March 31, 2016 Project No. 1530908-1000

Department of National Defence Canada
ADM (Infrastructure & Environment)
Ottawa, Ontario
K1A 0K2
ATTN: Laura D'Costa and Cynthia Tremblay

FINAL 2015 CAM-5 MONITORING REPORT

QIKIQ15 BAFFIN REGION DEW LINE SITE MONITORING

Dear Ms. D'Costa and Ms. Tremblay;

Please find attached final report on 2015 monitoring at the CAM-5 DEW Line Site for the QIKIQ15 Baffin Region monitoring contract.

If you wish to discuss any aspect of this report, please do not hesitate to contact the undersigned.

Yours very truly,

GOLDER ASSOCIATES LTD.

Darrin Johnson, P.Eng.
Project Manager

DCJ

Attachments: Final 2015 CAM-5 Monitoring Report

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March 2016

QIKIQ15 BAFFIN REGION DEW LINE SITE MONITORING

2015 CAM-5 Monitoring Report

Submitted to:
Department of National Defence
ADM (Infrastructure & Environment)
Ottawa, Ontario
K1A 0K2

ATTN: Laura D'Costa and Cynthia Tremblay

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Executive Summary

Golder Associates Ltd. (Golder) has been contracted by Public Works and Government Services Canada (PWGSC), on behalf of the Department of National Defence (DND), to complete the 2015-2018 Distant Early Warning (DEW) Line Sites Landfill Monitoring Program in the Baffin Region of Nunavut. The four DEW Line sites that were monitored in 2015 as part of the QIKIQ15 contract are DYE-M, FOX-3, FOX-2 and CAM-5. These sites are all now in the Post-Construction Monitoring Phase of their remedial program.

This Monitoring Report presents the 2015 post-construction inspection and monitoring results for four landfills at CAM-5: Lower Site Landfill South, Non-Hazardous Waste Landfill, USAF & Asbestos Landfill and Tier II Disposal Facility. The remediation of CAM-5 was competed in 2010. The 2015 Monitoring is the fifth and final year of annual monitoring; CAM-5 will be monitored next in 2017.

Lower Site Landfill South

This landfill was assessed to have a “Marginal” overall landfill performance with a “Moderate” potential for failure of the east slope because cracking, erosion, seepage and staining observed along the east slope and toe has increased since the last visual inspection impact but does not appear to have impacted landfill stability to date. Ponded water and/or seepage with frequent areas of staining was observed at the east toe, notably in the area of C5-4 and C5-5. This staining was reddish in colour and interpreted to most likely reflect iron, however the analytical suite does not include iron as a parameter.

Concentrations of copper, nickel, cobalt, zinc, chromium and arsenic were detected in the soil samples above the background and/or baseline arithmetic mean. The metal concentrations were highest at downgradient locations C5-3, C5-4 and C5-5 (notably at the latter two locations), located near the eastern toe of the landfill. In some cases, the 2015 concentrations were slightly lower than in earlier years (e.g., many parameters at C5-3 and C5-4), and in other cases they were higher (e.g., at C5-5). These sample locations are located near where minor erosion, ponding of water and staining was observed during the visual inspection.

Concentrations of petroleum hydrocarbons above the baseline concentration were noted in both samples at C5-2 and in the deep sample at C5-4. No detectable concentrations of Total PCB were noted in any of the samples in 2015.

Whereas a number of the environmental sampling results are the same as in the two previous sampling sessions, elevated parameters and increases in some cases (i.e., C5-5) are associated with the areas where there is seepage and staining. This may be reflective of an ongoing impact from the landfill.

Consideration should be given to adding iron to the analytical parameter list for this landfill to confirm expectations that the staining is related to iron. In addition, consideration should be given to collecting soil samples at locations 25 metres downgradient of C5-3 through C5-5, to determine if the concentrations in the soil decline with distance from the landfill.

Non-Hazardous Waste Landfill

The Non-Hazardous Waste Landfill has been assessed to have an “Acceptable” overall landfill performance although erosion and ponding of water along the toe have increased in extent since the last inspection but they do not appear to be impacting landfill stability to date. Erosion from the running water along the toe and increased ponding along the toe (potentially causing increased permafrost thaw) could result in potential instability of the

landfill sideslopes over the long-term. Observed minor settlement and staining features were assessed as "Acceptable". No cracks have been observed at this landfill.

Concentrations of copper, nickel, cobalt, zinc, chromium and arsenic were detected in the soil samples above the background and/or baseline arithmetic mean at one or more soil sampling locations. At all three locations, the concentrations of most metals were similar to or less than those observed in 2011 and 2013. No detectable concentrations of PHC or PCB were noted in any of the samples in 2015.

Exceedances of the baseline values in the groundwater samples were only observed at cross-gradient location MW09, for nickel and cobalt; these concentrations were lower than those reported in 2011 and 2013. No detectable concentrations of PHC or PCB were noted in any of the groundwater samples in 2015.

Based on the results, there does not appear to be significant impact to groundwater quality from the landfill at cross-gradient locations MW09 and MW11.

USAF & Asbestos Landfill

Minor settlement, erosion, staining and ponded water features were observed at the USAF and Asbestos Landfill. This landfill was assessed to have an "Acceptable" overall landfill performance because all observed features were assessed as "Acceptable". No cracking or exposed waste was observed at this landfill. Some establishment of sparse vegetation was observed on the north slope and the west crest surface.

Concentrations of copper, nickel, arsenic were detected in the soil samples above the background and/or baseline arithmetic mean at the upgradient location C5-6 and cross-gradient location C5-7. In addition, elevated concentrations of zinc were present in the upgradient sample (C5-6) were higher than those observed in 2011 and 2013.

Concentrations of petroleum hydrocarbons above the baseline concentration were noted in both samples at C5-6. The TPH concentration was greater than that measured in 2013 but less than that measured in 2011. No detectable concentrations of PCB were noted in any of the samples for this landfill in 2015.

Tier II Disposal Facility

The visual inspection did not identify any significant erosion, settlement, ponded water, staining or indications of instability at the Tier II Disposal Facility. This landfill was assessed to have an "Acceptable" overall landfill performance because all observed features were assessed as "Acceptable". No cracking or exposed waste was observed. A wet area was observed in the northwest toe area that is likely related to recent snowmelt, rather than seepage from the landfill.

Concentrations of copper (most commonly), nickel, cobalt, zinc and arsenic were detected in the soil samples above the background and/or baseline arithmetic mean. Metal concentrations were generally lowest at MW06, a downgradient location. At upgradient location MW05, the concentrations of most metals increased from those concentrations observed in previous years. No detectable concentrations of PHC or PCB were noted in any of the samples in 2015.

In the groundwater sample at MW06, the concentrations of copper (0.0193 mg/L) and nickel (0.018 mg/L) exceeded their respective baseline concentrations (0.015 mg/L and 0.014 mg/L), respectively. At MW08, the average concentration of copper (0.026 mg/L) exceeded the baseline concentration. No detectable concentrations of PHC or PCB were noted in any of the groundwater samples in 2015.

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1.0 INTRODUCTION

Golder Associates Ltd. (Golder) has been contracted by Public Works and Government Services Canada (PWGSC), on behalf of the Department of National Defence (DND), to complete the 2015-2018 Distant Early Warning (DEW) Line Sites Landfill Monitoring Program in the Baffin Region of Nunavut (hereafter referred to as the "Project"). The contract number with PWGSC is W6837-151002/001/NCS. The DND file number for the Project is QIKIQ15. The contracted scope of work is in accordance with the project Terms of Reference (TOR) dated April 2015, and Golder Proposal P1530908 dated June 16, 2015 ("Golder Proposal").

The four DEW Line sites that were monitored in 2015 as part of the QIKIQ15 contract are DYE-M, FOX-3, FOX-2 and CAM-5. They are all now in the Post-Construction Monitoring Phase of their remedial program. Post-Construction Monitoring was carried out in accordance with the TOR and implemented as per Golder's Logistics and Work Plan (LAWP) dated July 30, 2015. Monitoring activities included geotechnical visual inspection, thermal monitoring, soil and groundwater sampling.

This Monitoring Report presents the 2015 post-construction inspection and monitoring results for CAM-5 (the Site). The remediation of CAM-5 was competed in 2010. The 2015 Monitoring is the fifth and final year of annual monitoring; CAM-5 will be monitored next in 2017.

Appendix A is a summary of the report limitations and forms part of the report.

1.1 Objective of the Study

The objective of the Landfill Monitoring Program is to collect sufficient information to assess the performance, integrity, and stability of the landfills from a geotechnical and environmental perspective for human health and environmental protection. The monitoring program is designed to monitor landfill integrity and to determine in the event of any evident deterioration, if remedial measures are required.

1.2 Scope of Work

The scope of work for this Project includes the following:

1) Project Management including liaison with DND, project team coordination, scope management, cost management, schedule management and resource coordination;

2) Preparation of site-specific Health Safety and Environment Plan and procurement of safety equipment and supplies (e.g., personal protective equipment, first aid kits and satellite phones);

3) Development of a Logistics and Work Plan for each field season that outlines the field schedule, travel plans, accommodation, hiring of local Inuit contract workers, ATV and charter aircraft rental;

4) Completion of field work consisting of visual inspection, photographic documentation, thermistor data collection and soil and water sample collection;

5) Preparation of a Field Work Progress Report that summarizes field work activities completed each year (submitted under separate cover);

6) Preparation of a Consultant Inuit Participation Plan and Report (submitted under separate cover); and,

7) Preparation of draft and final Monitoring Reports for each site with visual inspection results, photographic log, thermistor data collection, figures of inspection features and photograph locations, soil and groundwater quality monitoring results, QA/QC and data interpretation.

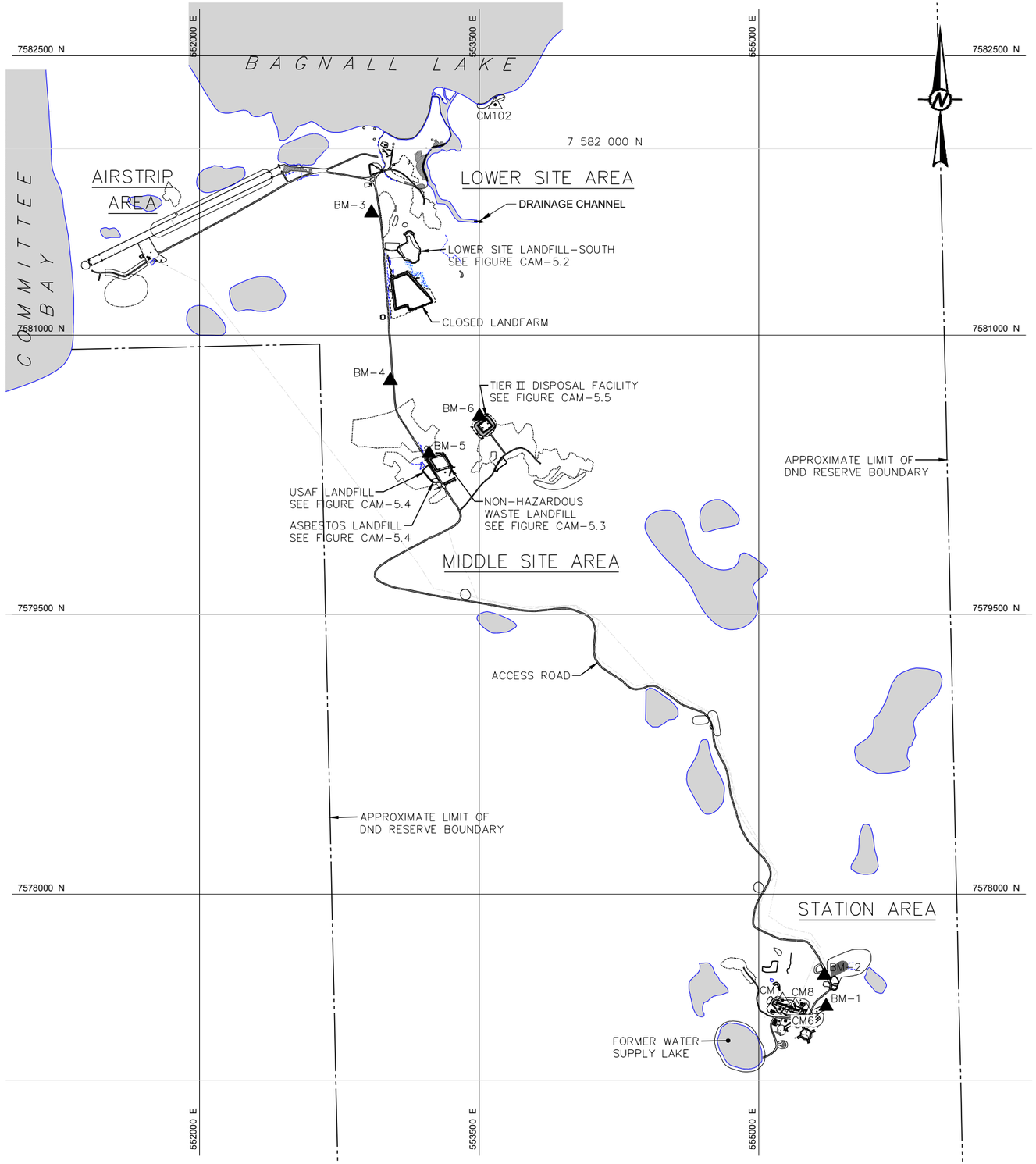
2.0 BACKGROUND

2.1 Site Description

CAM-5 is located at Mackar Inlet, on the western shore of Melville Peninsula in the Committee Bay area of Nunavut, at 68° 20’ N, 85° 42’ W. The CAM-5 site was decommissioned in 1992 when the CAM-5A (Cape McLoughlin) North Warning System (NWS) short-range radar site was established approximately 35 km north of Mackar Inlet. The CAM-5 station is at an elevation of 400 metres above sea level (masl), about 7 km inland by road from the airstrip. The airstrip is situated close to Bagnall Lake, which is separated from the ocean by a large sandbar.

The site includes four landfills all located at the Lower Site, within 2 km of the airstrip. Figure CAM-5.1 presents a location map and overall site plan of CAM-5 illustrating the landfills that were monitored as well as other site features.

Remediation of the CAM-5 DEW Line Site began in 2008 and was completed in 2010. Two new landfills were constructed during the remediation phase: the Non-hazardous Waste Landfill (NHWL) for debris, and the Tier II Disposal Facility for contaminated soils. The two existing landfills: Lower Site Landfill—South and the United States Air Force (USAF) and Asbestos Landfill, were evaluated to be low risk and were left in place and re-graded.





LOCATION OF MACKAR INLET WITHIN NUNAVUT TERRITORY

SCALE: NTS

LEGEND

- CM1 — SURVEY CONTROL MONUMENT
- BM-1 — PERMANENT BENCHMARK LOCATION (6)
- APPROXIMATE LIMIT OF DND RESERVE BOUNDARY
- ARCHAEOLOGICAL FEATURE
- BODY OF WATER

NOTES

GRID PROJECTION IS NAD83 ZONE 16N.
ELEVATIONS ARE GEODETIC.

REFERENCE

PREVIOUS INSPECTION FIGURE PROVIDED BY BIOGENIE, A DIVISION OF ENGLOBE CORPORATION, PROJECT NO.CD2655_400_403, DATED JUNE 2015.

0 500 1,000
1:25,000 METRES

CLIENT
DEPARTMENT OF NATIONAL DEFENCE CANADA

PROJECT
2015 CAM-5 MONITORING REPORT

TITLE
OVERALL SITE PLAN

CONSULTANT
Golder Associates

YYYY-MM-DD	2016-03-24
DESIGNED	RM
PREPARED	TDR
REVIEWED	DJC
APPROVED	DP

PROJECT NO.	PHASE	REV.	FIGURE
1530908	1000	B	CAM-5.1

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2.2 Site Geology and Hydrology

The site is on the northeastern edge of the Precambrian (Canadian) Shield. Most Precambrian bedrock has been metamorphosed (altered by intense heat and pressure) into granite. Surficial soils have been formed by the erosive forces of glaciation and related deposition of materials by retreating glaciers. Glacial retreat has deposited glacial till moraine, boulders and talus slopes over the landscape. The landscape is dominated by bedrock outcrops and boulder fields with tundra vegetation generally limited to valleys and lower slopes.

The groundwater flow processes at the site are significantly influenced by the presence of continuous permafrost. Annual active thaw layers are typically a few metres below ground surface, depending on ground cover, soil materials and surface water features. Shallow groundwater representing meltwater (both surficial and within the active layer) and precipitation from the period after the summer thaw is perched within the active layer during the short summer season. Movement of the groundwater is dictated by soil type, presence of shallow permafrost and hydraulic pressures resulting from topographic differences and distribution (elevation) of the water within the soils. Water elevations are only measured at some wells, and therefore the use of terms upgradient or downgradient may not be truly reflective of the actual flow direction. Nevertheless, for the purposes of this report, upgradient and downgradient are used to maintain consistency with the identification of monitoring locations in previous annual reports.

Rugged topography and the presence of permafrost at the site have created many small, shallow perched lakes and seasonal streams from drainage of melting snow. Smaller, shallow surface water features typically freeze solid during the winter months. Some of the larger, deeper lakes may not freeze solid, potentially allowing them to support fish populations.

The Lower Site Landfill South is located approximately 200 metres from a drainage channel leading to Bagnall Lake and approximately 1,900 metres from Mackar Inlet within the Gulf of Boothia. The remaining landfills are located approximately 2,000 to 2,400 metres from Mackar Inlet; the closest water body to these landfills is an un-named lake, located approximately 200 metres southeast of the Tier II Disposal Facility, which appears to be upgradient of the landfills.

2.3 Land-Use Description

In the 1950's, DEW Line sites were constructed around the North from Alaska to Greenland, between latitudes 65 and 70 degrees to maintain surveillance of the North American Airspace. In 1963, technology upgrades led to the closure of most of these sites and later replacement with the North Warning System (NWS). Since the 1990's, investigations, decommissioning, and clean-up activities have been undertaken. Clean-up and decommissioning activities involved the demolition of surplus buildings and structures, excavation of contaminated soils, and the retrofit of existing landfills. New engineered landfills were also constructed for the disposal of excavated soils and building materials.

Landfills at DEW Line sites can be categorized as follows:

- **Re-graded:** Existing landfills that were re-graded and capped with gravel;
- **Leachate Contained:** Existing landfills that were capped with gravel and provided with an impermeable membrane keyed into the permafrost (either only on the sides or over the entire surface), to contain leachate;
- **New NH:** New non-hazardous waste landfills; and

- **New Tier II:** New Tier II disposal facilities (used for the disposal of Tier II soils as described by the DEW Line Cleanup Criteria) have impermeable liners below and above the contaminated soil to encapsulate the contents and contain the leachate. Tier II landfills have a saturated granular perimeter berm keyed into the permafrost and sufficient cover of granular material to promote permafrost aggradation into the landfilled materials.

Gravel airstrips are maintained at the DEW Line sites for the purpose of ongoing site operations, maintenance and monitoring.

2.4 Field Program Staff and Schedule

Table 2-1 presents a list of field personnel, roles, responsibilities and dates for the CAM-5 2015 monitoring program.

Table 2-1: Field Personnel and Roles

Name (Affiliation)	Role / Responsibility	Date
Reza Moghaddam (Golder)	Field Geotechnical Lead / Inspections	August 23
Kevin Rattray (Golder)	Field Environmental Lead / Sampling	August 23
Moses Nuvviaq (Inuit Subcontractor)	Wildlife Monitor	August 23
Laimiki Irittuq (Inuit Subcontractor)	Wildlife Monitor	August 23
Eric Tunngilik (Inuit Subcontractor)	Environmental Assistant / Sampling	August 23
Kenney Kaenerk (Inuit Subcontractor)	Environmental Assistant / Sampling	August 23

2.5 Weather Conditions

Table 2-2 presents a summary of weather conditions on the day of the CAM-5 monitoring program.

Table 2-2: Summary of Weather Conditions

Date	Weather
August 23	Clear sky, 15 degrees Celsius

2.6 Project References

Biogénie 2013, The Collection of Landfill Monitoring Data at the Former CAM-5 DEW Line Site, Mackar Inlet, Nunavut, Final Report dated January 2014.

Canadian Council of Ministers of the Environment (CCME, 1993), "Guidance Manual on Sampling, Analysis and Data Management for Contaminated Sites Guidance Manual on Sampling, Analysis and Data Management for Contaminated Sites – Volumes I and II, Main Report and Analytical Methods".

Department of National Defence (DND, 2015), "Terms of Reference, DEW Line Monitoring Program CAM-5, FOX-M, 2, 3, 4, 5, DYE-M", QIKIQ15 Contract, April 2015.

Environmental Sciences Group, Royal Military College, Kingston, Ontario (ESG, 2011), CAM-5 Mackar Inlet, Nunavut First Year Monitoring Report November 2011.

Golder Associates Ltd. (Golder, 2015a), "Solicitation No. W6837-151002/A Baffin Region Dew Line Sites Monitoring Program", Report P1530908, dated June 16, 2015.

Golder Associates Ltd. (Golder, 2015b), "Baffin Region DEW Line Site Monitoring Health Safety and Environment Plan", Report 1530908-1200-Rev2, dated July 31, 2015.

Golder Associates Ltd. (Golder, 2015c), "2015 Landfill Monitoring for DEW Line Sites: Logistics and Work Plan", Report 1530908-1300-Rev2, dated July 31, 2015.

Golder Associates Ltd. (Golder, 2015d), "2015 Baffin Region DEW Line Site Landfill Monitoring Field Work Progress Report", Report 1530908-1300-Rev2, dated October 5, 2015.

2.7 Report Structure

This report describes the monitoring program carried out in August 2015 at CAM-5. Results from visual inspection activities, thermal monitoring, soil sampling and groundwater sampling are presented in accordance with the TOR.

The report is organized with a separate section for each of the landfills (Sections 4.1 to 4.4). Each section contains the following 2015 monitoring information for that landfill:

- Visual Inspection Checklist;
- Preliminary Stability Assessment Table;
- Table of visual inspection photographs;
- Landfill plan with photograph locations and observed features;
- Summary of thermal monitoring (if applicable for landfill);
- Summary of soil sampling analytical results;
- Summary of groundwater sampling analytical results (if applicable for landfill); and,
- Discussion of overall landfill performance based on available monitoring data.

Appendix A provides a Limitation of Responsibilities and forms part of the report. Thermal and groundwater monitoring field record sheets are included in Appendix B. Laboratory Certificates of Analysis, QA/QC Reports and historical landfill monitoring results are included in Appendix C. A photographic log is included in Appendix D. An electronic version of the report, tables, figures, full resolution photos and Laboratory Certificates of Analysis are saved on a DVD-ROM, which is appended to the hardcopy of the report.

3.0 APPROACH & METHODOLOGY (GENERAL)

3.1 Summary of Work

3.1.1 Health and Safety

Golder developed a Health and Safety Environment Plan (Golder, 2015b) for the QIKIQ15 field program, which describes potential hazards, risks and proposed mitigation measures. Unique health and safety risks included the potential for wildlife encounters, travel by air in light planes, long distances to the nearest emergency health care facilities and variable weather conditions. In addition, Golder developed a Logistics and Work Plan (Golder, 2015c) for the field program that contained the detailed schedule and travel plans, contact information, accommodation details, transportation, communications, field equipment and sampling protocols.

3.1.2 Field Program

Table 3-1 provides a summary of the monitoring schedule for the seven DEW Line sites that are part of the QIKIQ15 Project. CAM-5 was monitored in 2015 (Year 5 since remediation) and will be monitored again in 2017 (Year 7). The field monitoring program consisted of the following activities:

- Visual inspection including photographic documentation of observed conditions;
- Thermal monitoring (i.e., datalogger downloading at landfills with thermistors);
- Soil sampling; and,
- Groundwater sampling (at landfills with monitoring wells).

Table 3-2 provides a summary of monitoring activities by landfill.

Table 3-1: Summary of QIKIQ15 Project Monitoring Schedule

DEW Line Site	Year			
	2015	2016	2017	2018
CAM-5 Mackar Inlet	Year 5		Year 7	
FOX-M Hall Beach			Year 10	
FOX-2 Longstaff Bluff	Year 4	Year 5		Year 7
FOX-3 Dewar Lakes	Year 4[(a)]	Year 5		Year 7
FOX-4 Cape Hooper		Year 18		Year 20
FOX-5 Broughton Island		Year 10		
DYE-M Cape Dyer	Year 2	Year 3	Year 4	Year 5

Legend	
	Phase I Monitoring
	Phase II Monitoring

Note:

a) At FOX-3 in 2015 (Year 4) – Complete a geotechnical inspection of the thermokarst regrade.

Table 3-2: Summary of Monitoring Requirements for CAM-5

Landfill Designation	Type of Landfill	Visual Inspection	Soil Sampling[(a)]	Groundwater Sampling	Thermal Monitoring
		✓ = yes	Locations x Samples	# of Monitoring Wells	# of Thermistors
CAM-5					
Lower Site Landfill South	Regraded	✓	5 x 2		
Non-Hazardous Waste Landfill	NEW NH	✓	3 x 2	3	
USAF & Asbestos Landfill	Regraded	✓	3 x 2		
Tier II Disposal Facility	New Tier II	✓	4 x 2	4	4
	TOTAL	***4***	***30***	***7***	***4***

Notes:

a) (# x #) Indicates the number of sampling points at each landfill. Samples are collected from two depths at each sampling point; from 0-15 cm and from 40-50 cm (or at refusal).

3.1.3 Visual Inspection

At each of the landfill locations mentioned above, a visual inspection was conducted to observe whether there were any visual signs of erosion, cracking, seepage, ponded water, stressed vegetation (potentially caused by the landfill) and for physical stability. Photographic records of the landfill were taken to document the observed condition of the landfill and other notable features that were observed. GPS coordinates were recorded of all photograph and feature locations.

Visual inspection information was used to complete a Preliminary Stability Assessment for each landfill. Each observed feature was assigned a Severity Rating (Acceptable, Marginal, Significant or Unacceptable – see definitions below) and Extent (Isolated, Occasional, Numerous or Extensive – see definitions below) and then the landfill was assigned an overall Performance Rating (Acceptable, Marginal, Significant or Unacceptable – see definitions below).

Feature Severity Rating / Landfill Performance 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.

Feature Severity Rating / Landfill Performance Rating	Description
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

3.1.4 Thermal Monitoring

The landfills that require leachate containment (e.g., Tier II disposal facilities) and rely on permafrost aggradation have ground temperature monitoring systems with vertical thermistor strings that measure temperature at various depths and automated dataloggers that allow for data collection. The data recorded on the dataloggers was downloaded using Lakewood Systems Ltd's. Prolog software and a laptop computer. Thermistor inspection and data downloading details were recorded on field record sheets included in Appendix B.

At the CAM-5 site, thermistors and data loggers were only present at the Tier II disposal facility.

3.1.5 Soil Sampling

Soil samples were collected in accordance with the TOR, the Golder Proposal, Logistics and Work Plan and Canadian Council of Ministers of the Environment Guidance Manual on Sampling, Analysis and Data Management for Contaminated Sites – Volumes I and II, Main Report and Analytical Methods (CCME, 1993). The only soil sampling procedures that deviated from the TOR are those stated below (*in italics*):

- Soil samples were collected within 2 to 4 metres of monitoring wells (where applicable). Where there was no corresponding monitoring well, soil samples were collected within 2 to 4 metres of the previous sample locations.
- GPS readings of the 2015 soil sampling locations were recorded and confirmed to be consistent with previous/required sampling locations prior to sampling.
- Test pits were dug with a shovel that was washed between sample locations. Soil samples were collected by hand using a single-use disposable nitrile glove and placed into new/clean glass sample jars provided by the laboratory that were labelled with the sample location ID and depth.
- Soil samples were generally collected at depths of 0 to 15 centimetres (cm) and 40 to 50 cm at the locations, in accordance with the TOR. *At some locations, the sample collection depth was adjusted where soil was frozen or refusal on rock was encountered. Where refusal on a large rock(s) was encountered near surface, the sampling location was moved slightly to avoid the rock. When rocks were encountered prior to reaching*

the target sampling depth, the test pit was enlarged and the rock(s) were excavated if possible. If the specified sampling depth could not be reached after expending reasonable effort to enlarge the hole and remove rock(s), a sample was collected at or near the zone of refusal (in accordance with the TOR). If refusal was encountered after the shallow soil sample depth and even with additional effort it was not possible to remove the rock(s) causing refusal, then only one soil sample was collected at that location (noted as "refusal" in summary tables in Section 4 for each landfill).

- *At locations where the ground was covered with snow and ice, excavation of the snow was attempted but, in most cases, it was impossible to dig through the ice and frozen ground beneath the snow to collect a soil sample (noted as "frozen" in summary tables in Section 4 for each landfill).*
- Inter-lab field duplicates were collected for 10% of the total soil samples collected. The field duplicates were collected from relatively homogenous soil material that was mixed either in a stainless steel bowl *or in the test pit*, so that the composition of the two samples was considered to be the same.

3.1.6 Groundwater Sampling

Groundwater samples were collected in accordance with the TOR, the Golder Proposal, Logistics and Work Plan and CCME Guidance Manual on Sampling, Analysis and Data Management for Contaminated Sites Guidance Manual on Sampling, Analysis and Data Management for Contaminated Sites – Volumes I and II, Main Report and Analytical Method (CCME, 1993). Groundwater sampling procedures of note are as follows (*deviations in italics*):

- Water levels in the wells were measured with an interface probe that was decontaminated with soap and water, then methyl hydrate and rinsed with distilled water prior to use.
- *At monitoring well locations where there was snow on the ground surrounding the well and no measurable water level or water that could be pumped with the peristaltic pump, water samples were not collected (noted as "frozen" in the summary tables in Section 4 for each landfill).*
- *At monitoring well locations that had no measurable water level or water that could be pumped with the peristaltic pump, water samples were not collected (noted as "dry" in summary tables in Section 4 for each landfill).*
- *Because of the limited quantity of water in the wells and/or slow recharge, purging was only carried out until a steady flow was observed* and then sampling was commenced in the priority order outlined in the TOR. *The number of water sample bottles collected and parameters that could not be analyzed are listed in footnotes following the respective summary tables below.*
- Purging and sampling was carried out using a peristaltic pump. Peristaltic pump flexible tubing and nylon tubing extending down the well was single-use and disposed after use at each well (i.e., was not re-used). Sample tubing was removed from the wells after completion of the sampling event and disposed off-site.
- Groundwater samples were pumped directly from the well into analysis-specific glass bottles provided by the laboratory, which were labelled with the sample location ID and date. Groundwater samples were not field filtered and were not field-acidified or preserved, in accordance with the TOR. The low-flow sampling technique used here was to ensure low turbidity which is critical when the samples are not field filtered.

- Where groundwater was insufficient for collection of a complete suite of samples, sampling was prioritized in the following order:
  - Petroleum hydrocarbons (PHC): F1 fraction;
  - Inorganic elements – total concentrations: arsenic, cadmium, chromium, cobalt, copper, lead, nickel, zinc and mercury. ;
  - PHC: F2, F3 and F4 fractions; and,
  - PCB (polychlorinated biphenyls – Total Aroclor analysis).
- Inter-lab duplicates were collected for 10% of the total groundwater samples collected.
- A field blank was filled in the field and analyzed for all parameters.
- Trip blanks were brought to the field and back and analyzed for all parameters.

3.2 Field Notes and Data

Visual inspection photographs, features, locations and notes were recorded in the field with a rugged tablet computer equipped with a camera and Global Positioning System (GPS). Field data and photographs from the tablet were uploaded to an online Geographic Information System (GIS) database that was used to generate the photograph log and figures presented in this report.

Thermistor inspection and monitoring data was recorded on field record sheets included in Appendix B. Thermistor locations were recorded with either the field tablet or a hand-held GPS.

Soil sampling locations were photographed with location identification (ID) cards before test pit excavation, at the maximum depth of the test pit excavation and after backfilling. Soil sampling locations were recorded with either the field tablet or a hand-held GPS.

Groundwater monitoring data was recorded on field record sheets included in Appendix B. Monitoring well locations were recorded with either the field tablet or a hand-held Global Positioning System (GPS).

3.3 QA/QC Methodology

Quality Assurance (QA) is the set of procedures incorporated into the project's standard operating procedures to ensure that it achieves its quality objectives. Quality control (QC) is the system of checks and validations performed which measure quality in order to determine if the quality objectives have been met.

The QA procedures incorporated into the monitoring program carried out at CAM-5 included:

- Using only ISO 17025 certified environmental labs to perform the soil and groundwater analyses. Golder used Paracel Laboratories Ltd. (Paracel) of Ottawa as the primary lab and AGAT Environmental (AGAT) of Mississauga for the duplicate samples. Both of them are ISO 17025 certified for the analyses performed. The labs also exchanged their Standard Methods for the analyses in the program to harmonize their procedures for the duplicate analysis;
- The field sampling for soil and groundwater was done by a two-person team which helped ensure that no part of the sampling and field identification procedures were forgotten;

- Duplicate soil samples were prepared in the field by mixing the soil in a stainless steel bowl and taking pinches of soil and alternately filling the sample jars for the two labs. If a duplicate from the lower of the two sample intervals was being prepared, it was sometimes mixed at the bottom of the test pit.
- Duplicate groundwater samples were prepared by alternately filling bottles for each lab for each parameter type; yield of the wells in some cases prevented filling the whole suite of sample bottles;
- To minimize the possibility of cross contamination, soil samples were collected directly from the test pits with nitrile gloved hands, at the designated depth intervals, and placed into lab-supplied sample jars, leaving no headspace. New gloves were used for each sample. The shovel and trowel used to open the test pit were cleaned manually then rinsed with methyl-hydrate and de-ionized water;
- To minimize the risk of cross-contamination, groundwater samples were pumped from the monitoring wells using dedicated tubing inserted into the well and another dedicated length of tubing between the rollers in the peristaltic pump. Nitrile-gloved hands were used to hold the sample bottles. Samples were labelled at the monitoring well with identification, time and date.
- Groundwater samples were neither filtered nor preserved in the field. The low-flow sampling technique was employed to minimize the presence of sediment in the water sample.
- Soil samples were not preserved in the field.
- To minimize the time delay from actual sample collection to receipt at the lab, Golder sent coolers from the site to the staging point every time we performed a resupply flight. From the staging point communities, the coolers were sent directly to Golder's office in Ottawa where they were checked for breakage and legibility of the labels and accuracy and completeness of the chain of custody. After being checked in Ottawa, the samples were dispatched to the primary and duplicate labs. The maximum allowable hold times were met for all samples at the CAM-5 site, except for PHC-F1 which was exceeded by 6 days due to its very short hold time of 48 hours.

Quality control was measured by the duplicate analysis and review of the lab's QA/QC data in each lab certificate. In addition to the duplicate analyses, a field blank (consisting of bottles filled with distilled water in the field) was submitted to AGAT for analysis of all specified parameters. Trip blanks (consisting of bottles filled with distilled water and sealed at the laboratory, which were brought to the field for the overall 2015 program and back) were submitted to both Paracel and AGAT for analysis of all specified parameters.

No equipment blanks were prepared because neither the soil samples nor the water samples touched non-dedicated equipment. The water sampling tubing was single-use, and soil samples were collected from the test pits into sample jars with gloved hands. This was possible because the soil texture was generally loose sandy soil.

A discussion of the QA/QC results is provided in Section 5.

4.0 2015 MONITORING PROGRAM RESULTS

Photographs 1 through 121 (in Appendix D) document the observed conditions during the visual inspection. Photographs 122 through 127 record the condition of the groundwater monitoring wells. Photographs 128 through 172 illustrate soil sample locations before excavation, after excavation and after backfilling. Photographs 173 through 180 illustrate the condition of the thermistors. A complete log of all photographs are included in Appendix D. Copies of all digital photograph files are included on a DVD attached to this report. Visual inspection photographs taken with the field tablet are identified by an "ATT number" in the file name which are noted in brackets in the visual inspection photograph log tables.

The monitoring program results are listed for each landfill in the sections below. Soil and groundwater analytical data in the tables are flagged where they exceed the background data - arithmetic mean (bold) and baseline data – arithmetic mean (underlined). Soil and groundwater are also compared to their baseline concentration plus three standard deviations (3σ). A modified total petroleum hydrocarbons (TPH) value, calculated as the sum of the PHC F1, F2 and F3 fractions, is discussed throughout this report to allow for comparison to TPH baseline data.

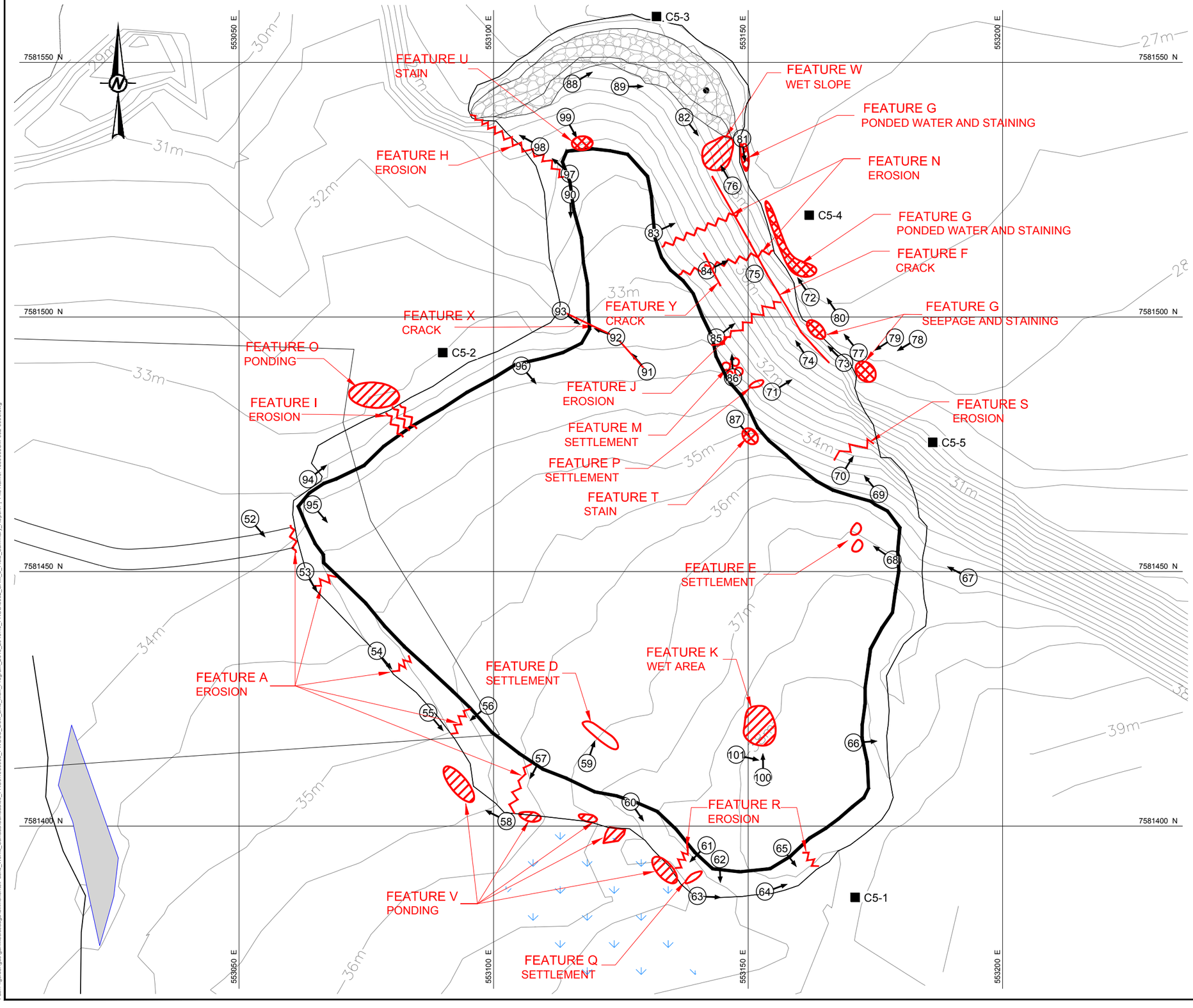
Historical soil and groundwater results and charts are included in Appendix C. It is recommended that seven data points be used at a minimum to identify a soil or groundwater quality trend for these landfills. As of the end of 2015, there are less than seven years of monitoring data available for these landfills, and therefore insufficient information available to establish a reliable trend.

4.1 Lower Site Landfill – South

4.1.1 Landfill Description

The Lower Site Landfill – South is located in the Lower Site Area, north of a closed landfarm (i.e., soil remediation area). The location of the landfill is shown on Figure CAM-5.1. The landfill covers an area approximately 12,700 m^2. The remediation for this landfill consisted of the removal of surface debris and re-grading of the existing cover soil. The layout of the landfill and the soil monitoring locations are shown on Figure CAM-5.2.

The long term monitoring plan for this landfill consists of visual inspection and the periodic collection of soil samples. The approximate locations for the collection of soil samples are identified on Figure CAM-5.2.



LEGEND

- BODY OF WATER
- SOIL SAMPLE LOCATION (2015)
- PHOTOGRAPH LOCATION
- SETTLEMENT (NTS)
- EROSION (NTS)
- STAINING
- PONDING
- CRACK (NTS)
- ELEVATION CONTOUR (0.5m INT)
- SWAMP
- LANDFILL RIP RAP

NOTES

GRID PROJECTION IS NAD83 ZONE 16N.
ELEVATIONS ARE GEODETIC.

REFERENCE

PREVIOUS INSPECTION FIGURE PROVIDED BY BIOGENIE, A DIVISION OF ENGLOBE CORPORATION, PROJECT NO.CD2655_400_403, DATED JUNE 2015.

0 12.5 25
1:750 METRES

CLIENT
DEPARTMENT OF NATIONAL DEFENCE CANADA

PROJECT
2015 CAM-5 MONITORING REPORT

TITLE
LOWER SITE LANDFILL - SOUTH

CONSULTANT
Golder Associates

YYYY-MM-DD	2016-03-24
DESIGNED	RM
PREPARED	TDR
REVIEWED	DJC
APPROVED	DP

PROJECT NO.	PHASE	REV.	FIGURE
1530908	1000	B	CAM-5.2

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B

0 25 mm

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4.1.2 Summary of Scope Deviations

The field work was conducted as per the TOR. There were no notable exceptions to the scope of work.

4.1.3 Visual Inspection

The Lower Site Landfill South has multiple locations with observed settlement, erosion, cracking, seepage staining and ponded water features. Table 4-1 presents a summary of observed visual inspection features and Table 4-2 presents the Preliminary Stability Assessment results. This landfill was assessed to have a “Marginal” overall landfill performance because of cracking, erosion, seepage and staining observed along the east slope and toe that has increased since the last visual inspection impact but does not appear to have impacted landfill stability to date. All other observed features were assessed as “Acceptable”. Table 4-3 is a log of photographs taken during the 2015 visual inspection.

No cracks were reported at this landfill in the 2013 monitoring report. Features B and F were cracks observed in 2012 that were not observed in 2013 and dropped from the feature checklist. However, two new cracks were observed in 2015 (Features X and Y) that are considered marginal. In particular, a 40 m long tension crack running along the lower east slope (Feature F) with a shorter 4 m long tension crack near crest (Feature Y) indicate a “moderate” potential for slope failure.

The extent of seepage, staining and ponded water along the east slope (previously identified Feature G) appears to have expanded from previous inspections (Photos 72-82 in Appendix D). Most of the east toe was observed to have ponded water and/or seepage with frequent areas of iron oxide staining. The ponded water along the east toe may be causing thaw of permafrost and may be related to the observed cracking on the east slope (Features F and Y). A wet area on the east slope was also observed (Feature W). Seepage and staining may be a visual indication of potential impacts to groundwater and soil quality. New ponded water area (Feature V) was observed at the southwest toe. Previously observed ponded water (Feature O) at the northwest toe was unchanged while the extent of wet area on the cover surface (Feature K) appears to have expanded from previous inspections.

The extent of minor self-armouring erosion on the west slope (previously identified Feature A) has increased (Photos 53-57 in Appendix D) and new minor self-armouring erosion channels were observed on the south and east slopes (Features R and S). The extent of previously observed self-armouring erosion channels on the east slope (Features J and N) has increased. The extent of minor self-armouring erosion on the northwest slope (Feature I) was unchanged since previous observation. A previously observed major erosion gulley in the northwest corner (Feature H) does not appear to have deteriorated further and no exposed waste materials were observed during the 2015 inspection. Erosion features were assigned a “Marginal” severity rating because the extent of erosion has increased with time.

In general, observed settlement features were isolated, minor and consistent with previous observations (Features D, E, and M). Two new minor settlement features were observed on the east and south slopes (Features P and Q). The previously observed insignificant minor depression (Feature C) was not identified during the 2015 inspection.

The previously observed small hydrocarbon stain (Feature L) was not identified during the 2015 inspection. However, two new small hydrocarbon stains (Features T and U) were observed on the crest surface. These small hydrocarbon stains are unrelated to landfill performance and are considered insignificant.

Table 4-1: Visual Inspection Checklist – Lower Site Landfill South

SITE NAME: CAM-5 Mackar Inlet
LANDFILL DESIGNATION: Lower Site Landfill South
DATE OF INSPECTION: August 23, 2015
DATE OF PREVIOUS INSPECTION: August 29, 2013
INSPECTED BY: Reza Moghaddam
REPORT PREPARED BY: Reza Moghaddam
MONITORING EVENT NUMBER: 4
The inspector/reporter represents to the best of his/her knowledge that 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 4-1: Visual Inspection Checklist – Lower Site Landfill South

Checklist Item	Present (Y/N)	Feature ID (A, B, etc.)	Location Description	Easting	Northing	Length (m)	Width (m)	Depth (m)	Extent of Landfill Area (%)	Description (Severity Rating)	Comparison to Historical Observations	Photos
Settlement	Y	C	East crest	-	-	-	-	-	-	Insignificant minor depression (Acceptable)	Previously noted (not identified in 2015)	-
		D	Southwest crest	553,118.32	7,581,412.39	5	0.2	0.1	0.008%	Linear depression (Acceptable)	Unchanged since previous observation	59
		E	Cover surface east corner	553,178.35	7,581,452.33	4	4	0.1	0.126%	Two small minor settlement areas (Acceptable)	Unchanged since previous observation	68
		M	East crest	553,146.99	7,581,488.10	2	2	0.2	0.031%	4 minor settlements (Acceptable)	Unchanged since previous observation	86
		P	East slope	553,154.66	7,581,485.31	3	1	0.1	0.024%	Minor settlement and erosion (Acceptable)	New observation	71
		Q	Southeast slope	553,141.40	7,581,385.11	2	0.5	0.1	0.008%	Minor settlement (Acceptable)	New observation	62

Table 4-1: Visual Inspection Checklist – Lower Site Landfill South

Checklist Item	Present (Y/N)	Feature ID (A, B, etc.)	Location Description	Easting	Northing	Length (m)	Width (m)	Depth (m)	Extent of Landfill Area (%)	Description (Severity Rating)	Comparison to Historical Observations	Photos
Erosion	Y	A	West slope	553,087.16	7,581,422.28	70	5	0.1	2.75%	Minor self-armouring erosion (Acceptable)	Expanded area along west slope. Combined length of the area is 70 m.	53-57
		H	Northwest slope	553,108.69	7,581,526.09	20	2	0.5	0.31%	Major erosion gulley(Marginal)	Unchanged since previous observation	97, 98
		I	Northwest slope	553,086.46	7,581,485.61	4	3	0.1	0.09%	Minor self-armouring erosion (Acceptable)	Unchanged since previous observation	94
		J	East slope	553,143.73	7,581,495.95	20	1	0.1	0.16%	Minor erosion channel (Acceptable)	Extended but no changes in depth	85
		N	East slope	553,131.44	7,581,516.59	20	5	0.1	0.79%	Minor self-armouring erosion (Marginal)	Expanded Area towards north along east slope	83
		R	South slope	553,156.68	7,581,395.74	10	2	0.1	0.16%	2 minor erosion channels (Acceptable)	New observation	61,65
		S	East slope	553,168.14	7,581,468.81	10	2	0.1	0.16%	Minor self-armouring erosion (Acceptable)	New observation	70
Lateral Movement	N											
Frost Action	N											

Table 4-1: Visual Inspection Checklist – Lower Site Landfill South

Checklist Item	Present (Y/N)	Feature ID (A, B, etc.)	Location Description	Easting	Northing	Length (m)	Width (m)	Depth (m)	Extent of Landfill Area (%)	Description (Severity Rating)	Comparison to Historical Observations	Photos
Sloughing	N											
Cracking	Y	B	-	-	-	-	-	-	-	Tension crack	Not observed in 2015	-
		X	Northwest crest and slope	553,130.07	7,581,489.27	20	0.05-0.1	0.01-0.05	0.016%	Crack and erosion channel (Acceptable)	New observation	91-93
		F	Toe of east slope	553,170.44	7,581,489.69	40	0.05-0.1	0.05	0.031%	Crack on slope along toe (Marginal)	This feature was observed in 2012 but not in 2013. The dimension of the feature has not changed since 2012.	72-76
		Y	East slope near crest	553,141.88	7,581,509.15	4	0.05-0.1	0.05	0.003%	Crack on slope near crest (Marginal)	New Observation	84
Animal Burrows	N											
Vegetation	N											
Staining	Y	G	East toe	553,171.04	7,581,488.03	50	3	-	1.179%	Seepage with iron staining (Marginal)	Expanded Area along east toe	77-79
		L	South crest surface	-	-	0.3	0.3	-	0.001%	Small hydrocarbon stain (Acceptable)	Previously noted (not identified in 2015)	-

Table 4-1: Visual Inspection Checklist – Lower Site Landfill South

Checklist Item	Present (Y/N)	Feature ID (A, B, etc.)	Location Description	Easting	Northing	Length (m)	Width (m)	Depth (m)	Extent of Landfill Area (%)	Description (Severity Rating)	Comparison to Historical Observations	Photos
		T	East crest	553,147.46	7,581,479.97	0.5	0.5	-	0.002%	Small hydrocarbon stain (Acceptable)	New observation	87
		U	North slope	553,114.14	7,581,539.28	2	2	-	0.031%	Wet area or potential stain (Acceptable)	New observation	99
Vegetation Stress	N											
Seepage or Ponded Water	Y	G	East toe	553,168.01	7,581,499.86	50	3	Unknown	1.179%	Ponded water with iron staining (Marginal)	Expanded Area	80, 81
		O	Northwest toe	553,086.46	7,581,485.61	20	5	0.15	0.786%	Ponded water at toe (Acceptable)	Unchanged since previous observation	94
		K	South crest surface	553,155.00	7,581,420.00	10	10	-	0.786%	Wet area on crest (Acceptable)	Expanded Area	100
		W	Northeast slope	553,137.44	7,581,539.24	20	10	-	1.572%	Wet area on slope (Acceptable)	New Observation	82
		V	Southwest toe	553,102.50	7,581,400.98	40	5	Unknown	1.572%	Ponded water along toe (Acceptable)	New Observation	58
Debris and/or Liner Exposed	N											

Table 4-1: Visual Inspection Checklist – Lower Site Landfill South

Checklist Item	Present (Y/N)	Feature ID (A, B, etc.)	Location Description	Easting	Northing	Length (m)	Width (m)	Depth (m)	Extent of Landfill Area (%)	Description (Severity Rating)	Comparison to Historical Observations	Photos
Presence / Condition of Monitoring Instruments	N											
Features of Note / Other Observations	N											

Landfill Area = 12,720 m^2.

Table 4-2: Preliminary Stability Assessment – Lower Site Landfill South

Feature	Severity Rating	Extent
Settlement	Acceptable	Isolated
Erosion	Marginal	Numerous
Lateral Movement	Acceptable	-
Frost Action	Acceptable	-
Sloughing	Acceptable	-
Cracking	Marginal	Isolated
Animal Burrows	Acceptable	-
Vegetation establishment	Acceptable	-
Staining	Marginal	Occasional
Vegetation Stress	Acceptable	-
Seepage/Ponded Water	Marginal	Occasional
Debris and/or liner exposure	Acceptable	-
Other	-	-
Overall Landfill Performance	**Marginal**	

Table 4-3: Summary Table of Photographic Log – Lower Site Landfill South

Photo	Description (file name.jpg)	Easting	Northing	Date
52	Lower Site Landfill South – West crest and toe, looking south (ATT65_Photo1.jpg)	553052.1649	7581460.359	23-Aug-15
53	Lower Site Landfill South – Feature A, minor erosion (self-armouring) and minor settlement along west slope (ATT66_Photo1.jpg)	553062.9766	7581449.99	23-Aug-15
54	Lower Site Landfill South – Feature A, minor erosion (self-armouring) and minor settlement along west slope (ATT67_Photo1.jpg)	553077.0559	7581434.411	23-Aug-15
55	Lower Site Landfill South – Feature A, minor erosion (self-armouring) and minor settlement along west slope, looking south (ATT68_Photo1.jpg)	553087.1562	7581422.28	23-Aug-15
56	Lower Site Landfill South – Feature A, minor erosion (self-armouring) and frequent minor settlement along west slope, looking west (ATT69_Photo1.jpg)	553098.9241	7581423.66	23-Aug-15
57	Lower Site Landfill South – Feature A, minor erosion (self-armouring) along west slope, looking west (ATT70_Photo1.jpg)	553104.1673	7581406.074	23-Aug-15
58	Lower Site Landfill South – Feature V, ponded water along west toe, looking north (ATT71_Photo1.jpg)	553102.5022	7581400.984	23-Aug-15
59	Lower Site Landfill South – Feature D, linear depression on the cover surface, looking north (ATT72_Photo1.jpg)	553118.3245	7581412.393	23-Aug-15
60	Lower Site Landfill South – Southwest slope and toe, ponded water at toe (Feature V) (ATT73_Photo1.jpg)	553126.8816	7581404.784	23-Aug-15

Table 4-3: Summary Table of Photographic Log – Lower Site Landfill South

Photo	Description (file name.jpg)	Easting	Northing	Date
61	Lower Site Landfill South – Feature R, minor erosion (self-armouring) near southwest corner, looking northwest (ATT74_Photo1.jpg)	553139.2818	7581389.411	23-Aug-15
62	Lower Site Landfill South – Feature Q, minor linear settlement near southwest corner (ATT75_Photo1.jpg)	553141.4044	7581385.106	23-Aug-15
63	Lower Site Landfill South – South toe and slope, looking southeast (ATT76_Photo1.jpg)	553140.0205	7581386.267	23-Aug-15
64	Lower Site Landfill South – South slope and crest surface, looking east (ATT77_Photo1.jpg)	553153.2824	7581387.139	23-Aug-15
65	Lower Site Landfill South – Feature R, minor erosion channel on south crest and slope, looking south (ATT78_Photo1.jpg)	553156.6799	7581395.742	23-Aug-15
66	Lower Site Landfill South – South east slope, looking east (ATT79_Photo1.jpg)	553176.5672	7581416.326	23-Aug-15
67	Lower Site Landfill South – Southeast slope, looking northwest (ATT80_Photo1.jpg)	553193.2388	7581448.794	23-Aug-15
68	Lower Site Landfill South – Feature E, 3 minor settlement areas near southeast crest edge, looking north (ATT81_Photo1.jpg)	553178.3468	7581452.33	23-Aug-15
69	Lower Site Landfill South – East slope, looking north (ATT83_Photo2.jpg)	553175.6733	7581465.229	23-Aug-15
70	Lower Site Landfill South – Feature S, minor self-armouring erosion channel on east slope, looking east (ATT84_Photo1.jpg)	553168.1413	7581468.807	23-Aug-15
71	Lower Site Landfill South – Feature P, settlement and self-armouring erosion on east slope, looking east from crest (ATT86_Photo1.jpg)	553154.6603	7581485.309	23-Aug-15
72	Lower Site Landfill South – Feature F, tension crack near toe on east slope, looking north, south endpoint (ATT87_Photo1.jpg)	553367.822	7581808.203	23-Aug-15
73	Lower Site Landfill South – Feature F, tension crack on east slope, looking north (ATT88_Photo1.jpg)	553170.4368	7581489.692	23-Aug-15
74	Lower Site Landfill South – Feature F, tension crack on east slope, mid-point, looking north (ATT89_Photo1.jpg)	553161.8292	7581491.519	23-Aug-15
75	Lower Site Landfill South – Feature F, tension crack on east slope, looking south (ATT90_Photo1.jpg)	553151.2361	7581508.49	23-Aug-15
76	Lower Site Landfill South – Feature F, tension crack on east slope, north endpoint, looking north (ATT97_Photo1.jpg)	553146.8917	7581525.779	23-Aug-15
77	Lower Site Landfill South – Feature G, seepage and ponded water at the toe, looking north (ATT91_Photo1.jpg)	553171.0415	7581488.032	23-Aug-15
78	Lower Site Landfill South – Feature G, seepage with iron oxide staining, east toe (ATT93_Photo1.jpg)	553164.4321	7581499.362	23-Aug-15
79	Lower Site Landfill South – Feature G, minor seepage with iron oxide staining, east toe (ATT94_Photo2.jpg)	553164.4321	7581499.362	23-Aug-15

Table 4-3: Summary Table of Photographic Log – Lower Site Landfill South

Photo	Description (file name.jpg)	Easting	Northing	Date
80	Lower Site Landfill South – Feature G, ponded water along east toe, with iron oxide staining, looking north from south endpoint (ATT95_Photo1.jpg)	553168.0059	7581499.864	23-Aug-15
81	Lower Site Landfill South – Feature G, ponded water along east toe, iron oxide staining, looking south from north endpoint (ATT96_Photo1.jpg)	553148.8054	7581535.057	23-Aug-15
82	Lower Site Landfill South – Feature W, wet area on northeast slope and toe, looking south (ATT98_Photo1.jpg)	553137.4364	7581539.242	23-Aug-15
83	Lower Site Landfill South – Feature N, self-armouring erosion on east slope, looking east from crest (ATT99_Photo1.jpg)	553131.4357	7581516.589	23-Aug-15
84	Lower Site Landfill South – Feature Y, tension crack on east slope close to the crest, some self-armouring erosion (Feature R), looking east (ATT100_Photo1.jpg)	553141.8772	7581509.15	23-Aug-15
85	Lower Site Landfill South – Feature J, erosion channel on east slope, looking east (ATT101_Photo1.jpg)	553143.7258	7581495.954	23-Aug-15
86	Lower Site Landfill South – Feature M, settlement near east crest edge, looking north (ATT102_Photo1.jpg)	553146.9869	7581488.104	23-Aug-15
87	Lower Site Landfill South – Feature T, stain (ATT103_Photo1.jpg)	553147.4592	7581479.973	23-Aug-15
88	Lower Site Landfill South – North slope and toe, looking east (ATT104_Photo1.jpg)	553105.5736	7581533.167	23-Aug-15
89	Lower Site Landfill South – North crest and slope, looking east (ATT105_Photo2.jpg)	553105.5736	7581533.167	23-Aug-15
90	Lower Site Landfill South – Northwest slope and crest surface, looking south (ATT106_Photo1.jpg)	553107.7322	7581532.059	23-Aug-15
91	Lower Site Landfill South – Feature X, crack and/or minor erosion gully from northwest crest to toe, looking north (ATT108_Photo1.jpg)	553130.071	7581489.274	23-Aug-15
92	Lower Site Landfill South – Feature X, crack and/or minor erosion gully, looking north (ATT110_Photo1.jpg)	553124.0308	7581496.062	23-Aug-15
93	Lower Site Landfill South – Feature X, south end point, looking south (ATT111_Photo1.jpg)	553113.2111	7581501.226	23-Aug-15
94	Lower Site Landfill South – Northwest slope and toe, looking east (ATT112_Photo1.jpg)	553056.4648	7581460.616	23-Aug-15
95	Lower Site Landfill South – Cover surface, looking south from northwest corner (ATT113_Photo1.jpg)	553064.4244	7581463.18	23-Aug-15
96	Lower Site Landfill South – Cover surface, looking south from northwest crest edge (ATT114_Photo1.jpg)	553105.438	7581490.413	23-Aug-15
97	Lower Site Landfill South – Feature H, erosion gully from northwest crest to toe, looking north (ATT115_Photo1.jpg)	553108.6878	7581526.094	23-Aug-15
98	Lower Site Landfill South – Feature H, erosion gully, looking north, 2 m wide x 0.5 m deep (ATT116_Photo2.jpg)	553108.6878	7581526.094	23-Aug-15

Table 4-3: Summary Table of Photographic Log – Lower Site Landfill South

Photo	Description (file name.jpg)	Easting	Northing	Date
99	Lower Site Landfill South – Feature U, wet area or potential stain (ATT118_Photo1.jpg)	553114.1385	7581539.275	23-Aug-15
100	Lower Site Landfill South – Cover surface, looking north (ATT119_Photo1.jpg)	553152.9083	7581409.604	23-Aug-15
101	Lower Site Landfill South – Cover surface, looking east (ATT120_Photo1.jpg)	553147.6176	7581414.028	23-Aug-15

4.1.4 Soil Sampling

Table 4-4 presents a summary of analytical results for soil samples collected at the Lower Site Landfill – South. C5-1 represents an upgradient sampling location, whereas C5-2, C5-3, C5-4 and C5-5 represent downgradient sampling locations.

C5-1

Sampling location C5-1 is located upgradient of the landfill, approximately 10 m south of the southern toe of the landfill. The estimated elevation of this sampling point is 38.5 masl. Photograph 63 (Appendix D) illustrates the cover and soils off the toe of the cover. The soils in the area consist of yellow sand and gravel with sparse vegetation.

In the shallow sample at C5-1 (0-15 cm), the concentration of copper (7.1 mg/kg) exceeded the baseline concentration (5.7 mg/kg) The concentration of copper reported in 2015 represents a slight increase from those measured in 2011 (3.7 mg/kg) and 2013 (4.1 mg/kg). The concentration of arsenic (1.2 mg/kg) exceeded the background (0.83 mg/kg) and baseline (1.0 mg/kg) concentrations. Concentrations of arsenic observed in 2011 and 2013 were less than the method detection limit (1.0 mg/kg). No exceedances of the baseline concentrations plus 3σ were reported in 2015. No PHC or PCB were detected from the shallow sample at C5-1 in 2015.

The deep sample at C5-1 (40-50 cm) results indicated that all parameters were at less than the background values. No PHC or PCB were detected from the deep sample at C5-1 in 2015.

C5-2

Sampling location C5-2 is located downgradient of the landfill, approximately 6 m north of the northwest toe of the landfill. The estimated elevation of this sampling point is 33 masl; Photograph 97 (Appendix D) illustrates the area of the sample, which can be observed in the background of the photo. The soils in the area consist of brown sand with sparse vegetation.

The shallow sample at C5-2 (0-15 cm) indicated the concentrations of all metals parameters were less than the background and baseline concentrations. The concentration of TPH (44 mg/kg) exceeded the baseline concentration (17 mg/kg). The TPH concentration was greater than the concentrations measured in 2013 (24 mg/kg) and 2011 (12 mg/kg). The concentration of the PHC F4 fraction in 2015 was 25 mg/kg. No PCB were detected from the shallow sample at C5-2 in 2015.

The deep sample at C5-2 (40-50 cm) indicated the concentrations all metals parameters were less than the background and baseline concentrations. The concentration of TPH (30 mg/kg) exceeded the baseline concentration (17 mg/kg). The TPH concentration was less than the concentration measured in 2013 (44 mg/kg) but greater than the concentration measured in 2011 (17 mg/kg). The concentration of the PHC F4 fraction in 2015 was 9 mg/kg. No PCB were detected from the deep sample at C5-2 in 2015.

C5-3

Sampling location C5-3 is located downgradient of the landfill, immediately north of the northern toe of the landfill. The estimated elevation of this sampling point is 27 masl. As shown in Photograph 88 (Appendix D), some ponding of water was observed near the toe of the landfill in this area. The soils in the area consist of grey-brown sand and gravel and are in the area of the edge of the landfill cover.

The shallow sample at C5-3 (0-15 cm) exhibited elevated concentrations of metals. The concentrations of cobalt (5.9 mg/kg) and zinc (27.9 mg/kg) exceeded their respective baseline concentrations (5.0 mg/kg and 15 mg/kg, respectively). In addition, the concentration of copper (12.8 mg/kg), nickel (14.6 mg/kg), chromium (24.6 mg/kg) and arsenic (1.1 mg/kg) exceeded their respective background and baseline concentrations. Elevated metal concentrations were observed in 2011 and 2013 at similar concentrations. No exceedances of the baseline concentrations plus 3σ were reported in 2015. No PHC or PCB were detected from the shallow sample at C5-3 in 2015.

The deep sample at C5-3 (40-50 cm) also exhibited elevated concentrations of metals. The concentrations of cobalt (6.1 mg/kg) and zinc (28.7 mg/kg) exceeded their respective baseline concentrations (5.0 mg/kg and 15 mg/kg, respectively). In addition, the concentration of copper (13 mg/kg), nickel (14.7 mg/kg) and chromium (25.1 mg/kg) exceeded their respective background and baseline concentrations. Elevated metal concentrations were observed in 2011 and 2013 at similar concentrations. No exceedances of the baseline concentrations plus 3σ were reported in 2015. No PHC or PCB were detected from the deep sample at C5-3 in 2015.

C5-4

Sampling location C5-4 is located downgradient of the landfill, approximately 6 m east of the eastern toe of the landfill. The estimated elevation of this sampling point is 27.5 masl. As shown in Photographs 80 and 81 (Appendix D), some ponding of water and iron-oxide staining was observed near along the eastern toe of the landfill in this area. The soils in the area consist of wet grey stony sand and are stained at surface.

The shallow sample at C5-4 (0-15 cm) exhibited elevated concentrations of metals. The concentrations of copper (8.7 mg/kg), nickel (11.9 mg/kg), zinc (25 mg/kg) and chromium (20.4 mg/kg) exceeded their respective baseline concentrations. In addition, the concentration of arsenic (1.1 mg/kg) exceeded the background (0.83 mg/kg) and baseline (1.0 mg/kg) concentrations. Concentrations of arsenic observed in 2011 and 2013 were less than the method detection limit (1.0 mg/kg). The concentrations of most metal parameters observed in 2015 were lower than those observed in 2013 and 2011. The concentration of TPH (38 mg/kg) exceeded the respective baseline concentration (17 mg/kg). The TPH concentration was less than the concentration measured in 2013 (51 mg/kg) but greater than the concentration measured in 2011 (12 mg/kg). No exceedances of the baseline concentrations plus 3σ were reported in 2015. No PHC F4 fraction or PCB were detected from the shallow sample at C5-4 in 2015.

The deep sample at C5-4 (40-50 cm) exhibited elevated concentrations of metals, and are generally higher than those in the shallow sample. The concentrations of cobalt (8 mg/kg) exceeded the respective baseline concentration (6.4 mg/kg). In addition, the concentration of copper (17.6 mg/kg), nickel (22.7 mg/kg), zinc (37.4 mg/kg) and chromium (37.3 mg/kg) exceeded their respective background and baseline concentrations. Elevated metal concentrations were observed in 2011 and 2013 at similar concentrations. No exceedances of the baseline concentrations plus 3σ were reported in 2015. No PHC or PCB were detected from the deep sample at C5-4 in 2015.

C5-5

Sampling location C5-5 is located downgradient of the landfill, approximately 6 m east of the eastern toe of the landfill. The estimated elevation of this sampling point is 30 masl. As shown in Photograph 69 (Appendix D), some ponding of water was observed near along the eastern toe of the landfill in this area. The soils in the area consist of moist grey stony sand with some silt.

The shallow sample at C5-3 (0-15 cm) exhibited elevated concentrations of metals. The concentrations of copper (10.1 mg/kg), nickel (13.8 mg/kg), cobalt (5.2 mg/kg) and zinc (24.7 mg/kg) exceeded their respective baseline concentrations. In addition, the concentration of chromium (22.5 mg/kg) and arsenic (1.0 mg/kg) exceeded their respective background and baseline concentrations. The concentrations of most metal parameters, including chromium and arsenic, were higher than those concentrations observed in 2013 and 2011. No exceedances of the baseline concentrations plus 3σ were reported in 2015. No PHC or PCB were detected from the shallow sample at C5-5 in 2015.

