Nunavut Baffin Region
2014 DEW Line Landfill Monitoring Program
FOX-5 Broughton Island
Final Monitoring Report

Prepared for:

Public Works and Government Services Canada

Prepared by:

SENES Consultants
AN ARCADIS COMPANY

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February 2015

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19 February 2015

Public Works and Government Services Canada
Western Region – Environmental Services
5th Floor, 10025 Jasper Avenue
ATB Financial Plaza North Tower
Edmonton, AB, T5J 1S6

Attention: Ms. Liana Smith
Project Manager

RE: Final Monitoring Report
Baffin Region Nunavut DEW LINE Landfill Monitoring Program
Fox-5 Broughton Island, NU
DND Project #: DLCLFMP2 (QIKIQ14)

Dear Ms. Smith:

Please find enclosed the Final Monitoring Report for the 2014 Landfill Monitoring Program at the former FOX-5 DEW Line site located on Broughton Island in Nunavut.

Regards,

SENES Consultants

Stephen J. Borcsok, P.Eng.
Environmental Engineer

Charles F. Gravelle, M.Sc.E., P.Eng.
Senior Geotechnical Engineer

REGISTERED PROFESSIONAL ENGINEER
C.F. GRAVELLE
LICENSEE
NWT/NU

ISO 9001 Certified

EXECUTIVE SUMMARY

SENES Consultants (SENES) was retained by Public Works and Government Services Canada (PWGSC) on behalf of the Department of National Defence (DND) to complete the 2014 landfill monitoring at the former FOX-5 DEW Line Site. This site is located on Broughton Island, off the east coast of Baffin Island in Nunavut.

The former DEW Line site was decommissioned in 1991 and a remotely operated North Warning System (NWS) Short Range Radar Station has been constructed in its vicinity. Environmental cleanup, demolition, and remediation of the old facilities were completed between 2001 and 2006. Three landfills constructed as part of these works, namely the Middle Site Tier II Soil Disposal Facility and Non-Hazardous Waste Landfill, Main Landfill, and Station Non-Hazardous Landfill.

The DEW Line landfill monitoring program is divided into three phases: Phase I (yearly for five years following the completion of remediation activities at the site), Phase II (years 7, 10, 15, and 25 following completion of remediation activities), and Phase III (to be determined when Phase II is completed). This 2014 monitoring event represents the year 7 event as part of Phase II of the monitoring program, however it has been completed in year 8 due to a delay in the monitoring program at this site.

The scope of monitoring work at each landfill noted above included:

- A visual inspection of the landfill;
- Collection of soil samples from each landfill;
- Collection of groundwater samples from each landfill; and
- Collection of thermal data from vertical thermistor installations at each landfill (only at Middle Site and Main landfills).

The performance of each landfill was assessed using the results of this inspection and comparison of these results to those of previous monitoring events. Trends in physical changes to the landfill observed during the visual inspection, and trends in concentrations of selected parameters in soil and groundwater over time were analyzed to determine if each landfill is performing as designed and what, if any remedial actions are required.

Performance of each landfill was assessed and rated as acceptable, marginal, significant, or unacceptable. These ratings indicate the potential for failure of the landfill, with acceptable representing no failure potential, marginal representing low to moderate failure potential, significant representing imminent failure potential, and unacceptable representing failure of the landfill has already occurred.

The results of this monitoring program indicate the performance of the Middle Site Tier II Soil Disposal Facility and Non-Hazardous Waste Landfill is acceptable. Regular scheduled monitoring of this landfill should be continued. No remedial actions are required at this time.

The results of this monitoring program indicate the performance of the Main Landfill is acceptable. Regular scheduled monitoring of this landfill should be continued. No remedial actions are required at this time.

The results of this monitoring program indicate the performance of the Station Non-Hazardous Waste Landfill is acceptable. Regular scheduled monitoring of this landfill should be continued. No remedial actions are required at this time.

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1.0 BACKGROUND

SENES Consultants (SENES) was retained by Public Works and Government Services Canada (PWGSC) on behalf of the Department of National Defence (DND) to complete landfill monitoring at the former FOX-5 DEW Line Site.

The FOX-5 DEW Line site is located on the southeastern edge of Broughton Island, located off the east coast of Baffin Island. The FOX-5 site is located at 67º 33' north latitude and 63º 49' west longitude. It is located approximately 9 km east of the community of Qikiqtarjuaq and is accessible via all-terrain vehicle on a formerly maintained road. As part of the site decommissioning and remediation program three landfills, namely the Middle Site Tier II Soil Disposal Facility and Non-Hazardous Waste Landfill, Main Landfill, and Station Area Non-Hazardous Landfill were constructed to manage the site derived wastes. The location of the landfills is provided on the Site Overview in Figure 1.

1.1 OBJECTIVE OF STUDY

The objective of this study was to collect and analyze post-closure landfill monitoring data for three landfills located at the FOX-5 DEW Line site located on Broughton Island, Nunavut.

1.2 SCOPE OF WORK

The scope of work for this project has been detailed in the *Terms of Reference* for DND Project # DLCLFMP2 (QIKIQ14), dated June 2014. The scope of work completed at each landfill includes:

- A visual inspection of the landfill;
- Collection of soil samples from five locations at each landfill ;
- Collection of groundwater samples from five monitoring wells at each landfill; and
- Collection of thermal data from four vertical thermistor installations at the Middle Site Tier II Soil Disposal Facility and Non-Hazardous Waste Landfill, and from eight vertical thermistor locations at the Main Landfill.

1.3 SITE GEOLOGY, HYDROGEOLOGY AND HYDROLOGY

Broughton Island is located within the Canadian Shield, in the Rae Domain of the Churchill Province. Bedrock in the area is composed of Paleoproterozoic granulite-facies granitoids. The edge of the Laurentide ice sheet was present in this area during the Pleistocene epoch. It is in an area of continuous permafrost with low ground ice content. Local surficial geologic conditions

Sheet Size: 11 x 17 (432mm x 279mm)
PLOT: February-17-15 4:19:25 PM
Saved by: Izabela Ziba
SENES FILE NO.: 350600-515-3 FOX-5_Fig 1 - Site Overview.dwg

PERMANENT BENCHMARKS

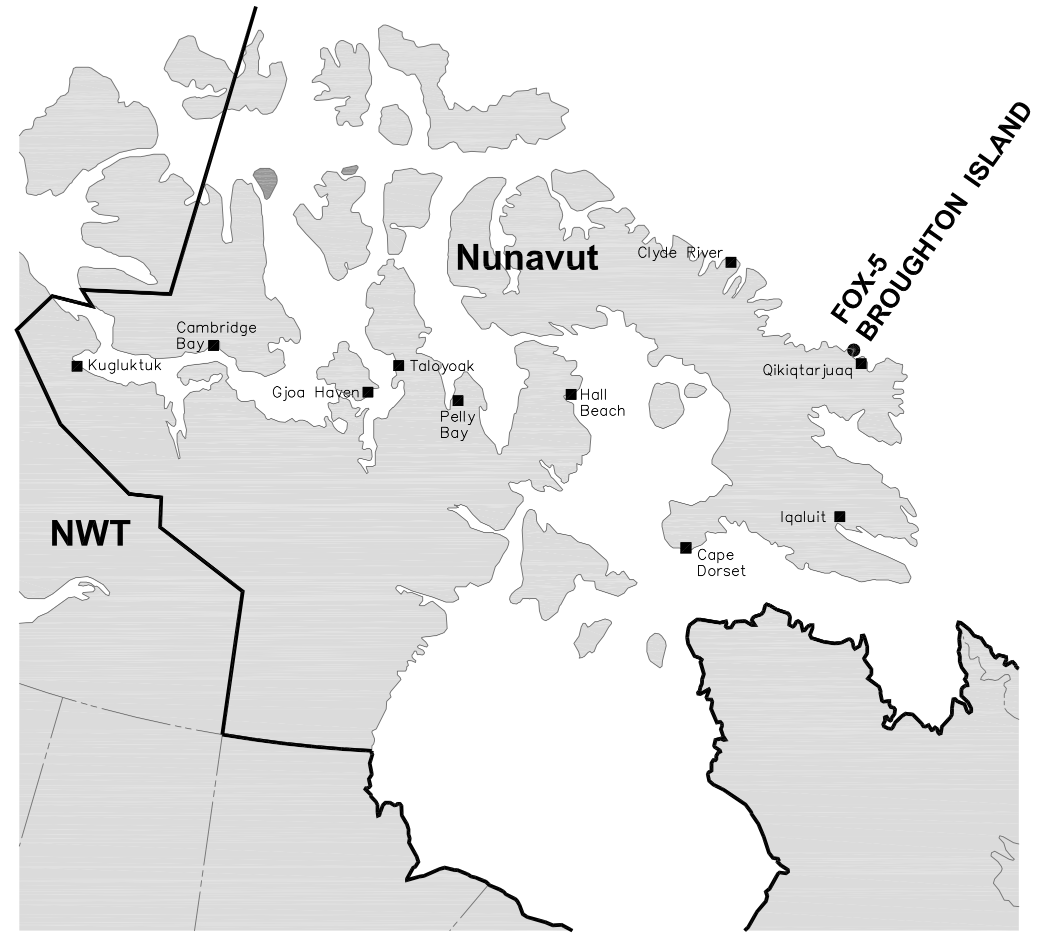
NO.	COORDINATES		ELEV.	DESCRIPTION
	NORTHING	EASTING		
BM-1	5 599.643	4 498.140	514.934	25mm DIA. STEEL PIPE
BM-2	5 749.976	4 692.327	502.600	25mm DIA. STEEL PIPE

NOTE: THE STATION AREA IS ON A SEPARATE COORDINATE SYSTEM. IT IS NOT TIED-IN TO THE SITE SURVEY AT THE MIDDLE SITE, COMMUNITY BORROW, AIRSTRIP AND BEACH AREAS.

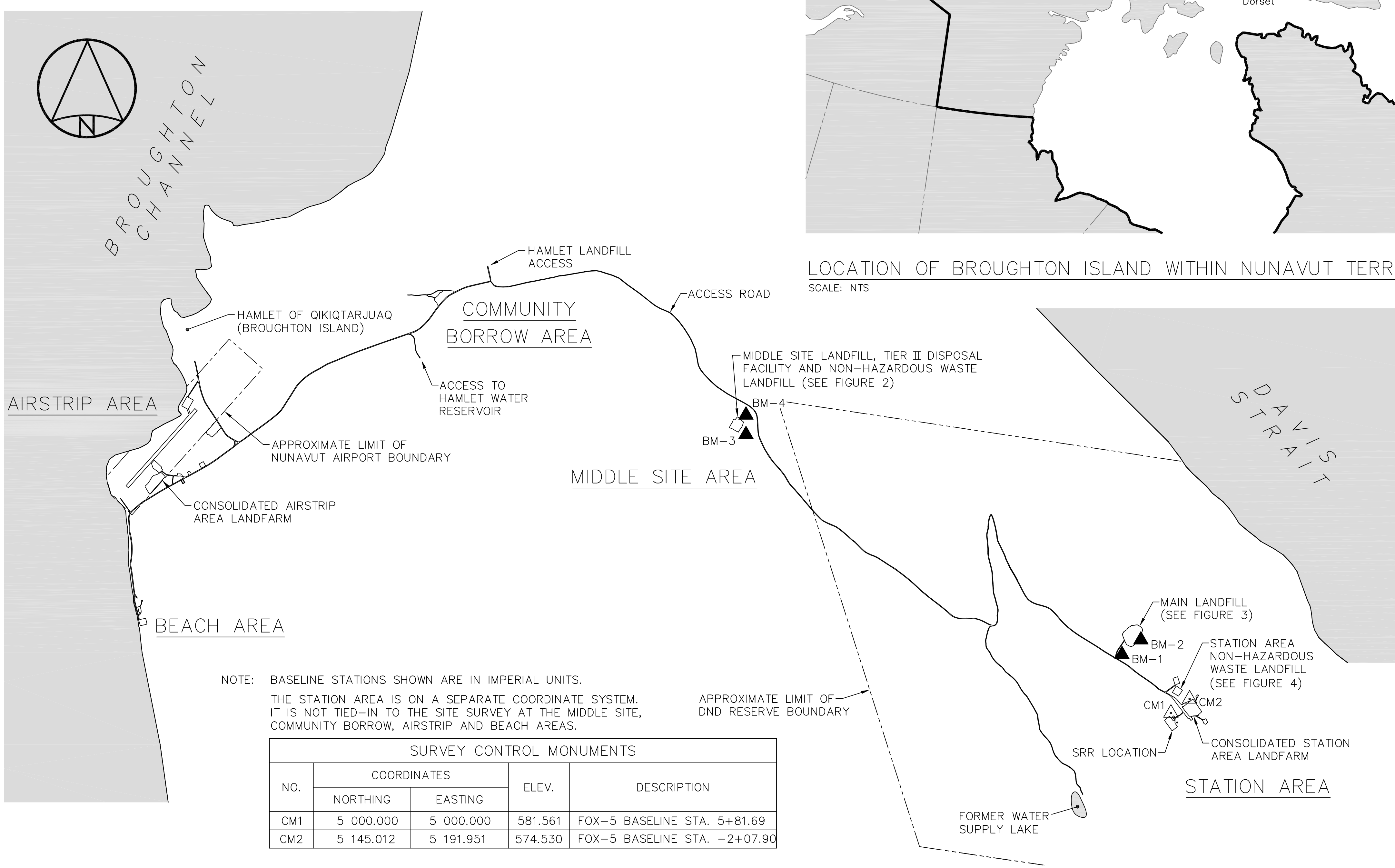
PERMANENT BENCHMARKS

NO.	COORDINATES		ELEV.	DESCRIPTION
	NORTHING	EASTING		
BM-3	9 700.063	15 599.940	314.770	25mm DIA. STEEL PIPE
BM-4	9 900.067	15 600.081	309.963	25mm DIA. STEEL PIPE

NOTE: THE MIDDLE SITE, COMMUNITY BORROW, AIRSTRIP AND BEACH AREAS ARE ON A SEPARATE COORDINATE SYSTEM. THEY ARE NOT TIED-IN TO THE SITE SURVEY AT THE STATION AREA.



LOCATION OF BROUGHTON ISLAND WITHIN NUNAVUT TERRITORY
SCALE: NTS



NOTE: BASELINE STATIONS SHOWN ARE IN IMPERIAL UNITS.
THE STATION AREA IS ON A SEPARATE COORDINATE SYSTEM. IT IS NOT TIED-IN TO THE SITE SURVEY AT THE MIDDLE SITE, COMMUNITY BORROW, AIRSTRIP AND BEACH AREAS.

SURVEY CONTROL MONUMENTS

NO.	COORDINATES		ELEV.	DESCRIPTION
	NORTHING	EASTING		
CM1	5 000.000	5 000.000	581.561	FOX-5 BASELINE STA. 5+81.69
CM2	5 145.012	5 191.951	574.530	FOX-5 BASELINE STA. -2+07.90

LEGEND:

- CM1 SURVEY CONTROL MONUMENT (2)
- BM-1 PERMANENT BENCHMARK LOCATION (4)
- APPROXIMATE LOCATION OF PROPERTY BOUNDARY
- BODY OF WATER

NOTES:

1. HORIZONTAL CONTROL REFERENCED TO SURVEY CONTROL MONUMENTS.
2. ALL ELEVATIONS REFER TO MEAN SEA LEVEL.
3. ALL DIMENSIONS ARE IN METRES UNLESS NOTED OTHERWISE.

REVISIONS:

No.	Date:	By:	Revisions

REFERENCE:
AECOM, FILE No.: FOX-5.1 Year 6 LF MON.dwg, Feb. 2013

0 1000 2000 metres
SCALE 1:50,000

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PUBLIC WORKS AND GOVERNMENT SERVICES CANADA

2014 DEW LINE MONITORING PROGRAM

FOX-5 BROUGHTON ISLAND, NUNAVUT

SITE OVERVIEW

Drawn By: I.S.Z.	Approved By: C.F.G.	Project No: 350600-515-3
Date: FEB. 2015	Scale: 1:50,000	Drawing No: FIGURE 1

were observed to generally consist of thin layers of soil overlying bedrock with many rock outcrops.

Groundwater flow is seasonal, occurring mainly in the summer period of maximum active layer thaw. Groundwater is located at shallow depths and is highly affected by local permafrost conditions. Average annual precipitation on Broughton Island is 262 mm, of which over 85% consists of snow. Surface water on Broughton Island drains to Baffin Bay which surrounds the island through well-defined drainage channels present on the island. Based on the local topography, surface water at the Middle Site Landfill is expected to drain to the west into Baffin Bay, while surface water at the Main and Station Area Non-Hazardous Landfills is expected to drain to the northeast into Baffin Bay.

Based on the results of thermal data collected at the landfills, the maximum and minimum depths of active layer thaw in landfills at the FOX-5 site for the 2013 calendar year were 1.8 m and 2.4 m, respectively.

1.4 SITE LAND-USE DESCRIPTION

The unmanned FOX-5 North Warning System (NWS) Short Range Radar (SRR) station is located in the vicinity of the former DEW Line site. Two landfills (Station Non-Hazardous and Main) are located near this station at the high point of the island. The third landfill (Middle Site) is located approximately halfway between the community of Qikiqtarjuaq and the FOX-5 station. Aside from the community of Qikiqtarjuaq, Broughton Island is uninhabited and consists of open tundra.

1.5 FIELD PROGRAM STAFF AND FIELD SCHEDULE

The DEW Line landfill monitoring program is divided into three phases: Phase I (yearly for five years following the completion of remediation activities at the site), Phase II (years 7, 10, 15, and 25 following completion of remediation activities), and Phase III (to be determined when Phase II is completed). This 2014 monitoring event represents the year 7 event as part of Phase II of the monitoring program, however it has been completed in year 8 due to a delay in the monitoring program at this site. The monitoring program for this site is detailed in Table 1.1.

The 2014 monitoring program was completed by Messrs. Jason Mauchan and Stephen Borcsok, of SENES Consultants between 19 and 23 August 2014.

Table 1.1: Summary of Multi-Year Monitoring Program

No. of Years After Construction	Monitoring Event Number	Year
Prior to and during	Baseline	1998, 2000, 2001, 2004, 2005, 2006
1	1	2007
2	2	2008
3	3	2009
4	4	2010
6	5	2012
7	6	2013
8	**7**	**2014***
10	8	2016
15	9	2021
25	10	2031

* - Year 7 monitoring was completed during Year 8 due to a delay in the monitoring program schedule.

1.6 WEATHER CONDITIONS

Weather conditions during the site inspection are described below in Table 1.2.

Table 1.2: Weather Conditions by Site

Date	Weather Conditions	Landfills Monitored
19 August 2014	Partly cloudy, occasional showers, calm winds, 15°C	Middle, Station
20 August 2014	Cloudy, light wind from east, 8°C	Station, Main
21 August 2014	Cloudy, light wind from east ,8 °C	Middle, Main
22 August 2014	Cloudy, moderate wind from north, 4 °C	Middle, Main
23 August 2014	Cloudy, moderate wind from north, 4 °C	Middle

1.7 PROJECT REFERENCES

"Terms of Reference. DEW Line Landfill Monitoring Program. DEW Line Sites Nunavut Baffin Region, DND Project #: DLCLFMP2 (QIKIQ14)." Prepared by Environmental Services, Public Works & Government Services Canada, Western Region, Edmonton, AB on behalf of The Department of National Defence of Canada, dated June 2014.

"*FOX-5 Broughton Island Year 6 Landfill Monitoring*" Prepared for Defence Construction Canada by AECOM, dated March 2013.

"*Site Specific Health and Safety Plan for 2014 Nunavut Baffin Region DEW Line Landfill Monitoring Program, FOX-M Hall Beach, NU, FOX-4 Cape Hooper, NU, FOX-5 Broughton Island, NU.* Prepared by SENES Consultants, dated July 2014.

"*Logistics & Work Plan. Prepared for: 2014 Nunavut Baffin Region DEW Line Landfill Monitoring Program, FOX-M Hall Beach, NU, FOX-4 Cape Hooper, NU, FOX-5 Broughton Island, NU.*" Prepared by SENES Consultants, dated July 2014.

1.8 REPORT STRUCTURE

A general overview of the approach and methodology taken during the site inspection is provided in Section 2.0 while detailed results of the monitoring program for each of the three landfills at FOX-5 are presented in Sections 3.0 through 5.0.

2.0 APPROACH & METHODOLOGY (GENERAL)

2.1 SUMMARY OF WORK

2.1.1 Health and Safety

A Site Specific Health and Safety Plan was prepared for the 2014 site inspection by SENES Consultants and reviewed by PWGSC and DND prior to the commencement of field work. The field work component of this work was completed in accordance with this site specific health and safety plan. No health and safety incidents occurred during the site inspection.

2.1.2 Field Program

The scope of the monitoring program is shown in Table 2.1 below. The number of locations where monitoring was to take place are shown in parentheses.

Table 2.1: Summary of Monitoring Program/Requirements (by Landfill)

Landfill	Visual Inspection	Soil Monitoring*	Groundwater Monitoring	Temperature Monitoring Locations
Middle Site Landfill	√	√ (5)	√ (5)	√ (4)
Main Landfill	√	√ (5)	√ (5)	√ (8)
Station Non-HazardousLandfill	√	√ (5)	√ (5)	NA

* - two soil samples were collected at each monitoring location: one surface sample from 0-15 cm, and one subsurface sample from 40-50 cm.

NA – Not applicable as there are no thermistors installed at this location.

2.1.3 Visual Inspection

As part of the monitoring program a visual inspection of each landfill was to be conducted and a visual inspection checklist completed for each landfill site. Inspection information including Landfill Designation, Landfill Type, Date, Monitoring Event Number, Weather Conditions, and the Name of the Inspector was recorded for each landfill. The following information was recorded for each of the respective landfill locations:

- Settlement;
- Erosion;

- Lateral movement;
- Sloughing of slopes;
- Cracks;
- Frost action;
- Animal burrows;
- Vegetation re-establishment on surface;
- Vegetation stress;
- Staining;
- Seepage points or ponded water;
- Debris or liner exposure;
- Condition of monitoring points; and
- Other relevant observations.

The presence of the above conditions was recorded along with their location, dimensions, extent, and description.

Photographic records were taken to document the general condition of the landfill. All photographs were referenced to existing monuments, and include a visual reference to indicate the scale of the photograph. A detailed figure of each landfill showing the results of the inspection has been created.

Historical features and conditions have been noted during previous monitoring events. Existing features were compared to these features noted in the most recent monitoring report and comparative analysis is included in this monitoring report.

2.1.4 Soil Sampling

Two soil samples were collected at each sampling location: one sample from 0-15 cm depth, and one sample from 40-50 cm depth. Samples were collected from test pits manually excavated with hand tools (pick/shovel). Each soil sample was collected in one single use zip-top plastic bag and one 60 mL glass jar, which was filled with soil such that no headspace remained in the jar. Hand tools were rinsed with water between sampling locations. During sample collection, soil that had come into contact with the hand tools was discarded and not collected as part of each sample.

All soil sampling locations were backfilled after each monitoring event. All locations were photographed during sampling and after backfilling was completed, with these photographs included in the Photographic Records for the site.

Soil samples were analyzed for the following parameters:

- Petroleum Hydrocarbons (PHCs): F1-F4 fractions. (F1-F3 fractions were summed to obtain an analogous modified total petroleum hydrocarbons (TPH) concentration);
- Inorganic elements: arsenic, cadmium, chromium, cobalt, copper, lead, nickel, zinc, mercury; and
- Polychlorinated Biphenyls (PCBs – Total Aroclors).

Analyses were carried out by Maxxam Analytics, an ISO 17025 certified laboratory in Mississauga, Ontario, Nepean, Ontario, and Calgary, Alberta. Duplicate sample analyses were carried out by AGAT Laboratories of Mississauga, Ontario, an ISO 17025 certified laboratory. Soil sample portions collected in 60mL glass jars were analyzed for PHC F1-F4 fractions, while the remaining portion collected in a zip-top plastic bag was analyzed for inorganic elements and PCBs. The impact on the results from using zip-top plastic bags as sampling containers is negligible.

2.1.5 Groundwater Sampling

Groundwater samples were collected from each well where enough water was present to collect a sample. Wells were monitored to determine the water level and depth to bottom, and purged prior to sampling, with pH, conductivity, and temperature being measured during purging until values for these parameters have stabilized.

Wells were purged and sampled using new dedicated sampling equipment consisting of high density polyethylene (HDPE) tubing with an HDPE foot valve. No significant issues with turbidity were encountered during sampling. All tubing and foot valves were only used at one monitoring well location, and were removed from the site following sampling to prevent damage due to freezing.

Groundwater samples were analyzed for the following parameters. In cases where insufficient water was present, sampling was prioritized in the order presented below. Metals were not filtered.

- Petroleum Hydrocarbons (PHCs): F1-F4 fractions. (F1-F3 fractions have been summed to obtain an analogous total petroleum hydrocarbons (TPH) concentration);
- Inorganic elements: arsenic, cadmium, chromium, cobalt, copper, lead, nickel, zinc, mercury; and

- Polychlorinated Biphenyls (PCBs – Total Aroclors).

Groundwater samples were collected in the following sampling containers:

- Metals – 120 mL plastic bottle preserved with nitric acid;
- Mercury – 100 mL clear glass bottle preserved with hydrochloric acid;
- PHC F1 fraction and BTEX – 3 x 40 mL clear glass vials;
- PHC F2-F4 fractions – 2 x 500 mL glass bottle preserved with sodium bisulphate;
- Polychlorinated Biphenyls – 500 mL glass bottle with no preservative;

Analyses were carried out by Maxxam Analytics, an ISO 17025 certified laboratory in Mississauga, Ontario, Nepean, Ontario, and Calgary, Alberta. Duplicate sample analyses were carried out by AGAT Laboratories of Mississauga, Ontario, an ISO 17025 certified laboratory.

Soil and groundwater samples were kept cool and shipped in insulated coolers with ice or ice packs when possible. Samples were shipped under chain-of-custody protocols and coolers were sealed with custody seals by SENES staff prior to shipment. No issues with sample temperature were reported by the laboratories upon receipt of samples. Sample hold times were met with the exception of soil samples from the Middle Site and Main landfills, and soil samples from locations MW-18 and MW-19 at the Station Non-Hazardous Waste Landfills, which exceeded sample hold times due to errors during shipping.

2.1.6 Comparison of Soil and Groundwater Monitoring Data

Soil and groundwater monitoring data collected during the 2014 monitoring program has been compared to data collected during previous monitoring events, as well as background concentrations (soil only), baseline average concentrations (soil and groundwater), and DEW Line Cleanup Criteria (soil only).

Background chemical concentrations were determined from soil sampling conducted by Environmental Science Group (ESG) in 1984 and 1990, and represent soil chemical conditions in the area that have not been impacted by site activities.

Baseline average concentrations (BAC) represent existing soil and groundwater chemistry at the landfill areas prior to and during remediation.

The DEW Line Cleanup Criteria were developed as part of the DEW Line Cleanup Protocol to provide a consistent approach across all DEW Line sites that is generally protective of the Arctic ecosystem. The Cleanup Criteria differentiates between Tier I and Tier II soils. Soil containing parameters at concentrations above the Tier I Criteria but below the Tier II Criteria was acceptable for placement in a non-hazardous waste landfill, while soil containing parameters at concentrations above the Tier II Criteria are to be treated/disposed of in a manner that precludes contact with the Arctic ecosystem.

Comparison to background, baseline, and Tier I/II DEW Line Cleanup Criteria have been included in the summary chemical tables in this report. Parameter concentrations in soil exceeding background levels are not discussed in this report as their presence does not necessarily indicate that contaminant migration from a landfill was or is occurring. Concentrations above background levels may be as a result of site activities conducted prior to the construction of the landfill. However baseline concentrations account for site activities that occurred prior to and during construction of the landfill, and parameter concentrations above these levels may indicate contaminant migration is occurring.

2.1.7 Thermal Monitoring

Thermal monitoring and thermal data downloading was completed at the Main and Middle Site Landfills. No thermal monitoring was completed at the Station Non-Hazardous Waste Landfill as this landfill does not have thermistor installations. Monitoring consisted of the following steps:

- Inspection of the condition of thermistor installations, noting their condition, damage if applicable, and any specific repair requirements;
- Retrieval of ground temperature data from the thermistor installations using a personal computer equipped with the appropriate software (ProLog) to retrieve the data at each location (data was reviewed in the field to ensure completeness);
- Collection of manual readings of Thermistors using ProLog software;
- Measurement of the distance of each thermistor cable above the ground;
- Replacement of batteries (following retrieval of ground temperature data) in dataloggers. The following batteries are required for each datalogger:
  - 1 Ultra-Logger Lithium Battery – 5.2 amp 12 volt, Lakewood model identification ULB-15;
  - 1 Ultra-Logger Lithium Battery – 9 volt, Lakewood model identification ULB-1; and
- Resetting datalogger memory to zero and restarting readings. The system was monitored using the personal computer to ensure that the dataloggers were functioning and temperatures were being recorded.

Following the site inspection, the downloaded data was forwarded to DND to be analyzed by Tetra Tech EBA. The results of these analyses have been summarized in this report, and the thermistor reports are provided in Appendix D.

2.2 FIELD NOTES AND DATA (TO BE INCLUDED AS APPENDIX B)

Field notes for each landfill monitored as part of this program are included in Appendix B. The checklist templates were included in the Terms of Reference for the program and copies were provided by DND staff prior to use during the monitoring program.

2.3 QA/QC

Intra-laboratory comparison of soil and groundwater analytical results has been completed by Maxxam Analytics as part of their standard internal QA/QC procedures, and are provided in the Certificates of Analysis in Appendix A. Blind duplicates were collected for approximately 10% of the soil and groundwater samples collected, and were submitted to a second laboratory, AGAT Laboratories of Mississauga, Ontario, an ISO 17025 certified laboratory, for inter-laboratory comparison of results. Each duplicate sample was also sent to the ESG Ops Centre in Kingston, Ontario for archiving.

The relative percent difference (RPD) was calculated for the analytical results of duplicate samples submitted for inter-laboratory comparison. The RPD is calculated to assess the precision of duplicate measurements. RPD values under 30% are considered acceptable levels of precision for this program as specified in the Terms of Reference for the program. A discussion of the results for duplicate samples and RPD values are provided with the analytical results for each landfill.

3.0 MIDDLE SITE TIER II SOIL DISPOSAL FACILITY/NON-HAZARDOUS WASTE LANDFILL

3.1 LANDFILL DESCRIPTION

The Middle Site Tier II Soil Disposal Facility/Non-Hazardous Waste Landfill (herein referred to as the Middle Site Landfill) is located along the road between Qikiqtarjuaq and the station area on the southeast corner of Broughton Island. The conjoined facility was newly constructed to contain non-hazardous debris derived from demolition and surface debris pickup, and to dispose of Tier II contaminated soil. A detailed drawing of this landfill is provided in Figure 2. The historical chemical results for soil samples collected at this landfill are shown in plan on Figure 2A. The historical chemical results for groundwater samples collected at this landfill are shown in plan on Figure 2B.

3.2 SUMMARY OF WORK CONDUCTED

3.2.1 Visual Inspection

The visual inspection of the landfill was completed with no deviations from the visual inspection work plan.

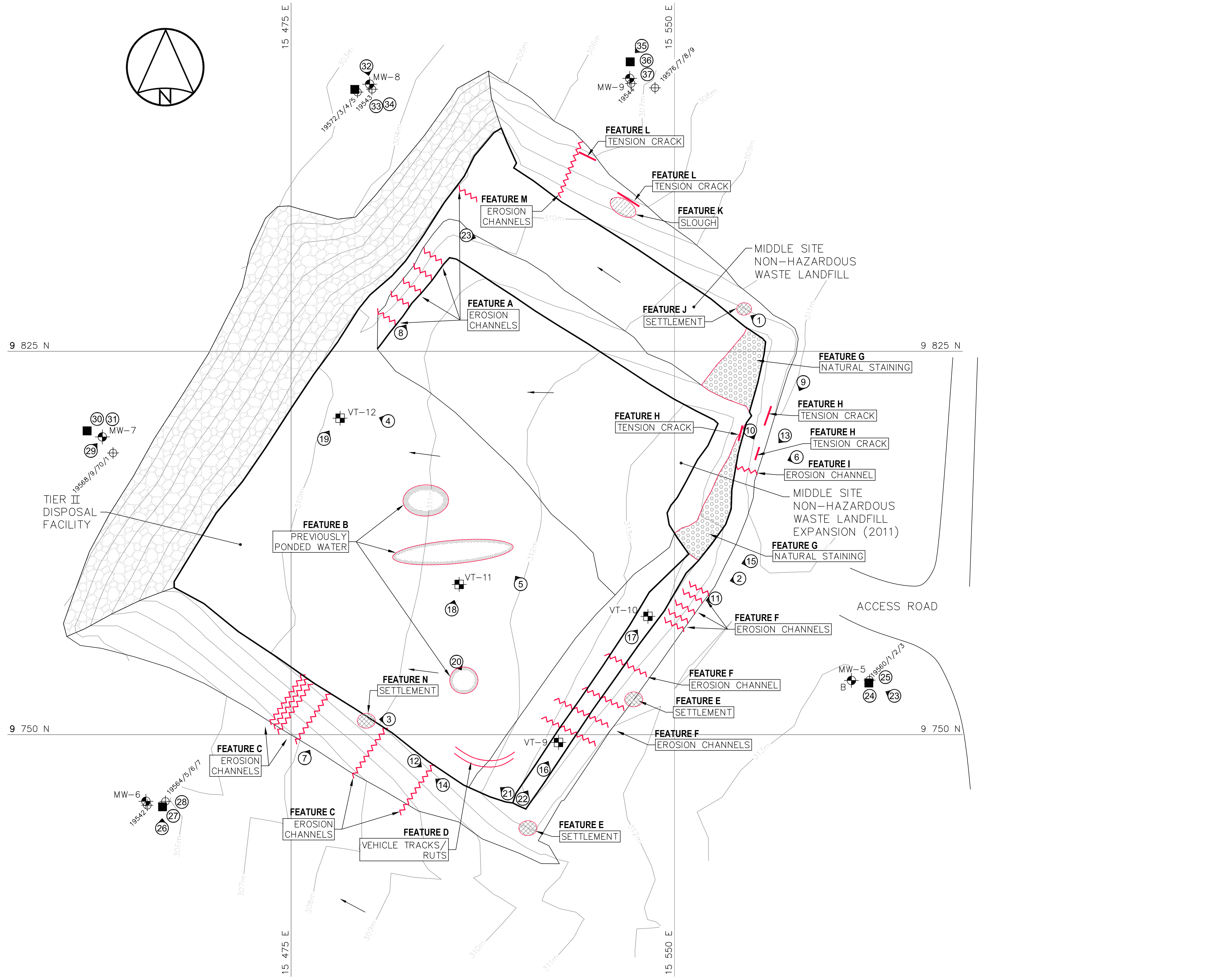
3.2.2 Soil Sampling

Soil samples were collected at five (5) locations as shown on the site plan. Surface and subsurface samples were collected at each location. There were no deviations from the soil sampling work plan. One duplicate soil sample was collected at surface at MW-6. Soil sampling completed at the landfill is summarized in Table 3.1.

Table 3.1: Summary of Work Conducted by Soil Sampling Location (Middle Site Landfill)

Location	Surface Soil Sample Collected	Subsurface Soil Sample Collected
F5-MID-MW-5	√	√
F5-MID-MW-6	√ D	√
F5-MID-MW-7	√	√
F5-MID-MW-8	√	√
F5-MID-MW-9	√	√

D = duplicate sample collected
√ - sample collected
X – no sample collected



LEGEND:

- MW-6 MONITORING WELL LOCATION (4)
- MW-5 B BACKGROUND MONITORING WELL LOCATION (1)
- VT-9 GROUND TEMPERATURE CABLE LOCATION (4)
- MONITORING SOIL SAMPLE LOCATION (5)
- 19 APPROX. PHOTOGRAPHIC VIEWPOINT
- 19560 SOIL SAMPLE TAG LOCATION
- 311m CONTOURS IN 1M INTERVALS
- OVERLAND FLOW DIRECTION
- EROSION CHANNEL
- AREA OF SETTLEMENT
- TENSION CRACK
- PONDED WATER
- VEHICLE TRACKS/RUTS
- NATURAL STAINING

NOTES:

1. LOCATIONS AND SCALE OF FEATURES ARE APPROXIMATE AND SHOWN FOR ILLUSTRATIVE PURPOSES ONLY.
2. PHOTOGRAPHS TAKEN AUG. 19, 2014.
3. HORIZONTAL CONTROL REFERENCED TO SURVEY CONTROL MONUMENTS.
4. ALL ELEVATIONS REFER TO MEAN SEA LEVEL.
5. ALL DIMENSIONS ARE IN METRES UNLESS NOTED OTHERWISE.

REVISIONS:

No.	Date:	By:	Revisions

REFERENCE:

AECOM, FILE No.: FOX-5.2 Year 6 LF MON.dwg, Feb. 2013

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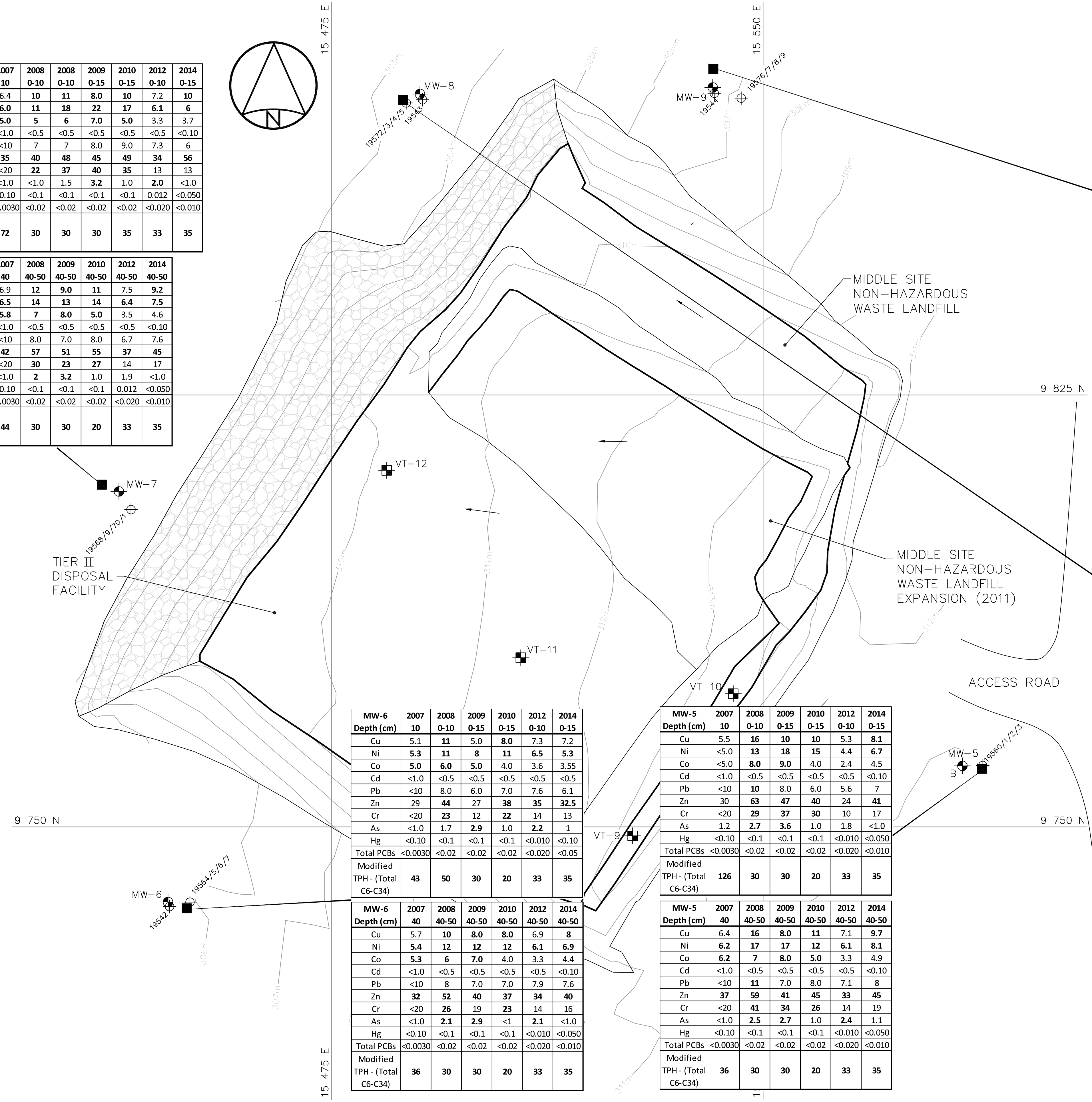
PUBLIC WORKS AND GOVERNMENT SERVICES CANADA

2014 DEW LINE MONITORING PROGRAM

FOX-5 BROUGHTON ISLAND, NUNAVUT
MIDDLE SITE AREA
NON-HAZARDOUS WASTE LANDFILL AND TIER II DISPOSAL FACILITY

Drawn By: I.S.Z.	Approved By: C.F.G.	Project No: 350600-515-3
Date: FEB. 2015	Scale: 1:750	Drawing No: FIGURE 2



MW-7 Depth (cm)	2007 10	2008 0-10	2008 0-10	2009 0-15	2010 0-15	2012 0-10	2014 0-15
Cu	6.4	**10**	**11**	**8.0**	**10**	7.2	**10**
Ni	**6.0**	**11**	**18**	**22**	**17**	**6.1**	**6**
Co	**5.0**	**5**	**6**	**7.0**	**5.0**	3.3	3.7
Cd	<1.0	<0.5	<0.5	<0.5	<0.5	<0.5	<0.10
Pb	<10	7	7	8.0	9.0	7.3	6
Zn	**35**	**40**	**48**	**45**	**49**	**34**	**56**
Cr	<20	**22**	**37**	**40**	**35**	13	13
As	<1.0	<1.0	1.5	**3.2**	1.0	**2.0**	<1.0
Hg	<0.10	<0.1	<0.1	<0.1	<0.1	0.012	<0.050
Total PCBs	<0.0030	<0.02	<0.02	<0.02	<0.02	<0.020	<0.010
Modified TPH - (Total C6-C34)	**72**	**30**	**30**	**30**	**35**	**33**	**35**

MW-7 Depth (cm)	2007 40	2008 40-50	2009 40-50	2010 40-50	2012 40-50	2014 40-50
Cu	6.9	**12**	**9.0**	**11**	7.5	**9.2**
Ni	**6.5**	**14**	**13**	**14**	**6.4**	**7.5**
Co	**5.8**	**7**	**8.0**	**5.0**	3.5	4.6
Cd	<1.0	<0.5	<0.5	<0.5	<0.5	<0.10
Pb	<10	8.0	7.0	8.0	6.7	7.6
Zn	**42**	**57**	**51**	**55**	**37**	**45**
Cr	<20	**30**	**23**	**27**	14	17
As	<1.0	**2**	**3.2**	1.0	1.9	<1.0
Hg	<0.10	<0.1	<0.1	<0.1	0.012	<0.050
Total PCBs	<0.0030	<0.02	<0.02	<0.02	<0.020	<0.010
Modified TPH - (Total C6-C34)	**44**	**30**	**30**	**20**	**33**	**35**

MW-9 Depth (cm)	2007 10	2008 0-10	2009 0-15	2010 0-15	2012 0-10	2014 0-15
Cu	5.2	**9.0**	7.0	7.0	6.6	5.6
Ni	**5.2**	**9.0**	**15**	**7.0**	**5.8**	4.5
Co	<5.0	**5.0**	**7.0**	4.0	3.3	2.9
Cd	<1.0	<0.5	<0.5	<0.5	<0.5	<0.10
Pb	<10	7.0	6.0	8.0	7.5	5.9
Zn	31	**42**	**36**	**33**	30	26
Cr	<20	**20**	**27**	14	13	11
As	<1.0	**3.1**	**3.8**	**2.0**	**3.0**	1.4
Hg	<0.10	<0.1	<0.1	<0.1	<0.010	<0.050
Total PCBs	<0.0030	<0.02	<0.02	<0.02	<0.020	<0.010
Modified TPH - (Total C6-C34)	**34**	**30**	**30**	**20**	**33**	**35**

MW-9 Depth (cm)	2007 40	2008 40-50	2009 40-50	2010 40-50	2012 40-50	2014 40-50
Cu	4.6	11	7.0	**8.0**	7.0	5.6
Ni	<5.0	**10**	**12**	**11**	**6.1**	5.1
Co	<5.0	**5.0**	**6.0**	4.0	3.4	3
Cd	<1.0	<0.5	<0.5	<0.5	<0.5	<0.10
Pb	<10	6.0	5.0	7.0	8.2	7
Zn	28	**40**	**34**	**35**	31	26
Cr	<20	**22**	18	**23**	14	12
As	1.1	**3.0**	**3.9**	**2.0**	**3.4**	1.3
Hg	<0.10	<0.1	<0.1	<0.1	<0.010	<0.050
Total PCBs	<0.0030	<0.02	<0.02	<0.02	<0.020	<0.010
Modified TPH - (Total C6-C34)	**23**	**30**	**30**	**20**	**33**	**35**

MW-8 Depth (cm)	2007 10	2008 0-10	2009 0-15	2010 0-15	2012 0-10	2014 0-15
Cu	4.9	**9.0**	**8.0**	**8.0**	5.9	7.1
Ni	<5.0	**7.0**	**15**	**7.0**	5.0	5.1
Co	<5.0	**5.0**	**7.0**	3.0	2.7	3
Cd	<1.0	<0.5	<0.5	<0.5	<0.5	<0.10
Pb	<10	6.0	6.0	7.0	5.9	6.8
Zn	26	**34**	**39**	**33**	27	27
Cr	<20	15	**30**	15	11	12
As	1.2	**3.4**	**3.8**	**2**	**2.3**	1
Hg	<0.10	<0.1	<0.1	<0.1	0.015	<0.050
Total PCBs	<0.0030	<0.02	<0.02	<0.02	<0.020	<0.010
Modified TPH - (Total C6-C34)	**58**	**27**	**30**	**20**	**61**	**81**

MW-8 Depth (cm)	2007 40	2008 40-50	2009 40-50	2010 40-50	2012 40-50	2014 40-50
Cu	4.5	**10**	7.0	**9.0**	5.1	7
Ni	<5.0	**11**	**15**	**13**	4.5	**5.9**
Co	<5.0	**5.0**	**6.0**	4.0	2.3	3.9
Cd	<1.0	<0.5	<0.5	<0.5	<0.5	<0.10
Pb	<10	7.0	6.0	7.0	5.8	7.2
Zn	27	**35**	**34**	**38**	24	**33**
Cr	<20	**24**	**26**	**29**	10	14
As	<1.0	**2.7**	**3.2**	**2.0**	**2.4**	1.1
Hg	<0.10	<0.1	<0.1	<0.1	0.012	<0.050
Total PCBs	<0.0030	<0.02	<0.02	<0.02	<0.020	<0.010
Modified TPH - (Total C6-C34)	**48**	**30**	**30**	**20**	**71**	**35**

MW-6 Depth (cm)	2007 10	2008 0-10	2009 0-15	2010 0-15	2012 0-10	2014 0-15
Cu	5.1	**11**	5.0	**8.0**	7.3	7.2
Ni	**5.3**	**11**	**8**	**11**	**6.5**	**5.3**
Co	**5.0**	**6.0**	**5.0**	4.0	3.6	3.55
Cd	<1.0	<0.5	<0.5	<0.5	<0.5	<0.5
Pb	<10	8.0	6.0	7.0	7.6	6.1
Zn	29	**44**	27	**38**	**35**	**32.5**
Cr	<20	**23**	12	**22**	14	13
As	<1.0	1.7	**2.9**	1.0	**2.2**	1
Hg	<0.10	<0.1	<0.1	<0.1	<0.010	<0.10
Total PCBs	<0.0030	<0.02	<0.02	<0.02	<0.020	<0.05
Modified TPH - (Total C6-C34)	**43**	**50**	**30**	**20**	**33**	**35**

MW-6 Depth (cm)	2007 40	2008 40-50	2009 40-50	2010 40-50	2012 40-50	2014 40-50
Cu	5.7	**10**	**8.0**	**8.0**	6.9	**8**
Ni	**5.4**	**12**	**12**	**12**	**6.1**	**6.9**
Co	**5.3**	**6**	**7.0**	4.0	3.3	4.4
Cd	<1.0	<0.5	<0.5	<0.5	<0.5	<0.10
Pb	<10	8	7.0	7.0	7.9	7.6
Zn	**32**	**52**	**40**	**37**	**34**	**40**
Cr	<20	**26**	19	**23**	14	16
As	<1.0	**2.1**	**2.9**	<1	**2.1**	<1.0
Hg	<0.10	<0.1	<0.1	<0.1	<0.010	<0.050
Total PCBs	<0.0030	<0.02	<0.02	<0.02	<0.020	<0.010
Modified TPH - (Total C6-C34)	**36**	**30**	**30**	**20**	**33**	**35**

MW-5 Depth (cm)	2007 10	2008 0-10	2009 0-15	2010 0-15	2012 0-10	2014 0-15
Cu	5.5	**16**	**10**	**10**	5.3	**8.1**
Ni	<5.0	**13**	**18**	**15**	4.4	**6.7**
Co	<5.0	**8.0**	**9.0**	4.0	2.4	4.5
Cd	<1.0	<0.5	<0.5	<0.5	<0.5	<0.10
Pb	<10	**10**	8.0	6.0	5.6	7
Zn	30	**63**	**47**	**40**	24	**41**
Cr	<20	**29**	**37**	**30**	10	17
As	1.2	**2.7**	**3.6**	1.0	1.8	<1.0
Hg	<0.10	<0.1	<0.1	<0.1	<0.010	<0.050
Total PCBs	<0.0030	<0.02	<0.02	<0.02	<0.020	<0.010
Modified TPH - (Total C6-C34)	**126**	**30**	**30**	**20**	**33**	**35**

MW-5 Depth (cm)	2007 40	2008 40-50	2009 40-50	2010 40-50	2012 40-50	2014 40-50
Cu	6.4	**16**	**8.0**	**11**	7.1	**9.7**
Ni	**6.2**	**17**	**17**	**12**	**6.1**	**8.1**
Co	**6.2**	**7**	**8.0**	**5.0**	3.3	4.9
Cd	<1.0	<0.5	<0.5	<0.5	<0.5	<0.10
Pb	<10	**11**	7.0	8.0	7.1	8
Zn	**37**	**59**	**41**	**45**	**33**	**45**
Cr	<20	**41**	**34**	**26**	14	19
As	<1.0	**2.5**	**2.7**	1.0	**2.4**	1.1
Hg	<0.10	<0.1	<0.1	<0.1	<0.010	<0.050
Total PCBs	<0.0030	<0.02	<0.02	<0.02	<0.020	<0.010
Modified TPH - (Total C6-C34)	**36**	**30**	**30**	**20**	**33**	**35**

LEGEND:

- MW-6 MONITORING WELL LOCATION (4)
- MW-5 B BACKGROUND MONITORING WELL LOCATION (1)
- VT-9 GROUND TEMPERATURE CABLE LOCATION (4)
- MONITORING SOIL SAMPLE LOCATION (5)
- 19560 SOIL SAMPLE TAG LOCATION
- 311m CONTOURS IN 1M INTERVALS
- OVERLAND FLOW DIRECTION

Parameter	Baseline Average Concentration	DEW Line Tier I Cleanup Criteria	DEW Line Tier II Cleanup Criteria
Cu	7.6	N/A	100
Ni	5.2	N/A	100
Co	5.0	N/A	50
Cd	1.0	N/A	5
Pb	10	200	500
Zn	31.7	N/A	500
Cr	20.0	N/A	250
As	2.0	N/A	130
Hg	0.1	N/A	2.0
Total PCBs	0.003	1	5
Modified TPH - (Total C6-C34)	10	N/A	2500

All Concentrations in ug/kg

Bold	Concentration is Equal to or Exceeds Baseline Average Concentration
*	Concentration Exceeds DEW Line Tier I Cleanup Criteria
**	Concentration Exceeds DEW Line Tier II Cleanup Criteria
-	No Concentration Reported
N/A	Not Applicable

NOTES:

1. HORIZONTAL CONTROL REFERENCED TO SURVEY CONTROL MONUMENTS.
2. ALL ELEVATIONS REFER TO MEAN SEA LEVEL.
3. ALL DIMENSIONS ARE IN METRES UNLESS NOTED OTHERWISE.

REFERENCE:

AECOM, FILE No.: FOX-5.2 Year 6 LF MON.dwg, Feb. 2013

0 15 30 metres

SCALE 1:750

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PUBLIC WORKS AND GOVERNMENT SERVICES CANADA

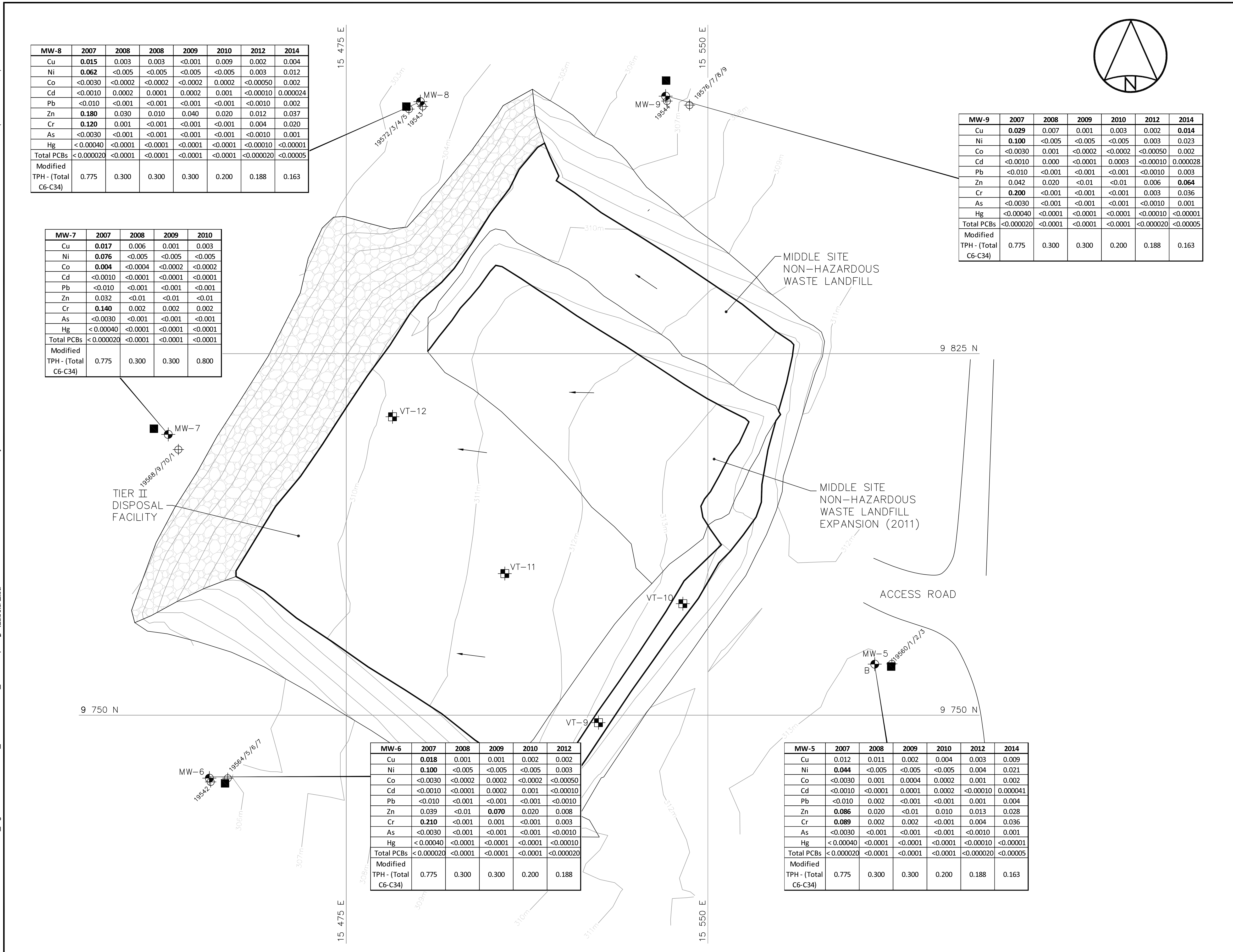
2014 DEW LINE MONITORING PROGRAM

FOX-5 BROUGHTON ISLAND, NUNAVUT
MIDDLE SITE AREA NON-HAZARDOUS WASTE LANDFILL AND TIER II DISPOSAL FACILITY

SOIL CONTAMINANT DISTRIBUTION PLAN

Drawn By: I.S.Z.	Approved By: C.F.G.	Project No: 350600-515-3
Date: FEB. 2015	Scale: 1:750	Drawing No: FIGURE 2A

Sheet Size: 11 x 17 (432mm x 279mm)
PLOT: February-17-15 4:12:53 PM
Saved by: Izabela Ziba
SENES FILE NO.: 350600-515-3 FOX-5_Fig 2 - Middle Site Area_Non-Haz Landfill_Tier II Disposal



MW-8	2007	2008	2008	2009	2010	2012	2014
Cu	**0.015**	0.003	0.003	<0.001	0.009	0.002	0.004
Ni	**0.062**	<0.005	<0.005	<0.005	<0.005	0.003	0.012
Co	<0.0030	<0.0002	<0.0002	<0.0002	0.0002	<0.00050	0.002
Cd	<0.0010	0.0002	0.0001	0.0002	0.001	<0.00010	0.000024
Pb	<0.010	<0.001	<0.001	<0.001	<0.001	<0.0010	0.002
Zn	**0.180**	0.030	0.010	0.040	0.020	0.012	0.037
Cr	**0.120**	0.001	<0.001	<0.001	<0.001	0.004	0.020
As	<0.0030	<0.001	<0.001	<0.001	<0.001	<0.0010	0.001
Hg	< 0.00040	<0.0001	<0.0001	<0.0001	<0.0001	<0.00010	<0.00001
Total PCBs	< 0.000020	<0.0001	<0.0001	<0.0001	<0.0001	<0.000020	<0.00005
Modified TPH - (Total C6-C34)	0.775	0.300	0.300	0.300	0.200	0.188	0.163

MW-7	2007	2008	2009	2010
Cu	**0.017**	0.006	0.001	0.003
Ni	**0.076**	<0.005	<0.005	<0.005
Co	**0.004**	<0.0004	<0.0002	<0.0002
Cd	<0.0010	<0.0001	<0.0001	<0.0001
Pb	<0.010	<0.001	<0.001	<0.001
Zn	0.032	<0.01	<0.01	<0.01
Cr	**0.140**	0.002	0.002	0.002
As	<0.0030	<0.001	<0.001	<0.001
Hg	< 0.00040	<0.0001	<0.0001	<0.0001
Total PCBs	< 0.000020	<0.0001	<0.0001	<0.0001
Modified TPH - (Total C6-C34)	0.775	0.300	0.300	0.800

MW-9	2007	2008	2009	2010	2012	2014
Cu	**0.029**	0.007	0.001	0.003	0.002	**0.014**
Ni	**0.100**	<0.005	<0.005	<0.005	0.003	0.023
Co	<0.0030	0.001	<0.0002	<0.0002	<0.00050	0.002
Cd	<0.0010	0.000	<0.0001	0.0003	<0.00010	0.000028
Pb	<0.010	<0.001	<0.001	<0.001	<0.0010	0.003
Zn	0.042	0.020	<0.01	<0.01	0.006	**0.064**
Cr	**0.200**	<0.001	<0.001	<0.001	0.003	0.036
As	<0.0030	<0.001	<0.001	<0.001	<0.0010	0.001
Hg	<0.00040	<0.0001	<0.0001	<0.0001	<0.00010	<0.00001
Total PCBs	<0.000020	<0.0001	<0.0001	<0.0001	<0.000020	<0.00005
Modified TPH - (Total C6-C34)	0.775	0.300	0.300	0.200	0.188	0.163

MW-6	2007	2008	2009	2010	2012
Cu	**0.018**	0.001	0.001	0.002	0.002
Ni	**0.100**	<0.005	<0.005	<0.005	0.003
Co	<0.0030	<0.0002	0.0002	<0.0002	<0.00050
Cd	<0.0010	<0.0001	0.0002	0.001	<0.00010
Pb	<0.010	<0.001	<0.001	<0.001	<0.0010
Zn	0.039	<0.01	**0.070**	0.020	0.008
Cr	**0.210**	<0.001	0.001	<0.001	0.003
As	<0.0030	<0.001	<0.001	<0.001	<0.0010
Hg	< 0.00040	<0.0001	<0.0001	<0.0001	<0.00010
Total PCBs	< 0.000020	<0.0001	<0.0001	<0.0001	<0.000020
Modified TPH - (Total C6-C34)	0.775	0.300	0.300	0.200	0.188

MW-5	2007	2008	2009	2010	2012	2014
Cu	0.012	0.011	0.002	0.004	0.003	0.009
Ni	**0.044**	<0.005	<0.005	<0.005	0.004	0.021
Co	<0.0030	0.001	0.0004	0.0002	0.001	0.002
Cd	<0.0010	<0.0001	0.0001	0.0002	<0.00010	0.000041
Pb	<0.010	0.002	<0.001	0.010	0.001	0.004
Zn	**0.086**	0.020	<0.01	0.010	0.013	0.028
Cr	**0.089**	0.002	0.002	<0.001	0.004	0.036
As	<0.0030	<0.001	<0.001	<0.001	<0.0010	0.001
Hg	< 0.00040	<0.0001	<0.0001	<0.0001	<0.00010	<0.00001
Total PCBs	< 0.000020	<0.0001	<0.0001	<0.0001	<0.000020	<0.00005
Modified TPH - (Total C6-C34)	0.775	0.300	0.300	0.200	0.188	0.163

LEGEND:

- MW-6 MONITORING WELL LOCATION (4)
- MW-5 B BACKGROUND MONITORING WELL LOCATION (1)
- VT-9 GROUND TEMPERATURE CABLE LOCATION (4)
- MONITORING SOIL SAMPLE LOCATION (5)
- 19560 SOIL SAMPLE TAG LOCATION
- 311m CONTOURS IN 1M INTERVALS
- OVERLAND FLOW DIRECTION

Parameter	Baseline Average Concentration
Cu	0.012
Ni	0.043
Co	0.003
Cd	0.001
Pb	0.01
Zn	0.063
Cr	0.084
As	0.003
Hg	0.0004
Total PCBs	0.00002
Modified TPH - (Total C6-C34)	1

All Concentrations in mg/L

Bold Concentration is Equal to or Exceeds Baseline Average Concentration

- No Concentration Reported

N/A Not Applicable

NOTES:

1. HORIZONTAL CONTROL REFERENCED TO SURVEY CONTROL MONUMENTS.
2. ALL ELEVATIONS REFER TO MEAN SEA LEVEL.
3. ALL DIMENSIONS ARE IN METRES UNLESS NOTED OTHERWISE.

REFERENCE:

AECOM, FILE No.: FOX-5.2 Year 6 LF MON.dwg, Feb. 2013

0 15 30 metres

SCALE 1:750

SENES Consultants
AN ARCADIS COMPANY

PUBLIC WORKS AND GOVERNMENT SERVICES CANADA

2014 DEW LINE MONITORING PROGRAM

FOX-5 BROUGHTON ISLAND, NUNAVUT
MIDDLE SITE AREA NON-HAZARDOUS WASTE LANDFILL AND TIER II DISPOSAL FACILITY
GROUNDWATER CONTAMINANT DISTRIBUTION PLAN

Drawn By: I.S.Z.	Approved By: C.F.G.	Project No: 350600-515-3
Date: FEB. 2015	Scale: 1:750	Drawing No: FIGURE 2B

3.2.3 Groundwater Sampling

Groundwater monitoring was completed at five monitoring wells as shown on Figure 2. Inspection of the groundwater monitoring wells and groundwater sampling at the Middle Site Landfill was generally completed as per the work plan. As indicated in Table 3.2, groundwater samples were not collected from two of five monitoring wells at this landfill as the wells were found to be dry during the recent monitoring program. No duplicate groundwater samples were collected at this landfill.

Table 3.2: Summary of Work Conducted by Groundwater Sampling Location (Middle Site Landfill)

Location	Visual Inspection/ Groundwater Monitoring	Sample collected for PCB analysis	Sample collected for metals analysis	Sample collected for PHCs F1-F4 analysis
F5-MID-MW-5	√	√	√	√
F5-MID-MW-6	√	X^N	X^N	X^N
F5-MID-MW-7	√	X^N	X^N	X^N
F5-MID-MW-8	√	√	√	√
F5-MID-MW-9	√	√	√	√

D = duplicate sample collected
√ - sample collected
X – no sample collected
N – no water in well (well was dry)
I – insufficient water in well to collect sample

3.2.4 Thermal Monitoring

Thermal monitoring was completed at three of the four vertical thermistor locations at the Middle Site Landfill. Data from the thermistor F5-MID-VT-12 did not appear correct in the field, and no realtime response was noted from any thermistor beads at this location. This thermistor was removed from site and returned to DND for repairs. A summary of thermistor work completed at this landfill is provided in Table 3.3.

Table 3.3: Summary of Work Conducted by Thermistor Location (Middle Site Landfill)

Location	Realtime Data	Data Downloaded	Batteries Replaced
F5-MID-VT- 9	√	√	√
F5-MID-VT-10	√	√	√
F5-MID-VT-11	√	√	√
F5-MID-VT-12	X	X	X

3.3 RESULTS OF THE MONITORING PROGRAM

3.3.1 Visual Inspection

The visual inspection at the Middle Site Landfill was completed on 19 August 2014. The visual inspection checklist completed during the site inspection is provided in Table 3.4.

3.3.1.1 Stability Assessment

The preliminary stability assessment completed during the site inspection is provided in Table 3.5.

3.3.1.2 Photographic Records

The photograph log for the site is provided in Table 3.6.

3.3.1.3 Trend Analysis

The observations obtained during the visual inspection from the current 2014 monitoring event were compared to the observations obtained during the previous 2012 monitoring event, and are presented in Table 3.7 below for each category observed.

TABLE 3.4 - VISUAL INSPECTION CHECKLIST

DEW LINE CLEANUP: POST-CONSTRUCTION - LANDFILL MONITORING
INSPECTION REPORT – PAGE 1 OF 2

SITE NAME: FOX-5
LANDFILL DESIGNATION: Middle Site Non-Hazardous Waste Landfill and Tier II Disposal Facility
DATE OF INSPECTION: 19 August 2014
DATE OF PREVIOUS INSPECTION: 13-16 August 2012
INSPECTED BY: S. Borcsok, J. Mauchan
REPORT PREPARED BY: S. Borcsok
The inspector/reporter represents to the best of their 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.

TABLE 3.4 - VISUAL INSPECTION CHECKLIST - INSPECTION REPORT – PAGE 2 OF 2

Checklist Item	Present Yes/No	Location (Describe relative to existing monuments/features and relative to landfill design i.e. surface, berms, toe)	Length	Width	Depth	Extent relative to Area of Landfill (%)	Description	Photographic Records Focal length, location, view point & direction (relative to magnetic north) Feature of note Scale	Additional Comments
Settlement	YES	Small areas of settlement on northeast, southeast, southwest berms of landfill **(FEATURE E)**				<1%	Small holes and depressions	P-1, P-2, P-3,	
Erosion	YES	Erosion channels on northeast, southeast, southwest berms, and top of landfill **(FEATURE A, C, F, I, M)**	~10m (typ.)	0.2m (typ.)	0.2m (typ.)	<1%	Erosion channels	P-6, P-7, P-8, P-9, P-12, P-14, P-15,	
Frost Action	NO								
Sloughing and Cracking	YES	Tension cracks on northeast and southeast berms of landfill **(FEATURE H, L)**	0.5m			<1%	Tension cracks	P-10, P-13	
Animal Burrows	NO								
Vegetation	YES	At MW-5				<1%	Small shrubs	P-24	
Staining	YES	North end of southeast berm **(FEATURE G)**				5%	Natural red staining on aggregate	P-9	
Vegetation Stress	NO								
Seepage Points	NO								
Debris Exposed	NO								
Presence/Condition – Monitoring Instruments	YES	Four thermistor installations within the landfill and five monitoring wells outside the perimeter of the landfill				<1%	Thermistor installations and monitoring wells	P-16 to P-19, P-23, P-26, P-29, P-32, P-35	
Features of Note.	YES	Top of landfill **(FEATURE B, D)**				~2%	Vehicle tracks and areas of previously ponded water	P-5, P-20, P-21, P-22	

Table 3.5: Preliminary Stability Assessment - FOX-5 Middle Site Landfill

Feature	Severity Rating	Extent
Settlement	Acceptable	Occasional
Erosion	Acceptable	Occasional
Frost Action	None	None
Staining	Acceptable	Isolated
Vegetation Stress	None	None
Seepage/Ponded Water	Acceptable	Isolated
Debris exposure	None	None
Overall Landfill Performance: ACCEPTABLE		

Performance/ Severity Rating	Description
Acceptable	Noted features are of little consequence. The landfill is performing as designed. Minor deviations in environmental or physical performance may be observed, such as isolated areas of erosion, settlement.
Marginal	Physical/environmental performance appears to be deteriorating with time. Observations may include an increase in size or number of features of note, such as differential settlement, erosion or cracking. No significant impact on landfill stability to date, but potential for failure is assessed as low or moderate.
Significant	Significant or potentially significant changes affecting landfill stability, such as significant changes in slope geometry, significant erosion or differential settlement; scarp development. The potential for failure is assessed as imminent.
Unacceptable	Stability of landfill is compromised to the extent that ability to contain waste materials is compromised. Examples may include: - Debris exposed in erosion channels or areas of differential settlement. - Liner exposed. - Slope failure.

Extent	Description
Isolated	Singular feature
Occasional	Features of note occurring at irregular intervals/locations
Numerous	Many features of note, impacted less than 50% of the surface area of the landfill
Extensive	Impacting greater than 50% of the surface area of the landfill

TABLE 3.6: LANDFILL VISUAL INSPECTION PHOTO LOG (MIDDLE SITE LANDFILL)

Middle Site Non-Hazardous Waste Landfill (see Figure 2)

Photo 1 (FOX-5 MID P-1.jpg)	Photo 2 (FOX-5 MID P-2.jpg)
Description: View looking northwest along northeastern slope of landfill. Minor settlement noted at field book location. **(FEATURE J)**	Description: View looking southwest along southeastern slope of landfill.
	
Date: August 19, 2014	Date: August 19, 2014

TABLE 3.6: LANDFILL VISUAL INSPECTION PHOTO LOG (MIDDLE SITE LANDFILL)

Photo 3 (FOX-5 MID P-3.jpg)	Photo 4 (FOX-5 MID P-4.jpg)
Description: Settlement noted at top of southwestern landfill slope. View looking west partially downhill. **(FEATURE N)**	Description: View looking west toward VT-12.
	
Date: August 19, 2014	Date: August 19, 2014

TABLE 3.6: LANDFILL VISUAL INSPECTION PHOTO LOG (MIDDLE SITE LANDFILL)

Photo 5 (FOX-5 MID P-5.jpg)	Photo 6 (FOX-5 MID P-6.jpg)
Description: View looking northwest across cap of landfill. Evidence of previously ponded water on cap. VT-11 is adjacent to boulder seen on right hand side of photo. **(FEATURE B)**	Description: View looking southwest toward southeastern landfill slope. Erosion channel observed at geological hammer location. **(FEATURE I)**
	
Date: August 19, 2014	Date: August 19, 2014

TABLE 3.6: LANDFILL VISUAL INSPECTION PHOTO LOG (MIDDLE SITE LANDFILL)

Photo 7 (FOX-5 MID P-7.jpg)	Photo 8 (FOX-5 MID P-8.jpg)
Description: Erosion channel on southwestern slope. View northeast from toe. Note second erosion channel can be seen top left of photo. **(FEATURE C)**	Description: View northeast looking over minor erosion channels. **(FEATURE A)**
	
Date: August 19, 2014	Date: August 19, 2014

TABLE 3.6: LANDFILL VISUAL INSPECTION PHOTO LOG (MIDDLE SITE LANDFILL)

Photo 9 (FOX-5 MID P-9.jpg)	Photo 10 (FOX-5 MID P-10.jpg)
Description: View southwest along southeastern slope of landfill. Erosion channels and natural staining were observed. **(FEATURE G, I)**	Description: Small tension cracks observed at northern end of southeastern slope. Small crack visible below geological hammer. **(FEATURE H)**
	
Date: August 19, 2014	Date: August 19, 2014

TABLE 3.6: LANDFILL VISUAL INSPECTION PHOTO LOG (MIDDLE SITE LANDFILL)

Photo 11 (FOX-5 MID P-11.jpg)	Photo 12 (FOX-5 MID P-12.jpg)
Description: View toward VT-10 from southeastern slope.	Description: Erosion channel on southwestern slope. **(FEATURE C)**
	
Date: August 19, 2014	Date: August 19, 2014

TABLE 3.6: LANDFILL VISUAL INSPECTION PHOTO LOG (MIDDLE SITE LANDFILL)

Photo 13 (FOX-5 MID P-13.jpg)	Photo 14 (FOX-5 MID P-14.jpg)
Description: View southwest along southeastern slope. Tension crack noted adjacent to geological hammer. **(FEATURE H)**	Description: Erosion channel on southwestern slope. **(FEATURE C)**
	
Date: August 19, 2014	Date: August 19, 2014

TABLE 3.6: LANDFILL VISUAL INSPECTION PHOTO LOG (MIDDLE SITE LANDFILL)

Photo 15 (FOX-5 MID P-15.jpg)	Photo 16 (FOX-5 MID P-16.jpg)
Description: View of erosion channels on southeastern slope near VT-10. **(FEATURE F)**	Description: View northeast toward VT-9.
	
Date: August 19, 2014	Date: August 19, 2014

TABLE 3.6: LANDFILL VISUAL INSPECTION PHOTO LOG (MIDDLE SITE LANDFILL)

Photo 17 (FOX-5 MID P-17.jpg)	Photo 18 (FOX-5 MID P-18.jpg)
Description: View northeast toward VT-10.	Description: View north toward VT-11.
 	
Date: August 19, 2014	Date: August 19, 2014

TABLE 3.6: LANDFILL VISUAL INSPECTION PHOTO LOG (MIDDLE SITE LANDFILL)

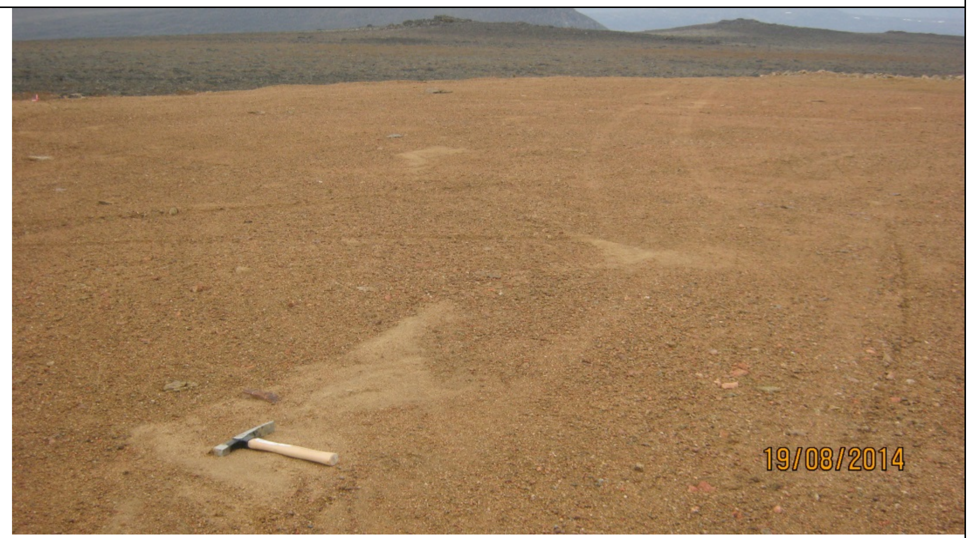
<table>
<tr><td>Photo 19 (FOX-5 MID P-19.jpg)</td><td>Photo 20 (FOX-5 MID P-20.jpg)</td></tr>
<tr><td>Description: View northeast toward VT-12.</td><td>Description: View of previously ponded water near southern corner of cap. (FEATURE B)</td></tr>
<tr><td>
</td><td>
</td></tr>
<tr><td>Date: August 19, 2014</td><td>Date: August 19, 2014</td></tr>
</table>

TABLE 3.6: LANDFILL VISUAL INSPECTION PHOTO LOG (MIDDLE SITE LANDFILL)

Photo 21 (FOX-5 MID P-21.jpg)	Photo 22 (FOX-5 MID P-22.jpg)
Description: View northwest across landfill cap. Vehicle tracks and ruts observed. **(FEATURE D)**	Description: View northeast toward VT-9 from southern corner of landfill cap. VT-11 seen in distance. Vehicle and ATV tracks observed. **(FEATURE D)**
	
Date: August 19, 2014	Date: August 19, 2014

TABLE 3.6: LANDFILL VISUAL INSPECTION PHOTO LOG (MIDDLE SITE LANDFILL)

Photo 23 (FOX-5 MID P-23.jpg)	Photo 24 (FOX-5 MID P-24.jpg)
Description: View west toward MW-5.	Description: Sample location F5-MID-MW-5.
	
Date: August 19, 2014	Date: August 19, 2014

TABLE 3.6: LANDFILL VISUAL INSPECTION PHOTO LOG (MIDDLE SITE LANDFILL)

Photo 25 (FOX-5 MID P-25.jpg)	Photo 26 (FOX-5 MID P-26.jpg)
Description: Once samples were collected at F5-MID-MW-5, the test hole was backfilled.	Description: View north toward MW-6.
	
Date: August 19, 2014	Date: August 19, 2014

TABLE 3.6: LANDFILL VISUAL INSPECTION PHOTO LOG (MIDDLE SITE LANDFILL)

<table>
<tr><td>Photo 27 (FOX-5 MID P-27.jpg)</td><td>Photo 28 (FOX-5 MID P-28.jpg)</td></tr>
<tr><td>Description: F5-MID-MW-6 during sample collection.</td><td>Description: F5-MID-MW-6 after sample collection and backfill.</td></tr>
<tr><td>
</td><td>
</td></tr>
<tr><td>Date: August 19, 2014</td><td>Date: August 19, 2014</td></tr>
</table>

TABLE 3.6: LANDFILL VISUAL INSPECTION PHOTO LOG (MIDDLE SITE LANDFILL)

Photo 29 (FOX-5 MID P-29.jpg)	Photo 30 (FOX-5 MID P-30.jpg)
Description: View of northwestern landfill slope from MW-7.	Description: F5-MID-MW-7 during sample collection.
	
Date: August 19, 2014	Date: August 19, 2014

TABLE 3.6: LANDFILL VISUAL INSPECTION PHOTO LOG (MIDDLE SITE LANDFILL)

Photo 31 (FOX-5 MID P-31.jpg)	Photo 32 (FOX-5 MID P-32.jpg)
Description: F5-MID-MW-7 after sample collection and backfill.	Description: View south toward MW-8.
	
Date: August 19, 2014	Date: August 19, 2014

TABLE 3.6: LANDFILL VISUAL INSPECTION PHOTO LOG (MIDDLE SITE LANDFILL)

Photo 33 (FOX-5 MID P-33.jpg)	Photo 34 (FOX-5 MID P-34.jpg)
Description: F5-MID-MW-8 during sample collection.	Description: F5-MID-MW-8 after sample collection and backfill.
	
Date: August 19, 2014	Date: August 19, 2014

TABLE 3.6: LANDFILL VISUAL INSPECTION PHOTO LOG (MIDDLE SITE LANDFILL)

Photo 35 (FOX-5 MID P-35.jpg)	Photo 36 (FOX-5 MID P-36.jpg)
Description: View southeast toward MW-9 and northern corner of landfill.	Description: F5-MID-MW-9 during sample collection.
	
Date: August 19, 2014	Date: August 19, 2014

TABLE 3.6: LANDFILL VISUAL INSPECTION PHOTO LOG (MIDDLE SITE LANDFILL)

Photo 37 (FOX-5 MID P-37.jpg)	
Description: F5-MID-MID-MW-9 after sample collection and backfill.	
	
Date: August 19, 2014	

Table 3.7: Visual Inspection Trends (Middle Site Landfill)

Item	AECOM 2012 Observations	SENES 2014 Observations	Trend
Settlement	Occasional minor settlement was observed on the berms and the cover of the landfill. The typical size of the settlement areas was approximately 400 millimetre (mm) length by 300 mm width and 30 mm to 100 mm depth. Some differential settlement, due to the weight of large boulders placed on the landfill to protect the thermistors, was also observed. Minor cracks have formed around VT-11 and VT-12 as a result of the differential settlement.	Minor settlement was observed at four locations on the southwest, southeast and northeast berms of the landfill. (Feature E)	Occasional settlement noted on southwest, southeast, and northeast berms in both previous and current monitoring event. Differential settlement and cracking under boulders placed around thermistor installations was noted in the previous event but not during the current event.
Erosion	Several erosion channels were observed on the northeast and southwest slopes along preferred drainage pathways, with occasional channels forming on the cover and southeast side of the landfill. The channel dimensions ranged from 2 m length by 150 mm width by 10 mm depth to 25 m length by 1 m width by 100 mm depth. The majority of the erosion channels appear to have self-armoured.	Small erosion channels were observed on the southwest and southeast berms, and on the top of the landfill along the north end. (Feature A, C, F, I, M)	Erosion channels were noted on the southwest and southeast berms, and on the top of the landfill in the previous and current monitoring events. More erosion channels were noted on the southwest and southeast berms during the current monitoring event.
Frost Action	Indications of frost action were not observed.	None noted in previous or current monitoring event.	None observed at this landfill.

Item	AECOM 2012 Observations	SENES 2014 Observations	Trend
Sloughing and Cracking	Cracking at the toe of the northwest berm - possibly due to differential settlement caused by the weight of the rip rap. Cracking at the toe of the berm on the northeast side. One portion may have sloughed on the northeast side of the berm, however, it is more likely that it was constructed this way. Numerous tension cracks on the southeast and southwest side.	Two small tension cracks were observed on the northeast and southeast berms of the landfill. (Feature H, L)	Small tension cracks are present in both the current and previous monitoring report. They do not appear to be worsening with time.
Animal Burrows	Evidence of burrowing animals was not observed.	None noted in previous or current monitoring event.	None observed at this landfill.
Vegetation	One isolated shrub (unidentified) was observed on the southwest berm.	No vegetation was observed within the limits of this landfill.	Vegetation is not establishing itself on the landfill.
Staining	Red staining that appears to be natural was observed on the east portion of the surface of the landfill. The source of the staining is believed to be the granular material used to cap the landfill.	Natural reddish staining was observed on the north end of the southeast berm of the landfill during the previous and current monitoring events. (Feature G)	Natural staining was present in the same area during the current and previous monitoring events.
Vegetation Stress	Not noted in 2012 report.	None noted in previous or current monitoring event.	None observed at this landfill.
Seepage Points	Some washed rock observed on the south corner of the southwest berm is indicative of water exiting the berm at that location.	No active seepage points were observed.	A seepage point was observed in the previous monitoring report on the southwest berm. This point was not observed to be a seepage point in the current monitoring event.

Item	AECOM 2012 Observations	SENES 2014 Observations	Trend
Debris Exposed	Several small pieces of wood and one piece of geotextile were observed around the berms of the landfill. The debris does not appear to have originated from within the landfill.	None observed.	Occasional debris was observed around the berms of the landfill during the previous monitoring event, but was not observed in the current monitoring event. The debris was not believed to have originated from the landfill and may have blown away or been physically removed.
Presence/Condition of Monitoring Instruments	Four vertical thermistor installations and five monitoring well installations were observed at the landfill.	Four vertical thermistor installations and five monitoring well installations were observed at the landfill. These monitoring installations were found to be in good condition. Soil surrounding the monitoring well installations was observed to be very soft. MW-9 had standing water in the well casing around the standpipe.	Monitoring instruments were observed. during the previous and current monitoring event.
Other Features of Note	There are occasional low areas on the top of the landfill that have allowed ponding of water. These areas have a higher moisture content then the surrounding areas and have allowed the deposition of fine material within them. This fine material retains water making these spots softer.	Vehicle tracks and areas of previously ponded water were observed on the top of the landfill. (Feature B, D)	Areas of previously ponded water on top of the landfill were noted during the previous and current monitoring events. Vehicle tracks were noted on top of the landfill during the current monitoring event but not the previous event.

3.3.1.4 Discussion of Results/Trends

A comparison of the visual inspection results of the 2012 and 2014 monitoring events at the Middle Site Landfill indicates that some additional erosion channels have formed along the berms of the landfill. This trend is considered minor and not of concern to the stability of the landfill at the present time. No other tangible changes in the physical condition of the landfill were observed.

3.4 SOIL SAMPLING

Soil sampling at the Middle Site Landfill was completed on 19 August 2014. As previously reported a total of eleven samples including one duplicate sample were procured from five locations as shown in plan on Figure 2.

3.4.1.1 Laboratory Analytical Results

The analytical results for soil samples collected at the Middle Site Landfill are presented in Table 3.8.

A duplicate soil sample was collected at surface at MW-6 and was submitted to AGAT, a secondary laboratory for QA/QC purposes. The RPDs for the duplicate sample results were below 30%, indicating consistency between the results.

3.4.1.2 Discussion of Results – Comparison to Baseline

A discussion of the analytical results for each parameter analyzed in soil samples collected at the Middle Site Landfill is provided in Table 3.9. The discussion includes a comparison of results from upgradient (MW-5) and downgradient (MW-6, MW-7, MW-8, MW-9) soil sampling locations to baseline average concentrations (BAC) that have been determined for each landfill from soil chemistry at the landfill area prior to and during remediation.

TABLE 3.8

RESULTS OF ANALYSIS FOR PARAMETERS IN SOIL AT MIDDLE SITE LANDFILL

PARAMETERS	Background Concentration (_)	Baseline Average Concentration (+)	DEW Line Cleanup Tier I Criteria (*)	DEW Line Cleanup Tier II Criteria (**)	F5-MID-MW-5-S 0-15 cm 19-Aug-14	F5-MID-MW-5-D 40-50 cm 19-Aug-14	F5-MID-MW-6-S 0-15 cm 19-Aug-14	F5-MID-MW-6-S (DUP) 0-15 cm 19-Aug-14	F5-MID-MW-6-S (AVG) 0-15 cm 19-Aug-14	F5-MID-MW-6-D 40-50 cm 19-Aug-14	F5-MID-MW-7-S 0-15 cm 19-Aug-14	F5-MID-MW-7-D 40-50 cm 19-Aug-14	F5-MID-MW-8-S 0-15 cm 19-Aug-14	F5-MID-MW-8-D 40-50 cm 19-Aug-14	F5-MID-MW-9-S 0-15 cm 19-Aug-14	F5-MID-MW-9-D 40-50 cm 19-Aug-14
Copper	**10**	**7.6**	**-**	**100**	**8.1+**	**9.7+**	6.4	**8+**	6.4	**8+**	**10+**	**9.2+**	7.1	7	5.6	5.6
Nickel	**5.3**	**5.2**	**-**	**100**	**6.7+**	**8.1+**	**5.6+**	5	**5.3+**	**6.9+**	**6+**	**7.5+**	5.1	**5.9+**	4.5	5.1
Cobalt	**4.0**	**5.0**	**-**	**50**	**4.5**	**4.9**	3.4	3.7	3.55	**4.4**	3.7	**4.6**	3	3.9	2.9	3
Cadmium	**1.0**	**1.0**	**-**	**5**	<0.10	<0.10	<0.10	<0.5	<0.5	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Lead	**5.0**	**10.0**	**200**	**500**	**7.0**	**8.0**	**6.2**	**6.0**	**6.1**	**7.6**	**6.0**	**7.6**	**6.8**	**7.2**	**5.9**	**7.0**
Zinc	**46**	**31.7**	**-**	**500**	**41+**	**45+**	31	**34+**	32.5	**40+**	**56+**	**45+**	27	**33+**	26	26
Chromium	**19**	**20.0**	**-**	**250**	17	19	12	14	13	16	13	17	12	14	11	12
Arsenic	**1.93**	**2.0**	**-**	**30**	<1.0	1.1	<1.0	1	1	<1.0	<1.0	<1.0	1	1.1	1.4	1.3
Mercury	**0.5**	**0.1**	**-**	**2**	<0.050	<0.050	<0.050	<0.10	<0.10	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Total PCBs	**0.001**	**0.003**	**1**	**5**	<0.010	<0.010	<0.010	<0.05	<0.05	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
PHC F1 (C6-C10)	-	-	-	-	<10	<10	<10	<5	<10	<10	<10	<10	<10	<10	<10	<10
PHC F2 (C10-C16)	-	-	-	-	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
PHC F3 (C16-C34)	-	-	-	-	<50	<50	<50	<50	<50	<50	<50	<50	71	<50	<50	<50
PHC F4 (C34-C50)	-	-	-	-	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50
Modifed TPH (Total C6-C34)	**5.0**	**10**	**-**	**2500**	**35+**	**35+**	**35+**	**32.5+**	**32.5+**	**35+**	**35+**	**35+**	**81+**	**35+**	**35+**	**35+**

NOTES:

All parameter values in µg/g (ppm) unless otherwise indicated.

_ Exceeds FOX-5 Middle Site Landfill Background Concentration.
+ Exceeds FOX-5 Middle Site Landfill Baseline Average Concentration.
+ Exceeds DEW Line Cleanup Tier I Criteria.
* Exceeds DEW Line Cleanup Tier II Criteria.

(DUP) Duplicate sample analyzed by AGAT Laboratories for QA/QC purposes.
(AVG) Average concentration of duplicate samples.
< Not detected.
\- No concentration reported.

Table 3.9: Evaluation of 2014 Soil Analytical Data (Middle Site Landfill)

Parameter	Baseline Average Concentration (ug/g)	2014 Results
Copper	7.6	Detectable concentrations ranged between 8.1 and 9.7 ug/g for the upgradient samples and 5.6 and 10 ug/g for the downgradient samples, with the highest concentration reported in the surface sample collected from the MW-7 sample location while the lowest concentration was reported within the surficial and subsurface samples at the MW-9 sample location. 5 of the 11 samples analyzed reported concentrations below the BAC while 6 of 11 samples reported a parameter concentration slightly above the BAC.
Nickel	5.2	Detectable concentrations ranged between 6.7 and 8.1 ug/g for the upgradient samples and 4.5 and 7.5 ug/g for the downgradient samples, with the highest concentration reported in the subsurface sample collected from the MW-5 sample location while the lowest concentration was reported in the surface sample at the MW-9 sample location. 7 of the 11 samples analyzed reported concentrations below the BAC while 4 of 11 samples reported a parameter concentration slightly above the BAC.
Cobalt	5.0	Detectable concentrations ranged between 4.5 and 4.9 ug/g for the upgradient samples and 2.9 and 4.6 ug/g for the downgradient samples, with the highest concentration reported in the subsurface sample at the MW-5 sample location while the lowest concentration was reported in the surface sample at the MW-9 sample location. All 11 samples analyzed reported concentrations below the BAC.
Cadmium	1.0	All reported concentrations were less than the laboratory detection limit (0.10 ug/g and 0.5 ug/g for the duplicate sample submitted to the secondary laboratory) and the BAC.
Lead	10	Detectable concentrations ranged between 7.0 and 8.0 ug/g for the upgradient samples and 5.9 and 7.6 ug/g for the downgradient samples, with the highest concentration reported in the subsurface sample at the MW-5 sample location and the lowest concentration in the surface sample at the MW-9 sample location. All 11 samples reported concentrations below the baseline average.
Zinc	32	Detectable concentrations ranged between 41 and 45 ug/g for the upgradient samples and 26 and 56 ug/g for the downgradient samples, with the highest concentration reported in the surface sample at the MW-7 sample location and the lowest concentration within the surface and subsurface samples at the MW-9 sample location. 4 of the 11 samples analyzed reported concentrations below the BAC while 7 of 11 samples reported a parameter concentration slightly above the BAC.
Chromium	20	Detectable concentrations ranged between 17 and 19 ug/g for the upgradient samples and 11 and 17 ug/g for the downgradient samples, with the highest concentration reported in the subsurface sample at the MW-5 sample location and the lowest concentration in the surface sample at the MW-9 sample location. All 11 samples reported concentrations below the BAC.
Arsenic	2.0	A detectable concentration of 1.1 ug/g was reported for one upgradient sample, and concentrations for downgradient samples ranged between 1 and 1.4 ug/g, with the highest concentration reported in the surface sample at the MW-9 sample location and the lowest concentration in the surface sample at the MW-6 sample location. All 11 samples reported

Parameter	Baseline Average Concentration (ug/g)	2014 Results
		concentrations below the BAC, with 5 of these results below the laboratory detection lmit (1.0 ug/g).
Mercury	0.10	All 11 samples reported concentrations less than the laboratory detection limit (0.050 ug/g and 0.10 ug/g for the duplicate sample submitted to the secondary laboratory) and BAC.
PCBs	0.003	All 11 samples reported concentrations less than the laboratory detection limit (0.010 ug/g and 0.05 ug/g for the duplicate sample submitted to the secondary laboratory) and BAC.
TPH	10	One detectable concentration of 81 ug/g was reported in the surface sample at the downgradient MW-8 sample location. The remaining 10 of 11 samples reported concentrations below the laboratory detection limit for PHC fractions F1, F2 and F3, however the corresponding modified TPH concentrations are above the BAC due to the use of half detection limits in calculating the modified TPH parameter.

3.4.1.3 Soil Trend Analysis by Parameter and Discussion of Trends

A discussion of the trends observed for parameter concentrations in soil from 2007 to 2014 are presented in Table 3.10. Trends have been analyzed for upgradient and downgradient locations, where upgradient locations are those near the landfill that are not influenced by migration of contaminants through the landfill, and downgradient locations are at the toe of the landfill or from areas of preferential drainage. Note that these trend analyses were performed on six datasets, however a minimum of seven data sets are recommended to establish a statistical trend.

Table 3.10: Evaluation of Soil Result Trends (Middle Site Landfill)

Parameter	2014 Results
Copper	Concentrations show a downward trend for upgradient soil locations and a very slight downward trend for downgradient soil locations. Concentrations are clustered around the baseline average.
Nickel	Concentrations show a downward trend for upgradient and downgradient soil locations. Concentrations have generally been above the baseline average.
Cobalt	Concentrations show a downward trend for upgradient and downgradient soil locations. Concentrations have generally been above the baseline average.
Cadmium	Concentrations have been below laboratory detection limits at all locations for all monitoring events.
Lead	Concentrations show a very slight downward trend for upgradient soil locations and an upward trend for downgradient soil locations. Concentrations have generally been above the baseline average.
Zinc	Concentrations show a downward trend for upgradient and downgradient soil locations. Concentrations have generally been above the baseline average.
Chromium	Concentrations show a downward trend for upgradient and downgradient soil locations. Concentrations have generally been above the baseline average.
Arsenic	Concentrations show a slight downward trend for upgradient and downgradient soil locations. Some concentrations were above the baseline average in past monitoring events but all results were

Parameter	2014 Results
	below the baseline average in the 2014 monitoring report.
Mercury	Concentrations have been below laboratory detection limits at all locations for all monitoring events except for some locations in 2012 where very low concentrations were detected.
PCBs	Concentrations have been below laboratory detection limits at all locations for all monitoring events.
TPH	Most concentrations have been below detection limits for F1, F2 and F3 parameters. No trend is apparent for this parameter for upgradient or downgradient soil locations.

3.4.2 Groundwater Sampling

Groundwater sampling was completed at the Middle Landfill on 19 August 2014. As previously reported a total of three samples were procured from three monitoring wells as shown in plan on Figure 2.

3.4.2.1 Monitoring Well Sampling/Inspection Logs

Monitoring well sampling/inspection logs are provided following this page.

3.4.2.2 Water Levels/Groundwater Flow

Water levels were measured at the Middle Landfill on 19 August 2014. The groundwater levels measured are shown below in Table 3.11. Based on the measured groundwater levels, groundwater flow is expected to be towards the northwest, however groundwater flow will be highly affected by freeze/thaw cycles and permafrost.

Table 3.11: Groundwater Levels (Middle Site Landfill)

Monitoring Well	Date	Ground Surface Elevation (m)	Water Level (m bgs)	Water Level Elevation (m)	Depth to Bottom (m bgs)	Bottom Elevation (m)
MW-5	19-Aug-14	313.2	0.73	312.47	1.69	311.51
MW-6	19-Aug-14	305.9	Dry	N/A	0.4	305.5
MW-7	19-Aug-14	303.1	Dry	N/A	0.84	302.26
MW-8	19-Aug-14	303.5	0.83	302.67	1.48	302.02
MW-9	19-Aug-14	306.7	0.96	305.74	1.55	305.15

Monitoring well MW-6 had not been reported dry in any of the previous monitoring years. Monitoring well MW-7 was reported to be dry in 2012. It is recommended that monitoring of all wells continue during future monitoring events.

Monitoring Well Sampling Record

Site Name:	FOX-5	Middle Site Non-Haz/Tier II	
Date of Sampling Event:	19-Aug-14	Time:	3pm
Names of Samplers:		S.Borcsok	
		J.Mauchan	
Landfill Name:	Middle	Samples Collected:	YES
Monitoring Well ID:	MW-5	PHC F1	YES
Sample Number:		Inorganic Elements	YES
Condition of Well:	OK	PHC F2-F4	YES
soft ground around casing		PCBs	YES
Measured Data		Duplicate Collected?	NO
Well pipe height above ground (cm)=	62	Sample ID:	F5-MID-MW-5
Diameter of well (cm)=	5		
Depth of well installation (cm)=			
(from ground surface)			
Length screened section (cm)=			
Depth to top of screen (cm)=			
(from ground surface)			
Depth to water surface (cm)=	135	Measurement method: (meter, tape, etc)	Interface Meter
(from top of pipe)			
Static water level (cm)=			
(below ground surface)			
Measured well refusal depth (cm) =	231	Evidence of sludge or siltation:	None
(i.e. depth to frozen ground)			
Measured well refusal depth from ground surface			
Thickness of water column	96		
Static volume of water in well	1.94		
(L)			
Free product thickness (mm)=	0	Measurement method:	IM
Purging: (Y/N)	Y	Purging/Sampling Equipment:	Waterra
Volume Purged Water=	3L	(dry after 2L)	tubing and
Decontamination required: (Y/N)	N		footvalve
Number washes:			
Number rinses:			
Final pH=	8.89		
Final Conductivity (uS/cm)=	45.7		
Final Temperature (degC)=	5.7		

Monitoring Well Sampling Record

Site Name:	FOX-5	Middle Site Non-Haz/Tier II	
Date of Sampling Event:	19-Aug-14	Time:	305pm
Names of Samplers:		S.Borcsok	
		J.Mauchan	
Landfill Name:	Middle	Samples Collected:	NO
Monitoring Well ID:	MW-6	PHC F1	
Sample Number:		Inorganic Elements	
Condition of Well:		PHC F2-F4	
soft ground around casing		PCBs	
Measured Data		Duplicate Collected?	
Well pipe height above ground (cm)=	70	Sample ID:	
Diameter of well (cm)=	5		
Depth of well installation (cm)= (from ground surface)			
Length screened section (cm)=			
Depth to top of screen (cm)= (from ground surface)			
Depth to water surface (cm)= (from top of pipe)	N/A (Dry)	Measurement method: (meter, tape, etc)	Interface Meter
Static water level (cm)= (below ground surface)			
Measured well refusal depth (cm)= (i.e. depth to frozen ground)	110	Evidence of sludge or siltation:	None
Measured well refusal depth from ground surface			
Thickness of water column	0		
Static volume of water in well	0		
Free product thickness (mm)=	0	Measurement method:	IM
Purging: (Y/N)	N	Purging/Sampling Equipment:	N/A
Volume Purged Water=			
Decontamination required: (Y/N)			
Number washes:			
Number rinses:			
Final pH=			
Final Conductivity (uS/cm)=			
Final Temperature (degC)=			

Monitoring Well Sampling Record

Site Name:	FOX-5	Middle Site Non-Haz/Tier II	
Date of Sampling Event:	19-Aug-14	Time:	310pm
Names of Samplers:		S.Borcsok	
		J.Mauchan	
Landfill Name:	Middle	Samples Collected:	NO
Monitoring Well ID:	MW-7	PHC F1	
Sample Number:		Inorganic Elements	
Condition of Well:	OK	PHC F2-F4	
cap of casing not completely sealed		PCBs	
Measured Data		Duplicate Collected?	
Well pipe height above ground (cm)=	69	Sample ID:	
Diameter of well (cm)=	5		
Depth of well installation (cm)=			
(from ground surface)			
Length screened section (cm)=			
Depth to top of screen (cm)=			
(from ground surface)			
Depth to water surface (cm)=	N/A (Dry)	Measurement method: (meter, tape, etc)	Interface Meter
(from top of pipe)			
Static water level (cm)=			
(below ground surface)			
Measured well refusal depth (cm)=	153	Evidence of sludge or siltation:	None
(i.e. depth to frozen ground)			
Measured well refusal depth from ground surface			
Thickness of water column	0		
Static volume of water in well	0		
Free product thickness (mm)=	0	Measurement method:	IM
Purging: (Y/N)	N	Purging/Sampling Equipment:	N/A
Volume Purged Water=			
Decontamination required: (Y/N)			
Number washes:			
Number rinses:			
Final pH=			
Final Conductivity (uS/cm)=			
Final Temperature (degC)=			

Monitoring Well Sampling Record

Site Name:	FOX-5	Middle Site Non-Haz/Tier II	
Date of Sampling Event:	19-Aug-14	Time:	315pm
Names of Samplers:		S.Borcsok	
		J.Mauchan	
Landfill Name:	Middle	Samples Collected:	YES
Monitoring Well ID:	MW-8	PHC F1	YES
Sample Number:		Inorganic Elements	YES
Condition of Well:	OK	PHC F2-F4	YES
soft soil around casing		PCBs	YES
Measured Data		Duplicate Collected?	NO
Well pipe height above ground (cm)=	60	Sample ID:	F5-MID-MW-8
Diameter of well (cm)=	5		
Depth of well installation (cm)=			
(from ground surface)			
Length screened section (cm)=			
Depth to top of screen (cm)=			
(from ground surface)			
Depth to water surface (cm)=	143	Measurement method: (meter, tape, etc)	Interface Meter
(from top of pipe)			
Static water level (cm)=			
(below ground surface)			
Measured well refusal depth (cm)=	208	Evidence of sludge or siltation:	None
(i.e. depth to frozen ground)			
Measured well refusal depth from ground surface			
Thickness of water column	0.65		
Static volume of water in well	1.31		
Free product thickness (cm)=	0	Measurement method:	
Free product top			
Purging: (Y/N)	Y	Purging/Sampling Equipment:	Waterra
Volume Purged Water=	2L	(dry after 1 L)	Tubing/
Decontamination required: (Y/N)	N		Footvalve
Number washes:			
Number rinses:			
Final pH=	8.61		
Final Conductivity (uS/cm)=	27.3		
Final Temperature (degC)=	5		

Monitoring Well Sampling Record

Middle Site Non-Haz/Tier II	FOX-5	Middle Site Non-Haz/Tier II	
Time:	19-Aug-14	Time:	330pm
Names of Samplers:		S.Borcsok	
		J.Mauchan	
Landfill Name:	Middle	Samples Collected:	YES
Monitoring Well ID:	MW-9	PHC F1	YES
Sample Number:		Inorganic Elements	YES
Condition of Well:	OK	PHC F2-F4	YES
soft soil around casing		PCBs	YES
Measured Data		Duplicate Collected?	NO
Well pipe height above ground (cm)=	70	Sample ID:	F5-MID-MW-9
Diameter of well (cm)=	5		
Depth of well installation (cm)=			
(from ground surface)			
Length screened section (cm)=			
Depth to top of screen (cm)=			
(from ground surface)			
Depth to water surface (cm)=	166	Measurement method: (meter, tape, etc)	Interface Meter
(from top of pipe)			
Static water level (cm)=			
(below ground surface)			
Measured well refusal depth (cm)=	225	Evidence of sludge or siltation:	None
(i.e. depth to frozen ground)			
Measured well refusal depth from ground surface			
Thickness of water column	0.59		
Static volume of water in well	1.19		
Free product thickness (mm)=	0	Measurement method:	IM
Purging: (Y/N)	Y	Purging/Sampling Equipment:	Waterra
Volume Purged Water=	2L	(dry after 1 L)	Tubing/
Decontamination required: (Y/N)	N		Footvalve
Number washes:			
Number rinses:			
Final pH=	8.03		
Final Conductivity (uS/cm)=	31		
Final Temperature (degC)=	4.3		

3.4.2.3 Laboratory Analytical Results

The analytical results for groundwater samples collected at the Middle Site Landfill are presented in Table 3.12. No duplicate groundwater samples were collected at the Middle Site Landfill.

3.4.2.4 Discussion of Results by Parameter

An evaluation of the groundwater analytical results at the Station Non-Hazardous Waste Landfill is presented in Table 3.13. The discussion includes a comparison of results from upgradient (MW-5) and downgradient (MW-8, MW-9) monitoring well locations to the baseline average concentrations (BAC) that have been determined for each landfill from groundwater chemistry at the landfill area prior to and during remediation. No groundwater samples were collected from downgradient wells MW-6 and MW-7 during this monitoring event.

Table 3.13: Evaluation of Groundwater Analytical Results (Middle Site Landfill)

Parameter	Baseline Average Concentration (mg/L)	2014 Results
Copper	0.012	Detectable concentrations were 0.087 mg/L for the upgradient well and were 0.0044 and 0.014 mg/L for the downgradient wells, with the highest concentration reported at monitoring well MW-9 and the lowest concentration at monitoring well MW-8. 2 of the 3 samples analyzed reported concentrations below the BAC, while 1 of the samples reported a concentration slightly higher than the BAC.
Nickel	0.043	Detectable concentrations were 0.021 mg/L for the upgradient well and were 0.012 and 0.023 mg/L for the downgradient wells, with the highest concentration reported at monitoring well MW-9 and the lowest concentration at monitoring well MW-8. All 3 samples reported concentrations below the BAC.
Cobalt	0.003	Detectable concentrations were 0.0022 mg/L for the upgradient well and were 0.0019 mg/L for both downgradient wells, with the highest concentration at monitoring well MW-5 and the lowest concentration at monitoring wells MW-8 and MW-9. All 3 samples reported concentrations below the BAC.
Cadmium	0.001	Detectable concentrations were 0.000041 mg/L at the upgradient well and were 0.000024 and 0.000028 mg/L at the downgradient wells, with the highest concentration at monitoring well MW-5 and the lowest concentration at monitoring well MW-8. All 3 samples reported concentrations below the BAC.
Lead	0.01	Detectable concentrations were 0.0036 mg/L at the upgradient well and were 0.0023 and 0.0031 mg/L at the downgradient wells, with the highest

TABLE 3.12

RESULTS OF ANALYSIS FOR PARAMETERS IN GROUNDWATER AT MIDDLE SITE LANDFILL

PARAMETERS	Baseline Average Concentration (+)	F5-MID-MW-5 19-Aug-14	F5-MID-MW-8 19-Aug-14	F5-MID-MW-9 19-Aug-14
Copper	**0.012**	0.0087	0.0044	**0.014+**
Nickel	**0.043**	0.021	0.012	0.023
Cobalt	**0.003**	0.0022	0.0019	0.0019
Cadmium	**0.001**	0.000041	0.000024	0.000028
Lead	**0.01**	0.0036	0.0023	0.0031
Zinc	**0.063**	0.028	0.037	**0.064+**
Chromium	**0.084**	0.036	0.02	0.036
Arsenic	**0.003**	0.00081	0.0007	0.00076
Mercury	**0.0004**	<0.00001	<0.00001	<0.00001
Total PCBs	**0.00002**	<0.00005	<0.00005	<0.00005
PHC F1 (C6-C10)	-	<0.025	<0.025	<0.025
PHC F2 (C10-C16)	-	<0.1	<0.1	<0.1
PHC F3 (C16-C34)	-	<0.2	<0.2	<0.2
PHC F4 (C34-C50)	-	<0.2	<0.2	<0.2
Modifed TPH (Total C6-C34)	**1**	0.163	0.163	0.163

NOTES:

All parameter values in mg/L (ppm) unless otherwise indicated.

