-6841*/42	6841	P2-11	2011	0-10	8.6	9	<5.0	<1.0	<10	48	<20	1.4	<0.10	<0.050	61	<10	5.8	55
11-6843*/44	6841	P2-11	2011	30-40	<3.0	<5.0	<5.0	<1.0	<10	<15	<20	2.2	<0.10	<0.050	17	<10	<4.0	17
11-6845*/46	6845	P2-12	2011	0-10	7.4	6	<5.0	<1.0	<10	100	<20	1.3	<0.10	<0.050	66	<10	<4.0	66
11-6847*/48	6845	P2-12	2011	30-40	9.9	9.1	<5.0	<1.0	<10	19	<20	1.7	<0.10	<0.050	194	<10	4.1	190
		N Value			36	32	32	32	36	36	32	32	8	29	14			
		Average			28.4	5.7	<5.0	<1.0	<10	107	<20	3.7	<0.10	<0.1	79			
		Standard Deviation			71.7	3.7				251		4.2			152			
		Minimum			<3.0	5.0	<5.0	<1.0	<10	<15	<20	1.3		<0.050	17			
		Maximum			420.0	15.0	5.2	1.5	570	1300	24	24.0	<0.10	<0.1	580			
		95% Confidence Limit			23.4	1.3				82		1.4			80			

8. Non-Hazardous Waste Landfill

The Non-Hazardous Waste Landfill is a new landfill constructed for the disposal of non-hazardous wastes and debris generated and collected during clean-up activities. The landfill is located near the intersection of the main station access road and the Harding River Road.

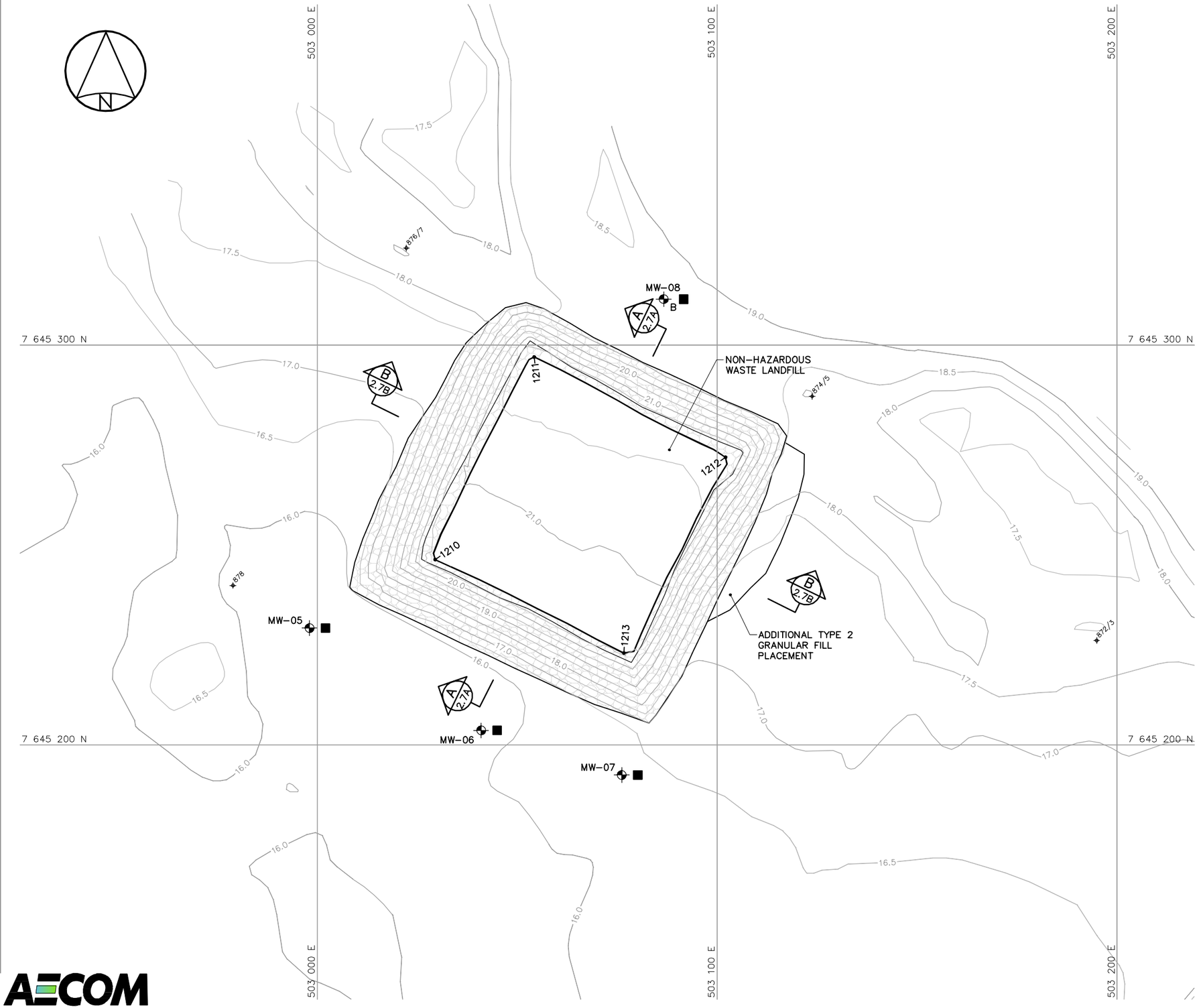
The design of this landfill includes perimeter berms and placement of a top geomembrane and cover of compacted Type 2 granular fill over the landfilled material. Four groundwater monitoring wells were installed around the perimeter of the landfill.

The long term monitoring plan will consist of visual monitoring and periodic collection of soil and groundwater samples. Approximate locations for the collection of soil and groundwater samples are identified of Figure PIN-2.7.

8.1 Baseline Data

Locations for baseline soil samples are shown on Figure PIN-2.7. A summary of baseline soil analytical data is provided in Table 8.1. Baseline data is comprised of samples collected in the vicinity of the Non-Hazardous Waste Landfill during the site investigation in 2004, and samples collected at permanent monitoring locations during 2010 and 2011. The mean baseline concentration for arsenic was noted to be higher than background concentrations. All other inorganic element concentrations were consistent with, or below, the background concentrations. PCB concentrations were below detection limits. Low level TPH concentrations (F2 and F3 fractions) were detected. Hydrocarbon concentrations ranged between <10 mg/kg to 120 mg/kg.

A summary of baseline groundwater data is provided in Table 8.2. Baseline data was collected from permanent monitoring locations in 2010, and 2011. The down-gradient wells were the only monitoring wells with groundwater for collection during the two monitoring events. Low concentrations of copper, nickel, cobalt, lead, zinc, chromium and arsenic were detected in all three wells. Cadmium, mercury, PCBs and TPH results were all below detection limits.



GENERAL NOTES:

1. ALL COORDINATES ARE REFERENCED TO NAD83 (CSRS), UTM ZONE 11N. ALL ELEVATIONS REFER TO GEODETIC DATUM.
2. ALL DIMENSIONS ARE IN METRES UNLESS NOTED OTHERWISE.

LEGEND:

- 1210 — COORDINATE POINT
- MONITORING WELL LOCATION (3)
- B — BACKGROUND MONITORING WELL LOCATION (1)
- MONITORING SOIL SAMPLE LOCATION (4)
- 674 — SOIL SAMPLE TAG LOCATION

NON–HAZARDOUS WASTE LANDFILL MONITORING WELLS (AS–BUILT)			
NO.	UTM COORDINATES		ELEV.
	NORTHING	EASTING	
MW–05	7 645 229.3	502 998.0	15.9
MW–06	7 645 203.7	503 040.9	16.0
MW–07	7 645 192.5	503 076.1	16.4
MW–08	7 645 311.5	503 086.6	18.9

NON–HAZARDOUS WASTE LANDFILL FINAL GRADING (AS–BUILT)			
NO.	UTM COORDINATES		ELEV.
	NORTHING	EASTING	
1210	7 645 246.4	503 029.4	20.6
1211	7 645 297.0	503 054.2	21.8
1212	7 645 272.0	503 102.0	21.8
1213	7 645 223.0	503 076.6	20.5

NOTE:
COORDINATE POINTS AND ELEVATIONS PROVIDED ARE TO THE FINAL GRADE OF TYPE 2 GRANULAR FILL PRIOR TO THE PLACEMENT OF TYPE 1 GRANULAR FILL ON SIDE SLOPES.

RECORD DRAWING
NOT FOR CONSTRUCTION

0 10 20 m SCALE 1:1000

DEW LINE CLEAN UP
LANDFILL MONITORING PLAN

PIN-2 CAPE YOUNG

NON-HAZARDOUS WASTE LANDFILL

FIGURE PIN-2.7

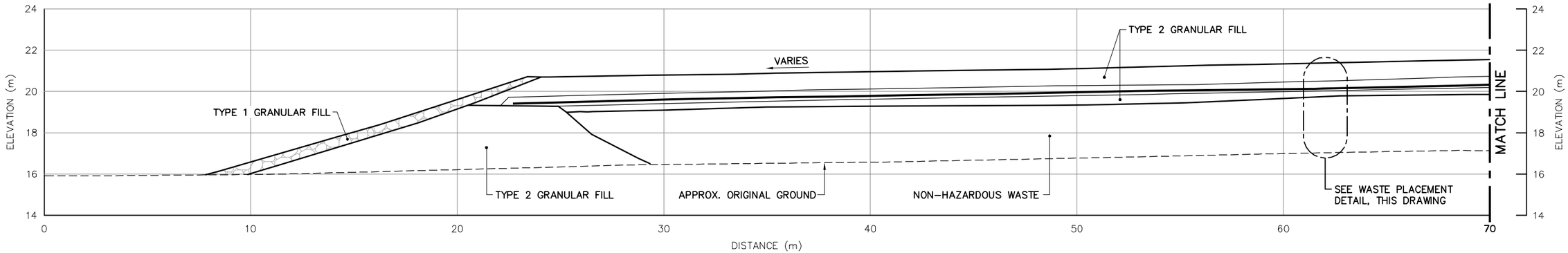
AECOM

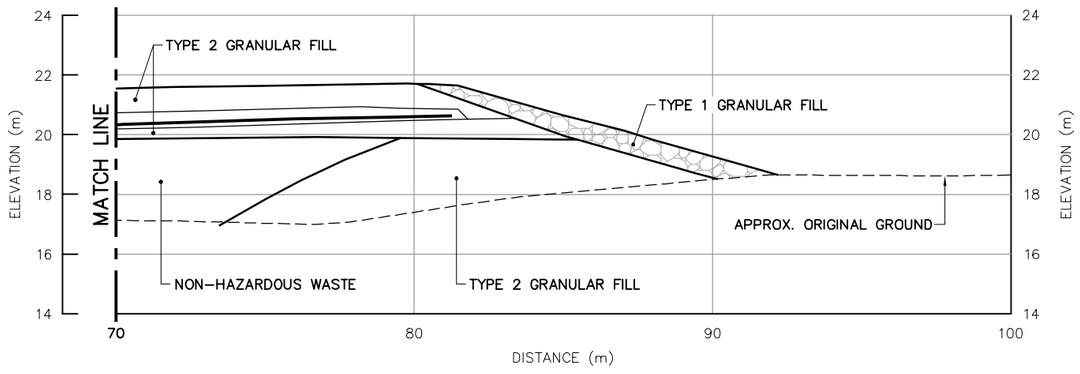
GENERAL NOTES:

1. ALL ELEVATIONS REFER TO GEODETIC DATUM.
2. ALL DIMENSIONS ARE IN METRES UNLESS NOTED OTHERWISE.

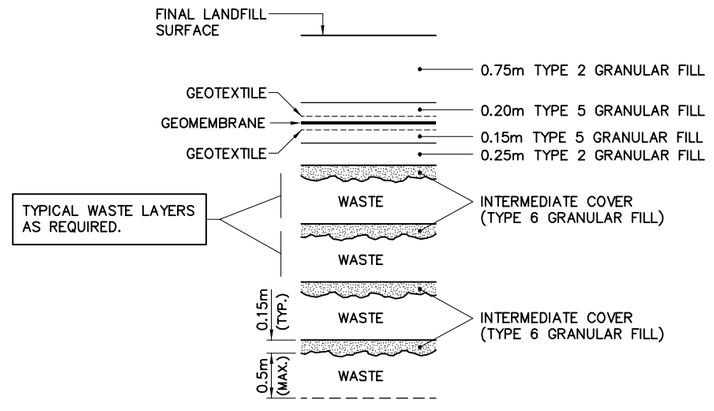
LEGEND:

GENERATED BASED ON AS-BUILT SURVEY INFORMATION





SECTION A 2.7



WASTE PLACEMENT DETAIL
SCALE: NTS

RECORD DRAWING
NOT FOR CONSTRUCTION

0 2 4 m SCALE 1:200

DEW LINE CLEAN UP
LANDFILL MONITORING PLAN

PIN-2 CAPE YOUNG

NON-HAZARDOUS WASTE LANDFILL CROSS SECTION AND DETAIL

FIGURE PIN-2.7A

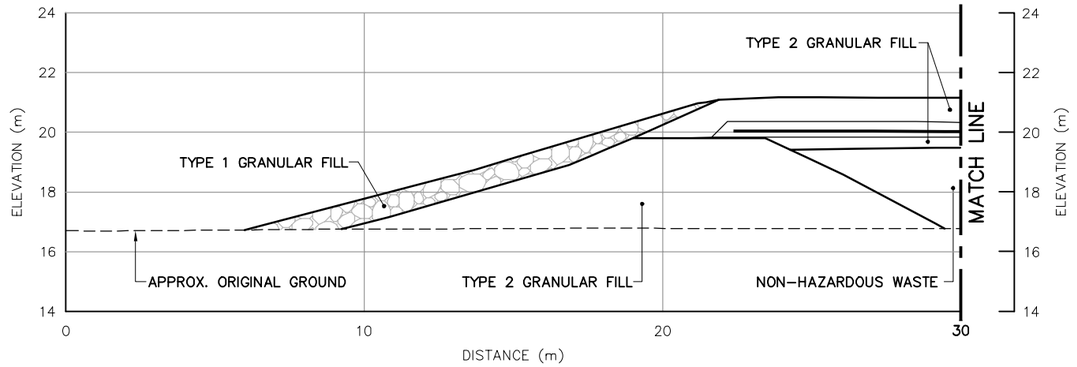
AECOM

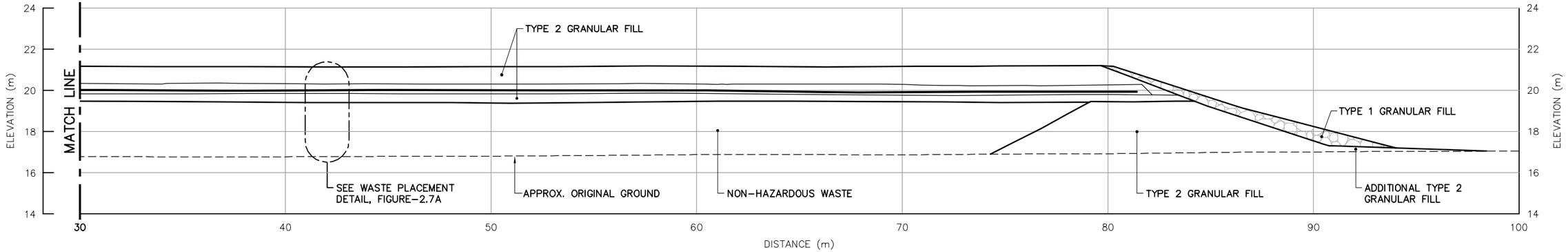
GENERAL NOTES:

1. ALL ELEVATIONS REFER TO GEODETIC DATUM.
2. ALL DIMENSIONS ARE IN METRES UNLESS NOTED OTHERWISE.

LEGEND:

——— GENERATED BASED ON AS-BUILT SURVEY INFORMATION





SECTION B 2.7

RECORD DRAWING
NOT FOR CONSTRUCTION

0 2 4 m SCALE 1:200

DEW LINE CLEAN UP
LANDFILL MONITORING PLAN

PIN-2 CAPE YOUNG

NON-HAZARDOUS WASTE LANDFILL CROSS SECTION

FIGURE PIN-2.7B

AECOM

Table 8.1: Non-Hazardous Waste Landfill – Baseline Soil Data

Sample #	Surface/ Reference Tag #	Location	Date	Depth (cm)	Cu [mg/kg]	Ni [mg/kg]	Co [mg/kg]	Cd [mg/kg]	Pb [mg/kg]	Zn [mg/kg]	Cr [mg/kg]	As [mg/kg]	Hg [mg/kg]	PCBs [mg/kg]	TPH [mg/kg]	TPH Identity		
																F1	F2	F3
Up-gradient Soil Samples																		
04-872	872		2004	0	6.2	<5.0	<5.0	<1.0	<10	<15	<20	3.7		<0.1	<40			
04-873	872		2004	80	5.6	5	<5.0	<1.0	<10	<15	<20	3.4		<0.1				
04-874	874		2004	15	5.8	<5.0	<5.0	<1.0	<10	<15	<20	2.9		<0.1				
04-875	874		2004	80	9.4	<5.0	<5.0	<1.0	<10	<15	<20	3.8		<0.1				
04-876	876		2004	10	5.1	<5.0	<5.0	<1.0	<10	<15	<20	3.8		<0.1				
04-877	876		2004	80	5.2	<5.0	<5.0	<1.0	<10	<15	<20	2.3		<0.1				
10-5010*/11	5010	BMW-8	2010	0-10	<3.0	<5.0	<5.0	<1.0	<10	<15	<20	3.6	<0.10	<0.0030	23	<10	4.4	19
10-5012*/13	5010	BMW-8	2010	30-40	4.2	<5.0	<5.0	<1.0	<10	<15	<20	3.9375	<0.10	<0.0030	<10	<10	<4.0	<9.0
11-6881*/82	6881	BMW-8	2011	0-10	8	5.0	<5.0	<1.0	<10	28	<20	3.3	<0.10	<0.05	120	<10	<4.0	120
11-6883*/84	6881	BMW-8	2011	30-40	<3.0	<5.0	<5.0	<1.0	<10	<15	<20	2.4	<0.10	<0.05	19	<10	5	14
Down-gradient Soil Samples																		
04-878	878		2004	15	9.9	<5.0	<5.0	<1.0	<10	<15	<20	2.1		<0.1				
10-5006*/07	5006	MW-5	2010	0-10	38.5	24.45	<5.0	1.23	21.52	120	38.2	14.09	<0.10	<0.0030	18	<10	<4.0	18
10-5008*/09	5006	MW-5	2010	30-40	5.3	<5.0	<5.0	<1.0	<10	15.1	<20	2.265	<0.10	<0.0030	36	<10	<4.0	36
10-5002*/03	5002	MW-6	2010	0-10	4.0	<5.0	<5.0	<1.0	<10	<15	<20	2.21	<0.10	<0.0030	19	<10	4.1	15
10-5004*/05	5002	MW-6	2010	30-40	6.5	<5.0	<5.0	<1.0	<10	<15	<20	2.79	<0.10	<0.0030	14	<10	4.4	9.1
10-4998*/99	4998	MW-7	2010	0-10	5.5	<5.0	<5.0	<1.0	<10	20.13	<20	3.45	<0.10	<0.0030	14	<10	<4.0	14
10-5000*/01*	4998	MW-7	2010	30-40	5.1	<5.0	<5.0	<1.0	<10	<15	<20	2.8	<0.10	<0.0030	<10	<10	<4.0	9
11-6885*/86	6885	MW-5	2011	0-10	<3.0	<5.0	<5.0	<1.0	<10	<15	<20	1.3	<0.10	<0.05	19	<10	5	14
11-6887*/88	6885	MW-5	2011	30-40	7.6	6.9	<5.0	<1.0	<10	18	<20	6.3	<0.10	<0.05	<10	<10	<4.0	<9.0
11-6889*/90*	6889	MW-6	2011	0-10	<3.0	<5.0	<5.0	<1.0	<10	<15	<20	4	<0.10	<0.05	14	<10	<4.0	14
11-6891*/92	6889	MW-6	2011	30-40	7.3	<5.0	<5.0	<1.0	<10	21	<20	9	<0.10	<0.05	<10	<10	<4.0	<9.0
11-6893*/94	6893	MW-7	2011	0-10	5.2	<5.0	<5.0	<1.0	<10	26	<20	2.4	<0.10	<0.05	37	<10	<4.0	37
11-6895*/96	6893	MW-7	2011	30-40	5.3	<5.0	<5.0	<1.0	<10	20	<20	2.9	<0.10	<0.05	14	<10	<4.0	14
		N Value			23	23	23	23	23	23	23	23	16	23	17			
		Average			6.8	<5.0	<5.0	<1.0	<10	<15	<20	3.9	<0.10	<0.0030	23			
		Standard Deviation			7.3							2.7			27			
		Minimum			<3.0	<5.0		<1.0	<10	<15	<20	1.3		<0.0030	<10			
		Maximum			38.5	24.5	<5.0	1.2	21.5	120	38	14.1	<0.10	<0.1	120			
		95% Confidence Limit			3.0							1.1			13			

Table 8.2: Non-Hazardous Waste Landfill – Baseline Groundwater Data

Sample #	Location	Date	Cu [mg/L]	Ni [mg/L]	Co [mg/L]	Cd [mg/L]	Pb [mg/L]	Zn [mg/L]	Cr [mg/L]	As [mg/L]	Hg [mg/L]	PCBs [mg/L]	TPH [mg/L]	TPH Identity		
														F1	F2	F3
Down-gradient Groundwater Samples																
10-5020/21	MW-5	2010	0.071	0.087	0.0	<0.0010	0.02	0.069	0.1200	0	<0.00040	<0.000020	<1.0	<0.050	<0.50	<1.0
10-5019	MW-6	2010	0.149	0.088	0.005	<0.0010	0.0183	0.8650	0.0900	0.0460	<0.00040	<0.000020	<1.0	<0.050	<0.50	<1.0
10-5016	MW-7	2010	0.066	0.097	0.009	<0.0010	0.0113	0.0394	0.1550	0.0221	<0.00040	<0.000020	<1.0	<0.050	<0.50	<1.0
6964	MW-5	2011	0.069	0.006	<0.0030	<0.0010	<0.010	0.2120	0.0657	0.0131	<0.00040	<0.0030	<1.0	<0.050	<0.50	<1.0
6963	MW-6	2011	0.058	<0.0050	<0.0030	<0.0010	<0.010	1.6500	0.0270	0.0162	<0.00040	<0.0030	<1.0	<0.050	<0.50	<1.0
6965	MW-7	2011	0.040	0.012	0.004	<0.0010	<0.010	0.05	0.0737	0.0112	<0.00040	<0.0030	<1.0	<0.050	<0.50	<1.0
N Value			6	6	6	6	6	6	6	6	6	6	6			
Average			0.075	0.049	0.005	<0.0010	0.011	0.481	0.089	0.026	<0.00040	<0.000020	<1.0			
Standard Deviation			0.038	0.046	0.003		0.007	0.653	0.045	0.016						
Minimum			0.040	0.006	0.004		0.011	0.039	0.027	0.011		<0.0030				
Maximum			0.149	0.097	0.009	<0.0010	0.020	1.650	0.155	0.047	<0.00040	<0.000020	<1.0			
95% Confidence Limit			0.030	0.037	0.002		0.006	0.523	0.036	0.013						

9. South Landfill – East

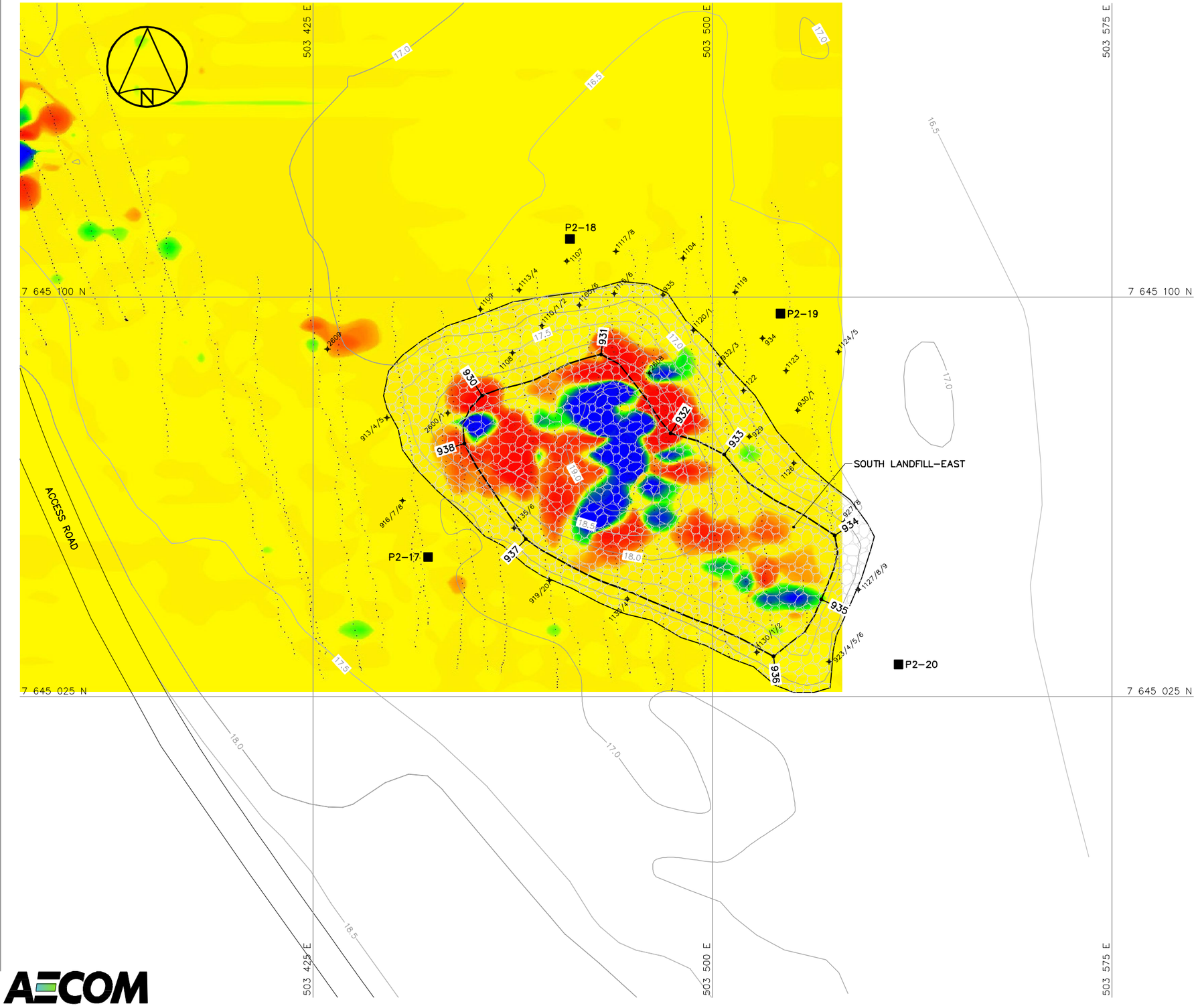
The South Landfill - East is located 1.7 km south-southeast of the main station, 50 m to the east of the Station Access Road, south of the intersection with the Harding River Road. During the assessment, two pieces of partially buried metal debris (one of which appeared to be a culvert) and some wood were noted in the southeastern section of the landfill. No exposed debris was noted in the central portion. Some partially exposed wood, a barrel, cans and metal strapping were observed at the western portion. Scattered surface debris noted in the overall landfill area consists of rusted tin cans, wood, metal strapping, and copper pipe. Surface cover consisted of gravelly sand. The landfill surface was well vegetated and ground squirrel burrows were common throughout. Soil surrounding the landfill has been largely removed to bedrock. The overall size of the landfill is 1,690 m^2.

