Voluntary Response Action Plan

Vacant Property, Highway 280 and Kasota Avenue
St. Paul, Minnesota

Prepared for:
Venture Pass Partners, LLC
Mason Holdings III, LLC

June 2019

Landmark Environmental, LLC
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Table of Contents

Figures

Tables

Appendices

1.0 Introduction

Landmark Environmental, LLC (Landmark) prepared this Voluntary Response Action Plan (VRAP) on behalf of Venture Pass Partners, LLC and Mason Holdings III, LLC in connection with the property located northwest of Kasota Avenue and MN-280 in the City of St. Paul, Ramsey County, Minnesota (Property). The Property location is shown on **Figure 1**. The VRAP has been prepared in preparation for completing a real estate transaction and redeveloping the vacant Property as a surface parking lot for parking semi-trailers and management of surface water runoff. Redevelopment plans are included in **Appendix A**.

Landmark prepared a Phase I Environmental Site Assessment (ESA) Report, dated April 2019, and a Limited Phase II Environmental Investigation (Phase II Investigation) Report, dated June 2019, on behalf of Venture Pass Partners, LLC and Mason Holdings III, LLC. The findings from the Phase I ESA Report and the results presented in the Phase II Investigation Report are discussed in Sections 1.1 and 1.2 of this VRAP. In addition, Landmark completed Additional Soil Sampling (Additional Investigation) at the Property on June 18, 2019. The results of the Additional Investigation are included in Section 2 of this VRAP. The Additional Investigation was conducted to more fully determine the extent and magnitude of lead impacts to soil that was identified during the Phase II Investigation.

Venture Pass Partners, LLC and Mason Holdings III, LLC is submitting the Phase I ESA Report and Phase II Investigation Report to the Minnesota Pollution Control Agency (MPCA) Voluntary Investigation and Cleanup (VIC) Program and the MPCA Petroleum Brownfields (PB) Program for review and approval, and to request environmental assurances. In addition, Venture Pass Partners, LLC and Mason Holdings III, LLC is submitting this VRAP as well as an Environmental Construction Contingency Plan (ECCP) for review and approval prior to the redevelopment.

This VRAP describes the response actions (RAs) that will be necessary to remediate soil that is contaminated at concentrations above the applicable industrial risk-based criteria established by the MPCA. The ECCP, which has been prepared under separate cover, is also being submitted to the MPCA VIC Program and PB Program for review and approval. In addition, an updated Site Safety Plan (SSP) will be submitted to the MPCA VIC Program and PB Program for review prior to the implementation of the RAs. Upon completion of the RAs, a RA Implementation Report will be prepared and submitted to the MPCA VIC Program and PB Program for review and approval. The VRAP has been prepared in accordance with applicable MPCA guidelines and in accordance with acceptable industry standards. A copy of the applicable MPCA guidance documents are included in **Appendix B**.

1.1 Background and Phase I Summary

The Property is currently owned by Stan Koch and Sons Trucking, Inc. The Property consists of 1.668 acres of land that is currently zoned for light industrial use. The Property has never been developed. Historical aerial photographs from 1947 show surface water on the northern half and far-south sections of the Property. Surface water was no longer present by 1953, but visible again in 1966. This fluctuation may be the result of seasonal changes, precipitation or snowmelt. By 1974, the majority of the Property was occupied by surface water. By 1980, fill material appears to have been brought onto the Property because surface water is present on adjacent sites but is no longer present on the Property. The southwestern corner of the Property appears to support a stormwater pond/low-lying area between 1988 and present. The current Property owner, Stan Koch and Sons Trucking Inc., acquired the Property on February 25, 1992 and the Property has been vacant and unused since then.

Previous environmental investigations indicated that the Property supported a portion of the Elm Street Ash dump, which was used for disposal of incinerator ash containing heavy metals and other wastes. Therefore, historic uses on the Property have likely involved the use, storage, and/or disposal of hazardous substances and petroleum products, and the documented presence of impacted fill soils at the Property, likely caused by historic dumping (Elm Street Ash Dump), was identified as a Recognized Environmental Conditions (REC) in the Phase I ESA Report.

Based on the identified REC, a Limited Phase II Environmental Investigation was recommended to further understand the potential for sub-surface impacts related to the planned redevelopment.

The following previous environmental assessments and investigations were conducted at the Property and were summarized in Section 4.8 of the Phase I ESA.

- *Exploratory Soil Borings for Phillips Klein, 280 & Kasota*, prepared by Advance Surveying & Engineering, Co. and dated March 14, 1986;

- *MPCA Property File Evaluation Letter*, prepared by the MPCA and dated August 10, 1995;

- *Phase I Environmental Site Assessment, Kasota Avenue and Highway 280, St. Paul, Minnesota*, prepared by GME and dated August 17, 1995;

- *A Geotechnical Evaluation Report for Stan Koch & Sons Trucking, Proposed Manufacturing/Warehouse Building Northwest of the Intersection of Kasota Avenue and the Southbound Minnesota Highway 280 Entrance Ramp in St. Paul, Minnesota*, prepared by Braun Intertec Corporation (Braun) and dated January 15, 1996;

- *Environmental Profile, Kasota and Highway 280 Saint Paul, Ramsey County, MN*, prepared by EnPro Assessment Corp (EnPro) and dated May 21, 1996; and

- *Log of Boring Sheets and Monitoring Well Details for the Site Located in the Northwest Quadrant of Kasota Avenue and Highway 280 in St. Paul, Minnesota*, prepared by Braun and dated March 27, 1996.

1.2 Limited Phase II Investigation Summary and Results

Based on the findings from the Phase I ESA Report, Landmark conducted a Phase II Investigation at the Property on May 30, 2019 at the locations shown on **Figure 2**. In addition, Braun was onsite to conduct a geotechnical evaluation for the proposed parking lot design and their associated report is included in Appendix B of the Phase II Investigation Report. Eight test trenches, labeled Landmark Test Trench 1 (LTT-1) through LTT-8 were excavated to investigate the RECs and provide overall spatial coverage across the Property. Test trenches were excavated to an approximate depth of 5 feet below ground surface (bgs) for the collection of soil samples. Test trench logs are included in **Appendix C**.

All soil samples were screened in the field for organic headspace values with a photoionization detector (PID) equipped with an 11.7 eV bulb as well as visual observation. A total of 8 soil samples (one sample from each test trench) were analyzed at Pace Analytical Services, Inc. (Pace). Eight soil samples (one sample at each test trench) were held pending review of initial soil sampling results. Analytical parameters were determined for each location based on field screening indications of contamination, previous investigation results, and to provide spatial coverage across the Property. As such, soil samples were analyzed for Resource Conservation and Recovery Act (RCRA) metals, volatile organic compounds (VOCs), diesel range organics (DRO), polynuclear aromatic hydrocarbons (PAHs) and polychlorinated biphenyls (PCBs). Upon review of initial soil sampling results, each sample was also analyzed for lead using the toxicity characteristic leaching procedure (TCLP).

Table 1 lists the analytical results from the Phase II Investigation along with the MPCA Industrial Soil Reference Value (ISRV), the Residential SRV (RSRV), and the Tier 1 Soil Leaching Value (SLV) for comparison with MPCA criteria. Soil samples were labeled according to location and depth. For example, sample LTT-4/2-4 is a sample collected at LTT-4 from 2 to 4 feet bgs. A detailed summary of the analytical results is included in the Phase II Investigation Report. Impacts to soil at the Property were observed and/or reported at the following locations:

- Fill material was observed across the Property to depths of 5 feet bgs. Fill material was comprised of silty sand with varying amounts of gravel and debris. Field screening indications of contamination, including elevated PID readings, were observed in each test trench. A petroleum odor, elevated PID readings that ranged from 12.9 parts per million

(ppm) to 254.2 ppm, and debris consisting of concrete, brick, clay tile, glass, plastic, wood, rubber, slag/coke, ash, metal and styrofoam were observed in each of the test trenches.

- Arsenic was reported above the Tier 1 SLV in sample LTT-5/0-2', LTT-6/0-2' and LTT-7/2-4'. In addition, arsenic in sample LTT-5/0-2' was reported above the RSRV, but below the applicable MPCA ISRV criteria.

- Lead was reported in samples LTT-1/1-2' and LTT-5/0-2' above the RSRV and the lead detection in sample LTT-5/0-2' is above the MPCA ISRV. Because lead was detected in all 8 samples above 100 mg/kg, each sample was analyzed for TCLP lead. TCLP lead sample was not detected above the Pace MDL.

- Mercury was reported above the RSRV in sample LTT-5/0-2', but well below the Tier 1 SLV and the applicable MPCA ISRV criteria.

- Total PCBs were detected in the 8 soil samples above the Tier 1 SLV. In addition, total PCBs were detected above the RSRV in samples LTT-1/1-2', LTT-2/2-3', LTT-4/2-4', LTT-5/0-2' and LTT-7/2-4'. Total PCBs were not detected above the MPCA ISRV.

- Soil samples LTT-4/2-4', LTT-6/0-2' and LTT-7/2-4' were submitted to Pace for laboratory analysis of VOCs. Of the 14 VOCs detected, all of the detected VOCs were reported below the Tier 1 SLVs, RSRVs and the applicable MPCA ISRV criteria, except for benzene, ethylbenzene and TCE. Benzene was detected above the Tier 1 SLV in sample LTT-7/2-4', but below the RSRV and the ISRV. Ethylbenzene was detected above the Tier 1 SLV in sample LTT-7/2-4', but well below the RSRV and the ISRV. TCE was detected in samples LTT-4/2-4', LTT-6/0-2' and LTT-7/2-4' above the Tier 1 SLV, but well below the RSRV and the ISRV.

- DRO was reported in each of the 8 samples. Except for the DRO sample at LTT-8, DRO was reported above the MPCA BMP criteria of 100 mg/kg in each of the samples.

- PAHs were reported in each sample; however, concentrations were reported below the MPCA ISRV, RSRV and the Tier 1 SLV.

Of the parameters detected in the 8 soil samples, lead was the only parameter detected above the applicable MPCA action criteria of Industrial Soil Reference Value (ISRV) of 700 milligrams per kilogram (mg/kg). Lead was detected at 1,430 mg/kg in sample LTT-5/0-2'. Based on this result, Landmark conducted an Additional Investigation to delineate the horizontal extent of the lead impacted soil, as summarized in Section 2.0.

2.0 Additional Investigation Sampling

Landmark completed the field work portion of the Additional Investigation on June 18, 2019, at the locations shown on **Figure 2**. Eight hand auger borings, labeled Landmark Test Trench 5 – Sidewall 1 (LTT5-SW1) through LTT5-SW8, were advanced to delineate the lateral extent of near-surface lead impacts to soil in the vicinity of LTT-5. The Additional Investigation activities were conducted in accordance with Landmark Standard Operation Procedures (SOPs), included in **Appendix D**, and in accordance with applicable MPCA guidelines.

2.1 Summary of the Additional Investigation Activities

Soil descriptions and field screening results for the samples collected during the Additional Investigation were consistent with the result from LTT-5. Debris consisting of concrete, glass, slag/coke, metal, clay tile, wood, plastic, brick and fabric were observed throughout each location. Soil samples are labeled according to location and depth. For instance, sample LTT5-SW1/0-2 was collected at location LTT5-SW1 from ground surface to 2 feet bgs. All soil samples were screened in the field for organic headspace values with a PID equipped with an 11.7 eV bulb as well as visual observation.

Table 2 lists the PID reading for each sample as well as the lead concentrations for samples analyzed at Pace. An elevated PID reading was observed in LTT5-SW1 at 65.4 ppm; otherwise, no other elevated PID readings were measured during the Additional Investigation. Eight soil samples (one sample at each hand auger boring) were submitted to Pace for analysis of lead. The four "outer delineation" hand auger soil samples were held pending review of initial "inner delineation" analytical results.

2.2 Additional Investigation Laboratory Results

Lead detections for the soil samples are listed in **Table 2** along with the MPCA SLV, RSRV, and the ISRV for comparison purposes. Lead was detected in the initial "inner delineation" soil samples at concentrations between 245 mg/kg to 1,230 mg/kg. The lead concentration in sample LTT-5/SW2 was reported at 245 mg/kg, which is below the ISRV (700 mg/kg) the RSRV (300 mg/kg) and the Tier 1 SLV (2,700 mg/kg). Concentrations of lead in samples LTT5-SW1 (369 mg/kg) and LTT5-SW4 (388 mg/kg) were reported above the RSRV, but below the ISRV and Tier 1 SLV. In sample LTT5-SW3, lead was reported at 1,230 mg/kg, which exceeds the ISRV and RSRV; therefore, outer delineation sample LTT5-SW7 was also analyzed for lead. As listed on **Table 2**, lead was detected in sample LTT5-SW7 at 236 mg/kg, which is below the RSRV and ISRV. As shown on **Figure 3**, the area of lead impacts to soil at concentrations above the MPCA ISRV measures approximately 15 feet (east-west) by 20 feet (north-south). The Pace laboratory reports are included in **Appendix E**.

3.0 Voluntary Response Action Plan

This section describes the proposed RAs, based on the results of the Phase II Investigation and Additional Investigation and taking into account the proposed redevelopment for construction of a surface parking lot with stormwater improvements on the Property. This section proposes cleanup goals, summarizes environmental issues to be addressed as part of the implementation of the VRAP, and explains elements of the proposed RAs necessary to obtain approval from the MPCA VIC Program, taking into account potential redevelopment plans for the Property.

3.1 Current and Planned Future Use of the Property

Redevelopment plans are included in **Appendix A**. Plans for the Property include constructing a paved surface parking lot for parking semi-trailers. Improvements will include a paved parking lot and driveway, perimeter chain link fencing, site lighting and the construction of a stormwater pond and associated stormwater manhole structures. The stormwater pond is located in the southwest corner of the Property, at Phase II Investigation location LTT-4.

Based on the results of the Phase II Investigation and Additional Investigation, Landmark estimates that approximately 50 tons of soil and fill material containing buried debris will need to be excavated from Phase II Investigation location LTT-5 (identified as Hot Spot 1) and transported off-site to a permitted RCRA Subtitle D landfill to meet the proposed cleanup goal proposed in this VRAP. The location of Hot Spot 1 is shown on **Figure 3**. Hot Spot 1 is defined as fill material containing buried debris and soil, which was documented during the Phase II Investigation as having one or more chemicals of concern (COCs) at concentrations above applicable MPCA risk-based criteria for a commercial/industrial use and petroleum action criteria.

Based on the results of the Phase II Investigation and Braun's geotechnical evaluation, soil that is located outside the Hot Spot 1 area that is excavated as part of the redevelopment can be reused on the Property. Any excavated soil that cannot be reused on the Property as part of the redevelopment must be transported off-site to a permitted RCRA Subtitle D landfill. If large debris is found in any excavated fill material, the debris will be transported off-site to a permitted landfill. Additional RAs needed to address contaminated and/or debris soil encountered during future redevelopment of the Property will be addressed as part of the ECCP implementation.

3.2 Chemicals of Concern and Action Levels/Cleanup Goals

Based upon the Phase II Investigation and Additional Investigation results, lead, debris, and petroleum are the primary chemicals of concern (COCs) in soil. Concentrations above the

applicable MPCA ISRVs as well as MPCA criteria for "unregulated excess fill" for these COCs were reported in soil samples as discussed below.

The proposed soil cleanup goals for the RAs described in this VRAP are the MPCA ISRVs and MPCA petroleum action limits, based on field screening indications of contamination (i.e., organic vapor headspace concentrations with PID readings measured less than 200 ppm, presence of discoloration, odor, or sheen). The locations and approximate size of the Hot Spot is shown on **Figure 3**.

3.3 Response Actions

The proposed RAs generally consist of the following elements and are described in more detail in the following sections:

- The SSP will be updated to include results from the Phase II Investigation and Additional Investigation as pertaining to the RAs, and necessary permits will be obtained.

- Recyclable materials, including asphalt (if necessary), and solid waste items will be properly removed.

- Soil RAs shown on **Figure 3** are based on the results of the Phase II Investigation and Additional Investigation and include excavation of soil in the vicinity of Hot Spot 1. Hot Spot 1 is located in the northwest portion of the Property at Phase II Investigation loation LTT-5. Soil contaminants at Hot Spot 1 include lead above the ISRV, DRO detected above unregulated fill criteria, and buried debris including concrete, brick, clay tile, glass, plastic, wood, slag/coke, metal and fabric. The approximate dimensions of Hot Spot 1 are 15 feet (east-west) by 20 feet (north-south). The Hot Spot 1 area will be excavated to 2 feet bgs. A total of 50 tons of soil and debris is estimated to be excavated from Hot Spot 1.