+ Exceeds Middle Site Landfill Baseline Average Concentration

(DUP) Duplicate sample analyzed by AGAT Laboratories for QA/QC purposes.
(AVG) Average concentration of duplicate sample analyses.
RDL Reportable Detection Limit.
< Not detected.

Parameter	Baseline Average Concentration (mg/L)	2014 Results
		concentration at monitoring well MW-5 and the lowest concentration at monitoring well MW-8. All 3 samples reported concentrations below the BAC.
Zinc	0.063	Detectable concentrations were 0.028 mg/L at the upgradient well and were 0.037 and 0.064 mg/L at the downgradient wells, with the highest concentration at monitoring well MW-9 and the lowest concentration at monitoring well MW-5. 2 of the 3 samples analyzed reported concentrations below the BAC, while 1 of the samples reported a concentration slightly higher than the BAC.
Chromium	0.084	Detectable concentrations were 0.036 mg/L at the upgradient well and were 0.02 and 0.036 mg/L at the downgradient wells, with the highest concentration at monitoring wells MW-5 and MW-9 and the lowest concentration at monitoring well MW-8. All 3 samples reported concentrations below the BAC.
Arsenic	0.003	Detectable concentrations were 0.00081 mg/L for the upgradient well and were 0.0007 and 0.00076 mg/L for the downgradient wells, with the highest concentration at monitoring well MW-5 and the lowest concentration at monitoring well MW-8. All 3 samples reported concentrations below the BAC.
Mercury	0.0004	All 3 samples reported concentrations below the laboratory detection limit of 0.00001 mg/L and below the BAC.
PCBs	0.00002	All 3 samples reported concentrations below the laboratory detection limit of 0.00005 mg/L. This detection limit is above the baseline average, however as the BAC for PCBs at this site was based on a lower detection limit from a previous sampling event.
TPH	1	All 3 samples reported concentrations of PHC fractions F1, F2, and F3 below their respective detection limits. The calculated modified TPH value was 0.163 mg/L for all 3 samples, below the BAC.

3.4.2.5 Groundwater Trend Analysis by Parameter & Discussion of Trends

A discussion of the trends observed for parameter concentrations in groundwater from 2007 to 2014 are presented in Table 3.14. Note that these trend analyses were performed on six datasets, however a minimum of seven data sets are recommended to establish a statistical trend.

Table 3.14: Evaluation of Groundwater Result Trends (Middle Site Landfill)

Parameter	2014 Results
Copper	Concentrations show a downward trend for upgradient and downgradient wells. Reported concentrations are generally below the baseline average.
Nickel	Concentrations show a slight downward trend for upgradient wells and a downward trend for downgradient wells. Reported concentrations were above the baseline average in 2007 but since

Parameter	2014 Results
	2008 have been below the baseline average.
Cobalt	Concentrations show an upward trend for upgradient wells and a slight downward trend for downgradient wells. Reported concentrations are clustered around the baseline average.
Cadmium	Concentrations show a downward trend for upgradient and downgradient wells, however this trend is due to lower laboratory detection limits over time. Reported concentrations are below the baseline average.
Lead	Concentrations show a downward trend for upgradient and downgradient wells. Reported concentrations are generally below the baseline average.
Zinc	Concentrations show a slight downward trend for upgradient and downgradient wells. Reported concentrations are generally below the baseline average.
Chromium	Concentrations show a slight downward trend for upgradient wells and a downward trend for downgradient wells. Reported concentrations are generally below the baseline average.
Arsenic	Concentrations show a downward trend for upgradient and downgradient wells, however this trend is due to lower laboratory detection limits over time. Reported concentrations are below the baseline average.
Mercury	All results were below laboratory detection limits for all monitoring events.
PCBs	All results were below laboratory detection limits for all monitoring events.
TPH	Concentrations show a downward trend for upgradient and downgradient wells, however this trend is due to lower laboratory detection limits over time. One reported concentration was above the baseline average.

3.4.3 Thermal Monitoring

Thermal monitoring was completed at this landfill between 21 and 23 August 2014.

3.4.3.1 Thermistor Annual Maintenance Reports

The thermistor annual maintenance reports completed during the site inspection are provided following this page.

3.4.3.2 Summary of Findings from Annual DEW Line Thermal Reports

Thermistor data was analyzed by Tetra Tech EBA. The results of the thermal reports indicate that the landfill is stabilizing and performing as expected from a thermal perspective. The Thermal Report for the Tier II Disposal Facility is provided in Appendix D.

3.5 CONCLUSIONS/OVERALL PERFORMANCE OF THE LANDFILL

Based on the findings of the 2014 landfill monitoring program and comparison of these findings to the results of the 2012 monitoring program, the performance of the landfill is considered to be acceptable.

Thermistor Annual Maintenance Report 1

Contractor Name:	SENES	Inspection Date:	21-Aug-14
Prepared By:	S. Borcsok		

Thermistor Information

Site Name:	**FOX-5**		Thermistor Location	Middle Site Landfill			
Thermistor Number: VT-9			Inclination: Vertical				
Install Date:			First Date Event			Last Date Event	
Coordinates and Elevation		N	9748.5	E	15527.3	Elev	313.4
Length of Cable (m)		Cable Lead Above Ground (m)			Nodal Points		
Datalogger Serial # 02020261					Cable Serial Number		
Thermistor Type: UL16							

Thermistor Inspection

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

Battery Installation Date Jul-10

Battery Levels Main 11.34 / 11.34 Aux 12.53 / 13.50

(Battery level before replacement / after replacement)

Manual Ground Temperature Readings

Bead	Volts	Degrees C
1	1.1316	6.2022
2	1.113	5.5956
3	1.0432	3.3118
4	0.9757	1.0925
5	0.9397	-0.0800
6	0.9188	-0.7968
7	0.8927	-1.6714
8	0.8748	-2.2735

Bead	Volts	Degrees C
9	-	-2.6846
10	-	-3.1598
11	0	381.0742
12	0	381.0742
13	0	381.0742
14	0	381.0742
15	0	381.0742
16	0	381.1

Observations and Proposed Maintenance

Dessicant needs to be replaced

Thermistor Annual Maintenance Report 2

Contractor Name:	SENES	Inspection Date:	21-Aug-14
Prepared By:	S. Borcsok		

Thermistor Information

Site Name:	**FOX-5**		Thermistor Location	Middle Site Landfill			
Thermistor Number: VT-10			Inclination: Vertical				
Install Date:			First Date Event			Last Date Event	
Coordinates and Elevation		N	9773.1	E	15544.8	Elev	314.0
Length of Cable (m)		Cable Lead Above Ground (m)			Nodal Points		
Datalogger Serial # 02020230					Cable Serial Number		
Thermistor Type: UL16							

Thermistor Inspection

	Good	Needs Maintenance	
Casing	☐X	☐	
Cover	☐X	☐	
Data Logger	☐X	☐	
Cable	☐X	☐	
Beads	☐	☐X	beads 2, 5 not working

Battery Installation Date: Batteries replaced before downloading as ProLog would not connect

Battery Levels: Main 11.34 Aux 13.50

(Battery level after replacement)

Manual Ground Temperature Readings

Bead	Volts	Degrees C
1	1.0246	2.7016
2	0	381.0742
3	1.0706	4.2083
4	1.0822	4.5876
5	0	381.0742
6	0.9622	0.6462
7	0.9259	-0.5574
8	0.9076	-1.1899

Bead	Volts	Degrees C
9	0.8834	-1.9823
10	0.8753	-2.2554
11	0	381.0742
12	0	381.0742
13	0	381.0742
14	0	381.0742
15	0	381.0742
16	0	381.0742

Observations and Proposed Maintenance

Datalogger clock time -53:24

Dessicant needs to be replaced

Thermistor Annual Maintenance Report 3

Contractor Name:	SENES	Inspection Date:	21-Aug-14
Prepared By:	S. Borcsok		

Thermistor Information

Site Name: **FOX-5**		Thermistor Location		Middle Site Landfill			
Thermistor Number: VT-11		Inclination: Vertical					
Install Date:		First Date Event			Last Date Event		
Coordinates and Elevation	N	9779.4	E	15507.9		Elev	311.4
Length of Cable (m)	Cable Lead Above Ground (m)			Nodal Points			
Datalogger Serial # 02020270				Cable Serial Number			
Thermistor Type: UL16							

Thermistor Inspection

	Good	Needs Maintenance	
Casing	☐X	☐	
Cover	☐X	☐	
Data Logger	☐X	☐	
Cable	☐X	☐	
Beads	☐	☐X	Bead #10 not working

Battery Installation Date: Unknown

Battery Levels: Main 11.34 Aux 12.41

(Battery level after replacement)

Manual Ground Temperature Readings

Bead	Volts	Degrees C
1	1.0936	4.9594
2	1.0889	4.7897
3	1.1275	6.0698
4	1.1409	6.5069
5	1.0609	3.8913
6	1.9737	1.0270
7	0.9487	0.2013
8	0.9053	-1.2461

Bead	Volts	Degrees C
9	0.8937	-1.6380
10	0.0017	-93.1005
11	0	381.0742
12	0	381.0742
13	0	381.0742
14	0	381.0742
15	0	381.0742
16	0.0005	101.4553

Observations and Proposed Maintenance

Dessicant needs to be replaced

Thermistor Annual Maintenance Report 4

Contractor Name:	SENES	Inspection Date:	21-Aug-14
Prepared By:	S. Borcsok		

Thermistor Information

Site Name: **FOX-5**		Thermistor Location	Middle Site Landfill			
Thermistor Number: VT-12		Inclination: Vertical				
Install Date:		First Date Event		Last Date Event		
Coordinates and Elevation	N	9811.9	E	15484.6	Elev	310.3
Length of Cable (m)	Cable Lead Above Ground (m)		Nodal Points			
Datalogger Serial # 02020120			Cable Serial Number			
Thermistor Type: UL16						

Thermistor Inspection

	Good	Needs Maintenance	
Casing	☐X	☐	
Cover	☐X	☐	
Data Logger	☐	☐X	
Cable	☐X	☐	
Beads	☐	☐X	All beads reporting 0V

Battery Installation Date: Unknown

Battery Levels: Main 11.34 Aux 12.41

(Battery level in existing batteries in datalogger)

Manual Ground Temperature Readings

Bead	Volts	Degrees C
1	0	381.0742
2	0	381.0742
3	0	381.0742
4	0	381.0742
5	0	381.0742
6	0	381.0742
7	0	381.0742
8	0	381.0742

Bead	Volts	Degrees C
9	0	381.0742
10	0	381.0742
11	0	381.0742
12	0	381.0742
13	0	381.0742
14	0	381.0742
15	0	381.0742
16	0	381.0742

Observations and Proposed Maintenance

All beads reported 0 volts during manual readings.
Datalogger returned to DND in Ottawa for maintenance.
Dessicant needs to be replaced

3.6 RECOMMENDATIONS/NEXT STEPS

Regular monitoring of this landfill as per the monitoring schedule shown in Table 1.1 should be continued. No remedial work is necessary at this time.

4.0 MAIN LANDFILL

4.1 LANDFILL DESCRIPTION

The Main Landfill is located approximately 1 km northwest of the Station Area, in a broad valley that slopes downward towards the Arctic Ocean, and has an approximate area of 10,000m^2. The Main Landfill was an existing landfill that was regraded and remediated. A detailed drawing of this landfill is provided in Figure 3. The historical chemical results for soil samples collected at this landfill are shown in plan on Figure 3A. The historical chemical results for groundwater samples collected at this landfill are shown in plan on Figure 3B.

4.2 SUMMARY OF WORK CONDUCTED

4.2.1 Visual Inspection

The visual inspection of the landfill was completed with no deviations from the visual inspection work plan.

4.2.2 Soil Sampling

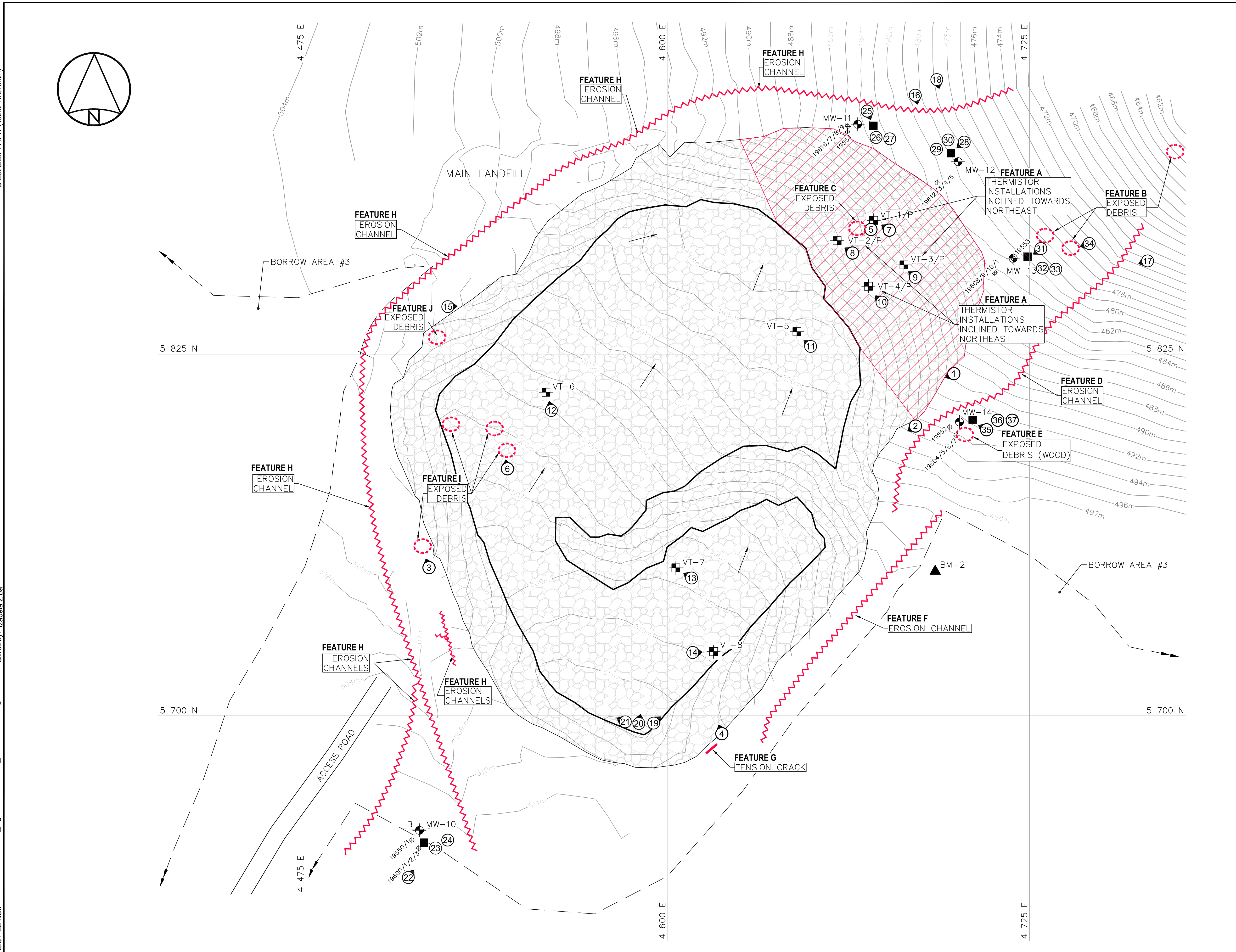
Soil samples were collected at five (5) locations as shown on Figure 3. Surface and subsurface samples were collected at each location. There were no deviations from the soil sampling work plan. A duplicate sample was collected at depth at MW-14. Soil sampling completed at the landfill is summarized in Table 4.1.

Table 4.1: Summary of Work Conducted by Soil Sampling Location (Main Landfill)

Location	Surface Soil Sample Collected	Subsurface Soil Sample Collected
F5-MN-MW-10	√	√
F5-MN-MW-11	√	√
F5-MN-MW-12	√	√
F5-MN-MW-13	√	√
F5-MN-MW-14	√ D	√

D = duplicate sample collected
√ - sample collected
X – no sample collected

4.2.3 Groundwater Sampling



LEGEND:

BM-2	PERMANENT BENCHMARK LOCATION (1)
MW-11	MONITORING WELL LOCATION (4)
MW-10 B	BACKGROUND MONITORING WELL LOCATION (1)
VT-5	GROUND TEMPERATURE CABLE LOCATION (4)
VT-1/P	GROUND TEMPERATURE CABLE AND PIEZOMETER LOCATION (4)
	MONITORING SOIL SAMPLE LOCATION (5)
19	APPROX. PHOTOGRAPHIC VIEWPOINT
19600	SOIL SAMPLE TAG LOCATION
497m	CONTOURS IN 1M INTERVALS
	OVERLAND FLOW DIRECTION
	EROSION CHANNEL
	TENSION CRACK
	EXPOSED DEBRIS
	AREA POTENTIALLY EXPERIENCING DOWNHILL CREEP

NOTES:

1. LOCATIONS AND SCALE OF FEATURES ARE APPROXIMATE AND SHOWN FOR ILLUSTRATIVE PURPOSES ONLY.
2. PHOTOGRAPHS TAKEN AUG. 20, 2014.
3. HORIZONTAL CONTROL REFERENCED TO SURVEY CONTROL MONUMENTS.
4. ALL ELEVATIONS REFER TO MEAN SEA LEVEL.
5. ALL DIMENSIONS ARE IN METRES UNLESS NOTED OTHERWISE.

REVISIONS:

No.	Date:	By:	Revisions

REFERENCE:

AECOM, FILE No.: FOX-5.3 Year 6 LF MON.dwg, Feb. 2013

0 25 50 metres

SCALE 1:1250

SENES Consultants
AN ARCADIS COMPANY

PUBLIC WORKS AND GOVERNMENT SERVICES CANADA

2014 DEW LINE MONITORING PROGRAM

FOX-5 BROUGHTON ISLAND, NUNAVUT

MAIN LANDFILL

Drawn By: I.S.Z.	Approved By: C.F.G.	Project No: 350600-515-3
Date: FEB. 2015	Scale: 1:1250	Drawing No: FIGURE 3

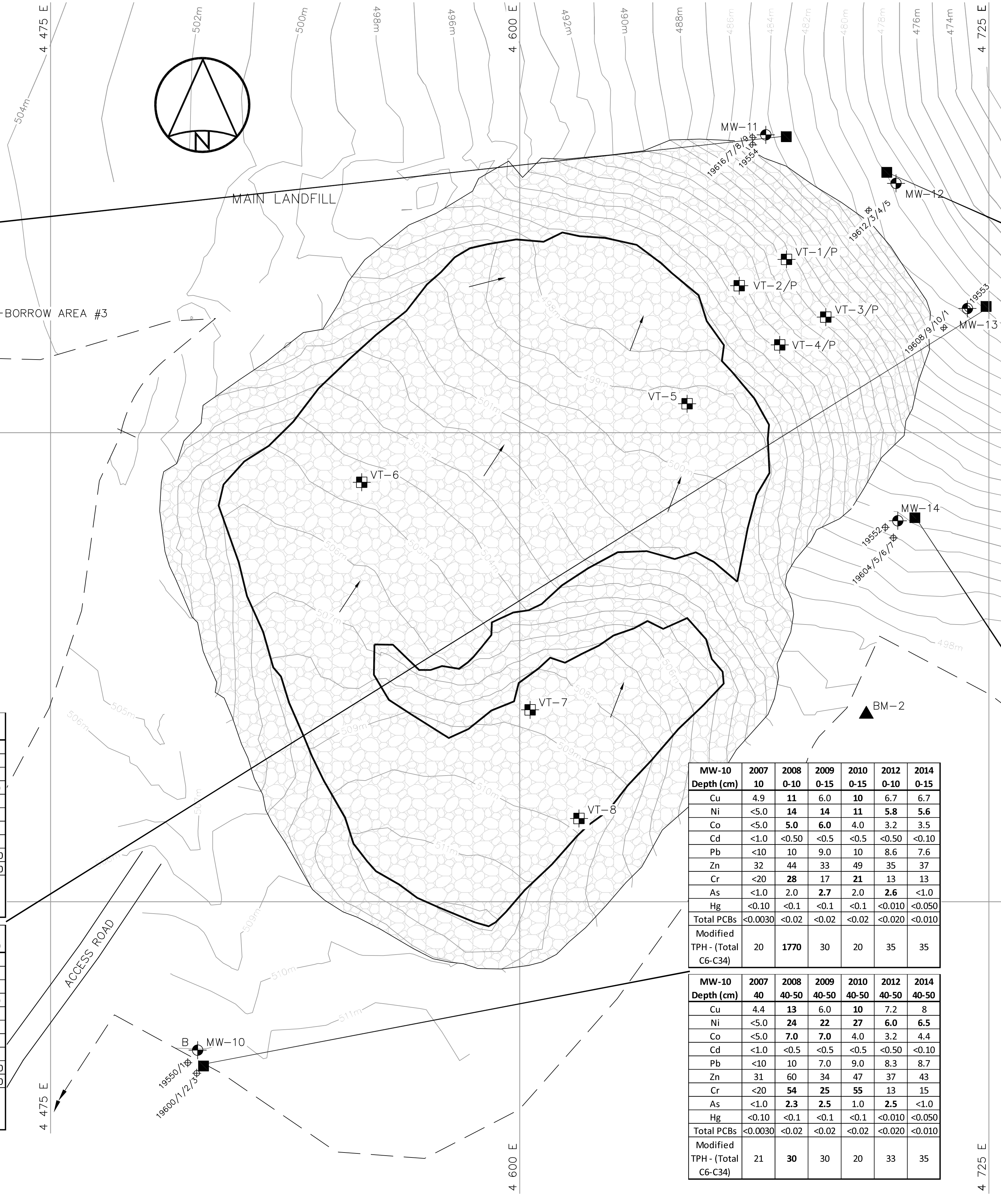
Sheet Size: 11 x 17 (432mm x 279mm)

Saved by: Izabela Ziba

SENES FILE NO.: 350600-515-3 FOX-5_Fig 3 - Station Area_Main Landfill.dwg

MW-11 Depth (cm)	2007 10	2008 0-10	2009 0-15	2010 0-15	2012 0-10	2014 0-15
Cu	6.6	**12**	**9.0**	**9.0**	5.1	8
Ni	**5.8**	**13**	**32**	**10**	4.0	**6.4**
Co	**5.5**	**6.0**	**10**	4.0	2.1	3.8
Cd	<1.0	<0.5	<0.5	<0.5	<0.50	<0.10
Pb	12	12	13	13	18	14.0
Zn	32	53	43	42	24	40
Cr	<20	**28**	**35**	19	7.6	14
As	**3.4**	**4.0**	**5.0**	2.0	**5.1**	1.2
Hg	<0.10	<0.1	<0.1	<0.1	<0.010	<0.050
Total PCBs	<0.0030	<0.02	<0.02	<0.02	<0.020	<0.010
Modified TPH - (Total C6-C34)	16	30	60	20	33	35

MW-11 Depth (cm)	2007 40	2008 40-50	2009 40-50	2010 40-50	2012 40-50	2014 40-50
Cu	4.7	**11**	8.0	**11**	6.1	**8.6**
Ni	<5.0	**12**	**19**	**13**	**5.0**	**6.5**
Co	<5.0	**5.0**	**8.0**	**5.0**	2.4	3.7
Cd	<1.0	<0.5	<0.5	<0.5	<0.50	<0.10
Pb	<10	16	9.0	13	9.4	14.0
Zn	20	42	38	47	25	34
Cr	<20	**27**	**30**	**26**	10	15
As	**2.9**	**2.8**	**5.4**	**3.0**	**3.4**	1.2
Hg	<0.10	<0.1	<0.1	<0.1	<0.010	<0.050
Total PCBs	<0.0030	<0.02	<0.02	<0.02	<0.020	<0.010
Modified TPH - (Total C6-C34)	32	30	30	20	33	35



MW-13 Depth (cm)	2007 10	2008 0-10	2009 0-15	2010 0-15	2012 0-10	2014 0-15
Cu	<3.0	**11**	7.0	**11**	5.0	5.9
Ni	<5.0	**15**	**20**	**9.0**	3.7	4.3
Co	<5.0	**5.0**	**7.0**	4.0	2.3	3.0
Cd	<1.0	<0.5	<0.5	<0.5	<0.50	<0.10
Pb	<10	11	8.0	13	7.7	7.8
Zn	21	52	39	54	29	34
Cr	<20	**30**	**20**	18	7.9	9.3
As	<1.0	1.9	**3.3**	2.0	2.2	<1.0
Hg	<0.10	<0.1	<0.1	<0.1	<0.010	<0.050
Total PCBs	0.005	<0.02	<0.02	<0.02	<0.020	<0.010
Modified TPH - (Total C6-C34)	45	67	30	33	33	35

MW-13 Depth (cm)	2007 40	2008 40-50	2009 40-50	2010 40-50	2012 40-50	2014 40-50
Cu	3.0	7	5.0	8.0	5.2	5.5
Ni	<5.0	**25**	**21**	**8.0**	3.7	3.9
Co	<5.0	3.0	**6.0**	3.0	2.3	2.5
Cd	<1.0	<0.5	<0.5	<0.5	<0.50	<0.10
Pb	<10	7.0	6.0	9.0	6.4	9.4
Zn	21	35	30	44	29	31
Cr	<20	**56**	16	17	7.4	8.1
As	<1.0	<1.0	1.9	1.0	1.7	<1.0
Hg	<0.10	<0.1	<0.1	<0.1	<0.010	<0.050
Total PCBs	<0.0030	<0.02	<0.02	<0.02	<0.020	<0.010
Modified TPH - (Total C6-C34)	21	30	41	20	33	35

MW-10 Depth (cm)	2007 10	2008 0-10	2009 0-15	2010 0-15	2012 0-10	2014 0-15
Cu	4.9	**11**	6.0	**10**	6.7	6.7
Ni	<5.0	**14**	**14**	**11**	**5.8**	**5.6**
Co	<5.0	**5.0**	**6.0**	4.0	3.2	3.5
Cd	<1.0	<0.50	<0.5	<0.5	<0.50	<0.10
Pb	<10	10	9.0	10	8.6	7.6
Zn	32	44	33	49	35	37
Cr	<20	**28**	17	**21**	13	13
As	<1.0	2.0	**2.7**	2.0	**2.6**	<1.0
Hg	<0.10	<0.1	<0.1	<0.1	<0.010	<0.050
Total PCBs	<0.0030	<0.02	<0.02	<0.02	<0.020	<0.010
Modified TPH - (Total C6-C34)	20	**1770**	30	20	35	35

MW-10 Depth (cm)	2007 40	2008 40-50	2009 40-50	2010 40-50	2012 40-50	2014 40-50
Cu	4.4	**13**	6.0	**10**	7.2	8
Ni	<5.0	**24**	**22**	**27**	**6.0**	**6.5**
Co	<5.0	**7.0**	**7.0**	4.0	3.2	4.4
Cd	<1.0	<0.5	<0.5	<0.5	<0.50	<0.10
Pb	<10	10	7.0	9.0	8.3	8.7
Zn	31	60	34	47	37	43
Cr	<20	**54**	**25**	**55**	13	15
As	<1.0	**2.3**	**2.5**	1.0	**2.5**	<1.0
Hg	<0.10	<0.1	<0.1	<0.1	<0.010	<0.050
Total PCBs	<0.0030	<0.02	<0.02	<0.02	<0.020	<0.010
Modified TPH - (Total C6-C34)	21	**30**	30	20	33	35

MW-12 Depth (cm)	2007 10	2008 0-10	2008 0-10	2009 0-15	2010 0-15	2012 0-10	2014 0-15
Cu	3.9	**10**	**10**	**9.0**	**22**	8.3	5
Ni	<5.0	**8**	**14**	**17**	**13**	**5.9**	2.8
Co	<5.0	4.0	4.0	**6.0**	4.0	3.2	1.7
Cd	<1.0	<0.5	<0.5	0.6	<0.5	<0.50	<0.10
Pb	<10	11	14	21	18	13	7.7
Zn	29	57	57	67	76	41	26
Cr	<20	17	**31**	**28**	**26**	13	5.7
As	1.6	2.2	1.8	**25**	2.0	**3.1**	<1.0
Hg	<0.10	<0.1	<0.1	<0.1	<0.1	<0.010	<0.050
Total PCBs	<0.0030	<0.02	<0.02	<0.02	0.43	0.06	0.013
Modified TPH - (Total C6-C34)	45	30	30	91	49	85	35

MW-12 Depth (cm)	2007 40	2008 40-50	2009 40-50	2010 40-50	2012 40-50	2014 40-50
Cu	3.6	**11**	6.0	8.0	5.2	**8.5**
Ni	<5.0	**14**	**19**	**11**	4.4	3.6
Co	<5.0	**5.0**	**6.0**	3.0	2.4	2.1
Cd	<1.0	<0.5	<0.5	<0.5	<0.50	0.12
Pb	<10	17	7.0	14	11	13.0
Zn	26	59	40	35	33	38
Cr	<20	**32**	**28**	**22**	8.6	7.7
As	1.1	**3**	**2.9**	2.0	**3.3**	<1.0
Hg	<0.10	<0.1	<0.1	<0.1	<0.010	<0.050
Total PCBs	<0.0030	<0.02	<0.02	<0.02	<0.020	0.085
Modified TPH - (Total C6-C34)	28	30	30	43	33	**120**

MW-14 Depth (cm)	2007 10	2008 0-10	2009 0-15	2010 0-15	2012 0-10	2014 0-15
Cu	<3.0	8	4.0	7.0	4.2	7.55
Ni	<5.0	**10**	4.0	**8.0**	2.8	4.7
Co	<5.0	4.0	3.0	3.0	2.1	3.4
Cd	<1.0	<0.5	<0.5	<0.5	<0.50	<0.5
Pb	<10	10	6.0	10	10	10.1
Zn	19	41	19	35	23	36
Cr	<20	**20**	8.0	15	5.7	9.9
As	1.3	1.1	**2.9**	1.0	**2.7**	**2**
Hg	<0.10	<0.1	<0.1	<0.1	<0.010	<0.10
Total PCBs	<0.0030	<0.02	<0.02	<0.02	<0.020	<0.05
Modified TPH - (Total C6-C34)	18	30	30	20	33	35

MW-14 Depth (cm)	2007 40	2008 40-50	2009 40-50	2010 40-50	2012 40-50	2014 40-50
Cu	3.8	**9**	5.0	8.0	5.5	5
Ni	<5.0	**12**	**9.0**	**7.0**	3.9	3.5
Co	<5.0	4.0	**6.0**	3.0	3.3	2.8
Cd	<1.0	<0.5	<0.5	<0.5	<0.50	<0.10
Pb	<10	11	8.0	9.0	7.8	7.2
Zn	27	43	34	35	32	30
Cr	<20	**24**	**21**	14	8.0	7.7
As	1.5	1.3	**3.2**	1.0	2.0	<1.0
Hg	<0.10	<0.1	<0.1	<0.1	<0.010	<0.050
Total PCBs	<0.0030	<0.02	<0.02	<0.02	<0.020	<0.010
Modified TPH - (Total C6-C34)	16	30	30	20	33	35

LEGEND:

BM-2 PERMANENT BENCHMARK LOCATION (1)

MW-11 MONITORING WELL LOCATION (4)

MW-10 B BACKGROUND MONITORING WELL LOCATION (1)

VT-5 GROUND TEMPERATURE CABLE LOCATION (4)

VT-1/P GROUND TEMPERATURE CABLE AND PIEZOMETER LOCATION (4)

MONITORING SOIL SAMPLE LOCATION (5)

19600 SOIL SAMPLE TAG LOCATION

497m CONTOURS IN 1M INTERVALS

OVERLAND FLOW DIRECTION

Parameter	Baseline Average Concentration	DEW Line Tier I Cleanup Criteria	DEW Line Tier II Cleanup Criteria
Cu	8.5	N/A	100
Ni	5.0	N/A	100
Co	5.0	N/A	50
Cd	1.0	N/A	5
Pb	10	200	500
Zn	38	N/A	500
Cr	20	N/A	250
As	2	N/A	130
Hg	0.10	N/A	2.0
Total PCBs	0.003	1	5
Modified TPH - (Total C6-C34)	69	N/A	2500

All Concentrations in ug/kg

Bold Concentration is Equal to or Exceeds Baseline Average Concentration

* Concentration Exceeds DEW Line Tier I Cleanup Criteria

** Concentration Exceeds DEW Line Tier II Cleanup Criteria

- No Concentration Reported

N/A Not Applicable

NOTES:

1. HORIZONTAL CONTROL REFERENCED TO SURVEY CONTROL MONUMENTS.
2. ALL ELEVATIONS REFER TO MEAN SEA LEVEL.
3. ALL DIMENSIONS ARE IN METRES UNLESS NOTED OTHERWISE.

REFERENCE:

AECOM, FILE No.: FOX-5.3 Year 6 LF MON.dwg, Feb. 2013

0 25 50 metres

SCALE 1:1250

SENES Consultants
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PUBLIC WORKS AND GOVERNMENT SERVICES CANADA

2014 DEW LINE MONITORING PROGRAM

FOX-5 BROUGHTON ISLAND, NUNAVUT
MAIN LANDFILL

SOIL CONTAMINANT DISTRIBUTION PLAN

Drawn By: I.S.Z.	Approved By: C.F.G.	Project No: 350600-515-3
Date: FEB. 2015	Scale: 1:1250	Drawing No: FIGURE 3A

Sheet Size: 11 x 17 (432mm x 279mm)

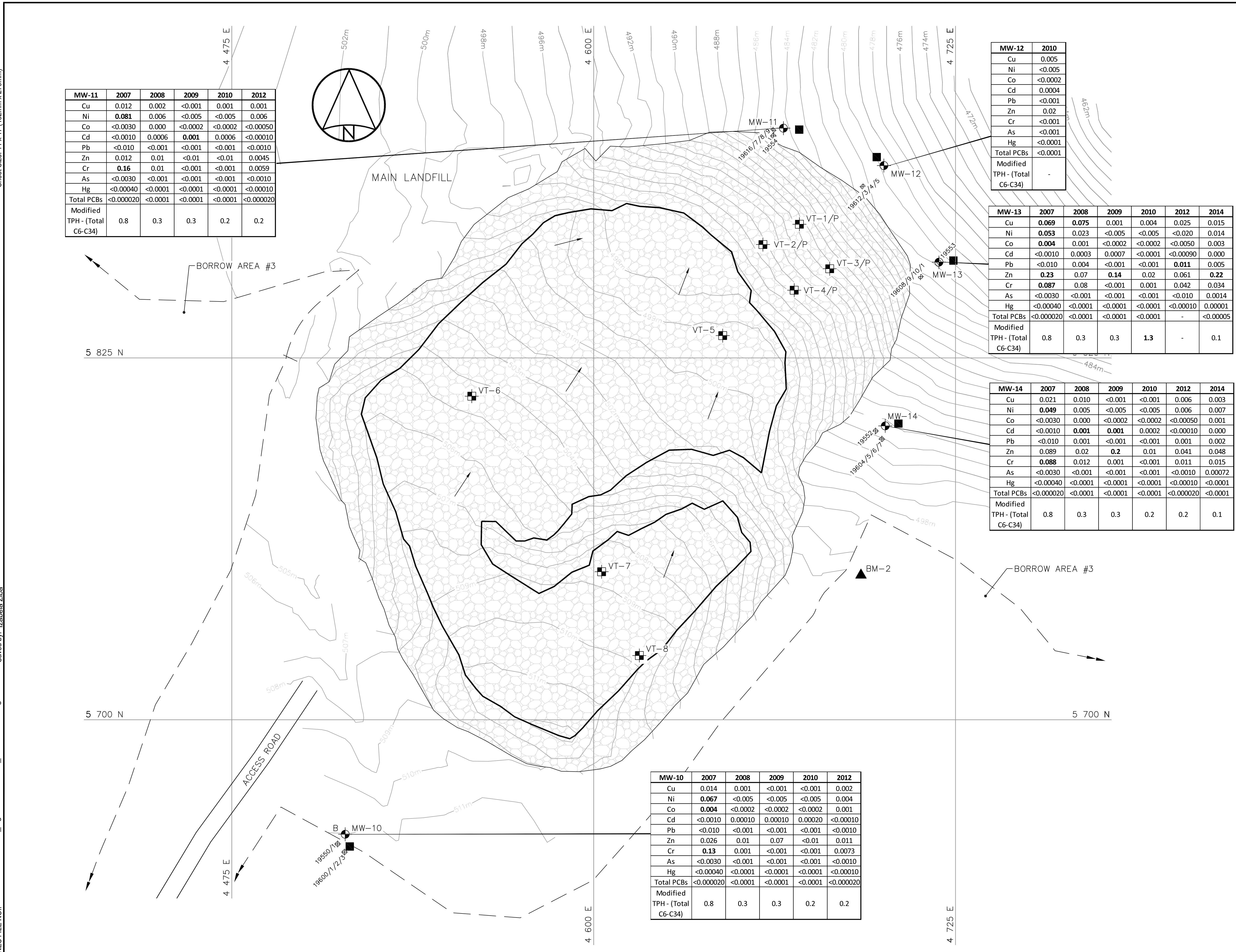
Saved by: Izabela Zliba

SENES FILE NO.: 350600-515-3 FOX-5_Fig 3 - Station Area_Main Landfill.dwg

Sheet Size: 11 x 17 (432mm x 279mm)

Saved by: Izabela Ziba

SENES FILE NO.: 350600-515-3 FOX-5_Fig 3 - Station Area_Main Landfill.dwg



MW-11	2007	2008	2009	2010	2012
Cu	0.012	0.002	<0.001	0.001	0.001
Ni	**0.081**	0.006	<0.005	<0.005	0.006
Co	<0.0030	0.000	<0.0002	<0.0002	<0.00050
Cd	<0.0010	0.0006	**0.001**	0.0006	<0.00010
Pb	<0.010	<0.001	<0.001	<0.001	<0.0010
Zn	0.012	0.01	<0.01	<0.01	0.0045
Cr	**0.16**	0.01	<0.001	<0.001	0.0059
As	<0.0030	<0.001	<0.001	<0.001	<0.0010
Hg	<0.00040	<0.0001	<0.0001	<0.0001	<0.00010
Total PCBs	<0.000020	<0.0001	<0.0001	<0.0001	<0.000020
Modified TPH - (Total C6-C34)	0.8	0.3	0.3	0.2	0.2

MW-12	2010
Cu	0.005
Ni	<0.005
Co	<0.0002
Cd	0.0004
Pb	<0.001
Zn	0.02
Cr	<0.001
As	<0.001
Hg	<0.0001
Total PCBs	<0.0001
Modified TPH - (Total C6-C34)	-

MW-13	2007	2008	2009	2010	2012	2014
Cu	**0.069**	**0.075**	0.001	0.004	0.025	0.015
Ni	**0.053**	0.023	<0.005	<0.005	<0.020	0.014
Co	**0.004**	0.001	<0.0002	<0.0002	<0.0050	0.003
Cd	<0.0010	0.0003	0.0007	<0.0001	<0.00090	0.000
Pb	<0.010	0.004	<0.001	<0.001	**0.011**	0.005
Zn	**0.23**	0.07	**0.14**	0.02	0.061	**0.22**
Cr	**0.087**	0.08	<0.001	0.001	0.042	0.034
As	<0.0030	<0.001	<0.001	<0.001	<0.010	0.0014
Hg	<0.00040	<0.0001	<0.0001	<0.0001	<0.00010	0.00001
Total PCBs	<0.000020	<0.0001	<0.0001	<0.0001	-	<0.00005
Modified TPH - (Total C6-C34)	0.8	0.3	0.3	**1.3**	-	0.1

MW-14	2007	2008	2009	2010	2012	2014
Cu	0.021	0.010	<0.001	<0.001	0.006	0.003
Ni	**0.049**	0.005	<0.005	<0.005	0.006	0.007
Co	<0.0030	0.000	<0.0002	<0.0002	<0.00050	0.001
Cd	<0.0010	**0.001**	**0.001**	0.0002	<0.00010	0.000
Pb	<0.010	0.001	<0.001	<0.001	0.001	0.002
Zn	0.089	0.02	**0.2**	0.01	0.041	0.048
Cr	**0.088**	0.012	0.001	<0.001	0.011	0.015
As	<0.0030	<0.001	<0.001	<0.001	<0.0010	0.00072
Hg	<0.00040	<0.0001	<0.0001	<0.0001	<0.00010	<0.0001
Total PCBs	<0.000020	<0.0001	<0.0001	<0.0001	<0.000020	<0.0001
Modified TPH - (Total C6-C34)	0.8	0.3	0.3	0.2	0.2	0.1

MW-10	2007	2008	2009	2010	2012
Cu	0.014	0.001	<0.001	<0.001	0.002
Ni	**0.067**	<0.005	<0.005	<0.005	0.004
Co	**0.004**	<0.0002	<0.0002	<0.0002	0.001
Cd	<0.0010	0.00010	0.00010	0.00020	<0.00010
Pb	<0.010	<0.001	<0.001	<0.001	<0.0010
Zn	0.026	0.01	0.07	<0.01	0.011
Cr	**0.13**	0.001	<0.001	<0.001	0.0073
As	<0.0030	<0.001	<0.001	<0.001	<0.0010
Hg	<0.00040	<0.0001	<0.0001	<0.0001	<0.00010
Total PCBs	<0.000020	<0.0001	<0.0001	<0.0001	<0.000020
Modified TPH - (Total C6-C34)	0.8	0.3	0.3	0.2	0.2

LEGEND:

- BM-2 PERMANENT BENCHMARK LOCATION (1)
- MW-11 MONITORING WELL LOCATION (4)
- MW-10 B BACKGROUND MONITORING WELL LOCATION (1)
- VT-5 GROUND TEMPERATURE CABLE LOCATION (4)
- VT-1/P GROUND TEMPERATURE CABLE AND PIEZOMETER LOCATION (4)
- MONITORING SOIL SAMPLE LOCATION (5)
- 19600 SOIL SAMPLE TAG LOCATION
- 497m CONTOURS IN 1M INTERVALS
- OVERLAND FLOW DIRECTION

Parameter	Baseline Average Concentration
Cu	0.062
Ni	0.047
Co	0.003
Cd	0.001
Pb	0.01
Zn	0.11
Cr	0.084
As	0.003
Hg	0.0004
Total PCBs	0.00002
Modified TPH - (Total C6-C34)	1

All Concentrations in mg/L

Bold Concentration is Equal to or Exceeds Baseline Average Concentration

\- No Concentration Reported

N/A Not Applicable

NOTES:

1. HORIZONTAL CONTROL REFERENCED TO SURVEY CONTROL MONUMENTS.
2. ALL ELEVATIONS REFER TO MEAN SEA LEVEL.
3. ALL DIMENSIONS ARE IN METRES UNLESS NOTED OTHERWISE.

REFERENCE:

AECOM, FILE No.: FOX-5.3 Year 6 LF MON.dwg, Feb. 2013

0 25 50 metres

SCALE 1:1250

SENES Consultants AN ARCADIS COMPANY

PUBLIC WORKS AND GOVERNMENT SERVICES CANADA

2014 DEW LINE MONITORING PROGRAM

FOX-5 BROUGHTON ISLAND, NUNAVUT MAIN LANDFILL

GROUNDWATER CONTAMINANT DISTRIBUTION PLAN

Drawn By:	I.S.Z.	Approved By:	C.F.G.	Project No:	350600-515-3
Date:	FEB. 2015	Scale:	1:1250	Drawing No:	FIGURE 3B

Groundwater monitoring was completed at five monitoring wells as shown on Figure 3. Groundwater monitoring and sampling at this landfill was generally completed as per the work plan. As indicated in Table 4.2, groundwater samples were not collected from three of five monitoring wells at this landfill as the wells were dry or had insufficient water. One duplicate groundwater sample was collected at MW-14.

Table 4.2: Summary of Work Conducted by Groundwater Sampling Location (Main Landfill)

Location	Visual Inspection/ Groundwater Monitoring	Sample collected for PCB analysis	Sample collected for metals analysis	Sample collected for PHCs F1-F4 analysis
F5-MN-MW-10	√	X^N	X^N	X^N
F5-MN-MW-11	√	X^I	X^I	X^I
F5-MN-MW-12	√	X^N	X^N	X^N
F5-MN-MW-13	√	√	√	√
F5-MN-MW-14	√	√ D	√ D	√ D

D - duplicate sample collected
√ - sample collected
X – no sample collected
N – no water in well (well was dry)
I – insufficient water in well to collect sample

Monitoring well MW-10 had not been reported dry in any of the previous monitoring years. Monitoring well MW-12 was reported to be dry in 2008, 2009, and 2012, but contained a limited amount of water in 2010. It is recommended that monitoring of all wells continue during future monitoring events.

4.2.4 Thermal Monitoring

Thermal monitoring was completed at all eight of the vertical thermistor locations at the Main Landfill. A summary of thermistor work completed at this landfill is provided in Table 4.3.

Table 4.3: Summary of Work Conducted by Thermistor Location (Main Landfill)

Location	Realtime Data	Data Downloaded	Batteries Replaced
F5-MN-VT-1	√	√	√
F5-MN-VT-2	√	√	√
F5-MN-VT-3	√	√	√
F5-MN-VT-4	√	√	√
F5-MN-VT-5	√	√	√
F5-MN-VT-6	√	√	√
F5-MN-VT-7	√	√	√
F5-MN-VT-8	√	√	√

4.3 RESULTS OF THE MONITORING PROGRAM

4.3.1 Visual Inspection

The visual inspection at the Main Landfill was completed on 20 August 2014. The visual inspection checklist completed during the site inspection is provided in Table 4.4.

4.3.1.1 Stability Assessment

The preliminary stability assessment completed during the site inspection is provided in Table 4.5.

4.3.1.2 Photographic Records

The photographic records for the Main Landfill are provided in Table 4.6.

4.3.1.3 Trend Analysis

The observations obtained during the visual inspection from the current 2014 monitoring event were compared to the observations obtained during the previous 2012 monitoring event, and are presented in Table 4.7 below for each category observed.

TABLE 4.4 - VISUAL INSPECTION CHECKLIST

DEW LINE CLEANUP: POST-CONSTRUCTION - LANDFILL MONITORING
INSPECTION REPORT – PAGE 1 OF 2

SITE NAME: FOX-5
LANDFILL DESIGNATION: Main Landfill
DATE OF INSPECTION: 20 August 2014
DATE OF PREVIOUS INSPECTION: 13-16 August 2012
INSPECTED BY: S. Borcsok, J. Mauchan
REPORT PREPARED BY: S. Borcsok
The inspector/reporter represents to the best of their 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.

TABLE 4.4 - VISUAL INSPECTION CHECKLIST - INSPECTION REPORT – PAGE 2 OF 2

Checklist Item	Present Yes/No	Location (Describe relative to existing monuments/features and relative to landfill design i.e. surface, berms, toe)	Length	Width	Depth	Extent relative to Area of Landfill (%)	Description	Photographic Records Focal length, location, view point & direction (relative to magnetic north) Feature of note Scale	Additional Comments
Settlement	NO								
Erosion	YES	Around the perimeter of the landfill **(FEATURE D, F, H)**	Along most of the perimeter of the landfill	1m	0.5m	~2%	Erosion evident in drainage channels around perimeter of the landfill	P-1, P-2	
Frost Action	NO								
Sloughing and Cracking	YES	Tension crack on south end of landfill **(FEATURE G)**	0.5m				Small tension crack	P-4	
Animal Burrows	NO								
Vegetation	NO								
Staining	NO								
Vegetation Stress	NO								
Seepage Points	NO								
Debris Exposed	YES	Within boulders in cap and outside perimeter of landfill **(FEATURE B, C, E, I)**				<1%	Metal cables, small metal and wood debris	P-3, P-5, P-6, P-15, P-34, P-35	Debris not suspected to have originated within the landfill
Presence/Condition – Monitoring Instruments	YES	Eight thermistors within landfill and five monitoring wells outside perimeter of landfill **(FEATURE A)**					Thermistors and Monitoring Wells – Thermistors 1, 2, 3, 4 are inclined downslope	P-7 to P-14, P-22, P-25, P-28, P-31,	
Features of Note.	YES	Fine soil particles infilling void spaces in boulders in landfill cap				50%	Fine soil particles infilling void spaces in boulders in landfill cap	P-5, P-6	This is a natural process that would be expected to occur with the materials used to construct the cap

Table 4.5: Preliminary Stability Assessment - FOX-5 Main Landfill

Feature	Severity Rating	Extent
Settlement	None	None
Erosion	Acceptable	Occasional
Frost Action	None	None
Staining	None	None
Vegetation Stress	None	None
Seepage/Ponded Water	None	None
Debris exposure	Acceptable	Occasional
Overall Landfill Performance: ACCEPTABLE		

Performance/ Severity Rating	Description
Acceptable	Noted features are of little consequence. The landfill is performing as designed. Minor deviations in environmental or physical performance may be observed, such as isolated areas of erosion, settlement.
Marginal	Physical/environmental performance appears to be deteriorating with time. Observations may include an increase in size or number of features of note, such as differential settlement, erosion or cracking. No significant impact on landfill stability to date, but potential for failure is assessed as low or moderate.
Significant	Significant or potentially significant changes affecting landfill stability, such as significant changes in slope geometry, significant erosion or differential settlement; scarp development. The potential for failure is assessed as imminent.
Unacceptable	Stability of landfill is compromised to the extent that ability to contain waste materials is compromised. Examples may include: - Debris exposed in erosion channels or areas of differential settlement. - Liner exposed. - Slope failure.

Extent	Description
Isolated	Singular feature
Occasional	Features of note occurring at irregular intervals/locations
Numerous	Many features of note, impacted less than 50% of the surface area of the landfill
Extensive	Impacting greater than 50% of the surface area of the landfill

TABLE 4.6: LANDFILL VISUAL INSPECTION PHOTO LOG (MAIN LANDFILL)

Main Landfill (see Figure 3)

Photo 1 (FOX-5 MN P-1.jpg)	Photo 2 (FOX-5 MN P-2.jpg)
Description: Erosion channel on eastern side of cap, north of MW-14.	Description: Erosion channel on eastern side of cap, south of MW-14. **(FEATURE D)**
	
Date: August 20, 2014	Date: August 20, 2014

TABLE 4.6: LANDFILL VISUAL INSPECTION PHOTO LOG (MAIN LANDFILL)

Photo 3 (FOX-5 MN P-3.jpg)	Photo 4 (FOX-5 MN P-4.jpg)
Description: View north over exposed debris along western edge of landfill. Exposed debris is metal wire seen above trowel. **(FEATURE I)**	Description: Small tension crack on south side of landfill. **(FEATURE G)**
	
Date: August 20, 2014	Date: August 20, 2014

TABLE 4.6: LANDFILL VISUAL INSPECTION PHOTO LOG (MAIN LANDFILL)

<table>
<tr><td>Photo 5 (FOX-5 MN P-5.jpg)</td><td>Photo 6 (FOX-5 MN P-6.jpg)</td></tr>
<tr><td>Description: Exposed debris observed near VT-2. (FEATURE C)</td><td>Description: View north toward exposed debris (metal wires) from southwest of VT-6. (FEATURE I)</td></tr>
<tr><td>
</td><td>
</td></tr>
<tr><td>Date: August 20, 2014</td><td>Date: August 20, 2014</td></tr>
</table>

TABLE 4.6: LANDFILL VISUAL INSPECTION PHOTO LOG (MAIN LANDFILL)

Photo 7 (FOX-5 MN P-7.jpg)	Photo 8 (FOX-5 MN P-8.jpg)
Description: View northwest of VT-1. VT-1 observed to be slightly slanted. (**FEATURE A)**	Description: View northwest of VT-2. VT-2 observed to be slightly slanted. **(FEATURE A)**
	
Date: August 20, 2014	Date: August 20, 2014

TABLE 4.6: LANDFILL VISUAL INSPECTION PHOTO LOG (MAIN LANDFILL)

Photo 9 (FOX-5 MN P-9.jpg)	Photo 10 (FOX-5 MN P-10.jpg)
Description: View northwest of VT-3. VT-3 observed to be slightly slanted. (**FEATURE A)**	Description: View northwest of VT-4. VT-4 observed to be very slanted. (**FEATURE A)**
	
Date: August 20, 2014	Date: August 20, 2014

TABLE 4.6: LANDFILL VISUAL INSPECTION PHOTO LOG (MAIN LANDFILL)

Photo 11 (FOX-5 MN P-11.jpg)	Photo 12 (FOX-5 MN P-12.jpg)
Description: View northwest toward VT-5.	Description: View north toward VT-6.
	
Date: August 20, 2014	Date: August 20, 2014

TABLE 4.6: LANDFILL VISUAL INSPECTION PHOTO LOG (MAIN LANDFILL)

Photo 13 (FOX-5 MN P-13.jpg)	Photo 14 (FOX-5 MN P-14.jpg)
Description: View west toward VT-7.	Description: View of VT-8.
	
Date: August 20, 2014	Date: August 20, 2014

TABLE 4.6: LANDFILL VISUAL INSPECTION PHOTO LOG (MAIN LANDFILL)

Photo 15 (FOX-5 MN P-15.jpg)	Photo 16 (FOX-5 MN P-16.jpg)
Description: View east across landfill. Exposed debris (corrugated metal) in foreground. **(FEATURE J)**	Description: View east, downslope, away from the landfill.
	
Date: August 20, 2014	Date: August 20, 2014

TABLE 4.6: LANDFILL VISUAL INSPECTION PHOTO LOG (MAIN LANDFILL)

Photo 17 (FOX-5 MN P-17.jpg)	Photo 18 (FOX-5 MN P-18.jpg)
Description: View west over erosion channel, toward northern end of landfill. **(FEATURE D)**	Description: View south toward northern end of landfill. **(FEATURE H)**
	
Date: August 20, 2014	Date: August 20, 2014

TABLE 4.6: LANDFILL VISUAL INSPECTION PHOTO LOG (MAIN LANDFILL)

Photo 19 (FOX-5 MN P-19.jpg)	Photo 20 (FOX-5 MN P-20.jpg)
Description: View northeast toward VT-8 from south end of landfill.	Description: View north from south end of landfill.
	
Date: August 20, 2014	Date: August 20, 2014

TABLE 4.6: LANDFILL VISUAL INSPECTION PHOTO LOG (MAIN LANDFILL)

Photo 21 (FOX-5 MN P-21.jpg)	Photo 22 (FOX-5 MN P-22.jpg)
Description: View west from south end of landfill.	Description: View northeast of MW-10, looking toward south end of landfill.
	
Date: August 20, 2014	Date: August 20, 2014

TABLE 4.6: LANDFILL VISUAL INSPECTION PHOTO LOG (MAIN LANDFILL)

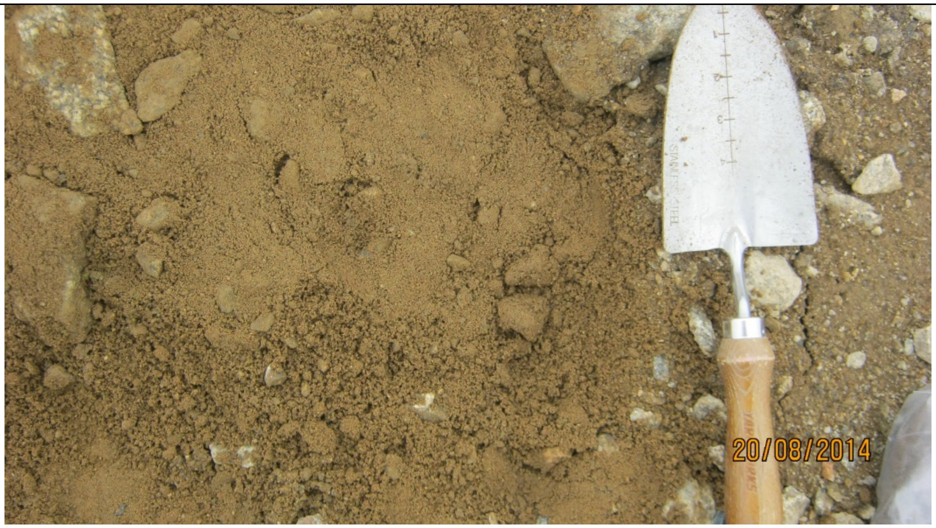
Photo 23 (FOX-5 MN P-23.jpg)	Photo 24 (FOX-5 MN P-24.jpg)
Description: F5-MN-MW-10 during sample collection.	Description: F5-MN-MW-10 after sample collection and backfill.
 	
Date: August 20, 2014	Date: August 20, 2014

TABLE 4.6: LANDFILL VISUAL INSPECTION PHOTO LOG (MAIN LANDFILL)

Photo 25 (FOX-5 MN P-25.jpg)	Photo 26 (FOX-5 MN P-26.jpg)
Description: View south toward MW-11 and north end of landfill.	Description: F5-MN-MW-11 during sample collection.
	
Date: August 20, 2014	Date: August 20, 2014

TABLE 4.6: LANDFILL VISUAL INSPECTION PHOTO LOG (MAIN LANDFILL)

Photo 27 (FOX-5 MN P-27.jpg)	Photo 28 (FOX-5 MN P-28.jpg)
Description: F5-MN-MW-11 after sample collection and backfill.	Description: View southwest toward MW-12 and north end of landfill.
	
Date: August 20, 2014	Date: August 20, 2014

TABLE 4.6: LANDFILL VISUAL INSPECTION PHOTO LOG (MAIN LANDFILL)

Photo 29 (FOX-5 MN P-29.jpg)	Photo 30 (FOX-5 MN P-30.jpg)
Description: F5-MN-MW-12 during sample collection.	Description: F5-MN-MW-12 after sample collection and backfill.
	
Date: August 20, 2014	Date: August 20, 2014

TABLE 4.6: LANDFILL VISUAL INSPECTION PHOTO LOG (MAIN LANDFILL)

Photo 31 (FOX-5 MN P-31.jpg)	Photo 32 (FOX-5 MN P-32.jpg)
Description: View west toward MW-13 and north end of landfill. Vertical thermistors can be seen in distance.	Description: F5-MN-MW-13 during sample collection.
	
Date: August 20, 2014	Date: August 20, 2014

TABLE 4.6: LANDFILL VISUAL INSPECTION PHOTO LOG (MAIN LANDFILL)

Photo 33 (FOX-5 MN P-33.jpg)	Photo 34 (FOX-5 MN P-34.jpg)
Description: F5-MN-MW-13 after sample collection and backfill.	Description: Exposed debris northeast of MW-13 included pieces of scrap wood. **(FEATURE B)**
	
Date: August 20, 2014	Date: August 20, 2014

TABLE 4.6: LANDFILL VISUAL INSPECTION PHOTO LOG (MAIN LANDFILL)

Photo 35 (FOX-5 MN P-35.jpg)	Photo 36 (FOX-5 MN P-36.jpg)
Description: View west toward MW-14 and landfill beyond erosion channel. **(FEATURE D)**	Description: F5-MN-MW-13 during sample collection.
	
Date: August 20, 2014	Date: August 20, 2014

TABLE 4.6: LANDFILL VISUAL INSPECTION PHOTO LOG (MAIN LANDFILL)

Photo 37 (FOX-5 MN P-37.jpg)	
Description: F5-MN-MW-13 after sample collection and backfill.	
	
Date: August 20, 2014	

Table 4.7: Visual Inspection Trends (Main Landfill)

Item	AECOM 2012 Observations	SENES 2014 Observations	Trend
Settlement	Indications of settlement were not observed.	None observed.	None observed at this landfill.
Erosion	Fines were observed next to flow channels adjacent to the landfill. Due to the size of the boulders placed on the landfill, it is unclear if a portion of the fines have migrated from underneath, or if they all originated from the surrounding area.	Erosion channels were noted around the perimeter of the landfill, draining to the northeast. It is understood that the flow of water was redirected to flow around the landfill in this manner. (Feature D, F, H)	Erosion in drainage channels is continuing around the landfill.
Frost Action	Indications of frost action were not observed.	None observed.	None observed at this landfill.
Sloughing and Cracking	One tension crack was observed on the south end of the landfill.	A small tension crack was observed on the south end of the landfill. (Feature G)	The same tension crack was observed in both reports but does not appear to be worsening.
Animal Burrows	Evidence of burrowing animals was not observed.	None observed.	None observed at this landfill.
Vegetation	Indications of vegetation were not observed.	No vegetation was observed at this landfill.	None observed at this landfill.
Staining	Staining was not evident at the landfill.	None observed.	None observed at this landfill.
Vegetation Stress	Indications of vegetation were not observed.	No vegetation was observed at this landfill.	None observed at this landfill.
Seepage Points	Indications of seepage were not observed.	None observed.	None observed at this landfill.
Debris Exposed	Occasional small pieces of metal and wood, and pieces of metal cable or rebar were observed. It does not appear that the debris originated from the landfill.	Occasional small pieces of metal and wood debris were observed around the landfill and within the large boulders placed as cover. It does not appear that this debris originated from within the landfill. (Feature B, C, E, I)	Debris exposure has not originated within the landfill and is relatively minor.

Item	AECOM 2012 Observations	SENES 2014 Observations	Trend
Presence/Condition of Monitoring Instruments	Four vertical thermistor installations and five monitoring well installations were observed at the landfill.	Eight vertical thermistor installations and five monitoring well installations were observed at the landfill. Monitoring wells were in good condition, although locks on all wells were broken. Standing water was noted inside the casing of MW-13. Vertical Thermistors VT-1, 2, 3, and 4 were inclined towards the northeast. (Feature A)	Inclination of the thermistors was visible in 2012 report but was not noted as an issue. It is unclear if inclination became worse between 2012 and 2014.
Other Features of Note	None noted.	Fine soil particles are slowly infilling the void spaces in and around the large boulders placed as the landfill cap.	Infilling of void spaces is expected to continue over time.

4.3.1.4 Discussion of Results/Trends

The Main Landfill is located in a valley that is sloped towards the ocean. Vertical thermistors VT-1, 2, 3, and 4 are located at the lowest end of the landfill within this valley. The inclination of these vertical thermistors may indicate that the landfill is undergoing a slow translational failure known as downhill creep, in which the landfill itself is sliding down the slope of the valley. The presence of a tension crack at the opposite high point of the landfill may also indicate that this creep is occurring. It is understood that the vertical thermistors were installed perpendicular to the ground surface which would result in some of them being angled from true vertical, however continued monitoring is required to confirm if the inclination is increasing over time.

4.3.2 Soil Sampling

Soil sampling was completed at the Main Landfill on 20 August 2014. As previously reported a total of eleven samples including one duplicate sample were procured from five locations as shown in plan on Figure 2.

4.3.2.1 Laboratory Analytical Results

The analytical results for soil samples collected at the Main Landfill are presented in Table 4.8.

A duplicate soil sample was collected at surface at MW-14 and was submitted to AGAT, a secondary laboratory for QA/QC purposes. The RPDs for the duplicate sample results were below 30%, indicating good agreeability of the results for all parameters except for copper.

TABLE 4.8

RESULTS OF ANALYSIS FOR PARAMETERS IN SOIL AT MAIN LANDFILL

PARAMETERS	Background Concentration (_)	Baseline Average Concentration (+)	DEW Line Cleanup Tier I Criteria (*)	DEW Line Cleanup Tier II Criteria (**)	F5-MN-MW-10-S 0-15 cm 20-Aug-14	F5-MN-MW-10-D 40-50 cm 20-Aug-14	F5-MN-MW-11-S 0-15 cm 20-Aug-14	F5-MN-MW-11-D 40-50 cm 20-Aug-14	F5-MN-MW-12-S 0-15 cm 20-Aug-14	F5-MN-MW-12-D 40-50 cm 20-Aug-14	F5-MN-MW-13-S 0-15 cm 20-Aug-14	F5-MN-MW-13-D 40-50 cm 20-Aug-14	F5-MN-MW-14-S 0-15 cm 20-Aug-14	F5-MN-MW-14-S (DUP) 0-15 cm 20-Aug-14	F5-MN-MW-14-S (AVG) 0-15 cm 20-Aug-14	F5-MN-MW-14-D 40-50 cm 20-Aug-14
Copper	**11**	**8.5**	**-**	**100**	6.7	8	8	**<u>8.6+</u>**	5	8.5	5.9	5.5	6.1	9	7.55	5
Nickel	**5.3**	**5.0**	**-**	**100**	**<u>5.6+</u>**	**<u>6.5+</u>**	**<u>6.4+</u>**	**<u>6.5+</u>**	2.8	3.6	4.3	3.9	4.4	5	4.7	3.5
Cobalt	**5.0**	**5.0**	**-**	**50**	3.5	4.4	3.8	3.7	1.7	2.1	3	2.5	3.1	3.7	3.4	2.8
Cadmium	**1.0**	**1.0**	**-**	**5**	<0.10	<0.10	<0.10	<0.10	<0.10	0.12	<0.10	<0.10	<0.10	<0.5	<0.5	<0.10
Lead	**10**	**10**	**200**	**500**	7.6	8.7	**<u>14+</u>**	**<u>14+</u>**	7.7	**<u>13+</u>**	7.8	9.4	9.1	**<u>11+</u>**	**<u>10.05+</u>**	7.2
Zinc	**46**	**38**	**-**	**500**	37	**43+**	**40+**	34	26	38	34	31	32	**40**	36	30
Chromium	**20**	**20**	**-**	**250**	13	15	14	15	5.7	7.7	9.3	8.1	8.8	11	9.9	7.7
Arsenic	**1.9**	**2**	**-**	**30**	<1.0	<1.0	1.2	1.2	<1.0	<1.0	<1.0	<1.0	<1.0	2.0	2.0	<1.0
Mercury	**0.5**	**0.10**	**-**	**2**	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.10	<0.10	<0.050
Total PCBs	**0.010**	**0.003**	**1**	**5**	<0.010	<0.010	<0.010	<0.010	0.013	0.085	<0.010	<0.010	<0.010	<0.05	<0.05	<0.010
PHC F1 (C6-C10)	**-**	**-**	**-**	**-**	<10	<10	<10	<10	<10	<10	<10	<10	<10	<5	<10	<10
PHC F2 (C10-C16)	**-**	**-**	**-**	**-**	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
PHC F3 (C16-C34)	**-**	**-**	**-**	**-**	<50	<50	<50	<50	<50	110	<50	<50	<50	<50	<50	<50
PHC F4 (C34-C50)	**-**	**-**	**-**	**-**	<50	<50	<50	<50	<50	56	<50	<50	<50	<50	<50	<50
Modifed TPH (Total C6-C34)	**5.0**	**69**	**-**	**2500**	**<u>35</u>**	**<u>35</u>**	**<u>35</u>**	**<u>35</u>**	**<u>35</u>**	**<u>120+</u>**	**<u>35</u>**	**<u>35</u>**	**<u>35</u>**	**<u>32.5</u>**	**<u>33.75</u>**	**<u>35</u>**

<u>NOTES</u>:

All parameter values in µg/g (ppm) unless otherwise indicated.

_ Exceeds FOX-5 Main Landfill Background Concentration.
\+ Exceeds FOX-5 Main Landfill Baseline Average Concentration.
\+ Exceeds DEW Line Cleanup Tier I Criteria.
* Exceeds DEW Line Cleanup Tier II Criteria.

(DUP) Duplicate sample analyzed by AGAT Laboratories for QA/QC purposes.
(AVG) Average concentration of duplicate samples.
< Not detected.
\- No concentration reported.

Concentrations of copper in this sample were reported as 6.1 and 9 ug/g from Maxxam and AGAT, respectively, yielding an RPD of 38.4%. Given the low concentrations of copper and the agreeability with the rest of the parameter results, this duplicate result is considered acceptable.

4.3.2.2 Discussion of Results – Comparison to Baseline

A discussion of the analytical results for each parameter analyzed in soil samples collected at the Main Landfill is provided in Table 4.9. The discussion includes a comparison of results from upgradient (MW-10) and downgradient (MW-11, MW-12, MW-13, MW-14) soil sampling locations to baseline average concentrations (BAC) that have been determined for each landfill from soil chemistry at the landfill area prior to and during remediation.

Table 4.9: Evaluation of 2014 Soil Analytical Data (Main Landfill)

Parameter	Baseline Average Concentration (ug/g)	2014 Results
Copper	8.0	Detectable concentrations ranged between 6.7 and 8 ug/g for upgradient samples and 5 and 9 ug/g for downgradient samples, with the highest concentration reported in the surface sample at the MW-14 sample location and the lowest concentration in the surface sample at the MW-12 sample location and in the subsurface sample at the MW-14 sample location. 8 of 11 samples reported concentrations below the BAC while 3 of 11 samples reported concentrations slightly above the BAC.
Nickel	4.0	Detectable concentrations ranged between 5.6 and 6.5 ug/g for upgradient samples and 2.8 and 6.5 ug/g for downgradient samples, with the highest concentration in the subsurface samples at the MW-10 and MW-11 sample locations and the lowest concentration in the surface sample at the MW-12 sample location. 4 of 11 samples reported concentrations below the BAC while 7 of 11 samples reported concentrations slightly above the BAC.
Cobalt	3.0	Detectable concentrations ranged between 3.5 and 4.4 ug/g for upgradient samples and 1.7 and 3.8 ug/g for downgradient samples, with the highest concentration reported in the subsurface sample at the MW-10 sample location and the lowest concentration in the surface sample at the MW-12 sample location. 5 of 11 samples reported concentrations below the BAC while 6 of 11 samples reported concentrations slightly above the BAC.
Cadmium	1.0	One detectable concentration of 0.12 ug/g was reported for the subsurface sample collected at the MW-12 sample location (downgradient). The remaining 10 of 11 samples reported concentrations less than the laboratory detection limit (0.10 ug/g and 0.5 ug/g for the duplicate submitted to the secondary laboratory) and below the BAC.
Lead	10	Detectable concentrations ranged between 7.6 and 8.7 ug/g for upgradient samples and 7.2 and 14 ug/g for downgradient samples, with the highest concentration reported in surface and subsurface samples at the MW-11

Parameter	Baseline Average Concentration (ug/g)	2014 Results
		sample location and the lowest concentration in the subsurface sample at the MW-14 sample location. 7 of 11 samples reported concentrations below the BAC while 4 of 11 samples reported concentrations slightly above the BAC.
Zinc	38	Detectable concentrations ranged between 37 and 43 ug/g for upgradient samples and 26 and 40 ug/g for downgradient samples, with the highest concentration in the subsurface sample at the MW-10 sample location and the lowest concentration in the surface sample at the MW-12 sample location. 7 of 11 samples reported concentrations below the BAC while 4 of 11 samples reported concentrations slightly above the BAC.
Chromium	20	Detectable concentrations ranged between 13 and 15 ug/g for upgradient samples and 5.7 and 15 ug/g for downgradient samples, with the highest concentration in the subsurface samples at the MW-10 and MW-11 sample locations and the lowest concentration in the surface sample at the MW-12 sample location. All 11 samples reported concentrations below the BAC.
Arsenic	2	Detectable concentrations were not reported in upgradient samples, and ranged between 1.2 and 2 ug/g for downgradient samples, with the highest concentration in the surface sample at the MW-14 sample location and the lowest concentration in surface and subsurface samples at the MW-11 sample location. All 11 samples reported concentrations below the BAC with 8 of the eleven samples reporting concentrations less than the laboratory detection limit (1.0 ug/g).
Mercury	0.10	All 11 samples reported concentrations less than the laboratory detection limit (0.050 ug/g and 0.10 ug/g for the duplicate sample submitted to the secondary laboratory) and BAC.
PCBs	0.003	Detectable concentrations of 0.013 and 0.085 ug/g were detected in surface and subsurface samples at the downgradient MW-12 sample location, respectively. 9 of the 11 samples reported concentrations below the BAC while 2 of the 11 samples reported concentrations slightly higher than the BAC.
TPH	40	One detectable concentration of 120 ug/g was reported in the subsurface sample collected at the downgradient MW-12 sample location. The remaining 10 of 11 samples reported concentrations below the laboratory detection limit for PHC fractions F1, F2 and F3 and their modified TPH values concentrations are below the BAC.

4.3.2.3 Soil Trend Analysis by Parameter and Discussion of Trends

A discussion of the trends observed for parameter concentrations in soil from 2007 to 2014 are presented in Table 4.10. Note that these trend analyses were performed on six datasets, however a minimum of seven data sets are recommended to establish a statistical trend.

Table 4.10: Evaluation of Soil Result Trends (Main Landfill)

Parameter	2014 Results
Copper	Concentrations are generally stable for upgradient and downgradient soil locations. Reported concentrations are clustered around the baseline average.
Nickel	Concentrations show a downward trend for upgradient and downgradient soil locations. Concentrations reported during the 2014 sampling program are clustered around the baseline average while concentrations in past monitoring years were more elevated but well below the Tier II Cleanup Criteria.
Cobalt	Concentrations show a downward trend for upgradient and downgradient soil locations. Concentrations reported during the 2014 sampling program are above the baseline average while concentrations in past monitoring years were more elevated but well below the Tier II Cleanup Criteria.
Cadmium	Concentrations have been below laboratory detection limits at all locations for all monitoring events except for one concentration marginally higher than the baseline average in 2009 and one concentration well below the baseline average in 2014.
Lead	Concentrations show a slight upward trend for upgradient and downgradient soil locations. Concentrations are slightly above the baseline average but well below Tier I and Tier II Cleanup Criteria.
Zinc	Concentrations are generally stable for upgradient soil locations and show a slight downward trend for downgradient soil locations. Concentrations are clustered around the baseline average.
Chromium	Concentrations show a downward trend for upgradient and downgradient soil locations. Concentrations are generally clustered around the baseline average.
Arsenic	Concentrations show a slight downward trend for upgradient and downgradient soil locations. Concentrations are generally clustered around the baseline average.
Mercury	Concentrations have been below laboratory detection limits at all locations for all monitoring events.
PCBs	Concentrations have been below laboratory detection limits at all locations for all monitoring events except for MW-12 which has reported concentrations above the baseline average but below the Tier I and II Cleanup Criteria.
TPH	Concentrations show a slight upward trend for downgradient soil locations, and a very strong downward trend for upgradient soil locations. The downward trend is due to a very high concentration of 1770 ug/g in surface soil at MW-10 from 2008 which skews the results. Excluding this result shows a very slight upward trend for upgradient soil locations. Concentrations have generally been slightly higher than the baseline average.

4.3.3 Groundwater Sampling

Groundwater sampling at the Main Landfill was completed on 20 August 2014. As previously reported a total of three samples including one duplicate were procured from two monitoring wells as shown in plan on Figure 3.

4.3.3.1 Monitoring Well Sampling/Inspection Logs

Monitoring well sampling/inspection logs are provided following this page.

4.3.3.2 Water Levels/Groundwater Flow

Water levels were measured at the Main Landfill on 20 August 2014. The groundwater levels measured are shown below in Table 4.11. Based on the measured groundwater levels, groundwater flow is expected to be towards the northeast, however groundwater flow will be highly affected by freeze/thaw cycles and permafrost.

Table 4.11: Groundwater Levels (Main Landfill)

Monitoring Well	Date	Ground Surface Elevation (m)	Water Level (m bgs)	Water Level Elevation (m)	Depth to Bottom (m bgs)	Bottom Elevation (m)
MW-10	20-Aug-14	511.2	Dry	N/A	1.32	509.88
MW-11	20-Aug-14	484.4	1.25	483.15	1.56	482.84
MW-12	20-Aug-14	479.8	Dry	N/A	1.19	478.61
MW-13	20-Aug-14	480.6	0.9	479.7	1.32	479.28
MW-14	20-Aug-14	493.4	0.84	492.56	1.44	491.96

4.3.3.3 Laboratory Analytical Results

The analytical results for groundwater analyses at the Main Landfill are presented in Table 4.12.

A duplicate groundwater sample was collected at MW-14 and was submitted to AGAT, a secondary laboratory for QA/QC purposes. The RPDs for the duplicate sample results were above 30%, indicating poor agreeability of the results for all parameters. In this instance, reported concentrations of parameters are very low, in the parts per billion range. Where such low concentrations are encountered, relatively small changes in concentration can result in high RPD values. Based on this the duplicate results are acceptable.

4.3.3.4 Discussion of Results by Parameter

A discussion of the results for each parameter analyzed in groundwater at the Main Landfill is provided in Table 4.13. The discussion includes a comparison of results to the baseline average concentrations that have been determined for each landfill from groundwater chemistry at the landfill area prior to and during remediation. Note that the results are for downgradient wells as the upgradient well MW-10 was dry during the 2014 monitoring event.

Monitoring Well Sampling Record

Site Name:	FOX-5	Main Landfill	
Date of Sampling Event:	20-Aug-14	Time:	145pm
Names of Samplers:		S.Borcsok	
		J.Mauchan	
Landfill Name:	Main	Samples Collected:	NO
Monitoring Well ID:	MW-10	PHC F1	
Sample Number:		Inorganic Elements	
Condition of Well:	OK	PHC F2-F4	
lock rusted shut, broken off		PCBs	
Measured Data		Duplicate Collected?	
Well pipe height above ground (cm)=	40		
Diameter of well (cm)=	5		
Depth of well installation (cm)=			
(from ground surface)			
Length screened section (cm)=			
Depth to top of screen (cm)=			
(from ground surface)			
Depth to water surface (cm)=	N/A (Dry)	Measurement method: (meter, tape, etc)	Interface Meter
(from top of pipe)			
Static water level (cm)=			
(below ground surface)			
Measured well refusal depth (cm)=	172	Evidence of sludge or siltation:	None
(i.e. depth to frozen ground)			
Thickness of water column	0		
Static volume of water in well	0		
Free product thickness (mm)=	0	Measurement method:	IM
Purging: (Y/N)	N/A (Dry)	Purging/Sampling Equipment:	N/A
Volume Purged Water=			
Decontamination required: (Y/N)			
Number washes:			
Number rinses:			
Final pH=			
Final Conductivity (uS/cm)=			
Final Temperature (degC)=			

Monitoring Well Sampling Record

Site Name:	FOX-5	Main Landfill	
Date of Sampling Event:	20-Aug-14	Time:	140pm
Names of Samplers:		S.Borcsok	
		J.Mauchan	
Landfill Name:	Main	Samples Collected:	NO
Monitoring Well ID:	MW-11	PHC F1	
Sample Number:		Inorganic Elements	
Condition of Well:	OK	PHC F2-F4	
lock was taped but broken		PCBs	
Measured Data		Duplicate Collected?	
Well pipe height above ground (cm)=	102		
Diameter of well (cm)=	5		
Depth of well installation (cm)=			
(from ground surface)			
Length screened section (cm)=			
Depth to top of screen (cm)=			
(from ground surface)			
Depth to water surface (cm)=	227	Measurement method: (meter, tape, etc)	Interface Meter
(from top of pipe)			
Static water level (cm)=			
(below ground surface)			
Measured well refusal depth (cm)=	258	Evidence of sludge or siltation:	None
(i.e. depth to frozen ground)			
Thickness of water column	0.31		
Static volume of water in well	0.62		
Free product thickness (mm)=	0	Measurement method:	IM
Purging: (Y/N)	Y	Purging/Sampling Equipment:	Waterra
Volume Purged Water=	0		Tubing/
Decontamination required: (Y/N)	N	Purging attempted, no water was able to be purged	Footvalve
Number washes:			
Number rinses:			
Final pH=			
Final Conductivity (uS/cm)=			
Final Temperature (degC)=			

Monitoring Well Sampling Record

Site Name:	FOX-5	Main Landfill	
Date of Sampling Event:	20-Aug-14	Time:	135pm
Names of Samplers:		S.Borcsok	
		J.Mauchan	
Landfill Name:	Main	Samples Collected:	NO
Monitoring Well ID:	MW-12	PHC F1	
Sample Number:		Inorganic Elements	
Condition of Well:	OK	PHC F2-F4	
lock was taped but broken		PCBs	
Measured Data		Duplicate Collected?	
Well pipe height above ground (cm)=	35		
Diameter of well (cm)=	5		
Depth of well installation (cm)=			
(from ground surface)			
Length screened section (cm)=			
Depth to top of screen (cm)=			
(from ground surface)			
Depth to water surface (cm)=	N/A (Dry)	Measurement method: (meter, tape, etc)	Interface Meter
(from top of pipe)			
Static water level (cm)=			
(below ground surface)			
Measured well refusal depth (cm)=	154	Evidence of sludge or siltation:	None
(i.e. depth to frozen ground)			
Thickness of water column	0		
Static volume of water in well	0		
Free product thickness (mm)=	0	Measurement method:	IM
Purging: (Y/N)	N	Purging/Sampling Equipment:	N/A
Volume Purged Water=			
Decontamination required: (Y/N)			
Number washes:			
Number rinses:			
Final pH=			
Final Conductivity (uS/cm)=			
Final Temperature (degC)=			

Monitoring Well Sampling Record

Site Name:	FOX-5	Main Landfill	
Date of Sampling Event:	20-Aug-14	Time:	130pm
Names of Samplers:		S.Borcsok	
		J.Mauchan	
Landfill Name:	Main	Samples Collected:	YES
Monitoring Well ID:	MW-13	PHC F1	YES
Sample Number:		Inorganic Elements	YES
Condition of Well:	OK	PHC F2-F4	YES
lock taped but broken, water in casing		PCBs	YES
Measured Data		Duplicate Collected?	NO
Well pipe height above ground (cm)=	55	Sample ID:	F5-MN-MW-13
Diameter of well (cm)=	5		
Depth of well installation (cm)=			
(from ground surface)			
Length screened section (cm)=			
Depth to top of screen (cm)=			
(from ground surface)			
Depth to water surface (cm)=	145	Measurement method: (meter, tape, etc)	Interface Meter
(from top of pipe)			
Static water level (cm)=			
(below ground surface)			
Measured well refusal depth (cm)=	187	Evidence of sludge or siltation:	None
(i.e. depth to frozen ground)			
Thickness of water column	42		
Static volume of water in well	0.85		
Free product thickness (mm)=	0	Measurement method:	IM
Purging: (Y/N)	Y	Purging/Sampling Equipment:	Waterra
Volume Purged Water=	3L		Tubing/
Decontamination required: (Y/N)	N		Footvalve
Number washes:			
Number rinses:			
Final pH=	7.88		
Final Conductivity (uS/cm)=	24.6		
Final Temperature (degC)=	3.2		

Monitoring Well Sampling Record

Site Name:	FOX-5	Main Landfill	
Date of Sampling Event:	20-Aug-14	Time:	125pm
Names of Samplers:		S.Borcsok	
		J.Mauchan	
Landfill Name:	Main	Samples Collected:	YES
Monitoring Well ID:	MW-14	PHC F1	YES
Sample Number:		Inorganic Elements	YES
Condition of Well:	OK	PHC F2-F4	YES
		PCBs	YES
Measured Data		Duplicate Collected?	YES
Well pipe height above ground (cm)=	50	Sample ID:	F5-MN-MW-14
Diameter of well (cm)=	5		
Depth of well installation (cm)=			
(from ground surface)			
Length screened section (cm)=			
Depth to top of screen (cm)=			
(from ground surface)			
Depth to water surface (cm)=	134	Measurement method: (meter, tape, etc)	Interface Meter
(from top of pipe)			
Static water level (cm)=			
(below ground surface)			
Measured well refusal depth (cm)=	184	Evidence of sludge or siltation:	None
(i.e. depth to frozen ground)			
Thickness of water column	50		
Static volume of water in well	1.02		
Free product thickness (mm)=	0	Measurement method:	IM
Purging: (Y/N)	Y	Purging/Sampling Equipment:	Waterra
Volume Purged Water=	3L		Tubing/
Decontamination required: (Y/N)	N		Footvalve
Number washes:			
Number rinses:			
Final pH=	8.48		
Final Conductivity (uS/cm)=	25.8		
Final Temperature (degC)=	3.1		

TABLE 4.12

RESULTS OF ANALYSIS FOR PARAMETERS IN GROUNDWATER AT MAIN LANDFILL

PARAMETERS	Baseline Average Concentration (+)	F5-MN-MW-13 20-Aug-14	F5-MN-MW-14 20-Aug-14	F5-MN-MW-14 (DUP) 20-Aug-14	F5-MN-MW-14 (AVG) 20-Aug-14
Copper	**0.062**	0.015	0.0047	0.002	0.00335
Nickel	**0.047**	0.014	0.0091	0.004	0.00655
Cobalt	**0.003**	0.0029	0.0011	<0.001	0.0011
Cadmium	**0.001**	0.000044	0.00002	<0.001	0.00002
Lead	**0.01**	0.0053	0.0022	0.001	0.0016
Zinc	**0.11**	**0.22+**	0.058	0.038	0.048
Chromium	**0.084**	0.034	0.022	0.008	0.015
Arsenic	**0.003**	0.0014	0.00072	<0.001	0.00072
Mercury	**0.0004**	0.00001	<0.00001	<0.0001	<0.0001
Total PCBs	**0.00002**	<0.00005	<0.00005	<0.0001	<0.0001
PHC F1 (C6-C10)	-	<0.025	<0.025	<0.025	<0.025
PHC F2 (C10-C16)	-	<0.1	<0.1	<0.1	<0.1
PHC F3 (C16-C34)	-	<0.1	<0.1	<0.1	<0.1
PHC F4 (C34-C50)	-	<0.1	<0.1	<0.1	<0.1
Modifed TPH (Total C6-C34)	**1**	0.113	0.113	0.113	0.113

NOTES:

All parameter values in mg/L (ppm) unless otherwise indicated.

+ Exceeds Main Landfill Baseline Average Concentration

(DUP) Duplicate sample analyzed by AGAT Laboratories for QA/QC purposes.
(AVG) Average concentration of duplicate sample analyses.
RDL Reportable Detection Limit.
< Not detected.

Table 4.13: Evaluation of Groundwater Analytical Results (Main Landfill)

Parameter	Baseline Average Concentration (mg/L)	2014 Results
Copper	0.062	Detectable ranged between 0.0047 and 0.015 mg/L with the highest concentration recorded at monitoring well MW-13 and the lowest concentration recorded at monitoring well MW-14. All three concentrations were below the BAC.
Nickel	0.047	Detectable concentrations ranged between 0.0091 and 0.014 mg/L, with the highest concentration recorded at monitoring well MW-13 and the lowest concentration recorded at monitoring well MW-14. All three concentrations were below the BAC.
Cobalt	0.003	Detectable concentrations ranged between 0.0011 and 0.0029 mg/L, with the highest concentration recorded at monitoring well MW-13 and the lowest concentration recorded at monitoring well MW-14. All three concentrations were below the BAC.
Cadmium	0.001	Detectable ranged between 0.00002 and 0.000044 mg/L, with the highest concentration recorded at monitoring well MW-13 and the lowest concentration recorded at monitoring well MW-14. All three concentrations were below the BAC.
Lead	0.01	Detectable concentrations ranged between 0.002 and 0.0053 mg/L, with the highest concentration recorded at monitoring well MW-13 and the lowest concentration recorded at monitoring well MW-14. All three concentrations were below the BAC.
Zinc	0.11	Detectable concentrations ranged between 0.058 and 0.22 mg/L, with the highest concentration recorded at monitoring well MW-13 and the lowest concentration recorded at MW-14. Two of the three samples reported concentrations below the BAC while one of the three samples reported a concentration above the BAC.
Chromium	0.084	Detectable concentrations ranged between 0.022 and 0.034 mg/L, with the highest concentration recorded at monitoring well MW-13 and the lowest concentration recorded at monitoring well MW-14. All three concentrations were below the BAC.

Parameter	Baseline Average Concentration (mg/L)	2014 Results
Arsenic	0.003	Detectable concentrations ranged between 0.00072 and 0.0014 mg/L, with the highest concentration recorded at monitoring well MW-13 and the lowest concentration recorded at monitoring well MW-14. All three concentrations were below the BAC.
Mercury	0.0004	A detectable concentration of 0.00001 mg/L was reported at monitoring well MW-13. All three concentrations were below the BAC.
PCBs	0.00002	All results were below the laboratory detection limit of 0.00005 mg/L. The laboratory detection limit is above the BAC as it was defined based on a lower detection limit from a previous monitoring event.
TPH	1	All results were below the laboratory detection limits for PHC fractions F1, F2, and F3 resulting in a modified TPH value of 0.113 mg/L. All three concentrations were below the BAC.

4.3.3.5 Groundwater Trend Analysis by Parameter & Discussion of Trends

A discussion of the trends observed for parameter concentrations in groundwater from 2007 to 2014 are presented in Table 4.14. Note that these trend analyses were performed on six datasets, however a minimum of seven data sets are recommended to establish a statistical trend.

Table 4.14: Evaluation of Groundwater Result Trends (Main Landfill)

Parameter	2014 Results
Copper	Concentrations show a downward trend for upgradient and downgradient wells. Reported concentrations are generally below the baseline average.
Nickel	Concentrations show a downward trend for upgradient and downgradient wells. Reported concentrations are generally below the baseline average.
Cobalt	Concentrations show a slight downward trend for upgradient and a downward trend for downgradient wells. Reported concentrations are generally clustered around the baseline average.
Cadmium	Concentrations show a downward trend for upgradient and downgradient wells. Reported concentrations are generally clustered around the baseline average.
Lead	Concentrations show a downward trend for upgradient and a slight upward trend for downgradient wells. Reported concentrations are generally below the baseline average.
Zinc	Concentrations show a slight downward trend for upgradient wells and are generally stable for downgradient wells. Reported concentrations are generally below the baseline average.
Chromium	Concentrations show a downward trend for upgradient and downgradient wells. Reported concentrations are generally below the baseline average.
Arsenic	Concentrations show a downward trend for upgradient wells and an upward trend of downgradient wells. Reported concentrations are generally below the baseline average.
Mercury	All concentrations are below the laboratory detection limit for mercury for all sampling events except for one concentration of 0.00001 mg/L in 2014.
PCBs	All concentrations are below the laboratory detection limit for PCBs for all sampling events.

Parameter	2014 Results
TPH	Concentrations show a downward trend for upgradient and downgradient wells. Reported concentrations are generally below the baseline average.

4.3.4 Thermal Monitoring

Thermal monitoring results were retrieved from thermistor installations at the Main Landfill on 21 and 22 August 2014.

4.3.4.1 Thermistor Annual Maintenance Reports

Thermistor annual maintenance reports are provided following this page.

4.3.4.2 Summary of Findings from Annual DEW Line Thermal Reports

Thermistor data was analyzed by Tetra Tech EBA. The results of the thermal reports indicate that the landfill is stabilizing and performing as expected from a thermal perspective. The Thermal Report for the Tier II Disposal Facility is provided in Appendix D.

4.4 CONCLUSIONS/OVERALL PERFORMANCE OF THE LANDFILL

Based on the findings of the 2014 landfill monitoring program and comparison of these findings to the results of the 2012 monitoring program, the performance of the Main Landfill is considered to be acceptable. The potential downhill creep of the landfill that may be indicated by inclined thermistor installations at the northeast corner of the landfill is of concern, but has not compromised the integrity of the landfill at this time. It is understood that the vertical thermistors were installed perpendicular to the ground surface which would result in some of them being angled from true vertical, however continued monitoring is required to confirm if the inclination is increasing over time.

4.5 RECOMMENDATIONS/NEXT STEPS

Due to the downhill creep suggested by the inclined thermistor installations at the northeast corner of the landfill, it is recommended that as part of ongoing monitoring work, the location and inclination of the thermistor installations, as well as the location of the toe of the landfill at its northeast corner be monitored to determine if downhill creep is occurring.

Thermistor Annual Maintenance Report 5

Contractor Name:	SENES	Inspection Date:	22-Aug-14
Prepared By:	S. Borcsok		

Thermistor Information

Site Name:	**FOX-5**		Thermistor Location		Main Landfill		
Thermistor Number: VT-1			Inclination: Slanted off-vertical				
Install Date:			First Date Event			Last Date Event	
Coordinates and Elevation		N	5871.2	E	4671.1	Elev	485.5
Length of Cable (m)		Cable Lead Above Ground (m)			Nodal Points		
Datalogger Serial # 02020269					Cable Serial Number		
Thermistor Type: UL16							

Thermistor Inspection

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

Battery Installation Date: Unknown

Battery Levels: Main 11.34 / 11.34 Aux 12.77 / 13.75

(Battery level before replacement / after replacement)

Manual Ground Temperature Readings

Bead	Volts	Degrees C
1	1.1805	7.8056
2	1.1463	6.6843
3	1.0592	3.8364
4	1.0002	1.8996
5	0.9409	-0.0597
6	0.9236	-0.6363
7	0.9070	-1.1899
8	0.8907	-1.7381

Bead	Volts	Degrees C
9	0.8766	-2.2142
10	0.8657	-2.5836
11	0.8509	-3.0843
12	0.8467	-3.2275
13	0.0017	-93.1005
14	0.0017	-93.1005
15	0.0017	-93.1005
16	0.0005	-101.4553

Observations and Proposed Maintenance

Dessicant needs to be replaced

Clock behind 48:38

Thermistor Annual Maintenance Report 6

Contractor Name:	SENES	Inspection Date:	22-Aug-14
Prepared By:	S. Borcsok		

Thermistor Information

Site Name:	**FOX-5**		Thermistor Location		Main Landfill		
Thermistor Number: VT-2			Inclination: Slanted off-vertical				
Install Date:			First Date Event			Last Date Event	
Coordinates and Elevation		N	5864.2	E	4658.5	Elev	491.0
Length of Cable (m)		Cable Lead Above Ground (m)			Nodal Points		
Datalogger Serial # 02020228					Cable Serial Number		
Thermistor Type: UL16							

Thermistor Inspection

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

Battery Installation Date: Unknown

Battery Levels: Main 11.34 / 11.34 Aux 13.21 / 13.87

(Battery level before replacement / after replacement)

Manual Ground Temperature Readings

Bead	Volts	Degrees C
1	1.1487	6.7868
2	1.1044	5.3136
3	1.0568	3.7565
4	0.9949	1.7264
5	0.9439	0.0392
6	0.9230	-0.6567
7	0.9065	-1.2078
8	0.8937	-1.6380

Bead	Volts	Degrees C
9	0.8798	-2.1059
10	0.8683	-2.4931
11	0.8527	-3.0427
12	0	381.0742
13	0	381.0742
14	0	381.0742
15	0	381.0742
16	0	381.0742

Observations and Proposed Maintenance

Dessicant needs to be replaced

Clock behind 48:04

Thermistor Annual Maintenance Report 7

Contractor Name:	SENES	Inspection Date:	22-Aug-14
Prepared By:	S. Borcsok		

Thermistor Information

Site Name:	**FOX-5**		Thermistor Location	Main Landfill			
Thermistor Number: VT-3			Inclination: Slanted off-vertical				
Install Date:			First Date Event			Last Date Event	
Coordinates and Elevation		N	5855.8	E	4681.5	Elev	486.3
Length of Cable (m)		Cable Lead Above Ground (m)			Nodal Points		
Datalogger Serial # 02020255					Cable Serial Number		
Thermistor Type: UL16							

Thermistor Inspection

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

Battery Installation Date: Unknown

Battery Levels: Main 11.34 / 11.34 Aux 13.26 / 13.75

(Battery level before replacement / after replacement)

Manual Ground Temperature Readings

Bead	Volts	Degrees C
1	1.1652	7.3046
2	1.1657	7.3221
3	1.1878	8.0463
4	1.1954	8.2974
5	1.1760	7.6577
6	1.0936	4.9594
7	1.0475	3.4518
8	0.9783	1.1807

Bead	Volts	Degrees C
9	0.9385	-0.1383
10	0.9230	-0.6567
11	0.9041	-1.2870
12	0.8900	-1.7612
13	0.8760	-2.2322
14	0.8669	-2.5422
15	0.8597	-2.7857
16	0.0017	-93.1005

Observations and Proposed Maintenance

Dessicant needs to be replaced
Clock behind 44:34
Lock broken

Thermistor Annual Maintenance Report 8

Contractor Name:	SENES	Inspection Date:	21-Aug-14
Prepared By:	S. Borcsok		

Thermistor Information

Site Name: **FOX-5**		Thermistor Location		Main Landfill			
Thermistor Number: VT-4		Inclination: Slanted off-vertical					
Install Date:		First Date Event			Last Date Event		
Coordinates and Elevation	N	5848.4	E	4669.3		Elev	491.0
Length of Cable (m)		Cable Lead Above Ground (m)		Nodal Points			
Datalogger Serial # 02020265				Cable Serial Number			
Thermistor Type: UL16							

Thermistor Inspection

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

Battery Installation Date: Unknown

Battery Levels: Main 11.34 / 11.34 Aux 12.41 / 13.63

(Battery level before replacement / after replacement)

Manual Ground Temperature Readings

Bead	Volts	Degrees C
1	1.1019	5.2313
2	1.1027	5.2588
3	1.1379	6.4094
4	1.1487	6.7643
5	1.1049	5.3311
6	1.0389	3.1719
7	0.9514	0.2898
8	0.9530	-0.2550

Bead	Volts	Degrees C
9	0.9102	-1.0825
10	0.8960	-1.5585
11	0.8924	-1.6816
12	0.8663	-2.5603
13	0.8479	-3.1884
14	0.0005	-101.4553
15	0.0005	-101.4553
16	0.0011	-96.1857

Observations and Proposed Maintenance

Dessicant needs to be replaced

Clock behind 54:14

Thermistor Annual Maintenance Report 9

Contractor Name:	SENES	Inspection Date:	21-Aug-14
Prepared By:	S. Borcsok		

Thermistor Information

Site Name: **FOX-5**		Thermistor Location		Main Landfill			
Thermistor Number: VT-5		Inclination: Vertical					
Install Date:		First Date Event				Last Date Event	
Coordinates and Elevation	N	5832.7	E	4644.6		Elev	496.2
Length of Cable (m)	Cable Lead Above Ground (m)			Nodal Points			
Datalogger Serial # 02020252				Cable Serial Number			
Thermistor Type: UL16							

Thermistor Inspection

	Good	Needs Maintenance	
Casing	☐X	☐	
Cover	☐X	☐	
Data Logger	☐X	☐	
Cable	☐X	☐	
Beads	☐	☐X	Beads 1, 2, 3 not working
Battery Installation Date	Unknown		
Battery Levels	Main 11.34 / 11.34	Aux 13.38 / 13.99	

(Battery level before replacement / after replacement)

Manual Ground Temperature Readings

Bead	Volts	Degrees C
1	0.0000	381.0742
2	0.0000	381.0742
3	0.0000	381.0742
4	1.0219	2.6140
5	0.9559	0.4390
6	0.9403	-0.0800
7	0.9162	-0.8835
8	0.8987	-1.4688

Bead	Volts	Degrees C
9	0.8834	-1.9823
10	0.8632	-2.6665
11	0.8522	-3.0427
12	0.0000	381.0742
13	0.0000	381.0742
14	0.0000	381.0742
15	0.0000	381.0742
16	0.0000	381.0742

Observations and Proposed Maintenance

Dessicant needs to be replaced

Clock behind 50:59

Thermistor Annual Maintenance Report 10

Contractor Name:	SENES	Inspection Date:	21-Aug-14
Prepared By:	S. Borcsok		

Thermistor Information

Site Name:	**FOX-5**	Thermistor Location	Main Landfill				
Thermistor Number: VT-6		Inclination: Vertical					
Install Date:		First Date Event			Last Date Event		
Coordinates and Elevation	N	5811.8	E	4557.9	Elev	501.4	
Length of Cable (m)		Cable Lead Above Ground (m)		Nodal Points			
Datalogger Serial # 02020256				Cable Serial Number			
Thermistor Type: UL16							

Thermistor Inspection

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

Battery Installation Date: Unknown

Battery Levels: Main 11.34 / 11.34 Aux 13.14 / 13.50

(Battery level before replacement / after replacement)

Manual Ground Temperature Readings

Bead	Volts	Degrees C
1	1.1682	7.4022
2	1.1013	5.2114
3	1.0378	3.1344
4	0.9799	1.2310
5	0.9417	-0.0318
6	0.9217	-0.7000
7	0.9041	-1.2870
8	0.8840	-1.9643

Bead	Volts	Degrees C
9	0.8689	-2.4750
10	0.8516	-3.0609
11	0.8522	-3.0427
12	0.0000	381.0742
13	0.0000	381.0742
14	0.0000	381.0742
15	0.0000	381.0742
16	0.0000	381.0742

Observations and Proposed Maintenance

Dessicant needs to be replaced

Clock behind 57:01

Thermistor Annual Maintenance Report 11

Contractor Name: SENES	Inspection Date: 21-Aug-14
Prepared By: S. Borcsok	

Thermistor Information

Site Name: **FOX-5**		Thermistor Location	Main Landfill			
Thermistor Number: VT-7		Inclination: Vertical				
Install Date:		First Date Event		Last Date Event		
Coordinates and Elevation	N	5751.2	E	4602.7	Elev	505.6
Length of Cable (m)	Cable Lead Above Ground (m)			Nodal Points		
Datalogger Serial # 02020257				Cable Serial Number		
Thermistor Type: UL16						

Thermistor Inspection

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

Battery Installation Date: Unknown

Battery Levels: Main 11.34 / 11.34 Aux 12.04 / 13.14

(Battery level before replacement / after replacement)

Manual Ground Temperature Readings

Bead	Volts	Degrees C
1	1.1634	7.2445
2	1.0913	4.8845
3	0.9884	1.5128
4	0.9457	0.1000
5	0.9284	-0.4735
6	0.9102	-1.0825
7	0.8924	-1.6816
8	0.8718	-2.3768

Bead	Volts	Degrees C
9	0.8576	-2.8583
10	0.8431	-3.3526
11	0.8363	-3.5851
12	0.0000	381.0742
13	0.0000	381.0742
14	0.0000	381.0742
15	0.0000	381.0742
16	0.0000	381.0742

Observations and Proposed Maintenance

Dessicant needs to be replaced

Clock behind 49:43

Thermistor Annual Maintenance Report 12

Contractor Name: SENES	Inspection Date: 21-Aug-14
Prepared By: S. Borcsok	

Thermistor Information

Site Name: **FOX-5**		Thermistor Location	Main Landfill			
Thermistor Number: VT-8		Inclination: Vertical				
Install Date:		First Date Event		Last Date Event		
Coordinates and Elevation	N	5722.2	E	4615.8	Elev	505.8
Length of Cable (m)	Cable Lead Above Ground (m)			Nodal Points		
Datalogger Serial # 02020259				Cable Serial Number		
Thermistor Type: UL16						

Thermistor Inspection

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

Battery Installation Date: Unknown

Battery Levels: Main 11.34 / 11.34 Aux 13.02 / 13.50

(Battery level before replacement / after replacement)

Manual Ground Temperature Readings

Bead	Volts	Degrees C
1	1.1219	5.8851
2	1.0556	3.7165
3	0.9769	1.1328
4	0.9379	-0.1586
5	0.9181	-0.8172
6	0.9022	-1.3510
7	0.8846	-1.9437
8	0.8640	-2.6406

Bead	Volts	Degrees C
9	0.8528	-3.0219
10	0.8473	-3.2093
11	0.0000	381.0742
12	0.0000	381.0742
13	0.0000	381.0742
14	0.0000	381.0742
15	0.0000	381.0742
16	0.0000	381.0742

Observations and Proposed Maintenance

Dessicant needs to be replaced

Clock behind 46:00

5.0 STATION NON-HAZARDOUS WASTE LANDFILL

5.1 LANDFILL DESCRIPTION

The Station Non-Hazardous Waste Landfill is located east of the station area at the southeast corner of Broughton Island. This landfill was newly constructed at the location of the former sewage outfall for the disposal of Tier I contaminated soil, site debris collected during cleanup, and non-hazardous materials generated from demolition of facilities not required for the operation of the North Warning System Short Range Radar (SRR) Station. A detailed drawing of this landfill is provided in Figure 4. The historical chemical results for soil samples collected at this landfill are shown in plan on Figure 4A. The historical chemical results for groundwater samples collected at this landfill are shown in plan on Figure 4B.

5.2 SUMMARY OF WORK CONDUCTED

5.2.1 Visual Inspection

The visual inspection of the landfill was completed with no deviations from the visual inspection work plan.

5.2.2 Soil Sampling

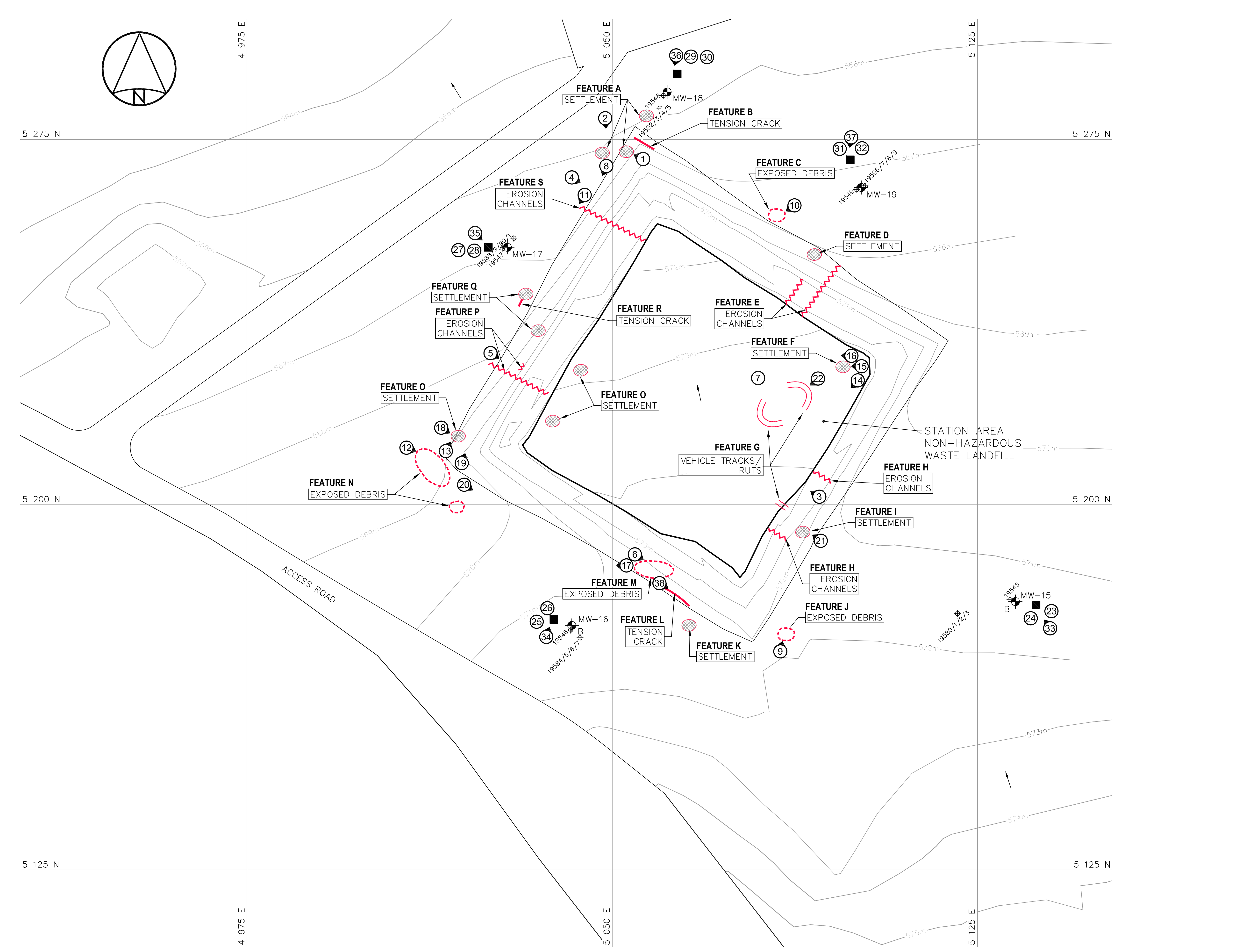
Soil samples were collected at five (5) locations as shown on the site plan. Surface and Subsurface samples were collected at each location. There were no deviations from the soil sampling work plan. Soil sampling completed at the landfill is summarized in Table 5.1.

