Appendix A

Station Area Non-hazardous Waste Landfill

- A1 – Site Condition/Visual Inspection Records
- A2 – Geotechnical Inspection Photographic Records
- A3 – Field Notes

A1. Station Area Non-hazardous Landfill

A1.1 Landfill Summary

The Station Area Non-Hazardous Waste Landfill is located on the Upper Site, approximately 500 m northeast of the main facilities area. The landfill contains non-hazardous wastes and debris generated and collected during clean up of the site. The landfill consists of perimeter berms and a cap of compacted granular fill. The location of the Station Area Non-Hazardous Waste Landfill is presented in Figure A-1.

For 2008, the monitoring requirements for the Station Area Non-Hazardous Waste Landfill included visual inspection only.

A1.2 Visual Monitoring

No significant erosion, settlement or indications of slope instability were observed at the Station Area Non-Hazardous Waste Landfill. Overall landfill performance is assessed as “acceptable”. Appendix A1 presents a summary of the 2008 visual inspection results.

Minor erosion gullies were observed on the east slope that appear to be self-armouring (Photo SNH-8 in Appendix A2). An area of minor seepage and orange staining was observed on the lower half of the northeast slope (Photos SNH-7A and 7B in Appendix A2). Some minor drainage was observed along the road at the south toe (Photo SNH-10 in Appendix A2). No issues of concern that require immediate attention were identified.

A1.3 Soil Sampling

Soil sampling was not scheduled for the 2008 monitoring year.

A1.4 Groundwater Sampling

Groundwater sampling was not scheduled for the 2008 monitoring year.

A1 – Site Condition/Visual Inspection Records

Visual Inspection Checklist
Inspection Report – Page 1 of 2

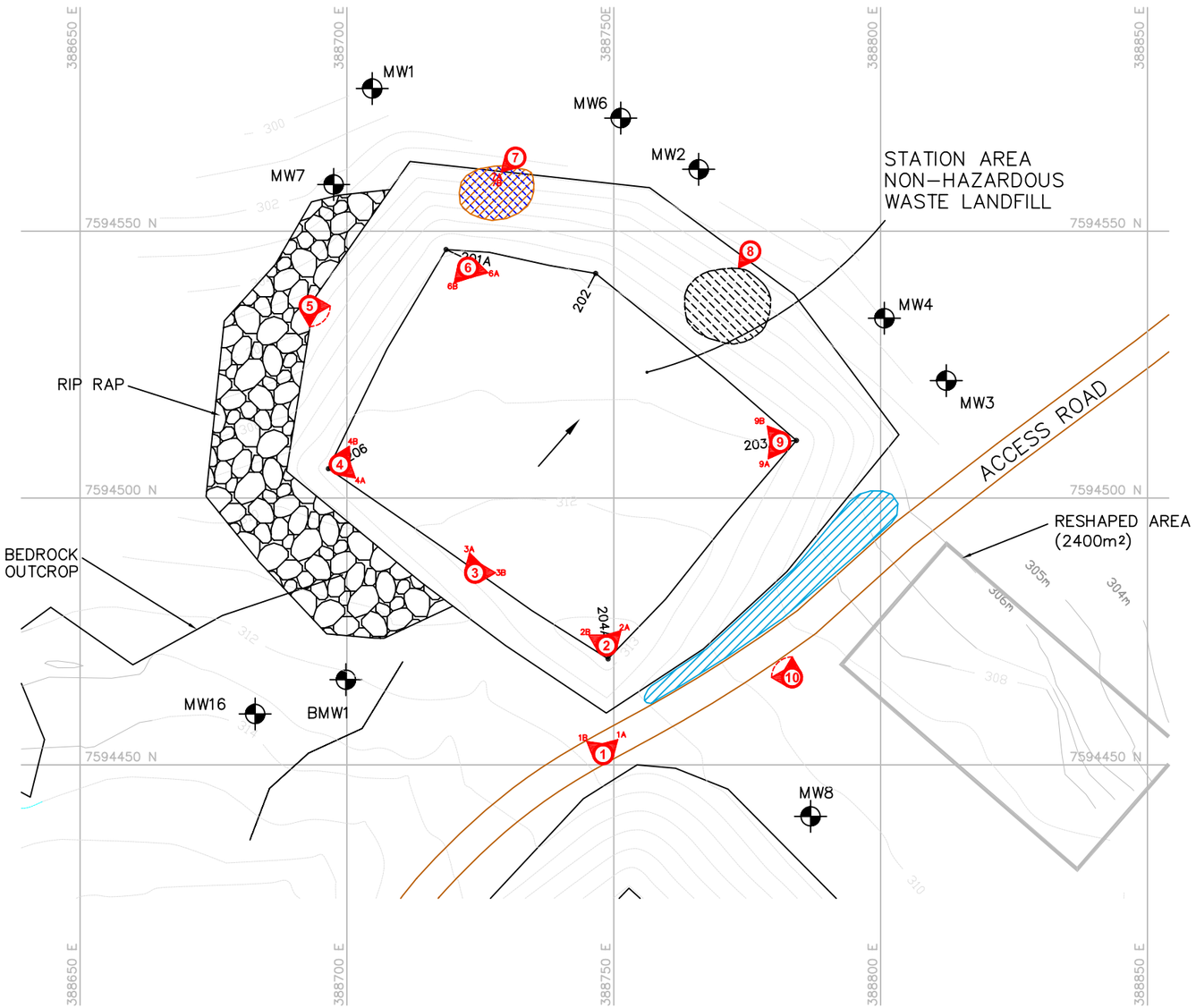
SITE NAME:	CAM-4 - Pelly Bay
LANDFILL/AREA DESIGNATION:	Station Area Non-Hazardous Waste Landfill
DATE OF INSPECTION:	August 14, 2008
DATE OF PREVIOUS INSPECTION:	August 24 - 26, 2007
INSPECTED BY:	Darrin Johnson, P.Eng.
REPORT PREPARED BY:	Darrin Johnson, P.Eng.

The preparer represents to the best of the preparer's knowledge, the following statements and observations are true and correct and to the best of the preparer's actual knowledge, no material facts have been suppressed or misstated.

Preliminary Stability Assessment

Feature	Severity Rating	Extent
Settlement	Not observed	None
Erosion	Acceptable	Isolated
Frost Action	Not observed	None
Animal Burrows	Not observed	None
Vegetation	Not observed	None
Staining	Acceptable	Isolated
Vegetation Stress	Not observed	None
Seepage Points	Acceptable	Isolated
Debris Exposed	Not observed	None
Tension Crack	Not observed	None
Overall Landfill Performance	Acceptable	

Checklist Item	Present Yes/No	Location	Dimensions (L x W) (m)	Depth (m)	Extent (%)	Description	Photographic Records (Photos referenced in photolog and in figures)	Additional Comments/ Preliminary Stability Assessment
Settlement	No							
Erosion	Minor	East slope	10m x 10m	0.1m	1%	Isoloated area of minor erosion that appears to be self-armouring.	SNH-8	Acceptable
Frost Action	No							
Animal Burrows	No							
Vegetation	No							
Staining	Yes	Northeast corner slope	10m x 10m	N/A	1%	Isolated area of minor orange staining.	SNH-7A and SNH-7B	Acceptable
Vegetation Stress	No							
Seepage Points	Yes	Northeast corner slope	10m x 10m	N/A	1%	Isolated area of minor seepage.	SNH-7A and SNH-7B	Acceptable
Debris Exposed	No							
Presence/ Condition of Monitoring Instruments	Good							
Other Features of Note.	Yes	South toe along road	50m x 5m	N/A	3%	Drainage along road at toe. No staining.	SNH-10	Acceptable
Additional Photos						General	SNH-1A, 1B, 2A, 2B, 3A, 3B, 4A, 4B, 5, 6A, 6B, 9A, 9B	



Legend

- TBM4 — TEMPORARY BENCHMARK
- BM-1 — PERMANENT BENCHMARK
- 101 — COORDINATE POINT
- MONITORING WELL LOCATION
- PHOTOGRAPH LOCATION
- AREA OF ORANGE STAINING
- AREA OF MINOR SEEPAGE
- AREA OF MINOR EROSION
- AREA OF WATER DRAINAGE

RECORD DRAWING
NOT FOR CONSTRUCTION

Map Sources / Notes:
-Source drawing from UMA: C4-RD02.dwg
-Photograph numbers refer to those found in Appendix A2 - Visual Inspection Photographs

0 5 10 20 30 40 m

1 : 1000
UTM Zone 16W, NAD83

File Name:	C4-RD02.dwg		
Reviewed by:	DCJ	Prepared by:	KAB
Date Issued:	October, 2008	Project Number:	80-297

Defence Construction Canada

2008 CAM-4 DEW Line Monitoring Program
CAM-4 Kugaaruk
Nunavut Territory

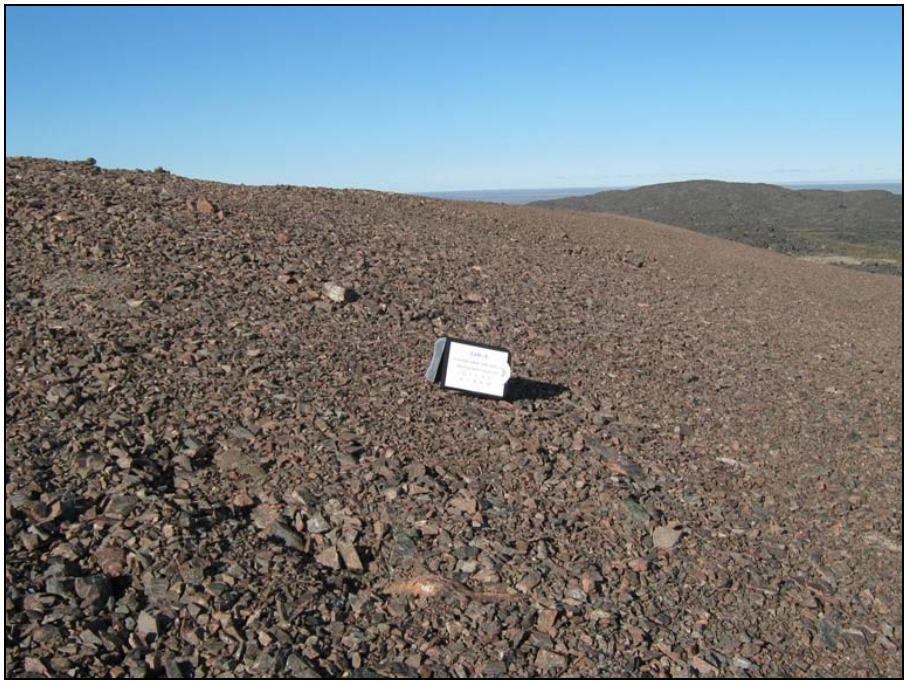
Station Area Non-Hazardous Waste Landfill

AECOM

Figure A-1
Version 1

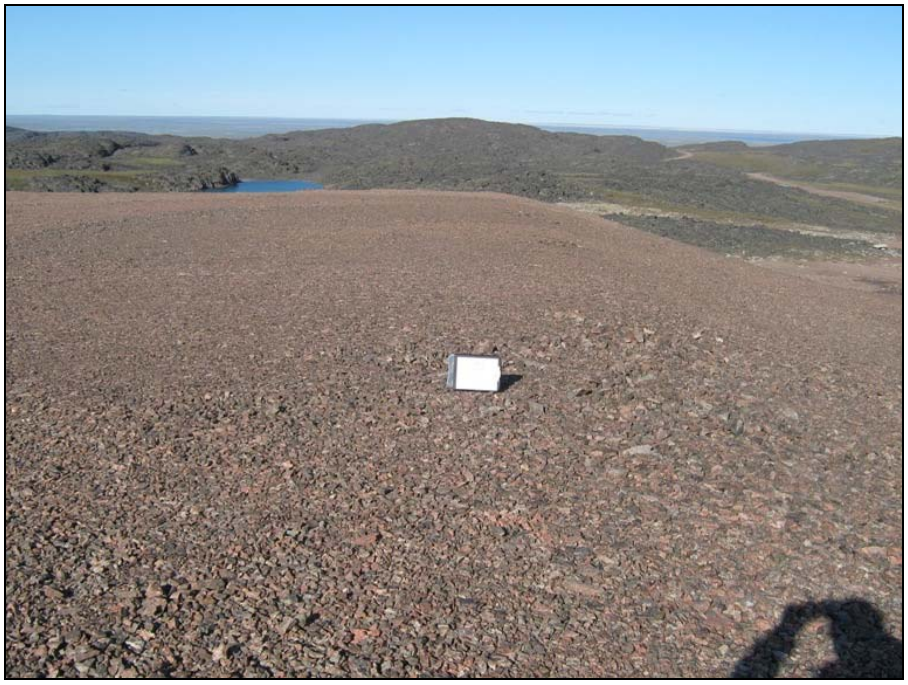
Date Plotted: October 16, 2006 Path: N:\Projects\20088\80297\2008\WorkInProgress\Documents\80297-4_CAM-4-FINAL-Report\ACAD_Files\C4-RD02.dwg

A2 – Geotechnical Inspection Photographic Records



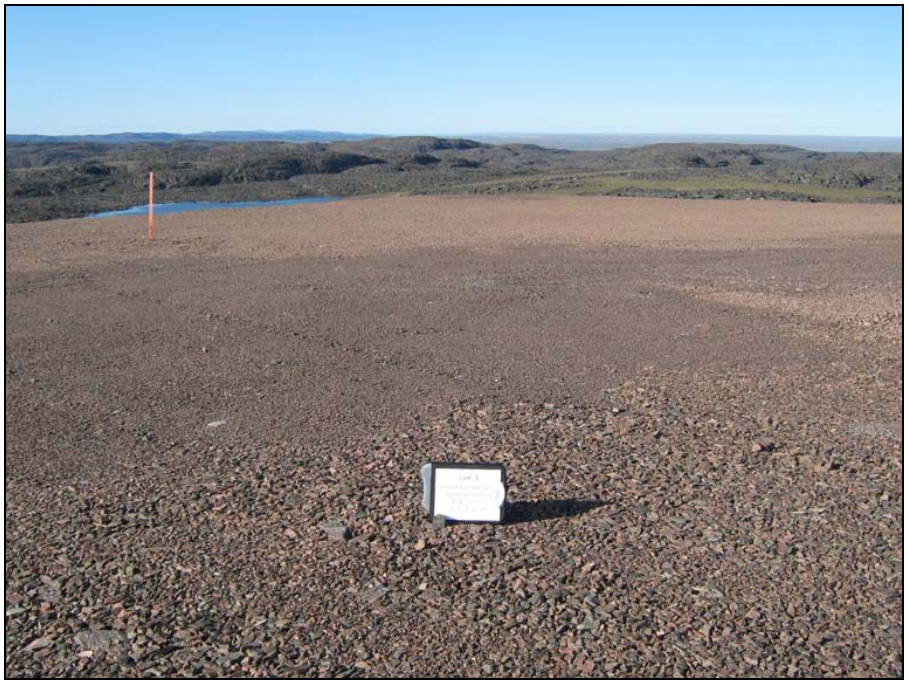
Photograph SNH-1A. Southwest corner at the toe, facing northeast. ↑

Photograph SNH-1B. Southwest corner at the toe, facing north. ↑



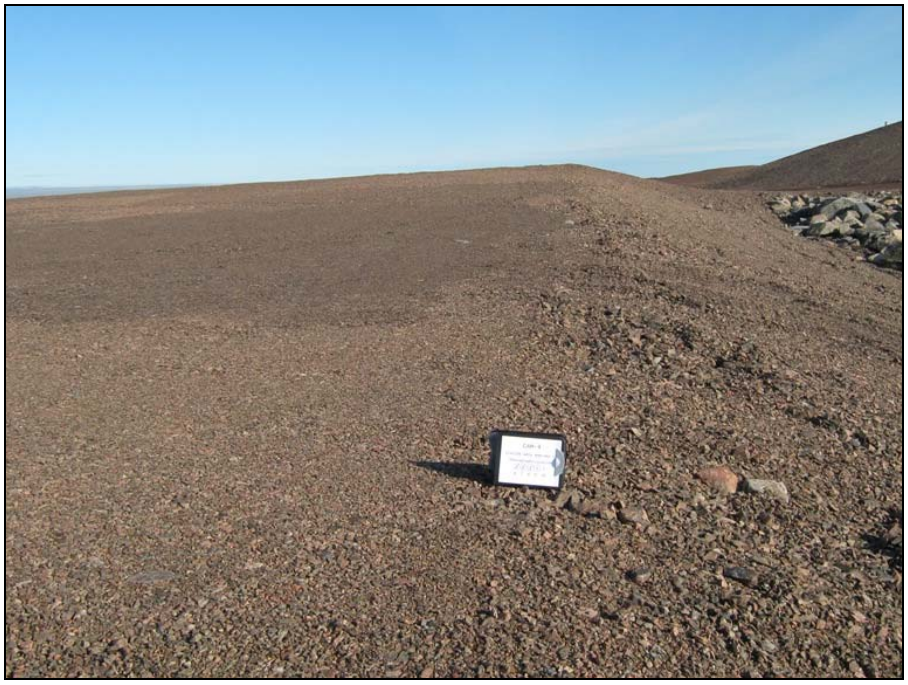
Photograph SNH-2A. Southwest corner at the crest facing northeast. Some tire tracks from a vehicle that tried to drive up onto the landfill near clipboard. ↑

Photograph SNH-2B. Southwest corner at the crest, facing north. ↑

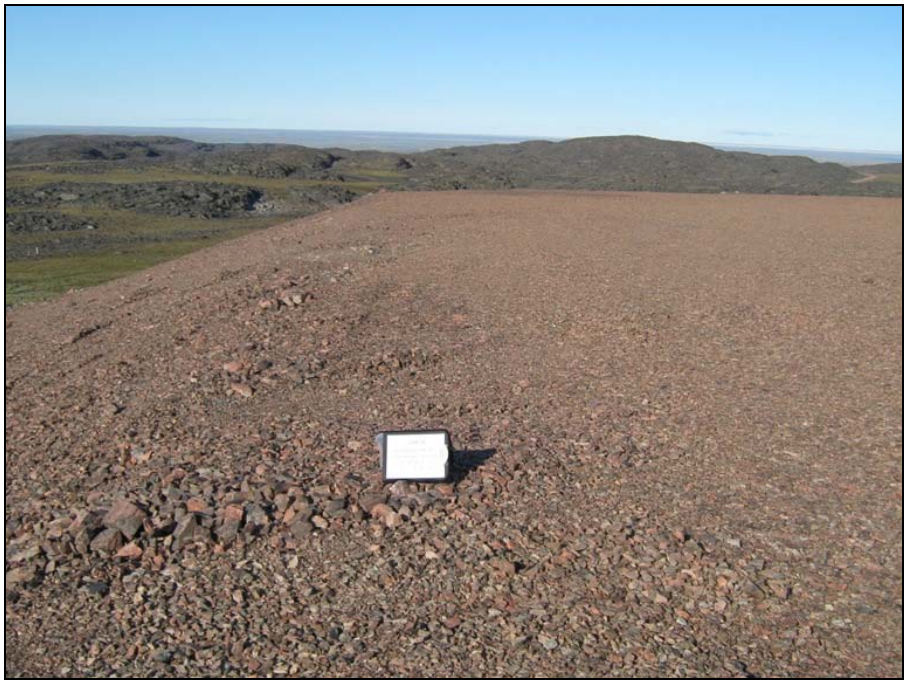


Photograph SNH-3A. Facing northeast over landfill surface. ↑

Photograph SNH-3B. Facing southeast over landfill top. ↑



Photograph SNH-4A. Northwest corner crest, facing south. ↑

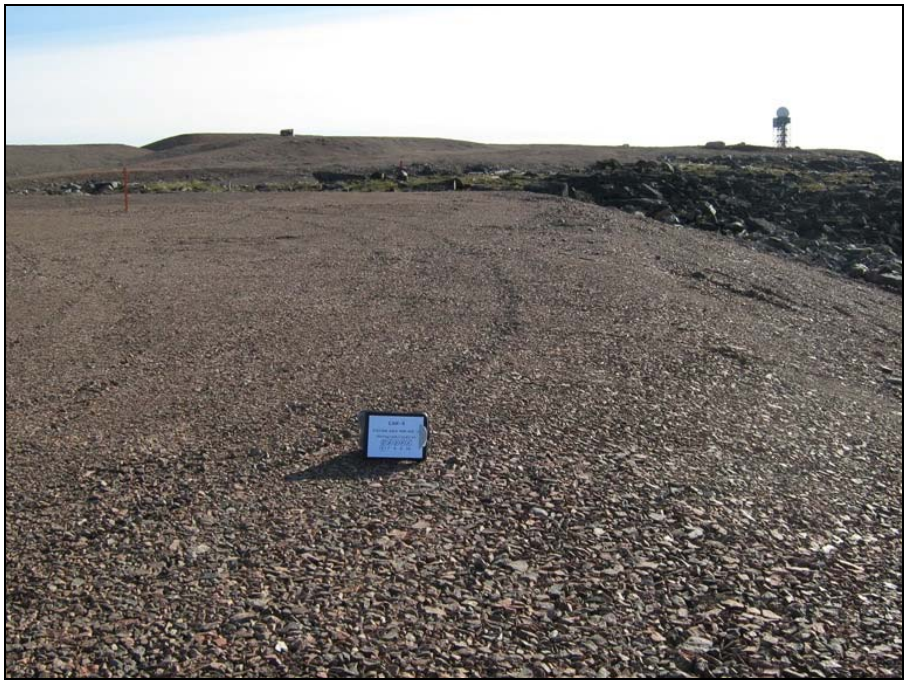


Photograph SNH-4B. Northwest corner crest, facing east. ↑

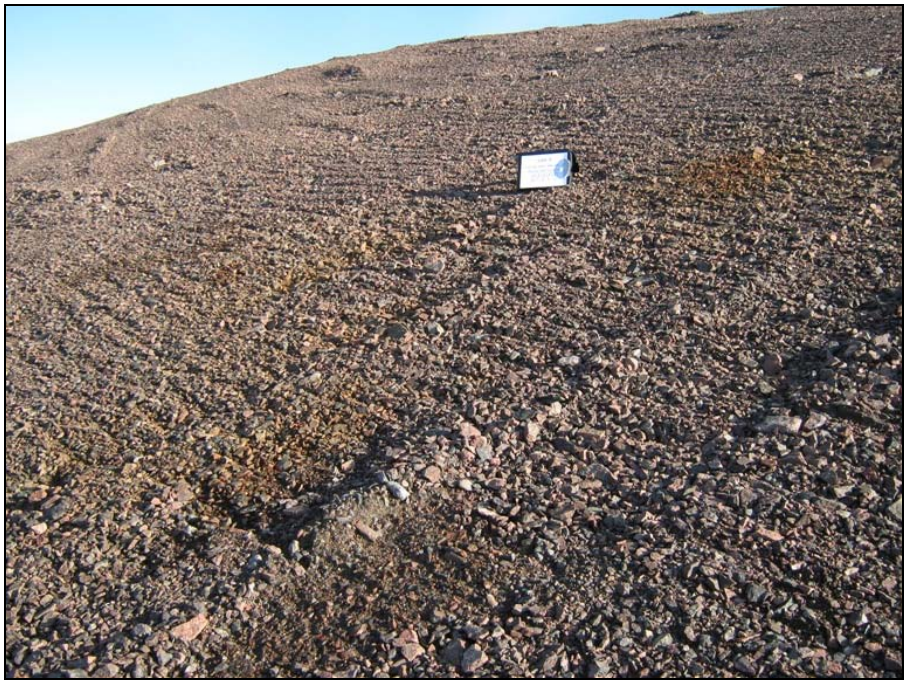
Photograph SNH-5. Panoramic of the north slope. ↑

