westonandsampson.com

55 Walkers Brook Drive, Suite 100
Reading, MA 01867
tel: 978.532.1900

REPORT

Phase II Environmental Site Assessment

ES Pinevale Street
Springfield, Massachusetts
RTN 1-170

October 2023

Funded by MassDevelopment

TABLE OF CONTENTS

Page

EXECUTIVE SUMMARY ES-1

TABLE OF CONTENTS i

LIST OF FIGURES iii

LIST OF TABLES iii

LIST OF APPENDICES iii

1.0 INTRODUCTION 1-1
1.1 General 1-1
1.2 Property Location and Description 1-1
1.3 Property History 1-2
1.3.1 Operations and Ownership 1-2
1.3.2 Oil and Hazardous Materials (OHM) Usage and Storage 1-2
1.4 Area Receptors 1-2
1.5 MCP Method 1 Soil and Groundwater Classification 1-3
1.5.1 Soil 1-3
1.5.2 Groundwater 1-3

2.0 PREVIOUS ENVIRONMMENTAL INVESTIGATIONS 2-1
2.1 1986 Phase I ESA 2-1
2.2 February 1987 Removal of USTs from Site 2-1
2.3 April 1987 Remedial Investigations 2-2
2.4 1991 Phase II ESA 2-3
2.5 1996 Post-Remedial Action Report 2-4
2.6 1998 Phase II ESA Addendum 2-4
2.7 2003 Post-Audit Completion Statement and Addendum Risk Characterization 2-5
2.8 2007 Release Abatement Measure (RAM) Plan 2-6
2.9 2009 RAM Completion Report 2-6
2.10 2010 Asbestos Assessment 2-6
2.11 April 2010 Environmental Site Assessment 2-7
2.12 April 2010 Preliminary Geotechnical Findings 2-8
2.13 2015 Pollution Report No. 1 2-8
2.14 2016 Removal Program After Action Report 2-8

3.0 PHASE II SUBSURFACE INVESTIGATION 3-1
3.1 Soil Boring Advancement 3-1
3.2 Soil Sampling and Analysis 3-1
3.3 Monitoring Well Installation 3-2
3.4 Groundwater Sampling and Analysis 3-3

4.0 PHASE II SUBSURFACE INVESTIGATION RESULTS 4-1
4.1 Underlying Bedrock and Surficial Geology 4-1
4.1.1 Bedrock Geology 4-1

4.1.2 Surficial Geology 4-1
4.1.3 Groundwater Elevations and Flow Direction 4-1
4.2 Soil Analytical Results 4-1
4.3 Groundwater Analytical Results 4-2
4.4 Nature and Extent of Contamination 4-2

5.0 RISK CHARACTERIZATION 5-1
5.1 General 5-1
5.2 Exposure Media and Dataset 5-1
5.3 Hazard Evaluation 5-1
5.3.1 Dataset - Soil 5-1
5.3.2 Dataset - Groundwater 5-2
5.3.3 Asbestos in Soil 5-3
5.3.4 Identification of Background Conditions 5-3
5.3.5 Selection of Chemicals of Potential Concern 5-4
5.3.6 Toxicity Profiles 5-4
5.4 Exposure Assessment 5-4
5.4.1 Receptors of Concern 5-4
5.4.2 Evaluation of Hot Spots 5-6
5.4.3 Exposure Point Concentrations 5-7
5.5 Dose-Response Assessment 5-7
5.5.1 Non-Carcinogenic Health Effects 5-7
5.5.2 Carcinogenic Health Effects 5-8
5.5.3 Relative Absorption Factors 5-9
5.6 Risk Characterization 5-9
5.6.1 Estimating Average Daily Dose and Risk 5-9
5.6.2 Applicable or Suitably Analogous Public Health Standards 5-10
5.7 Uncertainty Evaluation 5-11
5.8 Characterization of Risk to Safety 5-13
5.9 Characterization of Risk to Public Welfare 5-13
5.10 Characterization of Risk to the Environment 5-13
5.11 Risk Assessment Summary 5-14

6.0 CONCEPTUAL SITE MODEL 6-1

7.0 CONCLUSIONS AND RECOMMENDATIONS 7-1

8.0 LIMITATIONS 8-1

9.0 REFERENCES 9-1

LIST OF FIGURES

Figure 1 ..... Locus Map

Figure 2 ..... Site Plan

Figure 3 ..... Area Receptors Map

LIST OF TABLES

Table 1 ..... Summary of Soil Analytical Results – May 2023 Soil Borings

Table 2 ..... Summary of Scanning Electron Microscopy Sample Analytical Results

Table 3 ..... Summary of Groundwater Analytical Results

LIST OF APPENDICES

Appendix A ..... Historical Data Tables and Figures

Appendix B ..... Field Logs – Soil Boring Logs and Monitoring Well Construction Logs

Appendix C ..... Laboratory Analytical Reports

Appendix D ..... Supporting Documentation for Risk Characterization

\\wse03.local\WSE\Projects\MA\Springfield MA\ENG23-0351 - ES Pinevale Assessment\Report\Phase II ESA_Draft.docx

EXECUTIVE SUMMARY

Weston & Sampson Engineers, Inc. (Weston & Sampson), on behalf of the City of Springfield Office of Planning & Economic Development (the City), has prepared this Phase II Environmental Site Assessment (ESA) Report for the ES Pinevale Site. The ES Pinevale Site is located on the east side of Pinevale Street, north of Goodwin Street, in the Indian Orchard neighborhood of Springfield, Massachusetts (the Site). The Site comprises one vacant parcel totaling approximately 16 contiguous acres that the City identified as a target redevelopment property. This assessment was funded by MassDevelopment through the Brownfields Redevelopment Fund.

The Site was historically operated by the Chapman Valve Manufacturing Company and the Crane Company, manufacturers of specialty metal valves for federal agencies. Historical manufacturing uses included brass and iron foundries as well as steel and iron machine shops. The Massachusetts Department of Environmental Protection (MassDEP) issued Release Tracking Number (RTN) 1-170 for petroleum impacts to soil and groundwater. Records available from MassDEP indicate the Site is currently not in regulatory compliance with the Massachusetts Contingency Plan (MCP; 310 CMR 40.0000)); however, the City acquired the parcel through a municipal tax title taking and is not subject to MCP deadlines.

Weston & Sampson completed a Phase II ESA that included the collection and analysis of 34 soil samples and 7 groundwater samples from soil borings and groundwater monitoring wells, as well as a review of recent and historical reports. Based on the results of the Phase II ESA investigation, Weston & Sampson concludes:

- Based on the analytical results from this investigation, soil and groundwater impacts are consistent with historical results post-remediation, and there are no new reportable conditions for the analyzed compounds under the applicable standards in the MCP.

- During previous investigations performed by others, asbestos-containing material (ACM) in construction debris piles and surficial soils across the Site were identified. Although some of this soil and the debris piles were excavated and disposed of offsite during the 2015 removal program, ACM-impacted surficial soil remains in the central portion of the Site.

- Weston & Sampson evaluated risk of harm to human health, safety, public welfare, and the environment via a Method 3 Risk Characterization. The results of the risk characterization indicate that a condition No Significant Risk (NSR) to human health, safety and environment does not exist at the Site due primarily to lead, polycyclic aromatic hydrocarbons (PAHs), and ACM in shallow soil.

Regulatory closure can be achieved if the source of impacts is eliminated or controlled. This may include a combination of soil remediation (removal and off-site disposal of impacted soil), construction and installation of a cover system to prevent access to residual soil impacts, and/or the implementation of an Activity and Use Limitation (AUL). Additionally, further investigation of soil gas and/or indoor air of future buildings or the inclusion of vapor mitigation measures in future design may be appropriate if building construction is proposed in locations of residual petroleum impacts.

An analysis of remedial alternatives, to include conceptual costs, should be performed to estimate the costs to implement the necessary remedial actions and achieve regulatory closure at the Site under the MCP.

1.0 INTRODUCTION

1.1 General

Weston & Sampson Engineers, Inc. (Weston & Sampson), on behalf of the City of Springfield Office of Planning & Economic Development (the City), has prepared this Phase II Environmental Site Assessment (ESA) Report for the ES Pinevale Site. The ES Pinevale Site is an approximately 16-acre property located on the east side of Pinevale Street, north of Goodwin Street, in the Indian Orchard neighborhood of Springfield, Massachusetts (the Site). This assessment was funded by MassDevelopment through the Brownfields Redevelopment Fund.

Weston & Sampson was retained by the City to complete a Phase II ESA of the Site as part of a redevelopment initiative. At the request of the City, in January 2023, Weston & Sampson developed a Scope of Work and Cost Estimate to investigate the Site based on a review of historical data and previous reports.

This report is not part of a response action under the Massachusetts Contingency Plan (MCP; 310 CMR 40.0000); however, data was collected and analyzed in accordance with MCP performance standards in order to support future MCP response actions, and to evaluate Site risk under future use scenarios. Weston & Sampson is not acting as Licensed Site Professional (LSP)-of-Record for the Site or the Release Tracking Numbers (RTNs) listed herein. The City of Springfield acquired the parcel through a municipal tax title taking. As such the city has municipal exempt status under the MCP and is not subject to MCP timelines.

1.2 Property Location and Description

The Site includes one parcel of land, totaling approximately 16 acres, located on the east side of Pinevale Street in Springfield, Massachusetts. The City of Springfield Assessor's Department indicates the Site is identified by the following Parcel Identification Number: 097550086. A Locus Map showing the location and general surroundings of the Site is provided as Figure 1.

The approximate geographical coordinates for the Site are as follows:

Latitude/Longitude:	42.154797 North 72.499815 West

The use of abutting properties to and/or boundaries of the Site include the following:

- North – Mixed use, Commercial/Industrial/Residential (machine shop, construction materials distribution, non-profit organization)
- South – Goodwin Street, Commercial/Industrial (Eversource Energy solar farm)
- East – Moxon Street, Residential
- West – Pinevale Street, Mixed-use, Commercial/Residential (roofing contractor)

The Site is currently heavily vegetated. A chain-link fence is constructed along the entire perimeter of the Site, with an access gate located at the middle of the western section of the fence on Pinevale Street. Concrete slabs from the foundations of the historical manufacturing buildings remain across the Site. Several of these slabs are covered below a layer of soil and vegetation and their extents could not be precisely identified in the field. Several locations of wood block flooring remain intact within these concrete slab foundations. An exposed subsurface vault was observed in the northwestern corner,

indicating there are likely additional similar vaults in other areas across the Site. Evidence of historical railroad tracks (i.e., piers, wooden ties) were observed along the east side of the Site. Various debris piles, associated with past response actions conducted at the Site and demolition activities, remain onsite, mainly at the western portion of the Site. These piles consist of mainly concrete with some brick and metal rebar, and several stockpiled debris piles appear to be covered in vegetation. A Site Plan is provided as Figure 2.

1.3 Property History

1.3.1 Operations and Ownership

The Site is an approximately 16-acre parcel that was formerly part of a 54-acre property owned by the Chapman Valve Manufacturing Company of Boston, Massachusetts (Chapman Valve) who purchased the property around 1874 to conduct valve manufacturing activities. Chapman Valve manufactured metal valves primarily for use by the Navy, but also worked under contract with the Atomic Energy Commission (AEC) to manufacture uranium metal for Manhattan Engineering District (MED) projects. Chapman Valve was acquired by Crane Company (Crane Co.) in 1959 who continued valve manufacturing at the Site until the 1980s. Crane Co. dissolved the 54-acre property into numerous parcels, which were sold to various parties, except for the 16-acre parcel located at ES Pinevale Street. Crane Co. demolished the original 12 factory buildings located at the Site between the 1980s and 1996, leaving the slabs and foundations in place. The Site went through various property transfers between 2003 and 2013 before the City of Springfield acquired the property through a municipal tax taking in May 2013.

1.3.2 Oil and Hazardous Materials (OHM) Usage and Storage

As the Site is vacant, there are currently no petroleum and/or hazardous materials used as part of the operations at the Site. As previously described, the Site operated as a valve manufacturing facility for over 100 years and used heavy machinery within the factory buildings for the brass and iron foundries and steel and iron machine shops. Based on several reports submitted to MassDEP reviewed by Weston & Sampson, a total of 19 underground storage tanks (USTs) were removed by Clean Harbors in 1987, containing No. 2, No. 4, or No. 6 oil, gasoline, water/oily sludge, or alcohol. During UST removal activities, free product, oily soil, and/or oily groundwater were observed in several excavation areas. Multiple subsurface investigations were performed to delineate and remediate the contaminated UST graves. Between October and November 1996, on-Site transformers, electrical switches, and approximately 4,625 gallons of transformer oil were removed and disposed of by Cyn Environmental Services of Wilbraham, Massachusetts.

Additional details of OHM release to the environment are documented in reports submitted to the MassDEP in accordance with the MCP; 310 CMR 40.0000. A summary of those reports is contained in Section 2.0.

1.4 Area Receptors

As shown in Figure 3 – Area Receptors Map, the Site is not located within a Zone II or Interim Well Protection Area (IWPA) for a public water supply. The Site is also not located in a potentially productive aquifer or within a Current or Potential Drinking Water Source Area. In addition, there are no known drinking water wells within 500 feet of the Site. No portion of the Site is listed as Natural Heritage and Endangered Species Protected (NHESP) Wetlands Habitats for Rare or Endangered Species. The closest NHESP Estimated Habitats of Rare Wildlife area to the Site is located a half mile to the northeast. Areas of Protected Open Space are located within a half mile of the Site. The Crane & Co. Foundry Sand

Landfill is located between 500 feet and a half mile to the south of the Site across Goodwin Street. Major basins and sub-basins are located within a half mile of the Site. The closest surface water body to the Site is the Chicopee River located approximately 1,500 feet the north.

1.5 MCP Method 1 Soil and Groundwater Classification

The MCP soil and groundwater classifications presented below were identified in accordance with 310 CMR 40.0933 and 310 CMR 40.0932, respectively, and were used to compare the analytical results with applicable Method 1 Cleanup Standards developed by MassDEP for preliminary risk screening purposes. A comprehensive discussion of exposure scenarios is provided as part of the Method 3 Risk Characterization (see Section 5).

1.5.1 Soil

Under current conditions, since human receptors including children are unlikely to be present, but not restricted, direct exposure to soil at the Site is considered low frequency and activities are expected to be low intensity. Based on these assumptions, soil is currently categorized as S-2 for soils located 0 to 3 feet below ground surface (bgs) in unpaved areas and S-3 for soils located greater than 3 feet bgs and all soil beneath pavement.

For the purpose of risk screening for unrestricted use, all soil has also been conservatively compared to S-1 in the attached tables. The Method 1 S-1 Cleanup Standards are the most stringent and considered to be protective of human health for residential use, which considers the highest exposure potential and the most sensitive receptors (young children, elderly, pregnant females). Consequently, if concentrations are below Method 1 S-1 Cleanup Standards, it may be concluded that a condition of No Significant Risk (NSR) exists for unrestricted use, and no further risk characterization, remedial response actions, or land use restrictions are required.

1.5.2 Groundwater

Based on potential exposures, MassDEP has defined three categories of groundwater for risk characterization, classified as follows:

- Groundwater category GW-1 applies to groundwater located within current or potential drinking water source areas;
- Groundwater category GW-2 is a potential source of oil and/or hazardous materials (OHM) vapors to indoor air, and includes groundwater with an average annual depth of the water table less than 15 feet below ground surface (bgs), and groundwater located within 30 feet of an occupied building in which contaminants are identified; and,
- Groundwater category GW-3 applies to all groundwater in Massachusetts due to its potential to discharge to surface water bodies.

A series of databases have been developed by MassDEP and the Executive Office of Environmental Affairs ("EOEA"). These databases are compilations of information pertaining to the location of relevant cultural features, water supplies, medium and high yield aquifers, MassDEP-approved wellhead protection areas, certified vernal pools and other environmentally sensitive receptors. A summary of this information is provided in Figure 3 – Area Receptors Map.

As previously discussed, the Site is not located within a Zone II or Interim Well Protection Area (IWPA)

for a public water supply. The Site is also not located in a potentially productive aquifer or within a Current or Potential Drinking Water Source Area. In addition, there are no known drinking water wells within 500 feet of the Site. Given that the Site is not located within a current or potential drinking water source area, the GW-1 groundwater category is not applicable to the Site.

The MCP at 310 CMR 40.0932(6) specifies that groundwater shall be categorized as GW-2 if it is located within 30 feet of an existing occupied building or structure, and the average annual depth to groundwater in that area is 15 feet or less. Based on the depth of groundwater reported later this report, and the proximity to commercial and residential buildings surrounding the Site being greater than 30 feet, the GW-2 category is not applicable to the Site.

Groundwater at all Disposal Sites is considered a potential source of discharge to surface water, as defined by 310 CMR 40.0932(2), and therefore, all groundwater shall be classified as the GW-3 groundwater category. The MCP Method 1 GW-3 Cleanup Standards are meant to be protective of aquatic organisms in surface water bodies, the closest being the Chicopee River to the north.

In summary, the applicable MCP Groundwater Category is GW-3 for the entire Site. If in the future, occupied buildings are constructed at the Site, then GW-2 would apply to groundwater located within 30-feet of those future buildings.

2.0 PREVIOUS ENVIRONMMENTAL INVESTIGATIONS

Weston & Sampson reviewed files available on the Energy and Environmental Affairs (EEA) Data Portal for Waste Sites and Reportable Releases (https://eeaonline.eea.state.ma.us/portal#!/search/wastesite), as well as reports provided by the City to document Site history and previous response actions. Documented releases of OHM at the Site include metals, petroleum hydrocarbons (total, extractable and volatile), polycyclic aromatic hydrocarbons (PAHs), asbestos-containing material (ACM), volatile and semi-volatile organic compounds (VOCs and SVOCs), and polychlorinated biphenyls (PCBs) in soil; petroleum hydrocarbons, metals, VOCs, and SVOCs in groundwater; measurable oil in the subsurface; and various threats of release due to poor housekeeping practices associated with past industrial usage of the Site.

The results of this file review are summarized in the following sections. Based on our review of the EEA Data Portal files, one RTN, 1-170, is associated with the Site. Data tables for the laboratory results discussed in this section are provided in Appendix A. Sample and remedial excavation locations, if available, are shown in Figure 2. Note that data no longer representative (i.e., data for soil that has been removed from the Site) is not included.