The landfill evaluation classified the landfill a low potential environmental risk. Contaminant source and pathway components had low quantities of surface debris, no surface contamination, and low potential for contaminant migration away from the landfill. The receptor component was moderately higher because of vegetation density surrounding the landfill area and because of burrowing animals in the vicinity. Remediation of the landfill consisted of removal of the surface debris and covering the landfill with 0.4 m of Type 1 granular fill over 0.4 m of Type 2 granular fill.

The long term monitoring plan consists of visual monitoring and the collection of soil samples. Approximate locations for the collection of soil samples are identified on Figure PIN-2.8.

9.1 Baseline Data

Sample locations for soil baseline data are shown in Figure PIN-2.8. A summary of the baseline soil analytical data is provided in Table 9.1. Baseline data is comprised of site investigation information collected up and down-gradient of the landfill in 2004 and samples collected at permanent monitoring locations up and down-gradient of the landfill in 2011. Mean soil baseline concentrations of inorganic elements are consistent with or lower than site background levels, with the exception of copper and zinc, concentrations which are higher than background levels. All PCB results were below detection limits. TPH concentrations (F2 and F3 fractions) were detected at several of the sample locations. Hydrocarbon concentrations ranged between 10 mg/kg to 170 mg/kg.



GENERAL NOTES:

1. ALL COORDINATES ARE REFERENCED TO NAD83 (CSRS), UTM ZONE 11N. ALL ELEVATIONS REFER TO GEODETIC DATUM.
2. ALL DIMENSIONS ARE IN METRES UNLESS NOTED OTHERWISE.

LEGEND:

- 930 — COORDINATE POINT
- ■ — MONITORING SOIL SAMPLE LOCATION (4)
- 1122 — SOIL SAMPLE TAG LOCATION

400
280
220
180
150
120
95
80
65
50
41
38
35
−36
−39
−42
−55
−70
−85
−100
−130
−160
−190
−240
−300
−360

MAGNETIC GRADIENT (gammas/m)

SOUTH LANDFILL–EAST
REGRADED (AS–BUILT)

NO.	UTM COORDINATES		ELEV.
	NORTHING	EASTING	
930	7 645 081.6	503 456.7	18.3
931	7 645 089.3	503 479.0	18.4
932	7 645 074.5	503 492.1	18.7
933	7 645 070.5	503 502.1	17.6
934	7 645 055.3	503 522.9	17.4
935	7 645 043.3	503 520.4	17.7
936	7 645 032.6	503 511.4	17.3
937	7 645 054.6	503 464.9	17.4
938	7 645 072.6	503 453.4	18.5

RECORD DRAWING
NOT FOR CONSTRUCTION

0 7.5 15 m SCALE 1:750

DEW LINE CLEAN UP
LANDFILL MONITORING PLAN

PIN-2 CAPE YOUNG

SOUTH LANDFILL - EAST

FIGURE PIN-2.8

AECOM

Table 9.1: South Landfill East – Baseline Soil Data

Sample #	Surface/ Reference Tag #	Location	Date	Depth (cm)	Cu [mg/kg]	Ni [mg/kg]	Co [mg/kg]	Cd [mg/kg]	Pb [mg/kg]	Zn [mg/kg]	Cr [mg/kg]	As [mg/kg]	Hg [mg/kg]	PCBs [mg/kg]	TPH [mg/kg]	TPH Identity		
																F1	F2	F3
Up-gradient Soil Samples																		
04-913	913		2004	0	11.0	<5.0	<5.0	<1.0	<10	<15	<20	2.5		<0.1				
04-914	913		2004	40	14.0	13.0	6.9	<1.0	<10	18	<20	2.4		<0.1				
04-915	913		2004	65	5.6	5.1	<5.0	<1.0	<10	<15	<20	2.4		<0.1				
04-916	916		2004	0	13.0	5.2	<5.0	<1.0	<10	<15	<20	2.2		<0.1				
04-917	916		2004	50	5.8	<5.0	<5.0	<1.0	<10	15	<20	2.0		<0.1				
04-918	916		2004	80	4.9	<5.0	<5.0	<1.0	<10	<15	<20	2.3		<0.1				
04-919	919		2004	0	11	5.6	<5.0	<1.0	<10	<15	<20	2.2		<0.1				
04-920	919		2004	35	14.0	<5.0	<5.0	<1.0	<10	<15	<20	3.0		<0.1				
04-2609	2609		2004	0	67				140	85				<0.5				
11-6865*/66	6865	P2-17	2011	0-10	10	<5.0	<5.0	<1.0	<10	26	<20	1.9	<0.10	<0.050	24	<10	<4.0	24
11-6867*/68	6864	P2-17	2011	30-40	5.9	<5.0	<5.0	<1.0	<10	16	<20	2.7	<0.10	<0.050	10	<10	<4.0	10
Down-gradient Soil Samples																		
04-923	923		2004	10	7.4	<5.0	<5.0	<1.0	<10	22	39	2.9		<0.1				
04-924	923		2004	45	9.2	9.3	<5.0	<1.0	<10	17	<20	1.5		<0.1				
04-925/26	923		2004	65	11.0	5.1	<5.0	<1.0	<10	<15	<20	1.8		<0.1				
04-927	927		2004	0	5.4	5.6	<5.0	<1.0	<10	<15	<20	2		<0.1				
04-928	927		2004	20	4.0	<5.0	<5.0	<1.0	<10	<15	<20	1.6		<0.1				
04-929	929		2004	0	5.2	<5.0	<5.0	<1.0	<10	15	<20	3.4		<0.1				
04-930/31	930		2004	0	4.6	<5.0	<5.0	<1.0	<10	<15	<20	2.8		<0.1				
04-932	932		2004	0	5.6	<5.0	<5.0	<1.0	<10	16	<20	2		<0.1				
04-933	932		2004	25	11.0	<5.0	<5.0	<1.0	<10	17	<20	2.9		<0.1				
04-934	934		2004	0	5.7	<5.0	<5.0	<1.0	<10	20	<20	2.3		<0.1				

Sample #	Surface/ Reference Tag #	Location	Date	Depth (cm)	Cu [mg/kg]	Ni [mg/kg]	Co [mg/kg]	Cd [mg/kg]	Pb [mg/kg]	Zn [mg/kg]	Cr [mg/kg]	As [mg/kg]	Hg [mg/kg]	PCBs [mg/kg]	TPH [mg/kg]	TPH Identity		
																F1	F2	F3
04-935	935		2004	0	6.7	<5.0	<5.0	<1.0	<10	<15	<20	1.8		<0.1				
04-1104	1104		2004	0	24.0	6	<5.0	<1.0	<10	19	<20	2.1		<0.1				
04-1105	1105		2004	0	6.3	5.1	<5.0	<1.0	<10	<15	<20	2.5		<0.1				
04-1106	1105		2004	20	20.0	14	12	<1.0	<10	37	<20	1.6		<0.1				
04-1107	1107		2004	0	6.9	<5.0	<5.0	<1.0	<10	19	<20	2.8		<0.1				
04-1108	1108		2004	0	7.1	5.7	<5.0	<1.0	<10	17	<20	2.5		<0.1				
04-1109	1109		2004	0	6.0	<5.0	<5.0	<1.0	<10	<15	<20	2.7		<0.1				
04-1110/11	1110		2004	0	27.0	15	8.3	<1.0	<10	20	<20	2.1		<0.1				
04-1112	1110		2004	20	7.2	5.2	<5.0	<1.0	<10	<15	<20	<1.0		<0.1				
04-1113	1113		2004	0	8.4	<5.0	<5.0	<1.0	<10	17	<20	3.7		<0.1				
04-1114	1113		2004	15	8.3	5.7	<5.0	<1.0	<10	<15	<20	2.9		<0.1				
04-1115	1115		2004	0	7.3	6.6	<5.0	<1.0	<10	<15	<20	2.9		<0.1				
04-1116	1115		2004	25	14.0	8.4	5.1	<1.0	<10	16	<20	4.4		<0.1				
04-1117	1117		2004	0	6.1	<5.0	<5.0	<1.0	<10	19	<20	1.1		<0.1				
04-1118	1117		2004	20	6.8	6.9	<5.0	<1.0	<10	<15	<20	1.1		<0.1				
04-1119	1119		2004	0	4.8	<5.0	<5.0	<1.0	<10	20	<20	2.5		<0.1				
04-1120/21	1120		2004	0	10.0	7	3.8	<1.0	<10	19	<20	24		<0.1				
04-1122	1122		2004	0	8.0	<5.0	<5.0	<1.0	<10	18	<20	5.1		<0.1				
04-1123	1123		2004	0	4.4	<5.0	<5.0	<1.0	<10	<15	<20	1.6		<0.1				
04-1124	1124		2004	0														
04-1125	1124		2004	30														
04-1126	1126		2004	0	11.0	5.4	<5.0	<1.0	<10	20	<20	1.4		<0.1				
04-1127	1127		2004	0	9.8	6	<5.0	<1.0	<10	17	<20	2.3		<0.1				
04-1128	1127		2004	20	6.9	<5.0	<5.0	<1.0	<10	19	<20	1.9		<0.1				
04-1129	1127		2004	40														

Sample #	Surface/ Reference Tag #	Location	Date	Depth (cm)	Cu [mg/kg]	Ni [mg/kg]	Co [mg/kg]	Cd [mg/kg]	Pb [mg/kg]	Zn [mg/kg]	Cr [mg/kg]	As [mg/kg]	Hg [mg/kg]	PCBs [mg/kg]	TPH [mg/kg]	TPH Identity		
																F1	F2	F3
04-1130/31	1130		2004	0	15.0	6.5	<5.0	<1.0	<10	15	<20	3		<0.1				
04-1132	1130		2004	40	6.3	5.7	<5.0	<1.0	<10	<15	<20	2.3		<0.1				
04-1133	1133		2004	0	8.7	5.6	<5.0	<1.0	<10	<15	<20	2.5		<0.1				
04-1134	1133		2004	35	8.9	5.4	<5.0	<1.0	<10	<15	<20	2.9		<0.1				
04-1135	1135		2004	0	16.0	6.4	<5.0	<1.0	<10	<15	<20	2.5		<0.1				
04-1136	1135		2004	25	8.5	5.8	<5.0	<1.0	<10	<15	<20	2.3		<0.1				
04-2600/01	2600		2004	0	<40				32	<30				<0.5				
04-2608	2608		2004	0	<40				<30	<30				<0.5				
11-6869*/70*	6869	P2-18	2011	0-10	<3.0	5.4	<5.0	<1.0	<10	16	<20	2.2	<0.10	<0.050	12	<10	<4.0	12
11-6871*/72	6869	P2-18	2011	30-40	<3.0	5.1	<5.0	<1.0	<10	<15	<20	2.6	<0.10	<0.050	11	<10	<4.0	11
11-6873*/74	6873	P2-19	2011	0-10	<3.0	<5.0	<5.0	<1.0	<10	18	<20	2.2	<0.10	<0.050	170	<10	<4.0	170
11-6875*/76	6873	P2-19	2011	30-40	<3.0	<5.0	<5.0	<1.0	<10	<15	<20	2.2	<0.10	<0.050	12	<10	<4.0	12
11-6877*/78	6877	P2-20	2011	0-10	8.8	<5.0	<5.0	<1.0	<10	31	<20	2.1	<0.10	<0.050	12	<10	<4.0	12
11-6879*/80*	6877	P2-20	2011	30-40	9.0	<5.0	<5.0	<1.0	<10	19	<20	2.5	<0.10	<0.050	15	<10	<4.0	15
		N Value			57	54	54	54	57	57	54	54	8	57	8			
		Average			10.1	4.8	<5.0	<1.0	<10	15	<20	2.8	<0.10	<0.050	33			
		Standard Deviation			9.3	2.9				12		3.0			55			
		Minimum			<3.0	5.1	3.8		<10	<15	<20	<1.0		<0.050	10			
		Maximum			67.0	15.0	12.0	<1.0	140	85	39	24.0	<0.10	<0.5	170			
		95% Confidence Limit			2.4	0.8				3		0.8			38			

10. South Borrow Landfill

The South Borrow Landfill is located on the west side of the Station Access Road, at the northern tip of the South Borrow Area. Geophysical survey confirmed the presence of buried debris over an area of 1,060 m 2. The tundra down-gradient of the landfill was quite wet, with lush vegetation and a thick organic mat. There was standing water along the toe, particularly at the southwest and northwest corners. Debris exposure along the toe was common, with less exposure moving towards the centre and up-gradient edge.

Concentrations of copper and nickel down-gradient of the South Borrow Landfill were elevated above overall site background concentrations. However, the down-gradient terrain at this landfill is more vegetated and wet compared to other areas on site. A comparison of environmental data from other areas investigated nearby shows similarly elevated levels of copper and nickel. These levels have therefore been considered natural for this specific site area and not indicative of contaminant migration.

The landfill was classified as a low potential environmental risk. The receptor component of the scoring was the most significant because of lush vegetation down-gradient of the landfill. In addition, while the internal project team evaluated the elevated copper and nickel levels as naturally-occurring, the EWG scored the landfills as having evidence of contaminant migration. Based on the evaluation of the landfill as a low potential environmental risk, the landfill was covered with 0.4 m of Type 1 granular fill over 0.4 m of Type 2 granular fill.

The long term monitoring plan consists of visual monitoring and the collection of soil samples. Approximate locations for the collection of soil samples are identified on Figure PIN-2.9.

10.1 Baseline Data

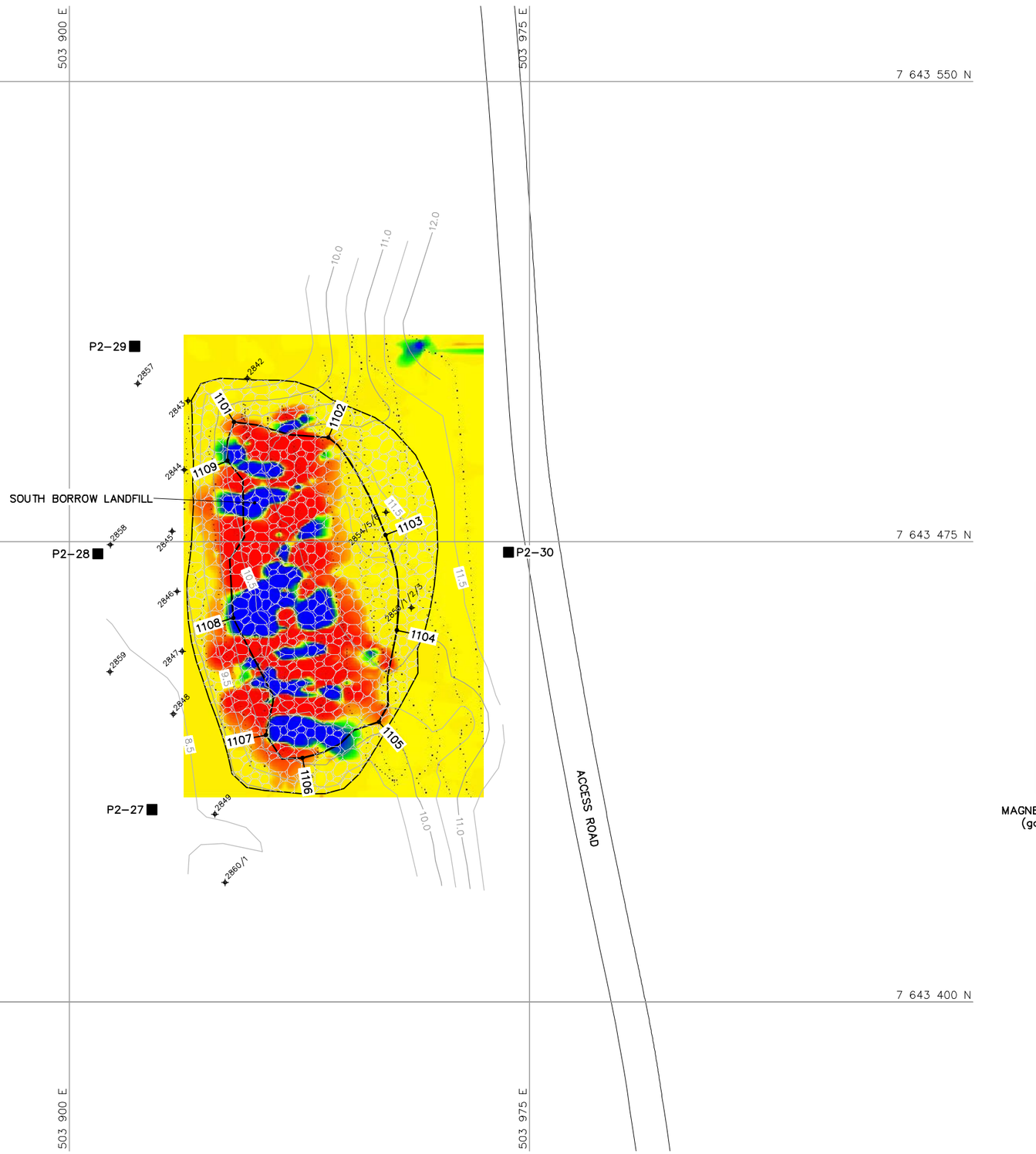
Sample locations for baseline soil samples are shown on Figure PIN-2.9. A summary of the baseline soils analytical data is provided in Table 10.1. Baseline data is comprised of samples collected in the vicinity of the USAF & Asbestos Landfill during the site investigation in 2004, and samples collected at permanent monitoring locations during 2010 and 2011. Copper and nickel levels are slightly elevated above the site background concentrations. The PCB results were below detection limits with the exception of one result from 2011 (0.12 mg/kg). Low level TPH (F2 and F3 fractions) concentrations were detected at up and down-gradient locations. The concentrations ranged from <10 mg/kg to 285 mg/kg.

GENERAL NOTES:

1. ALL COORDINATES ARE REFERENCED TO NAD83 (CSRS), UTM ZONE 11N. ALL ELEVATIONS REFER TO GEODETIC DATUM.
2. ALL DIMENSIONS ARE IN METRES UNLESS NOTED OTHERWISE.

LEGEND:

- 1101 — COORDINATE POINT
- ■ — MONITORING SOIL SAMPLE LOCATION (4)
- 2842 — SOIL SAMPLE TAG LOCATION



400
280
220
180
150
120
95
80
65
50
41
38
35
−36
−39
−42
−55
−70
−85
−100
−130
−160
−190
−240
−300
−360

MAGNETIC GRADIENT (gammas/m)

SOUTH BORROW LANDFILL
REGRADED (AS-BUILT)

NO.	UTM COORDINATES		ELEV.
	NORTHING	EASTING	
1101	7 643 494.5	503 926.8	10.5
1102	7 643 492.0	503 942.2	11.3
1103	7 643 476.1	503 951.5	11.6
1104	7 643 460.6	503 953.4	11.3
1105	7 643 445.7	503 950.4	10.3
1106	7 643 439.8	503 938.0	10.1
1107	7 643 443.5	503 932.0	10.0
1108	7 643 462.6	503 926.7	10.1
1109	7 643 488.2	503 925.7	10.5

RECORD DRAWING
NOT FOR CONSTRUCTION

0 7.5 15 m SCALE 1:750

DEW LINE CLEAN UP
LANDFILL MONITORING PLAN

PIN-2 CAPE YOUNG

SOUTH BORROW LANDFILL

FIGURE PIN-2.9

AECOM

Table 10.1: South Borrow Landfill – Baseline Soil Data

Sample #	Surface/ Reference Tag #	Location	Date	Depth (cm)	Cu [mg/kg]	Ni [mg/kg]	Co [mg/kg]	Cd [mg/kg]	Pb [mg/kg]	Zn [mg/kg]	Cr [mg/kg]	As [mg/kg]	Hg [mg/kg]	PCBs [mg/kg]	TPH [mg/kg]	TPH Identity		
																F1	F2	F3
Up-gradient Soil Samples																		
11-6937*/38	6937	P2-30	2011	0-10	8.3	5.2	<5.0	<1.0	<10	18	<20	8.0	<0.10	<0.050	19	<10	5	14
11-6939*/40	6937	P2-30	2011	30-40	8.5	5.1	<5.0	<1.0	<10	21	<20	7.4	<0.10	<0.050	<10	<10	<4.0	<9.0
Down-gradient Soil Samples																		
04-2842	2842		2004	10	23.0	9.1	<5.0	<1.0	<10	<15	<20	3.7		<0.1				
04-2843	2843		2004	10	11.0	9.5	<5.0	<1.0	<10	<15	<20	4.3		<0.1				
04-2844	2844		2004	10	14.0	7.4	<5.0	<1.0	<10	16	<20	1.7		<0.1				
04-2845	2845		2004	10	25.0	10	<5.0	<1.0	<10	<15	<20	5		<0.1				
04-2846	2846		2004	10	28.0	10	<5.0	<1.0	<10	33	<20	3.8		<0.1				
04-2847	2847		2004	10	7.8	7.7	<5.0	<1.0	<10	<15	<20	2.1		<0.1				
04-2848	2848		2004	10	28.0	16	6	<1.0	<10	44	<20	4		<0.1				
04-2849	2849		2004	10	32.0	12	<5.0	<1.0	<10	17	<20	2.4		<0.1				
04-2850/51	2850		2004	0	6.2	5.5	<5.0	<1.0	<10	<15	<20	2.1		<0.1				
04-2852	2850		2004	40	9.2	5.3	<5.0	<1.0	<10	<15	<20	1.8		<0.1				
04-2853	2850		2004	100	7.4	<5.0	<5.0	<1.0	<10	<15	<20	1.2		<0.1				
04-2854	2854		2004	0	11.0	34	<5.0	<1.0	<10	30	<20	3.2		<0.1				
04-2855	2854		2004	40	7.6	5.7	<5.0	<1.0	<10	<15	<20	2		<0.1				
04-2856	2854		2004	80	7.5	5.9	<5.0	<1.0	<10	<15	<20	2.1		<0.1				
04-2857	2857		2004	10														
04-2858	2858		2004	10	37.0	7.7	<5.0	<1.0	<10	<15	<20	<1.0						
04-2859	2859		2004	10	22.0	12	<5.0	<1.0	<10	50	<20	<1.0						
04-2860/61	2860		2004	10	15.0	8.9	5.3	<1.0	<10	22	<20	1.6		<0.1				
11-6945*/46	6945	P2-27	2011	0-10	13.0	6.9	<5.0	<1.0	<10	17	<20	2.3	<0.10	<0.050	36	<10	4.6	31
11-6947*/48	6945	P2-27	2011	30-40	14.0	13	<5.0	<1.0	<10	19	<20	2.4	<0.10	<0.050	28	<10	4.6	23

Sample #	Surface/ Reference Tag #	Location	Date	Depth (cm)	Cu [mg/kg]	Ni [mg/kg]	Co [mg/kg]	Cd [mg/kg]	Pb [mg/kg]	Zn [mg/kg]	Cr [mg/kg]	As [mg/kg]	Hg [mg/kg]	PCBs [mg/kg]	TPH [mg/kg]	TPH Identity		
																F1	F2	F3
11-6941*/42	6941	P2-28	2011	0-10	13.0	6.2	<5.0	<1.0	<10	<15	<20	2.5	<0.10	<0.050	108	<10	13	95
11-6943*/44	6941	P2-28	2011	30-40	9.5	5.3	<5.0	<1.0	<10	<15	<20	2.2	<0.10	<0.050	10	<10	<4.0	10
11-6949*/50*	6949	P2-29	2011	0-10	4.4	24	<5.0	<1.0	<10	<15	<20	3.5	<0.10	0.12	285	<10	15	270
11-6951*/52	6949	P2-29	2011	30-40	5.3	11	<5.0	<1.0	<10	<15	<20	2.5	<0.10	<0.050	192	<10	13	180
		N Value			25	25	25	25	25	25	25	25	8	23	8			
		Average			14.7	9.8	<5.0	<1.0	<10	<15	<20	2.9	<0.10	<0.050	85			
		Standard Deviation			9.2	6.7						1.8			103			
		Minimum			4.4	5.1	<5.0			<15		1.2		<0.050	<10			
		Maximum			37.0	34.0	6.0	<1.0	<10	50	<20	8.0	<0.10	0.12	285			
		95% Confidence Limit			3.6	2.6						0.7			71			

Appendix A

PIN-2 Cape Young Year 1 Monitoring Data

PIN-2 Cape Young – 2012 Landfill Monitoring

In August 2012, a visual inspection of each landfill and downloading of ground temperature data, where required, was completed by EBA. Soil and groundwater samples were collected where applicable by the Environmental Sciences Group (ESG). Samples were analyzed at Queen's University and Royal Military College laboratories, in Kingston, Ontario.

