March 2018

QIKIQ15 BAFFIN REGION DEW LINE SITE MONITORING

2017 FOX-M Monitoring Report

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

ATTN: Alison Street and Laura D'Costa

Report Number: 1530908-3000-R5-V4

Distribution:

Department of National Defence – 1 hard copy and 10 electronic copies

Golder Associates Ltd. – 1 electronic copy

Golder Associates

Executive Summary

Golder Associates Ltd. (Golder) has been contracted by Public Services and Procurement Canada (PSPC), 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 three DEW Line sites that were monitored in 2017 as part of the QIKIQ15 contract are DYE-M, CAM-5 and FOX-M. These sites are all now in the Post-Construction Monitoring Phase of their remedial program. The 2017 FOX-M monitoring event was carried out on August 10th, 13th and 14th.

This monitoring report presents the 2017 post-construction inspection and monitoring results for nine landfills at FOX-M:

- Tier II Disposal Facility;
- East Beach Landfill South;
- East Beach Landfill North;
- Non-Hazardous Waste Landfill;
- G-217 West Landfill;
- Billboards Landfill;
- Hazmat Storage East Landfill;
- Communications Northwest Landfill;
- Communications North Landfill;

Tier II Disposal Facility

Based on the visual inspection, there does not appear to be any significant erosion, settlement, exposed waste or indications of instability at the Tier II Disposal Facility. A minor erosion channel and two new minor settlement areas were observed. The extensive vehicle tracks on the cover surface and slopes have not deteriorated and are not considered to be significant. Previously observed metal and wood debris on the northwest slope is not exposed waste and therefore has not been reported as a feature in 2017. Previously observed ponded water along the southwest toe was unchanged, whereas ponded water along the east toe appears to be larger in area compared to the previous inspection. Ponded water was observed in 2017 along the southeast toe in an area where ponded water had been previously observed in 2012 but not in 2014. The ponded water areas along the toe of the landfill have not impacted the stability of the landfill. This landfill was assessed to have an “Acceptable” overall landfill performance rating because all observed features were assessed as “Acceptable.”

The concentrations of the metals were typically highest overall at the sample location MW-02, located downgradient of the east side of the landfill; however, they were less than or similar to those observed in previous years. A long-term general decreasing trend was noted for the concentrations of many metals. At the shallow sample location MW 02, the modified TPH concentration of 26 mg/kg was slightly lower than that observed in 2014 (28 mg/kg) and that in 2012 (68 mg/kg). No detectable concentrations of arsenic, cadmium or PCB were noted in any of the soil samples in 2017. None of the reported values exceeded their respective baseline mean concentrations plus 3σ.

In 2017, groundwater samples were collected from all five monitoring wells adjacent to the landfill. Where detected, the concentrations of the metals in the groundwater samples were less than or similar to previous years. No detectable concentrations of arsenic, cadmium, cobalt, copper, lead or PHC were noted in any of the groundwater samples in 2017. It is noted that the groundwater samples collected in 2017 were filtered in the lab, and therefore the results represent dissolved metals instead of total metals.

Based on the results of the 2017 sampling period and comparison to historical trends, there is no evident ongoing impact of the landfill on soil or groundwater quality. No modifications to the ongoing monitoring program at this landfill are recommended. It is recommended that the well casing at MW-04 be cut to allow the well to be secured.

East Beach Landfill (South and North)

Visual inspection of the East Beach Landfill South observed that the amount of vehicle tracks on the cover surface and slopes had increased slightly compared to the previous inspection in 2014. Previously observed settlement areas were unchanged while three new settlement areas were observed in 2017. Previously observed ponded water along the northwest crest toe was so far away from the toe that it is not considered significant and has not been assessed as a feature in 2017. Some sparse vegetation was observed on the south slope. The observed features do not appear to be impacting the stability of the East Beach Landfill South. Previously observed debris are not buried waste that has become exposed and therefore have not been reported in 2017.

The overall stability performance of the East Beach Landfill (South and North) was assessed as “Acceptable” overall landfill performance rating because all observed features were assessed as “Acceptable.”

Groundwater flow at this landfill is considered to be radial, and therefore all sample locations are considered to be downgradient. No detectable concentrations of arsenic or cadmium were noted in any of the soil samples in 2017. At all sampling locations, the concentrations of most metals in soil were similar to values reported in previous years. The concentrations of lead slightly exceeded the baseline concentration plus 3σ in the both MW-20 samples, the deep MW-23 sample, both MW-24 samples, both MW-25 samples and both MW-31 samples. The concentrations of lead in the deep MW-20 sample and shallow MW-24 sample notably represent new historical maxima.

PHC in soil were detected in both MW-21 samples, the deep MW-23 sample, both MW-24 samples and the deep MW-30 sample at modified TPH concentrations between 15 mg/kg and 119 mg/kg. The modified TPH concentrations of 119 mg/kg at the deep sample location MW-30 represents a new historical maximum, whereas the concentrations at the remaining locations were less than those reported in previous years. It is noted that the PCB concentration at the shallow MW-31 location exceeded the baseline concentration plus 3σ, but remains below the historical maximum reported in 2011.

In 2017, groundwater samples were collected from three out of twelve monitoring wells adjacent to the landfill. The groundwater samples at MW-20, MW-22, MW-23, MW-24, MW-25, MW-26, MW-27, MW-28 and MW-31 could not be collected because the groundwater in the wells was frozen. At all locations where groundwater was sampled, the concentrations of the metals detected in the groundwater samples were less than recent years. The concentration of zinc at MW-30 exceeded the baseline concentration plus 3σ but was less than the concentrations reported from 2011 to 2014. No detectable concentrations of arsenic, cadmium, chromium, cobalt, copper, lead or PHC were noted in any of the groundwater samples in 2017. It is noted that the groundwater samples collected in 2017 were filtered in the lab, and therefore the results represent dissolved metals instead of total metals. An overall trend comparison on the impact of results based on total versus dissolved metals will be prepared in 2018.

The historical graphs in Appendix C illustrate concentration trends in the soil samples collected at the East Beach Landfill. The graphs indicate that relatively stable or slight decreasing trends are observed for most parameters at downgradient monitoring locations; notable decreasing trends were observed for chromium and cobalt. A slight decreasing trend is also observed for the modified TPH results, with the exception of the deep MW-30

location where a historical maximum was reported. It is noted that these concentrations are similar to those observed in 2012 and less than those observed historically in the shallow sampling location.

Elevated concentrations of lead are reported at a number of the wells at this landfill; however, the historical data indicate variably elevated lead concentrations, which in some cases extend to the initial sample collection in 2008. Trends of lead should be reviewed in future to determine if any actions are warranted. No modifications to the ongoing monitoring program at this landfill are recommended.

Non-Hazardous Waste Landfill (NHWL)

Based on the visual inspection, there does not appear to be any significant erosion, settlement, exposed waste or indications of instability at the Non-Hazardous Waste Landfill. The extent of vehicle tracks on the cover surface and slopes has increased slightly since the last inspection; however, they are not deteriorating or impacting landfill stability. A previously observed settlement area on the south slope was unchanged. Three new minor settlement areas were observed on the east, south, and north slopes in 2017. Previously observed ponded water at the north toe was observed to be unchanged in 2017. The extent of previously observed sparse vegetation was observed to have increased slightly in area. Some new sparse vegetation was also observed on the south slope. These observed features do not appear to be impacting the stability of the Non-Hazardous Waste Landfill. Previously reported staining on the east slope appears to be naturally darker aggregate rather than staining related to environmental performance of the landfill. A piece of metal wire was observed at the south crest edge of the landfill, which may be waste that was not sufficiently buried since there is no associated erosion or sloughing. This landfill was assessed to have an “Acceptable” overall landfill performance rating because all observed features were assessed as “Acceptable.”

No detectable concentrations of arsenic, cadmium, or PCB were noted in any of the soil samples in 2017. At all sampling locations, the concentrations of most metals were all less than or similar to reported in previous years. The concentrations of zinc in the downgradient shallow MW-12 sample, the downgradient deep MW-15 sample and the upgradient shallow MW-16 sample exceeded the baseline concentration plus 3σ but remain below the historical maximum concentrations and are similar to baseline arithmetic mean concentrations. At the shallow sample location MW-12, the lead concentration exceeded the baseline concentration plus 3σ and represents a new historical maximum.

PHC were detected in both MW-12 samples, the deep downgradient MW-13 sample, the shallow downgradient MW-14 sample, the deep MW-15 sample and both MW-16 samples at modified TPH concentrations between 29 mg/kg and 192 mg/kg. The modified TPH concentrations reported in both MW-12 samples represent new historical maxima, whereas the concentrations at the remaining locations were less than or similar to those reported in previous years. The presence of hydrocarbons at MW-13 is associated with the active operation of the North Warning System site and its associated fuel tanks and is not related to the NHWL DEW Line landfill.

In 2017, groundwater samples were collected from two out of five monitoring wells adjacent to the landfill. The groundwater samples at MW-12, MW-14 and MW-16 could not be collected because the groundwater in the wells was frozen. At both sampled locations, the concentrations of the only metals detected in the groundwater samples were similar to previous years. The concentration of zinc at MW-13 marginally exceeded the baseline mean concentration plus 3σ but remains below the historical maximum reported in 2008. PHC were detected in the groundwater sample collected at MW-13; the modified TPH concentration exceeded the baseline mean concentration plus 3σ but was well below the historical maximum concentration reported in 2012. Just as for TPH in soil, the presence of hydrocarbons at MW-13 in groundwater is associated with the North Warning System sites and not related to the NHWL DEW Line landfill. No detectable concentrations of arsenic, cadmium, chromium,

cobalt or copper were noted in any of the groundwater samples in 2017. It is noted that the groundwater samples collected in 2017 were filtered in the lab, and therefore the results represent dissolved metals instead of total metals. An overall trend comparison on the impact of results based on total versus dissolved metals will be prepared in 2018.

Most of the environmental sampling results are similar to those noted for earlier years. Increasing trends in lead at MW-12 may reflect impact from the landfill; however, further results are required for confirmation. No modifications to the ongoing monitoring program at this landfill are recommended.

G-217 West Landfill

The G-217 West Landfill has some observed minor settlement, sparse vegetation, vehicle tracks and ponded water features. There was no observed cracking, erosion, exposed waste or indications of instability at this landfill during the 2017 visual inspection. All previously observed features were unchanged since the previous inspection in 2014 except the ponded water area along the south toe which was slightly expanded. Previously observed areas of settlement vehicle tracks and some sparse vegetation were also observed on the slopes and cover surface in 2017. The physical performance of this landfill does not appear to be deteriorating with time and the observed features are not impacting the stability of the G-217 West Landfill. This landfill was assessed to have an “Acceptable” overall landfill performance rating because all observed features were assessed as “Acceptable.”

Groundwater flow at this landfill is considered to be radial, and therefore all sample locations are considered to be downgradient. No detectable concentrations of arsenic or PCB were noted in any of the soil samples in 2017. With the exception of FM 7 (deep), no cadmium was noted in any 2017 soil samples. The concentrations of metals were highest overall at the FM 6 and FM 7 sample locations, located downgradient of the east side of the landfill. In both FM 6 samples, the concentrations of most metals were similar to previous years. In both samples, the lead concentration exceeded the baseline concentration plus 3σ and a general increasing trend of lead concentrations is noted. At the shallow sample location FM 7, the concentrations of most metals were similar to previous years, whereas the concentration of lead exceeded the baseline concentration plus 3σ and represents a new historical maximum. At the deep sample location FM 7, the concentrations of cadmium slightly exceeded the baseline concentration plus 3σ and represents a new historical maximum. At FM 5 and FM 8, the metal concentrations reported in 2017 were similar to those reported in previous years.

PHC were detected in the shallow FM 6 sample and the deep FM 7 sample at modified TPH concentrations of 31 mg/kg and 16 mg/kg, respectively. The modified TPH concentrations at FM 6 was less than those reported in previous years, whereas that at FM 7 was similar.

Overall, the results of the soil samples are similar to earlier years; however, elevated lead may reflect impact from the landfill. Further data is required to assess this. No modifications to the ongoing monitoring program at this landfill are recommended.

Billboards Landfill

Based on the visual inspection, no new features were observed in 2017. Ponded water at the south toe has expanded slightly since the last inspection and was observed to span approximately 40 m wide (i.e., along the entire toe length) and extend to approximately 55 m south of the landfill. Ponded water at the west toe of the landfill also appears to have expanded since the last inspection. However, previously observed ponded water at the north and northwest toe do not appear to have changed since the last inspection. Previously observed red staining was not observed during the 2017 visual inspection. There is a vehicle track on the cover surface. There is no observed erosion, settlement, exposed waste or indications of instability at the Billboards Landfill.

The observed features are not impacting the stability of the landfill and the landfill physical performance is assessed as “Acceptable.”

No detectable concentrations of arsenic, cadmium, PHC or PCB were noted in any of the soil samples in 2017. The concentrations of metals were highest overall at the shallow sample location FM-3, located downgradient of the west side of the landfill. At this location, the concentrations of all detected metals were greater than previous years. This includes the concentrations of chromium, copper, lead, nickel and zinc, which exceeded the baseline concentration plus 3σ. At all remaining locations, the concentrations of most metals were similar to previous years. It is noted that the concentrations of nickel in both upgradient FM-1 samples, both downgradient FM-2 samples and the deep FM-3 sample also exceeded the baseline concentration plus 3σ. In addition, the concentration of lead in the shallow FM-2 sample and the concentrations of zinc in the deep FM-2 and FM-3 samples exceeded the baseline concentration plus 3σ.

Whereas most of the environmental sampling results are less than or the same as previous sampling sessions, elevated parameters and increases in some cases (e.g., metals at shallow sample location FM-3) may be reflective of an ongoing impact from the landfill; however, further data is required to assess this. No modifications to the ongoing monitoring program at this landfill are recommended.

Hazmat Storage East Landfill

The Hazmat Storage-East Landfill is largely surrounded by ponded water with vehicle track and sparse vegetation features. Previously observed ponded water along the east and south toe of the landfill does not appear to have changed since the last inspection. The area of ponded water along the west toe appears to have expanded compared to the previous inspection. Previously observed ponded water on the cover surface was not observed during the 2017 visual inspection. The extent of vehicle tracks on the cover surface appears to have increased since the last inspection. Some new sparse vegetation was observed on the cover surface during the 2017 visual inspection. Previously observed erosion was not observed during the 2017 visual inspection. Previously observed surficial debris is not buried waste that has become exposed from erosion or sloughing so it was not reported as a feature in 2017. The observed features do not appear to be having a negative impact on landfill stability. This landfill was assessed to have an “Acceptable” overall landfill performance rating because all observed features were assessed as “Acceptable.”

No detectable concentrations of cadmium or PCB were noted in any of the soil samples in 2017. Concentrations of lead and zinc were highest at the shallow sample location FM-11, located downgradient of the southeast side of the landfill, whereas concentrations of cobalt and chromium were highest at the shallow sample location FM-12, located downgradient on the south side of the landfill. For the shallow sample at FM-11, the concentrations of most detected metals were less than or similar to previous years, whereas the concentrations of copper and lead represent new historical maxima. The lead concentration moderately exceeded the baseline concentration plus 3σ. The zinc concentration exceeded the baseline concentration plus 3σ but remains less than the historical maximum concentration reported in 2010. At the deep sample location FM-11, the zinc concentration exceeded the baseline concentration plus 3σ and represents a new historical maximum concentration.

PHC concentrations were noted at both FM-11 sample locations and at the shallow sample location FM-12, at modified TPH concentrations between 19 mg/kg and 121 mg/kg. The modified TPH concentration at both FM-11 locations represent new historical maxima whereas the concentration in the shallow FM-12 sample was less than concentrations reported in previous years.

Whereas most of the environmental sampling results are less than or the same as previous sampling sessions, elevated parameters and increases in some cases (e.g., lead and PHC at FM 11) may be reflective of an ongoing impact from the landfill; however, further data is required to assess this. No modifications to the ongoing monitoring program at this landfill are recommended.

Communications Northwest Landfill

The Communications North Landfill has some observed minor settlement and uneven ground, ponded water, vehicle tracks and sparse vegetation features.

A new minor settlement area was observed on the west slope in 2017. In addition, a new area of uneven ground was observed at the north crest. Previously observed ponded water along the west toe of the landfill was observed to be the same as the previous inspection (i.e., unchanged). Ponded water was observed in 2017 along the east and west toe of the landfill in areas where water was observed previously in 2012 but not observed during the last inspection in 2014. Some new ponded water was observed on the “thoroughfare”, traveled portion of the cover surface in 2017. Previously observed vehicle tracks on the cover surface appear to be unchanged since the last inspection. Some sparse vegetation was observed at the southeast toe of the landfill in 2017 where ponded water had been reported in 2014; however, no ponded water was observed here in 2017. The observed features at this landfill do not appear to be having a negative impact on landfill stability. This landfill was assessed to have an “Acceptable” overall landfill performance rating because all observed features were assessed as “Acceptable.”

Groundwater flow at this landfill is considered to be radial, and therefore all sample locations are considered to be downgradient. No detectable concentrations of arsenic, cadmium or PCB were noted in any of the soil samples in 2017. The concentrations of chromium, cobalt and nickel were slightly higher at sample location FM 14, located downgradient of the north side of the landfill; the concentration of chromium represents a new historical maximum. Similarly, at the remaining sampling locations, most metals concentrations similar to those observed in previous years. The concentration of copper (14.2 mg/kg) at shallow sample location FM 14 exceeded the baseline mean concentration plus 3σ (10.8 mg/kg) and the slight increase in 2017 represents a new historical maximum. The concentration of zinc (21.3 mg/kg) from the deep sample location FM-16 moderately exceeded the concentration plus 3σ (15.0 mg/kg), but remains below the historical maximum concentration reported in 2008 (24.0 mg/kg).

PHC were detected at the FM 14 and FM 15 at modified TPH concentrations between 22 mg/kg and 34 mg/kg. The modified TPH concentrations at these locations were less than or similar to those reported in previous years.

Based on the results, there does not appear to be significant impact to soil quality from the landfill. No modifications to the ongoing monitoring program at this landfill are recommended.

Communications North Landfill

Based on the visual inspection, there does not appear to be any significant erosion, settlement, exposed waste or indications of instability at the Communications North Landfill. Some minor settlement, ponded water areas, sparse vegetation and vehicle tracks were observed in 2017. This landfill was assessed to have an “Acceptable” overall landfill performance rating because all observed features were assessed as “Acceptable.”

No detectable concentrations of arsenic, cadmium PHC or PCB were noted in any of the soil samples in 2017, with the exception of arsenic at FM-21 (deep), located downgradient of the east side of the landfill. Similar concentrations of metals were observed at all six sampling locations. At all six locations, the concentrations of most metals were similar to those reported in previous years. It is noted that at a number of locations, the slight

increases in the concentrations of copper and lead represented new historical maxima. None of the reported values exceeded their respective baseline mean concentrations plus 3σ.

Overall, there is no evident ongoing impact of the landfill on soil quality. No modifications to the ongoing monitoring program at this landfill are recommended.

Table of Contents

1.0 INTRODUCTION 1

1.1 Objective of the Study 1

1.2 Scope of Work 1

2.0 BACKGROUND 2

2.1 Site Description 2

2.2 Site Geology, Hydrogeology and Hydrology 4

2.3 Land-Use Description 4

2.4 Field Program Staff and Schedule 5

2.5 Weather Conditions 5

2.6 Project References 6

2.7 Report Structure 7

3.0 APPROACH & METHODOLOGY (GENERAL) 8

3.1 Summary of Work 8

3.1.1 Health and Safety 8

3.1.2 Field Program 8

3.1.3 Visual Inspection 9

3.1.4 Thermal Monitoring 11

3.1.5 Soil Sampling 11

3.1.6 Groundwater Sampling 12

3.2 Field Notes and Data 14

3.3 QA/QC 14

4.0 2017 MONITORING PROGRAM RESULTS 16

4.1 Tier II Disposal Facility 18

4.1.1 Landfill Description 18

4.1.2 Visual Inspection 20

4.1.3 Thermal Monitoring 27

4.1.4 Summary of any Sampling Deviations 27

4.1.5 Soil Sampling 27

4.1.6 Groundwater Sampling 31

4.1.7 Conclusions and Overall Performance of the Tier II Disposal Facility 33
4.1.8 Recommendations for Tier II Disposal Facility 33
4.2 East Beach Landfill (North and South) 34
4.2.1 Landfill Description 34
4.2.2 Visual Inspection 37
4.2.3 Thermal Monitoring 46
4.2.4 Summary of any Sampling Deviations 46
4.2.5 Soil Sampling 46
4.2.6 Groundwater Sampling 55
4.2.7 Conclusions and Overall Performance of the East Beach Landfill (South and North) 57
4.2.8 Recommendations for East Beach Landfill (South and North) 57
4.3 Station Area Non-Hazardous Waste Landfill (NHWL) 58
4.3.1 Landfill Description 58
4.3.2 Visual Inspection 60
4.3.3 Thermal Monitoring 65
4.3.4 Summary of any Sampling Deviations 65
4.3.5 Soil Sampling 66
4.3.6 Groundwater Sampling 71
4.3.7 Conclusions and Overall Performance of the Non-Hazardous Waste Landfill (NHWL) 73
4.3.8 Recommendations for Non-Hazardous Waste Landfill (NHWL) 73
4.4 G-217 West Landfill 74
4.4.1 Landfill Description 74
4.4.2 Visual Inspection 76
4.4.3 Summary of any Sampling Deviations 81
4.4.4 Soil Sampling 81
4.4.5 Conclusions and Overall Performance of the G-217 West Landfill 85
4.4.6 Recommendations for G-217 West Landfill 85
4.5 Billboards Landfill 86
4.5.1 Landfill Description 86
4.5.2 Visual Inspection 88
4.5.3 Summary of any Sampling Deviations 93

4.5.4 Soil Sampling 93
4.5.5 Conclusions and Overall Performance of the Billboards Landfill 96
4.5.6 Recommendations for Billboards Landfill 96
4.6 Hazmat Storage East Landfill 97
4.6.1 Landfill Description 97
4.6.2 Visual Inspection 99
4.6.3 Summary of any Sampling Deviations 104
4.6.4 Soil Sampling 104
4.6.5 Conclusions and Overall Performance of the Hazmat Storage East Landfill 108
4.6.6 Recommendations for Hazmat Storage East Landfill 108
4.7 Communications Northwest Landfill 109
4.7.1 Landfill Description 109
4.7.2 Visual Inspection 111
4.7.3 Summary of any Sampling Deviations 115
4.7.4 Soil Sampling 115
4.7.5 Conclusions and Overall Performance of the Communications Northwest Landfill 119
4.7.6 Recommendations for Communications Northwest Landfill 119
4.8 Communications North Landfill 120
4.8.1 Landfill Description 120
4.8.2 Visual Inspection 122
4.8.3 Summary of any Sampling Deviations 127
4.8.4 Soil Sampling 127
4.8.5 Conclusions and Overall Performance of the Communications North Landfill 132
4.8.6 Recommendations for Communications North Landfill 132
5.0 QA/QC RESULTS 133
5.1 Hold Times 133
5.2 Accuracy 134
5.3 Reliability 134
5.4 Reproducibility (Duplicate Analysis) 135
5.4.1 Soil Samples 136
5.4.2 Groundwater Samples 138

5.4.3 Overall Lab Data Reproducibility....139

5.5 QA/QC Conclusions....139

TABLES

Table 2-1: Field Personnel and Roles....5

Table 2-2: Summary of Weather Conditions....5

Table 3-1: Summary of QIKIQ15 Project Monitoring Schedule....8

Table 3-2: Summary of Monitoring Requirements by Landfill....9

Table 4-1: Visual Inspection Checklist –Tier II Disposal Facility....22

Table 4-2: Preliminary Stability Assessment - Tier II Disposal Facility....25

Table 4-3: Summary Table of Photographic Log –Tier II Disposal Facility....25

Table 4-4: Soil Chemical Analysis Results –Tier II Disposal Facility....30

Table 4-5: Monitoring Well Groundwater Levels and Groundwater Chemical Analysis Results – Tier II Disposal Facility....32

Table 4-6: Visual Inspection Checklist – East Beach Landfill (South and North)....39

Table 4-7: Preliminary Stability Assessment – East Beach Landfill (South and North)....43

Table 4-8: Summary Table of Photographic Log – East Beach Landfill (South and North)....43

Table 4-9: Soil Chemical Analysis Results – East Beach Landfill (North and South)....52

Table 4-10: Monitoring Well Groundwater Levels and Groundwater Chemical Analysis Results – East Beach Landfill (South and North)....56

Table 4-11: Visual Inspection Checklist – Non-Hazardous Waste Landfill (NHWL)....62

Table 4-12: Preliminary Stability Assessment – Non-Hazardous Waste Landfill (NHWL)....64

Table 4-13: Summary Table of Photographic Log – Non-Hazardous Waste Landfill (NHWL)....64

Table 4-14: Soil Chemical Analysis Results - Non-Hazardous Waste Landfill (NHWL)....69

Table 4-15: Monitoring Well Groundwater Levels and Groundwater Chemical Analysis Results – Non-Hazardous Waste Landfill....72

Table 4-16: Visual Inspection Checklist – G-217 West Landfill....78

Table 4-17: Preliminary Stability Assessment – G-217 West Landfill....80

Table 4-18: Summary Table of Photographic Log – G-217 West Landfill....80

Table 4-19: Soil Chemical Analysis Results – G-217 West Landfill....84

Table 4-20: Visual Inspection Checklist – Billboards Landfill....90

Table 4-21: Preliminary Stability Assessment – Billboards Landfill....92

Table 4-22: Summary Table of Photographic Log – Billboards Landfill....92

Table 4-23: Soil Chemical Analysis Results – Billboards Landfill....95

Table 4-24: Visual Inspection Checklist – Hazmat Storage East Landfill....101

Table 4-25: Preliminary Stability Assessment – Hazmat Storage East Landfill....103

Table 4-26: Summary Table of Photographic Log – Hazmat Storage East Landfill 103
Table 4-27: Soil Chemical Analysis Results – Hazmat Storage East Landfill.....107
Table 4-28: Visual Inspection Checklist – Communications Northwest Landfill 113
Table 4-29: Preliminary Stability Assessment – Communications Northwest Landfill 114
Table 4-30: Summary Table of Photographic Log – Communications Northwest Landfill.....114
Table 4-31: Soil Chemical Analysis Results – Communications Northwest Landfill.....118
Table 4-32: Visual Inspection Checklist – Communications North Landfill.....124
Table 4-33: Preliminary Stability Assessment – Communications North Landfill 126
Table 4-34: Summary Table of Photographic Log – Communications North Landfill 126
Table 4-35: Soil Chemical Analysis Results – Communications North Landfill 130

FIGURES

Figure FOX-M.1: Site Plan.....3
Figure FOX-M.2: Tier II Disposal Facility Plan (with photo numbers and feature annotations).....19
Figure FOX-M.3: East Beach Landfill South Plan (with photo numbers and feature annotations).....35
Figure FOX-M.4: East Beach Landfill North Plan (with photo numbers and feature annotations) 36
Figure FOX-M.5: Station Area Non-Hazardous Waste Landfill Plan (with photo numbers and feature annotations).....59
Figure FOX-M.6: G-217 West Landfill Plan (with photo numbers and feature annotations) 75
Figure FOX-M.7: Billboards Landfill Plan (with photo numbers and feature annotations).....87
Figure FOX-M.8: Hazmat Storage-East Landfill Plan (with photo numbers and feature annotations) 98
Figure FOX-M.9: Communications Northwest Landfill Plan (with photo numbers and feature annotations).....110
Figure FOX-M.10: Communications North Landfill Plan (with photo numbers and feature annotations) 121

APPENDICES

APPENDIX A
Report Limitations

APPENDIX B
Field Records

APPENDIX C
Laboratory Data

APPENDIX D
Photograph Log

1.0 INTRODUCTION

Golder Associates Ltd. (Golder) has been contracted by Public Services and Procurement Canada (PSPC), 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 PSPC 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") and the May 24, 2017 kick-off meeting minutes.

The three DEW Line sites that were monitored in 2017 as part of the QIKIQ15 contract are DYE M, CAM-5 and FOX M. 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 7, 2017. Monitoring activities included geotechnical visual inspection, thermal monitoring, soil and groundwater sampling. Deviations from the TOR are noted throughout this report, where applicable.

This monitoring report presents the 2017 post-construction inspection and monitoring results for FOX-M (the site). The remediation of FOX-M was competed in 2007; the previous site monitoring was in 2014 and the monitoring performed in 2017 is the year 10 monitoring event and the seventh event since remediation. Its next monitoring visit is planned for 2022 (year 15).

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 information to assess the performance, integrity, and stability of the landfills from a geotechnical and environmental perspective for the protection of human health and the environment. The monitoring program is designed to monitor landfill integrity and to determine, in the event of any evident deterioration or impacts identified from sampling results, 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 a site-specific Health Safety and Environment Plan (HASEP) 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 (LWP) for each field season that outlines the field schedule, travel plans, accommodation, hiring of local Inuit contract workers, all-terrain vehicle (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's Inuit Participation Plan (CIPP) and Report (CIPR), that contains the Inuit employment and subcontracting content (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, Quality Analysis / Quality Control (QA/QC) and data interpretation.

2.0 BACKGROUND

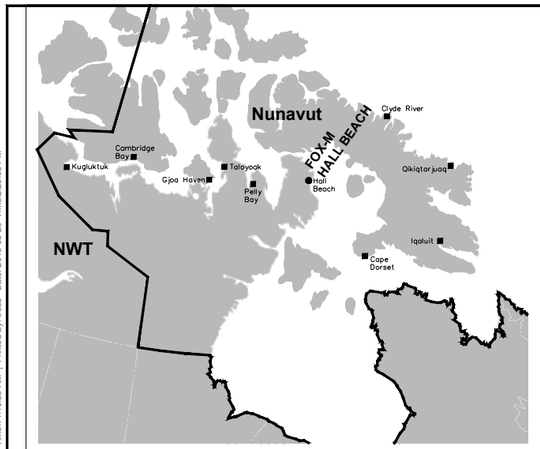
2.1 Site Description

The FOX-M Hall Beach DEW Line site is located on the east coast of the Melville Peninsula at 68°46' north latitude and 81°12' west longitude in the Fox Basin Area. The community of Hall Beach, located approximately 2 km north of the site, has accommodation services and can be reached by commercial airlines.

The terrain is undulating to nearly flat lying with raised former beach ridges. The ground surface elevation rarely exceeds more than 5 metres above sea level (masl) and numerous water filled depressions occur throughout the site. There are many isolated lakes and the fresh water reservoir west of the site. The Arctic Ocean is directly to the east of the site. Nearly continuous cover of grass and sedge characterizes areas surrounding the ponds and lakes. Areas more removed from natural water features are generally dry and characterized by intermittent vegetation providing up to 40% cover.

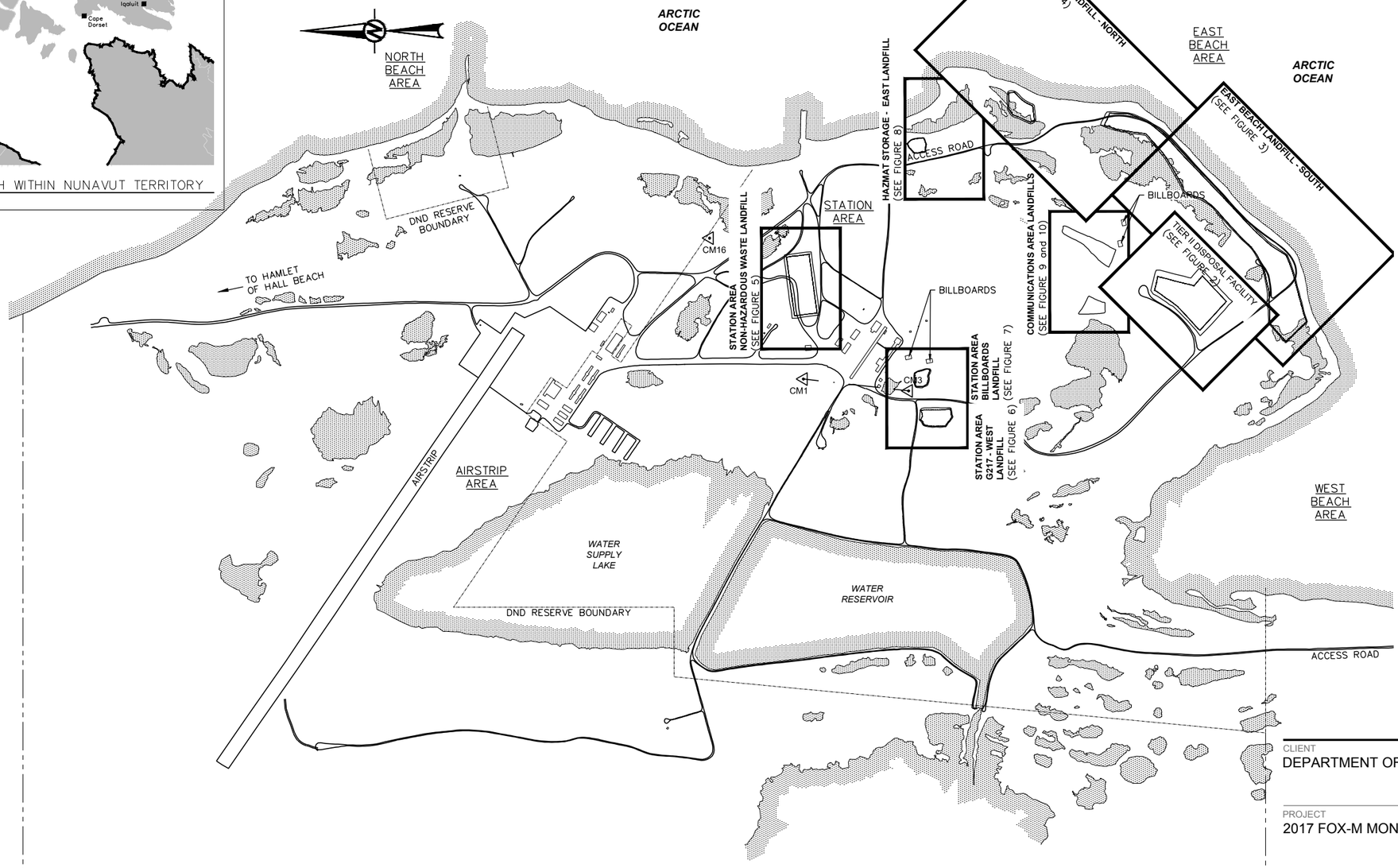
FOX-M was originally a main site within the original DEW Line system and was decommissioned in 1989 to become a North Warning System (NWS) Long Range Radar (LRR) station and Logistical Support Site (LSS). The station has been staffed continuously since its construction in the 1950s. The environmental cleanup and demolition of facilities not required for the operation of the LRR site commenced in 2003 and was completed in 2007. The following landfills, as shown on the overall site plan, Figure FOX-M.1, are part of the long-term monitoring program:

- Tier II Disposal Facility;
- East Beach Landfill South;
- East Beach Landfill North;
- Non-Hazardous Waste Landfill (NHWL);
- G217-West Landfill;
- Billboards Landfill;
- Hazmat Storage East Landfill;
- Communications Northwest Landfill;
- Communications North Landfill;



LOCATION OF HALL BEACH WITHIN NUNAVUT TERRITORY

SCALE: NTS



LEGEND:

- SURVEY CONTROL MONUMENT
- APPROXIMATE LOCATION OF PROPERTY BOUNDARY

NOTES:

1. ALL COORDINATES ARE REFERENCED TO NAD83 (CSRS), UTM ZONE 17N.

REFERENCE:

PREVIOUS INSPECTION FIGURE PROVIDED BY SENES CONSULTS. PROJECT NO. 350600(-1515-1), DATED FEB.20, 2015.

0 250 500

1:15,000 METRES

SURVEY CONTROL MONUMENTS

NO.	UTM COORDINATES		ELEV.	DESCRIPTION
	NORTHING	EASTING		
CM1	7 628 008.274	490 743.723	3.577	FOX-M BASELINE STA. 36+00
CM3	7 627 675.453	490 706.281	5.291	FOX-M BASELINE STA. 47+00
CM16	7 628 305.218	491 189.319	1.190	C.L.S. MONUMENT

CLIENT
DEPARTMENT OF NATIONAL DEFENCE CANADA

PROJECT
2017 FOX-M MONITORING REPORT

TITLE
OVERALL SITE PLAN

CONSULTANT
GOLDER

YYYY-MM-DD	2018-01-10
DESIGNED	RM
PREPARED	TDR
REVIEWED	DCJ
APPROVED	DP

PROJECT NO.	PHASE	REV.	FIGURE
1530908	3000	A	FOX-M.1

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

25 mm

Path: \\golder.gds\gal\Mississauga\SIM\Clients\Public_Works_Canada\Canada\99_PRO\A1530908_PWGSC_Dew_Line_Mon_Program_2015_2018\40_PROD\0012_Fox_M_Field_Summary_Report_2017\ | File Name: 1530907-0012-BG-0001.dwg | Last Edited By: tose Date: 2018-02-26 Time:11:10:55 AM | Printed By: tose Date: 2018-03-26 Time:2:26:03 PM

2.2 Site Geology, Hydrogeology and Hydrology

The east coast of the Melville Peninsula is located within the Arctic Platform geological province. Bedrock in the area is composed of Paleozoic undivided carbonate and siliciclastic rocks. The Laurentide ice sheet was present in this area during the Pleistocene epoch. It is in an area of continuous permafrost with medium to high ground ice content characterized by abundant ice wedges and massive ice bodies. Local surficial geologic conditions were observed to generally consist of coarse soil deposits of marine origin.

Groundwater flow is seasonal, occurring mainly in the summer period of maximum active layer thaw. Groundwater is located at shallow depths and is highly affected by local permafrost conditions. Average annual precipitation in Hall Beach is 214.6 mm, of which over 55% consists of snow. The local topography at the FOX-M landfill sites is very flat and close to sea level. Subsequently the local drainage is either to the ocean on the east and south sides of the site or to the small inland lakes and reservoir in the low-lying area on the west side of the site.

2.3 Land-Use Description

In the 1950s, DEW Line sites were constructed across a number of locations in the northern parts of Alaska, Canada and Greenland, between latitudes 65 and 70 degrees to maintain surveillance of the North American Airspace. In 1963, improvements in surveillance technology led to the closure of most of the DEW Line sites and their replacement with the NWS. Since the 1990s, investigations, decommissioning, and clean-up activities have been undertaken at the DEW Line sites. Clean-up and decommissioning activities involved the demolition of surplus buildings and structures, excavation of contaminated soils, and the regrading of existing landfills. New engineered landfills were also constructed for the disposal of excavated soils and building demolition materials.

Landfills at DEW Line sites can be categorized as follows:

- **Regraded:** Existing landfills that were regraded 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 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) with an impermeable liner underneath and on top of the contaminated soil to encapsulate the contents (leachate contained). 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.

The airstrips remain in place for ongoing site operations, maintenance and monitoring.

2.4 Field Program Staff and Schedule

Table 2-1 presents a list of field personal, roles, responsibilities and dates for the FOX-M 2017 monitoring program.

Table 2-1: Field Personnel and Roles

Name (Affiliation)	Role / Responsibility	Site	Date
Reza Moghaddam (Golder)	Field Geotechnical Lead / Sampling	FOX-M	August 10,13 and 14
Jamie Bonany (Golder)	Environmental Field Lead/ Soil and Water Sampling	FOX-M	August 10,13 and 14
Laimiki Irittuq (Inuit Subcontractor)	Wildlife Monitor	FOX-M	August 10-,13 and 14
Glen Nangmalik (Inuit Subcontractor)	Wildlife Monitor	FOX-M	August 10,13 and 14
Kenny Kaenerk (Inuit Subcontractor)	Environmental Assistant / Sampling	FOX-M	August 10,13 and 14
Moses Nuvviaq (Inuit Subcontractor)	Environmental Assistant / Sampling	FOX-M	August 10,13 and 14

2.5 Weather Conditions

Table 2-2 presents a summary of weather conditions during the 2017 FOX-M monitoring program.

Table 2-2: Summary of Weather Conditions

Date	Weather
August 10	Morning: Foggy, 0°C Afternoon: Overcast, 1°C to 4°C
August 13	Morning: Foggy, 0°C Afternoon: Overcast, 2°C to 0°C
August 14	Morning: Foggy, 0°C Afternoon: Overcast, 0°C to 7°C

2.6 Project References

Biogenie “The Collection of Landfill Monitoring Data at the Former FOX-M DEW Line Site, Hall Beach, Nunavut” Final Report – 2009 Season, Prepared for Defence Construction Canada by, dated March 2010.

Biogenie “The Collection of Landfill Monitoring Data at the Former FOX-M DEW Line Site, Hall Beach, Nunavut” Final Report – 2010 Season, Prepared for Defence Construction Canada by, dated February 2011.

Biogenie “The Collection of Landfill Monitoring Data at the Former FOX-M DEW Line Site, Hall Beach, Nunavut” Final Report – 2012 Season, Prepared for Defence Construction Canada by, dated April 2013.

Canadian Council of Ministers of the Environment (CCME, 2016a), “Guidance Manual for Environmental Site Characterization in Support of Environmental and Human Health Risk Assessment – Volume I Guidance Manual”.

Canadian Council of Ministers of the Environment (CCME, 2016b), “Guidance Manual for Environmental Site Characterization in Support of Environmental and Human Health Risk Assessment – Volume III Suggested Operating Procedures”.

Canadian Council of Ministers of the Environment (CCME, 2016c), “Guidance Manual for Environmental Site Characterization in Support of Environmental and Human Health Risk Assessment – Volume IV 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.

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, 2017a), “Baffin Region DEW Line Site Monitoring Health Safety and Environment Plan”, Report 1530908-3000, dated July 7, 2017.

Golder Associates Ltd. (Golder, 2017b), “2017 Landfill Monitoring for DEW Line Sites: Logistics and Work Plan”, Report 1530908-3000-R1, dated July 7, 2017.

Golder Associates Ltd. (Golder, 2017c), “2017 Baffin Region DEW Line Site Landfill Monitoring Field Work Progress Report”, Report 1530908-3000-R2-V2, dated October 4, 2017

SENES Consultants (2015), “2014 DEW Line Landfill Monitoring Program FOX-M Hall Beach, Nunavut Baffin Region. Final Monitoring Report Prepared for: Public Works and Government Services Canada. 350600-515-001, February 2015.

2.7 Report Structure

This report describes the monitoring program carried out in August 2017 at FOX-M. Results from soil and groundwater sampling, thermal monitoring and visual inspection activities are presented in Section 4 in accordance with the TOR.

Each of the landfills is described in separate sub-sections (Sections 4.1 to 4.8 with the East Beach Landfill North and South reported together). Each section contains the following 2017 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.

The methodology for the monitoring program is described in Section 3. Information on the development of Background and Baseline data used for comparison of soil and groundwater samples described herein is provided at the beginning of Section 4. The Quality Analysis / Quality Control (QA/QC) data interpretation is contained in Section 5.

Appendix A provides a Limitation of Responsibilities and forms part of the report. Thermal, soil and groundwater monitoring field record sheets are included in Appendix B. Laboratory Certificates of Analysis, historical landfill monitoring results and QA/QC Reports are included in Appendix C. A photographic log is included in Appendix D.

An electronic version of the report, tables, figures, 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, 2017a) for the QIKIQ15 field program that described potential hazards, risks and proposed mitigation measures. Unique health and safety risks included the potential for wildlife encounters, long distances to the nearest emergency health care facilities and variable weather conditions. In addition, Golder developed a Logistics and Work Plan (Golder, 2017b) for the field program that outlined 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. FOX-M was monitored in 2017 (Year 10). The field monitoring program consisted of the following activities:

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

The field methodology is detailed in the following sections, and any deviations from the TOR are noted in *italics*. 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[(a)]		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 and 2016 (Years 4 and 5) – Complete a geotechnical inspection of the thermokarst regrade.

Table 3-2: Summary of Monitoring Requirements by Landfill

Landfill Designation	Type of Landfill	Visual Inspection	Soil Sampling[a]	Groundwater Sampling	Thermal Monitoring[b]	
		ü = yes	# Locations	# MW	# Thermistors	Change batteries & re-program[c]
FOX-M Hall Beach						
Tier II Disposal Facility	NEW Tier II	ü	5 x 2	5	5 + 1 (background)	Change ULB1 and ULB15 batteries and reprogram
East Beach Landfill South	Leachate contained	ü	10 x 2	10	4	Change ULB1 and ULB15 batteries and reprogram
East Beach Landfill North	Leachate contained	ü	2 x 2	2	2	Change ULB1 and ULB15 batteries and reprogram
Non-Hazardous Waste Landfill (NHWL)	New NH	ü	5 x 2	5	1 (background)	Change ULB1 and ULB15 batteries and reprogram
G217-West Landfill	Regraded	ü	4 x 2			
Billboards Landfill	Regraded	ü	4 x 2			
Hazmat Storage East Landfill	Regraded	ü	4 x 2			
Communications Northwest Landfill	Regraded	ü	4 x 2			
Communications North Landfill	Regraded	ü	6 x 2			
	Total	***9***	***88***	***22***	***13***	***13***

Notes:

a) (# x #) Indicates number of sampling points at each landfill x 2 depths at each location; at 0-15 cm and 40-50 cm (or at refusal).

b) Two extra sets of datalogger batteries should be brought to each monitoring event to troubleshoot a datalogger malfunction.

c) Re-programming of dataloggers at FOX-M to be carried out in 2017.

3.1.3 Visual Inspection

At each of the FOX-M landfill locations, 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. Coordinates of all photographs and feature locations were collected using a Garmin GLO GPS (*accurate to 3 m, which is less than 0.5 to 1 m accuracy specified in the TOR*) connected by Bluetooth to a field tablet. *The dimensions of all features were measured (e.g., smaller features by measuring tape and larger features by counting 1-m steps)* and recorded on the field tablet. *Noteworthy features larger than 10 m in length were photographed at 10-m intervals* and GPS coordinates were recorded to dimension the feature. Depths of features were measured with a measuring tape. Areas with the same minor feature (e.g., minor self-armouring erosion, vegetation or vehicle tracks) have generally been assigned a single feature letter where they are located on the same side/section/area of the landfill and/or when previous inspections have reported the area as a single feature. Where extensive minor erosion was observed, the reported feature dimensions refer to the area of minor erosion (i.e., not a single erosion channel). The statement “no significant change” indicates that no significant or noteworthy change in the condition of a feature was observed during the 2017 inspection compared to previously reported observations and photographs of the

feature. In some cases, the reported dimensions of a feature may be different from previously reported observations due to weathering over time, even when there is 'no significant change' (e.g., due to infilling of cracks or stabilization of self-armouring erosion).

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) and Extent (Isolated, Occasional, Numerous or Extensive) and then the landfill was assigned an overall Performance Rating (Acceptable, Marginal, Significant or Unacceptable). If a type of feature was not observed during the inspection, then the Severity Rating was reported as "Not Observed" in the Preliminary Stability Assessment. Definitions of these terms are as follows:

Feature Severity Rating / Landfill Performance Rating	Description
Not Observed	This type of feature was not observed at the landfill during the inspection.
Acceptable	Noted features are of little consequence. The landfill is performing as designed. Minor deviations in environmental or physical performance may be observed, such as isolated areas of erosion, settlement.
Marginal	Physical/environmental performance appears to be deteriorating with time. Observations may include an increase in size or number of features of note, such as differential settlement, erosion or cracking. No significant impact on landfill stability to date, but potential for failure is assessed as low or moderate.
Significant	Significant or potentially significant changes affecting landfill stability, such as significant changes in slope geometry, significant erosion or differential settlement; scarp development. The potential for failure is assessed as imminent.
Unacceptable	Stability of landfill is compromised to the extent that ability to contain waste materials is compromised. Examples may include: ¡ Debris exposed in erosion channels or areas of differential settlement. ¡ Liner exposed. ¡ Slope failure.

Extent	Description
Isolated	Singular feature
Occasional	Features of note occurring at irregular intervals/locations
Numerous	Many features of note, impacting 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 incorporate ground temperature monitoring systems with thermistor strings that measure temperature at various depths and automated data loggers that allow for data collection. The data recorded on the data loggers was downloaded using a laptop computer and Prolog software from Lakewood Systems Ltd. Thermistor inspection and data downloading details were recorded on field record sheets included in Appendix B.

The Tier II Disposal Facility, East Beach Landfill and Non-Hazardous Waste Landfill at FOX-M have thermistors installed to monitor ground temperature. After downloading monitoring data from the thermistor dataloggers, the lithium batteries were replaced in the dataloggers and the dataloggers were reprogrammed to record temperature measurements every 48 hours at 12:00 pm (noon) in accordance with instructions received from Lakewood Systems Ltd. The loggers are designed to record measurements at 12:00 am (midnight) when they are set to take readings every 48 hours so the internal datalogger clocks were shifted by 12 hours so that ground temperatures are recorded at 12:00 pm (noon), which is more conservative for the purposes of assessing maximum thaw depth. Further details on the datalogger downloading and reprogramming is presented in Sections 4.1.3, 4.2.3 and 4.3.3 (below). Instructions from Lakewood Systems Ltd. to configure the dataloggers for a 48-hour sampling rate is included in Appendix B.

The datalogger batteries (changed in 2017) can be expected to last 7 to 8 years, and therefore the batteries should be scheduled for replacement during the next monitoring event in 2022 (year 15) since they will not last until the subsequent monitoring event.

There are some malfunctioning temperature sensors (i.e., beads) in some of the thermistor strings installed at this site. Thermistor beads cannot be repaired without completely replacing/reinstalling the thermistor string and this may not be necessary. The decision about whether data is required from malfunctioning beads at specific depths must be made by those who are interpreting the ground temperature data and is beyond the current scope of work).

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 (CCME) Guidance Manual for Environmental Site Characterization in Support of Environmental and Human Health Risk Assessment – Volume I Guidance Manual (CCME, 2016a). Soil sampling procedures of note are as follows (deviations from the TOR are noted *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 previous sample locations. Previous consultants left pins and tags in the ground to indicate where they sampled soil. Golder sampled away from those locations and did not leave pins in the ground.
- Coordinates of the 2017 soil sampling locations were recorded using a field tablet equipped with a Garmin GPS 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. The shovel was decontaminated with soap and water, methyl hydrate and rinsed with deionized water before each use. 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 0 to 15 centimetres (cm) depth and at 40 to 50 cm depth 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 large rock(s). 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 in an attempt to 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 below).*
- Soil samples were not analyzed for mercury during the 2017 monitoring program in accordance with Environmental Working Group (EWG) recommendations.
- Field duplicates were collected for at least 10% of the total soil samples collected. The field duplicates were collected from relatively homogenous soil material in the test pit, such that the composition of the samples was the same and to minimize escape of volatile compounds.
- In order to assess the effectiveness of decontamination of the shovel used for soil sampling, an equipment rinsate (equipment blank) sample was completed following a typical decontamination procedure at each Site.

3.1.6 Groundwater Sampling

Groundwater samples were collected in accordance with the TOR, the Golder Proposal, Logistics and Work Plan and 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, methyl hydrate and rinsed with deionized water before each 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 below).*
- *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 below).*
- *In wells with limited water depth and/or slow recharge, purging was only carried out until the field parameters were observed to stabilize* and then sampling was commenced in the priority order outlined in the TOR.
- Purging and sampling was carried out using a peristaltic pump and a low-flow purge rate of less than 100 mL/min was maintained. Peristaltic pump flexible tubing and nylon tubing extending down the well was single-use and disposed after use at each well (i.e., not reused). Sample tubing was removed from the wells after completion of the sampling event and disposed off-site.
- Based on experience gained in the 2015 sampling program, the purging and sampling protocols were changed to maximize sample collection for the wells, which typically have low recovery. For wells with less than 20 cm of standing water, an initial sample for analysis of field parameters was collected, followed by sampling and, where enough water remained, a final sample for analysis of field parameters was collected. For wells with more than 20 cm of standing water, a second sample for field analysis was collected, followed by sampling and a final sample for analysis of field parameters was collected. Where it was evident that the

sample recovery was slowing, the second field analysis was not undertaken. The total purging volumes for this technique were 250 mL and 500 mL, equivalent to one or two containers of the Horiba field meter.

- *The potential impact of collecting groundwater samples before the field parameters have stabilized is offset in the case of this project by the requirement to obtain sufficient sample volume for the analyses and thus make interpretations of potential changes in groundwater quality, given the difficulty in accessing the sites and the short period over which active zone water is available for sampling. The approach taken to well purging for this project is a reasonable balance between prioritizing the objectives of having adequate sample volume and achieving stability of the field parameters to the extent possible.*
- The meter used to analyze field parameters was a Horiba U-52 meter, which monitors temperature, turbidity, pH and electrical conductivity. The instrument was calibrated before the 2017 sampling program by Pine Environmental; the calibration record is provided in Appendix B. In addition, the meter was field calibrated prior to use at each Site, with standard field calibration solutions for pH (4.01), conductivity (4.49 mS/cm) and turbidity (0 NTU). The meter probes were rinsed with deionized water and patted dry between each calibration.
- Groundwater samples were pumped directly from the well into analysis-specific bottles provided by the laboratory that were labelled with the sample location ID. Groundwater samples were not field filtered and were not field-acidified or preserved (in accordance with the TOR).
- Groundwater samples were not analyzed for mercury or PCBs (polychlorinated biphenyls – Total Aroclor analysis) during the 2017 monitoring program in accordance with Environmental Working Group (EWG) recommendations. In addition, petroleum hydrocarbon F1 fraction samples were preserved using sodium bisulphate.
- Field duplicates were collected for 10% of the total groundwater samples collected.
- A field blank was filled in the field with deionized water and analyzed for all parameters.
- A travel blank of laboratory prepared water accompanied the sampling containers for each site, and analyzed for the entire suite of parameters.
- In order to assess the effectiveness of decontamination of the groundwater level / interface probe, and the shovel used to dig the test pits, equipment rinsate (equipment blank) samples of the probe and shovel were completed following a typical decontamination procedure at each site.
- No equipment blanks were required for the sample collection tubing, as new tubing was used at each sampling location.
- *Lab analyses were done as dissolved metals instead of total metals in 2017. This is noted on the historic data and trend charts. Golder is conducting an overall trend comparison on the impact of results based on total versus dissolved metals and is preparing a separate memo to discuss the comparison*.

3.2 Field Notes and Data

Visual inspection photographs, features, UTM coordinates, dimension measurements and other notes were recorded in the field with a tablet computer equipped with a camera and Global Positioning System (GPS). The tablet's GPS accuracy was enhanced by connecting it to a Garmin GLO, which allows it to also receive information from the GLONASS satellites. *The GPS manufacturer's specified accuracy is 3 m* (typical of handheld GPS units), which is less accurate than the TOR requirement of 0.5 to 1 m (typical of survey quality GPS instruments). Field data, UTM coordinates and photographs from the field 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. Scale items (e.g., people, ATV, glove, field book, handheld radio, etc.) were included in feature photographs. For difficult to identify features, scale items have been placed beside or on the feature and annotation arrows have been drawn in the photo log to help locate features in the visual inspection photographs.

Thermistor inspection and monitoring data were recorded on field record sheets included in Appendix B. Photographs and UTM coordinates of the thermistor locations were recorded with the field tablet.

Soil sampling locations were photographed before test pit excavation, at the maximum depth of the test pit excavation and after backfilling. A shovel was used for scale in the photos taken prior to excavation. 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).

Aerial photographs of the landfills at FOX-M taken during landing and/or take off from Hall Beach (Photographs 469 to 474) are included in Appendix D.

3.3 QA/QC

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

The QC procedures incorporated into the monitoring program carried out at FOX-M included:

- Using only ISO 17025 certified environmental labs to perform the soil and groundwater analyses. Golder used Paracel Laboratories Ltd. (Paracel) of Ottawa for all chemical analyses.
- Paracel performed its own internal QA/QC procedures on the analyses performed including testing of matrix spikes, method blanks and lab duplicates. Golder reviewed the quality control reports with each certificate of analysis and has commented on the accuracy of lab results as indicated with these procedures. Golder also reviewed the method detection limits (MDLs) achieved by Paracel and has commented on them in Section 5.
- The field sampling for soil and groundwater was completed by a two-person team, which helped to ensure that all of the sampling and field identification procedures were followed. To minimize the possibility of mislabelling sample containers, they were labelled at the sample location, and with identification, date and time.
- Duplicate soil samples were collected from relatively homogenous soil material in the test pit, such that the composition of the samples was the same and to minimize escape of petroleum hydrocarbon (F1 fraction) compounds.

- Duplicate groundwater samples were prepared by alternately filling bottles for each lab for each parameter type; the 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 used to open the test pit was cleaned manually then rinsed with methyl-hydrate and distilled 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. Staff holding the sample bottles wore nitrile gloves. Samples were labelled at the monitoring well with identification, time and date.
- Equipment blanks were taken by running lab-supplied deionized water over the sterilized shovel and groundwater probe once per site for testing to confirm that the effectiveness of the cleaning procedure in limiting cross-contamination.
- Groundwater samples for were neither filtered nor preserved in the field, with the exception of the petroleum hydrocarbon F1 fraction, which was preserved using a $NaHSO_4$ tablet. 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 sample collection to receipt at the lab, the coolers were shipped from the staging location (Hall Beach) to Ottawa as soon as the sampling program for FOX-M was complete.
- Golder sent coolers to Ottawa via First Air under cold storage labelling. Golder picked the coolers up on the day of arrival and took them to Golder's office in Ottawa where they were checked for breakage, legibility of the labels and accuracy and the chain of custody was filled out. After being checked at Golder, the samples were dispatched to Paracel Labs. The maximum allowable hold times for samples were largely met, with the exception of PHC-F1 in soil, which has an unpreserved hold time of 48 hours.

QA was measured by the duplicate analysis of soil and groundwater samples and a review of the QA/QC data contained in each laboratory certificate of results. In addition to the duplicate analyses, a field blank (consisting of bottles filled with deionized water in the field) was prepared, and a trip blank consisting of bottles filled with deionized water and sealed at the laboratory was brought uniquely to FOX-M and not opened, then submitted to Paracel for analysis of all specified parameters.

The soil samples and groundwater samples were collected with dedicated single-use equipment. The water sampling tubing was single-use from the well to sample bottle, and soil samples were collected from the test pits into sample jars using single-use gloves. This was possible because the texture of the soil samples was generally loose sandy soil. Nevertheless, equipment blanks were prepared for each type of sampling performed at FOX-M. For groundwater sampling, the equipment blank was a sample of deionized water poured over the water level probe after it had been sterilized, and for soil sampling the equipment blank was a sample of deionized water that had been poured over the shovel after it had been washed between samples. No equipment blank was required for the sample collection tubing, as new tubing was used at each sampling location.

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

4.0 2017 MONITORING PROGRAM RESULTS

Photographs 1 through 474 (in Appendix D) document the conditions observed during the visual inspection including features on the cover/toe of the landfills, the groundwater monitoring wells, soil sample locations before excavation, after excavation and after backfilling as well as the condition of thermistors. The photographs taken at each of the landfill sites to document the observed conditions are organized as follows:

- Tier II Disposal Facility – Photographs 1 through 81;
- East Beach Landfill South – Photographs 82 through 179;
- East Beach Landfill North – Photographs 180 through 224;
- Non-Hazardous Waste Landfill (NHWL) - Photographs 225 through 282;
- G217-West Landfill - Photographs 283 through 323;
- Billboards Landfill - Photographs 324 through 350;
- Hazmat Storage East Landfill – Photographs 351 through 386;
- Communications Northwest Landfill – Photographs 387 through 425;
- Communications North Landfill – Photographs 426 through 468; and
- Aerial photographs – Photographs 469 through 474.

A complete log of all photographs is included in Appendix D. Copies of all digital photograph files in original size and format from the data capture system are included on a DVD attached to this report. Visual inspection photograph file names are noted in brackets after the photograph captions.

Feature IDs in this report are generally consistent with the monitoring reports up to 2012 (Biogénie 2013). The 2014 monitoring report (SENES 2015) did not follow the historical naming convention. Where applicable, reference to the 2014 feature IDs has been adjusted to reflect their historic designations or to follow the lettering sequence established in 2012.

Some of the observed features classified as “acceptable” do not appear to be related to landfill performance. For example, shallow depressions that appear to be unchanged since construction of the landfill (i.e., as-built condition) or minor hydrocarbon staining from post-construction anthropogenic activities (e.g., ATV use). These acceptable features that do not appear to be related to landfill performance have been reported as “*not a concern*”. Where observed, self-armouring erosion, minor water ponding and seepage without staining have also been reported as “*not a concern*” when they are not indicative of deteriorating landfill performance and/or when they are suspected as being weather related. In addition, when minor cracking appears to be related to thaw creep and does not indicate slope instability, it is not considered to be a concern at the present time.

The environmental monitoring program results are listed for each landfill in the sections below. In the tables contained within the text and Appendix C, data which exceed the arithmetic mean background data and baseline arithmetic mean data are identified by underlined and **bold** fonts, respectively. The background arithmetic mean limits for each landfill have been previously established using the arithmetic mean concentrations for soil samples collected outside the landfill areas in 2001. The baseline arithmetic mean limits were calculated based on the concentrations for soil samples collected at each of the current soil sampling locations adjacent to

the landfills, between 1997 and 2007. Soil and groundwater quality data are also compared to the baseline mean concentration plus three standard deviations (3σ); exceedances of this standard are shaded. This limit is based on the “three-sigma rule of thumb”, wherein it is expected that nearly all values not influenced by changes in impact lie within three standard deviations of the arithmetic mean.

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.

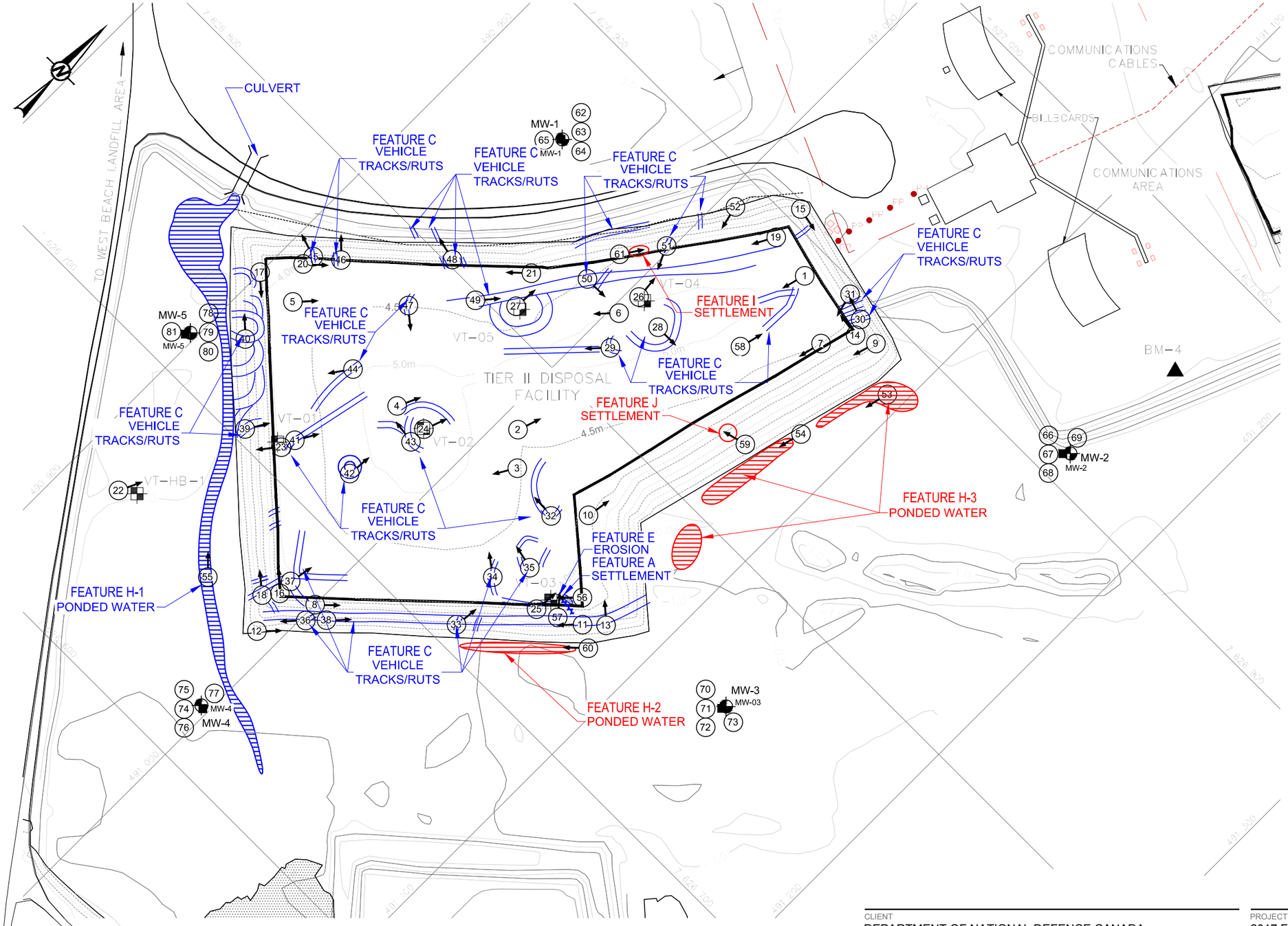
Historical soil and groundwater results and charts are included in Appendix C. It is recommended that seven data points be used as a minimum to identify a soil or groundwater quality trend for these landfills. Discussion of the 2017 data in this report focused on identifying trends, data results for locations where concentrations significantly different (typically greater) than previous years are observed, or locations where concentrations exceeded the baseline mean concentration plus 3σ.

Duplicate soil samples were collected at a total of eight locations at FOX-M. This included the deep FM-4 (40-50 cm), shallow FM-5 (0-15 cm), deep FM-9 (30-40 cm), deep FM-22 (30-40 cm), deep MW-05 (40-50 cm), deep MW-14 (40-50 cm), shallow MW-23 (0-15 cm) and shallow MW-25 (0-15 cm) sample locations. A single duplicate groundwater sample was also collected at monitoring well MW-29. For these duplicate sample locations, the average of the two concentrations is presented in the tables and used to discuss in the results in Section 4. The reproducibility of the duplicate sample results is discussed in Section 5.

4.1 Tier II Disposal Facility

4.1.1 Landfill Description

The Tier II Disposal Facility was constructed approximately 800 m south of the main station area, immediately northwest of the East Beach Landfill South. The landfill was constructed with two separate cells, because of the uncertainty related to Tier II soil quantities that would be generated during excavation of the East Beach Landfill. Both cells were constructed with the placement of low permeability, saturated, compacted berms, installation of a liner system over the berms and along the landfill base, and the placement of a cover liner system over the landfill contents followed by placement of sufficient overlying granular fill to promote freeze-back of landfill contents. Five groundwater monitoring wells were installed around the landfill perimeter and five thermistors were installed within the landfill. In addition, a background thermistor was installed beyond the south toe of this landfill to collect ground temperature information for climate change studies. The long-term monitoring plan consists of visual inspection, collection of soil and groundwater samples, and monitoring of subsurface ground temperatures in the landfill. Approximate soil and groundwater sampling and thermistor installation locations for the Tier II Disposal Facility are provided in Figure FOX-M.2.



LEGEND:

- PERMANENT BENCHMARK
- POWER
- SOIL SAMPLING LOCATION
- MONITORING WELL LOCATION
- VERTICAL THERMISTOR LOCATION
- PHOTOGRAPH VIEWPOINT
- CONTOURS IN 0.5m INTERVALS
- EROSION CHANNEL
- VEHICLE TRACKS/RUTS
- AREA OF SETTLEMENT
- PONDED WATER

NOTES:

1. *LOCATIONS AND SCALE OF FEATURES ARE APPROXIMATE AND SHOWN FOR ILLUSTRATIVE PURPOSES ONLY.*
2. ALL COORDINATES ARE REFERENCED TO NAD83 (CSRS), UTM ZONE 17N.
3. FEATURES DRAWN IN RED ARE EITHER NEW OR EXPANDED.

REFERENCE:

PREVIOUS INSPECTION FIGURE PROVIDED BY SENES CONSULTS. PROJECT NO. 350600(-1515-1), DATED FEB.20, 2015.

0 25 50
1:1,500 METRES

CLIENT
DEPARTMENT OF NATIONAL DEFENCE CANADA

PROJECT
2017 FOX-M MONITORING REPORT

CONSULTANT
GOLDER

YYYY-MM-DD	2018-01-10
DESIGNED	RM
PREPARED	TDR
REVIEWED	DCJ
APPROVED	DP

TITLE
TIER II SOIL DISPOSAL FACILITY

PROJECT NO.	PHASE	REV.	FIGURE
1530908	3000	A	FOX-M.2

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

25 mm

0

Path: \\golder.gds\gal\Mississauga\SIM\Client\Public_Works_Canada\Canada99_PROJ\1530908_FWGSC_Dew_Line_Mon_Program_2015_2018\40_PROD\0012_Fox_M_Field_Summary_Report_2017\ | File Name: 1530907-0012-BG-0002.dwg | Last Edited By: trose Date: 2018-02-26 Time:1:27:46 AM | Printed By: trose Date: 2018-03-26 Time:2:30:47 PM

4.1.2 Visual Inspection

The Tier II Disposal Facility exhibits locations with observed minor erosion, settlement, ponded water, and vehicle tracks. 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 an “Acceptable” overall landfill performance because all observed features were assessed as “Acceptable.” Table 4-3 is a log of photographs taken during the 2017 visual inspection.

Extensive vehicle tracks (Feature C) were observed on the landfill cover surface and slopes. These vehicle tracks do not appear to be deteriorating or impacting the stability of the landfill. Previously observed metal and wood debris (Feature B) on the northwest slope is not exposed waste and therefore has not been reported as a feature in 2017. A minor self-armouring erosion channel (Feature E) was unchanged since the previous inspection. Previously observed minor settlement (Feature A) was unchanged since the previous inspection. Two new minor settlement areas were observed in 2017 (new Features J and I). Previously observed ponded water along the southwest toe (Feature H-1) was unchanged, whereas ponded water along the east toe (Feature H-3) appears to be larger in area compared to the previous inspection. Ponded water was observed in 2017 along the southeast toe (Feature H-2) in an area where ponded water had been previously observed in 2012 but not in 2014. The observed features are not associated with any observed landfill instability and are not considered a concern.

Table 4-1: Visual Inspection Checklist –Tier II Disposal Facility

SITE NAME: FOX-M Hall Beach
LANDFILL DESIGNATION: Tier II Disposal Facility
DATE OF INSPECTION: August 10, 2017
DATE OF PREVIOUS INSPECTION: August 16, 2014
INSPECTED BY: Reza Moghaddam
REPORT PREPARED BY: Reza Moghaddam
MONITORING EVENT NUMBER: 7
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 –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 (Severity Rating)	Comparison to Historical Observations	Photos
Settlement	Y	A	Southeast crest	491,064	7,626,744	0.3	0.3	0.1	<0.01%	Small depression (Acceptable)	Unchanged since previous inspection	56
	Y	J	East slope	491,070	7,626,830	0.3	0.3	0.1	<0.01%	Minor settlement (Acceptable)	New	59
	Y	I	Northwest slope near crest	490,988	7,626,847	0.5	0.3	0.3	<0.01%	Two small depressions (Acceptable)	New	61
Erosion	Y	E	Cover surface	491,065	7,626,742	1.0	0.1	0.1	<0.01%	Erosion channel (Acceptable)	Unchanged since previous inspection	57
Lateral Movement	N	-	-	-	-	-	-	-	-	-	-	-
Frost Action	N	-	-	-	-	-	-	-	-	-	-	-
Sloughing	N	-	-	-	-	-	-	-	-	-	-	-
Animal Burrows	N	-	-	-	-	-	-	-	-	-	-	-
Vegetation	N	-	-	-	-	-	-	-	-	-	-	-
Staining	N	G	-	-	-	-	-	-	-	Previously observed staining	Observed in 2012 but not in 2014 or 2017	-
Vegetation Stress	N	-	-	-	-	-	-	-	-	-	-	-

Table 4-1: 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 (Severity Rating)	Comparison to Historical Observations	Photos
Seepage or Ponded Water	Y	H-3	East toe	491,094	7,626,880	30	3-10	0.2	0.5%	Ponded water along toe (Acceptable)	Expanded area	53
	Y	H-3	East toe	491,082	7,626,847	50	3-10	0.2	1%	Ponded water along toe (Acceptable)	Expanded area	54
	Y	H-1	South toe	490,965	7,626,657	210	3-20	0.2	2%	Ponded water along toe (Acceptable)	Unchanged since previous inspection	55
	Y	H-2	Southeast toe	491,082	7,626,737	40	3	0.2	0.4%	Ponded water along toe (Acceptable)	Previously observed in 2012 but not in 2014	60
Debris and/or Liner Exposed	N	B	-	-	-	-	-	-	-	Previously observed surficial metal and wood debris	Not exposed waste	-
Presence / Condition of Monitoring Instruments	Y	VT-1, 2, 3, 4, 5 and HB-1 (background) MW-1,2,3, 4 and 5	-	-	-	-	-	-	-	Issues with thermistor HB-1 (see sect 4.1.3) Issues with MW-3, MW-4 (see Appendix B for details) All other instruments in good working condition.	-	22-27, 65,69, 73,77, 81

Table 4-1: 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 (Severity Rating)	Comparison to Historical Observations	Photos
Features of Note / Other Observations	Y	C	Cover surface and slopes	491,017	7,626,838	400	50	-	69%	Extensive Vehicle tracks (Acceptable)	Slightly expanded area, Features D and F from 2012 have been consolidated into Feature C.	28 -51

Landfill Area = 28,984 m^2.

Table 4-2: Preliminary Stability Assessment - Tier II Disposal Facility

Feature	Severity Rating	Extent
Settlement	Acceptable	Occasional
Erosion	Acceptable	Isolated
Lateral Movement	Not Observed	-
Frost Action	Not Observed	-
Sloughing	Not Observed	-
Cracking	Not Observed	-
Animal Burrows	Not Observed	-
Vegetation establishment	Not Observed	-
Staining	Not Observed	-
Vegetation Stress	Not Observed	-
Seepage/Ponded Water	Acceptable	Occasional
Debris and/or liner exposure	Not Observed	-
Other	Acceptable	Extensive
Overall Landfill Performance	**Acceptable**	

Table 4-3: Summary Table of Photographic Log –Tier II Disposal Facility

Photo	Easting	Northing	Date
Photo 1:	491,042	7,626,889	Aug.10, 2017
Photo 2:	491,007	7,626,775	Aug.10, 2017
Photo 3:	491,017	7,626,765	Aug.10, 2017
Photo 4:	490,970	7,626,750	Aug.10, 2017
Photo 5:	490,916	7,626,750	Aug.10, 2017
Photo 6:	491,003	7,626,831	Aug.10, 2017
Photo 7:	491,063	7,626,876	Aug.10, 2017
Photo 8:	491,000	7,626,677	Aug.10, 2017
Photo 9:	491,078	7,626,890	Aug.10, 2017
Photo 10:	491,048	7,626,771	Aug.10, 2017
Photo 11:	491,074	7,626,741	Aug.10, 2017
Photo 12:	490,992	7,626,656	Aug.10, 2017
Photo 13:	491,081	7,626,747	Aug.10, 2017
Photo 14:	491,068	7,626,888	Aug.10, 2017
Photo 15:	491,023	7,626,905	Aug.10, 2017
Photo 16:	490,988	7,626,671	Aug.10, 2017
Photo 17:	490,900	7,626,749	Aug.10, 2017
Photo 18:	490,984	7,626,666	Aug.10, 2017
Photo 19:	491,024	7,626,892	Aug.10, 2017
Photo 20:	490,909	7,626,763	Aug.10, 2017

Table 4-3: Summary Table of Photographic Log –Tier II Disposal Facility

Photo	Easting	Northing	Date
Photo 21:	490,970	7,626,819	Aug.10, 2017
Photo 22:	490,920	7,626,656	Aug.10, 2017
Photo 23:	490,951	7,626,709	Aug.10, 2017
Photo 24:	490,983	7,626,751	Aug.10, 2017
Photo 25:	491,116	7,626,817	Aug.10, 2017
Photo 26:	491,004	7,626,841	Aug.10, 2017
Photo 27:	490,975	7,626,807	Aug.10, 2017
Photo 28:	491,017	7,626,838	Aug.10, 2017
Photo 29:	491,010	7,626,820	Aug.10, 2017
Photo 30:	491,067	7,626,892	Aug.10, 2017
Photo 31:	491,061	7,626,894	Aug.10, 2017
Photo 32:	491,038	7,626,761	Aug.10, 2017
Photo 33:	491,042	7,626,709	Aug.10, 2017
Photo 34:	491,039	7,626,731	Aug.10, 2017
Photo 35:	491,046	7,626,743	Aug.10, 2017
Photo 36:	491,002	7,626,672	Aug.10, 2017
Photo 37:	490,988	7,626,677	Aug.10, 2017
Photo 38:	491,005	7,626,676	Aug.10, 2017
Photo 39:	490,937	7,626,705	Aug.10, 2017
Photo 40:	490,913	7,626,728	Aug.10, 2017
Photo 41:	490,952	7,626,715	Aug.10, 2017
Photo 42:	490,975	7,626,720	Aug.10, 2017
Photo 43:	490,983	7,626,744	Aug.10, 2017
Photo 44:	490,949	7,626,748	Aug.10, 2017
Photo 45:	490,910	7,626,767	Aug.10, 2017
Photo 46:	490,918	7,626,773	Aug.10, 2017
Photo 47:	490,947	7,626,779	Aug.10, 2017
Photo 48:	490,946	7,626,802	Aug.10, 2017
Photo 49:	490,963	7,626,798	Aug.10, 2017
Photo 50:	490,986	7,626,832	Aug.10, 2017
Photo 51:	490,998	7,626,861	Aug.10, 2017
Photo 52:	491,007	7,626,884	Aug.10, 2017
Photo 53:	491,094	7,626,880	Aug.10, 2017
Photo 54:	491,082	7,626,847	Aug.10, 2017
Photo 55:	490,965	7,626,657	Aug.10, 2017
Photo 56:	491,064	7,626,744	Aug.10, 2017
Photo 57:	491,065	7,626,742	Aug.10, 2017
Photo 58:	491,043	7,626,854	Aug.10, 2017

Table 4-3: Summary Table of Photographic Log –Tier II Disposal Facility

Photo	Easting	Northing	Date
Photo 59:	491,070	7,626,830	Aug.10, 2017
Photo 60:	491,082	7,626,737	Aug.10, 2017
Photo 61:	490,988	7,626,847	Aug.10, 2017

4.1.3 Thermal Monitoring

Thermistor dataloggers VT-1, VT-2, VT-3, VT-4 and VT-5 located at the Tier II Disposal Facility were downloaded using Lakewood Systems Ltd. Prolog software and a laptop computer. The background thermistor datalogger at the Tier II Disposal Facility (VT-HB-1) could not be downloaded due to lack of battery power but resumed operation after replacing the batteries. All 6 existing ULB1 (9 V) batteries were replaced with new ULB1 lithium batteries in the thermistor dataloggers. Also, all 5 existing ULB15 batteries (in VT-1, VT-2, VT-3, VT-4 and VT-5) and 1 existing ULB5 battery (in background thermistor VT-HB-1) were replaced with new ULB15 lithium batteries. After replacing the batteries, all thermistor dataloggers were successfully reprogrammed for a 48-hour recording period and to collect data at noon, as requested by DND. The dead batteries were shipped back to Lakewood Systems under appropriate TDG labelling and shipping.

Thermistor inspection and data downloading details were recorded on field record sheets included in Appendix B.

4.1.4 Summary of any Sampling Deviations

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

- The deep soil sample at MW-03 could not be collected due to refusal on rock.

4.1.5 Soil Sampling

Table 4-4 presents a summary of analytical results for soil samples collected at the Tier II Disposal Facility. MW-01 represents an upgradient sampling location, whereas MW-02, MW-03, MW-04 and MW-05 represent downgradient sampling locations.

Table 4-4 also lists the arithmetic mean background and baseline values for the landfill, in addition to the baseline plus 3σ limit. At the Tier II Disposal Facility, the background arithmetic mean for PCB is greater than the baseline arithmetic mean. The background arithmetic mean for PCB is also greater than the baseline mean plus 3σ, as the standard deviation of the baseline mean value was zero. Additionally, the arithmetic mean baseline and the baseline concentrations plus 3σ are the same for cadmium, chromium, cobalt and lead, which reflects the fact that baseline concentrations of these parameters were primarily at or below laboratory detection limits.

There was no arsenic or cadmium detected in the soil samples at the Tier II landfill in 2017. There were no detections of PCB at any location at this landfill in 2017.

MW-01

Sampling location MW-01 is located upgradient of the landfill, approximately 30 m northwest of the toe. The estimated elevation of this sampling point is 1.0 masl. As shown in Photograph 62 (Appendix D), the area is largely covered with gravel and is sparsely vegetated. The soils consisted of grey sand, gravel and stone. Seepage into the hole commenced shortly after it was excavated.

For the shallow sample at MW-01 (0-15 cm), the concentrations of all metals were less than or similar to those reported in previous years. No PHC were detected at this location in 2017. None of the reported values exceeded their respective baseline mean concentrations plus 3σ.

For the deep sample at MW-01 (40-50 cm), most detected metal concentrations were similar those in the shallow sample. The concentrations of metals were all less than or similar to reported in previous years, with the exception of lead. None of the reported values exceeded their respective baseline mean concentrations plus 3σ.

MW-02

Sampling location MW-02 is located downgradient of the landfill, approximately 70 m east of the toe. The estimated elevation of this sampling point is only slightly higher than the surrounding sea level. As shown in Photograph 66, the area is largely covered with sand and gravel with established vegetation. The soils consisted of grey sand, gravel and stone. Seepage into the excavation commenced shortly after excavation.

For the shallow sample at MW-02 (0-15 cm), the concentrations of all metals were less than or similar to those reported in previous years. The modified TPH concentration of 26 mg/kg was decreased from those observed in 2012 and 2014 (68 mg/kg and 28 mg/kg, respectively). None of the reported values exceeded their respective baseline mean concentrations plus 3σ.

For the deep sample at MW-02 (20-30 cm), metals concentrations were similar to those in the shallow sample. Similarly, to the shallow sample, the concentrations of many metals were all less than or similar to reported in previous years. The 2017 zinc concentration was similar to earlier observations and significantly lower than the 2014 result. The concentration of lead is slightly higher than the historical maximum concentration at this location. The modified TPH concentration of 15 mg/kg was less than the concentration reported in 2012 (72 mg/kg); no PHC were detected in 2014. None of the reported values exceeded their respective baseline mean concentrations plus 3σ.

MW-03

Sampling location MW-03 is located downgradient of the landfill, approximately 40 m east of the toe. The estimated elevation of this sampling point is only slightly higher than the surrounding sea level. As shown in Photograph 70, the area consists of sand and gravel with some established vegetation. The soils consisted of grey sand, gravel and stone. Seepage into the hole commenced shortly after it was excavated.

For the shallow sample at MW-03 (0-15 cm), the concentrations of all metals were less than or similar to those reported in previous years. No PHC were detected at this location in 2017. None of the reported values exceeded their respective baseline mean concentrations plus 3σ.

MW-04

Sampling location MW-04 is located downgradient of the landfill, approximately 30 m south of the toe. The estimated elevation of this sampling point is only slightly higher than the surrounding sea level. As shown in Photograph 74, the area is largely covered with sand and gravel with established vegetation. The soils consisted of grey sand, gravel and stone. Seepage into the hole commenced shortly after it was excavated.

For the shallow sample at MW-04 (0-15 cm), the concentrations of all metals were less than or similar to those reported in previous years. No PHC were detected at this location in 2017. None of the reported values exceeded their respective baseline mean concentrations plus 3σ.

For the deep sample at MW-04 (30-40 cm), most detected metal concentrations, with the exception of lead (slightly higher) were slightly less than those in the shallow sample. The concentrations of most metals were all less than or similar to reported in previous years. It is noted that the concentration of lead is slightly higher than the previous historical maximum. No PHC were detected at this location in 2017. None of the reported values exceeded their respective baseline mean concentrations plus 3σ.

MW-05

Sampling location MW-05 is located downgradient of the landfill, approximately 15 m southwest of the toe. The estimated elevation of this sampling point is only slightly higher than the surrounding sea level. As shown in Photograph 78, the area is largely covered with sand and gravel with established vegetation. The soils consisted of grey sand, gravel and stone. Seepage into the hole commenced shortly after it was excavated.

For the shallow sample at MW-05 (0-15 cm), the concentrations of all metals were less than or similar to those reported in previous years. The modified TPH concentration of 48 mg/kg was greater than the concentration reported in 2012 (30 mg/kg); no PHC were detected in 2014. None of the reported values exceeded their respective baseline mean concentrations plus 3σ.

For the deep sample at MW-05 (40-50 cm, duplicate location), metals concentrations were less than those in the shallow sample. The concentrations of many metals were all less than or similar to reported in previous years, with the exception of lead. No PHC were detected at this location in 2017.

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

ID	Depth (cm)	As (mg/kg)	Cd (mg/kg)	Cr (mg/kg)	Co (mg/kg)	Cu (mg/kg)	Pb (mg/kg)	Ni (mg/kg	Zn (mg/kg)	Total PCB (mg/kg)	F1 (mg/kg)	F2 (mg/kg)	F3 (mg/kg)	F4 (mg/kg)
Background Mean		1.00	1.00	20.0	5.00	6.33	10.00	5.00	15.00	0.213	NA	NA	NA	NA
Baseline Mean		**2.22**	**1.00**	**20.0**	**5.00**	**6.63**	**10.00**	**8.04**	**17.10**	**0.003**	**NA**	**NA**	**NA**	**NA**
Baseline + 3σ		5.02	1.00	20.0	5.00	19.47	10.00	15.19	51.61	0.003	NA	NA	NA	NA
Upgradient														
MW-01 Shallow	0-15	<1.0	<0.5	9.5	1.9	4.5	8.0	7.9	9.5	<0.05	<7	<4	<8	<6
MW-01 Deep	40-50	<1.0	<0.5	9.8	2.0	4.1	6.6	6.7	6.7	<0.05	<7	<4	<8	<6
Downgradient														
MW-02 Shallow	0-15	<1.0	<0.5	10.0	2.1	4.4	8.2	**8.3**	11.0	<0.05	<7	5	17	<6
MW-02 Deep	20-30	<1.0	<0.5	9.0	1.8	5.4	8.1	6.9	12.6	<0.05	<7	7	<8	<6
MW-03 Shallow	0-15	<1.0	<0.5	7.1	1.5	3.0	5.0	6.6	6.8	<0.05	<7	<4	<8	<6
MW-03 Deep[1]														
MW-04 Shallow	0-15	<1.0	<0.5	8.7	1.7	3.2	4.7	6.7	7.7	<0.05	<7	<4	<8	<6
MW-04 Deep	30-40	<1.0	<0.5	7.7	1.4	2.8	4.9	5.4	6.6	<0.05	<7	<4	<8	<6
MW-05 Shallow	0-15	<1.0	<0.5	11.3	2.1	3.3	4.6	7.1	9.1	<0.05	<7	10	34	<6
MW-05 Deep	40-50	<1.0	<0.5	9.6	2.0	3.6	4.0	6.8	8.0	<0.05	<7	<4	<8	<6
MW-905 Deep (Duplicate)	40-50	<1.0	<0.5	7.7	1.8	2.8	4.2	5.5	6.6	<0.05	<7	<4	<8	<6
MW-05 Deep (Dup Avg)	40-50	<1.0	<0.5	8.7	1.9	3.2	4.1	6.2	7.3	<0.05	<7	<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.

1: The deep soil sample at MW-03 could not be collected due to refusal on rock.

4.1.6 Groundwater Sampling

Groundwater sampling and monitoring well inspection field records are included in Appendix B. Table 4-5 presents a summary of groundwater levels and analytical results for groundwater samples collected at the Tier II Disposal Facility.

There was no arsenic, cadmium copper or lead detected in the groundwater samples at these landfills in 2017. There were no detections of PHC in any of the samples collected from the wells at this location in 2017.

MW-01

The depth to groundwater measured at MW-01 in 2017 was 0.37 m below grade. This is consistent with the reported higher elevation of this well compared to the downgradient locations. The concentrations of nickel and zinc, the only metals detected at MW-01, were less than recent years, but similar to those in 2010 and prior. None of the reported values exceeded their respective baseline mean concentrations plus 3σ.

MW-02

The depth to groundwater measured at MW-02 in 2017 was 0.31 m below grade. The concentration of zinc, the only metal detected at MW-02, was less than the concentration reported in 2014, but similar to that reported in earlier years. None of the reported values exceeded their respective baseline mean concentrations plus 3σ.

MW-03

The depth to groundwater measured at MW-03 in 2017 was 0.27 m below grade. The concentrations of chromium and zinc, the only metals detected at MW-03, were less than or similar to previous years. None of the reported values exceeded their respective baseline mean concentrations plus 3σ.

Based on the elevated field pH (above 10) recorded at MW-03, it is possible that there is interaction with cement from the well casing installation.

MW-04

The depth to groundwater measured at MW-04 in 2017 was 0.17 m below grade. The concentrations of nickel and zinc, the only metals detected at MW-04, were less than or similar to previous years. Nickel was notably less than the result from 2014, which exceeded the baseline mean concentrations plus 3σ standard. None of the reported values in 2017 exceeded their respective baseline mean concentrations plus 3σ.

It was noted that the well casing at MW-04 is above the surface casing, preventing the well from being properly secured. It is recommended that the well casing be cut to allow the well to be secured.

MW-05

The depth to groundwater measured at MW-05 in 2017 was 0.19 m below grade. The concentrations of nickel and zinc, the only metals detected at MW-05, were less than or similar to previous years. The 2017 nickel concentration was a historic low. None of the reported values exceeded their respective baseline mean concentrations plus 3σ.

Table 4-5: Monitoring Well Groundwater Levels and Groundwater Chemical Analysis Results –Tier II Disposal Facility

ID	GW Depth BGS (m)	As (mg/L)	Cd (mg/L)	Cr (mg/L)	Co (mg/L)	Cu (mg/L)	Pb (mg/L)	Ni (mg/L)	Zn (mg/L)	F1 (mg/L)	F2 (mg/L)	F3 (mg/L)	F4 (mg/L)
Baseline Mean		**0.003**	**0.001**	**0.0260**	**0.003**	**0.0097**	**0.01**	**0.0127**	**0.19**	**NA**	**NA**	**NA**	**NA**
Baseline + 3σ		0.003	0.001	0.1517	0.003	0.0405	0.01	0.0127	1.46	NA	NA	NA	NA
Upgradient													
MW-01	0.37	<0.001	<0.0001	<0.001	<0.0005	<0.0005	<0.0001	0.002	0.007	<0.025	<0.1	<0.1	<0.1
Downgradient													
MW-02	0.31	<0.001	<0.0001	<0.001	<0.0005	<0.0005	<0.0001	<0.001	0.086	<0.025	<0.1	<0.1	<0.1
MW-03	0.27	<0.001	<0.0001	0.012	<0.0005	<0.0005	<0.0001	<0.001	0.006	<0.025	<0.1	<0.1	<0.1
MW-04	0.17	<0.001	<0.0001	<0.001	<0.0005	<0.0005	<0.0001	0.003	0.016	<0.025	<0.1	<0.1	<0.1
MW-05	0.19	<0.001	<0.0001	<0.001	<0.0005	<0.0005	<0.0001	0.001	0.012	<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.
Groundwater metals analyses were for dissolved metals.

4.1.7 Conclusions and Overall Performance of the Tier II Disposal Facility

Based on the visual inspection, there does not appear to be any significant erosion, settlement, exposed waste or indications of instability at the Tier II Disposal Facility. A minor erosion channel and a few minor settlement areas were observed. The extensive vehicle tracks on the cover surface and slopes have not deteriorated and are not considered to be significant. The ponded water areas along the toe of the landfill have not impacted the stability of the landfill. The overall stability performance of this landfill was assessed as Acceptable.

The concentrations of the metals were typically highest overall at the sample location MW-02, located downgradient of the east side of the landfill; however, they were less than or similar to those observed in previous years. At the shallow sample location MW-02, the modified TPH concentration of 26 mg/kg was slightly lower than that observed in 2014 (28 mg/kg) and that in 2012 (68 mg/kg). No detectable concentrations of arsenic, cadmium or PCB were noted in any of the soil samples in 2017. None of the reported values exceeded their respective baseline mean concentrations plus 3σ.

In 2017, groundwater samples were collected from all five monitoring wells adjacent to the landfill. Where detected, the concentrations of the metals in the groundwater samples were less than or similar to previous years. No detectable concentrations of arsenic, cadmium, cobalt, copper, lead or PHC were noted in any of the groundwater samples in 2017. It is noted that the groundwater samples collected in 2017 were filtered in the lab, and therefore the results represent dissolved metals instead of total metals. An overall trend comparison on the impact of results based on total versus dissolved metals will be prepared in 2018.

The historical graphs in Appendix C show concentration trends in the soil samples collected at the Tier II Disposal Facility. The graphs indicate that relatively stable or slight decreasing trends are observed for most parameters at downgradient monitoring locations; notable decreasing trends were observed for chromium, cobalt and nickel. Similar decreasing trends are observed for a number of metals (i.e. chromium, cobalt and nickel) at the upgradient monitoring location, MW-01.

Based on the results of the 2017 sampling period and comparison to historical trends, there is no evident ongoing impact of the landfill on soil or groundwater quality.

4.1.8 Recommendations for Tier II Disposal Facility

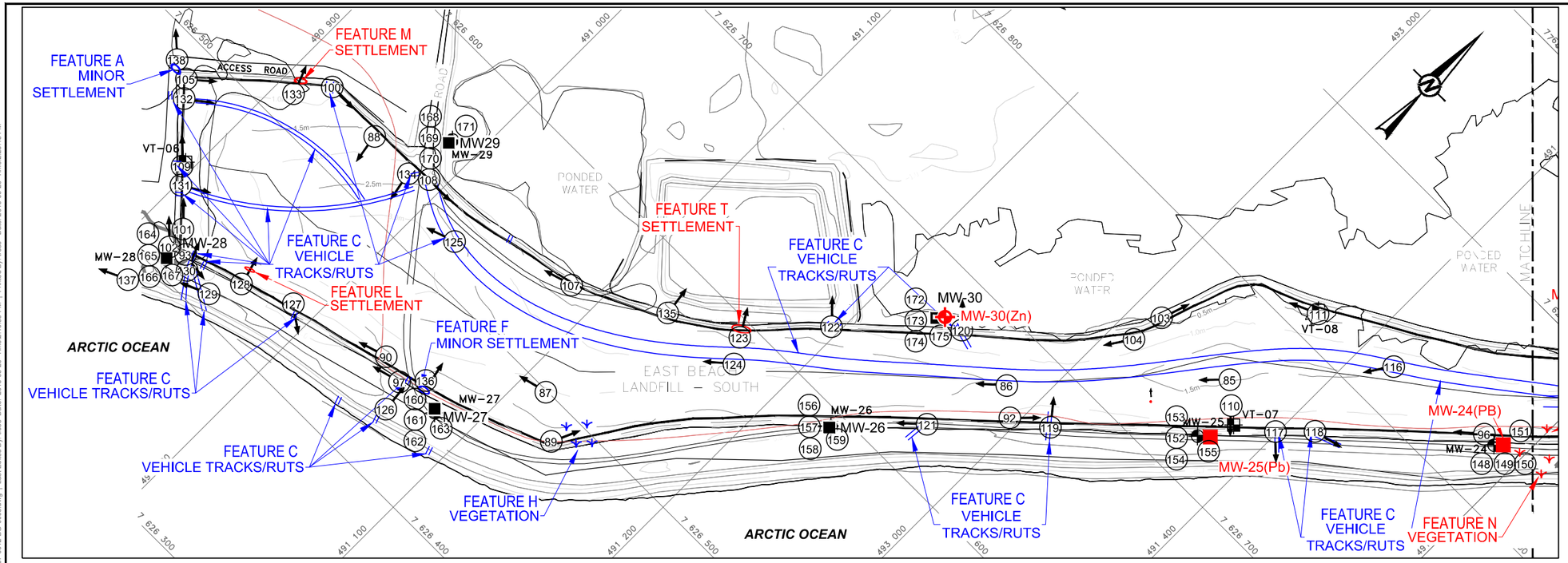
No modifications to the ongoing monitoring program at this landfill are recommended. It is recommended that the well casing at MW-04 be cut to allow the well to be secured.

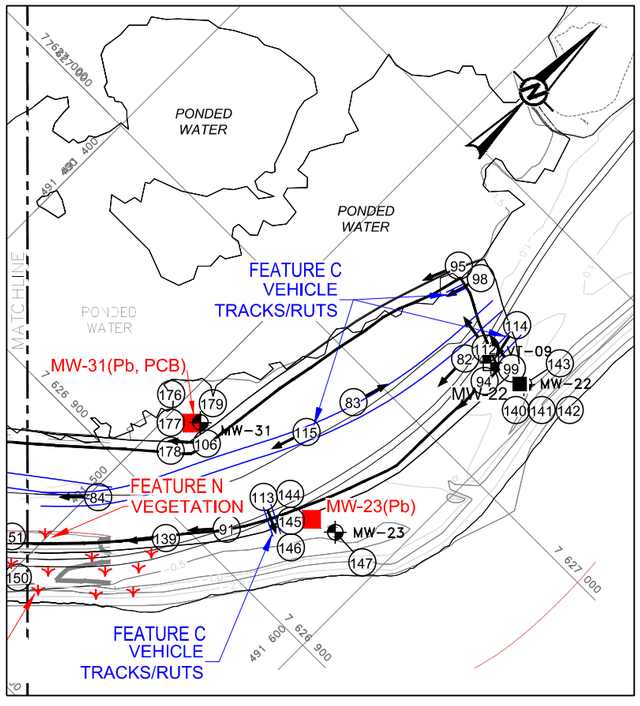
4.2 East Beach Landfill (North and South)

4.2.1 Landfill Description

The East Beach Landfill South is located southeast of the Main Station and curves around parallel to the ocean shoreline. It is a long linear cell extending over approximately 1.2 km in length. To the east, it is bounded by the Arctic Ocean, and to the west, low lying areas. The landfill is approximately 40 to 120 m in width. The East Beach Landfill North is a separate landfill cell measuring 60 m by 100 m, located further north along the ocean shoreline.

The remediation of these landfills included partial excavation of all buried debris within 30 m of the shoreline and construction of leachate containment for the remainder of the landfill. The leachate containment system consists of a synthetic liner system keyed into permafrost and the placement of sufficient granular cover fill to cause aggradation of permafrost through the buried waste materials. Ten groundwater monitoring wells were installed around the East Beach Landfill South perimeter and six thermistors were installed within the landfill footprint to monitor freeze back conditions. Two wells (MW-20 and MW-21) are east of the East Beach Landfill North. The long-term monitoring plan consists of visual inspection, collection of soil and groundwater samples, and monitoring of subsurface ground temperatures along the length of the landfill. Approximate soil and groundwater sampling, and thermistor installation locations are provided in Figure FOX-M.3 (East Beach Landfill South) and Figure FOX-M.4 (East Beach Landfill North).





LEGEND:

- SOIL SAMPLING LOCATION
- SOIL SAMPLING LOCATION WITH EXCEEDANCE OF BASELINE MEAN PLUS 3σ
- MONITORING WELL LOCATION
- MONITORING WELL LOCATION WITH EXCEEDANCE OF BASELINE MEAN PLUS 3σ
- VERTICAL THERMISTOR LOCATION
- 84 PHOTOGRAPH VIEWPOINT LOCATION
- 2.0m CONTOURS IN 0.5m INTERVALS
- VEHICLE TRACKS/RUTS
- AREA OF SETTLEMENT
- VEGETATION

NOTES:

1. *LOCATIONS AND SCALE OF FEATURES ARE APPROXIMATE AND SHOWN FOR ILLUSTRATIVE PURPOSES ONLY.*
2. ALL COORDINATES ARE REFERENCED TO NAD83 (CSRS), UTM ZONE 17N.
3. FEATURES DRAWN IN RED ARE EITHER NEW OR EXPANDED.

REFERENCE:

PREVIOUS INSPECTION FIGURE PROVIDED BY SENES CONSULTS. PROJECT NO. 350600(-1515-1), DATED FEB.20, 2015.

0 50 100
1:2,500 METRES

CLIENT
DEPARTMENT OF NATIONAL DEFENCE CANADA

PROJECT
2017 FOX-M MONITORING REPORT

TITLE
EAST BEACH LANDFILL SOUTH

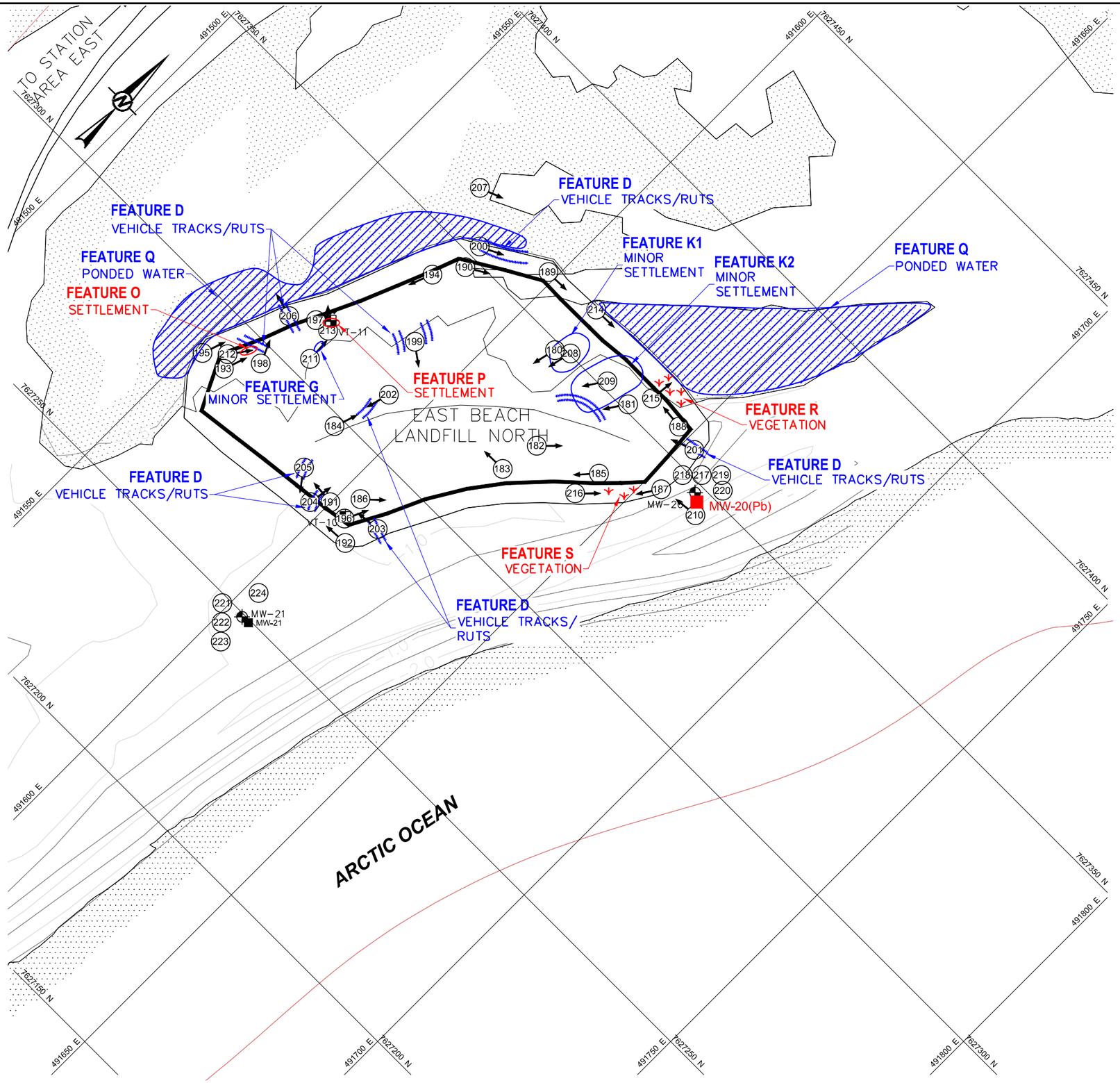
CONSULTANT
GOLDER

YYYY-MM-DD	2018-01-10
DESIGNED	RM
PREPARED	TDR
REVIEWED	DCJ
APPROVED	DP

PROJECT NO.	PHASE	REV.	FIGURE
1530908	3000	A	FOX-M.3

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

Path: \\golder.gds\gal\Mississauga\SIM\Clients\Public_Works_Canada\Canada\99_PROJ\1530908_PWGSC_Dew_Line_Mon_Program_2015_2018\40_PROD\0012_Fox_M_Field_Summary_Report_2017\ | File Name: 1530907-0012-BG-0003.dwg | Last Edited By: trose Date: 2018-03-26 Time:2:10:33 PM | Printed By: trose Date: 2018-03-26 Time:2:25:15 PM



LEGEND:

- SOIL SAMPLING LOCATION
- SOIL SAMPLING LOCATION WITH EXCEEDANCE OF BASELINE MEAN PLUS 3σ
- MONITORING WELL LOCATION
- VERTICAL THERMISTOR LOCATION
- PHOTOGRAPH VIEWPOINT LOCATION
- CONTOURS IN 0.5m INTERVALS
- VEHICLE TRACKS/RUTS
- AREA OF SETTLEMENT
- PONDED WATER
- VEGETATION

NOTES:

1. *LOCATIONS AND SCALE OF FEATURES ARE APPROXIMATE AND SHOWN FOR ILLUSTRATIVE PURPOSES ONLY.*
2. ALL COORDINATES ARE REFERENCED TO NAD83 (CSRS), UTM ZONE 17N.
3. FEATURES DRAWN IN RED ARE EITHER NEW OR EXPANDED.

REFERENCE:

PREVIOUS INSPECTION FIGURE PROVIDED BY SENES CONSULTS. PROJECT NO. 350600(-1515-1), DATED FEB.20, 2015.

0 25 50
1:1,000 METRES

CLIENT
DEPARTMENT OF NATIONAL DEFENCE CANADA

PROJECT
2017 FOX-M MONITORING REPORT

TITLE
EAST BEACH LANDFILL NORTH

CONSULTANT
GOLDER

YYYY-MM-DD	2018-01-10
DESIGNED	RM
PREPARED	TDR
REVIEWED	DCJ
APPROVED	DP

PROJECT NO.	PHASE	REV.	FIGURE
1530908	3000	A	FOX-M.4

Path: \\golder.gds\gal\Mississauga\SIM\Client\Public_Works_Canada\Canada99_PROJ\1530908_PWGSC_Dew_Line_Mon_Program_2015_2018\40_PROD\0012_Fox_M_Field_Summary_Report_2017\ | File Name: 1530907-0012-BG-0004.dwg | Last Edited By: trose Date: 2018-02-26 Time:3:35:55 PM | Printed By: trose Date: 2018-03-26 Time:2:33:06 PM
IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B
25 mm
0

4.2.2 Visual Inspection

The East Beach Landfill (South and North) exhibited a number of locations with settlement, vehicle tracks, sparse vegetation and ponded water features. Table 4-6 presents a summary of observed visual inspection features and Table 4-7 presents the Preliminary Stability Assessment results. These landfills were assessed to have an “Acceptable” overall landfill performance because all observed features were assessed as “Acceptable.” Table 4-8 is a log of photographs taken during the 2017 visual inspection.

Visual inspection of the East Beach Landfill South observed that the amount of vehicle tracks (Feature C) on the cover surface and slopes had increased slightly compared to the previous inspection in 2014. Previously observed settlement areas (Features F and A) were unchanged while three new settlement areas (new Features T, L and M) were observed in 2017. Previously observed ponded water along the northwest crest toe was so far away from the toe that it is not considered significant and has not been assessed as a feature in 2017. Some sparse vegetation (Features H and N) was observed on the south slope. The observed features do not appear to be impacting the stability of the East Beach Landfill South. Previously observed debris (Feature B) are not buried waste that has become exposed and therefore have not been reported in 2017.

Visual inspection of the East Beach Landfill North observed that the amount of vehicle tracks (Feature D) on the cover surface and slopes had increased slightly compared to the previous inspection in 2014. Previously observed minor settlement areas (Features G and K) were unchanged, whereas two new settlement areas (new Features O and P) were observed in 2017. Previously observed ponded water along the west and north toe (Feature Q) does not appear to have impacted the stability of the landfill. Some sparse vegetation (new Features R and S) was observed on the north and east slopes. The observed features do not appear to be impacting the stability of the East Beach Landfill North. Previously observed debris (Feature B) are not buried waste that has become exposed and therefore have not been assessed as a feature in 2017.

Table 4-6: Visual Inspection Checklist – East Beach Landfill (South and North)

SITE NAME: FOX-M Hall Beach
LANDFILL DESIGNATION: East Beach Landfill South and North
DATE OF INSPECTION: August 13, 2017
DATE OF PREVIOUS INSPECTION: August 16, 2014
INSPECTED BY: Reza Moghaddam
REPORT PREPARED BY: Reza Moghaddam
MONITORING EVENT NUMBER: 7
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 4-6: Visual Inspection Checklist – East Beach Landfill (South and North)

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	K1	North Landfill – Cover surface	491,616	7,627,350	15	10	0.05	2.5%	Multiple small shallow depressions (Acceptable)	Unchanged since previous inspection	208
	Y	K2	North Landfill – Cover surface	491,627	7,627,352	22	15	0.05	5%	Multiple small shallow depressions (Acceptable)	Unchanged since previous inspection	209
	Y	G	North Landfill – Cover surface	491,572	7,627,305	2	0.5	0.05	0.016%	Small shallow depressions (Acceptable)	Unchanged since previous inspection	211
	Y	O	North Landfill – West crest	491,557	7,627,292	1	0.5	0.3	0.008%	Minor settlement (Acceptable)	New	212
	Y	P	North Landfill – Cover surface	491,571	7,627,311	1	0.3	0.05	0.005%	Linear depression (Acceptable)	New	213
	Y	F	South Landfill – Southeast crest	491,068	7,626,455	1	0.3	0.05	<0.001%	Minor settlement (Acceptable)	Unchanged since previous inspection	136
	Y	A	South Landfill – south slope	490,857	7,626,482	1	1	0.1	0.002%	Small depressions (Acceptable)	Unchanged since previous inspection	138
	Y	T	South Landfill – northwest slope	491,163	7,626,596	0.5	0.5	0.4	<0.001%	Two small sink holes (Acceptable)	New	123
	Y	L	South Landfill –Southeast crest	490,961	7,626,427	0.5	0.5	0.2	<0.001%	Two small sink holes (Acceptable)	New	128

Table 4-6: Visual Inspection Checklist – East Beach Landfill (South and North)

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	M	South Landfill – Northwest crest and slope	490,908	7,626,520	1	1	0.2	0.002%	Two small sink holes (Acceptable)	New	133
Erosion	N	-	-	-	-	-	-	-	-	-	-	-
Lateral Movement	N	-	-	-	-	-	-	-	-	-	-	-
Frost Action	N	-	-	-	-	-	-	-	-	-	-	-
Sloughing	N	-	-	-	-	-	-	-	-	-	-	-
Cracking	N	E	-	-	-	-	-	-	-	Tension crack	Observed in 2010 but not since.	-
Animal Burrows	N	-	-	-	-	-	-	-	-	-	-	-
Vegetation	Y	R	North Landfill – north slope	491,637	7,627,357	10	2	-	0.3%	Sparse vegetation (Acceptable)	New	215
	Y	S	North Landfill – East slope	491,640	7,627,327	10	3	-	0.5%	Sparse vegetation (Acceptable)	New	216
	Y	N	South Landfill – South slope	491,536	7,626,891	60	2	-	0.5%	Sparse vegetation (Acceptable)	New	139
	Y	H	South Landfill – South slope	491,134	7,626,483	10	10	-	1.5%	Sparse vegetation (Acceptable)	Observed in 2012 but not in 2014	89

Table 4-6: Visual Inspection Checklist – East Beach Landfill (South and North)

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
Staining	N	-	-	-	-	-	-	-	-	-	-	-
Vegetation Stress	N	-	-	-	-	-	-	-	-	-	-	-
Seepage or Ponded Water	Y	Q	North Landfill – West and north toe	491,612	7,627,362	120	5	0.2	9.7%	Ponded water (Acceptable)	Shown on previous report figures but not designated as a feature.	214
Debris and/or Liner Exposed	N	B	North Landfill – Northwest toe	-	-	-	-	-	-	Previously observed surficial metal/wood debris	Not buried waste	-
		B	North Landfill – East toe	-	-	-	-	-	-	Previously observed surficial metal/wood debris	Not buried waste	-
		B	South Landfill – Northwest crest	-	-	-	-	-	-	Previously observed surficial metal/wood debris	Not buried waste	-
		B	South Landfill – South toe	-	-	-	-	-	-	Previously observed surficial metal/wood debris	Not buried waste	-
Presence / Condition of Monitoring Instruments	Y	VT-6,7,8, 9,10,11 and MW-20,21, 22,23,24, 25,26,27, 28,29,30,31	South and North Landfills	-	-	-	-	-	-	Wells and thermistors intact (see Appendix B for details)	-	109-112, 196,197, 143,147, 151,155, 159,163, 167,171, 175,179, 220,224

Table 4-6: Visual Inspection Checklist – East Beach Landfill (South and North)

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
Features of Note / Other Observations	Y	D	North Landfill – cover surface and slopes	491,587	7,627,326	25	25	-	10.17%	Vehicle tracks (Acceptable)	Slightly expanded area	198-206
	Y	C	South Landfill – cover surface and slopes	491,419	7,626,823	800	5	-	65%	Vehicle tracks (Acceptable)	Slightly expanded area	113-132

South Landfill = 66,486 m^2 and North Landfill Area = 6,144 m^2.

Note: Previously reported Features I and J have been consolidated into Feature C.

Table 4-7: Preliminary Stability Assessment – East Beach Landfill (South and North)

Feature	Severity Rating	Extent
Settlement	Acceptable	Numerous
Erosion	Not Observed	-
Lateral Movement	Not Observed	-
Frost Action	Not Observed	-
Sloughing	Not Observed	-
Cracking	Not observed	-
Animal Burrows	Not Observed	-
Vegetation establishment	Acceptable	Occasional
Staining	Not Observed	-
Vegetation Stress	Not Observed	-
Seepage/Ponded Water	Acceptable	Isolated
Debris and/or liner exposure	Not Observed	-
Other	Acceptable	Extensive
Overall Landfill Performance	**Acceptable**	

Table 4-8: Summary Table of Photographic Log – East Beach Landfill (South and North)

Photo	Easting	Northing	Date
Photo 82:	491,576	7,627,040	Aug.13, 2017
Photo 83:	491,551	7,626,987	Aug.13, 2017
Photo 84:	491,503	7,626,883	Aug.13, 2017
Photo 85:	491,363	7,626,757	Aug.13, 2017
Photo 86:	491,282	7,626,673	Aug.13, 2017
Photo 87:	491,114	7,626,499	Aug.13, 2017
Photo 88:	490,956	7,626,531	Aug.13, 2017
Photo 89:	491,134	7,626,483	Aug.13, 2017
Photo 90:	491,042	7,626,453	Aug.13, 2017
Photo 91:	491,551	7,626,912	Aug.13, 2017
Photo 92:	491,295	7,626,662	Aug.13, 2017
Photo 93:	490,932	7,626,417	Aug.13, 2017
Photo 94:	491,583	7,627,036	Aug.13, 2017
Photo 95:	491,542	7,627,059	Aug.13, 2017
Photo 96:	491,477	7,626,832	Aug.13, 2017
Photo 97:	491,056	7,626,449	Aug.13, 2017
Photo 98:	491,552	7,627,061	Aug.13, 2017
Photo 99:	491,584	7,627,045	Aug.13, 2017
Photo 100:	490,922	7,626,533	Aug.13, 2017
Photo 101:	490,920	7,626,424	Aug.13, 2017

Table 4-8: Summary Table of Photographic Log – East Beach Landfill (South and North)

Photo	Easting	Northing	Date
Photo 102:	490,922	7,626,413	Aug.13, 2017
Photo 103:	491,315	7,626,755	Aug.13, 2017
Photo 104:	491,312	7,626,737	Aug.13, 2017
Photo 105:	490,864	7,626,482	Aug.13, 2017
Photo 106:	491,520	7,626,931	Aug.13, 2017
Photo 107:	491,084	7,626,548	Aug.13, 2017
Photo 108:	490,987	7,626,535	Aug.13, 2017
Photo 109:	490,895	7,626,448	Aug.13, 2017
Photo 110:	491,379	7,626,742	Aug.13, 2017
Photo 111:	491,371	7,626,815	Aug.13, 2017
Photo 112:	491,579	7,627,040	Aug.13, 2017
Photo 113:	491,563	7,626,928	Aug.13, 2017
Photo 114:	491,579	7,627,050	Aug.13, 2017
Photo 115:	491,546	7,626,964	Aug.13, 2017
Photo 116:	491,419	7,626,823	Aug.13, 2017
Photo 117:	491,399	7,626,755	Aug.13, 2017
Photo 118:	491,414	7,626,770	Aug.13, 2017
Photo 119:	491,314	7,626,673	Aug.13, 2017
Photo 120:	491,243	7,626,675	Aug.13, 2017
Photo 121:	491,267	7,626,629	Aug.13, 2017
Photo 122:	491,196	7,626,629	Aug.13, 2017
Photo 123:	491,163	7,626,596	Aug.13, 2017
Photo 124:	491,173	7,626,579	Aug.13, 2017
Photo 125:	491,024	7,626,521	Aug.13, 2017
Photo 126:	491,058	7,626,453	Aug.13, 2017
Photo 127:	490,992	7,626,434	Aug.13, 2017
Photo 128:	490,961	7,626,427	Aug.13, 2017
Photo 129:	490,947	7,626,409	Aug.13, 2017
Photo 130:	490,934	7,626,415	Aug.13, 2017
Photo 131:	490,904	7,626,437	Aug.13, 2017
Photo 132:	490,871	7,626,474	Aug.13, 2017
Photo 133:	490,908	7,626,520	Aug.13, 2017
Photo 134:	490,985	7,626,532	Aug.13, 2017
Photo 135:	491,130	7,626,574	Aug.13, 2017
Photo 136:	491,068	7,626,455	Aug.13, 2017
Photo 137:	490,918	7,626,389	Aug.13, 2017
Photo 138:	490,857	7,626,482	Aug.13, 2017
Photo 139:	491,536	7,626,891	Aug.13, 2017

Table 4-8: Summary Table of Photographic Log – East Beach Landfill (South and North)

Photo	Easting	Northing	Date
Photo 180:	491,612	7,627,348	Aug.13, 2017
Photo 181:	491,634	7,627,351	Aug.13, 2017
Photo 182:	491,626	7,627,329	Aug.13, 2017
Photo 183:	491,624	7,627,319	Aug.13, 2017
Photo 184:	491,588	7,627,298	Aug.13, 2017
Photo 185:	491,641	7,627,335	Aug.13, 2017
Photo 186:	491,605	7,627,290	Aug.13, 2017
Photo 187:	491,654	7,627,343	Aug.13, 2017
Photo 188:	491,647	7,627,356	Aug.13, 2017
Photo 189:	491,598	7,627,360	Aug.13, 2017
Photo 190:	491,583	7,627,347	Aug.13, 2017
Photo 191:	491,600	7,627,284	Aug.13, 2017
Photo 192:	491,609	7,627,280	Aug.13, 2017
Photo 193:	491,559	7,627,289	Aug.13, 2017
Photo 194:	491,579	7,627,340	Aug.13, 2017
Photo 195:	491,553	7,627,288	Aug.13, 2017
Photo 196:	491,605	7,627,284	Aug.13, 2017
Photo 197:	491,566	7,627,313	Aug.13, 2017
Photo 198:	491,558	7,627,299	Aug.13, 2017
Photo 199:	491,587	7,627,326	Aug.13, 2017
Photo 200:	491,582	7,627,353	Aug.13, 2017
Photo 201:	491,653	7,627,355	Aug.13, 2017
Photo 202:	491,592	7,627,312	Aug.13, 2017
Photo 203:	491,613	7,627,287	Aug.13, 2017
Photo 204:	491,598	7,627,282	Aug.13, 2017
Photo 205:	491,590	7,627,285	Aug.13, 2017
Photo 206:	491,561	7,627,309	Aug.13, 2017
Photo 207:	491,572	7,627,363	Aug.13, 2017
Photo 208:	491,616	7,627,350	Aug.13, 2017
Photo 209:	491,627	7,627,352	Aug.13, 2017
Photo 210:	491,664	7,627,344	Aug.13, 2017
Photo 211:	491,572	7,627,305	Aug.13, 2017
Photo 212:	491,557	7,627,292	Aug.13, 2017
Photo 213:	491,571	7,627,311	Aug.13, 2017
Photo 214:	491,612	7,627,362	Aug.13, 2017
Photo 215:	491,637	7,627,357	Aug.13, 2017
Photo 216:	491,640	7,627,327	Aug.13, 2017

4.2.3 Thermal Monitoring

Thermistor dataloggers VT-6, 7, 8 and 9 located at the East Beach Landfill South and VT-10 and 11 located at the East Beach Landfill North were downloaded using Lakewood Systems Ltd. Prolog software and a laptop computer. The ULB1 and ULB15 batteries in all the dataloggers were replaced with new lithium batteries. After replacing the batteries, all thermistor dataloggers were successfully reprogrammed for a 48-hour recording period to collect the data at noon, as requested by DND. The dead batteries were sent back to Lakewood Systems under appropriate TDG labelling and shipping.

Thermistor inspection and data downloading details were recorded on field record sheets included in Appendix B.

4.2.4 Summary of any Sampling Deviations

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

- The groundwater samples at nine wells (MW-20, MW-22, MW-23, MW-24, MW-25, MW-26, MW-27, MW-28 and MW-31) could not be collected because the groundwater in the wells was frozen.

4.2.5 Soil Sampling

Table 4-9 presents a summary of analytical results for soil samples collected at the East Beach Landfill (South and North). Groundwater flow at this landfill is considered to be radial, and therefore all sample locations are considered to be downgradient.

Table 4-9 also lists the arithmetic mean background and baseline values for the landfill, in addition to the baseline plus 3σ limit. At the East Beach Landfill (South and North), the background arithmetic mean for PCB is greater than the baseline arithmetic mean. The background arithmetic mean for PCB is also greater than the baseline mean plus 3σ, as the standard deviation of the baseline mean value was zero. Additionally, the arithmetic mean baseline and the baseline concentrations plus 3σ are the same for cadmium, chromium, cobalt and lead, which reflects the fact that baseline concentrations of these parameters were primarily at or below laboratory detection limits.

There was no arsenic or cadmium detected in any of the soil samples at the East Beach North and South landfills in 2017. With the exception MW-31 (shallow) there were no detections of PCB at any location in 2017.

East Beach North

MW-20

Sampling location MW-20 is located downgradient of the East Beach Landfill North, approximately 5 m east of the toe. The estimated elevation of this sampling point is 1.0 masl. As shown in Photograph 217, the area primarily consists of gravel and is not vegetated. The soils consisted of grey sand with gravel and stone.

For the shallow sample at MW-20 (0-15 cm), the concentrations of metals were less or similar to those reported in previous years, although decreased concentrations are notable for copper, lead and zinc. The concentration of lead (15.9 mg/kg) slightly exceeded the baseline mean concentration plus 3σ (14.0 mg/kg) but is lower than the concentrations reported in 2012 and 2014 (18.8 mg/kg and 30.0 mg/kg, respectively). No PHC were detected at this location in 2017.

For the deep sample at MW-20 (40-50 cm), most detected metal concentrations were similar to those in the shallow sample. The concentrations of most metals in the deep sample were less than or similar to those reported in previous years. It is noted the concentration of lead (14.3 mg/kg) marginally exceeded the baseline mean concentration plus 3σ (14.0 mg/kg) and represents a new historical maximum concentration. No PHC were detected at this location in 2017.

MW-21

Sampling location MW-21 is located downgradient of the East Beach Landfill South, approximately 25 m south of the toe. The estimated elevation of this sampling point is 1.5 masl. As shown in Photograph 221, the area primarily consists of gravel and is not vegetated. The soils consisted of grey sand with gravel and stone.

For the shallow sample at MW-21 (0-15 cm), the concentrations of all metals were less than or similar to those reported in previous years. The modified TPH concentration of 18 mg/kg remained below the concentration of 49 mg/kg reported in 2012; no PHC were detected in 2014. A PHC F3 fraction of 12 mg/kg and F4 fraction of 8 mg/kg were reported in 2017. None of the reported values exceeded their respective baseline mean concentrations plus 3σ.

For the deep sample at MW-21 (40-50 cm), most detected metal concentrations were similar to those in the shallow sample. The concentrations of metals were similar to those reported in previous years. The modified TPH concentration of 19 mg/kg remained below the concentration of 98 mg/kg reported in 2012; no PHC were detected in 2014. A PHC F3 fraction of 13 mg/kg and F4 fraction of 7 mg/kg were reported in 2017. None of the reported values exceeded their respective baseline mean concentrations plus 3σ.

East Beach South

MW-22

Sampling location MW-22 is located downgradient of the East Beach Landfill South, approximately 5 m southeast of the toe. The estimated elevation of this sampling point is only slightly higher than the surrounding sea level. As shown in Photograph 140, the area primarily consists of gravel and is not vegetated. The soils consisted of grey sand with gravel and stone.

For the shallow sample at MW-22 (0-15 cm), the concentrations of most metals were less than those reported in previous years, notably copper, lead and zinc where elevated concentrations were noted in 2014. No PHC were detected at this location in 2017. It is noted that modified TPH concentrations of 44 mg/kg and 90 mg/kg were reported in 2012 and 2014, respectively. None of the reported values exceeded their respective baseline mean concentrations plus 3σ.

For the deep sample at MW-22 (40-50 cm), most detected metal concentrations were similar to those in the shallow sample. The concentrations of most metals were less than those reported in previous years, notably copper, lead and zinc where elevated concentrations were noted in 2014. No PHC were detected at this location in 2017. None of the reported values exceeded their respective baseline mean concentrations plus 3σ.

MW-23

Sampling location MW-23 is located downgradient of the East Beach Landfill South, immediately southeast of the toe. The estimated elevation of this sampling point is only slightly higher than the surrounding sea level. As shown in Photograph 144, the area primarily consists of gravel and is not vegetated. The soils consisted of grey sand with gravel and stone.

For the shallow sample at MW-23 (0-15 cm, duplicate location), the concentrations of all metals were slightly less than or similar to those reported in previous years. No PHC were detected at this location in 2017. None of the reported values exceeded their respective baseline mean concentrations plus 3σ.

For the deep sample at MW-23 (40-50 cm), most detected metal concentrations were similar to those in the shallow sample, with the notable exception of lead (31.6 mg/kg), which was higher. The concentrations of metals were typically similar to those reported in previous years, with the exception of lead (higher). The concentration of lead (31.6 mg/kg) exceeded the baseline mean concentration plus 3σ (14.0 mg/kg) but remains below the historical maximum concentration reported in 2008 (90.0 mg/kg). The modified TPH concentration of 31 mg/kg remained below the concentration of 41 mg/kg reported in 2012; no PHC were detected in 2014. A PHC F3 fraction of 25 mg/kg and F4 fraction of 7 mg/kg were reported in 2017.

MW-24

Sampling location MW-24 is located downgradient of the East Beach Landfill South, immediately southeast of the toe. The estimated elevation of this sampling point is only slightly higher than the surrounding sea level. As shown in Photograph 148, the area primarily consists of gravel and is not vegetated. The soils consisted of grey sand with gravel and stone.

For the shallow sample at MW-24 (0-15 cm), the concentrations of most metals were less than or similar to those reported in previous years, with the exception of lead (66.5 mg/kg; higher); no sample was collected at this location in 2014. The concentration of lead exceeded the baseline mean concentration plus 3σ (14.0 mg/kg) and represents a new historical maximum concentration. The modified TPH concentration of 17 mg/kg remained below the concentration of 30 mg/kg reported in 2012. A PHC F3 fraction of 11 mg/kg was reported in 2017.

For the deep sample at MW-24 (40-50 cm), all detected metal concentrations were less than those in the shallow sample. Concentrations of all metals were all less than or similar to those reported in previous years. It is noted the concentration of lead (27.3 mg/kg) exceeded the baseline mean concentration plus 3σ (14.0 mg/kg) but remains below the historical maximum concentration reported in 2008 (140.0 mg/kg). The modified TPH concentration of 15 mg/kg remained below the concentration of 30 mg/kg reported in 2012. A PHC F3 fraction of 9 mg/kg was reported in 2017; no PHC were detected in 2014.

MW-25

Sampling location MW-25 is located downgradient of the East Beach Landfill South, immediately southeast of the toe. The estimated elevation of this sampling point is only slightly higher than the surrounding sea level. As shown in Photograph 152, the area primarily consists of gravel and is not vegetated. The soils consisted of grey sand with gravel and stone.

For the shallow sample at MW-25 (0-15 cm, duplicate location), the concentrations of all metals were less than or similar to those reported in previous years. The concentration of lead (83.2 mg/kg) exceeded the baseline mean concentration plus 3σ (14.0 mg/kg), but remains below the recent (2014) result and the historical maximum concentration reported in 2008 (620.0 mg/kg). No PHC were detected at this location in 2017.

For the deep sample at MW-25 (40-50 cm), most detected metal concentrations were similar to those in the shallow sample. The concentrations of metals were all less than or similar to reported in previous years. The concentration of lead (120.0 mg/kg) exceeded the baseline mean concentration plus 3σ (14.0 mg/kg) but remains below the historical maximum concentration reported in 2014 (230.0 mg/kg). No PHC were detected at this location in 2017.

MW-26

Sampling location MW-26 is located downgradient of the East Beach Landfill South, immediately southeast of the toe. The estimated elevation of this sampling point is only slightly higher than the surrounding sea level. As shown in Photograph 156, the area primarily consists of gravel and is not vegetated. The soils consisted of grey sand with gravel and stone.

For the shallow sample at MW-26 (0-15 cm), the concentrations of metals were less than those reported in previous years. No PHC were detected at this location in 2017. None of the reported values exceeded their respective baseline mean concentrations plus 3σ.

For the deep sample at MW-26 (40-50 cm), most detected metal concentrations were similar to those in the shallow sample. The concentrations of metals were less than those reported in previous years. No PHC were detected at this location in 2017. None of the reported values exceeded their respective baseline mean concentrations plus 3σ.

MW-27

Sampling location MW-27 is located downgradient of the East Beach Landfill South, approximately 5 m south of the toe. The estimated elevation of this sampling point is only slightly higher than the surrounding sea level. As shown in Photograph 160, the area primarily consists of gravel and is not vegetated. The soils consisted of grey sand with gravel and stone.

For the shallow sample at MW-27 (0-15 cm), the concentrations of all metals were less those reported in previous years. No PHC were detected at this location in 2017. None of the reported values exceeded their respective baseline mean concentrations plus 3σ.

For the deep sample at MW-27 (30-40 cm), most detected metal concentrations were slightly greater than those in the shallow sample. The concentrations of all metals were less than those reported in previous years. No PHC were detected at this location in 2017. None of the reported values exceeded their respective baseline mean concentrations plus 3σ.

MW-28

Sampling location MW-28 is located downgradient of the East Beach Landfill South, approximately 5 m south of the toe. The estimated elevation of this sampling point is only slightly higher than the surrounding sea level. As shown in Photograph 164, the area primarily consists of gravel and is not vegetated. The soils consisted of grey sand with gravel and stone.

For the shallow sample at MW-28 (0-15 cm), the concentrations of all metals were less than those reported in previous years. No PHC were detected at this location in 2017. It is noted a PCB concentration of 0.5 mg/kg was reported in 2014; however, no PCB was detected in 2017. None of the reported values exceeded their respective baseline mean concentrations plus 3σ.

For the deep sample at MW-28 (40-50 cm), most detected metal concentrations were slightly greater than those in the shallow sample. The concentrations of all metals were similar to those reported in previous years. No PHC were detected at this location in 2017. None of the reported values exceeded their respective baseline mean concentrations plus 3σ.

MW-29

Sampling location MW-29 is located downgradient of the East Beach Landfill South, approximately 5 m northwest of the toe. The estimated elevation of this sampling point is only slightly higher than the surrounding sea level. As shown in Photograph 168, the area primarily consists of gravel and is not vegetated. The soils consisted of grey sand with gravel and stone. Seepage into the hole commenced shortly after it was excavated.

For the shallow sample at MW-29 (0-15 cm), the concentrations of all metals were less than or similar to those reported in previous years. No arsenic, cadmium, PHC or PCB were detected at this location in 2017. None of the reported values exceeded their respective baseline mean concentrations plus 3σ.

For the deep sample at MW-29 (40-50 cm), most detected metal concentrations were similar to those in the shallow sample. The concentrations of all metals were less than or similar to those reported in previous years. No PHC were detected at this location in 2017. None of the reported values exceeded their respective baseline mean concentrations plus 3σ.

MW-30

Sampling location MW-30 is located downgradient of the East Beach Landfill South, approximately 5 m northwest of the toe. The estimated elevation of this sampling point is only slightly higher than the surrounding sea level. As shown in Photograph 172, the area primarily consists of gravel and is sparsely vegetated. The soils consisted of grey sand with gravel and stone. Seepage into the hole commenced shortly after it was excavated.

For the shallow sample at MW-30 (0-15 cm), the concentrations of most metals were below those reported in 2012 and 2014, notably copper, lead, nickel and zinc. No PHC were detected at this location in 2017. It is noted that modified TPH concentrations of 1,128 mg/kg and 25 mg/kg were reported in 2012 and 2014, respectively. None of the reported values exceeded their respective baseline mean concentrations plus 3σ.

For the deep sample at MW-30 (40-50 cm), most detected metal concentrations were similar to those in the shallow sample. The concentrations of most metals were slightly below those reported in 2014. The modified TPH concentration of 119 mg/kg represents a new historical maximum. PHC F2 (11 mg/kg), F3 (104 mg/kg) and F4 fraction (36 mg/kg) were reported in 2017. It is noted that these concentrations are similar to those observed in 2012 and less than those observed historically in the shallow sampling location. None of the reported values exceeded their respective baseline mean concentrations plus 3σ.

MW-31

Sampling location MW-31 is located downgradient of the East Beach Landfill South, approximately 5 m northwest of the toe. The estimated elevation of this sampling point is 0 masl. As shown in Photograph 176, the area primarily consists of gravel and is not vegetated. The soils consisted of grey sand with gravel and stone.

For the shallow sample at MW-31 (0-15 cm), the concentrations of metals were less than those reported in previous years. The lead concentration of 14.7 mg/kg exceeded the baseline concentration plus 3σ (14.0 mg/kg) but remains below the historical maximum of 21.0 mg/kg reported in 2014. No PHC were detected at this location in 2017. It is noted that the PCB concentration of 0.13 mg/kg exceeded the baseline concentration plus 3σ (0.10 mg/kg) but remains below the historical maximum of 0.28 mg/kg reported in 2011.

For the deep sample at MW-31 (40-50 cm), most detected metal concentrations were similar to those in the shallow sample. The concentrations of positively detected metals were less than or similar to those reported in previous years. The lead concentration of 14.1 mg/kg marginally exceeded the baseline concentration plus 3σ (14.0 mg/kg) but remains below the historical maximum of 20.0 mg/kg reported in 2014. No PHC were detected at this location in 2017.

Table 4-9: Soil Chemical Analysis Results – East Beach Landfill (North and South)

ID	Depth (cm)	As (mg/kg)	Cd (mg/kg)	Cr (mg/kg)	Co (mg/kg)	Cu (mg/kg)	Pb (mg/kg)	Ni (mg/kg	Zn (mg/kg)	Total PCB (mg/kg)	F1 (mg/kg)	F2 (mg/kg)	F3 (mg/kg)	F4 (mg/kg)
Background Mean		1.00	1.00	20.0	5.00	6.33	10.00	5.00	15.00	0.213	NA	NA	NA	NA
Baseline Mean		**2.32**	**1.00**	**20.0**	**5.00**	**8.56**	**13.97**	**6.56**	**32.30**	**0.10**	**NA**	**NA**	**NA**	**NA**
Baseline + 3σ		8.47	1.00	20.0	5.00	42.16	13.97	12.77	217.66	0.10	NA	NA	NA	NA
Downgradient														
MW-20 Shallow	0-15	<1.0	<0.5	8.8	1.9	**27.7**	**15.9**	**9.1**	15.8	<0.05	<7	<4	<8	<6
MW-20 Deep	40-50	<1.0	<0.5	9.0	2.0	**10.2**	**14.3**	**7.6**	11.9	<0.05	<7	<4	<8	<6
MW-21 Shallow	0-15	<1.0	<0.5	6.8	1.6	4.5	9.4	6.0	8.1	<0.05	<7	<4	12	8
MW-21 Deep	40-50	<1.0	<0.5	7.0	1.6	4.3	9.8	6.0	10.5	<0.05	<7	<4	13	7
MW-22 Shallow	0-15	<1.0	<0.5	7.3	1.7	3.2	5.3	**6.9**	6.7	<0.05	<7	<4	<8	<6
MW-22 Deep	40-50	<1.0	<0.5	7.5	1.7	4.2	7.5	6.4	8.9	<0.05	<7	<4	<8	<6
MW-23 Shallow	0-15	<1.0	<0.5	9.0	2.3	7.1	8.9	7.7	10.9	<0.05	<7	<4	<8	<6
MW-923 Shallow (Duplicate)	0-15	<1.0	<0.5	10.4	2.6	**9.2**	11.4	**9.5**	13.9	<0.05	<7	<4	<8	<6
MW-23 Shallow (Dup Avg)	0-15	<1.0	<0.5	9.7	2.5	8.2	10.2	**8.6**	12.4	<0.05	<7	<4	<8	<6
MW-23 Deep	40-50	<1.0	<0.5	9.6	2.3	**11.6**	**31.6**	**8.8**	16.2	<0.05	<7	<4	25	7
MW-24 Shallow	0-15	<1.0	<0.5	8.6	2.1	**9.3**	**66.5**	**7.6**	16.4	<0.05	<7	<4	11	<6

Table 4-9: Soil Chemical Analysis Results – East Beach Landfill (North and South)

ID	Depth (cm)	As (mg/kg)	Cd (mg/kg)	Cr (mg/kg)	Co (mg/kg)	Cu (mg/kg)	Pb (mg/kg)	Ni (mg/kg	Zn (mg/kg)	Total PCB (mg/kg)	F1 (mg/kg)	F2 (mg/kg)	F3 (mg/kg)	F4 (mg/kg)
Background Mean		1.00	1.00	20.0	5.00	6.33	10.00	5.00	15.00	0.213	NA	NA	NA	NA
Baseline Mean		**2.32**	**1.00**	**20.0**	**5.00**	**8.56**	**13.97**	**6.56**	**32.30**	**0.10**	**NA**	**NA**	**NA**	**NA**
Baseline + 3σ		8.47	1.00	20.0	5.00	42.16	13.97	12.77	217.66	0.10	NA	NA	NA	NA
MW-24 Deep	40-50	<1.0	<0.5	8.2	2.0	8.4	**27.3**	6.1	16.1	<0.05	<7	<4	9	<6
MW-25 Shallow	0-15	<1.0	<0.5	7.6	1.7	5.5	**97.6**	6.5	10.8	<0.05	<7	<4	<8	<6
MW-925 Shallow (Duplicate)	0-15	<1.0	<0.5	7.9	1.7	5.4	**68.7**	**6.9**	9.8	<0.05	<7	<4	<8	<6
MW-25 Shallow (Dup Avg)	0-15	<1.0	<0.5	7.8	1.7	5.5	**83.2**	**6.7**	10.3	<0.05	<7	<4	<8	<6
MW-25 Deep	40-50	<1.0	<0.5	8.3	1.8	6.4	**120.0**	**7.3**	9.9	<0.05	<7	<4	<8	<6
MW-26 Shallow	0-15	<1.0	<0.5	6.5	1.6	2.7	5.9	6.1	5.5	<0.05	<7	<4	<8	<6
MW-26 Deep	40-50	<1.0	<0.5	6.7	1.8	5.0	7.3	5.9	7.1	<0.05	<7	<4	<8	<6
MW-27 Shallow	0-15	<1.0	<0.5	6.9	1.7	2.9	5.3	6.2	6.8	<0.05	<7	<4	<8	<6
MW-27 Deep	30-40	<1.0	<0.5	7.3	1.9	3.7	6.1	6.0	8.0	<0.05	<7	<4	<8	<6
MW-28 Shallow	0-15	<1.0	<0.5	8.8	2.0	6.3	7.2	**6.6**	8.2	<0.05	<7	<4	<8	<6
MW-28 Deep	40-50	<1.0	<0.5	9.5	2.0	**8.8**	10.9	**6.9**	8.5	<0.05	<7	<4	<8	<6
MW-29 Shallow	0-15	<1.0	<0.5	8.8	1.9	4.1	5.8	6.5	8.1	<0.05	<7	<4	<8	<6

Table 4-9: Soil Chemical Analysis Results – East Beach Landfill (North and South)

ID	Depth (cm)	As (mg/kg)	Cd (mg/kg)	Cr (mg/kg)	Co (mg/kg)	Cu (mg/kg)	Pb (mg/kg)	Ni (mg/kg	Zn (mg/kg)	Total PCB (mg/kg)	F1 (mg/kg)	F2 (mg/kg)	F3 (mg/kg)	F4 (mg/kg)
Background Mean		1.00	1.00	20.0	5.00	6.33	10.00	5.00	15.00	0.213	NA	NA	NA	NA
Baseline Mean		**2.32**	**1.00**	**20.0**	**5.00**	**8.56**	**13.97**	**6.56**	**32.30**	**0.10**	**NA**	**NA**	**NA**	**NA**
Baseline + 3σ		8.47	1.00	20.0	5.00	42.16	13.97	12.77	217.66	0.10	NA	NA	NA	NA
MW-29 Deep	40-50	<1.0	<0.5	7.5	1.5	4.4	5.6	6.2	6.9	<0.05	<7	<4	<8	<6
MW-30 Shallow	0-15	<1.0	<0.5	8.2	1.8	3.7	6.2	6.5	8.2	<0.05	<7	<4	<8	<6
MW-30 Deep	40-50	<1.0	<0.5	8.8	1.8	4.1	7.2	**7.4**	9.2	<0.05	<7	11	104	36
MW-31 Shallow	0-15	<1.0	<0.5	8.6	1.9	5.9	**14.7**	**6.8**	9.5	**0.13**	<7	<4	<8	<6
MW-31 Deep	40-50	<1.0	<0.5	7.0	1.8	7.6	**14.1**	**7.1**	8.5	<0.05	<7	<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.

Shaded Values: Results exceed the Baseline arithmetic mean plus 3σ.

4.2.6 Groundwater Sampling

Groundwater sampling and monitoring well inspection field records are included in Appendix B. Table 4-10 presents a summary of groundwater levels and analytical results for groundwater samples collected at the East Beach Landfill (South and North). The groundwater samples at MW-20, MW-22, MW-23, MW-24, MW-25, MW-26, MW-27, MW-28 and MW-31 could not be collected because the groundwater in the wells was frozen.

The sample results from 2017 did not contain any detectable arsenic, cadmium, chromium, cobalt, copper, lead or any PHC.

MW-21

The depth to groundwater measured at MW-21 in 2017 was 0.77 m below grade. No metals or PHC were detected at this location in 2017.

MW-29

The depth to groundwater measured at MW-29 (duplicate location) in 2017 was 0.31 m below grade. The concentrations of nickel and zinc, the only metals detected in 2017 at MW-29, were less than those reported in 2014. None of the reported values exceeded their respective baseline mean concentration plus 3σ.

MW-30

The depth to groundwater measured at MW-30 in 2017 was 0.06 m below grade. The concentration of zinc (0.087 mg/L), the only metal detected at MW-30 in 2017, exceeded the baseline concentration plus 3σ (0.063 mg/kg), but was less than the concentrations reported from 2011 to 2014.

Table 4-10: Monitoring Well Groundwater Levels and Groundwater Chemical Analysis Results – East Beach Landfill (South and North)

ID	GW Depth BGS (m)	As (mg/L)	Cd (mg/L)	Cr (mg/L)	Co (mg/L)	Cu (mg/L)	Pb (mg/L)	Ni (mg/L)	Zn (mg/L)	F1 (mg/L)	F2 (mg/L)	F3 (mg/L)	F4 (mg/L)
Baseline Mean		**0.0046**	**0.001**	**0.0409**	**0.003**	**0.005**	**0.010**	**0.005**	**0.0195**	**NA**	**NA**	**NA**	**NA**
Baseline + 3σ		0.0129	0.001	0.1923	0.003	0.005	0.010	0.005	0.0631	NA	NA	NA	NA
Downgradient													
MW-20[1]													
MW-21	0.77	<0.001	<0.0001	<0.001	<0.0005	<0.0005	<0.0001	<0.001	<0.005	<0.025	<0.1	<0.1	<0.1
MW-22[1]													
MW-23[1]													
MW-24[1]													
MW-25[1]													
MW-26[1]													
MW-27[1]													
MW-28[1]													
MW-29	0.31	<0.001	<0.0001	<0.001	<0.0005	<0.0005	<0.0001	0.002	0.013	<0.025	<0.1	<0.1	<0.1
MW-929 (Duplicate) (Dup Avg)	0.31	<0.001	<0.0001	<0.001	<0.0005	<0.0005	<0.0001	0.001	0.011	<0.025	<0.1	<0.1	<0.1
MW-29 (Dup Avg)	0.31	<0.001	<0.0001	<0.001	<0.0005	<0.0005	<0.0001	0.002	0.012	<0.025	<0.1	<0.1	<0.1
MW-30	0.06	<0.001	<0.0001	<0.001	<0.0005	<0.0005	<0.0001	<0.001	**0.087**	<0.025	<0.1	<0.1	<0.1
MW-31[1]													

Notes:
ID: Monitoring well location ID.
GW: Groundwater.
BGS: Below ground surface.
NA: Not available
Bold Values: Results exceed Baseline arithmetic mean.
Shaded Values: Results exceed the Baseline arithmetic mean plus 3σ.
Groundwater metals analyses were for dissolved metals.
1: The groundwater samples at MW-20, MW-22, MW-23, MW-24, MW-25, MW-26, MW-27, MW-28 and MW-31 could not be collected because the groundwater in the well was frozen.

4.2.7 Conclusions and Overall Performance of the East Beach Landfill (South and North)

Based on the visual inspection, there does not appear to be any significant erosion, settlement, exposed waste or indications of instability at the East Beach Landfill (South and North). Some minor settlement, numerous vehicle tracks, sparse vegetation and ponded water at the toe were observed. The overall stability performance of the East Beach Landfill (South and North) was assessed as Acceptable.

Groundwater flow at this landfill is considered to be radial, and therefore all sample locations are considered to be downgradient. No detectable concentrations of arsenic or cadmium were noted in any of the soil samples in 2017. At all sampling locations, the concentrations of most metals in soil were similar to values reported in previous years. The concentrations of lead slightly exceeded the baseline concentration plus 3σ in the both MW-20 samples, the deep MW-23 sample, both MW-24 samples, both MW-25 samples and both MW-31 samples. The concentrations of lead in the deep MW-20 sample and shallow MW-24 sample notably represent new historical maxima.

PHC in soil were detected in both MW-21 samples, the deep MW-23 sample, both MW-24 samples and the deep MW-30 sample at modified TPH concentrations between 15 mg/kg and 119 mg/kg. The modified TPH concentrations of 119 mg/kg at the deep sample location MW-30 represents a new historical maximum, whereas the concentrations at the remaining locations were less than those reported in previous years. It is noted that the PCB concentration at the shallow MW-31 location exceeded the baseline concentration plus 3σ, but remains below the historical maximum reported in 2011.

In 2017, groundwater samples were collected from three out of twelve monitoring wells adjacent to the landfill. The groundwater samples at MW-20, MW-22, MW-23, MW-24, MW-25, MW-26, MW-27, MW-28 and MW-31 could not be collected because the groundwater in the wells was frozen. At all locations where groundwater was sampled, the concentrations of the metals detected in the groundwater samples were less than recent years. The concentration of zinc at MW-30 exceeded the baseline concentration plus 3σ but was less than the concentrations reported from 2011 to 2014. No detectable concentrations of arsenic, cadmium, chromium, cobalt, copper, lead or PHC were noted in any of the groundwater samples in 2017. It is noted that the groundwater samples collected in 2017 were filtered in the lab, and therefore the results represent dissolved metals instead of total metals. An overall trend comparison on the impact of results based on total versus dissolved metals will be prepared in 2018.

The historical graphs in Appendix C illustrate concentration trends in the soil samples collected at the East Beach Landfill. The graphs indicate that relatively stable or slight decreasing trends are observed for most parameters at downgradient monitoring locations; notable decreasing trends were observed for chromium and cobalt. A slight decreasing trend is also observed for the modified TPH results, with the exception of the deep MW-30 location where a historical maximum was reported. It is noted that these concentrations are similar to those observed in 2012 and less than those observed historically in the shallow sampling location.

Elevated concentrations of lead are reported at a number of the wells at this landfill; however, the historical data indicate variably elevated lead concentrations, which in some cases extend to the initial sample collection in 2008. Trends of lead should be reviewed in future to determine if any actions are warranted. No modifications to the ongoing monitoring program at this landfill are recommended.

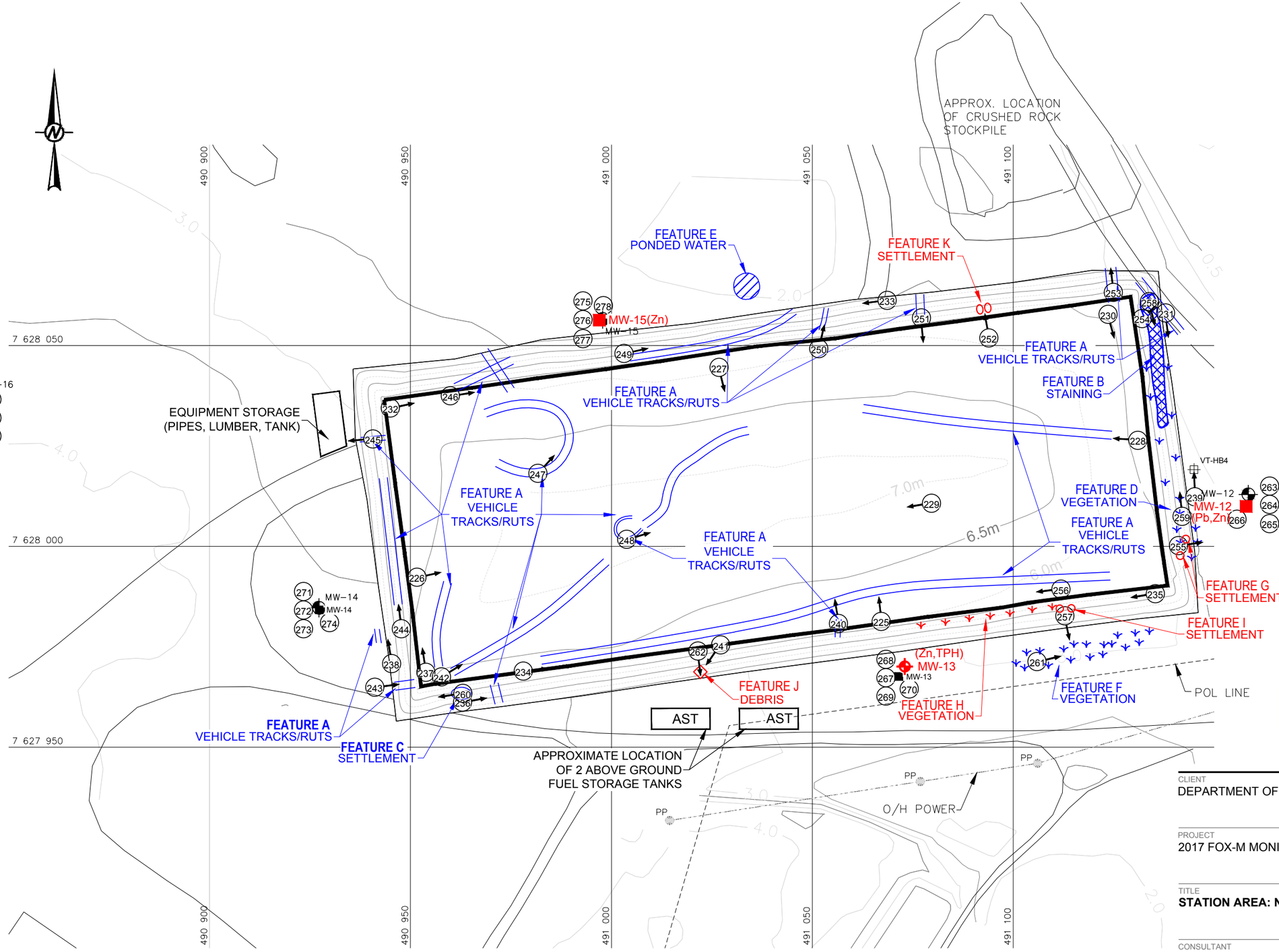
4.2.8 Recommendations for East Beach Landfill (South and North)

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

4.3 Station Area Non-Hazardous Waste Landfill (NHWL)

4.3.1 Landfill Description

The Station Area Non-Hazardous Waste Landfill is located northeast of the LRR station buildings. The landfill was constructed for the disposal of non-hazardous waste derived from site cleanup. It is rectangular, measuring 200 m x 90 m, toe to toe (18,000 m^2), and very slightly crowned. It is about 4 metres above surrounding grade. The landfill design included the construction of compacted perimeter berms, and the placement of a cover of compacted granular fill over the landfilled material. Five groundwater monitoring wells were installed around the landfill perimeter. In addition, a background thermistor was installed east of the landfill toe to collect ground temperature information for climate change studies. The long-term monitoring plan consists of visual inspection and collection of soil and groundwater samples. Approximate soil and groundwater sampling locations for the Station Area Non-Hazardous Waste Landfill (NHWL) are provided in Figure FOX-M.5.



LEGEND:

- MONITORING WELL LOCATION
- MONITORING WELL LOCATION WITH EXCEEDANCE OF BASELINE MEAN PLUS 3σ
- VERTICAL THEMISTOR LOCATION
- SOIL SAMPLING LOCATION
- SOIL SAMPLING LOCATION WITH EXCEEDANCE OF BASELINE MEAN PLUS 3σ
- PHOTOGRAPH VIEWPOINT LOCATION
- CONTOURS IN 0.5m INTERVALS
- VEHICLE TRACKS/RUTS
- NATURAL STAINING
- VEGETATION
- AREA OF SETTLEMENT
- DEBRIS
- PONDED WATER

NOTES:

1. *LOCATIONS AND SCALE OF FEATURES ARE APPROXIMATE AND SHOWN FOR ILLUSTRATIVE PURPOSES ONLY.*
2. ALL COORDINATES ARE REFERENCED TO NAD83 (CSRS), UTM ZONE 17N.
3. FEATURES DRAWN IN RED ARE EITHER NEW OR EXPANDED.

REFERENCE:

PREVIOUS INSPECTION FIGURE PROVIDED BY SENES CONSULTS. PROJECT NO. 350600(-1515-1), DATED FEB.20, 2015.

0 25 50
1:1,000 METRES

CLIENT
DEPARTMENT OF NATIONAL DEFENCE CANADA

PROJECT
2017 FOX-M MONITORING REPORT

TITLE
STATION AREA: NON-HAZARDOUS WASTE LANDFILL

CONSULTANT
GOLDER

YYYY-MM-DD	2018-01-10
DESIGNED	RM
PREPARED	TDR
REVIEWED	DCJ
APPROVED	DP

PROJECT NO.	PHASE	REV.	FIGURE
1530908	3000	A	FOX-M.5

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

25 mm

Path: \\golder.gds\gal\Mississauga\SIM\Clients\Public_Works_Canada\Canada\09_PRO\J\1530908_PWGSC_Dew_Line_Mon_Program_2015_2018\40_PROD\0012_Fox_M_Field_Summary_Report_2017\ | File Name: 1530907-0012-BG-0005.dwg | Last Edited By: trose Date: 2018-03-12 Time:6:16:07 PM | Printed By: trose Date: 2018-03-26 Time:2:34:32 PM

4.3.2 Visual Inspection

The Station Area Non-Hazardous Waste Landfill has some observed minor settlement, vehicle tracks, sparse vegetation, ponded water and staining features. 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 as all observed features were assessed as “Acceptable.” Table 4-13 is a log of photographs taken during the 2017 visual inspection.

The extent of vehicle tracks (Feature A) on the cover surface and slopes has increased slightly since the last inspection; however, they are not deteriorating or impacting landfill stability. A previously observed settlement area on the south slope (Feature C) was unchanged. Three new minor settlement areas (new Features G, I and K) were observed on the east, south, and north slopes in 2017. Previously observed ponded water at the north toe (Feature E) was observed to be unchanged in 2017. The extent of previously observed sparse vegetation (Features D and F) was observed to have increased slightly in area. Some new sparse vegetation (new Feature H) was also observed on the south slope. These observed features do not appear to be impacting the stability of the Non-Hazardous Waste Landfill. Previously reported staining on the east slope (Feature B) appears to be naturally darker aggregate rather than staining related to environmental performance of the landfill. A piece of metal wire (new Feature J) was observed at the south crest edge of the landfill, which may be waste that was not sufficiently buried since there is no associated erosion or sloughing.