2.1 1986 Phase I ESA

ERT, Inc. of Laurel, Maryland (ERT), conducted a Phase I ESA in October 1986 at the Site, on behalf of Crane Co. At the time, the Site consisted of a 16-acre fenced property containing 13 buildings. A 20-acre landfill, which was part of the larger Chapman Valve/Crane operations, existed south of the Site. During this investigation, ACM, lead paint, silica sand and blasting dust (free silica), fuel oil, solvents, probable PCB oil, and various unknown substances were noted throughout the Site. Based on the findings of the Phase I ESA, ERT recommended the following:

- Assessment and removal/repair of asbestos insulation by a licensed asbestos contractor
- Filling or sealing the pipe tunnel located on the Site, or leaving as is
- A complete underground storage tank (UST) inventory and removal of all Site USTs by a licensed tank removal contractor
- Assessment of possible PCB oil containing transformers for off-site disposal by a licensed PCB transformer disposal contractor
- Assessment and disposal of unknown substances located throughout the Site by a licensed hazardous waste contractor

2.2 February 1987 Removal of USTs from Site

In February 1987, Clean Harbors Environmental Services of Kingston, Massachusetts (CHES), was contracted by Crane Co. to empty, clean, excavate, remove, and dispose of the USTs identified in the 1986 Phase I ESA by ERT. Nineteen (19) USTs of various capacities and containing various products were removed from the Site. A summary table of the UST characteristics are summarized below:

Tank #	Location	Total Capacity (gal)	Amount of product (in)	Product Type
1	Old Power House	25,000	47	#4 Oil
2	Old Power House	25,000	91	#4 Oil
3	Old Power House	25,000	13	#6 Oil
4	Old Power House	25,000	65	Waster/Sludge
5	Pattern Storage	100	Unknown	Alcohol
6	Brass Foundry No. 1	3,000	46	#2 Oil
7	Brass Foundry No. 2	3,000	76	#2 Oil
8	Lot Essex & Pinevale	650	8	Gasoline
9	Department 40	8,000	Unknown	#2 Oil
10	New Power House No. 1	20,000	13	#4 Oil
11	New Power House No. 2	20,000	11	Water/Sludge
12	Department 7 Hill No. 1	20,000	94	#2 Oil
13	Department 7 Hill No. 2	20,000	6	Water/Oil
14	Department 7 Hill No. 3	20,000	6	Water/Oil
15	Department 7 Hill No. 4	20,000	60	Water/#6 Oil Sludge
16	Department 7 Hill No. 5	20,000	6	#6 Oil Sludge
17	Department 7 Hill No. 6	20,000	6	#6 Oil Sludge
18	Department 7 Shipment	3,000	0	Not Recorded
19	Department 40	8,000	Unknown	#2 Oil

During UST removal activities, free product, oily soil, and/or oily groundwater were observed in the following excavation areas:

- Tanks 1 through 4
- Tanks 6 and 7
- Tanks 10 and 11

ERT proposed to perform limited subsurface investigation activities to determine the most cost and environmentally effective way to remediate these areas of contamination, including soil borings, monitoring well installations, the collection of soil boring samples, excavation/stockpile samples, and groundwater samples, and assessing/sampling a cistern located to the west of Tanks 1 through 4.

2.3 April 1987 Remedial Investigations

In April 1987, ERT prepared a scope of work on behalf of Crane Co. following a Notice of Responsibility (NOR) by Massachusetts DEQE (Department of Environmental Quality Engineering – now the Department of Environmental Protection) to perform remedial investigations at the Site. The remedial investigations were implemented and presented in an October 1987 ERT report titled "Remedial Investigations for Indian Orchard Facility." The following actions were taken at the Site:

- A subsurface exploration program, including the advancement of 25 soil borings and installation of 25 monitoring wells at each boring location. Several borings were located along the railroad tracks and adjacent to UST excavations (Tanks 1-4 and Tanks 10-11) and the Building 48 yard. Soil samples were collected and analyzed for petroleum hydrocarbons and PCBs. Groundwater

samples (and surface water samples from within the Tank 1-4 excavation) were collected and analyzed for petroleum hydrocarbons, VOCs, and PCBs.

- Samples of water within the cistern adjacent to the Tank 1-4 excavation area were collected and analyzed. A temporary discharge permit was approved and all the water within the cistern was pumped into the municipal sewer system.

- Inspections of potential past spill areas across the Site

Based on the findings of these remedial investigations, ERT recommended the following:

- Identify locations of oily soil for removal and disposal by a clean-up contractor

- Assess the Tank 1-4 excavation area and design a long-term oil removal system

- Removal of soils within the excavations of Tanks 1-4, 6-7, and 10-11 with elevated concentrations of petroleum hydrocarbons by a licensed hazardous waste contractor

- Removal of surficial soils at the Dept #7 yard with elevated concentrations of petroleum hydrocarbons

2.4 1991 Phase II ESA

Con-Test, Inc. of East Longmeadow, Massachusetts (Con-Test), on behalf of Crane Co., conducted a Phase II ESA investigation between October and December 1990 at the Site. Investigation activities included a wood block subfloor investigation, oily surface verification, Site security analysis, and monitoring well installation, sampling, and analysis. The findings of the Phase II ESA are summarized below:

- Total Petroleum Hydrocarbons (TPH) were detected in soil samples collected from beneath portions of concrete subfloors associated with Buildings 23, 25, and 48. TPH concentrations range from not detected (ND) to 3,000 milligrams per kilogram (mg/kg) at Building 23, ND to 730 mg/kg at Building 25, and ND to 100 mg/kg at Building 48. Semi-volatile Organic Compounds (SVOCs) were detected at low concentrations in some soil samples collected beneath Buildings 23, 25, and 48. Fluorene was detected at 6 mg/kg at the eastern end of Building 23. Volatile Organic Compounds (VOCs) were not detected in soil samples collected at beneath these buildings.

- VOCs were detected in groundwater at low concentrations in MW-1, MW-19, CMW-30, and the December 6, 1990, trip blank. SVOCs were detected in groundwater at low concentrations in MW-1, MW-7, MW-12, MW-14, MW-19, CMW-31S and the November 30, 1990, trip blank. TPH was detected in groundwater at 1.2 mg/L at CMW-30.

- The presence of oil under Building 23 may be attributable to a spill of #4 oil from Tanks 10 and 11.

- TPH, TCLP barium, and TCLP lead were detected at concentrations of 140 to 3100 mg/kg, 0.65 mg/L, and 0.56 mg/L, respectively, in various composite samples collected from Oily Soil Area #2. Trace concentrations of VOCs and SVOCs were detected.

- TPH, anthracene, benzo(a)anthracene, benzo(b)fluoranthene, fluoranthene, phenanthrene, 1,2,4-trichlorobenzene, TCLP barium, and TCLP lead were detected at concentrations of 110 to 780 mg/kg, 6 mg/kg, 8 mg/kg, 8 mg/kg, 23 mg/kg, 18 mg/kg, 15 mg/kg, 0.40 mg/L, and 0.09 mg/L, respectively, in various composite samples collected from Oily Soil Area #3.

- Bedrock was identified at depths ranging from 2 to 20 feet below ground surface (bgs) in three (3) monitoring wells (CMW-30, CMW-31S, and CMW-31D) and three (3) subfloor borings beneath Building 23. Two (2) bedrock cores were collected and identified as the Portland Formation.

- A radiological survey of the Site was requested by MassDEP due to the disposal of uranium metallic dust and/or waste or plant equipment contaminated with uranium or uranium oxides in shallow burials. The contamination is associated with work conducted in Building 23 for the Manhattan Project in the 1940s by Chapman Valve. The survey was to be completed by the U.S. Department of Energy at a later date.

2.5 1996 Post-Remedial Action Report

Bechtel National, Inc of Reston, Virgina (BNI), on behalf of the U.S. Department of Energy (DOE), assisted in the planning and implementation of remedial activities for radioactive contamination at the Site from July to September 1995. Residual uranium contamination was present in the western third of Building 23 from operations conducted for the AEC in 1948.

Remedial activities included the decontamination of a bridge crane, overhead trusses, horizontal wall surfaces, wooden block and concrete floor pads, underlying soils, and a drain line. A portion of the decontaminated material were left onsite, including concrete monoliths, wooden decking from the crane, wooden blocks, and concrete pads. Post-remediation surveys performed in the area indicated levels of radioactivity below the applicable DOE cleanup guidelines.

2.6 1998 Phase II ESA Addendum

In May 1998, ATC Associates, Inc. of Woburn, Massachusetts (ATC), on behalf of Crane Co., completed an addendum to the Phase II ESA performed by Con-Test in 1991. Supplemental assessment and investigation activities included soil boring and monitoring well installation, additional analytical characterization, product recovery testing of culvert wells, disposal of on-Site transformers and switches, transformer pad confirmation sampling, disposal of PCB contaminated woodblocks, interim measures (i.e. gauging and bailing, test pitting, oily soil excavation and removal, NAPL extraction and dewatering activities), and risk characterization. The findings of the supplemental investigation are summarized below:

- Comprehensive investigations and monitoring indicate minimal impact to soil and groundwater from historical Site operations.

- Interim measure activities listed above have addressed UST releases to subsurface and surficial soils Site-wide.

- Residual petroleum-impacted soils surrounding the tank grave associated with Tanks 1-4 are located beneath substantial, permanent, concrete structures and are considered inaccessible, apparently limited in quantity, and isolated. Petroleum-impacts are associated with #4 and #6

oil. The permanent concrete structures are proposed to be left in place and limit the potential migration of residual petroleum impacts.

- Constituents of concern included VOCs, PCBs, and ten (10) metals in groundwater, SVOCs and selenium in soil only, and TPH and PCBs in both soil and groundwater.

- A Method 3 Risk Characterization was performed to evaluate the potential for site-specific risk to employees of Crane Co., trespassers, potential construction or utility workers, and future residential populations. Based on the results of the Method 3 Risk Characterization and the Interim Measures performed at the Site, a condition of NSR was achieved in association with the documented release conditions.

2.7 2003 Post-Audit Completion Statement and Addendum Risk Characterization

Between September and October 2003, ATC, on behalf of Crane Co., conducted supplement field assessment activities in response to a Notice of Audit Findings/Notice of Non-Compliance (NOAF/NON) issued by MassDEP on July 1, 2003. In the NOAF/NON, MassDEP identified asserted that the 1998 Phase II ESA Addendum did not establish the horizontal and vertical extent of metals and petroleum impacts in soil and groundwater. MassDEP required additional assessment and an updated Method 3 Risk Characterization.

Assessment activities included a metals assessment program, “black-stained soil” assessment, indoor air sampling, and a surficial oil staining assessment. The findings of the supplemental field assessment are summarized below:

- Soil samples were collected in the vicinity of former monitoring well locations and in areas of the former Iron Machine Shop and Brass Foundry. Laboratory analytical results indicated that antimony, beryllium, lead, copper, and zinc were detected at elevated concentrations. Arsenic, barium, cadmium, chromium, mercury, nickel, and silver were also detected.

- “Black-stained soil” was identified near a manhole cover west of the Tank 1-4 excavation during a Site inspection conducted by MassDEP on June 11, 2003. The “black-stained soil” had a mild organic odor and was presumed to have been stained from regular foundry activities. Petroflag™ kits were used to screen two near-surface soil samples for TPH; TPH readings were recorded as 163 mg/kg and 320 mg/kg. Additional soil samples (S-1 and S-2) were collected by ATC on September 11, 2003, and analyzed for volatile petroleum hydrocarbons (VPH), extractable petroleum hydrocarbons (EPH), and PAHs. Laboratory analytical results showed various EPH and PAH compounds above laboratory detection limits. Additionally, polarized light microscopy (PLM) and scanning electron microscope (SEM)/energy dispersive x-ray (EDX) examination was performed on the samples and a moderate amount of anthracite coal and coal ash were identified in the samples. The “black-stained soil” was determined by ATC to be exempt from the MCP, and was therefore left out of the risk characterization conducted for the Site.

- During groundwater sampling conducted in 1987 and 1988 by ERT, two (2) groundwater monitoring wells MW-8 and MW-27 were found to have TPH at concentrations high enough to pose a risk of vapor intrusion to the occupied buildings. Six (6) vapors points were installed between August and September 2003 and soil gas was screened using a photoionization detector (PID) with results ranging from ND to 28.9 ppmv. On September 12, 2003, four soil vapor samples were collected for air-phase petroleum hydrocarbons (APH) and sent to Con-

Test Analytical Laboratories (Con-Test Analytical) for analysis. Laboratory analytical results indicated various compounds above laboratory detection limits. Petroleum hydrocarbon vapors were found to not have the potential to significantly impact indoor air in the occupied buildings down gradient of the impacted wells.

- Surficial oil staining was identified near the eastern end of former Building 10 and several locations in the footprint of Building 23 during a Site inspection conducted by MassDEP on June 11, 2003. The stained materials generally consisted of a sand, gravel, brick, and wood fragment mixture that was likely used to cut material associated with oil spills from former equipment operations. Additionally, a concrete containment bin located in the area was observed to have an oily sheen after sediments within the containment bin were disturbed. Clean up activities were conducted by ATC within the identified areas. Oily water and materials, such as soil, debris, and wooden blocks, were generated and disposed of off Site at appropriate facilities.

- Risk characterization results were amended with the additional metal results and did not significantly impact the risk characterization results reported in the 1992 Phase II EAS Addendum submitted in May 1998.

2.8 2007 Release Abatement Measure (RAM) Plan

On January 4, 2007, WjF GeoConsultants, Inc. (WjF), on behalf of Goodwin Realty, LLC, submitted a Release Abatement Measure (RAM) Plan for the discovery of contamination during environmental assessment activities performed by O'Reilly, Talbot & Okun (OTO), on behalf of Western Area Development Corporation. The environmental assessment performed by OTO was completed as a due diligence investigation for a potential purchaser. The objective of the RAM plan will be to reduce the concentrations of EPH and PCBs below risk-based standards in the area of the former machine shop (Building 10). Additional contaminates identified above MassDEP Reportable Concentrations S-1 (RCS-1) standards during OTO's assessment were VPH, SVOCs, arsenic, and lead detected in samples collected from beneath the former brass foundry (Building 5) and former iron foundry (Building 16).

2.9 2009 RAM Completion Report

In December 2006, WjF conducted a soil boring program to delineate the EPH and PCB impacts at the Site. Delineation of EPH impacted soil was only partially successful as former foundations and utility tunnels provided excavation limits to the east and south but soil samples at the north and west extents of the excavation detected EPH concentrations above the Method 1 S-1 GW-2/GW-3 standards. During the June and October 2007 soil excavation program, the north and west extents of EPH impacted soil were delineated. Contaminated soils and concrete foundations in the former machine shop building were excavated and stockpiled on Site. Contaminated soils were sampled for disposal characterization parameters. In June 2008, approximately 160 tons of contaminated soil and concrete rubble was disposed of at Ondrick Construction Company.

2.10 2010 Asbestos Assessment

In 2010 OTO completed an asbestos assessment on behalf of Springfield Redevelopment Authority. The purpose of the assessment was to identify ACM that may have remained on site or were left in place when the former foundry buildings were demolished, and to identify areas of asbestos in soil. The asbestos assessment primarily focused on surface level construction debris piles and soil piles, but subgrade exploration was performed at the boiler room and the main north/south utility tunnel. Representative bulk samples of suspected ACM were collected from the ground surface and from limited subsurface structures. ACM, such as transite pipe, transite panels, black building construction

paper, black pipe insulation, various roofing materials, resilient floor tiles, and adhesive mastic, was identified in construction debris and soil piles as well as the boiler room and utility tunnel. An approximate 1,850 cubic yards of ACM construction debris and 31,625 cubic yards of ACM soil was estimated to be present at the Site.

2.11 April 2010 Environmental Site Assessment

In April 2012, OTO completed an ESA at the Site on behalf of Springfield Redevelopment Authority. The purpose of the ESA was to assess the nature and extent of OHM materials in soil and groundwater at the Site. During assessment activities, OTO identified thirteen (13) locations that require additional response actions summarized in the table below. OTO estimated response actions would cost up to $105,000 to address the 13 areas and conduct one (1) Method 3 Risk Assessment and a Response Action Outcome (RAO) Report.

Area	Associated Samples	Constituents > RCS-1 in Soil	Constituents > RCGW-2 in GW	Proposed Response Actions
RC-1	BT-E, DP-1	Petroleum	N/A	Delineate extent of impacted soil, localized soil excavation (assume 100 cubic yards), Method 3 Risk Assessment, RAO
RC-2	CM-22	Petroleum	None	Delineate extent of impacted soil, Method 3 Risk Assessment, RAO
RC-3	CM-38	Petroleum	Petroleum, Lead	Consider petroleum in groundwater consistent with waiver completion, resample groundwater for total and dissolved lead, assume that condition will not be reportable and document with MassDEP
RC-4	CM-39	Lead	None	Delineate extent of impacted soil, localized soil excavation (assume 100 cubic yards), Method 3 Risk Assessment, RAO
RC-5	CM-40, CM-53, CM-54	Barium, Cadmium, Lead	N/A	Delineate extent of impacted soil, localized soil excavation (assume 50 cubic yards), Method 3 Risk Assessment, RAO
RC-6	CM-43	Petroleum	Petroleum, Lead	Resample groundwater for total and dissolved metals, assume that condition will not be reportable
RC-7	CM-45	None	Lead	Resample groundwater for total and dissolved metals, assume that condition will not be reportable
RC-8	CM-52	Cadmium	None	Delineate extent of impacted soil, localized soil excavation (assume 50 cubic yards), Method 3 Risk Assessment, RAO
RC-9	DP-2	Polycyclic Aromatic Hydrocarbons	N/A	Perform microscopic analysis on soil, assume that condition will not be reportable due to coal/ash
RC-10	MW-205	None	Cadmium	Resample groundwater for total and dissolved metals, assume that condition will not be reportable

RC-11	OTP-4	Polycyclic Aromatic Hydrocarbons	N/A	Perform microscopic analysis on soil, assume that condition will not be reportable due to coal/ash
RC-12	OTP-6	Polycyclic Aromatic Hydrocarbons	N/A	Perform microscopic analysis on soil, assume that condition will not be reportable due to coal/ash
RC-13	OTP-8	Polycyclic Aromatic Hydrocarbons	N/A	Perform microscopic analysis on soil, assume that condition will not be reportable due to coal/ash

2.12 April 2010 Preliminary Geotechnical Findings

In April 2010, a preliminary geotechnical assessment was completed by OTO in April 2010, on behalf of Springfield Redevelopment Authority, to assess the geotechnical suitability of on-Site soils for future development in a business/office park. The investigation found that two (2) main issues were present on-Site that would result in premium costs for construction of single story or two to three story buildings. One issue involves the presence of non-engineered fill consisting of ash and building debris and organic soils throughout portions of the Site that would need to be removed and replaced with engineered fill. The other issue involves the presence of concrete floor slabs, foundations, and buried debris that would need to be removed prior to development. Additionally void, basements, tunnels, and improperly abandoned utilities were found to be present in some portions of the Site and would need to be removed from any proposed building footprint and replaced with engineered fill prior to building construction.