Photograph SNH-6A. Northeast corner facing south. ↑

privileged and confidential



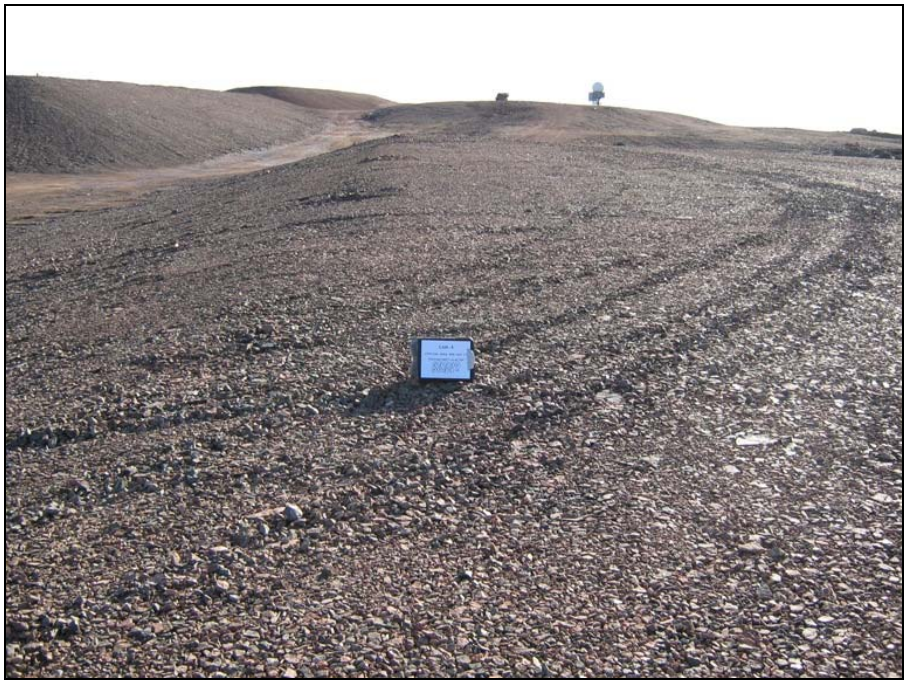
Photograph SNH-6B. Northeast corner facing west. ↑



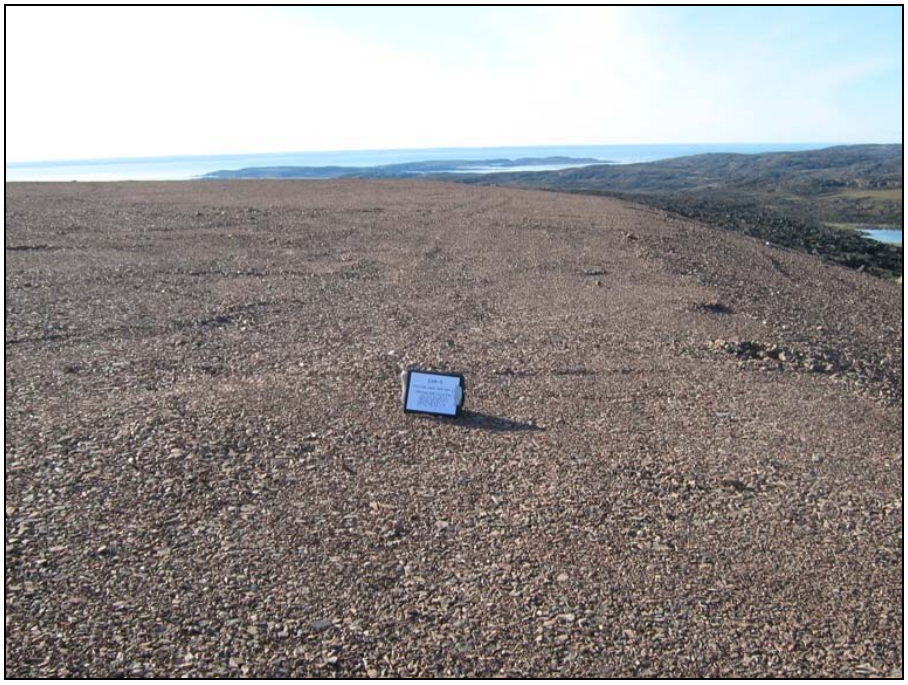
Photograph SNH-7A. Facing slope. Some seepage and orange staining over 10m x 10m area on lower half of east slope, towards the northeast corner toe. ↑

Photograph SNH-7B. Toe of slope near northeast corner. Orange staingin and seepage discharging onto rocks at toe of landfill. Down-slope of photo SNH-12. ↑

Photograph SNH-8. East slope. Area of possible minor erosion with gullies about 0.5m wide and less than 0.1m deep that appear to be self healing with larger rock in cover fill. ↑



Photograph SNH-9A. Facing west along south crest. ↑



Photograph SNH-9B. Facing north along east crest. Some tire tracks but no damage. ↑

privileged and confidential

Photograph SNH-10. Panoramic of the south face. Some seepage and drainage along road at toe. No staining. ↑

A3 – Field Notes

- STATION AREA NON-HAZ LANDFILL (SANH)
- STARTED INSPECTION AT 3:30PM

- SANH PHOTO LOC. 1 (WAYPOINT 25)
  - SOUTHWEST CORNER TOE
  - PHOTO 46 (FACING NE)
  - PHOTO 47 (FACING NORTH)
  - COARSE ROCK ON SLOPES
  - NO EROSION OR TENSION CRACKS OBSERVED

- SANH PHOTO 2 (WAYPOINT 26)
  - SOUTHWEST CORNER CREST
  - PHOTO 48 (FACING NE)
  - PHOTO 49 (FACING NORTH)
  - SOME TIRE TRACKS FROM A VEHICLE THAT TRIED TO DRIVE UP ONTO LANDFILL NEAR PHOTO SIGN FOR PHOTO 48

- SANH PHOTO 3 (WAYPOINT 27)
  - PHOTO 50 (FACING NE OVER LF SURFACE)
  - PHOTO 51 (FACING SE OVER LF TOP)
  - NO SIGNIFICANT SETTLEMENT OR CONCERN

STATION AREA NON-HAZ (PAGE 2)

- PHOTO LOC. 4 (WAYPOINT 28)
  - NORTHWEST CORNER CREST
  - PHOTO 52 (FACING SOUTH)
  - PHOTO 53 (FACING EAST)
  - PHOTO 54 (OCEAN IN DISTANCE)

- PHOTO LOC. 5 (WAYPOINT 29)
  - NORTH SLOPE
  - PHOTOS 55, 56 & 57 (PANORAMIC)
  - NO EROSION OR CRACKS OBSERVED
  - LARGE 1m DIA. ROCKS AT TOE
  - NO SEEPAGE OBSERVED

- PHOTO LOC. 6 (WAYPOINT 30-NE CORNER)
  - PHOTO 58 (FACING SOUTH)
  - PHOTO 59 (FACING WEST)

- PHOTO LOC. 7 (WAYPOINT 31)
  - PHOTO 60 (FACING SLOPE)
  - SOME SEEPAGE AND ORANGE STAINING OVER 10m x 10m AREA ON LOWER HALF OF EAST SLOPE TOWARDS NE CORNER TOE.

STATION AREA NON-HAZ (PAGE 3)

- PHOTO 61 (TOE OF SLOPE NEAR NE CORNER)
  - ORANGE STAINING AND SEEPAGE DISCHARGING ONTO ROCKS AT TOE OF LANDFILL
  - DOWNSLOPE OF PHOTO 60

- PHOTO LOC. 8 (WAYPOINT 32)
  - PHOTO 62 (EAST SLOPE)
  - AREA OF POSSIBLE MINOR EROSION WITH GULLIES ABOUT 0.5m WIDE AND LESS THAN 0.1m DEEP. THAT APPEAR TO BE SELF HEALING WITH LARGER ROCK IN COVER FILL

- PHOTO LOC. 9 (WAYPOINT 33)
  - PHOTO 63 (FACING WEST ALONG SOUTH COAST)
  - PHOTO 64 (FACING NORTH ALONG EAST COAST)
  - SOME TIRE TRACKS - NO DAMAGE

- PHOTO LOC. 10 (WAYPOINT 34 - SOUTH FACE)
  - PHOTOS 65, 66 & 67 (PANORAMIC)
  - SOME SEEPAGE AND DRAINAGE ALONG ROAD AT TOE, NO STAINING

Appendix B

DCC Tier II Soil Disposal Facility

- B1 – Site Condition/Visual Inspection Records
- B2 – Geotechnical Inspection Photographic Records
- B3 – Monitoring Photographic Records
- B4 – Monitoring Well Sampling Records
- B5 – Thermistor Maintenance Records
- B6 – Thermistor Graphs
- B7 – Field Notes

B1. Tier II Soil Disposal Facility

B1.1 Landfill Summary

The Tier II Soil Disposal Facility is located approximately 550 m west of the main facilities area. The landfill was constructed for disposal of Tier II soil excavated during the clean up. The location and plan of the Tier II Disposal Facility is presented in Figure B-1.

The landfill has a double containment system consisting of a geomembrane liner and placement of sufficient surface fill to promote permafrost aggradation through the landfill contents. The liner was placed across the bottom of the landfill, along the berms and over top of the landfilled material.

For 2008, the monitoring requirements for the Tier II Soil Disposal Facility included visual inspection, soil sampling, groundwater sampling and thermal monitoring.

B1.2 Visual Monitoring

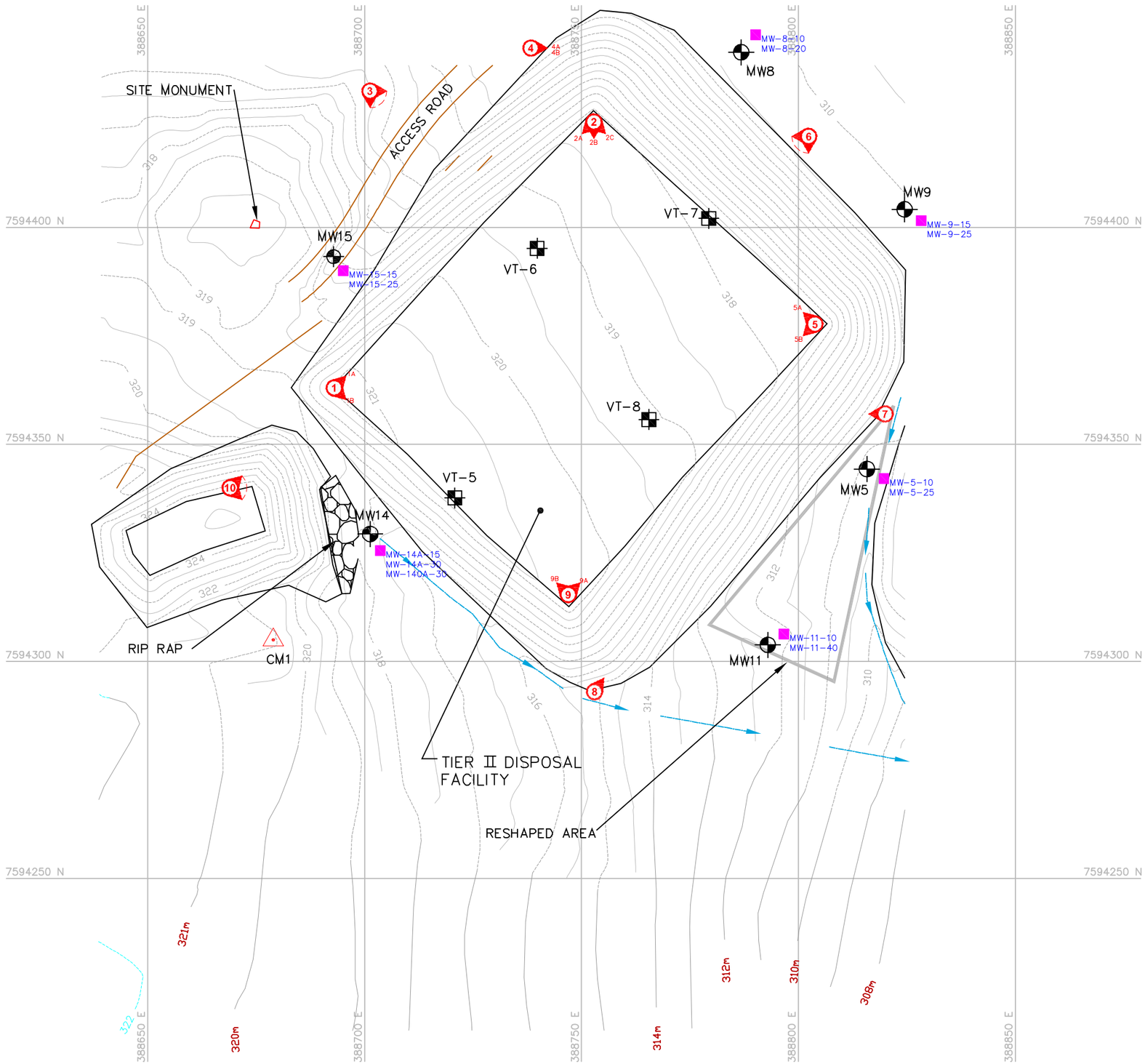
No significant erosion, settlement or indications of slope instability were observed at the Tier II Soil Disposal Facility. Overall landfill performance is assessed as “acceptable”. Appendix B1 presents a summary of the 2008 visual inspection results.

An area of minor orange staining was observed at the toe of the northeast slope (TII-4A in Appendix B2). Seepage was observed from the lower half of the northeast and southeast slopes (TII-6 and 7 in Appendix B2). No staining was observed on the slopes. Minor ponding of water and drainage was observed along the toes of the northwest, southeast and southwest slopes (TII-3, 9A and 10 in Appendix B2). No issues of concern that require immediate attention were identified.

B1.3 Soil Sampling

Soil samples were collected at the designated locations (BMW-3, MW-5, MW-8, MW-9, MW-14-A, MW-15 AND MW-16). Sampling locations are shown on Figure B-1. Two samples were collected at each station at depths of 0.10 – 0.15 m below ground surface and between 0.25 – 0.40 meters below ground surface. The photographs of each monitoring well and test pit location are included in Attachment B3.

No staining or free product was observed during the sampling event at the Tier II Soil Disposal Facility. There were no odours documented during the Tier II Disposal Facility sampling event, with the exception of one monitoring location, MW-16. An ambient hydrocarbon-like odour was detected during soil sampling at the MW-16 monitoring location.



Legend

- TBM4 — TEMPORARY BENCHMARK
- BM-1 — PERMANENT BENCHMARK
- 101 — COORDINATE POINT
- MW-11-10 / MW-11-40 — MONITORING SOIL SAMPLE LOCATION
- MONITORING WELL LOCATION
- VERTICAL THERMISTOR LOCATION
- 1 — PHOTOGRAPH LOCATION

RECORD DRAWING
NOT FOR CONSTRUCTION

Map Sources / Notes:
Source drawing from UMA: C4-RD03.dwg

0 5 10 20 30 40 m
1 : 1000
UTM Zone 16W, NAD83

File Name:	C4-RD03.dwg		
Reviewed by:	DCJ	Prepared by:	KAB
Date Issued:	October, 2008	Project Number:	80-297

Defence Construction Canada

2008 CAM-4 DEW LIne Monitoring Program
CAM-4 Kugaaruk
Nunavut Territory

DCC Tier II
Soil Disposal Facility

AECOM

Figure B-1
Version 1

Date Plotted: October 16, 2006 Path: N:\Projects\2008\80297\2008\WorkInProgress\DataInterpretation\CAD\CAM-4\C4-RD03.dwg

The laboratory analyses detected concentrations of TPH (C6-34) at monitoring locations MW-8, MW-9, MW-15 and MW-16. It is recommended that these results be evaluated in the context of the Landfill Monitoring Plan.

The analytical results and depths of samples are provided in Table B-1. The Laboratory Certificates of Analysis are provided in Appendix F.

B1.4 Groundwater Sampling

Groundwater measurements and monitoring system condition records were documented for observation wells BMW-3, MW-5, MW-8, MW-9, MW-14-A, MW-15 and MW-16. These records are provided in Attachment B4.

All groundwater monitoring wells slated for monitoring in 2008 at the Tier II Soil Disposal Facility contained sufficient volume for sampling. Samples were collected at a flow rate equal to the recharge rate of the monitoring well (and not exceeding 100mL/min). All monitors were sampled using a peristaltic pump and disposable LDPE tubing with the exception of BMW-3 and MW-16. The rechargeable battery provided with the peristaltic pump from the supplier proved to be faulty, thus monitors that were accessible by vehicle were sampled with the peristaltic pump runoff the vehicle battery. Monitors BMW-3 and MW-16 were not accessible by vehicle, therefore were purged and sampled using a disposable bailer.

Groundwater samples were not filtered and not preserved. Samples were analyzed for total concentration of inorganic metals, TPH (C6-C32) and PCB.

TPH (C6-C32) was detected in monitoring wells MW-5, MW-8, MW-9, MW-14-A, MW-15 and MW-16. The results should be evaluated in the context of the Landfill Monitoring Plan as well as compared with DCC internal standards.

The results are presented in Table B-2. The laboratory Certificates of Analysis are provided in Appendix F.

B1.5 Thermal Monitoring

All thermistors at the Tier II Soil Disposal Facility were in good condition. Thermistor data was downloaded on August 15, 2008, programming was checked and the data loggers were reset. The data logger clocks were adjusted to local (Standard Time). Battery charge was checked to ensure sufficient remaining charge and batteries were not changed in 2008.

Thermistor Maintenance Records were completed for all thermistors located at the Lower Landfill and are located in Appendix B5. Selected data has been plotted into graphs for each thermistor which are provided as Graphs B-1 through B-4 located in Appendix B6.

Table B-1. CAM-4 Kugaaruk, Summary of 2008 Soil Analysis - Tier II Soil Disposal Facility

Sample Ident.	Sample Location	Depth	Copper Cu	Nickel Ni	Cobalt Co	Cadmium Cd	Lead Pb	Zinc Zn	Chromium Cr	Arsenic As	Mercury Hg	PCB Total Aroclors	F1 C6-C10	F2 C10-C16	F3 C16-C34	TPH C6-34
		(m)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)
Upgradient Samples																
BMW-3-15	BMW-3	0.15	13.9	15.7	8.5	<0.50	9.3	44.0	31.8	<5.0	<0.0050	<0.050	<10	<30	<50	0
BMW-3-40	BMW-3	0.40	16.8	17.5	9.0	<0.50	10.9	53.7	35.0	<5.0	0.0086	<0.050	<10	<31	<51	0
BMW-30-40*	BMW-3	0.40	12.0	13.9	7.1	<0.50	8.0	38.3	28.4	<5.0	<0.0050	<0.050	<10	<30	<50	0
MW-14-A-15	MW-14-A	0.15	11.0	13.3	6.2	<0.50	8.0	33.2	28.0	<5.0	<0.0050	<0.050	<10	<30	<50	0
MW-14-A-30	MW-14-A	0.30	12.1	14.2	6.7	<0.50	8.3	35.8	28.1	<5.0	<0.0050	<0.050	<10	<30	<50	0
MW-140-A-30*	MW-14-A	0.30	11.8	13.9	6.1	<0.50	8.0	33.8	27.4	<5.0	<0.0050	<0.050	<10	<30	<50	0
MW-15-15	MW-15	0.15	9.8	9.4	6.5	<0.50	8.0	41.3	17.1	<5.0	<0.0050	<0.050	<10	118	235	353
MW-15-25	MW-15	0.25	11.2	9.3	7.0	<0.50	7.4	43.9	17.9	<5.0	<0.0050	<0.050	<10	119	302	421
MW-16-15	MW-16	0.15	14.2	16.0	7.8	<0.50	8.4	43.1	31.9	<5.0	<0.0050	<0.050	<10	286	133	419
MW-16-40	MW-16	0.40	12.3	15.2	7.8	<0.50	8.0	39.3	29.5	<5.0	<0.0050	<0.050	<10	49	<50	49
Downgradient Samples																
MW-5-10	MW-5	0.10	11.5	9.4	6.6	<0.50	6.6	33.0	18.3	<5.0	<0.0050	<0.050	<10	<30	<50	0
MW-5-25	MW-5	0.25	11.6	9.0	6.3	<0.50	6.8	33.5	19.0	<5.0	0.0051	<0.050	<10	<30	<50	0
MW-8-10	MW-8	0.10	11.9	10.6	6.8	<0.50	7.9	40.5	19.8	<5.0	<0.0050	<0.050	<10	<30	<50	0
MW-8-20	MW-8	0.20	11.9	10.6	6.4	<0.50	13.5	38.6	22.5	<5.0	0.0066	<0.050	<10	296	121	417
MW-9-15	MW-9	0.15	10.3	8.9	6.4	<0.50	11.6	35.6	18.1	<5.0	0.0070	<0.050	<10	<30	69	69
MW-9-25	MW-9	0.25	10.4	7.9	6.2	<0.50	9.7	35.6	16.6	<5.0	0.0056	<0.050	<10	<30	<50	0

***** *Denotes duplicate sample. (Further information located in Table 2 of main report)*

Note: mg/kg = ug/g

TPH is represented as the total of F1, F2 and F3 as defined by CCME Tier I Method - Rev. 5 Analysis of Petroleum Hydrocarbons in Soil

AECOM

Table B-2. CAM-4 Kugaaruk, Summary of 2008 Groundwater Analysis - Tier II Soil Disposal Facility

Sample Identification	Location	Groundwater Elevation (masl)	Copper Cu (mg/L)	Nickel Ni (mg/L)	Cobalt Co (mg/L)	Cadmium Cd (mg/L)	Lead Pb (mg/L)	Zinc Zn (mg/L)	Chromium Cr (mg/L)	Arsenic As (mg/L)	Mercury Hg (mg/L)	PCB Total Aroclors (mg/L)	F1 C6-C10 (mg/L)	F2 C10-C16 (mg/L)	F3 C16-C34 (mg/L)	TPH C6-34 (mg/L)
Upgradient Samples																
BMW-3	BMW-3	316.84	0.0155	0.0180	0.00817	0.000061	0.0091	0.0513	0.0437	0.00230	<0.000020	<0.0010	<0.10	<0.30	<0.30	0
MW-14A	MW-14A	317.24	0.0146	0.0091	0.00135	0.000067	0.00112	2.41	0.0100	0.00067	<0.000020	<0.0010	<0.10	<0.30	0.33	0.33
MW-15	MW-15	317.76	<0.0020	0.0065	0.00216	<0.000034	<0.0010	0.250	0.0024	0.0020	<0.000020	<0.0010	0.35	5.98	1.65	7.98
MW-150*	MW-15	317.76	<0.0020	0.0063	0.00208	<0.000034	<0.0010	0.239	<0.0030	0.0020	<0.000020	<0.0010	0.33	5.15	1.40	6.88
MW-16	MW-16	312.96	0.0040	0.0120	0.00210	0.000082	0.00056	0.0149	0.0025	0.00076	<0.000020	<0.0010	2.23	76.7	8.01	86.94
Downgradient Samples																
MW-5	MW-5	310.34	0.0043	0.0086	0.00030	0.000039	0.00142	0.0366	0.0051	<0.00050	<0.000020	<0.0010	<0.10	<0.30	0.33	0.33
MW-8	MW-8	310.20	0.0228	0.0268	0.0031	0.000170	<0.0025	0.0391	<0.0050	<0.0025	<0.000020	<0.0010	2.89	8.17	1.84	12.9
MW-9	MW-9	310.14	0.0071	0.0079	<0.0015	<0.000085	<0.0025	0.0382	0.0183	<0.0025	<0.000020	<0.0010	<0.10	0.44	0.63	1.07

***** *Denotes duplicate sample. (Further information located in Table 2 of main report)*

Note: mg/L = 1000 ug/L

AECOM

B1 – Site Condition/Visual Inspection Records

Visual Inspection Checklist
Inspection Report – Page 1 of 2

SITE NAME:	CAM-4 - Pelly Bay
LANDFILL/AREA DESIGNATION:	DCC Tier II Soil Disposal Facility
DATE OF INSPECTION:	August 14, 2008
DATE OF PREVIOUS INSPECTION:	August 24 - 26, 2007
INSPECTED BY:	Darrin Johnson, P.Eng.
REPORT PREPARED BY:	Darrin Johnson, P.Eng.