The deep sample at C5-5 (40-50 cm) exhibited elevated concentrations of metals and are generally higher than those in the shallow sample. The concentrations of cobalt (7.7 mg/kg) exceeded the baseline concentration (6.4 mg/kg). The concentration of copper (16.6 mg/kg), nickel (21.8 mg/kg), zinc (36.3 mg/kg), chromium (35.6 mg/kg) and arsenic (1.3 mg/kg) exceeded their respective background and baseline concentrations. The concentrations of most metal parameters were higher than those concentrations observed in 2013 and 2011. No exceedances of the baseline concentrations plus 3σ were reported in 2015. No PHC or PCB were detected from the deep sample at C5-5 in 2015.

Table 4-4: Soil Chemical Analysis Results – Lower Site Landfill South

ID	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 (mg/kg)	F2 (mg/kg)	F3 (mg/kg)	F4 (mg/kg)
Background Mean		10	14	9.5	1.1	10	31	22	0.83	NA	0.036	NA	NA	NA	NA
Baseline Mean		**5.7**	**6.8**	**5.0**	**1.0**	**10**	**15**	**20**	**1.0**	**0.10**	**0.003**	**NA**	**NA**	**NA**	**NA**
Baseline + 3σ		21	29	13	1.0	10	55	57	2.0	0.10	0.003	NA	NA	NA	NA
Upgradient															
C5-1 (0-15)	(0-15)	**7.1**	4.5	2.2	<0.5	2.4	11.3	6.8	**1.2**	<0.1	<0.05	<7	<4	<8	<6
C5-1 (40-50)	(40-50)	3.3	3.4	1.6	<0.5	1.5	7.5	4.3	<1	<0.1	<0.05	<7	<4	<8	<6
Downgradient															
C5-2 (0-15)	(0-15)	2.1	2.7	1.4	<0.5	2	7.7	6	<1	<0.1	<0.05	<7	<4	38	25
C5-2 (40-50)	(40-50)	2.5	3	1.5	<0.5	1.6	7.6	5.2	<1	<0.1	<0.05	<7	<4	24	9
C5-3 (0-15)	(0-15)	**12.8**	**14.6**	**5.9**	<0.5	4.6	**27.9**	**24.6**	**1.1**	<0.1	<0.05	<7	<4	<8	<6
C5-3 (40-50)	(40-50)	**13**	**14.7**	**6.1**	<0.5	5.1	**28.7**	**25.1**	<1	<0.1	<0.05	<7	<4	<8	<6
C5-4 (0-15)	(0-15)	**8.7**	**11.9**	4.4	<0.5	3.6	**25**	**20.4**	**1.1**	<0.1	<1 [1]	<7	<4	32	<6
C5-4 (40-50)	(40-50)	**17.6**	**22.7**	**8**	<0.5	5.7	**37.4**	**37.3**	<1	<0.1	<0.05	<7	<4	<8	<6
C5-5 (0-15)	(0-15)	**10.1**	**13.8**	**5.2**	<0.5	3	**24.7**	**22.5**	**1**	<0.1	<0.05	<7	<4	<8	<6
C5-5 (40-50)	(40-50)	**16.6**	**21.8**	**7.7**	<0.5	5.9	**36.3**	**35.6**	**1.3**	<0.1	<0.05	<7	<4	<8	<6

Notes:
NA: Not available
1: Dilution required due to elevated concentrations of other analytes.
Underlined values: Results exceed Background arithmetic mean.
Bold Values: Results exceed Baseline arithmetic mean.

4.1.5 Conclusions and Overall Performance of the Lower Site Landfill South

This landfill was assessed to have a “Marginal” overall landfill performance with a “Moderate” potential for failure of the east slope because cracking, erosion, seepage and staining observed along the east slope and toe has increased since the last visual inspection impact but does not appear to have impacted landfill stability to date.

Most of the east toe was observed to have ponded water and/or seepage with frequent areas of staining, notably in the area of C5-4 and C5-5. This staining was reddish in colour and interpreted to most likely reflect iron, however the analyses do not include iron.

Two soil samples (shallow and deep) were collected at all designated locations in 2015.. Concentrations of copper, nickel, cobalt, zinc, chromium and arsenic were detected above the background and/or baseline arithmetic mean. The metal concentrations were highest at C5-3, C5-4 and C5-5 (highest at the latter two locations), located near the eastern toe of the landfill. In some cases the 2015 concentrations were slightly lower than in earlier years (e.g., many parameters at C5-3 and C5-4), and in other cased they were higher (e.g., at C5-5). These sample locations are located near where minor erosion, ponding of water and staining was observed during the visual inspection. Although there is no definitive connection between the observed presence of ponding and staining at the toe of the landfill, it is possible the landfill may be contributing to the observed elevated parameters in the soil samples.

Concentrations of petroleum hydrocarbons above the baseline concentration (17 mg/kg) were noted in both samples at C5-2 and in the deep sample at C5-4, at TPH concentrations ranging from 30 mg/kg to 44 mg/kg. No detectable concentrations of Total PCB were noted in any of the samples in 2015.

Whereas a number of the environmental sampling results are the same as in the two previous sampling sessions, elevated parameters and increases in some cases (i.e., C5-5) are associated with the areas where there is seepage and staining. This may be reflective of an ongoing impact from the landfill.

4.1.6 Recommendations for Lower Site Landfill South

- Consideration should be given to adding iron to the analytical parameter list for this landfill to confirm expectations that the staining is related to iron.
- Consideration should be given to collecting soil samples at locations 25 metres downgradient of C5-3 through C5-5 to determine if the concentrations in the soil decline with distance from the landfill.

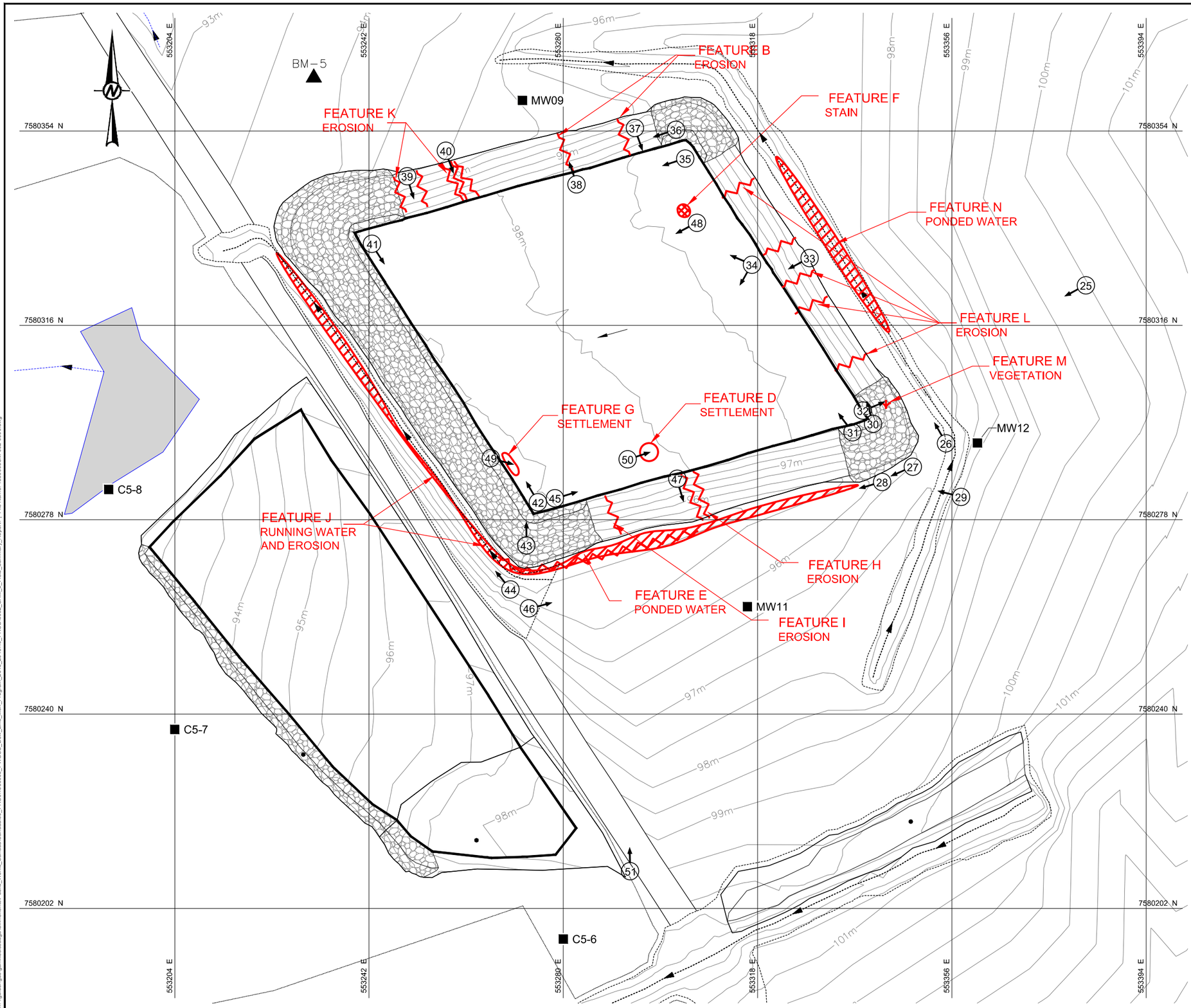
4.2 Non-Hazardous Waste Landfill

4.2.1 Landfill Description

The Non-Hazardous Waste Landfill is located in the Middle Site Area, on the east side of the main road (Figure CAM-5.1). This landfill was constructed for the disposal of non-hazardous wastes and debris generated and collected during site clean-up. The landfill covers an area approximately 7,000 m^2. The design of this landfill includes perimeter berms and the placement of a cover of compacted granular fill over the landfilled material.

Four groundwater monitoring wells were installed around the landfill perimeter. The long-term monitoring plan consists of visual inspection, and the periodic collection of soil and groundwater samples at three of these wells, MW-09, MW-11 and MW-12. It is reported that MW-10 was removed when a drainage swale was constructed around the landfill. Approximate locations for the collection of soil and groundwater samples are identified in Figure CAM-5.3.

The long term monitoring plan for this landfill consists of a visual inspection of the landfill and the periodic collection of soil and groundwater sampling and analyses.



LEGEND

- BODY OF WATER
- BM-6 PERMANENT BENCHMARK LOCATION (1)
- MONITORING WELL LOCATION (2)
- B BACKGROUND MONITORING WELL LOCATION (1)
- SOIL SAMPLE LOCATION (2015)
- 1 PHOTOGRAPH LOCATION
- EROSION (NTS)
- PONDING (NTS)
- STAINING (NTS)
- SETTLEMENT (NTS)
- VEGETATION (NTS)
- 97m ELEVATION CONTOUR (0.5m INT.)
- DRAINAGE
- LANDFILL RIP RAP

NOTES

GRID PROJECTION IS NAD83 ZONE 16N.
ELEVATIONS ARE GEODETIC.

REFERENCE

PREVIOUS INSPECTION FIGURE PROVIDED BY BIOGENIE, A DIVISION OF ENGLOBE CORPORATION, PROJECT NO.CD2655_400_403, DATE : JUNE 2015.

0 12.5 25
1:750 METRES

CLIENT
DEPARTMENT OF NATIONAL DEFENCE CANADA

PROJECT
2015 CAM-5 MONITORING REPORT

TITLE
NON-HAZARDOUS WASTE LANDFILL

CONSULTANT
Golder Associates

YYYY-MM-DD	2015-03-24
DESIGNED	RM
PREPARED	TDR
REVIEWED	DJC
APPROVED	DP

PROJECT NO.	PHASE	REV.	FIGURE
1530908	1000	B	CAM-5.3

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B

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4.2.2 Summary of Scope Deviations

The field work was conducted as per the TOR with the following exception:

- The deep soil sample at MW11 could not be collected due to refusal.

4.2.3 Visual Inspection

The Non-Hazardous Waste Landfill has observed ponded water, settlement, erosion, vegetation and stain features. Table 4-6 presents a summary of observed visual inspection features and Table 4-7 presents the Preliminary Stability Assessment results. This landfill was assessed to have an “Acceptable” overall landfill performance. Although erosion and ponding of water have increased in extent since the last inspection they do not appear to be impacting landfill stability. All other observed features were assessed as “Acceptable”. No cracks or exposed waste has been observed at this landfill. Table 4-8 is a log of photographs taken during the 2015 visual inspection.

Ponded water around the toe (previously identified as Feature E along the south toe) was observed to extend along the east (Feature N) and west toes (Feature J) during the 2015 visual inspection (Photos 26, 28 and 44 in Appendix D). Previous inspections reported erosion from the running water along the toe. The increased area of water ponding compared to previous inspections is likely due to the recent snow melt prior to the 2015 inspection. Short-term or seasonal ponding of water due to snow melt is not a concern. However, long-term ponding of water (potentially causing increased permafrost thaw) and/or erosion along the toe over the long-term could result in potential instability of the landfill side slopes.

The extent of minor self-armouring erosion on the side slopes has increased on the north (Features K and B) and east (Feature L) slopes (Photos 33, 38 and 39 in Appendix D). Previously observed self-armouring erosion on the south slope (Features H and I) was also observed in 2015.

Previously observed ponded water on the crest surface (Feature D) was only observed to be a minor settlement area in 2015. The other previously observed linear depression (Feature G) is isolated and considered insignificant.

There is one previously identified small hydrocarbon stain (Feature F) on the crest surface which is unrelated to landfill performance considered insignificant. A very small area of sparse vegetation (Feature M) was also observed on the east slope, which is unrelated to landfill performance.

Features A and C were not listed in the previous inspection report as well as this report.

Table 4-5: Visual Inspection Checklist - Non-Hazardous Waste Landfill

SITE NAME: CAM-5 Mackar Inlet
LANDFILL DESIGNATION: Non Hazardous Waste Landfill
DATE OF INSPECTION: August 23, 2015
DATE OF PREVIOUS INSPECTION: August 29, 2013
INSPECTED BY: Reza Moghaddam
REPORT PREPARED BY: Reza Moghaddam
MONITORING EVENT NUMBER: 4
The inspector/reporter represents to the best of his/her knowledge that 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 4-5: Visual Inspection Checklist - Non-Hazardous Waste Landfill

Checklist Item	Present (Y/N)	Feature ID (A, B, etc.)	Location Description	Easting	Northing	Length (m)	Width (m)	Depth (m)	Extent of Landfill Area (%)	Description (Severity Rating)	Comparison to Historical Observations	Photos
Settlement	Y	G	Southwest corner along crest	553,265.798	7,580,290.038	1.25	0.15	0.1	0.001%	Minor linear settlement near crest (Acceptable)	Unchanged since previous observation	49
		D	South crest surface	553,292.567	7,580,289.819	3	2	0.1	0.085%	Minor settlement (Acceptable)	Previously noted as ponded water	50
Erosion	Y	L	East slope	553,328.143	7,580,329.134	40	5	0.1	2.849%	Self-armouring erosion (Acceptable)	New Observation	33
		B	North slope	553,293.990	7,580,354.570	10	8	0.1	1.140%	Self-armouring erosion (Acceptable)	Previously noted with the same condition	37
			North slope	553,282.550	7,580,343.568					Self-armouring erosion (Acceptable)	Additional area	38
		K	North slope	553,249.440	7,580,345.159	15	8	0.1	1.709%	Self-armouring erosion (Acceptable)	Additional area	39
			North slope	553,257.286	7,580,343.428					Self-armouring erosion (Acceptable)	Previously noted with the same condition	40
		H	South central slope	553,302.271	7,580,285.989	10	5	0.1	0.712%	Self-armouring erosion (Acceptable)	Unchanged since previous observation	47
		I	Southwest slope	553,290.1	7,580,288.0	5	2	0.1	0.142%	Self-armouring erosion (Acceptable)	Not significantly changed since previous observation	46

Table 4-5: Visual Inspection Checklist - Non-Hazardous Waste Landfill

Checklist Item	Present (Y/N)	Feature ID (A, B, etc.)	Location Description	Easting	Northing	Length (m)	Width (m)	Depth (m)	Extent of Landfill Area (%)	Description (Severity Rating)	Comparison to Historical Observations	Photos
Lateral Movement	N											
Frost Action	N											
Sloughing	N											
Cracking	N											
Animal Burrows	N											
Vegetation	Y	M	Southeast corner	553,338.565	7,580,299.334	10	5	-	0.712%	Sparse vegetation on slope (Acceptable)	New Observation	32
Staining	Y	F	NE corner crest	553,306.119	7,580,336.032	1	0.5	-	0.007%	Small hydrocarbon stain (Acceptable)	Unchanged since previous observation	48
Vegetation Stress	N											
Seepage	N											

Table 4-5: Visual Inspection Checklist - Non-Hazardous Waste Landfill

Checklist Item	Present (Y/N)	Feature ID (A, B, etc.)	Location Description	Easting	Northing	Length (m)	Width (m)	Depth (m)	Extent of Landfill Area (%)	Description (Severity Rating)	Comparison to Historical Observations	Photos
Ponded Water	Y	J	West toe	553,272.981	7,580,261.304	80	2	0.2	2.279%	Running water along toe (Acceptable)	Previously noted as erosion	44
		E	South toe	553,273.277	7,580,260.659	70	2	0.2	1.994%	Ponded/Running water along toe (Acceptable)	Extended length due to recent snow melt prior to 2015 inspection	46
			South toe	553,342.342	7,580,285.362							28
		N	East toe	553,354.830	7,580,292.910	40	2	0.2	1.140%	Wet area and ponded water (Acceptable)	New Observation	26
Debris and/or Liner Exposed	N											
Presence / Condition of Monitoring Instruments	Y	MW-09, 11,12								Monitoring wells intact		125,126,127
Features of Note / Other Observations	N											

Landfill Area = 7,020 m^2.

Table 4-6: Preliminary Stability Assessment – Non-Hazardous Waste Landfill

Feature	Severity Rating	Extent
Settlement	Acceptable	Isolated
Erosion	Acceptable	Occasional
Lateral Movement	Acceptable	-
Frost Action	Acceptable	-
Sloughing	Acceptable	-
Cracking	Acceptable	-
Animal Burrows	Acceptable	-
Vegetation establishment	Acceptable	Occasional
Staining	Acceptable	Isolated
Vegetation Stress	Acceptable	-
Seepage/Ponded Water	-Acceptable	Occasional
Debris and/or liner exposure	Acceptable	-
Other		
Overall Landfill Performance	**Acceptable**	

Table 4-7: Summary Table of Photographic Log - Non-Hazardous Waste Landfill

Photo	Description (file name.jpg)	Easting	Northing	Date
25	Non-Haz Waste Landfill – East slope, looking west (ATT27_Photo1.jpg)	553382.2086	7580323.82	23-Aug-15
26	Non-Haz Waste Landfill – East toe and slope, looking north, Feature N, water in ditch (ATT29_Photo1.jpg)	553354.83	7580292.91	23-Aug-15
27	Non-Haz Waste Landfill – South toe, looking west (ATT30_Photo1.jpg)	553348.3378	7580288.35	23-Aug-15
28	Non-Haz Waste Landfill – Feature E, water/seepage along south toe (ATT31_Photo1.jpg)	553342.3415	7580285.362	23-Aug-15
29	Non-Haz Waste Landfill – Overview of southeast corner with Feature A, looking northwest (ATT32_Photo1.jpg)	553357.777	7580282.452	23-Aug-15
30	Non-Haz Waste Landfill – East slope and toe, looking north (ATT33_Photo1.jpg)	553340.5642	7580296.718	23-Aug-15
31	Non-Haz Waste Landfill – East crest, looking north (ATT34_Photo1.jpg)	553336.5247	7580295.091	23-Aug-15
32	Non-Haz Waste Landfill – Feature M, sparse vegetation, southeast corner (ATT35_Photo1.jpg)	553338.5652	7580299.334	23-Aug-15
33	Non-Haz Waste Landfill – Feature L, self-armouring erosion on east slope (ATT36_Photo1.jpg)	553328.1434	7580329.134	23-Aug-15
34	Non-Haz Waste Landfill – Cover surface, looking southwest to northwest, sparse vegetation (ATT37_Photo1.jpg) and (ATT38_Photo2.jpg)	553316.877	7580327.838	23-Aug-15
35	Non-Haz Waste Landfill – North crest surface, looking west (ATT39_Photo1.jpg)	553303.8287	7580348.605	23-Aug-15

Table 4-7: Summary Table of Photographic Log - Non-Hazardous Waste Landfill

Photo	Description (file name.jpg)	Easting	Northing	Date
36	Non-Haz Waste Landfill – North slope and toe, looking west (ATT40_Photo1.jpg)	553302.021	7580354.218	23-Aug-15
37	Non-Haz Waste Landfill – Feature B, self-armouring erosion on north slope (ATT41_Photo1.jpg)	553293.99	7580354.57	23-Aug-15
38	Non-Haz Waste Landfill – Feature B, self-armouring erosion on north slope (ATT43_Photo2.jpg)	553282.5496	7580343.568	23-Aug-15
39	Non-Haz Waste Landfill – Feature K, self-armouring erosion on north slope (ATT44_Photo1.jpg)	553249.4395	7580345.159	23-Aug-15
40	Non-Haz Waste Landfill – Feature K, self-armouring erosion on north slope (ATT45_Photo1.jpg)	553257.2864	7580343.428	23-Aug-15
41	Non-Haz Waste Landfill – West crest, looking south (ATT46_Photo1.jpg)	553239.3638	7580331.305	23-Aug-15
42	Non-Haz Waste Landfill – West crest, looking north (ATT47_Photo1.jpg)	553273.9191	7580275.227	23-Aug-15
43	Non-Haz Waste Landfill – West slope and toe, looking north (ATT49_Photo2.jpg)	553272.744	7580272.953	23-Aug-15
44	Non-Haz Waste Landfill – Feature J, west toe and downstream ditch with running water, looking north (ATT51_Photo1.jpg)	553272.9814	7580261.304	23-Aug-15
45	Non-Haz Waste Landfill – South crest, looking east (ATT50_Photo1.jpg)	553274.6376	7580276.673	23-Aug-15
46	Non-Haz Waste Landfill – Feature E, running water along south toe, looking east (ATT52_Photo1.jpg)	553273.2766	7580260.659	23-Aug-15
47	Non-Haz Waste Landfill – Feature H, self-armouring erosion on south slope, looking down from crest edge (ATT53_Photo1.jpg)	553302.2712	7580285.989	23-Aug-15
48	Non-Haz Waste Landfill – Feature F, small stain (ATT54_Photo1.jpg)	553306.119	7580336.032	23-Aug-15
49	Non-Haz Waste Landfill – Feature G, minor settlement (ATT55_Photo1.jpg)	553265.7976	7580290.038	23-Aug-15
50	Non-Haz Waste Landfill – Feature D, minor settlement (ATT56_Photo1.jpg)	553292.5665	7580289.819	23-Aug-15
51	Non-Haz Waste Landfill – Overview facing north (ATT57_Photo1.jpg) (ATT58_Photo2.jpg)	553293.0267	7580209.271	23-Aug-15

4.2.4 Soil Sampling

Table 4-8 presents a summary of analytical results for soil samples collected at the Non-Hazardous Waste Landfill. MW12 represents an upgradient sampling location whereas MW11 and MW09 represent cross-slope sampling locations. The deep soil sample at MW11 could not be collected due to refusal on rocks.

MW12

Sampling location MW12 is located upgradient of the landfill, approximately 14 m southeast of the southern toe of the landfill. The estimated elevation of this sampling point is 98 masl. As shown in Photograph 27 (Appendix D), the area is covered with loose coarse sand, gravel and stones with sparse vegetation. The soil in the area of the sample location consisted of yellow-brown sand matrix with pink and grey igneous gravel, pebbles and stone.

In the shallow sample at MW12 (0-15 cm), the concentration of arsenic (1.3 mg/kg) exceeded the background (0.83 mg/kg) and baseline (1.0 mg/kg) concentrations. Concentrations of arsenic observed in 2011 and 2013 were less than the method detection limit (1.0 mg/kg). The concentration of most other metals decreased in comparison to those observed in 2011 and 2013. No exceedances of the baseline concentrations plus 3σ were reported in 2015. No PHC or PCB were detected from the shallow sample at MW12 in 2015.

A duplicate sample was collected at the deep MW12 (40-50 cm) sample location, and therefore the average concentrations are discussed relative to background and baseline values. The calculated relative percent difference (RPD) values indicated the original and duplicate sample results differ by more than 20% for some of the observed metals (i.e., Cu, Ni, Zn, Cr) and are typically higher in the duplicate sample. These variations in analytical results are discussed further in Section 5 (below).

In the deep sample at MW12 (40-50 cm), the average concentration of copper (11 mg/kg) exceeded the background concentration (10 mg/kg). In addition, the average concentration of arsenic (1.2 mg/L) exceeded the background (0.83 mg/kg) and baseline (1.0 mg/kg) concentrations. Concentrations of arsenic observed in 2011 and 2013 were less than the method detection limit (1.0 mg/kg). The average concentration of most other metals decreased in comparison to those observed in 2011 and 2013. No exceedances of the baseline concentrations plus 3σ were reported in 2015. No PHC or PCB were detected from the deep samples at MW12 in 2015.

MW09

Sampling location MW09 is located cross-gradient of the landfill, approximately 12 m north of the northern toe of the landfill. The estimated elevation of this sampling point is 95.5 masl. As shown in Photograph 36 (Appendix D), the area is generally covered with coarse sand, gravel and boulders with sparse vegetation. The soil in the area of the sample location consisted of yellow sand matrix with pink and grey igneous gravel, pebbles and stone.

The shallow sample at MW09 (0-15 cm) exhibited elevated concentrations of metals. The concentrations of nickel (8.5 mg/kg) and cobalt (5.5 mg/kg) exceeded their baseline concentrations (7.1 mg/kg and 5.0 mg/kg, respectively). In addition, the concentration of zinc (34.8 mg/kg) and arsenic (1.2 mg/kg) exceeded their respective background and baseline concentrations. The concentrations of most metals were similar to or less than those observed in 2011 and 2013. No exceedances of the baseline concentrations plus 3σ were reported in 2015. No PHC or PCB were detected from the shallow sample at MW09 in 2015.

The deep sample at MW09 (40-50 cm) exhibited elevated concentrations of metals, and are generally similar to or less than those in the shallow sample. The concentrations of nickel (8.1 mg/kg) and zinc (29.1 mg/kg) exceeded their respective baseline concentrations (7.1 mg/kg and 26 mg/kg, respectively). The concentrations of most

metals were similar to or less than those observed in 2011 and 2013. In addition, the concentration of copper (12.2 mg/kg) and arsenic (1.0 mg/kg) exceeded their respective background and baseline concentrations. No exceedances of the baseline concentrations plus 3σ were reported in 2015. No PHC or PCB were detected from the deep sample at MW09 in 2015.

MW11

Sampling location MW11 is located cross-gradient of the landfill, approximately 19 m south of the southern toe of the landfill. The estimated elevation of this sampling point is 96 masl. As shown in Photograph 27 (Appendix D), there is surface water in the drainage swale representing potential seepage along the southern toe of the landfill in the area of MW11. The area generally consists of sand and gravel, with cobbles and stone and is sparsely vegetated. The soil in the area of the sample location consisted of grey sand matrix with predominantly pink and grey igneous gravel, pebbles and stone.

The shallow soil sample at MW11 (0-15 cm) exhibited elevated concentrations of metals. The concentrations of nickel (13.3 mg/kg), cobalt (5.7 mg/kg) and zinc (26.3 mg/kg) exceeded their baseline concentrations. In addition, the concentration of chromium (23.5 mg/kg) and arsenic (1.4 mg/kg) exceeded their background and baseline concentrations. The concentration of most metals increased slightly in comparison to those observed in 2011 and 2013. No exceedances of the baseline concentrations plus 3σ were reported in 2015. No PHC or PCB were detected from the shallow sample at MW11 in 2015.

A deep soil sample could not be taken at MW11 due to refusal on large rocks.

Table 4-8: Soil Chemical Analysis Results – Non-Hazardous Waste Landfill

ID	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 (mg/kg)	F2 (mg/kg)	F3 (mg/kg)	F4 (mg/kg)
Background Mean		10	14	9.5	1.1	10	31	22	0.83	NA	0.0	NA	NA	NA	NA
Baseline Mean		**12**	**7.1**	**5.0**	**1.0**	**10**	**26**	**20**	**1.0**	**0.10**	**0.003**	**NA**	**NA**	**NA**	**NA**
Baseline + 3σ		39	15	11	1.0	10	44	20	1.9	0.10	0.013	NA	NA	NA	NA
Upgradient															
MW12 (0-15)	(0-15)	8	5.3	3.4	<0.5	4.3	18.4	9.2	**1.3**	<0.1	<0.05	<7	<4	<8	<6
MW12 (40-50)	(40-50)	8.3	5.2	3.1	<0.5	3.7	17.7	9	**1.4**	<0.1	<0.05	<7	<4	<8	<6
MW12 (40-50) (Duplicate)	(40-50)	**14**	7	4.4	<0.5	9	**27**	14	<1	<0.10	<0.1	<5	<4	<8	<6
MW12 (40-50) (Dup Avg)	(40-50)	11	6	3.8	<0.5	6	22	12	**1.2**	<0.1	<0.1	<6	<4	<8	<6
Cross-gradient															
MW09 (0-15)	(0-15)	8.3	**8.5**	**5.5**	<0.5	5.7	**34.8**	13.7	**1.2**	<0.1	<0.05	<7	<4	<8	<6
MW09 (40-50)	(40-50)	**12.2**	**8.1**	4.9	<0.5	5.2	**29.1**	12.4	**1**	<0.1	<0.05	<7	<4	<8	<6
MW11 (0-15)	(0-15)	10.2	**13.3**	**5.7**	<0.5	4.3	**26.3**	**23.5**	**1.4**	<0.1	<0.05	<7	<4	<8	<6
MW11 (deep) [1]															

Notes:

NA: Not available

ID: Soil sample location ID.

Underlined values: Results exceed Background arithmetic mean.

Bold Values: Results exceed Baseline arithmetic mean.

1: The deep soil sample at MW11 could not be collected due to refusal.

4.2.5 Groundwater Sampling

Groundwater sampling and monitoring well inspection field records are included in Appendix B. Table 4-9 presents a summary of groundwater levels and analytical results for groundwater samples collected at the Non-Hazardous Waste Landfill.

MW12

The depth to groundwater measured at MW12 in 2015 was 1.04 m below grade. The groundwater results at MW12 indicated all parameters were less than the baseline concentrations. The concentrations of all metals, including nickel (less than 0.001 mg/L) and cobalt (less than 0.0005 mg/L), decreased in comparison to those observed in 2013 (0.022 mg/L and 0.0055 mg/L, respectively). No exceedances of the baseline concentrations plus 3σ were reported in 2015. No PHC or PCB were detected in the groundwater sample taken at MW12 in 2015.

MW09

The depth to groundwater measured at MW09 in 2015 was 0.98 m below grade. The groundwater results at MW09 exhibited elevated concentrations of nickel and cobalt. The concentrations of nickel (0.075 mg/L) and cobalt (0.0188 mg/L) exceeded their respective baseline concentrations (0.021 mg/L and 0.0030 mg/L, respectively). The concentration of cobalt also exceeded the baseline concentration plus 3σ (0.013 mg/L). The concentrations nickel and cobalt, were lower in 2015 in comparison to the concentrations observed in 2013 (0.090 mg/L and 0.023 mg/L, respectively), which was similarly the case for most other metals. No PHC or PCB were detected in the groundwater sample taken at MW09 in 2015.

MW11

The depth to groundwater measured at MW11 in 2015 was 0.45 m below grade. The groundwater results at MW11 indicated all parameters were less than the baseline values. The concentrations of all metals decreased in comparison to those observed in 2011 and 2013. No PHC or PCB were detected in the groundwater sample taken at MW11 in 2015.

Table 4-9: Monitoring Well Groundwater Levels and Groundwater Chemical Analysis Results – Non-Hazardous Waste Landfill

ID	GW Depth BGS (m)	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 PCB (mg/L)	F1 (mg/L)	F2 (mg/L)	F3 (mg/L)	F3 (mg/L)
Baseline Mean		**0.050**	**0.021**	**0.0030**	**0.0010**	**0.010**	**0.051**	**0.039**	**0.0030**	**0.00040**	**0.000020**	**NA**	**NA**	**NA**	**NA**
Baseline + 3σ		0.22	0.082	0.013	0.0010	0.016	0.21	0.15	0.0085	0.00040	0.000020	NA	NA	NA	NA
Upgradient															
MW12	1.04	0.0037	<0.001	<0.0005	<0.0001	0.0003	<0.005	0.001	<0.001	<0.0001	<0.00005	<0.025	<0.1	<0.1	<0.1
Cross-gradient															
MW09	0.98	0.0102	**0.075**	**0.0188**	0.0001	0.0008	0.031	0.002	<0.001	<0.0001	<0.00005	<0.025	<0.1	<0.1	<0.1
MW11	0.45	0.0057	<0.001	<0.0005	<0.0001	0.0004	0.019	<0.001	<0.001	<0.0001	<0.00005	<0.025	<0.1	<0.1	<0.1

Notes:
ID: Monitoring well location ID.
GW: Groundwater.
BGS: Below ground surface.
NA: Not available
Bold Values: Results exceed Baseline arithmetic mean.

4.2.6 Conclusions and Overall Performance of the Non-Hazardous Waste Landfill

The Non-Hazardous Waste Landfill has been assessed to have an “Acceptable” overall landfill performance. Although erosion and ponding of water along the toe have increased in extent since the last inspection they do not appear to be impacting landfill stability to date. Erosion from the running water along the toe and increased ponding along the toe, potentially causing increased permafrost thaw, could result in potential instability of the landfill sideslopes over the long-term. Observed minor settlement and stain features were assessed as “Acceptable”. No cracks have been observed at this landfill.

Two soil samples were collected at two of the three designated locations in 2015; a deep sample could not be collected at MW11 due to refusal..

Concentrations of copper, nickel, cobalt, zinc, chromium and arsenic were detected above the background and/or baseline arithmetic mean at one or more soil sampling locations. At all three locations, the concentrations of most metals were similar to or less than those observed in 2011 and 2013. No detectable concentrations of PHC or PCB were noted in any of the samples in 2015.

In 2015, groundwater samples were collected from all three monitoring wells adjacent to the landfill. Exceedances of the baseline values were only observed at MW09, for nickel and copper; however, these concentrations were lower than those reported in 2011 and 2013. No detectable concentrations of PHC or PCB were noted in any of the groundwater samples in 2015.

Comparison of groundwater elevations based on estimated grade elevation and the measured water depth in the wells indicates that groundwater levels were highest at MW12, lower at MW11 and lowest at MW09. It is noted that the swale in the south part of the landfill contained water. Given that this area is approximately 1 metre or more lower in elevation compared to the wells to the south, this indicates that the water in the swale likely represents an expression of the local water table.

Based on the results, there does not appear to be significant impact to groundwater quality from the landfill at cross-gradient locations MW09 and MW11.

4.2.7 Recommendations for Non-Hazardous Waste Landfill

No modifications to the ongoing monitoring program at this landfill are recommended.

4.3 USAF & Asbestos Landfill

4.3.1 Landfill Description

The USAF & Asbestos Landfill is located in the Middle Site Area, west of the main road. This landfill was constructed during the closure of the site in 1992. The remediation of these landfills consisted of regrading. The USAF & Asbestos landfill, including the regraded sideslopes, covers an area approximately 4,100 m^2.

The long term monitoring plan consists of visual inspection and collection of soil samples. Approximate locations for the collection of soil samples are identified in Figure CAM-5.4.

DRAINAGE COURSE (TYP.)

FEATURE M
ROUGH GRADING

FEATURE F
CEMENT OF BENTONITE ON SURFACE

FEATURE J
SETTLEMENT

FEATURE G
ROUGH GRADING

C5-8

FEATURE H
VEGETATION

FEATURE L
EROSION

FEATURE H
SPARSE VEGETATION

FEATURE I
PONDED WATER

FEATURE C
SETTLEMENT

C5-7

FEATURE B
STAIN

TYPE 1 GRANULAR FILL (TYP.)

USAF LANDFILL

ASBESTOS LANDFILL

MW11

RESHAPED AREA

FEATURE K
LINEAR DEPRESSION

FEATURE A
SETTLEMENT

FEATURE E
RUTTING

C5-6

553175 E, 553200 E, 553225 E, 553250 E, 553275 E, 553300 E

7580300 N, 7580275 N, 7580250 N, 7580225 N, 7580200 N

LEGEND

- BODY OF WATER
- SOIL SAMPLE (2015)
- PHOTOGRAPH LOCATION
- SETTLEMENT / ROUGH GRADING (NTS)
- RUTTING (NTS)
- VEGETATION (NTS)
- PONDING (NTS)
- STAINING (NTS)
- ELEVATION CONTOUR (0.5m INT.)
- DRAINAGE
- LANDFILL RIP RAP

NOTES

GRID PROJECTION IS NAD83 ZONE 16N.
ELEVATIONS ARE GEODETIC.

REFERENCE

PREVIOUS INSPECTION FIGURE PROVIDED BY BIOGENIE, A DIVISION OF ENGLOBE CORPORATION, PROJECT NO.CD2655_400_403, DATED JUNE 2015.

0 10 20
1:500 METRES

CLIENT
DEPARTMENT OF NATIONAL DEFENCE CANADA

PROJECT
2015 CAM-5 MONITORING REPORT

TITLE
USAF AND ASBESTOS LANDFILL

CONSULTANT
Golder Associates

YYYY-MM-DD	2016-03-24
DESIGNED	RM
PREPARED	TDR
REVIEWED	DJC
APPROVED	DP

PROJECT NO. 1530908 | PHASE 1000 | REV. B | FIGURE CAM-5.4

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B

0 25 mm

Path: \\golder.gds\gal\Mississauga\SIM\Clients\Public_Works_Canada\Canada99_PROJ\1530908_PWGSC_Dew_Line_Mon_Program_2015_2018\40_PROD\0002_CAM_5_Field_Summary_Report\ | File Name: 1530908CM-002-0007.dwg

4.3.2 Summary of Scope Deviations

The field work was conducted as per the TOR with the following exceptions:

- The deep soil samples at C5-6 and C5-8 could not be collected due to refusal.

4.3.3 Visual Inspection

The USAF and Asbestos Landfill exhibits settlement, erosion, staining, vegetation and ponded water features. Sparse vegetation (Feature H) was observed on the north slope and west crest surface. Table 4-11 presents a summary of observed visual inspection features and Table 4-12 presents the Preliminary Stability Assessment results. This landfill was assessed to have an “Acceptable” overall landfill performance because all observed features were assessed as “Acceptable”. No cracking or exposed waste was observed at this landfill. Some of the features identified at the landfill appear to be a result of anthropogenic activities (e.g., small hydrocarbon stain (Feature B), spilled cement or bentonite (Feature F) and rutting caused by vehicles (Feature E) and are not related to landfill performance. Table 4-13 is a log of photographs taken during the 2015 visual inspection.

Ponded and running water was observed along the west toe in 2015 (new Feature I) but this area has cobbles and boulders that should provide erosion protection.

Previously identified areas with rutting were observed to have self-armouring erosion (Feature L) but do not appear to be deteriorating (i.e., experiencing increased erosion) with time. A rough area with minor erosion channel was also observed (Feature M), which was previously noted as rutting caused by heavy machinery. A new rough area with minor settlement (Feature G) was observed on the cover surface.

Previously observed linear depressions (Features A and C) and new minor settlement areas (Features K and J) are considered insignificant.

There is one previously identified small hydrocarbon stain (Feature B) on the crest surface which is unrelated to landfill performance considered insignificant.

Table 4-10: Visual Inspection Checklist – USAF & Asbestos Landfill

SITE NAME: CAM-5 Mackar Inlet
LANDFILL DESIGNATION: USAF & Asbestos Landfill
DATE OF INSPECTION: August 23, 2015
DATE OF PREVIOUS INSPECTION: August 29, 2013
INSPECTED BY: Reza Moghaddam
REPORT PREPARED BY: Reza Moghaddam
MONITORING EVENT NUMBER: 4
The inspector/reporter represents to the best of his/her knowledge that 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 4-10: Visual Inspection Checklist – USAF & Asbestos Landfill

Checklist Item	Present (Y/N)	Feature ID (A, B, etc.)	Location Description	Easting	Northing	Length (m)	Width (m)	Depth (m)	Extent of Landfill Area (%)	Description	Comparison to Historical Observations	Photos
Settlement	Y	A	Southeast crest surface	553,275.00	7,580,225.00	2	0.6	0.2	0.029%	Linear depression (Acceptable)	Unchanged since previous observation	113
		C	West crest surface	553,219.114	7,580,253.855	0.3	0.3	0.1	0.002%	Minor settlement (Acceptable)	Unchanged since previous observation	108
		K	Southeast crest surface	553,267.533	7,580,233.178	1	0.3	0.1	0.007%	Linear depression (Acceptable)	New Observation	117
		J	Northeast crest surface	553,226.245	7,580,288.930	0.3	0.3	0.1	0.002%	Minor settlement (Acceptable)	New Observation	116
Erosion	Y	E	Southeast crest surface	553,278.487	7,580,215.992	5	5	0.1	0.602%	Vehicle rutting with minor erosion (Acceptable)	Previously noted as rutting. Unchanged since previous observation	114
		L	Northwest slope	553,197.420	7,580,271.858	3	2	0.1	0.14%	Minor erosion channel (Acceptable)	Previously noted as rutting. Combined width for the area.	105
		M	Northwest slope	553,222.866	7,580,294.435	5	5	-	0.60%	Rough area with minor erosion (Acceptable)	Previously noted as rutting	121
		G	North crest surface	553,215.085	7,580,281.205	5	0.3	0.2	0.036%	Rough area with minor settlement (Acceptable)	New Observation	120

Table 4-10: Visual Inspection Checklist – USAF & Asbestos Landfill

Checklist Item	Present (Y/N)	Feature ID (A, B, etc.)	Location Description	Easting	Northing	Length (m)	Width (m)	Depth (m)	Extent of Landfill Area (%)	Description	Comparison to Historical Observations	Photos
Lateral Movement	N											
Frost Action	N											
Sloughing	N											
Cracking	N											
Animal Burrows	N											
Vegetation	Y	H	North slope	553,198.223	7,580,272.246	20	3	-	1.446%	Sparse vegetation (Acceptable)	New Observation	104
			West crest	553,219.691	7,580,246.952	30	20	-	14.458%	Sparse vegetation (Acceptable)	New Observation	107
Staining	Y	B	South central crest	553,256.024	7,580,230.651	0.4	0.2	-	0.002%	Small hydrocarbon stain (Acceptable)	Unchanged since previous observation	109
Vegetation Stress	N											
Seepage or Ponded Water	Y	I	West toe	553,197.626	7,580,269.892	15	3	0.2	1.084%	Ponded water along toe (Acceptable)	New Observation	106
Debris and/or Liner Exposed	N											

Table 4-10: Visual Inspection Checklist – USAF & Asbestos Landfill

Checklist Item	Present (Y/N)	Feature ID (A, B, etc.)	Location Description	Easting	Northing	Length (m)	Width (m)	Depth (m)	Extent of Landfill Area (%)	Description	Comparison to Historical Observations	Photos
Presence / Condition of Monitoring Instruments	N											
Features of Note / Other Observations	Y	D	Not Available	-	-	-	-	-	-	Unknown Feature (Acceptable)	Not noted in the previous report.	
		F	Northeast crest surface	553,228.046	7,580,295.399	3	3		0.217%	Bentonite or cement on surface (Acceptable)	Previously identified as fertilizer	118,119

Landfill Area = 4,150 m^2.

Table 4-11: Preliminary Stability Assessment – USAF & Asbestos Landfill

Feature	Severity Rating	Extent
Settlement	Acceptable	Occasional
Erosion	Acceptable	Occasional
Lateral Movement	Acceptable	-
Frost Action	Acceptable	-
Sloughing	Acceptable	-
Cracking	Acceptable	-
Animal Burrows	Acceptable	-
Vegetation establishment	Acceptable	Occasional
Staining	Acceptable	Isolated
Vegetation Stress	Acceptable	-
Seepage/Ponded Water	Acceptable	Isolated
Debris and/or liner exposure	Acceptable	-
Other	Acceptable	Isolated
Overall Landfill Performance	**Acceptable**	

Table 4-12: Summary Table of Photographic Log – USAF & Asbestos Landfill

Photo	Description (file name.jpg)	Easting	Northing	Date
102	USAF Landfill – North slope and cover surface, looking west (ATT121_Photo1.jpg)	553231.7313	7580293.301	23-Aug-15
103	USAF Landfill – East cover surface and toe, looking south (ATT122_Photo1.jpg)	553230.2127	7580291.355	23-Aug-15
104	USAF Landfill – Feature H, sparse vegetation on north slope, looking east (ATT123_Photo1.jpg)	553198.2225	7580272.246	23-Aug-15
105	USAF Landfill – Feature L, minor erosion channel on north slope (ATT124_Photo1.jpg)	553197.42	7580271.858	23-Aug-15
106	USAF Landfill – West slope and toe, looking south, Feature I, ponded water along toe (ATT125_Photo1.jpg)	553197.626	7580269.892	23-Aug-15
107	USAF Landfill – West crest surface, looking south, Feature H, sparse vegetation (ATT126_Photo1.jpg)	553199.4174	7580268.331	23-Aug-15
108	USAF Landfill – Feature C, minor settlement (ATT127_Photo1.jpg)	553219.1139	7580253.855	23-Aug-15
109	USAF Landfill – Feature B, small stain (ATT129_Photo1.jpg)	553256.0238	7580230.651	23-Aug-15
110	USAF Landfill – West crest surface and slope, looking north (ATT130_Photo1.jpg)	553252.7402	7580210.656	23-Aug-15
111	USAF Landfill – South crest and slope, looking east (ATT131_Photo1.jpg)	553252.6833	7580210.748	23-Aug-15
112	USAF Landfill – Cover surface, looking north (ATT132_Photo1.jpg)	553265.9193	7580211.509	23-Aug-15

Table 4-12: Summary Table of Photographic Log – USAF & Asbestos Landfill

Photo	Description (file name.jpg)	Easting	Northing	Date
113	USAF Landfill – East crest, looking north (ATT133_Photo1.jpg)	553283.4076	7580215.556	23-Aug-15
114	USAF Landfill – Feature E, rutting (noted in previous report), looking west (ATT134_Photo1.jpg)	553278.4865	7580215.992	23-Aug-15
115	USAF Landfill – Cover surface, from southwest to northwest (ATT136_Photo1.jpg)	553251.0965	7580273.001	23-Aug-15
116	USAF Landfill – Feature J, minor settlement (ATT140_Photo1.jpg)	553226.2447	7580288.93	23-Aug-15
117	USAF Landfill – Feature K, linear depression (ATT135_Photo1.jpg)	553267.5327	7580233.178	23-Aug-15
118	USAF Landfill – Feature F, cement and/or bentonite on surface (ATT141_Photo1.jpg)	553226.4257	7580290.458	23-Aug-15
119	USAF Landfill – Feature F, cement and/or bentonite on surface, looking southwest (ATT143_Photo1.jpg)	553228.0464	7580295.399	23-Aug-15
120	USAF Landfill – Feature G, rough area with minor settlement near north crest edge, looking north (ATT142_Photo1.jpg)	553215.0854	7580281.205	23-Aug-15
121	USAF Landfill – Feature M, rough area on north slope and toe (ATT144_Photo1.jpg)	553222.8663	7580294.435	23-Aug-15

4.3.4 Soil Sampling

Table 4-13 presents a summary of analytical results for soil samples collected at the USAF & Asbestos Landfill. C5-6 represents an upgradient sampling location, C5-7 represents a cross-gradient sampling location and C5-8 represents a downgradient sampling location. The deep soil samples at C5-6 and C5-8 could not be collected due to refusal on rocks.

C5-6

Sampling location C5-6 is located upgradient of the landfill, approximately 20 m south of the southern toe of the landfill. The estimated elevation of this sampling point is 98 masl. As shown in Photograph 111 (Appendix D), the area consists of a boulder pavement with a soil matrix of sand and stones with sparse vegetation. The soil in the area of the sample location consisted of brown sand matrix with igneous gravel, pebbles and stone.

A duplicate sample was collected at the shallow C5-6 (0-15 cm) sample location, and therefore the average concentrations are discussed relative to background and baseline values. The calculated RPD values indicated the original and duplicate sample results differ by more than 40% for some of the observed metals (i.e., Cu, Ni, Zn, Cr, As) and are typically higher in the duplicate sample.

The shallow samples at C5-6 (0-15 cm) exhibited elevated concentrations of metals. The average concentration of cobalt (8.3 mg/kg) exceeded the baseline concentration (6.4 mg/kg). In addition, the average concentrations of copper (29 mg/kg), nickel (15 mg/kg), lead (10 mg/kg), zinc (44 mg/kg), chromium (25 mg/kg) and arsenic (3 mg/kg) exceeded their background and baseline concentrations. The concentration of copper, nickel and

arsenic also exceeded their baseline concentration plus 3σ. Concentrations of most metals, including copper, nickel and zinc were higher than concentrations observed in 2011 and 2013. The average concentration of TPH (49 mg/kg) exceeded the baseline concentration. The TPH concentration was greater than the concentration measured in 2013 (15 mg/kg) but less than the concentration measured in 2011 (88 mg/kg). The average concentration of the PHC F4 fraction in 2015 was 18 mg/kg. No PCB were detected from the shallow samples at C5-6 in 2015.

The deep sample could not be obtained due to refusal on rocks.

C5-7

Sampling location C5-7 is located cross-gradient of the landfill, approximately 28 m west of the western toe of the landfill. The estimated elevation of this sampling point is 94.5 masl. As shown in Photograph 110 (Appendix D), the area consists of a boulder pavement with a soil matrix of and a loose coarse sand gravel and stones with sparse vegetation. The soil in the area of the sample location consisted of a wet, brown sand matrix with pink and grey igneous gravel, pebbles and stone. The excavation filled with groundwater soon after it was dug.

The shallow sample at C5-7 (0-15 cm) exhibited elevated concentrations of some metals. The concentration of nickel (8.1 mg/kg) exceeded the baseline concentration (7.5 mg/kg). In addition, the concentration of copper (12.4 mg/kg) and arsenic (1.5 mg/kg) exceeded their background and baseline concentrations. The concentrations of arsenic observed in 2011 and 2013 were less than the method detection limit (1.0 mg/kg). The concentrations of most metals were slightly lower in comparison to those observed in 2013, but higher than those observed in 2011. No exceedances of the baseline concentrations plus 3σ were reported in 2015. No PHC or PCB were detected from the shallow sample at C5-7 in 2015.

The deep sample at C5-7 (40-50 cm) exhibited elevated concentrations of some metals, and are higher than those in the shallow sample. The concentrations of most metals were slightly lower in comparison to those observed in 2013, but higher than those observed in 2011. The concentration of nickel (12.6 mg/kg) exceeded the baseline concentration (7.5 mg/kg). In addition, the concentration of copper (13.4 mg/kg) and arsenic (3.2 mg/kg) exceeded their respective background and baseline concentrations. The concentration of arsenic also exceeded the baseline concentration plus 3σ (2.1 mg/kg). The concentrations of arsenic observed in 2011 and 2013 were less than the method detection limit (1.0 mg/kg). No PHC or PCB were detected from the deep sample at C5-7 in 2015.

C5-8

Sampling location C5-8 is located downgradient of the landfill, approximately 31 m west of the western toe of the landfill. The estimated elevation of this sampling point is 92 masl. As shown in Photograph 110 (Appendix D), the area consists of a boulder pavement with a soil matrix of coarse sand and gravel with sparse vegetation. The soil in the area of the sample location consisted of red-brown sand matrix within stones and boulders, which was difficult to excavate.

Analysis of the shallow sample at C5-8 (0-15 cm) indicated that all parameters were less than the background and baseline concentrations. No PHC or PCB were detected from the shallow sample at C5-8 in 2015.

The deep sample could not be obtained due to refusal on rocks.

Table 4-13: Soil Chemical Analysis Results – USAF & Asbestos Landfill

ID	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 (mg/kg)	F2 (mg/kg)	F3 (mg/kg)	F4 (mg/kg)
Background Mean		10	14	9.5	1.0	10	31	22	0.83	NA	0.1	NA	NA	NA	NA
Baseline Mean		**9.5**	**7.5**	**6.4**	**1.0**	**10**	**27**	**20**	**1.0**	**0.10**	**0.003**	**NA**	**NA**	**NA**	**NA**
Baseline + 3σ		22	14	14	1.0	25	48	48	2.1	0.10	0.0052	NA	NA	NA	NA
Upgradient															
C5-6 (0-15)	(0-15)	**21.9**	**12**	**7.2**	<0.5	9.9	**35.8**	20.3	**4**	<0.1	<0.05	<7	<4	41	15
C5-6 (0-15) (Duplicate)	(0-15)	**37**	**17**	**9.3**	<0.5	**11**	**53**	**30**	**2**	<0.10	<0.1	<5	<4	44	20
C5-6 (0-15) (Dup Avg)	(0-15)	**29**	**15**	**8.3**	<0.5	**10**	**44**	**25**	**3**	<0.1	<0.1	<6	<4	43	18
C5-6 (deep) [1]															
Cross-gradient															
C5-7 (0-15)	(0-15)	**12.4**	**8.1**	4.3	<0.5	5	21.7	12	**1.5**	<0.1	<0.05	<7	<4	<8	<6
C5-7 (40-50)	(40-50)	**13.4**	**12.6**	6.1	<0.5	6	26	15.3	**3.2**	<0.1	<0.05	<7	<4	<8	<6
Downgradient															
C5-8 .(0-15)	(40-50)	4.9	6.4	4.7	<0.5	6.7	23.7	11.5	<1	<0.1	<0.05	<7	<4	<8	<6
C5-8 (deep) [1]															

Notes:

NA: Not available Underlined values: Results exceed Background arithmetic mean.

Bold Values: Results exceed Baseline arithmetic mean.

1: The deep soil samples at C5-6 and C5-8 could not be collected due to refusal.

4.3.5 Conclusions and Overall Performance of the USAF & Asbestos Landfill

Minor settlement, erosion, staining and ponded water features were observed at the USAF and Asbestos Landfill. This landfill was assessed to have an “Acceptable” overall landfill performance because all observed features were assessed as “Acceptable”. No cracking or exposed waste was observed at this landfill. Some establishment of sparse vegetation was observed on the north slope and west crest surface.

Two soil samples were collected at one of the three designated locations in 2015; deep samples could not be collected at C5-6 and C5-8 as a result of refusal (boulders). Concentrations of copper, nickel, arsenic were detected above the background and/or baseline arithmetic mean at C5-6 and C5-7. In addition, elevated concentrations of lead, zinc and chromium were present in the upgradient sample (C5-6), were higher than those observed in 2011 and 2013.

Concentrations of petroleum hydrocarbons above the baseline concentration (34 mg/kg) were noted in both samples at C5-6, ranging from 47 mg/kg to 49 mg/kg. The TPH concentration was greater than that measured in 2013 (15 mg/kg) but less than that measured in 2011. No detectable concentrations of PCB were noted in any of the samples for this landfill in 2015.

4.3.6 Recommendations for USAF & Asbestos Landfill

No modifications to the ongoing monitoring program at this landfill are recommended.

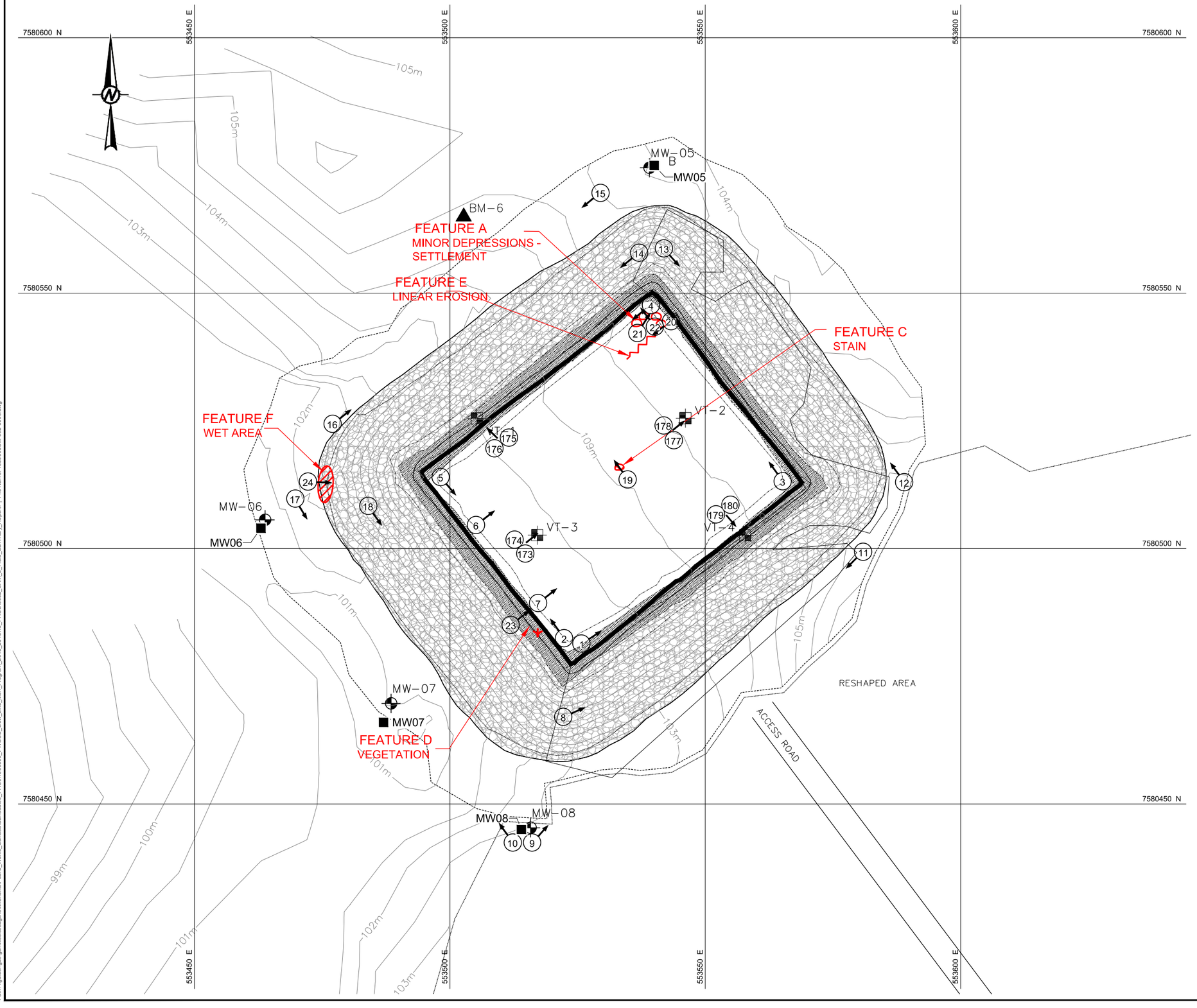
4.4 Tier II Disposal Facility

4.4.1 Landfill Description

A DCC Tier II Disposal Facility has been constructed at the CAM-5 site for the disposal of Tier II soil excavated during the clean-up. The Facility is located in the Middle Site Area, northeast of the Non-Hazardous Waste Landfill. The landfill covers an area approximately 7,200 m^2.

The design of this landfill included a double containment system consisting of a geosynthetic base liner and cover and the placement of sufficient surface fill to promote freezing of landfill contents. The liner was placed along the bottom of the landfill, along the berms, and over the top of the landfill contents.

Four thermistor strings were installed within the landfill. Four groundwater monitoring wells were installed outside of the landfill perimeter. The long term monitoring plan consists of visual inspection, periodic collection of soil and groundwater samples (at wells MW-05 through MW-08), and monitoring of subsurface ground temperatures in the berms and in the main body of the disposal facility. Approximate locations for the collection of soil and groundwater samples, and thermistor installation locations are identified in Figure CAM-5.5.



LEGEND

- BM-6 — PERMANENT BENCHMARK LOCATION (1)
- MONITORING WELL LOCATION (3)
- B — BACKGROUND MONITORING WELL LOCATION (1)
- GROUND TEMPERATURE CABLE LOCATION (4)
- SOIL SAMPLE LOCATION (2015)
- 1 — PHOTOGRAPH LOCATION
- SETTLEMENT (NTS)
- STAINING (NTS)
- EROSION (NTS)
- PONDNG (NTS)
- VEGETATION (NTS)
- 103m — ELEVATION CONTOUR (0.5m INT.)
- LANDFILL RIP RAP

NOTES

GRID PROJECTION IS NAD83 ZONE 16N.
ELEVATIONS ARE GEODETIC.

REFERENCE

PREVIOUS INSPECTION FIGURE PROVIDED BY BIOGENIE, A DIVISION OF ENGLOBE CORPORATION, PROJECT NO.CD2655_400_403, DATED JUNE 2015.

0 12.5 25
1:750 METRES

CLIENT
DEPARTMENT OF NATIONAL DEFENCE CANADA

PROJECT
2015 CAM-5 MONITORING REPORT

TITLE
TIER II DISPOSAL LANDFILL

CONSULTANT
Golder Associates

YYYY-MM-DD	2016-03-24
DESIGNED	RM
PREPARED	TDR
REVIEWED	DJC
APPROVED	DP

PROJECT NO.	PHASE	REV.	FIGURE
1530908	1000	B	CAM-5.5

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4.4.2 Summary of Scope Deviations

The field work was conducted as per the TOR with the following exceptions:

- The groundwater sample at MW-05 could not be collected because the pump delivered a mixture of water and sand.
- The groundwater sample at MW07 could not be collected because the groundwater in the well was frozen.

4.4.3 Visual Inspection

The Tier II Disposal Facility had minor settlement, erosion, staining, vegetation and wet area features. Table 4-15 presents a summary of observed visual inspection features and Table 4-16 presents the Preliminary Stability Assessment results. This landfill was assessed to have an “Acceptable” overall landfill performance because all observed features were assessed as “Acceptable”. No cracking was observed at this landfill. Table 4-17 is a log of photographs taken during the 2015 visual inspection.

A previously observed minor depression (Feature A) is isolated and considered insignificant. Seepage on the southeast slope and toe (Feature B) previously reported in 2012 was not reported in 2013 and not observed in 2015. There is a previously identified small hydrocarbon stain (Feature C) on the crest surface which is unrelated to landfill performance and considered insignificant. Sparse vegetation (Feature D) was observed on the west slope. A linear feature with some minor self-armouring erosion (new Feature E) was observed on the northeast crest. A wet area was observed in the northwest toe area (new Feature F) but this is likely related to recent snowmelt rather than seepage from the landfill. Overall this landfill appeared to be stable and performing well.

Table 4-14: Visual Inspection Checklist – Tier II Disposal Facility

SITE NAME: CAM-5 Mackar Inlet
LANDFILL DESIGNATION: Tier II Disposal Facility
DATE OF INSPECTION: August 23, 2015
DATE OF PREVIOUS INSPECTION: August 29, 2013
INSPECTED BY: Reza Moghaddam
REPORT PREPARED BY: Reza Moghaddam
MONITORING EVENT NUMBER: 4
The inspector/reporter represents to the best of his/her knowledge that 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 4-14: Visual Inspection Checklist – Tier II Disposal Facility

Checklist Item	Present (Y/N)	Feature ID (A, B, etc.)	Location Description	Easting	Northing	Length (m)	Width (m)	Depth (m)	Extent of Landfill Area (%)	Description	Comparison to Historical Observations	Photos
Settlement	Y	A	Northeast crest surface	553,536.053	7,580,546.110	0.5	0.3	0.15	0.002%	Minor depressions (Acceptable)	Unchanged since previous observation	21, 22
Erosion	Y	E	Northeast crest surface	553,538.237	7,580,543.480	10	0.2	0.1	0.028%	Minor erosion along liner feature (Acceptable)	New Observation	20
Lateral Movement	N											
Frost Action	N											
Sloughing	N											
Cracking	N											
Animal Burrows	N											
Vegetation	Y	D	West slope	553,511.903	7,580,485.062	5	5		0.347%	Sparse vegetation (Acceptable)	New Observation	23
Staining	Y	C	Central crest surface	553,534.795	7,580,513.537	0.3	0.3		0.001%	Possible hydrocarbon stain (Acceptable)	Unchanged since previous observation	19
Vegetation Stress	N											
Seepage or Ponded Water	Y	F	Northwest toe	553,472.199	7,580,513.129	10	3		0.417%	Wet area (Acceptable)	New observation	24

Table 4-14: Visual Inspection Checklist – Tier II Disposal Facility

Checklist Item	Present (Y/N)	Feature ID (A, B, etc.)	Location Description	Easting	Northing	Length (m)	Width (m)	Depth (m)	Extent of Landfill Area (%)	Description	Comparison to Historical Observations	Photos
Debris and/or Liner Exposed	N											
Presence / Condition of Monitoring Instruments	Y	VT1, 2, 3, 4, MW-05,06,07,08								Thermistors and monitoring wells intact	ULB1 batteries replacement in all thermistors	1,2,3,4,122, 123,124, 173,174,175,176,177,178,179, 180
Features of Note / Other Observations	N											

Landfill Area = 7,200 m^2.

Table 4-15: Preliminary Stability Assessment – Tier II Disposal Facility

Feature	Severity Rating	Extent
Settlement	Acceptable	Isolated
Erosion	Acceptable	Isolated
Lateral Movement	Acceptable	-
Frost Action	Acceptable	-
Sloughing	Acceptable	-
Cracking	Acceptable	-
Animal Burrows	Acceptable	-
Vegetation establishment	Acceptable	Occasional
Staining	Acceptable	Isolated
Vegetation Stress	Acceptable	-
Seepage/Ponded Water	Acceptable	Isolated
Debris and/or liner exposure	Acceptable	-
Other		-
Overall Landfill Performance	**Acceptable**	

Table 4-16: Summary Table of Photographic Log – Tier II Disposal Facility

Photo	Description (file name.jpg)	Easting	Northing	Date
1	Tier II Disposal Facility – South crest surface, looking east (ATT3_Photo1.jpg)	553523.3328	7580476.604	23-Aug-15
2	Tier II Disposal Facility – West crest surface, looking north (ATT4_Photo1.jpg)	553523.8839	7580476.857	23-Aug-15
3	Tier II Disposal Facility – East crest surface, looking north (ATT5_Photo1.jpg)	553568.3918	7580510.937	23-Aug-15
4	Tier II Disposal Facility – North crest surface, looking west (ATT6_Photo1.jpg)	553539.4867	7580550.365	23-Aug-15
5	Tier II Disposal Facility – West crest surface, looking south (ATT7_Photo1.jpg)	553494.0331	7580512.604	23-Aug-15
6	Tier II Disposal Facility – Cover surface, looking east (ATT8_Photo1.jpg)	553501.3608	7580502.572	23-Aug-15
7	Tier II Disposal Facility – Cover surface, looking east, VT2 and VT4 in the photo (ATT9_Photo1.jpg)	553514.187	7580486.523	23-Aug-15
8	Tier II Disposal Facility – South slope, looking east (ATT10_Photo1.jpg)	553522.1875	7580467.063	23-Aug-15
9	Tier II Disposal Facility – South toe, looking east (ATT11_Photo1.jpg)	553517.759	7580444.145	23-Aug-15
10	Tier II Disposal Facility – West toe, looking north (ATT12_Photo1.jpg)	553517.4372	7580444.417	23-Aug-15

Table 4-16: Summary Table of Photographic Log – Tier II Disposal Facility

Photo	Description (file name.jpg)	Easting	Northing	Date
11	Tier II Disposal Facility – South toe, looking west (ATT13_Photo1.jpg)	553580.8768	7580499.36	23-Aug-15
12	Tier II Disposal Facility – East toe, looking north (ATT14_Photo1.jpg)	553588.9078	7580512.987	23-Aug-15
13	Tier II Disposal Facility – East slope, looking south (ATT15_Photo1.jpg)	553541.8993	7580558.761	23-Aug-15
14	Tier II Disposal Facility – North slope, looking west (ATT16_Photo1.jpg)	553537.0267	7580557.897	23-Aug-15
15	Tier II Disposal Facility – North toe, looking west (ATT17_Photo1.jpg)	553529.4639	7580569.633	23-Aug-15
16	Tier II Disposal Facility – North toe, looking east(ATT18_Photo1.jpg)	553477.0172	7580524.402	23-Aug-15
17	Tier II Disposal Facility – West toe, looking south (ATT19_Photo1.jpg)	553469.7144	7580509.768	23-Aug-15
18	Tier II Disposal Facility – West slope, looking south (ATT20_Photo1.jpg)	553484.0116	7580508.341	23-Aug-15
19	Tier II Disposal Facility – Feature C, stain, looking west (ATT21_Photo1.jpg)	553534.7952	7580513.537	23-Aug-15
20	Tier II Disposal Facility – Feature E, minor erosion along north crest, looking west, 4 m away from crest, 10 m long x 0.2 m wide (ATT22_Photo1.jpg)	553538.2374	7580543.48	23-Aug-15
21	Tier II Disposal Facility – Feature A, minor depression at northeast corner, looking northeast (ATT23_Photo1.jpg)	553536.0526	7580546.11	23-Aug-15
22	Tier II Disposal Facility – Feature A, minor depression at northeast corner (ATT24_Photo2.jpg)	553536.0526	7580546.11	23-Aug-15
23	Tier II Disposal Facility – Feature D, sparse vegetation on west slope (ATT25_Photo1.jpg)	553511.9029	7580485.062	23-Aug-15
24	Tier II Disposal Facility – Feature F, wet area at northwest toe, looking southeast (ATT26_Photo1.jpg)	553472.1989	7580513.129	23-Aug-15

4.4.4 Thermal Monitoring

All four dataloggers and thermistors were observed to be functioning properly.Thermistor dataloggers VT-1, 2, 3 and 4 located at the Tier II Disposal Facility were downloaded using Lakewoods Systems Ltd. Prolog software and a laptop computer. Thermistor inspection and data downloading details were recorded on field record sheets included in Appendix B.