Table 4-11: Visual Inspection Checklist – Non-Hazardous Waste Landfill (NHWL)

SITE NAME: FOX-M Hall Beach
LANDFILL DESIGNATION: Non-Hazardous Waste Landfill (NHWL)
DATE OF INSPECTION: August 14, 2017
DATE OF PREVIOUS INSPECTION: August 14, 2014
INSPECTED BY: Reza Moghaddam
REPORT PREPARED BY: Reza Moghaddam
MONITORING EVENT NUMBER: 7
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 4-11: Visual Inspection Checklist – Non-Hazardous Waste Landfill (NHWL)

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	South slope	490,963	7,627,963	0.5	0.5	0.05	0.001%	Small depression (Acceptable)	Unchanged since previous inspection	260
	Y	G	East slope	491,141	7,628,000	0.3	0.3	0.3	<0.001%	Two small depressions (Acceptable)	New	255
	Y	I	South slope	491,113	7,627,983	0.5	0.5	0.3	0.001%	Two small depressions (Acceptable)	New	257
	Y	K	North slope	491,221	7,628,199	2	0.5	0.2	0.005%	Two small depressions (Acceptable)	New	252
Erosion	N	-	-	-	-	-	-	-	-	-	-	-
Lateral Movement	N	-	-	-	-	-	-	-	-	-	-	-
Frost Action	N	-	-	-	-	-	-	-	-	-	-	-
Sloughing	N	-	-	-	-	-	-	-	-	-	-	-
Cracking	N	-	-	-	-	-	-	-	-	-	-	-
Animal Burrows	N	-	-	-	-	-	-	-	-	-	-	-
Vegetation	Y	D	East slope	491,142	7,628,007	50	3	-	0.84%	Sparse vegetation (Acceptable)	Slightly expanded area	259
	Y	F	South toe	491,106	7,627,971	30	3	-	0.5%	Sparse vegetation (Acceptable)	Slightly expanded area	261
	Y	H	South slope	491,122	7,627,988	40	1	-	0.225%	Sparse vegetation (Acceptable)	New	256

Table 4-11: Visual Inspection Checklist – Non-Hazardous Waste Landfill (NHWL)

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
Staining	Y	B	East slope	491,134	7,628,061	30	1	-	0.113%	Darker aggregate previously reported as staining (Acceptable)	Unchanged since previous inspection	258
Vegetation Stress	N	-	-	-	-	-	-	-	-	-	-	-
Seepage or Ponded Water	Y	E	North toe	491,069	7,628,061	5	5	0.3	0.141%	Ponded water (Acceptable)	Unchanged since previous inspection	233
Debris and/or Liner Exposed	Y	J	South crest edge	491,022	7,627,974	1	-	-	<0.01%	Waste metal wire (Acceptable)	New	261
Presence / Condition of Monitoring Instruments	Y	-	VT-HB4 and MW-12, 13, 14, 15, 16	-	-	-	-	-	-	Wells and thermistors intact (see Appendix B for details)	-	239, 266, 270, 274, 278, 282
Features of Note / Other Observations	Y	A	Cover surface and slopes	491,004	7,628,002	350	2	-	3.94%	Vehicle tracks (Acceptable)	Slightly expanded area	240-254

Landfill Area = 17,767 m^2.

Table 4-12: Preliminary Stability Assessment – Non-Hazardous Waste Landfill (NHWL)

Feature	Severity Rating	Extent
Settlement	Acceptable	Occasional
Erosion	Not Observed	-
Lateral Movement	Not Observed	-
Frost Action	Not Observed	-
Sloughing	Not Observed	-
Cracking	Not Observed	-
Animal Burrows	Not Observed	-
Vegetation establishment	Acceptable	Occasional
Staining	Acceptable	Isolated
Vegetation Stress	Not Observed	-
Seepage/Ponded Water	Acceptable	Isolated
Debris and/or liner exposure	Acceptable	Isolated
Other	Acceptable	Numerous
Overall Landfill Performance	**Acceptable**	

Table 4-13: Summary Table of Photographic Log – Non-Hazardous Waste Landfill (NHWL)

Photo	Easting	Northing	Date
Photo 225:	491,067	7,627,981	Aug.14,2017
Photo 226:	490,952	7,627,992	Aug.14,2017
Photo 227:	491,027	7,628,045	Aug.14,2017
Photo 228:	491,131	7,628,026	Aug.14,2017
Photo 229:	491,080	7,628,011	Aug.14,2017
Photo 230:	491,124	7,628,058	Aug.14,2017
Photo 231:	491,138	7,628,058	Aug.14,2017
Photo 232:	490,945	7,628,034	Aug.14,2017
Photo 233:	491,069	7,628,061	Aug.14,2017
Photo 234:	490,978	7,627,969	Aug.14,2017
Photo 235:	491,135	7,627,988	Aug.14,2017
Photo 236:	490,963	7,627,961	Aug.14,2017
Photo 237:	490,954	7,627,969	Aug.14,2017
Photo 238:	490,945	7,627,971	Aug.14,2017
Photo 239:	491,069	7,628,225	Aug.14,2017
Photo 240:	491,057	7,627,981	Aug.14,2017
Photo 241:	491,027	7,627,976	Aug.14,2017
Photo 242:	490,958	7,627,968	Aug.14,2017
Photo 243:	490,941	7,627,965	Aug.14,2017
Photo 244:	490,942	7,627,977	Aug.14,2017

Table 4-13: Summary Table of Photographic Log – Non-Hazardous Waste Landfill (NHWL)

Photo	Easting	Northing	Date
Photo 245:	490,941	7,628,027	Aug.14,2017
Photo 246:	490,960	7,628,038	Aug.14,2017
Photo 247:	490,982	7,628,018	Aug.14,2017
Photo 248:	491,004	7,628,002	Aug.14,2017
Photo 249:	491,003	7,628,048	Aug.14,2017
Photo 250:	491,052	7,628,049	Aug.14,2017
Photo 251:	491,077	7,628,057	Aug.14,2017
Photo 252:	491,221	7,628,199	Aug.14,2017
Photo 253:	491,125	7,628,063	Aug.14,2017
Photo 254:	491,132	7,628,057	Aug.14,2017
Photo 255:	491,141	7,628,000	Aug.14,2017
Photo 256:	491,122	7,627,988	Aug.14,2017
Photo 257:	491,113	7,627,983	Aug.14,2017
Photo 258:	491,134	7,628,061	Aug.14,2017
Photo 259:	491,142	7,628,007	Aug.14,2017
Photo 260:	490,963	7,627,963	Aug.14,2017
Photo 261:	491,106	7,627,971	Aug.14,2017
Photo 262:	491,022	7,627,974	Aug.14,2017
Photo 263:	491,158	7,628,009	Aug.14,2017
Photo 264:	491,158	7,628,009	Aug.14,2017
Photo 265:	491,158	7,628,009	Aug.14,2017
Photo 266:	491,158	7,628,010	Aug.14,2017

4.3.3 Thermal Monitoring

Thermistor datalogger VT-HB4 located at the east toe of the Non-Hazardous Waste Landfill was downloaded using Lakewood Systems Ltd. Prolog software and a laptop computer. The ULB1 and ULB15 batteries in the datalogger was replaced with new lithium batteries. After replacing the batteries, the thermistor datalogger was successfully reprogrammed for a 48-hour recording period and to collect the data at noon, as requested by DND. The dead batteries were sent back to Lakewood Systems under appropriate TDG labelling and shipping.

Thermistor inspection and data downloading details were recorded on field record sheets included in Appendix B.

4.3.4 Summary of any Sampling Deviations

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

- The groundwater samples at MW-12, MW-14 and MW-16 could not be collected because the groundwater in the wells was frozen.

4.3.5 Soil Sampling

Table 4-14 presents a summary of analytical results for soil samples collected at the Non-Hazardous Waste Landfill. MW-16 represents an upgradient sampling location, whereas MW-12, MW-13, MW-14 and MW-15 represent downgradient sampling locations.

Table 4-14 also lists the arithmetic mean background and baseline values for the landfill, in addition to the baseline plus three-sigma (baseline plus 3σ) limit. At the Non-Hazardous Waste Landfill, the background arithmetic mean for copper and PCB are greater than the baseline arithmetic mean. The background arithmetic mean for PCB is also greater than the baseline mean plus 3σ, as the standard deviation of the baseline mean value was zero. Additionally, the arithmetic mean baseline and the baseline concentrations plus 3σ are the same for cadmium, chromium, cobalt and zinc, which reflects the fact that baseline concentrations of these parameters were primarily at or below laboratory detection limits.

There was no arsenic or cadmium detected in any of the soil samples at the Non-Hazardous Waste landfill in 2017. There were no detections of PCB at any location surrounding this landfill in 2017.

MW-16

Sampling location MW-16 is located upgradient of the landfill, approximately 90 m west of the toe. The estimated elevation of this sampling point is 4 masl. As shown in Photograph 279, the area primarily consists of gravel and is not vegetated. The soils consisted of grey sand with gravel and stone.

For the shallow sample at MW-16 (0-15 cm), the concentrations of most metals similar to those reported in previous years. The concentration of zinc (18.8 mg/kg) decreased notably since 2014 but remained above the baseline concentration plus 3σ (15.0 mg/kg), albeit below the historical maximum of 42.0 mg/kg reported in 2012. It is noted that the modified TPH concentration of 81 mg/kg was similar to those reported in previous years. The PHC F3 Fraction of 75 mg/kg and F4 fraction of 22 mg/kg were reported in 2017.

For the deep sample at MW-16 (40-50 cm), detected metal concentrations were less than those in the shallow sample. The concentrations of metals were typically less than or similar to those reported in previous years. It is noted that the modified TPH concentration of 35 mg/kg was similar to the concentration reported in 2012 (44 mg/kg); no PHC were detected in 2014. The PHC F3 Fraction (30 mg/kg) and PHC F4 fraction of 6 mg/kg were reported in 2017.

MW-12

Sampling location MW-12 is located downgradient of the landfill, approximately 15 m east of the toe. The estimated elevation of this sampling point is 2 masl. As shown in Photograph 263, the area primarily consists of gravel and is not vegetated. The soils consisted of grey sand with gravel and stone.

For the shallow sample at MW-12 (0-15 cm), the concentrations of most metals were similar to those reported in previous years. The lead concentration of 96.7 mg/kg exceeded the baseline concentration plus 3σ (82.7 mg/kg) and represents a new historical maximum. The zinc concentration of 17.9 mg/kg exceeded the baseline concentration plus 3σ (15.0 mg/kg) but remains below the historical maximum of 23.0 mg/kg reported in 2012. It is noted that the modified TPH concentration of 76 mg/kg represents a new historical maximum concentration; a concentration of 71 mg/kg was reported in 2012 and no PHC were detected in 2014, but both the F2 and F3 fractions are present in 2017. No arsenic, cadmium or PCB were detected at this location in 2017.

For the deep sample at MW-12 (30-40 cm), detected metal concentrations were similar to those in the shallow sample. The concentrations of most metals were slightly less than or similar to those reported in previous years, with the exception of lead, the concentration of which (63.4 mg/kg) represents a new historical maximum. It is noted that the modified TPH concentration of 192 mg/kg represents a new historical maximum concentration; concentrations of 40 mg/kg and 139 mg/kg were reported in 2012 and 2014, respectively. Both F2 (169 mg/kg) and F3 (19 mg/kg) fractions are noted in 2017. No arsenic, cadmium or PCB were detected at this location in 2017. None of the reported values exceeded their respective baseline mean concentrations plus 3σ.

MW-13

Sampling location MW-13 is located downgradient of the landfill, approximately 5 m south of the toe. The estimated elevation of this sampling point is 3.0 masl. As shown in Photograph 267, the area primarily consists of gravel and is sparsely vegetated. The soils consisted of grey sand with gravel and stone. A hydrocarbon odour was noted in the deep soils excavated from this location. The presence of hydrocarbons at this location is associated with the active operation of the North Warning System site and its associated fuel tanks and is not related to the landfill.

For the shallow sample at MW-13 (0-15 cm), the concentrations of metals were less than or similar to those reported in previous years. No PHC were detected at this location in 2017. It is noted that the modified TPH concentrations of 42 mg/kg and 64 mg/kg were reported in 2012 and 2014. None of the reported values exceeded their respective baseline mean concentrations plus 3σ.

For the deep sample at MW-13 (40-50 cm), detected metal concentrations were similar to those in the shallow sample. The concentrations of most metals were similar, to those reported in previous years. It is noted that the modified TPH concentration of 66 mg/kg was less than the concentration of 766 mg/kg reported in 2014 but slightly greater than the concentration of 36 mg/kg reported in 2012. Both F2 (47 mg/kg) and F3 (15 mg/kg) fractions are noted in 2017 and a hydrocarbon odour was detected from this sample in the field. None of the reported values exceeded their respective baseline mean concentrations plus 3σ.

MW-14

Sampling location MW-14 is located downgradient of the landfill, approximately 15 m west of the toe. The estimated elevation of this sampling point is 3.5 masl. As shown in Photograph 271, the area primarily consists of gravel and is not vegetated. The soils consisted of grey sand with gravel and stone.

For the shallow sample at MW-14 (0-15 cm), the concentrations of all metals were less than or similar to those reported in previous years. It is noted that the modified TPH concentration of 66 mg/kg was greater than the concentrations reported in recent years but remains below the historical maximum reported in 2008 (94 mg/kg). Both F3 (60 mg/kg) and F4 (27 mg/kg) fractions are noted in 2017. None of the reported values exceeded their respective baseline mean concentrations plus 3σ.

For the deep sample at MW-14 (40-50 cm, duplicate location), detected metal concentrations were slightly less than those in the shallow sample, notably lead. The concentrations of all metals, with the exception of a slight increase in lead, were less than or similar to those reported in previous years. No PHC were detected at this location in 2017. None of the reported values exceeded their respective baseline mean concentrations plus 3σ.

MW-15

Sampling location MW-15 is located downgradient of the landfill, approximately 5 m north of the toe. The estimated elevation of this sampling point is 2.5 masl. As shown in Photograph 275, the area primarily consists of gravel and is sparsely vegetated. The soils consisted of grey sand with gravel and stone.

For the shallow sample at MW-15 (0-15 cm), the concentrations of all metals were similar to those reported in previous years. No PHC were detected at this location in 2017. None of the reported values exceeded their respective baseline mean concentrations plus 3σ.

For the deep sample at MW-15 (30-40 cm), most detected metal concentrations were similar to those in the shallow sample, with the exception of lead, which was higher. The concentrations of copper and notably lead represent new historical maxima. The zinc concentration of 16.3 mg/kg exceeded the baseline concentration plus 3σ (15.0 mg/kg) but remains below the historical maximum concentration of 43.0 mg/kg reported in 2008. It is noted that the modified TPH concentration of 29 mg/kg was well below the historical maximum concentration of 306 mg/kg reported in 2014. Both F2 (23 mg/kg) and F3 (12 mg/kg) fractions are noted in 2017.

Table 4-14: Soil Chemical Analysis Results - Non-Hazardous Waste Landfill (NHWL)

ID	Depth (cm)	As (mg/kg)	Cd (mg/kg)	Cr (mg/kg)	Co (mg/kg)	Cu (mg/kg)	Pb (mg/kg)	Ni (mg/kg	Zn (mg/kg)	Total PCB (mg/kg)	F1 (mg/kg)	F2 (mg/kg)	F3 (mg/kg)	F4 (mg/kg)
Background Mean		1.00	1.00	20.0	5.00	6.33	10.00	5.00	15.00	0.213	NA	NA	NA	NA
Baseline Mean		**2.05**	**1.00**	**20.0**	**5.00**	**5.15**	**18.41**	**5.00**	**15.00**	**0.003**	**NA**	**NA**	**NA**	**NA**
Baseline + 3σ		3.93	1.00	20.0	5.00	13.67	82.70	11.21	15.00	0.003	NA	NA	NA	NA
Upgradient														
MW-16 Shallow	0-15	<1.0	<0.5	12.2	2.0	**6.0**	**82.1**	**6.9**	**18.8**	<0.05	<7	<4	75	22
MW-16 Deep	40-50	<1.0	<0.5	6.9	1.4	2.9	**20.9**	4.5	9.5	<0.05	<7	<4	30	6
Downgradient														
MW-12 Shallow	0-15	<1.0	<0.5	9.7	1.8	**5.7**	**96.7**	**7.1**	**17.9**	<0.05	<7	48	25	<6
MW-12 Deep	30-40	<1.0	<0.5	9.5	2.0	4.2	**63.4**	**6.8**	12.5	<0.05	<7	169	19	<6
MW-13 Shallow	0-15	<1.0	<0.5	12.2	2.2	4.8	**28.2**	**8.8**	11.6	<0.05	<7	<4	<8	<6
MW-13 Deep	40-50	<1.0	<0.5	10.7	2.0	4.4	**28.3**	**7.8**	10.0	<0.05	<7	47	15	<6
MW-14 Shallow	0-15	<1.0	<0.5	8.9	1.9	5.0	**21.7**	**6.8**	12.1	<0.05	<7	<4	60	27
MW-14 Deep	40-50	<1.0	<0.5	8.2	1.7	3.3	10.7	**6.3**	7.9	<0.05	<7	<4	<8	<6
MW-914 Deep (Duplicate)	40-50	<1.0	<0.5	5.8	1.3	2.3	6.4	4.8	4.6	<0.05	<7	<4	<8	<6
MW-14 Deep (Dup Avg)	40-50	<1.0	<0.5	7.0	1.5	2.8	8.6	**5.6**	6.3	<0.05	<7	<4	<8	<6

Table 4-14: Soil Chemical Analysis Results - Non-Hazardous Waste Landfill (NHWL)

ID	Depth (cm)	As (mg/kg)	Cd (mg/kg)	Cr (mg/kg)	Co (mg/kg)	Cu (mg/kg)	Pb (mg/kg)	Ni (mg/kg	Zn (mg/kg)	Total PCB (mg/kg)	F1 (mg/kg)	F2 (mg/kg)	F3 (mg/kg)	F4 (mg/kg)
Background Mean		1.00	1.00	20.0	5.00	6.33	10.00	5.00	15.00	0.213	NA	NA	NA	NA
Baseline Mean		**2.05**	**1.00**	**20.0**	**5.00**	**5.15**	**18.41**	**5.00**	**15.00**	**0.003**	**NA**	**NA**	**NA**	**NA**
Baseline + 3σ		3.93	1.00	20.0	5.00	13.67	82.70	11.21	15.00	0.003	NA	NA	NA	NA
MW-15 Shallow	0-15	<1.0	<0.5	9.1	2.0	4.7	18.3	**7.4**	12.2	<0.05	<7	<4	<8	<6
MW-15 Deep	30-40	<1.0	<0.5	9.8	2.1	**6.1**	**44.8**	**7.2**	**16.3**	<0.05	<7	<4	23	12

Notes:
NA: Not available
Underlined values: Results exceed Background arithmetic mean.
Bold Values: Results exceed Baseline arithmetic mean.
Shaded Values: Results exceed the Baseline arithmetic mean plus 3σ.

4.3.6 Groundwater Sampling

Groundwater sampling and monitoring well inspection field records are included in Appendix B. Table 4-15 presents a summary of groundwater levels and analytical results for groundwater samples collected at the Non-Hazardous Waste Landfill. The groundwater samples at MW-12, MW-14 and MW-16 could not be collected because the groundwater in the wells was frozen.

The sample results from 2017 did not contain any detectable arsenic, cadmium, chromium, cobalt or copper. Additionally, the arithmetic mean baseline and the baseline concentrations plus 3σ are the same for arsenic, cadmium, cobalt, copper, lead and zinc, which reflects the fact that baseline concentrations of these parameters were primarily at or below laboratory detection limits.

MW-13

The depth to groundwater measured at MW-13 in 2017 was 0.38 m below grade. A strong hydrocarbon odour and sheen were noted at this location, but no free product was detected. The presence of hydrocarbons at this location is associated with the active operation of the North Warning System site and its associated fuel tanks and is not related to the landfill. Lead, nickel and zinc were the only metals detected at this location; the concentration of zinc (0.009 mg/L) marginally exceeded the baseline mean concentration plus 3σ (0.0085 mg/L). The zinc concentration remains below the historical maximum of 0.039 mg/L reported in 2008. It is noted that although the modified TPH concentration of 1.07 mg/L exceeded the baseline mean concentration plus 3σ (1.03 mg/L), it was well below the historical maximum concentration of 3.00 mg/L reported in 2012.

MW-15

The depth to groundwater measured at MW-15 in 2017 was 0.28 m below grade. The concentrations of nickel and zinc, the only metals detected in 2017, were similar to those reported in recent years. No PHC were detected at this location in 2017. None of the reported values exceeded their respective baseline mean concentration plus 3σ.

Table 4-15: Monitoring Well Groundwater Levels and Groundwater Chemical Analysis Results – Non-Hazardous Waste Landfill

ID	GW Depth BGS (m)	As (mg/L)	Cd (mg/L)	Cr (mg/L)	Co (mg/L)	Cu (mg/L)	Pb (mg/L)	Ni (mg/L)	Zn (mg/L)	F1 (mg/L)	F2 (mg/L)	F3 (mg/L)	F4 (mg/L)
Baseline Mean		**0.003**	**0.001**	**0.011**	**0.003**	**0.0064**	**0.010**	**0.0081**	**0.0085**	**NA**	**NA**	**NA**	**NA**
Baseline + 3σ		0.003	0.001	0.0336	0.003	0.0064	0.010	0.0225	0.0085	NA	NA	NA	NA
Upgradient													
MW-16[1]													
Downgradient													
MW-12[1]													
MW-13	0.38	<0.001	<0.0001	<0.001	<0.0005	<0.0005	0.0002	0.003	**0.009**	0.319	0.7	<0.1	<0.1
MW-14[1]													
MW-15	0.28	<0.001	<0.0001	<0.001	<0.0005	<0.0005	<0.0001	0.002	0.007	<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.
Shaded Values: Results exceed the Baseline arithmetic mean plus 3σ.
Groundwater metals analyses were for dissolved metals.
1: The groundwater samples at MW-12, MW-14 and MW-16 could not be collected because the groundwater in the well was frozen.

4.3.7 Conclusions and Overall Performance of the Non-Hazardous Waste Landfill (NHWL)

Based on the visual inspection, there does not appear to be any significant erosion, settlement, exposed waste or indications of instability at the Non-Hazardous Waste Landfill. The observed metal wire may be waste that was not sufficiently buried since there is no associated erosion or sloughing but it is considered insignificant. Three new minor settlement areas and some additional sparse vegetation were observed in 2017. All other observed features were unchanged since the last inspection in 2014. The overall stability performance of the landfill was assessed as Acceptable.

No detectable concentrations of arsenic, cadmium, or PCB were noted in any of the soil samples in 2017. At all sampling locations, the concentrations of most metals were all less than or similar to reported in previous years. The concentrations of zinc in the downgradient shallow MW-12 sample, the downgradient deep MW-15 sample and the upgradient shallow MW-16 sample exceeded the baseline concentration plus 3σ but remain below the historical maximum concentrations and are similar to baseline arithmetic mean concentrations. At the shallow sample location MW-12, the lead concentration exceeded the baseline concentration plus 3σ and represents a new historical maximum.

PHC were detected in both MW-12 samples, the deep downgradient MW-13 sample, the shallow downgradient MW-14 sample, the deep MW-15 sample and both MW-16 samples at modified TPH concentrations between 29 mg/kg and 192 mg/kg. The modified TPH concentrations reported in both MW-12 samples represent new historical maxima, whereas the concentrations at the remaining locations were less than or similar to those reported in previous years. The presence of hydrocarbons at MW-13 is associated with the active operation of the North Warning System site and its associated fuel tanks and is not related to the NHWL DEW Line landfill.

In 2017, groundwater samples were collected from two out of five monitoring wells adjacent to the landfill. The groundwater samples at MW-12, MW-14 and MW-16 could not be collected because the groundwater in the wells was frozen. At both sampled locations, the concentrations of the only metals detected in the groundwater samples were similar to previous years. The concentration of zinc at MW-13 marginally exceeded the baseline mean concentration plus 3σ but remains below the historical maximum reported in 2008. PHC were detected in the groundwater sample collected at MW-13; the modified TPH concentration exceeded the baseline mean concentration plus 3σ but was well below the historical maximum concentration reported in 2012. Just as for TPH in soil, the presence of hydrocarbons at MW-13 in groundwater is associated with the North Warning System sites and not related to the NHWL DEW Line landfill. No detectable concentrations of arsenic, cadmium, chromium, cobalt or copper were noted in any of the groundwater samples in 2017. It is noted that the groundwater samples collected in 2017 were filtered in the lab, and therefore the results represent dissolved metals instead of total metals. An overall trend comparison on the impact of results based on total versus dissolved metals will be prepared in 2018.

Most of the environmental sampling results are similar to those noted for earlier years. Increasing trends in lead at MW-12 may reflect impact from the landfill; however, further results are required for confirmation.

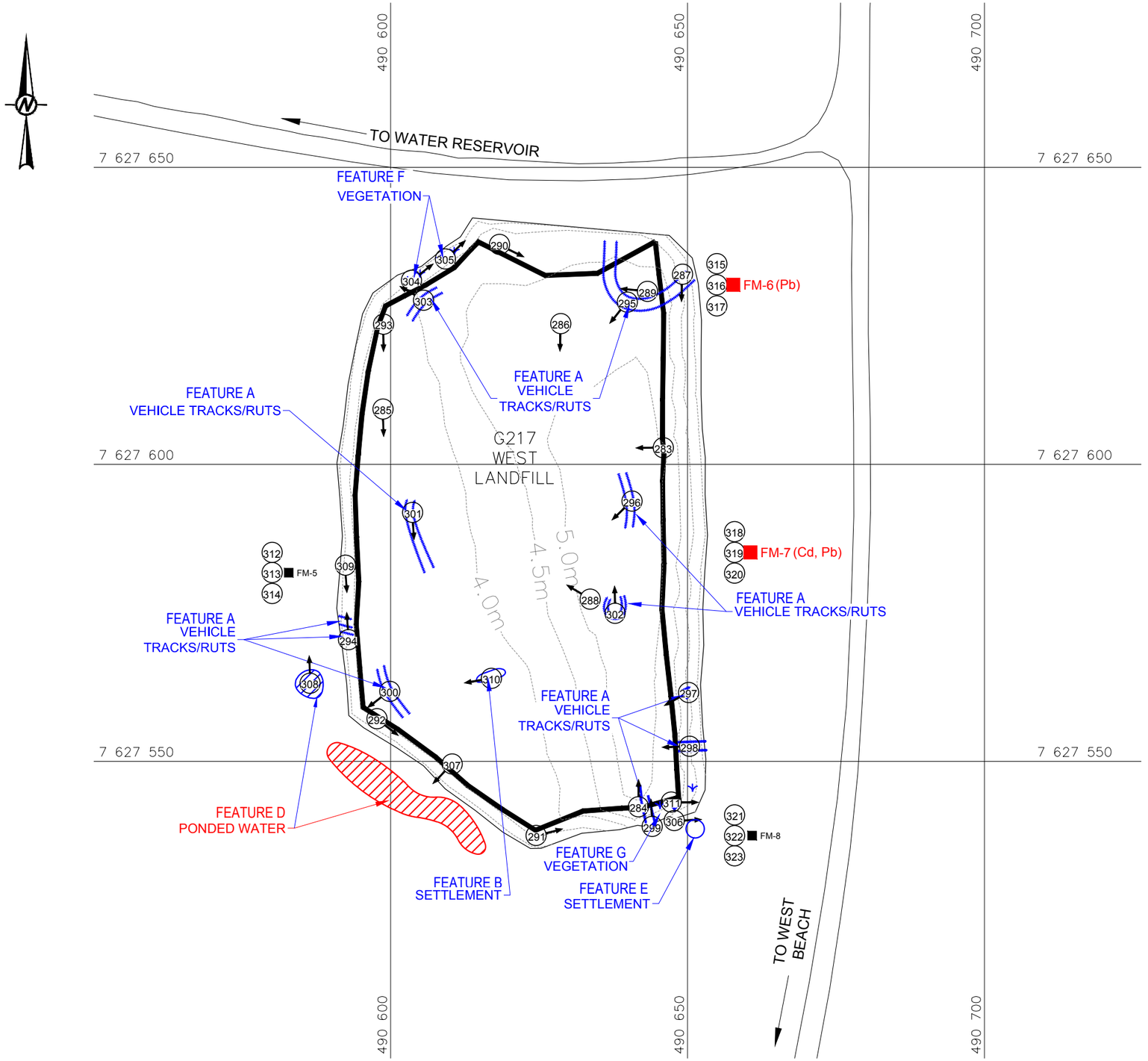
4.3.8 Recommendations for Non-Hazardous Waste Landfill (NHWL)

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

4.4 G-217 West Landfill

4.4.1 Landfill Description

The G-217 West Landfill is located approximately 200 m southwest of the main station area, southwest of the intersection of the roads to the water reservoir and to the west beach area. The landfill covers an area approximately 5,700 m^2. The surface of the landfill slopes downward to the west. Landfill remediation included collection of surface debris, regrading and placement of additional granular cover over the waste materials. The long-term monitoring plan for this landfill consists of visual inspection and the periodic collection of soil samples. Approximate soil sampling locations for G-217 West Landfill are provided in Figure FOX-M.6. There are no monitoring wells at the G-217 landfill.



LEGEND:

- SOIL SAMPLING LOCATION
- SOIL SAMPLING LOCATION WITH EXCEEDANCE OF BASELINE MEAN PLUS 3σ
- 283 PHOTOGRAPH VIEWPOINT LOCATION
- 5.0m CONTOURS IN 0.5m INTERVALS
- VEHICLE TRACKS/RUTS
- AREA OF SETTLEMENT/DEPRESSION
- PONDED WATER
- VEGETATION

NOTES:

1. *LOCATIONS AND SCALE OF FEATURES ARE APPROXIMATE AND SHOWN FOR ILLUSTRATIVE PURPOSES ONLY.*
2. ALL COORDINATES ARE REFERENCED TO NAD83 (CSRS), UTM ZONE 17N.
3. FEATURES DRAWN IN RED ARE EITHER NEW OR EXPANDED.
4. TOPOGRAPHIC CONTOURS BEYOND THE LANDFILL FOOTPRINT ARE NOT CURRENTLY AVAILABLE. THE AREA AROUND THE LANDFILL IS VERY FLAT AND CLOSE TO SEA LEVEL.

REFERENCE:

PREVIOUS INSPECTION FIGURE PROVIDED BY SENES CONSULTS. PROJECT NO. 350600(-1515-1), DATED FEB.20, 2015.

0 12.5 25
1:750 METRES

CLIENT
DEPARTMENT OF NATIONAL DEFENCE CANADA

PROJECT
2017 FOX-M MONITORING REPORT

TITLE
STATION AREA: G-217 WEST LANDFILL

CONSULTANT
GOLDER

YYYY-MM-DD	2018-01-10
DESIGNED	RM
PREPARED	TDR
REVIEWED	DCJ
APPROVED	DP

PROJECT NO.	PHASE	REV.	FIGURE
1530908	3000	A	FOX-M.6

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

Path: \\golder.gds\gal\Mississauga\SIM\Clients\Public_Works_Canada\Canada\99_PROJ\1530908_PWGSC_Dew_Line_Mon_Program_2015_2018\40_PROD\0012_Fox_M_Field_Summary_Report_2017\ | File Name: 1530907-0012-BG-0006.dwg | Last Edited By: trose Date: 2018-03-12 Time:6:19:39 PM | Printed By: trose Date: 2018-03-26 Time:2:35:54 PM

4.4.2 Visual Inspection

The G-217 West Landfill has some observed minor settlement, sparse vegetation, vehicle tracks and ponded water features. There was no observed cracking, erosion, exposed waste or indications of instability at this landfill during the 2017 visual inspection. Table 4-16 presents a summary of observed visual inspection features and Table 4-17 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." Table 4-18 is a log of photographs taken during the 2017 visual inspection.

In general, all previously observed features were unchanged since the previous inspection in 2014 except the ponded water area along the south toe (Feature D), which was slightly expanded. Previously observed areas of settlement (Features B and E), vehicle tracks (Feature A) and some sparse vegetation (Features F and G) were also observed on the slopes and cover surface in 2017. The physical performance of this landfill does not appear to be deteriorating with time and the observed features are not impacting the stability of the G-217 West Landfill.

Table 4-16: Visual Inspection Checklist – G-217 West Landfill

SITE NAME: FOX-M Hall Beach
LANDFILL DESIGNATION: G-217 West Landfill
DATE OF INSPECTION: August 10, 2017
DATE OF PREVIOUS INSPECTION: August 14, 2014
INSPECTED BY: Reza Moghaddam
REPORT PREPARED BY: Reza Moghaddam
MONITORING EVENT NUMBER: 7
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 4-16: Visual Inspection Checklist – G-217 West 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	E	South slope	490,648	7,627,542	1	0.3	0.1	0.002%	Linear depression (Acceptable)	Unchanged since previous inspection	306
	Y	B	Cover surface	490,617	7,627,564	1	0.3	0.1	0.002%	Linear depression (Acceptable)	Unchanged since previous inspection	310
Erosion	N	-	-	-	-	-	-	-	-	-	-	-
Lateral Movement	N	-	-	-	-	-	-	-	-	-	-	-
Frost Action	N	-	-	-	-	-	-	-	-	-	-	-
Sloughing	N	-	-	-	-	-	-	-	-	-	-	-
Cracking	N	C	West slope	490,592	7,627,583	-	-	-	-	Previously observed tension crack	Not observed in 2017	309
Animal Burrows	N	-	-	-	-	-	-	-	-	-	-	-
Vegetation	Y	F	Northwest slope	490,604	7,627,631	2	2	-	0.07%	Sparse Vegetation (Acceptable)	Unchanged since previous inspection	304 and 305
	Y	G	South slope	490,645	7,627,542	1	0.5	-	0.009%	Sparse Vegetation (Acceptable)	Unchanged since previous inspection	311
Staining	N	-	-	-	-	-	-	-	-	-	-	-
Vegetation Stress	N	-	-	-	-	-	-	-	-	-	-	-
Seepage or Ponded Water	Y	D	Southwest toe	490,610	7,627,550	30	5	0.3	2.6%	Ponded water (Acceptable)	Slightly expanded area	307 and 308
Debris and/or Liner Exposed	N	-	-	-	-	-	-	-	-	-	-	-
Presence / Condition of Monitoring Instruments	N	-	-	-	-	-	-	-	-	-	-	-

Table 4-16: Visual Inspection Checklist – G-217 West 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
Features of Note / Other Observations	Y	A	Cover surface and slopes	490,650	7,627,553	60	5	-	5%	Vehicle tracks (Acceptable)	Unchanged since previous inspection	295-303

Landfill Area = 5,700 m^2.

Table 4-17: Preliminary Stability Assessment – G-217 West Landfill

Feature	Severity Rating	Extent
Settlement	Acceptable	Occasional
Erosion	Not Observed	-
Lateral Movement	Not Observed	-
Frost Action	Not Observed	-
Sloughing	Not Observed	-
Cracking	Not Observed	-
Animal Burrows	Not Observed	-
Vegetation establishment	Acceptable	Occasional
Staining	Not Observed	-
Vegetation Stress	Not Observed	-
Seepage/Ponded Water	Acceptable	Isolated
Debris and/or liner exposure	Not Observed	-
Other	Acceptable	Numerous
Overall Landfill Performance	**Acceptable**	

Table 4-18: Summary Table of Photographic Log – G-217 West Landfill

Photo	Easting	Northing	Date
Photo 283:	490,646	7,627,603	Aug.10, 2017
Photo 284:	490,643	7,627,543	Aug.10, 2017
Photo 285:	490,599	7,627,609	Aug.10, 2017
Photo 286:	490,629	7,627,624	Aug.10, 2017
Photo 287:	490,649	7,627,632	Aug.10, 2017
Photo 288:	490,634	7,627,577	Aug.10, 2017
Photo 289:	490,643	7,627,629	Aug.10, 2017
Photo 290:	490,618	7,627,637	Aug.10, 2017
Photo 291:	490,625	7,627,538	Aug.10, 2017
Photo 292:	490,598	7,627,557	Aug.10, 2017
Photo 293:	490,599	7,627,624	Aug.10, 2017
Photo 294:	490,593	7,627,571	Aug.10, 2017
Photo 295:	490,640	7,627,627	Aug.10, 2017
Photo 296:	490,641	7,627,594	Aug.10, 2017
Photo 297:	490,650	7,627,562	Aug.10, 2017
Photo 298:	490,650	7,627,553	Aug.10, 2017
Photo 299:	490,644	7,627,539	Aug.10, 2017
Photo 300:	490,600	7,627,562	Aug.10, 2017
Photo 301:	490,604	7,627,592	Aug.10, 2017
Photo 302:	490,638	7,627,575	Aug.10, 2017

Table 4-18: Summary Table of Photographic Log – G-217 West Landfill

Photo	Easting	Northing	Date
Photo 303:	490,606	7,627,628	Aug.10, 2017
Photo 304:	490,604	7,627,631	Aug.10, 2017
Photo 305:	490,609	7,627,635	Aug.10, 2017
Photo 306:	490,648	7,627,542	Aug.10, 2017
Photo 307:	490,610	7,627,550	Aug.10, 2017
Photo 308:	490,586	7,627,563	Aug.10, 2017
Photo 309:	490,592	7,627,583	Aug.10, 2017
Photo 310:	490,617	7,627,564	Aug.10, 2017
Photo 311:	490,645	7,627,542	Aug.10, 2017

4.4.3 Summary of any Sampling Deviations

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

- The deep soil sample at FM-5 could not be collected due to refusal on rock.

4.4.4 Soil Sampling

Table 4-19 presents a summary of analytical results for soil samples collected at the G-217 West Landfill. Groundwater flow at this landfill is considered to be radial, and therefore all sample locations are considered to be downgradient.

Table 4-19 also lists the arithmetic mean background and baseline values for the soil samples at this landfill, in addition to the baseline plus 3σ limit. At the G-217 West Landfill, the background arithmetic mean for copper and PCB are greater than the baseline arithmetic mean. The background arithmetic mean for PCB is also greater than the baseline mean plus 3σ, as the standard deviation of the baseline mean value was zero. Additionally, the arithmetic mean baseline and the baseline concentrations plus 3σ are the same for cadmium, chromium, cobalt and lead, which reflects the fact that baseline concentrations of these parameters were primarily at or below laboratory detection limits.

There was no arsenic detected in any of the soil samples at the G-217 West Landfill in 2017; cadmium was only detected at the deep FM-7 sample location. There were no detections of PCB at any location surrounding this landfill in 2017.

FM-5

Sampling location FM-5 is located downgradient of the landfill, approximately 8 m west of the toe. The estimated elevation of this sampling point is 2.5 masl. As shown in Photograph 312, the area primarily consists of sand and gravel with established vegetation. The soils consisted of grey sand with gravel and stone. Seepage into the hole commenced shortly after it was excavated.

For the shallow sample at FM-5 (0-15 cm, duplicate location), the concentrations of all metals were less than or similar to those reported in previous years. No PHC were detected at this location in 2017. None of the reported values exceeded their respective baseline mean concentrations plus 3σ.

FM-6

Sampling location FM-6 is located downgradient of the landfill, approximately 5 m east of the toe. The estimated elevation of this sampling point is 2.5 masl. As shown in Photograph 315, the area primarily consists of sand and gravel and is sparsely vegetated. The soils consisted of grey sand with gravel and stone.

For the shallow sample at FM-6 (0-15 cm), the concentrations of most metals were similar to previous years, whereas the concentration of lead represent new historical maxima. The lead concentration of 32.6 mg/kg exceeded the baseline concentration plus 3σ (11.9 mg/kg). It is noted that the modified TPH concentration of 30 mg/kg was well below the concentrations of 186 mg/kg and 630 mg/kg reported in 2012 and 2014, respectively. Both F3 (25 mg/kg) and F4 (7 mg/kg) fractions were detected in 2017.

For the deep sample at FM-6 (30-40 cm), most detected metal concentrations were similar to those in the shallow sample; lead and zinc are higher. The concentrations of most metals were similar to previous years, whereas the concentration of lead represents new historical maxima. The lead concentration of 45.6 mg/kg exceeded the baseline concentration plus 3σ (11.9 mg/kg). No PHC were detected at this location in 2017. It is noted that the modified TPH concentrations of 658 mg/kg and 22 mg/kg were reported in 2012 and 2014, respectively.

FM-7

Sampling location FM-7 is located downgradient of the landfill, approximately 7 m east of the toe. The estimated elevation of this sampling point is 2.5 masl. As shown in Photograph 318, the area primarily consists of gravel and is not vegetated. The soils consisted of grey sand with gravel and stone. Seepage into the hole commenced shortly after it was excavated.

For the shallow sample at FM-7 (0-15 cm), the concentrations of most metals were similar to previous years, whereas the concentration of lead represents a new historical maximum. The lead concentration of 57.6 mg/kg exceeded the baseline concentration plus 3σ (11.9 mg/kg). No PHC were detected at this location in 2017.

For the deep sample at FM-7 (40-50 cm), most detected metal concentrations were similar to those in the shallow sample. The concentrations of most metals were similar to previous years, except for the concentration of cadmium represents a new historical maximum. The concentration of cadmium (1.7 mg/kg) slightly exceeded the baseline concentration plus 3σ (1.0 mg/kg) and represents a new historical maximum. The lead concentration of 52.3 mg/kg exceeded the baseline concentration plus 3σ (11.9 mg/kg) but remains less than the historical maximum concentration of 79.3 mg/kg reported in 2012. It is noted that the modified TPH concentration of 16 mg/kg remains below the concentrations of 24 mg/kg reported in 2012; no PHC were detected in 2014. A PHC F3 fraction of 10 mg/kg was detected in 2017.

FM-8

Sampling location FM-8 is located downgradient of the landfill, approximately 10 m southeast of the toe. The estimated elevation of this sampling point is 2.5 masl. As shown in Photograph 321, the area primarily consists of sand and gravel and is sparsely vegetated. The soils consisted of grey sand with gravel and stone.

For the shallow sample at FM-8 (0-15 cm), the concentrations of all detected metals were similar to previous years. No PHC were detected at this location in 2017. None of the reported values exceeded their respective baseline mean concentrations plus 3σ.

For the deep sample at FM-8 (40-50 cm), all detected metal concentrations were similar to than those in the shallow sample. The concentrations of all metals were less than or similar to previous years. No cobalt or PHC were detected at this location in 2017. None of the reported values exceeded their respective baseline mean concentrations plus 3σ.

Table 4-19: Soil Chemical Analysis Results – G-217 West Landfill

ID	Depth (cm)	As (mg/kg)	Cd (mg/kg)	Cr (mg/kg)	Co (mg/kg)	Cu (mg/kg)	Pb (mg/kg)	Ni (mg/kg	Zn (mg/kg)	Total PCB (mg/kg)	F1 (mg/kg)	F2 (mg/kg)	F3 (mg/kg)	F4 (mg/kg)
Background Mean		1.00	1.00	20.0	5.00	6.33	10.00	5.00	15.00	0.213	NA	NA	NA	NA
Baseline Mean		**2.07**	**1.00**	**20.0**	**5.00**	**5.91**	**11.90**	**5.90**	**40.85**	**0.003**	**NA**	**NA**	**NA**	**NA**
Baseline + 3σ		4.38	1.00	20.0	5.00	18.20	11.90	15.36	212.09	0.003	NA	NA	NA	NA
Downgradient														
FM-5 Shallow	0-15	<1.0	<0.5	4.5	<1.0	1.7	2.4	2.8	3.2	<0.05	<7	<4	<8	<6
FM-95 Shallow (Duplicate)	0-15	<1.0	<0.5	5.0	1.1	2.0	1.8	2.3	3.0	<0.05	<7	<4	<8	<6
FM-5 Shallow (Dup Avg)	0-15	<1.0	<0.5	4.8	1.1	1.9	2.1	2.6	3.1	<0.05	<7	<4	<8	<6
FM-5 Deep[1]														
FM-6 Shallow	0-15	<1.0	<0.5	12.7	2.5	**15.6**	**32.6**	**9.1**	**99.1**	<0.05	<7	<4	25	7
FM-6 Deep	30-40	<1.0	<0.5	13.0	2.4	**13.3**	**45.6**	**8.4**	**139.0**	<0.05	<7	<4	<8	<6
FM-7 Shallow	0-15	<1.0	<0.5	19.4	2.9	**6.1**	**57.6**	**10.0**	25.8	<0.05	<7	<4	<8	<6
FM-7 Deep	40-50	<1.0	**1.7**	18.5	3.1	5.8	**52.3**	**10.3**	24.2	<0.05	<7	<4	10	<6
FM-8 Shallow	0-15	<1.0	<0.5	6.0	1.2	3.0	3.7	4.3	5.1	<0.05	<7	<4	<8	<6
FM-8 Deep	40-50	<1.0	<0.5	5.5	<1.0	2.1	3.4	3.8	4.3	<0.05	<7	<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.

Shaded Values: Results exceed the Baseline arithmetic mean plus 3σ.

1: The deep soil sample at FM-5 could not be collected due to refusal on rock.

4.4.5 Conclusions and Overall Performance of the G-217 West Landfill

No erosion, exposed waste or indications of slope instability were observed at the G-217 West Landfill during the 2017 visual inspection. Some minor settlement, vehicle tracks and sparse vegetation on the landfill slopes and cover surface were observed in 2017. No new features or deteriorated conditions were observed during the 2017 visual inspection, indicating good physical landfill performance. The overall stability performance of the landfill was assessed as Acceptable.

Groundwater flow at this landfill is considered to be radial, and therefore all sample locations are considered to be downgradient. No detectable concentrations of arsenic or PCB were noted in any of the soil samples in 2017. With the exception of FM-7 (deep), no cadmium was noted in any 2017 soil samples. The concentrations of metals were highest overall at the FM-6 and FM-7 sample locations, located downgradient of the east side of the landfill. In both FM-6 samples, the concentrations of most metals were similar to previous years. In both samples, the lead concentration exceeded the baseline concentration plus 3σ and a general increasing trend of lead concentrations is noted. At the shallow sample location FM-7, the concentrations of most metals were similar to previous years, whereas the concentration of lead exceeded the baseline concentration plus 3σ and represents a new historical maximum. At the deep sample location FM-7, the concentrations of cadmium slightly exceeded the baseline concentration plus 3σ and represents a new historical maximum. At FM-5 and FM-8, the metal concentrations reported in 2017 were similar to those reported in previous years.

PHC were detected in the shallow FM-6 sample and the deep FM-7 sample at modified TPH concentrations of 31 mg/kg and 16 mg/kg, respectively. The modified TPH concentrations at FM-6 was less than those reported in previous years, whereas that at FM-7 was similar.

Overall, the results of the soil samples are similar to earlier years; however, elevated lead may reflect impact from the landfill. Further data is required to assess this.

4.4.6 Recommendations for G-217 West Landfill

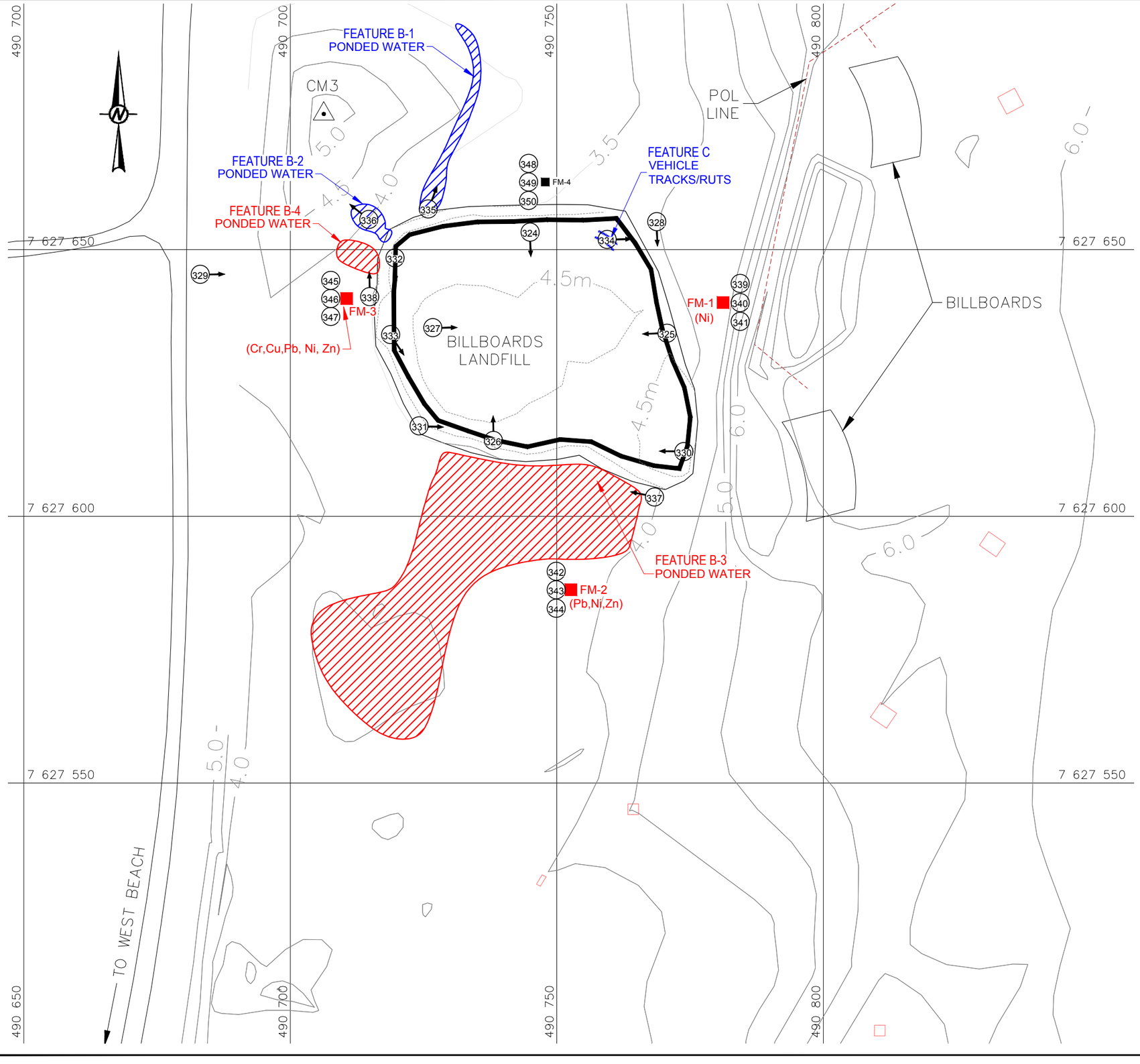
The evident increasing trend of lead at FM-6 and elevated concentrations of lead at FM-6 and FM-7 and cadmium at the deep FM-7 location in 2017 should be confirmed following completion of the next monitoring event (i.e., compared to 2022 monitoring results) for these locations prior to consideration of any further actions. It is noted that only five samples have been collected at these locations and fewer than seven samples have been collected for trend confirmation.

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

4.5 Billboards Landfill

4.5.1 Landfill Description

The Billboards Landfill is located approximately 100 m south of the main station area, to the west of the communications billboards and east of G-217 West Landfill. Remediation of the Billboards Landfill included collection of surface debris, regrading and placement of additional granular cover over the waste materials. The long-term monitoring plan for the Billboards landfill consists of visual inspection and periodic collection of soil samples. The cover of the landfill is only about half a metre above grade. There are four soil sampling points around the Billboards Landfill but no monitoring wells. Approximate soil sampling locations for the Billboards Landfill are provided in Figure FOX-M.7.



LEGEND:

- SURVEY CONTROL MONUMENT
- SOIL SAMPLING LOCATION
- SOIL SAMPLING LOCATION WITH EXCEEDANCE OF BASELINE MEAN PLUS 3σ
- PHOTOGRAPH VIEWPOINT LOCATION
- CONTOURS IN 0.5m INTERVALS
- VEHICLE TRACKS/RUTS
- PONDED WATER

NOTES:

1. *LOCATIONS AND SCALE OF FEATURES ARE APPROXIMATE AND SHOWN FOR ILLUSTRATIVE PURPOSES ONLY.*
2. ALL COORDINATES ARE REFERENCED TO NAD83 (CSRS), UTM ZONE 17N.
3. FEATURES DRAWN IN RED ARE EITHER NEW OR EXPANDED.

REFERENCE:

PREVIOUS INSPECTION FIGURE PROVIDED BY SENES CONSULTS. PROJECT NO. 350600(-1515-1), DATED FEB.20, 2015.

0 12.5 25
1:750 METRES

CLIENT
DEPARTMENT OF NATIONAL DEFENCE CANADA

PROJECT
2017 FOX-M MONITORING REPORT

TITLE
BILLBOARDS LANDFILL

CONSULTANT
GOLDER

YYYY-MM-DD	2018-01-10
DESIGNED	RM
PREPARED	TDR
REVIEWED	DCJ
APPROVED	DP

PROJECT NO. 1530908 | PHASE 3000 | REV. A | FIGURE FOX-M.7

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\Canada\99_PRO\1530908_PWGSC_Dew_Line_Mon_Program_2015_2018\40_PROD\0012_Fox_M_Field_Summary_Report_2017\ | File Name: 1530907-0012-BG-0007.dwg | Last Edited By: trose Date: 2018-02-26 Time:12:22:12 PM | Printed By: trose Date: 2018-03-26 Time:2:38:28 PM

4.5.2 Visual Inspection

The Billboards Landfill has some observed ponded water at the toe (notably to the south) and vehicle tracks on the cover surface. Table 4-20 presents a summary of observed visual inspection features and Table 4-21 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.” Table 4-22 is a log of photographs taken during the 2017 visual inspection.

No new features were observed in 2017. Ponded water at the south toe (Feature B-3) has expanded slightly since the last inspection and was observed to span approximately 40 m wide (i.e., along the entire toe length) and extend to approximately 55 m south of the landfill. Ponded water at the west toe of the landfill (Feature B-4) also appears to have expanded since the last inspection. However, previously observed ponded water at the north and northwest toe (Features B-1 and B-2) do not appear to have changed since the last inspection. Previously observed red staining (Feature A) was not observed during the 2017 visual inspection. The observed features do not appear to be having a negative impact on landfill stability.

Table 4-20: Visual Inspection Checklist – Billboards Landfill

SITE NAME: FOX-M Hall Beach
LANDFILL DESIGNATION: Billboards Landfill
DATE OF INSPECTION: August 10, 2017
DATE OF PREVIOUS INSPECTION: August 14, 2014
INSPECTED BY: Reza Moghaddam
REPORT PREPARED BY: Reza Moghaddam
MONITORING EVENT NUMBER: 7
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 4-20: Visual Inspection Checklist – Billboards 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	N	-	-	-	-	-	-	-	-	-	-	-
Erosion	N	-	-	-	-	-	-	-	-	-	-	-
Lateral Movement	N	-	-	-	-	-	-	-	-	-	-	-
Frost Action	N	-	-	-	-	-	-	-	-	-	-	-
Sloughing	N	-	-	-	-	-	-	-	-	-	-	-
Cracking	N	-	-	-	-	-	-	-	-	-	-	-
Animal Burrows	N	-	-	-	-	-	-	-	-	-	-	-
Vegetation	N	-	-	-	-	-	-	-	-	-	-	-
Staining	N	A	-	-	-	-	-	-	-	Red staining	Not observed in 2017	-
Vegetation Stress	N	-	-	-	-	-	-	-	-	-	-	-
Seepage or Ponded Water	Y	B-1	North toe	490,726	7,627,658	40	3	0.3	N/A	Ponded water (Acceptable)	Unchanged since previous inspection	335
	Y	B-2	Northwest toe	490,715	7,627,656	10	3	0.3	N/A	Ponded water (Acceptable)	Unchanged since previous inspection	336
	Y	B-3	South toe	490,768	7,627,604	55	15-25	0.3	N/A	Ponded water (Acceptable)	Slightly expanded area	337
	Y	B-4	West toe	490,715	7,627,641	8	5	0.3	N/A	Ponded water (Acceptable)	Slightly expanded area	338

Table 4-20: Visual Inspection Checklist – Billboards 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
Debris and/or Liner Exposed	N	-	-	-	-	-	-	-	-	-	-	-
Presence / Condition of Monitoring Instruments	N	-	-	-	-	-	-	-	-	-	-	-
Features of Note / Other Observations	Y	C	Cover surface	490,759	7,627,652	5	2	-	0.4%	Vehicle tracks (Acceptable)	Unchanged since previous inspection	334

Landfill Area = 2,533 m^2.

Table 4-21: Preliminary Stability Assessment – Billboards Landfill

Feature	Severity Rating	Extent
Settlement	Not Observed	-
Erosion	Not Observed	-
Lateral Movement	Not Observed	-
Frost Action	Not Observed	-
Sloughing	Not Observed	-
Cracking	Not Observed	-
Animal Burrows	Not Observed	-
Vegetation establishment	Not Observed	-
Staining	Not Observed	-
Vegetation Stress	Not Observed	-
Seepage/Ponded Water	Acceptable	Occasional
Debris and/or liner exposure	Not Observed	-
Other	Acceptable	Isolated
Overall Landfill Performance	**Acceptable**	

Table 4-22: Summary Table of Photographic Log – Billboards Landfill

Photo	Easting	Northing	Date
Photo 324:	490,745	7,627,653	August 10, 2017
Photo 325:	490,771	7,627,634	August 10, 2017
Photo 326:	490,738	7,627,614	August 10, 2017
Photo 327:	490,727	7,627,635	August 10, 2017
Photo 328:	490,779	7,627,655	August 10, 2017
Photo 329:	490,683	7,627,645	August 10, 2017
Photo 330:	490,774	7,627,612	August 10, 2017
Photo 331:	490,724	7,627,617	August 10, 2017
Photo 332:	490,720	7,627,649	August 10, 2017
Photo 333:	490,719	7,627,634	August 10, 2017
Photo 334:	490,759	7,627,652	August 10, 2017
Photo 335:	490,726	7,627,658	August 10, 2017
Photo 336:	490,715	7,627,656	August 10, 2017
Photo 337:	490,768	7,627,604	August 10, 2017
Photo 338:	490,715	7,627,641	August 10, 2017

4.5.3 Summary of any Sampling Deviations

The field work was conducted as per the TOR with no exceptions.

4.5.4 Soil Sampling

Table 4-23 presents a summary of analytical results for soil samples collected at the Billboards Landfill. FM-1 represents an upgradient sampling location, whereas FM-2, FM-3 and FM-4 represent downgradient sampling locations.

Table 4-23 also lists the arithmetic mean background and baseline values for the landfill, in addition to the baseline plus 3σ limit. At the Billboards Landfill, the background arithmetic mean for copper and PCB are greater than the baseline arithmetic mean. The background arithmetic mean for PCB is also greater than the baseline mean plus 3σ, as the standard deviation of the baseline mean value was zero. Additionally, the arithmetic mean baseline and the baseline concentrations plus 3σ are the same for cadmium, chromium, cobalt, lead, nickel and zinc, which reflects the fact that baseline concentrations of these parameters were primarily at or below laboratory detection limits.

Soil sample FM-3 (shallow) had higher detection limits (DLs) because it lacked enough fine-grained material to attain the standard MDLs. There was no arsenic or cadmium detected in any of the soil samples at the Billboards in 2017. There were no detections of PCB or PHC at any location surrounding this landfill in 2017

FM-1

Sampling location FM-1 is located upgradient of the landfill, approximately 10 m east of the toe. The estimated elevation of this sampling point is 4.5 masl. As shown in Photograph 339, the area primarily consists of sand and gravel with some vegetation. The soils consisted of grey sand with gravel and stone.

For the shallow sample at FM-1 (0-15 cm), the concentrations of most detected metals were similar to previous years, with the exceptions of zinc (lower). The nickel concentration of 8.9 mg/kg exceeded the baseline concentration plus 3σ (5.0 mg/kg) but remains less than the historical maximum concentration of 17.0 mg/kg reported in 2012.

For the deep sample at FM-1 (40-50 cm), all detected metal concentrations were less than those in the shallow sample. The concentrations of detected metals were similar to previous years, with the notable exception of zinc (lower). The nickel concentration of 6.2 mg/kg exceeded the baseline concentration plus 3σ (5.0 mg/kg) but remains less than the historical maximum concentration of 19.4 mg/kg reported in 2012.

FM-2

Sampling location FM-2 is located downgradient of the landfill, approximately 25 m south of the toe. The estimated elevation of this sampling point is 4.0 masl. As shown in Photograph 342, the area primarily consists of sand and gravel with established vegetation. The soils consisted of grey sand with gravel and stone. Seepage into the hole commenced shortly after it was excavated.

For the shallow sample at FM-2 (0-15 cm), the concentrations of most detected metals were similar to previous years; however, the concentration of lead increased and represents new historical maximum. The lead concentration of 35.3 mg/kg exceeded the baseline concentration plus 3σ (10.0 mg/kg). The nickel concentration of 10.7 mg/kg moderately exceeded the baseline concentration plus 3σ (5.0 mg/kg) but remains less than the historical maximum concentration of 294.0 mg/kg reported in 2010.

For the deep sample at FM-2 (40-50 cm), most detected metal concentrations were similar to those in the shallow sample, with the exception of lead (lower). The concentrations of all detected metals were similar to previous years, whereas the slightly increased concentration of lead represents new historical maximum. The nickel and zinc concentrations (12.7 mg/kg and 16.5 mg/kg, respectively) moderately exceeded the baseline concentration plus 3σ (5.0 mg/kg and 15.0 mg/kg, respectively) but remain less than the historical maximum concentrations of reported in 2012 (18.7 mg/kg and 18.0 mg/kg, respectively).

FM-3

Sampling location FM-3 is located downgradient of the landfill, approximately 5 m west of the toe. The estimated elevation of this sampling point is 4.0 masl. As shown in Photograph 345, the area primarily consists of sand and gravel with established vegetation. The soils consisted of grey sand with gravel and stone. Seepage into the hole commenced shortly after it was excavated.

For the shallow sample at FM-3 (0-15 cm), the concentrations of all detected metals were greater than previous years. This includes the concentrations of chromium, copper, lead, nickel and zinc, which exceeded the baseline concentration plus 3σ. Cobalt was not detected at this location in 2017.

For the deep sample at FM-3 (30-40 cm), metals concentrations were less than those in the shallow sample. The concentrations of all metals were less than or similar to previous years; no sample was collected in 2014. The nickel and zinc concentrations (11.3 mg/kg and 15.7 mg/kg, respectively) exceeded the baseline concentration plus 3σ (5.0 mg/kg and 15.0 mg/kg, respectively) but remain less than the historical maximum concentrations of reported in 2012 (23.5 mg/kg and 28.0 mg/kg, respectively).

FM-4

Sampling location FM-4 is located downgradient of the landfill, approximately 5 m north of the toe. The estimated elevation of this sampling point is 4.5 masl. As shown in Photograph 348, the area primarily consists of sand and gravel with established vegetation. The soils consisted of grey sand with gravel and stone.

For the shallow sample at FM-4 (0-15 cm), the concentrations of all detected metals were less than or similar to previous years and notably for lead and zinc, lower than those reported in 2014. None of the reported values exceeded their respective baseline mean concentrations plus 3σ.

For the deep sample at FM-4 (40-50 cm, duplicate location), metals concentrations were similar to those in the shallow sample. The concentrations of metals were similar to previous years. None of the reported values exceeded their respective baseline mean concentrations plus 3σ.

Table 4-23: Soil Chemical Analysis Results – Billboards Landfill

ID	Depth (cm)	As (mg/kg)	Cd (mg/kg)	Cr (mg/kg)	Co (mg/kg)	Cu (mg/kg)	Pb (mg/kg)	Ni (mg/kg	Zn (mg/kg)	Total PCB (mg/kg)	F1 (mg/kg)	F2 (mg/kg)	F3 (mg/kg)	F4 (mg/kg)
Background Mean		1.00	1.00	20.0	5.00	6.33	10.00	5.00	15.00	0.213	NA	NA	NA	NA
Baseline Mean		**1.75**	**1.00**	**20.0**	**5.00**	**5.46**	**10.00**	**5.00**	**15.00**	**0.10**	**NA**	**NA**	**NA**	**NA**
Baseline + 3σ		9.68	1.00	20.0	5.00	14.80	10.00	5.00	15.00	0.10	NA	NA	NA	NA
Upgradient														
FM-1 Shallow	0-15	<1.0	<0.5	11.1	2.5	**5.6**	7.2	**8.9**	11.3	<0.05	<7	<4	<8	<6
FM-1 Deep	40-50	<1.0	<0.5	8.0	1.5	3.3	5.8	**6.2**	6.2	<0.05	<7	<4	<8	<6
Downgradient														
FM-2 Shallow	0-15	<1.0	<0.5	11.5	2.8	**7.9**	**35.3**	**10.7**	13.2	<0.05	<7	<4	<8	<6
FM-2 Deep	40-50	<1.0	<0.5	12.2	3.3	**9.2**	8.7	**12.7**	**16.5**	<0.05	<7	<4	<8	<6
FM-3 Shallow	0-15	<16.1	<8.1	**69.0**	<16.1	**49.1**	**57.6**	**78.5**	**86.9**	<0.05	<7	<4	<8	<6
FM-3 Deep	30-40	<1.0	<0.5	12.5	2.1	**9.3**	7.1	**11.3**	**15.7**	<0.05	<7	<4	<8	<6
FM-4 Shallow	0-15	<1.0	<0.5	6.0	1.4	2.0	3.9	3.5	5.4	<0.05	<7	<4	<8	<6
FM-4 Deep	40-50	<1.0	<0.5	5.8	1.3	2.0	4.1	3.7	6.5	<0.05	<7	<4	<8	<6
FM-94 Deep (Duplicate)	40-50	<1.0	<0.5	6.8	1.4	2.1	4.8	3.9	6.4	<0.05	<7	<4	<8	<6
FM-4 Deep (Dup Avg)	40-50	<1.0	<0.5	6.3	1.4	2.1	4.5	3.8	6.5	<0.05	<7	<4	<8	<6

Notes:
NA: Not available
Underlined values: Results exceed Background arithmetic mean.
Bold Values: Results exceed Baseline arithmetic mean.
Shaded Values: Results exceed the Baseline arithmetic mean plus 3σ.

4.5.5 Conclusions and Overall Performance of the Billboards Landfill

Based on the visual inspection, there is no observed erosion, settlement, exposed waste or indications of instability at the Billboards Landfill. There is a vehicle track on the cover surface and some ponded water around the toe of the landfill which has increased to the south and west (Features B-3 and B-4). The observed features are not impacting the stability of the landfill and the landfill physical performance is assessed as Acceptable.

No detectable concentrations of arsenic, cadmium, PHC or PCB were noted in any of the soil samples in 2017. The concentrations of metals were highest overall at the shallow sample location FM-3, located downgradient of the west side of the landfill. At this location, the concentrations of all detected metals were greater than previous years. This includes the concentrations of chromium, copper, lead, nickel and zinc, which exceeded the baseline concentration plus 3σ. At all remaining locations, the concentrations of most metals were similar to previous years. It is noted that the concentrations of nickel in both upgradient FM-1 samples, both downgradient FM-2 samples and the deep FM-3 sample also exceeded the baseline concentration plus 3σ. In addition, the concentration of lead in the shallow FM-2 sample and the concentrations of zinc in the deep FM-2 and FM-3 samples exceeded the baseline concentration plus 3σ.

Whereas most of the environmental sampling results are less than or the same as previous sampling sessions, elevated parameters and increases in some cases (e.g., metals at shallow sample location FM-3) may be reflective of an ongoing impact from the landfill; however, further data is required to assess this.

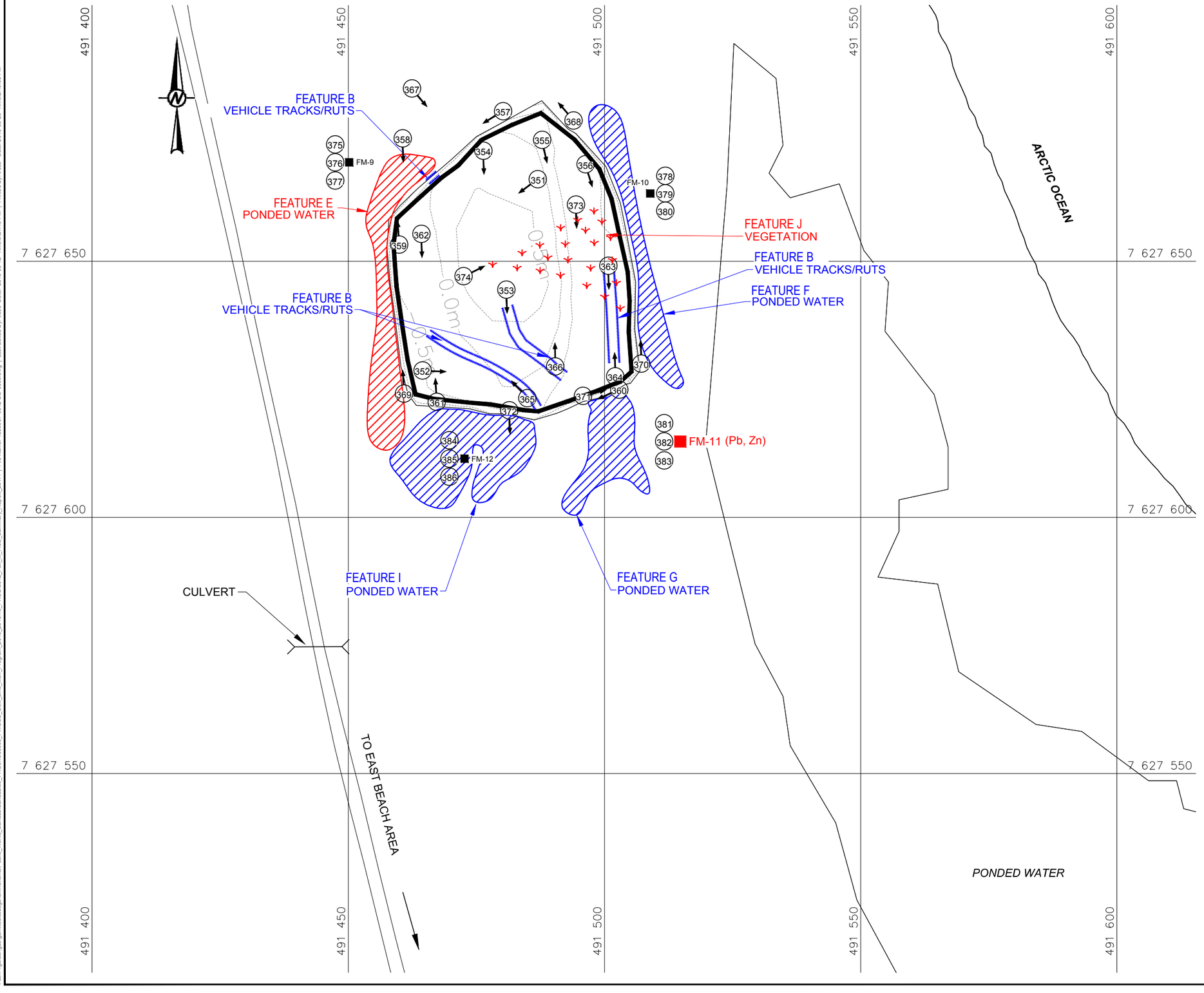
4.5.6 Recommendations for Billboards Landfill

The elevated concentrations of metals at the shallow FM-3 sampling location in 2017 should be confirmed following completion of the next monitoring event (i.e., compared to 2022 monitoring results) for this location, prior to consideration of any further actions.

4.6 Hazmat Storage East Landfill

4.6.1 Landfill Description

The Hazmat Storage-East Landfill is located east of the main station area, on the east side of the east beach area access road. Remediation of this landfill included collection of surface debris, regrading and placement of additional granular cover over the waste materials. The area of regraded landfill cover is approximately 2,300 m^2. The long-term monitoring plan for this regraded landfill consists of visual inspection and periodic collection of soil samples. It has four soil sampling locations and no monitoring wells. The approximate soil sampling locations for Hazmat Storage East Landfill are provided in Figure FOX-M.8.



LEGEND:

- SOIL SAMPLING LOCATION
- SOIL SAMPLING LOCATION WITH EXCEEDANCE OF BASELINE MEAN PLUS 3σ
- PHOTOGRAPH VIEWPOINT LOCATION
- CONTOURS IN 0.5m INTERVALS
- VEHICLE TRACKS/RUTS
- VEGETATION
- PONDED WATER

NOTES:

1. *LOCATIONS AND SCALE OF FEATURES ARE APPROXIMATE AND SHOWN FOR ILLUSTRATIVE PURPOSES ONLY.*
2. ALL COORDINATES ARE REFERENCED TO NAD83 (CSRS), UTM ZONE 17N.
3. FEATURES DRAWN IN RED ARE EITHER NEW OR EXPANDED.
4. TOPOGRAPHIC CONTOURS BEYOND THE LANDFILL FOOTPRINT ARE NOT CURRENTLY AVAILABLE. THE AREA AROUND THE LANDFILL IS VERY FLAT AND CLOSE TO SEA LEVEL.

REFERENCE:

PREVIOUS INSPECTION FIGURE PROVIDED BY SENES CONSULTS. PROJECT NO. 350600(-1515-1), DATED FEB.20, 2015.

0 12.5 25
1:750 METRES

CLIENT
DEPARTMENT OF NATIONAL DEFENCE CANADA

PROJECT
2017 FOX-M MONITORING REPORT

TITLE
HAZMAT STORAGE EAST LANDFILL

CONSULTANT
GOLDER

YYYY-MM-DD	2018-01-10
DESIGNED	RM
PREPARED	TDR
REVIEWED	DCJ
APPROVED	DP

PROJECT NO.	PHASE	REV.	FIGURE
1530908	3000	A	FOX-M.8

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\Canada\99_PRO\1530908_PWGSC_Dew_Line_Mon_Program_2015_2018\40_PROD\0012_Fox_M_Field_Summary_Report_2017\ | File Name: 1530907-0012-BG-0008.dwg | Last Edited By: trose Date: 2018-03-12 Time:6:21:46 PM | Printed By: trose Date: 2018-03-26 Time:2:40:05 PM

4.6.2 Visual Inspection

The Hazmat Storage-East Landfill is largely surrounded by ponded water with vehicle track and sparse vegetation features. Table 4-24 presents a summary of observed visual inspection features and Table 4-25 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.” Table 4-26 is a log of photographs taken during the 2017 visual inspection.

Previously observed ponded water along the east and south toe of the landfill (Features F, I and G) does not appear to have changed since the last inspection. The area of ponded water along the west toe (Feature E) appears to have expanded compared to the previous inspection. Previously observed ponded water on the cover surface (Feature H) was not observed during the 2017 visual inspection. The extent of vehicle tracks on the cover surface (Feature B) appears to have increased since the last inspection. Some new sparse vegetation (Feature J) was observed on the cover surface during the 2017 visual inspection. Previously observed erosion (Feature D) was not observed during the 2017 visual inspection. Previously observed surficial debris (Feature A) is not buried waste that has become exposed from erosion or sloughing so it was not reported as a feature in 2017. The observed features do not appear to be having a negative impact on landfill stability.

Table 4-24: Visual Inspection Checklist – Hazmat Storage East Landfill

SITE NAME: FOX-M Hall Beach
LANDFILL DESIGNATION: Hazmat Storage East Landfill
DATE OF INSPECTION: August 10, 2017
DATE OF PREVIOUS INSPECTION: August 15, 2014
INSPECTED BY: Reza Moghaddam
REPORT PREPARED BY: Reza Moghaddam
MONITORING EVENT NUMBER: 7
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 4-24: Visual Inspection Checklist – Hazmat Storage East 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	N	-	-	-	-	-	-	-	-	-	-	-
Erosion	N	D	East toe	-	-	-	-	-	-	Erosion channel	Not observed in 2017	-
Lateral Movement	N	-	-	-	-	-	-	-	-	-	-	-
Frost Action	N	-	-	-	-	-	-	-	-	-	-	-
Sloughing	N	-	-	-	-	-	-	-	-	-	-	-
Cracking	N	-	-	-	-	-	-	-	-	-	-	-
Animal Burrows	N	-	-	-	-	-	-	-	-	-	-	-
Vegetation	Y	J	Crest surface	491,473	7,627,647	30	15	-	19.3%	Sparse vegetation (Acceptable)	New	373 and 374
Staining	N	-	-	-	-	-	-	-	-	-	-	-
Vegetation Stress	N	-	-	-	-	-	-	-	-	-	-	-
Seepage or Ponded Water	Y	E	West toe	491,461	7,627,624	55	3	0.2	6.4%	Ponded water (Acceptable)	Expanded area	358, 369
	Y	F	East toe	491,507	7,627,630	55	3	0.2	6.4%	Ponded water (Acceptable)	Unchanged since previous inspection	370
	N	H	Cover surface	-	-	-	-	-	-	Ponded water	Not observed in 2017	-
	Y	I	South toe	491,502	7,627,613	30	10	0.3	13%	Ponded water (Acceptable)	Unchanged since previous inspection	371 and 372
	Y	G	South toe	491,503	7,627,625	15	10	0.3	6.5%	Ponded water (Acceptable)	Unchanged since previous inspection	360,371

Table 4-24: Visual Inspection Checklist – Hazmat Storage East 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
Debris and/or Liner Exposed	N	A	-	-	-	-	-	-	-	Previously reported surficial debris	Not buried debris that has become exposed	-
Presence / Condition of Monitoring Instruments	N	-	-	-	-	-	-	-	-	-	-	-
Features of Note / Other Observations	Y	B	Cover surface	491,490	7,627,630	70	2	-	6%	Vehicle tracks (Acceptable)	Slightly expanded area, Feature C from 2012 has been consolidated into Feature B.	363, 364, 365 and 366

Landfill Area = 2,326 m^2.

Table 4-25: Preliminary Stability Assessment – Hazmat Storage East Landfill

Feature	Severity Rating	Extent
Settlement	Not Observed	-
Erosion	Not Observed	-
Lateral Movement	Not Observed	-
Frost Action	Not Observed	-
Sloughing	Not Observed	-
Cracking	Not Observed	-
Animal Burrows	Not Observed	-
Vegetation establishment	Acceptable	Isolated
Staining	Not Observed	-
Vegetation Stress	Not Observed	-
Seepage/Ponded Water	Acceptable	Occasional
Debris and/or liner exposure	Not Observed	-
Other	Acceptable	Occasional
Overall Landfill Performance	**Acceptable**	

Table 4-26: Summary Table of Photographic Log – Hazmat Storage East Landfill

Photo	Easting	Northing	Date
Photo 351:	491,487	7,627,666	August 10, 2017
Photo 352:	491,465	7,627,629	August 10, 2017
Photo 353:	491,481	7,627,644	August 10, 2017
Photo 354:	491,476	7,627,672	August 10, 2017
Photo 355:	491,488	7,627,674	August 10, 2017
Photo 356:	491,496	7,627,669	August 10, 2017
Photo 357:	491,480	7,627,679	August 10, 2017
Photo 358:	491,461	7,627,674	August 10, 2017
Photo 359:	491,460	7,627,653	August 10, 2017
Photo 360:	491,503	7,627,625	August 10, 2017
Photo 361:	491,466	7,627,623	August 10, 2017
Photo 362:	491,464	7,627,655	August 10, 2017
Photo 363:	491,505	7,627,651	August 10, 2017
Photo 364:	491,502	7,627,628	August 10, 2017
Photo 365:	491,485	7,627,623	August 10, 2017
Photo 366:	491,490	7,627,630	August 10, 2017
Photo 367:	491,462	7,627,684	August 10, 2017
Photo 368:	491,494	7,627,678	August 10, 2017
Photo 369:	491,461	7,627,624	August 10, 2017
Photo 370:	491,507	7,627,630	August 10, 2017

Table 4-26: Summary Table of Photographic Log – Hazmat Storage East Landfill

Photo	Easting	Northing	Date
Photo 371:	491,502	7,627,613	August 10, 2017
Photo 372:	491,479	7,627,611	August 10, 2017
Photo 373:	491,494	7,627,661	August 10, 2017
Photo 374:	491,473	7,627,647	August 10, 2017

4.6.3 Summary of any Sampling Deviations

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

- The deep soil sample at FM-12 could not be collected due to refusal on rock.

4.6.4 Soil Sampling

Table 4-27 presents a summary of analytical results for soil samples collected at the Hazmat Storage East Landfill. Groundwater flow at this landfill is considered to be radial, and therefore all sample locations are considered to be downgradient.

Table 4-27 also lists the arithmetic mean background and baseline values for the landfill, in addition to the baseline plus 3σ limit. At the Hazmat Storage East Landfill, the background arithmetic mean for copper and PCB are greater than the baseline arithmetic mean. The background arithmetic mean for PCB is also greater than the baseline mean plus 3σ, as the standard deviation of the baseline mean value was zero. Additionally, the arithmetic mean baseline and the baseline concentrations plus 3σ are the same for cadmium, chromium, cobalt, lead and zinc, which reflects the fact that baseline concentrations of these parameters were primarily at or below laboratory detection limits.

There was no cadmium detected in any of the soil samples at the Hazmat Storage East Landfill in 2017; arsenic was only detected at the deep FM-9 sample location. There were no detections of PCB at any location surrounding this landfill in 2017.

FM-9

Sampling location FM-9 is located downgradient of the landfill, approximately 12 m northwest of the toe. The estimated elevation of this sampling point is only slightly higher than the surrounding sea level. As shown in Photograph 375, the area primarily consists of sand and gravel and is sparsely vegetation. The soils consisted of grey sand with gravel and stone.

For the shallow sample at FM-9 (0-15 cm), the concentrations of all metals were similar to previous years. No PHC were detected at this location in 2017. None of the reported values exceeded their respective baseline mean concentrations plus 3σ.

For the deep sample at FM-9 (30-40 cm, duplicate location), most detected metal concentrations were similar to those in the shallow sample. The concentrations of all metals were similar to previous years. No PHC were detected at this location in 2017. None of the reported values exceeded their respective baseline mean concentrations plus 3σ.

FM-10

Sampling location FM-10 is located downgradient of the landfill, approximately 5 m east of the toe. The estimated elevation of this sampling point is only slightly higher than the nearby sea level. As shown in Photograph 378, the area primarily consists of sand and gravel with some vegetation. Ponding is observed in the area along the toe of the landfill. The soils consisted of grey sand with gravel and stone. Seepage into the hole commenced shortly after it was excavated.

For the shallow sample at FM-10 (0-15 cm), the concentrations of all detected metals were less than or similar to previous years, and notably lower for zinc. No PHC were detected at this location in 2017. None of the reported values exceeded their respective baseline mean concentrations plus 3σ.

For the deep sample at FM-10 (40-50 cm), metals concentrations were similar to those in the shallow sample. The concentrations of most metals were slightly less than previous years; the slightly increased concentration of lead represents a new historical maximum; no sample was collected in 2014. No PHC were detected at this location in 2017. None of the reported values exceeded their respective baseline mean concentrations plus 3σ.

FM-11

Sampling location FM-11 is located downgradient of the landfill, approximately 15 m southeast of the toe. The estimated elevation of this sampling point is only slightly higher than the nearby sea level. As shown in Photograph 381, the area primarily consists of sand and gravel with some vegetation. The soils consisted of grey sand with gravel and stone. Seepage into the hole commenced shortly after it was excavated.

For the shallow sample at FM-11 (0-15 cm), the concentrations of most detected metals were less than or similar to previous years, whereas the concentrations of copper and lead represent new historical maxima. The lead concentration of 21.7 mg/kg exceeded the baseline concentration plus 3σ (10.0 mg/kg). The zinc concentration of 24.6 mg/kg exceeded the baseline concentration plus 3σ (15.0 mg/kg) but remains less than the historical maximum concentration of 53.0 mg/kg reported in 2010. The modified TPH concentration of 102 mg/kg represents a new historical maximum concentration; a modified TPH concentration of 55 mg/kg was reported in 2014. Both F3 (96 mg/kg) and F4 (18 mg/kg) fractions were reported in 2017. It is noted that PCB concentrations of 3.1 mg/kg and 8.8 mg/kg were reported in 2014.

For the deep sample at FM-11 (40-50 cm), most metals concentrations were similar to or less than those in the shallow sample. The concentrations of most metals were less than or similar to previous years, whereas the concentrations of lead and zinc represent new historical maxima. The zinc concentration of 16.3 mg/kg exceeded the baseline concentration plus 3σ (15.0 mg/kg). The modified TPH concentration of 121 mg/kg represents a new historical maximum concentration; a modified TPH concentration of 29 mg/kg was reported in 2012, whereas no PHC were detected in 2014. Concentrations in F3 (115 mg/kg) and F4 (22 mg/kg) fractions were reported in 2017.

FM-12

Sampling location FM-12 is located downgradient of the landfill, approximately 12 m south of the toe. The estimated elevation of this sampling point is only slightly higher than the nearby sea level. As shown in Photograph 384, the area primarily consists of sand and gravel with some vegetation. Ponding is observed in the area along the toe of the landfill. The soils consisted of grey sand with gravel and stone. Seepage into the hole commenced shortly after it was excavated.

For the shallow sample at FM-12 (0-15 cm), the concentrations of all metals were less than or similar to previous years, and was notably lower for zinc. The modified TPH concentration of 19 mg/kg was less than the concentration of 39 mg/kg reported in 2012; no PHC were detected in 2014. A PHC F3 fraction of 13 mg/kg was reported in 2017. None of the reported values exceeded their respective baseline mean concentrations plus 3σ.

Table 4-27: Soil Chemical Analysis Results – Hazmat Storage East Landfill

ID	Depth (cm)	As (mg/kg)	Cd (mg/kg)	Cr (mg/kg)	Co (mg/kg)	Cu (mg/kg)	Pb (mg/kg)	Ni (mg/kg	Zn (mg/kg)	Total PCB (mg/kg)	F1 (mg/kg)	F2 (mg/kg)	F3 (mg/kg)	F4 (mg/kg)
Background Mean		1.00	1.00	20.0	5.00	6.33	10.00	5.00	15.00	0.213	NA	NA	NA	NA
Baseline Mean		**1.23**	**1.00**	**20.0**	**5.00**	**4.37**	**10.00**	**7.15**	**15.00**	**0.003**	**NA**	**NA**	**NA**	**NA**
Baseline + 3σ		2.55	1.00	20.0	5.00	8.76	10.00	9.47	15.00	0.003	NA	NA	NA	NA
Downgradient														
FM-9 Shallow	0-15	<1.0	<0.5	9.9	1.9	3.7	5.0	**7.2**	8.2	<0.05	<7	<4	<8	<6
FM-9 Deep	30-40	<1.0	<0.5	11.5	2.1	**4.5**	5.0	**7.7**	9.3	<0.05	<7	<4	<8	<6
FM-99 Deep (Duplicate)	30-40	**1.8**	<0.5	11.0	2.2	**4.6**	6.3	**7.9**	9.0	<0.05	<7	<4	<8	<6
FM-9 Deep (Dup Avg)	30-40	**1.4**	<0.5	11.3	2.2	**4.6**	5.7	**7.8**	9.2	<0.05	<7	<4	<8	<6
FM-10 Shallow	0-15	<1.0	<0.5	8.7	1.8	3.5	5.7	6.3	8.6	<0.05	<7	<4	<8	<6
FM-10 Deep	40-50	<1.0	<0.5	8.8	1.9	3.1	5.8	6.4	8.7	<0.05	<7	<4	<8	<6
FM-11 Shallow	0-15	<1.0	<0.5	7.8	1.5	**8.5**	**21.7**	4.9	**24.6**	<0.05	<7	<4	96	18
FM-11 Deep	40-50	<1.0	<0.5	7.4	1.3	**5.0**	8.6	5.5	**16.3**	<0.05	<7	<4	115	22
FM-12 Shallow	0-15	<1.0	<0.5	11.8	2.1	**4.7**	7.3	**8.7**	13.7	<0.05	<7	<4	13	<6
FM-12 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.

Shaded Values: Results exceed the Baseline arithmetic mean plus 3σ.

1: The deep soil sample at FM-12 could not be collected due to refusal on rock.

4.6.5 Conclusions and Overall Performance of the Hazmat Storage East Landfill

Based on the visual inspection, there does not appear to be any significant erosion, settlement, exposed waste or indications of instability at the Hazmat Storage East Landfill. Some ponded water, sparse vegetation and vehicle tracks were observed during the 2017 visual inspection. The overall stability performance for this landfill was assessed as Acceptable.

No detectable concentrations of cadmium or PCB were noted in any of the soil samples in 2017. Concentrations of lead and zinc were highest at the shallow sample location FM-11, located downgradient of the southeast side of the landfill, whereas concentrations of cobalt and chromium were highest at the shallow sample location FM-12, located downgradient on the south side of the landfill. For the shallow sample at FM-11, the concentrations of most detected metals were less than or similar to previous years, whereas the concentrations of copper and lead represent new historical maxima. The lead concentration moderately exceeded the baseline concentration plus 3σ. The zinc concentration exceeded the baseline concentration plus 3σ but remains less than the historical maximum concentration reported in 2010. At the deep sample location FM-11, the zinc concentration exceeded the baseline concentration plus 3σ and represents a new historical maximum concentration.

PHC concentrations were noted at both FM-11 sample locations and at the shallow sample location FM-12, at modified TPH concentrations between 19 mg/kg and 121 mg/kg. The modified TPH concentration at both FM-11 locations represent new historical maxima whereas the concentration in the shallow FM-12 sample was less than concentrations reported in previous years.

Whereas most of the environmental sampling results are less than or the same as previous sampling sessions, elevated parameters and increases in some cases (e.g., lead and PHC at FM-11) may be reflective of an ongoing impact from the landfill; however, further data is required to assess this.

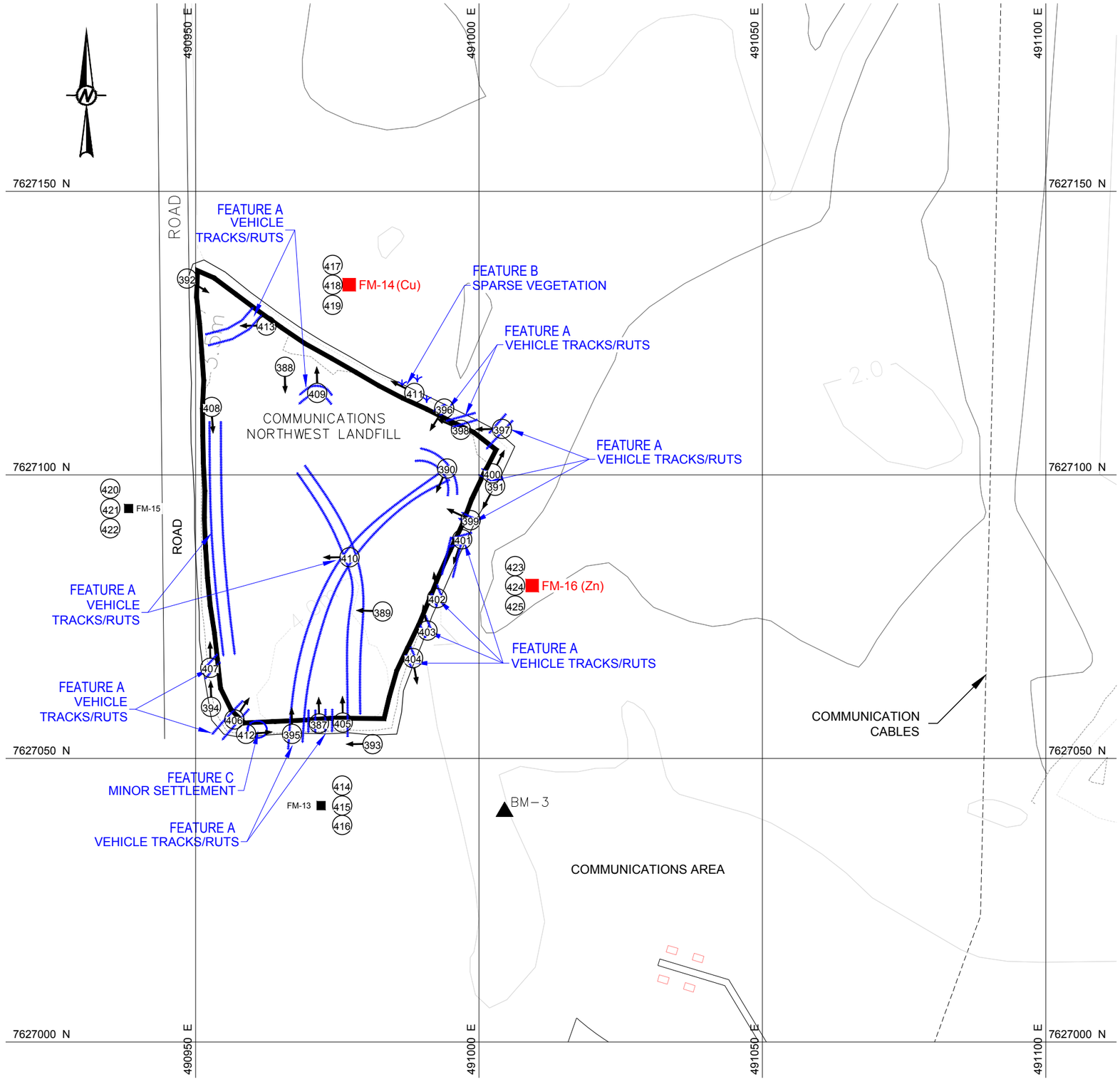
4.6.6 Recommendations for Hazmat Storage East Landfill

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

4.7 Communications Northwest Landfill

4.7.1 Landfill Description

The Communications Northwest Landfill is located off the northwest corner of the tropospheric communications infrastructure pad. The extent of buried debris at this landfill was estimated to be about 2,600 m^2 based on a geophysical survey. Remediation of this landfill included collection of surface debris, regrading and placement of additional granular cover over the waste materials. The area of regraded landfill cover is approximately 3,160 m^2. There are four soil sampling locations and no monitoring wells for this landfill. The long-term monitoring plan for this regraded landfill consists of visual inspection and periodic collection of soil samples. Approximate soil sampling locations for Communication Northwest Landfill are provided in Figure FOX-M.9.



LEGEND:

- PERMANENT BENCHMARK
- SOIL SAMPLING LOCATION
- SOIL SAMPLING LOCATION WITH EXCEEDANCE OF BASELINE MEAN PLUS 3σ
- 413 PHOTOGRAPH VIEWPOINT LOCATION
- 2.0m CONTOURS IN 0.5m INTERVALS
- VEHICLE TRACKS/RUTS
- AREA OF SETTLEMENT
- VEGETATION

NOTES:

1. *LOCATIONS AND SCALE OF FEATURES ARE APPROXIMATE AND SHOWN FOR ILLUSTRATIVE PURPOSES ONLY.*
2. ALL COORDINATES ARE REFERENCED TO NAD83 (CSRS), UTM ZONE 17N.
3. FEATURES DRAWN IN RED ARE EITHER NEW OR EXPANDED.

REFERENCE:

PREVIOUS INSPECTION FIFUGRE PROVIDED BY SENES CONSULTS. PROJECT NO. 350600(-1515-1), DATED FEB.20, 2015.

0 12.5 25
1:750 METRES

CLIENT
DEPARTMENT OF NATIONAL DEFENCE CANADA

PROJECT
2017 FOX-M MONITORING REPORT

TITLE
COMMUNICATIONS NORTHWEST LANDFILL

CONSULTANT
GOLDER

YYYY-MM-DD	2018-01-10
DESIGNED	RM
PREPARED	TDR
REVIEWED	DCJ
APPROVED	DP

PROJECT NO. 1530908 | PHASE 3000 | REV. A | FIGURE FOX-M.9

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

25 mm 0

Path: \\golder.gds\gal\Mississauga\SIM\Client\Public_Works_Canada\Canada99_PRO\A1530908_PWGSC_Dew_Line_Mon_Program_2015_2018\40_PROD\0012_Fox_M_Field_Summary_Report_2017\ | File Name: 1530907-0012-BG-0009.dwg | Last Edited By: trose Date: 2018-02-26 Time:12:29:17 PM | Printed By: trose Date: 2018-03-26 Time:2:41:35 PM

4.7.2 Visual Inspection

The Communications Northwest Landfill exhibits some observed minor settlement, sparse vegetation and vehicle track features. Table 4-28 presents a summary of observed visual inspection features and Table 4-29 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.” Table 4-30 is a log of photographs taken during the 2017 visual inspection.

Based on the 2017 visual inspection, previously observed minor settlement (Feature C) and sparse vegetation (Feature B) have not changed since the last inspection. However, there were slightly more vehicle tracks (Feature A) observed in 2017 compared to the previous inspection. The observed features are not impacting landfill stability.

Table 4-28: Visual Inspection Checklist – Communications Northwest Landfill

SITE NAME: FOX-M Hall Beach
LANDFILL DESIGNATION: Communications Northwest Landfill
DATE OF INSPECTION: August 13, 2017
DATE OF PREVIOUS INSPECTION: August 14, 2014
INSPECTED BY: Reza Moghaddam
REPORT PREPARED BY: Reza Moghaddam
MONITORING EVENT NUMBER: 7
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 4-28: Visual Inspection Checklist – Communications Northwest 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	C	South slope	491,023	7,627,026	0.3	0.3	0.1	<0.1%	Small depression (Acceptable)	Unchanged since previous inspection	412
Erosion	N	-	-	-	-	-	-	-	-	-	-	-
Lateral Movement	N	-	-	-	-	-	-	-	-	-	-	-
Frost Action	N	-	-	-	-	-	-	-	-	-	-	-
Sloughing		-	-	-	-	-	-	-	-	-	-	-
Cracking	N	-	-	-	-	-	-	-	-	-	-	-
Animal Burrows	N	-	-	-	-	-	-	-	-	-	-	-
Vegetation	Y	B	North slope	490,989	7,627,114	5	1	-	0.16%	Sparse vegetation (Acceptable)	Unchanged since previous inspection	411
Staining	N	-	-	-	-	-	-	-	-	-	-	-
Vegetation Stress	N	-	-	-	-	-	-	-	-	-	-	-
Seepage or Ponded Water	N	-	-	-	-	-	-	-	-	-	-	-
Debris and/or Liner Exposed	N	-	-	-	-	-	-	-	-	-	-	-
Presence / Condition of Monitoring Instruments	N	-	-	-	-	-	-	-	-	-	-	-
Features of Note / Other Observations	Y	A	Cover surface and slopes	490,977	7,627,085	150	2	-	9.4%	Vehicle tracks (Acceptable)	Expanded area	398-410

Landfill Area = 3,160m^2

Table 4-29: Preliminary Stability Assessment – Communications Northwest Landfill

Feature	Severity Rating	Extent
Settlement	Acceptable	Isolated
Erosion	Not Observed	-
Lateral Movement	Not Observed	-
Frost Action	Not Observed	-
Sloughing	Not Observed	-
Cracking	Not Observed	-
Animal Burrows	Not Observed	-
Vegetation establishment	Acceptable	Isolated
Staining	Not Observed	-
Vegetation Stress	Not Observed	-
Seepage/Ponded Water	Not Observed	-
Debris and/or liner exposure	Not Observed	-
Other	Acceptable	Numerous
Overall Landfill Performance	**Acceptable**	

Table 4-30: Summary Table of Photographic Log – Communications Northwest Landfill

Photo	Easting	Northing	Date
Photo 387:	490,973	7,627,056	August 13, 2017
Photo 388:	490,966	7,627,119	August 13, 2017
Photo 389:	490,983	7,627,076	August 13, 2017
Photo 390:	490,994	7,627,101	August 13, 2017
Photo 391:	491,003	7,627,098	August 13, 2017
Photo 392:	490,949	7,627,135	August 13, 2017
Photo 393:	490,981	7,627,053	August 13, 2017
Photo 394:	490,953	7,627,059	August 13, 2017
Photo 395:	490,967	7,627,054	August 13, 2017
Photo 396:	490,994	7,627,112	August 13, 2017
Photo 397:	491,004	7,627,108	August 13, 2017
Photo 398:	490,997	7,627,109	August 13, 2017
Photo 399:	490,999	7,627,092	August 13, 2017
Photo 400:	491,002	7,627,100	August 13, 2017
Photo 401:	490,997	7,627,089	August 13, 2017
Photo 402:	490,993	7,627,078	August 13, 2017
Photo 403:	490,991	7,627,073	August 13, 2017
Photo 404:	490,988	7,627,068	August 13, 2017
Photo 405:	490,974	7,627,056	August 13, 2017
Photo 406:	490,957	7,627,057	August 13, 2017

Table 4-30: Summary Table of Photographic Log – Communications Northwest Landfill

Photo	Easting	Northing	Date
Photo 407:	490,953	7,627,066	August 13, 2017
Photo 408:	490,953	7,627,112	August 13, 2017
Photo 409:	490,971	7,627,114	August 13, 2017
Photo 410:	490,977	7,627,085	August 13, 2017
Photo 411:	490,989	7,627,114	August 13, 2017
Photo 412:	491,023	7,627,026	August 13, 2017
Photo 413:	490,963	7,627,126	August 13, 2017

4.7.3 Summary of any Sampling Deviations

The field work was conducted as per the TOR with no exceptions.

4.7.4 Soil Sampling

Table 4-31 presents a summary of analytical results for soil samples collected at the Communications Northwest Landfill. Groundwater flow at this landfill is considered to be radial, and therefore all sample locations are considered to be downgradient.

Table 4-31 also lists the arithmetic mean background and baseline values for the landfill, in addition to the baseline plus 3σ limit. At the Communications Northwest Landfill, the background arithmetic mean for copper and PCB are greater than the baseline arithmetic mean. The background arithmetic mean for PCB is also greater than the baseline mean plus 3σ, as the standard deviation of the baseline mean value was zero. Additionally, the arithmetic mean baseline and the baseline concentrations plus 3σ are the same for cadmium, chromium, cobalt, lead and zinc, which reflects the fact that baseline concentrations of these parameters were primarily at or below laboratory detection limits.

There was no arsenic or cadmium detected in any of the soil samples at the Communications Northwest Landfill in 2017. There were no detections of PCB at any location surrounding this landfill in 2017.

FM-13

Sampling location FM-13 is located downgradient of the landfill, approximately 12 m south of the toe. The estimated elevation of this sampling point is 2.5 masl. As shown in Photograph 414, the area primarily consists of sand and gravel and is not vegetated. The soils consisted of grey sand with gravel and stone.

For the shallow sample at FM-13 (0-15 cm), the concentrations of most detected metals were similar to those reported in previous years, with the exception of zinc (lower) and lead (higher). No PHC were detected at this location in 2017. None of the reported values exceeded their respective baseline mean concentrations plus 3σ.

For the deep sample at FM-13 (30-40 cm), all detected metal concentrations were also similar to those in the shallow sample. The concentrations of most metals were less than or similar to previous years; the concentration of lead increased marginally and represents a new historical maximum. No PHC were detected at this location in 2017. None of the reported values exceeded their respective baseline mean concentrations plus 3σ.

FM-14

Sampling location FM-14 is located downgradient of the landfill, approximately 12 m north of the toe. The estimated elevation of this sampling point is 2.5 masl. As shown in Photograph 417, the area primarily consists of sand and gravel with established vegetation. The soils consisted of grey sand with gravel and stone.

For the shallow sample at FM-14 (0-15 cm), the concentrations of most metals were similar to those reported in previous years; the concentration of copper increased slightly and represents a new historical maximum. The concentration of copper (14.2 mg/kg) slightly exceeded the baseline mean concentration plus 3σ (10.8 mg/kg). The modified TPH concentration of 34 mg/kg was greater than the concentration reported in 2014 (23 mg/kg) but less than the concentration reported in 2012 (56 mg/kg). A PHC F3 fraction of 28 mg/kg was reported in 2017.

For the deep sample at FM-14 (40-50 cm), most metals concentrations were slightly greater than those in the shallow sample. The concentrations of most metals were similar to those reported in previous years; the slight increase in the concentration of chromium represents a new historical maximum, whereas the decrease in zinc results in a decline to below the exceedance of baseline mean concentrations plus 3σ. No PHC were detected at this location in 2017. None of the reported values exceeded their respective baseline mean concentrations plus 3σ.

FM-15

Sampling location FM-15 is located downgradient of the landfill, approximately 11 m west of the toe. The estimated elevation of this sampling point is 2.5 masl. As shown in Photograph 420, the area primarily consists of sand and gravel with established vegetation. The soils consisted of grey sand with gravel and stone. Seepage into the hole commenced shortly after it was excavated.

For the shallow sample at FM-15 (0-15 cm), the concentrations of all metals were similar to those reported in previous years. The modified TPH concentration of 22 mg/kg remains well below the concentrations reported in 2012 and 2014 (185 mg/kg and 150 mg/kg, respectively). A PHC F3 fraction of 16 mg/kg was reported in 2017. No cobalt was detected at this location in 2017. None of the reported values exceeded their respective baseline mean concentrations plus 3σ.

For the deep sample at FM-15 (30-40 cm), all detected metals concentrations were slightly greater than those in the shallow sample. The concentrations of most metals were similar to those reported in previous years; the slight increase in the concentration of lead represents a new historical maximum. The modified TPH concentration of 24 mg/kg was less than the concentration of 111 mg/kg was reported in 2012; no PHC were detected in 2014. Both F3 (18 mg/kg) and F4 (8 mg/kg) fractions were detected in 2017. None of the reported values exceeded their respective baseline mean concentrations plus 3σ.

FM-16

Sampling location FM-16 is located downgradient of the landfill, approximately 12 m east of the toe. The estimated elevation of this sampling point is 2.5 masl. As shown in Photograph 423, the area primarily consists of sand and gravel with established vegetation. The soils consisted of grey sand with gravel and stone. Seepage into the hole commenced shortly after it was excavated.

For the shallow sample at FM-16 (0-15 cm), the concentrations of all metals were less than or similar to those reported in previous years, and most metals were notably lower than in 2014. No PHC were detected at this location in 2017. None of the reported values exceeded their respective baseline mean concentrations plus 3σ.

For the deep sample at FM-16 (40-50 cm), most metals concentrations were similar to those in the shallow sample. The concentrations of all metals were similar to those reported in previous years. The concentration of zinc (21.3 mg/kg) moderately exceeded the baseline mean concentration plus 3σ (15.0 mg/kg) but remains below the historical maximum concentration reported in 2008 (24.0 mg/kg). No PHC were detected at this location in 2017.

Table 4-31: Soil Chemical Analysis Results – Communications Northwest Landfill

ID	Depth (cm)	As (mg/kg)	Cd (mg/kg)	Cr (mg/kg)	Co (mg/kg)	Cu (mg/kg)	Pb (mg/kg)	Ni (mg/kg	Zn (mg/kg)	Total PCB (mg/kg)	F1 (mg/kg)	F2 (mg/kg)	F3 (mg/kg)	F4 (mg/kg)
Background Mean		1.00	1.00	20.0	5.00	6.33	10.00	5.00	15.00	0.213	NA	NA	NA	NA
Baseline Mean		**1.75**	**1.00**	**20.0**	**5.00**	**6.03**	**10.00**	**8.30**	**15.00**	**0.10**	**NA**	**NA**	**NA**	**NA**
Baseline + 3σ		4.80	1.00	20.0	5.00	10.75	10.00	19.68	15.00	0.10	NA	NA	NA	NA
Downgradient														
FM-13 Shallow	0-15	<1.0	<0.5	11.0	2.4	5.4	9.2	8.0	12.1	<0.05	<7	<4	<8	<6
FM-13 Deep	30-40	<1.0	<0.5	8.9	1.9	3.6	5.5	7.1	8.4	<0.05	<7	<4	<8	<6
FM-14 Shallow	0-15	<1.0	<0.5	7.7	1.6	**14.2**	6.7	7.9	8.3	<0.05	<7	<4	28	<6
FM-14 Deep	40-50	<1.0	<0.5	16.0	2.8	**8.1**	7.0	**11.6**	14.9	<0.05	<7	<4	<8	<6
FM-15 Shallow	0-15	<1.0	<0.5	3.9	<1.0	3.2	3.8	6.9	3.6	<0.05	<7	<4	16	<6
FM-15 Deep	30-40	<1.0	<0.5	12.6	2.1	5.2	6.1	8.0	11.1	<0.05	<7	<4	18	8
FM-16 Shallow	0-15	<1.0	<0.5	12.3	2.3	5.5	8.4	**9.2**	12.8	<0.05	<7	<4	<8	<6
FM-16 Deep	40-50	<1.0	<0.5	9.0	1.9	**6.4**	8.2	7.3	**21.3**	<0.05	<7	<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.
Shaded Values: Results exceed the Baseline arithmetic mean plus 3σ.

4.7.5 Conclusions and Overall Performance of the Communications Northwest Landfill

Based on the visual inspection, there does not appear to be any significant erosion, settlement, exposed waste or indications of instability at the Communications Northwest Landfill. Previously observed minor settlement and sparse vegetation were observed to be unchanged in 2017. The overall stability performance of this landfill was assessed as Acceptable.

Groundwater flow at this landfill is considered to be radial, and therefore all sample locations are considered to be downgradient. No detectable concentrations of arsenic, cadmium or PCB were noted in any of the soil samples in 2017. The concentrations of chromium, cobalt and nickel were slightly higher at sample location FM-14, located downgradient of the north side of the landfill; the concentration of chromium represents a new historical maximum. Similarly, at the remaining sampling locations, most metals concentrations similar to those observed in previous years. The concentration of copper (14.2 mg/kg) at shallow sample location FM-14 exceeded the baseline mean concentration plus 3σ (10.8 mg/kg) and the slight increase in 2017 represents a new historical maximum. The concentration of zinc (21.3 mg/kg) from the deep sample location FM-16 moderately exceeded the concentration plus 3σ (15.0 mg/kg), but remains below the historical maximum concentration reported in 2008 (24.0 mg/kg).

PHC were detected at the FM-14 and FM-15 at modified TPH concentrations between 22 mg/kg and 34 mg/kg. The modified TPH concentrations at these locations were less than or similar to those reported in previous years.

Based on the results, there does not appear to be significant impact to soil quality from the landfill.

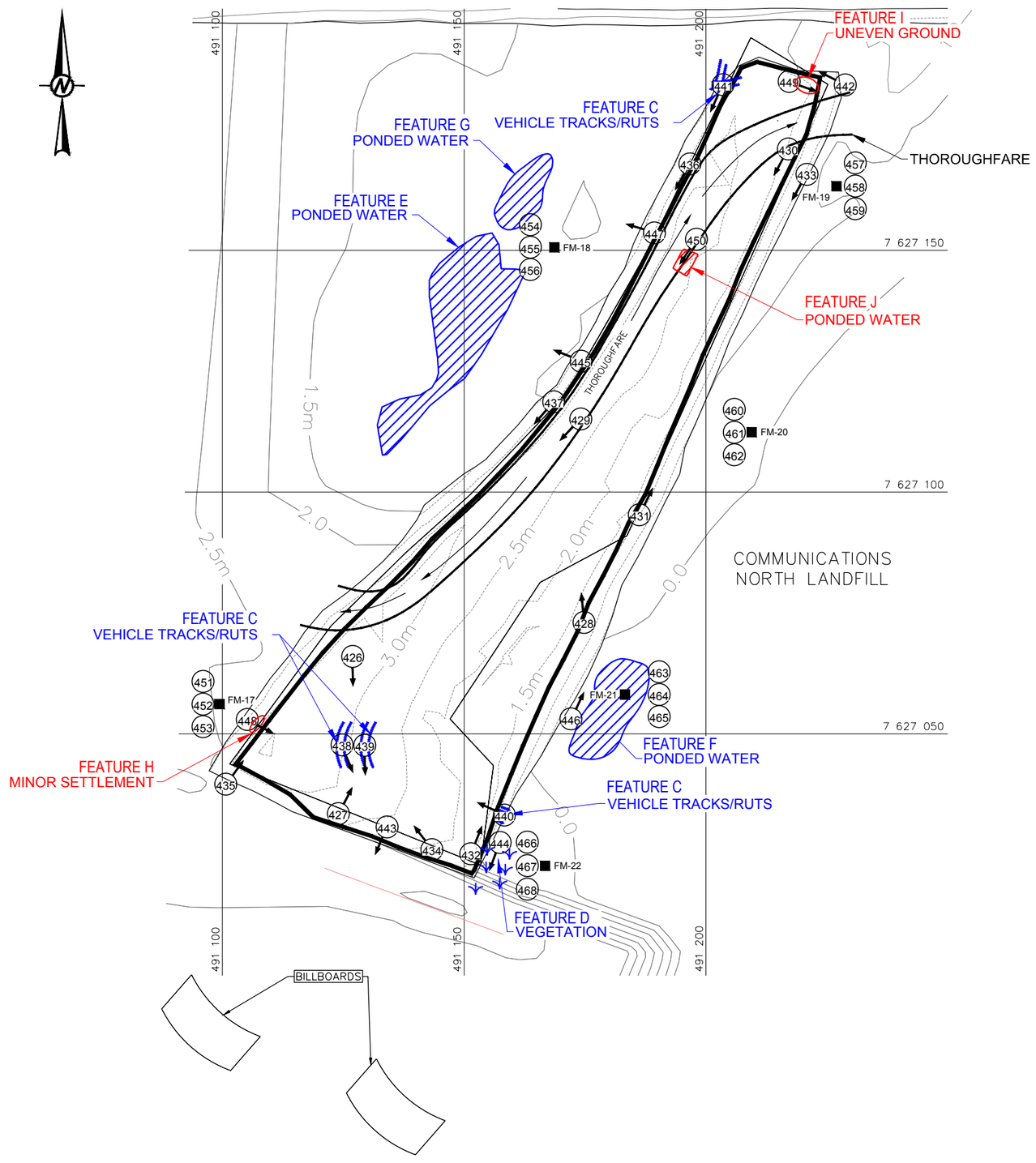
4.7.6 Recommendations for Communications Northwest Landfill

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

4.8 Communications North Landfill

4.8.1 Landfill Description

The Communications North Landfill is located north of the billboards and communications infrastructure pad. Based on the results of a geophysical survey, buried waste extends over an area approximately 180 m long and varying in width from 50 m at the south end to 15 m at the north end. Remediation of this landfill included collection of surface debris, regrading and placement of additional granular cover over the waste materials. The area of the regraded landfill cover is approximately 7,000 m^2. The surface of the landfill slopes downward from its northwest side to its southwest side. It has six soil sampling locations and no monitoring wells. The long-term monitoring plan for this landfill consists of visual inspection and the periodic collection of soil samples. Approximate soil sampling locations for Communications North Landfill are provided on Figure FOX-M.10.



LEGEND:

- SOIL SAMPLING LOCATION
- PHOTOGRAPH VIEWPOINT LOCATION
- CONTOURS IN 0.5m INTERVALS
- VEHICLE TRACKS/RUTS
- PONDED WATER
- VEGETATION
- SETTLEMENT

NOTES:

1. *LOCATIONS AND SCALE OF FEATURES ARE APPROXIMATE AND SHOWN FOR ILLUSTRATIVE PURPOSES ONLY.*
2. ALL COORDINATES ARE REFERENCED TO NAD83 (CSRS), UTM ZONE 17N.
3. FEATURES DRAWN IN RED ARE EITHER NEW OR EXPANDED.

REFERENCE:

PREVIOUS INSPECTION FIFUGRE PROVIDED BY SENES CONSULTS. PROJECT NO. 350600(-1515-1), DATED FEB.20, 2015.

0 25 50
1:1,000 METRES

CLIENT
DEPARTMENT OF NATIONAL DEFENCE CANADA

PROJECT
2017 FOX-M MONITORING REPORT

TITLE
COMMUNICATIONS NORTH LANDFILL

CONSULTANT
GOLDER

YYYY-MM-DD	2018-01-10
DESIGNED	RM
PREPARED	TDR
REVIEWED	DCJ
APPROVED	DP

PROJECT NO. 1530908 | PHASE 3000 | REV. A | FIGURE FOX-M.10

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

25 mm

0

Path: \\golder.gds\gal\Mississauga\SIM\Client\Public_Works_Canada\Canada99_PROJ\1530908_FWGSC_Dew_Line_Mon_Program_2015_2018\40_PROD\0012_Fox_M_Field_Summary_Report_2017\ | File Name: 1530907-0012-BG-0010.dwg | Last Edited By: trose Date: 2018-02-26 Time:12:33:47 PM | Printed By: trose Date: 2018-03-26 Time:2:42:51 PM

© 2017.

4.8.2 Visual Inspection

The Communications North Landfill has some observed minor settlement and uneven ground, ponded water, vehicle tracks and sparse vegetation features. Table 4-32 presents a summary of observed visual inspection features and Table 4-33 presents the Preliminary Stability Assessment results. This landfill was assessed to have an “Acceptable” overall stability performance because all observed features were assessed as “Acceptable.” Table 4-34 is a log of photographs taken during the 2017 visual inspection.

A new minor settlement area (new Feature H) was observed on the west slope in 2017. In addition, a new area of uneven ground (new Feature I) was observed at the north crest. Previously observed ponded water along the west toe of the landfill (Feature E) was observed to be the same as the previous inspection (i.e., unchanged). Ponded water was observed in 2017 along the east and west toe of the landfill (Features F and G) in areas where water was observed previously in 2012 but not observed during the last inspection in 2014. Some new ponded water was observed on the “thoroughfare”, traveled portion of the cover surface in 2017 (Feature J). Previously observed vehicle tracks on the cover surface (Feature C) appear to be unchanged since the last inspection. Some sparse vegetation was observed at the southeast toe of the landfill in 2017 (Feature D) where ponded water had been reported in 2014; however, no ponded water was observed here in 2017. The observed features at this landfill do not appear to be having a negative impact on landfill stability.

Table 4-32: Visual Inspection Checklist – Communications North Landfill

SITE NAME: FOX-M Hall Beach
LANDFILL DESIGNATION: Communications North Landfill
DATE OF INSPECTION: August 13, 2017
DATE OF PREVIOUS INSPECTION: August 15, 2014
INSPECTED BY: Reza Moghaddam
REPORT PREPARED BY: Reza Moghaddam
MONITORING EVENT NUMBER: 7
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 4-32: Visual Inspection Checklist – Communications North 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	H	West slope	491,105	7,627,053	1.5	0.5	0.2	0.011%	Minor settlement (Acceptable)	New	448
	Y	I	North crest	491,217	7,627,185	6	4	-	0.57%	Uneven ground (Acceptable)	New	449
Erosion	N	-	-	-	-	-	-	-	-	-	-	-
Lateral Movement	N	-	-	-	-	-	-	-	-	-	-	-
Frost Action	N	-	-	-	-	-	-	-	-	-	-	-
Sloughing	N	-	-	-	-	-	-	-	-	-	-	-
Cracking	N	-	-	-	-	-	-	-	-	-	-	-
Animal Burrows	N	-	-	-	-	-	-	-	-	-	-	-
Vegetation	Y	D	Southeast toe	491,157	7,627,028	8	5	-	0.57%	Sparse vegetation (Acceptable)	Previously noted as ponded water	444
Staining	N	-	-	-	-	-	-	-	-	-	-	-
Vegetation Stress	N	-	-	-	-	-	-	-	-	-	-	-

Table 4-32: Visual Inspection Checklist – Communications North 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
Seepage or Ponded Water	Y	E	West toe	491,152	7,627,139	50	15	0.2	7.7%	Ponded water (Acceptable)	Unchanged since previous inspection	445
	Y	F	East toe	491,172	7,627,053	20	10	0.05	0.5%	Ponded water (Acceptable)	Previously observed in 2012 but not in 2014	446
	Y	G	West toe	491,163	7,627,162	15	5	0.2	1.07%	Ponded water (Acceptable)	Previously observed in 2012 but not in 2014	447
	Y	J	Cover surface	491,198	7,627,152	5	2	0.03	0.144%	Ponded water (Acceptable)	New	450
Debris and/or Liner Exposed	N	A and B	-	-	-	-	-	-	-	Previously reported surficial debris	Not buried waste that has become exposed	-
Presence / Condition of Monitoring Instruments	N	-	-	-	-	-	-	-	-	-	-	-
Features of Note / Other Observations	Y	C	Cover surface and slopes	491,125	7,627,048	30	2	-	0.86%	Vehicle tracks (Acceptable)	Unchanged since previous inspection	438,439, 440, 441

Landfill Area = 6,966 m^2.

Table 4-33: Preliminary Stability Assessment – Communications North Landfill

Feature	Severity Rating	Extent
Settlement	Acceptable	Occasional
Erosion	Not Observed	-
Lateral Movement	Not Observed	-
Frost Action	Not Observed	-
Sloughing	Not Observed	-
Cracking	Not Observed	-
Animal Burrows	Not Observed	-
Vegetation establishment	Acceptable	Isolated
Staining	Not Observed	-
Vegetation Stress	Not Observed	-
Seepage/Ponded Water	Acceptable	Occasional
Debris and/or liner exposure	Not Observed	-
Other	Acceptable	Occasional
Overall Landfill Performance	**Acceptable**	

Table 4-34: Summary Table of Photographic Log – Communications North Landfill

Photo	Easting	Northing	Date
Photo 426:	491,127	7,627,066	August 13, 2017
Photo 427:	491,124	7,627,034	August 13, 2017
Photo 428:	491,175	7,627,073	August 13, 2017
Photo 429:	491,174	7,627,115	August 13, 2017
Photo 430:	491,217	7,627,171	August 13, 2017
Photo 431:	491,186	7,627,096	August 13, 2017
Photo 432:	491,151	7,627,025	August 13, 2017
Photo 433:	491,221	7,627,166	August 13, 2017
Photo 434:	491,143	7,627,026	August 13, 2017
Photo 435:	491,101	7,627,040	August 13, 2017
Photo 436:	491,197	7,627,168	August 13, 2017
Photo 437:	491,169	7,627,119	August 13, 2017
Photo 438:	491,125	7,627,048	August 13, 2017
Photo 439:	491,129	7,627,048	August 13, 2017
Photo 440:	491,158	7,627,033	August 13, 2017
Photo 441:	491,204	7,627,184	August 13, 2017
Photo 442:	491,229	7,627,184	August 13, 2017
Photo 443:	491,134	7,627,031	August 13, 2017
Photo 444:	491,157	7,627,028	August 13, 2017
Photo 445:	491,152	7,627,139	August 13, 2017

Table 4-34: Summary Table of Photographic Log – Communications North Landfill

Photo	Easting	Northing	Date
Photo 446:	491,172	7,627,053	August 13, 2017
Photo 447:	491,163	7,627,162	August 13, 2017
Photo 448:	491,105	7,627,053	August 13, 2017
Photo 449:	491,217	7,627,185	August 13, 2017
Photo 450:	491,198	7,627,152	August 13, 2017

4.8.3 Summary of any Sampling Deviations

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

- The deep soil sample at FM-21 could not be collected due to refusal on rock.

4.8.4 Soil Sampling

Table 4-35 presents a summary of analytical results for soil samples collected at the Communications North Landfill. Groundwater flow at this landfill is considered to be radial, and therefore all sample locations are considered to be downgradient.

Table 4-35 also lists the arithmetic mean background and baseline values for the landfill, in addition to the baseline plus 3σ limit. At the Communications North Landfill, the background arithmetic mean for copper and PCB are greater than the baseline arithmetic mean. The background arithmetic mean for PCB is also greater than the baseline mean plus 3σ, as the standard deviation of the baseline mean value was zero. Additionally, the arithmetic mean baseline and the baseline concentrations plus 3σ are the same for cadmium, chromium, cobalt, lead and zinc, which reflects the fact that baseline concentrations of these parameters were primarily at or below laboratory detection limits.

There was no arsenic or cadmium detected in any of the soil samples at the Communications North Landfill in 2017. There were no detections of PHC or PCB at any location surrounding this landfill in 2017

FM-17

Sampling location FM-17 is located downgradient of the landfill, approximately 5 m west of the toe. The estimated elevation of this sampling point is 2.5 masl. As shown in Photograph 451, the area primarily consists of sand and gravel and is sparsely vegetated. The soils consisted of grey sand with gravel and stone.

For the shallow sample at FM-17 (0-15 cm), the concentrations of most metals were less than or similar to those reported in previous years, whereas the slight increase in the concentration of lead represents a new historical maximum. The decrease in the concentration of zinc to below baseline mean concentrations plus 3σ is noted. No arsenic, cadmium, PHC or PCB were detected at this location in 2017. None of the reported values exceeded their respective baseline mean concentrations plus 3σ.

For the deep sample at FM-17 (30-40 cm), metals concentrations were similar to those in the shallow sample. The concentrations of most metals were similar to previous years; the slight increase in the concentration of lead represents a new historical maximum. The decrease in the concentration of copper to below baseline mean concentrations plus 3σ is noted. None of the reported values exceeded their respective baseline mean concentrations plus 3σ.

FM-18

Sampling location FM-18 is located downgradient of the landfill, approximately 13 m west of the toe, between two ponded water features. The estimated elevation of this sampling point is 1.5 masl. As shown in Photograph 454, the area primarily consists of sand and gravel and is not vegetated. The soils consisted of grey sand with gravel and stone.

For the shallow sample at FM-18 (0-15 cm), the concentrations of most metals were slightly higher or similar to those reported in 2010 and 2012. The slight increase in the concentrations of copper and lead reported in 2017 represent new historical maxima. None of the reported values exceeded their respective baseline mean concentrations plus 3σ.

For the deep sample at FM-18 (40-50 cm), metals concentrations were similar those in the shallow sample. The concentrations of all metals were less than or similar to previous years; the concentrations of nickel and zinc declined to below their respective baseline mean concentrations plus 3σ. No sample was collected in 2014. None of the reported values exceeded their respective baseline mean concentrations plus 3σ.

FM-19

Sampling location FM-19 is located downgradient of the landfill, approximately 7 m east of the toe. The estimated elevation of this sampling point is 0.5 masl. As shown in Photograph 457, the area primarily consists of sand and gravel and is sparsely vegetated. The soils consisted of grey sand with gravel and stone.

For the shallow sample at FM-19 (0-15 cm), the concentrations of most metals were similar to those reported in previous years, whereas; slight increases in the concentrations of copper and lead represent new historical maxima. None of the reported values exceeded their respective baseline mean concentrations plus 3σ.

For the deep sample at FM-19 (40-50 cm), metals concentrations were similar those in the shallow sample. The concentrations of most metals were similar to previous years, whereas the slight increase in the concentration of lead represents a new historical maximum. The concentration of zinc declined to below the baseline mean concentrations plus 3σ. None of the reported values exceeded their respective baseline mean concentrations plus 3σ.

FM-20

Sampling location FM-20 is located downgradient of the landfill, approximately 12 m east of the toe. The estimated elevation of this sampling point is 0 masl. As shown in Photograph 460, the area primarily consists of sand and gravel with some vegetation. The soils consisted of grey sand with gravel and stone. Seepage into the hole commenced shortly after it was excavated.

For the shallow sample at FM-20 (0-15 cm), the concentrations of most metals were similar to those reported in previous years, whereas the slight increase in the concentration of lead represent new historical maximum. The concentration of zinc declined to below the baseline mean concentrations plus 3σ. None of the reported values exceeded their respective baseline mean concentrations plus 3σ.

For the deep sample at FM-20 (40-50 cm), most metals concentrations were similar to those in the shallow sample and were similar to previous years. The concentration of zinc declined to below the baseline mean concentrations plus 3σ. None of the reported values exceeded their respective baseline mean concentrations plus 3σ.

FM-21

Sampling location FM-21 is located downgradient of the landfill, approximately 8 m east of the toe, in an area surrounded by very shallow ponded water (puddles). The estimated elevation of this sampling point is 0 masl. As shown in Photograph 463, the area primarily consists of sand and gravel and is not vegetated. The soils consisted of grey sand with gravel and stone. Seepage into the hole commenced shortly after it was excavated.

For the shallow sample at FM-21 (0-15 cm), the concentrations of metals were similar to those reported in previous years, whereas the slight increase in the concentration of lead represent new historical maximum. None of the reported values exceeded their respective baseline mean concentrations plus 3σ.

FM-22

Sampling location FM-22 is located downgradient of the landfill, approximately 10 m east of the toe. The estimated elevation of this sampling point is 0.5 masl. As shown in Photograph 466, the area primarily consists of sand and gravel with established vegetation. The soils consisted of grey sand with gravel and stone.

For the shallow sample at FM-22 (0-15 cm), the concentrations of most metals were similar to those reported in previous years; the slight increase in the concentration of lead represents a new historical maximum. None of the reported values exceeded their respective baseline mean concentrations plus 3σ.

For the deep sample at FM-22 (30-40 cm, duplicate location), metals concentrations were similar to those in the shallow sample and similar to previous years; the slight increases in the concentrations of copper and lead represent new historical maxima. None of the reported values exceeded their respective baseline mean concentrations plus 3σ.

Table 4-35: Soil Chemical Analysis Results – Communications North Landfill

ID	Depth (cm)	As (mg/kg)	Cd (mg/kg)	Cr (mg/kg)	Co (mg/kg)	Cu (mg/kg)	Pb (mg/kg)	Ni (mg/kg	Zn (mg/kg)	Total PCB (mg/kg)	F1 (mg/kg)	F2 (mg/kg)	F3 (mg/kg)	F4 (mg/kg)
Background Mean		1.00	1.00	20.0	5.00	6.33	10.00	5.00	15.00	0.213	NA	NA	NA	NA
Baseline Mean		**1.84**	**1.00**	**20.0**	**5.00**	**5.69**	**10.00**	**7.83**	**15.30**	**0.10**	**NA**	**NA**	**NA**	**NA**
Baseline + 3σ		4.65	1.00	20.0	5.00	11.49	10.00	14.01	15.30	0.10	NA	NA	NA	NA
Downgradient														
FM-17 Shallow	0-15	<1.0	<0.5	12.0	2.6	5.1	6.8	**10.8**	10.1	<0.05	<7	<4	<8	<6
FM-17 Deep	30-40	<1.0	<0.5	11.3	2.3	4.7	5.6	**9.1**	11.0	<0.05	<7	<4	<8	<6
FM-18 Shallow	0-15	<1.0	<0.5	11.6	2.3	4.9	7.9	**9.9**	10.3	<0.05	<7	<4	<8	<6
FM-18 Deep	40-50	<1.0	<0.5	11.4	2.2	4.7	9.0	**9.2**	9.9	<0.05	<7	<4	<8	<6
FM-19 Shallow	0-15	<1.0	<0.5	9.6	2.3	**5.9**	7.4	7.7	11.2	<0.05	<7	<4	<8	<6
FM-19 Deep	40-50	<1.0	<0.5	9.0	1.8	**6.4**	6.8	7.4	12.7	<0.05	<7	<4	<8	<6
FM-20 Shallow	0-15	<1.0	<0.5	11.5	2.7	4.6	6.5	**10.0**	12.0	<0.05	<7	<4	<8	<6
FM-20 Deep	40-50	<1.0	<0.5	12.4	2.9	**5.7**	7.8	**9.9**	14.8	<0.05	<7	<4	<8	<6
FM-21 Shallow	0-15	<1.0	<0.5	11.2	2.3	4.4	6.4	**9.8**	9.6	<0.05	<7	<4	<8	<6
FM-21 Deep [1]														
FM-22 Shallow	0-15	<1.0	<0.5	11.5	2.1	5.6	7.3	**9.5**	8.9	<0.05	<7	<4	<8	<6
FM-22 Deep	30-40	<1.0	<0.5	10.9	2.3	4.8	5.6	**9.6**	9.1	<0.05	<7	<4	<8	<6

Table 4-35: Soil Chemical Analysis Results – Communications North Landfill

ID	Depth (cm)	As (mg/kg)	Cd (mg/kg)	Cr (mg/kg)	Co (mg/kg)	Cu (mg/kg)	Pb (mg/kg)	Ni (mg/kg	Zn (mg/kg)	Total PCB (mg/kg)	F1 (mg/kg)	F2 (mg/kg)	F3 (mg/kg)	F4 (mg/kg)
Background Mean		1.00	1.00	20.0	5.00	6.33	10.00	5.00	15.00	0.213	NA	NA	NA	NA
Baseline Mean		**1.84**	**1.00**	**20.0**	**5.00**	**5.69**	**10.00**	**7.83**	**15.30**	**0.10**	**NA**	**NA**	**NA**	**NA**
Baseline + 3σ		4.65	1.00	20.0	5.00	11.49	10.00	14.01	15.30	0.10	NA	NA	NA	NA
FM-922 Deep (Duplicate)	30-40	<1.0	<0.5	11.3	2.3	5.3	4.9	**9.0**	9.6	<0.05	<7	<4	<8	<6
FM-22 Deep (Dup Avg)	30-40	<1.0	<0.5	11.1	2.3	5.1	5.3	**9.3**	9.4	<0.05	<7	<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.

Shaded Values: Results exceed the Baseline arithmetic mean plus 3σ.

1: The deep soil sample at FM-21 could not be collected due to refusal on rock.

4.8.5 Conclusions and Overall Performance of the Communications North Landfill

Based on the visual inspection, there does not appear to be any significant erosion, settlement, exposed waste or indications of instability at the Communications North Landfill. Some minor settlement, ponded water areas, sparse vegetation and vehicle tracks were observed in 2017. The overall stability performance of this landfill was assessed as Acceptable.

No detectable concentrations of arsenic, cadmium PHC or PCB were noted in any of the soil samples in 2017, with the exception of arsenic at FM-21 (deep), located downgradient of the east side of the landfill. Similar concentrations of metals were observed at all six sampling locations. At all six locations, the concentrations of most metals were similar to those reported in previous years. It is noted that at a number of locations, the slight increases in the concentrations of copper and lead represented new historical maxima. None of the reported values exceeded their respective baseline mean concentrations plus 3σ.

Overall, there is no evident ongoing impact of the landfill on soil quality.

4.8.6 Recommendations for Communications North Landfill

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 three DEW Line sites monitored in 2017 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 for FOX-M are contained in Appendix C. The lab report for groundwater at CAM-5 is also included because it contains the field blank analysis for FOX-M.

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;
- PCB in soil: 365 days;
- PHC-F1 in soil: 48 hours (unpreserved), PHC-F1 in water (preserved): 14 days
- PHC F2-F4 in soil: 14 days, PHC F2-F4 in water (preserved): 14 days

At FOX-M, the soil and groundwater sampling was carried out on August 10, 13 and 14, 2017 and the samples were all received at Paracel on August 18, 2017, four to eight days later, thus all of the field samples with the exception of PHC-F1 in soil, met their respective hold times. The maximum hold time was exceeded for PHC-F1 in soil 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 years (i.e., for comparison to previous monitoring data in the program) and because PHC-F1 preservation would require methanol which might cause the sample shipment to be delayed.

The sample date on the FOX-M trip blank corresponds to the date it was prepared at the lab (July 13, 2017), thus it is shown as over its hold time; however, this was intended because it had to be carried over the duration of the entire travel from the lab to FOX-M and back.

With groundwater samples for PHC now being preserved as of the 2017 monitoring none of them exceeded their hold times.

The samples were packed in coolers with ice prior to shipping and sent with instructions "Keep Cold" on First Air. They were stored in a walk-in refrigerator at First Air cargo upon arrival in Ottawa until Golder picked them up. The temperature recorded by Paracel upon reception of the batch of CAM-5 samples was 19ºC; however, we have confirmed with Paracel that the temperature is measured once per shipment received with a handheld infrared temperature reader pointed into a single cooler. The samples were only unrefrigerated during the two or three hours that they were being checked at Golder's lab in Ottawa just prior to same-day delivery to Paracel, then repacked in coolers with cold gel packs. The sample jars or bottles comprising each soil or groundwater sample were packed together in plastic Ziploc® bags. Based on our review of procedures, we expect that the exterior temperature of the Ziploc® bag which had warmed up during sample inspection in our lab is what was read by the IR temperature reader and was not representative of the interior temperature of the soil or water contained within.

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 lab blanks, spikes and surrogate recoveries. Paracel analyzed the FOX-M samples in two batches for the soil and one batch for the water. For each batch, they performed blank and spike analyses on water and soil, and a surrogate recovery for soil. The analyses of blanks were all non-detect. The spike recovery percentages and the surrogate recovery were within their acceptable data quality objectives, in every case. The accuracy of the results is therefore considered to be not an issue. Paracel was able to achieve the project's MDLs for soil and groundwater.

5.3 Reliability

Reliability is a measure of certainty that the concentrations reported by the lab are reliable indicators of field conditions and have not been affected other sources of contamination. The analysis of blanks provides a measure of reliability. A set of bottles of deionized water for Trip Blanks accompanied the team to FOX-M. These bottles were not opened at the site. The analytical reports indicate that no parameter was detected in the Trip Blank at the end of the trip.

A Field Blank was prepared at the FOX-M site by pouring deionized water into sample bottles. It was analyzed for every parameter in the scope of work. Zinc was the only parameter detected in the Field Blank, and it was detected at twice the detection limit.

Two Equipment Blanks were prepared at FOX-M: one to test the decontamination of the groundwater probe, and the other to test the decontamination of the shovel used to dig test pits. The Shovel Blank was non-detect for every parameter; however, zinc was detected in the Probe Blank at about twice the detection limit.

Given that zinc was detected at similar concentrations in the Shovel, Probe and Trip blanks at the other sites in the QIKIQ program in 2017 (DYE-M and CAM-5) and it was prepared from the same batch of deionized water, it was likely present in the water and not introduced in the field. Paracel confirmed that the batch of deionized water that was sent to the field for blanks and sterilization purposes had been prepared five weeks prior to its return to the lab, and was tested upon production and had no detection of any parameter; however, the pattern of occurrence of low levels of zinc in several water blanks in the QIKIQ program in 2017 suggests that the deionized water acquired some dissolved zinc somewhere in its path from the lab to field and back to the lab. Given the minute concentrations of zinc detected in the probe blank and the minimal contact between the probe and the water being sampled, and the fact that three monitoring well samples from FOX-M had non-detection of zinc in groundwater, it is concluded that the zinc detected in the probe blank is not influencing the results of the collected samples.

The Trip Blank, Field Blank and two Equipment Blank sample results are summarized in the table below.

Field, Trip and Equipment Blank Samples (mg/L)

ID	As*	Cd*	Cr*	Co*	Cu	Pb	Ni	Zn	F1	F2	F3	F4
Trip Blank	<0.001	<0.0001	<0.001	<0.0005	<0.0005	<0.0001	<0.001	<0.005	<0.025	<0.1	<0.1	<0.1
Field Blank	<0.001	<0.0001	<0.001	<0.0005	<0.0005	<0.0001	<0.001	**0.01**	<0.025	<0.1	<0.1	<0.1
Shovel Blank	<0.001	<0.0001	<0.001	<0.0005	<0.0005	<0.0001	<0.001	<0.005	<0.025	<0.1	<0.1	<0.1
Probe Blank	<0.001	<0.0001	<0.001	<0.0005	<0.0005	<0.0001	<0.001	**0.01**	<0.025	<0.1	<0.1	<0.1

Note: **bold** indicates detection in a blank sample.

5.4 Reproducibility (Duplicate Analysis)

The reproducibility of lab results was measured through the comparative analysis of field duplicate samples. Duplicate soil samples were prepared in the field, in the test pit being sampled, by taking portions of soil and alternately filling the sample jars for the original and duplicate samples. Duplicate groundwater samples were prepared by alternately filling bottles for each lab for each parameter type. Unlike previous years, the duplicate samples were analyzed at the same lab as the rest of the samples: Paracel Labs in Ottawa.

Paracel Labs also performed their own internal duplicate analysis of soil, which indicated all parameter pairs met their RPD limit of 30.0%. Their internal duplicate analysis for groundwater indicated that all parameter pairs met their RPD limit of 20%.

The total number of original soil samples collected for the 2017 QIKIQ program was 254, for which 26 duplicate soil samples were prepared and analyzed, providing a duplicate ratio of over 10%. A total of 24 groundwater samples were collected and three duplicates were analyzed, which is a duplicate ratio of over 10% for each site and for the program. The distribution of duplicate soil and groundwater samples over the three sites is provided in the table below.

Soil Samples and Duplicates

	DEW Line Site			Total
	CAM-5	DYE-M	FOX-M	
Soil Samples Collected	25	145	84	254
Duplicate Soil Samples	3	15	8	26
Percent	12%	10%	10%	10%

Groundwater Samples and Duplicates

	DEW Line Site			Total
	CAM-5	DYE-M	FOX-M	
Monitoring Well Sampled	6	8	10	24
Duplicate Groundwater Samples	1	1	1	3
Percent	17%	13%	10%	13%

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 FOX-M is provided below.

5.4.1 Soil Samples

Organics and PCB

Program Level Interpretation

At the 2017 program level, there were only two duplicated samples where PCB was detected and in both cases the original and duplicate PCB results were below five times the MDL which is internally consistent; RPDs were not calculated due to the low concentrations.

From the 26 soil duplicates, there were only three samples in the 2017 program where one or more PHC fraction was detected. From those three samples there were six PHC parameter pairs with concentrations over five times the MDL for RPD analysis (all were at DYE-M), and three of them had RPDs over 30%; however, the concentrations were still within the same order of magnitude. When PHC is present, the variability in the duplicate results is greater than 30%, in half of the cases.

Site Level Interpretation

All eight of the duplicate pairs of soil samples at FOX-M had PHC F1-F3 results which were below the detection limit and all PCB concentrations were also below the detection limit; therefore, the organics and PCBs in soil met the data quality objective (DQO).

Metals

Program Level Interpretation

Cadmium was below detection limits for all 26 pairs of duplicate soil samples in the program. Mercury in soil has been removed from the analytical program as of the 2017 monitoring year. RPD calculations were undertaken on the seven remaining metals (arsenic, chromium, cobalt, copper, lead nickel and zinc) for the 26 pairs of duplicate soil samples, where both sample results were over five times the MDL.

Nine parameter pairs had RPDs exceeding 30%; six for metals and three for PHCs. Only one of the 26 soil duplicates had a sample average RPD of over 30% and it was at DYE-M, not at FOX-M. The most frequent metals to have an RPD over 30% were: lead (twice) and copper (twice). Copper and cobalt had one RPD over 30%. The program-level average RPD for the soil sample duplicate analysis was 16% which meets the DQO.

Site Level Interpretation

From the eight soil sample duplicates taken at FOX-M there were 56 potential parameter pairs for RPD analysis (7 metals times 8 samples). Of those 56 parameter pairs, only 24 had concentrations over five times the MDL for both parameters in the pair, thus 24 parameter RPDs were calculated. All but three of the 24 parameter pairs had RPDs which met the DQO of 30%. The RPDs ranged from 2% to 50%. Copper and zinc had the lowest RPDs of 2% and lead had the highest of 50%. The FOX-M average RPD for the soil sample duplicate analysis was 15% which meets the DQO. The reproducibility of the soil sample results at FOX-M was acceptable and equal to that of the overall program. The table below shows the metals results and RPD calculations for FOX-M.

Relative Percent Difference Analysis of Soil Data at FOX-M

Sample ID	Parameter Concentrations (mg/kg)							Sample Average RPD	Any Over 30%?
	Arsenic	Chromium	Cobalt	Copper	Lead	Nickel	Zinc		
MDL	**<1**	**<1**	**<1**	**<1**	**<1**	**<1**	**<1**		
MW14 Deep	<1.0	**8.2**	1.7	3.3	**10.7**	6.3	7.9	42%	Yes Cr,Pb
MW914 Deep	<1.0	**5.8**	1.3	2.3	**6.4**	4.8	4.6		
RPD		34%			50%				
FM 5 Shallow	<1.0	4.5	<1.0	1.7	2.4	2.8	3.2	n/a	No
FM 95 Shallow	<1.0	5.0	1.1	2.0	1.8	2.3	3.0		
RPD									
FM 4 Deep	<1.0	**5.8**	1.3	2.0	4.1	3.7	**6.5**	9%	No
FM 94 Deep	<1.0	**6.8**	1.4	2.1	4.8	3.9	**6.4**		
RPD		16%					2%		
FM 9 Deep	<1.0	**11.5**	2.1	4.5	**5.0**	**7.7**	**9.3**	8%	No
FM 99 Deep	1.8	**11.0**	2.2	4.6	**6.3**	**7.9**	**9.0**		
RPD		4%			23%	3%	3%		
FM 22 Deep	<1.0	**10.9**	2.3	4.8	5.6	**9.6**	**9.1**	5%	No
FM 922 Deep	<1.0	**11.3**	2.3	5.3	4.9	**9.0**	**9.6**		
RPD		4%				6%	5%		
MW5 Deep	<1.0	**9.6**	2.0	3.6	4.0	**6.8**	**8.0**	21%	No
MW905 Deep	<1.0	**7.7**	1.8	2.8	4.2	**5.5**	**6.6**		
RPD		22%				21%	19%		
MW23 Shallow	<1.0	**9.0**	2.3	**7.1**	**8.9**	**7.7**	**10.9**	22%	No
MW923 Shallow	<1.0	**10.4**	2.6	**9.2**	**11.4**	**9.5**	**13.9**		
RPD		14%		26%	25%	21%	24%		
MW25 Shallow	<1.0	**7.6**	1.7	**5.5**	**97.6**	**6.5**	**10.8**	11%	Yes Pb
MW925 Shallow	<1.0	**7.9**	1.7	**5.4**	**68.7**	**6.9**	**9.8**		
RPD		4%		2%	35%	6%	10%		
							FOX-M Site Average RPD	15%	1 Cr 2 Pb

Note: Parameters with concentrations greater than 5 x MDL are **bold and highlighted yellow**.

5.4.2 Groundwater Samples

Organics

All three of the groundwater duplicate analyses in the 2017 program had PHC F1-F3 results which were below the detection limit in the original and duplicate samples, therefore these results met the DQO. PCB testing in groundwater has been removed from the analytical program as of the 2017 monitoring year.

Metals

Program Level Interpretation

Given the three groundwater duplicate pairs and eight metals analyzed, there were 24 potential parameters pairs for duplicate analysis of metals via RPD calculation (8 metals times 3 samples). Mercury in groundwater has been removed from the analytical program as of the 2017 monitoring year. The metals concentrations were very low in fact however, only 10 of these parameter pairs had both parameters detected above the MDL, and only four had both parameters greater than five times the MDL and were therefore eligible for RPD analysis. Therefore, in addition to analyzing the QC by RPD analysis the following points are made regarding repeatability. Of the 24 parameter pairs, there were:

- 14 parameter pairs where both concentrations were non-detect in the parameter pair (good repeatability);
- 6 parameter pairs where both concentrations were detected and less than five times the MDL (good repeatability);
- 4 parameter pairs where concentrations were greater than five times the MDL, so an RPD could be calculated. Of those:
  - All 4 were under 15% (very good repeatability)
- No pairs where the results were greater than five times the MDL and the RPD was over 30% (good result).

The program-level average RPD for water analysis of metals (where both parameters were over five times the MDL) was 8%, which meets the DQO for groundwater of 15%.

Site Level Interpretation

The duplicate groundwater sample at FOX-M was taken at MW-29 at the East Beach Landfill (South). As shown in the table below, there were no groundwater parameter pairs for which the concentrations in the original and duplicate were over 5 times the MDL thus no RPDs were calculated for the groundwater duplicate at FOX-M. Nickel and zinc were the only metals detected in the groundwater sample and its duplicate. Each of them was detected in the original and also in the duplicate sample, and both concentrations were below five times the MDL, which indicates good repeatability. There is no indication of lack of data reproducibility for the groundwater data at FOX-M.

Relative Percent Difference Analysis of Groundwater Data at FOX-M

Sample ID	Parameter Concentrations (mg/L)								Average RPD	Any Over 15%?
	As	Cd	Cr	Co	Cu	Pb	Ni	Zn		
MDL	<0.001	<0.0001	<0.001	<0.0005	<0.0005	<0.0001	<0.001	<0.005		
MW29	<0.001	<0.0001	<0.001	<0.0005	<0.0005	<0.0001	0.002	0.013	n/a	no
MW929 (Duplicate)	<0.001	<0.0001	<0.001	<0.0005	<0.0005	<0.0001	0.001	0.011		
RPD										

Note: No parameters were detected with concentrations greater than 5 x MDL.

5.4.3 Overall Lab Data Reproducibility

Based on a QIKIQ15 program average of the field RPD of 16% for soil and considering that only nine of the 338 soil parameter pairs (26 duplicate samples x 13 parameters) exhibited an RPD over the DQO of 30%, it is concluded that that the lab data reproducibility for soil is acceptable.

For groundwater, the program average RPD was 8% and only one of the 36 parameter pairs (3 duplicate samples x 12 parameters) had an RPD over the DQO of 15%, so the groundwater data reproducibility is acceptable as well.

5.5 QA/QC Conclusions

The QA/QC analysis has shown that:

- Achieving maximum hold times of PHC-F1 in soil is often not possible if the sample is not preserved, given the logistics of transport from the remote site location;
- Preserving the PHC water samples enabled meeting the maximum hold time for PHC-F1;
- The Field Blank and groundwater Probe Blank had zinc detected at twice the detection limit, however; given the very low concentrations of zinc detected in the probe blank and the minimal contact between the probe and the water being sampled, and the fact that three monitoring well samples from FOX-M had non-detection of zinc in groundwater, it is concluded that the zinc detected in the probe blank is not influencing the results of the collected samples.
- The duplicate analyses for soil at FOX-M met the program field data quality objectives; and,
- The duplicate analyses for water at FOX-M met the program field data quality objectives.

Report Signature Page

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

GOLDER ASSOCIATES LTD.