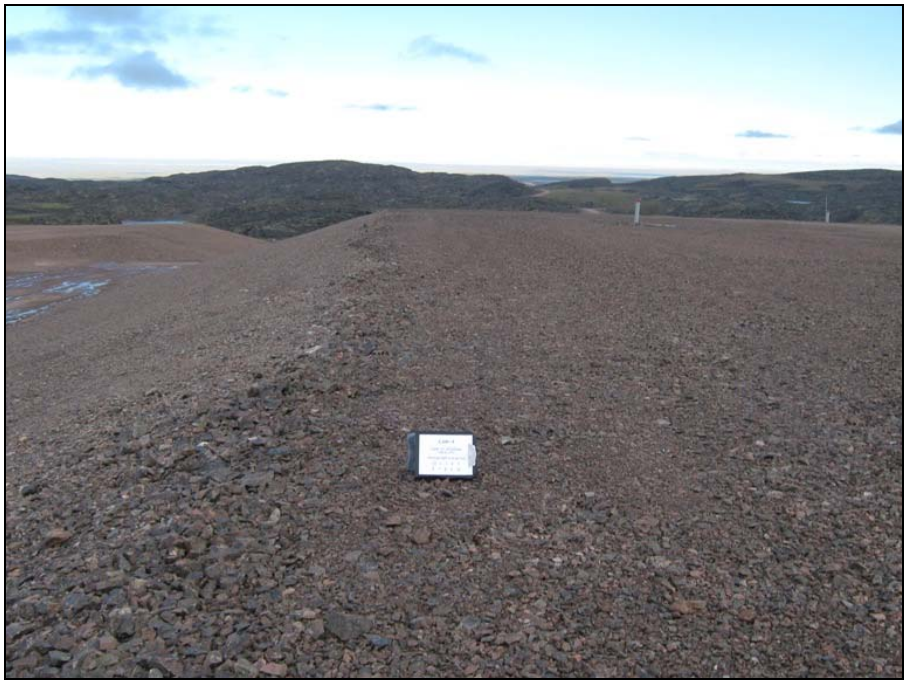
The preparer represents to the best of the preparer's knowledge, the following statements and observations are true and correct and to the best of the preparer's actual knowledge, no material facts have been suppressed or misstated.

Preliminary Stability Assessment

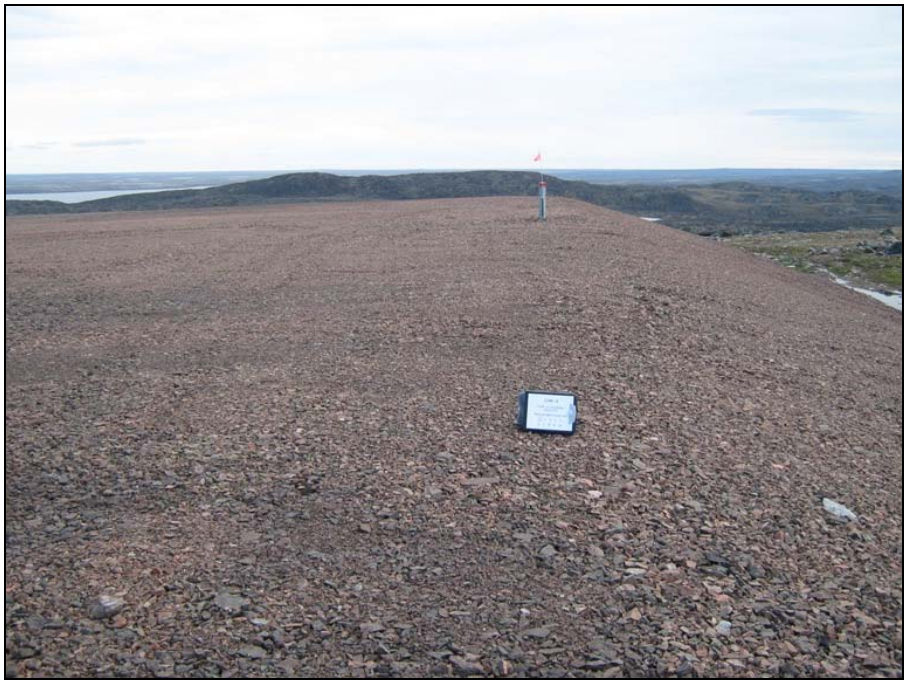
Feature	Severity Rating	Extent
Settlement	Not observed	None
Erosion	Not observed	None
Frost Action	Not observed	None
Animal Burrows	Not observed	None
Vegetation	Not observed	None
Staining	Acceptable	Isolated
Vegetation Stress	Not observed	None
Seepage Points	Acceptable	Occasional
Debris Exposed	Not observed	None
Tension Crack	Not observed	None
Overall Landfill Performance	Acceptable	

Checklist Item	Present Yes/No	Location	Dimensions (L x W) (m)	Depth (m)	Extent (%)	Description	Photographic Records (Photos referenced in photolog and in figures)	Additional Comments/ Preliminary Stability Assessment
Settlement	No							
Erosion	No							
Frost Action	No							
Animal Burrows	No							
Vegetation	No							
Staining	Yes	Northeast toe	10 m x 10 m	N/A	1%	Orange staining at toe of slope.	TII-4A	Acceptable
Vegetation Stress	No							
Seepage Points	Yes	Lower half of northeast and southeast slopes.	60 m x 10 m	N/A	6%	Some seepage from lower half of slope. No staining on slopes observed.	TII-6 and TII-7	Acceptable
Debris Exposed	No							
Presence/ Condition of Monitoring Instruments	Good							
Other Features of Note.	Yes	Ponded water along toes of northwest, southeast and southwest slopes.	50m x 5m x3	N/A	8%	Minor ponding of water and drainage along toe.	TII-3, 9A, 10	Acceptable
Additional Photos							TII-1A, 1B, 2A, 2B, 2C, 4B, 5A, 5B, 8, 9B	

B2 – Geotechnical Inspection Photographic Records



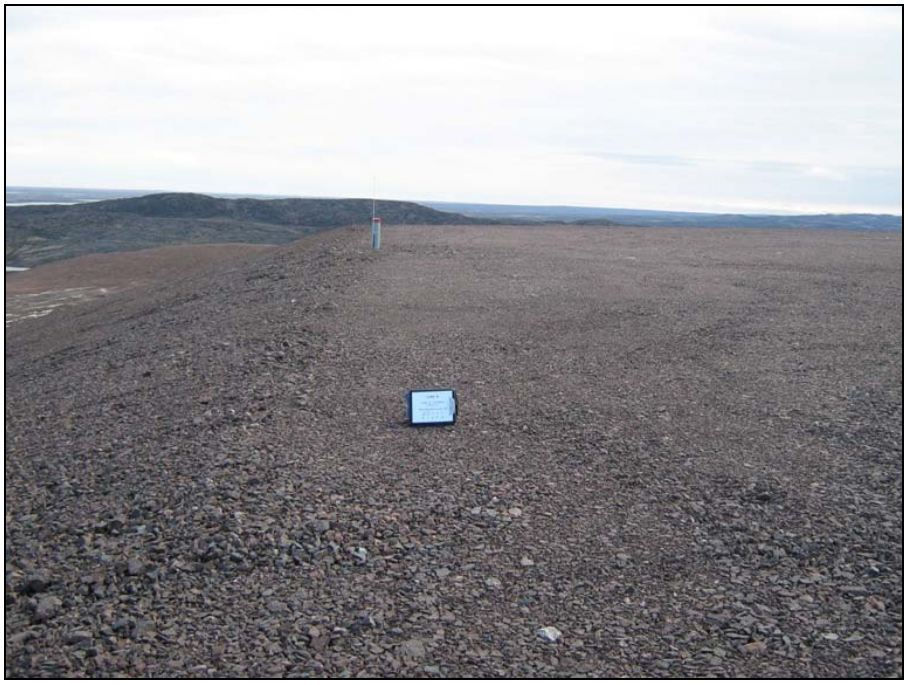
Photograph TII-1A. Northwest corner of landfill facing east along crest. ↑



Photograph TII-1B. Northwest corner of landfill facing south along crest. ↑

Photograph TII-2A. Northeast corner of landfill facing west. ↑

Photograph TII-2B. Northeast corner of landfill facing southwest. ↑

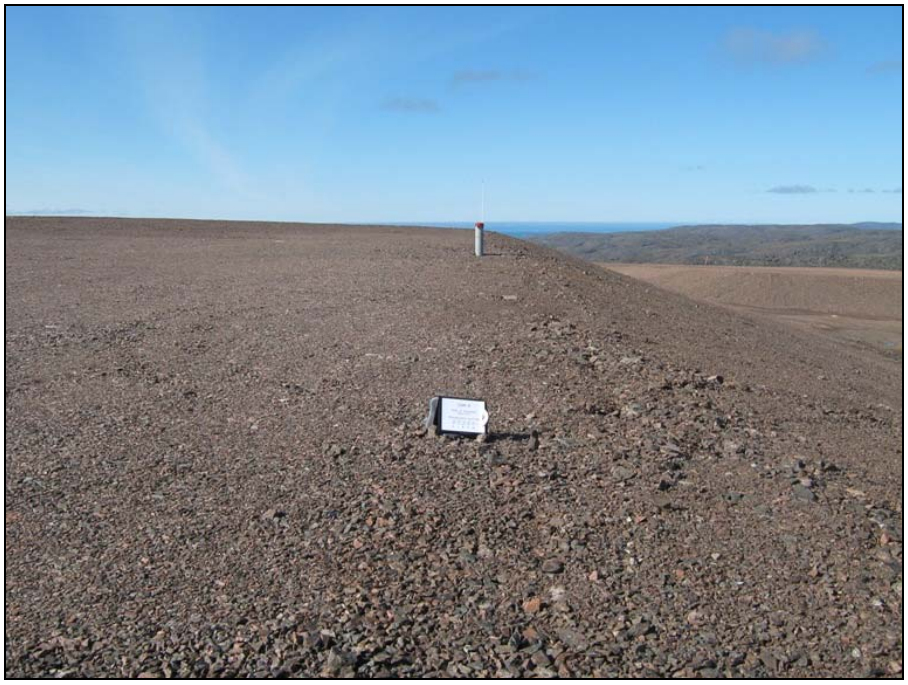


Photograph TII-2C. Northeast corner of landfill facing south. ↑

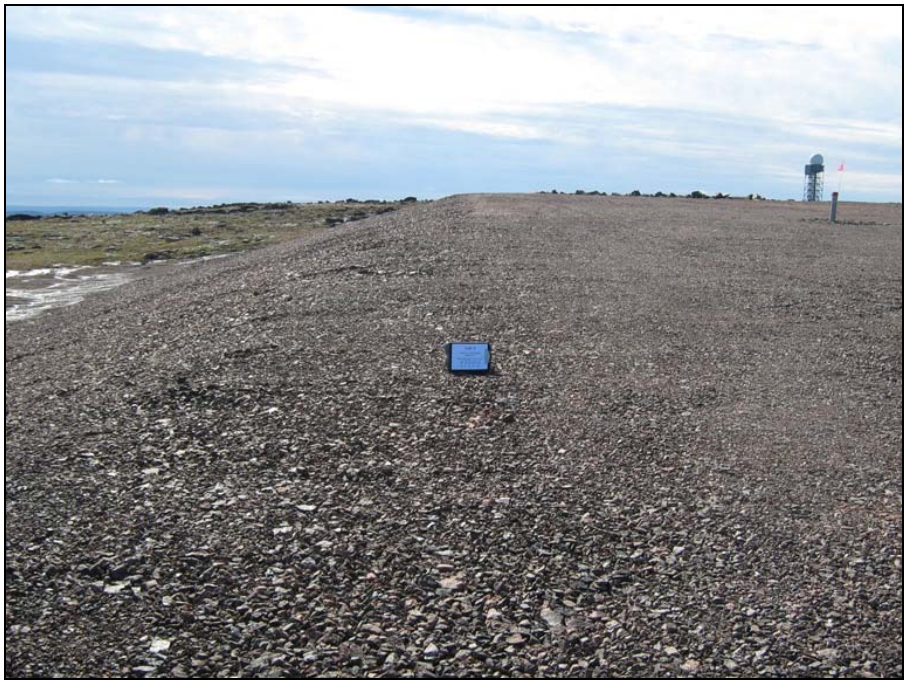
Photograph TII-3. Panoramic photo of the north slope. ↑

Photograph TII-4A. At the northeast toe. Some seepage with orange staining. Some water drainage along the road at the toe. ↑

Photograph TII-4B. Northeast corner and toe. ↑



Photograph TII-5A. Southeast crest facing north. ↑

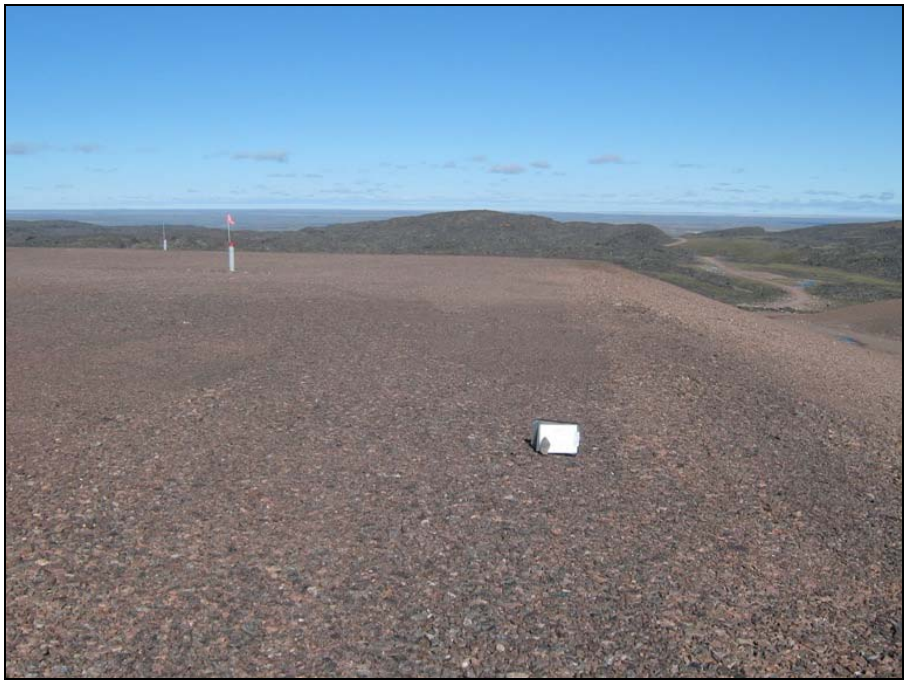


Photograph TII-5B. Southeast crest facing west. Some coarse rockfill along crest edge but there does not appear to be tension cracks. ↑

Photograph TII-6. Panoramic photo of the southeast slope. Some water seeping out of slope face. No staining. ↑

Photograph TII-7. South slope from southeast toe facing west. Some seepage from south slope and minor ponding at toe. No staining. ↑

Photograph TII-8. South slope from southwest toe facing east. ↑



Photograph TII-9A. Facing east along crest from the southwest corner of the landfill. ↑

Photograph TII-9B. Facing north along crest from the southwest corner of the landfill. Some ponded water along toe. No staining. ↑

Photograph TII-10. Panoramic photo of Tier II landfill facing east from raised gravel pad. ↑

B3 – Monitoring Photographic Records

Photograph 1. Monitoring Location BMW-3 (Upgradient) Facing South. ↑

Photograph 2. Monitoring Location MW-14-A (Upgradient). Facing North. ↑

Photograph 3. Monitoring Location MW-15 (Upgradient). Facing East. ↑

Photograph 4. Monitoring Location MW-16 (Upgradient). Facing South. ↑

Photograph 5. Monitoring Location MW-5 (Downgradient). Facing Northwest. ↑

Photograph 6. Monitoring Location MW-8 (Downgradient). Facing Northwest. ↑

Photograph 7. Monitoring Location MW-9 (Downgradient). Facing North. ↑

B4 – Monitoring Well Sampling Records

2008 Monitoring Well Sampling Log (BMW-3)

Site name:	CAM-4
Date of sampling event:	14-17 Aug 2008
Names of samplers:	TFB
Monitoring well ID:	BMW-3
Facility:	Tier II Soil Disposal Facility

Known Data

Depth of installation* (m):	3.45
Length of screened section (m):	2.03
Depth to top of screen* (m):	0.46

Measured Data

Condition of well:	Good	Procedure/Equipment:	Interface Meter
Procedure/Equipment:	Interface Meter	Depth to water surface (m):	0.92
Well height above ground (m):	0.76	Depth to bottom (m):	2.25
Diameter of well (m):	0.05	Free product thickness (mm):	-

Calculations

Depth of water (m):	1.33
Well volume of water (L):	2.61
Static water level* (m):	0.16
Length of screen collecting water (m):	1.03

Notes

Evidence of sludge:	-
Evidence of freezing/siltation:	-

Development/Purging Information

Equipment:	Disposable Bailer, Horiba U-22

Date & Time	Volume Removed (L)	Temperature (^{o}C)	pH	Conductivity (µS/cm)	Turbidity (NTU)	Description of Water
16-Aug-08	3	2.81	8.73	0.504	-	Silty, greyish brown, N/O

Water Sampling

Date & Time Collected:	16-Aug-08
Sample Number - Water:	BMW-3
Sample Containers:	3 x 0.5L Amber Glass 2 x VOC vials
Procedure/Equipment:	Disposable Bailer
Water Description:	Silty, greyish brown, N/O
Sampling Equipment Decontamination (Y/N):	Y
Number Washes:	1
Number Rinses:	2

Soil Sampling

Date and Time Collected:	14-Aug-08
Sample Number - Soil:	BMW-3-15 BMW-3-40 Dup BMW-30-40
Sample Containers:	8 x 250mL Glass
Procedure/Equipment:	SS Trowel
Soil Description:	Greyish brown silt till, some gravel.
Sampling Equipment Decontamination (Y/N):	Y
Number Washes:	2
Number Rinses:	2

*From ground surface. Unless this is stated, all measurments are assumed to be from the top of the casing.
n/a=not applicable
LDPE=Low Density Polyethylene
SS=Stainless Steel

AECOM

2008 Monitoring Well Sampling Log (MW-5)

Site name:	CAM-4
Date of sampling event:	14-17 Aug 2008
Names of samplers:	TFB
Monitoring well ID:	MW-5
Facility:	Tier II Soil Disposal Facility

Known Data

Depth of installation* (m):	3.60
Length of screened section (m):	2.03
Depth to top of screen* (m):	0.60

Measured Data

Condition of well:	Good	Procedure/Equipment:	Interface Meter
Procedure/Equipment:	Interface Meter	Depth to water surface (m):	1.17
Well height above ground (m):	0.60	Depth to bottom (m):	3.25
Diameter of well (m):	0.05	Free product thickness (mm):	-

Calculations

Depth of water (m):	2.08
Well volume of water (L):	4.08
Static water level* (m):	0.57
Length of screen collecting water (m):	2.05

Notes

Evidence of sludge:	-
Evidence of freezing/siltation:	-

Development/Purging Information

Equipment: Peristaltic Pump, Horiba U-22 with flow through cell, LDPE

Date & Time	Volume Removed (L)	Temperature (^{o}C)	pH	Conductivity (µS/cm)	Turbidity (NTU)	Description of Water
16-Aug-08	4.8	2.05	7.32	0.887	6.1	C&C, Slight chemical odour

Water Sampling

Date & Time Collected:	15-Aug-08
Sample Number - Water:	MW-5
Sample Containers:	3 x 0.5L Amber Glass
	2 x VOC vials
Procedure/Equipment:	Peristaltic Pump, Horiba U-22
Water Description:	C&C, Slight chemical odour
Sampling Equipment Decontamination (Y/N):	Y
Number Washes:	1
Number Rinses:	2

Soil Sampling

Date and Time Collected:	14-Aug-08
Sample Number - Soil:	MW-5-10
Refusal @ 0.25 m	MW-5-25
Sample Containers:	4 x 250mL Glass
Procedure/Equipment:	SS Trowel
Soil Description:	Greyish brown silt till, some gravel.
Sampling Equipment Decontamination (Y/N):	Y
Number Washes:	2
Number Rinses:	2

*From ground surface. Unless this is stated, all measurments are assumed to be from the top of the casing.
n/a=not applicable
LDPE=Low Density Polyethylene
SS=Stainless Steel

AECOM

2008 Monitoring Well Sampling Log (MW-8)

Site name:	CAM-4
Date of sampling event:	14-17 Aug 2008
Names of samplers:	TFB
Monitoring well ID:	MW-8
Facility:	Tier II Soil Disposal Facility

Known Data

Depth of installation* (m):	4.08
Length of screened section (m):	2.01
Depth to top of screen* (m):	0.97

Measured Data

Condition of well:	Good	Procedure/Equipment:	Interface Meter
Procedure/Equipment:	Interface Meter	Depth to water surface (m):	0.97
Well height above ground (m):	0.97	Depth to bottom (m):	2.45
Diameter of well (m):	0.05	Free product thickness (mm):	-

Calculations

Depth of water (m):	1.48
Well volume of water (L):	2.91
Static water level* (m):	0.00
Length of screen collecting water (m):	0.51

Notes

Evidence of sludge:	-
Evidence of freezing/siltation:	-

Development/Purging Information

Equipment: Peristaltic Pump, Horiba U-22 with flow through cell, LDPE

Date & Time	Volume Removed (L)	Temperature (^{o}C)	pH	Conductivity (µS/cm)	Turbidity (NTU)	Description of Water
16-Aug-08	3	3.7	7.01	1150	10.7	C&C Chemical odour

Water Sampling

Date & Time Collected:	16-Aug-08
Sample Number - Water:	MW-8
Sample Containers:	3 x 0.5L Amber Glass 2 x VOC vials
Procedure/Equipment:	Peristaltic Pump, Horiba U-22
Water Description:	C&C, Chemical Odour
Sampling Equipment Decontamination (Y/N):	Y
Number Washes:	1
Number Rinses:	2

Soil Sampling

Date and Time Collected:	14-Aug-08
Sample Number - Soil:	MW-8-10 MW-8-20
Sample Containers:	4 x 250mL Glass
Procedure/Equipment:	SS Trowel
Soil Description:	Brown sandy silt till, some gravel.
Sampling Equipment Decontamination (Y/N):	Y
Number Washes:	2
Number Rinses:	3

*From ground surface. Unless this is stated, all measurments are assumed to be from the top of the casing.
n/a=not applicable
LDPE=Low Density Polyethylene
SS=Stainless Steel

AECOM

2008 Monitoring Well Sampling Log (MW-9)

Site name:	CAM-4
Date of sampling event:	14-17 Aug 2008
Names of samplers:	TFB
Monitoring well ID:	MW-9
Facility:	Tier II Soil Disposal Facility

Known Data

Depth of installation* (m):	3.32
Length of screened section (m):	2.01
Depth to top of screen* (m):	0.40

Measured Data

Condition of well:	Good	Procedure/Equipment:	Interface Meter
Procedure/Equipment:	Interface Meter	Depth to water surface (m):	0.29
Well height above ground (m):	0.33	Depth to bottom (m):	1.98
Diameter of well (m):	0.05	Free product thickness (mm):	-

Calculations

Depth of water (m):	1.69
Well volume of water (L):	3.32
Static water level* (m):	-0.04
Length of screen collecting water (m):	1.25

Notes

Evidence of sludge:	-
Evidence of freezing/siltation:	-

Development/Purging Information

Equipment: Peristaltic Pump, Horiba U-22 with flow through cell, LDPE

Date & Time	Volume Removed (L)	Temperature (^{o}C)	pH	Conductivity (µS/cm)	Turbidity (NTU)	Description of Water
15-Aug-08	4	2.62	11.34	1060	41.3	C&C Chemical odour

Water Sampling

Date & Time Collected:	16-Aug-08
Sample Number - Water:	MW-9
Sample Containers:	3 x 0.5L Amber Glass
	2 x VOC vials
Procedure/Equipment:	Peristaltic Pump, Horiba U-22
Water Description:	C&C Chemical odour
Sampling Equipment Decontamination (Y/N):	Y
Number Washes:	1
Number Rinses:	2