Table 5.1: Summary of Work Conducted by Soil Sampling Location (Station Landfill)

Location	Surface Soil Sample Collected	Subsurface Soil Sample Collected
F5-STA-MW-15	√	√
F5-STA-MW-16	√	√
F5-STA-MW-17	√	√
F5-STA-MW-18	√	√ D
F5-STA-MW-19	√	√

D = duplicate sample collected
√ - sample collected
X – no sample collected

5.2.3 Groundwater Sampling



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PLOT: February-19-15 4:28:38 PM
Saved by: Paul Flemming (new)
SENES FILE NO.: 350600-515-3 FOX-5_Fig 4 - Station Area_Non-Haz Landfill.dwg

LEGEND:

- MW-17 MONITORING WELL LOCATION (3)
- MW-15 B BACKGROUND MONITORING WELL LOCATION (2)
- MONITORING SOIL SAMPLE LOCATION (5)
- 19 APPROX. PHOTOGRAPHIC VIEWPOINT
- 19580 SOIL SAMPLE TAG LOCATION
- 568m CONTOURS IN 1M INTERVALS
- OVERLAND FLOW DIRECTION
- EROSION CHANNEL
- AREA OF SETTLEMENT
- TENSION CRACK
- EXPOSED DEBRIS
- VEHICLE TRACKS/RUTS

NOTES:

1. LOCATIONS AND SCALE OF FEATURES ARE APPROXIMATE AND SHOWN FOR ILLUSTRATIVE PURPOSES ONLY.
2. PHOTOGRAPHS TAKEN AUG. 19 and 20, 2014.
3. HORIZONTAL CONTROL REFERENCED TO SURVEY CONTROL MONUMENTS.
4. ALL ELEVATIONS REFER TO MEAN SEA LEVEL.
5. ALL DIMENSIONS ARE IN METRES UNLESS NOTED OTHERWISE.

REVISIONS:

No.	Date:	By:	Revisions

REFERENCE:

AECOM, FILE No.: FOX-5.4 Year 6 LF MON.dwg, Feb. 2013

0 15 30 metres

SCALE 1:750

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PUBLIC WORKS AND GOVERNMENT SERVICES CANADA

2014 DEW LINE MONITORING PROGRAM

FOX-5 BROUGHTON ISLAND, NUNAVUT
STATION AREA
NON-HAZARDOUS WASTE LANDFILL

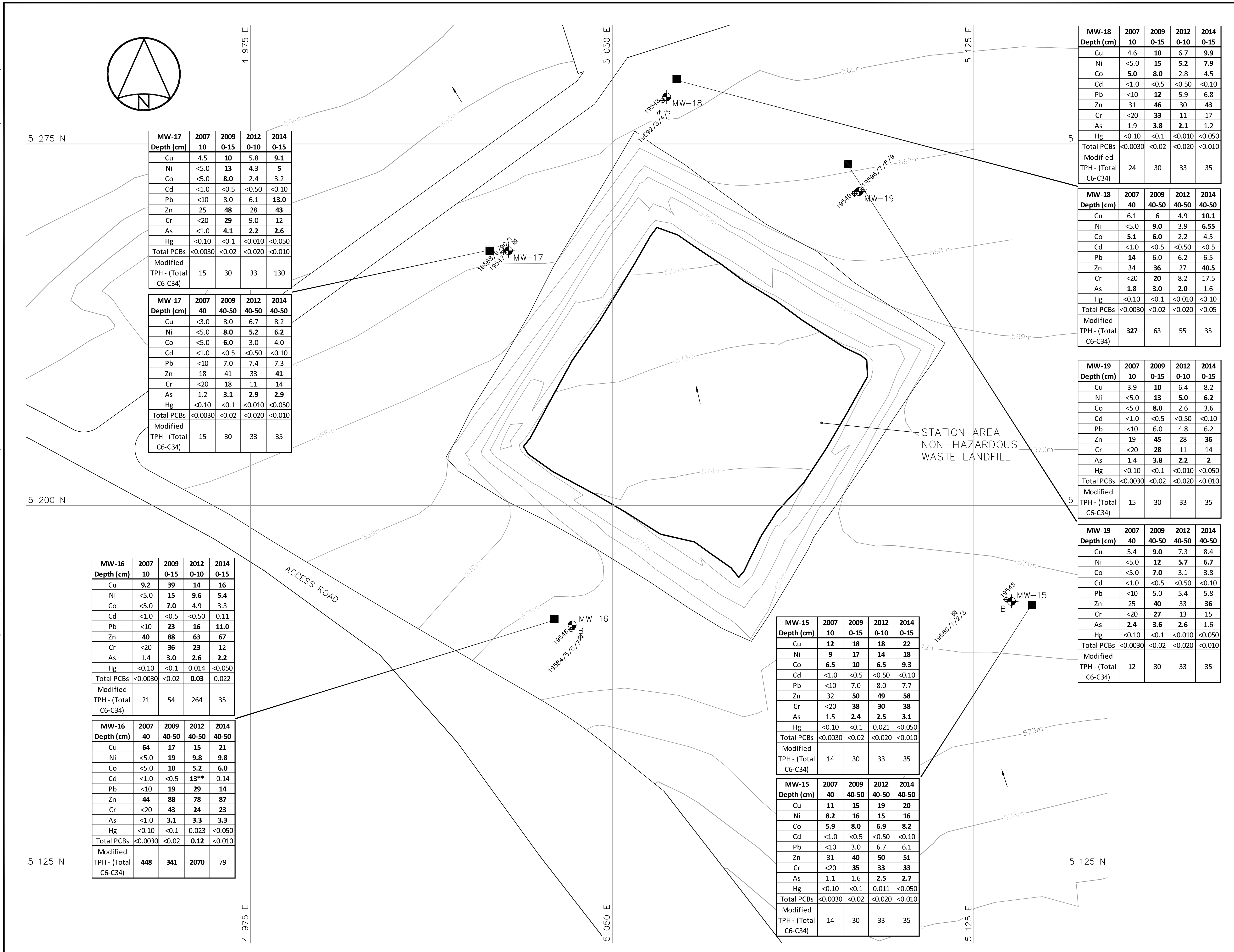
Drawn By: I.S.Z.	Approved By: C.F.G.	Project No: 350600-515-3
Date: FEB. 2015	Scale: 1:750	Drawing No: FIGURE 4

Sheet Size: 11 x 17 (432mm x 279mm)

PLOT: February-17-15 4:17:52 PM

Saved by: Izabela Ziba

SENES FILE NO.: 350600-515-3 FOX-5_Fig 4 - Station Area_Non-Haz Landfill.dwg



MW-17 Depth (cm)	2007 10	2009 0-15	2012 0-10	2014 0-15
Cu	4.5	**10**	5.8	**9.1**
Ni	<5.0	**13**	4.3	**5**
Co	<5.0	**8.0**	2.4	3.2
Cd	<1.0	<0.5	<0.50	<0.10
Pb	<10	8.0	6.1	**13.0**
Zn	25	**48**	28	**43**
Cr	<20	**29**	9.0	12
As	<1.0	**4.1**	**2.2**	**2.6**
Hg	<0.10	<0.1	<0.010	<0.050
Total PCBs	<0.0030	<0.02	<0.020	<0.010
Modified TPH - (Total C6-C34)	15	30	33	130

MW-17 Depth (cm)	2007 40	2009 40-50	2012 40-50	2014 40-50
Cu	<3.0	8.0	6.7	8.2
Ni	<5.0	**8.0**	**5.2**	**6.2**
Co	<5.0	**6.0**	3.0	4.0
Cd	<1.0	<0.5	<0.50	<0.10
Pb	<10	7.0	7.4	7.3
Zn	18	41	33	**41**
Cr	<20	18	11	14
As	1.2	**3.1**	**2.9**	**2.9**
Hg	<0.10	<0.1	<0.010	<0.050
Total PCBs	<0.0030	<0.02	<0.020	<0.010
Modified TPH - (Total C6-C34)	15	30	33	35

MW-16 Depth (cm)	2007 10	2009 0-15	2012 0-10	2014 0-15
Cu	**9.2**	**39**	**14**	**16**
Ni	<5.0	**15**	**9.6**	**5.4**
Co	<5.0	**7.0**	4.9	3.3
Cd	<1.0	<0.5	<0.50	0.11
Pb	<10	**23**	**16**	**11.0**
Zn	**40**	**88**	**63**	**67**
Cr	<20	**36**	**23**	12
As	1.4	**3.0**	**2.6**	**2.2**
Hg	<0.10	<0.1	0.014	<0.050
Total PCBs	<0.0030	<0.02	**0.03**	0.022
Modified TPH - (Total C6-C34)	21	54	264	35

MW-16 Depth (cm)	2007 40	2009 40-50	2012 40-50	2014 40-50
Cu	**64**	**17**	**15**	**21**
Ni	<5.0	**19**	**9.8**	**9.8**
Co	<5.0	**10**	**5.2**	**6.0**
Cd	<1.0	<0.5	13**	0.14
Pb	<10	**19**	**29**	**14**
Zn	**44**	**88**	**78**	**87**
Cr	<20	**43**	**24**	**23**
As	<1.0	**3.1**	**3.3**	**3.3**
Hg	<0.10	<0.1	0.023	<0.050
Total PCBs	<0.0030	<0.02	**0.12**	<0.010
Modified TPH - (Total C6-C34)	**448**	**341**	**2070**	79

MW-18 Depth (cm)	2007 10	2009 0-15	2012 0-10	2014 0-15
Cu	4.6	**10**	6.7	**9.9**
Ni	<5.0	**15**	**5.2**	**7.9**
Co	**5.0**	**8.0**	2.8	4.5
Cd	<1.0	<0.5	<0.50	<0.10
Pb	<10	**12**	5.9	6.8
Zn	31	**46**	30	**43**
Cr	<20	**33**	11	17
As	1.9	**3.8**	**2.1**	1.2
Hg	<0.10	<0.1	<0.010	<0.050
Total PCBs	<0.0030	<0.02	<0.020	<0.010
Modified TPH - (Total C6-C34)	24	30	33	35

MW-18 Depth (cm)	2007 40	2009 40-50	2012 40-50	2014 40-50
Cu	6.1	6	4.9	**10.1**
Ni	<5.0	**9.0**	3.9	**6.55**
Co	**5.1**	**6.0**	2.2	4.5
Cd	<1.0	<0.5	<0.50	<0.5
Pb	**14**	6.0	6.2	6.5
Zn	34	**36**	27	**40.5**
Cr	<20	**20**	8.2	17.5
As	**1.8**	**3.0**	**2.0**	1.6
Hg	<0.10	<0.1	<0.010	<0.10
Total PCBs	<0.0030	<0.02	<0.020	<0.05
Modified TPH - (Total C6-C34)	**327**	63	55	35

MW-19 Depth (cm)	2007 10	2009 0-15	2012 0-10	2014 0-15
Cu	3.9	**10**	6.4	8.2
Ni	<5.0	**13**	**5.0**	**6.2**
Co	<5.0	**8.0**	2.6	3.6
Cd	<1.0	<0.5	<0.50	<0.10
Pb	<10	6.0	4.8	6.2
Zn	19	**45**	28	**36**
Cr	<20	**28**	11	14
As	1.4	**3.8**	**2.2**	**2**
Hg	<0.10	<0.1	<0.010	<0.050
Total PCBs	<0.0030	<0.02	<0.020	<0.010
Modified TPH - (Total C6-C34)	15	30	33	35

MW-19 Depth (cm)	2007 40	2009 40-50	2012 40-50	2014 40-50
Cu	5.4	**9.0**	7.3	8.4
Ni	<5.0	**12**	**5.7**	**6.7**
Co	<5.0	**7.0**	3.1	3.8
Cd	<1.0	<0.5	<0.50	<0.10
Pb	<10	5.0	5.4	5.8
Zn	25	**40**	33	**36**
Cr	<20	**27**	13	15
As	**2.4**	**3.6**	**2.6**	1.6
Hg	<0.10	<0.1	<0.010	<0.050
Total PCBs	<0.0030	<0.02	<0.020	<0.010
Modified TPH - (Total C6-C34)	12	30	33	35

MW-15 Depth (cm)	2007 10	2009 0-15	2012 0-10	2014 0-15
Cu	**12**	**18**	**18**	**22**
Ni	**9**	**17**	**14**	**18**
Co	**6.5**	**10**	**6.5**	**9.3**
Cd	<1.0	<0.5	<0.50	<0.10
Pb	<10	7.0	8.0	7.7
Zn	32	**50**	**49**	**58**
Cr	<20	**38**	**30**	**38**
As	1.5	**2.4**	**2.5**	**3.1**
Hg	<0.10	<0.1	0.021	<0.050
Total PCBs	<0.0030	<0.02	<0.020	<0.010
Modified TPH - (Total C6-C34)	14	30	33	35

MW-15 Depth (cm)	2007 40	2009 40-50	2012 40-50	2014 40-50
Cu	**11**	**15**	**19**	**20**
Ni	**8.2**	**16**	**15**	**16**
Co	**5.9**	**8.0**	**6.9**	**8.2**
Cd	<1.0	<0.5	<0.50	<0.10
Pb	<10	3.0	6.7	6.1
Zn	31	**40**	**50**	**51**
Cr	<20	**35**	**33**	**33**
As	1.1	1.6	**2.5**	**2.7**
Hg	<0.10	<0.1	0.011	<0.050
Total PCBs	<0.0030	<0.02	<0.020	<0.010
Modified TPH - (Total C6-C34)	14	30	33	35

LEGEND:

- MW-17 MONITORING WELL LOCATION (3)
- MW-15 B BACKGROUND MONITORING WELL LOCATION (2)
- MONITORING SOIL SAMPLE LOCATION (5)
- 19580 SOIL SAMPLE TAG LOCATION
- 568m CONTOURS IN 1M INTERVALS
- OVERLAND FLOW DIRECTION

Parameter	Baseline Average Concentration	DEW Line Tier I Cleanup Criteria	DEW Line Tier II Cleanup Criteria
Cu	8.6	N/A	100
Ni	5.0	N/A	100
Co	5.0	N/A	50
Cd	1.0	N/A	5
Pb	10	200	500
Zn	35	N/A	500
Cr	20	N/A	250
As	1.8	N/A	130
Hg	0.10	N/A	2.0
Total PCBs	0.003	1	5
Modified TPH - (Total C6-C34)	299	N/A	2500

All Concentrations in ug/kg

Bold	Concentration is Equal to or Exceeds Baseline Average Concentration
*	Concentration Exceeds DEW Line Tier I Cleanup Criteria
**	Concentration Exceeds DEW Line Tier II Cleanup Criteria
-	No Concentration Reported
N/A	Not Applicable

NOTES:

1. HORIZONTAL CONTROL REFERENCED TO SURVEY CONTROL MONUMENTS.
2. ALL ELEVATIONS REFER TO MEAN SEA LEVEL.
3. ALL DIMENSIONS ARE IN METRES UNLESS NOTED OTHERWISE.

REFERENCE:

AECOM, FILE No.: FOX-5.4 Year 6 LF MON.dwg, Feb. 2013

0 15 30 metres

SCALE 1:750

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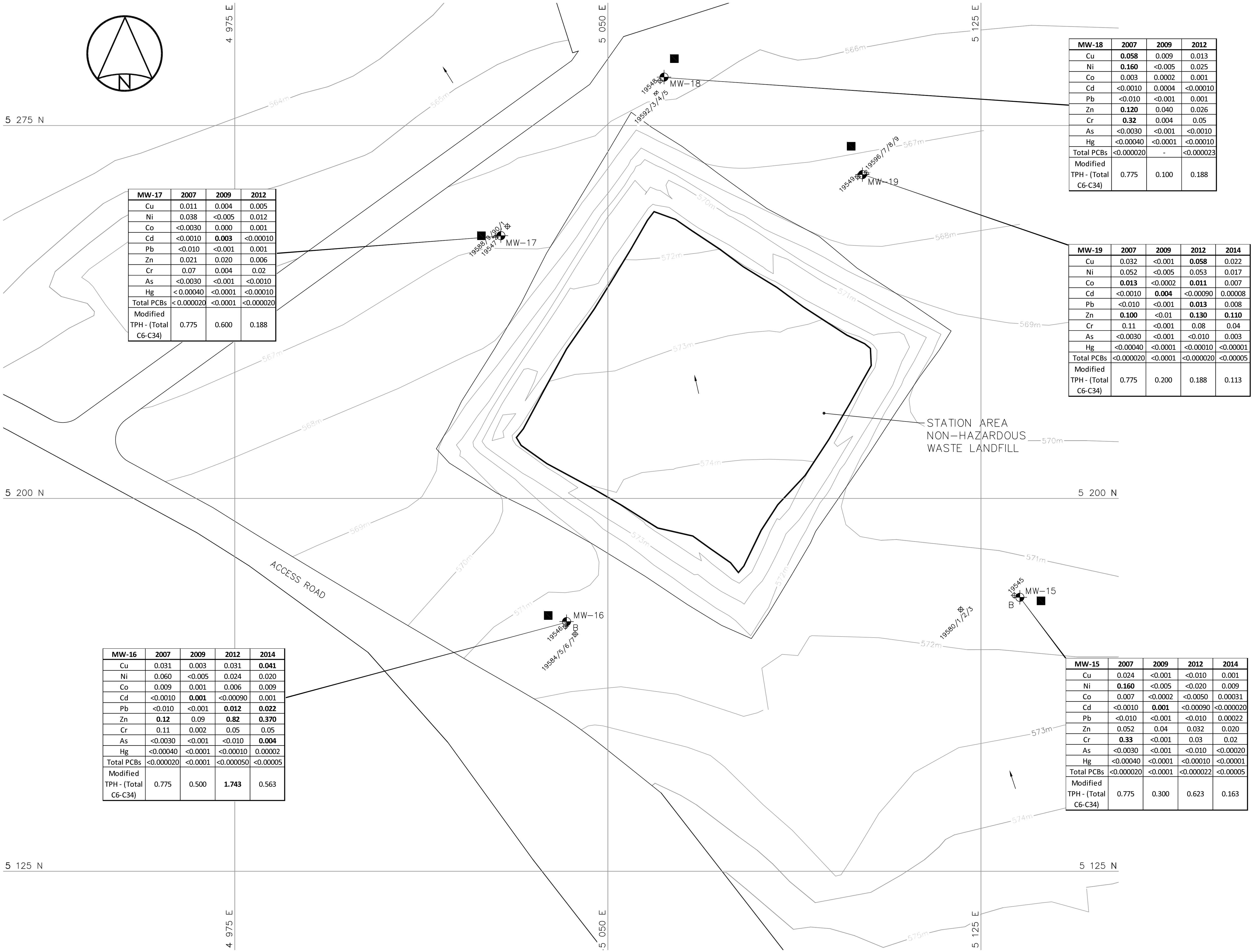
PUBLIC WORKS AND GOVERNMENT SERVICES CANADA

2014 DEW LINE MONITORING PROGRAM

FOX-5 BROUGHTON ISLAND, NUNAVUT
STATION AREA
NON-HAZARDOUS WASTE LANDFILL
SOIL CONTAMINANT DISTRIBUTION PLAN

Drawn By: I.S.Z.	Approved By: C.F.G.	Project No: 350600-515-3
Date: FEB. 2015	Scale: 1:750	Drawing No: FIGURE 4A



MW-17	2007	2009	2012
Cu	0.011	0.004	0.005
Ni	0.038	<0.005	0.012
Co	<0.0030	0.000	0.001
Cd	<0.0010	**0.003**	<0.00010
Pb	<0.010	<0.001	0.001
Zn	0.021	0.020	0.006
Cr	0.07	0.004	0.02
As	<0.0030	<0.001	<0.0010
Hg	< 0.00040	<0.0001	<0.00010
Total PCBs	< 0.000020	<0.0001	<0.000020
Modified TPH - (Total C6-C34)	0.775	0.600	0.188

MW-18	2007	2009	2012
Cu	**0.058**	0.009	0.013
Ni	**0.160**	<0.005	0.025
Co	0.003	0.0002	0.001
Cd	<0.0010	0.0004	<0.00010
Pb	<0.010	<0.001	0.001
Zn	**0.120**	0.040	0.026
Cr	**0.32**	0.004	0.05
As	<0.0030	<0.001	<0.0010
Hg	<0.00040	<0.0001	<0.00010
Total PCBs	<0.000020	-	<0.000023
Modified TPH - (Total C6-C34)	0.775	0.100	0.188

MW-19	2007	2009	2012	2014
Cu	0.032	<0.001	**0.058**	0.022
Ni	0.052	<0.005	0.053	0.017
Co	**0.013**	<0.0002	**0.011**	0.007
Cd	<0.0010	**0.004**	<0.00090	0.00008
Pb	<0.010	<0.001	**0.013**	0.008
Zn	**0.100**	<0.01	**0.130**	**0.110**
Cr	0.11	<0.001	0.08	0.04
As	<0.0030	<0.001	<0.010	0.003
Hg	<0.00040	<0.0001	<0.00010	<0.00001
Total PCBs	<0.000020	<0.0001	<0.000020	<0.00005
Modified TPH - (Total C6-C34)	0.775	0.200	0.188	0.113

MW-16	2007	2009	2012	2014
Cu	0.031	0.003	0.031	**0.041**
Ni	0.060	<0.005	0.024	0.020
Co	0.009	0.001	0.006	0.009
Cd	<0.0010	**0.001**	<0.00090	0.001
Pb	<0.010	<0.001	**0.012**	**0.022**
Zn	**0.12**	0.09	**0.82**	**0.370**
Cr	0.11	0.002	0.05	0.05
As	<0.0030	<0.001	<0.010	**0.004**
Hg	<0.00040	<0.0001	<0.00010	0.00002
Total PCBs	<0.000020	<0.0001	<0.000050	<0.00005
Modified TPH - (Total C6-C34)	0.775	0.500	**1.743**	0.563

MW-15	2007	2009	2012	2014
Cu	0.024	<0.001	<0.010	0.001
Ni	**0.160**	<0.005	<0.020	0.009
Co	0.007	<0.0002	<0.0050	0.00031
Cd	<0.0010	**0.001**	<0.00090	<0.000020
Pb	<0.010	<0.001	<0.010	0.00022
Zn	0.052	0.04	0.032	0.020
Cr	**0.33**	<0.001	0.03	0.02
As	<0.0030	<0.001	<0.010	<0.00020
Hg	<0.00040	<0.0001	<0.00010	<0.00001
Total PCBs	<0.000020	<0.0001	<0.000022	<0.00005
Modified TPH - (Total C6-C34)	0.775	0.300	0.623	0.163

LEGEND:

- MW-17 MONITORING WELL LOCATION (3)
- MW-15 B BACKGROUND MONITORING WELL LOCATION (2)
- MONITORING SOIL SAMPLE LOCATION (5)
- 19580 SOIL SAMPLE TAG LOCATION
- 568m CONTOURS IN 1M INTERVALS
- OVERLAND FLOW DIRECTION

Parameter	Baseline Average Concentration
Cu	0.036
Ni	0.075
Co	0.010
Cd	0.001
Pb	0.01
Zn	0.097
Cr	0.116
As	0.003
Hg	0.004
Total PCBs	0.00002
Modified TPH - (Total C6-C34)	1

All Concentrations in mg/L

Bold	Concentration is Equal to or Exceeds Baseline Average Concentration
-	No Concentration Reported
N/A	Not Applicable

NOTES:

1. HORIZONTAL CONTROL REFERENCED TO SURVEY CONTROL MONUMENTS.
2. ALL ELEVATIONS REFER TO MEAN SEA LEVEL.
3. ALL DIMENSIONS ARE IN METRES UNLESS NOTED OTHERWISE.

REFERENCE:

AECOM, FILE No.: FOX-5.4 Year 6 LF MON.dwg, Feb. 2013

0 15 30 metres

SCALE 1:750

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PUBLIC WORKS AND GOVERNMENT SERVICES CANADA
2014 DEW LINE MONITORING PROGRAM

FOX-5 BROUGHTON ISLAND, NUNAVUT
STATION AREA
NON-HAZARDOUS WASTE LANDFILL

GROUNDWATER CONTAMINANT DISTRIBUTION PLAN

Drawn By: I.S.Z.	Approved By: C.F.G.	Project No: 350600-515-3
Date: FEB. 2015	Scale: 1:750	Drawing No: FIGURE 4B

Sheet Size: 11 x 17 (432mm x 279mm)
PLOT: February-17-15 4:18:26 PM
Saved by: Izabela Ziba
SENES FILE NO.: 350600-515-3 FOX-5_Fig 4 - Station Area_Non-Haz Landfill.dwg

Groundwater monitoring was completed at five monitoring wells as shown on Figure 4. Groundwater monitoring and sampling at the Station Non-Hazardous Waste Landfill was generally completed as per the work plan. As indicated in Table 5.2, groundwater samples were not collected from two of five monitoring wells at this landfill as the wells had insufficient water. No duplicate groundwater samples were collected at this landfill.

Table 5.2: Summary of Work Conducted by Groundwater Sampling Location (Station Landfill)

Location	Visual Inspection/ Groundwater Monitoring	Sample collected for PCB analysis	Sample collected for metals analysis	Sample collected for PHCs F1-F4 analysis
F5-STA-MW-15	√	√	√	√
F5-STA-MW-16	√	√	√	√
F5-STA-MW-17	√	X[I]	X[I]	X[I]
F5-STA-MW-18	√	X[I]	X[I]	X[I]
F5-STA-MW-19	√	√	√	√

D - duplicate sample collected
√ - sample collected
X – no sample collected
N – no water in well (well was dry)
I – insufficient water in well to collect sample

No wells at the Station Non-Hazardous Waste Landfill have been reported to be dry during the previous monitoring events.

5.2.4 Thermal Monitoring

No thermal monitoring was completed at this landfill as no thermal monitoring installations have been installed at this landfill.

5.3 RESULTS OF THE MONITORING PROGRAM

5.3.1 Visual Inspection

The visual inspection at the Station Non-Hazardous Waste Landfill was completed on 20 August 2014. The visual inspection checklist completed during the site inspection is provided in Table 5.3.

5.3.1.1 Stability Assessment

TABLE 5.3 - VISUAL INSPECTION CHECKLIST

DEW LINE CLEANUP: POST-CONSTRUCTION - LANDFILL MONITORING
INSPECTION REPORT – PAGE 1 OF 2

SITE NAME: FOX-5
LANDFILL DESIGNATION: Station Non-Hazardous Waste Landfill
DATE OF INSPECTION: 20 August 2014
DATE OF PREVIOUS INSPECTION: 13-16 August 2012
INSPECTED BY: S. Borcsok, J. Mauchan
REPORT PREPARED BY: S. Borcsok
The inspector/reporter represents to the best of their 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.

TABLE 5.3 - VISUAL INSPECTION CHECKLIST - INSPECTION REPORT – PAGE 2 OF 2

Checklist Item	Present Yes/No	Location (Describe relative to existing monuments/features and relative to landfill design i.e. surface, berms, toe)	Length	Width	Depth	Extent relative to Area of Landfill (%)	Description	Photographic Records Focal length, location, view point & direction (relative to magnetic north) Feature of note Scale	Additional Comments
Settlement	YES	Occasional areas of minor settlement on berms, top cover, and outside toe **(FEATURE A, D, F, I, K, O, Q)**	0.5m (typ.)	0.5m (typ.)	0.2m (typ.)	1%	Small holes and depressions	P-1, P-2, P-4, P-8, P-15, P-21,	
Erosion	YES	Erosion channels going downhill on northwest, northeast and southeast berms **(FEATURE E, H, P, S)**	10-15m (typ.)	0.2m (typ.)	0.1m (typ.)	1%	Erosion channels flowing down berms	P-3, P-5,	
Frost Action	NO								
Sloughing and Cracking	YES	Tension cracks on southwest berm and at north corner of landfill **(FEATURE B, L, R)**	1m, 6m on south berm, 5m on north berm			<1%	Tension cracks on landfill berms	P-38	
Animal Burrows	NO								No burrows observed, but an arctic hare was observed near the landfill
Vegetation	YES	Very sparse shrubs and grasses on berms and top of landfill				<1%	Small shrubs and grasses	P-32	
Staining	NO								
Vegetation Stress	NO								
Seepage Points	NO								
Debris Exposed	YES	Occasional debris was observed outside the landfill at the southwest corner, southeast corner, and north of the landfill, and on the south berm **(FEATURE C, J, M, N)**				<1%	Small pieces of metal and wood, north of the landfill is a large piece of reinforced concrete (2m x 1m x 0.5m)	P-6, P-7, P-9, P-10, P-12, P-13,	Debris not suspected to have originated within the landfill
Presence/Condition – Monitoring Instruments	YES	Outside perimeter of landfill, see Figure 3					Five monitoring wells	P-33 to P-37	
Features of Note	YES	Vehicle (ATV) tracks and ruts on top surface of landfill **(FEATURE G)**				1%		P-3, P-22	

The preliminary stability assessment completed during the site inspection is provided in Table 5.4.

5.3.1.2 Photographic Records

The photograph log for the site is provided in Table 5.5.

5.3.1.3 Trend Analysis

Trend analysis for visual inspections during the current 2014 monitoring event and the previous 2012 monitoring event are provided below in Table 5.6.

Table 5.4: Preliminary Stability Assessment - FOX-5 Station Non-Hazardous Landfill

Feature	Severity Rating	Extent
Settlement	Acceptable	Occasional
Erosion	Acceptable	Occasional
Frost Action	None	None
Staining	None	None
Vegetation Stress	None	None
Seepage/Ponded Water	None	None
Debris exposure	Acceptable	Occasional
Overall Landfill Performance: ACCEPTABLE		

Performance/ Severity Rating	Description
Acceptable	Noted features are of little consequence. The landfill is performing as designed. Minor deviations in environmental or physical performance may be observed, such as isolated areas of erosion, settlement.
Marginal	Physical/environmental performance appears to be deteriorating with time. Observations may include an increase in size or number of features of note, such as differential settlement, erosion or cracking. No significant impact on landfill stability to date, but potential for failure is assessed as low or moderate.
Significant	Significant or potentially significant changes affecting landfill stability, such as significant changes in slope geometry, significant erosion or differential settlement; scarp development. The potential for failure is assessed as imminent.
Unacceptable	Stability of landfill is compromised to the extent that ability to contain waste materials is compromised. Examples may include: - Debris exposed in erosion channels or areas of differential settlement. - Liner exposed. - Slope failure.

Extent	Description
Isolated	Singular feature
Occasional	Features of note occurring at irregular intervals/locations
Numerous	Many features of note, impacted less than 50% of the surface area of the landfill
Extensive	Impacting greater than 50% of the surface area of the landfill

TABLE 5.5: LANDFILL VISUAL INSPECTION PHOTO LOG (STATION LANDFILL)

Station Area NHWL (see Figure 4)

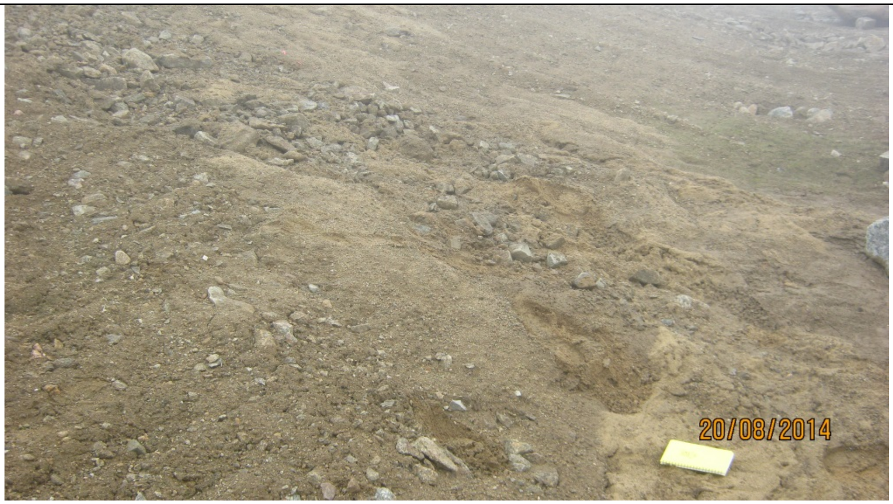
Photo 1 (FOX-5 SA P-1.jpg)	Photo 2 (FOX-5 SA P-2.jpg)
Description: View looking down slope at minor settlement. **(FEATURE A)**	Description: View looking southwest along toe of landfill. Minor settlement noted at toe. **(FEATURE A)**
	
Date: August 20, 2014	Date: August 20, 2014

TABLE 5.5: LANDFILL VISUAL INSPECTION PHOTO LOG (STATION LANDFILL)

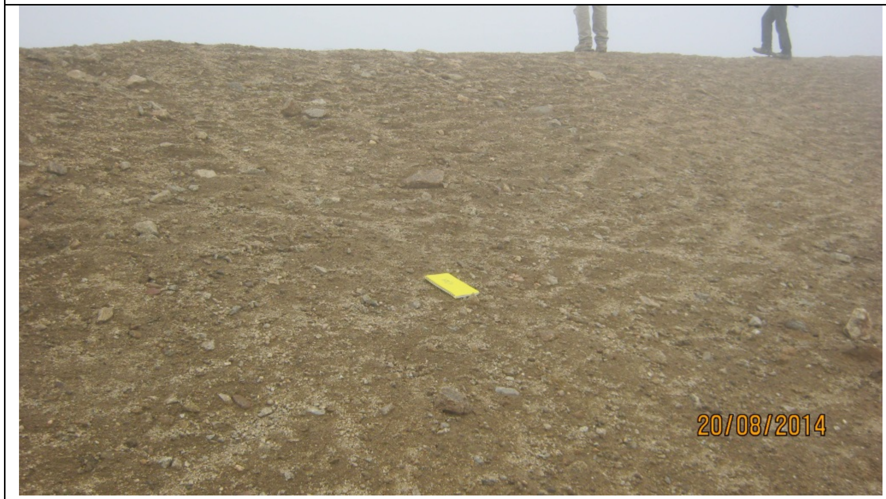
Photo 3 (FOX-5 SA P-3.jpg)	Photo 4 (FOX-5 SA P-4.jpg)
Description: View looking up hill toward minor erosion channels likely initiated by vehicle tracks/ruts. **(FEATURE H)**	Description: View looking southeast of near the north corner of the Station Area landfill. Minor settlement noted. **(FEATURE A)**
	
Date: August 20, 2014	Date: August 20, 2014

TABLE 5.5: LANDFILL VISUAL INSPECTION PHOTO LOG (STATION LANDFILL)

Photo 5 (FOX-5 SA P-5.jpg)	Photo 6 (FOX-5 SA P-6.jpg)
Description: View of erosion channel on northwest wall of landfill. **(FEATURE P)**	Description: View of minor amounts of debris on southwestern landfill wall. **(FEATURE M)**
	
Date: August 20, 2014	Date: August 20, 2014

TABLE 5.5: LANDFILL VISUAL INSPECTION PHOTO LOG (STATION LANDFILL)

Photo 7 (FOX-5 SA P-7.jpg)	Photo 8 (FOX-5 SA P-8.jpg)
Description: An example of the minor debris on landfill cap.	Description: View southwest along landfill wall. Settlement observed. **(FEATURE A)**
	
Date: August 20, 2014	Date: August 20, 2014

TABLE 5.5: LANDFILL VISUAL INSPECTION PHOTO LOG (STATION LANDFILL)

Photo 9 (FOX-5 SA P-9.jpg)	Photo 10 (FOX-5 SA P-10.jpg)
Description: Exposed debris near southern corner of landfill. Debris included metal strapping. **(FEATURE J)**	Description: Debris adjacent to northeast wall of landfill. Concrete piece with rebar is seen in photo. **(FEATURE C)**
	
Date: August 20, 2014	Date: August 20, 2014

TABLE 5.5: LANDFILL VISUAL INSPECTION PHOTO LOG (STATION LANDFILL)

Photo 11 (FOX-5 SA P-11.jpg)	Photo 12 (FOX-5 SA P-12.jpg)
Description: View southwest along northwestern toe of landfill.	Description: View east toward western corner of landfill. Observed debris included metal strapping, seen adjacent to field book. **(FEATURE N)**
	
Date: August 20, 2014	Date: August 20, 2014

TABLE 5.5: LANDFILL VISUAL INSPECTION PHOTO LOG (STATION LANDFILL)

<table>
<tr><td>Photo 13 (FOX-5 SA P-13.jpg)</td><td>Photo 14 (FOX-5 SA P-14.jpg)</td></tr>
<tr><td>Description: View of debris at eastern toe of landfill. Debris includes metal strapping and rope. (FEATURE N)</td><td>Description: View south along eastern edge of cap.</td></tr>
<tr><td>
</td><td>
</td></tr>
<tr><td>Date: August 20, 2014</td><td>Date: August 20, 2014</td></tr>
</table>

TABLE 5.5: LANDFILL VISUAL INSPECTION PHOTO LOG (STATION LANDFILL)

Photo 15 (FOX-5 SA P-15.jpg)	Photo 16 (FOX-5 SA P-16.jpg)
Description: View of minor settlement observed at eastern end of cap. **(FEATURE F)**	Description: View west along northern end of cap.
	
Date: August 20, 2014	Date: August 20, 2014

TABLE 5.5: LANDFILL VISUAL INSPECTION PHOTO LOG (STATION LANDFILL)

Photo 17 (FOX-5 SA P-17.jpg)	Photo 18 (FOX-5 SA P-18.jpg)
Description: View west along southern toe of landfill.	Description: Minor settlement observed at western toe of landfill. **(FEATURE O)**
	
Date: August 20, 2014	Date: August 20, 2014

TABLE 5.5: LANDFILL VISUAL INSPECTION PHOTO LOG (STATION LANDFILL)

<table>
<tr><td>Photo 19 (FOX-5 SA P-19.jpg)</td><td>Photo 20 (FOX-5 SA P-20.jpg)</td></tr>
<tr><td>Description: View north along western slope of landfill.</td><td>Description: View east along southern slope of landfill.</td></tr>
<tr><td>
</td><td>
</td></tr>
<tr><td>Date: August 20, 2014</td><td>Date: August 20, 2014</td></tr>
</table>

TABLE 5.5: LANDFILL VISUAL INSPECTION PHOTO LOG (STATION LANDFILL)

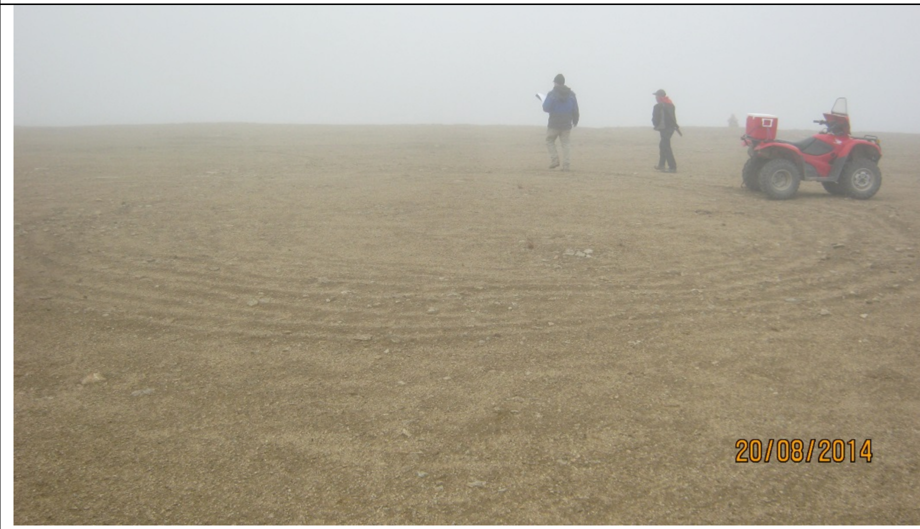
Photo 21 (FOX-5 SA P-21.jpg)	Photo 22 (FOX-5 SA P-22.jpg)
Description: View of minor settlement on eastern slope of landfill. **(FEATURE I)**	Description: View looking west of vehicle tracks/ruts, from eastern corner.
	
Date: August 20, 2014	Date: August 20, 2014

TABLE 5.5: LANDFILL VISUAL INSPECTION PHOTO LOG (STATION LANDFILL)

Photo 23 (FOX-5 SA P-23.jpg)	Photo 24 (FOX-5 SA P-24.jpg)
Description: F5-SA-MW-15 during sample collection.	Description: F5-SA-MW-15 after sample collection and backfill.
	
Date: August 20, 2014	Date: August 20, 2014

TABLE 5.5: LANDFILL VISUAL INSPECTION PHOTO LOG (STATION LANDFILL)

Photo 25 (FOX-5 SA P-25.jpg)	Photo 26 (FOX-5 SA P-26.jpg)
Description: F5-SA-MW-16 during sample collection.	Description: F5-SA-MW-16 after sample collection and backfill.
	
Date: August 20, 2014	Date: August 20, 2014

TABLE 5.5: LANDFILL VISUAL INSPECTION PHOTO LOG (STATION LANDFILL)

Photo 27 (FOX-5 SA P-27.jpg)	Photo 28 (FOX-5 SA P-28.jpg)
Description: F5-SA-MW-17 during sample collection.	Description: F5-SA-MW-17 after sample collection and backfill.
	
Date: August 20, 2014	Date: August 20, 2014

TABLE 5.5: LANDFILL VISUAL INSPECTION PHOTO LOG (STATION LANDFILL)

Photo 29 (FOX-5 SA P-29.jpg)	Photo 30 (FOX-5 SA P-30.jpg)
Description: F5-SA-MW-18 during sample collection.	Description: F5-SA-MW-18 after sample collection and backfill.
	
Date: August 20, 2014	Date: August 20, 2014

TABLE 5.5: LANDFILL VISUAL INSPECTION PHOTO LOG (STATION LANDFILL)

Photo 31 (FOX-5 SA P-31.jpg)	Photo 32 (FOX-5 SA P-32.jpg)
Description: F5-SA-MW-19 during sample collection.	Description: F5-SA-MW-19 after sample collection and backfill.
	
Date: August 20, 2014	Date: August 20, 2014

TABLE 5.5: LANDFILL VISUAL INSPECTION PHOTO LOG (STATION LANDFILL)

Photo 33 (FOX-5 SA P-33.jpg)	Photo 34 (FOX-5 SA P-34.jpg)
Description: View northwest toward MW-15 and landfill.	Description: View northeast toward MW-16. ATVs parked on landfill cap.
	
Date: August 20, 2014	Date: August 20, 2014

TABLE 5.5: LANDFILL VISUAL INSPECTION PHOTO LOG (STATION LANDFILL)

Photo 35 (FOX-5 SA P-35.jpg)	Photo 36 (FOX-5 SA P-36.jpg)
Description: View southeast toward MW-17.	Description: View south toward MW-18.
	
Date: August 20, 2014	Date: August 20, 2014

TABLE 5.5: LANDFILL VISUAL INSPECTION PHOTO LOG (STATION LANDFILL)

Photo 37 (FOX-5 SA P-37.jpg)	Photo 38 (FOX-5 SA P-38.jpg)
Description: View of MW-19. Northern slope of landfill seen in the background.	Description: View of tension crack on southwestern slope of landfill. **(FEATURE L)**
	
Date: August 20, 2014	Date: August 20, 2014

Table 5.6: Visual Inspection Trends (Station Landfill)

Item	AECOM 2012 Observations	SENES 2014 Observations	Trend
Settlement	Minor settlement was observed occasionally on the berms and top cover of the landfill. A number of sinkholes were observed on the southwest, northeast, and northwest sides of the landfill. Several settlement areas previously identified on the landfill cover were filled as part of the construction activities in 2011.	Minor settlement was observed occasionally on the berms and on top of the landfill. (Feature A, D, F, I, K, O, Q)	Minor areas of settlement were noted in the previous and current monitoring events but sinkholes were not observed during the 2014 event.
Erosion	Erosion was observed on the northwest and northeast slopes in preferred channels that appear to have selfarmoured. Some minor erosion was seen around large cobbles on the southeast and northwest side. Some of the minor channels still have some fines that are migrating from the landfill cover to the toe.	Minor erosion channels were observed on the northwest, northeast, and southeast berms of the landfill. (Feature E, H, P, S)	Erosion channels are becoming more numerous on the landfill but are not negatively affecting the performance of the landfill.
Frost Action	Indications of frost action were not evident.	None observed.	None observed at this landfill.
Sloughing and Cracking	Tension cracks were noted on berms and outside the landfill.	Small tension cracks were observed on the berms on the south and north ends of the landfill. (Feature B, L, R)	Tension cracks remain present but do not appear to be worsening with time.
Animal Burrows	Evidence of burrowing animals was not observed.	None observed. An arctic hare was observed in the vicinity of the landfill during the site inspection.	None observed at this landfill. It is not expected that animals are using the landfill as a site for burrows.
Vegetation	One isolated shrub (unidentified) and some green colouring was observed on the top cover of the landfill.	Isolated small pieces of vegetation were observed on the berms and top of the landfill.	Vegetation is slowly establishing itself on the landfill.
Staining	Staining was not observed at the landfill.	None observed.	None observed at this landfill.
Vegetation Stress	None noted.	None observed.	None observed at this landfill.

Item	AECOM 2012 Observations	SENES 2014 Observations	Trend
Seepage Points	Moisture was evident at the northwest berm of the landfill. It was not known if the moisture was originating from within the landfill or from surface drainage. Some washed rock observed near the north corner of the northwest berm is indicative of water exiting the berm at that location.	None observed.	Seepage may be occurring from the landfill at certain times of the year, however it does not appear to be negatively affecting the performance of the landfill.
Debris Exposed	Several small pieces of metal or wood and one large piece of concrete were observed around and between the west and south corners of the landfill. The large piece of reinforced concrete was located at the toe of the northeast berm. It is not suspected that the debris originated from within the landfill.	Several small pieces of metal and wood debris were observed around the landfill. One large piece of reinforced concrete was observed north of the landfill. The debris is not suspected to have originated within the landfill. (Feature C, J, M, N)	Debris exposure is minor and debris did not originate from within the landfill. The large piece of reinforced concrete is not negatively affecting the landfill performance.
Presence/Condition of Monitoring Instruments	Five monitoring wells were observed around the landfill.	Five monitoring wells were observed around the landfill. Standing water was noted in the casing around the standpipe at MW-19.	Monitoring well installations continue to be in good condition.
Other Features of Note	None noted.	Vehicle tracks and ruts on top surface of landfill. (Feature G)	Minor tracks and ruts are now present at the landfill.

5.3.1.4 Discussion of Results/Trends

The results of the visual inspection indicate that the performance of the landfill is acceptable. All identified issues were minor and of no consequence to the performance of the landfill.

The findings of the 2014 investigation are consistent with those of the 2012 investigation. No trends were observed that are indicative of degradation of the performance of the landfill.

5.3.2 Soil Sampling

Soil sampling at the Station Non-Hazardous Waste Landfill was completed on 19 August 2014. As previously reported a total of eleven samples including one duplicate sample were procured from five locations as shown in plan on Figure 2.

5.3.2.1 Laboratory Analytical Results

The laboratory analytical results for soil samples collected at the Station Non-Hazardous Waste Landfill during the 2014 monitoring event are provided in Table 5.7. A duplicate soil sample was collected at depth at MW-18 and was submitted to AGAT, a secondary laboratory for QA/QC purposes. The RPDs for the duplicate sample results were below 30%, indicating good agreeability of the results.

5.3.2.2 Discussion of Results – Comparison to Baseline

A discussion of the analytical results for each parameter analyzed in soil samples collected at the Station Non-Hazardous Waste Landfill during the 2014 monitoring event are provided in Table 5.8. The discussion includes a comparison of results from upgradient (MW-15, MW-16) and downgradient (MW17, MW-18, MW-19) soil sampling locations to baseline average concentrations (BAC) that have been determined for each landfill from soil chemistry at the landfill area prior to and during remediation.

TABLE 5.7

RESULTS OF ANALYSIS FOR PARAMETERS IN SOIL AT STATION NON-HAZARDOUS WASTE LANDFILL

PARAMETERS	Background Concentration (_)	Baseline Average Concentration (+)	DEW Line Cleanup Tier I Criteria (*)	DEW Line Cleanup Tier II Criteria (**)	F5-SA MW-15-S 0-15 cm 19-Aug-14	F5-SA MW-15-D 40-50 cm 19-Aug-14	F5-SA MW-16-S 0-15 cm 19-Aug-14	F5-SA MW-16-D 40-50 cm 19-Aug-14	F5-SA MW-17-S 0-15 cm 19-Aug-14	F5-SA MW-17-D 40-50 cm 19-Aug-14	F5-SA MW-18-S 0-15 cm 19-Aug-14	F5-SA MW-18-D 40-50 cm 19-Aug-14	F5-SA MW-18-D (DUP) 40-50 cm 19-Aug-14	F5-SA MW-18-D (AVG) 40-50 cm 19-Aug-14	F5-SA MW-19-S 0-15 cm 19-Aug-14	F5-SA MW-19-D 40-50 cm 19-Aug-14
Copper	**10**	**8.6**	-	**100**	22+	20+	16+	21+	9.1+	8.2	9.9+	9.2+	11+	10.1+	8.2	8.4
Nickel	**5.3**	**5.0**	-	**100**	18+	16+	5.4+	9.8+	5.0	6.2+	7.9+	7.1+	6+	6.55+	6.2+	6.7+
Cobalt	**4.0**	**5.0**	-	**50**	9.3+	8.2+	3.3	6+	3.2	4	4.5	4.4	4.5	4.45	3.6	3.8
Cadmium	**1.0**	**1.0**	-	**5**	<0.10	<0.10	0.11	0.14	<0.10	<0.10	<0.10	<0.10	<0.5	<0.5	<0.10	<0.10
Lead	**5.0**	**10**	**200**	**500**	7.7	6.1	11+	14+	13+	7.3	6.8	5.9	7	6.45	6.2	5.8
Zinc	**46**	**35**	-	**500**	58+	51+	67+	87+	43+	41+	43+	39+	42+	40.5+	36+	36+
Chromium	**19**	**20**	-	**250**	38+	33+	12	23+	12	14	17	17	18	17.5	14	15
Arsenic	**1.93**	**1.8**	-	**30**	3.1+	2.7+	2.2+	3.3+	2.6+	2.9+	1.2	1.2	2	1.6	2.0+	1.6
Mercury	**0.5**	**0.10**	-	**2**	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.10	<0.10	<0.050	<0.050
Total PCBs	**0.001**	**0.003**	**1**	**5**	<0.010	<0.010	0.022	<0.010	<0.010	<0.010	<0.010	<0.010	<0.05	<0.05	<0.010	<0.010
PHC F1 (C6-C10)	-	-	-	-	<10	<10	<10	<10	<10	<10	<10	<10	<5	<10	<10	<10
PHC F2 (C10-C16)	-	-	-	-	<10	<10	<10	23	<10	<10	<10	<10	<10	<10	<10	<10
PHC F3 (C16-C34)	-	-	-	-	<50	<50	<50	51	120	<50	<50	<50	<50	<50	<50	<50
PHC F4 (C34-C50)	-	-	-	-	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50
Modifed TPH (Total C6-C34)	**5.0**	**299**	-	**2500**	35	35	35	79	130	35	35	35	35	35	35	35

NOTES:

All parameter values in µg/g (ppm) unless otherwise indicated.

_ Exceeds FOX-5 Station Non-Hazardous Waste Landfill Background Concentration.
+ Exceeds FOX-5 Station Non-Hazardous Waste Landfill Baseline Average Concentration.
+ Exceeds DEW Line Cleanup Tier I Criteria.
* Exceeds DEW Line Cleanup Tier II Criteria.

(DUP) Duplicate sample analyzed by AGAT Laboratories for QA/QC purposes.
(AVG) Average concentration of duplicate samples.
< Not detected.
- No concentration reported.

Table 5.8: Evaluation of 2014 Soil Analytical Data (Station Landfill)

Parameter	Baseline Average Concentration (ug/g)	2014 Results
Copper	9.0	Detectable concentrations ranged between 16 and 22 ug/g for upgradient samples and 8.2 and 11 ug/g in downgradient samples, with the highest concentration recorded in the surface sample at the MW-15 sample location and the lowest concentration recorded in the surface sample at the MW-19 sample location and in the subsurface sample at the MW-17 sample location. Three of the eleven samples reported concentrations less than the BAC, while eight of the eleven samples reported a concentration slightly higher than the BAC.
Nickel	5.0	Detectable concentrations ranged between 5.4 and 18 ug/g for upgradient samples and 5.0 and 7.9 ug/g for downgradient samples, with the highest concentration recorded in the surface sample at the MW-15 sample location and the lowest concentration recorded in the surface sample at the MW-17 sample location. One of eleven samples reported a concentration equivalent to the BAC, while ten of the eleven samples reported a concentration slightly higher than the BAC.
Cobalt	5.0	Detectable concentrations ranged between 3.3 and 9.3 ug/g for upgradient samples and 3.2 and 4.5 ug/g for downgradient samples, with the highest concentration recorded in the surface sample at the MW-15 sample location and the lowest concentration recorded at surface at the MW-17 sample location. Eight of the eleven samples reported concentrations less than the BAC, while three of the eleven samples reported a concentration slightly higher than the BAC.
Cadmium	1.0	Detectable concentrations of 0.11 and 0.44 ug/g were reported in surface and subsurface samples, respectively, at the upgradient MW-16 sample location. All eleven samples reported concentrations below the BAC.
Lead	10	Detectable concentrations ranged between 6.1 and 14 ug/g for upgradient samples and 5.8 and 13 ug/g for downgradient samples, with the highest concentration recorded in the subsurface sample at the MW-16 sample location and the lowest concentration recorded in the subsurface sample at the MW-19 sample location. Eight of the eleven samples reported concentrations less than the BAC, while three of the eleven samples reported a concentration slightly higher than the BAC.
Zinc	35	Detectable concentrations ranged between 51 and 87 ug/g for upgradient samples and 36 and 43 ug/g for downgradient samples, with the highest concentration recorded in the subsurface sample at the MW-16 sample location and the lowest concentration recorded in surface and subsurface samples at the MW-19 sample location. All eleven samples reported concentrations slightly above the BAC.

Parameter	Baseline Average Concentration (ug/g)	2014 Results
Chromium	20	Detectable concentrations ranged between 12 and 38 ug/g for upgradient samples and 12 and 18 ug/g for downgradient samples, with the highest concentration recorded in the surface sample at the MW-15 sample location and the lowest concentration recorded in the surface samples at the MW-16 and MW-17 sample locations. Eight of the eleven samples reported concentrations less than the BAC, while three of the eleven samples reported a concentration slightly higher than the BAC.
Arsenic	2.0	Detectable concentrations ranged between 2.2 and 3.3 for upgradient samples and 1.2 and 2.9 ug/g for downgradient samples, with the highest concentration recorded in the subsurface sample at the MW-16 sample location and the lowest concentration recorded in surface and subsurface samples at the MW-18 sample location. All eleven samples reported concentrations below the BAC.
Mercury	0.10	All results were below the laboratory detection limit of 0.050 ug/g (and 0.10 ug/g for the duplicate sample submitted to the secondary laboratory) and were below the BAC.
PCBs	0.003	One detectable concentration of 0.022 ug/g was reported in the surface sample at the upgradient MW-16 sample location. Ten of the eleven samples reported concentrations less than the BAC, while one of the eleven samples reported a concentration slightly higher than the BAC.
TPH	299	Detectable concentrations of PHCs F1, F2, and F3 were reported for the subsurface sample at the upgradient MW-16 sample location and the surface sample at the downgradient MW-17 sample location, yielding modified TPH concentrations of 79 and 130 ug/g, respectively. All eleven samples reported concentrations below the BAC.

5.3.2.3 Soil Trend Analysis by Parameter and Discussion of Trends

A discussion of the trends observed for parameter concentrations in soil from 2007 to 2014 are presented in Table 5.9. Note that these trend analyses were performed on six datasets, however a minimum of seven data sets are recommended to establish a statistical trend.

Table 5.9: Evaluation of Soil Result Trends (Station Landfill)

Parameter	2014 Results
Copper	Concentrations show a slight downward trend for upgradient soil locations and a slight upward trend for downgradient soil locations. Reported concentrations are generally above the baseline average.
Nickel	Concentrations show a slight upward trend for upgradient and downgradient soil locations. Reported concentrations are generally above the baseline average.
Cobalt	Concentrations show an upward trend for upgradient soil locations and a downward trend for downgradient soil locations. Reported concentrations are generally above the baseline average.
Cadmium	Concentrations show a slight upward trend for upgradient soil locations and a slight downward trend for downgradient soil locations. Reported concentrations are generally below the baseline average, with most results below the laboratory detection limit. One result in 2012 was 13 ug/g, above the Tier II Cleanup Criteria of 5 ug/g for cadmium, however the 2014 result at this location was below the baseline average.
Lead	Concentrations show a slight upward trend for upgradient and downgradient soil locations. Reported concentrations are generally above the baseline average.
Zinc	Concentrations show a slight upward trend for upgradient and downgradient soil locations. Reported concentrations are above and below the baseline average.
Chromium	Concentrations show an upward trend for upgradient soil locations and a slight downward trend for downgradient soil locations. Reported concentrations are generally above the baseline average.
Arsenic	Concentrations show an upward trend for upgradient soil locations and a slight downward trend for downgradient soil locations. Reported concentrations are generally above the baseline average.
Mercury	Concentrations show a downward trend for upgradient and downgradient soil locations, however most results are below the laboratory detection limits and the trend is caused by decreasing detection limits over time.
PCBs	Concentrations show a slight upward trend for upgradient soil locations and are generally stable for downgradient soil locations. Most results are below the laboratory detection limits. Detectable concentrations are above the baseline average.
TPH	Concentrations show a slight upward trend for upgradient soil locations and are generally stable for downgradient soil locations. Most results are below the baseline average.

5.3.3 Groundwater Sampling

Groundwater sampling at the Station Non-Hazardous Waste Landfill was completed on 19 and 20 August 2014. As previously reported a total of three groundwater samples were procured from three monitoring wells as shown in plan on Figure 4.

5.3.3.1 Monitoring Well Sampling/Inspection Logs

Monitoring well sampling/inspection logs are provided following this page.

5.3.3.2 Water Levels/Groundwater Flow

Water levels were measured at the Station Non-Hazardous Waste Landfill on 19 August 2014. The groundwater levels measured are shown below in Table 5.10. Based on the measured groundwater levels, groundwater flow is expected to be towards the north, however groundwater flow will be highly affected by freeze/thaw cycles and permafrost.

Table 5.10: Groundwater Levels (Station Landfill)

Monitoring Well	Date	Ground Surface Elevation (m)	Water Level (m bgs)	Water Level Elevation (m)	Depth to Bottom (m bgs)	Bottom Elevation (m)
MW-15	19 August 2014	571.5	0.70	570.8	1.72	569.78
MW-16	19 August 2014	570.6	0.65	569.95	1.22	569.38
MW-17	19 August 2014	567.0	1.28	565.72	1.55	565.45
MW-18	19 August 2014	565.8	1.36	564.44	1.41	564.39
MW-19	19 August 2014	567.3	1.15	566.15	1.62	565.68

5.3.3.3 Laboratory Analytical Results

Laboratory analytical results for groundwater at the Station Non-Hazardous Waste Landfill are presented in Table 5.11. No duplicate groundwater samples were collected at the Station Non-Hazardous Waste Landfill.

5.3.3.4 Discussion of Results by Parameter

An evaluation of the groundwater analytical results at the Station Non-Hazardous Waste Landfill is presented in Table 5.12. The discussion includes a comparison of results from upgradient (MW-15, MW-16) and downgradient (MW-19) monitoring well locations to the baseline average concentrations (BAC) that have been determined for each landfill from groundwater chemistry at the landfill area prior to and during remediation. No groundwater samples were collected from downgradient wells MW-17 and MW-18 during this monitoring event.

Monitoring Well Sampling Record

Site Name:	FOX-5	Station Area Landfill	
Date of Sampling Event:	19-Aug-14	Time:	745pm
Names of Samplers:		S.Borcsok	
		J.Mauchan	
Landfill Name:	Station	Samples Collected:	YES
Monitoring Well ID:	MW-15	PHC F1	YES
Sample Number:		Inorganic Elements	YES
Condition of Well:	OK	PHC F2-F4	YES
soft soil around casing		PCBs	YES
Measured Data		Duplicate Collected?	NO
Well pipe height above ground (cm)=	59	Sample ID:	F5-SA-MW-15
Diameter of well (cm)=	5		
Depth of well installation (cm)=			
(from ground surface)			
Length screened section (cm)=			
Depth to top of screen (cm)=			
(from ground surface)			
Depth to water surface (cm)=	129	Measurement method: (meter, tape, etc)	Interface Meter
(from top of pipe)			
Static water level (cm)=			
(below ground surface)			
Measured well refusal depth (cm)=	231	Evidence of sludge or siltation:	None
(i.e. depth to frozen ground)			
Thickness of water column	102		
Static volume of water in well	2.07		
Free product thickness (mm)=	0	Measurement method:	IM
Purging: (Y/N)	Y	Purging/Sampling Equipment:	Waterra
Volume Purged Water=	4L	(Dry after 1.5L)	Tubing/
Decontamination required: (Y/N)	N		Footvalve
Number washes:			
Number rinses:			
Final pH=	7.66		
Final Conductivity (uS/cm)=	30.3		
Final Temperature (degC)=	4.2		

Monitoring Well Sampling Record

Site Name:	FOX-5	Station Area Landfill	
Date of Sampling Event:	19-Aug-14	Time:	755pm
Names of Samplers:		S.Borcsok	
		J.Mauchan	
Landfill Name:	Station	Samples Collected:	YES
Monitoring Well ID:	MW-16	PHC F1	YES
Sample Number:		Inorganic Elements	YES
Condition of Well:	OK	PHC F2-F4	YES
broken lock		PCBs	YES
Measured Data		Duplicate Collected?	NO
Well pipe height above ground (cm)=	46	Sample ID:	F5-SA-MW-16
Diameter of well (cm)=	5		
Depth of well installation (cm)=			
(from ground surface)			
Length screened section (cm)=			
Depth to top of screen (cm)=			
(from ground surface)			
Depth to water surface (cm)=	111	Measurement method: (meter, tape, etc)	Interface Meter
(from top of pipe)			
Static water level (cm)=			
(below ground surface)			
Measured well refusal depth (cm)=	168	Evidence of sludge or siltation:	None
(i.e. depth to frozen ground)			
Thickness of water column	57		
Static volume of water in well	1.15		
Free product thickness (mm)=	0	Measurement method:	IM
Purging: (Y/N)	Y	Purging/Sampling Equipment:	Waterra
Volume Purged Water=	2L	(Dry after 0.5L)	Tubing/
Decontamination required: (Y/N)	N		Footvalve
Number washes:			
Number rinses:			
Final pH=	7.8		
Final Conductivity (uS/cm)=	27.7		
Final Temperature (degC)=	4		

Monitoring Well Sampling Record

Site Name:	FOX-5	Station Area Landfill	
Date of Sampling Event:	19-Aug-14	Time:	805pm
Names of Samplers:		S.Borcsok	
		J.Mauchan	
Landfill Name:	Station	Samples Collected:	NO
Monitoring Well ID:	MW-17	PHC F1	
Sample Number:		Inorganic Elements	
Condition of Well:	OK	PHC F2-F4	
soft ground around casing		PCBs	
Measured Data		Duplicate Collected?	
Well pipe height above ground (cm)=	35	Sample ID:	
Diameter of well (cm)=	5		
Depth of well installation (cm)= (from ground surface)			
Length screened section (cm)=			
Depth to top of screen (cm)= (from ground surface)			
Depth to water surface (cm)= (from top of pipe)	163	Measurement method: (meter, tape, etc)	Interface Meter
Static water level (cm)= (below ground surface)			
Measured well refusal depth (cm)= (i.e. depth to frozen ground)	190	Evidence of sludge or siltation:	None
Thickness of water column	27		
Static volume of water in well	0.54		
Free product thickness (mm)=	0	Measurement method:	IM
Purging: (Y/N)	N	Purging/Sampling Equipment:	None
Volume Purged Water=			
Decontamination required: (Y/N)			
Number washes:			
Number rinses:			
Final pH=			
Final Conductivity (uS/cm)=			
Final Temperature (degC)=			

Monitoring Well Sampling Record

Site Name:	FOX-5	Station Area Landfill	
Date of Sampling Event:	19-Aug-14	Time:	815pm
Names of Samplers:		S.Borcsok	
		J.Mauchan	
Landfill Name:	Station	Samples Collected:	NO
Monitoring Well ID:	MW-18	PHC F1	
Sample Number:		Inorganic Elements	
Condition of Well:	OK	PHC F2-F4	
standpipe very low in casing		PCBs	
Measured Data		Duplicate Collected?	
Well pipe height above ground (cm)=	80	Sample ID:	
Diameter of well (cm)=	5		
Depth of well installation (cm)=			
(from ground surface)			
Length screened section (cm)=			
Depth to top of screen (cm)=			
(from ground surface)			
Depth to water surface (cm)=	216	Measurement method: (meter, tape, etc)	Interface Meter
(from top of pipe)			
Static water level (cm)=			
(below ground surface)			
Measured well refusal depth (cm)=	221	Evidence of sludge or siltation:	None
(i.e. depth to frozen ground)			
Thickness of water column	5		
Static volume of water in well	0.10		
Free product thickness (mm)=	0	Measurement method:	IM
Purging: (Y/N)	N	Purging/Sampling Equipment:	None
Volume Purged Water=			
Decontamination required: (Y/N)			
Number washes:			
Number rinses:			
Final pH=			
Final Conductivity (uS/cm)=			
Final Temperature (degC)=			

Monitoring Well Sampling Record

Site Name:	FOX-5	Station Area Landfill	
Date of Sampling Event:	19-Aug-14	Time:	125pm
Names of Samplers:		S.Borcsok	
		J.Mauchan	
Landfill Name:	Station	Samples Collected:	YES
Monitoring Well ID:	MW-19	PHC F1	YES
Sample Number:		Inorganic Elements	YES
Condition of Well:	OK	PHC F2-F4	YES
water around standpipe		PCBs	YES
Measured Data		Duplicate Collected?	NO
Well pipe height above ground (cm)=	50	Sample ID:	F5-SA-MW-19
Diameter of well (cm)=	5		
Depth of well installation (cm)=		Well monitored 19 August 2014 Well sampled 20 August 2014	
(from ground surface)			
Length screened section (cm)=			
Depth to top of screen (cm)=			
(from ground surface)			
Depth to water surface (cm)=	150	Measurement method: (meter, tape, etc)	Interface Meter
(from top of pipe)			
Static water level (cm)=			
(below ground surface)			
Measured well refusal depth (cm)=	197	Evidence of sludge or siltation:	None
(i.e. depth to frozen ground)			
Thickness of water column	47		
Static volume of water in well	0.95		
Free product thickness (mm)=	0	Measurement method:	IM
Purging: (Y/N)	Y	Purging/Sampling Equipment:	Waterra
Volume Purged Water=	3L		Tubing/
Decontamination required: (Y/N)	N		Footvalve
Number washes:			
Number rinses:			
Final pH=	7.92		
Final Conductivity (uS/cm)=	33.3		
Final Temperature (degC)=	4.2		

TABLE 5.11

RESULTS OF ANALYSIS FOR PARAMETERS IN GROUNDWATER AT STATION NON-HAZARDOUS WASTE LANDFILL

PARAMETERS	Baseline Average Concentration (+)	F5-SA-MW-15 19-Aug-14	F5-SA-MW-16 19-Aug-14	F5-SA-MW-19 20-Aug-14
Copper	**0.036**	0.0011	**0.041+**	0.022
Nickel	**0.075**	0.009	0.02	0.017
Cobalt	**0.010**	0.00031	0.0086	0.0066
Cadmium	**0.001**	<0.000020	0.00079	0.00008
Lead	**0.01**	0.00022	**0.022+**	0.0075
Zinc	**0.097**	0.02	**0.37+**	**0.11+**
Chromium	**0.116**	0.018	0.052	0.04
Arsenic	**0.003**	<0.00020	**0.0037**	0.0028
Mercury	**0.004**	<0.00001	0.00002	<0.00001
Total PCBs	**0.00002**	<0.00005	<0.00005	<0.00005
PHC F1 (C6-C10)	-	<0.025	<0.025	<0.025
PHC F2 (C10-C16)	-	<0.1	0.45	<0.100
PHC F3 (C16-C34)	-	<0.2	<0.2	<0.1
PHC F4 (C34-C50)	-	<0.2	<0.2	<0.1
Modifed TPH (Total C6-C34)	**1**	0.25	0.45	0.25

NOTES:

All parameter values in mg/L (ppm) unless otherwise indicated.

+ Exceeds Station Area Landfill Baseline Average Concentration

(DUP) Duplicate sample analyzed by AGAT Laboratories for QA/QC purposes.
RDL Reportable Detection Limit.
< Not detected.
- No concentration reported.

Table 5.12: Evaluation of Groundwater Analytical Results (Station Landfill)

Parameter	Baseline Average Concentration (mg/L)	2014 Results
Copper	0.036	Detectable concentrations were 0.0011 and 0.041 mg/L at the upgradient wells and 0.022 mg/L at the downgradient well, with the highest concentration recorded at monitoring well MW-16 and the lowest concentration recorded at monitoring well MW-15. 2 of the 3 samples reported concentrations below the BAC while 1 of the 3 samples reported a concentration slightly above the BAC.
Nickel	0.075	Detectable concentrations ranged were 0.009 and 0.02 mg/L at the upgradient wells and 0.017 mg/L at the downgradient well with the highest concentration recorded at monitoring well MW-16 and the lowest concentration recorded at monitoring well MW-15. All 3 samples reported concentrations below the BAC.
Cobalt	0.01	Detectable concentrations were 0.00031 and 0.0086 mg/L at the upgradient wells and 0.0066 mg/L at the downgradient well, with the highest concentration recorded at monitoring well MW-16 and the lowest concentration recorded at monitoring well MW-15. All 3 samples reported concentrations below the BAC.
Cadmium	0.001	Detectable concentrations were 0.00079 mg/L at the upgradient well MW-16 and 0.00008 mg/L at the downgradient well MW-19. The reported concentration at monitoring well MW-15 was less than the laboratory detection limit (0.000020 mg/L). All 3 samples reported concentrations below the BAC.
Lead	0.01	Detectable concentrations were 0.00022 and 0.022 mg/L at the upgradient wells and 0.0075 mg/L at the downgradient well, with the highest concentration recorded at monitoring well MW-16 and the lowest concentration recorded at monitoring well MW-15. 2 of the 3 samples reported concentrations below the BAC while 1 of the 3 samples reported a concentration slightly above the BAC.
Zinc	0.097	Detectable concentrations were 0.02 and 0.37 mg/L at the upgradient wells and 0.11 mg/L at the downgradient well, with the highest concentration recorded at monitoring well MW-16 and the lowest concentration recorded at monitoring well MW-15. 1 of the 3 samples reported a concentration below the BAC while 2 of the 3 samples reported concentrations slightly above the BAC.
Chromium	0.12	Detectable concentrations were 0.018 and 0.052 mg/L at the upgradient wells and 0.04 mg/L at the downgradient well, with the highest concentration recorded at monitoring well MW-16 and the lowest concentration recorded at monitoring well MW-15. All 3 samples reported concentrations below the BAC.

Parameter	Baseline Average Concentration (mg/L)	2014 Results
Arsenic	0.003	Detectable concentrations were 0.0037 mg/L at the upgradient well MW-16 and 0.0028 mg/L at the downgradient well MW-19. The reported concentration at monitoring well MW-15 was less than the laboratory detection limit (0.00020 mg/L). 2 of the 3 samples reported concentrations below the BAC while 1 of the 3 samples reported a concentration slightly above the BAC.
Mercury	0.004	A detectable concentration of 0.00002 mg/L was reported at upgradient well MW-16. All 3 samples reported concentrations below the BAC, of which two were below the laboratory detection limit (0.00001 mg/L).
PCBs	0.00002	All 3 samples reported concentrations less than the laboratory detection limit (0.00005 mg/L). The laboratory detection limit is above the BAC as it was defined based on a lower detection limit from a previous monitoring event.
TPH	1	A detectable concentration of 0.45 mg/L was reported at upgradient well MW-16. All 3 results were below the BAC.

5.3.3.5 Groundwater Trend Analysis by Parameter & Discussion of Trends

A discussion of the trends observed for parameter concentrations in groundwater from 2007 to 2014 are presented in Table 5.13. Note that these trend analyses were performed on six datasets, however a minimum of seven data sets are recommended to establish a statistical trend.

Table 5.13: Evaluation of Groundwater Result Trends (Station Landfill)

Parameter	2014 Results
Copper	Concentrations show a very slight upward trend for upgradient wells and very slight downward trend for downgradient wells. Reported concentrations are below or slightly above the baseline average.
Nickel	Concentrations show a downward trend for upgradient and downgradient wells. Reported concentrations are below the baseline average except for two 2007 results.
Cobalt	Concentrations show a very slight upward trend for upgradient wells and very slight downward trend for upgradient wells. Reported concentrations are above and below the baseline average.
Cadmium	Concentrations show a downward trend for upgradient and downgradient wells. Reported concentrations are clustered around the baseline average.
Lead	Concentrations show an upward trend for upgradient and downgradient wells. Reported concentrations are clustered around the baseline average.
Zinc	Concentrations show an upward trend for upgradient wells and a very slight upward trent for downgradient wells. Reported concentrations are generally clustered around the baseline average.
Chromium	Concentrations show a downward trend for upgradient and downgradient wells. Reported concentrations are generally below the baseline average.
Arsenic	Concentrations show an upward trend for upgradient and downgradient wells. Reported concentrations are clustered around the baseline average.

Parameter	2014 Results
Mercury	All reported concentrations are below the laboratory detection limit except for one 2014 value that is very slightly above the laboratory detection limit and well below the baseline average.
PCBs	All reported concentrations are below the laboratory detection limit and below the baseline average.
TPH	Concentrations show a slight downward trend for upgradient wells and a downward trend for downgradient wells. Concentrations are above and below the baseline average.

5.4 CONCLUSIONS/OVERALL PERFORMANCE OF THE LANDFILL

Based on the results of the 2014 monitoring program, the performance of the Station Non-Hazardous Waste Landfill is acceptable.

5.5 RECOMMENDATIONS/NEXT STEPS

Regular monitoring of this landfill as per the monitoring schedule shown in Table 1.1 should be continued. No remedial work is necessary at this time.

APPENDIX A

RANGE OF THE REPORT AND LIMITATION OF RESPONSIBILITIES

RANGE OF THE REPORT AND LIMITATION OF RESPONSIBILITIES

This landfill monitoring program was commissioned as part of an ongoing program assessing the performance of landfills present at the subject site. The visual observations, test data, chemical analyses and conclusions given in this landfill monitoring report are considered to provide a fair representation of the surface and subsurface conditions within or adjacent to each landfill subject to monitoring. It should be noted, however, that any conclusions regarding the performance of these landfills are based on interpretation of conditions observed during the landfill monitoring program and at specific locations and sampling depths.

This monitoring report, prepared for Public Works and Government Services (PWGSC) and the Department of National Defence (DND), does not provide certification or warranty, expressed or implied, that the monitoring program uncovered all potential issues of environmental or geotechnical concern at the landfills inspected. The material in the report reflects SENES' best judgement in light of the information available at the time of report preparation in November 2014. Changes to soil and/or groundwater quality in the areas investigated can occur following the date of testing. Any use which a third party makes of, or any reliance on, or decisions based on this report or of parts thereof made by them, is the sole responsibility of such third parties unless otherwise agreed-to by duly authorized representatives from SENES, PWGSC and DND.

APPENDIX B

FIELD NOTES

APPENDIX B.1 – Thermistor Inspection Reports
APPENDIX B.2 – Monitoring Well Inspection Reports
APPENDIX B.3 – Visual Inspection Reports

Thermistor Annual Maintenance Report

Contractor Name: SENES	Inspection Date: 22 Aug/14
Prepared By: S. Borcsok	

Thermistor Information

Site Name: FOX-5	Thermistor Location MAIN LANDFILL		
Thermistor Number: VT-1	Inclination Slanted off vertical		
Install Date:	First Date Event		Last Date Event
Coordinates and Elevation	N	E	Elev
Length of Cable (m)	Cable Lead Above Ground (m)	Nodal Points	
Datalogger Serial # 02020264		Cable Serial Number	
Thermistor Type UL16			

Thermistor Inspection

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

Battery Installation Date ? /22Aug/14

Battery Levels Main 11.34 / 11.34 Aux 12.77 / 13.75

Manual Ground Temperature Readings

Bead	ohms/V	Degrees C
1	1.1805	7.8056
2	1.1463	6.6843
3	1.0592	3.8364
4	1.0002	1.8996
5	0.9409	-0.0597
6	0.9236	-0.6363
7	0.9070	-1.1899
8	0.8907	-1.7381

Bead	ohms V	Degrees C
9	0.8766	-2.2142
10	0.8657	-2.5836
11	0.8509	-3.0843
12	0.8467	-3.2275
13	0.0017	-93.1005
14	↓	-93.1005
15		-93.1005
16	0.0005	-101.4553

Observations and Proposed Maintenance

clock – 48:38
Dessicant needs replacement

190
115
135

5.6
3.0

Thermistor Annual Maintenance Report

Contractor Name: SENES	Inspection Date: 22 Aug/14
Prepared By: S. Borcsok	

Thermistor Information

Site Name: FOX-5	Thermistor Location MAIN LANDFILL	
Thermistor Number: VT-2	Inclination INCLINED TO EAST	
Install Date:	First Date Event	Last Date Event
Coordinates and Elevation N	E	Elev
Length of Cable (m)	Cable Lead Above Ground (m)	Nodal Points
Datalogger Serial # 02020228		Cable Serial Number
Thermistor Type UL16		

Thermistor Inspection

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

Battery Installation Date 22 Aug/14

Battery Levels Main 11.34 / 11.34 Aux 13.21 / 13.87

Manual Ground Temperature Readings

Bead	ohms	Degrees C
1	1.1487	6.7868
2	1.1044	5.3136
3	1.0568	3.7565
4	0.9949	1.7264
5	0.9439	0.0392
6	0.9230	-0.6567
7	0.9065	-1.2078
8	0.8937	-1.6380

Bead	ohms	Degrees C
9	0.8798	-2.1059
10	0.8683	-2.4931
11	0.8527	-3.0427
12	0	381.0742
13		
14		
15		
16		

Observations and Proposed Maintenance

clock -48:04

Dessicant needs replacement

5.0

3.0

172, 100

100

Thermistor Annual Maintenance Report

Contractor Name: SENES	Inspection Date: 22 Aug/14
Prepared By: S. Borcsok	

Thermistor Information

Site Name: FOX-5	Thermistor Location MAIN LANDFILL		
Thermistor Number: VT-3	Inclination TILTED TO EAST		
Install Date:	First Date Event		Last Date Event
Coordinates and Elevation	N	E	Elev
Length of Cable (m)	Cable Lead Above Ground (m)	Nodal Points	
Datalogger Serial # 02020255		Cable Serial Number	
Thermistor Type UL16			

Thermistor Inspection

	Good	Needs Maintenance	
Casing	☑	☐	lock broken off due to rust
Cover	☑	☐	
Data Logger	☑	☐	
Cable	☑	☐	
Beads	☑	☐	

Battery Installation Date / 22 Aug/14

Battery Levels Main 11.34 / 11.34 Aux 13.26 / 13.25

Manual Ground Temperature Readings

Bead	ohms ✓	Degrees C
1	1.1652	7.3046
2	1.1657	7.3221
3	1.1878	8.0463
4	1.1954	8.2974
5	1.1768	7.6577
6	1.0936	4.9894
7	1.0475	3.4518
8	0.9783	1.1867

Bead	ohms ✓	Degrees C
9	0.9385	-0.1383
10	0.9230	-0.6567
11	0.9041	-1.2870
12	0.8900	-1.7612
13	0.8760	-2.2322
14	0.8669	-2.5422
15	0.8597	-2.7857
16	0.0017	-93.1005

Observations and Proposed Maintenance

Dessicant needs replacement

clock -44:34

String L 6.8
Lead L 3.0

3.83 + 104
134

Thermistor Annual Maintenance Report

Contractor Name: SENES	Inspection Date: ~~20~~ 21 Aug/14
Prepared By: S. Borcsok	

Thermistor Information

Site Name: FOX-5	Thermistor Location MAIN LANDFILL		
Thermistor Number: VT-4	Inclination Inclined ~30° to east		
Install Date:	First Date Event		Last Date Event
Coordinates and Elevation	N	E	Elev
Length of Cable (m)	Cable Lead Above Ground (m)	Nodal Points	
Datalogger Serial # 02020265		Cable Serial Number	
Thermistor Type UL16			

Thermistor Inspection

	Good	Needs Maintenance	
Casing	☑ ok but inclined	☐	
Cover	☑	☐	
Data Logger	☑	☐	
Cable	☑	☐	
Beads	☑	☐	

Battery Installation Date / 21 Aug/14

Battery Levels Main 11.34 / 11.34 Aux 12.41 / 13.83

Manual Ground Temperature Readings

Bead	ohms √	Degrees C
1	1.1019	5.2313
2	1.1027	5.2588
3	1.1379	6.4094
4	1.1487	6.7643
5	1.1049	5.3311
6	1.0389	3.1719
7	0.9574	0.2898
8	0.9530	-0.2550

Bead	ohms √	Degrees C
9	0.9102	-1.0825
10	0.8960	-1.5585
11	0.8924	-1.6816
12	0.8663	-2.5603
13	0.8479	-3.1884
14	0.0005	-101.4553
15	0.0005	↓
16	0.0011	-96.1857

Observations and Proposed Maintenance

clock – 54:14, reset
Dessicant needs replacement

String 6.0 m
Leads 3.0 m

2.85 + 0.87
130

Thermistor Annual Maintenance Report

Contractor Name: SENES	Inspection Date: 21 Aug/14
Prepared By: S. Borcsok	

Thermistor Information

Site Name: FOX-5	Thermistor Location MAIN LANDFILL		
Thermistor Number: VT-5	Inclination Slanted off vertical		
Install Date:	First Date Event		Last Date Event
Coordinates and Elevation	N	E	Elev
Length of Cable (m)	Cable Lead Above Ground (m)	Nodal Points	
Datalogger Serial # 02020252		Cable Serial Number	
Thermistor Type UL16			

Thermistor Inspection

	Good	Needs Maintenance	
Casing	☑	☐	
Cover	☑	☐	
Data Logger	☑	☐	
Cable	☑	☐	
Beads	☐	☑	1, 2, 3 not reading
Battery Installation Date		/ 21 Aug/14	
Battery Levels	Main 11.34 / 11.37	Aux	13.38 / 13.99

Manual Ground Temperature Readings

Bead	ohms	Degrees C
1	0	381.0742
2	0	↓
3	0	
4	1.0219	2.6140
5	0.9559	0.4390
6	0.9403	-0.0800
7	0.9162	-0.8835
8	0.8987	-1.4688

Bead	ohms	Degrees C
9	0.8834	-1.9823
10	0.8632	-2.6665
11	0.8522	-3.0427
12	0	381.0742
13	0	↓
14	0	
15	0	
16	0	

Observations and Proposed Maintenance

clock -50:59
Dessicant needs replacing

Thermistor Annual Maintenance Report

Contractor Name: SENES	Inspection Date: 21 Aug/14
Prepared By: S. Borcsok	

Thermistor Information

Site Name: FOX-5	Thermistor Location MAIN LANDFILL		
Thermistor Number: VT-6	Inclination 5°, 4°, off vert		
Install Date:	First Date Event		Last Date Event
Coordinates and Elevation	N	E	Elev
Length of Cable (m)	Cable Lead Above Ground (m)	Nodal Points	
Datalogger Serial # 02020256		Cable Serial Number	
Thermistor Type UL16			

Thermistor Inspection

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

Battery Installation Date ? / 21 Aug/14

Battery Levels Main 11.34 / 11.34 Aux 13.14 / 13.50

Manual Ground Temperature Readings

Bead	ohms ✓	Degrees C
1	1.1682	7.4022
2	1.1013	5.2114
3	1.0378	3.1344
4	0.9799	1.2310
5	0.9417	-0.0318
6	0.9217	-0.7000
7	0.9041	-1.2870
8	0.8840	-1.9643

Bead	ohms ✓	Degrees C
9	0.8689	-2.4750
10	0.8516	-3.0609
11	0.8522	-3.0427
12	0	381.0742
13	0	
14	0	
15	0	
16	0	

Observations and Proposed Maintenance

Clock at -57 :01
Dessicant needs replacing

Thermistor Annual Maintenance Report

Contractor Name: SENES	Inspection Date: 21 Aug/14
Prepared By: S. Borcsok	

Thermistor Information

Site Name: FOX-5	Thermistor Location MAIN LANDFILL	
Thermistor Number: VT-7	Inclination VERT	
Install Date:	First Date Event	Last Date Event
Coordinates and Elevation N	E	Elev
Length of Cable (m)	Cable Lead Above Ground (m)	Nodal Points
Datalogger Serial # 02020257		Cable Serial Number
Thermistor Type UL16		

Thermistor Inspection

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

Battery Installation Date: 7 old / new 21 Aug /14

Battery Levels: Main 11.34 / 11.34 Aux 13.14 / 12.04

Manual Ground Temperature Readings

Bead	ohms	Degrees C
1	1.1634	7.2445
2	1.0913	4.8845
3	0.9884	1.5128
4	0.9457	0.1000
5	0.9284	-0.4735
6	0.9162	-1.0825
7	0.8924	-1.6816
8	0.8718	-2.3768

Bead	ohms	Degrees C
9	0.8576	-2.8583
10	0.8431	-3.3526
11	0.8363	-3.5851
12	0	381.0742
13	0	
14	0	
15	0	
16	0	

Observations and Proposed Maintenance

Clock at 15:24 vs 4.19
-49:43
reset

Dessicant needs replacing

String L. 4.8
Lead L. 3.0

Thermistor Annual Maintenance Report

Contractor Name: SENES	Inspection Date: 21 Aug/14
Prepared By: S. Borcsok	

Thermistor Information

Site Name: FOX-5	Thermistor Location MAIN LANDFILL	
Thermistor Number: VT-8	Inclination VERT	
Install Date:	First Date Event	Last Date Event
Coordinates and Elevation N	E	Elev
Length of Cable (m)	Cable Lead Above Ground (m)	Nodal Points
Datalogger Serial # 02020259		Cable Serial Number
Thermistor Type UL-16		

Thermistor Inspection

	Good	Needs Maintenance
Casing	☑	☐
Cover	☑	☐
Data Logger	☑	☐
Cable	☑	☐
Beads	☑	☐
Battery Installation Date	?	/21 Aug/14
Battery Levels	Main 11.34 / 11.34	Aux 13.02 / 13.50

Manual Ground Temperature Readings

Bead	~~ohms~~ Volts	Degrees C
1	1.1219	5.8851
2	1.0556	3.7165
3	0.9769	1.1328
4	0.9379	-0.1586
5	0.9181	-0.8172
6	0.9022	-1.3510
7	0.8846	-1.9437
8	0.8640	-2.6406

Bead	~~ohms~~ Volts	Degrees C
9	0.8528	-3.0219
10	0.8473	-3.2093
11	0	381.0742
12	0	
13	0	
14	0	
15	0	
16	0	

Observations and Proposed Maintenance

Clock off: 3:08 (actual time 3:54) set on logger
Dessicant needs replacing

String length 4.3
Lead length 3.0

Thermistor Annual Maintenance Report

Contractor Name: SENES	Inspection Date: 21 Aug /14
Prepared By: S. Borcsok	

Thermistor Information

Site Name: FOX-5	Thermistor Location MIDDLE SITE LANDFILL		
Thermistor Number: VT-9	Inclination VERT		
Install Date:	First Date Event		Last Date Event
Coordinates and Elevation	N 7631386	E 0490287	Elev
Length of Cable (m)	Cable Lead Above Ground (m)	Nodal Points	
Datalogger Serial # 02020261 02020261		Cable Serial Number	
Thermistor Type UL16			

Thermistor Inspection

	Good	Needs Maintenance	
Casing	☑	☐	
Cover	☑	☐	
Data Logger	☑	☐	
Cable	☑	☐	
Beads	☑	☐	
Battery Installation Date	July 2010		
Battery Levels	Main 12.34 / 11.34	Aux 12.53 / 13.50	

Manual Ground Temperature Readings

Bead	ohms	Degrees C
1	1.1316	6.2022
2	1.1130	5.5956
3	1.0432	3.3118
4	0.9757	1.0925
5	0.9397	-0.0800
6	0.9188	-0.7968
7	0.8927	-1.6714
8	0.8748	-2.2735

Bead	ohms	Degrees C
9		-2.6846
10		-3.1598
11	0	381.0742
12		
13		
14		
15		
16		

Observations and Proposed Maintenance

locked
Dessicant needs replacing

"String Lead = 4.4m"
Lead L = 3.0
EBA label

Thermistor Annual Maintenance Report

Contractor Name: SENES	Inspection Date: 21 Aug /14
Prepared By: S. Borcsok	

Thermistor Information

Site Name: FOX-5	Thermistor Location MIDDLE SITE LANDFILL	
Thermistor Number: VT-10	Inclination VERT	
Install Date:	First Date Event	Last Date Event
Coordinates and Elevation N	E	Elev
Length of Cable (m)	Cable Lead Above Ground (m)	Nodal Points
Datalogger Serial # 02020230		Cable Serial Number
Thermistor Type UL16		

Thermistor Inspection

	Good	Needs Maintenance	
Casing	☑	☐	
Cover	☑	☐	
Data Logger	☑	☐	
Cable	☑	☐	
Beads	☑	☐	2, 5 not working
Battery Installation Date		/ 22 Aug/14	
Battery Levels	Main ~~[illegible]~~ / 11.37	Aux ~~[illegible]~~ / 13.58	

Manual Ground Temperature Readings ← 23 Aug/14

Bead	ohms	Degrees C
1	1.0246	2.7016
2	0	381.0742
3	1.0706	4.2083
4	1.0822	4.5876
5	0	381.0742
6	0.9622	0.6462
7	0.9259	-0.5574
8	0.9076	-1.1899

Bead	ohms	Degrees C
9	0.8834	-1.9823
10	0.8753	-2.2554
11	0	381.0742
12	0	
13	0	
14	0	
15	0	
16	0	

Observations and Proposed Maintenance

Batteries replaced first as troubleshooting
-53.24
Dessicant needs replacing

Cable
EBA A1705
4100148.001

Thermistor Annual Maintenance Report

Contractor Name: SENES	Inspection Date: 21 Aug/14
Prepared By: S. Borcsok	

Thermistor Information

Site Name: FOX-5	Thermistor Location MIDDLE SITE LANDFILL		
Thermistor Number: VT-11	Inclination VERT		
Install Date:	First Date Event	Last Date Event	
Coordinates and Elevation	N	E	Elev
Length of Cable (m)	Cable Lead Above Ground (m)	Nodal Points	
Datalogger Serial # 02020120		Cable Serial Number	
Thermistor Type UL 16			

Thermistor Inspection

	Good	Needs Maintenance	
Casing	☑	☐	
Cover	☑	☐	
Data Logger	☑	☐	
Cable	☑	☐	
Beads	☑	☐	Check #10

Battery Installation Date

Battery Levels Main 11.34V Aux 13.14V

Manual Ground Temperature Readings

Bead	ohms	Degrees C
1	1.0936	4.9594
2	1.0889	4.7897
3	1.1275	6.0698
4	1.1409	6.5069
5	1.0609	3.8913
6	0.9737	1.0270
7	0.9487	0.2013
8	0.9053	-1.2461

Bead	ohms	Degrees C
9	0.8937	-1.6380
10	0.0017	-93.1005
11	0	381.0742
12	0	
13	0	
14	0	
15	0	
16	0.0005	101.4553

Observations and Proposed Maintenance

Dessicant needs replacement

3.8 200,58, 120
3.0

/

Thermistor Annual Maintenance Report

Contractor Name: SENES	Inspection Date: 21 Aug /14
Prepared By: S. Borcsok	

Thermistor Information

Site Name: FOX-5	Thermistor Location MIDDLE SITE LANDFILL		
Thermistor Number: VT-12	Inclination VERT		
Install Date:	First Date Event		Last Date Event Aug 19, 2007?
Coordinates and Elevation	N	E	Elev
Length of Cable (m)	Cable Lead Above Ground (m)	Nodal Points	
Datalogger Serial # 02020270		Cable Serial Number	
Thermistor Type UL16			

Thermistor Inspection

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

Battery Installation Date: Aug 19, 2007? /

Battery Levels: Main 11.34 / Aux 12.41 /

Manual Ground Temperature Readings

Bead	ohms	Degrees C
1	0	381.0742
2		
3		
4		
5		
6		
7		
8		

Bead	ohms	Degrees C
9	0	381.0742
10		
11		
12		
13		
14		
15		
16		

Observations and Proposed Maintenance

Not working? Data All 0.0000V.
Taken back to office
Small plastic bag taken off
Dessicant needs replacing

7.0
3.0

2.80 cu. 117

Monitoring Well Sampling Record

Site Name:	FOX-5		
Date of Sampling Event:	19 Aug/14	Time:	3pm
Names of Samplers:	JM/SB		
Landfill Name:	MIDDLE	Samples Collected:	YES
Monitoring Well ID:	MW-5	PHC F1	✓
Sample Number:	F5-MID-MW-5	Inorganic Elements	✓
Condition of Well:	OK, soft soil around casing	PHC F2-F4	✓
		PCBs	✓
Measured Data		Duplicate Collected?	NO
Well pipe height above ground (cm)=	62		
Diameter of well (cm)=	5		
Depth of well installation (cm)= (from ground surface)			
Length screened section (cm)=			
Depth to top of screen (cm)= (from ground surface)			
Depth to water surface (~~cm~~)= (from top of pipe)	1.35m	Measurement method: (meter, tape, etc)	Interface Meter
Static water level (cm)= (below ground surface)			
Measured well refusal depth (cm)= (i.e. depth to frozen ground)	2.31m	Evidence of sludge or siltation:	NO
Thickness of water column	0.96m		
Static volume of water in well	1.94L		
Free product thickness (mm)=	0	Measurement method:	IM
Purging: (Y/N)	Y	Purging/Sampling Equipment:	Waterra Tubing and Footvalve
Volume Purged Water=	3L (dry after 2L)		
Decontamination required: (Y/N)	N		
Number washes:			
Number rinses:			
Final pH=	8.89		
Final Conductivity (uS/cm)=	45.7		
Final Temperature (degC)=	5.7		

Monitoring Well Sampling Record

Site Name:	FOX-5		
Date of Sampling Event:	19 Aug/14	Time:	305pm
Names of Samplers:	SM/SB		
Landfill Name:	MIDDLE	Samples Collected:	NO
Monitoring Well ID:	MW-6	PHC F1	
Sample Number:		Inorganic Elements	
Condition of Well:	OK, soft soil	around casing PHC F2-F4	
		PCBs	
Measured Data		Duplicate Collected?	
Well pipe height above ground (cm)=	70		
Diameter of well (cm)=	5		
Depth of well installation (cm)= (from ground surface)			
Length screened section (cm)=			
Depth to top of screen (cm)= (from ground surface)			
Depth to water surface (cm)= (from top of pipe)	N/A (Dry)	Measurement method: (meter, tape, etc)	Interface Meter
Static water level (cm)= (below ground surface)			
Measured well refusal depth (cm)= (i.e. depth to frozen ground)	1.10	Evidence of sludge or siltation:	No
Thickness of water column	0		
Static volume of water in well	0		
Free product thickness (mm)=	0	Measurement method:	IM
Purging: (Y/N)	NO	Purging/Sampling Equipment:	N/A
Volume Purged Water=			
Decontamination required: (Y/N)			
Number washes:			
Number rinses:			
Final pH=			
Final Conductivity (uS/cm)=			
Final Temperature (degC)=			

Monitoring Well Sampling Record

Site Name:	FOX-5		
Date of Sampling Event:	19 Aug/14	Time:	310pm
Names of Samplers:	JM/SB		
Landfill Name:	MIDDLE	Samples Collected:	No
Monitoring Well ID:	MW-7	PHC F1	
Sample Number:		Inorganic Elements	
Condition of Well:	OK, cap of	casing not completely sealed. PHC F2-F4	
		PCBs	
Measured Data		Duplicate Collected?	
Well pipe height above ground (cm)=	69		
Diameter of well (cm)=	5		
Depth of well installation (cm)= (from ground surface)			
Length screened section (cm)=			
Depth to top of screen (cm)= (from ground surface)			
Depth to water surface (cm)= (from top of pipe)	N/A (Dry)	Measurement method: (meter, tape, etc)	Interface Meter
Static water level (cm)= (below ground surface)			
Measured well refusal depth (~~cm~~)= (i.e. depth to frozen ground)	1.53m	Evidence of sludge or siltation:	Bottom of well felt soft.
Thickness of water column	0		
Static volume of water in well	0		
Free product thickness (mm)=	0	Measurement method:	IM
Purging: (Y/N)	No	Purging/Sampling Equipment:	N/A
Volume Purged Water=			
Decontamination required: (Y/N)			
Number washes:			
Number rinses:			
Final pH=			
Final Conductivity (uS/cm)=			
Final Temperature (degC)=			

Monitoring Well Sampling Record

Site Name:	FOX-5		
Date of Sampling Event:	19 Aug/14	Time:	315pm
Names of Samplers:	JM/SB		
Landfill Name:	MIDDLE	Samples Collected:	YES
Monitoring Well ID:	MW-8	PHC F1	✓
Sample Number:	FS-MID-MW	-8 Inorganic Elements	✓
Condition of Well:	OK, soft soil	around casing PHC F2-F4	✓
		PCBs	✓
Measured Data		Duplicate Collected?	NO
Well pipe height above ground (cm)=	60		
Diameter of well (cm)=	5		
Depth of well installation (cm)= (from ground surface)			
Length screened section (cm)=			
Depth to top of screen (cm)= (from ground surface)			
Depth to water surface (~~cm~~)= (from top of pipe)	1.43m	Measurement method: (meter, tape, etc)	Interface Meter
Static water level (cm)= (below ground surface)			
Measured well refusal depth (~~cm~~)= (i.e. depth to frozen ground)	2.08m	Evidence of sludge or siltation:	No
Thickness of water column	0.65m		
Static volume of water in well	1.31L		
Free product thickness (mm)=	0	Measurement method:	IM
Purging: (Y/N)	YES	Purging/Sampling Equipment:	Waterra Tubing
Volume Purged Water=	2L (dry after 1L)		and Footvalve
Decontamination required: (Y/N)	N		
Number washes:			
Number rinses:			
Final pH=	8.61		
Final Conductivity (uS/cm)=	27.3		
Final Temperature (degC)=	5.0°c		

Monitoring Well Sampling Record

Site Name:	FOX-5		
Date of Sampling Event:	19 Aug/14	Time:	330pm
Names of Samplers:	JM/SB		
Landfill Name:	MIDDLE	Samples Collected:	YES
Monitoring Well ID:	MW-9	PHC F1	✓
Sample Number:	F5-MID-MW-9	Inorganic Elements	✓
Condition of Well:	OK, standing water around standpipe	PHC F2-F4	✓
	soft soil around casing	PCBs	✓
Measured Data		Duplicate Collected?	NO
Well pipe height above ground (cm)=	70		
Diameter of well (cm)=	5		
Depth of well installation (cm)= (from ground surface)			
Length screened section (cm)=			
Depth to top of screen (cm)= (from ground surface)			
Depth to water surface (~~cm~~)= (from top of pipe)	1.66 m	Measurement method: (meter, tape, etc)	Interface Meter
Static water level (cm)= (below ground surface)			
Measured well refusal depth (cm)= (i.e. depth to frozen ground)	2.25m	Evidence of sludge or siltation:	NO
Thickness of water column	0.59m		
Static volume of water in well	1.19L		
Free product thickness (mm)=	0	Measurement method:	IM
Purging: (Y/N)	YES	Purging/Sampling Equipment:	Waterra
Volume Purged Water=	2L (dry after 1L)		Tubing
Decontamination required: (Y/N)	N		& Footvalve
Number washes:			
Number rinses:			
Final pH=	8.03		
Final Conductivity (uS/cm)=	31.0		
Final Temperature (degC)=	4.3		

Monitoring Well Sampling Record

Site Name:	FOX-5		
Date of Sampling Event:	20Aug/14	Time:	145pm
Names of Samplers:	JM / SB		
Landfill Name:	MAIN	Samples Collected:	NO
Monitoring Well ID:	MW-10	PHC F1	
Sample Number:		Inorganic Elements	
Condition of Well:	OK, lock was	rusted shut and broken PHC F2-F4	
		off PCBs	
Measured Data		Duplicate Collected?	
Well pipe height above ground (cm)=	40		
Diameter of well (cm)=	5		
Depth of well installation (cm)=			
(from ground surface)			
Length screened section (cm)=			
Depth to top of screen (cm)=			
(from ground surface)			
Depth to water surface (cm)=	N/A (Dry)	Measurement method: (meter, tape, etc)	Interface Meter
(from top of pipe)			
Static water level (cm)=			
(below ground surface)			
Measured well refusal depth (~~cm~~)=	1.72m	Evidence of sludge or siltation:	NO
(i.e. depth to frozen ground)			
Thickness of water column	0		
Static volume of water in well	0		
Free product thickness (mm)=	0	Measurement method:	IM
Purging: (Y/N)	NO	Purging/Sampling Equipment:	N/A
Volume Purged Water=			
Decontamination required: (Y/N)			
Number washes:			
Number rinses:			
Final pH=			
Final Conductivity (uS/cm)=			
Final Temperature (degC)=			

Monitoring Well Sampling Record

Site Name:	FOX-5		
Date of Sampling Event:	20 Aug/14	Time:	140pm
Names of Samplers:	JM/SB		
Landfill Name:	MAIN	Samples Collected:	NO
Monitoring Well ID:	MW-11	PHC F1	
Sample Number:		Inorganic Elements	
Condition of Well:	OK, lock was	taped but was open PHC F2-F4	
		and broken PCBs	
Measured Data		Duplicate Collected?	
Well pipe height above ground (cm)=	102		
Diameter of well (cm)=	5		
Depth of well installation (cm)=			
(from ground surface)			
Length screened section (cm)=			
Depth to top of screen (cm)=			
(from ground surface)			
Depth to water surface (~~cm~~)=	2.27m	Measurement method: (meter, tape, etc)	Interface Meter
(from top of pipe)			
Static water level (cm)=			
(below ground surface)			
Measured well refusal depth (~~cm~~)=	2.58m	Evidence of sludge or siltation:	NO
(i.e. depth to frozen ground)			
Thickness of water column	0.31		
Static volume of water in well	0.62L		
Free product thickness (mm)=	0	Measurement method:	IM
Purging: (Y/N)	Y	Purging/Sampling Equipment:	Waterra Tubing
Volume Purged Water=	0		and Foot valve
Decontamination required: (Y/N)	N	Purging attempted, could not get any water out	
Number washes:			
Number rinses:			
Final pH=			
Final Conductivity (uS/cm)=			
Final Temperature (degC)=			

Monitoring Well Sampling Record

Site Name:	FOX-5		
Date of Sampling Event:	20 Aug/14	Time:	135pm
Names of Samplers:	JM /SB		
Landfill Name:	MAIN	Samples Collected:	NO
Monitoring Well ID:	MW-12	PHC F1	
Sample Number:		Inorganic Elements	
Condition of Well:	OK lock was	taped but was broken PHC F2-F4	
		PCBs	
Measured Data		Duplicate Collected?	
Well pipe height above ground (cm)=	35		
Diameter of well (cm)=	5		
Depth of well installation (cm)= (from ground surface)			
Length screened section (cm)=			
Depth to top of screen (cm)= (from ground surface)			
Depth to water surface (cm)= (from top of pipe)	N/A (Dry)	Measurement method: (meter, tape, etc)	Interface Meter
Static water level (cm)= (below ground surface)			
Measured well refusal depth ~~(cm)~~= (i.e. depth to frozen ground)	1.54m	Evidence of sludge or siltation:	No
Thickness of water column	0		
Static volume of water in well	0		
Free product thickness (mm)=	0	Measurement method:	IM
Purging: (Y/N)	No	Purging/Sampling Equipment:	N/A
Volume Purged Water=			
Decontamination required: (Y/N)			
Number washes:			
Number rinses:			
Final pH=			
Final Conductivity (uS/cm)=			
Final Temperature (degC)=			

Monitoring Well Sampling Record

Site Name:	FOX-5		
Date of Sampling Event:	20 Aug/19	Time:	130pm
Names of Samplers:	JM/SB		
Landfill Name:	MAIN	Samples Collected:	YES
Monitoring Well ID:	MW-13	PHC F1	✓
Sample Number:		Inorganic Elements	✓
Condition of Well:	OK, water in	standpipe PHC F2-F4	✓
	lock taped but	broken PCBs	✓
Measured Data		Duplicate Collected?	
Well pipe height above ground (cm)=	55		
Diameter of well (cm)=	5		
Depth of well installation (cm)= (from ground surface)			
Length screened section (cm)=			
Depth to top of screen (cm)= (from ground surface)			
Depth to water surface (~~cm~~)= (from top of pipe)	1.45m	Measurement method: (meter, tape, etc)	Interface Meter
Static water level (cm)= (below ground surface)			
Measured well refusal depth (~~cm~~)= (i.e. depth to frozen ground)	1.87m	Evidence of sludge or siltation:	NO
Thickness of water column	0.42m		
Static volume of water in well	0.85L		
Free product thickness (mm)=	0	Measurement method:	IM
Purging: (Y/N)	YES	Purging/Sampling Equipment:	Waterra Tubing
Volume Purged Water=	3L		and Footvalve
Decontamination required: (Y/N)	N		
Number washes:			
Number rinses:			
Final pH=	7.88		
Final Conductivity (uS/cm)=	24.6		
Final Temperature (degC)=	3.2		

Monitoring Well Sampling Record

Site Name:	FOX-5		
Date of Sampling Event:	20 Aug/14	Time:	125pm
Names of Samplers:	JM/SB		
Landfill Name:	MAIN	Samples Collected:	YES
Monitoring Well ID:	MW-14	PHC F1	✓
Sample Number:	F5-MN-MW-14	Inorganic Elements	✓
Condition of Well:	OK	PHC F2-F4	✓
		PCBs	✓
Measured Data		Duplicate Collected?	YES
Well pipe height above ground (cm)=	50		
Diameter of well (cm)=	5		
Depth of well installation (cm)= (from ground surface)			
Length screened section (cm)=			
Depth to top of screen (cm)= (from ground surface)			
Depth to water surface (~~cm~~)= (from top of pipe)	1.34m	Measurement method: (meter, tape, etc)	Interface Meter
Static water level (cm)= (below ground surface)			
Measured well refusal depth (~~cm~~)= (i.e. depth to frozen ground)	1.84m	Evidence of sludge or siltation:	None
Thickness of water column	50		
Static volume of water in well	1.02		
Free product thickness (mm)=	0	Measurement method:	
Purging: (Y/N)	YES	Purging/Sampling Equipment:	Waterra Tubing
Volume Purged Water=			and Footvalve
Decontamination required: (Y/N)	N		
Number washes:			
Number rinses:			
Final pH=	8.48		
Final Conductivity (uS/cm)=	25.8		
Final Temperature (degC)=	3.1		

Monitoring Well Sampling Record

Site Name:	FOX-5		
Date of Sampling Event:	19Aug/14	Time:	825pm
Names of Samplers:	JM/SB		
Landfill Name:	STATION	Samples Collected:	YES
Monitoring Well ID:	MW-19	PHC F1	✓
Sample Number:		Inorganic Elements	✓
Condition of Well:	OK water	around standpipe PHC F2-F4	✓
		PCBs	✓
Measured Data		Duplicate Collected?	
Well pipe height above ground (cm)=	35	Sampled 20Aug/14	
Diameter of well (cm)=	5		
Depth of well installation (cm)= (from ground surface)			
Length screened section (cm)=			
Depth to top of screen (cm)= (from ground surface)			
Depth to water surface (~~cm~~)= (from top of pipe)	1.50m	Measurement method: (meter, tape, etc)	Interface Meter
Static water level (cm)= (below ground surface)			
Measured well refusal depth (~~cm~~)= (i.e. depth to frozen ground)	1.97m	Evidence of sludge or siltation:	No
Thickness of water column	0.47m		
Static volume of water in well	0.95L		
Free product thickness (mm)=	0	Measurement method:	IM
Purging: (Y/N)	Y	Purging/Sampling Equipment:	
Volume Purged Water=	3L		
Decontamination required: (Y/N)	N		
Number washes:			
Number rinses:			
Final pH=	7.92		
Final Conductivity (uS/cm)=	33.3		
Final Temperature (degC)=	4.2		

Monitoring Well Sampling Record

Site Name:	FOX-5			
Date of Sampling Event:	19 Aug/15		Time:	745pm
Names of Samplers:	JM/SB			
Landfill Name:	STATION		Samples Collected:	YES
Monitoring Well ID:	MW-15		PHC F1	✓
Sample Number:	FS-SA-MW	-15	Inorganic Elements	✓
Condition of Well:	OK, soft soil	around casing	PHC F2-F4	✓
			PCBs	✓
Measured Data			Duplicate Collected?	NO
Well pipe height above ground (cm)=	59			
Diameter of well (cm)=	5			
Depth of well installation (cm)= (from ground surface)				
Length screened section (cm)=				
Depth to top of screen (cm)= (from ground surface)				
Depth to water surface (~~cm~~)= (from top of pipe)	1.29m		Measurement method: (meter, tape, etc)	Interface Meter
Static water level (cm)= (below ground surface)				
Measured well refusal depth (~~cm~~)= (i.e. depth to frozen ground)	2.31m		Evidence of sludge or siltation:	No
Thickness of water column	1.02m			
Static volume of water in well	2,07L			
Free product thickness (mm)=	0		Measurement method:	IM
Purging: (Y/N)	YES		Purging/Sampling Equipment:	Waterra Tubing + Footvalve
Volume Purged Water=	4L (dry after	1.5L)		
Decontamination required: (Y/N)	N			
Number washes:				
Number rinses:				
Final pH=	7.66			
Final Conductivity (uS/cm)=	30.3			
Final Temperature (degC)=	4.2			

Monitoring Well Sampling Record

Site Name:	FOX-5		
Date of Sampling Event:	19 Aug/14	Time:	755pm
Names of Samplers:	JM/SB		
Landfill Name:	STATION	Samples Collected:	YES
Monitoring Well ID:	MW-16	PHC F1	✓
Sample Number:	FS-SA-MW	-16 Inorganic Elements	✓
Condition of Well:	OK, lock had	rusted and was PHC F2-F4	✓
	broken off	to access well PCBs	✓
Measured Data		Duplicate Collected?	NO
Well pipe height above ground (cm)=	46		
Diameter of well (cm)=	5		
Depth of well installation (cm)= (from ground surface)			
Length screened section (cm)=			
Depth to top of screen (cm)= (from ground surface)			
Depth to water surface (~~cm~~)= (from top of pipe)	1.11m	Measurement method: (meter, tape, etc)	Interface Meter
Static water level (cm)= (below ground surface)			
Measured well refusal depth (~~cm~~)= (i.e. depth to frozen ground)	1.68m	Evidence of sludge or siltation:	No
Thickness of water column	0.57m		
Static volume of water in well	1.15L		
Free product thickness (mm)=	0	Measurement method:	IM
Purging: (Y/N)	YES	Purging/Sampling Equipment:	Waterra Tubing + Footvalve
Volume Purged Water=	2L (dry after 0.5L)		
Decontamination required: (Y/N)	N		
Number washes:			
Number rinses:			
Final pH=	7.80		
Final Conductivity (uS/cm)=	27.7		
Final Temperature (degC)=	4.0		

Monitoring Well Sampling Record

Site Name:	FOX-5		
Date of Sampling Event:	19 Aug/14	Time:	805pm
Names of Samplers:	JM/SB		
Landfill Name:	STATION	Samples Collected:	No
Monitoring Well ID:	MW-17	PHC F1	
Sample Number:		Inorganic Elements	
Condition of Well:	OK, soft ground around	PHC F2-F4	
	casing	PCBs	
Measured Data		Duplicate Collected?	
Well pipe height above ground (cm)=	35		
Diameter of well (cm)=	5		
Depth of well installation (cm)= (from ground surface)			
Length screened section (cm)=			
Depth to top of screen (cm)= (from ground surface)			
Depth to water surface (~~cm~~)= (from top of pipe)	1.63m	Measurement method: (meter, tape, etc)	Interface Meter
Static water level (cm)= (below ground surface)			
Measured well refusal depth (~~cm~~)= (i.e. depth to frozen ground)	1.90m	Evidence of sludge or siltation:	No
Thickness of water column	0.27m		
Static volume of water in well	0.54L		
Free product thickness (mm)=	0	Measurement method:	IM
Purging: (Y/N)	No	Purging/Sampling Equipment:	N/A
Volume Purged Water=			
Decontamination required: (Y/N)	N	Not sampled (not enough water)	
Number washes:			
Number rinses:			
Final pH=			
Final Conductivity (uS/cm)=			
Final Temperature (degC)=			

Monitoring Well Sampling Record

Site Name:	FOX-5		
Date of Sampling Event:	19 Aug/14	Time:	815pm
Names of Samplers:	JM/SB		
Landfill Name:	STATION	Samples Collected:	NO
Monitoring Well ID:	MW-18	PHC F1	
Sample Number:		Inorganic Elements	
Condition of Well:	OK, standpipe is very low in casing	PHC F2-F4	
		PCBs	
Measured Data		Duplicate Collected?	
Well pipe height above ground (cm)=	80	(measured from low point of top	of open casing)
Diameter of well (cm)=	5		
Depth of well installation (cm)= (from ground surface)			
Length screened section (cm)=			
Depth to top of screen (cm)= (from ground surface)			
Depth to water surface (~~cm~~)= (from top of pipe)	2.16m	Measurement method: (meter, tape, etc)	Interface Meter
Static water level (cm)= (below ground surface)			
Measured well refusal depth (~~cm~~)= (i.e. depth to frozen ground)	2.21m	Evidence of sludge or siltation:	NO
Thickness of water column	0.05m		
Static volume of water in well	0.10L		
Free product thickness (mm)=	0	Measurement method:	IM
Purging: (Y/N)	No	Purging/Sampling Equipment:	N/A
Volume Purged Water=			
Decontamination required: (Y/N)	N	Not sampled (Not enough water)	
Number washes:			
Number rinses:			
Final pH=			
Final Conductivity (uS/cm)=			
Final Temperature (degC)=			

DEW LINE CLEANUP: POST-CONSTRUCTION - LANDFILL MONITORING

VISUAL INSPECTION CHECKLIST
INSPECTION REPORT – PAGE 1 OF 2

SITE NAME:	FOX-5
LANDFILL DESIGNATION:	Middle Site Tier II Disposal Facility/Non-Hazardow Waste Landfill
DATE OF INSPECTION:	19 Aug/14
DATE OF PREVIOUS INSPECTION:	2012
INSPECTED BY:	Jason Mauchan/Stephen Borcsok
REPORT PREPARED BY:	Stephen Borcsok

The inspector/reporter represents to the best of the their 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.