Reza Moghaddam, Ph.D., P.Eng.
Geotechnical Engineer

Paul Dewaele, P.Eng. (NU, NT, ON)
Principal, Environmental Engineer

REGISTERED PROFESSIONAL ENGINEER
6/4/2018
P.J. DEWAELE
LICENSEE
NT/NU

REGISTERED PROFESSIONAL ENGINEER
APP. 6/2018
D.C. JOHNSON
LICENSEE
NWT/NU

Darrin Johnson, P.Eng. (NU, NT, ON), PMP
Associate, Project Manager and
Geotechnical Engineer

Don Plenderleith, P.Eng. (NU, NT, ON), PMP
Principal, Project Director and Environmental Engineer

REGISTERED PROFESSIONAL ENGINEER
4/6/2018
D.H. PLENDERLEITH
LICENSEE
DNP
NWT/NU

DCJ/DNP/RM/JB/PDW/sk/hp

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

\\golder gds\ga\ottawa\active\2015\3 proj\1530908 pwgsc dew line\6_3000_2017\9_final reports\r5_fox-m\1530908_final 2017 fox-m monitoring report_r5_v4_28mar2018.docx

APPENDIX A

Report Limitations

REPORT LIMITATIONS

This report has been prepared as an assessment of the environmental condition 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 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

Soil Sampling Logs

Monitoring Well Sampling Logs

Thermistor Inspection Record Sheets

Annex J: Monitoring Wells Sampling Log

Site Name: FOX-M | Landfill Name: Tier II Disposal Facility
Monitoring Well ID: MW-01
Sample Number(s) include dups.: 1
Bottles filled (by parameter type) 4 (all)
Date of Sampling Event: 13 August 2017 Time: 3:10pm
Weather Foggy and overcast, 6°C, slight wind
Names of Samplers JEB
Description of well condition and surrounding ground conditions (note ponding of water):
Casing in great condition, no ponding, dry ground
Lock (condition, presence, model, manufacturer): Not present, added

Pre-Measured Data (from water well record log)

Depth of well installation (cm): | Diameter of well (cm): 4
Depth to top of screen (cm): | Length of screened section (cm):

Field Measurements

Measurement method (interface probe, tape, etc): Interface Probe
Well pipe height above ground (cm) (to top of pipe): 54
Static water level (cm) from top of pipe: 91
Static water level (cm) (below ground surface) calculated: 37
Measured well refusal depth (cm) (measured after sampling from top of pipe): 209
Thickness of water column (cm): 118 | Static Volume of water in well (mL): 1483
Free product thickness (mm): N/A | Evidence of Sludge or siltation: none

Purge Information Summary

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

Well purged (Y/N): Y | Recharge Rate: ~ 100 mL/min
Volume Purged (L) (note multiple purging events): ~ 500 mL | Purge Rate: ~ 100 mL/min

Parameter	Initial	Stablized	Final	Notes
pH	8.16	7.99	7.97	
Conductivity (mS/cm)	0.562	0.574	0.57	
Turbidity (NTU)	0.2	0	0	
Temperature (degC)	5.41	4.51	4.54	

Visual/olfactory observations:
Clear, no sheen, no odour

Decontamination of sampling equipment

Type of decontamination fluid(s): Methyl hydrate, soap, water
Number of washes: 1 | Number of rinses: 1

Other relevant comments:

Annex J: Monitoring Wells Sampling Log

Site Name: FOX-M | Landfill Name: Tier II Disposal Facility
Monitoring Well ID: MW-02
Sample Number(s) include dups.: 1
Bottles filled (by parameter type) 4 (all)
Date of Sampling Event: 13 August 2017 Time: 2:40pm
Weather Foggy and overcast, 6°C, slight wind
Names of Samplers JEB
Description of well condition and surrounding ground conditions (note ponding of water):
Casing in great condition, no ponding, dry ground
Lock (condition, presence, model, manufacturer): Cut & replaced

Pre-Measured Data (from water well record log)

Depth of well installation (cm): | Diameter of well (cm): 4
Depth to top of screen (cm): | Length of screened section (cm):

Field Measurements

Measurement method (interface probe, tape, etc): Interface Probe
Well pipe height above ground (cm) (to top of pipe): 50
Static water level (cm) from top of pipe: 81
Static water level (cm) (below ground surface) calculated: 31
Measured well refusal depth (cm) (measured after sampling from top of pipe): 209
Thickness of water column (cm): 128 | Static Volume of water in well (mL): 1608
Free product thickness (mm): N/A | Evidence of Sludge or siltation: none

Purge Information Summary

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

Well purged (Y/N): Y | Recharge Rate: ~ 100 mL/min
Volume Purged (L) (note multiple purging events): ~ 500 mL | Purge Rate: ~ 100 mL/min

Parameter	Initial	Stablized	Final	Notes
pH	9.01	8.61	8.45	
Conductivity (mS/cm)	0.551	0.559	0.559	
Turbidity (NTU)	0.2	0	0	
Temperature (degC)	5.44	5.32	5.3	

Visual/olfactory observations:
Clear, no sheen, no odour

Decontamination of sampling equipment

Type of decontamination fluid(s): Methyl hydrate, soap, water
Number of washes: 1 | Number of rinses: 1

Other relevant comments:

Annex J: Monitoring Wells Sampling Log

Site Name:	FOX-M	Landfill Name:	Tier II Disposal Facility
Monitoring Well ID:	MW-03		
Sample Number(s) include dups.:	1		
Bottles filled (by parameter type)	4 (all)		
Date of Sampling Event:	13 August 2017		Time: 2:00pm
Weather	Foggy and overcast, 6°C, slight wind		
Names of Samplers	JEB		

Description of well condition and surrounding ground conditions (note ponding of water):
Casing in great condition, no ponding, dry ground

Lock (condition, presence, model, manufacturer): Cut & replaced

Pre-Measured Data (from water well record log)

Depth of well installation (cm):		Diameter of well (cm):	4
Depth to top of screen (cm):		Length of screened section (cm):	

Field Measurements

Measurement method (interface probe, tape, etc):	Interface Probe		
Well pipe height above ground (cm) (to top of pipe):			54
Static water level (cm) from top of pipe:			81
Static water level (cm) (below ground surface) calculated:			27
Measured well refusal depth (cm) (measured after sampling from top of pipe):			191
Thickness of water column (cm):	110	Static Volume of water in well (mL):	1382
Free product thickness (mm):	N/A	Evidence of Sludge or siltation:	bentonite

Purge Information Summary

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

Well purged (Y/N):	Y	Recharge Rate:	~ 100 mL/min
Volume Purged (L) (note multiple purging events):	~ 500 mL	Purge Rate:	~ 100 mL/min

Parameter	Initial	Stablized	Final	Notes
pH	11.31	11.55	10.85	
Conductivity (mS/cm)	0.541	0.557	0.648	
Turbidity (NTU)	27.8	27	17.3	
Temperature (degC)	6.17	5.78	5.84	

Visual/olfactory observations:
Slightly silty, no sheen, no odour, possible bentonite in well based on pH

Decontamination of sampling equipment

Type of decontamination fluid(s):	Methyl hydrate, soap, water		
Number of washes:	1	Number of rinses:	1

Other relevant comments:

Annex J: Monitoring Wells Sampling Log

Site Name:	FOX-M	Landfill Name:	Tier II Disposal Facility
Monitoring Well ID:	MW-04		
Sample Number(s) include dups.:	1		
Bottles filled (by parameter type)	4 (all)		
Date of Sampling Event:	13 August 2017		Time: 4:30pm
Weather	Foggy and overcast, 6°C, slight wind		
Names of Samplers	JEB		

Description of well condition and surrounding ground conditions (note ponding of water):
Riser above casing, no ponding, dry ground

Lock (condition, presence, model, manufacturer): Cannot be locked

Pre-Measured Data (from water well record log)

Depth of well installation (cm):		Diameter of well (cm):	4
Depth to top of screen (cm):		Length of screened section (cm):	

Field Measurements

Measurement method (interface probe, tape, etc):	Interface Probe		
Well pipe height above ground (cm) (to top of pipe):			96
Static water level (cm) from top of pipe:			113
Static water level (cm) (below ground surface) calculated:			17
Measured well refusal depth (cm) (measured after sampling from top of pipe):			235
Thickness of water column (cm):	122	Static Volume of water in well (mL):	1533
Free product thickness (mm):	N/A	Evidence of Sludge or siltation:	none

Purge Information Summary

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

Well purged (Y/N):	Y	Recharge Rate:	~ 100 mL/min
Volume Purged (L) (note multiple purging events):	~ 500 mL	Purge Rate:	~ 100 mL/min

Parameter	Initial	Stablized	Final	Notes
pH	7.90	7.82	7.68	
Conductivity (mS/cm)	0.707	0.687	0.665	
Turbidity (NTU)	265	72.4	12.8	
Temperature (degC)	4.14	4.29	4.28	

Visual/olfactory observations:
Slightly silty, no sheen, no odour

Decontamination of sampling equipment

Type of decontamination fluid(s):	Methyl hydrate, soap, water		
Number of washes:	1	Number of rinses:	1

Other relevant comments:

Annex J: Monitoring Wells Sampling Log

Site Name: FOX-M | Landfill Name: Tier II Disposal Facility
Monitoring Well ID: MW-05
Sample Number(s) include dups.: 1
Bottles filled (by parameter type) 4 (all)
Date of Sampling Event: 13 August 2017 Time: 3:50pm
Weather Foggy and overcast, 6°C, slight wind
Names of Samplers JEB
Description of well condition and surrounding ground conditions (note ponding of water):
Casing in great condition, no ponding, dry ground
Lock (condition, presence, model, manufacturer): Cut & replaced

Pre-Measured Data (from water well record log)

Depth of well installation (cm): | Diameter of well (cm): 4
Depth to top of screen (cm): | Length of screened section (cm):

Field Measurements

Measurement method (interface probe, tape, etc): Interface Probe
Well pipe height above ground (cm) (to top of pipe): 63
Static water level (cm) from top of pipe: 82
Static water level (cm) (below ground surface) calculated: 19
Measured well refusal depth (cm) (measured after sampling from top of pipe): 187
Thickness of water column (cm): 105 | Static Volume of water in well (mL): 1319
Free product thickness (mm): N/A | Evidence of Sludge or siltation: none

Purge Information Summary

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

Well purged (Y/N): Y | Recharge Rate: ~ 100 mL/min
Volume Purged (L) (note multiple purging events): ~ 500 mL | Purge Rate: ~ 100 mL/min

Parameter	Initial	Stablized	Final	Notes
pH	7.82	7.76	7.62	
Conductivity (mS/cm)	0.803	0.776	0.654	
Turbidity (NTU)	0	0	0	
Temperature (degC)	5.36	4.49	4.53	

Visual/olfactory observations:
Clear, no sheen, no odour

Decontamination of sampling equipment

Type of decontamination fluid(s): Methyl hydrate, soap, water
Number of washes: 1 | Number of rinses: 1

Other relevant comments:

Annex J: Monitoring Wells Sampling Log

Site Name: FOX-M Landfill Name:
Monitoring Well ID: MW-12 NHWL
Sample Number(s) include dups.: -
Bottles filled (by parameter type) -
Date of Sampling Event: 14 August 2017 Time: 8:40am
Weather Sunny, 6°C, very windy
Names of Samplers JEB
Description of well condition and surrounding ground conditions (note ponding of water):
Casing in great condition, no ponding, dry ground
Lock (condition, presence, model, manufacturer): Cut & replaced

Pre-Measured Data (from water well record log)

Depth of well installation (cm): Diameter of well (cm): 4
Depth to top of screen (cm): Length of screened section (cm):

Field Measurements

Measurement method (interface probe, tape, etc): Interface probe
Well pipe height above ground (cm) (to top of pipe): 49
Static water level (cm) from top of pipe: frozen @129
Static water level (cm) (below ground surface) calculated: frozen @80
Measured well refusal depth (cm) (measured after sampling from top of pipe): frozen @129
Thickness of water column (cm): - Static Volume of water in well (mL): N/A
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): - Purge Rate: N/A

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

Visual/olfactory observations:
Frozen, ice on probe

Decontamination of sampling equipment

Type of decontamination fluid(s): Methyl hydrate, soap, water
Number of washes: 1 Number of rinses: 1

Other relevant comments:

Annex J: Monitoring Wells Sampling Log

Site Name: FOX-M Landfill Name:
Monitoring Well ID: MW-13 NHWL
Sample Number(s) include dups.: 1
Bottles filled (by parameter type) 4 (all)
Date of Sampling Event: 14 August 2017 Time: 11:30am
Weather Sunny, 6°C, very windy
Names of Samplers JEB
Description of well condition and surrounding ground conditions (note ponding of water):
Casing in great condition, ponding in casing, dry ground
Lock (condition, presence, model, manufacturer): Cut & replaced

Pre-Measured Data (from water well record log)

Depth of well installation (cm): Diameter of well (cm): 4
Depth to top of screen (cm): Length of screened section (cm):

Field Measurements

Measurement method (interface probe, tape, etc): Interface Probe
Well pipe height above ground (cm) (to top of pipe): 62
Static water level (cm) from top of pipe: 100
Static water level (cm) (below ground surface) calculated: 38
Measured well refusal depth (cm) (measured after sampling from top of pipe): 161
Thickness of water column (cm): 61 Static Volume of water in well (mL): 767
Free product thickness (mm): 0 Evidence of Sludge or siltation: none

Purge Information Summary

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

Well purged (Y/N): Y Recharge Rate: ~ 100 mL/min
Volume Purged (L) (note multiple purging events): ~ 500 mL Purge Rate: ~ 100 mL/min

Parameter	Initial	Stablized	Final	Notes
pH	7.62	7.60	7.59	
Conductivity (mS/cm)	1.73	1.65	1.65	
Turbidity (NTU)	2.9	1.9	1.6	
Temperature (degC)	5.27	4.98	4.78	

Visual/olfactory observations:
Strong hydrocarbon odour and sheen, no free product measured using H.oil probe

Decontamination of sampling equipment

Type of decontamination fluid(s): Methyl hydrate, soap, water
Number of washes: 2 Number of rinses: 2

Other relevant comments:

Annex J: Monitoring Wells Sampling Log

Site Name: FOX-M Landfill Name:
Monitoring Well ID: MW-14 NHWL
Sample Number(s) include dups.: -
Bottles filled (by parameter type) -
Date of Sampling Event: 14 August 2017 Time: 9:20am
Weather Sunny, 6°C, very windy
Names of Samplers JEB
Description of well condition and surrounding ground conditions (note ponding of water):
Casing in great condition, ponding in casing, dry ground
Lock (condition, presence, model, manufacturer): Cut & replaced

Pre-Measured Data (from water well record log)

Depth of well installation (cm): Diameter of well (cm): 4
Depth to top of screen (cm): Length of screened section (cm):

Field Measurements

Measurement method (interface probe, tape, etc): Interface probe
Well pipe height above ground (cm) (to top of pipe): 43
Static water level (cm) from top of pipe: frozen @113
Static water level (cm) (below ground surface) calculated: frozen @70
Measured well refusal depth (cm) (measured after sampling from top of pipe): frozen @113
Thickness of water column (cm): - Static Volume of water in well (mL): N/A
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): - Purge Rate: N/A

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

Visual/olfactory observations:
Frozen, ice on probe

Decontamination of sampling equipment

Type of decontamination fluid(s): Methyl hydrate, soap, water
Number of washes: 1 Number of rinses: 1

Other relevant comments:

Annex J: Monitoring Wells Sampling Log

Site Name: FOX-M Landfill Name:
Monitoring Well ID: MW-15 NHWL
Sample Number(s) include dups.: 1
Bottles filled (by parameter type) 4 (all)
Date of Sampling Event: 14 August 2017 Time: 10:30am
Weather Sunny, 6°C, very windy
Names of Samplers JEB
Description of well condition and surrounding ground conditions (note ponding of water):
Casing in great condition, no ponding, dry ground
Lock (condition, presence, model, manufacturer): Cut & replaced

Pre-Measured Data (from water well record log)

Depth of well installation (cm): Diameter of well (cm): 4
Depth to top of screen (cm): Length of screened section (cm):

Field Measurements

Measurement method (interface probe, tape, etc): Interface Probe
Well pipe height above ground (cm) (to top of pipe): 54
Static water level (cm) from top of pipe: 82
Static water level (cm) (below ground surface) calculated: 28
Measured well refusal depth (cm) (measured after sampling from top of pipe): 163
Thickness of water column (cm): 81 Static Volume of water in well (mL): 1018
Free product thickness (mm): N/A Evidence of Sludge or siltation: none

Purge Information Summary

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

Well purged (Y/N): Y Recharge Rate: ~ 100 mL/min
Volume Purged (L) (note multiple purging events): ~ 500 mL Purge Rate: ~ 100 mL/min

Parameter	Initial	Stablized	Final	Notes
pH	7.85	7.87	7.63	
Conductivity (mS/cm)	1.30	0.898	0.891	
Turbidity (NTU)	0.6	0	0	
Temperature (degC)	5.87	4.91	4.89	

Visual/olfactory observations:
Clear, no sheen, no odour

Decontamination of sampling equipment

Type of decontamination fluid(s): Methyl hydrate, soap, water
Number of washes: 1 Number of rinses: 1

Other relevant comments:

Annex J: Monitoring Wells Sampling Log

Site Name: FOX-M Landfill Name:
Monitoring Well ID: MW-16 NHWL
Sample Number(s) include dups.: -
Bottles filled (by parameter type) -
Date of Sampling Event: 14 August 2017 Time: 9:50am
Weather Sunny, 6°C, very windy
Names of Samplers JEB
Description of well condition and surrounding ground conditions (note ponding of water):
Casing slightly dented, lid broken (riser above casing slightly), ponding in casing, dry ground
Lock (condition, presence, model, manufacturer): Cannot be locked

Pre-Measured Data (from water well record log)

Depth of well installation (cm): Diameter of well (cm): 4
Depth to top of screen (cm): Length of screened section (cm):

Field Measurements

Measurement method (interface probe, tape, etc): Interface probe
Well pipe height above ground (cm) (to top of pipe): 56
Static water level (cm) from top of pipe: frozen @137
Static water level (cm) (below ground surface) calculated: frozen @81
Measured well refusal depth (cm) (measured after sampling from top of pipe): frozen @137
Thickness of water column (cm): - Static Volume of water in well (mL): N/A
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): - Purge Rate: N/A

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

Visual/olfactory observations:
Frozen, ice on probe

Decontamination of sampling equipment

Type of decontamination fluid(s): Methyl hydrate, soap, water
Number of washes: 1 Number of rinses: 1

Other relevant comments:

Annex J: Monitoring Wells Sampling Log

Site Name: FOX-M Landfill Name:
Monitoring Well ID: MW-20 East Beach
Sample Number(s) include dups.: - Landfill North
Bottles filled (by parameter type) -
Date of Sampling Event: 13 August 2017 Time: 9:30am
Weather Foggy and overcast, 6°C, slight wind
Names of Samplers JEB
Description of well condition and surrounding ground conditions (note ponding of water):
Casing in great condition, no ponding, dry ground
Lock (condition, presence, model, manufacturer): Cut & replaced

Pre-Measured Data (from water well record log)

Depth of well installation (cm): Diameter of well (cm): 4
Depth to top of screen (cm): Length of screened section (cm):

Field Measurements

Measurement method (interface probe, tape, etc): Interface probe
Well pipe height above ground (cm) (to top of pipe): 42
Static water level (cm) from top of pipe: frozen @112
Static water level (cm) (below ground surface) calculated: frozen @70
Measured well refusal depth (cm) (measured after sampling from top of pipe): frozen @112
Thickness of water column (cm): - Static Volume of water in well (mL): N/A
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): - Purge Rate: N/A

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

Visual/olfactory observations:
Frozen, ice on probe

Decontamination of sampling equipment

Type of decontamination fluid(s): Methyl hydrate, soap, water
Number of washes: 1 Number of rinses: 1

Other relevant comments:

Annex J: Monitoring Wells Sampling Log

Site Name: FOX-M Landfill Name:
Monitoring Well ID: MW-21 East Beach
Sample Number(s) include dups.: 1 Landfill North
Bottles filled (by parameter type) 4 (all)
Date of Sampling Event: 13 August 2017 Time: 8:30am
Weather Foggy and overcast, 6°C, slight wind
Names of Samplers JEB
Description of well condition and surrounding ground conditions (note ponding of water):
Casing in great condition, no ponding, dry ground
Lock (condition, presence, model, manufacturer): Cut & replaced

Pre-Measured Data (from water well record log)

Depth of well installation (cm): Diameter of well (cm): 4
Depth to top of screen (cm): Length of screened section (cm):

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: 124
Static water level (cm) (below ground surface) calculated: 77
Measured well refusal depth (cm) (measured after sampling from top of pipe): 132
Thickness of water column (cm): 8 Static Volume of water in well (mL): 101
Free product thickness (mm): N/A Evidence of Sludge or siltation: none

Purge Information Summary

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

Well purged (Y/N): Y Recharge Rate: < 100 mL/min
Volume Purged (L) (note multiple purging events): ~ 250 mL Purge Rate: ~ 100 mL/min

Parameter	Initial	Stablized	Final	Notes
pH	7.97	-	8.08	limited volume, therefore filled
Conductivity (mS/cm)	0.538	-	0.496	bottles after initial readings
Turbidity (NTU)	1.1	-	0.1	
Temperature (degC)	6.81	-	4.86	

Visual/olfactory observations:
Clear, no sheen, no odour

Decontamination of sampling equipment

Type of decontamination fluid(s): Methyl hydrate, soap, water
Number of washes: 1 Number of rinses: 1

Other relevant comments:

Annex J: Monitoring Wells Sampling Log

Site Name: FOX-M Landfill Name:
Monitoring Well ID: MW-22 East Beach
Sample Number(s) include dups.: - Landfill South
Bottles filled (by parameter type) -
Date of Sampling Event: 13 August 2017 Time: 10:00am
Weather Foggy and overcast, 6°C, slight wind
Names of Samplers JEB
Description of well condition and surrounding ground conditions (note ponding of water):
Casing in good condition, lid needs replacement, no ponding, dry ground
Lock (condition, presence, model, manufacturer): Cut & replaced

Pre-Measured Data (from water well record log)

Depth of well installation (cm): Diameter of well (cm): 4
Depth to top of screen (cm): Length of screened section (cm):

Field Measurements

Measurement method (interface probe, tape, etc): Interface probe
Well pipe height above ground (cm) (to top of pipe): 50
Static water level (cm) from top of pipe: frozen @68
Static water level (cm) (below ground surface) calculated: frozen @18
Measured well refusal depth (cm) (measured after sampling from top of pipe): frozen @68
Thickness of water column (cm): - Static Volume of water in well (mL): N/A
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): - Purge Rate: N/A

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

Visual/olfactory observations:
Frozen, ice on probe

Decontamination of sampling equipment

Type of decontamination fluid(s): Methyl hydrate, soap, water
Number of washes: 1 Number of rinses: 1

Other relevant comments:

Annex J: Monitoring Wells Sampling Log

Site Name: FOX-M Landfill Name:
Monitoring Well ID: MW-23 East Beach
Sample Number(s) include dups.: - Landfill South
Bottles filled (by parameter type) -
Date of Sampling Event: 13 August 2017 Time: 10:30am
Weather Foggy and overcast, 6°C, slight wind
Names of Samplers JEB
Description of well condition and surrounding ground conditions (note ponding of water):
Casing in great condition, no ponding, dry ground
Lock (condition, presence, model, manufacturer): Cut & replaced

Pre-Measured Data (from water well record log)

Depth of well installation (cm): Diameter of well (cm): 4
Depth to top of screen (cm): Length of screened section (cm):

Field Measurements

Measurement method (interface probe, tape, etc): Interface probe
Well pipe height above ground (cm) (to top of pipe): 41
Static water level (cm) from top of pipe: frozen @112
Static water level (cm) (below ground surface) calculated: frozen @71
Measured well refusal depth (cm) (measured after sampling from top of pipe): frozen @112
Thickness of water column (cm): - Static Volume of water in well (mL): N/A
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): - Purge Rate: N/A

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

Visual/olfactory observations:
Frozen, ice on probe

Decontamination of sampling equipment

Type of decontamination fluid(s): Methyl hydrate, soap, water
Number of washes: 1 Number of rinses: 1

Other relevant comments:

Annex J: Monitoring Wells Sampling Log

Site Name: FOX-M Landfill Name:
Monitoring Well ID: MW-24 East Beach
Sample Number(s) include dups.: - Landfill South
Bottles filled (by parameter type) -
Date of Sampling Event: 13 August 2017 Time: 10:50am
Weather Foggy and overcast, 6°C, slight wind
Names of Samplers JEB
Description of well condition and surrounding ground conditions (note ponding of water):
Casing in great condition, no ponding, dry ground
Lock (condition, presence, model, manufacturer): Cut & replaced

Pre-Measured Data (from water well record log)

Depth of well installation (cm): Diameter of well (cm): 4
Depth to top of screen (cm): Length of screened section (cm):

Field Measurements

Measurement method (interface probe, tape, etc): Interface probe
Well pipe height above ground (cm) (to top of pipe): 49
Static water level (cm) from top of pipe: frozen @114
Static water level (cm) (below ground surface) calculated: frozen @65
Measured well refusal depth (cm) (measured after sampling from top of pipe): frozen @114
Thickness of water column (cm): - Static Volume of water in well (mL): N/A
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): - Purge Rate: N/A

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

Visual/olfactory observations:
Frozen, ice on probe

Decontamination of sampling equipment

Type of decontamination fluid(s): Methyl hydrate, soap, water
Number of washes: 1 Number of rinses: 1

Other relevant comments:

Annex J: Monitoring Wells Sampling Log

Site Name: FOX-M Landfill Name:
Monitoring Well ID: MW-25 East Beach
Sample Number(s) include dups.: - Landfill South
Bottles filled (by parameter type) -
Date of Sampling Event: 13 August 2017 Time: 11:10am
Weather Foggy and overcast, 6°C, slight wind
Names of Samplers JEB
Description of well condition and surrounding ground conditions (note ponding of water):
Casing in great condition, no ponding, dry ground
Lock (condition, presence, model, manufacturer): Not present, added

Pre-Measured Data (from water well record log)

Depth of well installation (cm): Diameter of well (cm): 4
Depth to top of screen (cm): Length of screened section (cm):

Field Measurements

Measurement method (interface probe, tape, etc): Interface probe
Well pipe height above ground (cm) (to top of pipe): 48
Static water level (cm) from top of pipe: frozen @130
Static water level (cm) (below ground surface) calculated: frozen @82
Measured well refusal depth (cm) (measured after sampling from top of pipe): frozen @130
Thickness of water column (cm): - Static Volume of water in well (mL): N/A
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): - Purge Rate: N/A

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

Visual/olfactory observations:
Frozen, ice on probe

Decontamination of sampling equipment

Type of decontamination fluid(s): Methyl hydrate, soap, water
Number of washes: 1 Number of rinses: 1

Other relevant comments:

Annex J: Monitoring Wells Sampling Log

Site Name: FOX-M Landfill Name:
Monitoring Well ID: MW-26 East Beach
Sample Number(s) include dups.: - Landfill South
Bottles filled (by parameter type) -
Date of Sampling Event: 13 August 2017 Time: 11:30am
Weather Foggy and overcast, 6°C, slight wind
Names of Samplers JEB
Description of well condition and surrounding ground conditions (note ponding of water):
Casing in great condition, no ponding, dry ground
Lock (condition, presence, model, manufacturer): Cut & replaced

Pre-Measured Data (from water well record log)

Depth of well installation (cm): Diameter of well (cm): 4
Depth to top of screen (cm): Length of screened section (cm):

Field Measurements

Measurement method (interface probe, tape, etc): Interface probe
Well pipe height above ground (cm) (to top of pipe): 38
Static water level (cm) from top of pipe: frozen @118
Static water level (cm) (below ground surface) calculated: frozen @80
Measured well refusal depth (cm) (measured after sampling from top of pipe): frozen @118
Thickness of water column (cm): - Static Volume of water in well (mL): N/A
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): - Purge Rate: N/A

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

Visual/olfactory observations:
Frozen, ice on probe

Decontamination of sampling equipment

Type of decontamination fluid(s): Methyl hydrate, soap, water
Number of washes: 1 Number of rinses: 1

Other relevant comments:

Annex J: Monitoring Wells Sampling Log

Site Name: FOX-M Landfill Name:
Monitoring Well ID: MW-27 East Beach
Sample Number(s) include dups.: - Landfill South
Bottles filled (by parameter type) -
Date of Sampling Event: 13 August 2017 Time: 11:50am
Weather Foggy and overcast, 6°C, slight wind
Names of Samplers JEB
Description of well condition and surrounding ground conditions (note ponding of water):
Casing in good condition, lid needs replacement, no ponding, dry ground
Lock (condition, presence, model, manufacturer): Cut & replaced

Pre-Measured Data (from water well record log)

Depth of well installation (cm): Diameter of well (cm): 4
Depth to top of screen (cm): Length of screened section (cm):

Field Measurements

Measurement method (interface probe, tape, etc): Interface probe
Well pipe height above ground (cm) (to top of pipe): 44
Static water level (cm) from top of pipe: frozen @119
Static water level (cm) (below ground surface) calculated: frozen @75
Measured well refusal depth (cm) (measured after sampling from top of pipe): frozen @119
Thickness of water column (cm): - Static Volume of water in well (mL): N/A
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): - Purge Rate: N/A

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

Visual/olfactory observations:
Frozen, ice on probe

Decontamination of sampling equipment

Type of decontamination fluid(s): Methyl hydrate, soap, water
Number of washes: 1 Number of rinses: 1

Other relevant comments:

Annex J: Monitoring Wells Sampling Log

Site Name: FOX-M Landfill Name:
Monitoring Well ID: MW-28 East Beach
Sample Number(s) include dups.: - Landfill South
Bottles filled (by parameter type) -
Date of Sampling Event: 13 August 2017 Time: 12:10pm
Weather Foggy and overcast, 6°C, slight wind
Names of Samplers JEB
Description of well condition and surrounding ground conditions (note ponding of water):
Casing in great condition, no ponding, dry ground
Lock (condition, presence, model, manufacturer): Cut & replaced

Pre-Measured Data (from water well record log)

Depth of well installation (cm): Diameter of well (cm): 4
Depth to top of screen (cm): Length of screened section (cm):

Field Measurements

Measurement method (interface probe, tape, etc): Interface probe
Well pipe height above ground (cm) (to top of pipe): 48
Static water level (cm) from top of pipe: frozen @117
Static water level (cm) (below ground surface) calculated: frozen @69
Measured well refusal depth (cm) (measured after sampling from top of pipe): frozen @117
Thickness of water column (cm): - Static Volume of water in well (mL): N/A
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): - Purge Rate: N/A

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

Visual/olfactory observations:
Frozen, ice on probe

Decontamination of sampling equipment

Type of decontamination fluid(s): Methyl hydrate, soap, water
Number of washes: 1 Number of rinses: 1

Other relevant comments:

Annex J: Monitoring Wells Sampling Log

Site Name: FOX-M Landfill Name:
Monitoring Well ID: MW-29 East Beach
Sample Number(s) include dups.: 2 (duplicate MW-929) Landfill South
Bottles filled (by parameter type) 4 (all)
Date of Sampling Event: 13 August 2017 Time: 12:40pm
Weather Foggy and overcast, 6°C, slight wind
Names of Samplers JEB
Description of well condition and surrounding ground conditions (note ponding of water):
Casing in great condition, no ponding, dry ground
Lock (condition, presence, model, manufacturer): Cut & replaced

Pre-Measured Data (from water well record log)

Depth of well installation (cm): Diameter of well (cm): 4
Depth to top of screen (cm): Length of screened section (cm):

Field Measurements

Measurement method (interface probe, tape, etc): Interface probe
Well pipe height above ground (cm) (to top of pipe): 42
Static water level (cm) from top of pipe: 73
Static water level (cm) (below ground surface) calculated: 31
Measured well refusal depth (cm) (measured after sampling from top of pipe): 127
Thickness of water column (cm): 54 Static Volume of water in well (mL): 679
Free product thickness (mm): N/A Evidence of Sludge or siltation: none

Purge Information Summary

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

Well purged (Y/N): Y Recharge Rate: ~ 100 mL/min
Volume Purged (L) (note multiple purging events): ~ 500 mL Purge Rate: ~ 100 mL/min

Parameter	Initial	Stablized	Final	Notes
pH	7.81	7.77	7.76	
Conductivity (mS/cm)	2.15	1.99	1.72	
Turbidity (NTU)	2.2	0	0	
Temperature (degC)	6.64	5.53	5.14	

Visual/olfactory observations:
Clear, no sheen, no odour

Decontamination of sampling equipment

Type of decontamination fluid(s): Methyl hydrate, soap, water
Number of washes: 1 Number of rinses: 1

Other relevant comments:

Annex J: Monitoring Wells Sampling Log

Site Name: FOX-M Landfill Name:
Monitoring Well ID: MW-30 East Beach
Sample Number(s) include dups.: 1 Landfill South
Bottles filled (by parameter type) 4 (all)
Date of Sampling Event: 13 August 2017 Time: 1:20pm
Weather Foggy and overcast, 6°C, slight wind
Names of Samplers JEB
Description of well condition and surrounding ground conditions (note ponding of water):
Casing in great condition, no ponding, wet ground/bentonite
Lock (condition, presence, model, manufacturer): Cut & replaced

Pre-Measured Data (from water well record log)

Depth of well installation (cm): Diameter of well (cm): 4
Depth to top of screen (cm): Length of screened section (cm):

Field Measurements

Measurement method (interface probe, tape, etc): Interface probe
Well pipe height above ground (cm) (to top of pipe): 41
Static water level (cm) from top of pipe: 47
Static water level (cm) (below ground surface) calculated: 6
Measured well refusal depth (cm) (measured after sampling from top of pipe): 127
Thickness of water column (cm): 80 Static Volume of water in well (mL): 1005
Free product thickness (mm): N/A Evidence of Sludge or siltation: none

Purge Information Summary

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

Well purged (Y/N): Y Recharge Rate: ~ 100 mL/min
Volume Purged (L) (note multiple purging events): ~ 500 mL Purge Rate: ~ 100 mL/min

Parameter	Initial	Stablized	Final	Notes
pH	8.20	8.19	8.11	
Conductivity (mS/cm)	1.05	1.11	1.12	
Turbidity (NTU)	1.7	0	0	
Temperature (degC)	6.48	5.42	5.4	

Visual/olfactory observations:
Clear, no sheen, no odour

Decontamination of sampling equipment

Type of decontamination fluid(s): Methyl hydrate, soap, water
Number of washes: 1 Number of rinses: 1

Other relevant comments:

Annex J: Monitoring Wells Sampling Log

Site Name:	FOX-M	Landfill Name:	East Beach Landfill South
Monitoring Well ID:	MW-31		
Sample Number(s) include dups.:	-		
Bottles filled (by parameter type)	-		
Date of Sampling Event:	14 August 2017	Time:	8:20am
Weather	Sunny, 6°C, very windy		
Names of Samplers	JEB		

Description of well condition and surrounding ground conditions (note ponding of water):
Casing in great condition, no ponding, dry ground

Lock (condition, presence, model, manufacturer): Cut & replaced

Pre-Measured Data (from water well record log)

Depth of well installation (cm):		Diameter of well (cm):	4
Depth to top of screen (cm):		Length of screened section (cm):	

Field Measurements

Measurement method (interface probe, tape, etc):	Interface probe		
Well pipe height above ground (cm) (to top of pipe):			45
Static water level (cm) from top of pipe:			118
Static water level (cm) (below ground surface) calculated:			73
Measured well refusal depth (cm) (measured after sampling from top of pipe):			120
Thickness of water column (cm):	2	Static Volume of water in well (mL):	25
Free product thickness (mm):	N/A	Evidence of Sludge or siltation:	none

Purge Information Summary

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

Well purged (Y/N):	N/A	Recharge Rate:	< 100 mL/min
Volume Purged (L) (note multiple purging events):	-	Purge Rate:	N/A

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

Visual/olfactory observations:
Tried to sample, insufficient volume

Decontamination of sampling equipment

Type of decontamination fluid(s):	Methyl hydrate, soap, water		
Number of washes:	1	Number of rinses:	1

Other relevant comments: Well infilled with sand

Thermistor Inspection Field Record Sheet

Inspector Name:	Reza Moghaddam		Inspection Date:	August	14 , 2017
Inspector Signature / Prepared By:					

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

Site Name:	**FOX-M**	Landfill:	**Tier II Disposal Facility**		
Thermistor Number:	**VT-1**	Inclination:	**Vertical**		
Datalogger model no:	**RX-16**	Datalogger cable download model:		USB	**TS07050014 B-9.2**
*Install Date:	**23-Aug-07**	First Date Event	**20-Aug-08**	Last Date Event	**29-Aug-14**
*Coordinates and Elevation		N **7626709**	E **490947**	Elev	**0**
Length of Cable (m)	**9.23**	Cable Lead Above Ground (m)	4.2		
Datalogger Serial #	**07050014**	Nodal Points	**11**		

Thermistor Inspection

	Good	Needs Maintenance	Description
Casing	X	☐	
Cover	X	☐	
Data Logger	X	☐	
Cable	X	☐	
Beads	X	☐	
Lock condition	X	☐	
Battery Installation Date	**8/14/2017**		
Battery Levels	Main 11.34	Aux 13.26	

Manual Ground Temperature Readings

Bead	ohms	Degrees C
1	1.119	5.79
2	1.1007	5.19
3	1.0739	4.31
4	0.9694	0.88
5	0.9211	-0.72
6	0.8646	-1.94
7	0.8536	-2.99
8	0.8230	-4.04

Bead	ohms	Degrees C
9	0.8006	-4.81
10	0.7783	-5.59
11	0.7565	-6.36

Battery Information

Batteries changed ? Yes [x] No [ ] Monitoring Year: 10

Battery model number installed: ULB1 and ULB15 batteries

Expected battery life (years): 2024 (7 years)

Datalogger Programming (Describe programming completed; beads and frequency)

Reprogramed for 48 hours at noon.

Observations and Proposed Maintenance

Installed new ULB1 and ULB15 batteries.

Istalled new lock.

Thermistor Inspection Field Record Sheet

Inspector Name:	Reza Moghaddam	Inspection Date:	August 14 , 2017
Inspector Signature / Prepared By:			

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

Site Name:	**FOX-M**	Landfill:	**Tier II Disposal Facility**		
Thermistor Number:	**VT-2**	Inclination:	**Vertical**		
Datalogger model no:	**RX-16**	Datalogger cable download model:	USB	**TS07060009 B-7.2**	
*Install Date:	**23-Aug-2017**	First Date Event	**20-Aug-08**	Last Date Event	**29-Aug-14**
*Coordinates and Elevation	N **7626747**	E **490982**		Elev	**0**
Length of Cable (m)	**7.23**	Cable Lead Above Ground (m)	**4.32**		
Datalogger Serial #	**07060009**	Nodal Points	**7**		

Thermistor Inspection

	Good	Needs Maintenance	Description
Casing	X	☐	
Cover	X	☐	
Data Logger	X	☐	
Cable	X	☐	
Beads	X	☐	
Lock condition	X	☐	
Battery Installation Date	**8/14/2017**		
Battery Levels	Main 11.34	Aux 13.50	

Manual Ground Temperature Readings

Bead	ohms	Degrees C
1	1.1024	5.24
2	1.0523	3.60
3	0.9409	-0.06
4	0.8972	-1.52
5	0.8536	-2.99
6	0.8023	-4.75
7	0.7746	-5.72

Bead	ohms	Degrees C

Battery Information

Batteries changed ? Yes [x] No [ ] Monitoring Year: 10

Battery model number installed: ULB1 and ULB15 batteries

Expected battery life (years): 2024 (7 years)

Datalogger Programming (Describe programming completed; beads and frequency)

Reprogramed for 48 hours at noon.

Observations and Proposed Maintenance

Installed new ULB1 and ULB15 batteries.

Istalled new lock.

Thermistor Inspection Field Record Sheet

Inspector Name:	Reza Moghaddam	Inspection Date:	August 14 , 2017
Inspector Signature / Prepared By:			

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

Site Name:	**FOX-M**	Landfill:	**Tier II Disposal Facility**		
Thermistor Number:	**VT-3**	Inclination:	**Vertical**		
Datalogger model no:	**RX-16**	Datalogger cable download model:		USB	**TS06030090 B-9.2**
*Install Date:	**23-Aug-07**	First Date Event	**20-Aug-08**	Last Date Event	**29-Aug-14**
*Coordinates and Elevation		N **7626738**	E **491057**	Elev	**0**
Length of Cable (m)	**9.21**	Cable Lead Above Ground (m)	**4.2**		
Datalogger Serial #	**06030090**	Nodal Points	**11**		

Thermistor Inspection

	Good	Needs Maintenance	Description
Casing	X	☐	
Cover	X	☐	
Data Logger	X	☐	
Cable	X	☐	
Beads	X	☐	
Lock condition	X	☐	
Battery Installation Date	**8/14/2017**		
Battery Levels	Main 11.34	Aux 13.38	

Manual Ground Temperature Readings

Bead	ohms	Degrees C
1	1.1122	5.56
2	1.0511	3.56
3	0.9433	0.02
4	0.9035	-1.30
5	0.964	-2.64
6	0.9341	-3.65
7	0.8083	-4.55
8	0.7871	-5.28

Bead	ohms	Degrees C
9	0.7632	-6.10
10	0.7431	-6.84
11	0.7313	-7.26

Battery Information

Batteries changed ? Yes [x] No [ ] Monitoring Year: 10

Battery model number installed: ULB1 and ULB15 batteries

Expected battery life (years): 2024 (7 years)

Datalogger Programming (Describe programming completed; beads and frequency)

Reprogramed for 48 hours at noon.

Observations and Proposed Maintenance

Installed new ULB1 and ULB15 batteries.

Istalled new lock.

Thermistor Inspection Field Record Sheet

Inspector Name:	Reza Moghaddam	Inspection Date:	August 14 , 2017
Inspector Signature / Prepared By:			

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

Site Name:	**FOX-M**	Landfill:	**Tier II Disposal Facility**		
Thermistor Number:	**VT-4**	Inclination:	**Vertical**		
Datalogger model no:	**RX-16**	Datalogger cable download model:	USB	**TS07060020**	
*Install Date:	**23-Aug-07**	First Date Event	**20-Aug-08**	Last Date Event	**29-Aug-14**
*Coordinates and Elevation	N **7626841**	E **491005**		Elev	**0**
Length of Cable (m)	**7.32**	Cable Lead Above Ground (m)	**4.32**		
Datalogger Serial #	**07060020**	Nodal Points	**7**		

Thermistor Inspection

	Good	Needs Maintenance	Description
Casing	X	☐	
Cover	X	☐	
Data Logger	X	☐	
Cable	X	☐	
Beads	X	☐	
Lock condition	X	☐	
Battery Installation Date	**8/14/2017**		
Battery Levels	Main 11.34	Aux 13.63	

Manual Ground Temperature Readings

Bead	ohms	Degrees C
1	1.1287	6.10
2	1.0884	4.78
3	0.9585	0.52
4	0.9211	-0.71
5	0.8683	-2.49
6	0.8303	-3.78
7	0.7997	-4.84

Bead	ohms	Degrees C

Battery Information

Batteries changed ? Yes [x] No [ ] Monitoring Year: 10

Battery model number installed: ULB1 and ULB15 batteries

Expected battery life (years): 2024 (7 years)

Datalogger Programming (Describe programming completed; beads and frequency)

Reprogramed for 48 hours at noon.

Observations and Proposed Maintenance

Installed new ULB1 and ULB15 batteries.

Istalled new lock.

Thermistor Inspection Field Record Sheet

Inspector Name:	Reza Moghaddam	Inspection Date:	August 14 , 2017
Inspector Signature / Prepared By:			

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

Site Name:	**FOX-M**	Landfill:	**Tier II Disposal Facility**		
Thermistor Number:	**VT-5**	Inclination:	**Vertical**		
Datalogger model no:	**RX-16**	Datalogger cable download model:	USB	**TS07060023 B-7.2**	
*Install Date:	**23-Aug-07**	First Date Event	**20-Aug-08**	Last Date Event	**29-Aug-14**
*Coordinates and Elevation	N **7626809**	E **490979**		Elev	**0**
Length of Cable (m)	**7.33**	Cable Lead Above Ground (m)	**4.33**		
Datalogger Serial #	**07060023**	Nodal Points	**7**		

Thermistor Inspection

	Good	Needs Maintenance	Description
Casing	X	☐	
Cover	X	☐	
Data Logger	X	☐	
Cable	X	☐	
Beads	X	☐	
Lock condition	X	☐	
Battery Installation Date	**8/14/2017**		
Battery Levels	Main 11.34	Aux 13.50	

Manual Ground Temperature Readings

Bead	ohms	Degrees C
1	1.1366	6.36
2	1.0598	3.85
3	0.9433	0.02
4	0.9017	-1.36
5	0.8509	-3.08
6	0.8206	-4.12
7	0.7962	-4.97

Bead	ohms	Degrees C

Battery Information

Batteries changed ? Yes [x] No [ ] Monitoring Year: 10

Battery model number installed: ULB1 and ULB15 batteries

Expected battery life (years): 2024 (7 years)

Datalogger Programming (Describe programming completed; beads and frequency)

Reprogramed for 48 hours at noon.

Observations and Proposed Maintenance

Installed new ULB1 and ULB15 batteries.

Istalled new lock.

Thermistor Inspection Field Record Sheet

Inspector Name:	Reza Moghaddam	Inspection Date:	August 14 , 2017
Inspector Signature / Prepared By:			

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

Site Name:	**FOX-M**	Landfill:	**Tier II Disposal Facility**		
Thermistor Number:	**HB-1**	Inclination:	**Vertical**		
Datalogger model no:	**RX-16**	Datalogger cable download model:	USB		
*Install Date:		First Date Event	**21-Aug-08**	Last Date Event	**29-Aug-14**
*Coordinates and Elevation		N **7626657**	E **490920**	Elev	**0**
Length of Cable (m)	**8.2**	Cable Lead Above Ground (m)	4.2		
Datalogger Serial #	**N/A**	Nodal Points			

Thermistor Inspection

	Good	Needs Maintenance	Description
Casing	X	☐	
Cover	X	☐	
Data Logger	X	☐	
Cable	X	☐	
Beads	X	☐	
Lock condition	X	☐	
Battery Installation Date	**14/08/2017 (No power in logger prior to inspection)**		
Battery Levels	Main -	Aux -	

Manual Ground Temperature Readings

Bead	ohms	Degrees C	Bead	ohms	Degrees C
1	N/A		9		
2	N/A		10		
3	N/A		11		
4	N/A		12		
5	N/A		13		
6	N/A		14		
7	N/A		15		
8	N/A		16		

Battery Information

Batteries changed ? Yes [x] No [ ] Monitoring Year: 10

Battery model number installed: ULB1 and ULB15 batteries

Expected battery life (years): 2024 (7 years)

Datalogger Programming (Describe programming completed; beads and frequency)

Reprogramed for 48 hours at noon.

Observations and Proposed Maintenance

Installed new ULB1 and ULB15 batteries. Data logger started working. Reprogrammed after complete memory transfer.

Thermistor Inspection Field Record Sheet

Inspector Name:	Reza Moghaddam	Inspection Date:	August 13 , 2017
Inspector Signature / Prepared By:			

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

Site Name:	**FOX-M**	Landfill:	**East Beach Landfill South Lobe**		
Thermistor Number:	**VT-6**	Inclination:	**Vertical**		
Datalogger model no:	**RX-16**	Datalogger cable download model:	USB	**TS07060018**	
*Install Date:	**24-Aug-07**	First Date Event	**20-Aug-08**	Last Date Event	**29-Aug-14**
*Coordinates and Elevation	N **7626449**	E **490895**		Elev	**0**
Length of Cable (m)	**8.23**	Cable Lead Above Ground (m)	4.23		
Datalogger Serial #	**07060018**	Nodal Points	**9**		

Thermistor Inspection

	Good	Needs Maintenance	Description
Casing	X	☐	
Cover	X	☐	
Data Logger	X	☐	
Cable	X	☐	
Beads	X	☐	
Lock condition	X	☐	
Battery Installation Date	**8/13/2017**		
Battery Levels	Main 11.34	Aux 13.50	

Manual Ground Temperature Readings

Bead	ohms	Degrees C
1	1.262	10.50
2	1.1951	8.28
3	1.0549	3.69
4	0.9365	-0.20
5	0.9095	-1.10
6	0.8803	-2.08
7	0.8528	-3.02
8	0.8236	-4.02

Bead	ohms	Degrees C
9	0.8000	-4.83

Battery Information

Batteries changed ?	Yes	x	No	Monitoring Year:	10
Battery model number installed:	ULB1 and ULB15 batteries				
Expected battery life (years):	2024 (7 years)				

Datalogger Programming (Describe programming completed; beads and frequency)

Reprogramed for 48 hours at noon.

Observations and Proposed Maintenance

Installed new ULB1 and ULB15 batteries.
Istalled new lock.

Thermistor Inspection Field Record Sheet

Inspector Name:	Reza Moghaddam	Inspection Date:	August 13 , 2017
Inspector Signature / Prepared By:			

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

Site Name:	**FOX-M**	Landfill:	**East Beach Landfill South Lobe**		
Thermistor Number:	**VT-7**	Inclination:	**Vertical**		
Datalogger model no:	**RX-16**	Datalogger cable download model:	USB	**TS07010006 B-8.2**	
*Install Date:	**24-Aug-07**	First Date Event	**20-Aug-08**	Last Date Event	**29-Aug-14**
*Coordinates and Elevation		N **7626740**	E **491378**	Elev	**0**
Length of Cable (m)	**8.22**	Cable Lead Above Ground (m)	**4.22**		
Datalogger Serial #	**07010006**	Nodal Points	**9**		

Thermistor Inspection

	Good	Needs Maintenance	Description
Casing	X	☐	
Cover	X	☐	
Data Logger	X	☐	
Cable	X	☐	
Beads	X	☐	
Lock condition	X	☐	
Battery Installation Date	**8/13/2017**		
Battery Levels	Main 11.34	Aux 13.63	

Manual Ground Temperature Readings

Bead	ohms	Degrees C
1	1.2583	10.37
2	1.1916	8.17
3	1.0804	4.78
4	0.9574	0.48
5	0.972	-0.68
6	0.9	-1.76
7	0.8552	-2.93
8	0.8249	-3.97

Bead	ohms	Degrees C
9	0.7956	-4.9900

Battery Information

Batteries changed ? Yes [x] No [ ] Monitoring Year: 10

Battery model number installed: ULB1 and ULB15 batteries

Expected battery life (years): 2024 (7 years)

Datalogger Programming (Describe programming completed; beads and frequency)

Reprogramed for 48 hours at noon.

Observations and Proposed Maintenance

Installed new ULB1 and ULB15 batteries.

Istalled new lock.

Thermistor Inspection Field Record Sheet

Inspector Name:	Reza Moghaddam		Inspection Date:	August	13 , 2017
Inspector Signature / Prepared By:					

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

Site Name:	**FOX-M**	Landfill:	**East Beach Landfill South Lobe**				
Thermistor Number:	**VT-8**	Inclination:	**Vertical**				
Datalogger model no:	**RX-16**	Datalogger cable download model:		USB	**TS07040022 B-8.2**		
*Install Date:	**24-Aug-07**	First Date Event	**20-Aug-08**	Last Date Event	**29-Aug-14**		
*Coordinates and Elevation		N **7626818**	E **491372**		Elev	**0**	
Length of Cable (m)	**8.32**	Cable Lead Above Ground (m)	**4.32**				
Datalogger Serial #	**07040022**	Nodal Points	**9**				

Thermistor Inspection

	Good	Needs Maintenance	Description
Casing	X	☐	
Cover	X	☐	
Data Logger	X	☐	
Cable	X	☐	
Beads	X	☐	
Lock condition	X	☐	
Battery Installation Date	**8/13/2017**		
Battery Levels	Main 11.34	Aux 13.26	

Manual Ground Temperature Readings

Bead	ohms	Degrees C
1	1.2786	11.05
2	1.1776	7.71
3	1.0598	3.85
4	0.9403	-0.08
5	0.9073	-1.17
6	0.8737	-2.31
7	0.8444	-3.30
8	0.8174	-4.25

Bead	ohms	Degrees C
9	0.7968	-4.95

Battery Information

Batteries changed ? Yes [x] No [ ] Monitoring Year: 10

Battery model number installed: ULB1 and ULB15 batteries

Expected battery life (years): 2024 (7 years)

Datalogger Programming (Describe programming completed; beads and frequency)

Reprogramed for 48 hours at noon.

Observations and Proposed Maintenance

Installed new ULB1 and ULB15 batteries.

Istalled new lock.

Thermistor Inspection Field Record Sheet

Inspector Name:	Reza Moghaddam	Inspection Date:	August 13 , 2017
Inspector Signature / Prepared By:			

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

Site Name:	**FOX-M**	Landfill:	**East Beach Landfill South Lobe**		
Thermistor Number:	**VT-9**	Inclination:	**Vertical**		
Datalogger model no:	**RX-16**	Datalogger cable download model:	USB	**TS07060017**	
*Install Date:	**22-Aug-07**	First Date Event	**20-Aug-08**	Last Date Event	**29-Aug-14**
*Coordinates and Elevation	N **7627038**	E **491574**		Elev	**0**
Length of Cable (m)	**8.22**	Cable Lead Above Ground (m)	**4.22**		
Datalogger Serial #	**07060017**	Nodal Points	**9**		

Thermistor Inspection

	Good	Needs Maintenance	Description
Casing	X	☐	
Cover	X	☐	
Data Logger	X	☐	
Cable	X	☐	
Beads	X	☐	
Lock condition	X	☐	
Battery Installation Date	**8/13/2017**		
Battery Levels	Main 11.34	Aux 13.87	

Manual Ground Temperature Readings

Bead	ohms	Degrees C	Bead	ohms	Degrees C
1	1.2759	10.96	9	0.8041	-4.69
2	1.2154	8.95			
3	1.1319	6.21			
4	1.0263	2.75			
5	0.9362	-0.21			
6	0.9022	-1.35			
7	0.8615	-2.72			
8	0.8322	-3.72			

Battery Information

Batteries changed ? Yes [x] No [ ] Monitoring Year: 10

Battery model number installed: ULB1 and ULB15 batteries

Expected battery life (years): 2024 (7 years)

Datalogger Programming (Describe programming completed; beads and frequency)

Reprogramed for 48 hours at noon.

Observations and Proposed Maintenance

Installed new ULB1 and ULB15 batteries.

Istalled new lock.

Thermistor Inspection Field Record Sheet

Inspector Name:	Reza Moghaddam		Inspection Date:	August	13 , 2017
Inspector Signature / Prepared By:					

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

Site Name:	**FOX-M**	Landfill:	**East Beach Landfill North Lobe**				
Thermistor Number:	**VT-10**	Inclination:	**Vertical**				
Datalogger model no:	**RX-16**	Datalogger cable download model:		USB	**TS07060003 B-8.2**		
*Install Date:	**24-Aug-07**	First Date Event	**20-Aug-08**	Last Date Event	**29-Aug-14**		
*Coordinates and Elevation		N **7627282**	E **491605**		Elev	**0**	
Length of Cable (m)	**8.22**	Cable Lead Above Ground (m)	**4.22**				
Datalogger Serial #	**07060003**	Nodal Points	**9**				

Thermistor Inspection

	Good	Needs Maintenance	Description
Casing	X	☐	
Cover	X	☐	
Data Logger	X	☐	
Cable	X	☐	
Beads	X	☐	
Lock condition	X	☐	
Battery Installation Date	**8/13/2017**		
Battery Levels	Main 11.34	Aux 13.38	

Manual Ground Temperature Readings

Bead	ohms	Degrees C
1	1.147	6.70
2	1.1202	5.83
3	1.081	4.56
4	0.9609	0.60
5	0.9181	-0.81
6	0.9883	-1.81
7	0.8546	-2.95
8	0.8273	-3.89

Bead	ohms	Degrees C
9	0.8035	-4.71

Battery Information

Batteries changed ? Yes [x] No [ ] Monitoring Year: 10

Battery model number installed: ULB1 and ULB15 batteries

Expected battery life (years): 2024 (7 years)

Datalogger Programming (Describe programming completed; beads and frequency)

Reprogramed for 48 hours at noon.

Observations and Proposed Maintenance

Installed new ULB1 and ULB15 batteries.

Istalled new lock.

Thermistor Inspection Field Record Sheet

Inspector Name:	Reza Moghaddam	Inspection Date:	August 13 , 2017
Inspector Signature / Prepared By:			

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

Site Name:	**FOX-M**	Landfill:	**East Beach Landfill North Lobe**		
Thermistor Number:	**VT-11**	Inclination:	**Vertical**		
Datalogger model no:	**RX-16**	Datalogger cable download model:	USB	**TS07060002**	
*Install Date:	**24-Aug-07**	First Date Event	**20-Aug-08**	Last Date Event	**29-Aug-14**
*Coordinates and Elevation	N **7627318**	E **491566**		Elev	**0**
Length of Cable (m)	**8.22**	Cable Lead Above Ground (m)	**4.22**		
Datalogger Serial #	**07060002**	Nodal Points	**9**		

Thermistor Inspection

	Good	Needs Maintenance	Description
Casing	X	☐	
Cover	X	☐	
Data Logger	X	☐	
Cable	X	☐	
Beads	X	☐	
Lock condition	X	☐	
Battery Installation Date	**8/13/2017**		
Battery Levels	Main 11.34	Aux 13.63	

Manual Ground Temperature Readings

Bead	ohms	Degrees C
1	1.1764	7.67
2	1.1417	6.53
3	1.0907	4.86
4	0.9554	0.42
5	0.915	-0.92
6	0.8803	-2.08
7	0.8479	-3.18
8	0.8194	-4.16

Bead	ohms	Degrees C
9	0.7968	-4.95

Battery Information

Batteries changed ? Yes [x] No [ ] Monitoring Year: 10

Battery model number installed: ULB1 and ULB15 batteries

Expected battery life (years): 2024 (7 years)

Datalogger Programming (Describe programming completed; beads and frequency)

Reprogramed for 48 hours at noon.

Observations and Proposed Maintenance

Installed new ULB1 and ULB15 batteries.

Istalled new lock.

Thermistor Inspection Field Record Sheet

Inspector Name:	Reza Moghaddam		Inspection Date:	August	14 , 2017
Inspector Signature / Prepared By:					

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

Site Name:	**FOX-M**	Landfill:	**Non-Hazardous Waste Landfill**		
Thermistor Number:	**VB-2 (HB-4)**	Inclination:	**Vertical**		
Datalogger model no:	**RX-16**	Datalogger cable download model:		USB	
*Install Date:		First Date Event	**21-Aug-08**	Last Date Event	**29-Aug-14**
*Coordinates and Elevation		N **7628019**	E **491145**	Elev	**0**
Length of Cable (m)	**8.2**	Cable Lead Above Ground (m)	4.2		
Datalogger Serial #	**N/A**	Nodal Points	**11**		

Thermistor Inspection

	Good	Needs Maintenance	Description
Casing	X	☐	
Cover	X	☐	
Data Logger	X	☐	
Cable	X	☐	
Beads	☐	X	2 beads out (no data)
Lock condition	☐	X	Needs a new lock

Battery Installation Date	**8/14/2017**				
Battery Levels	Main	11.34	Aux	11.68	

Manual Ground Temperature Readings

Bead	ohms	Degrees C	Bead	ohms	Degrees C
1	1.1751	7.63	9	0.7054	-8.21
2	-	-	10	0.7095	-8.06
3	-	-	11	0.7241	-7.52
4	0.9102	-1.08			
5	0.8945	-1.61			
6	0.8138	-4.36			
7	0.7631	-6.13			
8	0.7540	-6.45			

Battery Information

Batteries changed ?	Yes	x	No	Monitoring Year:	10
Battery model number installed:	ULB1 and ULB15 batteries				
Expected battery life (years):	2024 (7 years)				

Datalogger Programming (Describe programming completed; beads and frequency)

Reprogramed for 48 hours at noon.

Observations and Proposed Maintenance

Installed new ULB1 and ULB15 batteries.
Needs a new lock. Lock was functional but stiff in 2017 (casing relocked).
To be replaced in 2018.

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

Site Name: FOX-M Landfill Name: Tier II Disposal Facility

Monitoring Well ID: MW-01

Sample Number(s) include dups.: 1

Bottles filled (by parameter type): all

Date of Sampling Event: 13-Aug-2017 Time: 3:10pm

Weather: 6°C, foggy and overcast, slight wind

Names of Samplers: JEB JJJ

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

casing in great condition, no ponding, dry ground

Lock (condition, presence, model, manufacturer): not present, added

Pre-Measured Data (From Water Well Record Log)

*Depth of well installation (cm)= _____ Diameter of well (cm)= 4

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

*note: *depths are from ground surface*

Field Measurements

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

Well pipe height above ground (cm) (to top of pipe)= 54

Static water level (cm) from top of pipe = 91

Static water level (cm) (below ground surface) calculated = 37

Measured well refusal depth (cm) (measure after sampling)= 209

Thickness of water column (cm)= 118 Static volume of water in well (mL)= 1483

Free product thickness (mm)= Ø Evidence of sludge or siltation: none

Purging Information Summary*

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

Well purged (Y/N): Y Recharge Rate: ~100mL/min

Volume Purged (L) (note multiple purging events if applicable): ~500mL

Parameter	Initial	Stabilized	Final	Notes (if not stabilized)
pH	8.16	7.99	7.97	
Conductivity (uS/cm)	0.562	0.574	0.570	
Turbidity (NTU)	0.2	0.0	0.0	
Temperature (degC)	5.41	4.51	4.54	

Visual/olfactory observations (incl. colour, odour, presence of free product/sheen/globules, siltation...): clear, no sheen, no odour

Decontamination of sampling equipment

Type of decontamination fluid (s): methyl hydrate, soap, water

Number washes: 1 Number rinses: 1

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.

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

Site Name: FOX-M Landfill Name: Tier II Disposal Facility

Monitoring Well ID: MW-02

Sample Number(s) include dups.: 1

Bottles filled (by parameter type): all

Date of Sampling Event: 13 Aug 2017 Time: 2:40 pm

Weather: 6°, overcast and foggy, slight wind

Names of Samplers: JEB

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

casing in great condition, no ponding, dry ground

Lock (condition, presence, model, manufacturer): cut & replaced

Pre-Measured Data (From Water Well Record Log)

*Depth of well installation (cm)= _____ Diameter of well (cm)= 4

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

*note: *depths are from ground surface*

Field Measurements

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

Well pipe height above ground (cm) (to top of pipe)= 50

Static water level (cm) from top of pipe = 81

Static water level (cm) (below ground surface) calculated = 31

Measured well refusal depth (cm) (measure after sampling)= 209

Thickness of water column (cm)= 128 Static volume of water in well (mL)= 1608

Free product thickness (mm)= Ø Evidence of sludge or siltation: none

Purging Information Summary*

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

Well purged (Y/N): Y Recharge Rate: ~100mL/min

Volume Purged (L) (note multiple purging events if applicable): ~500mL

Parameter	Initial	Stabilized	Final	Notes (if not stabilized)
pH	9.01	8.61	8.45	
Conductivity (uS/cm)	0.551	0.559	0.559	
Turbidity (NTU)	0.2	0.0	0.0	
Temperature (degC)	5.44	5.38	5.30	

Visual/olfactory observations (incl. colour, odour, presence of free product/sheen/globules, siltation...): clear, no sheen, no odour

Decontamination of sampling equipment

Type of decontamination fluid (s): methyl hydrate, soap, water

Number washes: 1 Number rinses: 1

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.

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

Site Name: FOX-M Landfill Name: Tier II Disposal Facility

Monitoring Well ID: MW03

Sample Number(s) include dups.: 1

Bottles filled (by parameter type): all

Date of Sampling Event: 13-Aug-2017 Time: 2:00 pm

Weather: 6°C foggy and overcast, slight wind

Names of Samplers: JEBW

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

casing in great condition no ponding, dry ground

Lock (condition, presence, model, manufacturer): cut & replaced

Pre-Measured Data (From Water Well Record Log)

*Depth of well installation (cm)= _____ Diameter of well (cm)= 4

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

*note: *depths are from ground surface*

Field Measurements

Measurement method (interface probe, tape, etc): Interface Probe

Well pipe height above ground (cm) (to top of pipe)= 54

Static water level (cm) from top of pipe = 81

Static water level (cm) (below ground surface) calculated = 27

Measured well refusal depth (cm) (measure after sampling)= 191

Thickness of water column (cm)= 110 Static volume of water in well (mL)= 1382

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

Purging Information Summary*

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

Well purged (Y/N): Y Recharge Rate: ~100mL/min

Volume Purged (L) (note multiple purging events if applicable): ~1500mL

Parameter	Initial	Stabilized	Final	Notes (if not stabilized)
pH	11.31	11.55	10.85	
Conductivity (uS/cm)	0.541	0.557	0.648	
Turbidity (NTU)	27.8	27.0	17.3	
Temperature (degC)	6.17	5.78	5.84	

Visual/olfactory observations (incl. colour, odour, presence of free product/sheen/globules, siltation...): possible bentonite in well based on pH? slightly silty, no sheen, no odour.

Decontamination of sampling equipment

Type of decontamination fluid (s): methyl hydrate, soap water

Number washes: 1 Number rinses: 1

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.

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

Site Name: FOX-M Landfill Name: Tier II Disposal Facility

Monitoring Well ID: MW-04

Sample Number(s) include dups.: 1

Bottles filled (by parameter type): all

Date of Sampling Event: 13-Aug-2017 Time: 4:30 pm

Weather: 6°C, foggy and overcast, slight wind

Names of Samplers: JEB JJJ

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

riser above casing, no ponding dry ground

Lock (condition, presence, model, manufacturer): cannot be locked

Pre-Measured Data (From Water Well Record Log)

*Depth of well installation (cm)= _____ Diameter of well (cm)= 4

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

*note: *depths are from ground surface*

Field Measurements

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

Well pipe height above ground (cm) (to top of pipe)= 96

Static water level (cm) from top of pipe = 113

Static water level (cm) (below ground surface) calculated = 17

Measured well refusal depth (cm) (measure after sampling)= 235

Thickness of water column (cm)= 122 Static volume of water in well (mL)= 1533

Free product thickness (mm)= Ø Evidence of sludge or siltation: none

Purging Information Summary*

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

Well purged (Y/N): Y Recharge Rate: ~ 100mL/min

Volume Purged (L) (note multiple purging events if applicable): ~1500mL

Parameter	Initial	Stabilized	Final	Notes (if not stabilized)
pH	7.90	7.82	7.68	
Conductivity (uS/cm)	0.707	0.687	0.665	
Turbidity (NTU)	265	72.4	12.8	
Temperature (degC)	4.14	4.29	4.28	

Visual/olfactory observations (incl. colour, odour, presence of free product/sheen/globules, siltation...): slightly silty, no sheen, no odour

Decontamination of sampling equipment

Type of decontamination fluid (s): methyl hydrate, soap, water

Number washes: 1 Number rinses: 1

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.

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

Site Name: FOX-M Landfill Name: Tier II Disposal Facility

Monitoring Well ID: MW-05

Sample Number(s) include dups.: 1

Bottles filled (by parameter type): all

Date of Sampling Event: 13 Aug 2017 Time: 3:50 pm

Weather: 6°C, foggy and overcast, slight wind

Names of Samplers: JEB

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

casing in great condition, no ponding, dry ground

Lock (condition, presence, model, manufacturer): cut & replaced

Pre-Measured Data (From Water Well Record Log)

*Depth of well installation (cm)= _____ Diameter of well (cm)= 4

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

*note: *depths are from ground surface*

Field Measurements

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

Well pipe height above ground (cm) (to top of pipe)= 63

Static water level (cm) from top of pipe = 82

Static water level (cm) (below ground surface) calculated = 19

Measured well refusal depth (cm) (measure after sampling)= 187

Thickness of water column (cm)= 105 Static volume of water in well (mL)= 1319

Free product thickness (mm)= Ø Evidence of sludge or siltation: none

Purging Information Summary*

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

Well purged (Y/N): Y Recharge Rate: ~100mL/min

Volume Purged (L) (note multiple purging events if applicable): ~500mL

Parameter	Initial	Stabilized	Final	Notes (if not stabilized)
pH	7.82	7.76	7.62	
Conductivity (uS/cm)	0.803	0.776	0.654	
Turbidity (NTU)	0.0	0.0	0.0	
Temperature (degC)	5.36	4.49	4.53	

Visual/olfactory observations (incl. colour, odour, presence of free product/sheen/globules, siltation...): clear, no sheen, no odour

Decontamination of sampling equipment

Type of decontamination fluid (s): methyl hydrate, soap, water

Number washes: 1 Number rinses: 1

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.

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

Site Name: FOX-M Landfill Name: NHWL

Monitoring Well ID: MW-12

Sample Number(s) include dups.: Ø

Bottles filled (by parameter type): Ø

Date of Sampling Event: 14-Aug-2017 Time: 8:40 am

Weather: Sunny, 6°C, very windy

Names of Samplers: JEB

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

casing in great condition, no ponding, dry ground

Lock (condition, presence, model, manufacturer): cut & replaced

Pre-Measured Data (From Water Well Record Log)

*Depth of well installation (cm)= _____ Diameter of well (cm)= 4

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

*note: *depths are from ground surface*

Field Measurements

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

Well pipe height above ground (cm) (to top of pipe)= 49

Static water level (cm) from top of pipe = 129

Static water level (cm) (below ground surface) calculated = 80

Measured well refusal depth (cm) (measure after sampling)= 129

Thickness of water column (cm)= Ø Static volume of water in well (mL)= N/A

Free product thickness (mm)= Ø Evidence of sludge or siltation: N/A

Purging 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 if applicable): N/A

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...): Frozen ice on probe

Decontamination of sampling equipment

Type of decontamination fluid (s): methyl hydrate, soap, water

Number washes: 1 Number rinses: 1

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.

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

Site Name: FOX-M Landfill Name: NHWL

Monitoring Well ID: MW-13

Sample Number(s) include dups.: 1

Bottles filled (by parameter type): all

Date of Sampling Event: 14-Aug-2017 Time: 11:30am

Weather: sunny, 6°C, very windy

Names of Samplers: JEB

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

casing in great condition, ponding in casing, dry ground

Lock (condition, presence, model, manufacturer): cut & replaced

Pre-Measured Data (From Water Well Record Log)

*Depth of well installation (cm)= _____ Diameter of well (cm)= 4

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

*note: *depths are from ground surface*

Field Measurements

Measurement method (interface probe, tape, etc): Interface Probe

Well pipe height above ground (cm) (to top of pipe)= 62

Static water level (cm) from top of pipe = 100

Static water level (cm) (below ground surface) calculated = 38

Measured well refusal depth (cm) (measure after sampling)= 161

Thickness of water column (cm)= 61 Static volume of water in well (mL)= 767

Free product thickness (mm)= Ø Evidence of sludge or siltation: none

Purging Information Summary*

Purging/sampling equipment, sampling technique and equipment calibration information: low flow peristatic pump

Well purged (Y/N): N Recharge Rate: ~100mL/min

Volume Purged (L) (note multiple purging events if applicable): ~600mL

Parameter	Initial	Stabilized	Final	Notes (if not stabilized)
pH	7.62	7.60	7.59	
Conductivity (uS/cm)	1.73	1.65	1.65	
Turbidity (NTU)	2.9	1.9	1.6	
Temperature (degC)	5.27	4.98	4.78	

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

* no free product via H.oil probe

Decontamination of sampling equipment

Type of decontamination fluid (s): methyl hydrate, soap, water

Number washes: 2 Number rinses: 2

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.

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

Site Name: FOX-M Landfill Name: NHWL

Monitoring Well ID: MW-17

Sample Number(s) include dups.: Ø

Bottles filled (by parameter type): Ø

Date of Sampling Event: 14 Aug 2017 Time: 9:20 am

Weather: Sunny, 6°C, very windy

Names of Samplers: JEB

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

casing in great condition, ponding in casing, dry ground

Lock (condition, presence, model, manufacturer): cut & replaced

Pre-Measured Data (From Water Well Record Log)

*Depth of well installation (cm)= _____ Diameter of well (cm)= 4

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

*note: *depths are from ground surface*

Field Measurements

Measurement method (interface probe, tape, etc): Interface Probe

Well pipe height above ground (cm) (to top of pipe)= 43

Static water level (cm) from top of pipe = 113

Static water level (cm) (below ground surface) calculated = 70

Measured well refusal depth (cm) (measure after sampling)= 113

Thickness of water column (cm)= Ø Static volume of water in well (mL)= N/A

Free product thickness (mm)= Ø Evidence of sludge or siltation: N/A

Purging 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 if applicable): N/A

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...): frozen, ice on probe

Decontamination of sampling equipment

Type of decontamination fluid (s): methyl hydrate, soap, water

Number washes: 1 Number rinses: 1

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.

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

Site Name: FOX-M Landfill Name: NHWL

Monitoring Well ID: MW-15

Sample Number(s) include dups.: 1

Bottles filled (by parameter type): all

Date of Sampling Event: 14 Aug 2017 Time: 10:30 am

Weather: sunny, 6°C, very windy

Names of Samplers: JEB

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

Casing in great condition, no ponding dry ground

Lock (condition, presence, model, manufacturer): cut & replaced

Pre-Measured Data (From Water Well Record Log)

*Depth of well installation (cm)= _____ Diameter of well (cm)= 4

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

*note: *depths are from ground surface*

Field Measurements

Measurement method (interface probe, tape, etc): Interface Probe

Well pipe height above ground (cm) (to top of pipe)= 54

Static water level (cm) from top of pipe = 82

Static water level (cm) (below ground surface) calculated = 28

Measured well refusal depth (cm) (measure after sampling)= 163

Thickness of water column (cm)= 81 Static volume of water in well (mL)= 1018

Free product thickness (mm)= Ø Evidence of sludge or siltation: none

Purging Information Summary*

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

Well purged (Y/N): Y Recharge Rate: ~100mL/min

Volume Purged (L) (note multiple purging events if applicable): ~500mL

Parameter	Initial	Stabilized	Final	Notes (if not stabilized)
pH	7.85	7.87	7.63	
Conductivity (uS/cm)	1.30	0.898	0.891	
Turbidity (NTU)	0.6	0.0	0.0	
Temperature (degC)	5.87	4.91	4.89	

Visual/olfactory observations (incl. colour, odour, presence of free product/sheen/globules, siltation...): clear, no sheen, no odour

Decontamination of sampling equipment

Type of decontamination fluid (s): methyl hydrate, soap, water

Number washes: 1 Number rinses: 1

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.

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

Site Name: FOX-M Landfill Name: NHWL

Monitoring Well ID: MW-16

Sample Number(s) include dups.: Ø

Bottles filled (by parameter type): Ø

Date of Sampling Event: 14-Aug-2017 Time: 9:50am

Weather: Sunny, 6°C, very windy

Names of Samplers: JEB

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

casing slight dent, lrd broken (riser above casing slightly), ponding in casing, dry ground

Lock (condition, presence, model, manufacturer): cannot be locked

Pre-Measured Data (From Water Well Record Log)

*Depth of well installation (cm)= _____ Diameter of well (cm)= 4

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

*note: *depths are from ground surface*

Field Measurements

Measurement method (interface probe, tape, etc): Interface Probe

Well pipe height above ground (cm) (to top of pipe)= 56

Static water level (cm) from top of pipe = 137

Static water level (cm) (below ground surface) calculated = 81

Measured well refusal depth (cm) (measure after sampling)= 137

Thickness of water column (cm)= Ø Static volume of water in well (mL)= N/A

Free product thickness (mm)= Ø Evidence of sludge or siltation: N/A

Purging 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 if applicable): N/A

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...): frozen, ice on probe

Decontamination of sampling equipment

Type of decontamination fluid (s): methyl hydrate, soap, water

Number washes: 1 Number rinses: 1

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.

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

Site Name: FOX-M Landfill Name: East Beach Landfill North

Monitoring Well ID: MW20

Sample Number(s) include dups.: Ø

Bottles filled (by parameter type): Ø

Date of Sampling Event: 13-Aug-2017 Time: 9:30am

Weather: 6°C, Foggy and overcast, slight wind

Names of Samplers: JEB

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

casing in great condition, no ponding, dry ground

Lock (condition, presence, model, manufacturer): cut & replaced

Pre-Measured Data (From Water Well Record Log)

*Depth of well installation (cm)= _____ Diameter of well (cm)= 4

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

*note: *depths are from ground surface*

Field Measurements

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

Well pipe height above ground (cm) (to top of pipe)= 42

Static water level (cm) from top of pipe = 112

Static water level (cm) (below ground surface) calculated = 70

Measured well refusal depth (cm) (measure after sampling)= 112

Thickness of water column (cm)= Ø Static volume of water in well (mL)= N/A

Free product thickness (mm)= Ø Evidence of sludge or siltation: N/A

Purging 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 if applicable): N/A

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...): frozen, ice on probe

Decontamination of sampling equipment

Type of decontamination fluid (s): methyl hydrate, soap, water

Number washes: 1 Number rinses: 1

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.

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

Site Name: Fox-M Landfill Name: ~~East~~ Beach Landfill North

Monitoring Well ID: MW-21

Sample Number(s) include dups.: 1

Bottles filled (by parameter type): all

Date of Sampling Event: 13-Aug-2017 Time: 8:30 am

Weather: 6°C, foggy & overcast, slight wind

Names of Samplers: JEB WJ

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

casing in great condition, no ponding, dry ground

Lock (condition, presence, model, manufacturer): cut & replaced

Pre-Measured Data (From Water Well Record Log)

*Depth of well installation (cm)= _____ Diameter of well (cm)= 4

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

*note: *depths are from ground surface*

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 = 124

Static water level (cm) (below ground surface) calculated = 77

Measured well refusal depth (cm) (measure after sampling)= 132

Thickness of water column (cm)= 8 Static volume of water in well (mL)= 101

Free product thickness (mm)= Ø Evidence of sludge or siltation: none

Purging Information Summary*

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

Well purged (Y/N): N Recharge Rate: < 100mL/min

Volume Purged (L) (note multiple purging events if applicable): ~0.250mL

Parameter	Initial	Stabilized	Final	Notes (if not stabilized)
pH	7.97		8.08	limited water
Conductivity (uS/cm)	0.538		0.496	∴ filled bottles
Turbidity (NTU)	1.1		0.1	after initial
Temperature (degC)	6.81		4.86	readings

Visual/olfactory observations (incl. colour, odour, presence of free product/sheen/globules, siltation...): clear, no sheen, no odour

Decontamination of sampling equipment

Type of decontamination fluid (s): methyl hydrate, soap, water.

Number washes: 1 Number rinses: 1

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.

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

Site Name: FOX-M Landfill Name: East Beach Landfill South

Monitoring Well ID: MW-22

Sample Number(s) include dups.: Ø

Bottles filled (by parameter type): Ø

Date of Sampling Event: 13-Aug-2017 Time: 10:00am

Weather: 6°C, foggy and overcast, slight wind

Names of Samplers: JEB

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

Casing in good condition, lid needs replacement, no ponding, dry ground.

Lock (condition, presence, model, manufacturer): cut & replaced

Pre-Measured Data (From Water Well Record Log)

*Depth of well installation (cm)= _____ Diameter of well (cm)= 4

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

*note: *depths are from ground surface*

Field Measurements

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

Well pipe height above ground (cm) (to top of pipe)= 50

Static water level (cm) from top of pipe = 68

Static water level (cm) (below ground surface) calculated = 18

Measured well refusal depth (cm) (measure after sampling)= 68

Thickness of water column (cm)= Ø Static volume of water in well (mL)= N/A

Free product thickness (mm)= Ø Evidence of sludge or siltation: N/A

Purging Information Summary*

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

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

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

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...): frozen ice on probe

Decontamination of sampling equipment

Type of decontamination fluid (s): methyl hydrate, soap, water.

Number washes: 1 Number rinses: 1

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.

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

Site Name: FOX-M Landfill Name: East Beach Landfill South

Monitoring Well ID: MW-23

Sample Number(s) include dups.: Ø

Bottles filled (by parameter type): Ø

Date of Sampling Event: 13-Aug-2017 Time: 10:30 am

Weather: 6°C, foggy and overcast, slight wind

Names of Samplers: JEB

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

casing in great condition, no ponding, dry ground

Lock (condition, presence, model, manufacturer): cut & replaced

Pre-Measured Data (From Water Well Record Log)

*Depth of well installation (cm)= Diameter of well (cm)= 4

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

*note: *depths are from ground surface*

Field Measurements

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

Well pipe height above ground (cm) (to top of pipe)= 41

Static water level (cm) from top of pipe = 112

Static water level (cm) (below ground surface) calculated = 71

Measured well refusal depth (cm) (measure after sampling)= 112

Thickness of water column (cm)= Ø Static volume of water in well (mL)= N/A

Free product thickness (mm)= Ø Evidence of sludge or siltation: N/A

Purging 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 if applicable): N/A

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...): frozen ice on probe

Decontamination of sampling equipment

Type of decontamination fluid (s): methyl hydrate, soap water

Number washes: 1 Number rinses: 1

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.

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

Site Name: FOX-M Landfill Name: East Beach Landfill South

Monitoring Well ID: MW-24

Sample Number(s) include dups.: Ø

Bottles filled (by parameter type): Ø

Date of Sampling Event: 13-Aug-2017 Time: 10:50 am

Weather: 6°C, foggy and overcast, slight wind

Names of Samplers: JER JJJ

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

casing in great condition, no ponding, dry ground

Lock (condition, presence, model, manufacturer): cut & replaced

Pre-Measured Data (From Water Well Record Log)

*Depth of well installation (cm)= _____ Diameter of well (cm)= 4

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

*note: *depths are from ground surface*

Field Measurements

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

Well pipe height above ground (cm) (to top of pipe)= 49

Static water level (cm) from top of pipe = 114

Static water level (cm) (below ground surface) calculated = 65

Measured well refusal depth (cm) (measure after sampling)= 114

Thickness of water column (cm)= Ø Static volume of water in well (mL)= N/A

Free product thickness (mm)= Ø Evidence of sludge or siltation: N/A

Purging 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 if applicable): N/A

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...): frozen, ice on probe

Decontamination of sampling equipment

Type of decontamination fluid (s): methyl hydrate, soap, water.

Number washes: 1J Number rinses: 1

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.

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

Site Name: FOX-M Landfill Name: East Beach Landfill South

Monitoring Well ID: MW-25

Sample Number(s) include dups.: Ø

Bottles filled (by parameter type): Ø

Date of Sampling Event: 13-Aug-2017 Time: 11:10 am

Weather: 6°C, foggy and overcast, slight wind

Names of Samplers: JER JJJ

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

casing in great condition, no ponding, dry ground

Lock (condition, presence, model, manufacturer): not present, added

Pre-Measured Data (From Water Well Record Log)

*Depth of well installation (cm)= _____ Diameter of well (cm)= 4

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

*note: *depths are from ground surface*

Field Measurements

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

Well pipe height above ground (cm) (to top of pipe)= 48

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

Static water level (cm) (below ground surface) calculated = 82

Measured well refusal depth (cm) (measure after sampling)= 130

Thickness of water column (cm)= Ø Static volume of water in well (mL)= N/A

Free product thickness (mm)= Ø Evidence of sludge or siltation: N/A

Purging 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 if applicable): N/A

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...): Frozen, ice on probe

Decontamination of sampling equipment

Type of decontamination fluid (s): methyl hydrate, Soap, water

Number washes: 1 Number rinses: 1

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.

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

Site Name: Fox-M Landfill Name: East Beach Landfill South

Monitoring Well ID: MW-26

Sample Number(s) include dups.: ∅

Bottles filled (by parameter type): ∅

Date of Sampling Event: 13 Aug, 2017 Time: 11:30 am

Weather: 6°C, foggy and overcast, slight wind

Names of Samplers: JEB WJ

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

casing in great condition, no ponding, dry ground

Lock (condition, presence, model, manufacturer): cut & replaced

Pre-Measured Data (From Water Well Record Log)

*Depth of well installation (cm)= _____ Diameter of well (cm)= 4

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

*note: *depths are from ground surface*

Field Measurements

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

Well pipe height above ground (cm) (to top of pipe)= 38

Static water level (cm) from top of pipe = 118

Static water level (cm) (below ground surface) calculated = 80

Measured well refusal depth (cm) (measure after sampling)= 118

Thickness of water column (cm)= ∅ Static volume of water in well (mL)= N/A

Free product thickness (mm)= ∅ Evidence of sludge or siltation: N/A

Purging 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 if applicable): N/A

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...): frozen, ice on probe

Decontamination of sampling equipment

Type of decontamination fluid (s): methyl hydrate, soap, water

Number washes: 1 J Number rinses: 1

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.

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

Site Name: FOX-M Landfill Name: East Beach Landfill South

Monitoring Well ID: MW-27

Sample Number(s) include dups.: Ø

Bottles filled (by parameter type): Ø

Date of Sampling Event: 13 Aug 2017 Time: 11:50 am

Weather: 6oC, foggy and overcast, slight wind

Names of Samplers: JEB

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

casing in good condition, lid needs replacement, no ponding, dry ground

Lock (condition, presence, model, manufacturer): cut & replaced

Pre-Measured Data (From Water Well Record Log)

*Depth of well installation (cm)= _____ Diameter of well (cm)= 4

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

*note: *depths are from ground surface*

Field Measurements

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

Well pipe height above ground (cm) (to top of pipe)= 44

Static water level (cm) from top of pipe = 119

Static water level (cm) (below ground surface) calculated = 75

Measured well refusal depth (cm) (measure after sampling)= 119

Thickness of water column (cm)= Ø Static volume of water in well (mL)= N/A

Free product thickness (mm)= Ø Evidence of sludge or siltation: N/A

Purging 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 if applicable): N/A

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...): frozen, ice on probe

Decontamination of sampling equipment

Type of decontamination fluid (s): methyl hydrate, soap, water

Number washes: 1 Number rinses: 1

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.

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

Site Name: FOX-M Landfill Name: East Beach Landfill South

Monitoring Well ID: MW-28

Sample Number(s) include dups.: Ø

Bottles filled (by parameter type): Ø

Date of Sampling Event: 13-Aug-2017 Time: 12:10pm

Weather: 6°C, foggy and overcast, Slight wind

Names of Samplers: JEB

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

casing in great condition, no ponding, dry ground

Lock (condition, presence, model, manufacturer): cut & replaced

Pre-Measured Data (From Water Well Record Log)

*Depth of well installation (cm)= _____ Diameter of well (cm)= 4

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

*note: *depths are from ground surface*

Field Measurements

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

Well pipe height above ground (cm) (to top of pipe)= 48

Static water level (cm) from top of pipe = 117

Static water level (cm) (below ground surface) calculated = 69

Measured well refusal depth (cm) (measure after sampling)= 117

Thickness of water column (cm)= Ø Static volume of water in well (mL)= N/A

Free product thickness (mm)= Ø Evidence of sludge or siltation: N/A

Purging 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 if applicable): N/A

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...): frozen, ice on probe

Decontamination of sampling equipment

Type of decontamination fluid (s): methyl hydrate, soap, water

Number washes: 1 Number rinses: 1

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.

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

Site Name: FOX-M Landfill Name: East Beach Landfill South

Monitoring Well ID: MW-29

Sample Number(s) include dups.: 2 (MW-929)

Bottles filled (by parameter type): all

Date of Sampling Event: 13-Aug-2017 Time: 12:40 pm

Weather: 6°C, foggy and overcast, slight wind

Names of Samplers: JFB JJJ

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

casing in great condition, no ponding, dry ground

Lock (condition, presence, model, manufacturer): cut & replaced

Pre-Measured Data (From Water Well Record Log)

*Depth of well installation (cm)= _____ Diameter of well (cm)= 4

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

*note: *depths are from ground surface*

Field Measurements

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

Well pipe height above ground (cm) (to top of pipe)= 42

Static water level (cm) from top of pipe = 73

Static water level (cm) (below ground surface) calculated = 31

Measured well refusal depth (cm) (measure after sampling)= 127

Thickness of water column (cm)= 64 Static volume of water in well (mL)= 679

Free product thickness (mm)= Ø Evidence of sludge or siltation: none

Purging Information Summary*

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

Well purged (Y/N): N Recharge Rate: ~100mL/min

Volume Purged (L) (note multiple purging events if applicable): ~500mL

Parameter	Initial	Stabilized	Final	Notes (if not stabilized)
pH	7.81	7.77	7.76	
Conductivity (uS/cm)	2.15	1.99	1.72	
Turbidity (NTU)	2.2	0.0	0.0	
Temperature (degC)	6.64	5.53	5.14	

Visual/olfactory observations (incl. colour, odour, presence of free product/sheen/globules, siltation...): no sheen, no odour, clear

Decontamination of sampling equipment

Type of decontamination fluid (s): methyl hydrate, soap, water

Number washes: 1 Number rinses: 1

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.

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

Site Name: FOX-M Landfill Name: East Beach Landfill South

Monitoring Well ID: MW-30

Sample Number(s) include dups.: 1

Bottles filled (by parameter type): all

Date of Sampling Event: 13-Aug-2017 Time: 1:20pm

Weather: 6°C, foggy and overcast, slight wind

Names of Samplers: SEB

Description of Well Condition and Surrounding ground conditions (note ponding of water): casing in great ponding, no ponding, wet ground bentonite

Lock (condition, presence, model, manufacturer): cut & replaced

Pre-Measured Data (From Water Well Record Log)

*Depth of well installation (cm)= _____ Diameter of well (cm)= 4

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

*note: *depths are from ground surface*

Field Measurements

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

Well pipe height above ground (cm) (to top of pipe)= 41

Static water level (cm) from top of pipe = 47

Static water level (cm) (below ground surface) calculated = 6

Measured well refusal depth (cm) (measure after sampling)= 127

Thickness of water column (cm)= 80 Static volume of water in well (mL)= 1005

Free product thickness (mm)= 0 Evidence of sludge or siltation: none

Purging Information Summary*

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

Well purged (Y/N): Y Recharge Rate: ~100mL/min

Volume Purged (L) (note multiple purging events if applicable): ~1500mL

Parameter	Initial	Stabilized	Final	Notes (if not stabilized)
pH	8.20	8.19	8.11	
Conductivity (uS/cm)	1.05	1.11	1.12	
Turbidity (NTU)	1.7	0.0	0.0	
Temperature (degC)	6.48	5.42	5.40	

Visual/olfactory observations (incl. colour, odour, presence of free product/sheen/globules, siltation...): clear, no sheen, no odour

Decontamination of sampling equipment

Type of decontamination fluid (s): methyl hydrate, soap, water

Number washes: 1 Number rinses: 1

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.

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

Site Name: FOX-M Landfill Name: East Beach Landfill South

Monitoring Well ID: MW-31

Sample Number(s) include dups.: Ø

Bottles filled (by parameter type): Ø

Date of Sampling Event: 14 Aug 2017 Time: 8:20 am

Weather: sunny, 6°C, very windy

Names of Samplers: JER

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

casing in great condition no ponding, dry ground

Lock (condition, presence, model, manufacturer): cut & replaced

Pre-Measured Data (From Water Well Record Log)

*Depth of well installation (cm)= _____ Diameter of well (cm)= 4

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

*note: *depths are from ground surface*

Field Measurements

Measurement method (interface probe, tape, etc): Interface Probe

Well pipe height above ground (cm) (to top of pipe)= 45

Static water level (cm) from top of pipe = 118

Static water level (cm) (below ground surface) calculated = 73

Measured well refusal depth (cm) (measure after sampling)= 120

Thickness of water column (cm)= 2 Static volume of water in well (mL)= 25

Free product thickness (mm)= Ø Evidence of sludge or siltation: none

Purging Information Summary*

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

Well purged (Y/N): N/A Recharge Rate: <100mL/min

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

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...): -tried to sample, insufficient volume.

Decontamination of sampling equipment

Type of decontamination fluid (s): methyl hydrate, soap, water

Number washes: 1 Number rinses: 1

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.

SITE NAME: FOX-M

RECORD OF SOIL SAMPLING

SAMPLER N: Aug 10, 2017 JEB

LANDFILL NAME	SOIL SAMPLE ID	DEPTH (m)	SOIL DESCRIPTION	GPS Northing	GPS Easting	GPS Elevation	Photographs	Backfilled (Y/N)
Communications northwest landfill	FM-16 Shallow	0-15	wet grey gravel & stone with some sand				3	Y
Communications northwest landfill	FM-16 Deep	40-50	wet grey gravel & stone with some sand	- water in hole.			3	Y
Communications northwest landfill	FM-14 Shallow	0-15	moist brown sand with gravel & stone, trace organics				3	Y
Communications northwest landfill	FM-14 Deep	40-50	moist grey silty sand with some gravel.				3	Y
Communications northwest landfill	FM-13 Shallow	0-15	wet grey gravel & stone with some sand				3	Y
Communications northwest landfill	FM-13 Deep	30-40	wet grey gravel & stone with some sand	- refusal @ 40 cm on compacted gravel & stone			3	Y
Communications north landfill	FM-17 Shallow	0-15	wet grey gravel & stone with some sand				3	Y
Communications north landfill	FM-17 Deep	30-40	wet grey gravel & stone with some sand				3	Y
Communications north landfill	FM-18 Shallow	0-15	wet grey gravel & stone, trace sand				3	Y
Communications north landfill	FM-18 Deep	40-50	wet grey gravel & stone, trace sand				3	Y

SITE NAME: FOX-M

RECORD OF SOIL SAMPLING

DATE: Aug 10, 2017
SAMPLER NAME: JEB

LANDFILL NAME	SOIL SAMPLE ID	DEPTH (m)	SOIL DESCRIPTION	GPS Northing	GPS Easting	GPS Elevation	Photographs	Backfilled (Y/N)
Communications north landfill	FM-19 Shallow	0-15	wet grey gravel & stone with trace sand				3	Y
communications north landfill	FM-19 deep	40-50	wet grey gravel & stone, trace sand - water in hole				3	Y
communications north landfill	FM-20 shallow	0-15	wet grey gravel & stone, trace sand				3	Y
communications north landfill	FM-20 deep	40-50	wet grey gravel & stone, trace sand - water in hole				3	Y
communications north landfill	FM-21 shallow	0-15	wet grey gravel & stone, trace sand - water in hole - refusal @ 20cm on rolled gravel, stone				3	Y
communications north landfill	FM-22 Shallow	0-15	wet grey gravel & stone with some sand, trace organics				3	Y
communications north landfill	FM-22 Deep	30-40	wet grey gravel & stone with some sand				3	Y
communications north landfill	FM-922 Deep	30-40	wet grey gravel & stone with some sand - refusal @ 40cm on gravel, stone				3	Y
Billboards Landfill	FM-3 shallow	0-15	wet grey gravel & stone with some sand, trace organics				3	Y
Billboards Landfill	FM-3 Deep	30-40	wet grey gravel & stone with some sand - water in hole - refusal @ 40 cm on gravel, stone				3	Y

SITE NAME: FOX-M1

RECORD OF SOIL SAMPLING

SAMPLER N: Aug 10, 2017 JJEB

LANDFILL NAME	SOIL SAMPLE ID	DEPTH (m)	SOIL DESCRIPTION	GPS Northing	GPS Easting	GPS Elevation	Photographs	Backfilled (Y/N)
Billboards Landfill	FM-4 shallow	0-15	moist grey sand and gravel with some stone, trace organics				3	Y
Billboards Landfill	FM-4 Deep	40-50	moist grey sand and gravel with some stone				3	Y
Billboards Landfill	FM-94 Deep	40-50	moist grey sand and gravel with some stone				3	Y
Billboards Landfill	FM-1 shallow	0-15	moist grey gravel and stone with some sand				3	Y
Billboards Landfill	FM-1 Deep	40-50	moist grey gravel and stone with some sand				3	Y
Billboards Landfill	FM-2 shallow	0-15	wet grey gravel and stone, trace sand and organis(black)				3	Y
Billboards Landfill	FM-2 Deep	40-50	wet grey gravel and stone trace sand - water entered hole				3	Y
6217 West Landfill	FM-7 Shallow	0-15	wet grey gravel and stone, trace sand				3	Y
6217 West Landfill	FM-7 Deep	40-50	wet grey gravel and stone, trace sand -water entered hole				3	Y
6217 West Landfill	FM-8 Shallow	0-15	wet grey gravel and stone with some sand, trace organics				3	Y

SITE NAME: FOX-M

RECORD OF SOIL SAMPLING

DATE: Aug 10 2017
SAMPLER NAME: JJEB

LANDFILL NAME	SOIL SAMPLE ID	DEPTH (m)	SOIL DESCRIPTION	GPS Northing	GPS Easting	GPS Elevation	Photographs	Backfilled (Y/N)
G217 West Landfill	FM-8 Deep	40-50	wet grey gravel and stone with some sand				3	Y
G217 West Landfill	FM-5 Shallow	0-15	wet grey gravel and sand with some stone				3	Y
G217 West Landfill	FM-9S Shallow	0-15	wet grey gravel and sand with some stone -refusal @ 20cm on rock				3	Y
G217 West Landfill	FM-6 Shallow	0-15	moist grey gravel and stone with some sand				3	Y
G217 West Landfill	FM-6 Deep	30-40	moist grey gravel and stone with some sand -refusal @ 40cm on compacted gravel/rock				3	Y
Haz mat Storage East Landfill	FM-9 Shallow	0-15	moist grey sand and gravel with some stone				3	Y
Hazmat Storage East Landfill	FM-99 Deep	30-40	moist grey sand and gravel with some stone				3	Y
Hazmat Storage East Landfill	FM-99 Deep	30-40	moist grey sand and gravel with some stone				3	Y
Hazmat Storage East Landfill	FM-12 Shallow	0-15	wet grey gravel and stone, trace sand -water entered hole -refusal @ 20cm on rock				3	Y
Hazmat Storage East Landfill	FM-11 Shallow	0-15	wet grey stone and gravel, with some sand				3	Y

SITE NAME: FOX-M

RECORD OF SOIL SAMPLING

SAMPLER N.: Aug 10, 2017 JFB

LANDFILL NAME	SOIL SAMPLE ID	DEPTH (m)	SOIL DESCRIPTION	GPS Northing	GPS Easting	GPS Elevation	Photographs	Backfilled (Y/N)
Hazmat Storage East landfill	FM-11 Deep	40-50	wet grey gravel and stone with some sand	-water entered hole			3	Y
Hazmat Storage East landfill	FM-10 Shallow	0-15	wet grey stone and gravel, trace sand				3	Y
Hazmat Storage East landfill	FM-1D Deep	40-50	wet grey gravel and stone, trace sand	-water entered hole			3	Y

SITE NAME: FOX-M

RECORD OIL SAMPLING

SAMPLER: JTEB DATE: Aug 13, 2017

LANDFILL NAME	SOIL SAMPLE ID	DEPTH (m)	SOIL DESCRIPTION	GPS Northing	GPS Easting	GPS Elevation	Photographs	Backfilled (Y/N)
East Beach Landfill North	MW-21 Shallow	0-15	moist grey gravel & stone with some sand				3	Y
East Beach Landfill North	MW-21 Deep	40-50	moist grey gravel & stone with some sand				3	Y
East Beach Landfill North	MW-20 Shallow	0-15	moist grey gravel & stone with some sand				3	Y
East Beach Landfill North	MW-20 Deep	40-50	moist grey gravel & stone with some sand				3	Y
East Beach Landfill South	MW-22 shallow	0-15	moist grey gravel & stone with some sand				3	Y
East Beach Landfill South	MW-22 Deep	40-50	moist grey gravel & stone with some sand				3	Y
East Beach Landfill South	MW-23 Shallow	0-15	moist grey sand and gravel, some stone				3	Y
East Beach Landfill South	MW-923 Shallow	0-15	moist grey sand and gravel, some stone				3	Y
East Beach Landfill South	MW-23 Deep	40-50	moist grey sand and gravel, some stone				3	Y
East Beach Landfill South	MW-24 Shallow	0-15	moist grey gravel & stone with some sand				3	Y

SITE NAME: FOX-M

RECORD OF SOIL SAMPLING

DATE: Aug 13, 2017
SAMPLER NAME: J JEFS

LANDFILL NAME	SOIL SAMPLE ID	DEPTH (m)	SOIL DESCRIPTION	GPS Northing	GPS Easting	GPS Elevation	Photographs	Backfilled (Y/N)
East Beach Landfill South	MW-24 Deep	40-50	moist grey gravel and stone with some sand				3	Y
East Beach Landfill South	MW-25 Shallow	0-15	moist grey sand and gravel, trace stone				3	Y
East Beach Landfill South	MW-925 Shallow	0-15	moist grey sand and gravel, trace stone				3	Y
East Beach Landfill South	MW-25 Deep	40-50	moist grey sand and gravel, trace stone				3	Y
East Beach Landfill South	MW-26 Shallow	0-15	moist grey gravel with sand & stone				3	Y
East Beach Landfill South	MW-26 Deep	40-50	moist grey gravel with sand & stone				3	Y
East Beach Landfill South	MW-27 Shallow	0-15	moist grey gravel with sand & stone				3	Y
East Beach Landfill South	MW-27 Deep	30-40	moist grey gravel with sand & stone	-peat layer (thin, 1-2cm) @ depth of 25cm -refusal @ 40cm on compacted rock			3	Y
East Beach Landfill South	MW-28 Shallow	0-15	Moist grey gravel with sand & stone				3	Y
East Beach Landfill South	MW-28 Deep	40-50	moist grey gravel with sand & stone				3	Y

SITE NAME: FOX-M

RECORD OF SOIL SAMPLING

SAMPLER NAME: Aug 13, 2017 JER

LANDFILL NAME	SOIL SAMPLE ID	DEPTH (m)	SOIL DESCRIPTION	GPS Northing	GPS Easting	GPS Elevation	Photographs	Backfilled (Y/N)
East Beach Landfill South	MW-29 Shallow	0-15	moist grey gravel and stone, trace sand				3	Y
East Beach Landfill South	MW-29 Deep	40-50	wet grey gravel and stone, trace sand	-water entered hole			3	Y
East Beach Landfill South	MW-30 Shallow	0-15	wet grey gravel and stone, trace sand				3	Y
East Beach Landfill South	MW-30 Deep	40-50	wet grey gravel and stone, trace sand	-water entered hole			3	Y
Tier II Disposal Facility	MW-03 Shallow	0-15	wet grey gravel and stone, trace sand + organics	-refusal @ 20cm on compacted gravel/rock -water entered hole			3	Y
Tier II Disposal Facility	MW-02 Shallow	0-15	wet grey gravel and stone, trace sand + organics				3	Y
Tier II Disposal Facility	MW-02 Deep	20-30	wet grey gravel and stone, trace sand	-refusal @ 30cm on compacted gravel/rock -water entered hole			3	Y
Tier II Disposal Facility	MW-01 Shallow	0-15	wet grey gravel and stone with some sand, trace organics				3	Y
Tier II Disposal Facility	MW-01 Deep	40-50	wet grey gravel and stone with some sand	-water entered hole			3	Y
Tier II Disposal Facility	MW-05 shallow	0-15	top 5cm sand (loam) with organics, 5cm to 15cm = wet grey sand with some gravel & stone				3	Y

SITE NAME: FOX-M

RECORD OF SOIL SAMPLING

DATE: Aug 13, 2017
SAMPLER NAME: JTB

LANDFILL NAME	SOIL SAMPLE ID	DEPTH (m)	SOIL DESCRIPTION	GPS Northing	GPS Easting	GPS Elevation	Photographs	Backfilled (Y/N)
Tier II Disposal Facility	MW-05 Deep	40-50	Wet grey sand with some gravel and stone				3	Y
Tier II Disposal Facility	MW-90S Deep	40-50	wet grey sand with some gravel and stone	- water entered hole			3	Y
Tier II Disposal Facility	MW-04 Shallow	0-15	- top 5cm = Sand (loam) with organics • 5cm to 15cm, wet grey gravel with some sand/stone				3	Y
Tier II Disposal Facility	MW-04 Deep	30-40	• wet grey gravel with some sand, stone	- water entered hole - refusal @ 40cm on rock			3	Y
Communications northwest landfill	~~FM-15~~ Shallow	0-15	• top 5cm = Sand (loam) with organics • 5cm to 15cm, moist grey gravel with sand + stone				3	Y
Communications Northwest Landfill	FM-15 Deep	30-40	• wet grey gravel with sand + stone	- water entered hole - refusal @ 40cm on compacted gravel/rock			3	Y

SITE NAME: FOX-1M

RECORD OIL SAMPLING

SAMPLER: JFR

DATE: Aug 14, 2017

LANDFILL NAME	SOIL SAMPLE ID	DEPTH (m)	SOIL DESCRIPTION	GPS Northing	GPS Easting	GPS Elevation	Photographs	Backfilled (Y/N)
East Beach Landfill South	MW-31 Shallow	0-15	moist grey gravel with sand and stone				3	Y
East Beach Landfill South	MW-31 Deep	40-50	moist grey gravel with sand and stone.				3	Y
Non-Hazardous Waste Landfill	MW-12 Shallow	0-15	moist grey gravel and stone with some sand				3	Y
Non-Hazardous Waste Landfill	MW-12 Deep	30-40	moist grey gravel and stone with some sand	-refusal @ 46 cm on compacted gravel/rock			3	Y
Non-Hazardous Waste Landfill	MW-14 Shallow	0-15	moist grey Sand and gravel, trace stone				3	Y
Non-Hazardous Waste Landfill	MW-14 Deep	40-50	moist gray sand and gravel, trace stone				3	Y
Non-Hazardous Waste Landfill	MW-914 Deep	40-50	moist grey sand and gravel, trace stone				3	Y
Non-Hazardous Waste Landfill	MW-16 Shallow	0-15	moist grey sand and gravel, trace stone				3	Y
Non-Hazardous Waste Landfill	MW-16 Deep	40-50	moist grey Sand and gravel, trace stone				3	Y
Non-Hazardous Waste-Landfill	MW-15 Shallow	0-15	moist grey gravel with some sand, stone				3	Y

SITE NAME: FOX-M

RECORD OF SOIL SAMPLING

DATE: Aug 14, 2017
SAMPLER NAME: SEB

LANDFILL NAME	SOIL SAMPLE ID	DEPTH (m)	SOIL DESCRIPTION	GPS Northing	GPS Easting	GPS Elevation	Photographs	Backfilled (Y/N)
Non-Hazardous Waste Landfill	MW-15 Deep	30-40	moist grey gravel with some sand, & stone	- refusal @	40cm on	rock.	3	Y
Non-Hazardous Waste Landfill	MW-13 Shallow	0-15	moist grey gravel & stone, some sand				3	Y
Non-Hazardous Waste Landfill	MW-13 Deep	40-50	moist grey gravel & stone, some sand	- hydrocarbon	odour		3	Y

FOX-M

VT-1

ANNEX M: Thermistor Inspection Template

Inspector Name: Reza Roghabian	Inspection Date: Aug 14, 2017
Inspector Signature / Prepared By:	

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

Site Name: FOX-M		Landfill: Vertical	
Thermistor Number: VT-1		Inclination:	
Datalogger model no: RX1616		Datalogger cable download model: TS [redacted] USB	
*Install Date:		First Date Event 2007	Last Date Event 2017
*Coordinates and Elevation	N 7626 to E 490947		Elev
Length of Cable (m) 9.23		Cable Lead Above Ground (m) 4.2	
Datalogger Serial # c F050614		Nodal Points 11	

Thermistor Inspection

	Good	Needs Maintenance	Description
Casing	☑	☐	
Cover	☑	☐	
Data Logger	☑	☐	
Cable	☑	☐	
Beads	☑	☐	
Lock condition	☑	☐	New locks
Battery Installation Date			
Battery Levels	Main 11.74	Aux 13.26	

Manual Ground Temperature Readings

Bead	ohms	Degrees C
1	1.1190	5.79
2	1.1057	5.19
3	1.0734	4.31
4	0.9694	0.38
5	0.9211	-0.717
6	0.8846	-1.94
7	0.8536	-2.99
8	0.8230	-4.09

Bead	ohms	Degrees C
9	0.8006	-4.8
10	0.7783	-5.59
11	0.7565	-6.36

Battery Information

Batteries changed ? Yes ☑ No ☐ Monitoring Year: 10 (2017)

Battery model number installed: ~~ULBI~~ ULBI5

Expected battery life (years): ~~2024~~

Datalogger Programming (Describe programming completed: beads and frequency)

changed batteries

Reprogramed 8hrs @ noon.

Observations and Proposed Maintenance

NA

FOK-M

VT-2

ANNEX M: Thermistor Inspection Template

Inspector Name: Reba Moghadden	Inspection Date: Aug 14, 2017
Inspector Signature / Prepared By:	

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

Site Name: Fok-M		Landfill: Tiel II	
Thermistor Number: VT-2		Inclination: Vertical	
Datalogger model no: RS-16		Datalogger cable download model: TSB [illegible] USB	
*Install Date:		First Date Event 2007	Last Date Event 2017
*Coordinates and Elevation	N 7626.74	E 4909.82	Elev
Length of Cable (m) 7.23		Cable Lead Above Ground (m) 4.32	
Datalogger Serial # 0700605		Nodal Points 7	

Thermistor Inspection

	Good	Needs Maintenance	Description
Casing	☑	☐	
Cover	☑	☐	
Data Logger	☑	☐	
Cable	☑	☐	
Beads	☑	☐	
Lock condition	☑	☐	New lock
Battery Installation Date			
Battery Levels	Main 11.34	Aux 13.5	

Manual Ground Temperature Readings

Bead	ohms	Degrees C
1	1.1024	5.21
2	1.0523	3.6
3	0.9409	-0.059
4	0.8972	-1.52
5	0.8525	-2.99
6	0.8023	-4.75
7	0.7746	-5.72

Bead	ohms	Degrees C

Battery Information

Batteries changed ? Yes ☑ No ☐ Monitoring Year: 10 (2017)

Battery model number installed: 4 AA Ultra

Expected battery life (years): 2.14

Datalogger Programming (Describe programming completed: beads and frequency)

Reprogramed 48 hrs at noon

Observations and Proposed Maintenance

changed all batteries.

Fox H
VT-3

ANNEX M: Thermistor Inspection Template

Inspector Name: Reka Hajhaddun	Inspection Date: Aug 14, 2017
Inspector Signature / Prepared By:	

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

Site Name: Fox [redacted]		Landfill: Tier II	
Thermistor Number: VT-3		Inclination: Vertical	
Datalogger model no: CR-10		Datalogger cable download model: TS [redacted] USB	
*Install Date:		First Date Event 2009	Last Date Event 2017
*Coordinates and Elevation	N 766132 E 991057		Elev
Length of Cable (m) 9.21		Cable Lead Above Ground (m) 4.2	
Datalogger Serial # 06c3cc90		Nodal Points 11	

Thermistor Inspection

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

Manual Ground Temperature Readings

Bead	ohms	Degrees C
1	1.021	5.56
2	1.0511	3.56
3	0.9433	0.52
4	0.9035	-1.30
5	0.8646	-2.64
6	0.8341	-3.63
7	0.7983	-4.55
8	0.7771	-5.28

Bead	ohms	Degrees C
9	0.7632	-6.10
10	0.7431	-6.94
11	0.7312	-7.26

Battery Information

Batteries changed ? Yes ☑ No ☐ Monitoring Year: 10 (2017)

Battery model number installed: VLBi - VLB35

Expected battery life (years): 2021

Datalogger Programming (Describe programming completed; beads and frequency)

Reprogrammed 4hrs. at noon

Observations and Proposed Maintenance

changed all batteries.

FOX-M

VT-4

ANNEX M: Thermistor Inspection Template

Inspector Name: Debra Meyhew	Inspection Date: Aug 14, 2017
Inspector Signature / Prepared By:	

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

Site Name: Fox		Landfill: Tier II	
Thermistor Number: V-		Inclination: Vertical	
Datalogger model no: RX		Datalogger cable download model: TS	USB
*Install Date:		First Date Event 2007	Last Date Event 2012
*Coordinates and Elevation	N 762604	E 99165	Elev
Length of Cable (m) 7.22		Cable Lead Above Ground (m) 4.32	
Datalogger Serial # 070602C		Nodal Points 7	

Thermistor Inspection

	Good	Needs Maintenance	Description
Casing	☑	☐	
Cover	☑	☐	
Data Logger	☑	☐	
Cable	☑	☐	
Beads	☑	☐	
Lock condition	☑	☐	New lock
Battery Installation Date			
Battery Levels	Main 11.34	Aux 13.63	

Manual Ground Temperature Readings

Bead	ohms	Degrees C
1	1.1227	6.16
2	1.0824	4.78
3	0.9585	0.52
4	0.920	-0.71
5	0.8683	-2.49
6	0.8503	-3.78
7	0.7947	-4.84
	-	

Bead	ohms	Degrees C

Battery Information

Batteries changed ? Yes ☑ No ☐ Monitoring Year: 10 (2017)

Battery model number installed: VxBi - VxBi5

Expected battery life (years): 2024

Datalogger Programming (Describe programming completed: beads and frequency)

Reprogrammed HBky at noon

Observations and Proposed Maintenance

changed all batteries.

ANNEX M: Thermistor Inspection Template

Inspector Name: Reza Roghaddam	Inspection Date: Aug 14, 2017
Inspector Signature / Prepared By:	

FOX-H
VT-5

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

Site Name: Fox [redacted]		Landfill: Fox H	
Thermistor Number: V [redacted]		Inclination: Vertical	
Datalogger model no: [redacted]		Datalogger cable download model: T [redacted]	USB
*Install Date:		First Date Event 2007	Last Date Event 2017
*Coordinates and Elevation	N 7626604	E 490474	Elev
Length of Cable (m) 7.33		Cable Lead Above Ground (m) 4.33	
Datalogger Serial # [redacted] 700023		Nodal Points 7	

Thermistor Inspection

	Good	Needs Maintenance	Description
Casing	☑	☐	
Cover	☑	☐	
Data Logger	☑	☐	
Cable	☑	☐	
Beads	☑	☐	
Lock condition	☑	☐	new lock
Battery Installation Date			
Battery Levels	Main 11.34	Aux 13.50	

Manual Ground Temperature Readings

Bead	ohms	Degrees C
1	1.1366	6.36
2	1.0598	3.95
3	0.9433	0.02
4	0.9017	-1.36
5	0.8569	-3.09
6	0.8206	-4.12
7	0.7982	-4.97

Bead	ohms	Degrees C

Battery Information

Batteries changed ? Yes ☑ No ☐ Monitoring Year: 10-2017

Battery model number installed: ULBiCV0815

Expected battery life (years): 2024

Datalogger Programming (Describe programming completed: beads and frequency)

Reprogrammed 48hrs at noon

Observations and Proposed Maintenance

changed all batteries.

ANNEX M: Thermistor Inspection Template

Inspector Name: Reza Noghabaei	Inspection Date: Aug 13, 2017
Inspector Signature / Prepared By:	

FOX-M HB-1

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

Site Name: Fox-[redacted]		Landfill: Tervetam	
Thermistor Number: HB-1		Inclination:	
Datalogger model no: [redacted]		Datalogger cable download model: USB	
*Install Date:		First Date Event 2015	Last Date Event 2017
*Coordinates and Elevation	N 7626657 E 490420		Elev
Length of Cable (m) 3.2		Cable Lead Above Ground (m) 1.2	
Datalogger Serial # 07a600		Nodal Points N/A	

Thermistor Inspection

	Good	Needs Maintenance	Description
Casing	☑	☐	
Cover	☑	☐	
Data Logger	☑	☐	
Cable	☑	☐	
Beads	☑	☐	
Lock condition	☑	☐	new lock
Battery Installation Date			
Battery Levels	Main —	Aux —	dead

The data logger was dead! new batteries!

Manual Ground Temperature Readings

Bead	ohms	Degrees C
	N/A	

Bead	ohms	Degrees C
	N/A	

Battery Information

Batteries changed ? Yes ☐ No ☐ Monitoring Year: 10 (2017)

Battery model number installed: VLB1 - VLB15

Expected battery life (years): 2021

Datalogger Programming (Describe programming completed: beads and frequency)

Reprogrammed 48hr afnoon.

Observations and Proposed Maintenance

Installed new VLB1 and VLB15 → The datalogger started working. Reprogramed after complet Memory Transfer.

ANNEX M: Thermistor Inspection Template

Inspector Name: Reza Mothaddem	Inspection Date: Aug 13, 2017
Inspector Signature / Prepared By:	

FOX-M
VT-6

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

Site Name: FOX-M		Landfill: East Branch (South)	
Thermistor Number: VT-6		Inclination: Vertical	
Datalogger model no: [redacted]		Datalogger cable download model: [redacted]	USB
*Install Date:		First Date Event 2007	Last Date Event 2017
*Coordinates and Elevation	N 7626114 E 490895		Elev
Length of Cable (m) 9.23		Cable Lead Above Ground (m) 4.23	
Datalogger Serial # 07260072		Nodal Points 9	

Thermistor Inspection

	Good	Needs Maintenance	Description
Casing	☑	☐	
Cover	☑	☐	
Data Logger	☑	☐	
Cable	☑	☐	
Beads	☑	☐	
Lock condition	☑	☐	New Lock
Battery Installation Date			
Battery Levels	Main 11.34	Aux 13.5	

Manual Ground Temperature Readings

Bead	ohms	Degrees C
1	1.2620	10.50
2	1.1951	9.23
3	1.0549	3.69
4	0.9365	-0.20
5	0.9095	-1.10
6	0.8803	-2.08
7	0.8578	-3.02
8	0.8236	-4.02

Bead	ohms	Degrees C
9	0.8000	-4.63

Battery Information

Batteries changed ? Yes ☑ No ☐ Monitoring Year: 10 (2017)

Battery model number installed: ~~Li B1~~ Li B15

Expected battery life (years): ~~2021~~

Datalogger Programming (Describe programming completed; beads and frequency)

Reprogrammed 4 hrs at noon

Observations and Proposed Maintenance

Changed all batteries

FoX-M
VT-7

ANNEX M: Thermistor Inspection Template

Inspector Name: Reza Moghaddam	Inspection Date: Aug 17, 2017
Inspector Signature / Prepared By:	

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

Site Name: Fox [redacted]		Landfill: East Bangor Landfill (Casella)	
Thermistor Number: [redacted]		Inclination: Vertical	
Datalogger model no: [redacted]		Datalogger cable download model: TS[redacted]	B8.2 USB
*Install Date:		First Date Event 2008	Last Date Event 2017
*Coordinates and Elevation	N 7676740	E 491378	Elev
Length of Cable (m) 22	Cable Lead Above Ground (m)	4.22	
Datalogger Serial # [redacted] 0 to 9996	Nodal Points 9		

Thermistor Inspection

	Good	Needs Maintenance	Description
Casing	☑	☐	
Cover	☑	☐	
Data Logger	☑	☐	
Cable	☑	☐	
Beads	☑	☐	
Lock condition	☑	☐	New Lock
Battery Installation Date			
Battery Levels	Main 4.34	Aux 13.63	

Manual Ground Temperature Readings

Bead	ohms	Degrees C
1	1.2583	10.97
2	1.1916	8.13
3	1.0884	4.38
4	0.9574	2.43
5	0.9760	-0.68
6	0.9800	-1.76
7	0.5552	-2.93
8	0.8249	-3.97

Bead	ohms	Degrees C
9	0.7956	-4.99

Battery Information

Batteries changed ? Yes ☑ No ☐ Monitoring Year: 10 (2017)

Battery model number installed: ~~ULBi-ULB7.5~~

Expected battery life (years): 2024

Datalogger Programming (Describe programming completed; beads and frequency)

Reprogrammed Hours at noon.

Obeervations and Proposed Maintenance

Changed all batteries.

FOX-M
VT-8

ANNEX M: Thermistor Inspection Template

Inspector Name: Peter Mayhew	Inspection Date: Aug 13, 2017
Inspector Signature / Prepared By:	

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

Site Name: FOX-M		Landfill: East Berm (South)	
Thermistor Number: VT-8		Inclination: Vertical	
Datalogger model no: RX 18		Datalogger cable download model: USB8.2 USB	
*Install Date:		First Date Event 2008	Last Date Event 2017
*Coordinates and Elevation	N 7626213 E 491372		Elev
Length of Cable (m) 8.32		Cable Lead Above Ground (m) 4.32	
Datalogger Serial # 07041022		Nodal Points 9	

Thermistor Inspection

	Good	Needs Maintenance	Description
Casing	☑	☐	
Cover	☑	☐	
Data Logger	☑	☐	
Cable	☑	☐	
Beads	☑	☐	
Lock condition	☑	☐	Needs to be replaced
Battery Installation Date			
Battery Levels	Main 13.4	Aux 13.24	

Manual Ground Temperature Readings

Bead	ohms	Degrees C
1	1.2796	11.05
2	1.1726	7.71
3	1.0578	3.25
4	0.9903	-0.08
5	0.9077	-1.17
6	0.8737	-2.31
7	0.8404	-3.50
8	0.8174	-4.23

Bead	ohms	Degrees C
9	0.7168	-9.95

Battery Information

Batteries changed ? Yes ☑ No ☐ Monitoring Year: 10 (2017)

Battery model number installed: ~~Ultralife VL835~~

Expected battery life (years): ~~2~~ 4

Datalogger Programming (Describe programming completed; beads and frequency)

Reprogrammed 4 hours at noon.

Observations and Proposed Maintenance

changed all batteries

FOX-M
VT-9

ANNEX M: Thermistor Inspection Template

Inspector Name: [redacted]	Inspection Date: Aug 13, 20
Inspector Signature / Prepared By:	

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

Site Name: Fox		Landfill: [redacted]	
Thermistor Number: VT-9		Inclination: Vertical	
Datalogger model no: [redacted]		Datalogger cable download model: JS[redacted]	
*Install Date:		First Date Event [redacted]	Last Date Event [redacted]
*Coordinates and Elevation	N 762638	E 49157U	Elev
Length of Cable (m) 9.22		Cable Lead Above Ground (m) 4.22	
Datalogger Serial # BOHH07664		Nodal Points 9	

Thermistor Inspection

	Good	Needs Maintenance	Description
Casing	☑	☐	
Cover	☑	☐	
Data Logger	☑	☐	
Cable	☑	☐	
Beads	☑	☐	
Lock condition	☑	☐	none
Battery Installation Date			
Battery Levels	Main 11.34	Aux 13.27	

Manual Ground Temperature Readings

Bead	ohms	Degrees C
1	1.2754	10.46
2	1.2154	8.95
3	1.1319	6.21
4	1.0213	2.75
5	0.9362	-0.21
6	0.9022	-1.35
7	0.8915	-2.72
8	0.8322	-3.72

Bead	ohms	Degrees C
9	0.8041	-4.69

Battery Information

Batteries changed ? Yes ☑ No ☐ Monitoring Year: 10 (20 17)

Battery model number installed: ULBI - ULBI5

Expected battery life (years): ~~2024~~

Datalogger Programming (Describe programming completed; beads and frequency)

Reprogrammed 48 hrs. at noon

Observations and Proposed Maintenance

Changed all batteries.

ANNEX M: Thermistor Inspection Template

Inspector Name: Reza Moghaddam	Inspection Date: Aug 13, 2017
Inspector Signature / Prepared By:	

FOX-M
VT-10

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

Site Name: FOX		Landfill: West Beach landfill (North)	
Thermistor Number: VT-10		Inclination: vertical	
Datalogger model no: CR1000		Datalogger cable download model: USB	
*Install Date:		First Date Event Aug 2017	Last Date Event 2017
*Coordinates and Elevation	N 7627185	E 499605	Elev
Length of Cable (m) 8.22		Cable Lead Above Ground (m) 4.22	
Datalogger Serial # 0F0000 3		Nodal Points 9	

Thermistor Inspection

	Good	Needs Maintenance	Description
Casing	☑	☐	
Cover	☑	☐	
Data Logger	☑	☐	
Cable	☑	☐	
Beads	☐	☐	
Lock condition	☑	☐	new lock
Battery Installation Date			
Battery Levels	Main 11.34	Aux 13.38	

Manual Ground Temperature Readings

Bead	ohms	Degrees C
1	1.1476	6.70
2	1.1202	5.73
3	1.0910	4.56
4	0.9609	0.60
5	0.9181	-0.81
6	0.8983	-1.81
7	0.8546	-2.95
8	0.8273	-3.79

Bead	ohms	Degrees C
9	0.8035	-4.71

Battery Information

Batteries changed ? Yes ☑ No ☐ Monitoring Year: (2017)
Battery model number installed: VLB1 - VLB15
Expected battery life (years): 10-24

Datalogger Programming (Describe programming completed: beads and frequency)

Replaced Batteries
Reprogrammed 48hrs at noon.

Observations and Proposed Maintenance

Changed all batteries.

FOX-H

VT-H

ANNEX M: Thermistor Inspection Template

Inspector Name: [redacted]	Inspection Date: Aug 13, 2014
Inspector Signature / Prepared By:	

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

Site Name: FOX [redacted]		Landfill: East Beach (North)	
Thermistor Number: VT-H		Inclination: vertical	
Datalogger model no: [redacted] 16		Datalogger cable download model: [redacted]	USB
*Install Date:		First Date Event [redacted]	Last Date Event 2012
*Coordinates and Elevation	N 7627319	E 1141566	Elev
Length of Cable (m) 8.22		Cable Lead Above Ground (m) 4.22	
Datalogger Serial # 07b6002		Nodal Points 9	

Thermistor Inspection

	Good	Needs Maintenance	Description
Casing	☑	☐	
Cover	☑	☐	
Data Logger	☑	☐	
Cable	☑	☐	
Beads	☐	☐	
Lock condition	☑	☐	new lock
Battery installation Date			
Battery Levels	Main 11.34	Aux 13.63	

Manual Ground Temperature Readings

Bead	ohms	Degrees C
	1.1764	7.67
	1.1417	6.53
	1.0907	4.86
	0.9554	0.42
	0.9150	-0.92
	0.8823	-2.08
	0.8479	-3.18
	0.8194	-4.18

Bead	ohms	Degrees C
9	0.7962	-4.95

Battery Information

Batteries changed ? Yes ☑ No ☐ Monitoring Year: 10 (2017)

Battery model number installed: [redacted] 1-NBK

Expected battery life (years): [redacted] 2024

Datalogger Programming (Describe programming completed; beads and frequency)

Reprogrammed 4Bhrs. at noon

Observations and Proposed Maintenance

changed all batteries.

FOX-M
VB-2
(HB4)

ANNEX M: Thermistor Inspection Template

Inspector Name: Reza Moghaddam	Inspection Date: Aug 14, 2017
Inspector Signature / Prepared By:	

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

Site Name: Fox-[redacted]		Landfill: NGH-Hydraulic waste landfill	
Thermistor Number: VB[redacted]		Inclination: Vertical	
Datalogger model no: [redacted]		Datalogger cable download model: CS[redacted]	
*Install Date:		First Date Event Sep 9	Last Date Event 2017
*Coordinates and Elevation	N 7623 019	E 49 11 45	Elev
Length of Cable (m) 3.2		Cable Lead Above Ground (m) 4.22	
Datalogger Serial # N/A		Nodal Points 11	

Thermistor Inspection

	Good	Needs Maintenance	Description
Casing	☑	☐	
Cover	☑	☐	
Data Logger	☑	☐	
Cable	☑	☐	
Beads	☑	☑	2 beads out.
Lock condition	☐	☑	needs a new lock
Battery Installation Date			
Battery Levels	Main 11.34	Aux 11.68	

Manual Ground Temperature Readings

Bead	ohms	Degrees C
1	1.1351	7.63
2	—	—
3	—	—
4	0.9107	-1.08
5	0.8943	-1.61
6	0.9138	-4.36
7	0.7631	-6.13
8	0.7540	-6.45

Bead	ohms	Degrees C
9	0.7054	-8.21
10	0.7045	-8.06
11	0.7041	-7.57

Battery Information

Batteries changed ? Yes ☑ No ☐ Monitoring Year: 10(2017)

Battery model number installed: ~~WLD1 - HB15~~

Expected battery life (years): ~~5~~ (2021)

Datalogger Programming (Describe programming completed: beads and frequency)

Reprogrammed 48hrs. at noon.

Observations and Proposed Maintenance

changed all batteries.



CONFIGURING DATA LOGGERS FOR 24 HOUR AND 48 HOUR SAMPLE RATES

NOTE: Fully test all data logging and associated equipment before field installation.

LIMITATION OF REMEDIES

In no event will Lakewood be liable to any party for any damages, including any lost profits, lost savings, or other incidental or consequential damages arising out of the use or inability to use such equipment or related software, even if notice has been made of the possibility of such damages.

Microsoft, Word, Outlook and Excel are either registered trademarks or trademarks of Microsoft Corporation in the United States and/or other countries. Other products and company names mentioned herein may be the trade marks of their respective owners

COPYRIGHT © LAKEWOOD SYSTEMS 2017

TABLE OF CONTENTS

EXTRA LONG RECORDING TIMES....1
OVERVIEW....1
24 HOUR SAMPLE RATE....1
48 HOUR SAMPLE RATE....2
OBTAINING TECHNICAL SUPPORT....5

EXTRA LONG RECORDING TIMES

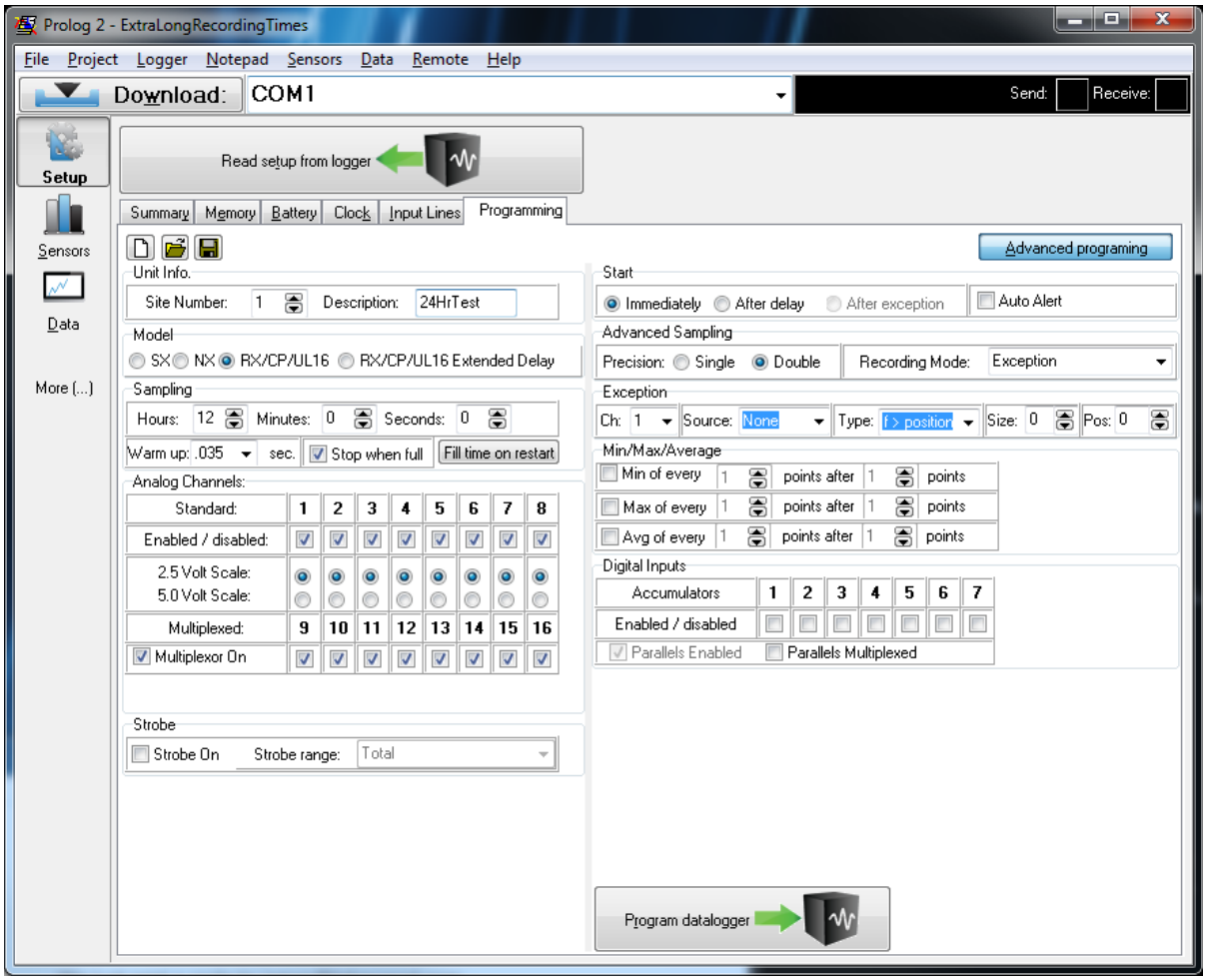
OVERVIEW

In a normal timed recording mode the RX-16 data logger can record with a maximum sample rate of one recording every 12 hours. A recording rate of 12:00:00 would take one reading at noon and one reading at midnight. It is possible using a special configuration and Prolog Version 2.226 or newer to have a multiplexed data logger record at either 24 or 48 hour intervals. In the case of 48 hour recordings, every midnight, half of the data loggers banks are sampled.

NOTE: Not all versions of Lakewood's software supports 24 and 48 hour sample rates. Be sure that you are using Prolog version 2.226 or newer.

24 HOUR SAMPLE RATE

A data logger can be configured to take readings only at midnight by modifying the settings of recording type and exception source. By setting the recording mode to Exception and the exception source to none the data logger will only take readings at midnight regardless of what the sample rate of the data logger is set to. The recording mode and exception source can be set by connecting the data logger to a computer and launching Prolog 2 software. In Prolog 2 the recording rate can be set by clicking the *setup button*, selecting the *programming tab* and clicking on the *advanced button* to see the recording mode and exception source settings. The following screen capture shows a data logger configured with a 24 hour sample rate:



A 24 HOUR SAMPLE RATE CONFIGURATION

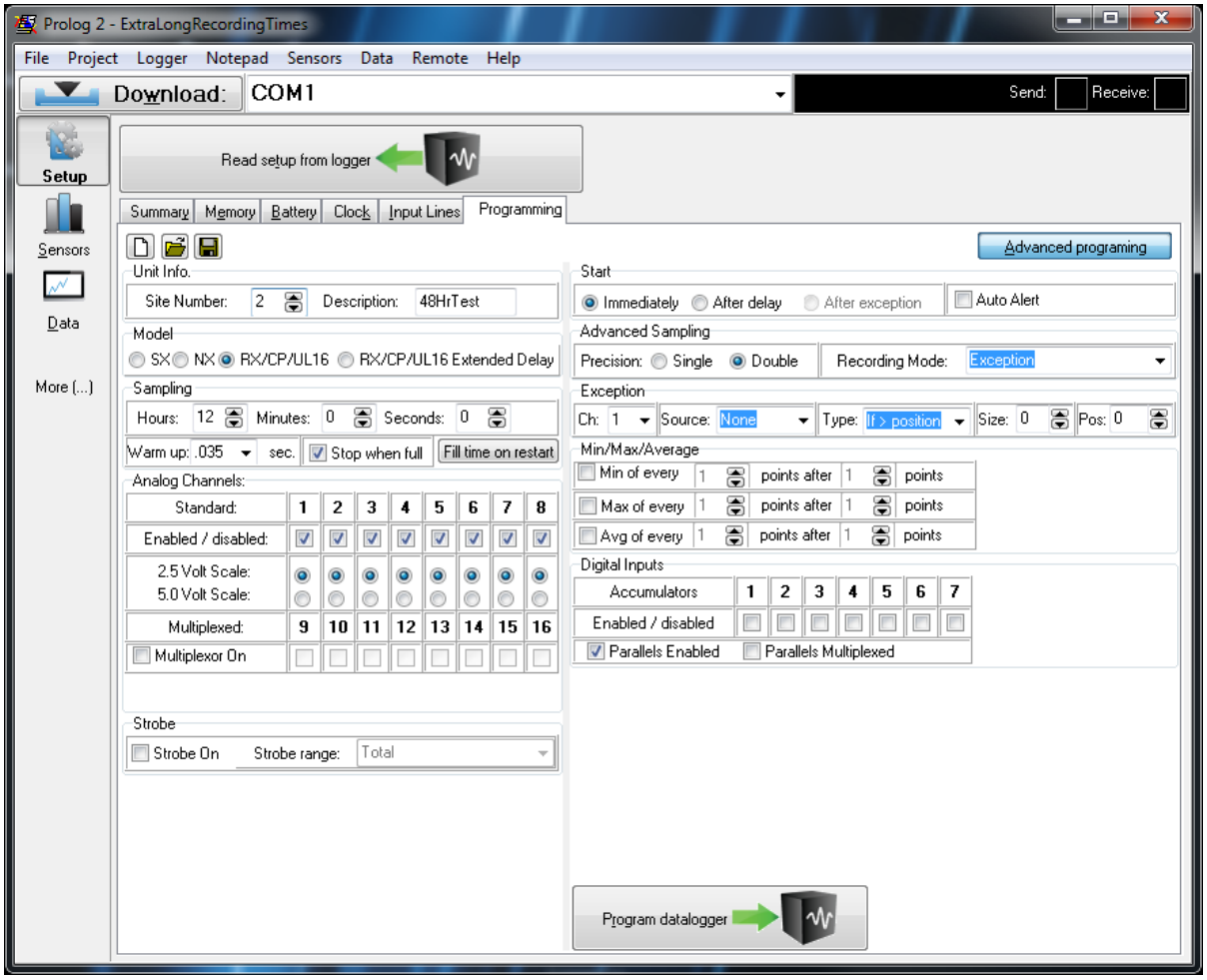
NOTE: A DATA LOGGER WITH 16 CHANNELS OF MULTIPLEXED DATA, A SAMPLING RATE OF 24 HOURS AND 64k MEMOREY WILL FILL IN 4.6 YEARS

48 HOUR SAMPLE RATE

A Data logger with a multiplexor installed can record with a 48 hour sample rate. The data logger will alternate between recording the channels 1-8 on one night and channels 9-16 on the next night at midnight.

To configure the data logger, the recoding mode needs to be set to exception, the exception source should be set to none and the multiplexor should be disabled (although it is installed in the data logger). The data logger can be configured for 48 hour recordings by connecting the data logger to a computer and using the Prolog 2

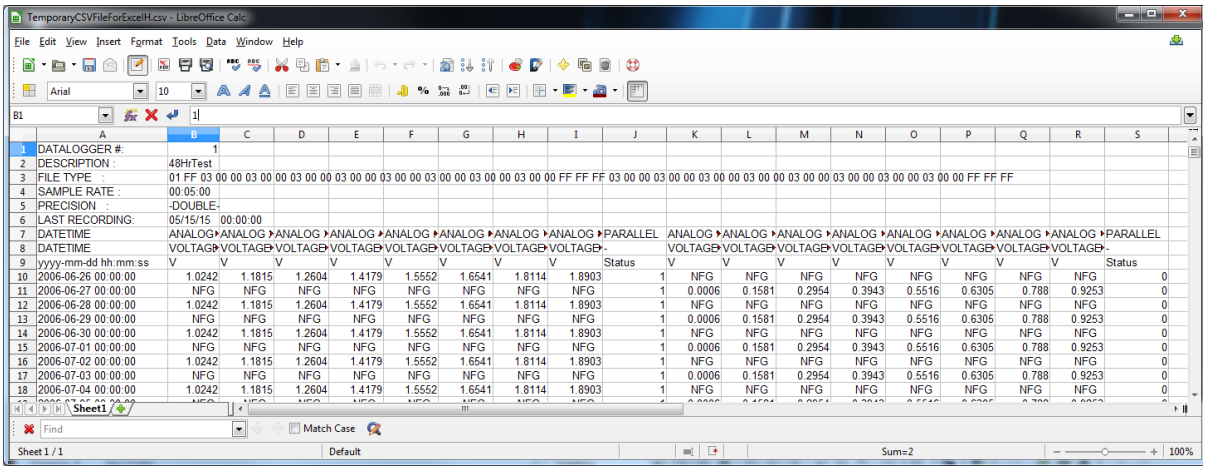
software. In Prolog a 48 hour recording rate is set by clicking the *setup button*, selecting to the *programing tab* and clicking on the *advanced button* to see the recording mode and exception source settings. The following screen capture shows a data logger configured with a 48 hour sample rate:



A 48 HOUR SAMPLE RATE CONFIGURATION

NOTE: A Data Logger with 16 multiplex channels recordings in a 48 hour recording mode with 64k of memory will fill in 8.8 years

When the data from a data logger with a 48 hour recording rate is processed, the readings in the .lsf, .csv and .prn files for a bank of 8 channels that are not present are filled with a not for graphing value. The not for graphing value can be specified for each project in Prolog 2 by selecting the *Project menu*, *Project Options*, selecting the *options tab*, unchecking the *Use default not for graphing value check box* and assigning a new not for graphing value to the project. The following image shows how the data will appear when opened in a spreadsheet



	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S
1	DATALOGGER #:	1																	
2	DESCRIPTION :	48HrTest																	
3	FILE TYPE :	01 FF 03 00 00 03 00 00 03 00 00 03 00 00 03 00 00 03 00 00 03 00 00 00 FF FF FF									03 00 00 03 00 00 03 00 00 03 00 00 03 00 00 03 00 00 03 00 00 03 00 00 00 FF FF FF								
4	SAMPLE RATE :	00:05:00																	
5	PRECISION :	-DOUBLE-																	
6	LAST RECORDING:	05/15/15 00:00:00																	
7	DATETIME	ANALOG	ANALOG	ANALOG	ANALOG	ANALOG	ANALOG	ANALOG	ANALOG	PARALLEL	ANALOG	ANALOG	ANALOG	ANALOG	ANALOG	ANALOG	ANALOG	ANALOG	PARALLEL
8	DATETIME	VOLTAGE	VOLTAGE	VOLTAGE	VOLTAGE	VOLTAGE	VOLTAGE	VOLTAGE	VOLTAGE	-	VOLTAGE	VOLTAGE	VOLTAGE	VOLTAGE	VOLTAGE	VOLTAGE	VOLTAGE	VOLTAGE	-
9	yyyy-mm-dd hh:mm:ss	V	V	V	V	V	V	V	V	Status	V	V	V	V	V	V	V	V	Status
10	2006-06-26 00:00:00	1.0242	1.1815	1.2604	1.4179	1.5552	1.6541	1.8114	1.8903	1	NFG	NFG	NFG	NFG	NFG	NFG	NFG	NFG	0
11	2006-06-27 00:00:00	NFG	NFG	NFG	NFG	NFG	NFG	NFG	NFG	1	0.0006	0.1581	0.2954	0.3943	0.5516	0.6305	0.788	0.9253	0
12	2006-06-28 00:00:00	1.0242	1.1815	1.2604	1.4179	1.5552	1.6541	1.8114	1.8903	1	NFG	NFG	NFG	NFG	NFG	NFG	NFG	NFG	0
13	2006-06-29 00:00:00	NFG	NFG	NFG	NFG	NFG	NFG	NFG	NFG	1	0.0006	0.1581	0.2954	0.3943	0.5516	0.6305	0.788	0.9253	0
14	2006-06-30 00:00:00	1.0242	1.1815	1.2604	1.4179	1.5552	1.6541	1.8114	1.8903	1	NFG	NFG	NFG	NFG	NFG	NFG	NFG	NFG	0
15	2006-07-01 00:00:00	NFG	NFG	NFG	NFG	NFG	NFG	NFG	NFG	1	0.0006	0.1581	0.2954	0.3943	0.5516	0.6305	0.788	0.9253	0
16	2006-07-02 00:00:00	1.0242	1.1815	1.2604	1.4179	1.5552	1.6541	1.8114	1.8903	1	NFG	NFG	NFG	NFG	NFG	NFG	NFG	NFG	0
17	2006-07-03 00:00:00	NFG	NFG	NFG	NFG	NFG	NFG	NFG	NFG	1	0.0006	0.1581	0.2954	0.3943	0.5516	0.6305	0.788	0.9253	0
18	2006-07-04 00:00:00	1.0242	1.1815	1.2604	1.4179	1.5552	1.6541	1.8114	1.8903	1	NFG	NFG	NFG	NFG	NFG	NFG	NFG	NFG	0

48 HOUR RECORDINGS IN A SPREADSHEET

OBTAINING TECHNICAL SUPPORT

Technical support can be obtained by contacting Lakewood Systems directly. Please feel free to contact us if you have any questions or concerns. The following contact information can be used to obtain technical support:

Tel.: (780) 462-9110
Fax: (780) 450-3867
#112, 9704 39 Avenue
Edmonton AB
Canada
T6E 6M7

INSTRUMENT CALIBRATION REPORT

Pine Environmental Services LLC

159 Colonnade Road
Unit 3
Ottawa, Ontario K2E 7L9

Pine Environmental Services, Inc.

Instrument ID 25326
Description Horiba U-52 Sonde 2m Cable
Calibrated 7/12/2017 10:38:04AM

Manufacturer Horiba
Model Number U-5000
Serial Number/ Lot Number TBKUUMSS
Location Ottawa
Department

State Certified
Status Pass
Temp °C 21.6
Humidity % 56

Calibration Specifications

Group # 1
Group Name PH
Stated Accy Pct of Reading
Range Acc % 0.0000
Reading Acc % 3.0000
Plus/Minus 0.00

Nom In Val / In Val	In Type	Out Val	Out Type	Fnd As	Lft As	Dev%	Pass/Fail
7.01 / 7.01	PH	7.01	PH	6.83	7.01	0.00%	Pass
4.01 / 4.01	PH	4.01	PH	3.82	4.01	0.00%	Pass

Group # 2
Group Name Turbidity
Stated Accy Pct of Reading
Range Acc % 0.0000
Reading Acc % 3.0000
Plus/Minus 0.00

Nom In Val / In Val	In Type	Out Val	Out Type	Fnd As	Lft As	Dev%	Pass/Fail
0.00 / 0.00	NTU	0.00	NTU	1.70	0.00	0.00%	Pass
800.00 / 800.00	NTU	800.00	NTU	813.00	800.00	0.00%	Pass

Group # 3
Group Name Conductivity
Stated Accy Pct of Reading
Range Acc % 0.0000
Reading Acc % 3.0000
Plus/Minus 0.000

Nom In Val / In Val	In Type	Out Val	Out Type	Fnd As	Lft As	Dev%	Pass/Fail
0.718 / 0.718	ms/cm	0.718	ms/cm	0.700	0.718	0.00%	Pass
5.000 / 5.000	ms/cm	5.000	ms/cm	5.140	5.000	0.00%	Pass
80.000 / 80.000	ms/cm	80.000	ms/cm	84.600	80.000	0.00%	Pass

Group # 4
Group Name Redox (ORP)
Stated Accy Pct of Reading
Range Acc % 0.0000
Reading Acc % 3.0000
Plus/Minus 0.00

Nom In Val / In Val	In Type	Out Val	Out Type	Fnd As	Lft As	Dev%	Pass/Fail
240.00 / 240.00	mv	240.00	mv	249.00	240.00	0.00%	Pass

Group # 5
Group Name Disolved Oxygen Zero
Stated Accy Pct of Reading
Range Acc % 0.0000
Reading Acc % 3.0000
Plus/Minus 0.00

INSTRUMENT CALIBRATION REPORT

Pine Environmental Services LLC

159 Colonnade Road
Unit 3
Ottawa, Ontario K2E 7L9

Pine Environmental Services, Inc.

Instrument ID 25326
Description Horiba U-52 Sonde 2m Cable
Calibrated 7/12/2017 10:38:04AM

Group # 5 | **Range Acc %** 0.0000
Group Name Disolved Oxygen Zero | **Reading Acc %** 3.0000
Stated Accy Pct of Reading | **Plus/Minus** 0.00

Nom In Val / In Val	In Type	Out Val	Out Type	Fnd As	Lft As	Dev%	Pass/Fail
0.00 / 0.00	mg/L	0.00	mg/L	0.52	0.00	0.00%	Pass

Group # 6 | **Range Acc %** 0.0000
Group Name Temperature DO Span | **Reading Acc %** 0.0000
Stated Accy Plus / Minus | **Plus/Minus** 3.00

Nom In Val / In Val	In Type	Out Val	Out Type	Fnd As	Lft As	Dev%	Pass/Fail
19.20 / 20.50	degrees C	8.68	mg/L	7.16	8.68	0.00%	Pass

Test Instruments Used During the Calibration **(As Of Cal Entry Date)**

Test Standard ID	Description	Manufacturer	Model Number	Serial Number / Lot Number	Last Cal Date/ Opened Date	Next Cal Date / Expiration Date

Notes about this calibration

Calibration Result Calibration Successful
Who Calibrated Shawn Neely

All instruments are calibrated by Pine Environmental Services LLC according to the manufacturer's specifications, but it is the customer's responsibility to calibrate and maintain this unit in accordance with the manufacturer's specifications and/or the customer's own specific needs.

Notify Pine Environmental Services LLC of any defect within 24 hours of receipt of equipment
Please call 800-301-9663 for Technical Assistance

APPENDIX C

Laboratory Data

FOX-M Tier II Soil Disposal Facility - Summary of Soil Monitoring Analytical Data

Link to: Table of Contents

Sample ID	Location	Year	Monitoring Year	Monitoring Phase	Depth (cm)	As* (mg/kg)	Cd* (mg/kg)	Cr* (mg/kg)	Co* (mg/kg)	Cu (mg/kg)	Pb* (mg/kg)	Ni* (mg/kg)	Zn* (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						1.00	1.00	20.0	5.00	6.3	10.0	5.0	15.0	0.213				N/A
Baseline Data - Arithmetic Mean						**2.22**	**1.00**	**20.0**	**5.00**	**6.6**	**10.0**	**8.0**	**17.1**	**0.003**				**40.0**
Baseline Data - Standard Deviation						0.93	0.00	0.0	0.00	4.3	0.0	2.4	11.5	0.000				21.6
Baseline Data Mean + 3xStandard Deviation						**5.02**	**1.00**	**20.0**	**5.00**	**19.5**	**10.0**	**15.2**	**51.6**	**0.003**				**104.8**
**** 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						*30*	*5*	*250*	*50*	*100*	*500*	*100*	*500*	*5*				*2500*
Monitoring Data																		**TPH Sum will appear when F1, F2 and F3 fractions are entered.**
Upgradient																		
	MW-1 surface																	
08-10688	MW-1	2008	1	Phase I	0	1.0	<1.0	<20	<5.0	3.8	<10	6.6	<15	<0.0030	<10	<4.0	<9.0	11.5
FM09-1WA	MW-1	2009	2	Phase I	0-15	2.0	<0.50	**24.0**	**12.0**	**9.0**	8.0	**17.0**	**22.0**	<0.020	<20	<20	<20	30.0
FM10-1WA	MW-1	2010	3	Phase I	0-15	2.0	<0.50	16.0	2.0	4.0	3.0	**12.0**	8.0	<0.020	<10	<10	<20	20.0
11-14300	MW-1	2011	4	Phase I	0-10	2.2	<1.0	<20	<5.0	**6.7**	<10	7.2	<15	<0.050	<4.0	11.0	<8.0	17.0
FM12-1A	MW-1	2012	5	Phase I	0-15	**2.7**	<0.50	13.5	3.5	5.8	5.7	**22.7**	**18.0**	<0.050	<10	<10	11.0	21.0
FM-T2-MW-1-S	MW-1	2014	7	Phase II	0-15	2.0	<0.10	9.6	2.0	4.8	4.1	**8.3**	11.0	<0.1	<10	<10	<10	15.0
MW-01 Shallow	MW-1	2017	10	Phase II	0-15	<1.0	<0.5	9.5	1.9	4.5	8.0	7.9	9.5	<0.05	<7	<4	<8	9.5
	MW-1		15	Phase II														#N/A
	MW-1		25	Phase II														#N/A
																		#N/A
																		#N/A
																		#N/A
																		#N/A
	MW-1 depth																	
08-10690	MW-1	2008	1	Phase I	40	0.8	<1.0	<20	<5.0	<3.0	<10	5.2	<15	<0.0030	<10	<4.0	<9.0	11.5
FM09-1WB	MW-1	2009	2	Phase I	40-50	2.0	<0.50	**22.0**	**8.0**	**8.0**	4.0	**14.0**	10.0	<0.020	<20	<20	<20	30.0
FM10-1WB	MW-1	2010	3	Phase I	40-50	2.0	<0.50	13.0	2.0	4.0	3.0	**11.0**	9.0	<0.020	<10	<10	<20	20.0
11-14301	MW-1	2011	4	Phase I	30-40	**6.5**	<1.0	<20	<5.0	3.4	<10	6.8	**18.0**	<0.050	<4.0	<9.0	<8.0	10.5
FM12-1B	MW-1	2012	5	Phase I	40-50	**2.9**	<0.50	15.0	4.1	5.9	5.0	**23.8**	16.0	<0.050	<10	<10	<10	15.0
FM-T2-MW-1-D	MW-1	2014	7	Phase II	40-50	**3.2**	<0.10	12.0	2.0	4.5	3.0	**8.2**	12.0	<0.1	<10	<10	<10	15.0
MW-01 Deep	MW-1	2017	10	Phase II	40-50	<1.0	<0.5	9.8	2.0	4.1	6.6	6.7	6.7	<0.05	<7	<4	<8	9.5
	MW-1		15	Phase II														#N/A
	MW-1		25	Phase II														#N/A
																		#N/A
																		#N/A
																		#N/A
																		#N/A

FOX-M Tier II Soil Disposal Facility - Summary of Soil Monitoring Analytical Data

Link to: Table of Contents

Sample ID	Location	Year	Monitoring Year	Monitoring Phase	Depth (cm)	As* (mg/kg)	Cd* (mg/kg)	Cr* (mg/kg)	Co* (mg/kg)	Cu (mg/kg)	Pb* (mg/kg)	Ni* (mg/kg)	Zn* (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						1.00	1.00	20.0	5.00	6.3	10.0	5.0	15.0	0.213				N/A
Baseline Data - Arithmetic Mean						**2.22**	**1.00**	**20.0**	**5.00**	**6.6**	**10.0**	**8.0**	**17.1**	**0.003**				**40.0**
Baseline Data - Standard Deviation						0.93	0.00	0.0	0.00	4.3	0.0	2.4	11.5	0.000				21.6
Baseline Data Mean + 3xStandard Deviation						**5.02**	**1.00**	**20.0**	**5.00**	**19.5**	**10.0**	**15.2**	**51.6**	**0.003**				**104.8**
Downgradient																		
	MW-2 surface																	
08-10684	MW-2	2008	1	Phase I	0	1.2	<1.0	<20	<5.0	4.5	<10	7.2	<15	<0.0030	<10	<4.0	14.0	21.0
FM09-2WA	MW-2	2009	2	Phase I	0-15	2.0	<0.50	**23.0**	**7.0**	6.0	8.0	**14.0**	**25.0**	<0.020	<20	<20	<20	30.0
FM10-2WA	MW-2	2010	3	Phase I	0-15	1.0	<0.50	16.0	3.0	**7.0**	7.0	**13.0**	15.0	<0.020	<10	<10	<20	20.0
11-14302	MW-2	2011	4	Phase I	0-10	**2.4**	<1.0	<20	<5.0	4.7	<10	7.4	16.0	<0.050	7.3	<9.0	<8.0	15.8
FM12-2A-D	MW-2	2012	5	Phase I	0-15	**2.3**	<0.50	**20.1**	4.1	**10.8**	**21.0**	**26.7**	**26.0**	<0.050	<10	<10	58.0	**68.0**
FM-T2-MW-2-S	MW-2	2014	7	Phase II	0-15	2.1	<0.10	12.0	2.2	5.8	7.9	**9.0**	**37.0**	<0.1	<10	18.0	<10	28.0
MW-02 Shallow	MW-2	2017	10	Phase II	0-15	<1.0	<0.5	10.0	2.1	4.4	8.2	**8.3**	11.0	<0.05	<7	5.0	17.0	25.5
	MW-2		15	Phase II														#N/A
	MW-2		25	Phase II														#N/A
																		#N/A
																		#N/A
																		#N/A
																		#N/A
	MW-2 depth																	
08-10686/87	MW-2	2008	1	Phase I	40	0.7	<1.0	<20	<5.0	**14.2**	<10	6.7	<15	<0.0030	<10	<4.0	9.8	16.8
FM09-2WB	MW-2	2009	2	Phase I	40-50	**3.0**	<0.50	**26.0**	**10.0**	**9.0**	7.0	**16.0**	14.0	<0.020	<20	<20	<20	30.0
FM10-2WB	MW-2	2010	3	Phase I	40-50	<1.0	<0.50	19.0	3.0	5.0	4.0	**15.0**	15.0	<0.020	<10	<10	<20	20.0
11-14303	MW-2	2011	4	Phase I	30-40	1.7	<1.0	<20	<5.0	5.5	<10	7.5	<15	<0.050	11.0	12.0	<8.0	27.0
FM12-2B	MW-2	2012	5	Phase I	40-50	1.3	<0.50	12.7	3.2	6.5	5.0	**24.0**	**21.0**	<0.050	<10	19.0	48.0	**72.0**
FM-T2-MW-2-D	MW-2	2014	7	Phase II	40-50	<1.0	<0.10	10.0	1.8	5.6	6.3	7.8	**140.0**	<0.1	<10	<10	<10	15.0
MW-02 Deep	MW-2	2017	10	Phase II	20-30	<1.0	<0.5	9.0	1.8	5.4	8.1	6.9	12.6	<0.05	<7	7.0	<8	14.5
	MW-2		15	Phase II														#N/A
	MW-2		25	Phase II														#N/A
																		#N/A
																		#N/A
																		#N/A
																		#N/A

FOX-M Tier II Soil Disposal Facility - Summary of Soil Monitoring Analytical Data

Link to: Table of Contents

Sample ID	Location	Year	Monitoring Year	Monitoring Phase	Depth (cm)	As* (mg/kg)	Cd* (mg/kg)	Cr* (mg/kg)	Co* (mg/kg)	Cu (mg/kg)	Pb* (mg/kg)	Ni* (mg/kg)	Zn* (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						1.00	1.00	20.0	5.00	6.3	10.0	5.0	15.0	0.213				N/A
Baseline Data - Arithmetic Mean						**2.22**	**1.00**	**20.0**	**5.00**	**6.6**	**10.0**	**8.0**	**17.1**	**0.003**				**40.0**
Baseline Data - Standard Deviation						0.93	0.00	0.0	0.00	4.3	0.0	2.4	11.5	0.000				21.6
Baseline Data Mean + 3xStandard Deviation						**5.02**	**1.00**	**20.0**	**5.00**	**19.5**	**10.0**	**15.2**	**51.6**	**0.003**				**104.8**
	MW-3 surface																	
08-10680/81	MW-3	2008	1	Phase I	0	<0.20	<1.0	<20	<5.0	3.8	<10	7.0	**22.5**	<0.0030	<10	<4.0	<9.0	11.5
FM09-3WA	MW-3	2009	2	Phase I	0-15	2.0	<0.50	**29.0**	**7.0**	**7.0**	6.0	**17.0**	**170.0**	<0.020	<20	<20	<20	30.0
FM10-3WA	MW-3	2010	3	Phase I	0-15	2.0	<0.50	18.0	3.0	5.0	5.0	**14.0**	12.0	<0.020	<10	<10	<20	20.0
11-14304	MW-3	2011	4	Phase I	0-10	**4.9**	<1.0	<20	<5.0	5.0	<10	**10.0**	<15	<0.050	<4.0	<9.0	<8.0	10.5
FM12-3A	MW-3	2012	5	Phase I	0-15	2.0	<0.50	12.1	3.4	**6.7**	6.0	**25.2**	**18.0**	<0.050	<10	15.0	86.0	**106.0**
FM-T2-MW-3-S	MW-3	2014	7	Phase II	0-15	**3.7**	<0.10	13.0	2.9	5.7	6.2	**11.0**	17.0	<0.1	<10	<10	<10	15.0
MW-03 Shallow	MW-3	2017	10	Phase II	0-15	<1.0	<0.5	7.1	1.5	3.0	5.0	6.6	6.8	<0.05	<7	<4	<8	9.5
	MW-3		15	Phase II														#N/A
	MW-3		25	Phase II														#N/A
																		#N/A
																		#N/A
																		#N/A
																		#N/A
	MW-3 depth																	
08-10682	MW-3	2008	1	Phase I	40	1.2	<1.0	<20	<5.0	**7.6**	<10	7.5	<15	<0.0030	<10	6.5	11.0	22.5
FM09-3WB	MW-3	2009	2	Phase I	40-50	2.0	<0.50	19.0	5.0	6.0	3.0	**14.0**	12.0	<0.020	<20	<20	<20	30.0
FM10-3WB	MW-3	2010	3	Phase I	40-50	<1.0	<0.50	15.0	3.0	5.0	4.0	**13.0**	9.0	<0.10	<10	<10	<20	20.0
11-14305	MW-3	2011	4	Phase I	30-40	**4.1**	<1.0	<20	<5.0	5.3	<10	**10.0**	16.0	<0.050	<4.0	<9.0	<8.0	10.5
FM12-3B	MW-3	2012	5	Phase I	40-50	**3.4**	<0.50	19.7	4.3	**7.3**	5.2	**26.6**	**19.0**	<0.050	<10	<10	32.0	**42.0**
FM-T2-MW-3-D	MW-3	2014	7	Phase II	40-50	**2.9**	<0.10	15.0	2.7	5.8	3.8	**11.0**	16.0	<0.1	<10	<10	<10	15.0
Not sampled - refusal	MW-3	2017	10	Phase II														#N/A
	MW-3		15	Phase II														#N/A
	MW-3		25	Phase II														#N/A
																		#N/A
																		#N/A
																		#N/A
																		#N/A

FOX-M Tier II Soil Disposal Facility - Summary of Soil Monitoring Analytical Data

Link to: Table of Contents

Sample ID	Location	Year	Monitoring Year	Monitoring Phase	Depth (cm)	As* (mg/kg)	Cd* (mg/kg)	Cr* (mg/kg)	Co* (mg/kg)	Cu (mg/kg)	Pb* (mg/kg)	Ni* (mg/kg)	Zn* (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						1.00	1.00	20.0	5.00	6.3	10.0	5.0	15.0	0.213				N/A
Baseline Data - Arithmetic Mean						**2.22**	**1.00**	**20.0**	**5.00**	**6.6**	**10.0**	**8.0**	**17.1**	**0.003**				**40.0**
Baseline Data - Standard Deviation						0.93	0.00	0.0	0.00	4.3	0.0	2.4	11.5	0.000				21.6
Baseline Data Mean + 3xStandard Deviation						**5.02**	**1.00**	**20.0**	**5.00**	**19.5**	**10.0**	**15.2**	**51.6**	**0.003**				**104.8**
	MW-4 surface																	
08-10696	MW-4	2008	1	Phase I	0	<0.20	<1.0	<20	<5.0	3.8	<10	6.8	<15	<0.0030	<10	<4.0	<9.0	11.5
FM09-4WA	MW-4	2009	2	Phase I	0-15	1.0	<0.50	15.0	5.0	4.0	3.0	**10.0**	10.0	<0.020	<20	<20	60.0	**80.0**
FM10-4WA	MW-4	2010	3	Phase I	0-15	1.0	<0.50	17.0	3.0	6.0	4.0	**13.0**	13.0	<0.020	<10	<10	<20	20.0
11-14306	MW-4	2011	4	Phase I	0-10	**2.5**	<1.0	<20	<5.0	4.0	<10	7.3	<15	<0.050	4.4	<9.0	<8.0	12.9
FM12-4A	MW-4	2012	5	Phase I	0-15	1.4	<0.50	13.0	3.1	6.1	5.7	**18.9**	**25.0**	<0.050	<10	38.0	210.0	**253.0**
FM-T2-MW-4-S	MW-4	2014	7	Phase II	0-15	1.5	<0.10	11.0	1.8	3.8	3.3	7.2	11.0	<0.1	<10	<10	<10	15.0
MW-04 Shallow	MW-4	2017	10	Phase II	0-15	<1.0	<0.5	8.7	1.7	3.2	4.7	6.7	7.7	<0.05	<7	<4	<8	9.5
	MW-4		15	Phase II														#N/A
	MW-4		25	Phase II														#N/A
																		#N/A
																		#N/A
																		#N/A
																		#N/A
	MW-4 depth																	
08-10698	MW-4	2008	1	Phase I	40	0.9	<1.0	<20	<5.0	2.3	<10	<5.0	<15	<0.0030	<10	<4.0	13.0	20.0
FM09-4WB	MW-4	2009	2	Phase I	40-50	2.0	<0.50	18.0	4.0	4.0	2.0	**11.0**	10.0	<0.020	<20	<20	32.0	**52.0**
FM10-4WB	MW-4	2010	3	Phase I	40-50	1.0	<0.50	10.0	2.0	4.0	2.0	**9.0**	8.0	<0.020	<10	<10	<20	20.0
11-14307	MW-4	2011	4	Phase I	30-40	**2.6**	<1.0	<20	<5.0	3.7	<10	6.7	<15	<0.050	<4.0	9.0	<8.0	15.0
FM12-4B	MW-4	2012	5	Phase I	40-50	1.3	<0.50	13.7	2.9	4.6	3.4	**19.3**	14.0	<0.050	<10	<10	35.0	**45.0**
FM-T2-MW-4-D	MW-4	2014	7	Phase II	40-50	1.8	<0.10	9.1	1.5	3.0	2.3	5.6	8.5	<0.1	<10	<10	<10	15.0
MW-04 Deep	MW-4	2017	10	Phase II	30-40	<1.0	<0.5	7.7	1.4	2.8	4.9	5.4	6.6	<0.05	<7	<4	<8	9.5
	MW-4		15	Phase II														#N/A
	MW-4		25	Phase II														#N/A
																		#N/A
																		#N/A
																		#N/A
																		#N/A

FOX-M Tier II Soil Disposal Facility - Summary of Soil Monitoring Analytical Data

Link to: Table of Contents

Sample ID	Location	Year	Monitoring Year	Monitoring Phase	Depth (cm)	As* (mg/kg)	Cd* (mg/kg)	Cr* (mg/kg)	Co* (mg/kg)	Cu (mg/kg)	Pb* (mg/kg)	Ni* (mg/kg)	Zn* (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						1.00	1.00	20.0	5.00	6.3	10.0	5.0	15.0	0.213				N/A
Baseline Data - Arithmetic Mean						**2.22**	**1.00**	**20.0**	**5.00**	**6.6**	**10.0**	**8.0**	**17.1**	**0.003**				**40.0**
Baseline Data - Standard Deviation						0.93	0.00	0.0	0.00	4.3	0.0	2.4	11.5	0.000				21.6
Baseline Data Mean + 3xStandard Deviation						**5.02**	**1.00**	**20.0**	**5.00**	**19.5**	**10.0**	**15.2**	**51.6**	**0.003**				**104.8**
	MW-5 surface																	
08-10692	MW-5	2008	1	Phase I	0	0.5	<1.0	<20	<5.0	3.2	<10	8.0	<15	<0.0030	<10	4.1	<9.0	13.6
FM09-5WA	MW-5	2009	2	Phase I	0-15	<1.0	<0.50	**22.0**	**6.0**	4.0	3.0	**14.0**	13.0	<0.020	<20	<20	20.0	40.0
FM10-5WA	MW-5	2010	3	Phase I	0-15	2.0	<0.50	18.0	3.0	4.0	4.0	**13.0**	13.0	<0.10	<10	<10	<20	20.0
11-14308/09	MW-5	2011	4	Phase I	0-10	**2.5**	<1.0	<20	<5.0	4.5	<10	**11.0**	17.0	<0.050	<4.0	<9.0	<8.0	10.5
FM12-5A	MW-5	2012	5	Phase I	0-15	**2.7**	<0.50	10.9	3.1	5.2	6.3	**27.0**	14.0	<0.050	<10	<10	20.0	30.0
FM-T2-MW-5-S	MW-5	2014	7	Phase II	0-15	1.5	<0.10	17.0	2.8	**30.0**	4.0	**12.0**	**19.0**	<0.1	<10	<10	<10	15.0
MW-05 Shallow	MW-5	2017	10	Phase II	0-15	<1.0	<0.5	11.3	2.1	3.3	4.6	7.1	9.1	<0.05	<7	10.0	34.0	**47.5**
	MW-5		15	Phase II														#N/A
	MW-5		25	Phase II														#N/A
																		#N/A
																		#N/A
																		#N/A
																		#N/A
	MW-5 depth																	
08-10694	MW-5	2008	1	Phase I	40	0.5	<1.0	<20	<5.0	<3.0	<10	6.7	<15	<0.0030	<10	<4.0	<9.0	11.5
FM09-5WB	MW-5	2009	2	Phase I	40-50	2.0	<0.50	**25.0**	**9.0**	6.0	4.0	**19.0**	15.0	<0.020	<20	<20	42.0	**62.0**
FM10-5WB	MW-5	2010	3	Phase I	40-50	<1.0	<0.50	14.0	3.0	4.0	3.0	**11.0**	12.0	<0.020	<10	<10	<20	20.0
11-14310/11	MW-5	2011	4	Phase I	30-40	1.9	<1.0	<20	<5.0	3.3	<10	**8.1**	16.0	<0.050	<4.0	<9.0	<8.0	10.5
FM12-5B	MW-5	2012	5	Phase I	40-50	1.3	<0.50	19.9	4.1	6.3	3.4	**22.5**	**21.0**	<0.050	<10	<10	45.0	**55.0**
FM-T2-MW-5-D	MW-5	2014	7	Phase II	40-50	1.5	<0.10	12.0	2.2	5.8	2.5	**8.4**	14.0	<0.1	<10	<10	<10	15.0
MW-05 Deep (Dup Avg)	MW-5	2017	10	Phase II	40-50	<1.0	<0.5	8.65	1.9	3.2	4.1	6.15	7.3	<0.05	<7	<4	<8	9.5
	MW-5		15	Phase II														#N/A
	MW-5		25	Phase II														#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

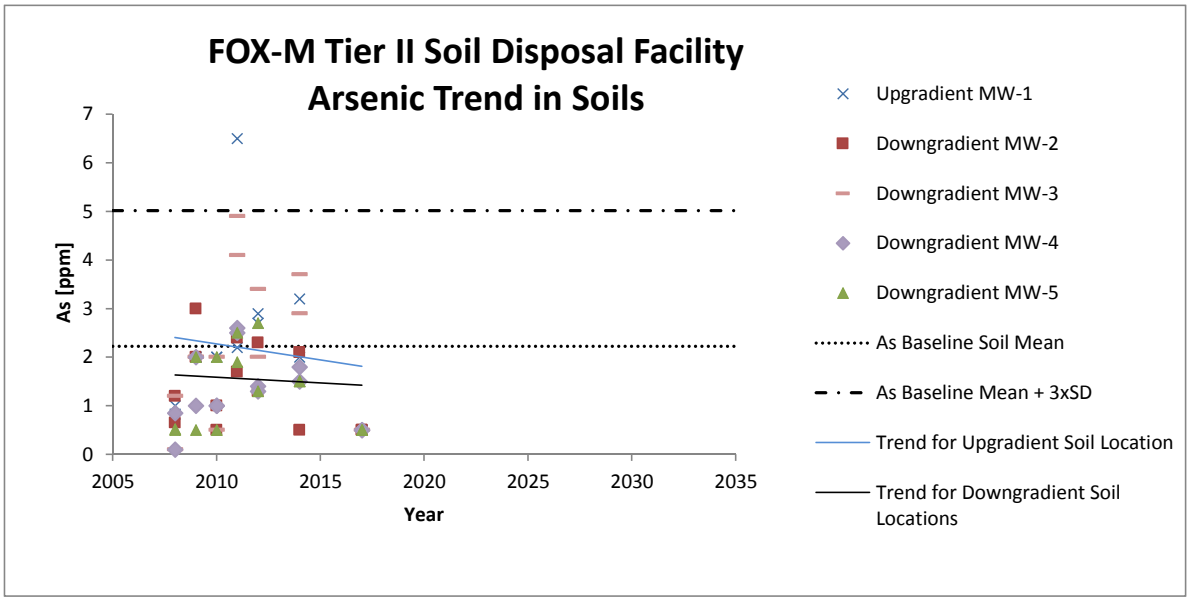
Legend	
XX	**Sample exceeds baseline mean**
XX	**Sample exceeds baseline mean + 3xSD**

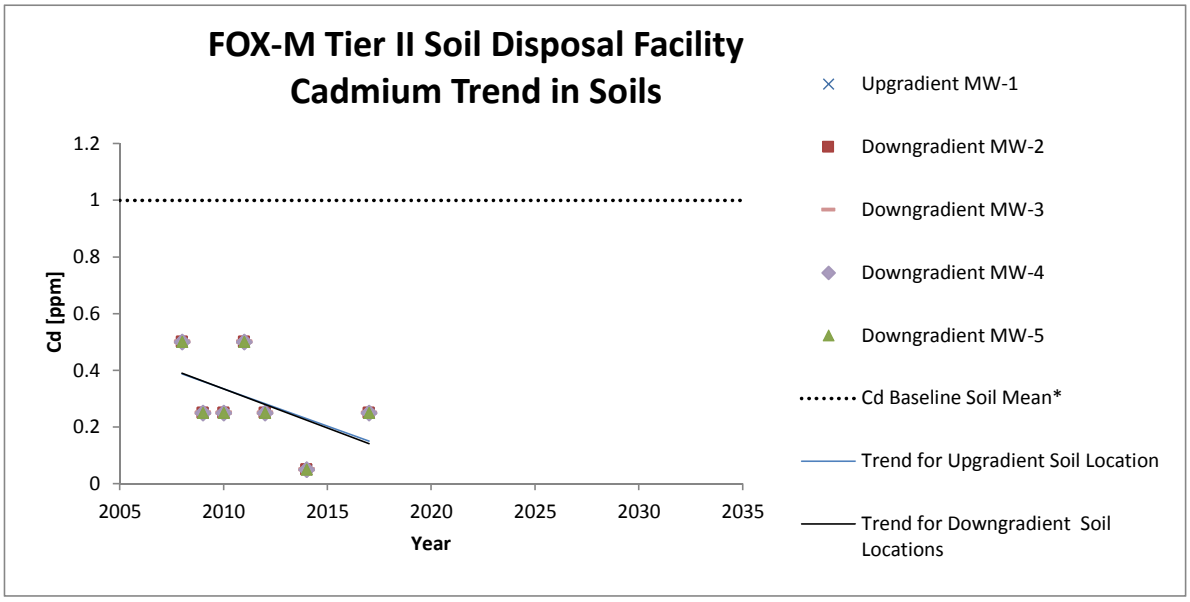
FOX-M Tier II Soil Disposal Facility Trends in Soil Inorganics, PCBs and Modified TPH

Link to: Table of Contents

Where results are below detection, half of the detection limit has been used in the charts for the sample points.