Existing ULB1 batteries (9V) were replaced in all dataloggers with new ULB1 batteries as a precautionary measure since we will not be returning to CAM-5 next year. The ULB15 batteries were changed in 2012 and should last 8 years; therefore, they should not require changing until 2020 (CAM-5 Monitoring Year 10). The ULB1 batteries are backup to the main ULB15 batteries and, therefore, should not require changing until 2020 (CAM-5 Monitoring Year 10) when the ULB15 batteries are changed. However, we will be returning to CAM-5 in 2017 (for CAM-5 Monitoring Year 7) and will monitor remaining battery power at that time.

4.4.5 Soil Sampling

Table 4-17 presents a summary of analytical results for soil samples collected at the Tier II Disposal Facility. MW05 represents an upgradient sampling location whereas MW06, MW07 represent downgradient sampling locations and MW08 represents a cross-gradient monitoring location.

MW05

Sampling location MW05 is located upgradient of the landfill, approximately 12 m north of the northern toe of the landfill. The estimated elevation of this sampling point is 105 masl. As shown in Photograph 14 (Appendix D), the area is a boulder covered with loose coarse sand, gravel and stones with sparse vegetation. The soil in the area of the sample location consisted of reddish-brown matrix with pink and grey gravel, pebbles and stone.

The shallow sample at MW05 (0-15 cm) exhibited elevated concentrations of metals. The concentrations of nickel (9.2 mg/kg), cobalt (5.8 mg/kg) and zinc (25 mg/kg) exceeded their respective baseline concentrations. In addition, the concentration of copper (19.8 mg/kg) and arsenic (1.4 mg/kg) exceeded their respective background and baseline concentrations. The concentration of copper also exceeded the baseline concentration plus 3σ (12 mg/kg). The concentrations of most metals including, copper and arsenic, increased from those concentrations observed in previous years. No PHC or PCB were detected from the shallow sample at MW05 in 2015.

The deep sample at MW05 (40-50 cm) exhibited elevated concentrations of metals, but are lower than those in the shallow sample. The concentrations of nickel (7.2 mg/kg) exceeded the baseline concentration (5.5 mg/kg). In addition, the concentration of copper (10.9 mg/kg) exceeded the background (10 mg/kg) and baseline (6.1 mg/kg) concentrations. The concentrations of most metals including, nickel and copper, increased slightly from those concentrations observed in previous years. No exceedances of the baseline concentrations plus 3σ were reported in 2015. No PHC or PCB were detected from the deep sample at MW05 in 2015.

MW08

Sampling location MW08 is located cross-gradient of the landfill, approximately 19 m southwest of the western toe of the landfill. The estimated elevation of this sampling point is 103 masl. As shown in Photograph 11 (Appendix D), the area is covered with loose coarse sand, gravel and stones with sparse vegetation. The soil in the area of the sample location consisted of brown matrix with pink and grey gravel, pebbles and stone.

The shallow sample at MW08 (0-15 cm) indicated elevated concentrations of metals. The concentrations of nickel (10.3 mg/kg), cobalt (6.2 mg/kg) and zinc (28.9 mg/kg) exceeded their baseline concentrations. In addition, the concentration of copper (17.2 mg/kg) and arsenic (2.3 mg/kg) exceeded their background and baseline concentrations. The concentration of copper and arsenic also exceeded their baseline concentration plus 3σ (12 mg/kg and 2.2 mg/kg, respectively). Elevated metal concentrations were observed in previous years at similar concentrations. No PHC or PCB were detected from the shallow sample at MW08 in 2015.

The deep sample at MW08 (40-50 cm) exhibited elevated concentrations of metals, but are lower than those in the shallow sample. The concentrations of copper (8.7 mg/kg) and nickel (5.8 mg/kg) exceeded the baseline concentrations (6.1 mg/kg and 5.5 mg/kg, respectively). In addition, the concentration of arsenic (1.8 mg/kg) exceeded the background (0.8 mg/kg) and baseline (1.0 mg/kg) concentrations. Elevated metal concentrations were observed in previous years at similar concentrations. No exceedances of the baseline concentrations plus 3σ were reported in 2015. No PHC or PCB were detected from the deep sample at MW08 in 2015.

MW06

Sampling location MW06 is located downgradient of the landfill, approximately 17 m west of the western toe of the landfill. The estimated elevation of this sampling point is 101.5 masl. As shown in Photograph 24 (Appendix D), there is wet area representing potential seepage along the northwest toe of the landfill in the area of MW06. The area is covered with loose coarse sand, gravel and stones with sparse vegetation. The soil in the area of the sample location consisted of brown sand matrix with pink and grey gravel, pebbles and stone.

The results for the shallow sample at MW06 (0-15 cm) indicated that all parameters were less than the background values. No PHC or PCB were detected from the shallow sample at MW06 in 2015.

In the deeper sample at MW06 (30-40 cm), the concentration of zinc (23 mg/kg) exceeded the baseline concentration (22 mg/kg). The concentration of most metals, including zinc, were higher in comparison to the concentrations reported in 2014 (12 mg/kg), but less than the concentrations reported from 2011 to 2013 (zinc concentrations between 26 mg/kg to 31 mg/kg). No exceedances of the baseline concentrations plus 3σ were reported in 2015. No PHC or PCB were detected from the deep sample at MW06 in 2015.

MW07

Sampling location MW07 is located downgradient of the landfill, approximately 16 m west of the western toe of the landfill. The estimated elevation of this sampling point is 101 masl. As shown in Photographs 17 and 18 (Appendix D), the area is covered with loose coarse sand and with sparse vegetation. The soil in the area of the sample location consisted of brown matrix with pink and grey gravel.

In the shallow sample at MW07 (0-15 cm), the concentration of copper (7.6 mg/kg) exceeded the baseline concentration (6.1 mg/kg). The concentration of copper reported in 2015 represents a slight decrease from those measured in 2014 (8.6 mg/kg) and 2013 (17 mg/kg), but is similar to those observed in 2011 and 2012. In addition, the concentration of arsenic (1.2 mg/kg) exceeded the background (0.83 mg/kg) and baseline (1.0 mg/kg)

concentrations. This represents a slight increase from concentrations of arsenic observed in 2014 (0.70 mg/kg) and 2013 (less than 1.0 mg/kg). No exceedances of the baseline concentrations plus 3σ were reported in 2015. No PHC or PCB were detected from the shallow sample at MW07 in 2015.

A duplicate sample was collected at the deep MW07 (40-50 cm) sample location, and therefore the average concentrations are discussed relative to background and baseline values. The calculated RPD values indicated the original and duplicate sample results differ by more than 30% for some of the observed metals (i.e., Cu, Ni, Co, Zn, Cr).

The deep samples at MW07 (40-50 cm) exhibited elevated concentrations of metals, and are generally higher than those in the shallow sample. The average concentrations of nickel (6 mg/kg) and zinc (22 mg/kg) exceeded their baseline concentrations (5.5 mg/kg and 22 mg/kg, respectively). In addition, the average concentrations of copper (11 mg/kg) and arsenic (1.1 mg/kg) exceeded their background and baseline concentrations. Elevated metal concentrations were observed in previous years at similar concentrations. No exceedances of the baseline concentrations plus 3σ were reported in 2015. No PHC or PCB were detected from the deep sample at MW07 in 2015.

Table 4-17: Soil Chemical Analysis Results – Tier II Disposal Facility

ID	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 (mg/kg)	F2 (mg/kg)	F3 (mg/kg)	F4 (mg/kg)
Background Mean		10	14	9.5	1.1	10	31	22	0.8	NA	0.0	NA	NA	NA	NA
Baseline Mean		**6.1**	**5.5**	**5.0**	**1.0**	**10**	**22**	**20**	**1.0**	**0.10**	**0.0030**	**NA**	**NA**	**NA**	**NA**
Baseline + 3σ		12	16	12	1.0	10	38	30	2.2	0.10	0.013	NA	NA	NA	NA
Upgradient															
MW05 (0-15)	(0-15)	**19.8**	**9.2**	**5.8**	<0.5	4	**25**	12	**1.4**	<0.1	<0.05	<7	<4	<8	<6
MW05 (40-50)	(40-50)	**10.9**	**7.2**	3.9	<0.5	3.3	18.1	11.5	<1	<0.1	<0.05	<7	<4	<8	<6
Cross-gradient															
MW08 (0-15)	(0-15)	**17.2**	**10.3**	**6.2**	<0.5	5.9	**28.9**	15.2	**2.3**	<0.1	<0.05	<7	<4	<8	<6
MW08 (40-50)	(40-50)	**8.7**	**5.8**	3.9	<0.5	3.6	20.5	8.3	**1.8**	<0.1	<0.05	<7	<4	<8	<6
Downgradient															
MW06 (0-15)	(0-15)	4.6	4.8	3.1	<0.5	3.4	19.9	8.1	<1	<0.1	<0.05	<7	<4	<8	<6
MW06 (30-40)	(30-40)	5	5	3.5	<0.5	3.7	**23**	9	<1	<0.1	<0.05	<7	<4	<8	<6
MW07 (0-15)	(0-15)	**7.6**	5.2	3.1	<0.5	3	16.1	8.8	**1.2**	<0.1	<0.05	<7	<4	<8	<6
MW07 (40-50)	(40-50)	**7.6**	4.9	3.3	<0.5	3.8	15.9	7.2	**1.1**	<0.1	<0.05	<7	<4	<8	<6
MW07 (40-50) (Duplicate)	(40-50)	**14**	**8**	5	<0.5	5	**29**	11	<1	<0.10	<0.1	<5	<4	<8	<6
MW07 (40-50) (Dup Avg)	(40-50)	**11**	**6**	4	<0.5	4	**22**	9	**1.1**	<0.1	<0.1	<6	<4	<8	<6

Notes: NA: Not available; ID: Soil sample location ID.

Underlined values: Results exceed Background arithmetic mean; **Bold Values**: Results exceed Baseline arithmetic mean.

4.4.6 Groundwater Sampling

Groundwater sampling and monitoring well inspection field records are included in Appendix B. Table 4-18 presents a summary of groundwater levels and analytical results for groundwater samples collected at the Tier II Disposal Facility. The groundwater sample at MW05 could not be collected because the pump delivered a mixture of water and sand and MW07 could not be sampled because the water was frozen.

MW08

A duplicate sample was collected at MW08 sample location, and therefore the average concentrations are discussed relative to baseline values. The original and duplicate sample results differ by less than 16% for all parameters.

The depth to groundwater measured at MW08 in 2015 was 1.47 m below grade. The groundwater results at MW08 exhibited an elevated concentration of copper. The average concentration of copper (0.026 mg/L) exceeded the baseline concentration. The average concentrations of all metals were lower in 2015 in comparison to the concentrations observed in 2013 and 2014 (copper concentrations of 0.090 mg/L and 0.092 mg/L, respectively). No exceedances of the baseline concentrations plus 3σ were reported in 2015. No PHC or PCB were detected in the groundwater sample taken at MW08 in 2015.

MW06

The depth to groundwater measured at MW06 in 2015 was 1.66 m below grade. The concentrations of copper (0.0193 mg/L) and nickel (0.018 mg/L) in the groundwater sample exceeded their respective baseline concentrations (0.015 mg/L and 0.014 mg/L, respectively). The concentrations of copper and nickel were higher in 2015 in comparison to the concentrations observed in 2013 (0.0089 mg/L and 0.012 mg/L, respectively) but lower than those observed in 2012 (0.084 mg/L and 0.21 mg/L, respectively). The concentrations of most other metals were similar to or less than the concentrations observed in 2012 and 2013. No exceedances of the baseline concentrations plus 3σ were reported in 2015. No PHC or PCB were detected in the groundwater sample collected at MW06 in 2015.

Table 4-18: Monitoring Well Groundwater Levels and Groundwater Chemical Analysis Results – Tier II Disposal Facility

ID	GW Depth BGS (m)	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 PCB (mg/L)	F1 (mg/L)	F2 (mg/L)	F3 (mg/L)	F4 (mg/L)
Baseline Mean		**0.015**	**0.014**	**0.0030**	**0.0010**	**0.010**	**0.010**	**0.021**	**0.003**	**0.0004**	**0.00002**	**NA**	**NA**	**NA**	**NA**
Baseline + 3σ		0.085	0.068	0.0047	0.0038	0.0151	0.068	0.062	0.003	0.00040	0.000020	NA	NA	NA	NA
Upgradient															
MW05 [2]															
Cross-gradient															
MW08	1.47	**0.028**	0.008	<0.0025	<0.0005	0.0045	<0.025	0.006	<0.005	<0.0001	<0.00005	<0.025	<0.1	<0.1	<0.1
MW08 (Duplicate)	1.47	**0.024**	0.007	0.001	0.00004	0.004	0.009	0.007	0.001	<0.000016	<0.00005	<0.025	<0.1	<0.1	<0.1
MW08 (Dup Avg)	1.47	**0.026**	0.008	0.001	0.00004	0.004	0.009	0.007	0.001	<0.0001	<0.00005	<0.025	<0.1	<0.1	<0.1
Downgradient															
MW06	1.66	**0.0193**	**0.018**	0.0028	<0.0005	0.0006	<0.025	0.02	<0.005	<0.0001	<0.00005	<0.025	<0.1	<0.1	<0.1
MW07 [2]															

Notes:
ID: Monitoring well location ID.
GW: Groundwater.
BGS: Below ground surface.
NA: Not available
Bold Values: Results exceed Baseline arithmetic mean.
1: The groundwater sample at MW05 could not be collected because the well was dry.
2: The groundwater sample at MW07 could not be collected because the groundwater in the well was frozen

4.4.7 Conclusions and Overall Performance of the Tier II Disposal Facility

The visual inspection did not observe any significant erosion, settlement, ponded water, staining or indications of instability at the Tier II Disposal Facility. This landfill was assessed to have an “Acceptable” overall landfill performance because all observed features were assessed as “Acceptable”. No cracking or exposed waste was observed. A wet area was observed in the northwest toe area that is likely related to recent snowmelt rather than seepage from the landfill.

Two soil samples (shallow and deep) were collected at all designated locations in 2015.. Concentrations of copper (most commonly), nickel, cobalt, zinc and arsenic were detected above the background and/or baseline arithmetic mean. Metal concentrations were generally lowest at MW06, a downgradient location. At MW05, the concentrations of most metals increased from those concentrations observed in previous years. No detectable concentrations of PHC or PCB were noted in any of the samples in 2015.

In 2015, groundwater samples were collected from two of the four monitoring wells at the landfill. At MW06, the concentrations of copper (0.0193 mg/L) and nickel (0.018 mg/L) exceeded their respective baseline concentrations (0.015 mg/L and 0.014 mg/L, respectively. At MW08, the average concentration of copper (0.026 mg/L) exceeded the baseline concentration. No detectable concentrations of PHC or PCB were noted in any of the groundwater samples in 2015.

Comparison of groundwater elevations based on estimated grade elevation and the measured water depth in the wells indicates that groundwater in MW08 was approximately 1.4 m higher than that at MW06, consistent with the difference in grade between these locations.

4.4.8 Recommendations for Tier II Disposal Facility

No modifications to the ongoing monitoring program at this landfill are recommended.

5.0 QA/QC RESULTS

This section contains the results of the QA/QC program described in Section 3.3. The results are described in terms of accuracy, reliability (blank analysis) and reproducibility (duplicate analysis).

The four DEW Line sites monitored in 2015 were performed as a single deployment of people and equipment in which the standard operating procedures didn't change from site to site. Therefore, the QA/QC analysis below contains both program-level and site-level discussions where appropriate. The lab reports related to the site-level discussion are contained in Appendix C.

5.1 Hold Times

The generally accepted hold times for the parameters analyzed in this program are:

- Metals in soil: 180 days, metals in water 60 days;
- Mercury in soil and water is 28 days
- PCB in soil: 365 days and 7 days in water
- PHC-F1 in soil: 48 hours (if unpreserved), PHC-F1 in water: 7 days
- PHC F2-F4 in soil: 14 days, PHC F2-F4 in water: 7 days

At CAM-5, the groundwater sampling was carried out on August 23, 2015 and the samples were received at Paracel five days later, on August 28, 2015. The soil sampling was also carried out on August 23, 2015 and the samples were received at Paracel eight days later, on September 1, 2015. The duplicate soil and groundwater samples were received at AGAT on September 1, 2015 eight days later.

Maximum hold times were achieved for all parameters being analyzed in soil except for PHC-F1 which was exceeded by 6 days due to its very short hold time of 48 hours. The very short hold time for unpreserved PHC-F1 in soil is a known issue but it has been decided to not preserve this parameter in order to maintain consistency with earlier data in the program.

For groundwater, the maximum hold time of 7 days for PCB, and PHC F1-F4 were exceeded by one day for the duplicate water sample only. Given that the hold time for PCB and PHC F1-F4 in water was exceeded by only one day and that the concentrations of these parameters were below detection in the original and duplicate water sample taken at CAM-5, the delay is not expected to have had a material effect on the reported results.

5.2 Accuracy

Accuracy is a measure of how close a measured value is to the true value. The accuracy of the laboratory data is generally evaluated by the laboratory through the use of matrix spikes or surrogate recoveries. For the CAM-5 samples, Paracel performed a spike analysis on water and one on soil. The spike recovery percentages were within the acceptable data quantity objectives, in every case. AGAT also performed a matrix spike on CAM-5 soil and water samples and all of the results were within their own data quality objectives of 70-130% recovery.

5.3 Reliability

Reliability is a measure of certainty that the concentrations reported by the labs are reliable indicators of field conditions and have not been affected other sources of contamination. The analysis of blanks provides a measure of reliability. Two sets of bottles of deionized water for Trip Blanks accompanied the team on the 2015 monitoring program; one from Paracel and one from AGAT. These bottles were not opened at the sites. The analytical reports from both labs indicate that no parameter was detected in the Trip Blanks at the end of the trip.

A field blank was prepared at the CAM-5 site by pouring deionized water into sample bottles. It was analyzed at AGAT for every parameter in the scope of work. No parameter concentrations were above the detection limit.

The Trip Blank and Field Blank sample results suggest that no other sources of contamination have affected the reported lab results.

5.4 Reproducibility (Duplicate Analysis)

The reproducibility of lab results was measured through the testing of field duplicate samples. Duplicate soil samples were prepared in the field by mixing the soil in a stainless steel bowl and taking pinches of soil and alternately filling the sample jars for the two labs. If a duplicate from the lower of the two sample intervals was being prepared, it was sometimes mixed at the bottom of the test pit.

The total number of original soil samples collected was 230 and 22 duplicate soil samples were prepared and analyzed, which provided a duplicate rate of approximately 10% (9.6%). For groundwater, a total of 26 samples were collected and five duplicates were analyzed, which is a duplicate rate of more than 10%. The distribution of duplicate soil and groundwater samples over the four sites is provided in the table below.

Soil Samples and Duplicates

	DEW Line Site				Totals
	CAM-5	FOX-2	FOX-3	DYE-M	
Soil Samples Collected	27	38	40	125	230
Duplicate Soil Samples	3	3	4	12	22
Percent	11.1%	7.9%	10.0%	9.6%	9.6%

Groundwater Samples and Duplicates

	DEW Line Site				Totals
	CAM-5	FOX-2	FOX-3	DYE-M	
Monitoring Well Sampled	5	11	8	12	26
Duplicate Groundwater Samples	1	1	1	2	5
Percent	20.0%	9.1%	12.5%	16.7%	13.9%

To determine the precision of the original and duplicate sample results, the RPD was calculated according to the following equation:

$$RPD = \frac{|x_2 - x_1|}{\left(\frac{x_1 + x_2}{2}\right)} \times 100\%$$

Where, x_1 and x_2 are the original and duplicate concentrations of a given parameter in a pair. RPDs can only be calculated if concentrations of given parameter are greater than the analytical method detection limits (MDL) in both the duplicate and original samples of the pair. Additionally, lower precision in the RPD calculation occurs when the reported concentrations are less than five (5) times the MDL. RPDs have been calculated wherever the concentrations of a parameter were five (5) times greater than the MDL in both the original and duplicate samples. Sample-level RPDs were calculated by taking the average of the parameter RPDs for a given sample-duplicate pair, and a program-level RPD was calculated by taking the average of all sample RPDs to arrive at a program-wide indication of repeatability.

The TOR sets a data quality objective (DQO) for the RPD in soil and groundwater between a sample and its duplicate of 30%. A discussion or the RPDs for the program and at CAM-5 is provided below.

5.4.1 Soil Samples

Organics and PCB

All of the duplicate pairs of soil samples in the program had PHC F1-F3 results which were below the detection limit and all PCB concentrations were below the detection limit; therefore the precision of these results is not a concern.

Metals

Program Level Interpretation

Mercury and cadmium were below detection limits for all 22 pairs of duplicate samples in the program. RPD calculations were undertaken on the seven remaining metals (copper, nickel, cobalt, lead, zinc, chromium and arsenic) for the 22 pairs of duplicate soil samples. The program-level RPD for the soil sample duplicate analysis was 18%.

Four of the 22 soil sample pairs, including the three at CAM-5 had a sample-RPD of over 30%. The most frequent metals to have an RPD over 30% were: zinc, lead and copper. The results for the samples analyzed by AGAT exhibited overall higher metals concentrations in 13 cases; Paracel's overall concentrations were higher in seven cases, and in two cases it was evenly spilt. There appears to be a bias in that AGAT's results were generally higher than Paracel's.

Site Level Interpretation

From the three soil sample duplicates taken at CAM-5 there were 21 potential parameter pairs for RPD analysis (7 metals times 3 samples). As shown in the table below, 13 parameter pairs had concentrations over five times the MDL for both parameters in the pair, so only 13 individual RPDs were calculated. The RPDs ranged from 11% to 59%. Copper had the highest RPDs from 51% to 59% and lead was the lowest at 11%. Chromium ranged from 39 to 43%. The RPD of cobalt and lead were less than 30%. The average of the 13 RPDs from the three samples was 43%, which was on the high side of the range of RPDs in the program. A possible cause for the high RPDs

was that the overall concentrations of metals were low compared to the other sites, and low concentrations lead to higher variability in reported results. Eight of the 21 possible parameter pairs in the three samples had concentrations under the five times MDL threshold and the metals concentration in the samples that were over the threshold were still low compared to other sites. The table below shows the metals results and RPD calculations for CAM-5.

In conclusion, the reproducibility of the soil sample results at CAM-5 was not as good as for the overall program, which was likely an expression of the generally low concentrations of metals at this site.

Relative Percent Difference Analysis of Soil Data at CAM-5

		Parameter Concentrations (mg/kg)								
Sample ID	Lab	Cu	Ni	Co	Pb	Zn	Cr	As	Sample Average RPD	Any Over 30%?
MDL		<1	<1	<1	<1	<1	<1	<1		
MW12 (40-50)	Paracel	8.3	5.2	3.1	3.7	17.7	9	1.4	41%	4
MW12 (40-50) (Duplicate)	AGAT	14	7	4.4	9	27	14	<1		
RPD		51%	30%			42%	43%			
MW07 (40-50)	Paracel	7.6	4.9	3.3	3.8	15.9	7.2	1.1	53%	3
MW07 (40-50) (Duplicate)	AGAT	14	8	5	5	29	11	<1		
RPD		59%				58%	42%			
C5-6 (0-15)	Paracel	21.9	12	7.2	9.9	35.8	20.3	4	33%	4
C5-6 (0-15) (Duplicate)	AGAT	37	17	9.3	11	53	30	2		
RPD		51%	34%	25%	11%	39%	39%			
Concentration < 5 x MDL									Average 43%	11

5.4.2 Groundwater Samples

Organics and PCB

All five of the duplicate pairs of groundwater samples in the program had PHC F1-F3 results which were below the detection limit and all PCB concentrations were below the detection limit; therefore the precision of these results is not a concern.

Metals

Program Level Interpretation

Given the five groundwater duplicate pairs and nine metals analyzed, there were 45 potential parameters pairs for duplicate analysis via RPD calculation (9 metals times 5 samples); however, only twenty of these parameter pairs had both parameters detected above the MDL, and only 13 had both parameters greater than five times the MDL and were therefore eligible for RPD analysis.

The program-level average RPD for water analysis of metals (where both parameters were over five times the MDL) was 30%, which exceeds the data quality objective of 15%.

Site Level Interpretation

MW08 at the Tier II Waste Facility was the groundwater sample that had a duplicate at CAM-5. As shown in the table below, there were four groundwater parameter pairs for which the concentrations in the original and duplicate were over 5 times the MDL (copper, nickel, lead and chromium) thus four RPDs were calculated for the groundwater duplicate at CAM-5. The RPDs were low (15%, 13%, 12% and 15%) with an average of 14%. The data quality objective for inorganics in groundwater was set as 15%, on the average therefore the groundwater quality at CAM-5 met the data quality objectives.

Relative Percent Difference Analysis of Groundwater Data at CAM-5

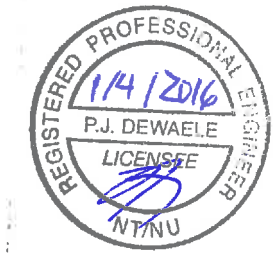
		Parameter Concentrations (mg/L)										
Sample ID	**Lab**	**Cu**	**Ni**	**Co**	**Cd**	**Pb**	**Zn**	**Cr**	**As**	**Hg**	**Average RPD**	**Any Over 15%?**
MDL		<0.0005	<0.001	<0.0005	<0.0001	<0.0001	<0.005	<0.001	<0.001	<0.0001		
MW08	Paracel	0.028	0.008	<0.0025	<0.0005	0.0045	0.025	0.006	0.005	<0.0001	14%	no
MW08 (Duplicate)	AGAT	0.024	0.007	0.001	0.00004	0.004	0.009	0.007	0.001	<0.000016		
RPD		15%	13%			12%		15%			Average 14%	
Concentration < 5 x MDL												

Report Signature Page

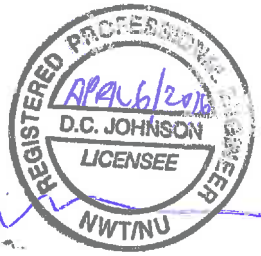
We trust that this Monitoring Report meets the Project requirements of DND. Please direct any questions to the undersigned.

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APPENDIX A

Report Limitations

REPORT LIMITATIONS

This report has been prepared as an assessment of the environmental condition and visual inspection of the subject site. The monitoring program described in this report was conducted in a manner consistent with that level of care and skill normally exercised by other members of the engineering and science professions currently practising under similar conditions, subject to the time limits and financial and physical constraints applicable to the services. The scope of work was carried out in accordance with the agreement between Golder Associates Ltd. and the client.

The assessment of environmental conditions at this Site has been made using the results of chemical analysis of soil and groundwater from a limited number of locations. The Site conditions between sampling locations have been inferred based on conditions observed at sampling locations. Subsurface conditions may vary from those encountered at the sample locations. Additional study, including further subsurface investigation, can reduce the inherent uncertainties associated with this type of study. However, it is never possible, even with exhaustive sampling and testing, to dismiss the possibility that part of a Site may be contaminated and remain undetected. Visual inspection comments are based on observed conditions at the time of the inspection and may change with time.

Any use which a third party makes of this report, or any reliance on, or decisions to be made based on it, are the responsibility of such third parties. Golder Associates Ltd. accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on the information contained in this report.

The content of this report is based on information collected during our monitoring program, our present understanding of the Site conditions, and our professional judgement in light of such information at the time of writing this report. This report provides a professional opinion and therefore no warranty is expressed, implied, or made as to the conclusions and recommendations offered in this report. This report does not provide a legal opinion regarding compliance with applicable laws. With respect to regulatory compliance issues, it should be noted that regulatory statutes and the interpretation of regulatory statutes are subject to change.

The findings and conclusions of this report are valid only as of the date of this report. If new information is discovered, Golder Associates Ltd. should be requested to re-evaluate the conclusions of this report, and to provide amendments as required.

APPENDIX B

Field Records

Monitoring Well Sampling Logs

Thermistor Inspection Record Sheets

Thermistor Inspection Field Record Sheet

Inspector Name:	Reza Moghaddam	Inspection Date:	August 23 , 2015
Inspector Signature / Prepared By:			

Thermistor Information (*Some Information can be pre-populated from thermistor logs)

Site Name:	**CAM-5**	Landfill:	Tier II Disposal Facility		
Thermistor Number:	**VT-1**	Inclination:	Vertical		
Datalogger model no:		Datalogger cable download model:			
*Install Date:	**2010-09-07**	First Date Event	**22-Aug-14**	Last Date Event	**23-Aug-15**
*Coordinates and Elevation		N **7580526**	E **553505.3**	Elev	**109.1 m**
Length of Cable (m)	**10.5**	Cable Lead Above Ground (m)	3.47		
Datalogger Serial #	**7110050**	Nodal Points	16		

Thermistor Inspection

	Good	Needs Maintenance	Description
Casing	X	☐	
Cover	X	☐	
Data Logger	X	☐	
Cable	X	☐	
Beads	X	☐	
Lock condition	☐	X	Replace lock
Battery Installation Date	**2015-08-23**		
Battery Levels	Main 11.34	Aux 13.38	

Manual Ground Temperature Readings

Bead	Volts	Degrees C	Bead	Volts	Degrees C
1	1.2306	9.4583	9	0.8174	-4.2334
2	1.0836	4.6326	10	0.7932	-5.0757
3	1.016	2.4186	11	0.7765	-5.6611
4	0.973	1.0044	12	0.7658	-6.0379
5	0.9345	-0.2728	13	0.7511	-6.5579
6	0.8987	-1.4688	14	0.7405	-6.9397
7	0.8669	-2.5422	15	0.7338	-7.1781
8	0.8407	-3.4335	16	0.7289	-7.3540

Battery Information

Batteries changed ?	Yes	x	No	Monitoring Year:	2015
Battery model number installed:		ULB1 batteries (9 V)			
Expected battery life (years):		2020			

Datalogger Programming (Describe programming completed; beads and frequency)

Observations and Proposed Maintenance

Memory 40% used.

Thermistor Inspection Field Record Sheet

Inspector Name:	Reza Moghaddam	Inspection Date:	August 23 , 2015
Inspector Signature / Prepared By:			

Thermistor Information (*Some Information can be pre-populated from thermistor logs)

Site Name:	**CAM-5**	Landfill:	Tier II Disposal Facility
Thermistor Number:	**VT-2**	Inclination:	Vertical
Datalogger model no:		Datalogger cable download model:	
*Install Date:	**2010-09-07**	First Date Event	**22-Aug-14** Last Date Event **23-Aug-15**
*Coordinates and Elevation		N **7580525.5** E **553546.1**	Elev **109.1 m**
Length of Cable (m)	**8.25**	Cable Lead Above Ground (m)	3
Datalogger Serial #	**7110073**	Nodal Points	12

Thermistor Inspection

	Good	Needs Maintenance	Description
Casing	X	☐	
Cover	X	☐	
Data Logger	X	☐	
Cable	X	☐	
Beads	X	☐	
Lock condition	☐	X	Replace lock
Battery Installation Date	**2015-08-23**		
Battery Levels	Main 11.34	Aux 13.38	

Manual Ground Temperature Readings

Bead	Volts	Degrees C	Bead	Volts	Degrees C
1	1.1434	6.5893	9	0.8077	-4.5688
2	1.1061	5.3770	10	0.7871	-5.2890
3	1.0451	3.7430	11	0.7686	-5.9381
4	0.9332	1.6711	12	0.7533	-6.4791
5	0.9562	0.4492			
6	0.922	-0.6898			
7	0.8621	-2.7053			
8	0.8309	-3.7684			

Battery Information

Batteries changed ? Yes [x] No [ ] Monitoring Year: 2015

Battery model number installed: ULB1 batteries (9 V)

Expected battery life (years): 2020

Datalogger Programming (Describe programming completed; beads and frequency)

Observations and Proposed Maintenance

Memory 40% used.

Thermistor Inspection Field Record Sheet

Inspector Name:	Reza Moghaddam	Inspection Date:	August 23 , 2015
Inspector Signature / Prepared By:			

Thermistor Information (*Some Information can be pre-populated from thermistor logs)

Site Name:	**CAM-5**	Landfill:	Tier II Disposal Facility		
Thermistor Number:	**VT-3**	Inclination:	Vertical		
Datalogger model no:		Datalogger cable download model:			
*Install Date:	**2010-09-07**	First Date Event	**22-Aug-14**	Last Date Event	**23-Aug-15**
*Coordinates and Elevation		N **7580502.6**	E **553517.1**	Elev	**108.3 m**
Length of Cable (m)	**9.25**	Cable Lead Above Ground (m)	3.53		
Datalogger Serial #	**7110076**	Nodal Points	14		

Thermistor Inspection

	Good	Needs Maintenance	Description
Casing	X	☐	
Cover	X	☐	
Data Logger	X	☐	
Cable	X	☐	
Beads	X	☐	
Lock condition	☐	X	Replace lock

Battery Installation Date: **2015-08-23**

Battery Levels: Main 11.34 Aux 13.26

Manual Ground Temperature Readings

Bead	Volts	Degrees C	Bead	Volts	Degrees C
1	1.2451	9.9388	9	0.8351	-3.6243
2	1.2189	9.0723	10	0.8097	-4.5000
3	1.1292	6.1247	11	0.7903	-5.1770
4	1.0646	4.0137	12	0.7752	-5.7068
5	1.0127	2.3109	13	0.7588	-6.2839
6	0.966	0.7724	14	0.7460	-6.7403
7	0.9308	-0.3947			
8	0.8645	-2.6224			

Battery Information

Batteries changed ? Yes [x] No [ ] Monitoring Year: 2015

Battery model number installed: ULB1 batteries (9 V)

Expected battery life (years): 2020

Datalogger Programming (Describe programming completed; beads and frequency)

Observations and Proposed Maintenance

Memory 40% used.

Thermistor Inspection Field Record Sheet

Inspector Name:	Reza Moghaddam	Inspection Date:	August 23 , 2015
Inspector Signature / Prepared By:			

Thermistor Information (*Some Information can be pre-populated from thermistor logs)

Site Name:	**CAM-5**	Landfill:	Tier II Disposal Facility		
Thermistor Number:	**VT-4**	Inclination:	Vertical		
Datalogger model no:		Datalogger cable download model:			
*Install Date:	**2010-09-07**	First Date Event	**22-Aug-14**	Last Date Event	**23-Aug-15**
*Coordinates and Elevation		N **7580502.6**	E **553557.8**	Elev	**108.48 m**
Length of Cable (m)	**10.5**	Cable Lead Above Ground (m)	3.9		
Datalogger Serial #	**7110071**	Nodal Points	16		

Thermistor Inspection

	Good	Needs Maintenance	Description
Casing	X	☐	
Cover	X	☐	
Data Logger	X	☐	
Cable	X	☐	
Beads	X	☐	
Lock condition	☐	X	Replace lock
Battery Installation Date	**2015-08-23**		
Battery Levels	Main 11.34	Aux 13.87	

Manual Ground Temperature Readings

Bead	Volts	Degrees C	Bead	Volts	Degrees C
1	1.3449	13.2915	9	0.8273	-3.8942
2	1.1657	7.3221	10	0.8054	-4.6508
3	1.0585	3.8114	11	0.7852	-5.3558
4	1.0006	1.9147	12	0.7703	-5.8789
5	0.9612	0.6134	13	0.7540	-6.4547
6	0.917	-0.8554	14	0.7437	-6.8249
7	0.8803	-2.0879	15	0.7362	-7.0930
8	0.8509	-3.0843	16	0.7273	-7.4146

Battery Information

Batteries changed ? Yes [x] No [ ] Monitoring Year: 2015

Battery model number installed: ULB1 batteries (9 V)

Expected battery life (years): 2020

Datalogger Programming (Describe programming completed; beads and frequency)

Observations and Proposed Maintenance

Memory 40% used.

Annex J: Monitoring Wells Sampling Log

Site Name: CAM5 Landfill Name:
Monitoring Well ID: MW-05 Tier II Facility
Sample Number(s) include dups.: MW-05
Bottles filled (by parameter type) -
Date of Sampling Event: 23 August 2015 Time:9:30
Weather Clear, +5
Names of Samplers KR
Description of well condition and surrounding ground conditions (note ponding of water):
Area is dry.
Lock (condition, presence, model, manufacturer): Crown working.

Pre-Measured Data (from water well record log)

Depth of well installation (cm):	0	Diameter of well (cm):	4.4
Depth to top of screen (cm):	0	Length of screened section (cm):	0

Field Measurements

Measurement method (interface probe, tape, etc):	Interface Probe		
Well pipe height above ground (cm) (to top of pipe):			52
Static water level (cm) from top of pipe:			196
Static water level (cm) (below ground surface) calculated:			144
Measured well refusal depth (cm) (measured after sampling):			199
Thickness of water column (cm):	3	Static Volume of water in well (mL):	46
Free product thickness (mm):	N/A	Evidence of Sludge or siltation:	N/A

Purge Information Summary

Purging/sampling equipment, sampling technique and equipment calibration information:

Well purged (Y/N): N/A Recharge Rate: N/A
Volume Purged (L) (note multiple purging events):

Parameter	Initial	Stablized	Final	Notes
pH	-			
Conductivity (mS/cm)	-			
Turbidity (NTU)	-			
Temperature (degC)	-			

Visual/olfactory observations:
Clear water mixed with clean sand.

Decontamination of sampling equipment

Type of decontamination fluid(s):
Number of washes: N/A Number of rinses: N/A

Other relevant comments: Pumped water and sand, unable to sample.

Annex J: Monitoring Wells Sampling Log

Site Name: CAM5 Landfill Name:
Monitoring Well ID: MW-06 Tier II Facility
Sample Number(s) include dups.: MW-06
Bottles filled (by parameter type) BTEX, Metals, Mercury, F2-F4, PCB
Date of Sampling Event: 23 August 2015 Time: 10:45
Weather Clear, +5
Names of Samplers KR
Description of well condition and surrounding ground conditions (note ponding of water):
Area is dry.
Lock (condition, presence, model, manufacturer): Crown working.

Pre-Measured Data (from water well record log)

Depth of well installation (cm):	0	Diameter of well (cm):	4.4
Depth to top of screen (cm):	0	Length of screened section (cm):	0

Field Measurements

Measurement method (interface probe, tape, etc):	Interface Probe		
Well pipe height above ground (cm) (to top of pipe):			59
Static water level (cm) from top of pipe:			175
Static water level (cm) (below ground surface) calculated:			116
Measured well refusal depth (cm) (measured after sampling):			225
Thickness of water column (cm):	50	Static Volume of water in well (mL):	760
Free product thickness (mm):	N/A	Evidence of Sludge or siltation:	N/A

Purge Information Summary

Purging/sampling equipment, sampling technique and equipment calibration information:
<100mL removed from well to facilitate measurement of field parameters.
Filling of sample bottles was completed directly after measurement. Peristaltic pump @ <0.100 L/min
Well purged (Y/N): N/A Recharge Rate: N/A
Volume Purged (L) (note multiple purging events):

Parameter	Initial	Stablized	Final	Notes
pH	7.42			
Conductivity (mS/cm)	0.549			
Turbidity (NTU)	no data			
Temperature (degC)	6.44			

Visual/olfactory observations:
Clear, no colour.

Decontamination of sampling equipment

Type of decontamination fluid(s):
Number of washes: N/A Number of rinses: N/A

Other relevant comments:

Annex J: Monitoring Wells Sampling Log

Site Name: CAM5 Landfill Name:
Monitoring Well ID: MW-07 Tier II Facility
Sample Number(s) include dups.: MW-07
Bottles filled (by parameter type) -
Date of Sampling Event: 23 August 2015 Time:11:07
Weather Clear, +5
Names of Samplers KR
Description of well condition and surrounding ground conditions (note ponding of water):
Area is dry.
Lock (condition, presence, model, manufacturer): Crown working.

Pre-Measured Data (from water well record log)

Depth of well installation (cm): 0 Diameter of well (cm): 4.4
Depth to top of screen (cm): 0 Length of screened section (cm): 0

Field Measurements

Measurement method (interface probe, tape, etc): Interface Probe
Well pipe height above ground (cm) (to top of pipe): 55
Static water level (cm) from top of pipe: Frozen
Static water level (cm) (below ground surface) calculated:
Measured well refusal depth (cm) (measured after sampling): 178
Thickness of water column (cm): Static Volume of water in well (mL):
Free product thickness (mm): N/A Evidence of Sludge or siltation: N/A

Purge Information Summary

Purging/sampling equipment, sampling technique and equipment calibration information:

Well purged (Y/N): N/A Recharge Rate: N/A
Volume Purged (L) (note multiple purging events):

Parameter	Initial	Stablized	Final	Notes
pH	-			
Conductivity (mS/cm)	-			
Turbidity (NTU)	-			
Temperature (degC)	-			

Visual/olfactory observations:

Decontamination of sampling equipment

Type of decontamination fluid(s):
Number of washes: N/A Number of rinses: N/A

Other relevant comments: Frozen, unable to sample.

Annex J: Monitoring Wells Sampling Log

Site Name: CAM5 Landfill Name:
Monitoring Well ID: MW-08 Tier II Facility
Sample Number(s) include dups.: Duplicate MW-08
Bottles filled (by parameter type) BTEX, Metals, Mercury, F2-F4, PCB
Date of Sampling Event: 23 August 2015 Time: 11:20
Weather Clear, +5
Names of Samplers KR
Description of well condition and surrounding ground conditions (note ponding of water):
Loose sand around casing, dry at surface.
Lock (condition, presence, model, manufacturer): Crown working.

Pre-Measured Data (from water well record log)

Depth of well installation (cm):	0	Diameter of well (cm):	4.4
Depth to top of screen (cm):	0	Length of screened section (cm):	0

Field Measurements

Measurement method (interface probe, tape, etc):	Interface Probe		
Well pipe height above ground (cm) (to top of pipe):			29
Static water level (cm) from top of pipe:			176
Static water level (cm) (below ground surface) calculated:			147
Measured well refusal depth (cm) (measured after sampling):			244
Thickness of water column (cm):	68	Static Volume of water in well (mL):	1034
Free product thickness (mm):	N/A	Evidence of Sludge or siltation:	N/A

Purge Information Summary

Purging/sampling equipment, sampling technique and equipment calibration information:
<100mL removed from well to facilitate measurement of field parameters.
Filling of sample bottles was completed directly after measurement. Peristaltic pump @ <0.100 L/min
Well purged (Y/N): N/A Recharge Rate: N/A
Volume Purged (L) (note multiple purging events):

Parameter	Initial	Stablized	Final	Notes
pH	7.54			
Conductivity (mS/cm)	0.529			
Turbidity (NTU)	248			
Temperature (degC)	6.78			

Visual/olfactory observations:
Turbid, whitish.

Decontamination of sampling equipment

Type of decontamination fluid(s):
Number of washes: N/A Number of rinses: N/A

Other relevant comments:

Annex J: Monitoring Wells Sampling Log

Site Name: CAM5 Landfill Name: Non-Haz Waste LF
Monitoring Well ID: MW-09
Sample Number(s) include dups.: MW-09
Bottles filled (by parameter type) BTEX, Metals, Mercury, F2-F4, PCB
Date of Sampling Event: 23 August 2015 Time: 1:30
Weather Clear, +15
Names of Samplers KR
Description of well condition and surrounding ground conditions (note ponding of water):
Water in casing is at the height of the well pipe. Water removed from casing.
Lock (condition, presence, model, manufacturer): Crown working.

Pre-Measured Data (from water well record log)

Depth of well installation (cm):	0	Diameter of well (cm):	4.4
Depth to top of screen (cm):	0	Length of screened section (cm):	0

Field Measurements

Measurement method (interface probe, tape, etc):	Interface Probe		
Well pipe height above ground (cm) (to top of pipe):			32
Static water level (cm) from top of pipe:			130
Static water level (cm) (below ground surface) calculated:			98
Measured well refusal depth (cm) (measured after sampling):			203
Thickness of water column (cm):	73	Static Volume of water in well (mL):	1110
Free product thickness (mm):	N/A	Evidence of Sludge or siltation:	N/A

Purge Information Summary

Purging/sampling equipment, sampling technique and equipment calibration information:
<100mL removed from well to facilitate measurement of field parameters.
Filling of sample bottles was completed directly after measurement. Peristaltic pump @ <0.100 L/min
Well purged (Y/N): N/A Recharge Rate: N/A
Volume Purged (L) (note multiple purging events):

Parameter	Initial	Stablized	Final	Notes
pH	8.47			
Conductivity (mS/cm)	0.062			
Turbidity (NTU)	305			
Temperature (degC)	8.5			

Visual/olfactory observations:
Turbid

Decontamination of sampling equipment

Type of decontamination fluid(s):
Number of washes: N/A Number of rinses: N/A

Other relevant comments:

Annex J: Monitoring Wells Sampling Log

Site Name:	CAM5	Landfill Name:	Non-Haz Waste LF
Monitoring Well ID:	MW-11		
Sample Number(s) include dups.:	MW-11		
Bottles filled (by parameter type)	BTEX, Metals, Mercury, F2-F4, PCB		
Date of Sampling Event:	23 August 2015	Time:	1:00
Weather	Clear, +15		
Names of Samplers	KR		

Description of well condition and surrounding ground conditions (note ponding of water):
Evidence of jacking, bottom of casing is visible. Dry at surface.

Lock (condition, presence, model, manufacturer): Crown working.

Pre-Measured Data (from water well record log)

Depth of well installation (cm):	0	Diameter of well (cm):	4.4
Depth to top of screen (cm):	0	Length of screened section (cm):	0

Field Measurements

Measurement method (interface probe, tape, etc):	Interface Probe		
Well pipe height above ground (cm) (to top of pipe):			47
Static water level (cm) from top of pipe:			92
Static water level (cm) (below ground surface) calculated:			45
Measured well refusal depth (cm) (measured after sampling):			260
Thickness of water column (cm):	168	Static Volume of water in well (mL):	2554
Free product thickness (mm):	N/A	Evidence of Sludge or siltation:	N/A

Purge Information Summary

Purging/sampling equipment, sampling technique and equipment calibration information:
<100mL removed from well to facilitate measurement of field parameters.

Filling of sample bottles was completed directly after measurement. Peristaltic pump @ <0.100 L/min

Well purged (Y/N):	N/A	Recharge Rate:	N/A
Volume Purged (L) (note multiple purging events):			

Parameter	Initial	Stablized	Final	Notes
pH	7.94			
Conductivity (mS/cm)	0.02			
Turbidity (NTU)	96.3			
Temperature (degC)	8.29			

Visual/olfactory observations:
Turbid

Decontamination of sampling equipment

Type of decontamination fluid(s):

Number of washes:	N/A	Number of rinses:	N/A

Other relevant comments:

Annex J: Monitoring Wells Sampling Log

Site Name:	CAM5	Landfill Name:	Non-Haz Waste LF
Monitoring Well ID:	MW-12		
Sample Number(s) include dups.:	MW-12		
Bottles filled (by parameter type)	BTEX, Metals, Mercury, F2-F4, PCB		
Date of Sampling Event:	23 August 2015	Time:	12:23
Weather	Clear, +15		
Names of Samplers	KR		

Description of well condition and surrounding ground conditions (note ponding of water):
Loose sand around casing, dry at surface.

Lock (condition, presence, model, manufacturer): Crown working.

Pre-Measured Data (from water well record log)

Depth of well installation (cm):	0	Diameter of well (cm):	4.4
Depth to top of screen (cm):	0	Length of screened section (cm):	0

Field Measurements

Measurement method (interface probe, tape, etc):	Interface Probe		
Well pipe height above ground (cm) (to top of pipe):			30
Static water level (cm) from top of pipe:			134
Static water level (cm) (below ground surface) calculated:			104
Measured well refusal depth (cm) (measured after sampling):			165
Thickness of water column (cm):	31	Static Volume of water in well (mL):	471
Free product thickness (mm):	N/A	Evidence of Sludge or siltation:	N/A

Purge Information Summary

Purging/sampling equipment, sampling technique and equipment calibration information:
<100mL removed from well to facilitate measurement of field parameters.

Filling of sample bottles was completed directly after measurement. Peristaltic pump @ <0.100 L/min

Well purged (Y/N):	N/A	Recharge Rate:	N/A
Volume Purged (L) (note multiple purging events):			

Parameter	Initial	Stablized	Final	Notes
pH	5.29			
Conductivity (mS/cm)	0.011			
Turbidity (NTU)	77			
Temperature (degC)	9.59			

Visual/olfactory observations:
Turbid

Decontamination of sampling equipment

Type of decontamination fluid(s):

Number of washes:	N/A	Number of rinses:	N/A

Other relevant comments:

SITE NAME: _____

RECORD OF SOIL SAMPLING

SAMPLER NAME: _____

LANDFILL NAME	SOIL SAMPLE ID	DEPTH (m)	SOIL DESCRIPTION	GPS Northing	GPS Easting	GPS Elevation	Photographs	Backfilled (Y/N)
Aug 22	MW-09	30-40 0-15	Brown Silt Sand and gravel	18W 0494273 7643179		154	✓ ✓ ✓	✓
Aug 23	MW-05 Cam 5	0-15 40-50	Brown sand/gravel	16W 0553540 7580575		104m	✓ ✓	✓
Aug 23	MW-06 Cam#-5	0-15 30-40	Brown Rockie Sand gravel	16W 0553463 7580504		101m	✓ ✓ ✓	—
11	MW-07 Cam 5	0-15 40-50 dup	brown sand gravel loose.	16W 0553487 7580466		105	✓ ✓	✓
	MW08	0-15 40-50	〃	16W 0553514 7580445		104	✓ ✓ ✓	✓
	CS-8	0-15 rocky refusal	sand & organics	16W 0553540 7580285		110	✓ ✓	✓
	MW12	0-15 40-50 dup	loose sand gravel	16W 0553361 7580293		100	✓ ✓	—
11	MW 11	0-15 Rocky refusal	gray sand gravel Rock cobbles	16W 0553331 7580261		96m	✓ ✓ ✓	✓
11	MW-09	0-15 40-50	organics Brown Sand gravel	16W 0553272 7580360		92m	✓ ✓	✓
	CS-6	0-15 dup	organics, sand	16W 0553280 7580196		94m	✓ ✓	✓

SITE NAME:

RECORD OF SOIL SAMPLING

DAT
SAMPLER NAME:

LANDFILL NAME	SOIL SAMPLE ID	DEPTH (m)	SOIL DESCRIPTION	GPS Northing	GPS Easting	GPS Elevation	Photographs	Backfilled (Y/N)
Aug 23	CS-7	0-15 40-50	wet sand and gravel.	16W 0553204 7580237		91	✓ ✓ ✓	✓
	CS-2	0-15 40-50	organics and sand.	16W0553090 7581493		31	✓ ✓	✓
	CS-3	0-15 40-50	sand/gravel. organics at depth	16W0553132 7581559		25	✓ ✓	✓
	CS-4	0-15 40-50	organics wet sand a ~~silt~~ clay	16W0553162 7581520		29	✓ ✓	✓
	CS-5	0-15 40-50	silty clay. organics.	16W0553280 7581972		29	✓ ✓	✓
	CS-1	0-15 40-50	sand and gravel.	16W0553171 7581386		42	✓ ✓	✓

GLOBAL PROJECT #1530908 PHASE 1000

ANNEX M: Thermistor Inspection Template

Inspector Name:	Inspection Date: AUGUST 23, 2013
Inspector Signature / Prepared By:	

Thermistor Information (*Some Information can be pre-populated from thermistor logs)

Site Name: CAM-2		Landfill: TIOGA	
Thermistor Number: T-4		Inclination:	
Datalogger model no:		Datalogger cable download model:	
*Install Date:		First Date Event	Last Date Event
*Coordinates and Elevation	N	E	Elev
Length of Cable (m)		Cable Lead Above Ground (m)	
Datalogger Serial # 07110031		Nodal Points 16	

Thermistor Inspection

	Good	Needs Maintenance	Description
Casing	☑	☐	
Cover	☐	☐	
Data Logger	☑	☐	
Cable	☑	☐	
Beads	☑	☐	
Lock condition	☐	☑	
Battery Installation Date			
Battery Levels	Main 11.3V	Aux 13.87	

Manual Ground Temperature Readings

Bead	ohms	Degrees C
1	1.3449	13.291
2	1.1657	7.3721
3	1.0585	3.8114
4	1.0006	1.9147
5	0.9612	0.6134
6	0.9170	-0.8554
7	0.8803	-2.0874
8	0.8509	-3.0843

Bead	ohms	Degrees C
9	0.8273	-3.8942
10	0.8054	-4.6508
11	0.7852	-5.3458
12	0.7703	-5.8789
13	0.7540	-6.4547
14	0.7437	-6.8249
15	0.7362	-7.0850
16	0.7277	-7.4146

Battery Information

Batteries changed ? Yes ☑ No ☐ Monitoring Year:

Battery model number installed:

Expected battery life (years):

Datalogger Programming (Describe programming completed; beads and frequency)

Observations and Proposed Maintenance

Battery changed

GOLDER PROJECT #1530908 PHASE 1000

ANNEX M: Thermistor Inspection Template

Inspector Name: Reza	Inspection Date: August 23, 201
Inspector Signature / Prepared By:	

Thermistor Information (*Some Information can be pre-populated from thermistor logs)

Site Name: CAM-5		Landfill: Tier II Disposal	
Thermistor Number: VT3		Inclination:	
Datalogger model no:		Datalogger cable download model:	
*Install Date:		First Date Event	Last Date Event
*Coordinates and Elevation	N	E	Elev
Length of Cable (m)		Cable Lead Above Ground (m)	
Datalogger Serial # 8710076		Nodal Points	

Thermistor Inspection

	Good	Needs Maintenance	Description
Casing	☑	☐	
Cover	☑	☐	
Data Logger	☑	☐	
Cable	☑	☐	
Beads	☑	☐	
Lock condition	☐	☑	needs to be replaced
Battery Installation Date			
Battery Levels	Main 11.34	Aux 13.26	

Manual Ground Temperature Readings

Bead	ohms	Degrees C
1	1.2451	9.9388
2	1.2189	9.0723
3	1.1292	6.1247
4	1.0646	4.0137
5	1.0127	2.3109
6	0.9660	0.7724
7	0.9308	-0.3947
8	0.8645	-2.6224

Bead	ohms	Degrees C
9	0.8351	-3.6243
10	0.8097	-4.5000
11	0.7903	-5.1730
12	0.7752	-5.7068
13	0.7588	-6.2839
14	0.7460	-6.7403

Battery Information

Batteries changed ? Yes ☑ No ☐ Monitoring Year:

Battery model number installed: 9V

Expected battery life (years):

Datalogger Programming (Describe programming completed; beads and frequency)

Battery change

Observations and Proposed Maintenance

GOLDER PROJECT #1530908 PHASE 1000

ANNEX M: Thermistor Inspection Template

Inspector Name: Reza	Inspection Date: August 23, 2013
Inspector Signature / Prepared By:	

Thermistor Information (*Some Information can be pre-populated from thermistor logs)

Site Name: CAM-7		Landfill: Tier II Disposal Facility	
Thermistor Number: VT-2		Inclination:	
Datalogger model no:		Datalogger cable download model:	
*Install Date:		First Date Event	Last Date Event
*Coordinates and Elevation	N	E	Elev
Length of Cable (m)		Cable Lead Above Ground (m)	
Datalogger Serial # 07100773		Nodal Points 12	

Thermistor Inspection

	Good	Needs Maintenance	Description
Casing	☑	☐	
Cover	☑	☐	
Data Logger	☑	☐	
Cable	☑	☐	
Beads	☑	☐	
Lock condition	☐	☑	needs to be replaced
Battery Installation Date			
Battery Levels	Main 11.34		Aux 13.38

Manual Ground Temperature Readings

Bead	ohms	Degrees C
1	1.1431	6.5893
2	1.1061	5.3770
3	1.0451	3.3743
4	0.9332	1.6711
5	0.9562	0.4499
6	0.9220	-0.6899
7	0.8621	-2.7053
8	0.8309	-3.7784

Bead	ohms	Degrees C
9	0.8077	-4.5688
10	0.7871	-5.2890
11	0.7686	-5.9381
12	0.7533	-6.4791

Battery Information

Batteries changed ? Yes ☑ No ☐ Monitoring Year:

Battery model number installed: 95

Expected battery life (years):

Datalogger Programming (Describe programming completed; beads and frequency)

Observations and Proposed Maintenance

Battery change

GOLDER PROJECT #1530908 PHASE 1000

ANNEX M: Thermistor Inspection Template

Inspector Name: Reza	Inspection Date: August 23, 2011
Inspector Signature / Prepared By:	

Thermistor Information (*Some Information can be pre-populated from thermistor logs)

Site Name: CAM-S		Landfill:	
Thermistor Number: VT-1		Inclination:	
Datalogger model no:		Datalogger cable download model:	
*Install Date:		First Date Event	Last Date Event
*Coordinates and Elevation	N	E	Elev
Length of Cable (m)		Cable Lead Above Ground (m)	
Datalogger Serial # 07110050		Nodal Points 16	

Thermistor Inspection

	Good	Needs Maintenance	Description
Casing	☑	☐	
Cover	☑	☐	
Data Logger	☑	☐	
Cable	☑	☐	
Beads	☑	☐	
Lock condition	☐	☑	needs to be replaced
Battery Installation Date			
Battery Levels	Main 11.34		Aux 13.38

Manual Ground Temperature Readings

Bead	ohms	Degrees C
1	1.2306	9.4583
2	1.0836	4.6326
3	1.0160	2.4186
4	0.9730	1.0044
5	0.9345	-0.2728
6	0.8987	-1.4688
7	0.8669	-2.5422
8	0.8407	-3.4335

Bead	ohms	Degrees C
9	0.8174	-4.2334
10	0.7932	-5.0757
11	0.7765	-5.6611
12	0.7658	-6.0379
13	0.7511	-6.5579
14	0.7405	-6.9397
15	0.7338	-7.1781
16	0.7289	-7.3540

Battery Information

Batteries changed ? Yes ☑ No ☐ Monitoring Year:

Battery model number installed: 9V

Expected battery life (years):

Datalogger Programming (Describe programming completed; beads and frequency)

Observations and Proposed Maintenance

GOLDER PROJECT #1530908 PHASE 1000

ANNEX J: Monitoring Well Sampling Log (Complete All Fields)

Site Name: CAMS Landfill Name: Tier 2.

Monitoring Well ID: MW05

Sample Number(s) include dups.:

Bottles filled (by parameter type): None.

Date of Sampling Event: AUGUST 23 Time: ~~8:45~~ 9:30

Weather: clear, windy +5

Names of Samplers: K.P.

Description of Well Condition and Surrounding ground conditions (note ponding of water): Dig above well

Lock (condition, presence, model, manufacturer): crown working.

Pre-Measured Data (From Water Well Record Log)

*Depth of well installation (cm)= Diameter of well (cm)=

*Depth to top of screen (cm)= Length screened section (cm)=

*note: *depths are from ground surface*

Field Measurements

Measurement method (interface probe, tape, etc): ip.

Well pipe height above ground (cm) (to top of pipe)= 52cm

Static water level (cm) from top of pipe = 196

Static water level (cm) (below ground surface) calculated =

Measured well refusal depth (cm) (measure after sampling)= 199

Thickness of water column (cm)= Static volume of water in well (mL)=

Free product thickness (mm)= Evidence of sludge or siltation:

Purging Information Summary*

Purging/sampling equipment, sampling technique and equipment calibration information:

Well purged (Y/N): Y Recharge Rate:

Volume Purged (L) (note multiple purging events if applicable): 10mL.

Parameter	Initial	Stabilized	Final	*Notes (if not stabilized)*
pH				
Conductivity (uS/cm)				
Turbidity (NTU)				
Temperature (degC)				

Visual/olfactory observations (incl. colour, odour, presence of free product/sheen/globules, siltation...): sand mixed with water.

Decontamination of sampling equipment

Type of decontamination fluid (s):

Number washes: Number rinses:

Other Relevant Comments: unable to sample, filled pipe with sand mixed with water, then well ran dry.

* Complete field notes including full suite of water quality indicator parameters VS time as per EPA low flow sampling procedures should be apended to this summary.

GOLDER PROJECT #1530908 PHASE 1000

ANNEX J: Monitoring Well Sampling Log (Complete All Fields)

Site Name: CAMS Landfill Name: Tier 2.

Monitoring Well ID: MW06.

Sample Number(s) include dups.:

Bottles filled (by parameter type): all

Date of Sampling Event: August 23 Time: 10:45

Weather: Same as previous

Names of Samplers: KR.

Description of Well Condition and Surrounding ground conditions (note ponding of water): dry.

Lock (condition, presence, model, manufacturer): crown working

Pre-Measured Data (From Water Well Record Log)

*Depth of well installation (cm)= Diameter of well (cm)=

*Depth to top of screen (cm)= Length screened section (cm)=

*note: *depths are from ground surface*

Field Measurements

Measurement method (interface probe, tape, etc):

Well pipe height above ground (cm) (to top of pipe)= 59cm

Static water level (cm) from top of pipe = 175

Static water level (cm) (below ground surface) calculated =

Measured well refusal depth (cm) (measure after sampling)= 225

Thickness of water column (cm)= Static volume of water in well (mL)=

Free product thickness (mm)= Evidence of sludge or siltation:

Purging Information Summary*

Purging/sampling equipment, sampling technique and equipment calibration information: peristaltic pump

Well purged (Y/N): Y Recharge Rate:

Volume Purged (L) (note multiple purging events if applicable): 40 mL for field measurement.

Parameter	Initial	Stabilized	Final	*Notes (if not stabilized)*
pH	7.42			
Conductivity (uS/cm)	0.549 mS/cm			
Turbidity (NTU)	0.0			
Temperature (degC)	6.44			

Visual/olfactory observations (incl. colour, odour, presence of free product/sheen/globules, siltation...): clear

Decontamination of sampling equipment

Type of decontamination fluid (s):

Number washes: Number rinses:

Other Relevant Comments:

* Complete field notes including full suite of water quality indicator parameters VS time as per EPA low flow sampling procedures should be apended to this summary.

GOLDER PROJECT #1530908 PHASE 1000

ANNEX J: Monitoring Well Sampling Log (Complete All Fields)

Site Name: Cams Landfill Name: Tier 2

Monitoring Well ID: MW07

Sample Number(s) include dups.: none

Bottles filled (by parameter type):

Date of Sampling Event: August 23 Time: 11:07

Weather: sunny

Names of Samplers: KR

Description of Well Condition and Surrounding ground conditions (note ponding of water): no ponded water, sand

Lock (condition, presence, model, manufacturer): crown. working.

Pre-Measured Data (From Water Well Record Log)

*Depth of well installation (cm)= Diameter of well (cm)=

*Depth to top of screen (cm)= Length screened section (cm)=

*note: *depths are from ground surface*

Field Measurements

Measurement method (interface probe, tape, etc):

Well pipe height above ground (cm) (to top of pipe)= 55cm Frozen.

Static water level (cm) from top of pipe =

Static water level (cm) (below ground surface) calculated =

Measured well refusal depth (cm) (measure after sampling)= 178

Thickness of water column (cm)= Static volume of water in well (mL)=

Free product thickness (mm)= Evidence of sludge or siltation:

Purging Information Summary*

Purging/sampling equipment, sampling technique and equipment calibration information:

Well purged (Y/N): Recharge Rate:

Volume Purged (L) (note multiple purging events if applicable):

Parameter	Initial	Stabilized	Final	*Notes (if not stabilized)*
pH				
Conductivity (uS/cm)				
Turbidity (NTU)				
Temperature (degC)				

Visual/olfactory observations (incl. colour, odour, presence of free product/sheen/globules, siltation...):

Decontamination of sampling equipment

Type of decontamination fluid (s):

Number washes: Number rinses:

Other Relevant Comments:

* Complete field notes including full suite of water quality indicator parameters VS time as per EPA low flow sampling procedures should be apended to this summary.

GOLDER PROJECT #1530908 PHASE 1000

ANNEX J: Monitoring Well Sampling Log (Complete All Fields)

Site Name: CAMS Landfill Name: Tier 2

Monitoring Well ID: MW08

Sample Number(s) include dups.:

Bottles filled (by parameter type): all + duplicate.

Date of Sampling Event: AUGUST 23 Time: 11:20

Weather:

Names of Samplers: K.R.

Description of Well Condition and Surrounding ground conditions (note ponding of water): Loose sand around site, dry at surface

Lock (condition, presence, model, manufacturer): none working.

Pre-Measured Data (From Water Well Record Log)

*Depth of well installation (cm)= Diameter of well (cm)=

*Depth to top of screen (cm)= Length screened section (cm)=

*note: *depths are from ground surface*

Field Measurements

Measurement method (interface probe, tape, etc): IP

Well pipe height above ground (cm) (to top of pipe)= 29cm

Static water level (cm) from top of pipe = 176

Static water level (cm) (below ground surface) calculated =

Measured well refusal depth (cm) (measure after sampling)= 244

Thickness of water column (cm)= Static volume of water in well (mL)=

Free product thickness (mm)= Evidence of sludge or siltation:

Purging Information Summary*

Purging/sampling equipment, sampling technique and equipment calibration information:

Well purged (Y/N): Y Recharge Rate:

Volume Purged (L) (note multiple purging events if applicable): 40mL

Parameter	Initial	Stabilized	Final	*Notes (if not stabilized)*
pH	7.54			
Conductivity (uS/cm)	0.529			
Turbidity (NTU)	248			
Temperature (degC)	6.57			

Visual/olfactory observations (incl. colour, odour, presence of free product/sheen/globules, siltation...): turbid, white milky.

Decontamination of sampling equipment

Type of decontamination fluid (s):

Number washes: Number rinses:

Other Relevant Comments:

* Complete field notes including full suite of water quality indicator parameters VS time as per EPA low flow sampling procedures should be apended to this summary.