2.13 2015 Pollution Report No. 1

In March 2011, an investigation to determine the extent of asbestos contamination in on-Site soil and debris piles was requested by MassDEP Western Regional Office (WERO) with assistance from the USEPA Region I Emergency Planning and Response Branch (EPRB). On August 17, 2015, USEPA, Superfund Technical Assessment Team (START), and Emergency Rapid Response Service (ERRS) mobilized to the Site and established work zones, developed a staging area, and prepared for Site excavation at three (3) piles, five (5) surface areas, and four (4) surface soil grids. Excavation activities commenced on August 24, 2015, and were completed on September 2, 2015. Site excavations and analytical results were reviewed with MassDEP WERO and confirmed that excavation activities were complete. Approximately 2,500 tons of soil and debris were excavated and stockpiled on Site pending transportation and disposal. USEPA demobilized from the Site on September 2, 2015.

2.14 2016 Removal Program After Action Report

The Removal Program After Action Report summarized the activities recorded in Pollution Report No. 1 by the USEPA. ACM soil from the primary stockpile staged on-Site created during the August and September 2015 excavation activities was loaded for disposal at the Seneca Meadow, Inc. Disposal Facility in Waterloo, New York. Between October 26 and 30, 2015, 21 trucks were loaded with this ACM soil. Between November 2 and 3, 2015, a total of 9 trucks were loaded with this ACM soil. The final Site Walk was completed on November 2, 2015, with USEPA, START, and MassDEP and all activities were completed on November 4, 2015. Six (6) of 18 confirmatory soil samples collected post-excavation showed detectable asbestos in soil. No additional soil removal was conducted. Areas of ACM material removal, marked up to show locations of confirmatory samples that were positive of asbestos, is provided in Appendix A.

3.0 PHASE II SUBSURFACE INVESTIGATION

Weston & Sampson performed a Phase II subsurface investigation at the Site in May and August 2023. Subsurface investigation activities included the advancement of 34 soil borings; the collection of soil samples from each soil boring location; the installation of four (4) groundwater monitoring wells; and the collection of groundwater samples from the four (4) newly installed wells and three (3) existing wells. Weston & Sampson located soil boring and sampling locations using the following objectives for guidance:

- To gain a broad and comprehensive understanding of overall Site conditions;
- To further evaluate known historical operations and releases at the Site;
- To further evaluate metals and PAH impacts identified in previous investigations; and,
- To complete a general characterization of the Site for future redevelopment and assist with MCP compliance.

Please note that evaluation of residual ACM was beyond the scope of this study.

3.1 Soil Boring Advancement

Between May 15 and 19, 2023, Weston & Sampson observed the advancement of 34 soil borings by New England Geotech of Jamestown, Rhode Island (NE Geotech). Soil borings were advanced using a track-mounted Geoprobe 7822DT rig, and are depicted on Figure 2 – Site Plan. Soil boring locations were based on the sampling plan designed by Weston & Sampson and were positioned to assess areas identified in previous investigations that required further evaluation and to complete a general overall characterization of the Site.

Soil borings were advanced to depths ranging from 2 to 15 feet bgs. The depth of each soil boring was determined by the depth to overburden groundwater measured at each boring location or chosen based on the depth of historical exceedances. Soil samples were collected continuously during the advancement of the soil borings and Weston & Sampson recorded the following information on boring logs for each boring location: soil type, color, depth and thickness of soils, field estimation of moisture content, field instrumentation readings, evidence of soil contamination, sampling intervals, and borehole abandonment details. Each soil sample (at a minimum of every 5 feet) was screened for VOCs using a PID equipped with a 10.6 eV lamp and in accordance with the jar headspace screening method outlined in MassDEP Waste Site Cleanup Policy #WSC-94-400 entitled Interim Remediation Waste Management Policy for Petroleum Contaminated Soils. Characterization details and PID readings are included in the Soil Boring Logs included in Appendix B.

Soil samples were submitted for laboratory analysis from each boring at the target depth interval, as discussed in Section 3.2 below.

3.2 Soil Sampling and Analysis

Samples from soil boring locations were submitted for laboratory analysis according to the rationale below, and based on concentrations reported by others in previous reports:

Sampling and Analysis Rationale			
AOC	Sample IDs	Rationale	Analytes
BT-E, DP-1	BTE-E, BT-EN, BT-ENW, BT-ESW	Evaluate extent of petroleum-impacted soil	EPH/VPH

CM-22	CM-22E, CM-22N, CM-22S, CM-22W	Evaluate extent of petroleum-impacted soil	EPH/VPH
CM-38	CM-38E, CM-38N, CM-38NW, CM-38SE, CM-38SW	Evaluate extent of petroleum-impacted soil; resample for groundwater for dissolved lead	EPH/VPH; Lead
CM-39	CM-39E, CM-39N, CM-39S, CM-39W	Evaluate extent of lead-impacted soil	Lead
CM-40, CM-53, CM-54	CM-53E, CM-53N, CM-53SE, CM-53SW, CM-53W	Evaluate extent of metals-impacted soil, resample for groundwater for dissolved metals	Barium, Cadmium, Lead
CM-43	CM-43N, CM-43NW, CM-43SW	Evaluate extent of petroleum-impacted soil; resample for groundwater for dissolved lead	EPH/VPH; Lead
CM-45	No Sample – Refusal near Ground Surface	Sample soil for lead; resample groundwater for dissolved lead	Lead
CM-52	CM-52E, CM-52N, CM-52S, CM-52W	Evaluate extent of cadmium-impacted soil	Cadmium
DP-2	DP-2A	Evaluate if coal/ash exemption applies	PAHs, Lead, Coal/Ash
MW-205	MW-205A	Sample soil for cadmium; resample groundwater for dissolved cadmium	Cadmium
OTP-4	OTP-4A	Evaluate if coal/ash exemption applies	PAHs, Lead, Coal/Ash
OTP-6	OTP-6A	Evaluate if coal/ash exemption applies	PAHs, Lead, Coal/Ash
OTP-8	OTP-8A	Evaluate if coal/ash exemption applies	PAHs, Lead, Coal/Ash

For quality assurance and quality control (QA/QC) purposes, Weston & Sampson submitted four (4) duplicate soil samples for laboratory analysis for metals and/or EPH, PAHs, and VPH.

All soil samples collected for analysis were placed directly into new laboratory-prepared sample containers and packed and transported on ice to Pace Analytical (Pace) in East Longmeadow, Massachusetts, in accordance with professional standards of care for selected analyses via EPA or state methods. Chain-of-custody documentation was maintained throughout the sampling process. A copy of each chain-of-custody is included in the respective laboratory report (see Appendix C).

3.3 Monitoring Well Installation

Weston & Sampson directed the installation of four (4) 2-inch diameter PVC monitoring wells at four boring locations in general accordance with MassDEP publication #WSC-310-91 entitled Standard Reference for Monitoring Wells and MassDEP Policy Standard References for Monitoring Wells, Small Diameter Driven Well Supplement, dated January 1999. Each well was constructed with a 10-foot, 0.010-inch slotted screen and completed with a locking, steel stick-up casing or flush-mount road box. The groundwater monitoring well locations were based on the sampling plan designed by Weston & Sampson and were placed to evaluate impacts from historical operations at the Site. Well placement was designed to complete a general overall characterization of groundwater at the Site. Groundwater monitoring well construction logs are included in Appendix B. Monitoring well locations are shown in Figure 2.

3.4 Groundwater Sampling and Analysis

Weston & Sampson conducted two rounds of groundwater sampling on June 1 and August 25, 2023. Groundwater samples were collected from the four (4) newly installed monitoring wells (MW-CM-38N, MW-CM-43N, MW-CM-53N, MW-205A) and three (3) existing monitoring wells (EW-1, EW-2, EW-3) using low-flow sampling techniques in accordance with EPA's Region I "Low Stress (low flow) Purging and Sampling Procedure for the Collection of Ground Water Samples from Monitoring Wells", EPASOP-GW 001 (Revision 4, September 19, 2017). The groundwater samples were submitted to Pace for laboratory analysis. On June 1, 2023, groundwater at the four (4) newly installed monitoring wells was initially analyzed for barium, cadmium, and lead only. Weston & Sampson conducted a supplemental sampling round on August 25, 2023, at the four (4) newly installed wells and three (3) existing wells. Groundwater from the seven (7) locations was analyzed for MCP-14 metals, VOCs, and SVOCs.

Prior to sampling, all wells were gauged to evaluate the presence of light non-aqueous phase liquid (LNAPL) and to record depth to groundwater and depth to well bottom using an oil-water interface probe. Dedicated disposable tubing was used at each well to prevent cross-contamination between sample locations. A peristaltic pump was used to pump the water to the ground surface, and groundwater was monitored for physical and chemical parameters using a multi-function water quality meter and stand-alone turbidity meter. Once a stable drawdown was achieved, select parameters and water level were recorded approximately every three to five minutes until stable and samples were collected. Non-dedicated equipment was decontaminated between sampling locations with a double wash using an Alconox detergent solution followed by a double rinse with deionized water.

Once sampling conditions were established, each groundwater sample was collected for laboratory analysis by pumping directly into laboratory-supplied containers. Samples analyzed for metals were field-filtered. The groundwater samples, including one (1) duplicate for each sampling round, were collected and submitted on ice to Pace for laboratory analysis. Chain-of-custody documentation was maintained throughout the sampling process. A copy of each chain-of-custody is included in the respective laboratory report (see Appendix C).

4.0 PHASE II SUBSURFACE INVESTIGATION RESULTS

4.1 Underlying Bedrock and Surficial Geology

4.1.1 Bedrock Geology

According to the USGS Bedrock Geologic Map of Massachusetts (Zen et al., 1983), bedrock underlying the Site is part of the Lower Jurassic Portland Formation, which consists primarily of sedimentary rocks, specifically, "reddish-brown to pale red arkose and siltstone, as well as gray sandstone, gray siltstone, and black shale interpreted as lake beds." Bedrock was not encountered by Weston & Sampson during Phase II investigation activities and bedrock outcroppings were not observed in the immediate area. Suspected bedrock was encountered at the Site from two (2) to 20 feet bgs during the 1991 Phase II ESA performed by Con-Test; however, refusal may have been related to subsurface structures.

4.1.2 Surficial Geology

In general, shallow soils across the Site consisted of sand, concrete, and varying types and amounts of fill materials. Typically, where concrete was not observed at ground surface, several inches of topsoil were encountered, followed by 6 inches of concrete. Fill materials encountered included crushed rock, brick, asphalt, rubber and metal debris, slag, and ash. Deeper soils throughout the Site were primarily composed of light brown and gray fine to coarse sand with trace gravel. Several borings (CM-38SW, CT-22N, CM-22S, CM-22W, CM-38N-a, CM-38N-c, CM-38NW, CM-38E, CM-38SE, DP-2A/CM-43N) also included a slight to strong petroleum-like odor from between approximately 10 to 15 feet. A copy of the complete boring logs is included in Appendix B.

4.1.3 Groundwater Elevations and Flow Direction

In June and August 2023, Weston & Sampson conducted a groundwater gauging event at the Site. Depth to groundwater was measured at the four (4) newly installed monitoring wells and three (3) existing wells. Groundwater was encountered at depths ranging from 7.01 feet (MW-205A) to 11.80 feet (MW-CM-43N).

Weston & Sampson also attempted to survey the newly installed wells and tie them into the existing well network in June 2023; however, several attempts at conducting the survey yielded large errors due to the Site constraints. Heavy vegetation and unstable soil and rubble on the ground surface required multiple survey turns over the long distances at the Site. This resulted in unreliable survey results; therefore, based on previous data, groundwater direction is assumed to be the same as it was in previous reports.

A survey was performed by ERT in May 1988 to determine monitoring well and groundwater elevations and to evaluate groundwater flow direction. Groundwater elevations were calculated using the elevations of the top of casings of the wells installed in August 1987 and the groundwater levels measured in these wells. Based on these calculations, groundwater flow at the Site is expected to be to the northwest toward the Chicopee River.

4.2 Soil Analytical Results

Soil analytical results from the May 2023 sampling event are summarized below. Soil analytical data summary tables are provided in Tables 1 and 2. The results summarized in Table 1 are compared to the applicable Method 1 Cleanup Standards. Table 2 includes the SEM analyses. Original laboratory analytical reports for all soil samples are included in Appendix C. Sample locations are shown in Figure 2.

The following contaminant concentrations were detected above the MCP Method 1 S-1/GW-3 Cleanup Standards:

Semi-Volatile Organic Compounds (SVOCs)

- Benz(a)anthracene was detected in CM-38SE (4-7 feet), DP-2A (0-2 feet), and OTP-4A (0-2 ft) at concentrations of 9.5, 8, and 23 mg/kg, respectively.
- Benzo(a)pyrene was detected in CM-38N (3.5-6.5 feet), CM-38SE (4-7 feet), DP-2A (0-2 feet), and OTP-4A (0-2 ft) at concentrations of 2.2, 8.1, 7.9, and 32 mg/kg, respectively.
- Benzo(b)fluoranthene was detected in CM-38SE (4-7 feet), DP-2A (0-2 feet), and OTP-4A (0-2 ft) at concentrations of 9.5, 11, 41 mg/kg, respectively.
- Dibenz(a,h)anthracene was detected in CM-38SE (4-7 feet), DP-2A (0-2 feet), and OTP-4A (0-2 ft) at concentrations of 1.1, 1.4, 6.5 mg/kg, respectively.
- Indeno(1,2,3-cd)pyrene was detected in OTP-4A (0-2 ft) at a concentration of 28 mg/kg.

Extractable Petroleum Hydrocarbons (EPH)

- C_9-C_{18} aliphatics were detected in CM-38N (4.5-7.5 feet) at a concentration of 2800 mg/kg.
- C_5-C_8 aliphatics were detected in CM-38N (4.5-7.5 feet) and CM-38SE (4-7 feet) at a concentration of 110 and 110 mg/kg, respectively.
- C_9-C_{10} aromatics were detected in CM-38N (4.5-7.5 feet) and CM-38SE (4-7 feet) at a concentration of 530 and 340 mg/kg, respectively.

Additionally, trace to light amounts of coal, coal ash, and wood ash were detected in samples OTP-4A, OTP-6A, OTP-8A, and DP-2A. Light asphalt was detected in sample OTP-6A. Moderate tar was detected in DP-2A.

4.3 Groundwater Analytical Results

Groundwater sample analytical results from the June 1, 2023, and August 25, 2023, sampling events are provided in Table 3. Original laboratory analytical reports containing a comprehensive record of sample analytical results are included in Appendix C.

Laboratory analyses did not detect concentrations of metals, VOCs, or SVOCs exceeding the applicable MCP Method 1 GW-3 Cleanup Standards in any of the seven (7) sampled monitoring wells.

4.4 Nature and Extent of Contamination

Based on the analytical results presented above and summarized in attached tables as well as data reviewed from reports generated by others, low-level metals impacts are present throughout the Site from the ground surface to a maximum depth of approximately eleven feet bgs. Lead, barium, and cadmium are present at concentrations greater than the laboratory reporting limits, but below the applicable Method 1 S-1/GW-3 standards in multiple sample locations across the Site. Dissolved metals are present in groundwater throughout the Site; however, concentrations are below the Method 1 GW-3 standard at all sampling locations performed by Weston & Sampson in 2023.

Petroleum impacts (EPH/PAHs/VPH) greater than the applicable Method 1 S-1/GW-3 Cleanup Standards are present in deep soil (greater than 3 feet bgs) in two (2) locations at the Site: CM-38N from 3.5-6.5 feet bgs and CM-38SE from 4-7 feet bgs. Several EPH compounds were present in deep soils at multiple locations throughout the Site at concentrations greater than the laboratory reporting limits, but below the applicable Method 1 S-1/GW-3 Cleanup Standards. Petroleum-like odors and/or a sheen was observed on purge water pumped from monitoring wells MW-CM-38N, MW-CM-43N, MW-205A,

EW-1, EW-2, and EW-3. The analytical data indicate the residual petroleum impacts are highly weathered and although odors are still present, the grossly impacted soil in these area was removed by previous remedial responses or has significantly attenuated.

SVOC/PAH impacts greater than the applicable Method 1 S-1/GW-3 standards are present in surficial soils (0-2 feet bgs) in DP-2A and OTP-4A. Detections of SVOC compounds greater than the laboratory reporting limits were also present in surficial soil samples from OTP-6A and OTP-8A but below the applicable Method 1 S-1/GW-3 standards. Coal, coal ash, wood ash, asphalt, and/or tar was present in all four (4) of these soil samples, indicating that the SVOC/PAH impacts are likely associated with fill materials than discrete petroleum releases. SVOCs are present in groundwater in two (2) monitoring wells (EW-1 and CM-38N) located along the western side of the Site; however, concentrations are below the applicable Method 1 GW-3 Cleanup Standards.

Low-level VOC impacts are present in the groundwater samples collected from four (4) monitoring wells located in the approximate western portion/center of the Site (EW-1, MW-205A, MW-CM-38N, and MW-CM-43N); however, concentrations are below the applicable Method 1 GW-3 Cleanup Standards.

Asbestos impacts to surficial soil are present primarily within the central portion. The area of asbestos impacts, as interpreted by others during investigations conducted in 2010 is shown in Figure 2. Locations and stockpiles removed under EPA oversight are shown in the figure included with Appendix A. Asbestos impacts are expected to be limited to shallow soil, as the source is assumed to be surface deposition.