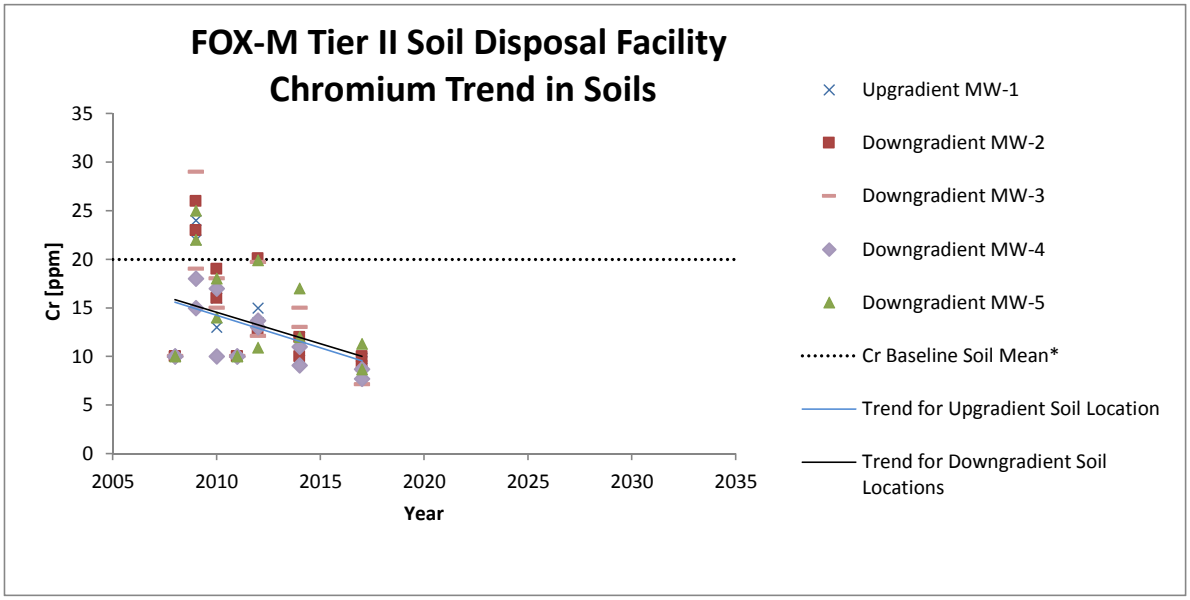
Trendlines are intended for visual interpretation of temporal trends. When all monitoring results are below detection, trendlines are a reflection of changes in detection limit. Users should refer to data tables.



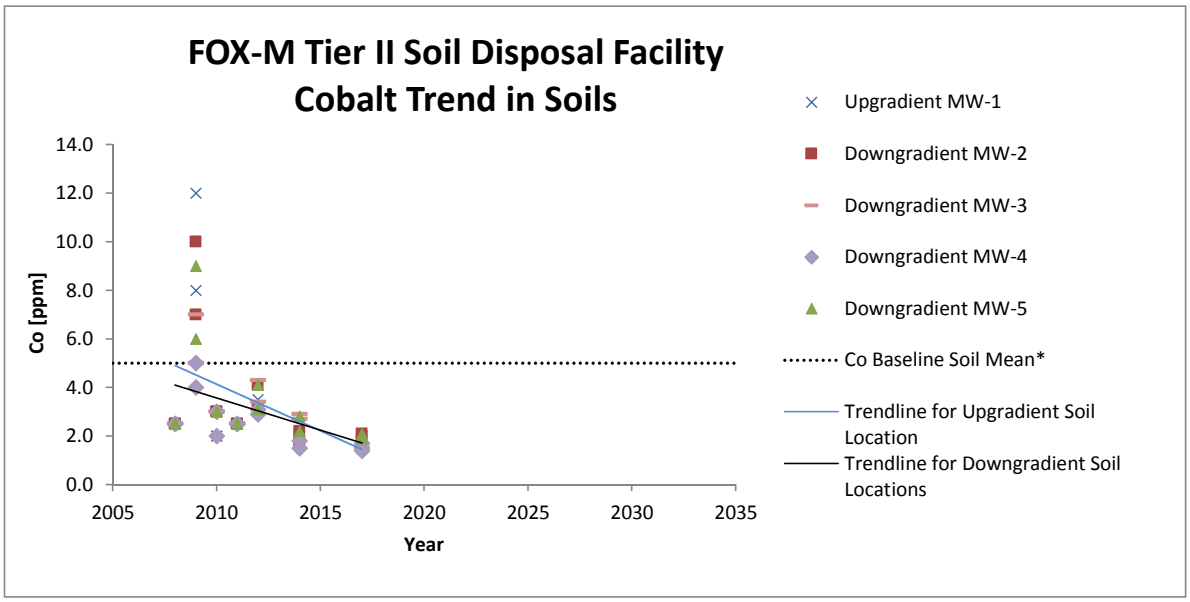


* Cd baseline arithmetic mean is equal to the baseline detection limit
* Cd baseline standard deviation = 0

FOX-M Tier II Soil Disposal Facility Trends in Soil Inorganics, PCBs and Modified TPH

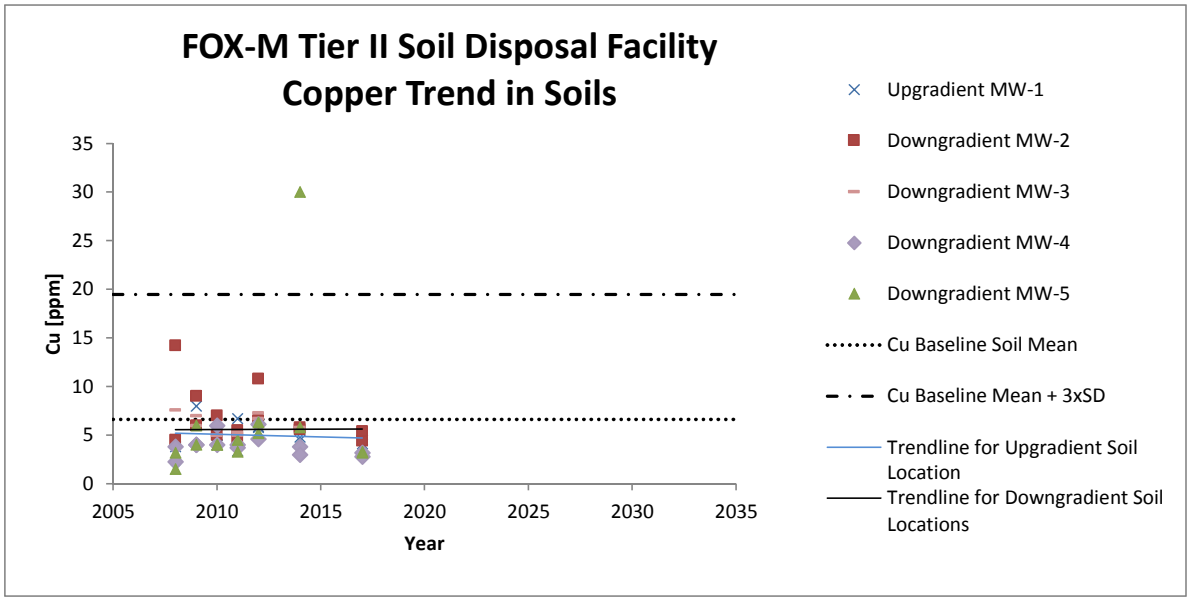


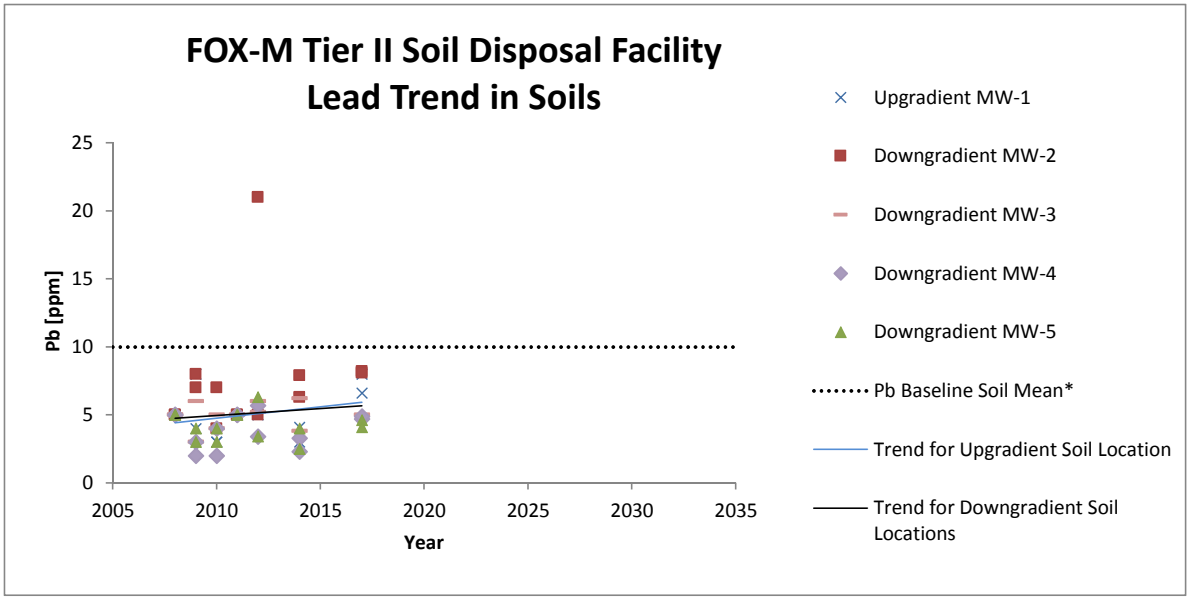
* Cr baseline arithmetic mean is equal to the baseline detection limit
* Cr baseline standard deviation = 0



* Co baseline arithmetic mean is equal to the baseline detection limit
* Co baseline standard deviation = 0

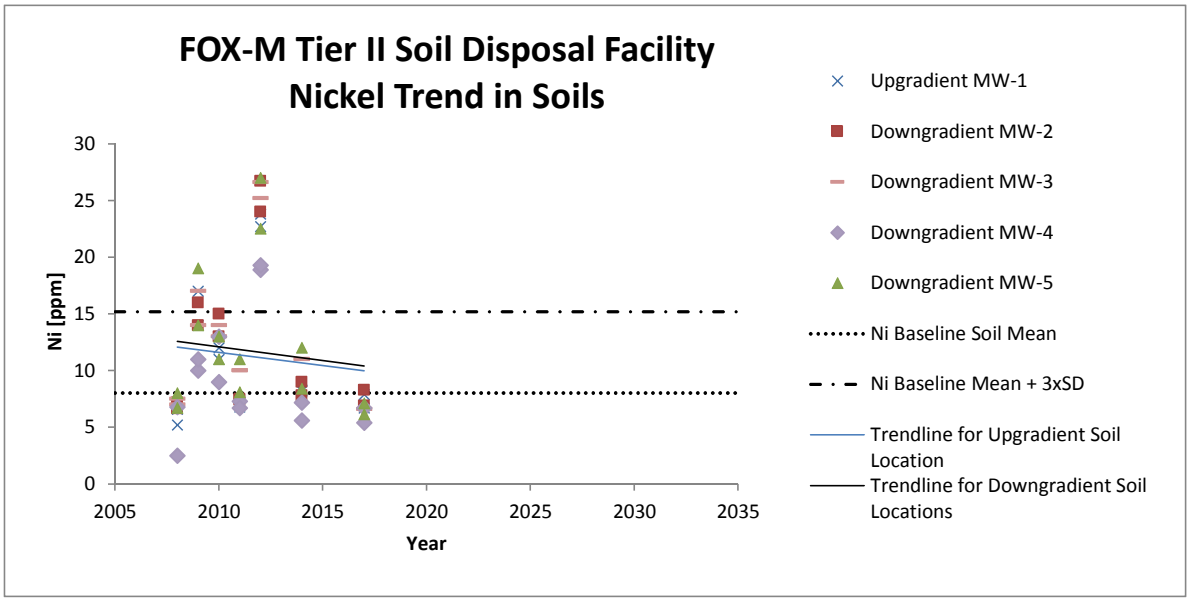
FOX-M Tier II Soil Disposal Facility Trends in Soil Inorganics, PCBs and Modified TPH

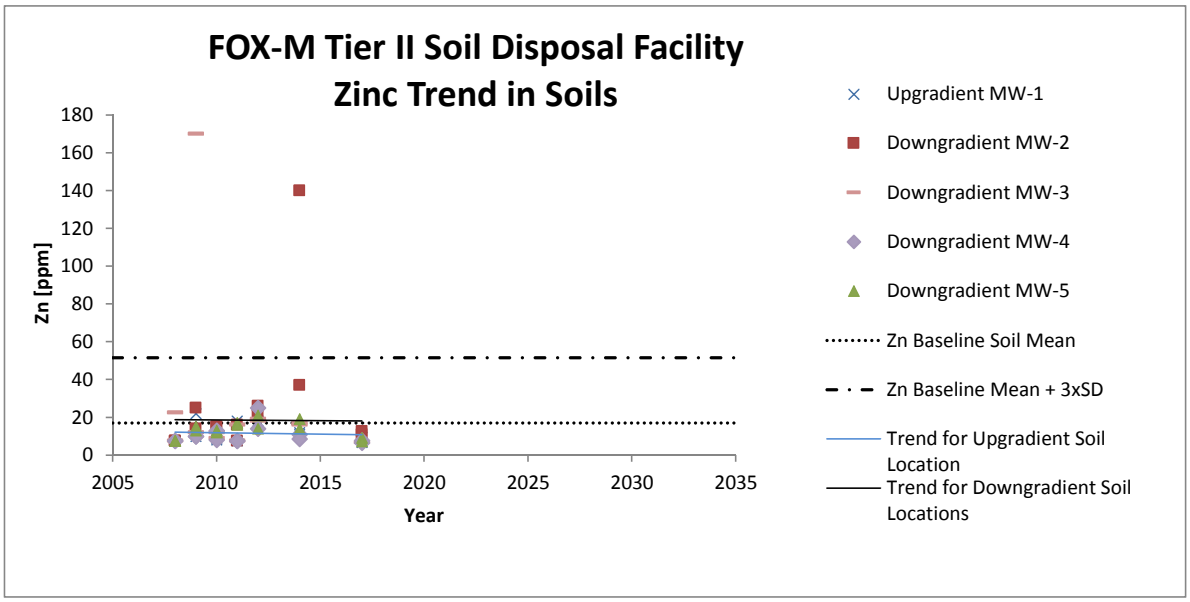




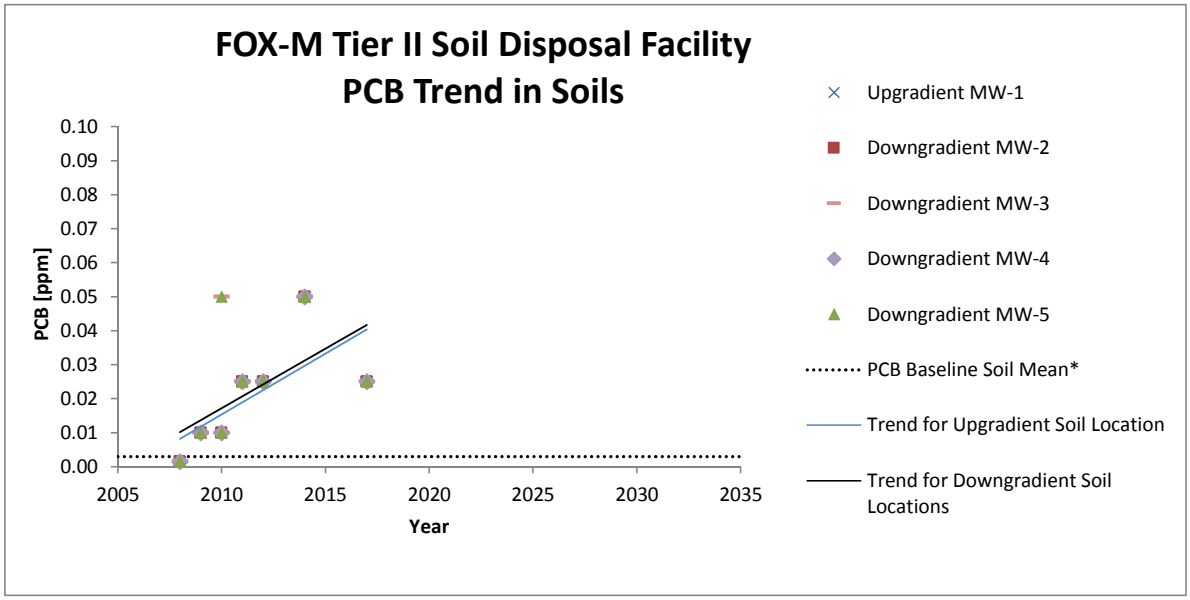
* Pb baseline arithmetic mean is equal to the baseline detection limit
* Pb baseline standard deviation = 0

FOX-M Tier II Soil Disposal Facility Trends in Soil Inorganics, PCBs and Modified TPH

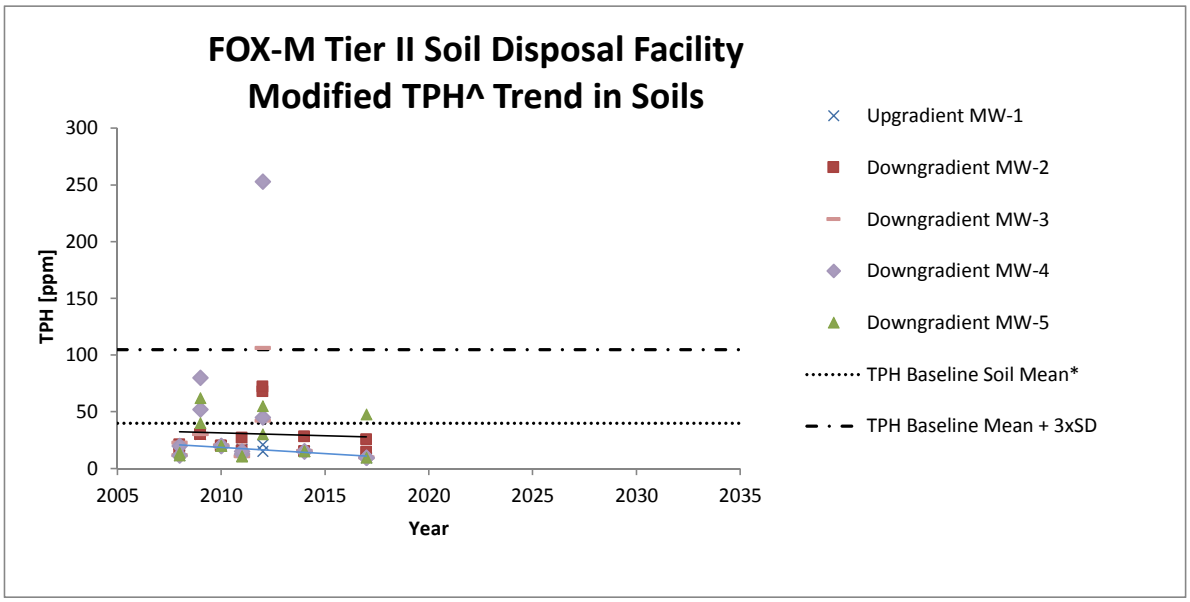




FOX-M Tier II Soil Disposal Facility Trends in Soil Inorganics, PCBs and Modified TPH



* PCB baseline arithmetic mean is equal to the baseline detection limit
* PCB baseline standard deviation = 0
Note: variations seen to 2017 are an indication of changing detection limits; all results below detection limits



^ Modified TPH is sum of F1, F2 and F3 fractions (C_6 - C_{34})
* TPH baseline arithmetic mean is equal to the detection limit

FOX-M Tier II Soil Disposal Facility - Summary of Groundwater Monitoring Analytical Data

Link to: Table of Contents

Sample ID	Location	Date	Monitoring Year	Monitoring Phase	As* (mg/L)	Cd* (mg/L)	Cr (mg/L)	Co* (mg/L)	Cu (mg/L)	Pb* (mg/L)	Ni (mg/L)	Zn (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:																
04-12743	MW-1	2004			<0.0030	<0.0010	<0.0050	<0.0030	<0.0050	<0.010	<0.0050	0.018				<1.0
05-24355	MW-1	2005			<0.0030	<0.0010	<0.010	<0.0030	<0.0050	<0.010	0.0070	<0.010				<1.0
06-05831	MW-1	2006			0.0056	<0.0010	0.040	<0.0030	0.020	<0.010	0.032	0.030				N/A
07-29513	MW-1	2007			<0.0030	<0.0010	0.053	<0.0030	0.0050	<0.010	0.031	0.024				<1.0
Downgradient:																
04-12748	MW-2	2004			<0.0030	<0.0010	<0.0050	<0.0030	0.008	<0.010	<0.0050	1.2				<1.0
04-12747	MW-3	2004			<0.0030	<0.0010	0.006	<0.0030	0.008	<0.010	<0.0050	0.02				<1.0
04-12746	MW-4	2004			<0.0030	<0.0010	<0.0050	<0.0030	0.009	<0.010	0.007	<0.010				<1.0
04-12744	MW-5	2004			<0.0030	<0.0010	<0.0050	<0.0030	0.005	<0.010	<0.0050	<0.010				<1.0
05-24356	MW-2	2005			<0.0030	<0.0010	<0.0010	<0.0030	<0.0050	<0.010	<0.0050	0.69				<1.0
05-24358	MW-4	2005			<0.0030	<0.0010	0.019	<0.0030	0.005	<0.010	0.013	<0.010				<1.0
05-24359	MW-5	2005			<0.0030	<0.0010	<0.0050	<0.0030	<0.0050	<0.010	<0.0050	<0.010				<1.0
06-05851/52	MW-2	2006			<0.0030	<0.0010	0.031	<0.0030	0.012	<0.010	0.015	0.21				N/A
06-05846	MW-3	2006			0.0054	<0.0010	0.070	<0.0030	0.026	<0.010	0.0320	<0.010				N/A
06-05841	MW-4	2006			0.0050	<0.0010	0.18	<0.0030	0.033	<0.010	0.059	0.02				N/A
06-05836	MW-5	2006			0.0033	<0.0010	0.025	<0.0030	0.032	<0.010	0.020	0.02				N/A
07-29514	MW-2	2007			<0.0030	<0.0010	0.013	<0.0030	<0.0050	<0.010	<0.0050	1.4				<1.0
07-29515	MW-3	2007			<0.0030	<0.0010	0.012	<0.0030	<0.0050	<0.010	<0.0050	<0.010				<1.0
07-29517	MW-4	2007			<0.0030	<0.0010	0.01	<0.0030	<0.0050	<0.010	<0.0050	<0.010				<1.0
07-29518	MW-5	2007			<0.0030	<0.0010	0.02	<0.0030	<0.0050	<0.010	<0.0050	<0.010				<1.0
		N value			19	19	19	19	19	19	19	19				14
Baseline Data - Arithmetic Mean					0.0022	0.0005	0.0260	0.0015	0.0097	0.0050	0.0127	0.19				0.50
Baseline Data - Arithmetic Mean Corrected for Detection Limit					**0.0030**	**0.0010**	**0.0260**	**0.0030**	**0.0097**	**0.010**	**0.0127**	**0.19**				**1.00**
Baseline Data - Standard Deviation					0.0000	0.0000	0.0419	0.0000	0.0103	0.000	0.0000	0.42				0.00
Baseline Data - Corrected Arithmetic Mean + 3xStandard Deviation					**0.0030**	**0.0010**	**0.1517**	**0.0030**	**0.0405**	**0.010**	**0.0127**	**1.46**				**1.00**
**** If baseline or background arithmetic mean was below the detection limit, the mean has been modified to match the detection limit value.***																
Monitoring Data													**Modified TPH TOTAL will appear when F1, F2, F3 fraction results are entered.**			
Upgradient MW-1																
08-10704	MW-1	2008	1	Phase I	<0.0030	<0.0010	<0.0050	<0.0030	<0.0050	<0.0010	<0.0050	0.043	N/A	N/A	N/A	<1.0
FM09-1W	MW-1	2009	2	Phase I	0.0010	<0.00010	0.0030	<0.00020	<0.0010	<0.0010	<0.0050	<0.010	N/A	N/A	N/A	<0.20
FM10-1W	MW-1	2010	3	Phase I	<0.0050	<0.00010	0.0090	0.0014	0.0020	<0.0010	0.0060	<0.010	N/A	N/A	N/A	<0.20
11-14345/46	MW-1	2011	4	Phase I	<0.0030	<0.0010	**0.058**	<0.0030	<0.0050	<0.010	**0.015**	<0.010	N/A	N/A	N/A	<1.0
FM12-1	MW-1	2012	5	Phase I	0.0030	<0.000050	0.018	0.0020	**0.010**	0.0030	**0.017**	0.052	N/A	N/A	N/A	<0.10
FM-T2-MW-1	MW-1	2014	7	Phase II	0.00062	<0.000020	0.0025	<0.00030	0.00065	<0.00020	0.003	<0.0030	<0.025	<0.100	<0.100	0.1
MW-01 (*dissolved metals*)	MW-1	2017	10	Phase II	*<0.001*	*<0.0001*	*<0.001*	*<0.0005*	*<0.0005*	*<0.0001*	*0.002*	*0.007*	<0.025	<0.1	<0.1	0.1
	MW-1		15	Phase II												#N/A
	MW-1		25	Phase II												#N/A
																#N/A
																#N/A

FOX-M Tier II Soil Disposal Facility - Summary of Groundwater Monitoring Analytical Data

Link to: Table of Contents

Sample ID	Location	Date	Monitoring Year	Monitoring Phase	As* (mg/L)	Cd* (mg/L)	Cr (mg/L)	Co* (mg/L)	Cu (mg/L)	Pb* (mg/L)	Ni (mg/L)	Zn (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:																
04-12743	MW-1	2004			<0.0030	<0.0010	<0.0050	<0.0030	<0.0050	<0.010	<0.0050	0.018				<1.0
05-24355	MW-1	2005			<0.0030	<0.0010	<0.010	<0.0030	<0.0050	<0.010	0.0070	<0.010				<1.0
06-05831	MW-1	2006			0.0056	<0.0010	0.040	<0.0030	0.020	<0.010	0.032	0.030				N/A
07-29513	MW-1	2007			<0.0030	<0.0010	0.053	<0.0030	0.0050	<0.010	0.031	0.024				<1.0
Downgradient:																
04-12748	MW-2	2004			<0.0030	<0.0010	<0.0050	<0.0030	0.008	<0.010	<0.0050	1.2				<1.0
04-12747	MW-3	2004			<0.0030	<0.0010	0.006	<0.0030	0.008	<0.010	<0.0050	0.02				<1.0
04-12746	MW-4	2004			<0.0030	<0.0010	<0.0050	<0.0030	0.009	<0.010	0.007	<0.010				<1.0
04-12744	MW-5	2004			<0.0030	<0.0010	<0.0050	<0.0030	0.005	<0.010	<0.0050	<0.010				<1.0
05-24356	MW-2	2005			<0.0030	<0.0010	<0.0010	<0.0030	<0.0050	<0.010	<0.0050	0.69				<1.0
05-24358	MW-4	2005			<0.0030	<0.0010	0.019	<0.0030	0.005	<0.010	0.013	<0.010				<1.0
05-24359	MW-5	2005			<0.0030	<0.0010	<0.0050	<0.0030	<0.0050	<0.010	<0.0050	<0.010				<1.0
06-05851/52	MW-2	2006			<0.0030	<0.0010	0.031	<0.0030	0.012	<0.010	0.015	0.21				N/A
06-05846	MW-3	2006			0.0054	<0.0010	0.070	<0.0030	0.026	<0.010	0.0320	<0.010				N/A
06-05841	MW-4	2006			0.0050	<0.0010	0.18	<0.0030	0.033	<0.010	0.059	0.02				N/A
06-05836	MW-5	2006			0.0033	<0.0010	0.025	<0.0030	0.032	<0.010	0.020	0.02				N/A
07-29514	MW-2	2007			<0.0030	<0.0010	0.013	<0.0030	<0.0050	<0.010	<0.0050	1.4				<1.0
07-29515	MW-3	2007			<0.0030	<0.0010	0.012	<0.0030	<0.0050	<0.010	<0.0050	<0.010				<1.0
07-29517	MW-4	2007			<0.0030	<0.0010	0.01	<0.0030	<0.0050	<0.010	<0.0050	<0.010				<1.0
07-29518	MW-5	2007			<0.0030	<0.0010	0.02	<0.0030	<0.0050	<0.010	<0.0050	<0.010				<1.0
		N value			19	19	19	19	19	19	19	19				14
Baseline Data - Arithmetic Mean					0.0022	0.0005	0.0260	0.0015	0.0097	0.0050	0.0127	0.19				0.50
Baseline Data - Arithmetic Mean Corrected for Detection Limit					**0.0030**	**0.0010**	**0.0260**	**0.0030**	**0.0097**	**0.010**	**0.0127**	**0.19**				**1.00**
Baseline Data - Standard Deviation					0.0000	0.0000	0.0419	0.0000	0.0103	0.000	0.0000	0.42				0.00
Baseline Data - Corrected Arithmetic Mean + 3xStandard Deviation					**0.0030**	**0.0010**	**0.1517**	**0.0030**	**0.0405**	**0.010**	**0.0127**	**1.46**				**1.00**
Downgradient MW-2																
08-10705	MW-2	2008	1	Phase I	<0.0030	<0.0010	<0.0050	<0.0030	<0.0050	<0.0010	<0.0050	0.14	N/A	N/A	N/A	<1.0
FM09-2W	MW-2	2009	2	Phase I	<0.0010	0.00010	0.0020	0.00030	0.0010	<0.0010	<0.0050	0.090	N/A	N/A	N/A	<0.20
FM10-2W	MW-2	2010	3	Phase I	<0.0010	0.00010	0.0030	<0.00020	0.0010	<0.0010	<0.0050	0.040	N/A	N/A	N/A	<0.20
11-14347	MW-2	2011	4	Phase I	<0.0030	<0.0010	**0.056**	<0.0030	<0.0050	<0.010	**0.018**	**0.24**	N/A	N/A	N/A	<1.0
FM12-2	MW-2	2012	5	Phase I	<0.0010	<0.000050	0.012	<0.0010	0.0040	<0.0010	**0.015**	**0.75**	N/A	N/A	N/A	<0.10
FM-T2-MW-2	MW-2	2014	7	Phase II	0.00072	<0.000020	0.0065	0.00054	0.0025	0.0011	0.0046	**0.73**	<0.025	<0.100	<0.100	0.1
MW-02 (*dissolved metals*)	MW-2	2017	10	Phase II	*<0.001*	*<0.0001*	*<0.001*	*<0.0005*	*<0.0005*	*<0.0001*	*<0.001*	*0.086*	<0.025	<0.1	<0.1	0.1
	MW-2		15	Phase II												#N/A
	MW-2		25	Phase II												#N/A
																#N/A

FOX-M Tier II Soil Disposal Facility - Summary of Groundwater Monitoring Analytical Data

Link to: Table of Contents

Sample ID	Location	Date	Monitoring Year	Monitoring Phase	As* (mg/L)	Cd* (mg/L)	Cr (mg/L)	Co* (mg/L)	Cu (mg/L)	Pb* (mg/L)	Ni (mg/L)	Zn (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:																
04-12743	MW-1	2004			<0.0030	<0.0010	<0.0050	<0.0030	<0.0050	<0.010	<0.0050	0.018				<1.0
05-24355	MW-1	2005			<0.0030	<0.0010	<0.010	<0.0030	<0.0050	<0.010	0.0070	<0.010				<1.0
06-05831	MW-1	2006			0.0056	<0.0010	0.040	<0.0030	0.020	<0.010	0.032	0.030				N/A
07-29513	MW-1	2007			<0.0030	<0.0010	0.053	<0.0030	0.0050	<0.010	0.031	0.024				<1.0
Downgradient:																
04-12748	MW-2	2004			<0.0030	<0.0010	<0.0050	<0.0030	0.008	<0.010	<0.0050	1.2				<1.0
04-12747	MW-3	2004			<0.0030	<0.0010	0.006	<0.0030	0.008	<0.010	<0.0050	0.02				<1.0
04-12746	MW-4	2004			<0.0030	<0.0010	<0.0050	<0.0030	0.009	<0.010	0.007	<0.010				<1.0
04-12744	MW-5	2004			<0.0030	<0.0010	<0.0050	<0.0030	0.005	<0.010	<0.0050	<0.010				<1.0
05-24356	MW-2	2005			<0.0030	<0.0010	<0.0010	<0.0030	<0.0050	<0.010	<0.0050	0.69				<1.0
05-24358	MW-4	2005			<0.0030	<0.0010	0.019	<0.0030	0.005	<0.010	0.013	<0.010				<1.0
05-24359	MW-5	2005			<0.0030	<0.0010	<0.0050	<0.0030	<0.0050	<0.010	<0.0050	<0.010				<1.0
06-05851/52	MW-2	2006			<0.0030	<0.0010	0.031	<0.0030	0.012	<0.010	0.015	0.21				N/A
06-05846	MW-3	2006			0.0054	<0.0010	0.070	<0.0030	0.026	<0.010	0.0320	<0.010				N/A
06-05841	MW-4	2006			0.0050	<0.0010	0.18	<0.0030	0.033	<0.010	0.059	0.02				N/A
06-05836	MW-5	2006			0.0033	<0.0010	0.025	<0.0030	0.032	<0.010	0.020	0.02				N/A
07-29514	MW-2	2007			<0.0030	<0.0010	0.013	<0.0030	<0.0050	<0.010	<0.0050	1.4				<1.0
07-29515	MW-3	2007			<0.0030	<0.0010	0.012	<0.0030	<0.0050	<0.010	<0.0050	<0.010				<1.0
07-29517	MW-4	2007			<0.0030	<0.0010	0.01	<0.0030	<0.0050	<0.010	<0.0050	<0.010				<1.0
07-29518	MW-5	2007			<0.0030	<0.0010	0.02	<0.0030	<0.0050	<0.010	<0.0050	<0.010				<1.0
		N value			19	19	19	19	19	19	19	19				14
Baseline Data - Arithmetic Mean					0.0022	0.0005	0.0260	0.0015	0.0097	0.0050	0.0127	0.19				0.50
Baseline Data - Arithmetic Mean Corrected for Detection Limit					**0.0030**	**0.0010**	**0.0260**	**0.0030**	**0.0097**	**0.010**	**0.0127**	**0.19**				**1.00**
Baseline Data - Standard Deviation					0.0000	0.0000	0.0419	0.0000	0.0103	0.000	0.0000	0.42				0.00
Baseline Data - Corrected Arithmetic Mean + 3xStandard Deviation					**0.0030**	**0.0010**	**0.1517**	**0.0030**	**0.0405**	**0.010**	**0.0127**	**1.46**				**1.00**
Downgradient MW-3																
08-10706	MW-3	2008	1	Phase I	**0.0046**	<0.0010	**0.049**	<0.0030	**0.0197**	<0.0010	**0.018**	0.010	N/A	N/A	N/A	<1.0
FM09-3W	MW-3	2009	2	Phase I	0.0010	<0.00010	0.0050	<0.00020	0.0010	<0.0010	<0.0050	<0.010	N/A	N/A	N/A	<0.20
FM10-3W	MW-3	2010	3	Phase I	<0.0050	<0.00010	0.0080	<0.00020	0.0020	<0.0010	<0.0050	<0.010	N/A	N/A	N/A	<0.20
11-14348	MW-3	2011	4	Phase I	<0.0030	<0.0010	**0.26**	<0.0030	0.0072	<0.010	**0.10**	<0.010	N/A	N/A	N/A	<1.0
FM12-3 (no PCB or TPH sample)	MW-3	2012	5	Phase I	<0.0010	<0.000050	0.021	0.00038	0.0070	0.0040	0.011	0.047	N/A	N/A	N/A	N/A
FM-T2-MW-3 (insufficient sample)	MW-3	2014	7	Phase II	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	<0.025	N/A	N/A	0.013
MW-03 (*dissolved metals*)	MW-3	2017	10	Phase II	*<0.001*	*<0.0001*	*0.012*	*<0.0005*	*<0.0005*	*<0.0001*	*<0.001*	*0.006*	<0.025	<0.1	<0.1	0.1
	MW-3		15	Phase II												#N/A
	MW-3		25	Phase II												#N/A
																#N/A

FOX-M Tier II Soil Disposal Facility - Summary of Groundwater Monitoring Analytical Data

Link to: Table of Contents

Sample ID	Location	Date	Monitoring Year	Monitoring Phase	As* (mg/L)	Cd* (mg/L)	Cr (mg/L)	Co* (mg/L)	Cu (mg/L)	Pb* (mg/L)	Ni (mg/L)	Zn (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:																
04-12743	MW-1	2004			<0.0030	<0.0010	<0.0050	<0.0030	<0.0050	<0.010	<0.0050	0.018				<1.0
05-24355	MW-1	2005			<0.0030	<0.0010	<0.010	<0.0030	<0.0050	<0.010	0.0070	<0.010				<1.0
06-05831	MW-1	2006			0.0056	<0.0010	0.040	<0.0030	0.020	<0.010	0.032	0.030				N/A
07-29513	MW-1	2007			<0.0030	<0.0010	0.053	<0.0030	0.0050	<0.010	0.031	0.024				<1.0
Downgradient:																
04-12748	MW-2	2004			<0.0030	<0.0010	<0.0050	<0.0030	0.008	<0.010	<0.0050	1.2				<1.0
04-12747	MW-3	2004			<0.0030	<0.0010	0.006	<0.0030	0.008	<0.010	<0.0050	0.02				<1.0
04-12746	MW-4	2004			<0.0030	<0.0010	<0.0050	<0.0030	0.009	<0.010	0.007	<0.010				<1.0
04-12744	MW-5	2004			<0.0030	<0.0010	<0.0050	<0.0030	0.005	<0.010	<0.0050	<0.010				<1.0
05-24356	MW-2	2005			<0.0030	<0.0010	<0.0010	<0.0030	<0.0050	<0.010	<0.0050	0.69				<1.0
05-24358	MW-4	2005			<0.0030	<0.0010	0.019	<0.0030	0.005	<0.010	0.013	<0.010				<1.0
05-24359	MW-5	2005			<0.0030	<0.0010	<0.0050	<0.0030	<0.0050	<0.010	<0.0050	<0.010				<1.0
06-05851/52	MW-2	2006			<0.0030	<0.0010	0.031	<0.0030	0.012	<0.010	0.015	0.21				N/A
06-05846	MW-3	2006			0.0054	<0.0010	0.070	<0.0030	0.026	<0.010	0.0320	<0.010				N/A
06-05841	MW-4	2006			0.0050	<0.0010	0.18	<0.0030	0.033	<0.010	0.059	0.02				N/A
06-05836	MW-5	2006			0.0033	<0.0010	0.025	<0.0030	0.032	<0.010	0.020	0.02				N/A
07-29514	MW-2	2007			<0.0030	<0.0010	0.013	<0.0030	<0.0050	<0.010	<0.0050	1.4				<1.0
07-29515	MW-3	2007			<0.0030	<0.0010	0.012	<0.0030	<0.0050	<0.010	<0.0050	<0.010				<1.0
07-29517	MW-4	2007			<0.0030	<0.0010	0.01	<0.0030	<0.0050	<0.010	<0.0050	<0.010				<1.0
07-29518	MW-5	2007			<0.0030	<0.0010	0.02	<0.0030	<0.0050	<0.010	<0.0050	<0.010				<1.0
		N value			19	19	19	19	19	19	19	19				14
Baseline Data - Arithmetic Mean					0.0022	0.0005	0.0260	0.0015	0.0097	0.0050	0.0127	0.19				0.50
Baseline Data - Arithmetic Mean Corrected for Detection Limit					**0.0030**	**0.0010**	**0.0260**	**0.0030**	**0.0097**	**0.010**	**0.0127**	**0.19**				**1.00**
Baseline Data - Standard Deviation					0.0000	0.0000	0.0419	0.0000	0.0103	0.000	0.0000	0.42				0.00
Baseline Data - Corrected Arithmetic Mean + 3xStandard Deviation					**0.0030**	**0.0010**	**0.1517**	**0.0030**	**0.0405**	**0.010**	**0.0127**	**1.46**				**1.00**
Downgradient MW-4																
08-10708	MW-4	2008	1	Phase I	<0.0030	<0.0010	0.0063	<0.0030	<0.0050	<0.0010	<0.0050	<0.0050	N/A	N/A	N/A	<1.0
FM09-4W	MW-4	2009	2	Phase I	<0.0010	<0.00010	0.0060	<0.00020	0.0020	<0.0010	<0.0050	<0.010	N/A	N/A	N/A	<0.20
FM10-4W	MW-4	2010	3	Phase I	<0.0010	<0.00010	0.0060	<0.00020	0.0020	<0.0010	0.0070	<0.010	N/A	N/A	N/A	<0.20
11-14349	MW-4	2011	4	Phase I	<0.0030	<0.0010	**0.058**	<0.0030	0.0059	<0.010	0.0073	<0.010	N/A	N/A	N/A	<1.0
FM12-4	MW-4	2012	5	Phase I	0.0020	<0.000050	**0.030**	**0.012**	0.0060	0.0030	**0.017**	0.053	N/A	N/A	N/A	<0.10
FM-T2-MW-4	MW-4	2014	7	Phase II	0.0014	<0.000020	**0.029**	**0.007**	0.0059	0.0023	**0.017**	0.039	<0.025	<0.100	<0.100	0.1
MW-04 (*dissolved metals*)	MW-4	2017	10	Phase II	*<0.001*	*<0.0001*	*<0.001*	*<0.0005*	*<0.0005*	*<0.0001*	*0.003*	*0.016*	<0.025	<0.1	<0.1	0.1
	MW-4		15	Phase II												#N/A
	MW-4		25	Phase II												#N/A
																#N/A

FOX-M Tier II Soil Disposal Facility - Summary of Groundwater Monitoring Analytical Data

Link to: Table of Contents

Sample ID	Location	Date	Monitoring Year	Monitoring Phase	As* (mg/L)	Cd* (mg/L)	Cr (mg/L)	Co* (mg/L)	Cu (mg/L)	Pb* (mg/L)	Ni (mg/L)	Zn (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:																
04-12743	MW-1	2004			<0.0030	<0.0010	<0.0050	<0.0030	<0.0050	<0.010	<0.0050	0.018				<1.0
05-24355	MW-1	2005			<0.0030	<0.0010	<0.010	<0.0030	<0.0050	<0.010	0.0070	<0.010				<1.0
06-05831	MW-1	2006			0.0056	<0.0010	0.040	<0.0030	0.020	<0.010	0.032	0.030				N/A
07-29513	MW-1	2007			<0.0030	<0.0010	0.053	<0.0030	0.0050	<0.010	0.031	0.024				<1.0
Downgradient:																
04-12748	MW-2	2004			<0.0030	<0.0010	<0.0050	<0.0030	0.008	<0.010	<0.0050	1.2				<1.0
04-12747	MW-3	2004			<0.0030	<0.0010	0.006	<0.0030	0.008	<0.010	<0.0050	0.02				<1.0
04-12746	MW-4	2004			<0.0030	<0.0010	<0.0050	<0.0030	0.009	<0.010	0.007	<0.010				<1.0
04-12744	MW-5	2004			<0.0030	<0.0010	<0.0050	<0.0030	0.005	<0.010	<0.0050	<0.010				<1.0
05-24356	MW-2	2005			<0.0030	<0.0010	<0.0010	<0.0030	<0.0050	<0.010	<0.0050	0.69				<1.0
05-24358	MW-4	2005			<0.0030	<0.0010	0.019	<0.0030	0.005	<0.010	0.013	<0.010				<1.0
05-24359	MW-5	2005			<0.0030	<0.0010	<0.0050	<0.0030	<0.0050	<0.010	<0.0050	<0.010				<1.0
06-05851/52	MW-2	2006			<0.0030	<0.0010	0.031	<0.0030	0.012	<0.010	0.015	0.21				N/A
06-05846	MW-3	2006			0.0054	<0.0010	0.070	<0.0030	0.026	<0.010	0.0320	<0.010				N/A
06-05841	MW-4	2006			0.0050	<0.0010	0.18	<0.0030	0.033	<0.010	0.059	0.02				N/A
06-05836	MW-5	2006			0.0033	<0.0010	0.025	<0.0030	0.032	<0.010	0.020	0.02				N/A
07-29514	MW-2	2007			<0.0030	<0.0010	0.013	<0.0030	<0.0050	<0.010	<0.0050	1.4				<1.0
07-29515	MW-3	2007			<0.0030	<0.0010	0.012	<0.0030	<0.0050	<0.010	<0.0050	<0.010				<1.0
07-29517	MW-4	2007			<0.0030	<0.0010	0.01	<0.0030	<0.0050	<0.010	<0.0050	<0.010				<1.0
07-29518	MW-5	2007			<0.0030	<0.0010	0.02	<0.0030	<0.0050	<0.010	<0.0050	<0.010				<1.0
		N value			19	19	19	19	19	19	19	19				14
Baseline Data - Arithmetic Mean					0.0022	0.0005	0.0260	0.0015	0.0097	0.0050	0.0127	0.19				0.50
Baseline Data - Arithmetic Mean Corrected for Detection Limit					**0.0030**	**0.0010**	**0.0260**	**0.0030**	**0.0097**	**0.010**	**0.0127**	**0.19**				**1.00**
Baseline Data - Standard Deviation					0.0000	0.0000	0.0419	0.0000	0.0103	0.000	0.0000	0.42				0.00
Baseline Data - Corrected Arithmetic Mean + 3xStandard Deviation					**0.0030**	**0.0010**	**0.1517**	**0.0030**	**0.0405**	**0.010**	**0.0127**	**1.46**				**1.00**
Downgradient MW-5																
08-10707	MW-5	2008	1	Phase I	<0.0030	<0.0010	**0.097**	<0.0030	0.0052	<0.0010	0.0082	<0.0050	N/A	N/A	N/A	<1.0
FM09-5W	MW-5	2009	2	Phase I	0.0020	<0.00010	<0.0050	0.00040	0.0030	<0.0010	**0.021**	<0.010	N/A	N/A	N/A	<0.20
FM10-5W	MW-5	2010	3	Phase I	<0.0050	<0.00010	0.026	0.00060	0.0030	<0.0010	**0.026**	<0.010	N/A	N/A	N/A	<0.20
11-14350	MW-5	2011	4	Phase I	<0.0030	<0.0010	**0.22**	<0.0030	0.0056	<0.010	**0.017**	<0.010	N/A	N/A	N/A	<1.0
FM12-5	MW-5	2012	5	Phase I	<0.0010	<0.000050	**0.035**	<0.0010	0.0050	<0.0010	0.0090	0.010	N/A	N/A	N/A	<0.10
FM-T2-MW-5	MW-5	2014	7	Phase II	0.00081	<0.000020	0.0056	<0.00030	0.0011	<0.00020	0.0041	0.0086	<0.025	<0.100	<0.100	0.1
MW-05 (*dissolved metals*)	MW-5	2017	10	Phase II	*<0.001*	*<0.0001*	*<0.001*	*<0.0005*	*<0.0005*	*<0.0001*	*0.001*	*0.012*	<0.025	<0.1	<0.1	0.1
	MW-5		15	Phase II												#N/A
	MW-5		25	Phase II												#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 baseline mean**

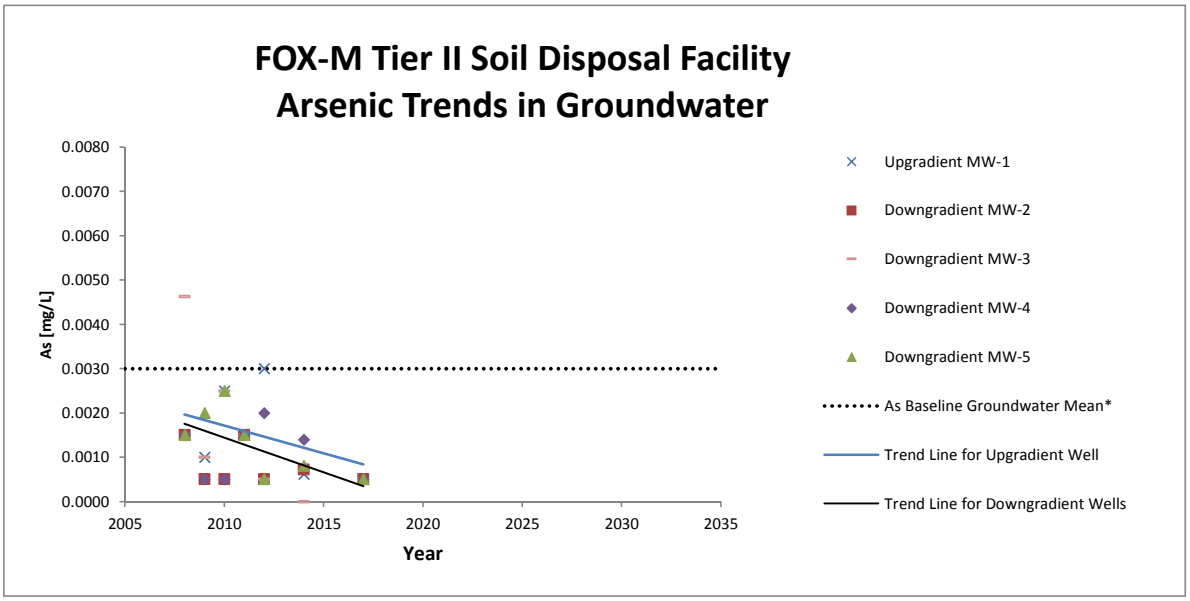
XX **Sample exceeds baseline mean + 3xSD**

FOX-M Tier II Soil Disposal Facility Trends in Groundwater Inorganics, PCBs and Modified TPH

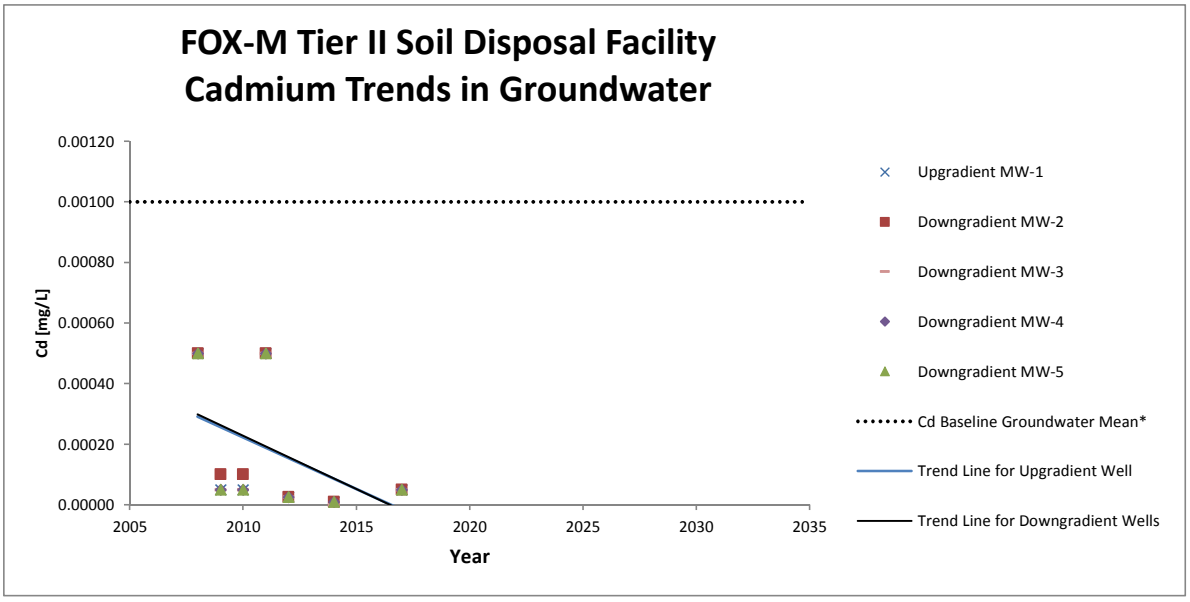
Link to: Table of Contents

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.

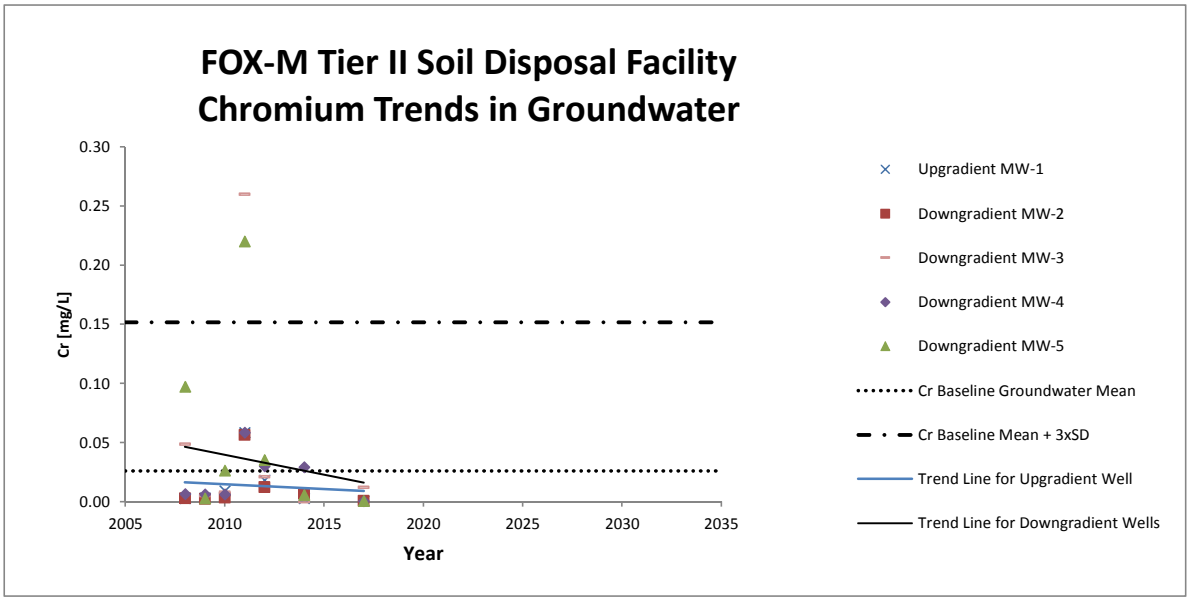


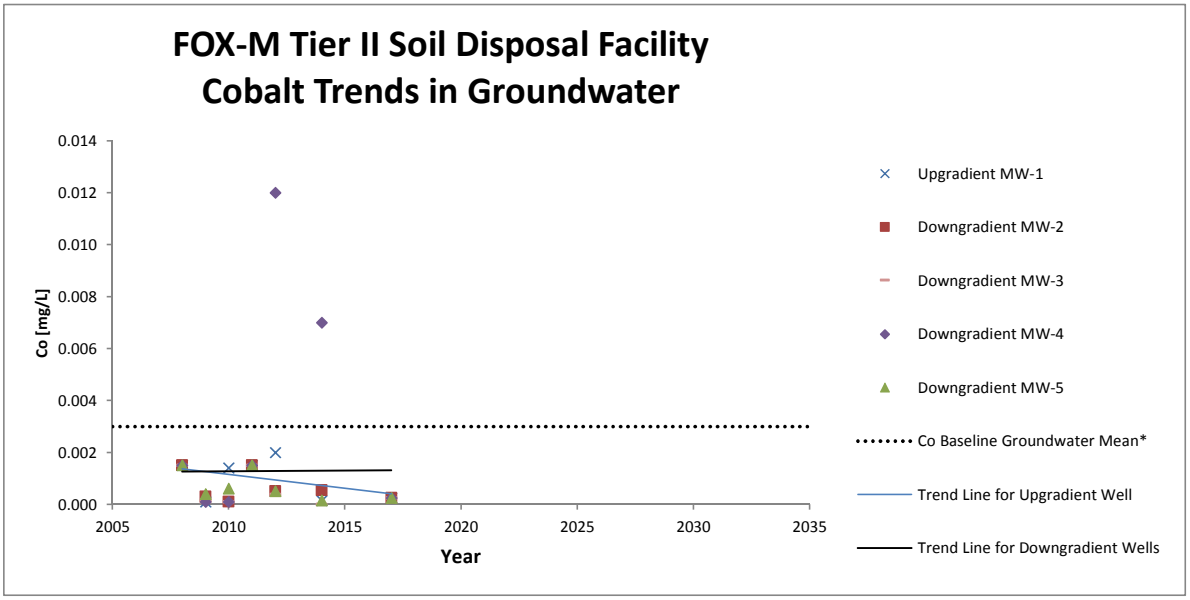
* As baseline arithmetic mean is equal to the baseline detection limit
* As baseline standard deviation = 0



* Cd baseline arithmetic mean is equal to the baseline detection limit
* Cd baseline standard deviation = 0

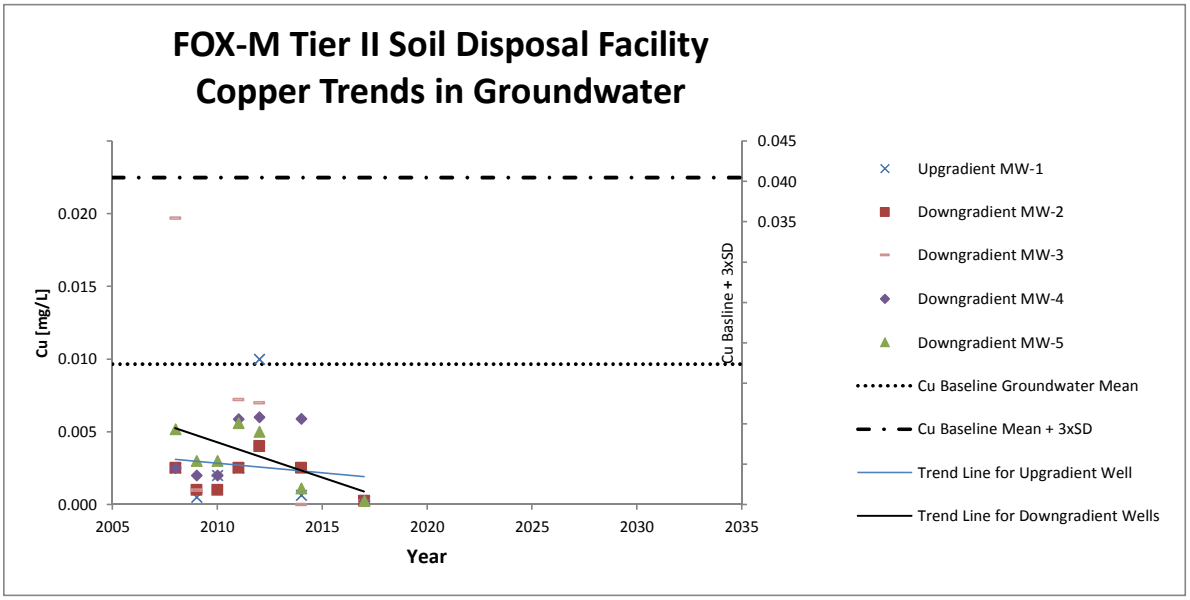
FOX-M Tier II Soil Disposal Facility Trends in Groundwater Inorganics, PCBs and Modified TPH

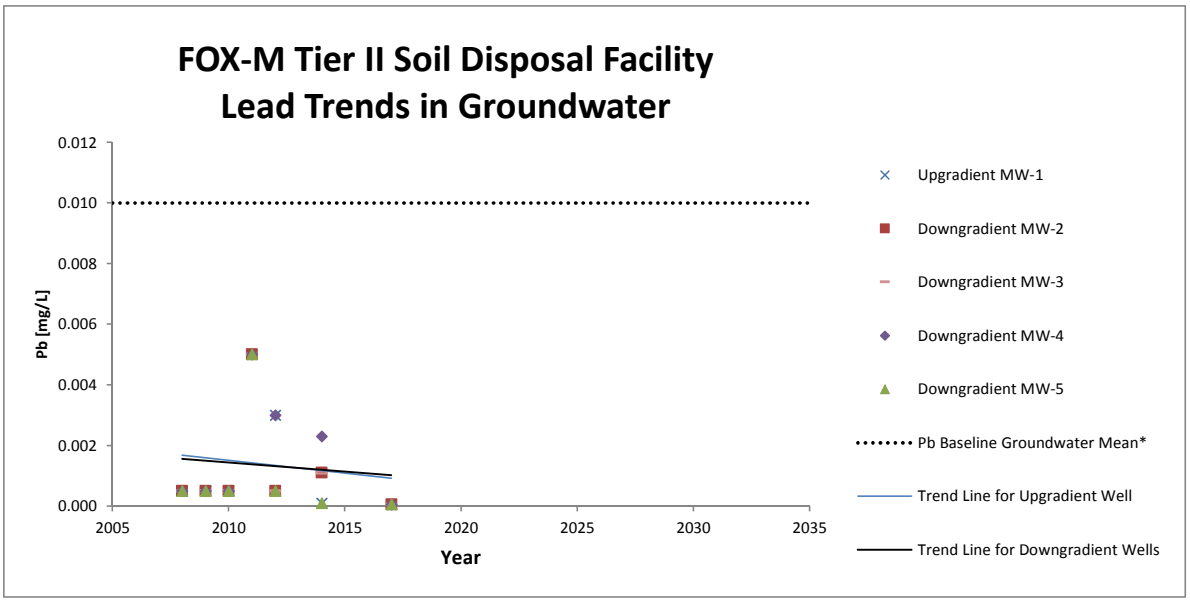




* Co baseline arithmetic mean is equal to the baseline detection limit
* Co baseline standard deviation = 0

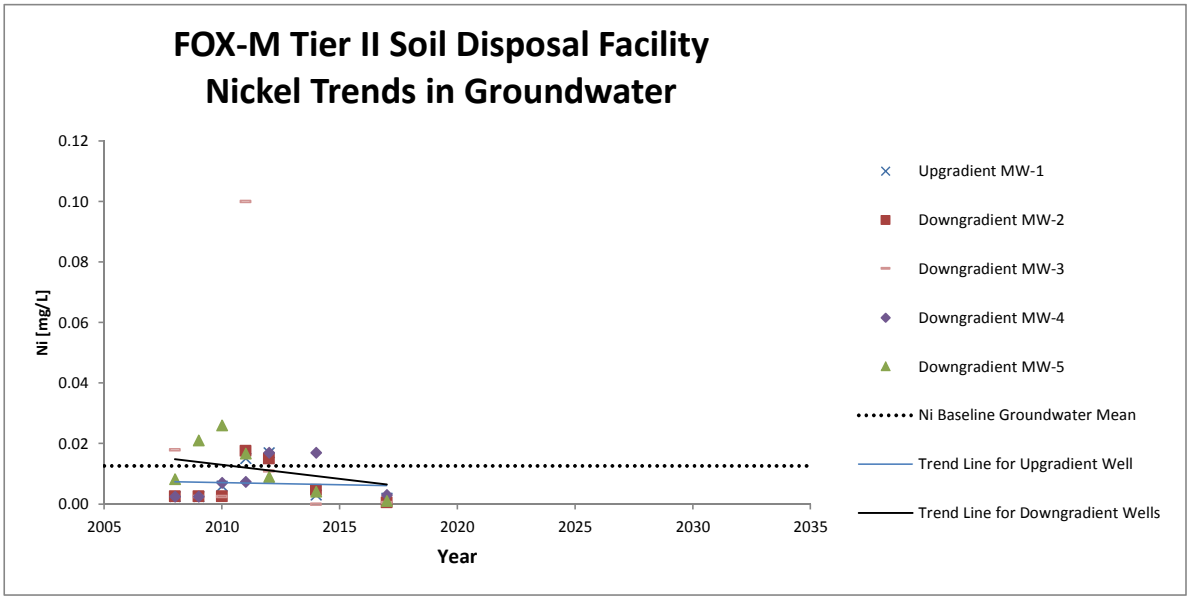
FOX-M Tier II Soil Disposal Facility Trends in Groundwater Inorganics, PCBs and Modified TPH



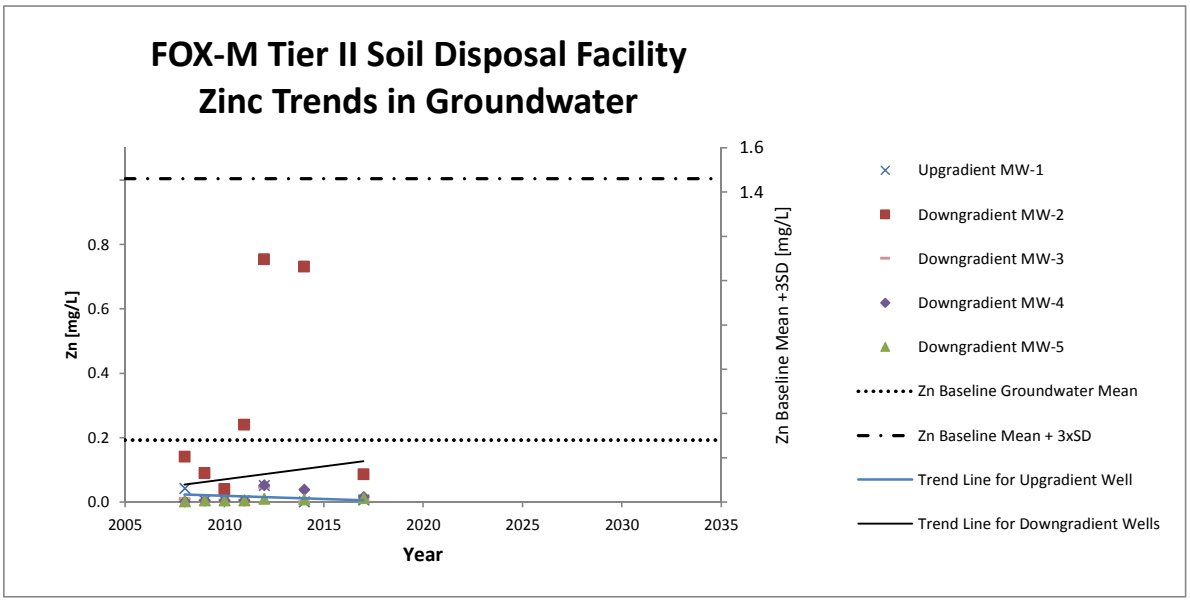


* Pb baseline arithmetic mean is equal to the baseline detection limit
* Pb baseline standard deviation = 0

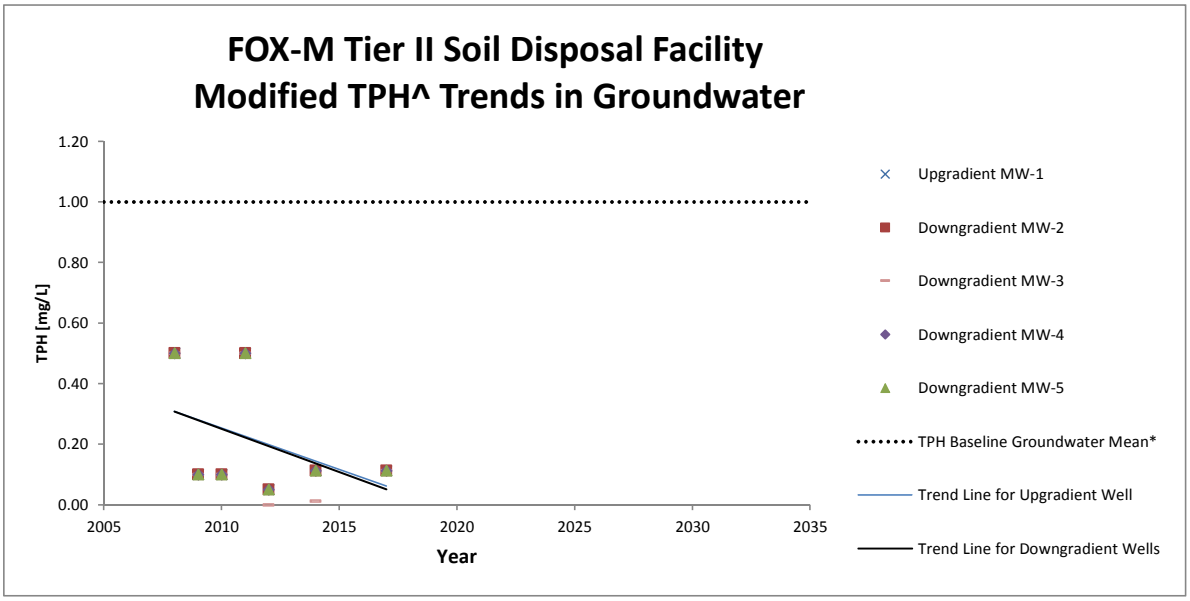
FOX-M Tier II Soil Disposal Facility Trends in Groundwater Inorganics, PCBs and Modified TPH



* Ni baseline standard deviation = 0



FOX-M Tier II Soil Disposal Facility Trends in Groundwater Inorganics, PCBs and Modified TPH



^ Modified TPH is sum of F1, F2 and F3 fractions (C_6 - C_{34})
* TPH baseline arithmetic mean is equal to the detection limit
* TPH baseline standard deviation = 0

FOX-M East Beach Landfill - Summary of Soil Monitoring Analytical Data

Link to: Table of Contents

Sample ID	Location	Year	Monitoring Year	Monitoring Phase	Depth (cm)	As* (mg/kg)	Cd* (mg/kg)	Cr* (mg/kg)	Co* (mg/kg)	Cu* (mg/kg)	Pb* (mg/kg)	Ni* (mg/kg)	Zn* (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						1.00	1.00	20.0	5.00	6.3	10.0	5.0	15.0	0.213				N/A
Baseline Data - Arithmetic Mean						**2.32**	**1.00**	**20.0**	**5.00**	**8.6**	**14.0**	**6.6**	**32.3**	**0.10**				**40.0**
Baseline Data - Standard Deviation						2.05	0.00	0.0	0.00	11.2	0.0	2.1	61.8	0.00				43.8
Baseline Data Mean + 3xStandard Deviation						**8.47**	**1.00**	**20.0**	**5.00**	**42.2**	**14.0**	**12.8**	**217.7**	**0.10**				**171.3**
**** 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						*30*	*5*	*250*	*50*	*100*	*500*	*100*	*500*	*5*				*2500*
Monitoring Data																		**TPH Sum will appear when F1, F2 and F3 fractions are entered.**
Upgradient - no identified upgradient locations																		
Downgradient																		
	MW-20 surface																	
08-10745	MW-20	2008	1	Phase I	0	0.8	<1.0	<20	<5.0	6.8	<10	**7.1**	<15	0.005	<10	<4.0	16.0	23.0
FM09-20WA	MW-20	2009	2	Phase I	0-15	2.0	<0.50	**25.0**	5.0	**14.0**	10.0	**14.0**	13.0	<0.020	<20	<20	137.0	**147.0**
FM10-20WA	MW-20	2010	3	Phase I	0-15	2.0	<0.50	**30.0**	2.0	**9.0**	11.0	**18.0**	13.0	<0.020	<10	<10	<20	20.0
11-14338	MW-20	2011	4	Phase I	0-10	2.3	<1.0	<20	<5.0	5.2	<10	**8.5**	17.0	<0.050	<10	<4.0	11.0	18.0
FM12-20A	MW-20	2012	5	Phase I	0-15	2.2	<0.50	12.3	3.3	8.3	**18.8**	**22.6**	17.0	<0.050	<10	10.0	43.0	**58.0**
FM-EB-MW-20-S	MW-20	2014	7	Phase II	0-15	**3.4**	0.8	12.0	2.4	**99.0**	**30.0**	**17.0**	**39.0**	**0.400**	<10	<10	<10	15.0
MW-20 Shallow	MW-20	2017	10	Phase II	0-15	<1.0	<0.5	8.8	1.9	**27.7**	**15.9**	**9.1**	15.8	<0.05	<7	<4	<8	9.5
	MW-20		15	Phase II														#N/A
	MW-20		25	Phase II														#N/A
																		#N/A
																		#N/A
	MW-20 depth																	
08-10747	MW-20	2008	1	Phase I	40	1.8	<1.0	<20	<5.0	4.0	<10	5.9	<15	<0.0030	<10	<4.0	21.0	28.0
FM09-20WB	MW-20	2009	2	Phase I	40-50	**3.0**	<0.50	**25.0**	**6.0**	7.0	7.0	**15.0**	16.0	<0.020	<20	<20	114.0	**134.0**
FM-10-20WB	MW-20	2010	3	Phase I	40-50	1.0	<0.50	15.0	3.0	6.0	7.0	**13.0**	13.0	<0.020	<10	<10	<20	20.0
11-14339	MW-20	2011	4	Phase I	30-40	**2.5**	<1.0	<20	<5.0	3.9	<10	**7.1**	17.1	<0.050	<10	<4.0	<9.0	11.5
FM12-20B	MW-20	2012	5	Phase I	40-50	2.2	<0.50	13.5	3.4	6.8	7.8	**22.9**	17.0	<0.050	<10	<10	47.0	**57.0**
FM-EB-MW-20-D	MW-20	2014	7	Phase II	40-50	**2.5**	0.1	10.0	2.0	**15.0**	7.2	**8.5**	14.0	<0.1	<10	<10	<10	15.0
MW-20 Deep	MW-20	2017	10	Phase II	40-50	<1.0	<0.5	9.0	2.0	**10.2**	**14.3**	**7.6**	11.9	<0.05	<7	<4	<8	9.5
	MW-20		15	Phase II														#N/A
	MW-20		25	Phase II														#N/A
																		#N/A
																		#N/A
																		#N/A
																		#N/A

FOX-M East Beach Landfill - Summary of Soil Monitoring Analytical Data

Link to: Table of Contents

Sample ID	Location	Year	Monitoring Year	Monitoring Phase	Depth (cm)	As* (mg/kg)	Cd* (mg/kg)	Cr* (mg/kg)	Co* (mg/kg)	Cu* (mg/kg)	Pb* (mg/kg)	Ni* (mg/kg)	Zn* (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						1.00	1.00	20.0	5.00	6.3	10.0	5.0	15.0	0.213				N/A
Baseline Data - Arithmetic Mean						**2.32**	**1.00**	**20.0**	**5.00**	**8.6**	**14.0**	**6.6**	**32.3**	**0.10**				**40.0**
Baseline Data - Standard Deviation						2.05	0.00	0.0	0.00	11.2	0.0	2.1	61.8	0.00				43.8
Baseline Data Mean + 3xStandard Deviation						**8.47**	**1.00**	**20.0**	**5.00**	**42.2**	**14.0**	**12.8**	**217.7**	**0.10**				**171.3**
	MW-21 surface																	
08-10749	MW-21	2008	1	Phase I	0	1.2	<1.0	<20	<5.0	4.2	<10	<5.0	<15	0.004	<10	<4.0	<9.0	11.5
FM09-21WA	MW-21	2009	2	Phase I	0-15	2.0	<0.50	16.0	**6.0**	**10.0**	13.0	**11.0**	21.0	<0.020	<20	<20	<20	20.0
FM10-21wa	MW-21	2010	3	Phase I	0-15	2.0	<0.50	16.0	2.0	4.0	4.0	**11.0**	8.0	<0.020	<10	<10	<20	20.0
11-14336	MW-21	2011	4	Phase I	0-10	**2.8**	<1.0	<20	<5.0	5.8	<10	**6.6**	26.4	<0.050	<10	<4.0	<9.0	11.5
FM12-21A-D	MW-21	2012	5	Phase I	0-15	**2.6**	<0.50	12.5	3.5	**10.7**	**20.3**	**25.2**	18.0	<0.050	<10	<10	39.0	**49.0**
FM-EB-MW-21-S	MW-21	2014	7	Phase II	0-15	**2.4**	<0.10	11.0	1.9	**9.6**	**18.0**	**7.4**	18.0	<0.1	<10	<10	<10	15.0
MW-21 Shallow	MW-21	2017	10	Phase II	0-15	<1.0	<0.5	6.8	1.6	4.5	9.4	6.0	8.1	<0.05	<7	<4	12.0	17.5
	MW-21		15	Phase II														#N/A
	MW-21		25	Phase II														#N/A
																		#N/A
	MW-21 depth																	
08-10751	MW-21	2008	1	Phase I	40	2.0	<1.0	<20	<5.0	7.1	11.0	5.5	<15	<0.0030	<10	<4.0	12.0	19.0
FM09-21WB	MW-21	2009	2	Phase I	40-50	2.0	<0.50	18.0	**6.0**	4.0	4.0	**12.0**	10.0	<0.020	<20	<20	<20	30.0
FM10-21WB	MW-21	2010	3	Phase I	40-50	1.0	<0.50	14.0	2.0	4.0	4.0	**11.0**	18.0	<0.10	<10	<10	<20	20.0
11-14337	MW-21	2011	4	Phase I	30-40	**2.7**	<1.0	<20	<5.0	3.9	<10	5.8	<15	<0.050	<10	<4.0	<9.0	11.5
FM12-21B	MW-21	2012	5	Phase I	40-50	**2.4**	<0.50	13.0	3.7	7.6	**17.6**	**26.0**	29.0	<0.050	<10	<10	88.0	**98.0**
FM-EB-MW-21-D	MW-21	2014	7	Phase II	40-50	2.0	<0.10	9.4	1.9	3.2	2.7	**7.1**	10.0	<0.1	<10	<10	<10	15.0
MW-21 Deep	MW-21	2017	10	Phase II	40-50	<1.0	<0.5	7.0	1.6	4.3	9.8	6.0	10.5	<0.05	<7	<4	13.0	18.5
	MW-21		15	Phase II														#N/A
	MW-21		25	Phase II														#N/A
																		#N/A
																		#N/A

FOX-M East Beach Landfill - Summary of Soil Monitoring Analytical Data

Link to: Table of Contents

Sample ID	Location	Year	Monitoring Year	Monitoring Phase	Depth (cm)	As* (mg/kg)	Cd* (mg/kg)	Cr* (mg/kg)	Co* (mg/kg)	Cu* (mg/kg)	Pb* (mg/kg)	Ni* (mg/kg)	Zn* (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						1.00	1.00	20.0	5.00	6.3	10.0	5.0	15.0	0.213				N/A
Baseline Data - Arithmetic Mean						**2.32**	**1.00**	**20.0**	**5.00**	**8.6**	**14.0**	**6.6**	**32.3**	**0.10**				**40.0**
Baseline Data - Standard Deviation						2.05	0.00	0.0	0.00	11.2	0.0	2.1	61.8	0.00				43.8
Baseline Data Mean + 3xStandard Deviation						**8.47**	**1.00**	**20.0**	**5.00**	**42.2**	**14.0**	**12.8**	**217.7**	**0.10**				**171.3**
	MW-22 surface																	
08-10741	MW-22	2008	1	Phase I	0	1.0	<1.0	<20	<5.0	**10.0**	**22.0**	6.3	20.0	0.016	<10	<4.0	35.0	**42.0**
FM09-22WA	MW-22	2009	2	Phase I	0-15	2.0	<0.50	**24.0**	4.0	4.0	5.0	**15.0**	9.0	<0.020	<20	<20	<20	30.0
FM10-22WA	MW-22	2010	3	Phase I	0-15	2.0	<0.50	16.0	3.0	**56.0**	**82.0**	**13.0**	**47.0**	<0.020	<10	<10	21.0	31.0
11-14334	MW-22	2011	4	Phase I	0-10	**2.6**	<1.0	<20	<5.0	4.7	<10	**9.3**	<15	<0.050	<10	<4.0	12.0	19.0
FM12-22A	MW-22	2012	5	Phase I	0-15	2.3	<0.50	12.1	3.3	**10.0**	12.6	**24.3**	17.0	<0.050	<10	<10	34.0	**44.0**
FM-EB-MW-22-S	MW-22	2014	7	Phase II	0-15	**2.9**	0.1	11.0	2.0	**32.0**	**79.0**	**9.1**	**35.0**	<0.1	<10	80.0	<10	**90.0**
MW-22 Shallow	MW-22	2017	10	Phase II	0-15	<1.0	<0.5	7.3	1.7	3.2	5.3	**6.9**	6.7	<0.05	<7	<4	<8	9.5
	MW-22		15	Phase II														#N/A
	MW-22		25	Phase II														#N/A
																		#N/A
																		#N/A
	MW-22 depth																	
08-10743/44	MW-22	2008	1	Phase I	40	1.4	<1.0	<20	<5.0	**21.0**	**27.0**	**7.1**	29.0	0.017	<10	<4.0	38.5	**45.5**
FM09-22WB	MW-22	2009	2	Phase I	40-50	**3.0**	<0.50	15.0	4.0	4.0	4.0	**12.0**	10.0	<0.020	<20	<20	<20	30.0
FM10-22WB	MW-22	2010	3	Phase I	40-50	2.0	<0.50	16.0	3.0	**19.0**	**50.0**	**13.0**	29.0	<0.020	<10	<10	<20	20.0
11-14335	MW-22	2011	4	Phase I	30-40	**2.7**	<1.0	<20	<5.0	4.7	<10	**7.0**	<15	<0.050	<10	<4.0	13.0	20.0
FM12-22B	MW-22	2012	5	Phase I	40-50	**2.6**	<0.50	13.5	3.2	**8.8**	**39.9**	**23.6**	16.0	<0.050	<10	<10	35.0	**45.0**
FM-EB-MW-22-D	MW-22	2014	7	Phase II	40-50	**4.5**	0.3	15.0	2.8	**38.0**	**260.0**	**11.0**	**59.0**	<0.1	<10	<10	<10	15.0
MW-22 Deep	MW-22	2017	10	Phase II	40-50	<1.0	<0.5	7.5	1.7	4.2	7.5	6.4	8.9	<0.05	<7	<4	<8	9.5
	MW-22		15	Phase II														#N/A
	MW-22		25	Phase II														#N/A
																		#N/A

FOX-M East Beach Landfill - Summary of Soil Monitoring Analytical Data

Link to: Table of Contents

Sample ID	Location	Year	Monitoring Year	Monitoring Phase	Depth (cm)	As* (mg/kg)	Cd* (mg/kg)	Cr* (mg/kg)	Co* (mg/kg)	Cu* (mg/kg)	Pb* (mg/kg)	Ni* (mg/kg)	Zn* (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						1.00	1.00	20.0	5.00	6.3	10.0	5.0	15.0	0.213				N/A
Baseline Data - Arithmetic Mean						**2.32**	**1.00**	**20.0**	**5.00**	**8.6**	**14.0**	**6.6**	**32.3**	**0.10**				**40.0**
Baseline Data - Standard Deviation						2.05	0.00	0.0	0.00	11.2	0.0	2.1	61.8	0.00				43.8
Baseline Data Mean + 3xStandard Deviation						**8.47**	**1.00**	**20.0**	**5.00**	**42.2**	**14.0**	**12.8**	**217.7**	**0.10**				**171.3**
	MW-23 surface																	
08-10753/54	MW-23	2008	1	Phase I	0	1.8	<1.0	<20	<5.0	3.6	<10	5.9	<15	0.024	<10	<4.0	11.5	18.5
FM09-23WA	MW-23	2009	2	Phase I	0-15	**3.0**	<0.50	15.0	5.0	**14.0**	**22.0**	**12.0**	26.0	<0.020	<20	<20	<20	30.0
FM10-23WA	MW-23	2010	3	Phase I	0-15	**4.0**	<0.50	14.0	3.0	5.0	5.0	**14.0**	11.0	<0.020	<10	<10	22.0	32.0
11-14332	MW-23	2011	4	Phase I	0-10	**8.4**	<1.0	<20	<5.0	**10.5**	**23.0**	**9.5**	27.0	**0.130**	<10	<4.0	57.0	**64.0**
FM12-23A	MW-23	2012	5	Phase I	0-15	**3.9**	<0.50	15.7	4.3	8.4	10.0	**28.6**	22.0	<0.050	<10	<10	36.0	**46.0**
FM-EB-MW-23-S	MW-23	2014	7	Phase II	0-15	**3.8**	<0.10	12.0	2.6	**11.0**	**19.0**	**10.0**	23.0	0.100	<10	<10	<10	15.0
MW-23 Shallow (Dup Avg)	MW-23	2017	10	Phase II	0-15	<1.0	<0.5	9.7	2.5	8.2	10.2	**8.6**	12.4	<0.05	<7	<4	<8	9.5
	MW-23		15	Phase II														#N/A
	MW-23		25	Phase II														#N/A
																		#N/A
	MW-23 depth																	
08-10755	MW-23	2008	1	Phase I	40	**19.0**	<1.0	**85.0**	**15.0**	**70.0**	**90.0**	**63.0**	**240.0**	0.069	<10	<4.0	25.0	32.0
FM09-23WB	MW-23	2009	2	Phase I	40-50	**3.0**	<0.50	16.0	5.0	5.0	6.0	**13.0**	14.0	<0.020	<20	<20	<20	30.0
FM10-23WB	MW-23	2010	3	Phase I	40-50	**4.0**	<0.50	14.0	3.0	5.0	5.0	**13.0**	11.0	<0.020	<10	<10	<20	20.0
11-14333	MW-23	2011	4	Phase I	30-40	**3.4**	<1.0	<20	<5.0	**12.9**	**15.0**	**9.1**	21.1	0.070	<10	<4.0	21.0	28.0
FM12-23B	MW-23	2012	5	Phase I	40-50	**3.4**	<0.50	15.9	4.3	8.1	11.6	**27.4**	21.0	0.100	<10	<10	31.0	**41.0**
FM-EB-MW-23-D	MW-23	2014	7	Phase II	40-50	**3.7**	<0.10	9.6	2.3	4.4	4.7	**9.0**	12.0	<0.1	<10	<10	<10	15.0
MW-23 Deep	MW-23	2017	10	Phase II	40-50	<1.0	<0.5	9.6	2.3	**11.6**	**31.6**	**8.8**	16.2	<0.05	<7	<4	25.0	30.5
	MW-23		15	Phase II														#N/A
	MW-23		25	Phase II														#N/A
																		#N/A
																		#N/A

FOX-M East Beach Landfill - Summary of Soil Monitoring Analytical Data

Link to: Table of Contents

Sample ID	Location	Year	Monitoring Year	Monitoring Phase	Depth (cm)	As* (mg/kg)	Cd* (mg/kg)	Cr* (mg/kg)	Co* (mg/kg)	Cu* (mg/kg)	Pb* (mg/kg)	Ni* (mg/kg)	Zn* (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						1.00	1.00	20.0	5.00	6.3	10.0	5.0	15.0	0.213				N/A
Baseline Data - Arithmetic Mean						**2.32**	**1.00**	**20.0**	**5.00**	**8.6**	**14.0**	**6.6**	**32.3**	**0.10**				**40.0**
Baseline Data - Standard Deviation						2.05	0.00	0.0	0.00	11.2	0.0	2.1	61.8	0.00				43.8
Baseline Data Mean + 3xStandard Deviation						**8.47**	**1.00**	**20.0**	**5.00**	**42.2**	**14.0**	**12.8**	**217.7**	**0.10**				**171.3**
	MW-24 surface																	
08-10757	MW-24	2008	1	Phase I	0	1.1	<1.0	<20	<5.0	3.6	<10	5.8	<15	0.021	<10	<4.0	19.0	26.0
FM09-24WA	MW-24	2009	2	Phase I	0-15	**3.0**	<0.50	19.0	4.0	5.0	10.0	**14.0**	16.0	<0.020	<20	<20	<20	30.0
FM10-24WA	MW-24	2010	3	Phase I	0-15	2.0	<0.50	16.0	3.0	**16.0**	**31.0**	**13.0**	30.0	<0.020	<10	13.0	<20	28.0
11-14330	MW-24	2011	4	Phase I	0-10	**2.7**	<1.0	**120.0**	<5.0	7.7	12.5	**59.0**	23.0	<0.050	<10	<4.0	9.2	16.2
FM12-24A	MW-24	2012	5	Phase I	0-15	**3.6**	<0.50	12.3	4.4	5.4	5.4	**28.6**	15.0	<0.050	<10	<10	20.0	30.0
No sample (gravel/cobbles)	MW-24	2014	7	Phase II														#N/A
MW-24 Shallow	MW-24	2017	10	Phase II	0-15	<1.0	<0.5	8.6	2.1	**9.3**	**66.5**	**7.6**	16.4	<0.05	<7	<4	11.0	16.5
	MW-24		15	Phase II														#N/A
	MW-24		25	Phase II														#N/A
																		#N/A
	MW-24 depth																	
08-10759	MW-24	2008	1	Phase I	40	1.2	<1.0	<20	<5.0	4.5	**140.0**	5.8	<15	<0.0030	<10	<4.0	12.0	19.0
FM09-24WB	MW-24	2009	2	Phase I	40-50	2.0	<0.50	**23.0**	4.0	5.0	5.0	**15.0**	12.0	<0.020	<20	<20	<20	30.0
FM10-24WB	MW-24	2010	3	Phase I	40-50	2.0	<0.50	15.0	3.0	**14.0**	**28.0**	**13.0**	32.0	<0.020	<10	<10	23.0	33.0
11-14331	MW-24	2011	4	Phase I	30-40	**2.4**	<1.0	<20	<5.0	5.6	<10	**7.2**	17.6	<0.050	<10	<4.0	15.0	22.0
FM12-24B	MW-24	2012	5	Phase I	40-50	**3.2**	<0.50	11.8	4.2	5.2	5.0	**27.8**	14.0	<0.050	<10	<10	20.0	30.0
FM-EB-MW-24-D	MW-24	2014	7	Phase II	40-50	2.2	<0.10	9.4	2.0	6.4	9.2	**7.9**	13.0	<0.1	<10	<10	<10	15.0
MW-24 Deep	MW-24	2017	10	Phase II	40-50	<1.0	<0.5	8.2	2.0	8.4	**27.3**	6.1	16.1	<0.05	<7	<4	9.0	14.5
	MW-24		15	Phase II														#N/A
	MW-24		25	Phase II														#N/A
																		#N/A
																		#N/A

FOX-M East Beach Landfill - Summary of Soil Monitoring Analytical Data

Link to: Table of Contents

Sample ID	Location	Year	Monitoring Year	Monitoring Phase	Depth (cm)	As* (mg/kg)	Cd* (mg/kg)	Cr* (mg/kg)	Co* (mg/kg)	Cu* (mg/kg)	Pb* (mg/kg)	Ni* (mg/kg)	Zn* (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						1.00	1.00	20.0	5.00	6.3	10.0	5.0	15.0	0.213				N/A
Baseline Data - Arithmetic Mean						**2.32**	**1.00**	**20.0**	**5.00**	**8.6**	**14.0**	**6.6**	**32.3**	**0.10**				**40.0**
Baseline Data - Standard Deviation						2.05	0.00	0.0	0.00	11.2	0.0	2.1	61.8	0.00				43.8
Baseline Data Mean + 3xStandard Deviation						**8.47**	**1.00**	**20.0**	**5.00**	**42.2**	**14.0**	**12.8**	**217.7**	**0.10**				**171.3**
	MW-25 surface																	
08-10761	MW-25	2008	1	Phase I	0	1.7	<1.0	<20	<5.0	5.3	**620.0**	6.1	<15	0.006	<10	<4.0	20.0	27.0
FM09-25WA	MW-25	2009	2	Phase I	0-15	2.0	<0.50	**22.0**	4.0	4.0	4.0	**16.0**	9.0	<0.020	<20	<20	<20	30.0
FM10-25WA	MW-25	2010	3	Phase I	0-15	2.0	<0.50	13.0	2.0	5.0	**45.0**	**12.0**	11.0	<0.020	<10	<10	<20	20.0
11-14328	MW-25	2011	4	Phase I	0-10	**2.8**	<1.0	<20	<5.0	**8.7**	**480.0**	**9.7**	17.6	<0.050	<10	<4.0	13.0	20.0
FM12-25A	MW-25	2012	5	Phase I	0-15	**2.6**	<0.50	12.9	3.5	**8.9**	**139.0**	**25.7**	21.0	<0.050	<10	<10	84.0	**94.0**
FM-EB-MW-25-S	MW-25	2014	7	Phase II	0-15	**2.9**	<0.10	11.0	2.2	**10.0**	**180.0**	**9.2**	21.0	<0.1	<10	<10	<10	15.0
MW-25 Shallow (Dup Avg)	MW-25	2017	10	Phase II	0-15	<1.0	<0.5	7.8	1.7	5.5	**83.2**	**6.7**	10.3	<0.05	<7	<4	<8	9.5
	MW-25		15	Phase II														#N/A
	MW-25		25	Phase II														#N/A
																		#N/A
	MW-25 depth																	
08-10763	MW-25	2008	1	Phase I	40	2.2	<1.0	<20	<5.0	5.8	**160.0**	**6.9**	<15	<0.0030	<10	<4.0	36.0	**43.0**
FM09-25WB	MW-25	2009	2	Phase I	40-50	1.0	<0.50	16.0	5.0	4.0	6.0	**13.0**	10.0	<0.020	<20	<20	<20	30.0
FM10-25WB	MW-25	2010	3	Phase I	40-50	2.0	<0.50	15.0	3.0	5.0	**91.0**	**13.0**	12.0	<0.020	<10	<10	<20	20.0
11-14329	MW-25	2011	4	Phase I	30-40	**4.0**	<1.0	<20	<5.0	6.0	**130.0**	**7.8**	<15	<0.050	<10	<4.0	9.7	16.7
FM12-25B	MW-25	2012	5	Phase I	40-50	**2.4**	<0.50	14.5	3.8	6.9	**87.6**	**26.2**	18.0	<0.050	<10	11.0	81.0	**97.0**
FM-EB-MW-25-D	MW-25	2014	7	Phase II	40-50	**2.7**	<0.10	10.0	2.0	6.9	**230.0**	**8.3**	16.0	<0.1	<10	<10	<10	15.0
MW-25 Deep	MW-25	2017	10	Phase II	40-50	<1.0	<0.5	8.3	1.8	6.4	**120.0**	**7.3**	9.9	<0.05	<7	<4	<8	9.5
	MW-25		15	Phase II														#N/A
	MW-25		25	Phase II														#N/A
																		#N/A
																		#N/A

FOX-M East Beach Landfill - Summary of Soil Monitoring Analytical Data

Link to: Table of Contents

Sample ID	Location	Year	Monitoring Year	Monitoring Phase	Depth (cm)	As* (mg/kg)	Cd* (mg/kg)	Cr* (mg/kg)	Co* (mg/kg)	Cu* (mg/kg)	Pb* (mg/kg)	Ni* (mg/kg)	Zn* (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						1.00	1.00	20.0	5.00	6.3	10.0	5.0	15.0	0.213				N/A
Baseline Data - Arithmetic Mean						**2.32**	**1.00**	**20.0**	**5.00**	**8.6**	**14.0**	**6.6**	**32.3**	**0.10**				**40.0**
Baseline Data - Standard Deviation						2.05	0.00	0.0	0.00	11.2	0.0	2.1	61.8	0.00				43.8
Baseline Data Mean + 3xStandard Deviation						**8.47**	**1.00**	**20.0**	**5.00**	**42.2**	**14.0**	**12.8**	**217.7**	**0.10**				**171.3**
	MW-26 surface																	
08-10765	MW-26	2008	1	Phase I	0	2.2	<1.0	<20	<5.0	**10.0**	**15.0**	**7.5**	<15	0.022	<10	<4.0	30.0	37.0
FM09-26WA	MW-26	2009	2	Phase I	0-15	2.0	<0.50	19.0	5.0	4.0	4.0	**13.0**	7.0	<0.020	<20	<20	<20	30.0
FM10-26WA	MW-26	2010	3	Phase I	0-15	**3.0**	<0.50	14.0	3.0	**16.0**	**30.0**	**14.0**	23.0	<0.020	<10	<10	<20	20.0
11-14324/25	MW-26	2011	4	Phase I	0-10	**2.4**	<1.0	<20	<5.0	<3.0	<10	**6.7**	<15	<0.050	<10	<4.0	<9.0	11.5
FM12-26A	MW-26	2012	5	Phase I	0-15	**2.4**	<0.50	11.3	3.2	**15.3**	**52.4**	**22.4**	24.0	<0.050	<10	<10	33.0	**43.0**
FM-EB-MW-26-S	MW-26	2014	7	Phase II	0-15	**3.4**	0.3	12.0	2.6	**15.0**	**26.0**	**11.0**	24.0	<0.1	<10	<10	<10	15.0
MW-26 Shallow	MW-26	2017	10	Phase II	0-15	<1.0	<0.5	6.5	1.6	2.7	5.9	6.1	5.5	<0.05	<7	<4	<8	9.5
	MW-26		15	Phase II														#N/A
	MW-26		25	Phase II														#N/A
																		#N/A
																		#N/A
	MW-26 depth																	
08-10767	MW-26	2008	1	Phase I	40	1.8	<1.0	<20	<5.0	<3.0	<10	5.1	<15	<0.0030	<10	<4.0	16.0	23.0
FM09-26WB	MW-26	2009	2	Phase I	40-50	2.0	<0.50	13.0	3.0	3.0	4.0	**11.0**	8.0	<0.020	<20	<20	<20	30.0
FM10-26WB	MW-26	2010	3	Phase I	40-50	**3.0**	<0.50	15.0	3.0	**18.0**	**33.0**	**14.0**	24.0	<0.020	<10	<10	<20	20.0
11-14326/27	MW-26	2011	4	Phase I	30-40	2.0	<1.0	<20	<5.0	<3.0	<10	<5.0	<15	<0.050	<10	<4.0	<9.0	11.5
FM12-26B	MW-26	2012	5	Phase I	40-50	**2.6**	<0.50	10.1	3.2	**11.3**	8.3	**23.1**	13.0	<0.050	<10	<10	16.0	26.0
FM-EB-MW-26-D	MW-26	2014	7	Phase II	40-50	**3.1**	0.1	9.9	2.1	**11.0**	**18.0**	**13.0**	19.0	<0.1	<10	<10	<10	15.0
MW-26 Deep	MW-26	2017	10	Phase II	40-50	<1.0	<0.5	6.7	1.8	5.0	7.3	5.9	7.1	<0.05	<7	<4	<8	9.5
	MW-26		15	Phase II														#N/A
	MW-26		25	Phase II														#N/A
																		#N/A

FOX-M East Beach Landfill - Summary of Soil Monitoring Analytical Data

Link to: Table of Contents

Sample ID	Location	Year	Monitoring Year	Monitoring Phase	Depth (cm)	As* (mg/kg)	Cd* (mg/kg)	Cr* (mg/kg)	Co* (mg/kg)	Cu* (mg/kg)	Pb* (mg/kg)	Ni* (mg/kg)	Zn* (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						1.00	1.00	20.0	5.00	6.3	10.0	5.0	15.0	0.213				N/A
Baseline Data - Arithmetic Mean						**2.32**	**1.00**	**20.0**	**5.00**	**8.6**	**14.0**	**6.6**	**32.3**	**0.10**				**40.0**
Baseline Data - Standard Deviation						2.05	0.00	0.0	0.00	11.2	0.0	2.1	61.8	0.00				43.8
Baseline Data Mean + 3xStandard Deviation						**8.47**	**1.00**	**20.0**	**5.00**	**42.2**	**14.0**	**12.8**	**217.7**	**0.10**				**171.3**
	MW-27 surface																	
08-10773	MW-27	2008	1	Phase I	0	**2.5**	<1.0	<20	<5.0	3.4	<10	6.4	<15	<0.0030	<10	<4.0	14.0	21.0
FM09-27WA	MW-27	2009	2	Phase I	0-15	2.0	<0.50	18.0	3.0	3.0	5.0	**13.0**	8.0	<0.020	<20	<20	<20	20.0
FM10-27WA	MW-27	2010	3	Phase I	0-15	2.0	<0.50	17.0	3.0	**15.0**	**21.0**	**13.0**	18.0	<0.020	<10	<10	<20	20.0
11-14320/21	MW-27	2011	4	Phase I	0-10	**3.4**	<1.0	<20	<5.0	4.4	<10	**6.9**	<15	<0.050	<10	<4.0	<9.0	11.5
FM12-27A	MW-27	2012	5	Phase I	0-15	**4.2**	<0.50	13.6	4.1	**13.9**	**15.2**	**27.4**	20.0	<0.050	<10	<10	12.0	22.0
FM-EB-MW-27-S	MW-27	2014	7	Phase II	0-15	**4.0**	0.4	10.0	2.5	7.4	7.7	**9.0**	14.0	<0.1	<10	<10	<10	15.0
MW-27 Shallow	MW-27	2017	10	Phase II	0-15	<1.0	<0.5	6.9	1.7	2.9	5.3	6.2	6.8	<0.05	<7	<4	<8	9.5
	MW-27		15	Phase II														#N/A
	MW-27		25	Phase II														#N/A
																		#N/A
	MW-27 depth																	
08-10775	MW-27	2008	1	Phase I	40	**2.6**	<1.0	<20	<5.0	4.3	<10	5.8	<15	<0.0030	<10	<4.0	13.0	20.0
FM09-27WB	MW-27	2009	2	Phase I	40-50	**3.0**	<0.50	15.0	4.0	7.0	6.0	**13.0**	11.0	<0.020	<20	<20	<20	30.0
FM10-27WB	MW-27	2010	3	Phase I	40-50	**4.0**	<0.50	14.0	3.0	5.0	6.0	**13.0**	12.0	<0.020	<10	<10	<20	20.0
11-14322/23	MW-27	2011	4	Phase I	30-40	**3.7**	<1.0	<20	<5.0	**110.0**	<10	**7.3**	<15	<0.050	<10	<4.0	<9.0	11.5
FM12-27B	MW-27	2012	5	Phase I	40-50	**3.6**	<0.50	11.9	3.7	**11.1**	**22.0**	**23.8**	24.0	<0.050	<10	<10	13.0	23.0
FM-EB-MW-27-D	MW-27	2014	7	Phase II	40-50	**4.1**	<0.10	10.0	2.5	5.6	9.6	**9.1**	15.0	<0.1	<10	<10	<10	15.0
MW-27 Deep	MW-27	2017	10	Phase II	30-40	<1.0	<0.5	7.30	1.90	3.70	6.10	6.00	8.00	<0.05	<7	<4	<8	9.5
	MW-27		15	Phase II														#N/A
	MW-27		25	Phase II														#N/A
																		#N/A
																		#N/A

FOX-M East Beach Landfill - Summary of Soil Monitoring Analytical Data

Link to: Table of Contents

Sample ID	Location	Year	Monitoring Year	Monitoring Phase	Depth (cm)	As* (mg/kg)	Cd* (mg/kg)	Cr* (mg/kg)	Co* (mg/kg)	Cu* (mg/kg)	Pb* (mg/kg)	Ni* (mg/kg)	Zn* (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						1.00	1.00	20.0	5.00	6.3	10.0	5.0	15.0	0.213				N/A
Baseline Data - Arithmetic Mean						**2.32**	**1.00**	**20.0**	**5.00**	**8.6**	**14.0**	**6.6**	**32.3**	**0.10**				**40.0**
Baseline Data - Standard Deviation						2.05	0.00	0.0	0.00	11.2	0.0	2.1	61.8	0.00				43.8
Baseline Data Mean + 3xStandard Deviation						**8.47**	**1.00**	**20.0**	**5.00**	**42.2**	**14.0**	**12.8**	**217.7**	**0.10**				**171.3**
	MW-28 surface																	
08-10777	MW-28	2008	1	Phase I	0	1.7	<1.0	<20	<5.0	6.0	<10	6.0	<15	0.015	<10	<4.0	18.0	25.0
FM09-28WA	MW-28	2009	2	Phase I	0-15	2.0	<0.50	12.0	4.0	**13.0**	13.0	**11.0**	13.0	<0.020	<20	<20	<20	30.0
FM10-28WA	MW-28	2010	3	Phase I	0-15	2.0	<0.50	18.0	3.0	**14.0**	13.0	**14.0**	14.0	<0.020	<10	<10	<20	20.0
11-14316/17	MW-28	2011	4	Phase I	0-10	**4.4**	<1.0	<20	<5.0	4.7	<10	6.3	<15	<0.050	<10	<4.0	<9.0	11.5
FM12-28A	MW-28	2012	5	Phase I	0-15	**2.6**	<0.50	9.6	3.2	3.1	3.0	**24.4**	10.0	<0.050	<10	<10	<10	15.0
FM-EB-MW-28-S	MW-28	2014	7	Phase II	0-15	**3.5**	0.1	12.0	2.8	**11.0**	13.0	**10.0**	17.0	**0.500**	<10	<10	<10	15.0
MW-28 Shallow	MW-28	2017	10	Phase II	0-15	<1.0	<0.5	8.8	2.0	6.3	7.2	**6.6**	8.2	<0.05	<7	<4	<8	9.5
	MW-28		15	Phase II														#N/A
	MW-28		25	Phase II														#N/A
																		#N/A
																		#N/A
	MW-28 depth																	
08-10779/80	MW-28	2008	1	Phase I	40	1.7	<1.0	<20	<5.0	4.0	<10	<5.0	<15	0.002	<10	<4.0	7.0	14.0
FM09-28WB	MW-28	2009	2	Phase I	40-50	**3.0**	<0.50	20.0	4.0	**20.0**	**47.0**	**14.0**	21.0	<0.020	<20	<20	<20	30.0
FM10-28WB	MW-28	2010	3	Phase I	40-50	**3.0**	<0.50	18.0	3.0	**34.0**	**41.0**	**15.0**	**74.0**	<0.020	<10	<10	<20	20.0
11-14318/19	MW-28	2011	4	Phase I	30-40	**2.6**	<1.0	<20	<5.0	4.6	<10	**7.5**	<15	<0.050	<10	4.1	<9.0	13.6
FM12-28B	MW-28	2012	5	Phase I	40-50	**2.4**	<0.50	9.6	3.1	**10.8**	**14.1**	**21.8**	20.0	**0.140**	<10	<10	19.0	29.0
FM-EB-MW-28-D	MW-28	2014	7	Phase II	40-50	**2.8**	<0.10	8.3	2.0	4.6	5.3	**7.6**	10.0	<0.1	<10	<10	<10	15.0
MW-28 Deep	MW-28	2017	10	Phase II	40-50	<1.0	<0.5	9.5	2.0	**8.8**	10.9	**6.9**	8.5	<0.05	<7	<4	<8	9.5
	MW-28		15	Phase II														#N/A
	MW-28		25	Phase II														#N/A
																		#N/A
																		#N/A

FOX-M East Beach Landfill - Summary of Soil Monitoring Analytical Data

Link to: Table of Contents

Sample ID	Location	Year	Monitoring Year	Monitoring Phase	Depth (cm)	As* (mg/kg)	Cd* (mg/kg)	Cr* (mg/kg)	Co* (mg/kg)	Cu* (mg/kg)	Pb* (mg/kg)	Ni* (mg/kg)	Zn* (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						1.00	1.00	20.0	5.00	6.3	10.0	5.0	15.0	0.213				N/A
Baseline Data - Arithmetic Mean						**2.32**	**1.00**	**20.0**	**5.00**	**8.6**	**14.0**	**6.6**	**32.3**	**0.10**				**40.0**
Baseline Data - Standard Deviation						2.05	0.00	0.0	0.00	11.2	0.0	2.1	61.8	0.00				43.8
Baseline Data Mean + 3xStandard Deviation						**8.47**	**1.00**	**20.0**	**5.00**	**42.2**	**14.0**	**12.8**	**217.7**	**0.10**				**171.3**
	MW-29 surface																	
08-10781/82	MW-29	2008	1	Phase I	0	1.7	<1.0	<20	<5.0	2.4	<10	5.6	<15	<0.0030	<10	<4.0	6.9	13.9
FM09-29WA	MW-29	2009	2	Phase I	0-15	2.0	<0.50	15.0	3.0	6.0	7.0	**12.0**	11.0	<0.020	<20	<20	<20	30.0
FM10-29WA	MW-29	2010	3	Phase I	0-15	1.0	<0.50	11.0	2.0	6.0	4.0	**11.0**	13.0	<0.020	<10	<10	<20	20.0
11-14313	MW-29	2011	4	Phase I	0-10	**2.5**	<1.0	<20	<5.0	3.4	<10	**7.2**	<15	<0.050	<10	<4.0	<9.0	11.5
FM12-29A	MW-29	2012	5	Phase I	0-15	2.1	<0.50	12.8	3.3	5.4	4.3	**21.5**	15.0	<0.050	<10	<10	15.0	25.0
FM-EB-MW-29-S	MW-29	2014	7	Phase II	0-15	2.0	<0.10	11.0	2.1	4.3	4.2	**8.2**	13.0	<0.1	<10	<10	<10	15.0
MW-29 Shallow	MW-29	2017	15	Phase II	0-15	<1.0	<0.5	8.8	1.9	4.1	5.8	6.5	8.1	<0.05	<7	<4	<8	9.5
	MW-29		15	Phase II														#N/A
	MW-29		25	Phase II														#N/A
																		#N/A
																		#N/A
	MW-29 depth																	
08-10783	MW-29	2008	1	Phase I	40	1.8	<1.0	<20	<5.0	<3.0	<10	5.5	<15	<0.0030	<10	<4.0	9.2	16.2
FM09-29WB	MW-29	2009	2	Phase I	40-50	2.0	<0.50	15.0	3.0	4.0	5.0	**11.0**	9.0	<0.020	<20	<20	<20	30.0
FM10-29WB	MW-29	2010	3	Phase I	40-50	2.0	<0.50	17.0	2.0	5.0	8.0	**12.0**	9.0	<0.020	<10	<10	<20	20.0
11-14315	MW-29	2011	4	Phase I	30-40	**2.5**	<1.0	<20	<5.0	4.2	<10	**8.7**	<15	<0.050	<10	<4.0	<9.0	11.5
FM12-29B	MW-29	2012	5	Phase I	40-50	2.1	<0.50	12.2	3.2	5.0	3.6	**24.8**	15.0	<0.050	<10	<10	37.0	**47.0**
FM-EB-MW-29-D	MW-29	2014	7	Phase II	40-50	**2.4**	<0.10	11.0	2.1	4.3	3.9	**8.1**	12.0	<0.1	<10	<10	<10	15.0
MW-29 Deep	MW-29	2017	15	Phase II	40-50	<1.0	<0.5	7.5	1.5	4.4	5.6	6.2	6.9	<0.05	<7	<4	<8	9.5
	MW-29		15	Phase II														#N/A
	MW-29		25	Phase II														#N/A
																		#N/A
																		#N/A

FOX-M East Beach Landfill - Summary of Soil Monitoring Analytical Data

Link to: Table of Contents

Sample ID	Location	Year	Monitoring Year	Monitoring Phase	Depth (cm)	As* (mg/kg)	Cd* (mg/kg)	Cr* (mg/kg)	Co* (mg/kg)	Cu* (mg/kg)	Pb* (mg/kg)	Ni* (mg/kg)	Zn* (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						1.00	1.00	20.0	5.00	6.3	10.0	5.0	15.0	0.213				N/A
Baseline Data - Arithmetic Mean						**2.32**	**1.00**	**20.0**	**5.00**	**8.6**	**14.0**	**6.6**	**32.3**	**0.10**				**40.0**
Baseline Data - Standard Deviation						2.05	0.00	0.0	0.00	11.2	0.0	2.1	61.8	0.00				43.8
Baseline Data Mean + 3xStandard Deviation						**8.47**	**1.00**	**20.0**	**5.00**	**42.2**	**14.0**	**12.8**	**217.7**	**0.10**				**171.3**
	MW-30 surface																	
08-10769	MW-30	2008	1	Phase I	0	1.6	<1.0	<20	<5.0	5.5	<10	**7.0**	<15	0.004	<10	<4.0	83.0	**90.0**
FM09-30WA	MW-30	2009	2	Phase I	0-15	**3.0**	<0.50	19.0	4.0	5.0	8.0	**13.0**	12.0	<0.020	<20	<20	<20	30.0
FM10-30WA	MW-30	2010	3	Phase I	0-15	2.0	<0.50	16.0	3.0	5.0	4.0	**12.0**	10.0	<0.020	<10	<10	<20	20.0
11-14342	MW-30	2011	4	Phase I	0-10	**2.7**	<1.0	<20	<5.0	3.3	<10	**7.2**	<15	<0.050	<10	<4.0	<9.0	11.5
FM12-30A	MW-30	2012	5	Phase I	0-15	**2.5**	<0.50	13.6	3.7	7.4	**19.4**	**25.5**	26.0	**0.200**	<10	13.0	1110.0	**1128.0**
FM-EB-MW-30-S	MW-30	2014	7	Phase II	0-15	2.1	0.25	14.0	2.7	**20.0**	**30.0**	**12.0**	**37.0**	<0.2	<10	<10	15.0	25.0
MW-30 Shallow	MW-30	2017	10	Phase II	0-15	<1.0	<0.5	8.2	1.8	3.7	6.2	6.5	8.2	<0.05	<7	<4	<8	9.5
	MW-30		15	Phase II														#N/A
	MW-30		25	Phase II														#N/A
																		#N/A
	MW-30 depth																	
08-10771	MW-30	2008	1	Phase I	40	2.2	<1.0	<20	<5.0	7.6	<10	**8.2**	18.0	<0.0030	<10	<4.0	52.0	**59.0**
FM09-30WB	MW-30	2009	2	Phase I	40-50	**3.0**	<0.50	16.0	4.0	5.0	6.0	**12.0**	10.0	<0.020	<20	<20	<20	30.0
FM10-30WB	MW-30	2010	3	Phase I	40-50	2.0	<0.50	19.0	3.0	5.0	5.0	**14.0**	10.0	<0.020	<10	<10	<20	20.0
11-14343	MW-30	2011	4	Phase I	30-40	1.4	<1.0	<20	<5.0	3.7	<10	**7.5**	<15	<0.050	<10	<4.0	<9.0	11.5
FM12-30B	MW-30	2012	5	Phase I	40-50	**2.6**	<0.50	13.4	3.6	5.1	5.8	**25.6**	21.0	<0.050	<10	<10	84.0	**94.0**
FM-EB-MW-30-D	MW-30	2014	7	Phase II	40-50	1.7	<0.10	12.0	2.0	**11.0**	8.7	**8.4**	18.0	<0.1	<10	<10	<10	15.0
MW-30 Deep	MW-30	2017	10	Phase II	40-50	<1.0	<0.5	8.8	1.8	4.1	7.2	**7.4**	9.2	<0.05	<7	11.0	104.0	**118.5**
	MW-30		15	Phase II														#N/A
	MW-30		25	Phase II														#N/A
																		#N/A

FOX-M East Beach Landfill - Summary of Soil Monitoring Analytical Data

Link to: Table of Contents

Sample ID	Location	Year	Monitoring Year	Monitoring Phase	Depth (cm)	As* (mg/kg)	Cd* (mg/kg)	Cr* (mg/kg)	Co* (mg/kg)	Cu* (mg/kg)	Pb* (mg/kg)	Ni* (mg/kg)	Zn* (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						1.00	1.00	20.0	5.00	6.3	10.0	5.0	15.0	0.213				N/A
Baseline Data - Arithmetic Mean						**2.32**	**1.00**	**20.0**	**5.00**	**8.6**	**14.0**	**6.6**	**32.3**	**0.10**				**40.0**
Baseline Data - Standard Deviation						2.05	0.00	0.0	0.00	11.2	0.0	2.1	61.8	0.00				43.8
Baseline Data Mean + 3xStandard Deviation						**8.47**	**1.00**	**20.0**	**5.00**	**42.2**	**14.0**	**12.8**	**217.7**	**0.10**				**171.3**
	MW-31 surface																	
No sample collected	MW-31	2008	1	Phase I	0-15													
FM09-31WA	MW-31	2009	2	Phase I	0-15	**3.0**	<0.50	14.0	3.0	4.0	6.0	**12.0**	9.0	<0.020	<20	<20	<20	25.0
FM10-31WA	MW-31	2010	3	Phase I	0-15	2.0	<0.50	11.0	2.0	4.0	5.0	**9.0**	10.0	<0.020	<10	<10	<20	20.0
11-14340	MW-31	2011	4	Phase I	0-10	**3.0**	<1.0	<20	<5.0	4.6	10.0	**7.8**	15.5	**0.280**	<10	<4.0	<9.0	11.5
FM12-31A	MW-31	2012	5	Phase I	0-15	**4.1**	<0.50	13.6	3.7	5.4	11.9	**24.5**	18.0	<0.050	<10	<10	24.0	34.0
FM-EB-MW-31-S	MW-31	2014	7	Phase II	0-15	**3.7**	<0.10	11.0	2.3	8.4	**21.0**	**8.6**	19.0	0.100	<10	<10	<10	15.0
MW-31 Shallow	MW-31	2017	10	Phase II	0-15	<1.0	<0.5	8.6	1.9	5.9	**14.7**	**6.8**	9.5	**0.13**	<7	<4	<8	9.5
	MW-31		15	Phase II														#N/A
	MW-31		25	Phase II														#N/A
																		#N/A
																		#N/A
	MW-31 depth																	
No sample collected	MW-31	2008	1	Phase I	40-50													
FM09-31WB	MW-31	2009	2	Phase I	40-50	**3.0**	<0.50	19.0	3.0	4.0	8.0	**14.0**	11.0	<0.020	<20	<20	<20	25.0
FM10-31WB	MW-31	2010	3	Phase I	40-50	2.0	<0.50	15.0	2.0	4.0	6.0	**10.0**	14.0	<0.020	<10	<10	<20	20.0
11-14341	MW-31	2011	4	Phase I	30-40	1.4	<1.0	<20	<5.0	3.2	<10	6.5	<15	0.100	<10	<4.0	<9.0	11.5
FM12-31B	MW-31	2012	5	Phase I	40-50	2.1	<0.50	13.0	3.3	5.8	10.5	**22.4**	20.0	<0.050	<10	<10	20.0	30.0
FM-EB-MW-31-D	MW-31	2014	7	Phase II	40-50	**3.2**	<0.10	11.0	2.2	8.3	**20.0**	**9.0**	16.0	**0.200**	<10	<10	<10	15.0
MW-31 Deep	MW-31	2017	10	Phase II	40-50	<1.0	<0.5	7.0	1.8	7.6	**14.1**	**7.1**	8.5	<0.05	<7	<4	<8	9.5
	MW-31		15	Phase II														#N/A
	MW-31		25	Phase II														#N/A
																		#N/A
																		#N/A
																		#N/A

Legend

XX **Sample exceeds baseline mean**

XX **Sample exceeds baseline mean + 3xSD**

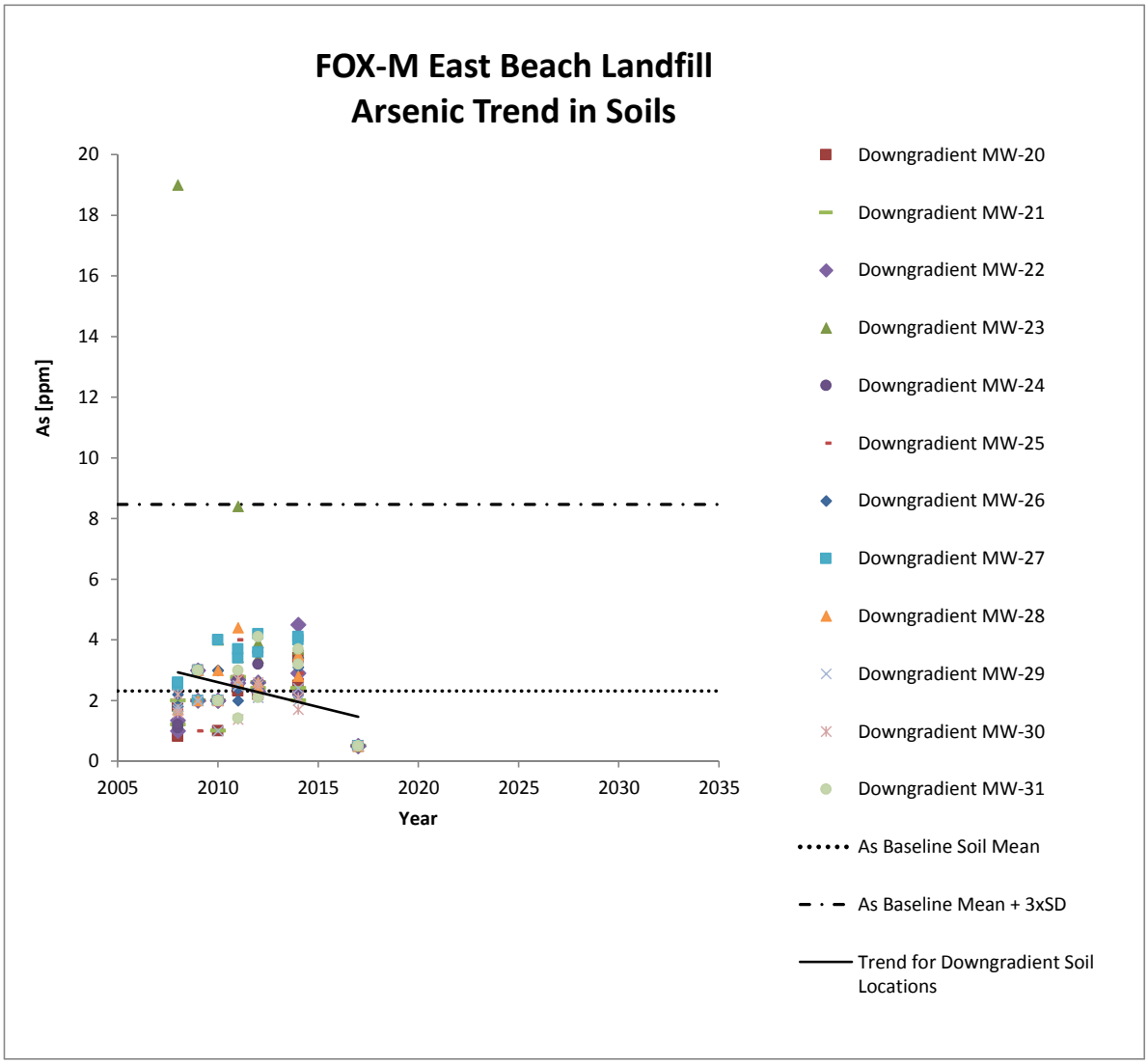
Note ^: Modified TPH Total (C_6-C_{34}) has been calculated by adding results for F1, F2 and F3.

N/A = not analyzed

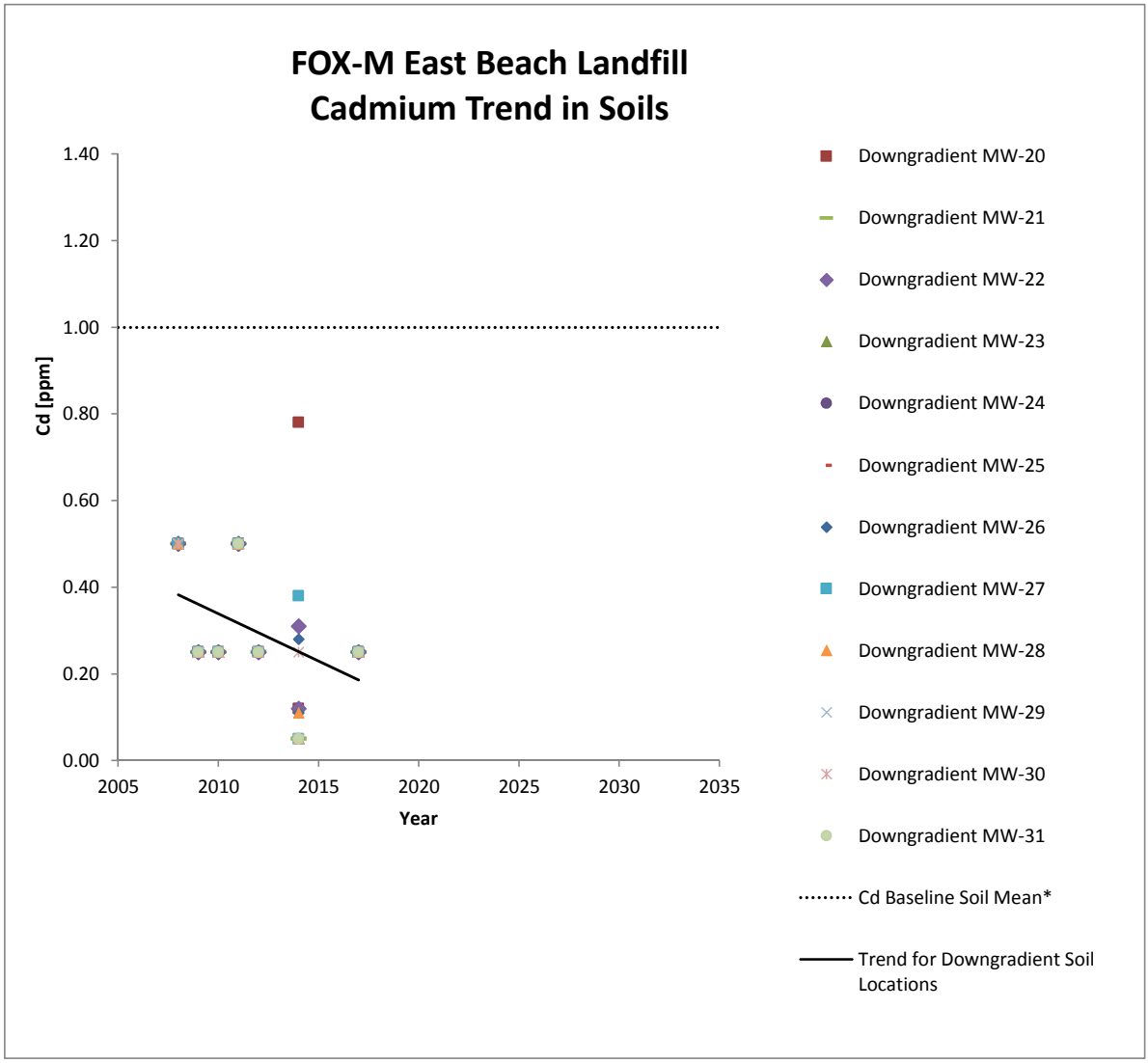
FOX-M East Beach Landfill Trends in Soil Inorganics, PCBs and Modified TPH

Link to: Table of Contents

Note: All wells are downgradient wells, there are no upgradient wells.
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.

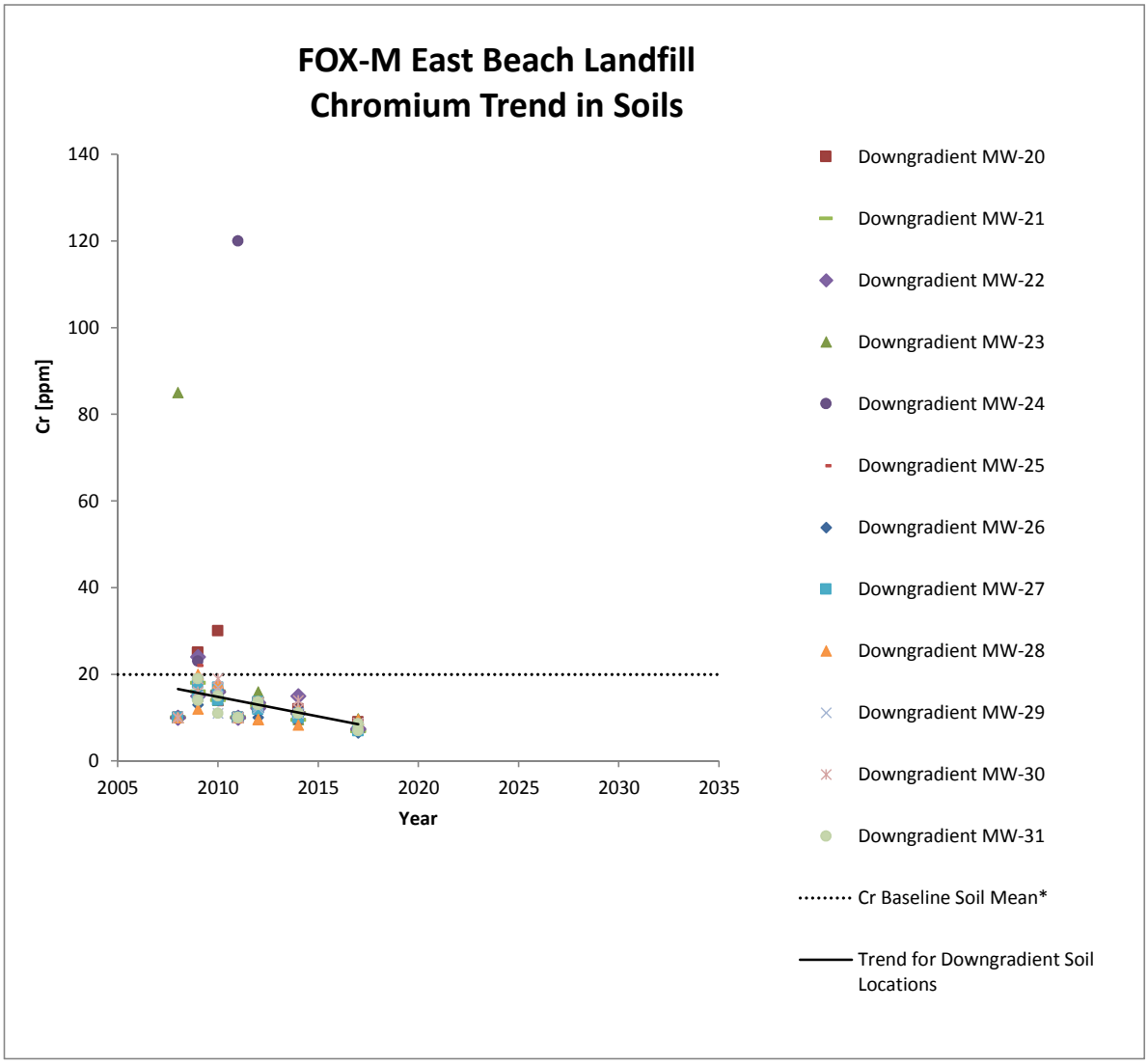


FOX-M East Beach Landfill Trends in Soil Inorganics, PCBs and Modified TPH



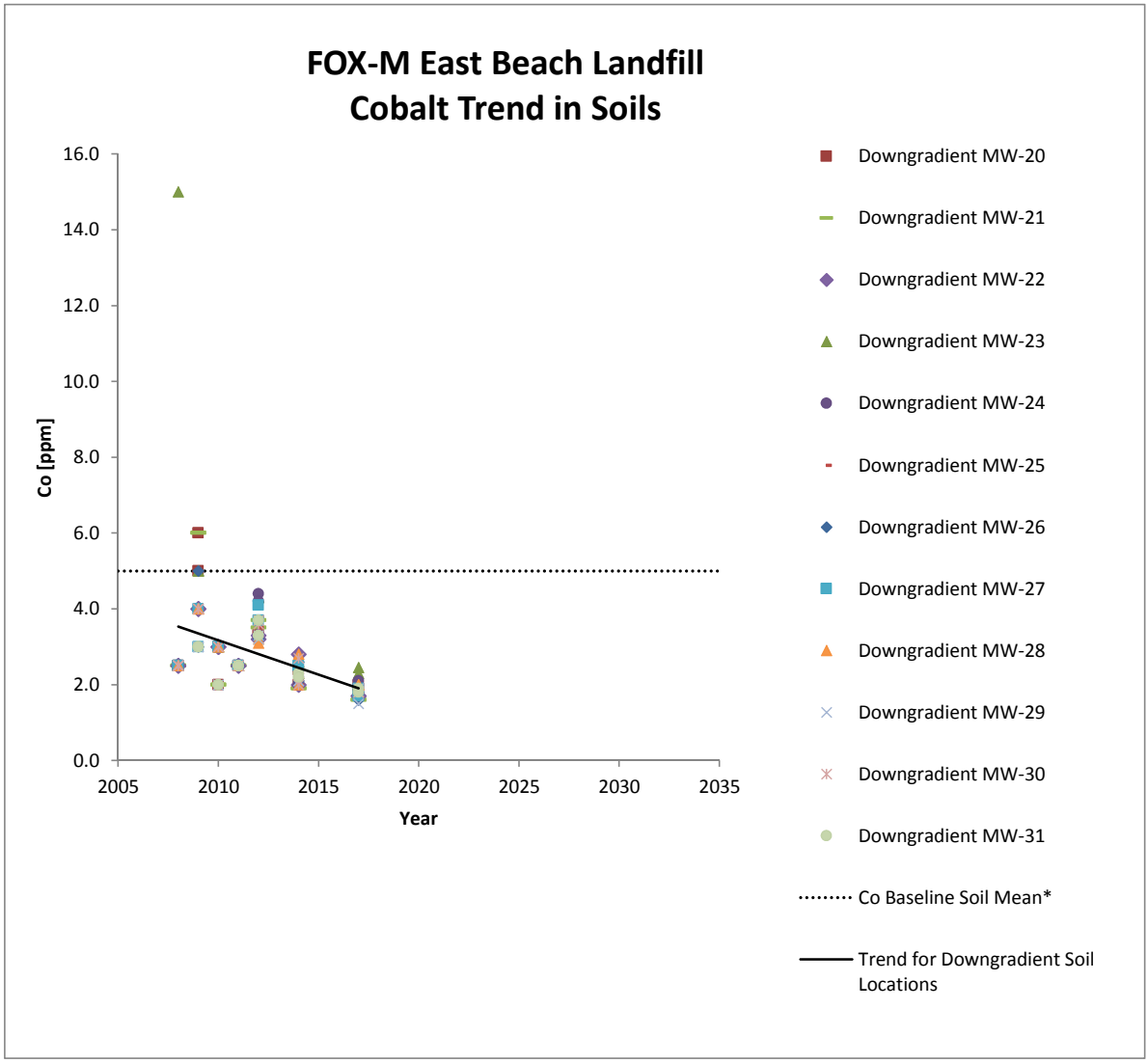
* Cd baseline arithmetic mean is equal to the baseline detection limit
* Cd baseline standard deviation = 0

FOX-M East Beach Landfill Trends in Soil Inorganics, PCBs and Modified TPH



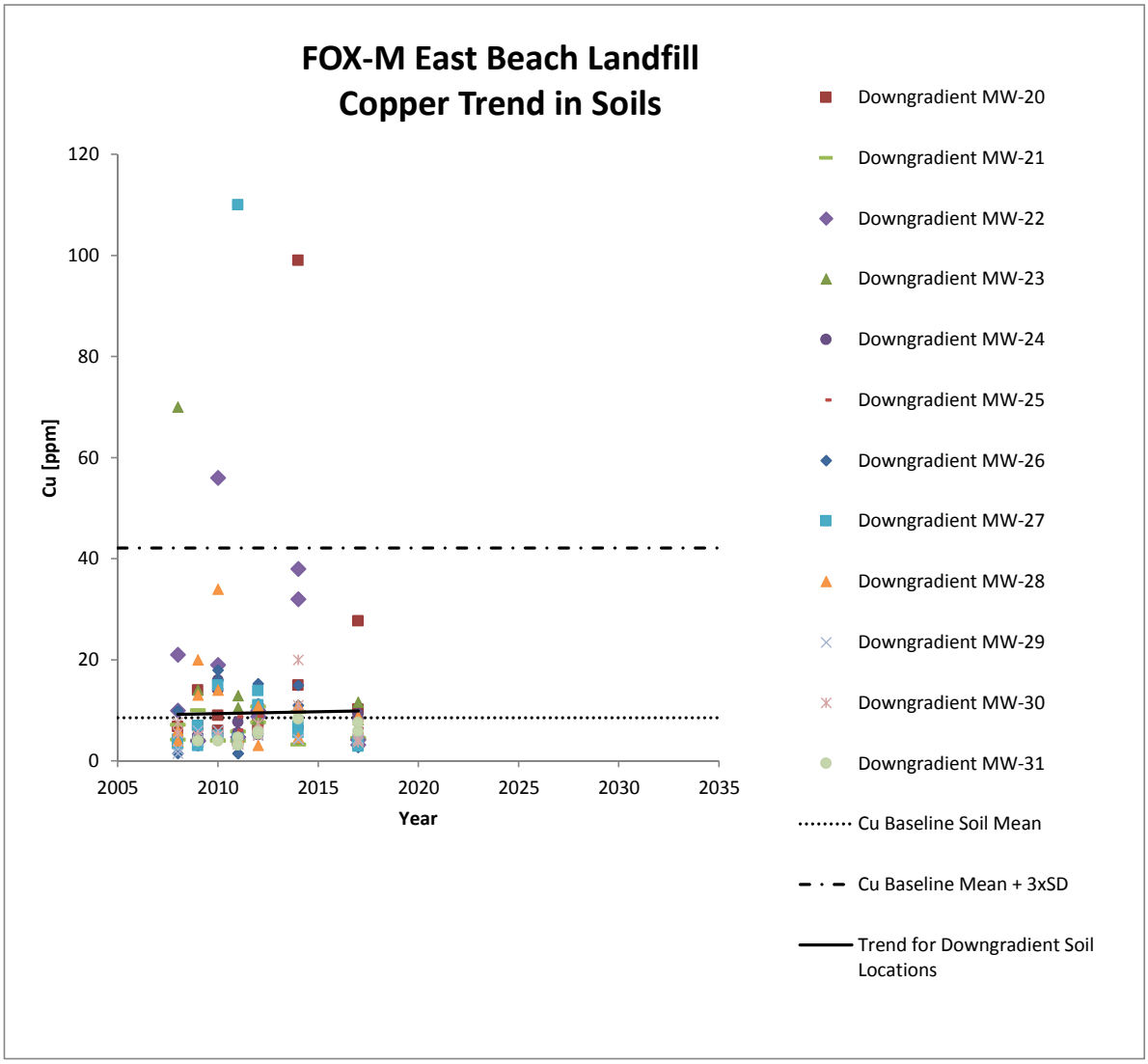
* Cr baseline arithmetic mean is equal to the baseline detection limit
* Cr baseline standard deviation = 0

FOX-M East Beach Landfill Trends in Soil Inorganics, PCBs and Modified TPH

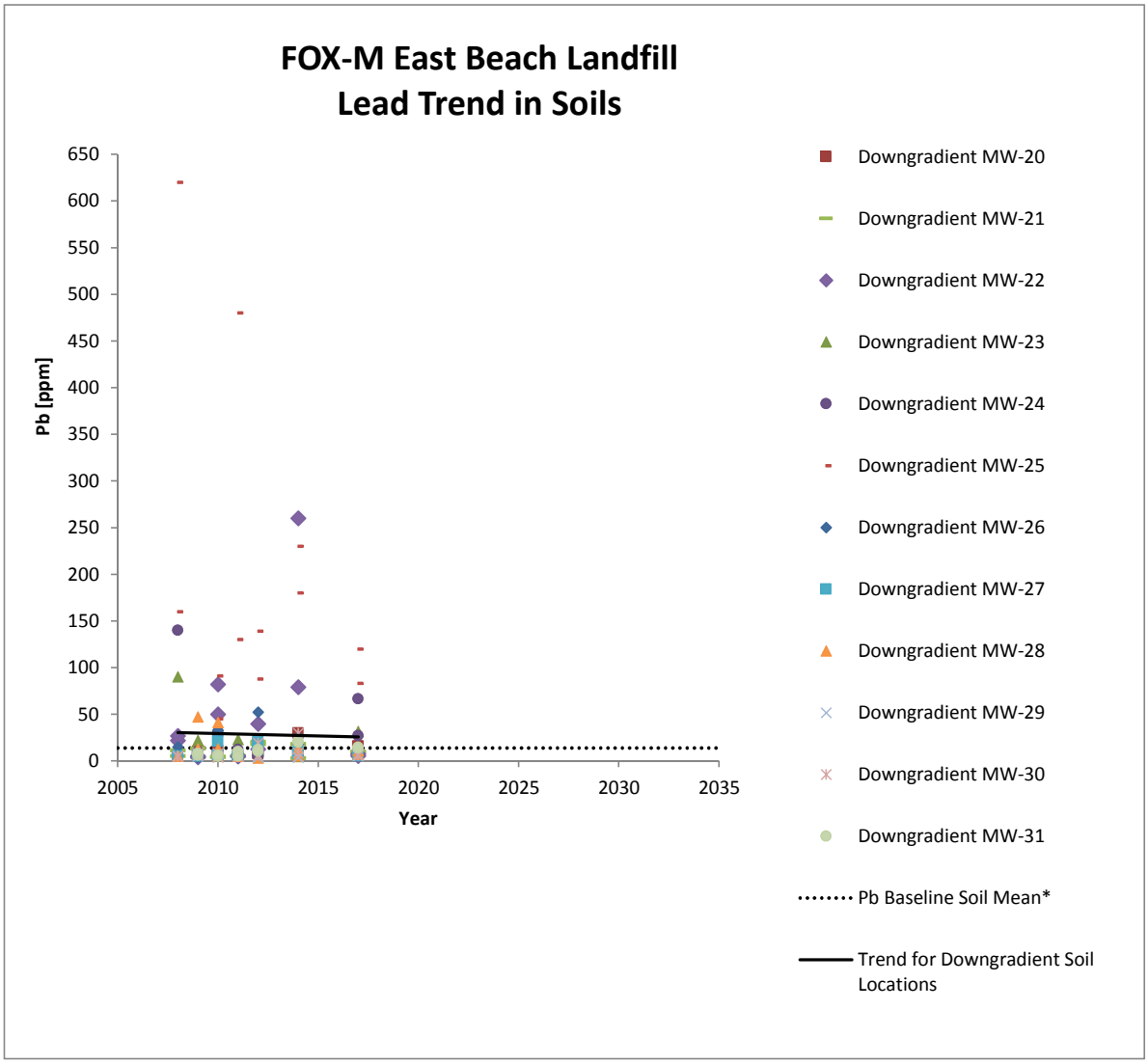


* Co baseline arithmetic mean is equal to the baseline detection limit
* Co baseline standard deviation = 0

FOX-M East Beach Landfill Trends in Soil Inorganics, PCBs and Modified TPH

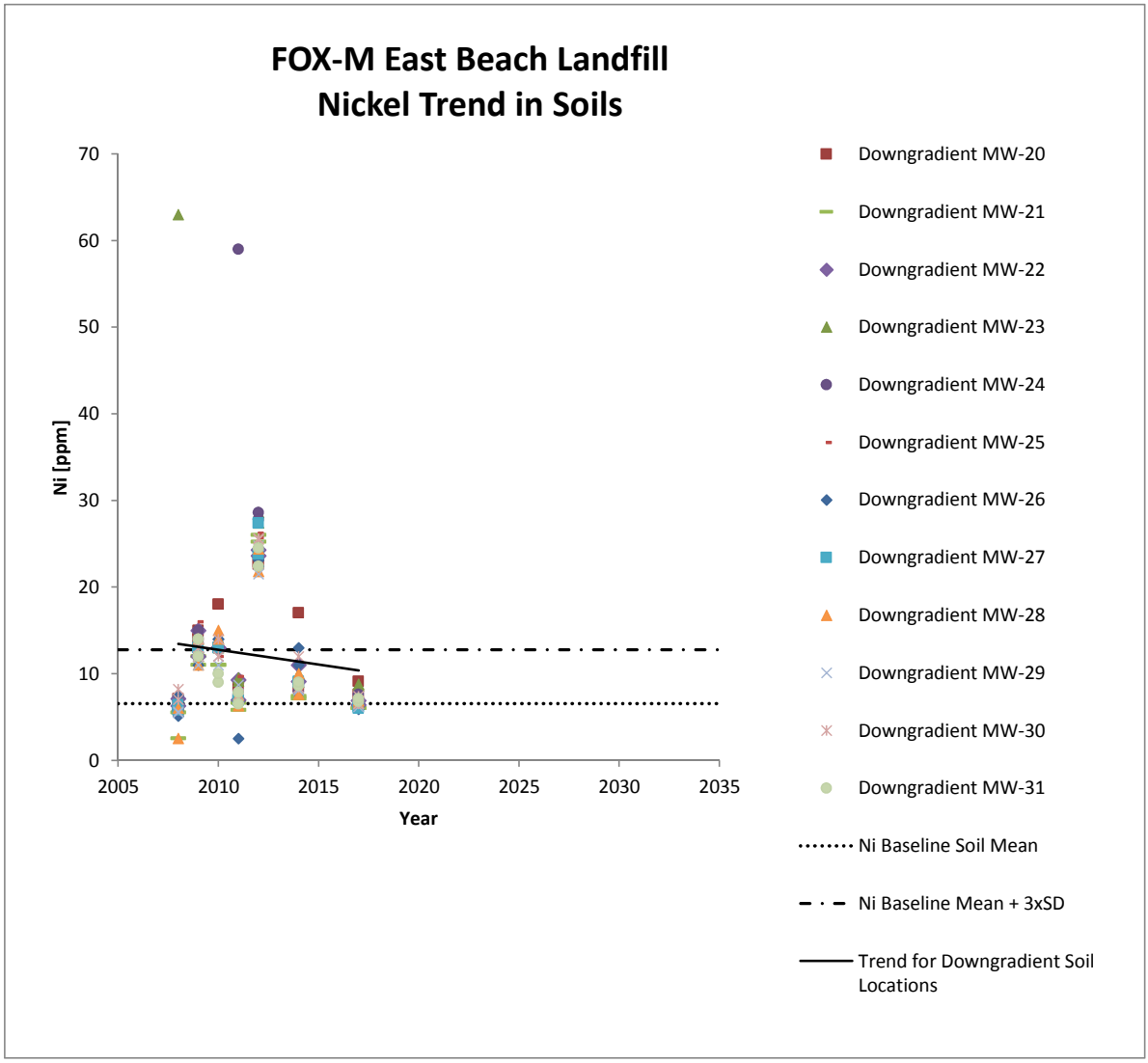


FOX-M East Beach Landfill Trends in Soil Inorganics, PCBs and Modified TPH

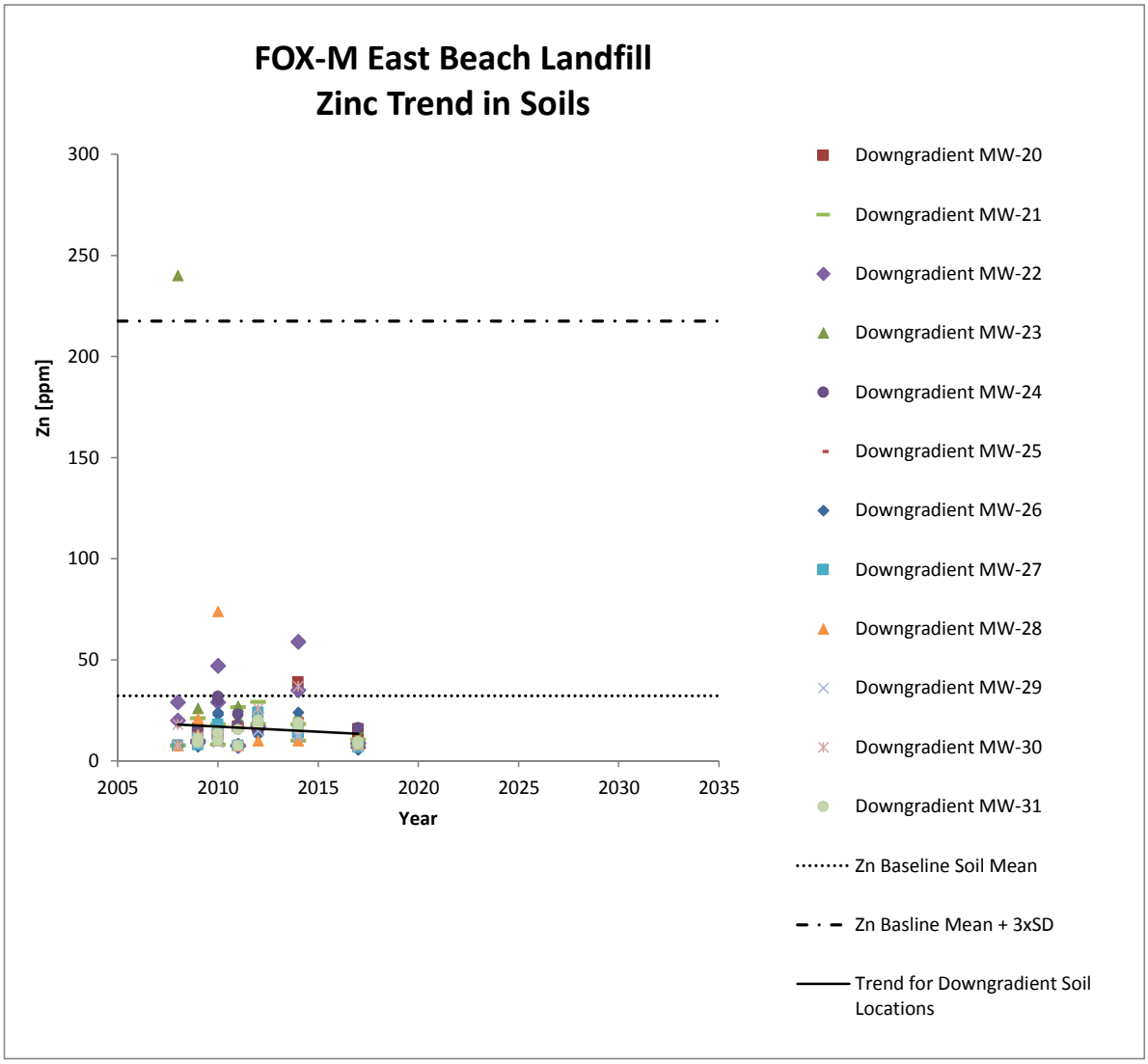


* Pb baseline arithmetic mean is equal to the baseline detection limit
* Pb baseline standard deviation = 0

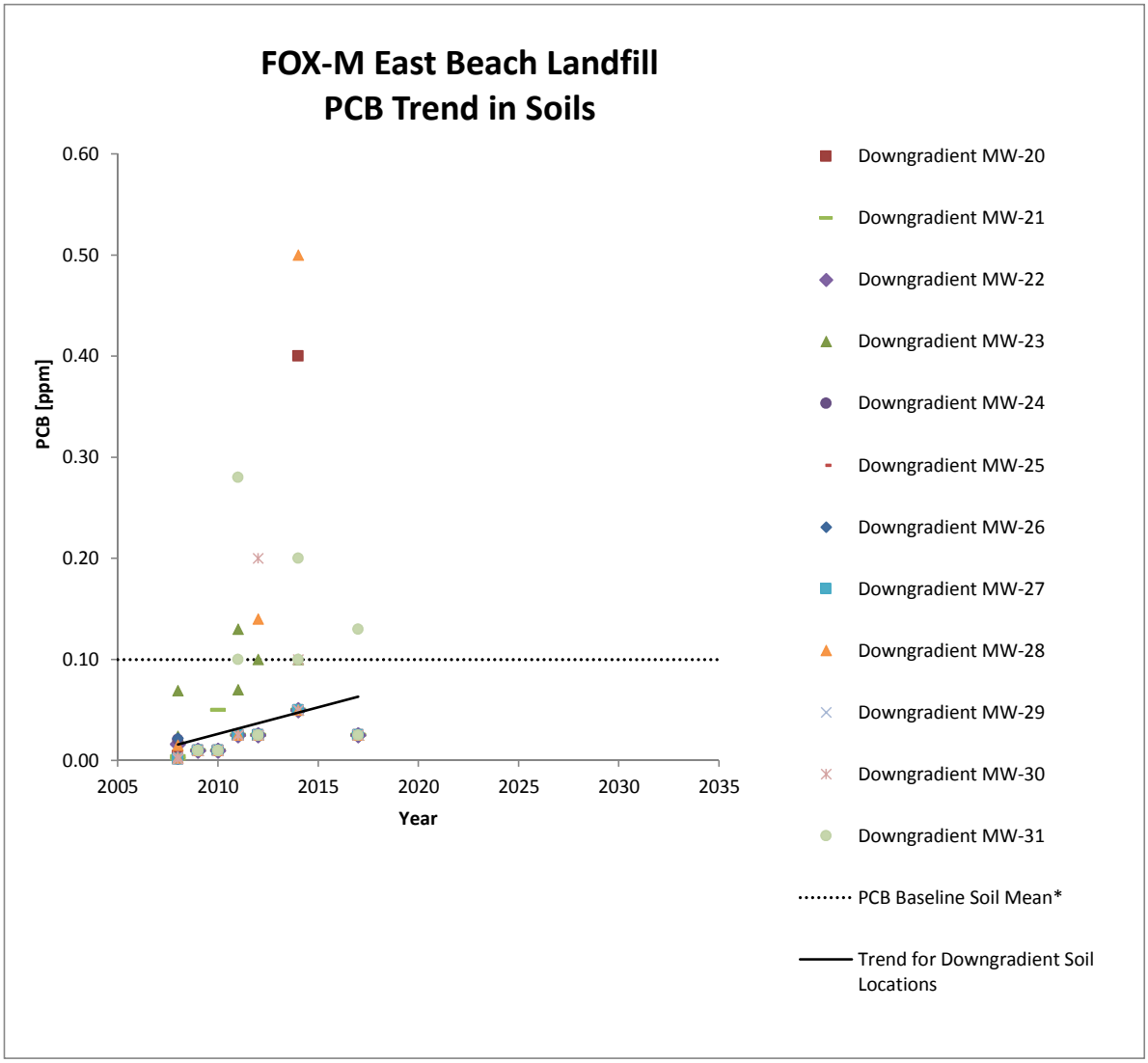
FOX-M East Beach Landfill Trends in Soil Inorganics, PCBs and Modified TPH



FOX-M East Beach Landfill Trends in Soil Inorganics, PCBs and Modified TPH

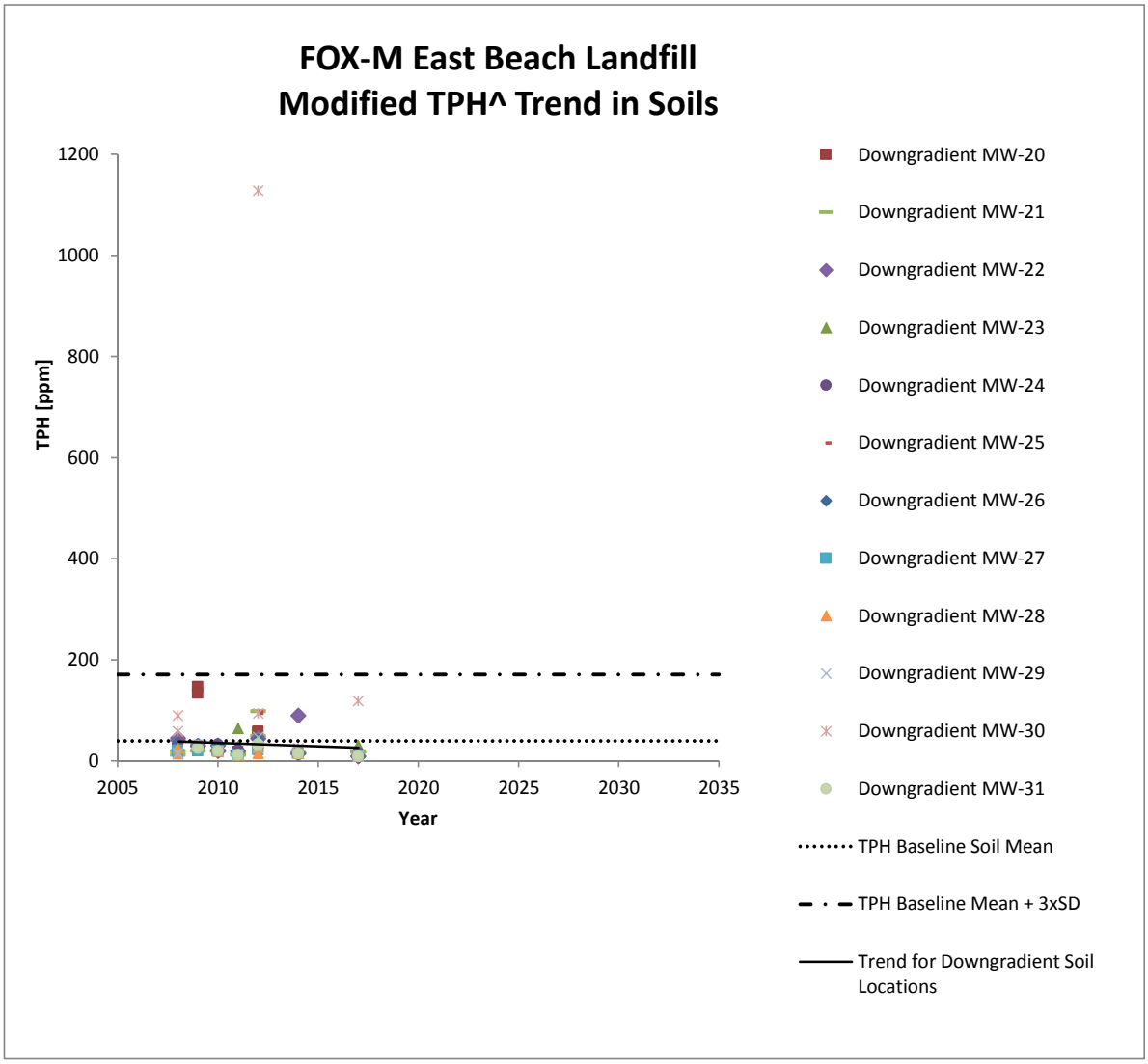


FOX-M East Beach Landfill Trends in Soil Inorganics, PCBs and Modified TPH



* PCB baseline arithmetic mean is equal to the baseline detection limit
* PCB baseline standard deviation = 0

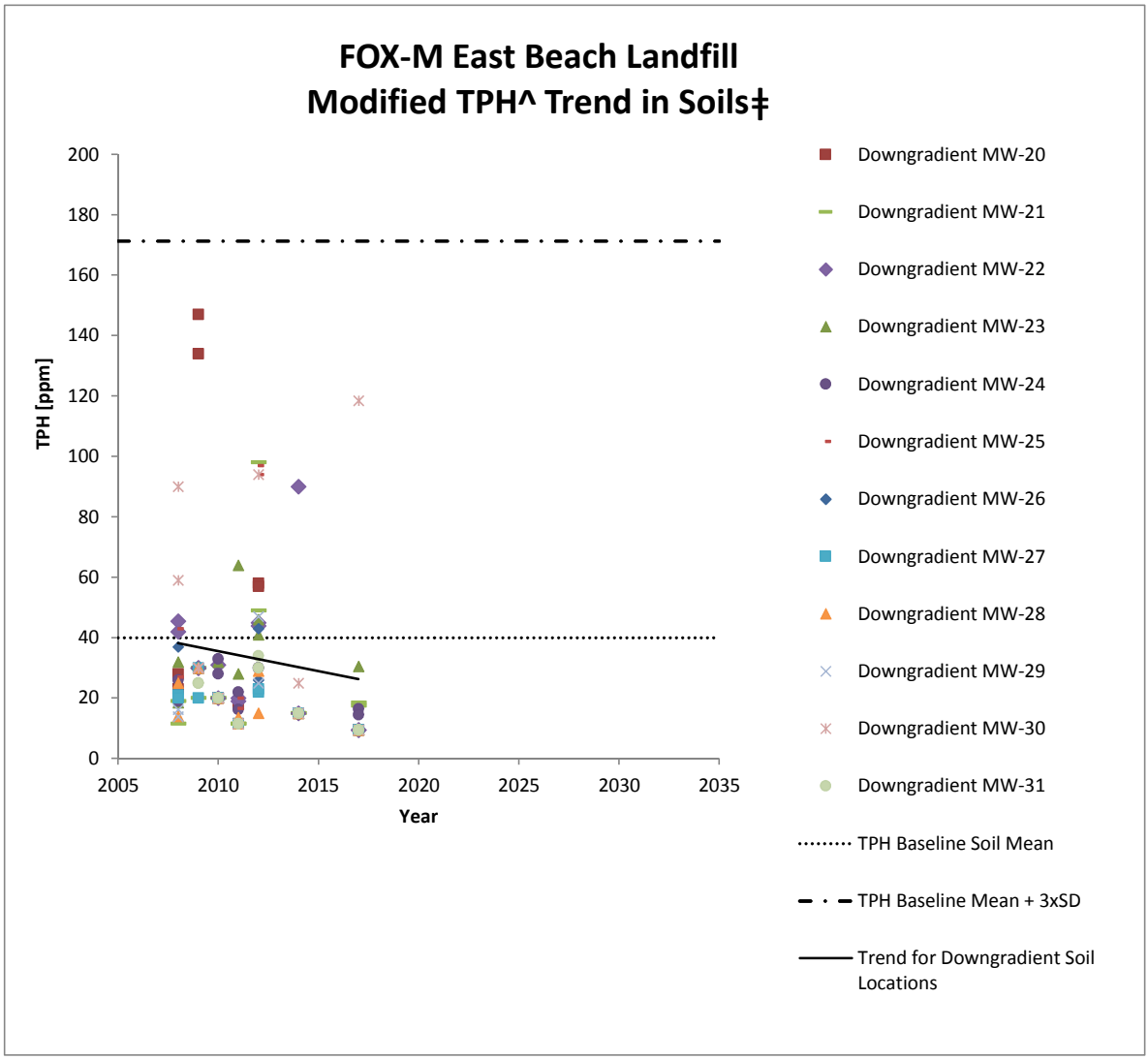
FOX-M East Beach Landfill Trends in Soil Inorganics, PCBs and Modified TPH



^ Modified TPH is sum of F1, F2 and F3 fractions (C_6 - C_{34})

* TPH baseline arithmetic mean is equal to the detection limit

FOX-M East Beach Landfill Trends in Soil Inorganics, PCBs and Modified TPH



^ Modified TPH is sum of F1, F2 and F3 fractions (C_6 - C_{34})

‡ TPH chart with y-axis modified to show trend without displaying the 2012 result for TPH of 1128 ppm at MW-30 surface. The value is included in the trend analysis.