GOLDER PROJECT #1530908 PHASE 1000

ANNEX J: Monitoring Well Sampling Log (Complete All Fields)

Site Name: CAMS Landfill Name: _____

Monitoring Well ID: MW12

Sample Number(s) include dups.: _____

Bottles filled (by parameter type): All

Date of Sampling Event: August 23 Time: 12:23

Weather: _____

Names of Samplers: KR.

Description of Well Condition and Surrounding ground conditions (note ponding of water): loose sand, dry at surface,

Lock (condition, presence, model, manufacturer): Crown working.

Pre-Measured Data (From Water Well Record Log)

*Depth of well installation (cm)= _____ Diameter of well (cm)= _____

*Depth to top of screen (cm)= _____ Length screened section (cm)= _____

*note: *depths are from ground surface*

Field Measurements

Measurement method (interface probe, tape, etc): _____

Well pipe height above ground (cm) (to top of pipe)= 30cm.

Static water level (cm) from top of pipe = 134

Static water level (cm) (below ground surface) calculated = _____

Measured well refusal depth (cm) (measure after sampling)= 165

Thickness of water column (cm)= _____ Static volume of water in well (mL)= _____

Free product thickness (mm)= _____ Evidence of sludge or siltation: _____

Purging Information Summary*

Purging/sampling equipment, sampling technique and equipment calibration information: Y

Well purged (Y/N): Y Recharge Rate: _____

Volume Purged (L) (note multiple purging events if applicable): 40mL.

Parameter	Initial	Stabilized	Final	*Notes (if not stabilized)*
pH	5.29			
Conductivity (uS/cm)	0.011mS/cm.			
Turbidity (NTU)	77.0			
Temperature (degC)	9.59.			

Visual/olfactory observations (incl. colour, odour, presence of free product/sheen/globules, siltation...): _____

Decontamination of sampling equipment

Type of decontamination fluid (s): _____

Number washes: _____ Number rinses: _____

Other Relevant Comments: _____

* Complete field notes including full suite of water quality indicator parameters VS time as per EPA low flow sampling procedures should be apended to this summary.

GOLDER PROJECT #1530908 PHASE 1000

ANNEX J: Monitoring Well Sampling Log (Complete All Fields)

Site Name: CAMS Landfill Name: ~~non hazard~~

Monitoring Well ID: MW1C

Sample Number(s) include dups.: All

Bottles filled (by parameter type):

Date of Sampling Event: AUGUST 23 Time: 1:00

Weather:

Names of Samplers: KR

Description of Well Condition and Surrounding ground conditions (note ponding of water): evidence of jacking. bottom of casing is visible, dry at surface.

Lock (condition, presence, model, manufacturer): crown, working.

Pre-Measured Data (From Water Well Record Log)

*Depth of well installation (cm)= Diameter of well (cm)=

*Depth to top of screen (cm)= Length screened section (cm)=

*note: *depths are from ground surface*

Field Measurements

Measurement method (interface probe, tape, etc):

Well pipe height above ground (cm) (to top of pipe)= 47

Static water level (cm) from top of pipe = 42

Static water level (cm) (below ground surface) calculated =

Measured well refusal depth (cm) (measure after sampling)= 260

Thickness of water column (cm)= Static volume of water in well (mL)=

Free product thickness (mm)= Evidence of sludge or siltation:

Purging Information Summary*

Purging/sampling equipment, sampling technique and equipment calibration information:

Well purged (Y/N): Y Recharge Rate:

Volume Purged (L) (note multiple purging events if applicable): field readings.

Parameter	Initial	Stabilized	Final	*Notes (if not stabilized)*
pH	7.94			
Conductivity (uS/cm)	0.020			
Turbidity (NTU)	96.3			
Temperature (degC)	8.29			

Visual/olfactory observations (incl. colour, odour, presence of free product/sheen/globules, siltation...): slightly turbid.

Decontamination of sampling equipment

Type of decontamination fluid (s):

Number washes: Number rinses:

Other Relevant Comments:

* Complete field notes including full suite of water quality indicator parameters VS time as per EPA low flow sampling procedures should be apended to this summary.

GOLDER PROJECT #1530908 PHASE 1000

ANNEX J: Monitoring Well Sampling Log (Complete All Fields)

Site Name: CAMS Landfill Name: _____

Monitoring Well ID: MW09

Sample Number(s) include dups.: ALL

Bottles filled (by parameter type): _____

Date of Sampling Event: AUGUST 23 Time: 1:30

Weather: _____

Names of Samplers: KR

Description of Well Condition and Surrounding ground conditions (note ponding of water): good condition, soil is dry. Water in casing is almost height of pipe.

Lock (condition, presence, model, manufacturer): ground working

Pre-Measured Data (From Water Well Record Log)

*Depth of well installation (cm)= _____ Diameter of well (cm)= _____

*Depth to top of screen (cm)= _____ Length screened section (cm)= _____

*note: *depths are from ground surface*

Field Measurements

Measurement method (interface probe, tape, etc): _____

Well pipe height above ground (cm) (to top of pipe)= 32cm (3cm of water)

Static water level (cm) from top of pipe = ~~150~~ 130

Static water level (cm) (below ground surface) calculated = _____

Measured well refusal depth (cm) (measure after sampling)= 203

Thickness of water column (cm)= _____ Static volume of water in well (mL)= _____

Free product thickness (mm)= _____ Evidence of sludge or siltation: _____

Purging Information Summary*

Purging/sampling equipment, sampling technique and equipment calibration information: _____

Well purged (Y/N): Y Recharge Rate: _____

Volume Purged (L) (note multiple purging events if applicable): 40mL for field measurement

Parameter	Initial	Stabilized	Final	*Notes (if not stabilized)*
pH	8.47			
Conductivity (uS/cm)	0.062			
Turbidity (NTU)	305			
Temperature (degC)	8.5			

Visual/olfactory observations (incl. colour, odour, presence of free product/sheen/globules, siltation...): _____

Decontamination of sampling equipment

Type of decontamination fluid (s): _____

Number washes: _____ Number rinses: _____

Other Relevant Comments: _____

* Complete field notes including full suite of water quality indicator parameters VS time as per EPA low flow sampling procedures should be apended to this summary.

APPENDIX C

Laboratory Certificates of Analysis and QA/QC Reports

AGAT Laboratories

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

CLIENT NAME: GOLDER ASSOCIATES LTD
1931 ROBERTSON ROAD
OTTAWA, ON K2H5B7
(613) 592-9600

ATTENTION TO: Nicole MacDonald

PROJECT: Dew Line - 1530908

AGAT WORK ORDER: 15Z013916

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

TRACE ORGANICS REVIEWED BY: Inga Kuzmina, Trace Organics Lab Manager

WATER ANALYSIS REVIEWED BY: Parvathi Malemath, Data Reviewer

DATE REPORTED: Nov 13, 2015

PAGES (INCLUDING COVER): 12

VERSION*: 2

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

*NOTES

VERSION 2:Nov 13, 2015

The RDL for zinc has been revised to comply with the required regulatory standards.

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

Member of: Association of Professional Engineers and Geoscientists of Alberta (APEGA)
Western Enviro-Agricultural Laboratory Association (WEALA)
Environmental Services Association of Alberta (ESAA)

AGAT Laboratories is accredited to ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA) and/or Standards Council of Canada (SCC) for specific tests listed on the scope of accreditation. AGAT Laboratories (Mississauga) is also accredited by the Canadian Association for Laboratory Accreditation Inc. (CALA) for specific drinking water tests. Accreditations are location and parameter specific. A complete listing of parameters for each location is available from www.cala.ca and/or www.scc.ca. The tests in this report may not necessarily be included in the scope of accreditation.

Results relate only to the items tested and to all the items tested
All reportable information as specified by ISO 17025:2005 is available from AGAT Laboratories upon request

AGAT Laboratories

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http://www.agatlabs.com

Certificate of Analysis

AGAT WORK ORDER: 15Z013916

PROJECT: Dew Line - 1530908

CLIENT NAME: GOLDER ASSOCIATES LTD

ATTENTION TO: Nicole MacDonald

SAMPLING SITE:FOX-2, CAM-5

SAMPLED BY:

Metals Scan (Soil) (incl. Hg)

DATE RECEIVED: 2015-09-01

DATE REPORTED: 2015-11-13

		SAMPLE DESCRIPTION:		MW-11 (40-50)	C5-6 (0-15)	MW12 (40-50)	MW07 (40-50)
		SAMPLE TYPE:		Soil	Soil	Soil	Soil
		DATE SAMPLED:		8/22/2015	8/23/2015	8/23/2015	8/23/2015
Parameter	Unit	G / S	RDL	6926370	6926380	6926385	6926388
Arsenic	µg/g		1	58	2	<1	<1
Cadmium	µg/g		0.5	<0.5	<0.5	<0.5	<0.5
Cobalt	µg/g		0.5	9.7	9.3	4.4	5.0
Chromium	µg/g		2	48	30	14	11
Copper	µg/g		1	64	37	14	14
Lead	µg/g		1	12	11	9	5
Mercury	µg/g		0.10	<0.10	<0.10	<0.10	<0.10
Nickel	µg/g		1	41	17	7	8
Zinc	µg/g		2	73	53	27	29

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

6926370-6926388 Nov 13, 2015

The RDL for zinc has been revised to comply with the required regulatory standards.

Certified By:

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

AGAT Laboratories

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Certificate of Analysis

AGAT WORK ORDER: 15Z013916

PROJECT: Dew Line - 1530908

CLIENT NAME: GOLDER ASSOCIATES LTD

ATTENTION TO: Nicole MacDonald

SAMPLING SITE:FOX-2, CAM-5

SAMPLED BY:

O. Reg. 153 - Petroleum Hydrocarbon F1 - F4 (-BTEX) - Water

DATE RECEIVED: 2015-09-01

DATE REPORTED: 2015-11-13

		SAMPLE DESCRIPTION:		MW08	MW14	Field Blank	Trip Blank
		SAMPLE TYPE:		Water	Water	Water	Water
		DATE SAMPLED:		8/23/2015	8/22/2015	8/23/2015	8/22/2015
Parameter	Unit	G / S	RDL	6926392	6927006	6927024	6927036
C6 - C10 (F1)	µg/L		25	<25	<25	<25	<25
C6 - C10 (F1 minus BTEX)	µg/L		25	<25	<25	<25	<25
C>10 - C16 (F2)	µg/L		100	<100	<100	<100	<100
C>16 - C34 (F3)	µg/L		100	<100	<100	<100	<100
C>34 - C50 (F4)	µg/L		100	<100	<100	<100	<100
Gravimetric Heavy Hydrocarbons	µg/L		500	NA	NA	NA	NA

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

6926392-6927036 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.
Total C6-C50 results are corrected for BTEX and PAH 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 without the contribution of PAHs. Under Ontario Regulation 153/04, results are considered valid without determining the PAH contribution if not requested by the client.

Certified By:

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

AGAT Laboratories

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Certificate of Analysis

AGAT WORK ORDER: 15Z013916

PROJECT: Dew Line - 1530908

CLIENT NAME: GOLDER ASSOCIATES LTD

ATTENTION TO: Nicole MacDonald

SAMPLING SITE:FOX-2, CAM-5

SAMPLED BY:

O. Reg. 153 - Petroleum Hydrocarbons F1 - F4 (C6 - C50) (-BTEX) - Soil

DATE RECEIVED: 2015-09-01

DATE REPORTED: 2015-11-13

		SAMPLE DESCRIPTION:		MW-11 (40-50)	C5-6 (0-15)	MW12 (40-50)	MW07 (40-50)
		SAMPLE TYPE:		Soil	Soil	Soil	Soil
		DATE SAMPLED:		8/22/2015	8/23/2015	8/23/2015	8/23/2015
Parameter	Unit	G / S	RDL	6926370	6926380	6926385	6926388
C6 - C10 (F1)	µg/g		5	<5	<5	<5	<5
C6 - C10 (F1 minus BTEX)	µg/g		5	<5	<5	<5	<5
C>10 - C16 (F2)	µg/g		4	<4	<4	<4	<4
C>16 - C34 (F3)	µg/g		8	34	44	<8	<8
C>34 - C50 (F4)	µg/g		6	9	20	<6	<6
Gravimetric Heavy Hydrocarbons	µg/g		50	NA	NA	NA	NA
Moisture Content	%		0.1	13.1	5.4	8.7	9.9

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

6926370-6926388 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 without the contribution of PAHs. Under Ontario Regulation 153/04, results are considered valid without determining the PAH contribution if not requested by the client.

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: 15Z013916

PROJECT: Dew Line - 1530908

CLIENT NAME: GOLDER ASSOCIATES LTD

ATTENTION TO: Nicole MacDonald

SAMPLING SITE:FOX-2, CAM-5

SAMPLED BY:

PCBs (Aroclors) - Soil

DATE RECEIVED: 2015-09-01

DATE REPORTED: 2015-11-13

		SAMPLE DESCRIPTION:		MW-11 (40-50)	C5-6 (0-15)	MW12 (40-50)	MW07 (40-50)
		SAMPLE TYPE:		Soil	Soil	Soil	Soil
		DATE SAMPLED:		8/22/2015	8/23/2015	8/23/2015	8/23/2015
Parameter	**Unit**	**G / S**	**RDL**	**6926370**	**6926380**	**6926385**	**6926388**
Aroclor 1242	µg/g		0.05	<0.05	<0.05	<0.05	<0.05
Aroclor 1248	µg/g		0.05	<0.05	<0.05	0.052	<0.05
Aroclor 1254	µg/g		0.05	<0.05	<0.05	<0.05	<0.05
Aroclor 1260	µg/g		0.05	<0.05	<0.05	<0.05	<0.05
PCBs	µg/g		0.05	<0.05	<0.05	0.052	<0.05
Surrogate	**Unit**	**Acceptable Limits**					
Decachlorobiphenyl	%	60-130		108	64	120	120

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

6926370-6926388 Results are based on the dry weight of soil extracted.

Certified By:

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

AGAT Laboratories

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Certificate of Analysis

AGAT WORK ORDER: 15Z013916

PROJECT: Dew Line - 1530908

CLIENT NAME: GOLDER ASSOCIATES LTD

ATTENTION TO: Nicole MacDonald

SAMPLING SITE:FOX-2, CAM-5

SAMPLED BY:

PCBs (water) (Aroclors)

DATE RECEIVED: 2015-09-01

DATE REPORTED: 2015-11-13

		SAMPLE DESCRIPTION:		MW08	MW14	Field Blank	Trip Blank
		SAMPLE TYPE:		Water	Water	Water	Water
		DATE SAMPLED:		8/23/2015	8/22/2015	8/23/2015	8/22/2015
Parameter	**Unit**	**G / S**	**RDL**	**6926392**	**6927006**	**6927024**	**6927036**
Aroclor 1242	µg/L		0.05	<0.05	<0.05	<0.05	<0.05
Aroclor 1248	µg/L		0.05	<0.05	<0.05	<0.05	<0.05
Aroclor 1254	µg/L		0.05	<0.05	<0.05	<0.05	<0.05
Aroclor 1260	µg/L		0.05	<0.05	<0.05	<0.05	<0.05
PCBs	µg/L		0.05	<0.05	<0.05	<0.05	<0.05
Surrogate	**Unit**	**Acceptable Limits**					
Decachlorobiphenyl	%	60-130		120	123	115	101

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

Certificate of Analysis

AGAT WORK ORDER: 15Z013916

PROJECT: Dew Line - 1530908

CLIENT NAME: GOLDER ASSOCIATES LTD

ATTENTION TO: Nicole MacDonald

SAMPLING SITE:FOX-2, CAM-5

SAMPLED BY:

Metals - CCME Metals - (Water) - mg/L (incl. Hg)

DATE RECEIVED: 2015-09-01

DATE REPORTED: 2015-11-13

		SAMPLE DESCRIPTION:		MW08	MW14	Field Blank	Trip Blank
		SAMPLE TYPE:		Water	Water	Water	Water
		DATE SAMPLED:		8/23/2015	8/22/2015	8/23/2015	8/22/2015
Parameter	Unit	G / S	RDL	6926392	6927006	6927024	6927036
Arsenic	mg/L		0.001	0.001	<0.001	<0.001	<0.001
Cadmium	mg/L		0.00002	0.00004	0.00021	<0.00002	<0.00002
Chromium	mg/L		0.002	0.007	<0.002	<0.002	<0.002
Cobalt	mg/L		0.001	0.001	0.017	<0.001	<0.001
Copper	mg/L		0.002	0.024	0.027	<0.002	<0.002
Lead	mg/L		0.001	0.004	<0.001	<0.001	<0.001
Mercury	mg/L		0.000016	<0.000016	<0.000016	<0.000016	<0.000016
Nickel	mg/L		0.003	0.007	0.059	<0.003	<0.003
Zinc	mg/L		0.005	0.009	0.056	<0.005	<0.005

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

Certified By:

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Quality Assurance

CLIENT NAME: GOLDER ASSOCIATES LTD

AGAT WORK ORDER: 15Z013916

PROJECT: Dew Line - 1530908

ATTENTION TO: Nicole MacDonald

SAMPLING SITE:FOX-2, CAM-5

SAMPLED BY:

Soil Analysis

RPT Date: Nov 13, 2015			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
Metals Scan (Soil) (incl. Hg)															
Arsenic	6927072		2	2	0.0%	< 1	106%	70%	130%	89%	80%	120%	98%	70%	130%
Cadmium	6927072		<0.5	<0.5	0.0%	< 0.5	101%	70%	130%	103%	80%	120%	97%	70%	130%
Cobalt	6927072		4.5	4.4	2.2%	< 0.5	92%	70%	130%	99%	80%	120%	95%	70%	130%
Chromium	6927072		16	15	6.5%	< 2	93%	70%	130%	107%	80%	120%	99%	70%	130%
Copper	6927072		9	9	0.0%	< 1	89%	70%	130%	106%	80%	120%	95%	70%	130%
Lead	6927072		4	4	0.0%	< 1	98%	70%	130%	102%	80%	120%	92%	70%	130%
Mercury	6927072		<0.10	<0.10	0.0%	< 0.10	96%	70%	130%	82%	80%	120%	73%	70%	130%
Nickel	6927072		8	8	0.0%	< 1	91%	70%	130%	99%	80%	120%	92%	70%	130%
Zinc	6927072		21	20	4.9%	< 2	96%	70%	130%	104%	80%	120%	96%	70%	130%

Certified By:

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http://www.agatlabs.com

Quality Assurance

CLIENT NAME: GOLDER ASSOCIATES LTD

AGAT WORK ORDER: 15Z013916

PROJECT: Dew Line - 1530908

ATTENTION TO: Nicole MacDonald

SAMPLING SITE:FOX-2, CAM-5

SAMPLED BY:

Trace Organics Analysis

RPT Date: Nov 13, 2015			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
O. Reg. 153 - Petroleum Hydrocarbons F1 - F4 (C6 - C50) (-BTEX) - Soil															
C6 - C10 (F1)	6917453		< 5	< 5	0.0%	< 5	111%	70%	130%	103%	70%	130%	73%	70%	130%
C>10 - C16 (F2)	6928098		< 4	< 4	0.0%	< 4	98%	70%	130%	110%	70%	130%	88%	70%	130%
C>16 - C34 (F3)	6928098		< 8	< 8	0.0%	< 8	96%	70%	130%	112%	70%	130%	91%	70%	130%
C>34 - C50 (F4)	6928098		< 6	< 6	0.0%	< 6	83%	70%	130%	96%	70%	130%	84%	70%	130%
PCBs (Aroclors) - Soil															
Aroclor 1242	6929917		< 0.05	< 0.05	0.0%	< 0.05	NA	60%	130%	NA	60%	130%	NA	60%	130%
Aroclor 1248	6929917		< 0.05	< 0.05	0.0%	< 0.05	NA	60%	130%	NA	60%	130%	NA	60%	130%
Aroclor 1254	6929917		< 0.05	< 0.05	0.0%	< 0.05	NA	60%	130%	NA	60%	130%	NA	60%	130%
Aroclor 1260	6929917		< 0.05	< 0.05	0.0%	< 0.05	NA	60%	130%	NA	60%	130%	NA	60%	130%
PCBs	6929917		< 0.05	< 0.05	0.0%	< 0.05	83%	60%	140%	109%	60%	140%	110%	60%	140%
O. Reg. 153 - Petroleum Hydrocarbon F1 - F4 (-BTEX) - Water															
C6 - C10 (F1)	6924498		< 25	< 25	0.0%	< 25	76%	60%	130%	87%	60%	130%	84%	60%	130%
C>10 - C16 (F2)		TW	< 100	< 100	0.0%	< 100	75%	70%	130%	85%	70%	130%	76%	70%	130%
C>16 - C34 (F3)		TW	< 100	< 100	0.0%	< 100	98%	70%	130%	82%	70%	130%	98%	70%	130%
C>34 - C50 (F4)		TW	< 100	< 100	0.0%	< 100	98%	70%	130%	70%	70%	130%	85%	70%	130%

Comments: TW:Tap water analysis has been performed as QC sample testing for duplicate and matrix spike due to insufficient sample volume.

PCBs (water) (Aroclors)															
Aroclor 1242		TW	< 0.05	< 0.05	0.0%	< 0.05	NA	60%	130%	NA	60%	130%	NA	60%	130%
Aroclor 1248		TW	< 0.05	< 0.05	0.0%	< 0.05	NA	60%	130%	NA	60%	130%	NA	60%	130%
Aroclor 1254		TW	< 0.05	< 0.05	0.0%	< 0.05	NA	60%	130%	NA	60%	130%	NA	60%	130%
Aroclor 1260		TW	< 0.05	< 0.05	0.0%	< 0.05	NA	60%	130%	NA	60%	130%	NA	60%	130%
PCBs		TW	< 0.05	< 0.05	0.0%	< 0.05	89%	60%	140%	111%	60%	140%	109%	60%	140%

Comments: TW:Tap water analysis has been performed as QC sample testing for duplicate and matrix spike due to insufficient sample volume.

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CANADA L4Z 1Y2
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http://www.agatlabs.com

Quality Assurance

CLIENT NAME: GOLDER ASSOCIATES LTD

AGAT WORK ORDER: 15Z013916

PROJECT: Dew Line - 1530908

ATTENTION TO: Nicole MacDonald

SAMPLING SITE:FOX-2, CAM-5

SAMPLED BY:

Water Analysis

RPT Date: Nov 13, 2015			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
Metals - CCME Metals - (Water) - mg/L (incl. Hg)															
Arsenic	6925209		0.012	0.012	0.0%	< 0.001	105%	90%	110%	100%	90%	110%	106%	70%	130%
Cadmium	6925209		<0.00002	<0.00002	0.0%	< 0.00002	103%	90%	110%	104%	90%	110%	119%	70%	130%
Chromium	6925209		0.005	0.005	0.0%	< 0.002	108%	90%	110%	105%	90%	110%	94%	70%	130%
Cobalt	6925209		<0.001	<0.001	0.0%	< 0.001	105%	90%	110%	103%	90%	110%	104%	70%	130%
Copper	6925209		<0.002	<0.002	0.0%	< 0.002	109%	90%	110%	104%	90%	110%	105%	70%	130%
Lead	6925209		<0.001	<0.001	0.0%	< 0.001	103%	90%	110%	105%	90%	110%	96%	70%	130%
Mercury	6927416		<0.	<0.	0.0%	< 0.000016	106%	90%	110%	104%	90%	110%	102%	80%	120%
Nickel	6925209		0.006	0.006	0.0%	< 0.003	110%	90%	110%	105%	90%	110%	104%	70%	130%
Zinc	6925209		<0.005	<0.005	0.0%	< 0.005	101%	90%	110%	103%	90%	110%	105%	70%	130%

Comments: .

Certified By:

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MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
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http://www.agatlabs.com

Method Summary

CLIENT NAME: GOLDER ASSOCIATES LTD

AGAT WORK ORDER: 15Z013916

PROJECT: Dew Line - 1530908

ATTENTION TO: Nicole MacDonald

SAMPLING SITE:FOX-2, CAM-5

SAMPLED BY:

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			
C6 - C10 (F1)	VOL-91-5010	MOE PHC E3421	(P&T)GC/FID
C6 - C10 (F1 minus BTEX)	VOL-91-5010	MOE PHC E3421	(P&T)GC/FID
C>10 - C16 (F2)	VOL-91-5010	MOE PHC E3421	GC / FID
C>16 - C34 (F3)	VOL-91-5010	MOE PHC E3421	GC / FID
C>34 - C50 (F4)	VOL-91-5010	MOE PHC E3421	GC / FID
Gravimetric Heavy Hydrocarbons	VOL-91-5010	MOE PHC E3421	BALANCE
C6 - C10 (F1)	VOL-91-5009	CCME Tier 1 Method, SW846 5035	P &T GC / FID
C6 - C10 (F1 minus BTEX)	VOL-91-5009	CCME Tier 1 Method, SW846 5035	P & T GC / FID
C>10 - C16 (F2)	VOL-91-5009	CCME Tier 1 Method	GC / FID
C>16 - C34 (F3)	VOL-91-5009	CCME Tier 1 Method	GC / FID
C>34 - C50 (F4)	VOL-91-5009	CCME Tier 1 Method	GC / FID
Gravimetric Heavy Hydrocarbons	VOL-91-5009	CCME Tier 1 Method	GRAVIMETRIC ANALYSIS
Moisture Content	VOL-91-5009	CCME Tier 1 Method, SW846 5035,8015	GC / FID
Aroclor 1242	ORG-91-5113	EPA SW-846 3541 & 8082	GC/ECD
Aroclor 1248	ORG-91-5113	EPA SW-846 3541 & 8082	GC/ECD
Aroclor 1254	ORG-91-5113	EPA SW-846 3541 & 8082	GC/ECD
Aroclor 1260	ORG-91-5113	EPA SW-846 3541 & 8082	GC/ECD
PCBs	ORG-91-5113	EPA SW-846 3541 & 8082	GC/ECD
Decachlorobiphenyl	ORG-91-5113	EPA SW-846 3541 & 8082	GC/ECD
Aroclor 1242	ORG-91-5112	EPA SW-846 3510 & 8082	GC/ECD
Aroclor 1248	ORG-91-5112	EPA SW-846 3510 & 8082	GC/ECD
Aroclor 1254	ORG-91-5112	EPA SW-846 3510 & 8082	GC/ECD
Aroclor 1260	ORG-91-5112	EPA SW-846 3510 & 8082	GC/ECD
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

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

AGAT Laboratories
5835 Coopers Avenue
Mississauga, Ontario L4Z 1Y2
Ph: 905.712.5100 Fax: 905.712.5122
www.agatlabs.com webearth.agatlabs.com

Chain of Custody Record

If this is a Drinking Water sample, please use Drinking Water Chain of Custody Form (potable water intended for human consumption)

Laboratory Use Only
Work Order #: 1520139 16
Cooler Quantity: 1
Arrival Temperatures: 4 | 5 | 5 / 4.2 | 3.8 | 4.9
Custody Seal Intact: ☐ Yes ☐ No ☑ N/A
Notes:

Report Information:
Company: Golder Associates Ltd.
Contact: Nicole MacDonald
Address: 1931 Robertson Rd, Ottawa
Phone: 613 592 9600 Fax: 613 592 9601
Reports to be sent to:
1. Email: nicole_macdonald@golder.com
2. Email: damin_johnson@golder.com

Regulatory Requirements: ☐ No Regulatory Requirement
(Please check all applicable boxes)
☐ Regulation 153/04 — Table ____ (Indicate One) ☐ Ind/Com ☐ Res/Park ☐ Agriculture — Soil Texture (Check One) ☐ Coarse ☐ Fine
☐ Sewer Use ☐ Sanitary ☐ Storm — Region ____ (Indicate One)
☐ Regulation 558 ☑ CCME ☐ Prov. Water Quality Objectives (PWQO) ☐ Other ____ (Indicate One)

Turnaround Time (TAT) Required:
Regular TAT ☑ 5 to 7 Business Days
Rush TAT (Rush Surcharges Apply)
☐ 3 Business Days ☐ 2 Business Days ☐ 1 Business Day
OR Date Required (Rush Surcharges May Apply): ____
Please provide prior notification for rush TAT
**TAT is exclusive of weekends and statutory holidays*

Project Information:
Project: DEW Line – 1530908
Site Location: FOX-2, CAM-5
Sampled By: KR
AGAT Quote #: 69566
Please note: If quotation number is not provided, client will be billed full price for analysis.

Is this submission for a **Record of Site Condition?** ☐ Yes ☑ No

Report Guideline on Certificate of Analysis ☑ Yes ☐ No

Invoice Information: Bill To Same: Yes ☑ No ☐
Company: Don Plenderleith
Contact:
Address:
Email: dplenderleith@golder.com

Sample Matrix Legend
B Biota
GW Ground Water
O Oil
P Paint
S Soil
SD Sediment
SW Surface Water

Sample Identification	Date Sampled	Time Sampled	# of Containers	Sample Matrix	Comments/ Special Instructions	Metals and Inorganics	Metal Scan	Hydride Forming Metals	Client Custom Metals	ORPs: ☐ B-HWS ☐ Cl ☐ CN ☐ Cr^{6+} ☐ EC ☐ FOC ☐ NO_3/NO_2 ☐ Total N ☐ Hg ☐ pH ☐ SAR	Nutrients: ☐ TP ☐ NH_3 ☐ TKN ☐ NO_3 ☐ NO_2 ☐ NO_3/NO_2	Volatiles: ☐ VOC ☐ BTEX ☐ THM	CCME Fractions 1 to 4	ABNs	PAHs	Chlorophenols	PCBs	Organochlorine Pesticides	TCLP Metals/Inorganics	Sewer Use	Quote 69566
MW11 (40-50)	Aug 22/15	11:45	3	S																X
CS-6 (0-15)	Aug 23/15	—	3	S																X
MW12 (40-50)	Aug 23/15	12:26	3	S																X
MW07 (40-50)	Aug 23/15	11:07	3	S																X
MW08	Aug 23/15	11:20	6	GW																X
MW14	Aug 22/15	12:50	7	GW																X
Field Blank	Aug 23/15	12:01	7	GW																X
Trip Blank	—	—	7	W																X

Samples Relinquished By (Print Name and Sign): Nicole MacDonald — Date: Aug 31/15 — Time: 17:45
Samples Received By (Print Name and Sign): L Berthelet — Date: 09-01-15 — Time: 8h00
Samples Relinquished By (Print Name and Sign): — Date: — Time:
Samples Received By (Print Name and Sign): Shazma Sept 2/15 — Date: 10:00 — Time:

Page 1 of 1
N°: T000651

Pink Copy - Client | Yellow Copy - AGAT | White Copy - AGAT

Document ID: DW 78-1511-0111

AGAT Laboratories

5835 Coopers Avenue
Mississauga, Ontario L4Z 1Y2
Ph: 905.712.5100 Fax: 905.712.5122
www.agatlabs.com webearth.agatlabs.com

Chain of Custody Record

If this is a Drinking Water sample, please use Drinking Water Chain of Custody Form (potable water intended for human consumption)

Report Information:

Company: Golder Associates Ltd.
Contact: Nicole MacDonald
Address: 1931 Robertson Rd, Ottawa
Phone: 613 592 9600 Fax: 613 592 9601
Reports to be sent to:
1. Email: nicole_macdonald@golder.com
2. Email: damin_johnson@golder.com

Project Information:

Project: DEW Line – 1530908
Site Location: FOX-2, CAM-5
Sampled By: KR
AGAT Quote #: 69566
Please note: If quotation number is not provided, client will be billed full price for analysis.

Invoice Information:

Bill To Same: Yes ☑ No ☐
Company: Don Plenderleith
Contact:
Address:
Email: dplenderleith@golder.com

Regulatory Requirements:

☐ No Regulatory Requirement
(Please check all applicable boxes)

☐ Regulation 153/04
Table ____ *Indicate One*
☐ Ind/Com
☐ Res/Park
☐ Agriculture
Soil Texture *(Check One)*
☐ Coarse
☐ Fine

☐ Sewer Use
☐ Sanitary
☐ Storm
Region ____ *Indicate One*

☐ Regulation 558
☑ CCME
☐ Prov. Water Quality Objectives (PWQO)
☐ Other ____ *Indicate One*

Is this submission for a **Record of Site Condition?** ☐ Yes ☑ No

Report Guideline on Certificate of Analysis ☑ Yes ☐ No

Laboratory Use Only

Work Order #:
Cooler Quantity:
Arrival Temperatures:
Custody Seal Intact: ☐ Yes ☐ No ☐ N/A
Notes:

Turnaround Time (TAT) Required:

Regular TAT ☑ 5 to 7 Business Days
Rush TAT (Rush Surcharges Apply)
☐ 3 Business Days ☐ 2 Business Days ☐ 1 Business Day
OR Date Required (Rush Surcharges May Apply):
Please provide prior notification for rush TAT
**TAT is exclusive of weekends and statutory holidays*

Sample Matrix Legend

B	Biota
GW	Ground Water
O	Oil
P	Paint
S	Soil
SD	Sediment
SW	Surface Water

Sample Identification	Date Sampled	Time Sampled	# of Containers	Sample Matrix	Comments/ Special Instructions	Metals and Inorganics	Metal Scan	Hydride Forming Metals	Client Custom Metals	ORPs: ☐ B-HWS ☐ Cl ☐ CN ☐ Cr^{6+} ☐ EC ☐ FOC ☐ NO_3/NO_2 ☐ Total N ☐ Hg ☐ pH ☐ SAR	Nutrients: ☐ TP ☐ NH_3 ☐ TKN ☐ NO_2 ☐ NO_3/NO_2	Volatiles: ☐ VOC ☐ BTEX ☐ THM	CCME Fractions 1 to 4	ABNs	PAHs	Chlorophenols	PCBs	Organochlorine Pesticides	TCLP Metals/Inorganics	Sewer Use	Quote 69566
MW11 (40-50)	Aug 22/15	11:45	3	S																X
C5-6 (0-15)	Aug 23/15	—	3	S																X
MW12 (40-50)	Aug 23/15	12:26	3	S																X
MW07 (40-50)	Aug 23/15	11:07	3	S																X
MW08	Aug 23/15	11:20	6	GW																X
MW14	Aug 22/15	12:50	7	GW																X
Field Blank	Aug 23/15	12:01	7	GW																Y
Trip Blank	—	—	7	W																X

Samples Relinquished By (Print Name and Sign):	Date	Time	Samples Received By (Print Name and Sign):	Date	Time
Nicole MacDonald	Aug 31/15	17:45			
Samples Relinquished By (Print Name and Sign):	Date	Time	Samples Received By (Print Name and Sign):	Date	Time

Page 1 of 1
N°: T000651

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Certificate of Analysis

Golder Associates Ltd. (Ottawa)

1931 Robertson Rd.
Ottawa, ON K2H 5B7
Attn: Nicole MacDonald

Client PO:
Project: 1530908
Custody: 98032/33

Report Date: 28-Sep-2015
Order Date: 28-Aug-2015

Revised Repo **Order #: 1536016**

This Certificate of Analysis contains analytical data applicable to the following samples as submitted:

Paracel ID	Client ID
1536016-09	MW06
1536016-10	MW08
1536016-11	MW12
1536016-12	MW11
1536016-13	MW09
1536016-14	Trip Blank

Approved By: Mark Foto

Mark Foto, M.Sc.
Lab Supervisor

Any use of these results implies your agreement that our total liabilty in connection with this work, however arising, shall be limited to the amount paid by you for this work, and that our employees or agents shall not under any circumstances be liable to you in connection with this work.

Certificate of Analysis

Report Date: 28-Sep-2015

Client: **Golder Associates Ltd. (Ottawa)**

Order Date:28-Aug-2015

Client PO:

Project Description: 1530908

Analysis Summary Table

Analysis	Method Reference/Description	Extraction Date	Analysis Date
Mercury by CVAA	EPA 245.1 - Cold Vapour AA	2-Sep-15	2-Sep-15
Metals, ICP-MS	EPA 200.8 - ICP-MS	1-Sep-15	1-Sep-15
PCBs, total	EPA 608 - GC-ECD	2-Sep-15	3-Sep-15
PHC F1	CWS Tier 1 - P&T GC-FID	1-Sep-15	3-Sep-15
PHC F2 - F4	CWS Tier 1 - GC-FID, extraction	2-Sep-15	2-Sep-15

Certificate of Analysis

Report Date: 28-Sep-2015

Client: **Golder Associates Ltd. (Ottawa)**

Order Date:28-Aug-2015

Client PO:

Project Description: 1530908

	Client ID:	MW06	MW08	MW12	MW11
	Sample Date:	23-Aug-15	23-Aug-15	23-Aug-15	23-Aug-15
	Sample ID:	1536016-09	1536016-10	1536016-11	1536016-12
	MDL/Units	Water	Water	Water	Water
Metals					
Mercury	0.1 ug/L	<0.1	<0.1	<0.1	<0.1
Arsenic	1 ug/L	<5 [4]	<5 [4]	<1	<1
Cadmium	0.1 ug/L	<0.5 [4]	<0.5 [4]	<0.1	<0.1
Chromium	1 ug/L	20	6	1	<1
Cobalt	0.5 ug/L	2.8	<2.5 [4]	<0.5	<0.5
Copper	0.5 ug/L	19.3	28.0	3.7	5.7
Lead	0.1 ug/L	0.6	4.5	0.3	0.4
Nickel	1 ug/L	18	8	<1	<1
Zinc	5 ug/L	<25 [4]	<25 [4]	<5	19
Hydrocarbons					
F1 PHCs (C6-C10)	25 ug/L	<25 [1]	<25 [1]	<25 [1]	<25 [1]
F2 PHCs (C10-C16)	100 ug/L	<100 [3]	<100 [3]	<100 [3]	<100 [3]
F3 PHCs (C16-C34)	100 ug/L	<100 [3]	<100 [3]	<100 [3]	<100 [3]
F4 PHCs (C34-C50)	100 ug/L	<100 [3]	<100 [3]	<100 [3]	<100 [3]
PCBs					
PCBs, total	0.05 ug/L	<0.05	<0.05	<0.05	<0.05
Decachlorobiphenyl	Surrogate	108%	102%	84.9%	87.5%

Certificate of Analysis

Report Date: 28-Sep-2015

Client: **Golder Associates Ltd. (Ottawa)**

Order Date:28-Aug-2015

Client PO:

Project Description: 1530908

	Client ID:	MW09	Trip Blank	-	-
	Sample Date:	23-Aug-15	24-Jul-15	-	-
	Sample ID:	1536016-13	1536016-14	-	-
	MDL/Units	Water	Water	-	-
Metals					
Mercury	0.1 ug/L	<0.1	<0.1 [2]	-	-
Arsenic	1 ug/L	<1	<1	-	-
Cadmium	0.1 ug/L	0.1	<0.1	-	-
Chromium	1 ug/L	2	<1	-	-
Cobalt	0.5 ug/L	18.8	<0.5	-	-
Copper	0.5 ug/L	10.2	<0.5	-	-
Lead	0.1 ug/L	0.8	<0.1	-	-
Nickel	1 ug/L	75	<1	-	-
Zinc	5 ug/L	31	<5	-	-
Hydrocarbons					
F1 PHCs (C6-C10)	25 ug/L	<25 [1]	<25 [1]	-	-
F2 PHCs (C10-C16)	100 ug/L	<100 [3]	<100 [3]	-	-
F3 PHCs (C16-C34)	100 ug/L	<100 [3]	<100 [3]	-	-
F4 PHCs (C34-C50)	100 ug/L	<100 [3]	<100 [3]	-	-
PCBs					
PCBs, total	0.05 ug/L	<0.05	<0.05 [1]	-	-
Decachlorobiphenyl	Surrogate	83.9%	82.4% [1]	-	-

Method Quality Control: Blank

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F1 PHCs (C6-C10)	ND	25	ug/L						
F2 PHCs (C10-C16)	ND	100	ug/L						
F3 PHCs (C16-C34)	ND	100	ug/L						
F4 PHCs (C34-C50)	ND	100	ug/L						
Metals									
Mercury	ND	0.1	ug/L						
Arsenic	ND	1	ug/L						
Cadmium	ND	0.1	ug/L						
Chromium	ND	1	ug/L						
Cobalt	ND	0.5	ug/L						
Copper	ND	0.5	ug/L						
Lead	ND	0.1	ug/L						
Nickel	ND	1	ug/L						
Zinc	ND	5	ug/L						
PCBs									
PCBs, total	ND	0.05	ug/L						
Surrogate: Decachlorobiphenyl	*0.277*		*ug/L*		*111*	*60-140*			

Method Quality Control: Duplicate

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F1 PHCs (C6-C10)	ND	25	ug/L	ND				30	
Metals									
Mercury	ND	0.1	ug/L	ND				20	
Arsenic	ND	1	ug/L	ND			0.0	20	
Cadmium	ND	0.1	ug/L	ND			0.0	20	
Chromium	ND	1	ug/L	ND			0.0	20	
Cobalt	ND	0.5	ug/L	ND			0.0	20	
Copper	ND	0.5	ug/L	ND			0.0	20	
Lead	ND	0.1	ug/L	ND			0.0	20	
Nickel	ND	1	ug/L	ND			0.0	20	
Zinc	ND	5	ug/L	ND			0.0	20	

Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F1 PHCs (C6-C10)	2020	25	ug/L	ND	101	68-117			
F2 PHCs (C10-C16)	1530	100	ug/L	ND	85.1	60-140			
F3 PHCs (C16-C34)	3200	100	ug/L	ND	86.0	60-140			
F4 PHCs (C34-C50)	1920	100	ug/L	ND	77.6	60-140			
Metals									
Mercury	3.06	0.1	ug/L	ND	102	78-137			
Arsenic	49.7		ug/L	ND	99.6	80-120			
Cadmium	49.3		ug/L	ND	98.6	80-120			
Chromium	47.7		ug/L	0.03	95.3	80-120			
Cobalt	47.4		ug/L	ND	94.7	80-120			
Copper	47.4		ug/L	ND	94.9	80-120			
Lead	45.6		ug/L	ND	91.9	80-120			
Nickel	47.3		ug/L	ND	94.6	80-120			
Zinc	52		ug/L	0.2	103	80-120			
PCBs									
PCBs, total	1.35	0.05	ug/L	ND	135	60-140			
Surrogate: Decachlorobiphenyl	*0.294*		*ug/L*		*118*	*60-140*			

Qualifier Notes:

Login Qualifiers :

Sample - Not preserved - metals and mercury not preserved, preserved in house
Applies to samples: MW06, MW08, MW12, MW11, MW09, Trip

Sample Qualifiers :

1 : Holding time had been exceeded upon sample receipt.

2 : This analysis was conducted after the accepted holding time had been exceeded.

3 : Holding time had been exceeded upon sample receipt at the laboratory

4 : Sediment and/or particulates in this liquid sample required digestion for Total metals analysis, which resulted in elevated detection limits.

Sample Data Revisions

None

Work Order Revisions / Comments:

Revision 1 - this report includes an updated client Sample list.

Other Report Notes:

n/a: not applicable
ND: Not Detected
MDL: Method Detection Limit
Source Result: Data used as source for matrix and duplicate samples
%REC: Percent recovery.
RPD: Relative percent difference.

CCME PHC additional information:

- The method for the analysis of PHCs complies with the Reference Method for the CWS PHC and is validated for use in the laboratory. All prescribed quality criteria identified in the method has been met.
- F1 range corrected for BTEX.
- F2 to F3 ranges corrected for appropriate PAHs where available.
- The gravimetric heavy hydrocarbons (F4G) are not to be added to C6 to C50 hydrocarbons.
- In the case where F4 and F4G are both reported, the greater of the two results is to be used for comparison to CWS PHC criteria.

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№ 98032

Page 1 of 2

Client Name: Golder Associates Ltd
Contact Name: Nicole MacDonald
Address: 1931 Robertson Road, Ottawa
Telephone: 613 592 9600

Project Reference: 1530908
Quote # 15-304
PO #
Email Address: nicole_macdonald@golder.com
damin_johnson@golder.com

TAT: [✓] Regular [ ] 3 Day [ ] 2 Day [ ] 1 Day
Date Required: _____

Criteria: [ ] O. Reg. 153/04 (As Amended) Table __ [ ] RSC Filing [ ] O. Reg. 558/00 [ ] PWQO [✓] CCME [ ] SUB (Storm) [ ] SUB (Sanitary) Municipality: _____ [ ] Other: _____

Matrix Type: S (Soil/Sed.) GW (Ground Water) SW (Surface Water) SS (Storm/Sanitary Sewer) P (Paint) A (Air) O (Other)

Paracel Order Number: 1586016

	Sample ID/Location Name	Matrix	Air Volume	# of Containers	Sample Taken Date	Sample Taken Time	PHCs F1-F4+BTEX	VOCs	PAHs	Metals by ICP	Hg	CrVI	B (HWS)	Quote 15-304
1	MW9	GW		6	Aug 22/15	14:40								X
2	MW10			6		12:30								X
3	MW11			6		11:40								X
4	MW12			6		11:20								X
5	MW13			6		14:06								X
6	MW14			6		12:50								X
7	MW15			5		13:20								X
8	MW16			6		13:40								X
9														
10	Proceed regardless of hold time as per Nicole.													

Comments: Metals not field filtered
MW9 PHC bottle broke, use PCB bottle to perform analysis, don't do PCB as per Nicole. *

Method of Delivery: Walk-in

Relinquished By (Sign):	Received by Driver/Depot: Rain Cull	Received at Lab: O. Charlebois	Verified By: O. Charlebois
Relinquished By (Print): Tony Lyon	Date/Time: Aug 28/15 5:00	Date/Time: AUG 31/15 9:35	Date/Time: AUG 31/15 10:05
Date/Time: Aug 28, 2015 5:00	Temperature: 12.3 °C	Temperature: 6.4 °C	pH Verified [ ] By: DC

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№ 98033

Page 2 of 2

Client Name: see page 1	Project Reference: 1530908
Contact Name:	Quote # 15-304
Address:	PO #
Telephone:	Email Address: see page 1

TAT: [✓] Regular [ ] 3 Day [ ] 2 Day [ ] 1 Day
Date Required: _____

Criteria: [ ] O. Reg. 153/04 (As Amended) Table __ [ ] RSC Filing [ ] O. Reg. 558/00 [ ] PWQO [✓] CCME [ ] SUB (Storm) [ ] SUB (Sanitary) Municipality: _____ [ ] Other: _____

Matrix Type: S (Soil/Sed.) GW (Ground Water) SW (Surface Water) SS (Storm/Sanitary Sewer) P (Paint) A (Air) O (Other)

Required Analyses

Paracel Order Number: 1536016

	Sample ID/Location Name	Matrix	Air Volume	# of Containers	Sample Taken Date	Sample Taken Time	PHCs F1-F4+BTEX	VOCs	PAHs	Metals by ICP	Hg	CrVI	B (HWS)	quote 15-304
1	MW06	GW		6	Aug 23/15	10:45								X
2	MW08			6		11:20								X
3	MW12			6		12:20								X
4	MW11			6		13:00								X
5	MW09			6		13:30								X
6	Trip blank			6		12:01								X
7														
8														
9														
10														

Comments: Metals NOT field filtered

Method of Delivery: Walk-in

Relinquished By (Sign):	Received by Driver/Depot: Lauren Cull	Received at Lab: D. Charlebois	Verified By: D. Charlebois
Relinquished By (Print): Tony Lyon	Date/Time: Aug 28/15 5:00	Date/Time: Aug 31/15 9:35	Date/Time: Aug 31/15 10:05
Date/Time: Aug 28, 2015 5:00	Temperature: 12.3 °C	Temperature: 6.4 °C	pH Verified [ ] By: DC

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Certificate of Analysis

Golder Associates Ltd. (Ottawa)

1931 Robertson Rd.
Ottawa, ON K2H 5B7
Attn: Nicole MacDonald

Client PO:
Project: Dew Lines Sites Landfill Monitoring
Custody: 22010/22992/85/86/99077

Report Date: 29-Sep-2015
Order Date: 1-Sep-2015

Revised Repo **Order #: 1536160**

This Certificate of Analysis contains analytical data applicable to the following samples as submitted:

Paracel ID	Client ID
1536160-21	C5-1 (0-15)
1536160-22	C5-1 (40-50)
1536160-23	C5-5 (0-15)
1536160-24	C5-5 (40-50)
1536160-25	C5-4 (0-15)
1536160-26	C5-4 (40-50)
1536160-27	C5-3 (0-15)
1536160-28	C5-3 (40-50)
1536160-29	C5-2 (0-15)
1536160-30	C5-2 (40-50)
1536160-31	C5-7 (0-15)
1536160-32	C5-7 (40-50)
1536160-33	C5-6 (0-15)
1536160-34	MW09 (0-15)
1536160-35	MW09 (40-50)
1536160-36	MW11 (0-15)
1536160-37	MW12 (0-15)
1536160-38	MW12 (40-50)
1536160-39	C5-8 (0-15)
1536160-42	MW08 (0-15)
1536160-43	MW08 (40-50)
1536160-44	MW07 (0-15)
1536160-45	MW07 (40-50)
1536160-46	MW06 (0-15)
1536160-47	MW06 (30-40)
1536160-48	MW05 (0-15)
1536160-49	MW05 (40-50)

Approved By: 

Mark Foto, M.Sc.
Lab Supervisor

Any use of these results implies your agreement that our total liabilty in connection with this work, however arising, shall be limited to the amount paid by you for this work, and that our employees or agents shall not under any circumstances be liable to you in connection with this work.

Certificate of Analysis

Report Date: 29-Sep-2015

Client: **Golder Associates Ltd. (Ottawa)**

Order Date:1-Sep-2015

Client PO:

Project Description: Dew Lines Sites Landfill Monitoring

Analysis Summary Table

Analysis	Method Reference/Description	Extraction Date	Analysis Date
CCME-SQG: Metals by ICP-OES	based on MOE E3470, ICP-OES	4-Sep-15	4-Sep-15
Mercury by CVAA	EPA 7471B - CVAA, digestion	4-Sep-15	8-Sep-15
PCBs, total	SW846 8082A - GC-ECD	1-Sep-15	4-Sep-15
PHC F1	CWS Tier 1 - P&T GC-FID	2-Sep-15	6-Sep-15
PHC F2 - F4	CWS Tier 1 - GC-FID, extraction	3-Sep-15	4-Sep-15
Solids, %	Gravimetric, calculation	3-Sep-15	3-Sep-15

Certificate of Analysis

Report Date: 29-Sep-2015

Client: **Golder Associates Ltd. (Ottawa)**

Order Date:1-Sep-2015

Client PO:

Project Description: Dew Lines Sites Landfill Monitoring

	Client ID:	C5-1 (0-15)	C5-1 (40-50)	C5-5 (0-15)	C5-5 (40-50)
	Sample Date:	23-Aug-15	23-Aug-15	23-Aug-15	23-Aug-15
	Sample ID:	1536160-21	1536160-22	1536160-23	1536160-24
	MDL/Units	Soil	Soil	Soil	Soil
Physical Characteristics					
% Solids	0.1 % by Wt.	98.2	98.2	79.5	88.0
Metals					
Arsenic	1.0 ug/g dry	1.2	<1.0	1.0	1.3
Cadmium	0.5 ug/g dry	<0.5	<0.5	<0.5	<0.5
Chromium	1.0 ug/g dry	6.8	4.3	22.5	35.6
Cobalt	1.0 ug/g dry	2.2	1.6	5.2	7.7
Copper	1.0 ug/g dry	7.1	3.3	10.1	16.6
Lead	1.0 ug/g dry	2.4	1.5	3.0	5.9
Mercury	0.1 ug/g dry	<0.1	<0.1	<0.1	<0.1
Nickel	1.0 ug/g dry	4.5	3.4	13.8	21.8
Zinc	1.0 ug/g dry	11.3	7.5	24.7	36.3
Hydrocarbons					
F1 PHCs (C6-C10)	7 ug/g dry	<7	<7	<7	<7
F2 PHCs (C10-C16)	4 ug/g dry	<4	<4	<4	<4
F3 PHCs (C16-C34)	8 ug/g dry	<8	<8	<8	<8
F4 PHCs (C34-C50)	6 ug/g dry	<6	<6	<6	<6
PCBs					
PCBs, total	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
Decachlorobiphenyl	Surrogate	86.0%	93.0%	86.0%	94.0%

Certificate of Analysis

Report Date: 29-Sep-2015

Client: **Golder Associates Ltd. (Ottawa)**

Order Date:1-Sep-2015

Client PO:

Project Description: Dew Lines Sites Landfill Monitoring

	Client ID:	C5-4 (0-15)	C5-4 (40-50)	C5-3 (0-15)	C5-3 (40-50)
	Sample Date:	23-Aug-15	23-Aug-15	23-Aug-15	23-Aug-15
	Sample ID:	1536160-25	1536160-26	1536160-27	1536160-28
	MDL/Units	Soil	Soil	Soil	Soil
Physical Characteristics					
% Solids	0.1 % by Wt.	86.7	81.6	93.3	90.9
Metals					
Arsenic	1.0 ug/g dry	1.1	<1.0	1.1	<1.0
Cadmium	0.5 ug/g dry	<0.5	<0.5	<0.5	<0.5
Chromium	1.0 ug/g dry	20.4	37.3	24.6	25.1
Cobalt	1.0 ug/g dry	4.4	8.0	5.9	6.1
Copper	1.0 ug/g dry	8.7	17.6	12.8	13.0
Lead	1.0 ug/g dry	3.6	5.7	4.6	5.1
Mercury	0.1 ug/g dry	<0.1	<0.1	<0.1	<0.1
Nickel	1.0 ug/g dry	11.9	22.7	14.6	14.7
Zinc	1.0 ug/g dry	25.0	37.4	27.9	28.7
Hydrocarbons					
F1 PHCs (C6-C10)	7 ug/g dry	<7	<7	<7	<7
F2 PHCs (C10-C16)	4 ug/g dry	<4	<4	<4	<4
F3 PHCs (C16-C34)	8 ug/g dry	32	<8	<8	<8
F4 PHCs (C34-C50)	6 ug/g dry	<6	<6	<6	<6
PCBs					
PCBs, total	0.05 ug/g dry	<1.00 [1] [3]	<0.05	<0.05	<0.05
Decachlorobiphenyl	Surrogate	-	88.0%	91.0%	92.0%

Certificate of Analysis

Report Date: 29-Sep-2015

Client: **Golder Associates Ltd. (Ottawa)**

Order Date:1-Sep-2015

Client PO:

Project Description: Dew Lines Sites Landfill Monitoring

	Client ID:	C5-2 (0-15)	C5-2 (40-50)	C5-7 (0-15)	C5-7 (40-50)
	Sample Date:	23-Aug-15	23-Aug-15	23-Aug-15	23-Aug-15
	Sample ID:	1536160-29	1536160-30	1536160-31	1536160-32
	MDL/Units	Soil	Soil	Soil	Soil
Physical Characteristics					
% Solids	0.1 % by Wt.	93.9	94.4	88.7	87.5
Metals					
Arsenic	1.0 ug/g dry	<1.0	<1.0	1.5	3.2
Cadmium	0.5 ug/g dry	<0.5	<0.5	<0.5	<0.5
Chromium	1.0 ug/g dry	6.0	5.2	12.0	15.3
Cobalt	1.0 ug/g dry	1.4	1.5	4.3	6.1
Copper	1.0 ug/g dry	2.1	2.5	12.4	13.4
Lead	1.0 ug/g dry	2.0	1.6	5.0	6.0
Mercury	0.1 ug/g dry	<0.1	<0.1	<0.1	<0.1
Nickel	1.0 ug/g dry	2.7	3.0	8.1	12.6
Zinc	1.0 ug/g dry	7.7	7.6	21.7	26.0
Hydrocarbons					
F1 PHCs (C6-C10)	7 ug/g dry	<7	<7	<7	<7
F2 PHCs (C10-C16)	4 ug/g dry	<4	<4	<4	<4
F3 PHCs (C16-C34)	8 ug/g dry	38	24	<8	<8
F4 PHCs (C34-C50)	6 ug/g dry	25	9	<6	<6
PCBs					
PCBs, total	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
Decachlorobiphenyl	Surrogate	94.0%	93.0%	93.0%	94.0%

Certificate of Analysis

Report Date: 29-Sep-2015

Client: **Golder Associates Ltd. (Ottawa)**

Order Date:1-Sep-2015

Client PO:

Project Description: Dew Lines Sites Landfill Monitoring

	Client ID:	C5-6 (0-15)	MW09 (0-15)	MW09 (40-50)	MW11 (0-15)
	Sample Date:	23-Aug-15	23-Aug-15	23-Aug-15	23-Aug-15
	Sample ID:	1536160-33	1536160-34	1536160-35	1536160-36
	MDL/Units	Soil	Soil	Soil	Soil
Physical Characteristics					
% Solids	0.1 % by Wt.	89.9	95.7	100	95.8
Metals					
Arsenic	1.0 ug/g dry	4.0	1.2	1.0	1.4
Cadmium	0.5 ug/g dry	<0.5	<0.5	<0.5	<0.5
Chromium	1.0 ug/g dry	20.3	13.7	12.4	23.5
Cobalt	1.0 ug/g dry	7.2	5.5	4.9	5.7
Copper	1.0 ug/g dry	21.9	8.3	12.2	10.2
Lead	1.0 ug/g dry	9.9	5.7	5.2	4.3
Mercury	0.1 ug/g dry	<0.1	<0.1	<0.1	<0.1
Nickel	1.0 ug/g dry	12.0	8.5	8.1	13.3
Zinc	1.0 ug/g dry	35.8	34.8	29.1	26.3
Hydrocarbons					
F1 PHCs (C6-C10)	7 ug/g dry	<7	<7	<7	<7
F2 PHCs (C10-C16)	4 ug/g dry	<4	<4	<4	<4
F3 PHCs (C16-C34)	8 ug/g dry	41	<8	<8	<8
F4 PHCs (C34-C50)	6 ug/g dry	15	<6	<6	<6
PCBs					
PCBs, total	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
Decachlorobiphenyl	Surrogate	95.0%	92.0%	85.0%	85.0%

Certificate of Analysis

Report Date: 29-Sep-2015

Client: **Golder Associates Ltd. (Ottawa)**

Order Date:1-Sep-2015

Client PO:

Project Description: Dew Lines Sites Landfill Monitoring

	Client ID:	MW12 (0-15)	MW12 (40-50)	C5-8 (0-15)	MW08 (0-15)
	Sample Date:	23-Aug-15	23-Aug-15	23-Aug-15	23-Aug-15
	Sample ID:	1536160-37	1536160-38	1536160-39	1536160-42
	MDL/Units	Soil	Soil	Soil	Soil
Physical Characteristics					
% Solids	0.1 % by Wt.	98.2	97.8	93.8	98.9
Metals					
Arsenic	1.0 ug/g dry	1.3	1.4	<1.0	2.3
Cadmium	0.5 ug/g dry	<0.5	<0.5	<0.5	<0.5
Chromium	1.0 ug/g dry	9.2	9.0	11.5	15.2
Cobalt	1.0 ug/g dry	3.4	3.1	4.7	6.2
Copper	1.0 ug/g dry	8.0	8.3	4.9	17.2
Lead	1.0 ug/g dry	4.3	3.7	6.7	5.9
Mercury	0.1 ug/g dry	<0.1	<0.1	<0.1	<0.1
Nickel	1.0 ug/g dry	5.3	5.2	6.4	10.3
Zinc	1.0 ug/g dry	18.4	17.7	23.7	28.9
Hydrocarbons					
F1 PHCs (C6-C10)	7 ug/g dry	<7	<7	<7	<7
F2 PHCs (C10-C16)	4 ug/g dry	<4	<4	<4	<4
F3 PHCs (C16-C34)	8 ug/g dry	<8	<8	<8	<8
F4 PHCs (C34-C50)	6 ug/g dry	<6	<6	<6	<6
PCBs					
PCBs, total	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
Decachlorobiphenyl	Surrogate	94.0%	86.0%	96.0%	125%

Certificate of Analysis

Report Date: 29-Sep-2015

Client: **Golder Associates Ltd. (Ottawa)**

Order Date:1-Sep-2015

Client PO:

Project Description: Dew Lines Sites Landfill Monitoring

	Client ID:	MW08 (40-50)	MW07 (0-15)	MW07 (40-50)	MW06 (0-15)
	Sample Date:	23-Aug-15	23-Aug-15	23-Aug-15	23-Aug-15
	Sample ID:	1536160-43	1536160-44	1536160-45	1536160-46
	MDL/Units	Soil	Soil	Soil	Soil
Physical Characteristics					
% Solids	0.1 % by Wt.	97.2	98.1	99.1	95.3
Metals					
Arsenic	1.0 ug/g dry	1.8	1.2	1.1	<1.0
Cadmium	0.5 ug/g dry	<0.5	<0.5	<0.5	<0.5
Chromium	1.0 ug/g dry	8.3	8.8	7.2	8.1
Cobalt	1.0 ug/g dry	3.9	3.1	3.3	3.1
Copper	1.0 ug/g dry	8.7	7.6	7.6	4.6
Lead	1.0 ug/g dry	3.6	3.0	3.8	3.4
Mercury	0.1 ug/g dry	<0.1	<0.1	<0.1	<0.1
Nickel	1.0 ug/g dry	5.8	5.2	4.9	4.8
Zinc	1.0 ug/g dry	20.5	16.1	15.9	19.9
Hydrocarbons					
F1 PHCs (C6-C10)	7 ug/g dry	<7	<7	<7	<7
F2 PHCs (C10-C16)	4 ug/g dry	<4	<4	<4	<4
F3 PHCs (C16-C34)	8 ug/g dry	<8	<8	<8	<8
F4 PHCs (C34-C50)	6 ug/g dry	<6	<6	<6	<6
PCBs					
PCBs, total	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
Decachlorobiphenyl	Surrogate	121%	124%	84.0%	120%

Certificate of Analysis

Report Date: 29-Sep-2015

Client: **Golder Associates Ltd. (Ottawa)**

Order Date:1-Sep-2015

Client PO:

Project Description: Dew Lines Sites Landfill Monitoring

	Client ID:	MW06 (30-40)	MW05 (0-15)	MW05 (40-50)	-
	Sample Date:	23-Aug-15	23-Aug-15	23-Aug-15	-
	Sample ID:	1536160-47	1536160-48	1536160-49	-
	MDL/Units	Soil	Soil	Soil	-
Physical Characteristics					
% Solids	0.1 % by Wt.	96.5	98.8	98.8	-
Metals					
Arsenic	1.0 ug/g dry	<1.0	1.4	<1.0	-
Cadmium	0.5 ug/g dry	<0.5	<0.5	<0.5	-
Chromium	1.0 ug/g dry	9.0	12.0	11.5	-
Cobalt	1.0 ug/g dry	3.5	5.8	3.9	-
Copper	1.0 ug/g dry	5.0	19.8	10.9	-
Lead	1.0 ug/g dry	3.7	4.0	3.3	-
Mercury	0.1 ug/g dry	<0.1	<0.1	<0.1	-
Nickel	1.0 ug/g dry	5.0	9.2	7.2	-
Zinc	1.0 ug/g dry	23.0	25.0	18.1	-
Hydrocarbons					
F1 PHCs (C6-C10)	7 ug/g dry	<7	<7	<7	-
F2 PHCs (C10-C16)	4 ug/g dry	<4	<4	<4	-
F3 PHCs (C16-C34)	8 ug/g dry	<8	<8	<8	-
F4 PHCs (C34-C50)	6 ug/g dry	<6	<6	<6	-
PCBs					
PCBs, total	0.05 ug/g dry	<0.05	<0.05	<0.05	-
Decachlorobiphenyl	Surrogate	118%	129%	86.0%	-

Method Quality Control: Blank

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F1 PHCs (C6-C10)	ND	7	ug/g						
F2 PHCs (C10-C16)	ND	4	ug/g						
F3 PHCs (C16-C34)	ND	8	ug/g						
F4 PHCs (C34-C50)	ND	6	ug/g						
Metals									
Arsenic	ND	1.0	ug/g						
Cadmium	ND	0.5	ug/g						
Chromium	ND	1.0	ug/g						
Cobalt	ND	1.0	ug/g						
Copper	ND	1.0	ug/g						
Lead	ND	1.0	ug/g						
Mercury	ND	0.1	ug/g						
Nickel	ND	1.0	ug/g						
Zinc	ND	1.0	ug/g						
PCBs									
PCBs, total	ND	0.05	ug/g						
Surrogate: Decachlorobiphenyl	*0.0850*		*ug/g*		*85.0*	*60-140*			

Method Quality Control: Duplicate

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F1 PHCs (C6-C10)	ND	7	ug/g dry	ND				40	
F2 PHCs (C10-C16)	ND	4	ug/g dry	ND				30	
F3 PHCs (C16-C34)	ND	8	ug/g dry	ND				30	
F4 PHCs (C34-C50)	ND	6	ug/g dry	ND				30	
Metals									
Arsenic	54.8	1.0	ug/g dry	26.9			68.3	30	QR-04
Cadmium	ND	0.5	ug/g dry	ND			0.0	30	
Chromium	39.6	1.0	ug/g dry	34.8			13.0	30	
Cobalt	12.5	1.0	ug/g dry	10.1			21.2	30	
Copper	34.0	1.0	ug/g dry	30.2			11.9	30	
Lead	11.6	1.0	ug/g dry	9.80			17.1	30	
Mercury	ND	0.1	ug/g dry	ND				35	
Nickel	31.3	1.0	ug/g dry	27.1			14.4	30	
Zinc	59.8	1.0	ug/g dry	53.0			12.0	30	
PCBs									
PCBs, total	ND	0.05	ug/g dry	ND				40	
Surrogate: Decachlorobiphenyl	*0.0876*		*ug/g dry*	*ND*	*86.0*	*60-140*			
Physical Characteristics									
% Solids	85.7	0.1	% by Wt.	86.6			1.0	25	

Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F1 PHCs (C6-C10)	176	7	ug/g	ND	88.1	80-120			
F2 PHCs (C10-C16)	135	4	ug/g	ND	119	60-140			
F3 PHCs (C16-C34)	301	8	ug/g	ND	129	60-140			
F4 PHCs (C34-C50)	192	6	ug/g	ND	123	60-140			
Metals									
Arsenic	777		ug/L	538	95.5	70-130			
Cadmium	223		ug/L	4.75	87.4	70-130			
Chromium	919		ug/L	696	89.3	70-130			
Cobalt	422		ug/L	203	87.9	70-130			
Copper	820		ug/L	603	86.6	70-130			
Lead	417		ug/L	196	88.3	70-130			
Mercury	1.53	0.1	ug/g	ND	102	72-128			
Nickel	754		ug/L	542	84.9	70-130			
Zinc	1260		ug/L	1060	78.8	70-130			
PCBs									
PCBs, total	0.520	0.05	ug/g	ND	128	60-140			
Surrogate: Decachlorobiphenyl	*0.0988*		*ug/g*		*97.0*	*60-140*			

Qualifier Notes:

Login Qualifiers :

Container(s) - Bottle and COC sample ID don't match - 250mL jar mislabelled.
Applies to samples: MW08 (40-50)

Sample Qualifiers :

1 : Elevated detection limit because of dilution required due to the presence of high levels of non-target analytes.

3 : Surrogates not available due to extract dilution.

QC Qualifiers :

QR-04 : Duplicate results exceeds RPD limits due to non-homogeneous matrix.

Sample Data Revisions

None

Work Order Revisions / Comments:

Revision 1 - this report includes an updated client Sample list.

Revision 2c - this report includes an updated client Sample ID.

Other Report Notes:

n/a: not applicable
ND: Not Detected
MDL: Method Detection Limit
Source Result: Data used as source for matrix and duplicate samples
%REC: Percent recovery.
RPD: Relative percent difference.

Soil results are reported on a dry weight basis when the units are denoted with 'dry'.
Where %Solids is reported, moisture loss includes the loss of volatile hydrocarbons.