The following table documents the specific monitoring requirements for 2012 (year one of monitoring) at each landfill.

Landfill Designation	Visual Inspection	Groundwater Sampling	Soil Sampling	Thermal Monitoring
Airstrip Landfill	√		√	
USAF Landfill	√		√	
Station West Landfill	√		√	
Tier II Disposal Facility	√	√	√	√
Airstrip South Landfill	√		√	
Pallet Line West Landfill	√		√	
Non-Hazardous Waste Landfill	√	√	√	
South Landfill – East	√		√	
South Borrow Landfill	√		√	

This appendix serves as a compilation of the EBA geotechnical report (EBA 2012) and the ESG environmental report (ESG 2012) to document the results of landfill monitoring from year 1. The data is organized by landfill in separate annexes. The following information is provided in each Annex:

- Visual inspection checklist
- Visual inspection drawing mark-up
- A selection of visual inspection photos (all photos will be provided electronically)
- Thermal monitoring summary (where applicable)
- Plots of ground temperatures with depth at each thermistors installation (where applicable)
- Evaluation of 2012 soil analytical data, as compared to baseline conditions
- Summary of 2012 soil analytical data
- Summary of 2012 groundwater analytical data
- Monitoring well development/sampling reports (where applicable)

Summary of Significant Observations

With the exception of thermal data, no interpretation or recommendations have been provided in this appendix; these shall be provided by the Environmental Working Group – Nunavut Tunngavik Incorporated (EWG-NTI). Meeting minutes from the review shall be appended to this report.

Annex 1 Airstrip Landfill – Year 1 Data

Figures:

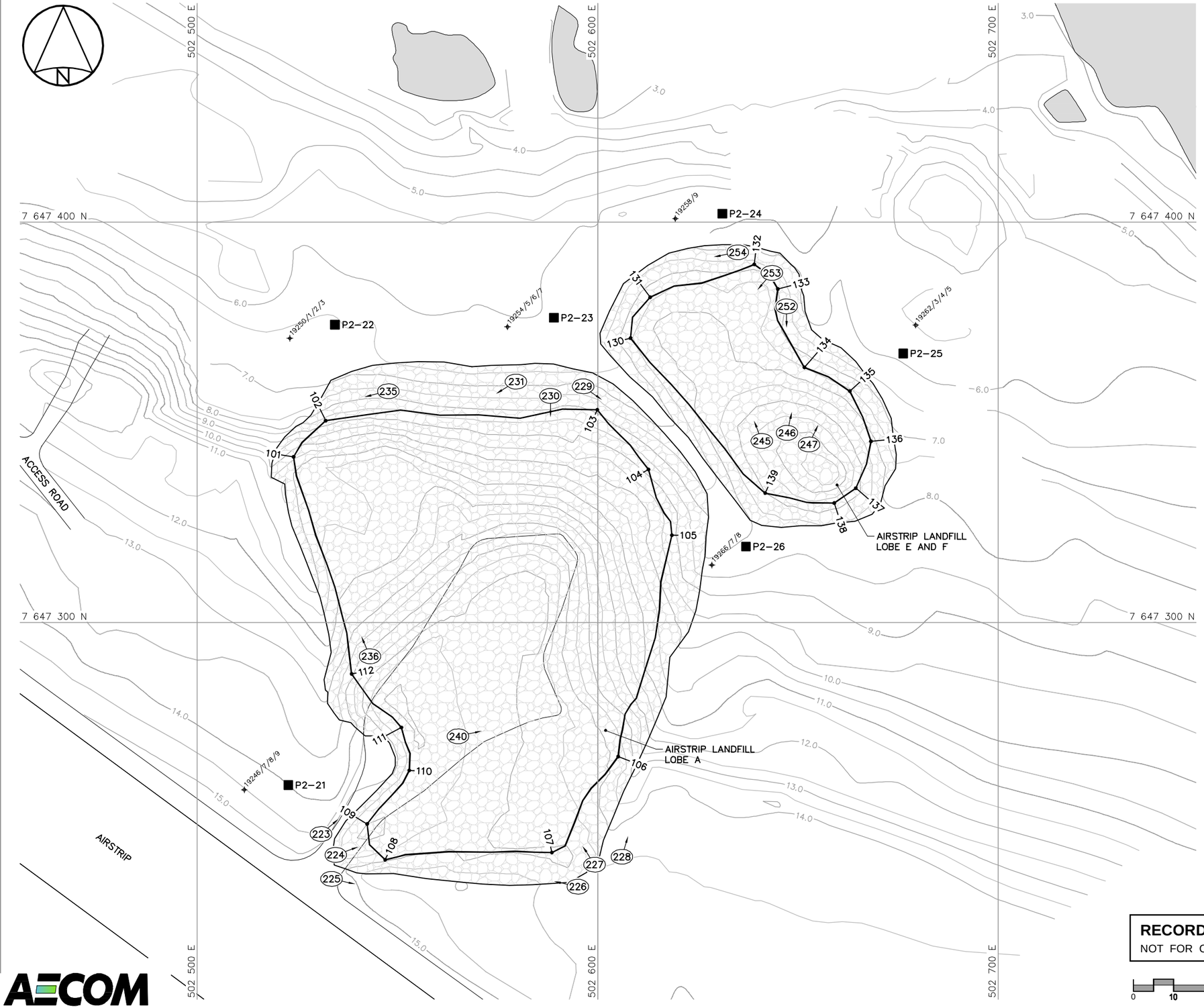
- PIN-2.2: Site Plan – Airstrip Landfill

Tables:

- Landfill Visual Inspection – Airstrip Landfill
- Airstrip Landfill – Evaluation of Year 1 Soil Data
- Airstrip Landfill – Year 1 (2012) Soil Data

Photographic Records:

- Photos 1 and 2
- Photos 3 and 4
- Photos 5 and 6
- Photos 7 and 8
- Photos 9 and 10
- Photos 11 and 12
- Photos 13 and 14
- Photos 15 and 16
- Photos 17 and 18



GENERAL NOTES:

1. ALL COORDINATES ARE REFERENCED TO NAD83 (CSRS), UTM ZONE 11N. ALL ELEVATIONS REFER TO GEODETIC DATUM.
2. ALL DIMENSIONS ARE IN METRES UNLESS NOTED OTHERWISE.

LEGEND:

- 101 — COORDINATE POINT
- ■ — MONITORING SOIL SAMPLE LOCATION (6)
- (247) — APPROX. PHOTOGRAPHIC VIEWPOINT
- 19262 — 2012 SOIL SAMPLE TAG LOCATION
- BODY OF WATER

AIRSTRIP LANDFILL (LOBE A) REGRADED (AS-BUILT)			
NO.	UTM COORDINATES		ELEV.
	NORTHING	EASTING	
101	7 647 341.4	502 524.0	10.4
102	7 647 350.4	502 532.0	8.7
103	7 647 353.1	502 599.9	7.9
104	7 647 338.3	502 612.6	8.8
105	7 647 321.8	502 618.5	9.1
106	7 647 266.6	502 605.1	13.9
107	7 647 242.6	502 588.5	15.1
108	7 647 240.8	502 546.9	15.1
109	7 647 249.7	502 542.4	16.0
110	7 647 263.1	502 552.9	15.8
111	7 647 273.8	502 550.9	15.8
112	7 647 287.2	502 538.5	13.9

AIRSTRIP LANDFILL (LOBES E & F) REGRADED (AS-BUILT)			
NO.	UTM COORDINATES		ELEV.
	NORTHING	EASTING	
130	7 647 371.1	502 608.2	7.4
131	7 647 381.2	502 613.1	7.4
132	7 647 389.5	502 639.1	6.8
133	7 647 383.3	502 644.9	7.0
134	7 647 363.7	502 651.6	7.5
135	7 647 357.8	502 663.0	7.6
136	7 647 345.3	502 668.2	8.2
137	7 647 333.6	502 664.4	9.2
138	7 647 329.9	502 659.0	9.2
139	7 647 332.4	502 641.8	9.0

RECORD DRAWING
NOT FOR CONSTRUCTION

0 10 20 m SCALE 1:1000

DEW LINE CLEAN UP
LANDFILL MONITORING PLAN

PIN-2 CAPE YOUNG

AIRSTRIP LANDFILL LOBES A, E, F, G

FIGURE PIN-2.2

AECOM

DEW Line Cleanup: Post-Construction - Landfill Monitoring
Visual Inspection Checklist and Preliminary Stability Assessment

Site Name:	**PIN-2 Cape Young**
Landfill Designation:	**Airstrip Landfill**
Date of Inspection:	**August 11 and August 12, 2012**
Inspected By:	**Renata Klassen, P.Eng. (EBA-TT)**

Checklist Item	Present Yes/No	Location (Describe relative to existing monuments/features and relative to landfill design i.e. surface, berms, toe)	Length	Width	Depth	Extent relative to Area of Landfill (%)	Description	Photographic Records Focal length, location, view point & direction (relative to magnetic north) Feature of note Scale	Additional Comments	Severity Rating
Settlement	No									
Erosion	No									
Frost Action	No									
Sloughing and Cracking	No									
Animal Burrows	No									
Vegetation	No									
Staining	No									
Vegetation Stress	No									
Seepage Points	No									
Debris Exposed	No									
Presence/Condition - Monitoring Instruments	No									
Features of Note	-									
Landfill Performance										Acceptable

Airstrip Landfill - EVALUATION OF YEAR 1 SOIL ANALYTICAL DATA

Parameter	N value Baseline	Arithmetic Mean +/- 95% Confidence Limit Baseline	Maximum Baseline [mg/kg]	2012	Comments
Copper	139	7.2 +/- 0.9	29	All concentrations within 95% confidence limit.	
Nickel	138	<5.0	13	Concentrations consistent with baseline mean (non-detect).	
Cobalt	138	<5.0	7.8	Concentrations consistent with baseline mean (non-detect).	
Cadmium	138	<1.0	<1.0	Concentrations consistent with baseline mean (non-detect).	
Lead	139	<10	48	Concentrations consistent with baseline mean (non-detect).	
Zinc	139	<15	42	Concentrations consistent with baseline mean (non-detect).	
Chromium	138	<20	<20	Concentrations consistent with baseline mean (non-detect).	
Arsenic	138	5.5 +/- 0.3	17	Seven of eleven concentrations above baseline mean, but were below baseline maximum.	The samples collected from sample locations P2-22, P2-23, P2-24, and P2-25 has concentrations of 6.0, 6.1, 7.1, 7.9, 8.0, 7.9, and 7.6 mg/kg, respectively.
Mercury	12	<0.10	<0.10	Concentrations consistent with baseline mean (non-detect).	
PCBs	139	<0.1	1.1	Concentrations consistent with baseline mean (non-detect).	
TPH	63	<10	14000	Concentrations consistent with baseline mean (non-detect).	

Airstrip Landfill - Year 1 (2012) Soil Data

Sample #	Surface/ Reference Tag #	Location	Date	Depth (cm)	Cu [mg/kg]	Ni [mg/kg]	Co [mg/kg]	Cd [mg/kg]	Pb [mg/kg]	Zn [mg/kg]	Cr [mg/kg]	As [mg/kg]	Hg [mg/kg]	PCBs [mg/kg]	TPH [mg/kg]	TPH Identity		
																F1	F2	F3
Airstrip Landfill- Baseline Concentrations					**7.2 +/- 0.9**	**<5.0**	**<5.0**	**<1.0**	**<10**	**<15**	**<20**	**5.5 +/- 0.3**	**<0.10**	**<0.1**	**<10**			
Airstrip Landfill - Maximum Concentrations					**29.0**	**13.0**	**7.8**	**<1.0**	**48**	**42**	**<20**	**17**	**<0.10**	**1.1**	**14000**			
Upgradient Soil Samples																		
12-19246/47	19246	P2-21	2012	0-10	3.2	1.8	<1.0	<0.50	4.6	10	2.3	2.8	<0.010	<0.020	<50	<5.0	<10	<50
12-19248/49	19246	P2-21	2012	30-40	3.1	1.3	<1.0	<0.50	4.8	8	2	2.9	<0.010	<0.020	<50	<5.0	<10	<50
Downgradient Soil Samples																		
12-19250/51	19250	P2-22	2012	0-10	2.4	2.0	<1.0	<0.50	4.9	8	3	6.0	<0.010	<0.020	<50	<5.0	<10	<50
12-19252/53	19250	P2-22	2012	30-40	2.7	2.2	1	<0.50	4.4	10	3	6.1	<0.010	<0.020	<50	<5.0	<10	<50
12-19254/55	19254	P2-23	2012	0-10	2.9	2.4	<1.0	<0.50	5.6	6	2	7.1	<0.010	<0.020	<50	<5.0	<10	<50
12-19256/57	19254	P2-23	2012	30-40	4.3	3.4	1.2	<0.50	6	7	3	7.9	<0.010	<0.020	<50	<5.0	<10	<50
12-19258/59	19258	P2-24	2012	0-10	3.0	1.9	<1.0	<0.50	5.7	11	2	8.0	0.015	<0.020	<50	<5.0	<10	<50
12-19262/63	19262	P2-25	2012	0-10	3.2	2.7	1.1	<0.50	5.1	7	3	7.9	<0.010	<0.020	<50	<5.0	<10	<50
12-19264/65	19262	P2-25	2012	30-40	3.3	2.9	<1.0	<0.50	5.2	6	2	7.6	<0.010	<0.020	<50	<5.0	<10	<50
12-19266/67	19266	P2-26	2012	0-10	2.1	1.6	<1.0	<0.50	3.6	8	2	4.8	<0.010	<0.020	<50	<5.0	<10	<50
12-19268/69	19266	P2-26	2012	30-40	2.5	1.5	<1.0	<0.50	4.1	8	2	5.2	<0.010	<0.020	<50	<5.0	<10	<50

Photograph 1. Looking at W toe from the SW corner of Lobe A (Photo 223). ↑

Photograph 2. Looking NE from the SW corner of Lobe A (Photo 224). ↑

Photograph 3. Looking along S toe from SW corner of Lobe A (Photo 225). ↑

Photograph 4. Looking at S toe from the SE corner of Lobe A (Photo 226). ↑

Photograph 5. Looking NE across landfill from SW corner of Lobe A (Photo 227). ↑

Photograph 6. Looking NE from SE corner of Lobe A (Photo 228). ↑

Photograph 7. Looking SE from NE corner of the landfill Lobe A (Photo 229) ↑

Photograph 8. Looking S from NE corner of the landfill Lobe A (Photo 230). ↑

Photograph 9. Looking E from NE corner of Lobe A (Photo 231) ↑

Photograph 10. Looking W from N toe of landfill (Photo 235). ↑

Photograph 11. Looking N from centre of W edge of Lobe A (Photo 236) ↑

Photograph 12. Looking E from SW portion of Lobe A (Photo 240). ↑

Photograph 13. Looking N from SW corner of the landfill Lobe E and F (Photo 245) ↑

Photograph 14. Looking NE from SW corner of the landfill Lobe E and F (Photo 246). ↑

Photograph 15. Looking NE from SE corner of the landfill Lobe E and F (Photo 247) ↑

Photograph 16. Looking W from NE corner of the landfill Lobe E and F (Photo 254). ↑

Photograph 17. Looking SE from NE corner of the landfill Lobe E and F (Photo 253) ↑

Photograph 18. Looking S from NE corner of the landfill Lobe E and F (Photo 252). ↑

Annex 2 USAF Landfill – Year 1 Data

Figures:

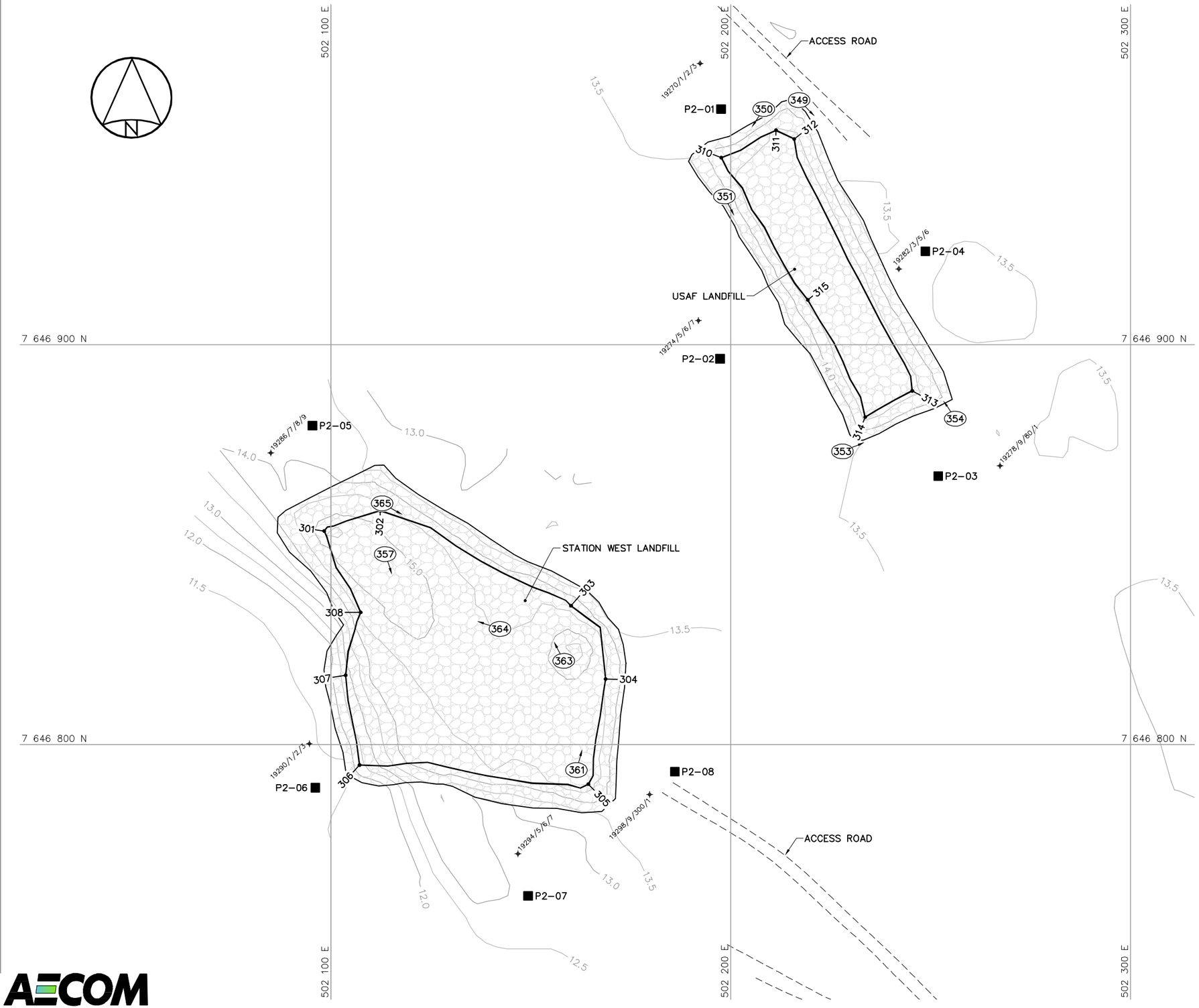
- PIN-2.3: Site Plan – USAF Landfill

Tables:

- Landfill Visual Inspection – USAF Landfill
- USAF Landfill – Evaluation of Year 1 Soil Data
- USAF Landfill – Year 1 (2012) Soil Data

Photographic Records:

- Photos 19 and 20
- Photos 21 and 22
- Photo 23



GENERAL NOTES:

1. ALL COORDINATES ARE REFERENCED TO NAD83 (CSRS), UTM ZONE 11N. ALL ELEVATIONS REFER TO GEODETIC DATUM.
2. ALL DIMENSIONS ARE IN METRES UNLESS NOTED OTHERWISE.

LEGEND:

- 301 — COORDINATE POINT
- ■ — MONITORING SOIL SAMPLE LOCATION (8)
- (350) — APPROX. PHOTOGRAPHIC VIEWPOINT
- ★19282 — 2012 SOIL SAMPLE TAG LOCATION

STATION WEST LANDFILL REGRADED (AS–BUILT)			
NO.	UTM COORDINATES		ELEV.
	NORTHING	EASTING	
301	7 646 853.4	502 098.3	15.4
302	7 646 858.5	502 112.4	14.7
303	7 646 834.7	502 160.0	14.4
304	7 646 816.4	502 168.7	14.5
305	7 646 790.1	502 164.4	14.7
306	7 646 794.9	502 107.2	12.3
307	7 646 817.4	502 103.7	12.8
308	7 646 833.1	502 107.5	14.6

USAF LANDFILL REGRADED (AS–BUILT)			
NO.	UTM COORDINATES		ELEV.
	NORTHING	EASTING	
310	7 646 946.8	502 197.6	14.4
311	7 646 953.6	502 211.3	14.6
312	7 646 951.5	502 215.8	14.7
313	7 646 888.5	502 245.4	14.7
314	7 646 881.9	502 233.6	14.7
315	7 646 911.2	502 219.3	14.6

RECORD DRAWING
NOT FOR CONSTRUCTION

0 10 20 m SCALE 1:1000

DEW LINE CLEAN UP
LANDFILL MONITORING PLAN

PIN-2 CAPE YOUNG

STATION WEST LANDFILL AND USAF LANDFILL

FIGURE PIN-2.3

AECOM

DEW Line Cleanup: Post-Construction - Landfill Monitoring
Visual Inspection Checklist and Preliminary Stability Assessment

Site Name:	**PIN-2 Cape Young**
Landfill Designation:	**USAF Landfill**
Date of Inspection:	**August 11 and August 12, 2012**
Inspected By:	**Renata Klassen, P.Eng. (EBA-TT)**

Checklist Item	Present Yes/No	Location (Describe relative to existing monuments/features and relative to landfill design i.e. surface, berms, toe)	Length	Width	Depth	Extent relative to Area of Landfill (%)	Description	Photographic Records Focal length, location, view point & direction (relative to magnetic north) Feature of note Scale	Additional Comments	Severity Rating
Settlement	No									
Erosion	No									
Frost Action	No									
Sloughing and Cracking	No									
Animal Burrows	No									
Vegetation	No									
Staining	No									
Vegetation Stress	No									
Seepage Points	No									
Debris Exposed	No									
Presence/Condition - Monitoring Instruments	No									
Features of Note	-									
Landfill Performance										Acceptable

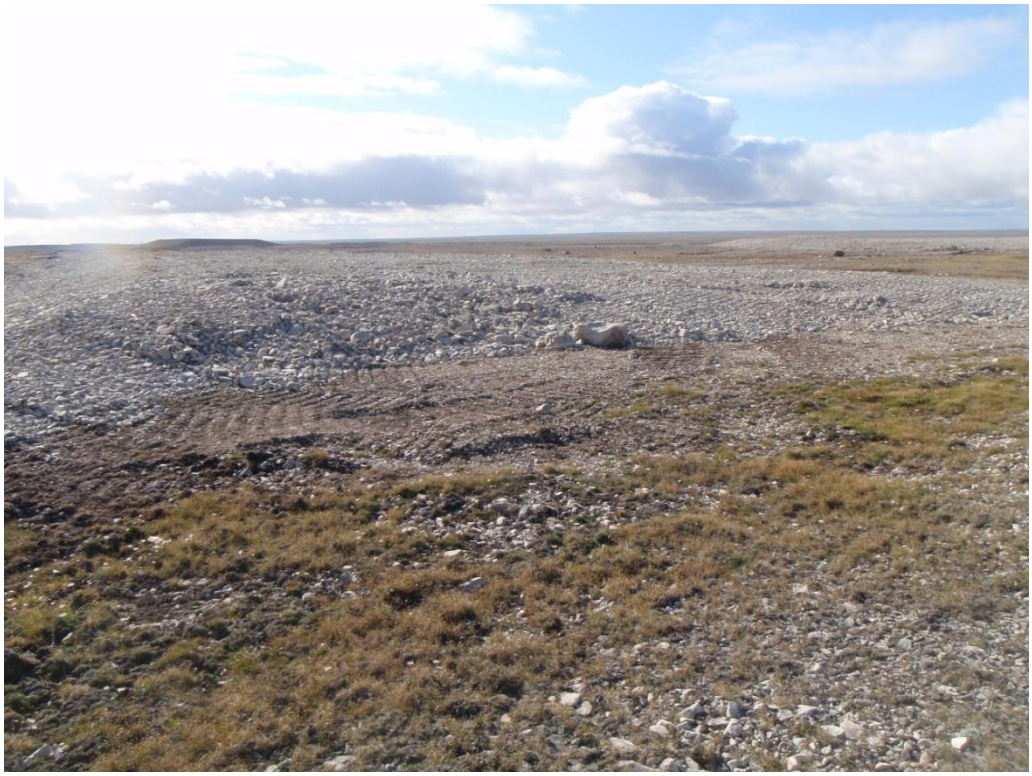
USAF Landfill - EVALUATION OF YEAR 1 SOIL ANALYTICAL DATA

Parameter	N value Baseline	Arithmetic Mean +/- 95% Confidence Limit Baseline	Maximum Baseline [mg/kg]	2012	Comments
Copper	38	7.7 +/- 0.9	19	All concentrations within 95% confidence limit.	
Nickel	38	<5.0	62	All concentrations consistent with baseline mean, with three exceptions.	The surface and depth samples at P2-2 had concentrations of 6.3 and 5.7 mg/kg and the surface sample at P2-4 had a concentration of 100.0 mg/kg.
Cobalt	38	<5.0	<5.0	Concentrations consistent with baseline mean (non-detect).	
Cadmium	38	<1.0	<1.0	Concentrations consistent with baseline mean (non-detect).	
Lead	38	<10	18	All concentrations consistent with baseline mean, with two exceptions.	The surface and depth samples at P2-4 had concentrations of 22 and 16 mg/kg, respectively.
Zinc	38	15 +/- 2	31	Concentrations within 95% confidence limit, with five exceptions.	The surface and depth samples at P2-2 and P2-4 had concentrations of 33, 26, 22, and 37 mg/kg, respectively. The surface sample at P2-3 had a concentration of 26 mg/kg.
Chromium	38	<20	140	All concentrations consistent with baseline mean, with one exception.	The surface sample from P2-4 had a concentration of 230 mg/kg.
Arsenic	38	5.9 +/- 4.1	80	All concentrations within 95% confidence limit.	
Mercury	8	<0.10	<0.10	Concentrations consistent with baseline mean (non-detect).	
PCBs	38	<0.1	<0.1	Concentrations consistent with baseline mean (non-detect).	
TPH	8	<10	15	All concentrations consistent with baseline mean, with one exceptions.	The surface sample from P2-1 had a concentration of 290 mg/kg.