FOX-M East Beach Landfill - Summary of Groundwater Monitoring Analytical Data

Link to: Table of Contents

Sample ID	Location	Year	Monitoring Year	Monitoring Phase	As (mg/L)	Cd* (mg/L)	Cr (mg/L)	Co* (mg/L)	Cu* (mg/L)	Pb* (mg/L)	Ni* (mg/L)	Zn (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																
Downgradient																
07-29526	MW-20	2007			<0.0030	<0.0010	0.029	<0.0030	0.0080	<0.0100	<0.0050	0.030				<1.0
07-29527	MW-21	2007			0.0071	<0.0010	0.031	<0.0030	<0.0050	<0.0100	<0.0050	<0.0010				<1.0
07-29528	MW-22	2007			0.0040	<0.0010	0.023	<0.0030	<0.0050	<0.0100	<0.0050	<0.0010				<1.0
07-29529	MW-23	2007			<0.0030	<0.0010	0.0055	<0.0030	<0.0050	<0.0100	<0.0050	0.014				<1.0
07-29530/31	MW-24	2007			0.010	<0.0010	0.10	<0.0030	<0.0050	<0.0100	<0.0050	0.040				<1.0
07-29548	MW-25	2007			<0.0030	<0.0010	0.0077	<0.0030	<0.0050	<0.0100	<0.0050	0.014				<1.0
07-29549	MW-26	2007			0.0036	<0.0010	0.18	<0.0030	<0.0050	<0.0100	<0.0050	0.028				<1.0
07-29550/51	MW-27	2007			0.0084	<0.0010	0.045	<0.0030	<0.0050	<0.0100	<0.0050	0.037				<1.0
07-29552	MW-28	2007			0.0042	<0.0010	0.014	<0.0030	0.0062	<0.0100	0.0054	0.034				<1.0
07-29565	MW-29	2007			0.0048	<0.0010	0.019	<0.0030	<0.0050	<0.0100	<0.0050	0.012				<1.0
07-29570	MW-30	2007			0.0056	<0.0010	0.014	<0.0030	<0.0050	<0.0100	0.0078	<0.0010				<1.0
07-29575	MW-31	2007			0.0034	<0.0010	0.023	<0.0030	<0.0050	<0.0100	<0.0050	0.023				<1.0
		N value			12	12	12	12	12	12	12	12				12
Baseline Data - Arithmetic Mean					0.0046	0.0005	0.0409	0.0015	0.0033	0.0050	0.0032	0.0195				0.50
Baseline Data - Arithmetic Mean Corrected for Detection Limit					**0.0046**	**0.0010**	**0.0409**	**0.0030**	**0.0050**	**0.010**	**0.0050**	**0.0195**				**1.00**
Baseline Data - Standard Deviation					0.0027	0.0000	0.0505	0.0000	0.0000	0.000	0.0000	0.0146				0.00
Baseline Data - Corrected Arithmetic Mean + 3xStandard Deviation					**0.0129**	**0.0010**	**0.1923**	**0.0030**	**0.0050**	**0.010**	**0.0050**	**0.0631**				**1.00**
**** If baseline or background arithmetic mean was below the detection limit, the mean has been modified to match the detection limit value.***																
Monitoring Data													**Modified TPH TOTAL will appear when F1, F2, F3 fraction results are entered.**			
Upgradient - No identified upgradient locations																
Downgradient MW-20																
No sample collected - well dry	MW-20	2008	1	Phase I												#N/A
No sample collected - well dry	MW-20	2009	2	Phase I												#N/A
No sample collected - well dry	MW-20	2010	3	Phase I												#N/A
No sample collected - well dry	MW-20	2011	4	Phase I												#N/A
No sample collected - frozen	MW-20	2012	5	Phase I												#N/A
No sample collected - well dry	MW-20	2014	7	Phase II												#N/A
No sample collected - frozen	MW-20	2017	10	Phase II												#N/A
	MW-20		15	Phase II												#N/A
	MW-20		25	Phase II												#N/A
																#N/A

FOX-M East Beach Landfill - Summary of Groundwater Monitoring Analytical Data

Link to: Table of Contents

Sample ID	Location	Year	Monitoring Year	Monitoring Phase	As (mg/L)	Cd* (mg/L)	Cr (mg/L)	Co* (mg/L)	Cu* (mg/L)	Pb* (mg/L)	Ni* (mg/L)	Zn (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																
Downgradient																
07-29526	MW-20	2007			<0.0030	<0.0010	0.029	<0.0030	0.0080	<0.0100	<0.0050	0.030				<1.0
07-29527	MW-21	2007			0.0071	<0.0010	0.031	<0.0030	<0.0050	<0.0100	<0.0050	<0.0010				<1.0
07-29528	MW-22	2007			0.0040	<0.0010	0.023	<0.0030	<0.0050	<0.0100	<0.0050	<0.0010				<1.0
07-29529	MW-23	2007			<0.0030	<0.0010	0.0055	<0.0030	<0.0050	<0.0100	<0.0050	0.014				<1.0
07-29530/31	MW-24	2007			0.010	<0.0010	0.10	<0.0030	<0.0050	<0.0100	<0.0050	0.040				<1.0
07-29548	MW-25	2007			<0.0030	<0.0010	0.0077	<0.0030	<0.0050	<0.0100	<0.0050	0.014				<1.0
07-29549	MW-26	2007			0.0036	<0.0010	0.18	<0.0030	<0.0050	<0.0100	<0.0050	0.028				<1.0
07-29550/51	MW-27	2007			0.0084	<0.0010	0.045	<0.0030	<0.0050	<0.0100	<0.0050	0.037				<1.0
07-29552	MW-28	2007			0.0042	<0.0010	0.014	<0.0030	0.0062	<0.0100	0.0054	0.034				<1.0
07-29565	MW-29	2007			0.0048	<0.0010	0.019	<0.0030	<0.0050	<0.0100	<0.0050	0.012				<1.0
07-29570	MW-30	2007			0.0056	<0.0010	0.014	<0.0030	<0.0050	<0.0100	0.0078	<0.0010				<1.0
07-29575	MW-31	2007			0.0034	<0.0010	0.023	<0.0030	<0.0050	<0.0100	<0.0050	0.023				<1.0
		N value			12	12	12	12	12	12	12	12				12
Baseline Data - Arithmetic Mean					0.0046	0.0005	0.0409	0.0015	0.0033	0.0050	0.0032	0.0195				0.50
Baseline Data - Arithmetic Mean Corrected for Detection Limit					**0.0046**	**0.0010**	**0.0409**	**0.0030**	**0.0050**	**0.010**	**0.0050**	**0.0195**				**1.00**
Baseline Data - Standard Deviation					0.0027	0.0000	0.0505	0.0000	0.0000	0.000	0.0000	0.0146				0.00
Baseline Data - Corrected Arithmetic Mean + 3xStandard Deviation					**0.0129**	**0.0010**	**0.1923**	**0.0030**	**0.0050**	**0.010**	**0.0050**	**0.0631**				**1.00**
Downgradient MW-21																
No sample collected - well dry	MW-21	2008	1	Phase I												#N/A
No sample collected - well dry	MW-21	2009	2	Phase I												#N/A
No sample collected - well dry	MW-21	2010	3	Phase I												#N/A
No sample collected - well dry	MW-21	2011	4	Phase I												#N/A
FM12-31	MW-21	2012	5	Phase I	0.003	0.00026	0.035	0.003	**0.031**	**0.016**	**0.027**	**0.244**	N/A	N/A	N/A	0.200
No sample collected - well dry	MW-21	2014	7	Phase II												#N/A
MW-21 (*dissolved metals*)	MW-21	2017	10	Phase II	*<0.001*	*<0.0001*	*<0.001*	*<0.0005*	*<0.0005*	*<0.0001*	*<0.001*	*<0.005*	<0.025	<0.1	<0.1	0.113
	MW-21		15	Phase II												#N/A
	MW-21		25	Phase II												#N/A
																#N/A
Downgradient MW-22																
No sample collected - well dry	MW-22	2008	1	Phase I												#N/A
No sample collected - well dry	MW-22	2009	2	Phase I												#N/A
No sample collected - well dry	MW-22	2010	3	Phase I												#N/A
No sample collected - well dry	MW-22	2011	4	Phase I												#N/A
No sample collected - frozen	MW-22	2012	5	Phase I												#N/A
No sample collected - well dry	MW-22	2014	7	Phase II												#N/A
No sample collected - frozen	MW-22	2017	10	Phase II												#N/A
	MW-22		15	Phase II												#N/A
	MW-22		25	Phase II												#N/A
																#N/A

FOX-M East Beach Landfill - Summary of Groundwater Monitoring Analytical Data

Link to: Table of Contents

Sample ID	Location	Year	Monitoring Year	Monitoring Phase	As (mg/L)	Cd* (mg/L)	Cr (mg/L)	Co* (mg/L)	Cu* (mg/L)	Pb* (mg/L)	Ni* (mg/L)	Zn (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																
Downgradient																
07-29526	MW-20	2007			<0.0030	<0.0010	0.029	<0.0030	0.0080	<0.0100	<0.0050	0.030				<1.0
07-29527	MW-21	2007			0.0071	<0.0010	0.031	<0.0030	<0.0050	<0.0100	<0.0050	<0.0010				<1.0
07-29528	MW-22	2007			0.0040	<0.0010	0.023	<0.0030	<0.0050	<0.0100	<0.0050	<0.0010				<1.0
07-29529	MW-23	2007			<0.0030	<0.0010	0.0055	<0.0030	<0.0050	<0.0100	<0.0050	0.014				<1.0
07-29530/31	MW-24	2007			0.010	<0.0010	0.10	<0.0030	<0.0050	<0.0100	<0.0050	0.040				<1.0
07-29548	MW-25	2007			<0.0030	<0.0010	0.0077	<0.0030	<0.0050	<0.0100	<0.0050	0.014				<1.0
07-29549	MW-26	2007			0.0036	<0.0010	0.18	<0.0030	<0.0050	<0.0100	<0.0050	0.028				<1.0
07-29550/51	MW-27	2007			0.0084	<0.0010	0.045	<0.0030	<0.0050	<0.0100	<0.0050	0.037				<1.0
07-29552	MW-28	2007			0.0042	<0.0010	0.014	<0.0030	0.0062	<0.0100	0.0054	0.034				<1.0
07-29565	MW-29	2007			0.0048	<0.0010	0.019	<0.0030	<0.0050	<0.0100	<0.0050	0.012				<1.0
07-29570	MW-30	2007			0.0056	<0.0010	0.014	<0.0030	<0.0050	<0.0100	0.0078	<0.0010				<1.0
07-29575	MW-31	2007			0.0034	<0.0010	0.023	<0.0030	<0.0050	<0.0100	<0.0050	0.023				<1.0
		N value			12	12	12	12	12	12	12	12				12
Baseline Data - Arithmetic Mean					0.0046	0.0005	0.0409	0.0015	0.0033	0.0050	0.0032	0.0195				0.50
Baseline Data - Arithmetic Mean Corrected for Detection Limit					**0.0046**	**0.0010**	**0.0409**	**0.0030**	**0.0050**	**0.010**	**0.0050**	**0.0195**				**1.00**
Baseline Data - Standard Deviation					0.0027	0.0000	0.0505	0.0000	0.0000	0.000	0.0000	0.0146				0.00
Baseline Data - Corrected Arithmetic Mean + 3xStandard Deviation					**0.0129**	**0.0010**	**0.1923**	**0.0030**	**0.0050**	**0.010**	**0.0050**	**0.0631**				**1.00**
Downgradient MW-23																
No sample collected**	MW-23	2008	1	Phase I												
No sample collected - well dry	MW-23	2009	2	Phase I												#N/A
No sample collected - well dry	MW-23	2010	3	Phase I												#N/A
No sample collected - well dry	MW-23	2011	4	Phase I												#N/A
No sample collected - frozen	MW-23	2012	5	Phase I												#N/A
No sample collected - well dry	MW-23	2014	7	Phase II												#N/A
No sample collected - frozen	MW-23	2017	10	Phase II												#N/A
	MW-23		15	Phase II												#N/A
	MW-23		25	Phase II												#N/A
																#N/A
Downgradient MW-24																
No sample collected - well dry	MW-24	2008	1	Phase I												#N/A
No sample collected - well dry	MW-24	2009	2	Phase I												#N/A
No sample collected - well dry	MW-24	2010	3	Phase I												#N/A
No sample collected - well dry	MW-24	2011	4	Phase I												#N/A
No sample collected - frozen	MW-24	2012	5	Phase I												#N/A
No sample collected - well dry	MW-24	2014	7	Phase II												#N/A
No sample collected - frozen	MW-24	2017	10	Phase II												#N/A
	MW-24		15	Phase II												#N/A
	MW-24		25	Phase II												#N/A
																#N/A

FOX-M East Beach Landfill - Summary of Groundwater Monitoring Analytical Data

Link to: Table of Contents

Sample ID	Location	Year	Monitoring Year	Monitoring Phase	As (mg/L)	Cd* (mg/L)	Cr (mg/L)	Co* (mg/L)	Cu* (mg/L)	Pb* (mg/L)	Ni* (mg/L)	Zn (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																
Downgradient																
07-29526	MW-20	2007			<0.0030	<0.0010	0.029	<0.0030	0.0080	<0.0100	<0.0050	0.030				<1.0
07-29527	MW-21	2007			0.0071	<0.0010	0.031	<0.0030	<0.0050	<0.0100	<0.0050	<0.0010				<1.0
07-29528	MW-22	2007			0.0040	<0.0010	0.023	<0.0030	<0.0050	<0.0100	<0.0050	<0.0010				<1.0
07-29529	MW-23	2007			<0.0030	<0.0010	0.0055	<0.0030	<0.0050	<0.0100	<0.0050	0.014				<1.0
07-29530/31	MW-24	2007			0.010	<0.0010	0.10	<0.0030	<0.0050	<0.0100	<0.0050	0.040				<1.0
07-29548	MW-25	2007			<0.0030	<0.0010	0.0077	<0.0030	<0.0050	<0.0100	<0.0050	0.014				<1.0
07-29549	MW-26	2007			0.0036	<0.0010	0.18	<0.0030	<0.0050	<0.0100	<0.0050	0.028				<1.0
07-29550/51	MW-27	2007			0.0084	<0.0010	0.045	<0.0030	<0.0050	<0.0100	<0.0050	0.037				<1.0
07-29552	MW-28	2007			0.0042	<0.0010	0.014	<0.0030	0.0062	<0.0100	0.0054	0.034				<1.0
07-29565	MW-29	2007			0.0048	<0.0010	0.019	<0.0030	<0.0050	<0.0100	<0.0050	0.012				<1.0
07-29570	MW-30	2007			0.0056	<0.0010	0.014	<0.0030	<0.0050	<0.0100	0.0078	<0.0010				<1.0
07-29575	MW-31	2007			0.0034	<0.0010	0.023	<0.0030	<0.0050	<0.0100	<0.0050	0.023				<1.0
		N value			12	12	12	12	12	12	12	12				12
Baseline Data - Arithmetic Mean					0.0046	0.0005	0.0409	0.0015	0.0033	0.0050	0.0032	0.0195				0.50
Baseline Data - Arithmetic Mean Corrected for Detection Limit					**0.0046**	**0.0010**	**0.0409**	**0.0030**	**0.0050**	**0.010**	**0.0050**	**0.0195**				**1.00**
Baseline Data - Standard Deviation					0.0027	0.0000	0.0505	0.0000	0.0000	0.000	0.0000	0.0146				0.00
Baseline Data - Corrected Arithmetic Mean + 3xStandard Deviation					**0.0129**	**0.0010**	**0.1923**	**0.0030**	**0.0050**	**0.010**	**0.0050**	**0.0631**				**1.00**
Downgradient MW-25																
No sample collected - well dry	MW-25	2008	1	Phase I												#N/A
No sample collected - well dry	MW-25	2009	2	Phase I												#N/A
No sample collected - well dry	MW-25	2010	3	Phase I												#N/A
No sample collected - well dry	MW-25	2011	4	Phase I												#N/A
No sample collected - frozen	MW-25	2012	5	Phase I												#N/A
No sample collected - well dry	MW-25	2014	7	Phase II												#N/A
No sample collected - frozen	MW-25	2017	10	Phase II												#N/A
	MW-25		15	Phase II												#N/A
	MW-25		25	Phase II												#N/A
																#N/A
Downgradient MW-26																
No sample collected - well dry	MW-26	2008	1	Phase I												#N/A
No sample collected - well dry	MW-26	2009	2	Phase I												#N/A
No sample collected - well dry	MW-26	2010	3	Phase I												#N/A
No sample collected - well dry	MW-26	2011	4	Phase I												#N/A
No sample collected - frozen	MW-26	2012	5	Phase I												#N/A
No sample collected - well dry	MW-26	2014	7	Phase II												#N/A
No sample collected - frozen	MW-26	2017	10	Phase II												#N/A
	MW-26		15	Phase II												#N/A
	MW-26		25	Phase II												#N/A
																#N/A

FOX-M East Beach Landfill - Summary of Groundwater Monitoring Analytical Data

Link to: Table of Contents

Sample ID	Location	Year	Monitoring Year	Monitoring Phase	As (mg/L)	Cd* (mg/L)	Cr (mg/L)	Co* (mg/L)	Cu* (mg/L)	Pb* (mg/L)	Ni* (mg/L)	Zn (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																
Downgradient																
07-29526	MW-20	2007			<0.0030	<0.0010	0.029	<0.0030	0.0080	<0.0100	<0.0050	0.030				<1.0
07-29527	MW-21	2007			0.0071	<0.0010	0.031	<0.0030	<0.0050	<0.0100	<0.0050	<0.0010				<1.0
07-29528	MW-22	2007			0.0040	<0.0010	0.023	<0.0030	<0.0050	<0.0100	<0.0050	<0.0010				<1.0
07-29529	MW-23	2007			<0.0030	<0.0010	0.0055	<0.0030	<0.0050	<0.0100	<0.0050	0.014				<1.0
07-29530/31	MW-24	2007			0.010	<0.0010	0.10	<0.0030	<0.0050	<0.0100	<0.0050	0.040				<1.0
07-29548	MW-25	2007			<0.0030	<0.0010	0.0077	<0.0030	<0.0050	<0.0100	<0.0050	0.014				<1.0
07-29549	MW-26	2007			0.0036	<0.0010	0.18	<0.0030	<0.0050	<0.0100	<0.0050	0.028				<1.0
07-29550/51	MW-27	2007			0.0084	<0.0010	0.045	<0.0030	<0.0050	<0.0100	<0.0050	0.037				<1.0
07-29552	MW-28	2007			0.0042	<0.0010	0.014	<0.0030	0.0062	<0.0100	0.0054	0.034				<1.0
07-29565	MW-29	2007			0.0048	<0.0010	0.019	<0.0030	<0.0050	<0.0100	<0.0050	0.012				<1.0
07-29570	MW-30	2007			0.0056	<0.0010	0.014	<0.0030	<0.0050	<0.0100	0.0078	<0.0010				<1.0
07-29575	MW-31	2007			0.0034	<0.0010	0.023	<0.0030	<0.0050	<0.0100	<0.0050	0.023				<1.0
		N value			12	12	12	12	12	12	12	12				12
Baseline Data - Arithmetic Mean					0.0046	0.0005	0.0409	0.0015	0.0033	0.0050	0.0032	0.0195				0.50
Baseline Data - Arithmetic Mean Corrected for Detection Limit					**0.0046**	**0.0010**	**0.0409**	**0.0030**	**0.0050**	**0.010**	**0.0050**	**0.0195**				**1.00**
Baseline Data - Standard Deviation					0.0027	0.0000	0.0505	0.0000	0.0000	0.000	0.0000	0.0146				0.00
Baseline Data - Corrected Arithmetic Mean + 3xStandard Deviation					**0.0129**	**0.0010**	**0.1923**	**0.0030**	**0.0050**	**0.010**	**0.0050**	**0.0631**				**1.00**
Downgradient MW-27																
No sample collected - well dry	MW-27	2008	1	Phase I												#N/A
No sample collected - well dry	MW-27	2009	2	Phase I												#N/A
No sample collected - well dry	MW-27	2010	3	Phase I												#N/A
No sample collected - well dry	MW-27	2011	4	Phase I												#N/A
No sample collected - frozen	MW-27	2012	5	Phase I												#N/A
No sample collected - well dry	MW-27	2014	7	Phase II												#N/A
No sample collected - frozen	MW-27	2017	10	Phase II												#N/A
	MW-27		15	Phase II												#N/A
	MW-27		25	Phase II												#N/A
																#N/A
Downgradient MW-28																
No sample collected - well dry	MW-28	2008	1	Phase I												#N/A
No sample collected - well dry	MW-28	2009	2	Phase I												#N/A
No sample collected - well dry	MW-28	2010	3	Phase I												#N/A
No sample collected - well dry	MW-28	2011	4	Phase I												#N/A
No sample collected - frozen	MW-28	2012	5	Phase I												#N/A
No sample collected - well dry	MW-28	2014	7	Phase II												#N/A
No sample collected - frozen	MW-28	2017	10	Phase II												#N/A
	MW-28		15	Phase II												#N/A
	MW-28		25	Phase II												#N/A
																#N/A

FOX-M East Beach Landfill - Summary of Groundwater Monitoring Analytical Data

Link to: Table of Contents

Sample ID	Location	Year	Monitoring Year	Monitoring Phase	As (mg/L)	Cd* (mg/L)	Cr (mg/L)	Co* (mg/L)	Cu* (mg/L)	Pb* (mg/L)	Ni* (mg/L)	Zn (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																
Downgradient																
07-29526	MW-20	2007			<0.0030	<0.0010	0.029	<0.0030	0.0080	<0.0100	<0.0050	0.030				<1.0
07-29527	MW-21	2007			0.0071	<0.0010	0.031	<0.0030	<0.0050	<0.0100	<0.0050	<0.0010				<1.0
07-29528	MW-22	2007			0.0040	<0.0010	0.023	<0.0030	<0.0050	<0.0100	<0.0050	<0.0010				<1.0
07-29529	MW-23	2007			<0.0030	<0.0010	0.0055	<0.0030	<0.0050	<0.0100	<0.0050	0.014				<1.0
07-29530/31	MW-24	2007			0.010	<0.0010	0.10	<0.0030	<0.0050	<0.0100	<0.0050	0.040				<1.0
07-29548	MW-25	2007			<0.0030	<0.0010	0.0077	<0.0030	<0.0050	<0.0100	<0.0050	0.014				<1.0
07-29549	MW-26	2007			0.0036	<0.0010	0.18	<0.0030	<0.0050	<0.0100	<0.0050	0.028				<1.0
07-29550/51	MW-27	2007			0.0084	<0.0010	0.045	<0.0030	<0.0050	<0.0100	<0.0050	0.037				<1.0
07-29552	MW-28	2007			0.0042	<0.0010	0.014	<0.0030	0.0062	<0.0100	0.0054	0.034				<1.0
07-29565	MW-29	2007			0.0048	<0.0010	0.019	<0.0030	<0.0050	<0.0100	<0.0050	0.012				<1.0
07-29570	MW-30	2007			0.0056	<0.0010	0.014	<0.0030	<0.0050	<0.0100	0.0078	<0.0010				<1.0
07-29575	MW-31	2007			0.0034	<0.0010	0.023	<0.0030	<0.0050	<0.0100	<0.0050	0.023				<1.0
		N value			12	12	12	12	12	12	12	12				12
Baseline Data - Arithmetic Mean					0.0046	0.0005	0.0409	0.0015	0.0033	0.0050	0.0032	0.0195				0.50
Baseline Data - Arithmetic Mean Corrected for Detection Limit					**0.0046**	**0.0010**	**0.0409**	**0.0030**	**0.0050**	**0.010**	**0.0050**	**0.0195**				**1.00**
Baseline Data - Standard Deviation					0.0027	0.0000	0.0505	0.0000	0.0000	0.000	0.0000	0.0146				0.00
Baseline Data - Corrected Arithmetic Mean + 3xStandard Deviation					**0.0129**	**0.0010**	**0.1923**	**0.0030**	**0.0050**	**0.010**	**0.0050**	**0.0631**				**1.00**
Downgradient MW-29																
08-10715	MW-29	2008	1	Phase I	0.00348	<0.0010	0.014	<0.0030	<0.0050	0.001	**0.009**	**0.081**	N/A	N/A	N/A	<1.0
FM09-29W	MW-29	2009	2	Phase I	0.003	<0.00010	<0.0050	0.001	0.003	<0.0010	**0.008**	**0.020**	N/A	N/A	N/A	<0.20
FM10-29W	MW-29	2010	3	Phase I	<0.0050	<0.00010	0.013	0.0003	0.002	<0.0010	**0.006**	<0.010	N/A	N/A	N/A	<0.20
11-14351	MW-29	2011	4	Phase I	<0.0030	<0.0010	0.031	<0.0030	**0.006**	<0.010	<0.0050	**0.065**	N/A	N/A	N/A	<1.0
FM12-29	MW-29	2012	5	Phase I	**0.005**	0.00031	**0.050**	0.003	**0.027**	0.005	**0.044**	**0.158**	N/A	N/A	N/A	<0.10
FM-EB-MW-29	MW-29	2014	7	Phase II	0.0028	0.00020	0.015	0.0016	**0.008**	0.0038	**0.011**	**0.110**	<0.025	<0.100	<0.100	0.113
MW-29 (Dup Avg) (*dissolved metals*)	MW-29	2017	10	Phase II	*<0.001*	*<0.0001*	*<0.001*	*<0.0005*	*<0.0005*	*<0.0001*	*0.0015*	*0.012*	<0.025	<0.1	<0.1	0.113
	MW-29		15	Phase II												#N/A
	MW-29		25	Phase II												#N/A
																#N/A
Downgradient MW-30																
08-10713/14	MW-30	2008	1	Phase I	0.0045	<0.0010	0.007	<0.0030	<0.0050	<0.0010	<0.0050	0.013	N/A	N/A	N/A	<1.0
FM09-30W	MW-30	2009	2	Phase I	**0.008**	<0.00010	0.002	<0.00020	0.002	<0.0010	**0.037**	<0.010	N/A	N/A	N/A	<0.20
FM10-30W	MW-30	2010	3	Phase I	<0.010	<0.00010	0.002	0.0002	0.001	<0.0010	**0.014**	<0.010	N/A	N/A	N/A	<0.20
11-14352	MW-30	2011	4	Phase I	**0.014**	0.00100	**0.220**	**0.010**	**0.016**	**0.013**	**0.079**	**0.190**	N/A	N/A	N/A	<1.0
FM12-30D	MW-30	2012	5	Phase I	**0.006**	0.00012	**0.052**	0.002	**0.011**	0.003	**0.031**	**0.187**	N/A	N/A	N/A	0.200
FM-EB-MW-30	MW-30	2014	7	Phase II	0.0036	<0.000020	0.022	0.001	0.002	0.001	**0.009**	**0.210**	<0.025	<0.100	<0.100	0.113
MW-30 (*dissolved metals*)	MW-30	2017	10	Phase II	*<0.001*	*<0.0001*	*<0.001*	*<0.0005*	*<0.0005*	*<0.0001*	*<0.001*	***0.087***	<0.025	<0.1	<0.1	0.113
	MW-30		15	Phase II												#N/A
	MW-30		25	Phase II												#N/A
																#N/A

FOX-M East Beach Landfill - Summary of Groundwater Monitoring Analytical Data

Link to: Table of Contents

Sample ID	Location	Year	Monitoring Year	Monitoring Phase	As (mg/L)	Cd* (mg/L)	Cr (mg/L)	Co* (mg/L)	Cu* (mg/L)	Pb* (mg/L)	Ni* (mg/L)	Zn (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																
Downgradient																
07-29526	MW-20	2007			<0.0030	<0.0010	0.029	<0.0030	0.0080	<0.0100	<0.0050	0.030				<1.0
07-29527	MW-21	2007			0.0071	<0.0010	0.031	<0.0030	<0.0050	<0.0100	<0.0050	<0.0010				<1.0
07-29528	MW-22	2007			0.0040	<0.0010	0.023	<0.0030	<0.0050	<0.0100	<0.0050	<0.0010				<1.0
07-29529	MW-23	2007			<0.0030	<0.0010	0.0055	<0.0030	<0.0050	<0.0100	<0.0050	0.014				<1.0
07-29530/31	MW-24	2007			0.010	<0.0010	0.10	<0.0030	<0.0050	<0.0100	<0.0050	0.040				<1.0
07-29548	MW-25	2007			<0.0030	<0.0010	0.0077	<0.0030	<0.0050	<0.0100	<0.0050	0.014				<1.0
07-29549	MW-26	2007			0.0036	<0.0010	0.18	<0.0030	<0.0050	<0.0100	<0.0050	0.028				<1.0
07-29550/51	MW-27	2007			0.0084	<0.0010	0.045	<0.0030	<0.0050	<0.0100	<0.0050	0.037				<1.0
07-29552	MW-28	2007			0.0042	<0.0010	0.014	<0.0030	0.0062	<0.0100	0.0054	0.034				<1.0
07-29565	MW-29	2007			0.0048	<0.0010	0.019	<0.0030	<0.0050	<0.0100	<0.0050	0.012				<1.0
07-29570	MW-30	2007			0.0056	<0.0010	0.014	<0.0030	<0.0050	<0.0100	0.0078	<0.0010				<1.0
07-29575	MW-31	2007			0.0034	<0.0010	0.023	<0.0030	<0.0050	<0.0100	<0.0050	0.023				<1.0
		N value			12	12	12	12	12	12	12	12				12
Baseline Data - Arithmetic Mean					0.0046	0.0005	0.0409	0.0015	0.0033	0.0050	0.0032	0.0195				0.50
Baseline Data - Arithmetic Mean Corrected for Detection Limit					**0.0046**	**0.0010**	**0.0409**	**0.0030**	**0.0050**	**0.010**	**0.0050**	**0.0195**				**1.00**
Baseline Data - Standard Deviation					0.0027	0.0000	0.0505	0.0000	0.0000	0.000	0.0000	0.0146				0.00
Baseline Data - Corrected Arithmetic Mean + 3xStandard Deviation					**0.0129**	**0.0010**	**0.1923**	**0.0030**	**0.0050**	**0.010**	**0.0050**	**0.0631**				**1.00**
Downgradient MW-31																
08-10711/12**	MW-31	2008	1	Phase I	<0.0030	<0.0010	<0.0050	<0.0030	**0.006**	<0.0010	<0.0050	0.011	N/A	N/A	N/A	<1.0
FM09-31W	MW-31	2009	2	Phase I	<0.0010	0.0002	0.008	0.0002	**0.008**	<0.0010	<0.0050	<0.010	N/A	N/A	N/A	<0.20
No sample collected - well dry	MW-31	2010	3	Phase I												#N/A
No sample collected - well dry	MW-31	2011	4	Phase I												#N/A
FM12-31	MW-31	2012	5	Phase I	0.001	0.00049	0.021	0.001	**0.026**	0.002	**0.030**	**0.095**	N/A	N/A	N/A	<0.10
No sample collected - well dry	MW-31	2014	7	Phase II												#N/A
No sample collected - frozen	MW-31	2017	10	Phase II												#N/A
	MW-31		15	Phase II												#N/A
	MW-31		25	Phase II												#N/A
																#N/A

** Sample listed as MW 23/31 in first year report. Results included as MW-31.

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

N/A = not analyzed

Legend

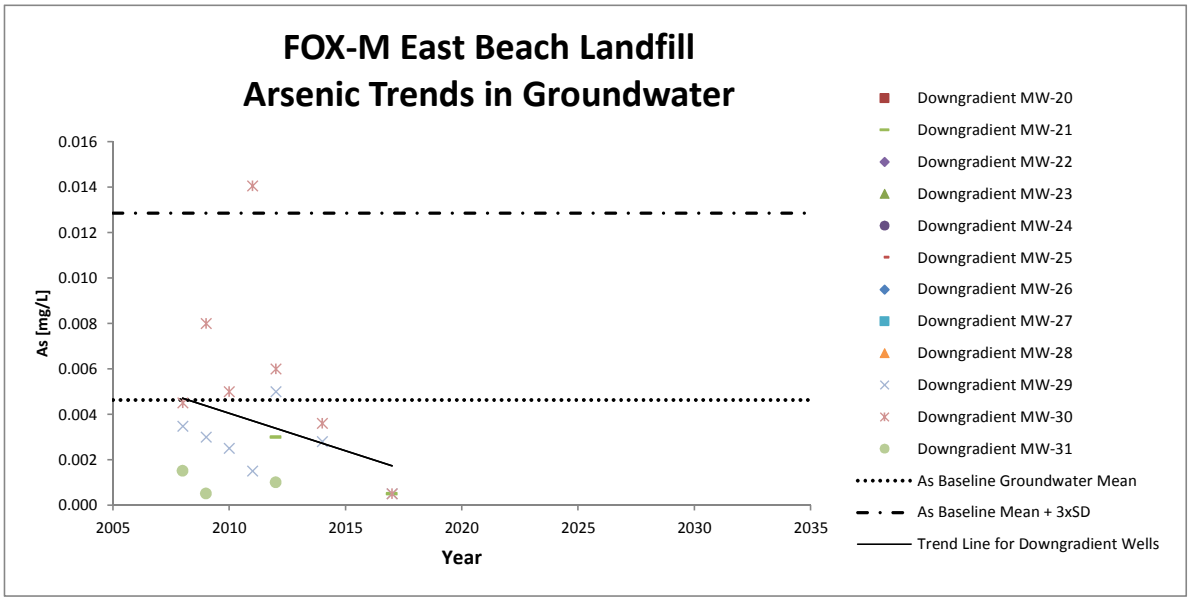
XX Sample exceeds baseline mean

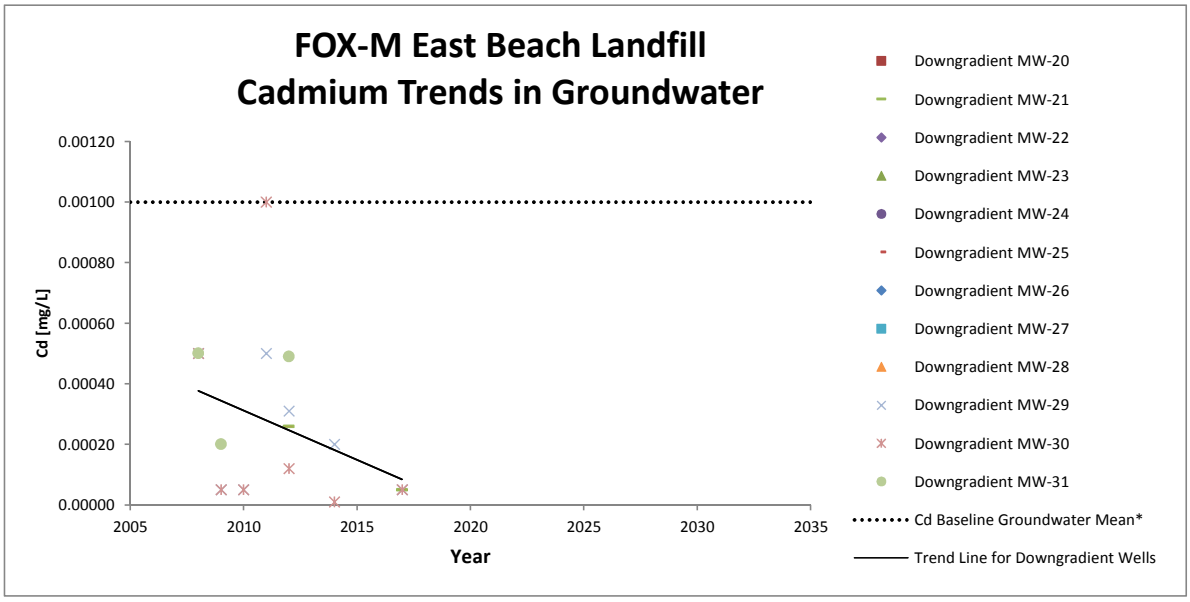
XX Sample exceeds baseline mean + 3xSD

FOX-M East Beach Landfill Trends in Groundwater Inorganics, PCBs and Modified TPH

Link to: Table of Contents

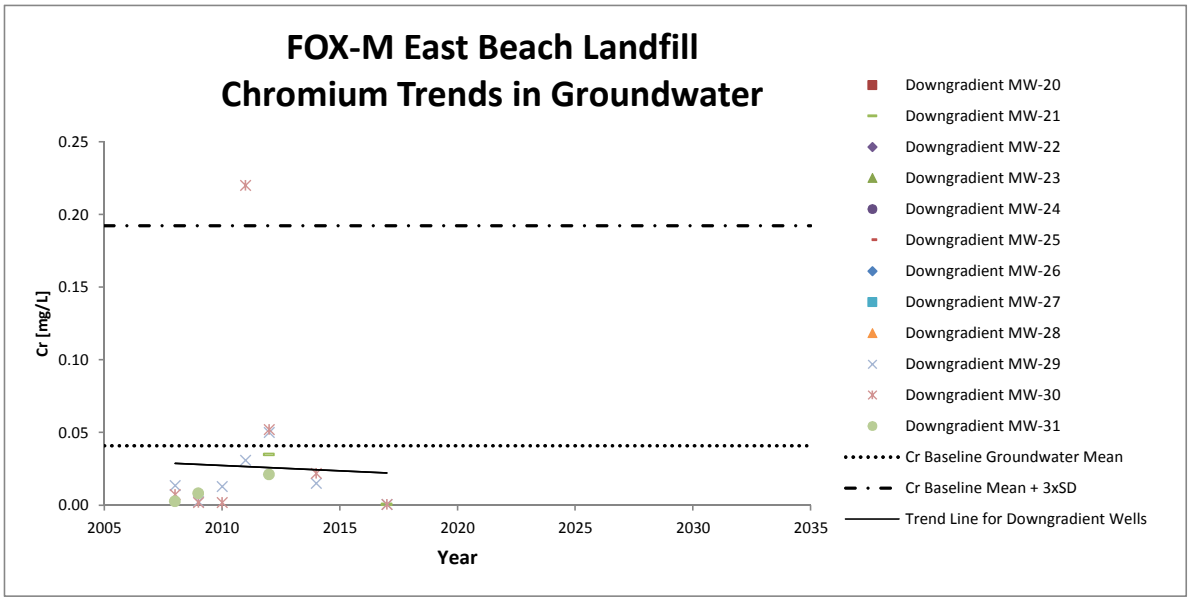
Note: All wells are downgradient wells, there are no upgradient wells.
Where results are below detection, half of the detection limit has been used in the charts for the sample points.
Trendlines are intended for visual interpretation of temporal trends. When all monitoring results are below detection, trendlines are a reflection of changes in detection limit. Users should refer to data tables.

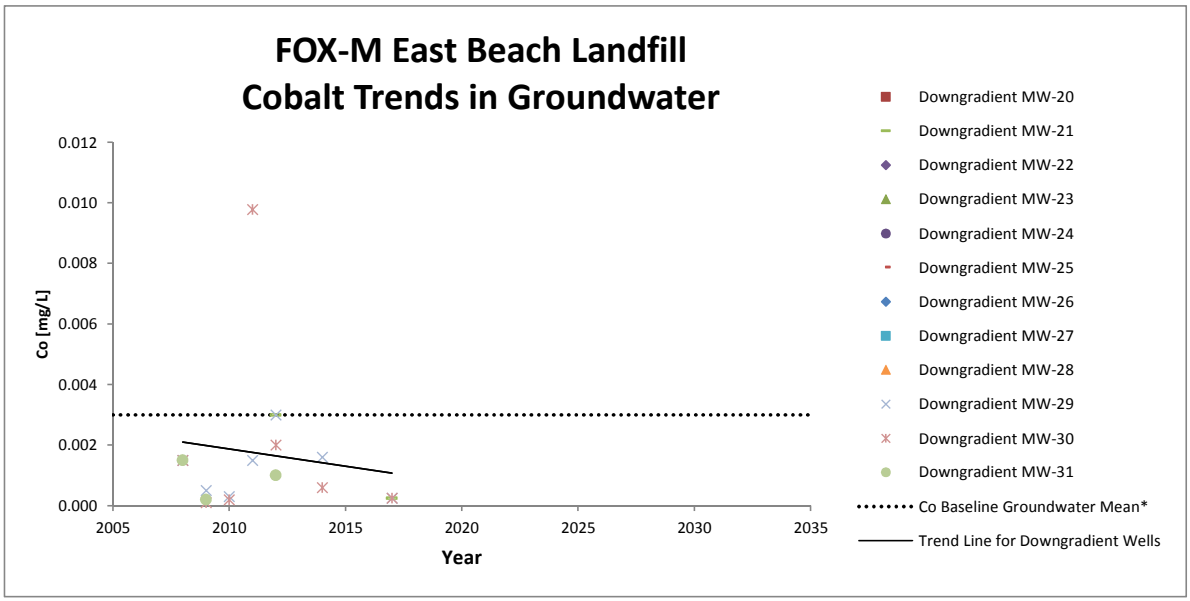




* Cd baseline arithmetic mean is equal to the baseline detection limit
* Cd baseline standard deviation = 0

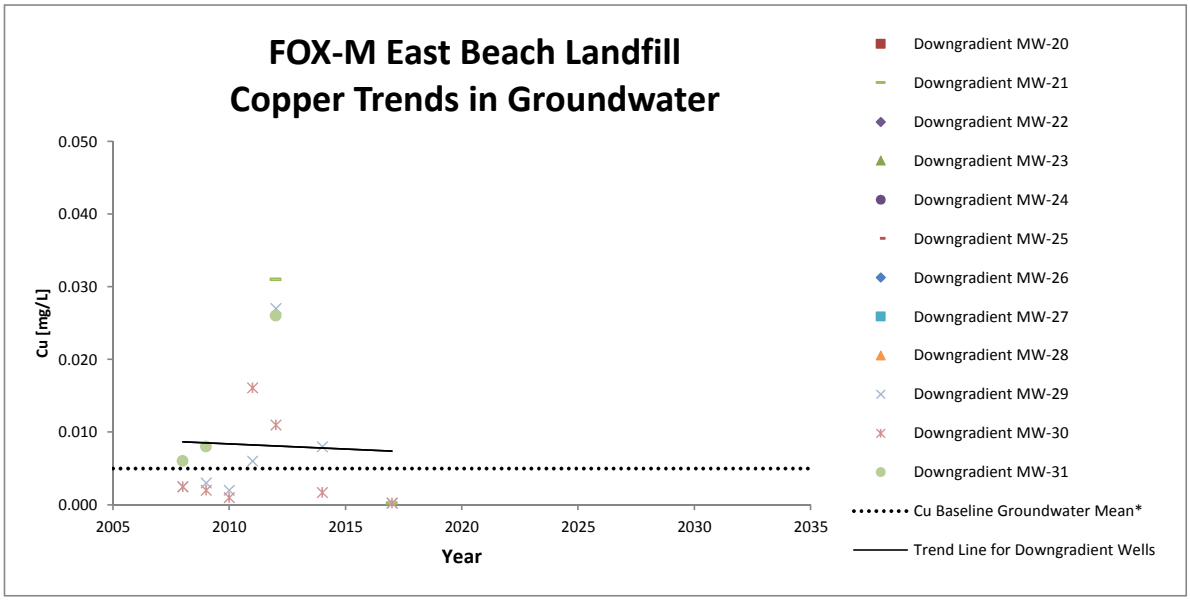
FOX-M East Beach Landfill Trends in Groundwater Inorganics, PCBs and Modified TPH



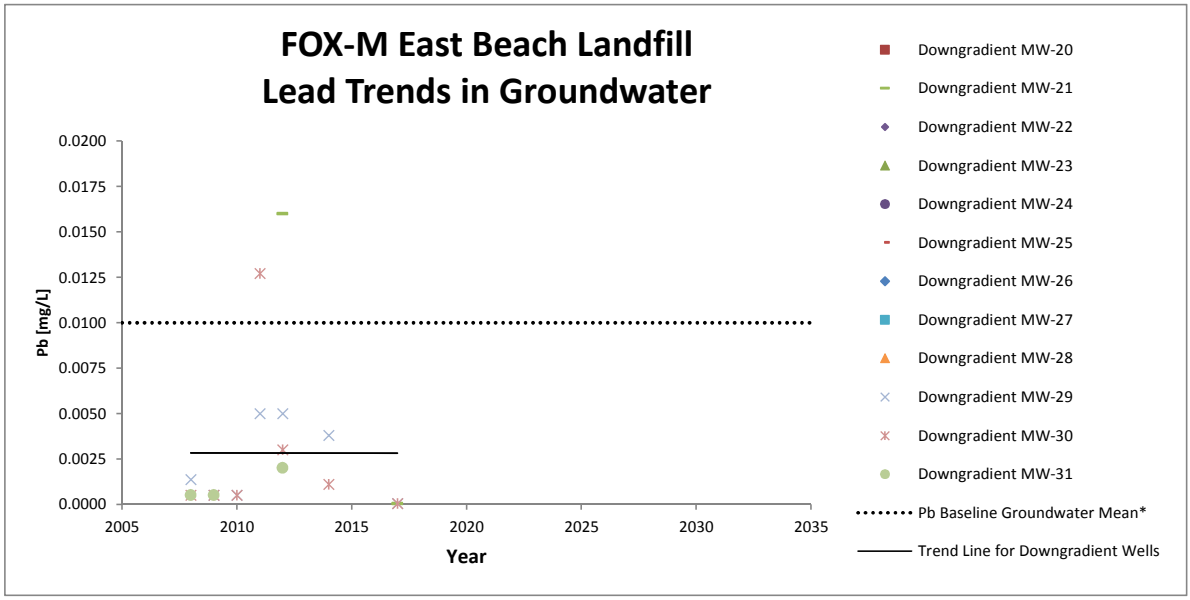


* Co baseline arithmetic mean is equal to the baseline detection limit
* Co baseline standard deviation = 0

FOX-M East Beach Landfill Trends in Groundwater Inorganics, PCBs and Modified TPH

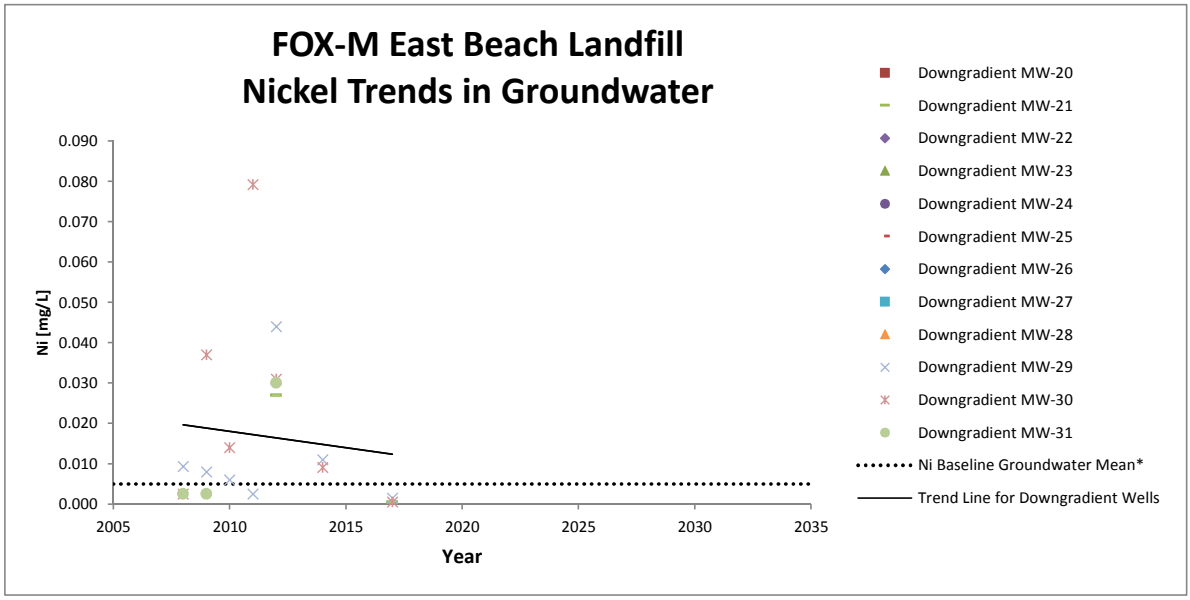


* Cu baseline arithmetic mean is equal to the baseline detection limit
* Cu baseline standard deviation = 0

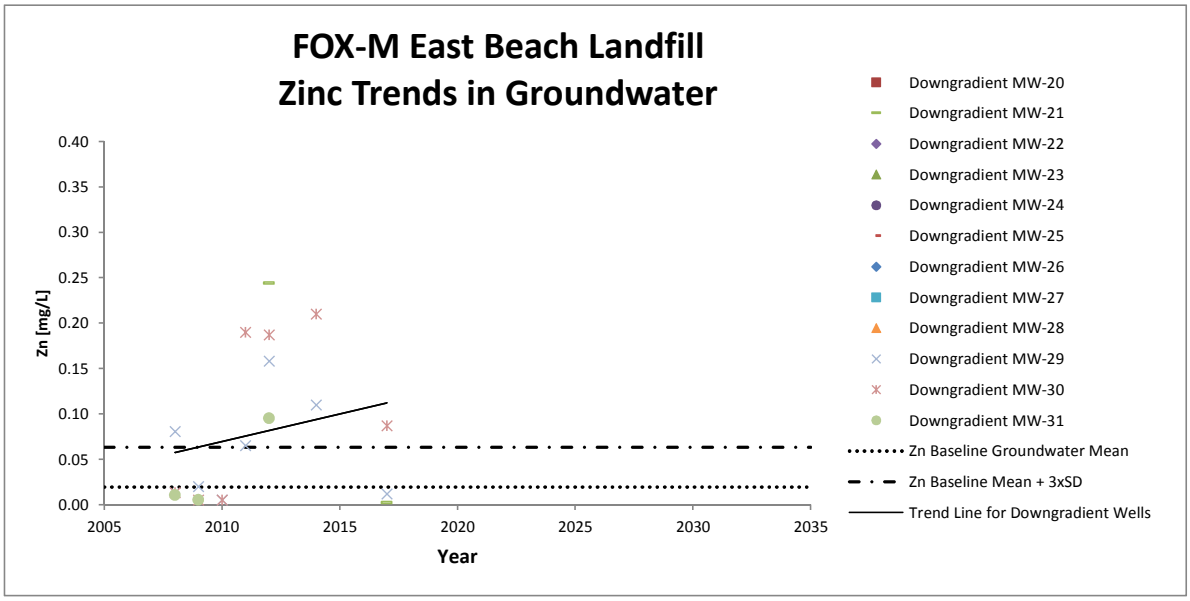


* Pb baseline arithmetic mean is equal to the baseline detection limit
* Pb baseline standard deviation = 0

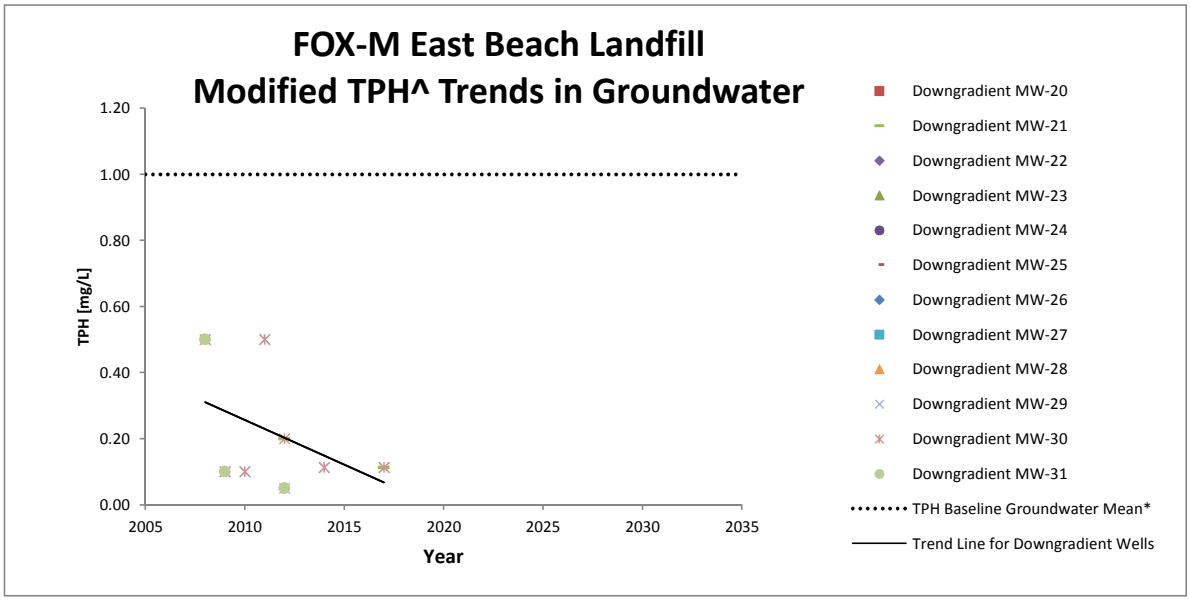
FOX-M East Beach Landfill Trends in Groundwater Inorganics, PCBs and Modified TPH



* Ni baseline arithmetic mean is equal to the baseline detection limit
* Ni baseline standard deviation = 0



FOX-M East Beach Landfill Trends in Groundwater Inorganics, PCBs and Modified TPH



^ Modified TPH is sum of F1, F2 and F3 fractions (C_6 - C_{34})
* TPH baseline arithmetic mean is equal to the detection limit
* TPH baseline standard deviation = 0

FOX-M Non-Hazardous Waste Landfill - Summary of Soil Monitoring Analytical Data

Link to: Table of Contents

Sample ID	Location	Year	Monitoring Year	Monitoring Phase	Depth (cm)	As* (mg/kg)	Cd* (mg/kg)	Cr* (mg/kg)	Co* (mg/kg)	Cu (mg/kg)	Pb* (mg/kg)	Ni* (mg/kg)	Zn* (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						1.00	1.00	20.0	5.00	6.3	10.0	5.0	15.0	0.213				N/A
Baseline Data - Arithmetic Mean						**2.05**	**1.00**	**20.0**	**5.00**	**5.2**	**18.4**	**5.0**	**15.0**	**0.003**				**59.7**
Baseline Data - Standard Deviation						0.63	0.00	0.0	0.00	2.8	21.4	2.1	0.0	0.000				94.8
Baseline Data Mean + 3xStandard Deviation						**3.93**	**1.00**	**20.0**	**5.00**	**13.7**	**82.7**	**11.2**	**15.0**	**0.003**				**344.1**
**** 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						*30*	*5*	*250*	*50*	*100*	*500*	*100*	*500*	*5*				*2500*
Monitoring Data																		**TPH Sum will appear when F1, F2 and F3 fractions are entered.**
Upgradient																		
	MW-16 surface																	
08-10737	MW-16	2008	1	Phase I	0	1.3	<1.0	<20	<5.0	4.9	**200.0**	**5.2**	**22.0**	**0.005**	<10	4.3	87.0	**96.3**
FM10-16WA	MW-16	2010	3	Phase I	0-15	2.0	<0.50	13.0	2.0	**6.0**	**41.0**	**10.0**	14.0	<0.020	<10	<10	72.0	**82.0**
FM12-16A-D	MW-16	2012	5	Phase I	0-15	**3.1**	<0.50	**22.2**	3.5	**8.6**	**170.0**	**21.8**	**42.0**	<0.050	<10	<10	67.0	**77.0**
FM-NH-MW-16-S	MW-16	2014	7	Phase II	0-15	**3.0**	0.2	11.0	2.0	**5.6**	**79.0**	**6.6**	**28.0**	<0.1	<10	<10	65.0	**75.0**
MW-16 Shallow	MW-16	2017	10	Phase II	0-15	<1.0	<0.5	12.2	2.0	**6.0**	**82.1**	**6.9**	**18.8**	<0.05	<7	<4	75.0	**80.5**
	MW-16		15	Phase II														#N/A
	MW-16		25	Phase II														#N/A
																		#N/A
																		#N/A
	MW-16 depth																	
08-10739	MW-16	2008	1	Phase I	40	1.4	<1.0	<20	<5.0	<3.0	**24.0**	<5.0	<15	<0.0030	<10	4.1	16.0	25.1
FM10-16WB	MW-16	2010	3	Phase I	40-50	2.0	<0.50	16.0	2.0	4.0	13.0	**11.0**	9.0	<0.020	<10	<10	<20	20.0
FM12-16B	MW-16	2012	5	Phase I	40-50	**2.6**	<0.50	13.6	2.8	4.9	**48.9**	**16.1**	**24.0**	<0.050	<10	<10	34.0	44.0
FM-NH-MW-16-D	MW-16	2014	7	Phase II	30-40	2.0	<0.10	7.9	1.6	3.6	15.0	**5.2**	11.0	<0.1	<10	<10	<10	15.0
MW-16 Deep	MW-16	2017	10	Phase II	40-50	<1.0	<0.5	6.9	1.4	2.9	**20.9**	4.5	9.5	<0.05	<7	<4	30.0	35.5
	MW-16		15	Phase II														#N/A
	MW-16		25	Phase II														#N/A
																		#N/A

FOX-M Non-Hazardous Waste Landfill - Summary of Soil Monitoring Analytical Data

Link to: Table of Contents

Sample ID	Location	Year	Monitoring Year	Monitoring Phase	Depth (cm)	As* (mg/kg)	Cd* (mg/kg)	Cr* (mg/kg)	Co* (mg/kg)	Cu (mg/kg)	Pb* (mg/kg)	Ni* (mg/kg)	Zn* (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						1.00	1.00	20.0	5.00	6.3	10.0	5.0	15.0	0.213				N/A
Baseline Data - Arithmetic Mean						**2.05**	**1.00**	**20.0**	**5.00**	**5.2**	**18.4**	**5.0**	**15.0**	**0.003**				**59.7**
Baseline Data - Standard Deviation						0.63	0.00	0.0	0.00	2.8	21.4	2.1	0.0	0.000				94.8
Baseline Data Mean + 3xStandard Deviation						**3.93**	**1.00**	**20.0**	**5.00**	**13.7**	**82.7**	**11.2**	**15.0**	**0.003**				**344.1**
Downgradient																		
	MW-12 surface																	
08-10725	MW-12	2008	1	Phase I	0	0.8	<1.0	<20	<5.0	5.0	17.0	**6.5**	<15	<0.0030	<10	4.4	32.0	41.4
FM10-12WA	MW-12	2010	3	Phase I	0-15	1.0	<0.50	16.0	3.0	5.0	**28.0**	**13.0**	13.0	<0.020	<10	14.0	<20	29.0
FM12-12A	MW-12	2012	5	Phase I	0-15	**2.1**	<0.50	14.6	3.8	**6.4**	**35.7**	**25.9**	**23.0**	<0.050	<10	<10	61.0	**71.0**
FM-NH-MW-12-S	MW-12	2014	7	Phase II	0-15	2.0	<0.10	10.0	1.9	**16.0**	**73.0**	**7.7**	**21.0**	<0.1	<10	<10	<10	15.0
MW-12 Shallow	MW-12	2017	10	Phase II	0-15	<1.0	<0.5	9.7	1.8	**5.7**	**96.7**	**7.1**	**17.9**	<0.05	<7	48.0	25.0	**76.5**
	MW-12		15	Phase II														#N/A
	MW-12		25	Phase II														#N/A
																		#N/A
																		#N/A
	MW-12 depth																	
08-10727	MW-12	2008	1	Phase I	40	1.4	<1.0	<20	<5.0	3.5	**21.0**	**7.2**	<15	<0.0030	<10	<4.0	25.0	32.0
FM10-12WB	MW-12	2010	3	Phase I	40-50	1.0	<0.50	15.0	2.0	4.0	14.0	**12.0**	10.0	<0.10	<10	13.0	<20	28.0
FM12-12B	MW-12	2012	5	Phase I	40-50	2.0	<0.50	13.2	3.6	**5.7**	**24.8**	**24.0**	**19.0**	<0.050	<10	20.0	15.0	40.0
FM-NH-MW-12-D	MW-12	2014	7	Phase II	30-40	**2.7**	<0.10	11.0	2.7	4.5	**19.0**	**8.7**	13.0	<0.1	41.0	84.0	14.0	**139.0**
MW-12 Deep	MW-12	2017	10	Phase II	30-40	<1.0	<0.5	9.5	2.0	4.2	**63.4**	**6.8**	12.5	<0.05	<7	169.0	19.0	**191.5**
	MW-12		15	Phase II														#N/A
	MW-12		25	Phase II														#N/A
																		#N/A
																		#N/A
																		#N/A
																		#N/A
																		#N/A
	MW-13 surface																	
08-10700	MW-13	2008	1	Phase I	0	0.7	<1.0	<20	<5.0	3.5	**34.0**	<5.0	<15	<0.0030	<10	4.1	57.0	**66.1**
FM10-13WA	MW-13	2010	3	Phase I	0-15	1.0	<0.50	12.0	2.0	4.0	**42.0**	**9.0**	10.0	<0.10	<10	<10	25.0	35.0
FM12-13A	MW-13	2012	5	Phase I	0-15	**2.3**	<0.50	14.2	3.1	**5.4**	**55.9**	**20.5**	**20.0**	<0.050	<10	11.0	26.0	42.0
FM-NH-MW-13-S	MW-13	2014	7	Phase II	0-15	**2.2**	<0.10	12.0	2.1	4.8	**41.0**	**8.3**	14.0	<0.1	<10	<10	54.0	**64.0**
MW-13 Shallow	MW-13	2017	10	Phase II	0-15	<1.0	<0.5	12.2	2.2	4.8	**28.2**	**8.8**	11.6	<0.05	<7	<4	<8	9.5
	MW-13		15	Phase II														#N/A
	MW-13		25	Phase II														#N/A
																		#N/A
																		#N/A
	MW-13 depth																	
08-10702/03	MW-13	2008	1	Phase I	40	1.5	<1.0	<20	<5.0	4.8	**32.5**	**5.1**	<15	<0.0030	<10	3.5	62.5	**71.0**
FM10-13WB	MW-13	2010	3	Phase I	40-50	1.0	<0.50	14.0	2.0	4.0	**27.0**	**11.0**	9.0	<0.020	<10	<10	<20	20.0
FM12-13B	MW-13	2012	5	Phase I	40-50	**2.2**	<0.50	15.1	4.2	**9.4**	**140.0**	**25.7**	**21.0**	<0.050	10.0	15.0	11.0	36.0
FM-NH-MW-13-D	MW-13	2014	7	Phase II	30-40	1.7	<0.10	9.5	1.7	3.8	**26.0**	**7.3**	11.0	<0.1	32.0	660.0	74.0	**766.0**
MW-13 Deep	MW-13	2017	10	Phase II	40-50	<1.0	<0.5	10.7	2.0	4.4	**28.3**	**7.8**	10.0	<0.05	<7	47.0	15.0	**65.5**
	MW-13		15	Phase II														#N/A
	MW-13		25	Phase II														#N/A

FOX-M Non-Hazardous Waste Landfill - Summary of Soil Monitoring Analytical Data

Link to: Table of Contents

Sample ID	Location	Year	Monitoring Year	Monitoring Phase	Depth (cm)	As* (mg/kg)	Cd* (mg/kg)	Cr* (mg/kg)	Co* (mg/kg)	Cu (mg/kg)	Pb* (mg/kg)	Ni* (mg/kg)	Zn* (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						1.00	1.00	20.0	5.00	6.3	10.0	5.0	15.0	0.213				N/A
Baseline Data - Arithmetic Mean						**2.05**	**1.00**	**20.0**	**5.00**	**5.2**	**18.4**	**5.0**	**15.0**	**0.003**				**59.7**
Baseline Data - Standard Deviation						0.63	0.00	0.0	0.00	2.8	21.4	2.1	0.0	0.000				94.8
Baseline Data Mean + 3xStandard Deviation						**3.93**	**1.00**	**20.0**	**5.00**	**13.7**	**82.7**	**11.2**	**15.0**	**0.003**				**344.1**
	MW-14 surface																	
08-10733	MW-14	2008	1	Phase I	0	0.7	<1.0	<20	<5.0	3.2	**20.0**	<5.0	<15	<0.0030	<10	<4.0	87.0	**94.0**
FM10-14WA	MW-14	2010	3	Phase I	0-15	2.0	<0.50	15.0	2.0	**25.0**	8.0	**13.0**	10.0	<0.10	<10	<10	33.0	43.0
FM12-14A	MW-14	2012	5	Phase I	0-15	**2.5**	<0.50	15.5	3.5	**6.3**	**23.8**	**24.2**	**21.0**	<0.050	<10	<10	19.0	29.0
FM-NH-MW-14-S	MW-14	2014	7	Phase II	0-15	**2.3**	0.1	9.4	1.8	4.2	13.0	**7.0**	14.0	<0.1	<10	<10	<10	15.0
MW-14 Shallow	MW-14	2017	10	Phase II	0-15	<1.0	<0.5	8.9	1.9	5.0	**21.7**	**6.8**	12.1	<0.05	<7	<4	60.0	**65.5**
	MW-14		15	Phase II														#N/A
	MW-14		25	Phase II														#N/A
																		#N/A
																		#N/A
	MW-14 depth																	
08-10735	MW-14	2008	1	Phase I	40	0.3	<1.0	<20	<5.0	<3.0	<10	<5.0	<15	<0.0030	<10	<4.0	14.0	21.0
FM10-14WB	MW-14	2010	3	Phase I	40-50	2.0	<0.50	**23.0**	2.0	4.0	6.0	**15.0**	9.0	<0.020	<10	<10	<20	20.0
FM12-14B	MW-14	2012	5	Phase I	40-50	1.4	<0.50	9.0	2.3	4.3	5.7	**15.1**	10.0	<0.050	<10	<10	<10	15.0
FM-NH-MW-14-D	MW-14	2014	7	Phase II	30-40	1.5	<0.10	7.4	1.4	2.4	3.2	4.7	8.1	<0.1	<10	<10	<10	15.0
MW-14 Deep (Dup Avg)	MW-14	2017	10	Phase II	40-50	<1.0	<0.5	7.0	1.5	2.8	8.6	**5.6**	6.3	<0.05	<7	<4	<8	9.5
	MW-14		15	Phase II														#N/A
	MW-14		25	Phase II														#N/A
																		#N/A
																		#N/A
	MW-15 surface																	
08-10729	MW-15	2008	1	Phase I	0	0.5	<1.0	<20	<5.0	**5.3**	**37.0**	**7.4**	**22.0**	<0.0030	<10	<4.0	21.0	28.0
FM10-15WA	MW-15	2010	3	Phase I	0-15	2.0	<0.50	18.0	2.0	**6.0**	14.0	**13.0**	11.0	<0.020	<10	15.0	<20	30.0
FM12-15A	MW-15	2012	5	Phase I	0-15	**2.5**	<0.50	15.5	3.2	**8.8**	**29.6**	**21.6**	**38.0**	<0.050	<10	<10	42.0	52.0
FM-NH-MW-15-S	MW-15	2014	7	Phase II	0-15	**3.8**	<0.10	11.0	2.7	5.1	10.0	**10.0**	15.0	<0.1	<10	<10	<10	15.0
MW-15 Shallow	MW-15	2017	10	Phase II	0-15	<1.0	<0.5	9.1	2.0	4.7	18.3	**7.4**	12.2	<0.05	<7	<4	<8	9.5
	MW-15		15	Phase II														#N/A
	MW-15		25	Phase II														#N/A
																		#N/A
																		#N/A
	MW-15 depth																	
08-10731	MW-15	2008	1	Phase I	40	0.3	<1.0	<20	<5.0	3.3	<10	**5.4**	**43.0**	<0.0030	<10	<4.0	160.0	**167.0**
FM10-15WB	MW-15	2010	3	Phase I	40-50	**3.0**	<0.50	18.0	2.0	5.0	6.0	**13.0**	10.0	<0.020	<10	18.0	<20	33.0
FM12-15B	MW-15	2012	5	Phase I	40-50	1.8	<0.50	14.4	3.0	**5.5**	13.7	**20.0**	**21.0**	<0.050	<10	<10	42.0	52.0
FM-NH-MW-15-D	MW-15	2014	7	Phase II	30-40	**2.4**	0.15	7.9	1.5	**5.4**	11.0	**7.9**	11.0	<0.1	<10	61.0	240.0	**306.0**
MW-15 Deep	MW-15	2017	10	Phase II	30-40	<1.0	<0.5	9.8	2.1	**6.1**	**44.8**	**7.2**	**16.3**	<0.05	<7	<4	23.0	28.5
	MW-15		15	Phase II														#N/A
	MW-15		25	Phase II														#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

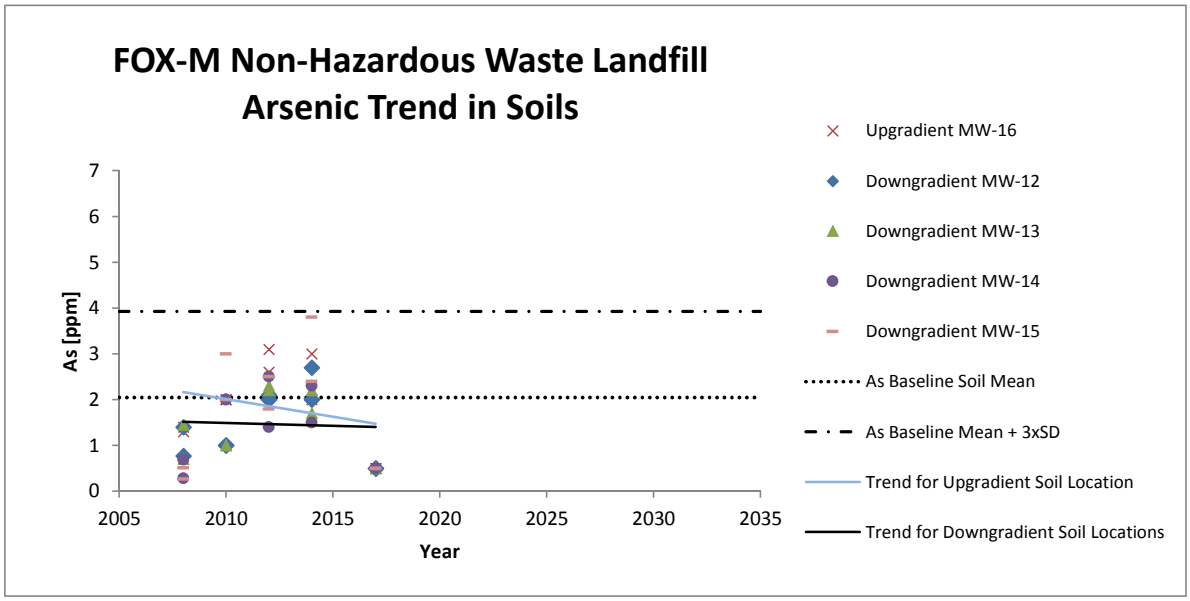
Legend	
XX	**Sample exceeds baseline mean**
XX	**Sample exceeds baseline mean + 3xSD**

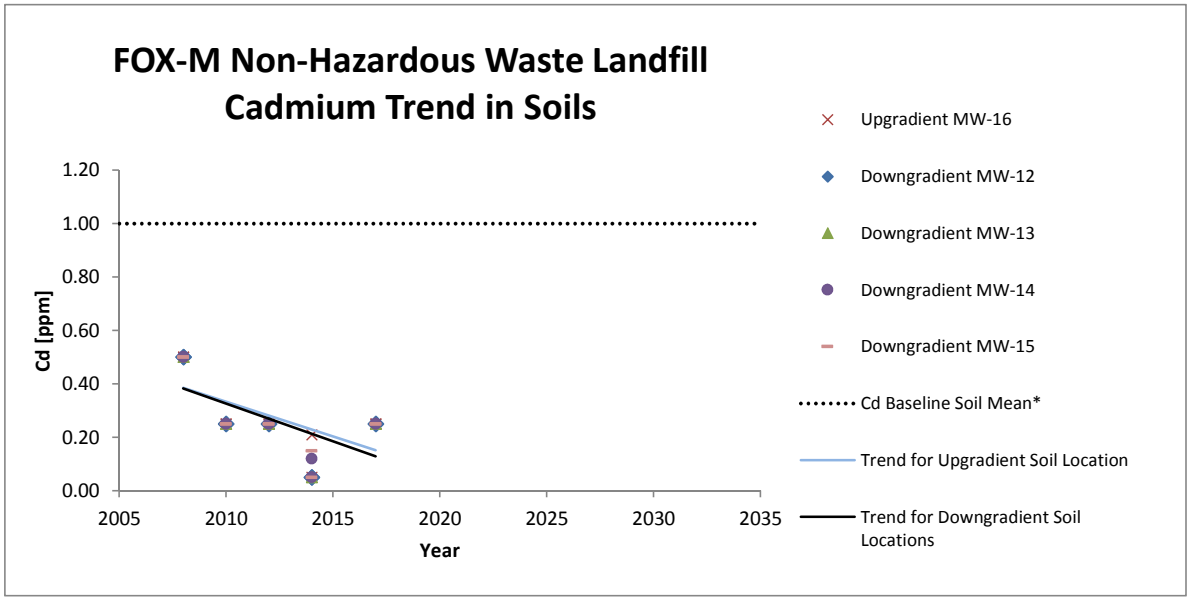
FOX-M Non-Hazardous Waste Landfill Trends in Soil Inorganics, PCBs and Modified TPH

Link to: Table of Contents

Where results are below detection, half of the detection limit has been used in the charts for the sample points.

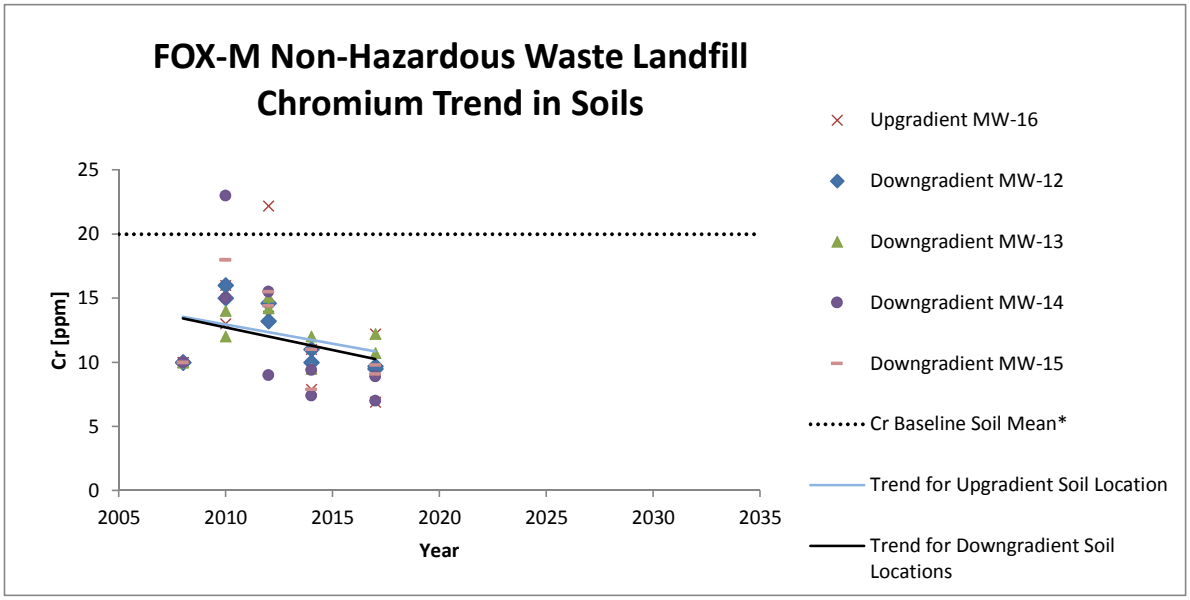
Trendlines are intended for visual interpretation of temporal trends. When all monitoring results are below detection, trendlines are a reflection of changes in detection limit. Users should refer to data tables.



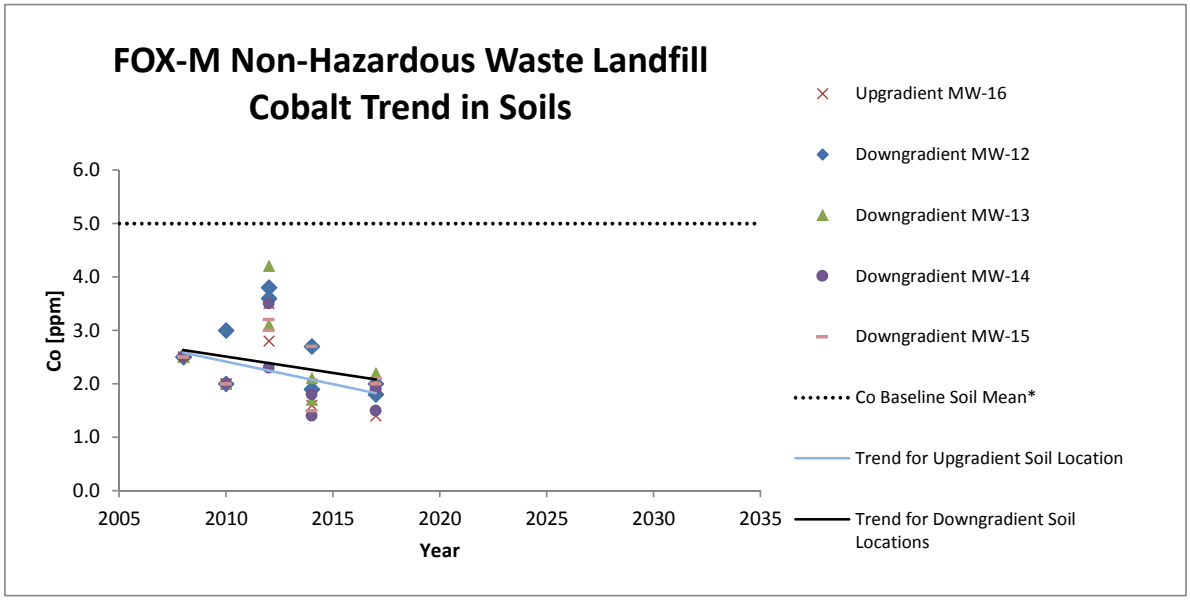


* Cd baseline arithmetic mean is equal to the baseline detection limit
* Cd baseline standard deviation = 0

FOX-M Non-Hazardous Waste Landfill Trends in Soil Inorganics, PCBs and Modified TPH

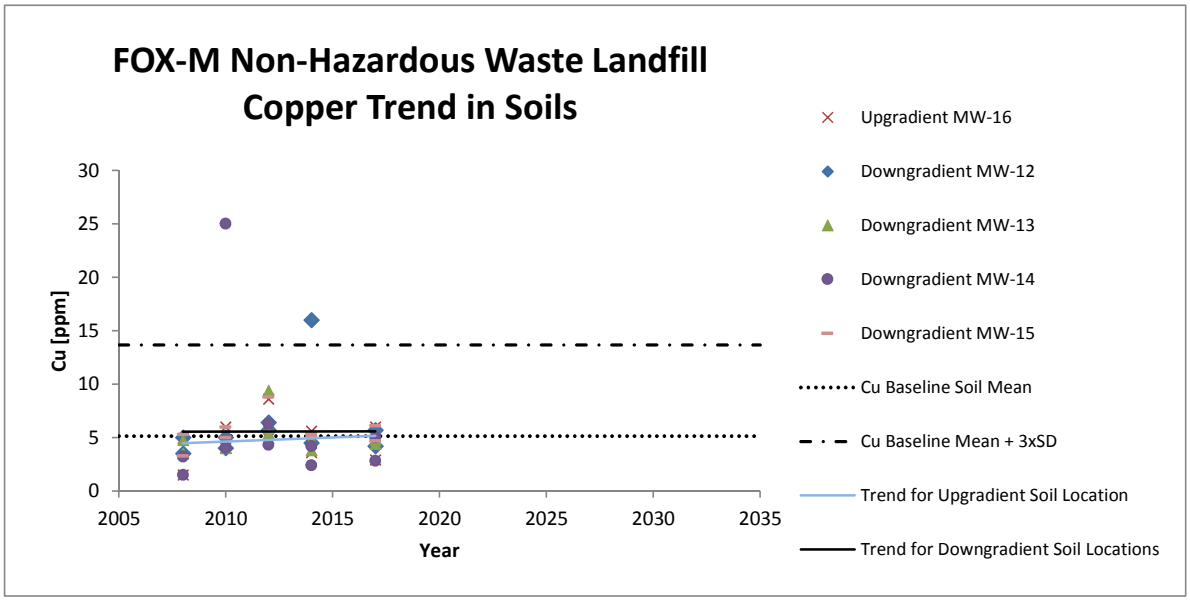


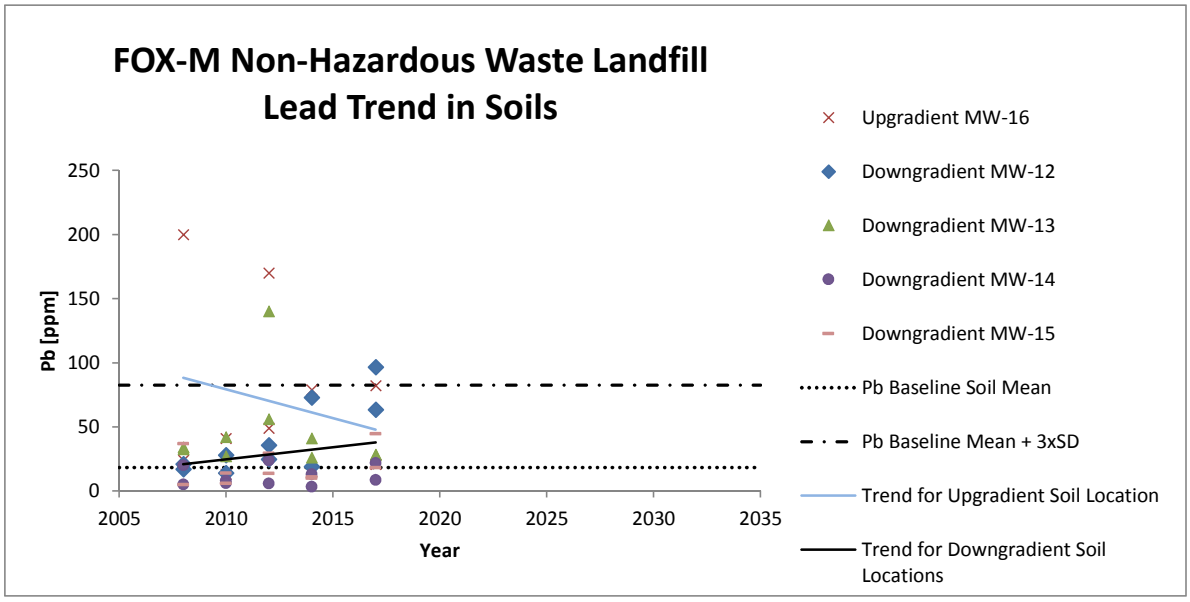
* Cr baseline arithmetic mean is equal to the baseline detection limit
* Cr baseline standard deviation = 0



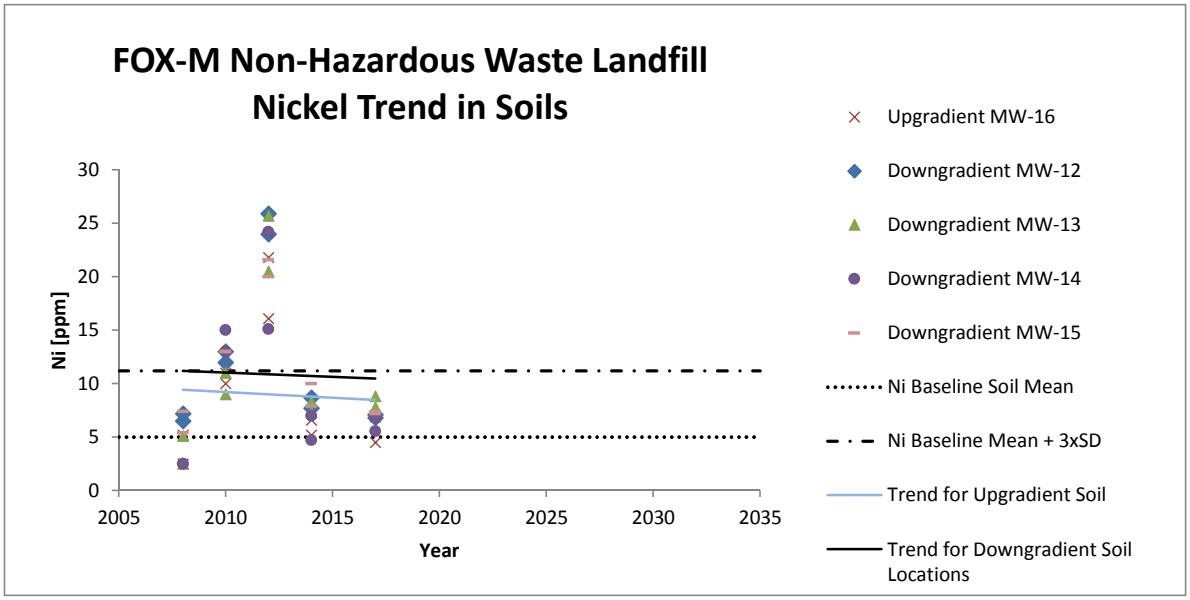
* Co baseline arithmetic mean is equal to the baseline detection limit
* Co baseline standard deviation = 0

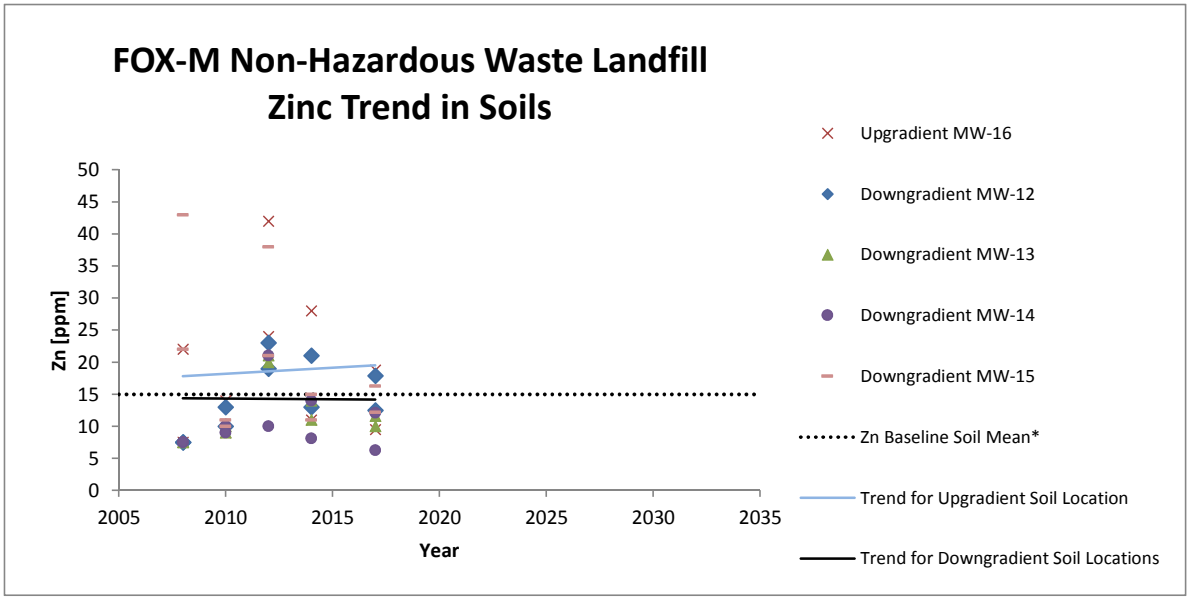
FOX-M Non-Hazardous Waste Landfill Trends in Soil Inorganics, PCBs and Modified TPH





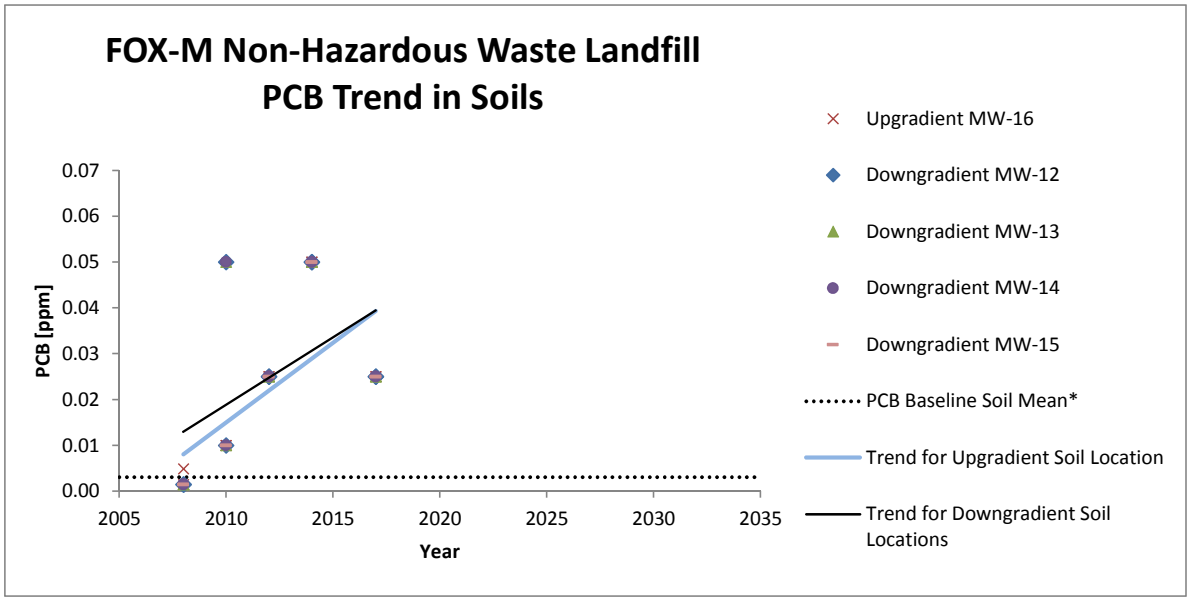
FOX-M Non-Hazardous Waste Landfill Trends in Soil Inorganics, PCBs and Modified TPH



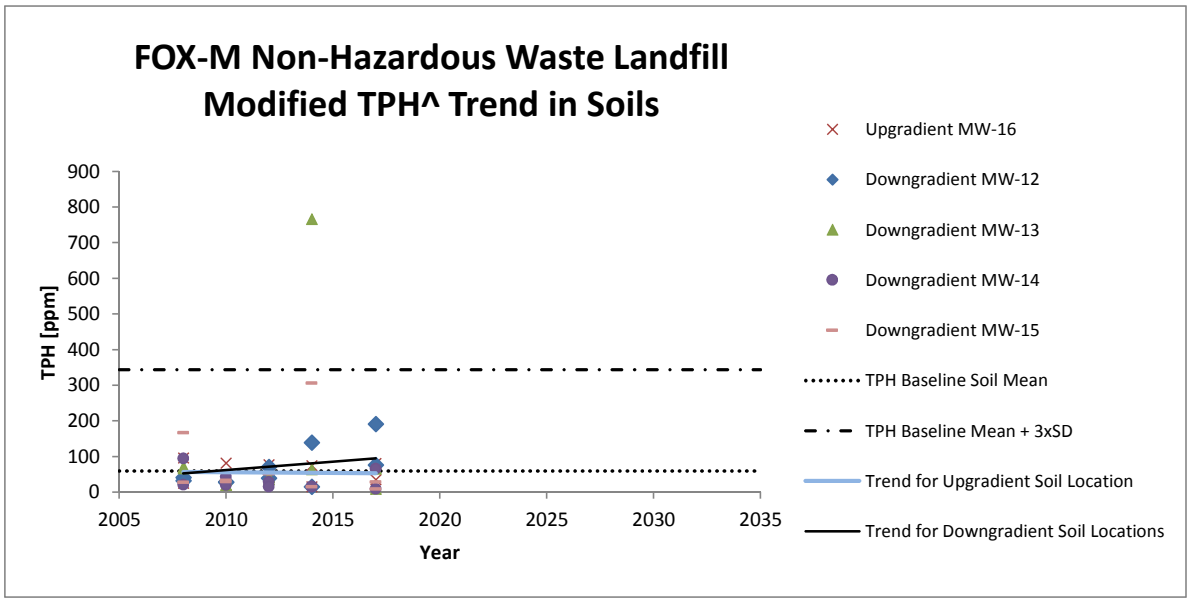


* Zn baseline arithmetic mean is equal to the baseline detection limit
* Zn baseline standard deviation = 0

FOX-M Non-Hazardous Waste Landfill Trends in Soil Inorganics, PCBs and Modified TPH



* PCB baseline standard deviation = 0



^ Modified TPH is sum of F1, F2 and F3 fractions (C_6 - C_{34})

FOX-M Non-Hazardous Waste Landfill - Summary of Groundwater Monitoring Analytical Data

Link to: Table of Contents

Sample ID	Location	Date	Monitoring Year	Monitoring Phase	As* (mg/L)	Cd* (mg/L)	Cr (mg/L)	Co* (mg/L)	Cu (mg/L)	Pb* (mg/L)	Ni (mg/L)	Zn (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																
Downgradient																
04-12740/41	MW-13	2004			<0.0030	<0.0010	<0.0050	<0.0030	0.0059	<0.010	0.017	<0.010				1.50
04-12742	MW-15	2004			<0.0030	<0.0010	<0.0050	<0.0030	0.010	<0.010	<0.0050	<0.010				<1.0
05-24350/51	MW-13	2005			<0.0030	<0.0010	0.023	<0.0030	<0.0050	<0.010	<0.020	<0.010				3.60
05-24352	MW-14	2005			<0.0030	<0.0010	0.011	<0.0030	<0.0050	<0.010	<0.020	<0.010				<1.0
05-24357	MW-15	2005			<0.0030	<0.0010	<0.010	<0.0030	<0.0050	<0.010	<0.0050	<0.010				<1.0
06-05780	MW-13	2006			0.0031	<0.0010	0.014	<0.0030	0.010	<0.010	0.0090	0.013				N/A
06-05765	MW-14	2006			0.0047	<0.0010	0.0087	<0.0030	0.0090	<0.010	0.010	<0.010				N/A
06-05770	MW-15	2006			0.0031	<0.0010	0.019	<0.0030	0.021	<0.010	0.014	0.010				N/A
07-29519	MW-13	2007			<0.0030	<0.0010	<0.0050	<0.0030	<0.0050	<0.010	<0.0050	<0.010				0.62
07-29520/21	MW-14	2007			<0.0030	<0.0010	0.017	<0.0030	<0.0050	<0.010	0.0052	0.44				<1.0
07-29522	MW-15	2007			<0.0030	<0.0010	0.018	<0.0030	<0.0050	<0.010	0.0063	0.027				<1.0
		N value			11	11	11	11	11	11	11	11				8
Baseline Data - Arithmetic Mean					0.0021	0.00050	0.011	0.0015	0.0064	0.0050	0.0081	0.0085				1.03
Baseline Data - Arithmetic Mean Corrected for Detection Limit					**0.0030**	**0.0010**	**0.011**	**0.0030**	**0.0064**	**0.010**	**0.0081**	**0.0085**				**1.03**
Baseline Data - Standard Deviation					0.0000	0.0000	0.0075	0.0000	0.0000	0.000	0.0048	0.0000				0.00
Baseline Data - Corrected Arithmetic Mean + 3xStandard Deviation					**0.0030**	**0.0010**	**0.0336**	**0.0030**	**0.0064**	**0.010**	**0.0225**	**0.0085**				**1.03**
**** If baseline arithmetic mean was below the detection limit, the mean has been modified to match the detection limit value.***																
Monitoring Data													**Modified TPH TOTAL will appear when F1, F2, F3 fraction results are entered.**			
Upgradient MW-16																
No sample collected - well dry	MW-16	2008	1	Phase I												#N/A
No sample collected - well dry	MW-16	2010	3	Phase I												#N/A
No sample collected - well dry	MW-16	2012	5	Phase I												#N/A
No sample collected - well dry	MW-16	2014	7	Phase II												#N/A
No sample collected - frozen	MW-16	2017	10	Phase II												#N/A
	MW-16		15	Phase II												#N/A
	MW-16		25	Phase II												#N/A
																#N/A
																#N/A
																#N/A

FOX-M Non-Hazardous Waste Landfill - Summary of Groundwater Monitoring Analytical Data

Link to: Table of Contents

Sample ID	Location	Date	Monitoring Year	Monitoring Phase	As* (mg/L)	Cd* (mg/L)	Cr (mg/L)	Co* (mg/L)	Cu (mg/L)	Pb* (mg/L)	Ni (mg/L)	Zn (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																
Downgradient																
04-12740/41	MW-13	2004			<0.0030	<0.0010	<0.0050	<0.0030	0.0059	<0.010	0.017	<0.010				1.50
04-12742	MW-15	2004			<0.0030	<0.0010	<0.0050	<0.0030	0.010	<0.010	<0.0050	<0.010				<1.0
05-24350/51	MW-13	2005			<0.0030	<0.0010	0.023	<0.0030	<0.0050	<0.010	<0.020	<0.010				3.60
05-24352	MW-14	2005			<0.0030	<0.0010	0.011	<0.0030	<0.0050	<0.010	<0.020	<0.010				<1.0
05-24357	MW-15	2005			<0.0030	<0.0010	<0.010	<0.0030	<0.0050	<0.010	<0.0050	<0.010				<1.0
06-05780	MW-13	2006			0.0031	<0.0010	0.014	<0.0030	0.010	<0.010	0.0090	0.013				N/A
06-05765	MW-14	2006			0.0047	<0.0010	0.0087	<0.0030	0.0090	<0.010	0.010	<0.010				N/A
06-05770	MW-15	2006			0.0031	<0.0010	0.019	<0.0030	0.021	<0.010	0.014	0.010				N/A
07-29519	MW-13	2007			<0.0030	<0.0010	<0.0050	<0.0030	<0.0050	<0.010	<0.0050	<0.010				0.62
07-29520/21	MW-14	2007			<0.0030	<0.0010	0.017	<0.0030	<0.0050	<0.010	0.0052	0.44				<1.0
07-29522	MW-15	2007			<0.0030	<0.0010	0.018	<0.0030	<0.0050	<0.010	0.0063	0.027				<1.0
		N value			11	11	11	11	11	11	11	11				8
Baseline Data - Arithmetic Mean					0.0021	0.00050	0.011	0.0015	0.0064	0.0050	0.0081	0.0085				1.03
Baseline Data - Arithmetic Mean Corrected for Detection Limit					**0.0030**	**0.0010**	**0.011**	**0.0030**	**0.0064**	**0.010**	**0.0081**	**0.0085**				**1.03**
Baseline Data - Standard Deviation					0.0000	0.0000	0.0075	0.0000	0.0000	0.000	0.0048	0.0000				0.00
Baseline Data - Corrected Arithmetic Mean + 3xStandard Deviation					**0.0030**	**0.0010**	**0.0336**	**0.0030**	**0.0064**	**0.010**	**0.0225**	**0.0085**				**1.03**
Downgradient MW-12																
No sample collected - well dry	MW-12	2008	1	Phase I												#N/A
No sample collected - well dry	MW-12	2010	3	Phase I												#N/A
No sample collected - well dry	MW-12	2012	5	Phase I												#N/A
No sample collected - well dry	MW-12	2014	7	Phase II												#N/A
No sample collected - frozen	MW-12	2017	10	Phase II												#N/A
	MW-12		15	Phase II												#N/A
	MW-12		25	Phase II												#N/A
																#N/A
																#N/A
																#N/A
Downgradient MW-13																
08-10709	MW-13	2008	1	Phase I	<0.0030	<0.0010	<0.0050	<0.0030	<0.0050	0.00172	<0.0050	**0.039**	N/A	N/A	N/A	**1.40**
FM10-13W	MW-13	2010	3	Phase I	<0.0010	0.00010	0.004	0.001	0.003	<0.0010	**0.010**	<0.010	N/A	N/A	N/A	<0.20
FM12-13	MW-13	2012	5	Phase I	<0.0010	0.00005	0.005	0.002	0.005	0.002	**0.024**	**0.015**	N/A	N/A	N/A	**3.00**
No sample collected (free product)	MW-13	2014	7	Phase II												#N/A
MW-13 (*dissolved metals*)	MW-13	2017	10	Phase II	*<0.001*	*<0.0001*	*<0.001*	*<0.0005*	*<0.0005*	*0.0002*	*0.003*	***0.009***	0.319	0.70	<0.1	**1.069**
	MW-13		15	Phase II												#N/A
	MW-13		25	Phase II												#N/A
																#N/A
																#N/A
																#N/A

FOX-M Non-Hazardous Waste Landfill - Summary of Groundwater Monitoring Analytical Data

Link to: Table of Contents

Sample ID	Location	Date	Monitoring Year	Monitoring Phase	As* (mg/L)	Cd* (mg/L)	Cr (mg/L)	Co* (mg/L)	Cu (mg/L)	Pb* (mg/L)	Ni (mg/L)	Zn (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																
Downgradient																
04-12740/41	MW-13	2004			<0.0030	<0.0010	<0.0050	<0.0030	0.0059	<0.010	0.017	<0.010				1.50
04-12742	MW-15	2004			<0.0030	<0.0010	<0.0050	<0.0030	0.010	<0.010	<0.0050	<0.010				<1.0
05-24350/51	MW-13	2005			<0.0030	<0.0010	0.023	<0.0030	<0.0050	<0.010	<0.020	<0.010				3.60
05-24352	MW-14	2005			<0.0030	<0.0010	0.011	<0.0030	<0.0050	<0.010	<0.020	<0.010				<1.0
05-24357	MW-15	2005			<0.0030	<0.0010	<0.010	<0.0030	<0.0050	<0.010	<0.0050	<0.010				<1.0
06-05780	MW-13	2006			0.0031	<0.0010	0.014	<0.0030	0.010	<0.010	0.0090	0.013				N/A
06-05765	MW-14	2006			0.0047	<0.0010	0.0087	<0.0030	0.0090	<0.010	0.010	<0.010				N/A
06-05770	MW-15	2006			0.0031	<0.0010	0.019	<0.0030	0.021	<0.010	0.014	0.010				N/A
07-29519	MW-13	2007			<0.0030	<0.0010	<0.0050	<0.0030	<0.0050	<0.010	<0.0050	<0.010				0.62
07-29520/21	MW-14	2007			<0.0030	<0.0010	0.017	<0.0030	<0.0050	<0.010	0.0052	0.44				<1.0
07-29522	MW-15	2007			<0.0030	<0.0010	0.018	<0.0030	<0.0050	<0.010	0.0063	0.027				<1.0
		N value			11	11	11	11	11	11	11	11				8
Baseline Data - Arithmetic Mean					0.0021	0.00050	0.011	0.0015	0.0064	0.0050	0.0081	0.0085				1.03
Baseline Data - Arithmetic Mean Corrected for Detection Limit					**0.0030**	**0.0010**	**0.011**	**0.0030**	**0.0064**	**0.010**	**0.0081**	**0.0085**				**1.03**
Baseline Data - Standard Deviation					0.0000	0.0000	0.0075	0.0000	0.0000	0.000	0.0048	0.0000				0.00
Baseline Data - Corrected Arithmetic Mean + 3xStandard Deviation					**0.0030**	**0.0010**	**0.0336**	**0.0030**	**0.0064**	**0.010**	**0.0225**	**0.0085**				**1.03**
Downgradient MW-14																
No sample collected - well dry	MW-14	2008	1	Phase I												#N/A
No sample collected - well dry	MW-14	2010	3	Phase I												#N/A
No sample collected - well dry	MW-14	2012	5	Phase I												#N/A
No sample collected - well dry	MW-14	2014	7	Phase II												#N/A
No sample collected - frozen	MW-14	2017	10	Phase II												#N/A
	MW-14		15	Phase II												#N/A
	MW-14		25	Phase II												#N/A
																#N/A
																#N/A
																#N/A
Downgradient MW-15																
08-10710	MW-15	2008	1	Phase I	<0.0030	<0.0010	<0.0050	<0.0030	0.00567	0.00123	<0.0050	<0.0050	N/A	N/A	N/A	<1.0
FM10-15W	MW-15	2010	3	Phase I	<0.0010	<0.00010	0.004	0.0004	0.002	<0.0010	**0.010**	<0.010	N/A	N/A	N/A	<0.20
FM12-15	MW-15	2012	5	Phase I	<0.0010	<0.000050	0.011	0.003	0.005	0.001	**0.024**	**0.047**	N/A	N/A	N/A	<0.10
FM-NH-MW-15	MW-15	2014	7	Phase II	0.00028	<0.000020	**0.013**	0.001	0.001	0.00021	0.008	0.004	<0.025	<0.100	<0.100	0.113
MW-15 (*dissolved metals*)	MW-15	2017	10	Phase II	*<0.001*	*<0.0001*	*<0.001*	*<0.0005*	*<0.0005*	*<0.0001*	*0.002*	*0.007*	<0.025	<0.1	<0.1	0.113
	MW-15		15	Phase II												#N/A
	MW-15		25	Phase II												#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

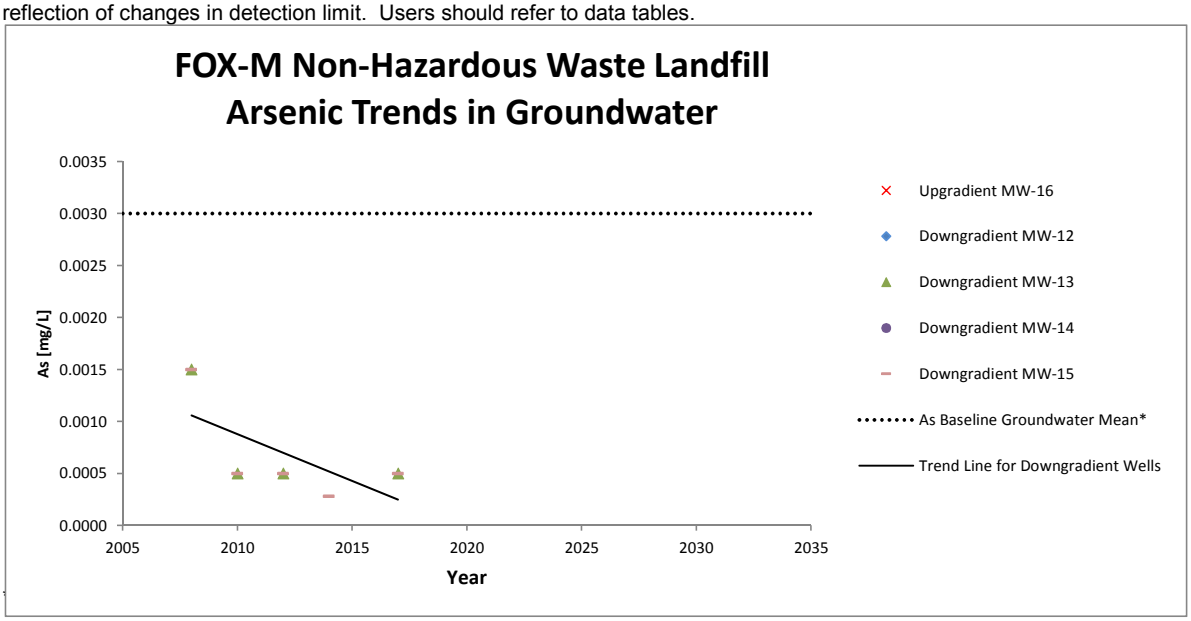
Legend	
XX	Sample exceeds baseline mean
XX	**Sample exceeds baseline mean + 3xSD**

FOX-M Non-Hazardous Waste Landfill Trends in Groundwater Inorganics, PCBs and Modified TPH

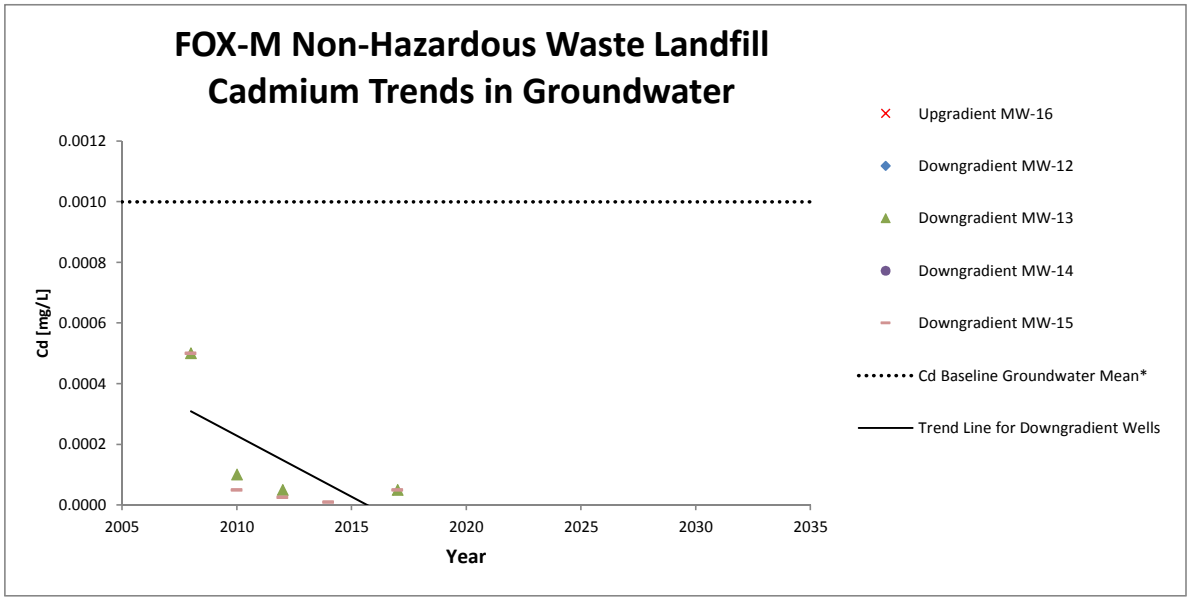
Link to: Table of Contents

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.

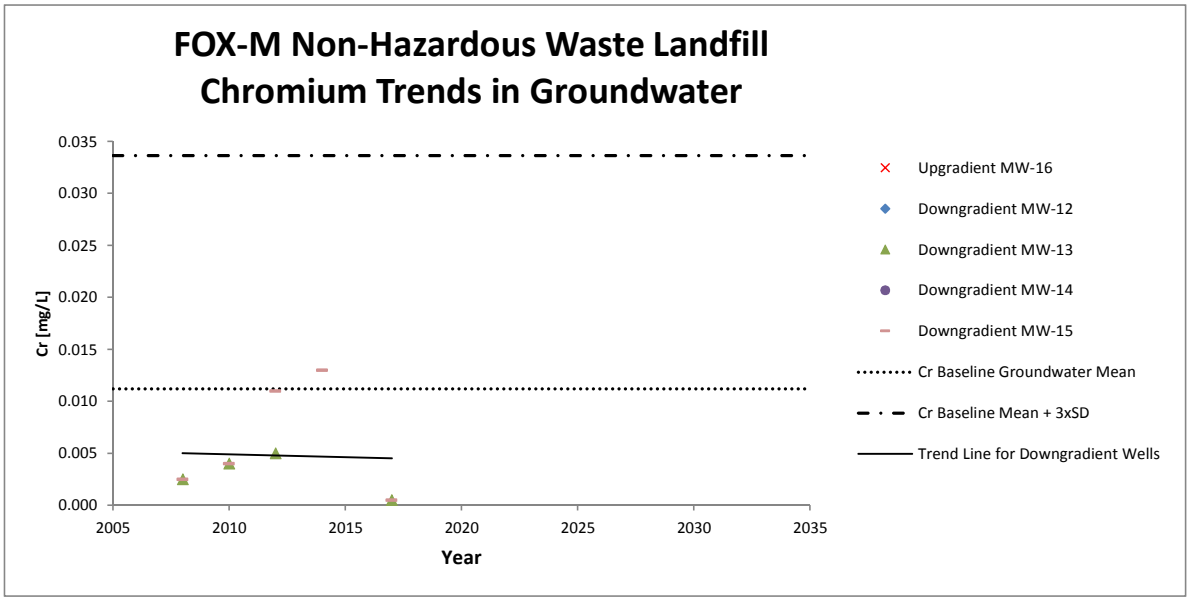


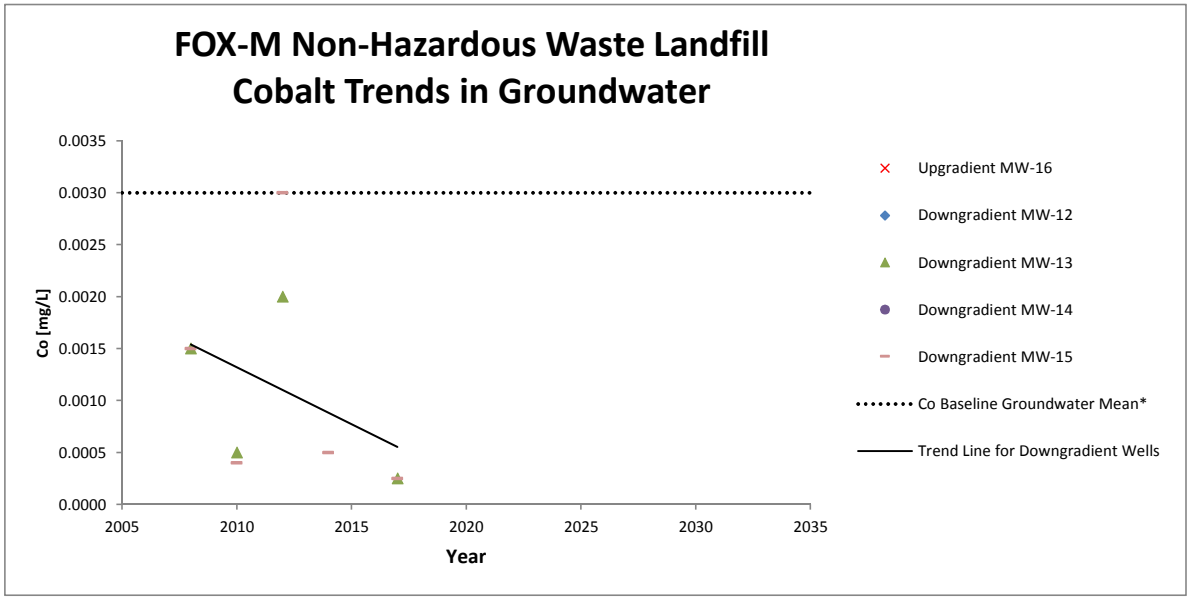
* As baseline arithmetic mean is equal to the baseline detection limit
* As baseline standard deviation = 0



* Cd baseline arithmetic mean is equal to the baseline detection limit
* Cd baseline standard deviation = 0

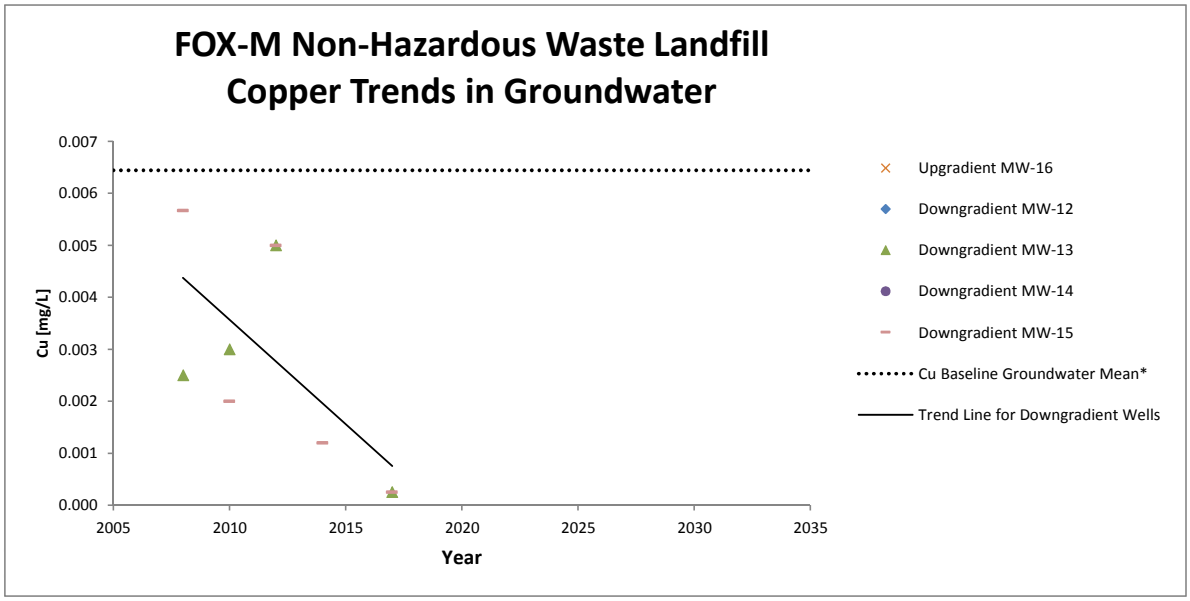
FOX-M Non-Hazardous Waste Landfill Trends in Groundwater Inorganics, PCBs and Modified TPH



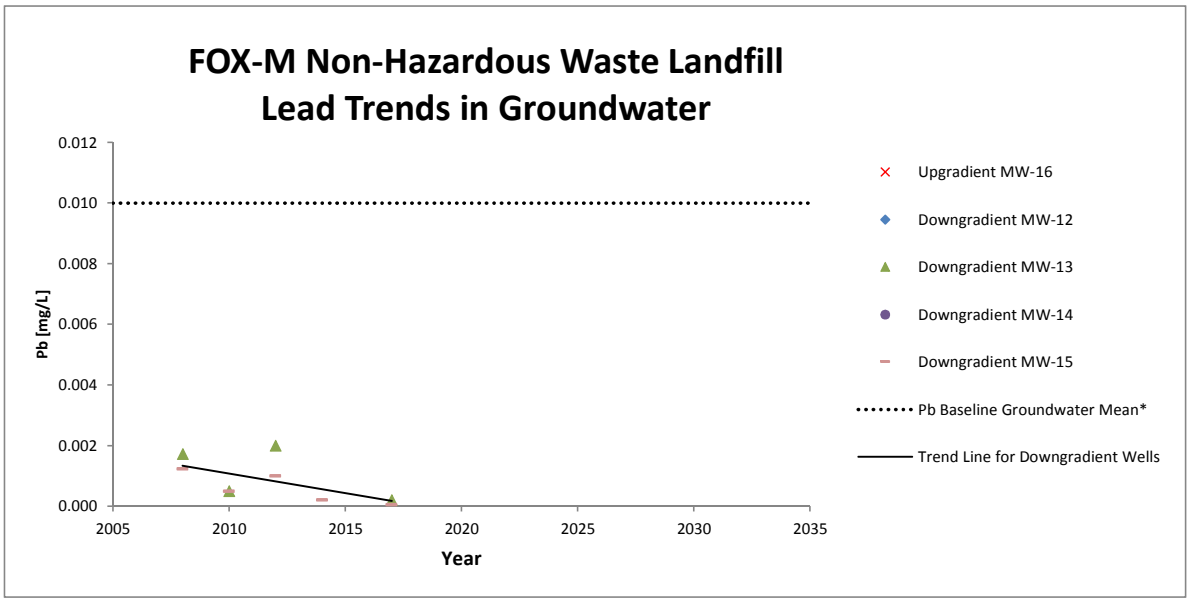


* Co baseline arithmetic mean is equal to the baseline detection limit
* Co baseline standard deviation = 0

FOX-M Non-Hazardous Waste Landfill Trends in Groundwater Inorganics, PCBs and Modified TPH

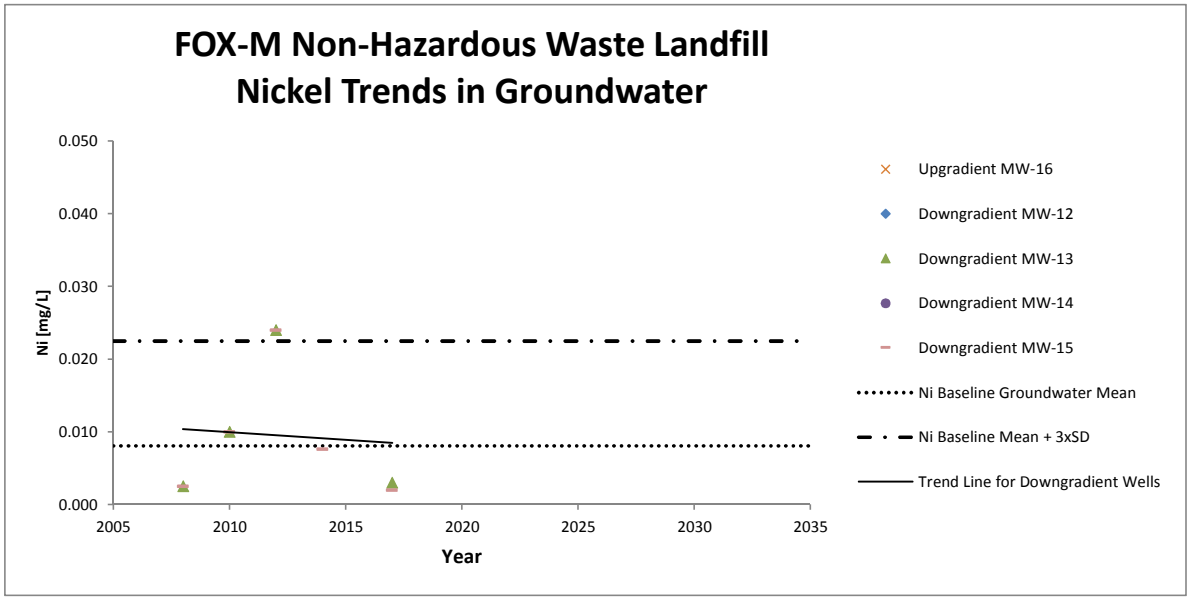


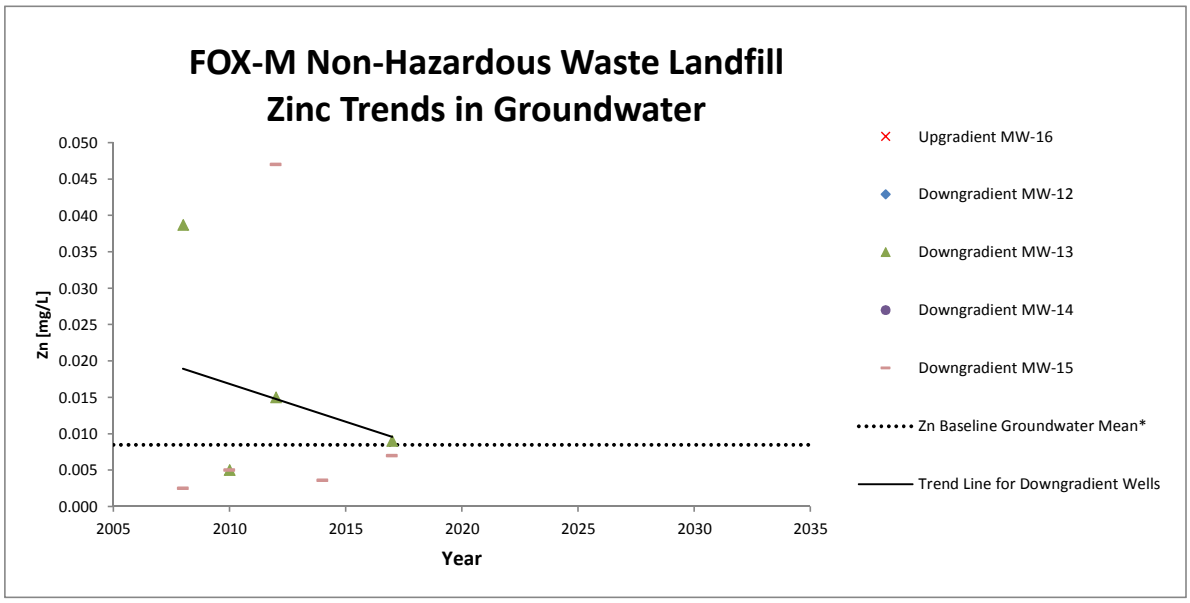
* Cu baseline standard deviation = 0



* Pb baseline arithmetic mean is equal to the baseline detection limit
* Pb baseline standard deviation = 0

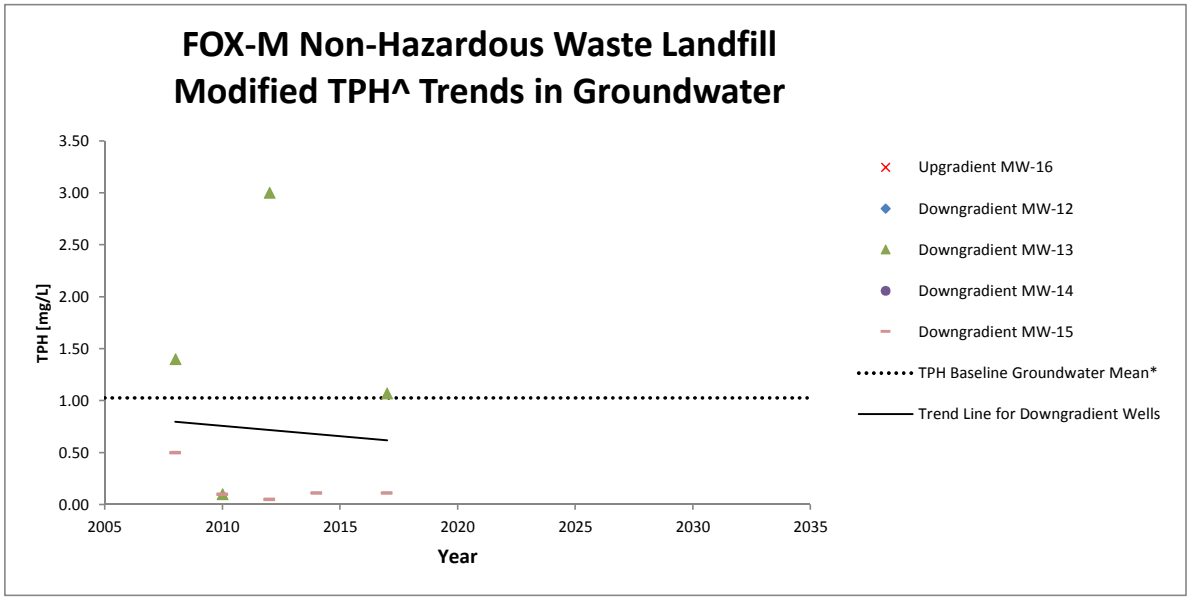
FOX-M Non-Hazardous Waste Landfill Trends in Groundwater Inorganics, PCBs and Modified TPH





* Zn baseline standard deviation = 0

FOX-M Non-Hazardous Waste Landfill Trends in Groundwater Inorganics, PCBs and Modified TPH



^ Modified TPH is sum of F1, F2 and F3 fractions (C_6 - C_{34})

* TPH baseline standard deviation = 0

MW-13 not sampled in 2014 due to the presence of free product in the well

FOX-M G217-West Landfill - Summary of Soil Monitoring Analytical Data

Link to: Table of Contents

Sample ID	Location	Year	Monitoring Year	Monitoring Phase	Depth (cm)	As* (mg/kg)	Cd* (mg/kg)	Cr* (mg/kg)	Co* (mg/kg)	Cu (mg/kg)	Pb* (mg/kg)	Ni* (mg/kg)	Zn* (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						1.00	1.00	20.0	5.00	6.3	10.0	5.0	15.0	0.213				N/A
Baseline Data - Arithmetic Mean						**2.07**	**1.00**	**20.0**	**5.00**	**5.9**	**11.9**	**5.9**	**40.9**	**0.003**				**146.1**
Baseline Data - Standard Deviation						0.77	0.00	0.0	0.00	4.1	0.0	3.2	57.1	0.000				261.9
Baseline Data Mean + 3xStandard Deviation						**4.38**	**1.00**	**20.0**	**5.00**	**18.2**	**11.9**	**15.4**	**212.1**	**0.003**				**931.9**
**** 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						*30*	*5*	*250*	*50*	*100*	*500*	*100*	*500*	*5*				*2500*
Monitoring Data																		**TPH Sum will appear when F1, F2 and F3 fractions are entered.**
Upgradient - no identified upgradient locations																		
Downgradient																		
	FM-5 surface																	
08-10881/82	FM-5	2008	1	Phase I	0	0.7	<1.0	<20	<5.0	2.4	<10	3.8	<15	<0.0030	<10	<4.0	<9.0	11.5
FM10-5A	FM-5	2010	3	Phase I	0-15	2.0	<0.50	12.0	3.0	5.0	4.0	**11.0**	12.0	<0.20	<10	<10	<20	15.0
FM12-5A	FM-5	2012	5	Phase I	0-15	0.6	<0.50	7.5	1.5	2.0	1.7	**7.9**	9.0	<0.050	<10	<10	<10	15.0
FM-W-5-S	FM-5	2014	7	Phase II	0-15	**3.1**	<0.10	14.0	2.9	5.9	5.4	**8.1**	14.0	<0.1	<10	<10	<10	15.0
FM-5 Shallow (Dup Avg)	FM-5	2017	10	Phase II	0-15	<1.0	<0.5	4.8	1.1	1.9	2.1	2.6	3.1	<0.05	<7	<4	<8	9.5
	FM-5		15	Phase II														#N/A
	FM-5		25	Phase II														#N/A
																		#N/A
																		#N/A
																		#N/A
																		#N/A
																		#N/A
	FM-5 depth																	
08-10883	FM-5	2008	1	Phase I	40	**2.2**	<1.0	<20	<5.0	5.3	<10	**8.1**	<15	<0.0030	<10	<4.0	<9.0	11.5
FM10-5B	FM-5	2010	3	Phase I	40-50	**3.0**	<0.50	13.0	3.0	**6.0**	5.0	**12.0**	14.0	<0.20	<10	<10	47.0	57.0
FM12-5B	FM-5	2012	5	Phase I	40-50	1.0	<0.50	7.7	1.7	2.2	1.7	**8.9**	9.0	<0.050	<10	<10	<10	15.0
FM-W-5-D	FM-5	2014	7	Phase II	40-50	**2.7**	<0.10	17.0	3.8	**6.6**	6.1	**11.0**	17.0	<0.1	<10	<10	<10	15.0
Not sampled - refusal	FM-5	2017	10	Phase II														#N/A
	FM-5		15	Phase II														#N/A
	FM-5		25	Phase II														#N/A
																		#N/A
																		#N/A
																		#N/A
																		#N/A
																		#N/A

FOX-M G217-West Landfill - Summary of Soil Monitoring Analytical Data

Link to: Table of Contents

Sample ID	Location	Year	Monitoring Year	Monitoring Phase	Depth (cm)	As* (mg/kg)	Cd* (mg/kg)	Cr* (mg/kg)	Co* (mg/kg)	Cu (mg/kg)	Pb* (mg/kg)	Ni* (mg/kg)	Zn* (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						1.00	1.00	20.0	5.00	6.3	10.0	5.0	15.0	0.213				N/A
Baseline Data - Arithmetic Mean						**2.07**	**1.00**	**20.0**	**5.00**	**5.9**	**11.9**	**5.9**	**40.9**	**0.003**				**146.1**
Baseline Data - Standard Deviation						0.77	0.00	0.0	0.00	4.1	0.0	3.2	57.1	0.000				261.9
Baseline Data Mean + 3xStandard Deviation						**4.38**	**1.00**	**20.0**	**5.00**	**18.2**	**11.9**	**15.4**	**212.1**	**0.003**				**931.9**
	FM-6 surface																	
08-10869	FM-6	2008	1	Phase I	0	**5.8**	<1.0	<20	<5.0	**6.0**	**13.4**	**7.4**	**310.0**	<0.0030	<10	18.0	1500.0	**1523.0**
FM10-6A	FM-6	2010	3	Phase I	0-15	2.0	<0.50	14.0	3.0	**7.0**	**23.0**	**11.0**	**483.0**	<0.10	<10	<10	<20	20.0
FM12-6A-D	FM-6	2012	5	Phase I	0-15	**2.5**	<0.50	15.0	3.4	**21.5**	**27.4**	**21.3**	**119.0**	<0.050	<10	<10	176.0	**186.0**
FM-W-6-S	FM-6	2014	7	Phase II	0-15	**2.5**	0.2	12.0	2.1	**7.9**	**28.0**	**8.8**	**200.0**	<0.1	<10	<10	620.0	**630.0**
FM-6 Shallow	FM-6	2017	10	Phase II	0-15	<1.0	<0.5	12.7	2.5	**15.6**	**32.6**	**9.1**	**99.1**	<0.05	<7	<4	25.0	30.5
	FM-6		15	Phase II														#N/A
	FM-6		25	Phase II														#N/A
																		#N/A
																		#N/A
																		#N/A
	FM-6 depth																	
08-10871	FM-6	2008	1	Phase I	40	2.0	<1.0	<20	<5.0	**6.3**	**13.9**	**6.8**	**270.0**	<0.0030	20.0	22.0	1500.0	**1527.0**
FM10-6B	FM-6	2010	3	Phase I	40-50	2.0	<0.50	11.0	2.0	**7.0**	11.0	**9.0**	**52.0**	<0.10	<10	<10	51.0	61.0
FM12-6B	FM-6	2012	5	Phase I	40-50	1.9	<0.50	10.0	2.4	**8.9**	**19.9**	**14.5**	**234.0**	<0.050	<10	<10	648.0	**658.0**
FM-W-6-D	FM-6	2014	7	Phase II	40-50	**2.4**	0.2	14.0	2.4	**14.0**	**32.0**	**9.2**	**140.0**	<0.1	<10	<10	12.0	22.0
FM-6 Deep	FM-6	2017	10	Phase II	30-40	<1.0	<0.5	13.0	2.4	**13.3**	**45.6**	**8.4**	**139.0**	<0.05	<7	<4	<8	9.5
	FM-6		15	Phase II														#N/A
	FM-6		25	Phase II														#N/A
																		#N/A
																		#N/A
																		#N/A
	FM-7 surface																	
08-10873	FM-7	2008	1	Phase I	0	**2.4**	<1.0	<20	<5.0	<3.0	**18.9**	**6.5**	16.7	<0.0030	<10	<4.0	<9.0	11.5
FM10-7A	FM-7	2010	3	Phase I	0-15	**3.0**	<0.50	**23.0**	3.0	**7.0**	**56.0**	**12.0**	40.0	<0.020	<10	10.0	<20	25.0
FM12-7A	FM-7	2012	5	Phase I	0-15	**3.5**	<0.50	19.4	3.3	**11.8**	**46.8**	**21.9**	24.0	<0.050	<10	<10	<10	15.0
FM-W-7-S	FM-7	2014	7	Phase II	0-15	**3.5**	0.2	14.0	2.2	4.0	**25.0**	**8.3**	21.0	<0.1	<10	<10	<10	15.0
FM-7 Shallow	FM-7	2017	10	Phase II	0-15	<1.0	<0.5	19.4	2.9	**6.1**	**57.6**	**10.0**	25.8	<0.05	<7	<4	<8	9.5
	FM-7		15	Phase II														#N/A
	FM-7		25	Phase II														#N/A
																		#N/A
																		#N/A
																		#N/A
	FM-7 depth																	
08-10875/76	FM-7	2008	1	Phase I	40	**2.9**	<1.0	<20	<5.0	3.7	**32.0**	**6.9**	19.5	<0.0030	<10	<4.0	<9.0	11.5
FM10-7B	FM-7	2010	3	Phase I	40-50	<1.0	<0.50	8.0	1.0	2.0	3.0	5.0	8.0	<0.020	<10	<10	<20	20.0
FM12-7B	FM-7	2012	5	Phase I	40-50	**3.2**	0.7	**27.0**	3.4	**13.3**	**79.3**	**20.5**	30.0	<0.050	<10	<10	14.0	24.0
FM-W-7-D	FM-7	2014	7	Phase II	40-50	<1.0	<0.10	4.6	0.7	1.9	2.0	2.6	5.9	<0.1	<10	<10	<10	15.0
FM-7 Deep	FM-7	2017	10	Phase II	40-50	<1.0	**1.7**	18.5	3.1	5.8	**52.3**	**10.3**	24.2	<0.05	<7	<4	10.0	15.5
	FM-7		15	Phase II														#N/A
	FM-7		25	Phase II														#N/A
																		#N/A

FOX-M G217-West Landfill - Summary of Soil Monitoring Analytical Data

Link to: Table of Contents

Sample ID	Location	Year	Monitoring Year	Monitoring Phase	Depth (cm)	As* (mg/kg)	Cd* (mg/kg)	Cr* (mg/kg)	Co* (mg/kg)	Cu (mg/kg)	Pb* (mg/kg)	Ni* (mg/kg)	Zn* (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						1.00	1.00	20.0	5.00	6.3	10.0	5.0	15.0	0.213				N/A
Baseline Data - Arithmetic Mean						**2.07**	**1.00**	**20.0**	**5.00**	**5.9**	**11.9**	**5.9**	**40.9**	**0.003**				**146.1**
Baseline Data - Standard Deviation						0.77	0.00	0.0	0.00	4.1	0.0	3.2	57.1	0.000				261.9
Baseline Data Mean + 3xStandard Deviation						**4.38**	**1.00**	**20.0**	**5.00**	**18.2**	**11.9**	**15.4**	**212.1**	**0.003**				**931.9**
	FM-8 surface																	
08-10877	FM-8	2008	1	Phase I	0	1.5	<1.0	<20	<5.0	<3.0	<10	<5.0	<15	<0.0030	<10	<4.0	<9.0	11.5
FM10-8A	FM-8	2010	3	Phase I	0-15	2.0	<0.50	12.0	2.0	5.0	4.0	**10.0**	11.0	<0.020	<10	12.0	<20	27.0
FM12-8A	FM-8	2012	5	Phase I	0-15	1.7	<0.50	8.0	2.1	**6.6**	4.9	**13.1**	11.0	<0.050	<10	<10	<10	15.0
FM-W-8-S	FM-8	2014	7	Phase II	0-15	**2.4**	<0.10	8.4	1.5	4.1	3.8	5.9	9.2	<0.1	<10	<10	<10	15.0
FM-8 Shallow	FM-8	2017	10	Phase II	0-15	<1.0	<0.5	6.0	1.2	3.0	3.7	4.3	5.1	<0.05	<7	<4	<8	9.5
	FM-8		15	Phase II														#N/A
	FM-8		25	Phase II														#N/A
																		#N/A
																		#N/A
																		#N/A
																		#N/A
																		#N/A
	FM-8 depth																	
08-10879	FM-8	2008	1	Phase I	40	**2.2**	<1.0	<20	<5.0	<3.0	<10	<5.0	<15	<0.0030	<10	<4.0	<9.0	11.5
FM10-8B	FM-8	2010	3	Phase I	40-50	**3.0**	<0.50	**43.0**	2.0	**6.0**	4.0	**24.0**	9.0	<0.40	<10	<10	<20	20.0
FM12-8B	FM-8	2012	5	Phase I	40-50	**3.5**	<0.50	13.0	3.1	**17.2**	5.4	**19.8**	27.0	<0.050	<10	<10	<10	15.0
FM-W-8-D	FM-8	2014	7	Phase II	40-50	1.2	<0.10	5.8	1.0	3.4	1.8	3.4	5.8	<0.1	<10	<10	<10	15.0
FM-8 Deep	FM-8	2017	10	Phase II	40-50	<1.0	<0.5	5.5	<1.0	2.1	3.4	3.8	4.3	<0.05	<7	<4	<8	9.5
	FM-8		15	Phase II														#N/A
	FM-8		25	Phase II														#N/A
																		#N/A
																		#N/A
																		#N/A
																		#N/A
																		#N/A

Legend

XX **Sample exceeds baseline mean**

XX **Sample exceeds baseline mean + 3xSD**

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

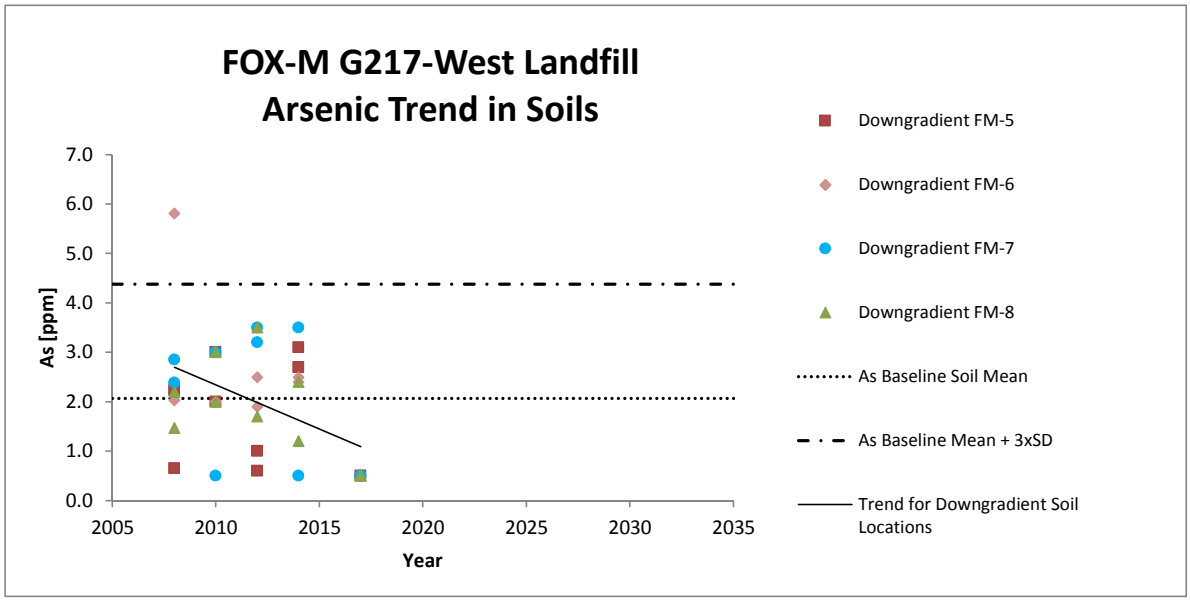
N/A = not analyzed

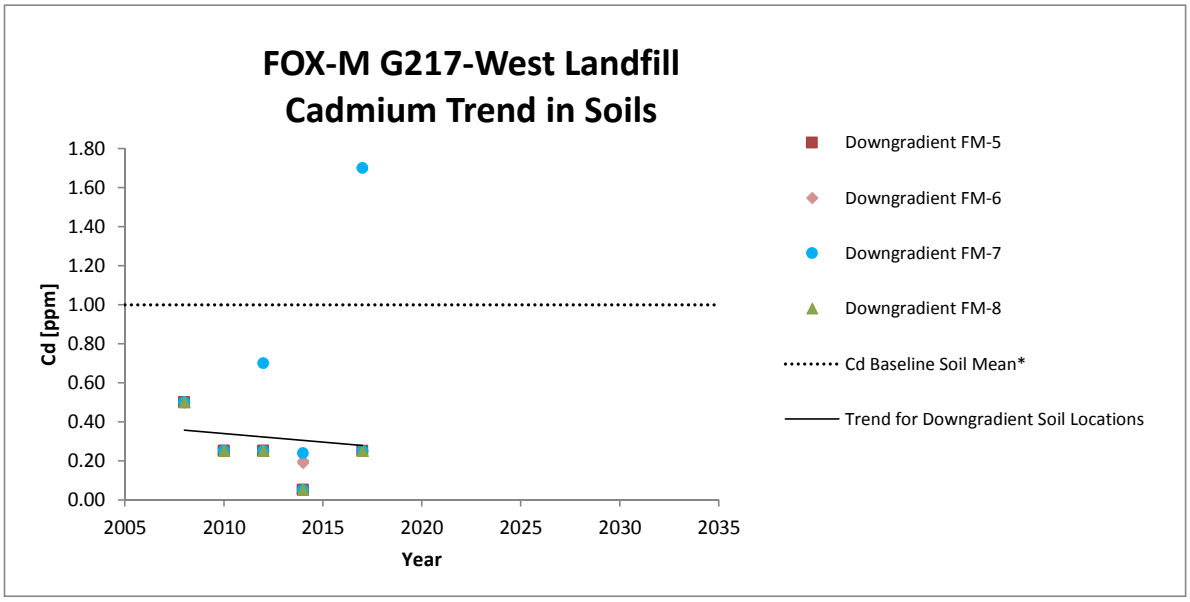
Note: All locations are downgradient, there are no identified upgradient locations.