5.0 RISK CHARACTERIZATION

5.1 General

A Method 3 Risk Characterization was performed to evaluate whether a condition of NSR to human health, safety, public welfare, and the environment exists due to the presence of EPH fractions, PAHs, VPH fractions, VOCs, metals, and PCBs detected in soil at the Site and VOCs, PAHs, and metals detected in groundwater at the Site. The Method 3 Risk Characterization was performed in accordance with 310 CMR 40.0990 of the MCP and MassDEP's document entitled, *"Guidance for Disposal Site Risk Characterization - In Support of the Massachusetts Contingency Plan"* dated July 1995 as well as EPA's Risk Assessment Guidance (USEPA, 1989 with updates through 2009). Separate characterizations of risk to safety, public welfare, and the environment were completed in accordance with 310 CMR 40.0960, 40.0994, and 40.0995, respectively, of the MCP. Supporting data for the risk characterization, including the tables referenced in this section, is provided in Appendix D.

5.2 Exposure Media and Dataset

Soil and groundwater were the main exposure media evaluated at this Site. The risk characterization was based on the soil data collected from the Site during evaluations conducted between June 2006 and May 2023 and groundwater collected in June and August 2023. Data representative of soil that was excavated and transported off-Site was not considered in this Risk Characterization.

5.3 Hazard Evaluation

This section includes a description of the data used as the basis of the Risk Characterization and presents the selection of chemicals of potential concern (COPC). To calculate the arithmetic mean, one-half the detection limit was used to represent samples where the constituent was not detected. For calculation of the 95th percentile upper concentration limit (95UCL), EPA's proUCL application was used and the 95UCL selected as the most representative of the distribution of the data by proUCL was used. Samples where a constituent was not detected were not included in in the 95UCL calculation (calculation without NDs selected); however, the proUCL application does take into account the number of non-detects versus detected concentrations within a dataset.

5.3.1 Dataset - Soil

Appendix D - Table 1 presents the descriptive statistics (i.e., frequency of detection, minimum, average, and maximum) for soil samples collected from the Site and used in this Risk Characterization. Soil samples were collected from the Site for laboratory analysis between June 2006 and May 2023. The samples were collected between 0 and 17 feet below grade. A subset of soil samples collected from the Site were analyzed for EPH fractions, PAHs, VPH fractions, VOCs, metals, and PCBs. Based on a review of soil data, the primary constituents of concern in terms of potential health risks at the Site are lead, PAHs, and PCBs. All analytical data for soil samples is presented in Appendix D and a summary of soil data is presented as Appendix D - Table 1 and a summary of soil data from 0 to 15 feet below grade is presented as Appendix D - Table 2. Appendix D - Table 3 presents the soil data separated out into soil from 0 to 3 feet (surface soil). Appendix D - Table 4 presents soil data from 0 to 6 feet. A discussion of the soil samples collected from the Site is presented in Section 4.2 of this report. The discussion below refers to the soil data set collected from 0 to 17 feet and presented on Appendix D - Table 1.

Seven individual metals were detected in soil samples collected from the Site. The primary metal of concern, lead, was discussed in more detail below.

Lead was detected in all 75 samples analyzed at concentrations ranging from 2.1 to 1,040 mg/kg. The highest concentrations of lead were detected in surface soil samples TP-16 (2 to 4 feet, 1,040 mg/kg), CM-39 (0 to 2 feet, 550 mg/kg), and CM-53 (0 to 2 feet, 400 mg/kg). TP-16 was located under the former Building 1 foundation. Five soil samples were analyzed for chromium VI; chromium VI was detected in 3 of the 5 samples at concentrations ranging from 1.7 to 2 mg/kg. The highest detected concentration of chromium at the Site contained 550 mg/kg total chromium with only 1.7 mg/kg (0.3 percent) chromium VI. The chromium at this Site is therefore likely to be mostly chromium III which has less toxicity than chromium VI.

PCBs were detected in 1 of 23 surface soil sample at a concentration of 2.05 mg/kg in TP-3 (0.6 to 1 feet). The sample contained Aroclor 1254, which are comprised of higher amounts of chlorine and is considered to be high toxicity.

EPH fractions were detected in 23 of 34 soil samples at total EPH fractions concentrations ranging from 14 to 15,900 mg/kg. The highest concentrations of total EPH fractions (sum of EPH fractions in a sample) were detected in BT-E (depth not disclosed, 15,900 mg/kg) and TP-3 (0.6 to 1 foot, 11,110 mg/kg). Soil sample BT-E is located in the area of the former buried box truck. TP-3 was located under the former Building 19 foundation.

PAHs were detected in up to 26 of 39 soil samples analyzed with the highest detected concentrations detected in soil sample TP-3 (0.6 to 1 foot, 2,581 mg/kg total PAHs). Although presence of elevated PAHs in this sample correlated with elevated concentrations of EPH fractions, PAHs at these concentrations may be indicative of pieces of asphalt in the sample. Soil samples OP-4A, CM-38SE, DP-2A, OTP-6, OTP-8, and DP-2 also contained elevated concentrations of PAHs. These samples were not in a centralized location but scattered throughout surface soil at the Site. The higher concentrations of PAHs detected in soil are greater than published natural background concentrations and for soil containing anthropogenic fill materials.

VPH fractions were detected in 7 of 24 soil samples; the highest detected concentrations of VPH fractions were in soil sample BT-E (depth not disclosed). This sample also contained the highest concentrations of naphthalene and xylenes.

Appendix D - Table 2 presents the soil data separated into the 0 to 15 feet depth which is similar to the “all soil” data, a single soil sample collected at 15 to 17 feet was excluded from this interval. Appendix D - Table 3 presents the soil data separated into the 0 to 3 feet depth. As presented on Appendix D - Table 3, the highest concentrations of lead, EPH fractions, PAHs, and PCBs were detected in surface soil. Appendix D - Table 4 presents the soil data separated into the 0 to 6 feet depth. This depth interval was assumed to be representative of potential exposures to future utilities.

5.3.2 Dataset - Groundwater

Groundwater was collected from two monitoring wells, MW-205A and MW-CM-53N, in June 2023 and analyzed for cadmium and/or barium. Groundwater was collected from seven monitoring wells in August 2023 and analyzed metals, VOCs, and semi-volatile organic compounds which includes PAHs (refer to Appendix D - Table 5).

Detected dissolved metals, including arsenic, barium, cadmium, nickel, and zinc, were generally detected at a low frequency of detection, with the exception of barium which was detected in each of the groundwater samples analyzed. The detected concentrations of dissolved metals were less than Method 1 GW-3 groundwater standards. Groundwater collected from monitoring well MW-CM-38N

contained the highest concentrations of VOCs and PAHs. Detected concentrations of VOCs and PAHs in groundwater were less than Method 1 GW-2 and GW-3 Cleanup Standards.

5.3.3 Asbestos in Soil

An evaluation of the Site completed by Weston Solutions in 2011 identified a small number of asbestos fibers in Site surface soil. Activity-based sampling was conducted at the Site with the coordination of USEPA, MassDEP, and Superfund Technical Assessment and Response Team (START). Prior to activity-based sampling (ABS), a team of 6 people (an USEPA representative, a MassDEP representative, the Site Coordinator from Weston Solutions and 3 samplers did extensive soil collection in a grid pattern to conduct surface soil sampling for asbestos analysis. Debris piles were also analyzed for asbestos. Five (5) out of 80 surface soil samples collected contained asbestos, two at trace levels. Bulk asbestos-containing debris (2 containing asbestos out of many samples collected, though the exact number is not specified) also identified at that time has since been removed from the Site. ABS was performed at the Site in November 2011. The activity-based sampling used personal and perimeter air sampling to evaluate a trespasser scenario.

- 3 walking scenarios were performed – 3 - 50 by 50 feet areas around the Site.
- Air samples were submitted to Batta for analysis via International Organization for Standardization (ISO) 10312, Ambient Air – Determination of Asbestos Fibers: Direct Transfer Transmission Electron Microscopy Method.
- One grab surface soil sample (0 to 1 inch bgs) was collected from each ABS location and submitted to EPA OEME NERL for percent solids analysis.
- Samplers walked through each area for 100 consecutive minutes wearing a backpack with 1 high volume (10 liters per minute (L/min)) and 1 low volume air (3 L/min) sampling pump with 0.8 micron (μm) mixed cellulose ester (MCE) cassettes situated in the breathing zone of the sampler.
- High-volume air sampling pumps were established at two or three perimeter locations, within 10 feet of each personal sampling area, to assess nearby dust migration during the activity.
- Three reference air sampling pumps were established at locations in the northern and eastern portions of the site.
- No asbestos was detected in air during the ABS activities.

Although the results of the ABS testing would indicate that asbestos fibers do not pose a significant health risk for the limited activities conducted, MassDEP has not given sufficient guidance on the use of ABS to indicate a condition of NSR to human health for future use. Additionally, this ABS was conducted prior to the disturbance and removal of ACM soil and debris by EPA contractors in 2015. Confirmatory samples collected subsequent to that removal action showed six (6) of 18 surficial soil samples with detectable asbestos in the soil.

5.3.4 Identification of Background Conditions

Background conditions are defined in the MCP (310 CMR 40.0006) as those levels of oil and hazardous material that would exist in the absence of the disposal site of concern, including both Natural Background and Anthropogenic Background.

As presented on Appendix D - Table 6, the maximum concentrations of PAHs and metals from soil samples were compared to background concentrations in soil that contains coal or wood ash associated with anthropogenic fill material. The maximum PAH concentrations were greater than the 90th percentile background concentrations containing anthropogenic fill; therefore, no PAHs were excluded

from this evaluation on this basis. For metals, the maximum concentrations of silver were less than background concentrations and were therefore, eliminated as COPC. Arsenic, barium, cadmium, chromium, lead, and mercury were retained as COPC in soil in this Risk Characterization.

5.3.5 Selection of Chemicals of Potential Concern

All constituents detected in at least one (1) confirmatory sample were evaluated to determine if it was appropriate to include them as COPCs. The COPCs for soil are EPH fractions, PAHs, VPH fractions, detected VOCs, arsenic, barium, cadmium, chromium, lead, and mercury, and PCBs.

Constituents n-butylbenzene, sec-butylbenzene, 4-isopropyltoluene, 1,2,4-trimethylbenzene, and 1,3,5-trimethylbenzene were detected at a total concentration of 6 mg/kg in soil sample BT-E (not presented on the tables). These constituents are part of the C_9 to C_{10} aromatic fraction. Since VPH fractions were analyzed in this sample, including these constituents would double count a portion of the C_9 to C_{10} aromatic fraction. These constituents were therefore eliminated as COPC in soil.

For groundwater, COPC include dissolved metals, VOCs, and PAHs. Constituents n-butylbenzene, sec-butylbenzene, tert-butylbenzene, isopropylbenzene, p-isopropyltoluene, n-propylbenzene, and 1,2,4-trimethylbenzene were detected in groundwater collected from the Site. These constituents are part of the C_9 to C_{10} aromatic fraction. Groundwater was not analyzed for VPH fractions; therefore, the sum of these constituents was compared to the UCL and Method 1 GW-3 standard for the C_9 to C_{10} aromatic fraction.

5.3.6 Toxicity Profiles

The potential health effects associated with exposure to each COPC can be found in toxicity profiles developed by the Agency for Toxic Substances and Disease Registry (ATSDR). The ASTDR toxicity profiles are very comprehensive but condensed toxicological summaries – ToxFAQs™ – are provided on-line for a number of hazardous substances including those identified at the Site.[1]

5.4 Exposure Assessment

5.4.1 Receptors of Concern

Under current conditions, the Site is comprised of a vacant 16-acre parcel owned by the City of Springfield. The Site is located in a residential and commercial area in the Indian Orchard neighborhood in Springfield, Massachusetts. Concrete slabs and foundations of the former manufacturing buildings of the Chapman Valve / Crane Co. remain across the Site. Specific redevelopment has not yet been planned for this property; therefore, hypothetical future use scenarios included residential use such as a condominium, a public park, and a commercial building. The human receptors evaluated were associated with these potential future uses of the Site. During future Site redevelopment, construction or utility workers may be exposed to impacted soil at the Site. To characterize the Site under current and potential future Site conditions, a resident, park visitor, employee, trespasser, and construction worker receptor were evaluated.

MassDEP's on-line *ShortForm for Human Health Risk Assessment under the MCP,* ("ShortForm," 2012) was used to evaluate human health risk at this Site for residents, park visitors, trespassers, and construction workers. A modified ShortForm with MassDEP assumptions for employee exposure to soil was used to evaluate the employee since MassDEP has no Shortform for employee exposure to soil.

[1] http://www.atsdr.cdc.gov/toxfaq.html

The ShortForms are Excel spreadsheets developed by MassDEP as a screening tool to assess potential risk for various receptors exposed to soil at the Site. The risks are calculated using generic exposure assumptions intended to be protective of potential receptors independent of site-specific conditions. The exposure assumptions for each receptor discussed below and are presented in Appendix D along with the ShortForm and risk calculation spreadsheets.

Hypothetical Resident: Resident exposure to soil via dermal contact and incidental ingestion was calculated assuming that residents age 1 to 2 years (for subchronic effects), 1 to 8 years (for chronic effects) and 1 to 31 years (for cancer effects) would encounter soil five (5) days per week over a period of thirty (30) weeks per year. The ingestion rate is assumed to be one hundred (100) mg/day soil for children up to age 8 years and fifty (50) mg/day soil for children 8 years and older and adult workers. Surface area was based on exposure to face, forearms, hands, lower legs, and feet.

Ingestion of soil via ingestion of homegrown produce was also evaluated since metals and PCBs may bioaccumulate in vegetables.

Detected concentrations of VOCs in groundwater were less than Method 1 GW-2 groundwater standards. In soil, detected concentrations of C_9 to C_{10} aromatic fractions were greater than Method 1 S-1/GW-2 standards. Currently, there are no occupied buildings on the property. Inhalation of indoor air of a future building was not evaluated at this time; however, further investigation of VPH fractions and VOCs in soil gas and/or indoor air or the inclusion of vapor mitigation design elements is recommended if future plans include occupied buildings as a conservative measure.

Hypothetical Park Visitor: On-Site park visitor exposure to soil via dermal contact and incidental ingestion was calculated assuming that park visitors age 1 to 2 years (for subchronic effects), 1 to 8 years (for chronic effects) and 1 to 31 years (for cancer effects) would encounter soil three (3) days per week over a period of thirty (30) weeks per year. The ingestion rate is assumed to be one hundred (100) mg/day soil for children up to age 8 years and fifty (50) mg/day soil for children 8 years and older children and adults. Surface area was based on exposure to face, forearms, hands, lower legs, and feet.

Hypothetical Employee: Employee exposure to soil via dermal contact and incidental ingestion was calculated assuming that adults age 18 to 45 years would encounter soil four (4) days per week over a period of thirty (30) weeks per year for 27 years. The ingestion rate is assumed to be (50) mg/day soil for adult workers. Surface area was based on exposure to face, forearms, hands, lower legs, and feet.

Hypothetical Trespasser: Trespasser exposure to soil via dermal contact and incidental ingestion was calculated assuming that trespassers, age 11 to 18 years (for chronic and cancer effects) would encounter soil two (2) days per week over a period of thirty (30) weeks per year. The ingestion rate is assumed to be fifty (50) mg/day soil. Surface area was based on exposure to forearms, hands, and feet.

Hypothetical Construction Worker: The construction worker is assumed to be female, age 18 to 25 years and on-Site for a 6-month period (182 days per year, 8 hours per day). The soil exposure pathways evaluated included dermal contact, incidental ingestion and inhalation of soil particulates in air (fugitive dust). The ShortForm assumes that inhalation of particulates is a significant pathway and occurs through two mechanisms depending on the particulate size. Respirable particulates less than 10 microns are absorbed into the lungs while larger particulates are coughed up, swallowed and eventually enter the gastrointestinal tract. The default PM10 concentration in air used in the ShortForm is 60 micrograms per cubic meter ($\mu g/m^3$). All equations and assumptions used to evaluate inhalation of particulates are

provided in MassDEP's Technical Update, "*Characterization of Risks Due to Inhalation of Particulates by Construction Workers"*, revised July 2008.

Construction workers may be exposed to groundwater during construction work, generally over a short time period because groundwater is pumped out of the excavation for the safety of the workers. Potential construction worker exposures to groundwater via dermal contact were conservatively evaluated in this Risk Characterization. Dermal contact with groundwater was assumed to occur 5 days per week, over a six month period for one hour on each day of exposure.

Since VOCs in groundwater were less than Method 1 GW-2 Cleanup Standards, it is unlikely that construction workers exposure to volatile constituents in air of a trench will be a significant pathway and inhalation of vapors in a trench was not evaluated at this time.

A separate risk evaluation was not performed for the utility worker. MassDEP does not consider the utility worker's risk to be potentially significant unless the COPCs have significant acute health effects (i.e., cyanide). In addition, the non-cancer risks are not affected by the exposure duration unlike cancer risks which are evaluated over a lifetime. The health risks calculated for the construction worker, which are of a longer duration than a utility worker are protective of the lesser exposed utility worker.

5.4.2 Evaluation of Hot Spots

An evaluation of potential hot spots was conducted in accordance with the requirements of 310 CMR 40.0926. MassDEP Guidance (MassDEP, 1996) defines a "hot spot" as an area where concentrations more than 100-fold higher than surrounding areas are observed, except where potential for greater exposure exists. At these latter sub-areas, concentrations more than 10-fold higher than surrounding concentrations might be "hot spots." Soil "hot spots" cannot be averaged with other soil concentrations throughout the Site and must be evaluated as separate exposure-point concentrations (EPCs) in accordance with 310 CMR 40.0924(2).

There are several soil samples containing elevated concentrations of lead. The highest concentrations of lead were detected in surface soil samples TP-16 (2 to 4 feet, 1,040 mg/kg), CM-39 (0 to 2 feet, 550 mg/kg), and CM-53 (0 to 2 feet, 400 mg/kg). While the concentrations of lead in are elevated compared to the surrounding areas, these samples are not co-located, nor are they 10 times the concentrations observed in other areas of the Site. The elevated concentrations do not represent a contiguous area of elevated lead concentrations and therefore, do not constitute a hot spot.

A single concentration of PCBs was detected in surface soil TP-3 (0.6 to 1 foot) at a concentration of 2.05 mg/kg. A single detected concentration does not constitute a hot spot and while 2.05 mg/kg is above the Method 1 S-1 Cleanup Standard of 1 mg/kg, this concentration does not pose a significant risk to human health.