USAF Landfill - Year 1 (2012) Soil Data

Sample #	Surface/ Reference Tag #	Location	Date	Depth (cm)	Cu [mg/kg]	Ni [mg/kg]	Co [mg/kg]	Cd [mg/kg]	Pb [mg/kg]	Zn [mg/kg]	Cr [mg/kg]	As [mg/kg]	Hg [mg/kg]	PCBs [mg/kg]	TPH [mg/kg]	TPH Identity		
																F1	F2	F3
USAF Landfill- Baseline Concentrations					**7.7 +/- 0.9**	**<5.0**	**<5.0**	**<1.0**	**<10**	**15 +/- 2**	**<20**	**5.9 +/- 4.1**	**<0.10**	**<0.1**	**<10**			
USAF Landfill - Maximum Concentrations					**19.0**	**62.0**	**<5.0**	**<1.0**	**18**	**31**	**140**	**80.0**	**<0.10**	**<0.1**	**15**			
Upgradient Soil Samples																		
12-19270/71	19270	P2-01	2012	0-10	7.7	2.4	<1.0	<0.50	3	17	3	1.1	0.065	<0.040	290	<10	<20	290
12-19272/73	19270	P2-01	2012	30-40	3.0	3.0	1.4	<0.50	3	10	5	1.9	0.01	<0.020	<50	<5.0	<10	<50
Downgradient Soil Samples																		
12-19274/75	19274	P2-02	2012	0-10	5.9	6.3	3.1	<0.50	5	33	9	3.7	0.015	<0.020	<50	<5.0	<10	<50
12-19276/77	19274	P2-02	2012	30-40	6.1	5.7	2.6	<0.50	6	26	9	7.5	0.014	<0.020	<50	<5.0	<10	<50
12-19278/79	19278	P2-03	2012	0-10	5.7	3.0	1.6	<0.50	3	26	4	2.6	0.016	<0.020	<50	<5.0	<10	<50
12-19280/81	19278	P2-03	2012	30-40	3.7	2.1	1.1	<0.50	3	14	3	3.4	0.02	0.036	<50	<5.0	<10	<50
12-19282/83	19282	P2-04	2012	0-10	7.8	100.0	3.5	<0.50	22	22	230	5.8	<0.010	<0.020	<50	<5.0	<10	<50
12-19284/85	19282	P2-04	2012	30-40	6.4	4.0	2.0	<0.50	16	37	8	5.3	0.014	0.039	<50	<5.0	<10	<50

Photograph 19. Looking SE along E toe of landfill (Photo 349). ↑



Photograph 20. Looking W from the NE corner of landfill (Photo 350). ↑

Photograph 21. Looking SE along W toe of landfill (Photo 351). ↑

Photograph 22. Looking along S toe of landfill (Photo 353). ↑

Photograph 23. Looking along E toe of landfill (Photo 354). ↑

Annex 3 Station West Landfill – Year 1 Data

Figures:

- PIN-2.3: Site Plan – Station West Landfill

Tables:

- Landfill Visual Inspection – Station West Landfill
- Station West Landfill – Evaluation of Year 1 Soil Data
- Station West Landfill – Year 1 (2012) Soil Data

Photographic Records:

- Photos 24 and 25
- Photos 26 and 27
- Photo 28

DEW Line Cleanup: Post-Construction - Landfill Monitoring
Visual Inspection Checklist and Preliminary Stability Assessment

Site Name:	**PIN-2 Cape Young**
Landfill Designation:	**Station West Landfill**
Date of Inspection:	**August 11 and August 12, 2012**
Inspected By:	**Renata Klassen, P.Eng. (EBA-TT)**

Checklist Item	Present Yes/No	Location (Describe relative to existing monuments/features and relative to landfill design i.e. surface, berms, toe)	Length	Width	Depth	Extent relative to Area of Landfill (%)	Description	Photographic Records Focal length, location, view point & direction (relative to magnetic north) Feature of note Scale	Additional Comments	Severity Rating
Settlement	No									
Erosion	No									
Frost Action	No									
Sloughing and Cracking	No									
Animal Burrows	No									
Vegetation	No									
Staining	No									
Vegetation Stress	No									
Seepage Points	No									
Debris Exposed	No									
Presence/Condition - Monitoring Instruments	No									
Features of Note	-									
Landfill Performance										Acceptable

Station West Landfill - EVALUATION OF YEAR 1 SOIL ANALYTICAL DATA

Parameter	N value Baseline	Arithmetic Mean +/- 95% Confidence Limit Baseline	Maximum Baseline [mg/kg]	2012	Comments
Copper	42	5.8 +/- 0.7	12	All concentrations within 95% confidence limit, with two exceptions.	The surface samples at P2-5 and P2-7 had concentrations of 9.3 and 8.5 mg/kg, respectively. Both results were below the baseline maximum.
Nickel	42	<5.0	6.1	Concentrations consistent with baseline mean (non-detect), with one exception.	The surface sample at P2-6 had a concentration of 5.1 mg.kg. The result was below the baseline maximum.
Cobalt	42	<5.0	<5.0	Concentrations consistent with baseline mean (non-detect).	
Cadmium	42	<1.0	<1.0	Concentrations consistent with baseline mean (non-detect).	
Lead	42	<10	<10	Concentrations consistent with baseline mean (non-detect).	
Zinc	42	<15	23	Concentrations consistent with baseline mean (non-detect), with four exceptions.	The surface samples at P2-5, -6, -7, and -8 had concentrations of 55, 26, 42, and 30 mg/kg, respectively. Three of the results exceeded the baseline maximum.
Chromium	42	<20	<20	Concentrations consistent with baseline mean (non-detect).	
Arsenic	42	3.6 +/- 0.3	5.3	All concentrations within 95% confidence limit, with one exception.	The surface sample at P2-6 had a concentration of 4.3 mg/kg. The result was below the baseline maximum.
Mercury	8	<0.10	<0.10	Concentrations consistent with baseline mean (non-detect).	
PCBs	42	<0.1	0.1	Concentrations consistent with baseline mean (non-detect).	
TPH	10	<40	<40	Concentrations consistent with baseline mean (non-detect), with five exceptions.	The surface and depth sample at P2-5 had a concentration of 260 and 53 mg/kg. The surface samples at P2-6, -7, and -8 had a concentration of 100, 53, and 140 mg/kg, respectively. All of the sample results were above the baseline maximum.

Station West Landfill - Year 1 (2012) Soil Data

Sample #	Surface/ Reference Tag #	Location	Date	Depth (cm)	Cu [mg/kg]	Ni [mg/kg]	Co [mg/kg]	Cd [mg/kg]	Pb [mg/kg]	Zn [mg/kg]	Cr [mg/kg]	As [mg/kg]	Hg [mg/kg]	PCBs [mg/kg]	TPH [mg/kg]	TPH Identity		
																F1	F2	F3
Station West Landfill- Baseline Concentrations					**5.8 +/- 0.7**	**<5.0**	**<5.0**	**<1.0**	**<10**	**<15**	**<20**	**3.6 +/- 0.3**	**<0.10**	**<0.1**	**<40**			
Station West Landfill - Maximum Concentrations					**12.0**	**6.1**	**<5.0**	**<1.0**	**<10**	**23**	**<20**	**5.3**	**<0.10**	**0.1**	**<40**			
Upgradient Soil Samples																		
12-19286/87	19286	P2-05	2012	0-10	9.3	2.8	1.4	<0.50	1.7	55	3.5	1.2	0.027	<0.060	260	<15**	<30**	260
12-19288/89	19286	P2-05	2012	30-40	3.3	4.1	1.8	<0.50	3.3	12	7	2.4	0.012	<0.020	53	<5.0	<10	53
Downgradient Soil Samples																		
12-19290/91	19290	P2-06	2012	0-10	6.0	5.1	3.7	<0.50	7.3	26	9	4.3	0.037	<0.040	100	<10**	<20**	100
12-19292/93	19290	P2-06	2012	30-40	1.6	2.2	1.1	<0.50	3.7	15	7	2.8	<0.010	<0.020	<50	<5.0	<10	<50
12-19294/95	19294	P2-07	2012	0-10	8.5	3.4	1.7	<0.50	4.1	42	5	3.5	0.023	<0.020	53	<5.0	<10	53
12-19296/97	19294	P2-07	2012	30-40	3.1	1.7	<1.0	<0.50	3.3	13	4	3.8	0.013	<0.020	<50	<5.0	<10	<50
12-19298/99	19298	P2-08	2012	0-10	4.7	2.1	1.1	<0.50	3.5	30	3	2.8	0.054	<0.030	140	<5.0	<15**	140
12-19300/01	19298	P2-08	2012	30-40	2.5	1.8	<1.0	<0.50	2.8	10	3	3.3	0.015	<0.020	<50	<5.0	<10	<50

Photograph 24. Looking SE from NW corner of landfill (Photo 357). ↑

Photograph 25. Looking N from SE corner of landfill (Photo 361). ↑

Photograph 26. Looking along NE toe (Photo 363). ↑

Photograph 27. Looking W from centre of landfill (Photo 364). ↑

Photograph 28. Looking SE across landfill from N corner (Photo 365). ↑

Annex 4 Tier II Disposal Facility – Year 1 Data

Figures:

- PIN-2.4: Site Plan – Tier II Disposal Facility
- Ground Temperature Profile Tier II Disposal Facility Vertical Thermistor VT-1
- Ground Temperature Profile Tier II Disposal Facility Vertical Thermistor VT-2
- Ground Temperature Profile Tier II Disposal Facility Vertical Thermistor VT-3
- Ground Temperature Profile Tier II Disposal Facility Vertical Thermistor VT-4

Tables:

- Landfill Visual Inspection – Tier II Disposal Facility
- Tier II Disposal Facility – Evaluation of Year 1 Soil Analytical Data
- Tier II Disposal Facility – Year 1 (2012) Soil Data
- Tier II Disposal Facility – Year 1 (2012) Groundwater Data

Photographic Records:

- Photos 29 and 30
- Photos 31 and 32
- Photos 33 and 34
- Photos 35 and 36

Well Sampling Records:

- Well MW-05
- Well MW-06
- Well MW-07
- Well MW-08

Thermistor Annual Maintenance Records:

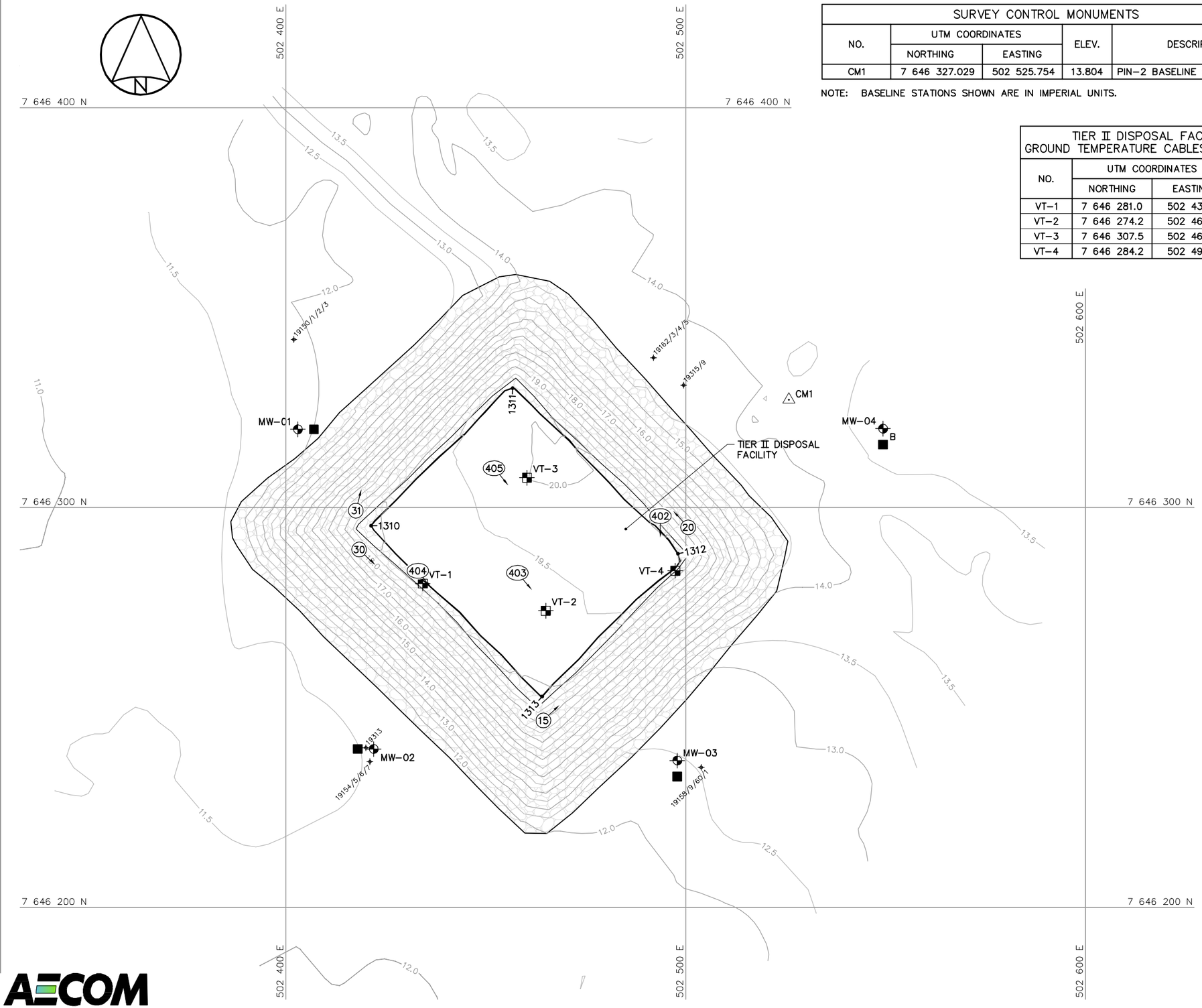
- VT-1
- VT-2
- VT-3
- VT-4

Tier II Disposal Facility – Evaluation of Ground Temperature Data

Ground temperature profiles for the vertical thermistors are attached, showing ground temperature curves since August 2012. The table shows the depth of the active layer as defined by the 0°C isotherm for August 11, 2012.

Summary of Tier II Disposal Facility Thermal Results				
	VT-1	**VT-2**	**VT-3**	**VT-4**
Depth (m) of 0°C Isotherm (August 11/12)	-3.1	-2.4	-2.6	-1.9

The average active layer depth of 2.5 m was less than the design active layer (4.0 m) (EBA 2012). The ground temperatures are expected to cool in subsequent years, and the active layer is expected to reach the design active layer.



SURVEY CONTROL MONUMENTS				
NO.	UTM COORDINATES		ELEV.	DESCRIPTION
	NORTHING	EASTING		
CM1	7 646 327.029	502 525.754	13.804	PIN-2 BASELINE STA. 0+00

NOTE: BASELINE STATIONS SHOWN ARE IN IMPERIAL UNITS.

TIER II DISPOSAL FACILITY GROUND TEMPERATURE CABLES (AS-BUILT)			
NO.	UTM COORDINATES		ELEV.
	NORTHING	EASTING	
VT-1	7 646 281.0	502 434.2	19.1
VT-2	7 646 274.2	502 465.0	19.2
VT-3	7 646 307.5	502 460.3	20.0
VT-4	7 646 284.2	502 497.4	19.9

GENERAL NOTES:

1. ALL COORDINATES ARE REFERENCED TO NAD83 (CSRS), UTM ZONE 11N. ALL ELEVATIONS REFER TO GEODETIC DATUM.
2. ALL DIMENSIONS ARE IN METRES UNLESS NOTED OTHERWISE.

LEGEND:

- 1310 — COORDINATE POINT
- MONITORING WELL LOCATION (3)
- B — BACKGROUND MONITORING WELL LOCATION (1)
- GROUND TEMPERATURE CABLE LOCATION (4)
- MONITORING SOIL SAMPLE LOCATION (4)
- 402 — APPROX. PHOTOGRAPHIC VIEWPOINT
- 19315 — 2012 SOIL SAMPLE TAG LOCATION

TIER II DISPOSAL FACILITY MONITORING WELLS (AS-BUILT)			
NO.	UTM COORDINATES		ELEV.
	NORTHING	EASTING	
MW-01	7 646 319.6	502 402.9	11.8
MW-02	7 646 239.7	502 421.9	11.5
MW-03	7 646 236.8	502 497.9	12.6
MW-04	7 646 319.8	502 549.3	13.4

TIER II DISPOSAL FACILITY FINAL GRADING (AS-BUILT)			
NO.	UTM COORDINATES		ELEV.
	NORTHING	EASTING	
1310	7 646 295.5	502 421.3	18.9
1311	7 646 329.9	502 456.7	19.8
1312	7 646 288.5	502 498.0	20.0
1313	7 646 252.8	502 464.0	18.9

NOTE:
COORDINATE POINTS AND ELEVATIONS PROVIDED ARE TO THE FINAL GRADE OF TYPE 2 GRANULAR FILL PRIOR TO THE PLACEMENT OF TYPE 1 GRANULAR FILL ON SIDE SLOPES.

RECORD DRAWING
NOT FOR CONSTRUCTION

0 10 20 m SCALE 1:1000

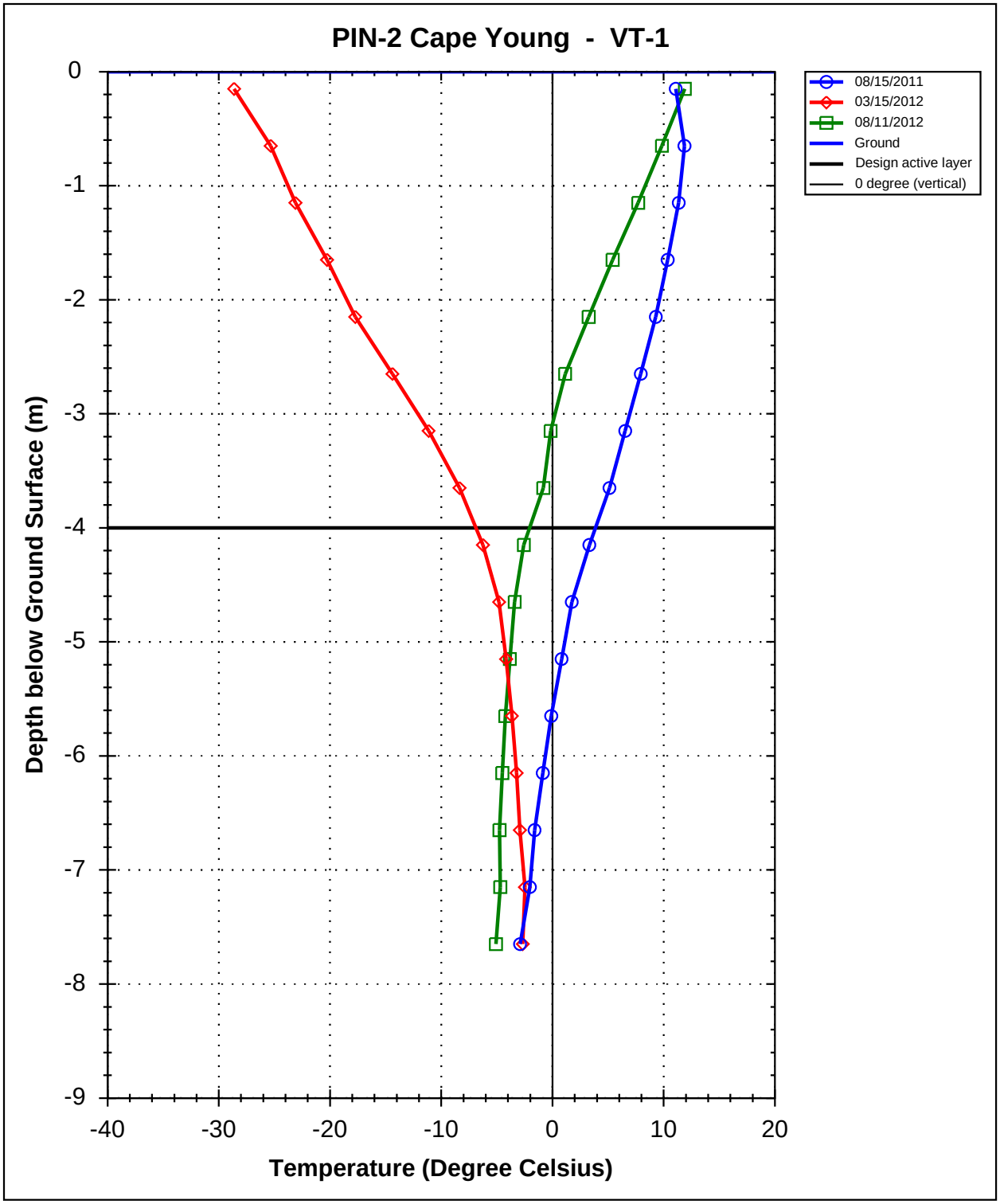
DEW LINE CLEAN UP
LANDFILL MONITORING PLAN