- Although groundwater related RAs are not necessary, if excavation dewatering is necessary during construction as a result of the collection of precipitation and stormwater runoff, the water will be properly managed during construction and RA implementation activities.

- Standard dust and runoff control measures will be implemented during construction and RA implementation activities.

- An MPCA-approved ECCP will be implemented during RA implementation and future redevelopment activities, and a trained environmental professional will be on-site during all earthwork activities.

3.3.1 Excavation and Verification Soil/Fill Material Sampling Plan

The soil and fill material containing buried debris in the Hot Spot 1 area will be excavated to depths necessary to meet the proposed cleanup goals of this VRAP. Landmark estimates that a total of approximately 50 tons of contaminated soil/fill material will need to be excavated to meet proposed risk-based cleanup criteria and petroleum action limits. This soil and the fill material containing buried debris will be excavated and transported off-site to a permitted RCRA Subtitle D landfill. All proposed excavation and backfilling work will be completed using standard construction equipment (backhoes, loaders, and dump trucks).

Additional waste profile samples will be analyzed and submitted with analytical reports for approval to the disposal facility, if necessary. Waste profile forms will be completed prior to excavation and disposal. Because lead was reported above 100 mg/kg in the soil samples analyzed as part of the Phase II Investigation, the samples were also analyzed for lead using the TCLP method, and lead was not detected in any of the samples; therefore, this soil can be disposed at a RCRA Subtitle D landfill. If future waste profile information identify any soil or fill material that exceeds TCLP criteria, the soil and fill material will be segregated from other soils and stockpiled. This material may require on-site or off-site treatment at an appropriate facility, depending on the soil characteristics. For example, lead contaminated soil or fill material failing TCLP criteria can be stabilized on-site and then disposed off-site at a permitted landfill after meeting TCLP criteria.

Following RA implementation, Venture Pass Partners, LLC and their excavation contractor will make every effort to reuse excavated non-Hot Spot soil on-site. If for some reason, the soil is not reused on-site, the soil may need to be transported to a permitted Subtitle D landfill for disposal.

All soil excavated or graded outside the Hot Spot area will be field screened and properly characterized prior to disposal off-site at a permitted landfill or reuse on-site. An estimated volume of 1,255 tons of soil and debris will be excavated for construction of a stormwater pond in the southwest corner of the Property at Phase II Investigation location LTT-4. As listed in **Table 1**, soil excavated as part of the stormwater pond construction is expected to meet VRAP Cleanup goals for the COCs listed above, as PID readings were measured at 3.8 ppm, DRO was detected at 159 mg/kg, and lead was reported at 208 mg/kg. However, as listed in the test trench log for LTT-4, the soil and fill material between 1 and 5 feet bgs contains debris and therefore, this material may not be able to be reused as part of the redevelopment.

Clean fill material may be imported and placed following RA implementation. If the clean fill material is obtained from a commercial gravel pit or from a native soil source, analytical samples of the clean fill will not be conducted. However, if the clean fill material is obtained from a

"developed property", samples will be collected to determine that the fill material meets proposed cleanup goals for the Property and the definition of Unregulated Excess Fill. The sampling frequency and analytical parameters for the imported clean fill material, which will follow applicable MPCA guidelines, will be reported to the MPCA.

A trained environmental field representative will be on-site to observe excavated, stockpiled and underlying soils for field screening evidence of contamination (e.g., organic vapor concentrations using a PID, odor, discoloration, and presence of chemical containers or asbestos) during RA implementation. If field screening observation results indicate the presence of unexpected impacted soils or other unexpected conditions (e.g., buried drum), the environmental field representative will implement the procedures identified in the MPCA-approved ECCP.

Once excavation limits have been reached to meet the proposed cleanup goals in the Hot Spot, no further excavation is proposed to be completed, besides the stormwater pond excavation. All soil and fill material excavated outside the Hot Spot area will be managed in accordance with MPCA guidelines and as described in this VRAP and the ECCP.

3.3.2 Contaminated Water during Redevelopment

Groundwater beneath the Property will not be used for any purpose as part of the planned redevelopment. If storm water collects in any excavations during construction and requires dewatering, a water discharge permit may be necessary if water is in contact with impacted fill material or soil. If dewatering is necessary, the water will be discharged to the sanitary sewer with a permit from the Metropolitan Council Environment Services.

3.4 Environmental Contingency Plan

An ECCP will be prepared by Landmark to address any unexpected environmental issues that are encountered during the implementation of the RAs and future redevelopment activities. The ECCP will be submitted to the MPCA VIC Program and the PB Program for review and approval. Potential COCs will be field screened and sampled in accordance with the MPCA-approved ECCP.

3.5 Site Safety, Run-off Control and Dust Control

Possible short-term risks include the risk of the workers coming into direct contact with contaminated soil and fill material. Standard MPCA recognized surface water run-off and dust control procedures will be implemented, as necessary, during earthwork activities and onsite workers will operate under the updated SSP when dealing with potential unexpected hazardous materials. The updated SSP will be submitted to the MPCA prior to implementation of the RAs.

3.6 Institutional Controls

Following the RA implementation activities, the appropriate institutional control will be prepared and filed with Ramsey County prior to the MPCA's review and approval of the RA Implementation Report.

3.7 Response Action Implementation Report

An RA Implementation Report summarizing the RAs and any analytical results will be submitted to the MPCA for review and approval. The RA Implementation Report will include the following: (1) data, results, and record drawings of the RAs (maps of actual soil excavation areas and placement of clean fill); (2) follow-up actions, if any; (3) discussion of any changes in the RAs with a discussion of why the changes were necessary; (4) discussion of any difficulties encountered during the implementation, which may alter or impair the effectiveness of the RAs and (5) spatial data requirements. Following review of the RA Implementation Report, the MPCA VIC Program is requested to issue a RA Implementation Report Approval letter and a No Further Action Letter.

3.5 Schedule

The following RA implementation schedule is anticipated; MPCA staff will be notified of schedule changes:

Submit VRAP and ECCP to the MPCA ..... July 2019

MPCA Reviews and Approves of VRAP and ECCP ..... Within 30 Business Days

Submit SSP to the MPCA ..... Prior to RA Implementation Activities

Begin RA Implementation ..... Summer 2019/Fall 2019

Submit RA Implementation Report ..... Within 60 Days Following RA Completion

Figures

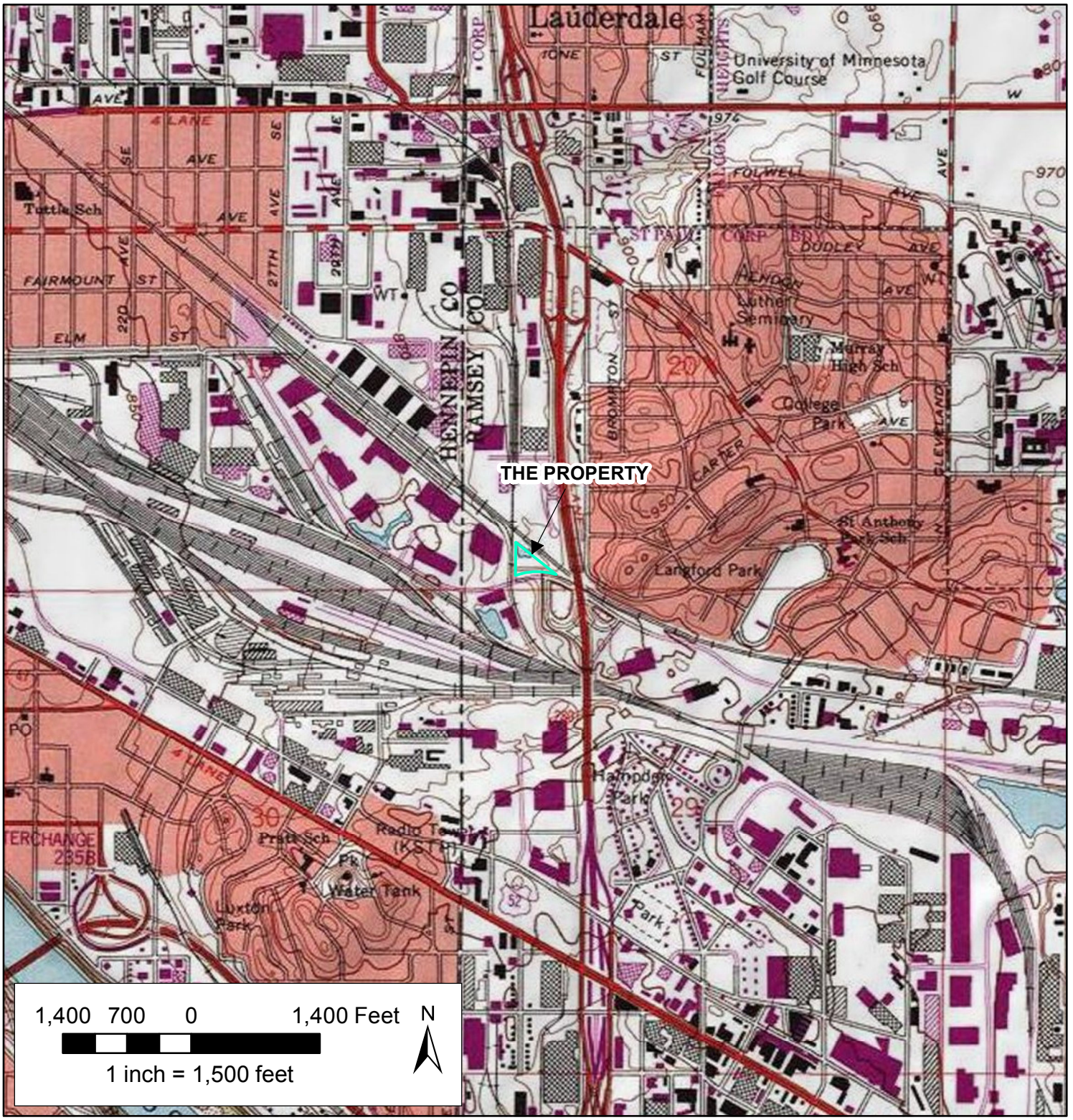

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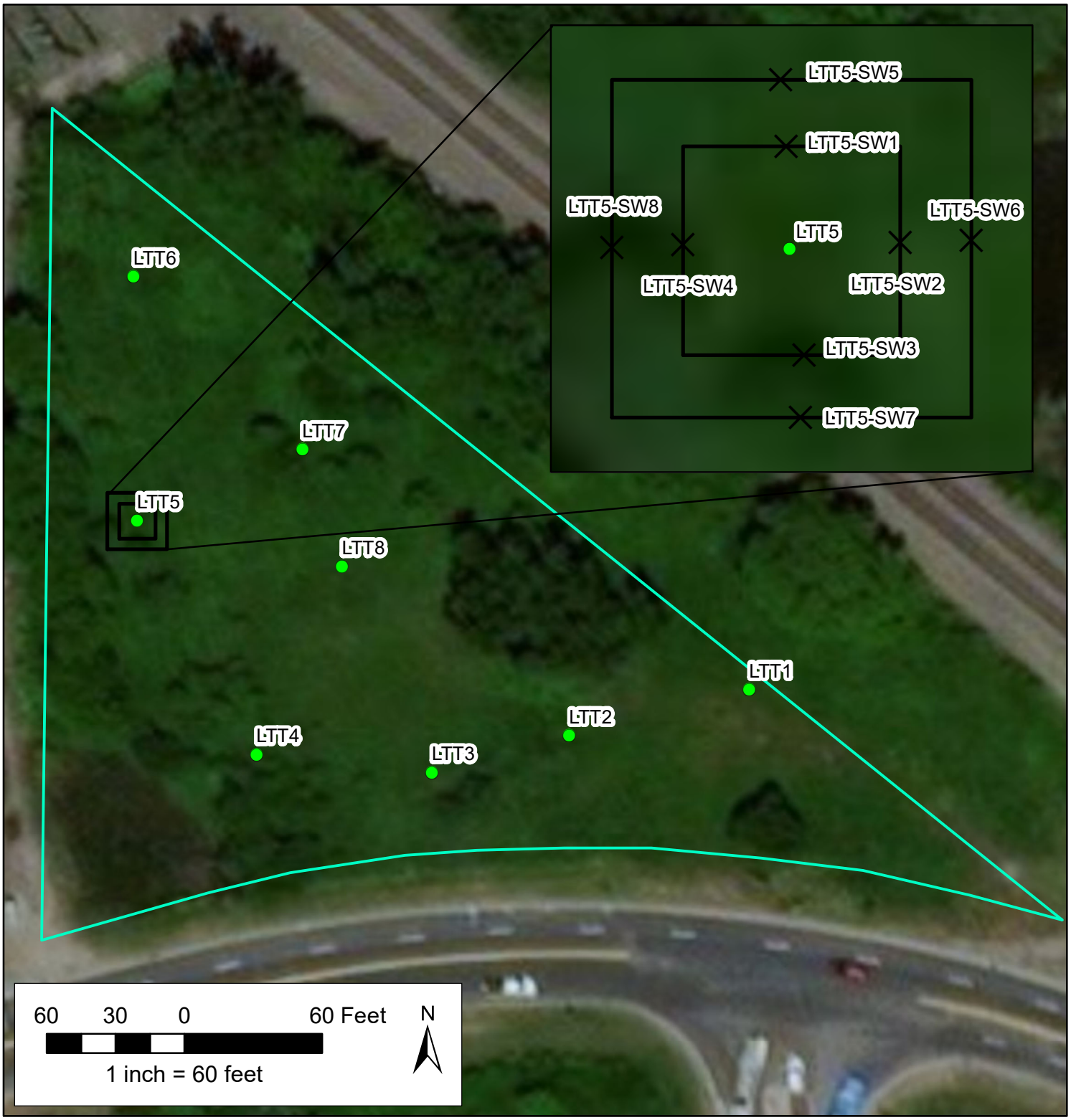
Figure 1

PROPERTY LOCATION MAP
NW of Kasota Ave and MN-280
St. Paul, Minnesota

LANDMARK ENVIRONMENTAL, LLC



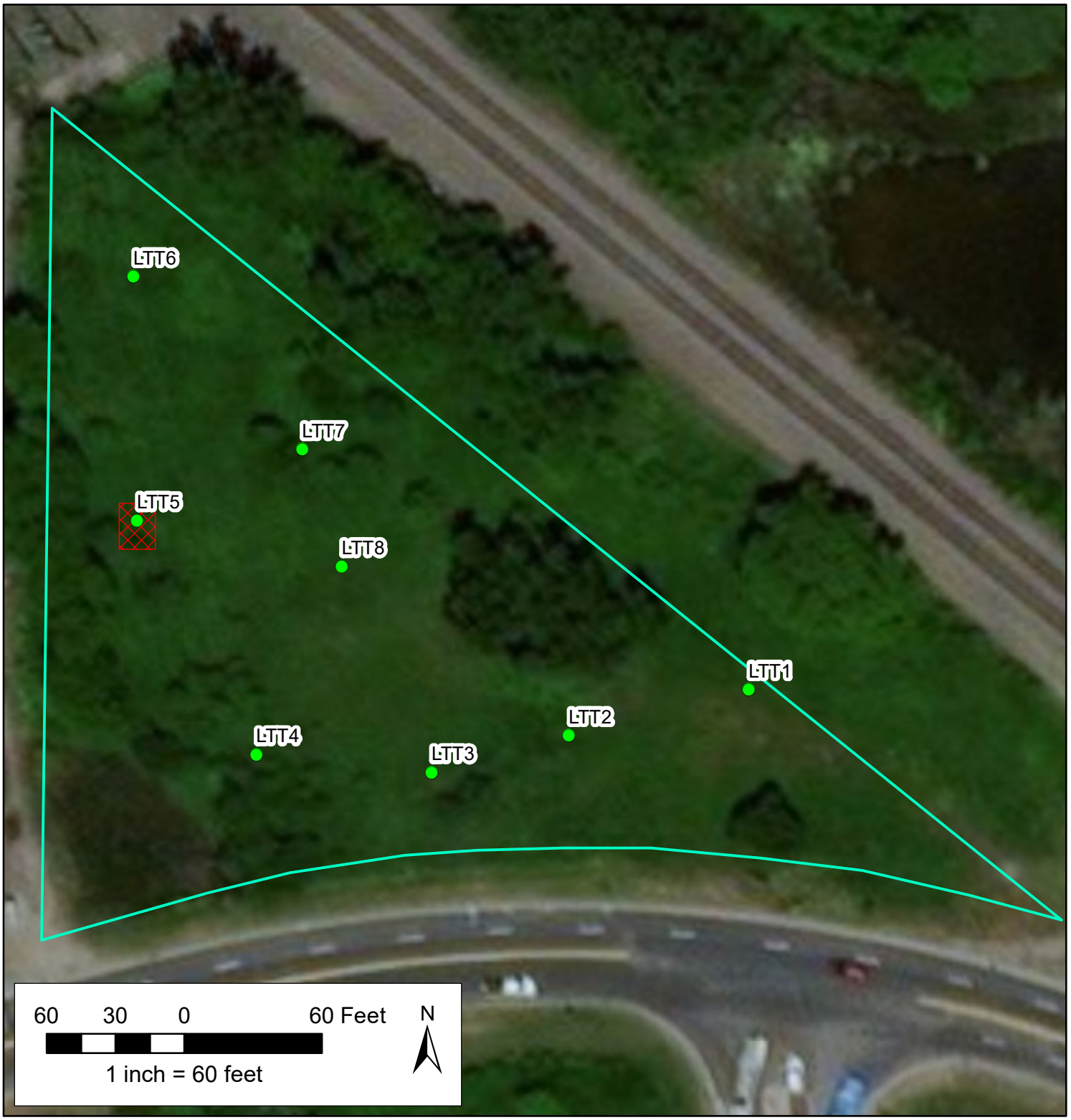
Legend

- Property Boundary
- Tax Parcels
- Test Trench Locations
- Delineation Sampling Locations