Soil Sampling

Date and Time Collected:	14-Aug-08
Sample Number - Soil:	MW-9-15
Refusal @ 0.25 m	MW-9-25
Sample Containers:	4 x 250mL Glass
Procedure/Equipment:	SS Trowel
Soil Description:	Brown sandy silt till, some gravel.
Sampling Equipment Decontamination (Y/N):	Y
Number Washes:	2
Number Rinses:	3

*From ground surface. Unless this is stated, all measurments are assumed to be from the top of the casing.
n/a=not applicable
LDPE=Low Density Polyethylene
SS=Stainless Steel

AECOM

2008 Monitoring Well Sampling Log (MW-14-A)

Site name:	CAM-4
Date of sampling event:	14-17 Aug 2008
Names of samplers:	TFB
Monitoring well ID:	MW-14-A
Facility:	Tier II Soil Disposal Facility

Known Data

Depth of installation* (m):	4.66
Length of screened section (m):	2.03
Depth to top of screen* (m):	1.67

Measured Data

Condition of well:	Good	Procedure/Equipment:	Interface Meter
Procedure/Equipment:	Interface Meter	Depth to water surface (m):	1.07
Well height above ground (m):	0.51	Depth to bottom (m):	2.47
Diameter of well (m):	0.05	Free product thickness (mm):	-

Calculations

Depth of water (m):	1.40
Well volume of water (L):	2.75
Static water level* (m):	0.56
Length of screen collecting water (m):	0.29

Notes

Evidence of sludge:	-
Evidence of freezing/siltation:	-

Development/Purging Information

Equipment: Peristaltic Pump, Horiba U-22 with flow through cell, LDPE

Date & Time	Volume Removed (L)	Temperature (^{o}C)	pH	Conductivity (µS/cm)	Turbidity (NTU)	Description of Water
16-Aug-08	3	1.01	6.73	0.95	-	Grey, slightly cloudy N/O

Water Sampling

Date & Time Collected:	16-Aug-08
Sample Number - Water:	MW-14-A
Sample Containers:	3 x 0.5L Amber Glass
	2 x VOC vials
Procedure/Equipment:	Peristaltic Pump, Horiba U-22
Water Description:	Grey, slightly cloudy, N/O
Sampling Equipment Decontamination (Y/N):	Y
Number Washes:	2
Number Rinses:	2

Soil Sampling

Date and Time Collected:	14-Aug-08
Sample Number - Soil:	MW-14-A-15
Refusal @ 0.30 m	MW-14-A-30
Dup	MW-140-A-30
Sample Containers:	8 x 250mL Glass
Procedure/Equipment:	SS Trowel
Soil Description:	Brown sandy silt till.
Sampling Equipment Decontamination (Y/N):	Y
Number Washes:	2
Number Rinses:	2

*From ground surface. Unless this is stated, all measurments are assumed to be from the top of the casing.
n/a=not applicable
LDPE=Low Density Polyethylene
SS=Stainless Steel

AECOM

2008 Monitoring Well Sampling Log (MW-15)

Site name:	CAM-4
Date of sampling event:	14-17 Aug 2008
Names of samplers:	TFB
Monitoring well ID:	MW-15
Facility:	Tier II Soil Disposal Facility

Known Data

Depth of installation* (m):	3.25
Length of screened section (m):	1.97
Depth to top of screen* (m):	0.33

Measured Data

Condition of well:	Good	Procedure/Equipment:	Interface Meter
Procedure/Equipment:	Interface Meter	Depth to water surface (m):	0.45
Well height above ground (m):	0.51	Depth to bottom (m):	2.45
Diameter of well (m):	0.05	Free product thickness (mm):	-

Calculations

Depth of water (m):	2.00
Well volume of water (L):	3.93
Static water level* (m):	-0.06
Length of screen collecting water (m):	1.61

Notes

Evidence of sludge:	-
Evidence of freezing/siltation:	-

Development/Purging Information

Equipment: Peristaltic Pump, Horiba U-22 with flow through cell, LDPE

Date & Time	Volume Removed (L)	Temperature (^{o}C)	pH	Conductivity (µS/cm)	Turbidity (NTU)	Description of Water
16-Aug-08	4.5	2.08	6.31	0.846	13.5	Clear, slightly yellow Chemical odour

Water Sampling

Date & Time Collected:	16-Aug-08
Sample Number - Water:	MW-15
Dup	MW-150
Sample Containers:	6 x 0.5L Amber glass
	4 x VOC vials
2 x 1L Amber glass	1 x 0.25L Plastic
Procedure/Equipment:	Peristaltic Pump, Horiba U-22
Water Description:	Clear, slightly yellow, chemical odour
Sampling Equipment Decontamination (Y/N):	Y
Number Washes:	2
Number Rinses:	2

Soil Sampling

Date and Time Collected:	14-Aug-08
Sample Number - Soil:	MW-15-15
Refusal @ 0.25 m	MW-15-25
Sample Containers:	4 x 250mL Glass
Procedure/Equipment:	SS Trowel
Soil Description:	Brown sandy silt till, some gravel.
Sampling Equipment Decontamination (Y/N):	Y
Number Washes:	2
Number Rinses:	2

*From ground surface. Unless this is stated, all measurments are assumed to be from the top of the casing.
n/a=not applicable
LDPE=Low Density Polyethylene
SS=Stainless Steel

AECOM

2008 Monitoring Well Sampling Log (MW-16)

Site name:	CAM-4
Date of sampling event:	14-17 Aug 2008
Names of samplers:	TFB
Monitoring well ID:	MW-16
Facility:	Tier II Soil Disposal Facility

Known Data

Depth of installation* (m):	Data not available
Length of screened section (m):	
Depth to top of screen* (m):	

Measured Data

Condition of well:	Good	Procedure/Equipment:	Interface Meter
Procedure/Equipment:	Interface Meter	Depth to water surface (m):	1.34
Well height above ground (m):	0.60	Depth to bottom (m):	3.00
Diameter of well (m):	0.05	Free product thickness (mm):	-

Calculations

Depth of water (m):	1.66
Well volume of water (L):	3.30
Static water level* (m):	0.74
Length of screen collecting water (m):	

Notes

Evidence of sludge:	-
Evidence of freezing/siltation:	-

Development/Purging Information

Equipment:	Disposable Bailer, Horiba U-22

Date & Time	Volume Removed (L)	Temperature (^{o}C)	pH	Conductivity (µS/cm)	Turbidity (NTU)	Description of Water
16-Aug-08	4	1.7	6.9	0.544	54	C&C, sheen on surface Hydrocarbon odour

Water Sampling

Date & Time Collected:	16-Aug-08
Sample Number - Water:	MW-16
Sample Containers:	3 x 0.5L Amber Glass
	2 x VOC vials
Procedure/Equipment:	Disposable Bailer
Water Description:	C&C, sheen on surface, Hydrocarbon odour
Sampling Equipment Decontamination (Y/N):	Y
Number Washes:	2
Number Rinses:	3

Soil Sampling

Date and Time Collected:	14-Aug-08
Sample Number - Soil:	MW-16-15
Refusal @ 0.40 m	MW-16-40
Sample Containers:	4 x 250mL Glass
Procedure/Equipment:	SS Trowel
Soil Description:	Brown, sandy silt till
Sampling Equipment Decontamination (Y/N):	Y
Number Washes:	3
Number Rinses:	3

*From ground surface. Unless this is stated, all measurments are assumed to be from the top of the casing.
n/a=not applicable
LDPE=Low Density Polyethylene
SS=Stainless Steel

AECOM

B5 – Thermistor Maintenance Records

Thermal Monitoring
Ground Temperature Annual Maintenance Report

Contarctor Name:	**AECOM**	Inspection Date:	**15-Aug-08**
Prepared By:	**Darrin Johnson**		

Thermistor Information

Site Name:	**CAM-4**		Thermistor Location	**Tier II Disposal Facility**			
Thermistor Number:	**VT05**		Inclination	**Vertical**			
Install Date:	**13-Aug-06**		First Date Event	**27-Aug-07**	Last Date Event	**15-Aug-08**	
Coordinates and Elevation	N		E		Elev	**320.975**	
Length of Cable (m)	**7.7**	Cable Lead Above Ground (m)	**1.2**	Nodal Points	**13**		
Datalogger Serial #	**111092**			Cable Serial Number		**1616**	

Code CAM-4VT05

Thermistor Inspection

	Good	Needs Maintenance
Casing	☑	☐
Cover	☑	☐
Data Logger	☑	☐
Cable	☑	☐
Beads	☑	☐

Battery Installation Date: **Batteries not replaced in 2008.**

Battery Levels: Main **11.34 V** Aux **13.14 V**

Manual Ground Temperature Readings

Bead	ohms	Temp. (ºC)
1		**8.4**
2		**10.9**
3		**3.4**
4		**1.4**
5		**-0.5**
6		**-2.3**
7		**-3.4**
8		**-4.4**

Bead	ohms	Temp. (ºC)
9		**-5.5**
10		**-6.4**
11		**-7.1**
12		**-7.9**
13		**-8.0**

Observations and Proposed Maintenance

Lock lubricated.

Thermal Monitoring
Ground Temperature Annual Maintenance Report

Contarctor Name:	**AECOM**	Inspection Date:	**15-Aug-08**
Prepared By:	**Darrin Johnson**		

Thermistor Information

Site Name:	**CAM-4**	Thermistor Location	**Tier II Disposal Facility**		
Thermistor Number:	**VT06**	Inclination	**Vertical**		
Install Date:	**13-Aug-06**	First Date Event	**27-Aug-07**	Last Date Event	**15-Aug-08**
Coordinates and Elevation	N		E	Elev	**319.3**
Length of Cable (m)	**6.2**	Cable Lead Above Ground (m)	**1.2**	Nodal Points	**10**
Datalogger Serial #	**111102**			Cable Serial Number	**1620**

Code CAM-4VT06

Thermistor Inspection

	Good	Needs Maintenance
Casing	☑	☐
Cover	☑	☐
Data Logger	☑	☐
Cable	☑	☐
Beads	☑	☐

Battery Installation Date: **Batteries not replaced in 2008.**

Battery Levels: Main **11.43 V** Aux **13.02 V**

Manual Ground Temperature Readings

Bead	ohms	Temp. (ºC)
1		**9.9**
2		**9.4**
3		**4.9**
4		**3.1**
5		**0.2**
6		**-1.5**
7		**-3.0**
8		**-4.3**

Bead	ohms	Temp. (ºC)
9		**-5.4**
10		**-5.6**

Observations and Proposed Maintenance

Lock lubricated.

Thermal Monitoring
Ground Temperature Annual Maintenance Report

Contarctor Name:	**AECOM**	Inspection Date:	**15-Aug-08**
Prepared By:	**Darrin Johnson**		

Thermistor Information

Site Name:	**CAM-4**		Thermistor Location	**Tier II Disposal Facility**			
Thermistor Number:	**VT07**		Inclination	**Vertical**			
Install Date:	**13-Aug-06**		First Date Event	**27-Aug-07**	Last Date Event		**15-Aug-08**
Coordinates and Elevation	N		E		Elev		**317.825**
Length of Cable (m)	**9.45**	Cable Lead Above Ground (m)	**1.5**	Nodal Points	**16**		
Datalogger Serial #	**209067**			Cable Serial Number			**1624**

Code CAM-4VT07

Thermistor Inspection

	Good	Needs Maintenance
Casing	☑	☐
Cover	☑	☐
Data Logger	☑	☐
Cable	☑	☐
Beads	☑	☐

Battery Installation Date: **Batteries not replaced in 2008.**

Battery Levels: Main **11.34 V** Aux **13.14 V**

Manual Ground Temperature Readings

Bead	ohms	Temp. (ºC)
1		**4.6**
2		**2.4**
3		**-0.4**
4		**-2.0**
5		**-3.3**
6		**-4.5**
7		**-5.5**
8		**-6.5**

Bead	ohms	Temp. (ºC)
9		**-7.4**
10		**-8.1**
11		**-8.7**
12		**-9.3**
13		**-9.7**
14		**-10.0**
15		**-9.8**
16		**-9.4**

Observations and Proposed Maintenance

Lock lubricated.

Thermal Monitoring
Ground Temperature Annual Maintenance Report

Contarctor Name:	**AECOM**	Inspection Date:	**15-Aug-08**
Prepared By:	**Darrin Johnson**		

Thermistor Information

Site Name:	**CAM-4**	Thermistor Location	**Tier II Disposal Facility**		
Thermistor Number:	**VT08**	Inclination	**Vertical**		
Install Date:	**13-Aug-06**	First Date Event	**27-Aug-07**	Last Date Event	**15-Aug-08**
Coordinates and Elevation	N		E	Elev	**319.18**
Length of Cable (m)	**6.2**	Cable Lead Above Ground (m)	**1.2**	Nodal Points	**10**
Datalogger Serial #	**108038**			Cable Serial Number	**1622**

Code CAM-4VT08

Thermistor Inspection

	Good	Needs Maintenance
Casing	☑	☐
Cover	☑	☐
Data Logger	☑	☐
Cable	☑	☐
Beads	☑	☐

Battery Installation Date: **Batteries not replaced in 2008.**

Battery Levels: Main **11.34 V** Aux **13.02 V**

Manual Ground Temperature Readings

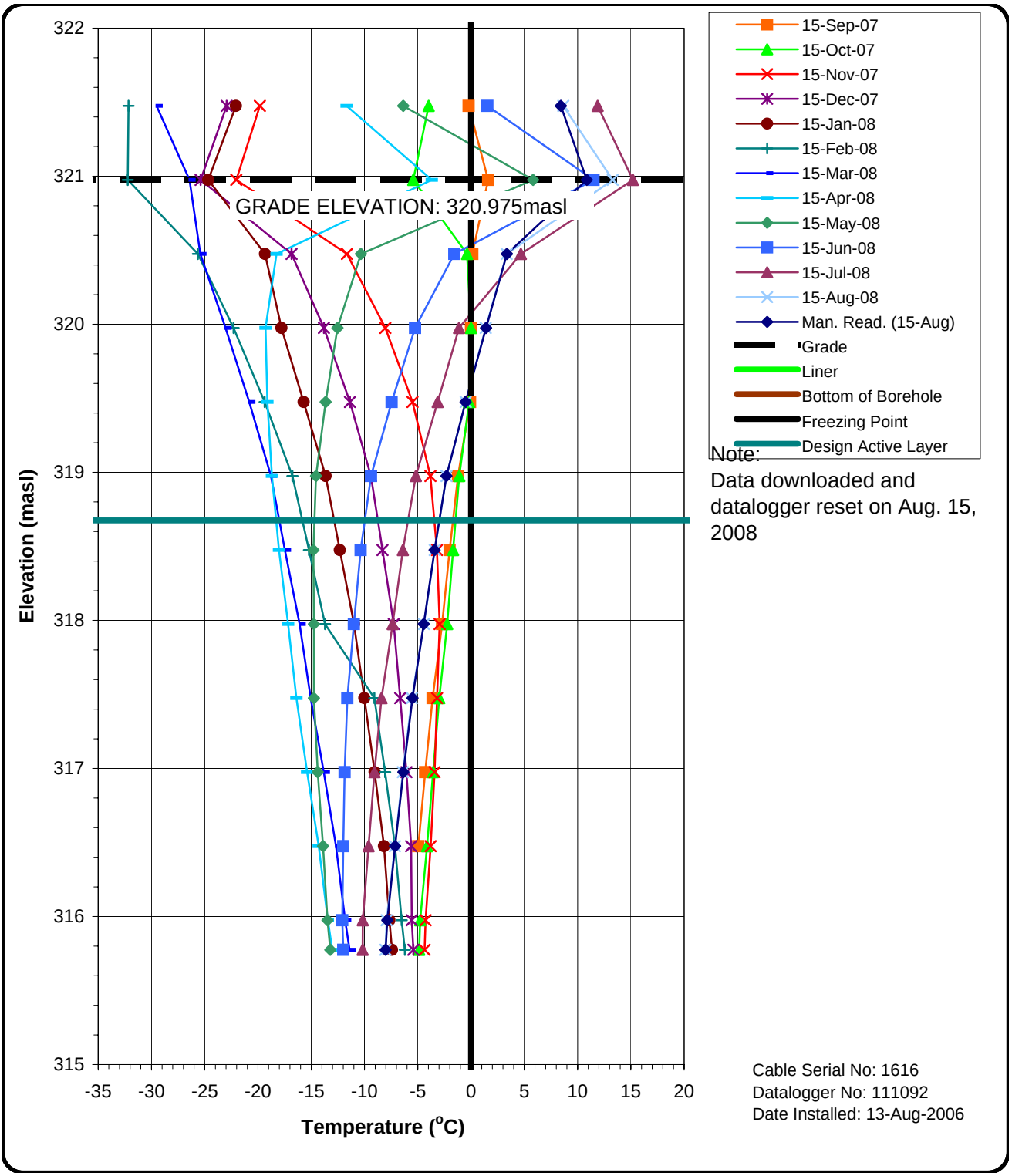
Bead	ohms	Temp. (ºC)
1		**11.3**
2		**9.4**
3		**4.9**
4		**3.2**
5		**0.2**
6		**-1.8**
7		**-3.6**
8		**-4.8**

Bead	ohms	Temp. (ºC)
9		**-5.7**
10		**-6.6**

Observations and Proposed Maintenance

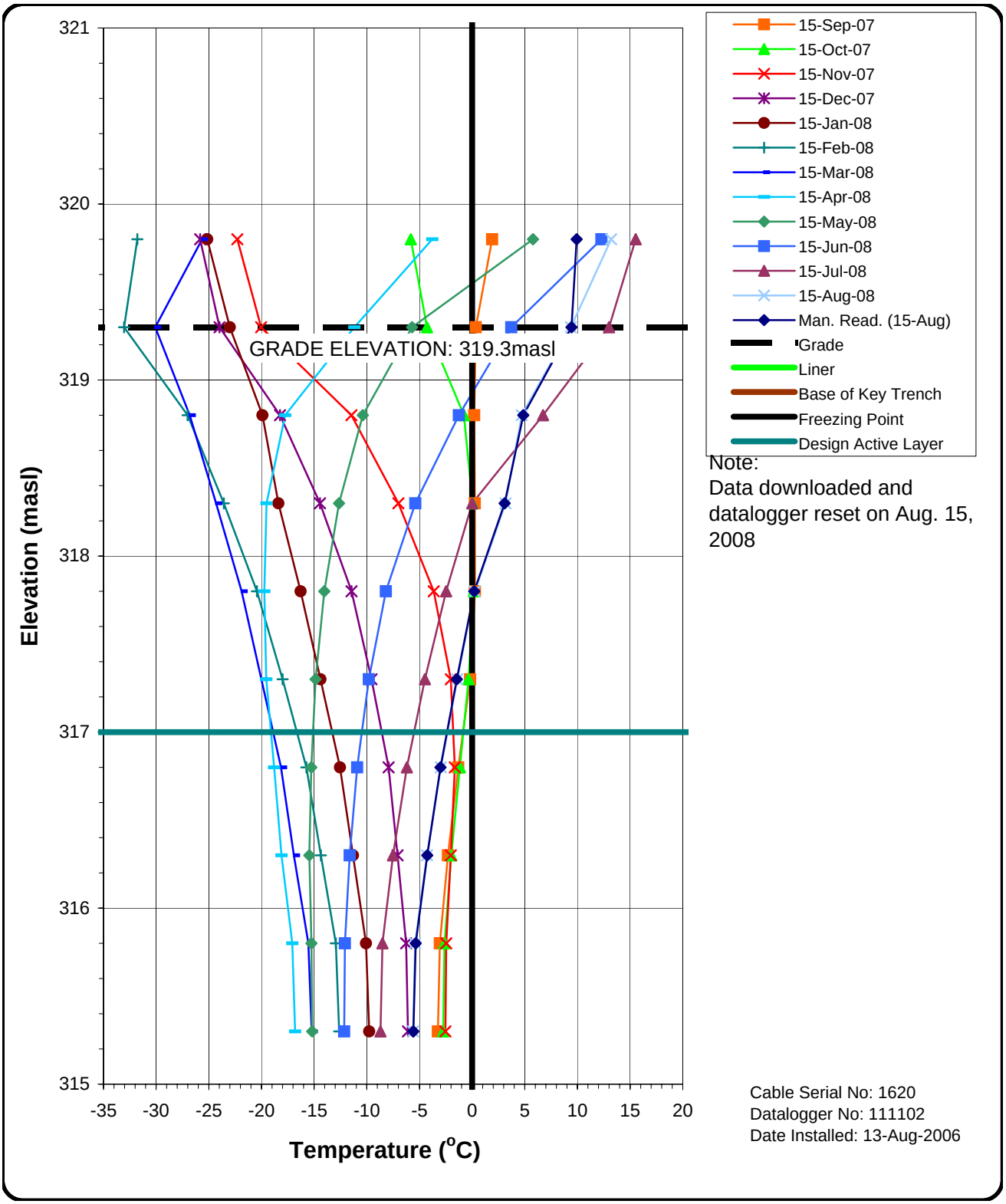
Lock lubricated.