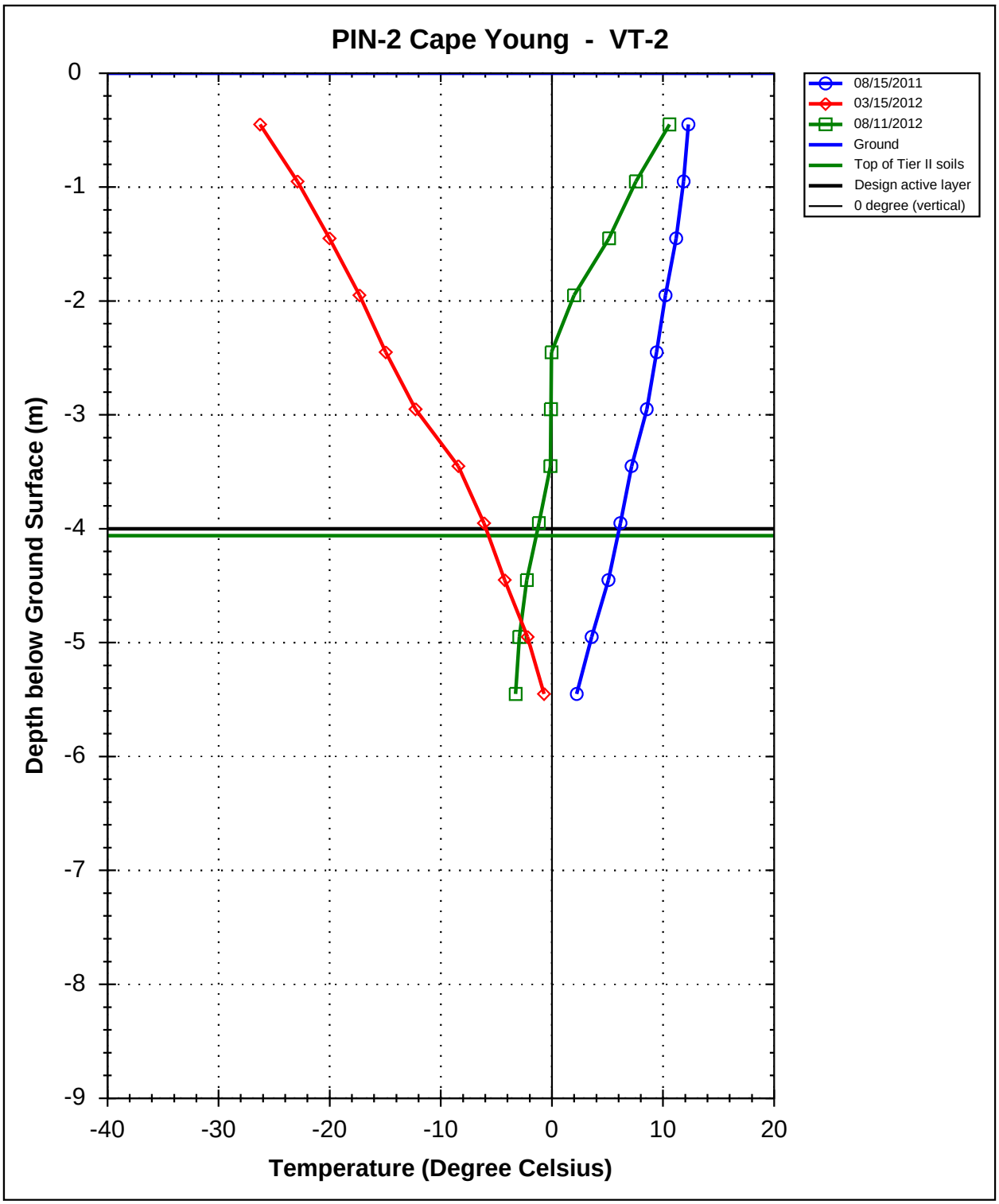
PIN-2 CAPE YOUNG

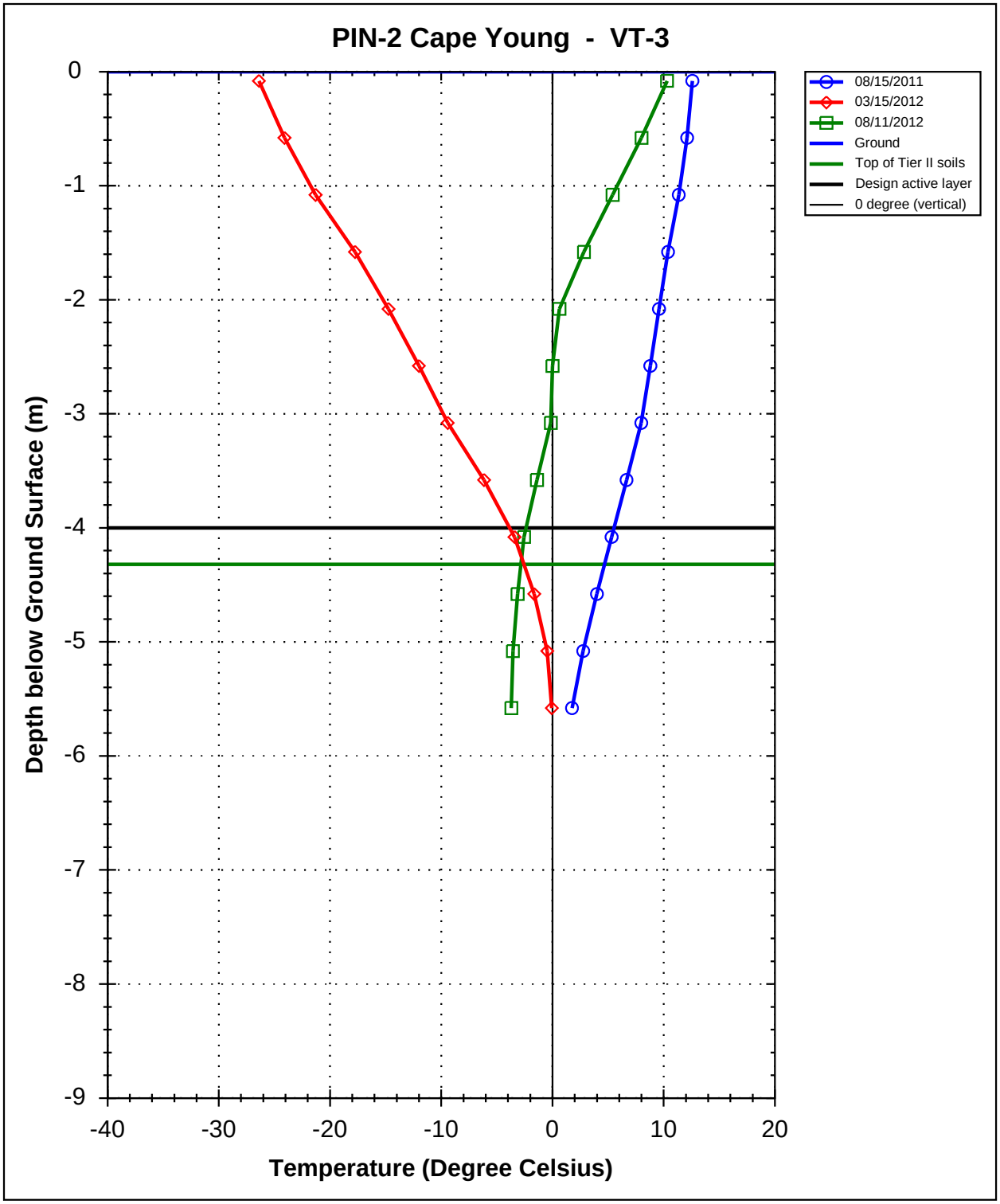
TIER II DISPOSAL FACILITY

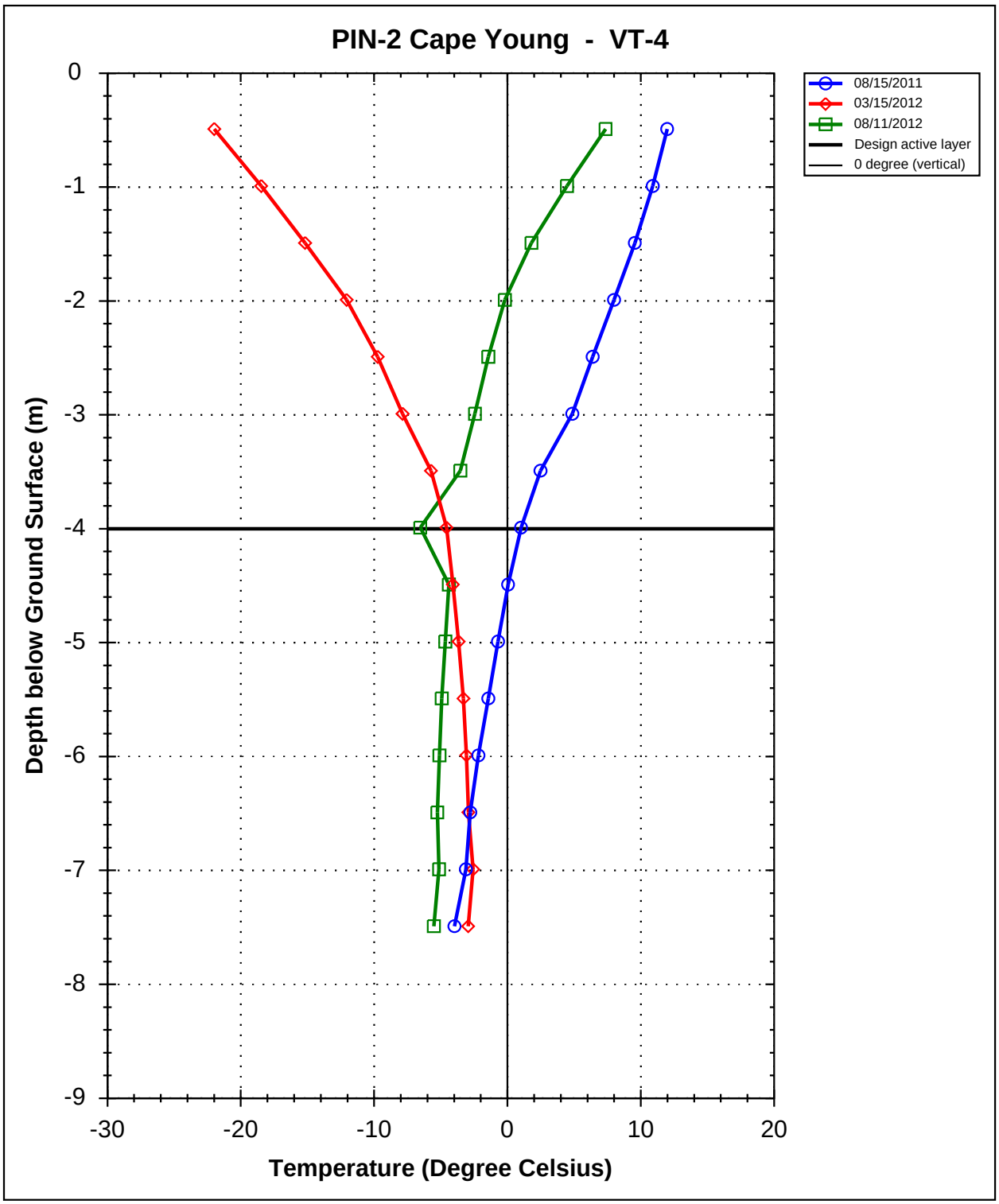
FIGURE PIN-2.4

AECOM


PIN-2 Cape Young - VT-1
Depth below Ground Surface (m)
Temperature (Degree Celsius)
0
-1
-2
-3
-4
-5
-6
-7
-8
-9
-40
-30
-20
-10
0
10
20
08/15/2011
03/15/2012
08/11/2012
Ground
Design active layer
0 degree (vertical)


PIN-2 Cape Young - VT-2
Depth below Ground Surface (m)
Temperature (Degree Celsius)
0
-1
-2
-3
-4
-5
-6
-7
-8
-9
-40
-30
-20
-10
0
10
20
08/15/2011
03/15/2012
08/11/2012
Ground
Top of Tier II soils
Design active layer
0 degree (vertical)


PIN-2 Cape Young - VT-3
Depth below Ground Surface (m)
0
-1
-2
-3
-4
-5
-6
-7
-8
-9
-40
-30
-20
-10
0
10
20
Temperature (Degree Celsius)
08/15/2011
03/15/2012
08/11/2012
Ground
Top of Tier II soils
Design active layer
0 degree (vertical)


PIN-2 Cape Young - VT-4
Depth below Ground Surface (m)
Temperature (Degree Celsius)
0
-1
-2
-3
-4
-5
-6
-7
-8
-9
-30
-20
-10
0
10
20
08/15/2011
03/15/2012
08/11/2012
Design active layer
0 degree (vertical)

DEW Line Cleanup: Post-Construction - Landfill Monitoring
Visual Inspection Checklist and Preliminary Stability Assessment

Site Name:	**PIN-2 Cape Young**
Landfill Designation:	**Tier II Disposal Facility**
Date of Inspection:	**August 11 and August 12, 2012**
Inspected By:	**Renata Klassen, P.Eng. (EBA-TT)**

Checklist Item	Present Yes/No	Location (Describe relative to existing monuments/features and relative to landfill design i.e. surface, berms, toe)	Length	Width	Depth	Extent relative to Area of Landfill (%)	Description	Photographic Records Focal length, location, view point & direction (relative to magnetic north) Feature of note Scale	Additional Comments	Severity Rating
Settlement	No									
Erosion	No									
Frost Action	No									
Sloughing and Cracking	No									
Animal Burrows	No									
Vegetation	No									
Staining	No									
Vegetation Stress	No									
Seepage Points	No									
Debris Exposed	No									
Presence/Condition - Monitoring Instruments	Yes	As shown on Figure PIN-2.4.					VT-1 to VT-4			
Features of Note	Yes	Thermistor VT-2				Isolated	The cap's edge is bent and side is cracked through one of the holes. The datalogget holding screw is stripped of its protective plastic cover and rusted.		The cap was locked as designed. The screw fulfills its purpose and the datalogger was positioned as designed. Dry bentonite is visible on the inside of the housing.	Acceptable
Landfill Performance										Acceptable

Tier II Disposal Facility - EVALUATION OF YEAR 1 SOIL ANALYTICAL DATA

Parameter	N value Baseline	Arithmetic Mean +/- 95% Confidence Limit Baseline	Maximum Baseline [mg/kg]	2012	Comments
Copper	16	5.2 +/- 1.9	12.6	All concentrations within 95% confidence limit, with two exceptions.	The surface samples at MW-2 and MW-3 had concentrations of 7.7 and 10.2 mg/kg, respectively. Both results were below the baseline maximum.
Nickel	16	<5.0	8.0	Concentrations consistent with baseline mean (non-detect), with two exceptions.	The surface samples at MW-2 and MW-3 had concentrations of 6.3 and 6.1 mg/kg, respectively. Both results were below the baseline maximum.
Cobalt	16	<5.0	5.2	Concentrations consistent with baseline mean (non-detect).	
Cadmium	16	<1.0	<1.0	Concentrations consistent with baseline mean (non-detect).	
Lead	16	<10	<10	Concentrations consistent with baseline mean (non-detect).	
Zinc	16	15 +/- 4	26	All concentrations within 95% confidence limit, with two exceptions.	The surface samples at MW-2 and MW-4 had concentrations of 21 and 27 mg/kg, respectively. One result exceeded the baseline maximum.
Chromium	16	<20	<20	Concentrations consistent with baseline mean (non-detect).	
Arsenic	16	3.9 +/- 1.0	10	Concentrations consistent with baseline mean (non-detect).	
Mercury	16	<0.10	<0.10	Concentrations consistent with baseline mean (non-detect).	
PCBs	16	<0.05	<0.05	Concentrations consistent with baseline mean (non-detect).	
TPH	16	20 +/- 7	45	All concentrations within 95% confidence limit, with two exceptions.	The surface samples at MW-2 and MW-3 had concentrations of 86 and 110 mg/kg, respectively. Both results exceeded the baseline maximum.

Tier II Disposal Facility - Year 1 (2012) Soil Data

Sample #	Surface/ Reference Tag #	Location	Date	Depth (cm)	Cu [mg/kg]	Ni [mg/kg]	Co [mg/kg]	Cd [mg/kg]	Pb [mg/kg]	Zn [mg/kg]	Cr [mg/kg]	As [mg/kg]	Hg [mg/kg]	PCBs [mg/kg]	TPH [mg/kg]	TPH Identity		
																F1	F2	F3
Tier II Disposal Facility- Baseline Concentrations					**5.2 +/- 1.9**	**<5.0**	**<5.0**	**<1.0**	**<10**	**15 +/- 4**	**<20**	**3.9 +/- 1.0**	**<0.10**	**<0.05**	**20 +/- 7**			
Tier II Disposal Facility - Maximum Concentrations					**12.6**	**8.0**	**5.2**	**<1.0**	**<10**	**26**	**<20**	**10**	**<0.10**	**<0.05**	**45**			
Upgradient Soil Samples																		
12-19162/63	19162	BMW-4	2012	0-10	6.6	4.1	2.3	<0.50	4	27	5.9	2.4	0.043	<0.020	<75	<7.5	<15	<75
12-19164/65	19162	BMW-4	2012	30-40	3.2	3.7	1.9	<0.50	2.9	15	6	2.3	0.012	<0.020	<50	<5.0	<10	<50
Downgradient Soil Samples																		
12-19150/51	19150	MW-1	2012	0-10	5.4	3.4	2	<0.50	4.5	17	8	1.0	0.021	<0.020	<50	12	<10	<50
12-19152/53	19150	MW-1	2012	30-40	2.3	3.0	1.6	<0.50	2.4	9	5	2.8	<0.010	<0.020	<50	<5.0	<10	<50
12-19154/55	19154	MW-2	2012	0-10	7.7	6.3	2.2	<0.50	3.8	21	8	4.2	0.031	<0.020	86	12	<10	74
12-19156/57	19154	MW-2	2012	30-40	4.5	4.2	1.6	<0.50	2.3	13	5	3.8	0.023	<0.020	<50	<5.0	<10	<50
12-19158/59	19158	MW-3	2012	0-10	10.2	6.1	1.8	<0.50	4	17	5	4.2	0.016	<0.020	110	<5.0	<10	110
12-19160/61	19158	MW-3	2012	30-40	3.7	3.4	1.3	<0.50	2.6	12	5	2.6	<0.010	<0.020	<50	<5.0	<10	<50

Tier II Disposal Facility - Year 1 (2012) Groundwater Data

Sample #	Location	Date	Cu [mg/L]	Ni [mg/L]	Co [mg/L]	Cd [mg/L]	Pb [mg/L]	Zn [mg/L]	Cr [mg/L]	As [mg/L]	Hg [mg/L]	PCBs [mg/L]	TPH [mg/L]	TPH Identity		
														F1	F2	F3
Upgradient Groundwater Samples																
12-19315/19	BMW-4	2012	0.01065	0.02175	0.0	0.0	0.0046	0.06505	0.0233	0.0057	<0.00010	<0.000040	<0.25	<0.025	<0.10	<0.25
Downgradient Groundwater Samples																
12-19313	MW-2	2012	0.0036	0.0115	<0.00050	<0.000090	<0.0010	0.0122	0.0148	0	<0.00010	<0.000040	<0.25	<0.025	<0.10	<0.25

Photograph 29. Tier II looking NE (Photo 31). ↑

Photograph 30. Looking SE (Photo 30). ↑

Photograph 31. Looking NW (Photo 15). ↑

Photograph 32. Looking NW (Photo 20). ↑

Photograph 33. VT-4 (Photo 402). ↑

Photograph 34. VT-2 (Photo 403). ↑

Photograph 35. VT-1 (Photo 404). ↑

Photograph 36. VT-3 (Photo 405). ↑

Table B-25: Monitoring Well Sampling Log- MW-05

Site Name:	PIN-2		
Date of Sampling Event:	August 11, 2012 (soil)		
Names of Samplers:	Tom Partridge, Kathryn Eagles		
Monitoring Well ID:	MW-5		
Facility:	Non-Hazardous Waste Landfill		
Water Sample Measured Data			
Condition of Well:	Good		
Procedure/Equipment:	tape measure	Procedure/Equipment:	interface meter
Well height above ground (m)=	0.60	Depth to water surface (m)=	1.8
Diameter of well (m)=	0.040	Static water level* (m)=	1.2
Depth of installation* (m)=	3.4	Depth to bottom (m)=	3.0
Length screened section (m)=	3.0	Free product thickness (mm)=	n/a
Depth to top of screen* (m)=	0.40		
Calculations		**Notes**	
Depth of water (m)=	1.2	Evidence of sludge etc:	N/A
Well volume of water (L)=	1.5	Evidence of freezing/siltation: (compare to installation record)	freezing
Length screen collecting water (m)=	1.2		

Development/Purging Information

Equipment: waterra tubing

Date & Time	Volume Removed (L)	Temperature (^{o}C)	pH	Conductivity (uS/cm)	Turbidity (NTU)	Description of water
11 - August 14:22	3.0	2.3	7.5	543	>1000	translucent, orange/white tinge
11 - August 14:40	2.0	2.6	8.0	501	>1000	translucent, orange/white tinge
11 - August 14:49	2.0	2.4	8.0	492	>1000	translucent, orange/white tinge

Water Sampling		**Soil Sampling**	
Date and time collected:	Saturday, August 11, 2012	Date and time collected:	Saturday, August 11, 2012
Sample Number - Water:	12-19316	Sample Number - Soil:	12-19186, 12-19187
			12-19188, 12-19189 (30 - 40 cm depth)
Sample containers:	1L HDPE	Sample containers:	Whirlpaks
	1L Teflon		125 mL Jars
	1L Amber Glass		
	3 40mL purge trap vials		
Procedure/Equipment:	Waterra tubing	Procedure/Equipment:	shovel, disposable scoops
Water description:	translucent, orange/white tinge	Soil description:	rocky terrain (gravel) in immediate vicinity, sand/fines at surface and depth, minor organic matter at depth
Filtration: (Y/N)	N	GPS	N/A
Acidification: (Y/N)	N		
Sampling Equipment Decontamination: (Y/N)	Y	Sampling Equipment Decontamination: (Y/N)	Y (shovel - soil rinse)
Number washes:	1 methanol and water	Number washes:	N/A
Number rinses:	1 water	Number rinses:	1

n/a=not applicable

*From ground surface. All other measurements are assumed to be from the top of the casing.

Table B-26: Monitoring Well Sampling Log- MW-06

Site Name:	PIN-2					
Date of Sampling Event:	August 11, 2012 (soil)					
Names of Samplers:	Tom Partridge, Kathryn Eagles					
Monitoring Well ID:	MW-6					
Facility:	Non-Hazardous Waste Landfill					
Water Sample Measured Data						
Condition of Well:	Good					
Procedure/Equipment:	tape measure			Procedure/Equipment:	interface meter	
Well height above ground (m)=	0.60			Depth to water surface (m)=	1.9	
Diameter of well (m)=	0.040			Static water level* (m)=	1.3	
Depth of installation* (m)=	3.4			Depth to bottom (m)=	2.9	
Length screened section (m)=	3.0			Free product thickness (mm)=	n/a	
Depth to top of screen* (m)=	0.40					
Calculations				**Notes**		
Depth of water (m)=	1.0			Evidence of sludge etc:	N/A	
Well volume of water (L)=	1.3			Evidence of freezing/siltation: (compare to installation record)	freezing	
Length screen collecting water (m)=	1.0					
Development/Purging Information						
Equipment:	waterra tubing					
Date & Time	Volume Removed (L)	Temperature (^{o}C)	pH	Conductivity (uS/cm)	Turbidity (NTU)	Description of water
11 - August 15:25	2.0	1.7	8.0	990	>1000	milky, translucent, orange tinge
11 - August 15:30	2.0	1.5	8.1	969	>1000	milky, translucent, orange tinge
11 - August 15:34	2.0	1.6	8.1	942	>1000	milky, translucent, orange tinge
Water Sampling				**Soil Sampling**		
Date and time collected:	Saturday, August 11, 2012			Date and time collected:	Saturday, August 11, 2012	
Sample Number - Water:	12-19317			Sample Number - Soil:	12-19190, 12-19191	
					12-19192, 12-19193 (30 - 40 cm depth)	
Sample containers:	1L HDPE			Sample containers:	Whirlpaks	
	1L Teflon				125 mL Jars	
	1L Amber Glass					
	3 40mL purge trap vials					
Procedure/Equipment:	Waterra tubing			Procedure/Equipment:	shovel, disposable scoops	
Water description:	milky, translucent, orange tinge			Soil description:	very little vegetation, some sand/fines present at surface and depth	
Filtration: (Y/N)	N			GPS	N/A	
Acidification: (Y/N)	N					
Sampling Equipment Decontamination: (Y/N)	Y			Sampling Equipment Decontamination: (Y/N)	Y (shovel - soil rinse)	
Number washes:	1 methanol and water			Number washes:	N/A	
Number rinses:	1 water			Number rinses:	1	

n/a=not applicable

*From ground surface. All other measurements are assumed to be from the top of the casing.

Table B-27: Monitoring Well Sampling Log- MW-07

Site Name:	PIN-2					
Date of Sampling Event:	August 11, 2012 (soil)					
Names of Samplers:	Tom Partridge, Kathryn Eagles					
Monitoring Well ID:	MW-7					
Facility:	Non-Hazardous Waste Landfill					
Water Sample Measured Data						
Condition of Well:	Good					
Procedure/Equipment:	tape measure			Procedure/Equipment:	interface meter	
Well height above ground (m)=	0.60			Depth to water surface (m)=	2.5	
Diameter of well (m)=	0.040			Static water level* (m)=	1.9	
Depth of installation* (m)=	3.4			Depth to bottom (m)=	3.0	
Length screened section (m)=	3.0			Free product thickness (mm)=	n/a	
Depth to top of screen* (m)=	0.40					
Calculations				**Notes**		
Depth of water (m)=	0.5			Evidence of sludge etc:	N/A	
Well volume of water (L)=	0.6			Evidence of freezing/siltation: (compare to installation record)	freezing	
Length screen collecting water (m)=	0.5					
Development/Purging Information						
Equipment:	waterra tubing					
Date & Time	Volume Removed (L)	Temperature (^{o}C)	pH	Conductivity (uS/cm)	Turbidity (NTU)	Description of water
11 - August 16:15	2.0	2.8	8.3	570	>1000	translucent, orange tint
11 - August 16:18	2.0	2.6	8.0	556	>1000	translucent, orange tint
11 - August 16:21	2.0	2.4	8.2	556	>1000	translucent, orange tint
Water Sampling				**Soil Sampling**		
Date and time collected:	Saturday, August 11, 2012			Date and time collected:	Saturday, August 11, 2012	
Sample Number - Water:	12-19318			Sample Number - Soil:	12-19194, 12-19195	
					12-19196, 12-19197 (30 - 40 cm depth)	
Sample containers:	1L HDPE			Sample containers:	Whirlpaks	
	1L Teflon				125 mL Jars	
	1L Amber Glass					
	3 40mL purge trap vials					
Procedure/Equipment:	Waterra tubing			Procedure/Equipment:	shovel, disposable scoops	
Water description:	translucent, orange tint			Soil description:	rocky terrain (gravel/cobbles), dark soil with fines beneath top gravel	
Filtration: (Y/N)	N			GPS	N/A	
Acidification: (Y/N)	N					
Sampling Equipment Decontamination: (Y/N)	Y			Sampling Equipment Decontamination: (Y/N)	Y (shovel - soil rinse)	
Number washes:	1 methanol and water			Number washes:	N/A	
Number rinses:	1 water			Number rinses:	1	

n/a=not applicable

*From ground surface. All other measurements are assumed to be from the top of the casing.

Table B-28: Monitoring Well Sampling Log- BMW-08

Site Name:	PIN-2				
Date of Sampling Event:	August 11, 2012 (soil)				
Names of Samplers:	Tom Partridge, Kathryn Eagles				
Monitoring Well ID:	BMW-08				
Facility:	Non-Hazardous Waste Landfill				
Water Sample Measured Data					
Condition of Well:	Good				
Procedure/Equipment:	tape measure		Procedure/Equipment:	interface meter	
Well height above ground (m)=	0.60		Depth to water surface (m)=	2.5	
Diameter of well (m)=	0.040		Static water level* (m)=	1.9	
Depth of installation* (m)=	4.4		Depth to bottom (m)=	3.0	
Length screened section (m)=	2.2		Free product thickness (mm)=	n/a	
Depth to top of screen* (m)=	0.40				
Calculations			**Notes**		
Depth of water (m)=	0.5		Evidence of sludge etc:	N/A	
Well volume of water (L)=	0.6		Evidence of freezing/siltation: (compare to installation record)	freezing	
Length screen collecting water (m)=	0.5				
Development/Purging Information					
Equipment:	waterra tubing				
Date & Time	Volume Removed (L)	Temperature (^{o}C)	pH	Conductivity (uS/cm)	Turbidity (NTU)	Description of water
well frozen					
Water Sampling			**Soil Sampling**		
Date and time collected:	Saturday, August 11, 2012		Date and time collected:	Saturday, August 11, 2012	
Sample Number - Water:	N/A		Sample Number - Soil:	12-19182, 12-19183	
				12-19184, 12-19185 (30 - 40 cm depth)	
Sample containers:	N/A		Sample containers:	Whirlpaks	
				125 mL Jars	
	N/A				
Procedure/Equipment:	N/A		Procedure/Equipment:	shovel, disposable scoops	
Water description:	N/A		Soil description:	no vegetation, extremely gravelly terrain, dark fine soil, lighter soil, some fines/clay at depth, no organic matter	
Filtration: (Y/N)	N/A		GPS	N/A	
Acidification: (Y/N)					
Sampling Equipment Decontamination: (Y/N)	N/A		Sampling Equipment Decontamination: (Y/N)	Y (shovel - soil rinse)	
Number washes:	N/A		Number washes:	N/A	
Number rinses:	N/A		Number rinses:	1	

n/a=not applicable

*From ground surface. All other measurements are assumed to be from the top of the casing.