VISUAL INSPECTION CHECKLIST - INSPECTION REPORT – PAGE 2 OF 2

Checklist Item	Present Yes/No	Location (Describe relative to existing monuments/features and relative to landfill design i.e. surface, berms, toe)	Length	Width	Depth	Extent relative to Area of Landfill (%)	Description	Photographic Records Focal length, location, view point & direction (relative to magnetic north) Feature of note Scale	Additional Comments
Settlement	Y	NE, SE, SW berms of landfill				<1%	Small holes / depressions		
Erosion	Y	NE, SE, SW berms + top of landfill.	~10m	~0.2m	~0.2m	<1%	Erosion Channels		
Frost Action	N								
Sloughing and Cracking	Y					<1%	Tension Cracks		
Animal Burrows	N								
Vegetation	Y	At MW-5				<1%	Small shrubs		
Staining	Y	North end of southeast berm				5%	Natural red staining		
Vegetation Stress	N								
Seepage Points	N								
Debris Exposed	N								
Presence/Condition – Monitoring Instruments	Y	4 Thermistors 5 Wells, locations as per dwg.				<1%	Thermistors, Wells		
Features of Note.	Y	On top cap of landfill				~2%	Vehicle Tracks,	Areas of Ponded Water	

SITE: FOX-5

LANDFILL: MIDDLE SITE LANDFILL

Preliminary Stability Assessment **Landfill:** FOX-5 MIDDLE SITE

Feature	Severity Rating	Extent
Settlement	ACCEPTABLE	OCCASIONAL
Erosion	ACCEPTABLE	OCCASIONAL
Frost Action	NONE	NONE
Staining	ACCEPTABLE	ISOLATED
Vegetation Stress	NONE	NONE
Seepage/Ponded Water	ACCEPTABLE	ISOLATED
Debris exposure	NONE	NONE
Overall Landfill Performance	ACCEPTABLE	

Performance/ Severity Rating	Description
Acceptable	Noted features are of little consequence. The landfill is performing as designed. Minor deviations in environmental or physical performance may be observed, such as isolated areas of erosion, settlement.
Marginal	Physical/environmental performance appears to be deteriorating with time. Observations may include an increase in size or number of features of note, such as differential settlement, erosion or cracking. No significant impact on landfill stability to date, but potential for failure is assessed as low or moderate.
Significant	Significant or potentially significant changes affecting landfill stability, such as significant changes in slope geometry, significant erosion or differential settlement; scarp development. The potential for failure is assessed as imminent.
Unacceptable	Stability of landfill is compromised to the extent that ability to contain waste materials is compromised. Examples may include: - Debris exposed in erosion channels or areas of differential settlement. - Liner exposed. - Slope failure.

Extent	Description
Isolated	Singular feature
Occasional	Features of note occurring at irregular intervals/locations
Numerous	Many features of note, impacted less than 50% of the surface area of the landfill
Extensive	Impacting greater than 50% of the surface area of the landfill

DEW LINE CLEANUP: POST-CONSTRUCTION - LANDFILL MONITORING

VISUAL INSPECTION CHECKLIST

INSPECTION REPORT – PAGE 1 OF 2

SITE NAME: FOX-5
LANDFILL DESIGNATION: MAIN LANDFILL
DATE OF INSPECTION: 20 Aug/14
DATE OF PREVIOUS INSPECTION: 2012
INSPECTED BY: Stephen Borcsok / Jason Mauchan
REPORT PREPARED BY: Stephen Borcsok
The inspector/reporter represents to the best of the their 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.

VISUAL INSPECTION CHECKLIST - INSPECTION REPORT – PAGE 2 OF 2

Checklist Item	Present Yes/No	Location (Describe relative to existing monuments/features and relative to landfill design i.e. surface, berms, toe)	Length	Width	Depth	Extent relative to Area of Landfill (%)	Description	Photographic Records Focal length, location, view point & direction (relative to magnetic north) Feature of note Scale	Additional Comments
Settlement	N								
Erosion	Y	Drainage channels around perimeter of landfill				~2%	Drainage channels routed around landfill		
Frost Action	N								
Sloughing and Cracking	Y	South end of landfill	0.5m				Small tension crack		
Animal Burrows	N								
Vegetation	N								
Staining	N								
Vegetation Stress	N								
Seepage Points	N								
Debris Exposed	Y	Within landfill cap boulders and outside landfill					Small metal/wood debris		Did not originate in landfill.
Presence/Condition – Monitoring Instruments	Y	8 Thermistors, 5 Wells as on drawings					Thermistors, Wells		Thermistors 1-4 are slanted downslope, indication of potential downhill movement of landfill
Features of Note.	Y	Landfill Cap					Fine particles infilling voids around boulders in cap		

Preliminary Stability Assessment **Landfill:** FOX-5 MAIN LANDFILL

Feature	Severity Rating	Extent
Settlement	NONE	NONE
Erosion	ACCEPTABLE	OCCASIONAL
Frost Action	NONE	NONE
Staining	NONE	NONE
Vegetation Stress	NONE	NONE
Seepage/Ponded Water	NONE	NONE
Debris exposure	ACCEPTABLE	OCCASIONAL
Overall Landfill Performance	ACCEPTABLE	

Performance/ Severity Rating	Description
Acceptable	Noted features are of little consequence. The landfill is performing as designed. Minor deviations in environmental or physical performance may be observed, such as isolated areas of erosion, settlement.
Marginal	Physical/environmental performance appears to be deteriorating with time. Observations may include an increase in size or number of features of note, such as differential settlement, erosion or cracking. No significant impact on landfill stability to date, but potential for failure is assessed as low or moderate.
Significant	Significant or potentially significant changes affecting landfill stability, such as significant changes in slope geometry, significant erosion or differential settlement; scarp development. The potential for failure is assessed as imminent.
Unacceptable	Stability of landfill is compromised to the extent that ability to contain waste materials is compromised. Examples may include: - Debris exposed in erosion channels or areas of differential settlement. - Liner exposed. - Slope failure.

Extent	Description
Isolated	Singular feature
Occasional	Features of note occurring at irregular intervals/locations
Numerous	Many features of note, impacted less than 50% of the surface area of the landfill
Extensive	Impacting greater than 50% of the surface area of the landfill

DEW LINE CLEANUP: POST-CONSTRUCTION - LANDFILL MONITORING

VISUAL INSPECTION CHECKLIST

INSPECTION REPORT – PAGE 1 OF 2

SITE NAME:	FOX-5
LANDFILL DESIGNATION:	STATION NON-HAZARDOUS WASTE LANDFILL
DATE OF INSPECTION:	20 Aug/14
DATE OF PREVIOUS INSPECTION:	2012
INSPECTED BY:	Jason Mauchan / Stephen Borcsok
REPORT PREPARED BY:	Stephen Borcsok

The inspector/reporter represents to the best of the their 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.

VISUAL INSPECTION CHECKLIST - INSPECTION REPORT – PAGE 2 OF 2

Checklist Item	Present Yes/No	Location (Describe relative to existing monuments/features and relative to landfill design i.e. surface, berms, toe)	Length	Width	Depth	Extent relative to Area of Landfill (%)	Description	Photographic Records Focal length, location, view point & direction (relative to magnetic north) Feature of note Scale	Additional Comments
Settlement	Y	On berms, top, outside toe (see dwgs)	0.5 m	0.5 m	0.2 m	1%	Small depressions/holes		
Erosion	Y	Going down hill on NW NE & SE berms	10 -15m	0.2m	0.1M	1%	Erosion Channels		
Frost Action	N								
Sloughing and Cracking	Y	On SW berm and at N corner	1m and 6m long on S berm 5M long on N corner			<1%	Tension cracks		
Animal Burrows	N								
Vegetation	Y	On berms and top of landfill				<1%	Small shrubs and grasses		
Staining	N								
Vegetation Stress	N								
Seepage Points	N								
Debris Exposed	Y	S berm, SW + SE corners, N of landfill				<1%	Wood, metal,	large reinforced concrete block (2m x 1m x 0.5m)	Did not originate from landfill
Presence/Condition – Monitoring Instruments	Y	5 monitoring wells as per drawings					Monitoring Wells		
Features of Note.	Y	Top surface of landfill				1%	Vehicle Tracks		

SITE: FOX-5 LANDFILL: STATION AREA LANDFILL

Preliminary Stability Assessment **Landfill:** FOX-5 STATION LANDFILL

Feature	Severity Rating	Extent
Settlement	Acceptable	Occasional
Erosion	Acceptable	Occasional
Frost Action	None	None
Staining	None	None
Vegetation Stress	None	None
Seepage/Ponded Water	None	None
Debris exposure	Acceptable	Occasional
Overall Landfill Performance	ACCEPTABLE	

Performance/ Severity Rating	Description
Acceptable	Noted features are of little consequence. The landfill is performing as designed. Minor deviations in environmental or physical performance may be observed, such as isolated areas of erosion, settlement.
Marginal	Physical/environmental performance appears to be deteriorating with time. Observations may include an increase in size or number of features of note, such as differential settlement, erosion or cracking. No significant impact on landfill stability to date, but potential for failure is assessed as low or moderate.
Significant	Significant or potentially significant changes affecting landfill stability, such as significant changes in slope geometry, significant erosion or differential settlement; scarp development. The potential for failure is assessed as imminent.
Unacceptable	Stability of landfill is compromised to the extent that ability to contain waste materials is compromised. Examples may include: - Debris exposed in erosion channels or areas of differential settlement. - Liner exposed. - Slope failure.

Extent	Description
Isolated	Singular feature
Occasional	Features of note occurring at irregular intervals/locations
Numerous	Many features of note, impacted less than 50% of the surface area of the landfill
Extensive	Impacting greater than 50% of the surface area of the landfill

APPENDIX C

LABORATORY QA/QC REPORTS AND CERTIFICATES OF ANALYSIS

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

CLIENT NAME: ARCADIS SENES CANADA INC(DCS)
121 GRANTON DRIVE, UNIT #11,
RICHMOND HILL, ON L4B3N4
(905) 882-5984

ATTENTION TO: Steve Borcsok

PROJECT: 350600-515

AGAT WORK ORDER: 14T881255

TRACE ORGANICS REVIEWED BY: Oksana Gushyla, Trace Organics Lab Supervisor

WATER ANALYSIS REVIEWED BY: Anthony Dapaah, PhD (Chem), Inorganic Lab Manager

DATE REPORTED: Sep 09, 2014

PAGES (INCLUDING COVER): 7

VERSION*: 1

Should you require any information regarding this analysis please contact your client services representative at (905) 712-5100

*NOTES

All samples will be disposed of within 30 days following analysis. Please contact the lab if you require additional sample storage time.

Certificate of Analysis

AGAT WORK ORDER: 14T881255
PROJECT: 350600-515

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FAX (905)712-5122
http://www.agatlabs.com

CLIENT NAME: ARCADIS SENES CANADA INC(DCS)
ATTENTION TO: Steve Borcsok
SAMPLING SITE:
SAMPLED BY:

O. Reg. 153(511) - PHCs F1 - F4 (Water)

DATE RECEIVED: 2014-08-26
DATE REPORTED: 2014-09-09

			SAMPLE DESCRIPTION:	F5-MN-MW-14
			SAMPLE TYPE:	Water
			DATE SAMPLED:	8/20/2014
Parameter	**Unit**	**G / S**	**RDL**	**5741349**
Benzene	µg/L		0.20	<0.20
Toluene	µg/L		0.20	<0.20
Ethylbenzene	µg/L		0.10	<0.10
Xylene Mixture	µg/L		0.20	<0.20
F1 (C6 to C10)	µg/L		25	<25
F1 (C6 to C10) minus BTEX	µg/L		25	<25
F2 (C10 to C16)	µg/L		100	<100
F3 (C16 to C34)	µg/L		100	<100
F4 (C34 to C50)	µg/L		100	<100
Gravimetric Heavy Hydrocarbons	µg/L		500	NA
Surrogate	**Unit**	**Acceptable Limits**		
Terphenyl	%	60-140		120

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

5741349
The C6-C10 fraction is calculated using Toluene response factor.
The C10 - C16, C16 - C34, and C34 - C50 fractions are calculated using the average response factor for n-C10, n-C16, and nC34.
Gravimetric Heavy Hydrocarbons are not included in the Total C16 - C50 and are only determined if the chromatogram of the C34 - C50 Hydrocarbons indicated that hydrocarbons >C50 are present.
The chromatogram has returned to baseline by the retention time of nC50.
Total C6-C50 results are corrected for BTEX contributions.
This method complies with the Reference Method for the CWS PHC and is validated for use in the laboratory.
nC6 and nC10 response factors are within 30% of Toluene response factor.
nC10, nC16 and nC34 response factors are within 10% of their average.
C50 response factor is within 70% of nC10 + nC16 nC34 average.
Linearity is within 15%.
Extraction and holding times were met for this sample.
Fractions 1-4 are quantified with the contribution of PAHs. Under Ontario Regulation 153, results are considered valid without determining the PAH contribution if not requested by the client.
NA = Not Applicable

Certified By:

Certificate of Analysis

AGAT WORK ORDER: 14T881255
PROJECT: 350600-515

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CLIENT NAME: ARCADIS SENES CANADA INC(DCS) **ATTENTION TO: Steve Borcsok**

SAMPLING SITE: **SAMPLED BY:**

PCBs (water)

DATE RECEIVED: 2014-08-26 **DATE REPORTED: 2014-09-09**

			SAMPLE DESCRIPTION:	F5-MN-MW-14
			SAMPLE TYPE:	Water
			DATE SAMPLED:	8/20/2014
Parameter	**Unit**	**G / S**	**RDL**	**5741349**
PCBs	µg/L		0.1	<0.1
Surrogate	**Unit**	**Acceptable Limits**		
Decachlorobiphenyl	%	60-130		94

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

Certified By:

Results relate only to the items tested and to all the items tested

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Certificate of Analysis

AGAT WORK ORDER: 14T881255

PROJECT: 350600-515

CLIENT NAME: ARCADIS SENES CANADA INC(DCS)

ATTENTION TO: Steve Borcsok

SAMPLING SITE:

SAMPLED BY:

Metals Scan (Water)

DATE RECEIVED: 2014-08-26 | **DATE REPORTED: 2014-09-09**

			SAMPLE DESCRIPTION:	F5-MN-MW-14
			SAMPLE TYPE:	Water
			DATE SAMPLED:	8/20/2014
Parameter	**Unit**	**G / S**	**RDL**	**5741349**
Arsenic	mg/L		0.001	<0.001
Cadmium	mg/L		0.001	<0.001
Chromium	mg/L		0.002	0.008
Cobalt	mg/L		0.001	<0.001
Copper	mg/L		0.002	0.002
Lead	mg/L		0.001	0.001
Mercury	mg/L		0.0001	<0.0001
Nickel	mg/L		0.003	0.004
Zinc	mg/L		0.005	0.038

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

Certified By:

Results relate only to the items tested and to all the items tested

AGAT Laboratories

5835 COOPERS AVENUE
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Quality Assurance

CLIENT NAME: ARCADIS SENES CANADA INC(DCS) | **AGAT WORK ORDER: 14T881255**

PROJECT: 350600-515 | **ATTENTION TO: Steve Borcsok**

SAMPLING SITE: | **SAMPLED BY:**

Trace Organics Analysis

RPT Date: Sep 09, 2014			DUPLICATE			Method Blank	REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD		Measured Value	Acceptable Limits Lower	Acceptable Limits Upper	Recovery	Acceptable Limits Lower	Acceptable Limits Upper	Recovery	Acceptable Limits Lower	Acceptable Limits Upper
O. Reg. 153(511) - PHCs F1 - F4 (Water)															
Benzene	1		< 0.20	< 0.20	0.0%	< 0.20	107%	50%	140%	118%	60%	130%	112%	50%	140%
Toluene	1		< 0.20	< 0.20	0.0%	< 0.20	109%	50%	140%	118%	60%	130%	112%	50%	140%
Ethylbenzene	1		< 0.10	< 0.10	0.0%	< 0.10	106%	50%	140%	118%	60%	130%	109%	50%	140%
Xylene Mixture	1		< 0.20	< 0.20	0.0%	< 0.20	105%	50%	140%	116%	60%	130%	111%	50%	140%
F1 (C6 to C10)	1		< 25	< 25	0.0%	< 25	87%	60%	140%	85%	60%	140%	89%	60%	140%
F2 (C10 to C16)	1		< 100	< 100	0.0%	< 100	104%	60%	140%	63%	60%	140%	98%	60%	140%
F3 (C16 to C34)	1		< 100	< 100	0.0%	< 100	104%	60%	140%	99%	60%	140%	102%	60%	140%
F4 (C34 to C50)	1		< 100	< 100	0.0%	< 100	84%	60%	140%	85%	60%	140%	102%	60%	140%
PCBs (water)															
PCBs	1		< 0.1	< 0.1	0.0%	< 0.1	95%	60%	140%	90%	60%	140%	100%	60%	140%

Certified By:

AGAT Laboratories

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Quality Assurance

CLIENT NAME: ARCADIS SENES CANADA INC(DCS)

PROJECT: 350600-515

SAMPLING SITE:

AGAT WORK ORDER: 14T881255

ATTENTION TO: Steve Borcsok

SAMPLED BY:

Water Analysis

RPT Date: Sep 09, 2014			DUPLICATE			Method Blank	REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD		Measured Value	Acceptable Limits Lower	Acceptable Limits Upper	Recovery	Acceptable Limits Lower	Acceptable Limits Upper	Recovery	Acceptable Limits Lower	Acceptable Limits Upper
Metals Scan (Water)															
Arsenic	1		0.002	0.002	0.0%	< 0.001	97%	90%	110%	105%	90%	110%	102%	70%	130%
Cadmium	1		< 0.001	< 0.001	0.0%	< 0.001	93%	90%	110%	102%	90%	110%	106%	70%	130%
Chromium	1		0.003	0.003	0.0%	< 0.002	100%	90%	110%	109%	90%	110%	106%	70%	130%
Cobalt	1		< 0.001	< 0.001	0.0%	< 0.001	96%	90%	110%	102%	90%	110%	97%	70%	130%
Copper	1		< 0.002	< 0.002	0.0%	< 0.002	104%	90%	110%	110%	90%	110%	108%	70%	130%
Lead	1		< 0.001	< 0.001	0.0%	< 0.001	107%	90%	110%	110%	90%	110%	107%	70%	130%
Mercury	5741349	5741349	<0.0001	<0.0001	0.0%	< 0.0001	96%	90%	110%	105%	90%	110%	111%	80%	120%
Nickel	1		< 0.003	< 0.003	0.0%	< 0.003	98%	90%	110%	105%	90%	110%	101%	70%	130%
Zinc	1		0.006	0.006	0.0%	< 0.005	100%	90%	110%	107%	90%	110%	103%	70%	130%

CHARTERED CHEMIST

Certified By:

5835 COOPERS AVENUE
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Method Summary

CLIENT NAME: ARCADIS SENES CANADA INC(DCS) **AGAT WORK ORDER: 14T881255**

PROJECT: 350600-515 **ATTENTION TO: Steve Borcsok**

SAMPLING SITE: **SAMPLED BY:**

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Trace Organics Analysis			
Benzene	VOL-91-5010	MOE PHC-E3421	(P&T)GC/FID
Toluene	VOL-91-5010	MOE PHC-E3421	(P&T)GC/FID
Ethylbenzene	VOL-91-5010	MOE PHC-E3421	(P&T)GC/FID
Xylene Mixture	VOL-91-5010	MOE PHC-E3421	(P&T)GC/FID
F1 (C6 to C10)	VOL-91-5010	MOE PHC-E3421	(P&T)GC/FID
F1 (C6 to C10) minus BTEX	VOL-91-5010	MOE PHC-E3421	(P&T)GC/FID
F2 (C10 to C16)	VOL-91-5010	MOE PHC-E3421	GC/FID
F3 (C16 to C34)	VOL-91-5010	MOE PHC-E3421	GC/FID
F4 (C34 to C50)	VOL -91- 5010	MOE PHC-E3421	GC/FID
Gravimetric Heavy Hydrocarbons	VOL-91-5010	MOE PHC-E3421	BALANCE
Terphenyl	VOL-91-5010		GC/FID
PCBs	ORG-91-5112	EPA SW-846 3510 & 8082	GC/ECD
Decachlorobiphenyl	ORG-91-5112	EPA SW-846 3510 & 8082	GC/ECD
Water Analysis			
Arsenic	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Cadmium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Chromium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Cobalt	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Copper	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Lead	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Mercury	MET-93-6100	EPA SW-846 7470 & 245.1	CVAAS
Nickel	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Zinc	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS

Med Blue

Seals intact

DCS SENES Consultants
121 Granton Drive, Unit 11, Richmond Hill, ON
Tel: (905) 882-5984 Fax: (905) 882-8962
Email: engineers@dcsltd.ca Website: www.dcsltd.ca

Chain of Custody Record

38/4.3/4.0
14T881255

Shipper

Project No.: 350600-515 **Site:** FOX-5 Broughton Island

Project Manager: S. Borcsok

Field Engineer/Techician: S. Borcsok/J. Mauchan

Date: **Route:** Courier

Lab: AGAT **Location** Ottawa

Required Date: **Turnaround:** STD Day(s)

Quotation No.:

MDL's To Meet: SEE ATTACHED

Location/ Hole No.	Sample No.	Depth (m)	Description	Label No.	Grab/ Comp.	Date Collected	PHCs F1	PHCs F2-F4	PCBs	Inorganics: As, Cd, Cr, Co, Cu, Pb, Ni, Zn, Hg							pH	Electrical Conductivity	Preservatives
F5-MN-MW		-14	GROUNDWATER			20-Aug/14	X	X	X	X									

Analyses Requested / **Field Procedures**

Relinquished By:	Date:	Time:	Received By:
			N. Berry
Relinquished By:	Date:	Time:	Received By: Aug 20 @ 3:20
Relinquished By:	Date:	Time:	Received By:

Laboratory

Remarks:
ALL RESULTS ARE TO BE SENT TO THE PROJECT MANAGER.

Success Through Science®

Your Project #: 350600-515
Site Location: FOX-5 BROUGHTON ISLAND
Your C.O.C. #: na

Attention:Stephen Borcsok

Decommissioning Consulting Services Limited
121 Granton Dr
Unit 11
Richmond Hill, ON
L4B 3N4

Report Date: 2014/09/02
Report #: R3142277
Version: 1

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B4F4066
Received: 2014/08/25, 09:40

Sample Matrix: Water
Samples Received: 3

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Reference
Petroleum Hydro. CCME F1 & BTEX in Water	3	N/A	2014/08/25	OTT SOP-00002	CCME CWS
Petroleum Hydrocarbons F2-F4 in Water	3	2014/08/27	2014/08/28	OTT SOP-00001	CCME Hydrocarbons
Mercury (low level) (1)	3	2014/08/27	2014/08/27	CAM SOP-00453	EPA 7470 m
Polychlorinated Biphenyl in Water (1)	3	2014/08/26	2014/08/27	CAM SOP-00309	EPA 8082 m

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) This test was performed by Maxxam Analytics Mississauga

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Keshani Vijh, Project Manager
Email: KVijh@maxxam.ca
Phone# (613) 274-0573
==
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Maxxam Analytics International Corporation o/a Maxxam Analytics 32 Colonnade Rd, Unit #1000, Nepean, ON K2E 7J6 Phone: 613 274-0573 Fax: 613 274-0574 Website: www.maxxam.ca

Maxxam Job #: B4F4066
Report Date: 2014/09/02

Decommissioning Consulting Services Limited
Client Project #: 350600-515
Site Location: FOX-5 BROUGHTON ISLAND
Sampler Initials: SB

ELEMENTS BY ATOMIC SPECTROSCOPY (WATER)

Maxxam ID		XG6978	XG6979	XG6980		
Sampling Date		2014/08/20	2014/08/20	2014/08/20		
COC Number		na	na	na		
	Units	**F5-MN-MW-13**	**F5-MN-MW-14**	**F5-SA-MW-19**	**RDL**	**QC Batch**
Metals						
Mercury (Hg)	ug/L	0.01	<0.01	<0.01	0.01	3726373

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Maxxam Job #: B4F4066
Report Date: 2014/09/02

Decommissioning Consulting Services Limited
Client Project #: 350600-515
Site Location: FOX-5 BROUGHTON ISLAND
Sampler Initials: SB

PETROLEUM HYDROCARBONS (CCME)

Maxxam ID		XG6978	XG6979	XG6980		
Sampling Date		2014/08/20	2014/08/20	2014/08/20		
COC Number		na	na	na		
	Units	**F5-MN-MW-13**	**F5-MN-MW-14**	**F5-SA-MW-19**	**RDL**	**QC Batch**
BTEX & F1 Hydrocarbons						
Benzene	ug/L	<0.20	<0.20	<0.20	0.20	3724349
Toluene	ug/L	<0.20	<0.20	<0.20	0.20	3724349
Ethylbenzene	ug/L	<0.20	<0.20	<0.20	0.20	3724349
o-Xylene	ug/L	<0.20	<0.20	<0.20	0.20	3724349
p+m-Xylene	ug/L	<0.40	<0.40	<0.40	0.40	3724349
Total Xylenes	ug/L	<0.40	<0.40	<0.40	0.40	3724349
F1 (C6-C10)	ug/L	<25	<25	<25	25	3724349
F1 (C6-C10) - BTEX	ug/L	<25	<25	<25	25	3724349
F2-F4 Hydrocarbons						
F2 (C10-C16 Hydrocarbons)	ug/L	<100	<100	<100	100	3726412
F3 (C16-C34 Hydrocarbons)	ug/L	<100	<100	<100	100	3726412
F4 (C34-C50 Hydrocarbons)	ug/L	<100	<100	<100	100	3726412
Reached Baseline at C50	ug/L	Yes	Yes	Yes		3726412
Surrogate Recovery (%)						
1,4-Difluorobenzene	%	110	111	110		3724349
4-Bromofluorobenzene	%	85	88	88		3724349
D10-Ethylbenzene	%	80	89	93		3724349
D4-1,2-Dichloroethane	%	109	102	101		3724349
o-Terphenyl	%	97	99	99		3726412

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Maxxam Job #: B4F4066
Report Date: 2014/09/02

Decommissioning Consulting Services Limited
Client Project #: 350600-515
Site Location: FOX-5 BROUGHTON ISLAND
Sampler Initials: SB

POLYCHLORINATED BIPHENYLS BY GC-ECD (WATER)

Maxxam ID		XG6978	XG6979	XG6980		
Sampling Date		2014/08/20	2014/08/20	2014/08/20		
COC Number		na	na	na		
	Units	F5-MN-MW-13	F5-MN-MW-14	F5-SA-MW-19	RDL	QC Batch
PCBs						
Aroclor 1016	ug/L	<0.05	<0.05	<0.05	0.05	3725649
Aroclor 1221	ug/L	<0.05	<0.05	<0.05	0.05	3725649
Aroclor 1232	ug/L	<0.05	<0.05	<0.05	0.05	3725649
Aroclor 1242	ug/L	<0.05	<0.05	<0.05	0.05	3725649
Aroclor 1248	ug/L	<0.05	<0.05	<0.05	0.05	3725649
Aroclor 1254	ug/L	<0.05	<0.05	<0.05	0.05	3725649
Aroclor 1260	ug/L	<0.05	<0.05	<0.05	0.05	3725649
Aroclor 1262	ug/L	<0.05	<0.05	<0.05	0.05	3725649
Aroclor 1268	ug/L	<0.05	<0.05	<0.05	0.05	3725649
Total PCB	ug/L	<0.05	<0.05	<0.05	0.05	3725649
Surrogate Recovery (%)						
Decachlorobiphenyl	%	70	74	73		3725649

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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GENERAL COMMENTS

Results relate only to the items tested.

Maxxam
A Bureau Veritas Group Company

Success Through Science®

Maxxam Job #: B4F4066
Report Date: 2014/09/02

QUALITY ASSURANCE REPORT

Decommissioning Consulting Services Lir...
Client Project #: 350600-515
Site Location: FOX-5 BROUGHTON ISLAND
Sampler Initials: SB

			Matrix Spike		Spiked Blank		Method Blank		RPD	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	Units	Value (%)	QC Limits
3724349	1,4-Difluorobenzene	2014/08/25	124	70 - 130	115	70 - 130	112	%		
3724349	4-Bromofluorobenzene	2014/08/25	94	70 - 130	91	70 - 130	86	%		
3724349	D10-Ethylbenzene	2014/08/25	100	70 - 130	82	70 - 130	83	%		
3724349	D4-1,2-Dichloroethane	2014/08/25	115	70 - 130	108	70 - 130	105	%		
3725649	Decachlorobiphenyl	2014/08/27	83	60 - 130	77	60 - 130	78	%		
3726412	o-Terphenyl	2014/08/27	104	30 - 130	101	30 - 130	94	%		
3724349	Benzene	2014/08/25	86	70 - 130	80	70 - 130	<0.20	ug/L	NC	40
3724349	Ethylbenzene	2014/08/25	85	70 - 130	76	70 - 130	<0.20	ug/L	NC	40
3724349	F1 (C6-C10) - BTEX	2014/08/25					<25	ug/L	NC	40
3724349	F1 (C6-C10)	2014/08/25	84	70 - 130	79	70 - 130	<25	ug/L	NC	40
3724349	o-Xylene	2014/08/25	86	70 - 130	78	70 - 130	<0.20	ug/L	NC	40
3724349	p+m-Xylene	2014/08/25	83	70 - 130	75	70 - 130	<0.40	ug/L	NC	40
3724349	Toluene	2014/08/25	76	70 - 130	73	70 - 130	<0.20	ug/L	NC	40
3724349	Total Xylenes	2014/08/25					<0.40	ug/L	NC	40
3725649	Aroclor 1016	2014/08/27					<0.05	ug/L	NC	40
3725649	Aroclor 1221	2014/08/27					<0.05	ug/L	NC	40
3725649	Aroclor 1232	2014/08/27					<0.05	ug/L	NC	40
3725649	Aroclor 1242	2014/08/27					<0.05	ug/L	NC	30
3725649	Aroclor 1248	2014/08/27					<0.05	ug/L	NC	30
3725649	Aroclor 1254	2014/08/27					<0.05	ug/L	NC	30
3725649	Aroclor 1260	2014/08/27	78	60 - 130	68	60 - 130	<0.05	ug/L	NC	30
3725649	Aroclor 1262	2014/08/27					<0.05	ug/L	NC	40
3725649	Aroclor 1268	2014/08/27					<0.05	ug/L	NC	40
3725649	Total PCB	2014/08/27	78	60 - 130	68	60 - 130	<0.05	ug/L	NC	40
3726373	Mercury (Hg)	2014/08/27	102	75 - 125	100	80 - 120	<0.01	ug/L	NC	20
3726412	F2 (C10-C16 Hydrocarbons)	2014/08/28	86	50 - 130	85	60 - 130	<100	ug/L	NC	50
3726412	F3 (C16-C34 Hydrocarbons)	2014/08/28	86	50 - 130	85	60 - 130	<100	ug/L	NC	50
3726412	F4 (C34-C50 Hydrocarbons)	2014/08/28	86	50 - 130	85	60 - 130	<100	ug/L	NC	50

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

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QUALITY ASSURANCE REPORT(CONT'D)

			Matrix Spike		Spiked Blank		Method Blank		RPD	
QC Batch	**Parameter**	**Date**	**% Recovery**	**QC Limits**	**% Recovery**	**QC Limits**	**Value**	**Units**	**Value (%)**	**QC Limits**
Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.										
Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.										
NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (one or both samples < 5x RDL).										

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VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).

Brad Newman, Scientific Specialist

Steve Roberts, Lab Supervisor, Ottawa

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DCS SENES Consultants
121 Granton Drive, Unit 11, Richmond Hill, ON
Tel: (905) 882-5984 Fax: (905) 882-8962
Email: engineers@dcsltd.ca Website: www.dcsltd.ca

Chain of Custody Record

Page 1 of __.

Shipper

Project No.: 350600-515 **Site:** FOX-5 Broughton Island
Project Manager: S. Borcsok
Field Engineer/Techician: S. Borcsok/J. Mauchan
Date: **Route:** Courier
Lab: MAxxAM **Location** Ottawa
Required Date: **Turnaround:** STD Day(s)
Quotation No.:
MDL's To Meet: SEE ATTACHED

~~On ice~~ KP 2014/08/25 No ice
REC'D IN OTTAWA
temp: 6,7,6

Analyses Requested / **Field Procedures**

Location/ Hole No.	Sample No.	Depth (m)	Description	Label No.	Grab/ Comp.	Date Collected	PHCs F1	PHCs F2-F4	PCBs	Inorganics: As, Cd, Cr, Co, Cu, Pb, Ni, Zn, Hg							pH	Electrical Conductivity	Preservatives
F5-MN-MW-	13		GROUNDWATER			20/Aug/14	X	X	X	X									
F5-MN-MW-	14		GROUNDWATER			↓	X	X	X	X									
F5-SA-MW-	19		GROUNDWATER				X	X	X	X									

25-Aug-14 09:40
Keshani Vijh
B4F4066
KP2 OTT-001

Relinquished By:	Date:	Time:	Received By:
			2014/08/25 Kelsey Rilen 9:40

Laboratory

Remarks:
ALL RESULTS ARE TO BE SENT TO THE PROJECT MANAGER.

Project No. and Date

(Revision 1 - 17 May 2012)

Your Project #: MB4F4066
Your C.O.C. #: 1 OF 1

Attention: SUB CONTRACTOR
MAXXAM ANALYTICS
CAMPOBELLO
6740 CAMPOBELLO ROAD
MISSISSAUGA, ON
CANADA L5N 2L8

Report Date: 2014/09/02
Report #: R1634209
Version: 2R

CERTIFICATE OF ANALYSIS – REVISED REPORT

MAXXAM JOB #: B474706
Received: 2014/08/26, 08:30

Sample Matrix: Water
Samples Received: 3

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Cadmium - low level CCME (Total)	3	2014/08/27	2014/08/29	AB SOP-00014 / AB SOP-00043	EPA 200.8 R5.4 m
Elements by ICPMS - Total	3	2014/08/28	2014/08/28	AB SOP-00014 / AB SOP-00043	EPA 200.8 R5.4 m

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.

Joyce Kimani, Project Manager Assistant
Email: JKimani@maxxam.ca
Phone# (403) 291-3077

==
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Total cover pages: 1

Maxxam Job #: B474706
Report Date: 2014/09/02

MAXXAM ANALYTICS
Client Project #: MB4F4066

RESULTS OF CHEMICAL ANALYSES OF WATER

Maxxam ID		KL0785	KL0786	KL0787		
Sampling Date		2014/08/21 13:00	2014/08/21 13:00	2014/08/21 13:00		
COC Number		1 OF 1	1 OF 1	1 OF 1		
	UNITS	**F5-MN-MW-13 (XG6978-05R)**	**F5-MN-MW-14 (XG6979-05R)**	**F5-SA-MW-19 (XG6980-05R)**	**RDL**	**QC Batch**
Low Level Elements						
Total Cadmium (Cd)	ug/L	0.044	0.020	0.080	0.020	7616308

RDL = Reportable Detection Limit

ELEMENTS BY ATOMIC SPECTROSCOPY (WATER)

Maxxam ID		KL0785	KL0786	KL0787		
Sampling Date		2014/08/21 13:00	2014/08/21 13:00	2014/08/21 13:00		
COC Number		1 OF 1	1 OF 1	1 OF 1		
	UNITS	**F5-MN-MW-13 (XG6978-05R)**	**F5-MN-MW-14 (XG6979-05R)**	**F5-SA-MW-19 (XG6980-05R)**	**RDL**	**QC Batch**
Elements						
Total Arsenic (As)	mg/L	0.0014	0.00072	0.0028	0.00020	7618345
Total Chromium (Cr)	mg/L	0.034	0.022	0.040	0.0010	7618345
Total Cobalt (Co)	mg/L	0.0029	0.0011	0.0066	0.00030	7618345
Total Copper (Cu)	mg/L	0.015	0.0047	0.022	0.00020	7618345
Total Lead (Pb)	mg/L	0.0053	0.0022	0.0075	0.00020	7618345
Total Nickel (Ni)	mg/L	0.014	0.0091	0.017	0.00050	7618345
Total Zinc (Zn)	mg/L	0.22	0.058	0.11	0.0030	7618345

RDL = Reportable Detection Limit

Package 1	2.3°C

Each temperature is the average of up to three cooler temperatures taken at receipt

General Comments

Results relate only to the items tested.

MAXXAM ANALYTICS
Attention: SUB CONTRACTOR
Client Project #: MB4F4066
P.O. #:
Site Location:

Quality Assurance Report

Maxxam Job Number: CB474706

QA/QC Batch Num Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	UNITS	QC Limits
7618345 HC7	Matrix Spike	Total Arsenic (As)	2014/08/28		113	%	80 - 120
		Total Chromium (Cr)	2014/08/28		111	%	80 - 120
		Total Cobalt (Co)	2014/08/28		113	%	80 - 120
		Total Copper (Cu)	2014/08/28		111	%	80 - 120
		Total Lead (Pb)	2014/08/28		120	%	80 - 120
		Total Nickel (Ni)	2014/08/28		109	%	80 - 120
		Total Zinc (Zn)	2014/08/28		110	%	80 - 120
	Spiked Blank	Total Arsenic (As)	2014/08/29		106	%	80 - 120
		Total Chromium (Cr)	2014/08/29		103	%	80 - 120
		Total Cobalt (Co)	2014/08/29		106	%	80 - 120
		Total Copper (Cu)	2014/08/29		104	%	80 - 120
		Total Lead (Pb)	2014/08/29		101	%	80 - 120
		Total Nickel (Ni)	2014/08/29		100	%	80 - 120
		Total Zinc (Zn)	2014/08/29		104	%	80 - 120
	Method Blank	Total Arsenic (As)	2014/08/28	<0.00020		mg/L	
		Total Chromium (Cr)	2014/08/28	<0.0010		mg/L	
		Total Cobalt (Co)	2014/08/28	<0.00030		mg/L	
		Total Copper (Cu)	2014/08/28	<0.00020		mg/L	
		Total Lead (Pb)	2014/08/28	<0.00020		mg/L	
		Total Nickel (Ni)	2014/08/28	<0.00050		mg/L	
		Total Zinc (Zn)	2014/08/28	<0.0030		mg/L	
	RPD	Total Arsenic (As)	2014/08/28	NC		%	20

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.
Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.
Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.
Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.
NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (one or both samples < 5x RDL).

Validation Signature Page

Maxxam Job #: B474706

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).

Michelle Fritz Gatehouse, Senior Analyst

==

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Your Project #: MB4F3737
Your C.O.C. #: 1 OF 1

Attention: SUB CONTRACTOR
MAXXAM ANALYTICS
CAMPOBELLO
6740 CAMPOBELLO ROAD
MISSISSAUGA, ON
CANADA L5N 2L8

Report Date: 2014/09/02
Report #: R1634306
Version: 1

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B475115
Received: 2014/08/27, 08:30

Sample Matrix: Water
Samples Received: 5

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Cadmium - low level CCME (Total)	4	2014/08/27	2014/08/30	AB SOP-00014 / AB SOP-00043	EPA 200.8 R5.4 m
Cadmium - low level CCME (Total)	1	2014/08/27	2014/09/02	AB SOP-00014 / AB SOP-00043	EPA 200.8 R5.4 m
Elements by ICP - Total	5	2014/08/29	2014/08/29	AB SOP-00014 / AB SOP-00042	EPA 200.7 CFR 2012 m
Elements by ICPMS - Total	5	2014/08/29	2014/08/29	AB SOP-00014 / AB SOP-00043	EPA 200.8 R5.4 m

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.

Cynny Hagen, Project Manager Assistant
Email: CHagen@maxxam.ca
Phone# (403) 291-3077 Ext:5601

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Total cover pages: 1

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MAXXAM ANALYTICS
Client Project #: MB4F3737

Maxxam Job #: B475115
Report Date: 2014/09/02

REGULATED METALS (CCME/AT1) - TOTAL

Maxxam ID		KL3471	KL3472	KL3473		
Sampling Date		2014/08/19	2014/08/19	2014/08/19		
COC Number		1 OF 1	1 OF 1	1 OF 1		
	UNITS	**F5-MID-MW-5(XG4890-03)**	**F5-MID-MW-8(XG4891-03)**	**F5-MID-MW-9(XG4892-03)**	**RDL**	**QC Batch**
Low Level Elements						
Total Cadmium (Cd)	ug/L	0.041	0.024	0.028	0.020	7616308
Elements						
Total Aluminum (Al)	mg/L	9.0	6.0	5.5	0.0030	7619601
Total Antimony (Sb)	mg/L	0.00061	<0.00060	<0.00060	0.00060	7619601
Total Arsenic (As)	mg/L	0.00081	0.00070	0.00076	0.00020	7619601
Total Barium (Ba)	mg/L	0.047	0.039	0.043	0.010	7619604
Total Beryllium (Be)	mg/L	<0.0010	<0.0010	<0.0010	0.0010	7619601
Total Boron (B)	mg/L	<0.020	<0.020	<0.020	0.020	7619604
Total Calcium (Ca)	mg/L	1.8	1.3	1.6	0.30	7619604
Total Chromium (Cr)	mg/L	0.036	0.020	0.036	0.0010	7619601
Total Cobalt (Co)	mg/L	0.0022	0.0019	0.0019	0.00030	7619601
Total Copper (Cu)	mg/L	0.0087	0.0044	0.014	0.00020	7619601
Total Iron (Fe)	mg/L	7.1	5.9	4.9	0.060	7619604
Total Lead (Pb)	mg/L	0.0036	0.0023	0.0031	0.00020	7619601
Total Lithium (Li)	mg/L	<0.020	<0.020	<0.020	0.020	7619604
Total Magnesium (Mg)	mg/L	2.0	1.7	1.0	0.20	7619604
Total Manganese (Mn)	mg/L	0.11	0.048	0.049	0.0040	7619604
Total Molybdenum (Mo)	mg/L	0.0013	0.00077	0.0012	0.00020	7619601
Total Nickel (Ni)	mg/L	0.021	0.012	0.023	0.00050	7619601
Total Phosphorus (P)	mg/L	0.20	0.18	0.17	0.10	7619604
Total Potassium (K)	mg/L	1.6	1.6	1.5	0.30	7619604
Total Selenium (Se)	mg/L	0.00022	<0.00020	<0.00020	0.00020	7619601
Total Silicon (Si)	mg/L	8.5	6.6	5.9	0.10	7619604
Total Silver (Ag)	mg/L	<0.00010	<0.00010	<0.00010	0.00010	7619601
Total Sodium (Na)	mg/L	4.7	3.9	3.5	0.50	7619604
Total Strontium (Sr)	mg/L	<0.020	<0.020	<0.020	0.020	7619604
Total Sulphur (S)	mg/L	0.26	0.35	0.35	0.20	7619604
Total Thallium (Tl)	mg/L	<0.00020	<0.00020	<0.00020	0.00020	7619601
Total Tin (Sn)	mg/L	0.0010	<0.0010	0.0010	0.0010	7619601
Total Titanium (Ti)	mg/L	0.61	0.63	0.41	0.0010	7619601
Total Uranium (U)	mg/L	0.00084	0.00079	0.00077	0.00010	7619601
Total Vanadium (V)	mg/L	0.013	0.012	0.0077	0.0010	7619601
Total Zinc (Zn)	mg/L	0.028	0.037	0.064	0.0030	7619601

RDL = Reportable Detection Limit

Success Through Science®

Maxxam Job #: B475115
Report Date: 2014/09/02

MAXXAM ANALYTICS
Client Project #: MB4F3737

REGULATED METALS (CCME/AT1) - TOTAL

Maxxam ID		KL3474		KL3475		
Sampling Date		2014/08/19		2014/08/19		
COC Number		1 OF 1		1 OF 1		
	UNITS	**F5-MID-MW-15(XG4893-03)**	**RDL**	**F5-MID-MW-16(XG4894-03)**	**RDL**	**QC Batch**
Low Level Elements						
Total Cadmium (Cd)	ug/L	<0.020	0.020	0.79	0.020	7616308
Elements						
Total Aluminum (Al)	mg/L	0.32	0.0030	31	0.0030	7619601
Total Antimony (Sb)	mg/L	<0.00060	0.00060	<0.00060	0.00060	7619601
Total Arsenic (As)	mg/L	<0.00020	0.00020	0.0037	0.00020	7619601
Total Barium (Ba)	mg/L	<0.010	0.010	0.21	0.010	7619604
Total Beryllium (Be)	mg/L	<0.0010	0.0010	0.0015	0.0010	7619601
Total Boron (B)	mg/L	<0.020	0.020	0.066	0.020	7619604
Total Calcium (Ca)	mg/L	1.1	0.30	6.1	0.30	7619604
Total Chromium (Cr)	mg/L	0.018	0.0010	0.052	0.0010	7619601
Total Cobalt (Co)	mg/L	0.00031	0.00030	0.0086	0.00030	7619601
Total Copper (Cu)	mg/L	0.0011	0.00020	0.041	0.00020	7619601
Total Iron (Fe)	mg/L	0.35	0.060	29	0.060	7619604
Total Lead (Pb)	mg/L	0.00022	0.00020	0.022	0.00020	7619601
Total Lithium (Li)	mg/L	<0.020	0.020	0.036	0.020	7619604
Total Magnesium (Mg)	mg/L	0.43	0.20	6.5	0.20	7619604
Total Manganese (Mn)	mg/L	0.022	0.0040	0.44	0.0040	7619604
Total Molybdenum (Mo)	mg/L	0.00033	0.00020	0.0021	0.00020	7619601
Total Nickel (Ni)	mg/L	0.0090	0.00050	0.020	0.00050	7619601
Total Phosphorus (P)	mg/L	<0.10	0.10	1.1	0.10	7619604
Total Potassium (K)	mg/L	0.31	0.30	8.0	0.30	7619604
Total Selenium (Se)	mg/L	<0.00020	0.00020	0.00071	0.00020	7619601
Total Silicon (Si)	mg/L	2.3	0.10	27	0.10	7619604
Total Silver (Ag)	mg/L	<0.00010	0.00010	0.00010	0.00010	7619601
Total Sodium (Na)	mg/L	4.3	0.50	15	0.50	7619604
Total Strontium (Sr)	mg/L	<0.020	0.020	0.031	0.020	7619604
Total Sulphur (S)	mg/L	1.2	0.20	1.9	0.20	7619604
Total Thallium (Tl)	mg/L	<0.00020	0.00020	0.00072	0.00020	7619601
Total Tin (Sn)	mg/L	<0.0010	0.0010	0.0021	0.0010	7619601
Total Titanium (Ti)	mg/L	0.034	0.0010	3.3 (1)	0.0025	7619601
Total Uranium (U)	mg/L	<0.00010	0.00010	0.0040	0.00010	7619601
Total Vanadium (V)	mg/L	<0.0010	0.0010	0.061	0.0010	7619601

RDL = Reportable Detection Limit
(1) Detection limits raised due to dilution to bring analyte within the calibrated range.

REGULATED METALS (CCME/AT1) - TOTAL

Maxxam ID		KL3474		KL3475		
Sampling Date		2014/08/19		2014/08/19		
COC Number		1 OF 1		1 OF 1		
	UNITS	**F5-MID-MW-15(XG4893-03)**	**RDL**	**F5-MID-MW-16(XG4894-03)**	**RDL**	**QC Batch**
Total Zinc (Zn)	mg/L	0.020	0.0030	0.37	0.0030	7619601

RDL = Reportable Detection Limit

Package 1	-1.0°C

Each temperature is the average of up to three cooler temperatures taken at receipt

General Comments

Results relate only to the items tested.

Success Through Science®

MAXXAM ANALYTICS
Attention: SUB CONTRACTOR
Client Project #: MB4F3737
P.O. #:
Site Location:

Quality Assurance Report

Maxxam Job Number: CB475115

QA/QC Batch Num Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	UNITS	QC Limits
7619601 HC7	Matrix Spike	Total Aluminum (Al)	2014/08/29		NC	%	80 - 120
		Total Antimony (Sb)	2014/08/29		98	%	80 - 120
		Total Arsenic (As)	2014/08/29		97	%	80 - 120
		Total Beryllium (Be)	2014/08/29		108	%	80 - 120
		Total Chromium (Cr)	2014/08/29		94	%	80 - 120
		Total Cobalt (Co)	2014/08/29		93	%	80 - 120
		Total Copper (Cu)	2014/08/29		90	%	80 - 120
		Total Lead (Pb)	2014/08/29		92	%	80 - 120
		Total Molybdenum (Mo)	2014/08/29		111	%	80 - 120
		Total Nickel (Ni)	2014/08/29		88	%	80 - 120
		Total Selenium (Se)	2014/08/29		97	%	80 - 120
		Total Silver (Ag)	2014/08/29		91	%	80 - 120
		Total Thallium (Tl)	2014/08/29		92	%	80 - 120
		Total Tin (Sn)	2014/08/29		107	%	80 - 120
		Total Titanium (Ti)	2014/08/29		89	%	80 - 120
		Total Uranium (U)	2014/08/29		99	%	80 - 120
		Total Vanadium (V)	2014/08/29		103	%	80 - 120
		Total Zinc (Zn)	2014/08/29		NC	%	80 - 120
	Spiked Blank	Total Aluminum (Al)	2014/08/29		118	%	80 - 120
		Total Antimony (Sb)	2014/08/29		99	%	80 - 120
		Total Arsenic (As)	2014/08/29		99	%	80 - 120
		Total Beryllium (Be)	2014/08/29		104	%	80 - 120
		Total Chromium (Cr)	2014/08/29		97	%	80 - 120
		Total Cobalt (Co)	2014/08/29		98	%	80 - 120
		Total Copper (Cu)	2014/08/29		100	%	80 - 120
		Total Lead (Pb)	2014/08/29		101	%	80 - 120
		Total Molybdenum (Mo)	2014/08/29		105	%	80 - 120
		Total Nickel (Ni)	2014/08/29		97	%	80 - 120
		Total Selenium (Se)	2014/08/29		100	%	80 - 120
		Total Silver (Ag)	2014/08/29		96	%	80 - 120
		Total Thallium (Tl)	2014/08/29		98	%	80 - 120
		Total Tin (Sn)	2014/08/29		104	%	80 - 120
		Total Titanium (Ti)	2014/08/29		94	%	80 - 120
		Total Uranium (U)	2014/08/29		106	%	80 - 120
		Total Vanadium (V)	2014/08/29		105	%	80 - 120
		Total Zinc (Zn)	2014/08/29		98	%	80 - 120
	Method Blank	Total Aluminum (Al)	2014/08/29	0.0030, RDL=0.0030		mg/L	
		Total Antimony (Sb)	2014/08/29	<0.00060		mg/L	
		Total Arsenic (As)	2014/08/29	<0.00020		mg/L	
		Total Beryllium (Be)	2014/08/29	<0.0010		mg/L	
		Total Chromium (Cr)	2014/08/29	<0.0010		mg/L	
		Total Cobalt (Co)	2014/08/29	<0.00030		mg/L	
		Total Copper (Cu)	2014/08/29	<0.00020		mg/L	
		Total Lead (Pb)	2014/08/29	<0.00020		mg/L	
		Total Molybdenum (Mo)	2014/08/29	<0.00020		mg/L	
		Total Nickel (Ni)	2014/08/29	<0.00050		mg/L	
		Total Selenium (Se)	2014/08/29	<0.00020		mg/L	
		Total Silver (Ag)	2014/08/29	<0.00010		mg/L	
		Total Thallium (Tl)	2014/08/29	<0.00020		mg/L	
		Total Tin (Sn)	2014/08/29	<0.0010		mg/L	
		Total Titanium (Ti)	2014/08/29	<0.0010		mg/L	
		Total Uranium (U)	2014/08/29	<0.00010		mg/L	
		Total Vanadium (V)	2014/08/29	<0.0010		mg/L	
		Total Zinc (Zn)	2014/08/29	<0.0030		mg/L	
	RPD	Total Aluminum (Al)	2014/08/29	5.4		%	20

MAXXAM ANALYTICS
Attention: SUB CONTRACTOR
Client Project #: MB4F3737
P.O. #:
Site Location:

Quality Assurance Report (Continued)

Maxxam Job Number: CB475115

QA/QC Batch Num Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	UNITS	QC Limits
7619601 HC7	RPD	Total Antimony (Sb)	2014/08/29	NC		%	20
		Total Arsenic (As)	2014/08/29	2.8		%	20
		Total Beryllium (Be)	2014/08/29	NC		%	20
		Total Chromium (Cr)	2014/08/29	NC		%	20
		Total Cobalt (Co)	2014/08/29	NC		%	20
		Total Copper (Cu)	2014/08/29	5.3		%	20
		Total Lead (Pb)	2014/08/29	2.0		%	20
		Total Molybdenum (Mo)	2014/08/29	2.5		%	20
		Total Nickel (Ni)	2014/08/29	NC		%	20
		Total Selenium (Se)	2014/08/29	NC		%	20
		Total Silver (Ag)	2014/08/29	NC		%	20
		Total Thallium (Tl)	2014/08/29	NC		%	20
		Total Tin (Sn)	2014/08/29	NC		%	20
		Total Titanium (Ti)	2014/08/29	NC		%	20
		Total Uranium (U)	2014/08/29	1.7		%	20
		Total Vanadium (V)	2014/08/29	NC		%	20
		Total Zinc (Zn)	2014/08/29	5.1		%	20
7619604 STI	Matrix Spike	Total Barium (Ba)	2014/08/29		NC	%	80 - 120
		Total Boron (B)	2014/08/29		84	%	80 - 120
		Total Calcium (Ca)	2014/08/29		NC	%	80 - 120
		Total Iron (Fe)	2014/08/29		NC	%	80 - 120
		Total Lithium (Li)	2014/08/29		85	%	80 - 120
		Total Magnesium (Mg)	2014/08/29		NC	%	80 - 120
		Total Manganese (Mn)	2014/08/29		NC	%	80 - 120
		Total Phosphorus (P)	2014/08/29		84	%	80 - 120
		Total Potassium (K)	2014/08/29		89	%	80 - 120
		Total Silicon (Si)	2014/08/29		NC	%	80 - 120
		Total Sodium (Na)	2014/08/29		NC	%	80 - 120
		Total Strontium (Sr)	2014/08/29		74 (1)	%	80 - 120
	Spiked Blank	Total Barium (Ba)	2014/08/29		96	%	80 - 120
		Total Boron (B)	2014/08/29		97	%	80 - 120
		Total Calcium (Ca)	2014/08/29		95	%	80 - 120
		Total Iron (Fe)	2014/08/29		101	%	80 - 120
		Total Lithium (Li)	2014/08/29		99	%	80 - 120
		Total Magnesium (Mg)	2014/08/29		96	%	80 - 120
		Total Manganese (Mn)	2014/08/29		94	%	80 - 120
		Total Phosphorus (P)	2014/08/29		93	%	80 - 120
		Total Potassium (K)	2014/08/29		95	%	80 - 120
		Total Silicon (Si)	2014/08/29		94	%	80 - 120
		Total Sodium (Na)	2014/08/29		96	%	80 - 120
		Total Strontium (Sr)	2014/08/29		95	%	80 - 120
	Method Blank	Total Barium (Ba)	2014/08/29	<0.010		mg/L	
		Total Boron (B)	2014/08/29	<0.020		mg/L	
		Total Calcium (Ca)	2014/08/29	<0.30		mg/L	
		Total Iron (Fe)	2014/08/29	<0.060		mg/L	
		Total Lithium (Li)	2014/08/29	<0.020		mg/L	
		Total Magnesium (Mg)	2014/08/29	<0.20		mg/L	
		Total Manganese (Mn)	2014/08/29	<0.0040		mg/L	
		Total Phosphorus (P)	2014/08/29	<0.10		mg/L	
		Total Potassium (K)	2014/08/29	<0.30		mg/L	
		Total Silicon (Si)	2014/08/29	<0.10		mg/L	
		Total Sodium (Na)	2014/08/29	<0.50		mg/L	
		Total Strontium (Sr)	2014/08/29	<0.020		mg/L	
		Total Sulphur (S)	2014/08/29	<0.20		mg/L	
	RPD	Total Barium (Ba)	2014/08/29	4.2		%	20

Maxxam
A Bureau Veritas Group Company

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MAXXAM ANALYTICS
Attention: SUB CONTRACTOR
Client Project #: MB4F3737
P.O. #:
Site Location:

Quality Assurance Report (Continued)

Maxxam Job Number: CB475115

QA/QC Batch Num Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	UNITS	QC Limits
7619604 STI	RPD	Total Boron (B)	2014/08/29	5.2		%	20
		Total Calcium (Ca)	2014/08/29	3.0		%	20
		Total Iron (Fe)	2014/08/29	3.7		%	20
		Total Lithium (Li)	2014/08/29	NC		%	20
		Total Magnesium (Mg)	2014/08/29	4.2		%	20
		Total Manganese (Mn)	2014/08/29	4.2		%	20
		Total Phosphorus (P)	2014/08/29	NC		%	20
		Total Potassium (K)	2014/08/29	4.8		%	20
		Total Silicon (Si)	2014/08/29	4.3		%	20
		Total Sodium (Na)	2014/08/29	4.4		%	20
		Total Strontium (Sr)	2014/08/29	4.3		%	20
		Total Sulphur (S)	2014/08/29	3.3		%	20

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.
Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.
Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.
Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.
NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spiked amount was too small to permit a reliable recovery calculation (matrix spike concentration was less than 2x that of the native sample concentration).
NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (one or both samples < 5x RDL).
(1) Recovery or RPD for this parameter is outside control limits. The overall quality control for this analysis meets acceptability criteria.

Validation Signature Page

Maxxam Job #: B475115

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).

Peng Liang, Analyst II

==

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

CLIENT NAME: ARCADIS SENES CANADA INC(DCS)
121 GRANTON DRIVE, UNIT #11,
RICHMOND HILL, ON L4B3N4
(905) 882-5984

ATTENTION TO: Steve Borcsok

PROJECT: 350600-515-3

AGAT WORK ORDER: 14Z884834

SOIL ANALYSIS REVIEWED BY: Parvathi Malemath, Data Reviewer

TRACE ORGANICS REVIEWED BY: Oksana Gushyla, Trace Organics Lab Supervisor

DATE REPORTED: Sep 19, 2014

PAGES (INCLUDING COVER): 7

VERSION*: 1

Should you require any information regarding this analysis please contact your client services representative at (905) 712-5100

*NOTES

All samples will be disposed of within 30 days following analysis. Please contact the lab if you require additional sample storage time.

Certificate of Analysis

AGAT WORK ORDER: 14Z884834
PROJECT: 350600-515-3

AGAT Laboratories
5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

CLIENT NAME: ARCADIS SENES CANADA INC(DCS)
SAMPLING SITE:

ATTENTION TO: Steve Borcsok
SAMPLED BY:S. Borcsok

Metals Scan (Soil)

DATE RECEIVED: 2014-09-05

DATE REPORTED: 2014-09-19

Parameter	Unit	G / S	RDL	F5-SA-MW-18-D	F5-MID-MW-6-S	F5-MN-MW-14-S
SAMPLE TYPE:				Soil	Soil	Soil
DATE SAMPLED:				8/20/2014	8/20/2014	8/21/2014
				5774868	5774886	5774888
Arsenic	µg/g		1	2	1	2
Cadmium	µg/g		0.5	<0.5	<0.5	<0.5
Cobalt	µg/g		0.5	4.5	3.7	3.7
Chromium	µg/g		2	18	14	11
Copper	µg/g		1	11	8	9
Lead	µg/g		1	7	6	11
Mercury	µg/g		0.10	<0.10	<0.10	<0.10
Nickel	µg/g		1	6	5	5
Zinc	µg/g		5	42	34	40

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: Refers to T1(All)
5774868-5774888

Certified By: Parvathi Malemath

AGAT Laboratories
5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

CLIENT NAME: ARCADIS SENES CANADA INC(DCS)
SAMPLING SITE:

ATTENTION TO: Steve Borcsok
SAMPLED BY:S. Borcsok

PCBs (soil)

DATE RECEIVED: 2014-09-05

DATE REPORTED: 2014-09-19

			SAMPLE DESCRIPTION:	F5-SA-MW-18-D	F5-MID-MW-6-S	F5-MN-MW-14-S
			SAMPLE TYPE:	Soil	Soil	Soil
			DATE SAMPLED:	8/20/2014	8/20/2014	8/21/2014
Parameter	Unit	G / S	RDL	5774868	5774886	5774888
PCBs	µg/g		0.05	<0.05	<0.05	<0.05
Surrogate	Unit	Acceptable Limits				
Decachlorobiphenyl	%	60-130		84	92	112

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard
5774868-5774888 Results are based on the dry weight of soil extracted.

Certified By:

AGAT Laboratories

5835 COOPERS AVENUE
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Certificate of Analysis

AGAT WORK ORDER: 14Z884834
PROJECT: 350600-515-3

CLIENT NAME: ARCADIS SENES CANADA INC(DCS)
SAMPLING SITE:

ATTENTION TO: Steve Borcsok
SAMPLED BY:S. Borcsok

PHCs F1 - F4 (Soil)

DATE RECEIVED: 2014-09-05

DATE REPORTED: 2014-09-19

Parameter	Unit	G / S	RDL	F5-SA-MW-18-D	F5-MID-MW-6-S	F5-MN-MW-14-S
SAMPLE TYPE:				Soil	Soil	Soil
DATE SAMPLED:				8/20/2014	8/20/2014	8/21/2014
				5774868	5774886	5774888
Benzene	µg/g		0.02	<0.02	<0.02	<0.02
Toluene	µg/g		0.08	<0.08	<0.08	<0.08
Ethylbenzene	µg/g		0.05	<0.05	<0.05	<0.05
Xylene Mixture	µg/g		0.05	<0.05	<0.05	<0.05
F1 (C6 to C10)	µg/g		5	<5	<5	<5
F1 (C6 to C10) minus BTEX	µg/g		5	<5	<5	<5
F2 (C10 to C16)	µg/g		10	<10	<10	<10
F3 (C16 to C34)	µg/g		50	<50	<50	<50
F4 (C34 to C50)	µg/g		50	<50	<50	<50
Gravimetric Heavy Hydrocarbons	µg/g		50	NA	NA	NA
Moisture Content	%		0.1	5.8	10.9	8.8
Surrogate	**Unit**	**Acceptable Limits**				
Terphenyl	%	60-140		82	125	100

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

5774868-5774888 The soil sample was prepared in the lab using the Methanol extraction technique. The sample was not field preserved with methanol.
Results are based on sample dry weight.
The C6-C10 fraction is calculated using toluene response factor.
The C10 - C16, C16 - C34, and C34 - C50 fractions are calculated using the average response factor for n-C10, n-C16, and n-C34.
Gravimetric Heavy Hydrocarbons are not included in the Total C16-C50 and are only determined if the chromatogram of the C34 - C50 hydrocarbons indicates that hydrocarbons >C50 are present.
The chromatogram has returned to baseline by the retention time of nC50.
Total C6 - C50 results are corrected for BTEX contributions.
This method complies with the Reference Method for the CWS PHC and is validated for use in the laboratory.
nC6 and nC10 response factors are within 30% of Toluene response factor.
nC10, nC16 and nC34 response factors are within 10% of their average.
C50 response factor is within 70% of nC10 + nC16 + nC34 average.
Linearity is within 15%.
Extraction and holding times were met for this sample.
Fractions 1-4 are quantified with the contribution of PAHs. Under Ontario Regulation 153, results are considered valid without determining the PAH contribution if not requested by the client.
Quality Control Data is available upon request.

Certified By:

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

Quality Assurance

CLIENT NAME: ARCADIS SENES CANADA INC(DCS)
AGAT WORK ORDER: 14Z884834
PROJECT: 350600-515-3
ATTENTION TO: Steve Borcsok
SAMPLING SITE:
SAMPLED BY:S. Borcsok

Soil Analysis

RPT Date: Sep 19, 2014			DUPLICATE			Method Blank	REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD		Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
Metals Scan (Soil)															
Arsenic	1	5774888	2	2	0.0%	< 1	105%	70%	130%	99%	80%	120%	102%	70%	130%
Cadmium	1	5774888	< 0.5	< 0.5	0.0%	< 0.5	98%	70%	130%	116%	80%	120%	107%	70%	130%
Cobalt	1	5774888	3.7	3.8	2.7%	< 0.5	98%	70%	130%	104%	80%	120%	101%	70%	130%
Chromium	1	5774888	11	11	0.0%	< 2	84%	70%	130%	104%	80%	120%	103%	70%	130%
Copper	1	5774888	9	9	0.0%	< 1	104%	70%	130%	105%	80%	120%	102%	70%	130%
Lead	1	5774888	11	11	0.0%	< 1	98%	70%	130%	102%	80%	120%	96%	70%	130%
Mercury	1	5774888	< 0.10	< 0.10	0.0%	< 0.10	106%	70%	130%	95%	80%	120%	104%	70%	130%
Nickel	1	5774888	5	5	0.0%	< 1	87%	70%	130%	98%	80%	120%	98%	70%	130%
Zinc	1	5774888	40	41	2.5%	< 5	101%	70%	130%	102%	80%	120%	102%	70%	130%

Comments: NA signifies Not Applicable

Certified By: Parvathi Malemath

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Quality Assurance

CLIENT NAME: ARCADIS SENES CANADA INC(DCS)
AGAT WORK ORDER: 14Z884834
PROJECT: 350600-515-3
ATTENTION TO: Steve Borcsok
SAMPLING SITE:
SAMPLED BY:S. Borcsok

Trace Organics Analysis

RPT Date: Sep 19, 2014			DUPLICATE			Method Blank	REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD		Measured Value	Acceptable Limits Lower	Acceptable Limits Upper	Recovery	Acceptable Limits Lower	Acceptable Limits Upper	Recovery	Acceptable Limits Lower	Acceptable Limits Upper
PHCs F1 - F4 (Soil)															
Benzene	1		< 0.02	< 0.02	0.0%	< 0.02	82%	50%	140%	107%	60%	130%	88%	50%	140%
Toluene	1		< 0.08	< 0.08	0.0%	< 0.08	79%	50%	140%	108%	60%	130%	91%	50%	140%
Ethylbenzene	1		< 0.05	< 0.05	0.0%	< 0.05	82%	50%	140%	107%	60%	130%	85%	50%	140%
Xylene Mixture	1		< 0.05	< 0.05	0.0%	< 0.05	86%	50%	140%	109%	60%	130%	94%	50%	140%
F1 (C6 to C10)	1		< 5	< 5	0.0%	< 5	121%	60%	140%	96%	80%	120%	80%	60%	140%
F2 (C10 to C16)	1		< 10	< 10	0.0%	< 10	100%	60%	140%	104%	80%	120%	75%	60%	140%
F3 (C16 to C34)	1		< 50	< 50	0.0%	< 50	103%	60%	140%	101%	80%	120%	85%	60%	140%
F4 (C34 to C50)	1		< 50	< 50	0.0%	< 50	99%	60%	140%	107%	80%	120%	102%	60%	140%
PCBs (soil)															
PCBs	1		< 0.1	< 0.1	0.0%	< 0.1	79%	60%	140%	74%	60%	140%	121%	60%	140%

Certified By:

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Method Summary

CLIENT NAME: ARCADIS SENES CANADA INC(DCS) — AGAT WORK ORDER: 14Z884834
PROJECT: 350600-515-3 — ATTENTION TO: Steve Borcsok
SAMPLING SITE: — SAMPLED BY:S. Borcsok

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Soil Analysis			
Arsenic	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
Cadmium	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
Cobalt	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
Chromium	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
Copper	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
Lead	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
Mercury	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
Nickel	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
Zinc	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
Trace Organics Analysis			
PCBs	ORG-91-5113	EPA SW-846 3541 & 8082	GC/ECD
Decachlorobiphenyl	ORG-91-5113	EPA SW-846 3541 & 8082	GC/ECD
Benzene	VOL-91-5009	EPA SW-846 5035 & 8260	P & T GC/MS
Toluene	VOL-91-5009	EPA SW-846 5035 & 8260	P & T GC/MS
Ethylbenzene	VOL-91-5009	EPA SW-846 5035 & 8260	P & T GC/MS
Xylene Mixture	VOL-91-5009	EPA SW-846 5035 & 8260	P & T GC/MS
F1 (C6 to C10)	VOL-91-5009	CCME Tier 1 Method	P & T GC/FID
F1 (C6 to C10) minus BTEX	VOL-91-5009	CCME Tier 1 Method	P & T GC/FID
F2 (C10 to C16)	VOL-91-5009	CCME Tier 1 Method, EPA SW846 8015	GC / FID
F3 (C16 to C34)	VOL-91-5009	CCME Tier 1 Method, EPA SW846 8015	GC / FID
F4 (C34 to C50)	VOL-91-5009	CCME Tier 1 Method, EPA SW846 8015	GC / FID
Gravimetric Heavy Hydrocarbons	VOL-91-5009	CCME Tier 1 Method	BALANCE
Moisture Content	VOL-91-5009	CCME Tier 1 Method	BALANCE
Terphenyl	VOL-91-5009		GC/FID

6.3 | 6.8 | 5.4

DCS SENES Consultants
121 Granton Drive, Unit 11, Richmond Hill, ON
Tel: (905) 882-5984 Fax: (905) 882-8962
Email: engineers@dcsltd.ca Website: www.dcsltd.ca

Chain of Custody Record

Shipper

Project No.: 350600-515-3 **Site:** FOX-5 Broughton Island
Project Manager: S. Borcsok
Field Engineer/Techician: S. Borcsok/J. Mauchan
Date: 28 Aug/14 **Route:** Courier
Lab: AGAT **Location** Ottawa
Required Date: **Turnaround:** STD Day(s)
Quotation No.:
MDL's To Meet: SEE ATTACHED

142884834

Location/ Hole No.	Sample No.	Depth (m)	Description	Label No.	Grab/ Comp.	Date Collected	PHCs F1	PHCs F2-F4	PCBs	Inorganics: As, Cd, Cr, Co, Cu, Pb, Ni, Zn, Hg							pH	Electrical Conductivity	Preservatives
F5-SA-MW-	18-D		SOIL			20 Aug/14	X	X	X	X									
F5-MID-MW	-6-S		SOIL			20 Aug/14	X	X	X	X									
F5-MN-MW	-14-S		SOIL			21 Aug/14	X	X	X	X									

Analyses Requested | Field Procedures

Relinquished By:	Date:	Time:	Received By:
S. Borcsok	28 Aug/14		Shazmin
Relinquished By:	Date:	Time:	Received By: Sept 5/14
Relinquished By:	Date:	Time:	Received By: 9:20am

Laboratory

Remarks:
ALL RESULTS ARE TO BE SENT TO THE PROJECT MANAGER.

Landfill Monitoring Detection Limits

Parameter	Soil (mg/kg)	Groundwater (mg/L)
Copper	<3.0	<0.005
Nickel	<5.0	<0.010
Cobalt	<5.0	<0.005
Cadmium	<1.0	<0.001
Lead	<10	<0.01
Zinc	<15	<0.005
Chromium	<20	<0.005
Arsenic	<0.2	<0.05
Mercury	<0.1	<0.001
PCBs	<0.05	<0.003
TPH	<40	<1

Your Project #: 350600-515-3
Site Location: FOX 5 BROUGHTON ISLAND
Your C.O.C. #: na

Attention:Stephen Borcsok

Decommissioning Consulting Services Limited
121 Granton Dr
Unit 11
Richmond Hill, ON
L4B 3N4

Report Date: 2014/10/09
Report #: R3184273
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B4I3499
Received: 2014/08/28, 16:35

Sample Matrix: Soil
Samples Received: 24

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Reference
Petroleum Hydro. CCME F1 & BTEX in Soil (1)	4	2014/10/03	2014/10/05	CAM SOP-00315	CCME PHC-CWS m
Petroleum Hydro. CCME F1 & BTEX in Soil (1)	20	2014/10/03	2014/10/06	CAM SOP-00315	CCME PHC-CWS m
Petroleum Hydrocarbons F2-F4 in Soil (1)	2	2014/10/03	2014/10/03	CAM SOP-00316	CCME CWS m
Petroleum Hydrocarbons F2-F4 in Soil (1)	22	2014/10/03	2014/10/04	CAM SOP-00316	CCME CWS m
Strong Acid Leachable Metals by ICPMS (1)	24	2014/10/06	2014/10/07	CAM SOP-00447	EPA 6020A m
Moisture (1)	24	N/A	2014/10/06	CAM SOP-00445	Carter 2nd ed 51.2 m
Polychlorinated Biphenyl in Soil (1)	20	2014/10/06	2014/10/06	CAM SOP-00309	EPA 8082 m
Polychlorinated Biphenyl in Soil (1)	4	2014/10/06	2014/10/07	CAM SOP-00309	EPA 8082 m

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.
(1) This test was performed by Maxxam Analytics Mississauga

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Keshani Vijh, Project Manager
Email: KVijh@maxxam.ca
Phone# (613) 274-0573
==
Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Maxxam
A Bureau Veritas Group Company

Success Through Science®

Maxxam Job #: B4I3499
Report Date: 2014/10/09

Decommissioning Consulting Services Limited
Client Project #: 350600-515-3
Site Location: FOX 5 BROUGHTON ISLAND

RESULTS OF ANALYSES OF SOIL

Maxxam ID		XV4996	XV4997	XV4998	XV4999	XV5000		
Sampling Date		2014/08/20	2014/08/20	2014/08/20	2014/08/20	2014/08/20		
COC Number		na	na	na	na	na		
	Units	F5-SA-MW-18-S	F5-SA-MW-18-D	F5-SA-MW-19-S	F5-SA-MW-19-D	F5-MID-MW-5-S	RDL	QC Batch
Inorganics								
Moisture	%	7.0	6.4	7.7	6.5	13	1.0	3775595

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Maxxam ID		XV5001	XV5002	XV5003	XV5004	XV5005		
Sampling Date		2014/08/20	2014/08/20	2014/08/20	2014/08/20	2014/08/20		
COC Number		na	na	na	na	na		
	Units	F5-MID-MW-5-D	F5-MID-MW-6-S	F5-MID-MW-6-D	F5-MID-MW-7-S	F5-MID-MW-7-D	RDL	QC Batch
Inorganics								
Moisture	%	11	13	12	7.6	15	1.0	3775595

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Maxxam ID		XV5006	XV5007	XV5008	XV5009	XV5010		
Sampling Date		2014/08/20	2014/08/20	2014/08/20	2014/08/20	2014/08/21		
COC Number		na	na	na	na	na		
	Units	F5-MID-MW-8-S	F5-MID-MW-8-D	F5-MID-MW-9-S	F5-MID-MW-9-D	F5-MN-MW-10-S	RDL	QC Batch
Inorganics								
Moisture	%	12	14	9.5	7.4	6.2	1.0	3775595

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Maxxam ID		XV5011	XV5012		XV5013	XV5014		
Sampling Date		2014/08/21	2014/08/21		2014/08/21	2014/08/21		
COC Number		na	na		na	na		
	Units	F5-MN-MW-10-D	F5-MN-MW-11-S	QC Batch	F5-MN-MW-11-D	F5-MN-MW-12-S	RDL	QC Batch
Inorganics								
Moisture	%	7.5	9.3	3775595	6.4	4.5	1.0	3775644

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Maxxam ID		XV5015	XV5016	XV5017	XV5018	XV5019		
Sampling Date		2014/08/21	2014/08/21	2014/08/21	2014/08/21	2014/08/21		
COC Number		na	na	na	na	na		
	Units	F5-MN-MW-12-D	F5-MN-MW-13-S	F5-MN-MW-13-D	F5-MN-MW-14-S	F5-MN-MW-14-D	RDL	QC Batch
Inorganics								
Moisture	%	5.2	6.0	4.7	14	7.1	1.0	3775644

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Maxxam Analytics International Corporation o/a Maxxam Analytics 32 Colonnade Rd, Unit #1000, Nepean, ON K2E 7J6 Phone: 613 274-0573 Fax: 613 274-0574 Website: www.maxxam.ca

Maxxam Job #: B4I3499
Report Date: 2014/10/09

Decommissioning Consulting Services Limited
Client Project #: 350600-515-3
Site Location: FOX 5 BROUGHTON ISLAND

ELEMENTS BY ATOMIC SPECTROSCOPY (SOIL)

Maxxam ID			XV4996		XV4997		XV4998		
Sampling Date			2014/08/20		2014/08/20		2014/08/20		
COC Number			na		na		na		
	Units	Criteria	F5-SA-MW-18-S	QC Batch	F5-SA-MW-18-D	QC Batch	F5-SA-MW-19-S	RDL	QC Batch
Metals									
Acid Extractable Arsenic (As)	ug/g	**12**	1.2	3774997	1.2	3775002	2.0	1.0	3774997
Acid Extractable Cadmium (Cd)	ug/g	**22**	<0.10	3774997	<0.10	3775002	<0.10	0.10	3774997
Acid Extractable Chromium (Cr)	ug/g	**87**	17	3774997	17	3775002	14	1.0	3774997
Acid Extractable Cobalt (Co)	ug/g	**-**	4.5	3774997	4.4	3775002	3.6	0.10	3774997
Acid Extractable Copper (Cu)	ug/g	**91**	9.9	3774997	9.2	3775002	8.2	0.50	3774997
Acid Extractable Lead (Pb)	ug/g	**600**	6.8	3774997	5.9	3775002	6.2	1.0	3774997
Acid Extractable Nickel (Ni)	ug/g	**50**	7.9	3774997	7.1	3775002	6.2	0.50	3774997
Acid Extractable Zinc (Zn)	ug/g	**360**	43	3774997	39	3775002	36	5.0	3774997
Acid Extractable Mercury (Hg)	ug/g	**50**	<0.050	3774997	<0.050	3775002	<0.050	0.050	3774997

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Criteria: CCME Industrial
Canadian Environmental Quality Guidelines for Soil 1998-1999

Maxxam ID			XV4999	XV5000	XV5001	XV5002		
Sampling Date			2014/08/20	2014/08/20	2014/08/20	2014/08/20		
COC Number			na	na	na	na		
	Units	Criteria	F5-SA-MW-19-D	F5-MID-MW-5-S	F5-MID-MW-5-D	F5-MID-MW-6-S	RDL	QC Batch
Metals								
Acid Extractable Arsenic (As)	ug/g	**12**	1.6	<1.0	1.1	<1.0	1.0	3774997
Acid Extractable Cadmium (Cd)	ug/g	**22**	<0.10	<0.10	<0.10	<0.10	0.10	3774997
Acid Extractable Chromium (Cr)	ug/g	**87**	15	17	19	12	1.0	3774997
Acid Extractable Cobalt (Co)	ug/g	**-**	3.8	4.5	4.9	3.4	0.10	3774997
Acid Extractable Copper (Cu)	ug/g	**91**	8.4	8.1	9.7	6.4	0.50	3774997
Acid Extractable Lead (Pb)	ug/g	**600**	5.8	7.0	8.0	6.2	1.0	3774997
Acid Extractable Nickel (Ni)	ug/g	**50**	6.7	6.7	8.1	5.6	0.50	3774997
Acid Extractable Zinc (Zn)	ug/g	**360**	36	41	45	31	5.0	3774997
Acid Extractable Mercury (Hg)	ug/g	**50**	<0.050	<0.050	<0.050	<0.050	0.050	3774997

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Criteria: CCME Industrial
Canadian Environmental Quality Guidelines for Soil 1998-1999

Maxxam Analytics International Corporation o/a Maxxam Analytics 32 Colonnade Rd, Unit #1000, Nepean, ON K2E 7J6 Phone: 613 274-0573 Fax: 613 274-0574 Website: www.maxxam.ca

Maxxam Job #: B4I3499
Report Date: 2014/10/09

Decommissioning Consulting Services Limited
Client Project #: 350600-515-3
Site Location: FOX 5 BROUGHTON ISLAND

ELEMENTS BY ATOMIC SPECTROSCOPY (SOIL)

Maxxam ID			XV5003	XV5004	XV5005		XV5006		
Sampling Date			2014/08/20	2014/08/20	2014/08/20		2014/08/20		
COC Number			na	na	na		na		
	Units	**Criteria**	**F5-MID-MW-6-D**	**F5-MID-MW-7-S**	**F5-MID-MW-7-D**	**QC Batch**	**F5-MID-MW-8-S**	**RDL**	**QC Batch**
Metals									
Acid Extractable Arsenic (As)	ug/g	**12**	<1.0	<1.0	<1.0	3774997	1.0	1.0	3775002
Acid Extractable Cadmium (Cd)	ug/g	**22**	<0.10	<0.10	<0.10	3774997	<0.10	0.10	3775002
Acid Extractable Chromium (Cr)	ug/g	**87**	16	13	17	3774997	12	1.0	3775002
Acid Extractable Cobalt (Co)	ug/g	**-**	4.4	3.7	4.6	3774997	3.0	0.10	3775002
Acid Extractable Copper (Cu)	ug/g	**91**	8.0	10	9.2	3774997	7.1	0.50	3775002
Acid Extractable Lead (Pb)	ug/g	**600**	7.6	6.0	7.6	3774997	6.8	1.0	3775002
Acid Extractable Nickel (Ni)	ug/g	**50**	6.9	6.0	7.5	3774997	5.1	0.50	3775002
Acid Extractable Zinc (Zn)	ug/g	**360**	40	56	45	3774997	27	5.0	3775002
Acid Extractable Mercury (Hg)	ug/g	**50**	<0.050	<0.050	<0.050	3774997	<0.050	0.050	3775002

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Criteria: CCME Industrial
Canadian Environmental Quality Guidelines for Soil 1998-1999

Maxxam ID			XV5007	XV5008	XV5009	XV5010		
Sampling Date			2014/08/20	2014/08/20	2014/08/20	2014/08/21		
COC Number			na	na	na	na		
	Units	**Criteria**	**F5-MID-MW-8-D**	**F5-MID-MW-9-S**	**F5-MID-MW-9-D**	**F5-MN-MW-10-S**	**RDL**	**QC Batch**
Metals								
Acid Extractable Arsenic (As)	ug/g	**12**	1.1	1.4	1.3	<1.0	1.0	3774997
Acid Extractable Cadmium (Cd)	ug/g	**22**	<0.10	<0.10	<0.10	<0.10	0.10	3774997
Acid Extractable Chromium (Cr)	ug/g	**87**	14	11	12	13	1.0	3774997
Acid Extractable Cobalt (Co)	ug/g	**-**	3.9	2.9	3.0	3.5	0.10	3774997
Acid Extractable Copper (Cu)	ug/g	**91**	7.0	5.6	5.6	6.7	0.50	3774997
Acid Extractable Lead (Pb)	ug/g	**600**	7.2	5.9	7.0	7.6	1.0	3774997
Acid Extractable Nickel (Ni)	ug/g	**50**	5.9	4.5	5.1	5.6	0.50	3774997
Acid Extractable Zinc (Zn)	ug/g	**360**	33	26	26	37	5.0	3774997
Acid Extractable Mercury (Hg)	ug/g	**50**	<0.050	<0.050	<0.050	<0.050	0.050	3774997

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Criteria: CCME Industrial
Canadian Environmental Quality Guidelines for Soil 1998-1999

Maxxam Analytics International Corporation o/a Maxxam Analytics 32 Colonnade Rd, Unit #1000, Nepean, ON K2E 7J6 Phone: 613 274-0573 Fax: 613 274-0574 Website: www.maxxam.ca

Maxxam Job #: B4I3499
Report Date: 2014/10/09

Decommissioning Consulting Services Limited
Client Project #: 350600-515-3
Site Location: FOX 5 BROUGHTON ISLAND

ELEMENTS BY ATOMIC SPECTROSCOPY (SOIL)

Maxxam ID			XV5011	XV5012	XV5013	XV5014		
Sampling Date			2014/08/21	2014/08/21	2014/08/21	2014/08/21		
COC Number			na	na	na	na		
	Units	**Criteria**	**F5-MN-MW-10-D**	**F5-MN-MW-11-S**	**F5-MN-MW-11-D**	**F5-MN-MW-12-S**	**RDL**	**QC Batch**
Metals								
Acid Extractable Arsenic (As)	ug/g	**12**	<1.0	1.2	1.2	<1.0	1.0	3774997
Acid Extractable Cadmium (Cd)	ug/g	**22**	<0.10	<0.10	<0.10	<0.10	0.10	3774997
Acid Extractable Chromium (Cr)	ug/g	**87**	15	14	15	5.7	1.0	3774997
Acid Extractable Cobalt (Co)	ug/g	**-**	4.4	3.8	3.7	1.7	0.10	3774997
Acid Extractable Copper (Cu)	ug/g	**91**	8.0	8.0	8.6	5.0	0.50	3774997
Acid Extractable Lead (Pb)	ug/g	**600**	8.7	14	14	7.7	1.0	3774997
Acid Extractable Nickel (Ni)	ug/g	**50**	6.5	6.4	6.5	2.8	0.50	3774997
Acid Extractable Zinc (Zn)	ug/g	**360**	43	40	34	26	5.0	3774997
Acid Extractable Mercury (Hg)	ug/g	**50**	<0.050	<0.050	<0.050	<0.050	0.050	3774997

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Criteria: CCME Industrial
Canadian Environmental Quality Guidelines for Soil 1998-1999

Maxxam ID			XV5015		XV5016		XV5017		
Sampling Date			2014/08/21		2014/08/21		2014/08/21		
COC Number			na		na		na		
	Units	**Criteria**	**F5-MN-MW-12-D**	**QC Batch**	**F5-MN-MW-13-S**	**QC Batch**	**F5-MN-MW-13-D**	**RDL**	**QC Batch**
Metals									
Acid Extractable Arsenic (As)	ug/g	**12**	<1.0	3775002	<1.0	3774997	<1.0	1.0	3775002
Acid Extractable Cadmium (Cd)	ug/g	**22**	0.12	3775002	<0.10	3774997	<0.10	0.10	3775002
Acid Extractable Chromium (Cr)	ug/g	**87**	7.7	3775002	9.3	3774997	8.1	1.0	3775002
Acid Extractable Cobalt (Co)	ug/g	**-**	2.1	3775002	3.0	3774997	2.5	0.10	3775002
Acid Extractable Copper (Cu)	ug/g	**91**	8.5	3775002	5.9	3774997	5.5	0.50	3775002
Acid Extractable Lead (Pb)	ug/g	**600**	13	3775002	7.8	3774997	9.4	1.0	3775002
Acid Extractable Nickel (Ni)	ug/g	**50**	3.6	3775002	4.3	3774997	3.9	0.50	3775002
Acid Extractable Zinc (Zn)	ug/g	**360**	38	3775002	34	3774997	31	5.0	3775002
Acid Extractable Mercury (Hg)	ug/g	**50**	<0.050	3775002	<0.050	3774997	<0.050	0.050	3775002

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Criteria: CCME Industrial
Canadian Environmental Quality Guidelines for Soil 1998-1999

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Report Date: 2014/10/09

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Client Project #: 350600-515-3
Site Location: FOX 5 BROUGHTON ISLAND

ELEMENTS BY ATOMIC SPECTROSCOPY (SOIL)

Maxxam ID			XV5018	XV5019		
Sampling Date			2014/08/21	2014/08/21		
COC Number			na	na		
	Units	**Criteria**	**F5-MN-MW-14-S**	**F5-MN-MW-14-D**	**RDL**	**QC Batch**
Metals						
Acid Extractable Arsenic (As)	ug/g	**12**	<1.0	<1.0	1.0	3774997
Acid Extractable Cadmium (Cd)	ug/g	**22**	<0.10	<0.10	0.10	3774997
Acid Extractable Chromium (Cr)	ug/g	**87**	8.8	7.7	1.0	3774997
Acid Extractable Cobalt (Co)	ug/g	**-**	3.1	2.8	0.10	3774997
Acid Extractable Copper (Cu)	ug/g	**91**	6.1	5.0	0.50	3774997
Acid Extractable Lead (Pb)	ug/g	**600**	9.1	7.2	1.0	3774997
Acid Extractable Nickel (Ni)	ug/g	**50**	4.4	3.5	0.50	3774997
Acid Extractable Zinc (Zn)	ug/g	**360**	32	30	5.0	3774997
Acid Extractable Mercury (Hg)	ug/g	**50**	<0.050	<0.050	0.050	3774997

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Criteria: CCME Industrial
Canadian Environmental Quality Guidelines for Soil 1998-1999

Maxxam Job #: B4I3499
Report Date: 2014/10/09

Decommissioning Consulting Services Limited
Client Project #: 350600-515-3
Site Location: FOX 5 BROUGHTON ISLAND

PETROLEUM HYDROCARBONS (CCME)

Maxxam ID			XV4996	XV4997	XV4998	XV4999	XV5000		
Sampling Date			2014/08/20	2014/08/20	2014/08/20	2014/08/20	2014/08/20		
COC Number			na	na	na	na	na		
	Units	**Criteria**	**F5-SA-MW-18-S**	**F5-SA-MW-18-D**	**F5-SA-MW-19-S**	**F5-SA-MW-19-D**	**F5-MID-MW-5-S**	**RDL**	**QC Batch**
BTEX & F1 Hydrocarbons									
Benzene	ug/g	**5**	<0.005	<0.005	<0.005	<0.005	<0.005	0.005	3773163
Toluene	ug/g	**0.8**	<0.02	<0.02	<0.02	<0.02	<0.02	0.02	3773163
Ethylbenzene	ug/g	**20**	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	3773163
o-Xylene	ug/g	-	<0.02	<0.02	<0.02	<0.02	<0.02	0.02	3773163
p+m-Xylene	ug/g	-	<0.04	<0.04	<0.04	<0.04	<0.04	0.04	3773163
Total Xylenes	ug/g	-	<0.04	<0.04	<0.04	<0.04	<0.04	0.04	3773163
F1 (C6-C10)	ug/g	-	<10	<10	<10	<10	<10	10	3773163
F1 (C6-C10) - BTEX	ug/g	-	<10	<10	<10	<10	<10	10	3773163
F2-F4 Hydrocarbons									
F2 (C10-C16 Hydrocarbons)	ug/g	-	<10	<10	<10	<10	<10	10	3773247
F3 (C16-C34 Hydrocarbons)	ug/g	-	<50	<50	<50	<50	<50	50	3773247
F4 (C34-C50 Hydrocarbons)	ug/g	-	<50	<50	<50	<50	<50	50	3773247
Reached Baseline at C50	ug/g	-	Yes	Yes	Yes	Yes	Yes		3773247
Surrogate Recovery (%)									
1,4-Difluorobenzene	%	-	91	90	90	90	90		3773163
4-Bromofluorobenzene	%	-	103	103	103	102	103		3773163
D10-Ethylbenzene	%	-	87	83	93	92	94		3773163
D4-1,2-Dichloroethane	%	-	99	98	102	101	102		3773163
o-Terphenyl	%	-	84	82	81	81	87		3773247

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Criteria: CCME Industrial
Canadian Environmental Quality Guidelines for Soil 1998-1999

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Site Location: FOX 5 BROUGHTON ISLAND

PETROLEUM HYDROCARBONS (CCME)

Maxxam ID			XV5001	XV5002	XV5003	XV5004		
Sampling Date			2014/08/20	2014/08/20	2014/08/20	2014/08/20		
COC Number			na	na	na	na		
	Units	**Criteria**	**F5-MID-MW-5-D**	**F5-MID-MW-6-S**	**F5-MID-MW-6-D**	**F5-MID-MW-7-S**	**RDL**	**QC Batch**
BTEX & F1 Hydrocarbons								
Benzene	ug/g	**5**	<0.005	<0.005	<0.005	<0.005	0.005	3773163
Toluene	ug/g	**0.8**	<0.02	<0.02	<0.02	<0.02	0.02	3773163
Ethylbenzene	ug/g	**20**	<0.01	<0.01	<0.01	<0.01	0.01	3773163
o-Xylene	ug/g	-	<0.02	<0.02	<0.02	<0.02	0.02	3773163
p+m-Xylene	ug/g	-	<0.04	<0.04	<0.04	<0.04	0.04	3773163
Total Xylenes	ug/g	-	<0.04	<0.04	<0.04	<0.04	0.04	3773163
F1 (C6-C10)	ug/g	-	<10	<10	<10	<10	10	3773163
F1 (C6-C10) - BTEX	ug/g	-	<10	<10	<10	<10	10	3773163
F2-F4 Hydrocarbons								
F2 (C10-C16 Hydrocarbons)	ug/g	-	<10	<10	<10	<10	10	3773247
F3 (C16-C34 Hydrocarbons)	ug/g	-	<50	<50	<50	<50	50	3773247
F4 (C34-C50 Hydrocarbons)	ug/g	-	<50	<50	<50	<50	50	3773247
Reached Baseline at C50	ug/g	-	Yes	Yes	Yes	Yes		3773247
Surrogate Recovery (%)								
1,4-Difluorobenzene	%	-	90	90	92	91		3773163
4-Bromofluorobenzene	%	-	103	103	103	102		3773163
D10-Ethylbenzene	%	-	87	85	89	89		3773163
D4-1,2-Dichloroethane	%	-	102	101	101	100		3773163
o-Terphenyl	%	-	90	86	85	90		3773247

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Criteria: CCME Industrial
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PETROLEUM HYDROCARBONS (CCME)

Maxxam ID			XV5005	XV5006	XV5007	XV5008		
Sampling Date			2014/08/20	2014/08/20	2014/08/20	2014/08/20		
COC Number			na	na	na	na		
	Units	**Criteria**	**F5-MID-MW-7-D**	**F5-MID-MW-8-S**	**F5-MID-MW-8-D**	**F5-MID-MW-9-S**	**RDL**	**QC Batch**
BTEX & F1 Hydrocarbons								
Benzene	ug/g	**5**	<0.005	<0.005	<0.005	<0.005	0.005	3773163
Toluene	ug/g	**0.8**	<0.02	<0.02	<0.02	<0.02	0.02	3773163
Ethylbenzene	ug/g	**20**	<0.01	<0.01	<0.01	<0.01	0.01	3773163
o-Xylene	ug/g	-	<0.02	<0.02	<0.02	<0.02	0.02	3773163
p+m-Xylene	ug/g	-	<0.04	<0.04	<0.04	<0.04	0.04	3773163
Total Xylenes	ug/g	-	<0.04	<0.04	<0.04	<0.04	0.04	3773163
F1 (C6-C10)	ug/g	-	<10	<10	<10	<10	10	3773163
F1 (C6-C10) - BTEX	ug/g	-	<10	<10	<10	<10	10	3773163
F2-F4 Hydrocarbons								
F2 (C10-C16 Hydrocarbons)	ug/g	-	<10	<10	<10	<10	10	3773247
F3 (C16-C34 Hydrocarbons)	ug/g	-	<50	71	<50	<50	50	3773247
F4 (C34-C50 Hydrocarbons)	ug/g	-	<50	<50	<50	<50	50	3773247
Reached Baseline at C50	ug/g	-	Yes	Yes	Yes	Yes		3773247
Surrogate Recovery (%)								
1,4-Difluorobenzene	%	-	90	90	91	91		3773163
4-Bromofluorobenzene	%	-	103	102	102	102		3773163
D10-Ethylbenzene	%	-	92	95	95	89		3773163
D4-1,2-Dichloroethane	%	-	100	103	101	102		3773163
o-Terphenyl	%	-	92	89	89	91		3773247

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Criteria: CCME Industrial
Canadian Environmental Quality Guidelines for Soil 1998-1999

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PETROLEUM HYDROCARBONS (CCME)

Maxxam ID			XV5009	XV5010	XV5011	XV5012		
Sampling Date			2014/08/20	2014/08/21	2014/08/21	2014/08/21		
COC Number			na	na	na	na		
	Units	**Criteria**	**F5-MID-MW-9-D**	**F5-MN-MW-10-S**	**F5-MN-MW-10-D**	**F5-MN-MW-11-S**	**RDL**	**QC Batch**
BTEX & F1 Hydrocarbons								
Benzene	ug/g	**5**	<0.005	<0.005	<0.005	<0.005	0.005	3773163
Toluene	ug/g	**0.8**	<0.02	<0.02	<0.02	<0.02	0.02	3773163
Ethylbenzene	ug/g	**20**	<0.01	<0.01	<0.01	<0.01	0.01	3773163
o-Xylene	ug/g	-	<0.02	<0.02	<0.02	<0.02	0.02	3773163
p+m-Xylene	ug/g	-	<0.04	<0.04	<0.04	<0.04	0.04	3773163
Total Xylenes	ug/g	-	<0.04	<0.04	<0.04	<0.04	0.04	3773163
F1 (C6-C10)	ug/g	-	<10	<10	<10	<10	10	3773163
F1 (C6-C10) - BTEX	ug/g	-	<10	<10	<10	<10	10	3773163
F2-F4 Hydrocarbons								
F2 (C10-C16 Hydrocarbons)	ug/g	-	<10	<10	<10	<10	10	3773247
F3 (C16-C34 Hydrocarbons)	ug/g	-	<50	<50	<50	<50	50	3773247
F4 (C34-C50 Hydrocarbons)	ug/g	-	<50	<50	<50	<50	50	3773247
Reached Baseline at C50	ug/g	-	Yes	Yes	Yes	Yes		3773247
Surrogate Recovery (%)								
1,4-Difluorobenzene	%	-	90	91	90	91		3773163
4-Bromofluorobenzene	%	-	102	102	103	102		3773163
D10-Ethylbenzene	%	-	85	92	89	92		3773163
D4-1,2-Dichloroethane	%	-	102	102	103	103		3773163
o-Terphenyl	%	-	88	92	92	92		3773247

RDL = Reportable Detection Limit

QC Batch = Quality Control Batch

Criteria: CCME Industrial
Canadian Environmental Quality Guidelines for Soil 1998-1999

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Maxxam Job #: B4I3499
Report Date: 2014/10/09

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Site Location: FOX 5 BROUGHTON ISLAND

PETROLEUM HYDROCARBONS (CCME)

Maxxam ID			XV5013	XV5014	XV5015		XV5016		
Sampling Date			2014/08/21	2014/08/21	2014/08/21		2014/08/21		
COC Number			na	na	na		na		
	Units	**Criteria**	**F5-MN-MW-11-D**	**F5-MN-MW-12-S**	**F5-MN-MW-12-D**	**QC Batch**	**F5-MN-MW-13-S**	**RDL**	**QC Batch**
BTEX & F1 Hydrocarbons									
Benzene	ug/g	**5**	<0.005	<0.005	<0.005	3773163	<0.005	0.005	3773162
Toluene	ug/g	**0.8**	<0.02	<0.02	<0.02	3773163	<0.02	0.02	3773162
Ethylbenzene	ug/g	**20**	<0.01	<0.01	<0.01	3773163	<0.01	0.01	3773162
o-Xylene	ug/g	-	<0.02	<0.02	<0.02	3773163	<0.02	0.02	3773162
p+m-Xylene	ug/g	-	<0.04	<0.04	<0.04	3773163	<0.04	0.04	3773162
Total Xylenes	ug/g	-	<0.04	<0.04	<0.04	3773163	<0.04	0.04	3773162
F1 (C6-C10)	ug/g	-	<10	<10	<10	3773163	<10	10	3773162
F1 (C6-C10) - BTEX	ug/g	-	<10	<10	<10	3773163	<10	10	3773162
F2-F4 Hydrocarbons									
F2 (C10-C16 Hydrocarbons)	ug/g	-	<10	<10	<10	3773247	<10	10	3773269
F3 (C16-C34 Hydrocarbons)	ug/g	-	<50	<50	110	3773247	<50	50	3773269
F4 (C34-C50 Hydrocarbons)	ug/g	-	<50	<50	56	3773247	<50	50	3773269
Reached Baseline at C50	ug/g	-	Yes	Yes	Yes	3773247	Yes		3773269
Surrogate Recovery (%)									
1,4-Difluorobenzene	%	-	90	91	91	3773163	90		3773162
4-Bromofluorobenzene	%	-	102	101	101	3773163	102		3773162
D10-Ethylbenzene	%	-	92	91	90	3773163	94		3773162
D4-1,2-Dichloroethane	%	-	102	102	102	3773163	99		3773162
o-Terphenyl	%	-	92	82	90	3773247	86		3773269

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Criteria: CCME Industrial
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PETROLEUM HYDROCARBONS (CCME)

Maxxam ID			XV5017	XV5018	XV5019		
Sampling Date			2014/08/21	2014/08/21	2014/08/21		
COC Number			na	na	na		
	Units	Criteria	F5-MN-MW-13-D	F5-MN-MW-14-S	F5-MN-MW-14-D	RDL	QC Batch
BTEX & F1 Hydrocarbons							
Benzene	ug/g	**5**	<0.005	<0.005	<0.005	0.005	3773162
Toluene	ug/g	**0.8**	<0.02	<0.02	<0.02	0.02	3773162
Ethylbenzene	ug/g	**20**	<0.01	<0.01	<0.01	0.01	3773162
o-Xylene	ug/g	-	<0.02	<0.02	<0.02	0.02	3773162
p+m-Xylene	ug/g	-	<0.04	<0.04	<0.04	0.04	3773162
Total Xylenes	ug/g	-	<0.04	<0.04	<0.04	0.04	3773162
F1 (C6-C10)	ug/g	-	<10	<10	<10	10	3773162
F1 (C6-C10) - BTEX	ug/g	-	<10	<10	<10	10	3773162
F2-F4 Hydrocarbons							
F2 (C10-C16 Hydrocarbons)	ug/g	-	<10	<10	<10	10	3773269
F3 (C16-C34 Hydrocarbons)	ug/g	-	<50	<50	<50	50	3773269
F4 (C34-C50 Hydrocarbons)	ug/g	-	<50	<50	<50	50	3773269
Reached Baseline at C50	ug/g	-	Yes	Yes	Yes		3773269
Surrogate Recovery (%)							
1,4-Difluorobenzene	%	-	90	90	90		3773162
4-Bromofluorobenzene	%	-	102	102	102		3773162
D10-Ethylbenzene	%	-	86	83	79		3773162
D4-1,2-Dichloroethane	%	-	97	98	98		3773162
o-Terphenyl	%	-	86	89	87		3773269

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Criteria: CCME Industrial
Canadian Environmental Quality Guidelines for Soil 1998-1999

Maxxam Job #: B4I3499
Report Date: 2014/10/09

Decommissioning Consulting Services Limited
Client Project #: 350600-515-3
Site Location: FOX 5 BROUGHTON ISLAND

POLYCHLORINATED BIPHENYLS BY GC-ECD (SOIL)

Maxxam ID			XV4996		XV4997	XV4998	XV4999		
Sampling Date			2014/08/20		2014/08/20	2014/08/20	2014/08/20		
COC Number			na		na	na	na		
	Units	**Criteria**	**F5-SA-MW-18-S**	**QC Batch**	**F5-SA-MW-18-D**	**F5-SA-MW-19-S**	**F5-SA-MW-19-D**	**RDL**	**QC Batch**
PCBs									
Aroclor 1016	ug/g	-	<0.010	3775200	<0.010	<0.010	<0.010	0.010	3774370
Aroclor 1221	ug/g	-	<0.010	3775200	<0.010	<0.010	<0.010	0.010	3774370
Aroclor 1232	ug/g	-	<0.010	3775200	<0.010	<0.010	<0.010	0.010	3774370
Aroclor 1242	ug/g	-	<0.010	3775200	<0.010	<0.010	<0.010	0.010	3774370
Aroclor 1248	ug/g	-	<0.010	3775200	<0.010	<0.010	<0.010	0.010	3774370
Aroclor 1254	ug/g	-	<0.010	3775200	<0.010	<0.010	<0.010	0.010	3774370
Aroclor 1260	ug/g	-	<0.010	3775200	<0.010	<0.010	<0.010	0.010	3774370
Aroclor 1262	ug/g	-	<0.010	3775200	<0.010	<0.010	<0.010	0.010	3774370
Aroclor 1268	ug/g	-	<0.010	3775200	<0.010	<0.010	<0.010	0.010	3774370
Total PCB	ug/g	**33**	<0.010	3775200	<0.010	<0.010	<0.010	0.010	3774370
Surrogate Recovery (%)									
Decachlorobiphenyl	%	-	84	3775200	76	76	76		3774370

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Criteria: CCME Industrial
Canadian Environmental Quality Guidelines for Soil 1998-1999

Maxxam ID			XV5000		XV5001	XV5002		
Sampling Date			2014/08/20		2014/08/20	2014/08/20		
COC Number			na		na	na		
	Units	**Criteria**	**F5-MID-MW-5-S**	**QC Batch**	**F5-MID-MW-5-D**	**F5-MID-MW-6-S**	**RDL**	**QC Batch**
PCBs								
Aroclor 1016	ug/g	-	<0.010	3774370	<0.010	<0.010	0.010	3775200
Aroclor 1221	ug/g	-	<0.010	3774370	<0.010	<0.010	0.010	3775200
Aroclor 1232	ug/g	-	<0.010	3774370	<0.010	<0.010	0.010	3775200
Aroclor 1242	ug/g	-	<0.010	3774370	<0.010	<0.010	0.010	3775200
Aroclor 1248	ug/g	-	<0.010	3774370	<0.010	<0.010	0.010	3775200
Aroclor 1254	ug/g	-	<0.010	3774370	<0.010	<0.010	0.010	3775200
Aroclor 1260	ug/g	-	<0.010	3774370	<0.010	<0.010	0.010	3775200
Aroclor 1262	ug/g	-	<0.010	3774370	<0.010	<0.010	0.010	3775200
Aroclor 1268	ug/g	-	<0.010	3774370	<0.010	<0.010	0.010	3775200
Total PCB	ug/g	**33**	<0.010	3774370	<0.010	<0.010	0.010	3775200
Surrogate Recovery (%)								
Decachlorobiphenyl	%	-	75	3774370	84	83		3775200

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Criteria: CCME Industrial
Canadian Environmental Quality Guidelines for Soil 1998-1999

Maxxam Analytics International Corporation o/a Maxxam Analytics 32 Colonnade Rd, Unit #1000, Nepean, ON K2E 7J6 Phone: 613 274-0573 Fax: 613 274-0574 Website: www.maxxam.ca

Maxxam Job #: B4I3499
Report Date: 2014/10/09

Decommissioning Consulting Services Limited
Client Project #: 350600-515-3
Site Location: FOX 5 BROUGHTON ISLAND

POLYCHLORINATED BIPHENYLS BY GC-ECD (SOIL)

Maxxam ID			XV5003	XV5004	XV5005	XV5006		
Sampling Date			2014/08/20	2014/08/20	2014/08/20	2014/08/20		
COC Number			na	na	na	na		
	Units	**Criteria**	**F5-MID-MW-6-D**	**F5-MID-MW-7-S**	**F5-MID-MW-7-D**	**F5-MID-MW-8-S**	**RDL**	**QC Batch**
PCBs								
Aroclor 1016	ug/g	-	<0.010	<0.010	<0.010	<0.010	0.010	3774370
Aroclor 1221	ug/g	-	<0.010	<0.010	<0.010	<0.010	0.010	3774370
Aroclor 1232	ug/g	-	<0.010	<0.010	<0.010	<0.010	0.010	3774370
Aroclor 1242	ug/g	-	<0.010	<0.010	<0.010	<0.010	0.010	3774370
Aroclor 1248	ug/g	-	<0.010	<0.010	<0.010	<0.010	0.010	3774370
Aroclor 1254	ug/g	-	<0.010	<0.010	<0.010	<0.010	0.010	3774370
Aroclor 1260	ug/g	-	<0.010	<0.010	<0.010	<0.010	0.010	3774370
Aroclor 1262	ug/g	-	<0.010	<0.010	<0.010	<0.010	0.010	3774370
Aroclor 1268	ug/g	-	<0.010	<0.010	<0.010	<0.010	0.010	3774370
Total PCB	ug/g	**33**	<0.010	<0.010	<0.010	<0.010	0.010	3774370
Surrogate Recovery (%)								
Decachlorobiphenyl	%	-	82	82	81	75		3774370

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Criteria: CCME Industrial
Canadian Environmental Quality Guidelines for Soil 1998-1999

Maxxam ID			XV5007	XV5008	XV5009	XV5010		
Sampling Date			2014/08/20	2014/08/20	2014/08/20	2014/08/21		
COC Number			na	na	na	na		
	Units	**Criteria**	**F5-MID-MW-8-D**	**F5-MID-MW-9-S**	**F5-MID-MW-9-D**	**F5-MN-MW-10-S**	**RDL**	**QC Batch**
PCBs								
Aroclor 1016	ug/g	-	<0.010	<0.010	<0.010	<0.010	0.010	3774370
Aroclor 1221	ug/g	-	<0.010	<0.010	<0.010	<0.010	0.010	3774370
Aroclor 1232	ug/g	-	<0.010	<0.010	<0.010	<0.010	0.010	3774370
Aroclor 1242	ug/g	-	<0.010	<0.010	<0.010	<0.010	0.010	3774370
Aroclor 1248	ug/g	-	<0.010	<0.010	<0.010	<0.010	0.010	3774370
Aroclor 1254	ug/g	-	<0.010	<0.010	<0.010	<0.010	0.010	3774370
Aroclor 1260	ug/g	-	<0.010	<0.010	<0.010	<0.010	0.010	3774370
Aroclor 1262	ug/g	-	<0.010	<0.010	<0.010	<0.010	0.010	3774370
Aroclor 1268	ug/g	-	<0.010	<0.010	<0.010	<0.010	0.010	3774370
Total PCB	ug/g	**33**	<0.010	<0.010	<0.010	<0.010	0.010	3774370
Surrogate Recovery (%)								
Decachlorobiphenyl	%	-	79	84	81	85		3774370

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Criteria: CCME Industrial
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Decommissioning Consulting Services Limited
Client Project #: 350600-515-3
Site Location: FOX 5 BROUGHTON ISLAND

POLYCHLORINATED BIPHENYLS BY GC-ECD (SOIL)

Maxxam ID			XV5011	XV5012		XV5013		
Sampling Date			2014/08/21	2014/08/21		2014/08/21		
COC Number			na	na		na		
	Units	**Criteria**	**F5-MN-MW-10-D**	**F5-MN-MW-11-S**	**QC Batch**	**F5-MN-MW-11-D**	**RDL**	**QC Batch**
PCBs								
Aroclor 1016	ug/g	-	<0.010	<0.010	3774370	<0.010	0.010	3775200
Aroclor 1221	ug/g	-	<0.010	<0.010	3774370	<0.010	0.010	3775200
Aroclor 1232	ug/g	-	<0.010	<0.010	3774370	<0.010	0.010	3775200
Aroclor 1242	ug/g	-	<0.010	<0.010	3774370	<0.010	0.010	3775200
Aroclor 1248	ug/g	-	<0.010	<0.010	3774370	<0.010	0.010	3775200
Aroclor 1254	ug/g	-	<0.010	<0.010	3774370	<0.010	0.010	3775200
Aroclor 1260	ug/g	-	<0.010	<0.010	3774370	<0.010	0.010	3775200
Aroclor 1262	ug/g	-	<0.010	<0.010	3774370	<0.010	0.010	3775200
Aroclor 1268	ug/g	-	<0.010	<0.010	3774370	<0.010	0.010	3775200
Total PCB	ug/g	**33**	<0.010	<0.010	3774370	<0.010	0.010	3775200
Surrogate Recovery (%)								
Decachlorobiphenyl	%	-	76	86	3774370	83		3775200

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Criteria: CCME Industrial
Canadian Environmental Quality Guidelines for Soil 1998-1999

Maxxam ID			XV5014	XV5015	XV5016	XV5017		
Sampling Date			2014/08/21	2014/08/21	2014/08/21	2014/08/21		
COC Number			na	na	na	na		
	Units	**Criteria**	**F5-MN-MW-12-S**	**F5-MN-MW-12-D**	**F5-MN-MW-13-S**	**F5-MN-MW-13-D**	**RDL**	**QC Batch**
PCBs								
Aroclor 1016	ug/g	-	<0.010	<0.010	<0.010	<0.010	0.010	3774370
Aroclor 1221	ug/g	-	<0.010	<0.010	<0.010	<0.010	0.010	3774370
Aroclor 1232	ug/g	-	<0.010	<0.010	<0.010	<0.010	0.010	3774370
Aroclor 1242	ug/g	-	<0.010	<0.010	<0.010	<0.010	0.010	3774370
Aroclor 1248	ug/g	-	<0.010	<0.010	<0.010	<0.010	0.010	3774370
Aroclor 1254	ug/g	-	0.013	0.085	<0.010	<0.010	0.010	3774370
Aroclor 1260	ug/g	-	<0.010	<0.010	<0.010	<0.010	0.010	3774370
Aroclor 1262	ug/g	-	<0.010	<0.010	<0.010	<0.010	0.010	3774370
Aroclor 1268	ug/g	-	<0.010	<0.010	<0.010	<0.010	0.010	3774370
Total PCB	ug/g	**33**	0.013	0.085	<0.010	<0.010	0.010	3774370
Surrogate Recovery (%)								
Decachlorobiphenyl	%	-	83	74	80	81		3774370

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Criteria: CCME Industrial
Canadian Environmental Quality Guidelines for Soil 1998-1999

Maxxam Job #: B4I3499
Report Date: 2014/10/09

Decommissioning Consulting Services Limited
Client Project #: 350600-515-3
Site Location: FOX 5 BROUGHTON ISLAND

POLYCHLORINATED BIPHENYLS BY GC-ECD (SOIL)

Maxxam ID			XV5018	XV5019		
Sampling Date			2014/08/21	2014/08/21		
COC Number			na	na		
	Units	Criteria	F5-MN-MW-14-S	F5-MN-MW-14-D	RDL	QC Batch
PCBs						
Aroclor 1016	ug/g	-	<0.010	<0.010	0.010	3774370
Aroclor 1221	ug/g	-	<0.010	<0.010	0.010	3774370
Aroclor 1232	ug/g	-	<0.010	<0.010	0.010	3774370
Aroclor 1242	ug/g	-	<0.010	<0.010	0.010	3774370
Aroclor 1248	ug/g	-	<0.010	<0.010	0.010	3774370
Aroclor 1254	ug/g	-	<0.010	<0.010	0.010	3774370
Aroclor 1260	ug/g	-	<0.010	<0.010	0.010	3774370
Aroclor 1262	ug/g	-	<0.010	<0.010	0.010	3774370
Aroclor 1268	ug/g	-	<0.010	<0.010	0.010	3774370
Total PCB	ug/g	**33**	<0.010	<0.010	0.010	3774370
Surrogate Recovery (%)						
Decachlorobiphenyl	%	-	81	83		3774370

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Criteria: CCME Industrial
Canadian Environmental Quality Guidelines for Soil 1998-1999

GENERAL COMMENTS

F1/BTXLOW and F24FID Analyses: Analysis was performed past sample holding time. This may increase the variability associated with these results.