Elevated PAHs were also detected in soil sample TP-3 (0.6 to 1 foot). The concentrations of PAHs in TP-3 are roughly 10 times the concentrations of PAHs in the soil samples with the next two highest concentrations of PAHs in soil samples OP-4A and CM-38SE. These samples are not co-located. TP-3 is a single sample with elevated PAHs and it is possible that the PAHs observed within this sample are related to asphalt in the sample. It was determined that concentrations of PAHs at the Site do not meet the definition of a hot spot.

No hot spots associated with other detected constituents were identified in the soil data. While individual soil samples have elevated concentrations of lead and PAHs, the distribution of these constituent

concentrations in soil is wide-spread and generally not high enough to be considered a hot spot.

5.4.3 Exposure Point Concentrations

Exposure areas, or exposure points, are defined as locations of potential contact between a receptor and portions/media of the Site. The EPC is thereby defined as the COPC concentration in the soil that a potential receptor may encounter within an exposure area. Several sets of EPCs were calculated:

- Soil – 0 to 15 feet below grade, Appendix D - Table 2 for surface and subsurface soil.
- Surface soil - 0 to 3 feet below grade, Appendix D - Table 3.
- Soil – 0 to 6 feet below grade, Appendix D - Table 4 for surface and subsurface soil representing the typical depth of utilities.

As presented in Appendix D - Tables 2 through 4, the maximum detected concentrations or the 95UCL were generally used to represent the EPCs. 95UCLs were calculated using EPA's proUCL application and recommended 95UCL based on the distribution of the data were selected as the EPC.

Residents, park visitors, trespassers, and employees were assumed to be exposed to soil from 0 to 15 feet and surficial soil 0 to 3 feet. Construction worker receptors were assumed to be exposed to soil from 0 to 15 feet and soil from 0 to 6 feet.

For groundwater, each individual monitoring well is an exposure point. The maximum detected concentrations of constituents in groundwater were used to represent EPCs.

5.5 Dose-Response Assessment

Published dose-response data provides information relating the exposure of a constituent (dose) to its anticipated health effect (response) and is derived separately for non-cancer (chronic) and cancer (lifetime) health effects as described below.

5.5.1 Non-Carcinogenic Health Effects

Constituents with known or potential noncarcinogenic effects are assumed to have a dose below which no adverse effect occurs, or conversely, above which an effect may be seen. In laboratory experiments, this dose is known as the "No Observed Adverse Effect Level" (NOAEL). The lowest dose at which an adverse effect is seen is called the "Lowest Observed Adverse Effect Level" (LOAEL). By applying uncertainty factors to the NOAEL or the LOAEL, the United States Environmental Protection Agency (USEPA) developed Reference Doses (RfDs) for chronic and, in some cases, subchronic, exposures to constituents with potential noncarcinogenic effects (USEPA, 2008). Subchronic toxicity values were used for evaluating exposure lasting from several days up to seven (7) years.

Uncertainty factors account for uncertainties associated with the dose-response data such as the appropriateness of using an animal study to derive a human dose-response value, and the potential for sensitive subpopulations to exist, which may not be adequately represented by the laboratory testing of animals. For constituents with potential noncarcinogenic effects, the RfD provides reasonable certainty through the use of uncertainty factors that, if the specified exposure dose is below the threshold, then no noncarcinogenic health effects are expected to occur. RfDs are expressed in terms of milligrams of compound per kilogram of body weight per day (mg/kg-day) and are used to evaluate estimated doses from oral and dermal exposures. Tables within Appendix D (Attachment C – resident, Attachment D – park visitor, Attachment E – employee, Attachment F- trespasser, and Attachment G – construction

worker) summarize the toxicity information for the COPCs evaluated at this Site for the oral and dermal contact with soil and inhalation of fugitive dust exposure routes. Exposures to groundwater by the construction worker are also presented in Attachment G. The RfDs used in the risk characterization were obtained from MassDEP's lookup tables (2019) and, where applicable, were verified from the EPA's Integrated Risk Information System (IRIS) on-line database, reviewed October 2023.

5.5.2 Carcinogenic Health Effects

In 2005, the USEPA published updated guidelines (USEPA, 2005) for evaluating carcinogenic risk in which a weight of evidence approach considers all scientific information in determining whether and under which conditions an agent may cause cancer in humans. In addition, the updated guidelines provide a narrative approach to characterizing carcinogenicity rather than using specific categories (e.g., Group A and Group B). Although the 2005 revised guidelines are the basis of the USEPA's guidance to evaluating cancer risk, not all constituents in the Integrated Risk Information System (IRIS) database have been revised under the new guidelines.

Under the previous cancer risk assessment guidelines (USEPA, 1986), the underlying assumption of regulatory risk assessment for constituents with known or assumed potential carcinogenic effects was that no threshold dose exists. In other words, it was assumed that a finite level of risk is associated with any dose above zero (0). Theoretically, even a single molecule could cause some level of risk. For carcinogenic effects, the USEPA risk assessment guidelines (USEPA, 1986) used a two-step evaluation in which the compound was assigned a weight-of-evidence classification, and then a cancer slope factor was calculated.

Cancer slope factors are a numerical estimate of the carcinogenic potency of a compound. The weight-of-evidence classification was based on the likelihood of the compound being a human carcinogen. Under this system, which is still in place for constituents in IRIS that have not been revised since 1999, Group A constituents are classified as human carcinogens, Group B constituents are probable human carcinogens, Group C constituents are possible human carcinogens, Group D constituents are not classifiable as to human carcinogenicity, and for Group E constituents there is evidence of noncarcinogenicity for humans. Furthermore, in the second part of the evaluation, cancer slope factors were calculated for constituents that are known or probable human carcinogens.

The risk assessment guidelines (USEPA, 1986) used linear models in the low dose region (which represents environmental exposure) as a default to estimate cancer slope factors. The USEPA's approach was to use the upper ninety-five (95) percent confidence bound on the slope of the line generated by the linear model to estimate the potency of carcinogens. Such potencies were then used to estimate risks at various exposures.

Under the updated cancer guidelines (USEPA, 2005), one of the most important features is the incorporation of greater emphasis on mechanisms for carcinogenic action. The USEPA has proposed a departure from using linearized models to relate doses to responses when the mode of action is deemed not to be genotoxic. In these cases, the guidelines propose to use a benchmark dose approach to risk assessment (USEPA, 2005). A benchmark approach uses a model to determine the dose that would result in a defined rate of an outcome, usually five (5) or ten (10) percent. Safety factors can then be applied to this benchmark dose level.

Tables within Appendix D (Attachment C – resident, Attachment D – park visitor, Attachment E – employee, Attachment F- trespasser, and Attachment G – construction worker) summarize toxicity information for COPCs assumed by the MassDEP to produce potential carcinogenic effects through the

oral and inhalation routes of exposure, respectively. Carcinogenic toxicity values for oral exposure are cancer slope factors and are expressed in terms of $(mg/kg\text{-}day)^{-1}$; carcinogenic toxicity values for inhalation exposures are inhalation unit risk values and are expressed in terms of 1/microgram per cubic meter $(\mu g/m^3)^{-1}$.

5.5.3 Relative Absorption Factors

The premise of estimating risk or hazard is that potential dose to the defined receptor is similar to the administered dose or applied dose in the laboratory experiment used as the basis for the RfD or CSF. The animal-derived CSFs and RfDs used in the quantitative risk assessment were based on applied doses, in most cases. However, the efficiency of COPC absorption via a particular route and from a particular matrix (e.g., soil) at the Site may differ from the absorption efficiency for the exposure route and matrix used in the experimental study that serves as the basis for the CSF or RfD. RAFs are used to adjust the calculated exposure dose to a particulate COPC so that it is comparable to the toxicity information for that compound as recommended by MassDEP (1996) and USEPA (1989). RAFs for site-related COPCs were derived and used in the calculation of human exposure doses and are presented in Tables within Appendix D (Attachment C – resident, Attachment D – park visitor, Attachment E – employee, Attachment F- trespasser, and Attachment G – construction worker). The RAFs were obtained from the MassDEP recommended values (MassDEP, 2013).

5.6 Risk Characterization

5.6.1 Estimating Average Daily Dose and Risk

Cancer and non-cancer risks are calculated separately for each receptor in human health risk assessments. The non-cancer risk is characterized by a hazard quotient (HQ_i) which is the ratio of the receptor's exposure (ADD) to the maximum allowable exposure level (RfD) for each contaminant and exposure pathway or:

$$HQ_1 = ADDi / RfDi$$

A condition of NSR for non-cancer effects exists if the total Site Hazard Index (HI) is equal to or less than 1 for each receptor as follows:

$$HI = \Sigma \frac{ADD}{RfD} = \Sigma \frac{EPC \times EF \times ED \times EP \times PSF}{BW \times AP \times RfD}$$

where:

ADD	=	Average Daily Dose, mg/kg-day
RfD	=	Reference Dose, mg/kg-day
EPC	=	Exposure-Point Concentration of contaminant, mg/kg
EF	=	Exposure Frequency (events/day)
ED	=	Exposure Duration (time/event)
EP	=	Exposure Period (time)
PSF	=	Pathway/receptor-specific factor for ingestion and dermal contact
BW	=	Body Weight (kg)
AP	=	Averaging Period (time)

The LADD is calculated in the same manner as the ADD, except that the averaging period is over a lifetime of 70 years. A condition of NSR for cancer effects exists if the Excess Lifetime Cancer Risk (ELCR) is less than or equal to 1×10^{-5}, shown in the following equation:

$$ELCR = \Sigma\ LADD * CSF = \Sigma\ \frac{EPC \times EF \times ED \times EP \times PSF \times CSF}{BW \times AP}$$

The equations and calculations for risk are included in Appendix D, and the results are summarized in Appendix D - Table 7 and 8.

As presented on Appendix D - Tables 7 and 8, there are exceedances of the MassDEP screening levels for both subchronic and chronic non-cancer risks for the resident exposure to soil from 0 to 15 feet below grade and subchronic and chronic non-cancer and cancer risks for the resident exposure to soil from 0 to 3 feet below grade. The exceedances are due to:

- A combination of the elevated concentrations of lead, EPH fractions, benzo(a)pyrene, and PCBs in surface soil from 0 to 3 feet.

Similarly, for the park visitor, the chronic hazard index exceeds the MassDEP screening level with exposures to soil from 0 to 3 feet due to a combination of the elevated concentrations of lead, EPH fractions, benzo(a)pyrene, and PCBs in surface soil from 0 to 3 feet (refer to Appendix D - Table 8).

The pathway for ingestion of home grown produce exceeds MassDEP Risk Levels. Therefore, use of Site soil for growing produce for consumption is not recommended. The use of Best Management Practices, presented in Attachment H, are recommended.

Potential health risks calculated for employees, trespassers, and construction workers were less than MassDEP screening levels.

Although not quantitatively calculated, the presence of asbestos fibers in surface soil poses a significant risk of harm to human health for all human receptors. The presence of asbestos fibers in soil requires mitigation measures to mitigate potential exposures.

5.6.2 Applicable or Suitably Analogous Public Health Standards

The MCP (310 CMR 40.0993 (3)) requires an evaluation of Applicable and Suitably Analogous Standards (ASAS) in addition to quantitative risk assessment. The general list of ASAS provided in the MCP (310 CMR 40.0993) includes the Massachusetts Drinking Water Quality Standards, the Massachusetts Air Quality Standards, and the Massachusetts Surface Water Quality Standards.

Massachusetts Drinking Water Standards and Guidelines are not applicable at this Site because the Site is not in a current or potential drinking water source area.

The Massachusetts Air Quality Standards relate to ambient concentrations of the so-called “criteria pollutants” (sulfur oxides, particulate, carbon monoxide, ozone, nitrogen dioxide and lead). These standards for lead are protective of emissions in air such as from car exhaust and are not applicable to

lead detected in soil at this Site. Other criteria pollutants were not COPCs at this Site, therefore the Air Quality Standards are not considered to be applicable to the Site.

5.7 Uncertainty Evaluation

Within any of the four (4) steps of the risk assessment process, assumptions must be made due to a lack of absolute scientific knowledge. Some of the assumptions are supported by considerable scientific evidence, while others have less support. Every assumption introduces some degree of uncertainty into the risk assessment process. Conservative assumptions are made throughout the risk assessment to ensure that the health of local residents and/or potential receptors and the environment are protected. Therefore, when all of the assumptions are combined, it is much more likely that actual risks, if any, are over-estimated rather than under-estimated.

The assumptions that introduce the greatest amount of uncertainty in this risk assessment are discussed in this section. They are discussed in general terms, because for most of the assumptions there is not enough quantitative information to assign a numerical value that can be factored into the calculation of risk.

Hazard Identification

During the Hazard Identification step, constituents are selected for inclusion in the quantitative Risk Characterization. Careful consideration of all detected constituents in Site soil was used to determine which constituents should be considered COPCs and evaluated in the Risk Characterization. All constituents detected in soil were evaluated in this risk characterization with the exceptions discussed in Section 5.3.4. Therefore, unless constituents have been overlooked in the MCP protocols used for the collection of samples and analytical methodologies conducted at the Site, it is unlikely that exposures are under-estimated by the hazard identification step.

Exposure Assessment

Estimation of EPCs, characterization of current and reasonably foreseeable site activities and uses, and calculation of ADDs contribute most to the uncertainty in the exposure assessment component of the risk characterization. To counter this uncertainty, health-protective exposure assumptions based on either site-specific information or conservative default values provided in MassDEP and USEPA guidance were used to quantitatively evaluate potential risks posed by the site.

The EPCs were generally based on the 95 percent upper confidence limit on the mean concentrations (95UCL) of the COPCs in the exposure medium or the maximum concentration. Using 95UCL will likely provide a conservative estimate of exposure. This EPC is conservative because it is an upper concentration estimate and is therefore usually higher than the arithmetic mean. Also, the use of the maximum concentration rather than the 95UCL for many of the COPCs overestimates the concentrations a receptor is likely to be exposed to over time.

In calculating receptor-specific exposure factors for the quantitatively evaluated scenarios, the most health-protective of the default range of values available were used. Receptor-specific parameters, such as contact and ingestion rates, were obtained from MassDEP and USEPA guidance, which are intended to err on the side of protecting human health.

Health protective exposure assumptions such as assuming park visitors would be at the Site 3 days per week, 30 weeks per year for 30 years is a purposeful over-estimate if the Site were to be redeveloped as a park. It is unlikely that the same child/adult would visit the park for a sustained period of time from age 1 to 31 years. Similarly, employees were assumed to be exposed to soil at the Site 4 days per week,

30 weeks per year for 27 years, which is also likely to be an overestimate of actual time spent at a workplace if the Site is redeveloped into a commercial building in the future.

There are also uncertainties associated with chemical-specific or class specific input parameters such as dermal absorption rate. Residents, park visitors, trespassers, and employees were assumed to contact soil on the face, forearms, hands, lower legs and/or feet and to ingest a quantity of soil on each day of exposure. These assumptions likely over-estimate potential exposures.

Toxicity Assessment

The primary sources of uncertainty associated with the toxicity values used to quantify risks include: (1) extrapolation of dose-response information from effects observed at high doses to predict adverse effects at low levels anticipated for human exposure to environmental contaminants, (2) use of toxicity information compiled from short-term exposure studies to predict the effects associated with long-term exposures (and vice-versa), (3) use of dose-response information from animal studies to predict likely effects in humans, and (4) use of toxicity information based on homogeneous animal populations or healthy human populations to predict the effects that are likely to be observed in the general population (including sensitive subgroups).

The dose-response values used in the calculation of HIs and cancer risk estimates are conservative values. Since RfDs and RfCs are derived using a number of safety factors and are developed to protect sensitive populations, the actual dose or concentration associated with a health effect is likely to be higher than the dose or concentration established by USEPA for most groups in the general population. In addition, the CSFs and unit risks are derived based on the upper 95 percent confidence limit and assume that no threshold level exists for exposure to carcinogens.

Although no values have been established for dermal contact exposures, it is standard practice to use values derived from studies based on oral exposures to evaluate dermal contact exposures. This technique is health protective since it has been demonstrated that the most significant exposures for most contaminants occur via the oral and inhalation routes.

PCBs are a group of compounds. The Aroclors detected in Site soil include Aroclor 1254 which contain higher amounts of chlorine and are considered to be high toxicity.

- The first two digits usually refer to the number of carbon atoms in the phenyl rings (for Polychlorinated Biphenyls this is 12).
- The second two numbers indicate the percentage of chlorine by mass in the mixture. For example, the name Aroclor 1254 means that the mixture contains approximately 54 percent chlorine by weight.

Although the Aroclors detected at this Site generally contain the higher amounts of chlorine, there is some variability of toxicity within the different Aroclors. For this evaluation, the toxicity values for the Aroclors with the highest toxicity were conservatively used to evaluate the detected PCBs.

Risk Characterization

The risk of adverse human health effects depends on estimated levels of exposure and on dose-response relationships. Once exposure to and risk from each of the selected constituents is calculated, the total risk posed by exposure to Site soil is determined by combining the health risk contributed by each constituent. Where COPCs do not interact, do not affect the same target organ, or do not have the same mechanism of action, summing the risks for multiple COPCs results in an over-estimate of risk

posed by the Site. However, in order not to understate the risk, it is assumed that the effects of different constituents may be added together. While there does exist the theoretical possibility of greater than additive effects (synergism) among constituents with effects on the same target organ, overall the application of the assumption of additivity is expected to conservatively estimate health risks.

Sources of uncertainty in the risk characterization include:

- the equal weight given to carcinogens that may have different carcinogenic potential in estimation of ELCR estimates;
- the equal weight given to chemical constituents whose RfDs have different confidence levels in estimating noncarcinogenic HIs; and
- the assumption of simple additivity of ELCRs and His across COPCs.

As with the evaluation of EPCs, the use of conservative assumptions and parameters in developing risk estimates would be expected to err on the side of protecting human health. Thus, the calculated HIs and cancer risk estimates are likely to result in upper-bound estimates of the hazard resulting from exposure to COPCs present in soil. Consequently, the estimates should be used to highlight areas of potential concern rather than as absolute estimates of health risks.

5.8 Characterization of Risk to Safety

Examples of Site conditions that potentially pose a risk to safety are described in 310 CMR 40.0960 of the MCP. Risk to safety is defined as a threat of physical harm or bodily injury to people. Potential concerns regarding safety (e.g., rusted or corroded drums or containers, pits and lagoons, fire or explosion hazards, and/or un-containerized materials of hazardous waste) have not been identified at this Site. Based on the criteria described in 310 CMR 40.0960, a condition of NSR to public safety exists at the Site under both current and foreseeable future Site conditions.