B6 – Thermistor Graphs



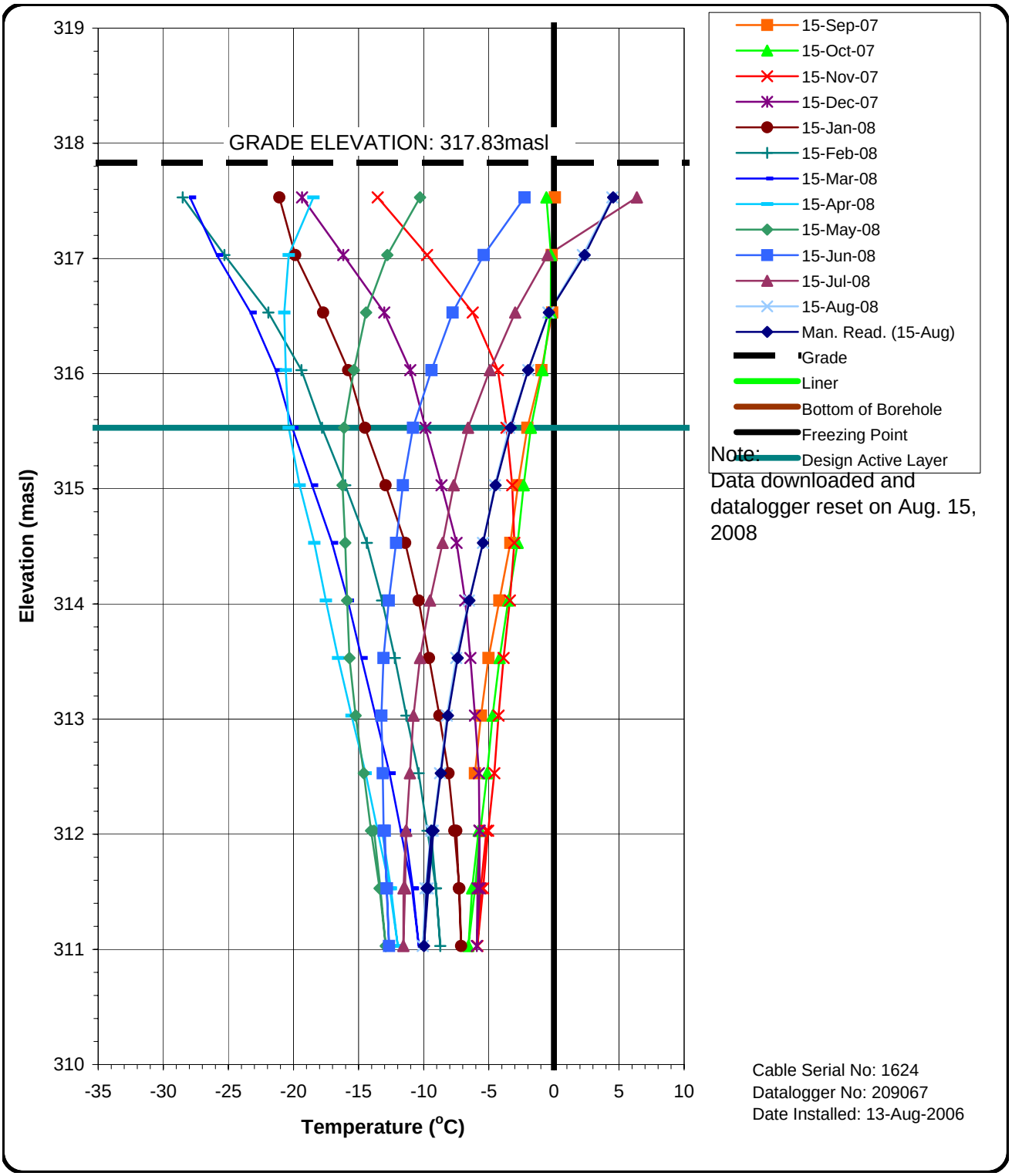
AECOM

Graph B-1
Ground Temperature Profile
Tier II Soil Disposal Facility
Vertical GTC VT-5



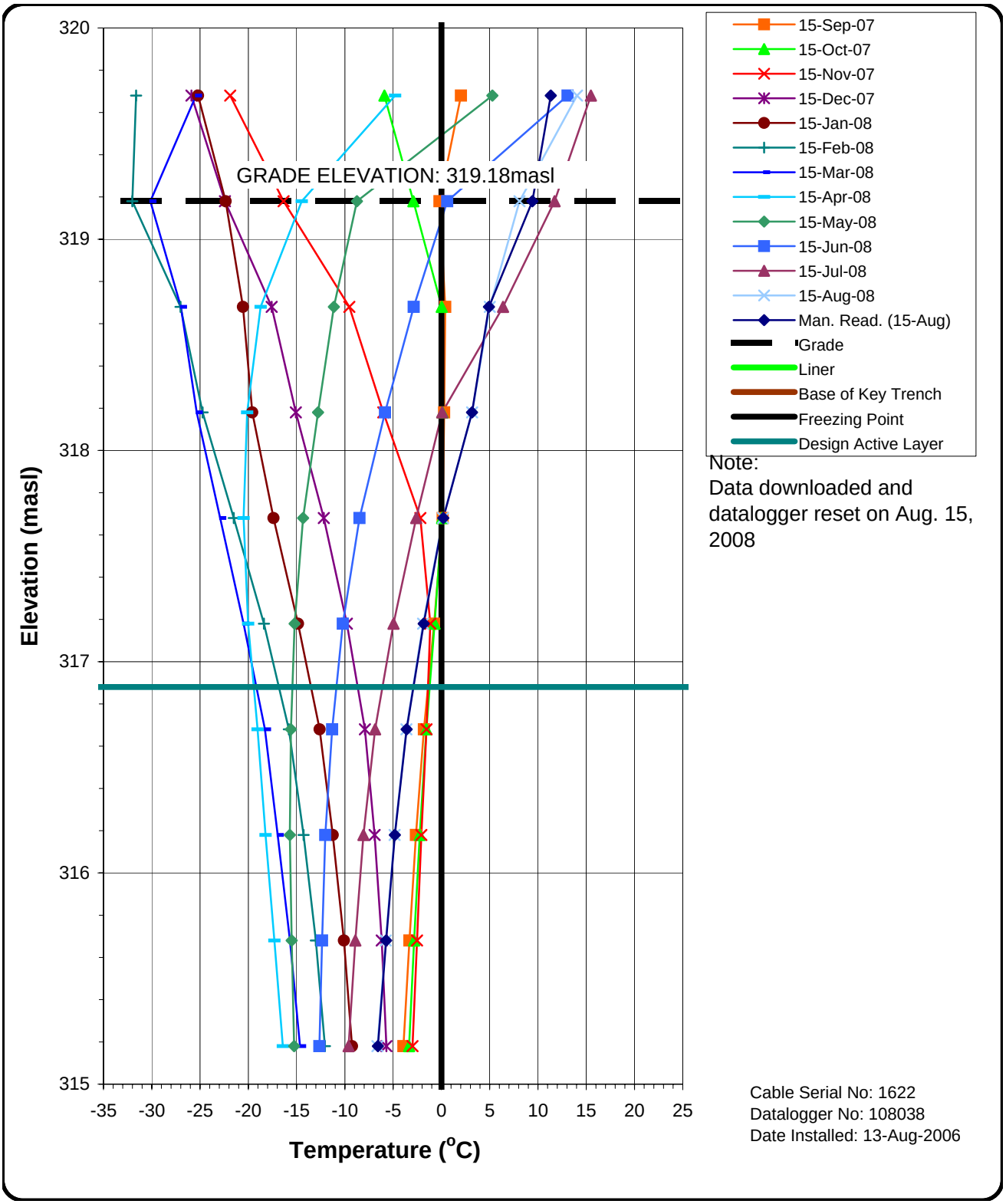
AECOM

Graph B-2
Ground Temperature Profile
Tier II Soil Disposal Facility
Vertical GTC VT-6



AECOM

Graph B-3
Ground Temperature Profile
Tier II Soil Disposal Facility
Vertical GTC VT-7



AECOM

Graph B-4
Ground Temperature Profile
Tier II Soil Disposal Facility
Vertical GTC VT-8

B7 – Field Notes

Aug. 14/08

- TEIR II LANDFILL (TII)
- STARTED INSPECTION @ 12:30PM

- PANORAMIC PHOTO OF TEIR II LF FACING EAST FROM RAISED GRAVEL PAD (WP 3)
  - ↳ PHOTOS 4, 5 & 6 (PANORAMIC) (TEIR II PHOTO LOC. 10)
- WAYPOINT 4 (NW CORNER OF LF)
  - PHOTO 7 (FACING EAST ALONG CREST)
  - PHOTO 7 (FACING SOUTH ALONG CREST) (TEIR II PHOTO LOC 1)
- WAYPOINT 5 (NE CORNER OF LF)
  - PHOTO 8 (FACING WEST)
  - PHOTO 9 (FACING SW)
  - PHOTO 10 (FACING SOUTH) (TEIR II PHOTO LOC. 2)
- WAYPOINT 6 (NORTH SLOPE)
  - PHOTO 11 & 12 (PANORAMIC) (TIER II PHOTO LOC. 3)

- TIER II (PAGE 2)

- WAYPOINT 7 (NE TOE)
  - SOME SEEPAGE AT TOE WITH SOME ORANGE STAINING
  - SOME WATER DRAINAGE ALONG ROAD AT TOE
  - PHOTO 13 (SEEPAGE FROM TOE)
  - PHOTO 14 (NE SLOPE/CORNER) (TIER II PHOTO LOC. 4)

- WAYPOINT 10 (SE CREST CORNER)
  - PHOTO 15 (FACING NORTH)
  - PHOTO 16 (FACING WEST)
  - SOME COARSE ROCKFILL ALONG CREST EDGE BUT DO NOT APPEAR TO BE TENSION CRACKS (TIER II PHOTO LOC. 5)

- WAYPOINT 9 (SE TOE)
  - PHOTOS 17 & 18 (PANORAMIC)
  - SOME WATER SEEPING OUT OF SLOPE FACE, NO STAINING (TIER II PHOTO LOC. 6)

- TIER II (PAGE 3)

- WAYPOINT 8 (SOUTH FACE FROM SE TOE)
  - PHOTO 19 (FACING WEST)
  - SOME SEEPAGE FROM SOUTH SLOPE AND MINOR PONDING AT TOE, NO STAINING (TIER II PHOTO LOC. 7)

- WAYPOINT 11 (SOUTH FACE FROM SW TOE)
  - PHOTO 20 (FACING EAST) (TIER II PHOTO LOC. 8)

- WAYPOINT 12 (SW CORNER CREST)
  - PHOTO 21 (FACING EAST)
  - PHOTO 22 (FACING NORTH) (TIER II PHOTO LOC. 9)
  - SOME PONDED WATER ALONG TOE
  - NO STAINING OBSERVED

OVERALL LANDFILL PERFORMANCE
- ACCEPTABLE, NO SETTLEMENT, EROSION, TENSION CRACKS OBSERVED
- SOME SEEPAGE WITH STAINING AT NORTHEAST TOE

BMW-3

2008 Monitoring Well Sampling Log (~~MW # 3~~)

Site name:	CAM-4
Date of sampling event:	AUG-14-16/2008
Names of samplers:	TFB
Monitoring well ID:	BMW-3
Facility:	UPPER SITE

Known Data

Depth of installation* (m):	3.45
Length of screened section (m):	2.03
Depth to top of screen* (m):	0.46

Measured Data

Condition of well:	GOOD	Procedure/Equipment:	INTERFACE METER
Procedure/Equipment:	INTERFACE METER	Depth to water surface (m):	0.92
Well height above ground (m):	0.76	Depth to bottom (m):	2.29
Diameter of well (m):	2"	Free product thickness (mm):	—

Calculations		Notes	
Depth of water (m):	0.92 1.67?	Evidence of sludge:	—
Well volume of water (L):	2.60	Evidence of freezing/siltation:	—
Static water level* (m):	0.16		
Length of screen collecting water (m):	~~[illegible]~~ ~~[illegible]~~ ~~[illegible]~~ 1.03		

Development/Purging Information

Equipment:	BAILER

Date & Time	Volume Removed (L)	Temperature (°C)	pH	Conductivity (μS/cm)	Turbidity (NTU)	Description of Water
16-AUG-08	3.0L	2.81	8.73	0.404	—	Silty, Greyish Brown, N/O

Water Sampling		Soil Sampling	
Date & Time Collected:	16-AUG-08	Date and Time Collected:	14-AUG-08
Sample Number - Water:	BMW-3	Sample Number - Soil:	BMW-3-15
		DUP = BMW-30-40	~~[illegible]~~
			BMW-3-40
Sample Containers:	3 [illegible]	Sample Containers:	2/250mL
	2 VOCs		Clear
			PER SAMPLE
Procedure/Equipment:	BAILER	Procedure/Equipment:	TROWEL
Water Description:	Silty, Grey with Brown, N/O	Soil Description:	~~[illegible]~~ Gravel, silt fill Greyish Brown
Sampling Equipment Decontamination (Y/N):	Y	Sampling Equipment Decontamination (Y/N):	Y
Number Washes:	1	Number Washes:	2
Number Rinses:	2	Number Rinses:	2

n/a=not applicable

*From ground surface. Unless this is stated, all measurments are assumed to be from the top of the casing.

2008 Monitoring Well Sampling Log (MW # 15)

Site name:	CAM-4
Date of sampling event:	AUG-14-16/2008
Names of samplers:	TFB
Monitoring well ID:	MW-15
Facility:	UPPER SITE

Known Data

Depth of installation* (m):	3.25
Length of screened section (m):	1.97
Depth to top of screen* (m):	0.33

Measured Data

Condition of well:	GOOD	Procedure/Equipment:	INTERFACE METER
Procedure/Equipment:	INTERFACE METER	Depth to water surface (m):	0.45
Well height above ground (m):	0.51	Depth to bottom (m):	2.44
Diameter of well (m):	2"	Free product thickness (mm):	—

Calculations		**Notes**	
Depth of water (m):	0.45	Evidence of sludge:	—
Well volume of water (L):	4.00	Evidence of freezing/siltation:	—
Static water level* (m):	-0.06		
Length of screen collecting water (m):	1.61		

Development/Purging Information

Equipment: PERISTALTIC PUMP

Date & Time	Volume Removed (L)	Temperature (°C)	pH	Conductivity (µS/cm)	Turbidity (NTU)	Description of Water
16-AUG-08	4.5 L	2.08	6.31	0.346	13.5	Clear, Slightly Yellow, Chemical odour

Water Sampling		**Soil Sampling**	
Date & Time Collected:	16 AUG-08	Date and Time Collected:	14 AUG 08
Sample Number - Water:	MW-15	Sample Number - Soil:	MW 15-15
DUP →	MW-150		MW 15-25
		Refusal @ 25cm	
Sample Containers:	6 40mL Ambers	Sample Containers:	2/250mL Clear PER SAMPLE
2/1L Ambers	4 vials		
	1 METALS (60mL)		
Procedure/Equipment:	PERISTALTIC PUMP	Procedure/Equipment:	TROWEL
Water Description:	Clear, Slightly Yellow Chemical odour	Soil Description:	Silty Gravel Till
Sampling Equipment Decontamination (Y/N):	Y	Sampling Equipment Decontamination (Y/N):	Y
Number Washes:	2	Number Washes:	2
Number Rinses:	2	Number Rinses:	2

n/a=not applicable

*From ground surface. Unless this is stated, all measurments are assumed to be from the top of the casing.

Gartner Lee

2008 Monitoring Well Sampling Log (MW #17-A)

Site name:	CAM- 4
Date of sampling event:	AUG- 14-16/2008
Names of samplers:	TPB
Monitoring well ID:	MW-14-A
Facility:	UPPER SITE

Known Data

Depth of installation* (m):	4.66
Length of screened section (m):	2.03
Depth to top of screen* (m):	1.67

Measured Data

Condition of well:	GOOD	Procedure/Equipment:	INTERFACE METER
Procedure/Equipment:	INTERFACE METER	Depth to water surface (m):	1.07
Well height above ground (m):	0.51	Depth to bottom (m):	2.47
Diameter of well (m):	2"	Free product thickness (mm):	———

Calculations		Notes	
Depth of water (m):	1.07	Evidence of sludge:	———
Well volume of water (L):	2.80	Evidence of freezing/siltation:	———
Static water level* (m):	0.56		
Length of screen collecting water (m):	0.79		

Development/Purging Information

Equipment: PERISTALTIC PUMP

Date & Time	Volume Removed (L)	Temperature (°C)	pH	Conductivity (µS/cm)	Turbidity (NTU)	Description of Water
16-AUG-08	3.0L	1.01	6.73	0.45	WELL BEGAN TO GO DRY → BUBBLES IN FLOW THROUGH CELL	

Water Sampling		Soil Sampling	
Date & Time Collected:	16-AUG-08	Date and Time Collected:	14AUG08
Sample Number - Water:	MW-17-A	Sample Number - Soil:	MW 14-A-15 MW 17-A-30 [redacted] MW 14-A-30
		Refusal @ 30 cm	
Sample Containers:	3 TOTAL AMBER 2 VOA's	+ 2/250mL clear-CANTEST 2/250mL clear-ESG.	Sample Containers: 2/250mL clear PER SAMPLE
Procedure/Equipment:	PERISTALTIC PUMP	Procedure/Equipment:	
Water Description:	Slightly cloudy clear, no/o	Soil Description:	SANDY SILT Till, Brown, Dry
Sampling Equipment Decontamination (Y/N):	Y	Sampling Equipment Decontamination (Y/N):	Y
Number Washes:	2	Number Washes:	2
Number Rinses:	2	Number Rinses:	2

LDP

n/a=not applicable

*From ground surface. Unless this is stated, all measurments are assumed to be from the top of the casing.

2008 Monitoring Well Sampling Log (MW #16)

Site name:	CAM- 4
Date of sampling event:	AUG- 14-16 / 2008
Names of samplers:	TFB
Monitoring well ID:	MW-16
Facility:	UPPER SITE

Known Data - DATA NOT AVAILABLE

Depth of installation* (m):	
Length of screened section (m):	
Depth to top of screen* (m):	

Measured Data

Condition of well:	GOOD	Procedure/Equipment:	INTERFACE METER
Procedure/Equipment:	INTERFACE METER	Depth to water surface (m):	1.53
Well height above ground (m):	0.60	Depth to bottom (m):	3.00
Diameter of well (m):	2"	Free product thickness (mm):	———

Calculations		**Notes**	
Depth of water (m):	1.34	Evidence of sludge:	———
Well volume of water (L):	3.30	Evidence of freezing/siltation:	———
Static water level* (m):	0.74		
Length of screen collecting water (m):			

Development/Purging Information

Equipment: BAILER

Date & Time	Volume Removed (L)	Temperature (°C)	pH	Conductivity (µS/cm)	Turbidity (NTU)	Description of Water
16-AUG-08	4.0 L	1.70	6.90	0.544	54.0	GC, Sheen on water Hydrocarbon odour

Water Sampling		**Soil Sampling**	
Date & Time Collected:	16-AUG-08	Date and Time Collected:	14-AUG-08
Sample Number - Water:	MW-16	Sample Number - Soil:	MW 16-15
			MW 16-40
		Refusal @ 9cm	
Sample Containers:	3 from AMBER 2 VOA's	Sample Containers:	2/250mL Clear PER SAMPLE
Procedure/Equipment:	BAILER	Procedure/Equipment:	TROWEL
Water Description:	GC, Sheen on TOP OF WATER Hydrocarbon odour	Soil Description:	Sandy silt Till Brown
Sampling Equipment Decontamination (Y/N):	Y	Sampling Equipment Decontamination (Y/N):	Y
Number Washes:	2	Number Washes:	3
Number Rinses:	3	Number Rinses:	3

n/a=not applicable

*From ground surface. Unless this is stated, all measurments are assumed to be from the top of the casing.

Gartner Lee

2008 Monitoring Well Sampling Log (MW # 8)

Site name:	CAM - 4
Date of sampling event:	AUG - 14-16 / 2008
Names of samplers:	TFB
Monitoring well ID:	MW - 8
Facility:	UPPER SITE

Known Data

Depth of installation* (m):	4.08
Length of screened section (m):	2.01
Depth to top of screen* (m):	0.97

Measured Data

Condition of well:	GOOD	Procedure/Equipment:	INTERFACE METER
Procedure/Equipment:	INTERFACE METER	Depth to water surface (m):	0.97
Well height above ground (m):	0.97	Depth to bottom (m):	2.45
Diameter of well (m):	2"	Free product thickness (mm):	—

Calculations		**Notes**	
Depth of water (m):	0.97	Evidence of sludge:	—
Well volume of water (L):	3.0 L	Evidence of freezing/siltation:	—
Static water level* (m):	0.00		
Length of screen collecting water (m):	0.51		

Development/Purging Information

Equipment: PERISTALTIC PUMP

Date & Time	Volume Removed (L)	Temperature (°C)	pH	Conductivity (µS/cm)	Turbidity (NTU)	Description of Water
16-AUG-08	3.0 L	3.70	7.01	1.15 mS/cm	10.7	GC Strong chemical / odour

Water Sampling		**Soil Sampling**	
Date & Time Collected:	16-AUG-08	Date and Time Collected:	14-AUG-08
Sample Number - Water:	MW-8	Sample Number - Soil:	MW8-10 MW8-20 VERY Rocky 1st Sample @ 10cm Refusal @ 20cm
Sample Containers:	3 500mL AMBERS 2 VOA	Sample Containers:	2 / 250mL Clear PER SAMPLE
Procedure/Equipment:	PERISTALTIC PUMP	Procedure/Equipment:	TROWEL
Water Description:	GC Strong chemical odour	Soil Description:	Sandy silt Fill prom OTPL. GRAVEL
Sampling Equipment Decontamination (Y/N):	Y	Sampling Equipment Decontamination (Y/N):	Y
Number Washes:	1	Number Washes:	2
Number Rinses:	2	Number Rinses:	3

n/a=not applicable

*From ground surface. Unless this is stated, all measurments are assumed to be from the top of the casing.

Gartner Lee

2008 Monitoring Well Sampling Log (MW # 9)

Site name:	CAM- 4
Date of sampling event:	AUG- 14-16/2008
Names of samplers:	TFB
Monitoring well ID:	MW - 9
Facility:	UPPER SITE

Known Data

Depth of installation* (m):	3,32
Length of screened section (m):	2.01
Depth to top of screen* (m):	0,40

Measured Data

Condition of well:	GOOD	Procedure/Equipment:	INTERFACE METER
Procedure/Equipment:	INTERFACE METER	Depth to water surface (m):	0,24
Well height above ground (m):	0,33	Depth to bottom (m):	1,39
Diameter of well (m):	2"	Free product thickness (mm):	—

Calculations		Notes	
Depth of water (m):	0.24 m BTOP	Evidence of sludge:	—
Well volume of water (L):	3,20	Evidence of freezing/siltation:	—
Static water level* (m):	-0.04		
Length of screen collecting water (m):	1,16		

Development/Purging Information

Equipment: PERISTALTIC PUMP

PURGED DRY

Date & Time	Volume Removed (L)	Temperature (°C)	pH	Conductivity (µS/cm)	Turbidity (NTU)	Description of Water
15-AUG-08	4L	2.62	11,34	1.06 mS/cm	41.3	C+C Chemical odour

Water Sampling		Soil Sampling	
Date & Time Collected:	16-AUG-08	Date and Time Collected:	14-AUG-08
Sample Number - Water:	MW 9	Sample Number - Soil:	MW9-15
WL 16-AUG-08 1.01 m BTOP			MW9-25
		Refusal @ 25cm	
Sample Containers:	3 500mL AMBERS	Sample Containers:	2/250mL clear PEK SAMPLE
	2 VOC VIALS		
Procedure/Equipment: PERISTALTIC PUMP	PERISTALTIC PUMP	Procedure/Equipment:	TROWEL
Water Description:	C+C Chemical odour	Soil Description:	SANDY SILT TILL (GRAVELLY from DTPL
Sampling Equipment Decontamination (Y/N):	Y	Sampling Equipment Decontamination (Y/N):	Y
Number Washes:	1	Number Washes:	3
Number Rinses:	1	Number Rinses:	3

n/a=not applicable

*From ground surface. Unless this is stated, all measurments are assumed to be from the top of the casing.

Gartner Lee

2008 Monitoring Well Sampling Log (MW # 5)

Site name:	CAM - 4
Date of sampling event:	AUG- 14-16 / 2008
Names of samplers:	TFB
Monitoring well ID:	MW - 5
Facility:	UPPER SITE

Known Data

Depth of installation* (m):	3.60
Length of screened section (m):	2.03
Depth to top of screen* (m):	0.60

Measured Data

Condition of well:	GOOD	Procedure/Equipment:	INTERFACE METER
Procedure/Equipment:	INTERFACE METER	Depth to water surface (m):	1.17 m bTOP
Well height above ground (m):	0.60	Depth to bottom (m):	3.25 m bTOP
Diameter of well (m):	2"	Free product thickness (mm):	—

Calculations / Notes

Depth of water (m):	1.17 m bTOP	Evidence of sludge:	—
Well volume of water (L):	4.20	Evidence of freezing/siltation:	—
Static water level* (m):	0.57		
Length of screen collecting water (m):	2.05		

Development/Purging Information

Equipment: PERISTALTIC PUMP

Date & Time	Volume Removed (L)	Temperature (°C)	pH	Conductivity (µS/cm)	Turbidity (NTU)	Description of Water
15-AUG-08	4.80	2.09	7.32	0.887	6.1	C+C SLIGHT chemical odour

Water Sampling / Soil Sampling

Date & Time Collected:	15-AUG-08	Date and Time Collected:	19-AUG-08
Sample Number - Water:	MW-5	Sample Number - Soil:	MW5-10 MW5-25
		Refusal @ 25cm	
Sample Containers:	3 500mL ~~[illegible]~~ AMBERS 2 VOA VIALS	3m T. Cam well	2/250mL Clear PER SAMPLE
Procedure/Equipment:	PERISTALTIC PUMP	Procedure/Equipment:	TROWEL
Water Description:	C+C slight chemical odour	Soil Description:	SANDY SILT TILL, GRAVELY BROWN DTRC
Sampling Equipment Decontamination (Y/N):	Y	Sampling Equipment Decontamination (Y/N):	Y
Number Washes:	1	Number Washes:	4
Number Rinses:	2	Number Rinses:	4

n/a=not applicable

*From ground surface. Unless this is stated, all measurments are assumed to be from the top of the casing.