Results relate only to the items tested.

QUALITY ASSURANCE REPORT

			Matrix Spike		Spiked Blank		Method Blank		RPD	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	Units	Value (%)	QC Limits
3773162	1,4-Difluorobenzene	2014/10/05	90	60 - 140	90	60 - 140	92	%		
3773162	4-Bromofluorobenzene	2014/10/05	102	60 - 140	102	60 - 140	103	%		
3773162	D10-Ethylbenzene	2014/10/05	80	60 - 140	88	60 - 140	82	%		
3773162	D4-1,2-Dichloroethane	2014/10/05	99	60 - 140	100	60 - 140	97	%		
3773163	1,4-Difluorobenzene	2014/10/06	90	60 - 140	90	60 - 140	90	%		
3773163	4-Bromofluorobenzene	2014/10/06	103	60 - 140	103	60 - 140	103	%		
3773163	D10-Ethylbenzene	2014/10/06	91	60 - 140	84	60 - 140	90	%		
3773163	D4-1,2-Dichloroethane	2014/10/06	100	60 - 140	99	60 - 140	100	%		
3773247	o-Terphenyl	2014/10/03	93	60 - 130	89	60 - 130	82	%		
3773269	o-Terphenyl	2014/10/04	82	60 - 130	88	60 - 130	87	%		
3774370	Decachlorobiphenyl	2014/10/06	81	60 - 130	72	60 - 130	73	%		
3775200	Decachlorobiphenyl	2014/10/07	82	60 - 130	86	60 - 130	83	%		
3773162	Benzene	2014/10/05	85	60 - 140	94	60 - 140	<0.005	ug/g	NC	50
3773162	Ethylbenzene	2014/10/05	88	60 - 140	92	60 - 140	<0.01	ug/g	NC	50
3773162	F1 (C6-C10) - BTEX	2014/10/05					<10	ug/g	NC	50
3773162	F1 (C6-C10)	2014/10/05	83	60 - 140	91	80 - 120	<10	ug/g	NC	50
3773162	o-Xylene	2014/10/05	89	60 - 140	93	60 - 140	<0.02	ug/g	NC	50
3773162	p+m-Xylene	2014/10/05	84	60 - 140	88	60 - 140	<0.04	ug/g	NC	50
3773162	Toluene	2014/10/05	88	60 - 140	94	60 - 140	<0.02	ug/g	NC	50
3773162	Total Xylenes	2014/10/05					<0.04	ug/g	NC	50
3773163	Benzene	2014/10/06	97	60 - 140	94	60 - 140	<0.005	ug/g	NC	50
3773163	Ethylbenzene	2014/10/06	99	60 - 140	92	60 - 140	<0.01	ug/g	NC	50
3773163	F1 (C6-C10) - BTEX	2014/10/06					<10	ug/g	NC	50
3773163	F1 (C6-C10)	2014/10/06	89	60 - 140	92	80 - 120	<10	ug/g	NC	50
3773163	o-Xylene	2014/10/06	101	60 - 140	94	60 - 140	<0.02	ug/g	NC	50
3773163	p+m-Xylene	2014/10/06	96	60 - 140	90	60 - 140	<0.04	ug/g	NC	50
3773163	Toluene	2014/10/06	100	60 - 140	95	60 - 140	<0.02	ug/g	NC	50
3773163	Total Xylenes	2014/10/06					<0.04	ug/g	NC	50
3773247	F2 (C10-C16 Hydrocarbons)	2014/10/04	87	50 - 130	90	80 - 120	<10	ug/g	NC	30
3773247	F3 (C16-C34 Hydrocarbons)	2014/10/04	102	50 - 130	103	80 - 120	<50	ug/g	NC	30
3773247	F4 (C34-C50 Hydrocarbons)	2014/10/04	114	50 - 130	111	80 - 120	<50	ug/g	NC	30
3773269	F2 (C10-C16 Hydrocarbons)	2014/10/04	92	50 - 130	91	80 - 120	<10	ug/g	NC	30

QUALITY ASSURANCE REPORT(CONT'D)

			Matrix Spike		Spiked Blank		Method Blank		RPD	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	Units	Value (%)	QC Limits
3773269	F3 (C16-C34 Hydrocarbons)	2014/10/04	102	50 - 130	100	80 - 120	<50	ug/g	NC	30
3773269	F4 (C34-C50 Hydrocarbons)	2014/10/04	99	50 - 130	100	80 - 120	<50	ug/g	NC	30
3774370	Aroclor 1016	2014/10/06					<0.010	ug/g	NC	50
3774370	Aroclor 1221	2014/10/06					<0.010	ug/g	NC	50
3774370	Aroclor 1232	2014/10/06					<0.010	ug/g	NC	50
3774370	Aroclor 1242	2014/10/06					<0.010	ug/g	NC	50
3774370	Aroclor 1248	2014/10/06					<0.010	ug/g	NC	50
3774370	Aroclor 1254	2014/10/06					<0.010	ug/g	NC	50
3774370	Aroclor 1260	2014/10/06	105	60 - 130	98	60 - 130	<0.010	ug/g	NC	50
3774370	Aroclor 1262	2014/10/06					<0.010	ug/g	NC	50
3774370	Aroclor 1268	2014/10/06					<0.010	ug/g	NC	50
3774370	Total PCB	2014/10/06	105	60 - 130	98	60 - 130	<0.010	ug/g	NC	50
3774997	Acid Extractable Arsenic (As)	2014/10/07	99	75 - 125	100	80 - 120	<1.0	ug/g	NC	30
3774997	Acid Extractable Cadmium (Cd)	2014/10/07	103	75 - 125	101	80 - 120	<0.10	ug/g	NC	30
3774997	Acid Extractable Chromium (Cr)	2014/10/07	NC	75 - 125	101	80 - 120	<1.0	ug/g	3.8	30
3774997	Acid Extractable Cobalt (Co)	2014/10/07	101	75 - 125	103	80 - 120	<0.10	ug/g	1.3	30
3774997	Acid Extractable Copper (Cu)	2014/10/07	100	75 - 125	101	80 - 120	<0.50	ug/g	6.3	30
3774997	Acid Extractable Lead (Pb)	2014/10/07	101	75 - 125	101	80 - 120	<1.0	ug/g	8.7	30
3774997	Acid Extractable Mercury (Hg)	2014/10/07	100	75 - 125	98	80 - 120	<0.050	ug/g	NC	30
3774997	Acid Extractable Nickel (Ni)	2014/10/07	100	75 - 125	99	80 - 120	<0.50	ug/g	7.0	30
3774997	Acid Extractable Zinc (Zn)	2014/10/07	NC	75 - 125	101	80 - 120	<5.0	ug/g	0.63	30
3775002	Acid Extractable Arsenic (As)	2014/10/07	102	75 - 125	99	80 - 120	<1.0	ug/g	NC	30
3775002	Acid Extractable Cadmium (Cd)	2014/10/07	103	75 - 125	99	80 - 120	<0.10	ug/g	NC	30
3775002	Acid Extractable Chromium (Cr)	2014/10/07	105	75 - 125	101	80 - 120	<1.0	ug/g	3.0	30
3775002	Acid Extractable Cobalt (Co)	2014/10/07	103	75 - 125	100	80 - 120	<0.10	ug/g	9.4	30
3775002	Acid Extractable Copper (Cu)	2014/10/07	100	75 - 125	101	80 - 120	<0.50	ug/g	4.7	30
3775002	Acid Extractable Lead (Pb)	2014/10/07	NC	75 - 125	101	80 - 120	<1.0	ug/g	2.0	30
3775002	Acid Extractable Mercury (Hg)	2014/10/07	102	75 - 125	98	80 - 120	<0.050	ug/g	NC	30
3775002	Acid Extractable Nickel (Ni)	2014/10/07	104	75 - 125	100	80 - 120	<0.50	ug/g	6.0	30
3775002	Acid Extractable Zinc (Zn)	2014/10/07	NC	75 - 125	100	80 - 120	<5.0	ug/g	5.5	30
3775200	Aroclor 1016	2014/10/07					<0.010	ug/g		
3775200	Aroclor 1221	2014/10/07					<0.010	ug/g		

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QUALITY ASSURANCE REPORT(CONT'D)

			Matrix Spike		Spiked Blank		Method Blank		RPD	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	Units	Value (%)	QC Limits
3775200	Aroclor 1232	2014/10/07					<0.010	ug/g		
3775200	Aroclor 1242	2014/10/07					<0.010	ug/g	NC	50
3775200	Aroclor 1248	2014/10/07					<0.010	ug/g	NC	50
3775200	Aroclor 1254	2014/10/07					<0.010	ug/g	NC	50
3775200	Aroclor 1260	2014/10/07	89	60 - 130	97	60 - 130	<0.010	ug/g	NC	50
3775200	Aroclor 1262	2014/10/07					<0.010	ug/g		
3775200	Aroclor 1268	2014/10/07					<0.010	ug/g		
3775200	Total PCB	2014/10/07	89	60 - 130	97	60 - 130	<0.010	ug/g	NC	50
3775595	Moisture	2014/10/06							NC	20
3775644	Moisture	2014/10/06							2.4	20

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.

NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spiked amount was too small to permit a reliable recovery calculation (matrix spike concentration was less than 2x that of the native sample concentration).

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (one or both samples < 5x RDL).

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).

Cristina Carriere

Cristina Carriere, Scientific Services

Suzana Popovic

Suzana Popovic, Supervisor, Hydrocarbons

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

245-YFB-38986570 **245-YFB-389865**

Shipper's Name and Address / Nom et adresse de l'expéditeur

JASON MAUCHAN
IQALUIT
NUNAVUT, CANADA
819-923-6832

Shippers Account Number / No de compte de l'expéditeur

NON NEGOTIABLE AIR WAYBILL (AIR CONSIGNMENT NOTE)
NON NÉGOTIABLE LETTRE DE TRANSPORT AÉRIEN

ISSUED BY / ÉMISE PAR: FIRST AIR — The Airline of the North

Incorporated in Canada with limited liability - Compagnie Canadienne a responsabilite limitee

Copies 1, 2, 3 and faximilies of this Air Waybill and originals and have the same validity.
Les exemplaires 1 2 3 et faximille de cette lettre de transport aerien sont originaux et ont la même validité

It is agreed that the goods described herein are accepted in apparent good order and condition (except as noted) for carriage. SUBJECT TO THE CONDITIONS AVAILABLE AT https://firstair.ca/cargo/cargo-conditions-of-contract/
FROM THE CARGO AGENT.
THE SHIPPER'S ATTENTION IS DRAWN TO THE NOTICE CONCERNING CARRIERS LIMITATION OF LIABILITY. Shipper may increase such limitation of liability by declaring a higher value for carriage and paying a supplemental if required.
Il est convenu que les marchandises decrites dans le présent document sont acceptées pour le transport en bon état apparent (sauf annotation contraire) et que le transport est SOUMIS AUX CONDITIONS DU CONTRAT DISPONIBLES AU https://firstair.ca/cargo/cargo-conditions-of-contract/
AUPRÉS DE L'AGENT CARGO.
L'ATTENTION DE L'EXPÉDITEUR EST ATTIRÉE SUR L'AVIS CONCERNANT LA LIMITATION DE RESPONSABILITÉ DU TRANSPORTEUR. L'expéditeur peut augmenter cette limitation de responsabilité en déclarant une valeur pour le transport plus élevée et en payant des frais supplémentaires s'il y a lieu.

Consignee Name and Address / Nom et adresse du destinataire

MAXXAM ANALYTICS
32 COLONNADE ROAD SOUTH, UNIT 1000
OTTAWA
ONTARIO, CANADA
K2E7J6 6132740573

Consignee Name and Address / Nom et adresse du destinataire

Issuing Carrier's Agent Name and City / Nom et ville de l'agent du transporteur émetteur

Agent's IATA Code / Code IATA de l'agent

Account Number / Numéro de compte

Accounting Information / Renseignements comptables: 56232
MAXXAM ANALYTICS INTERNATIONAL CORP
500 - 1919 MINNESOTA COURT
MISSISSAUGA
ONTARIO
L5N0C9
PO:

Airport of Departure / Aeroport de depart: **YFB**

Routing and destination To / à	First carrier / premier transport	To / à	by / par	To / à	by / par
YOW	7F				

Currency / Monnaie	CHGS Code Frais	WT / Poids-Val PPD payé	COLL Dû	Other/Autres PPD payé	COLL Dû	Declared Value for Carriage / Valeur déclarée pour le transport	Declared value for Customs / Valeur déclarée pour la douane
CDN	CX		X		X	NDV	NCV

Airport of Destination / Aeroport de destination: **YOW**

Flight Date / Vol Date:

Delivery Company:

Pick up Company:

Handling Information / Renseignements pour le traitement de l'expédition

FREEZER

No of Pieces rcp	Gross Weight	kg lb	Rate Class	Commodity Item No.	Chargeable Weight	Rate / Charge	Total	Nature and Quantity of Goods (inc. Dimensions or Volume)
1	20	K	G	GEN	20	4.84	96.80	SAMPLE (SPECIFY)-FREEZER SAMPLE
1	20						96.80	

Prepaid / Porte paye	Collect / Port du
Weight Charge	Taxation au poids: 96.80
Valuation Charge	Taxation a la valeur
Tax	Taxe: 16.30
Total other Charges Due Agent	Total des autres frais dus a l'agent
Total other Charges Due Carrier	Total des autres frais dus au transporteur: 28.55
Total Prepaid / Total port paye	Total collect / Total port du: 141.65
For Carrier User Online at Destination / Reservé au transporteur a destination	Charges at Desination / Frais à l'arrivée

Other Charges / Autres frais

FUEL SURCHARGE = 22.26, NAV SURCHARGE = 6.29, HST = 16.30

Shipper certifies that the particulars on the face hereof are correct and the insofar as any part of the consignment contains dangerous goods, such part is properly described by name and is in proper condition for carriage by air according to the applicable Dangerous Goods Regulations.
L'expéditeur certifie que les indications portées sur le présent document sont exactes et que dans la mesure ou une partie quelconque de l'expédition contient des marchandises dangereuses, cette partie de d'expédition est correctement dénommée et bien préparée pour le transport par air conformément à la réglementation applicable.

Print Name (Shipper) - Nom en lettres moulées (Expéditeur) — Signature

Executed on / Fait le — Date	Place / Lieu	Nom De L'agent / Agent's Name
08/29/2014	Ottawa	615500

Total Collect Charges / Total Du

Signature of Issuing Carrier or its Agent / Signature du transporteur émetteur ou de son agent

245-YFB-38986570

ORIGINAL NO.5 - CONSIGNEE'S COPY - COPIE DU DESTINATAIRE

Landfill Monitoring Detection Limits

Parameter	Soil (mg/kg)	Groundwater (mg/L)
Copper	<3.0	<0.005
Nickel	<5.0	<0.010
Cobalt	<5.0	<0.005
Cadmium	<1.0	<0.001
Lead	<10	<0.01
Zinc	<15	<0.005
Chromium	<20	<0.005
Arsenic	<0.2	<0.05
Mercury	<0.1	<0.001
PCBs	<0.05	<0.003
TPH	<40	<1

IMMEDIATE TEST

DCS SENES Consultants

121 Granton Drive, Unit 11, Richmond Hill, ON
Tel: (905) 882-5984 Fax: (905) 882-8962
Email: engineers@dcsltd.ca Website: www.dcsltd.ca

Chain of Custody Record

Page 1 of 2.

Shipper

Project No.: 350600-515-3 **Site:** FOX-5 Broughton Island

Project Manager: S. Borcsok

Field Engineer/Techician: S. Borcsok/J. Mauchan

Date: 28 August /14 **Route:** Courier

Lab: MAXXAM **Location** Ottawa

Required Date: **Turnaround:** STD **Day(s)**

Quotation No.:

MDL's To Meet: SEE ATTACHED

Temp. -8/-11/-9

Custody seal was Present

ON ICE Pack.

Analyses Requested / **Field Procedures**

Location/ Hole No.	Sample No.	Depth (m)	Description	Label No.	Grab/ Comp.	Date Collected	PHCs F1	PHCs F2-F4	PCBs	Inorganics: As, Cd, Cr, Co, Cu, Pb, Ni, Zn, Hg							pH	Electrical Conductivity	Preservatives
F5-SA-MW-	18-S		SOIL			20Aug/14	X	X	X	X									
F5-SA-MW-	18-D						X	X	X	X									
F5-SA-MW-	19-S						X	X	X	X									
F5-SA-MW-	19-D						X	X	X	X									
F5-MID-MW	-5-S						X	X	X	X									
F5-MID-MW	-5-D						X	X	X	X									
F5-MID-MW	-6-S						X	X	X	X									
F5-MID-MW	-6-D						X	X	X	X									
F5-MID-MW	-7-S						X	X	X	X									
F5-MID-MW	-7-D						X	X	X	X									
F5-MID-MW	-8-S						X	X	X	X									
F5-MID-MW	-8-D						X	X	X	X									

28-Aug-14 16:35
Keshani Vijh
B4I3499
M_P ENV-631

Relinquished By:	Date:	Time:	Received By:
S. Borcsok	28 August/14	16:35	SHA Fatemeh
	2014/10/02	10:05	ASAD BHATTI

Laboratory

Remarks:
ALL RESULTS ARE TO BE SENT TO THE PROJECT MANAGER.

REC'D IN OTTAWA

0/1/2 6/3/5

Project No. and Date

(Revision 1 - 17 May 2012)

DCS SENES Consultants

121 Granton Drive, Unit 11, Richmond Hill, ON
Tel: (905) 882-5984 Fax: (905) 882-8962
Email: engineers@dcsltd.ca Website: www.dcsltd.ca

Chain of Custody Record

Page 2 of 2.

Shipper

Project No.: 350600-515-3 **Site:** FOX-5 Broughton Island

Project Manager: S. Borcsok

Field Engineer/Techician: S. Borcsok/J. Mauchan

Date: 28 August/14 **Route:** Courier

Lab: MAXXAM **Location** Ottawa

Required Date: **Turnaround:** STD Day(s)

Quotation No.:

MDL's To Meet: SEE ATTACHED

Temp. -8/-11/-9

Custody seal was present.

On ice pack.

Analyses Requested

Location/ Hole No.	Sample No.	Depth (m)	Description	Label No.	Grab/ Comp.	Date Collected	PHCs F1	PHCs F2-F4	PCBs	Inorganics: As, Cd, Cr, Co, Cu, Pb, Ni, Zn, Hg	pH	Electrical Conductivity	Preservatives
F5-MID-MW	-9-S		SOIL			20Aug/14	X	X	X	X			
F5-MID-MW	-9-D					↓	X	X	X	X			
F5-MN-MW	-10-S					21Aug/14	X	X	X	X			
F5-MN-MW	-10-D						X	X	X	X			
F5-MN-MW	-11-S						X	X	X	X			
F5-MN-MW	-11-D						X	X	X	X			
F5-MN-MW	-12-S						X	X	X	X			
F5-MN-MW	-12-D						X	X	X	X			
F5-MN-MW	-13-S						X	X	X	X			
F5-MN-MW	-13-D						X	X	X	X			
F5-MN-MW	-14-S						X	X	X	X			
F5-MN-MW	-14-D		↓			↓	X	X	X	X			

Field Procedures

Relinquished By:	Date:	Time:	Received By:
S. Borcsok	28 August/14	16:35	SHA Fatemeh
Relinquished By:	Date: 2014/09/02	Time: 10:05	Received By: ASAD BHATTI
Relinquished By:	Date:	Time:	Received By:

Laboratory

Remarks:
ALL RESULTS ARE TO BE SENT TO THE PROJECT MANAGER.

REC'D IN OTTAWA

01/12 61315

Project No. and Date

(Revision 1 - 17 May 2012)

Your Project #: 350600-515
Site Location: FOX-5 BROUGHTON ISLAND
Your C.O.C. #: na

Attention:Stephen Borcsok

Decommissioning Consulting Services Limited
121 Granton Dr
Unit 11
Richmond Hill, ON
L4B 3N4

Report Date: 2014/09/03
Report #: R3142679
Version: 1

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B4F3737
Received: 2014/08/22, 10:50

Sample Matrix: Soil
Samples Received: 6

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Reference
Petroleum Hydro. CCME F1 & BTEX in Soil	6	2014/08/26	2014/08/27	CAM SOP-00315	CCME PHC-CWS m
Petroleum Hydrocarbons F2-F4 in Soil	6	2014/08/27	2014/08/28	CAM SOP-00316	CCME CWS
Strong Acid Leachable Metals by ICPMS	6	2014/08/28	2014/08/28	CAM SOP-00447	EPA 6020 m
Moisture	6	N/A	2014/08/26	CAM SOP-00445	R.Carter,1993
Polychlorinated Biphenyl in Soil	6	2014/08/29	2014/08/29	CAM SOP-00309	EPA 8082 m

Sample Matrix: Water
Samples Received: 5

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Reference
Petroleum Hydro. CCME F1 & BTEX in Water	5	N/A	2014/08/27	CAM SOP-00315	CCME PHC-CWS m
Petroleum Hydrocarbons F2-F4 in Water	5	2014/08/27	2014/08/28	CAM SOP-00316	CCME PHC-CWS m
Mercury (low level)	5	2014/08/27	2014/08/27	CAM SOP-00453	EPA 7470 m
Polychlorinated Biphenyl in Water	5	2014/08/26	2014/08/27	CAM SOP-00309	EPA 8082 m

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Keshani Vijh, Project Manager
Email: KVijh@maxxam.ca
Phone# (905) 817-5700
==
Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Maxxam
A Bureau Veritas Group Company

Maxxam Job #: B4F3737
Report Date: 2014/09/03

Decommissioning Consulting Services Limited
Client Project #: 350600-515
Site Location: FOX-5 BROUGHTON ISLAND

RESULTS OF ANALYSES OF SOIL

Maxxam ID		XG4895	XG4896	XG4897	XG4898	XG4899		
Sampling Date		2014/08/19	2014/08/19	2014/08/19	2014/08/19	2014/08/19		
COC Number		na	na	na	na	na		
	Units	**F5-SA-MW-15-S**	**F5-SA-MW-15-D**	**F5-SA-MW-16-S**	**F5-SA-MW-16-D**	**F5-SA-MW-17-S**	**RDL**	**QC Batch**
Inorganics								
Moisture	%	12	10	7.7	8.4	6.6	1.0	3725691

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Maxxam ID		XG4900		
Sampling Date		2014/08/19		
COC Number		na		
	Units	**F5-SA-MW-17-D**	**RDL**	**QC Batch**
Inorganics				
Moisture	%	7.8	1.0	3725691

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

Maxxam Job #: B4F3737
Report Date: 2014/09/03

Decommissioning Consulting Services Limited
Client Project #: 350600-515
Site Location: FOX-5 BROUGHTON ISLAND

ELEMENTS BY ATOMIC SPECTROSCOPY (SOIL)

Maxxam ID			XG4895	XG4896	XG4897	XG4898		
Sampling Date			2014/08/19	2014/08/19	2014/08/19	2014/08/19		
COC Number			na	na	na	na		
	Units	**Criteria**	**F5-SA-MW-15-S**	**F5-SA-MW-15-D**	**F5-SA-MW-16-S**	**F5-SA-MW-16-D**	**RDL**	**QC Batch**
Metals								
Acid Extractable Arsenic (As)	ug/g	**12**	3.1	2.7	2.2	3.3	1.0	3728208
Acid Extractable Cadmium (Cd)	ug/g	**22**	<0.10	<0.10	0.11	0.14	0.10	3728208
Acid Extractable Chromium (Cr)	ug/g	**87**	38	33	12	23	1.0	3728208
Acid Extractable Cobalt (Co)	ug/g	**-**	9.3	8.2	3.3	6.0	0.10	3728208
Acid Extractable Copper (Cu)	ug/g	**91**	22	20	16	21	0.50	3728208
Acid Extractable Lead (Pb)	ug/g	**600**	7.7	6.1	11	14	1.0	3728208
Acid Extractable Nickel (Ni)	ug/g	**50**	18	16	5.4	9.8	0.50	3728208
Acid Extractable Zinc (Zn)	ug/g	**360**	58	51	67	87	5.0	3728208
Acid Extractable Mercury (Hg)	ug/g	**50**	<0.050	<0.050	<0.050	<0.050	0.050	3728208

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Criteria: CCME Industrial
Canadian Environmental Quality Guidelines for Soil 1998-1999

Maxxam ID			XG4899	XG4900		
Sampling Date			2014/08/19	2014/08/19		
COC Number			na	na		
	Units	**Criteria**	**F5-SA-MW-17-S**	**F5-SA-MW-17-D**	**RDL**	**QC Batch**
Metals						
Acid Extractable Arsenic (As)	ug/g	**12**	2.6	2.9	1.0	3728208
Acid Extractable Cadmium (Cd)	ug/g	**22**	<0.10	<0.10	0.10	3728208
Acid Extractable Chromium (Cr)	ug/g	**87**	12	14	1.0	3728208
Acid Extractable Cobalt (Co)	ug/g	**-**	3.2	4.0	0.10	3728208
Acid Extractable Copper (Cu)	ug/g	**91**	9.1	8.2	0.50	3728208
Acid Extractable Lead (Pb)	ug/g	**600**	13	7.3	1.0	3728208
Acid Extractable Nickel (Ni)	ug/g	**50**	5.0	6.2	0.50	3728208
Acid Extractable Zinc (Zn)	ug/g	**360**	43	41	5.0	3728208
Acid Extractable Mercury (Hg)	ug/g	**50**	<0.050	<0.050	0.050	3728208

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Criteria: CCME Industrial
Canadian Environmental Quality Guidelines for Soil 1998-1999

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

Maxxam Job #: B4F3737
Report Date: 2014/09/03

Decommissioning Consulting Services Limited
Client Project #: 350600-515
Site Location: FOX-5 BROUGHTON ISLAND

PETROLEUM HYDROCARBONS (CCME)

Maxxam ID			XG4895	XG4896	XG4897	XG4898	XG4899		
Sampling Date			2014/08/19	2014/08/19	2014/08/19	2014/08/19	2014/08/19		
COC Number			na	na	na	na	na		
	Units	**Criteria**	**F5-SA-MW-15-S**	**F5-SA-MW-15-D**	**F5-SA-MW-16-S**	**F5-SA-MW-16-D**	**F5-SA-MW-17-S**	**RDL**	**QC Batch**
BTEX & F1 Hydrocarbons									
Benzene	ug/g	**5**	<0.005	<0.005	<0.005	<0.005	<0.005	0.005	3726101
Toluene	ug/g	**0.8**	<0.02	<0.02	<0.02	<0.02	<0.02	0.02	3726101
Ethylbenzene	ug/g	**20**	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	3726101
o-Xylene	ug/g	-	<0.02	<0.02	<0.02	<0.02	<0.02	0.02	3726101
p+m-Xylene	ug/g	-	<0.04	<0.04	<0.04	<0.04	<0.04	0.04	3726101
Total Xylenes	ug/g	-	<0.04	<0.04	<0.04	<0.04	<0.04	0.04	3726101
F1 (C6-C10)	ug/g	-	<10	<10	<10	<10	<10	10	3726101
F1 (C6-C10) - BTEX	ug/g	-	<10	<10	<10	<10	<10	10	3726101
F2-F4 Hydrocarbons									
F2 (C10-C16 Hydrocarbons)	ug/g	-	<10	<10	<10	23	<10	10	3727425
F3 (C16-C34 Hydrocarbons)	ug/g	-	<50	<50	<50	51	120	50	3727425
F4 (C34-C50 Hydrocarbons)	ug/g	-	<50	<50	<50	<50	<50	50	3727425
Reached Baseline at C50	ug/g	-	Yes	Yes	Yes	Yes	Yes		3727425
Surrogate Recovery (%)									
1,4-Difluorobenzene	%	-	90	92	92	92	92		3726101
4-Bromofluorobenzene	%	-	103	102	101	102	102		3726101
D10-Ethylbenzene	%	-	79	78	76	73	79		3726101
D4-1,2-Dichloroethane	%	-	96	101	99	99	100		3726101
o-Terphenyl	%	-	84	88	85	86	92		3727425

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Criteria: CCME Industrial
Canadian Environmental Quality Guidelines for Soil 1998-1999

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

Maxxam Job #: B4F3737
Report Date: 2014/09/03

Decommissioning Consulting Services Limited
Client Project #: 350600-515
Site Location: FOX-5 BROUGHTON ISLAND

PETROLEUM HYDROCARBONS (CCME)

Maxxam ID			XG4900		
Sampling Date			2014/08/19		
COC Number			na		
	Units	**Criteria**	**F5-SA-MW-17-D**	**RDL**	**QC Batch**
BTEX & F1 Hydrocarbons					
Benzene	ug/g	**5**	<0.005	0.005	3726101
Toluene	ug/g	**0.8**	<0.02	0.02	3726101
Ethylbenzene	ug/g	**20**	<0.01	0.01	3726101
o-Xylene	ug/g	-	<0.02	0.02	3726101
p+m-Xylene	ug/g	-	<0.04	0.04	3726101
Total Xylenes	ug/g	-	<0.04	0.04	3726101
F1 (C6-C10)	ug/g	-	<10	10	3726101
F1 (C6-C10) - BTEX	ug/g	-	<10	10	3726101
F2-F4 Hydrocarbons					
F2 (C10-C16 Hydrocarbons)	ug/g	-	<10	10	3727425
F3 (C16-C34 Hydrocarbons)	ug/g	-	<50	50	3727425
F4 (C34-C50 Hydrocarbons)	ug/g	-	<50	50	3727425
Reached Baseline at C50	ug/g	-	Yes		3727425
Surrogate Recovery (%)					
1,4-Difluorobenzene	%	-	92		3726101
4-Bromofluorobenzene	%	-	101		3726101
D10-Ethylbenzene	%	-	74		3726101
D4-1,2-Dichloroethane	%	-	99		3726101
o-Terphenyl	%	-	90		3727425

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Criteria: CCME Industrial
Canadian Environmental Quality Guidelines for Soil 1998-1999

Maxxam Job #: B4F3737
Report Date: 2014/09/03

Decommissioning Consulting Services Limited
Client Project #: 350600-515
Site Location: FOX-5 BROUGHTON ISLAND

POLYCHLORINATED BIPHENYLS BY GC-ECD (SOIL)

Maxxam ID			XG4895	XG4896	XG4897	XG4898	XG4899		
Sampling Date			2014/08/19	2014/08/19	2014/08/19	2014/08/19	2014/08/19		
COC Number			na	na	na	na	na		
	Units	**Criteria**	**F5-SA-MW-15-S**	**F5-SA-MW-15-D**	**F5-SA-MW-16-S**	**F5-SA-MW-16-D**	**F5-SA-MW-17-S**	**RDL**	**QC Batch**
PCBs									
Aroclor 1242	ug/g	-	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	3729735
Aroclor 1248	ug/g	-	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	3729735
Aroclor 1254	ug/g	-	<0.010	<0.010	0.022	<0.010	<0.010	0.010	3729735
Aroclor 1260	ug/g	-	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	3729735
Total PCB	ug/g	**33**	<0.010	<0.010	0.022	<0.010	<0.010	0.010	3729735
Surrogate Recovery (%)									
Decachlorobiphenyl	%	-	88	94	83	85	82		3729735

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Criteria: CCME Industrial
Canadian Environmental Quality Guidelines for Soil 1998-1999

Maxxam ID			XG4900		
Sampling Date			2014/08/19		
COC Number			na		
	Units	**Criteria**	**F5-SA-MW-17-D**	**RDL**	**QC Batch**
PCBs					
Aroclor 1242	ug/g	-	<0.010	0.010	3729735
Aroclor 1248	ug/g	-	<0.010	0.010	3729735
Aroclor 1254	ug/g	-	<0.010	0.010	3729735
Aroclor 1260	ug/g	-	<0.010	0.010	3729735
Total PCB	ug/g	**33**	<0.010	0.010	3729735
Surrogate Recovery (%)					
Decachlorobiphenyl	%	-	92		3729735

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Criteria: CCME Industrial
Canadian Environmental Quality Guidelines for Soil 1998-1999

ELEMENTS BY ATOMIC SPECTROSCOPY (WATER)

Maxxam ID		XG4890	XG4891	XG4892	XG4893	XG4894		
Sampling Date		2014/08/19	2014/08/19	2014/08/19	2014/08/19	2014/08/19		
COC Number		na	na	na	na	na		
	Units	**F5-MID-MW-5**	**F5-MID-MW-8**	**F5-MID-MW-9**	**F5-SA-MW-15**	**F5-SA-MW-16**	**RDL**	**QC Batch**
Metals								
Mercury (Hg)	ug/L	<0.01	<0.01	<0.01	<0.01	0.02	0.01	3726373

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Maxxam Job #: B4F3737
Report Date: 2014/09/03

Decommissioning Consulting Services Limited
Client Project #: 350600-515
Site Location: FOX-5 BROUGHTON ISLAND

PETROLEUM HYDROCARBONS (CCME)

Maxxam ID		XG4890	XG4891	XG4892	XG4893	XG4894		
Sampling Date		2014/08/19	2014/08/19	2014/08/19	2014/08/19	2014/08/19		
COC Number		na	na	na	na	na		
	Units	**F5-MID-MW-5**	**F5-MID-MW-8**	**F5-MID-MW-9**	**F5-SA-MW-15**	**F5-SA-MW-16**	**RDL**	**QC Batch**
BTEX & F1 Hydrocarbons								
Benzene	ug/L	<0.20	<0.20	<0.20	<0.20	<0.20	0.20	3726586
Toluene	ug/L	<0.20	<0.20	<0.20	<0.20	<0.20	0.20	3726586
Ethylbenzene	ug/L	<0.20	<0.20	<0.20	<0.20	<0.20	0.20	3726586
o-Xylene	ug/L	<0.20	<0.20	<0.20	<0.20	<0.20	0.20	3726586
p+m-Xylene	ug/L	<0.40	<0.40	<0.40	<0.40	<0.40	0.40	3726586
Total Xylenes	ug/L	<0.40	<0.40	<0.40	<0.40	<0.40	0.40	3726586
F1 (C6-C10)	ug/L	<25	<25	<25	<25	<25	25	3726586
F1 (C6-C10) - BTEX	ug/L	<25	<25	<25	<25	<25	25	3726586
F2-F4 Hydrocarbons								
F2 (C10-C16 Hydrocarbons)	ug/L	<100	<100	<100	<100	450	100	3727264
F3 (C16-C34 Hydrocarbons)	ug/L	<200	<200	<200	<200	<200	200	3727264
F4 (C34-C50 Hydrocarbons)	ug/L	<200	<200	<200	<200	<200	200	3727264
Reached Baseline at C50	ug/L	Yes	Yes	Yes	Yes	Yes		3727264
Surrogate Recovery (%)								
1,4-Difluorobenzene	%	107	104	103	108	108		3726586
4-Bromofluorobenzene	%	98	98	99	97	100		3726586
D10-Ethylbenzene	%	103	98	96	102	102		3726586
D4-1,2-Dichloroethane	%	94	95	95	93	96		3726586
o-Terphenyl	%	100	102	101	103	100		3727264

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

Maxxam Job #: B4F3737
Report Date: 2014/09/03

Decommissioning Consulting Services Limited
Client Project #: 350600-515
Site Location: FOX-5 BROUGHTON ISLAND

POLYCHLORINATED BIPHENYLS BY GC-ECD (WATER)

Maxxam ID		XG4890	XG4891	XG4892	XG4893	XG4894		
Sampling Date		2014/08/19	2014/08/19	2014/08/19	2014/08/19	2014/08/19		
COC Number		na	na	na	na	na		
	Units	**F5-MID-MW-5**	**F5-MID-MW-8**	**F5-MID-MW-9**	**F5-SA-MW-15**	**F5-SA-MW-16**	**RDL**	**QC Batch**
PCBs								
Aroclor 1016	ug/L	<0.05	<0.05	<0.05	<0.05	<0.05	0.05	3725649
Aroclor 1221	ug/L	<0.05	<0.05	<0.05	<0.05	<0.05	0.05	3725649
Aroclor 1232	ug/L	<0.05	<0.05	<0.05	<0.05	<0.05	0.05	3725649
Aroclor 1242	ug/L	<0.05	<0.05	<0.05	<0.05	<0.05	0.05	3725649
Aroclor 1248	ug/L	<0.05	<0.05	<0.05	<0.05	<0.05	0.05	3725649
Aroclor 1254	ug/L	<0.05	<0.05	<0.05	<0.05	<0.05	0.05	3725649
Aroclor 1260	ug/L	<0.05	<0.05	<0.05	<0.05	<0.05	0.05	3725649
Aroclor 1262	ug/L	<0.05	<0.05	<0.05	<0.05	<0.05	0.05	3725649
Aroclor 1268	ug/L	<0.05	<0.05	<0.05	<0.05	<0.05	0.05	3725649
Total PCB	ug/L	<0.05	<0.05	<0.05	<0.05	<0.05	0.05	3725649
Surrogate Recovery (%)								
Decachlorobiphenyl	%	77	72	70	66	66		3725649

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

GENERAL COMMENTS

Results relate only to the items tested.

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Success Through Science®

Maxxam Job #: B4F3737
Report Date: 2014/09/03

QUALITY ASSURANCE REPORT

Decommissioning Consulting Services Limited
Client Project #: 350600-515
Site Location: FOX-5 BROUGHTON ISLAND

			Matrix Spike		Spiked Blank		Method Blank		RPD	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	Units	Value (%)	QC Limits
3725649	Decachlorobiphenyl	2014/08/27	83	60 - 130	77	60 - 130	78	%		
3726101	1,4-Difluorobenzene	2014/08/27	92	60 - 140	91	60 - 140	90	%		
3726101	4-Bromofluorobenzene	2014/08/27	102	60 - 140	105	60 - 140	102	%		
3726101	D10-Ethylbenzene	2014/08/27	80	60 - 140	87	60 - 140	72	%		
3726101	D4-1,2-Dichloroethane	2014/08/27	103	60 - 140	95	60 - 140	98	%		
3726586	1,4-Difluorobenzene	2014/08/27	104	70 - 130	101	70 - 130	103	%		
3726586	4-Bromofluorobenzene	2014/08/27	100	70 - 130	100	70 - 130	98	%		
3726586	D10-Ethylbenzene	2014/08/27	102	70 - 130	98	70 - 130	97	%		
3726586	D4-1,2-Dichloroethane	2014/08/27	87	70 - 130	89	70 - 130	97	%		
3727264	o-Terphenyl	2014/08/27	103	60 - 130	105	60 - 130	101	%		
3727425	o-Terphenyl	2014/08/28	83	60 - 130	83	60 - 130	91	%		
3729735	Decachlorobiphenyl	2014/08/29	90	60 - 130	90	60 - 130	87	%		
3725649	Aroclor 1016	2014/08/27					<0.05	ug/L	NC	40
3725649	Aroclor 1221	2014/08/27					<0.05	ug/L	NC	40
3725649	Aroclor 1232	2014/08/27					<0.05	ug/L	NC	40
3725649	Aroclor 1242	2014/08/27					<0.05	ug/L	NC	30
3725649	Aroclor 1248	2014/08/27					<0.05	ug/L	NC	30
3725649	Aroclor 1254	2014/08/27					<0.05	ug/L	NC	30
3725649	Aroclor 1260	2014/08/27	78	60 - 130	68	60 - 130	<0.05	ug/L	NC	30
3725649	Aroclor 1262	2014/08/27					<0.05	ug/L	NC	40
3725649	Aroclor 1268	2014/08/27					<0.05	ug/L	NC	40
3725649	Total PCB	2014/08/27	78	60 - 130	68	60 - 130	<0.05	ug/L	NC	40
3725691	Moisture	2014/08/26							2.8	20
3726101	Benzene	2014/08/27	82	60 - 140	97	60 - 140	<0.005	ug/g	NC	50
3726101	Ethylbenzene	2014/08/27	85	60 - 140	100	60 - 140	<0.01	ug/g	NC	50
3726101	F1 (C6-C10) - BTEX	2014/08/27					<10	ug/g	NC	50
3726101	F1 (C6-C10)	2014/08/27	73	60 - 140	88	80 - 120	<10	ug/g	NC	50
3726101	o-Xylene	2014/08/27	83	60 - 140	97	60 - 140	<0.02	ug/g	NC	50
3726101	p+m-Xylene	2014/08/27	79	60 - 140	94	60 - 140	<0.04	ug/g	NC	50
3726101	Toluene	2014/08/27	81	60 - 140	97	60 - 140	<0.02	ug/g	NC	50
3726101	Total Xylenes	2014/08/27					<0.04	ug/g	NC	50
3726373	Mercury (Hg)	2014/08/27	102	75 - 125	100	80 - 120	<0.01	ug/L	NC	20

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Maxxam Job #: B4F3737
Report Date: 2014/09/03

QUALITY ASSURANCE REPORT(CONT'D)

Decommissioning Consulting Services Lir...
Client Project #: 350600-515
Site Location: FOX-5 BROUGHTON ISLAND

			Matrix Spike		Spiked Blank		Method Blank		RPD	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	Units	Value (%)	QC Limits
3726586	Benzene	2014/08/27	117	70 - 130	116	70 - 130	<0.20	ug/L	NC	30
3726586	Ethylbenzene	2014/08/27	125	70 - 130	120	70 - 130	<0.20	ug/L	NC	30
3726586	F1 (C6-C10) - BTEX	2014/08/27					<25	ug/L	NC	30
3726586	F1 (C6-C10)	2014/08/27	104	70 - 130	97	70 - 130	<25	ug/L	NC	30
3726586	o-Xylene	2014/08/27	129	70 - 130	127	70 - 130	<0.20	ug/L	NC	30
3726586	p+m-Xylene	2014/08/27	110	70 - 130	104	70 - 130	<0.40	ug/L	NC	30
3726586	Toluene	2014/08/27	97	70 - 130	93	70 - 130	<0.20	ug/L	NC	30
3726586	Total Xylenes	2014/08/27					<0.40	ug/L	NC	30
3727264	F2 (C10-C16 Hydrocarbons)	2014/08/28	81	50 - 130	95	60 - 130	<100	ug/L	NC	30
3727264	F3 (C16-C34 Hydrocarbons)	2014/08/28	88	50 - 130	97	60 - 130	<200	ug/L	NC	30
3727264	F4 (C34-C50 Hydrocarbons)	2014/08/28	99	50 - 130	105	60 - 130	<200	ug/L	NC	30
3727425	F2 (C10-C16 Hydrocarbons)	2014/08/28	88	50 - 130	88	80 - 120	<10	ug/g	NC	30
3727425	F3 (C16-C34 Hydrocarbons)	2014/08/28	89	50 - 130	89	80 - 120	<50	ug/g	NC	30
3727425	F4 (C34-C50 Hydrocarbons)	2014/08/28	94	50 - 130	95	80 - 120	<50	ug/g	NC	30
3728208	Acid Extractable Arsenic (As)	2014/08/28	106	75 - 125	104	80 - 120	<1.0	ug/g	NC	30
3728208	Acid Extractable Cadmium (Cd)	2014/08/28	107	75 - 125	104	80 - 120	<0.10	ug/g	NC	30
3728208	Acid Extractable Chromium (Cr)	2014/08/28	108	75 - 125	106	80 - 120	<1.0	ug/g	NC	30
3728208	Acid Extractable Cobalt (Co)	2014/08/28	107	75 - 125	108	80 - 120	<0.10	ug/g	9.9	30
3728208	Acid Extractable Copper (Cu)	2014/08/28	102	75 - 125	105	80 - 120	<0.50	ug/g	1.2	30
3728208	Acid Extractable Lead (Pb)	2014/08/28	106	75 - 125	105	80 - 120	<1.0	ug/g	NC	30
3728208	Acid Extractable Mercury (Hg)	2014/08/28	108	75 - 125	103	80 - 120	<0.050	ug/g	NC	30
3728208	Acid Extractable Nickel (Ni)	2014/08/28	107	75 - 125	105	80 - 120	<0.50	ug/g	7.4	30
3728208	Acid Extractable Zinc (Zn)	2014/08/28	105	75 - 125	104	80 - 120	<5.0	ug/g	NC	30
3729735	Aroclor 1242	2014/08/29					<0.010	ug/g	NC	50
3729735	Aroclor 1248	2014/08/29					<0.010	ug/g	NC	50
3729735	Aroclor 1254	2014/08/29					<0.010	ug/g	NC	50
3729735	Aroclor 1260	2014/08/29	103	60 - 130	99	60 - 130	<0.010	ug/g	NC	50
3729735	Total PCB	2014/08/29	103	60 - 130	99	60 - 130	<0.010	ug/g	NC	50

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

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QUALITY ASSURANCE REPORT(CONT'D)

			Matrix Spike		Spiked Blank		Method Blank		RPD	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	Units	Value (%)	QC Limits

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (one or both samples < 5x RDL).

Maxxam Job #: B4F3737
Report Date: 2014/09/03

Decommissioning Consulting Services Limited
Client Project #: 350600-515
Site Location: FOX-5 BROUGHTON ISLAND

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).

Eva Pranjic CHARTERED CHEMIST

Ewa Pranjic, M.Sc., C.Chem, Scientific Specialist

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

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245-YVM-35583402 **245-YVM-35583402**

NON NEGOTIABLE AIR WAYBILL (AIR CONSIGNMENT NOTE)
NON NÉGOTIABLE LETTRE DE TRANSPORT AÉRIEN
ISSUED BY: / ÉMISE PAR: **FIRST AIR** The Airline of the North

Incorporated in Canada with limited liability - Compagnie Canadienne a responsabilite limitee

Copies 1, 2, 3 and faximilies of this Air Waybill and originals and have the same validity.
Les exemplaires 1 2 3 et faximilie de cette lettre de transport aerien sont originaux et ont la même validité

It is agreed that the goods described herein are accepted in apparent good order and condition (except as noted) for carriage. SUBJECT TO THE CONDITIONS AVAILABLE AT https://firstair.ca/cargo/cargo-conditions-of-contract/
FROM THE CARGO AGENT.
THE SHIPPER'S ATTENTION IS DRAWN TO THE NOTICE CONCERNING CARRIERS LIMITATION OF LIABILITY. Shipper may increase such limitation of liability by declaring a higher value for carriage and paying a supplemental if required.
Il est convenu que les marchandises décrites dans le présent document sont acceptées pour le transport en bon état apparent (sauf annotation contraire) et que le transport est SOUMIS AUX CONDITIONS DU CONTRAT DISPONIBLES AU https://firstair.ca/cargo/cargo-conditions-of-contract/
AUPRÈS DE L'AGENT CARGO.
L'ATTENTION DE L'EXPÉDITEUR EST ATTIRÉE SUR L'AVIS CONCERNANT LA LIMITATION DE RESPONSABILITÉ DU TRANSPORTEUR. L'expéditeur peut augmenter cette limitation de responsabilité en déclarant une valeur pour le transport plus élevée et en payant des frais supplémentaires s'il y a lieu.

Shipper's Name and Address / Nom et adresse de l'expediteur:
Mauchan Jason
Gen Del
QIKIQTARJUAQ
NUNAVUT, CANADA
X0A 0B0 867-92700000

Shippers Account Number / No de compte de l'expediteur:

Consignee Name and Address / Nom et adresse du destinataire:
MAXXAM ANALYTICS
32 COLONNADE ROAD SOUTH, UNIT 1000
OTTAWA
ONTARIO, CANADA
K2E7J6 6132740573

Consignee Name and Address / Nom et adresse du destinataire:

Issuing Carrier's Agent Name and City / Nom et ville de l'agent du transporteur emetteur:

Accounting Information / Renseignements comptables: YVMCASH
YVMCASH
QIKIQTARJUAK
NUNAVUT
PO:

Agent's IATA Code / Code IATA de l'agent:
Account Number / Numéro de compte:

Airport of Departure / Aeroport de depart: **YVM**

Routing and destination To / à	First carrier / premier transport	To / à	by / par	To / à	by / par	Currency Monnaie	CHGS Code Frais	WT / Poids-Val PPD payé	COLL DÛ	Other/Autres PPD payé	COLL DÛ	Declared Value for Carriage / Valeur déclarée pour le transport	Declared value for Customs / Valeur déclarée pour la douane
YOW	7F					CDN	PX	X		X		NDV	NCV

Airport of Destination / Aeroport de destination: **YOW**
Flight Date / Vol Date:
Delivery Company:
Pick-up Company:

Handling Information / Renseignements pour le traitement de l'expedition:
hold for pick up

No of Pieces rcp	Gross Weight	kg lb	Rate Class	Commodity Item No.	Chargeable Weight	Rate / Charge	Total	Nature and Quantity of Goods (inc. Dimensions or Volume
1	28	K	G	GEN	28	10.67	298.76	SAMPLE (SPECIFY)-soil sample SAMPLE (SPECIFY)-soil sample
						10.67	298.76	
1	**28**						**298.76**	

Prepaid / Porte paye	Collect / Port du
Weight Charge / Taxation au poids: 298.76	
Valuation Charge / Taxation à la valeur:	
Tax / Taxe: 50.30	
Total other Charges Due Agent / Total des autres frais dus a l'agent:	
Total other Charges Due Carrier / Total des autres frais dus au transporteur: 88.13	
Total Prepaid / Total port paye: 437.19	Total collect / Total port du:
For Carrier User Online at Destination / Reserve au transporteur à destination	Charges at Destination / Frais à l'arrivée

Other Charges / Autres frais:
FUEL SURCHARGE = 68.71, NAV SURCHARGE = 19.42, GST = 50.30

Shipper certifies that the particulars on the face hereof are correct and that insofar as any part of the consignment contains dangerous goods, such part is properly described by name and is in proper condition for carriage by air according to the applicable Dangerous Goods Regulations.
L'expéditeur certifie que les indications portées sur le présent document sont exactes et que dans la mesure ou une partie quelconque de l'expédition contient des marchandises dangereuses, cettepartie de d'expédition est correctement dénommée et bien préparée pour le transport par air conformément à la réglementation applicable.

Print Name (Shipper) - Nom en lettres moulées (Expéditeur) / Signature

08/20/2014	Qikiqtarjuaq	521415
Executed on / Fait le Date	Place / Lieu	Nom De L'agent / Agent's Name

Total Collect Charges / Total Du
Signature of Issuing Carrier or its Agent / Signature du transporteur emetteur ou de son agent

245-YVM-35583402

ORIGINAL NO.5 - CONSIGNEE'S COPY - COPIE DU DESTINATAIRE

Landfill Monitoring Detection Limits

Parameter	Soil (mg/kg)	Groundwater (mg/L)
Copper	<3.0	<0.005
Nickel	<5.0	<0.010
Cobalt	<5.0	<0.005
Cadmium	<1.0	<0.001
Lead	<10	<0.01
Zinc	<15	<0.005
Chromium	<20	<0.005
Arsenic	<0.2	<0.05
Mercury	<0.1	<0.001
PCBs	<0.05	<0.003
TPH	<40	<1

DCS IMMEDIATE TEST

121 Granton Drive, Unit 11, Richmond Hill, ON
Tel: (905) 882-5984 Fax: (905) 882-8962
Email: engineers@dcsltd.ca Website: www.dcsltd.ca

Chain of Custody Record

Page 1 of 1.

Shipper

Project No.: 350600-515 **Site:** FOX-5 Broughton Island

Project Manager: S. Borcsok

Field Engineer/Techician: S. Borcsok/J. Mauchan

Date: 20 Aug/14 **Route:** Courier

Lab: MAXXAM **Location** Ottawa

Required Date: **Turnaround:** STD Day(s)

Quotation No.:

MDL's To Meet: See Attached

Temp: 7,9,7
on ice

REC'D IN OTTAWA

22-Aug-14 10:50
Keshani Vijh
B4F3737
MAF ENV-763

Analyses Requested / **Field Procedures**

Location/ Hole No.	Sample No.	Depth (m)	Description	Label No.	Grab/ Comp.	Date Collected	PHCs F1	PHCs F2-F4	PCBs	Inorganics: As, Cd, Cr, Co, Cu, Pb, Ni, Zn, Hg							pH	Electrical Conductivity	Preservatives
F5-MID-MW-	5		GROUNDWATER			19 Aug/14	X	X	X	X									
F5-MID-MW-	8		↓			↓	X	X	X	X									
F5-MID-MW-	9						X	X	X	X									
F5-SA-MW-	15						X	X	X	X									
F5-SA-MW-	16						X	X	X	X									
F5-SA-MW-	15-S		SOIL				X	X	X	X									
F5-SA-MW-	15-D		↓				X	X	X	X									
F5-SA-MW-	16-S						X	X	X	X									
F5-SA-MW-	16-D						X	X	X	X									
F5-SA-MW-	17-S						X	X	X	X									
F5-SA-MW-	17-D						X	X	X	X									

Relinquished By:	Date:	Time:	Received By:
S. Borcsok	20 Aug/14		2014/08/22 Kelsey Pilon 10:50
Relinquished By:	Date: 2014/08/23	Time: 09:40	Received By: ZQ. FANG WANG
Relinquished By:	Date:	Time:	Received By:

Laboratory

Remarks:
ALL RESULTS ARE TO BE SENT TO THE PROJECT MANAGER.

5/5/6i 6/6/6i

Project No. and Date

(Revision 1 - 17 May 2012)

APPENDIX D

THERMISTOR REPORTS

THERMAL MONITORING ANNUAL DATA ANALYSIS

Site: **FOX-5 Broughton Island**
Landfill: **Middle Site Tier II Soil Disposal Facility**

Design Infomation:

Design Active Layer (m):	-2.20
Mean Active Layer (m):	-1.60
1:100 Year Active Layer (m):	-2.00
Mean Thawing Index (degC Days):	245.00
Mean Freezing Index (degC Days):	4380.00
1:100 Year Thawing Index (degC Days):	490.00

Maximum Active Layer (m):

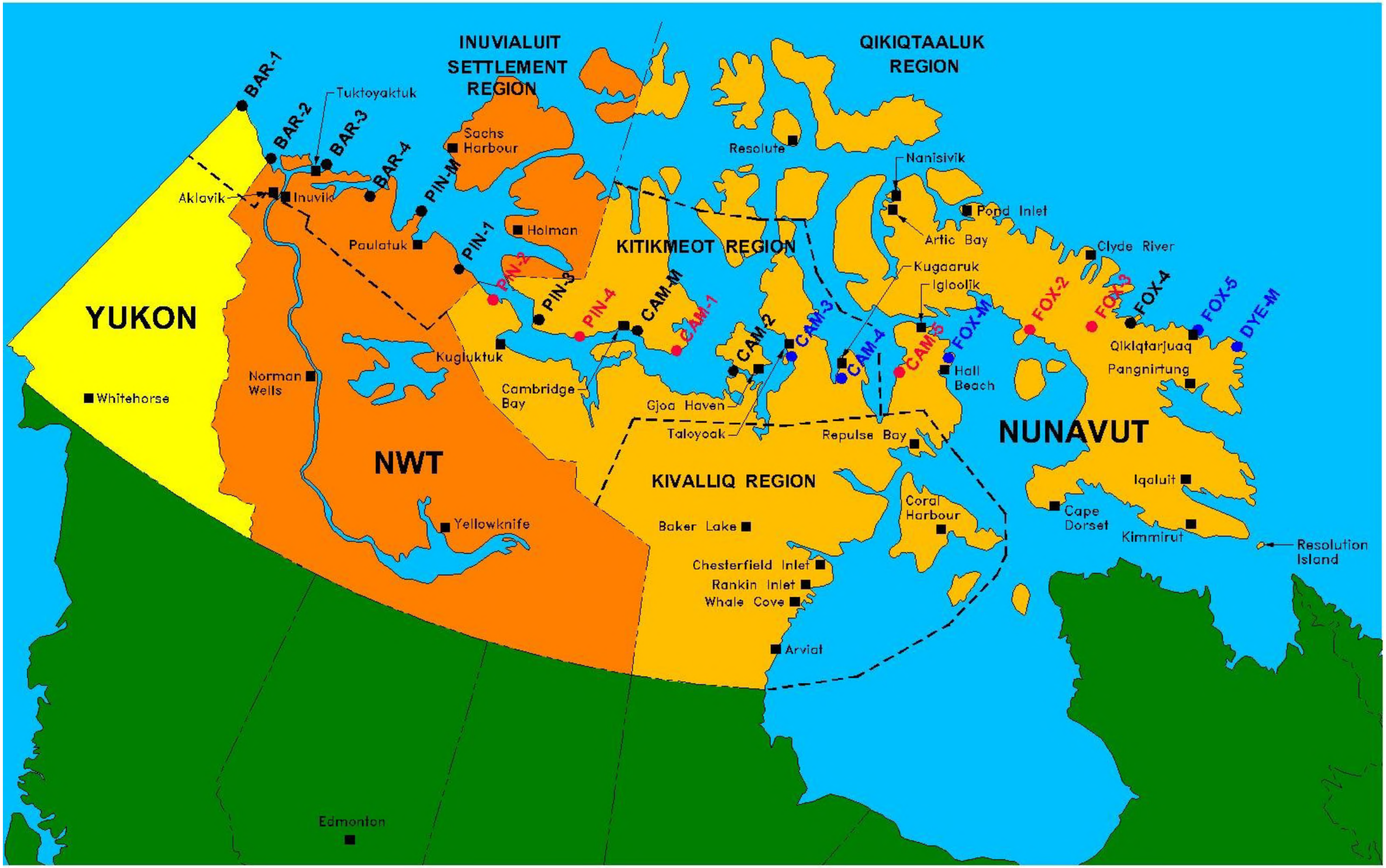
	VT-10	VT-11	VT-12	VT-9
2006	NaN	NaN	NaN	NaN
2007	-2.78	-2.63	-2.36	-2.59
2008	-2.30	-2.05	-1.77	-1.99
2009	-2.40	-2.16	-1.85	-2.13
2010	-2.55	-2.24	-2.00	-2.37
2011	NaN	-2.15	NaN	-2.12
2012	-2.42	-2.19	NaN	-2.28
2013	-2.21	-1.92	NaN	-2.01
2014	NaN	NaN	NaN	NaN

Thawing Index and Freezing Index:

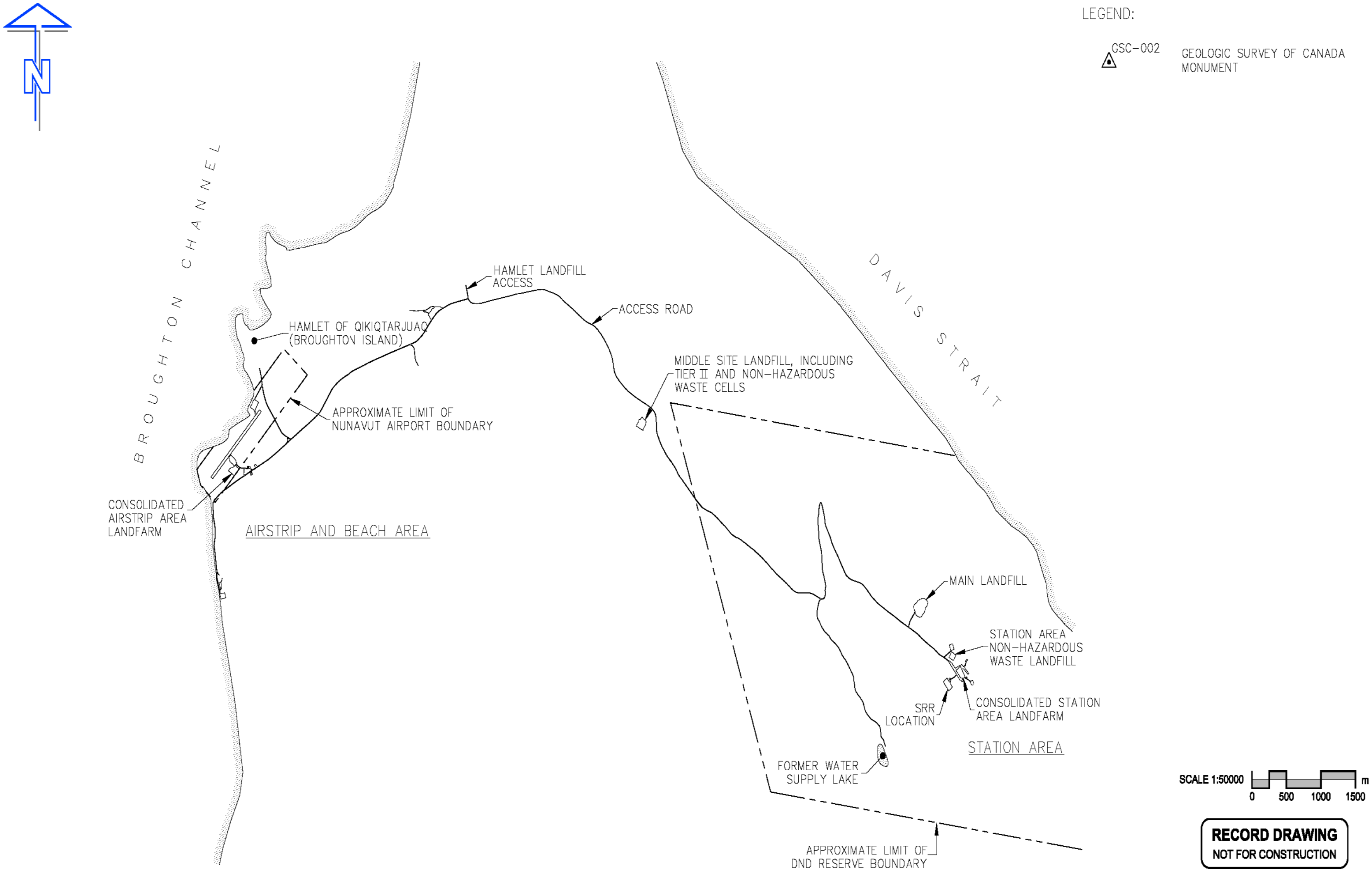
	TI	FI	max AL	min AL	average AL
2006	439.00	3798.00	NaN	NaN	NaN
2007	298.00	3876.00	-2.78	-2.36	-2.59
2008	504.00	4192.00	-2.30	-1.77	-2.03
2009	494.00	4083.00	-2.40	-1.85	-2.13
2010	484.00	3222.00	-2.55	-2.00	-2.29
2011	374.00	3668.00	-2.15	-2.12	-2.14
2012	616.00	4104.00	-2.42	-2.19	-2.24
2013	361.00	3660.00	-2.21	-1.92	-2.05
2014	437.00	4172.00	NaN	NaN	NaN

Deepest Bead Average Temperature:

	VT-10	VT-11	VT-12	VT-9	AVG
2006	NaN	NaN	NaN	NaN	NaN
2007	-3.36	-2.61	-3.02	-3.17	-3.04
2008	-5.49	-5.41	-5.42	-5.30	-5.41
2009	-5.00	-5.36	-5.48	-4.96	-5.20
2010	-3.51	-3.79	-4.40	-3.63	-3.83
2011	NaN	-2.97	NaN	-3.02	-3.00
2012	NaN	-3.40	NaN	-4.02	-3.71
2013	-4.57	-5.50	NaN	-4.57	-4.88
2014	NaN	NaN	NaN	NaN	NaN



INUVIALUIT SETTLEMENT REGION
QIKIQTAALUK REGION
KITIKMEOT REGION
KIVALLIQ REGION
NUNAVUT
YUKON
NWT
BAR-1
BAR-2
BAR-3
BAR-4
PIN-M
PIN-1
PIN-2
PIN-3
PIN-4
CAM-M
CAM-1
CAM-2
CAM-3
CAM-4
CAM-5
FOX-M
FOX-2
FOX-3
FOX-4
FOX-5
DYE-M
Tuktoyaktuk
Aklavik
Inuvik
Paulatuk
Sachs Harbour
Holman
Kugluktuk
Cambridge Bay
Norman Wells
Whitehorse
Yellowknife
Edmonton
Resolute
Nanisivik
Artic Bay
Pond Inlet
Clyde River
Kugaaruk
Igloolik
Hall Beach
Gjoa Haven
Taloyoak
Repulse Bay
Baker Lake
Chesterfield Inlet
Rankin Inlet
Whale Cove
Arviat
Coral Harbour
Qikiqtarjuaq
Pangnirtung
Iqaluit
Cape Dorset
Kimmirut
Resolution Island



RECORD DRAWING
NOT FOR CONSTRUCTION

GEOLOGIC SURVEY OF CANADA MONUMENT				
NO.	COORDINATES		ELEV.	DESCRIPTION
	NORTHING	EASTING		
–	–	–	–	–
–	–	–	–	–
–	–	–	–	–

UMA | AECOM

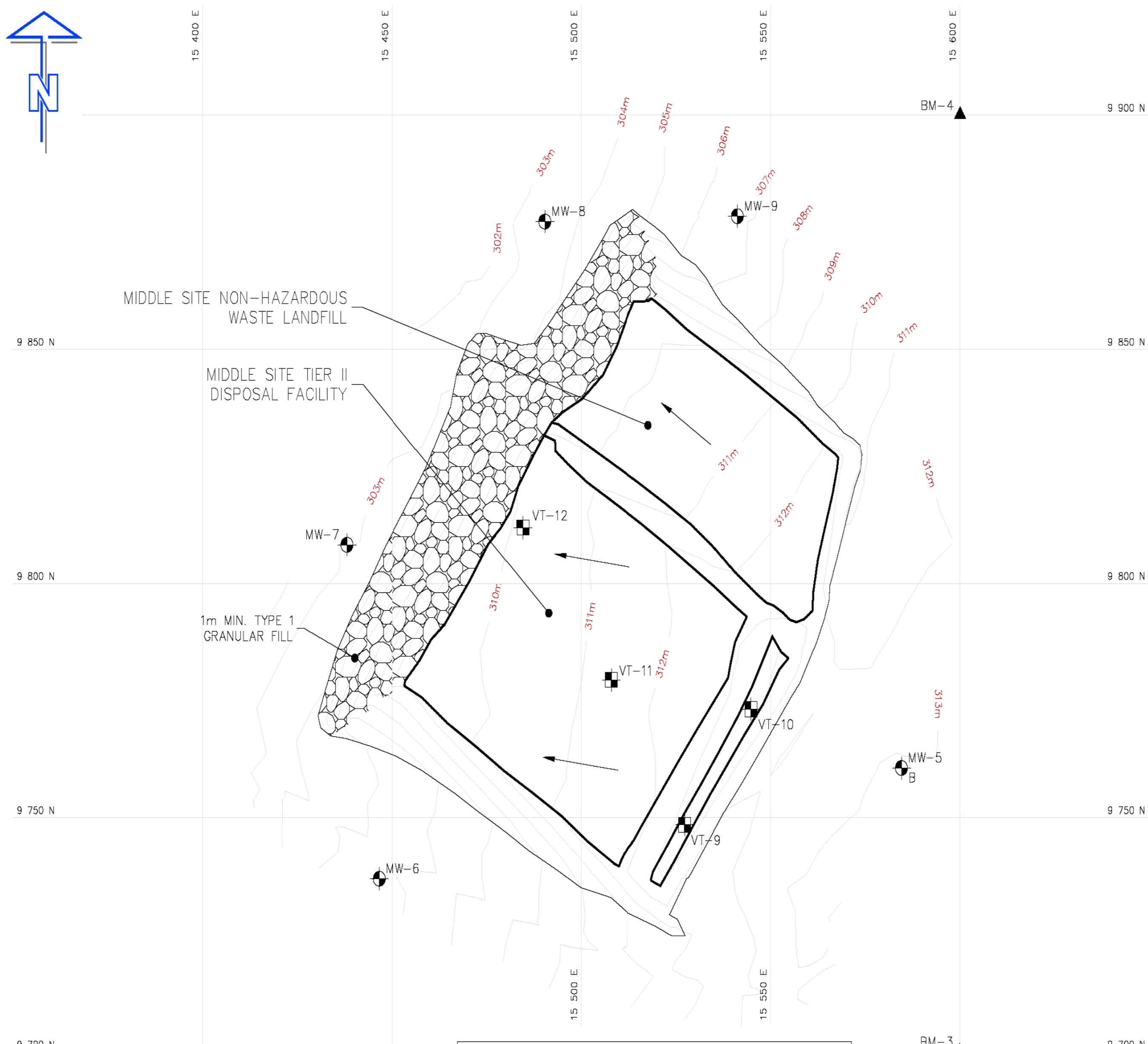
DEW LINE CLEAN UP
LANDFILL MONITORING PLAN

FOX-5 BROUGHTON ISLAND

OVERALL SITE PLAN

FIGURE FOX-5.1

DOS NAME: F5-RD01.DWG DMJ - 07/02/26



LEGEND:

TBM4	TEMPORARY BENCHMARK
BM-1	PERMANENT BENCHMARK
101	COORDINATE POINT
	MONITORING SOIL SAMPLE LOCATION
	BASELINE SOIL SAMPLE LOCATION
	VERTICAL THERMISTOR LOCATION
+1749	MONITORING WELL LOCATION

COORDINATE POINTS (AS-BUILT) VERTICAL THERMISTORS

NO.	NORTHING	EASTING
VT-9	9 748.5	15 527.3
VT-10	9 773.1	15 544.8
VT-11	9 779.4	15 507.9
VT-12	9 811.9	15 484.6

COORDINATE POINTS (AS BUILT) MONITORING WELLS

NO.	NORTHING	EASTING	ELEV.
MW-5	9 760.6	15 584.6	–
MW-6	9 736.9	15 446.6	–
MW-7	9 808.2	15 438.1	–
MW-8	9 877.3	15 490.4	–
MW-9	9 878.4	15 541.2	–

PERMANENT BENCHMARKS

NO.	COORDINATES		ELEV.	DESCRIPTION
	NORTHING	EASTING		
BM-3	9 700.063	15 599.940	314.770	25mm DIA. STEEL PIPE
BM-4	9 900.067	15 600.081	309.963	25mm DIA. STEEL PIPE

SCALE 1:1000 0 10 20 30 m

RECORD DRAWING
NOT FOR CONSTRUCTION

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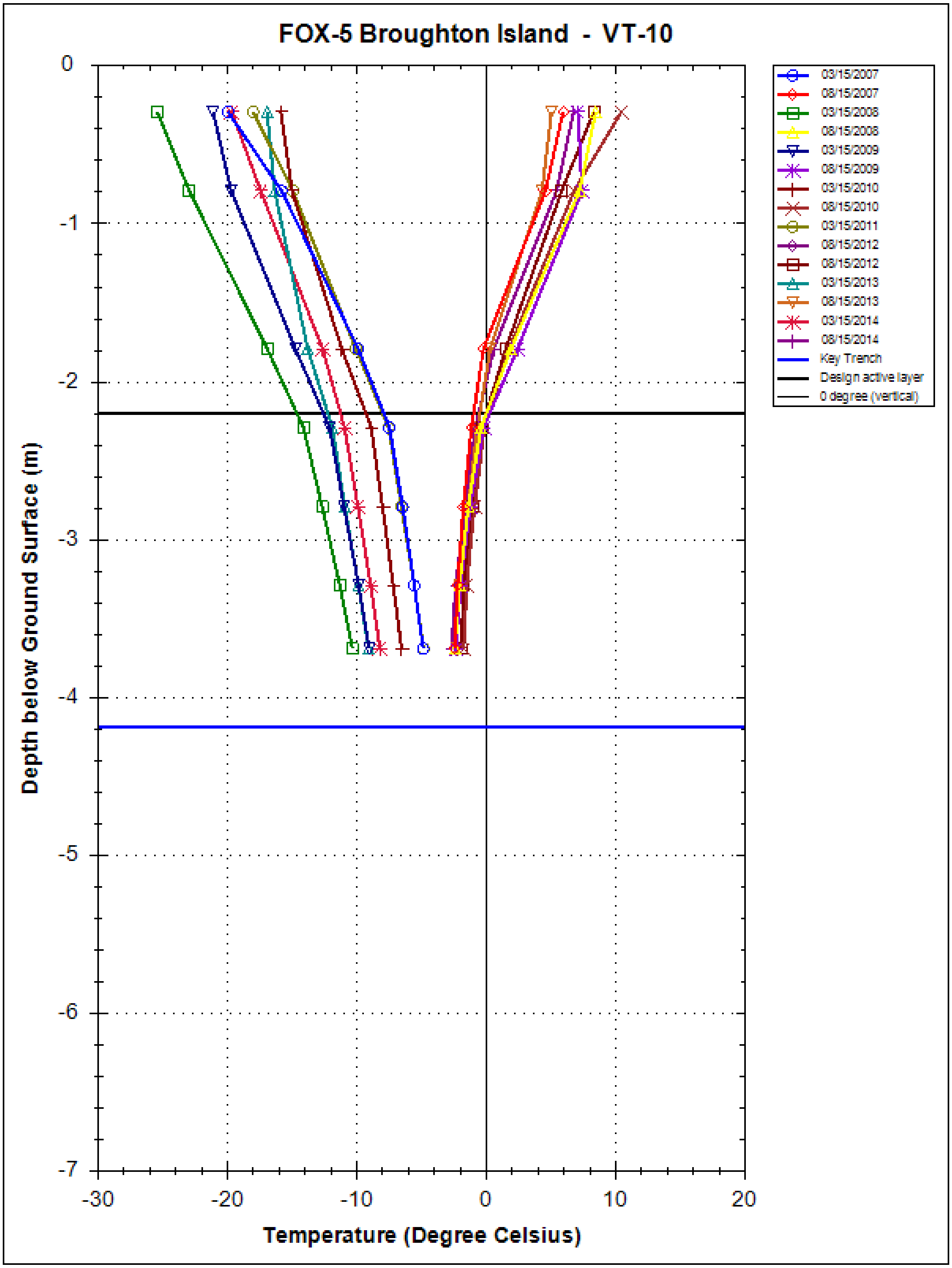
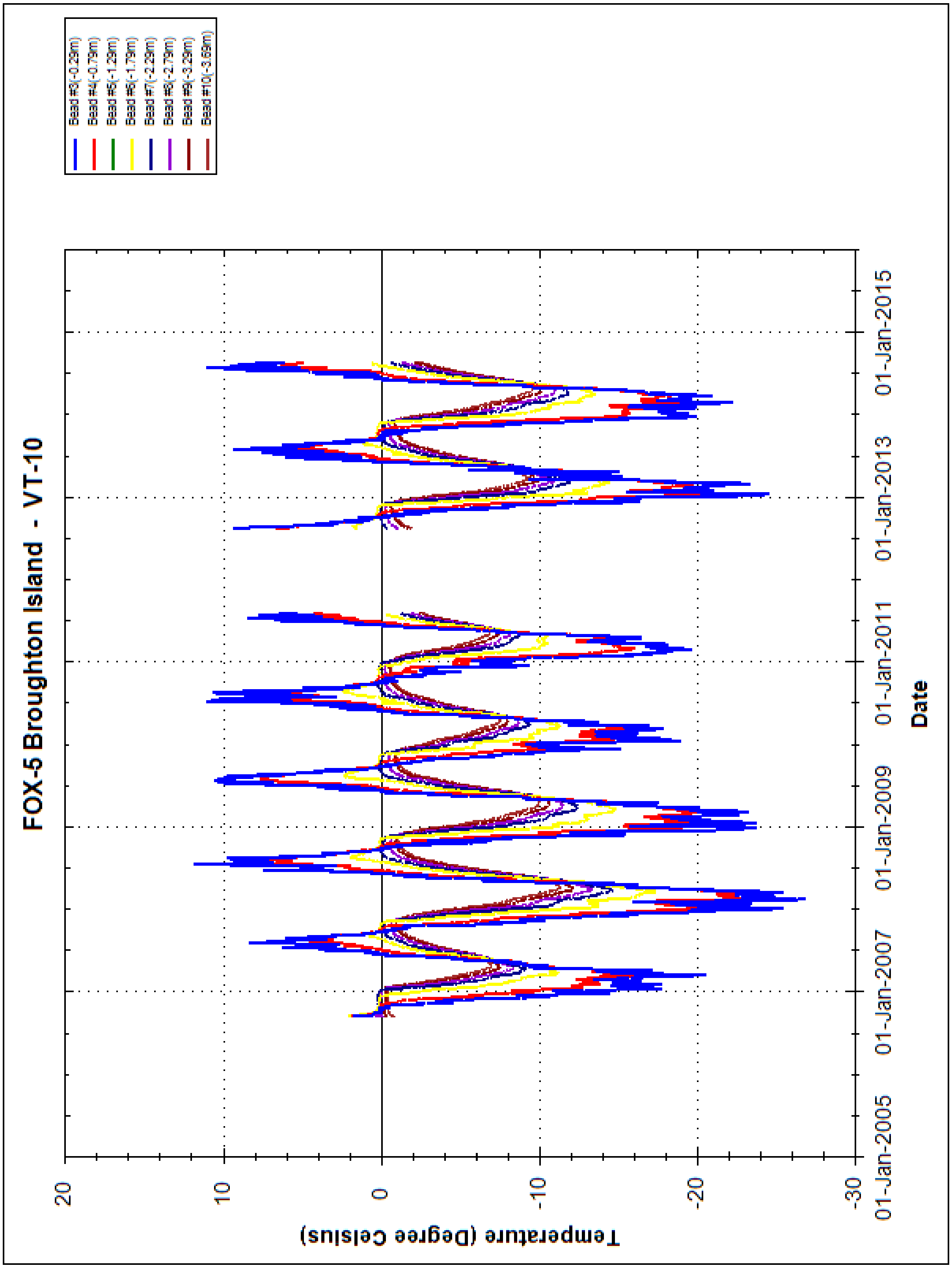
DEW LINE CLEAN UP
LANDFILL MONITORING PLAN
FOX-5 BROUGHTON ISLAND
MIDDLE SITE NON-HAZARDOUS WASTE LANDFILL AND TIER II DISPOSAL FACILITY
FIGURE FOX-5.4

DOS NAME: F5-RD04.DWG DMJ – 07/02/26

THERMAL MONITORING ANNUAL DATA ANALYSIS



THERMAL MONITORING ANNUAL DATA ANALYSIS



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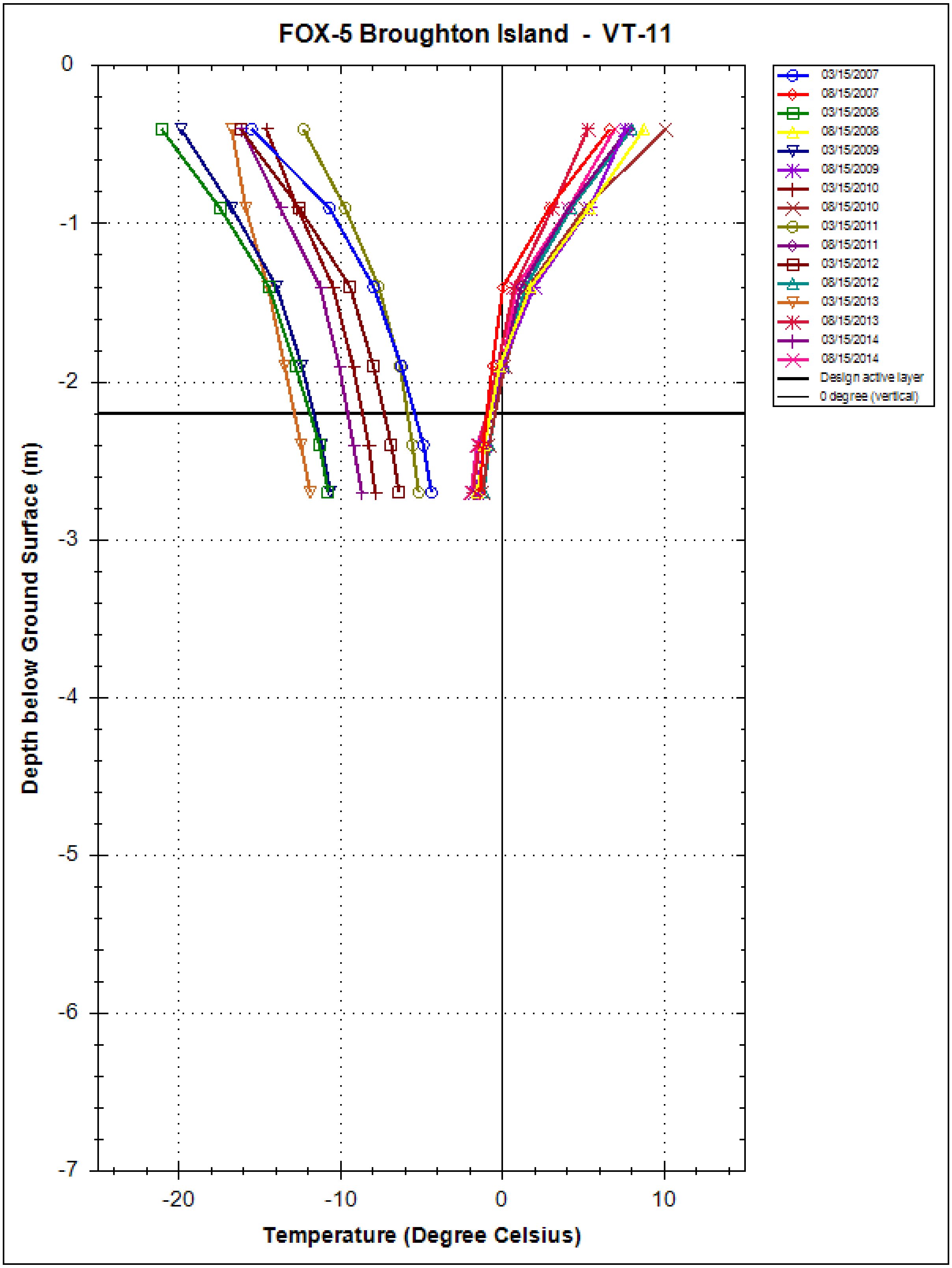
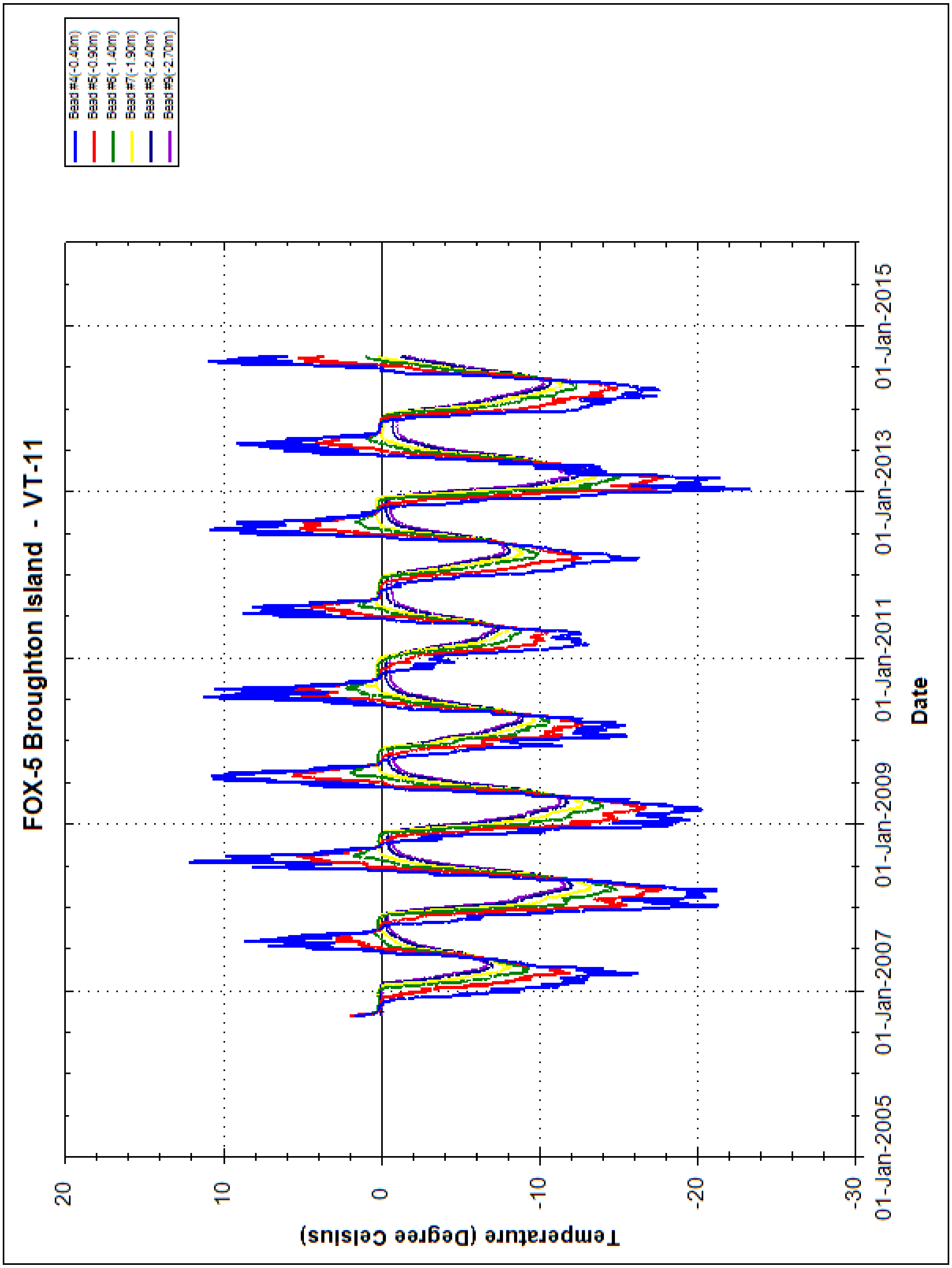
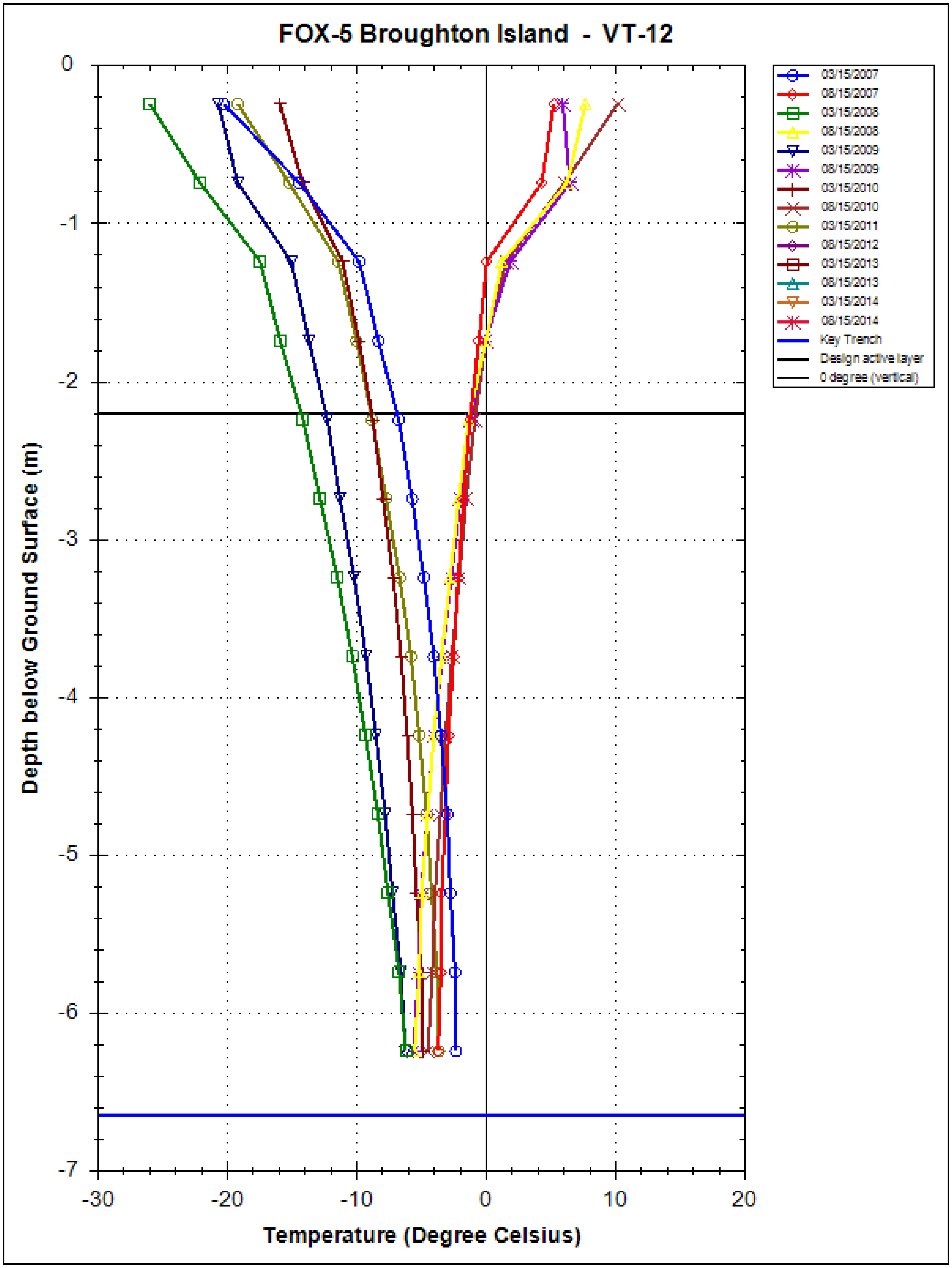



FOX-5 Broughton Island - VT-11
Bead #4(-0.40m)
Bead #5(-0.90m)
Bead #6(-1.40m)
Bead #7(-1.90m)
Bead #8(-2.40m)
Bead #9(-2.70m)
Temperature (Degree Celsius)
20
10
0
-10
-20
-30
Date
01-Jan-2005
01-Jan-2007
01-Jan-2009
01-Jan-2011
01-Jan-2013
01-Jan-2015

THERMAL MONITORING ANNUAL DATA ANALYSIS



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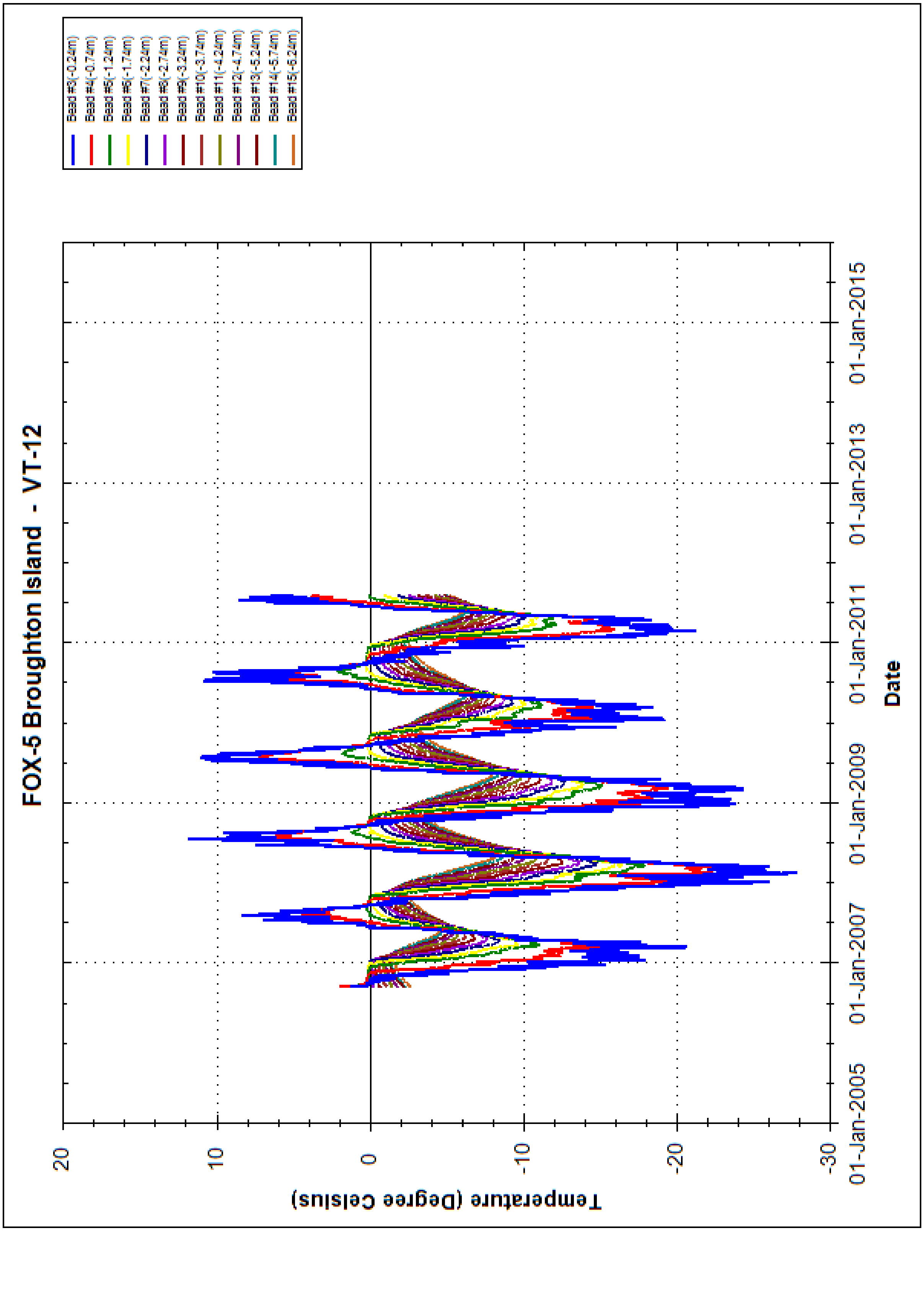
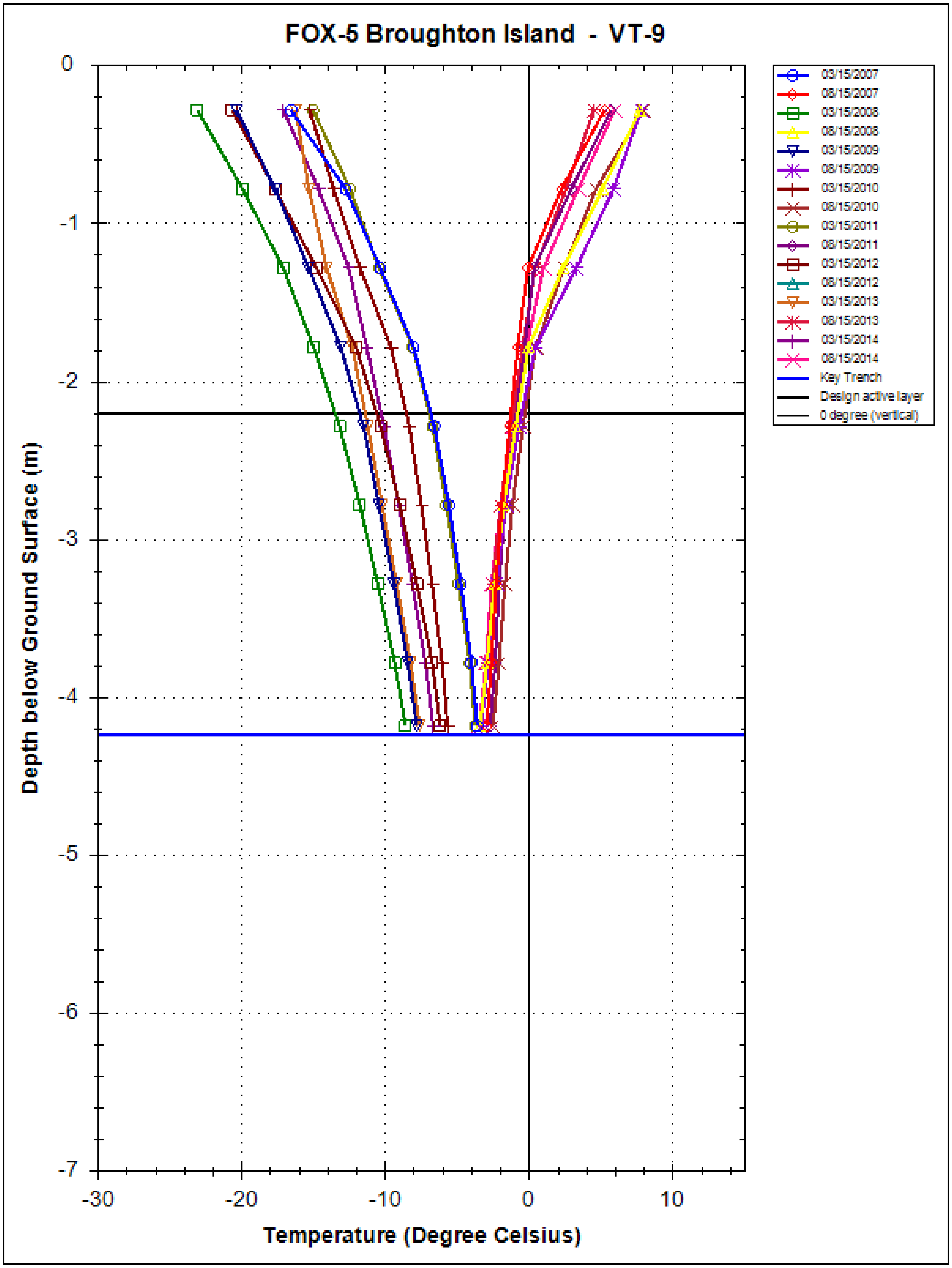
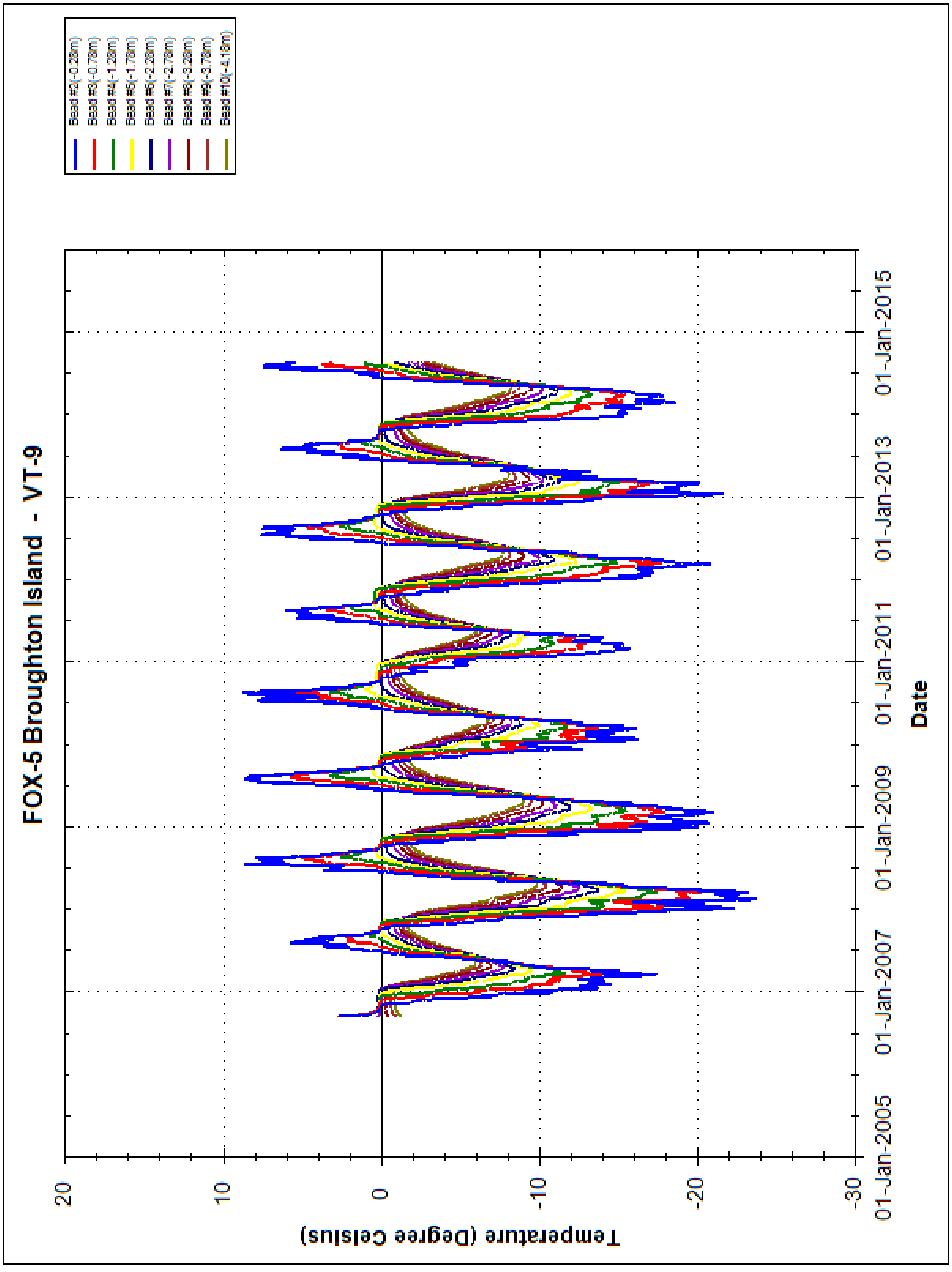


THERMAL MONITORING ANNUAL DATA ANALYSIS



THERMAL MONITORING ANNUAL DATA ANALYSIS



FOX-5 Broughton Island

Middle Site Tier II DF (Comment by Renata Klassen, Tetra Tech EBA, October 2014)

Four ground temperature cables were installed in the FOX-5 Middle Site Tier II Disposal Facility in 2006 (VT-9 through VT-11). 2014 thermal data is complete except for VT-12.