Figure 2

PROPERTY LAYOUT MAP WITH INVESTIGATION LOCATIONS
NW of Kasota Ave and MN-280
St. Paul, Minnesota

LANDMARK ENVIRONMENTAL, LLC



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Legend

- Property Boundary
- Tax Parcels
- Test Trench Locations
- Hot Spot 1

Figure 3

PROPERTY LAYOUT MAP WITH HOT SPOT
NW of Kasota Ave and MN-280
St. Paul, Minnesota

LANDMARK ENVIRONMENTAL, LLC

Tables

Table 1
Laboratory Soil Data - Detected Parameters
Vacant Property, Highway 280 and Kasota Avenue, St. Paul, Minnesota
(Results in mg/kg)

Sample Name	MPCA	MPCA	MPCA	US EPA[1]	LTT-1	LTT-2	LTT-3	LTT-4
Depth	2013	2009	2009	Characteristic Waste	1-2'	2-3'	0-2'	2-4'
Soil Type	Tier 1	Residential	Industrial	for Toxicity for	Fill	Fill	Fill	Fill
Date Collected	SLVs	SRVs	SRVs	Landfill Disposal	5/30/2019	5/30/2019	5/30/2019	5/30/2019
Petroluem								
PID Readings (ppm)	10	10	10	NS	0.0	**1.2**	0.0	**3.8**
DRO	100*	100*	100*	NS	**151**	**171**	**128**	**159**
PCBs	0.13	1.2	8	NS	**4.0**	**5.5**	**0.37**	**3.3**
RCRA Metals								
Arsenic	5.8	9	20	NS	**4.5**	**4.6**	**3.8**	**4.5**
Barium	1,700	1,100	18,000	NS	**119**	**123**	**62.7**	**110**
Cadmium	8.8	25	200	NS	**0.95**	**1.0**	**0.55**	**0.84**
Chromium (III/VI)	1000000000/36	44000/87	100000/650	NS	**43.9**	**43.3**	**30.5**	**23.5**
Lead	2,700	300	700	NS	**579**	**260**	**154**	**208**
Selenium	2.6	160	1,300	NS	<1.1	<1.1	<1.1	<1.1
Silver	7.9	160	1,300	NS	**0.62**	**0.58**	**0.59**	<0.57
Mercury	3.3	0.5	1.5	NS	**0.19**	**0.28**	**0.12**	**0.23**
TCLP RCRA Metals (mg/L)								
Lead	NS	NS	NS	5.0	<0.10	<0.10	<0.10	<0.10
VOCs								
1,2,4-Trimethylbenzene	2.7	8	25	NS	NA	NA	NA	**0.12**
1,2-Dichlorobenzene	11	26	75	NS	NA	NA	NA	<0.063
1,3,5-Trimethylbenzene	2.7	3	10	NS	NA	NA	NA	<0.063
Benzene	0.017	6	10	NS	NA	NA	NA	<0.025
Ethylbenzene	1	200	200	NS	NA	NA	NA	**0.64**
Isopropylbenzene (Cumene)	9.5	30	87	NS	NA	NA	NA	<0.063
Naphthalene	4.5	10	28	NS	NA	NA	NA	<0.25
Toluene	2.5	107	305	NS	NA	NA	NA	**0.19**
Trichloroethene (TCE)	0.0023	29	46	NS	NA	NA	NA	**0.099**
Xylene (Total)	5.4	45	130	NS	NA	NA	NA	**0.52**
n-Butylbenzene	NS	30	92	NS	NA	NA	NA	<0.063
n-Propylbenzene	NS	30	93	NS	NA	NA	NA	<0.063
p-Isopropyltoluene	NS	NS	NS	NS	NA	NA	NA	<0.063
sec-Butylbenzene	NS	25	70	NS	NA	NA	NA	<0.063
PAHs								
Acenaphthene	81	1,200	5,260	NS	**0.027**	**0.028**	**0.041**	**0.019**
Acenaphthylene	NS	NS	NS	NS	**0.018**	**0.022**	**0.014**	<0.012
Anthracene	1,300	7,880	45,400	NS	**0.078**	**0.076**	**0.070**	**0.052**
Benzo(a)anthracene	BaP Eq	BaP Eq	BaP Eq	NS	**0.33**	**0.24**	**0.41**	**0.19**
Benzo(a)pyrene	BaP Eq	BaP Eq	BaP Eq	NS	**0.39**	**0.31**	**0.65**	**0.20**
Benzo(b)fluoranthene	BaP Eq	BaP Eq	BaP Eq	NS	**0.63**	**0.46**	**0.90**	**0.30**
Benzo(g,h,i)perylene	NS	NS	NS	NS	**0.34**	**0.28**	**0.51**	**0.17**
Benzo(k)fluoranthene	BaP Eq	BaP Eq	BaP Eq	NS	**0.24**	**0.17**	**0.37**	**0.11**
Chrysene	BaP Eq	BaP Eq	BaP Eq	NS	**0.47**	**0.31**	**0.58**	**0.24**
Dibenz(a,h)anthracene	BaP Eq	BaP Eq	BaP Eq	NS	**0.097**	**0.075**	**0.12**	**0.051**
Fluoranthene	670	1,080	6,800	NS	**0.59**	**0.44**	**0.58**	**0.31**
Fluorene	110	850	4,120	NS	**0.026**	**0.032**	**0.039**	**0.029**
Indeno(1,2,3-cd)pyrene	BaP Eq	BaP Eq	BaP Eq	NS	**0.26**	**0.21**	**0.42**	**0.13**
Napththalene	4.5	10	28	NS	**0.14**	**0.13**	**0.30**	**0.077**
Phenanthrene	NS	NS	NS	NS	**0.33**	**0.30**	**0.37**	**0.22**
Pyrene	440	890	5,800	NS	**0.57**	**0.39**	**0.59**	**0.28**
Total BaP Equivalent	1.4	2	3	NS	**0.59**	**0.47**	**0.94**	**0.30**

Footnotes:

[1] As defined under 40 CFR 261 Subpart C. Analytical method is Toxicity Characteristics Leaching Procedure (TCLP) under US EPA SW-846 Method 1311

* Meets MPCA Unregulated Fill Criteria for DRO

BaP Eq: benzo(a)pyrene equivalent

DRO: diesel range organics

mg/kg: milligrams per kilogram

mg/L: milligrams per liter

MPCA: Minnesota Pollution Control Agency

NA: not analyzed

NS: no standard

PAHs: polynuclear aromatic hydrocarbons

PCBs: polychlorinated biphenyls

PID: photoionization detector

ppm: parts per million

RCRA: Resource Conservation Recovery Act

SLV: Soil Leaching Value

SRV: Soil Reference Value

VOCs: Volatile Organic Compounds

Table 1
Laboratory Soil Data - Detected Parameters
Vacant Property, Highway 280 and Kasota Avenue, St. Paul, Minnesota
(Results in mg/kg)

Sample Name	MPCA	MPCA	MPCA	US EPA[1]	LTT-5	LTT-6	LTT-7	LTT-8
Depth	2013	2009	2009	Characteristic Waste	0-2'	0-2'	2-4'	0-2'
Soil Type	Tier 1	Residential	Industrial	for Toxicity for	Fill	Fill	Fill	Fill
Date Collected	SLVs	SRVs	SRVs	Landfill Disposal	5/30/2019	5/30/2019	5/30/2019	5/30/2019
Petroluem								
PID Readings (ppm)	10	10	10	NS	0.0	0.0	**50.2**	0.0
DRO	100*	100*	100*	NS	**163**	**106**	**1,660**	**89.2**
PCBs	0.13	1.2	8	NS	**2.6**	**0.40**	**3.5**	**0.67**
RCRA Metals								
Arsenic	5.8	9	20	NS	**10.3**	**5.9**	**7.1**	**5.4**
Barium	1,700	1,100	18,000	NS	**242**	**138**	**191**	**98.5**
Cadmium	8.8	25	200	NS	**6.8**	**5.4**	**2.1**	**1.1**
Chromium (III/VI)	1000000000/36	44000/87	100000/650	NS	**59.5**	**43.9**	**61.2**	**75.1**
Lead	2,700	300	700	NS	**1,430**	**261**	**268**	**173**
Selenium	2.6	160	1,300	NS	<1.2	<1.2	<1.3	<1.3
Silver	7.9	160	1,300	NS	**0.69**	**0.82**	**2.0**	**0.66**
Mercury	3.3	0.5	1.5	NS	**0.51**	**0.25**	**0.16**	**0.20**
TCLP RCRA Metals (mg/L)								
Lead	NS	NS	NS	5.0	<0.10	<0.10	<0.10	<0.10
VOCs								
1,2,4-Trimethylbenzene	2.7	8	25	NS	NA	**0.18**	**1.6**	NA
1,2-Dichlorobenzene	11	26	75	NS	NA	<0.085	**0.090**	NA
1,3,5-Trimethylbenzene	2.7	3	10	NS	NA	**0.085**	**0.36**	NA
Benzene	0.017	6	10	NS	NA	<0.034	**0.14**	NA
Ethylbenzene	1	200	200	NS	NA	**0.39**	**2.6**	NA
Isopropylbenzene (Cumene)	9.5	30	87	NS	NA	<0.085	**0.16**	NA
Naphthalene	4.5	10	28	NS	NA	<0.34	**0.61**	NA
Toluene	2.5	107	305	NS	NA	**0.59**	**0.73**	NA
Trichloroethene (TCE)	0.0023	29	46	NS	NA	**0.09**	**0.10**	NA
Xylene (Total)	5.4	45	130	NS	NA	**1.3**	**3.4**	NA
n-Butylbenzene	NS	30	92	NS	NA	<0.085	**0.43**	NA
n-Propylbenzene	NS	30	93	NS	NA	<0.085	**0.51**	NA
p-Isopropyltoluene	NS	NS	NS	NS	NA	<0.085	**0.17**	NA
sec-Butylbenzene	NS	25	70	NS	NA	<0.085	**0.29**	NA
PAHs								
Acenaphthene	81	1,200	5,260	NS	**0.040**	<0.062	**0.081**	<0.027
Acenaphthylene	NS	NS	NS	NS	**0.022**	**0.080**	**0.027**	<0.027
Anthracene	1,300	7,880	45,400	NS	**0.16**	**0.098**	**0.055**	**0.073**
Benzo(a)anthracene	BaP Eq	BaP Eq	BaP Eq	NS	**0.92**	**0.44**	**0.17**	**0.29**
Benzo(a)pyrene	BaP Eq	BaP Eq	BaP Eq	NS	**0.88**	**0.47**	**0.22**	**0.35**
Benzo(b)fluoranthene	BaP Eq	BaP Eq	BaP Eq	NS	**1.3**	**0.75**	**0.32**	**0.47**
Benzo(g,h,i)perylene	NS	NS	NS	NS	**0.63**	**0.43**	**0.21**	**0.30**
Benzo(k)fluoranthene	BaP Eq	BaP Eq	BaP Eq	NS	**0.48**	**0.26**	**0.11**	**0.20**
Chrysene	BaP Eq	BaP Eq	BaP Eq	NS	**0.94**	**0.51**	**0.26**	**0.35**
Dibenz(a,h)anthracene	BaP Eq	BaP Eq	BaP Eq	NS	**0.19**	**0.15**	**0.058**	**0.09**
Fluoranthene	670	1,080	6,800	NS	**1.3**	**0.70**	**0.29**	**0.43**
Fluorene	110	850	4,120	NS	**0.039**	<0.062	**0.11**	<0.027
Indeno(1,2,3-cd)pyrene	BaP Eq	BaP Eq	BaP Eq	NS	**0.52**	**0.34**	**0.16**	**0.23**
Napththalene	4.5	10	28	NS	**0.18**	**0.14**	**0.44**	**0.14**
Phenanthrene	NS	NS	NS	NS	**0.63**	**0.39**	**0.38**	**0.36**
Pyrene	440	890	5,800	NS	**1.2**	**0.67**	**0.35**	**0.40**
Total BaP Equivalent	1.4	2	3	NS	**1.3**	**0.74**	**0.33**	**0.52**

Footnotes:

[1] As defined under 40 CFR 261 Subpart C. Analytical method is Toxicity Characteristics Leaching Procedure (TCLP) under US EPA SW-846 Method 1311

* Meets MPCA Unregulated Fill Criteria for DRO

BaP Eq: benzo(a)pyrene equivalent

DRO: diesel range organics

mg/kg: milligrams per kilogram

mg/L: milligrams per liter

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NA: not analyzed

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PAHs: polynuclear aromatic hydrocarbons

PCBs: polychlorinated biphenyls

PID: photoionization detector

ppm: parts per million

RCRA: Resource Conservation Recovery Act

SLV: Soil Leaching Value

SRV: Soil Reference Value

VOCs: Volatile Organic Compounds

Table 2
Laboratory Soil Data - Detected Parameters
Vacant Property, Highway 280 and Kasota Avenue, St. Paul, Minnesota
(Results in mg/kg)

Sample Name	MPCA	MPCA	MPCA	LTT5-SW1	LTT5-SW2	LTT5-SW3	LTT5-SW4	LTT5-SW7
Depth	2013	2009	2009	0-2'	0-2'	0-2'	0-2'	0-2'
Soil Type	Tier 1	Residential	Industrial	Fill	Fill	Fill	Fill	Fill
Date Collected	SLVs	SRVs	SRVs	6/18/2019	6/18/2019	6/18/2019	6/18/2019	6/18/2019
Petroluem								
PID Readings (ppm)	10	10	10	**65.4**	**1.8**	0.0	0.0	**0.1**
RCRA Metals								
Lead	2,700	300	700	**369**	**245**	**1,230**	**388**	**236**

Footnotes:
mg/kg: milligrams per kilogram
MPCA: Minnesota Pollution Control Agency
ND: not detected above laboratory method detection limits
PID: photoionization detector
ppm: parts per million
RCRA: Resource Conservation Recovery Act
SLV: Soil Leaching Value
SRV: Soil Reference Value

Appendices

Appendix A

CONCEPT PLAN ANALYSIS

AREA

GROSS SITE AREA	1.75 AC
PAVEMENT AREA	1.00 AC
IMPERVIOUS SURFACE COVERAGE	57.1%

SETBACKS - LIGHT INDUSTRIAL

FRONT	0 FEET
REAR YARD	0 FEET
SIDE YARD	0 FEET

STORMWATER
MWMO:
2, 10, 100-YR RATE CONTROL
FTO 2 - 60% TP REMOVAL REQUIREMENT

CITY OF ST. PAUL:
1.64 CFS/ACRE MAX DISCHARGE

Stormwater Pond

Proprietary Stormwater Filtration Structure

Construct MH over existing storm line.

RAMP FOR SOUTH BOUND S.T.H. NO. 280

NORTH

0 50 100
SCALE IN FEET

Feb 13, 2019 - 3:26pm - User:evogel L\PROJECTS\2162i\CAD\Civil\Conceptual\Concept 4\2019-01-25 - Concept Site Plan_sheet.dwg

Sambatek
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12800 Whitewater Drive, Suite 300
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763.476.6010 telephone
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Engineering | Surveying | Planning | Environmental

Client
VENTURE PASS PARTNERS

Project
280 TRAILER STORAGE

Location
ST PAUL, MN

Certification

Summary
Approved: Drawn: EAV

Revision History

No.	Date	By	Submittal / Rev.