CCME PHC additional information:

- The method for the analysis of PHCs complies with the Reference Method for the CWS PHC and is validated for use in the laboratory. All prescribed quality criteria identified in the method has been met.
- F1 range corrected for BTEX.
- F2 to F3 ranges corrected for appropriate PAHs where available.
- The gravimetric heavy hydrocarbons (F4G) are not to be added to C6 to C50 hydrocarbons.
- In the case where F4 and F4G are both reported, the greater of the two results is to be used for comparison to CWS PHC criteria.

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Golder Associates Ltd.
Nicole MacDonald
1931 Robertson Road
Ottawa, Ontario K2H 5B7
613-592-9600

Project Ref: Dew Lines Sites Landfill Monitoring
Quote: 15-304 Dew Lines Monitoring
Email address: Nicole_macdonald@golder.com
Darrin_johnson@golder.com

TAT: [✓] Regular [ ] 3 Day [ ] 2 Day [ ] 1 Day
Date Required:

Criteria: [ ] O. Reg. 153/04 (As Amended) Table __ [ ] RSC Filing [ ] O. Reg. 558/00 [ ] PWQO [✓] CCME [ ] SUB (Storm) [ ] SUB (Sanitary) Municipality: _____ [ ] Other: _____

Matrix Type: S (Soil/Sed.) GW (Ground Water) SW (Surface Water) SS (Storm/Sanitary Sewer) P (Paint) A (Air) O (Other)

quote 15-304

Required Analyses

Paracel Order Number: 1536160

	Sample ID/Location Name	Matrix	Air Volume	# of Containers	Sample Taken Date	Sample Taken Time	PAH	F1-F4	Inorg/-ORPs							
1	MW-13 (0-15)	S		2	Aug 22 2015	14:00	+	+	+			-60ml + 250 ml -				
2	MW-13 (40-50)					14:00										
3	MW-16 (0-15)					13:40										
4	MW-16 (40-50)					13:40										
5	MW-15 (0-15)					13:25										
6	MW-14 (0-15)					12:50										
7	MW-14 (40-50)					12:50										
8	MW-10 (0-15)					12:25										
9	MW-10 (40-50)					12:25						= BROKEN - CAUTION				
10	MW-11 (0-15)					11:45										

Comments: may be past hold time, please analyze anyway

Method of Delivery: Paracel

Relinquished By (Sign):	Received by Driver/Depot:	Received at Lab: SUREPORN DOK MAI	Verified By:
Relinquished By (Print): Nicole MacDonald	Date/Time: 09/09/15 4:35 PM	Date/Time: SEP 01, 2015 05:20	Date/Time: Sept 1/15
Date/Time: Sept 1/15 15:00	Temperature: ____ °C	Temperature: 6.3 °C	pH Verified [ ] By: N/A

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Golder Associates Ltd.
Nicole MacDonald
1931 Robertson Road
Ottawa, Ontario K2H 5B7
613-592-9600

Project Ref: Dew Lines Sites Landfill Monitoring
Quote: 15-304 Dew Lines Monitoring
Email address: Nicole_macdonald@golder.com
Darrin_johnson@golder.com

TAT: [✓] Regular [ ] 3 Day [ ] 2 Day [ ] 1 Day
Date Required:

Criteria: [ ] O. Reg. 153/04 (As Amended) Table __ [ ] RSC Filing [ ] O. Reg. 558/00 [ ] PWQO [✓] CCME [ ] SUB (Storm) [ ] SUB (Sanitary) Municipality: _____ [ ] Other: _____

Matrix Type: S (Soil/Sed.) GW (Ground Water) SW (Surface Water) SS (Storm/Sanitary Sewer) P (Paint) A (Air) O (Other)

quote 15-304

Required Analyses

Paracel Order Number: 1536160

	Sample ID/Location Name	Matrix	Air Volume	# of Containers	Sample Taken Date	Sample Taken Time	PCB	F1-F4	Hexs/Metals								
1	MW-11 (40-50)	S		2	Aug 23 2015	11:45	+	+	+				-60 ml	+ 250 ml			
2	MW-12 (0-15)					11:15											
3	MW-12 (40-50)					11:15											
4	F2-1 (0-15)					10:45											
5	F2-1 (30-40)					10:45											
6	F2-3 (0-15)					10:30											
7	F2-3 (30-40)					10:30											
8	F2-5 (0-15)					10:00											
9	F2-4 (0-15)					10:15											
10	F2-4 (30-40)					10:15											

Comments: may be past hold time, please analyze anyway

Method of Delivery: Paracel

Relinquished By (Sign):	Received by Driver/Depot: T Louise	Received at Lab: SUMEEPGRN DCH MAI	Verified By:
Relinquished By (Print): Nicole MacDonald	Date/Time: 01/09/15 4:35	Date/Time: SEP 01 2015 05:20	Date/Time: Sept 1/15
Date/Time: Sept 1/15 15:00	Temperature: ___ °C	Temperature: 6.3 °C	pH Verified [ ] By: N/A

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Client: Golder Associates Ltd.
Contact: Nicole MacDonald
Address: 1931 Robertson Road, Ottawa, Ontario K2H 5B7
Telephone: 613-592-9600

Project: Project Ref: Dew Lines Sites Landfill Monitoring
Quote: 15-304 Golder Dew Lines Monitoring
PO #:
Email: Nicole_macdonald@golder.com, Darrin_johnson@golder.com

TAT: [✓] Regular [ ] 3 Day [ ] 2 Day [ ] 1 Day
Date Required:

Criteria: [ ] O. Reg. 153/04 (As Amended) Table __ [ ] RSC Filing [ ] O. Reg. 558/00 [ ] PWQO [✓] CCME [ ] SUB (Storm) [ ] SUB (Sanitary) Municipality: _____ [ ] Other: _____

Matrix Type: S (Soil/Sed.) GW (Ground Water) SW (Surface Water) SS (Storm/Sanitary Sewer) P (Paint) A (Air) O (Other)

quote 15-304

Required Analyses

Paracel Order Number: 1536160

	Sample ID/Location Name	Matrix	Air Volume	# of Containers	Sample Taken Date	Sample Taken Time	F1-F4	PCB	Tri-Cl Metals								
1	C5-1 (0-15)	S		2	Aug 23/15	15:40	4	4	4			-60 mL + 250 mL-					
2	C5-1 (40-50)					15:40											
3	C5-5 (0-15)					15:25											
4	C5-5 (40-50)					15:25											
5	C5-4 (0-15)					15:00											
6	C5-4 (40-50)					15:00											
7	C5-3 (0-15)					14:45											
8	C5-3 (40-50)					14:45											
9	C5-2 (0-15)					14:30											
10	C5-2 (40-50)					14:30											

Comments: may be past hold time, please analyze anyway

Method of Delivery: Paracel

Relinquished By (Sign):	Received by Driver/Depot: Louise	Received at Lab: Sunnet Pokh Dorman	Verified By:
Relinquished By (Print): Nicole MacDonald	Date/Time: 01/09/15 4:35 pm	Date/Time: Sept 2 2015 08:20	Date/Time: Sept 1/15
Date/Time: Sept 1/15 15:00	Temperature: °C	Temperature: 6.3 °C	pH Verified [ ] By: N/A 5:42p

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Client №

Contact: Golder Associates Ltd.
Nicole MacDonald

Address: 1931 Robertson Road
Ottawa, Ontario K2H 5B7

Telepho: 613-592-9600

Proje

Quot

PO #

Emai

Project Ref: Dew Lines Sites Landfill Monitoring
Quote: 15-304 Golder Dew Lines Monitoring
Email address: Nicole_macdonald@golder.com
Darrin_johnson@golder.com

TAT: [✓] Regular [ ] 3 Day
[ ] 2 Day [ ] 1 Day
Date Required: _____

Criteria: [ ] O. Reg. 153/04 (As Amended) Table __ [ ] RSC Filing [ ] O. Reg. 558/00 [ ] PWQO [✓] CCME [ ] SUB (Storm) [ ] SUB (Sanitary) Municipality: _____ [ ] Other: _____

Matrix Type: S (Soil/Sed.) GW (Ground Water) SW (Surface Water) SS (Storm/Sanitary Sewer) P (Paint) A (Air) O (Other)

Required Analyses

Paracel Order Number: 1536160

	Sample ID/Location Name	Matrix	Air Volume	# of Containers	Sample Taken Date	Sample Taken Time	PAH	Metals	Texts / Metals	Quote 15-304							
1	CS-7 (0-15)	S		2	Aug 23/15	14:05				X		- 60mL + 250mL -					
2	CS-7 (40-50)					14:05				X							
3	CS-6 (0-15)					13:50				X							
4	MW09 (0-15)					13:20				X							
5	MW09 (40-50)					13:20				X							
6	MW11 (0-15)					12:50				X							
7	MW12 (0-15)					12:26				X							
8	MW12 (40-50)					12:26				X							
9	CS-8 (0-15)					11:55				X							
10	~~CS-8~~																

Comments: may be past hold time, please analyze anyway

Method of Delivery: Paracel

Relinquished By (Sign):	Received by Driver/Depot:	Received at Lab: SUMMERPORT DOWNTOWN	Verified By:
Relinquished By (Print): Nicole MacDonald	Date/Time: 01/09/15 4:35 PM	Date/Time: SEP 01 2015 05:20	Date/Time: Sept 1/15
Date/Time: Sept 1/15 15:00	Temperature: ___ °C	Temperature: 6.3 °C	pH Verified [ ] By: N/A

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Client Name: Golder Associates Ltd.	Project Reference: 1530908	TAT: [✓] Regular [ ] 3 Day	
Contact Name:	Quote # 15-304	[ ] 2 Day [ ] 1 Day	
Address: see page 1	PO #	Date Required:	
Telephone:	Email Address:		

Criteria: [ ] O. Reg. 153/04 (As Amended) Table __ [ ] RSC Filing [ ] O. Reg. 558/00 [ ] PWQO [✓] CCME [ ] SUB (Storm) [ ] SUB (Sanitary) Municipality: _____ [ ] Other: _____

Matrix Type: S (Soil/Sed.) GW (Ground Water) SW (Surface Water) SS (Storm/Sanitary Sewer) P (Paint) A (Air) O (Other)

Paracel Order Number: 1536160

	Sample ID/Location Name	Matrix	Air Volume	# of Containers	Sample Taken Date	Sample Taken Time	PHCs F1-F4+BTEX	VOCs	PAHs	Metals by ICP	Hg	CrVI	B (HWS)	quote 15-304						
1	MW-09 (0-15)	S		2	Aug 22/15	14:30								X	~ 60mL + 250mL -					
2	MW-09 (30-40)				"	14:30								X	BROKEN - CAUTION					
3	MW08 (0-15)				Aug 23/15	11:28								X						
4	MW08 (40-50)					11:28								X	250 reads MW07					
5	MW07 (0-15)					11:07								X	should read					
6	MW07 (40-50)					11:07								X	08 per Nicole sc					
7	MW06 (0-15)					10:45								X						
8	MW06 (30-40)					10:45								X						
9	MW05 (0-15)					10:25								X						
10	MW05 ~~(5~~ (40-50)					10:25								X						

Comments: may be past hold time, please analyze anyway

Method of Delivery: Paracel

Relinquished By (Sign): Nicole MacDonald	Received by Driver/Depot: Courier	Received at Lab: SUNEEPORN DUMMI	Verified By:
Relinquished By (Print):	Date/Time: 01/09/15 4:35 PM	Date/Time: SEP 01 2015 05:20	Date/Time: Sept 1/15
Date/Time: Sept 1/15 15:00	Temperature: ____ °C	Temperature: 6.3 °C	pH Verified [ ] By: N/A

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www.paracellabs.com

Chain of Custody
(Lab Use Only)
№ 98033

Page 2 of 2

Client Name: see page 1	Project Reference: 1530908
Contact Name:	Quote # 15-304
Address:	PO #
Telephone:	Email Address: see page 1

TAT: [✓] Regular [ ] 3 Day [ ] 2 Day [ ] 1 Day

Date Required: _____

Criteria: [ ] O. Reg. 153/04 (As Amended) Table __ [ ] RSC Filing [ ] O. Reg. 558/00 [ ] PWQO [✓] CCME [ ] SUB (Storm) [ ] SUB (Sanitary) Municipality: _____ [ ] Other: _____

Matrix Type: **S** (Soil/Sed.) **GW** (Ground Water) **SW** (Surface Water) **SS** (Storm/Sanitary Sewer) **P** (Paint) **A** (Air) **O** (Other)

Required Analyses

	Paracel Order Number: / Sample ID/Location Name	Matrix	Air Volume	# of Containers	Sample Taken Date	Sample Taken Time	PHCs F1-F4+BTEX	VOCs	PAHs	Metals by ICP	Hg	CrVI	B (HWS)	quote 15-304
1	MW06	GW		6	Aug 23/15	10:45								X
2	MW08			6		11:20								X
3	MW12			6		12:20								X
4	MW11			6		13:00								X
5	MW09			6		13:30								X
6	Trip blank			6		12:01								X
7														
8														
9														
10														

Comments: Metals NOT field filtered

Method of Delivery: Walk-in

Relinquished By (Sign):	Received by Driver/Depot:	Received at Lab:	Verified By:
Relinquished By (Print): Tony Lyon	Date/Time: Aug 28/15 5:00	Date/Time:	Date/Time:
Date/Time: Aug 28, 2015 5:00	Temperature: _____ °C	Temperature: _____ °C	pH Verified [ ] By: _____

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Chain of Custody
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№ 22985

Client:
Golder Associates Ltd.
Nicole MacDonald
1931 Robertson Road
Ottawa, Ontario K2H 5B7
613-592-9600

Project Ref: Dew Lines Sites Landfill Monitoring
Quote: 15-304 Golder Dew Lines Monitoring
Email address: Nicole_macdonald@golder.com
Darrin_johnson@golder.com

TAT: [✓] Regular [ ] 3 Day [ ] 2 Day [ ] 1 Day
Date Required:

Criteria: [ ] O. Reg. 153/04 (As Amended) Table ___ [ ] RSC Filing [ ] O. Reg. 558/00 [ ] PWQO [✓] CCME [ ] SUB (Storm) [ ] SUB (Sanitary) Municipality: ___ [ ] Other: ___

Matrix Type: S (Soil/Sed.) GW (Ground Water) SW (Surface Water) SS (Storm/Sanitary Sewer) P (Paint) A (Air) O (Other)

quote 15-304

Required Analyses

Paracel Order Number:

	Sample ID/Location Name	Matrix	Air Volume	# of Containers	Sample Taken Date	Sample Taken Time	F1-F4	PCB	Inorg/Metals							
1	C5-1 (0-15)	S		2	Aug 23/15	15:40	x	x	x							
2	C5-1 (40-50)					15:40										
3	C5-5 (0-15)					15:25										
4	C5-5 (40-50)					15:25										
5	C5-4 (0-15)					15:00										
6	C5-4 (40-50)					15:00										
7	C5-3 (0-15)					14:45										
8	C5-3 (40-50)					14:45										
9	C5-2 (0-15)					14:30										
10	C5-2 (40-50)					14:30										

Comments: may be past hold time, please analyze anyway

Method of Delivery:

Relinquished By (Sign):	Received by Driver/Depot:	Received at Lab:	Verified By:
Relinquished By (Print): Nicole MacDonald	Date/Time:	Date/Time:	Date/Time:
Date/Time: Sept 1/15 15:00	Temperature: ___ °C	Temperature: ___ °C	pH Verified [ ] By:

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Chain of Custody
(Lab Use Only)
№ 22986

Page 4 of 5

Golder Associates Ltd.
Nicole MacDonald
1931 Robertson Road
Ottawa, Ontario K2H 5B7
613-592-9600

Project Ref: Dew Lines Sites Landfill Monitoring
Quote: 15-304 Golder Dew Lines Monitoring
Email address: Nicole_macdonald@golder.com
Darrin_johnson@golder.com

TAT: [✓] Regular [ ] 3 Day [ ] 2 Day [ ] 1 Day
Date Required:

Criteria: [ ] O. Reg. 153/04 (As Amended) Table __ [ ] RSC Filing [ ] O. Reg. 558/00 [ ] PWQO [✓] CCME [ ] SUB (Storm) [ ] SUB (Sanitary) Municipality: [ ] Other:

Matrix Type: S (Soil/Sed.) GW (Ground Water) SW (Surface Water) SS (Storm/Sanitary Sewer) P (Paint) A (Air) O (Other)

Paracel Order Number:

	Sample ID/Location Name	Matrix	Air Volume	# of Containers	Sample Taken Date	Sample Taken Time	PCB	Hg	Trace Metals	9UOK 15-304							
1	C5-7 (0-15)	S		2	Aug 23/15	14:05				X							
2	C5-7 (40-50)					14:05				X							
3	C5-6 (0-15)					13:50				X							
4	MW09 (0-15)					13:20				X							
5	MW09 (40-50)					13:20				X							
6	MW11 (0-15)					12:50				X							
7	MW12 (0-15)					12:26				X							
8	MW12 (40-50)					12:26				X							
9	C5-8 (0-15)	↓		↓	↓	11:55				X							
10	~~C5-8~~																

Comments: may be past hold time, please analyze anyway

Method of Delivery:

Relinquished By (Sign):	Received by Driver/Depot:	Received at Lab:	Verified By:
Relinquished By (Print): Nicole MacDonald	Date/Time:	Date/Time:	Date/Time:
Date/Time: Sept 1/15 15:00	Temperature: °C	Temperature: °C	pH Verified [ ] By:

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Chain of Custody
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№ 99077

Page 5 of 5

Client Name: Golder Associates Ltd.
Contact Name:
Address: see page 1
Telephone:

Project Reference: 1530908
Quote # 15-304
PO #
Email Address:

TAT: [✓] Regular [ ] 3 Day [ ] 2 Day [ ] 1 Day
Date Required: _____

Criteria: [ ] O. Reg. 153/04 (As Amended) Table __ [ ] RSC Filing [ ] O. Reg. 558/00 [ ] PWQO [✓] CCME [ ] SUB (Storm) [ ] SUB (Sanitary) Municipality: _____ [ ] Other: _____

Matrix Type: **S** (Soil/Sed.) **GW** (Ground Water) **SW** (Surface Water) **SS** (Storm/Sanitary Sewer) **P** (Paint) **A** (Air) **O** (Other)

Required Analyses

	Paracel Order Number: / Sample ID/Location Name	Matrix	Air Volume	# of Containers	Sample Taken: Date	Sample Taken: Time	PHCs F1-F4+BTEX	VOCs	PAHs	Metals by ICP	Hg	CrVI	B (HWS)	quote 15-304						
1	MW-09 (0-15)	S		2	Aug 22/15	14:30								X						
2	MW-09 (30-40)				"	14:30								X		BROKEN CAUTION				
3	MW08 (0-15)				Aug 23/15	11:28								X						
4	MW08 (40-50)					11:28								X						
5	MW07 (0-15)					11:07								X						
6	MW07 (40-50)					11:07								X						
7	MW06 (0-15)					10:45								X						
8	MW06 (30-40)					10:45								X						
9	MW05 (0-15)					10:25								X						
10	MW05 (40-50)					10:25								X						

Comments: may be past hold time, please analyze anyway

Method of Delivery:

Relinquished By (Sign):	Received by Driver/Depot:	Received at Lab:	Verified By:
Nicole MacDonald.			
Relinquished By (Print):	Date/Time:	Date/Time:	Date/Time:
Date/Time: Sept 1/15 15:00	Temperature: ____ °C	Temperature: ____ °C	pH Verified [ ] By: ____

CAM-5 - Tier II Disposal Facility South- Summary of Monitoring 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)
Background Data - Arithmetic mean*						10	14	9.5	1.1	10	31	22	0.8	N/A	0.0				N/A
Baseline Data - Arithmetic mean*						**6.1**	**5.5**	**5.0**	**1.0**	**10**	**22**	**20**	**1.0**	**0.10**	**0.0030**				**26**
Baseline Data - Standard Deviation						2.0	3.6	2.3	0.0	0.0	5.2	3.3	0.41	0.0	0.0032				12
Baseline Data mean + 3xStandard Deviation						12	16	12	1.0	10	38	30	2.2	0.10	0.013				63
**** If baseline or background arithmetic mean was below the detection limit, the mean 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*	*2.0*	*5*				*2500*
Monitoring Data																			**TPH Sum will appear when F1, F2 and F3 fractions are entered.**
Upgradient																			
	MW # 5 surface																		
11-29052	BMW-5	2011	1	1	0-10	<3.0	<5.0	<5.0	<1.0	<10	16	<20	<1.0	<0.1	<0.050	<10	<4.0	18	25
C5-12-MW-05-A	BMW-5	2012	2	1	0-15	**7.6**	3.1	2.3	<0.50	2.7	18	5.0	<0.50	<0.50	<0.050	<10	<10	<10	15
2013-C5-MW-05-A	BMW-5	2013	3	1	0 - 15	**10**	**9.1**	4.3	<0.10	4.0	**23**	15	<1.0	<0.050	<0.010	<10	<10	<10	15
C514-5WA	BMW-5	2014	4	1	0 - 15	3.1	3.0	2.2	0.010	<4.9	14	4.6	0.20	<0.010	<0.10	<10	<50	<50	**55**
MW05 (0-15)	BMW-5	2015	5	1	0 - 15	**19.8**	**9.2**	**5.8**	<0.5	4	**25**	12	**1.4**	<0.1	<0.05	<7	<4	<8	10
	BMW-5		7	2															#N/A
	BMW-5		10	2															#N/A
	BMW-5		15	2															#N/A
	BMW-5		25	2															#N/A
																			#N/A
																			#N/A
																			#N/A
	MW # 5 depth																		
11-29054	BMW-5	2011	1	1	30-40	<3.0	<5.0	<5.0	<1.0	<10	16	<20	<1.0	<0.10	<0.050	31	<4.0	16	**49**
C5-12-MW-05-B	BMW-5	2012	2	1	40-50	5.0	4.5	2.6	<0.50	3.0	**23**	12	<0.50	<0.50	<0.050	<10	<10	69	**79**
2013-C5-MW-05-B	BMW-5	2013	3	1	40-50	**8.0**	**7.0**	3.7	<0.50	4.0	**23**	12	<1.0	<0.050	<0.010	<10	<10	<10	15
C514-5WB	BMW-5	2014	4	1	40-50	5.9	**6.1**	2.8	0.030	<5.0	18	3.9	0.20	<0.010	<0.10	<10	<50	<50	**55**
MW05 (40-50)	BMW-5	2015	5	1	40-50	**10.9**	**7.2**	3.9	<0.5	3.3	18.1	11.5	<1	<0.1	<0.05	<7	<4	<8	10
	BMW-5		7	2															#N/A
	BMW-5		10	2															#N/A
	BMW-5		15	2															#N/A
	BMW-5		25	2															#N/A
																			#N/A
																			#N/A
																			#N/A
																			#N/A

CAM-5 - Tier II Disposal Facility South- Summary of Monitoring 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)
Downgradient																			
	MW #6 surface																		
11-29048	MW-6	2011	1	1	0-10	**6.5**	<5.0	<5.0	<1.0	<10	**23**	<20	<1.0	<0.10	<0.050	<10	<4.0	<9.0	12
C5-12-MW-06-A	MW-6	2012	2	1	0-15	**6.8**	3.2	3.0	<0.5	2.8	21	4.7	<0.50	<0.50	<0.050	<10	<10	52	**62**
2013-C5-MW-06-A/06-A-D	MW-6	2013	3	1	0 - 15	**6.5**	**5.9**	3.8	<0.10	4.5	**29**	10	<1.0	0.05	<0.010	<10	<10	16	26
C514-6WA	MW-6	2014	4	1	0 - 15	2.2	2.9	2.3	0.020	<4.9	15	3.1	<0.20	<0.010	<0.10	<10	<50	<50	**55**
MW06 (0-15)	MW-6	2015	5	1	0 - 15	4.6	4.8	3.1	<0.5	3.4	19.9	8.1	<1	<0.1	<0.05	<7	<4	<8	10
	MW-6		7	2															#N/A
	MW-6		10	2															#N/A
	MW-6		15	2															#N/A
	MW-6		25	2															#N/A
																			#N/A
																			#N/A
																			#N/A
																			#N/A
	MW # 6 depth																		
11-29050	MW-6	2011	1	1	30-40	**10**	**7.9**	**5.8**	<1.0	<10	**26**	<20	<1.0	<0.10	<0.050	<10	<4.0	<9.0	12
C5-12-MW-06-B	MW-6	2012	2	1	40-50	**8.4**	4.7	3.4	<0.50	2.7	**26**	5.8	<0.50	<0.50	<0.050	<10	<10	25	**35**
2013-C5-MW-06-B	MW-6	2013	3	1	40 - 50	**11**	**7.8**	**5.9**	<0.10	5.0	**31**	12	<1.0	<0.05	<0.010	<10	<10	<10	15
C514-6WB	MW-6	2014	4	1	40 - 50	5.0	3.1	2.3	<0.010	<5.0	12	3.0	<0.20	<0.010	<0.10	<10	<50	<50	**55**
MW06 (30-40)	MW-6	2015	5	1	30 - 40	5	5	3.5	<0.5	3.7	**23**	9	<1	<0.1	<0.05	<7	<4	<8	10
	MW-6		7	2															#N/A
	MW-6		10	2															#N/A
	MW-6		15	2															#N/A
	MW-6		25	2															#N/A
																			#N/A
																			#N/A
																			#N/A
																			#N/A
	MW # 7 surface																		
11-29044	MW-7	2011	1	1	0-10	**6.8**	**5.5**	<5.0	<1.0	<10	21	<20	<1.0	<0.10	<0.050	<10	<4.0	9.5	17
C5-12-MW-07-A	MW-7	2012	2	1	0-15	**8.1**	**5.9**	4.0	<0.50	4.3	**25**	13	<0.50	<0.50	<0.050	<10	<10	<10	15
2013-C5-MW-07-A	MW-7	2013	3	1	0-15	**17**	**13**	**6.9**	<0.10	6.0	**40**	**21**	<1.0	<0.050	<0.010	<10	<10	<10	15
C514-7WA	MW-7	2014	4	1	0-15	**8.6**	**11**	3.7	<0.010	7.3	22	15	0.70	<0.010	<0.10	<10	<50	<50	**55**
MW07 (0-15)	MW-7	2015	5	1	0-15	**7.6**	5.2	3.1	<0.5	3	16.1	8.8	**1.2**	<0.1	<0.05	<7	<4	<8	10
	MW-7		7	2															#N/A
	MW-7		10	2															#N/A
	MW-7		15	2															#N/A
	MW-7		25	2															#N/A
																			#N/A
																			#N/A
																			#N/A
																			#N/A

CAM-5 - Tier II Disposal Facility South- Summary of Monitoring 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)
	MW # 7 depth																		
11-29046	MW-7	2011	1	1	30-40	**48**	**22**	**8.3**	<1.0	<10	**40**	**37**	**1.6**	<0.10	<0.050	<10	<10	<9.0	15
C5-12-MW-07-B	MW-7	2012	2	1	40-50	**7.6**	3.4	3.0	<0.50	2.7	**24**	3.8	<0.50	<0.50	<0.050	<10	<10	<10	15
2013-C5-MW-07-B	MW-7	2013	3	1	40 - 50	**15**	**14**	**5.4**	<0.10	6.0	**32**	**27**	**1.0**	<0.050	<0.010	<10	<10	<10	15
C514-7WB	MW-7	2014	4	1	40 - 50	**6.7**	**7.7**	3.2	<0.010	<4.9	20	6.2	0.20	<0.010	<0.10	<10	<50	<50	**55**
MW07 (40-50) (Dup Avg)	MW-7	2015	5	1	40 - 50	**10.8**	**6.45**	4.15	<0.5	4.4	**22.45**	9.1	**1.1**	<0.1	<0.1	<6	<4	<8	9
	MW-7		7	2															#N/A
	MW-7		10	2															#N/A
	MW-7		15	2															#N/A
	MW-7		25	2															#N/A
																			#N/A
																			#N/A
																			#N/A
																			#N/A
	MW # 8 surface																		
11-29040	MW-8	2011	1	1	0-10	**11**	**7.1**	**6.5**	<1.0	<10	**26**	<20	**1.1**	<0.10	<0.050	<10	<4.0	<9.0	12
C5-12-MW-08-A	MW-8	2012	2	1	0-15	**9.4**	4.8	3.2	<0.50	2.7	**25**	6.8	<0.50	<0.50	<0.050	<10	<10	<10	15
2013-C5-MW-08-A	MW-8	2013	3	1	0 - 15	**19**	**12.0**	**6.7**	<0.10	6.0	**37**	18	<1.0	<0.050	<0.010	<10	<10	<10	15
C514-8WA	MW-8	2014	4	1	0 - 15	6.1	**8.1**	2.7	<0.010	<5.0	16	3.7	<0.20	<0.010	<0.10	<10	<50	<50	**55**
MW08 (0-15)	MW-8	2015	5	1	0 -15	**17.2**	**10.3**	**6.2**	<0.5	5.9	**28.9**	15.2	**2.3**	<0.1	<0.05	<7	<4	<8	10
	MW-8		7	2															#N/A
	MW-8		10	2															#N/A
	MW-8		15	2															#N/A
	MW-8		25	2															#N/A
																			#N/A
																			#N/A
																			#N/A
																			#N/A
	MW # 8 depth																		
11-29042	MW-8	2011	1	1	30-40	**11**	**8.2**	**6.8**	<1.0	<10	**25**	<20	**1.0**	<0.10	<0.050	<10	<4.0	<9.0	12
C5-12-MW-08-B	MW-8	2012	2	1	40-50	**11**	5.1	4.2	<0.50	2.8	**28**	8.1	<0.50	<0.50	<0.050	<10	<10	<10	15
2013-C5-MW-08-B	MW-8	2013	3	1	40 - 50	**20**	**11**	**6.7**	<0.10	6.0	**34**	16	<1.0	<0.050	<0.010	<10	<10	<10	15
C514-8WA	MW-8	2014	4	1	40 - 50	**7.4**	4.5	3.2	<0.010	<4.9	17	4.6	0.20	<0.010	<0.10	<10	<50	<50	**55**
MW08 (40-50)	MW-8	2015	5	1	40 - 50	**8.7**	**5.8**	3.9	<0.5	3.6	20.5	8.3	**1.8**	<0.1	<0.05	<7	<4	<8	10
	MW-8		7	2															#N/A
	MW-8		10	2															#N/A
	MW-8		15	2															#N/A
	MW-8		25	2															#N/A
																			#N/A
																			#N/A
																			#N/A
																			#N/A
																			#N/A

Note: Modified TPH Total (C_6-C_{34}) has been calculated by adding results for F1, F2 and F3.

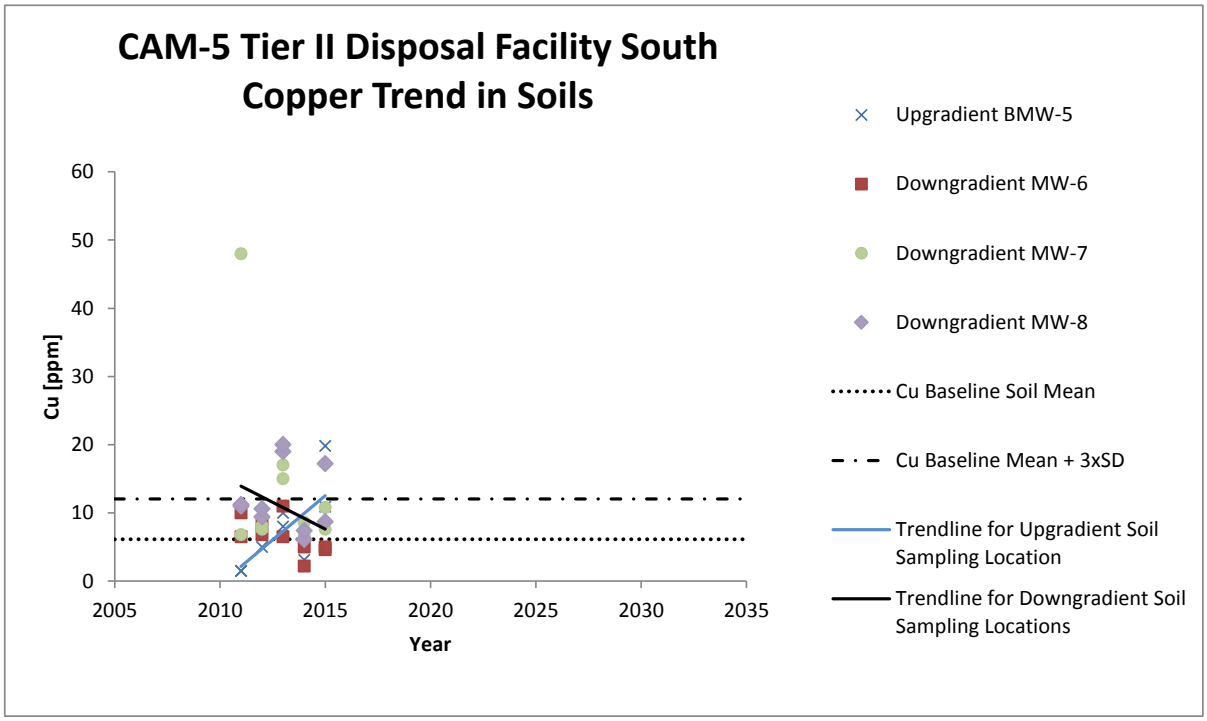
Legend

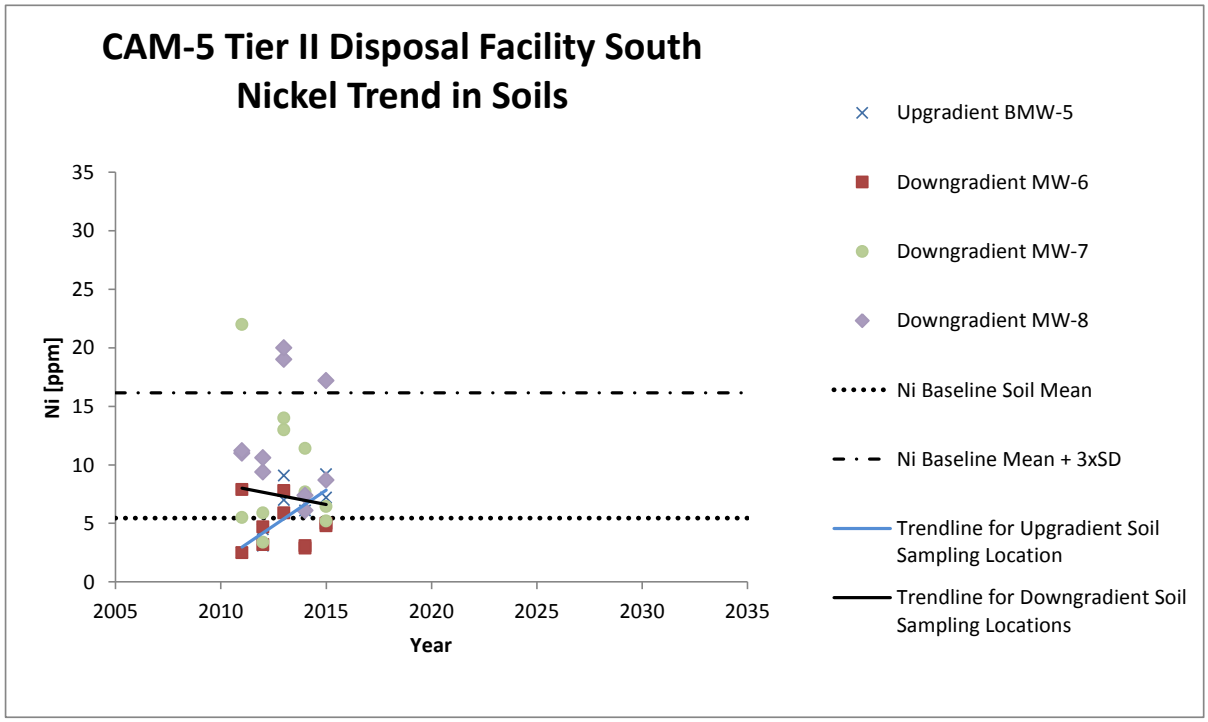
XX	sample exceeds background
XX	**sample exceeds baseline**
XX	*sample exceeds DLCU Tier I criteria*
XX	*sample exceeds DLCU Tier II criteria*

CAM-5 Tier II Disposal Facility South 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 for the sample points.

Trendlines are intended for visual interpretation of temporal trends. When all monitoring results are below detection, trendlines are a reflection of changes in detection limit. Users should refer to data tables.

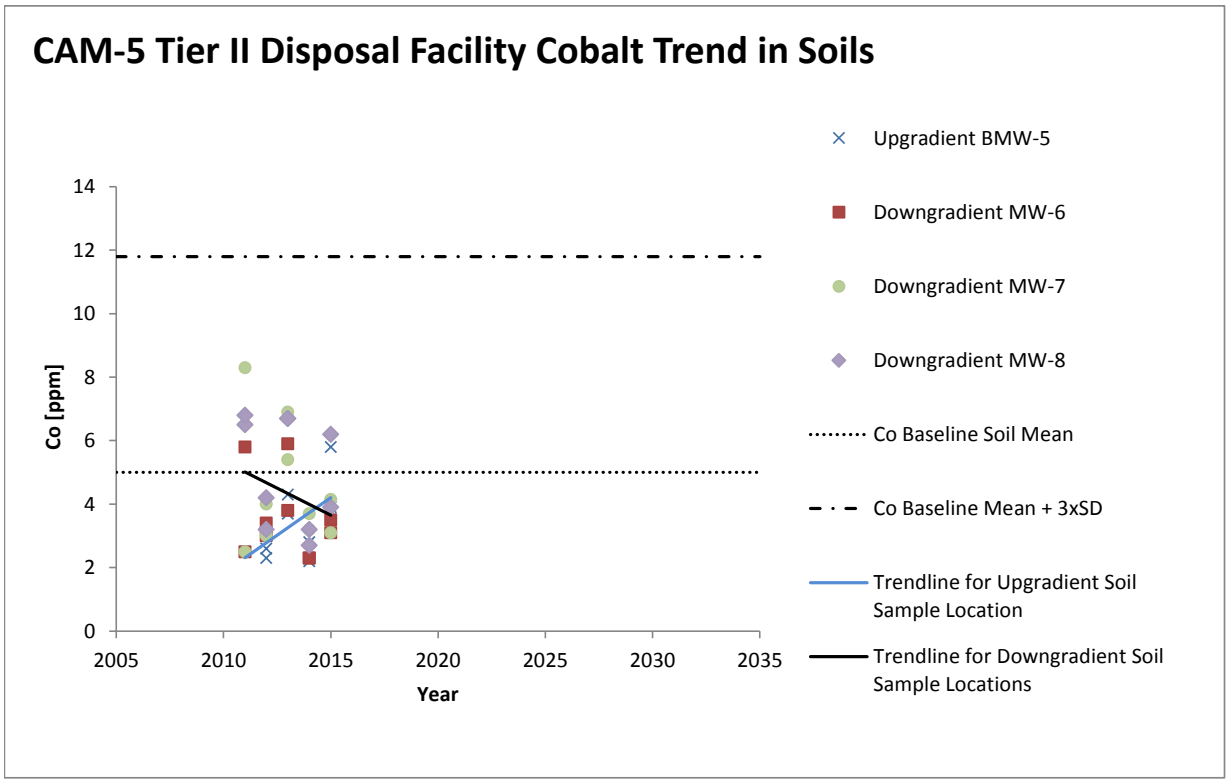




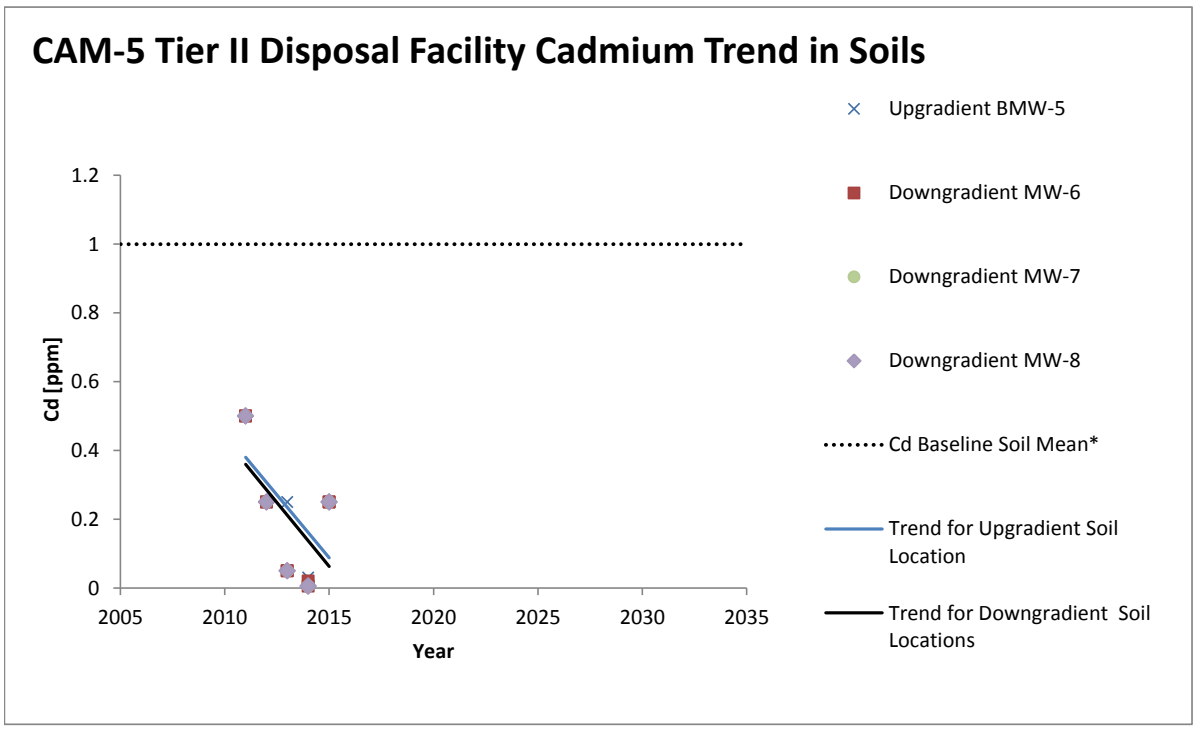
CAM-5 Tier II Disposal Facility South Trends in Soil Inorganics, PCBs and PHCs (modified TPH)

Where results are below detection, half of the detection limit has been used in the charts for the sample points.

Trendlines are intended for visual interpretation of temporal trends. When all monitoring results are below detection, trendlines are a reflection of changes in detection limit. Users should refer to data tables.



*Co Baseline Mean is equal to the baseline detection limit.



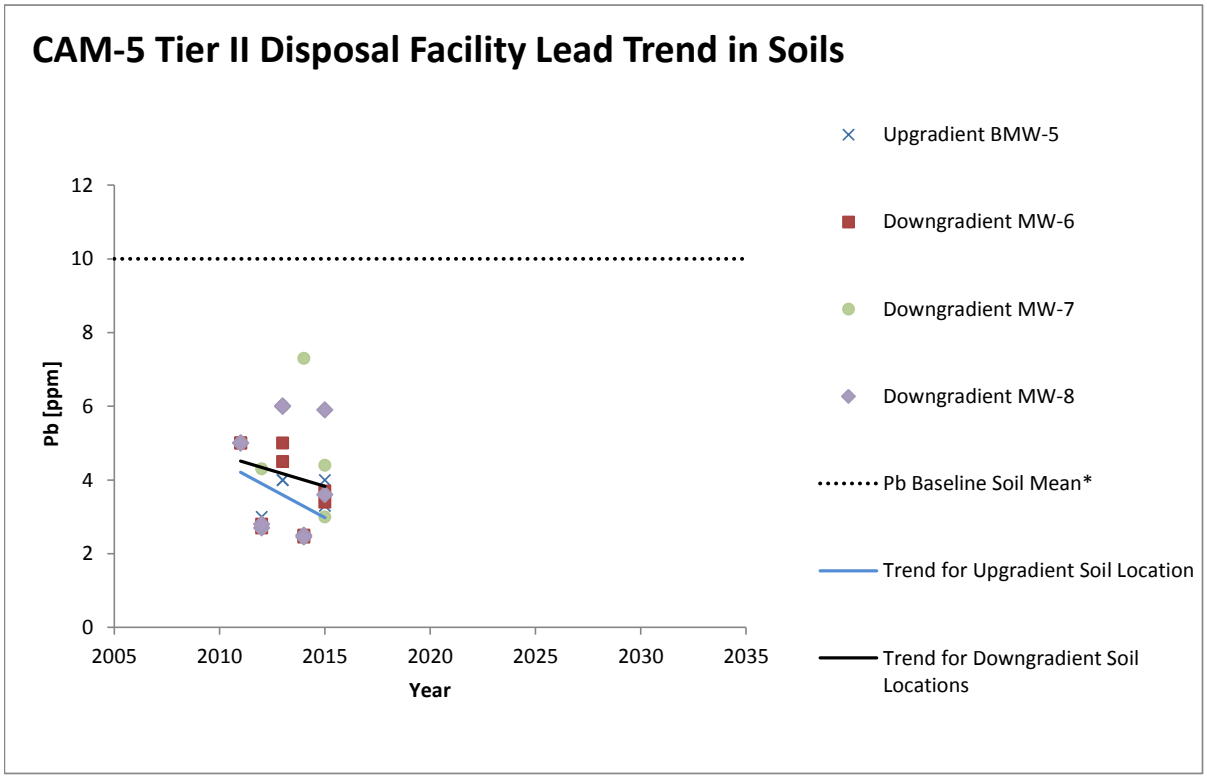
*Cd Baseline Mean is equal to the baseline detection limit.

**Cd Baseline SD = 0

CAM-5 Tier II Disposal Facility South Trends in Soil Inorganics, PCBs and PHCs (modified TPH)

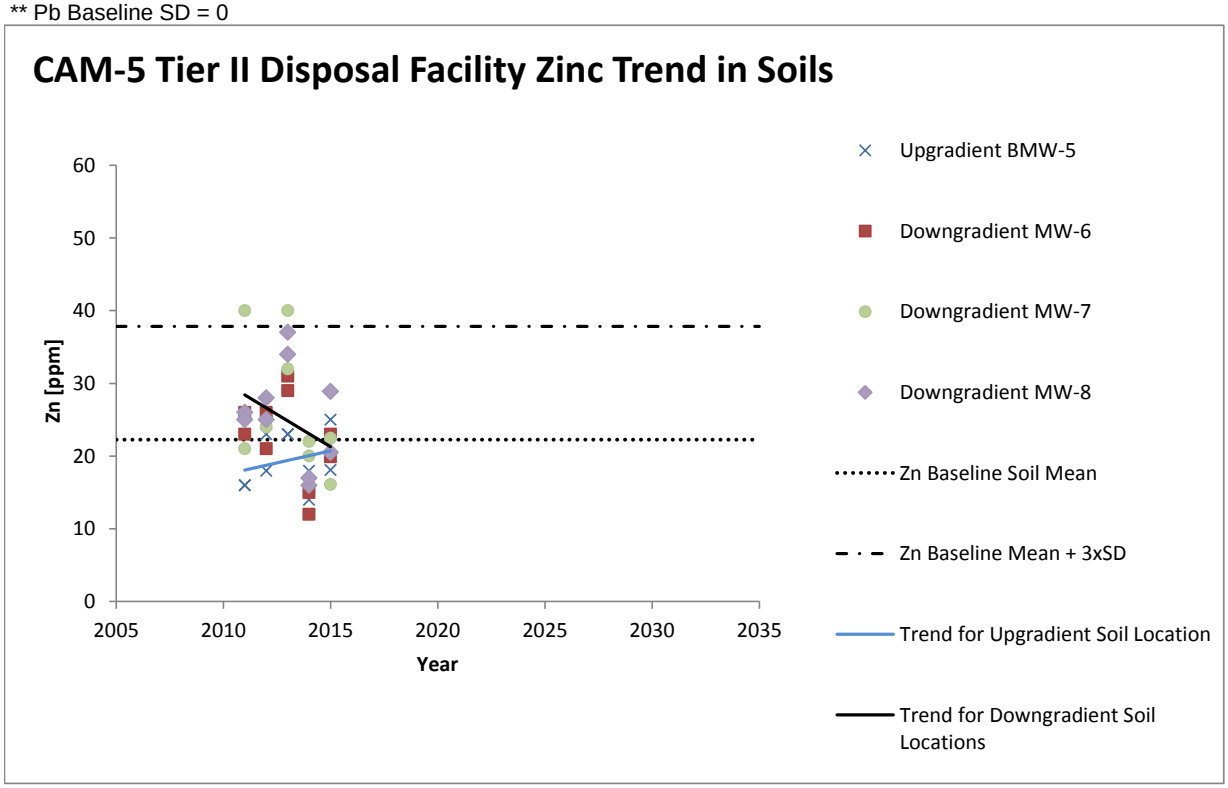
Where results are below detection, half of the detection limit has been used in the charts for the sample points.

Trendlines are intended for visual interpretation of temporal trends. When all monitoring results are below detection, trendlines are a reflection of changes in detection limit. Users should refer to data tables.



*Pb Baseline Mean is equal to the baseline detection limit.

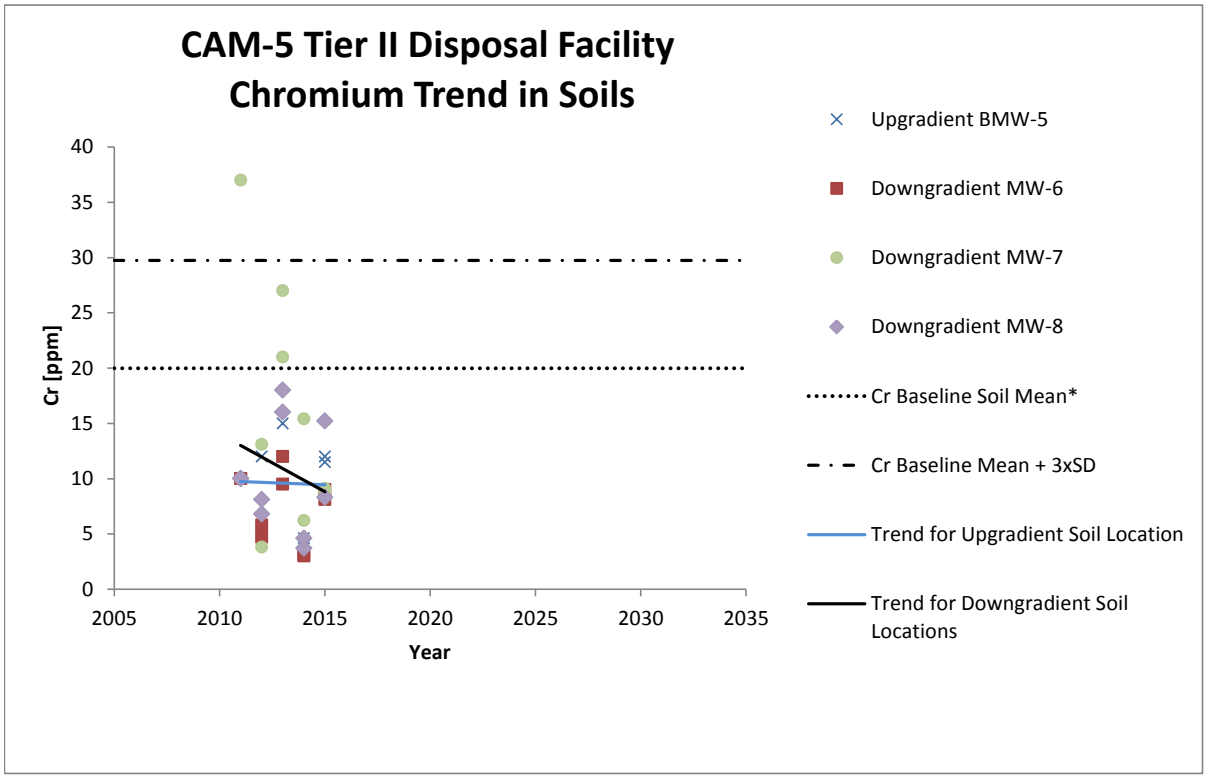
** Pb Baseline SD = 0



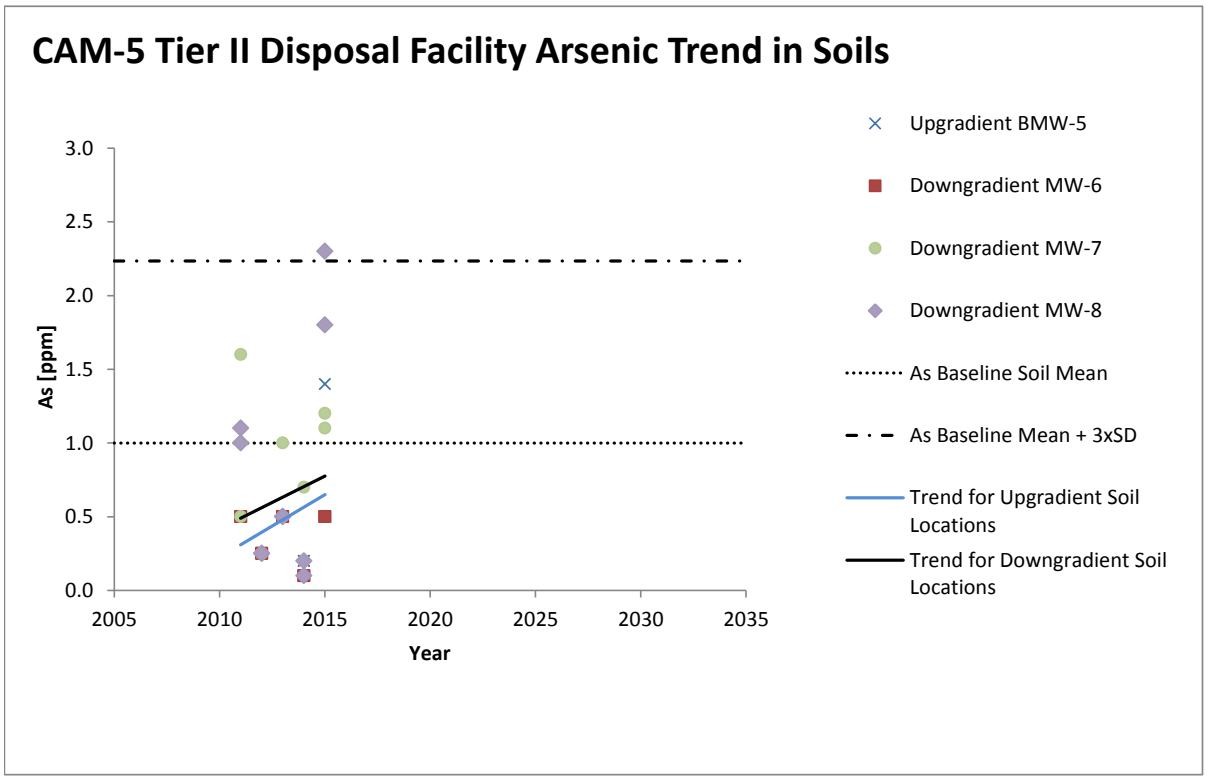
CAM-5 Tier II Disposal Facility South Trends in Soil Inorganics, PCBs and PHCs (modified TPH)

Where results are below detection, half of the detection limit has been used in the charts for the sample points.

Trendlines are intended for visual interpretation of temporal trends. When all monitoring results are below detection, trendlines are a reflection of changes in detection limit. Users should refer to data tables.



*Cr Baseline Mean is equal to the baseline detection limit.

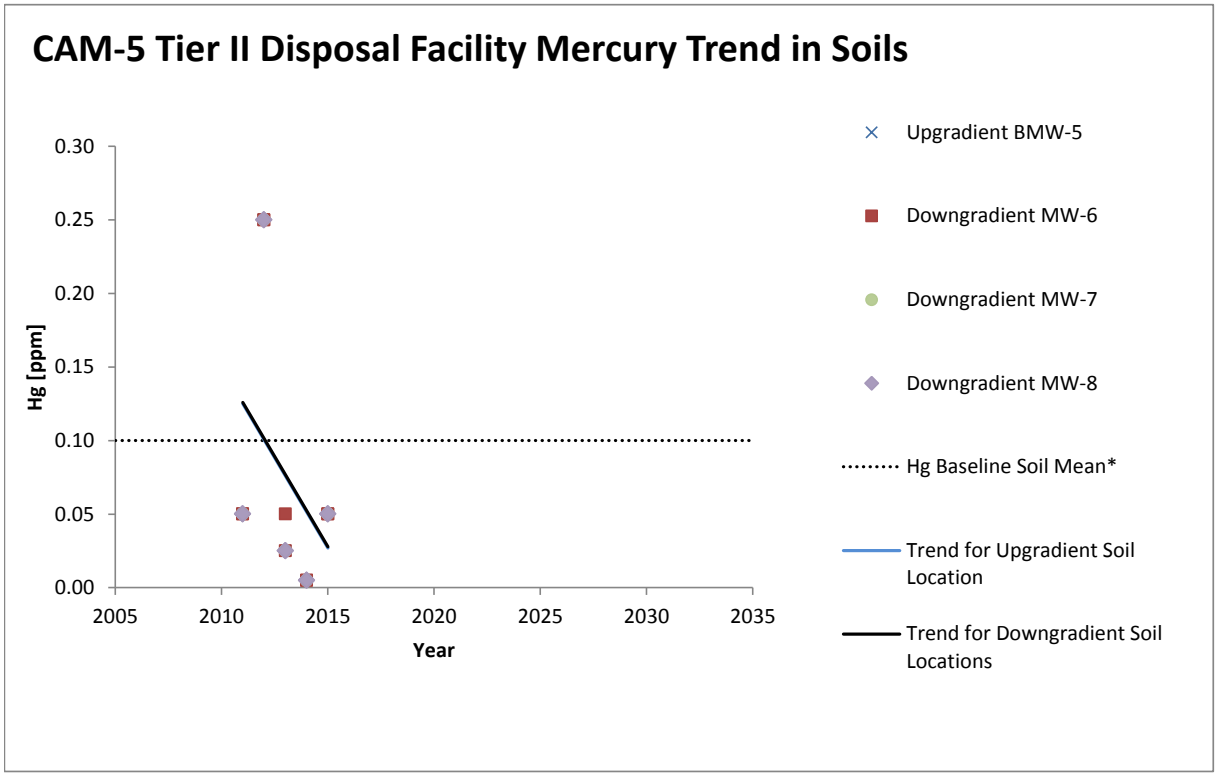


*As Baseline Mean is equal to the baseline detection limit.

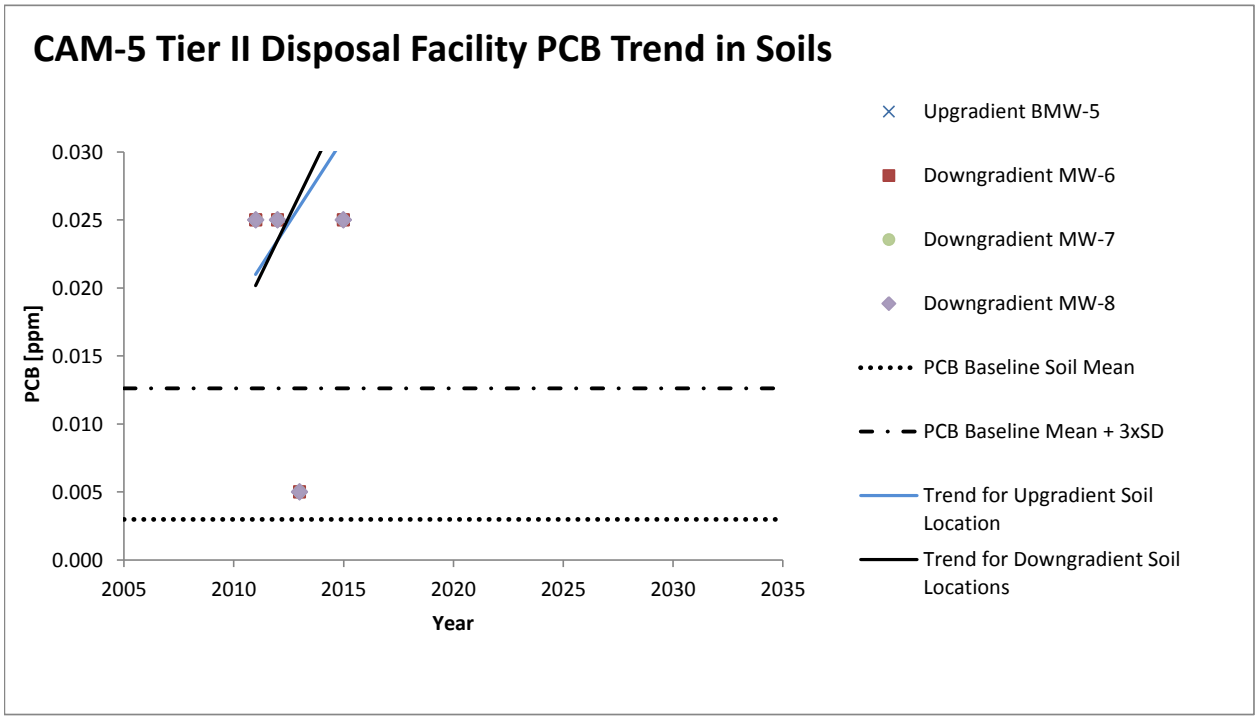
CAM-5 Tier II Disposal Facility South Trends in Soil Inorganics, PCBs and PHCs (modified TPH)

Where results are below detection, half of the detection limit has been used in the charts for the sample points.

Trendlines are intended for visual interpretation of temporal trends. When all monitoring results are below detection, trendlines are a reflection of changes in detection limit. Users should refer to data tables.



*Hg Baseline Mean is equal to the baseline detection limit.

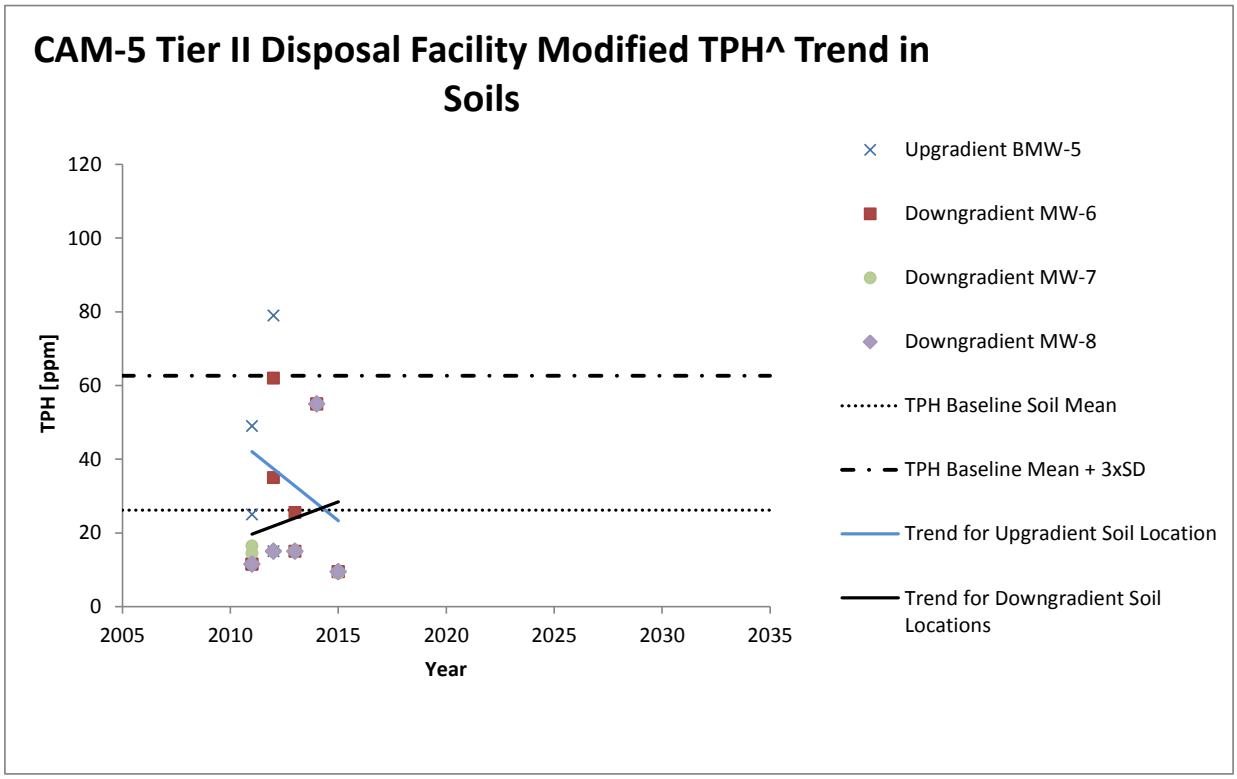


PCB Baseline Mean is equal to the baseline detection limit.

CAM-5 Tier II Disposal Facility South 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 for the sample points.

Trendlines are intended for visual interpretation of temporal trends. When all monitoring results are below detection, trendlines are a reflection of changes in detection limit. Users should refer to data tables.



^ Modified TPH is Sum of F1, F2 and F3 fractions (C_6 - C_{34})

CAM-5 - Tier II Disposal Facility South- Summary of Monitoring 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 PCB (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)
Baseline Data																		
Upgradient:																		
08-27206	BMW-5	2008			0.010	0.011	<0.0030	<0.0010	<0.0010	<0.0050	0.024	<0.0030	<0.00040	<0.000020	<0.050	<0.50	<1.0	0.8
Downgradient:																		
09-22816	MW-6	2009			0.010	0.010	<0.0030	<0.0010	<0.010	<0.010	0.030	<0.0030	<0.00040	<0.000020	<0.050	2.2	<1.0	2.7
09-22815	MW-7	2009			<0.0050	0.0060	<0.0030	<0.0010	<0.010	<0.010	<0.0050	<0.0030	<0.00040	<0.000020	<0.050	1.4	<1.0	1.9
09-22814	MW-8	2009			0.067	0.054	0.0030	<0.0010	<0.010	0.020	0.040	<0.0030	<0.00040	<0.000020	<0.050	<0.50	<1.0	0.8
10-27889	MW-6	2010			<0.0050	<0.0050	<0.0030	<0.0010	<0.010	<0.010	0.010	<0.0030	<0.00040	<0.000020	<0.050	<0.50	<1.0	0.8
10-27884	MW-7	2010			<0.0050	<0.0050	<0.0030	<0.0010	<0.010	<0.010	0.009	<0.0030	<0.00040	<0.000020	<0.050	<0.50	<1.0	0.8
10-27879	MW-8	2010			0.011	0.0090	<0.0030	0.0030	<0.010	0.056	0.029	<0.0030	<0.00040	<0.000020	<0.050	<0.50	<1.0	0.8
		N value			7	7	7	7	7	7	7	7	7	7				7
	Baseline Arithmetic Mean				0.015	0.014	0.0017	0.00086	0.0044	0.014	0.021	0.0015	0.0002	0.0000100				0.69
	Baseline Arithmetic Mean Corrected for Detection Limit				**0.015**	**0.014**	**0.0030**	**0.0010**	**0.010**	**0.010**	**0.021**	**0.003**	**0.0004**	**0.00002**				**1.0**
	Standard Deviation				0.023	0.018	0.00057	0.00094	0.0017	0.019	0.014	0.0	0.0	0.0				0.79
	Baseline Arithmetic Mean + 3xStandard Deviation				0.085	0.068	0.0047	0.0038	0.0151	0.068	0.062	0.003	0.00040	0.000020				3.1
	Detection Limit				0.005	0.005	0.003	0.001	0.010	0.0100	0.005	0.003	0.0004	0.00002				1.0
Monitoring Data																		
Upgradient - MW- 5																		
No sample collected	MW-5	2011	1	1														#N/A
No sample collected	MW-5	2012	2	1														#N/A
2013-C5-MW-05 - no sample, insufficient volume	MW-5	2013	3	1														#N/A
No sample, well dry	MW-5	2014	4	1														#N/A
No sample, well dry	MW-5	2015	5	1														#N/A
	MW-5		7	2														#N/A
	MW-5		10	2														#N/A
	MW-5		15	2														#N/A
	MW-5		25	2														#N/A
																		#N/A
																		#N/A

Modified TPH TOTAL will appear when F1, F2, F3 fraction results are entered.