Gartner

VT-6 DOWNLOADED AT 4:55pm
BAT- MAIN 11.34V
AUX 13.02V

CHANNEL	TEMP (°C)
1	11.33
2	9.42
3	4.93
4	3.17
5	0.201
6	-1.84
7	-3.60
8	-4.82
9	-5.73
10	-6.57

- CHECKED PROGRAMMING
- UPDATED CLOCK AND "STOP WHEN FULL"
- RESTARTED DATA LOGGER

WEATHER/TEMP. ⇒ VERY WINDY, ~ 0°C, COLD

VT-5 DOWNLOADED AT 5:10pm
BATT. MAIN, 11.34V
AUX. 13.14V

CHANNEL	TEMP (°C)
1	8.43
2	10.86
3	3.37
4	1.41
5	-0.51
6	-2.31
7	-3.42
8	-4.44
9	-5.50
10	-6.35
11	-7.13
12	-7.86
13	-8.02

- CHECKED PROGRAMMING
- UPDATED CLOCK & "STOP WHEN FULL"
- RESTARTED DATA LOGGER

VT-6 DOWNLOADED AT 5:25PM

BATTERY MAIN 11.34V

AUX 13.02V

CHANNEL	TEMP (°C)
1	9.92
2	9.44
3	4.86
4	3.09
5	0.201
6	-1.45
7	-3.00
8	-4.26
9	-5.36
10	-5.58

- CHECKED PROGRAMMING
- CHANGED CLOCK & "STOP WHEN FULL"
- RESTARTED DATA LOGGER

VT-7 DOWNLOADED AT 5:40PM

BATTERY MAIN 11.34V

AUX 13.14V

CHANNEL	TEMP (°C)
1	4.55
2	2.36
3	-0.39
4	-1.98
5	-3.32
6	-4.48
7	-5.45
8	-6.49
9	-7.39
10	-8.14
11	-8.69
12	-9.25
13	-9.65
14	-9.98
15	-9.78
16	-9.40

- CHECKED PROGRAMMING
- CHANGED/UPDATED CLOCK AND CHECKED "STOP WHEN FULL"
- RESTARTED DATALOGGER

Appendix C

Upper Site Landfill

- C1 – Site Condition/Visual Inspection Records
- C2 – Geotechnical Inspection Photographic Records
- C3 – Monitoring Photographic Records
- C4 – Monitoring Well Sampling Records
- C5 – Thermistor Maintenance Records
- C6 – Thermistor Graphs
- C7 – Field Notes

C1. Upper Site Landfill

C1.1 Landfill Summary

The Upper Site Landfill is located approximately 625 m east of the main facilities area. The original landfill consisted of three lobes (South, Central and North) that encompass an area of approximately 4,500 m^2. The location of the landfill is presented in Figure C-1.

A previous evaluation and geophysical survey determined landfilled material is continuous throughout the north and central lobes and more isolated in the south lobe. Tier I and Tier II contaminated soil was found downgradient of the central lobe, indicating contaminant migration from the landfill, thus, The Upper Site Landfill was classified as high potential environmental risk.

Remediation of the Upper Site Landfill involved complete excavation of the north lobe, partial excavation of the central lobe and installation of a leachate containment system in the central lobe and regrading of the south lobe.

Monitoring requirements for the 2008 monitoring year include visual inspection, soil sampling, groundwater sampling and thermal monitoring.

C1.2 Visual Monitoring

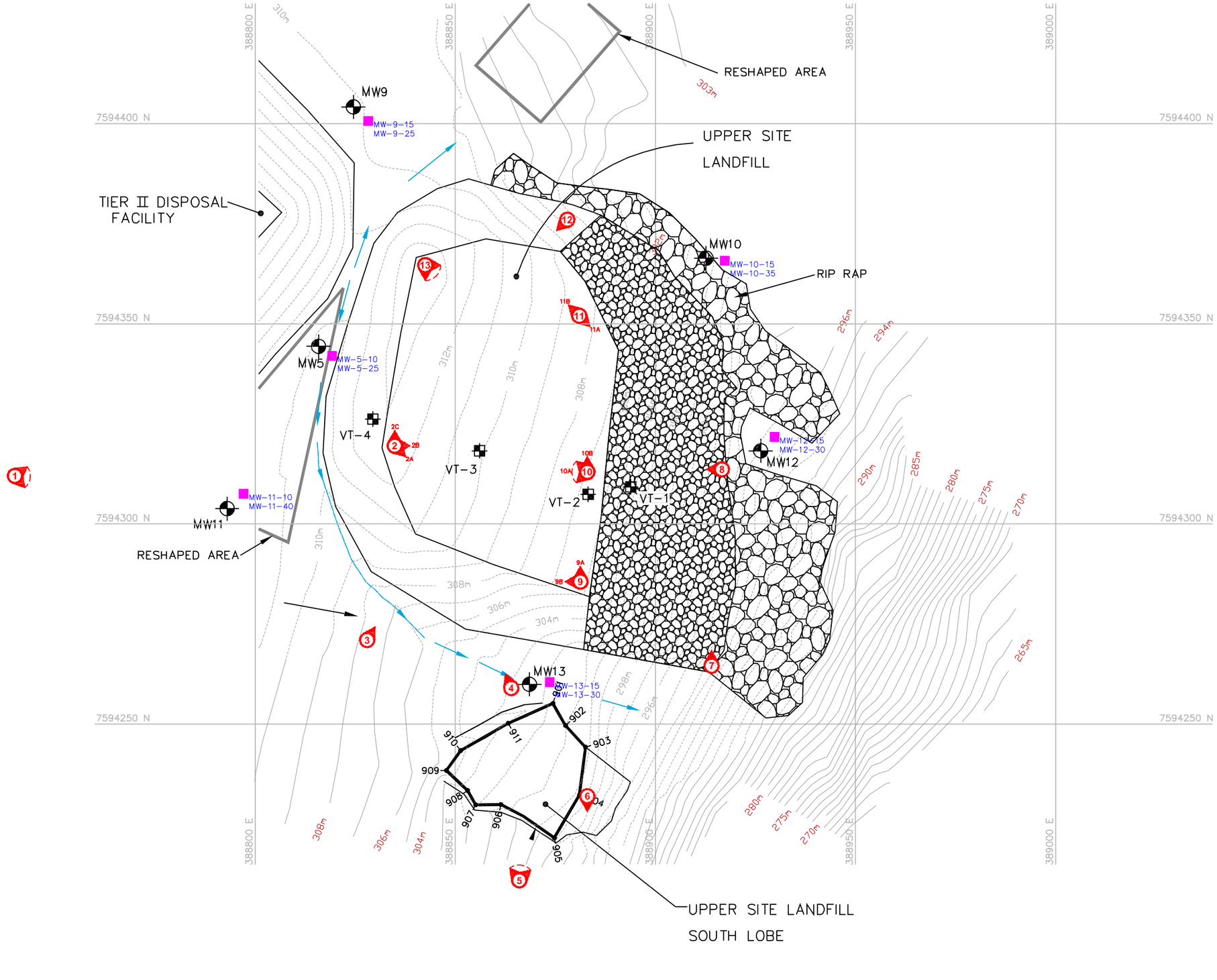
No significant erosion, settlement or indications of slope instability were observed at the Upper Site Landfill. Overall landfill performance is assessed as “acceptable”. Appendix C1 presents a summary of the 2008 visual inspection results.

No issues of concern that require immediate attention were identified.

C1.3 Soil Sampling

Soil samples were collected at monitoring locations MW-10, MW-11, MW-12 and MW-13. The sampling locations are presented in Figure C-1. Two samples were collected at each monitoring location at depths of approximately 0.10 to 0.15 m and 0.30 to 0.40 m below ground surface. The photographs of each monitoring well and test pit location are included in Attachment C3.

No staining or free product was observed during the sampling event at the Upper Site Landfill. No odours were detected during the sampling event at the Upper Site Landfill.



Legend

- TBM4 — TEMPORARY BENCHMARK
- BM-1 — PERMANENT BENCHMARK
- 101 — COORDINATE POINT
- C4-MW-1A / C4-MW-1B — MONITORING SOIL SAMPLE LOCATION
- MONITORING WELL LOCATION
- VERTICAL THERMISTOR LOCATION
- 1 — PHOTOGRAPH LOCATION

RECORD DRAWING
NOT FOR CONSTRUCTION

Map Sources / Notes:
Source drawing from UMA: C4-RD04.dwg

0 5 10 20 30 40 m
1 : 1000
UTM Zone 16W, NAD83

File Name:	C4-RD04.dwg		
Reviewed by:	DCJ	Prepared by:	KAB
Date Issued:	October, 2008	Project Number:	80-297

Defence Construction Canada

2008 CAM-4 DEW LIne Monitoring Program
CAM-4 Kugaaruk
Nunavut Territory

Upper Site Landfill

AECOM

Figure C-1
Version 1

Date Plotted: October 16, 2006 Path: N:\Projects\2008\80297\20081\WorkInProgress\DataInterpretation\CAD\CAM-4\C4-RD04.dwg

Laboratory analysis detected concentrations of TPH (C6-34) at monitoring locations MW-11 and MW-13. It is recommended that these results be evaluated in the context of the Landfill Monitoring Plan. The soil sample at MW-10-35 (0.35 m depth) returned an arsenic concentration of 93.6 mg/kg. This value is presumed to be anomalously high, given the non-detection at the 0.15 m soil sample. At the time of issuing this draft report the results of the confirmatory analysis are awaited from ALS Laboratory Group.

The analytical results and depths of samples are provided in Table C-1. The Laboratory Certificates of Analysis are provided in Appendix F.

C1.4 Groundwater Sampling

Groundwater measurements and monitoring system condition records were documented for monitoring wells MW-10, MW-11, MW-12 and MW-13. These records are provided in attachment C4.

All groundwater monitoring wells slated for monitoring in 2008 at the Upper Site Landfill contained sufficient volume for sampling, with the exception of MW-10, which was completely dry. Samples were collected at a flow rate equal to the recharge rate of the monitoring well (and not exceeding 100mL/min). Monitor MW-11 was sampled using a peristaltic pump and disposable LDPE tubing. The rechargeable battery provided with the peristaltic pump from the supplier proved to be faulty, thus monitors that were accessible by vehicle were sampled with the peristaltic pump run off the vehicle battery. Monitors MW-12 and MW-13 were not accessible by vehicle, therefore were purged and sampled using a disposable bailer. It should be noted that monitoring well MW-12 was found to have a blockage in the well pipe at approximately 0.64 m below ground surface. Sand was discovered on the interface meter as well as the disposable bailer. The blockage in the well pipe may be attributed to a broken coupling, presumably allowing sand pack from the borehole annulus to enter the well.

Groundwater samples were not filtered and not preserved. Samples were analyzed for total concentration of inorganics, TPH (C6-C32) and PCB.

TPH (C6-C32) was detected in monitoring wells MW-11, MW-12 and MW-13. Elevated concentrations of Chromium and Lead were also reported for monitor MW-12. The results should be evaluated in the context of the Landfill Monitoring Plan as well as compared with DCC internal standards.

The results are presented in Table C-2. The laboratory Certificates of Analysis are provided in Appendix F.

C1.5 Thermal Monitoring

All thermistors at the Upper Site Landfill were in good condition. Thermistor data was downloaded on August 15, 2008, programming was checked and the data loggers were reset. The data logger clocks were adjusted to local (Standard Time). Battery charge was checked to ensure sufficient remaining charge and batteries were not changed in 2008.

Tabulated ground temperature data since the last download in August 2007 are included in Appendix C5. Graphs of ground temperature versus depth are presented in Appendix C6.

Table C-1. CAM-4 Kugaaruk, Summary of 2008 Soil Analysis - Upper Site Landfil

Sample Ident.	Sample Location	Depth	Copper Cu	Nickel Ni	Cobalt Co	Cadmium Cd	Lead Pb	Zinc Zn	Chromium Cr	Arsenic As	Mercury Hg	PCB Total Aroclors	F1 C6-C10	F2 C10-C16	F3 C16-C34	TPH C6-34
		(m)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)
Upgradient Samples																
MW-11-10	MW-11	0.10	11.2	11.9	7.0	<0.50	19.1	43.9	27.7	<5.0	<0.0050	<0.050	<10	<30	1230	1230
MW-11-40	MW-11	0.40	10.0	11.6	6.5	<0.50	8.1	33.3	22.6	<5.0	<0.0050	<0.050	<10	<30	1150	1150
Downgradient Samples																
MW-10-15	MW-10	0.15	6.5	10.5	5.0	<0.50	5.6	22.9	22.3	<5.0	<0.0050	<0.050	<10	<30	<50	0
MW-10-35	MW-10	0.35	8.4	20.0	9.0	<0.50	6.2	27.0	24.8	93.6	<0.0050	<0.050	<10	<30	<50	0
MW-12-15	MW-12	0.15	6.0	6.8	3.6	<0.50	4.9	23.3	17.0	<5.0	<0.0050	<0.050	<10	<30	<50	0
MW-12-30	MW-12	0.30	5.4	6.9	3.8	<0.50	4.9	21.0	15.4	<5.0	<0.0050	<0.050	<10	<30	<50	0
MW-13-15	MW-13	0.15	7.1	8.6	5.1	<0.50	5.7	31.4	17.5	<5.0	0.0117	<0.050	<10	<30	76	76
MW-13-30	MW-13	0.30	3.5	6.6	3.6	<0.50	3.7	17.2	14.9	<5.0	<0.0050	<0.050	<10	<30	<50	0

Note: mg/kg = ug/g

TPH is represented as the total of F1, F2 and F3 as defined by CCME Tier I Method - Rev. 5 Analysis of Petroleum Hydrocarbons in Soil

AECOM

Table C-2. CAM-4 Kugaaruk, Summary of 2008 Groundwater Analysis - Upper Site Landfil

Sample Identification	Location	Groundwater Elevation (masl)	Copper Cu (mg/L)	Nickel Ni (mg/L)	Cobalt Co (mg/L)	Cadmium Cd (mg/L)	Lead Pb (mg/L)	Zinc Zn (mg/L)	Chromium Cr (mg/L)	Arsenic As (mg/L)	Mercury Hg (mg/L)	PCB Total Aroclors (mg/L)	F1 C6-C10 (mg/L)	F2 C10-C16 (mg/L)	F3 C16-C34 (mg/L)	TPH C6-34 (mg/L)
Upgradient Samples																
MW-11	MW-11	311.16	<0.0020	0.0026	0.00146	<0.000034	<0.0010	<0.0050	<0.0020	0.0011	<0.000020	<0.0010	<0.10	<0.30	0.47	0.47
Downgradient Samples																
MW-10	MW-10	<299.13	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MW-12	MW-12	294.18	0.0433	0.0418	0.0156	0.000135	0.0158	0.208	0.0540	0.0051	<0.000020	<0.0012	<0.10	1.26	2.02	3.28
MW-13	MW-13	301.12	0.0288	0.0257	0.00978	0.000176	0.00725	0.0809	0.0205	0.00216	<0.000020	<0.0011	<0.10	<0.30	1.11	1.11

- Denotes dry well; no sample obtained
Note: mg/L = 1000 ug/L

AECOM

C1 – Site Condition/Visual Inspection Records

Visual Inspection Checklist
Inspection Report – Page 1 of 2

SITE NAME:	CAM-4 - Pelly Bay
LANDFILL/AREA DESIGNATION:	Upper Site Landfill
DATE OF INSPECTION:	August 14, 2008
DATE OF PREVIOUS INSPECTION:	August 24 - 26, 2007
INSPECTED BY:	Darrin Johnson, P.Eng.
REPORT PREPARED BY:	Darrin Johnson, P.Eng.

The preparer represents to the best of the preparer's knowledge, the following statements and observations are true and correct and to the best of the preparer's actual knowledge, no material facts have been suppressed or misstated.

Preliminary Stability Assessment

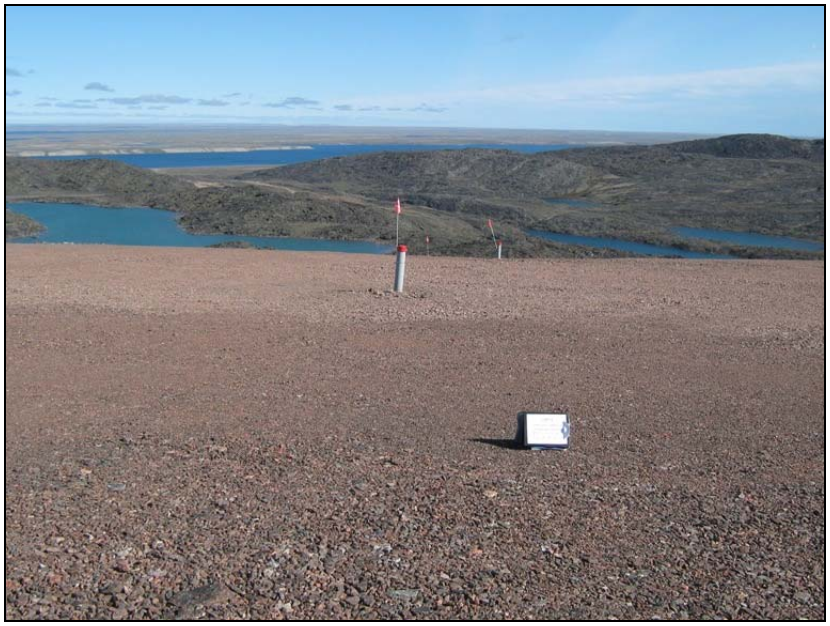
Feature	Severity Rating	Extent
Settlement	Not observed	None
Erosion	Not observed	None
Frost Action	Not observed	None
Animal Burrows	Not observed	None
Vegetation	Not observed	None
Staining	Not observed	None
Vegetation Stress	Not observed	None
Seepage Points	Not observed	None
Debris Exposed	Not observed	None
Tension Crack	Not observed	None
Overall Landfill Performance	Acceptable	

Checklist Item	Present Yes/No	Location	Dimensions (L x W) (m)	Depth (m)	Extent (%)	Description	Photographic Records (Photos referenced in photolog and in figures)	Additional Comments/ Preliminary Stability Assessment
Settlement	No							
Erosion	No							
Frost Action	No							
Animal Burrows	No							
Vegetation	No							
Staining	No							
Vegetation Stress	No							
Seepage Points	No							
Debris Exposed	No							
Presence/ Condition of Monitoring Instruments	Good							
Other Features of Note.	No							
Additional Photos						General	USL-1, 2A, 2B, 2C, 3, 4, 5, 6, 7, 8, 9A, 9B, 10A, 10B, 11A, 11B, 12, 13	

C2 – Geotechnical Inspection Photographic Records

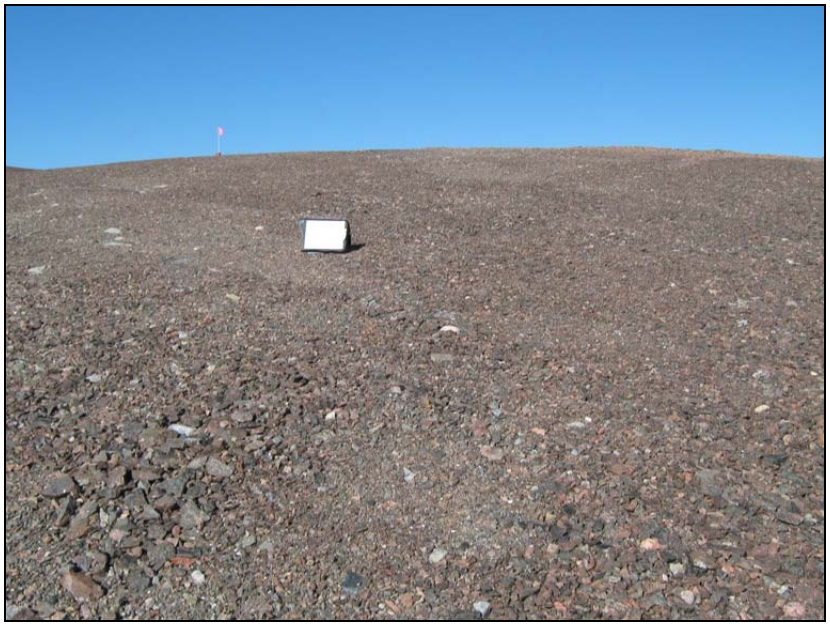
Photograph USL-1. Panoramic photo facing southeast towards west slope of Upper Site Landfill. ↑

Photograph USL-2A. Facing southeast along crest. ↑



Photograph USL-2B. Facing east along line of thermistors. ↑

Photograph USL-2C. Facing north along west crest. ↑



Photograph USL-3. Facing south slope. ↑

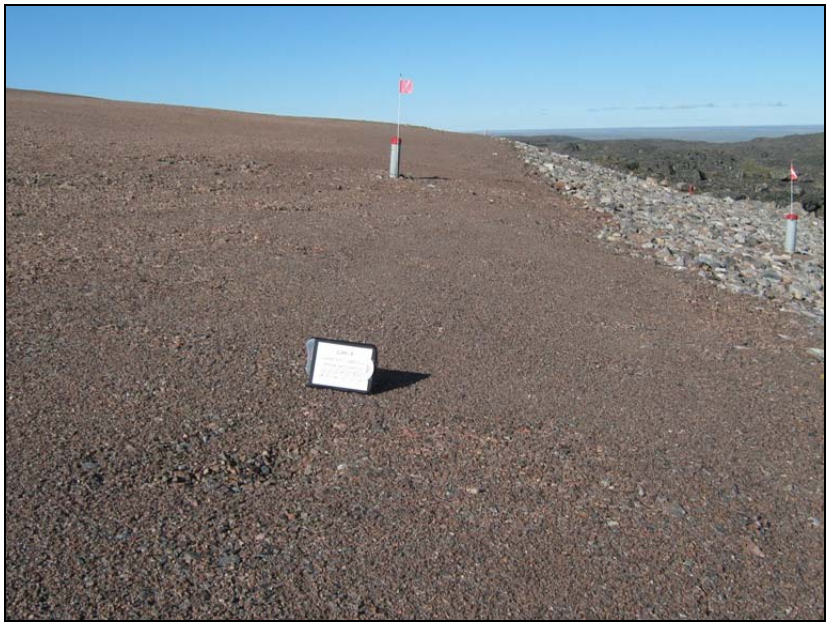
Photograph USL-4. Facing west along south slope. ↑

Photograph USL-5. Panoramic photo from the southwest corner of south lobe. ↑

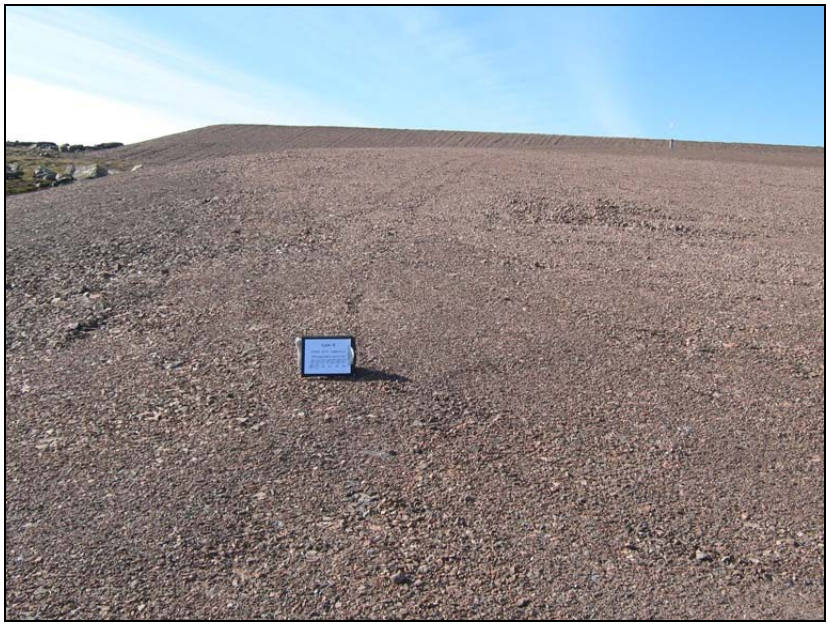
Photograph USL-6. Facing south along the south slope of the south lobe from the southeast corner. ↑