Sheet Title
CONCEPT 4

Sheet No. Revision
CP-4

Project No. 21625

Appendix B

Brownfield Program Response Action Plans

Petroleum Brownfields and Voluntary Investigation and Cleanup Programs

This document provides guidance on developing a Response Action Plan (RAP) for properties enrolled in the Minnesota Pollution Control Agency's (MPCA) Brownfield Program. The Brownfield Program consists of two integrated programs, the Petroleum Brownfields (PB) Program, which handles petroleum contamination under the Petroleum Tank Release Cleanup Act (Minn. Stat. 115C), and the Voluntary Investigation and Cleanup (VIC) Program, which handles hazardous substance contamination under Minnesota's Environmental Response and Liability Act (Minn. Stat. 115B). For a general description of Brownfield Program services and the types of liability assurance letters offered, see the Brownfield Program Services guidance document on the MPCA's Brownfields webpage. An application for enrollment in the MPCA's Brownfield Program can also be downloaded from that location.

I. Overview

State law requires that all persons properly manage contaminated soil and water they uncover or disturb, even if they are not the party responsible for the contamination. Improper management of contaminated soil or water can expose a landowner or developer to environmental liability and administrative penalties and/or fines. In addition, response actions may be necessary at a brownfield site to manage risk to human health or the environment posed by potential exposure to contaminants or to mitigate risk to groundwater or surface water.

To ensure that these issues are properly addressed, a party can seek Brownfield Program approval of a RAP and/or a Construction Contingency Plan (CCP). Collectively, these two documents cover the range of planned or potential response actions that may be necessary at a brownfield site. A RAP is designed to remediate and/or manage contaminated media known to be present based on site sampling data, while a CCP is prepared to manage previously unidentified environmental issues that may be encountered during response actions or other site activities. A CCP may be a stand-alone document or it may be a component of a RAP.

Response actions proposed in a RAP fall into two general categories:

1. **Risk-based response actions** to remediate source areas at a site and mitigate potential risk to human health or the environment caused by contaminated soil, groundwater, surface water, or soil vapor; or
2. **Construction-related response actions** to properly manage contaminated soil that does not pose a risk at the site, given the existing conditions and planned property use, but needs to be removed solely for construction or geotechnical purposes. If soil to be removed during redevelopment activities has contamination at concentrations or depths that do not warrant a risk-based response action at the site, the planned excavation and management of that soil should be described as a construction-related response action.

Successful implementation of a RAP or CCP and subsequent submittal of an Implementation Report may lead to an Implementation Report approval letter, which provides MPCA confirmation that the reported cleanup and/or management of contaminated media was appropriate and in accordance with

MPCA requirements. In addition, the VIC Program may issue a No Action/No Further Action Determination or a Certificate of Completion for hazardous substance contamination, provided that all requirements for those assurances have been met, and/or the PB program may issue closure of the petroleum release site file.

Note that response actions and/or other site improvements related to redevelopment of the property are not eligible for Petrofund reimbursement.

II. Site investigation and risk evaluation

Before submitting a RAP or CCP for MPCA Brownfield Program review, a current Phase I Environmental Site Assessment (ESA) must be prepared, and a site investigation must be conducted to define the extent and magnitude of contamination. The MPCA's review of the Phase I ESA and site investigation report(s) may lead to comments or identify gaps in information that need to be addressed before MPCA review and approval of a RAP or CCP. A risk evaluation must also be completed to define any risks to human health and the environment posed by the contamination. The risk evaluation must take into account current receptors as well as risk exposure pathways that may be created due to a planned change in land use. For a site enrolled in the MPCA's Brownfield Program, the risk evaluation is included in the site investigation report through an evaluation of the cumulative set of data collected at the site with respect to potential exposure pathways for the current and planned property use.

The PB Program requires sites to be addressed in accordance with Petroleum Remediation Program (PRP) guidance documents. For a site in the PB Program, a Limited Site Investigation (LSI) or a Remedial Investigation (RI) is usually required. In some circumstances, a Phase II investigation may satisfy the LSI/RI requirement. Because PRP guidance contains specific requirements for defining the extent and magnitude of contamination and conducting risk evaluations, work plan review and approval is not required by the PB Program. For more information, see Guidance Document 1-01 PRP General Policy and other applicable documents.

For hazardous substances, pollutants, or contaminants under the oversight of the VIC Program, various guidance documents on the MPCA's Cleanup Guidance webpage offer guidance for conducting site investigations and evaluating risk. Because of the wide range of contaminants and potential sources of contamination associated with VIC sites, and due to the nature of the various VIC liability assurance letters, the VIC Program encourages voluntary parties to submit Phase II investigation work plans for MPCA review and approval before they conduct field work. Feedback and approval from the VIC Program on the proposed scope of work can result in an investigation more specifically tailored to the desired assurance letter and VIC Program requirements. Proceeding with field work without VIC work plan approval may result in the need for an additional mobilization to obtain data that was not collected under the original scope of work. Per Minn. Stat. § 115B.175 subd. 3(b), the VIC Program cannot approve a RAP unless the nature and extent of the release have been adequately identified and evaluated in the site's investigation reports.

When applicable, the risk-based screening values listed below and associated guidance is used to evaluate risk to human health and the environment at MPCA brownfield sites. Each of these tools has a specific application, as outlined in MPCA guidance, and is intended to be used as an integrated piece of the overall site investigation and risk evaluation.

- **Soil Reference Values** (SRVs) for evaluating potential human health risks associated with exposure to contaminated soil
- **Soil Leaching Values** (SLVs) for evaluating potential risk to groundwater due to leaching of soil contaminants

- **Intrusion Screening Values** (ISVs) for evaluating potential risk associated with vapor intrusion
- **Health Risk Limits** (HRLs) for evaluating potential risk posed by consumption of contaminated groundwater

In addition, there may be site-specific concerns, such as methane or buried asbestos-containing debris that have contaminant-specific approaches for investigation and risk management. More detailed information on these wastes, and guidance on the application of SRVs, SLVs and ISVs, can be found on the MPCA's Cleanup Guidance webpage. A list of current HRLs can be found on the Minnesota Department of Health's website.

III. Review and approval of response action plans

Brownfield Program staff will generally review a RAP and/or CCP and provide a response (approval, request for additional information, or rejection of the document) within 30 business days. A voluntary party seeking RAP approval for a Contamination Cleanup Grant application must submit a complete RAP to the MPCA at least 30 business days before the grant application due date. *Late RAPs will not be treated as a priority and are not guaranteed a review before the grant application deadline*.

Per Minn. Stat. § 115B.175 subd. 4, nonresponsible parties conducting response actions for a release of hazardous substances in accordance with an MPCA-approved RAP do not associate themselves with the release as a result of performance of those response actions. Minn. Stat. § 115B.03 subd. 10 provides similar liability protection to contractors for implementation of response actions or site development activities, provided that the contractor performs those actions in accordance with an MPCA-approved plan. If liability protection under these statutes is desired, or if a party is seeking Brownfield Program assurances, the RAP and/or CCP must be approved by the MPCA before implementing response actions or beginning construction/redevelopment work at the property.

IV. Risk exposure pathways and response actions

The need for response actions at a brownfield site will depend on the concentration of contaminants, the depth and extent of contamination, and the planned property use. Because every brownfield site reflects a unique combination of hydrogeologic conditions, environmental contamination, and potential exposure pathways, the information presented below should be considered general guidance. It is through risk evaluation and the subsequent preparation of a RAP, if necessary, that the site-specific circumstances are weighed and a reasoned course of action chosen.

A. Soil-human health pathway: Excavation of contaminated soil to achieve appropriate cleanup goals and construction of engineering controls, such as caps or vertical buffers, are common risk-based response actions to prevent exposure to contaminated soil. Note that an exceedance of an SRV does not necessarily warrant a risk-based response action. The need for a risk-based response action depends on the collective body of information, the representativeness of the data, and a reasonable evaluation of risk exposure pathways. For additional information on assessing the soil-human health pathway, see the SRV guidance and applicable PRP guidance documents on the MPCA's Cleanup Guidance webpage.

Evaluation of the soil-human health pathway has a direct bearing on soil reuse decisions for soil excavated at brownfield sites. Whether contaminated soil may be reused on- or off-site depends on the type and concentrations of contaminants and the planned property use. The following table summarizes options for soil reuse at sites enrolled in the MPCA's Brownfield Program.

Table 1. Potential reuse options for excavated soil

Contamination level	Potential reuse option	Criteria/additional information
Unregulated fill	Reuse on site or off site at discretion of contractor	See Best Management Practices for the Off-Site Reuse of Unregulated Fill on the MPCA's Cleanup Guidance webpage.
Regulated fill	Reuse on site in accordance with MPCA-approved RAP or off site in accordance with Regulated Fill policy	See Off-site Use of Regulated Fill Policy on the MPCA's Cleanup Guidance webpage. If soil is impacted by VOCs and/or PID > 10 ppm, avoid reuse near building foundations or as backfill in utility trench.
Exceeds regulated fill criteria	On-site management in accordance with MPCA-approved RAP	Soil treatment may be necessary prior to on-site management.
Petroleum-impacted < 100 ppm (PID)	On-site landscape berm	Mix 50/50 with clean fill, with two foot cover of unregulated fill and vegetative cover.
Petroleum-impacted < 200 ppm (PID)	Thin-spread on-site under road or pavement.	Maximum thickness of four inches
Petroleum-impacted > 200 ppm (PID)	None	Needs landfill disposal or treatment at MPCA-approved facility.

B. Soil leaching pathway: Volatile organic compounds (VOCs) pose the greatest risk to groundwater due to their mobility in the environment. If VOCs or other leachable contaminants of concern are present in soil, and groundwater data is not available, SLVs are one tool that can be used to evaluate the potential risk to groundwater posed by the leaching of contaminants. In most cases, the assessment of whether the soil leaching pathway is a concern will be conducted through the evaluation of groundwater data. For additional information on assessing the soil leaching pathway, see the SLV guidance and applicable PRP guidance documents on the MPCA's Cleanup Guidance webpage.

Because a development's stormwater management system can affect the soil leaching pathway, the location and design of the stormwater management system should take into account the nature and distribution of contamination at the site. The Brownfield Program does not approve stormwater design plans. However, the RAP should include applicable stormwater design information, such as the type of stormwater management system planned for the site and its location relative to contaminated soil and/or groundwater, so any potential effect on contaminant mobilization can be evaluated. If stormwater best management practices such as infiltration are planned in the vicinity of contaminated soil or groundwater, the following options should be considered:

- move the stormwater design feature to a site location that is not anticipated to mobilize contaminants
- model the subsurface hydrologic setting to demonstrate that existing or residual contamination will not be adversely affected by the stormwater design feature

- remove soil contamination so as to accommodate infiltration practices
- consider a non-infiltration stormwater management system

The RAP should describe how the above considerations were or will be integrated into the site development plan. If information about the stormwater management system is not available when the RAP is prepared, a follow up submittal (correspondence or RAP Addendum, as appropriate) is required once the stormwater management system design has been completed.

C. Vapor intrusion pathway: If the investigation and risk assessment at a brownfield site points to a potential risk for vapor intrusion, the RAP should include response actions for the vapor intrusion pathway. Depending on the site-specific situation, this may include source remediation plus installation of a vapor mitigation system in an existing or planned building. The need for a risk-based response action for soil vapor will depend on the collective body of information, the representativeness of the data, and a reasonable evaluation of risk exposure pathways. Table 2 describes scenarios in which vapor controls may be required for new construction at a brownfield site. For detailed information on assessing the vapor intrusion pathway and mitigating vapor intrusion risk in existing or planned buildings, see the Vapor Intrusion Guidance on the MPCA's Cleanup Guidance webpage.

Table 2. Typical vapor controls for new construction

Scenario	Vapor control
Petroleum-impacted soil with PID > 10 ppm within or adjacent to footprint of proposed building	Sub-slab vapor barrier
Petroleum-impacted soil with PID > 10 ppm in sidewalls or base of utility trench	Vapor barrier in utility trench
Petroleum-impacted soil with PID > 50 ppm within or adjacent to proposed building footprint	Sub-slab vapor barrier and venting system
VOCs in soil gas > ISVs in sidewalls or base of utility trench	Vapor barrier in utility trench
VOCs in soil vapor > 10 x ISVs within or adjacent to proposed building footprint	Sub-slab vapor barrier and venting system

If general site information suggests that a vapor intrusion risk is possible or likely, proactive installation of a vapor barrier and venting system may be appropriate before, or in lieu of, a soil gas investigation. Be aware, however, that a soil gas investigation may be necessary to obtain certain Brownfield Program assurances and/or grant funds for installation of a vapor mitigation system. Questions regarding the latter should be directed to the appropriate granting agency.

D. Groundwater pathway: Most brownfield redevelopment projects do not create pathways of exposure to contaminated groundwater; thus, groundwater response actions are not typically required for site redevelopment. However, it may be necessary to address contaminated groundwater if a party desires regulatory closure or certain liability assurances for the groundwater contamination. Actions in this case could range from monitored natural attenuation to more active remedies designed to contain and treat a contaminant plume. If groundwater contamination poses a potential risk to a receptor, and

a voluntary party does not wish to pursue closure or a groundwater liability assurance, Brownfield Program staff will refer the groundwater contamination to the appropriate MPCA regulatory program.

If contaminated groundwater will or may be encountered during construction activities, such as dewatering, the RAP or CCP should reference the need to obtain a permit from the appropriate authority for the management and disposal of impacted groundwater.

E. Notice of environmental conditions or restrictions: When contaminants remain at a property that could pose a future risk to human health or the environment, there is a need to provide notice of the environmental conditions to future property owners and the public. Depending on the site conditions, the notification may be satisfied by providing access to reports maintained in MPCA files and/or on-line data search tools such as *What's in My Neighborhood?* If the property is subject to extensive contamination by a release of a hazardous substance, a more formal notification is appropriate. In this case, the VIC Program will require an *Affidavit Concerning Real Property Contaminated with Hazardous Substances* to be filed on the property record. In some cases, there is an additional need to restrict property use and/or activities that could result in exposure to a hazardous substance or to document affirmative obligations, such as maintenance of engineering controls or long-term monitoring requirements. Under these circumstances, the VIC Program will require an *Environmental Covenant and Easement* to be filed on the property record. Before filing either the affidavit or environmental covenant on the property record, the content must be reviewed and approved by MPCA staff. The VIC Program will not approve the RAP Implementation Report or issue final assurances for a site until the affidavit or environmental covenant (if required) has been recorded.

V. Components of a Response Action Plan

A RAP describes in detail the actions a party intends to take to remediate and/or manage contamination at a brownfield site. Background information on site history, environmental conditions, and the planned property use is required to present the context and rationale for the proposed response actions. Attachment A provides a menu of items that are common to many RAPs. Including in the RAP all items that are relevant for a particular site will enable Brownfield Program staff to review the document in a more efficient and timely manner.

The general outline in Attachment A is not meant to be an inclusive checklist or required format. Other RAP elements not listed may be appropriate on a site-specific basis. By the same token, some items may not be pertinent for a particular brownfield site. The outline in Attachment A should be used as a reference when preparing a RAP. Contact Brownfield Program staff if in doubt about the applicability of any particular item. If pertinent items are missing from the RAP, Brownfield Program staff will not be able to complete review of the document until such information is received. If pertinent information regarding planned response actions is not yet available, the response actions are considered to be conceptual and submittal of a RAP is premature.