FOX-M G217-West Landfill Trends in Soil Inorganics, PCBs and Modified TPH

Link to: Table of Contents

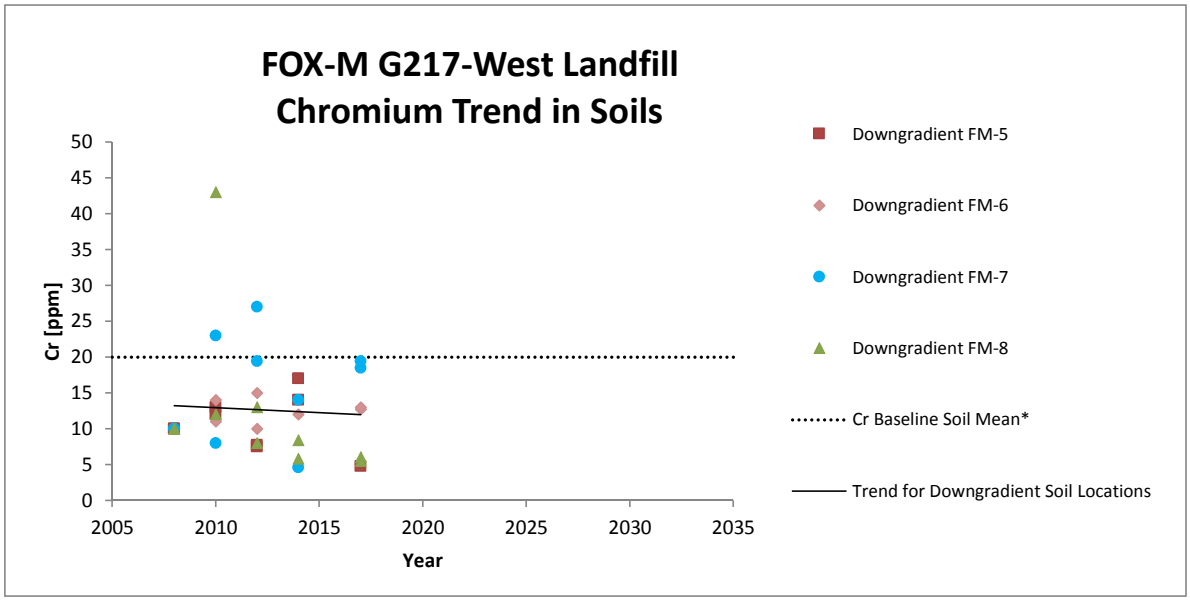
Note: All locations are downgradient, there are no upgradient locations.
Where results are below detection, half of the detection limit has been used in the charts for the sample points.
Trendlines are intended for visual interpretation of temporal trends. When all monitoring results are below detection, trendlines are a reflection of changes in detection limit. Users should refer to data tables.



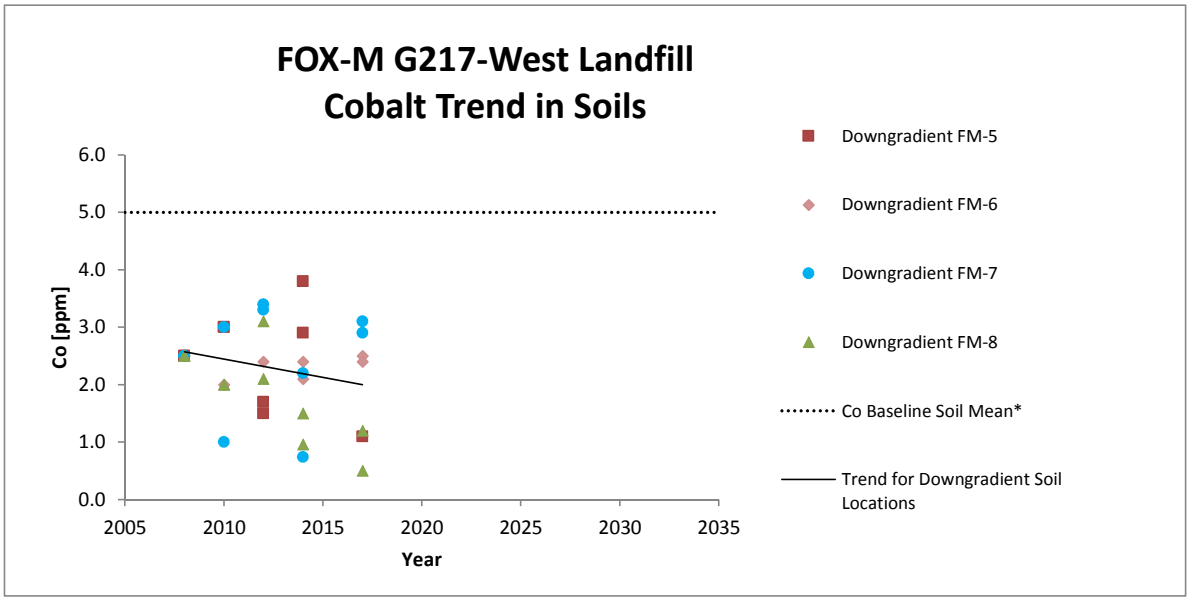


* Cd baseline arithmetic mean is equal to the baseline detection limit
* Cd baseline standard deviation = 0

FOX-M G217-West Landfill Trends in Soil Inorganics, PCBs and Modified TPH

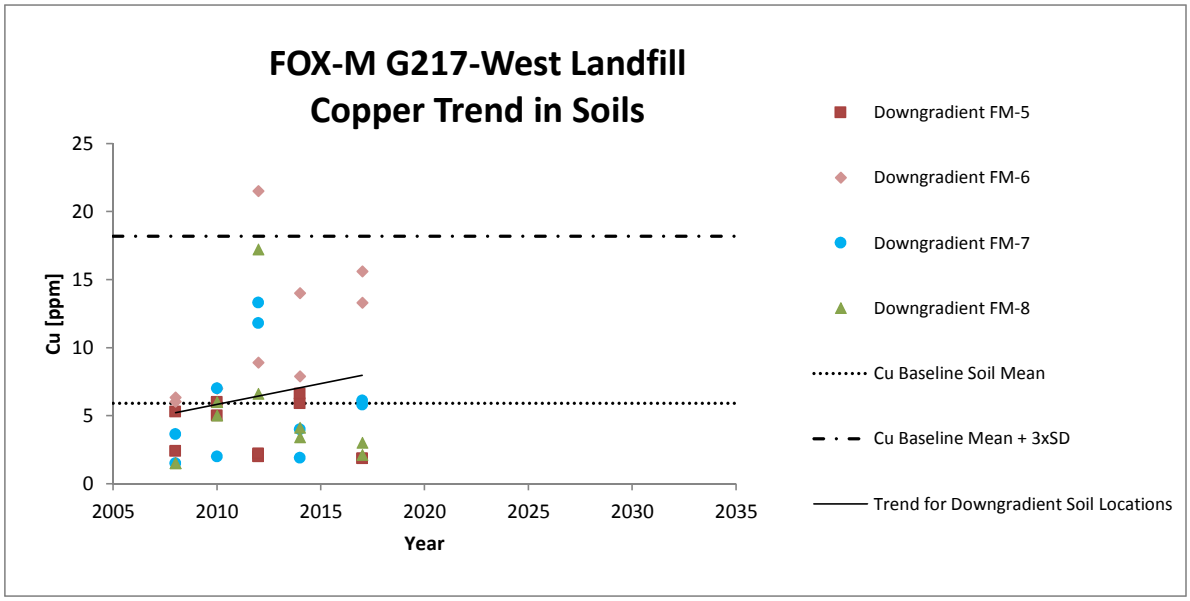


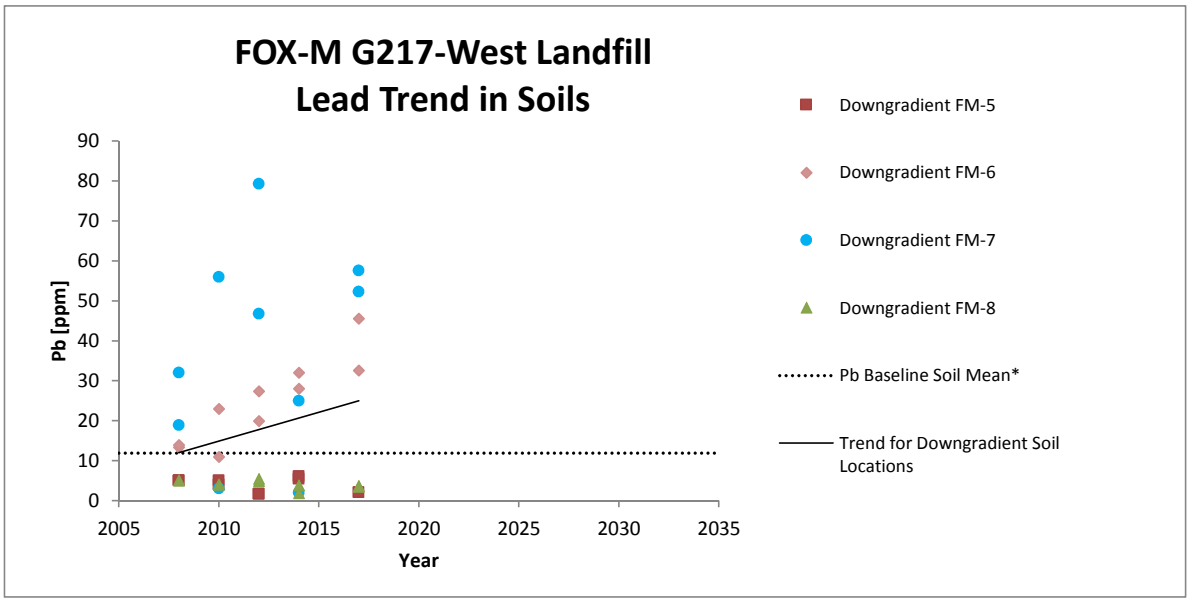
* Cr baseline arithmetic mean is equal to the baseline detection limit
* Cr baseline standard deviation = 0



* Co baseline arithmetic mean is equal to the baseline detection limit
* Co baseline standard deviation = 0

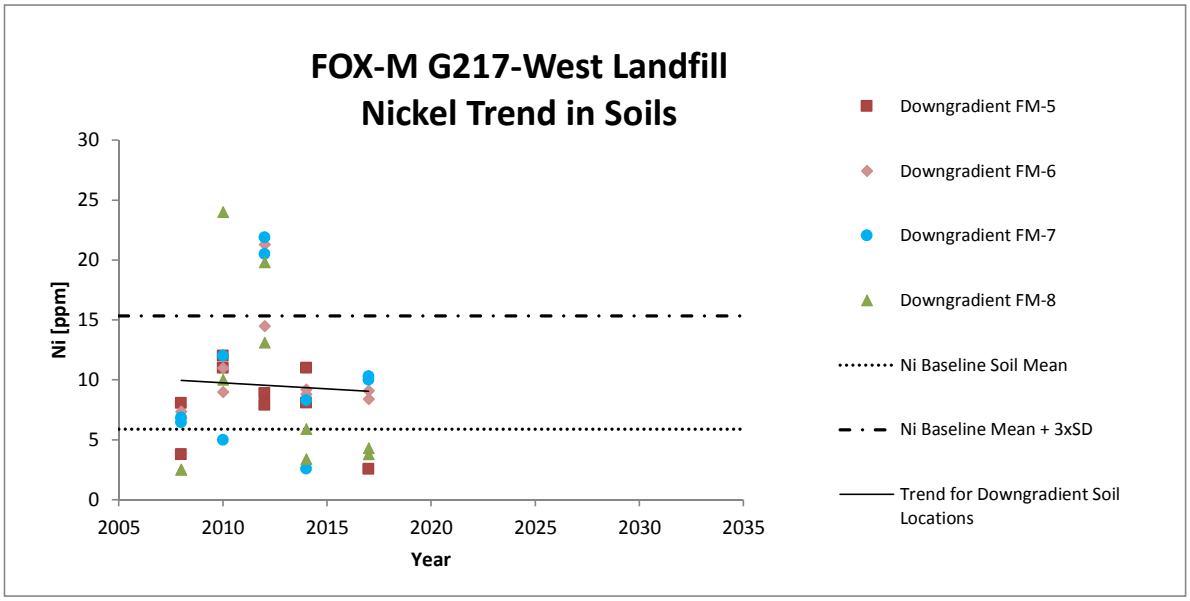
FOX-M G217-West Landfill Trends in Soil Inorganics, PCBs and Modified TPH

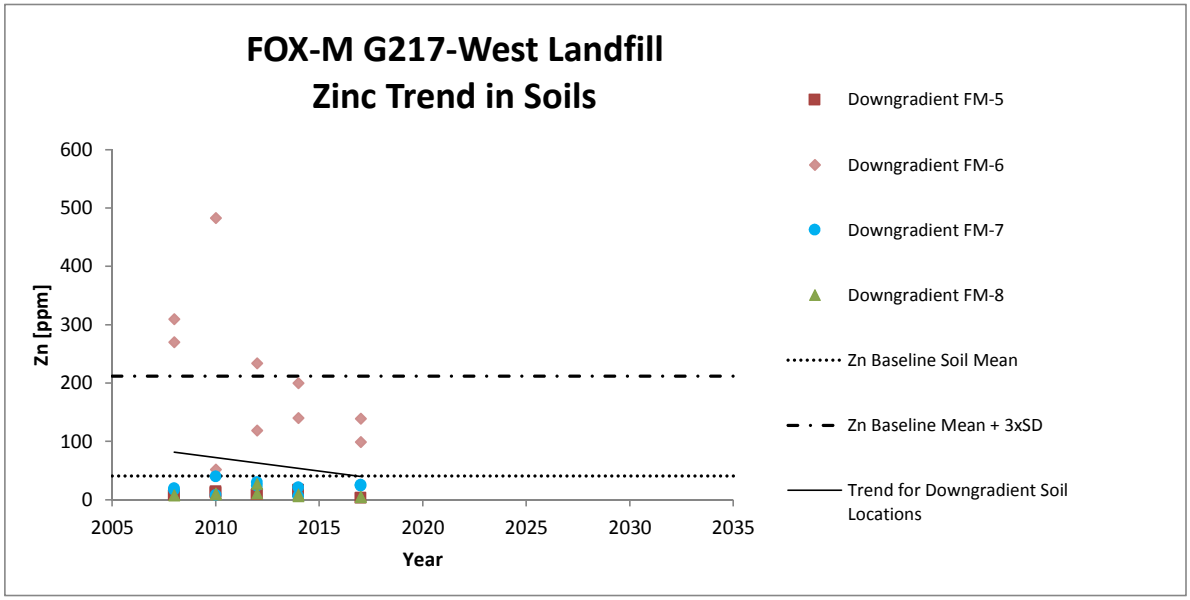




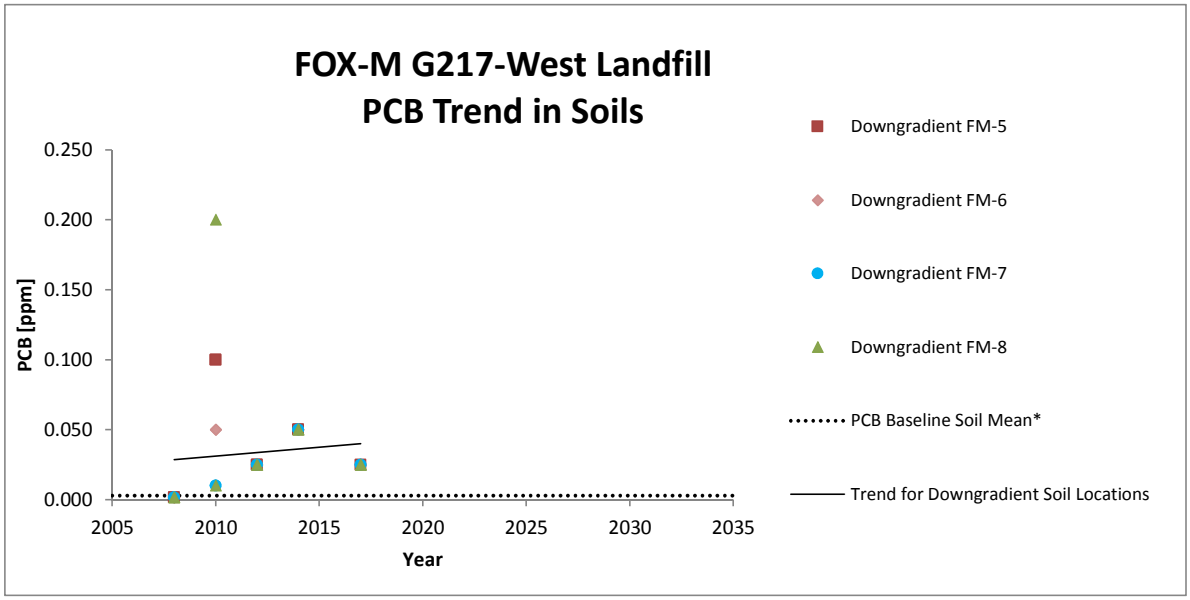
* Pb baseline standard deviation = 0

FOX-M G217-West Landfill Trends in Soil Inorganics, PCBs and Modified TPH

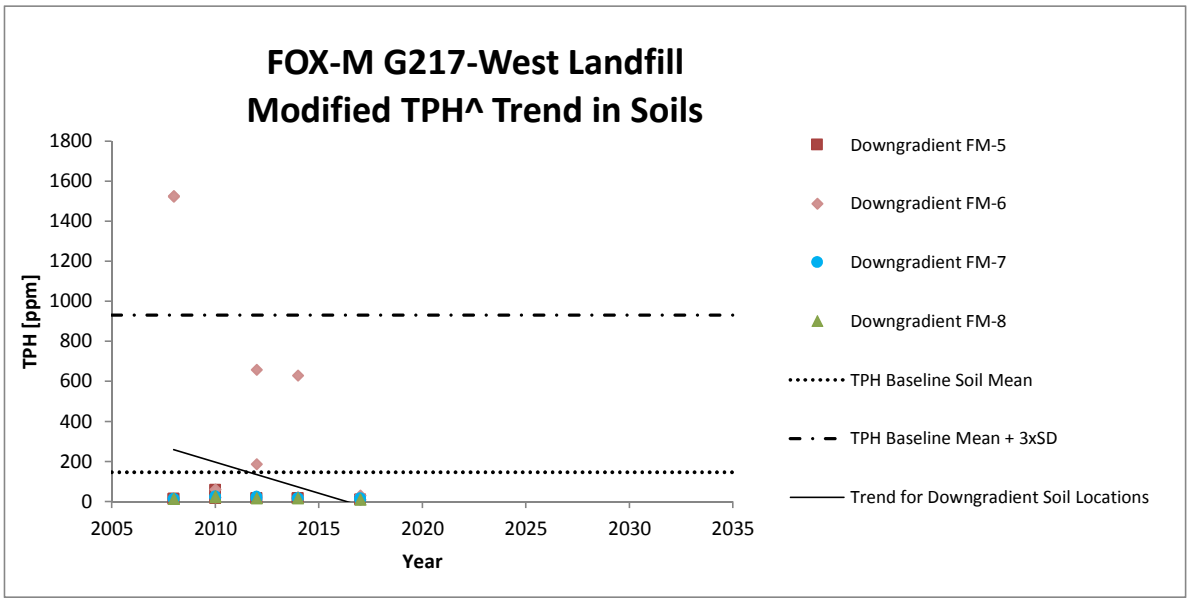




FOX-M G217-West Landfill Trends in Soil Inorganics, PCBs and Modified TPH



* PCB baseline arithmetic mean is equal to the baseline detection limit
* PCB baseline standard deviation = 0
Note: variations seen to 2017 are an indication of changing detection limits; all results below detection limits



^ Modified TPH is sum of F1, F2 and F3 fractions (C_6 - C_{34})
Baseline arithmetic mean and standard deviation reflect elevated baseline concentrations at FM-6

FOX-M Billboards Landfill - Summary of Soil Monitoring Analytical Data

Link to: Table of Contents

Sample ID	Location	Year	Monitoring Year	Monitoring Phase	Depth (cm)	As* (mg/kg)	Cd* (mg/kg)	Cr* (mg/kg)	Co* (mg/kg)	Cu (mg/kg)	Pb* (mg/kg)	Ni* (mg/kg)	Zn* (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						1.00	1.00	20.0	5.00	6.3	10.0	5.0	15.0	0.213				N/A
Baseline Data - Arithmetic Mean						**1.75**	**1.00**	**20.0**	**5.00**	**5.5**	**10.0**	**5.0**	**15.0**	**0.10**				**170.6**
Baseline Data - Standard Deviation						2.64	0.00	0.0	0.00	3.1	0.0	0.0	0.0	0.00				0.0
Baseline Data Mean + 3xStandard Deviation						**9.68**	**1.00**	**20.0**	**5.00**	**14.8**	**10.0**	**5.0**	**15.0**	**0.10**				**170.6**
**** 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						*30*	*5*	*250*	*50*	*100*	*500*	*100*	*500*	*5*				*2500*
Monitoring Data																		**TPH Sum will appear when F1, F2 and F3 fractions are entered.**
Upgradient																		
	FM-1 surface																	
08-10861	FM-1	2008	1	Phase I	0	**1.9**	<1.0	<20	<5.0	3.8	<10	<5.0	<15	<0.0030	<10	<4.0	28.0	35.0
FM10-1A	FM-1	2010	3	Phase I	0-15	**2.0**	<0.50	10.0	2.0	3.0	7.0	**8.0**	**17.0**	<0.020	<10	<10	<20	20.0
FM12-1A	FM-1	2012	5	Phase I	0-15	**1.9**	<0.50	10.8	2.6	**7.0**	**12.0**	**17.0**	**29.0**	<0.050	<10	<10	29.0	39.0
FM-BIL-1-S	FM-1	2014	7	Phase II	0-15	**2.2**	0.2	9.7	1.8	5.3	10.0	**6.6**	**22.0**	<0.1	<10	<10	<10	15.0
FM-1 Shallow	FM-1	2017	10	Phase II	0-15	<1.0	<0.5	11.1	2.5	**5.6**	7.2	**8.9**	11.3	<0.05	<7	<4	<8	9.5
	FM-1		15	Phase II														#N/A
	FM-1		25	Phase II														#N/A
																		#N/A
																		#N/A
																		#N/A
																		#N/A
																		#N/A
	FM-1 depth																	
08-10863/64	FM-1	2008	1	Phase I	40	1.2	<1.0	<20	<5.0	<3.0	<10	3.8	<15	<0.0030	<10	<4.0	<9.0	11.5
FM10-1B	FM-1	2010	3	Phase I	40-50	**2.0**	<0.50	16.0	3.0	**6.0**	7.0	**13.0**	**19.0**	<0.10	<10	36.0	40.0	81.0
FM12-1B	FM-1	2012	5	Phase I	40-50	**1.9**	<0.50	11.0	2.9	**11.7**	7.4	**19.4**	**23.0**	<0.050	<10	<10	117.0	127.0
FM-BIL-1-D	FM-1	2014	7	Phase II	40-50	1.6	0.2	7.0	1.8	**6.9**	2.9	**7.8**	**23.0**	<0.1	<20	<20	94.0	114.0
FM-1 Deep	FM-1	2017	10	Phase II	40-50	<1.0	<0.5	8.0	1.5	3.3	5.8	**6.2**	6.2	<0.05	<7	<4	<8	9.5
	FM-1		15	Phase II														#N/A
	FM-1		25	Phase II														#N/A
																		#N/A
																		#N/A
																		#N/A
																		#N/A
																		#N/A

FOX-M Billboards Landfill - Summary of Soil Monitoring Analytical Data

Link to: Table of Contents

Sample ID	Location	Year	Monitoring Year	Monitoring Phase	Depth (cm)	As* (mg/kg)	Cd* (mg/kg)	Cr* (mg/kg)	Co* (mg/kg)	Cu (mg/kg)	Pb* (mg/kg)	Ni* (mg/kg)	Zn* (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						1.00	1.00	20.0	5.00	6.3	10.0	5.0	15.0	0.213				N/A
Baseline Data - Arithmetic Mean						**1.75**	**1.00**	**20.0**	**5.00**	**5.5**	**10.0**	**5.0**	**15.0**	**0.10**				**170.6**
Baseline Data - Standard Deviation						2.64	0.00	0.0	0.00	3.1	0.0	0.0	0.0	0.00				0.0
Baseline Data Mean + 3xStandard Deviation						**9.68**	**1.00**	**20.0**	**5.00**	**14.8**	**10.0**	**5.0**	**15.0**	**0.10**				**170.6**
Downgradient																		
	FM-2 surface																	
08-10857/58	FM-2	2008	1	Phase I	0	1.7	<1.0	<20	<5.0	5.2	<10	**8.2**	12.3	<0.0030	<10	<4.0	27.5	34.5
FM10-2A	FM-2	2010	3	Phase I	0-15	**2.0**	<0.50	15.0	4.0	**286.0**	8.0	**294.0**	**76.0**	<0.020	<10	<10	<20	20.0
FM12-2A	FM-2	2012	5	Phase I	0-15	1.6	<0.50	10.5	2.7	**7.9**	7.6	**16.1**	**18.0**	<0.050	<10	<10	36.0	46.0
FM-BIL-2-S	FM-2	2014	7	Phase II	0-15	**2.6**	<0.10	13.0	3.4	**7.4**	9.9	**11.0**	**22.0**	<0.1	<10	<10	<10	15.0
FM-2 Shallow	FM-2	2017	10	Phase II	0-15	<1.0	<0.5	11.5	2.8	**7.9**	**35.3**	**10.7**	13.2	<0.05	<7	<4	<8	9.5
	FM-2		15	Phase II														#N/A
	FM-2		25	Phase II														#N/A
																		#N/A
																		#N/A
																		#N/A
	FM-2 depth																	
08-10859	FM-2	2008	1	Phase I	40	1.4	<1.0	<20	<5.0	3.2	<10	**5.4**	<15	<0.0030	<10	<4.0	<9.0	11.5
FM10-2B	FM-2	2010	3	Phase I	40-50	**2.0**	<0.50	**23.0**	4.0	**13.0**	7.0	**18.0**	**18.0**	<0.020	<10	<10	295.0	**305.0**
FM12-2B	FM-2	2012	5	Phase I	40-50	1.7	<0.50	11.9	3.3	**10.1**	5.8	**18.7**	**18.0**	<0.050	<10	<10	<10	15.0
FM-BIL-2-D	FM-2	2014	7	Phase II	40-50	**2.2**	<0.10	11.0	2.8	**5.6**	5.6	**8.6**	**16.0**	<0.1	<10	<10	<10	15.0
FM-2 Deep	FM-2	2017	10	Phase II	40-50	<1.0	<0.5	12.2	3.3	**9.2**	8.7	**12.7**	**16.5**	<0.05	<7	<4	<8	9.5
	FM-2		15	Phase II														#N/A
	FM-2		25	Phase II														#N/A
																		#N/A
																		#N/A
																		#N/A
	FM-3 surface																	
08-10853	FM-3	2008	1	Phase I	0	**1.8**	<1.0	<20	<5.0	**6.4**	<10	**7.6**	<15	<0.0030	<10	6.4	60.0	71.4
FM10-3A	FM-3	2010	3	Phase I	0-15	**3.0**	<0.50	**27.0**	3.0	**8.0**	6.0	**19.0**	**16.0**	<0.020	<10	<10	<20	20.0
FM12-3A	FM-3	2012	5	Phase I	0-15	**2.6**	<0.50	11.6	3.2	**13.1**	8.9	**20.3**	**22.0**	<0.050	<10	<10	48.0	58.0
FM-BIL-3-S	FM-3	2014	7	Phase II	0-15	**3.0**	0.3	9.3	2.2	**7.8**	**26.0**	**8.6**	**33.0**	<0.1	<10	<10	<10	15.0
FM-3 Shallow	FM-3	2017	10	Phase II	0-15	<16.1	<8.1	**69.0**	<16.1	**49.1**	**57.6**	**78.5**	**86.9**	<0.05	<7	<4	<8	9.5
	FM-3		15	Phase II														#N/A
	FM-3		25	Phase II														#N/A
																		#N/A
																		#N/A
																		#N/A
	FM-3 depth																	
08-10855	FM-3	2008	1	Phase I	40	**2.3**	<1.0	<20	<5.0	3.7	<10	**6.1**	<15	<0.0030	<10	<4.0	34.0	41.0
FM10-3B	FM-3	2010	3	Phase I	40-50	**2.0**	<0.50	**27.0**	2.0	**6.0**	4.0	**17.0**	11.0	<0.10	<10	11.0	<20	26.0
FM12-3B	FM-3	2012	5	Phase I	40-50	**3.4**	<0.50	16.0	3.8	**19.6**	**10.3**	**23.5**	**28.0**	<0.050	<10	<10	44.0	54.0
No sample (gravel/cobbles)	FM-3	2014	7	Phase II														#N/A
FM-3 Deep	FM-3	2017	10	Phase II	30-40	<1.0	<0.5	12.5	2.1	**9.3**	7.1	**11.3**	**15.7**	<0.05	<7	<4	<8	9.5
	FM-3		15	Phase II														#N/A
	FM-3		25	Phase II														#N/A

FOX-M Billboards Landfill - Summary of Soil Monitoring Analytical Data

Link to: Table of Contents

Sample ID	Location	Year	Monitoring Year	Monitoring Phase	Depth (cm)	As* (mg/kg)	Cd* (mg/kg)	Cr* (mg/kg)	Co* (mg/kg)	Cu (mg/kg)	Pb* (mg/kg)	Ni* (mg/kg)	Zn* (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						1.00	1.00	20.0	5.00	6.3	10.0	5.0	15.0	0.213				N/A
Baseline Data - Arithmetic Mean						**1.75**	**1.00**	**20.0**	**5.00**	**5.5**	**10.0**	**5.0**	**15.0**	**0.10**				**170.6**
Baseline Data - Standard Deviation						2.64	0.00	0.0	0.00	3.1	0.0	0.0	0.0	0.00				0.0
Baseline Data Mean + 3xStandard Deviation						**9.68**	**1.00**	**20.0**	**5.00**	**14.8**	**10.0**	**5.0**	**15.0**	**0.10**				**170.6**
	FM-4 surface																	
08-10865	FM-4	2008	1	Phase I	0	0.6	<1.0	<20	<5.0	<3.0	<10	<5.0	<15	<0.0030	<10	<4.0	<9.0	11.5
FM10-4A	FM-4	2010	3	Phase I	0-15	1.0	<0.50	7.0	1.0	2.0	2.0	5.0	6.0	<0.10	<10	11.0	<20	26.0
FM12-4A	FM-4	2012	5	Phase I	0-15	0.5	<0.50	5.6	1.5	2.0	1.4	**7.8**	8.0	<0.050	<10	<10	<10	15.0
FM-BIL-4-S	FM-4	2014	7	Phase II	0-15	1.5	0.4	8.1	1.8	4.9	**12.0**	**5.8**	**69.0**	<0.1	<10	<10	<10	15.0
FM-4 Shallow	FM-4	2017	10	Phase II	0-15	<1.0	<0.5	6.0	1.4	2.0	3.9	3.5	5.4	<0.05	<7	<4	<8	9.5
	FM-4		15	Phase II														#N/A
	FM-4		25	Phase II														#N/A
																		#N/A
																		#N/A
																		#N/A
																		#N/A
																		#N/A
	FM-4 depth																	
08-10867	FM-4	2008	1	Phase I	40	0.6	<1.0	<20	<5.0	<3.0	<10	<5.0	<15	<0.0030	<10	<4.0	<9.0	11.5
FM10-4B	FM-4	2010	3	Phase I	40-50	**2.0**	<0.50	13.0	2.0	3.0	2.0	**9.0**	7.0	<0.10	<10	<10	<20	20.0
FM12-4B	FM-4	2012	5	Phase I	40-50	<0.50	<0.50	5.0	1.3	1.6	1.1	**8.1**	7.0	<0.050	<10	<10	<10	15.0
FM-BIL-4-D	FM-4	2014	7	Phase II	40-50	<1.0	<0.10	4.4	1.0	1.7	1.2	3.1	8.0	<0.1	<10	<10	<10	15.0
FM-4 Deep (Dup Avg)	FM-4	2017	10	Phase II	40-50	<1.0	<0.5	6.3	1.4	2.1	4.5	3.8	6.5	<0.05	<7	<4	<8	9.5
	FM-4		15	Phase II														#N/A
	FM-4		25	Phase II														#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 baseline mean**

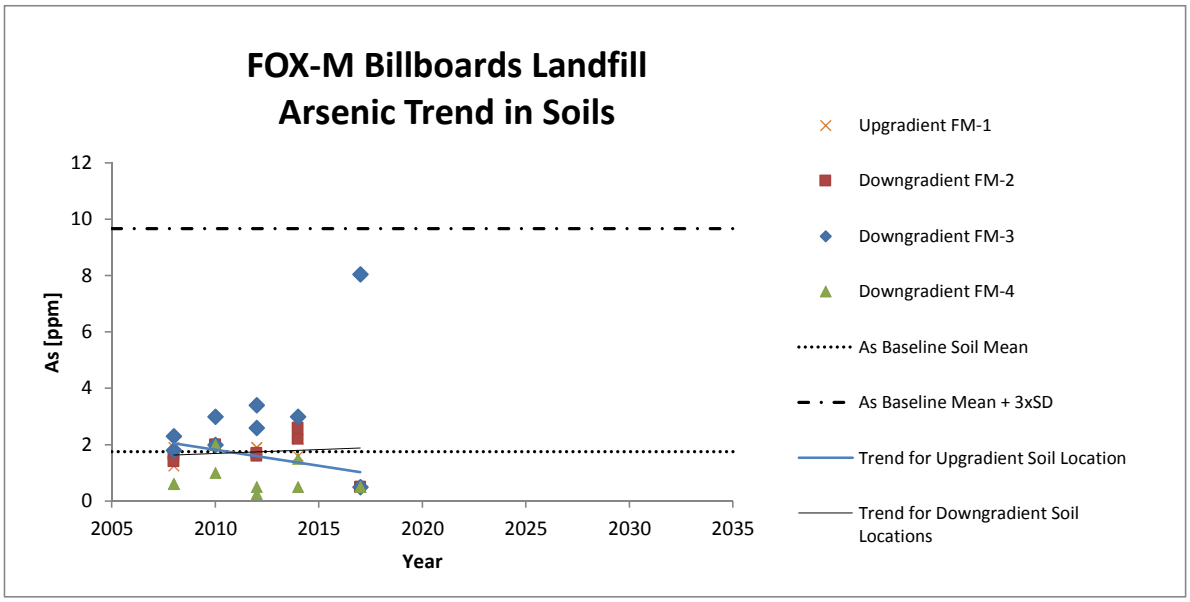
XX **Sample exceeds baseline mean + 3xSD**

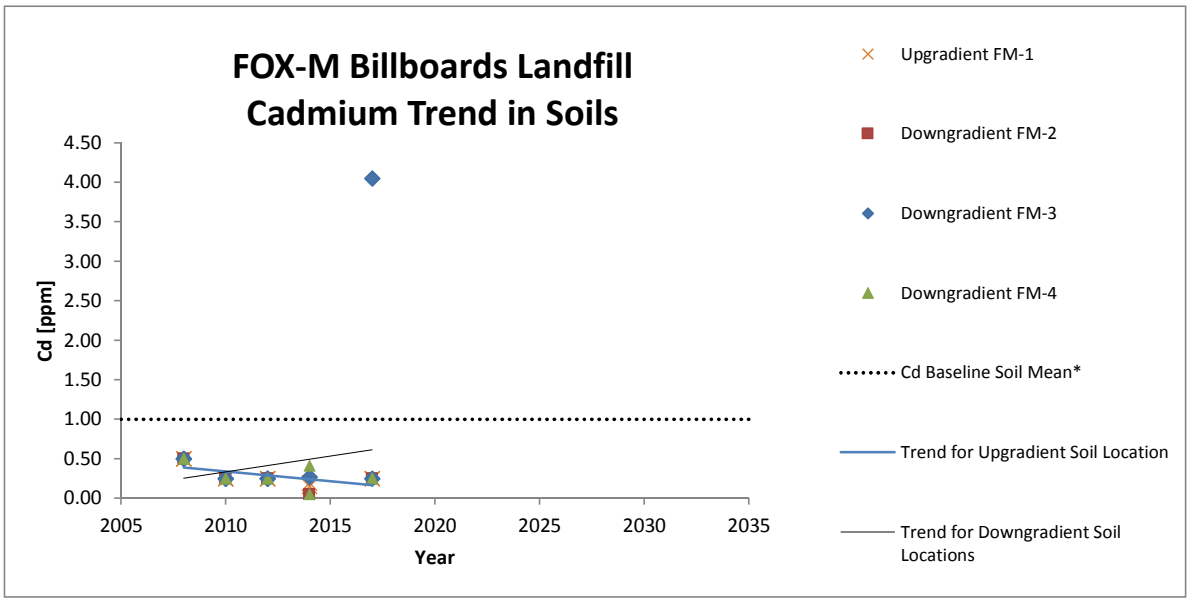
FOX-M Billboards Landfill Trends in Soil Inorganics, PCBs and Modified TPH

Link to: Table of Contents

Where results are below detection, half of the detection limit has been used in the charts for the sample points.

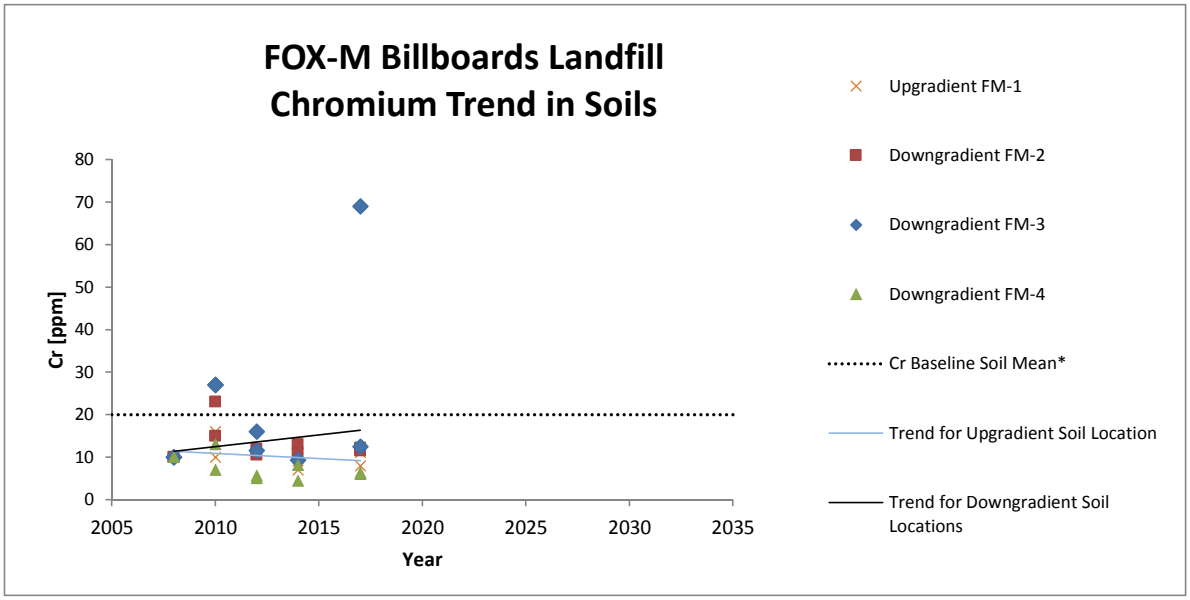
Trendlines are intended for visual interpretation of temporal trends. When all monitoring results are below detection, trendlines are a reflection of changes in detection limit. Users should refer to data tables.



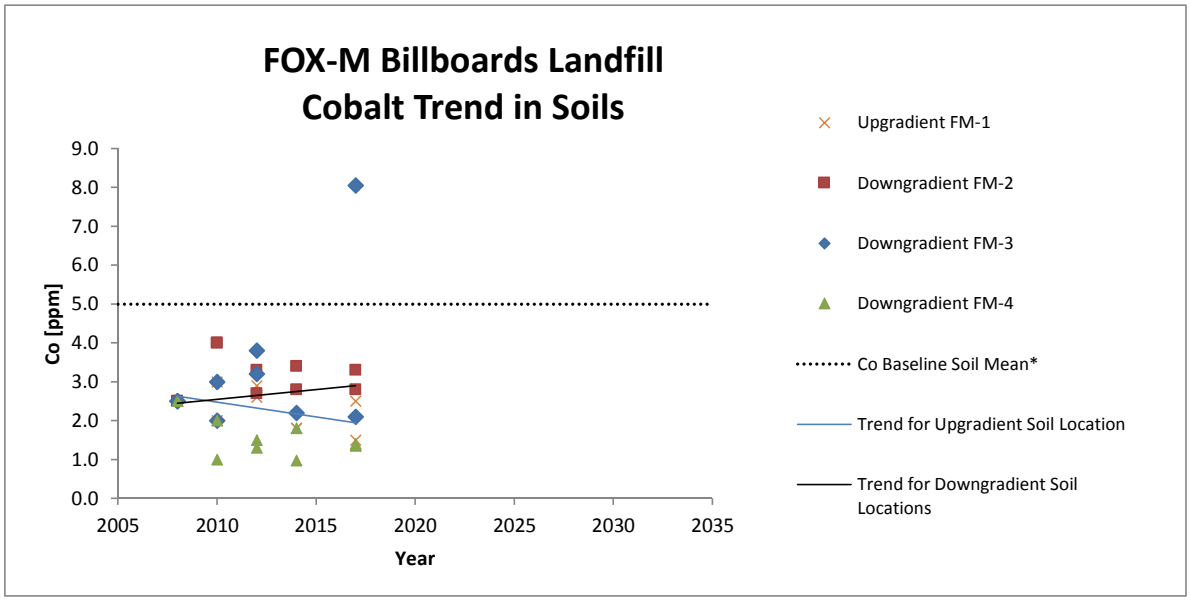


* Cd baseline arithmetic mean is equal to the baseline detection limit
* Cd baseline standard deviation = 0

FOX-M Billboards Landfill Trends in Soil Inorganics, PCBs and Modified TPH

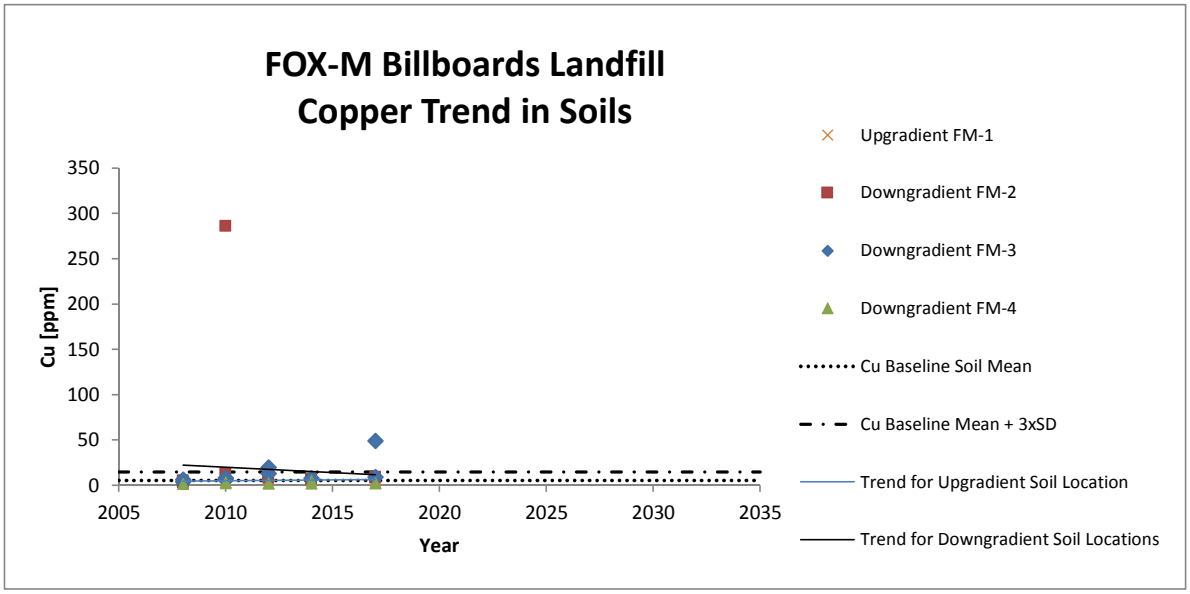


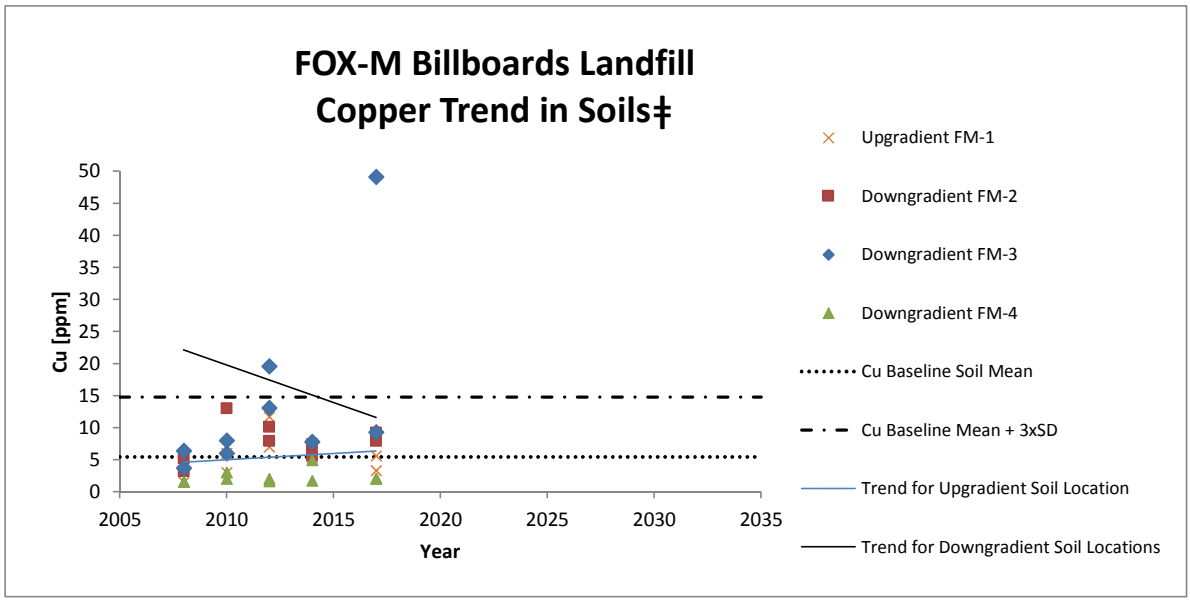
* Cr baseline arithmetic mean is equal to the baseline detection limit
* Cr baseline standard deviation = 0



* Co baseline arithmetic mean is equal to the baseline detection limit
* Co baseline standard deviation = 0

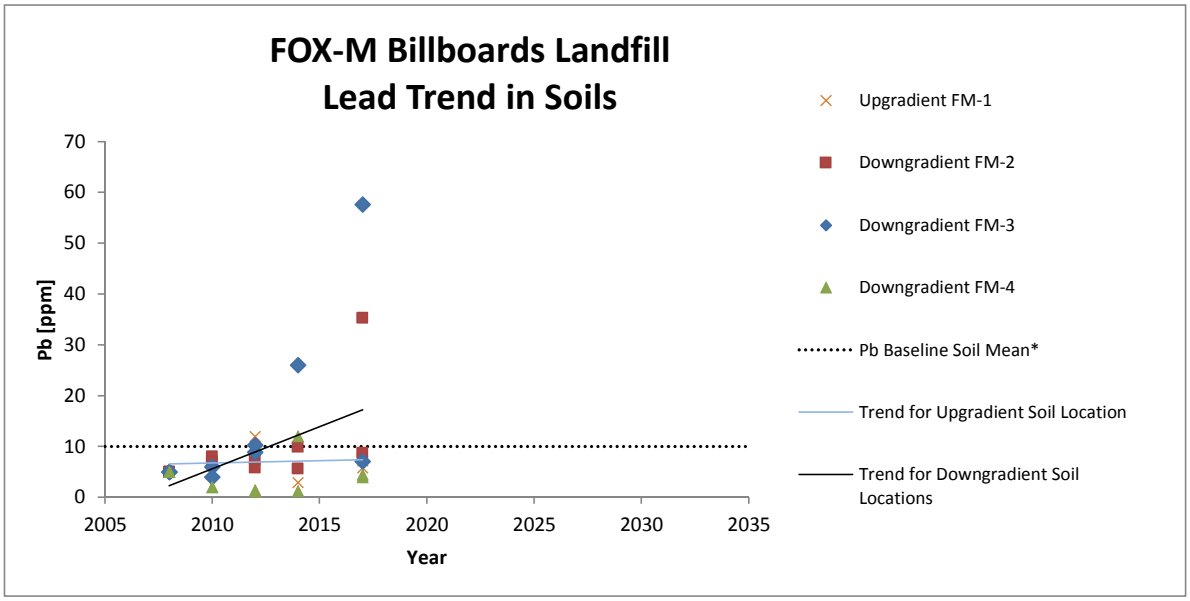
FOX-M Billboards Landfill Trends in Soil Inorganics, PCBs and Modified TPH





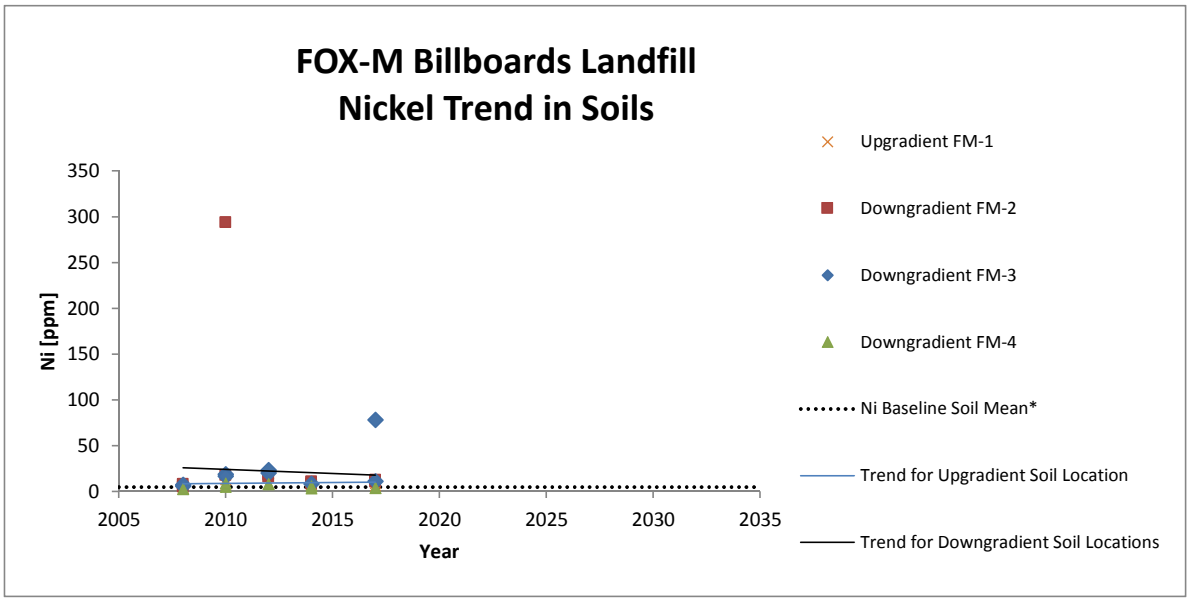
‡ Copper chart with y-axis modified to show trend without displaying the 2010 value of 286 ppm at FM-2.
The value is included in the trend analysis.

FOX-M Billboards Landfill Trends in Soil Inorganics, PCBs and Modified TPH

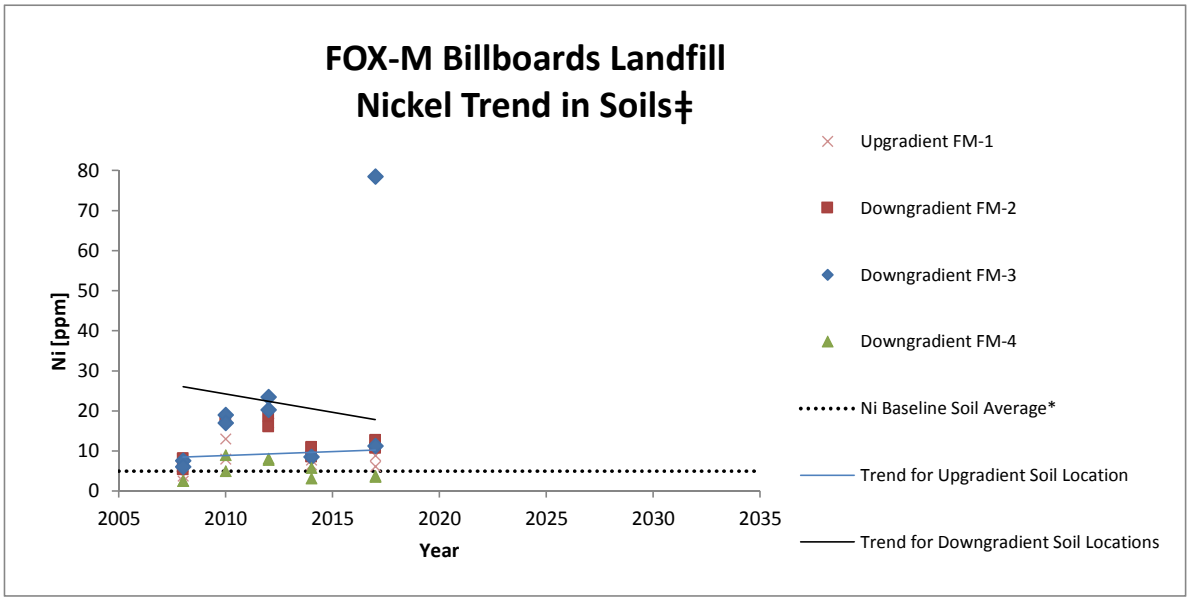


* Pb baseline arithmetic mean is equal to the baseline detection limit
* Pb baseline standard deviation = 0

FOX-M Billboards Landfill Trends in Soil Inorganics, PCBs and Modified TPH

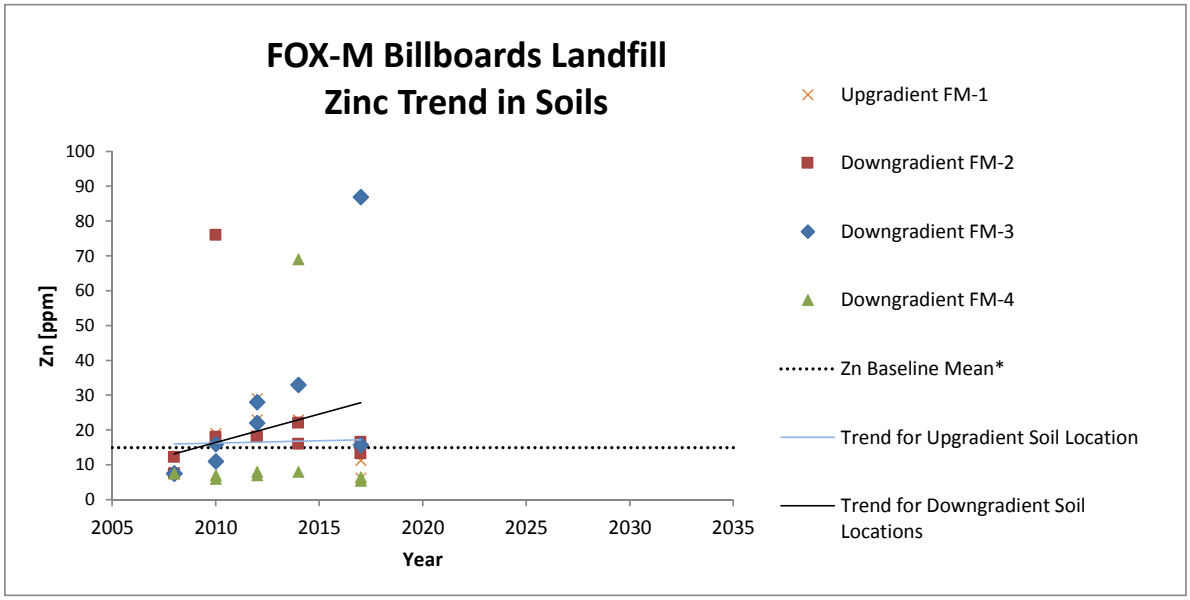


* Ni baseline arithmetic mean is equal to the baseline detection limit
* Ni baseline standard deviation = 0

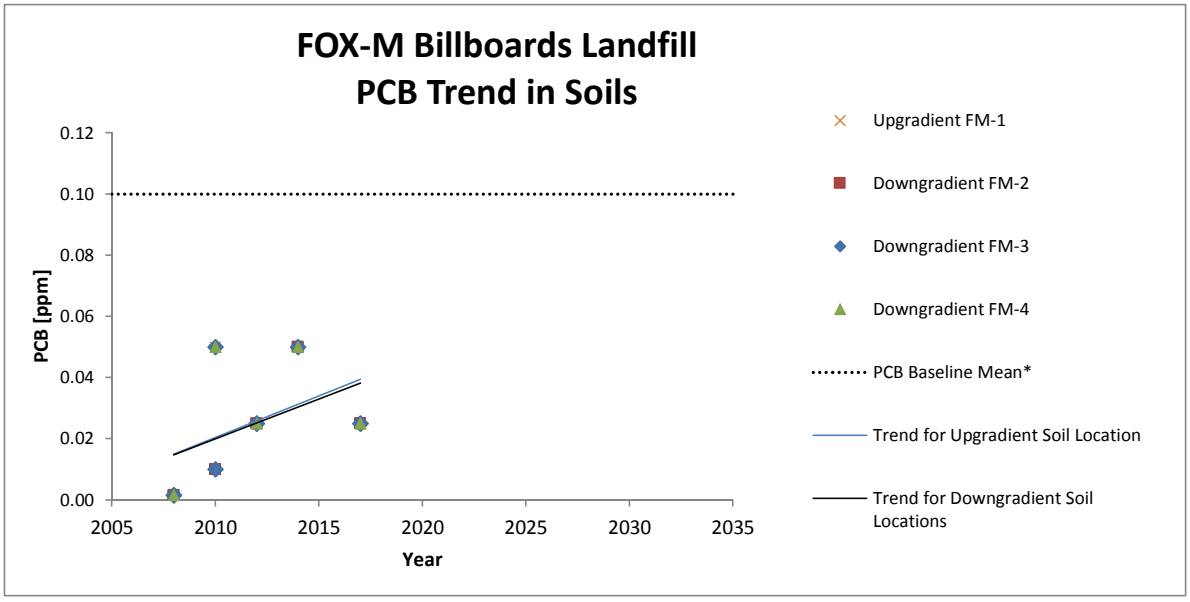


‡ Nickel chart with y-axis modified to show trend without displaying the 2010 value of 294 ppm at FM-2.
The value is included in the trend analysis.

FOX-M Billboards Landfill Trends in Soil Inorganics, PCBs and Modified TPH

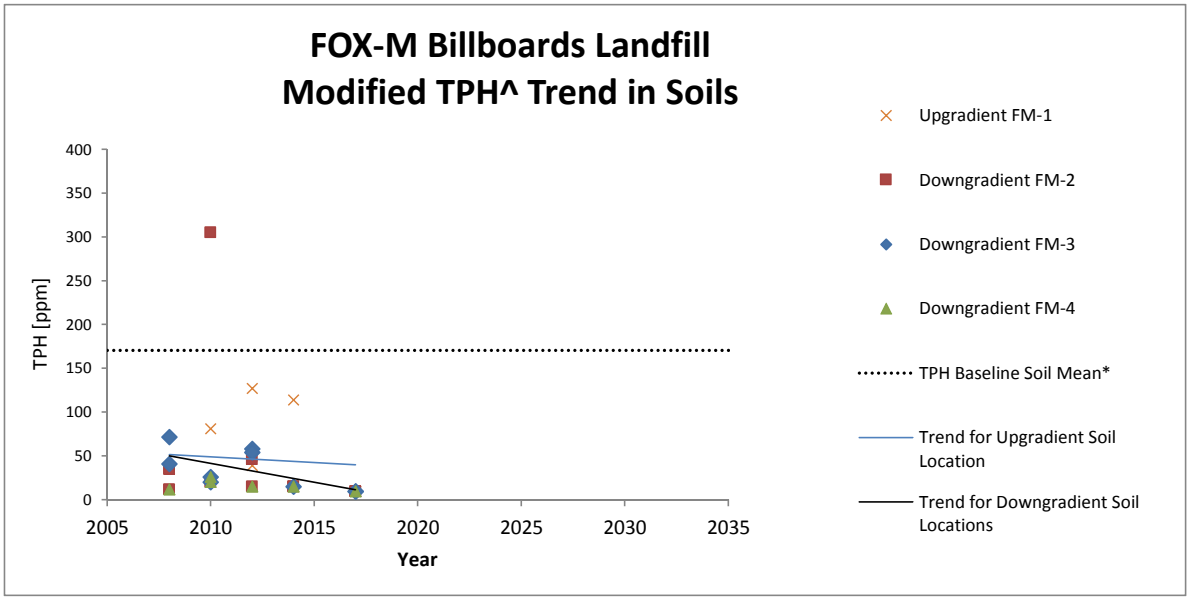


* Zn baseline arithmetic mean is equal to the baseline detection limit
* Zn baseline standard deviation = 0



* PCB baseline arithmetic mean is equal to the baseline detection limit
* PCB baseline standard deviation = 0
Note: variations seen to 2017 are an indication of changing detection limits; all results below detection limits

FOX-M Billboards Landfill Trends in Soil Inorganics, PCBs and Modified TPH



^ Modified TPH is sum of F1, F2 and F3 fractions (C_6 - C_{34})

* TPH baseline standard deviation = 0

FOX-M Hazmat Storage East Landfill - Summary of Soil Monitoring Analytical Data

Link to: Table of Contents

Sample ID	Location	Year	Monitoring Year	Monitoring Phase	Depth (cm)	As* (mg/kg)	Cd* (mg/kg)	Cr* (mg/kg)	Co* (mg/kg)	Cu (mg/kg)	Pb* (mg/kg)	Ni* (mg/kg)	Zn* (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						1.00	1.00	20.0	5.00	6.3	10.0	5.0	15.0	0.213				N/A
Baseline Data - Arithmetic Mean						**1.23**	**1.00**	**20.0**	**5.00**	**4.4**	**10.0**	**7.2**	**15.0**	**0.003**				**44.0**
Baseline Data - Standard Deviation						0.44	0.00	0.0	0.00	1.5	0.0	0.8	0.0	0.000				28.9
Baseline Data Mean + 3xStandard Deviation						**2.55**	**1.00**	**20.0**	**5.00**	**8.8**	**10.0**	**9.5**	**15.0**	**0.003**				**130.8**
**** 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						*30*	*5*	*250*	*50*	*100*	*500*	*100*	*500*	*5*				*2500*
Monitoring Data																		**TPH Sum will appear when F1, F2 and F3 fractions are entered.**
Upgradient - no identified upgradient locations																		
Downgradient																		
	FM-9 surface																	
08-10787	FM-9	2008	1	Phase I	0	**1.4**	<1.0	<20	<5.0	<3.0	<10	5.7	<15	<0.0030	<10	<4.0	<9.0	11.5
FM10-9A	FM-9	2010	3	Phase I	0-15	**2.0**	<0.50	11.0	2.0	4.0	3.0	**10.0**	11.0	<0.20	<10	<10	<20	20.0
FM12-9A	FM-9	2012	5	Phase I	0-15	**2.2**	<0.50	13.4	3.4	**13.0**	5.9	**23.6**	**18.0**	<0.050	<10	<10	<10	15.0
FM-HAZ-9-S	FM-9	2014	7	Phase II	0-15	**1.8**	<0.10	11.0	2.2	4.0	3.1	**8.0**	13.0	<0.1	<10	<10	<10	15.0
FM-9 Shallow	FM-9	2017	10	Phase II	0-15	<1.0	<0.5	9.9	1.9	3.7	5.0	**7.2**	8.2	<0.05	<7	<4	<8	9.5
	FM-9		15	Phase II														#N/A
	FM-9		25	Phase II														#N/A
																		#N/A
																		#N/A
																		#N/A
																		#N/A
																		#N/A
	FM-9 depth																	
08-10789	FM-9	2008	1	Phase I	40	**2.1**	<1.0	<20	<5.0	3.8	<10	**7.5**	<15	<0.0030	<10	<4.0	<9.0	11.5
FM10-9B	FM-9	2010	3	Phase I	40-50	1.0	<0.50	12.0	3.0	4.0	3.0	**11.0**	12.0	<0.10	<10	<10	<20	20.0
FM12-9B	FM-9	2012	5	Phase I	40-50	**2.5**	<0.50	18.1	4.2	**9.2**	6.1	**26.0**	**21.0**	<0.050	<10	11.0	11.0	27.0
FM-HAZ-9-D	FM-9	2014	7	Phase II	40-50	**1.9**	<0.10	12.0	2.3	**4.5**	3.3	**9.3**	13.0	<0.1	<10	<10	<10	15.0
FM-9 Deep (Dup Avg)	FM-9	2017	10	Phase II	30-40	**1.4**	<0.5	11.3	2.2	**4.6**	5.7	**7.8**	9.2	<0.05	<7	<4	<8	9.5
	FM-9		15	Phase II														#N/A
	FM-9		25	Phase II														#N/A
																		#N/A
																		#N/A
																		#N/A
																		#N/A

FOX-M Hazmat Storage East Landfill - Summary of Soil Monitoring Analytical Data

Link to: Table of Contents

Sample ID	Location	Year	Monitoring Year	Monitoring Phase	Depth (cm)	As* (mg/kg)	Cd* (mg/kg)	Cr* (mg/kg)	Co* (mg/kg)	Cu (mg/kg)	Pb* (mg/kg)	Ni* (mg/kg)	Zn* (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						1.00	1.00	20.0	5.00	6.3	10.0	5.0	15.0	0.213				N/A
Baseline Data - Arithmetic Mean						**1.23**	**1.00**	**20.0**	**5.00**	**4.4**	**10.0**	**7.2**	**15.0**	**0.003**				**44.0**
Baseline Data - Standard Deviation						0.44	0.00	0.0	0.00	1.5	0.0	0.8	0.0	0.000				28.9
Baseline Data Mean + 3xStandard Deviation						**2.55**	**1.00**	**20.0**	**5.00**	**8.8**	**10.0**	**9.5**	**15.0**	**0.003**				**130.8**
	FM-10 surface																	
08-10791	FM-10	2008	1	Phase I	0	**1.4**	<1.0	<20	<5.0	**4.4**	<10	5.9	**18.0**	<0.0030	<10	4.2	130.0	**139.2**
FM10-10A	FM-10	2010	3	Phase I	0-15	<1.0	<0.50	11.0	2.0	**5.0**	7.0	**9.0**	14.0	<0.10	<10	<10	<20	20.0
FM12-10A-D	FM-10	2012	5	Phase I	0-15	0.7	<0.50	11.3	2.7	4.1	5.5	**17.9**	14.0	<0.050	<10	<10	39.0	**49.0**
FM-HAZ-10-S	FM-10	2014	7	Phase II	0-15	<1.0	<0.10	9.9	1.7	4.2	6.7	7.0	14.0	<0.1	<10	<10	<10	15.0
FM-10 Shallow	FM-10	2017	10	Phase II	0-15	<1.0	<0.5	8.7	1.8	3.5	5.7	6.3	8.6	<0.05	<7	<4	<8	9.5
	FM-10		15	Phase II														#N/A
	FM-10		25	Phase II														#N/A
																		#N/A
																		#N/A
																		#N/A
	FM-10 depth																	
08-10793/94	FM-10	2008	1	Phase I	40	**1.9**	<1.0	<20	<5.0	**5.0**	<10	7.1	13.3	<0.0030	<10	6.0	100.0	**111.0**
FM10-10B	FM-10	2010	3	Phase I	40-50	1.0	<0.50	10.0	2.0	3.0	4.0	**8.0**	10.0	<0.020	<10	<10	<20	20.0
FM12-10B	FM-10	2012	5	Phase I	40-50	0.9	<0.50	9.8	2.8	**9.0**	2.2	**23.0**	11.0	<0.050	<10	<10	23.0	33.0
No sample (gravel/cobbles)	FM-10	2014	7	Phase II														#N/A
FM-10 Deep	FM-10	2017	10	Phase II	40-50	<1.0	<0.5	8.8	1.9	3.1	5.8	6.4	8.7	<0.05	<7	<4	<8	9.5
	FM-10		15	Phase II														#N/A
	FM-10		25	Phase II														#N/A
																		#N/A
																		#N/A
																		#N/A
	FM-11 surface																	
08-10795/96	FM-11	2008	1	Phase I	0	**1.3**	<1.0	<20	<5.0	3.6	<10	<5.0	<15	**0.006**	<10	<4.0	29.5	36.5
FM10-11A	FM-11	2010	3	Phase I	0-15	<1.0	<0.50	12.0	2.0	**5.0**	9.0	**10.0**	**53.0**	<0.020	<10	<10	<20	20.0
FM12-11A	FM-11	2012	5	Phase I	0-15	**1.6**	<0.50	10.2	2.7	**4.4**	6.4	**20.4**	12.0	<0.050	<10	<10	43.0	**53.0**
FM-HAZ-11-S	FM-11	2014	7	Phase II	0-15	**1.7**	0.1	8.9	1.6	**5.2**	**14.0**	6.4	**20.0**	**8.800**	<10	<10	<10	15.0
FM-HAZ-11-S interlab	FM-11	2014	7	Phase II	0-15	**3.0**	<0.5	12.0	2.6	**6.0**	**12.0**	**11.0**	**21.0**	**3.100**	<10	<50	<50	**55.0**
FM-11 Shallow	FM-11	2017	10	Phase II	0-15	<1.0	<0.5	7.8	1.5	**8.5**	**21.7**	4.9	**24.6**	<0.05	<7	<4	96	**101.5**
	FM-11		15	Phase II														#N/A
	FM-11		25	Phase II														#N/A
																		#N/A
																		#N/A
	FM-11 depth																	
08-10797	FM-11	2008	1	Phase I	40	**1.5**	<1.0	<20	<5.0	<3.0	<10	<5.0	<15	<0.0030	<10	<4.0	17.0	24.0
FM10-11B	FM-11	2010	3	Phase I	40-50	<1.0	<0.50	13.0	2.0	4.0	4.0	**10.0**	**16.0**	<0.020	<10	<10	<20	20.0
FM12-11B	FM-11	2012	5	Phase I	40-50	**1.4**	<0.50	13.4	3.6	**5.0**	4.2	**20.8**	15.0	<0.050	<10	<10	19.0	29.0
FM-HAZ-11-D	FM-11	2014	7	Phase II	40-50	**1.7**	<0.10	9.5	1.8	**4.8**	5.2	**7.2**	13.0	<0.1	<10	<10	<10	15.0
FM-11 Deep	FM-11	2017	10	Phase II	40-50	<1.0	<0.5	7.4	1.3	**5.0**	8.6	5.5	**16.3**	<0.05	<7	<4	115	**120.5**
	FM-11		15	Phase II														#N/A
	FM-11		25	Phase II														#N/A
																		#N/A

FOX-M Hazmat Storage East Landfill - Summary of Soil Monitoring Analytical Data

Link to: Table of Contents

Sample ID	Location	Year	Monitoring Year	Monitoring Phase	Depth (cm)	As* (mg/kg)	Cd* (mg/kg)	Cr* (mg/kg)	Co* (mg/kg)	Cu (mg/kg)	Pb* (mg/kg)	Ni* (mg/kg)	Zn* (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						1.00	1.00	20.0	5.00	6.3	10.0	5.0	15.0	0.213				N/A
Baseline Data - Arithmetic Mean						**1.23**	**1.00**	**20.0**	**5.00**	**4.4**	**10.0**	**7.2**	**15.0**	**0.003**				**44.0**
Baseline Data - Standard Deviation						0.44	0.00	0.0	0.00	1.5	0.0	0.8	0.0	0.000				28.9
Baseline Data Mean + 3xStandard Deviation						**2.55**	**1.00**	**20.0**	**5.00**	**8.8**	**10.0**	**9.5**	**15.0**	**0.003**				**130.8**
	FM-12 surface																	
08-10799	FM-12	2008	1	Phase I	0	1.0	<1.0	<20	<5.0	**32.0**	<10	6.1	**66.0**	<0.0030	<10	<4.0	16.0	23.0
FM10-12A	FM-12	2010	3	Phase I	0-15	**2.0**	<0.50	10.0	2.0	**9.0**	7.0	**9.0**	**22.0**	<0.020	<10	10.0	<20	25.0
FM12-12A	FM-12	2012	5	Phase I	0-15	**2.3**	<0.50	14.3	3.2	**7.7**	**16.4**	**21.6**	**27.0**	<0.050	<10	<10	29.0	39.0
FM-HAZ-12-S	FM-12	2014	7	Phase II	0-15	**2.2**	0.1	11.0	2.1	**9.7**	**13.0**	**8.8**	**39.0**	<0.1	<10	<10	<10	15.0
FM-12 Shallow	FM-12	2017	10	Phase II	0-15	<1.0	<0.5	11.8	2.1	**4.7**	7.3	**8.7**	13.7	<0.05	<7	<4	13	18.5
	FM-12		15	Phase II														#N/A
	FM-12		25	Phase II														#N/A
																		#N/A
																		#N/A
																		#N/A
																		#N/A
																		#N/A
	FM-12 depth																	
08-10801 (dup. avg.)	FM-12	2008	1	Phase I	40	**1.5**	<1.0	<20	<5.0	**6.3**	**150.0**	6.7	**21.0**	<0.0030	<10	<4.0	16.0	23.0
FM10-12B	FM-12	2010	3	Phase I	40-50	1.0	<0.50	11.0	3.0	4.0	4.0	**10.0**	**16.0**	<0.020	<10	<10	<20	20.0
FM12-12B	FM-12	2012	5	Phase I	40-50	**1.7**	<0.50	9.9	2.4	**5.1**	7.0	**15.7**	**17.0**	<0.050	<10	<10	27.0	37.0
FM-HAZ-12-D	FM-12	2014	7	Phase II	40-50	**2.3**	<0.10	12.0	2.7	**10.0**	7.3	**9.0**	**36.0**	<0.1	<10	<10	<10	15.0
Not sampled - refusal	FM-12	2017	10	Phase II														#N/A
	FM-12		15	Phase II														#N/A
	FM-12		25	Phase II														#N/A
																		#N/A
																		#N/A
																		#N/A
																		#N/A
																		#N/A

Legend

XX **Sample exceeds baseline mean**

XX **Sample exceeds baseline mean + 3xSD**

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

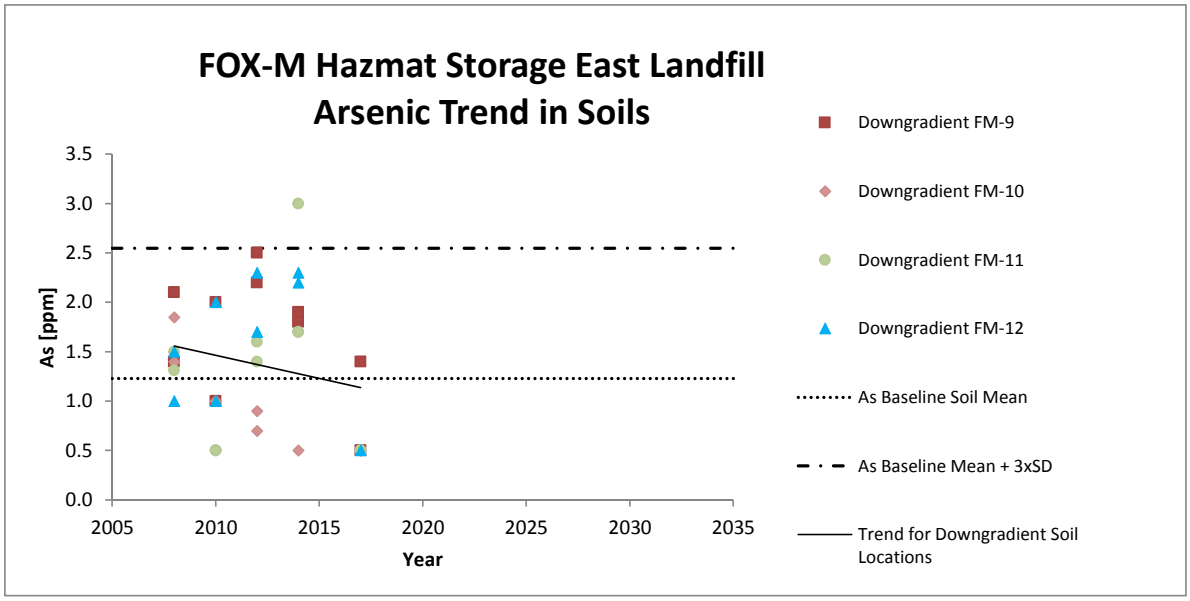
N/A = not analyzed

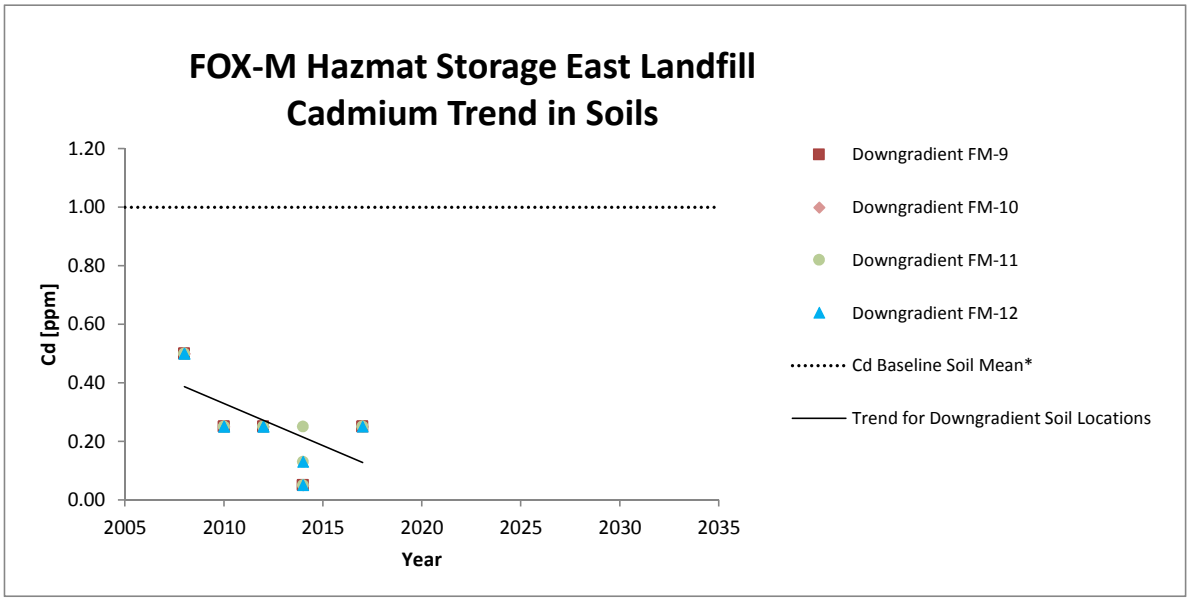
Note: All locations are downgradient, there are no identified upgradient locations.

FOX-M Hazmat Storage East Landfill Trends in Soil Inorganics, PCBs and Modified TPH

Link to: Table of Contents

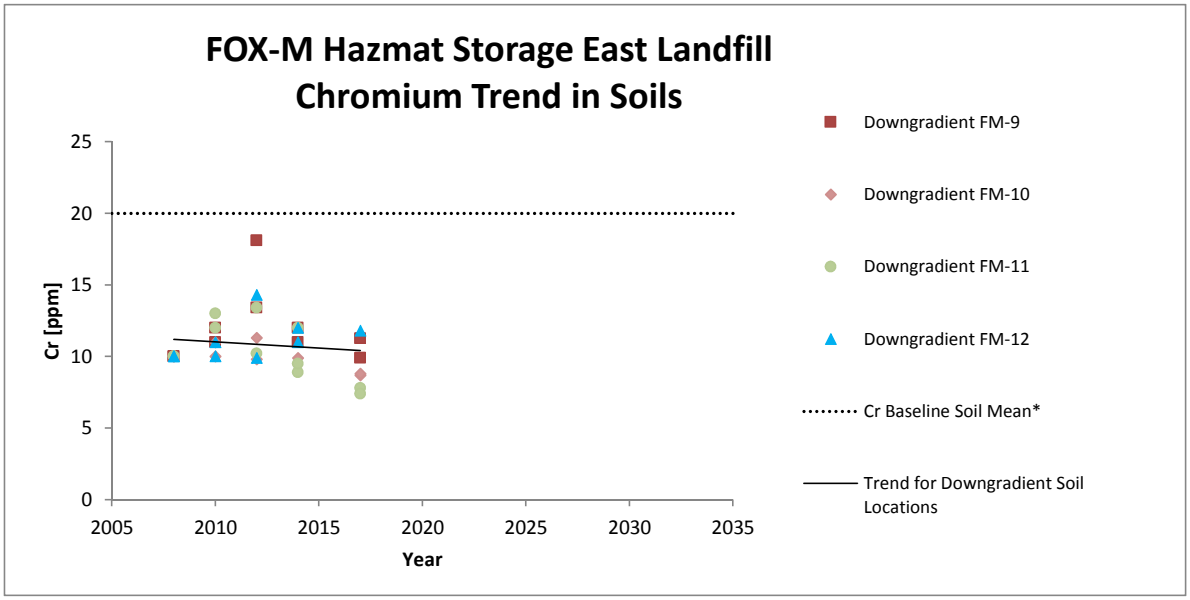
Note: All locations are downgradient, there are no upgradient locations.
Where results are below detection, half of the detection limit has been used in the charts for the sample points.
Trendlines are intended for visual interpretation of temporal trends. When all monitoring results are below detection, trendlines are a reflection of changes in detection limit. Users should refer to data tables.



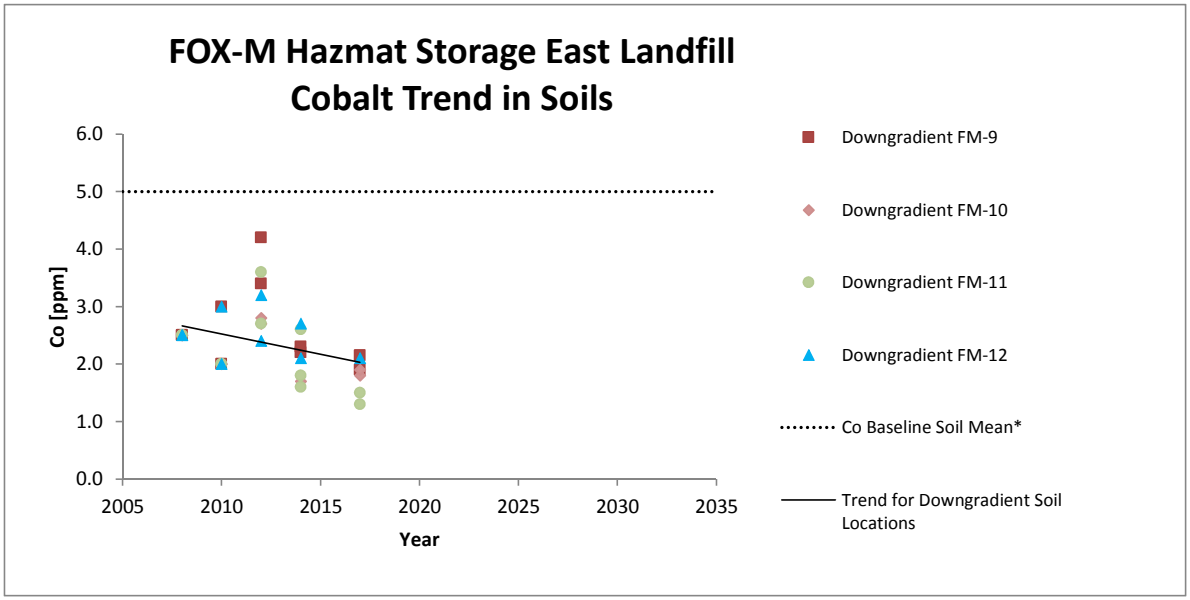


* Cd baseline arithmetic mean is equal to the baseline detection limit
* Cd baseline standard deviation = 0

FOX-M Hazmat Storage East Landfill Trends in Soil Inorganics, PCBs and Modified TPH

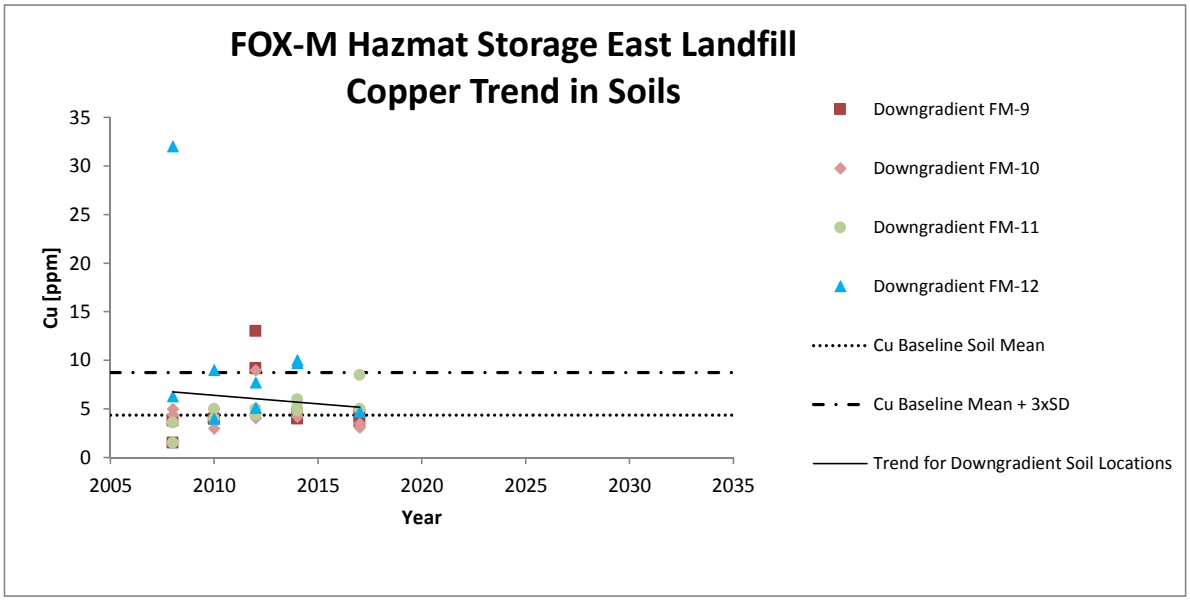


* Cr baseline arithmetic mean is equal to the baseline detection limit
* Cr baseline standard deviation = 0

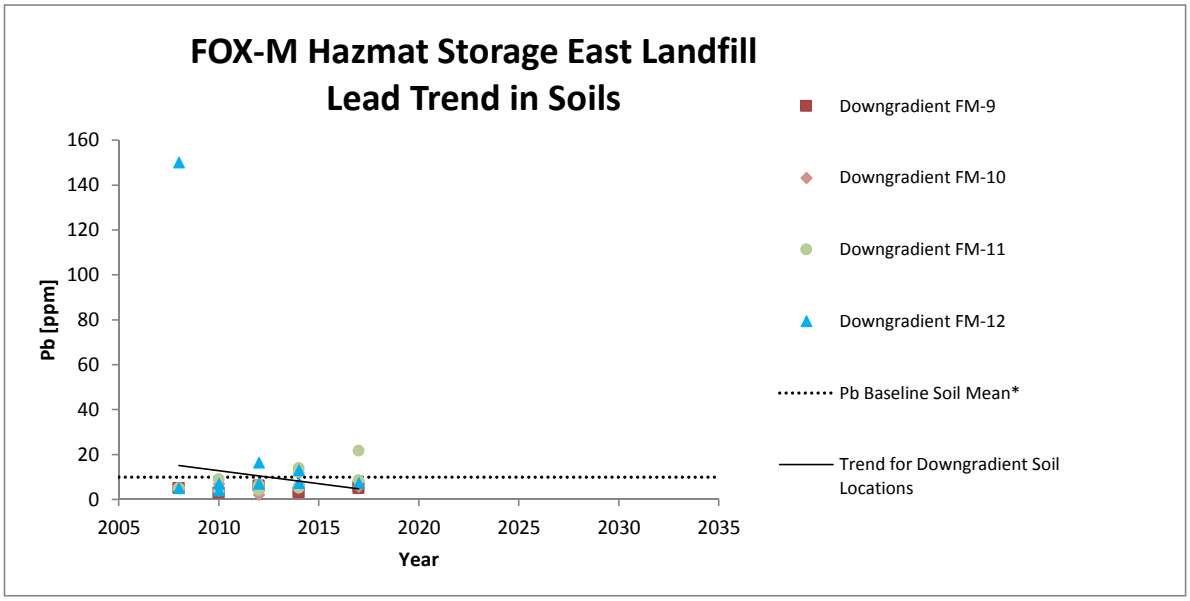


* Co baseline arithmetic mean is equal to the baseline detection limit
* Co baseline standard deviation = 0

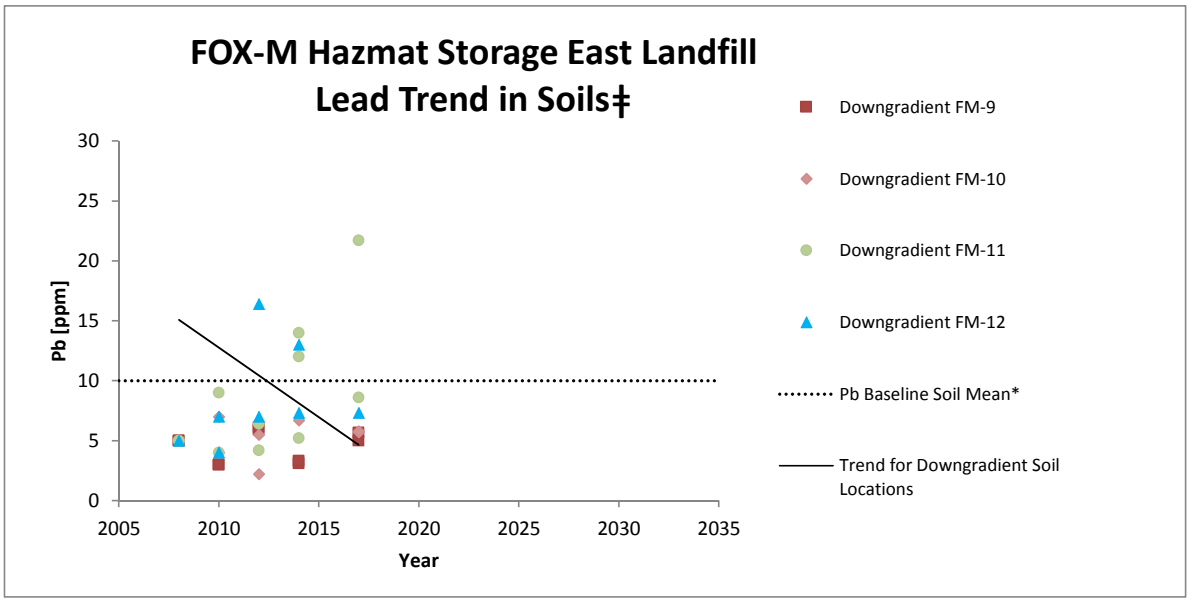
FOX-M Hazmat Storage East Landfill Trends in Soil Inorganics, PCBs and Modified TPH



FOX-M Hazmat Storage East Landfill Trends in Soil Inorganics, PCBs and Modified TPH

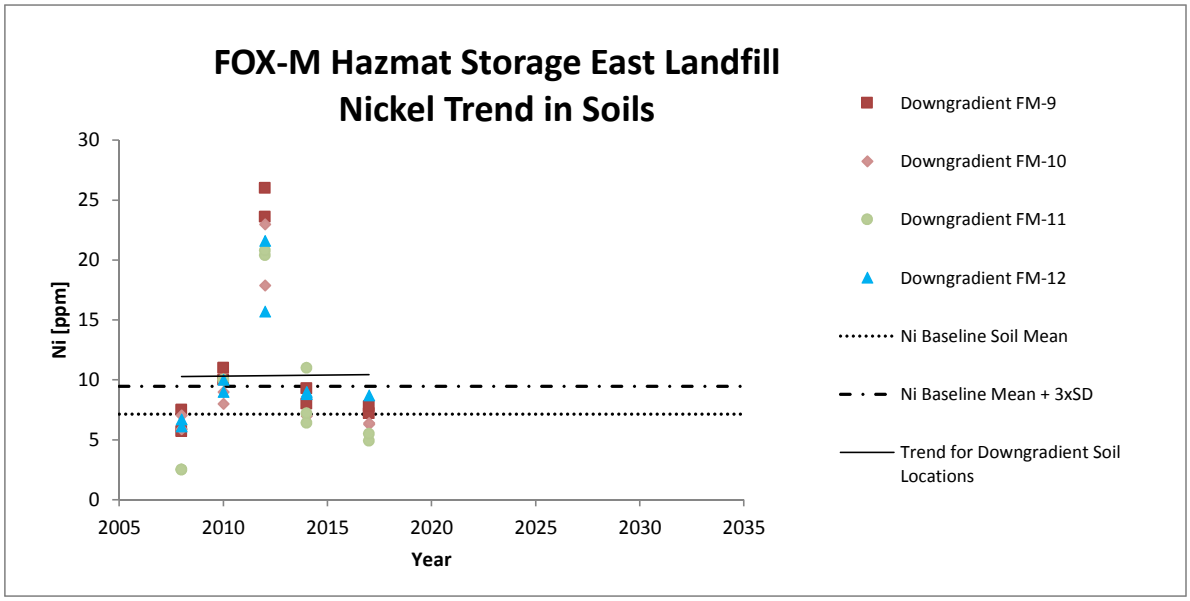


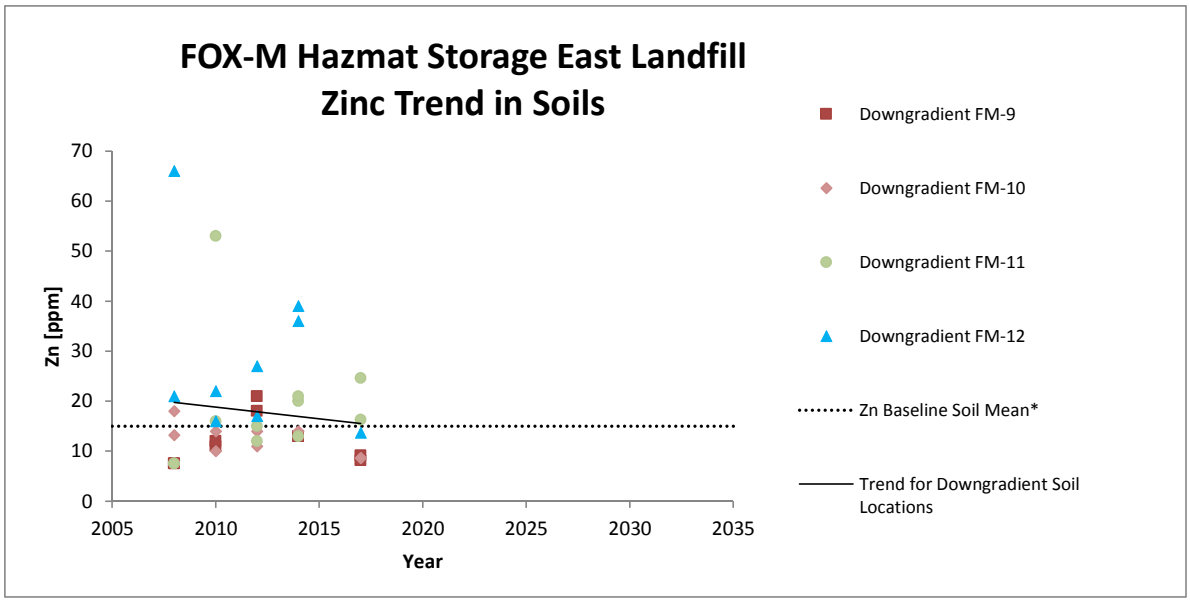
* Pb baseline arithmetic mean is equal to the baseline detection limit
* Pb baseline standard deviation = 0



‡ Lead chart with y-axis modified to show trend without displaying the 2008 value of 150 ppm at FM-12.
The value is included in the trend analysis.

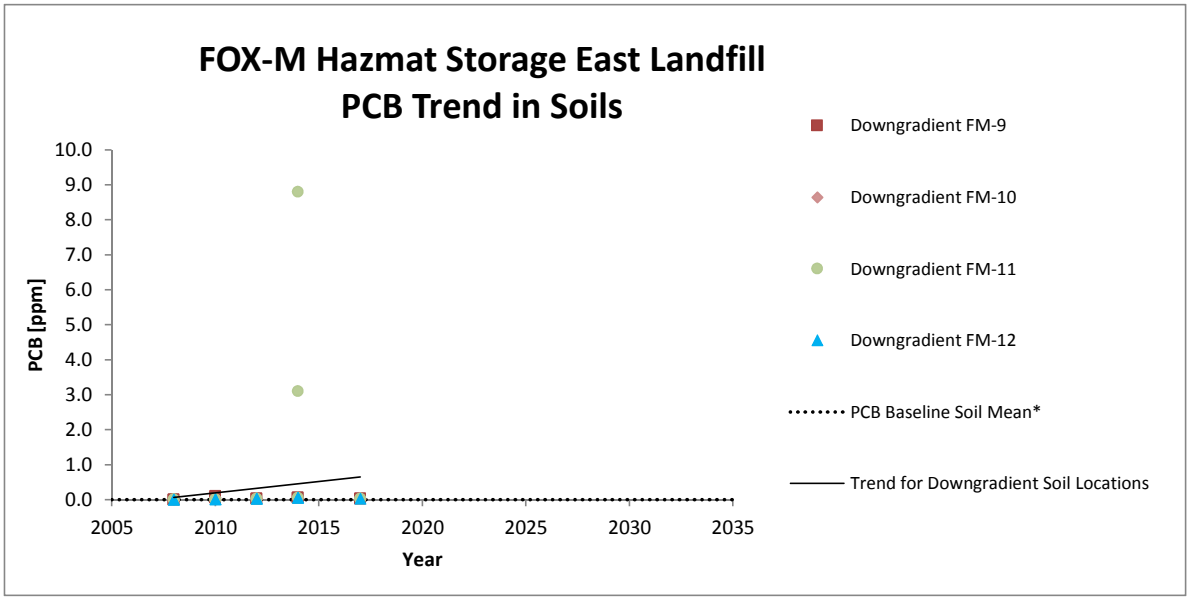
FOX-M Hazmat Storage East Landfill Trends in Soil Inorganics, PCBs and Modified TPH



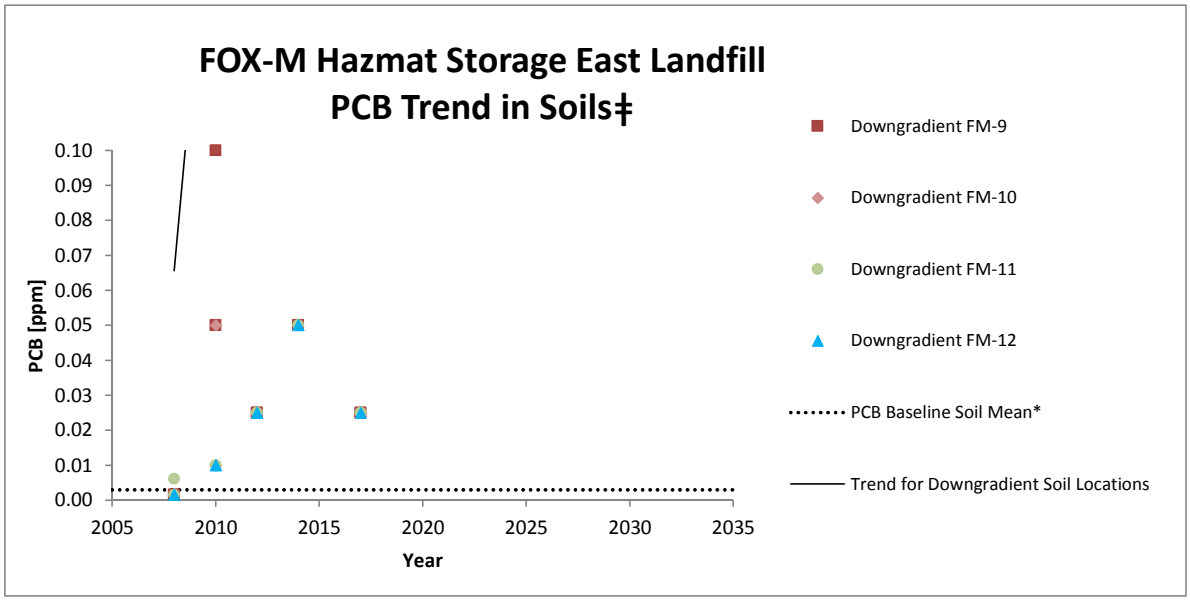


* Zn baseline arithmetic mean is equal to the baseline detection limit
* Zn baseline standard deviation = 0

FOX-M Hazmat Storage East Landfill Trends in Soil Inorganics, PCBs and Modified TPH

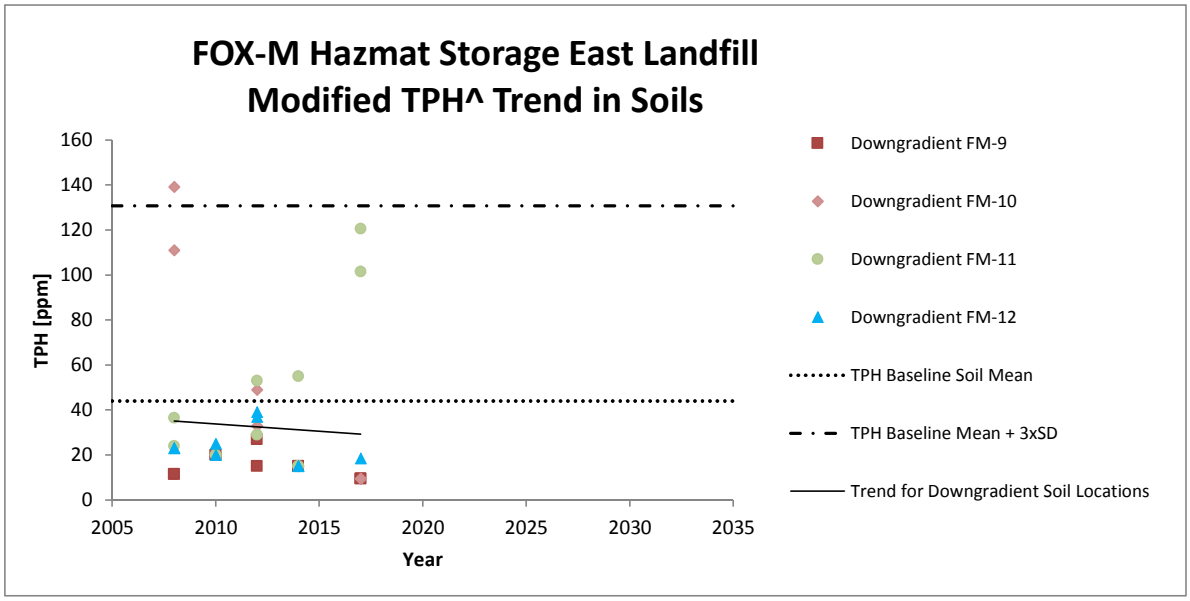


* PCB baseline arithmetic mean is equal to the baseline detection limit
* PCB baseline standard deviation = 0



‡ PCB chart with y-axis modified to show trend without displaying the 2014 interlab values of 8.8 and 3.1 ppm at FM-11. The value is included in the trend analysis.

FOX-M Hazmat Storage East Landfill Trends in Soil Inorganics, PCBs and Modified TPH



^ Modified TPH is Sum of F1, F2 and F3 fractions (C_6 - C_{34})

FOX-M Communications Northwest Landfill - Summary of Soil Monitoring Analytical Data

Link to: Table of Contents

Sample ID	Location	Year	Monitoring Year	Monitoring Phase	Depth (cm)	As* (mg/kg)	Cd* (mg/kg)	Cr* (mg/kg)	Co* (mg/kg)	Cu (mg/kg)	Pb* (mg/kg)	Ni* (mg/kg)	Zn* (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						1.00	1.00	20.0	5.00	6.3	10.0	5.0	15.0	0.213				N/A
Baseline Data - Arithmetic Mean						**1.75**	**1.00**	**20.0**	**5.00**	**6.0**	**10.0**	**8.3**	**15.0**	**0.10**				**40.0**
Baseline Data - Standard Deviation						1.02	0.00	0.0	0.00	1.6	0.0	3.8	0.0	0.00				0.0
Baseline Data Mean + 3xStandard Deviation						**4.80**	**1.00**	**20.0**	**5.00**	**10.8**	**10.0**	**19.7**	**15.0**	**0.10**				**40.0**
**** 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						*30*	*5*	*250*	*50*	*100*	*500*	*100*	*500*	*5*				*2500*
Monitoring Data																		**TPH Sum will appear when F1, F2 and F3 fractions are entered.**
Upgradient - no identified upgradient locations																		
Downgradient																		
	FM-13 surface																	
08-10819/20	FM-13	2008	1	Phase I	0	1.3	<1.0	<20	<5.0	2.8	<10	5.1	15.0	0.014	<10	<4.0	24.0	31.0
FM10-13A	FM-13	2010	3	Phase I	0-15	**2.0**	<0.50	10.0	2.0	5.0	9.0	**9.0**	15.0	<0.20	<10	<10	<20	20.0
FM12-13A-D	FM-13	2012	5	Phase I	0-15	**2.8**	<0.50	13.5	3.5	**6.3**	8.6	**23.1**	**20.0**	<0.050	<10	<10	20.0	30.0
FM-CNW-13-S	FM-13	2014	7	Phase II	0-15	**2.4**	0.3	8.3	1.6	4.7	6.0	6.2	**18.0**	<0.1	<10	<10	<10	15.0
FM-13 Shallow	FM-13	2017	10	Phase II	0-15	<1.0	<0.5	11.0	2.4	5.4	9.2	8.0	12.1	<0.05	<7	<4	<8	9.5
	FM-13		15	Phase II														#N/A
	FM-13		25	Phase II														#N/A
																		#N/A
																		#N/A
																		#N/A
																		#N/A
																		#N/A
	FM-13 depth																	
08-10821	FM-13	2008	1	Phase I	40	1.3	<1.0	<20	<5.0	3.6	<10	5.0	<15	0.003	<10	<4.0	<9.0	11.5
FM10-13B	FM-13	2010	3	Phase I	40-50	**2.0**	<0.50	11.0	3.0	5.0	5.0	**11.0**	12.0	<0.10	<10	13.0	<20	28.0
FM12-13B	FM-13	2012	5	Phase I	40-50	1.7	<0.50	10.1	2.8	4.5	3.1	**21.3**	11.0	<0.050	<10	<10	14.0	24.0
FM-CNW-13-D	FM-13	2014	7	Phase II	40-50	**2.6**	<0.10	11.0	2.2	4.4	4.0	**8.5**	13.0	<0.1	<10	<10	<10	15.0
FM-13 Deep	FM-13	2017	10	Phase II	30-40	<1.0	<0.5	8.9	1.9	3.6	5.5	7.1	8.4	<0.05	<7	<4	<8	9.5
	FM-13		15	Phase II														#N/A
	FM-13		25	Phase II														#N/A
																		#N/A
																		#N/A
																		#N/A
																		#N/A
																		#N/A

FOX-M Communications Northwest Landfill - Summary of Soil Monitoring Analytical Data

Link to: Table of Contents

Sample ID	Location	Year	Monitoring Year	Monitoring Phase	Depth (cm)	As* (mg/kg)	Cd* (mg/kg)	Cr* (mg/kg)	Co* (mg/kg)	Cu (mg/kg)	Pb* (mg/kg)	Ni* (mg/kg)	Zn* (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						1.00	1.00	20.0	5.00	6.3	10.0	5.0	15.0	0.213				N/A
Baseline Data - Arithmetic Mean						**1.75**	**1.00**	**20.0**	**5.00**	**6.0**	**10.0**	**8.3**	**15.0**	**0.10**				**40.0**
Baseline Data - Standard Deviation						1.02	0.00	0.0	0.00	1.6	0.0	3.8	0.0	0.00				0.0
Baseline Data Mean + 3xStandard Deviation						**4.80**	**1.00**	**20.0**	**5.00**	**10.8**	**10.0**	**19.7**	**15.0**	**0.10**				**40.0**
	FM-14 surface																	
08-10827/28	FM-14	2008	1	Phase I	0	**2.0**	<1.0	<20	<5.0	**7.1**	<10	5.3	<15	0.020	<10	3.2	55.5	**63.7**
FM10-14A	FM-14	2010	3	Phase I	0-15	**2.0**	<0.50	9.0	2.0	**8.0**	6.0	**10.0**	11.0	<0.10	<10	11.0	<20	26.0
FM12-14A	FM-14	2012	5	Phase I	0-15	**2.7**	<0.50	10.2	2.5	**10.0**	7.7	**17.1**	14.0	**0.110**	<10	<10	46.0	**56.0**
FM-CNW-14-S	FM-14	2014	7	Phase II	0-15	**3.7**	0.1	9.2	2.0	**9.3**	6.8	8.2	15.0	<0.1	<10	<10	13.0	23.0
FM-14 Shallow	FM-14	2017	10	Phase II	0-15	<1.0	<0.5	7.7	1.6	**14.2**	6.7	7.9	8.3	<0.05	<7	<4	28.0	33.5
	FM-14		15	Phase II														#N/A
	FM-14		25	Phase II														#N/A
																		#N/A
																		#N/A
																		#N/A
																		#N/A
	FM-14 depth																	
08-10829	FM-14	2008	1	Phase I	40	**2.3**	<1.0	<20	<5.0	**14.0**	<10	7.6	<15	0.004	<10	<4.0	25.0	32.0
FM10-14B	FM-14	2010	3	Phase I	40-50	**2.0**	<0.50	9.0	2.0	4.0	10.0	8.0	11.0	<0.10	<10	<10	<20	20.0
FM12-14B	FM-14	2012	5	Phase I	40-50	**1.9**	<0.50	13.0	3.2	**7.5**	4.7	**21.6**	13.0	<0.050	<10	<10	90.0	**100.0**
FM-CNW-14-D	FM-14	2014	7	Phase II	40-50	**2.9**	<0.10	13.0	2.7	**7.9**	5.7	**10.0**	**18.0**	<0.1	<10	<10	<10	15.0
FM-14 Deep	FM-14	2017	10	Phase II	40-50	<1.0	<0.5	16.0	2.8	**8.1**	7.0	**11.6**	14.9	<0.05	<7	<4	<8	9.5
	FM-14		15	Phase II														#N/A
	FM-14		25	Phase II														#N/A
																		#N/A
																		#N/A
	FM-15 surface																	
No Sample Collected	FM-15	2008	1	Phase I	0-15													
FM10-15A	FM-15	2010	3	Phase I	0-15	**2.0**	<0.50	7.0	1.0	3.0	3.0	7.0	6.0	<0.20	<10	<10	29.0	39.0
FM12-15A	FM-15	2012	5	Phase I	0-15	1.6	<0.50	14.6	2.9	**6.1**	4.3	**19.3**	**16.0**	<0.050	<10	17.0	163.0	**185.0**
FM-CNW-15-S	FM-15	2014	7	Phase II	0-15	**2.0**	0.16	4.3	0.7	**8.4**	2.8	5.1	7.2	<0.2	<30	<30	120.0	**150.0**
FM-15 Shallow	FM-15	2017	10	Phase II	0-15	<1.0	<0.5	3.9	<1.0	3.2	3.8	6.9	3.6	<0.05	<7	<4	16.0	21.5
	FM-15		15	Phase II														#N/A
	FM-15		25	Phase II														#N/A
																		#N/A
																		#N/A
	FM-15 depth																	
No Sample Collected	FM-15	2008	1	Phase I	40-50													
FM10-15B	FM-15	2010	3	Phase I	40-50	1.0	<0.50	9.0	2.0	4.0	3.0	8.0	9.0	<0.020	<10	<10	<20	20.0
FM12-15B	FM-15	2012	5	Phase I	40-50	**1.9**	<0.50	17.7	3.3	**6.9**	5.2	**20.2**	**19.0**	<0.050	<10	<10	101.0	**111.0**
FM-CNW-15-D	FM-15	2014	7	Phase II	40-50	1.7	0.21	13.0	2.0	4.6	3.4	7.7	13.0	<0.1	<10	<10	<10	15.0
FM-15 Deep	FM-15	2017	10	Phase II	30-40	<1.0	<0.5	12.6	2.1	5.2	6.1	8.0	11.1	<0.05	<7	<4	18.0	23.5
	FM-15		15	Phase II														#N/A
	FM-15		25	Phase II														#N/A
																		#N/A
																		#N/A

FOX-M Communications Northwest Landfill - Summary of Soil Monitoring Analytical Data

Link to: Table of Contents

Sample ID	Location	Year	Monitoring Year	Monitoring Phase	Depth (cm)	As* (mg/kg)	Cd* (mg/kg)	Cr* (mg/kg)	Co* (mg/kg)	Cu (mg/kg)	Pb* (mg/kg)	Ni* (mg/kg)	Zn* (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						1.00	1.00	20.0	5.00	6.3	10.0	5.0	15.0	0.213				N/A
Baseline Data - Arithmetic Mean						**1.75**	**1.00**	**20.0**	**5.00**	**6.0**	**10.0**	**8.3**	**15.0**	**0.10**				**40.0**
Baseline Data - Standard Deviation						1.02	0.00	0.0	0.00	1.6	0.0	3.8	0.0	0.00				0.0
Baseline Data Mean + 3xStandard Deviation						**4.80**	**1.00**	**20.0**	**5.00**	**10.8**	**10.0**	**19.7**	**15.0**	**0.10**				**40.0**
	FM-16 surface																	
08-10823	FM-16	2008	1	Phase I	0	**1.9**	<1.0	<20	<5.0	4.3	<10	7.1	<15	<0.0030	<10	18.0	60.0	**83.0**
FM10-16A	FM-16	2010	3	Phase I	0-15	<1.0	<0.50	14.0	2.0	**7.0**	4.0	**12.0**	13.0	<0.10	<10	13.0	26.0	**44.0**
FM12-16A	FM-16	2012	5	Phase I	0-15	**3.3**	<0.50	17.3	4.1	**9.4**	**13.4**	**23.9**	**21.0**	<0.050	<10	42.0	181.0	**228.0**
FM-CNW-16-S	FM-16	2014	7	Phase II	0-15	**8.6**	0.1	**61.0**	2.4	**30.0**	**260.0**	**8.5**	**21.0**	<0.1	<10	<10	54.0	**64.0**
FM-16 Shallow	FM-16	2017	10	Phase II	0-15	<1.0	<0.5	12.3	2.3	5.5	8.4	**9.2**	12.8	<0.05	<7	<4	<8	9.5
	FM-16		15	Phase II														#N/A
	FM-16		25	Phase II														#N/A
																		#N/A
																		#N/A
																		#N/A
																		#N/A
																		#N/A
	FM-16 depth																	
08-10825	FM-16	2008	1	Phase I	30	1.1	<1.0	<20	<5.0	4.2	<10	6.7	**24.0**	<0.0030	<10	<4.0	15.0	22.0
FM10-16B	FM-16	2010	3	Phase I	30	**2.0**	<0.50	**27.0**	2.0	**9.0**	5.0	**17.0**	12.0	<0.020	<10	11.0	23.0	39.0
FM12-16B	FM-16	2012	5	Phase I	40-50	**1.9**	<0.50	12.2	2.9	5.9	9.7	**20.5**	14.0	<0.050	<10	<10	106.0	**116.0**
FM-CNW-16-D	FM-16	2014	7	Phase II	40-50	**3.0**	<0.10	11.0	2.1	**7.0**	**12.0**	7.1	15.0	<0.1	<10	<10	<10	15.0
FM-16 Deep	FM-16	2017	10	Phase II	40-50	<1.0	<0.5	9.0	1.9	**6.4**	8.2	7.3	**21.3**	<0.05	<7	<4	<8	9.5
	FM-16		15	Phase II														#N/A
	FM-16		25	Phase II														#N/A
																		#N/A
																		#N/A
																		#N/A
																		#N/A

Legend

XX **Sample exceeds baseline mean**

XX **Sample exceeds baseline mean + 3xSD**

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

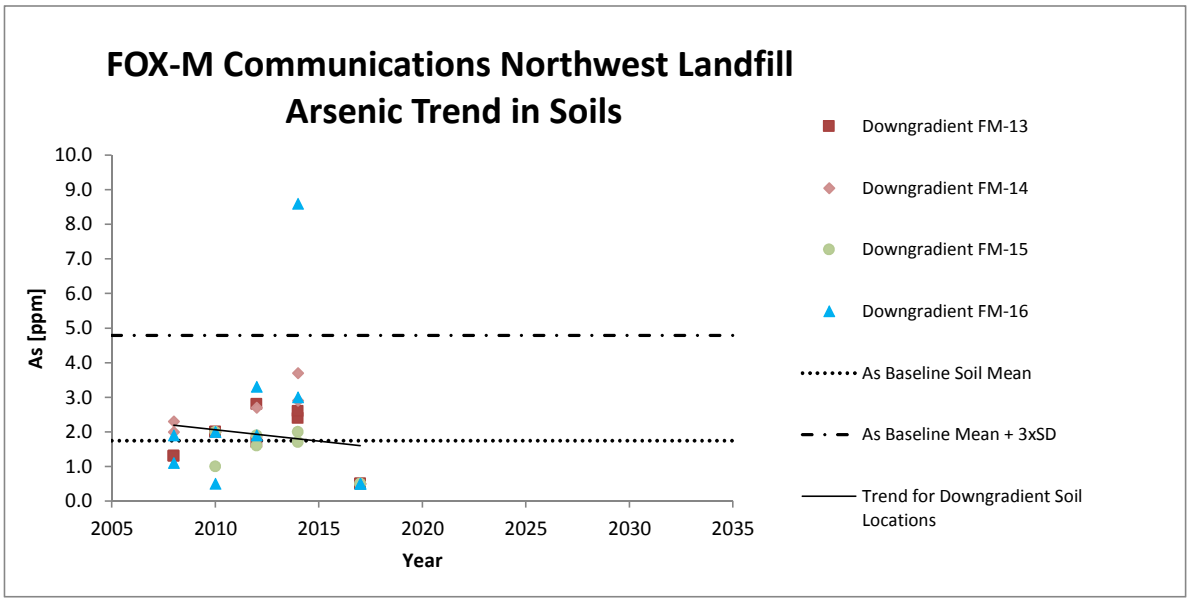
N/A = not analyzed

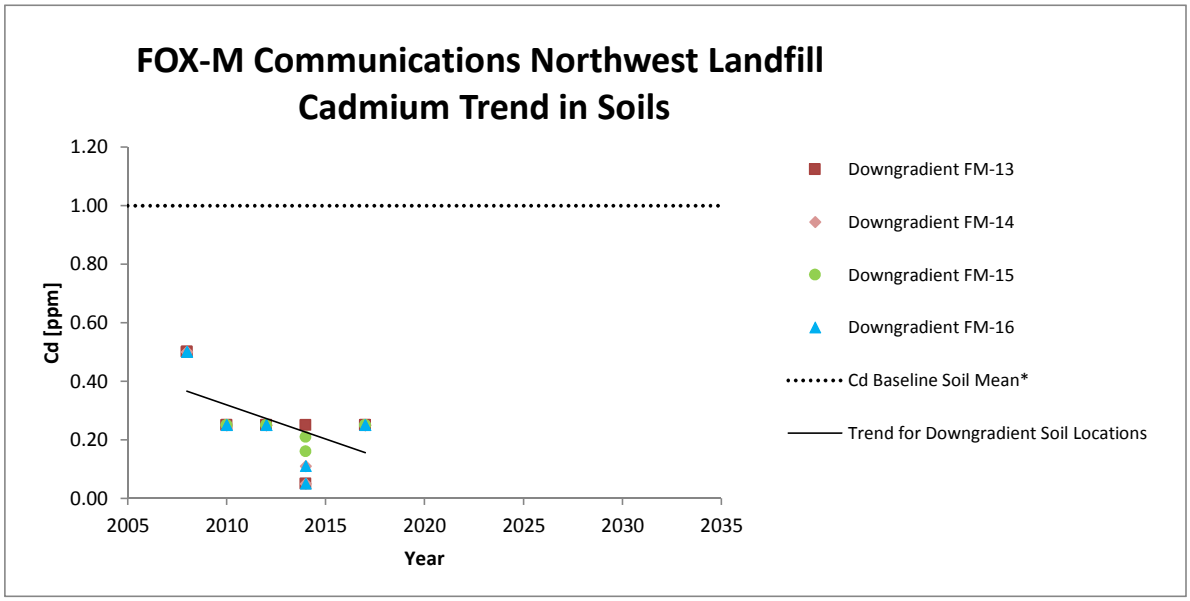
Note: All locations are downgradient, there are no identified upgradient locations.

FOX-M Communications Northwest Landfill Trends in Soil Inorganics, PCBs and Modified TPH

Link to: Table of Contents

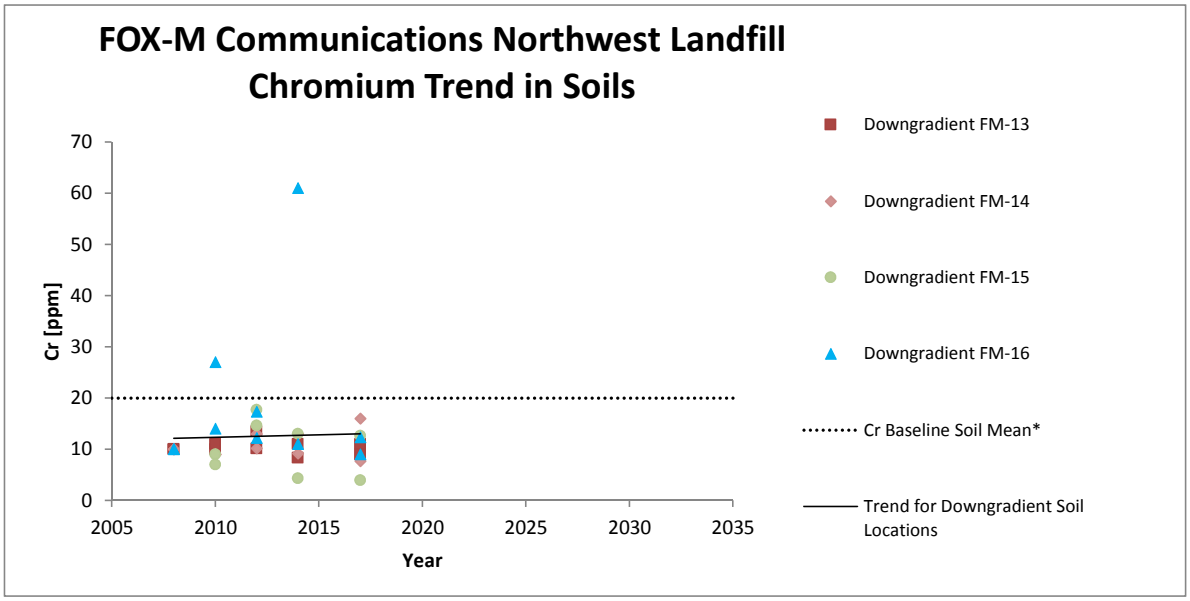
Note: All locations are downgradient, there are no upgradient locations.
Where results are below detection, half of the detection limit has been used in the charts for the sample points.
Trendlines are intended for visual interpretation of temporal trends. When all monitoring results are below detection, trendlines are a reflection of changes in detection limit. Users should refer to data tables.



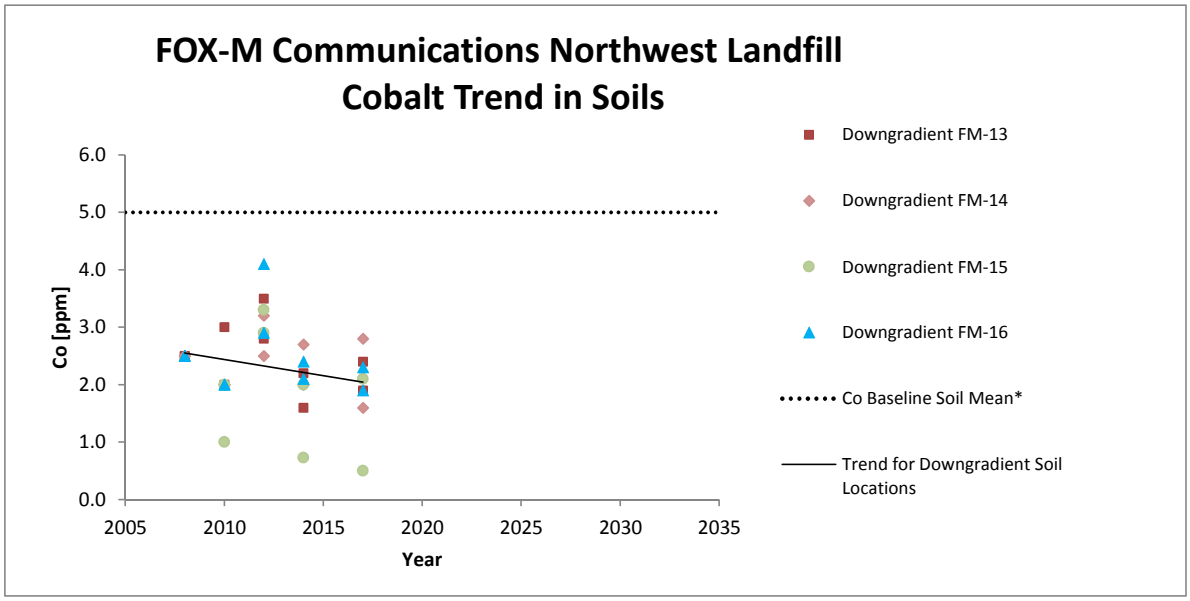


* Cd baseline arithmetic mean is equal to the baseline detection limit
* Cd baseline standard deviation = 0

FOX-M Communications Northwest Landfill Trends in Soil Inorganics, PCBs and Modified TPH

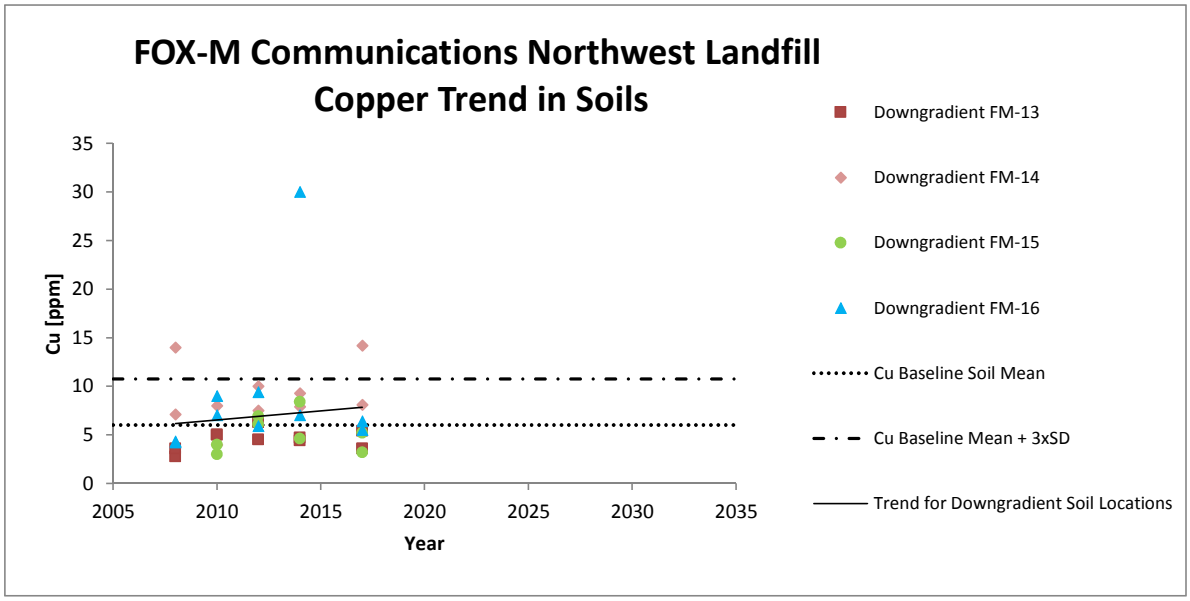


* Cr baseline arithmetic mean is equal to the baseline detection limit
* Cr baseline standard deviation = 0

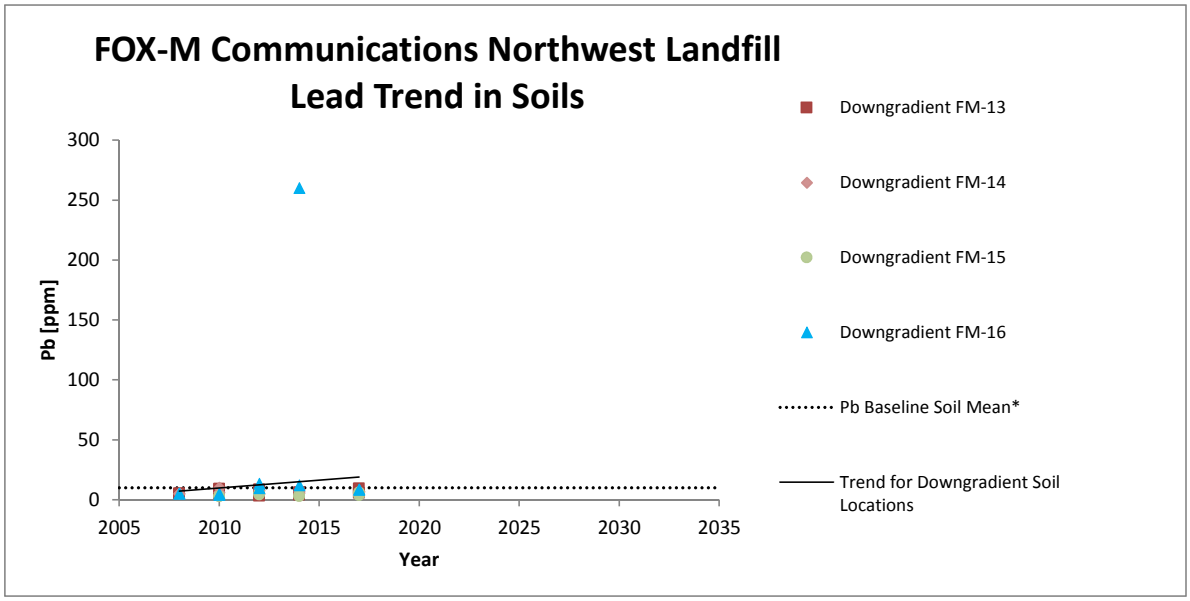


* Co baseline arithmetic mean is equal to the baseline detection limit
* Co baseline standard deviation = 0

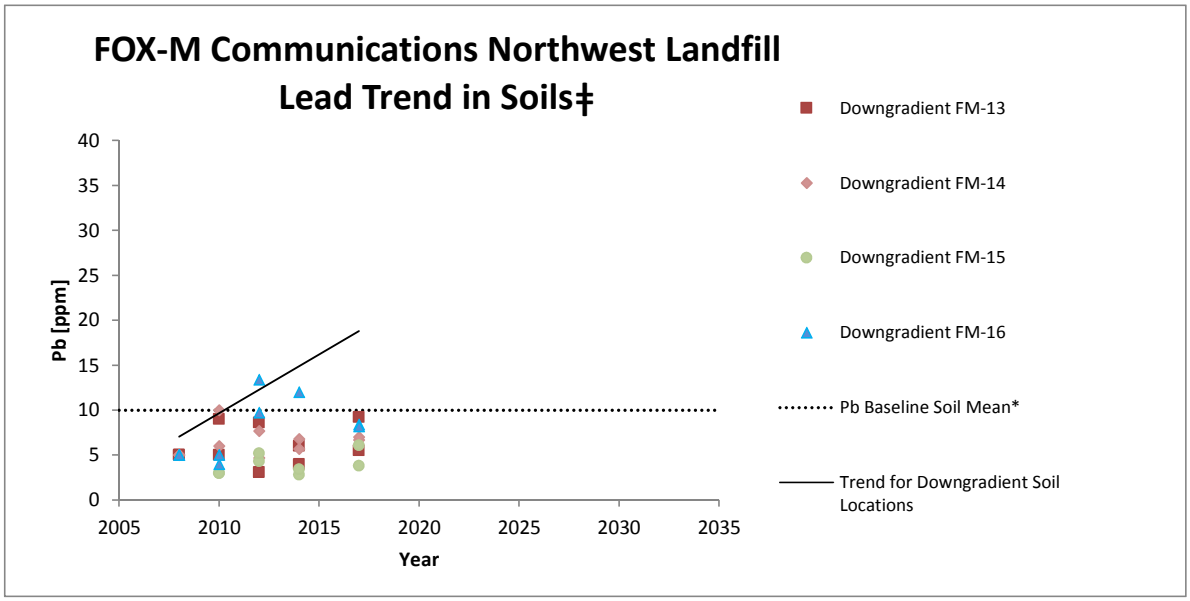
FOX-M Communications Northwest Landfill Trends in Soil Inorganics, PCBs and Modified TPH



FOX-M Communications Northwest Landfill Trends in Soil Inorganics, PCBs and Modified TPH

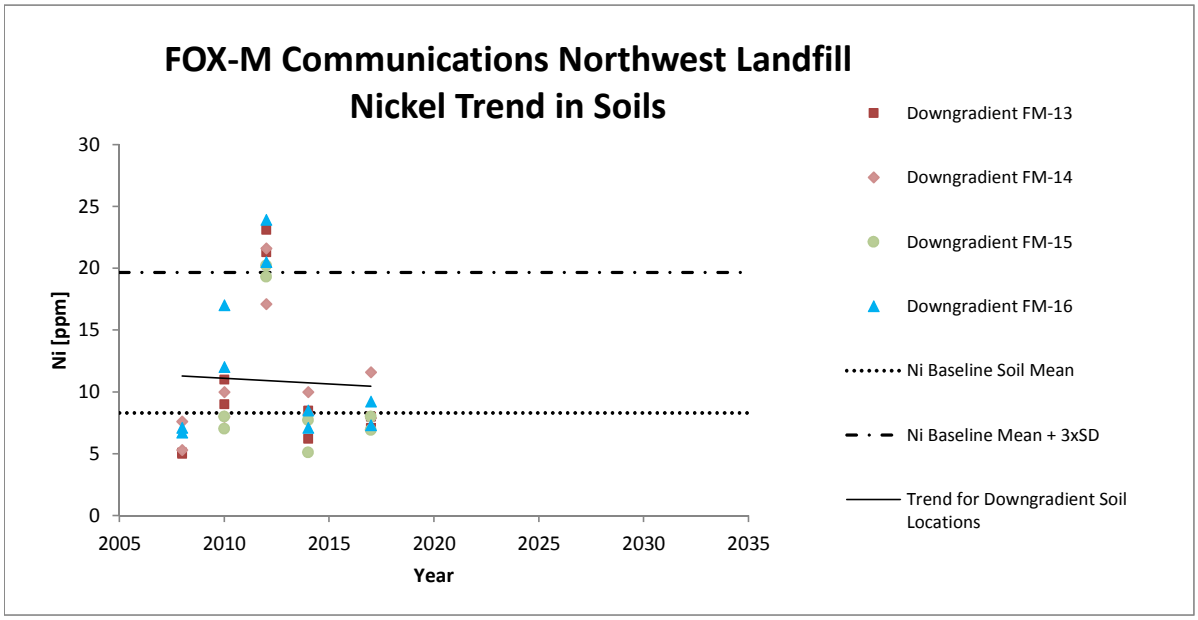


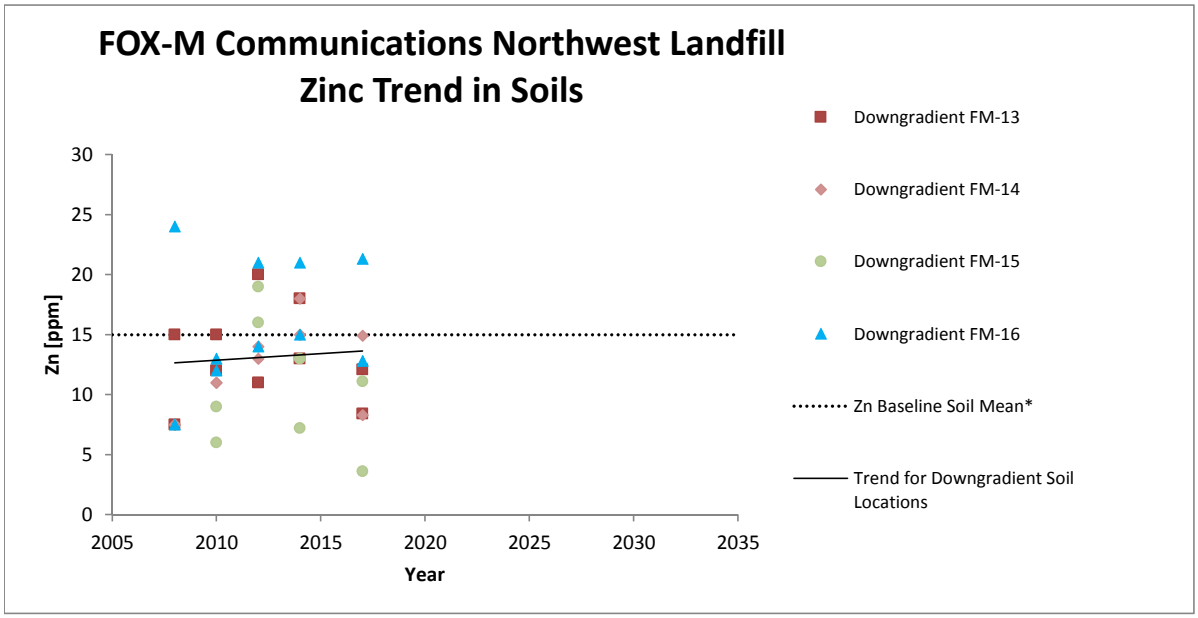
* Pb baseline arithmetic mean is equal to the baseline detection limit
* Pb baseline standard deviation = 0



‡ Lead chart with y-axis modified to show trend without displaying the 2014 value of 260 ppm at FM-16.
The value is included in the trend analysis.

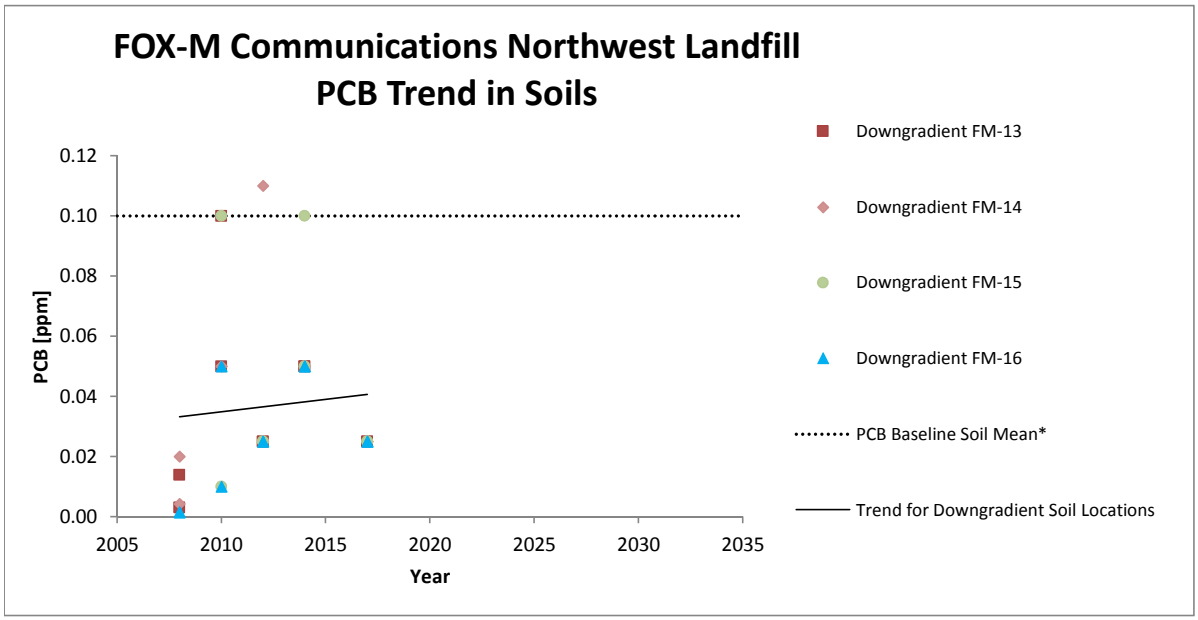
FOX-M Communications Northwest Landfill Trends in Soil Inorganics, PCBs and Modified TPH



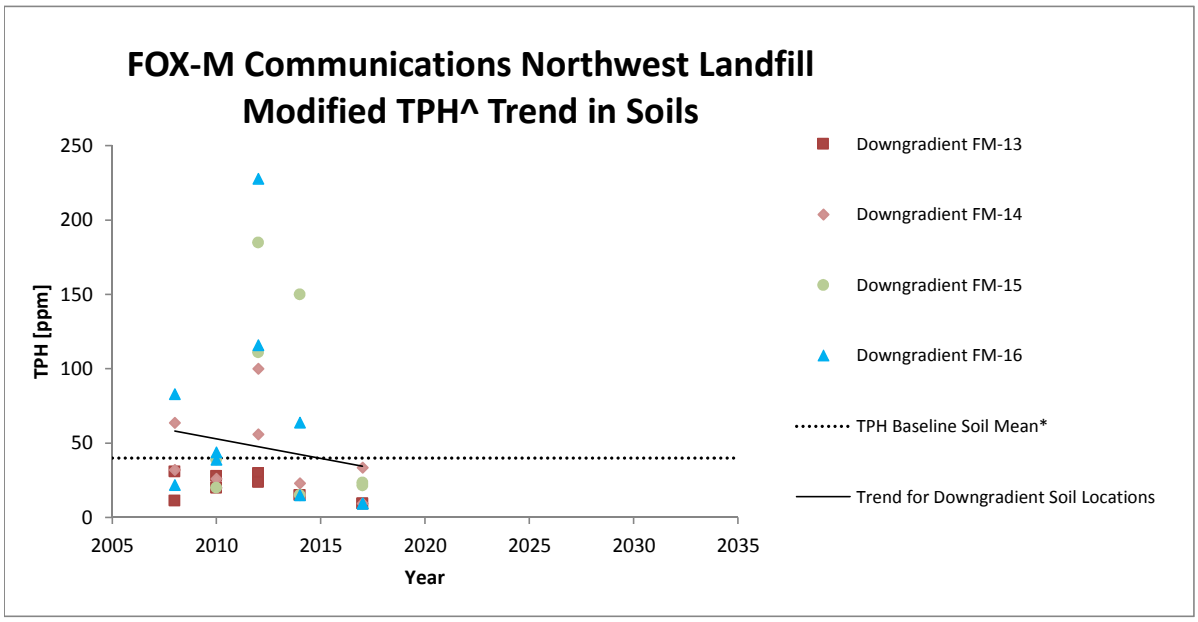


* Zn baseline arithmetic mean is equal to the baseline detection limit
* Zn baseline standard deviation = 0

FOX-M Communications Northwest Landfill Trends in Soil Inorganics, PCBs and Modified TPH



* PCB baseline arithmetic mean is equal to the baseline detection limit
* PCB baseline standard deviation = 0



^ Modified TPH is sum of F1, F2 and F3 fractions (C_6 - C_{34})
* TPH baseline arithmetic mean is equal to the detection limit
* TPH baseline standard deviation = 0

FOX-M Communications North Landfill - Summary of Soil Monitoring Analytical Data

Link to: Table of Contents

Sample ID	Location	Year	Monitoring Year	Monitoring Phase	Depth (cm)	As* (mg/kg)	Cd* (mg/kg)	Cr* (mg/kg)	Co* (mg/kg)	Cu (mg/kg)	Pb* (mg/kg)	Ni* (mg/kg)	Zn* (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						1.00	1.00	20.0	5.00	6.3	10.0	5.0	15.0	0.213				N/A
Baseline Data - Arithmetic Mean						**1.84**	**1.00**	**20.0**	**5.00**	**5.7**	**10.0**	**7.8**	**15.3**	**0.10**				**40.0**
Baseline Data - Standard Deviation						0.94	0.00	0.0	0.00	1.9	0.0	2.1	0.0	0.00				0.0
Baseline Data Mean + 3xStandard Deviation						**4.65**	**1.00**	**20.0**	**5.00**	**11.5**	**10.0**	**14.0**	**15.3**	**0.10**				**40.0**
**** 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						*30*	*5*	*250*	*50*	*100*	*500*	*100*	*500*	*5*				*2500*
Monitoring Data																		**TPH Sum will appear when F1, F2 and F3 fractions are entered.**
Upgradient - no identified upgradient locations																		
Downgradient																		
	FM-17 surface																	
08-10831/32	FM-17	2008	1	Phase I	0	1.7	<1.0	<20	<5.0	4.2	<10	6.9	<15	0.004	<10	<4.0	19.0	26.0
FM10-17A	FM-17	2010	3	Phase I	0-15	**2.0**	<0.50	**21.0**	3.0	**6.0**	5.0	**15.0**	14.0	<0.20	<10	<10	<20	20.0
FM12-17A	FM-17	2012	5	Phase I	0-15	1.5	<0.50	10.8	2.7	4.8	3.8	**18.9**	13.0	<0.050	<10	<10	26.0	36.0
FM-CNO-17-S	FM-17	2014	7	Phase II	0-15	**2.5**	<0.10	13.0	2.7	5.3	5.0	**9.7**	**17.0**	<0.1	<10	<10	<10	15.0
FM-17 Shallow	FM-17	2017	10	Phase II	0-15	<1.0	<0.5	12.0	2.6	5.1	6.8	**10.8**	10.1	<0.05	<7	<4	<8	9.5
	FM-17		15	Phase II														#N/A
	FM-17		25	Phase II														#N/A
																		#N/A
																		#N/A
																		#N/A
																		#N/A
																		#N/A
	FM-17 depth																	
08-10833	FM-17	2008	1	Phase I	40	1.8	<1.0	<20	<5.0	3.4	<10	6.1	<15	<0.0030	<10	<4.0	<9.0	11.5
FM10-17B	FM-17	2010	3	Phase I	40-50	**2.0**	<0.50	15.0	3.0	5.0	4.0	**13.0**	12.0	<0.020	<10	12.0	<20	27.0
FM12-17B	FM-17	2012	5	Phase I	40-50	**2.0**	<0.50	12.1	3.1	4.8	4.0	**20.5**	13.0	<0.050	<10	<10	26.0	36.0
FM-CNO-17-D	FM-17	2014	7	Phase II	40-50	1.7	<0.10	12.0	2.5	**41.0**	4.6	**11.0**	14.0	<0.1	<10	<10	<10	15.0
FM-17 Deep	FM-17	2017	10	Phase II	30-40	<1.0	<0.5	11.3	2.3	4.7	5.6	**9.1**	11.0	<0.05	<7	<4	<8	9.5
	FM-17		15	Phase II														#N/A
	FM-17		25	Phase II														#N/A
																		#N/A
																		#N/A
																		#N/A
																		#N/A
																		#N/A

FOX-M Communications North Landfill - Summary of Soil Monitoring Analytical Data

Link to: Table of Contents

Sample ID	Location	Year	Monitoring Year	Monitoring Phase	Depth (cm)	As* (mg/kg)	Cd* (mg/kg)	Cr* (mg/kg)	Co* (mg/kg)	Cu (mg/kg)	Pb* (mg/kg)	Ni* (mg/kg)	Zn* (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						1.00	1.00	20.0	5.00	6.3	10.0	5.0	15.0	0.213				N/A
Baseline Data - Arithmetic Mean						**1.84**	**1.00**	**20.0**	**5.00**	**5.7**	**10.0**	**7.8**	**15.3**	**0.10**				**40.0**
Baseline Data - Standard Deviation						0.94	0.00	0.0	0.00	1.9	0.0	2.1	0.0	0.00				0.0
Baseline Data Mean + 3xStandard Deviation						**4.65**	**1.00**	**20.0**	**5.00**	**11.5**	**10.0**	**14.0**	**15.3**	**0.10**				**40.0**
	FM-18 surface																	
08-10835	FM-18	2008	1	Phase I	0	**1.9**	<1.0	<20	<5.0	4.2	<10	**8.1**	<15	<0.0030	<10	<4.0	<9.0	11.5
FM10-18A	FM-18	2010	3	Phase I	0-15	**2.0**	<0.20	14.0	2.0	4.0	4.0	**11.0**	15.0	<0.020	<10	<10	<20	20.0
FM12-18A-D	FM-18	2012	5	Phase I	0-15	**1.9**	<0.50	11.0	2.8	4.2	6.3	**20.6**	14.0	<0.050	<10	<10	50.0	**60.0**
FM-CNO-18-S	FM-18	2014	7	Phase II	0-15	<1.0	0.1	6.4	1.0	2.8	1.6	5.8	6.3	<0.1	<10	<10	<10	15.0
FM-18 Shallow	FM-18	2017	10	Phase II	0-15	<1.0	<0.5	11.6	2.3	4.9	7.9	**9.9**	10.3	<0.05	<7	<4	<8	9.5
	FM-18		15	Phase II														#N/A
	FM-18		25	Phase II														#N/A
																		#N/A
																		#N/A
																		#N/A
	FM-18 depth																	
08-10837	FM-18	2008	1	Phase I	40	**1.9**	<1.0	<20	<5.0	<3.0	<10	5.7	<15	<0.0030	<10	<4.0	18.0	25.0
FM10-18B	FM-18	2010	3	Phase I	40-50	**2.0**	<0.50	15.0	3.0	4.0	4.0	**12.0**	12.0	<0.020	<10	<10	<20	20.0
FM12-18B	FM-18	2012	5	Phase I	40-50	**2.0**	<0.50	12.1	3.3	4.8	9.8	**21.2**	**16.0**	<0.50	<10	<10	49.0	**59.0**
No sample (gravel/cobbles)	FM-18	2014	7	Phase II														#N/A
FM-18 Deep	FM-18	2017	10	Phase II	40-50	<1.0	<0.5	11.4	2.2	4.7	9.0	**9.2**	9.9	<0.05	<7	<4	<8	9.5
	FM-18		15	Phase II														#N/A
	FM-18		25	Phase II														#N/A
																		#N/A
																		#N/A
																		#N/A
	FM-19 surface																	
08-10839	FM-19	2008	1	Phase I	0	1.7	<1.0	<20	<5.0	3.5	<10	7.2	<15	<0.0030	<10	<4.0	12.0	19.0
FM10-19A	FM-19	2010	3	Phase I	0-15	1.0	<0.50	16.0	3.0	5.0	4.0	**12.0**	10.0	<0.020	<10	<10	<20	20.0
FM12-19A	FM-19	2012	5	Phase I	0-15	**2.2**	<0.50	11.6	3.2	4.6	4.9	**21.2**	13.0	<0.050	<10	<10	14.0	24.0
FM-CNO-19-S	FM-19	2014	7	Phase II	0-15	**2.5**	<0.10	11.0	2.2	5.6	4.9	**9.0**	14.0	<0.1	<10	<10	<10	15.0
FM-19 Shallow	FM-19	2017	10	Phase II	0-15	<1.0	<0.5	9.6	2.3	**5.9**	7.4	7.7	11.2	<0.05	<7	<4	<8	9.5
	FM-19		15	Phase II														#N/A
	FM-19		25	Phase II														#N/A
																		#N/A
																		#N/A
																		#N/A
	FM-19 depth																	
08-10841	FM-19	2008	1	Phase I	40	**2.6**	<1.0	<20	<5.0	3.8	<10	7.8	<15	<0.0030	<10	<4.0	9.4	16.4
FM10-19B	FM-19	2010	3	Phase I	40-50	1.0	<0.50	20.0	3.0	**7.0**	4.0	**15.0**	**22.0**	<0.020	<10	15.0	<20	30.0
FM12-19B	FM-19	2012	5	Phase I	40-50	**2.0**	<0.50	11.2	3.0	4.6	3.8	**22.5**	12.0	<0.050	<10	<10	<10	15.0
FM-CNO-19-D	FM-19	2014	7	Phase II	40-50	**2.8**	<0.10	13.0	2.4	**5.9**	4.6	**11.0**	**19.0**	<0.1	<10	<10	<10	15.0
FM-19 Deep	FM-19	2017	10	Phase II	40-50	<1.0	<0.5	9.0	1.8	**6.4**	6.8	7.4	12.7	<0.05	<7	<4	<8	9.5
	FM-19		15	Phase II														#N/A
	FM-19		25	Phase II														#N/A
																		#N/A

FOX-M Communications North Landfill - Summary of Soil Monitoring Analytical Data

Link to: Table of Contents

Sample ID	Location	Year	Monitoring Year	Monitoring Phase	Depth (cm)	As* (mg/kg)	Cd* (mg/kg)	Cr* (mg/kg)	Co* (mg/kg)	Cu (mg/kg)	Pb* (mg/kg)	Ni* (mg/kg)	Zn* (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						1.00	1.00	20.0	5.00	6.3	10.0	5.0	15.0	0.213				N/A
Baseline Data - Arithmetic Mean						**1.84**	**1.00**	**20.0**	**5.00**	**5.7**	**10.0**	**7.8**	**15.3**	**0.10**				**40.0**
Baseline Data - Standard Deviation						0.94	0.00	0.0	0.00	1.9	0.0	2.1	0.0	0.00				0.0
Baseline Data Mean + 3xStandard Deviation						**4.65**	**1.00**	**20.0**	**5.00**	**11.5**	**10.0**	**14.0**	**15.3**	**0.10**				**40.0**
	FM-20 surface																	
08-10843	FM-20	2008	1	Phase I	0	1.5	<1.0	<20	<5.0	4.1	<10	**8.3**	<15	<0.0030	<10	<4.0	<9.0	11.5
FM10-20A	FM-20	2010	3	Phase I	0-15	<1.0	<0.50	20.0	3.0	5.0	3.0	**14.0**	11.0	<0.020	<10	<10	<20	20.0
FM12-20A	FM-20	2012	5	Phase I	0-15	1.6	<0.50	15.4	4.8	**6.2**	5.6	**22.4**	**18.0**	<0.050	20.0	<10	<10	30.0
FM-CNO-20-S	FM-20	2014	7	Phase II	0-15	**2.0**	<0.10	13.0	3.1	**6.9**	5.6	**11.0**	**17.0**	<0.1	<10	<10	<10	15.0
FM-20 Shallow	FM-20	2017	10	Phase II	0-15	<1.0	<0.5	11.5	2.7	4.6	6.5	**10.0**	12.0	<0.05	<7	<4	<8	9.5
	FM-20		15	Phase II														#N/A
	FM-20		25	Phase II														#N/A
																		#N/A
																		#N/A
	FM-20 depth																	
08-10845	FM-20	2008	1	Phase I	40	0.7	<1.0	<20	<5.0	3.8	<10	**8.6**	<15	<0.0030	<10	<4.0	<9.0	11.5
FM10-20B	FM-20	2010	3	Phase I	40-50	<1.0	<0.50	16.0	3.0	5.0	3.0	**14.0**	13.0	<0.020	<10	<10	<20	20.0
FM12-20B	FM-20	2012	5	Phase I	40-50	**2.4**	<0.50	18.8	**5.3**	**8.5**	**11.7**	**26.6**	**27.0**	<0.050	<10	<10	<10	15.0
FM-CNO-20-D	FM-20	2014	7	Phase II	40-50	1.3	<0.10	14.0	3.0	5.3	3.7	**12.0**	**16.0**	<0.1	<10	<10	<10	15.0
FM-20 Deep	FM-20	2017	10	Phase II	40-50	<1.0	<0.5	12.4	2.9	**5.7**	7.8	**9.9**	14.8	<0.05	<7	<4	<8	9.5
	FM-20		15	Phase II														#N/A
	FM-20		25	Phase II														#N/A
																		#N/A
																		#N/A
	FM-21 surface																	
08-10847	FM-21	2008	1	Phase I	0	1.3	<1.0	<20	<5.0	4.4	<10	**9.6**	<15	<0.0030	<10	<4.0	<9.0	11.5
FM10-21A	FM-21	2010	3	Phase I	0-15	1.0	<0.50	14.0	3.0	5.0	5.0	**13.0**	12.0	<0.020	<10	<10	<20	20.0
FM12-21A	FM-21	2012	5	Phase I	0-15	1.4	<0.50	18.2	4.3	**6.2**	5.7	**27.6**	**19.0**	<0.050	<10	<10	12.0	22.0
FM-CNO-21-S	FM-21	2014	7	Phase II	0-15	1.5	<0.10	10.0	2.1	4.6	3.3	**9.7**	11.0	<0.1	<10	<10	<10	15.0
FM-21 Shallow	FM-21	2017	10	Phase II	0-15	<1.0	<0.5	11.2	2.3	4.4	6.4	**9.8**	9.6	<0.05	<7	<4	<8	9.5
	FM-21		15	Phase II														#N/A
	FM-21		25	Phase II														#N/A
																		#N/A
																		#N/A
	FM-21 depth																	
No Sample Collected	FM-21	2008	1	Phase I														
FM10-21B	FM-21	2010	3	Phase I	40	<1.0	<0.50	15.0	2.0	4.0	3.0	**12.0**	9.0	<0.020	<10	<10	<20	20.0
FM12-21B	FM-21	2012	5	Phase I	40-50	1.0	<0.50	19.3	4.6	**6.5**	5.5	**28.1**	**27.0**	<0.050	<10	<10	<10	15.0
FM-CNO-21-D	FM-21	2014	7	Phase II	40-50	1.2	<0.10	10.0	2.3	4.6	3.0	**9.2**	11.0	<0.1	<10	<10	<10	15.0
Not sampled - refusal	FM-21	2017	10	Phase II														#N/A
	FM-21		15	Phase II														#N/A
	FM-21		25	Phase II														#N/A
																		#N/A
																		#N/A

FOX-M Communications North Landfill - Summary of Soil Monitoring Analytical Data

Link to: Table of Contents

Sample ID	Location	Year	Monitoring Year	Monitoring Phase	Depth (cm)	As* (mg/kg)	Cd* (mg/kg)	Cr* (mg/kg)	Co* (mg/kg)	Cu (mg/kg)	Pb* (mg/kg)	Ni* (mg/kg)	Zn* (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						1.00	1.00	20.0	5.00	6.3	10.0	5.0	15.0	0.213				N/A
Baseline Data - Arithmetic Mean						**1.84**	**1.00**	**20.0**	**5.00**	**5.7**	**10.0**	**7.8**	**15.3**	**0.10**				**40.0**
Baseline Data - Standard Deviation						0.94	0.00	0.0	0.00	1.9	0.0	2.1	0.0	0.00				0.0
Baseline Data Mean + 3xStandard Deviation						**4.65**	**1.00**	**20.0**	**5.00**	**11.5**	**10.0**	**14.0**	**15.3**	**0.10**				**40.0**
	FM-22 surface																	
08-10849/50	FM-22	2008	1	Phase I	0	**2.1**	<1.0	<20	<5.0	4.1	<10	7.1	<15	<0.0030	<10	<4.0	7.8	14.8
FM10-22A	FM-22	2010	3	Phase I	0-15	**2.0**	<0.50	14.0	3.0	**6.0**	4.0	**13.0**	12.0	<0.020	<10	<10	<20	20.0
FM12-22A	FM-22	2012	5	Phase I	0-15	1.3	<0.50	16.2	3.3	5.2	4.0	**21.5**	**16.0**	<0.050	<10	<10	<10	15.0
FM-CNO-22-S	FM-22	2014	7	Phase II	0-15	1.2	<0.10	11.0	2.1	4.2	3.0	**8.8**	12.0	<0.1	<10	<10	<10	15.0
FM-22 Shallow	FM-22	2017	10	Phase II	0-15	<1.0	<0.5	11.5	2.1	5.6	7.3	**9.5**	8.9	<0.05	<7	<4	<8	9.5
	FM-22		15	Phase II														#N/A
	FM-22		25	Phase II														#N/A
																		#N/A
																		#N/A
																		#N/A
																		#N/A
																		#N/A
	FM-22 depth																	
08-10851	FM-22	2008	1	Phase I	40	1.3	<1.0	<20	<5.0	3.2	<10	6.8	<15	<0.0030	<10	<4.0	<9.0	11.5
FM10-22B	FM-22	2010	3	Phase I	40-50	1.0	<0.50	13.0	2.0	5.0	3.0	**12.0**	13.0	<0.020	<10	<10	<20	20.0
FM12-22B	FM-22	2012	5	Phase I	40-50	0.8	<0.50	11.4	2.8	3.3	2.7	**20.3**	13.0	<0.050	<10	<10	<10	15.0
FM-CNO-22-D	FM-22	2014	7	Phase II	40-50	1.4	<0.10	12.0	2.2	4.3	2.9	**9.6**	13.0	<0.1	<10	<10	<10	15.0
FM-22 Deep (Dup Avg)	FM-22	2017	10	Phase II	30-40	<1.0	<0.5	11.1	2.3	5.1	5.3	**9.3**	9.4	<0.05	<7	<4	<8	9.5
	FM-22		15	Phase II														#N/A
	FM-22		25	Phase II														#N/A
																		#N/A
																		#N/A
																		#N/A
																		#N/A
																		#N/A

Legend

XX	**Sample exceeds baseline mean**
XX	**Sample exceeds baseline mean + 3xSD**

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

N/A = not analyzed

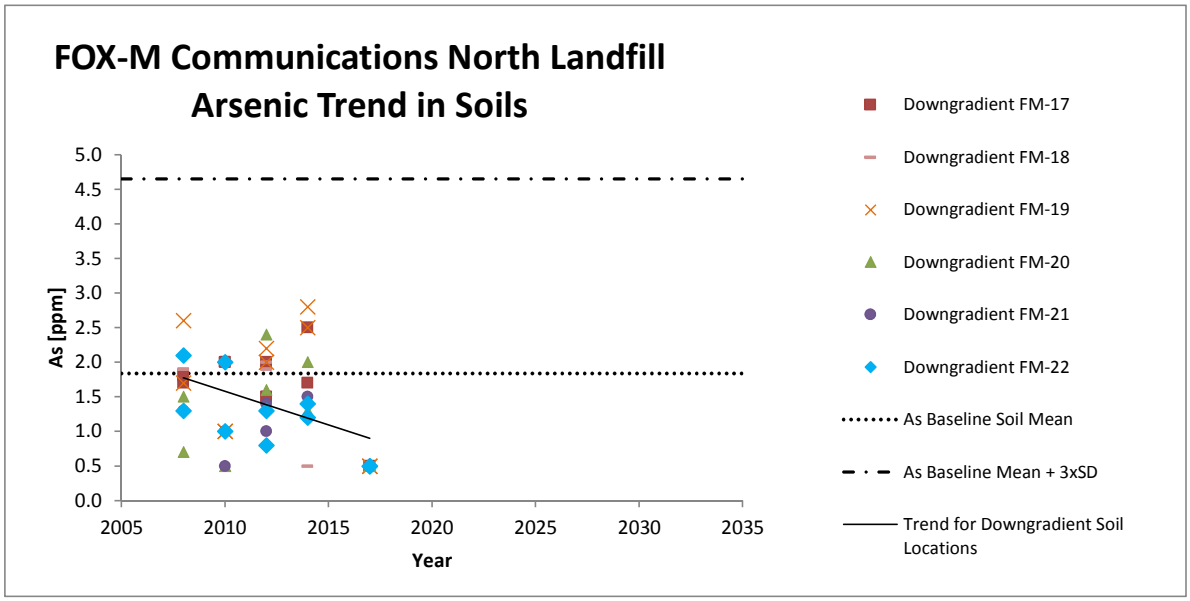
Note: All locations are downgradient, there are no identified upgradient locations.