Photograph USL-7. Facing north from the southeast corner of the rip-rap. ↑

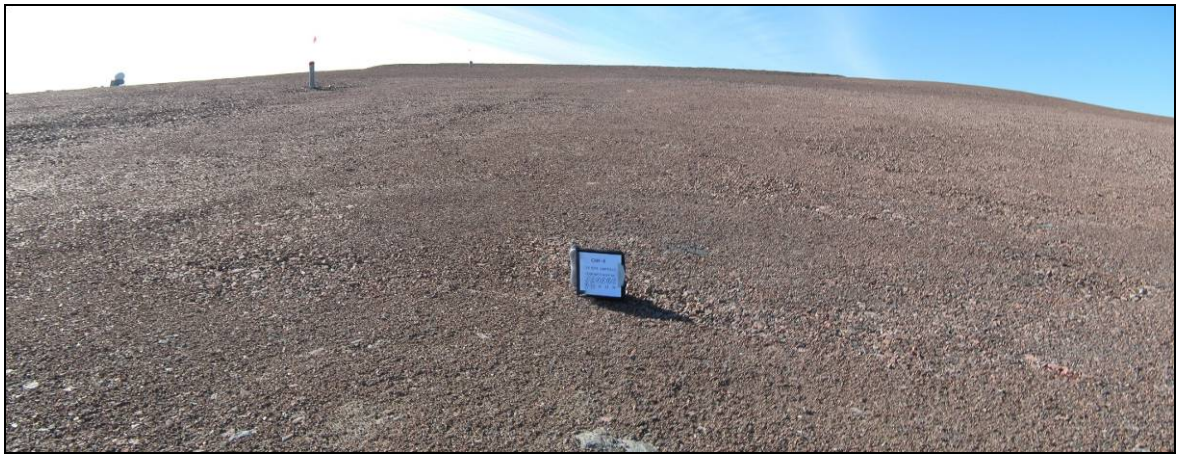
Photograph USL-8. Toe of rip-rap below thiermistors. ↑



Photograph USL-9A. Facing north along crest from southeast corner. ↑



Photograph USL-9B. Facing west along south crest from the southeast corner. ↑



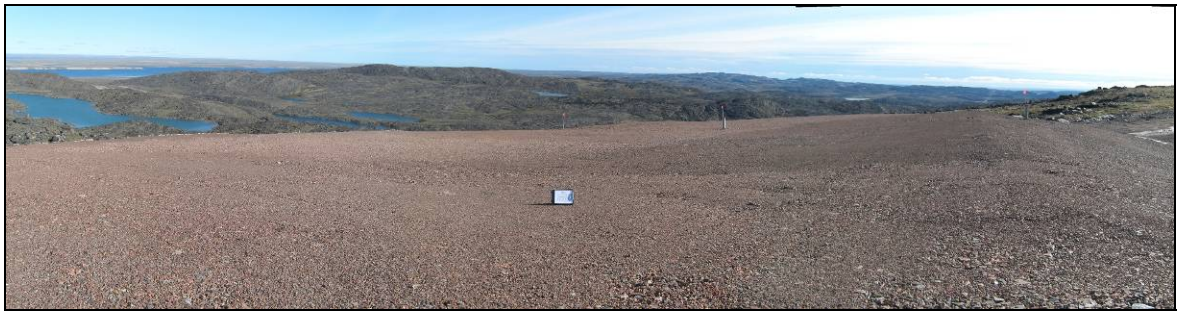
Photograph USL-10A. Panoramic photo of the top of the landfill facing west. ↑

Photograph USL-10B. Facing north along crest. ↑

Photograph USL-11A. Facing southeast. ↑

Photograph USL-11B. Facing northwest. ↑

Photograph USL-12. North gravel slope. ↑



Photograph USL-13. Panoramic photo of the landfill top from the northwest corner. ↑

C3 – Monitoring Photographic Records

Photograph 1. Monitoring Location MW-11 (Upgradient) Facing Southeast. ↑

Photograph 2. Monitoring Location MW-10 (Downgradient). Facing North. ↑

Photograph 3. Monitoring Location MW-12 (Downgradient). Facing North. ↑

Photograph 4. Monitoring Location MW-13 (Downgradient). Facing Northeast. ↑

C4 – Monitoring Well Sampling Records

2008 Monitoring Well Sampling Log (MW-10)

Site name:	CAM-4
Date of sampling event:	14-17 Aug 2008
Names of samplers:	TFB
Monitoring well ID:	MW-10
Facility:	Upper Site Landfill

Known Data	
Depth of installation* (m):	3.37
Length of screened section (m):	2.03
Depth to top of screen* (m):	0.38

Measured Data			
Condition of well:	Good	Procedure/Equipment:	Interface Meter
Procedure/Equipment:	Interface Meter	Depth to water surface (m):	
Well height above ground (m):	0.68	Depth to bottom (m):	2.38
Diameter of well (m):	0.05	Free product thickness (mm):	-

Calculations		Notes	
Depth of water (m):	Dry @ 2.38	Evidence of sludge:	-
Well volume of water (L):	0.00	Evidence of freezing/siltation:	-
Static water level* (m):			
Length of screen collecting water (m):			

Development/Purging Information

Equipment:

Date & Time	Volume Removed (L)	Temperature (^{o}C)	pH	Conductivity (µS/cm)	Turbidity (NTU)	Description of Water
16-Aug-08						

Water Sampling		Soil Sampling	
Date & Time Collected:		Date and Time Collected:	14-Aug-08
Sample Number - Water:		Sample Number - Soil:	MW-10-15
			MW-10-35
Sample Containers:		Sample Containers:	4 x 250mL Glass
Procedure/Equipment:		Procedure/Equipment:	SS Trowel
Water Description:		Soil Description:	Brown sandy silt till, some gravel.
Sampling Equipment Decontamination (Y/N):		Sampling Equipment Decontamination (Y/N):	Y
Number Washes:		Number Washes:	2
Number Rinses:		Number Rinses:	2

*From ground surface. Unless this is stated, all measurments are assumed to be from the top of the casing.
n/a=not applicable
LDPE=Low Density Polyethylene
SS=Stainless Steel

AECOM

2008 Monitoring Well Sampling Log (MW-11)

Site name:	CAM-4
Date of sampling event:	14-17 Aug 2008
Names of samplers:	TFB
Monitoring well ID:	MW-11
Facility:	Upper Site Landfill

Known Data

Depth of installation* (m):	3.85
Length of screened section (m):	2.03
Depth to top of screen* (m):	0.86

Measured Data

Condition of well:	Good	Procedure/Equipment:	Interface Meter
Procedure/Equipment:	Interface Meter	Depth to water surface (m):	1.97
Well height above ground (m):	0.56	Depth to bottom (m):	2.82
Diameter of well (m):	0.05	Free product thickness (mm):	-

Calculations

Depth of water (m):	0.85
Well volume of water (L):	1.67
Static water level* (m):	1.41
Length of screen collecting water (m):	0.85

Notes

Evidence of sludge:	-
Evidence of freezing/siltation:	-

Development/Purging Information

Equipment: Peristaltic Pump, Horiba U-22 with flow through cell, LDPE

Date & Time	Volume Removed (L)	Temperature (^{o}C)	pH	Conductivity (µS/cm)	Turbidity (NTU)	Description of Water
15-Aug-08	2.5	2.71	6.62	0.97	2.3	C&C Chemical odour

Water Sampling

Date & Time Collected:	15-Aug-08
Sample Number - Water:	MW-11
Sample Containers:	3 x 0.5L Amber Glass
	2 x VOC vials
Procedure/Equipment:	Peristaltic Pump, Horiba U-22
Water Description:	C&C, Chemical odour
Sampling Equipment Decontamination (Y/N):	Y
Number Washes:	1
Number Rinses:	2

Soil Sampling

Date and Time Collected:	14-Aug-08
Sample Number - Soil:	MW-11-10
Refusal @ 0.40 m	MW-11-40
Sample Containers:	4 x 250mL Glass
Procedure/Equipment:	SS Trowel
Soil Description:	Brown sandy silt till, some gravel.
Sampling Equipment Decontamination (Y/N):	Y
Number Washes:	3
Number Rinses:	3

*From ground surface. Unless this is stated, all measurments are assumed to be from the top of the casing.
n/a=not applicable
LDPE=Low Density Polyethylene
SS=Stainless Steel

AECOM

2008 Monitoring Well Sampling Log (MW-12)

Site name:	CAM-4
Date of sampling event:	14-17 Aug 2008
Names of samplers:	TFB
Monitoring well ID:	MW-12
Facility:	Upper Site Landfill

Known Data

Depth of installation* (m):	3.67
Length of screened section (m):	2.03
Depth to top of screen* (m):	0.68

Measured Data

Condition of well:	See note below	Procedure/Equipment:	Interface Meter
Procedure/Equipment:	Interface Meter	Depth to water surface (m):	1.53
Well height above ground (m):	0.66	Depth to bottom (m):	2.20
Diameter of well (m):	0.05	Free product thickness (mm):	-

Note - Blockage in well approx. 1.30 mBTOP. Possible damaged coupling. Sand pack allowed to enter well at damaged area.

Calculations		Notes	
Depth of water (m):	0.67	Evidence of sludge:	-
Well volume of water (L):	1.32	Evidence of freezing/siltation:	-
Static water level* (m):	0.87		
Length of screen collecting water (m):	0.67		

Development/Purging Information

Equipment:	Disposable Bailer, Horiba U-22

Date & Time	Volume Removed (L)	Temperature (^{o}C)	pH	Conductivity (µS/cm)	Turbidity (NTU)	Description of Water
16-Aug-08	1.4	Insufficient volume for field parameters				Grey, cloudy, silty Chemical odour

Water Sampling		Soil Sampling	
Date & Time Collected:	16-Aug-08	Date and Time Collected:	14-Aug-08
Sample Number - Water:	MW-12	Sample Number - Soil:	MW-12-15
		Refusal @ 0.32 m	MW-12-30
Sample Containers:	3 x 0.5L Amber Glass	Sample Containers:	4 x 250mL Glass
	2 x VOC vials		
Procedure/Equipment:	Disposable Bailer	Procedure/Equipment:	SS Trowel
Water Description:	Grey, cloudy, silty, chemical odour	Soil Description:	Brown sandy silt, some gravel.
Sampling Equipment Decontamination (Y/N):	Y	Sampling Equipment Decontamination (Y/N):	Y
Number Washes:	3	Number Washes:	2
Number Rinses:	5	Number Rinses:	2

*From ground surface. Unless this is stated, all measurments are assumed to be from the top of the casing.
n/a=not applicable
LDPE=Low Density Polyethylene
SS=Stainless Steel

AECOM

2008 Monitoring Well Sampling Log (MW-13)

Site name:	CAM-4
Date of sampling event:	14-17 Aug 2008
Names of samplers:	TFB/DAJ
Monitoring well ID:	MW-13
Facility:	Upper Site Landfill

Known Data

Depth of installation* (m):	3.18
Length of screened section (m):	1.90
Depth to top of screen* (m):	0.20

Measured Data

Condition of well:	Good	Procedure/Equipment:	Interface Meter
Procedure/Equipment:	Interface Meter	Depth to water surface (m):	1.88
Well height above ground (m):	0.64	Depth to bottom (m):	2.18
Diameter of well (m):	0.05	Free product thickness (mm):	-

Calculations

Depth of water (m):	0.30
Well volume of water (L):	0.59
Static water level* (m):	1.24
Length of screen collecting water (m):	0.30

Notes

Evidence of sludge:	-
Evidence of freezing/siltation:	-

Development/Purging Information

Equipment:	Disposable Bailer, Horiba U-22

Date & Time	Volume Removed (L)	Temperature (^{o}C)	pH	Conductivity (µS/cm)	Turbidity (NTU)	Description of Water
16-Aug-08	0.8	2.91	5.98	0.392	903	Grey, cloudy Chemical odour

Water Sampling

Date & Time Collected:	16-Aug-08
Sample Number - Water:	MW-13
Sample Containers:	2 x 0.5L Amber Glass
	2 x VOC vials
Procedure/Equipment:	Disposable Bailer
Water Description:	Cloudy, grey, chemical odour
Sampling Equipment Decontamination (Y/N):	Y
Number Washes:	2
Number Rinses:	3

Soil Sampling

Date and Time Collected:	14-Aug-08
Sample Number - Soil:	MW-13-15
Refusal @ 0.30 m	MW-13-30
Sample Containers:	4 x 250mL Glass
Procedure/Equipment:	SS Trowel
Soil Description:	Brown sandy silt till, some gravel.
Sampling Equipment Decontamination (Y/N):	Y
Number Washes:	2
Number Rinses:	3

*From ground surface. Unless this is stated, all measurments are assumed to be from the top of the casing.
n/a=not applicable
LDPE=Low Density Polyethylene
SS=Stainless Steel

AECOM

C5 – Thermistor Maintenance Records

Thermal Monitoring
Ground Temperature Annual Maintenance Report

Contarctor Name:	**AECOM**	Inspection Date:	**15-Aug-08**
Prepared By:	**Darrin Johnson**		

Thermistor Information

Site Name:	**CAM-4**		Thermistor Location	**Upper Site Landfill**			
Thermistor Number:	**VT01**		Inclination	**Vertical**			
Install Date:	**28-Sep-06**		First Date Event	**27-Aug-07**	Last Date Event		**15-Aug-08**
Coordinates and Elevation		N		E		Elev	**304.43**
Length of Cable (m)	**7.7**	Cable Lead Above Ground (m)	**1.2**	Nodal Points	**13**		
Datalogger Serial #	**111071**			Cable Serial Number			**1615**

Code CAM-4VT01

Thermistor Inspection

	Good	Needs Maintenance
Casing	☑	☐
Cover	☑	☐
Data Logger	☑	☐
Cable	☑	☐
Beads	☑	☐

Battery Installation Date: **Batteries not replaced in 2008.**

Battery Levels: Main **11.34 V** Aux **12.29 V**

Manual Ground Temperature Readings

Bead	ohms	Temp. (ºC)
1		**10.1**
2		**12.5**
3		**5.6**
4		**4.8**
5		**4.5**
6		**3.3**
7		**-0.2**
8		**-2.4**

Bead	ohms	Temp. (ºC)
9		**-3.9**
10		**-5.2**
11		**-6.4**
12		**-5.9**
13		**-4.9**

Observations and Proposed Maintenance

Lock lubricated.

Thermal Monitoring
Ground Temperature Annual Maintenance Report

Contarctor Name:	**AECOM**	Inspection Date:	**15-Aug-08**
Prepared By:	**Darrin Johnson**		

Thermistor Information

Site Name:	**CAM-4**		Thermistor Location	**Upper Site Landfill**			
Thermistor Number:	**VT02**		Inclination	**Vertical**			
Install Date:	**28-Sep-06**		First Date Event	**27-Aug-07**	Last Date Event		**15-Aug-08**
Coordinates and Elevation		N		E		Elev	**306.71**
Length of Cable (m)	**6.7**		Cable Lead Above Ground (m)	**1.2**	Nodal Points	**11**	
Datalogger Serial #	**2020175**				Cable Serial Number		**1617**

Code CAM-4VT02

Thermistor Inspection

	Good	Needs Maintenance
Casing	☑	☐
Cover	☑	☐
Data Logger	☑	☐
Cable	☑	☐
Beads	☑	☐

Battery Installation Date: **Batteries not replaced in 2008.**

Battery Levels: Main **11.34 V** Aux **12.77 V**

Manual Ground Temperature Readings

Bead	ohms	Temp. (ºC)
1		**11.2**
2		**8.9**
3		**5.3**
4		**4.0**
5		**1.4**
6		**-0.9**
7		**-2.6**
8		**-3.7**

Bead	ohms	Temp. (ºC)
9		**-4.8**
10		**-6.2**
11		**-7.6**

Observations and Proposed Maintenance

Lock lubricated.

Thermal Monitoring
Ground Temperature Annual Maintenance Report

Contarctor Name:	**AECOM**	Inspection Date:	**15-Aug-08**
Prepared By:	**Darrin Johnson**		

Thermistor Information

Site Name:	**CAM-4**	Thermistor Location	**Upper Site Landfill**		
Thermistor Number:	**VT03**	Inclination	**Vertical**		
Install Date:	**28-Sep-06**	First Date Event	**27-Aug-06**	Last Date Event	**15-Aug-08**
Coordinates and Elevation	N		E	Elev	**310.09**
Length of Cable (m)	**7.2**	Cable Lead Above Ground (m)	**1.2**	Nodal Points	**12**
Datalogger Serial #	**111126**			Cable Serial Number	**1618**

Code CAM-4VT03

Thermistor Inspection

	Good	Needs Maintenance
Casing	☑	☐
Cover	☑	☐
Data Logger	☑	☐
Cable	☑	☐
Beads	☑	☐

Battery Installation Date: **Batteries not replaced in 2008.**

Battery Levels: Main **11.34 V** Aux **13.5 V**

Manual Ground Temperature Readings

Bead	ohms	Temp. (ºC)
1		**14.2**
2		**9.2**
3		**4.1**
4		**2.3**
5		**0.0**
6		**-1.5**
7		**-2.8**
8		**-4.2**

Bead	ohms	Temp. (ºC)
9		**-5.3**
10		**-6.7**
11		**-7.6**
12		**-8.2**

Observations and Proposed Maintenance

Lock lubricated.

Thermal Monitoring
Ground Temperature Annual Maintenance Report

Contarctor Name:	**AECOM**	Inspection Date:	**15-Aug-08**
Prepared By:	**Darrin Johnson**		

Thermistor Information

Site Name:	**CAM-4**		Thermistor Location	**Upper Site Landfill**			
Thermistor Number:	**VT04**		Inclination	**Vertical**			
Install Date:	**26-Sep-06**		First Date Event	**27-Aug-07**	Last Date Event		**15-Aug-08**
Coordinates and Elevation		N		E		Elev	**312.8**
Length of Cable (m)	**6.2**		Cable Lead Above Ground (m)	**1.2**	Nodal Points	**10**	
Datalogger Serial #	**207046**				Cable Serial Number		**1619**

Code CAM-4VT04

Thermistor Inspection

	Good	Needs Maintenance
Casing	☑	☐
Cover	☑	☐
Data Logger	☑	☐
Cable	☑	☐
Beads	☑	☐

Battery Installation Date: **Batteries not replaced in 2008.**

Battery Levels: Main **11.34 V** Aux **13.63 V**

Manual Ground Temperature Readings

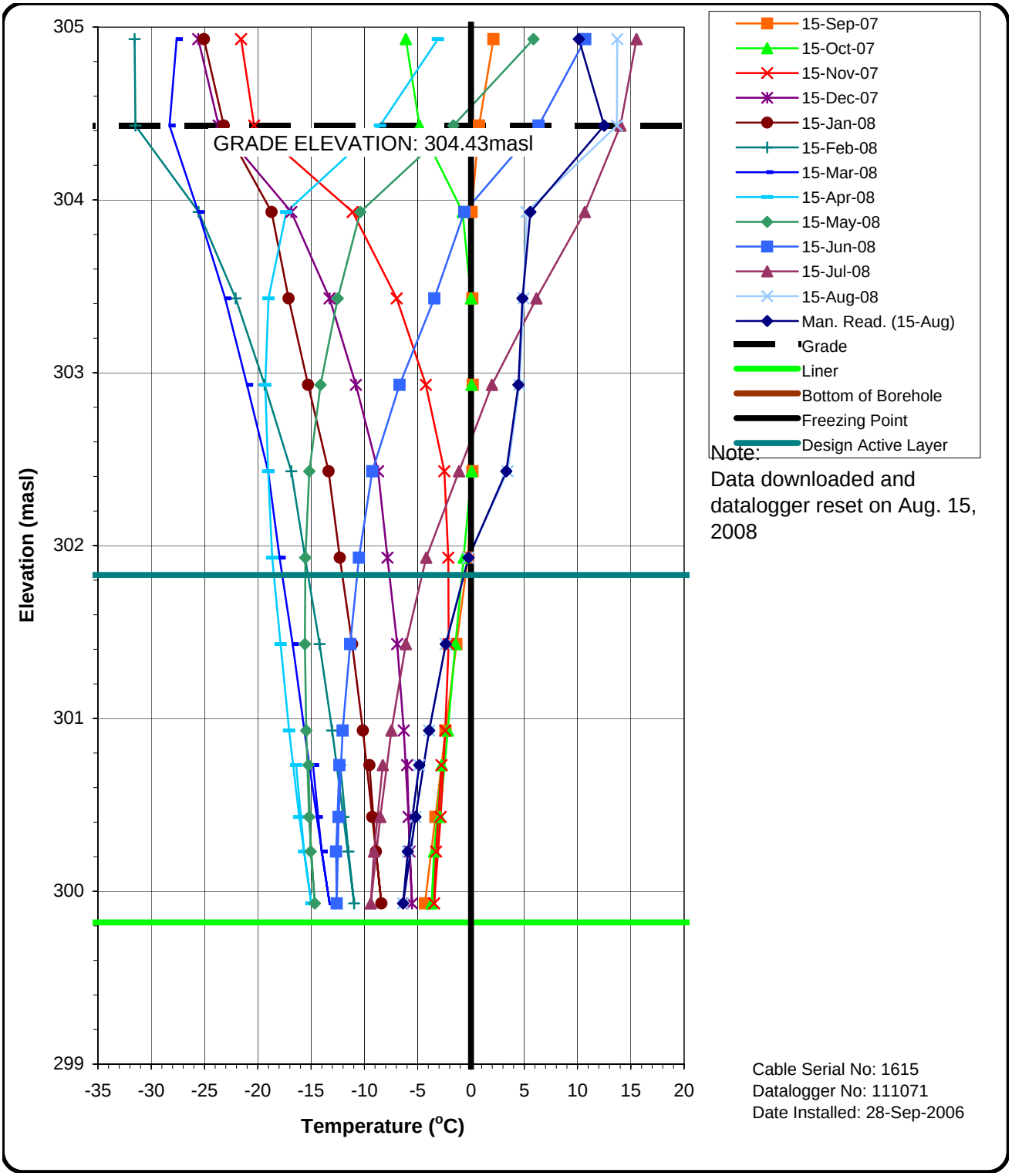
Bead	ohms	Temp. (ºC)
1		**13.7**
2		**9.6**
3		**5.0**
4		**3.4**
5		**1.2**
6		**-1.1**
7		**-2.5**
8		**-4.0**

Bead	ohms	Temp. (ºC)
9		**-5.2**
10		**-5.3**

Observations and Proposed Maintenance

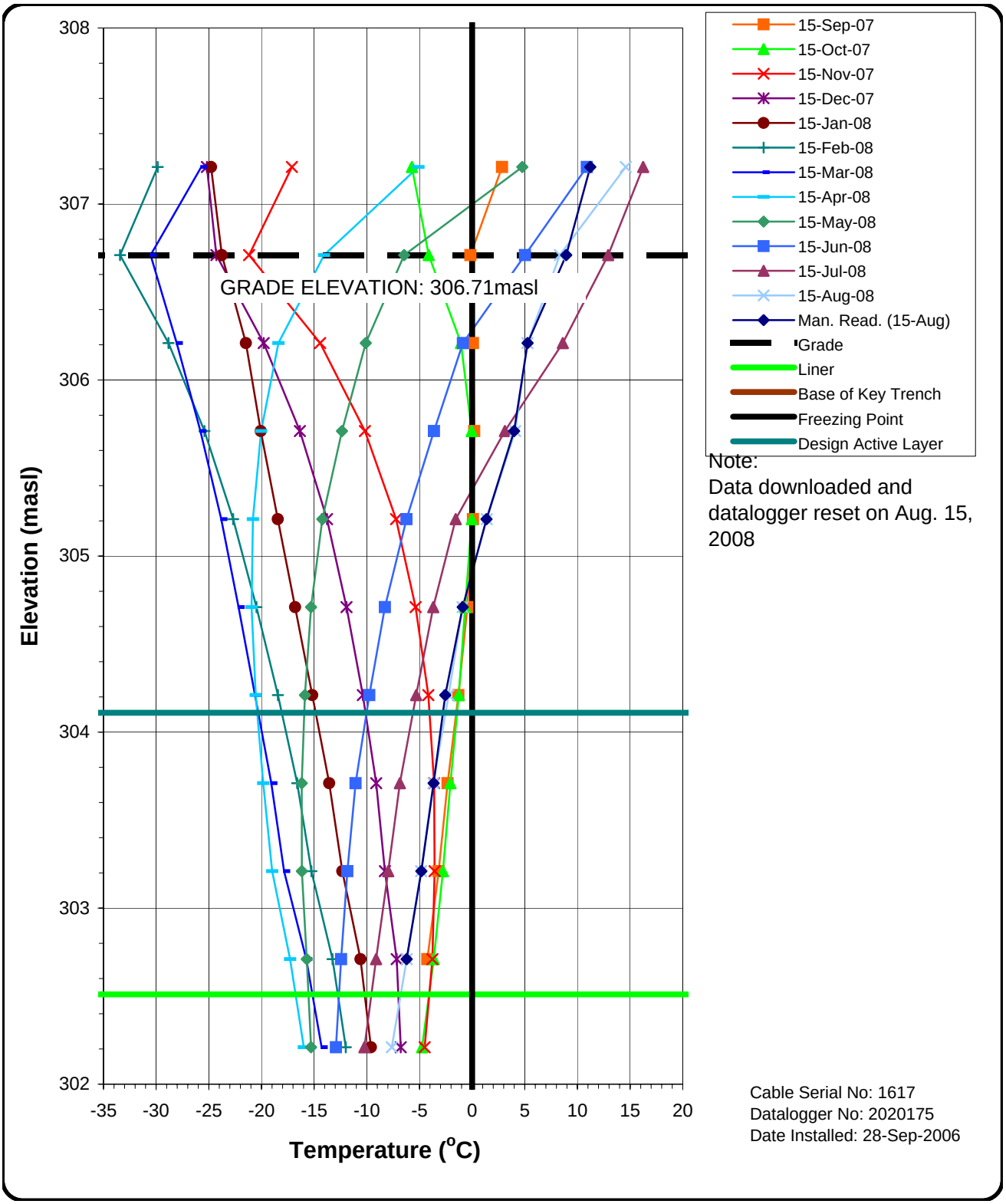
Lock lubricated.