Attachment A
Components of a Response Action Plan

Introduction

- Site location and description
- MPCA site name and project number(s)
- Brief description of the proposed development
- Letters/assurances desired from the PB and/or VIC programs
- Identification, project responsibilities, and contact information for contractors and MPCA staff

RAP scope and objectives

- Overview of RAP objectives
- Proposed cleanup goals

Summary of past investigations

Phase I ESA

- Historical and current use of the property
- Recognized environmental conditions at the property
- Summary of historical investigations and responses
- Surrounding land use and off-site environmental issues that may affect the property
- Physical features and regional hydrogeologic conditions

Summary of Phase II/Site Investigation

- Scope and results of the investigation(s) that have been completed at the property

Site conceptual model

- Geology and hydrogeology
- Nature and extent of contamination (e.g. debris fill, impacted soil, other media as appropriate)
- Comparison of contaminants of concern to risk-based screening values
- Potential receptors and exposure pathways
- Identification of unacceptable risks for which response actions are proposed

Proposed response actions

Soil response actions

- Estimated total volume of soil to be excavated during site activities
- Proposed soil excavations (location, rationale, contaminant(s) of concern, estimated volume)
- Environmental oversight and field screening procedures
- On-site soil management and handling methods
- Waste characterization procedures (sampling frequency, analytical methods, etc.)
- Soil stabilization or other on-site waste treatment procedures
- Disposition of excavated soil, including estimated volumes and criteria for on-site and off-site reuse, treatment and/or landfill disposal
- Identification of off-site treatment/disposal facilities (if known) for contaminated media

- Need for hazardous waste determination to support landfill disposal of soil
- Confirmation samples (number/frequency, parameters, analytical methods, sampling procedures, etc.)
- MDH-certified laboratory to be used for sample analysis

Engineering controls

- Soil buffers in greenspace areas and below pavement/building (thickness, criteria)
- Use of pavement or building as "cap"
- Use of vapor barrier in utility trenches

Engineered remedial systems

- Description and proposed design of engineered remedial systems (e.g., soil vapor extraction, building vapor mitigation, groundwater containment/treatment, engineered soil cap, etc.). Brownfield Program staff does not review/approve the full engineering design for a remedial system; however, enough information about the system must be provided in the RAP to allow an evaluation of the scope and effectiveness of the proposed system.
- Need for pilot testing, air emissions testing, etc.
- Need for future submittal of Operation and Maintenance Plan

Short-term monitoring/temporary engineering controls

- Perimeter monitoring and nuisance management (e.g. dust, noise, odor)
- Need for stormwater controls, including Construction Site Stormwater Pollution Prevention Plan
- Site security
- Reference to Health and Safety Plan

Long-term monitoring

Institutional controls

- Real Property Notification/Affidavit
- Environmental covenant

Necessary permits, variances, access agreements

Anticipated project schedule

- Implementation of response actions and construction activities
- Submittal of Response Action Implementation Report

Construction Contingency Plan

- Types of unexpected environmental conditions that might be encountered (e.g. buried debris, suspected asbestos containing waste materials, contaminated media, stained soil, odors, underground storage tanks, unsealed wells, etc.)
- Actions to follow if unexpected conditions, wastes, or contaminated media are encountered
- Specialized personnel that may be required, such as a licensed asbestos inspector, licensed well contractor, etc.

Figures

Site figures may be combined, as appropriate, provided that the requested information is clearly conveyed.

- Site location map (USGS topographic map, 7.5-minute, 1:24,000-scale).
- Site map showing property boundary and surrounding properties (with uses labeled).
- Detailed site map showing property boundaries, existing structures and features, and current/historical potential sources of contamination.
- Detailed site map, as above, showing location of all borings, test pits, wells, other sampling points.
- Detailed site map(s), as above, showing sample results for contaminants of concern (by media).
- Geologic cross section(s) of property showing locations of borings, test pits/trenches, monitoring wells, and key site features, such as buildings, basements, utilities, etc.
- Potentiometric map(s) showing groundwater flow direction.
- Site redevelopment plan showing proposed structures, utilities, stormwater management system, pavement and greenspace areas.
- Site redevelopment plan, as above, including sample results for contaminants of concern.
- Site map(s) showing the proposed location of soil excavations and/or other proposed response actions, relative to sample results for the contaminants of concern.
- Supporting design for any engineered remedial system.
- Grading plan and/or cut-and-fill map. If contaminated soil is to be reused on site, show the proposed location for soil placement, relative to planned structures, utilities, pavement, and greenspace.

Tables

- Comprehensive summary of field screening results (e.g., PID, XRF).
- Comprehensive summary of analytical data, by media, compared to risk-based screening values. Include date of sample collection and sample depth, as appropriate.
    - ***Soil*** data (mg/kg), with hazardous substances compared to residential and industrial SRVs and SLVs
    - ***Groundwater*** data (ug/l), compared to HRLs and other applicable standards
    - ***Surface water*** data, compared to applicable surface water standards
    - ***Soil gas*** data (ug/m^3), compared to ISVs, 10xISVs, and 100xISVs for the planned property use
    - ***Indoor air*** data (ug/m^3), compared to ISVs for the planned property use
- Comprehensive summary of static water level elevations from monitoring wells/piezometers.
- Monitoring well construction information, with well ID, unique numbers, date installed, total depth, casing/screen material, and elevation of ground surface, top of casing and screened interval.

Appendices

- Standard Operating Procedures
- Soil boring/test pit/well construction logs from Phase II/Site Investigation
- Laboratory analytical reports, including QA/QC data and chromatograms, as appropriate (if document contains new investigation results)

Best Management Practices for the Off-Site Reuse of Unregulated Fill

Remediation Division

This document defines **unregulated fill** and provides guidance from the Minnesota Pollution Control Agency (MPCA) Remediation Division regarding Best Management Practices for its off-site reuse.

Off-site reuse of excess soil as fill or aggregate is a common practice at many development and road construction projects. If no known or potential sources of contamination are identified during environmental due diligence and subsequent field observations, then sampling of excess soil for laboratory analysis is not necessary. However, when excess soil originates from a site with known or potential sources of contamination, characterization of the soil is warranted prior to off-site reuse in order to ensure the protection of public health and the environment.

If contamination is detected in the soil, the unregulated fill criteria and best management practices described herein provide a framework for making good decisions about the off-site reuse of the soil. If the soil does not meet the criteria for unregulated fill, the soil should be managed or disposed of in accordance with applicable regulations.

Definition of unregulated fill

Unregulated fill, for the purpose of this guidance, is defined as excess soil in which a release of contaminants has been identified at concentrations less than the MPCA's most conservative risk-based values (see complete criteria on the next page). Thus, the identified contaminants in the fill are present at concentrations that are not of regulatory concern to the MPCA. Unregulated fill is not a solid waste.*

Exclusions

1. Some excess soil and other material generated at a redevelopment site is regulated as either solid or hazardous waste and must be managed according to applicable solid or hazardous waste laws, including:
   - Soil that is characteristically hazardous or contaminated due to a release of a listed hazardous waste, as defined in Minn. R. ch. 7045. Such soil must be managed in accordance with the requirements of the MPCA's Resource Conservation and Recovery Act (RCRA) program.
   - Waste material such as salvaged bituminous, crushed concrete, bricks, fly ash, etc. proposed to be reused as fill. The beneficial reuse of solid wastes is governed by Minn. R. 7035.2860. Information regarding the beneficial reuse of solid wastes can be found on the MPCA's website at http://www.pca.state.mn.us/waste/sw-utilization.html.
2. The management and reuse of dredged material may be regulated by permit or subject to other regulations. Information about the management of dredged materials can be found on the MPCA's website at http://www.pca.state.mn.us/water/dredgedmaterials.html.

**If sent to a permitted landfill for disposal, unregulated fill may be subject to a solid waste tax.*

Criteria for unregulated fill

Unregulated fill is excess soil that meets all of the following field screening and contaminant concentration criteria:

- free from solid waste, debris, asbestos-containing material, visual staining, and chemical odor
- organic vapors less than 10 parts per million, as measured by a photoionization detector (PID)
- for petroleum-impacted soil, less than 100 mg/kg diesel range organics (DRO)/gasoline range organics (GRO)
- for contaminants detected in soil, less than the MPCA's Residential Soil Reference Values (SRVs) and Tier 1 Soil Leaching Values (SLVs)*

**Naturally-occurring concentrations of some metals, such as arsenic, selenium, or copper, sometimes exceed the SRV or SLV. Such soils are not considered impacted in the absence of a contaminant source or other field or laboratory indications of contamination.*

A list of current SRVs can be found in the MPCA's Risk-Based Guidance for the Soil-Human Health Pathway. A list of current SLVs can be found in the Risk-Based Guidance for Evaluating the Soil Leaching Pathway. Both documents can be found at http://www.pca.state.mn.us/cleanup/riskbasedoc.html. For contaminants detected in soil that do not have established SRVs or SLVs, additional evaluation may be needed to determine whether the soil can be considered unregulated fill.

Some detections of DRO in soil may stem from the presence of natural organic material or non-petroleum contaminants in the soil, such as coal tars or other material containing polynuclear aromatic hydrocarbons (PAHs). Evaluation of DRO data should take into consideration the history of the property, including the known or likely presence of a petroleum source, the presence (or lack thereof) of other contaminants in the soil sample, and the type of soil. If positive DRO results are related to non-petroleum contaminants, risk-based criteria for the non-petroleum contaminants should be applied. If necessary, laboratory analytical methods are available to help determine if the DRO is from natural organic material in the soil.

Placement of unregulated fill

To avoid potential problems or public concern stemming from the placement of unregulated fill in sensitive settings, the MPCA recommends the following Best Management Practices:

- Avoid placing unregulated fill at schools, playgrounds, daycares, and residential properties. Unregulated fill is most suitable for use at industrial or commercial properties.
- Avoid placing unregulated fill in gardens where food for human/animal ingestion will be grown.
- Observe a minimum ten-foot separation distance between unregulated fill and the water table.
- Avoid placing unregulated fill where contaminants may be transported by run-off to lakes, rivers, wetlands, or streams.

Sampling decisions

Decisions of whether to sample soil for contamination prior to off-site reuse should be based on the history of the source area, the nature of the source material, the extent to which the soil has been previously characterized, and other factors that are part of a due diligence assessment of the environmental condition of the source property.

If the soil originates from a site where known or potential sources of contamination are present, samples of the soil should be collected for field screening and laboratory analyses. Examples of sites where environmental due diligence may reveal known or potential sources of contamination include sites where contamination was previously identified as a result of regulatory action or voluntary

investigation, previously developed sites (commercial, industrial, recreational, or residential), agricultural properties, or land that may have been subject to dumping, spills, or historic filling activities.

If no known or potential sources of contamination are identified during environmental due diligence and subsequent field observations, then sampling of excess soil for laboratory analyses is not necessary.

Sample type and frequency

When soil sampling is appropriate, the frequency and type of samples should be based on the potential sources of contamination, the depth, volume, and heterogeneity of the source material, and the availability of existing data. At a minimum, analytical parameters should include volatile organic compounds, PAHs, RCRA metals, DRO, and GRO. Other contaminants of concern should be included as appropriate, based on the history of the source location. Analytical data should be age-appropriate and representative of the source material.

Some soils even lightly impacted by heavy metals have the potential to leach at concentrations at or above the Toxicity Characteristic Leaching Procedure (TCLP) regulatory limit. As a rule-of-thumb, a TCLP analysis for RCRA metals should be conducted if the soil concentration of a metal is 20 times or greater the TCLP regulatory criteria.

A typical frequency for the field screening of potentially contaminated soil using a PID is one measurement for every ten cubic yards of soil. For analytical samples, the stockpile sampling guidance presented in Section 7.3 of the MPCA's Site Characterization and Sampling Document can be used as a frame of reference for the appropriate sampling frequency based on soil volume: http://www.pca.state.mn.us/cleanup/pubs/sitechar.pdf. Soil sampling guidelines for the Petroleum Remediation Program are presented in guidance Document 4-04: http://www.pca.state.mn.us/publications/c-prp4-04.pdf. Flexibility in the number of samples may be warranted, depending on the site-specific circumstances. Sound professional judgment, taking into account all of the factors discussed above, should be used when developing a sampling plan to determine whether excess soil meets the criteria for unregulated fill.

Implementation

All parties are encouraged to use the best management practices described herein in order to make good decisions about the off-site reuse of unregulated fill. It is the responsibility of the property owners and other parties engaged in development and construction activities to make sure that their activities include appropriate environmental due diligence and that excess soil and other materials generated by these activities are managed in an environmentally responsible manner.

Note that some local units of government, including Dakota County, may have local ordinances which restrict the off-site reuse of unregulated fill within their boundaries. Parties seeking to import unregulated fill should check with local regulators to determine if such ordinances are in effect in their project area.

Nothing in this guidance excuses anyone from compliance with any law, rule, or other legal obligation (including any environmental covenant) that applies to any development or construction activity, including the generation, management, transport, and reuse of excess soil.

For more information

Questions about the information presented above can be directed to the MPCA at 651-296-6300 or 1-800-657-3864.

If compositing of samples is conducted and grid sampling is used, each grid square should be divided into four sub-areas for composite sampling. The composite concentration can then be applied to the grid square. If composite sampling is conducted without a grid, assign the composite concentration to the centroid of the polygon formed by the individual sample locations (no more than four). Averaging of composite sample data is not acceptable, since the composite samples are already representative of a physical average of the sub-samples. For more information on this topic, please refer to Section 5 (Data Collection and Evaluation) of the MPCA *Risk-Based Evaluation for Soil - Human Health Pathway Guidance*.

Certain site-specific soil data are required for the assessment of human health risks. Parameters such as soil moisture and total organic carbon should be analyzed. See the MPCA *Risk-Based Evaluation for Soil - Human Health Pathway Guidance* for additional information.. All laboratory method detection limits should be low enough so data can be used for risk evaluation purposes. In order to be used to evaluate risk, the data should also be representative of potential exposure scenarios.

6.0 SURFACE WATER SAMPLING

(To be added at a later date)

7.0 SAMPLING FOR REMEDIATION VERIFICATION

7.1 Introduction

Information presented in this section is intended to guide the environmental professional in the recommended methods for verifying that soil contamination has been adequately remediated. Primarily, the minimum number and the location of required samples are addressed.

Verification sampling strategies for soil remediation depend on the type of remediation -- excavation or in-situ treatment. The minimum number of samples and sampling locations are different for each remediation type. While the minimum number of samples required is easily determined for both situations, determining the sampling locations is more complex and requires some professional judgment. The sampling strategies are outlined below.

Ex-situ remedies may be amenable to statistical sampling strategies or batch sampling. Any proposed sampling for ex-situ remedies should be developed on a site by site basis with the oversight of the MPCA project staff.

7.2 Excavations

Verifying that contaminated soil has been remediated by means of excavation requires samples from the excavation floors and sidewalls. The tables below provide the minimum number of samples necessary to verify cleanup for various sizes of excavations. Remediation verification is demonstrated by comparing the analytical results from each sampling point with the cleanup goals. If the cleanup goals are exceeded at any point, this verification methodology may require additional excavation at that point until the goals are met. Specifically, if less than ten samples are collected from either excavation floors or sidewalls, the calculated average concentrations will have very little meaning from a risk standpoint. In these situations, the appropriate risk/cleanup standards should be considered as numbers that are not to be exceeded in any sample.

A sampling strategy that uses bias to choose sample locations is recommended. This guidance document cannot dictate the exact locations for sample collection using this strategy. The location of the sample collection points relies on site specific information from the remedial investigation, analysis of the release or contaminant distribution and the soil types encountered in the excavation. Sampling and analyzing the soil samples from the locations most likely to have contaminants can minimize the number of samples needed to verify that remediation is complete. Since professional judgment and site specific knowledge are required for selecting sampling locations, the rationale used to select these locations must be well documented in the implementation report.

Analysis of data generated by prior investigations at the site should yield information for the verification analysis. The field personnel present during the remediation should be sufficiently familiar with the conditions on site to implement an appropriate verification sampling plan. Soil verification sampling should incorporate all pertinent biases of a site which may include, but are not limited to, the following:

- preferential pathways of contaminant migration
- source areas, stained soils, other site specific "clues" (e.g., fractures in clays)
- changes in soil characteristics (e.g., sand/clay interfaces)
- soil types and characteristics.

Compositing soil samples for verifying soil remediation may be acceptable for non-volatile parameters. Generally, when sampling for non-volatile parameters, each composite sample to be analyzed may be comprised of a maximum of four subsamples. However, please be aware that if contamination is indicated in a composited sample at levels above the cleanup goal, the entire area of the excavation comprising the composite sample may require additional excavation until the cleanup goals are met. Suspected contaminated areas discovered during verification sampling should not be sampled as part of a composite but should be sampled discretely.

The minimum required number of verification samples is determined by the subsequent tables. Confirmation sampling should generally be conducted on a grid.

7.2.1 Excavation Floor

The minimum acceptable number of floor samples to be analyzed is based on the area of the excavation floor as designated in Table 7A shown below.