Maintenance reports were not available when the comments were prepared. The 2014 downloaded data indicate that:

- Dataloggers were read on August 22, 2014.
- VT-12 had bad data.

Tetra Tech EBA records from February 2013 indicate that datalogger batteries for VT-9 through VT-12 expire in July 2013.

New batteries should be installed within 3 years of the last battery install date.

The air temperatures in 2013 had a thawing index of 361°C-days compared to a design mean and 1:100 year thawing index of 245°C-days and 490°C-days, respectively. This indicates that the air temperatures were warmer than the average but colder than the 1:100 thawing index. Climate information was taken from Fox Five weather station.

The mean deepest bead average annual temperature was -5.04°C in 2013 for VT-9 and VT-11. The mean deepest bead average annual temperatures cooled by an average of 1.3°C between 2013 and 2012.

The measured maximum and minimum active layers in 2013 were 2.2 m and 1.9 m, respectively. The average measured active layer of 2.1 m in 2013 was greater than estimated mean active layer of 1.6 m, the estimated 1:100 year active layer of 2.0 m and less than the design active layer of 2.2 m.

The landfill is stabilizing and performing as expected from a thermal perspective.

THERMAL MONITORING ANNUAL DATA ANALYSIS

Site: FOX-5 Broughton Island
Landfill: Upper Site Main Landfill

Design Infomation:

Design Active Layer (m):	-3.30
Mean Active Layer (m):	-2.40
1:100 Year Active Layer (m):	-2.80
Mean Thawing Index (degC Days):	245.00
Mean Freezing Index (degC Days):	4380.00
1:100 Year Thawing Index (degC Days):	490.00

Maximum Active Layer (m):

	VT-1	VT-2	VT-3	VT-4	VT-5	VT-6
2006	NaN	NaN	NaN	NaN	NaN	NaN
2007	-4.42	-4.19	-2.64	-2.22	-4.47	-4.72
2008	-4.29	-4.19	-2.64	-4.19	-2.39	-2.47
2009	-1.53	-2.12	-2.44	-1.94	-2.39	-2.33
2010	-1.69	-2.16	-2.45	-1.96	-2.49	-2.60
2011	-1.32	NaN	-2.45	-1.93	NaN	NaN
2012	NaN	NaN	-2.48	-2.00	NaN	NaN
2013	NaN	-1.80	-1.97	-1.76	-2.36	-2.05
2014	NaN	NaN	NaN	NaN	NaN	NaN

	VT-7	VT-8
2006	NaN	NaN
2007	-4.66	-4.46
2008	-2.26	-2.05
2009	-2.22	-2.01
2010	-2.24	-2.08
2011	-2.15	NaN
2012	-2.34	NaN
2013	-1.99	-1.82
2014	NaN	NaN

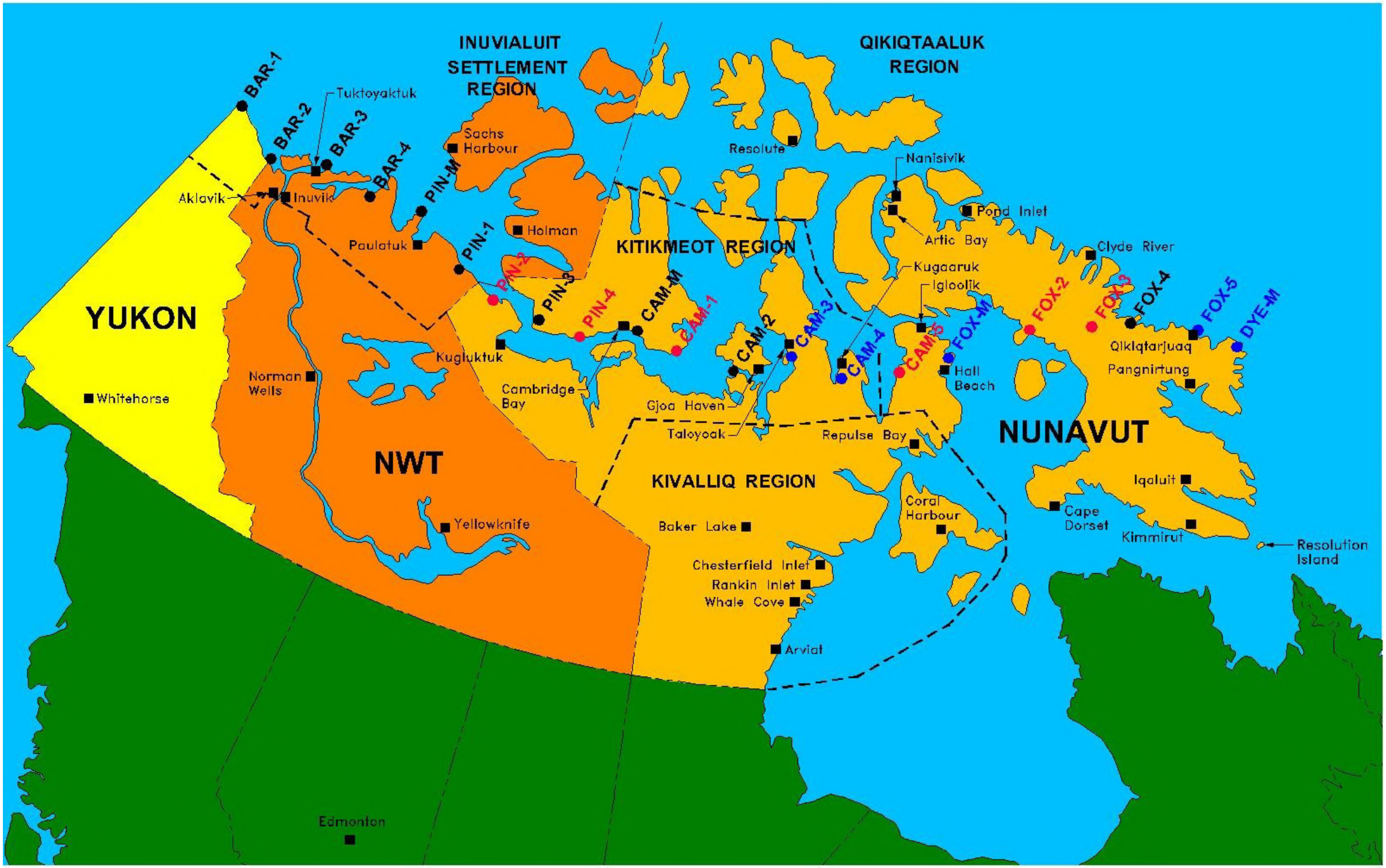
Thawing Index and Freezing Index:

	TI	FI	max AL	min AL	average AL
2006	439.00	3798.00	NaN	NaN	NaN
2007	298.00	3930.00	-4.72	-2.22	-3.97
2008	504.00	4192.00	-4.29	-2.05	-3.06
2009	494.00	4083.00	-2.44	-1.53	-2.12
2010	484.00	3222.00	-2.60	-1.69	-2.21
2011	374.00	3668.00	-2.45	-1.32	-1.96
2012	616.00	4104.00	-2.48	-2.00	-2.27
2013	361.00	3660.00	-2.36	-1.76	-1.96
2014	437.00	4172.00	NaN	NaN	NaN

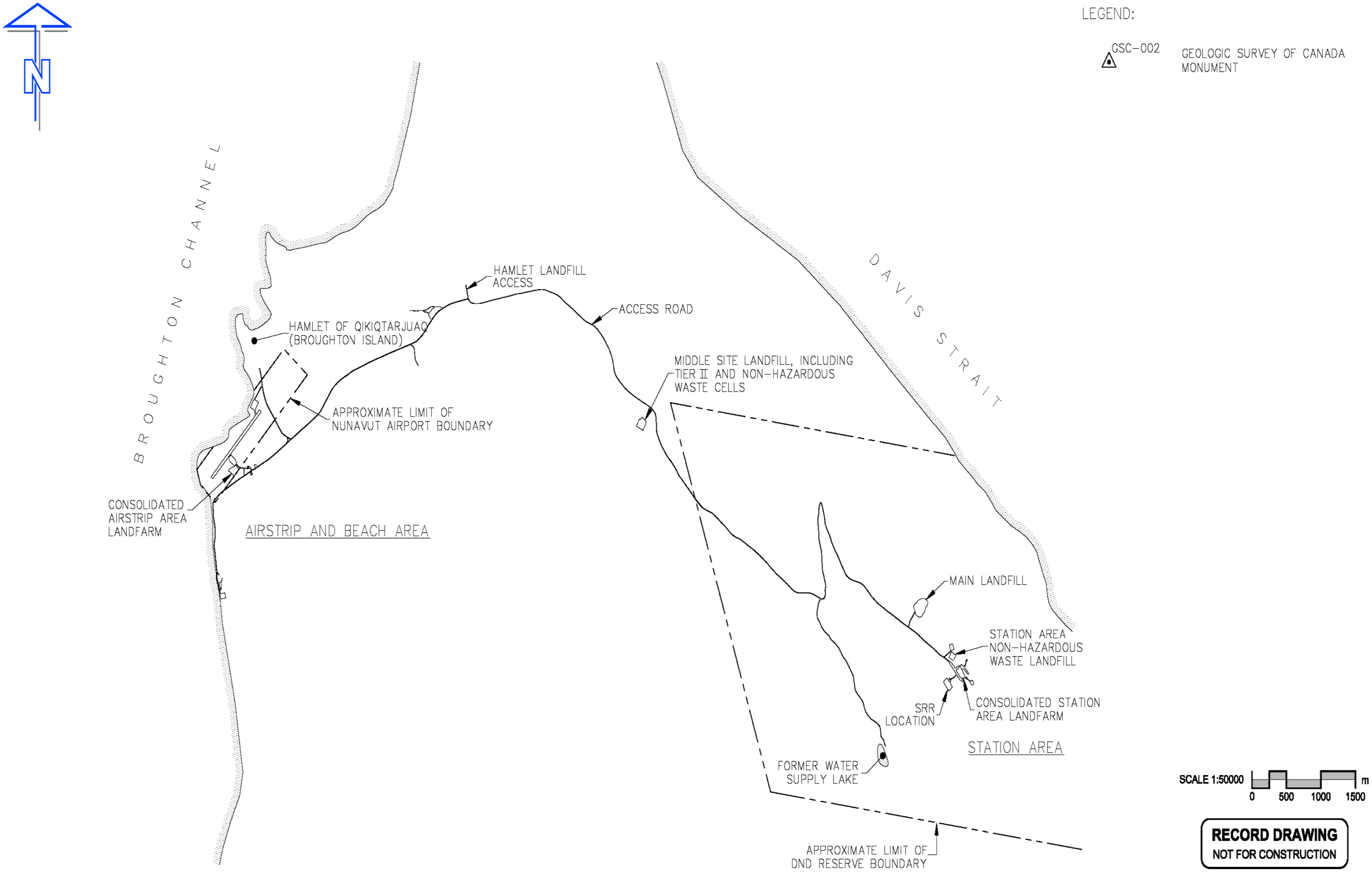
Deepest Bead Average Temperature:

	VT-1	VT-2	VT-3	VT-4	VT-5	VT-6
2006	NaN	NaN	NaN	NaN	NaN	NaN
2007	0.00	0.12	0.19	0.08	-0.10	-0.18
2008	-1.29	-0.51	-0.42	-0.93	-3.54	-2.99
2009	-2.75	-2.93	-1.86	-2.81	-4.46	-3.92
2010	-2.84	-2.87	-2.18	-2.71	-3.41	-3.31
2011	NaN	NaN	-1.17	-1.70	NaN	NaN
2012	NaN	NaN	-1.43	-1.91	NaN	NaN
2013	NaN	-3.41	-3.01	-3.54	-4.46	-3.87
2014	NaN	NaN	NaN	NaN	NaN	NaN

	VT-7	VT-8	AVG
2006	NaN	NaN	NaN
2007	-0.22	-0.43	-0.07
2008	-3.99	-3.86	-2.19
2009	-4.55	-4.48	-3.47
2010	-3.67	-3.53	-3.06
2011	-2.41	NaN	-1.76
2012	-3.36	NaN	-2.23
2013	-4.92	-4.39	-3.94
2014	NaN	NaN	NaN



INUVIALUIT SETTLEMENT REGION
QIKIQTAALUK REGION
KITIKMEOT REGION
KIVALLIQ REGION
NUNAVUT
YUKON
NWT
BAR-1
BAR-2
BAR-3
BAR-4
PIN-M
PIN-1
PIN-2
PIN-3
PIN-4
CAM-M
CAM-1
CAM-2
CAM-3
CAM-4
CAM-5
FOX-M
FOX-2
FOX-3
FOX-4
FOX-5
DYE-M
Tuktoyaktuk
Aklavik
Inuvik
Sachs Harbour
Paulatuk
Holman
Kugluktuk
Cambridge Bay
Norman Wells
Whitehorse
Yellowknife
Edmonton
Resolute
Nanisivik
Artic Bay
Pond Inlet
Clyde River
Kugaaruk
Igloolik
Hall Beach
Gjoa Haven
Taloyoak
Repulse Bay
Baker Lake
Chesterfield Inlet
Rankin Inlet
Whale Cove
Arviat
Coral Harbour
Qikiqtarjuaq
Pangnirtung
Iqaluit
Cape Dorset
Kimmirut
Resolution Island



RECORD DRAWING
NOT FOR CONSTRUCTION

GEOLOGIC SURVEY OF CANADA MONUMENT				
NO.	COORDINATES		ELEV.	DESCRIPTION
	NORTHING	EASTING		
–	–	–	–	–
–	–	–	–	–
–	–	–	–	–

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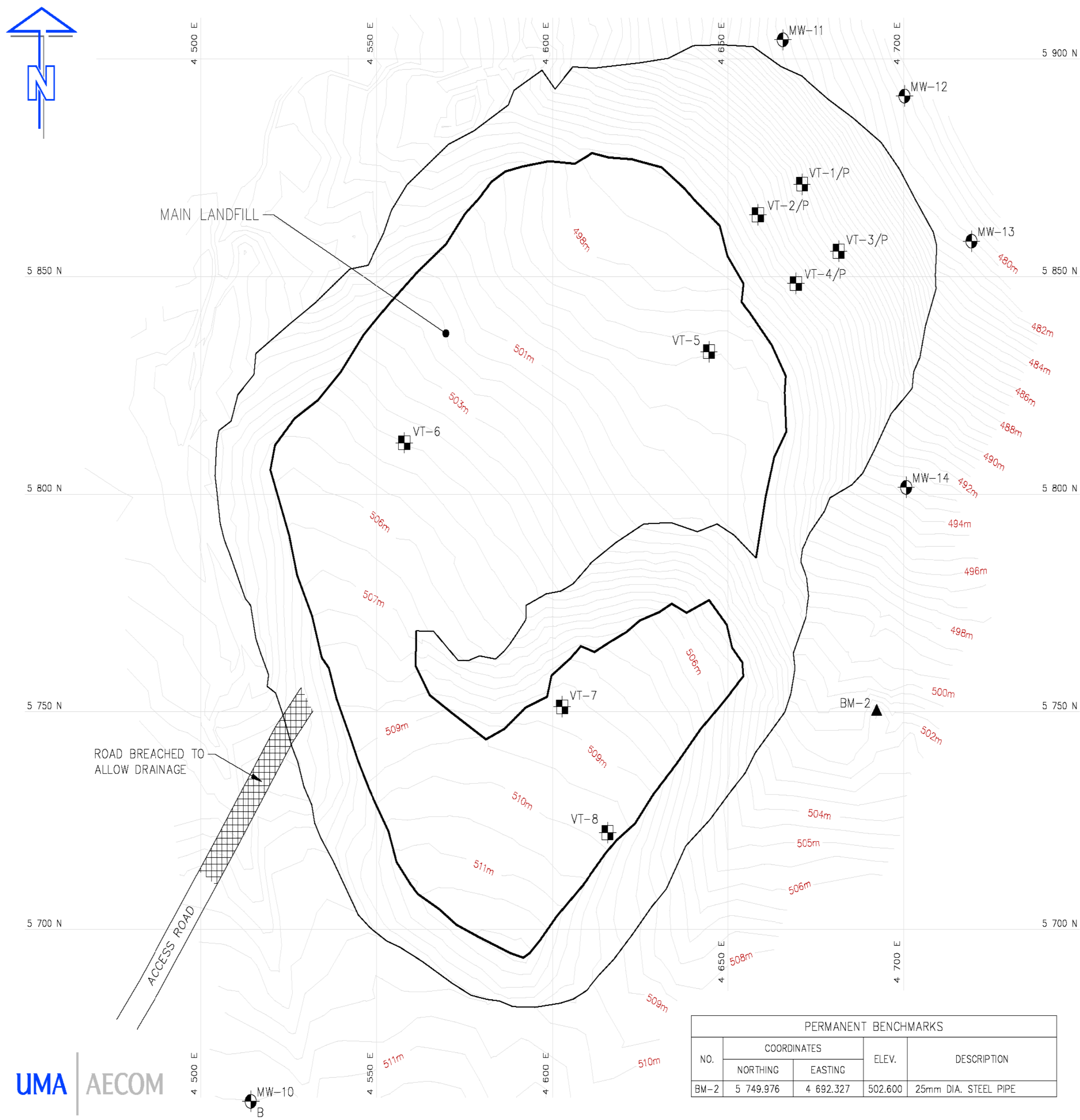
DEW LINE CLEAN UP
LANDFILL MONITORING PLAN

FOX-5 BROUGHTON ISLAND

OVERALL SITE PLAN

FIGURE FOX-5.1

DOS NAME: F5-RD01.DWG DMJ - 07/02/26



LEGEND:

TBM4	TEMPORARY BENCHMARK
BM-1	PERMANENT BENCHMARK
101	COORDINATE POINT
	MONITORING SOIL SAMPLE LOCATION
	BASELINE SOIL SAMPLE LOCATION
	VERTICAL THERMISTOR LOCATION
+1749	MONITORING WELL LOCATION

MAGNETIC GRADIENT (gammas/m)

COORDINATE POINTS (AS-BUILT) VERTICAL THERMISTORS

NO.	NORTHING	EASTING
VT-1	5 871.2	4 671.1
VT-2	5 864.2	4 658.5
VT-3	5 855.8	4 681.5
VT-4	5 848.4	4 669.3
VT-5	5 832.7	4 644.6
VT-6	5 811.8	4 557.9
VT-7	5 751.2	4 602.7
VT-8	5 722.2	4 615.8

COORDINATE POINTS (AS BUILT) MONITORING WELLS

NO.	NORTHING	EASTING	ELEV.
MW-10	5 660.5	4 514.2	–
MW-11	5 904.4	4 665.5	–
MW-12	5 891.5	4 700.2	–
MW-13	5 858.1	4 719.3	–
MW-14	5 801.6	4 700.7	–

PERMANENT BENCHMARKS

NO.	COORDINATES		ELEV.	DESCRIPTION
	NORTHING	EASTING		
BM-2	5 749.976	4 692.327	502.600	25mm DIA. STEEL PIPE

SCALE 1:1000 0 10 20 30 m

RECORD DRAWING
NOT FOR CONSTRUCTION

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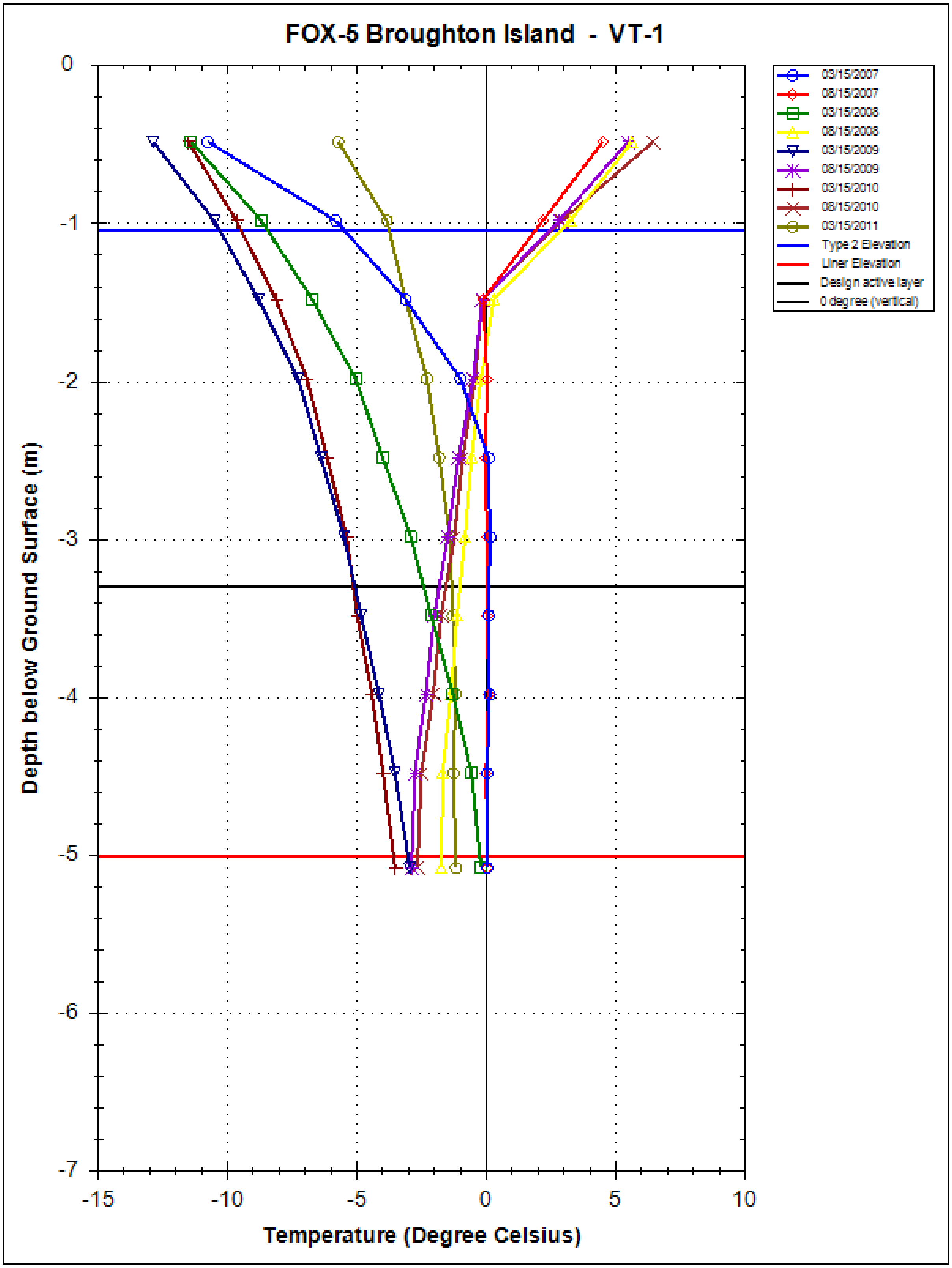
DEW LINE CLEAN UP
LANDFILL MONITORING PLAN

FOX-5 BROUGHTON ISLAND

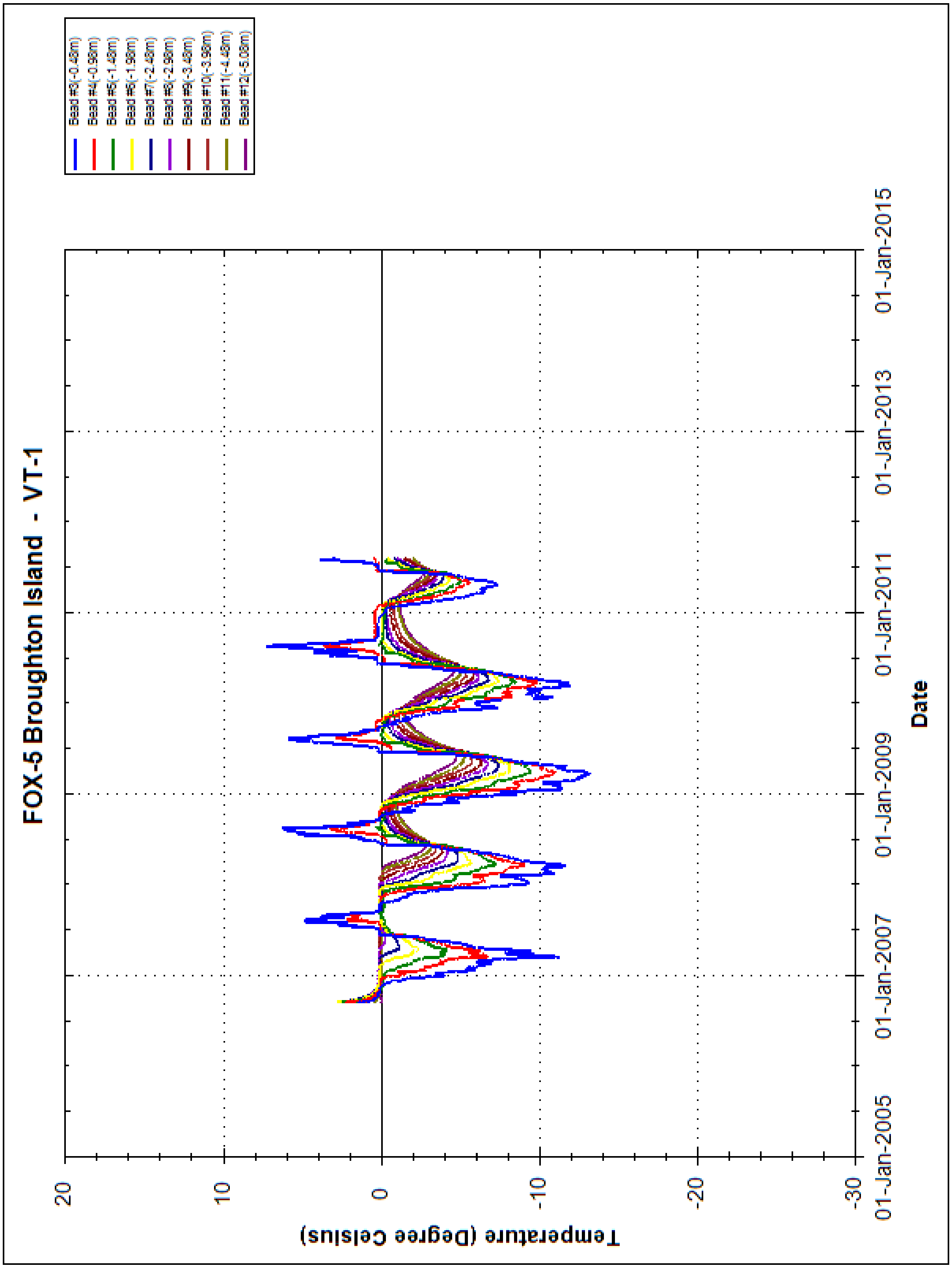
MAIN LANDFILL
FIGURE FOX-5.3

DOS NAME: F5-RD03.DWG DMJ – 07/02/26

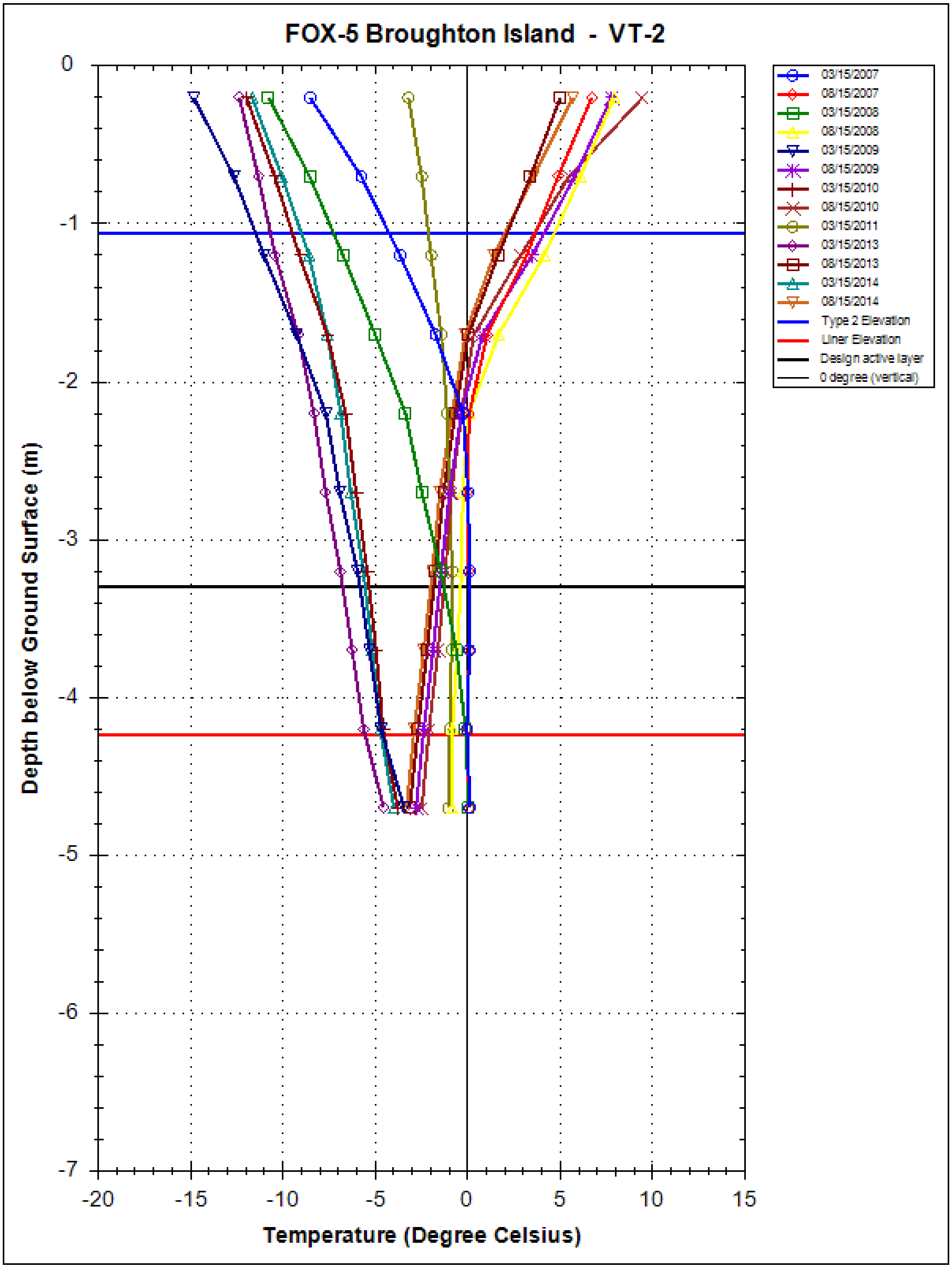
THERMAL MONITORING ANNUAL DATA ANALYSIS



THERMAL MONITORING ANNUAL DATA ANALYSIS



THERMAL MONITORING ANNUAL DATA ANALYSIS



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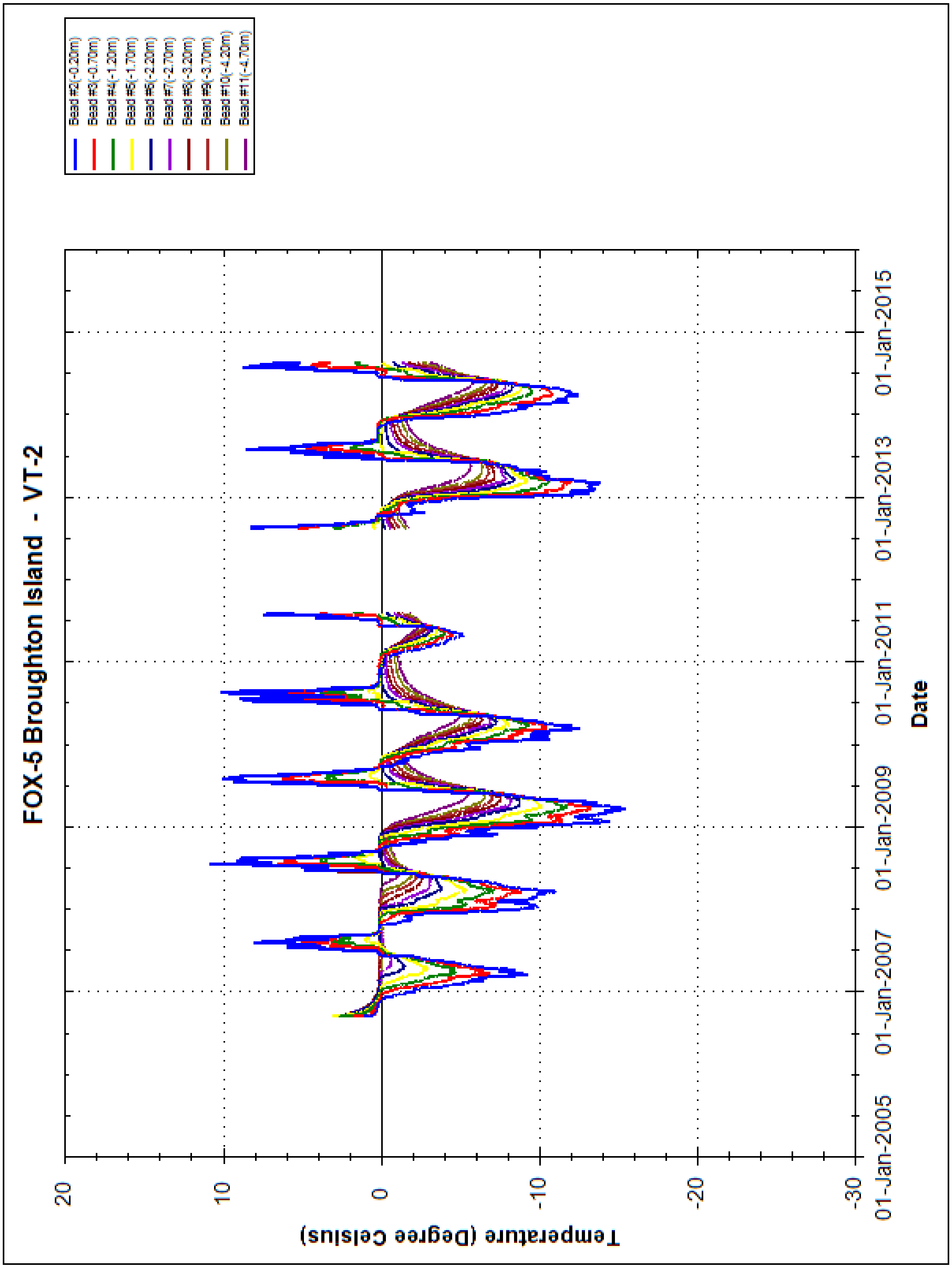

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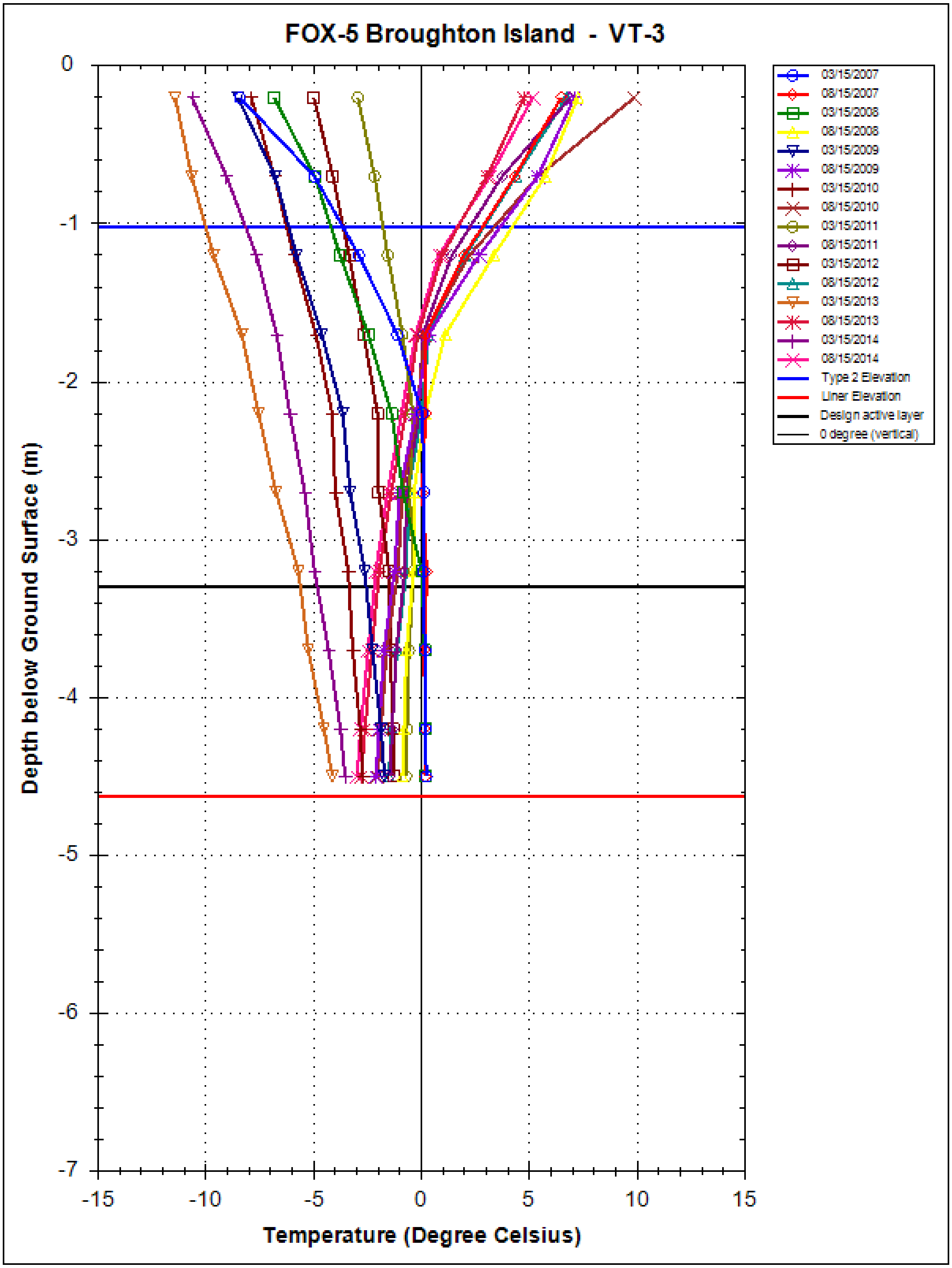

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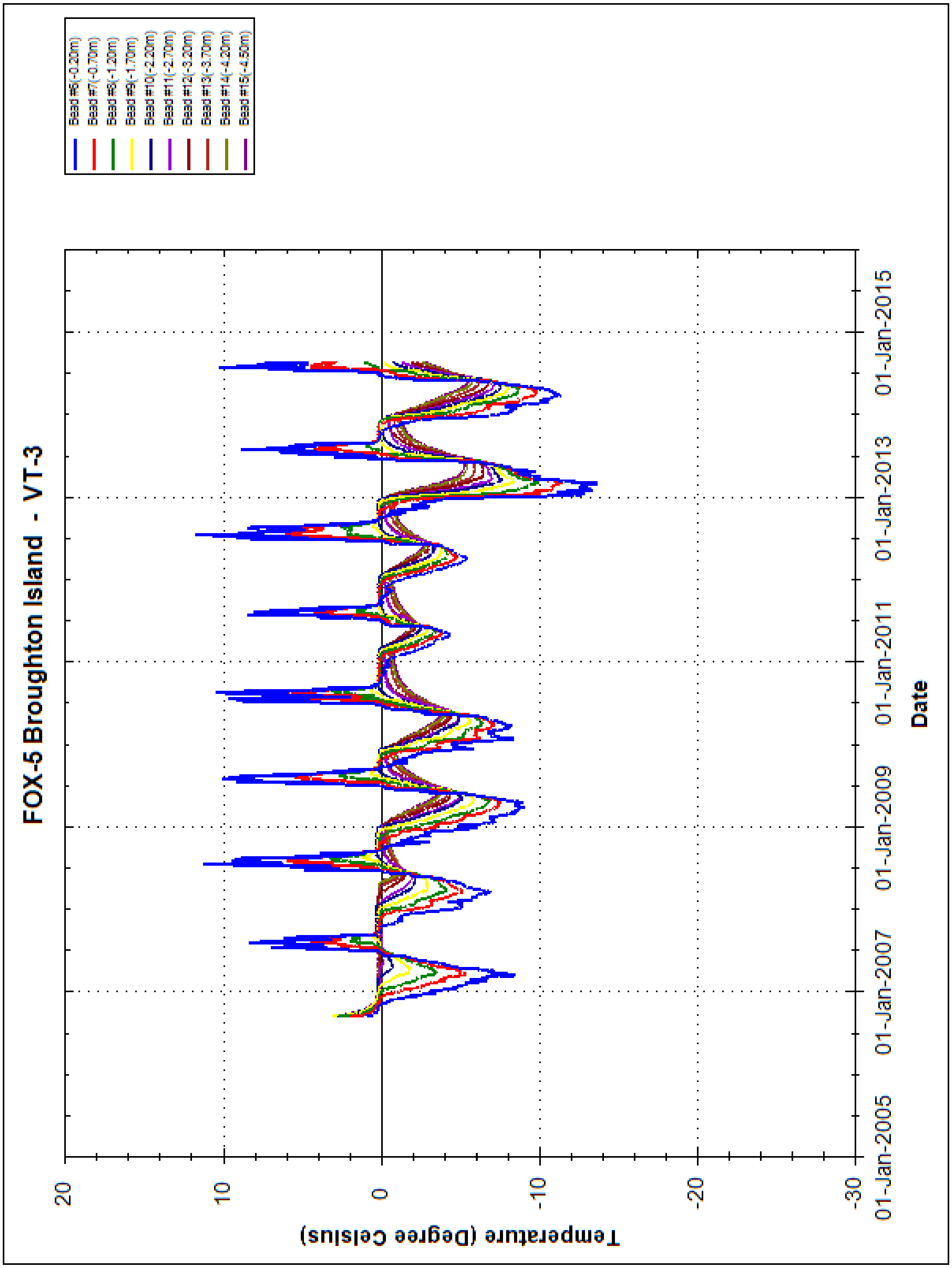

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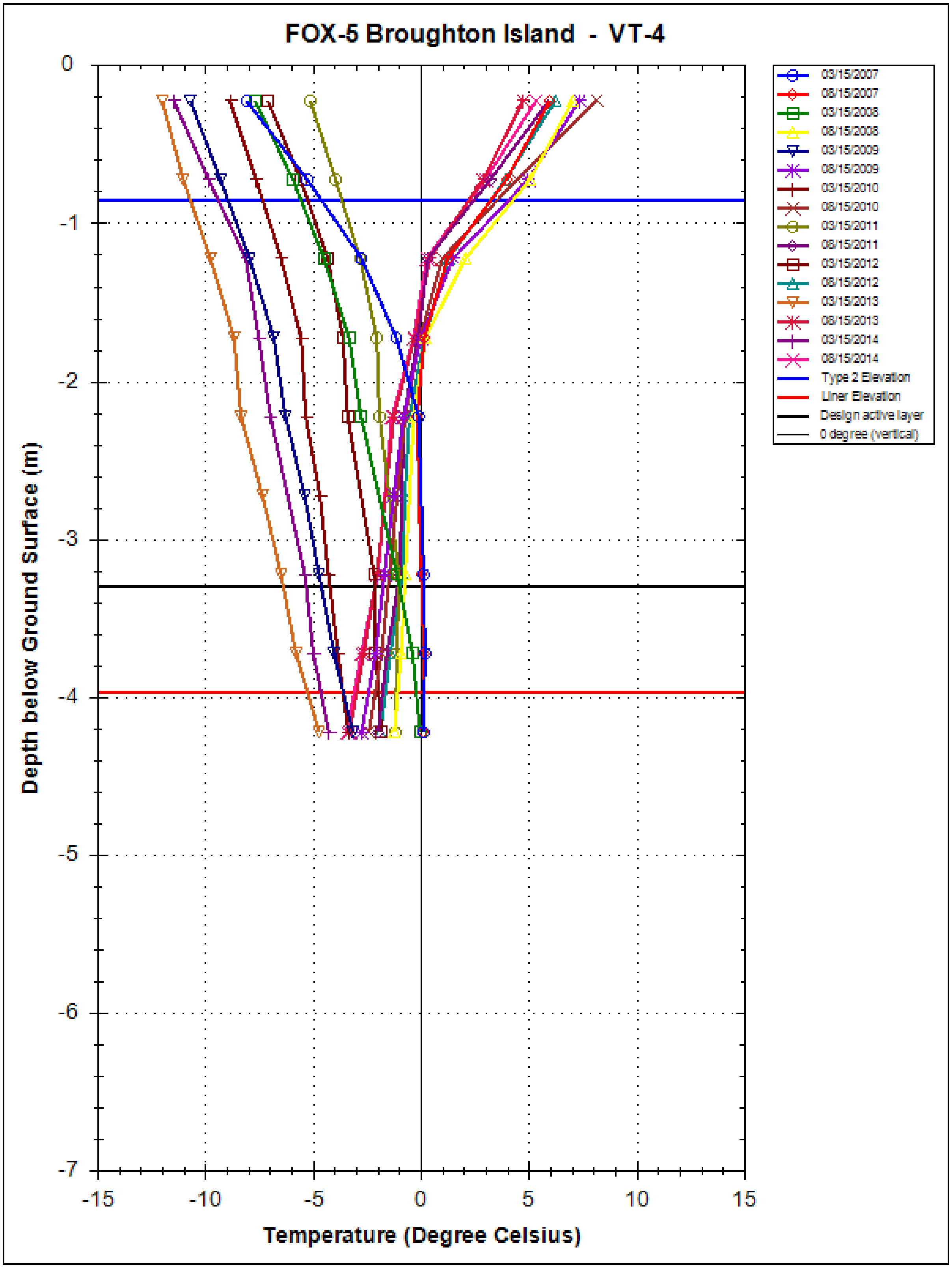

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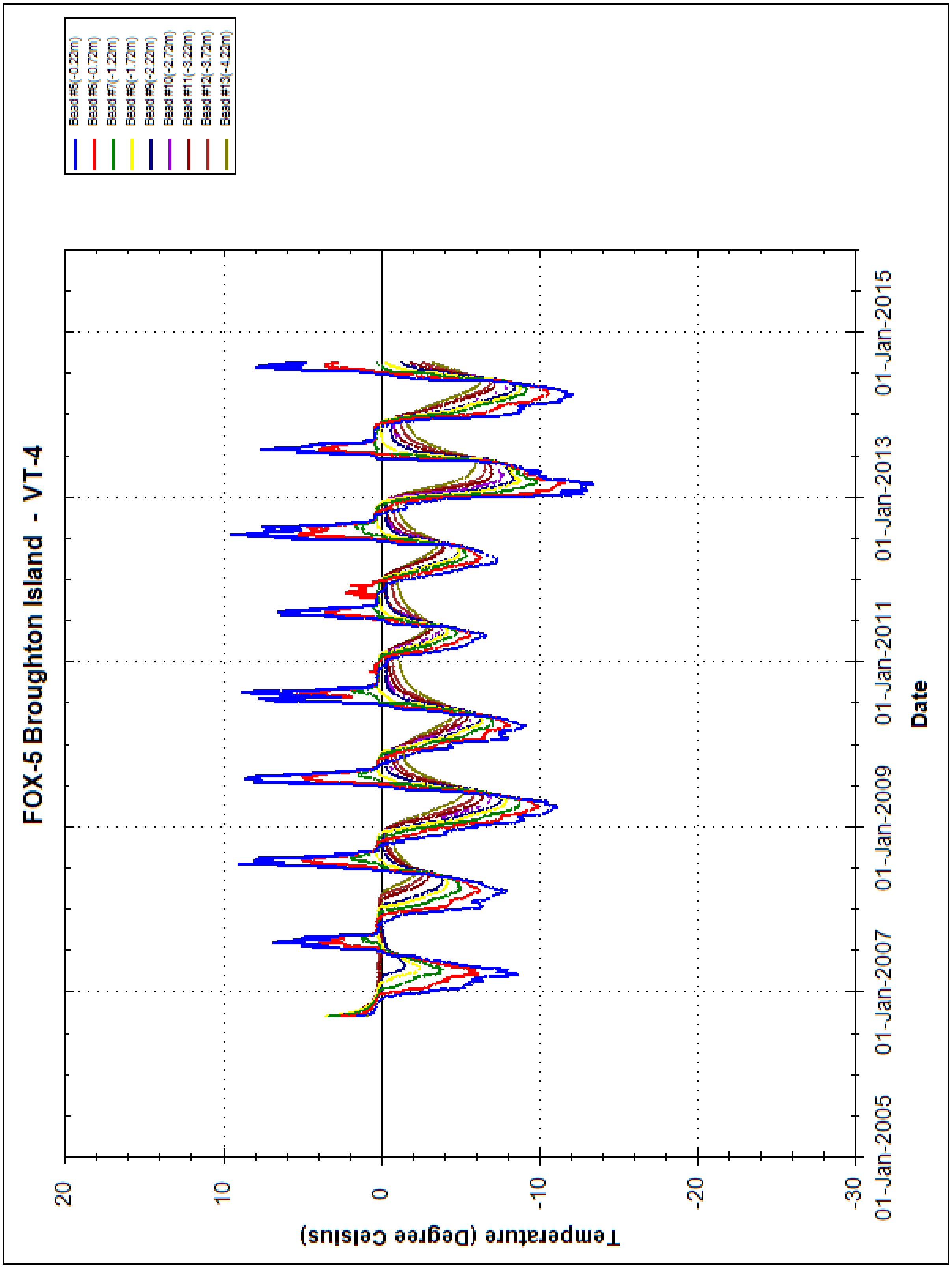

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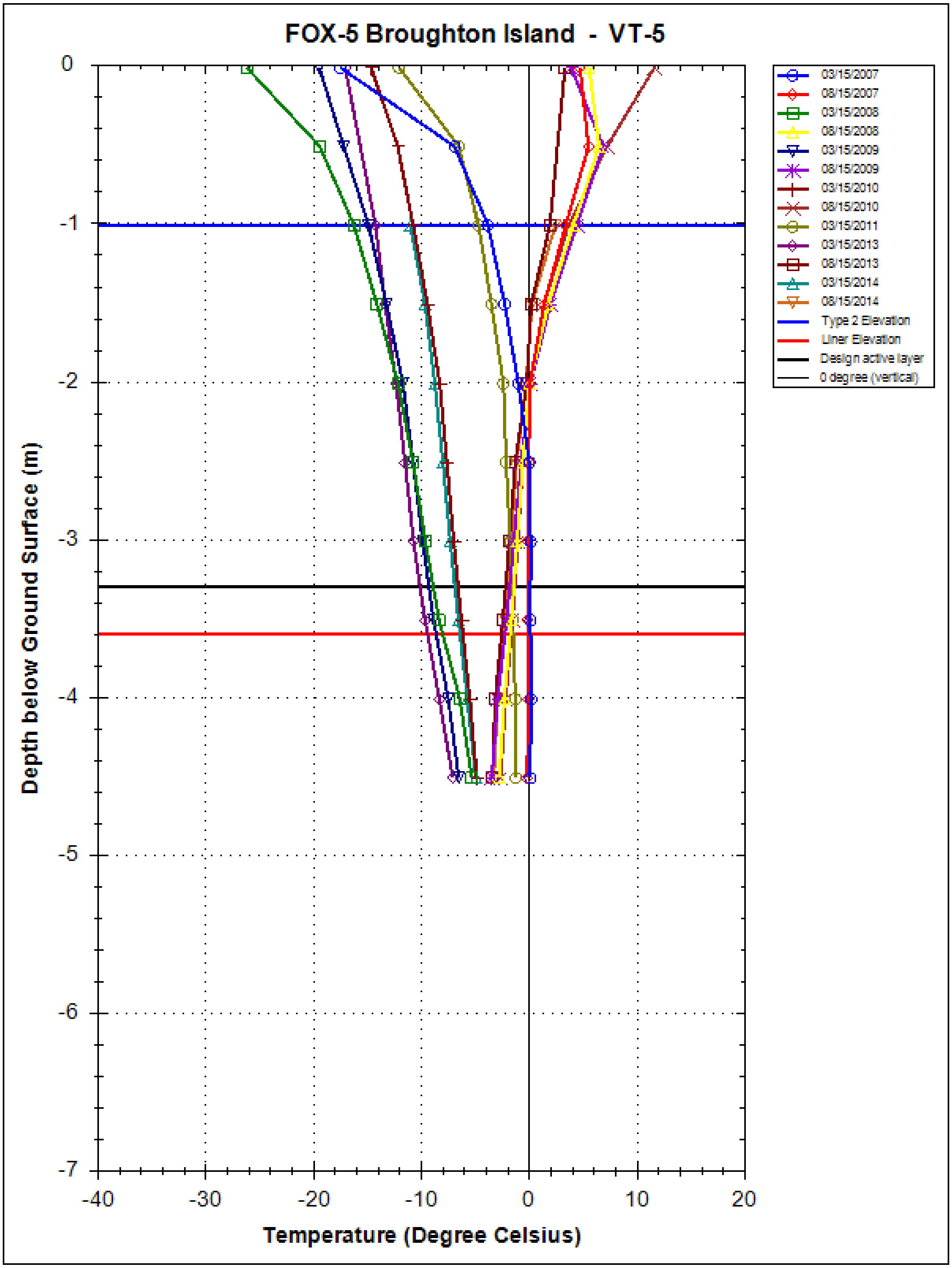

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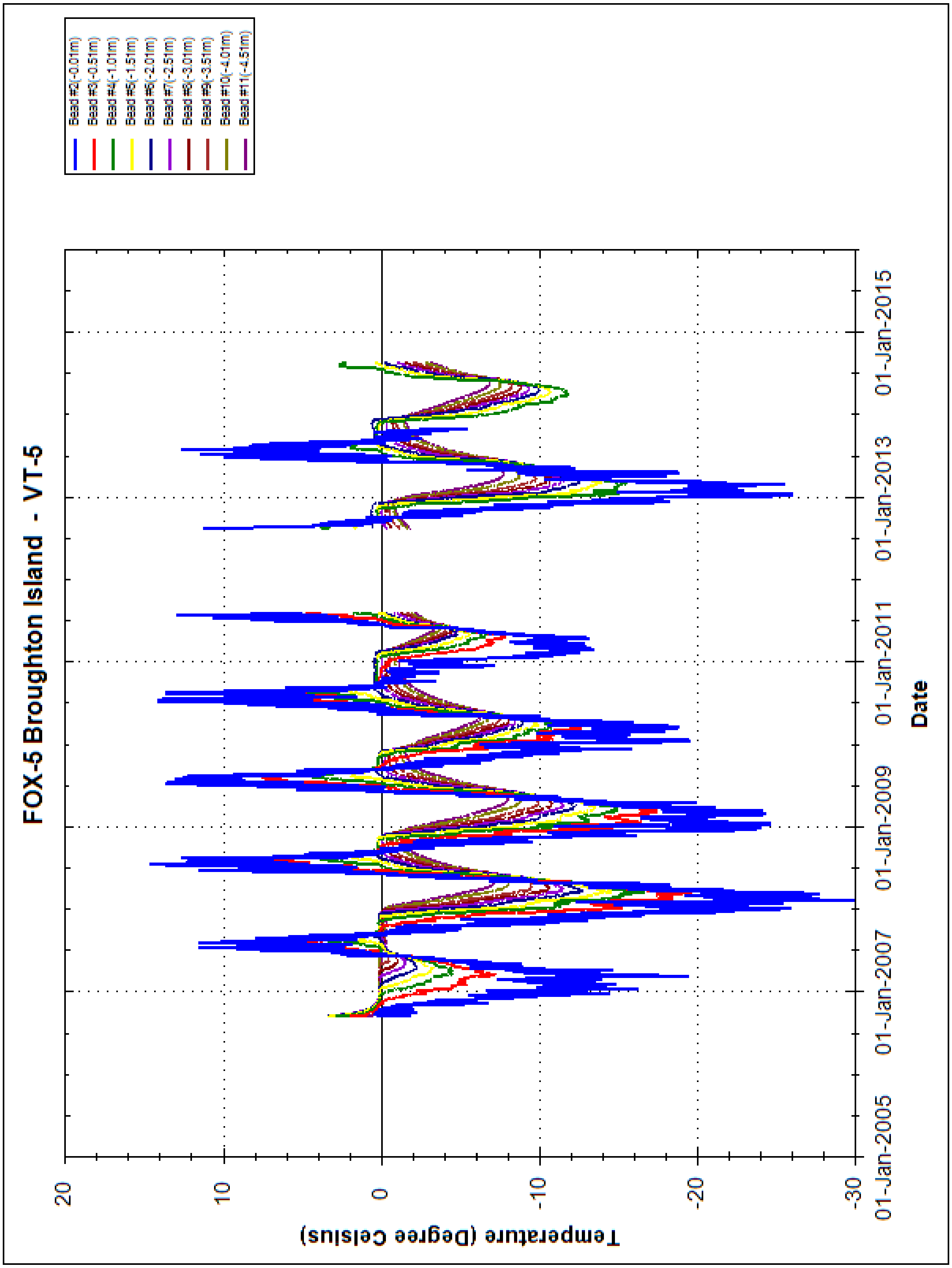

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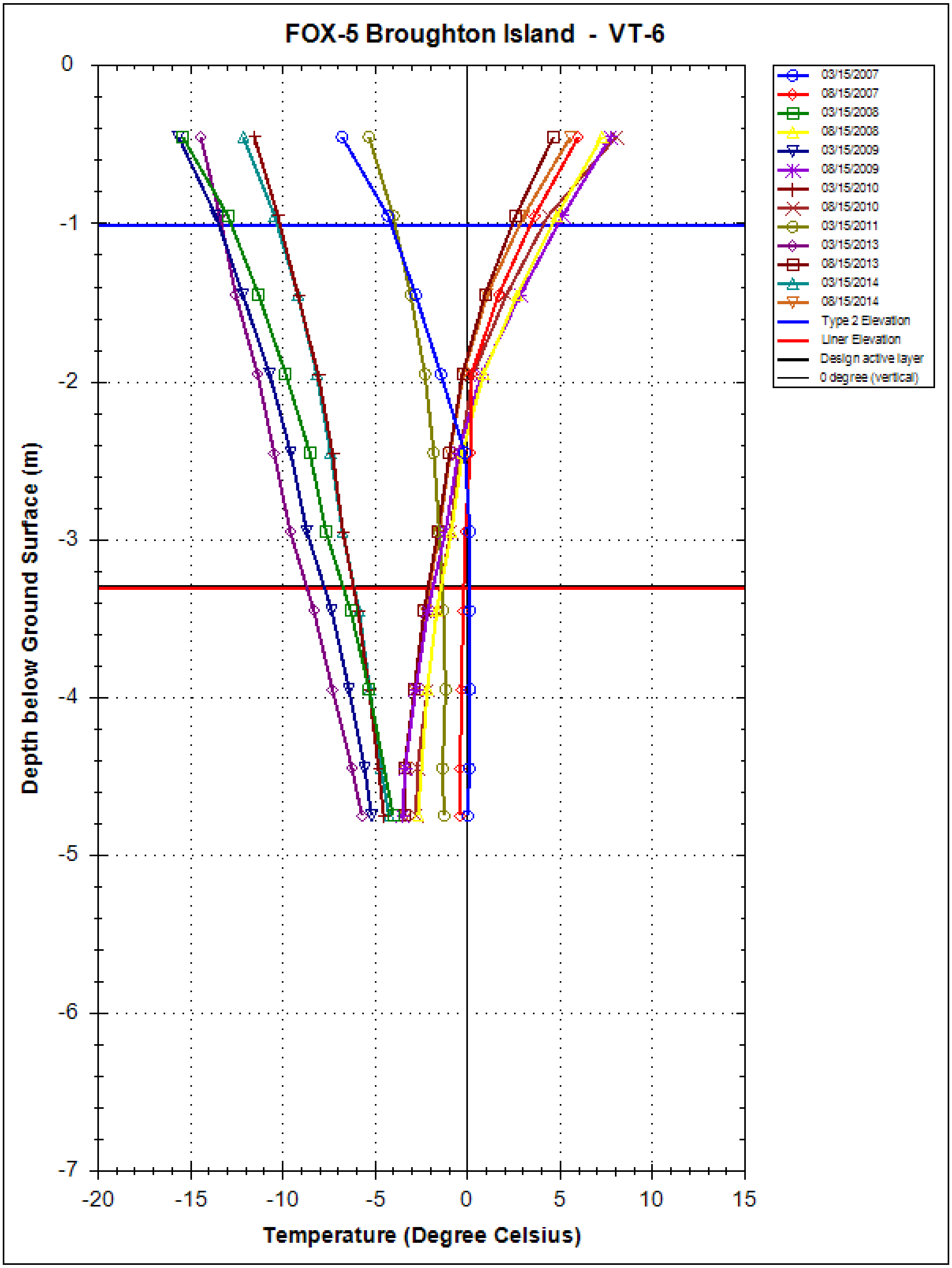

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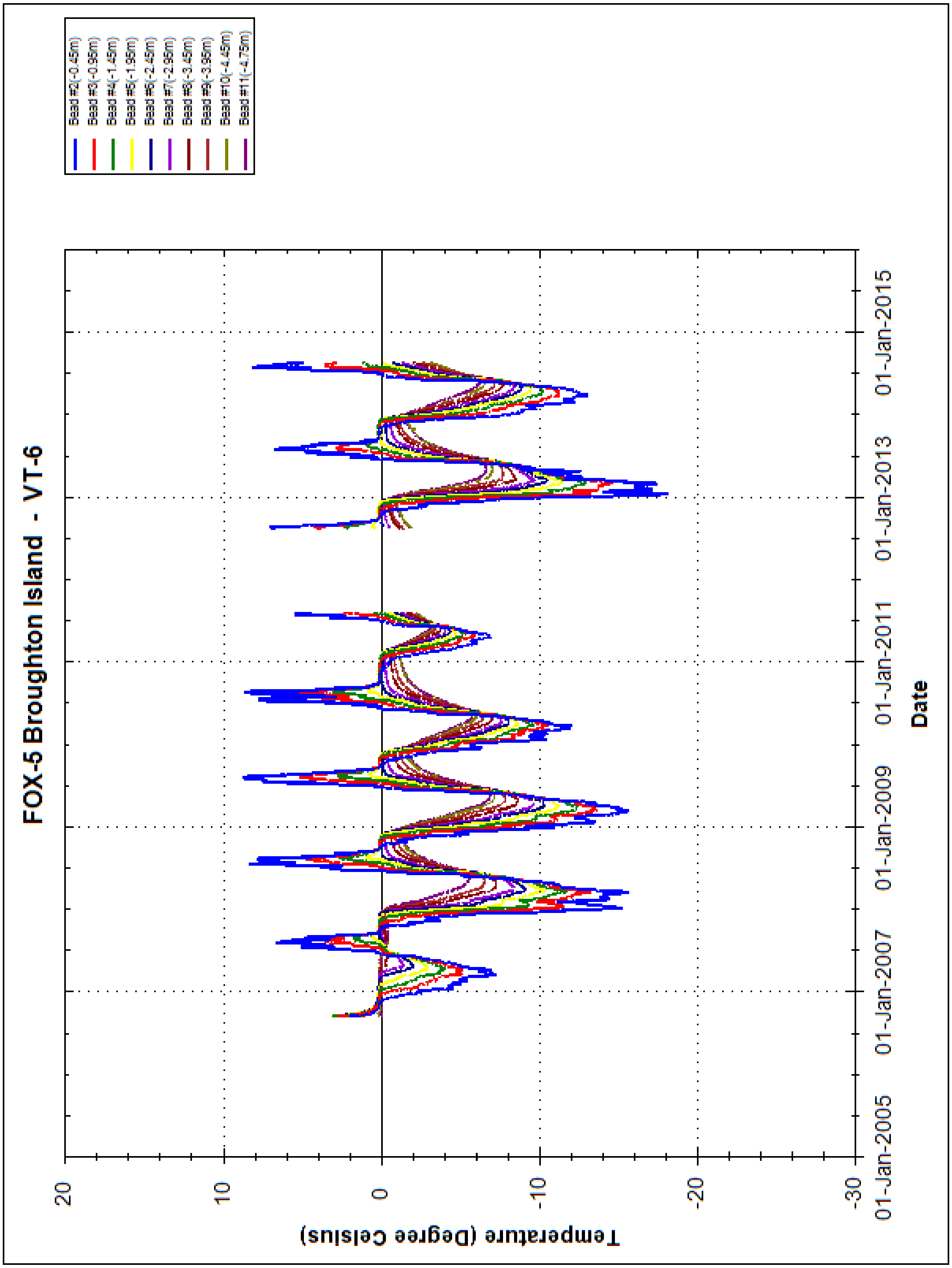

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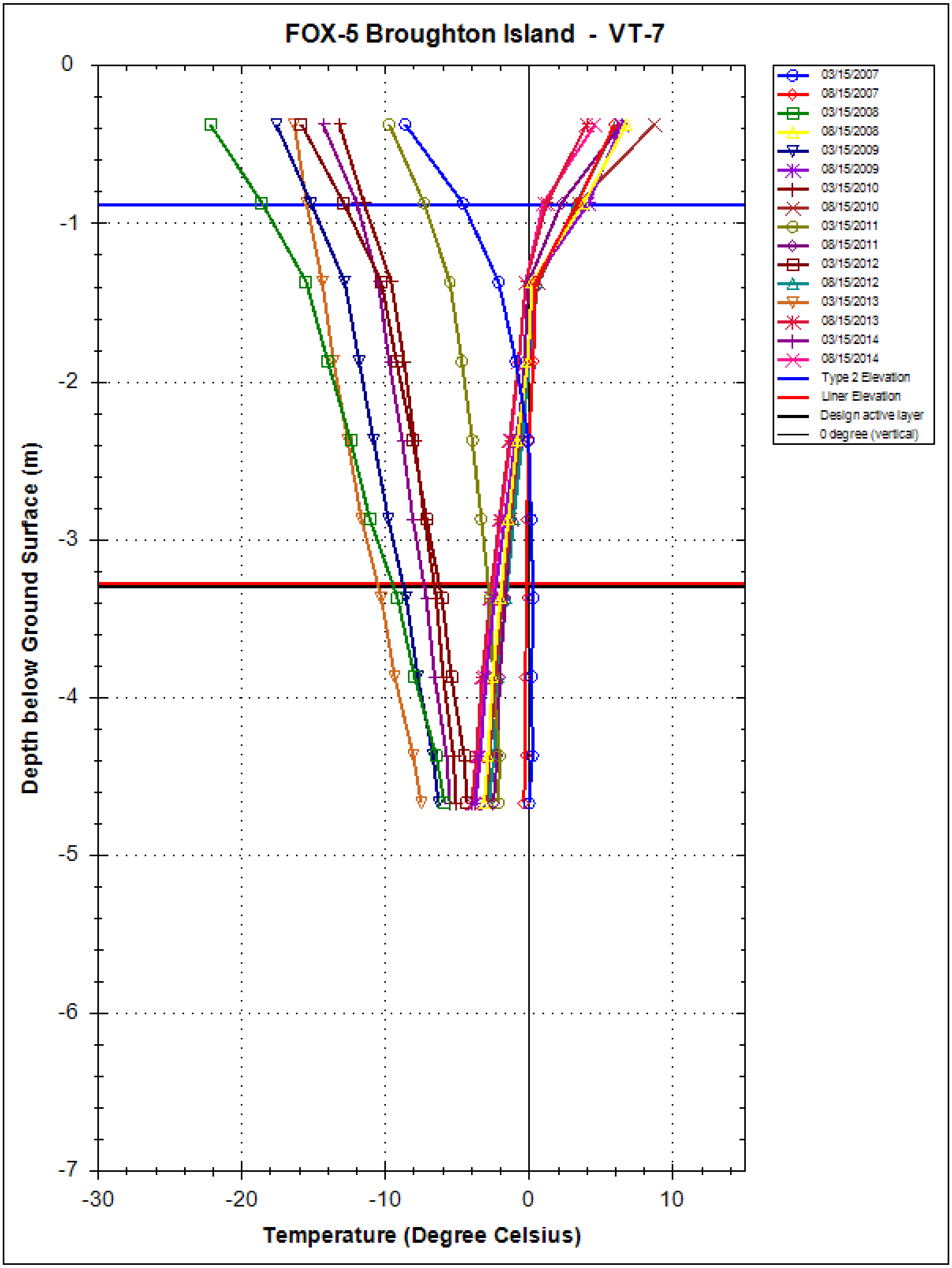

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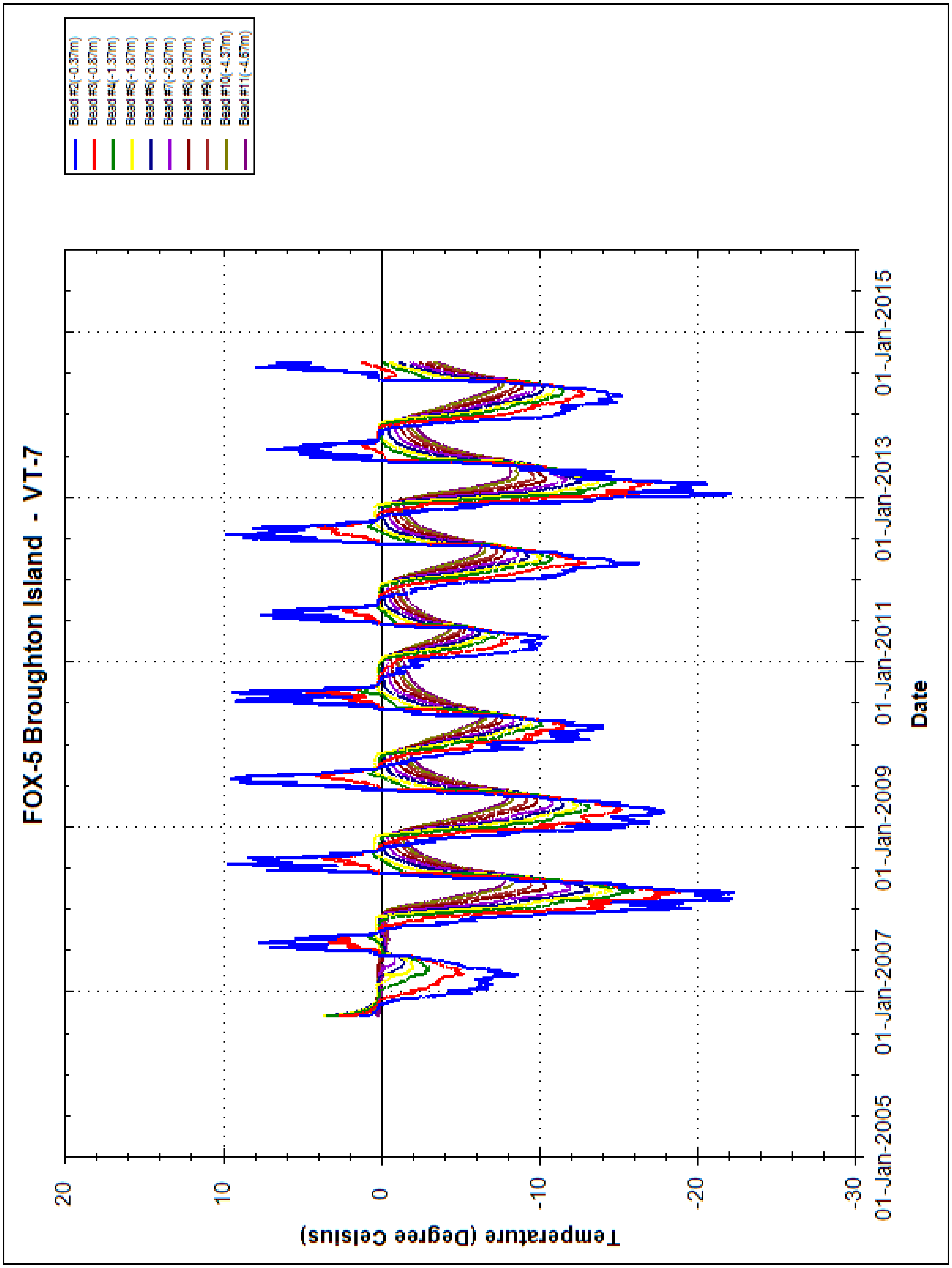

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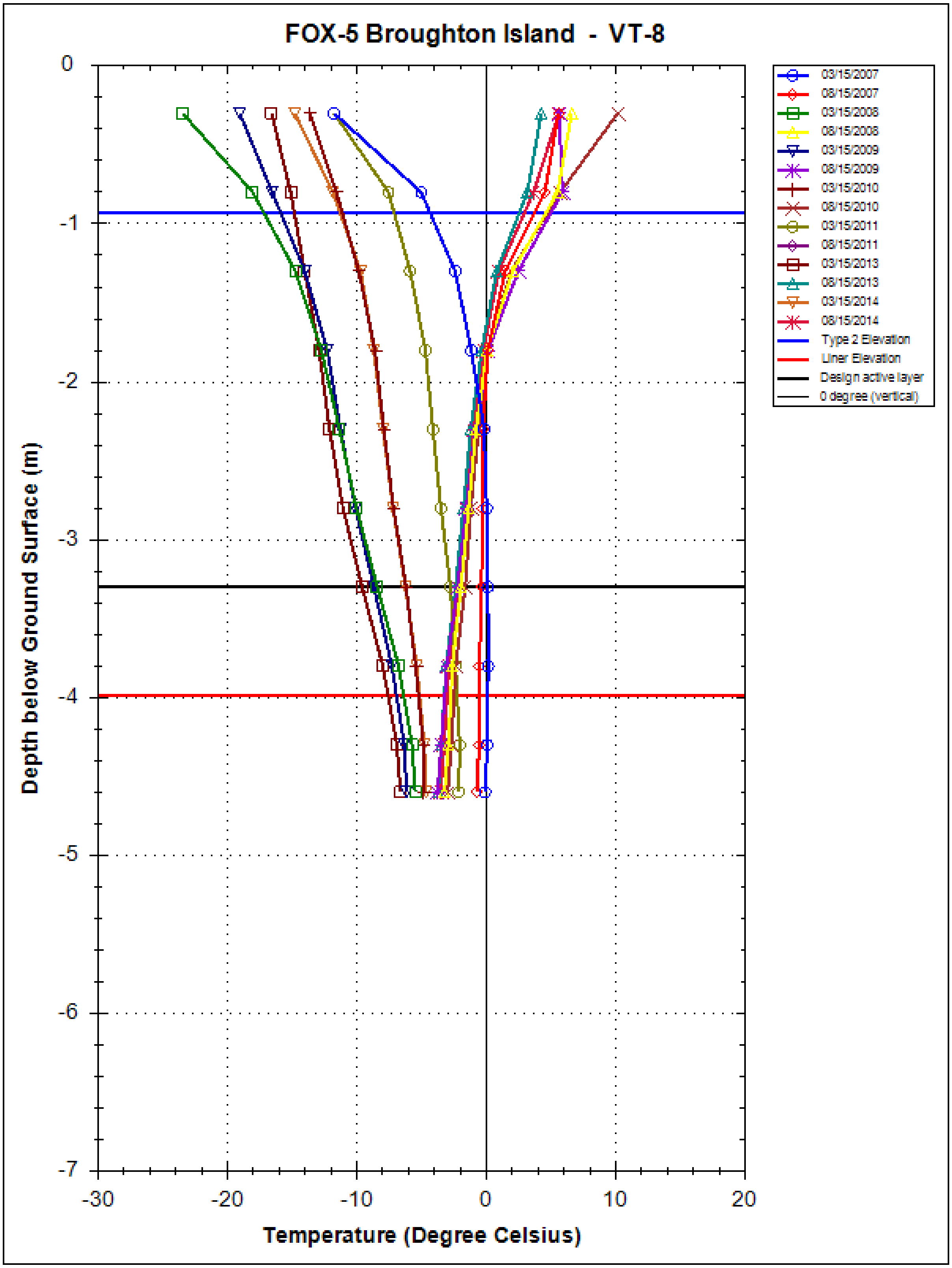
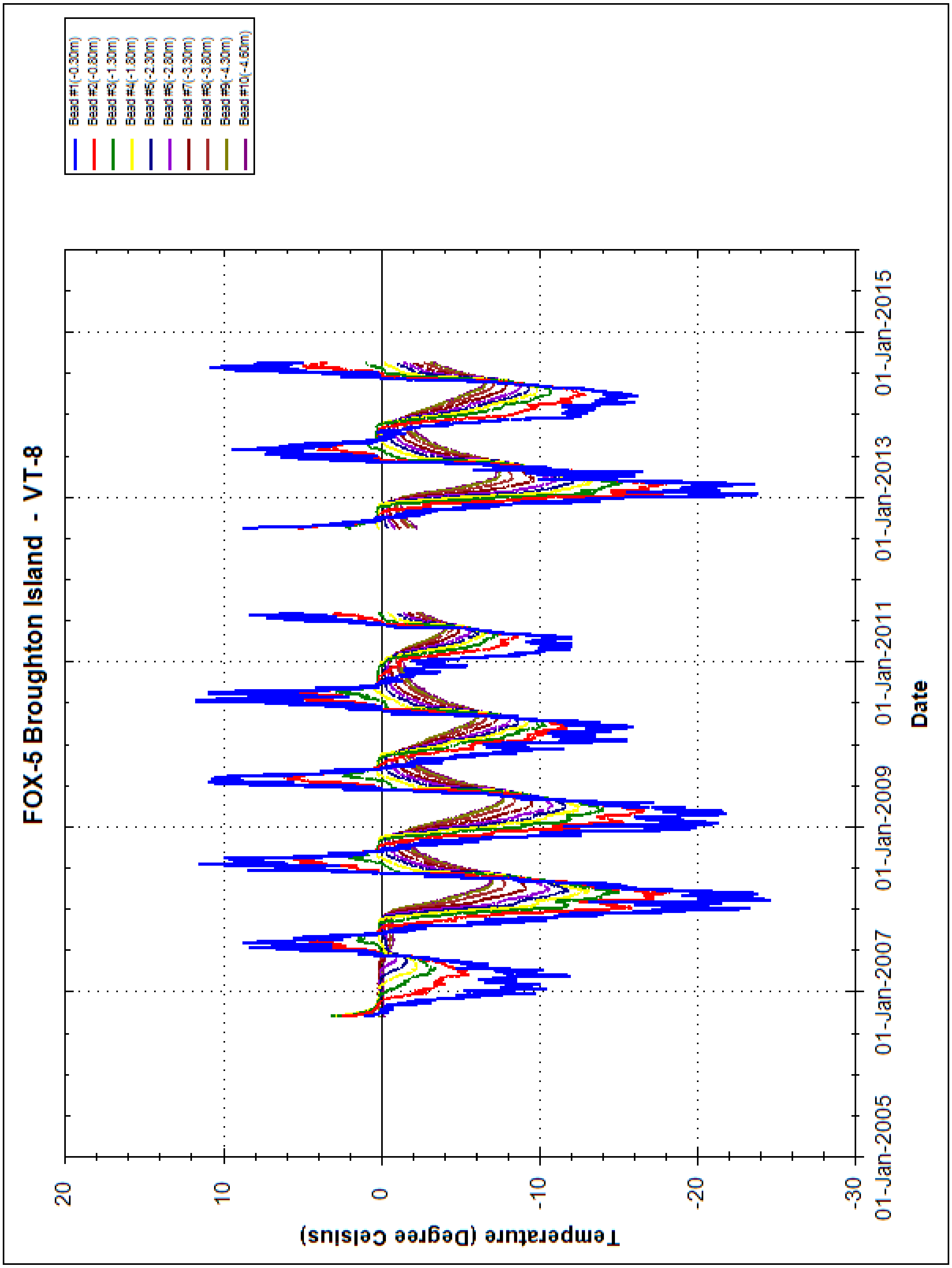


THERMAL MONITORING ANNUAL DATA ANALYSIS



FOX-5 Broughton Island

Upper Site Main Landfill (Comment by Renata Klassen, Tetra Tech EBA, October 2014)

Eight ground temperature cables were installed in the Upper Site Main Landfill in 2006 (VT-1 through VT-8). 2014 thermal data from VT-2 through VT-8 is complete.

Maintenance reports were not available when the comments were prepared. The 2014 downloaded data indicate that:

- Dataloggers were read on August 22, 2014.
- VT-1 had bad data.

Tetra Tech EBA records from February 2013 indicate that:

- Datalogger batteries were replaced in 2012 for VT-1, VT-2, VT-3, VT-5, VT-6 and VT-8.
- Datalogger batteries expiry date for VT-4 and VT-7 is July 2013.

New batteries should be installed within 3 years of the last battery install date.

The air temperatures in 2013 had a thawing index of 361°C-days compared to a design mean and 1:100 year thawing index of 245°C-days and 490°C -days, respectively. This indicates that the air temperatures were warmer than the average but colder than the 1:100 thawing index. Climate information was taken from Fox Five weather station.

The mean deepest bead average annual temperature was -3.9°C in 2013 for VT-2 through VT-8. The mean deepest bead average annual temperature was -3.8°C in 2013 for VT-3, VT-4 and VT-7. The mean deepest bead average temperature from the same beads in 2012 was -2.2°C. The mean deepest bead average annual temperatures cooled by an average of 1.6C° between 2012 and 2013.

The measured maximum and minimum active layers in 2013 were 2.4 m and 1.8 m, respectively. The average measured active layer of 2.0 m in 2013 was less than estimated mean active layer of 2.4 m, the estimated 1:100 year active layer of 2.8 m and the design active layer of 3.3 m.

The landfill is stabilizing and performing as expected from a thermal perspective.

APPENDIX E

HISTORICAL CHEMISTRY SUMMARY TABLES (SOIL)

FOX-5 Qikiqtarjuaq (Broughton Island) Tier II Disposal Facility and Non-Hazardous Waste Landfill (Middle Site)- Summary of 2007-2024 Soil Analytical Data

Sample ID	Location	Year	Monitoring Year	Monitoring Phase	Depth (cm)	Cu [mg/kg]	Ni [mg/kg]	Co* [mg/kg]	Cd* [mg/kg]	Pb* [mg/kg]	Zn [mg/kg]	Cr* [mg/kg]	As [mg/kg]	Hg* [mg/kg]	Total PCB* [mg/kg]	F1 C_6-C_{10} [mg/kg]	F2 C_{10}-C_{16} [mg/kg]	F3 C_{16}-C_{34} [mg/kg]	Modified TPH^ - Total C6-C34 [mg/kg]	TPH Identity % Fuel Oil	TPH Identity % Lube Oil
Background Data - Average						10	5.3	4.0	1.0	5.0	46	19	1.93	0.5	0.001				5.0		
Baseline Data - Average						**7.6**	**5.2**	**5.0**	**1.0**	**10.0**	**31.7**	**20.0**	**2.0**	**0.1**	**0.003**				**10**		
Baseline Data - Standard Deviation						1.4	1.8	1.6	0.0	0.0	6.2	0.0	0.6	0.00	0.000				7.1		
Baseline Data Average + 3xSD						12	11	9.8	1.0	10	50	20	3.8	0.1	0.003				31		
Detection Limit						<3.0	<5.0	<5.0	<1.0	<10	<15	<20	<1	<0.1	<0.003				<10		
**** If baseline average was below the detection limit, the average has been modified to match the detection limit value.***																					
DEW Line Cleanup Tier I Criteria										*200*					*1*						
DEW Line Cleanup Tier II Criteria & DLCU Hydrocarbon Action Level						*100*	*100*	*50*	*5*	*500*	*500*	*250*	*30*	*2*	*5*				*2500*		
Monitoring Data																					
Upgradient																					
	MW-5 Surface															**TPH Sum will appear when F1, F2 and F3 fraction results are entered**					
24720/21	MW 5	2007	1	Phase I	10	5.5	<5.0	<5.0	<1.0	<10	30	<20	1.2	<0.10	<0.0030	<10	11	110	126		
210808-146-FOX-5	MW 5	2008	2	Phase I	0-10	16	13	8.0	<0.5	10	63	29	2.7	<0.1	<0.02	<20	<20	<20	30		
F509-5WA	MW 5	2009	3	Phase I	0-15	10	18	9.0	<0.5	8.0	47	37	3.6	<0.1	<0.02	<20	<20	<20	30		
F510-5WA	MW 5	2010	4	Phase I	0-15	10	15	4.0	<0.5	6.0	40	30	1.0	<0.1	<0.02	<10	<10	<20	20		
12-19560	MW-5	2012	6	Phase I	0-10	5.3	4.4	2.4	<0.5	5.6	24	10	1.8	<0.010	<0.020	<5.0	<10	<50	33		
F5-MID-MW-5-S	MW-5	2014	8	Phase II	0-15	8.1	6.7	4.5	<0.10	7	41	17	<1.0	<0.050	<0.010	<10	<10	<50	35		
		2016	10	Phase II															#N/A		
		2021	15	Phase II															#N/A		
		2031	25	Phase II															#N/A		
				Phase III															#N/A		
																			#N/A		
																			#N/A		
																			#N/A		
	MW-5 Depth																				
24722	MW 5	2007	1	Phase I	40	6.4	6.2	6.2	<1.0	<10	37	<20	<1.0	<0.10	<0.0030	<10	5.3	26	36		
210808-147-FOX-5	MW 5	2008	2	Phase I	40-50	16	17	7	<0.5	11	59	41	2.5	<0.1	<0.02	<20	<20	<20	30		
F509-5WB	MW 5	2009	3	Phase I	40-50	8.0	17	8.0	<0.5	7.0	41	34	2.7	<0.1	<0.02	<20	<20	<20	30		
F510-5WB	MW 5	2010	4	Phase I	40-50	11	12	5.0	<0.5	8.0	45	26	1.0	<0.1	<0.02	<10	<10	<20	20		
12-19562	MW-5	2012	6	Phase I	40-50	7.1	6.1	3.3	<0.5	7.1	33	14	2.4	<0.010	<0.020	<5.0	<10	<50	33		
F5-MID-MW-5-D	MW-5	2014	8	Phase II	40-50	9.7	8.1	4.9	<0.10	8	45	19	1.1	<0.050	<0.010	<10	<10	<50	35		
		2016	10	Phase II															#N/A		
		2021	15	Phase II															#N/A		
		2031	25	Phase II															#N/A		
				Phase III															#N/A		
																			#N/A		
																			#N/A		
																			#N/A		

FOX-5 Qikiqtarjuaq (Broughton Island) Tier II Disposal Facility and Non-Hazardous Waste Landfill (Middle Site)- Summary of 2007-2024 Soil Analytical Data

Sample ID	Location	Year	Monitoring Year	Monitoring Phase	Depth (cm)	Cu [mg/kg]	Ni [mg/kg]	Co* [mg/kg]	Cd* [mg/kg]	Pb* [mg/kg]	Zn [mg/kg]	Cr* [mg/kg]	As [mg/kg]	Hg* [mg/kg]	Total PCB* [mg/kg]	F1 C_6-C_{10} [mg/kg]	F2 C_{10}-C_{16} [mg/kg]	F3 C_{16}-C_{34} [mg/kg]	Modified TPH^ - Total C6-C34 [mg/kg]	TPH Identity % Fuel Oil	TPH Identity % Lube Oil
Downgradient																					
	MW-6 Surface																				
24726	MW 6	2007	1	Phase I	10	5.1	**5.3**	**<u>5.0</u>**	<1.0	<10	29	<20	<1.0	<0.10	<0.0030	<10	4.2	34	**<u>43</u>**		
210808-143-FOX-5	MW 6	2008	2	Phase I	0-10	**<u>11</u>**	**<u>11</u>**	**<u>6.0</u>**	<0.5	<u>8.0</u>	**44**	**<u>23</u>**	1.7	<0.1	<0.02	<20	<20	30	**<u>50</u>**		
F509-6WA	MW 6	2009	3	Phase I	0-15	5.0	**<u>8</u>**	**<u>5.0</u>**	<0.5	<u>6.0</u>	27	12	**<u>2.9</u>**	<0.1	<0.02	<20	<20	<20	**<u>30</u>**		
F510-6WA	MW 6	2010	4	Phase I	0-15	**8.0**	**<u>11</u>**	<u>4.0</u>	<0.5	<u>7.0</u>	**38**	**<u>22</u>**	1.0	<0.1	<0.02	<10	<10	<20	**<u>20</u>**		
12-19564	MW 6	2012	6	Phase I	0-10	7.3	**<u>6.5</u>**	3.6	<0.5	<u>7.6</u>	**35**	14	**<u>2.2</u>**	<0.010	<0.020	<5.0	<10	<50	**<u>33</u>**		
F5-MID-MW-6-S	MW-6	2014	8	Phase II	0-15	7.2	**5.3**	3.55	<0.5	<u>6.1</u>	**32.5**	13	1	<0.10	<0.05	<10	<10	<50	**<u>35</u>**		
		2016	10	Phase II															#N/A		
		2021	15	Phase II															#N/A		
		2031	25	Phase II															#N/A		
				Phase III															#N/A		
																			#N/A		
																			#N/A		
																			#N/A		
	MW-6 Depth																				
24728	MW 6	2007	1	Phase I	40	5.7	**<u>5.4</u>**	**<u>5.3</u>**	<1.0	<10	**32**	<20	<1.0	<0.10	<0.0030	<10	<4.0	29	**<u>36</u>**		
210808-144-FOX-5	MW 6	2008	2	Phase I	40-50	**10**	**<u>12</u>**	**<u>6</u>**	<0.5	<u>8</u>	**<u>52</u>**	**<u>26</u>**	**<u>2.1</u>**	<0.1	<0.02	<20	<20	<20	**<u>30</u>**		
F509-6WB	MW 6	2009	3	Phase I	40-50	**8.0**	**<u>12</u>**	**<u>7.0</u>**	<0.5	<u>7.0</u>	**40**	<u>19</u>	**<u>2.9</u>**	<0.1	<0.02	<20	<20	<20	**<u>30</u>**		
F510-6WB	MW 6	2010	4	Phase I	40-50	**8.0**	**<u>12</u>**	<u>4.0</u>	<0.5	<u>7.0</u>	**37**	**<u>23</u>**	<1	<0.1	<0.02	<10	<10	<20	**<u>20</u>**		
12-19566	MW 6	2012	6	Phase I	40-50	6.9	**<u>6.1</u>**	3.3	<0.5	<u>7.9</u>	**34**	14	**<u>2.1</u>**	<0.010	<0.020	<5.0	<10	<50	**<u>33</u>**		
F5-MID-MW-6-D	MW-6	2014	8	Phase II	40-50	**8**	**<u>6.9</u>**	<u>4.4</u>	<0.10	<u>7.6</u>	**40**	16	<1.0	<0.050	<0.010	<10	<10	<50	**<u>35</u>**		
		2016	10	Phase II															#N/A		
		2021	15	Phase II															#N/A		
		2031	25	Phase II															#N/A		
				Phase III															#N/A		
																			#N/A		
																			#N/A		
																			#N/A		
	MW-7 Surface																				
24730/31	MW 7	2007	1	Phase I	10	6.4	**<u>6.0</u>**	**<u>5.0</u>**	<1.0	<10	**35**	<20	<1.0	<0.10	<0.0030	<10	4.1	63	**<u>72</u>**		
210808-139-FOX-5	MW 7	2008	2	Phase I	0-10	**10**	**<u>11</u>**	**<u>5</u>**	<0.5	<u>7</u>	**40**	**<u>22</u>**	<1.0	<0.1	<0.02	<20	<20	<20	**<u>30</u>**		
210808-140-FOX-5	MW 7	2008	2	Phase I	0-10	**<u>11</u>**	**<u>18</u>**	**<u>6</u>**	<0.5	<u>7</u>	**<u>48</u>**	**<u>37</u>**	1.5	<0.1	<0.02	<20	<20	<20	**<u>30</u>**		
F509-7WA	MW 7	2009	3	Phase I	0-15	**8.0**	**<u>22</u>**	**<u>7.0</u>**	<0.5	<u>8.0</u>	**45**	**<u>40</u>**	**<u>3.2</u>**	<0.1	<0.02	<20	<20	<20	**<u>30</u>**		
F510-7WA	MW 7	2010	4	Phase I	0-15	**10**	**<u>17</u>**	**<u>5.0</u>**	<0.5	<u>9.0</u>	**<u>49</u>**	**<u>35</u>**	1.0	<0.1	<0.02	<10	<10	25	**<u>35</u>**		
12-19568	MW 7	2012	6	Phase I	0-10	7.2	**<u>6.1</u>**	3.3	<0.5	<u>7.3</u>	**34**	13	<u>2.0</u>	0.012	<0.020	<5.0	<10	<50	**<u>33</u>**		
F5-MID-MW-7-S	MW-7	2014	8	Phase II	0-15	**10**	**<u>6</u>**	3.7	<0.10	<u>6</u>	**<u>56</u>**	13	<1.0	<0.050	<0.010	<10	<10	<50	**<u>35</u>**		
		2016	10	Phase II															#N/A		
		2021	15	Phase II															#N/A		
		2031	25	Phase II															#N/A		
				Phase III															#N/A		
																			#N/A		
																			#N/A		
																			#N/A		

FOX-5 Qikiqtarjuaq (Broughton Island) Tier II Disposal Facility and Non-Hazardous Waste Landfill (Middle Site)- Summary of 2007-2024 Soil Analytical Data

Sample ID	Location	Year	Monitoring Year	Monitoring Phase	Depth (cm)	Cu [mg/kg]	Ni [mg/kg]	Co* [mg/kg]	Cd* [mg/kg]	Pb* [mg/kg]	Zn [mg/kg]	Cr* [mg/kg]	As [mg/kg]	Hg* [mg/kg]	Total PCB* [mg/kg]	F1 C_6-C_{10} [mg/kg]	F2 C_{10}-C_{16} [mg/kg]	F3 C_{16}-C_{34} [mg/kg]	Modified TPH^ - Total C6-C34 [mg/kg]	TPH Identity % Fuel Oil	TPH Identity % Lube Oil
	MW-7 Depth																				
24732	MW 7	2007	1	Phase I	40	6.9	6.5	5.8	<1.0	<10	42	<20	<1.0	<0.10	<0.0030	<10	8.7	30	44		
210808-141-FOX-5	MW 7	2008	2	Phase I	40-50	12	14	7	<0.5	8.0	57	30	2	<0.1	<0.02	<20	<20	<20	30		
F509-7WB	MW 7	2009	3	Phase I	40-50	9.0	13	8.0	<0.5	7.0	51	23	3.2	<0.1	<0.02	<20	<20	<20	30		
F510-7WB	MW 7	2010	4	Phase I	40-50	11	14	5.0	<0.5	8.0	55	27	1.0	<0.1	<0.02	<10	<10	<20	20		
12-19570	MW 7	2012	6	Phase I	40-50	7.5	6.4	3.5	<0.5	6.7	37	14	1.9	0.012	<0.020	<5.0	<10	<50	33		
F5-MID-MW-7-D	MW-7	2014	8	Phase II	40-50	9.2	7.5	4.6	<0.10	7.6	45	17	<1.0	<0.050	<0.010	<10	<10	<50	35		
		2016	10	Phase II															#N/A		
		2021	15	Phase II															#N/A		
		2031	25	Phase II															#N/A		
				Phase III															#N/A		
																			#N/A		
																			#N/A		
																			#N/A		
	MW-8 Surface																				
24736	MW 8	2007	1	Phase I	10	4.9	<5.0	<5.0	<1.0	<10	26	<20	1.2	<0.10	<0.0030	<10	6.3	47	58		
210808-135-FOX-5	MW 8	2008	2	Phase I	0-10	9.0	7.0	5.0	<0.5	6.0	34	15	3.4	<0.1	<0.02	<20	<20	27	27		
F509-8WA	MW 8	2009	3	Phase I	0-15	8.0	15	7.0	<0.5	6.0	39	30	3.8	<0.1	<0.02	<20	<20	<20	30		
F510-8WA	MW 8	2010	4	Phase I	0-15	8.0	7.0	3.0	<0.5	7.0	33	15	2	<0.1	<0.02	<10	<10	<20	20		
12-19572	MW 8	2012	6	Phase I	0-10	5.9	5.0	2.7	<0.5	5.9	27	11	2.3	0.015	<0.020	<5.0	<10	53	61		
F5-MID-MW-8-S	MW-8	2014	8	Phase II	0-15	7.1	5.1	3	<0.10	6.8	27	12	1	<0.050	<0.010	<10	<10	71	81		
		2016	10	Phase II															#N/A		
		2021	15	Phase II															#N/A		
		2031	25	Phase II															#N/A		
				Phase III															#N/A		
																			#N/A		
																			#N/A		
																			#N/A		
	MW-8 Depth																				
24738	MW 8	2007	1	Phase I	40	4.5	<5.0	<5.0	<1.0	<10	27	<20	<1.0	<0.10	<0.0030	<10	6.0	37	48		
210808-136-FOX-5	MW 8	2008	2	Phase I	40-50	10	11	5.0	<0.5	7.0	35	24	2.7	<0.1	<0.02	<20	<20	<20	30		
F509-8WB	MW 8	2009	3	Phase I	40-50	7.0	15	6.0	<0.5	6.0	34	26	3.2	<0.1	<0.02	<20	<20	<20	30		
F510-8WB	MW 8	2010	4	Phase I	40-50	9.0	13	4.0	<0.5	7.0	38	29	2.0	<0.1	<0.02	<10	<10	<20	20		
12-19574	MW 8	2012	6	Phase I	40-50	5.1	4.5	2.3	<0.5	5.8	24	10	2.4	0.012	<0.020	<5.0	<10	63	71		
F5-MID-MW-8-D	MW-8	2014	8	Phase II	40-50	7	5.9	3.9	<0.10	7.2	33	14	1.1	<0.050	<0.010	<10	<10	<50	35		
		2016	10	Phase II															#N/A		
		2021	15	Phase II															#N/A		
		2031	25	Phase II															#N/A		
				Phase III															#N/A		
																			#N/A		
																			#N/A		
																			#N/A		

FOX-5 Qikiqtarjuaq (Broughton Island) Tier II Disposal Facility and Non-Hazardous Waste Landfill (Middle Site)- Summary of 2007-2024 Soil Analytical Data

Sample ID	Location	Year	Monitoring Year	Monitoring Phase	Depth (cm)	Cu [mg/kg]	Ni [mg/kg]	Co* [mg/kg]	Cd* [mg/kg]	Pb* [mg/kg]	Zn [mg/kg]	Cr* [mg/kg]	As [mg/kg]	Hg* [mg/kg]	Total PCB* [mg/kg]	F1 C_6-C_{10} [mg/kg]	F2 C_{10}-C_{16} [mg/kg]	F3 C_{16}-C_{34} [mg/kg]	Modified TPH^ - Total C6-C34 [mg/kg]	TPH Identity % Fuel Oil	TPH Identity % Lube Oil
	MW-9 Surface																				
24740/41	MW 9	2007	1	Phase I	10	5.2	5.2	<5.0	<1.0	<10	31	<20	<1.0	<0.10	<0.0030	<10	7.3	22	**34**		
210808-132-FOX-5	MW 9	2008	2	Phase I	0-10	**9.0**	**9.0**	**5.0**	<0.5	7.0	**42**	**20**	**3.1**	<0.1	<0.02	<20	<20	<20	**30**		
F509-9WA	MW 9	2009	3	Phase I	0-15	7.0	**15**	**7.0**	<0.5	6.0	**36**	**27**	**3.8**	<0.1	<0.02	<20	<20	<20	**30**		
F510-9WA	MW 9	2010	4	Phase I	0-15	7.0	**7.0**	4.0	<0.5	8.0	**33**	14	2.0	<0.1	<0.02	<10	<10	<20	**20**		
12-19576	MW 9	2012	6	Phase I	0-10	6.6	**5.8**	3.3	<0.5	7.5	30	13	**3.0**	<0.010	<0.020	<5.0	<10	<50	**33**		
F5-MID-MW-9-S	MW-9	2014	8	Phase II	0-15	5.6	4.5	2.9	<0.10	5.9	26	11	1.4	<0.050	<0.010	<10	<10	<50	**35**		
		2016	10	Phase II															#N/A		
		2021	15	Phase II															#N/A		
		2031	25	Phase II															#N/A		
				Phase III															#N/A		
																			#N/A		
																			#N/A		
																			#N/A		
	MW-9 Depth																				
24742	MW 9	2007	1	Phase I	40	4.6	<5.0	<5.0	<1.0	<10	28	<20	1.1	<0.10	<0.0030	<10	6.2	12	**23**		
210808-133-FOX-5	MW 9	2008	2	Phase I	40-50	**11**	**10**	**5.0**	<0.5	6.0	**40**	**22**	**3.0**	<0.1	<0.02	<20	<20	<20	**30**		
F509-9WB	MW 9	2009	3	Phase I	40-50	7.0	**12**	**6.0**	<0.5	5.0	**34**	18	**3.9**	<0.1	<0.02	<20	<20	<20	**30**		
F510-9WB	MW 9	2010	4	Phase I	40-50	**8.0**	**11**	4.0	<0.5	7.0	**35**	**23**	2.0	<0.1	<0.02	<10	<10	<20	**20**		
12-19578	MW 9	2012	6	Phase I	40-50	7.0	**6.1**	3.4	<0.5	8.2	31	14	**3.4**	<0.010	<0.020	<5.0	<10	<50	**33**		
F5-MID-MW-9-D	MW-9	2014	8	Phase II	40-50	5.6	5.1	3	<0.10	7	26	12	1.3	<0.050	<0.010	<10	<10	<50	**35**		
		2016	10	Phase II															#N/A		
		2021	15	Phase II															#N/A		
		2031	25	Phase II															#N/A		
				Phase III															#N/A		
																			#N/A		
																			#N/A		
																			#N/A		

^Note: Total Hydrocarbons (C_6-C_{34}) has been calculated by adding results for F1, F2 and F3.