C6 – Thermistor Graphs



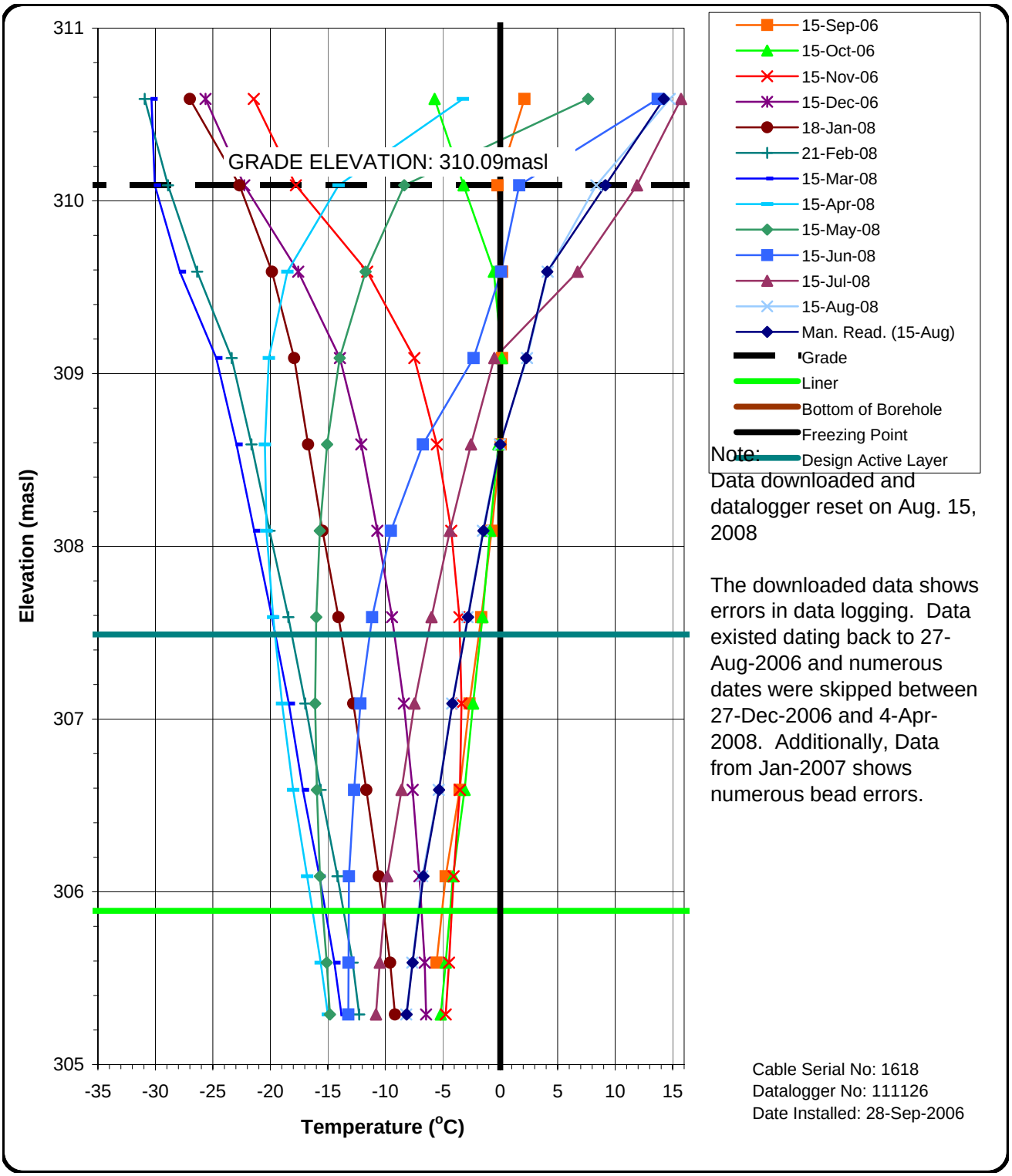
AECOM

Graph C-1
Ground Temperature Profile
Upper Site Landfill
Vertical GTC VT-1



AECOM

Graph C-2
Ground Temperature Profile
Upper Site Landfill
Vertical GTC VT-2



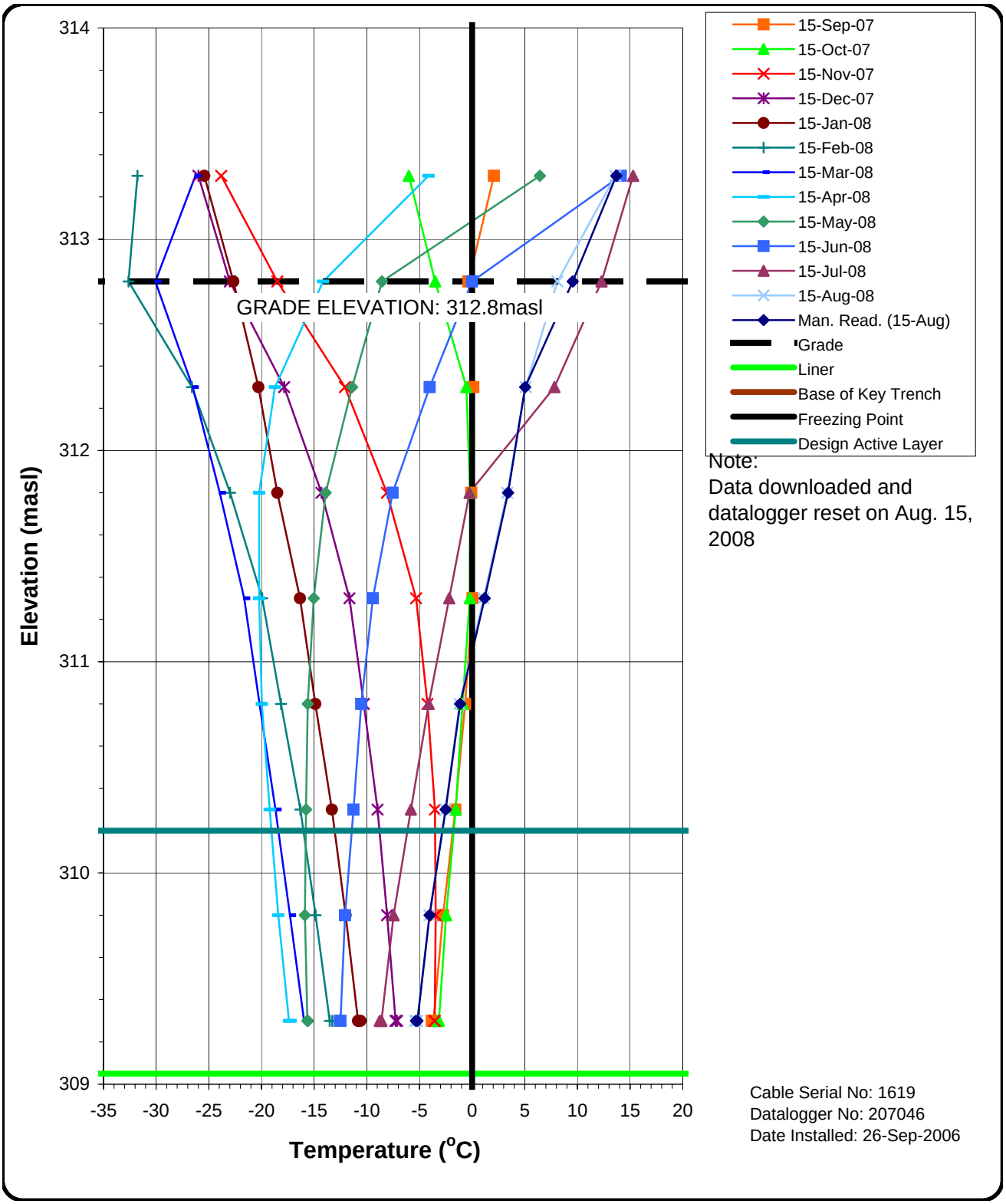
Note:
Data downloaded and datalogger reset on Aug. 15, 2008

The downloaded data shows errors in data logging. Data existed dating back to 27-Aug-2006 and numerous dates were skipped between 27-Dec-2006 and 4-Apr-2008. Additionally, Data from Jan-2007 shows numerous bead errors.

Cable Serial No: 1618
Datalogger No: 111126
Date Installed: 28-Sep-2006

AECOM

Graph C-3
Ground Temperature Profile
Upper Site Landfill
Vertical GTC VT-3



AECOM

Graph C-4
Ground Temperature Profile
Upper Site Landfill
Vertical GTC VT-4

C7 – Field Notes

Aug. 15/08

- LOWER SITE NON-HAZ LF (LSNH)
- STARTED INSPECTION AT 10AM

- LSNH PHOTO LOC. 1 (WAYPOINT 34)
  - FROM MW-20 (NORTH SLOPE)
  - PHOTOS 68, 69 & 70 (PANORAMIC)
  - COARSE ROCKFILL ON SLOPE WITH NO EROSION OR CRACKS OBSERVED, NO SEEPAGE AT TOE

- LSNH PHOTO LOC. 2 (WP 35)
  - CENTRE OF NORTH CREST ABOVE PHOTO LOC. 1
  - PHOTO 71 (CREST FACING EAST)
  - PHOTO 73 (TOP OF LF FACING SOUTH)
  - PHOTO 72 (CREST FACING WEST)
  - NO CRACKS OBSERVED ALONG CREST
  - NO SIGNIFICANT SETTLEMENT OF EXCAVATION ON TOP OF LF
  - SOME TIRE TRACKS VISIBLE BUT NO DAMAGE OR RUTTING

LSNH LF (PAGE 2)

- LSNH PHOTO LOC. 3 (WP 36)
  - CENTRE OF EAST CREST
  - PHOTO 74 (FACING NORTH)
  - PHOTO 75 (FACING SOUTH)

- LSNH PHOTO LOC. 4 (WP 37)
  - EAST SLOPE FACING NORTHWEST
  - PHOTO 76 (FACING SLOPE)

- LSNH PHOTO LOC. 5 (WP 38)
  - CENTRE OF SOUTH CREST
  - PHOTO 77 (FACING WEST CREST)
  - PHOTO 78 (FACING NORTH)
  - PHOTO 79 (FACING EAST ALONG CREST)
  - NO CRACKING OR SETTLEMENTS OBSERVED

- LSNH PHOTO LOC. 6 (WP 39)
  - CENTRE OF WEST CREST
  - PHOTO 80 (FACING NORTH)
  - PHOTO 81 (FACING SOUTH)

LSNH LF (PAGE 3)

- LSNH PHOTO LOC. 7 (WP 40)
  - WEST SLOPE OF LF
  - PHOTO 82 (FACING NE)
  - PHOTO 83 (FACING SE)

- OVERALL LANDFILL APPEARS TO BE STABLE, WITH NO EROSION OR CRACKING OBSERVED.
- NO SEEPAGE FROM TOES.
- NO VEGETATION.

2008 Monitoring Well Sampling Log (MW # 11)

Site name:	CAM- 4
Date of sampling event:	AUG- 14-16 / 2008
Names of samplers:	TFB
Monitoring well ID:	MW-11
Facility:	UPPER SITE

Known Data

Depth of installation* (m):	3.85
Length of screened section (m):	2.03
Depth to top of screen* (m):	0.86

Measured Data

Condition of well:	GOOD	Procedure/Equipment:	INTERFACE METER
Procedure/Equipment:	INTERFACE METER	Depth to water surface (m):	1.97 mBTOC
Well height above ground (m):	0.56	Depth to bottom (m):	2.82 mBTOC
Diameter of well (m):	2"	Free product thickness (mm):	—

Calculations

Depth of water (m):	1.97 mBTOC
Well volume of water (L):	7 mL
Static water level* (m):	1.41
Length of screen collecting water (m):	1.40

Notes

Evidence of sludge:	—
Evidence of freezing/siltation:	—

Development/Purging Information

Equipment: PERISTALTIC PUMP

Date & Time	Volume Removed (L)	Temperature (°C)	pH	Conductivity (µS/cm)	Turbidity (NTU)	Description of Water
15-AUG-08	2.50	2.71	6.62	0.97	2.3	C+C chemical odor

Water Sampling

Date & Time Collected:	15-AUG-08
Sample Number - Water:	MW-11
Sample Containers:	3 500 mL AMBERS 2 VOC VIALS
Procedure/Equipment:	PERISTALTIC PUMP
Water Description:	C+C chemical odor
Sampling Equipment Decontamination (Y/N):	Y
Number Washes:	1
Number Rinses:	2

Soil Sampling

Date and Time Collected:	14-AUG-08
Sample Number - Soil:	MW 11-10 MW 11-40
	Refusal @ 90 cm
Sample Containers:	2 / 250 mL Clear PER SAMPLE 2M FILTERED
Procedure/Equipment:	TROWEL
Soil Description:	SANDY SILT TILL BROWN GRAVELLY, DRY
Sampling Equipment Decontamination (Y/N):	Y
Number Washes:	3
Number Rinses:	3

n/a=not applicable

*From ground surface. Unless this is stated, all measurments are assumed to be from the top of the casing.

Gartner Lee

2008 Monitoring Well Sampling Log (MW # 13)

Site name:	CAM - 4
Date of sampling event:	AUG- 14-16/2008
Names of samplers:	TFB / DS (soil)
Monitoring well ID:	MW-13
Facility:	UPPER SITE

Known Data

Depth of installation* (m):	3.18
Length of screened section (m):	1.90
Depth to top of screen* (m):	0.20

Measured Data

Condition of well:	GOOD	Procedure/Equipment:	INTERFACE METER
Procedure/Equipment:	INTERFACE METER	Depth to water surface (m):	1.99
Well height above ground (m):	0.64	Depth to bottom (m):	2.18
Diameter of well (m):	2"	Free product thickness (mm):	—

Calculations		Notes	
Depth of water (m):	1.88	Evidence of sludge:	—
Well volume of water (L):	0.6 L	Evidence of freezing/siltation:	—
Static water level* (m):	1.24		
Length of screen collecting water (m):	1.34		

Development/Purging Information

Equipment: BAILER → SOME STAGNANT (WELL DRY)

Date & Time	Volume Removed (L)	Temperature (°C)	pH	Conductivity (µS/cm)	Turbidity (NTU)	Description of Water
16-AUG-08	0.8L	2.41	5.98	0.342	903.0	Cloudy, GREY chemical odour

Water Sampling		Soil Sampling	
Date & Time Collected:	16-AUG-08	Date and Time Collected:	19-AUG-08
Sample Number - Water:	MW-13,	Sample Number - Soil:	MW13-15 MW13-30
		Reduce 30cm	
Sample Containers:	2 VOC's 2 500mL AMBER	Sample Containers:	4 125mL Clear
Procedure/Equipment:	BAILER	Procedure/Equipment:	TROWEL
Water Description:	Cloudy, GREY Chemical odour.	Soil Description:	SANDY SILT TILL, brown GRAVELLY, moist
Sampling Equipment Decontamination (Y/N):	Y	Sampling Equipment Decontamination (Y/N):	Y
Number Washes:	2	Number Washes:	2
Number Rinses:	3	Number Rinses:	3

n/a=not applicable

*From ground surface. Unless this is stated, all measurments are assumed to be from the top of the casing.

Gartner Lee

2008 Monitoring Well Sampling Log (MW # 10)

Site name:	CAM- 4
Date of sampling event:	AUG- 14-16 / 2008
Names of samplers:	TFB
Monitoring well ID:	MW - 10
Facility:	UPPER SITE

Known Data

Depth of installation* (m):	3.37
Length of screened section (m):	2.03
Depth to top of screen* (m):	0.38

Measured Data

Condition of well:	GOOD	Procedure/Equipment:	INTERFACE METER
Procedure/Equipment:	INTERFACE METER	Depth to water surface (m):	DRY @ 2.35
Well height above ground (m):	0.68	Depth to bottom (m):	
Diameter of well (m):	2"	Free product thickness (mm):	—

Calculations

Depth of water (m):	DRY @ 1.38
Well volume of water (L):	
Static water level* (m):	
Length of screen collecting water (m):	1.32

Notes

Evidence of sludge:	—
Evidence of freezing/siltation:	—

Development/Purging Information

Equipment: —

Date & Time	Volume Removed (L)	Temperature (°C)	pH	Conductivity (µS/cm)	Turbidity (NTU)	Description of Water
16-AUG-08	DRY					

Water Sampling

Date & Time Collected:	
Sample Number - Water:	DRY
Sample Containers:	
Procedure/Equipment:	
Water Description:	
Sampling Equipment Decontamination (Y/N):	
Number Washes:	
Number Rinses:	

Soil Sampling

Date and Time Collected:	14 AUG 08
Sample Number - Soil:	MW10-15 MW 10-35
Sample Containers:	2/250 mL clear PER SAMPLE
Procedure/Equipment:	TROWEL
Soil Description:	SAND/SILT GRAVEL BROWN/GREY
Sampling Equipment Decontamination (Y/N):	Y
Number Washes:	2
Number Rinses:	2

n/a=not applicable

*From ground surface. Unless this is stated, all measurments are assumed to be from the top of the casing.

Gartner Lee

2008 Monitoring Well Sampling Log (MW #12)

Site name:	CAM-4
Date of sampling event:	AUG-~~19~~ 16 / 2008
Names of samplers:	TFB
Monitoring well ID:	MW-12
Facility:	UPPER SITE

Known Data

Depth of installation* (m):	3.67
Length of screened section (m):	2.03
Depth to top of screen* (m):	0.68

Measured Data

Condition of well:	SEE BELOW	Procedure/Equipment:	INTERFACE METER
Procedure/Equipment:	INTERFACE METER	Depth to water surface (m):	1.53
Well height above ground (m):	0.66	Depth to bottom (m):	2.20
Diameter of well (m):	2"	Free product thickness (mm):	

Calculations		Notes	
Depth of water (m):	1.53	Evidence of sludge:	—
Well volume of water (L):	1.40	Evidence of freezing/siltation:	—
Static water level* (m):	0.87		
Length of screen collecting water (m):	0.86		

Development/Purging Information

Equipment:	BAILER

Date & Time	Volume Removed (L)	Temperature (°C)	pH	Conductivity (µS/cm)	Turbidity (NTU)	Description of Water
16-AUG-08	1.40L	WELL DRY AFTER SAMPLE COLLECTION NO FIELD PARAMETERS				

Water Sampling		Soil Sampling	
Date & Time Collected:	16-AUG-08	Date and Time Collected:	19-AUG-08
Sample Number - Water:	MW-12	Sample Number - Soil:	MW12-19
Blockage IN well SAND pack ? @ coupling		Refusal @ 32 cm	MW12-20
Sample Containers:	3 500 ml AMBERS 2 VOCS	Sample Containers:	2/250mL clear PER SAMPLE
Procedure/Equipment:	BAILER	Procedure/Equipment:	TROWEL
Water Description:	cloudy GREY SILTY chemical odour	Soil Description:	SANDY SILT SOME GRAVEL DK. BROWN
Sampling Equipment Decontamination (Y/N):	Y	Sampling Equipment Decontamination (Y/N):	Y
Number Washes:	3	Number Washes:	2
Number Rinses:	5	Number Rinses:	2

n/a=not applicable

*From ground surface. Unless this is stated, all measurments are assumed to be from the top of the casing.

VT-4 DOWNLOADING AT 3:50PM

BATTERY MAIN 11.34V
AUX 13.63V

CHANNEL	TEMP (°C)	VOLT
1	13.69	1.35
2	9.55	1.23
3	5.037	1.09
4	3.41	1.04
5	1.19	0.97
6	-1.14	0.91
7	-2.52	0.87
8	-4.04	0.82
9	-5.19	0.79
10	-5.33	0.78

- CHECKED PROGRAMMING
- UPDATED CLOCK & CHECKED "STOP WHEN FULL"
- RESTARTED DATALOGGER

WEATHER: BECOMING OVERCAST COLD WIND, ~~ABOUT~~ 2°C

VT-3 DOWNLOADED AT 4:10PM

BATTERY MAIN 11.34V
AUX 13.5V

CHANNEL	TEMP (°C)	VOLT (V)
1	14.23	
2	9.15	
3	4.09	
4	2.27	
5	0.091	
6	-1.46	
7	-2.80	
8	-4.16	
9	-5.32	
10	-6.69	
11	-7.62	
12	-8.15	

- CHECKED PROGRAMMING
- UPDATED CLOCK & CHECKED "STOP WHEN FULL"
- RESTARTED DATALOGGER

VT-2 DOWNLOADED STARTED AT 4:20
BAT. MAIN 11.34V
AUX 12.77V

CHANNEL	TEMP (°C)	VOLT (V)
1	11.22	
2	8.94	
3	5.27	
4	3.98	
5	1.36	
6	-0.90	
7	-2.55	
8	-3.66	
9	-4.82	
10	-6.22	
11	-7.55	

- CHECKED PROGRAMMING
- UPDATED CLOCK & CHECKED "STOP WHEN FULL"
- RESTARTED DATALOGGER
- CHANGED SITE FROM 1 TO 2

VT-1 DOWNLOADED AT 4:35PM
BATT MAIN 11.34V
AUX. 12.29V

CHANNEL	TEMP (°C)
1	10.12
2	12.50
3	5.57
4	4.83
5	4.45
6	3.31
7	-0.23
8	-2.36
9	-3.92
10	-5.21
11	-6.37
12	-5.93
13	-4.85

- CHECKED PROGRAMMING
- CHANGED ETS-1 TO VT-1
- UPDATED CLOCK & CHECKED "STOP WHEN FULL"
- RESTARTED DATALOGGER

Appendix D

Lower Site Non-hazardous Waste Landfill

- D1 – Site Condition/Visual Inspection Records
- D2 – Geotechnical Inspection Photographic Records
- D3 – Field Notes

D1 – Site Condition/Visual Inspection Records

D2 – Geotechnical Inspection Photographic Records

D3 – Field Notes

Appendix E

Lower Site Landfill

- E1 – Site Condition/Visual Inspection Records
- E2 – Geotechnical Inspection Photographic Records
- E3 – Monitoring Photographic Records
- E4 – Monitoring Well Sampling Records
- E5 – Thermistor Maintenance Records
- E6 – Thermistor Graphs
- E7 – Field Notes

E1 – Site Condition/Visual Inspection Records

E2 – Geotechnical Inspection Photographic Records

E3 – Monitoring Photographic Records

E4 – Monitoring Well Sampling Records

E5 – Thermistor Maintenance Records

E6 – Thermistor Graphs

E7 – Field Notes

Appendix F

Laboratory Reports

Appendix G

Quality Assurance/Quality Control

- Table G1 – Soil Sampling QA/QC Results
- Table G2 – Water Sampling QA/QC Results