CAM-5 - Tier II Disposal Facility South- Summary of Monitoring Groundwater Analytical Data

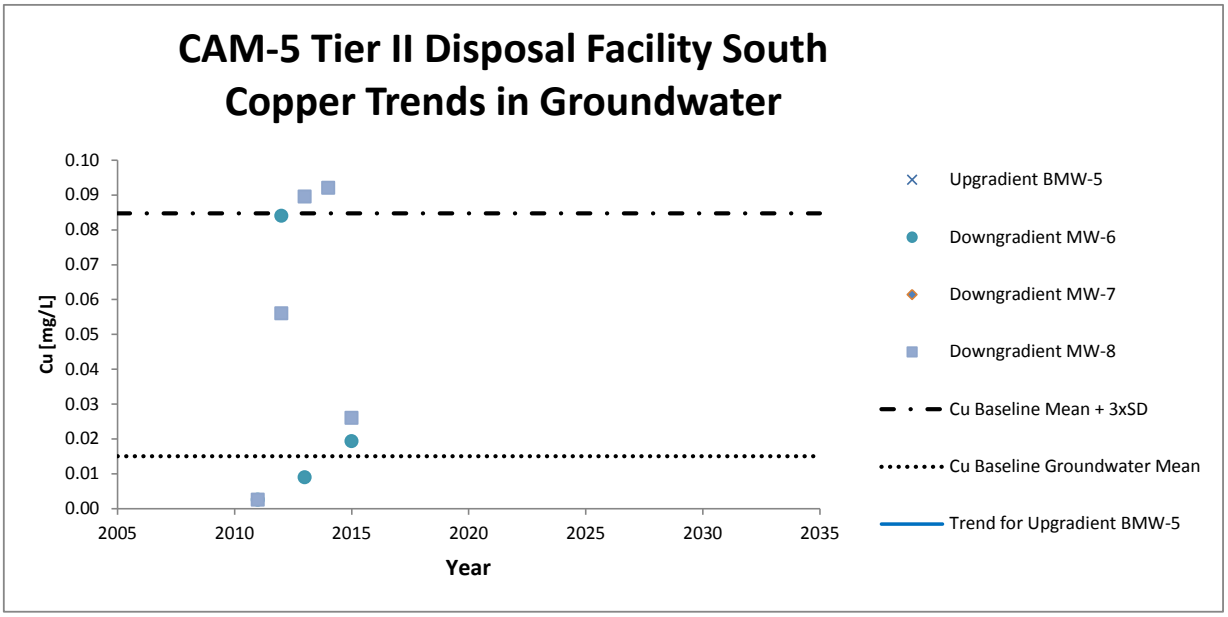
Sample ID	Location	Date	Monitoring Year	Monitoring Phase	Cu (mg/L)	Ni (mg/L)	Co (mg/L)	Cd (mg/L)	Pb (mg/L)	Zn (mg/L)	Cr (mg/L)	As (mg/L)	Hg (mg/L)	Total PCB (mg/L)	F1 C_6-C_{10} (mg/L)	F2 C_{10}-C_{16} (mg/L)	F3 C_{16}-C_{34} (mg/L)	Modified TPH^ - Total C6-C34 (mg/L)
Downgradient - MW-6																		
11-29110/11	MW-6	2011	1	1	<0.0050	**0.29**	<0.0030	<0.0010	<0.010	<0.045	0.018	<0.0030	<0.00040	<0.0030	<0.050	<0.50	<1.0	0.8
C5-12-MW-06	MW-6	2012	2	1	**0.084**	**0.21**	**0.0050**	**0.0027**	0.0090	**0.081**	**0.21**	0.0020	<0.000025	<0.00001	<0.10	<0.10	<0.10	0.2
2013-C5-MW-06	MW-6	2013	3	1	0.0089	0.012	0.0012	0.000051	0.0016	**0.013**	**0.02**	0.00054	<0.000010	<0.00001	<0.025	<0.10	<0.10	0.1
No sample, insufficient water	MW-6	2014	4	1														#N/A
MW06	MW-6	2015	5	1	**0.0193**	**0.018**	0.0028	<0.0005	0.0006	<0.025	0.02	<0.005	<0.0001	<0.00005	<0.025	<0.1	<0.1	0.1
	MW-6		7	2														#N/A
	MW-6		10	2														#N/A
	MW-6		15	2														#N/A
	MW-6		25	2														#N/A
																		#N/A
																		#N/A
																		#N/A
																		#N/A
Downgradient - MW-7																		
No sample collected	MW-7	2011	1	1														#N/A
No sample collected	MW-7	2012	2	1														#N/A
2013-C5-MW-07 no sample, insufficient volume	MW-7	2013	3	1														#N/A
No sample, well dry	MW-7	2014	4	1														#N/A
No sample, frozen	MW-7	2015	5	1														#N/A
	MW-7		7	2														#N/A
	MW-7		10	2														#N/A
	MW-7		15	2														#N/A
	MW-7		25	2														#N/A
																		#N/A
																		#N/A
Downgradient - MW-8																		
11-29112	MW-8	2011	1	1	<0.005	**0.027**	<0.0030	<0.0010	<0.010	**0.09**	**0.065**	<0.0030	<0.00040	<0.0030	<0.050	<0.50	<1.0	0.78
C5-12-MW-08	MW-8	2012	2	1	**0.0560**	**0.0470**	**0.0090**	0.0001	**0.01**	**0.054**	**0.081**	0.0010	<0.000025	<0.00001	<0.10	<0.10	<0.10	0.15
2013-C5-MW-08/08-D	MW-8	2013	3	1	**0.090**	**0.071**	**0.015**	0.000051	**0.013**	**0.088**	**0.20**	**0.0032**	<0.000010	<0.00001	<0.025	<0.10	<0.10	0.11
C514-8W	MW-8	2014	4	1	**0.092**	**0.049**	**0.016**	0.000050	**0.012**	**0.092**	**0.068**	**0.0040**	<0.000020	<0.00010	<0.20	<0.20	<0.10	0.25
MW08 (Dup Avg)	MW-8	2015	5	1	**0.026**	0.0075	0.001	0.00004	0.004	0.009	0.0065	0.001	<0.0001	<0.00005	<0.025	<0.1	<0.1	0.1
	MW-8		7	2														#N/A
	MW-8		10	2														#N/A
	MW-8		15	2														#N/A
	MW-8		25	2														#N/A
																		#N/A
																		#N/A

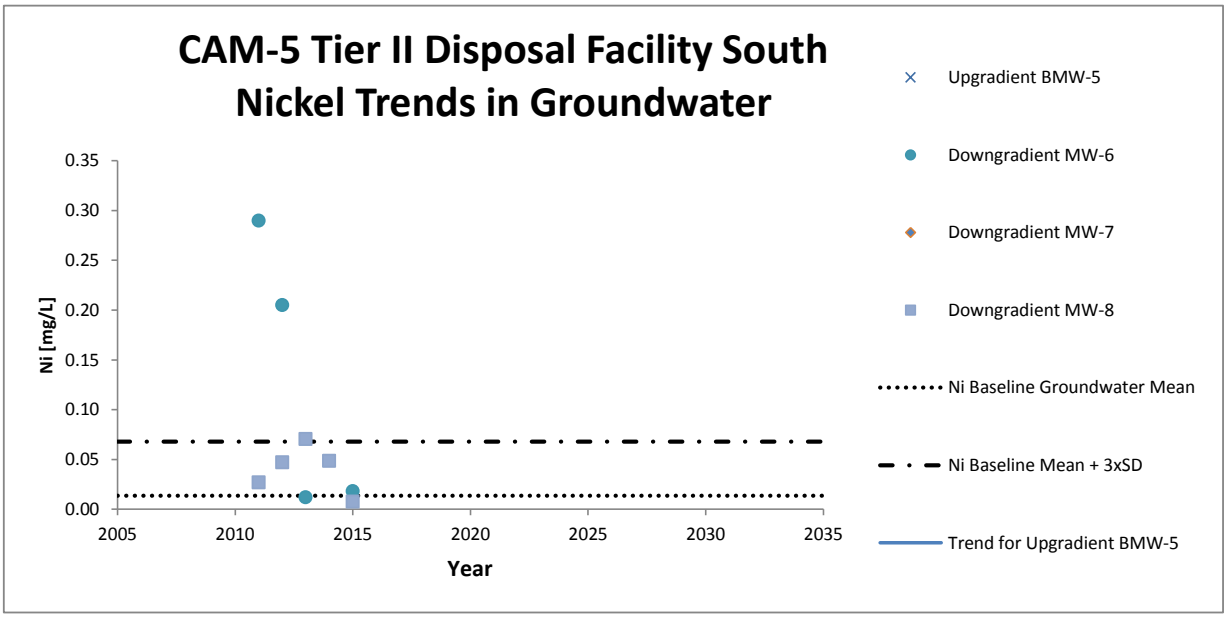
Note: Modified TPH Total (C_6-C_{34}) has been calculated by adding results for F1, F2 and F3.

CAM-5 Tier II Disposal Facility South 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 for the sample points.

Trendlines are intended for visual interpretation of temporal trends. When all monitoring results are below detection, trendlines reflection of changes in detection limit. Users should refer to data tables.

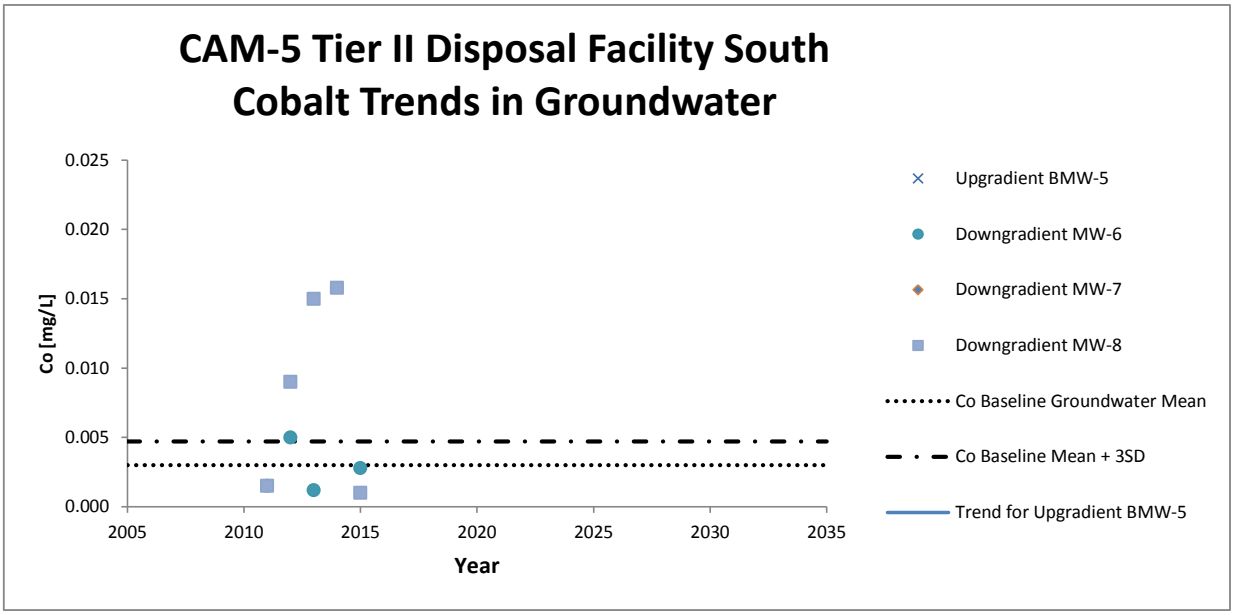




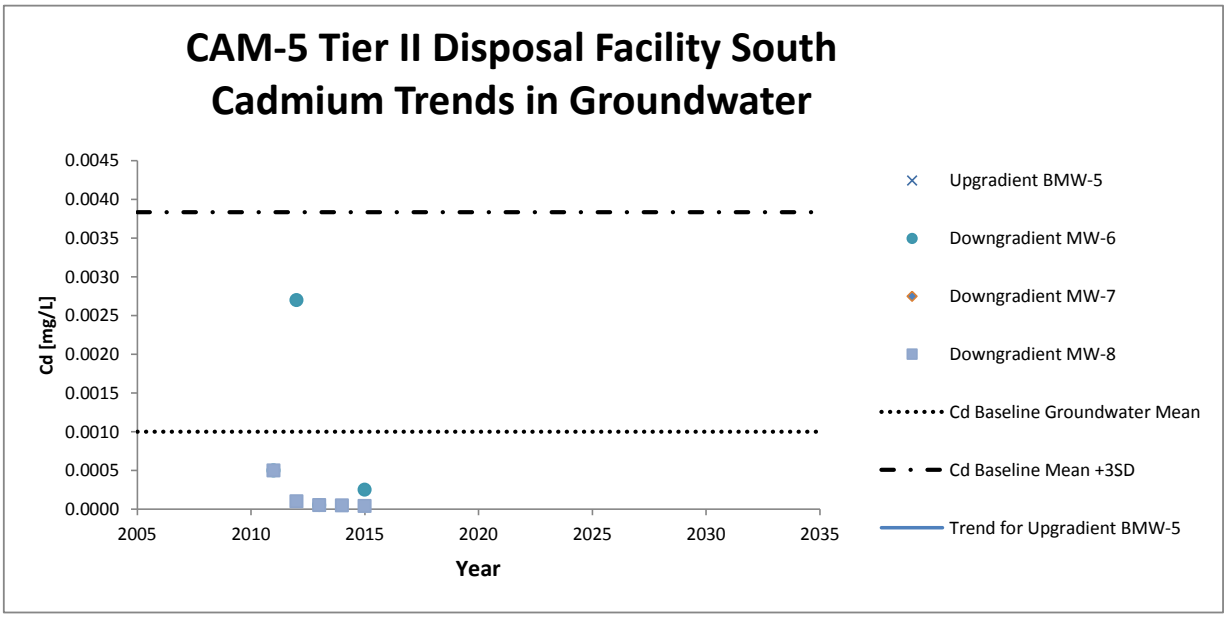
CAM-5 Tier II Disposal Facility South Graphs of Trends for Inorganic Elements, PCBs and TPH in Groundwater Samples

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Trendlines are intended for visual interpretation of temporal trends. When all monitoring results are below detection, trendlines reflection of changes in detection limit. Users should refer to data tables.



Co Baseline Mean equals the baseline detection limit

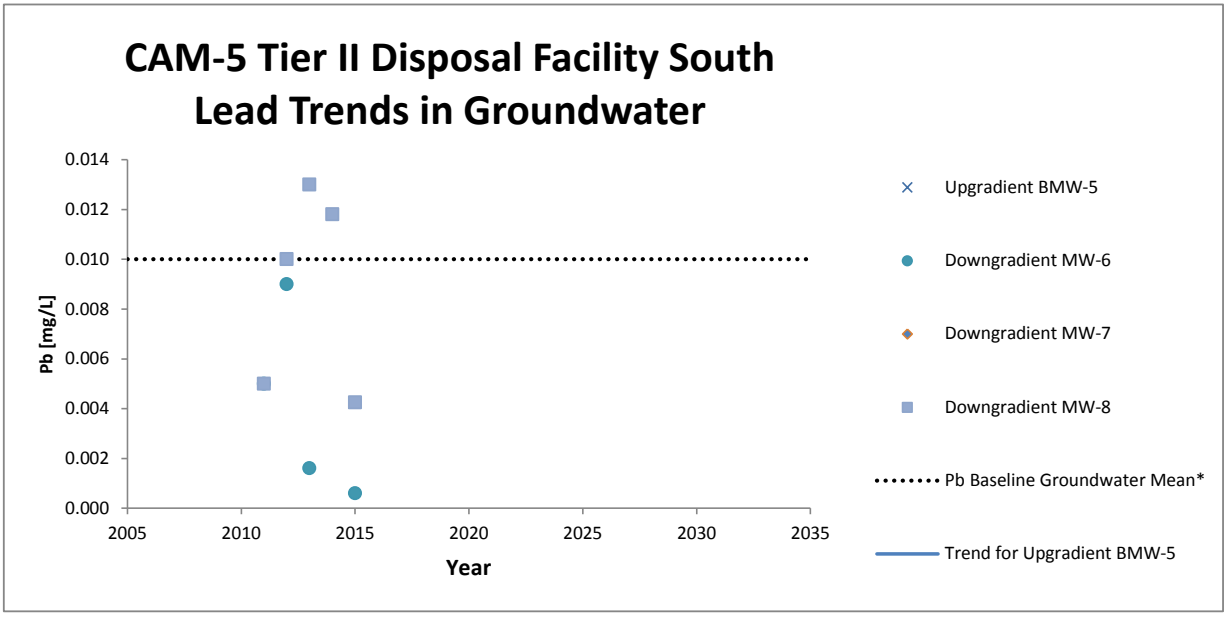


Cd Baseline Mean equals the baseline detection limit

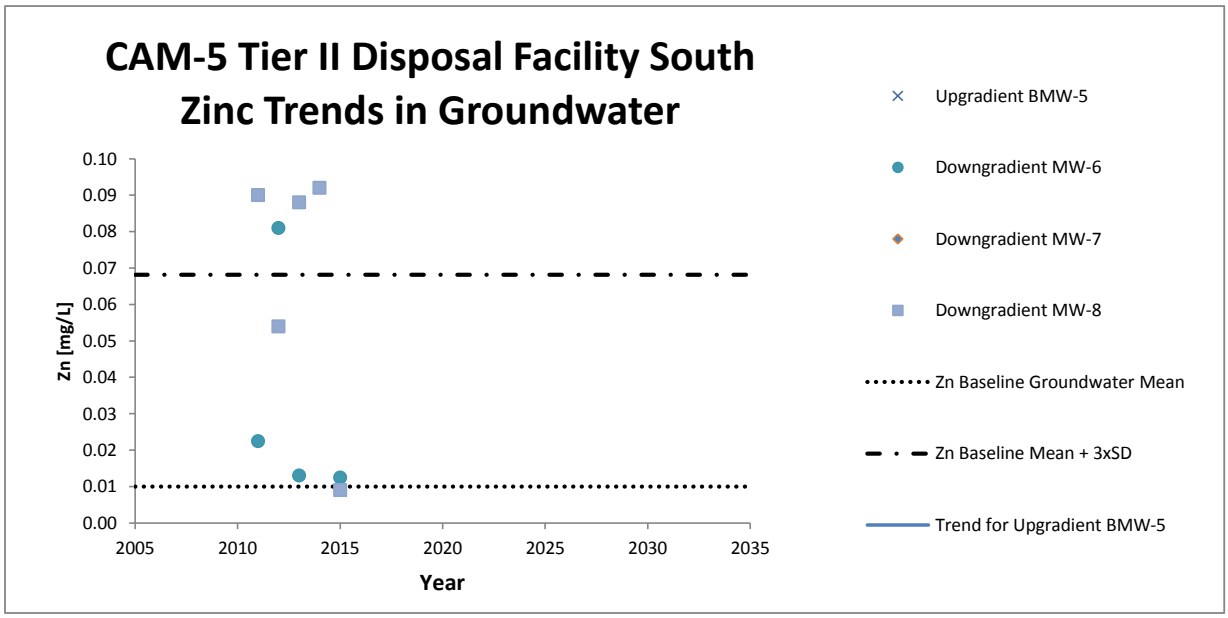
CAM-5 Tier II Disposal Facility South Graphs of Trends for Inorganic Elements, PCBs and TPH in Groundwater Samples

Where results are below detection, half of the detection limit has been used in the charts for the sample points.

Trendlines are intended for visual interpretation of temporal trends. When all monitoring results are below detection, trendlines reflection of changes in detection limit. Users should refer to data tables.



*Pb Baseline Mean is equal to the baseline detection limit.
*Pb Baseline SD=0

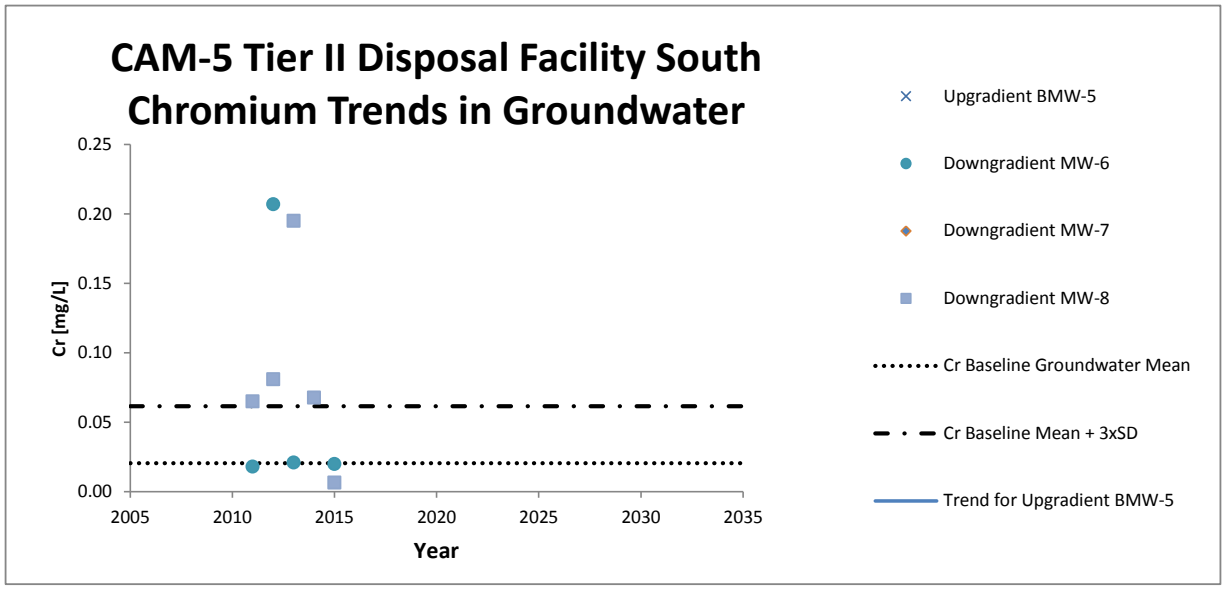


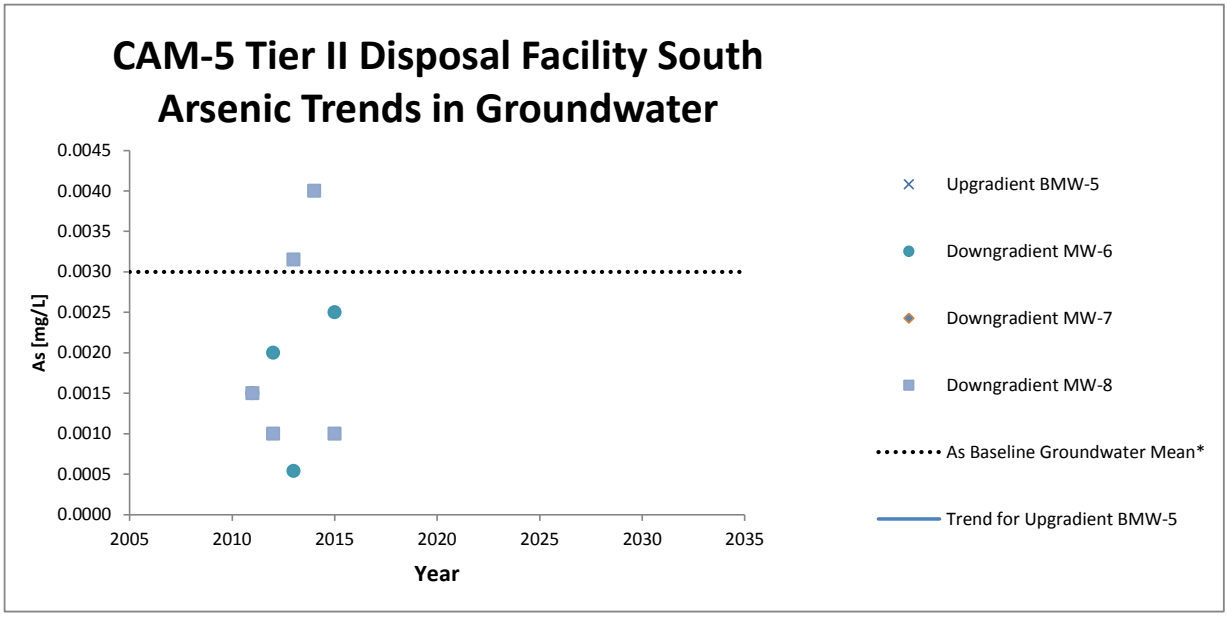
Zn Baseline Mean equals the baseline detection limit

CAM-5 Tier II Disposal Facility South 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 for the sample points.

Trendlines are intended for visual interpretation of temporal trends. When all monitoring results are below detection, trendlines reflection of changes in detection limit. Users should refer to data tables.



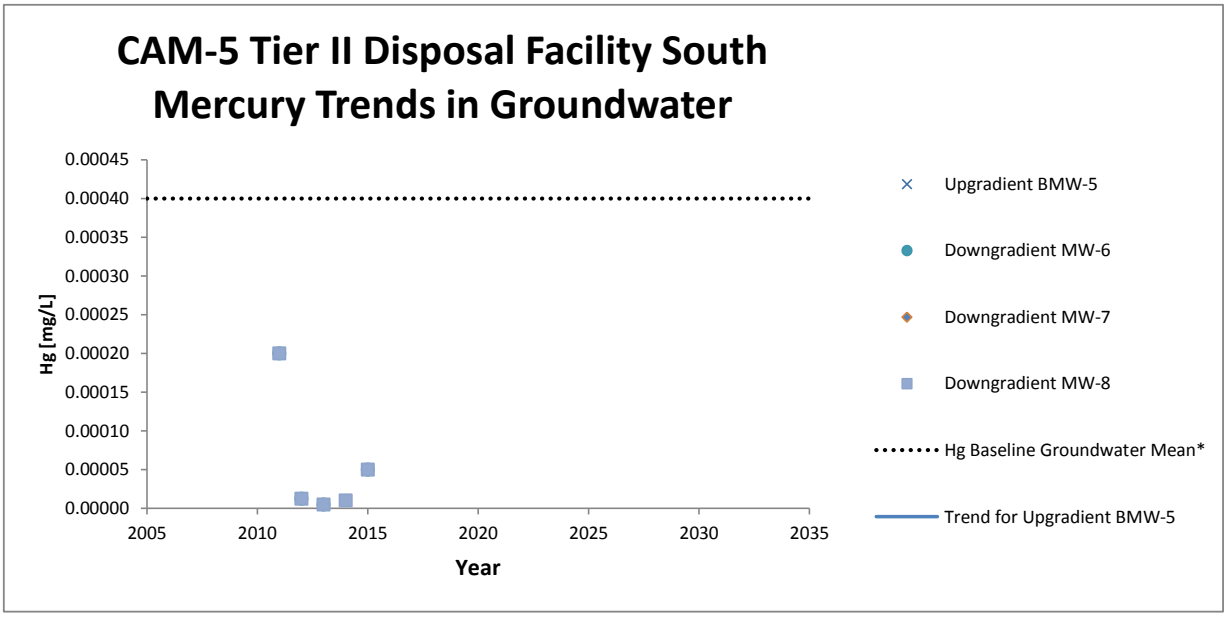


*As Baseline Mean is equal to the baseline detection limit.
*As Baseline SD = 0

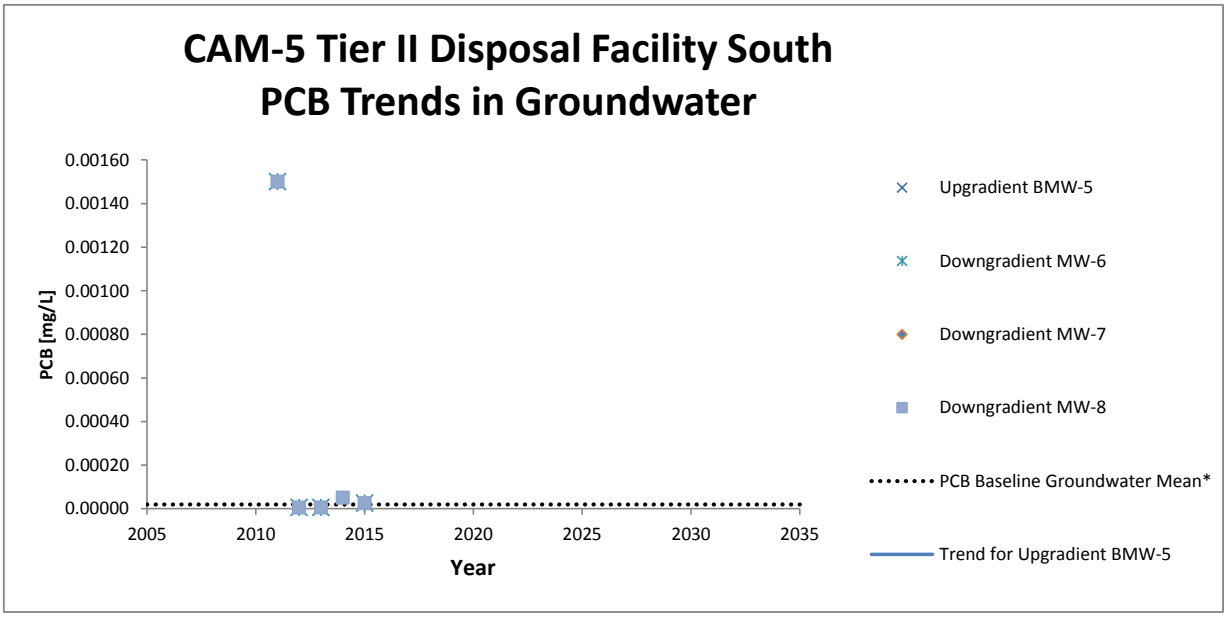
CAM-5 Tier II Disposal Facility South Graphs of Trends for Inorganic Elements, PCBs and TPH in Groundwater Samples

Where results are below detection, half of the detection limit has been used in the charts for the sample points.

Trendlines are intended for visual interpretation of temporal trends. When all monitoring results are below detection, trendlines reflection of changes in detection limit. Users should refer to data tables.



*Hg Baseline Mean is equal to the baseline detection limit.
*Hg Baseline SD = 0

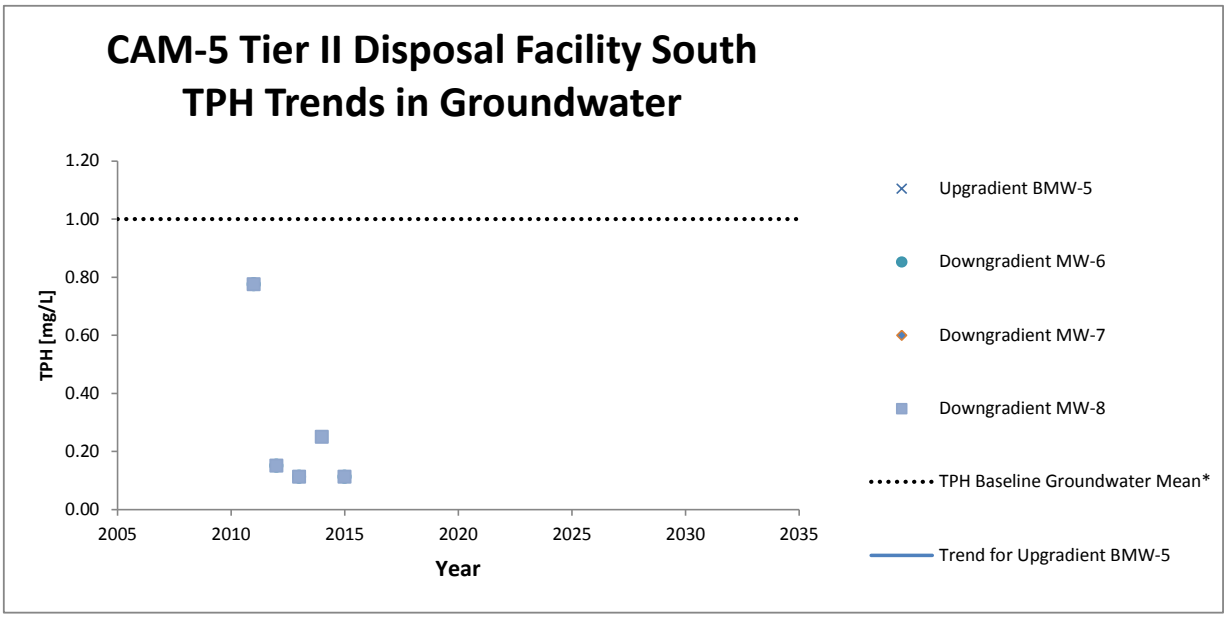


*PCB Baseline Mean is equal to the baseline detection limit.
*PCB Baseline SD = 0

CAM-5 Tier II Disposal Facility South 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 for the sample points.

Trendlines are intended for visual interpretation of temporal trends. When all monitoring results are below detection, trendlines reflection of changes in detection limit. Users should refer to data tables.



*TPH Baseline Mean is equal to the baseline detection limit.

CAM-5 - Non Hazardous Waste Landfill - Summary of Monitoring 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)
Background Data - Arithmetic Mean*						10	14	9.5	1.1	10	31	22	0.83	N/A	0.0				N/A
Baseline Data - Arithmetic Mean*						**12**	**7.1**	**5.0**	**1.0**	**10**	**26**	**20**	**1.0**	**0.10**	**0.003**				**30**
Baseline Data - Standard Deviation						9.0	2.8	1.9	0.0	0.0	6.2	0.0	0.31	0.0	0.0032				32
Baseline Data Mean + 3xStandard Deviation						39	15	11	1.0	10	44	20	1.9	0.10	0.013				125
**** If baseline or background arithmetic mean was below the detection limit, the mean 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*	*2.0*	*5*				*2500*
Monitoring Data																			**TPH Sum will appear when F1, F2 and F3 fractions are entered.**
Upgradient																			
	MW-12 surface																		
11-29060	MW-12	2011	1	1	0-10	9.1	7.1	**6.0**	<1.0	<10	**27**	<20	<1.0	<0.10	<0.050	<10	<4.0	<9.0	12
2013-C5-MW-12-A	MW-12	2013	3	1	0-15	**18**	**11**	**6.5**	<0.10	6.0	**41**	17	<1.0	<0.050	<0.010	<10	<10	<10	15
MW12 (0-15)	MW-12	2015	5	1	0-15	11	6	3.8	<0.5	6	22	12	**1.2**	<0.1	<0.1	<7	<4	<8	10
	MW-12		7	2															#N/A
	MW-12		10	2															#N/A
	MW-12		15	2															#N/A
	MW-12		25	2															#N/A
																			#N/A
																			#N/A
																			#N/A
																			#N/A
	MW-12 depth																		
11-29062	MW-12	2011	1	1	30-40	8.1	6.6	**5.7**	<1.0	<10	23	<20	<1.0	<0.10	<0.050	<10	<4.0	<9.0	12
2013-C5-MW-12-B	MW-12	2013	3	1	40-50	**25**	**12**	**6.9**	<0.10	6.0	**40**	**20**	<1.0	<0.050	<0.010	<10	<10	<10	15
MW12 (40-50) (Dup Avg)	MW-12	2015	5	1	40-50	11	6	3.8	<0.5	6	22	12	**1.2**	<0.1	<0.1	<6	<4	<8	9
	MW-12		7	2															#N/A
	MW-12		10	2															#N/A
	MW-12		15	2															#N/A
	MW-12		25	2															#N/A
																			#N/A
																			#N/A
																			#N/A
																			#N/A
																			#N/A

CAM-5 - Non Hazardous Waste Landfill - Summary of Monitoring 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)
Downgradient																			
	MW-9 surface																		
11-29064	MW-9	2011	1	1	0-10	**13**	**8.8**	**6.6**	<1.0	<10	**34**	<20	<1.0	<0.10	<0.050	<10	7.1	63	**75**
2013-C5-MW-09-A	MW-9	2013	3	1	0-15	**32**	**15**	**5.9**	<0.10	6.0	**47**	17	<1.0	<0.050	<0.010	<10	<10	25	**35**
MW09 (0-15)	MW-9	2015	5	1	0-15	8.3	**8.5**	**5.5**	<0.5	5.7	**34.8**	13.7	**1.2**	<0.1	<0.05	<7	<4	<8	10
	MW-9		7	2															#N/A
	MW-9		10	2															#N/A
	MW-9		15	2															#N/A
	MW-9		25	2															#N/A
																			#N/A
																			#N/A
																			#N/A
																			#N/A
																			#N/A
	MW-9 depth																		
11-29066	MW-9	2011	1	1	30-40	**16**	**11**	**6.8**	<1.0	<10	**35**	**21**	<1.0	<0.10	<0.050	<10	<4.0	25	**32**
2013-C5-MW-09-B	MW-9	2013	3	1	40-50	**16**	**13**	**7.0**	<0.10	7.0	**50**	17	<1.0	<0.050	<0.010	<10	<10	11	21
MW09 (40-50)	MW-9	2015	5	1	40-50	**12.2**	**8.1**	4.9	<0.5	5.2	**29.1**	12.4	**1**	<0.1	<0.05	<7	<4	<8	10
	MW-9		7	2															#N/A
	MW-9		10	2															#N/A
	MW-9		15	2															#N/A
	MW-9		25	2															#N/A
																			#N/A
																			#N/A
																			#N/A
																			#N/A

CAM-5 - Non Hazardous Waste Landfill - Summary of Monitoring 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)
	MW-11 surface																		
11-29056	MW-11	2011	1	1	0-10	6.0	**7.9**	**5.3**	<1.0	<10	23	<20	<1.0	<0.10	<0.050	17	<4.0	<9.0	24
2013-C5-MW-11-A/11-A-D	MW-11	2013	3	1	0-15	11	**11**	**5.2**	<0.10	4.0	**27**	19	<1.0	<0.050	<0.010	<10	<10	<10	15
MW11 (0-15)	MW-11	2015	5	1	0-15	10.2	**13.3**	**5.7**	<0.5	4.3	**26.3**	**23.5**	**1.4**	<0.1	<0.05	<7	<4	<8	10
	MW-9		7	2															#N/A
	MW-9		10	2															#N/A
	MW-9		15	2															#N/A
	MW-9		25	2															#N/A
																			#N/A
																			#N/A
																			#N/A
																			#N/A
																			#N/A
	MW-11 depth																		
11-29058/59	MW-11	2011	1	1	30-40	8.2	**11**	**7.1**	<1.0	<10	**29**	<20	<1.0	<0.10	<0.050	<10	<4.0	<9.0	12
2013-C5-MW-11-B	MW-11	2013	3	1	40-50	11	**12**	**5.6**	<0.10	5.0	**26**	**20**	<1.0	<0.050	<0.010	<10	<10	<10	15
No sample, refusal	MW-11	2015	5	1															#N/A
	MW-9		7	2															#N/A
	MW-9		10	2															#N/A
	MW-9		15	2															#N/A
	MW-9		25	2															#N/A
																			#N/A
																			#N/A
																			#N/A
																			#N/A

Legend

XX	sample exceeds background
XX	**sample exceeds baseline**
XX	*sample exceeds DLCU Tier I criteria*
XX	*sample exceeds DLCU Tier II criteria*

Note: Modified TPH Total (C_6-C_{34}) has been calculated by adding results for F1, F2 and F3.

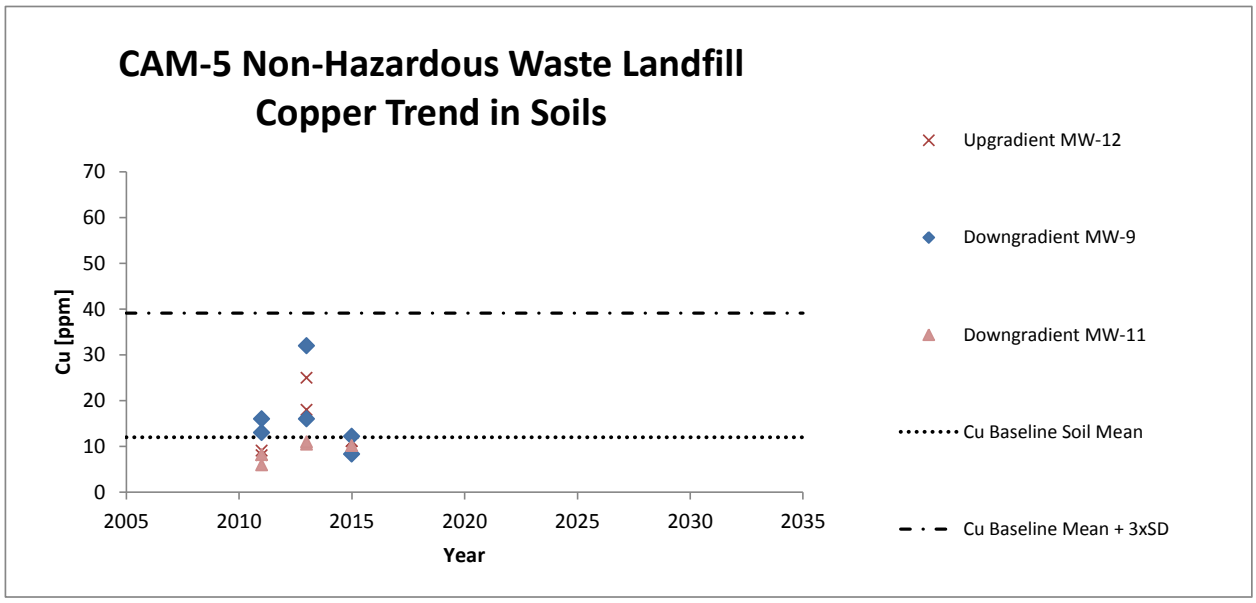
N/A = not analyzed

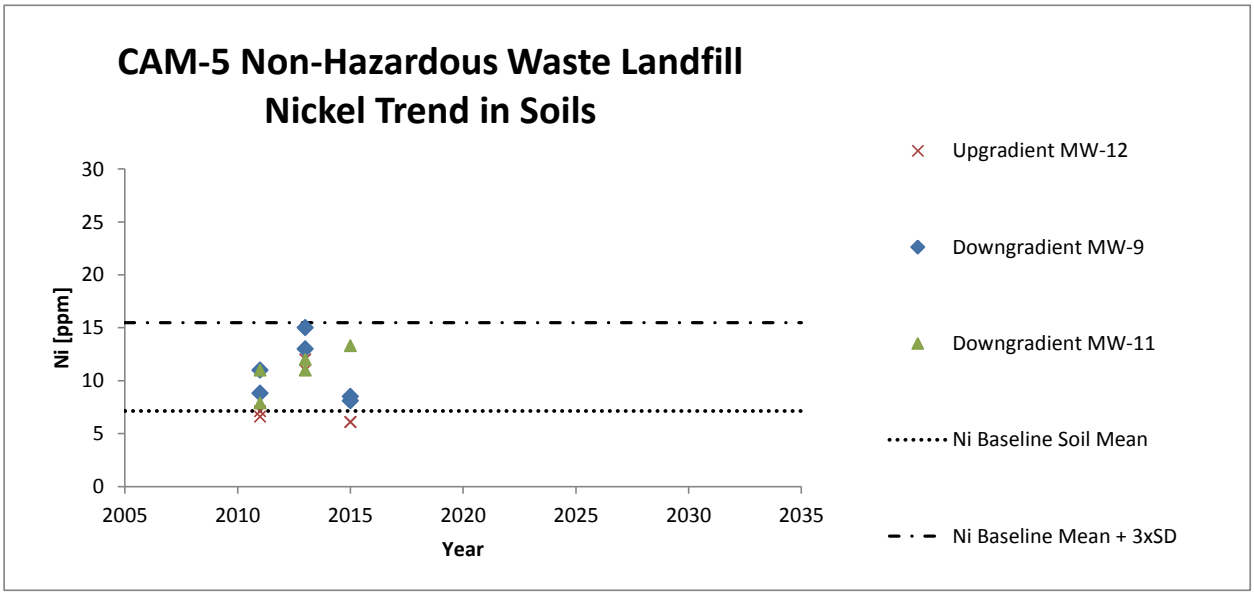
Monitoring Well 10 was removed in 2010 when a drainage swale was created around the landfill.

CAM-5 Non-Hazardous Waste Landfill 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 for the sample points.

Trendlines are intended for visual interpretation of temporal trends. When all monitoring results are below detection, trendlines are a reflection of changes in detection limit. Users should refer to data tables.

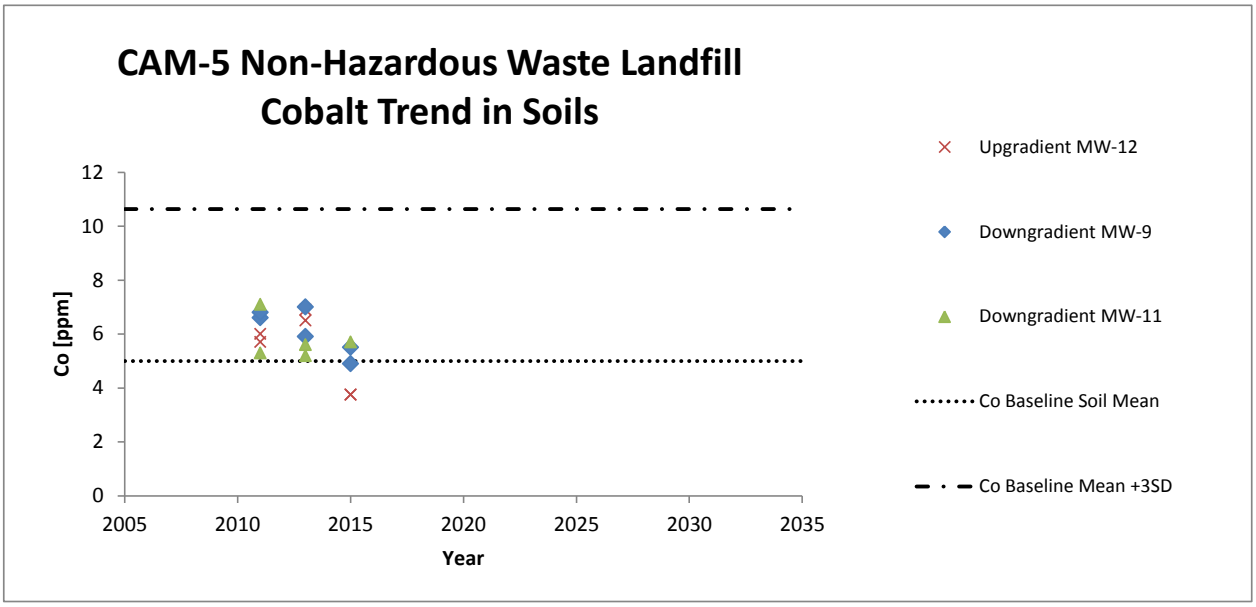


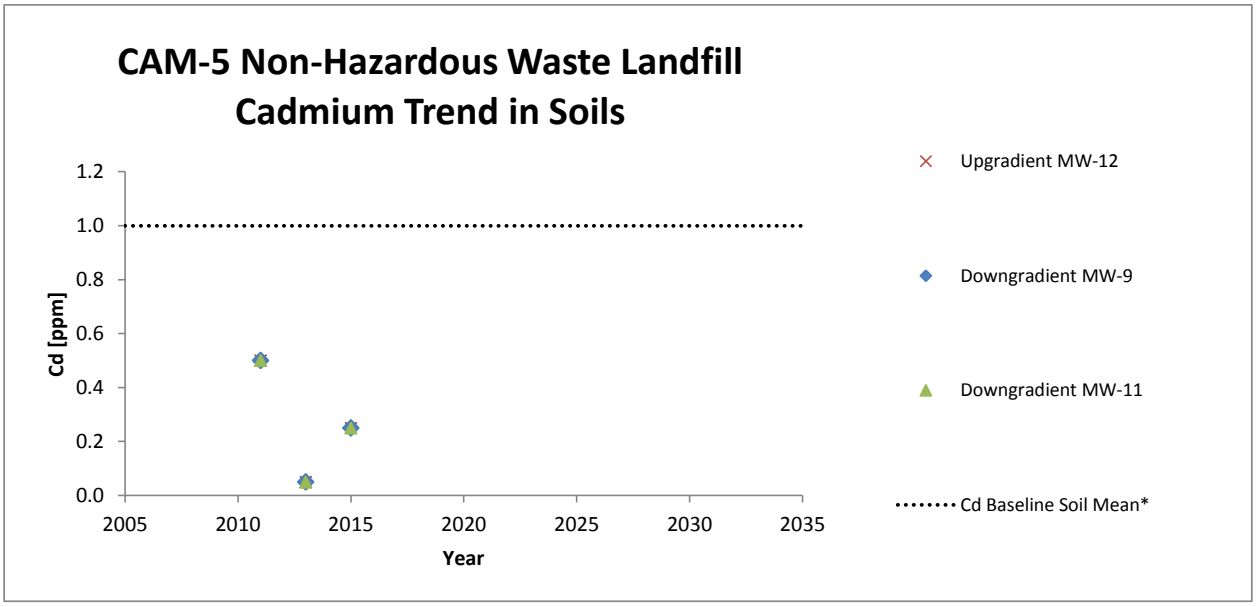


CAM-5 Non-Hazardous Waste Landfill Trends in Soil Inorganics, PCBs and PHCs (modified TPH)

Where results are below detection, half of the detection limit has been used in the charts for the sample points.

Trendlines are intended for visual interpretation of temporal trends. When all monitoring results are below detection, trendlines are a reflection of changes in detection limit. Users should refer to data tables.





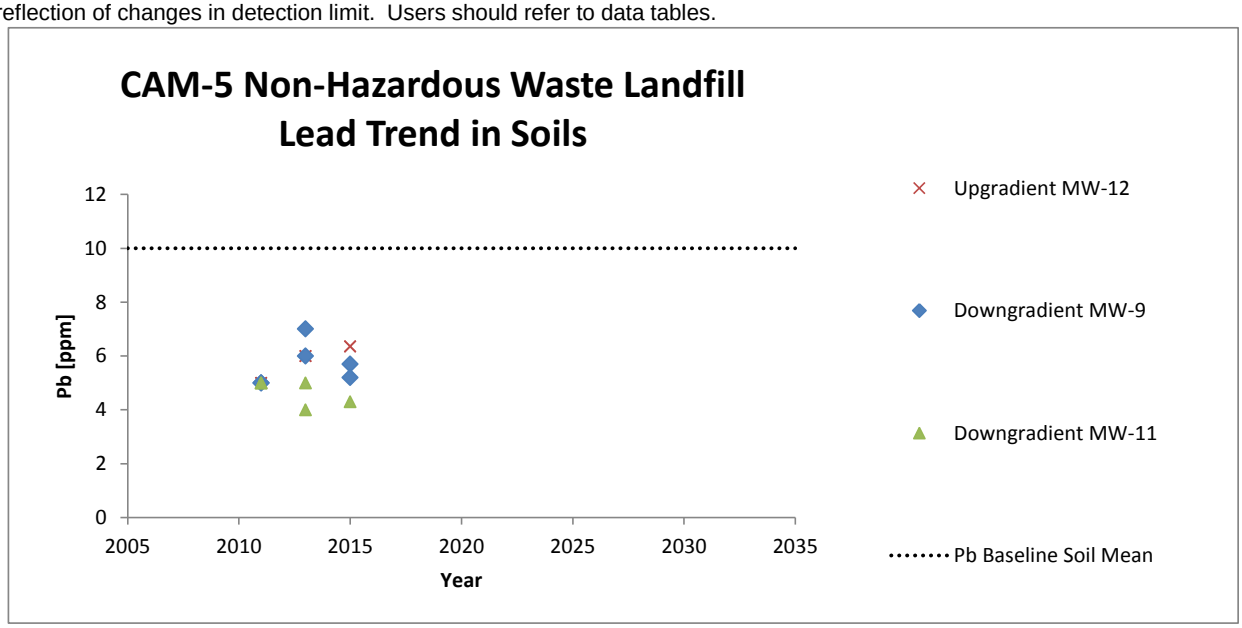
*Cd Baseline Arithmetic Mean is equal to the baseline detection limit.

*Cd Baseline SD = 0

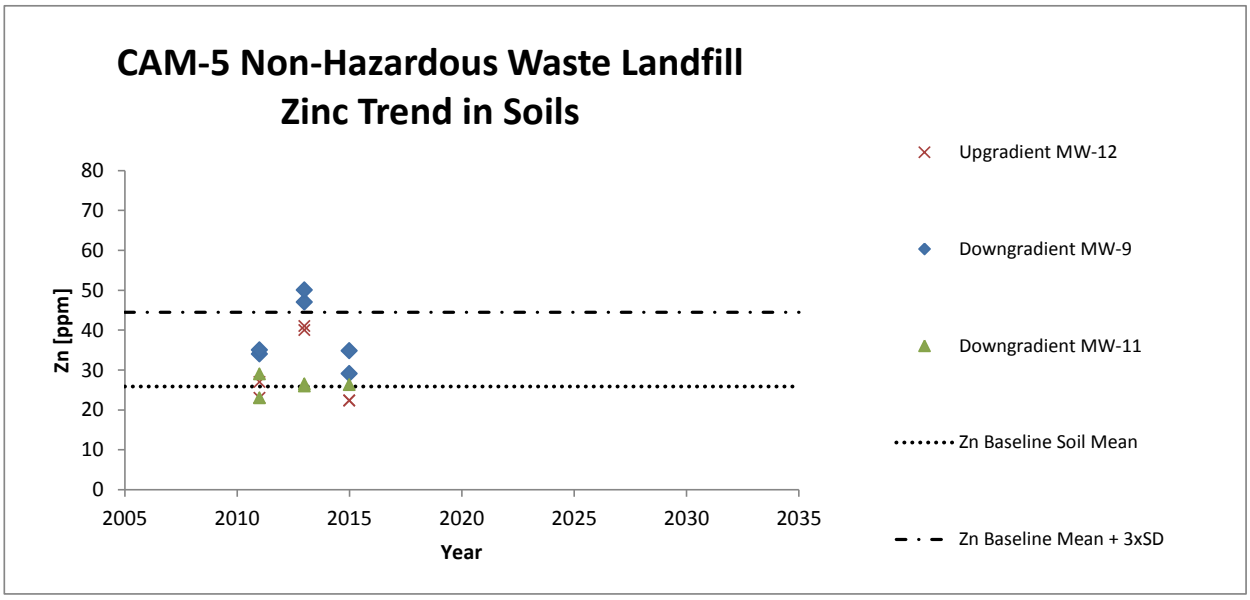
CAM-5 Non-Hazardous Waste Landfill Trends in Soil Inorganics, PCBs and PHCs (modified TPH)

Where results are below detection, half of the detection limit has been used in the charts for the sample points.

Trendlines are intended for visual interpretation of temporal trends. When all monitoring results are below detection, trendlines are a reflection of changes in detection limit. Users should refer to data tables.



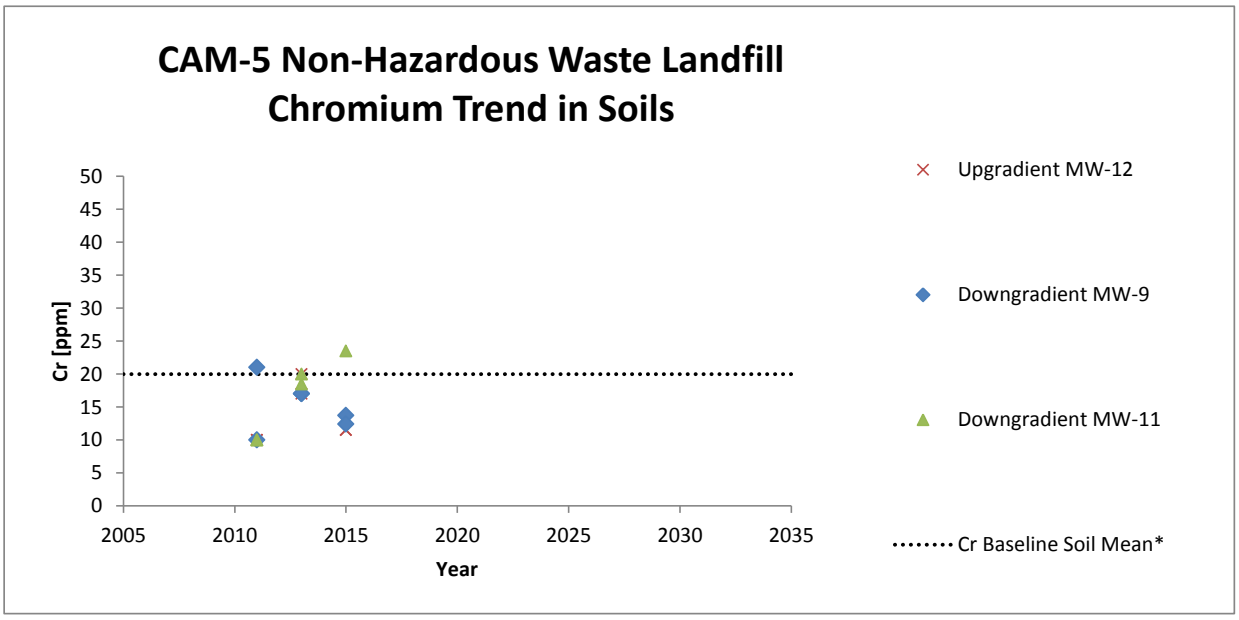
*Pb Baseline Arithmetic Mean is equal to the baseline detection limit.
*Pb Baseline SD = 0



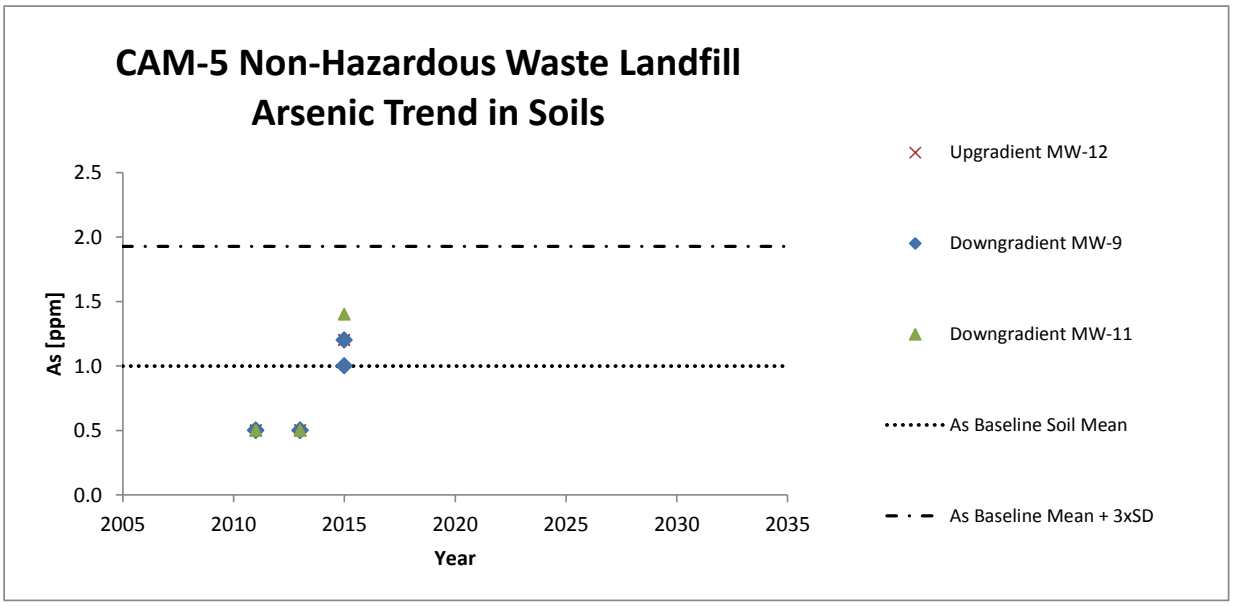
CAM-5 Non-Hazardous Waste Landfill Trends in Soil Inorganics, PCBs and PHCs (modified TPH)

Where results are below detection, half of the detection limit has been used in the charts for the sample points.

Trendlines are intended for visual interpretation of temporal trends. When all monitoring results are below detection, trendlines are a reflection of changes in detection limit. Users should refer to data tables.



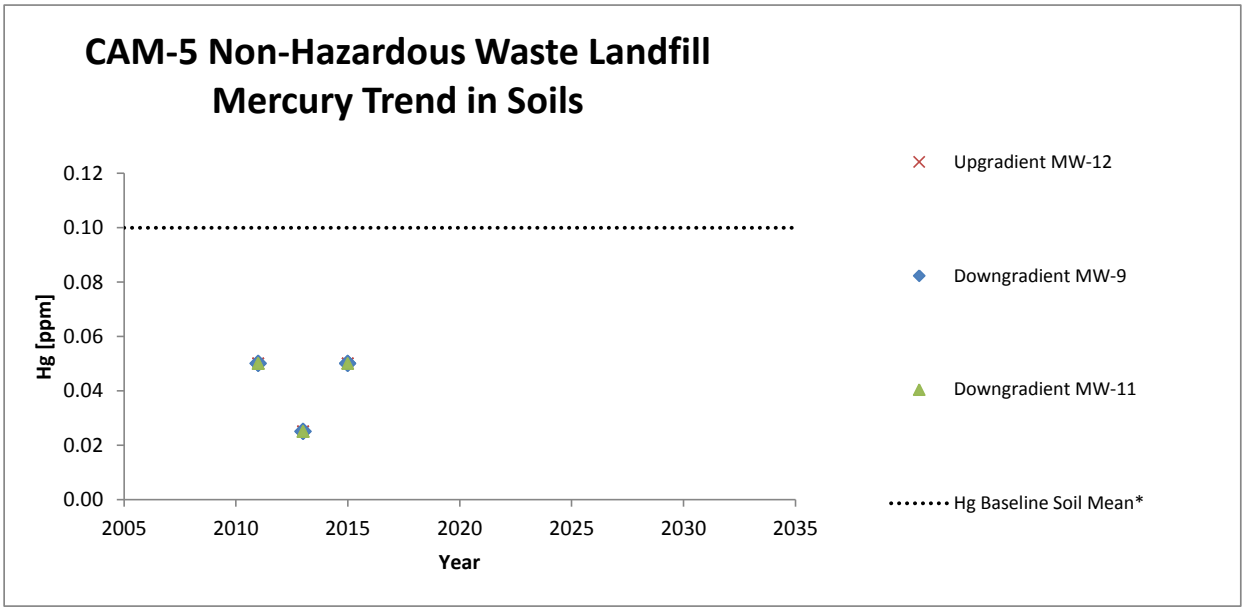
*Cr Baseline Arithmetic Mean is equal to the baseline detection limit.
*Cr Baseline Mean + 3xSD = 0



CAM-5 Non-Hazardous Waste Landfill Trends in Soil Inorganics, PCBs and PHCs (modified TPH)

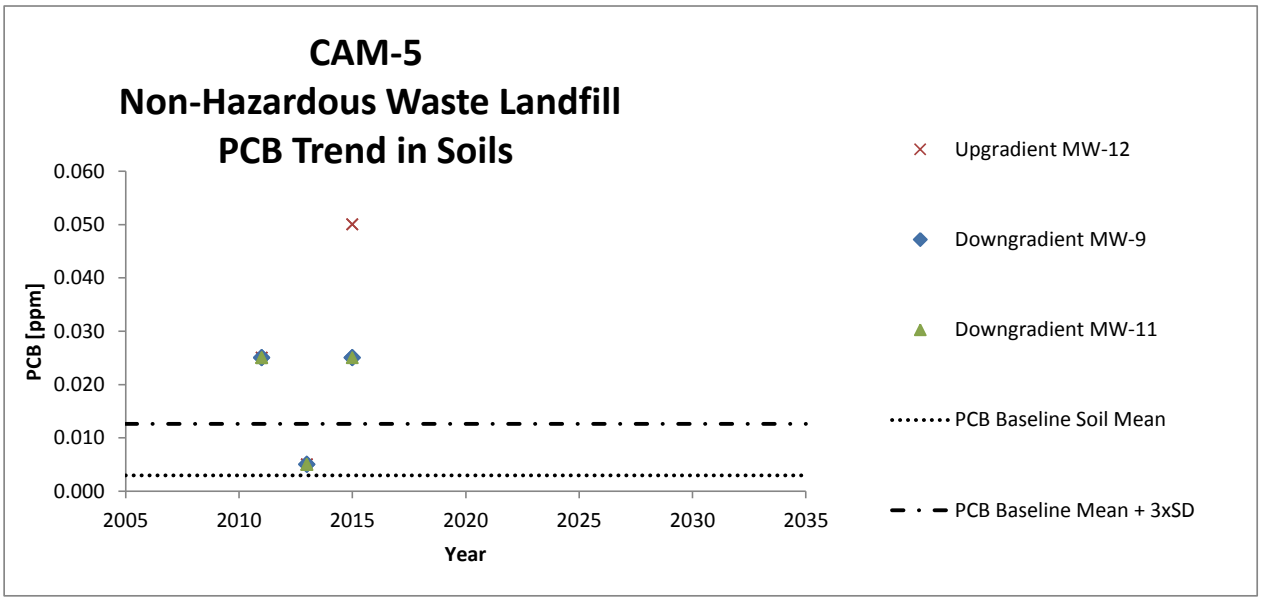
Where results are below detection, half of the detection limit has been used in the charts for the sample points.

Trendlines are intended for visual interpretation of temporal trends. When all monitoring results are below detection, trendlines are a reflection of changes in detection limit. Users should refer to data tables.



*Hg Baseline Arithmetic Mean is equal to the baseline detection limit.