Thermistor Annual Maintenance Report

Contractor Name:	EBA, A TETRA TECH COMPANY	Inspection Date:	AUGUST 11 /2012
Prepared By:	RENATA KLASSEN		

Thermistor Information

Site Name:	PIN-2 CAPE YOUNG	Thermistor Location	TIER II DISPOSAL FACILITY		
Thermistor Number:	VT-1	Inclination	VERTICAL		
Install Date:		First Date Event	AUGUST 1/2009	Last Date Event	AUG 11/2012
Coordinates and Elevation *	11 W N 7646 282	E	502 432	Elev	23
Length of Cable (m)		Cable Lead Above Ground (m)		Nodal Points	
Datalogger Serial #	07040010			Cable Serial Number	VT-1

Thermistor Inspection

	Good	Needs Maintenance
Casing	☐ YES	☐ NO
Cover	☐ YES	☐ NO
Data Logger	☐ YES	☐ NO
Cable	☐ YES	☐ NO
Beads	☐ YES	☐ NO
Battery Installation Date		
Battery Levels	Main 11.34 V	Aux 13.50 V

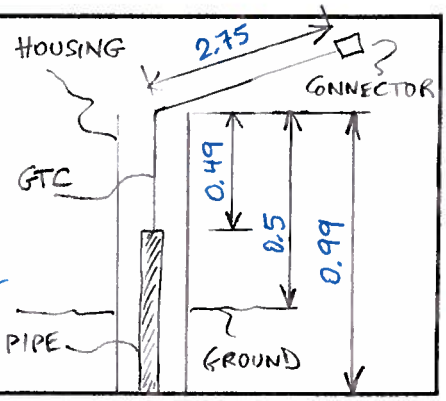
Manual Ground Temperature Readings

Bead	ohms	Degrees C
1	10.12	9.7
2	10.05	9.8
3	11.08	7.8
4	12.48	5.4
5	13.82	3.3
6	15.36	1.2
7	16.49	−0.2
8	17.01	−0.8

Bead	ohms	Degrees C
9	18.67	−2.6
10	19.51	−3.4
11	19.89	−3.8
12	20.31	−4.2
13	20.64	−4.5
14	20.96	−4.8
15	21.15	−5.0
16	21.34	−5.1

Observations and Proposed Maintenance

* COORDINATES AND ELEVATION RECORDED WITH HAND-HELD GPS UTM (NAD 83)
- DATALOGGER MEMORY WAS RESET TO ZERO
- BATTERIES SHOULD BE REPLACED
- BATTERIES EXPIRED IN JUNE 2012



Thermistor Annual Maintenance Report

Contractor Name:	EBA, A TETRA TECH COMPANY	Inspection Date:	AUGUST 11 /2012
Prepared By:	RENATA KLASSEN		

Thermistor Information

Site Name:	PIN-2 CAPE YOUNG	Thermistor Location	TIER II DISPOSAL FACILITY		
Thermistor Number:	VT-2	Inclination	VERTICAL		
Install Date:		First Date Event	AUG 1/2009	Last Date Event	
Coordinates and Elevation *	11 W N 7646274	E	502464	Elev	22
Length of Cable (m)		Cable Lead Above Ground (m)		Nodal Points	
Datalogger Serial #	07050024			Cable Serial Number	VT-2

Thermistor Inspection

	Good	Needs Maintenance
Casing	☐ YES	☐ NO
Cover	☐ NO	☐ YES COVER CRACKED AND BENT STILL CAN BE LOCED
Data Logger	☐ YES	☐ NO
Cable	☐ YES	☐ NO
Beads	☐ YES	☐ NO
Battery Installation Date		
Battery Levels	Main 11.34 V	Aux 13.99 V

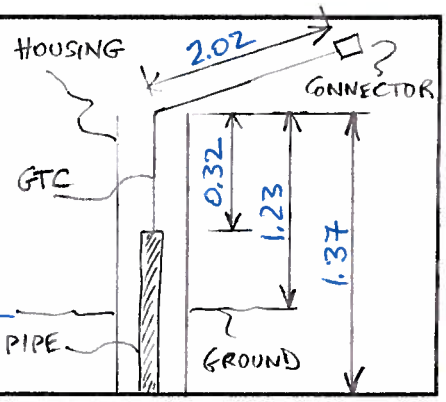
Manual Ground Temperature Readings

Bead	ohms	Degrees C
1	10.40	9.1
2	9.73	10.5
3	9.63	10.7
4	11.16	7.7
5	12.56	5.2
6	14.69	2.1
7	16.35	0.0
8	16.41	-0.1

Bead	ohms	Degrees C
9	16.45	-0.1
10	17.33	-1.1
11	18.28	-2.2
12	18.97	-2.9
13	19.33	-3.2
14	OL	
15	OL	
16	OL	

Observations and Proposed Maintenance

* COORDINATES AND ELEVATION RECORDED WITH HAND-HELD GPS UTM (NAD 83)
- DATALOGGER MEMORY WAS RESET TO ZERO
- COVER SHOULD BE REPLACED
- BATTERIES SHOULD BE REPLACED
- BATTERIES EXPIRED IN JUNE 2012
- GROUNDING SCREW ON HOUSING HAS RUSTED



Thermistor Annual Maintenance Report

Contractor Name: EBA, A TETRA TECH COMPANY	Inspection Date: AUGUST 11 /2012
Prepared By: RENATA KLASSEN	

Thermistor Information

Site Name: PIN-2 CAPE YOUNG	Thermistor Location	TIER II DISPOSAL FACILITY	
Thermistor Number: VT-3	Inclination	VERTICAL	
Install Date:	First Date Event	AUG 1 / 2009	Last Date Event
Coordinates and Elevation * 11W	N 7646 307	E 502 458	Elev 24
Length of Cable (m)	Cable Lead Above Ground (m)	Nodal Points	
Datalogger Serial # 07050029		Cable Serial Number	VT-3

Thermistor Inspection

	Good	Needs Maintenance
Casing	☐ YES	☐ NO
Cover	☐ YES	☐ NO
Data Logger	☐ YES	☐ NO
Cable	☐ YES	☐ NO
Beads	☐ YES	☐ NO
Battery Installation Date		
Battery Levels	Main 11.34 V	Aux 13.63 V

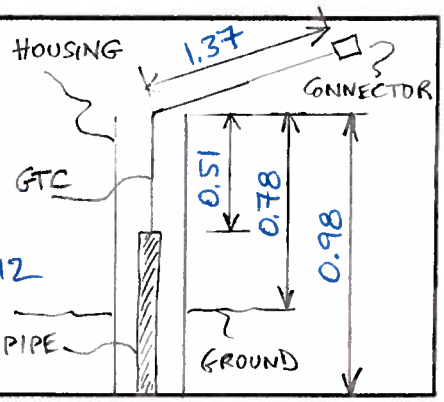
Manual Ground Temperature Readings

Bead	ohms	Degrees C
1	9.75	10.4
2	10.97	8.0
3	12.37	5.5
4	14.10	2.9
5	15.74	0.8
6	16.35	0.0
7	16.39	0.0
8	17.56	-1.4

Bead	ohms	Degrees C
9	18.57	-2.5
10	19.14	-3.1
11	19.63	-3.6
12	19.76	-3.6
13	OL	
14	OL	
15	OL	
16	OL	

Observations and Proposed Maintenance

* COORDINATES AND ELEVATION RECORDED WITH HAND-HELD GPS UTM (NAD 83)
- DATALOGGER MEMORY WAS RESET TO ZERO
- BATTERIES SHOULD BE REPLACED
- BATTERIES EXPIRED IN JUNE 2012



Thermistor Annual Maintenance Report

Contractor Name:	EBA, A TETRA TECH COMPANY	Inspection Date:	AUGUST 11 /2012
Prepared By:	RENATA KLASSEN		

Thermistor Information

Site Name:	PIN-2 CAPE YOUNG	Thermistor Location	TIER II DISPOSAL FACILITY		
Thermistor Number:	VT-4	Inclination	VERTICAL		
Install Date:		First Date Event	AUG 1 /2009	Last Date Event	
Coordinates and Elevation *	11W N 7646 284	E	502495	Elev	22
Length of Cable (m)		Cable Lead Above Ground (m)		Nodal Points	
Datalogger Serial #	0701 0044			Cable Serial Number	VT-4

Thermistor Inspection

	Good	Needs Maintenance
Casing	☐ YES	☐ NO
Cover	☐ YES	☐ NO
Data Logger	☐ YES	☐ NO
Cable	☐ YES	☐ NO
Beads	☐ YES	☐ NO
Battery Installation Date		
Battery Levels	Main 11.34 V	Aux 13.7 V

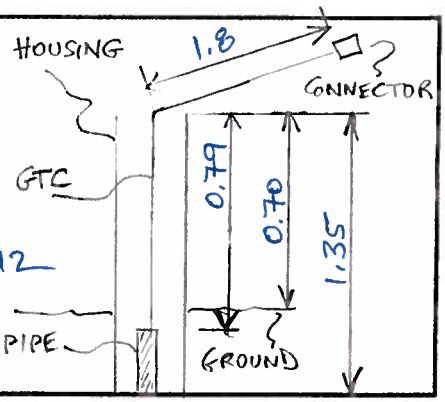
Manual Ground Temperature Readings

Bead	ohms	Degrees C
1	10.16	9.6
2	11.32	7.3
3	13.02	4.5
4	14.89	1.9
5	16.52	-0.2
6	17.62	-1.5
7	18.52	-2.4
8	19.61	-3.5

Bead	ohms	Degrees C
9	20.20	-4.1
10	20.61	-4.5
11	20.84	-4.7
12	21.16	-4.9
13	21.43	-5.2
14	21.56	-5.3
15	21.71	-5.4
16	21.84	-5.6

Observations and Proposed Maintenance

* COORDINATES AND ELEVATION RECORDED WITH HAND-HELD GPS UTM (NAD83)
- DATALOGGER MEMORY WAS RESET TO ZERO
- BATTERIES SHOULD BE REPLACED
- BATTERIES EXPIRED IN JUNE 2012



Annex 5 Airstrip South Landfill – Year 1 Data

Figures:

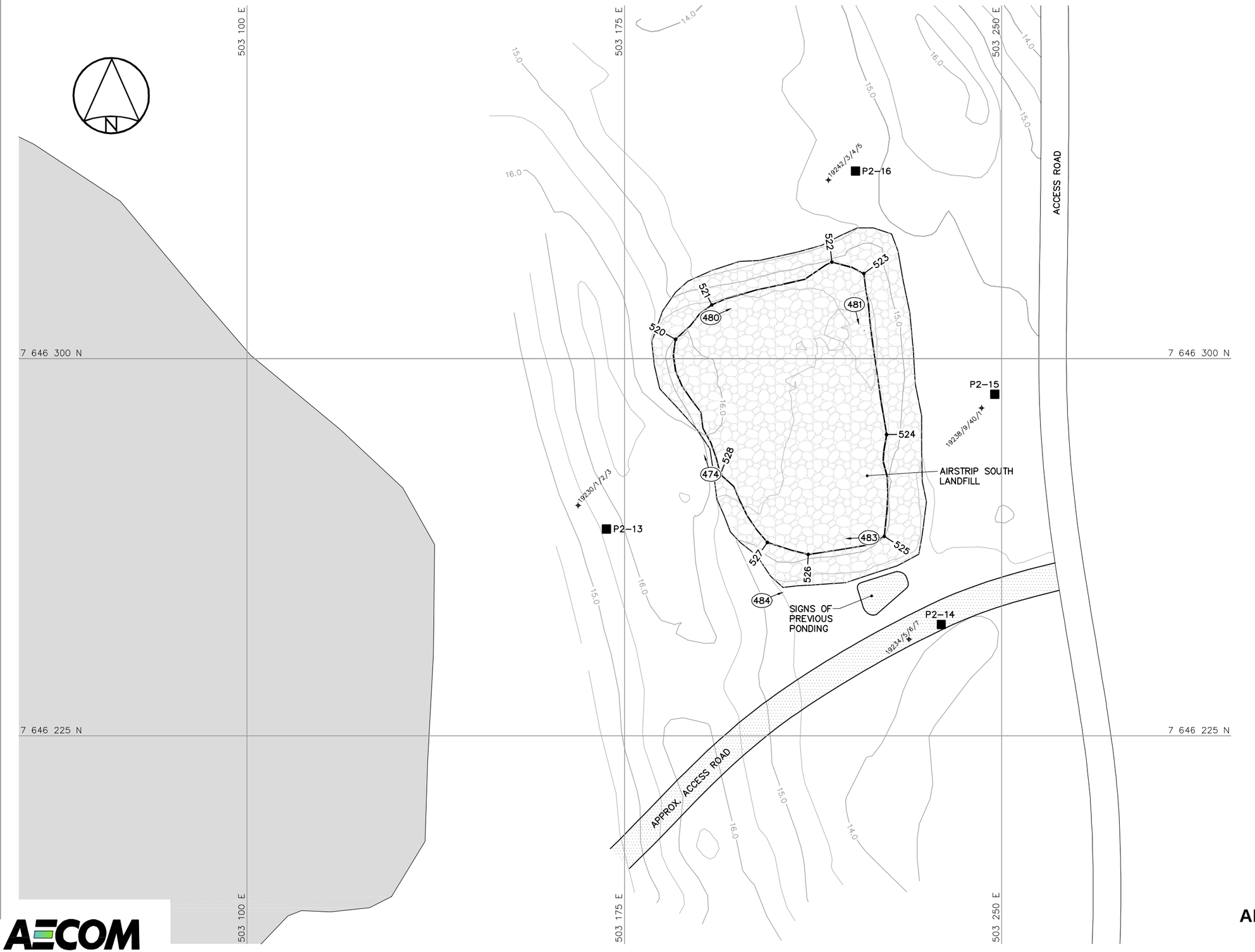
- PIN-2.5: Site Plan – Airstrip South Landfill

Tables:

- Landfill Visual Inspection – Airstrip South Landfill
- Airstrip South Landfill – Evaluation of Year 1 Soil Data
- Airstrip South Landfill – Year 1 (2012) Soil Data

Photographic Records:

- Photos 37 and 38
- Photos 39 and 40
- Photo 41



GENERAL NOTES:

1. ALL COORDINATES ARE REFERENCED TO NAD83 (CSRS), UTM ZONE 11N. ALL ELEVATIONS REFER TO GEODETIC DATUM.
2. ALL DIMENSIONS ARE IN METRES UNLESS NOTED OTHERWISE.

LEGEND:

- 520 — COORDINATE POINT
- MONITORING SOIL SAMPLE LOCATION (4)
- MONITORING SITE FEATURE
- (480) — APPROX. PHOTOGRAPHIC VIEWPOINT
- 19242 — 2012 SOIL SAMPLE TAG LOCATION
- BODY OF WATER

AIRSTRIP SOUTH LANDFILL REGRADED (AS–BUILT)			
NO.	UTM COORDINATES		ELEV.
	NORTHING	EASTING	
520	7 646 303.9	503 185.2	16.0
521	7 646 310.7	503 192.4	15.6
522	7 646 319.2	503 216.2	15.1
523	7 646 316.9	503 222.6	15.4
524	7 646 284.9	503 227.1	15.3
525	7 646 264.7	503 226.6	15.0
526	7 646 261.1	503 211.5	15.1
527	7 646 263.5	503 203.4	15.3
528	7 646 277.0	503 194.1	15.8

RECORD DRAWING
NOT FOR CONSTRUCTION

0 7.5 15 m SCALE 1:750

DEW LINE CLEAN UP
LANDFILL MONITORING PLAN

PIN-2 CAPE YOUNG

AIRSTRIP SOUTH LANDFILL

FIGURE PIN-2.5

AECOM

DEW Line Cleanup: Post-Construction - Landfill Monitoring
Visual Inspection Checklist and Preliminary Stability Assessment

Site Name:	**PIN-2 Cape Young**
Landfill Designation:	**Airstrip South Landfill**
Date of Inspection:	**August 11 and August 12, 2012**
Inspected By:	**Renata Klassen, P.Eng. (EBA-TT)**

Checklist Item	Present Yes/No	Location (Describe relative to existing monuments/features and relative to landfill design i.e. surface, berms, toe)	Length	Width	Depth	Extent relative to Area of Landfill (%)	Description	Photographic Records Focal length, location, view point & direction (relative to magnetic north) Feature of note Scale	Additional Comments	Severity Rating
Settlement	No									
Erosion	No									
Frost Action	No									
Sloughing and Cracking	No									
Animal Burrows	No									
Vegetation	No									
Staining	No									
Vegetation Stress	No									
Seepage Points	No									
Debris Exposed	No									
Presence/Condition - Monitoring Instruments	No									
Features of Note	Yes	Refer to Figure PIN-2.5	10 m	7 m	0.2 m	Isolated	The area contains few spots that indicate past water ponding adjacent to the landfill.	Photo 41	The area is small and shallow and does not pose a concerrn to the landfill performance.	Acceptable
Landfill Performance										Acceptable

Airstrip South Landfill - EVALUATION OF YEAR 1 SOIL ANALYTICAL DATA

Parameter	N value Baseline	Arithmetic Mean +/- 95% Confidence Limit Baseline	Maximum Baseline [mg/kg]	2012	Comments
Copper	51	8.4 +/- 1.5	30	All concentrations within 95% confidence limit.	
Nickel	51	<5.0	9.4	Concentrations consistent with baseline mean (non-detect).	
Cobalt	51	<5.0	6.2	Concentrations consistent with baseline mean (non-detect).	
Cadmium	51	<1.0	<1.0	Concentrations consistent with baseline mean (non-detect).	
Lead	51	<10	<10	Concentrations consistent with baseline mean (non-detect).	
Zinc	51	<15	27	All concentrations within 95% confidence limit, with three exceptions.	The surface and depth samples at P2-13 had concentrations of 48 and 27 mg/kg, respectively. The surface sample at P2-16 had a concentration of 24 mg/kg. Both samples at P2-13 were above the baseline maximum.
Chromium	51	<20	<20	Concentrations consistent with baseline mean (non-detect).	
Arsenic	51	4.6 +/- 3.0	80	Concentrations consistent with baseline mean (non-detect).	
Mercury	8	<0.10	<0.10	Concentrations consistent with baseline mean (non-detect).	
PCBs	43	<0.1	<0.1	Concentrations consistent with baseline mean (non-detect).	
TPH	27	<40	730	Concentrations consistent with baseline mean (non-detect), with four exceptions.	The surface and depth samples at P2-13 had concentrations of 146 and 67 mg/kg, respectively. The surface samples at P2-14 and P2-16 had concentrations of 65 and 144 mg/kg, respectively. No results exceeded the baseline maximum.

Airstrip South Landfill - Year 1 (2012) Soil Data

Sample #	Surface/ Reference Tag #	Location	Date	Depth (cm)	Cu [mg/kg]	Ni [mg/kg]	Co [mg/kg]	Cd [mg/kg]	Pb [mg/kg]	Zn [mg/kg]	Cr [mg/kg]	As [mg/kg]	Hg [mg/kg]	PCBs [mg/kg]	TPH [mg/kg]	TPH Identity		
																F1	F2	F3
Airstrip South Landfill- Baseline Concentrations					**8.4 +/- 1.5**	**<5.0**	**<5.0**	**<1.0**	**<10**	**<15**	**<20**	**4.6 +/- 3.0**	**<0.10**	**<0.1**	**<40**			
Airstrip South Landfill - Maximum Concentrations					**30**	**9.4**	**6.2**	**<1.0**	**<10**	**27**	**<20**	**80**	**<0.10**	**<0.1**	**730**			
Upgradient Soil Samples																		
12-19230/31	19230	P2-13	2012	0-10	8.6	3.0	1.5	<0.50	3.1	48	3.8	2.1	0.067	<0.020	146	<5.0	16.0	130
12-19232/33	19230	P2-13	2012	30-40	9.7	2.8	2.2	<0.50	4.2	27	7	3.1	0.041	<0.020	67	<5.0	<10	67
Downgradient Soil Samples																		
12-19234/35	19234	P2-14	2012	0-10	6.4	2.5	<1.0	<0.50	3.3	8	3	2.0	<0.010	<0.020	65	<5.0	<10	65
12-19236/37	19234	P2-14	2012	30-40	4.3	2.0	<1.0	<0.50	3.1	7	4	2.6	<0.010	<0.020	<50	<5.0	<10	<50
12-19238/39	19238	P2-15	2012	0-10	2.0	1.4	<1.0	<0.50	3	9	3	3.6	0.013	<0.020	<50	<5.0	<10	<50
12-19240/41	19238	P2-15	2012	30-40	1.9	1.6	<1.0	<0.50	2.9	10	3	4.0	<0.010	<0.020	<50	<5.0	<10	<50
12-19242/43	19242	P2-16	2012	0-10	3.1	4.5	2.1	<0.50	2.9	24	5	2.0	0.029	<0.020	144	<5.0	14	130
12-19244/45	19242	P2-16	2012	30-40	3.5	2.7	1.5	<0.50	3.2	15	4	3.4	0.018	<0.020	<50	<5.0	<10	<50

Photograph 37. Looking N along W side of landfill (Photo 474). ↑

Photograph 38. Looking E from NW corner of landfill (Photo 480). ↑

Photograph 39. Looking S along E toe (Photo 481). ↑

Photograph 40. Looking W from SE corner of landfill (Photo 483). ↑

Photograph 41. Area showing signs of minor ponding in the past (Photo 484). ↑

Annex 6 Pallet Line West Landfill – Year 1 Data

Figures:

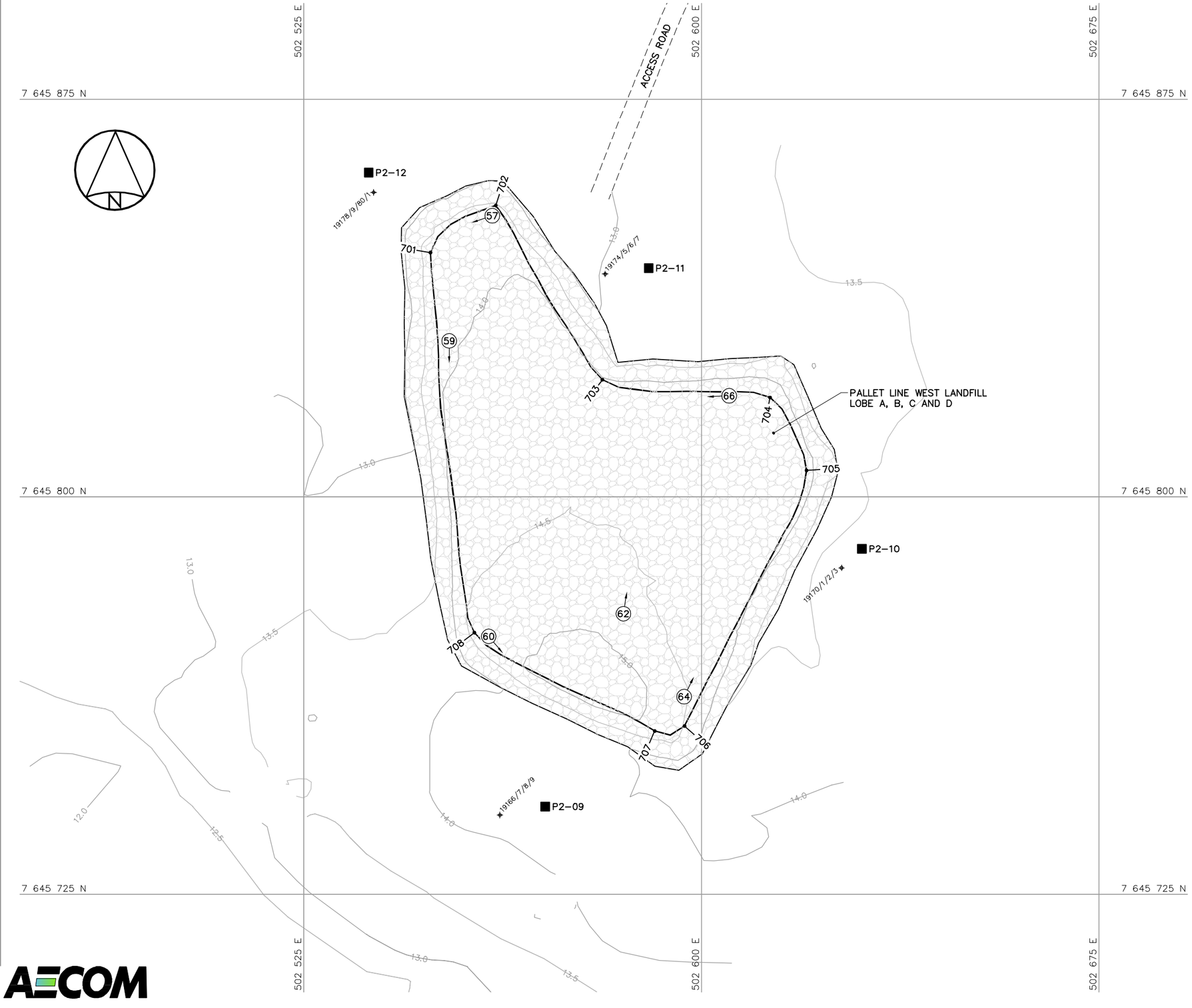
- PIN-2.6: Site Plan – Pallet Line West Landfill

Tables:

- Landfill Visual Inspection – Pallet Line West Landfill
- Pallet Line West Landfill – Evaluation of Year 1 Soil Data
- Pallet Line West Landfill – Year 1 (2012) Soil Data

Photographic Records:

- Photos 42 and 43
- Photos 44 and 45
- Photos 46 and 47



GENERAL NOTES:

1. ALL COORDINATES ARE REFERENCED TO NAD83 (CSRS), UTM ZONE 11N. ALL ELEVATIONS REFER TO GEODETIC DATUM.
2. ALL DIMENSIONS ARE IN METRES UNLESS NOTED OTHERWISE.