5.9 Characterization of Risk to Public Welfare

In accordance with 310 CMR 40.0994 of the MCP, a condition of NSR of harm to public welfare exists if the following conditions are met for current and reasonably foreseeable uses of a Site:

- Nuisance conditions (e.g., odors, fires, flooding) are not present as a result of the release of oil and/or hazardous material at a Site.
- There is no loss of active or passive property use as a result of the release of oil and/or hazardous material at a Site.
- All soil and groundwater EPCs are below the Method 3 Upper Concentration Limits (UCLs) established in 310 CMR 40.0996(7) (refer to Appendix D - Tables 9 and 10, respectively).

However, based on historical evaluations conducted at the Site, asbestos fibers remain in soil. As a result, the asbestos in soil pose a public welfare hazard. Based on this evaluation, a condition of NSR to public welfare does not exist at the Site.

5.10 Characterization of Risk to the Environment

An environmental risk characterization is required as part of the Method 3 Risk Characterization to evaluate the potential risk of harm to ecological receptors including terrestrial, aquatic and benthic organisms. The first step of the environmental risk characterization is to determine if potentially significant exposure pathways exist. The Site is greater than two acres and metals, PAHs, and PCBs can bioaccumulate in terrestrial receptors. Based on the size of the Site and because it is currently

undeveloped, could be a significant habitat for terrestrial and/or avian receptors; however, due to the Site's location within the Springfield city limits, it is unlikely that any special species of concern live at the Site. Only one sample of PCBs contained a concentration above the Method 1 S-1 soil standard of 1 mg/kg; therefore, the PCBs in surface soil at the Site are unlikely to pose a significant risk because it is not widespread across the Site. However, the elevated concentrations of metals, particularly lead, and PAHs in surface soil may pose a potential risk to terrestrial and/or avian receptors.

Ecological receptors are assumed to be exposed to surface soil and not soil at deeper strata. The arithmetic mean concentrations of constituents detected in surface soil are representative EPCs. EPCs were compared to USEPA Ecological Soil Screening Levels (Eco SSLs) as presented in Appendix D - Table 11. EPCs for cadmium, chromium (total), and lead, as well as, both low and high molecular weight PAHs were higher than one or more wildlife Eco SSLs. PAHs were also higher than Eco SSLs protective of invertebrates. Based on the concentrations of metals and PAHs in surface soil, the Site in its current unpaved and undeveloped condition poses a Significant Risk to potential terrestrial, avian, and/or invertebrate receptors.

No natural resource areas, such as areas of critical environmental concern, wetlands, certified vernal pools, outstanding resource waters or fish habitats, or MassWildlife's Natural Heritage and Endangered Species Program (NHESP) Estimated Habitat of Rate Wetland or Wildlife areas, are located within 500 feet of the Site. The closest surface water bodies to the Site are Long Pond situated approximately 1,200 feet to the west of the Site and the Chicopee River located approximately 1,500 feet to the north of the Site.

Detected concentrations of constituents in groundwater are below Method 1 GW-3 groundwater standards protective of aquatic receptors in nearby surface water bodies. Surface water concentrations were estimated from groundwater concentrations by using the maximum detected concentrations in groundwater and applying dilution factors to account for migration to the nearest surface water body and attenuation within the surface water as presented on Appendix D - Table 12. Based on the low concentrations of constituents detected and the distance between the Site and Long Pond, it is unlikely that constituents will migrate to the surface water in significant concentrations. On this basis, there is No Significant Risk of harm to health of aquatic receptors in downgradient surface water.

The elevated concentrations of metals and PAHs in surface soil exceed Eco SSLs which is considered to be a "first pass" to determine if exposure to soil may pose a significant risk to potential ecological receptors. On this basis, a condition of NSR to the environment does not exist under current conditions. Additional evaluation of ecological receptors may be performed under a Stage II Ecological Risk Characterization. Alternatively, mitigation of potential exposures to ecological receptors may be implemented with installation of a cap, barrier such as pavement, or other mitigation measures such as remediation of surface soil during Site redevelopment.

5.11 Risk Assessment Summary

The results of the risk characterization indicate that a condition of NSR to human health does not exist for human health at the Site for the resident or park visitor receptors. A condition of NSR of harm to human health did exist for employee, trespasser and construction worker receptor exposure to constituents in soil and groundwater, not including asbestos fibers in soil. However, due to the presence of asbestos fibers in soil, a condition of NSR of harm to human health does not exist. A condition of NSR to safety exists under the current and potential future Site use. However, a condition of NSR to public welfare and the environment does not exist.

Remediation and/or mitigation activities are recommended to reduce human and environmental exposures to acceptable levels. The level of remediation necessary to achieve a Permanent Solution under future use conditions is dependent upon the final redevelopment plans. Regardless of the redevelopment scenario, to facilitate future use and mitigate risk, remediation may include a combination of soil removal and off-site disposal, construction and installation of a cover system to prevent access to residual soil impacts, and/or the implementation of an AUL.

Additionally, further investigation of soil gas, and/or indoor air of future buildings or the inclusion of vapor mitigation measures in future design may be appropriate if building construction is proposed in locations of residual petroleum impacts.

6.0 CONCEPTUAL SITE MODEL

The findings of subsurface investigations performed at the Site to date were used to develop a Conceptual Site Model (CSM) which presents contaminant sources and distributions, impacted media, release mechanisms, exposure pathways, migration routes, and potential receptors.

The Site consists of one parcel of land, totaling approximately 16 acres, located in a residential and commercial area in the Indian Orchard neighborhood in Springfield, Massachusetts. Concrete slabs from the foundations of the former manufacturing buildings related to Chapman Valve and Crane Co. remain across the Site.

The sampling approach by Weston & Sampson for this Phase II ESA was to collect soil and groundwater data to:

- Gain a broad and comprehensive understanding of overall Site conditions;
- Further evaluate known historical operations and releases at the Site;
- Further evaluate metals and PAH impacts identified in previous investigations; and,
- Complete a general characterization of the Site for future redevelopment and assist with MCP compliance.

The dataset is not meant to be exhaustive, but an additional step in determining the best overall approach for the Site with respect to remediation and/or regulatory closure, and provide supplemental information relevant to the MCP implications for the City to explore redevelopment of the Site. Confirmatory sampling may be a necessary component of future remedial action.

In general, soils across the Site consist of varying types and amounts of fill materials to depth ranging from two (2) to 10 feet bgs. Fill materials generally included a light brown to brown fine to coarse sand matrix with trace gravel, containing varying amounts of brick, concrete, and asphalt. These materials encountered may be related to subsurface structures or backfill emplaced during previous filling events at the Site. Ash and slag were encountered in the CM-43N and DP-2A borings from the ground surface to 7.5 feet bgs. Petroleum odors in the soil were observed in several locations, including the CM-22 borings from 13 to 15 feet bgs, CM-38 borings from 6 to 15 feet bgs, and the CM-43N boring from 11 to 15 feet bgs.

Deeper soils throughout the Site were primarily composed of light brown fine to coarse sand with trace gravel and trace silt. Suspected bedrock was encountered at the Site from two (2) to 20 feet bgs during the 1991 Phase II ESA performed by Con-Test; however, refusal may have been related to subsurface structures. Refusal was encountered in several locations across the site during Weston & Sampson's 2023 subsurface investigations but it was likely due to subsurface structures (basements, walls, utilities) obstructing deeper drilling.

The primary source of contamination is believed to be related to releases from historical USTs and other small releases from former manufacturing activities, including foundries and machine shops, which were present at the Site from approximately the 1870s to the 1980s. Debris presumed to be related to the demolition of former Site buildings is scattered on the surface and aggregated into several piles throughout the Site. Debris observed in piles and on the ground surface included, but was not limited to concrete, bricks, rebar/metal posts, wood pallets and boards, and tires. Additionally, the degradation of the factory buildings and utilities at the Site since its closure in the 1980s and demolition of the buildings to their foundations in 1998 is likely to have contributed to the presence of ACM in the soil.

Contamination detected during Phase II activities, and during investigations by others, consisted of metals and petroleum constituents in soil and groundwater, and ACM in soil only, located across the Site.

As previously mentioned, the primary release mechanism for soil and groundwater impacts are likely surficial spills that have migrated into the soil and groundwater and subsurface releases from historical USTs and demolition debris. Metals impacts may be the result of industrial by-products included in the fill matrix and historical Site use as a valve manufacturing facility. ACM impacts may be the result of disturbance to already damaged ACM insulation and building materials at the Site during previous investigations, excavations, demolition activities, and/or natural degradation.

Secondary release mechanisms that could potentially cause exposure to impacted soils may include storm water runoff and wind driven dust. Potentially affected human receptors under current use risk scenarios include construction/utility workers and trespassers, and employees or visitors under future risk scenarios. Exposure to contaminated soil may be associated with inhalation of fugitive dust, dermal adsorption and/or ingestion. There is also potential exposure to terrestrial biota via uptake, ingestion, and dermal adsorption.

Weston & Sampson evaluated human health risk via a Method 3 Risk Characterization as described above in Section 5.0. The results of the risk characterization indicate that a condition NSR to human health, safety and environment does not exist at the Site due primarily to ACM in surficial soil.

7.0 CONCLUSIONS AND RECOMMENDATIONS

Weston & Sampson completed a Phase II ESA that included the advancement of 34 soil borings; the installation of four (4) groundwater monitoring wells; the collection and analysis of 34 soil samples and 11 groundwater samples, and a review of previous environmental reports. The sampling locations were determined based on a review of historical reports and to further evaluate known historical operations and releases at the Site, further evaluate metals and PAH impacts identified in previous investigations, and complete a general characterization of the Site for future redevelopment and assist with MCP compliance. Based on the results of the Phase II ESA investigation, Weston & Sampson concludes the following:

- During this investigation several contaminants were detected above laboratory reporting limits in the soil and groundwater. Concentrations were below the applicable Method 1 S-1/GW-3 and Method 1 GW-3 standards except for the following soil samples: select SVOCs in DP-2A and OTP-4A from the ground surface to 2 feet bgs and select EPH/VPH compounds in CM-38N and CM-38SE at depths between 3.5 and 7 feet bgs. Coal ash was confirmed in the DP-2A and OTP-4A soil samples via SEM analysis.

- Based on the analytical results from this investigation, soil and groundwater impacts are consistent with historical results post-remediation, and there are no new reportable conditions for the analyzed compounds under the applicable standards in the MCP.

- During previous investigations performed by others, ACM in construction debris piles and surficial soils were identified primarily in the central portion of the Site. Although much of this soil and the debris piles were excavated and disposed of offsite during the 2015 removal program, ACM-impacted surficial soil remains in the central portion of the Site.

- Weston & Sampson evaluated risk of harm to human health, safety, public welfare and the environment via a Method 3 Risk Characterization. The results of the risk characterization indicate that a condition NSR to human health, safety and environment does not exist at the Site due primarily to lead, PAHs, and ACM in surficial soil.

- Further evaluation of soil gas, and/or indoor air of future buildings or the inclusion of vapor mitigation measures in future design may be appropriate if building construction is proposed in locations of residual petroleum impacts.

- A Permanent Solution can be achieved if the source of impacts is eliminated or controlled. This may include a combination of soil remediation (removal and off-site disposal of impacted soil), construction and installation of a cover system to prevent access to residual soil impacts, and/or the implementation of an AUL.

Based on the conclusions presented above, Weston & Sampson has the following recommendations:

- An analysis of remedial alternatives, to include conceptual costs, should be performed to estimate the costs to implement the necessary remedial actions and achieve regulatory closure at the Site under the MCP.

8.0 LIMITATIONS

This Phase II ESA was prepared for the use of the City of Springfield and MassDevelopment, exclusively. The findings provided by Weston & Sampson in this report are based solely on the information reported in this document. Future investigations, and/or information that was not available to Weston & Sampson at the time of the investigation, may result in a modification of the findings stated in this report.

Should additional information become available concerning this Site or neighboring properties, which could directly impact the Site in the future, that information should be made available to Weston & Sampson for review so that, if necessary, conclusions presented in this report may be modified. The conclusions of this report are based on Site conditions observed by Weston & Sampson personnel at the time of the investigation, information provided by the City of Springfield, and samples collected and analyzed on the dates shown or stated in this report. This report has been prepared in accordance with generally accepted engineering and geological practices. No other warranty, express or implied, is made.

9.0 REFERENCES

Massachusetts Department of Environmental Protection (MassDEP), 1991. Standard References for Monitoring Wells, Office of Research and Standards and the Bureau of Waste Site Cleanup.

MassDEP, July 1995. Guidance for Site Risk Characterization - In Support of the Massachusetts Contingency Plan. Office of Research and Standards and the Bureau of Waste Site Cleanup.

MassDEP, April 2006. The Massachusetts Contingency Plan 310 CMR 40.0000, updated January 2015.

MassDEP, January 2006. Interim Technical Update: Update to Section 9 of Guidance for Disposal Site Risk Characterization.

MassDEP, September 2007. Waste Site Cleanup Policy # WSC-07-3–0 - MCP Representativeness Evaluations and Data Usability Assessments.

MassDEP, July 1, 2010. Quality Assurance and Quality Control Guidelines for the Acquisition and Reporting of Analytical Data in Support of Response Actions Conducted Under the Massachusetts Contingency Plan (MCP), Revision No. 3, Bureau of Waste Site Cleanup.

Previous reports are publicly available at: https://eeaonline.eea.state.ma.us/portal#!/wastesite/1-0000170

Zen, E-An (ed.), Goldsmith, R. (comp.), Ratcliffe, N.M. (comp.), Robinson, P. (comp.), Stanley, R.S. (comp.), Hatch, N.L., Jr., Shride, A.F., Weed, E.G.A., Wones, D.R., 1983, Bedrock Geologic Map of Massachusetts: U.S. Geological Survey, Reston, VA, scale 1: 250,000

FIGURES

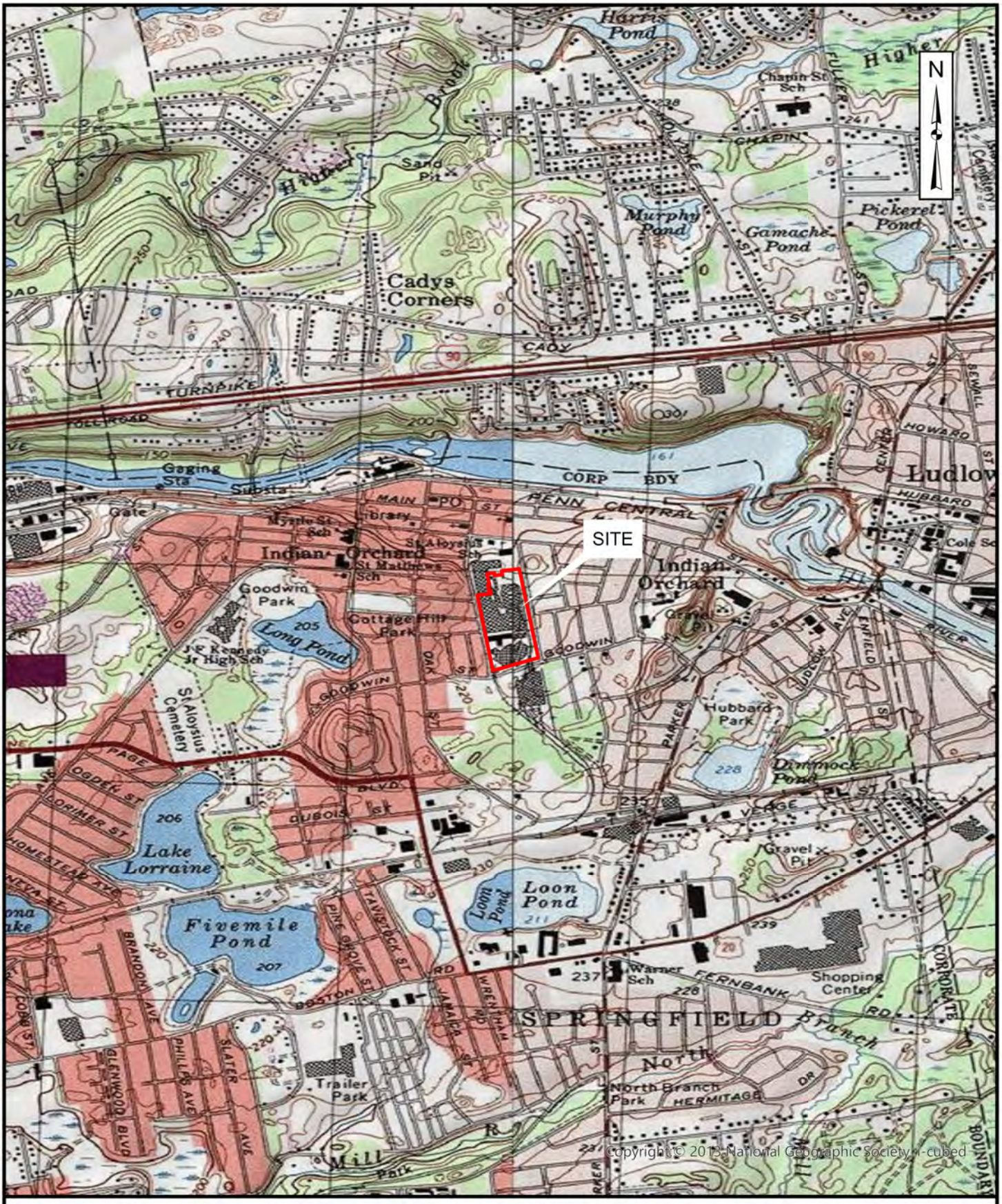


FIGURE 1
CITY OF SPRINGFIELD, MASSACHUSETTS
E/S PINEVALE

LOCUS MAP

0 2,000 4,000 Feet

Path: P:\MA\Springfield MA\ENG23-0351 - ES Pinevale Assessment\Report\Figures\GIS Figures\GIS Figures.aprx User: Ecker.Alison Saved: 9/28/2023 3:21 PM Opened: 9/28/2023 3:23 PM

NOTES:

1. SITE FEATURES AND EXPLORATORY LOCATION ARE BASED ON THE FOLLOWING PLANS:

"UST 1-4 EXCAVATION AREA (EXC-1) SOIL SAMPLING LOCATIONS CRANE MANUFACTURING FACILITY" CREATED BY ATC ASSOCIATES, INC. (ATC) IN JANUARY 1998.