Legend

XX	sample exceeds background
XX	**sample exceeds baseline**
XX	*sample exceeds DLCU Tier I criteria*
XX	*sample exceeds DLCU Tier II criteria*

FOX-5 Qikiqtarjuaq (Broughton Island) Main Landfill - Summary of 2007-2024 Soil Analytical Data

Sample ID	Location	Year	Monitoring Year	Monitoring Phase	Depth (cm)	Cu [mg/kg]	Ni [mg/kg]	Co* [mg/kg]	Cd* [mg/kg]	Pb* [mg/kg]	Zn [mg/kg]	Cr* [mg/kg]	As [mg/kg]	Hg* [mg/kg]	Total PCB* [mg/kg]	F1 C_6-C_{10} [mg/kg]	F2 C_{10}-C_{16} [mg/kg]	F3 C_{16}-C_{34} [mg/kg]	Modified TPH^ - Total C6-C34 [mg/kg]	TPH Identity % Fuel Oil	TPH Identity % Lube Oil
Background Data - Average						11	5.3	5.0	1.0	10	46	20	1.9	0.5	0.010				5.0		
Baseline Data - Average						**8.5**	**5.0**	**5.0**	**1.0**	**10**	**38**	**20**	**2**	**0.10**	**0.003**				**69**	n/a	n/a
Baseline Data - Standard Deviation						3.9	2.3	0.6	0.10	6.5	27	1.7	1.4	0.00	0.10				182		
Baseline Data Average + 3xSD						20	12	6.8	1.3	30	119	25	6	0	0				615		
Detection Limit						<3.0	<5.0	<5.0	<1.0	<10	<15	<20	<1	<0.1	<0.003				<40		
**** If baseline average was below the detection limit, the average has been modified to match the detection limit value.***																					
DEW Line Cleanup Tier I Criteria										*200*					*1*						
DEW Line Cleanup Tier II Criteria & Hydrocarbon Action Level						*100*	*100*	*50*	*5*	*500*	*500*	*250*	*30*	*2*	*5*				*2500*		
Monitoring Data																					
Upgradient																					
	MW-10 Surface															**TPH Sum will appear when F1-F3 results are entered.**					
24746	MW 10	2007	1	Phase I	10	4.9	<5.0	<5.0	<1.0	<10	32	<20	<1.0	<0.10	<0.0030	<10	4.0	11	20		
200808-128-FOX5	MW-10	2008	2	Phase I	0-10	**11**	**14**	**5.0**	<0.50	**10**	**44**	**28**	2.0	<0.1	<0.02	<20	<20	1750	**1770**		
F509-10WA	MW 10	2009	3	Phase I	0-15	6.0	**14**	**6.0**	<0.5	9.0	33	17	**2.7**	<0.1	<0.02	<20	<20	<20	30		
F510-10WA	MW-10	2010	4	Phase I	0-15	**10**	**11**	4.0	<0.5	**10**	**49**	**21**	2.0	<0.1	<0.02	<10	<10	<20	20		
12-19600	MW-10	2012	6	Phase I	0-10	6.7	**5.8**	3.2	<0.50	8.6	35	13	**2.6**	<0.010	<0.020	<10	<10	<50	35		
F5-MN-MW-10-S	MW-10	2014	8	Phase II	0-15	6.7	**5.6**	3.5	<0.10	7.6	37	13	<1.0	<0.050	<0.010	<10	<10	<50	35		
		2016	10	Phase II															#N/A		
		2021	15	Phase II															#N/A		
		2031	25	Phase II															#N/A		
				Phase III															#N/A		
																			#N/A		
																			#N/A		
																			#N/A		
	MW-10 Depth																				
24748	MW 10	2007	1	Phase I	40	4.4	<5.0	<5.0	<1.0	<10	31	<20	<1.0	<0.10	<0.0030	<10	4.5	11	21		
200808-129-FOX5	MW-10	2008	2	Phase I	40-50	**13**	**24**	**7.0**	<0.5	**10**	**60**	**54**	**2.3**	<0.1	<0.02	<20	<20	<20	30		
F509-10WB	MW 10	2009	3	Phase I	40-50	6.0	**22**	**7.0**	<0.5	7.0	34	**25**	**2.5**	<0.1	<0.02	<20	<20	<20	30		
F510-10WB	MW-10	2010	4	Phase I	40-50	**10**	**27**	4.0	<0.5	9.0	**47**	**55**	1.0	<0.1	<0.02	<10	<10	<20	20		
12-19602	MW-10	2012	6	Phase I	40-50	7.2	**6.0**	3.2	<0.50	8.3	37	13	**2.5**	<0.010	<0.020	<5.0	<10	<50	33		
F5-MN-MW-10-D	MW-10	2014	8	Phase II	40-50	8	**6.5**	4.4	<0.10	8.7	**43**	15	<1.0	<0.050	<0.010	<10	<10	<50	35		
		2016	10	Phase II															#N/A		
		2021	15	Phase II															#N/A		
		2031	25	Phase II															#N/A		
				Phase III															#N/A		
																			#N/A		
																			#N/A		
																			#N/A		

FOX-5 Qikiqtarjuaq (Broughton Island) Main Landfill - Summary of 2007-2024 Soil Analytical Data

Sample ID	Location	Year	Monitoring Year	Monitoring Phase	Depth (cm)	Cu [mg/kg]	Ni [mg/kg]	Co* [mg/kg]	Cd* [mg/kg]	Pb* [mg/kg]	Zn [mg/kg]	Cr* [mg/kg]	As [mg/kg]	Hg* [mg/kg]	Total PCB* [mg/kg]	F1 C_6-C_{10} [mg/kg]	F2 C_{10}-C_{16} [mg/kg]	F3 C_{16}-C_{34} [mg/kg]	Modified TPH^ - Total C6-C34 [mg/kg]	TPH Identity % Fuel Oil	TPH Identity % Lube Oil
Downgradient																					
	MW-11 Surface																				
24750/51	MW 11	2007	1	Phase I	10	6.6	**5.8**	**5.5**	<1.0	**12**	32	<20	**3.4**	<0.10	<0.0030	<10	6.0	< 9.0	16		
200808-116-FOX5	MW 11	2008	2	Phase I	0-10	**12**	**13**	**6.0**	<0.5	**12**	**53**	**28**	**4.0**	<0.1	<0.02	<20	<20	<20	30		
F509-11WA	MW 11	2009	3	Phase I	0-15	**9.0**	**32**	**10**	<0.5	**13**	**43**	**35**	**5.0**	<0.1	<0.02	<20	<20	40	60		
F510-11WA	MW 11	2010	4	Phase I	0-15	**9.0**	**10**	4.0	<0.5	**13**	**42**	19	2.0	<0.1	<0.02	<10	<10	<20	20		
12-19616	MW-11	2012	6	Phase I	0-10	5.1	4.0	2.1	<0.50	**18**	24	7.6	**5.1**	<0.010	<0.020	<5.0	<10	<50	33		
F5-MN-MW-11-S	MW-11	2014	8	Phase II	0-15	8	**6.4**	3.8	<0.10	**14.0**	**40**	14	1.2	<0.050	<0.010	<10	<10	<50	35		
		2016	10	Phase II															#N/A		
		2021	15	Phase II															#N/A		
		2031	25	Phase II															#N/A		
				Phase III															#N/A		
																			#N/A		
																			#N/A		
																			#N/A		
	MW-11 Depth																				
24752	MW 11	2007	1	Phase I	40	4.7	<5.0	<5.0	<1.0	<10	20	<20	**2.9**	<0.10	<0.0030	<10	8.1	19	32		
200808-117-FOX5	MW 11	2008	2	Phase I	40-50	**11**	**12**	**5.0**	<0.5	**16**	**42**	**27**	**2.8**	<0.1	<0.02	<20	<20	<20	30		
F509-11WB	MW 11	2009	3	Phase I	40-50	8.0	**19**	**8.0**	<0.5	9.0	38	**30**	**5.4**	<0.1	<0.02	<20	<20	<20	30		
F510-11WB	MW 11	2010	4	Phase I	40-50	**11**	**13**	**5.0**	<0.5	**13**	**47**	**26**	**3.0**	<0.1	<0.02	<10	<10	<20	20		
12-19618	MW-11	2012	6	Phase I	40-50	6.1	**5.0**	2.4	<0.50	9.4	25	10	**3.4**	<0.010	<0.020	<5.0	<10	<50	33		
F5-MN-MW-11-D	MW-11	2014	8	Phase II	40-50	**8.6**	**6.5**	3.7	<0.10	**14.0**	34	15	1.2	<0.050	<0.010	<10	<10	<50	35		
		2016	10	Phase II															#N/A		
		2021	15	Phase II															#N/A		
		2031	25	Phase II															#N/A		
				Phase III															#N/A		
																			#N/A		
																			#N/A		
																			#N/A		
	MW-12 Surface																				
24756	MW 12	2007	1	Phase I	10	3.9	<5.0	<5.0	<1.0	<10	29	<20	1.6	<0.10	<0.0030	<10	5.2	35	45		
200808-119-FOX5	MW 12	2008	2	Phase I	0-10	**10**	**8**	4.0	<0.5	**11**	**57**	17	2.2	<0.1	<0.02	<20	<20	<20	30		
Dup 200808-120-FOX5	MW 12	2008	3	Phase I	0-10	**10**	**14**	4.0	<0.5	**14**	**57**	**31**	1.8	<0.1	<0.02	<20	<20	<20	30		
F509-12WA	MW 12	2009	4	Phase I	0-15	**9.0**	**17**	**6.0**	0.6	**21**	**67**	**28**	**25**	<0.1	<0.02	<20	<20	71	**91**		
F510-12WA	MW-12	2010	6	Phase I	0-15	**22**	**13**	4.0	<0.5	**18**	**76**	**26**	2.0	<0.1	**0.43**	<10	<10	39	49		
12-19612	MW-12	2012	8	Phase II	0-10	8.3	**5.9**	3.2	<0.50	**13**	**41**	13	**3.1**	<0.010	**0.06**	<5.0	<10	77	**85**		
F5-MN-MW-12-S	MW-12	2014	10	Phase II	0-15	5	2.8	1.7	<0.10	7.7	26	5.7	<1.0	<0.050	**0.013**	<10	<10	<50	35		
		2016	15	Phase II															#N/A		
		2021	25	Phase II															#N/A		
		2031		Phase III															#N/A		
																			#N/A		
																			#N/A		
																			#N/A		
																			#N/A		

FOX-5 Qikiqtarjuaq (Broughton Island) Main Landfill - Summary of 2007-2024 Soil Analytical Data

Sample ID	Location	Year	Monitoring Year	Monitoring Phase	Depth (cm)	Cu [mg/kg]	Ni [mg/kg]	Co* [mg/kg]	Cd* [mg/kg]	Pb* [mg/kg]	Zn [mg/kg]	Cr* [mg/kg]	As [mg/kg]	Hg* [mg/kg]	Total PCB* [mg/kg]	F1 C_6-C_{10} [mg/kg]	F2 C_{10}-C_{16} [mg/kg]	F3 C_{16}-C_{34} [mg/kg]	Modified TPH^ - Total C6-C34 [mg/kg]	TPH Identity	
																				% Fuel Oil	% Lube Oil
	MW-12 Depth																				
24758	MW 12	2007	1	Phase I	40	3.6	<5.0	<5.0	<1.0	<10	26	<20	1.1	<0.10	<0.0030	<10	6.3	17	28		
200808-121-FOX5	MW 12	2008	2	Phase I	40-50	**11**	**14**	**5.0**	<0.5	**17**	**59**	**32**	**3**	<0.1	<0.02	<20	<20	<20	30		
F509-12WB	MW 12	2009	3	Phase I	40-50	6.0	**19**	**6.0**	<0.5	7.0	**40**	**28**	**2.9**	<0.1	<0.02	<20	<20	<20	30		
F510-12WB	MW 12	2010	4	Phase I	40-50	8.0	**11**	3.0	<0.5	**14**	35	**22**	2.0	<0.1	<0.02	<10	<10	33	43		
12-19614	MW-12	2012	6	Phase I	40-50	5.2	4.4	2.4	<0.50	**11**	33	8.6	**3.3**	<0.010	<0.020	<5.0	<10	<50	33		
F5-MN-MW-12-D	MW-12	2014	8	Phase II	40-50	**8.5**	3.6	2.1	0.12	**13.0**	38	7.7	<1.0	<0.050	**0.085**	<10	<10	110	**120**		
		2016	10	Phase II															#N/A		
		2021	15	Phase II															#N/A		
		2031	25	Phase II															#N/A		
				Phase III															#N/A		
																			#N/A		
																			#N/A		
																			#N/A		
	MW-13 Surface																				
24760/61	MW 13	2007	1	Phase I	10	<3.0	<5.0	<5.0	<1.0	<10	21	<20	<1.0	<0.10	**0.005**	<10	6.8	33	45		
200808-122-FOX5	MW 13	2008	2	Phase I	0-10	**11**	**15**	**5.0**	<0.5	**11**	**52**	**30**	1.9	<0.1	<0.02	<20	<20	47	67		
F509-13WA	MW 13	2009	3	Phase I	0-15	7.0	**20**	**7.0**	<0.5	8.0	**39**	**20**	**3.3**	<0.1	<0.02	<20	<20	<20	30		
F510-13WA	MW 13	2010	4	Phase I	0-15	**11**	**9.0**	4.0	<0.5	**13**	**54**	18	2.0	<0.1	<0.02	<10	<10	23	33		
12-19608	MW-13	2012	6	Phase I	0-10	5.0	3.7	2.3	<0.50	7.7	29	7.9	2.2	<0.010	<0.020	<5.0	<10	<50	33		
F5-MN-MW-13-S	MW-13	2014	8	Phase II	0-15	5.9	4.3	3.0	<0.10	7.8	34	9.3	<1.0	<0.050	<0.010	<10	<10	<50	35		
		2016	10	Phase II															#N/A		
		2021	15	Phase II															#N/A		
		2031	25	Phase II															#N/A		
				Phase III															#N/A		
																			#N/A		
																			#N/A		
																			#N/A		
	MW-13 Depth																				
24762	MW 13	2007	1	Phase I	40	3.0	<5.0	<5.0	<1.0	<10	21	<20	<1.0	<0.10	<0.0030	<10	5.7	10	21		
200808-123-FOX5	MW 13	2008	2	Phase I	40-50	7	**25**	3.0	<0.5	7.0	35	**56**	<1.0	<0.1	<0.02	<20	<20	<20	30		
F509-13WB	MW-13	2009	3	Phase I	40-50	5.0	**21**	**6.0**	<0.5	6.0	30	16	1.9	<0.1	<0.02	<20	<20	21	41		
F510-13WB	MW 13	2010	4	Phase I	40-50	8.0	**8.0**	3.0	<0.5	9.0	**44**	17	1.0	<0.1	<0.02	<10	<10	<20	20		
12-19610	MW-13	2012	6	Phase I	40-50	5.2	3.7	2.3	<0.50	6.4	29	7.4	1.7	<0.010	<0.020	<5.0	<10	<50	33		
F5-MN-MW-13-D	MW-13	2014	8	Phase II	40-50	5.5	3.9	2.5	<0.10	9.4	31	8.1	<1.0	<0.050	<0.010	<10	<10	<50	35		
		2016	10	Phase II															#N/A		
		2021	15	Phase II															#N/A		
		2031	25	Phase II															#N/A		
				Phase III															#N/A		
																			#N/A		
																			#N/A		
																			#N/A		

FOX-5 Qikiqtarjuaq (Broughton Island) Main Landfill - Summary of 2007-2024 Soil Analytical Data

Sample ID	Location	Year	Monitoring Year	Monitoring Phase	Depth (cm)	Cu [mg/kg]	Ni [mg/kg]	Co* [mg/kg]	Cd* [mg/kg]	Pb* [mg/kg]	Zn [mg/kg]	Cr* [mg/kg]	As [mg/kg]	Hg* [mg/kg]	Total PCB* [mg/kg]	F1 C_6-C_{10} [mg/kg]	F2 C_{10}-C_{16} [mg/kg]	F3 C_{16}-C_{34} [mg/kg]	Modified TPH^ - Total C6-C34 [mg/kg]	TPH Identity % Fuel Oil	TPH Identity % Lube Oil
	MW-14 Surface																				
24766	MW 14	2007	1	Phase I	10	<3.0	<5.0	<5.0	<1.0	<10	19	<20	1.3	<0.10	<0.0030	<10	4.1	9.2	18		
200808-125-FOX5	MW-14	2008	2	Phase I	0-10	8	**10**	4.0	<0.5	**10**	**41**	**20**	1.1	<0.1	<0.02	<20	<20	<20	30		
F509-14WA	MW-14	2009	3	Phase I	0-15	4.0	4.0	3.0	<0.5	6.0	19	8.0	**2.9**	<0.1	<0.02	<20	<20	<20	30		
F510-14WA	MW-14	2010	4	Phase I	0-15	7.0	**8.0**	3.0	<0.5	**10**	35	15	1.0	<0.1	<0.02	<10	<10	<20	20		
12-19604/05abc	MW-14	2012	6	Phase I	0-10	4.2	2.8	2.1	<0.50	**10**	23	5.7	**2.7**	<0.010	<0.020	<5.0	<10	<50	33		
F5-MN-MW-14-S	MW-14	2014	8	Phase II	0-15	7.55	4.7	3.4	<0.5	**10.1**	36	9.9	2	<0.10	<0.05	<10	<10	<50	35		
		2016	10	Phase II															#N/A		
		2021	15	Phase II															#N/A		
		2031	25	Phase II															#N/A		
				Phase III															#N/A		
																			#N/A		
																			#N/A		
																			#N/A		
	MW-14 Depth																				
24768	MW 14	2007	1	Phase I	40	3.8	<5.0	<5.0	<1.0	<10	27	<20	1.5	<0.10	<0.0030	<10	6.7	< 9.0	16		
200808-126-FOX5	MW-14	2008	2	Phase I	40-50	**9**	**12**	4.0	<0.5	**11**	**43**	**24**	1.3	<0.1	<0.02	<20	<20	<20	30		
F509-14WB	MW 14	2009	3	Phase I	40-50	5.0	**9.0**	**6.0**	<0.5	8.0	34	**21**	**3.2**	<0.1	<0.02	<20	<20	<20	30		
F510-14WB	MW 14	2010	4	Phase I	40-50	8.0	**7.0**	3.0	<0.5	9.0	35	14	1.0	<0.1	<0.02	<10	<10	<20	20		
12-19606/07abc	MW-14	2012	6	Phase I	40-50	5.5	3.9	3.3	<0.50	7.8	32	8.0	2.0	<0.010	<0.020	<5.0	<10	<50	33		
F5-MN-MW-14-D	MW-14	2014	8	Phase II	40-50	5	3.5	2.8	<0.10	7.2	30	7.7	<1.0	<0.050	<0.010	<10	<10	<50	35		
		2016	10	Phase II															#N/A		
		2021	15	Phase II															#N/A		
		2031	25	Phase II															#N/A		
				Phase III															#N/A		
																			#N/A		
																			#N/A		
																			#N/A		

^Note: Total Hydrocarbons (C_6-C_{34}) has been calculated by adding results for F1, F2 and F3.

Legend

XX	sample exceeds background
XX	**sample exceeds baseline**
XX	*sample exceeds DLCU Tier I criteria*
XX	*sample exceeds DLCU Tier II criteria*

FOX-5 Qikiqtarjuaq (Broughton Island) Station Non-Hazardous Waste Landfill Soil Analytical Summary 2007 - 2024

Sample ID	Location	Year	Monitoring Year	Monitoring Phase	Depth (cm)	Cu [mg/kg]	Ni [mg/kg]	Co* [mg/kg]	Cd* [mg/kg]	Pb* [mg/kg]	Zn [mg/kg]	Cr* [mg/kg]	As [mg/kg]	Hg* [mg/kg]	Total PCB* [mg/kg]	F1 C_6-C_{10} [mg/kg]	F2 C_{10}-C_{16} [mg/kg]	F3 C_{16}-C_{34} [mg/kg]	Modified TPH^ - Total C6-C34 [mg/kg]	TPH Identity % Fuel Oil	TPH Identity % Lube Oil
Background Data - Average						10	5.3	4.0	1.0	5.0	46	19	1.93	0.5	0.001				5.0		
Baseline Data - Average						**8.6**	**5.0**	**5.0**	**1.0**	**10**	**35**	**20**	**1.8**	**0.10**	**0.003**				**299**		
Baseline Data - Standard Deviation						3.5	2.6	1.7	0.00	20.0	15	4.0	0.6	0.00	0.20				654		
Baseline Data Average + 3xSD						19	13	10.1	1.0	70	80	32	3.6	0.10	0.60				2261		
Detection Limit						<3.0	<5.0	<5.0	<1.0	<10	<15	<20	<1	<0.1	<0.003				<40		
**** If baseline average was below the detection limit, the average has been modified to match the detection limit value.***																					
DEW Line Cleanup Tier I Criteria										*200*					*1*						
DEW Line Cleanup Tier II Criteria & Hydrocarbon Action Level						*100*	*100*	*50*	*5*	*500*	*500*	*250*	*30*	*2*	*5*				*2500*		
Monitoring Data																					
Upgradient																					
	MW-15 Surface																				
07-24776	MW 15	2007	1	Phase I	10	**12**	**9.0**	**6.5**	<1.0	<10	32	<20	1.5	<0.10	<0.0030	<10	4.4	< 9.0	14		
F509-15WA	MW-15	2009	3	Phase I	0-15	**18**	**17**	**10**	<0.5	7.0	**50**	**38**	**2.4**	<0.1	<0.02	<20	<20	<20	30		
12-19580	MW-15	2012	6	Phase I	0-10	**18**	**14**	**6.5**	<0.50	8.0	**49**	**30**	**2.5**	0.021	<0.020	<5.0	<10	<50	33		
F5-SA-MW-15-S	MW-15	2014	8	Phase II	0-15	**22**	**18**	**9.3**	<0.10	7.7	**58**	**38**	**3.1**	<0.050	<0.010	<10	<10	<50	35		
		2016	10	Phase II															#N/A		
		2021	15	Phase II															#N/A		
		2031	25	Phase II															#N/A		
				Phase III															#N/A		
																			#N/A		
																			#N/A		
																			#N/A		
																			#N/A		
	MW-15 Depth																				
07-24778	MW 15	2007	1	Phase I	40	**11**	**8.2**	**5.9**	<1.0	<10	31	<20	1.1	<0.10	<0.0030	<10	4.5	< 9.0	14		
F509-15WB	MW-15	2009	3	Phase I	40-50	**15**	**16**	**8.0**	<0.5	3.0	**40**	**35**	1.6	<0.1	<0.02	<20	<20	<20	30		
12-19582	MW-15	2012	6	Phase I	40-50	**19**	**15**	**6.9**	<0.50	6.7	**50**	**33**	**2.5**	0.011	<0.020	<5.0	<10	<50	33		
F5-SA-MW-15-D	MW-15	2014	8	Phase II	40-50	**20**	**16**	**8.2**	<0.10	6.1	**51**	**33**	**2.7**	<0.050	<0.010	<10	<10	<50	35		
		2016	10	Phase II															#N/A		
		2021	15	Phase II															#N/A		
		2031	25	Phase II															#N/A		
				Phase III															#N/A		
																			#N/A		
																			#N/A		
																			#N/A		
																			#N/A		

FOX-5 Qikiqtarjuaq (Broughton Island) Station Non-Hazardous Waste Landfill Soil Analytical Summary 2007 - 2024

Sample ID	Location	Year	Monitoring Year	Monitoring Phase	Depth (cm)	Cu [mg/kg]	Ni [mg/kg]	Co* [mg/kg]	Cd* [mg/kg]	Pb* [mg/kg]	Zn [mg/kg]	Cr* [mg/kg]	As [mg/kg]	Hg* [mg/kg]	Total PCB* [mg/kg]	F1 C_6-C_{10} [mg/kg]	F2 C_{10}-C_{16} [mg/kg]	F3 C_{16}-C_{34} [mg/kg]	Modified TPH^ - Total C6-C34 [mg/kg]	TPH Identity % Fuel Oil	TPH Identity % Lube Oil
	MW-16 Surface																				
07-24770	MW 16	2007	1	Phase I	10	**9.2**	<5.0	<5.0	<1.0	<10	**40**	<20	1.4	<0.10	<0.0030	<10	6.0	10	21		
F509-16WA	MW-16	2009	3	Phase I	0-15	**39**	**15**	**7.0**	<0.5	**23**	**88**	**36**	**3.0**	<0.1	<0.02	<20	<20	34	54		
12-19584	MW-16	2012	6	Phase I	0-10	**14**	**9.6**	4.9	<0.50	**16**	**63**	**23**	**2.6**	0.014	**0.03**	<5.0	81	180	264		
F5-SA-MW-16-S	MW-16	2014	8	Phase II	0-15	**16**	**5.4**	3.3	0.11	**11.0**	**67**	12	**2.2**	<0.050	**0.022**	<10	<10	<50	35		
		2016	10	Phase II															#N/A		
		2021	15	Phase II															#N/A		
		2031	25	Phase II															#N/A		
				Phase III															#N/A		
																			#N/A		
																			#N/A		
																			#N/A		
																			#N/A		
	MW-16 Depth																				
07-24772	MW 16	2007	1	Phase I	40	**64**	<5.0	<5.0	<1.0	<10	**44**	<20	<1.0	<0.10	<0.0030	<10	53	390	**448**		
F509-16WB	MW-16	2009	3	Phase I	40-50	**17**	**19**	**10**	<0.5	**19**	**88**	**43**	**3.1**	<0.1	<0.02	<20	213	118	**341**		
12-19586	MW-16	2012	6	Phase I	40-50	**15**	**9.8**	**5.2**	*13*	**29**	**78**	**24**	**3.3**	0.023	**0.12**	1200	770	100	**2070**		
F5-SA-MW-16-D	MW-16	2014	8	Phase II	40-50	**21**	**9.8**	**6.0**	0.14	**14.0**	**87**	**23**	**3.3**	<0.050	<0.010	<10	23	51	79		
		2016	10	Phase II															#N/A		
		2021	15	Phase II															#N/A		
		2031	25	Phase II															#N/A		
				Phase III															#N/A		
																			#N/A		
																			#N/A		
																			#N/A		
																			#N/A		
Downgradient																					
	MW-17 Surface																				
07-24790/91	MW 17	2007	1	Phase I	10	4.5	<5.0	<5.0	<1.0	<10	25	<20	<1.0	<0.10	<0.0030	<10	5.6	< 9.0	15		
F509-17WA	MW 17	2009	3	Phase I	0-15	**10**	**13**	**8.0**	<0.5	8.0	**48**	**29**	**4.1**	<0.1	<0.02	<20	<20	<20	30		
12-19588	MW 17	2012	6	Phase I	0-10	5.8	4.3	2.4	<0.50	6.1	28	9.0	**2.2**	<0.010	<0.020	<5.0	<10	<50	33		
F5-SA-MW-17-S	MW-17	2014	8	Phase II	0-15	**9.1**	**5**	3.2	<0.10	**13.0**	**43**	12	**2.6**	<0.050	<0.010	<10	<10	120	130		
		2016	10	Phase II															#N/A		
		2021	15	Phase II															#N/A		
		2031	25	Phase II															#N/A		
				Phase III															#N/A		
																			#N/A		
																			#N/A		
																			#N/A		
																			#N/A		

FOX-5 Qikiqtarjuaq (Broughton Island) Station Non-Hazardous Waste Landfill Soil Analytical Summary 2007 - 2024

Sample ID	Location	Year	Monitoring Year	Monitoring Phase	Depth (cm)	Cu [mg/kg]	Ni [mg/kg]	Co* [mg/kg]	Cd* [mg/kg]	Pb* [mg/kg]	Zn [mg/kg]	Cr* [mg/kg]	As [mg/kg]	Hg* [mg/kg]	Total PCB* [mg/kg]	F1 C_6-C_{10} [mg/kg]	F2 C_{10}-C_{16} [mg/kg]	F3 C_{16}-C_{34} [mg/kg]	Modified TPH^ - Total C6-C34 [mg/kg]	TPH Identity	
																				% Fuel Oil	% Lube Oil
	MW-17 Depth																				
07-24792	MW 17	2007	1	Phase I	40	<3.0	<5.0	<5.0	<1.0	<10	18	<20	1.2	<0.10	<0.0030	<10	5.3	< 9.0	15		
F509-17WB	MW 17	2009	3	Phase I	40-50	8.0	8.0	6.0	<0.5	7.0	41	18	3.1	<0.1	<0.02	<20	<20	<20	30		
12-19590	MW 17	2012	6	Phase I	40-50	6.7	5.2	3.0	<0.50	7.4	33	11	2.9	<0.010	<0.020	<5.0	<10	<50	33		
F5-SA-MW-17-D	MW-17	2014	8	Phase II	40-50	8.2	6.2	4.0	<0.10	7.3	41	14	2.9	<0.050	<0.010	<10	<10	<50	35		
		2016	10	Phase II															#N/A		
		2021	15	Phase II															#N/A		
		2031	25	Phase II															#N/A		
				Phase III															#N/A		
																			#N/A		
																			#N/A		
																			#N/A		
																			#N/A		
	MW-18 Surface																				
07-24786	MW 18	2007	1	Phase I	10	4.6	<5.0	5.0	<1.0	<10	31	<20	1.9	<0.10	<0.0030	<10	5.2	14	24		
F509-18WA	MW 18	2009	3	Phase I	0-15	10	15	8.0	<0.5	12	46	33	3.8	<0.1	<0.02	<20	<20	<20	30		
12-19592/93abc	MW-18	2012	6	Phase I	0-10	6.7	5.2	2.8	<0.50	5.9	30	11	2.1	<0.010	<0.020	<5.0	<10	<50	33		
F5-SA-MW-18-S	MW-18	2014	8	Phase II	0-15	9.9	7.9	4.5	<0.10	6.8	43	17	1.2	<0.050	<0.010	<10	<10	<50	35		
		2016	10	Phase II															#N/A		
		2021	15	Phase II															#N/A		
		2031	25	Phase II															#N/A		
				Phase III															#N/A		
																			#N/A		
																			#N/A		
																			#N/A		
																			#N/A		
	MW-18 Depth																				
07-24788	MW 18	2007	1	Phase I	40	6.1	<5.0	5.1	<1.0	14	34	<20	1.8	<0.10	<0.0030	<10	52	270	327		
F509-18WB	MW 18	2009	3	Phase I	40-50	6	9.0	6.0	<0.5	6.0	36	20	3.0	<0.1	<0.02	<20	<20	43	63		
12-19594/95abc	MW-18	2012	6	Phase I	40-50	4.9	3.9	2.2	<0.50	6.2	27	8.2	2.0	<0.010	<0.020	<10	<50	<50	55		
F5-SA-MW-18-D	MW-18	2014	8	Phase II	40-50	10.1	6.55	4.5	<0.5	6.5	40.5	17.5	1.6	<0.10	<0.05	<10	<10	<50	35		
		2016	10	Phase II															#N/A		
		2021	15	Phase II															#N/A		
		2031	25	Phase II															#N/A		
				Phase III															#N/A		
																			#N/A		
																			#N/A		
																			#N/A		
																			#N/A		

FOX-5 Qikiqtarjuaq (Broughton Island) Station Non-Hazardous Waste Landfill Soil Analytical Summary 2007 - 2024

Sample ID	Location	Year	Monitoring Year	Monitoring Phase	Depth (cm)	Cu [mg/kg]	Ni [mg/kg]	Co* [mg/kg]	Cd* [mg/kg]	Pb* [mg/kg]	Zn [mg/kg]	Cr* [mg/kg]	As [mg/kg]	Hg* [mg/kg]	Total PCB* [mg/kg]	F1 C_6-C_{10} [mg/kg]	F2 C_{10}-C_{16} [mg/kg]	F3 C_{16}-C_{34} [mg/kg]	Modified TPH^ - Total C6-C34 [mg/kg]	TPH Identity % Fuel Oil	TPH Identity % Lube Oil
	MW-19 Surface																				
07-24780	MW 19	2007	1	Phase I	10	3.9	<5.0	<5.0	<1.0	<10	19	<20	1.4	<0.10	<0.0030	<10	5.5	< 9.0	15		
F509-19WA	MW 19	2009	3	Phase I	0-15	**10**	**13**	**8.0**	<0.5	6.0	**45**	**28**	**3.8**	<0.1	<0.02	<20	<20	<20	30		
12-19596	MW-19	2012	6	Phase I	0-10	6.4	**5.0**	2.6	<0.50	4.8	28	11	**2.2**	<0.010	<0.020	<5.0	<10	<50	33		
F5-SA-MW-19-S	MW-19	2014	8	Phase II	0-15	8.2	**6.2**	3.6	<0.10	6.2	**36**	14	**2**	<0.050	<0.010	<10	<10	<50	35		
		2016	10	Phase II															#N/A		
		2021	15	Phase II															#N/A		
		2031	25	Phase II															#N/A		
				Phase III															#N/A		
																			#N/A		
																			#N/A		
																			#N/A		
																			#N/A		
	MW-19 Depth																				
07-24782	MW 19	2007	1	Phase I	40	5.4	<5.0	<5.0	<1.0	<10	25	<20	**2.4**	<0.10	<0.0030	<10	< 4.0	< 9.0	12		
F509-19WB	MW-19	2009	3	Phase I	40-50	**9.0**	**12**	**7.0**	<0.5	5.0	**40**	**27**	**3.6**	<0.1	<0.02	<20	<20	<20	30		
12-19598	MW-19	2012	6	Phase I	40-50	7.3	**5.7**	3.1	<0.50	5.4	33	13	**2.6**	<0.010	<0.020	<5.0	<10	<50	33		
F5-SA-MW-19-D	MW-19	2014	8	Phase II	40-50	8.4	**6.7**	3.8	<0.10	5.8	**36**	15	1.6	<0.050	<0.010	<10	<10	<50	35		
		2016	10	Phase II															#N/A		
		2021	15	Phase II															#N/A		
		2031	25	Phase II															#N/A		
				Phase III															#N/A		
																			#N/A		
																			#N/A		
																			#N/A		
																			#N/A		

The Station Non-Hazardous Waste Landfill was visually assessed in 2008 and 2010 but soil and groundwater samples were not taken as per the monitoring contract.

^Note: Total Hydrocarbons (C_6-C_{34}) has been calculated by adding results for F1, F2 and F3.

Legend

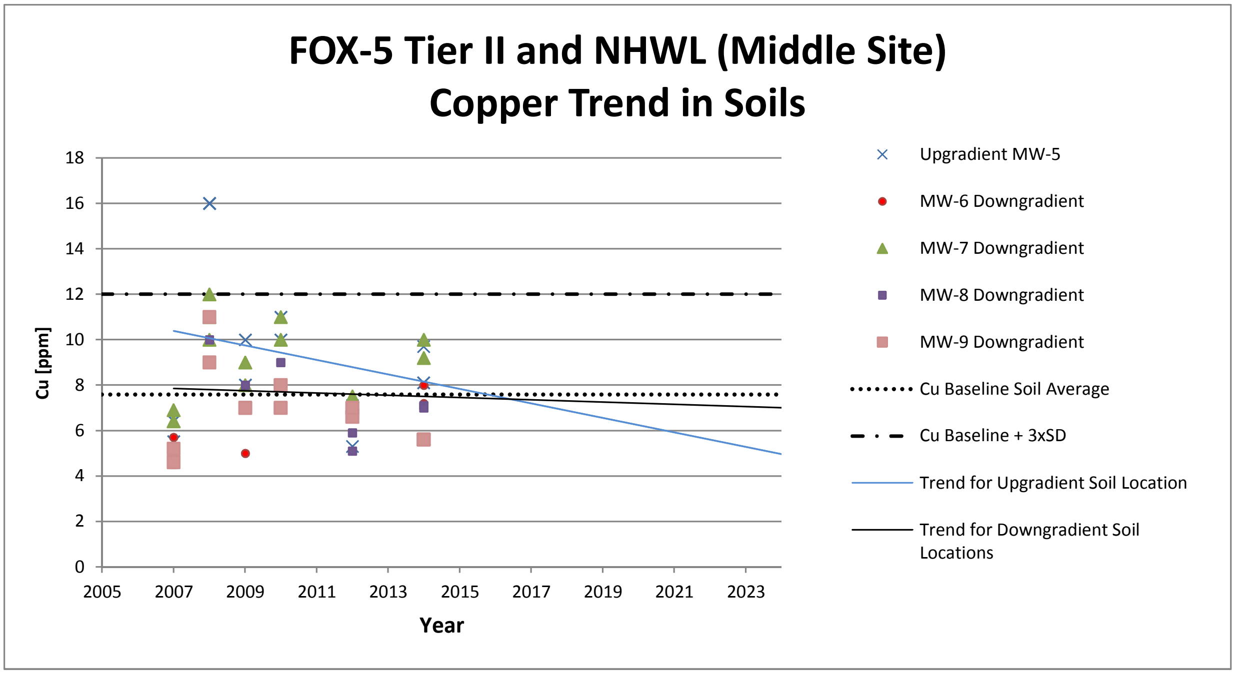
XX	sample exceeds background
XX	**sample exceeds baseline**
XX	*sample exceeds DLCU Tier I criteria*
XX	*sample exceeds DLCU Tier II criteria*

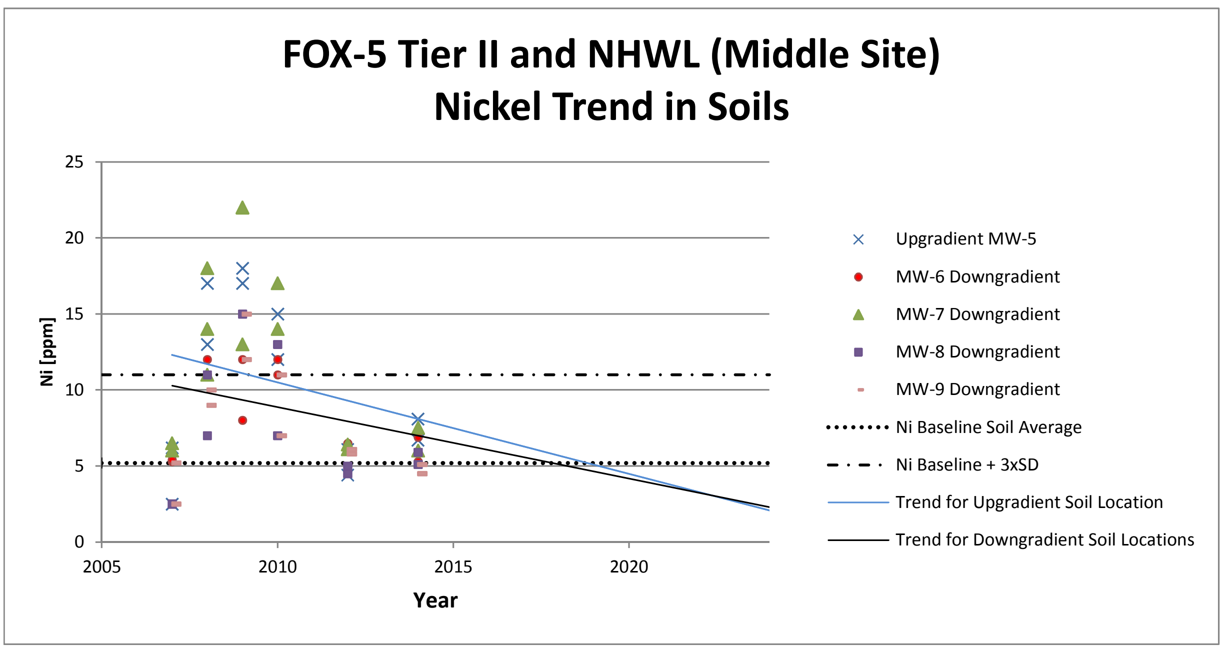
APPENDIX F

CHEMICAL CONCENTRATION TREND GRAPHS (SOIL)

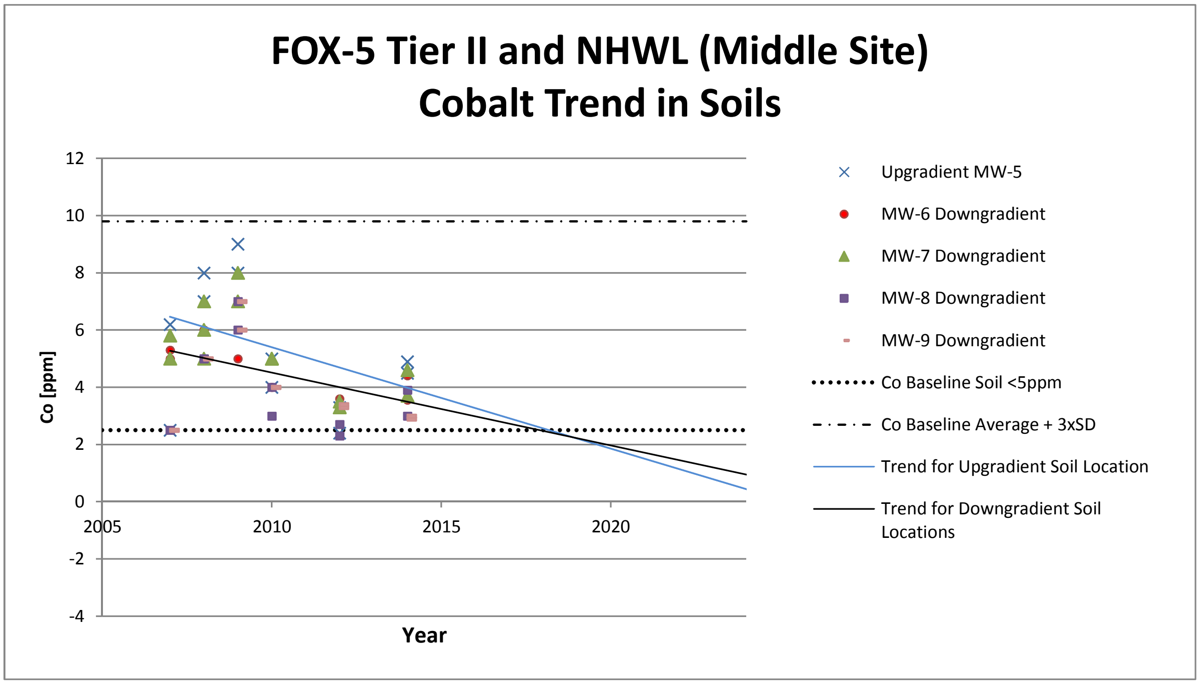
FOX-5 Qikiqtarjuaq (Broughton Island) Tier II Disposal Facility and Non-Hazardous Waste Landfill (Middle Site)- Landfill Trends

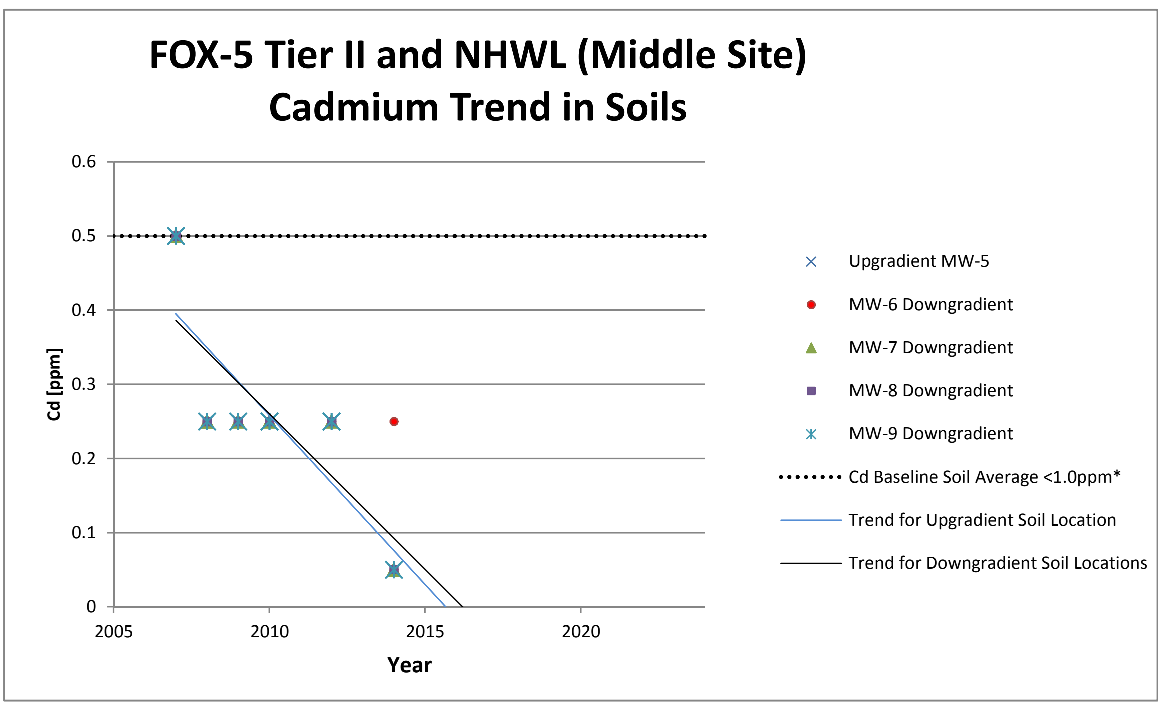
Where results are below detection, half of the detection limit has been used in the charts.





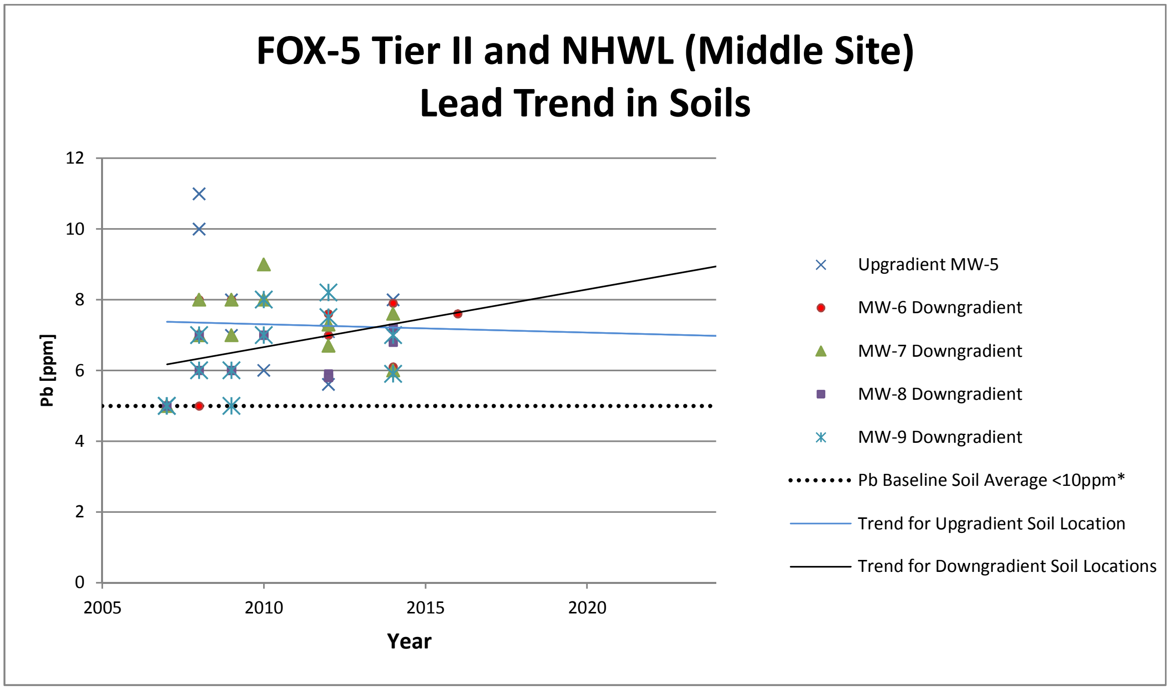
FOX-5 Qikiqtarjuaq (Broughton Island) Tier II Disposal Facility and Non-Hazardous Waste Landfill (Middle Site)- Landfill Trends



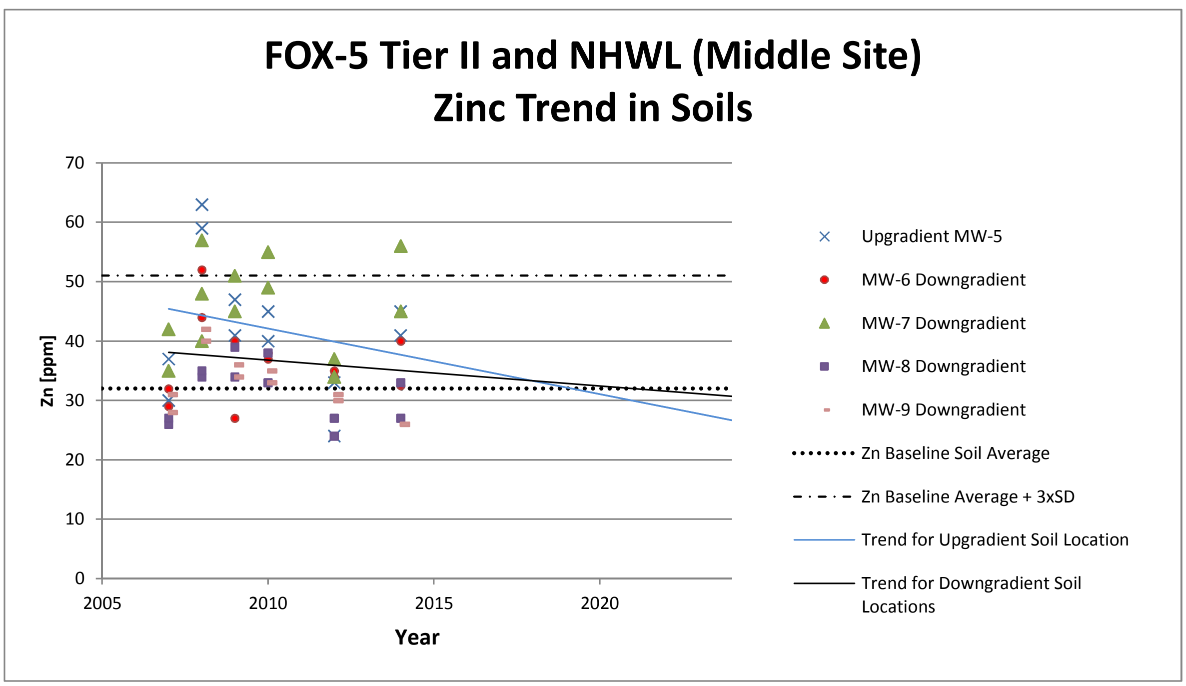


* Cd Baseline SD = 0, all Cd results below detection. Changes in detection limit cause change in trend.

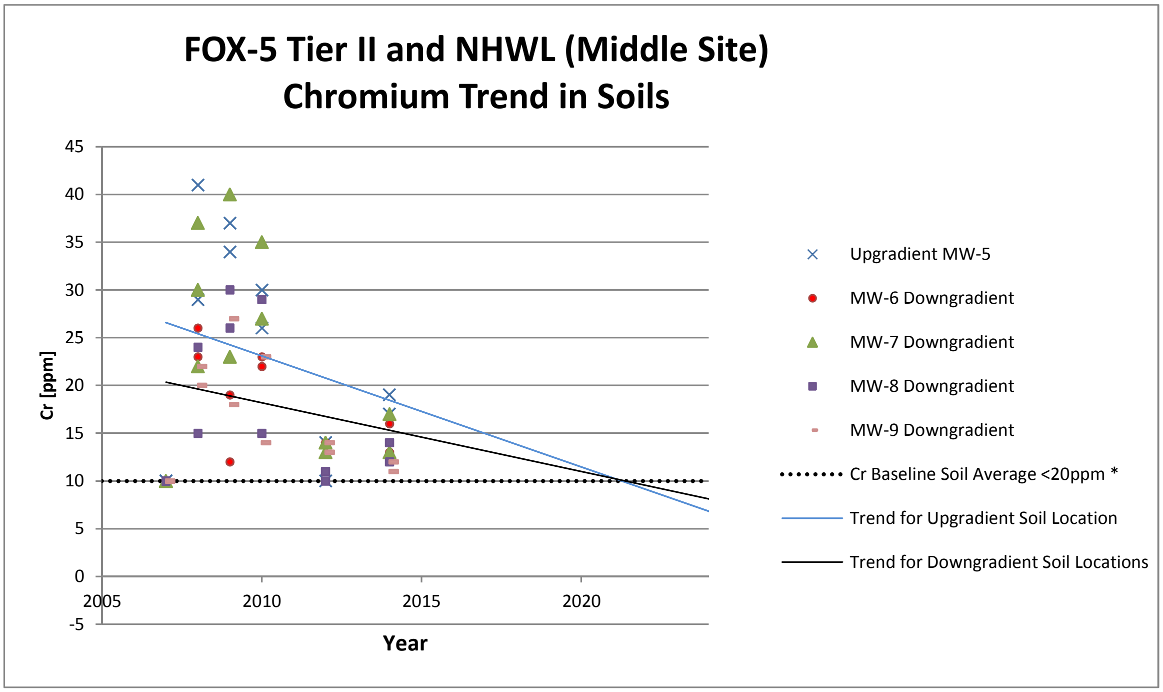
FOX-5 Qikiqtarjuaq (Broughton Island) Tier II Disposal Facility and Non-Hazardous Waste Landfill (Middle Site)- Landfill Trends



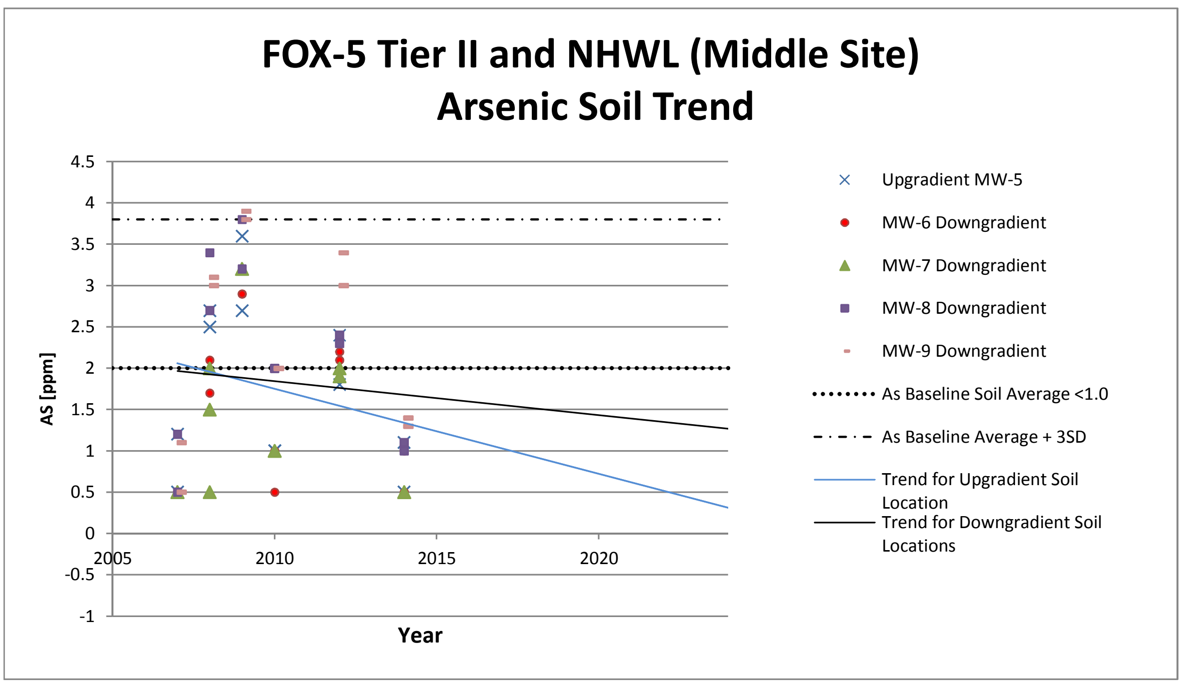
* Pb Baseline Standard Deviation = 0



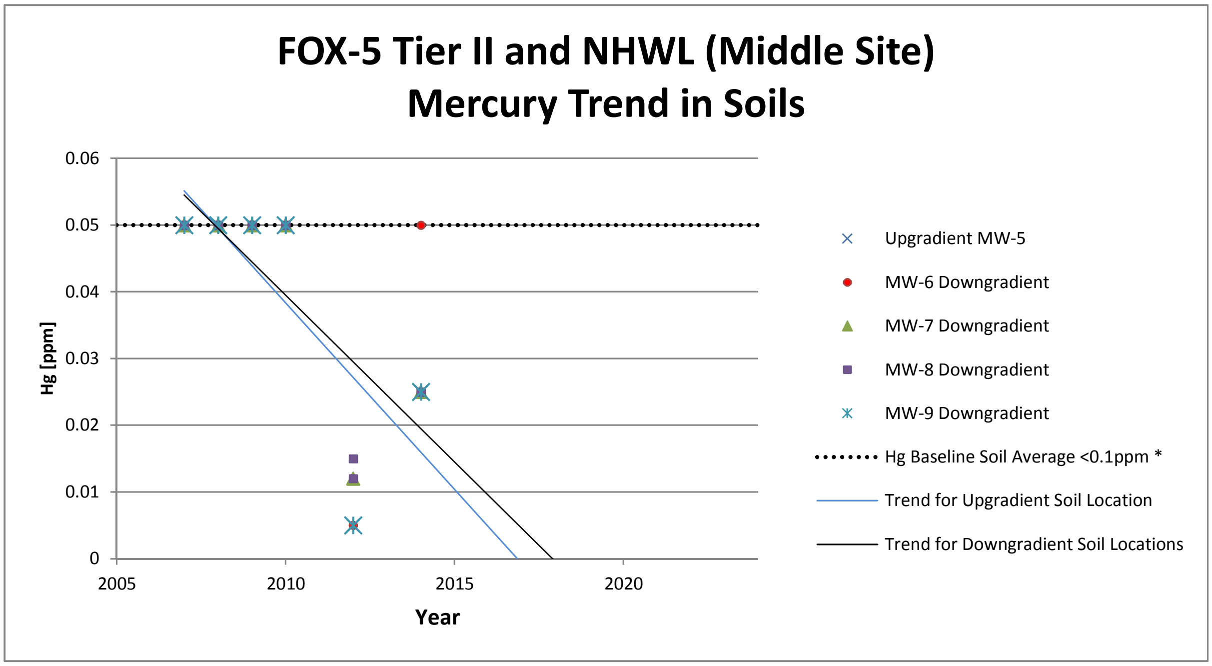
FOX-5 Qikiqtarjuaq (Broughton Island) Tier II Disposal Facility and Non-Hazardous Waste Landfill (Middle Site)- Landfill Trends



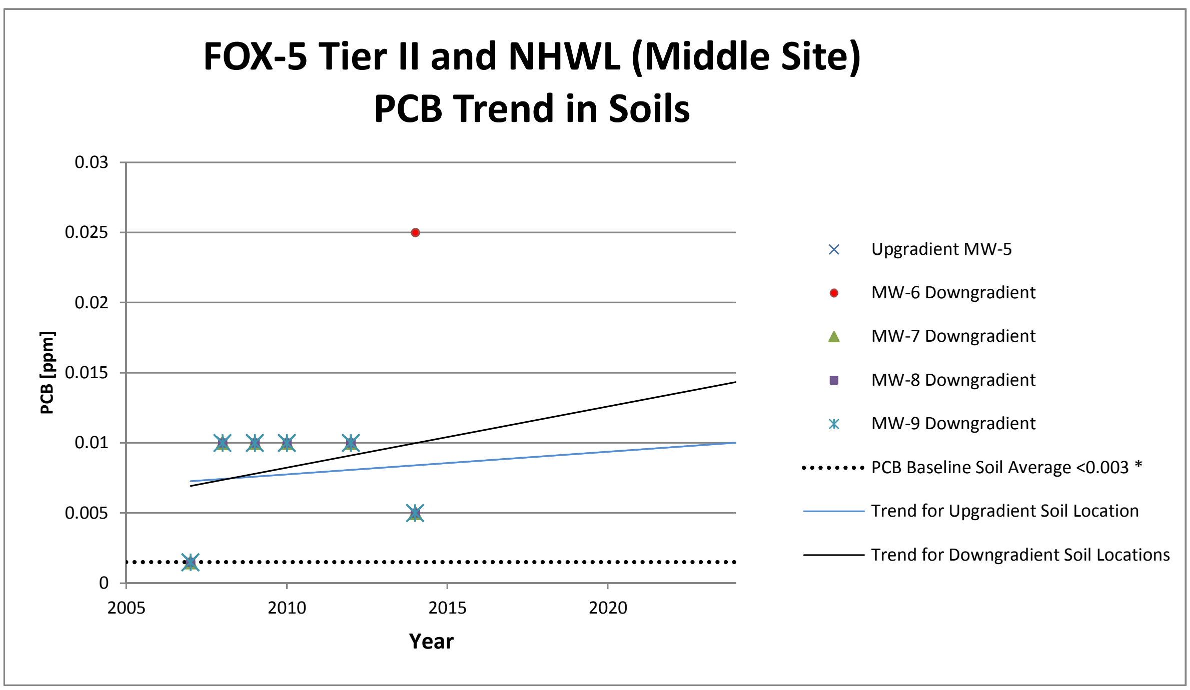
* Cr Baseline Standard Deviation = 0



FOX-5 Qikiqtarjuaq (Broughton Island) Tier II Disposal Facility and Non-Hazardous Waste Landfill (Middle Site)- Landfill Trends

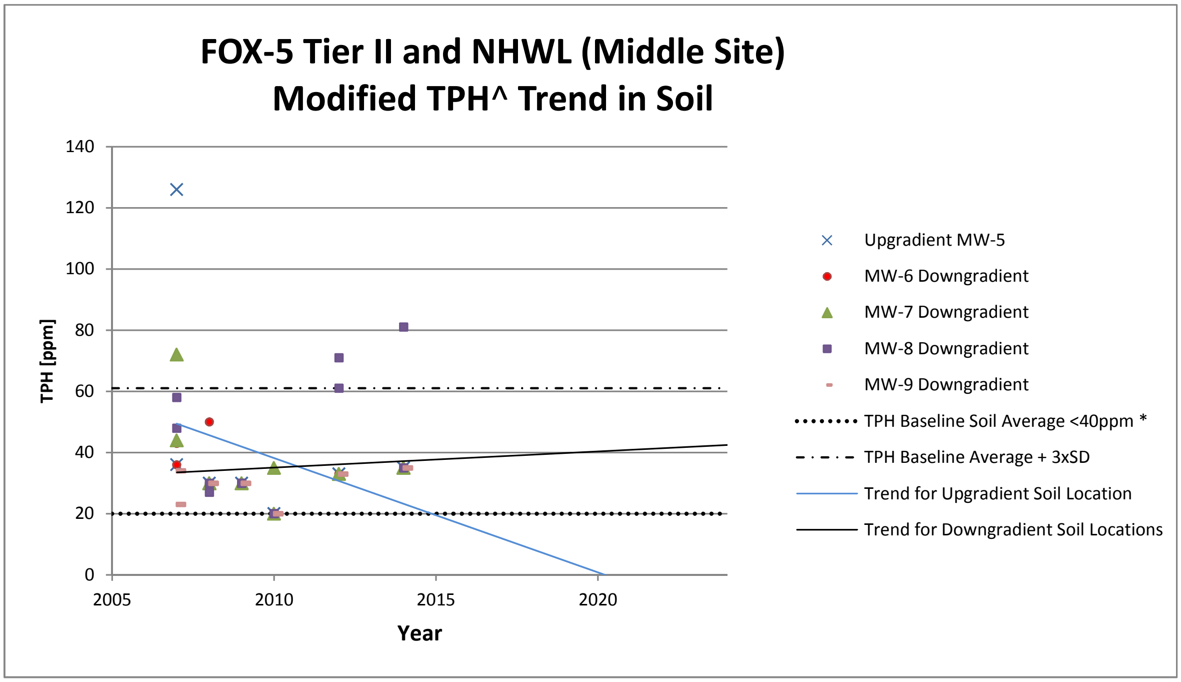


* Hg Baseline SD = 0 Detectable Hg seen in 2012 but at levels lower than detection limits from earlier years. All previous years showed no detectable Hg



* PCB Baseline SD = 0 All PCB Monitoring Results below detection. Trend reflects changes in detection limits.

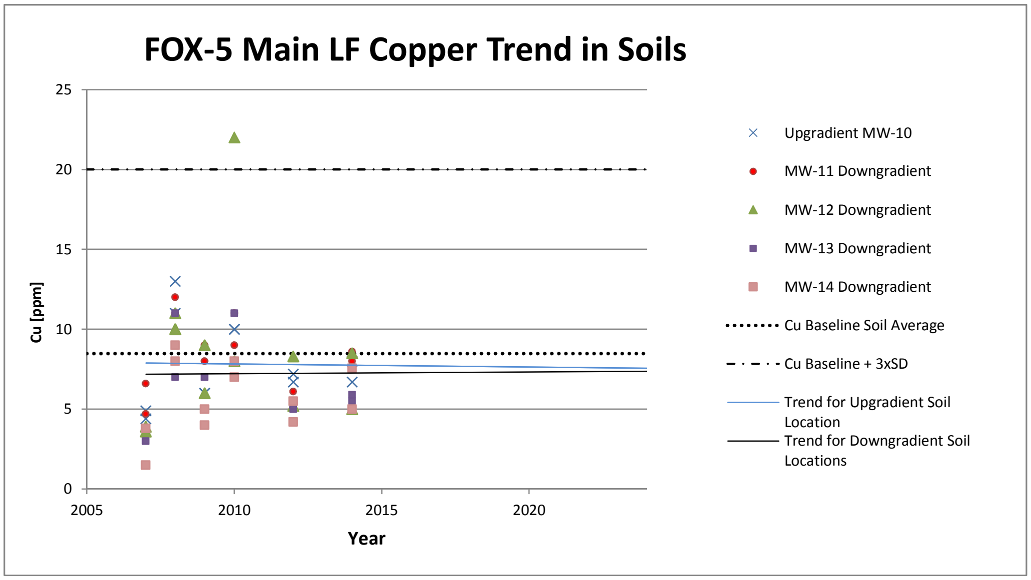
FOX-5 Qikiqtarjuaq (Broughton Island) Tier II Disposal Facility and Non-Hazardous Waste Landfill (Middle Site)- Landfill Trends

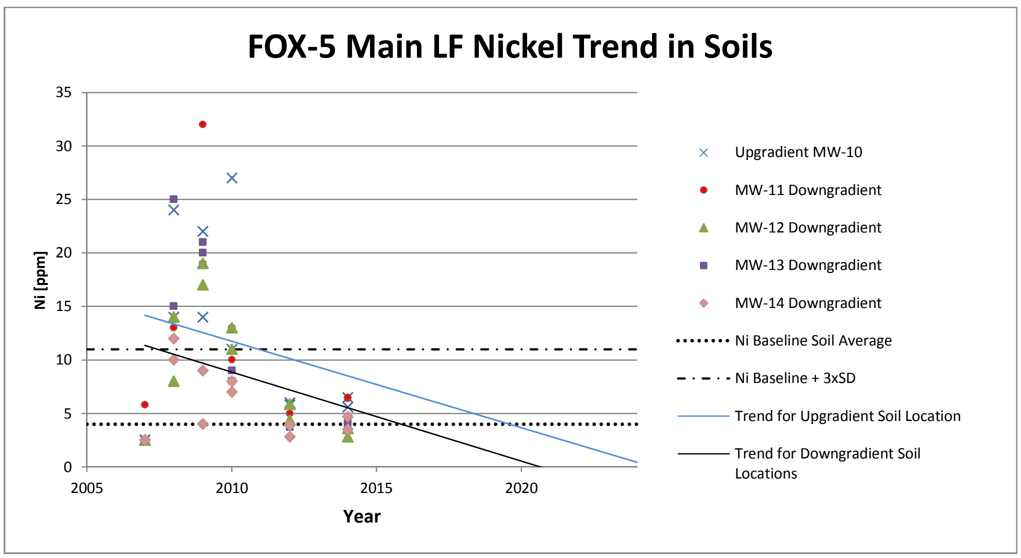


^ Baseline samples from 2002 were analyzed as TPH, results from 2003 and later are Sum of PHC F1-F3 fractions.

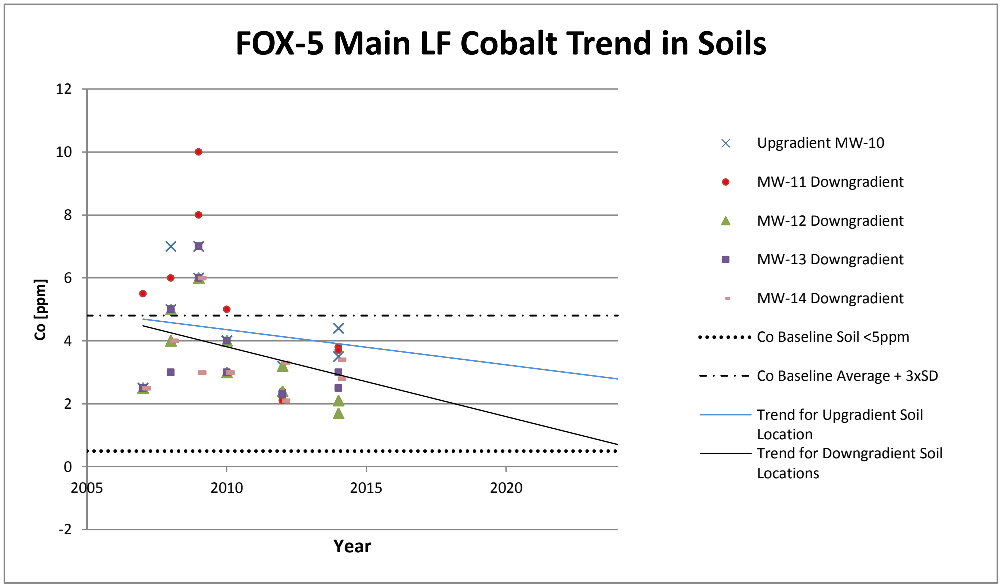
FOX-5 Qikiqtarjuaq (Broughton Island) Main Landfill - Summary of 2007-2024 Soil Charts

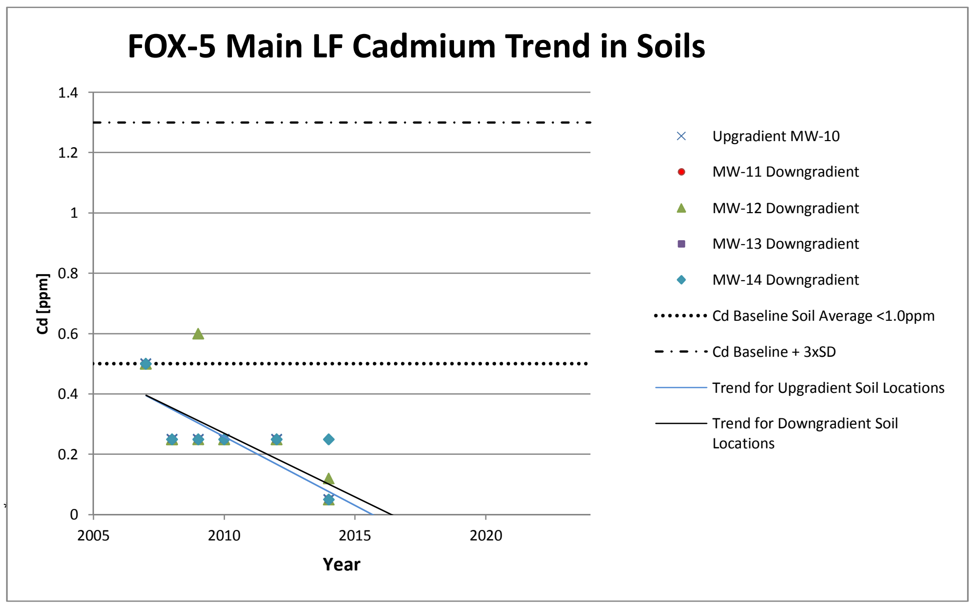
Where results are below detection, half of the detection limit has been used in the charts.



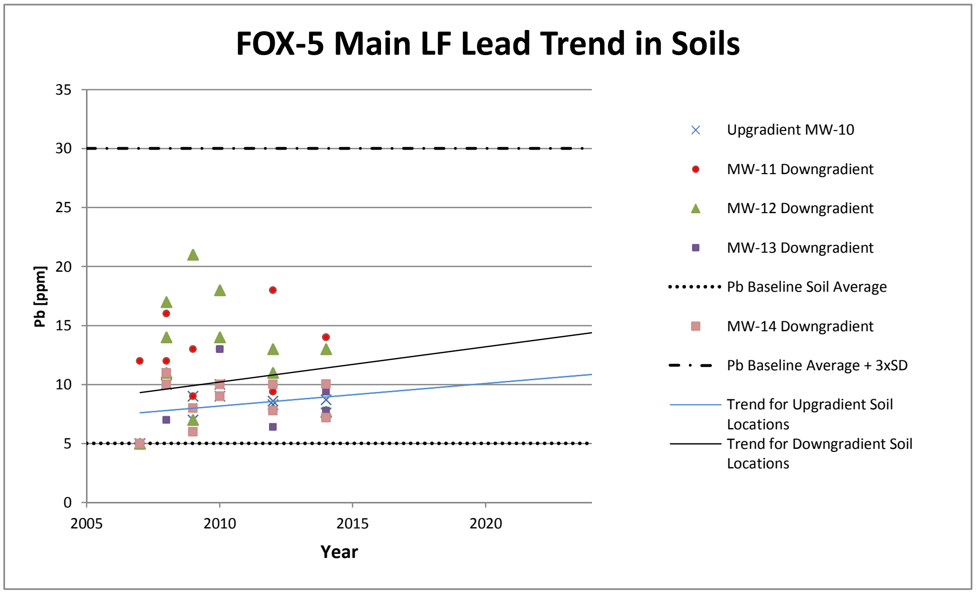


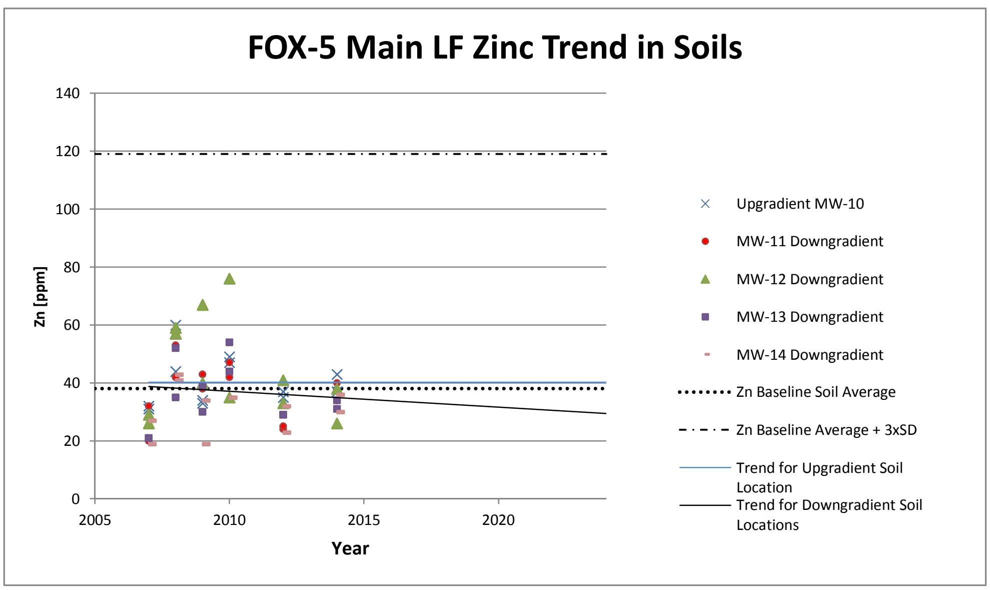
FOX-5 Qikiqtarjuaq (Broughton Island) Main Landfill - Summary of 2007-2024 Soil Charts



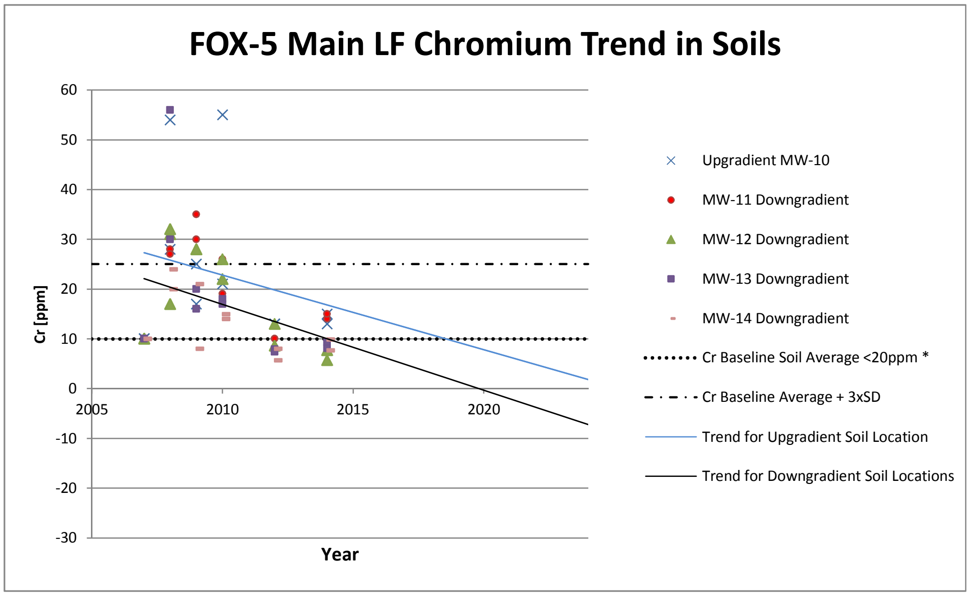


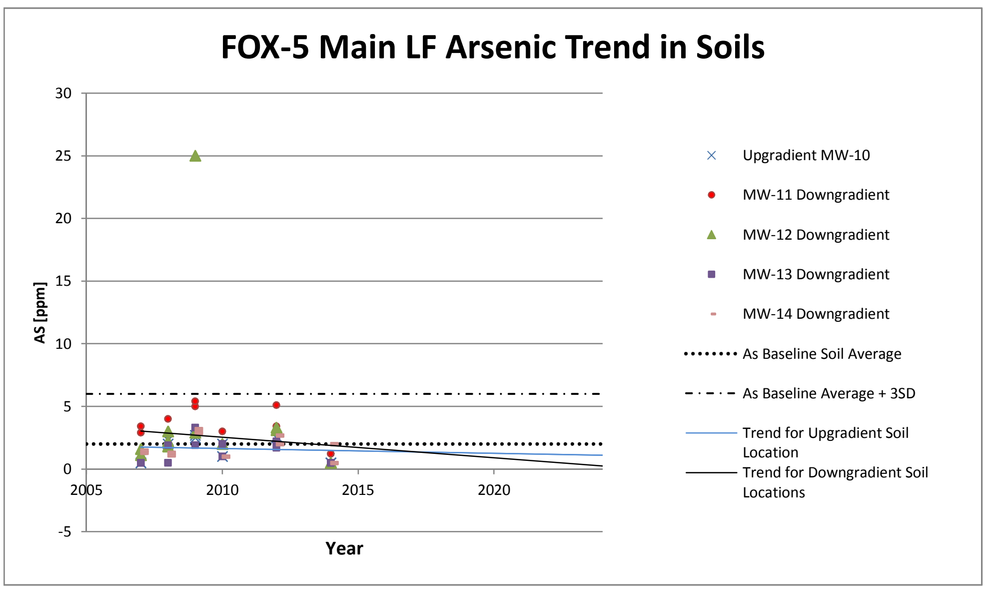
FOX-5 Qikiqtarjuaq (Broughton Island) Main Landfill - Summary of 2007-2024 Soil Charts



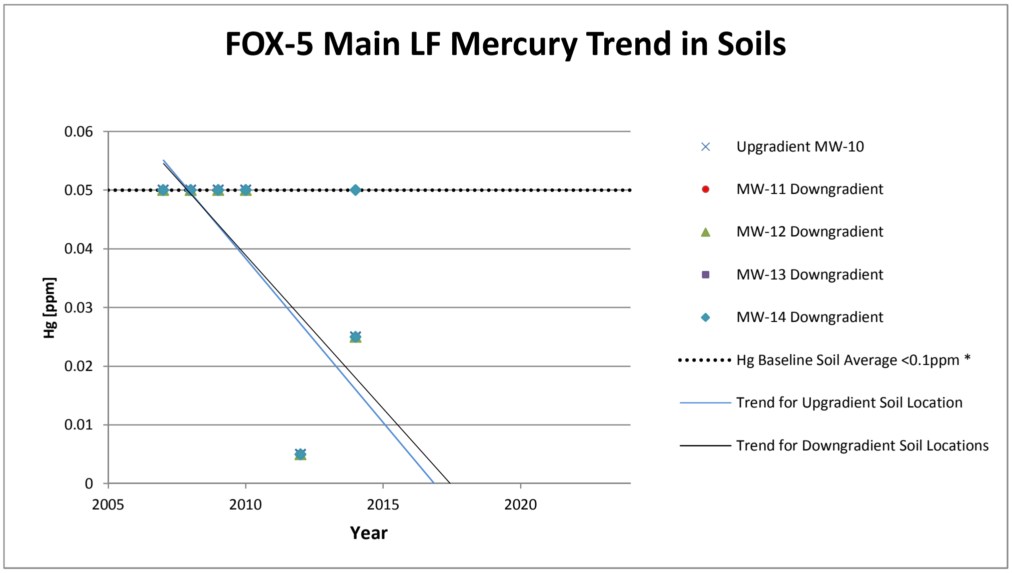


FOX-5 Qikiqtarjuaq (Broughton Island) Main Landfill - Summary of 2007-2024 Soil Charts

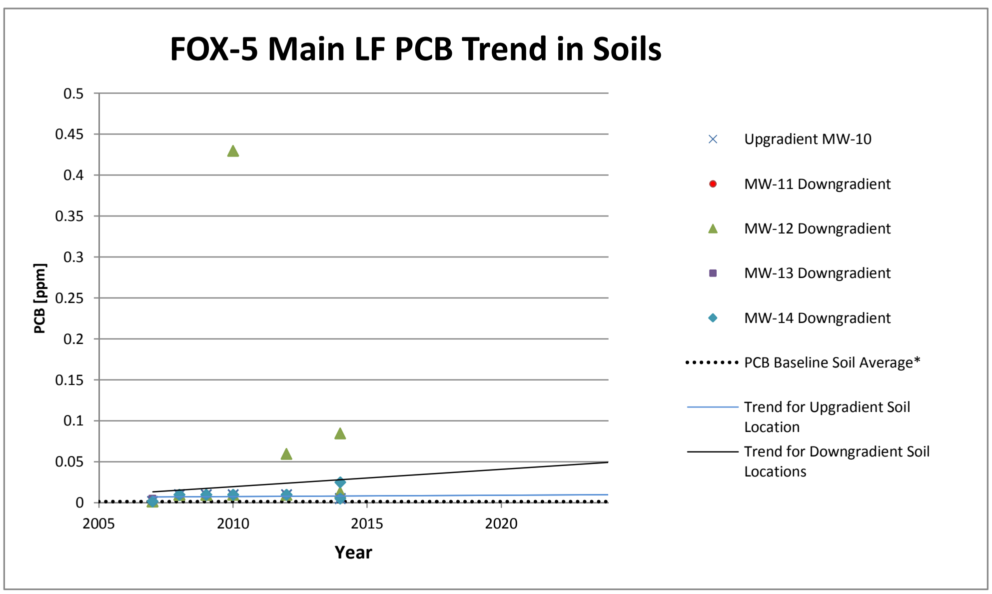




FOX-5 Qikiqtarjuaq (Broughton Island) Main Landfill - Summary of 2007-2024 Soil Charts

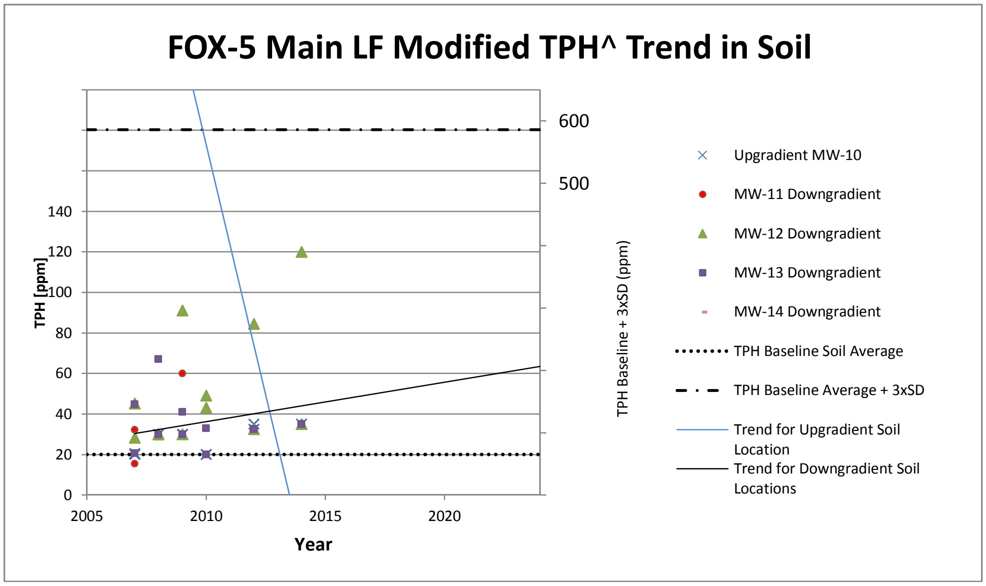


* Hg Baseline SD = 0   All Hg results below detection. Trend reflects changes in detection limits.



* PCB Baseline SD = 0

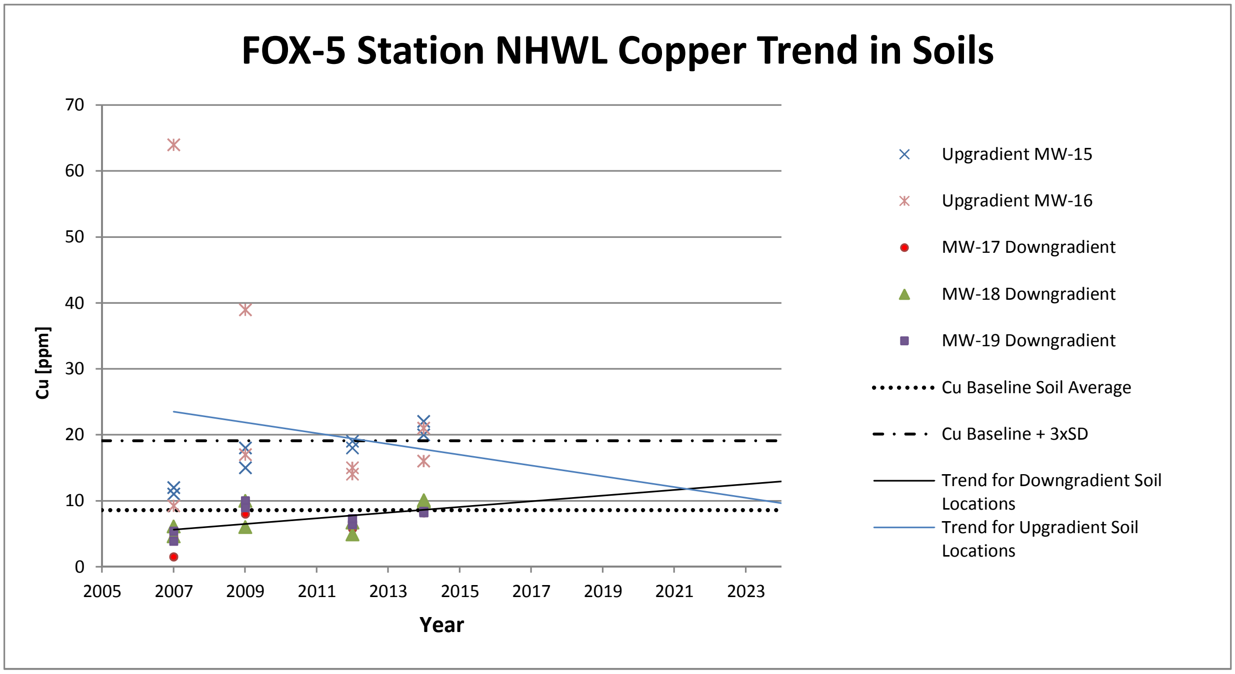
FOX-5 Qikiqtarjuaq (Broughton Island) Main Landfill - Summary of 2007-2024 Soil Charts

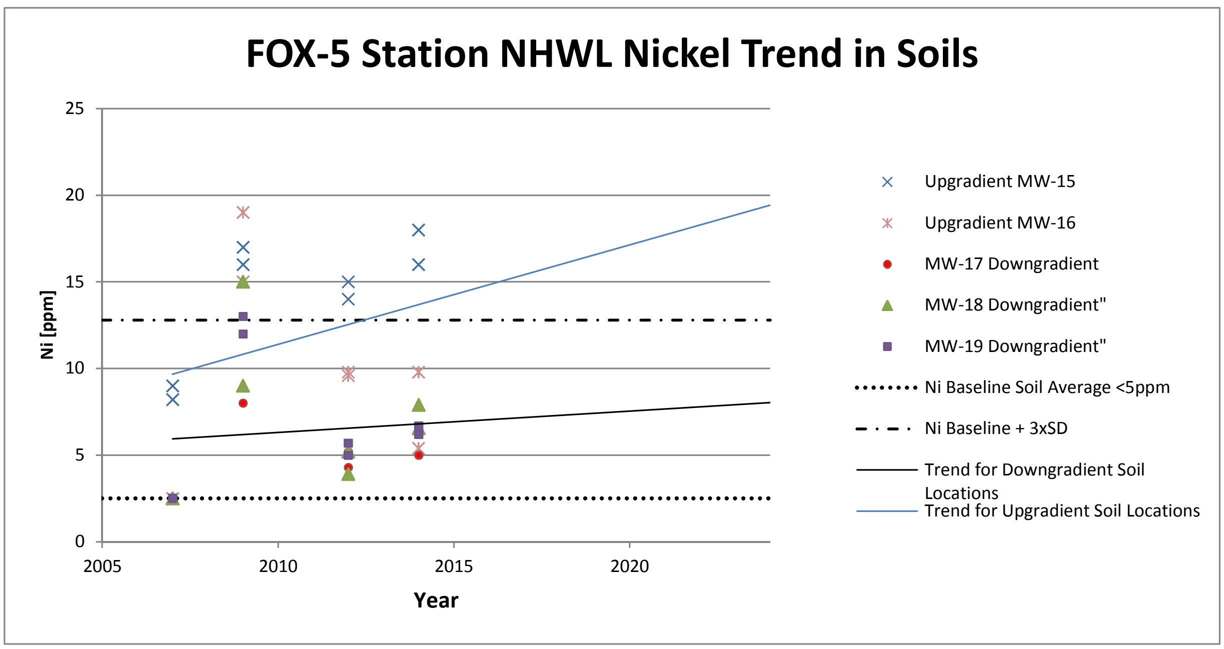


^ Baseline samples from 2002 and earlier were analyzed as TPH, results from 2003 and later are Sum of PHC F1-F3 fraction

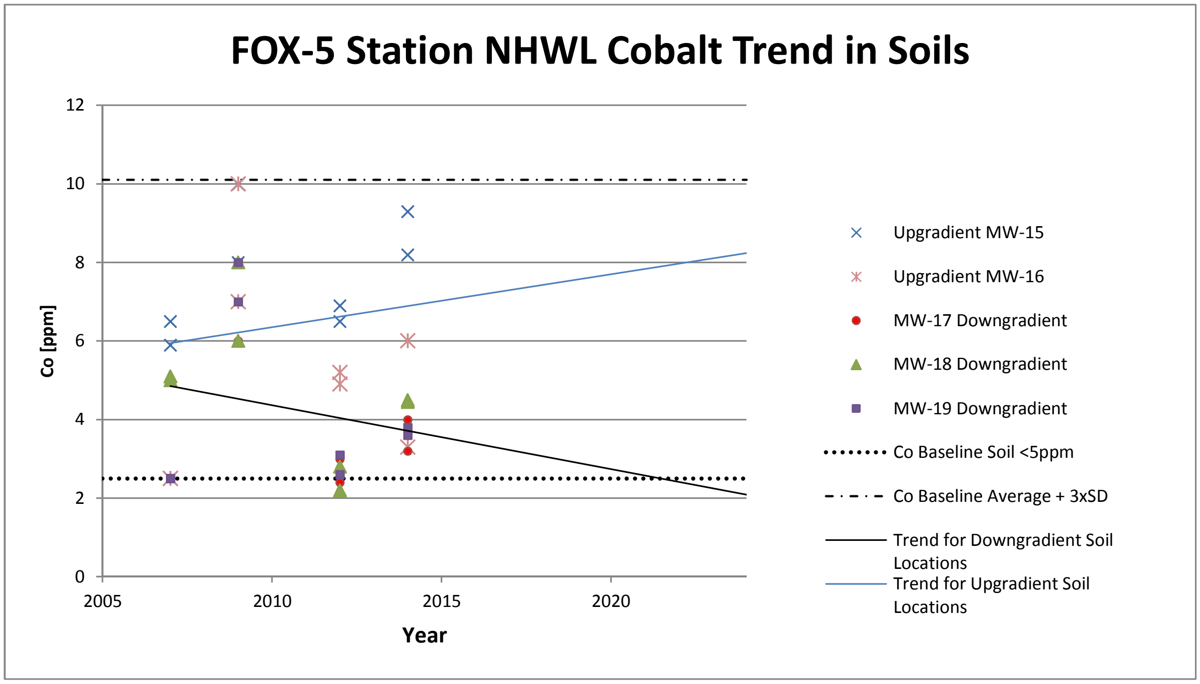
FOX-5 Station NHWL Trends in Soil Inorganics, PCBs and PHCs (modified TPH)

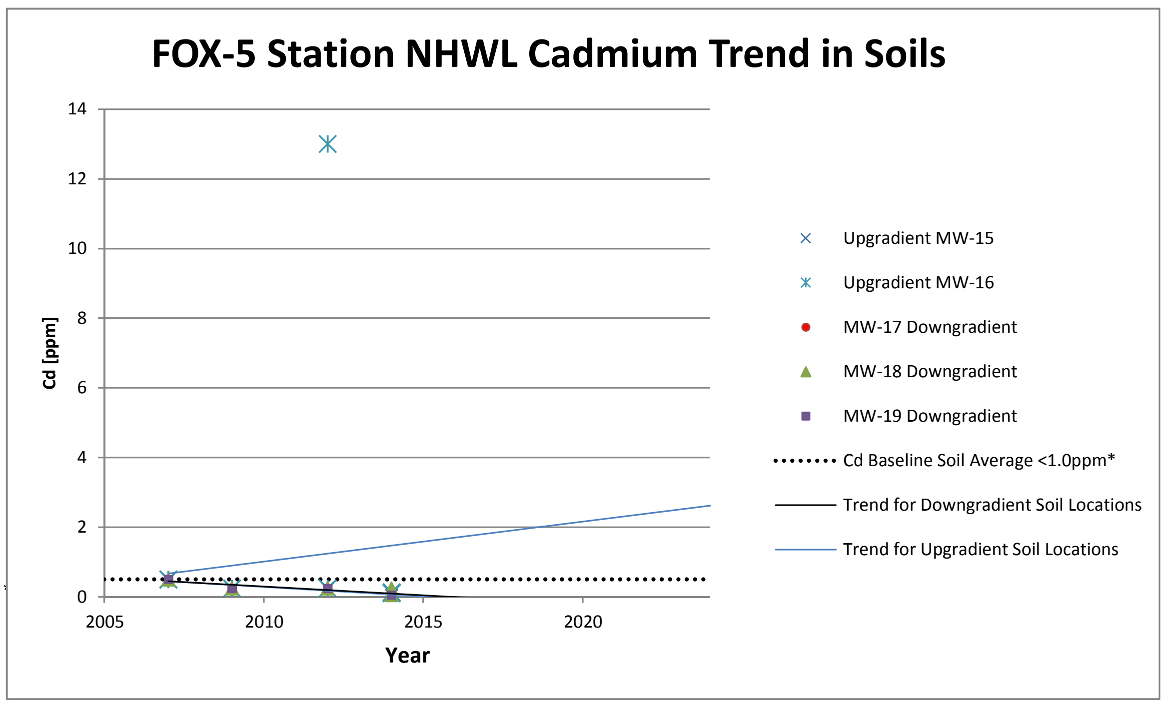
Where results are below detection, half of the detection limit has been used in the charts.