LEGEND:

- 701 — COORDINATE POINT
- ■ — MONITORING SOIL SAMPLE LOCATION (4)
- (57) — APPROX. PHOTOGRAPHIC VIEWPOINT
- 19174 — 2012 SOIL SAMPLE TAG LOCATION

PALLET LINE WEST LANDFILL (LOBES A,B,C,D) REGRADED (AS-BUILT)

NO.	UTM COORDINATES		ELEV.
	NORTHING	EASTING	
701	7 645 846.1	502 548.8	13.6
702	7 645 855.0	502 561.2	13.6
703	7 645 822.1	502 581.3	14.0
704	7 645 818.8	502 612.9	14.4
705	7 645 805.0	502 619.8	14.1
706	7 645 756.8	502 596.8	14.5
707	7 645 755.9	502 591.2	14.8
708	7 645 774.4	502 557.1	14.7

RECORD DRAWING
NOT FOR CONSTRUCTION

0 7.5 15 m SCALE 1:750

DEW LINE CLEAN UP
LANDFILL MONITORING PLAN

PIN-2 CAPE YOUNG

PALLET LINE WEST LANDFILL LOBES A, B, C, D

FIGURE PIN-2.6

AECOM

Sheet Size: 11 x 17 (432mm x 279mm)
PLOT: December 20, 2012 10:52:06 AM
Saved by: Cechi
AECOM FILE NO.: PIN-2.6 Year 1 LF MON.dwg

DEW Line Cleanup: Post-Construction - Landfill Monitoring
Visual Inspection Checklist and Preliminary Stability Assessment

Site Name:	**PIN-2 Cape Young**
Landfill Designation:	**Pallet Line West Landfill**
Date of Inspection:	**August 11 and August 12, 2012**
Inspected By:	**Renata Klassen, P.Eng. (EBA-TT)**

Checklist Item	Present Yes/No	Location (Describe relative to existing monuments/features and relative to landfill design i.e. surface, berms, toe)	Length	Width	Depth	Extent relative to Area of Landfill (%)	Description	Photographic Records Focal length, location, view point & direction (relative to magnetic north) Feature of note Scale	Additional Comments	Severity Rating
Settlement	No									
Erosion	No									
Frost Action	No									
Sloughing and Cracking	No									
Animal Burrows	No									
Vegetation	No									
Staining	No									
Vegetation Stress	No									
Seepage Points	No									
Debris Exposed	No									
Presence/Condition - Monitoring Instruments	No									
Features of Note	-									
Landfill Performance										Acceptable

Pallet Line West Landfill - EVALUATION OF YEAR 1 SOIL ANALYTICAL DATA

Parameter	N value Baseline	Arithmetic Mean +/- 95% Confidence Limit Baseline	Maximum Baseline [mg/kg]	2012	Comments
Copper	36	28.4 +/- 23.4	420	All concentrations within 95% confidence limit.	
Nickel	32	5.7 +/- 1.3	15	All concentrations within 95% confidence limit.	
Cobalt	32	<5.0	5.2	Concentrations consistent with baseline mean (non-detect).	
Cadmium	32	<1.0	1.5	Concentrations consistent with baseline mean (non-detect).	
Lead	36	<10	570	Concentrations consistent with baseline mean (non-detect).	
Zinc	36	107 +/- 82	1300	All concentrations within 95% confidence limit.	
Chromium	32	<20	24	Concentrations consistent with baseline mean (non-detect).	
Arsenic	32	3.7 +/- 1.4	24	All concentrations within 95% confidence limit, with one exception.	The depth sample from P2-11 had a concentration of 8.7 mg/kg. The sample was below the baseline maximum.
Mercury	8	<0.10	<0.10	Concentrations consistent with baseline mean (non-detect).	
PCBs	29	<0.1	<0.1	Concentrations consistent with baseline mean (non-detect).	
TPH	14	79 +/- 80	580	All concentrations within 95% confidence limit, with two exceptions.	The surface and depth samples had concetrations of 240 and 183 mg/kg, respectively. Both results were below the baseline maximum.

Pallet Line West Landfill - Year 1 (2012) Soil Data

Sample #	Surface/ Reference Tag #	Location	Date	Depth (cm)	Cu [mg/kg]	Ni [mg/kg]	Co [mg/kg]	Cd [mg/kg]	Pb [mg/kg]	Zn [mg/kg]	Cr [mg/kg]	As [mg/kg]	Hg [mg/kg]	PCBs [mg/kg]	TPH [mg/kg]	TPH Identity		
																F1	F2	F3
Pallet Line West Landfill- Baseline Concentrations					**28.4 +/- 23.4**	**5.7 +/- 1.3**	**<5.0**	**<1.0**	**<10**	**107 +/- 82**	**<20**	**3.7 +/- 1.4**	**<0.10**	**<0.1**	**79 +/- 80**			
Pallet Line West Landfill - Maximum Concentrations					**420.0**	**15.0**	**5.2**	**1.5**	**570**	**1300**	**24**	**24.0**	**<0.10**	**<0.1**	**580**			
Upgradient Soil Samples																		
12-19166/67	19166	P2-09	2012	0-10	6.7	2.8	<1.0	<0.50	1.3	24	1.8	<1.0	0.051	<0.040	240	<10	<20	240
12-19168/69	19166	P2-09	2012	30-40	9.7	6.3	1.5	<0.50	3.3	32	6	1.0	0.056	<0.020	183	13	<20	170
Downgradient Soil Samples																		
12-19170/71	19170	P2-10	2012	0-10	6.4	4.4	1.9	<0.50	2.6	32	6	1.9	0.025	<0.020	<50	<5.0	<10	<50
12-19172/73	19170	P2-10	2012	30-40	7.0	6.1	2.5	<0.50	2.8	16	7	2.6	0.017	<0.020	<50	<5.0	<10	<50
12-19174/75	19174	P2-11	2012	0-10	6.3	4.9	2.4	<0.50	3.9	34	8	2.0	0.027	<0.020	82	<5.0	<10	82
12-19176/77	19174	P2-11	2012	30-40	2.8	3.6	1.9	<0.50	3	20	5	8.7	<0.010	<0.020	<50	<5.0	<10	<50
12-19178/79	19178	P2-12	2012	0-10	6.3	2.2	1.2	<0.50	4.7	64	3	2.9	0.03	<0.020	<50	<5.0	<10	<50
12-19180/81	19178	P2-12	2012	30-40	3.7	2.0	1.1	<0.50	4.1	35	3	2.8	0.026	<0.020	<50	<5.0	<10	<50

Photograph 42. Looking W from N edge of landfill (Photo 57). ↑

Photograph 43. Looking S along W toe of landfill (Photo 59). ↑

Photograph 44. Looking SE along SW toe (Photo 60). ↑

Photograph 45. Looking NE along SE berm of landfill (Photo 64). ↑

Photograph 46. Looking W from centre of E side of landfill (Photo 66). ↑

Photograph 47. Looking N from centre of landfill (Photo 62). ↑

Annex 7 Non-Hazardous Waste Landfill – Year 1 Data

Figures:

- PIN-2.7: Site Plan – Non-Hazardous Waste Landfill

Tables:

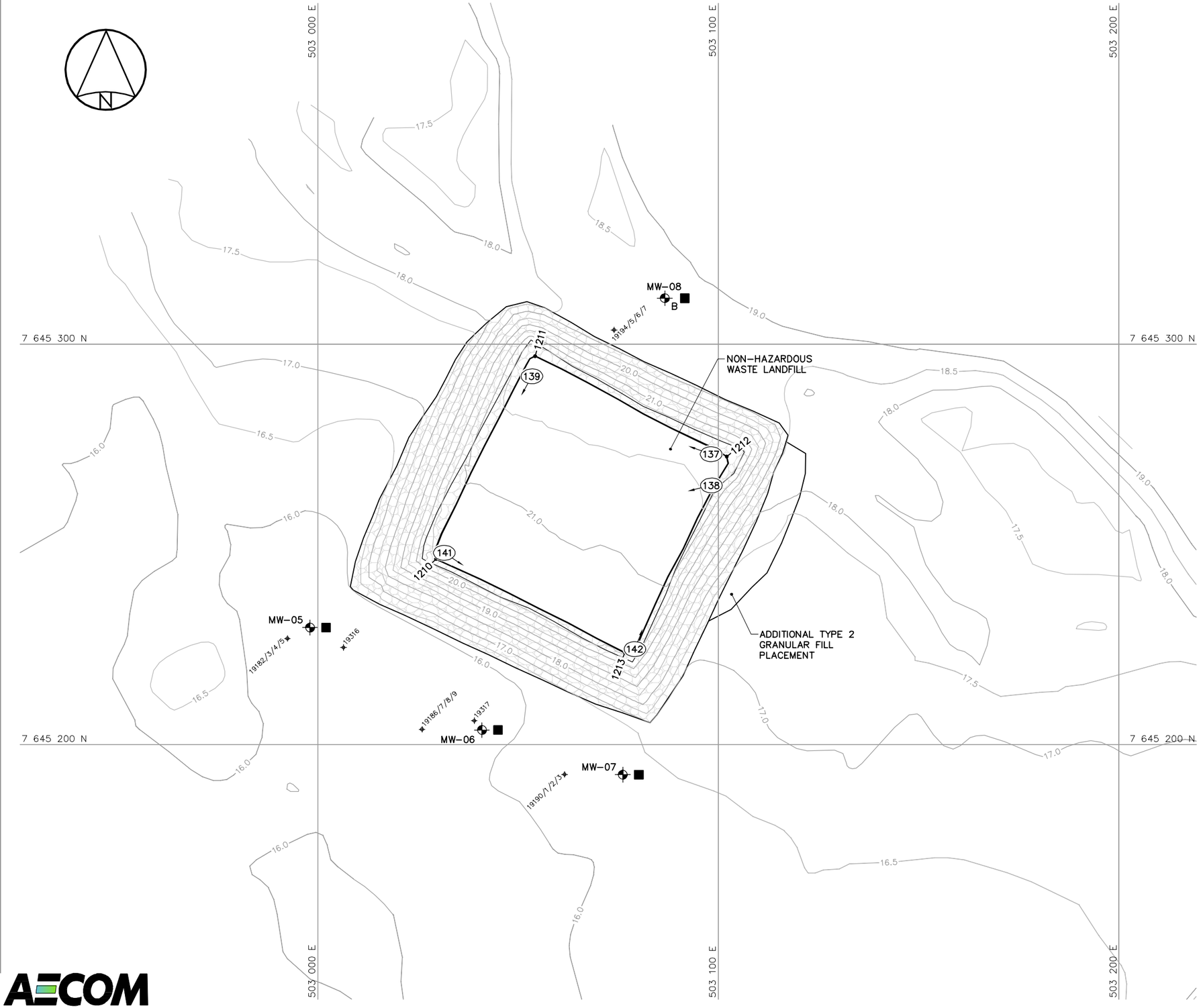
- Landfill Visual Inspection – Non-Hazardous Waste Landfill
- Non-Hazardous Waste Landfill – Evaluation of Year 1 Soil Analytical Data
- Non-Hazardous Waste Landfill – Year 1 (2012) Soil Data
- Non-Hazardous Waste Landfill – Year 1 (2012) Groundwater Data

Photographic Records:

- Photos 48 and 49
- Photos 50 and 51
- Photo 52

Well Sampling Records:

- Well MW-01
- Well MW-02
- Well MW-03
- Well MW-04



GENERAL NOTES:

1. ALL COORDINATES ARE REFERENCED TO NAD83 (CSRS), UTM ZONE 11N. ALL ELEVATIONS REFER TO GEODETIC DATUM.
2. ALL DIMENSIONS ARE IN METRES UNLESS NOTED OTHERWISE.

LEGEND:

- 1210 — COORDINATE POINT
- MONITORING WELL LOCATION (3)
- B — BACKGROUND MONITORING WELL LOCATION (1)
- MONITORING SOIL SAMPLE LOCATION (4)
- (137) — APPROX. PHOTOGRAPHIC VIEWPOINT
- 19194 — 2012 SOIL SAMPLE TAG LOCATION

NON-HAZARDOUS WASTE LANDFILL MONITORING WELLS (AS-BUILT)

NO.	UTM COORDINATES		ELEV.
	NORTHING	EASTING	
MW-05	7 645 229.3	502 998.0	15.9
MW-06	7 645 203.7	503 040.9	16.0
MW-07	7 645 192.5	503 076.1	16.4
MW-08	7 645 311.5	503 086.6	18.9

NON-HAZARDOUS WASTE LANDFILL FINAL GRADING (AS-BUILT)

NO.	UTM COORDINATES		ELEV.
	NORTHING	EASTING	
1210	7 645 246.4	503 029.4	20.6
1211	7 645 297.0	503 054.2	21.8
1212	7 645 272.0	503 102.0	21.8
1213	7 645 223.0	503 076.6	20.5

NOTE:
COORDINATE POINTS AND ELEVATIONS PROVIDED ARE TO THE FINAL GRADE OF TYPE 2 GRANULAR FILL PRIOR TO THE PLACEMENT OF TYPE 1 GRANULAR FILL ON SIDE SLOPES.

RECORD DRAWING
NOT FOR CONSTRUCTION

0 10 20 m SCALE 1:1000

DEW LINE CLEAN UP
LANDFILL MONITORING PLAN

PIN-2 CAPE YOUNG

NON-HAZARDOUS WASTE LANDFILL

FIGURE PIN-2.7

AECOM

DEW Line Cleanup: Post-Construction - Landfill Monitoring
Visual Inspection Checklist and Preliminary Stability Assessment

Site Name:	**PIN-2 Cape Young**
Landfill Designation:	**Non-Hazardous Waste Landfill**
Date of Inspection:	**August 11 and August 12, 2012**
Inspected By:	**Renata Klassen, P.Eng. (EBA-TT)**

Checklist Item	Present Yes/No	Location (Describe relative to existing monuments/features and relative to landfill design i.e. surface, berms, toe)	Length	Width	Depth	Extent relative to Area of Landfill (%)	Description	Photographic Records Focal length, location, view point & direction (relative to magnetic north) Feature of note Scale	Additional Comments	Severity Rating
Settlement	No									
Erosion	No									
Frost Action	No									
Sloughing and Cracking	No									
Animal Burrows	No									
Vegetation	No									
Staining	No									
Vegetation Stress	No									
Seepage Points	No									
Debris Exposed	No									
Presence/Condition - Monitoring Instruments	No									
Features of Note	-									
Landfill Performance										Acceptable

Non-Hazardous Waste Landfill - EVALUATION OF YEAR 1 SOIL ANALYTICAL DATA

Parameter	N value Baseline	Arithmetic Mean +/- 95% Confidence Limit Baseline	Maximum Baseline [mg/kg]	2012	Comments
Copper	23	6.8 +/- 3.0	38.5	All concentrations within 95% confidence limit.	
Nickel	23	<5.0	24.5	Concentrations consistent with baseline mean (non-detect), with one exception.	The surface sample at MW-8 had a concentration of 5.2 mg/kg. The result was below the baseline maximum.
Cobalt	23	<5.0	<5.0	Concentrations consistent with baseline mean (non-detect).	
Cadmium	23	<1.0	1.2	Concentrations consistent with baseline mean (non-detect).	
Lead	23	<10	21.5	Concentrations consistent with baseline mean (non-detect).	
Zinc	23	<15	120	All concentrations within 95% confidence limit, with three exceptions.	The surface and depth samples and MW-8 had concentrations of 22 and 24 mg/kg, respectively. The surface sample at MW-5 had a concentration of 16 mg/kg. All results wer below the baseline maximum.
Chromium	23	<20	38	Concentrations consistent with baseline mean (non-detect).	
Arsenic	23	3.9 +/- 1.1	14.1	All concentrations within 95% confidence limit.	
Mercury	16	<0.10	<0.10	Concentrations consistent with baseline mean (non-detect).	
PCBs	23	<0.0030	<0.1	Concentrations consistent with baseline mean (non-detect).	
TPH	17	23.00	120	All concentrations within 95% confidence limit.	

Non-Hazardous Waste Landfill - Year 1 (2012) Soil Data

Sample #	Surface/ Reference Tag #	Location	Date	Depth (cm)	Cu [mg/kg]	Ni [mg/kg]	Co [mg/kg]	Cd [mg/kg]	Pb [mg/kg]	Zn [mg/kg]	Cr [mg/kg]	As [mg/kg]	Hg [mg/kg]	PCBs [mg/kg]	TPH [mg/kg]	TPH Identity		
																F1	F2	F3
Non-Hazardous Waste Landfill - Baseline Concentrations					**6.8 +/- 3.0**	**<5.0**	**<5.0**	**<1.0**	**<10**	**<15**	**<20**	**3.9 +/- 1.1**	**<0.10**	**<0.0030**	**23**			
Non-Hazardous Waste Landfill - Maximum Concentrations					**38.5**	**24.5**	**<5.0**	**1.2**	**21.5**	**120**	**38**	**14.1**	**<0.10**	**<0.1**	**120**			
Upgradient Soil Samples																		
12-19194/95	19194	BMW-8	2012	0-10	8.6	5.2	2.5	<0.50	6.5	22	7.7	2.0	0.036	<0.020	<50	<5.0	<10	<50
12-19196/97	19194	BMW-8	2012	30-40	5.1	3.8	2	<0.50	3	24	5	2.6	0.022	<0.020	<50	<5.0	<10	<50
Downgradient Soil Samples																		
12-19182/83	19182	MW-5	2012	0-10	4.5	2.2	1.8	<0.50	6.4	16	7	2.2	0.021	<0.020	<50	<5.0	<10	<50
12-19184/85	19182	MW-5	2012	30-40	2.4	1.7	1	<0.50	2.6	10	3	3.4	0.012	<0.020	<50	<5.0	<10	<50
12-19186/87	19186	MW-6	2012	0-10	3.8	2.2	<1.0	<0.50	1.9	10	3	1.0	0.013	<0.020	<50	<5.0	<10	<50
12-19188/89	19186	MW-6	2012	30-40	4.8	3.5	1.2	<0.50	2.4	12	5	1.1	<0.010	<0.020	<50	<5.0	<10	<50
12-19190/91	19190	MW-7	2012	0-10	2.7	2.2	<1.0	<0.50	1.3	11	2	2.2	<0.010	<0.020	<50	<5.0	<10	<50
12-19192/93	19190	MW-7	2012	30-40	4.8	1.6	<1.0	<0.50	1.4	6	2	1.2	<0.010	<0.020	<50	<5.0	<10	<50

Non-Hazardous Waste Landfill - Year 1 (2012) Groundwater Data

Sample #	Location	Date	Cu [mg/L]	Ni [mg/L]	Co [mg/L]	Cd [mg/L]	Pb [mg/L]	Zn [mg/L]	Cr [mg/L]	As [mg/L]	Hg [mg/L]	PCBs [mg/L]	TPH [mg/L]	TPH Identity		
														F1	F2	F3
Downgradient Groundwater Samples																
12-19316	MW-5	2012	0.028	0.023	0.0043	0.000	0.01	0.087	0.042	0.023	<0.00010	<0.000040	<0.25	<0.025	<0.10	<0.25
12-19317	MW-6	2012	0.067	0.053	0.005	0.000	0.01	1.15	0.042	0.027	<0.00010	<0.000040	<0.25	<0.025	<0.10	<0.25
12-19318	MW-7	2012	0.014	0.014	0.004	0.000	0.01	0	0.013	0.010	<0.00010	<0.000040	<0.25	<0.025	<0.10	<0.25

Photograph 48. Looking SW from N corner of landfill (Photo 139). ↑

Photograph 49. Looking SE from W corner of landfill (Photo 141). ↑

Photograph 50. Looking NE from the S corner of landfill (Photo 142). ↑

Photograph 51. Looking NW from the W corner of the landfill (Photo 137). ↑

Photograph 52. Looking W across the landfill from the E corner (Photo 138). ↑

Table B-11: Monitoring Well Sampling Log- MW-1

Site Name:	PIN-2					
Date of Sampling Event:	Saturday, August 11, 2012					
Names of Samplers:	Tom Partridge, Kathryn Eagles					
Monitoring Well ID:	MW-1					
Facility:	Tier II Disposal Facility					
Water Sample Measured Data						
Condition of Well:	Good					
Procedure/Equipment:	tape measure			Procedure/Equipment:	interface meter	
Well height above ground (m)=	0.60			Depth to water surface (m)=	2.2	
Diameter of well (m)=	0.038			Static water level* (m)=	1.6	
Depth of installation* (m)=	3.4			Depth to bottom (m)=	2.3	
Length screened section (m)=	3.0			Free product thickness (mm)=	n/a	
Depth to top of screen* (m)=	0.50					
Calculations				**Notes**		
Depth of water (m)=	0.10			Evidence of sludge etc:	N/A	
Well volume of water (L)=	0.11			Evidence of freezing/siltation: (compare to installation record)	freezing	
Length screen collecting water (m)=	0.10					
Development/Purging Information						
Equipment:	waterra tubing					
Date & Time	Volume Removed (L)	Temperature (°C)	pH	Conductivity (uS/cm)	Turbidity (NTU)	Description of water
sample could not be collected due to insufficient water in well						
Water Sampling				**Soil Sampling**		
Date and time collected:	Saturday, August 11, 2012			Date and time collected:	Saturday, August 11, 2012	
Sample Number - Water:	N/A			Sample Number - Soil:	12-19154, 12-19155	
					12-19156, 12-19157 (30 - 40 cm depth)	
Sample containers:	N/A			Sample containers:	Whirlpaks	
					125 mL Jars	
Procedure/Equipment:	N/A			Procedure/Equipment:	shovel, disposable scoops	
Water description:	N/A			Soil description:	low lying vegetation, dark soil, moderate amount of fines, some organic material, lighter soil at depth, some fines present	
Filtration: (Y/N)	N/A			GPS	N/A	
Acidification: (Y/N)	N/A					
Sampling Equipment Decontamination (Y/N)	N/A			Sampling Equipment Decontamination (Y/N)	Y (shovel - soil rinse)	
Number washes:	N/A			Number washes:	N/A	
Number rinses:	N/A			Number rinses:	1	

n/a=not applicable

*From ground surface. All other measurements are assumed to be from the top of the casing

Table B-12: Monitoring Well Sampling Log- MW-2

Site Name:	PIN-2		
Date of Sampling Event:	Saturday, August 11, 2012		
Names of Samplers:	Tom Partridge, Kathryn Eagles		
Monitoring Well ID:	MW-2		
Facility:	Tier II Disposal Facility		
Water Sample Measured Data			
Condition of Well:	Good		
Procedure/Equipment:	tape measure	Procedure/Equipment:	interface meter
Well height above ground (m)=	0.60	Depth to water surface (m)=	1.2
Diameter of well (m)=	0.038	Static water level* (m)=	0.60
Depth of installation* (m)=	3.4	Depth to bottom (m)=	2.8
Length screened section (m)=	3.2	Free product thickness (mm)=	n/a
Depth to top of screen* (m)=	0.5		
Calculations		**Notes**	
Depth of water (m)=	1.6	Evidence of sludge etc:	N/A
Well volume of water (L)=	1.8	Evidence of freezing/siltation: (compare to installation record)	freezing
Length screen collecting water (m)=	1.6		

Development/Purging Information

Equipment: waterra tubing

Date & Time	Volume Removed (L)	Temperature (°C)	pH	Conductivity (uS/cm)	Turbidity (NTU)	Description of water
11 - August 11:55	3	3.1	7.4	800	33.4	translucent, grey
11 - August 11:59	3	2.7	7.8	736	28.7	translucent, grey
11 - August 12:02	2	2.8	7.7	725	29.8	translucent, grey

Water Sampling		**Soil Sampling**	
Date and time collected:	Saturday, August 11, 2012	Date and time collected:	Saturday, August 11, 2012
Sample Number - Water:	12-19313	Sample Number - Soil:	12-19158, 12-19159
			12-19160, 12-19161 (30 - 40 cm depth)
Sample containers:	1L HDPE	Sample containers:	Whirlpaks
	1L Teflon		125 mL Jars
	1L Amber Glass		
	3 40mL purge trap vials		
Procedure/Equipment:	Waterra tubing	Procedure/Equipment:	shovel, disposable scoops
Water description:	translucent, grey	Soil description:	low lying vegetation, dark soil, moderate amount of fines, some organic material, lighter soil at depth, some fines present
Filtration: (Y/N)	N	GPS	N/A
Acidification: (Y/N)	N		
Sampling Equipment Decontamination (Y/N)	Y	Sampling Equipment Decontamination (Y/N)	Y (shovel - soil rinse)
Number washes:	1 methanol and water	Number washes:	N/A
Number rinses:	1 water	Number rinses:	1

n/a=not applicable

*From ground surface. All other measurements are assumed to be from the top of the casing

Table B-13: Monitoring Well Sampling Log- MW-3

Site Name:	PIN-2		
Date of Sampling Event:	August 11, 2012 (soil)		
Names of Samplers:	Tom Partridge, Kathryn Eagles		
Monitoring Well ID:	MW-3		
Facility:	Tier II Disposal Facility		
Water Sample Measured Data			
Condition of Well:	Good		
Procedure/Equipment:	tape measure	Procedure/Equipment:	interface meter
Well height above ground (m)=	0.60	Depth to water surface (m)=	2.5
Diameter of well (m)=	0.038	Static water level* (m)=	1.9
Depth of installation* (m)=	3.4	Depth to bottom (m)=	2.6
Length screened section (m)=	3.0	Free product thickness (mm)=	n/a
Depth to top of screen* (m)=	0.50		
Calculations		**Notes**	
Depth of water (m)=	0.10	Evidence of sludge etc:	N/A
Well volume of water (L)=	0.11	Evidence of freezing/siltation: (compare to installation record)	freezing
Length screen collecting water (m)=	0.10		

Development/Purging Information

Equipment: waterra tubing

Date & Time	Volume Removed (L)	Temperature (^{o}C)	pH	Conductivity (uS/cm)	Turbidity (NTU)	Description of water
sample could not be collected due to insufficient water in well						

Water Sampling		**Soil Sampling**	
Date and time collected:	Saturday, August 11, 2012	Date and time collected:	Saturday, August 11, 2012
Sample Number - Water:	N/A	Sample Number - Soil:	12-19162, 12-19163
			12-19164, 12-19165 (30 - 40 cm depth)
Sample containers:	N/A	Sample containers:	Whirlpaks
			125 mL Jars
Procedure/Equipment:	N/A	Procedure/Equipment:	shovel, disposable scoops
Water description:	N/A	Soil description:	dark soil, high amount of organic matter, low lying vegetation, lighter brown soil at depth with fines and some organic matter
Filtration: (Y/N)	N/A	GPS	N/A
Acidification: (Y/N)	N/A		
Sampling Equipment Decontamination: (Y/N)	N/A	Sampling Equipment Decontamination: (Y/N)	Y (shovel - soil rinse)
Number washes:	N/A	Number washes:	N/A
Number rinses:	N/A	Number rinses:	1

n/a=not applicable

*From ground surface. All other measurements are assumed to be from the top of the casing.