"ADDENDUM RISK CHARACTERIZATION CRANE MANUFACTURING FACILITY" CREATED BY ATC IN JANUARY 1998.

"SITE PLAN FOR RAM COMPLETION REPORT PINEVALE, GOODWIN & MOXON SPRINGFIELD, MA" CREATED BY WjF GEOCONSULTANTS, INC. (WjF) IN FEBRUARY 2009.

"DEBRIS LOCATION PLAN FORMER CHAPMAN VALVE PINEVALE STREET - SPRINGFIELD, MASSACHUSETTS" BY O'REILLY, TALBOT & OKUN ASSOCIATES (OTO) IN MARCH 2010.

"POTENTIAL REPORTABLE CONDITIONS PINEVALE STREET PROPERTY FORMER CRANE COMPANY SPRINGFIELD, MASSACHUSETTS" BY OTO IN JANUARY 2010.

"SITE PLAN PINEVALE STREET PROPERTY FORMER CRANE COMPANY SPRINGFIELD, MASSACHUSETTS" BY OTO IN JANUARY 2010.

"FIGURE 2 EXCAVATION AREA MAP FORMER CHAPMAN VALVE/CRANE CO. PINEVALE STREET SPRINGFIELD, MASSACHUSETTS" CREATED BY WESTON SOLUTIONS IN JANUARY 2016.

2. BASEMAP IMAGERY TAKEN FROM MICROSOFT CORPORATION.

LEGEND:

- FORMER RAILROAD TRACK LOCATION
- ESTIMATED AREA OF ASBESTOS CONTAINING SOIL **(OTO 2010)**
- ESTIMATED AREA OF ASBESTOS CONTAINING DEMOLITION DEBRIS **(OTO 2010)**
- FORMER RETAINING WALL
- FORMER BUILDING FOOTPRINT
- SOIL BORINGS, MONITORING WELLS, AND SOIL VAPOR POINTS INSTALLED BY ATC
- SOIL BORINGS AND MONITORING WELLS INSTALLED BY WjF
- SOIL BORINGS, MONITORING WELLS, AND TEST PITS INSTALLED BY OTO
- FORMER UNDERGROUND STORAGE TANK (UST) LOCATION
- FORMER ASBESTOS CONTAINING DEBRIS REMOVED BY USEPA
- FORMER ASBESTOS CONTAINING SOIL EXCAVATED AND REMOVED BY USEPA
- FORMER IMPACTED/CONTAMINATED SOIL EXCAVATED AND REMOVED BY VARIOUS CONSULTANTS
- FORMER CONCRETE TRANSFORMER PAD LOCATIONS
- CM-38NW SOIL BORINGS AND MONITORING WELLS INSTALLED BY W&S MARCH 2023
- EW-1 EXISTING MONITORING WELLS SAMPLED BY W&S AUGUST 2023

N

100 50 0 100 200

SCALE: 1"=100'

FIGURE 2

E/S PINEVALE STREET
SPRINGFIELD, MASSACHUSETTS

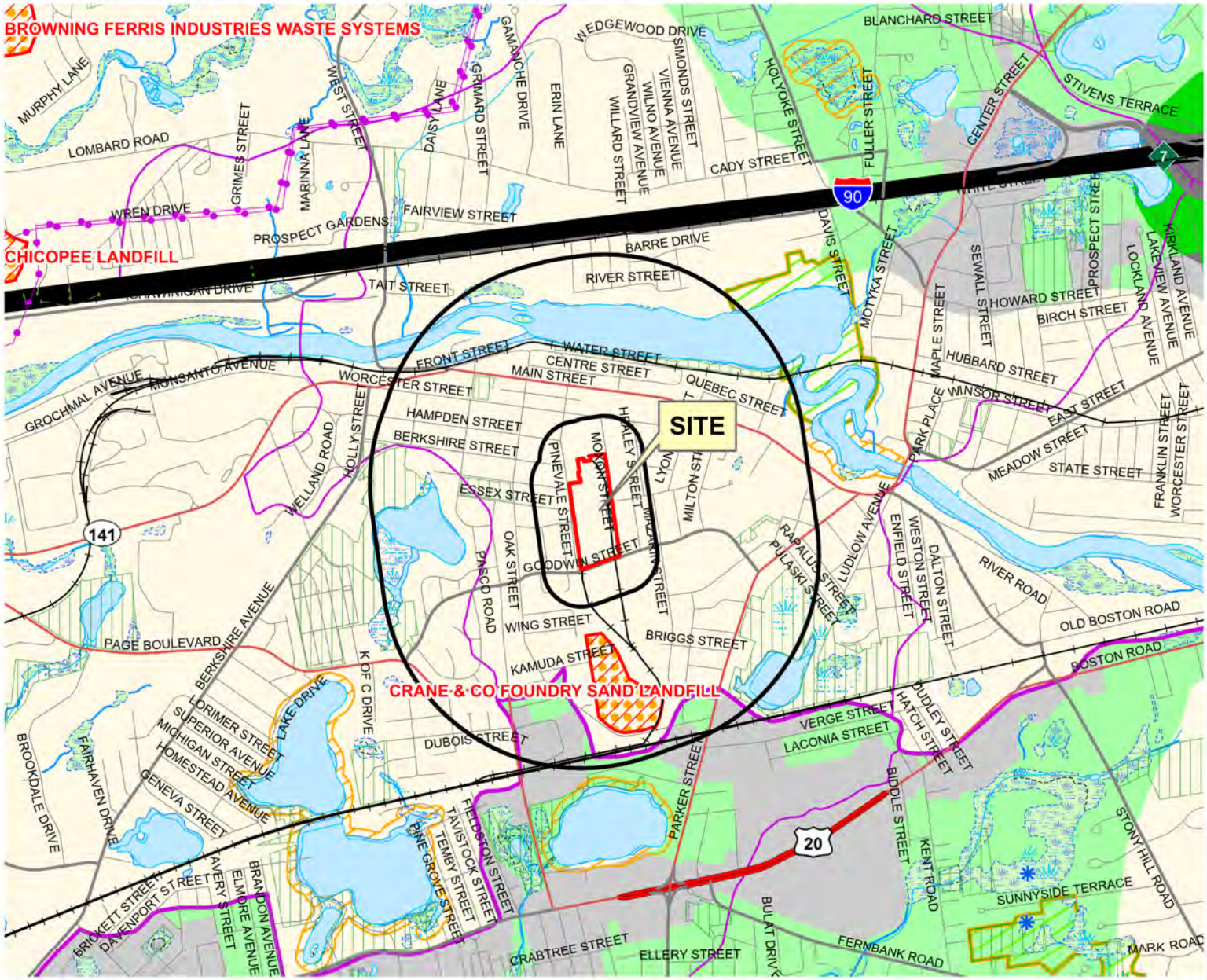
SITE PLAN

DESIGNED BY: MM/AE	CHECKED BY: JS	DATE: OCTOBER 2023

Weston & Sampson

\\wse03.local\WSE\Projects\MA\Springfield MA\ENG23-0351 - ES Pinevale Assessment\Correspondence\MCP Activities Memo\CAD\DWG\Site Plan_Updated ACE.dwg

Path: P:\MA\Springfield MA\ENG23-0351 - ES Pinevale Assessment\Report\Figures\GIS Figures\GIS Figures.aprx User: Ecker.Alison Saved: 9/28/2023 3:21 PM Opened: 9/28/2023 3:57 PM



N
W E
S

1,000 500 0 1,000
Feet

Miles
0.5 0.25 0

Data Source: Office of Geographic and Environmental Information (MassGIS), Commonwealth of Massachusetts Executive Office of Environmental Affairs

NOTE: Radii shown are approximately 500-feet and 1/2-mile from property boundary.

Legend

- Ground Water
- Surface Water
- Non-Community
- NHESP Certified Vernal Pools
- Railroads by Ownership
- Pipeline
- Pipeline Arbitrary Extension
- Powerline
- Powerline Arbitrary Extension
- Ski Lift/Tramway
- Substation
- Landing Strip/Airport
- Highway Exit Locations

All Roads

Road Classification

- Limited Access Highway
- Multi-lane Hwy; not limited access
- Other Numbered Highway
- Major Road, Collector
- Minor Road, Arterial
- Sub-basins
- Major Basins
- Landfills
- Dumping Grounds
- Protected Open Space
- ACECs
- Zone A
- IWPAs
- DEP Approved Zone IIs
- River, Stream, Shoreline
- Water
- Wetland
- Sole Source Aquifers
- NHESP Estimated Habitats of Rare Wildlife
- NHESP Priority Habitats of Rare Species

Non Potential Drinking Water Source Area

- High Yield
- Medium Yield

Aquifers

- High Yield
- Medium Yield

MA Towns (from Survey Points)

- MA Towns (from Survey Points)

FIGURE 3

Area Receptors Map
E/S Pinevale
Springfield, Massachusetts

Weston & Sampson

TABLES

Table 1
Summary of Soil Analytical Results - May 2023 Soil Borings
E/S Pinevale
Springfield, Massachusetts

Parameter	Units	Method 1 Cleanup Standard[1]	BTE-E		BT-EN		BT-ENW		BT-ESW		CM-22E				CM-22N		CM-22S		CM-22W	
													DUP-3							
			3.5 - 6.5 ft		3 - 6 ft		3 - 6 ft		4 - 7 ft		8 - 11 ft		8 - 11 ft		9 - 12 ft		8 - 11 ft		9.5 - 12.5 ft	
			5/18/2023		5/18/2023		5/18/2023		5/18/2023		5/16/2023		5/16/2023		5/16/2023		5/16/2023		5/16/2023	
		S-1/GW-3	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag
Metals - 6010/7471																				
Barium	mg/kg	1000	NA		NA		NA		NA		NA		NA		NA		NA		NA	
Cadmium	mg/kg	70	NA		NA		NA		NA		NA		NA		NA		NA		NA	
Lead	mg/kg	200	NA		NA		NA		NA		NA		NA		NA		NA		NA	
Semi-Volatile Organic Compounds (SVOCs) - 8270																				
Naphthalene	mg/kg	500	NA		NA		NA		NA		NA		NA		NA		NA		NA	
2-Methylnaphthalene	mg/kg	300	NA		NA		NA		NA		NA		NA		NA		NA		NA	
Acenaphthene	mg/kg	1000	NA		NA		NA		NA		NA		NA		NA		NA		NA	
Acenaphthylene	mg/kg	10	NA		NA		NA		NA		NA		NA		NA		NA		NA	
Anthracene	mg/kg	1000	NA		NA		NA		NA		NA		NA		NA		NA		NA	
Benz(a)anthracene	mg/kg	7	NA		NA		NA		NA		NA		NA		NA		NA		NA	
Benzo(a)pyrene	mg/kg	2	NA		NA		NA		NA		NA		NA		NA		NA		NA	
Benzo(b)fluoranthene	mg/kg	7	NA		NA		NA		NA		NA		NA		NA		NA		NA	
Benzo(g,h,i)perylene	mg/kg	1000	NA		NA		NA		NA		NA		NA		NA		NA		NA	
Benzo(k)fluoranthene	mg/kg	70	NA		NA		NA		NA		NA		NA		NA		NA		NA	
Chrysene	mg/kg	70	NA		NA		NA		NA		NA		NA		NA		NA		NA	
Dibenz(a,h)anthracene	mg/kg	0.7	NA		NA		NA		NA		NA		NA		NA		NA		NA	
Fluoranthene	mg/kg	1000	NA		NA		NA		NA		NA		NA		NA		NA		NA	
Fluorene	mg/kg	1000	NA		NA		NA		NA		NA		NA		NA		NA		NA	
Indeno(1,2,3-cd)pyrene	mg/kg	7	NA		NA		NA		NA		NA		NA		NA		NA		NA	
Phenanthrene	mg/kg	500	NA		NA		NA		NA		NA		NA		NA		NA		NA	
Pyrene	mg/kg	1000	NA		NA		NA		NA		NA		NA		NA		NA		NA	
Extractable Petroleum Hydrocarbons (EPH)																				
2-Methylnaphthalene	mg/kg	300	0.1	U	0.11	U	0.11	U	0.11	U	0.11	U	0.11	U	0.12	U	0.11	U	0.11	U
Acenaphthene	mg/kg	1000	0.1	U	0.11	U	0.11	U	0.11	U	0.11	U	0.11	U	0.12	U	0.11	U	0.11	U
Acenaphthylene	mg/kg	10	0.1	U	0.11	U	0.11	U	0.11	U	0.11	U	0.11	U	0.12	U	0.11	U	0.11	U
Anthracene	mg/kg	1000	0.1	U	0.11	U	0.11	U	0.11	U	0.11	U	0.11	U	0.12	U	0.11	U	0.11	U
Benz(a)anthracene	mg/kg	7	0.1	U	**0.19**		0.11	U	**0.35**		0.11	U	0.11	U	0.12	U	0.11	U	0.11	U
Benzo(a)pyrene	mg/kg	2	0.1	U	**0.21**		0.11	U	**0.37**		0.11	U	0.11	U	0.12	U	0.11	U	0.11	U
Benzo(b)fluoranthene	mg/kg	7	0.1	U	**0.28**		0.11	U	**0.49**		0.11	U	0.11	U	0.12	U	0.11	U	0.11	U
Benzo(g,h,i)perylene	mg/kg	1000	0.1	U	**0.23**		0.11	U	**0.29**		0.11	U	0.11	U	0.12	U	0.11	U	0.11	U
Benzo(k)fluoranthene	mg/kg	70	0.1	U	**0.11**		0.11	U	**0.19**		0.11	U	0.11	U	0.12	U	0.11	U	0.11	U
Chrysene	mg/kg	70	0.1	U	**0.26**		0.11	U	**0.44**		0.11	U	0.11	U	0.12	U	0.11	U	0.11	U
Dibenz(a,h)anthracene	mg/kg	0.7	0.1	U	0.11	U	0.11	U	0.11	U	0.11	U	0.11	U	0.12	U	0.11	U	0.11	U
Fluoranthene	mg/kg	1000	0.1	U	**0.48**		0.11	U	**0.62**		0.11	U	0.11	U	0.12	U	0.11	U	0.11	U
Fluorene	mg/kg	1000	0.1	U	0.11	U	0.11	U	0.11	U	0.11	U	0.11	U	0.12	U	0.11	U	0.11	U
Indeno(1,2,3-cd)pyrene	mg/kg	7	0.1	U	**0.16**		0.11	U	**0.23**		0.11	U	0.11	U	0.12	U	0.11	U	0.11	U
Naphthalene	mg/kg	500	0.1	U	0.11	U	0.11	U	0.11	U	0.11	U	0.11	U	0.12	U	0.11	U	0.11	U
Phenanthrene	mg/kg	500	0.1	U	**0.3**		0.11	U	**0.22**		0.11	U	0.11	U	0.12	U	0.11	U	0.11	U
Pyrene	mg/kg	1000	0.1	U	**0.47**		0.11	U	**0.61**		0.11	U	0.11	U	0.12	U	0.11	U	0.11	U
C11-C22 Aromatics	mg/kg	1000	10	U	11	U	11	U	**17**		11	U	11	U	12	U	11	U	11	U
C19-C36 Aliphatics	mg/kg	3000	10	U	11	U	11	U	**27**		11	U	11	U	12	U	11	U	11	U
C9-C18 Aliphatics	mg/kg	1000	10	U	11	U	11	U	11	U	11	U	11	U	12	U	11	U	11	U
Volatile Petroleum Hydrocarbons (VPH)																				
Benzene	mg/kg	40	0.05	U	0.053	U	0.054	U	0.058	U	0.065	U	0.051	U	0.07	U	0.054	U	0.055	U
Ethylbenzene	mg/kg	500	0.05	U	0.053	U	0.054	U	0.058	U	0.065	U	0.051	U	0.07	U	0.054	U	0.055	U
Methyl tert butyl ether (MTBE)	mg/kg	100	0.05	U	0.053	U	0.054	U	0.058	U	0.065	U	0.051	U	0.07	U	0.054	U	0.055	U
Naphthalene	mg/kg	500	0.25	U	0.26	U	0.27	U	0.29	U	0.32	U	0.25	U	0.35	U	0.27	U	0.28	U
Toluene	mg/kg	500	0.05	U	0.053	U	0.054	U	0.058	U	0.065	U	0.051	U	0.07	U	0.054	U	0.055	U
Xylene, m,p-	mg/kg	~	0.1	U	0.11	U	0.11	U	0.12	U	0.13	U	0.1	U	0.14	U	0.11	U	0.11	U
Xylene, o-	mg/kg	~	0.05	U	0.053	U	0.054	U	0.058	U	0.065	U	0.051	U	0.07	U	0.054	U	0.055	U
Xylene (Total)	mg/kg	500	0.15	U, Y	0.163	U, Y	0.164	U, Y	0.178	U, Y	0.195	U, Y	0.151	U, Y	0.21	U, Y	0.164	U, Y	0.165	U, Y
C5-C8 Aliphatics	mg/kg	100	10	U	11	U	11	U	12	U	13	U	10	U	14	U	11	U	11	U
C9-C10 Aromatics	mg/kg	100	10	U	11	U	11	U	12	U	13	U	10	U	14	U	11	U	11	U
C9-C12 Aliphatics	mg/kg	1000	10	U	11	U	11	U	12	U	13	U	10	U	14	U	11	U	11	U

QC by ACE 6/16/2023

Notes:

1	Standards are from the Massachusetts Contingency Plan, 310 CMR 40.0000
mg/kg	milligrams per kilogram
U	not detected above laboratory reporting limit
Y	calculated value
NA	Not Analyzed
~	No applicable Method 1 Cleanup Standard
Bold	Detected above laboratory reporting limit
Bold	Detected above MCP Method 1 Cleanup Standards

\\wse03.local\WSE\Projects\MA\Springfield MA\ENG23-0351 - ES Pinevale Assessment\Report\Tables\[Table 1_Soil Results_QC ACE.xlsx]Results

Table 1
Summary of Soil Analytical Results - May 2023 Soil Borings
E/S Pinevale
Springfield, Massachusetts