Table 7A Excavation Floor Samples

Area of Floor (sq ft)	Number of Samples
<500	2
500-<1,000	3
1,000-<1,500	4
1,500-<2,500	5
2,500-<4,000	6
4,000-<6,000	7
6,000-<8,500	8
8,500-<10,890 (0.25 acres)	9
>10,890	Use Guidance Below

The following guidance is to be used when excavation floor areas exceed 10,890 square feet:

Floor Acreage	Square Feet	Grid Interval
0.25 - 3.0	10,890-130,680	15 - 30 Feet
3.0 and over	130,680 +	30 Feet plus

7.2.2 Excavation Sidewalls

Sidewall samples are required to verify that the horizontal extent of the soil contamination has been remediated. The number of sidewall samples shall be determined by Table 7B shown below. In no case is less than one sample on each sidewall acceptable. Known hot spots should be sampled separately. Once again, when sampling for non-volatile parameters, each sample to be analyzed may be comprised of four subsamples.

Table 7B Excavation Sidewall Samples

Area of Sidewall (sq ft)	Number of Samples
<500	4
500-1,000	5
1,000-1,500	6
1,500-2,000	7
2,000-3,000	8
3,000-4,000	9
>4,000	1 sample per 45 lineal feet of sidewall

When sampling the sidewalls of excavations that exceed five feet in depth, the sidewall sampling locations must be staggered in the vertical plane. This will ensure that lateral remediation has been adequate at all depths within the excavation.

7.3 Soil Stockpiles

Often times an excavation results in a contaminated soil stockpile that then needs to be treated (on- or off-site) or sent off-site for appropriate disposal. Sampling of the stockpile is necessary in order to characterize the contaminated or treated soil and to determine the appropriate final disposition. Landfills and the various types of treatment facilities (such as thermal treatment facilities or land farm sites) have permitted limits on the levels of contaminants they can accept. Sampling is necessary to ensure receiving facilities are operating within their permit limits. Additional samples beyond what is recommended here may be necessary based on each facility's specific permit requirements. TCLP and/or total analyses should be conducted for each type of contaminant suspected to be present. The detection limits for the total analyses should be determined based on the requirements of the receiving facilities permit, or on the cleanup level established for the site. The following table shall be used to determine the appropriate number of stockpile samples to be collected for analyses.

Table 7C Stockpile Samples

Cubic Yards of Soil in Pile	Number of Samples
0-500	1 per 100 cubic yards
501- 1000	1 per 250 cubic yards
1001 or more	1 per 500 cubic yards

If less than ten samples are collected from a stockpile, a calculated average concentration will have very little meaning from a risk standpoint. Therefore, in this type of situation, the appropriate risk/cleanup standards should be considered as numbers that are not to be exceeded in any sample. Compositing of stockpile samples is acceptable for the non-volatile parameters. Each sample may be comprised of four subsamples collected randomly from within the stockpile.

7.4 In-Situ Soil Remediation

When in-situ remedies are used, the effectiveness of the remedy must be verified by soil sampling. In these cases, three-dimensional sampling must be undertaken to verify that the soils have been adequately treated.

In instances of in-situ stabilization, the sampling should be conducted using a grid pattern with a vertical component added at each node. The number of samples collected for analyses should be determined using Tables 7A and 7B. The vertical extent of the remedy should be determined by compositing samples within each grid over 10 foot depth intervals extending to the bottom of the stabilization zone.

For in-situ treatment such as soil vapor extraction (SVE), the number of samples collected for analyses should be determined using Tables 7A and 7B, but should be biased toward the sampling points located remote from the SVE points. The vertical component must also be addressed and, therefore, the soil borings should be screened continuously using a PID, and any soils showing elevated organic vapors should be sampled. If no elevated PID readings are detected, discrete samples should be collected at 5 foot intervals over the depth of the treatment zone.

Compositing of remediation verification samples is acceptable for in-situ remediations for the non-volatile parameters. Each sample may be comprised of no more than 4 subsamples.

MINNESOTA POLLUTION CONTROL AGENCY
SITE REMEDIATION SECTION

DRAFT GUIDELINES
RISK BASED SITE CHARACTERIZATION AND SAMPLING GUIDANCE

WORKING DRAFT, September 16, 1998
Comment Period Ends December 31, 1998
Send Written Comments to:

Guidance Coordination Team
Minnesota Pollution Control Agency
Site Remediation Section
520 Lafayette Road
St. Paul, Minnesota 55155-4194
Fax (651) 296-9707

NOTICE

THIS DOCUMENT IS A WORKING DRAFT. The Site Remediation Section of MPCA is developing guidelines for evaluating risks to human health and the environment at sites that may require investigation or response actions pursuant to the Minnesota Environmental Response and Liability Act, Minn. Stat. § 115B.01 to 115B.24 (MERLA).

DEVELOPMENT OF A SITE REMEDIATION SECTION SITE EVALUATION MANUAL. The attached document and other documents will be incorporated into a Site Remediation Risk-Based Site Evaluation Manual which will contain guidelines for conducting MERLA-related evaluations, including risk evaluations under the State Superfund program and the MPCA Voluntary Investigation and Cleanup (VIC) Program.

MPCA staff intend to use the policies and procedures in the manual as guidelines to evaluate the need for investigation or remedial actions to address releases and threatened releases of hazardous substances or pollutants or contaminants under MERLA, and the scope and nature of such actions. These policies and procedures are not exclusive and do not have the force and effect of law. MPCA staff may use other policies or procedures to evaluate the need for or adequacy of response actions under MERLA, including procedures set forth in outstanding MPCA Requests for Response Action and Consent Orders. The final standard for all such evaluations is the MERLA statutory requirement that such actions must be reasonable and necessary to protect the public health and welfare and the environment.

The Minnesota state Superfund program, governed by the Minnesota Environmental Response and Liability Act (MERLA) and the supplementary rules, and the federal Superfund program, governed by the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) and the federal regulations in the National Oil and Hazardous Substances Pollution Contingency Plan (NCP), work together to clean up various types of sites.

~ Continued ~

Appendix C

Test Trench Sampling Log

Landmark Environmental, LLC

Project Name: VPP-Kasota Ave

Address: 0 Kasota Avenue, St. Paul, MN

Excavation # LTT-1 **Date:** 5/30/2019 **Contractor:** Frattalone

Excavation Method: Backhoe **Coordinates:** NAD83 UTM 15T E483893/N4980522

Length: 15’ **Width:** 5’ **Depth:** 5’

Excavation Sidewall Sketch

View of south sidewall

0-1’ – topsoil – brown to dark brown silty sand, fine to medium grained, some organics/roots

1-2’ – fill – brown to dark brown silty sand, fine to medium grained, with debris:

- **pieces of concrete, brick/clay tile, glass, plastic, wood**

2-5’ – fill – black to dark gray silty sand, fine to medium grained, with petroleum odor and debris:

- **pieces of concrete, brick/clay tile, glass, plastic, wood**

PID
1-2’ 0.0 ppm
4-5’ 50.0 ppm

Soil Samples
LTT-1/1-2’ @ 8:15 – DRO, PAHs, RCRA Metals, PCBs, TCLP Lead, HOLD-VOCs
LTT-1/4-5’ @ 8:30 – HOLD- DRO, PAHs, RCRA Metals, PCBs, VOCs

Test Trench Sampling Log

Landmark Environmental, LLC

Project Name: VPP-Kasota Ave

Address: 0 Kasota Avenue, St. Paul, MN

Excavation # LTT-2 **Date:** 5/30/2019 **Contractor:** Frattalone

Excavation Method: Backhoe **Coordinates:** NAD83 UTM 15T E483869/N4980516

Length: 15’ **Width:** 5’ **Depth:** 5.5’

Excavation Sidewall Sketch

View of north sidewall

0-0.5’ – topsoil – brown to dark brown silty sand, fine to medium grained, some organics/roots

0.5-4’ – fill – brown to dark brown silty sand, fine to medium grained, with debris:

- **pieces of concrete, brick, glass, plastic, wood, rubber**

4-5.5’ – fill – black to dark gray silty sand fine to medium grained, with petroleum odor and debris:

- **pieces of concrete, brick, glass, plastic, wood, slag/coke**

PID
1-2’ 0.0 ppm
2-3’ 1.2 ppm
4-5’ 103.4 ppm

Soil Samples
LTT-2/2-3’ @ 8:45 – DRO, PAHs, RCRA Metals, PCBs, TCLP Lead, HOLD-VOCs
LTT-2/4-5’ @ 9:00 – HOLD- DRO, PAHs, RCRA Metals, PCBs, VOCs

Test Trench Sampling Log

Landmark Environmental, LLC

Project Name: VPP-Kasota Ave

Address: 0 Kasota Avenue, St. Paul, MN

Excavation # LTT-3 **Date:** 5/30/2019 **Contractor:** Frattalone

Excavation Method: Backhoe **Coordinates:** NAD83 UTM 15T E483851/N4980511

Length: 15’ **Width:** 5’ **Depth:** 5’

Excavation Sidewall Sketch

View of east/southeast sidewall

0-0.5’ – topsoil – brown to dark brown silty sand, fine to medium grained, some organics/roots

0.5-3.5’ – fill – brown to dark brown silty sand, fine to medium grained, with debris:

- **large chunk of concrete, pieces of concrete, brick, glass, plastic, wood, rubber**

3.5-5’ – fill – black to dark gray silty sand fine to medium grained, with petroleum odor and debris:

- **pieces of concrete, brick, glass, plastic, wood, ash**

PID
0-2’ 0.0 ppm
2-4’ 12.9 ppm
4-5’ 254.2 ppm

Soil Samples
LTT-3/0-2’ @ 9:15 – DRO, PAHs, RCRA Metals, PCBs, TCLP Lead, HOLD-VOCs
LTT-3/2-4’ @ 9:30 – HOLD- DRO, PAHs, RCRA Metals, PCBs, VOCs

Test Trench Sampling Log

Landmark Environmental, LLC

Project Name: VPP-Kasota Ave

Address: 0 Kasota Avenue, St. Paul, MN

Excavation # LTT-4 **Date:** 5/30/2019 **Contractor:** Frattalone

Excavation Method: Backhoe **Coordinates:** NAD83 UTM 15T E483828/N4980513

Length: 15' **Width:** 5' **Depth:** 5'

Excavation Sidewall Sketch

View of northeast sidewall

0-1' – topsoil – brown to dark brown silty sand, fine to medium grained, some organics/roots

1-3.5' – fill – brown to dark brown silty sand, fine to medium grained, with debris:

- **pieces of concrete, brick, glass, plastic, wood, rubber, metal**

3' – water seeping in

PID
0-2' 0.0 ppm
2-4' 3.8 ppm
4-5' 56.4 ppm

3.5-5' – fill – black to dark gray silty sand fine to medium grained, with petroleum odor and debris:

- **pieces of concrete, brick, glass, plastic, wood, slag/coke, metal**

Soil Samples

LTT-4/0-2' @ 9:45 – HOLD- DRO, PAHs, RCRA Metals, PCBs, VOCs

LTT-4/2-4' @ 10:00 – DRO, PAHs, RCRA Metals, PCBs, TCLP Lead, VOCs

Test Trench Sampling Log

Landmark Environmental, LLC

Project Name: VPP-Kasota Ave

Address: 0 Kasota Avenue, St. Paul, MN

Excavation # LTT-5 **Date:** 5/30/2019 **Contractor:** Frattalone

Excavation Method: Backhoe **Coordinates:** NAD83 UTM 15T E483812/N4980544

Length: 15' **Width:** 5' **Depth:** 5'

Excavation Sidewall Sketch

View of east sidewall

0-0.5' – topsoil – brown to dark brown silty sand, fine to medium grained, some organics/roots

0.5-3' – fill – brown to dark brown silty sand, fine to medium grained, with debris:

- **pieces of concrete, brick, glass, plastic, wood, rubber, metal, slag/coke**

3-5' – fill – black to dark gray silty sand fine to medium grained, with petroleum odor and debris:

- **pieces of concrete, brick, glass, plastic, wood, slag/coke**

3.5' – water seeping in

PID
0-2' 0.0 ppm
2-4' 55.1 ppm
4-5' 58.1 ppm

Soil Samples
LTT-5/0-2' @ 10:15 – DRO, PAHs, RCRA Metals, PCBs, TCLP Lead, HOLD-VOCs
LTT-5/2-4' @ 10:30 – HOLD- DRO, PAHs, RCRA Metals, PCBs, VOCs

Test Trench Sampling Log

Landmark Environmental, LLC

Project Name: VPP-Kasota Ave

Address: 0 Kasota Avenue, St. Paul, MN

Excavation # LTT-6 **Date:** 5/30/2019 **Contractor:** Frattalone

Excavation Method: Backhoe **Coordinates:** NAD83 UTM 15T E483811/N4980577

Length: 15' **Width:** 5' **Depth:** 5'

Excavation Sidewall Sketch

View of south sidewall

0-0.5' – topsoil – brown to dark brown silty sand, fine to medium grained, some organics/roots

0.5-3.5' – fill – brown to dark brown silty sand, fine to medium grained, with debris:

- **pieces of concrete, brick, glass, plastic, wood, rubber, metal, styrofoam**

3.5-5' – fill – black to dark gray silty sand fine to medium grained, with petroleum odor and debris:

- **pieces of concrete, brick, glass, plastic, wood, slag/coke**

PID
0-2' 0.0 ppm
2-4' 19.6 ppm
4-5' 54.6 ppm

Soil Samples
LTT-6/0-2' @ 10:45 – DRO, PAHs, RCRA Metals, PCBs, TCLP Lead, VOCs
LTT-6/2-4' @ 11:00 – HOLD- DRO, PAHs, RCRA Metals, PCBs, VOCs

Test Trench Sampling Log

Landmark Environmental, LLC

Project Name: VPP-Kasota Ave

Address: 0 Kasota Avenue, St. Paul, MN

Excavation # LTT-7 **Date:** 5/30/2019 **Contractor:** Frattalone

Excavation Method: Backhoe **Coordinates:** NAD83 UTM 15T E483834/N4980554

Length: 15’ **Width:** 5’ **Depth:** 5’

Excavation Sidewall Sketch

View of southwest sidewall

0-0.5’ – topsoil – brown to dark brown silty sand, fine to medium grained, some organics/roots

0.5-3.5’ – fill – brown to dark brown silty sand, fine to medium grained, with debris:

- **pieces of concrete, brick, glass, plastic, wood, rubber, metal**

2’ – water seeping in

3.5-5’ – fill – black to dark gray silty sand fine to medium grained, with petroleum odor and debris:

- **pieces of concrete, brick, glass, plastic, wood, rubber, metal**

PID
0-2’ 0.0 ppm
2-4’ 50.2 ppm
4-5’ 27.4 ppm

Soil Samples
LTT-7/0-2’ @ 11:15 – HOLD- DRO, PAHs, RCRA Metals, PCBs, VOCs
LTT-7/2-4’ @ 11:30 – DRO, PAHs, RCRA Metals, PCBs, TCLP Lead, VOCs

Test Trench Sampling Log

Landmark Environmental, LLC

Project Name: VPP-Kasota Ave

Address: 0 Kasota Avenue, St. Paul, MN

Excavation # LTT-8 **Date:** 5/30/2019 **Contractor:** Frattalone

Excavation Method: Backhoe **Coordinates:** NAD83 UTM 15T E483839/N4980538

Length: 15’ **Width:** 5’ **Depth:** 5’

Excavation Sidewall Sketch

View of northeast sidewall

PID
0-2’ 0.0 ppm
2-4’ 38.5 ppm
4-5’ 43.1 ppm

0-1’ – topsoil – brown to dark brown silty sand, fine to medium grained, some organics/roots

1-3’ – fill – brown to dark brown silty sand, fine to medium grained, with debris:

- **pieces of concrete, brick, glass, plastic, wood, rubber, metal**

1.5’ – water seeping in

3-5’ – fill – black to dark gray silty sand fine to medium grained, with petroleum odor and debris:

- **pieces of concrete, brick, glass, plastic, wood, rubber, metal**

Soil Samples
LTT-8/0-2’ @ 11:45 – DRO, PAHs, RCRA Metals, PCBs, TCLP Lead, HOLD-VOCs
LTT-8/2-4’ @ 12:00 – HOLD- DRO, PAHs, RCRA Metals, PCBs, VOCs

Appendix D

Standard Operating Procedures for the Bag Headspace Procedure Soil Sample Collection and Analysis
May 29, 2018

Introduction

This document describes technical standard operating procedures (SOPs) prepared by Landmark Environmental, LLC (Landmark). The SOPs, which are being submitted to the U.S. Environmental Protection Agency (EPA) and the Minnesota Pollution Control Agency (MPCA) for review, are based on the MPCA's Risk Based Site Characterization and Sampling Guidance, Working Draft, September 16, 1998 and Soil Sample Collection and Analysis Fact Sheet #3.22, July 1996 and has been prepared in accordance with Guidance for Preparing Standard Operating Procedures (QA/G-6), EPA/600/B-07/001, April 2007.