Table B-14: Monitoring Well Sampling Log- BMW-4

Site Name:	PIN-2					
Date of Sampling Event:	August 11, 2012 (soil)					
Names of Samplers:	Tom Partridge, Kathryn Eagles					
Monitoring Well ID:	BMW-4					
Facility:	Tier II Disposal Facility					
Water Sample Measured Data						
Condition of Well:	Good					
Procedure/Equipment:	tape measure			Procedure/Equipment:	interface meter	
Well height above ground (m)=	0.60			Depth to water surface (m)=	2.2	
Diameter of well (m)=	0.038			Static water level* (m)=	1.6	
Depth of installation* (m)=	3.4			Depth to bottom (m)=	2.8	
Length screened section (m)=	3.0			Free product thickness (mm)=	n/a	
Depth to top of screen* (m)=	0.40					
Calculations				**Notes**		
Depth of water (m)=	0.6			Evidence of sludge etc:	N/A	
Well volume of water (L)=	0.7			Evidence of freezing/siltation: (compare to installation record)	freezing	
Length screen collecting water (m)=	0.6					
Development/Purging Information						
Equipment:	waterra tubing					
Date & Time	Volume Removed (L)	Temperature (^{o}C)	pH	Conductivity (uS/cm)	Turbidity (NTU)	Description of water
11 - August 10:15	2.0	3.5	7.7	904	91.7	translucent, light brown
11 - August 10:21	2.0	3.3	7.6	886	198	translucent, light brown
11 - August 10:25	2.0	3.5	7.6	891	178	translucent, light brown
Water Sampling				**Soil Sampling**		
Date and time collected:	Saturday, August 11, 2012			Date and time collected:	Saturday, August 11, 2012	
Sample Number - Water:	12-19315			Sample Number - Soil:	12-19150, 12-19151	
	12-19319				12-19152, 12-19153 (30 - 40 cm depth)	
Sample containers:	2x 1L HDPE			Sample containers:	Whirlpaks	
	2x 1L Teflon				125 mL Jars	
	2x 1L Amber Glass					
	3 40mL purge trap vials					
Procedure/Equipment:	Waterra tubing			Procedure/Equipment:	shovel, disposable scoops	
Water description:	translucent, light brown			Soil description:	low lying vegetation, dark soil, moderate amount of fines, some organic material	
Filtration: (Y/N)	N			GPS	N/A	
Acidification: (Y/N)	N					
Sampling Equipment Decontamination: (Y/N)	Y			Sampling Equipment Decontamination: (Y/N)	Y (shovel - soil rinse)	
Number washes:	1 methanol and water			Number washes:	N/A	
Number rinses:	1 water			Number rinses:	1	

n/a=not applicable

*From ground surface. All other measurements are assumed to be from the top of the casing.

Annex 8 South Landfill - East – Year 1 Data

Figures:

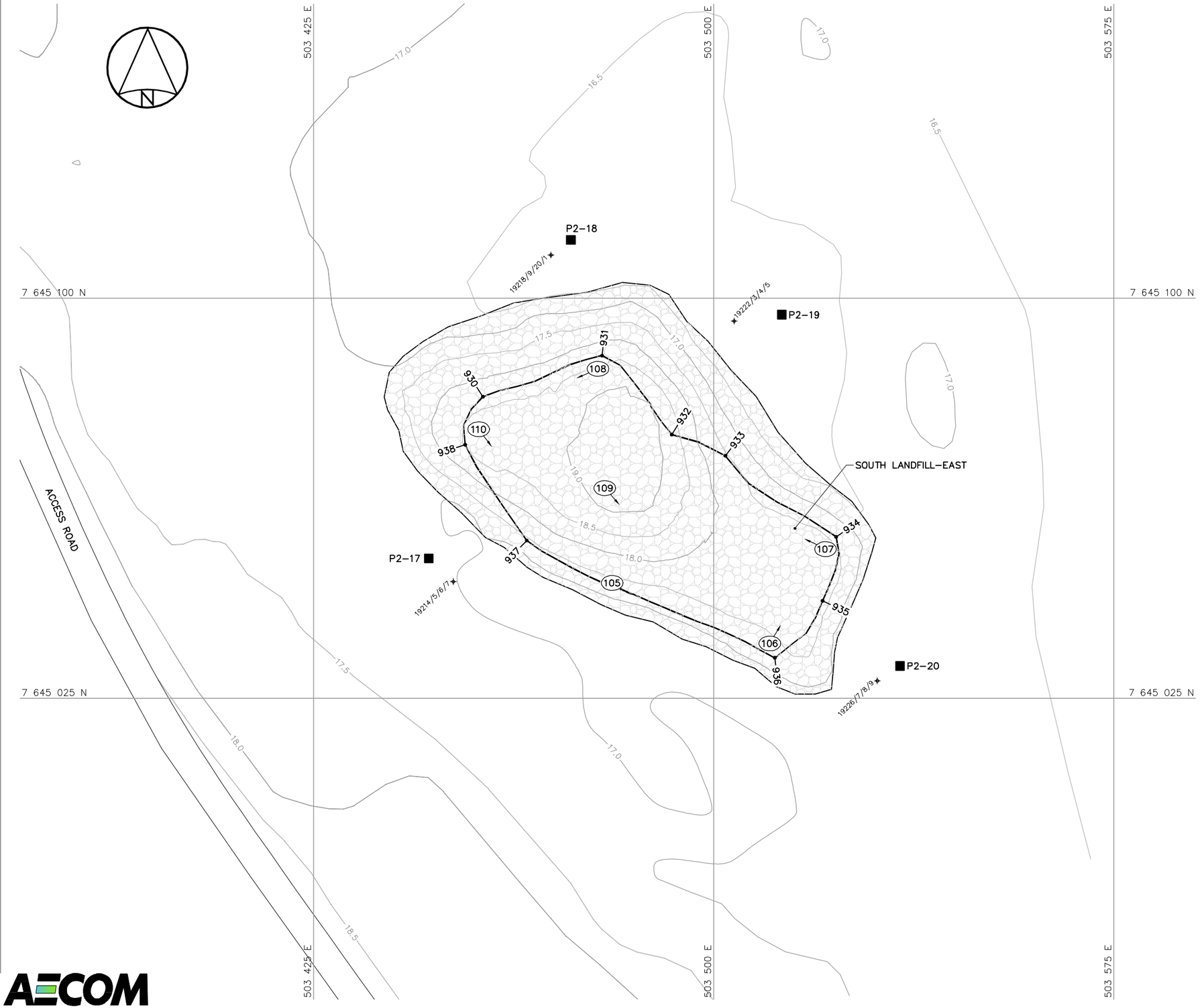
- PIN-2.8: Site Plan – South Landfill - East

Tables:

- Landfill Visual Inspection – South Landfill - East
- South Landfill - East – Evaluation of Year 1 Soil Analytical Data
- South Landfill - East – Year 1 (2012) Soil Data

Photographic Records:

- Photos 53 and 54
- Photos 55 and 56
- Photos 57 and 58



GENERAL NOTES:

1. ALL COORDINATES ARE REFERENCED TO NAD83 (CSRS), UTM ZONE 11N. ALL ELEVATIONS REFER TO GEODETIC DATUM.
2. ALL DIMENSIONS ARE IN METRES UNLESS NOTED OTHERWISE.

LEGEND:

- 930 — COORDINATE POINT
- ■ — MONITORING SOIL SAMPLE LOCATION (4)
- (108) — APPROX. PHOTOGRAPHIC VIEWPOINT
- 19222 — 2012 SOIL SAMPLE TAG LOCATION

SOUTH LANDFILL–EAST REGRADED (AS–BUILT)			
NO.	UTM COORDINATES		ELEV.
	NORTHING	EASTING	
930	7 645 081.6	503 456.7	18.3
931	7 645 089.3	503 479.0	18.4
932	7 645 074.5	503 492.1	18.7
933	7 645 070.5	503 502.1	17.6
934	7 645 055.3	503 522.9	17.4
935	7 645 043.3	503 520.4	17.7
936	7 645 032.6	503 511.4	17.3
937	7 645 054.6	503 464.9	17.4
938	7 645 072.6	503 453.4	18.5

RECORD DRAWING
NOT FOR CONSTRUCTION

0 7.5 15 m SCALE 1:750

DEW LINE CLEAN UP
LANDFILL MONITORING PLAN

PIN-2 CAPE YOUNG

SOUTH LANDFILL - EAST

FIGURE PIN-2.8

AECOM

DEW Line Cleanup: Post-Construction - Landfill Monitoring
Visual Inspection Checklist and Preliminary Stability Assessment

Site Name:	**PIN-2 Cape Young**
Landfill Designation:	**South Landfill - East**
Date of Inspection:	**August 11 and August 12, 2012**
Inspected By:	**Renata Klassen, P.Eng. (EBA-TT)**

Checklist Item	Present Yes/No	Location (Describe relative to existing monuments/features and relative to landfill design i.e. surface, berms, toe)	Length	Width	Depth	Extent relative to Area of Landfill (%)	Description	Photographic Records Focal length, location, view point & direction (relative to magnetic north) Feature of note Scale	Additional Comments	Severity Rating
Settlement	No									
Erosion	No									
Frost Action	No									
Sloughing and Cracking	No									
Animal Burrows	No									
Vegetation	No									
Staining	No									
Vegetation Stress	No									
Seepage Points	No									
Debris Exposed	No									
Presence/Condition - Monitoring Instruments	No									
Features of Note	-									
Landfill Performance										Acceptable

South Landfill - East - EVALUATION OF YEAR 1 SOIL ANALYTICAL DATA

Parameter	N value Baseline	Arithmetic Mean +/- 95% Confidence Limit Baseline	Maximum Baseline [mg/kg]	2012	Comments
Copper	57	10.1 +/- 2.4	67	All concentrations within 95% confidence limit.	
Nickel	54	4.8 +/- 0.8	15	All concentrations within 95% confidence limit.	
Cobalt	54	<5.0	12	Concentrations consistent with baseline mean (non-detect).	
Cadmium	54	<1.0	<1.0	Concentrations consistent with baseline mean (non-detect).	
Lead	57	<10	140	Concentrations consistent with baseline mean (non-detect), with one exception.	The surface sample at P2-17 had a concentration of 10.6 mg/kg. The result was below the baseline maximum.
Zinc	57	15 +/- 3	85	All concentrations within 95% confidence limit, with two exceptions.	The surface samples at P2-17 and P2-20 had concentrations of 36 and 24 mg/kg, respectively. Both results were below the baseline maximum.
Chromium	54	<20	39	Concentrations consistent with baseline mean (non-detect).	
Arsenic	54	2.8 +/- 0.8	24	All concentrations within 95% confidence limit.	
Mercury	8	<0.10	<0.10	Concentrations consistent with baseline mean (non-detect).	
PCBs	57	<0.050	<0.5	Concentrations consistent with baseline mean (non-detect).	
TPH	8	33 +/-38	170	All concentrations within 95% confidence limit, with two exceptions.	The surface sample at P2-17 had a concentration of 300 mg/kg. The depth sample at P2-19 had a concentration of 75 mg/kg. The surface sample at P2-17 exceeded the baseline maximum.

South Landfill - East - Year 1 (2012) Soil Data

Sample #	Surface/ Reference Tag #	Location	Date	Depth (cm)	Cu [mg/kg]	Ni [mg/kg]	Co [mg/kg]	Cd [mg/kg]	Pb [mg/kg]	Zn [mg/kg]	Cr [mg/kg]	As [mg/kg]	Hg [mg/kg]	PCBs [mg/kg]	TPH [mg/kg]	TPH Identity		
																F1	F2	F3
South Landfill - East - Baseline Concentrations					**10.1 +/- 2.4**	**4.8 +/- 0.8**	**<5.0**	**<1.0**	**<10**	**15 +/- 3**	**<20**	**2.8 +/- 0.8**	**<0.10**	**<0.050**	**33 +/-38**			
South Landfill - East - Maximum Concentrations					**67.0**	**15.0**	**12.0**	**<1.0**	**140**	**85**	**39**	**24.0**	**<0.10**	**<0.5**	**170**			
Upgradient Soil Samples																		
12-19214/15	19214	P2-17	2012	0-10	10.4	3.5	2	0.51	10.6	36	5.5	2.3	0.028	<0.020	300	<5.0	<10	300
12-19216/17	19214	P2-17	2012	30-40	8.3	4.0	2.2	<0.50	2.9	15	6	2.4	0.015	<0.020	<50	<5.0	<10	<50
Downgradient Soil Samples																		
12-19218/19	19218	P2-18	2012	0-10	2.9	4.3	2.2	<0.50	3	16	8	1.9	<0.010	<0.020	<50	<5.0	<10	<50
12-19220/21	19218	P2-18	2012	30-40	3.3	4.6	2.5	<0.50	2.9	16	7	2.0	<0.010	<0.020	<50	<5.0	<10	<50
12-19222/23	19222	P2-19	2012	0-10	2.8	2.1	<1.0	<0.50	3	14	5	1.6	<0.010	<0.020	<50	<5.0	<10	<50
12-19224/25	19222	P2-19	2012	30-40	4.2	2.6	2.1	<0.50	3.8	15	7	2.1	0.015	<0.020	75	<5.0	12	63
12-19226/27	19226	P2-20	2012	0-10	6.6	2.7	1.6	<0.50	2.7	24	5	2.0	0.022	<0.020	<50	<5.0	<10	<50
12-19228/29	19226	P2-20	2012	30-40	6.3	2.6	1.7	<0.50	2.8	14	5	2.5	0.015	<0.020	<50	<5.0	<10	<50

Photograph 53. W edge of landfill from center of berm (Photo 105). ↑

Photograph 54. Looking NE along S toe of landfill (Photo 106). ↑

Photograph 55. Looking NW along E toe (Photo 107). ↑

Photograph 56. Looking E along N berm of landfill (Photo 108). ↑

Photograph 57. Looking SE from NW corner of landfill (Photo 110). ↑

Photograph 58. Looking S from centre of landfill (Photo 109). ↑

Annex 9 South Borrow Landfill – Year 1 Data

Figures:

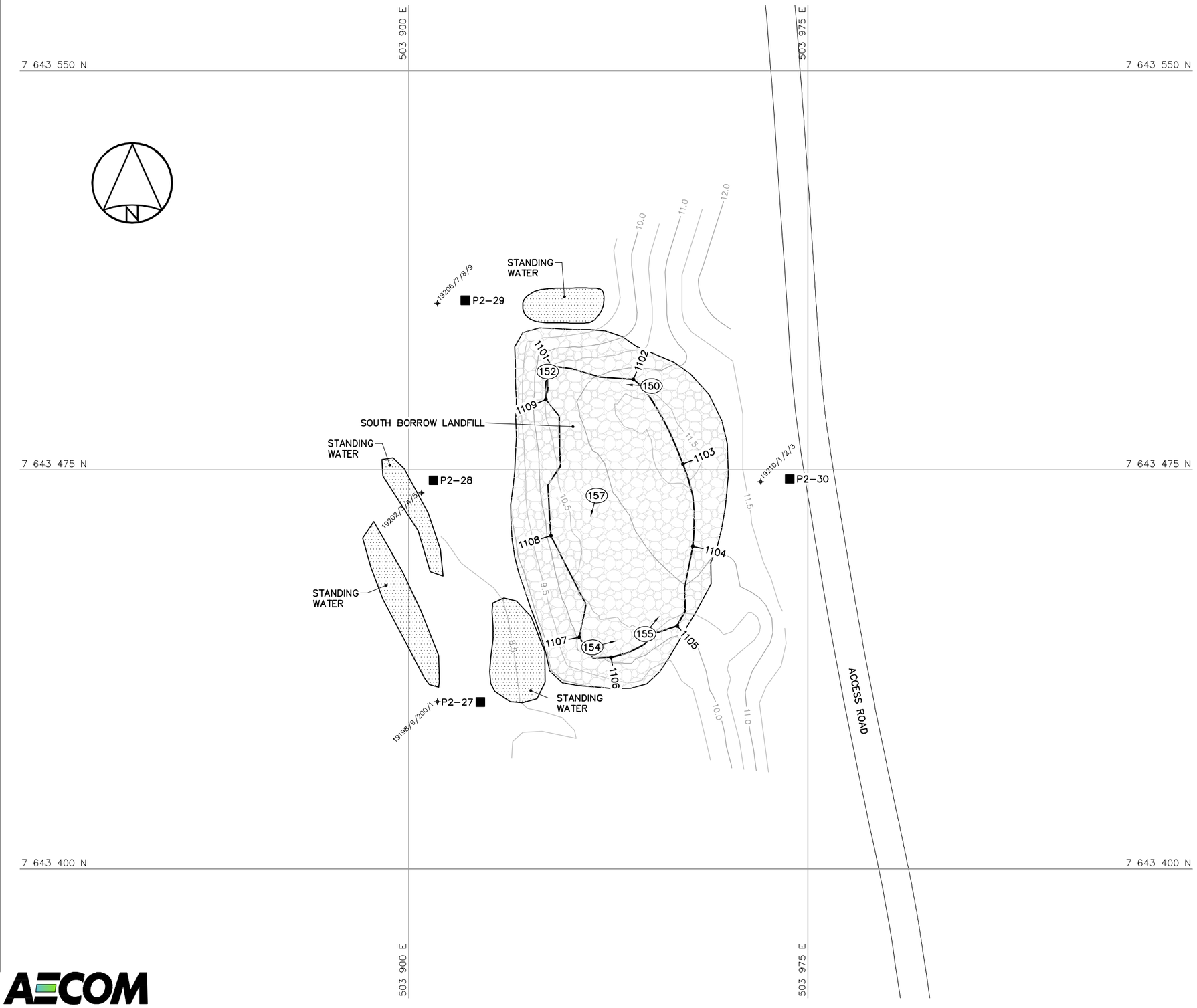
- PIN-2.9: Site Plan – South Borrow Landfill

Tables:

- Landfill Visual Inspection – South Borrow Landfill
- South Borrow Landfill – Evaluation of Year 1 Soil Analytical Data
- South Borrow Landfill – Year 1 (2012) Soil Data

Photographic Records:

- Photos 59 and 60
- Photos 61 and 62
- Photo 63



GENERAL NOTES:

1. ALL COORDINATES ARE REFERENCED TO NAD83 (CSRS), UTM ZONE 11N. ALL ELEVATIONS REFER TO GEODETIC DATUM.
2. ALL DIMENSIONS ARE IN METRES UNLESS NOTED OTHERWISE.

LEGEND:

- 1101 — COORDINATE POINT
- ■ — MONITORING SOIL SAMPLE LOCATION (4)
- MONITORING SITE FEATURE
- 150 — APPROX. PHOTOGRAPHIC VIEWPOINT
- 19210 — 2012 SOIL SAMPLE TAG LOCATION

SOUTH BORROW LANDFILL REGRADED (AS-BUILT)			
NO.	UTM COORDINATES		ELEV.
	NORTHING	EASTING	
1101	7 643 494.5	503 926.8	10.5
1102	7 643 492.0	503 942.2	11.3
1103	7 643 476.1	503 951.5	11.6
1104	7 643 460.6	503 953.4	11.3
1105	7 643 445.7	503 950.4	10.3
1106	7 643 439.8	503 938.0	10.1
1107	7 643 443.5	503 932.0	10.0
1108	7 643 462.6	503 926.7	10.1
1109	7 643 488.2	503 925.7	10.5

RECORD DRAWING
NOT FOR CONSTRUCTION

0 7.5 15 m SCALE 1:750

DEW LINE CLEAN UP
LANDFILL MONITORING PLAN

PIN-2 CAPE YOUNG

SOUTH BORROW LANDFILL

FIGURE PIN-2.9

AECOM

DEW Line Cleanup: Post-Construction - Landfill Monitoring
Visual Inspection Checklist and Preliminary Stability Assessment

Site Name:	**PIN-2 Cape Young**
Landfill Designation:	**South Borrow Landfill**
Date of Inspection:	**August 11 and August 12, 2012**
Inspected By:	**Renata Klassen, P.Eng. (EBA-TT)**

Checklist Item	Present Yes/No	Location (Describe relative to existing monuments/features and relative to landfill design i.e. surface, berms, toe)	Length	Width	Depth	Extent relative to Area of Landfill (%)	Description	Photographic Records Focal length, location, view point & direction (relative to magnetic north) Feature of note Scale	Additional Comments	Severity Rating
Settlement	No									
Erosion	No									
Frost Action	No									
Sloughing and Cracking	No									
Animal Burrows	No									
Vegetation	No									
Staining	No									
Vegetation Stress	No									
Seepage Points	No									
Debris Exposed	No									
Presence/Condition - Monitoring Instruments	No									
Features of Note	Yes	Refer to Figure PIN-2.9	N/A	N/A	N/A	N/A	The area that the landfill is adjacent to is wet by nature and contains standing water.	Photo 60	The landfill is performing well.	Acceptable
Landfill Performance										Acceptable

South Borrow Landfill - EVALUATION OF YEAR 1 SOIL ANALYTICAL DATA

Parameter	N value Baseline	Arithmetic Mean +/- 95% Confidence Limit Baseline	Maximum Baseline [mg/kg]	2012	Comments
Copper	25	14.7 +/- 3.6	37	All concentrations within 95% confidence limit, with one exception.	The surface sample at P2-28 had a concentration of 25.8 mg/kg. The results was below the baseline maximum.
Nickel	25	9.8 +/- 2.6	34	All concentrations within 95% confidence limit.	
Cobalt	25	<5.0	6	Concentrations consistent with baseline mean (non-detect).	
Cadmium	25	<1.0	<1.0	Concentrations consistent with baseline mean (non-detect).	
Lead	25	<10	<10	Concentrations consistent with baseline mean (non-detect).	
Zinc	25	<15	50	All concentrations within 95% confidence limit, with four exceptions.	The surface and depth samples at P2-30 had concentrations of 18 and 17 mg/kg, respectively. The surface samples at P2-27 and P2-28 had concentrations of 36 and 20 mg/kg, respectively. No results were above the baseline maximum.
Chromium	25	<20	<20	Concentrations consistent with baseline mean (non-detect).	
Arsenic	25	2.9 +/- 0.7	8	All concentrations within 95% confidence limit.	
Mercury	8	<0.10	<0.10	Concentrations consistent with baseline mean (non-detect).	
PCBs	23	<0.050	0.12	Concentrations consistent with baseline mean (non-detect).	Detection limits in 2012 were raised above the baseline maximum.
TPH	8	85 +/- 71	285	All concentrations within 95% confidence limit, with five exceptions.	The surface and depth samples at P2-27 had concentrations of 240 and 220 mg/kg, respectively. The depth sample at P2-28 had a concentration of 730 mg/kg. The surface and depth sample at P2-29 had concentrations of 580 and 690 mg/kg, respectively. The results at P2-28 and P2-29 exceeded the baseline maximum.

South Borrow Landfill - Year 1 (2012) Soil Data

Sample #	Surface/ Reference Tag #	Location	Date	Depth (cm)	Cu [mg/kg]	Ni [mg/kg]	Co [mg/kg]	Cd [mg/kg]	Pb [mg/kg]	Zn [mg/kg]	Cr [mg/kg]	As [mg/kg]	Hg [mg/kg]	PCBs [mg/kg]	TPH [mg/kg]	TPH Identity		
																F1	F2	F3
South Borrow Landfill- Baseline Concentrations					**14.7 +/- 3.6**	**9.8 +/- 2.6**	**<5.0**	**<1.0**	**<10**	**<15**	**<20**	**2.9 +/- 0.7**	**<0.10**	**<0.050**	**85 +/- 71**			
South Borrow Landfill - Maximum Concentrations					**37.0**	**34.0**	**6.0**	**<1.0**	**<10**	**50**	**<20**	**8.0**	**<0.10**	**0.12**	**285**			
Upgradient Soil Samples																		
12-19210/11	19210	P2-30	2012	0-10	7.2	4.6	2.5	<0.50	4.7	18	6.7	2.9	0.013	<0.020	<50	<5.0	<10	<50
12-19212/13	19210	P2-30	2012	30-40	7.1	4.6	2.6	<0.50	4	17	7	2.7	0.021	<0.020	<50	<5.0	<10	<50
Downgradient Soil Samples																		
12-19198/99	19198	P2-27	2012	0-10	5.5	5.7	1.8	<0.50	1.6	36	5	<1.0	0.012	<0.060	240	<15	<30	240
12-19200/01	19198	P2-27	2012	30-40	8.6	5.8	2.5	<0.50	2.6	12	7	1.2	<0.010	<0.020	220	<5.0	<10	220
12-19202/03	19202	P2-28	2012	0-10	25.8	6.8	3.6	<0.50	2.7	20	8	1.9	<0.010	<0.020	53	<5.0	<10	53
12-19204/05	19202	P2-28	2012	30-40	9.2	12.0	1.8	<0.50	1.6	7	7	2.5	<0.010	<0.060	730	<15	<30	730
12-19206/07	19206	P2-29	2012	0-10	6.2	11.9	2.1	<0.50	<1.0	5	5	2.4	0.015	<0.10	580	<20	<50	580
12-19208/09	19206	P2-29	2012	30-40	5.7	7.8	1.5	<0.50	<1.0	7	6	1.3	0.011	<0.10	690	<20	<50	690

Photograph 59. Looking S from NW corner of landfill (Photo 152). ↑

Photograph 60. Looking SW from centre of landfill.
Ponded water seen in background (Photo 157). ↑

Photograph 61. Looking E along S toe (Photo 154). ↑

Photograph 62. Looking NE along E berm of landfill (Photo 155). ↑

Photograph 63. Looking W from NE corner of landfill (Photo 150). ↑

Appendix B

Laboratory Analytical Reports (on DVD)

Appendix C

Field Notes (on DVD)

Appendix D

Additional Photographs (on DVD)