** Hg results below detection for all monitoring samples. Trendlines reflect changes in detection limit.

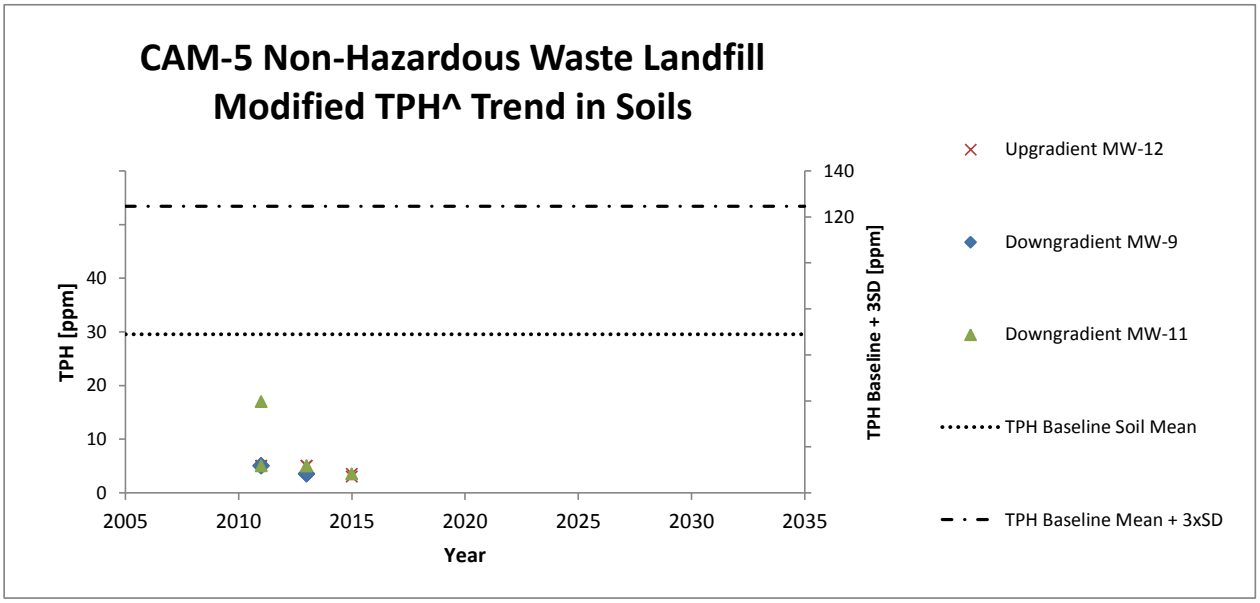


** PCB results below detection for all monitoring samples. Trendlines reflect changes in detection limit.

CAM-5 Non-Hazardous Waste Landfill Trends in Soil Inorganics, PCBs and PHCs (modified TPH)

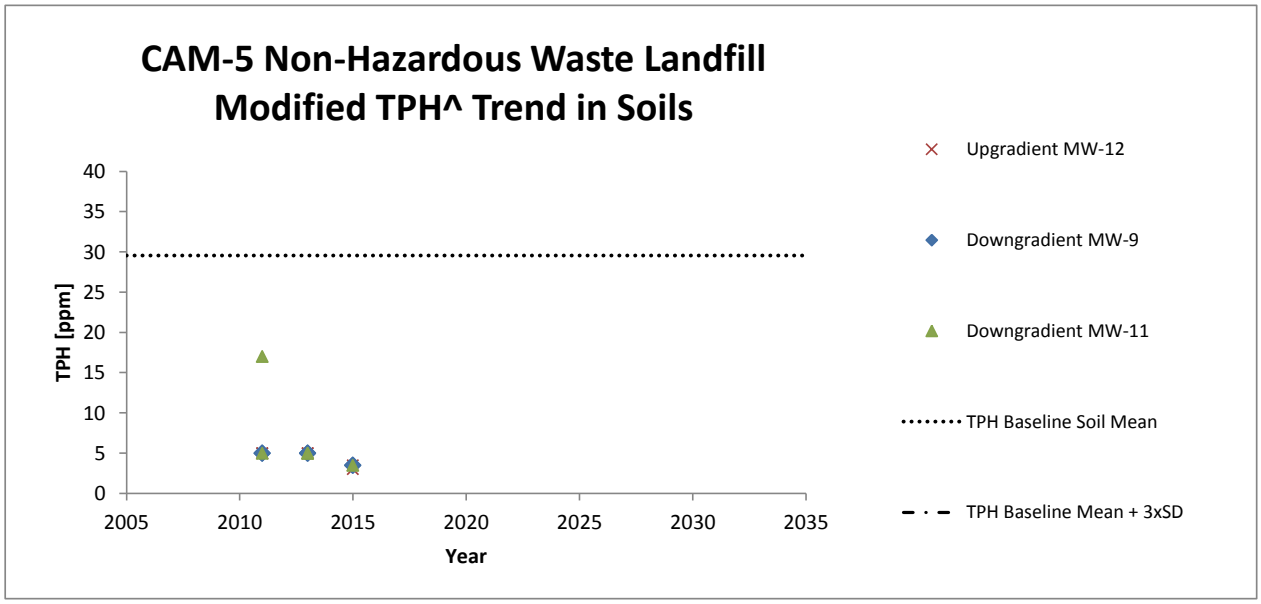
Where results are below detection, half of the detection limit has been used in the charts for the sample points.

Trendlines are intended for visual interpretation of temporal trends. When all monitoring results are below detection, trendlines are a reflection of changes in detection limit. Users should refer to data tables.



^ Modified TPH is Sum of F1, F2 and F3 fractions (C_6 - C_{34})

TPH chart with Y-axis modified to not show the Baseline mean + 3SD



CAM-5 - Non Hazardous Waste Landfill - Summary of Monitoring 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 PCB (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)
Baseline Data																		
Upgradient:																		
no sample taken - well dry	MW-12	2009																
Downgradient:																		
08-27207	MW-11	2008			0.12	0.041	0.0055	<0.0010	0.0050	0.11	0.024	<0.0030	<0.00040	<0.000020	<0.050	<0.50	<1.0	0.8
08-27208	MW-9	2008			0.040	0.021	<0.0030	<0.0010	<0.0010	0.0055	0.035	<0.0030	<0.00040	<0.000020	<0.050	<0.50	<1.0	0.8
09-22817	MW-10	2009			0.010	0.010	<0.0030	<0.0010	<0.010	<0.010	0.030	<0.0030	<0.00040	<0.000020	<0.050	0.60	<1.0	1.1
09-22560/61	MW-11	2009			0.12	0.050	0.0090	<0.0010	<0.010	0.11	0.11	0.0060	<0.00040	<0.000020	<0.050	<0.50	<1.0	0.8
10-27911	MW-10	2010			<0.0050	<0.0050	<0.0030	<0.0010	<0.010	<0.010	0.007	<0.0030	<0.00040	<0.000020	<0.050	<0.50	<1.0	0.8
10-27898	MW-11	2010			0.0070	<0.0050	<0.0030	<0.0010	<0.010	0.073	0.030	<0.0030	<0.00040	<0.000020	<0.050	<0.50	<1.0	0.8
		N value			6	6	6	6	6	6	6	6	6	6				6
		Arithmetic Mean			0.050	0.021	0.0034	0.00050	0.0043	0.051	0.039	0.0023	0.00020	0.000010				0.31
	Arithmetic Mean Corrected for Detection Limit				**0.050**	**0.021**	**0.0030**	**0.0010**	**0.010**	**0.051**	**0.039**	**0.0030**	**0.00040**	**0.000020**				**1.0**
		Standard Deviation			0.056	0.020	0.0032	0.0	0.0018	0.052	0.036	0.0018	0.0000	0.000000				0.14
		Arithmetic Mean + 3xStandard Deviation			0.22	0.082	0.013	0.0010	0.016	0.21	0.15	0.0085	0.00040	0.000020				1.43
		Baseline Detection Limit			0.0050	0.0050	0.0030	0.0010	0.010	0.010	0.0050	0.0030	0.00040	0.000020				1.0
Monitoring Data																		**Modified TPH TOTAL will appear when F1, F2, F3 fraction results are entered.**
Upgradient - MW- 12																		
No sample collected - insufficient water	MW-12	2011	1	1														#N/A
No sample collected as per TOR	MW-12	2012	2	1														#N/A
2013-C5-MW-12	MW-12	2013	3	1	0.039	**0.022**	**0.0055**	0.000019	0.006	0.038	0.038	0.0017	<0.00001	<0.00001	<0.025	<0.1	<0.1	0.113
MW12	MW-12	2015	5	1	0.0037	<0.001	<0.0005	<0.0001	0.0003	<0.005	0.001	<0.001	<0.0001	<0.00005	<0.025	<0.1	<0.1	0.113
	MW-12		7	2														#N/A
	MW-12		10	2														#N/A
	MW-12		15	2														#N/A
	MW-12		25	2														#N/A
																		#N/A
																		#N/A
																		#N/A

CAM-5 - Non Hazardous Waste Landfill - Summary of Monitoring Groundwater Analytical Data

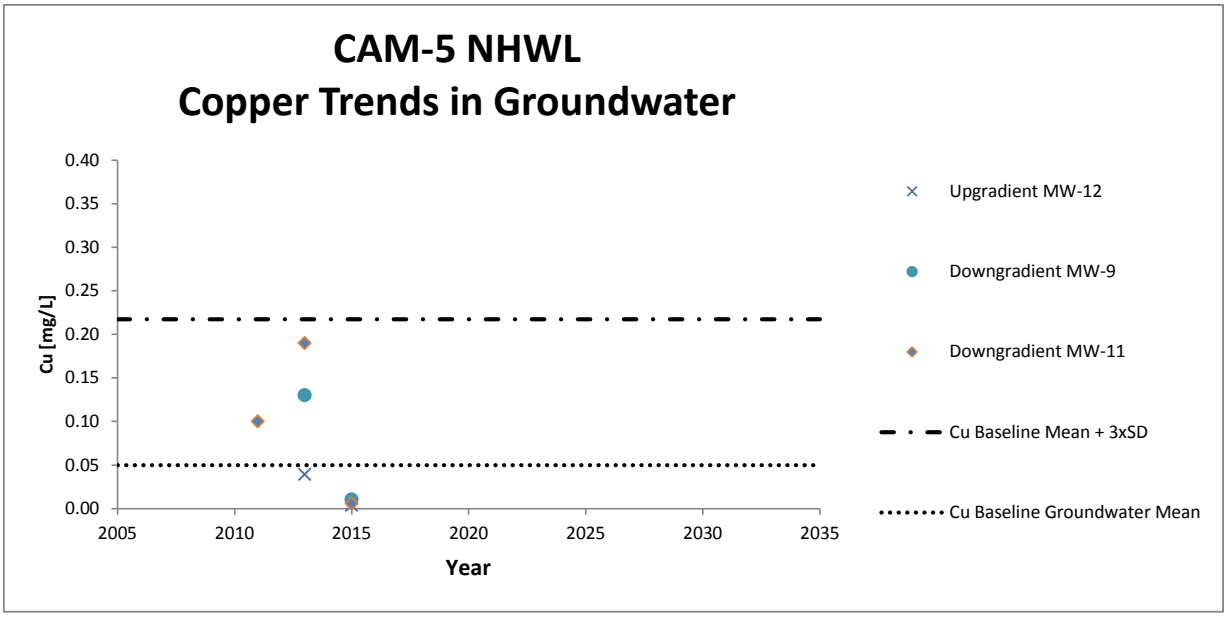
Sample ID	Location	Date	Monitoring Year	Monitoring Phase	Cu (mg/L)	Ni (mg/L)	Co (mg/L)	Cd (mg/L)	Pb (mg/L)	Zn (mg/L)	Cr (mg/L)	As (mg/L)	Hg (mg/L)	Total PCB (mg/L)	F1 C_6-C_{10} (mg/L)	F2 C_{10}-C_{16} (mg/L)	F3 C_{16}-C_{34} (mg/L)	Modified TPH^ - Total C6-C34 (mg/L)
Downgradient - MW-9																		
No sample collected - insufficient water	MW-9	2011	1	1														#N/A
No sample collected as per TOR	MW-9	2012	2	1														#N/A
2013-C5-MW-09	MW-9	2013	3	1	**0.13**	**0.090**	**0.023**	0.000087	**0.02**	**0.20**	**0.17**	**0.0094**	<0.00001	<0.00001	<0.025	<0.1	<0.1	0.113
MW09	MW-9	2015	5	1	0.0102	**0.075**	**0.0188**	0.0001	0.0008	0.031	0.002	<0.001	<0.0001	<0.00005	<0.025	<0.1	<0.1	0.113
	MW-9		7	2														#N/A
	MW-9		10	2														#N/A
	MW-9		15	2														#N/A
	MW-9		25	2														#N/A
																		#N/A
																		#N/A
																		#N/A
																		#N/A
																		#N/A
Downgradient - MW-11																		
11-29113	MW-11	2011	1	1	**0.10**	**0.088**	**0.0058**	<0.0010	<0.010	**0.078**	**0.18**	<0.0030	<0.00040	<0.0030	<0.050	<0.50	<1.0	0.775
No sample collected as per TOR	MW-11	2012	2	1														#N/A
2013-C5-MW-11	MW-11	2013	3	1	**0.19**	**0.059**	**0.010**	0.00016	**0.02**	**0.56**	**0.067**	**0.0048**	<0.00001	<0.00001	<0.025	<0.1	<0.1	0.113
MW11	MW-11	2015	5	1	0.0057	<0.001	<0.0005	<0.0001	0.0004	0.019	<0.001	<0.001	<0.0001	<0.00005	<0.025	<0.1	<0.1	0.11
	MW-11		7	2														#N/A
	MW-11		10	2														#N/A
	MW-11		15	2														#N/A
	MW-11		25	2														#N/A
																		#N/A
																		#N/A
																		#N/A
																		#N/A
																		#N/A

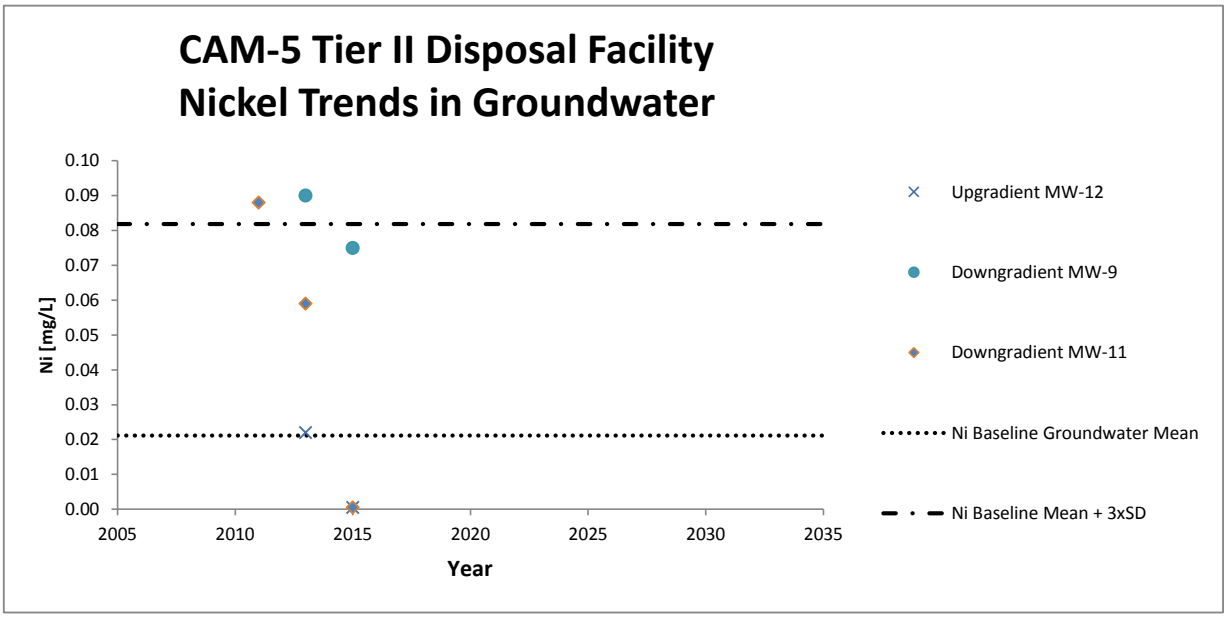
Note: Modified TPH Total (C_6-C_{34}) has been calculated by adding results for F1, F2 and F3.

CAM-5 Non-Hazardous Waste Landfill 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 for the sample points.

Trendlines are intended for visual interpretation of temporal trends. When all monitoring results are below detection, trendlines reflection of changes in detection limit. Users should refer to data tables.

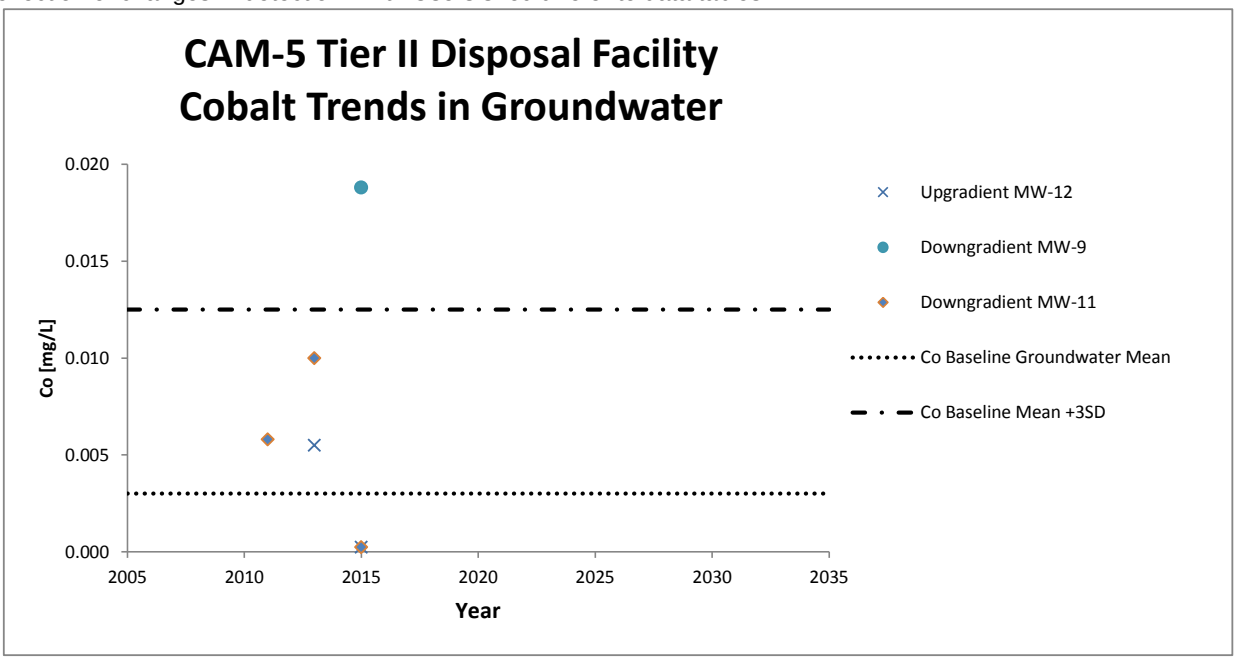


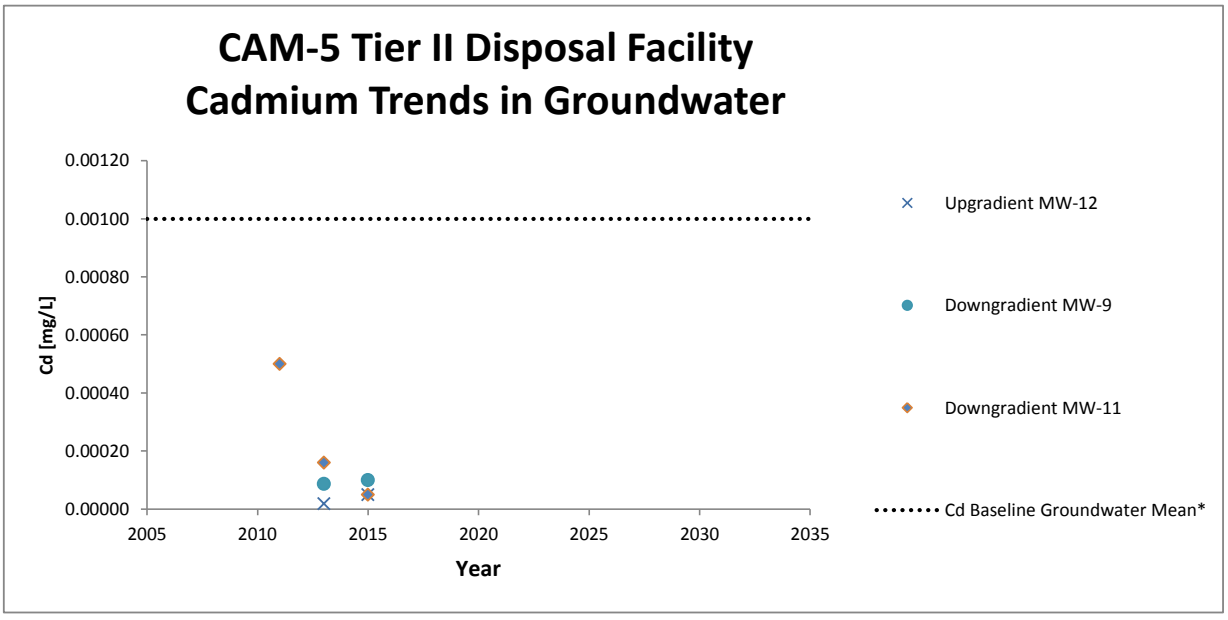


CAM-5 Non-Hazardous Waste Landfill Trends for Inorganic Elements, PCBs and TPH in Groundwater Samples

Where results are below detection, half of the detection limit has been used in the charts for the sample points.

Trendlines are intended for visual interpretation of temporal trends. When all monitoring results are below detection, trendlines reflection of changes in detection limit. Users should refer to data tables.



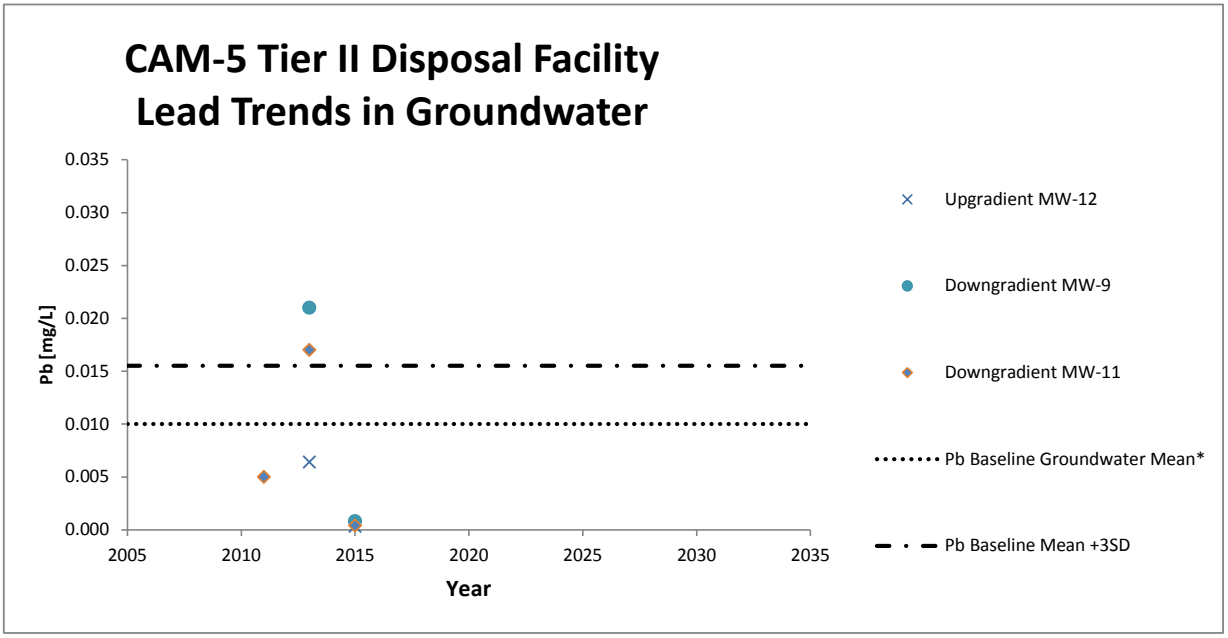


*Cd Baseline Mean is equal to the baseline detection limit.
*Cd Baseline Mean SD = 0

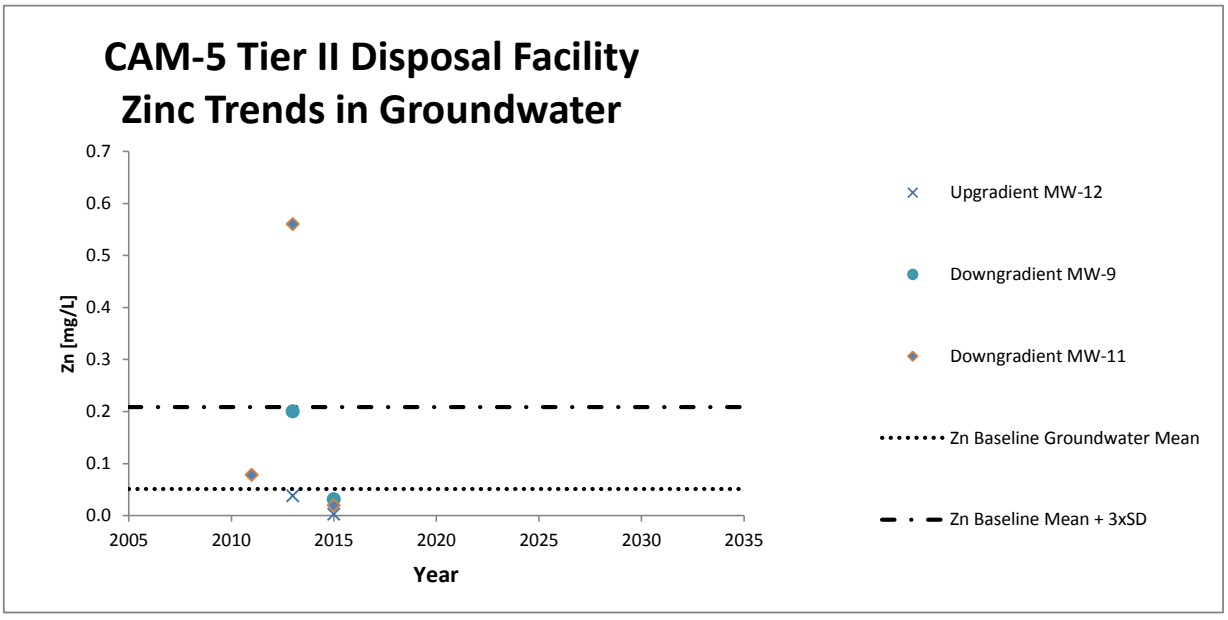
CAM-5 Non-Hazardous Waste Landfill Trends for Inorganic Elements, PCBs and TPH in Groundwater Samples

Where results are below detection, half of the detection limit has been used in the charts for the sample points.

Trendlines are intended for visual interpretation of temporal trends. When all monitoring results are below detection, trendlines reflection of changes in detection limit. Users should refer to data tables.



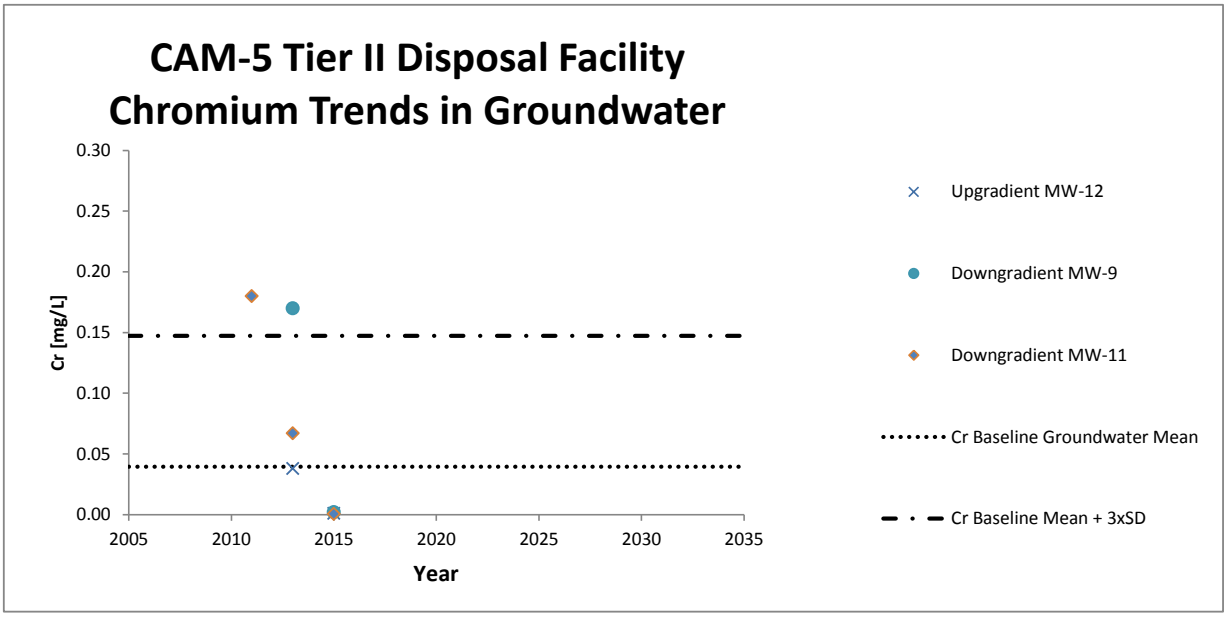
* Pb Baseline Mean is equal to the baseline detection limit

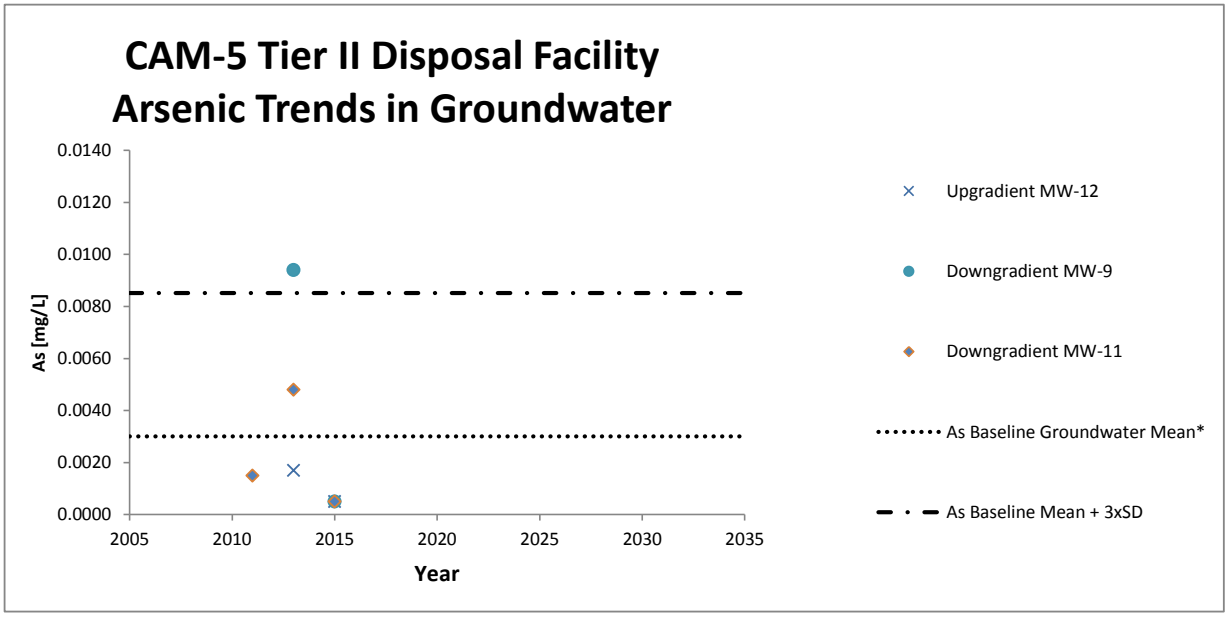


CAM-5 Non-Hazardous Waste Landfill Trends for Inorganic Elements, PCBs and TPH in Groundwater Samples

Where results are below detection, half of the detection limit has been used in the charts for the sample points.

Trendlines are intended for visual interpretation of temporal trends. When all monitoring results are below detection, trendlines reflection of changes in detection limit. Users should refer to data tables.



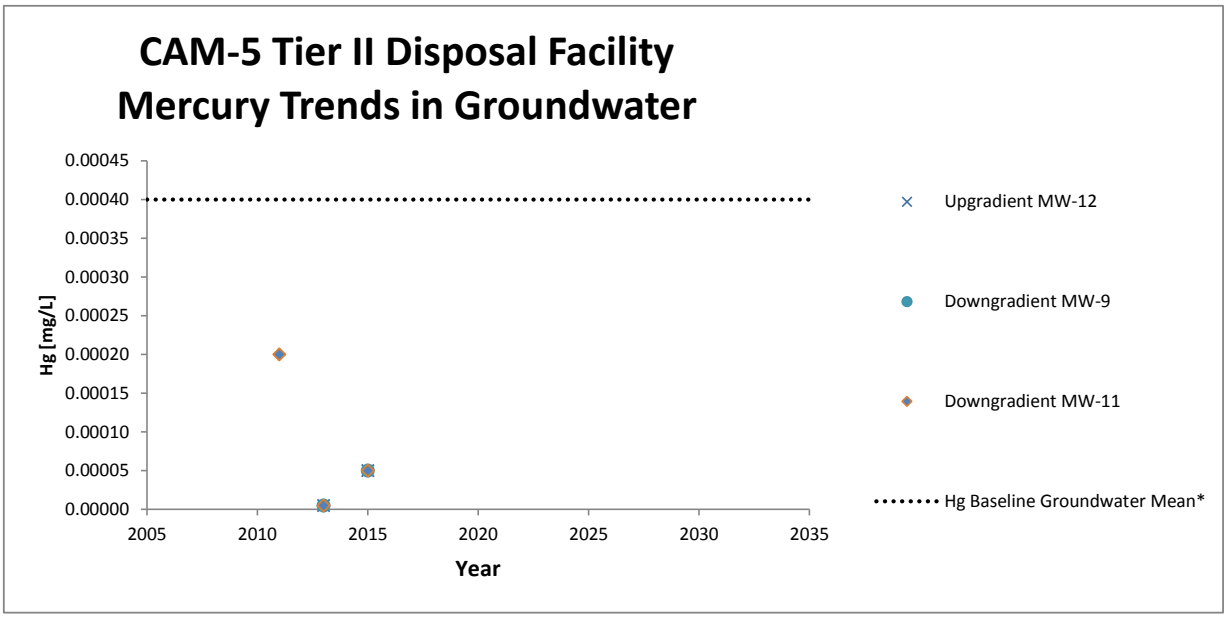


*As Baseline Mean is equal to the baseline detection limit.

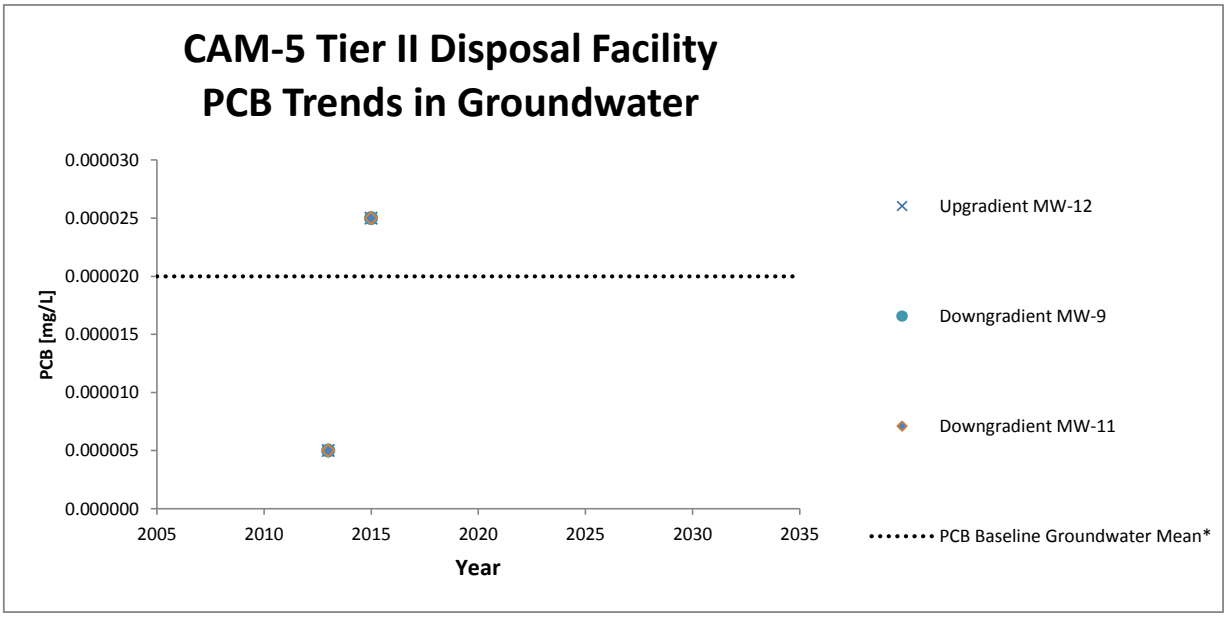
CAM-5 Non-Hazardous Waste Landfill Trends for Inorganic Elements, PCBs and TPH in Groundwater Samples

Where results are below detection, half of the detection limit has been used in the charts for the sample points.

Trendlines are intended for visual interpretation of temporal trends. When all monitoring results are below detection, trendlines reflection of changes in detection limit. Users should refer to data tables.



*Hg Baseline Mean is equal to the baseline detection limit.
*Hg Baseline SD = 0



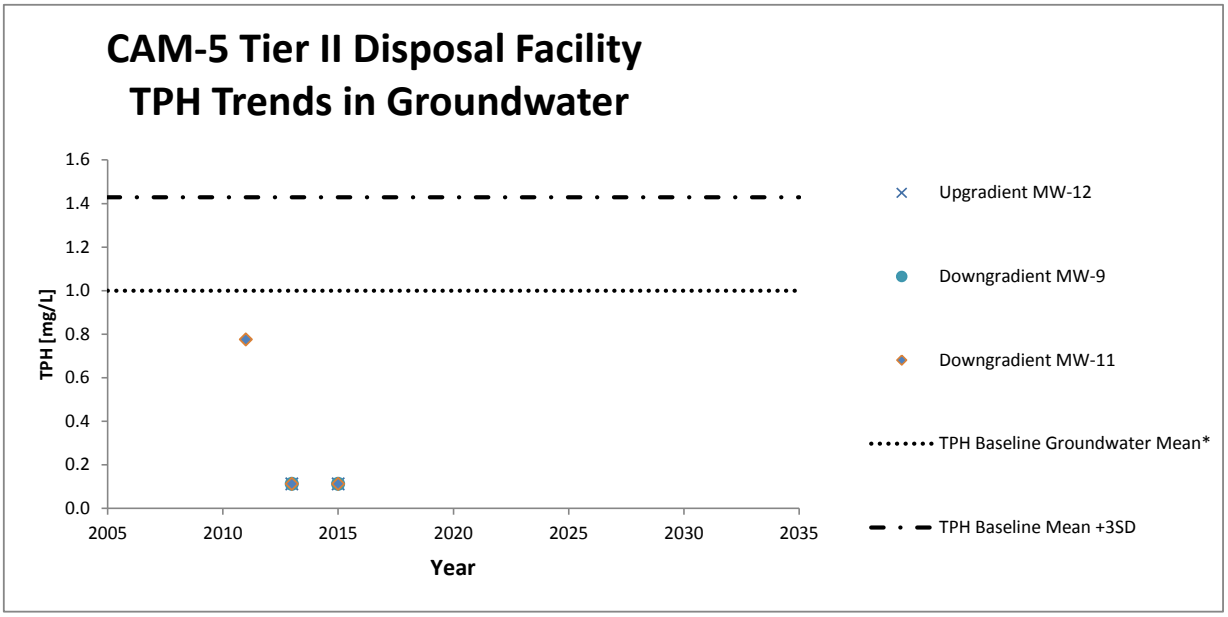
*PCB Baseline Mean is equal to the baseline detection limit <0.00002 mg/L.
*PCB Baseline SD = 0

2011 GW PCB results were reported at a higher detection limit (<0.003 mg/L). This value is listed in the table (MW-11) but has not been included on the chart.

CAM-5 Non-Hazardous Waste Landfill 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 for the sample points.

Trendlines are intended for visual interpretation of temporal trends. When all monitoring results are below detection, trendlines reflection of changes in detection limit. Users should refer to data tables.



*TPH Baseline Mean is equal to the baseline detection limit.

CAM-5 - USAF/Asbestos Landfill - Summary of Monitoring 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)
Background Data - Arithmetic Mean*						10	14	9.5	1.0	10	31	22	0.83	N/A	0.1				N/A
Baseline Data - Arithmetic Mean*						**9.5**	**7.5**	**6.4**	**1.0**	**10**	**27**	**20**	**1.0**	**0.10**	**0.003**				**34**
Baseline Data - Standard Deviation						4.3	2.1	2.4	0.0	4.9	6.9	9.4	0.38	0.0	0.00072				21
Baseline Data Mean + 3xStandard Deviation						22	14	14	1.0	25	48	48	2.1	0.10	0.0052				97
**** If baseline or background arithmetic mean was below the detection limit, the mean 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*	*2.0*	*5*				*2500*
Monitoring Data																			**TPH Sum will appear when F1, F2 and F3 fractions are entered.**
Upgradient																			
	C5-6 surface																		
11-29076	C5-6	2011	1	1	0-10	7.4	**9.6**	**11**	<1.0	**12**	**29**	**35**	<1.0	<0.10	<0.050	11	51	26	**88**
2013-C5-6-A	C5-6	2013	3	1	0-15	**11**	**7.7**	4.8	<0.1	7.0	**28**	14	<1.0	**0.13**	<0.010	<10	<10	<10	15
C5-6 (0-15) (Dup Avg)	C5-6	2015	5	1	0-15	**29**	**15**	**8.3**	<0.5	**10**	**44**	**25**	**3**	<0.1	<0.1	<6	<4	43	**48**
	C5-6		7	2															#N/A
	C5-6		10	2															#N/A
	C5-6		15	2															#N/A
	C5-6		25	2															#N/A
																			#N/A
																			#N/A
																			#N/A
																			#N/A
																			#N/A
	C5-6 depth																		
11-29078/79	C5-6	2011	1	1	20-30	7.5	**8.5**	**9.0**	<1.0	<10	**31**	16	**1.2**	**0.13**	<0.050	5.8	51	35	**92**
2013-C5-6-B	C5-6	2013	3	1	40-50	**14**	**8.2**	5.8	<0.1	8.0	**29**	19	<1.0	<0.050	<0.010	<10	<10	<10	15
No sample, refusal	C5-6	2015	5	1															#N/A
	C5-6		7	2															#N/A
	C5-6		10	2															#N/A
	C5-6		15	2															#N/A
	C5-6		25	2															#N/A
																			#N/A
																			#N/A
																			#N/A
																			#N/A
																			#N/A

CAM-5 - USAF/Asbestos Landfill - Summary of Monitoring 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)
Downgradient																			
	C5-7 surface																		
11-29074	C5-7	2011	1	1	0-10	9.4	7.2	5.2	<1.0	<10	24	<20	<1.0	<0.10	<0.050	<10	<4.0	<9.0	12
2013-C5-7-A	C5-7	2013	3	1	0 - 15	**30**	**18**	**11**	<0.1	9.0	**44**	**30**	<1.0	<0.050	<0.010	<10	<10	<10	15
C5-7 (0-15)	C5-7	2015	5	1	0 - 15	**12.4**	**8.1**	4.3	<0.5	5	21.7	12	**1.5**	<0.1	<0.05	<7	<4	<8	10
	C5-7		7	2															#N/A
	C5-7		10	2															#N/A
	C5-7		15	2															#N/A
	C5-7		25	2															#N/A
																			#N/A
																			#N/A
																			#N/A
																			#N/A
																			#N/A
	C5-7 depth																		
11-29072	C5-7	2011	1	1	20-30	9.1	7.0	5.9	<1.0	<10	23	<20	<1.0	<0.10	<0.050	<10	<4.0	<9.0	12
2013-C5-7-B	C5-7	2013	3	1	40-50	**21**	**15**	**12**	<0.1	8.0	**39**	**26.0**	<1.0	<0.050	<0.010	<10	<10	<10	15
C5-7 (40-50)	C5-7	2015	5	1	40-50	**13.4**	**12.6**	6.1	<0.5	6	26	15.3	**3.2**	<0.1	<0.05	<7	<4	<8	10
	C5-7		7	2															#N/A
	C5-7		10	2															#N/A
	C5-7		15	2															#N/A
	C5-7		25	2															#N/A
																			#N/A
																			#N/A
																			#N/A
																			#N/A
																			#N/A

CAM-5 - USAF/Asbestos Landfill - Summary of Monitoring 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)
	C5-8 surface																		
11-29068	C5-8	2011	1	1	0-10	**10**	**7.7**	5.4	<1.0	<10	24	<20	<1.0	<0.10	<0.050	<10	<4.0	<9.0	12
2013-C5-8-A	C5-8	2013	3	1	0-15	**17**	**10**	5.8	<0.1	6.0	**36**	14	<1.0	<0.050	<0.010	<10	<4.0	<9.0	12
C5-8 (0-15)	C5-8	2015	5	1	0-15	4.9	6.4	4.7	<0.5	6.7	23.7	11.5	<1	<0.1	<0.05	<7	<4	<8	10
	C5-8		7	2															#N/A
	C5-8		10	2															#N/A
	C5-8		15	2															#N/A
	C5-8		25	2															#N/A
																			#N/A
																			#N/A
																			#N/A
																			#N/A
																			#N/A
	C5-8 depth																		
11-29070	C5-8	2011	1	1	20-30	9.5	**7.8**	5.4	<1.0	<10	27	<20	<1.0	<0.10	<0.050	<10	20	<9.0	30
2013-C5-8-B	C5-8	2013	3	1	40-50	**22**	**12**	6.2	<0.1	7.0	**36**	17	<1.0	<0.050	<0.010	<10	<10	<10	15
No sample, refusal	C5-8	2015	5	1															#N/A
	C5-8		7	2															#N/A
	C5-8		10	2															#N/A
	C5-8		15	2															#N/A
	C5-8		25	2															#N/A
																			#N/A
																			#N/A
																			#N/A
																			#N/A
																			#N/A

Note: Modified TPH Total (C_6-C_{34}) has been calculated by adding results for F1, F2 and F3.

N/A = not analyzed

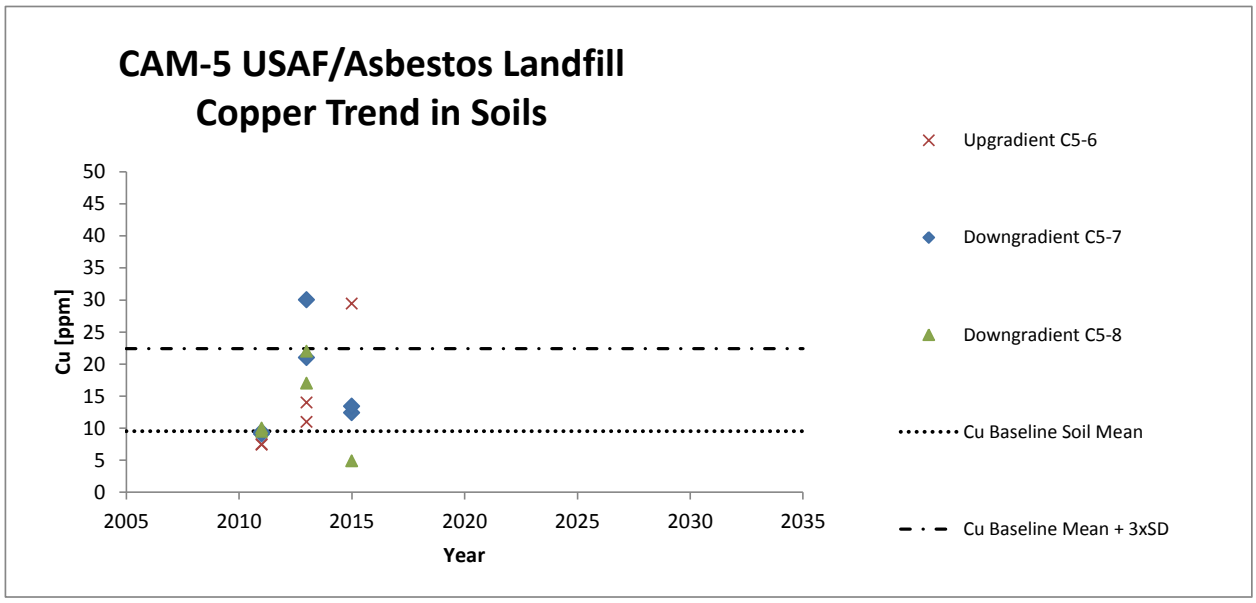
Legend

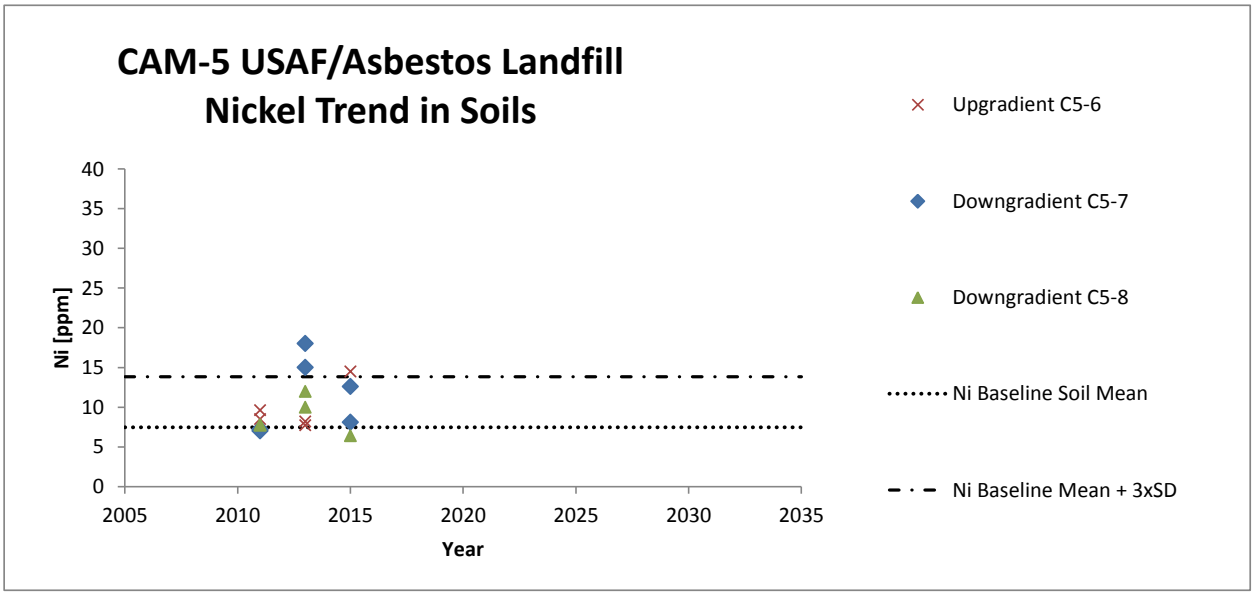
XX	sample exceeds background
XX	**sample exceeds baseline**
XX	*sample exceeds DLCU Tier I criteria*
XX	*sample exceeds DLCU Tier II criteria*

CAM-5 USAF/Asbestos Landfill 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 for the sample points.

Trendlines are intended for visual interpretation of temporal trends. When all monitoring results are below detection, trendlines are a reflection of changes in detection limit. Users should refer to data tables.

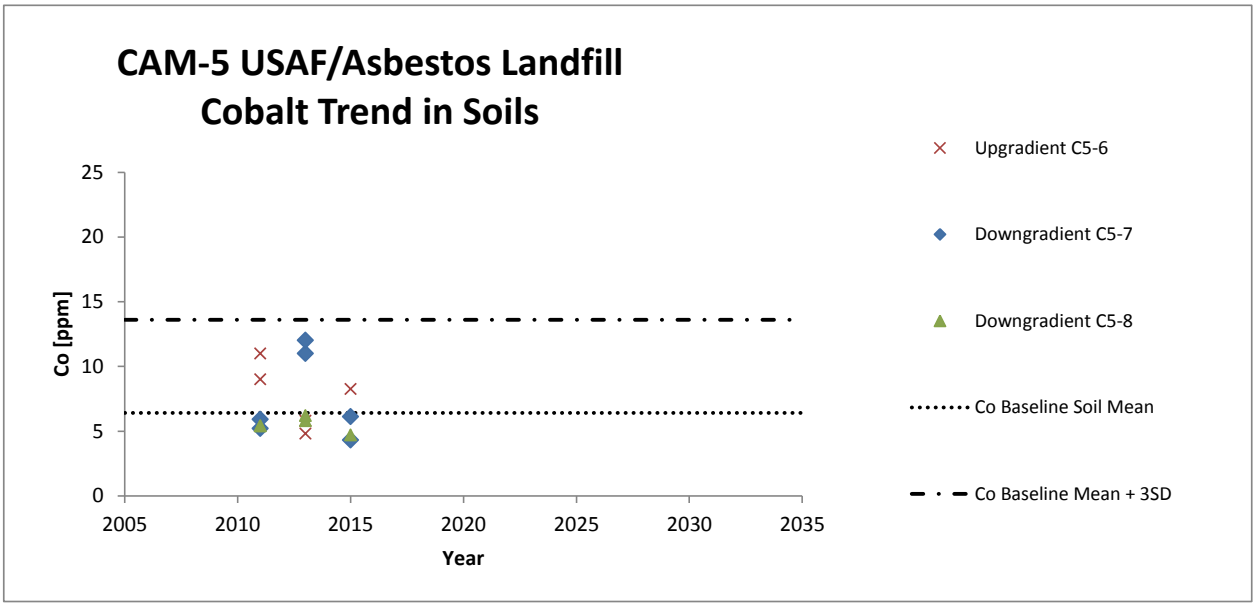


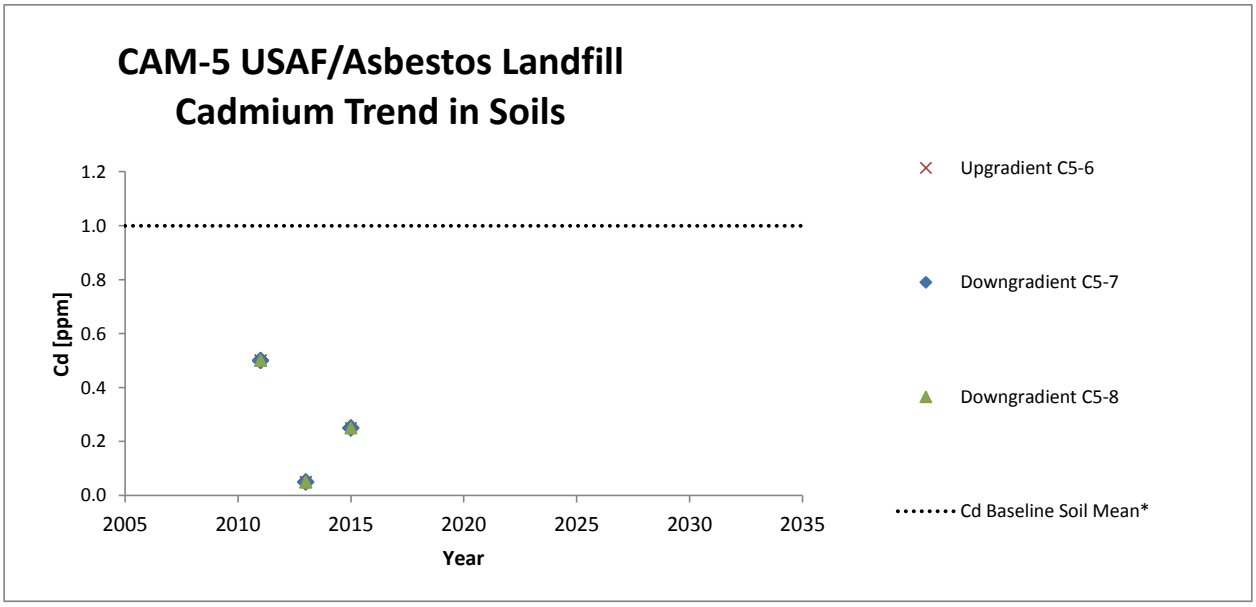


CAM-5 USAF/Asbestos Landfill Trends in Soil Inorganics, PCBs and PHCs (modified TPH)

Where results are below detection, half of the detection limit has been used in the charts for the sample points.

Trendlines are intended for visual interpretation of temporal trends. When all monitoring results are below detection, trendlines are a reflection of changes in detection limit. Users should refer to data tables.





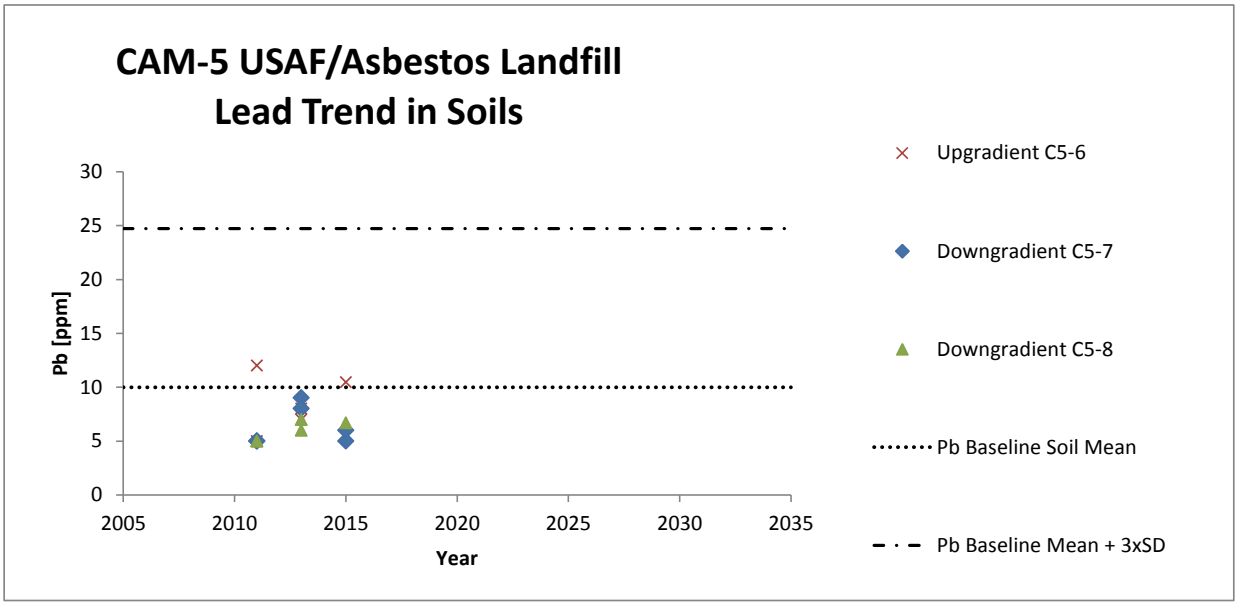
*Cd Baseline Arithmetic Mean is equal to the baseline detection limit.

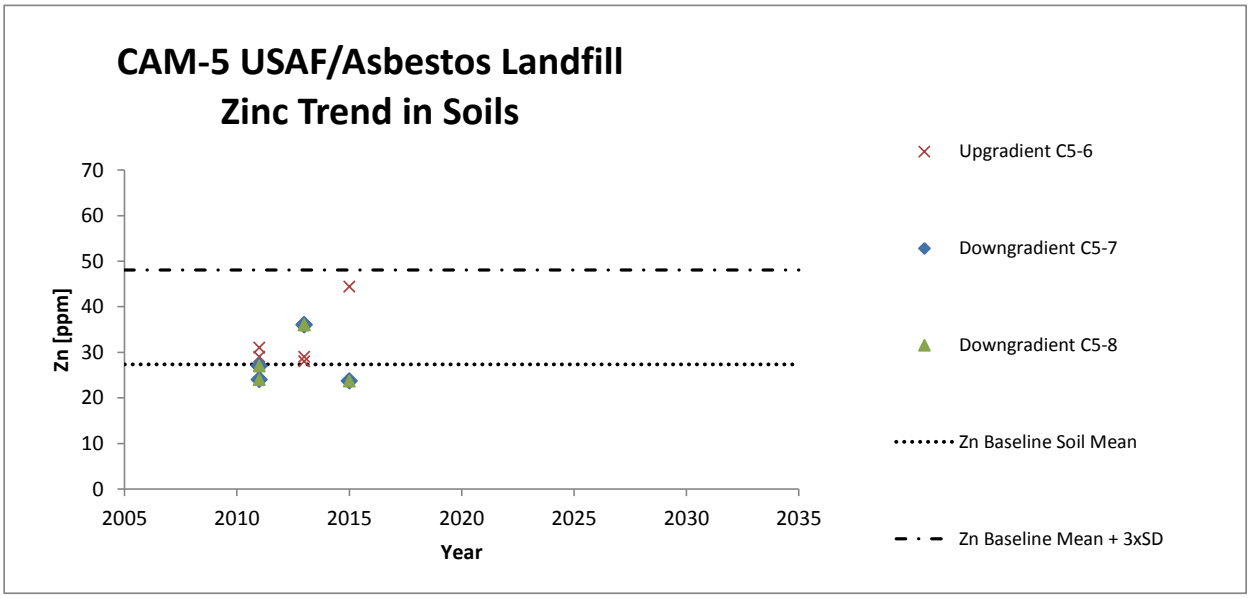
*Cd Baseline SD = 0

CAM-5 USAF/Asbestos Landfill 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 for the sample points.

Trendlines are intended for visual interpretation of temporal trends. When all monitoring results are below detection, trendlines are a reflection of changes in detection limit. Users should refer to data tables.

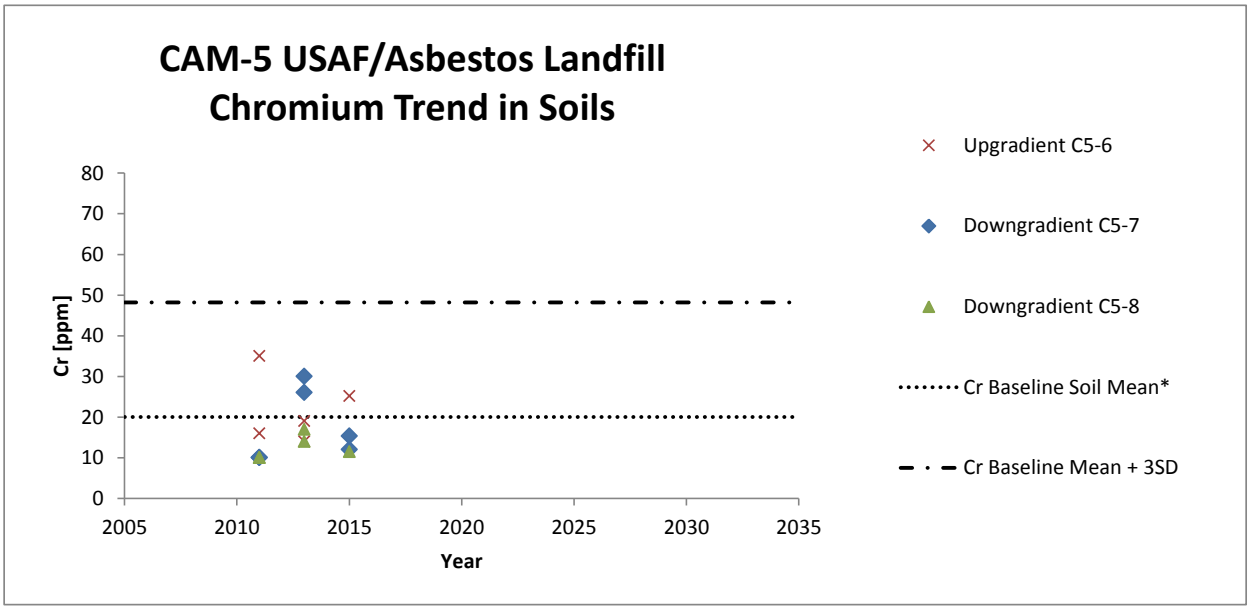




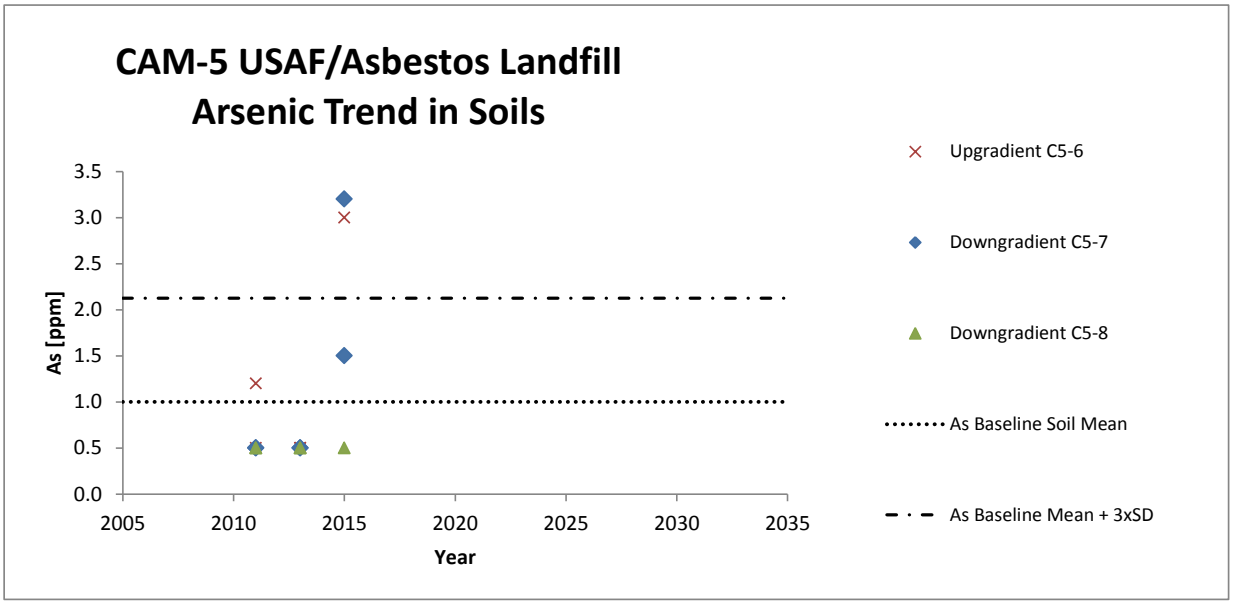
CAM-5 USAF/Asbestos Landfill Trends in Soil Inorganics, PCBs and PHCs (modified TPH)

Where results are below detection, half of the detection limit has been used in the charts for the sample points.

Trendlines are intended for visual interpretation of temporal trends. When all monitoring results are below detection, trendlines are a reflection of changes in detection limit. Users should refer to data tables.



*Cr Baseline Arithmetic Mean is equal to the baseline detection limit.

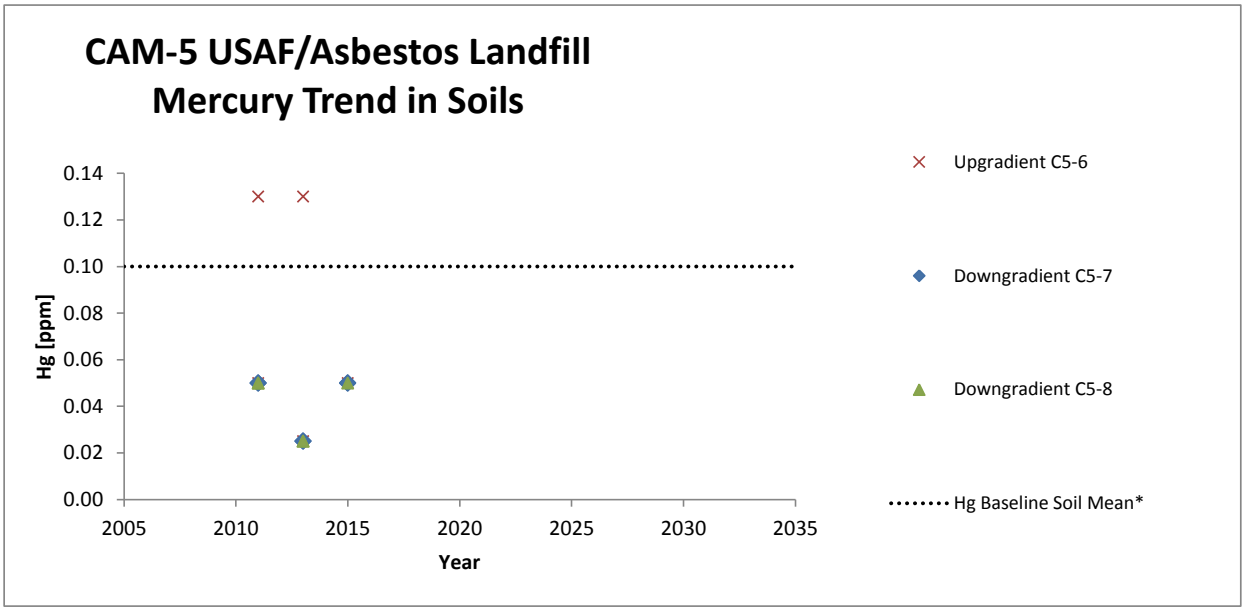


*As Baseline Arithmetic Mean is equal to the baseline detection limit.