While it is understood that different practitioners will employ various methods based on their experience and equipment, due care will be taken to ensure integrity of the samples and data quality. The procedures recommended in the SOPs may be varied or changed, with MPCA or EPA approval, depending on site-specific conditions or emerging technologies and methodologies. In all cases, the methodologies used in the field must be thoroughly described and documented in the final report accompanying the sampling results. Field work will be completed using the same methods and procedures at all sampling locations throughout the project. Equipment required to collect headspace readings includes, nitrile gloves, self-sealing quart-size bags, a photoionization detector (PID), and the appropriate personal protective equipment necessary for collection and handling of soil samples as described in the Site Safety Plan (SSP).

Field Screening Procedure

The MPCA recommends the polyethylene bag headspace method described below as the field procedure for characterization of soil contamination:

Use a PID with 11.7 or greater eV. Perform PID instrument calibration of site and at the start, end of the day and at least once mid-day to yield "total organic vapors" in volume parts per million (ppmv) of PCE equivalent. Follow the manufacturer's instructions for operation, maintenance, and calibration of the instrument. Daily calibration records will be kept. MPCA staff reserve the right to request these records.

Use a self-sealing quart-size polyethylene freezer bag. Half-fill the bag with the sample to be screened so the volume ratio of soil to air is equal. The bag should then be immediately sealed. If necessary, manually break up the soil clumps within the bag. *Note:* Soil collected from a split spoon should be transferred to the bag immediately after opening the split spoon; soil collected from an excavation or soil pile should be collected from freshly exposed surfaces.

Allow headspace development for at least 10 minutes. Vigorously shake bags for 15 seconds both at the beginning and end of the headspace development period. Headspace development decreases with temperature. When temperatures are below the operating range of the instrument perform headspace development and analysis within a heated vehicle or building. Record the ambient temperature during headspace screening. *Complete headspace analysis within approximately 20 minutes of sample collection.*

Following headspace development introduce the instrument sampling probe through a small opening in the bag to a point about one-half of the headspace depth. Keep the probe free of water droplets and soil particles.

Record the highest meter response in the appropriate field documentation (Drilling Log, Environmental Sampling Log, Excavation Sidewall Stratigraphic Log or the Field Information Data Sheet. Maximum response usually occurs within about two seconds. Erratic meter response may occur at high organic vapor concentrations or if moisture is present. Note any erratic headspace data.

This SOP was prepared by:

Name: Eric Gabrielson

Signature:
Title: Field Manager

This SOP was reviewed by:

Name: Jason Skramstad

Signature:
Title: Project Manager

This SOP was approved by:

Name: Ken Haberman

Signature:
Title: Quality Assurance Manager

Standard Operating Procedure for Classification of Soils for Engineering Purposes
May 29, 2018

Introduction

This document describes technical standard operating procedures (SOPs) prepared by Landmark Environmental, LLC (Landmark). This SOP, which has been submitted to the U.S. Environmental Protection Agency (EPA) for review.is based on the Minnesota Pollution Control Agency (MPCA) and has been prepared in accordance with *Guidance for Preparing Standard Operating Procedures (QA/G-6)*, EPA, EPA/240/B-01/004, March 2001. This SOP provides procedures for field methods and procedures for the collection of soil samples that will be submitted for laboratory analysis for a variety of hazardous substances. This SOP also provides procedures for the classification of soils for Engineering purposes specifically following ASTM D 2487-06 method.

Soil classification is used to systematically group soils with similar physical characteristics in the same classification category. The use of a soil classification system produces a consistent description of soil samples that can be readily understood by engineers, geologists, drillers and other members of the project team. Soil classification systems groups soils based upon physical characteristics (e.g. grain size, gradation, plasticity, etc.). General engineering and hydrologic properties of soils can be estimated from these physical characteristics allowing rapid preliminary assessment of site conditions during a field investigation program when little time is available for laboratory analyses. A systematic grouping of similar soil types based upon physical characteristics aids in the identification and correlation of subsurface stratigraphy. Accurate identification of subsurface structures of heterogeneities can have a significant impact on rates and directions of contaminant movement.

Procedure

Qualified individual will ensure that samples to be classified are representative of the soil strata from which they were obtained. Soil will be identified on the field data sheets to where it was collected. In addition, field personnel will write an extensive description of the soil encountered. Equipment necessary in the field for soil identification include; a knife or similar steel tools, a hand lens, a soil chart, a Munsell color chart, and a USCS Soil Classification Chart.

The following criteria are to be recorded in the field:

- Color
- Moisture
- Density
- Shape
- Size
- Plasticity
- Odor
- Noted if contaminated

The soil will be given one or more of the following designations:

- GW –well graded gravels
- GP –poorly graded gravels with little or no fines
- GM –silty gravels

- SW –well graded sands
- SP –poorly graded sands
- SM –silty sands
- SC –clayey sands
- ML –inorganic silts
- CL –inorganic clays
- OL –organic silts
- MH –inorganic silts
- CH –inorganic clay (fat clays)
- OH –organic clays
- PT –organic based soils

Fill and Debris Soils

Fill and debris soils are common to encounter during the initial depths of any soil boring. Fill and or debris represent any material that has been placed un- naturally typically occurring at the ground surface. These types of soils include soils that do not appear natural, concrete, brick, glass, plastic and organic materials. When fill/debris soils are encountered, they will be noted on the field data sheet.

Documentation

Documentation will be noted on the field data sheets or the soil boring logs.

Reference

ASTM D2487-11 Standard Practice for Classification of Soils for Engineering Purposes (ASTM D 2487).

This SOP was prepared by:

Name: Eric Gabrielson

Signature:
Title: Field Manager

This SOP was reviewed by:

Name: Jason Skramstad

Signature:
Title: Project Manager

This SOP was approved by:

Name: Ken Haberman

Signature: 
Title: Quality Assurance Manager

Standard Operating Procedure for General Soil Sample Collection
May 29, 2018

Introduction

This document describes technical standard operating procedures (SOPs) prepared by Landmark Environmental, LLC (Landmark). This SOP, which has been submitted to the U.S. Environmental Protection Agency (EPA) for review.is based on the Minnesota Pollution Control Agency (MPCA) and has been prepared in accordance with *Guidance for Preparing Standard Operating Procedures (QA/G-6)*, EPA, EPA/240/B-01/004, March 2001. This SOP provides procedures for field methods and procedures for the collection of soil samples that will be submitted for laboratory analysis for a variety of hazardous substances. This SOP also provides procedures for integrated and grab sample collection, as well as quality assurance/quality control (QA/QC) procedures for field sample collection and laboratory analysis. This SOP also provides procedures for grab and composite sample collection, as well as quality assurance/quality control (QA/QC) procedures for field sample collection and laboratory analysis.

A variety of samplers (Geoprobe, backhoe, split-barrel, auger, shovel, and hand sampling methods) may be used to retrieve soil from sampling locations. Immediately after collection, the soil sample will be transferred to laboratory-supplied containers. Equipment required to transfer soil from the sampler to the laboratory-supplied sample containers includes single uses disposable nitrile gloves, stainless steel spoons or scoops, and the appropriate personal protective equipment necessary for collection and handling of soil samples as described in the Site Safety Plan (SSP).

To prevent sample cross-contamination, all soil sampling equipment will be new and or cleaned prior to sampling. All sampling tools, including split-barrels and stainless steel spoons and scoops, will be cleaned before use and between samples by washing with a soap free of phosphate and 1,4-dioxane/clean-water solution (such as Seventh Generation Free ®) and rinsed with potable water. using a brush if necessary, and rinsing with potable water. Gloves will be discarded between sampling locations.

Metals, PAHs, VOC, and other General Analytical Samples

Soil samples collected with a sampler:

1. Open the sampler.

2. For VOCs analysis collect sample directly from the sampler using either a subcoring device, such as an Encore sampler™ or a modified syringe. Obtain the soil sample and either cap the subcoring device immediately or extrude the sample into a sample jar that contains methanol from the laboratory and immediately screw on the lid.

3. If a composite sample is required, place the remaining soil into a stainless steel or other inert container for mixing. Mix thoroughly to obtain a homogenous sample that is representative of the entire sample. Mixing soil for homogenous sample is applicable for Metals, PAH and other General Analytical Samples. Mix thoroughly with either a gloved hand or clean inert mixing apparatus. This will ensure a sample that represents a mixed

aliquot of the soil. Place soil into each appropriate container and wipe the jar lip and screw threads to remove soil and provide a good sealing surface, immediately screw on the lid. If the sample was homogenized, complete notes on the field homogenization sheet. Laboratory performed incremental sub-sampling techniques procedures are presented in the Appendix C (Laboratory Certifications) of the QAPP.

4. These and all samples will be documented with in a chain-of custody (COC), one per cooler and cooled to approximately 4°C. Ice used for cooling will be made from potable water. When the MPCA provides a COC, it will be adopted. The samples will either be hand delivered to the laboratory or direct courier. A Pace provided COC is provided as Attachment 1.
5. For MS/MSD samples two extra jars of soil will be collected for of VOC analysis but not TAL metals, PCGs and PAH. The extra volumes for VOC samples will be collected as stated below with a Encore Sampler ™ or a modified syringe.

Soil samples collected by hand:

1. Dig to the desired sampling interval, exposing a fresh soil surface to sample.

2. Collect a large sample on a shovel or auger and bring it to the surface, or collect the sample directly from the fresh soil surface.

3. For VOCs analysis collect sample directly from the sampler using either a subcoring device, such as an Encore sampler™ or a modified syringe. Obtain the soil sample and either cap the subcoring device immediately or extrude the sample into a sample jar that contains methanol from the laboratory and immediately screw on the lid.
4. .

5. If a composite sample is required, place the remaining soil into a stainless steel or other inert container for mixing. Mix thoroughly to obtain a homogenous sample representative of the entire sample. Mixing soil for homogenous sample is applicable for Metals, PAH and other General Analytical Samples place the remainder of the sample into a clean stainless steel or other homogenization container and mix thoroughly with either a gloved hand or inert clean mixing apparatus. If the sample was homogenized, complete notes on the field homogenization sheet. This will ensure a sample that represents a mixed aliquot of the soil. Wipe the jar lip and screw threads to remove soil and provide a good sealing surface, and immediately screw on the lid. Laboratory performed incremental sub-sampling techniques procedures are presented in the Appendix C (Laboratory Certifications) of the QAPP.

6. These and all samples will be documented with in a chain-of custody (COC), one per cooler and cooled to approximately 4°C. Ice used for cooling will be made from potable water. (See example COC at end of SOP.)

Volatile Organic Samples

Soil samples collected either by sampler or by hand:

1. Expose fresh soil surface in sampler.

2. Using a subcoring device, such as an Encore sampler™ or a modified syringe obtain a soil sample and either cap the subcoring device immediately or extrude the sample into a sample jar that contains methanol from the laboratory.

3. Wipe the jar lip and screw threads to remove soil and provide a good sealing surface, and immediately screw on the lid.

4. These and all samples will be documented with in a chain-of custody (COC), one per cooler and cooled to approximately 4°C. Ice used for cooling will be made from potable water.

Sample Storage

Field personnel will maintain custody of the samples until transferred to the shipper or laboratory.

Documentation on a Chain-of-Custody

The Chain-of-Custody (see Attachment 1) shows traceable possession of samples from the time they are obtained until they are introduced as evidence in legal proceedings (when the MPCA provides a chain of custody form it will be adopted for use).

1. Complete the Chain-of-Custody prior to leaving the sampling location.

2. Complete one Chain-of-Custody or more as needed for each cooler of samples.

3. Provide the following information on the Chain-of-Custody form:
   - Project number
   - Sample identification
   - Date and time of sample collection
   - Container type and number
   - Whether the sample is a grab, composite, or blank sample
   - Project manager
   - Project contact
   - Laboratory
   - Analyses required
   - Signature of sampler(s)
   - Signature of transferee
   - Date and time of transfer
   - Method of transport and any shipping numbers

This SOP was prepared by:

Name: Eric Gabrielson

Signature: 

Title: Field Manager

This SOP was reviewed by:

Name: Jason Skramstad

Signature: 
Title: Project Manager

This SOP was approved by:

Name: Ken Haberman

Signature: 
Title: Quality Assurance Manager

Appendix E

Pace Analytical Services, LLC
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

June 28, 2019

Shannon Russell
Landmark Environmental
2042 West 98th Street
Minneapolis, MN 55431

RE: Project: VPP-Kasota-Revised Report
Pace Project No.: 10479694

Dear Shannon Russell:
Enclosed are the analytical results for sample(s) received by the laboratory on June 18, 2019. The results relate only to the samples included in this report. Results reported herein conform to the most current, applicable TNI/NELAC standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

This report was revised on June 28, 2019 to include lead by 6010D results for sample LTT5-SW7/0-2 (10479694007).

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Annika Asp
annika.asp@pacelabs.com
(612)607-1700
Project Manager

Enclosures

cc: Mr. Jerry Mullin, Landmark Environmental

Pace Analytical Services, LLC
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Minneapolis, MN 55414
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CERTIFICATIONS

Project: VPP-Kasota-Revised Report
Pace Project No.: 10479694

Minnesota Certification IDs

1700 Elm Street SE, Minneapolis, MN 55414-2485
A2LA Certification #: 2926.01
Alabama Certification #: 40770
Alaska Contaminated Sites Certification #: 17-009
Alaska DW Certification #: MN00064
Arizona Certification #: AZ0014
Arkansas DW Certification #: MN00064
Arkansas WW Certification #: 88-0680
California Certification #: 2929
CNMI Saipan Certification #: MP0003
Colorado Certification #: MN00064
Connecticut Certification #: PH-0256
EPA Region 8+Wyoming DW Certification #: via MN 027-053-137
Florida Certification #: E87605
Georgia Certification #: 959
Guam EPA Certification #: MN00064
Hawaii Certification #: MN00064
Idaho Certification #: MN00064
Illinois Certification #: 200011
Indiana Certification #: C-MN-01
Iowa Certification #: 368
Kansas Certification #: E-10167
Kentucky DW Certification #: 90062
Kentucky WW Certification #: 90062
Louisiana DEQ Certification #: 03086
Louisiana DW Certification #: MN00064
Maine Certification #: MN00064
Maryland Certification #: 322
Massachusetts Certification #: M-MN064
Michigan Certification #: 9909
Minnesota Certification #: 027-053-137
Minnesota Dept of Ag Certifcation #: via MN 027-053-137
Minnesota Petrofund Certification #: 1240
Mississippi Certification #: MN00064
Missouri Certification #: 10100
Montana Certification #: CERT0092
Nebraska Certification #: NE-OS-18-06
Nevada Certification #: MN00064
New Hampshire Certification #: 2081
New Jersey Certification #: MN002
New York Certification #: 11647
North Carolina DW Certification #: 27700
North Carolina WW Certification #: 530
North Dakota Certification #: R-036
Ohio DW Certification #: 41244
Ohio VAP Certification #: CL101
Oklahoma Certification #: 9507
Oregon Primary Certification #: MN300001
Oregon Secondary Certification #: MN200001
Pennsylvania Certification #: 68-00563
Puerto Rico Certification #: MN00064
South Carolina Certification #:74003001
Tennessee Certification #: TN02818
Texas Certification #: T104704192
Utah Certification #: MN00064
Vermont Certification #: VT-027053137
Virginia Certification #: 460163
Washington Certification #: C486
West Virginia DEP Certification #: 382
West Virginia DW Certification #: 9952 C
Wisconsin Certification #: 999407970
Wyoming UST Certification #: via A2LA 2926.01

Pace Analytical Services, LLC
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SAMPLE SUMMARY

Project: VPP-Kasota-Revised Report
Pace Project No.: 10479694

Lab ID	Sample ID	Matrix	Date Collected	Date Received
10479694001	**LTT5-SW1 /0-2**	Solid	06/18/19 09:30	06/18/19 13:29
10479694002	**LTT5-SW2 /0-2**	Solid	06/18/19 10:00	06/18/19 13:29
10479694003	**LTT5-SW3 /0-2**	Solid	06/18/19 10:30	06/18/19 13:29
10479694004	**LTT5-SW4 /0-2**	Solid	06/18/19 11:00	06/18/19 13:29
10479694007	**LTT5-SW7 /0-2**	Solid	06/18/19 12:45	06/18/19 13:29