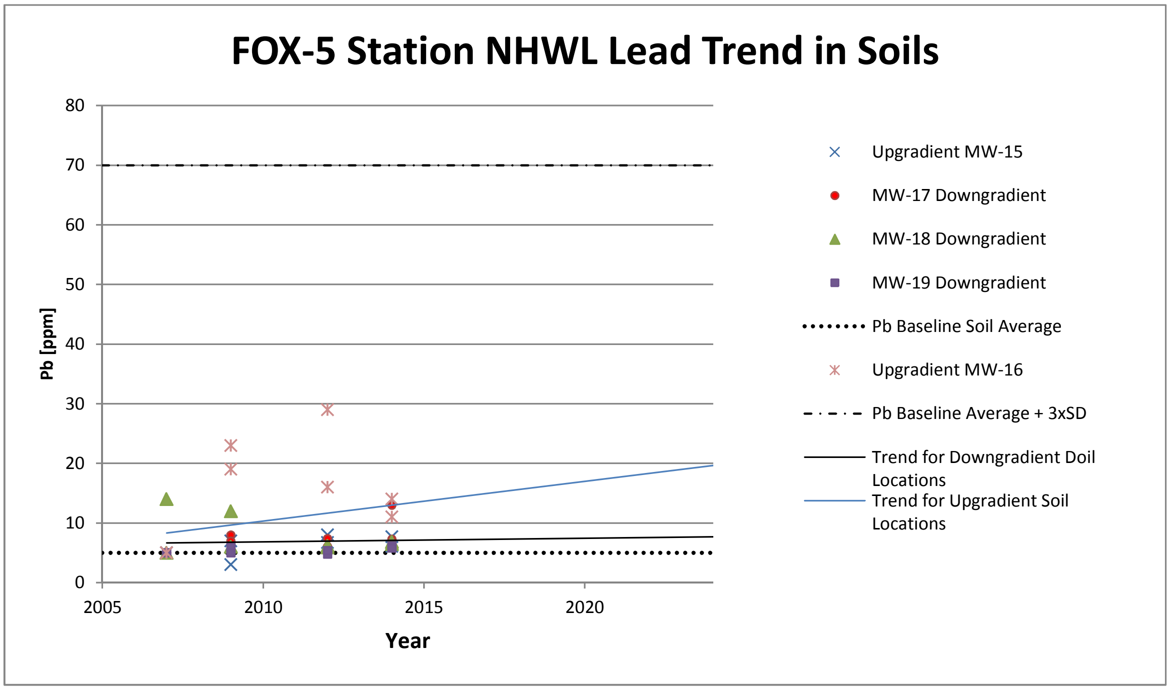
FOX-5 Station NHWL Trends in Soil Inorganics, PCBs and PHCs (modified TPH)

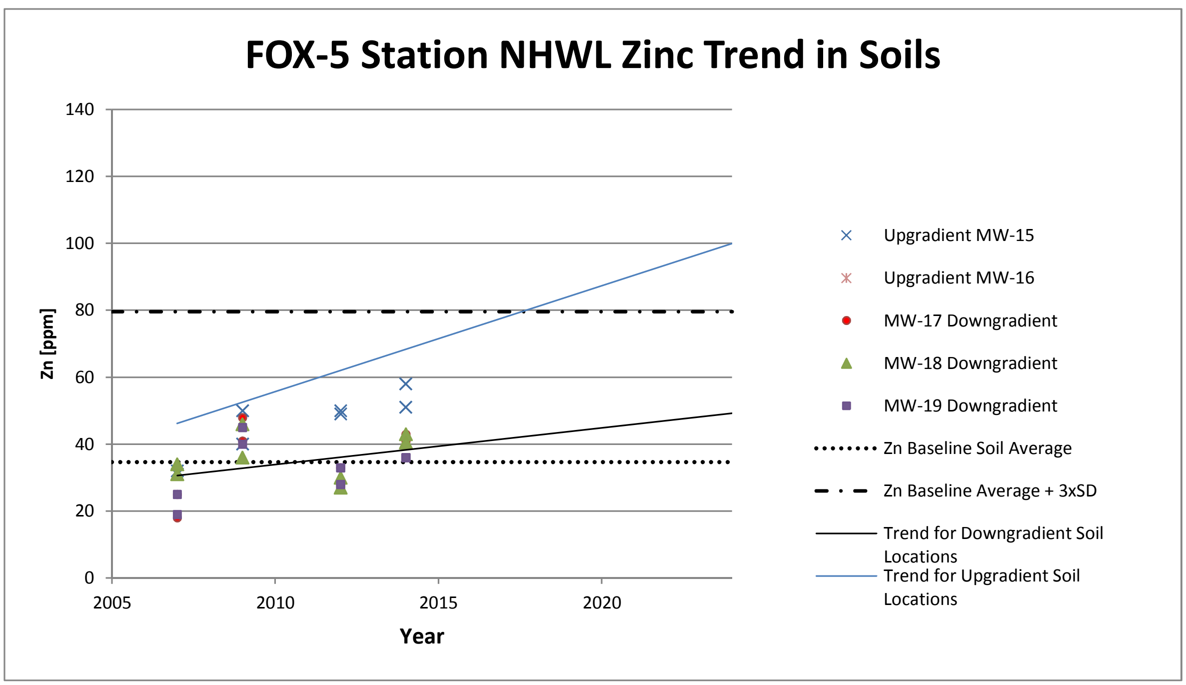




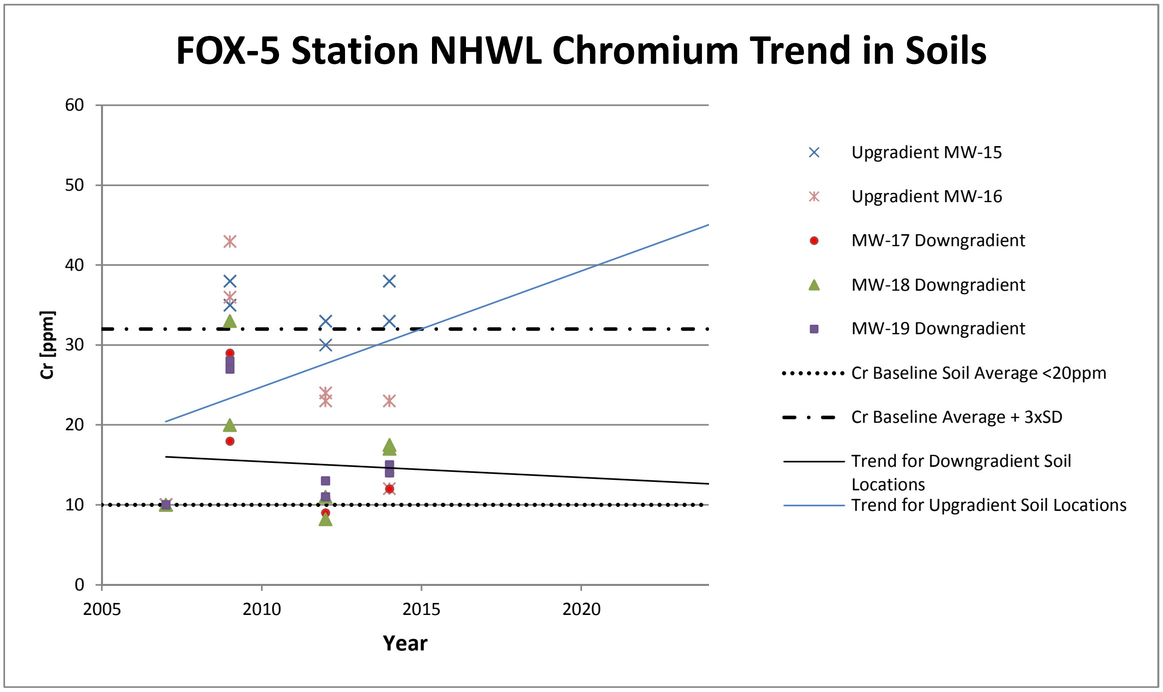
* Cd Baseline SD = 0

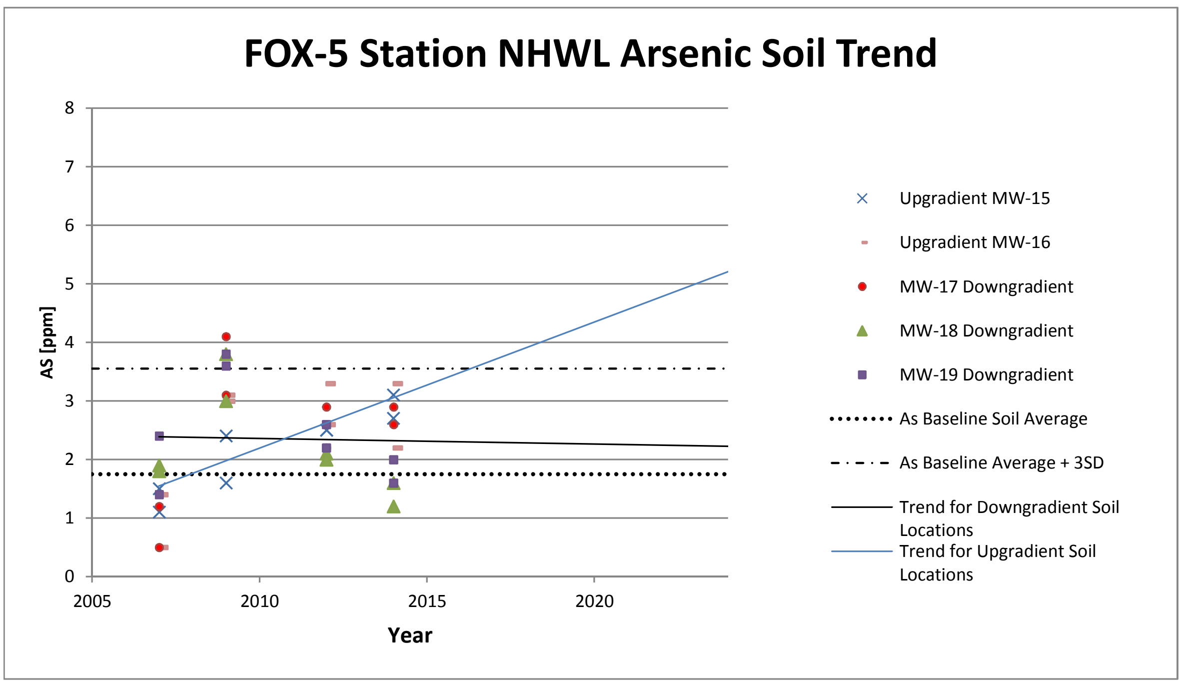
FOX-5 Station NHWL Trends in Soil Inorganics, PCBs and PHCs (modified TPH)



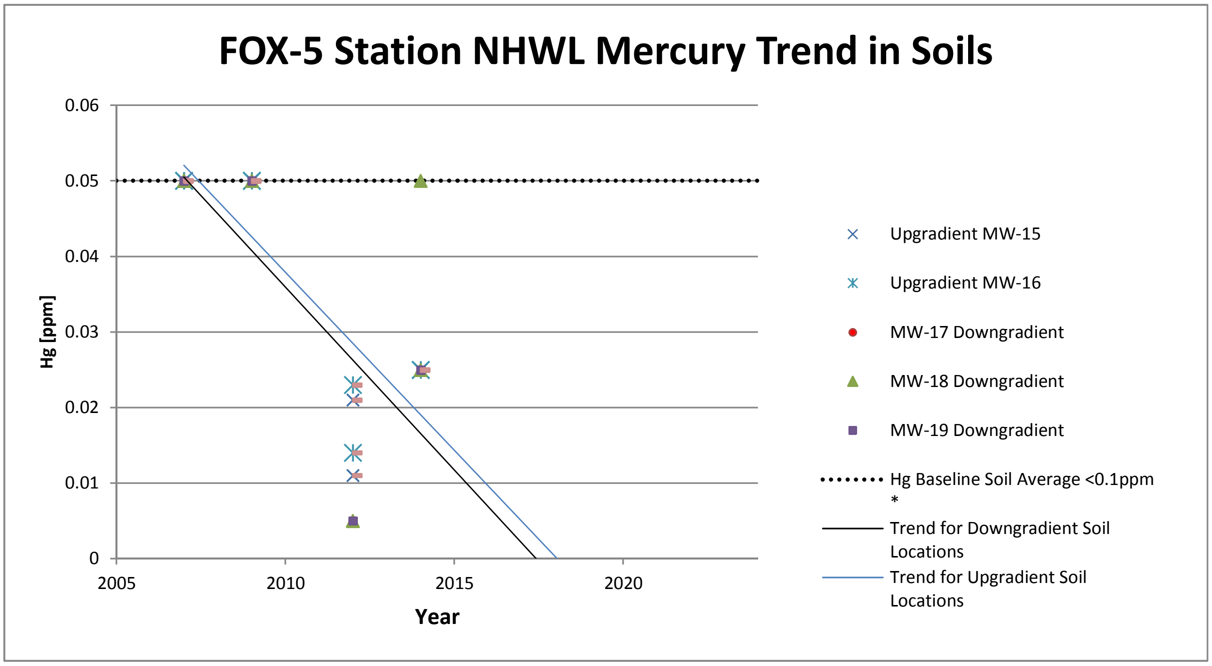


FOX-5 Station NHWL Trends in Soil Inorganics, PCBs and PHCs (modified TPH)

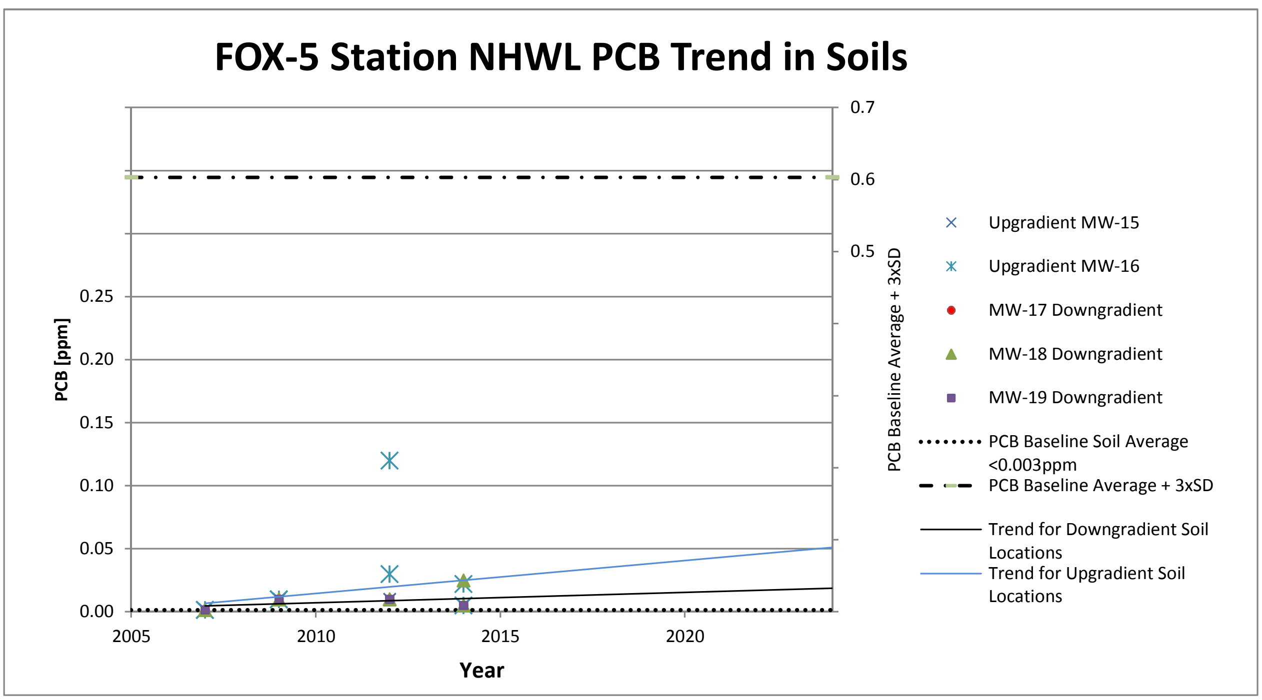




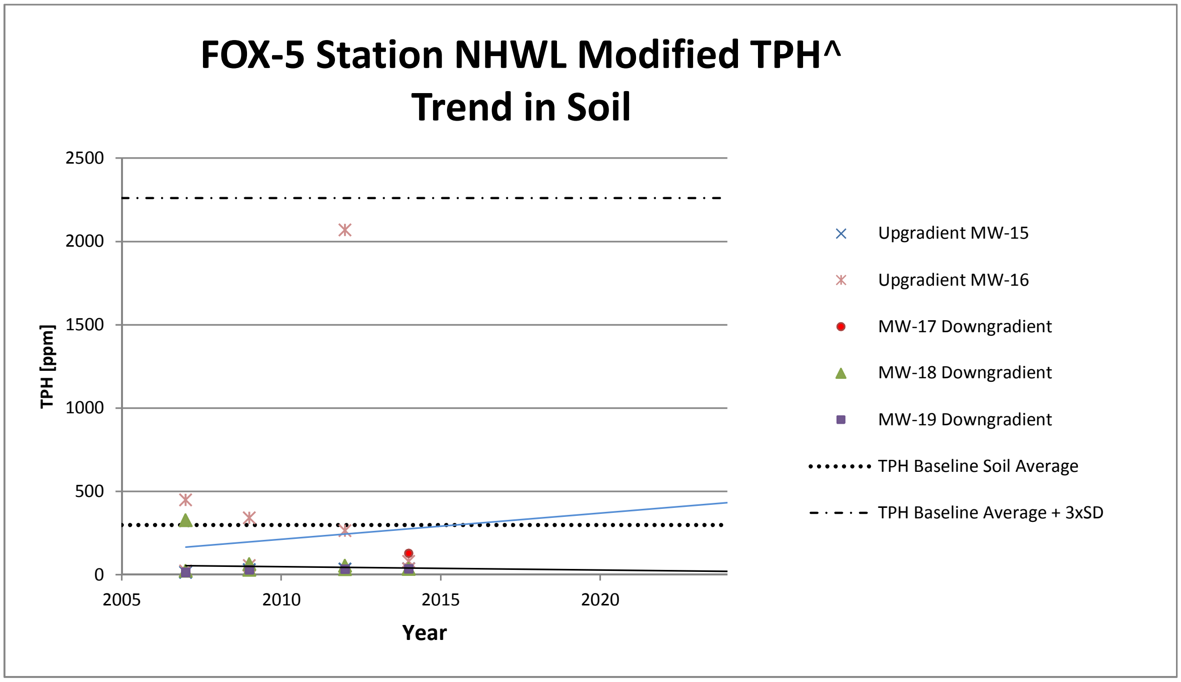
FOX-5 Station NHWL Trends in Soil Inorganics, PCBs and PHCs (modified TPH)



* Hg Baseline SD = 0



FOX-5 Station NHWL Trends in Soil Inorganics, PCBs and PHCs (modified TPH)



^ Baseline samples from 2002 and earlier were analyzed as TPH, results from 2003 and later are Sum of PHC F1-F3 fractions.

APPENDIX G

HISTORICAL CHEMISTRY SUMMARY TABLES (GROUNDWATER)

FOX-5 Qikiqtarjuaq (Broughton Island) Tier II Facility and NHWL (Middle Site) Groundwater Summary

Sample ID	Location	Year	Monitoring Year	Monitoring Phase	Cu	Ni	Co*	Cd*	Pb*	Zn	Cr	As*	Hg*	Total PCBs*	F1 C_6-C_{10}	F2 C_{10}-C_{16}	F3 C_{16}-C_{34}	Modified TPH - Total C6-C34	TPH Identity	
					[mg/L]	[mg/L]	[mg/L]	[mg/L]	[mg/L]	[mg/L]	[mg/L]	[mg/L]	[mg/L]	[mg/L]	[mg/L]	[mg/L]	[mg/L]	[mg/L]	% Fuel Oil	% Lube Oil
Baseline Data - Average					**0.012**	**0.043**	**0.003**	**0.001**	**0.01**	**0.063**	**0.084**	**0.003**	**0.0004**	**0.00002**				**1**		
Baseline Data - Standard Deviation					0.009	0.048	0.001	0	0	0.098	0.092	0	0	0				0		
Baseline Data Average + 3xSD					0.03917	0.18744	0.006	0.001	0.01	0.3571	0.36	0.003	0.0004	0.00002				1		
Detection Limit					<0.0010	<0.0020	<0.0030	<0.0010	<0.010	<0.010	<0.0010	<0.0030	<0.00040	<0.000020				<1.0		
**** If baseline average was below the detection limit, the average has been modified to match the detection limit value.***																				
Monitoring Data															**Total TPH will appear when F1, F2, F3 fractions are entered**					
Upgradient	**MW-5**																			
24724	MW 5	2007	1	Phase I	0.012	**0.044**	<0.0030	<0.0010	<0.010	**0.086**	**0.089**	<0.0030	< 0.00040	< 0.000020	< 0.050	< 0.50	< 1.0	0.775		
210808-148-FOX-5	MW 5	2008	2	Phase I	0.011	<0.005	0.001	<0.0001	0.002	0.020	0.002	<0.001	<0.0001	<0.0001	<0.2	<0.2	<0.2	0.300		
F509-5W	MW 5	2009	3	Phase I	0.002	<0.005	0.000	0.000	<0.001	<0.01	0.002	<0.001	<0.0001	<0.0001	<0.2	<0.2	<0.2	0.300		
F510-5W	MW 5	2010	4	Phase I	0.004	<0.005	0.000	0.000	<0.001	0.010	<0.001	<0.001	<0.0001	<0.0001	<0.1	<0.1	<0.2	0.200		
12-19540/41	MW-5	2012	6	Phase I	0.003	0.004	0.001	<0.00010	0.001	0.013	0.004	<0.0010	<0.00010	<0.000020	<0.025	<0.10	<0.25	0.188		
F5-MID-MW-5	MW-5	2014	8	Phase II	0.009	0.021	0.002	0.000	0.004	0.028	0.036	0.001	<0.00001	<0.00005	<0.025	<0.1	<0.2	0.163		
		2016	10	Phase II														#N/A		
		2021	15	Phase II														#N/A		
		2031	25	Phase II														#N/A		
				Phase III														#N/A		
																		#N/A		
																		#N/A		
																		#N/A		
Downgradient																				
	MW-6																			
24729	MW 6	2007	1	Phase I	**0.018**	**0.100**	<0.0030	<0.0010	<0.010	0.039	**0.210**	<0.0030	< 0.00040	< 0.000020	< 0.050	< 0.50	< 1.0	0.775		
210808-145-FOX5	MW 6	2008	2	Phase I	0.001	<0.005	<0.0002	<0.0001	<0.001	<0.01	<0.001	<0.001	<0.0001	<0.0001	<0.2	<0.2	<0.2	0.300		
F509-6W	MW 6	2009	3	Phase I	0.001	<0.005	0.000	0.000	<0.001	**0.070**	0.001	<0.001	<0.0001	<0.0001	<0.2	<0.2	<0.2	0.300		
F510-6W	MW 6	2010	4	Phase I	0.002	<0.005	<0.0002	0.001	<0.001	0.020	<0.001	<0.001	<0.0001	<0.0001	<0.1	<0.1	<0.2	0.200		
12-19542	MW 6	2012	6	Phase I	0.002	0.003	<0.00050	<0.00010	<0.0010	0.008	0.003	<0.0010	<0.00010	<0.000020	<0.025	<0.10	<0.25	0.188		
No sample collected - well was dry		2014	8	Phase II														#N/A		
		2016	10	Phase II														#N/A		
		2021	15	Phase II														#N/A		
		2031	25	Phase II														#N/A		
				Phase III														#N/A		
																		#N/A		
																		#N/A		
																		#N/A		
	MW-7																			
24734	MW 7	2007	1	Phase I	**0.017**	**0.076**	**0.004**	<0.0010	<0.010	0.032	**0.140**	<0.0030	< 0.00040	< 0.000020	< 0.050	< 0.50	< 1.0	0.775		
210808-142-FOX5	MW 7	2008	2	Phase I	0.006	<0.005	<0.0004	<0.0001	<0.001	<0.01	0.002	<0.001	<0.0001	<0.0001	<0.2	<0.2	<0.2	0.300		
F509-7W	MW 7	2009	3	Phase I	0.001	<0.005	<0.0002	<0.0001	<0.001	<0.01	0.002	<0.001	<0.0001	<0.0001	<0.2	<0.2	<0.2	0.300		
F510-7W	MW-7	2010	4	Phase I	0.003	<0.005	<0.0002	<0.0001	<0.001	<0.01	0.002	<0.001	<0.0001	<0.0001	<0.1	<0.1	0.7	0.800		
	MW-7 - dry	2012	6	Phase I														#N/A		
No sample collected - well was dry		2014	8	Phase II														#N/A		
		2016	10	Phase II														#N/A		
		2021	15	Phase II														#N/A		
		2031	25	Phase II														#N/A		
				Phase III														#N/A		
																		#N/A		
																		#N/A		

FOX-5 Qikiqtarjuaq (Broughton Island) Tier II Facility and NHWL (Middle Site) Groundwater Summary

Sample ID	Location	Year	Monitoring Year	Monitoring Phase	Cu	Ni	Co*	Cd*	Pb*	Zn	Cr	As*	Hg*	Total PCBs*	F1 C_6-C_{10}	F2 C_{10}-C_{16}	F3 C_{16}-C_{34}	Modified TPH - Total C6-C34	TPH Identity	
					[mg/L]	[mg/L]	[mg/L]	[mg/L]	[mg/L]	[mg/L]	[mg/L]	[mg/L]	[mg/L]	[mg/L]	[mg/L]	[mg/L]	[mg/L]	[mg/L]	% Fuel Oil	% Lube Oil
	MW-8																			
24739	MW 8	2007	1	Phase I	**0.015**	**0.062**	<0.0030	<0.0010	<0.010	**0.180**	**0.120**	<0.0030	< 0.00040	< 0.000020	< 0.050	< 0.50	< 1.0	0.775		
210808-137-FOX5	MW 8	2008	2	Phase I	0.003	<0.005	<0.0002	0.000	<0.001	0.030	0.001	<0.001	<0.0001	<0.0001	<0.2	<0.2	<0.2	0.300		
210808-138-FOX5	MW 8	2008	2	Phase I	0.003	<0.005	<0.0002	0.000	<0.001	0.010	<0.001	<0.001	<0.0001	<0.0001	<0.2	<0.2	<0.2	0.300		
F509-8W	MW 8	2009	3	Phase I	<0.001	<0.005	<0.0002	0.000	<0.001	0.040	<0.001	<0.001	<0.0001	<0.0001	<0.2	<0.2	<0.2	0.300		
F510-8W	MW 8	2010	4	Phase I	0.009	<0.005	0.000	0.001	<0.001	0.020	<0.001	<0.001	<0.0001	<0.0001	<0.1	<0.1	<0.2	0.200		
12-19543	MW 8	2012	6	Phase I	0.002	0.003	<0.00050	<0.00010	<0.0010	0.012	0.004	<0.0010	<0.00010	<0.000020	<0.025	<0.10	<0.25	0.188		
F5-MID-MW-8	MW-8	2014	8	Phase II	0.004	0.012	0.002	0.000	0.002	0.037	0.020	0.001	<0.00001	<0.00005	<0.025	<0.1	<0.2	0.163		
		2016	10	Phase II														#N/A		
		2021	15	Phase II														#N/A		
		2031	25	Phase II														#N/A		
				Phase III														#N/A		
																		#N/A		
																		#N/A		
																		#N/A		
	MW-9																			
24744	MW 9	2007	1	Phase I	**0.029**	**0.100**	<0.0030	<0.0010	<0.010	0.042	**0.200**	<0.0030	< 0.00040	< 0.000020	< 0.050	< 0.50	< 1.0	0.775		
210808-134-FOX5	MW 9	2008	2	Phase I	0.007	<0.005	0.001	0.000	<0.001	0.020	<0.001	<0.001	<0.0001	<0.0001	<0.2	<0.2	<0.2	0.300		
F509-9W	MW 9	2009	3	Phase I	0.001	<0.005	<0.0002	<0.0001	<0.001	<0.01	<0.001	<0.001	<0.0001	<0.0001	<0.2	<0.2	<0.2	0.300		
F510-9W	MW 9	2010	4	Phase I	0.003	<0.005	<0.0002	0.000	<0.001	<0.01	<0.001	<0.001	<0.0001	<0.0001	<0.1	<0.1	<0.2	0.200		
12-19544	MW 9	2012	6	Phase I	0.002	0.003	<0.00050	<0.00010	<0.0010	0.006	0.003	<0.0010	<0.00010	<0.000020	<0.025	<0.10	<0.25	0.188		
F5-MID-MW-9	MW-9	2014	8	Phase II	**0.014**	0.023	0.002	0.000	0.003	**0.064**	0.036	0.001	<0.00001	<0.00005	<0.025	<0.1	<0.2	0.163		
		2016	10	Phase II														#N/A		
		2021	15	Phase II														#N/A		
		2031	25	Phase II														#N/A		
				Phase III														#N/A		
																		#N/A		
																		#N/A		
																		#N/A		

^Note: Total Hydrocarbons (C_6-C_{34}) has been calculated by adding results for F1, F2 and F3.

FOX-5 Broughton Island Main Landfill - Summary of Groundwater Analytical Data

Sample ID	Location	Year	Monitoring Year	Monitoring Phase	Cu [mg/L]	Ni [mg/L]	Co* [mg/L]	Cd* [mg/L]	Pb* [mg/L]	Zn [mg/L]	Cr [mg/L]	As* [mg/L]	Hg* [mg/L]	Total PCBs* [mg/L]	F1 C_6-C_{10} [mg/L]	F2 C_{10}-C_{16} [mg/L]	F3 C_{16}-C_{34} [mg/L]	Modified TPH - Total C6-C34 [mg/L]	TPH Identity % Fuel Oil	% Lube Oil
Baseline Data - Average					**0.062**	**0.047**	**0.003**	**0.001**	**0.01**	**0.11**	**0.084**	**0.003**	**0.0004**	**0.00002**				**1**		
Baseline Data - Standard Deviation					0.069	0.036	0.015	0	0	0.138	0.101	0.0046	0	0				0		
Baseline Data Average + 3xSD					0.27	0.16	0.048	0.001	0.01	0.52	0.39	0.017	0.0004	0.00002				1		
Detection Limit					<0.0010	<0.0020	<0.0030	<0.0010	<0.010	<0.010	<0.0010	<0.0030	<0.00040	<0.000020				<1.0		
If baseline average was below the detection limit, the average has been modified to match the detection limit value.																				
Monitoring Data																				
Upgradient														**Total TPH will appear when F1, F2, F3 fractions are entered**						
	MW-10																			
24749/97	MW 10	2007	1	Phase I	0.014	**0.067**	**0.004**	<0.0010	<0.010	0.026	**0.13**	<0.0030	< 0.00040	< 0.000020	< 0.050	< 0.50	< 1.0	0.8		
200808-130-FOX5	MW-10	2008	2	Phase I	0.001	<0.005	<0.0002	0.00010	<0.001	0.01	0.001	<0.001	<0.0001	<0.0001	<0.2	<0.2	<0.2	0.3		
F509-10W	MW 10	2009	3	Phase I	<0.001	<0.005	<0.0002	0.00010	<0.001	0.07	<0.001	<0.001	<0.0001	<0.0001	<0.2	<0.2	<0.2	0.3		
F510-10W	MW10	2010	4	Phase I	<0.001	<0.005	<0.0002	0.00020	<0.001	<0.01	<0.001	<0.001	<0.0001	<0.0001	<0.1	<0.1	<0.2	0.2		
12-19550/51	MW-10	2012	6	Phase I	0.002	0.004	0.001	<0.00010	<0.0010	0.011	0.0073	<0.0010	<0.00010	<0.000020	<0.025	<0.10	<0.25	0.2		
No sample collected - well was dry		2014	8	Phase II														#N/A		
		2016	10	Phase II														#N/A		
		2021	15	Phase II														#N/A		
		2031	25	Phase II														#N/A		
				Phase III														#N/A		
																		#N/A		
																		#N/A		
																		#N/A		
Downgradient																				
	MW-11																			
24754	MW 11	2007	1	Phase I	0.012	**0.081**	<0.0030	<0.0010	<0.010	0.012	**0.16**	<0.0030	< 0.00040	< 0.000020	< 0.050	< 0.50	< 1.0	0.8		
200808-118-FOX-5	MW-11	2008	2	Phase I	0.002	0.006	0.000	0.0006	<0.001	0.01	0.01	<0.001	<0.0001	<0.0001	<0.2	<0.2	<0.2	0.3		
F509-11W	MW 11	2009	3	Phase I	<0.001	<0.005	<0.0002	**0.001**	<0.001	<0.01	<0.001	<0.001	<0.0001	<0.0001	<0.2	<0.2	<0.2	0.3		
F510-11W	MW-11	2010	4	Phase I	0.001	<0.005	<0.0002	0.0006	<0.001	<0.01	<0.001	<0.001	<0.0001	<0.0001	<0.1	<0.1	<0.2	0.2		
12-199554	MW-11	2012	6	Phase I	0.001	0.006	<0.00050	<0.00010	<0.0010	0.0045	0.0059	<0.0010	<0.00010	<0.000020	<0.025	<0.10	<0.25	0.2		
No sample collected - insufficient water		2014	8	Phase II														#N/A		
		2016	10	Phase II														#N/A		
		2021	15	Phase II														#N/A		
		2031	25	Phase II														#N/A		
				Phase III														#N/A		
																		#N/A		
																		#N/A		
																		#N/A		
	MW-12																			
24759	MW 12 - dry	2007	1	Phase I														#N/A		
	MW-12 - dry	2008	2	Phase I														#N/A		
F510-12W	MW-12	2010	3	Phase I	0.005	<0.005	<0.0002	0.0004	<0.001	0.02	<0.001	<0.001	<0.0001	<0.0001				#N/A		
	MW-12 - frozen	2012	4	Phase I														#N/A		
No sample collected - well was dry		2014	6	Phase I														#N/A		
		2016	8	Phase II														#N/A		
		2021	10	Phase II														#N/A		
		2031	15	Phase II														#N/A		
			25	Phase II														#N/A		
				Phase III														#N/A		
																		#N/A		
																		#N/A		

																		#N/A		
	MW-13																			
24764	MW 13	2007	1	Phase I	**0.069**	**0.053**	**0.004**	<0.0010	<0.010	**0.23**	**0.087**	<0.0030	< 0.00040	< 0.000020	< 0.050	< 0.50	< 1.0	0.8		
200808-124-FOX-5	MW-13	2008	2	Phase I	**0.075**	0.023	0.001	0.0003	0.004	0.07	0.08	<0.001	<0.0001	<0.0001	<0.2	<0.2	<0.2	0.3		
F509-13W	MW 13	2009	3	Phase I	0.001	<0.005	<0.0002	0.0007	<0.001	**0.14**	<0.001	<0.001	<0.0001	<0.0001	<0.2	<0.2	<0.2	0.3		
F510-13W	MW-13	2010	4	Phase I	0.004	<0.005	<0.0002	<0.0001	<0.001	0.02	0.001	<0.001	<0.0001	<0.0001	<0.1	0.6	0.6	**1.3**		
12-19553	MW-13	2012	6	Phase I	0.025	<0.020	<0.0050	<0.00090	**0.011**	0.061	0.042	<0.010	<0.00010					#N/A		
F5-MN-MW-13	MW-13	2014	8	Phase II	0.015	0.014	0.003	0.000	0.005	**0.22**	0.034	0.0014	0.00001	<0.00005	<0.025	<0.100	<0.100	0.1		
		2016	10	Phase II														#N/A		
		2021	15	Phase II														#N/A		
		2031	25	Phase II														#N/A		
				Phase III														#N/A		
																		#N/A		
																		#N/A		
																		#N/A		
	MW-14																			
24769	MW 14	2007	1	Phase I	0.021	**0.049**	<0.0030	<0.0010	<0.010	0.089	**0.088**	<0.0030	< 0.00040	< 0.000020	< 0.050	< 0.50	< 1.0	0.8		
200808-127-FOX-5	MW-14	2008	2	Phase I	0.010	0.005	0.000	**0.001**	0.001	0.02	0.012	<0.001	<0.0001	<0.0001	<0.2	<0.2	<0.2	0.3		
F509-14W	MW 14	2009	3	Phase I	<0.001	<0.005	<0.0002	**0.001**	<0.001	**0.2**	0.001	<0.001	<0.0001	<0.0001	<0.2	<0.2	<0.2	0.3		
F510-14W	MW-14	2010	4	Phase I	<0.001	<0.005	<0.0002	0.0002	<0.001	0.01	<0.001	<0.001	<0.0001	<0.0001	<0.1	<0.2	ND	0.2		
12-19552	MW-14	2012	6	Phase I	0.006	0.006	<0.00050	<0.00010	0.001	0.041	0.011	<0.0010	<0.00010	<0.000020	<0.025	<0.10	<0.25	0.2		
F5-MN-MW-14	MW-14	2014	8	Phase II	0.003	0.007	0.001	0.000	0.002	0.048	0.015	0.00072	<0.0001	<0.0001	<0.025	<0.1	<0.1	0.1		
		2016	10	Phase II														#N/A		
		2021	15	Phase II														#N/A		
		2031	25	Phase II														#N/A		
				Phase III														#N/A		
																		#N/A		
																		#N/A		
																		#N/A		

^Note: Total Hydrocarbons (C_6-C_{34}) has been calculated by adding results for F1, F2 and F3.

FOX-5 Qikiqtarjuaq (Broughton Island) Station NHWL - Summary of Groundwater Analytical Data

Sample ID	Location	Date	Monitoring Year	Monitoring Phase	Cu [mg/L]	Ni [mg/L]	Co* [mg/L]	Cd* [mg/L]	Pb* [mg/L]	Zn [mg/L]	Cr [mg/L]	As* [mg/L]	Hg* [mg/L]	Total PCBs* [mg/L]	F1 C_6-C_{10} [mg/L]	F2 C_{10}-C_{16} [mg/L]	F3 C_{16}-C_{34} [mg/L]	Modified TPH - Total C6-C34 [mg/L]	TPH Identity % Fuel Oil	TPH Identity % Lube Oil
Baseline Data - Average					**0.036**	**0.075**	**0.010**	**0.001**	**0.01**	**0.097**	**0.116**	**0.003**	**0.004**	**0.00002**				**1**		
Baseline Data - Standard Deviation					0.019	0.037	0.01	0	0	0.075	0.084	0.002	0	0				0		
Baseline Data Average + 3xSD					0.0929091	0.1857273	0.04032727	0.001	0.01	0.321529614	0.367821705	0.009	0.004	0.00002				1		
Detection Limit					<0.0010	<0.0020	<0.0030	<0.0010	<0.010	<0.010	<0.0010	<0.0030	<0.00040	<0.000020				<1.0		
If baseline average was below the detection limit, the average has been modified to match the detection limit value.																				
Monitoring Data																				
Upgradient															**Total TPH will appear when F1, F2, F3 fractions are entered**					
	MW-15																			
24779	MW 15	2007	1	Phase I	0.024	**0.160**	0.007	<0.0010	<0.010	0.052	**0.33**	<0.0030	< 0.00040	< 0.000020	< 0.050	< 0.50	< 1.0	0.775		
F509-15W	MW 15	2009	3	Phase I	<0.001	<0.005	<0.0002	**0.001**	<0.001	0.04	<0.001	<0.001	<0.0001	<0.0001	<0.2	<0.2	<0.2	0.300		
12-19545	MW-15	2012	6	Phase I	<0.010	<0.020	<0.0050	<0.00090	<0.010	0.032	0.03	<0.010	<0.00010	<0.000022	<0.025	<0.10	0.56	0.623		
F5-SA-MW-15	MW-15	2014	8	Phase II	0.001	0.009	0.000	<0.000020	0.000	0.020	0.02	<0.00020	<0.00001	<0.00005	<0.025	<0.1	<0.2	0.163		
		2016	10	Phase II														#N/A		
		2021	15	Phase II														#N/A		
		2031	25	Phase II														#N/A		
				Phase III														#N/A		
																		#N/A		
																		#N/A		
																		#N/A		
	MW-16																			
24774	MW 16	2007	1	Phase I	0.031	0.060	0.009	<0.0010	<0.010	**0.12**	0.11	<0.0030	< 0.00040	< 0.000020	< 0.050	< 0.50	< 1.0	0.775		
F509-16W	MW 16	2009	3	Phase I	0.003	<0.005	0.001	**0.001**	<0.001	0.09	0.002	<0.001	<0.0001	<0.0001	<0.2	0.2	0.2	0.500		
12-19546	MW-16	2012	6	Phase I	0.031	0.024	0.006	<0.00090	**0.012**	**0.82**	0.05	<0.010	<0.00010	<0.000050	<0.025	0.69	1.04	**1.743**		
F5-SA-MW-16	MW-16	2014	8	Phase II	**0.041**	0.020	0.009	0.001	**0.022**	**0.370**	0.05	**0.004**	0.000	<0.00005	<0.025	0.45	<0.2	0.563		
		2016	10	Phase II														#N/A		
		2021	15	Phase II														#N/A		
		2031	25	Phase II														#N/A		
				Phase III														#N/A		
																		#N/A		
																		#N/A		
																		#N/A		
Downgradient																				
	MW-17																			
24794	MW 17	2007	1	Phase I	0.011	0.038	<0.0030	<0.0010	<0.010	0.021	0.07	<0.0030	< 0.00040	< 0.000020	< 0.050	< 0.50	< 1.0	0.775		
F509-17W	MW 17	2009	3	Phase I	0.004	<0.005	0.000	**0.003**	<0.001	0.020	0.004	<0.001	<0.0001	<0.0001	<0.2	<0.2	0.4	0.600		
12-19547	MW-17	2012	6	Phase I	0.005	0.012	0.001	<0.00010	0.001	0.006	0.02	<0.0010	<0.00010	<0.000020	<0.025	<0.10	<0.25	0.188		
No sample collected - insufficient water		2014	8	Phase II														#N/A		
		2016	10	Phase II														#N/A		
		2021	15	Phase II														#N/A		
		2031	25	Phase II														#N/A		
				Phase III														#N/A		
																		#N/A		
																		#N/A		
																		#N/A		
	MW-18																			
24789	MW 18	2007	1	Phase I	**0.058**	**0.160**	0.003	<0.0010	<0.010	**0.120**	**0.32**	<0.0030	< 0.00040	< 0.000020	< 0.050	< 0.50	< 1.0	0.775		
F509-18W	MW 18	2009	3	Phase I	0.009	<0.005	0.000	0.0004	<0.001	0.040	0.00	<0.001	<0.0001		<0.2			0.100		
12-10948	MW-18	2012	6	Phase I	0.013	0.025	0.001	<0.00010	0.001	0.026	0.05	<0.0010	<0.00010	<0.000023	<0.025	<0.10	<0.25	0.188		

FOX-5 Qikiqtarjuaq (Broughton Island) Station NHWL - Summary of Groundwater Analytical Data

Sample ID	Location	Date	Monitoring Year	Monitoring Phase	Cu	Ni	Co*	Cd*	Pb*	Zn	Cr	As*	Hg*	Total PCBs*	F1 C_6 C_{10}	F2 C_{10}-C_{16}	F3 C_{16}-C_{34}	Modified TPH - Total C6-C34	TPH Identity	
					[mg/L]	[mg/L]	[mg/L]	[mg/L]	[mg/L]	[mg/L]	[mg/L]	[mg/L]	[mg/L]	[mg/L]	[mg/L]	[mg/L]	[mg/L]	[mg/L]	% Fuel Oil	% Lube Oil
No sample collected - insufficient water		2014	8	Phase II														#N/A		
		2016	10	Phase II														#N/A		
		2021	15	Phase II														#N/A		
		2031	25	Phase II														#N/A		
				Phase III														#N/A		
																		#N/A		
																		#N/A		
																		#N/A		
	MW-19																			
24784	MW 19	2007	1	Phase I	0.032	0.052	**0.013**	<0.0010	<0.010	**0.100**	0.11	<0.0030	< 0.00040	< 0.000020	< 0.050	< 0.50	< 1.0	0.775		
F509-19W	MW-19	2009	3	Phase I	<0.001	<0.005	<0.0002	**0.004**	<0.001	<0.01	<0.001	<0.001	<0.0001	<0.0001		<0.2	<0.2	0.200		
12-19549	MW-19	2012	6	Phase I	**0.058**	0.053	**0.011**	<0.00090	**0.013**	**0.130**	0.08	<0.010	<0.00010	<0.000020	<0.025	<0.10	<0.25	0.188		
F5-SA-MW-19	MW-19	2014	8	Phase II	0.022	0.017	0.007	0.000	0.008	**0.110**	0.04	0.003	<0.00001	<0.00005	<0.025	<0.100	<0.100	0.113		
		2016	10	Phase II														#N/A		
		2021	15	Phase II														#N/A		
		2031	25	Phase II														#N/A		
				Phase III														#N/A		
																		#N/A		
																		#N/A		
																		#N/A		

^Note: Total Hydrocarbons (C_6-C_{34}) has been calculated by adding results for F1, F2 and F3.

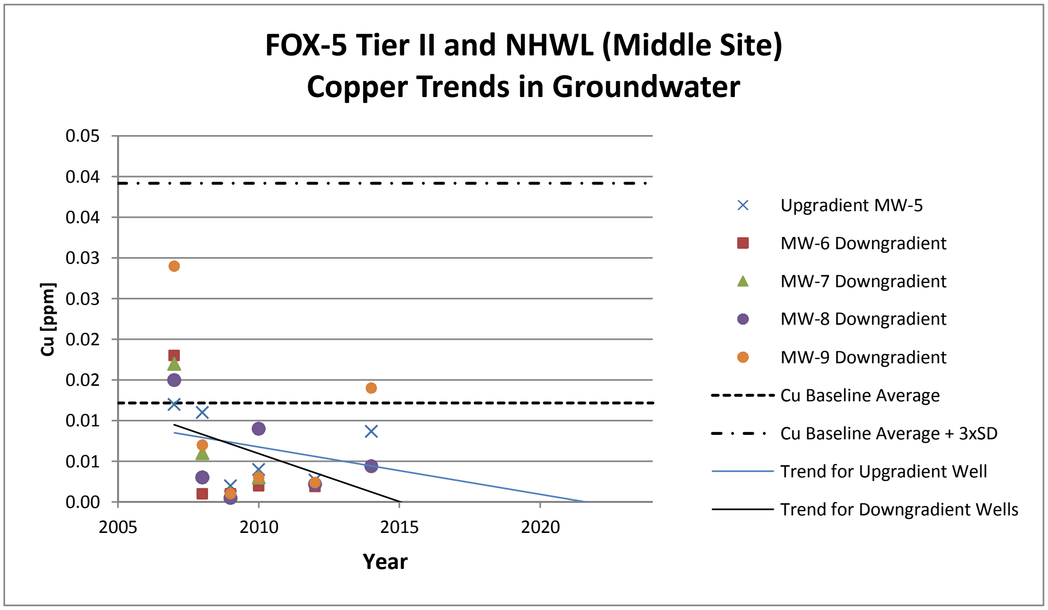
The Station Non-Hazardous Waste Landfill was visually assessed in 2008 and 2010 but soil and groundwater samples were not taken as per the monitoring contract.

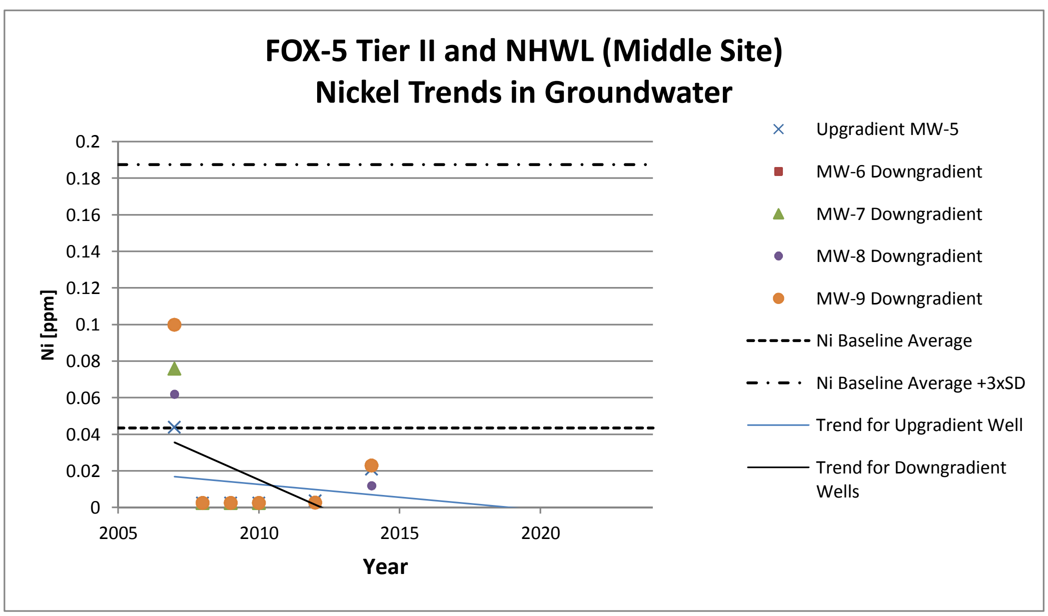
APPENDIX H

CHEMICAL CONCENTRATION TREND GRAPHS (GROUNDWATER)

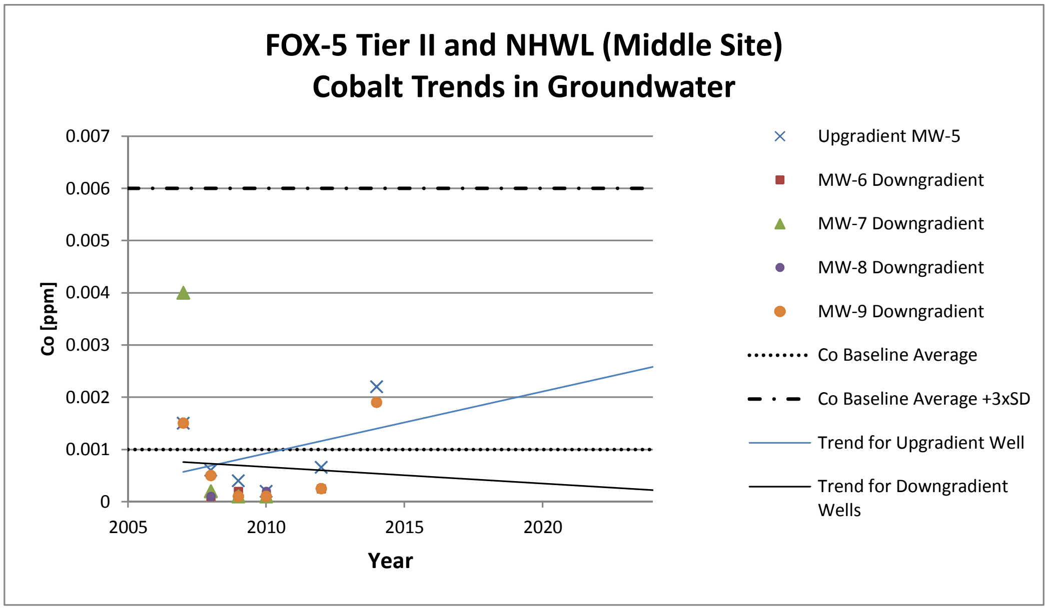
FOX-5 Tier II and NHWL (Middle Site) Graphs of Trends for Inorganic Elements, PCBs and TPH in Groundwater Samples

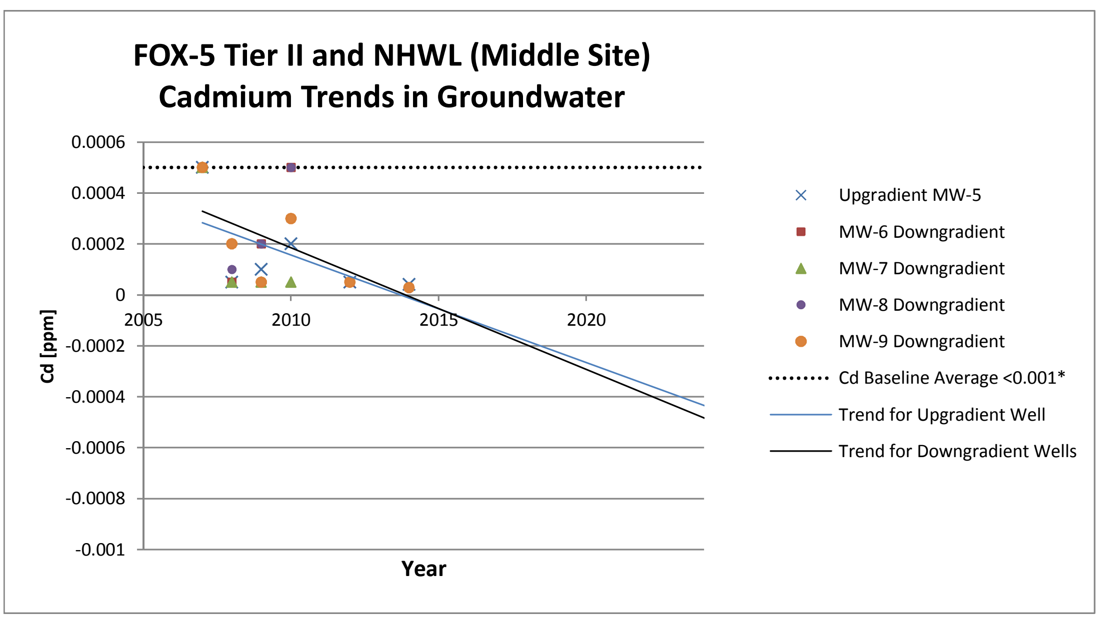
Where results are below detection, half of the detection limit has been used in the charts.





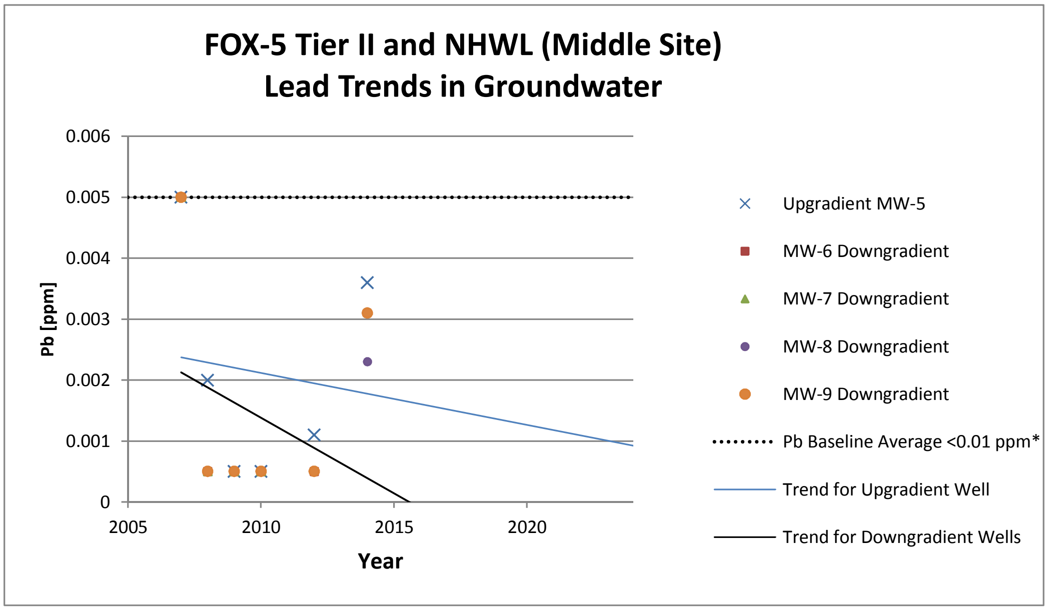
FOX-5 Tier II and NHWL (Middle Site) Graphs of Trends for Inorganic Elements, PCBs and TPH in Groundwater Samples



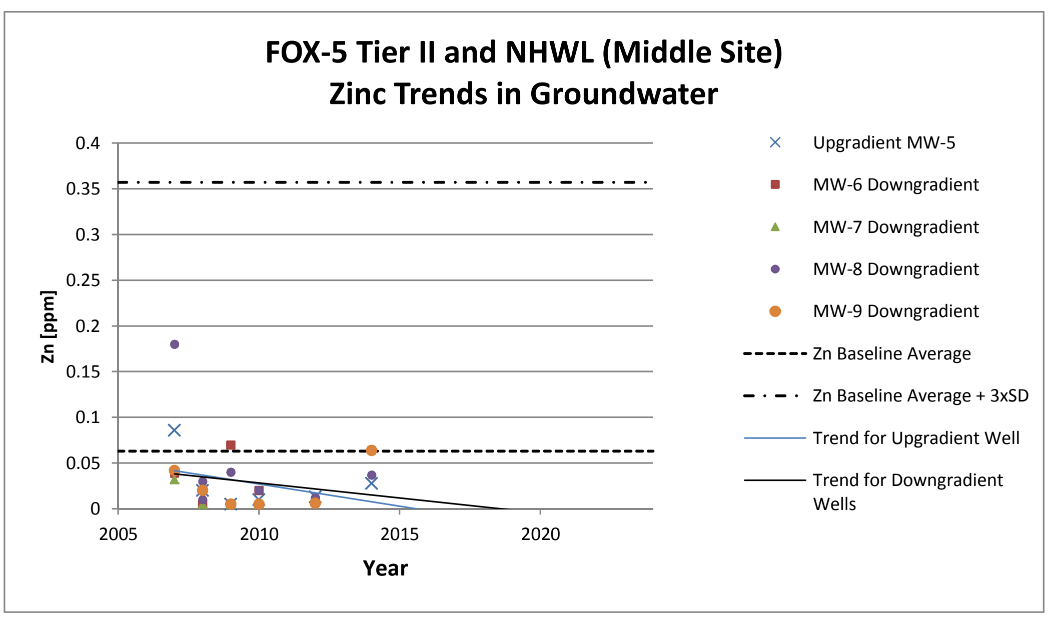


*Cd Baseline SD = 0

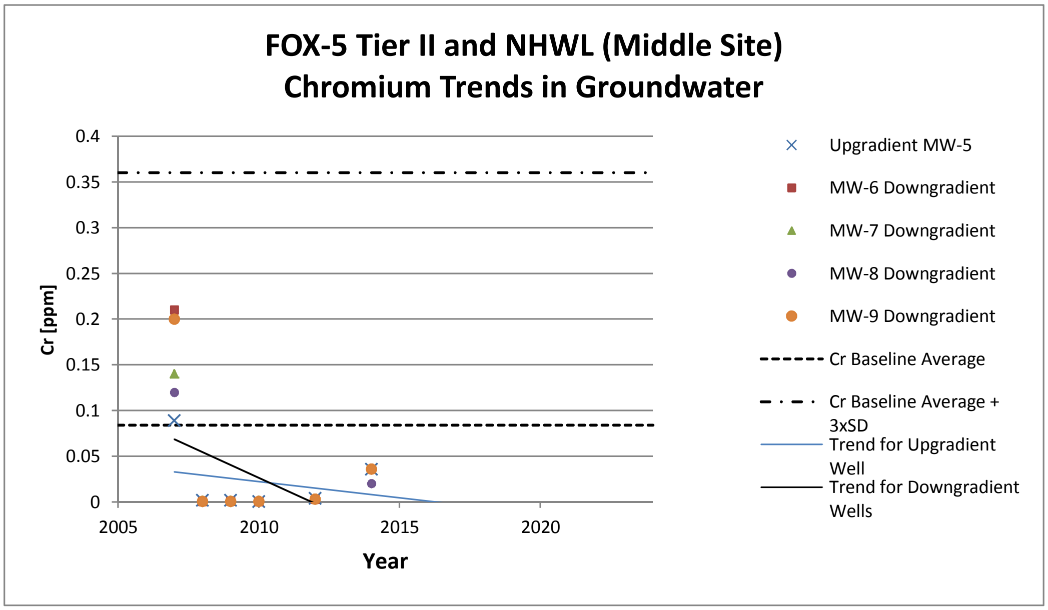
FOX-5 Tier II and NHWL (Middle Site) Graphs of Trends for Inorganic Elements, PCBs and TPH in Groundwater Samples

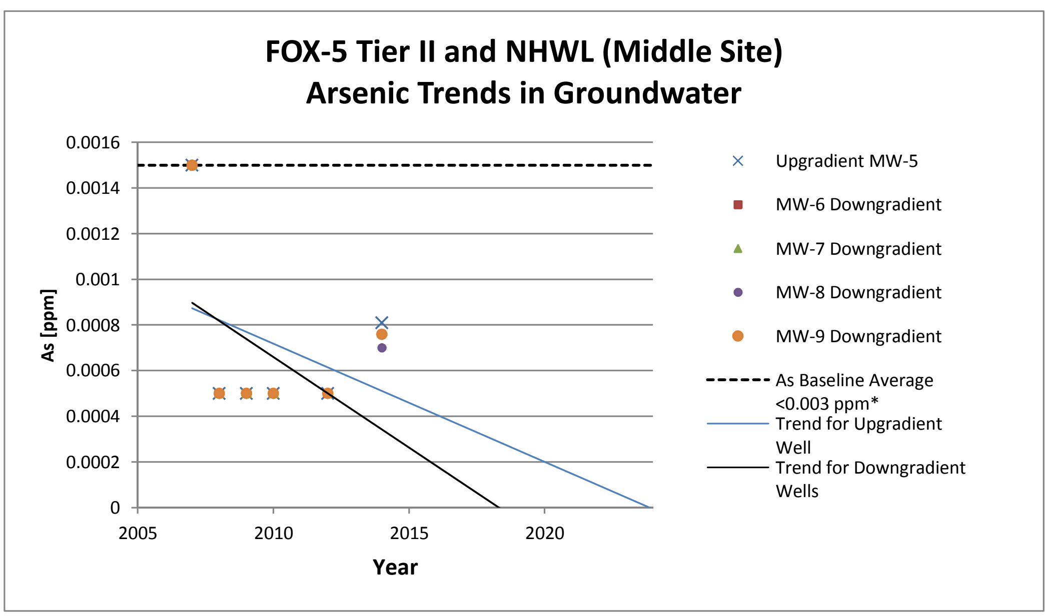


* Pb Baseline SD = 0



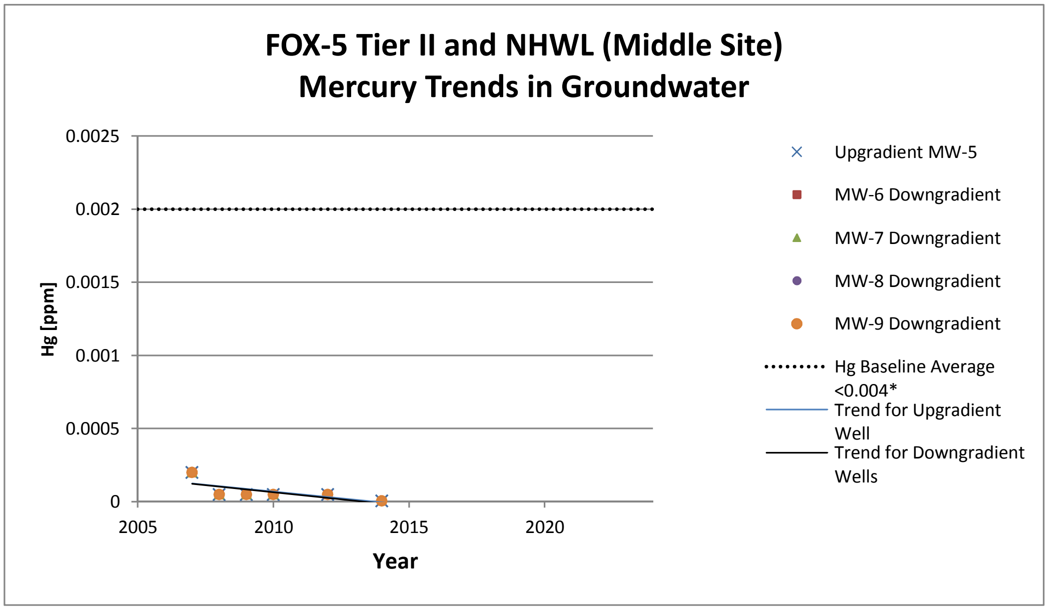
FOX-5 Tier II and NHWL (Middle Site) Graphs of Trends for Inorganic Elements, PCBs and TPH in Groundwater Samples



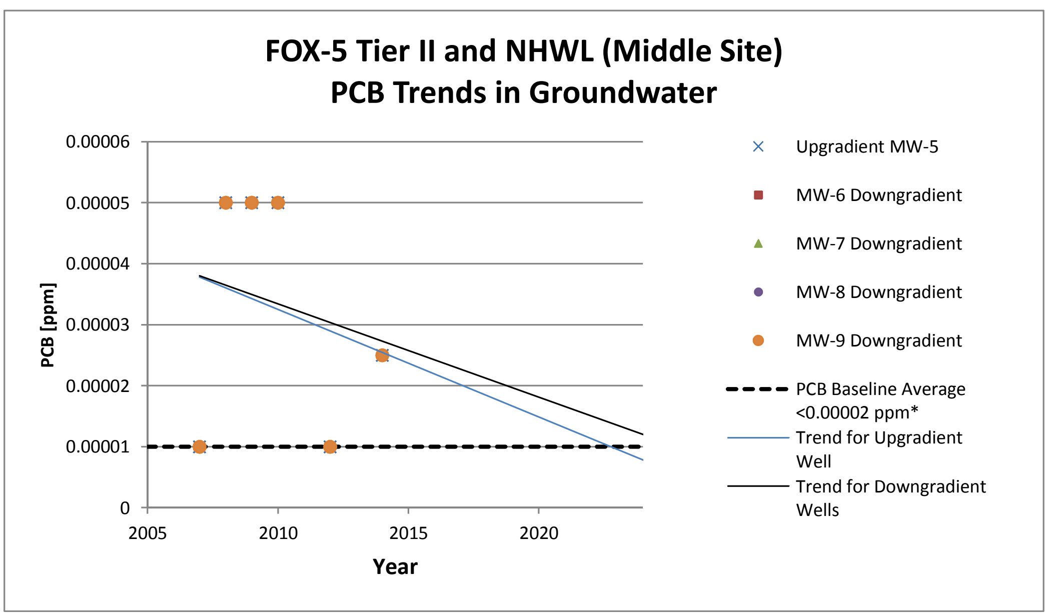


* As Baseline SD = 0 All As monitoring results below detection. Trend reflects changes in

FOX-5 Tier II and NHWL (Middle Site) Graphs of Trends for Inorganic Elements, PCBs and TPH in Groundwater Samples

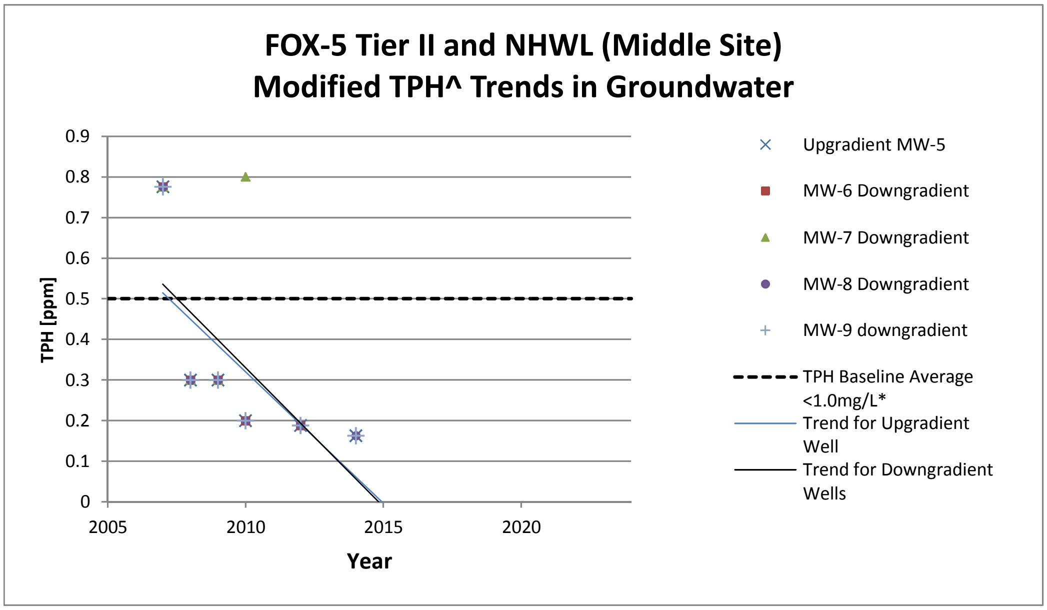


* Hg Baseline SD = 0. All Hg results below detection. Trend reflects changes in detection li



* PCB Baseline SD = 0. All PCB results below detection. Trend reflects changes in detecti

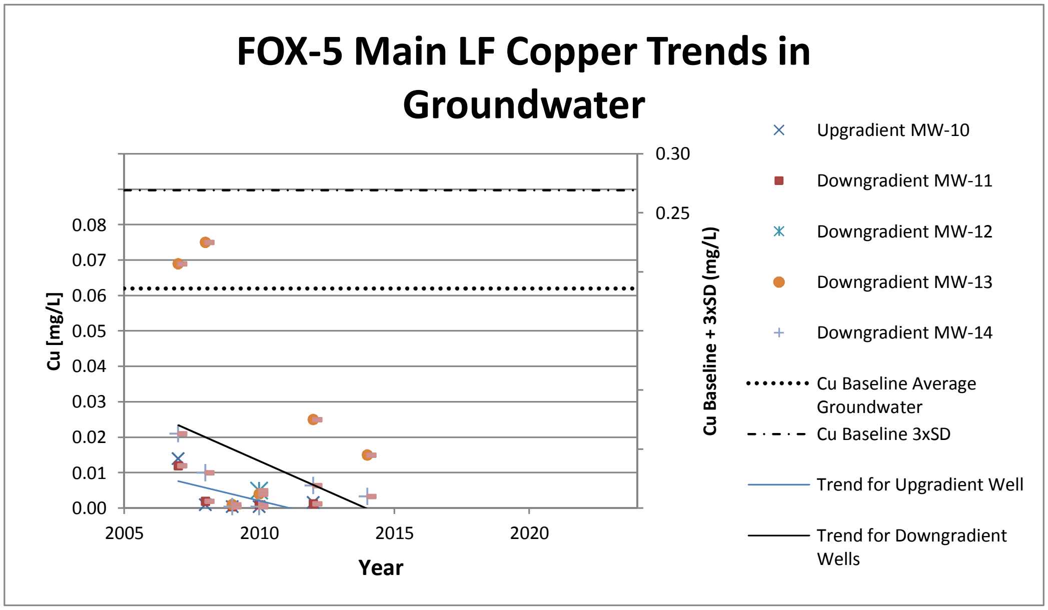
FOX-5 Tier II and NHWL (Middle Site) Graphs of Trends for Inorganic Elements, PCBs and TPH in Groundwater Samples

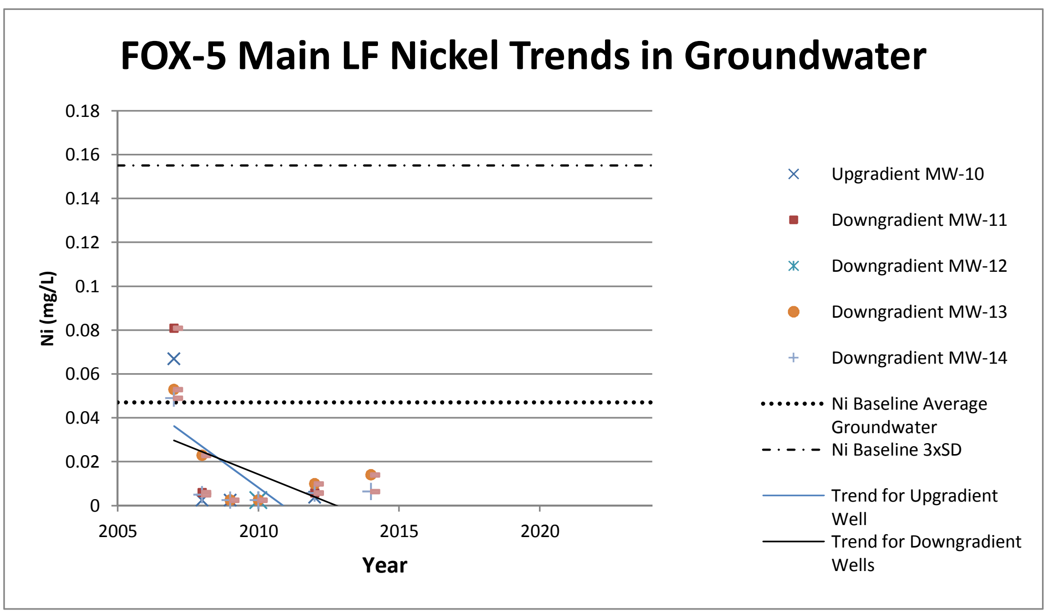


* TPH Baseline SD = 0
Most TPH results below detection. Trend shows changes in detection limits.
^ Modified TPH are Sum of PHC F1-F3 fractions.

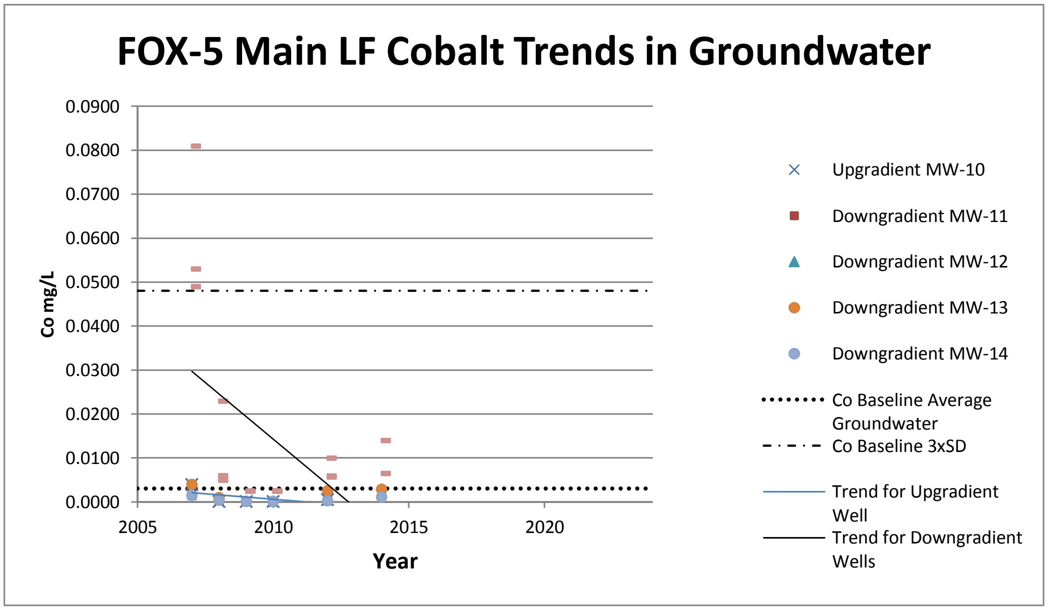
FOX-5 Main Landfill Graphs of Trends for Inorganic Elements, PCBs and TPH in Groundwater Samples

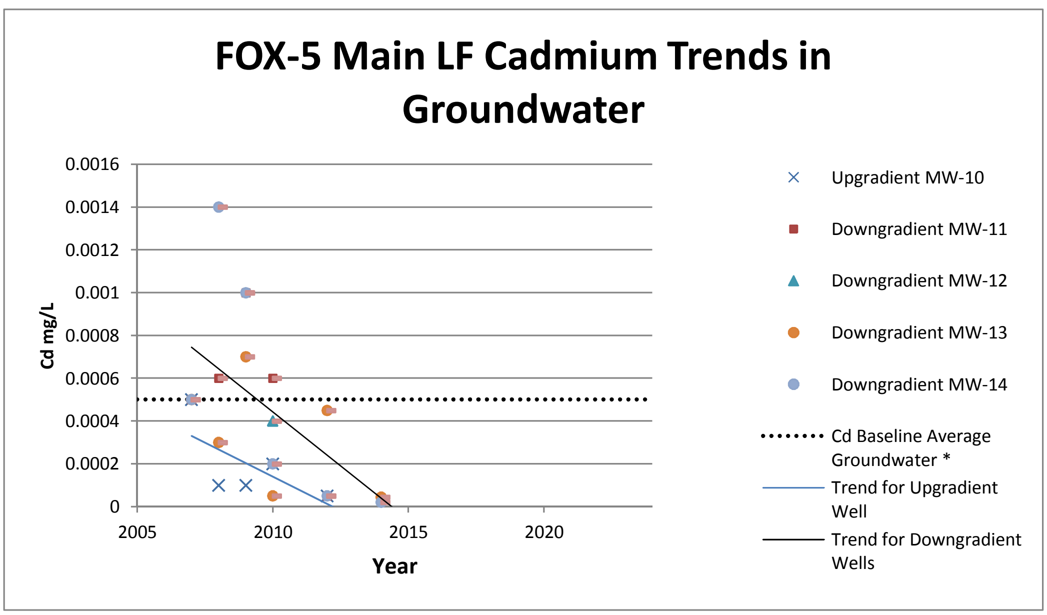
Where results are below detection, half of the detection limit has been used in the charts.





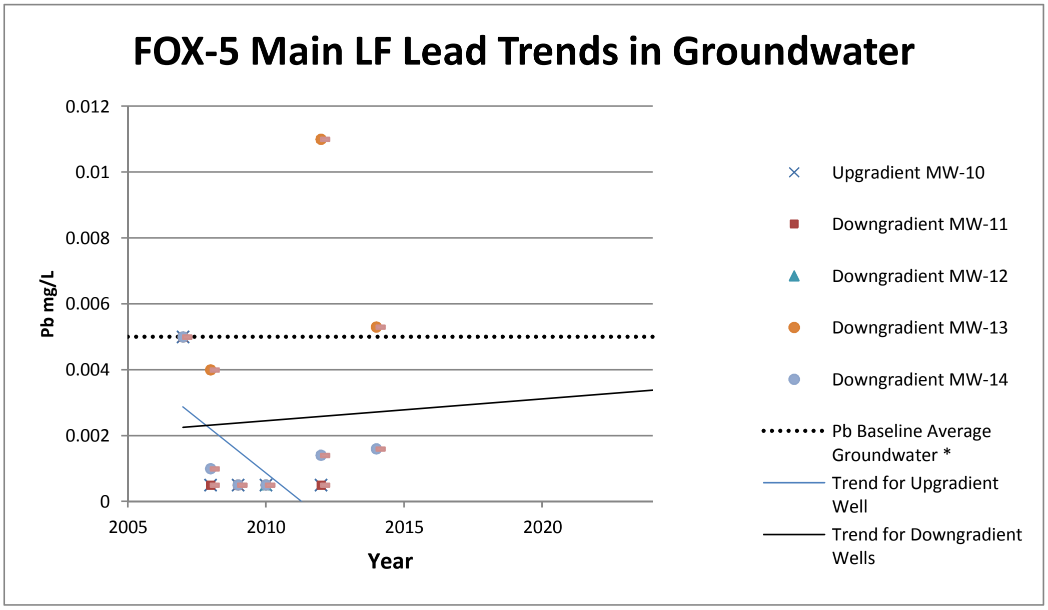
FOX-5 Main Landfill Graphs of Trends for Inorganic Elements, PCBs and TPH in Groundwater Samples



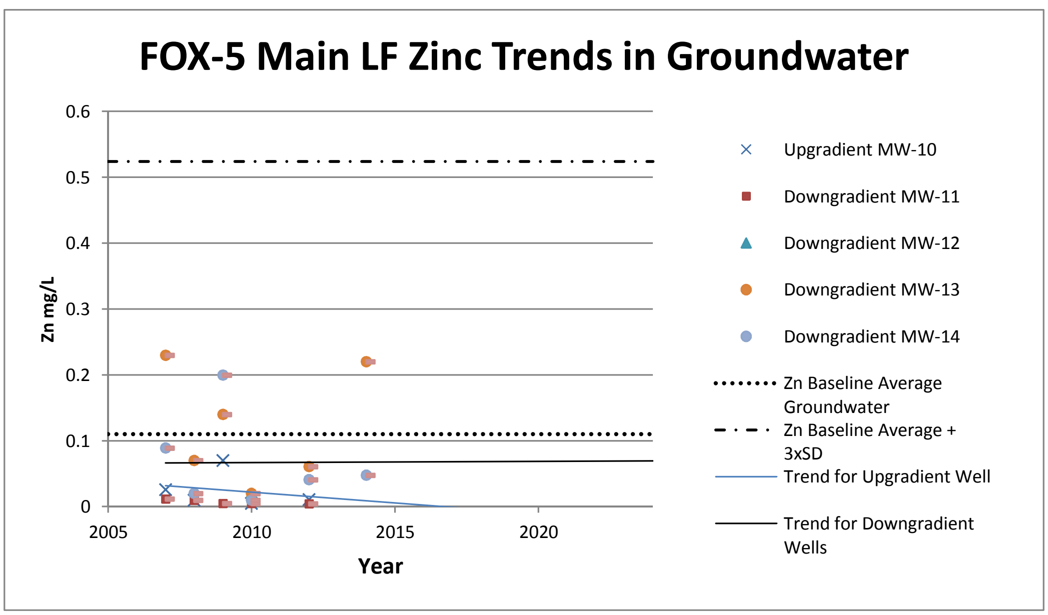


*Cd Baseline SD = 0

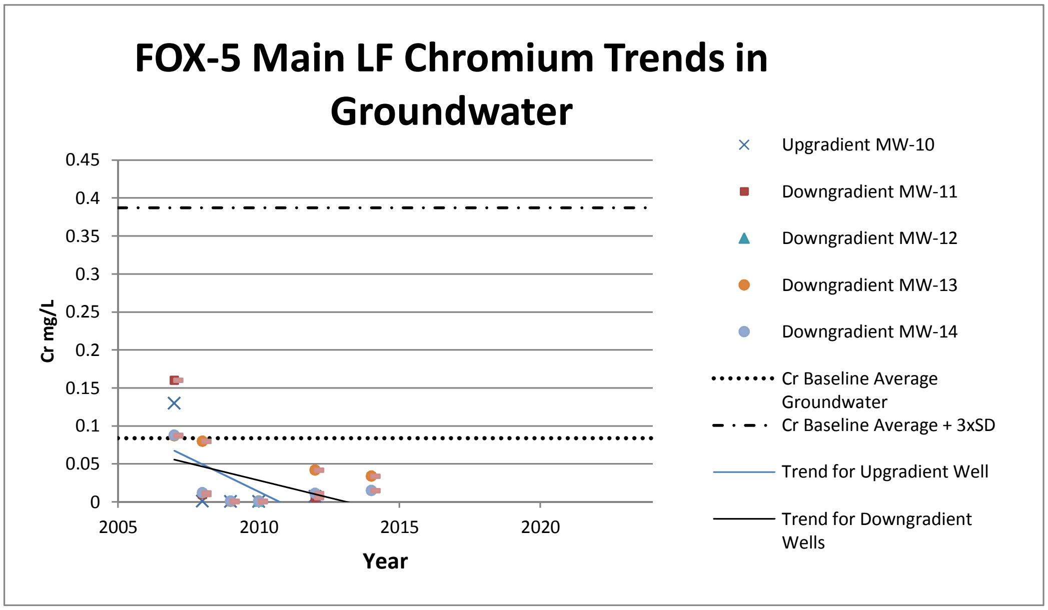
FOX-5 Main Landfill Graphs of Trends for Inorganic Elements, PCBs and TPH in Groundwater Samples

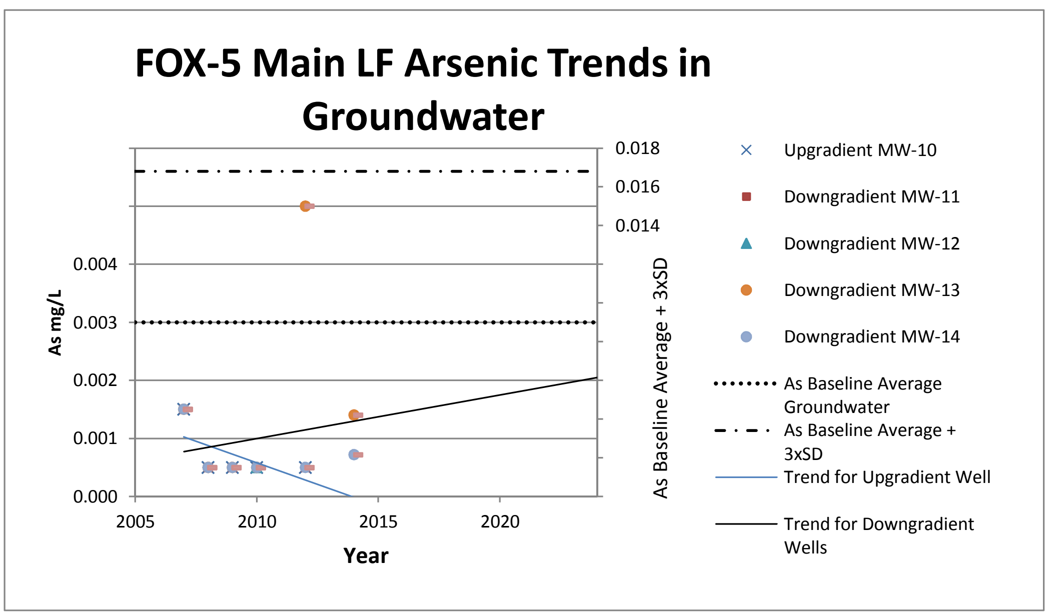


* Pb Baseline SD = 0

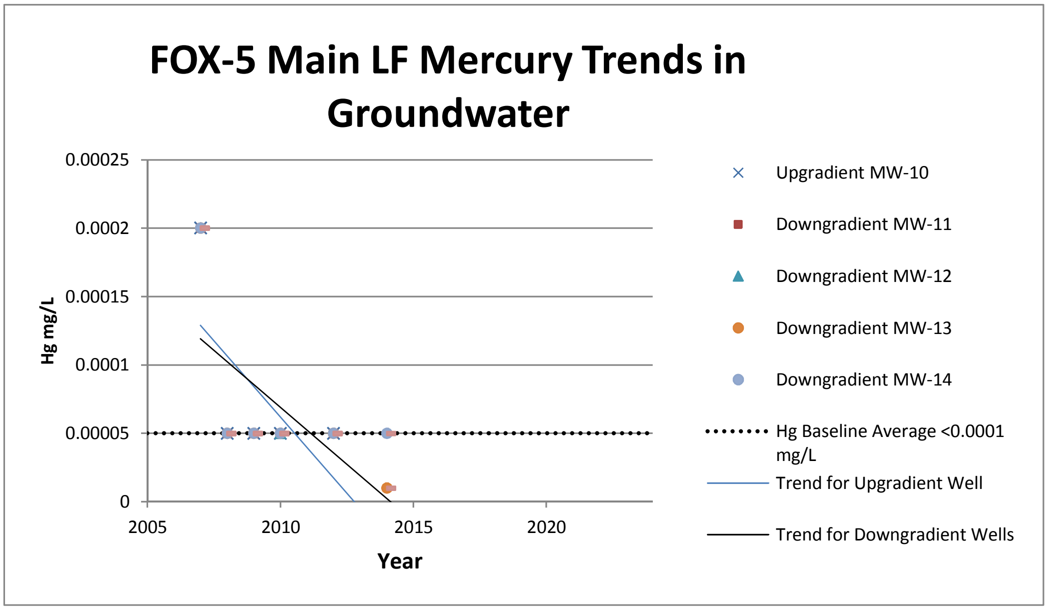


FOX-5 Main Landfill Graphs of Trends for Inorganic Elements, PCBs and TPH in Groundwater Samples

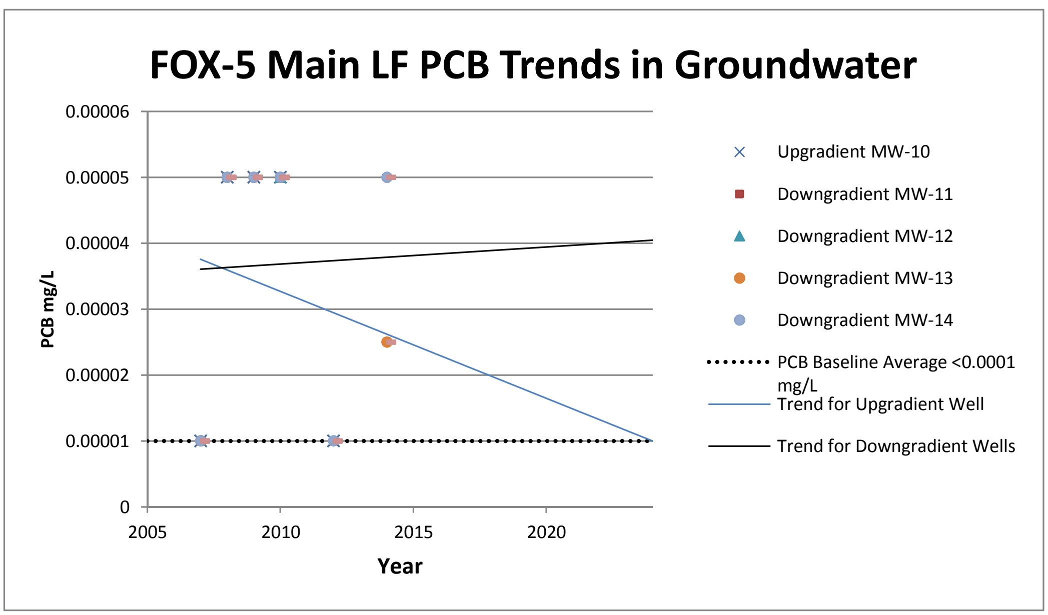




FOX-5 Main Landfill Graphs of Trends for Inorganic Elements, PCBs and TPH in Groundwater Samples

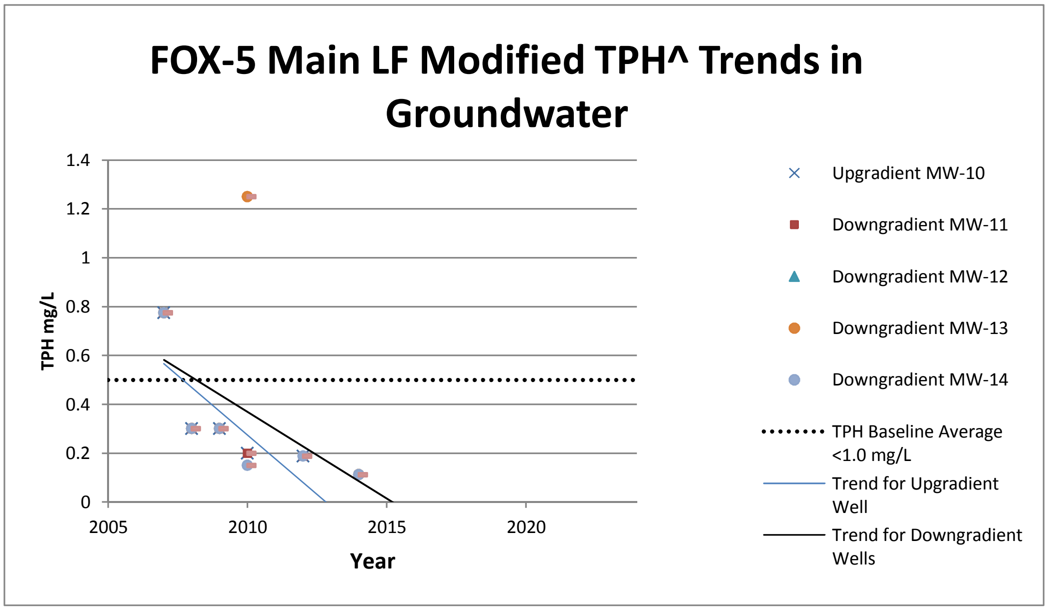


* Hg Baseline Average SD = 0
All Hg results below detection. Trend line reflects changes in detection limits.



* PCB Baseline Average SD = 0

FOX-5 Main Landfill Graphs of Trends for Inorganic Elements, PCBs and TPH in Groundwater Samples

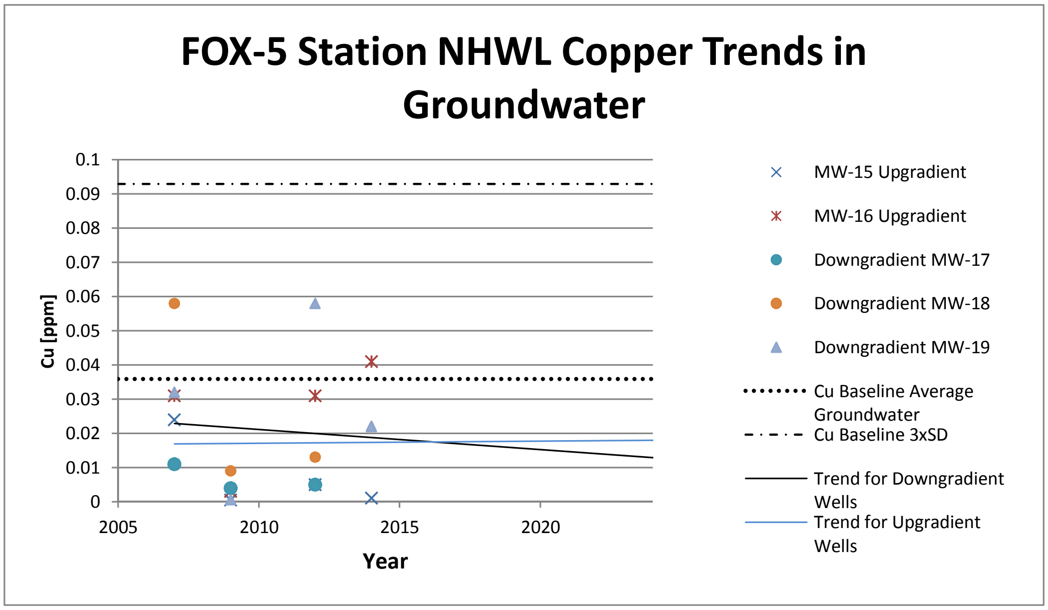


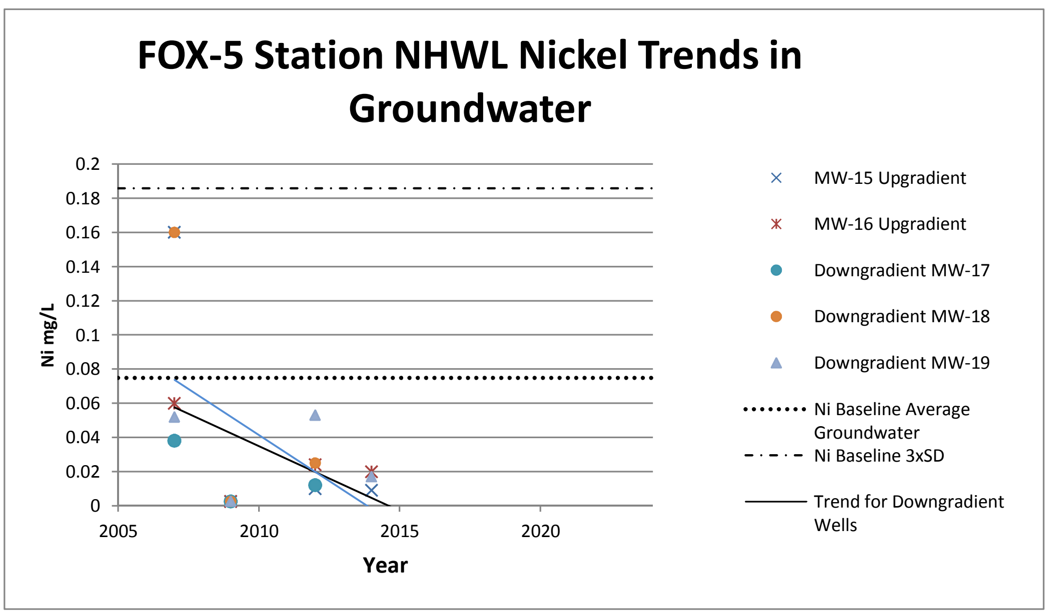
* TPH Baseline Average SD = 0

^ Baseline samples from 2002 were analyzed as TPH, results from 2003 and later are Sum of PHC F1-F3 fractions.

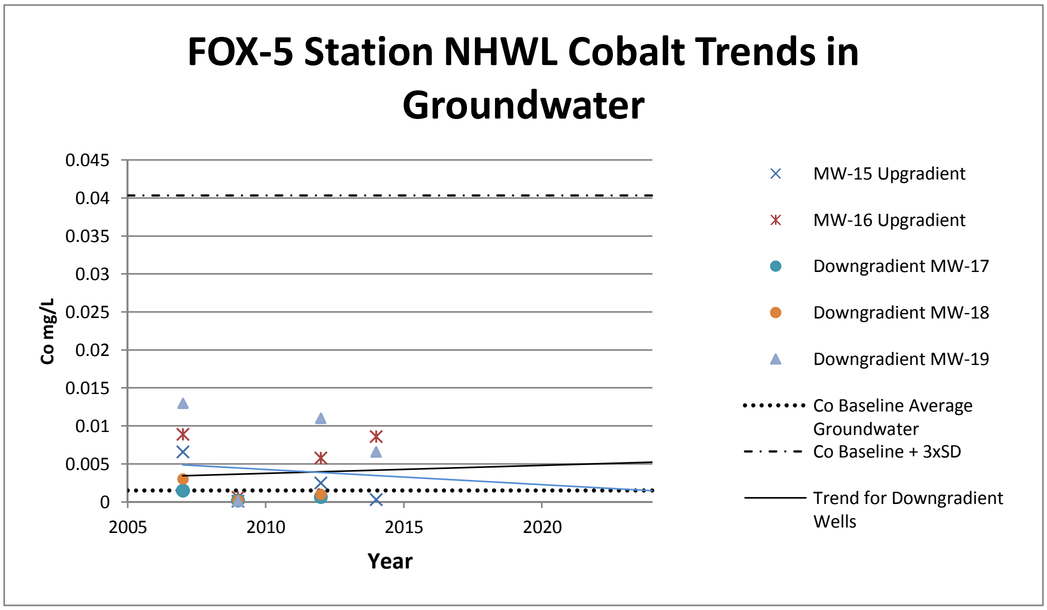
FOX-5 Station NHWL Graphs of Trends for Inorganic Elements, PCBs and TPH in Groundwater Samples

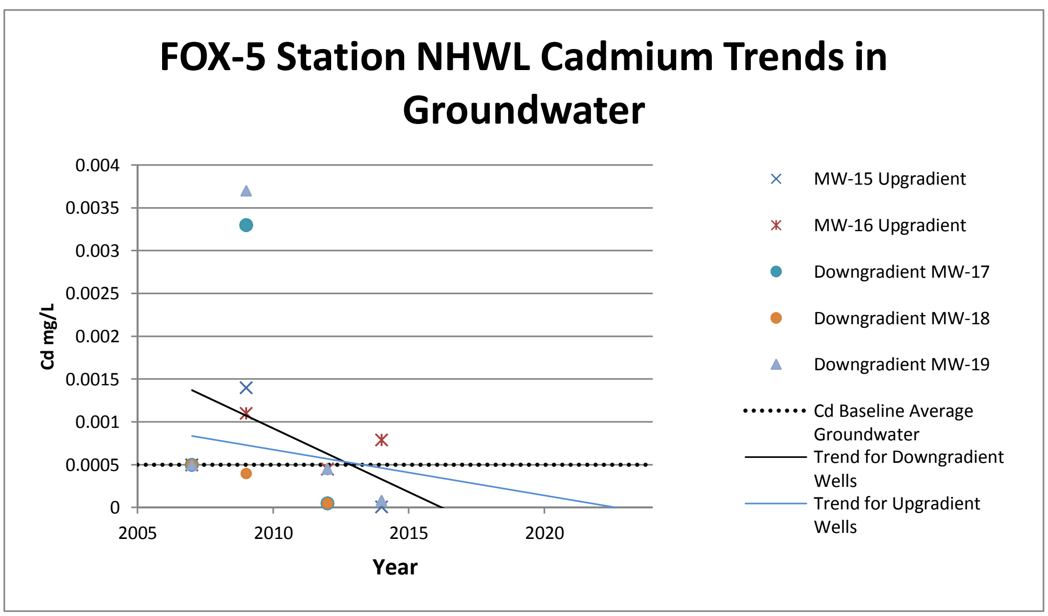
Where results are below detection, half of the detection limit has been used in the charts.



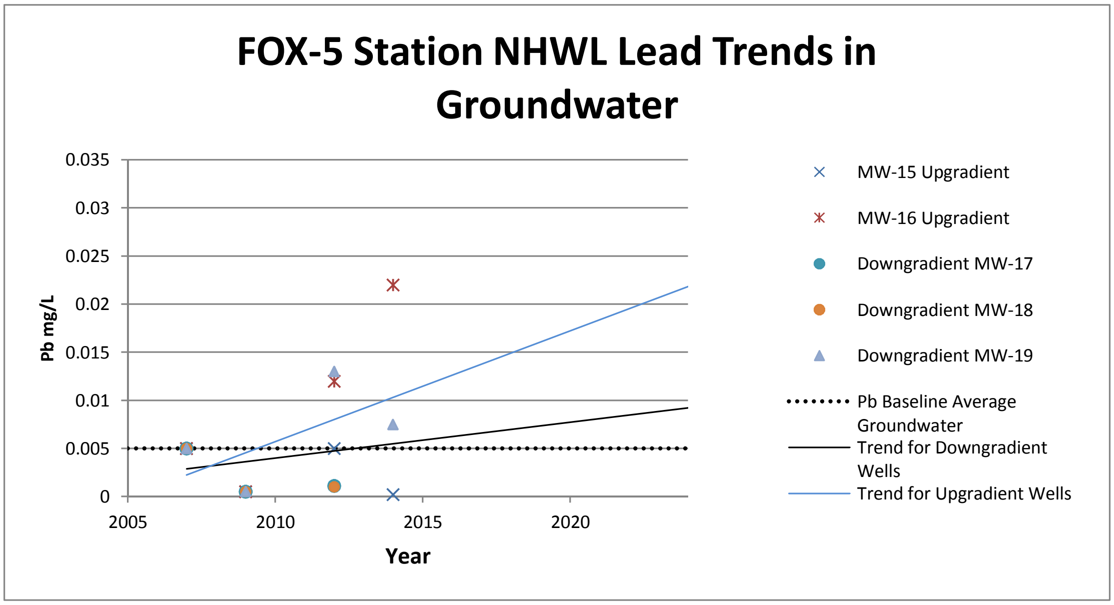


FOX-5 Station NHWL Graphs of Trends for Inorganic Elements, PCBs and TPH in Groundwater Samples

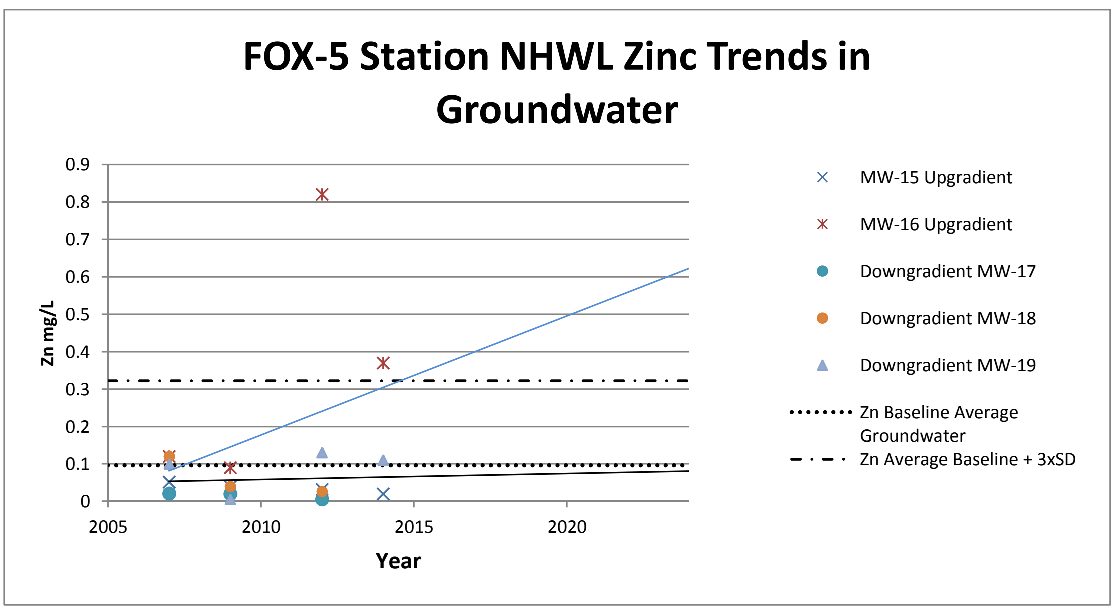




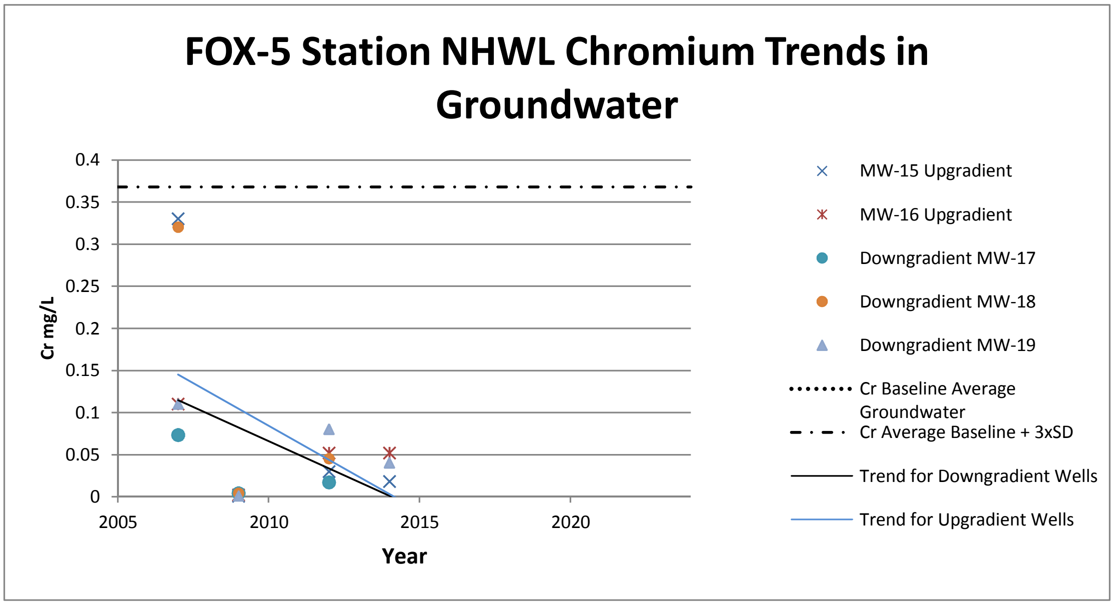
FOX-5 Station NHWL Graphs of Trends for Inorganic Elements, PCBs and TPH in Groundwater Samples

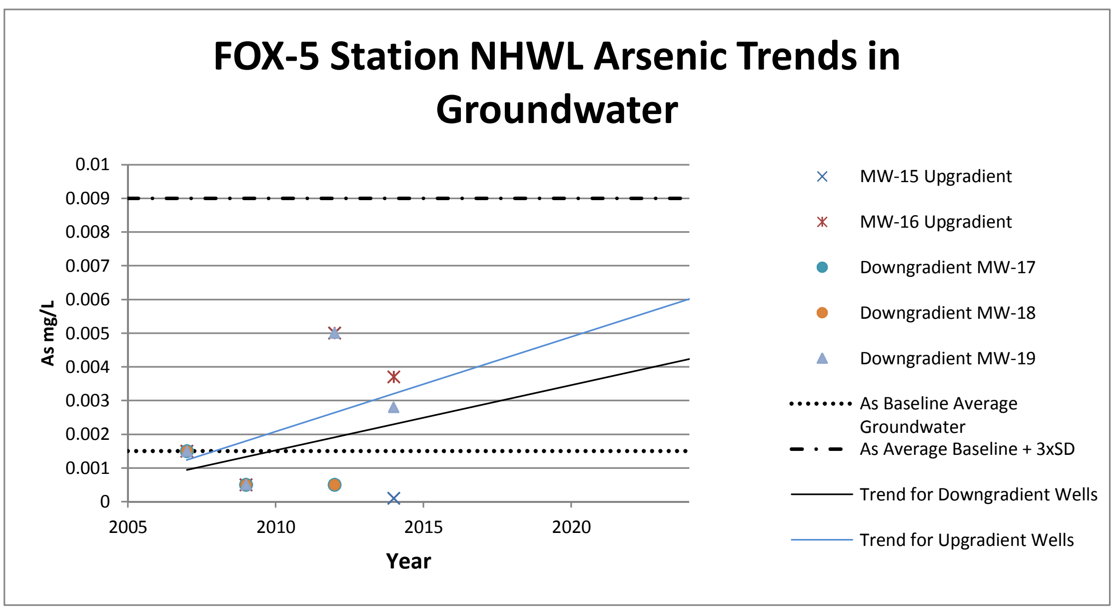


* Pb Baseline SD = 0



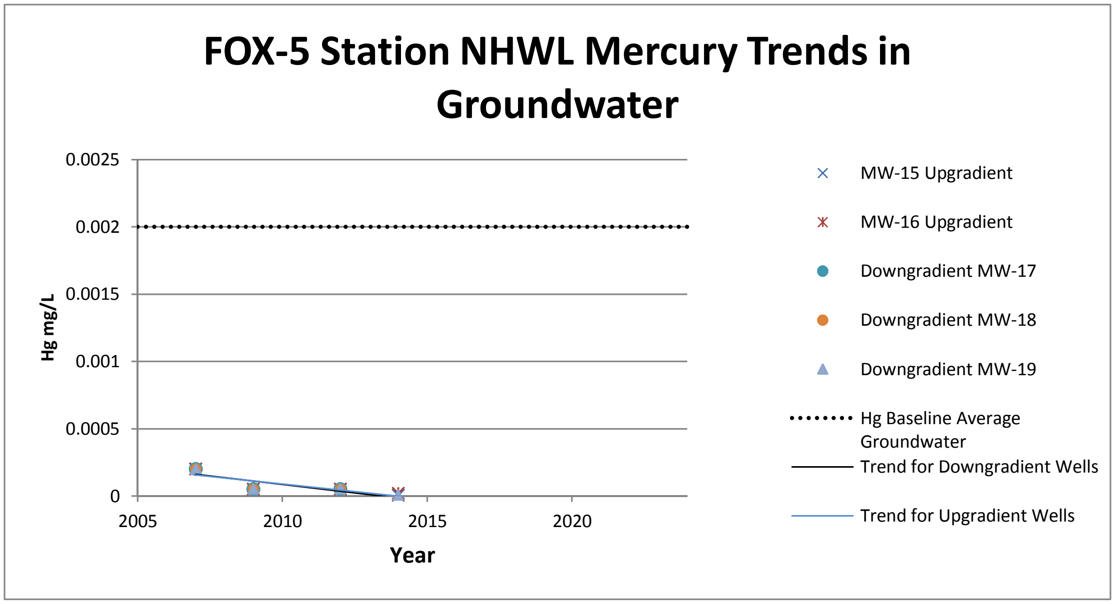
FOX-5 Station NHWL Graphs of Trends for Inorganic Elements, PCBs and TPH in Groundwater Samples



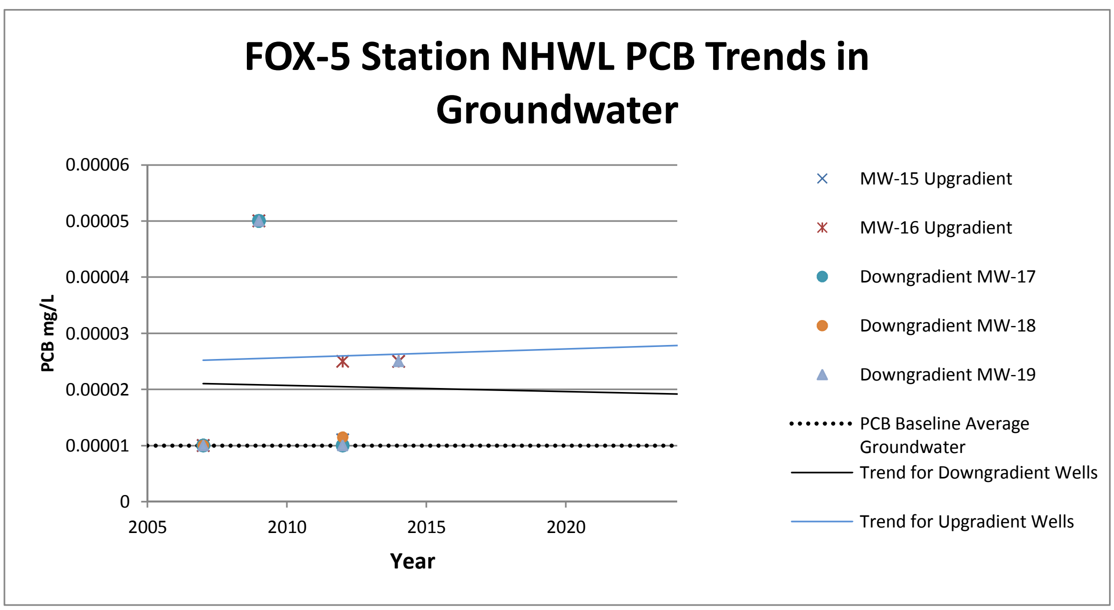


All As results below detection. Trend line reflects changes in detection limits.

FOX-5 Station NHWL Graphs of Trends for Inorganic Elements, PCBs and TPH in Groundwater Samples

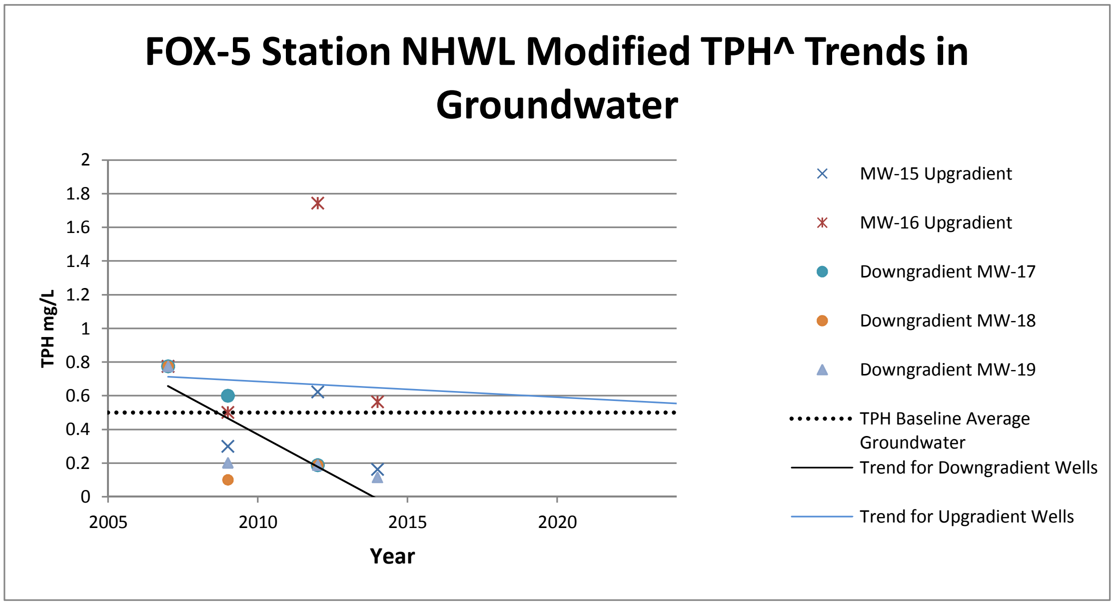


* Hg Baseline Average SD = 0
All Hg results below detection. Trend line reflects changes in detection limits.



* PCB Baseline Average SD = 0
Alll PCB results below detection. Trend lines reflect changes in detection limits

FOX-5 Station NHWL Graphs of Trends for Inorganic Elements, PCBs and TPH in Groundwater Samples



* TPH Baseline Average SD = 0

^ Modified TPH are Sum of PHC F1-F3 fractions.