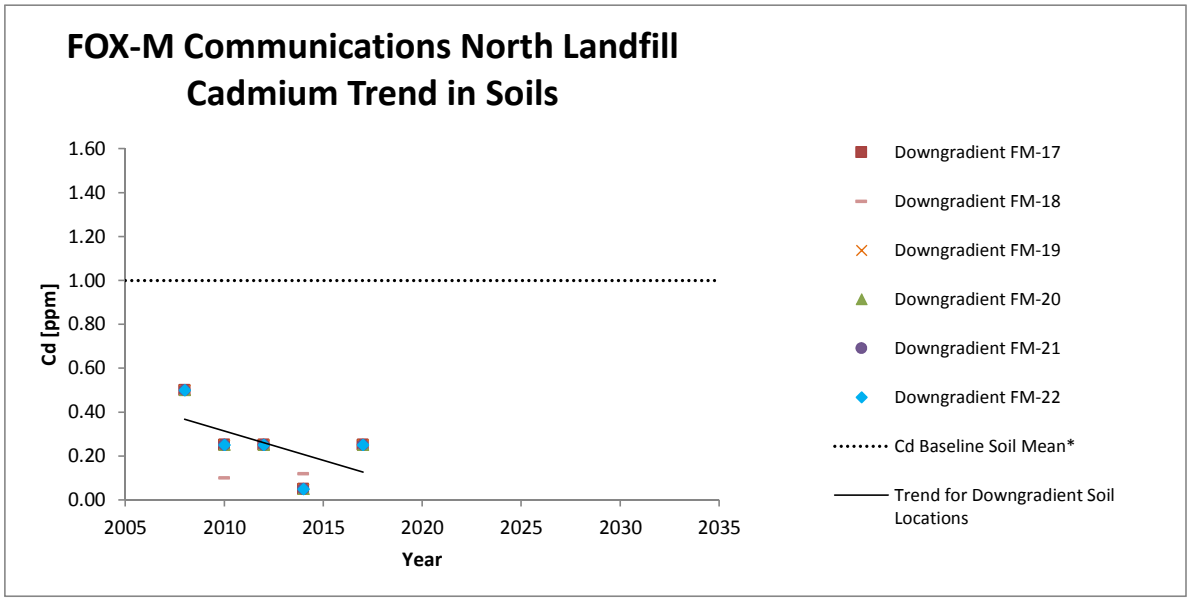
2010 result for upgradient FM-17 PCBs - detection limit raised due to matrix interferences.

FOX-M Communications North Landfill Trends in Soil Inorganics, PCBs and Modified TPH

Link to: Table of Contents

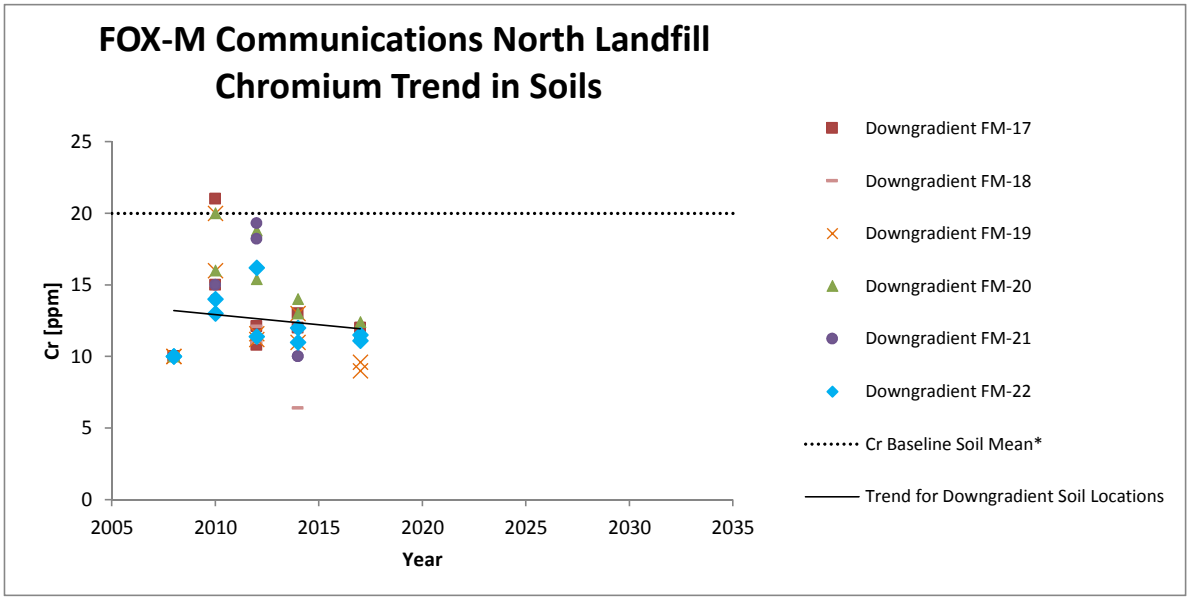
Note: All locations are downgradient, there are no upgradient locations.
Where results are below detection, half of the detection limit has been used in the charts for the sample points.
Trendlines are intended for visual interpretation of temporal trends. When all monitoring results are below detection, trendlines are a reflection of changes in detection limit. Users should refer to data tables.



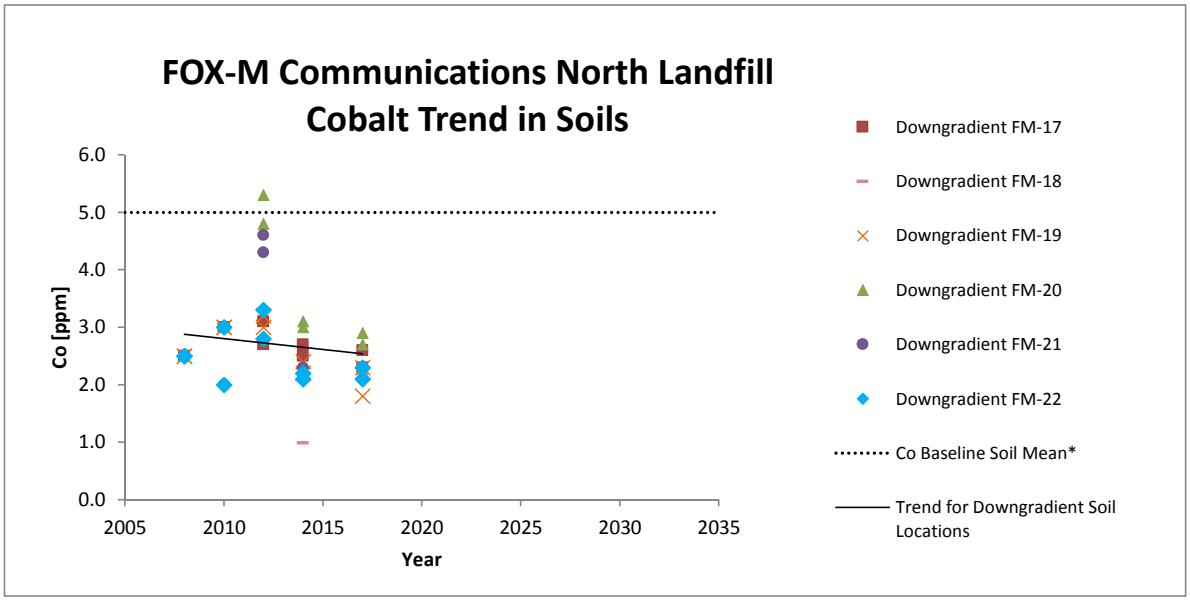


* Cd baseline arithmetic mean is equal to the baseline detection limit
* Cd baseline standard deviation = 0

FOX-M Communications North Landfill Trends in Soil Inorganics, PCBs and Modified TPH

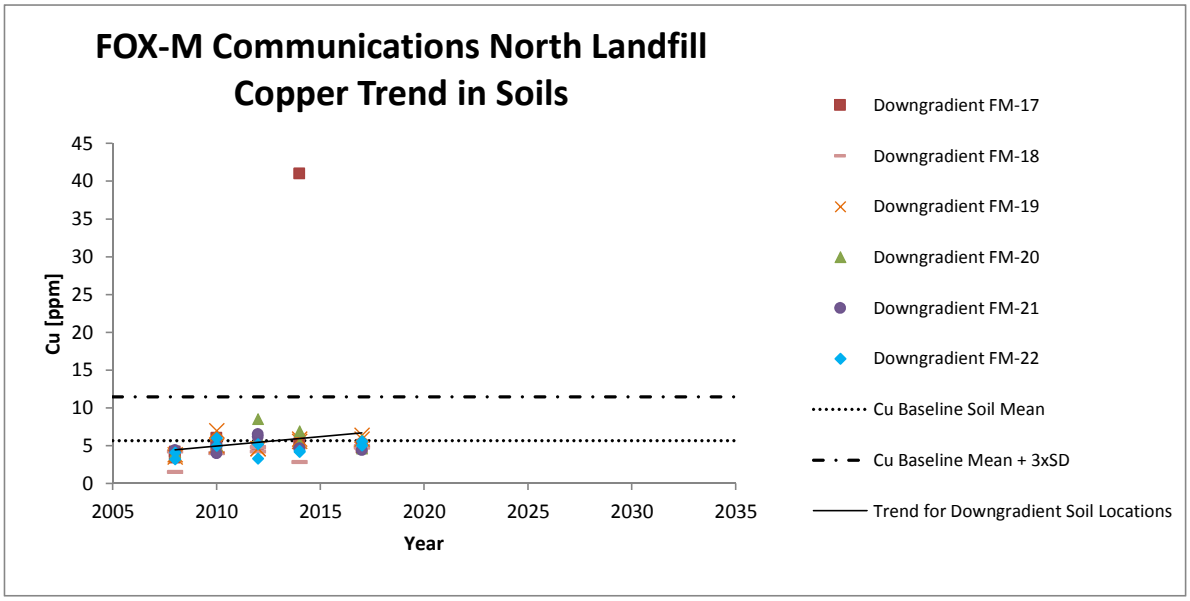


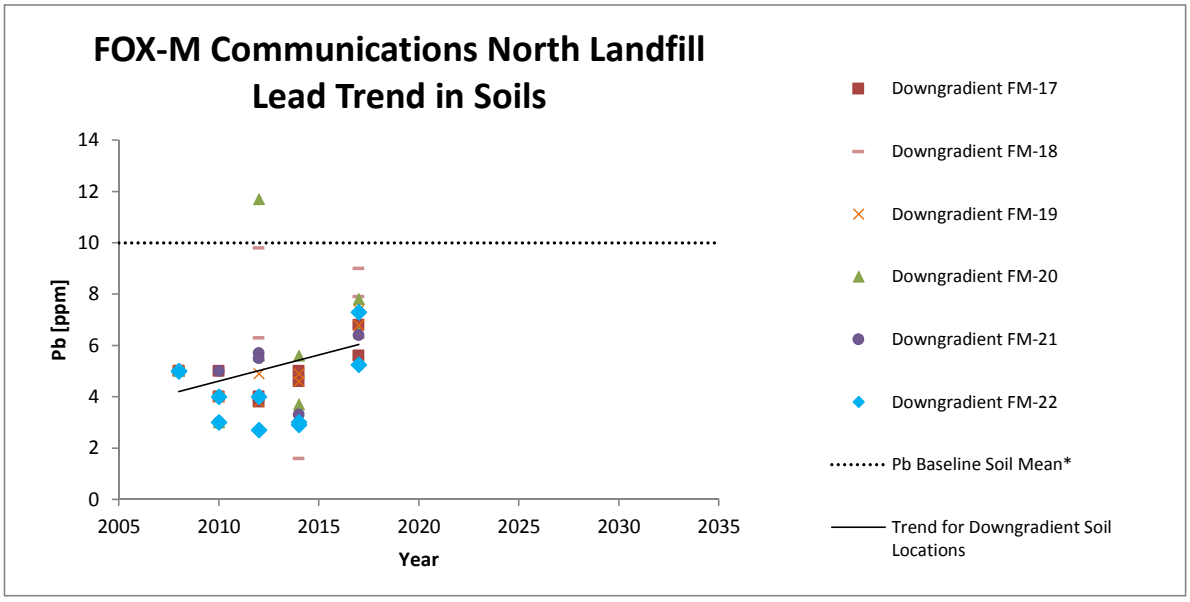
* Cr baseline arithmetic mean is equal to the baseline detection limit
* Cr baseline standard deviation = 0



* Co baseline arithmetic mean is equal to the baseline detection limit
* Co baseline standard deviation = 0

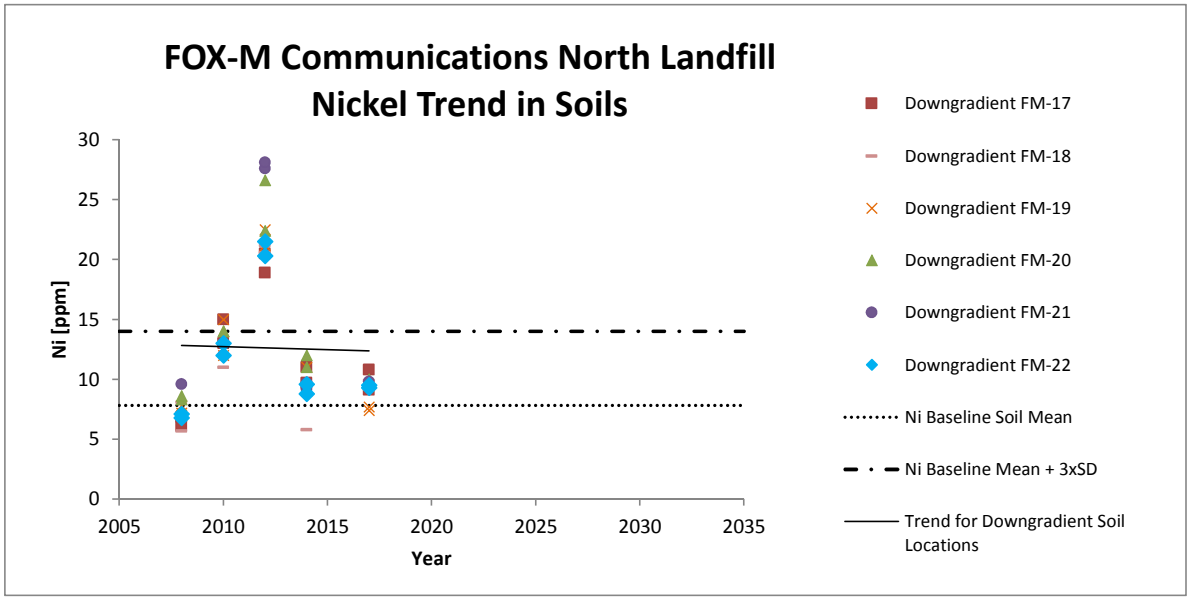
FOX-M Communications North Landfill Trends in Soil Inorganics, PCBs and Modified TPH

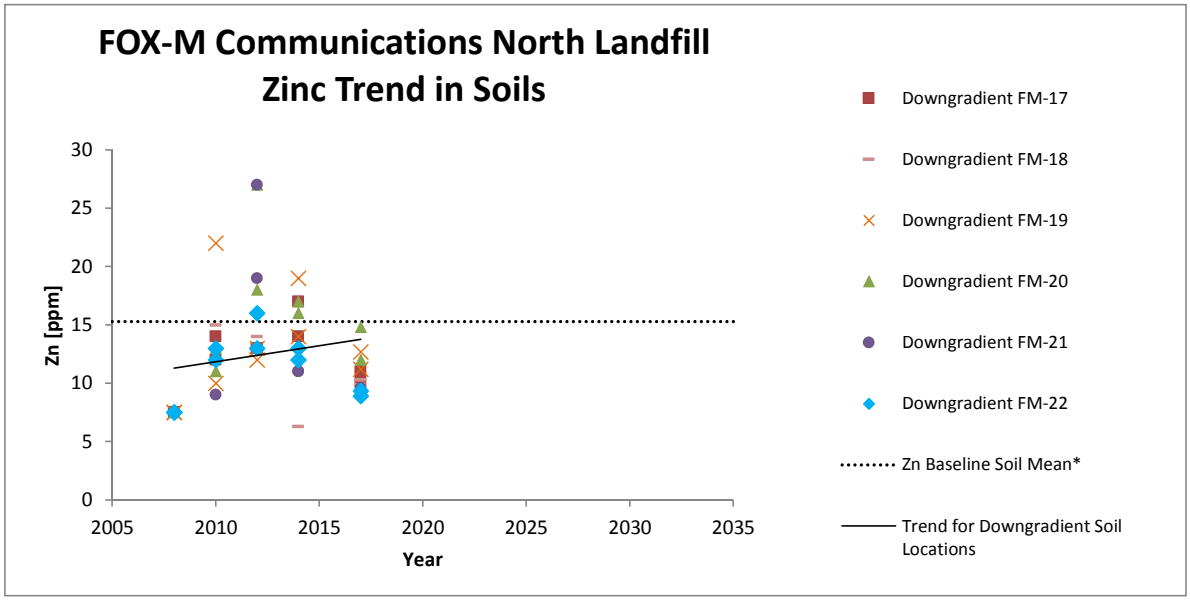




* Pb baseline arithmetic mean is equal to the baseline detection limit
* Pb baseline standard deviation = 0

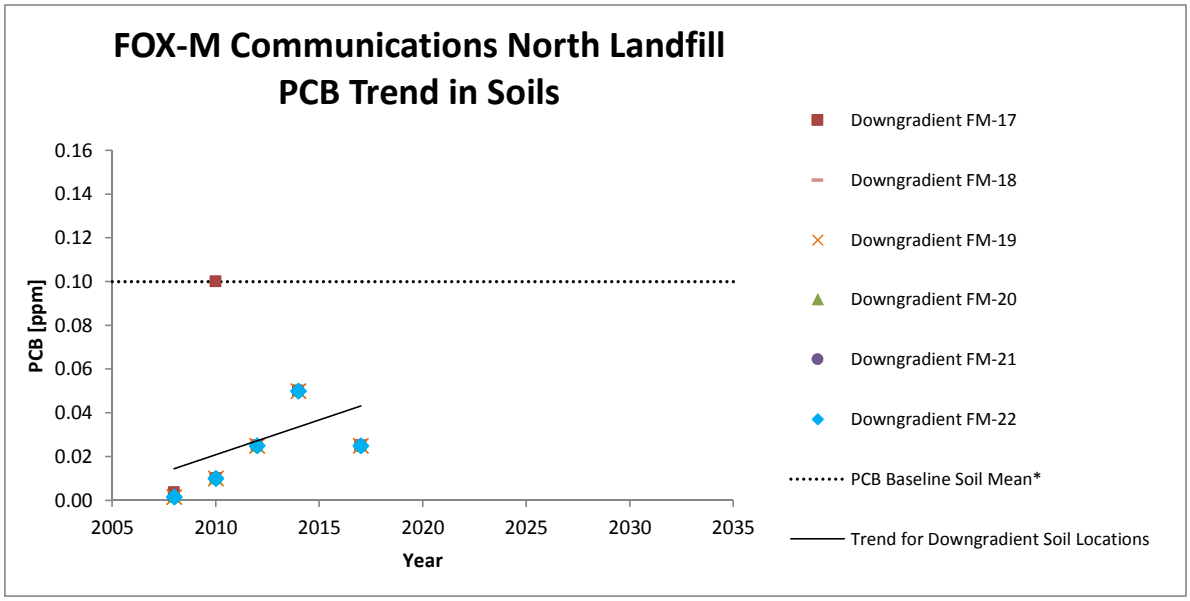
FOX-M Communications North Landfill Trends in Soil Inorganics, PCBs and Modified TPH



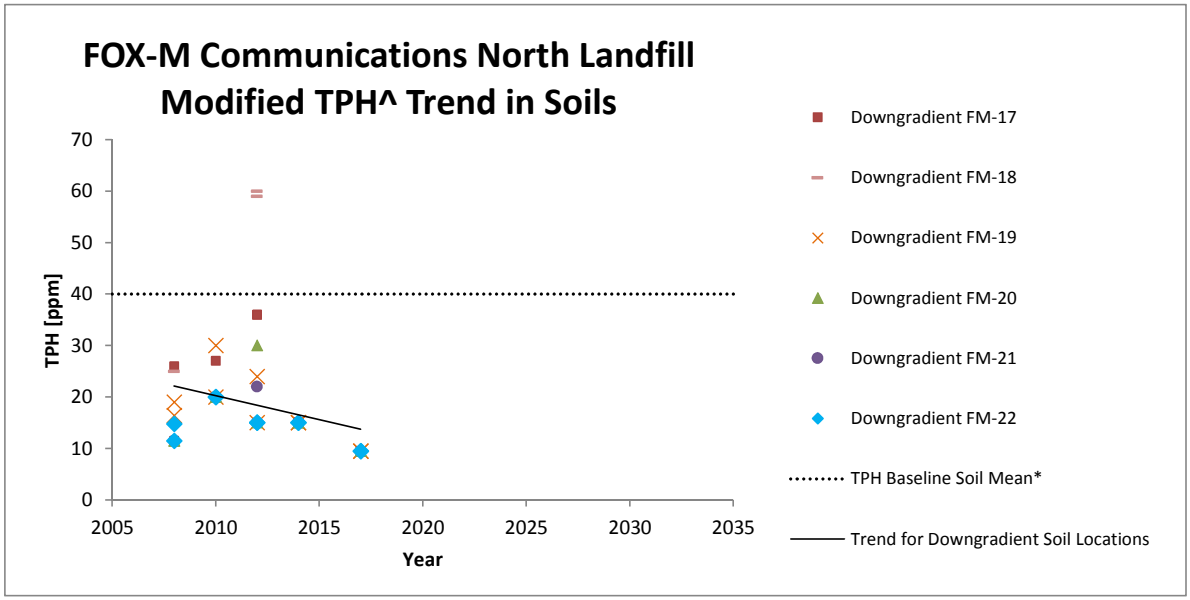


* Zn baseline standard deviation = 0

FOX-M Communications North Landfill Trends in Soil Inorganics, PCBs and Modified TPH



* PCB baseline arithmetic mean is equal to the baseline detection limit
* PCB baseline standard deviation = 0



^ Modified TPH is sum of F1, F2 and F3 fractions (C_6 - C_{34})
* TPH baseline arithmetic mean is equal to the baseline detection limit
* TPH baseline standard deviation = 0

PARACEL LABORATORIES LTD.
TRUSTED. RESPONSIVE. RELIABLE.

300 - 2319 St. Laurent Blvd
Ottawa, ON, K1G 4J8
1-800-749-1947
www.paracellabs.com

Certificate of Analysis

Golder Associates Ltd. (Ottawa)

1931 Robertson Rd.
Ottawa, ON K2H 5B7
Attn: Alyssa Troke

FOX-M Soil 1 of 2

Client PO: FOX-M Soil
Project: 1530908/3000
Custody: 110997/38508/9/10/11/12/13/14/15/16

Report Date: 30-Aug-2017
Order Date: 18-Aug-2017

Order #: 1733555

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

Paracel ID	Client ID
1733555-58	MW-1 Shallow
1733555-59	MW-1 Deep
1733555-60	MW-2 Shallow
1733555-61	MW2 Deep
1733555-62	MW3 Shallow
1733555-64	MW4 Shallow
1733555-65	MW4 Deep
1733555-66	MW5 Shallow
1733555-67	MW5 Deep
1733555-68	MW905 Deep
1733555-69	MW22 Shallow
1733555-70	MW22 Deep
1733555-71	MW923 Shallow
1733555-72	MW23 Shallow
1733555-73	MW23 Deep
1733555-74	MW24 Shallow
1733555-75	MW24 Deep
1733555-76	MW25 Shallow
1733555-77	MW25 Deep
1733555-78	MW925 Shallow
1733555-79	MW26 Shallow
1733555-80	MW26 Deep
1733555-81	MW27 Shallow
1733555-82	MW27 Deep
1733555-83	MW28 Shallow
1733555-84	MW28 Deep
1733555-85	MW29 Shallow
1733555-86	MW29 Deep
1733555-87	MW30 Shallow
1733555-88	MW30 Deep

Approved By:



Dale Robertson, BSc
Laboratory Director

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.

1733555-89	MW31 Shallow
1733555-90	MW31 Deep
1733555-91	MW20 Shallow
1733555-92	MW20 Deep
1733555-93	MW21 Shallow
1733555-94	MW21 Deep

Analysis Summary Table

Analysis	Method Reference/Description	Extraction Date	Analysis Date
CCME-SQG: Metals by ICP-OES	based on MOE E3470, ICP-OES	22-Aug-17	23-Aug-17
PCBs, total	SW846 8082A - GC-ECD	18-Aug-17	28-Aug-17
PHC F1	CWS Tier 1 - P&T GC-FID	25-Aug-17	28-Aug-17
PHCs F2 to F4	CWS Tier 1 - GC-FID, extraction	18-Aug-17	27-Aug-17
Solids, %	Gravimetric, calculation	28-Aug-17	28-Aug-17

Certificate of Analysis

Client: Golder Associates Ltd. (Ottawa)

Client PO: FOX-M Soil

Report Date: 30-Aug-2017

Order Date: 18-Aug-2017

Project Description: 1530908/3000

	Client ID:	MW-1 Shallow	MW-1 Deep	MW-2 Shallow	MW2 Deep
	Sample Date:	13-Aug-17	13-Aug-17	13-Aug-17	13-Aug-17
	Sample ID:	1733555-58	1733555-59	1733555-60	1733555-61
	MDL/Units	Soil	Soil	Soil	Soil
Physical Characteristics					
% Solids	0.1 % by Wt.	82.1	96.5	88.0	85.6
Metals					
Arsenic	1.0 ug/g dry	<1.0	<1.0	<1.0	<1.0
Cadmium	0.5 ug/g dry	<0.5	<0.5	<0.5	<0.5
Chromium	1.0 ug/g dry	9.5	9.8	10.0	9.0
Cobalt	1.0 ug/g dry	1.9	2.0	2.1	1.8
Copper	1.0 ug/g dry	4.5	4.1	4.4	5.4
Lead	1.0 ug/g dry	8.0	6.6	8.2	8.1
Nickel	1.0 ug/g dry	7.9	6.7	8.3	6.9
Zinc	1.0 ug/g dry	9.5	6.7	11.0	12.6
Hydrocarbons					
F1 PHCs (C6-C10)	7 mg/kg dry	<7	<7	<7	<7
F2 PHCs (C10-C16)	4 mg/kg dry	<4	<4	5	7
F3 PHCs (C16-C34)	8 mg/kg dry	<8	<8	17	<8
F4 PHCs (C34-C50)	6 mg/kg dry	<6	<6	<6	<6
PCBs					
PCBs, total	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
Decachlorobiphenyl	Surrogate	71.0%	71.0%	136%	70.0%

Certificate of Analysis

Report Date: 30-Aug-2017

Client: Golder Associates Ltd. (Ottawa)

Order Date: 18-Aug-2017

Client PO: FOX-M Soil

Project Description: 1530908/3000

	Client ID:	MW3 Shallow	MW4 Shallow	MW4 Deep	MW5 Shallow
	Sample Date:	13-Aug-17	13-Aug-17	13-Aug-17	13-Aug-17
	Sample ID:	1733555-62	1733555-64	1733555-65	1733555-66
	MDL/Units	Soil	Soil	Soil	Soil
Physical Characteristics					
% Solids	0.1 % by Wt.	86.7	86.4	81.7	85.7
Metals					
Arsenic	1.0 ug/g dry	<1.0	<1.0	<1.0	<1.0
Cadmium	0.5 ug/g dry	<0.5	<0.5	<0.5	<0.5
Chromium	1.0 ug/g dry	7.1	8.7	7.7	11.3
Cobalt	1.0 ug/g dry	1.5	1.7	1.4	2.1
Copper	1.0 ug/g dry	3.0	3.2	2.8	3.3
Lead	1.0 ug/g dry	5.0	4.7	4.9	4.6
Nickel	1.0 ug/g dry	6.6	6.7	5.4	7.1
Zinc	1.0 ug/g dry	6.8	7.7	6.6	9.1
Hydrocarbons					
F1 PHCs (C6-C10)	7 mg/kg dry	<7	<7	<7	<7
F2 PHCs (C10-C16)	4 mg/kg dry	<4	<4	<4	10
F3 PHCs (C16-C34)	8 mg/kg dry	<8	<8	<8	34
F4 PHCs (C34-C50)	6 mg/kg dry	<6	<6	<6	<6
PCBs					
PCBs, total	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
Decachlorobiphenyl	Surrogate	71.2%	60.7%	72.7%	67.9%

Certificate of Analysis

Client: Golder Associates Ltd. (Ottawa)

Client PO: FOX-M Soil

Report Date: 30-Aug-2017

Order Date: 18-Aug-2017

Project Description: 1530908/3000

	Client ID:	MW5 Deep	MW905 Deep	MW22 Shallow	MW22 Deep
	Sample Date:	13-Aug-17	13-Aug-17	13-Aug-17	13-Aug-17
	Sample ID:	1733555-67	1733555-68	1733555-69	1733555-70
	MDL/Units	Soil	Soil	Soil	Soil
Physical Characteristics					
% Solids	0.1 % by Wt.	82.2	87.1	95.0	95.2
Metals					
Arsenic	1.0 ug/g dry	<1.0	<1.0	<1.0	<1.0
Cadmium	0.5 ug/g dry	<0.5	<0.5	<0.5	<0.5
Chromium	1.0 ug/g dry	9.6	7.7	7.3	7.5
Cobalt	1.0 ug/g dry	2.0	1.8	1.7	1.7
Copper	1.0 ug/g dry	3.6	2.8	3.2	4.2
Lead	1.0 ug/g dry	4.0	4.2	5.3	7.5
Nickel	1.0 ug/g dry	6.8	5.5	6.9	6.4
Zinc	1.0 ug/g dry	8.0	6.6	6.7	8.9
Hydrocarbons					
F1 PHCs (C6-C10)	7 mg/kg dry	<7	<7	<7	<7
F2 PHCs (C10-C16)	4 mg/kg dry	<4	<4	<4	<4
F3 PHCs (C16-C34)	8 mg/kg dry	<8	<8	<8	<8
F4 PHCs (C34-C50)	6 mg/kg dry	<6	<6	<6	<6
PCBs					
PCBs, total	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
Decachlorobiphenyl	Surrogate	60.5%	65.7%	72.5%	71.1%

Certificate of Analysis

Client: Golder Associates Ltd. (Ottawa)

Client PO: FOX-M Soil

Report Date: 30-Aug-2017

Order Date: 18-Aug-2017

Project Description: 1530908/3000

	Client ID:	MW923 Shallow	MW23 Shallow	MW23 Deep	MW24 Shallow
	Sample Date:	13-Aug-17	13-Aug-17	13-Aug-17	13-Aug-17
	Sample ID:	1733555-71	1733555-72	1733555-73	1733555-74
	MDL/Units	Soil	Soil	Soil	Soil
Physical Characteristics					
% Solids	0.1 % by Wt.	96.8	94.9	94.7	96.9
Metals					
Arsenic	1.0 ug/g dry	<1.0	<1.0	<1.0	<1.0
Cadmium	0.5 ug/g dry	<0.5	<0.5	<0.5	<0.5
Chromium	1.0 ug/g dry	10.4	9.0	9.6	8.6
Cobalt	1.0 ug/g dry	2.6	2.3	2.3	2.1
Copper	1.0 ug/g dry	9.2	7.1	11.6	9.3
Lead	1.0 ug/g dry	11.4	8.9	31.6	66.5
Nickel	1.0 ug/g dry	9.5	7.7	8.8	7.6
Zinc	1.0 ug/g dry	13.9	10.9	16.2	16.4
Hydrocarbons					
F1 PHCs (C6-C10)	7 mg/kg dry	<7	<7	<7	<7
F2 PHCs (C10-C16)	4 mg/kg dry	<4	<4	<4	<4
F3 PHCs (C16-C34)	8 mg/kg dry	<8	<8	25	11
F4 PHCs (C34-C50)	6 mg/kg dry	<6	<6	7	<6
PCBs					
PCBs, total	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
Decachlorobiphenyl	Surrogate	68.0%	77.6%	65.8%	61.7%

Certificate of Analysis

Client: Golder Associates Ltd. (Ottawa)

Client PO: FOX-M Soil

Report Date: 30-Aug-2017

Order Date: 18-Aug-2017

Project Description: 1530908/3000

	Client ID:	MW24 Deep	MW25 Shallow	MW25 Deep	MW925 Shallow
	Sample Date:	13-Aug-17	13-Aug-17	13-Aug-17	13-Aug-17
	Sample ID:	1733555-75	1733555-76	1733555-77	1733555-78
	MDL/Units	Soil	Soil	Soil	Soil
Physical Characteristics					
% Solids	0.1 % by Wt.	97.1	97.9	95.5	96.7
Metals					
Arsenic	1.0 ug/g dry	<1.0	<1.0	<1.0	<1.0
Cadmium	0.5 ug/g dry	<0.5	<0.5	<0.5	<0.5
Chromium	1.0 ug/g dry	8.2	7.6	8.3	7.9
Cobalt	1.0 ug/g dry	2.0	1.7	1.8	1.7
Copper	1.0 ug/g dry	8.4	5.5	6.4	5.4
Lead	1.0 ug/g dry	27.3	97.6	120	68.7
Nickel	1.0 ug/g dry	6.1	6.5	7.3	6.9
Zinc	1.0 ug/g dry	16.1	10.8	9.9	9.8
Hydrocarbons					
F1 PHCs (C6-C10)	7 mg/kg dry	<7	<7	<7	<7
F2 PHCs (C10-C16)	4 mg/kg dry	<4	<4	<4	<4
F3 PHCs (C16-C34)	8 mg/kg dry	9	<8	<8	<8
F4 PHCs (C34-C50)	6 mg/kg dry	<6	<6	<6	<6
PCBs					
PCBs, total	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
Decachlorobiphenyl	Surrogate	66.0%	63.1%	61.3%	61.0%

Certificate of Analysis

Client: Golder Associates Ltd. (Ottawa)

Client PO: FOX-M Soil

Report Date: 30-Aug-2017

Order Date: 18-Aug-2017

Project Description: 1530908/3000

	Client ID:	MW26 Shallow	MW26 Deep	MW27 Shallow	MW27 Deep
	Sample Date:	13-Aug-17	13-Aug-17	13-Aug-17	13-Aug-17
	Sample ID:	1733555-79	1733555-80	1733555-81	1733555-82
	MDL/Units	Soil	Soil	Soil	Soil
Physical Characteristics					
% Solids	0.1 % by Wt.	97.1	97.0	96.1	95.3
Metals					
Arsenic	1.0 ug/g dry	<1.0	<1.0	<1.0	<1.0
Cadmium	0.5 ug/g dry	<0.5	<0.5	<0.5	<0.5
Chromium	1.0 ug/g dry	6.5	6.7	6.9	7.3
Cobalt	1.0 ug/g dry	1.6	1.8	1.7	1.9
Copper	1.0 ug/g dry	2.7	5.0	2.9	3.7
Lead	1.0 ug/g dry	5.9	7.3	5.3	6.1
Nickel	1.0 ug/g dry	6.1	5.9	6.2	6.0
Zinc	1.0 ug/g dry	5.5	7.1	6.8	8.0
Hydrocarbons					
F1 PHCs (C6-C10)	7 mg/kg dry	<7	<7	<7	<7
F2 PHCs (C10-C16)	4 mg/kg dry	<4	<4	<4	<4
F3 PHCs (C16-C34)	8 mg/kg dry	<8	<8	<8	<8
F4 PHCs (C34-C50)	6 mg/kg dry	<6	<6	<6	<6
PCBs					
PCBs, total	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
Decachlorobiphenyl	Surrogate	70.5%	60.8%	128%	127%

Certificate of Analysis

Client: Golder Associates Ltd. (Ottawa)

Client PO: FOX-M Soil

Report Date: 30-Aug-2017

Order Date: 18-Aug-2017

Project Description: 1530908/3000

	Client ID:	MW28 Shallow	MW28 Deep	MW29 Shallow	MW29 Deep
	Sample Date:	13-Aug-17	13-Aug-17	13-Aug-17	13-Aug-17
	Sample ID:	1733555-83	1733555-84	1733555-85	1733555-86
	MDL/Units	Soil	Soil	Soil	Soil
Physical Characteristics					
% Solids	0.1 % by Wt.	96.9	97.1	97.2	96.2
Metals					
Arsenic	1.0 ug/g dry	<1.0	<1.0	<1.0	<1.0
Cadmium	0.5 ug/g dry	<0.5	<0.5	<0.5	<0.5
Chromium	1.0 ug/g dry	8.8	9.5	8.8	7.5
Cobalt	1.0 ug/g dry	2.0	2.0	1.9	1.5
Copper	1.0 ug/g dry	6.3	8.8	4.1	4.4
Lead	1.0 ug/g dry	7.2	10.9	5.8	5.6
Nickel	1.0 ug/g dry	6.6	6.9	6.5	6.2
Zinc	1.0 ug/g dry	8.2	8.5	8.1	6.9
Hydrocarbons					
F1 PHCs (C6-C10)	7 mg/kg dry	<7	<7	<7	<7
F2 PHCs (C10-C16)	4 mg/kg dry	<4	<4	<4	<4
F3 PHCs (C16-C34)	8 mg/kg dry	<8	<8	<8	<8
F4 PHCs (C34-C50)	6 mg/kg dry	<6	<6	<6	<6
PCBs					
PCBs, total	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
Decachlorobiphenyl	Surrogate	132%	134%	122%	132%

Certificate of Analysis

Report Date: 30-Aug-2017

Client: Golder Associates Ltd. (Ottawa)

Order Date: 18-Aug-2017

Client PO: FOX-M Soil

Project Description: 1530908/3000

	Client ID:	MW30 Shallow	MW30 Deep	MW31 Shallow	MW31 Deep
	Sample Date:	13-Aug-17	13-Aug-17	14-Aug-17	14-Aug-17
	Sample ID:	1733555-87	1733555-88	1733555-89	1733555-90
	MDL/Units	Soil	Soil	Soil	Soil
Physical Characteristics					
% Solids	0.1 % by Wt.	96.7	91.8	97.8	95.1
Metals					
Arsenic	1.0 ug/g dry	<1.0	<1.0	<1.0	<1.0
Cadmium	0.5 ug/g dry	<0.5	<0.5	<0.5	<0.5
Chromium	1.0 ug/g dry	8.2	8.8	8.6	7.0
Cobalt	1.0 ug/g dry	1.8	1.8	1.9	1.8
Copper	1.0 ug/g dry	3.7	4.1	5.9	7.6
Lead	1.0 ug/g dry	6.2	7.2	14.7	14.1
Nickel	1.0 ug/g dry	6.5	7.4	6.8	7.1
Zinc	1.0 ug/g dry	8.2	9.2	9.5	8.5
Hydrocarbons					
F1 PHCs (C6-C10)	7 mg/kg dry	<7	<7	<7	<7
F2 PHCs (C10-C16)	4 mg/kg dry	<4	11	<4	<4
F3 PHCs (C16-C34)	8 mg/kg dry	<8	104	<8	<8
F4 PHCs (C34-C50)	6 mg/kg dry	<6	36	<6	<6
PCBs					
PCBs, total	0.05 ug/g dry	<0.05	<0.05	0.13	<0.05
Decachlorobiphenyl	Surrogate	123%	125%	127%	137%

Certificate of Analysis
Client: Golder Associates Ltd. (Ottawa)
Client PO: FOX-M Soil

Report Date: 30-Aug-2017
Order Date: 18-Aug-2017
Project Description: 1530908/3000

	Client ID:	MW20 Shallow	MW20 Deep	MW21 Shallow	MW21 Deep
	Sample Date:	13-Aug-17	13-Aug-17	13-Aug-17	13-Aug-17
	Sample ID:	1733555-91	1733555-92	1733555-93	1733555-94
	MDL/Units	Soil	Soil	Soil	Soil
Physical Characteristics					
% Solids	0.1 % by Wt.	96.2	96.1	95.7	95.8
Metals					
Arsenic	1.0 ug/g dry	<1.0	<1.0	<1.0	<1.0
Cadmium	0.5 ug/g dry	<0.5	<0.5	<0.5	<0.5
Chromium	1.0 ug/g dry	8.8	9.0	6.8	7.0
Cobalt	1.0 ug/g dry	1.9	2.0	1.6	1.6
Copper	1.0 ug/g dry	27.7	10.2	4.5	4.3
Lead	1.0 ug/g dry	15.9	14.3	9.4	9.8
Nickel	1.0 ug/g dry	9.1	7.6	6.0	6.0
Zinc	1.0 ug/g dry	15.8	11.9	8.1	10.5
Hydrocarbons					
F1 PHCs (C6-C10)	7 mg/kg dry	<7	<7	<7	<7
F2 PHCs (C10-C16)	4 mg/kg dry	<4	<4	<4	<4
F3 PHCs (C16-C34)	8 mg/kg dry	<8	<8	12	13
F4 PHCs (C34-C50)	6 mg/kg dry	<6	<6	8	7
PCBs					
PCBs, total	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
Decachlorobiphenyl	Surrogate	137%	138%	82.0%	97.3%

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	mg/kg						
F2 PHCs (C10-C16)	ND	4	mg/kg						
F3 PHCs (C16-C34)	ND	8	mg/kg						
F4 PHCs (C34-C50)	ND	6	mg/kg						
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						
Nickel	ND	1.0	ug/g						
Zinc	ND	1.0	ug/g						
PCBs									
PCBs, total	ND	0.05	ug/g						
Surrogate: Decachlorobiphenyl	*0.146*		*ug/g*		*73.0*	*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	mg/kg dry	ND				40	
F2 PHCs (C10-C16)	ND	4	mg/kg dry	ND				30	
F3 PHCs (C16-C34)	ND	8	mg/kg dry	ND				30	
F4 PHCs (C34-C50)	ND	6	mg/kg dry	ND				30	
Metals									
Antimony	ND	1.0	ug/g dry	ND			0.0	30	
Arsenic	ND	1.0	ug/g dry	ND				30	
Barium	11.1	1.0	ug/g dry	12.3			10.2	30	
Beryllium	ND	1.0	ug/g dry	ND			0.0	30	
Boron	23.2	1.0	ug/g dry	26.7			14.2	30	
Cadmium	ND	0.5	ug/g dry	ND			0.0	30	
Chromium	15.0	1.0	ug/g dry	16.0			6.8	30	
Cobalt	2.78	1.0	ug/g dry	2.82			1.2	30	
Copper	7.68	1.0	ug/g dry	8.14			5.9	30	
Lead	6.64	1.0	ug/g dry	7.05			6.0	30	
Molybdenum	1.11	1.0	ug/g dry	ND			0.0	30	
Nickel	11.4	1.0	ug/g dry	11.6			1.8	30	
Selenium	ND	1.0	ug/g dry	ND			0.0	30	
Silver	ND	0.5	ug/g dry	ND			0.0	30	
Thallium	1.95	1.0	ug/g dry	ND			0.0	30	
Tin	ND	5.0	ug/g dry	ND			0.0	30	
Uranium	ND	1.0	ug/g dry	ND			0.0	30	
Vanadium	20.4	1.0	ug/g dry	21.9			7.1	30	
Zinc	14.8	1.0	ug/g dry	14.9			0.1	30	
PCBs									
PCBs, total	ND	0.05	ug/g dry	ND				40	
Surrogate: Decachlorobiphenyl	*0.281*		*ug/g dry*		*130*	*60-140*			
Physical Characteristics									
% Solids	88.0	0.1	% by Wt.	88.0			0.0	25	

Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F1 PHCs (C6-C10)	203	7	mg/kg		101	80-120			
F2 PHCs (C10-C16)	87	4	mg/kg	ND	89.5	60-140			
F3 PHCs (C16-C34)	194	8	mg/kg	ND	96.4	60-140			
F4 PHCs (C34-C50)	131	6	mg/kg	ND	97.8	60-140			
Metals									
Antimony	288		ug/L	13.2	110	70-130			
Arsenic	316		ug/L	ND	126	70-130			
Barium	475		ug/L	246	91.8	70-130			
Beryllium	268		ug/L	4.32	106	70-130			
Boron	779		ug/L	535	97.8	70-130			
Cadmium	263		ug/L	4.37	103	70-130			
Chromium	545		ug/L	321	89.8	70-130			
Cobalt	275		ug/L	56.4	87.4	70-130			
Copper	421		ug/L	163	103	70-130			
Lead	380		ug/L	141	95.7	70-130			
Molybdenum	236		ug/L	19.4	86.7	70-130			
Nickel	458		ug/L	231	90.6	70-130			
Selenium	266		ug/L	7.47	103	70-130			
Silver	264		ug/L	ND	106	70-130			
Thallium	186		ug/L	ND	74.5	70-130			
Tin	295		ug/L	61.3	93.6	70-130			
Uranium	246		ug/L	17.8	91.5	70-130			
Vanadium	680		ug/L	439	96.5	70-130			
Zinc	330		ug/L	141	75.3	70-130			
PCBs									
PCBs, total	0.371	0.05	ug/g	ND	86.0	60-140			
Surrogate: Decachlorobiphenyl	*0.302*		*ug/g*		*140*	*60-140*			

Qualifier Notes:

Login Qualifiers :

Sample - F1/BTEX/VOCs (soil) not submitted according to CCME 2016 protocols - not field preserved

Applies to samples: MW-1 Shallow, MW-1 Deep, MW-2 Shallow, MW2 Deep, MW3 Shallow, MW4 Shallow, MW4 Deep, MW5 Shallow, MW5 Deep, MW905 Deep, MW22 Shallow, MW22 Deep, MW923 Shallow, MW23 Shallow, MW23 Deep, MW24 Shallow, MW24 Deep, MW25 Shallow, MW25 Deep, MW925 Shallow, MW26 Shallow, MW26 Deep, MW27 Shallow, MW27 Deep, MW28 Shallow, MW28 Deep, MW29 Shallow, MW29 Deep, MW30 Shallow, MW30 Deep, MW31 Shallow, MW31 Deep, MW20 Shallow, MW20 Deep, MW21 Shallow, MW21 Deep

Sample Data Revisions

None

Work Order Revisions / Comments:

None

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.

Paracel ID: 1733555

PARACEL LABORATORIES LTD.

TRUST
RESP(
RELIABLE .

Laurent Blvd.
io K1G 4J8
1947
e: paracel@paracellabs.com

Fox-M Soil

Chain of Custody
(Lab Use Only)
№ 110997

Page 1 of 10

Client Name: Golder	Project Reference: 1530908 / 3000
Contact Name: Alyssa Troiqe	Quote #
Address: 1931 Riverside Rd	PO #
Telephone:	Email Address:

Turnaround Time:
☐ 1 Day ☐ 3 Day
☐ 2 Day ☒ Regular
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 Q16-010

Paracel Order Number: 1733555

	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)
1	MW12 Shallow	S			Aug 11								
2	MW12 deep	S			Aug 11								
3	MW13 Shallow	S			Aug 16								
4	MW13 deep	S			Aug 16								
5	MW14 shallow	S			Aug 16								
6	MW14 deep	S			Aug 16								
7	MW914 deep	S			Aug 16								
8	MW15 Shallow	S			Aug 16								
9	MW15 deep	S			Aug 16								
10	MW16 Shallow	S			Aug 16								

Comments: Received samples labelled FM99 Deep and MW923 Shallow.

Method of Delivery: Paracel.

Relinquished By (Sign):	Received by Driver/Depot: M. Tousse	Received at Lab: Rachel Subject	Verified By: Rachel Subject
Relinquished By (Print):	Date/Time: 16/08/17 2:50 PM	Date/Time: Aug 18/17.	Date/Time: Aug 18/17.
Date/Time:	Temperature: ____ °C	Temperature: 19.0 °C 4:00	pH Verified [X] By: N/A 4:40

Paracel ID: 1733555

PARACEL LABORATORIES LTD.

TI
RESPONSIVE .
RELIABLE .

...urent Blvd.
... K1G 4J8
p: 1-800-749-1947
e: paracel@paracellabs.com

FOX-M Soil

Chain of Custody
(Lab Use Only)
№ 38508

Page 2 of 10

Client Name:	Project Reference:
Contact Name:	Quote #
Address:	PO #
	Email Address:
Telephone:	

Turnaround Time:
☐ 1 Day ☐ 3 Day
☐ 2 Day ☒ Regular
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)

Q16-018

Required Analyses

Paracel Order Number: 1733555

	Sample ID/Location Name	Matrix	Air Volume	# of Containers	Sample Taken: Date	Sample Taken: Time
1	MW16 deep	S			Aug 16	
2	FM 5 shallow	S			Aug 10	
3	FM 5 deep Missing	S			Aug 10	
4	~~FM 95 deep~~ FM95 shallow	S			Aug 10	FM 95 shallow
5	FM 6 shallow	S			Aug 10	
6	FM 6 deep	S			Aug 10	
7	FM 7 shallow	S			Aug 10	
8	FM 7 deep	S			Aug 10	
9	FM 97 deep Missing -	S			Aug 10	
10	FM 8 shallow	S			Aug 10	

Cancel
~~Cancel~~ Should read 95.

Comments:

Method of Delivery: Paracel.

Relinquished By (Sign):	Received by Driver/Depot: A Heuse	Received at Lab: Rachel Subject	Verified By: Rachel Subject
Relinquished By (Print):	Date/Time: 18/08/17 7:50 AM	Date/Time: Aug 18/17.	Date/Time: Aug 18/17
Date/Time:	Temperature: ___°C	Temperature: 19.0°C 4:00	pH Verified ☒ By: N/A 4:40

Paracel ID: 1733555

PARACEL LABORATORIES LTD. | RESPONSIVE. RELIABLE.

Laurent Blvd.
rio K1G 4J8
p: 1-800-749-1947
e: paracel@paracellabs.com

Chain of Custody
(Lab Use Only)
№ 38509

Page 3 of 10

Fox M So. 1

Client Name: Golder Associates	Project Reference: 1539951/303 Oct 15	**Turnaround Time:**
Contact Name: Alyssa Tuck	Quote #	☐ 1 Day ☐ 3 Day
Address:	PO #	☐ 2 Day ☒ Regular
Telephone:	Email Address:	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)

CR 16-010 **Required Analyses**

	Paracel Order Number: 1733555 / Sample ID/Location Name	Matrix	Air Volume	# of Containers	Sample Taken Date	Sample Taken Time
1	FM8 deep	S			Aug 10	
2	FM 1 shallow	S			Aug 10	
3	FM 1 deep	S			Aug 10	
4	FM 2 shallow	S			Aug 10	
5	FM 2 deep	S			Aug 10	
6	FM 3 shallow	S			Aug 10	
7	FM 3 deep	S			Aug 10	
8	FM 4 shallow	S			Aug 10	
9	FM 4 deep	S			Aug 10	
10	FM 9A deep	S			Aug 10	

Comments:

Method of Delivery: Paracel

Relinquished By (Sign):	Received by Driver/Depot: M. DeLouise	Received at Lab: Rachel Subject	Verified By: Rachel Subject
Relinquished By (Print):	Date/Time: 18/08/17 2:50 PM	Date/Time: Aug 18 17.	Date/Time: Aug 18 17
Date/Time:	Temperature: °C	Temperature: 19.0 °C 4:00	pH Verified ☐ By: N/A 4:40

Paracel ID: 1733555

PARACEL LABORATORIES LTD. | TRI RESPONSIVE . RELIABLE .

ent Blvd.
:1G 4J8
p: 1-800-749-1947
e: paracel@paracellabs.com

Chain of Custody
(Lab Use Only)
№ 38510

FOX-M Soil

Page 4 of 10

Client Name: Golder Assoc Ltd	Project Reference: Q1kg15
Contact Name: Aiyse Turko	Quote #
Address:	PO #
	Email Address:
Telephone:	

Turnaround Time:
☐ 1 Day ☐ 3 Day
☐ 2 Day ☒ Regular
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)

Q16-010 **Required Analyses**

Paracel Order Number: 1733555

	Sample ID/Location Name	Matrix	Air Volume	# of Containers	Sample Taken Date	Sample Taken Time
1	FM 9 shallow	S			Aug 10	
2	FM 9 deep	S			Aug 10	
3	FM 10 shallow	S			Aug 10	
4	FM 10 deep	S			Aug 10	
5	FM 11 shallow	S			Aug 10	
6	FM 11 deep	S			Aug 10	
7	FM 12 shallow	S			Aug 10	
8	FM 13 shallow	S			Aug 10	
9	FM 13 deep	S			Aug 10	
10	FM 14 shallow	S			Aug 10	

Comments:

Method of Delivery: Paracel.

Relinquished By (Sign):	Received by Driver/Depot: M. DeCourse	Received at Lab: Rachel Sinyet	Verified By: Rachel Sinyet
Relinquished By (Print):	Date/Time: 18/08/17 2:50	Date/Time: Aug 18 17	Date/Time: Aug 18 17
Date/Time:	Temperature: °C AT	Temperature: 19.0 4:00	pH Verified ☒ By: NM 4:40

Chain of Custody (Blank) - Rev 0.4 Feb 2016

Paracel ID: 1733555

PARACEL LABORATORIES LTD. | RESPONSIVE . RELIABLE .

t. Laurent Blvd.
tario K1G 4J8
p: 1-800-749-1947
e: paracel@paracellabs.com

Chain of Custody
(Lab Use Only)
№ 38511

Page 5 of 10

FOX-M soil

Client Name: Golder Associates	Project Reference: Rig 15
Contact Name: Alyssa Trotto	Quote #
Address:	PO #
	Email Address:
Telephone:	

Turnaround Time:
☐ 1 Day ☐ 3 Day
☐ 2 Day ☒ Regular
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)

Q16-010 **Required Analyses**

Paracel Order Number: 1733555

	Sample ID/Location Name	Matrix	Air Volume	# of Containers	Sample Taken Date	Sample Taken Time
1	FM 14 deep	S			Aug 13	Aug 10
2	FM 15 shallow	S			Aug 13	Aug 10
3	FM 15 deep	S			Aug 13	Aug 10
4	FM 16 shallow	S			Aug 13	Aug 10
5	FM 16 deep	S			Aug 13	Aug 10
6	FM 17 shallow	S			Aug 10	
7	FM 17 deep				Aug 10	
8	FM 18 shallow				Aug 10	
9	FM 18 deep				Aug 10	
10	FM 19 shallow				Aug 10	

Comments:

Method of Delivery: Paracel

Relinquished By (Sign):	Received by Driver/Depot: M. LOUISE	Received at Lab: Rachel Subject	Verified By: Rachel Subject
Relinquished By (Print):	Date/Time: 18/08/17 2:50 PM	Date/Time: Aug 18 17. 4:00	Date/Time: Aug 18 17. 4:40
Date/Time:	Temperature: °C	Temperature: 19.0°C	pH Verified ☐ By: N/A

Chain of Custody (Blank) - Rev 0.4 Feb 2016

Paracel ID: 1733555

PARACEL LABORATORIES LTD. | RESPONSIVE. RELIABLE.

. Laurent Blvd.
ario K1G 4J8
p. 1-800-749-1947
e: paracel@paracellabs.com

Chain of Custody
(Lab Use Only)
№ 38512

Page 6 of 10

FOX-M Soil

Client Name: Golder Associates	Project Reference:
Contact Name: Alyssa Trio	Quote #
Address:	PO #
Telephone:	Email Address:

Turnaround Time:
☐ 1 Day ☐ 3 Day
☐ 2 Day ☑ Regular
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)

Q16-010 **Required Analyses**

Paracel Order Number: 1733555

	Sample ID/Location Name	Matrix	Air Volume	# of Containers	Sample Taken Date	Sample Taken Time
1	FM 19 deep	S			Aug 10	
2	FM 26 shallow	S			Aug 10	
3	FM 20 deep	S			Aug 10	
4	FM 21 shallow	S			Aug 10	
5	FM 22 shallow	S			Aug 10	
6	FM 22 deep	S			Aug 10	
7	FM 922 deep	S			Aug 10	
8	MW-1 shallow	S			Aug 13	
9	MW-1 deep	S			Aug 13	
10	MW-2 shallow	S			Aug 13	

Comments:

Method of Delivery: Paracel

Relinquished By (Sign):	Received by Driver/Depot: M. Mouse	Received at Lab: Rachel Subject	Verified By: Rachel Subject
Relinquished By (Print):	Date/Time: 18/08/17 2.50	Date/Time: Aug 18/17.	Date/Time: Aug 18/17
Date/Time:	Temperature: °C PH.	Temperature: 19.0°C 4:00	pH Verified ☑ By: N/A 4:40

Paracel ID: 1733555

PARACEL LABORATORIES LTD. | TRUST . RESPONSIVE . RELIABLE .

p: 1-800-749-1947
e: paracel@paracellabs.com

Chain of Custody (Lab Use Only)
№ 38513

Fox M Soil

Page 7 of 10

Client Name: Golder Associates	Project Reference: Qika 15
Contact Name: Alyssa Yorke	Quote #
Address:	PO #
Telephone:	Email Address:

Turnaround Time:
☐ 1 Day ☐ 3 Day
☐ 2 Day ☐ Regular
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)

Q16-010 **Required Analyses**

Paracel Order Number: 1733555

	Sample ID/Location Name	Matrix	Air Volume	# of Containers	Sample Taken Date	Sample Taken Time	
1	MW2 deep	S			Aug 13		
2	MW3 shallow	S			Aug 13		
3	MW3 deep Missing	S			Aug 13		Cancel
4	MW4 shallow	S			Aug 13		
5	MW4 deep	S			Aug 13		
6	MW5 shallow	S			Aug 13		
7	MW5 deep	S			Aug 13		
8	MW905 deep	S			Aug 13		
9	MW22 shallow	S			Aug 13		
10	MW22 deep	S			Aug 13		

Comments:

Method of Delivery: Paracel

Relinquished By (Sign):	Received by Driver/Depot: M. Clouse	Received at Lab: Rachel Subject	Verified By: Rachel Subject
Relinquished By (Print):	Date/Time: 18/08/17 2:50 PM	Date/Time: Aug 18 17.	Date/Time: Aug 18 17.
Date/Time:	Temperature: °C	Temperature: 19.0 °C 4:00	pH Verified [x] By: NM 4:40

Chain of Custody (Blank) - Rev 0.4 Feb 2016

Paracel ID: 1733555

PARACEL LABORATORIES LTD. | TRUS RESPONSIVE . RELIABLE .

3lvd. 4J8

p: 1-800-749-1947
e: paracel@paracellabs.com

Chain of Custody (Lab Use Only)
№ 38514

FOX-M Soil

Page 8 of 10

Client Name: Golder Associates	Project Reference: 13-1415
Contact Name: Alyssa Traiso	Quote #
Address:	PO #
Telephone:	Email Address:

Turnaround Time:
☐ 1 Day ☐ 3 Day
☐ 2 Day ~~☐ Regular~~
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)

Q16-ON **Required Analyses**

Paracel Order Number: 1733555

	Sample ID/Location Name	Matrix	Air Volume	# of Containers	Sample Taken Date	Sample Taken Time
1	MW22 shallow Missing	S			Aug 13	
2	MW23 shallow	S			Aug 13	
3	MW23 deep	S			Aug 13	
4	MW24 shallow	S			Aug 13	
5	MW24 ~~shallow~~ Deep	S			Aug 13	
6	MW25 shallow	S			Aug 13	
7	MW25 ~~shallow~~ Deep	S			Aug 13	
8	MW925 shallow	S			Aug 13	
9	MW26 shallow	S			Aug 13	
10	MW26 deep	S			Aug 13	

Should read 923

Comments:

Method of Delivery: Paracel.

Relinquished By (Sign):	Received by Driver/Depot: A. Krouse	Received at Lab: Rachel Subject	Verified By: Rachel Subject
Relinquished By (Print):	Date/Time: 18/08/17 2:50 PM	Date/Time: Aug 18/17.	Date/Time: Aug 18/17.
Date/Time:	Temperature: °C	Temperature: 19.0 4:00	pH Verified [X] By: N/A 4:40

Paracel ID: 1733555

PARACEL LABORATORIES LTD. | TF RESPONSIVE . RELIABLE .

...rent Blvd.
K1G 4J8
p: 1-800-...947
e: paracel@paracellabs.com

FOX-M Soil

Chain of Custody
(Lab Use Only)
№ 38515

Page 9 of 10

Client Name: Guides Association	Project Reference: 2016
Contact Name: Alyssa Tyrie	Quote #
Address:	PO #
Telephone:	Email Address:

Turnaround Time:
☐ 1 Day ☐ 3 Day
☐ 2 Day ☒ Regular
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)

2016 VOC — Required Analyses

Paracel Order Number: 1733555

	Sample ID/Location Name	Matrix	Air Volume	# of Containers	Sample Taken: Date	Sample Taken: Time
1	MW27 shallow	S			Aug 13	
2	MW 27 deep	S			Aug 13	
3	MW 28 shallow	S			Aug 13	
4	MW28 deep	S			Aug 13	
5	MW29 shallow	S			Aug 13	
6	MW29 deep	S			Aug 13	
7	MW30 shallow	S			Aug 13	
8	MW30 deep	S			Aug 13	
9	MW 31 shallow	S			Aug 14	
10	MW31 deep	S			Aug 14	

Comments:

Method of Delivery: Paracel.

Relinquished By (Sign):	Received by Driver/Depot: M Jeanse	Received at Lab: Rachel Sabjeet	Verified By: Rachel Sabjeet
Relinquished By (Print):	Date/Time: 18/08/17 2:50 PM	Date/Time: Aug 18 17.	Date/Time: Aug 18 17
Date/Time:	Temperature: °C	Temperature: 19.0 °C 4:00	pH Verified [N] By: N/A 4:40

Paracel ID: 1733555

PARACEL LABORATORIES LTD. | TRU RESPONSIVE. RELIABLE.

t Blvd.
G 4J8
p: 1-800-749-1947
e: paracel@paracellabs.com

Chain of Custody
(Lab Use Only)
№ 38516

Fox-M soil

Page 12 of 10

Client Name: Golder	Project Reference: Qiky 15
Contact Name: Alyssa Trulo	Quote #
Address: 1931 Robertson Rd	PO #
Telephone:	Email Address:

Turnaround Time:
☐ 1 Day ☐ 3 Day
☐ 2 Day ☑ Regular
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)

Q 16 0,0 **Required Analyses**

Paracel Order Number: 1733555

	Sample ID/Location Name	Matrix	Air Volume	# of Containers	Sample Taken Date	Sample Taken Time
1	MW20 shallow	S			Aug 13	
2	MW20 deep	S			Aug 13	
3	MW21 shallow	S			Aug 13	
4	MW21 deep	S			Aug 13	
5						
6						
7						
8						
9						
10						

Comments:

Method of Delivery: Paracel.

Relinquished By (Sign): DHP Aug 18 2017	Received by Driver/Depot: T. Fleuse	Received at Lab: Rachel Silvert	Verified By: Rachel Silvert
Relinquished By (Print):	Date/Time: 18/08/17 2:50 PM	Date/Time: Aug 18/17	Date/Time: Aug 18/17
Date/Time:	Temperature: °C	Temperature: 19.0 °C 4:00	pH Verified ☐ By: N/A 4:40

Chain of Custody (Blank) - Rev 0.4 Feb 2016

PARACEL LABORATORIES LTD.
TRUSTED. RESPONSIVE. RELIABLE.

300 - 2319 St. Laurent Blvd
Ottawa, ON, K1G 4J8
1-800-749-1947
www.paracellabs.com

Certificate of Analysis

Golder Associates Ltd. (Ottawa)

1931 Robertson Rd.
Ottawa, ON K2H 5B7
Attn: Alyssa Troke

FOX-M Soil 2 of 2

Client PO: FOX-M Soil
Project: 1530908/3000
Custody: 110997/38508/9/10/11/12/13/14/15/16

Report Date: 30-Aug-2017
Order Date: 18-Aug-2017

Order #: 1733555

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

Paracel ID	Client ID
1733555-01	MW12 Shallow
1733555-02	MW12 Deep
1733555-03	MW13 Shallow
1733555-04	MW13 Deep
1733555-05	MW14 Shallow
1733555-06	MW14 Deep
1733555-07	MW914 Deep
1733555-08	MW15 Shallow
1733555-09	MW15 Deep
1733555-10	MW16 Shallow
1733555-11	MW16 Deep
1733555-12	FM 5 Shallow
1733555-14	FM 95 Shallow
1733555-15	FM 6 Shallow
1733555-16	FM 6 Deep
1733555-17	FM 7 Shallow
1733555-18	FM 7 Deep
1733555-19	FM 99 Deep
1733555-20	FM 8 Shallow
1733555-21	FM 8 Deep
1733555-22	FM 1 Shallow
1733555-23	FM 1 Deep
1733555-24	FM 2 Shallow
1733555-25	FM 2 Deep
1733555-26	FM 3 Shallow
1733555-27	FM 3 Deep
1733555-28	FM 4 Shallow
1733555-29	FM 4 Deep
1733555-30	FM 94 Deep
1733555-31	FM 9 Shallow

Approved By:

Dale Robertson, BSc
Laboratory Director

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.

1733555-32	FM 9 Deep
1733555-33	FM 10 Shallow
1733555-34	FM 10 Deep
1733555-35	FM 11 Shallow
1733555-36	FM 11 Deep
1733555-37	FM 12 Shallow
1733555-38	FM 13 Shallow
1733555-39	FM 13 Deep
1733555-40	FM 14 Shallow
1733555-41	FM 14 Deep
1733555-42	FM 15 Shallow
1733555-43	FM 15 Deep
1733555-44	FM 16 Shallow
1733555-45	FM 16 Deep
1733555-46	FM 17 Shallow
1733555-47	FM 17 Deep
1733555-48	FM 18 Shallow
1733555-49	FM 18 Deep
1733555-50	FM 19 Shallow
1733555-51	FM 19 Deep
1733555-52	FM 20 Shallow
1733555-53	FM 20 Deep
1733555-54	FM 21 Shallow
1733555-55	FM 22 Shallow
1733555-56	FM 22 Deep
1733555-57	FM 922 Deep

Certificate of Analysis
Client: Golder Associates Ltd. (Ottawa)
Client PO: FOX-M Soil

Report Date: 30-Aug-2017
Order Date: 18-Aug-2017
Project Description: 1530908/3000

Analysis Summary Table

Analysis	Method Reference/Description	Extraction Date	Analysis Date
CCME-SQG: Metals by ICP-OES	based on MOE E3470, ICP-OES	22-Aug-17	22-Aug-17
PCBs, total	SW846 8082A - GC-ECD	18-Aug-17	26-Aug-17
PHC F1	CWS Tier 1 - P&T GC-FID	25-Aug-17	26-Aug-17
PHCs F2 to F4	CWS Tier 1 - GC-FID, extraction	18-Aug-17	26-Aug-17
Solids, %	Gravimetric, calculation	28-Aug-17	28-Aug-17

Certificate of Analysis

Client: Golder Associates Ltd. (Ottawa)

Client PO: FOX-M Soil

Report Date: 30-Aug-2017

Order Date: 18-Aug-2017

Project Description: 1530908/3000

	Client ID:	MW12 Shallow	MW12 Deep	MW13 Shallow	MW13 Deep
	Sample Date:	11-Aug-17	11-Aug-17	14-Aug-17	14-Aug-17
	Sample ID:	1733555-01	1733555-02	1733555-03	1733555-04
	MDL/Units	Soil	Soil	Soil	Soil
Physical Characteristics					
% Solids	0.1 % by Wt.	95.9	88.4	95.1	94.4
Metals					
Arsenic	1.0 ug/g dry	<1.0	<1.0	<1.0	<1.0
Cadmium	0.5 ug/g dry	<0.5	<0.5	<0.5	<0.5
Chromium	1.0 ug/g dry	9.7	9.5	12.2	10.7
Cobalt	1.0 ug/g dry	1.8	2.0	2.2	2.0
Copper	1.0 ug/g dry	5.7	4.2	4.8	4.4
Lead	1.0 ug/g dry	96.7	63.4	28.2	28.3
Nickel	1.0 ug/g dry	7.1	6.8	8.8	7.8
Zinc	1.0 ug/g dry	17.9	12.5	11.6	10.0
Hydrocarbons					
F1 PHCs (C6-C10)	7 mg/kg dry	<7	<7	<7	<7
F2 PHCs (C10-C16)	4 mg/kg dry	48	169	<4	47
F3 PHCs (C16-C34)	8 mg/kg dry	25	19	<8	15
F4 PHCs (C34-C50)	6 mg/kg dry	<6	<6	<6	<6
PCBs					
PCBs, total	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
Decachlorobiphenyl	Surrogate	114%	76.0%	124%	125%

Certificate of Analysis

Client: Golder Associates Ltd. (Ottawa)

Client PO: FOX-M Soil

Report Date: 30-Aug-2017

Order Date: 18-Aug-2017

Project Description: 1530908/3000

	Client ID:	MW14 Shallow	MW14 Deep	MW914 Deep	MW15 Shallow
	Sample Date:	14-Aug-17	14-Aug-17	14-Aug-17	14-Aug-17
	Sample ID:	1733555-05	1733555-06	1733555-07	1733555-08
	MDL/Units	Soil	Soil	Soil	Soil
Physical Characteristics					
% Solids	0.1 % by Wt.	96.0	98.9	98.0	91.0
Metals					
Arsenic	1.0 ug/g dry	<1.0	<1.0	<1.0	<1.0
Cadmium	0.5 ug/g dry	<0.5	<0.5	<0.5	<0.5
Chromium	1.0 ug/g dry	8.9	8.2	5.8	9.1
Cobalt	1.0 ug/g dry	1.9	1.7	1.3	2.0
Copper	1.0 ug/g dry	5.0	3.3	2.3	4.7
Lead	1.0 ug/g dry	21.7	10.7	6.4	18.3
Nickel	1.0 ug/g dry	6.8	6.3	4.8	7.4
Zinc	1.0 ug/g dry	12.1	7.9	4.6	12.2
Hydrocarbons					
F1 PHCs (C6-C10)	7 mg/kg dry	<7	<7	<7	<7
F2 PHCs (C10-C16)	4 mg/kg dry	<4	<4	<4	<4
F3 PHCs (C16-C34)	8 mg/kg dry	60	<8	<8	<8
F4 PHCs (C34-C50)	6 mg/kg dry	27	<6	<6	<6
PCBs					
PCBs, total	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
Decachlorobiphenyl	Surrogate	139%	125%	132%	136%

Certificate of Analysis

Client: Golder Associates Ltd. (Ottawa)

Client PO: FOX-M Soil

Report Date: 30-Aug-2017

Order Date: 18-Aug-2017

Project Description: 1530908/3000

	Client ID:	MW15 Deep	MW16 Shallow	MW16 Deep	FM 5 Shallow
	Sample Date:	14-Aug-17	14-Aug-17	14-Aug-17	10-Aug-17
	Sample ID:	1733555-09	1733555-10	1733555-11	1733555-12
	MDL/Units	Soil	Soil	Soil	Soil
Physical Characteristics					
% Solids	0.1 % by Wt.	86.1	96.6	94.9	83.8
Metals					
Arsenic	1.0 ug/g dry	<1.0	<1.0	<1.0	<1.0
Cadmium	0.5 ug/g dry	<0.5	<0.5	<0.5	<0.5
Chromium	1.0 ug/g dry	9.8	12.2	6.9	4.5
Cobalt	1.0 ug/g dry	2.1	2.0	1.4	<1.0
Copper	1.0 ug/g dry	6.1	6.0	2.9	1.7
Lead	1.0 ug/g dry	44.8	82.1	20.9	2.4
Nickel	1.0 ug/g dry	7.2	6.9	4.5	2.8
Zinc	1.0 ug/g dry	16.3	18.8	9.5	3.2
Hydrocarbons					
F1 PHCs (C6-C10)	7 mg/kg dry	<7	<7	<7	<7
F2 PHCs (C10-C16)	4 mg/kg dry	<4	<4	<4	<4
F3 PHCs (C16-C34)	8 mg/kg dry	23	75	30	<8
F4 PHCs (C34-C50)	6 mg/kg dry	12	22	6	<6
PCBs					
PCBs, total	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
Decachlorobiphenyl	Surrogate	132%	139%	107%	119%

Certificate of Analysis

Client: Golder Associates Ltd. (Ottawa)

Client PO: FOX-M Soil

Report Date: 30-Aug-2017

Order Date: 18-Aug-2017

Project Description: 1530908/3000

	Client ID:	FM 95 Shallow	FM 6 Shallow	FM 6 Deep	FM 7 Shallow
	Sample Date:	12-Aug-17	10-Aug-17	10-Aug-17	10-Aug-17
	Sample ID:	1733555-14	1733555-15	1733555-16	1733555-17
	MDL/Units	Soil	Soil	Soil	Soil
Physical Characteristics					
% Solids	0.1 % by Wt.	88.3	90.5	91.0	96.0
Metals					
Arsenic	1.0 ug/g dry	<1.0	<1.0	<1.0	<1.0
Cadmium	0.5 ug/g dry	<0.5	<0.5	<0.5	<0.5
Chromium	1.0 ug/g dry	5.0	12.7	13.0	19.4
Cobalt	1.0 ug/g dry	1.1	2.5	2.4	2.9
Copper	1.0 ug/g dry	2.0	15.6	13.3	6.1
Lead	1.0 ug/g dry	1.8	32.6	45.6	57.6
Nickel	1.0 ug/g dry	2.3	9.1	8.4	10.0
Zinc	1.0 ug/g dry	3.0	99.1	139	25.8
Hydrocarbons					
F1 PHCs (C6-C10)	7 mg/kg dry	<7	<7	<7	<7
F2 PHCs (C10-C16)	4 mg/kg dry	<4	<4	<4	<4
F3 PHCs (C16-C34)	8 mg/kg dry	<8	25	<8	<8
F4 PHCs (C34-C50)	6 mg/kg dry	<6	7	<6	<6
PCBs					
PCBs, total	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
Decachlorobiphenyl	Surrogate	119%	128%	107%	140%

Certificate of Analysis

Client: Golder Associates Ltd. (Ottawa)

Client PO: FOX-M Soil

Report Date: 30-Aug-2017

Order Date: 18-Aug-2017

Project Description: 1530908/3000

	Client ID:	FM 7 Deep	FM 99 Deep	FM 8 Shallow	FM 8 Deep
	Sample Date:	10-Aug-17	10-Aug-17	10-Aug-17	10-Aug-17
	Sample ID:	1733555-18	1733555-19	1733555-20	1733555-21
	MDL/Units	Soil	Soil	Soil	Soil
Physical Characteristics					
% Solids	0.1 % by Wt.	92.9	91.3	86.7	90.6
Metals					
Arsenic	1.0 ug/g dry	<1.0	1.8	<1.0	<1.0
Cadmium	0.5 ug/g dry	1.7	<0.5	<0.5	<0.5
Chromium	1.0 ug/g dry	18.5	11.0	6.0	5.5
Cobalt	1.0 ug/g dry	3.1	2.2	1.2	<1.0
Copper	1.0 ug/g dry	5.8	4.6	3.0	2.1
Lead	1.0 ug/g dry	52.3	6.3	3.7	3.4
Nickel	1.0 ug/g dry	10.3	7.9	4.3	3.8
Zinc	1.0 ug/g dry	24.2	9.0	5.1	4.3
Hydrocarbons					
F1 PHCs (C6-C10)	7 mg/kg dry	<7	<7	<7	<7
F2 PHCs (C10-C16)	4 mg/kg dry	<4	<4	<4	<4
F3 PHCs (C16-C34)	8 mg/kg dry	10	<8	<8	<8
F4 PHCs (C34-C50)	6 mg/kg dry	<6	<6	<6	<6
PCBs					
PCBs, total	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
Decachlorobiphenyl	Surrogate	132%	138%	138%	75.0%

Certificate of Analysis

Client: Golder Associates Ltd. (Ottawa)

Client PO: FOX-M Soil

Report Date: 30-Aug-2017

Order Date: 18-Aug-2017

Project Description: 1530908/3000

	Client ID:	FM 1 Shallow	FM 1 Deep	FM 2 Shallow	FM 2 Deep
	Sample Date:	10-Aug-17	10-Aug-17	10-Aug-17	10-Aug-17
	Sample ID:	1733555-22	1733555-23	1733555-24	1733555-25
	MDL/Units	Soil	Soil	Soil	Soil
Physical Characteristics					
% Solids	0.1 % by Wt.	96.0	95.7	92.1	84.4
Metals					
Arsenic	1.0 ug/g dry	<1.0	<1.0	<1.0	<1.0
Cadmium	0.5 ug/g dry	<0.5	<0.5	<0.5	<0.5
Chromium	1.0 ug/g dry	11.1	8.0	11.5	12.2
Cobalt	1.0 ug/g dry	2.5	1.5	2.8	3.3
Copper	1.0 ug/g dry	5.6	3.3	7.9	9.2
Lead	1.0 ug/g dry	7.2	5.8	35.3	8.7
Nickel	1.0 ug/g dry	8.9	6.2	10.7	12.7
Zinc	1.0 ug/g dry	11.3	6.2	13.2	16.5
Hydrocarbons					
F1 PHCs (C6-C10)	7 mg/kg dry	<7	<7	<7	<7
F2 PHCs (C10-C16)	4 mg/kg dry	<4	<4	<4	<4
F3 PHCs (C16-C34)	8 mg/kg dry	<8	<8	<8	<8
F4 PHCs (C34-C50)	6 mg/kg dry	<6	<6	<6	<6
PCBs					
PCBs, total	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
Decachlorobiphenyl	Surrogate	71.0%	84.0%	70.0%	118%

Certificate of Analysis
Client: Golder Associates Ltd. (Ottawa)
Client PO: FOX-M Soil

Report Date: 30-Aug-2017
Order Date: 18-Aug-2017
Project Description: 1530908/3000

	Client ID:	FM 3 Shallow	FM 3 Deep	FM 4 Shallow	FM 4 Deep
	Sample Date:	10-Aug-17	10-Aug-17	10-Aug-17	10-Aug-17
	Sample ID:	1733555-26	1733555-27	1733555-28	1733555-29
	MDL/Units	Soil	Soil	Soil	Soil
Physical Characteristics					
% Solids	0.1 % by Wt.	80.2	74.1	95.7	98.6
Metals					
Arsenic	1.0 ug/g dry	<16.1	<1.0	<1.0	<1.0
Cadmium	0.5 ug/g dry	<8.1	<0.5	<0.5	<0.5
Chromium	1.0 ug/g dry	69.0	12.5	6.0	5.8
Cobalt	1.0 ug/g dry	<16.1	2.1	1.4	1.3
Copper	1.0 ug/g dry	49.1	9.3	2.0	2.0
Lead	1.0 ug/g dry	57.6	7.1	3.9	4.1
Nickel	1.0 ug/g dry	78.5	11.3	3.5	3.7
Zinc	1.0 ug/g dry	86.9	15.7	5.4	6.5
Hydrocarbons					
F1 PHCs (C6-C10)	7 mg/kg dry	<7	<7	<7	<7
F2 PHCs (C10-C16)	4 mg/kg dry	<4	<4	<4	<4
F3 PHCs (C16-C34)	8 mg/kg dry	<8	<8	<8	<8
F4 PHCs (C34-C50)	6 mg/kg dry	<6	<6	<6	<6
PCBs					
PCBs, total	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
Decachlorobiphenyl	Surrogate	129%	75.0%	119%	139%

Certificate of Analysis

Client: Golder Associates Ltd. (Ottawa)

Client PO: FOX-M Soil

Report Date: 30-Aug-2017

Order Date: 18-Aug-2017

Project Description: 1530908/3000

	Client ID:	FM 94 Deep	FM 9 Shallow	FM 9 Deep	FM 10 Shallow
	Sample Date:	10-Aug-17	10-Aug-17	10-Aug-17	10-Aug-17
	Sample ID:	1733555-30	1733555-31	1733555-32	1733555-33
	MDL/Units	Soil	Soil	Soil	Soil
Physical Characteristics					
% Solids	0.1 % by Wt.	96.6	94.0	89.3	90.8
Metals					
Arsenic	1.0 ug/g dry	<1.0	<1.0	<1.0	<1.0
Cadmium	0.5 ug/g dry	<0.5	<0.5	<0.5	<0.5
Chromium	1.0 ug/g dry	6.8	9.9	11.5	8.7
Cobalt	1.0 ug/g dry	1.4	1.9	2.1	1.8
Copper	1.0 ug/g dry	2.1	3.7	4.5	3.5
Lead	1.0 ug/g dry	4.8	5.0	5.0	5.7
Nickel	1.0 ug/g dry	3.9	7.2	7.7	6.3
Zinc	1.0 ug/g dry	6.4	8.2	9.3	8.6
Hydrocarbons					
F1 PHCs (C6-C10)	7 mg/kg dry	<7	<7	<7	<7
F2 PHCs (C10-C16)	4 mg/kg dry	<4	<4	<4	<4
F3 PHCs (C16-C34)	8 mg/kg dry	<8	<8	<8	<8
F4 PHCs (C34-C50)	6 mg/kg dry	<6	<6	<6	<6
PCBs					
PCBs, total	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
Decachlorobiphenyl	Surrogate	125%	130%	129%	70.0%

Certificate of Analysis

Client: Golder Associates Ltd. (Ottawa)

Client PO: FOX-M Soil

Report Date: 30-Aug-2017

Order Date: 18-Aug-2017

Project Description: 1530908/3000

	Client ID:	FM 10 Deep	FM 11 Shallow	FM 11 Deep	FM 12 Shallow
	Sample Date:	10-Aug-17	10-Aug-17	10-Aug-17	10-Aug-17
	Sample ID:	1733555-34	1733555-35	1733555-36	1733555-37
	MDL/Units	Soil	Soil	Soil	Soil
Physical Characteristics					
% Solids	0.1 % by Wt.	83.1	93.3	92.0	84.1
Metals					
Arsenic	1.0 ug/g dry	<1.0	<1.0	<1.0	<1.0
Cadmium	0.5 ug/g dry	<0.5	<0.5	<0.5	<0.5
Chromium	1.0 ug/g dry	8.8	7.8	7.4	11.8
Cobalt	1.0 ug/g dry	1.9	1.5	1.3	2.1
Copper	1.0 ug/g dry	3.1	8.5	5.0	4.7
Lead	1.0 ug/g dry	5.8	21.7	8.6	7.3
Nickel	1.0 ug/g dry	6.4	4.9	5.5	8.7
Zinc	1.0 ug/g dry	8.7	24.6	16.3	13.7
Hydrocarbons					
F1 PHCs (C6-C10)	7 mg/kg dry	<7	<7	<7	<7
F2 PHCs (C10-C16)	4 mg/kg dry	<4	<4	<4	<4
F3 PHCs (C16-C34)	8 mg/kg dry	<8	96	115	13
F4 PHCs (C34-C50)	6 mg/kg dry	<6	18	22	<6
PCBs					
PCBs, total	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
Decachlorobiphenyl	Surrogate	125%	74.0%	137%	78.0%

Certificate of Analysis
Client: Golder Associates Ltd. (Ottawa)
Client PO: FOX-M Soil

Report Date: 30-Aug-2017
Order Date: 18-Aug-2017
Project Description: 1530908/3000

	Client ID:	FM 13 Shallow	FM 13 Deep	FM 14 Shallow	FM 14 Deep
	Sample Date:	10-Aug-17	10-Aug-17	10-Aug-17	10-Aug-17
	Sample ID:	1733555-38	1733555-39	1733555-40	1733555-41
	MDL/Units	Soil	Soil	Soil	Soil
Physical Characteristics					
% Solids	0.1 % by Wt.	95.1	96.9	66.5	92.6
Metals					
Arsenic	1.0 ug/g dry	<1.0	<1.0	<1.0	<1.0
Cadmium	0.5 ug/g dry	<0.5	<0.5	<0.5	<0.5
Chromium	1.0 ug/g dry	11.0	8.9	7.7	16.0
Cobalt	1.0 ug/g dry	2.4	1.9	1.6	2.8
Copper	1.0 ug/g dry	5.4	3.6	14.2	8.1
Lead	1.0 ug/g dry	9.2	5.5	6.7	7.0
Nickel	1.0 ug/g dry	8.0	7.1	7.9	11.6
Zinc	1.0 ug/g dry	12.1	8.4	8.3	14.9
Hydrocarbons					
F1 PHCs (C6-C10)	7 mg/kg dry	<7	<7	<7	<7
F2 PHCs (C10-C16)	4 mg/kg dry	<4	<4	<4	<4
F3 PHCs (C16-C34)	8 mg/kg dry	<8	<8	28	<8
F4 PHCs (C34-C50)	6 mg/kg dry	<6	<6	<6	<6
PCBs					
PCBs, total	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
Decachlorobiphenyl	Surrogate	78.0%	72.0%	83.0%	71.0%

Certificate of Analysis
Client: Golder Associates Ltd. (Ottawa)
Client PO: FOX-M Soil

Report Date: 30-Aug-2017
Order Date: 18-Aug-2017
Project Description: 1530908/3000

	Client ID:	FM 15 Shallow	FM 15 Deep	FM 16 Shallow	FM 16 Deep
	Sample Date:	10-Aug-17	10-Aug-17	10-Aug-17	10-Aug-17
	Sample ID:	1733555-42	1733555-43	1733555-44	1733555-45
	MDL/Units	Soil	Soil	Soil	Soil
Physical Characteristics					
% Solids	0.1 % by Wt.	72.0	90.7	91.8	84.3
Metals					
Arsenic	1.0 ug/g dry	<1.0	<1.0	<1.0	<1.0
Cadmium	0.5 ug/g dry	<0.5	<0.5	<0.5	<0.5
Chromium	1.0 ug/g dry	3.9	12.6	12.3	9.0
Cobalt	1.0 ug/g dry	<1.0	2.1	2.3	1.9
Copper	1.0 ug/g dry	3.2	5.2	5.5	6.4
Lead	1.0 ug/g dry	3.8	6.1	8.4	8.2
Nickel	1.0 ug/g dry	6.9	8.0	9.2	7.3
Zinc	1.0 ug/g dry	3.6	11.1	12.8	21.3
Hydrocarbons					
F1 PHCs (C6-C10)	7 mg/kg dry	<7	<7	<7	<7
F2 PHCs (C10-C16)	4 mg/kg dry	<4	<4	<4	<4
F3 PHCs (C16-C34)	8 mg/kg dry	16	18	<8	<8
F4 PHCs (C34-C50)	6 mg/kg dry	<6	8	<6	<6
PCBs					
PCBs, total	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
Decachlorobiphenyl	Surrogate	74.0%	133%	116%	133%

Certificate of Analysis

Report Date: 30-Aug-2017

Client: Golder Associates Ltd. (Ottawa)

Order Date: 18-Aug-2017

Client PO: FOX-M Soil

Project Description: 1530908/3000

	Client ID:	FM 17 Shallow	FM 17 Deep	FM 18 Shallow	FM 18 Deep
	Sample Date:	10-Aug-17	10-Aug-17	10-Aug-17	10-Aug-17
	Sample ID:	1733555-46	1733555-47	1733555-48	1733555-49
	MDL/Units	Soil	Soil	Soil	Soil
Physical Characteristics					
% Solids	0.1 % by Wt.	92.7	94.2	92.6	92.8
Metals					
Arsenic	1.0 ug/g dry	<1.0	<1.0	<1.0	<1.0
Cadmium	0.5 ug/g dry	<0.5	<0.5	<0.5	<0.5
Chromium	1.0 ug/g dry	12.0	11.3	11.6	11.4
Cobalt	1.0 ug/g dry	2.6	2.3	2.3	2.2
Copper	1.0 ug/g dry	5.1	4.7	4.9	4.7
Lead	1.0 ug/g dry	6.8	5.6	7.9	9.0
Nickel	1.0 ug/g dry	10.8	9.1	9.9	9.2
Zinc	1.0 ug/g dry	10.1	11.0	10.3	9.9
Hydrocarbons					
F1 PHCs (C6-C10)	7 mg/kg dry	<7	<7	<7	<7
F2 PHCs (C10-C16)	4 mg/kg dry	<4	<4	<4	<4
F3 PHCs (C16-C34)	8 mg/kg dry	<8	<8	<8	<8
F4 PHCs (C34-C50)	6 mg/kg dry	<6	<6	<6	<6
PCBs					
PCBs, total	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
Decachlorobiphenyl	Surrogate	136%	76.0%	132%	133%

Certificate of Analysis

Client: Golder Associates Ltd. (Ottawa)

Client PO: FOX-M Soil

Report Date: 30-Aug-2017

Order Date: 18-Aug-2017

Project Description: 1530908/3000

	Client ID:	FM 19 Shallow	FM 19 Deep	FM 20 Shallow	FM 20 Deep
	Sample Date:	10-Aug-17	10-Aug-17	10-Aug-17	10-Aug-17
	Sample ID:	1733555-50	1733555-51	1733555-52	1733555-53
	MDL/Units	Soil	Soil	Soil	Soil
Physical Characteristics					
% Solids	0.1 % by Wt.	94.7	92.6	92.6	82.5
Metals					
Arsenic	1.0 ug/g dry	<1.0	<1.0	<1.0	<1.0
Cadmium	0.5 ug/g dry	<0.5	<0.5	<0.5	<0.5
Chromium	1.0 ug/g dry	9.6	9.0	11.5	12.4
Cobalt	1.0 ug/g dry	2.3	1.8	2.7	2.9
Copper	1.0 ug/g dry	5.9	6.4	4.6	5.7
Lead	1.0 ug/g dry	7.4	6.8	6.5	7.8
Nickel	1.0 ug/g dry	7.7	7.4	10.0	9.9
Zinc	1.0 ug/g dry	11.2	12.7	12.0	14.8
Hydrocarbons					
F1 PHCs (C6-C10)	7 mg/kg dry	<7	<7	<7	<7
F2 PHCs (C10-C16)	4 mg/kg dry	<4	<4	<4	<4
F3 PHCs (C16-C34)	8 mg/kg dry	<8	<8	<8	<8
F4 PHCs (C34-C50)	6 mg/kg dry	<6	<6	<6	<6
PCBs					
PCBs, total	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
Decachlorobiphenyl	Surrogate	72.0%	136%	74.0%	73.0%

Certificate of Analysis
Client: Golder Associates Ltd. (Ottawa)
Client PO: FOX-M Soil

Report Date: 30-Aug-2017
Order Date: 18-Aug-2017
Project Description: 1530908/3000

	Client ID:	FM 21 Shallow	FM 22 Shallow	FM 22 Deep	FM 922 Deep
	Sample Date:	10-Aug-17	10-Aug-17	10-Aug-17	10-Aug-17
	Sample ID:	1733555-54	1733555-55	1733555-56	1733555-57
	MDL/Units	Soil	Soil	Soil	Soil
Physical Characteristics					
% Solids	0.1 % by Wt.	85.0	87.8	88.9	89.9
Metals					
Arsenic	1.0 ug/g dry	<1.0	<1.0	<1.0	<1.0
Cadmium	0.5 ug/g dry	<0.5	<0.5	<0.5	<0.5
Chromium	1.0 ug/g dry	11.2	11.5	10.9	11.3
Cobalt	1.0 ug/g dry	2.3	2.1	2.3	2.3
Copper	1.0 ug/g dry	4.4	5.6	4.8	5.3
Lead	1.0 ug/g dry	6.4	7.3	5.6	4.9
Nickel	1.0 ug/g dry	9.8	9.5	9.6	9.0
Zinc	1.0 ug/g dry	9.6	8.9	9.1	9.6
Hydrocarbons					
F1 PHCs (C6-C10)	7 mg/kg dry	<7	<7	<7	<7
F2 PHCs (C10-C16)	4 mg/kg dry	<4	<4	<4	<4
F3 PHCs (C16-C34)	8 mg/kg dry	<8	<8	<8	<8
F4 PHCs (C34-C50)	6 mg/kg dry	<6	<6	<6	<6
PCBs					
PCBs, total	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
Decachlorobiphenyl	Surrogate	135%	77.0%	137%	130%

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	mg/kg						
F2 PHCs (C10-C16)	ND	4	mg/kg						
F3 PHCs (C16-C34)	ND	8	mg/kg						
F4 PHCs (C34-C50)	ND	6	mg/kg						
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						
Nickel	ND	1.0	ug/g						
Zinc	ND	1.0	ug/g						
PCBs									
PCBs, total	ND	0.05	ug/g						
Surrogate: Decachlorobiphenyl	*0.247*		*ug/g*		*124*	*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	mg/kg dry	ND				40	
F2 PHCs (C10-C16)	41	4	mg/kg dry	48			15.1	30	
F3 PHCs (C16-C34)	32	8	mg/kg dry	25			25.6	30	
F4 PHCs (C34-C50)	ND	6	mg/kg dry	ND				30	
Metals									
Antimony	ND	1.0	ug/g dry	ND			0.0	30	
Arsenic	ND	1.0	ug/g dry	ND				30	
Barium	8.45	1.0	ug/g dry	9.92			16.0	30	
Beryllium	ND	1.0	ug/g dry	ND			0.0	30	
Boron	15.7	1.0	ug/g dry	17.1			8.9	30	
Cadmium	ND	0.5	ug/g dry	ND			0.0	30	
Chromium	9.12	1.0	ug/g dry	9.74			6.5	30	
Cobalt	1.75	1.0	ug/g dry	1.82			4.4	30	
Copper	5.41	1.0	ug/g dry	5.67			4.8	30	
Lead	94.3	1.0	ug/g dry	96.7			2.5	30	
Molybdenum	ND	1.0	ug/g dry	ND			0.0	30	
Nickel	6.89	1.0	ug/g dry	7.10			3.1	30	
Selenium	ND	1.0	ug/g dry	ND			0.0	30	
Silver	ND	0.5	ug/g dry	ND			0.0	30	
Thallium	2.69	1.0	ug/g dry	3.37			22.6	30	
Tin	ND	5.0	ug/g dry	ND			0.0	30	
Uranium	ND	1.0	ug/g dry	ND			0.0	30	
Vanadium	11.8	1.0	ug/g dry	12.6			6.4	30	
Zinc	17.8	1.0	ug/g dry	17.9			0.3	30	
PCBs									
PCBs, total	ND	0.05	ug/g dry	ND				40	
Surrogate: Decachlorobiphenyl	*0.242*		*ug/g dry*		*116*	*60-140*			
Physical Characteristics									
% Solids	86.9	0.1	% by Wt.	87.2			0.3	25	

Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F1 PHCs (C6-C10)	203	7	mg/kg		101	80-120			
F2 PHCs (C10-C16)	126	4	mg/kg	48	83.1	60-140			
F3 PHCs (C16-C34)	216	8	mg/kg	25	98.5	60-140			
F4 PHCs (C34-C50)	147	6	mg/kg	ND	114	60-140			
Metals									
Antimony	294		ug/L	11.5	113	70-130			
Arsenic	302		ug/L	ND	121	70-130			
Barium	429		ug/L	198	92.3	70-130			
Beryllium	265		ug/L	1.98	105	70-130			
Boron	584		ug/L	343	96.6	70-130			
Cadmium	271		ug/L	2.91	107	70-130			
Chromium	412		ug/L	195	86.8	70-130			
Cobalt	245		ug/L	36.5	83.3	70-130			
Copper	387		ug/L	113	109	70-130			
Lead	310		ug/L	68.0	96.8	70-130			
Molybdenum	226		ug/L	8.56	87.0	70-130			
Nickel	370		ug/L	142	91.4	70-130			
Selenium	278		ug/L	ND	111	70-130			
Silver	273		ug/L	ND	109	70-130			
Thallium	278		ug/L	ND	111	70-130			
Tin	309		ug/L	36.0	109	70-130			
Uranium	212		ug/L	13.7	79.5	70-130			
Vanadium	491		ug/L	253	95.5	70-130			
Zinc	298		ug/L	86.8	84.3	70-130			
PCBs									
PCBs, total	0.266	0.05	ug/g	ND	63.7	60-140			
Surrogate: Decachlorobiphenyl	*0.234*		*ug/g*		*112*	*60-140*			

Qualifier Notes:

Login Qualifiers :

Sample - F1/BTEX/VOCs (soil) not submitted according to CCME 2016 protocols - not field preserved

Applies to samples: MW12 Shallow, MW12 Deep, MW13 Shallow, MW13 Deep, MW14 Shallow, MW14 Deep, MW914 Deep, MW15 Shallow, MW15 Deep, MW16 Shallow, MW16 Deep, FM 5 Shallow, FM 95 Shallow, FM 6 Shallow, FM 6 Deep, FM 7 Shallow, FM 7 Deep, FM 99 Deep, FM 8 Shallow, FM 8 Deep, FM 1 Shallow, FM 1 Deep, FM 2 Shallow, FM 2 Deep, FM 3 Shallow, FM 3 Deep, FM 4 Shallow, FM 4 Deep, FM 94 Deep, FM 9 Shallow, FM 9 Deep, FM 10 Shallow, FM 10 Deep, FM 11 Shallow, FM 11 Deep, FM 12 Shallow, FM 13 Shallow, FM 13 Deep, FM 14 Shallow, FM 14 Deep, FM 15 Shallow, FM 15 Deep, FM 16 Shallow, FM 16 Deep, FM 17 Shallow, FM 17 Deep, FM 18 Shallow, FM 18 Deep, FM 19 Shallow, FM 19 Deep, FM 20 Shallow, FM 20 Deep, FM 21 Shallow, FM 22 Shallow, FM 22 Deep, FM 922 Deep

Sample Data Revisions

None

Work Order Revisions / Comments:

The bulk of the material analyzed for these soil samples was gravel at >2mm.

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.

Paracel ID: 1733555

PARACEL LABORATORIES LTD.

TRUST
RESP(
RELIABLE .

Laurent Blvd.
io K1G 4J8
1947
e: paracel@paracellabs.com

Fox-M Soil

Chain of Custody
(Lab Use Only)
№ 110997

Page 1 of 10

Client Name: Golder	Project Reference: 1530908 / 3000
Contact Name: Alyssa Troiqe	Quote #
Address: 1931 Riverside Rd	PO #
Telephone:	Email Address:

Turnaround Time:
☐ 1 Day ☐ 3 Day
☐ 2 Day ☒ Regular
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 Q16-010

Paracel Order Number: 1733555

	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)
1	MW12 Shallow	S			Aug 11								
2	MW12 deep	S			Aug 11								
3	MW13 Shallow	S			Aug 16								
4	MW13 deep	S			Aug 16								
5	MW14 shallow	S			Aug 16								
6	MW14 deep	S			Aug 16								
7	MW914 deep	S			Aug 16								
8	MW15 shallow	S			Aug 16								
9	MW15 deep	S			Aug 16								
10	MW16 shallow	S			Aug 16								

Comments: Received samples labelled FM99 Deep and MW923 shallow.

Method of Delivery: Paracel.

Relinquished By (Sign):	Received by Driver/Depot: M. Tousse	Received at Lab: Rachel Subject	Verified By: Rachel Subject
Relinquished By (Print):	Date/Time: 16/08/17 2:50 PM	Date/Time: Aug 18/17.	Date/Time: Aug 18/17.
Date/Time:	Temperature: ____ °C	Temperature: 19.0 °C 4:00	pH Verified [X] By: N/A 4:40

Paracel ID: 1733555

PARACEL LABORATORIES LTD.

TI
RESPONSIVE .
RELIABLE .

...urent Blvd.
... K1G 4J8
p: 1-800-749-1947
e: paracel@paracellabs.com

FOX-M Soil

Chain of Custody
(Lab Use Only)
№ 38508

Page 2 of 10

Client Name:	Project Reference:
Contact Name:	Quote #
Address:	PO #
	Email Address:
Telephone:	

Turnaround Time:
☐ 1 Day ☐ 3 Day
☐ 2 Day ☒ Regular
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)

Q16-018

Required Analyses

Paracel Order Number: 1733555

	Sample ID/Location Name	Matrix	Air Volume	# of Containers	Sample Taken: Date	Sample Taken: Time
1	MW16 deep	S			Aug 16	
2	FM 5 shallow	S			Aug 10	
3	FM 5 deep Missing	S			Aug 10	
4	~~FM 95 deep~~ FM95 shallow	S			Aug 10	FM 95 shallow
5	FM 6 shallow	S			Aug 10	
6	FM 6 deep	S			Aug 10	
7	FM 7 shallow	S			Aug 10	
8	FM 7 deep	S			Aug 10	
9	FM 97 deep Missing -	S			Aug 10	
10	FM 8 shallow	S			Aug 10	

Cancel
~~Cancel~~ Should read 95.

Comments:

Method of Delivery: Paracel.

Relinquished By (Sign):	Received by Driver/Depot: A Heuse	Received at Lab: Rachel Subject	Verified By: Rachel Subject
Relinquished By (Print):	Date/Time: 18/08/17 7:50 AM	Date/Time: Aug 18/17.	Date/Time: Aug 18/17
Date/Time:	Temperature: ___°C	Temperature: 19.0°C 4:00	pH Verified ☒ By: N/A 4:40

Paracel ID: 1733555

PARACEL LABORATORIES LTD. | RESPONSIVE. RELIABLE.

Laurent Blvd.
rio K1G 4J8
p: 1-800-749-1947
e: paracel@paracellabs.com

Chain of Custody
(Lab Use Only)
№ 38509

Page 3 of 10

Fox M So. 1

Client Name: Golder Associates	Project Reference: 1539951/303 Oct 15	**Turnaround Time:**
Contact Name: Alyssa Tuck	Quote #	☐ 1 Day ☐ 3 Day
Address:	PO #	☐ 2 Day ☒ Regular
Telephone:	Email Address:	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)

CR 16-010 **Required Analyses**

	Paracel Order Number: 1733555 / Sample ID/Location Name	Matrix	Air Volume	# of Containers	Sample Taken Date	Sample Taken Time
1	FM8 deep	S			Aug 10	
2	FM 1 shallow	S			Aug 10	
3	FM 1 deep	S			Aug 10	
4	FM 2 shallow	S			Aug 10	
5	FM 2 deep	S			Aug 10	
6	FM 3 shallow	S			Aug 10	
7	FM 3 deep	S			Aug 10	
8	FM 4 shallow	S			Aug 10	
9	FM 4 deep	S			Aug 10	
10	FM 9A deep	S			Aug 10	

Comments:

Method of Delivery: Paracel

Relinquished By (Sign):	Received by Driver/Depot: M. DeLouise	Received at Lab: Rachel Subject	Verified By: Rachel Subject
Relinquished By (Print):	Date/Time: 18/08/17 2:50 PM	Date/Time: Aug 18 17.	Date/Time: Aug 18 17
Date/Time:	Temperature: °C	Temperature: 19.0 °C 4:00	pH Verified ☐ By: N/A 4:40

Paracel ID: 1733555

PARACEL LABORATORIES LTD. | TRI RESPONSIVE . RELIABLE .

ent Blvd.
:1G 4J8
p: 1-800-749-1947
e: paracel@paracellabs.com

Chain of Custody
(Lab Use Only)
№ 38510

FOX-M Soil

Page 4 of 10

Client Name: Golder Assoc Ltd	Project Reference: Q1kg15
Contact Name: Aiyse Turko	Quote #
Address:	PO #
	Email Address:
Telephone:	

Turnaround Time:
☐ 1 Day ☐ 3 Day
☐ 2 Day ☒ Regular
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)

Q16-010 **Required Analyses**

Paracel Order Number: 1733555

	Sample ID/Location Name	Matrix	Air Volume	# of Containers	Sample Taken Date	Sample Taken Time
1	FM 9 shallow	S			Aug 10	
2	FM 9 deep	S			Aug 10	
3	FM 10 shallow	S			Aug 10	
4	FM 10 deep	S			Aug 10	
5	FM 11 shallow	S			Aug 10	
6	FM 11 deep	S			Aug 10	
7	FM 12 shallow	S			Aug 10	
8	FM 13 shallow	S			Aug 10	
9	FM 13 deep	S			Aug 10	
10	FM 14 shallow	S			Aug 10	

Comments:

Method of Delivery: Paracel.

Relinquished By (Sign):	Received by Driver/Depot: M. DeCourse	Received at Lab: Rachel Sinyet	Verified By: Rachel Sinyet
Relinquished By (Print):	Date/Time: 18/08/17 2:50	Date/Time: Aug 18 17	Date/Time: Aug 18 17
Date/Time:	Temperature: °C AT	Temperature: 19.0 4:00	pH Verified ☒ By: NM 4:40

Chain of Custody (Blank) - Rev 0.4 Feb 2016

Paracel ID: 1733555

PARACEL LABORATORIES LTD. | RESPONSIVE . RELIABLE .

t. Laurent Blvd.
tario K1G 4J8
p: 1-800-749-1947
e: paracel@paracellabs.com

Chain of Custody
(Lab Use Only)
№ 38511

Page 5 of 10

FOX-M soil

Client Name: Golder Associates	Project Reference: Rig 15
Contact Name: Alyssa Trotto	Quote #
Address:	PO #
	Email Address:
Telephone:	

Turnaround Time:
☐ 1 Day ☐ 3 Day
☐ 2 Day ☒ Regular
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)

Q16-010 **Required Analyses**

Paracel Order Number: 1733555

	Sample ID/Location Name	Matrix	Air Volume	# of Containers	Sample Taken Date	Sample Taken Time
1	FM 14 deep	S			Aug 13	Aug 10
2	FM 15 shallow	S			Aug 13	Aug 10
3	FM 15 deep	S			Aug 13	Aug 10
4	FM 16 shallow	S			Aug 13	Aug 10
5	FM 16 deep	S			Aug 13	Aug 10
6	FM 17 shallow	S			Aug 10	
7	FM 17 deep				Aug 10	
8	FM 18 shallow				Aug 10	
9	FM 18 deep				Aug 10	
10	FM 19 shallow				Aug 10	

Comments:

Method of Delivery: Paracel

Relinquished By (Sign):	Received by Driver/Depot: M. LOUISE	Received at Lab: Rachel Subject	Verified By: Rachel Subject
Relinquished By (Print):	Date/Time: 18/08/17 2:50 PM	Date/Time: Aug 18 17. 4:00	Date/Time: Aug 18 17. 4:40
Date/Time:	Temperature: °C	Temperature: 19.0°C	pH Verified ☐ By: N/A

Chain of Custody (Blank) - Rev 0.4 Feb 2016

Paracel ID: 1733555

PARACEL LABORATORIES LTD. | RESPONSIVE. RELIABLE.

. Laurent Blvd.
ario K1G 4J8
p. 1-800-749-1947
e: paracel@paracellabs.com

Chain of Custody
(Lab Use Only)
№ 38512

Page 6 of 10

FOX-M Soil

Client Name: Golder Associates	Project Reference:
Contact Name: Alyssa Trio	Quote #
Address:	PO #
Telephone:	Email Address:

Turnaround Time:
☐ 1 Day ☐ 3 Day
☐ 2 Day ☑ Regular
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)

Q16-010 **Required Analyses**

Paracel Order Number: 1733555

	Sample ID/Location Name	Matrix	Air Volume	# of Containers	Sample Taken Date	Sample Taken Time
1	FM 19 deep	S			Aug 10	
2	FM 26 shallow	S			Aug 10	
3	FM 20 deep	S			Aug 10	
4	FM 21 shallow	S			Aug 10	
5	FM 22 shallow	S			Aug 10	
6	FM 22 deep	S			Aug 10	
7	FM 922 deep	S			Aug 10	
8	MW-1 shallow	S			Aug 13	
9	MW-1 deep	S			Aug 13	
10	MW-2 shallow	S			Aug 13	

Comments:

Method of Delivery: Paracel

Relinquished By (Sign):	Received by Driver/Depot: M. Mouse	Received at Lab: Rachel Subject	Verified By: Rachel Subject
Relinquished By (Print):	Date/Time: 18/08/17 2.50	Date/Time: Aug 18/17.	Date/Time: Aug 18/17
Date/Time:	Temperature: °C PH.	Temperature: 19.0°C 4:00	pH Verified ☑ By: N/A 4:40

Paracel ID: 1733555

PARACEL LABORATORIES LTD. | TRUST . RESPONSIVE . RELIABLE .

p: 1-800-749-1947
e: paracel@paracellabs.com

Chain of Custody (Lab Use Only)
№ 38513

Fox M Soil

Page 7 of 10

Client Name: Golder Associates	Project Reference: Qika 15
Contact Name: Alyssa Yorke	Quote #
Address:	PO #
Telephone:	Email Address:

Turnaround Time:
☐ 1 Day ☐ 3 Day
☐ 2 Day ☐ Regular
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)

Q16-010 **Required Analyses**

Paracel Order Number: 1733555

	Sample ID/Location Name	Matrix	Air Volume	# of Containers	Sample Taken Date	Sample Taken Time	
1	MW2 deep	S			Aug 13		
2	MW3 shallow	S			Aug 13		
3	MW3 deep Missing	S			Aug 13		Cancel
4	MW4 shallow	S			Aug 13		
5	MW4 deep	S			Aug 13		
6	MW5 shallow	S			Aug 13		
7	MW5 deep	S			Aug 13		
8	MW905 deep	S			Aug 13		
9	MW22 shallow	S			Aug 13		
10	MW22 deep	S			Aug 13		

Comments:

Method of Delivery: Paracel

Relinquished By (Sign):	Received by Driver/Depot: M. Clouse	Received at Lab: Rachel Subject	Verified By: Rachel Subject
Relinquished By (Print):	Date/Time: 18/08/17 2:50 PM	Date/Time: Aug 18 17.	Date/Time: Aug 18 17.
Date/Time:	Temperature: °C	Temperature: 19.0 °C 4:00	pH Verified [x] By: NM 4:40

Chain of Custody (Blank) - Rev 0.4 Feb 2016

Paracel ID: 1733555

PARACEL LABORATORIES LTD. | TRUS RESPONSIVE . RELIABLE .

3lvd. 4J8

p: 1-800-749-1947
e: paracel@paracellabs.com

Chain of Custody (Lab Use Only)
№ 38514

FOX-M Soil

Page 8 of 10

Client Name: Golder Associates	Project Reference: 13-1415
Contact Name: Alyssa Traiso	Quote #
Address:	PO #
Telephone:	Email Address:

Turnaround Time:
☐ 1 Day ☐ 3 Day
☐ 2 Day ~~☐ Regular~~
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)

Q16-ON **Required Analyses**

Paracel Order Number: 1733555

	Sample ID/Location Name	Matrix	Air Volume	# of Containers	Sample Taken Date	Sample Taken Time
1	MW22 shallow Missing	S			Aug 13	
2	MW23 shallow	S			Aug 13	
3	MW23 deep	S			Aug 13	
4	MW24 shallow	S			Aug 13	
5	MW24 ~~shallow~~ Deep	S			Aug 13	
6	MW25 shallow	S			Aug 13	
7	MW25 ~~shallow~~ Deep	S			Aug 13	
8	MW925 shallow	S			Aug 13	
9	MW26 shallow	S			Aug 13	
10	MW26 deep	S			Aug 13	

Should read 923

Comments:

Method of Delivery: Paracel.

Relinquished By (Sign):	Received by Driver/Depot: A. Krouse	Received at Lab: Rachel Subject	Verified By: Rachel Subject
Relinquished By (Print):	Date/Time: 18/08/17 2:50 PM	Date/Time: Aug 18/17.	Date/Time: Aug 18/17.
Date/Time:	Temperature: °C	Temperature: 19.0 4:00	pH Verified [X] By: N/A 4:40

Paracel ID: 1733555

PARACEL LABORATORIES LTD. | TF RESPONSIVE . RELIABLE .

...rent Blvd.
K1G 4J8
p: 1-800-...947
e: paracel@paracellabs.com

FOX-M Soil

Chain of Custody
(Lab Use Only)
№ 38515

Page 9 of 10

Client Name: Guides Association	Project Reference: 2016
Contact Name: Alyssa Tyrie	Quote #
Address:	PO #
Telephone:	Email Address:

Turnaround Time:
☐ 1 Day ☐ 3 Day
☐ 2 Day ☒ Regular
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)

2016 VOC — Required Analyses

Paracel Order Number: 1733555

	Sample ID/Location Name	Matrix	Air Volume	# of Containers	Sample Taken: Date	Sample Taken: Time
1	MW27 shallow	S			Aug 13	
2	MW 27 deep	S			Aug 13	
3	MW 28 shallow	S			Aug 13	
4	MW28 deep	S			Aug 13	
5	MW29 shallow	S			Aug 13	
6	MW29 deep	S			Aug 13	
7	MW30 shallow	S			Aug 13	
8	MW30 deep	S			Aug 13	
9	MW 31 shallow	S			Aug 14	
10	MW31 deep	S			Aug 14	

Comments:

Method of Delivery: Paracel.

Relinquished By (Sign):	Received by Driver/Depot: M Jeanse	Received at Lab: Rachel Sabjeet	Verified By: Rachel Sabjeet
Relinquished By (Print):	Date/Time: 18/08/17 2:50 PM	Date/Time: Aug 18 17.	Date/Time: Aug 18 17
Date/Time:	Temperature: °C	Temperature: 19.0 °C 4:00	pH Verified [N] By: N/A 4:40

Paracel ID: 1733555

PARACEL LABORATORIES LTD. | TRU RESPONSIVE. RELIABLE.

t Blvd.
G 4J8
p: 1-800-749-1947
e: paracel@paracellabs.com

Chain of Custody
(Lab Use Only)
№ 38516

Fox-M soil

Page 12 of 10

Client Name: Golder	Project Reference: Qiky 15
Contact Name: Alyssa Trulo	Quote #
Address: 1931 Robertson Rd	PO #
Telephone:	Email Address:

Turnaround Time:
☐ 1 Day ☐ 3 Day
☐ 2 Day ☑ Regular
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)

Q 16 0,0 **Required Analyses**

Paracel Order Number: 1733555

	Sample ID/Location Name	Matrix	Air Volume	# of Containers	Sample Taken Date	Sample Taken Time
1	MW20 shallow	S			Aug 13	
2	MW20 deep	S			Aug 13	
3	MW21 shallow	S			Aug 13	
4	MW21 deep	S			Aug 13	
5						
6						
7						
8						
9						
10						

Comments:

Method of Delivery: Paracel.

Relinquished By (Sign): DHP Aug 18 2017	Received by Driver/Depot: T. Fleuse	Received at Lab: Rachel Silvert	Verified By: Rachel Silvert
Relinquished By (Print):	Date/Time: 18/08/17 2:50 PM	Date/Time: Aug 18/17	Date/Time: Aug 18/17
Date/Time:	Temperature: °C	Temperature: 19.0 °C 4:00	pH Verified ☐ By: N/A 4:40

Chain of Custody (Blank) - Rev 0.4 Feb 2016

PARACEL LABORATORIES LTD.

TRUSTED.
RESPONSIVE.
RELIABLE.

300 - 2319 St. Laurent Blvd
Ottawa, ON, K1G 4J8
1-800-749-1947
www.paracellabs.com

Certificate of Analysis

Golder Associates Ltd. (Ottawa)

1931 Robertson Rd.
Ottawa, ON K2H 5B7
Attn: Alyssa Troke

Client PO:
Project: DEW Line Fox-M
Custody: 110884

FOX-M Groundwater

Report Date: 27-Nov-2017
Order Date: 18-Aug-2017

Order #: 1733554

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

Paracel ID	Client ID
1733554-01	MW 01
1733554-02	MW 02
1733554-03	MW 03
1733554-04	MW 04
1733554-05	MW 05
1733554-06	MW 13
1733554-07	MW 15
1733554-08	MW 29
1733554-09	MW 929
1733554-10	MW 30
1733554-11	FM Trip Blank
1733554-12	FM Probe R
1733554-13	FM Shovel R
1733554-14	MW 21

Approved By:



Dale Robertson, BSc
Laboratory Director

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: 27-Nov-2017

Client: Golder Associates Ltd. (Ottawa)

Order Date: 18-Aug-2017

Client PO:

Project Description: DEW Line Fox-M

Analysis Summary Table

Analysis	Method Reference/Description	Extraction Date	Analysis Date
Metals, ICP-MS	EPA 200.8 - ICP-MS	23-Aug-17	23-Aug-17
PHC F1	CWS Tier 1 - P&T GC-FID	24-Aug-17	25-Aug-17
PHCs F2 to F4	CWS Tier 1 - GC-FID, extraction	21-Aug-17	21-Aug-17

Certificate of Analysis

Report Date: 27-Nov-2017

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

Order Date: 18-Aug-2017

Client PO:

Project Description: DEW Line Fox-M

	Client ID:	MW 01	MW 02	MW 03	MW 04
	Sample Date:	13-Aug-17	13-Aug-17	13-Aug-17	13-Aug-17
	Sample ID:	1733554-01	1733554-02	1733554-03	1733554-04
	MDL/Units	Water	Water	Water	Water
Metals					
Arsenic	0.001 mg/L	<0.001	<0.001	<0.001	<0.001
Cadmium	0.0001 mg/L	<0.0001	<0.0001	<0.0001	<0.0001
Chromium	0.001 mg/L	<0.001	<0.001	0.012	<0.001
Cobalt	0.0005 mg/L	<0.0005	<0.0005	<0.0005	<0.0005
Copper	0.0005 mg/L	<0.0005	<0.0005	<0.0005	<0.0005
Lead	0.0001 mg/L	<0.0001	<0.0001	<0.0001	<0.0001
Nickel	0.001 mg/L	0.002	<0.001	<0.001	0.003
Zinc	0.005 mg/L	0.007	0.086	0.006	0.016
Hydrocarbons					
F1 PHCs (C6-C10)	0.025 mg/L	<0.025	<0.025	<0.025	<0.025
F2 PHCs (C10-C16)	0.1 mg/L	<0.1	<0.1	<0.1	<0.1
F3 PHCs (C16-C34)	0.1 mg/L	<0.1	<0.1	<0.1	<0.1
F4 PHCs (C34-C50)	0.1 mg/L	<0.1	<0.1	<0.1	<0.1

	Client ID:	MW 05	MW 13	MW 15	MW 29
	Sample Date:	13-Aug-17	14-Aug-17	14-Aug-17	13-Aug-17
	Sample ID:	1733554-05	1733554-06	1733554-07	1733554-08
	MDL/Units	Water	Water	Water	Water
Metals					
Arsenic	0.001 mg/L	<0.001	<0.001	<0.001	<0.001
Cadmium	0.0001 mg/L	<0.0001	<0.0001	<0.0001	<0.0001
Chromium	0.001 mg/L	<0.001	<0.001	<0.001	<0.001
Cobalt	0.0005 mg/L	<0.0005	<0.0005	<0.0005	<0.0005
Copper	0.0005 mg/L	<0.0005	<0.0005	<0.0005	<0.0005
Lead	0.0001 mg/L	<0.0001	0.0002	<0.0001	<0.0001
Nickel	0.001 mg/L	0.001	0.003	0.002	0.002
Zinc	0.005 mg/L	0.012	0.009	0.007	0.013
Hydrocarbons					
F1 PHCs (C6-C10)	0.025 mg/L	<0.025	0.319	<0.025	<0.025
F2 PHCs (C10-C16)	0.1 mg/L	<0.1	0.7	<0.1	<0.1
F3 PHCs (C16-C34)	0.1 mg/L	<0.1	<0.1	<0.1	<0.1
F4 PHCs (C34-C50)	0.1 mg/L	<0.1	<0.1	<0.1	<0.1

Certificate of Analysis

Report Date: 27-Nov-2017

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

Order Date: 18-Aug-2017

Client PO:

Project Description: DEW Line Fox-M

	Client ID:	MW 929	MW 30	FM Trip Blank	FM Probe R
	Sample Date:	13-Aug-17	13-Aug-17	13-Jul-17	13-Aug-17
	Sample ID:	1733554-09	1733554-10	1733554-11	1733554-12
	MDL/Units	Water	Water	Water	Water
Metals					
Arsenic	0.001 mg/L	<0.001	<0.001	<0.001	<0.001
Cadmium	0.0001 mg/L	<0.0001	<0.0001	<0.0001	<0.0001
Chromium	0.001 mg/L	<0.001	<0.001	<0.001	<0.001
Cobalt	0.0005 mg/L	<0.0005	<0.0005	<0.0005	<0.0005
Copper	0.0005 mg/L	<0.0005	<0.0005	<0.0005	<0.0005
Lead	0.0001 mg/L	<0.0001	<0.0001	<0.0001	<0.0001
Nickel	0.001 mg/L	0.001	<0.001	<0.001	<0.001
Zinc	0.005 mg/L	0.011	0.087	<0.005	0.010
Hydrocarbons					
F1 PHCs (C6-C10)	0.025 mg/L	<0.025	<0.025	<0.025	<0.025
F2 PHCs (C10-C16)	0.1 mg/L	<0.1	<0.1	<0.1	<0.1
F3 PHCs (C16-C34)	0.1 mg/L	<0.1	<0.1	<0.1	<0.1
F4 PHCs (C34-C50)	0.1 mg/L	<0.1	<0.1	<0.1	<0.1

	Client ID:	FM Shovel R	MW 21	-	-
	Sample Date:	13-Aug-17	13-Aug-17	-	-
	Sample ID:	1733554-13	1733554-14	-	-
	MDL/Units	Water	Water	-	-
Metals					
Arsenic	0.001 mg/L	<0.001	<0.001	-	-
Cadmium	0.0001 mg/L	<0.0001	<0.0001	-	-
Chromium	0.001 mg/L	<0.001	<0.001	-	-
Cobalt	0.0005 mg/L	<0.0005	<0.0005	-	-
Copper	0.0005 mg/L	<0.0005	<0.0005	-	-
Lead	0.0001 mg/L	<0.0001	<0.0001	-	-
Nickel	0.001 mg/L	<0.001	<0.001	-	-
Zinc	0.005 mg/L	<0.005	<0.005	-	-
Hydrocarbons					
F1 PHCs (C6-C10)	0.025 mg/L	<0.025	<0.025	-	-
F2 PHCs (C10-C16)	0.1 mg/L	<0.1	<0.1	-	-
F3 PHCs (C16-C34)	0.1 mg/L	<0.1	<0.1	-	-
F4 PHCs (C34-C50)	0.1 mg/L	<0.1	<0.1	-	-

Method Quality Control: Blank

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F1 PHCs (C6-C10)	ND	0.025	mg/L						
F2 PHCs (C10-C16)	ND	0.1	mg/L						
F3 PHCs (C16-C34)	ND	0.1	mg/L						
F4 PHCs (C34-C50)	ND	0.1	mg/L						
Metals									
Arsenic	ND	0.001	mg/L						
Cadmium	ND	0.0001	mg/L						
Chromium	ND	0.001	mg/L						
Cobalt	ND	0.0005	mg/L						
Copper	ND	0.0005	mg/L						
Lead	ND	0.0001	mg/L						
Nickel	ND	0.001	mg/L						
Zinc	ND	0.005	mg/L						

Method Quality Control: Duplicate

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F1 PHCs (C6-C10)	ND	0.025	mg/L	ND				30	
Metals									
Arsenic	ND	0.001	mg/L	ND			0.0	20	
Cadmium	ND	0.0001	mg/L	ND			0.0	20	
Chromium	ND	0.001	mg/L	ND			0.0	20	
Cobalt	ND	0.0005	mg/L	ND			0.0	20	
Copper	0.00509	0.0005	mg/L	ND			0.0	20	
Lead	0.00018	0.0001	mg/L	ND			0.0	20	
Nickel	0.0010	0.001	mg/L	ND			0.0	20	
Zinc	ND	0.005	mg/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)	1.71	0.025	mg/L		85.4	68-117			
F2 PHCs (C10-C16)	2.0	0.1	mg/L		108	60-140			
F3 PHCs (C16-C34)	3.4	0.1	mg/L		92.7	60-140			
F4 PHCs (C34-C50)	2.6	0.1	mg/L		104	60-140			
Metals									
Arsenic	50.0		ug/L	0.02	99.9	80-120			
Cadmium	47.9		ug/L	0.0002	95.7	80-120			
Chromium	48.6		ug/L	0.008	97.2	80-120			
Cobalt	47.6		ug/L	0.02	95.1	80-120			
Copper	49.3		ug/L	ND	98.6	80-120			
Lead	46.6		ug/L	0.04	93.1	80-120			
Nickel	47.7		ug/L	ND	95.4	80-120			
Zinc	69		ug/L	14	111	80-120			

Qualifier Notes:

Login Qualifiers :

Sample - One or more parameter received past hold time - CCME PHC F1-F4

Applies to samples: FM Trip

Sample - Filtered and preserved by Paracel upon receipt at the laboratory - Metals

Applies to samples: MW 01, MW 02, MW 03, MW 04, MW 05, MW 13, MW 15, MW 29, MW 929, MW 30, FM Trip , FM Probe R, FM Shovel R, MW 21

Sample Data Revisions

None

Work Order Revisions / Comments:

Hold time based on preparation date for this QA sample (Trip Blank and/or Trip Spike) and the associated analytical requirements. Hold time exceedances do not preclude the validity of the Trip Blank /Spike data.

Revision 1 Please note the metals concentration reported are dissolved metals concentrations.

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.

Paracel ID: 1733554

PARACEL LABORATORIES LTD.

TRUSTE
RESPOI
RELIABL.

FOX-11 Water

rent Blvd.
K1G 4J8
47
cellabs.com

Chain of Custody
(Lab Use Only)
№ 110884

Page 1 of 2

Client Name: Golder Associates	Project Reference: DEW Line Fox-11	**Turnaround Time:**
Contact Name: Alyssa Trico	Quote #	☐ 1 Day ☐ 3 Day
Address:	PO #	☐ 2 Day ☒ Regular
Telephone: 613 592 9600	Email Address:	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 Q 16-010

Paracel Order Number: 1733554

	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)
1	MW 01	GW		4	Aug 13								
2	MW 02	GW			Aug 13								
3	MW 03	GW			Aug 13								
4	MW 04	GW			Aug 13								
5	MW 05	GW			Aug 13								
6	MW 13	GW			Aug 14								
7	MW 15	GW			Aug 14								
8	MW 29	GW			Aug 13								
9	MW 929	GW			Aug 13								
10	MW 30 ✓	GW			Aug 13								

Comments: Received Extra Sample ID read = MW-31 Aug 13, 2017 (4 Containers) analyze as per QSR 016

Method of Delivery: Paracel

Relinquished By (Sign):	Received by Driver/Depot: M. LEDUC	Received at Lab: SUNDERDEEP DHUNNA	Verified By:
Relinquished By (Print):	Date/Time: 18/08/17 2:50	Date/Time: AUG 18, 2017 04:13	Date/Time: 08/18/17 4:50
Date/Time:	Temperature: ____ °C	Temperature: 19.0 °C	pH Verified [ ] By:

Paracel ID: 1733554

PARACEL LABORATORIES LTD. | TRUSTED . RESPONSIV RELIABLE .

e: paracel@paracellabs.com

Fox M White

Chain of Custody
(Lab Use Only)
№ 110885

Page 2 of 2

Client Name: Golder	Project Reference:	**Turnaround Time:**
Contact Name: Alyssa Troke	Quote #	☐ 1 Day ☐ 3 Day
Address:	PO #	☐ 2 Day ☑ Regular
Telephone:	Email Address:	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 2-16-010

Paracel Order Number: 1733554

	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)							
1	FM Trip Blank	W		4	Aug 13															
2	FM Prairie R	W			Aug 13															
3	FM Shovel R	W			Aug 13															
4																				
5																				
6																				
7																				
8																				
9																				
10																				

Comments:

Method of Delivery: Paracel

Relinquished By (Sign): DNP Aug 18 2017	Received by Driver/Depot: A. Rouse	Received at Lab: SUPERFORM DONMaj	Verified By:
Relinquished By (Print):	Date/Time: 18/08/17 2:50 PM	Date/Time: AUG 18 2017 04:33	Date/Time: 08/18/17 4:52
Date/Time:	Temperature: ____ °C	Temperature: 19.0 °C	pH Verified [ ] By:

PARACEL LABORATORIES LTD.

TRUSTED.
RESPONSIVE.
RELIABLE.

300 - 2319 St. Laurent Blvd
Ottawa, ON, K1G 4J8
1-800-749-1947
www.paracellabs.com

Certificate of Analysis

Golder Associates Ltd. (Ottawa)

1931 Robertson Rd.
Ottawa, ON K2H 5B7
Attn: Alyssa Troke

Field Blank Analysis for FOX-M

Client PO:
Project: DEW Line CAM-5
Custody: 111083

Report Date: 27-Nov-2017
Order Date: 18-Aug-2017

Order #: 1733535

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

Paracel ID	Client ID
1733535-01	MW 05
1733535-02	MW 06
1733535-03	MW 08
1733535-04	MW 09
1733535-05	MW 11
1733535-06	MW 12
1733535-07	Field Blank
1733535-08	MW 908
1733535-09	C-5 Shovel R
1733535-10	C-5 Probe R
1733535-11	C-5 Trip Blank

Approved By:

Dale Robertson, BSc
Laboratory Director

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: 27-Nov-2017

Client: Golder Associates Ltd. (Ottawa)

Order Date: 18-Aug-2017

Client PO:

Project Description: DEW Line CAM-5

Analysis Summary Table

Analysis	Method Reference/Description	Extraction Date	Analysis Date
Metals, ICP-MS	EPA 200.8 - ICP-MS	23-Aug-17	23-Aug-17
PHC F1	CWS Tier 1 - P&T GC-FID	24-Aug-17	25-Aug-17
PHCs F2 to F4	CWS Tier 1 - GC-FID, extraction	21-Aug-17	21-Aug-17

Certificate of Analysis

Report Date: 27-Nov-2017

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

Order Date: 18-Aug-2017

Client PO:

Project Description: DEW Line CAM-5

	Client ID:	MW 05	MW 06	MW 08	MW 09
	Sample Date:	11-Aug-17	11-Aug-17	11-Aug-17	11-Aug-17
	Sample ID:	1733535-01	1733535-02	1733535-03	1733535-04
	MDL/Units	Water	Water	Water	Water
Metals					
Arsenic	0.001 mg/L	<0.001	<0.001	<0.001	<0.001
Cadmium	0.0001 mg/L	<0.0001	<0.0001	<0.0001	<0.0001
Chromium	0.001 mg/L	<0.001	<0.001	<0.001	<0.001
Cobalt	0.0005 mg/L	<0.0005	<0.0005	<0.0005	<0.0005
Copper	0.0005 mg/L	0.0023	0.0017	0.0064	0.0008
Lead	0.0001 mg/L	0.0006	0.0006	0.0012	0.0004
Nickel	0.001 mg/L	<0.001	<0.001	<0.001	<0.001
Zinc	0.005 mg/L	0.012	0.007	0.007	<0.005
Hydrocarbons					
F1 PHCs (C6-C10)	0.025 mg/L	<0.025	<0.025	<0.025	<0.025
F2 PHCs (C10-C16)	0.1 mg/L	<0.1	<0.1	<0.1	<0.1
F3 PHCs (C16-C34)	0.1 mg/L	<0.1	<0.1	<0.1	<0.1
F4 PHCs (C34-C50)	0.1 mg/L	<0.1	<0.1	<0.1	<0.1

	Client ID:	MW 11	MW 12	Field Blank	MW 908
	Sample Date:	11-Aug-17	11-Aug-17	14-Aug-17	11-Aug-17
	Sample ID:	1733535-05	1733535-06	1733535-07	1733535-08
	MDL/Units	Water	Water	Water	Water
Metals					
Arsenic	0.001 mg/L	<0.001	<0.001	<0.001	<0.001
Cadmium	0.0001 mg/L	<0.0001	<0.0001	<0.0001	<0.0001
Chromium	0.001 mg/L	<0.001	<0.001	<0.001	<0.001
Cobalt	0.0005 mg/L	<0.0005	<0.0005	<0.0005	<0.0005
Copper	0.0005 mg/L	0.0005	<0.0005	<0.0005	0.0058
Lead	0.0001 mg/L	0.0001	<0.0001	<0.0001	0.0010
Nickel	0.001 mg/L	<0.001	<0.001	<0.001	<0.001
Zinc	0.005 mg/L	0.010	0.007	0.010	0.013
Hydrocarbons					
F1 PHCs (C6-C10)	0.025 mg/L	<0.025	<0.025	<0.025	<0.025
F2 PHCs (C10-C16)	0.1 mg/L	<0.1	<0.1	<0.1	<0.1
F3 PHCs (C16-C34)	0.1 mg/L	<0.1	<0.1	<0.1	<0.1
F4 PHCs (C34-C50)	0.1 mg/L	<0.1	<0.1	<0.1	<0.1

Certificate of Analysis

Report Date: 27-Nov-2017

Client: Golder Associates Ltd. (Ottawa)

Order Date: 18-Aug-2017

Client PO:

Project Description: DEW Line CAM-5

	Client ID:	C-5 Shovel R	C-5 Probe R	C-5 Trip Blank	-
	Sample Date:	12-Aug-17	11-Aug-17	13-Jul-17	-
	Sample ID:	1733535-09	1733535-10	1733535-11	-
	MDL/Units	Water	Water	Water	-
Metals					
Arsenic	0.001 mg/L	<0.001	<0.001	<0.001	-
Cadmium	0.0001 mg/L	<0.0001	<0.0001	<0.0001	-
Chromium	0.001 mg/L	<0.001	<0.001	<0.001	-
Cobalt	0.0005 mg/L	<0.0005	<0.0005	<0.0005	-
Copper	0.0005 mg/L	<0.0005	<0.0005	<0.0005	-
Lead	0.0001 mg/L	<0.0001	<0.0001	<0.0001	-
Nickel	0.001 mg/L	<0.001	<0.001	<0.001	-
Zinc	0.005 mg/L	0.011	0.013	0.014	-
Hydrocarbons					
F1 PHCs (C6-C10)	0.025 mg/L	<0.025	<0.025	<0.025	-
F2 PHCs (C10-C16)	0.1 mg/L	<0.1	<0.1	<0.1 [1]	-
F3 PHCs (C16-C34)	0.1 mg/L	<0.1	<0.1	<0.1 [1]	-
F4 PHCs (C34-C50)	0.1 mg/L	<0.1	<0.1	<0.1 [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	0.025	mg/L						
F2 PHCs (C10-C16)	ND	0.1	mg/L						
F3 PHCs (C16-C34)	ND	0.1	mg/L						
F4 PHCs (C34-C50)	ND	0.1	mg/L						
Metals									
Arsenic	ND	0.001	mg/L						
Cadmium	ND	0.0001	mg/L						
Chromium	ND	0.001	mg/L						
Cobalt	ND	0.0005	mg/L						
Copper	ND	0.0005	mg/L						
Lead	ND	0.0001	mg/L						
Nickel	ND	0.001	mg/L						
Zinc	ND	0.005	mg/L						

Method Quality Control: Duplicate

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F1 PHCs (C6-C10)	ND	0.025	mg/L	ND				30	
Metals									
Arsenic	ND	0.001	mg/L	ND			0.0	20	
Cadmium	ND	0.0001	mg/L	ND			0.0	20	
Chromium	ND	0.001	mg/L	ND			0.0	20	
Cobalt	ND	0.0005	mg/L	ND			0.0	20	
Copper	0.00509	0.0005	mg/L	ND			0.0	20	
Lead	0.00018	0.0001	mg/L	ND			0.0	20	
Nickel	0.0010	0.001	mg/L	ND			0.0	20	
Zinc	ND	0.005	mg/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)	1.71	0.025	mg/L		85.4	68-117			
F2 PHCs (C10-C16)	2.0	0.1	mg/L		108	60-140			
F3 PHCs (C16-C34)	3.4	0.1	mg/L		92.7	60-140			
F4 PHCs (C34-C50)	2.6	0.1	mg/L		104	60-140			
Metals									
Arsenic	50.0		ug/L	0.02	99.9	80-120			
Cadmium	47.9		ug/L	0.0002	95.7	80-120			
Chromium	48.6		ug/L	0.008	97.2	80-120			
Cobalt	47.6		ug/L	0.02	95.1	80-120			
Copper	49.3		ug/L	ND	98.6	80-120			
Lead	46.6		ug/L	0.04	93.1	80-120			
Nickel	47.7		ug/L	ND	95.4	80-120			
Zinc	69		ug/L	14	111	80-120			

Qualifier Notes:

Login Qualifiers :

Sample - One or more parameter received past hold time - CCME F1-F4

Applies to samples: C-5 Trip

Sample - Filtered and preserved by Paracel upon receipt at the laboratory - Metals

Applies to samples: MW 05, MW 06, MW 08, MW 09, MW 11, MW 12, Field , MW 908, C-5 Shovel R, C-5 Probe R, C-5 Trip

Sample Qualifiers :

1 : Holding time had been exceeded upon receipt of the sample at the laboratory.

Sample Data Revisions

None

Work Order Revisions / Comments:

Hold time based on preparation date for this QA sample (Trip Blank and/or Trip Spike) and the associated analytical requirements. Hold time exceedances do not preclude the validity of the Trip Blank/Spike data.

Revision 1 Please note the metals concentration reported are dissolved metals concentrations.

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.

PARACEL LABORATORIES LTD.

TRUSTED . RESPONSIVE . RELIABLE .

Paracel ID: 1733535

CAM-5 Water

Chain of Custody
(Lab Use Only)
№ 111083

Page 1 of 1

Client Name: Golder Associates	Project Reference: DEW Line CAM-5
Contact Name: Alyssa Trike	Quote #
Address: 1931 Robertson	PO #
Telephone: 613 592 9800	Email Address:

Turnaround Time:
☐ 1 Day ☐ 3 Day
☐ 2 Day ☒ Regular
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 ~~CCME 15-304 Mod~~ 16-010

Paracel Order Number: 1733535

	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)
1	MW 05	GW		4	Aug 11								
2	MW 06	GW			Aug 11								
3	MW 08	GW			Aug 11								
4	MW 09	GW			Aug 11								
5	MW 11	GW			Aug 11								
6	MW 12	GW			Aug 11								
7	Field Blank	W			Aug 14								
8	MW 908	GW			Aug 11								
9	C-5 Shovel R	W			Aug 12								
10	C-5 Probe R	W			Aug 11								
11	C5 Trip Blank	W			Aug 16								

Comments: proceed regardless of expired Blank. JW JUL 13, 2017.

Method of Delivery: Paracel

Relinquished By (Sign):	Received by Driver/Depot: A. Tessier	Received at Lab: SUNEPORN DOKMAI	Verified By:
Relinquished By (Print):	Date/Time: 18/08/17 2:50 PM	Date/Time: AUG 18, 2017 09:20	Date/Time: 08/18/17 5:00
Date/Time:	Temperature: ____ °C	Temperature: 19.0 °C	pH Verified [ ] By:

PARACEL LABORATORIES LTD.
TRUSTED. RESPONSIVE. RELIABLE.

300 - 2319 St. Laurent Blvd
Ottawa, ON, K1G 4J8
1-800-749-1947
www.paracellabs.com

SAMPLE SUBMISSION CHECKLIST

Golder Associates Ltd. (Ottawa)

Project Number: 1530908/3000
Paracel Work Order #: 1733555
C of C #: 110997/38508/9/10/11/12/13/14/15/16
PO #: FOX-M Soil
Submitted By:
Submission Date: 18-Aug-17

Item #	Sample Submission Requirement	Yes	No
	Sample Integrity		
1	Samples submitted > 10 °C *and sampled more than 1 day prior to submission*	✓	
2	Samples submitted > 10 °C *on day of sampling with attempt to cool*		✓
	Chain of Custody		
3	Client information complete, including contact		✓
4	Project reference and/or PO number provided	✓	
5	Guideline Requirements included	✓	
6	Analysis Request complete	✓	
7	TAT indicated on CoC	✓	
8	Sample Date Included	✓	
9	Submitted on Non-Paracel CoC	✓	
10	CoC signed and dated		✓
11	Samples received submerged in water. Suspected melted ice.		✓

Comments

5 year contract- expires Dec 31, 2020. CCME Coarse Criteria.
Cancelled sample # 13 and 63 per Don

Additional Bottle/Sample Integrity Qualifiers

Sample ID	Code	Qualifier Note	Additional Comment
01	LG-SMP005a	Sample - F1/BTEX/VOCs (soil) not submitted according to CCME 2016 protocols - not field preserved	
02	LG-SMP005a	Sample - F1/BTEX/VOCs (soil) not submitted according to CCME 2016 protocols - not field preserved	
03	LG-SMP005a	Sample - F1/BTEX/VOCs (soil) not submitted according to CCME 2016 protocols - not field preserved	
04	LG-SMP005a	Sample - F1/BTEX/VOCs (soil) not submitted according to CCME 2016 protocols - not field preserved	
05	LG-SMP005a	Sample - F1/BTEX/VOCs (soil) not submitted according to CCME 2016 protocols - not field preserved	

PARACEL LABORATORIES LTD.

TRUSTED.
RESPONSIVE.
RELIABLE.

300 - 2319 St. Laurent Blvd
Ottawa, ON, K1G 4J8
1-800-749-1947
www.paracellabs.com

SAMPLE SUBMISSION CHECKLIST

06	LG-SMP005a	Sample - F1/BTEX/VOCs (soil) not submitted according to CCME 2016 protocols - not field preserved
07	LG-SMP005a	Sample - F1/BTEX/VOCs (soil) not submitted according to CCME 2016 protocols - not field preserved
08	LG-SMP005a	Sample - F1/BTEX/VOCs (soil) not submitted according to CCME 2016 protocols - not field preserved
09	LG-SMP005a	Sample - F1/BTEX/VOCs (soil) not submitted according to CCME 2016 protocols - not field preserved
10	LG-SMP005a	Sample - F1/BTEX/VOCs (soil) not submitted according to CCME 2016 protocols - not field preserved
11	LG-SMP005a	Sample - F1/BTEX/VOCs (soil) not submitted according to CCME 2016 protocols - not field preserved
12	LG-SMP005a	Sample - F1/BTEX/VOCs (soil) not submitted according to CCME 2016 protocols - not field preserved
13	LG-SMP005a	Sample - F1/BTEX/VOCs (soil) not submitted according to CCME 2016 protocols - not field preserved
14	LG-SMP005a	Sample - F1/BTEX/VOCs (soil) not submitted according to CCME 2016 protocols - not field preserved
15	LG-SMP005a	Sample - F1/BTEX/VOCs (soil) not submitted according to CCME 2016 protocols - not field preserved
16	LG-SMP005a	Sample - F1/BTEX/VOCs (soil) not submitted according to CCME 2016 protocols - not field preserved
17	LG-SMP005a	Sample - F1/BTEX/VOCs (soil) not submitted according to CCME 2016 protocols - not field preserved
18	LG-SMP005a	Sample - F1/BTEX/VOCs (soil) not submitted according to CCME 2016 protocols - not field preserved
19	LG-SMP005a	Sample - F1/BTEX/VOCs (soil) not submitted according to CCME 2016 protocols - not field preserved
20	LG-SMP005a	Sample - F1/BTEX/VOCs (soil) not submitted according to CCME 2016 protocols - not field preserved
21	LG-SMP005a	Sample - F1/BTEX/VOCs (soil) not submitted according to CCME 2016 protocols - not field preserved
22	LG-SMP005a	Sample - F1/BTEX/VOCs (soil) not submitted according to CCME 2016 protocols - not field preserved
23	LG-SMP005a	Sample - F1/BTEX/VOCs (soil) not submitted according to CCME 2016 protocols - not field preserved
24	LG-SMP005a	Sample - F1/BTEX/VOCs (soil) not submitted according to CCME 2016 protocols - not field preserved
25	LG-SMP005a	Sample - F1/BTEX/VOCs (soil) not submitted according to CCME 2016 protocols - not field preserved
26	LG-SMP005a	Sample - F1/BTEX/VOCs (soil) not submitted according to CCME 2016 protocols - not field preserved
27	LG-SMP005a	Sample - F1/BTEX/VOCs (soil) not submitted according to CCME 2016 protocols - not field preserved
28	LG-SMP005a	Sample - F1/BTEX/VOCs (soil) not submitted according to CCME 2016 protocols - not field preserved
29	LG-SMP005a	Sample - F1/BTEX/VOCs (soil) not submitted according to CCME 2016 protocols - not field preserved
30	LG-SMP005a	Sample - F1/BTEX/VOCs (soil) not submitted according to CCME 2016 protocols - not field preserved

PARACEL LABORATORIES LTD.
TRUSTED.
RESPONSIVE.
RELIABLE.

300 - 2319 St. Laurent Blvd
Ottawa, ON, K1G 4J8
1-800-749-1947
www.paracellabs.com

SAMPLE SUBMISSION CHECKLIST

31	LG-SMP005a	Sample - F1/BTEX/VOCs (soil) not submitted according to CCME 2016 protocols - not field preserved
32	LG-SMP005a	Sample - F1/BTEX/VOCs (soil) not submitted according to CCME 2016 protocols - not field preserved
33	LG-SMP005a	Sample - F1/BTEX/VOCs (soil) not submitted according to CCME 2016 protocols - not field preserved
34	LG-SMP005a	Sample - F1/BTEX/VOCs (soil) not submitted according to CCME 2016 protocols - not field preserved
35	LG-SMP005a	Sample - F1/BTEX/VOCs (soil) not submitted according to CCME 2016 protocols - not field preserved
36	LG-SMP005a	Sample - F1/BTEX/VOCs (soil) not submitted according to CCME 2016 protocols - not field preserved
37	LG-SMP005a	Sample - F1/BTEX/VOCs (soil) not submitted according to CCME 2016 protocols - not field preserved
38	LG-SMP005a	Sample - F1/BTEX/VOCs (soil) not submitted according to CCME 2016 protocols - not field preserved
39	LG-SMP005a	Sample - F1/BTEX/VOCs (soil) not submitted according to CCME 2016 protocols - not field preserved
40	LG-SMP005a	Sample - F1/BTEX/VOCs (soil) not submitted according to CCME 2016 protocols - not field preserved
41	LG-SMP005a	Sample - F1/BTEX/VOCs (soil) not submitted according to CCME 2016 protocols - not field preserved
42	LG-SMP005a	Sample - F1/BTEX/VOCs (soil) not submitted according to CCME 2016 protocols - not field preserved
43	LG-SMP005a	Sample - F1/BTEX/VOCs (soil) not submitted according to CCME 2016 protocols - not field preserved
44	LG-SMP005a	Sample - F1/BTEX/VOCs (soil) not submitted according to CCME 2016 protocols - not field preserved
45	LG-SMP005a	Sample - F1/BTEX/VOCs (soil) not submitted according to CCME 2016 protocols - not field preserved
46	LG-SMP005a	Sample - F1/BTEX/VOCs (soil) not submitted according to CCME 2016 protocols - not field preserved
47	LG-SMP005a	Sample - F1/BTEX/VOCs (soil) not submitted according to CCME 2016 protocols - not field preserved
48	LG-SMP005a	Sample - F1/BTEX/VOCs (soil) not submitted according to CCME 2016 protocols - not field preserved
49	LG-SMP005a	Sample - F1/BTEX/VOCs (soil) not submitted according to CCME 2016 protocols - not field preserved
50	LG-SMP005a	Sample - F1/BTEX/VOCs (soil) not submitted according to CCME 2016 protocols - not field preserved
51	LG-SMP005a	Sample - F1/BTEX/VOCs (soil) not submitted according to CCME 2016 protocols - not field preserved
52	LG-SMP005a	Sample - F1/BTEX/VOCs (soil) not submitted according to CCME 2016 protocols - not field preserved
53	LG-SMP005a	Sample - F1/BTEX/VOCs (soil) not submitted according to CCME 2016 protocols - not field preserved
54	LG-SMP005a	Sample - F1/BTEX/VOCs (soil) not submitted according to CCME 2016 protocols - not field preserved
55	LG-SMP005a	Sample - F1/BTEX/VOCs (soil) not submitted according to CCME 2016 protocols - not field preserved

PARACEL LABORATORIES LTD.

TRUSTED.
RESPONSIVE.
RELIABLE.

300 - 2319 St. Laurent Blvd
Ottawa, ON, K1G 4J8
1-800-749-1947
www.paracellabs.com

SAMPLE SUBMISSION CHECKLIST

56	LG-SMP005a	Sample - F1/BTEX/VOCs (soil) not submitted according to CCME 2016 protocols - not field preserved
57	LG-SMP005a	Sample - F1/BTEX/VOCs (soil) not submitted according to CCME 2016 protocols - not field preserved
58	LG-SMP005a	Sample - F1/BTEX/VOCs (soil) not submitted according to CCME 2016 protocols - not field preserved
59	LG-SMP005a	Sample - F1/BTEX/VOCs (soil) not submitted according to CCME 2016 protocols - not field preserved
60	LG-SMP005a	Sample - F1/BTEX/VOCs (soil) not submitted according to CCME 2016 protocols - not field preserved
61	LG-SMP005a	Sample - F1/BTEX/VOCs (soil) not submitted according to CCME 2016 protocols - not field preserved
62	LG-SMP005a	Sample - F1/BTEX/VOCs (soil) not submitted according to CCME 2016 protocols - not field preserved
63	LG-SMP005a	Sample - F1/BTEX/VOCs (soil) not submitted according to CCME 2016 protocols - not field preserved
64	LG-SMP005a	Sample - F1/BTEX/VOCs (soil) not submitted according to CCME 2016 protocols - not field preserved
65	LG-SMP005a	Sample - F1/BTEX/VOCs (soil) not submitted according to CCME 2016 protocols - not field preserved
66	LG-SMP005a	Sample - F1/BTEX/VOCs (soil) not submitted according to CCME 2016 protocols - not field preserved
67	LG-SMP005a	Sample - F1/BTEX/VOCs (soil) not submitted according to CCME 2016 protocols - not field preserved
68	LG-SMP005a	Sample - F1/BTEX/VOCs (soil) not submitted according to CCME 2016 protocols - not field preserved
69	LG-SMP005a	Sample - F1/BTEX/VOCs (soil) not submitted according to CCME 2016 protocols - not field preserved
70	LG-SMP005a	Sample - F1/BTEX/VOCs (soil) not submitted according to CCME 2016 protocols - not field preserved
71	LG-SMP005a	Sample - F1/BTEX/VOCs (soil) not submitted according to CCME 2016 protocols - not field preserved
72	LG-SMP005a	Sample - F1/BTEX/VOCs (soil) not submitted according to CCME 2016 protocols - not field preserved
73	LG-SMP005a	Sample - F1/BTEX/VOCs (soil) not submitted according to CCME 2016 protocols - not field preserved
74	LG-SMP005a	Sample - F1/BTEX/VOCs (soil) not submitted according to CCME 2016 protocols - not field preserved
75	LG-SMP005a	Sample - F1/BTEX/VOCs (soil) not submitted according to CCME 2016 protocols - not field preserved
76	LG-SMP005a	Sample - F1/BTEX/VOCs (soil) not submitted according to CCME 2016 protocols - not field preserved
77	LG-SMP005a	Sample - F1/BTEX/VOCs (soil) not submitted according to CCME 2016 protocols - not field preserved
78	LG-SMP005a	Sample - F1/BTEX/VOCs (soil) not submitted according to CCME 2016 protocols - not field preserved
79	LG-SMP005a	Sample - F1/BTEX/VOCs (soil) not submitted according to CCME 2016 protocols - not field preserved
80	LG-SMP005a	Sample - F1/BTEX/VOCs (soil) not submitted according to CCME 2016 protocols - not field preserved

PARACEL LABORATORIES LTD.