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SAMPLE ANALYTE COUNT

Project: VPP-Kasota-Revised Report
Pace Project No.: 10479694

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
10479694001	**LTT5-SW1 /0-2**	EPA 6010D	IP	1	PASI-M
		ASTM D2974	JDL	1	PASI-M
10479694002	**LTT5-SW2 /0-2**	EPA 6010D	IP	1	PASI-M
		ASTM D2974	JDL	1	PASI-M
10479694003	**LTT5-SW3 /0-2**	EPA 6010D	IP	1	PASI-M
		ASTM D2974	JDL	1	PASI-M
10479694004	**LTT5-SW4 /0-2**	EPA 6010D	IP	1	PASI-M
		ASTM D2974	JDL	1	PASI-M
10479694007	**LTT5-SW7 /0-2**	EPA 6010D	DM	1	PASI-M
		ASTM D2974	JDL	1	PASI-M

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ANALYTICAL RESULTS

Project: VPP-Kasota-Revised Report
Pace Project No.: 10479694

Sample: LTT5-SW1 /0-2 **Lab ID: 10479694001** Collected: 06/18/19 09:30 Received: 06/18/19 13:29 Matrix: Solid

Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010D MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3050								
Lead	**369**	mg/kg	0.62	0.14	1	06/19/19 15:09	06/20/19 15:47	7439-92-1	P6,R1
Dry Weight / %M by ASTM D2974	Analytical Method: ASTM D2974								
Percent Moisture	**21.4**	%	0.10	0.10	1		06/20/19 13:47		

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: VPP-Kasota-Revised Report
Pace Project No.: 10479694

Sample: LTT5-SW2 /0-2 **Lab ID: 10479694002** Collected: 06/18/19 10:00 Received: 06/18/19 13:29 Matrix: Solid

Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010D MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3050								
Lead	**245**	mg/kg	0.61	0.14	1	06/19/19 15:09	06/20/19 16:01	7439-92-1	
Dry Weight / %M by ASTM D2974	Analytical Method: ASTM D2974								
Percent Moisture	**21.5**	%	0.10	0.10	1		06/20/19 13:47		

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: VPP-Kasota-Revised Report
Pace Project No.: 10479694

Sample: LTT5-SW3 /0-2 **Lab ID: 10479694003** Collected: 06/18/19 10:30 Received: 06/18/19 13:29 Matrix: Solid

Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010D MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3050								
Lead	**1230**	mg/kg	0.61	0.14	1	06/19/19 15:09	06/20/19 16:04	7439-92-1	
Dry Weight / %M by ASTM D2974	Analytical Method: ASTM D2974								
Percent Moisture	**22.3**	%	0.10	0.10	1		06/20/19 13:47		

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: VPP-Kasota-Revised Report
Pace Project No.: 10479694

Sample: LTT5-SW4 /0-2 **Lab ID: 10479694004** Collected: 06/18/19 11:00 Received: 06/18/19 13:29 Matrix: Solid

Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010D MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3050								
Lead	**388**	mg/kg	0.57	0.13	1	06/19/19 15:09	06/20/19 16:08	7439-92-1	
Dry Weight / %M by ASTM D2974	Analytical Method: ASTM D2974								
Percent Moisture	**17.0**	%	0.10	0.10	1		06/20/19 14:55		

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
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ANALYTICAL RESULTS

Project: VPP-Kasota-Revised Report
Pace Project No.: 10479694

Sample: LTT5-SW7 /0-2 **Lab ID: 10479694007** Collected: 06/18/19 12:45 Received: 06/18/19 13:29 Matrix: Solid

Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010D MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3050								
Lead	**236**	mg/kg	0.58	0.13	1	06/24/19 11:58	06/25/19 12:06	7439-92-1	
Dry Weight / %M by ASTM D2974	Analytical Method: ASTM D2974								
Percent Moisture	**18.2**	%	0.10	0.10	1		06/27/19 10:53		

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
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QUALITY CONTROL DATA

Project: VPP-Kasota-Revised Report
Pace Project No.: 10479694

QC Batch: 613895 Analysis Method: EPA 6010D
QC Batch Method: EPA 3050 Analysis Description: 6010D Solids
Associated Lab Samples: 10479694001, 10479694002, 10479694003, 10479694004

METHOD BLANK: 3316958 Matrix: Solid
Associated Lab Samples: 10479694001, 10479694002, 10479694003, 10479694004

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Lead	mg/kg	<0.47	0.47	0.11	06/20/19 15:41	

LABORATORY CONTROL SAMPLE: 3316959

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Lead	mg/kg	46.3	48.2	104	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3316960 3316961

Parameter	Units	10479694001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Lead	mg/kg	369	61.7	60.6	361	552	-14	301	75-125	42	20	P6,R1

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
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QUALITY CONTROL DATA

Project: VPP-Kasota-Revised Report
Pace Project No.: 10479694

QC Batch: 614927
QC Batch Method: EPA 3050
Analysis Method: EPA 6010D
Analysis Description: 6010D Solids
Associated Lab Samples: 10479694007

METHOD BLANK: 3322636 Matrix: Solid
Associated Lab Samples: 10479694007

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Lead	mg/kg	<0.50	0.50	0.11	06/25/19 10:58	

LABORATORY CONTROL SAMPLE: 3322637

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Lead	mg/kg	48.5	43.4	89	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3322638 3322639

Parameter	Units	10479908001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Lead	mg/kg	ND	51.1	50.7	46.4	46.8	88	89	75-125	1	20	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
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QUALITY CONTROL DATA

Project: VPP-Kasota-Revised Report
Pace Project No.: 10479694

QC Batch: 614243 Analysis Method: ASTM D2974
QC Batch Method: ASTM D2974 Analysis Description: Dry Weight / %M by ASTM D2974
Associated Lab Samples: 10479694001, 10479694002, 10479694003

SAMPLE DUPLICATE: 3318483

Parameter	Units	10479384003 Result	Dup Result	RPD	Max RPD	Qualifiers
Percent Moisture	%	11.7	11.4	2	30	

SAMPLE DUPLICATE: 3318484

Parameter	Units	10479694003 Result	Dup Result	RPD	Max RPD	Qualifiers
Percent Moisture	%	22.3	23.6	5	30	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

QUALITY CONTROL DATA

Project: VPP-Kasota-Revised Report
Pace Project No.: 10479694

QC Batch: 614260
QC Batch Method: ASTM D2974
Analysis Method: ASTM D2974
Analysis Description: Dry Weight / %M by ASTM D2974
Associated Lab Samples: 10479694004

SAMPLE DUPLICATE: 3318531

Parameter	Units	10479694004 Result	Dup Result	RPD	Max RPD	Qualifiers
Percent Moisture	%	17.0	18.3	7	30	

SAMPLE DUPLICATE: 3318532

Parameter	Units	10478477007 Result	Dup Result	RPD	Max RPD	Qualifiers
Percent Moisture	%	13.7	13.0	5	30	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

REPORT OF LABORATORY ANALYSIS

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1700 Elm Street - Suite 200
Minneapolis, MN 55414
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QUALITY CONTROL DATA

Project: VPP-Kasota-Revised Report
Pace Project No.: 10479694

QC Batch: 615924
QC Batch Method: ASTM D2974
Analysis Method: ASTM D2974
Analysis Description: Dry Weight / %M by ASTM D2974
Associated Lab Samples: 10479694007

SAMPLE DUPLICATE: 3327391

Parameter	Units	10480203022 Result	Dup Result	RPD	Max RPD	Qualifiers
Percent Moisture	%	24.8	24.4	2	30	

SAMPLE DUPLICATE: 3327748

Parameter	Units	10480203002 Result	Dup Result	RPD	Max RPD	Qualifiers
Percent Moisture	%	27.5	25.9	6	30	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
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Minneapolis, MN 55414
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QUALIFIERS

Project: VPP-Kasota-Revised Report
Pace Project No.: 10479694

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to dilution of the sample aliquot.

ND - Not Detected at or above adjusted reporting limit.

TNTC - Too Numerous To Count

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PQL - Practical Quantitation Limit.

RL - Reporting Limit - The lowest concentration value that meets project requirements for quantitative data with known precision and bias for a specific analyte in a specific matrix.

S - Surrogate

1,2-Diphenylhydrazine decomposes to and cannot be separated from Azobenzene using Method 8270. The result for each analyte is a combined concentration.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

LABORATORIES

PASI-M	Pace Analytical Services - Minneapolis

ANALYTE QUALIFIERS

P6	Matrix spike recovery was outside laboratory control limits due to a parent sample concentration notably higher than the spike level.
R1	RPD value was outside control limits.

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: VPP-Kasota-Revised Report
Pace Project No.: 10479694

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
10479694001	**LTT5-SW1 /0-2**	EPA 3050	613895	EPA 6010D	614275
10479694002	**LTT5-SW2 /0-2**	EPA 3050	613895	EPA 6010D	614275
10479694003	**LTT5-SW3 /0-2**	EPA 3050	613895	EPA 6010D	614275
10479694004	**LTT5-SW4 /0-2**	EPA 3050	613895	EPA 6010D	614275
10479694007	**LTT5-SW7 /0-2**	EPA 3050	614927	EPA 6010D	615289
10479694001	**LTT5-SW1 /0-2**	ASTM D2974	614243		
10479694002	**LTT5-SW2 /0-2**	ASTM D2974	614243		
10479694003	**LTT5-SW3 /0-2**	ASTM D2974	614243		
10479694004	**LTT5-SW4 /0-2**	ASTM D2974	614260		
10479694007	**LTT5-SW7 /0-2**	ASTM D2974	615924		

Pace Ana
www.p

WO# : 10479694

10479694

CHAIN-OF-CUSTODY / Analytical Request Document

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

Page: 1 of 1

2285676

Section A — Required Client Information:

Company: Landmark Environmental

Address:

Email To: Shannon Russell

Phone: Fax:

Requested Due Date/TAT: Rush 3-Day

Required Project Information:

Report To: Shannon Russell

Copy To: Jerry Muller

Purchase Order No.:

Project Name: VPP-Casota

Project Number:

Section C — Invoice Information:

Attention: Account Payable

Company Name: Landmark

Address:

Pace Quote Reference:

Pace Project Manager: Annika Asp

Pace Profile #:

REGULATORY AGENCY

☐ NPDES ☐ GROUND WATER ☐ DRINKING WATER

☐ UST ☐ RCRA ☐ OTHER

Site Location STATE:

Section D — Required Client Information

SAMPLE ID (A-Z, 0-9 / ,-) Sample IDs MUST BE UNIQUE

Matrix Codes (MATRIX / CODE): Drinking Water DW; Water WT; Waste Water WW; Product P; Soil/Solid SL; Oil OL; Wipe WP; Air AR; Tissue TS; Other OT

Requested Analysis Filtered (Y/N)

ITEM #	SAMPLE ID	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED COMPOSITE START DATE	COLLECTED COMPOSITE START TIME	COLLECTED COMPOSITE END/GRAB DATE	COLLECTED COMPOSITE END/GRAB TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives: Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	Analysis Test Y/N: Lead	Analysis Test Y/N: HOLD	Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.
1	LTTS-SW1 /0-2	SL	G	6/18/19	930													X			001
2	LTTS-SW2 /0-2				1000													X			002
3	LTTS-SW3 /0-2				1030													X			003
4	LTTS-SW4 /0-2				1100													X			004
5																					
6	LTTS-SW5/0-2				1145														X		005
7	LTTS-SW6 /0-2				1215														X		006
8	LTTS-SW7 /0-2				1245														X		007
9	LTTS-SW8 /0-2				1315														X		008
10																					
11																					
12																					

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS			
		6/18/19	1329		6/18/19	1329	5.9	Y	N	Y

ORIGINAL

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: Shannon Russell

SIGNATURE of SAMPLER: DATE Signed (MM/DD/YY): 06/18/19

Temp in °C | Received on Ice (Y/N) | Custody Sealed Cooler (Y/N) | Samples Intact (Y/N)

*Important Note: By signing this form you are accepting Pace's NET 30 day payment terms and agreeing to late charges of 1.5% per month for any invoices not paid within 30 days.

Pace Analytical	Document Name: **Sample Condition Upon Receipt Form**	Document Revised: 09May2019 Page 1 of 1
	Document No.: **F-MN-L-213-rev.28**	Issuing Authority: Pace Minnesota Quality Office

Sample Condition Upon Receipt

Client Name: Landmark

Project #: **WO#: 10479694**

PM: AKA **Due Date: 06/21/19**

CLIENT: LANDMARK ENV

Courier: ☐Fed Ex ☐UPS ☐USPS ☒Client ☐Pace ☐SpeeDee ☐Commercial **See Exception** ☐

Tracking Number:

Custody Seal on Cooler/Box Present? ☐Yes ☒No **Seals Intact?** ☐Yes ☒No **Biological Tissue Frozen?** ☐Yes ☐No ☒N/A

Packing Material: ☒Bubble Wrap ☒Bubble Bags ☐None ☐Other: **Temp Blank?** ☒Yes ☐No

Thermometer: ☐T1(0461) ☐T2(1336) ☐T3(0459) ☐T4(0254) ☒T5(0489) **Type of Ice:** ☒Wet ☐Blue ☐None ☐Dry ☐Melted

Note: Each West Virginia Sample must have temp taken (no temp blanks)

Temp should be above freezing to 6°C **Cooler Temp Read w/temp blank:** 0.1 (0.1) °C **Average Corrected Temp (no temp blank only):** °C **See Exceptions** ☐

Correction Factor: -0.2 **Cooler Temp Corrected w/temp blank:** 5.9 (5.9) AKA 6/18/19 °C

USDA Regulated Soil: (☐ N/A, water sample/Other:) **Date/Initials of Person Examining Contents:** 6/18/19 IJ

Did samples originate in a quarantine zone within the United States: AL, AR, CA, FL, GA, ID, LA. MS, NC, NM, NY, OK, OR, SC, TN, TX or VA (check maps)? ☐Yes ☒No

Did samples originate from a foreign source (internationally, including Hawaii and Puerto Rico)? ☐Yes ☒No

If Yes to either question, fill out a Regulated Soil Checklist (F-MN-Q-338) and include with SCUR/COC paperwork.

				COMMENTS:
Chain of Custody Present and Filled Out?	☒Yes	☐No		1.
Chain of Custody Relinquished?	☒Yes	☐No		2.
Sampler Name and/or Signature on COC?	☒Yes	☐No	☐N/A	3.
Samples Arrived within Hold Time?	☒Yes	☐No		4.
Short Hold Time Analysis (<72 hr)?	☐Yes	☒No		5. ☐Fecal Coliform ☐HPC ☐Total Coliform/E coli ☐BOD/cBOD ☐Hex Chrome ☐Turbidity ☐Nitrate ☐Nitrite ☐Orthophos ☐Other
Rush Turn Around Time Requested? 6/18/19 IJ	☒Yes	☐No		6.
Sufficient Volume?	☒Yes	☐No		7.
Correct Containers Used?	☒Yes	☐No		8.
-Pace Containers Used?	☒Yes	☐No		
Containers Intact?	☒Yes	☐No		9.
Field Filtered Volume Received for Dissolved Tests?	☐Yes	☐No	☒N/A	10. Is sediment visible in the dissolved container? ☐Yes ☐No
Is sufficient information available to reconcile the samples to the COC?	☒Yes	☐No		11. **If no, write ID/ Date/Time on Container Below:** **See Exception** ☐
Matrix: ☐Water ☒Soil ☐Oil ☐Other				
All containers needing acid/base preservation have been checked?	☐Yes	☐No	☒N/A	12. Sample #
All containers needing preservation are found to be in compliance with EPA recommendation? (HNO_3, H_2SO_4, <2pH, NaOH >9 Sulfide, NaOH>12 Cyanide)	☐Yes	☐No	☒N/A	☐NaOH ☐HNO_3 ☐H_2SO_4 ☐Zinc Acetate
Exceptions: VOA, Coliform, TOC/DOC Oil and Grease, DRO/8015 (water) and Dioxin/PFAS	☐Yes	☐No	☒N/A	Positive for Res. Chlorine? ☐Yes ☐No **pH Paper Lot#** **See Exception** ☐
				Res. Chlorine | 0-6 Roll | 0-6 Strip | 0-14 Strip
Headspace in VOA Vials (greater than 6mm)?	☐Yes	☐No	☒N/A	13. **See Exception** ☐
Trip Blank Present?	☐Yes	☐No	☒N/A	14.
Trip Blank Custody Seals Present?	☐Yes	☐No	☒N/A	Pace Trip Blank Lot # (if purchased):

CLIENT NOTIFICATION/RESOLUTION **Field Data Required?** ☐Yes ☐No

Person Contacted: Date/Time:

Comments/Resolution:

Project Manager Review: Anna Asp **Date:** 6/18/19

Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e out of hold, incorrect preservative, out of temp, incorrect containers).

Labeled by: IJ