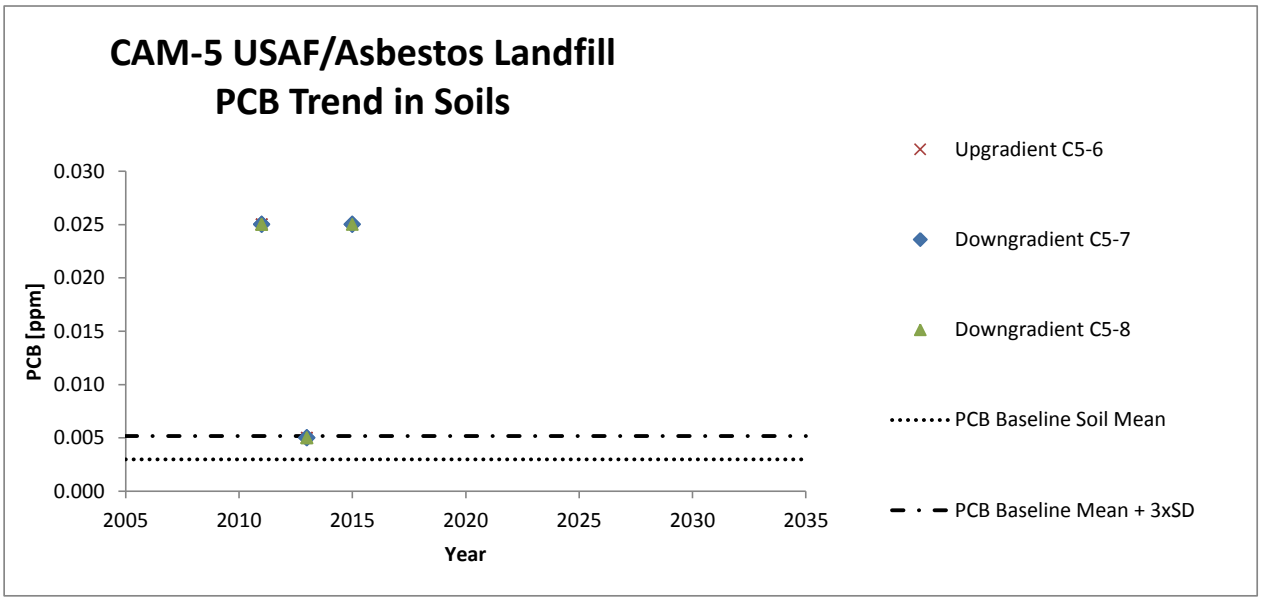
CAM-5 USAF/Asbestos Landfill Trends in Soil Inorganics, PCBs and PHCs (modified TPH)

Where results are below detection, half of the detection limit has been used in the charts for the sample points.

Trendlines are intended for visual interpretation of temporal trends. When all monitoring results are below detection, trendlines are a reflection of changes in detection limit. Users should refer to data tables.



*Hg Baseline Arithmetic Mean is equal to the baseline detection limit.

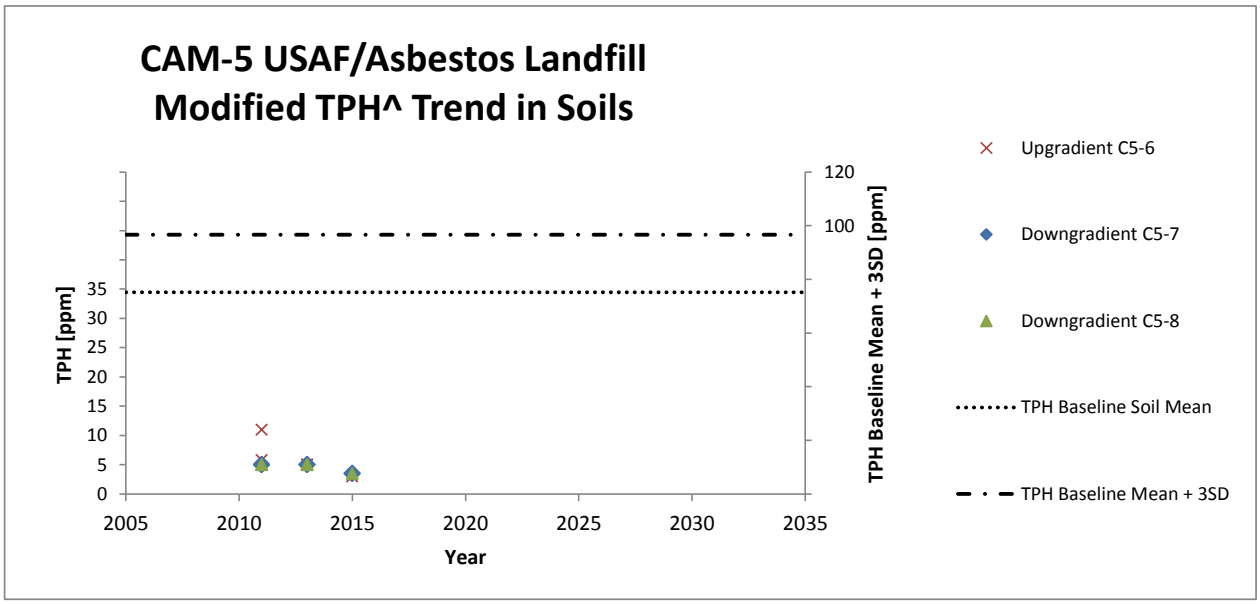


*PCB Baseline Arithmetic Mean is equal to the baseline detection limit.

CAM-5 USAF/Asbestos Landfill 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 for the sample points.

Trendlines are intended for visual interpretation of temporal trends. When all monitoring results are below detection, trendlines are a reflection of changes in detection limit. Users should refer to data tables.



^ Modified TPH is Sum of F1, F2 and F3 fractions (C_6 - C_{34})

CAM-5 - Lower Site Landfill South - Summary of Monitoring 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)
Background Data - Arithmetic Mean*						10	14	9.5	1.1	10	31	22	0.83	N/A	0.036				N/A
Baseline Data - Arithmetic Mean*						**5.7**	**6.8**	**5.0**	**1.0**	**10**	**15**	**20**	**1.0**	**0.10**	**0.003**				**17**
Baseline Data - Standard Deviation						5.0	7.4	2.6	0.0	0.0	13	12	0.32	0.0	0.0				7.3
Baseline Data Mean + 3xStandard Deviation						21	29	13	1.0	10	55	57	2.0	0.10	0.003				39
**** If baseline or background arithmetic mean was below the detection limit, the mean 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*	*2.0*	*5*				*2500*
Monitoring Data																			**TPH Sum will appear when F1, F2 and F3 fractions are entered.**
Upgradient																			
	C5-1 surface																		
11-29096/97	C5-1	2011	1	1	0-10	3.7	5.6	<5.0	<1.0	<10	<15	<20	<1.0	<0.10	<0.050	<10	4.0	<9.0	14
2013-C5-1-A	C5-1	2013	3	1	0-15	4.1	4.5	2.5	<0.10	2.0	14	7.0	<1.0	<0.050	<0.010	<10	<10	<10	15
C5-1 (0-15)	C5-1	2015	5	1	0-15	**7.1**	4.5	2.2	<0.5	2.4	11.3	6.8	**1.2**	<0.1	<0.05	<7	<4	<8	10
	C5-1		7	2															#N/A
	C5-1		10	2															#N/A
	C5-1		15	2															#N/A
	C5-1		25	2															#N/A
																			#N/A
																			#N/A
																			#N/A
																			#N/A
																			#N/A
	C5-1 depth																		
11-29098	C5-1	2011	1	1	20-30	4.3	**7.3**	<5.0	<1.0	<10	15	<20	**2.7**	<0.10	<0.050	<10	<4.0	<9.0	12
2013-C5-1-B	C5-1	2013	3	1	40-50	3.4	3.7	1.5	<0.1	2.0	9.0	5.0	<1.0	<0.050	<0.010	<10	<10	<10	15
C5-1 (40-50)	C5-1	2015	5	1	40-50	3.3	3.4	1.6	<0.5	1.5	7.5	4.3	<1	<0.1	<0.05	<7	<4	<8	10
	C5-1		7	2															#N/A
	C5-1		10	2															#N/A
	C5-1		15	2															#N/A
	C5-1		25	2															#N/A
																			#N/A
																			#N/A
																			#N/A
																			#N/A

CAM-5 - Lower Site Landfill South - Summary of Monitoring 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)
Downgradient																			
	C5-2 surface																		
11-29080	C5-2	2011	1	1	0-10	<3.0	<5.0	<5.0	<1.0	<10	<15	<20	<1.0	<0.10	<0.050	<10	<4.0	<9.0	12
2013-C5-2-A	C5-2	2013	3	1	0 - 15	3.1	3.1	2.0	<0.1	2.0	9.0	5.0	<1.0	<0.050	<0.010	<10	<10	14	**24**
C5-2 (0-15)	C5-2	2015	5	1	0 - 15	2.1	2.7	1.4	<0.5	2	7.7	6	<1	<0.1	<0.05	<7	<4	38	**44**
	C5-2		7	2															#N/A
	C5-2		10	2															#N/A
	C5-2		15	2															#N/A
	C5-2		25	2															#N/A
																			#N/A
																			#N/A
																			#N/A
																			#N/A
																			#N/A
	C5-2 depth																		
11-29082	C5-2	2011	1	1	20-30	<3.0	<5.0	<5.0	<1.0	<10	<15	<20	<1.0	<0.10	<0.050	<10	<4.0	9.5	17
2013-C5-2-B	C5-2	2013	3	1	40 - 50	5.3	3.8	2.0	<0.1	3.0	11	7.0	<1.0	<0.050	<0.010	<10	<10	34	**44**
C5-2 (40-50)	C5-2	2015	5	1	40 - 50	2.5	3	1.5	<0.5	1.6	7.6	5.2	<1	<0.1	<0.05	<7	<4	24	**30**
	C5-2		7	2															#N/A
	C5-2		10	2															#N/A
	C5-2		15	2															#N/A
	C5-2		25	2															#N/A
																			#N/A
																			#N/A
																			#N/A
																			#N/A
																			#N/A
	C5-3 surface																		
11-29084	C5-3	2011	1	1	0-10	**11**	**13**	**7.4**	<1.0	<10	**28**	**27**	<1.0	<0.10	<0.050	<10	<4.0	<9.0	12
2013-C5-3-A/3-A-D	C5-3	2013	3	1	0-15	**14.5**	**15**	**6.3**	<0.1	4.5	**33**	2.4	<1.0	<0.050	<0.010	<10	<10	<10	15
C5-3 (0-15)	C5-3	2015	5	1	0-15	**12.8**	**14.6**	**5.9**	<0.5	4.6	**27.9**	**24.6**	**1.1**	<0.1	<0.05	<7	<4	<8	10
	C5-3		7	2															#N/A
	C5-3		10	2															#N/A
	C5-3		15	2															#N/A
	C5-3		25	2															#N/A
																			#N/A
																			#N/A
																			#N/A
																			#N/A

CAM-5 - Lower Site Landfill South - Summary of Monitoring 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)
	C5-3 depth																		
11-29086	C5-3	2011	1	1	20-30	**12**	**15**	**7.9**	<1.0	<10	**35**	**26**	**1.0**	<0.10	<0.050	<10	<4.0	<9.0	12
2013-C5-3-B	C5-3	2013	3	1	40-50	**17**	**18**	**7.2**	<0.1	5.0	**36**	**29**	<1.0	<0.050	<0.010	<10	<10	<10	15
C5-3 (40-50)	C5-3	2015	5	1	40-50	**13**	**14.7**	**6.1**	<0.5	5.1	**28.7**	**25.1**	<1	<0.1	<0.05	<7	<4	<8	10
	C5-3		7	2															#N/A
	C5-3		10	2															#N/A
	C5-3		15	2															#N/A
	C5-3		25	2															#N/A
																			#N/A
																			#N/A
																			#N/A
																			#N/A
																			#N/A
	C5-4 surface																		
11-29088	C5-4	2011	1	1	0-10	**9.0**	**14**	**7.0**	<1.0	<10	**27**	**25**	<1.0	<0.10	<0.050	<10	<4.0	<9.0	12
2013-C5-4-A	C5-4	2013	3	1	0 - 15	**23**	**28**	**9.4**	<0.10	6.0	**54**	**45**	<1.0	<0.050	<0.010	<10	<10	41	**51**
C5-4 (0-15)	C5-4	2015	5	1	0 - 15	**8.7**	**11.9**	4.4	<0.5	3.6	**25**	**20.4**	**1.1**	<0.1	<1	<7	<4	32	**38**
	C5-4		7	2															#N/A
	C5-4		10	2															#N/A
	C5-4		15	2															#N/A
	C5-4		25	2															#N/A
																			#N/A
																			#N/A
																			#N/A
																			#N/A
																			#N/A
	C5-4 depth																		
11-29090	C5-4	2011	1	1	20-30	**14**	**25**	**9.8**	<1.0	<10	**36**	**56**	<1.0	<0.10	<0.050	<10	<4.0	<9.0	12
2013-C5-4-B	C5-4	2013	3	1	40 - 50	**24**	**30**	1.0	<0.10	6.0	**50**	**46**	<1.0	<0.050	<0.010	<10	<10	22	**32**
C5-4 (40-50)	C5-4	2015	5	1	40 - 50	**17.6**	**22.7**	**8**	<0.5	5.7	**37.4**	**37.3**	<1	<0.1	<0.05	<7	<4	<8	10
	C5-4		7	2															#N/A
	C5-4		10	2															#N/A
	C5-4		15	2															#N/A
	C5-4		25	2															#N/A
																			#N/A
																			#N/A
																			#N/A
																			#N/A
																			#N/A

CAM-5 - Lower Site Landfill South - Summary of Monitoring 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)
	C5-5 surface																		
11-29092	C5-5	2011	1	1	0-10	4.3	**7.6**	**5.0**	<1.0	<10	**20**	<20	<1.0	<0.10	<0.050	<10	<4.0	<9.0	12
2013-C5-5-A	C5-5	2013	3	1	0 - 15	5.5	4.4	2.1	<0.10	2.0	13	8.0	<1.0	<0.050	<0.010	<10	<10	<10	15
C5-5 (0-15)	C5-5	2015	5	1	0 - 15	**10.1**	**13.8**	**5.2**	<0.5	3	**24.7**	**22.5**	**1**	<0.1	<0.05	<7	<4	<8	10
	C5-5		7	2															#N/A
	C5-5		10	2															#N/A
	C5-5		15	2															#N/A
	C5-5		25	2															#N/A
																			#N/A
																			#N/A
																			#N/A
																			#N/A
																			#N/A
	C5-5 depth																		
11-29094	C5-5	2011	1	1	20-30	4.1	**7.9**	**5.1**	<1.0	<10	**18**	<20	<1.0	<0.10	<0.050	<10	<4.0	<9.0	12
2013-C5-5-B	C5-5	2013	3	1	40 - 50	4.0	5.5	2.4	<0.10	2.0	14	10	<1.0	<0.050	<0.010	<10	<10	<10	15
C5-5 (40-50)	C5-5	2015	5	1	40 - 50	**16.6**	**21.8**	**7.7**	<0.5	5.9	**36.3**	**35.6**	**1.3**	<0.1	<0.05	<7	<4	<8	10
	C5-5		7	2															#N/A
	C5-5		10	2															#N/A
	C5-5		15	2															#N/A
	C5-5		25	2															#N/A
																			#N/A
																			#N/A
																			#N/A
																			#N/A

Note: Modified TPH Total (C_6-C_{34}) has been calculated by adding results for F1, F2 and F3.

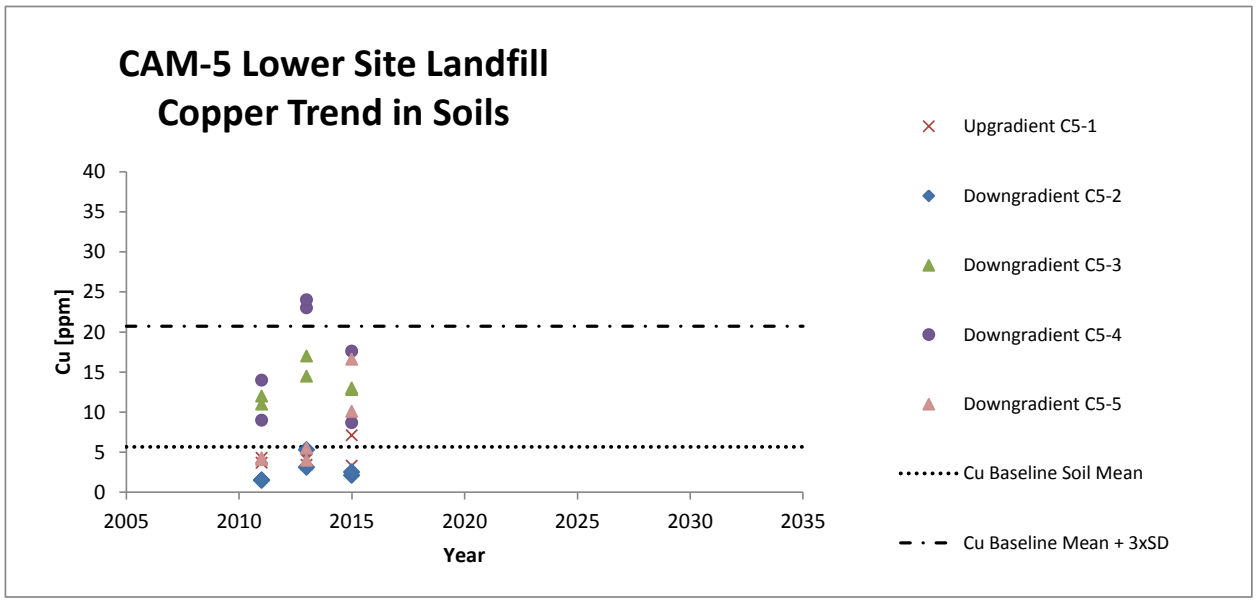
Legend

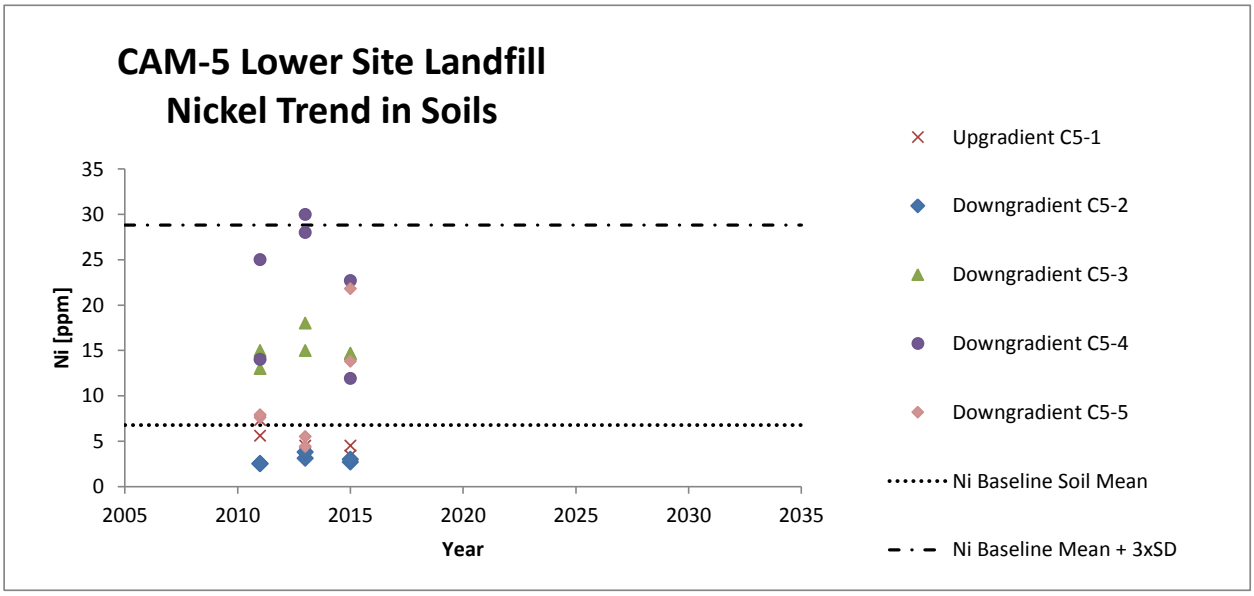
XX	sample exceeds background
XX	**sample exceeds baseline**
XX	*sample exceeds DLCU Tier I criteria*
XX	*sample exceeds DLCU Tier II criteria*

CAM-5 Lower Site Landfill 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 for the sample points.

Trendlines are intended for visual interpretation of temporal trends. When all monitoring results are below detection, trendlines are a reflection of changes in detection limit. Users should refer to data tables.

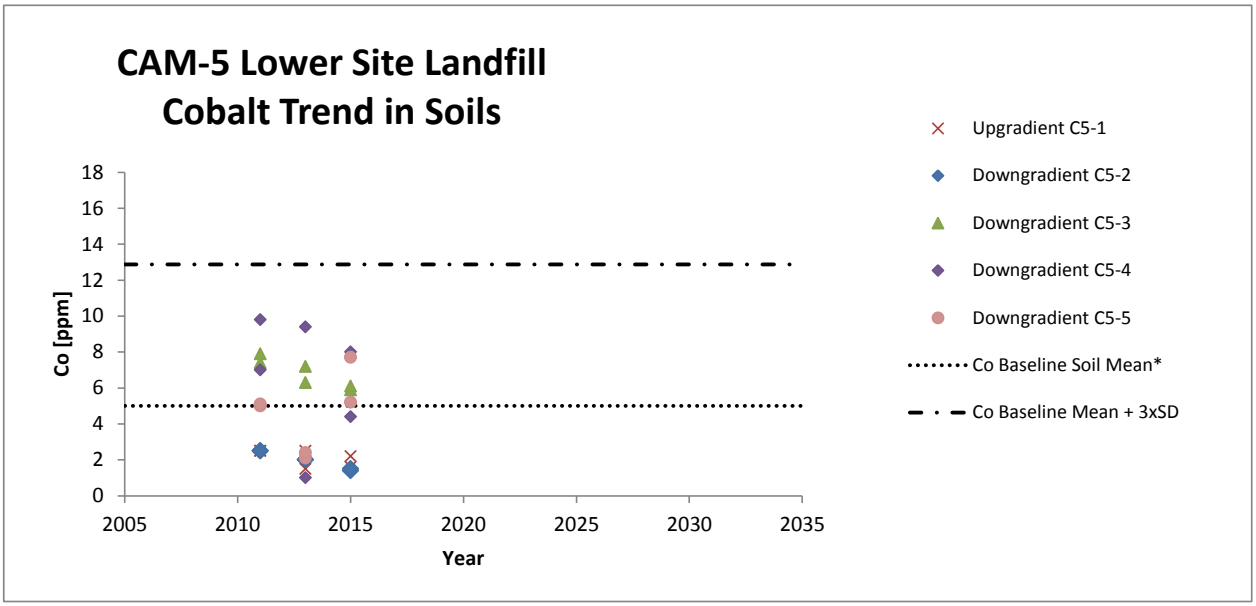




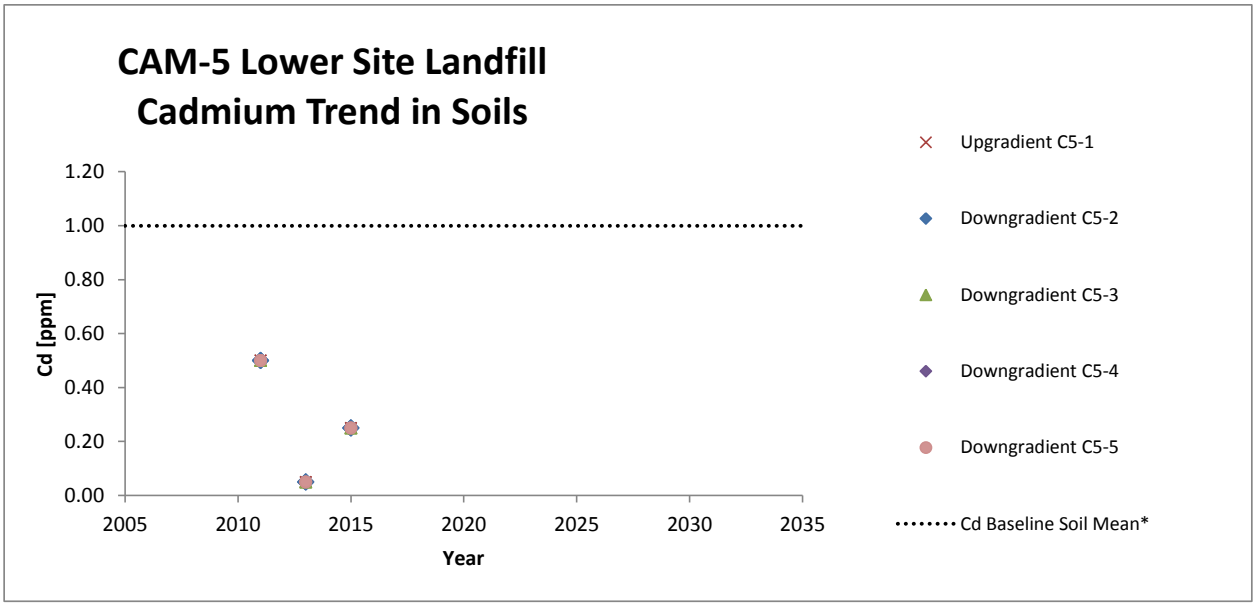
CAM-5 Lower Site Landfill Trends in Soil Inorganics, PCBs and PHCs (modified TPH)

Where results are below detection, half of the detection limit has been used in the charts for the sample points.

Trendlines are intended for visual interpretation of temporal trends. When all monitoring results are below detection, trendlines are a reflection of changes in detection limit. Users should refer to data tables.



*Co Baseline Arithmetic Mean is equal to the baseline detection limit.

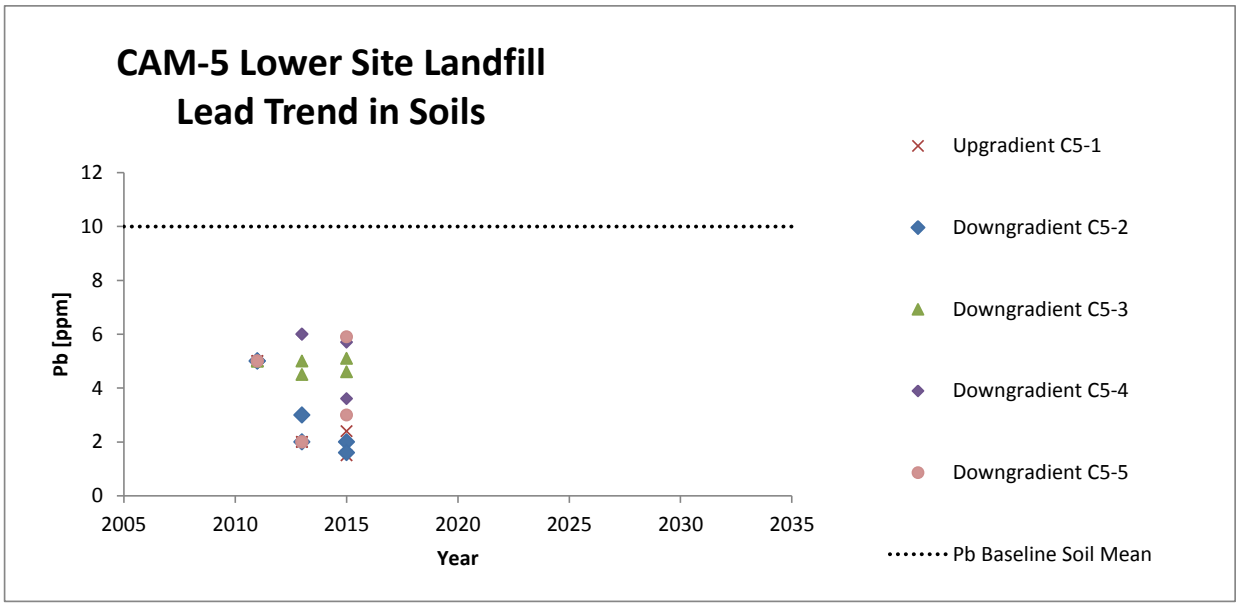


*Cd Baseline Arithmetic Mean is equal to the baseline detection limit.
*Cd Baseline SD = 0

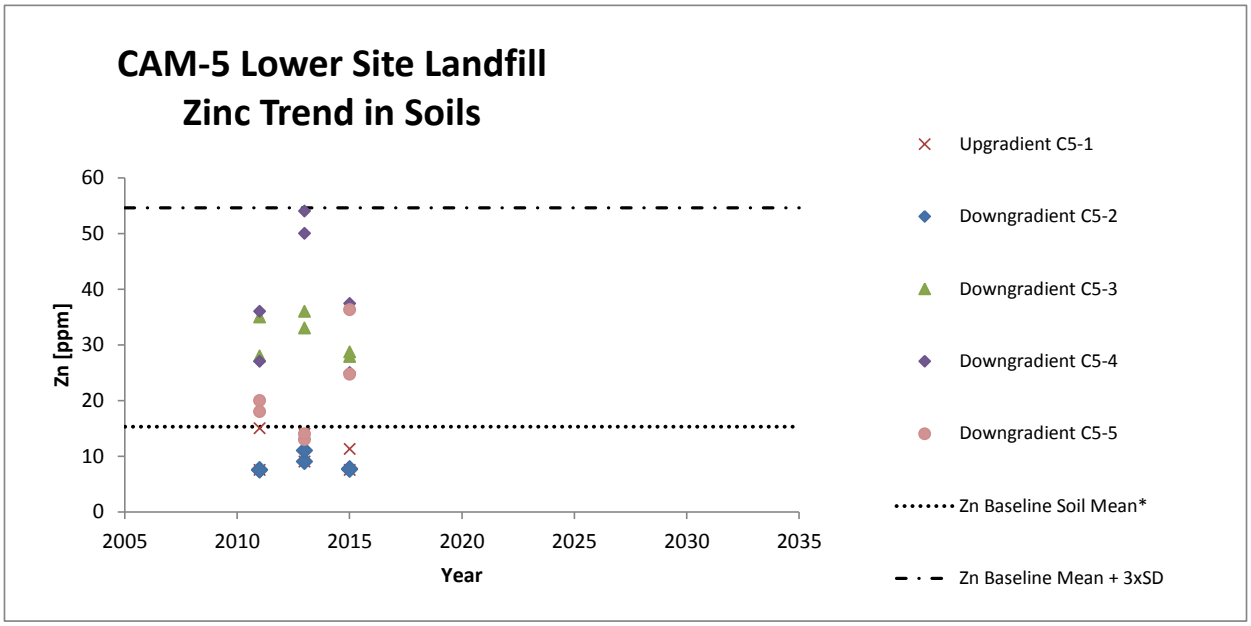
CAM-5 Lower Site Landfill Trends in Soil Inorganics, PCBs and PHCs (modified TPH)

Where results are below detection, half of the detection limit has been used in the charts for the sample points.

Trendlines are intended for visual interpretation of temporal trends. When all monitoring results are below detection, trendlines are a reflection of changes in detection limit. Users should refer to data tables.



*Pb Baseline Arithmetic Mean is equal to the baseline detection limit.
*Pb Baseline SD = 0

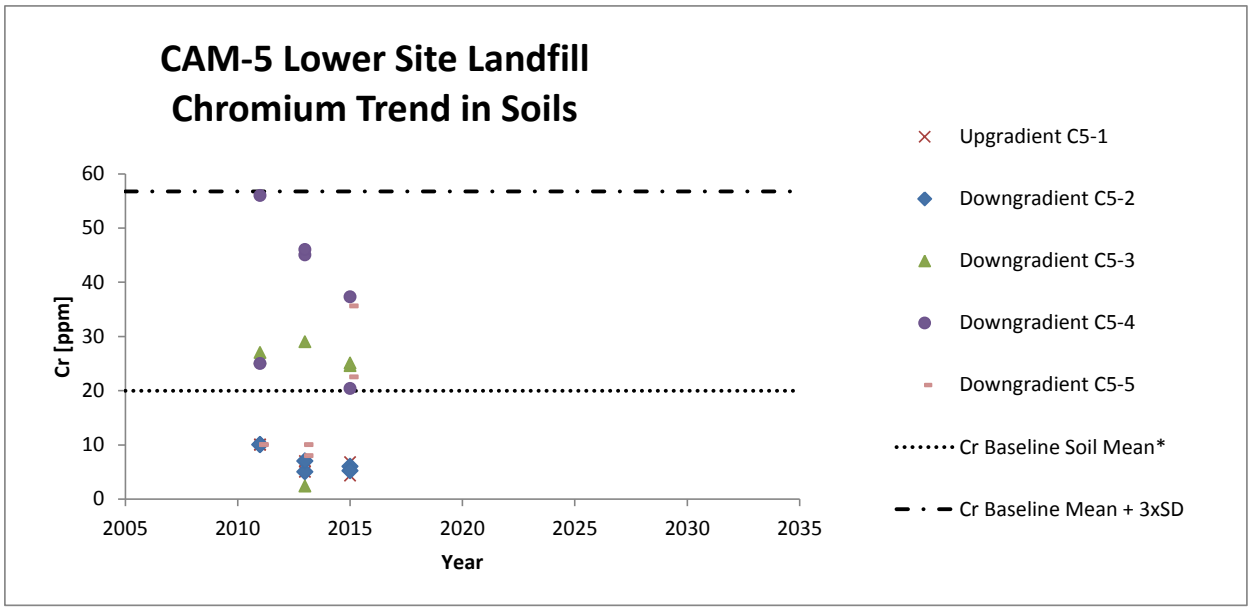


*Zn Baseline Arithmetic Mean is equal to the baseline detection limit.

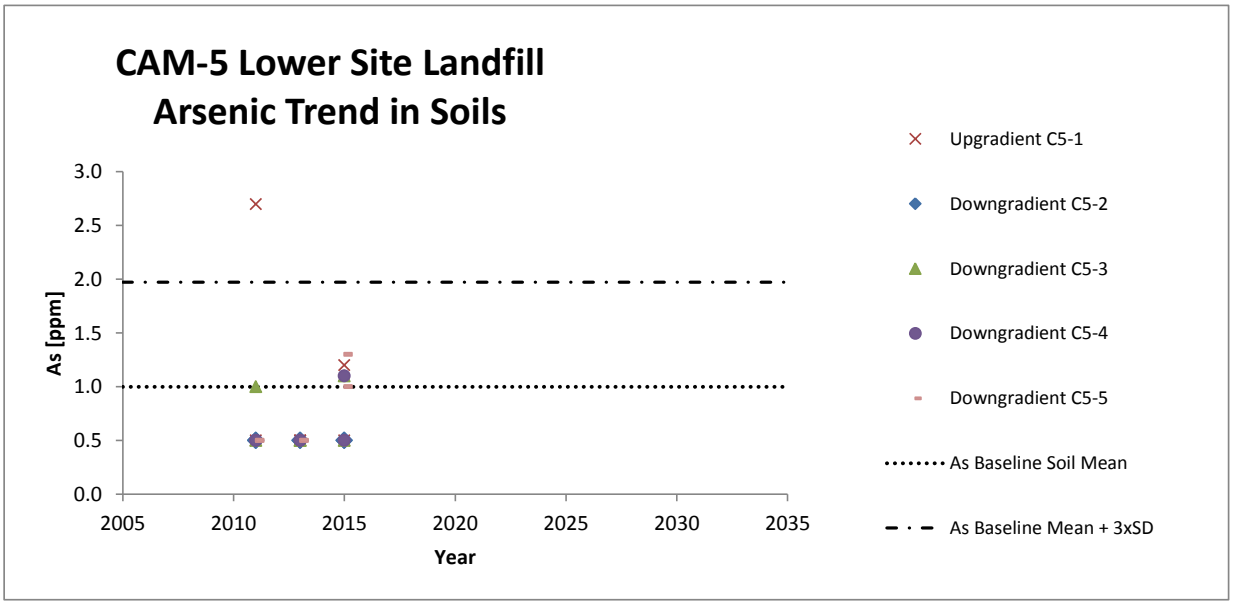
CAM-5 Lower Site Landfill Trends in Soil Inorganics, PCBs and PHCs (modified TPH)

Where results are below detection, half of the detection limit has been used in the charts for the sample points.

Trendlines are intended for visual interpretation of temporal trends. When all monitoring results are below detection, trendlines are a reflection of changes in detection limit. Users should refer to data tables.



*Cr Baseline Arithmetic Mean is equal to the baseline detection limit.

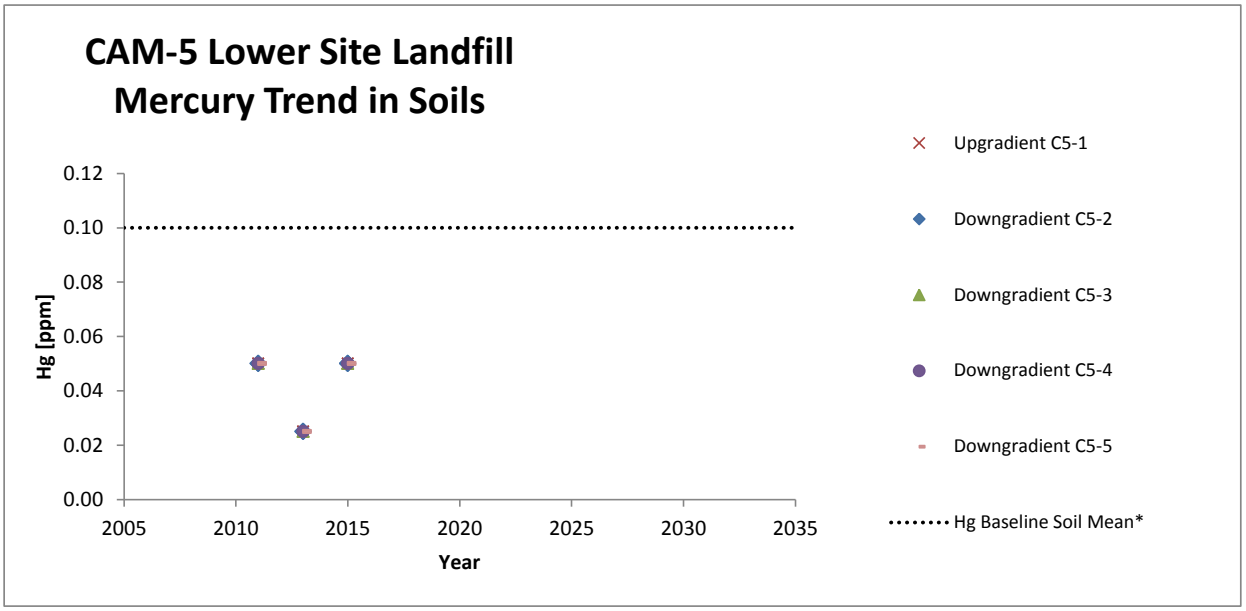


*As Baseline Arithmetic Mean is equal to the baseline detection limit.

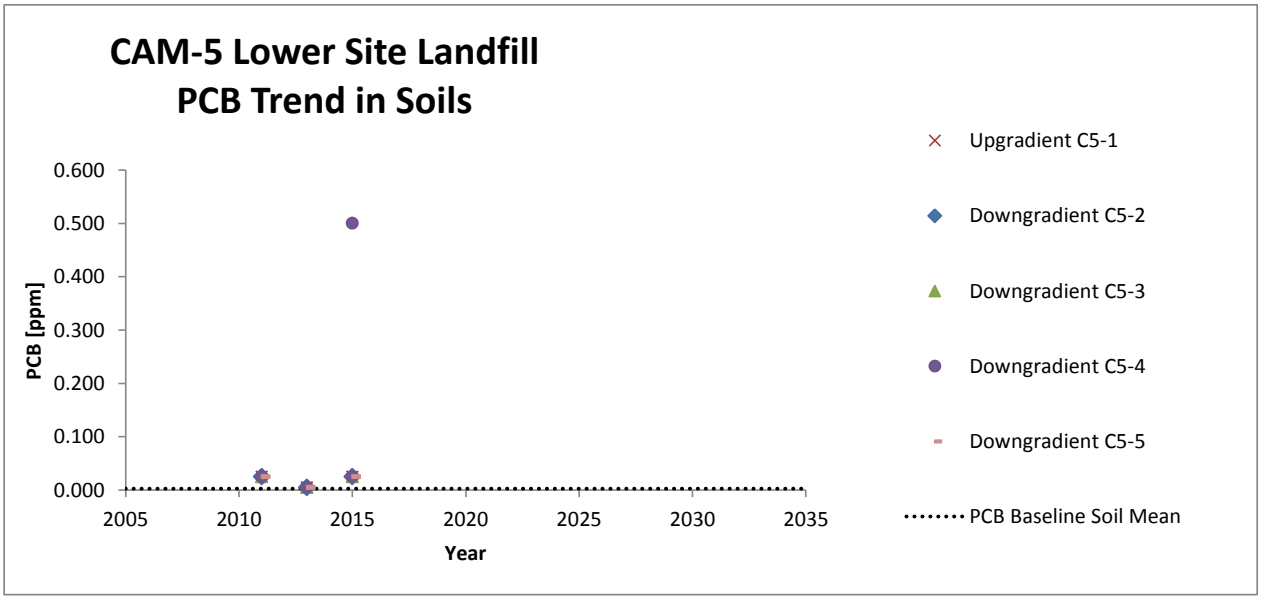
CAM-5 Lower Site Landfill Trends in Soil Inorganics, PCBs and PHCs (modified TPH)

Where results are below detection, half of the detection limit has been used in the charts for the sample points.

Trendlines are intended for visual interpretation of temporal trends. When all monitoring results are below detection, trendlines are a reflection of changes in detection limit. Users should refer to data tables.



*Hg Baseline Arithmetic Mean is equal to the baseline detection limit.
*Hg Baseline SD = 0

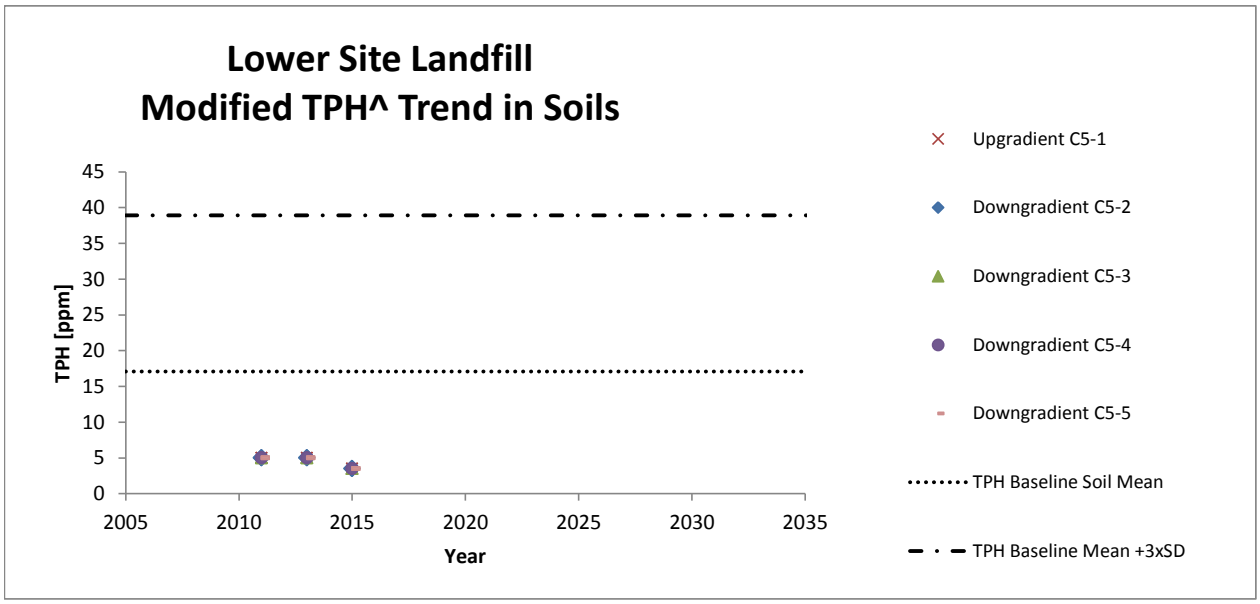


*PCB Baseline Mean is equal to the baseline detection limit.
*PCB Baseline SD = 0

CAM-5 Lower Site Landfill 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 for the sample points.

Trendlines are intended for visual interpretation of temporal trends. When all monitoring results are below detection, trendlines are a reflection of changes in detection limit. Users should refer to data tables.



^ Modified TPH is Sum of F1, F2 and F3 fractions (C_6 - C_{34})

APPENDIX D

Photograph Log

Visual Inspection Photographs
Thermistor Photographs
Monitoring Well Photographs
Soil Sampling Photographs

PHOTOS

Photo 1: Tier II Disposal Facility – South crest surface, looking east (ATT3_Photo1.jpg) 1
Photo 2: Tier II Disposal Facility – West crest surface, looking north (ATT4_Photo1.jpg) 1
Photo 3: Tier II Disposal Facility – East crest surface, looking north (ATT5_Photo1.jpg) 2
Photo 4: Tier II Disposal Facility – North crest surface, looking west (ATT6_Photo1.jpg) 2
Photo 5: Tier II Disposal Facility – West crest surface, looking south (ATT7_Photo1.jpg) 3
Photo 6: Tier II Disposal Facility – Cover surface, looking east (ATT8_Photo1.jpg) 3
Photo 7: Tier II Disposal Facility – Cover surface, looking east, VT2 and VT4 in the photo (ATT9_Photo1.jpg) 4
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Photo 10: Tier II Disposal Facility – West toe, looking north (ATT12_Photo1.jpg) 5
Photo 11: Tier II Disposal Facility – South toe, looking west (ATT13_Photo1.jpg) 6
Photo 12: Tier II Disposal Facility – East toe, looking north (ATT14_Photo1.jpg) 6
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Photo 14: Tier II Disposal Facility – North slope, looking west (ATT16_Photo1.jpg) 7
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Photo 38: Non-Haz Waste Landfill – Feature B, self-armouring erosion on north slope (ATT43_Photo2.jpg)

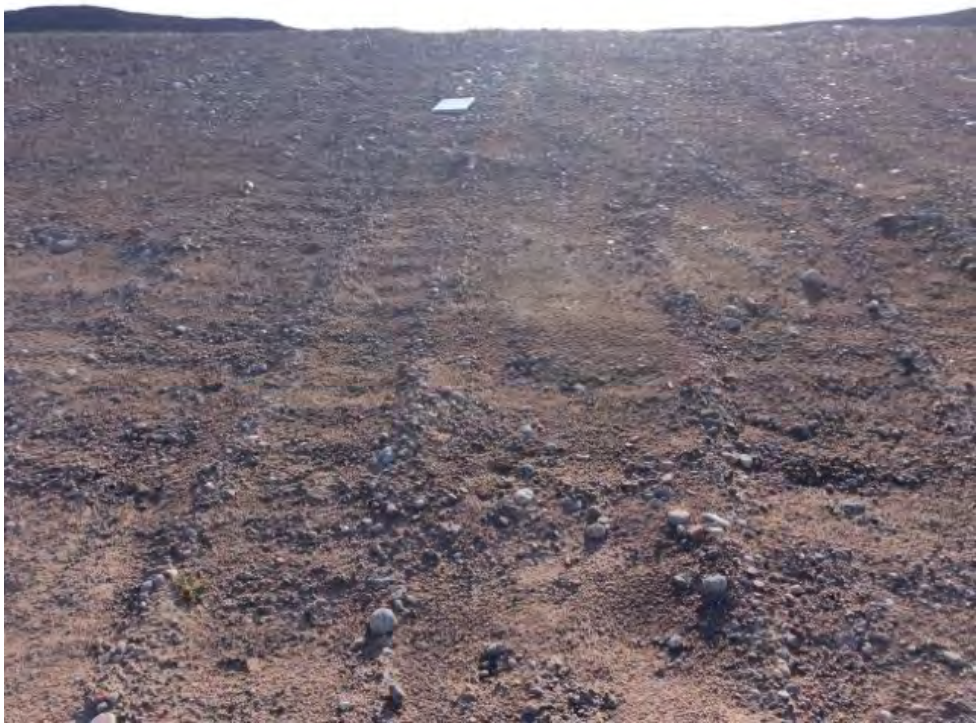


Photo 39: *Non-Haz Waste Landfill – Feature K, self-armouring erosion on north slope (ATT44_Photo1.jpg)*



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Photo 45: *Non-Haz Waste Landfill – South crest, looking east (ATT50_Photo1.jpg)*



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Photo 48: *Non-Haz Waste Landfill – Feature F, small hydrocarbon stain (ATT54_Photo1.jpg)*



Photo 49: *Non-Haz Waste Landfill – Feature G, minor settlement (ATT55_Photo1.jpg)*



Photo 50: *Non-Haz Waste Landfill – Feature D, minor settlement (ATT56_Photo1.jpg)*



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Photo 67: *Lower Site Landfill South – Southeast slope, looking northwest (ATT80_Photo1.jpg)*



Photo 68: *Lower Site Landfill South – Feature E, minor settlement areas near southeast crest edge, looking north (ATT81_Photo1.jpg)*

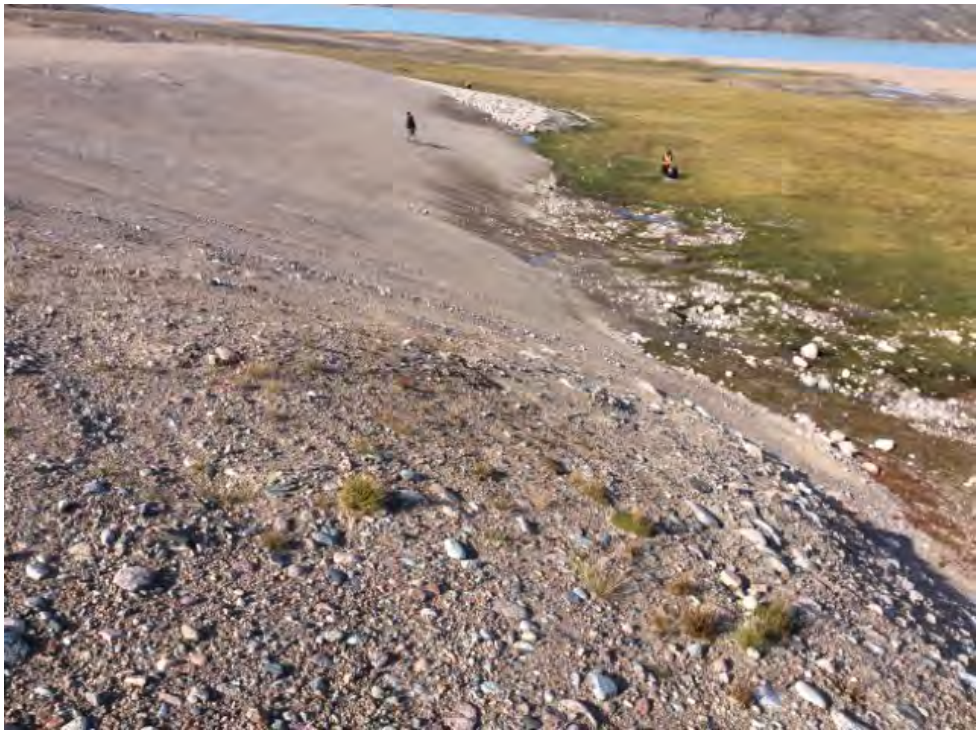


Photo 69: *Lower Site Landfill South – East slope, looking north (ATT83_Photo2.jpg)*



Photo 70: *Lower Site Landfill South – Feature S, minor self-armouring erosion channel on east slope, looking east (ATT84_Photo1.jpg)*



Photo 71: *Lower Site Landfill South – Feature P, settlement and self-armouring erosion on east slope, looking east from crest (ATT86_Photo1.jpg)*

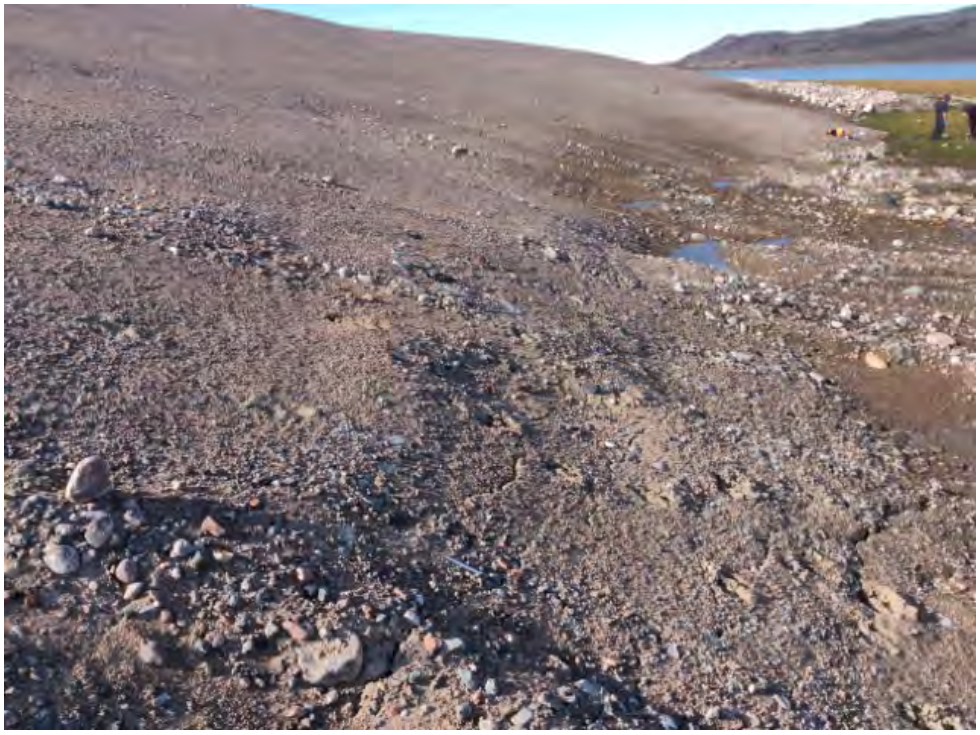


Photo 72: *Lower Site Landfill South – Feature Y, tension crack near toe on east slope, looking north, south endpoint (ATT87_Photo1.jpg)*



Photo 73: *Lower Site Landfill South – Feature Y, tension crack on east slope, looking north (ATT88_Photo1.jpg)*



Photo 74: *Lower Site Landfill South – Feature Y, tension crack on east slope, mid-point, looking north (ATT89_Photo1.jpg)*



Photo 75: *Lower Site Landfill South – Feature Y, tension crack on east slope, looking south (ATT90_Photo1.jpg)*



Photo 76: *Lower Site Landfill South – Feature Y, tension crack on east slope, north endpoint, looking north (ATT97_Photo1.jpg)*



Photo 77: *Lower Site Landfill South – Feature G, seepage and ponded water at the toe, looking north (ATT91_Photo1.jpg)*



Photo 78: *Lower Site Landfill South – Feature G, seepage with iron oxide staining, east toe (ATT93_Photo1.jpg)*



Photo 79: *Lower Site Landfill South – Feature G, seepage with iron oxide staining, east toe (ATT94_Photo2.jpg)*



Photo 80: *Lower Site Landfill South – Feature G, ponded water along east toe, with iron oxide staining, looking north from south endpoint (ATT95_Photo1.jpg)*



Photo 81: *Lower Site Landfill South – Feature G, ponded water along east toe, iron oxide staining, looking south from north endpoint (ATT96_Photo1.jpg)*



Photo 82: *Lower Site Landfill South – Feature W, wet area on northeast slope, looking south (ATT98_Photo1.jpg)*



Photo 83: *Lower Site Landfill South – Feature N, self-armouring erosion on east slope, looking east from crest (ATT99_Photo1.jpg)*



Photo 84: *Lower Site Landfill South – Feature Z, tension crack on east slope close to the crest, some self-armouring erosion (Feature R), looking east (ATT100_Photo1.jpg)*



Photo 85: *Lower Site Landfill South – Feature J, erosion channel on east slope, looking east (ATT101_Photo1.jpg)*



Photo 86: *Lower Site Landfill South – Feature M, settlement near east crest edge, looking north (ATT102_Photo1.jpg)*



Photo 87: *Lower Site Landfill South – Feature T, small hydrocarbon stain (ATT103_Photo1.jpg)*



Photo 88: *Lower Site Landfill South – North slope and toe, looking east (ATT104_Photo1.jpg)*



Photo 89: Lower Site Landfill South – North crest and slope, looking east (ATT105_Photo2.jpg)



Photo 90: Lower Site Landfill South – Northwest slope and crest surface, looking south (ATT106_Photo1.jpg)



Photo 91: *Lower Site Landfill South – Feature X, crack and minor erosion gully from northwest crest to toe, looking north (ATT108_Photo1.jpg)*

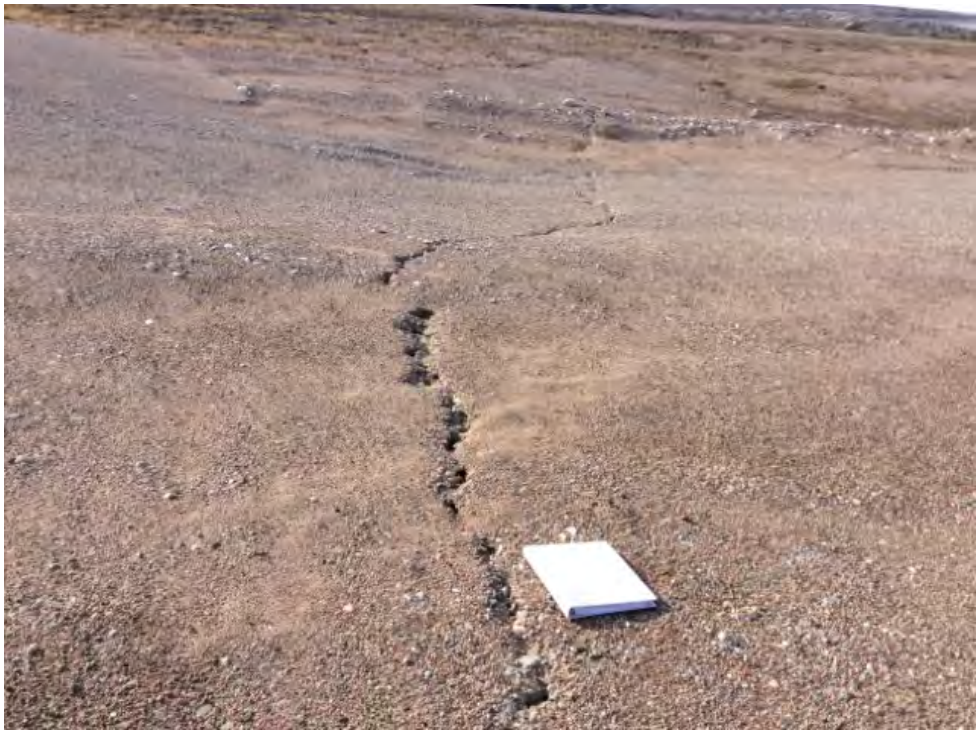


Photo 92: *Lower Site Landfill South – Feature X, crack and minor erosion gully, looking north (ATT110_Photo1.jpg)*



Photo 93: *Lower Site Landfill South – Feature X, south end point, looking south (ATT111_Photo1.jpg)*



Photo 94: *Lower Site Landfill South – Northwest slope and toe, looking east, Feature I (self-armouring minor erosion) and Feature O (ponded water at toe) in mid-ground (ATT112_Photo1.jpg)*



Photo 95: Lower Site Landfill South – Cover surface, looking south from northwest corner (ATT113_Photo1.jpg)



Photo 96: Lower Site Landfill South – Cover surface, looking south from northwest crest edge (ATT114_Photo1.jpg)



Photo 97: *Lower Site Landfill South – Feature H, major erosion gully from northwest crest to toe, looking north (ATT115_Photo1.jpg)*



Photo 98: *Lower Site Landfill South – Feature H, erosion gully, looking north, 2 m wide x 0.5 m deep (ATT116_Photo2.jpg)*



Photo 99: *Lower Site Landfill South – Feature U, wet area or potential stain (ATT118_Photo1.jpg)*



Photo 100: *Lower Site Landfill South – Cover surface, looking north (ATT119_Photo1.jpg)*



Photo 101: Lower Site Landfill South – Cover surface, looking east (ATT120_Photo1.jpg)



Photo 102: USAF Landfill – North slope and cover surface, looking west (ATT121_Photo1.jpg)



Photo 103: *USAF Landfill – East cover surface and toe, looking south (ATT122_Photo1.jpg)*



Photo 104: *USAF Landfill – Feature H, sparse vegetation on north slope, looking east (ATT123_Photo1.jpg)*



Photo 105: *USAF Landfill – Feature L, minor erosion channel on north slope (ATT124_Photo1.jpg)*



Photo 106: *USAF Landfill – West slope and toe, looking south, Feature I, ponded water along toe (ATT125_Photo1.jpg)*



Photo 107: USAF Landfill – West crest surface, looking south, Feature H, sparse vegetation (ATT126_Photo1.jpg)



Photo 108: USAF Landfill – Feature C, minor settlement (ATT127_Photo1.jpg)



Photo 109: *USAF Landfill – Feature B, small stain (ATT129_Photo1.jpg)*



Photo 110: *USAF Landfill – West crest surface and slope, looking north (ATT130_Photo1.jpg)*



Photo 111: *USAF Landfill – South crest and slope, looking east (ATT131_Photo1.jpg)*



Photo 112: *USAF Landfill – Cover surface, looking north (ATT132_Photo1.jpg)*



Photo 113: *USAF Landfill – East crest, looking north (ATT133_Photo1.jpg)*



Photo 114: *USAF Landfill – Feature E, rutting (noted in previous report), looking west (ATT134_Photo1.jpg)*



Photo 115: USAF Landfill – Cover surface, from southwest to northwest (ATT136_Photo1.jpg)



Photo 116: USAF Landfill – Feature J, minor settlement (ATT140_Photo1.jpg)



Photo 117: *USAF Landfill – Feature K, linear depression (ATT135_Photo1.jpg)*



Photo 118: *USAF Landfill – Feature F, cement and/or bentonite on surface (ATT141_Photo1.jpg)*



Photo 119: *USAF Landfill – Feature F, cement and/or bentonite on surface, looking southwest (ATT143_Photo1.jpg)*



Photo 120: *USAF Landfill – Feature G, rough area with minor settlement near north crest edge, looking north (ATT142_Photo1.jpg)*



Photo 121: *USAF Landfill – Feature M, rough area on north slope and toe (previously noted as vehicle rutting) (ATT144_Photo1.jpg)*



Photo 122: *Monitoring Well [MW05], Tier II Disposal Facility*



Photo 123: Monitoring Well [MW07], Tier II Disposal Facility



Photo 124: Monitoring Well [MW08], Tier II Disposal Facility



Photo 125: Monitoring Well [MW09], Non-Hazardous Waste Landfill



Photo 126: Monitoring Well [MW11], Non-Hazardous Waste Landfill



Photo 127: Monitoring Well [MW12], Non-Hazardous Waste Landfill



Photo 128: Soil Sample [C5-1] (1 – before excavation), Lower Site Landfill - South



Photo 129: *Soil sample [C5-1] (2 – after excavation), Lower Site Landfill - South*



Photo 130: *Soil sample [C5-1] (3 – after backfilling), Lower Site Landfill - South*



Photo 131: *Soil sample [C5-2] (1 – before excavation), Lower Site Landfill - South*



Photo 132: *Soil sample [C5-2] (2 – after excavation), Lower Site Landfill - South*



Photo 133: *Soil sample [C5-2] (3 – after backfilling), Lower Site Landfill - South*



Photo 134: *Soil sample [C5-3] (1 – before excavation), Lower Site Landfill - South*



Photo 135: Soil sample [C5-3] (2 – after excavation), Lower Site Landfill - South



Photo 136: Soil sample [C5-3] (3 – after backfilling), Lower Site Landfill - South



Photo 137: *Soil sample [C5-4] (1 – before excavation), Lower Site Landfill - South*



Photo 138: *Soil sample [C5-4] (2 – after excavation), Lower Site Landfill - South*



Photo 139: *Soil sample [C5-4] (3 – after backfilling), Lower Site Landfill - South*



Photo 140: *Soil sample [C5-5] (1 – before excavation), Lower Site Landfill - South*



Photo 141: *Soil sample [C5-5] (2 – after excavation), Lower Site Landfill - South*



Photo 142: *Soil sample [C5-5] (3 – after backfilling), Lower Site Landfill - South*



Photo 143: Soil sample [C5-6] (1 – before excavation), USAF & Asbestos Landfill



Photo 144: Soil sample [C5-6] (2 – after excavation), USAF & Asbestos Landfill



Photo 145: Soil sample [C5-6] (3 – after backfilling), USAF & Asbestos Landfill



Photo 146: Soil sample [C5-7] (1 – before excavation), USAF & Asbestos Landfill



Photo 147: Soil sample [C5-7] (2 – after excavation), USAF & Asbestos Landfill



Photo 148: Soil sample [C5-7] (3 – after backfilling), USAF & Asbestos Landfill



Photo 149: *Soil sample [C5-8] (1 – before excavation), USAF & Asbestos Landfill*



Photo 150: *Soil sample [C5-8] (2 – after excavation), USAF & Asbestos Landfill*



Photo 151: Soil sample [C5-8] (3 – after backfilling), USAF & Asbestos Landfill



Photo 152: Soil sample [MW05] (1 – before excavation), Tier II disposal Facility



Photo 153: *Soil sample [MW05] (2 – after excavation), Tier II Disposal Facility*



Photo 154: *Soil sample [MW05] (3 – after backfilling), Tier II Disposal Facility*



Photo 155: Soil sample [MW06] (1 – before excavation), Tier II Disposal Facility



Photo 156: Soil sample [MW06] (2 – after excavation), Tier II Disposal Facility



Photo 157: *Soil sample [MW06] (3 – after backfilling), Tier II Disposal Facility*



Photo 158: *Soil sample [MW07] (1 – before excavation), Tier II Disposal Facility*



Photo 159: Soil sample [MW07] (2 – after excavation), Tier II Disposal Facility



Photo 160: Soil sample [MW07] (3 – after backfilling), Tier II Disposal Facility



Photo 161: *Soil sample [MW08] (1 – before excavation), Tier II Disposal Facility*



Photo 162: *Soil sample [MW08] (2 – after excavation), Tier II Disposal Facility*



Photo 163: Soil sample [MW08] (3 – after backfilling), Tier II Disposal Facility



Photo 164: Soil sample [MW09] (1 – before excavation), Non-Hazardous Waste Landfill



Photo 165: Soil sample [MW09] (2 – after excavation), Non-Hazardous Waste Landfill



Photo 166: Soil sample [MW09] (3 – after backfilling), Non-Hazardous Waste Landfill



Photo 167: *Soil sample [MW11] (1 – before excavation), Non-Hazardous Waste Landfill*



Photo 168: *Soil sample [MW11] (2 – after excavation), Non-Hazardous Waste Landfill*



Photo 169: Soil sample [MW11] (3 – after backfilling), Non-Hazardous Waste Landfill



Photo 170: Soil sample [MW12] (1 – before excavation), Non-Hazardous Waste Landfill



Photo 171: *Soil sample [MW12] (2 – after excavation), Non-Hazardous Waste Landfill*



Photo 172: *Soil sample [MW12] (3 – after backfilling), Non-Hazardous Waste Landfill*



Photo 173: Tier II Disposal Facility – VT3, looking east (ATT145_Photo1.jpg)



Photo 174: Tier II Disposal Facility – VT3 Battery replacement (ATT146_Photo1.jpg)



Photo 175: Tier II Disposal Facility – VT, looking north (ATT147_Photo1.jpg)



Photo 176: Tier II Disposal Facility – VT1 Battery replacement (ATT148_Photo1.jpg)



Photo 177: *Tier II Disposal Facility – VT2, l,ooking east (ATT149_Photo1.jpg)*



Photo 178: *Tier II Disposal Facility – VT2 Battery replacement (ATT150_Photo1.jpg)*



Photo 179: Tier II Disposal Facility – VT4, looking south (ATT151_Photo1.jpg)



Photo 180: Tier II Disposal Facility – VT4 Battery replacement (ATT152_Photo1.jpg)

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