TRUSTED.
RESPONSIVE.
RELIABLE.

300 - 2319 St. Laurent Blvd
Ottawa, ON, K1G 4J8
1-800-749-1947
www.paracellabs.com

SAMPLE SUBMISSION CHECKLIST

81	LG-SMP005a	Sample - F1/BTEX/VOCs (soil) not submitted according to CCME 2016 protocols - not field preserved
82	LG-SMP005a	Sample - F1/BTEX/VOCs (soil) not submitted according to CCME 2016 protocols - not field preserved
83	LG-SMP005a	Sample - F1/BTEX/VOCs (soil) not submitted according to CCME 2016 protocols - not field preserved
84	LG-SMP005a	Sample - F1/BTEX/VOCs (soil) not submitted according to CCME 2016 protocols - not field preserved
85	LG-SMP005a	Sample - F1/BTEX/VOCs (soil) not submitted according to CCME 2016 protocols - not field preserved
86	LG-SMP005a	Sample - F1/BTEX/VOCs (soil) not submitted according to CCME 2016 protocols - not field preserved
87	LG-SMP005a	Sample - F1/BTEX/VOCs (soil) not submitted according to CCME 2016 protocols - not field preserved
88	LG-SMP005a	Sample - F1/BTEX/VOCs (soil) not submitted according to CCME 2016 protocols - not field preserved
89	LG-SMP005a	Sample - F1/BTEX/VOCs (soil) not submitted according to CCME 2016 protocols - not field preserved
90	LG-SMP005a	Sample - F1/BTEX/VOCs (soil) not submitted according to CCME 2016 protocols - not field preserved
91	LG-SMP005a	Sample - F1/BTEX/VOCs (soil) not submitted according to CCME 2016 protocols - not field preserved
92	LG-SMP005a	Sample - F1/BTEX/VOCs (soil) not submitted according to CCME 2016 protocols - not field preserved
93	LG-SMP005a	Sample - F1/BTEX/VOCs (soil) not submitted according to CCME 2016 protocols - not field preserved
94	LG-SMP005a	Sample - F1/BTEX/VOCs (soil) not submitted according to CCME 2016 protocols - not field preserved

PARACEL LABORATORIES LTD.
TRUSTED. RESPONSIVE. RELIABLE.

300 - 2319 St. Laurent Blvd
Ottawa, ON, K1G 4J8
1-800-749-1947
www.paracellabs.com

SAMPLE SUBMISSION CHECKLIST

Golder Associates Ltd. (Ottawa)

Project Number: DEW Line Fox-M
Paracel Work Order #: 1733554
C of C #: 110884

PO #:
Submitted By:
Submission Date: 18-Aug-17

Item #	Sample Submission Requirement	Yes	No
	Sample Integrity		
1	Samples submitted > 10 °C *and sampled more than 1 day prior to submission*	✗	
2	Samples submitted > 10 °C *on day of sampling with attempt to cool*		✓
	Chain of Custody		
3	Client information complete, including contact		✗
4	Project reference and/or PO number provided	✓	
5	Guideline Requirements included	✓	
6	Analysis Request complete	✓	
7	TAT indicated on CoC	✓	
8	Sample Date Included	✓	
9	Submitted on Non-Paracel CoC	✓	
10	CoC signed and dated	✓	
11	Samples received submerged in water. Suspected melted ice.		✓

Comments

5 year contract- expires Dec 31, 2020. CCME Coarse Criteria.

Additional Bottle/Sample Integrity Qualifiers

Sample ID	Code	Qualifier Note	Additional Comment
01	WO1	Revision 1 Please note the metals concentration reported are dissolved metals concentrations.	Revision 1 Please note the metals concentration reported are dissolved metals concentrations.
02	LG-SMP007	Sample - Filtered and preserved by Paracel upon receipt at the laboratory - Metals	Metals
03	LG-SMP007	Sample - Filtered and preserved by Paracel upon receipt at the laboratory - Metals	Metals
04	LG-SMP007	Sample - Filtered and preserved by Paracel upon receipt at the laboratory - Metals	Metals

PARACEL LABORATORIES LTD.
TRUSTED.
RESPONSIVE.
RELIABLE.

300 - 2319 St. Laurent Blvd
Ottawa, ON, K1G 4J8
1-800-749-1947
www.paracellabs.com

SAMPLE SUBMISSION CHECKLIST

05	LG-SMP007	Sample - Filtered and preserved by Paracel upon receipt at the laboratory - Metals	Metals
06	LG-SMP007	Sample - Filtered and preserved by Paracel upon receipt at the laboratory - Metals	Metals
07	LG-SMP007	Sample - Filtered and preserved by Paracel upon receipt at the laboratory - Metals	Metals
08	LG-SMP007	Sample - Filtered and preserved by Paracel upon receipt at the laboratory - Metals	Metals
09	LG-SMP007	Sample - Filtered and preserved by Paracel upon receipt at the laboratory - Metals	Metals
10	LG-SMP007	Sample - Filtered and preserved by Paracel upon receipt at the laboratory - Metals	Metals
11	LG-SMP006	Sample - One or more parameter received past hold time - CCME PHC F1-F4	CCME PHC F1-F4
12	LG-SMP007	Sample - Filtered and preserved by Paracel upon receipt at the laboratory - Metals	Metals
13	LG-SMP007	Sample - Filtered and preserved by Paracel upon receipt at the laboratory - Metals	Metals
14	LG-SMP007	Sample - Filtered and preserved by Paracel upon receipt at the laboratory - Metals	Metals

APPENDIX D

Photograph Log

Visual Inspection Photographs

Thermistor Photographs

Monitoring Well Photographs

Soil Sampling Photographs

PHOTOS

Photo 1: Tier II Disposal Facility - Cover surface, showing vehicle tracks, facing south (FOXM_Photo347.jpg) 1
Photo 2: Tier II Disposal Facility - Cover surface, facing north (FOXM_Photo352.jpg) 1
Photo 3: Tier II Disposal Facility - Cover surface, facing southwest (FOXM_Photo353.jpg) 2
Photo 4: Tier II Disposal Facility - Cover surface, showing Bilboards, facing north (FOXM_Photo360.jpg) 2
Photo 5: Tier II Disposal Facility - Cover surface, facing northeast (FOXM_Photo361.jpg) 3
Photo 6: Tier II Disposal Facility - Cover surface, facing southwest (FOXM_Photo365.jpg) 3
Photo 7: Tier II Disposal Facility - East crest, facing south (FOXM_Photo350.jpg) 4
Photo 8: Tier II Disposal Facility - Southeast crest, facing northeast (FOXM_Photo356.jpg) 4
Photo 9: Tier II Disposal Facility - East slope, facing south (FOXM_Photo349.jpg) 5
Photo 10: Tier II Disposal Facility - East slope, facing north (FOXM_Photo351.jpg) 5
Photo 11: Tier II Disposal Facility - Southeast slope, facing southwest (FOXM_Photo355.jpg) 6
Photo 12: Tier II Disposal Facility – Southeast slope and toe, facing northeast (FOXM_Photo358.jpg) 6
Photo 13: Tier II Disposal Facility – Northeast slope, facing northwest (FOXM_Photo354.jpg) 7
Photo 14: Tier II Disposal Facility - North crest, slope and toe, facing west (FOXM_Photo348.jpg) 7
Photo 15: Tier II Disposal Facility - North toe, facing southeast (FOXM_Photo367.jpg) 8
Photo 16: Tier II Disposal Facility - South crest, facing northwest (FOXM_Photo357.jpg) 8
Photo 17: Tier II Disposal Facility - South crest, facing southeast (FOXM_Photo362.jpg) 9
Photo 18: Tier II Disposal Facility - South slope and toe, facing northwest (FOXM_Photo359.jpg) 9
Photo 19: Tier II Disposal Facility - Northwest crest, facing southwest (FOXM_Photo366.jpg) 10
Photo 20: Tier II Disposal Facility - Northwest crest, slope and toe, facing northeast (FOXM_Photo363.jpg) 10
Photo 21: Tier II Disposal Facility - Northwest slope and toe, facing southwest (FOXM_Photo364.jpg) 11
Photo 22: Tier II Disposal Facility – VT-HB-1, facing north (FOXM_Photo451.jpg) 11
Photo 23: Tier II Disposal Facility – VT-01, facing southwest (FOXM_Photo452.jpg) 12
Photo 24: Tier II Disposal Facility – VT-02, facing north (FOXM_Photo453.jpg) 12
Photo 25: Tier II Disposal Facility – VT-03, facing north (FOXM_Photo454.jpg) 13
Photo 26: Tier II Disposal Facility – VT-04, facing north (FOXM_Photo456.jpg) 13
Photo 27: Tier II Disposal Facility – VT-05, facing north (FOXM_Photo455.jpg) 14

Photo 28: Tier II Disposal Facility – Cover surface - Feature C – Vehicle tracks, facing east (FOXM_Photo145.jpg) 14

Photo 29: Tier II Disposal Facility – Cover surface - Feature C – Vehicle tracks, facing southwest (FOXM_Photo146.jpg) 15

Photo 30: Tier II Disposal Facility – Cover surface - Feature C – Vehicle tracks on north slope, facing west (FOXM_Photo33.jpg) 15

Photo 31: Tier II Disposal Facility - Feature C – Vehicle tracks, north slope, facing southeast (FOXM_Photo34.jpg) 16

Photo 32: Tier II Disposal Facility – Cover surface – Feature C – Vehicle tracks, facing west (FOXM_Photo39.jpg) 16

Photo 33: Tier II Disposal Facility – Southeast slope - Feature C – Vehicle tracks, facing north (FOXM_Photo43.jpg) 17

Photo 34: Tier II Disposal Facility – Cover surface - Feature C – Vehicle tracks, facing northwest (FOXM_Photo44.jpg) 17

Photo 35: Tier II Disposal Facility – Cover surface - Feature C – Vehicle tracks, facing west (FOXM_Photo45.jpg) 18

Photo 36: Tier II Disposal Facility – Southeast slope - Feature C – Vehicle tracks, facing southwest (FOXM_Photo46.jpg) 18

Photo 37: Tier II Disposal Facility – Cover surface - Feature C – Vehicle tracks, facing north (FOXM_Photo47.jpg) 19

Photo 38: Tier II Disposal Facility – Southeast slope - Feature C – Vehicle tracks, facing northeast (FOXM_Photo48.jpg) 19

Photo 39: Tier II Disposal Facility – South slope - Feature C – Vehicle tracks, facing north (FOXM_Photo50.jpg) 20

Photo 40: Tier II Disposal Facility – South slope - Feature C – Vehicle tracks, facing northwest (FOXM_Photo51.jpg) 20

Photo 41: Tier II Disposal Facility – Cover surface - Feature C – Vehicle tracks, facing north (FOXM_Photo52.jpg) 21

Photo 42: Tier II Disposal Facility – Cover surface - Feature C – Vehicle tracks, facing north (FOXM_Photo53.jpg) 21

Photo 43: Tier II Disposal Facility – Cover surface - Feature C – Vehicle tracks, facing west (FOXM_Photo54.jpg) 22

Photo 44: Tier II Disposal Facility – Cover surface - Feature C – Vehicle tracks, facing southwest (FOXM_Photo55.jpg) 22

Photo 45: Tier II Disposal Facility – Northwest crest and slope - Feature C – Vehicle tracks, facing northwest (FOXM_Photo56.jpg) 23

Photo 46: Tier II Disposal Facility – Northwest slope - Feature C – Vehicle tracks, facing northwest (FOXM_Photo57.jpg) 23

Photo 47: Tier II Disposal Facility – Cover surface - Feature C – Vehicle tracks, facing southeast (FOXM_Photo58.jpg) 24
Photo 48: Tier II Disposal Facility – Northwest slope - Feature C – Vehicle tracks, facing west (FOXM_Photo59.jpg) 24
Photo 49: Tier II Disposal Facility – Cover surface - Feature C – Vehicle tracks, facing northeast (FOXM_Photo60.jpg) 25
Photo 50: Tier II Disposal Facility – Cover surface - Feature C – Vehicle tracks, facing east (FOXM_Photo61.jpg) 25
Photo 51: Tier II Disposal Facility – Northwest slope - Feature C – Vehicle tracks, facing south (FOXM_Photo63.jpg) 26
Photo 52: Tier II Disposal Facility – Northwest slope, facing south (FOXM_Photo64.jpg) 26
Photo 53: Tier II Disposal Facility – East toe - Feature H-3 – Ponded water, facing south (FOXM_Photo35.jpg) 27
Photo 54: Tier II Disposal Facility – East toe - Feature H-3 – Ponded water, facing south (FOXM_Photo37.jpg) 27
Photo 55: Tier II Disposal Facility – Southwest toe, Feature H-1 – Ponded water, facing northwest (FOXM_Photo49.jpg) 28
Photo 56: Tier II Disposal Facility – South crest - Feature A – Small depression, facing southwest (FOXM_Photo40.jpg) 28
Photo 57: Tier II Disposal Facility – Cover surface - Feature E – Erosion channel, facing northwest (FOXM_Photo41.jpg) 29
Photo 58: Tier II Disposal Facility – Cover surface - Feature C – Tire tracks, facing north (FOXM_Photo36.jpg) 29
Photo 59: Tier II Disposal Facility – East slope - Feature J – Minor settlement, facing west (FOXM_Photo38.jpg) 30
Photo 60: Tier II Disposal Facility – Southeast toe - Feature H-2 – Ponded water along toe, facing southwest (FOXM_Photo42.jpg) 30
Photo 61: Tier II Disposal Facility – Northwest slope near crest - Feature I – Two small depressions, facing northeast (FOXM_Photo62.jpg) 31
Photo 62: Tier II Disposal Facility - Soil Sample MW-01 – Before excavation (FOXM_Photo286.jpg) 31
Photo 63: Tier II Disposal Facility - Soil Sample MW-01 – After excavation (FOXM_Photo287.jpg) 32
Photo 64: Tier II Disposal Facility - Soil Sample MW-01 – After backfilling (FOXM_Photo288.jpg) 32
Photo 65: Tier II Disposal Facility - Water Sample MW-01 (FOXM_Photo285.jpg) 33
Photo 66: Tier II Disposal Facility - Soil Sample MW-02 – Before excavation (FOXM_Photo281.jpg) 33
Photo 67: Tier II Disposal Facility - Soil Sample MW-02 – After excavation (FOXM_Photo282.jpg) 34
Photo 68: Tier II Disposal Facility - Soil Sample MW-02 – After backfilling (FOXM_Photo283.jpg) 34
Photo 69: Tier II Disposal Facility - Water Sample MW-02 (FOXM_Photo284.jpg) 35

Photo 70: Tier II Disposal Facility - Soil Sample MW-03 – Before excavation (FOXM_Photo278.jpg).....35
Photo 71: Tier II Disposal Facility - Soil Sample MW-03 – After excavation (FOXM_Photo279.jpg).....36
Photo 72: Tier II Disposal Facility - Soil Sample MW-03 – After backfilling (FOXM_Photo280.jpg).....36
Photo 73: Tier II Disposal Facility - Water Sample MW-03 (FOXM_Photo277.jpg).....37
Photo 74: Tier II Disposal Facility - Soil Sample MW-04 – Before excavation (FOXM_Photo294.jpg).....37
Photo 75: Tier II Disposal Facility - Soil Sample MW-04 – After excavation (FOXM_Photo295.jpg).....38
Photo 76: Tier II Disposal Facility - Soil Sample MW-04 – After backfilling (FOXM_Photo296.jpg).....38
Photo 77: Tier II Disposal Facility - Water Sample MW-04 (FOXM_Photo293.jpg).....39
Photo 78: Tier II Disposal Facility - Soil Sample MW-05 – Before excavation (FOXM_Photo290.jpg).....39
Photo 79: Tier II Disposal Facility - Soil Sample MW-05 – After excavation (FOXM_Photo291.jpg).....40
Photo 80: Tier II Disposal Facility - Soil Sample MW-05 – After backfilling (FOXM_Photo292.jpg).....40
Photo 81: Tier II Disposal Facility - Water Sample MW-05 (FOXM_Photo289.jpg).....41
Photo 82: East Beach Landfill South - Cover surface, facing south (FOXM_Photo422.jpg).....41
Photo 83: East Beach Landfill South - Cover surface, facing north (FOXM_Photo426.jpg).....42
Photo 84: East Beach Landfill South - Cover surface, facing southwest (FOXM_Photo429.jpg).....42
Photo 85: East Beach Landfill South - Cover surface, facing southwest (FOXM_Photo433.jpg).....43
Photo 86: East Beach Landfill South - Cover surface, facing southwest (FOXM_Photo437.jpg).....43
Photo 87: East Beach Landfill South - Cover surface, facing west (FOXM_Photo439.jpg).....44
Photo 88: East Beach Landfill South - Cover surface showing vehicle ruts, facing south (FOXM_Photo448.jpg).....44
Photo 89: East Beach Landfill South - South crest, facing northeast, Feature H – sparse vegetation (FOXM_Photo438.jpg).....45
Photo 90: East Beach Landfill South - South crest, facing west (FOXM_Photo442.jpg).....45
Photo 91: East Beach Landfill South - Southeast crest, slope and toe, facing southwest (FOXM_Photo428.jpg).....46
Photo 92: East Beach Landfill South - Southeast slope, facing northeast (FOXM_Photo436.jpg).....46
Photo 93: East Beach Landfill South - Southeast slope, west corner, facing east (FOXM_Photo443.jpg).....47
Photo 94: East Beach Landfill South - Southeast slope and crest, east corner, facing south (FOXM_Photo425.jpg).....47
Photo 95: East Beach Landfill South - Northwest slope and toe, facing south (FOXM_Photo424.jpg).....48
Photo 96: East Beach Landfill South - southeast slope, facing southwest (FOXM_Photo430.jpg).....48
Photo 97: East Beach Landfill South - Southeast toe, facing west (FOXM_Photo441.jpg).....49

Photo 98: East Beach Landfill South - North slope, facing south (FOXM_Photo423.jpg) 49
Photo 99: East Beach Landfill South - North slope and toe, facing west (FOXM_Photo421.jpg) 50
Photo 100: East Beach Landfill South - Northwest slope and toe, facing east (FOXM_Photo447.jpg) 50
Photo 101: East Beach Landfill South - Southwest crest, facing northwest (FOXM_Photo445.jpg) 51
Photo 102: East Beach Landfill South - Southwest slope and toe, facing northwest (FOXM_Photo444.jpg) 51
Photo 103: East Beach Landfill South - Northwest crest, facing northeast (FOXM_Photo434.jpg) 52
Photo 104: East Beach Landfill South - Northwest crest, facing southwest (FOXM_Photo435.jpg) 52
Photo 105: East Beach Landfill South - Northwest crest and slope, facing northeast (FOXM_Photo446.jpg) 53
Photo 106: East Beach Landfill South - Northwest crest, slope and toe, facing southwest (FOXM_Photo427.jpg) 53
Photo 107: East Beach Landfill South - North slope, facing west (FOXM_Photo440.jpg) 54
Photo 108: East Beach Landfill South - North slope, facing east (FOXM_Photo449.jpg) 54
Photo 109: East Beach Landfill South – VT-06, facing northwest (FOXM_Photo450.jpg) 55
Photo 110: East Beach Landfill South – VT-07, facing southeast (FOXM_Photo432.jpg) 55
Photo 111: East Beach Landfill South – VT-08, facing west (FOXM_Photo431.jpg) 56
Photo 112: East Beach Landfill South – VT-09, facing west (FOXM_Photo420.jpg) 56
Photo 113: East Beach Landfill South – Southeast slope - Feature C – Vehicle tracks, facing east (FOXM_Photo120.jpg) 57
Photo 114: East Beach Landfill South – North slope – Feature C – Vehicle tracks, facing south (FOXM_Photo118.jpg) 57
Photo 115: East Beach Landfill South – Cover surface – Feature C – Vehicle tracks, facing southwest (FOXM_Photo119.jpg) 58
Photo 116: East Beach Landfill South – Cover surface – Feature C – Vehicle tracks, facing southwest (FOXM_Photo122.jpg) 58
Photo 117: East Beach Landfill South – Southeast slope – Feature C – Vehicle tracks, facing southeast (FOXM_Photo123.jpg) 59
Photo 118: East Beach Landfill South – Southeast slope – Feature C – Vehicle tracks, facing east (FOXM_Photo124.jpg) 59
Photo 119: East Beach Landfill South – Southeast slope – Feature C – Vehicle tracks, facing northwest (FOXM_Photo125.jpg) 60
Photo 120: East Beach Landfill South – Northwest slope – Feature C – Vehicle tracks, facing northwest (FOXM_Photo126.jpg) 60
Photo 121: East Beach Landfill South – Southeast slope – Feature C – Vehicle tracks, facing southwest (FOXM_Photo127.jpg) 61

Photo 122: East Beach Landfill South – Northwest slope – Feature C – Vehicle tracks, facing northwest (FOXM_Photo128.jpg) 61

Photo 123: East Beach Landfill South – Northwest slope – Feature T – Two small sink holes, facing northwest (FOXM_Photo129.jpg) 62

Photo 124: East Beach Landfill South – Cover surface – Feature C – Vehicle tracks, facing southwest (FOXM_Photo130.jpg) 62

Photo 125: East Beach Landfill South – Cover surface – Feature C – Vehicle tracks, facing west (FOXM_Photo132.jpg) 63

Photo 126: East Beach Landfill South – Southeast slope - Feature C – Vehicle tracks, facing north (FOXM_Photo134.jpg) 63

Photo 127: East Beach Landfill South – Southeast slope - Feature C – Vehicle tracks, facing southeast (FOXM_Photo135.jpg) 64

Photo 128: East Beach Landfill South – Southeast slope - Feature L – two small sink holes, facing north (FOXM_Photo136.jpg) 64

Photo 129: East Beach Landfill South – Southeast toe - Feature C – Vehicle tracks, facing west (FOXM_Photo137.jpg) 65

Photo 130: East Beach Landfill South – Southeast slope - Feature C – Vehicle tracks, facing north (FOXM_Photo138.jpg) 65

Photo 131: East Beach Landfill South – Cover surface - Feature C – Vehicle tracks, facing east (FOXM_Photo140.jpg) 66

Photo 132: East Beach Landfill South – Cover surface - Feature C – Vehicle tracks, facing northeast (FOXM_Photo141.jpg) 66

Photo 133: East Beach Landfill South – Northwest crest and slope - Feature M – Two small sink holes, facing north (FOXM_Photo143.jpg) 67

Photo 134: East Beach Landfill South – Cover surface - Feature C – Vehicle tracks, facing south (FOXM_Photo144.jpg) 67

Photo 135: East Beach Landfill South – Northwest slope, facing north (FOXM_Photo131.jpg) 68

Photo 136: East Beach Landfill South – Cover surface - Feature F – Minor settlement, facing north (FOXM_Photo133.jpg) 68

Photo 137: East Beach Landfill South – South toe beyond landfill area, surficial debris, facing west (FOXM_Photo139.jpg) 69

Photo 138: East Beach Landfill South – West crest corner - Feature A – Small depressions, facing northwest (FOXM_Photo142.jpg) 69

Photo 139: East Beach Landfill South – Southeast slope, Feature N – Sparse vegetation, facing southwest (FOXM_Photo121.jpg) 70

Photo 140: East Beach Landfill South - Soil Sample MW-22 – Before excavation (FOXM_Photo241.jpg) 70

Photo 141: East Beach Landfill South - Soil Sample MW-22 – After excavation (FOXM_Photo242.jpg) 71

Photo 142: East Beach Landfill South - Soil Sample MW-22 – After backfilling (FOXM_Photo243.jpg) 71

Photo 143: East Beach Landfill South - Water Sample MW-22 (FOXM_Photo244.jpg) 72
Photo 144: East Beach Landfill South - Soil Sample MW-23 – Before excavation (FOXM_Photo245.jpg) 72
Photo 145: East Beach Landfill South - Soil Sample MW-23 – After excavation (FOXM_Photo247.jpg) 73
Photo 146: East Beach Landfill South - Soil Sample MW-23 – After backfilling (FOXM_Photo248.jpg) 73
Photo 147: East Beach Landfill South - Water Sample MW-23 (FOXM_Photo246.jpg) 74
Photo 148: East Beach Landfill South - Soil Sample MW-24 – Before excavation (FOXM_Photo249.jpg) 74
Photo 149: East Beach Landfill South - Soil Sample MW-24 – After excavation (FOXM_Photo250.jpg) 75
Photo 150: East Beach Landfill South - Soil Sample MW-24 – After backfilling (FOXM_Photo251.jpg) 75
Photo 151: East Beach Landfill South - Water Sample MW-24 (FOXM_Photo252.jpg) 76
Photo 152: East Beach Landfill South - Soil Sample MW-25 – Before excavation (FOXM_Photo254.jpg) 76
Photo 153: East Beach Landfill South - Soil Sample MW-25 – After excavation (FOXM_Photo255.jpg) 77
Photo 154: East Beach Landfill South - Soil Sample MW-25 – After backfilling (FOXM_Photo256.jpg) 77
Photo 155: East Beach Landfill South - Water Sample MW-25 (FOXM_Photo253.jpg) 78
Photo 156: East Beach Landfill South - Soil Sample MW-26 – Before excavation (FOXM_Photo258.jpg) 78
Photo 157: East Beach Landfill South - Soil Sample MW-26 – After excavation (FOXM_Photo259.jpg) 79
Photo 158: East Beach Landfill South - Soil Sample MW-26 – After backfilling (FOXM_Photo260.jpg) 79
Photo 159: East Beach Landfill South - Water Sample MW-26 (FOXM_Photo257.jpg) 80
Photo 160: East Beach Landfill South - Soil Sample MW-27 – Before excavation (FOXM_Photo262.jpg) 80
Photo 161: East Beach Landfill South - Soil Sample MW-27 – After excavation (FOXM_Photo263.jpg) 81
Photo 162: East Beach Landfill South - Soil Sample MW-27 – After backfilling (FOXM_Photo264.jpg) 81
Photo 163: East Beach Landfill South - Water Sample MW-27 (FOXM_Photo261.jpg) 82
Photo 164: East Beach Landfill South - Soil Sample MW-28 – Before excavation (FOXM_Photo265.jpg) 82
Photo 165: East Beach Landfill South - Soil Sample MW-28 – After excavation (FOXM_Photo266.jpg) 83
Photo 166: East Beach Landfill South - Soil Sample MW-28 – After backfilling (FOXM_Photo267.jpg) 83
Photo 167: East Beach Landfill South - Water Sample MW-28 (FOXM_Photo268.jpg) 84
Photo 168: East Beach Landfill South - Soil Sample MW-29 – Before excavation (FOXM_Photo269.jpg) 84
Photo 169: East Beach Landfill South - Soil Sample MW-29 – After excavation (FOXM_Photo270.jpg) 85

Photo 170: East Beach Landfill South - Soil Sample MW-29 – After backfilling (FOXM_Photo271.jpg) 85
Photo 171: East Beach Landfill South - Water Sample MW-29 (FOXM_Photo272.jpg) 86
Photo 172: East Beach Landfill South - Soil Sample MW-30 – Before excavation (FOXM_Photo274.jpg).....86
Photo 173: East Beach Landfill South - Soil Sample MW-30 – After excavation (FOXM_Photo275.jpg).....87
Photo 174: East Beach Landfill South - Soil Sample MW-30 – After backfilling (FOXM_Photo276.jpg) 87
Photo 175: East Beach Landfill South - Water Sample MW-30 (FOXM_Photo273.jpg) 88
Photo 176: East Beach Landfill South - Soil Sample MW-31 – Before excavation (FOXM_Photo300.jpg).....88
Photo 177: East Beach Landfill South - Soil Sample MW-31 – After excavation (FOXM_Photo301.jpg).....89
Photo 178: East Beach Landfill South - Soil Sample MW-31 – After backfilling (FOXM_Photo302.jpg) 89
Photo 179: East Beach Landfill South - Water Sample MW-31 (FOXM_Photo303.jpg) 90
Photo 180: East Beach Landfill North - Cover surface, facing south (FOXM_Photo409.jpg) 90
Photo 181: East Beach Landfill North - Cover surface, vehicle tracks, facing southwest (FOXM_Photo410.jpg).....91
Photo 182: East Beach Landfill North - Cover surface, facing northeast (FOXM_Photo414.jpg) 91
Photo 183: East Beach Landfill North - Cover surface, facing west (FOXM_Photo415.jpg).....92
Photo 184: East Beach Landfill North - Cover surface, facing north (FOXM_Photo419.jpg).....92
Photo 185: East Beach Landfill North - East crest, facing southwest (FOXM_Photo413.jpg) 93
Photo 186: East Beach Landfill North - East crest, facing northeast (FOXM_Photo416.jpg).....93
Photo 187: East Beach Landfill North - East slope and toe, facing southwest (FOXM_Photo412.jpg) 94
Photo 188: East Beach Landfill North - North crest, facing west (FOXM_Photo411.jpg).....94
Photo 189: East Beach Landfill North - North slope and toe – Feature Q – Ponded water, facing east (FOXM_Photo408.jpg).....95
Photo 190: East Beach Landfill North - Northwest crest and slope, facing northeast (Feature Q-Ponded water) (FOXM_Photo407.jpg) 95
Photo 191: East Beach Landfill North - South crest, facing west (FOXM_Photo418.jpg).....96
Photo 192: East Beach Landfill North - South slope and toe, facing west (FOXM_Photo417.jpg) 96
Photo 193: East Beach Landfill North - West crest, facing northeast, VT-11 in distance (FOXM_Photo405.jpg).....97
Photo 194: East Beach Landfill North - West crest, facing southwest, VT-11 in distance (Feature Q – Ponded water) (FOXM_Photo406.jpg) 97
Photo 195: East Beach Landfill North - West slope and toe - Feature Q - Ponded water, facing northeast (FOXM_Photo404.jpg) 98

Photo 196: East Beach Landfill North – VT-10, facing northeast (FOXM_Photo402.jpg) 98

Photo 197: East Beach Landfill North – VT-11, facing northeast (FOXM_Photo403.jpg) 99

Photo 198: East Beach Landfill North – West crest - Feature D – Vehicle tracks, facing north (FOXM_Photo100.jpg) 99

Photo 199: East Beach Landfill North – Cover surface - Feature D – Vehicle tracks, facing southeast (FOXM_Photo104.jpg) 100

Photo 200: East Beach Landfill North – North slope - Feature D – Vehicle tracks, facing northeast (FOXM_Photo105.jpg) 100

Photo 201: East Beach Landfill North – East slope - Feature D – Vehicle tracks, facing west (FOXM_Photo111.jpg) 101

Photo 202: East Beach Landfill North - Feature D – Vehicle tracks, facing south (FOXM_Photo114.jpg) 101

Photo 203: East Beach Landfill North – East slope - Feature D – Vehicle tracks, facing west, VT-10 on top of slope (FOXM_Photo115.jpg) 102

Photo 204: East Beach Landfill North – South slope - Feature D – Vehicle tracks, facing north, VT-10 at top of slope (FOXM_Photo116.jpg) 102

Photo 205: East Beach Landfill North – South crest - Feature D – Vehicle tracks, facing southeast (FOXM_Photo117.jpg) 103

Photo 206: East Beach Landfill North - Feature D – Vehicle tracks and ponded water (Feature Q), facing west (FOXM_Photo99.jpg) 103

Photo 207: East Beach Landfill North – North toe, facing east, metal surficial debris (FOXM_Photo106.jpg) 104

Photo 208: East Beach Landfill North – Cover surface - Feature K1 – Multiple small shallow depressions, facing south (FOXM_Photo108.jpg) 104

Photo 209: East Beach Landfill North - Feature K2 – Multiple small shallow depressions, facing south (FOXM_Photo109.jpg) 105

Photo 210: East Beach Landfill North –East toe, facing west, MW-20 on right side of photo (FOXM_Photo112.jpg) 105

Photo 211: East Beach Landfill North – Cover surface - Feature G – Small shallow depressions, facing north, VT-11 at top of photo (FOXM_Photo102.jpg) 106

Photo 212: East Beach Landfill North – West crest - Feature O – Minor settlement, facing north, VT-11 on crest of landfill (FOXM_Photo101.jpg) 106

Photo 213: East Beach Landfill North – West crest - Feature P – Linear shallow depression, facing northwest (FOXM_Photo103.jpg) 107

Photo 214: East Beach Landfill North – North toe - Feature Q – Ponded water along toe, facing east (FOXM_Photo107.jpg) 107

Photo 215: East Beach Landfill North – North slope - Feature R – Sparse vegetation, facing north (FOXM_Photo110.jpg) 108

Photo 216: East Beach Landfill North – East slope - Feature S – Sparse vegetation, facing northeast (FOXM_Photo113.jpg) 108

Photo 217: East Beach Landfill North - Soil Sample MW-20 – Before excavation (FOXM_Photo238.jpg) 109

Photo 218: East Beach Landfill North - Soil Sample MW-20 – After excavation (FOXM_Photo239.jpg) 109

Photo 219: East Beach Landfill North - Soil Sample MW-20 – After backfilling (FOXM_Photo240.jpg) 110

Photo 220: East Beach Landfill North - Water Sample MW-20 (FOXM_Photo237.jpg) 110

Photo 221: East Beach Landfill North - Soil Sample MW-21 – Before excavation (FOXM_Photo234.jpg) 111

Photo 222: East Beach Landfill North - Soil Sample MW-21 – After excavation (FOXM_Photo235.jpg) 111

Photo 223: East Beach Landfill North - Soil Sample MW-21 – After backfilling (FOXM_Photo236.jpg) 112

Photo 224: East Beach Landfill North - Water Sample MW-21 (FOXM_Photo233.jpg) 112

Photo 225: Non-Hazardous Waste Landfill - Cover surface, facing north, vehicle tracks (FOXM_Photo457.jpg) 113

Photo 226: Non-Hazardous Waste Landfill - Cover surface, facing east, vehicle tracks (FOXM_Photo462.jpg) 113

Photo 227: Non-Hazardous Waste Landfill - Cover surface, facing south (FOXM_Photo464.jpg) 114

Photo 228: Non-Hazardous Waste Landfill - Cover surface, facing west, vehicle tracks (FOXM_Photo468.jpg) 114

Photo 229: Non-Hazardous Waste Landfill - Cover surface, facing west (FOXM_Photo470.jpg) 115

Photo 230: Non-Hazardous Waste Landfill - East crest, facing south (FOXM_Photo466.jpg) 115

Photo 231: Non-Hazardous Waste Landfill - East toe, facing south (FOXM_Photo467.jpg) 116

Photo 232: Non-Hazardous Waste Landfill - North crest, facing east (FOXM_Photo463.jpg) 116

Photo 233: Non-Hazardous Waste Landfill - North toe – Feature E – Ponded water (in distance on right), facing west (FOXM_Photo465.jpg) 117

Photo 234: Non-Hazardous Waste Landfill - South crest – Feature A – Vehicle tracks, facing east (FOXM_Photo458.jpg) 117

Photo 235: Non-Hazardous Waste Landfill - South crest and slope, facing west (FOXM_Photo469.jpg) 118

Photo 236: Non-Hazardous Waste Landfill - South toe, facing east. Two above ground storage tanks at bottom of slope (FOXM_Photo459.jpg) 118

Photo 237: Non-Hazardous Waste Landfill - West crest, facing north (FOXM_Photo460.jpg) 119

Photo 238: Non-Hazardous Waste Landfill - West slope and toe, facing north (FOXM_Photo461.jpg) 119

Photo 239: Non-Hazardous Waste Landfill – VT-HB4, facing north (FOXM_Photo471.jpg) 120

Photo 240: Non-Hazardous Waste Landfill – South crest edge - Feature A – Vehicle tracks, facing north (FOXM_Photo147.jpg) 120

Photo 241: Non-Hazardous Waste Landfill – South crest, facing southwest (FOXM_Photo148.jpg) 121

Photo 242: Non-Hazardous Waste Landfill – Cover surface - Feature A – Vehicle tracks, facing northeast (FOXM_Photo151.jpg) 121

Photo 243: Non-Hazardous Waste Landfill – West slope - Feature A – Vehicle tracks, facing east (FOXM_Photo152.jpg) 122

Photo 244: Non-Hazardous Waste Landfill – West slope - Feature A – Vehicle tracks, facing north (FOXM_Photo153.jpg) 122

Photo 245: Non-Hazardous Waste Landfill – West slope - Feature A – Vehicle tracks down west slope, facing west (FOXM_Photo154.jpg) 123

Photo 246: Non-Hazardous Waste Landfill – North slope and crest - Feature A – Vehicle tracks, facing east (FOXM_Photo155.jpg) 123

Photo 247: Non-Hazardous Waste Landfill – Cover surface - Feature A – Vehicle tracks, facing northeast (FOXM_Photo156.jpg) 124

Photo 248: Non-Hazardous Waste Landfill – Cover surface - Feature A – Vehicle tracks – facing northeast (FOXM_Photo157.jpg) 124

Photo 249: Non-Hazardous Waste Landfill – North slope - Feature A – Vehicle tracks, facing east (FOXM_Photo158.jpg) 125

Photo 250: Non-Hazardous Waste Landfill – North slope - Feature A – Vehicle tracks, facing northeast (FOXM_Photo159.jpg) 125

Photo 251: Non-Hazardous Waste Landfill – North slope - Feature A – Vehicle tracks, facing south (FOXM_Photo160.jpg) 126

Photo 252: Non-Hazardous Waste Landfill – North slope - Feature K - Two small settlement depressions, facing north (FOXM_Photo161.jpg) 126

Photo 253: Non-Hazardous Waste Landfill – North slope - Feature A – Vehicle tracks, facing north (FOXM_Photo162.jpg) 127

Photo 254: Non-Hazardous Waste Landfill – Northeast corner - Feature A – Vehicle tracks, facing northeast (FOXM_Photo163.jpg) 127

Photo 255: Non-Hazardous Waste Landfill – East slope - Feature G – Two small settlement depressions, facing east (FOXM_Photo166.jpg) 128

Photo 256: Non-Hazardous Waste Landfill – South crest - Feature A – Vehicle tracks and Feature H – Sparse vegetation, facing west (FOXM_Photo167.jpg) 128

Photo 257: Non-Hazardous Waste Landfill – South slope - Feature I – Two small settlement depressions, facing south (FOXM_Photo168.jpg) 129

Photo 258: Non-Hazardous Waste Landfill – East slope - Feature B – Slightly darker aggregate previously reported as staining, facing south (FOXM_Photo164.jpg) 129

Photo 259: Non-Hazardous Waste Landfill – East slope - Feature D – Sparse vegetation, facing north, MW-12 on right at bottom of slope (FOXM_Photo165.jpg) 130

Photo 260: Non-Hazardous Waste Landfill – South slope - Feature C – Small depression, facing west (FOXM_Photo150.jpg) 130

Photo 261: Non-Hazardous Waste Landfill – South toe - Feature F – Sparse vegetation, facing east (FOXM_Photo169.jpg) 131

Photo 262: Non-Hazardous Waste Landfill – South crest edge and slope - Feature J – Metal wire sticking up from cover, facing south (FOXM_Photo149.jpg) 131

Photo 263: Non-Hazardous Waste Landfill - Soil Sample MW-12 – Before excavation (FOXM_Photo304.jpg) 132

Photo 264: Non-Hazardous Waste Landfill - Soil Sample MW-12 – After excavation (FOXM_Photo305.jpg) 132

Photo 265: Non-Hazardous Waste Landfill - Soil Sample MW-12 – After backfilling (FOXM_Photo306.jpg) 133

Photo 266: Non-Hazardous Waste Landfill - Water Sample MW-12 (FOXM_Photo307.jpg) 133

Photo 267: Non-Hazardous Waste Landfill - Soil Sample MW-13 – Before excavation (FOXM_Photo323.jpg) 134

Photo 268: Non-Hazardous Waste Landfill - Soil Sample MW-13 – After excavation (FOXM_Photo324.jpg) 134

Photo 269: Non-Hazardous Waste Landfill - Soil Sample MW-13 – After backfilling (FOXM_Photo325.jpg) 135

Photo 270: Non-Hazardous Waste Landfill - Water Sample MW-13 (FOXM_Photo326.jpg) 135

Photo 271: Non-Hazardous Waste Landfill - Soil Sample MW-14 – Before excavation (FOXM_Photo309.jpg) 136

Photo 272: Non-Hazardous Waste Landfill - Soil Sample MW-14 – After excavation (FOXM_Photo310.jpg) 136

Photo 273: Non-Hazardous Waste Landfill - Soil Sample MW-14 – After backfilling (FOXM_Photo311.jpg) 137

Photo 274: Non-Hazardous Waste Landfill - Water Sample MW-14 (FOXM_Photo308.jpg) 137

Photo 275: Non-Hazardous Waste Landfill - Soil Sample MW-15 – Before excavation (FOXM_Photo320.jpg) 138

Photo 276: Non-Hazardous Waste Landfill - Soil Sample MW-15 – After excavation (FOXM_Photo321.jpg) 138

Photo 277: Non-Hazardous Waste Landfill - Soil Sample MW-15 – After backfilling (FOXM_Photo322.jpg) 139

Photo 278: Non-Hazardous Waste Landfill - Water Sample MW-15 (FOXM_Photo319.jpg) 139

Photo 279: Non-Hazardous Waste Landfill - Soil Sample MW-16 – Before excavation (FOXM_Photo313.jpg) 140

Photo 280: Non-Hazardous Waste Landfill - Soil Sample MW-16 – After excavation (FOXM_Photo314.jpg) 140
Photo 281: Non-Hazardous Waste Landfill - Soil Sample MW-16 – After backfilling (FOXM_Photo315.jpg) 141
Photo 282: Non-Hazardous Waste Landfill - Water Sample MW-16 (FOXM_Photo312.jpg) 141
Photo 283: G-217 West Landfill - Cover surface, facing west (FOXM_Photo380.jpg) 142
Photo 284: G-217 West Landfill - Cover surface, facing north (FOXM_Photo381.jpg) 142
Photo 285: G-217 West Landfill - Cover surface, facing south (FOXM_Photo385.jpg) 143
Photo 286: G-217 West Landfill - Cover surface, facing south (FOXM_Photo389.jpg) 143
Photo 287: G-217 West Landfill - East slope and toe, facing south (FOXM_Photo378.jpg) 144
Photo 288: G-217 West Landfill - Internal slope (on the landfill), facing northwest (FOXM_Photo386.jpg) 144
Photo 289: G-217 West Landfill - North crest, facing west (FOXM_Photo379.jpg) 145
Photo 290: G-217 West Landfill - North crest, facing east, Billboards at top of photo (FOXM_Photo388.jpg) 145
Photo 291: G-217 West Landfill - South slope, facing east (FOXM_Photo382.jpg) 146
Photo 292: G-217 West Landfill - Southwest slope, facing southeast (FOXM_Photo383.jpg) 146
Photo 293: G-217 West Landfill - West slope, facing south (FOXM_Photo387.jpg) 147
Photo 294: G-217 West Landfill - West toe, slope and creat, facing north (FOXM_Photo384.jpg) 147
Photo 295: G-217 West Landfill – Northeast corner - Feature A – Vehicle ruts, facing southwest (FOXM_Photo70.jpg) 148
Photo 296: G-217 West Landfill – Cover surface - Feature A – Vehicle ruts, facing southwest (FOXM_Photo71.jpg) 148
Photo 297: G-217 West Landfill – East slope - Feature A – Vehicle ruts, facing southwest (FOXM_Photo72.jpg) 149
Photo 298: G-217 West Landfill – East slope - Feature A – Vehicle ruts, facing west (FOXM_Photo73.jpg) 149
Photo 299: G-217 West Landfill – South slope - Feature A – Vehicle ruts, facing north (FOXM_Photo74.jpg) 150
Photo 300: G-217 West Landfill – Cover surface, Feature A – Vehicle ruts, facing southwest (FOXM_Photo79.jpg) 150
Photo 301: G-217 West Landfill – cover surface - Feature A – Vehicle ruts, facing south (FOXM_Photo81.jpg) 151
Photo 302: G-217 West Landfill – cover surface - Feature A – Vehicle ruts, facing north (FOXM_Photo83.jpg) 151

Photo 303: G-217 West Landfill – Northwest crest - Feature A – Vehicle ruts, facing northwest (FOXM_Photo86.jpg) 152
Photo 304: G-217 West Landfill – Northwest slope - Feature F – Vegetation, facing northeast (FOXM_Photo84.jpg) 152
Photo 305: G-217 West Landfill - Northwest slope - Feature F – Vegetation, facing northeast (FOXM_Photo85.jpg) 153
Photo 306: G-217 West Landfill – South slope - Feature E –linear depression, facing east (FOXM_Photo76.jpg) 153
Photo 307: G-217 West Landfill – Southwest toe - Feature D – Ponded water, facing southwest (FOXM_Photo77.jpg) 154
Photo 308: G-217 West Landfill – West toe - Feature D – Ponded water, facing north (FOXM_Photo78.jpg) 154
Photo 309: G-217 West Landfill – West slope – Previously observed tension crack (Feature C) not observed in 2017, facing south (FOXM_Photo80.jpg) 155
Photo 310: G-217 West Landfill – Cover surface - Feature B – Linear depression, facing west (FOXM_Photo82.jpg) 155
Photo 311: G-217 West Landfill – South slope - Feature G – Vegetation, facing east (FOXM_Photo75.jpg) 156
Photo 312: G-217 West Landfill - Soil Sample FM-5 – Before excavation (FOXM_Photo215.jpg) 156
Photo 313: G-217 West Landfill - Soil Sample FM-5 – After excavation (FOXM_Photo216.jpg) 157
Photo 314: G-217 West Landfill - Soil Sample FM-5 – After backfilling (FOXM_Photo217.jpg) 157
Photo 315: G-217 West Landfill - Soil Sample FM-6 – Before excavation (FOXM_Photo218.jpg) 158
Photo 316: G-217 West Landfill - Soil Sample FM-6 – After excavation (FOXM_Photo219.jpg) 158
Photo 317: G-217 West Landfill - Soil Sample FM-6 – After backfilling (FOXM_Photo220.jpg) 159
Photo 318: G-217 West Landfill - Soil Sample FM-7 – Before excavation (FOXM_Photo209.jpg) 159
Photo 319: G-217 West Landfill - Soil Sample FM-7 – After excavation (FOXM_Photo210.jpg) 160
Photo 320: G-217 West Landfill - Soil Sample FM-7 – After backfilling (FOXM_Photo211.jpg) 160
Photo 321: G-217 West Landfill - Soil Sample FM-8 – Before excavation (FOXM_Photo212.jpg) 161
Photo 322: G-217 West Landfill - Soil Sample FM-8 – After excavation (FOXM_Photo213.jpg) 161
Photo 323: G-217 West Landfill - Soil Sample FM-8 – After backfilling (FOXM_Photo214.jpg) 162
Photo 324: Billboards Landfill - Cover surface, facing south (FOXM_Photo369.jpg) 162
Photo 325: Billboards Landfill - Cover surface, facing west (FOXM_Photo371.jpg) 163
Photo 326: Billboards Landfill - Cover surface, facing north (FOXM_Photo373.jpg) 163
Photo 327: Billboards Landfill - Cover surface, facing east (FOXM_Photo376.jpg) 164
Photo 328: Billboards Landfill - East slope and crest, facing south (FOXM_Photo370.jpg) 164

Photo 329: Billboards Landfill - View of entire landfill from point west of landfill, facing east (FOXM_Photo377.jpg) 165
Photo 330: Billboards Landfill - South crest and slope, facing west (FOXM_Photo372.jpg) 165
Photo 331: Billboards Landfill – South crest and toe, facing east (FOXM_Photo374.jpg) 166
Photo 332: Billboards Landfill - West crest, facing south (FOXM_Photo368.jpg) 166
Photo 333: Billboards Landfill - West crest and slope, facing southeast (FOXM_Photo375.jpg) 167
Photo 334: Billboards Landfill – Cover surface - Feature C – Vehicle tracks, facing east (FOXM_Photo69.jpg) 167
Photo 335: Billboards Landfill – North toe, Feature B-1 – Ponded water, facing northeast (FOXM_Photo66.jpg) 168
Photo 336: Billboards Landfill – North toe - Feature B-2 – Ponded water, facing northwest (FOXM_Photo67.jpg) 168
Photo 337: Billboards Landfill - Feature B-3 – South toe - Ponded water, facing west (FOXM_Photo68.jpg) 169
Photo 338: Billboards Landfill – West toe - Feature B-4 – Ponded water, facing north (FOXM_Photo65.jpg) 169
Photo 339: Billboards Landfill - Soil Sample FM-1 – Before excavation (FOXM_Photo203.jpg) 170
Photo 340: Billboards Landfill - Soil Sample FM-1 – After excavation (FOXM_Photo204.jpg) 170
Photo 341: Billboards Landfill - Soil Sample FM-1 – After backfilling (FOXM_Photo205.jpg) 171
Photo 342: Billboards Landfill - Soil Sample FM-2 – Before excavation (FOXM_Photo206.jpg) 171
Photo 343: Billboards Landfill - Soil Sample FM-2 – After excavation (FOXM_Photo207.jpg) 172
Photo 344: Billboards Landfill - Soil Sample FM-2 – After backfilling (FOXM_Photo208.jpg) 172
Photo 345: Billboards Landfill - Soil Sample FM-3 – Before excavation (FOXM_Photo197.jpg) 173
Photo 346: Billboards Landfill - Soil Sample FM-3 – After excavation (FOXM_Photo198.jpg) 173
Photo 347: Billboards Landfill - Soil Sample FM-3 – After backfilling (FOXM_Photo199.jpg) 174
Photo 348: Billboards Landfill - Soil Sample FM-4 – Before excavation (FOXM_Photo200.jpg) 174
Photo 349: Billboards Landfill - Soil Sample FM-4 – After excavation (FOXM_Photo201.jpg) 175
Photo 350: Billboards Landfill - Soil Sample FM-4 – After backfilling (FOXM_Photo202.jpg) 175
Photo 351: Hazmat Storage East Landfill - Cover surface, facing southwest (FOXM_Photo392.jpg) 176
Photo 352: Hazmat Storage East Landfill - Cover surface, facing east (FOXM_Photo396.jpg) 176
Photo 353: Hazmat Storage East Landfill - Cover surface, facing south, Feature B vehicle tracks (FOXM_Photo399.jpg) 177
Photo 354: Hazmat Storage East Landfill - Cover surface, facing south (FOXM_Photo400.jpg) 177
Photo 355: Hazmat Storage East Landfill - East slope, facing south (FOXM_Photo391.jpg) 178

Photo 356: Hazmat Storage East Landfill - East toe, facing south, Feature F Ponded Water, on the top left (FOXM_Photo393.jpg) 178

Photo 357: Hazmat Storage East Landfill - North slope, facing southwest (FOXM_Photo390.jpg) 179

Photo 358: Hazmat Storage East Landfill - North toe, facing south, with Feature E ponded water at toe of slope (FOXM_Photo401.jpg) 179

Photo 359: Hazmat Storage East Landfill - Northwest crest, facing north, with Feature E ponded water, on left (FOXM_Photo397.jpg) 180

Photo 360: Hazmat Storage East Landfill - South crest, facing west, Feature G ponded water on left (FOXM_Photo394.jpg) 180

Photo 361: Hazmat Storage East Landfill - West crest, facing north (FOXM_Photo395.jpg) 181

Photo 362: Hazmat Storage East Landfill - West crest, facing south (FOXM_Photo398.jpg) 181

Photo 363: Hazmat Storage East Landfill – East crest - Feature B – Tire tracks, facing south (FOXM_Photo90.jpg) 182

Photo 364: Hazmat Storage East Landfill – East crest - Feature B – Tire tracks, facing north (FOXM_Photo91.jpg) 182

Photo 365: Hazmat Storage East Landfill – Cover surface - Feature B – Tire tracks, facing northwest (FOXM_Photo93.jpg) 183

Photo 366: Hazmat Storage East Landfill – Cover surface - Feature B – Tire tracks, facing north (FOXM_Photo95.jpg) 183

Photo 367: Hazmat Storage East Landfill – North toe, surficial debris (not uncovered waste), facing southeast (FOXM_Photo87.jpg) 184

Photo 368: Hazmat Storage East Landfill – East toe, facing northwest (FOXM_Photo88.jpg) 184

Photo 369: Hazmat Storage East Landfill – West toe - Feature E – Ponded water, facing north (FOXM_Photo97.jpg) 185

Photo 370: Hazmat Storage East Landfill – East toe - Feature F – Ponded water, facing north (FOXM_Photo92.jpg) 185

Photo 371: Hazmat Storage East Landfill – South toe - Feature G – Ponded water, facing east (FOXM_Photo94.jpg) 186

Photo 372: Hazmat Storage East Landfill – South toe - Feature I – Ponded water, facing south (FOXM_Photo96.jpg) 186

Photo 373: Hazmat Storage East Landfill - Feature J –Sparse vegetation on east side of cover and east slope, facing south (FOXM_Photo89.jpg) 187

Photo 374: Hazmat Storage East Landfill - Feature J – Sparse vegetation on cover, facing northeast (FOXM_Photo98.jpg) 187

Photo 375: Hazmat Storage East Landfill - Soil Sample FM-9 – Before excavation (FOXM_Photo221.jpg) 188

Photo 376: Hazmat Storage East Landfill - Soil Sample FM-9 – After excavation (FOXM_Photo222.jpg) 188

Photo 377: Hazmat Storage East Landfill - Soil Sample FM-9 – After backfilling (FOXM_Photo223.jpg) 189
Photo 378: Hazmat Storage East Landfill - Soil Sample FM-10 – Before excavation (FOXM_Photo230.jpg) 189
Photo 379: Hazmat Storage East Landfill - Soil Sample FM-10 – After excavation (FOXM_Photo231.jpg) 190
Photo 380: Hazmat Storage East Landfill - Soil Sample FM-10 – After backfilling (FOXM_Photo232.jpg) 190
Photo 381: Hazmat Storage East Landfill - Soil Sample FM-11 – Before excavation (FOXM_Photo227.jpg) 191
Photo 382: Hazmat Storage East Landfill - Soil Sample FM-11 – After excavation (FOXM_Photo228.jpg) 191
Photo 383: Hazmat Storage East Landfill - Soil Sample FM-11 – After backfilling (FOXM_Photo229.jpg) 192
Photo 384: Hazmat Storage East Landfill - Soil Sample FM-12 – Before excavation (FOXM_Photo224.jpg) 192
Photo 385: Hazmat Storage East Landfill - Soil Sample FM-12 – After excavation (FOXM_Photo225.jpg) 193
Photo 386: Hazmat Storage East Landfill - Soil Sample FM-12 – After backfilling (FOXM_Photo226.jpg) 193
Photo 387: Communications Northwest Landfill - Cover surface, facing north (FOXM_Photo327.jpg) 194
Photo 388: Communications Northwest Landfill - Cover surface, facing south (FOXM_Photo330.jpg) 194
Photo 389: Communications Northwest Landfill - Cover surface, facing west (FOXM_Photo333.jpg) 195
Photo 390: Communications Northwest Landfill - East crest, facing southwest (FOXM_Photo331.jpg) 195
Photo 391: Communications Northwest Landfill - East toe, facing southwest (FOXM_Photo332.jpg) 196
Photo 392: Communications Northwest Landfill - North crest, facing southeast (FOXM_Photo329.jpg) 196
Photo 393: Communications Northwest Landfill - South toe, facing west (FOXM_Photo334.jpg) 197
Photo 394: Communications Northwest Landfill - West slope, facing north. Road on left. (FOXM_Photo328.jpg) 197
Photo 395: Communications Northwest Landfill – Cover surface - Feature A – Vehicle tracks/ruts, facing north (FOXM_Photo1.jpg) 198
Photo 396: Communications Northwest Landfill – North slope - Feature A – Vehicle tracks/ruts, facing south (FOXM_Photo11.jpg) 198
Photo 397: Communications Northwest Landfill – north crest and slope - Feature A – Vehicle tracks/ruts, facing west (FOXM_Photo12.jpg) 199
Photo 398: Communications Northwest Landfill – North slope and crest - Feature A – Vehicle tracks/ruts, facing northwest (FOXM_Photo13.jpg) 199

Photo 399: Communications Northwest Landfill – East slope and crest - Feature A – Vehicle tracks/ruts, facing northwest (FOXM_Photo14.jpg) 200

Photo 400: Communications Northwest Landfill – East slope - Feature A – Vehicle tracks/ruts, facing northeast (FOXM_Photo15.jpg) 200

Photo 401: Communications Northwest Landfill – East slope - Feature A – Vehicle tracks/ruts, facing southwest (FOXM_Photo16.jpg) 201

Photo 402: Communications Northwest Landfill – East slope - Feature A – Vehicle tracks/ruts, facing north (FOXM_Photo17.jpg) 201

Photo 403: Communications Northwest Landfill – East slope - Feature A – Vehicle tracks/ruts, facing north (FOXM_Photo18.jpg) 202

Photo 404: Communications Northwest Landfill – East slope - Feature A – Vehicle tracks/ruts, facing south direction off landfill (FOXM_Photo19.jpg)....202

Photo 405: Communications Northwest Landfill – South slope - Feature A – Vehicle tracks/ruts, facing north (FOXM_Photo2.jpg)....203

Photo 406: Communications Northwest Landfill – South slope - Feature A – Vehicle tracks/ruts, facing northeast (FOXM_Photo4.jpg)....203

Photo 407: Communications Northwest Landfill – West crest - Feature A – Vehicle tracks/ruts, facing north (FOXM_Photo5.jpg) 204

Photo 408: Communications Northwest Landfill – West crest - Feature A – Vehicle tracks/ruts, facing south (FOXM_Photo6.jpg)....204

Photo 409: Communications Northwest Landfill – Cover surface - Feature A – Vehicle tracks/ruts, facing north (FOXM_Photo8.jpg)....205

Photo 410: Communications Northwest Landfill – Cover surface - Feature A – Vehicle tracks/ruts, facing west (FOXM_Photo9.jpg) 205

Photo 411: Communications Northwest Landfill – North slope - Feature B – Sparse vegetation, facing northwest (FOXM_Photo10.jpg)....206

Photo 412: Communications Northwest Landfill – South slope - Feature C – Small depression, facing east (FOXM_Photo3.jpg)....206

Photo 413: Communications Northwest Landfill – Cover surface, north end - Feature A – Vehicle tracks/ruts, facing west (FOXM_Photo7.jpg)....207

Photo 414: Communications Northwest Landfill - Soil Sample FM-13 – Before excavation (FOXM_Photo176.jpg)....207

Photo 415: Communications Northwest Landfill - Soil Sample FM-13 – After excavation (FOXM_Photo177.jpg)....208

Photo 416: Communications Northwest Landfill - Soil Sample FM-13 – After backfilling (FOXM_Photo178.jpg)....208

Photo 417: Communications Northwest Landfill - Soil Sample FM-14 – Before excavation (FOXM_Photo173.jpg)....209

Photo 418: Communications Northwest Landfill - Soil Sample FM-14 – After excavation (FOXM_Photo174.jpg) 209
Photo 419: Communications Northwest Landfill - Soil Sample FM-14 – After backfilling (FOXM_Photo175.jpg) 210
Photo 420: Communications Northwest Landfill - Soil Sample FM-15 – Before excavation (FOXM_Photo297.jpg) 210
Photo 421: Communications Northwest Landfill - Soil Sample FM-15 – After excavation (FOXM_Photo298.jpg) 211
Photo 422: Communications Northwest Landfill - Soil Sample FM-15 – After backfilling (FOXM_Photo299.jpg) 211
Photo 423: Communications Northwest Landfill - Soil Sample FM-16 – Before excavation (FOXM_Photo170.jpg) 212
Photo 424: Communications Northwest Landfill - Soil Sample FM-16 – After excavation (FOXM_Photo171.jpg) 212
Photo 425: Communications Northwest Landfill - Soil Sample FM-16 – After backfilling (FOXM_Photo172.jpg) 213
Photo 426: Communications North Landfill - Cover surface, facing south (FOXM_Photo335.jpg) 213
Photo 427: Communications North Landfill - Cover surface, facing northeast (FOXM_Photo338.jpg) 214
Photo 428: Communications North Landfill - Cover surface, facing northwest (FOXM_Photo340.jpg) 214
Photo 429: Communications North Landfill - Cover surface, facing southwest (FOXM_Photo342.jpg) 215
Photo 430: Communications North Landfill - Cover surface, facing southwest (FOXM_Photo345.jpg) 215
Photo 431: Communications North Landfill - East crest and slope, facing northeast (FOXM_Photo341.jpg) 216
Photo 432: Communications North Landfill - East crest, slope and toe, facing northeast, from southeast corner (FOXM_Photo337.jpg) 216
Photo 433: Communications North Landfill - East slope and toe, facing southwest (FOXM_Photo346.jpg) 217
Photo 434: Communications North Landfill - South crest, facing northwest (FOXM_Photo336.jpg) 217
Photo 435: Communications North Landfill - West crest from southwest corner, facing northeast (FOXM_Photo339.jpg) 218
Photo 436: Communications North Landfill - West crest, facing southwest (FOXM_Photo344.jpg) 218
Photo 437: Communications North Landfill – West crest and toe, facing southwest (FOXM_Photo343.jpg) 219
Photo 438: Communications North Landfill – Cover surface - Feature C – Vehicle tracks, facing southeast (FOXM_Photo20.jpg) 219
Photo 439: Communications North Landfill – Cover surface - Feature C – Vehicle tracks, facing south (FOXM_Photo21.jpg) 220

Photo 440: Communications North Landfill – East slope - Feature C – Vehicle tracks, facing northwest (FOXM_Photo25.jpg) 220

Photo 441: Communications North Landfill – West slope - Feature C – Vehicle tracks facing southwest (FOXM_Photo27.jpg) 221

Photo 442: Communications North Landfill – North toe, previously observed surface metal debris, facing northwest (FOXM_Photo28.jpg) 221

Photo 443: Communications North Landfill – South toe, previously observed surface metal debris, facing south (FOXM_Photo22.jpg) 222

Photo 444: Communications North Landfill – Southeast corner, Feature D – Previously reported ponded water not present in 2017, vegetation, facing southwest (FOXM_Photo24.jpg) 222

Photo 445: Communications North Landfill – West toe - Feature E – Ponded water, facing northwest (FOXM_Photo32.jpg) 223

Photo 446: Communications North Landfill – East toe - Feature F – Ponded water, facing northeast (FOXM_Photo26.jpg) 223

Photo 447: Communications North Landfill – West toe - Feature G – Ponded water, facing northwest (FOXM_Photo31.jpg) 224

Photo 448: Communications North Landfill – West slope - Feature H – Minor settlement, facing southeast (FOXM_Photo23.jpg) 224

Photo 449: Communications North Landfill – North crest - Feature I – Uneven ground, facing east (FOXM_Photo29.jpg) 225

Photo 450: Communications North Landfill – Cover surface - Feature J – Ponded water area on Thoroughfare, facing southwest (FOXM_Photo30.jpg) 225

Photo 451: Communications North Landfill - Soil Sample FM-17 – Before excavation (FOXM_Photo179.jpg) 226

Photo 452: Communications North Landfill - Soil Sample FM-17 – After excavation (FOXM_Photo180.jpg) 226

Photo 453: Communications North Landfill - Soil Sample FM-17 – After backfilling (FOXM_Photo181.jpg) 227

Photo 454: Communications North Landfill - Soil Sample FM-18 – Before excavation (FOXM_Photo182.jpg) 227

Photo 455: Communications North Landfill - Soil Sample FM-18 – After excavation (FOXM_Photo183.jpg) 228

Photo 456: Communications North Landfill - Soil Sample FM-18 – After backfilling (FOXM_Photo184.jpg) 228

Photo 457: Communications North Landfill - Soil Sample FM-19 – Before excavation (FOXM_Photo185.jpg) 229

Photo 458: Communications North Landfill - Soil Sample FM-19 – After excavation (FOXM_Photo186.jpg) 229

Photo 459: Communications North Landfill - Soil Sample FM-19 – After backfilling (FOXM_Photo187.jpg) 230

Photo 460: Communications North Landfill - Soil Sample FM-20 – Before excavation (FOXM_Photo188.jpg) 230

Photo 461: Communications North Landfill - Soil Sample FM-20 – After excavation (FOXM_Photo189.jpg) 231

Photo 462: Communications North Landfill - Soil Sample FM-20 – After backfilling (FOXM_Photo190.jpg) 231

Photo 463: Communications North Landfill - Soil Sample FM-21 – Before excavation (FOXM_Photo191.jpg) 232

Photo 464: Communications North Landfill - Soil Sample FM-21 – After excavation (FOXM_Photo192.jpg) 232

Photo 465: Communications North Landfill - Soil Sample FM-21 – After backfilling (FOXM_Photo193.jpg) 233

Photo 466: Communications North Landfill - Soil Sample FM-22 – Before excavation (FOXM_Photo194.jpg) 233

Photo 467: Communications North Landfill - Soil Sample FM-22 – After excavation (FOXM_Photo195.jpg) 234

Photo 468: Communications North Landfill - Soil Sample FM-22 – After backfilling (FOXM_Photo196.jpg) 234

Photo 469: FOX-M Aerial Photograph, East Beach Landfill – South (along shoreline), facing north (Photo469_FOX-M aerial photo.jpg) 235

Photo 470: FOX-M Aerial Photograph, East Beach Landfill – South and North (along shoreline), facing northwest (Photo470_FOX-M aerial photo.jpg) 235

Photo 471: FOX-M Aerial Photograph, East Beach Landfill – South and North (foreground), Communications Area Landfills (midground), Station Area Billboards and G217 West Landfills (background), facing west (Photo471_FOX-M aerial photo.jpg) 236

Photo 472: FOX-M Aerial Photograph, Hazmat Storage – East Landfill (foreground), Station Area Billboards and G217 West Landfills (background), facing west (Photo472_FOX-M aerial photo.jpg) 236

Photo 473: FOX-M Aerial Photograph, Hazmat Storage – East Landfill (foreground), Communications Area Landfills (background), facing southwest (Photo473_FOX-M aerial photo.jpg) 237

Photo 474: FOX-M Aerial Photograph, Station Area Non-Hazardous Waste Landfill, facing southwest (Photo474_FOX-M aerial photo.jpg) 237



Photo 1: *Tier II Disposal Facility - Cover surface, showing vehicle tracks, facing south (FOXM_Photo347.jpg)*



Photo 2: *Tier II Disposal Facility - Cover surface, facing north (FOXM_Photo352.jpg)*



Photo 3: *Tier II Disposal Facility - Cover surface, facing southwest (FOXM_Photo353.jpg)*



Photo 4: *Tier II Disposal Facility - Cover surface, showing Bilboards, facing north (FOXM_Photo360.jpg)*



Photo 5: *Tier II Disposal Facility - Cover surface, facing northeast (FOXM_Photo361.jpg)*



Photo 6: *Tier II Disposal Facility - Cover surface, facing southwest (FOXM_Photo365.jpg)*



Photo 7: *Tier II Disposal Facility - East crest, facing south (FOXM_Photo350.jpg)*



Photo 8: *Tier II Disposal Facility - Southeast crest, facing northeast (FOXM_Photo356.jpg)*



Photo 9: *Tier II Disposal Facility - East slope, facing south (FOXM_Photo349.jpg)*



Photo 10: *Tier II Disposal Facility - East slope, facing north (FOXM_Photo351.jpg)*



Photo 11: *Tier II Disposal Facility - Southeast slope, facing southwest (FOXM_Photo355.jpg)*



Photo 12: *Tier II Disposal Facility – Southeast slope and toe, facing northeast (FOXM_Photo358.jpg)*



Photo 13: *Tier II Disposal Facility – Northeast slope, facing northwest (FOXM_Photo354.jpg)*



Photo 14: *Tier II Disposal Facility - North crest, slope and toe, facing west (FOXM_Photo348.jpg)*



Photo 15: *Tier II Disposal Facility - North toe, facing southeast (FOXM_Photo367.jpg)*



Photo 16: *Tier II Disposal Facility - South crest, facing northwest (FOXM_Photo357.jpg)*



Photo 17: *Tier II Disposal Facility - South crest, facing southeast (FOXM_Photo362.jpg)*



Photo 18: *Tier II Disposal Facility - South slope and toe, facing northwest (FOXM_Photo359.jpg)*



Photo 19: Tier II Disposal Facility - Northwest crest, facing southwest (FOXM_Photo366.jpg)



Photo 20: Tier II Disposal Facility - Northwest crest, slope and toe, facing northeast (FOXM_Photo363.jpg)



Photo 21: Tier II Disposal Facility - Northwest slope and toe, facing southwest (FOXM_Photo364.jpg)



Photo 22: Tier II Disposal Facility – VT-HB-1, facing north (FOXM_Photo451.jpg)



Photo 23: *Tier II Disposal Facility – VT-01, facing southwest (FOXM_Photo452.jpg)*



Photo 24: *Tier II Disposal Facility – VT-02, facing north (FOXM_Photo453.jpg)*



Photo 25: *Tier II Disposal Facility – VT-03, facing north (FOXM_Photo454.jpg)*



Photo 26: *Tier II Disposal Facility – VT-04, facing north (FOXM_Photo456.jpg)*



Photo 27: *Tier II Disposal Facility – VT-05, facing north (FOXM_Photo455.jpg)*



Photo 28: *Tier II Disposal Facility – Cover surface - Feature C – Vehicle tracks, facing east (FOXM_Photo145.jpg)*



Photo 29: *Tier II Disposal Facility – Cover surface - Feature C – Vehicle tracks, facing southwest (FOXM_Photo146.jpg)*



Photo 30: *Tier II Disposal Facility – Cover surface - Feature C – Vehicle tracks on north slope, facing west (FOXM_Photo33.jpg)*



Photo 31: Tier II Disposal Facility - Feature C – Vehicle tracks, north slope, facing southeast (FOXM_Photo34.jpg)



Photo 32: Tier II Disposal Facility – Cover surface – Feature C – Vehicle tracks, facing west (FOXM_Photo39.jpg)



Photo 33: *Tier II Disposal Facility – Southeast slope - Feature C – Vehicle tracks, facing north (FOXM_Photo43.jpg)*

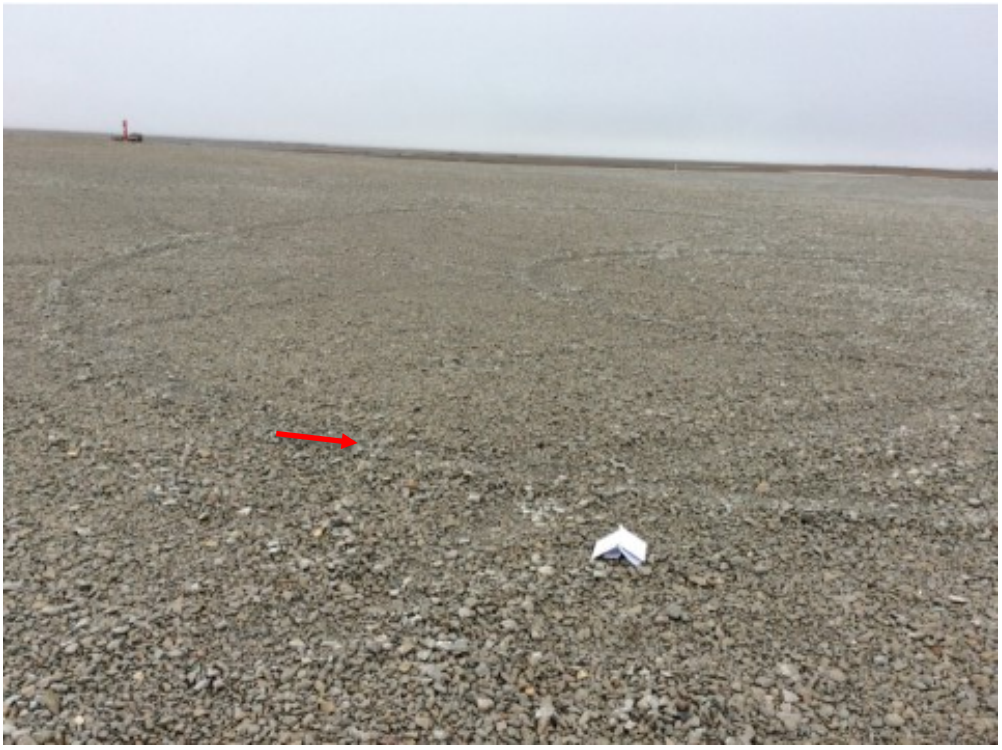


Photo 34: *Tier II Disposal Facility – Cover surface - Feature C – Vehicle tracks, facing northwest (FOXM_Photo44.jpg)*



Photo 35: *Tier II Disposal Facility – Cover surface - Feature C – Vehicle tracks, facing west (FOXM_Photo45.jpg)*



Photo 36: *Tier II Disposal Facility – Southeast slope - Feature C – Vehicle tracks, facing southwest (FOXM_Photo46.jpg)*



Photo 37: *Tier II Disposal Facility – Cover surface - Feature C – Vehicle tracks, facing north (FOXM_Photo47.jpg)*



Photo 38: *Tier II Disposal Facility – Southeast slope - Feature C – Vehicle tracks, facing northeast (FOXM_Photo48.jpg)*



Photo 39: *Tier II Disposal Facility – South slope - Feature C – Vehicle tracks, facing north (FOXM_Photo50.jpg)*



Photo 40: *Tier II Disposal Facility – South slope - Feature C – Vehicle tracks, facing northwest (FOXM_Photo51.jpg)*



Photo 41: Tier II Disposal Facility – Cover surface - Feature C – Vehicle tracks, facing north (FOXM_Photo52.jpg)



Photo 42: Tier II Disposal Facility – Cover surface - Feature C – Vehicle tracks, facing north (FOXM_Photo53.jpg)

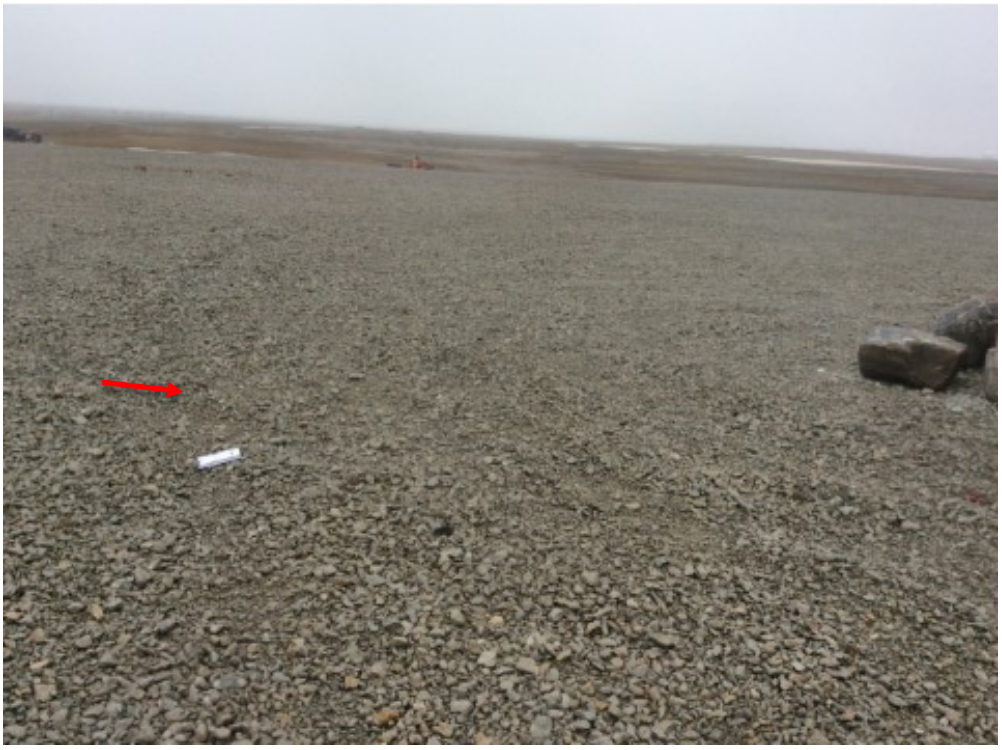


Photo 43: Tier II Disposal Facility – Cover surface - Feature C – Vehicle tracks, facing west (FOXM_Photo54.jpg)



Photo 44: Tier II Disposal Facility – Cover surface - Feature C – Vehicle tracks, facing southwest (FOXM_Photo55.jpg)



Photo 45: *Tier II Disposal Facility – Northwest crest and slope - Feature C – Vehicle tracks, facing northwest (FOXM_Photo56.jpg)*



Photo 46: *Tier II Disposal Facility – Northwest slope - Feature C – Vehicle tracks, facing northwest (FOXM_Photo57.jpg)*

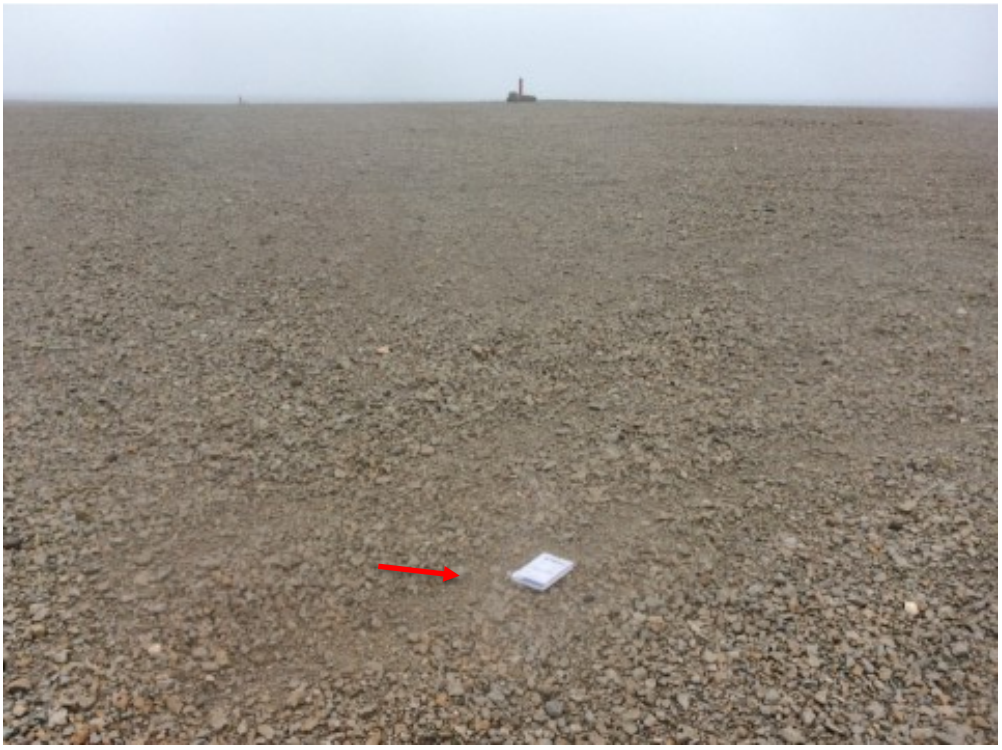


Photo 47: Tier II Disposal Facility – Cover surface - Feature C – Vehicle tracks, facing southeast (FOXM_Photo58.jpg)



Photo 48: Tier II Disposal Facility – Northwest slope - Feature C – Vehicle tracks, facing west (FOXM_Photo59.jpg)



Photo 49: *Tier II Disposal Facility – Cover surface - Feature C – Vehicle tracks, facing northeast (FOXM_Photo60.jpg)*



Photo 50: *Tier II Disposal Facility – Cover surface - Feature C – Vehicle tracks, facing east (FOXM_Photo61.jpg)*



Photo 51: Tier II Disposal Facility – Northwest slope - Feature C – Vehicle tracks, facing south (FOXM_Photo63.jpg)



Photo 52: Tier II Disposal Facility – Northwest slope, facing south (FOXM_Photo64.jpg)



Photo 53: *Tier II Disposal Facility – East toe - Feature H-3 – Ponded water, facing south (FOXM_Photo35.jpg)*



Photo 54: *Tier II Disposal Facility – East toe - Feature H-3 – Ponded water, facing south (FOXM_Photo37.jpg)*



Photo 55: Tier II Disposal Facility – Southwest toe, Feature H-1 – Ponded water, facing northwest (FOXM_Photo49.jpg)



Photo 56: Tier II Disposal Facility – South crest - Feature A – Small depression, facing southwest (FOXM_Photo40.jpg)



Photo 57: *Tier II Disposal Facility – Cover surface - Feature E – Erosion channel, facing northwest (FOXM_Photo41.jpg)*



Photo 58: *Tier II Disposal Facility – Cover surface - Feature C – Tire tracks, facing north (FOXM_Photo36.jpg)*

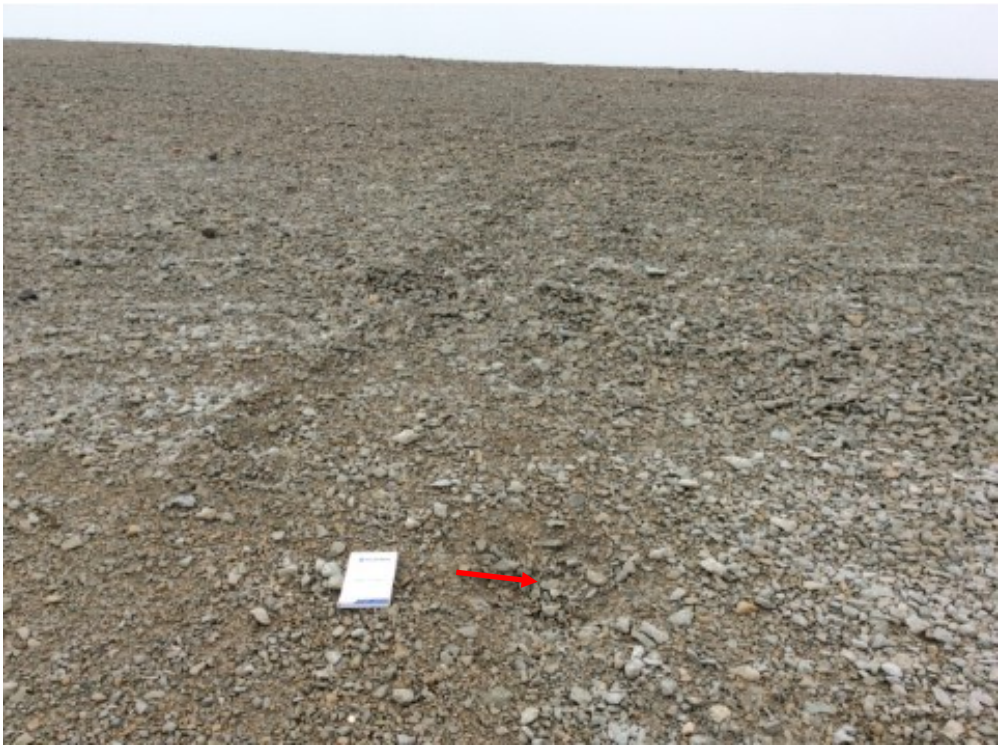


Photo 59: *Tier II Disposal Facility – East slope - Feature J – Minor settlement, facing west (FOXM_Photo38.jpg)*



Photo 60: *Tier II Disposal Facility – Southeast toe - Feature H-2 – Ponded water along toe, facing southwest (FOXM_Photo42.jpg)*

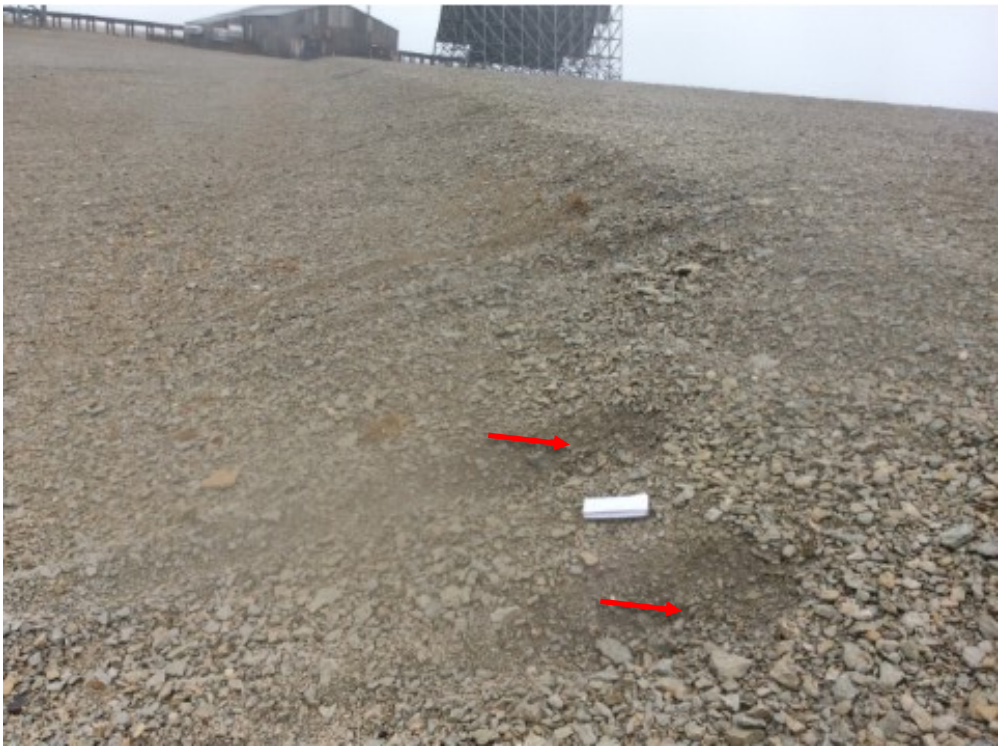


Photo 61: *Tier II Disposal Facility – Northwest slope near crest - Feature I – Two small depressions, facing northeast (FOXM_Photo62.jpg)*



Photo 62: *Tier II Disposal Facility - Soil Sample MW-01 – Before excavation (FOXM_Photo286.jpg)*



Photo 63: *Tier II Disposal Facility - Soil Sample MW-01 – After excavation (FOXM_Photo287.jpg)*



Photo 64: *Tier II Disposal Facility - Soil Sample MW-01 – After backfilling (FOXM_Photo288.jpg)*



Photo 65: *Tier II Disposal Facility - Water Sample MW-01 (FOXM_Photo285.jpg)*



Photo 66: *Tier II Disposal Facility - Soil Sample MW-02 – Before excavation (FOXM_Photo281.jpg)*



Photo 67: *Tier II Disposal Facility - Soil Sample MW-02 – After excavation (FOXM_Photo282.jpg)*



Photo 68: *Tier II Disposal Facility - Soil Sample MW-02 – After backfilling (FOXM_Photo283.jpg)*



Photo 69: *Tier II Disposal Facility - Water Sample MW-02 (FOXM_Photo284.jpg)*



Photo 70: *Tier II Disposal Facility - Soil Sample MW-03 – Before excavation (FOXM_Photo278.jpg)*



Photo 71: Tier II Disposal Facility - Soil Sample MW-03 – After excavation (FOXM_Photo279.jpg)



Photo 72: Tier II Disposal Facility - Soil Sample MW-03 – After backfilling (FOXM_Photo280.jpg)



Photo 73: *Tier II Disposal Facility - Water Sample MW-03 (FOXM_Photo277.jpg)*



Photo 74: *Tier II Disposal Facility - Soil Sample MW-04 – Before excavation (FOXM_Photo294.jpg)*



Photo 75: *Tier II Disposal Facility - Soil Sample MW-04 – After excavation (FOXM_Photo295.jpg)*



Photo 76: *Tier II Disposal Facility - Soil Sample MW-04 – After backfilling (FOXM_Photo296.jpg)*



Photo 77: *Tier II Disposal Facility - Water Sample MW-04 (FOXM_Photo293.jpg)*



Photo 78: *Tier II Disposal Facility - Soil Sample MW-05 – Before excavation (FOXM_Photo290.jpg)*



Photo 79: *Tier II Disposal Facility - Soil Sample MW-05 – After excavation (FOXM_Photo291.jpg)*



Photo 80: *Tier II Disposal Facility - Soil Sample MW-05 – After backfilling (FOXM_Photo292.jpg)*



Photo 81: Tier II Disposal Facility - Water Sample MW-05 (FOXM_Photo289.jpg)



Photo 82: East Beach Landfill South - Cover surface, facing south (FOXM_Photo422.jpg)



Photo 83: *East Beach Landfill South - Cover surface, facing north (FOXM_Photo426.jpg)*



Photo 84: *East Beach Landfill South - Cover surface, facing southwest (FOXM_Photo429.jpg)*



Photo 85: *East Beach Landfill South - Cover surface, facing southwest (FOXM_Photo433.jpg)*



Photo 86: *East Beach Landfill South - Cover surface, facing southwest (FOXM_Photo437.jpg)*



Photo 87: *East Beach Landfill South - Cover surface, facing west (FOXM_Photo439.jpg)*



Photo 88: *East Beach Landfill South - Cover surface showing vehicle ruts, facing south (FOXM_Photo448.jpg)*



Photo 89: *East Beach Landfill South - South crest, facing northeast, Feature H – sparse vegetation (FOXM_Photo438.jpg)*



Photo 90: *East Beach Landfill South - South crest, facing west (FOXM_Photo442.jpg)*



Photo 91: East Beach Landfill South - Southeast crest, slope and toe, facing southwest (FOXM_Photo428.jpg)



Photo 92: East Beach Landfill South - Southeast slope, facing northeast (FOXM_Photo436.jpg)

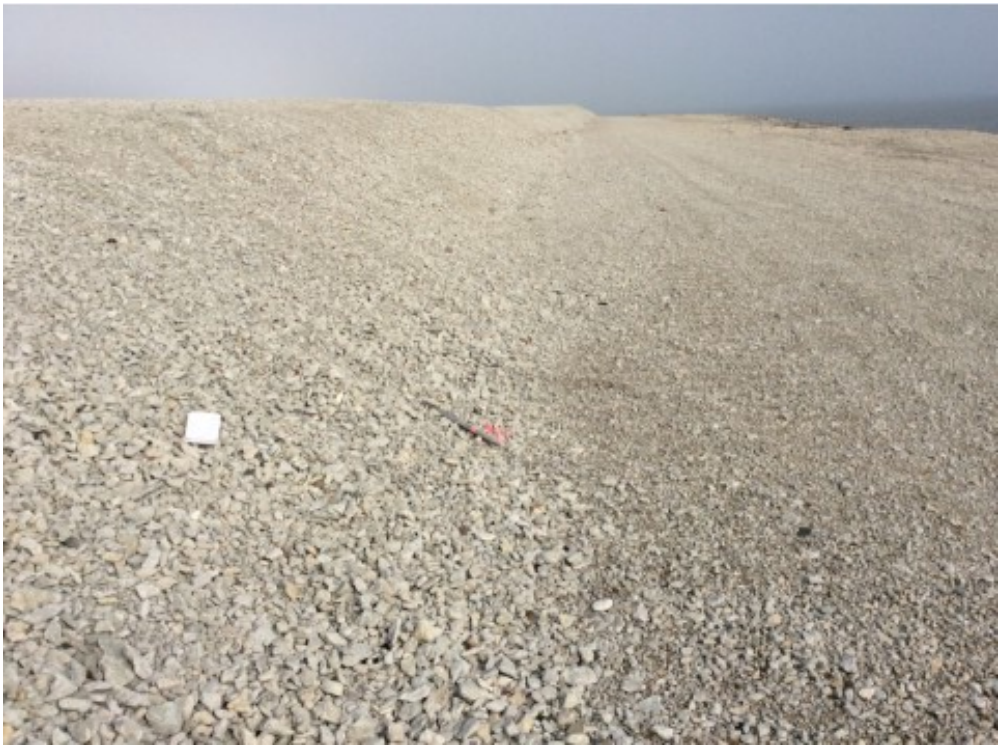


Photo 93: *East Beach Landfill South - Southeast slope, west corner, facing east (FOXM_Photo443.jpg)*



Photo 94: *East Beach Landfill South - Southeast slope and crest, east corner, facing south (FOXM_Photo425.jpg)*



Photo 95: *East Beach Landfill South - Northwest slope and toe, facing south (FOXM_Photo424.jpg)*



Photo 96: *East Beach Landfill South - southeast slope, facing southwest (FOXM_Photo430.jpg)*



Photo 97: *East Beach Landfill South - Southeast toe, facing west (FOXM_Photo441.jpg)*



Photo 98: *East Beach Landfill South - North slope, facing south (FOXM_Photo423.jpg)*



Photo 99: *East Beach Landfill South - North slope and toe, facing west (FOXM_Photo421.jpg)*



Photo 100: *East Beach Landfill South - Northwest slope and toe, facing east (FOXM_Photo447.jpg)*



Photo 101: East Beach Landfill South - Southwest crest, facing northwest (FOXM_Photo445.jpg)



Photo 102: East Beach Landfill South - Southwest slope and toe, facing northwest (FOXM_Photo444.jpg)



Photo 103: East Beach Landfill South - Northwest crest, facing northeast (FOXM_Photo434.jpg)



Photo 104: East Beach Landfill South - Northwest crest, facing southwest (FOXM_Photo435.jpg)



Photo 105: East Beach Landfill South - Northwest crest and slope, facing northeast (FOXM_Photo446.jpg)



Photo 106: East Beach Landfill South - Northwest crest, slope and toe, facing southwest (FOXM_Photo427.jpg)



Photo 107: East Beach Landfill South - North slope, facing west (FOXM_Photo440.jpg)



Photo 108: East Beach Landfill South - North slope, facing east (FOXM_Photo449.jpg)



Photo 109: East Beach Landfill South – VT-06, facing northwest (FOXM_Photo450.jpg)



Photo 110: East Beach Landfill South – VT-07, facing southeast (FOXM_Photo432.jpg)



Photo 111: East Beach Landfill South – VT-08, facing west (FOXM_Photo431.jpg)



Photo 112: East Beach Landfill South – VT-09, facing west (FOXM_Photo420.jpg)



Photo 113: East Beach Landfill South – Southeast slope - Feature C – Vehicle tracks, facing east (FOXM_Photo120.jpg)

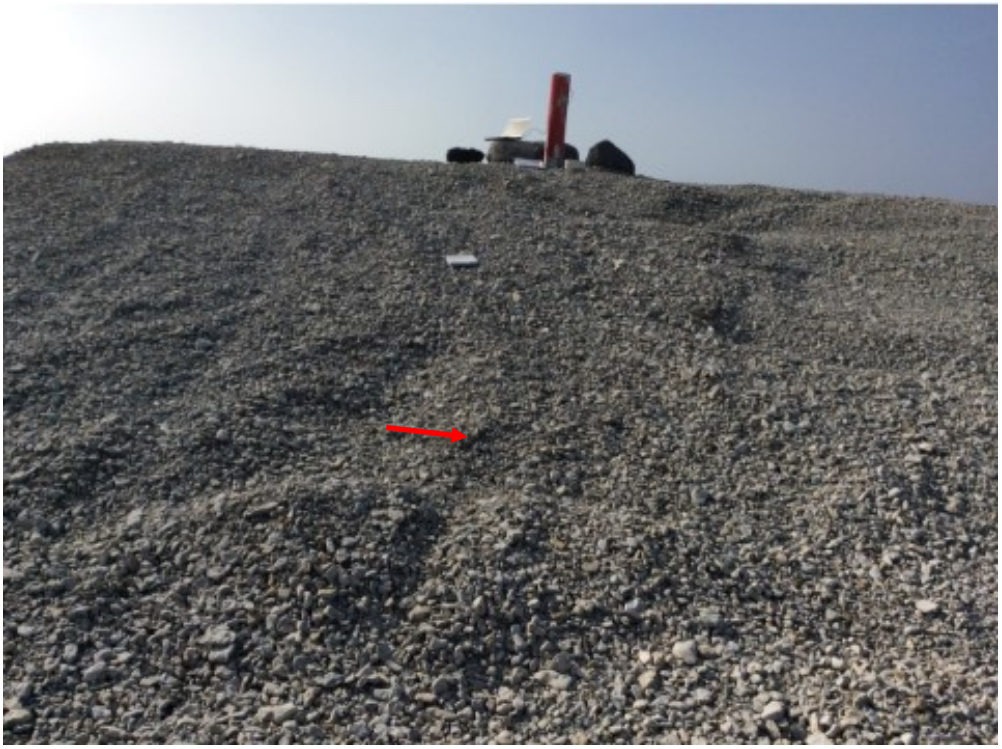


Photo 114: East Beach Landfill South – North slope – Feature C – Vehicle tracks, facing south (FOXM_Photo118.jpg)



Photo 115: *East Beach Landfill South – Cover surface – Feature C – Vehicle tracks, facing southwest (FOXM_Photo119.jpg)*



Photo 116: *East Beach Landfill South – Cover surface – Feature C – Vehicle tracks, facing southwest (FOXM_Photo122.jpg)*



Photo 117: East Beach Landfill South – Southeast slope – Feature C – Vehicle tracks, facing southeast (FOXM_Photo123.jpg)



Photo 118: East Beach Landfill South – Southeast slope – Feature C – Vehicle tracks, facing east (FOXM_Photo124.jpg)



Photo 119: East Beach Landfill South – Southeast slope – Feature C – Vehicle tracks, facing northwest (FOXM_Photo125.jpg)



Photo 120: East Beach Landfill South – Northwest slope – Feature C – Vehicle tracks, facing northwest (FOXM_Photo126.jpg)



Photo 121: *East Beach Landfill South – Southeast slope – Feature C – Vehicle tracks, facing southwest (FOXM_Photo127.jpg)*



Photo 122: *East Beach Landfill South – Northwest slope – Feature C – Vehicle tracks, facing northwest (FOXM_Photo128.jpg)*



Photo 123: *East Beach Landfill South – Northwest slope – Feature T – Two small sink holes, facing northwest (FOXM_Photo129.jpg)*



Photo 124: *East Beach Landfill South – Cover surface – Feature C – Vehicle tracks, facing southwest (FOXM_Photo130.jpg)*



Photo 125: *East Beach Landfill South – Cover surface – Feature C – Vehicle tracks, facing west (FOXM_Photo132.jpg)*



Photo 126: *East Beach Landfill South – Southeast slope - Feature C – Vehicle tracks, facing north (FOXM_Photo134.jpg)*



Photo 127: East Beach Landfill South – Southeast slope - Feature C – Vehicle tracks, facing southeast (FOXM_Photo135.jpg)



Photo 128: East Beach Landfill South – Southeast slope - Feature L – two small sink holes, facing north (FOXM_Photo136.jpg)

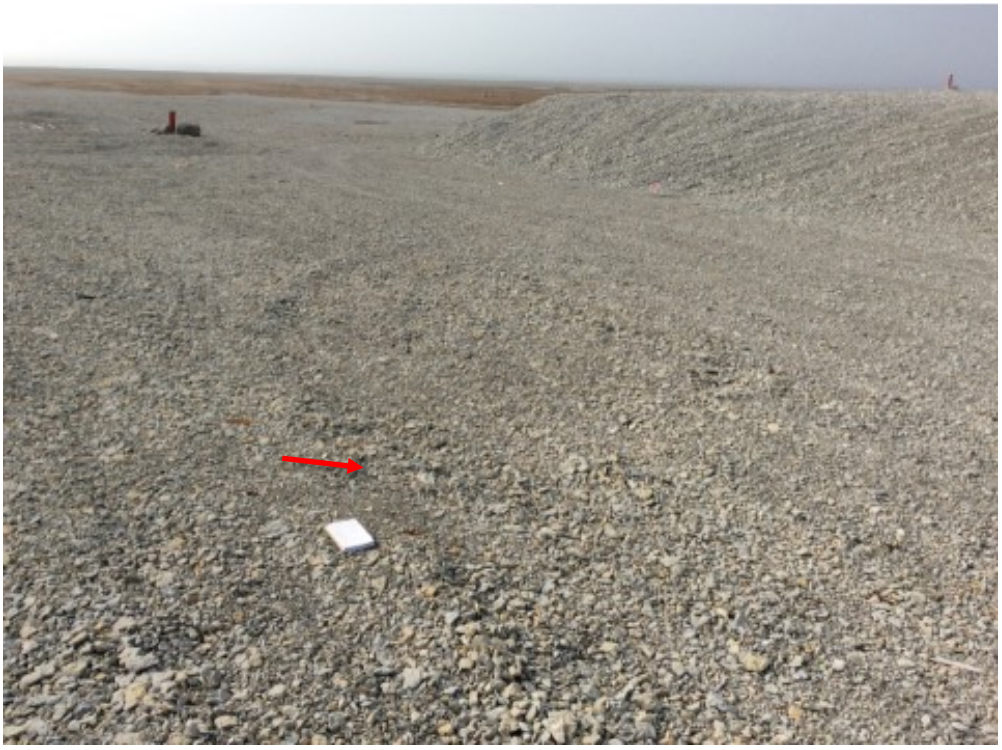


Photo 129: East Beach Landfill South – Southeast toe - Feature C – Vehicle tracks, facing west (FOXM_Photo137.jpg)



Photo 130: East Beach Landfill South – Southeast slope - Feature C – Vehicle tracks, facing north (FOXM_Photo138.jpg)



Photo 131: East Beach Landfill South – Cover surface - Feature C – Vehicle tracks, facing east (FOXM_Photo140.jpg)



Photo 132: East Beach Landfill South – Cover surface - Feature C – Vehicle tracks, facing northeast (FOXM_Photo141.jpg)



Photo 133: East Beach Landfill South – Northwest crest and slope - Feature M – Two small sink holes, facing north (FOXM_Photo143.jpg)



Photo 134: East Beach Landfill South – Cover surface - Feature C – Vehicle tracks, facing south (FOXM_Photo144.jpg)



Photo 135: East Beach Landfill South – Northwest slope, facing north (FOXM_Photo131.jpg)



Photo 136: East Beach Landfill South – Cover surface - Feature F – Minor settlement, facing north (FOXM_Photo133.jpg)



Photo 137: East Beach Landfill South – South toe beyond landfill area, surficial debris, facing west (FOXM_Photo139.jpg)



Photo 138: East Beach Landfill South – West crest corner - Feature A – Small depressions, facing northwest (FOXM_Photo142.jpg)



Photo 139: *East Beach Landfill South – Southeast slope, Feature N – Sparse vegetation, facing southwest (FOXM_Photo121.jpg)*



Photo 140: *East Beach Landfill South - Soil Sample MW-22 – Before excavation (FOXM_Photo241.jpg)*



Photo 141: East Beach Landfill South - Soil Sample MW-22 – After excavation (FOXM_Photo242.jpg)



Photo 142: East Beach Landfill South - Soil Sample MW-22 – After backfilling (FOXM_Photo243.jpg)



Photo 143: East Beach Landfill South - Water Sample MW-22 (FOXM_Photo244.jpg)



Photo 144: East Beach Landfill South - Soil Sample MW-23 – Before excavation (FOXM_Photo245.jpg)



Photo 145: East Beach Landfill South - Soil Sample MW-23 – After excavation (FOXM_Photo247.jpg)



Photo 146: East Beach Landfill South - Soil Sample MW-23 – After backfilling (FOXM_Photo248.jpg)



Photo 147: East Beach Landfill South - Water Sample MW-23 (FOXM_Photo246.jpg)



Photo 148: East Beach Landfill South - Soil Sample MW-24 – Before excavation (FOXM_Photo249.jpg)



Photo 149: East Beach Landfill South - Soil Sample MW-24 – After excavation (FOXM_Photo250.jpg)



Photo 150: East Beach Landfill South - Soil Sample MW-24 – After backfilling (FOXM_Photo251.jpg)



Photo 151: East Beach Landfill South - Water Sample MW-24 (FOXM_Photo252.jpg)



Photo 152: East Beach Landfill South - Soil Sample MW-25 – Before excavation (FOXM_Photo254.jpg)



Photo 153: East Beach Landfill South - Soil Sample MW-25 – After excavation (FOXM_Photo255.jpg)



Photo 154: East Beach Landfill South - Soil Sample MW-25 – After backfilling (FOXM_Photo256.jpg)



Photo 155: East Beach Landfill South - Water Sample MW-25 (FOXM_Photo253.jpg)



Photo 156: East Beach Landfill South - Soil Sample MW-26 – Before excavation (FOXM_Photo258.jpg)



Photo 157: East Beach Landfill South - Soil Sample MW-26 – After excavation (FOXM_Photo259.jpg)



Photo 158: East Beach Landfill South - Soil Sample MW-26 – After backfilling (FOXM_Photo260.jpg)



Photo 159: East Beach Landfill South - Water Sample MW-26 (FOXM_Photo257.jpg)



Photo 160: East Beach Landfill South - Soil Sample MW-27 – Before excavation (FOXM_Photo262.jpg)



Photo 161: East Beach Landfill South - Soil Sample MW-27 – After excavation (FOXM_Photo263.jpg)



Photo 162: East Beach Landfill South - Soil Sample MW-27 – After backfilling (FOXM_Photo264.jpg)



Photo 163: East Beach Landfill South - Water Sample MW-27 (FOXM_Photo261.jpg)



Photo 164: East Beach Landfill South - Soil Sample MW-28 – Before excavation (FOXM_Photo265.jpg)



Photo 165: East Beach Landfill South - Soil Sample MW-28 – After excavation (FOXM_Photo266.jpg)



Photo 166: East Beach Landfill South - Soil Sample MW-28 – After backfilling (FOXM_Photo267.jpg)



Photo 167: East Beach Landfill South - Water Sample MW-28 (FOXM_Photo268.jpg)



Photo 168: East Beach Landfill South - Soil Sample MW-29 – Before excavation (FOXM_Photo269.jpg)



Photo 169: East Beach Landfill South - Soil Sample MW-29 – After excavation (FOXM_Photo270.jpg)



Photo 170: East Beach Landfill South - Soil Sample MW-29 – After backfilling (FOXM_Photo271.jpg)



Photo 171: East Beach Landfill South - Water Sample MW-29 (FOXM_Photo272.jpg)



Photo 172: East Beach Landfill South - Soil Sample MW-30 – Before excavation (FOXM_Photo274.jpg)



Photo 173: East Beach Landfill South - Soil Sample MW-30 – After excavation (FOXM_Photo275.jpg)



Photo 174: East Beach Landfill South - Soil Sample MW-30 – After backfilling (FOXM_Photo276.jpg)



Photo 175: East Beach Landfill South - Water Sample MW-30 (FOXM_Photo273.jpg)



Photo 176: East Beach Landfill South - Soil Sample MW-31 – Before excavation (FOXM_Photo300.jpg)



Photo 177: East Beach Landfill South - Soil Sample MW-31 – After excavation (FOXM_Photo301.jpg)



Photo 178: East Beach Landfill South - Soil Sample MW-31 – After backfilling (FOXM_Photo302.jpg)



Photo 179: East Beach Landfill South - Water Sample MW-31 (FOXM_Photo303.jpg)



Photo 180: East Beach Landfill North - Cover surface, facing south (FOXM_Photo409.jpg)



Photo 181: East Beach Landfill North - Cover surface, vehicle tracks, facing southwest (FOXM_Photo410.jpg)



Photo 182: East Beach Landfill North - Cover surface, facing northeast (FOXM_Photo414.jpg)



Photo 183: East Beach Landfill North - Cover surface, facing west (FOXM_Photo415.jpg)



Photo 184: East Beach Landfill North - Cover surface, facing north (FOXM_Photo419.jpg)



Photo 185: East Beach Landfill North - East crest, facing southwest (FOXM_Photo413.jpg)



Photo 186: East Beach Landfill North - East crest, facing northeast (FOXM_Photo416.jpg)



Photo 187: *East Beach Landfill North - East slope and toe, facing southwest (FOXM_Photo412.jpg)*



Photo 188: *East Beach Landfill North - North crest, facing west (FOXM_Photo411.jpg)*



Photo 189: *East Beach Landfill North - North slope and toe – Feature Q – Ponded water, facing east (FOXM_Photo408.jpg)*



Photo 190: *East Beach Landfill North - Northwest crest and slope, facing northeast (Feature Q- Ponded water) (FOXM_Photo407.jpg)*



Photo 191: East Beach Landfill North - South crest, facing west (FOXM_Photo418.jpg)



Photo 192: East Beach Landfill North - South slope and toe, facing west (FOXM_Photo417.jpg)



Photo 193: East Beach Landfill North - West crest, facing northeast, VT-11 in distance (FOXM_Photo405.jpg)



Photo 194: East Beach Landfill North - West crest, facing southwest, VT-11 in distance (Feature Q – Ponded water) (FOXM_Photo406.jpg)



Photo 195: *East Beach Landfill North - West slope and toe - Feature Q - Ponded water, facing northeast (FOXM_Photo404.jpg)*



Photo 196: *East Beach Landfill North – VT-10, facing northeast (FOXM_Photo402.jpg)*



Photo 197: East Beach Landfill North – VT-11, facing northeast (FOXM_Photo403.jpg)



Photo 198: East Beach Landfill North – West crest - Feature D – Vehicle tracks, facing north (FOXM_Photo100.jpg)



Photo 199: East Beach Landfill North – Cover surface - Feature D – Vehicle tracks, facing southeast (FOXM_Photo104.jpg)



Photo 200: East Beach Landfill North – North slope - Feature D – Vehicle tracks, facing northeast (FOXM_Photo105.jpg)



Photo 201: East Beach Landfill North – East slope - Feature D – Vehicle tracks, facing west (FOXM_Photo111.jpg)



Photo 202: East Beach Landfill North - Feature D – Vehicle tracks, facing south (FOXM_Photo114.jpg)



Photo 203: *East Beach Landfill North – East slope - Feature D – Vehicle tracks, facing west, VT-10 on top of slope (FOXM_Photo115.jpg)*



Photo 204: *East Beach Landfill North – South slope - Feature D – Vehicle tracks, facing north, VT-10 at top of slope (FOXM_Photo116.jpg)*

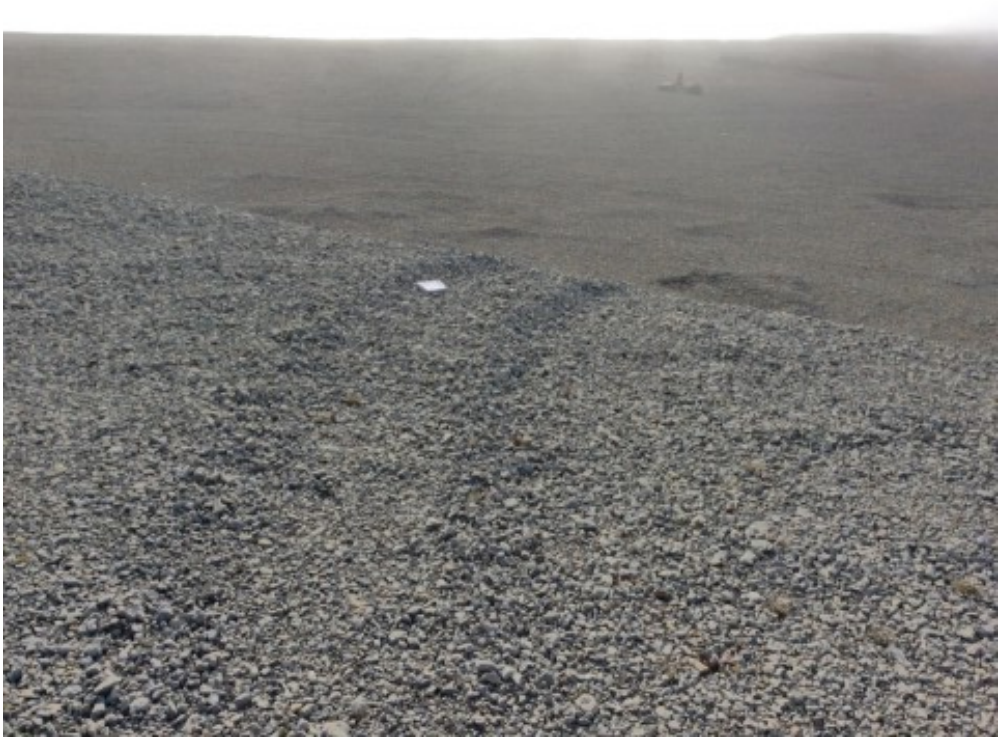


Photo 205: *East Beach Landfill North – South crest - Feature D – Vehicle tracks, facing southeast (FOXM_Photo117.jpg)*



Photo 206: *East Beach Landfill North - Feature D – Vehicle tracks and ponded water (Feature Q), facing west (FOXM_Photo99.jpg)*



Photo 207: East Beach Landfill North – North toe, facing east, metal surficial debris (FOXM_Photo106.jpg)



Photo 208: East Beach Landfill North – Cover surface - Feature K1 – Multiple small shallow depressions, facing south (FOXM_Photo108.jpg)



Photo 209: East Beach Landfill North - Feature K2 – Multiple small shallow depressions, facing south (FOXM_Photo109.jpg)



Photo 210: East Beach Landfill North –East toe, facing west, MW-20 on right side of photo (FOXM_Photo112.jpg)



Photo 211: East Beach Landfill North – Cover surface - Feature G – Small shallow depressions, facing north, VT-11 at top of photo (FOXM_Photo102.jpg)



Photo 212: East Beach Landfill North – West crest - Feature O – Minor settlement, facing north, VT-11 on crest of landfill (FOXM_Photo101.jpg)



Photo 213: East Beach Landfill North – West crest - Feature P – Linear shallow depression, facing northwest (FOXM_Photo103.jpg)



Photo 214: East Beach Landfill North – North toe - Feature Q – Ponded water along toe, facing east (FOXM_Photo107.jpg)



Photo 215: *East Beach Landfill North – North slope - Feature R – Sparse vegetation, facing north (FOXM_Photo110.jpg)*



Photo 216: *East Beach Landfill North – East slope - Feature S – Sparse vegetation, facing northeast (FOXM_Photo113.jpg)*



Photo 217: East Beach Landfill North - Soil Sample MW-20 – Before excavation (FOXM_Photo238.jpg)



Photo 218: East Beach Landfill North - Soil Sample MW-20 – After excavation (FOXM_Photo239.jpg)



Photo 219: East Beach Landfill North - Soil Sample MW-20 – After backfilling (FOXM_Photo240.jpg)



Photo 220: East Beach Landfill North - Water Sample MW-20 (FOXM_Photo237.jpg)



Photo 221: East Beach Landfill North - Soil Sample MW-21 – Before excavation (FOXM_Photo234.jpg)



Photo 222: East Beach Landfill North - Soil Sample MW-21 – After excavation (FOXM_Photo235.jpg)



Photo 223: East Beach Landfill North - Soil Sample MW-21 – After backfilling (FOXM_Photo236.jpg)



Photo 224: East Beach Landfill North - Water Sample MW-21 (FOXM_Photo233.jpg)



Photo 225: Non-Hazardous Waste Landfill - Cover surface, facing north, vehicle tracks (FOXM_Photo457.jpg)



Photo 226: Non-Hazardous Waste Landfill - Cover surface, facing east, vehicle tracks (FOXM_Photo462.jpg)



Photo 227: *Non-Hazardous Waste Landfill - Cover surface, facing south (FOXM_Photo464.jpg)*



Photo 228: *Non-Hazardous Waste Landfill - Cover surface, facing west, vehicle tracks (FOXM_Photo468.jpg)*



Photo 229: Non-Hazardous Waste Landfill - Cover surface, facing west (FOXM_Photo470.jpg)



Photo 230: Non-Hazardous Waste Landfill - East crest, facing south (FOXM_Photo466.jpg)



Photo 231: Non-Hazardous Waste Landfill - East toe, facing south (FOXM_Photo467.jpg)



Photo 232: Non-Hazardous Waste Landfill - North crest, facing east (FOXM_Photo463.jpg)



Photo 233: Non-Hazardous Waste Landfill - North toe – Feature E – Ponded water (in distance on right), facing west (FOXM_Photo465.jpg)



Photo 234: Non-Hazardous Waste Landfill - South crest – Feature A – Vehicle tracks, facing east (FOXM_Photo458.jpg)



Photo 235: Non-Hazardous Waste Landfill - South crest and slope, facing west (FOXM_Photo469.jpg)



Photo 236: Non-Hazardous Waste Landfill - South toe, facing east. Two above ground storage tanks at bottom of slope (FOXM_Photo459.jpg)



Photo 237: *Non-Hazardous Waste Landfill - West crest, facing north (FOXM_Photo460.jpg)*



Photo 238: *Non-Hazardous Waste Landfill - West slope and toe, facing north (FOXM_Photo461.jpg)*



Photo 239: Non-Hazardous Waste Landfill – VT-HB4, facing north (FOXM_Photo471.jpg)

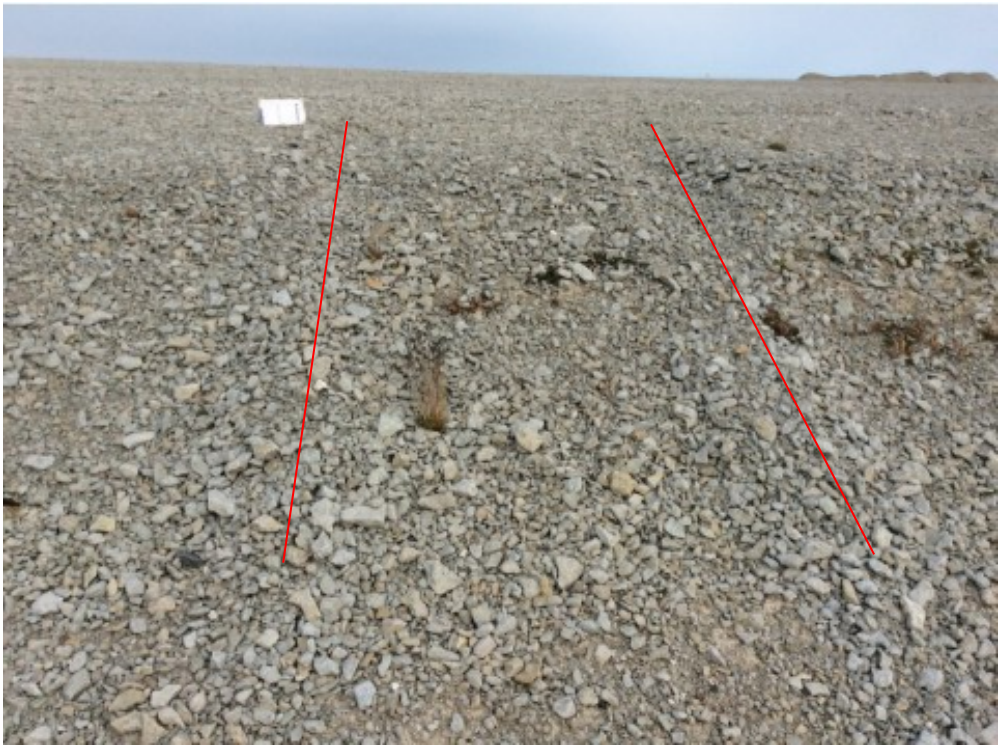


Photo 240: Non-Hazardous Waste Landfill – South crest edge - Feature A – Vehicle tracks, facing north (FOXM_Photo147.jpg)



Photo 241: Non-Hazardous Waste Landfill – South crest, facing southwest (FOXM_Photo148.jpg)



Photo 242: Non-Hazardous Waste Landfill – Cover surface - Feature A – Vehicle tracks, facing northeast (FOXM_Photo151.jpg)



Photo 243: Non-Hazardous Waste Landfill – West slope - Feature A – Vehicle tracks, facing east (FOXM_Photo152.jpg)



Photo 244: Non-Hazardous Waste Landfill – West slope - Feature A – Vehicle tracks, facing north (FOXM_Photo153.jpg)



Photo 245: *Non-Hazardous Waste Landfill – West slope - Feature A – Vehicle tracks down west slope, facing west (FOXM_Photo154.jpg)*



Photo 246: *Non-Hazardous Waste Landfill – North slope and crest - Feature A – Vehicle tracks, facing east (FOXM_Photo155.jpg)*



Photo 247: *Non-Hazardous Waste Landfill – Cover surface - Feature A – Vehicle tracks, facing northeast (FOXM_Photo156.jpg)*



Photo 248: *Non-Hazardous Waste Landfill – Cover surface - Feature A – Vehicle tracks – facing northeast (FOXM_Photo157.jpg)*



Photo 249: Non-Hazardous Waste Landfill – North slope - Feature A – Vehicle tracks, facing east (FOXM_Photo158.jpg)



Photo 250: Non-Hazardous Waste Landfill – North slope - Feature A – Vehicle tracks, facing northeast (FOXM_Photo159.jpg)



Photo 251: Non-Hazardous Waste Landfill – North slope - Feature A – Vehicle tracks, facing south (FOXM_Photo160.jpg)



Photo 252: Non-Hazardous Waste Landfill – North slope - Feature K - Two small settlement depressions, facing north (FOXM_Photo161.jpg)



Photo 253: *Non-Hazardous Waste Landfill – North slope - Feature A – Vehicle tracks, facing north (FOXM_Photo162.jpg)*



Photo 254: *Non-Hazardous Waste Landfill – Northeast corner - Feature A – Vehicle tracks, facing northeast (FOXM_Photo163.jpg)*



Photo 255: *Non-Hazardous Waste Landfill – East slope - Feature G – Two small settlement depressions, facing east (FOXM_Photo166.jpg)*



Photo 256: *Non-Hazardous Waste Landfill – South crest - Feature A – Vehicle tracks and Feature H – Sparse vegetation, facing west (FOXM_Photo167.jpg)*



Photo 257: *Non-Hazardous Waste Landfill – South slope - Feature I – Two small settlement depressions, facing south (FOXM_Photo168.jpg)*

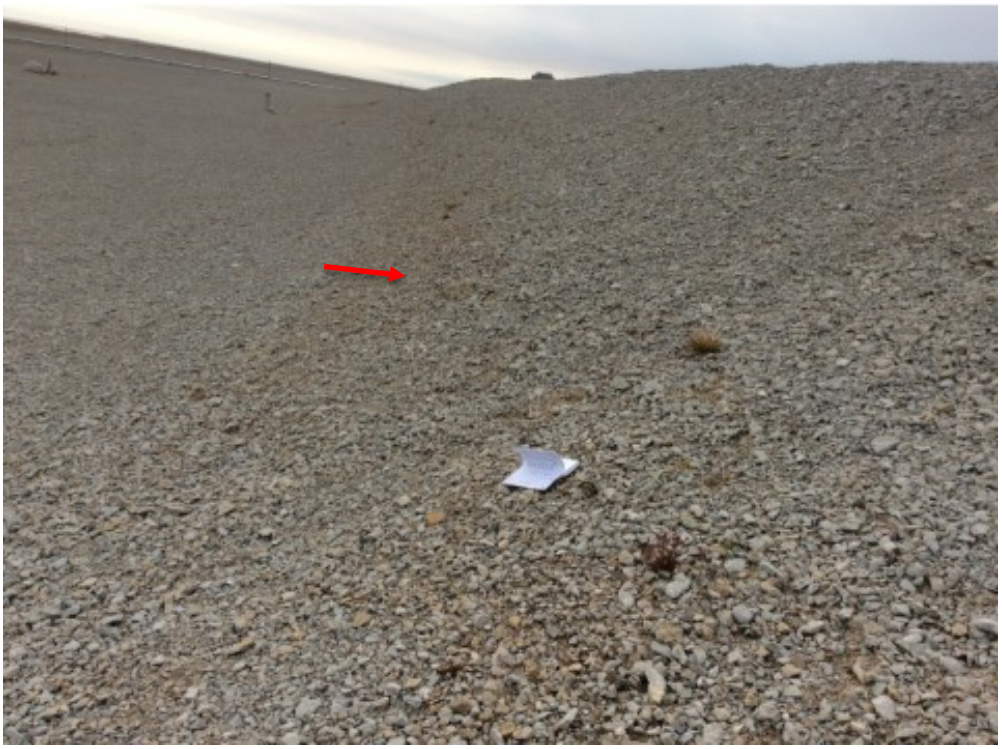


Photo 258: *Non-Hazardous Waste Landfill – East slope - Feature B – Slightly darker aggregate previously reported as staining, facing south (FOXM_Photo164.jpg)*



Photo 259: *Non-Hazardous Waste Landfill – East slope - Feature D – Sparse vegetation, facing north, MW-12 on right at bottom of slope (FOXM_Photo165.jpg)*



Photo 260: *Non-Hazardous Waste Landfill – South slope - Feature C – Small depression, facing west (FOXM_Photo150.jpg)*



Photo 261: Non-Hazardous Waste Landfill – South toe - Feature F – Sparse vegetation, facing east (FOXM_Photo169.jpg)



Photo 262: Non-Hazardous Waste Landfill – South crest edge and slope - Feature J – Metal wire sticking up from cover, facing south (FOXM_Photo149.jpg)



Photo 263: Non-Hazardous Waste Landfill - Soil Sample MW-12 – Before excavation (FOXM_Photo304.jpg)



Photo 264: Non-Hazardous Waste Landfill - Soil Sample MW-12 – After excavation (FOXM_Photo305.jpg)



Photo 265: Non-Hazardous Waste Landfill - Soil Sample MW-12 – After backfilling (FOXM_Photo306.jpg)



Photo 266: Non-Hazardous Waste Landfill - Water Sample MW-12 (FOXM_Photo307.jpg)



Photo 267: Non-Hazardous Waste Landfill - Soil Sample MW-13 – Before excavation (FOXM_Photo323.jpg)



Photo 268: Non-Hazardous Waste Landfill - Soil Sample MW-13 – After excavation (FOXM_Photo324.jpg)



Photo 269: Non-Hazardous Waste Landfill - Soil Sample MW-13 – After backfilling (FOXM_Photo325.jpg)



Photo 270: Non-Hazardous Waste Landfill - Water Sample MW-13 (FOXM_Photo326.jpg)



Photo 271: Non-Hazardous Waste Landfill - Soil Sample MW-14 – Before excavation (FOXM_Photo309.jpg)



Photo 272: Non-Hazardous Waste Landfill - Soil Sample MW-14 – After excavation (FOXM_Photo310.jpg)



Photo 273: Non-Hazardous Waste Landfill - Soil Sample MW-14 – After backfilling (FOXM_Photo311.jpg)



Photo 274: Non-Hazardous Waste Landfill - Water Sample MW-14 (FOXM_Photo308.jpg)



Photo 275: Non-Hazardous Waste Landfill - Soil Sample MW-15 – Before excavation (FOXM_Photo320.jpg)



Photo 276: Non-Hazardous Waste Landfill - Soil Sample MW-15 – After excavation (FOXM_Photo321.jpg)



Photo 277: Non-Hazardous Waste Landfill - Soil Sample MW-15 – After backfilling (FOXM_Photo322.jpg)



Photo 278: Non-Hazardous Waste Landfill - Water Sample MW-15 (FOXM_Photo319.jpg)



Photo 279: Non-Hazardous Waste Landfill - Soil Sample MW-16 – Before excavation (FOXM_Photo313.jpg)



Photo 280: Non-Hazardous Waste Landfill - Soil Sample MW-16 – After excavation (FOXM_Photo314.jpg)



Photo 281: Non-Hazardous Waste Landfill - Soil Sample MW-16 – After backfilling (FOXM_Photo315.jpg)



Photo 282: Non-Hazardous Waste Landfill - Water Sample MW-16 (FOXM_Photo312.jpg)



Photo 283: G-217 West Landfill - Cover surface, facing west (FOXM_Photo380.jpg)



Photo 284: G-217 West Landfill - Cover surface, facing north (FOXM_Photo381.jpg)



Photo 285: G-217 West Landfill - Cover surface, facing south (FOXM_Photo385.jpg)



Photo 286: G-217 West Landfill - Cover surface, facing south (FOXM_Photo389.jpg)



Photo 287: G-217 West Landfill - East slope and toe, facing south (FOXM_Photo378.jpg)



Photo 288: G-217 West Landfill - Internal slope (on the landfill), facing northwest (FOXM_Photo386.jpg)



Photo 289: *G-217 West Landfill - North crest, facing west (FOXM_Photo379.jpg)*



Photo 290: *G-217 West Landfill - North crest, facing east, Billboards at top of photo (FOXM_Photo388.jpg)*



Photo 291: G-217 West Landfill - South slope, facing east (FOXM_Photo382.jpg)



Photo 292: G-217 West Landfill - Southwest slope, facing southeast (FOXM_Photo383.jpg)



Photo 293: G-217 West Landfill - West slope, facing south (FOXM_Photo387.jpg)



Photo 294: G-217 West Landfill - West toe, slope and creat, facing north (FOXM_Photo384.jpg)

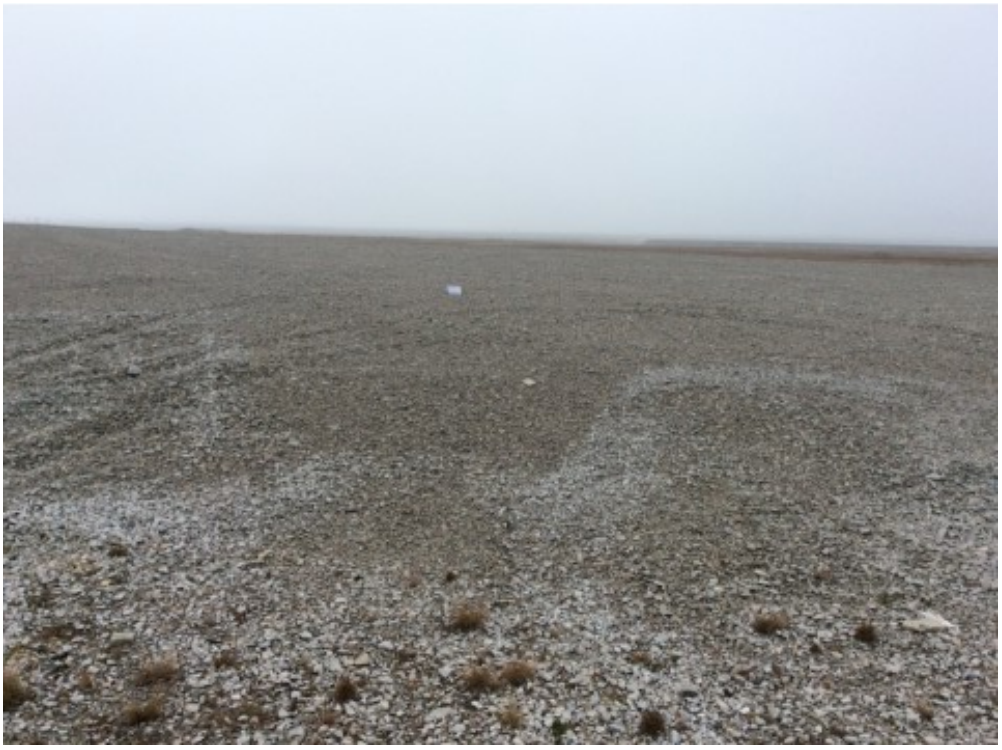


Photo 295: G-217 West Landfill – Northeast corner - Feature A – Vehicle ruts, facing southwest (FOXM_Photo70.jpg)



Photo 296: G-217 West Landfill – Cover surface - Feature A – Vehicle ruts, facing southwest (FOXM_Photo71.jpg)



Photo 297: G-217 West Landfill – East slope - Feature A – Vehicle ruts, facing southwest (FOXM_Photo72.jpg)



Photo 298: G-217 West Landfill – East slope - Feature A – Vehicle ruts, facing west (FOXM_Photo73.jpg)

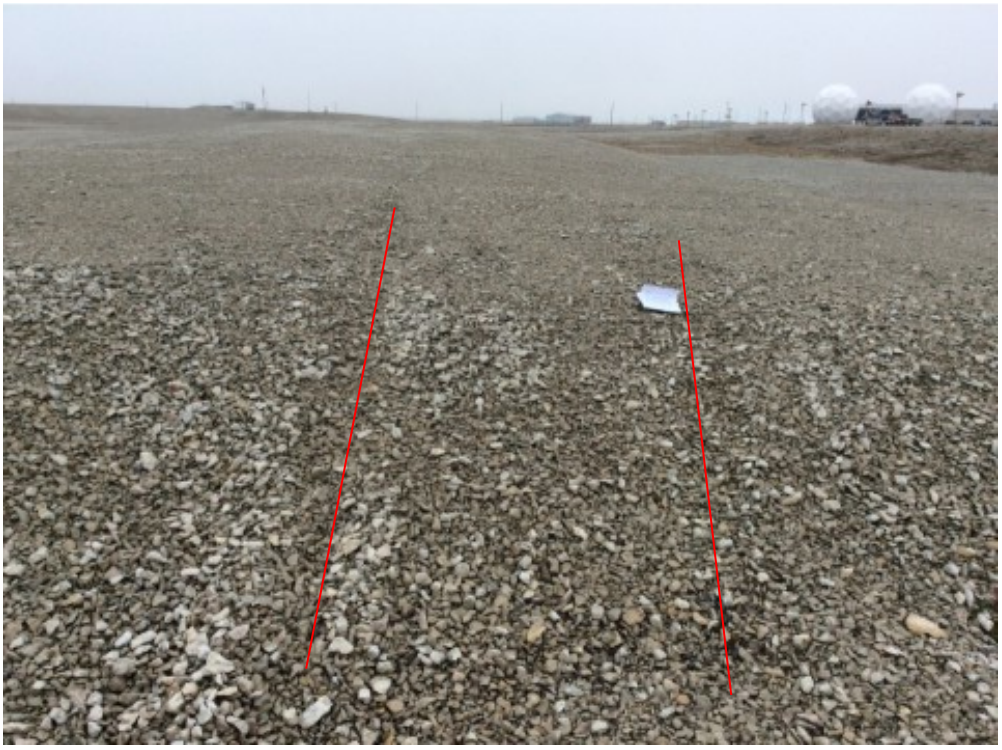


Photo 299: G-217 West Landfill – South slope - Feature A – Vehicle ruts, facing north (FOXM_Photo74.jpg)



Photo 300: G-217 West Landfill – Cover surface, Feature A – Vehicle ruts, facing southwest (FOXM_Photo79.jpg)



Photo 301: G-217 West Landfill – cover surface - Feature A – Vehicle ruts, facing south (FOXM_Photo81.jpg)



Photo 302: G-217 West Landfill – cover surface - Feature A – Vehicle ruts, facing north (FOXM_Photo83.jpg)



Photo 303: G-217 West Landfill – Northwest crest - Feature A – Vehicle ruts, facing northwest (FOXM_Photo86.jpg)



Photo 304: G-217 West Landfill – Northwest slope - Feature F – Vegetation, facing northeast (FOXM_Photo84.jpg)



Photo 305: G-217 West Landfill - Northwest slope - Feature F – Vegetation, facing northeast (FOXM_Photo85.jpg)



Photo 306: G-217 West Landfill – South slope - Feature E –linear depression, facing east (FOXM_Photo76.jpg)



Photo 307: G-217 West Landfill – Southwest toe - Feature D – Ponded water, facing southwest (FOXM_Photo77.jpg)



Photo 308: G-217 West Landfill – West toe - Feature D – Ponded water, facing north (FOXM_Photo78.jpg)



Photo 309: G-217 West Landfill – West slope – Previously observed tension crack (Feature C) not observed in 2017, facing south (FOXM_Photo80.jpg)



Photo 310: G-217 West Landfill – Cover surface - Feature B – Linear depression, facing west (FOXM_Photo82.jpg)



Photo 311: G-217 West Landfill – South slope - Feature G – Vegetation, facing east (FOXM_Photo75.jpg)



Photo 312: G-217 West Landfill - Soil Sample FM-5 – Before excavation (FOXM_Photo215.jpg)



Photo 313: G-217 West Landfill - Soil Sample FM-5 – After excavation (FOXM_Photo216.jpg)



Photo 314: G-217 West Landfill - Soil Sample FM-5 – After backfilling (FOXM_Photo217.jpg)



Photo 315: G-217 West Landfill - Soil Sample FM-6 – Before excavation (FOXM_Photo218.jpg)



Photo 316: G-217 West Landfill - Soil Sample FM-6 – After excavation (FOXM_Photo219.jpg)



Photo 317: *G-217 West Landfill - Soil Sample FM-6 – After backfilling (FOXM_Photo220.jpg)*



Photo 318: *G-217 West Landfill - Soil Sample FM-7 – Before excavation (FOXM_Photo209.jpg)*



Photo 319: G-217 West Landfill - Soil Sample FM-7 – After excavation (FOXM_Photo210.jpg)



Photo 320: G-217 West Landfill - Soil Sample FM-7 – After backfilling (FOXM_Photo211.jpg)



Photo 321: G-217 West Landfill - Soil Sample FM-8 – Before excavation (FOXM_Photo212.jpg)



Photo 322: G-217 West Landfill - Soil Sample FM-8 – After excavation (FOXM_Photo213.jpg)



Photo 323: G-217 West Landfill - Soil Sample FM-8 – After backfilling (FOXM_Photo214.jpg)



Photo 324: Billboards Landfill - Cover surface, facing south (FOXM_Photo369.jpg)



Photo 325: Billboards Landfill - Cover surface, facing west (FOXM_Photo371.jpg)



Photo 326: Billboards Landfill - Cover surface, facing north (FOXM_Photo373.jpg)



Photo 327: Billboards Landfill - Cover surface, facing east (FOXM_Photo376.jpg)



Photo 328: Billboards Landfill - East slope and crest, facing south (FOXM_Photo370.jpg)



Photo 329: Billboards Landfill - View of entire landfill from point west of landfill, facing east (FOXM_Photo377.jpg)



Photo 330: Billboards Landfill - South crest and slope, facing west (FOXM_Photo372.jpg)



Photo 331: Billboards Landfill – South crest and toe, facing east (FOXM_Photo374.jpg)



Photo 332: Billboards Landfill - West crest, facing south (FOXM_Photo368.jpg)



Photo 333: Billboards Landfill - West crest and slope, facing southeast (FOXM_Photo375.jpg)



Photo 334: Billboards Landfill – Cover surface - Feature C – Vehicle tracks, facing east (FOXM_Photo69.jpg)



Photo 335: Billboards Landfill – North toe, Feature B-1 – Ponded water, facing northeast (FOXM_Photo66.jpg)



Photo 336: Billboards Landfill – North toe - Feature B-2 – Ponded water, facing northwest (FOXM_Photo67.jpg)



Photo 337: Billboards Landfill - Feature B-3 – South toe - Ponded water, facing west (FOXM_Photo68.jpg)



Photo 338: Billboards Landfill – West toe - Feature B-4 – Ponded water, facing north (FOXM_Photo65.jpg)



Photo 339: Billboards Landfill - Soil Sample FM-1 – Before excavation (FOXM_Photo203.jpg)



Photo 340: Billboards Landfill - Soil Sample FM-1 – After excavation (FOXM_Photo204.jpg)



Photo 341: Billboards Landfill - Soil Sample FM-1 – After backfilling (FOXM_Photo205.jpg)



Photo 342: Billboards Landfill - Soil Sample FM-2 – Before excavation (FOXM_Photo206.jpg)



Photo 343: Billboards Landfill - Soil Sample FM-2 – After excavation (FOXM_Photo207.jpg)



Photo 344: Billboards Landfill - Soil Sample FM-2 – After backfilling (FOXM_Photo208.jpg)



Photo 345: Billboards Landfill - Soil Sample FM-3 – Before excavation (FOXM_Photo197.jpg)



Photo 346: Billboards Landfill - Soil Sample FM-3 – After excavation (FOXM_Photo198.jpg)



Photo 347: *Billboards Landfill - Soil Sample FM-3 – After backfilling (FOXM_Photo199.jpg)*



Photo 348: *Billboards Landfill - Soil Sample FM-4 – Before excavation (FOXM_Photo200.jpg)*



Photo 349: Billboards Landfill - Soil Sample FM-4 – After excavation (FOXM_Photo201.jpg)



Photo 350: Billboards Landfill - Soil Sample FM-4 – After backfilling (FOXM_Photo202.jpg)



Photo 351: Hazmat Storage East Landfill - Cover surface, facing southwest (FOXM_Photo392.jpg)



Photo 352: Hazmat Storage East Landfill - Cover surface, facing east (FOXM_Photo396.jpg)



Photo 353: Hazmat Storage East Landfill - Cover surface, facing south, Feature B vehicle tracks (FOXM_Photo399.jpg)



Photo 354: Hazmat Storage East Landfill - Cover surface, facing south (FOXM_Photo400.jpg)



Photo 355: *Hazmat Storage East Landfill - East slope, facing south (FOXM_Photo391.jpg)*



Photo 356: *Hazmat Storage East Landfill - East toe, facing south, Feature F Ponded Water, on the top left (FOXM_Photo393.jpg)*



Photo 357: Hazmat Storage East Landfill - North slope, facing southwest (FOXM_Photo390.jpg)



Photo 358: Hazmat Storage East Landfill - North toe, facing south, with Feature E ponded water at toe of slope (FOXM_Photo401.jpg)



Photo 359: *Hazmat Storage East Landfill - Northwest crest, facing north, with Feature E ponded water, on left (FOXM_Photo397.jpg)*



Photo 360: *Hazmat Storage East Landfill - South crest, facing west, Feature G ponded water on left (FOXM_Photo394.jpg)*



Photo 361: Hazmat Storage East Landfill - West crest, facing north (FOXM_Photo395.jpg)



Photo 362: Hazmat Storage East Landfill - West crest, facing south (FOXM_Photo398.jpg)



Photo 363: Hazmat Storage East Landfill – East crest - Feature B – Tire tracks, facing south (FOXM_Photo90.jpg)



Photo 364: Hazmat Storage East Landfill – East crest - Feature B – Tire tracks, facing north (FOXM_Photo91.jpg)



Photo 365: *Hazmat Storage East Landfill – Cover surface - Feature B – Tire tracks, facing northwest (FOXM_Photo93.jpg)*



Photo 366: *Hazmat Storage East Landfill – Cover surface - Feature B – Tire tracks, facing north (FOXM_Photo95.jpg)*



Photo 367: Hazmat Storage East Landfill – North toe, surficial debris (not uncovered waste), facing southeast (FOXM_Photo87.jpg)



Photo 368: Hazmat Storage East Landfill – East toe, facing northwest (FOXM_Photo88.jpg)



Photo 369: Hazmat Storage East Landfill – West toe - Feature E – Ponded water, facing north (FOXM_Photo97.jpg)



Photo 370: Hazmat Storage East Landfill – East toe - Feature F – Ponded water, facing north (FOXM_Photo92.jpg)



Photo 371: Hazmat Storage East Landfill – South toe - Feature G – Ponded water, facing east (FOXM_Photo94.jpg)



Photo 372: Hazmat Storage East Landfill – South toe - Feature I – Ponded water, facing south (FOXM_Photo96.jpg)



Photo 373: *Hazmat Storage East Landfill - Feature J –Sparse vegetation on east side of cover and east slope, facing south (FOXM_Photo89.jpg)*



Photo 374: *Hazmat Storage East Landfill - Feature J – Sparse vegetation on cover, facing northeast (FOXM_Photo98.jpg)*



Photo 375: Hazmat Storage East Landfill - Soil Sample FM-9 – Before excavation (FOXM_Photo221.jpg)



Photo 376: Hazmat Storage East Landfill - Soil Sample FM-9 – After excavation (FOXM_Photo222.jpg)



Photo 377: Hazmat Storage East Landfill - Soil Sample FM-9 – After backfilling (FOXM_Photo223.jpg)



Photo 378: Hazmat Storage East Landfill - Soil Sample FM-10 – Before excavation (FOXM_Photo230.jpg)



Photo 379: Hazmat Storage East Landfill - Soil Sample FM-10 – After excavation (FOXM_Photo231.jpg)



Photo 380: Hazmat Storage East Landfill - Soil Sample FM-10 – After backfilling (FOXM_Photo232.jpg)



Photo 381: Hazmat Storage East Landfill - Soil Sample FM-11 – Before excavation (FOXM_Photo227.jpg)



Photo 382: Hazmat Storage East Landfill - Soil Sample FM-11 – After excavation (FOXM_Photo228.jpg)



Photo 383: Hazmat Storage East Landfill - Soil Sample FM-11 – After backfilling (FOXM_Photo229.jpg)



Photo 384: Hazmat Storage East Landfill - Soil Sample FM-12 – Before excavation (FOXM_Photo224.jpg)



Photo 385: Hazmat Storage East Landfill - Soil Sample FM-12 – After excavation (FOXM_Photo225.jpg)



Photo 386: Hazmat Storage East Landfill - Soil Sample FM-12 – After backfilling (FOXM_Photo226.jpg)



Photo 387: Communications Northwest Landfill - Cover surface, facing north (FOXM_Photo327.jpg)



Photo 388: Communications Northwest Landfill - Cover surface, facing south (FOXM_Photo330.jpg)



Photo 389: Communications Northwest Landfill - Cover surface, facing west (FOXM_Photo333.jpg)



Photo 390: Communications Northwest Landfill - East crest, facing southwest (FOXM_Photo331.jpg)



Photo 391: Communications Northwest Landfill - East toe, facing southwest (FOXM_Photo332.jpg)



Photo 392: Communications Northwest Landfill - North crest, facing southeast (FOXM_Photo329.jpg)



Photo 393: Communications Northwest Landfill - South toe, facing west (FOXM_Photo334.jpg)



Photo 394: Communications Northwest Landfill - West slope, facing north. Road on left. (FOXM_Photo328.jpg)



Photo 395: Communications Northwest Landfill – Cover surface - Feature A – Vehicle tracks/ruts, facing north (FOXM_Photo1.jpg)



Photo 396: Communications Northwest Landfill – North slope - Feature A – Vehicle tracks/ruts, facing south (FOXM_Photo11.jpg)



Photo 397: Communications Northwest Landfill – north crest and slope - Feature A – Vehicle tracks/ruts, facing west (FOXM_Photo12.jpg)



Photo 398: Communications Northwest Landfill – North slope and crest - Feature A – Vehicle tracks/ruts, facing northwest (FOXM_Photo13.jpg)



Photo 399: Communications Northwest Landfill – East slope and crest - Feature A – Vehicle tracks/ruts, facing northwest (FOXM_Photo14.jpg)



Photo 400: Communications Northwest Landfill – East slope - Feature A – Vehicle tracks/ruts, facing northeast (FOXM_Photo15.jpg)



Photo 401: Communications Northwest Landfill – East slope - Feature A – Vehicle tracks/ruts, facing southwest (FOXM_Photo16.jpg)



Photo 402: Communications Northwest Landfill – East slope - Feature A – Vehicle tracks/ruts, facing north (FOXM_Photo17.jpg)



Photo 403: Communications Northwest Landfill – East slope - Feature A – Vehicle tracks/ruts, facing north (FOXM_Photo18.jpg)



Photo 404: Communications Northwest Landfill – East slope - Feature A – Vehicle tracks/ruts, facing south direction off landfill (FOXM_Photo19.jpg)



Photo 405: Communications Northwest Landfill – South slope - Feature A – Vehicle tracks/ruts, facing north (FOXM_Photo2.jpg)



Photo 406: Communications Northwest Landfill – South slope - Feature A – Vehicle tracks/ruts, facing northeast (FOXM_Photo4.jpg)



Photo 407: Communications Northwest Landfill – West crest - Feature A – Vehicle tracks/ruts, facing north (FOXM_Photo5.jpg)



Photo 408: Communications Northwest Landfill – West crest - Feature A – Vehicle tracks/ruts, facing south (FOXM_Photo6.jpg)



Photo 409: Communications Northwest Landfill – Cover surface - Feature A – Vehicle tracks/ruts, facing north (FOXM_Photo8.jpg)



Photo 410: Communications Northwest Landfill – Cover surface - Feature A – Vehicle tracks/ruts, facing west (FOXM_Photo9.jpg)



Photo 411: Communications Northwest Landfill – North slope - Feature B – Sparse vegetation, facing northwest (FOXM_Photo10.jpg)



Photo 412: Communications Northwest Landfill – South slope - Feature C – Small depression, facing east (FOXM_Photo3.jpg)



Photo 413: Communications Northwest Landfill – Cover surface, north end - Feature A – Vehicle tracks/ruts, facing west (FOXM_Photo7.jpg)



Photo 414: Communications Northwest Landfill - Soil Sample FM-13 – Before excavation (FOXM_Photo176.jpg)



Photo 415: Communications Northwest Landfill - Soil Sample FM-13 – After excavation (FOXM_Photo177.jpg)



Photo 416: Communications Northwest Landfill - Soil Sample FM-13 – After backfilling (FOXM_Photo178.jpg)



Photo 417: Communications Northwest Landfill - Soil Sample FM-14 – Before excavation (FOXM_Photo173.jpg)



Photo 418: Communications Northwest Landfill - Soil Sample FM-14 – After excavation (FOXM_Photo174.jpg)



Photo 419: Communications Northwest Landfill - Soil Sample FM-14 – After backfilling (FOXM_Photo175.jpg)



Photo 420: Communications Northwest Landfill - Soil Sample FM-15 – Before excavation (FOXM_Photo297.jpg)



Photo 421: Communications Northwest Landfill - Soil Sample FM-15 – After excavation (FOXM_Photo298.jpg)



Photo 422: Communications Northwest Landfill - Soil Sample FM-15 – After backfilling (FOXM_Photo299.jpg)



Photo 423: Communications Northwest Landfill - Soil Sample FM-16 – Before excavation (FOXM_Photo170.jpg)



Photo 424: Communications Northwest Landfill - Soil Sample FM-16 – After excavation (FOXM_Photo171.jpg)



Photo 425: Communications Northwest Landfill - Soil Sample FM-16 – After backfilling (FOXM_Photo172.jpg)



Photo 426: Communications North Landfill - Cover surface, facing south (FOXM_Photo335.jpg)



Photo 427: Communications North Landfill - Cover surface, facing northeast (FOXM_Photo338.jpg)



Photo 428: Communications North Landfill - Cover surface, facing northwest (FOXM_Photo340.jpg)



Photo 429: Communications North Landfill - Cover surface, facing southwest (FOXM_Photo342.jpg)



Photo 430: Communications North Landfill - Cover surface, facing southwest (FOXM_Photo345.jpg)



Photo 431: Communications North Landfill - East crest and slope, facing northeast (FOXM_Photo341.jpg)



Photo 432: Communications North Landfill - East crest, slope and toe, facing northeast, from southeast corner (FOXM_Photo337.jpg)



Photo 433: Communications North Landfill - East slope and toe, facing southwest (FOXM_Photo346.jpg)



Photo 434: Communications North Landfill - South crest, facing northwest (FOXM_Photo336.jpg)



Photo 435: Communications North Landfill - West crest from southwest corner, facing northeast (FOXM_Photo339.jpg)



Photo 436: Communications North Landfill - West crest, facing southwest (FOXM_Photo344.jpg)



Photo 437: *Communications North Landfill – West crest and toe, facing southwest (FOXM_Photo343.jpg)*



Photo 438: *Communications North Landfill – Cover surface - Feature C – Vehicle tracks, facing southeast (FOXM_Photo20.jpg)*



Photo 439: *Communications North Landfill – Cover surface - Feature C – Vehicle tracks, facing south (FOXM_Photo21.jpg)*



Photo 440: *Communications North Landfill – East slope - Feature C – Vehicle tracks, facing northwest (FOXM_Photo25.jpg)*



Photo 441: Communications North Landfill – West slope - Feature C – Vehicle tracks facing southwest (FOXM_Photo27.jpg)



Photo 442: Communications North Landfill – North toe, previously observed surface metal debris, facing northwest (FOXM_Photo28.jpg)



Photo 443: Communications North Landfill – South toe, previously observed surface metal debris, facing south (FOXM_Photo22.jpg)



Photo 444: Communications North Landfill – Southeast corner, Feature D – Previously reported ponded water not present in 2017, vegetation, facing southwest (FOXM_Photo24.jpg)



Photo 445: Communications North Landfill – West toe - Feature E – Ponded water, facing northwest (FOXM_Photo32.jpg)



Photo 446: Communications North Landfill – East toe - Feature F – Ponded water, facing northeast (FOXM_Photo26.jpg)



Photo 447: Communications North Landfill – West toe - Feature G – Ponded water, facing northwest (FOXM_Photo31.jpg)



Photo 448: Communications North Landfill – West slope - Feature H – Minor settlement, facing southeast (FOXM_Photo23.jpg)



Photo 449: Communications North Landfill – North crest - Feature I – Uneven ground, facing east (FOXM_Photo29.jpg)



Photo 450: Communications North Landfill – Cover surface - Feature J – Ponded water area on Thoroughfare, facing southwest (FOXM_Photo30.jpg)



Photo 451: Communications North Landfill - Soil Sample FM-17 – Before excavation (FOXM_Photo179.jpg)



Photo 452: Communications North Landfill - Soil Sample FM-17 – After excavation (FOXM_Photo180.jpg)



Photo 453: Communications North Landfill - Soil Sample FM-17 – After backfilling (FOXM_Photo181.jpg)



Photo 454: Communications North Landfill - Soil Sample FM-18 – Before excavation (FOXM_Photo182.jpg)



Photo 455: Communications North Landfill - Soil Sample FM-18 – After excavation (FOXM_Photo183.jpg)



Photo 456: Communications North Landfill - Soil Sample FM-18 – After backfilling (FOXM_Photo184.jpg)



Photo 457: Communications North Landfill - Soil Sample FM-19 – Before excavation (FOXM_Photo185.jpg)



Photo 458: Communications North Landfill - Soil Sample FM-19 – After excavation (FOXM_Photo186.jpg)



Photo 459: Communications North Landfill - Soil Sample FM-19 – After backfilling (FOXM_Photo187.jpg)



Photo 460: Communications North Landfill - Soil Sample FM-20 – Before excavation (FOXM_Photo188.jpg)



Photo 461: Communications North Landfill - Soil Sample FM-20 – After excavation (FOXM_Photo189.jpg)



Photo 462: Communications North Landfill - Soil Sample FM-20 – After backfilling (FOXM_Photo190.jpg)



Photo 463: Communications North Landfill - Soil Sample FM-21 – Before excavation (FOXM_Photo191.jpg)



Photo 464: Communications North Landfill - Soil Sample FM-21 – After excavation (FOXM_Photo192.jpg)



Photo 465: Communications North Landfill - Soil Sample FM-21 – After backfilling (FOXM_Photo193.jpg)



Photo 466: Communications North Landfill - Soil Sample FM-22 – Before excavation (FOXM_Photo194.jpg)



Photo 467: Communications North Landfill - Soil Sample FM-22 – After excavation (FOXM_Photo195.jpg)



Photo 468: Communications North Landfill - Soil Sample FM-22 – After backfilling (FOXM_Photo196.jpg)



Photo 469: FOX-M Aerial Photograph, East Beach Landfill – South (along shoreline), facing north (Photo469_FOX-M aerial photo.jpg)



Photo 470: FOX-M Aerial Photograph, East Beach Landfill – South and North (along shoreline), facing northwest (Photo470_FOX-M aerial photo.jpg)



Photo 471: FOX-M Aerial Photograph, East Beach Landfill – South and North (foreground), Communications Area Landfills (midground), Station Area Billboards and G217 West Landfills (background), facing west (Photo471_FOX-M aerial photo.jpg)



Photo 472: FOX-M Aerial Photograph, Hazmat Storage – East Landfill (foreground), Station Area Billboards and G217 West Landfills (background), facing west (Photo472_FOX-M aerial photo.jpg)



Photo 473: FOX-M Aerial Photograph, Hazmat Storage – East Landfill (foreground), Communications Area Landfills (background), facing southwest (Photo473_FOX-M aerial photo.jpg)



Photo 474: FOX-M Aerial Photograph, Station Area Non-Hazardous Waste Landfill, facing southwest (Photo474_FOX-M aerial photo.jpg)

At Golder Associates we strive to be the most respected global company providing consulting, design, and construction services in earth, environment, and related areas of energy. Employee owned since our formation in 1960, our focus, unique culture and operating environment offer opportunities and the freedom to excel, which attracts the leading specialists in our fields. Golder professionals take the time to build an understanding of client needs and of the specific environments in which they operate. We continue to expand our technical capabilities and have experienced steady growth with employees who operate from offices located throughout Africa, Asia, Australasia, Europe, North America, and South America.

Africa	+ 27 11 254 4800
Asia	+ 86 21 6258 5522
Australasia	+ 61 3 8862 3500
Europe	+ 356 21 42 30 20
North America	+ 1 800 275 3281
South America	+ 55 21 3095 9500

solutions@golder.com
www.golder.com

Golder Associates Ltd.
1931 Robertson Road
Ottawa, Ontario, K2H 5B7
Canada
T: +1 (613) 592 9600

Golder Associates