Parameter	Units	Method 1 Cleanup Standard[1]	CM-38E				CM-38N		CM-38NW		CM-38SE		CM-38SW		CM-39E		CM-39N		CM-39S		CM-39W	
					DUP-1																	
			4.5 - 7.5 ft		4.5 - 7.5 ft		3.5 - 6.5 ft		4.5 - 7.5 ft		4 - 7 ft		4.5 - 7.5 ft		0 - 2 ft		0 - 2 ft		0 - 2 ft		0 - 2 ft	
			5/16/2023		5/16/2023		5/16/2023		5/16/2023		5/17/2023		5/16/2023		5/17/2023		5/17/2023		5/17/2023		5/17/2023	
		S-1/GW-3	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag
Metals - 6010/7471																						
Barium	mg/kg	1000	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Cadmium	mg/kg	70	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Lead	mg/kg	200	**5.9**		**4.8**		**130**		**8.9**		**150**		**7**		**120**		**26**		**150**		**47**	
Semi-Volatile Organic Compounds (SVOCs) - 8270																						
Naphthalene	mg/kg	500	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
2-Methylnaphthalene	mg/kg	300	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Acenaphthene	mg/kg	1000	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Acenaphthylene	mg/kg	10	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Anthracene	mg/kg	1000	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Benz(a)anthracene	mg/kg	7	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Benzo(a)pyrene	mg/kg	2	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Benzo(b)fluoranthene	mg/kg	7	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Benzo(g,h,i)perylene	mg/kg	1000	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Benzo(k)fluoranthene	mg/kg	70	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Chrysene	mg/kg	70	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Dibenz(a,h)anthracene	mg/kg	0.7	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Fluoranthene	mg/kg	1000	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Fluorene	mg/kg	1000	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Indeno(1,2,3-cd)pyrene	mg/kg	7	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Phenanthrene	mg/kg	500	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Pyrene	mg/kg	1000	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Extractable Petroleum Hydrocarbons (EPH)																						
2-Methylnaphthalene	mg/kg	300	**0.53**		**0.3**		**0.12**		0.11	U	**2.4**		0.11	U	NA		NA		NA		NA	
Acenaphthene	mg/kg	1000	**0.7**		**0.46**		**0.15**		0.11	U	**2.8**		0.11	U	NA		NA		NA		NA	
Acenaphthylene	mg/kg	10	**0.43**		**0.29**		0.11	U	0.11	U	**2.1**		0.11	U	NA		NA		NA		NA	
Anthracene	mg/kg	1000	**1.5**		**1.2**		**0.39**		0.11	U	**7.3**		0.11	U	NA		NA		NA		NA	
Benz(a)anthracene	mg/kg	7	**1.7**		**1.3**		**1.8**		**0.12**		**9.5**		0.11	U	NA		NA		NA		NA	
Benzo(a)pyrene	mg/kg	2	**1.6**		**1.3**		**2.2**		**0.13**		**8.1**		0.11	U	NA		NA		NA		NA	
Benzo(b)fluoranthene	mg/kg	7	**1.9**		**1.4**		**2.8**		0.11	U	**9.5**		0.11	U	NA		NA		NA		NA	
Benzo(g,h,i)perylene	mg/kg	1000	**1.1**		**0.86**		**1.6**		**0.12**		**4.3**		0.11	U	NA		NA		NA		NA	
Benzo(k)fluoranthene	mg/kg	70	**0.7**		**0.56**		**1**		0.11	U	**3.6**		0.11	U	NA		NA		NA		NA	
Chrysene	mg/kg	70	**1.9**		**1.4**		**2.4**		**0.18**		**10**		0.11	U	NA		NA		NA		NA	
Dibenz(a,h)anthracene	mg/kg	0.7	**0.23**		**0.18**		**0.41**		0.11	U	**1.1**		0.11	U	NA		NA		NA		NA	
Fluoranthene	mg/kg	1000	**5**		**3.7**		**3**		**0.31**		**31**		0.11	U	NA		NA		NA		NA	
Fluorene	mg/kg	1000	**0.87**		**0.61**		0.11	U	0.11	U	**4.6**		0.11	U	NA		NA		NA		NA	
Indeno(1,2,3-cd)pyrene	mg/kg	7	**1.1**		**0.85**		**1.5**		0.11	U	**4.7**		0.11	U	NA		NA		NA		NA	
Naphthalene	mg/kg	500	**1.6**		**1**		0.11	U	0.11	U	**9.1**		0.11	U	NA		NA		NA		NA	
Phenanthrene	mg/kg	500	**6.7**		**4.7**		**2.2**		**0.23**		**36**		0.11	U	NA		NA		NA		NA	
Pyrene	mg/kg	1000	**4.8**		**3.6**		**3.6**		**0.29**		**30**		0.11	U	NA		NA		NA		NA	
C11-C22 Aromatics	mg/kg	1000	**45**		**39**		**610**		11	U	**180**		11	U	NA		NA		NA		NA	
C19-C36 Aliphatics	mg/kg	3000	**15**		**12**		**450**		11	U	**24**		11	U	NA		NA		NA		NA	
C9-C18 Aliphatics	mg/kg	1000	**15**		**20**		**2800**		11	U	**12**		11	U	NA		NA		NA		NA	
Volatile Petroleum Hydrocarbons (VPH)																						
Benzene	mg/kg	40	0.058	U	0.054	U	0.57	U	0.062	U	0.53	U	0.063	U	NA		NA		NA		NA	
Ethylbenzene	mg/kg	500	0.058	U	0.054	U	0.57	U	0.062	U	0.53	U	0.063	U	NA		NA		NA		NA	
Methyl tert butyl ether (MTBE)	mg/kg	100	0.058	U	0.054	U	0.57	U	0.062	U	0.53	U	0.063	U	NA		NA		NA		NA	
Naphthalene	mg/kg	500	0.29	U	0.27	U	2.9	U	0.31	U	2.7	U	0.31	U	NA		NA		NA		NA	
Toluene	mg/kg	500	0.058	U	0.054	U	0.57	U	0.062	U	0.53	U	0.063	U	NA		NA		NA		NA	
Xylene, m,p-	mg/kg	~	0.12	U	0.11	U	1.1	U	0.12	U	1.1	U	0.13	U	NA		NA		NA		NA	
Xylene, o-	mg/kg	~	0.058	U	0.054	U	0.57	U	0.062	U	0.53	U	0.063	U	NA		NA		NA		NA	
Xylene (Total)	mg/kg	500	0.178	U, Y	0.164	U, Y	1.67	U, Y	0.182	U, Y	1.63	U, Y	0.193	U, Y	NA		NA		NA		NA	
C5-C8 Aliphatics	mg/kg	100	12	U	11	U	**110**	U	12	U	**110**	U	13	U	NA		NA		NA		NA	
C9-C10 Aromatics	mg/kg	100	12	U	11	U	**530**		12	U	**340**		13	U	NA		NA		NA		NA	
C9-C12 Aliphatics	mg/kg	1000	12	U	11	U	**140**		12	U	**190**		13	U	NA		NA		NA		NA	

QC by ACE 6/16/2023

Notes:

1	Standards are from the Massachusetts Contingency Plan, 310 CMR 40.0000
mg/kg	milligrams per kilogram
U	not detected above laboratory reporting limit
Y	calculated value
NA	Not Analyzed
~	No applicable Method 1 Cleanup Standard
Bold	Detected above laboratory reporting limit
Bold	Detected above MCP Method 1 Cleanup Standards

\\wse03.local\WSE\Projects\MA\Springfield MA\ENG23-0351 - ES Pinevale Assessment\Report\Tables\[Table 1_Soil Re

Table 1
Summary of Soil Analytical Results - May 2023 Soil Borings
E/S Pinevale
Springfield, Massachusetts

Parameter	Units	Method 1 Cleanup Standard[1]	CM-43N		CM-43NW		CM-43SW		CM-52E		CM-52N		CM-52S		CM-52W	
			8 - 11 ft		5 - 8 ft		5 - 8 ft		1 - 3 ft		1 - 3 ft		1.2 - 3 ft		1 - 3 ft	
			5/18/2023		5/18/2023		5/18/2023		5/15/2023		5/15/2023		5/15/2023		5/15/2023	
		S-1/GW-3	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag
Metals - 6010/7471																
Barium	mg/kg	1000	NA		NA		NA		NA		NA		NA		NA	
Cadmium	mg/kg	70	NA		NA		NA		0.36	U	0.39	U	0.39	U	0.37	U
Lead	mg/kg	200	**120**		**70**		**34**		NA		NA		NA		NA	
Semi-Volatile Organic Compounds (SVOCs) - 8270																
Naphthalene	mg/kg	500	NA		NA		NA		NA		NA		NA		NA	
2-Methylnaphthalene	mg/kg	300	NA		NA		NA		NA		NA		NA		NA	
Acenaphthene	mg/kg	1000	NA		NA		NA		NA		NA		NA		NA	
Acenaphthylene	mg/kg	10	NA		NA		NA		NA		NA		NA		NA	
Anthracene	mg/kg	1000	NA		NA		NA		NA		NA		NA		NA	
Benz(a)anthracene	mg/kg	7	NA		NA		NA		NA		NA		NA		NA	
Benzo(a)pyrene	mg/kg	2	NA		NA		NA		NA		NA		NA		NA	
Benzo(b)fluoranthene	mg/kg	7	NA		NA		NA		NA		NA		NA		NA	
Benzo(g,h,i)perylene	mg/kg	1000	NA		NA		NA		NA		NA		NA		NA	
Benzo(k)fluoranthene	mg/kg	70	NA		NA		NA		NA		NA		NA		NA	
Chrysene	mg/kg	70	NA		NA		NA		NA		NA		NA		NA	
Dibenz(a,h)anthracene	mg/kg	0.7	NA		NA		NA		NA		NA		NA		NA	
Fluoranthene	mg/kg	1000	NA		NA		NA		NA		NA		NA		NA	
Fluorene	mg/kg	1000	NA		NA		NA		NA		NA		NA		NA	
Indeno(1,2,3-cd)pyrene	mg/kg	7	NA		NA		NA		NA		NA		NA		NA	
Phenanthrene	mg/kg	500	NA		NA		NA		NA		NA		NA		NA	
Pyrene	mg/kg	1000	NA		NA		NA		NA		NA		NA		NA	
Extractable Petroleum Hydrocarbons (EPH)																
2-Methylnaphthalene	mg/kg	300	0.12	U	0.11	U	0.11	U	NA		NA		NA		NA	
Acenaphthene	mg/kg	1000	0.12	U	0.11	U	0.11	U	NA		NA		NA		NA	
Acenaphthylene	mg/kg	10	0.12	U	0.11	U	0.11	U	NA		NA		NA		NA	
Anthracene	mg/kg	1000	0.12	U	**0.12**		**0.18**		NA		NA		NA		NA	
Benz(a)anthracene	mg/kg	7	0.12	U	**0.43**		**0.96**		NA		NA		NA		NA	
Benzo(a)pyrene	mg/kg	2	0.12	U	**0.47**		**1.2**		NA		NA		NA		NA	
Benzo(b)fluoranthene	mg/kg	7	0.12	U	**0.56**		**1.4**		NA		NA		NA		NA	
Benzo(g,h,i)perylene	mg/kg	1000	0.12	U	**0.31**		**0.87**		NA		NA		NA		NA	
Benzo(k)fluoranthene	mg/kg	70	0.12	U	**0.22**		**0.49**		NA		NA		NA		NA	
Chrysene	mg/kg	70	0.12	U	**0.52**		**1.1**		NA		NA		NA		NA	
Dibenz(a,h)anthracene	mg/kg	0.7	0.12	U	0.11	U	**0.17**		NA		NA		NA		NA	
Fluoranthene	mg/kg	1000	0.12	U	**0.88**		**2.1**		NA		NA		NA		NA	
Fluorene	mg/kg	1000	0.12	U	0.11	U	0.11	U	NA		NA		NA		NA	
Indeno(1,2,3-cd)pyrene	mg/kg	7	0.12	U	**0.32**		**0.83**		NA		NA		NA		NA	
Naphthalene	mg/kg	500	0.12	U	0.11	U	0.11	U	NA		NA		NA		NA	
Phenanthrene	mg/kg	500	0.12	U	**0.63**		**0.69**		NA		NA		NA		NA	
Pyrene	mg/kg	1000	0.12	U	**0.89**		**2.1**		NA		NA		NA		NA	
C11-C22 Aromatics	mg/kg	1000	**15**		**17**		**22**		NA		NA		NA		NA	
C19-C36 Aliphatics	mg/kg	3000	**24**		11	U	11	U	NA		NA		NA		NA	
C9-C18 Aliphatics	mg/kg	1000	12	U	11	U	11	U	NA		NA		NA		NA	
Volatile Petroleum Hydrocarbons (VPH)																
Benzene	mg/kg	40	0.059	U	0.054	U	0.053	U	NA		NA		NA		NA	
Ethylbenzene	mg/kg	500	0.059	U	0.054	U	0.053	U	NA		NA		NA		NA	
Methyl tert butyl ether (MTBE)	mg/kg	100	0.059	U	0.054	U	0.053	U	NA		NA		NA		NA	
Naphthalene	mg/kg	500	0.29	U	0.27	U	0.26	U	NA		NA		NA		NA	
Toluene	mg/kg	500	0.059	U	0.054	U	0.053	U	NA		NA		NA		NA	
Xylene, m,p-	mg/kg	~	0.12	U	0.11	U	0.11	U	NA		NA		NA		NA	
Xylene, o-	mg/kg	~	0.059	U	0.054	U	0.053	U	NA		NA		NA		NA	
Xylene (Total)	mg/kg	500	0.179	U, Y	0.164	U, Y	0.163	U, Y	NA		NA		NA		NA	
C5-C8 Aliphatics	mg/kg	100	12	U	11	U	11	U	NA		NA		NA		NA	
C9-C10 Aromatics	mg/kg	100	12	U	11	U	11	U	NA		NA		NA		NA	
C9-C12 Aliphatics	mg/kg	1000	12	U	11	U	11	U	NA		NA		NA		NA	

QC by ACE 6/16/2023

Notes:

1	Standards are from the Massachusetts Contingency Plan, 310 CMR 40.0000
mg/kg	milligrams per kilogram
U	not detected above laboratory reporting limit
Y	calculated value
NA	Not Analyzed
~	No applicable Method 1 Cleanup Standard
Bold	Detected above laboratory reporting limit
Bold	Detected above MCP Method 1 Cleanup Standards

\\wse03.local\WSE\Projects\MA\Springfield MA\ENG23-0351 - ES Pinevale Assessment\Report\Tables\[Table 1_Soil Re

Table 1
Summary of Soil Analytical Results - May 2023 Soil Borings
E/S Pinevale
Springfield, Massachusetts

Parameter	Units	Method 1 Cleanup Standard[1]	CM-53E				CM-53N		CM-53SE		CM-53SW		CM-53W		DP-2A		MW-205A	
					DUP-2													
			0 - 2 ft		0 - 2 ft		0 - 2 ft		1 - 2 ft		0.5 - 2 ft		0.5 - 2 ft		0 - 2 ft		0.42 - 3 ft	
			5/15/2023		5/15/2023		5/15/2023		5/15/2023		5/15/2023		5/15/2023		5/18/2023		5/15/2023	
		S-1/GW-3	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag
Metals - 6010/7471																		
Barium	mg/kg	1000	**22**		**16**		**30**		**48**		**73**		**35**		NA		NA	
Cadmium	mg/kg	70	0.34	U	0.35	U	0.46	U	0.35	U	0.35	U	0.34	U	NA		**1.1**	
Lead	mg/kg	200	**4.3**		**2.1**		**4.9**		**2.7**		**3.6**		**5.3**		**92**		NA	
Semi-Volatile Organic Compounds (SVOCs) - 8270																		
Naphthalene	mg/kg	500	NA		NA		NA		NA		NA		NA		**0.39**		NA	
2-Methylnaphthalene	mg/kg	300	NA		NA		NA		NA		NA		NA		0.37	U	NA	
Acenaphthene	mg/kg	1000	NA		NA		NA		NA		NA		NA		**0.94**		NA	
Acenaphthylene	mg/kg	10	NA		NA		NA		NA		NA		NA		**0.45**		NA	
Anthracene	mg/kg	1000	NA		NA		NA		NA		NA		NA		**2.5**		NA	
Benz(a)anthracene	mg/kg	7	NA		NA		NA		NA		NA		NA		**8**		NA	
Benzo(a)pyrene	mg/kg	2	NA		NA		NA		NA		NA		NA		**7.9**		NA	
Benzo(b)fluoranthene	mg/kg	7	NA		NA		NA		NA		NA		NA		**11**		NA	
Benzo(g,h,i)perylene	mg/kg	1000	NA		NA		NA		NA		NA		NA		**5.6**		NA	
Benzo(k)fluoranthene	mg/kg	70	NA		NA		NA		NA		NA		NA		**4.3**		NA	
Chrysene	mg/kg	70	NA		NA		NA		NA		NA		NA		**7.9**		NA	
Dibenz(a,h)anthracene	mg/kg	0.7	NA		NA		NA		NA		NA		NA		**1.4**		NA	
Fluoranthene	mg/kg	1000	NA		NA		NA		NA		NA		NA		**20**		NA	
Fluorene	mg/kg	1000	NA		NA		NA		NA		NA		NA		**0.82**		NA	
Indeno(1,2,3-cd)pyrene	mg/kg	7	NA		NA		NA		NA		NA		NA		**5.9**		NA	
Phenanthrene	mg/kg	500	NA		NA		NA		NA		NA		NA		**12**		NA	
Pyrene	mg/kg	1000	NA		NA		NA		NA		NA		NA		**17**		NA	
Extractable Petroleum Hydrocarbons (EPH)																		
2-Methylnaphthalene	mg/kg	300	NA		NA		NA		NA		NA		NA		NA		NA	
Acenaphthene	mg/kg	1000	NA		NA		NA		NA		NA		NA		NA		NA	
Acenaphthylene	mg/kg	10	NA		NA		NA		NA		NA		NA		NA		NA	
Anthracene	mg/kg	1000	NA		NA		NA		NA		NA		NA		NA		NA	
Benz(a)anthracene	mg/kg	7	NA		NA		NA		NA		NA		NA		NA		NA	
Benzo(a)pyrene	mg/kg	2	NA		NA		NA		NA		NA		NA		NA		NA	
Benzo(b)fluoranthene	mg/kg	7	NA		NA		NA		NA		NA		NA		NA		NA	
Benzo(g,h,i)perylene	mg/kg	1000	NA		NA		NA		NA		NA		NA		NA		NA	
Benzo(k)fluoranthene	mg/kg	70	NA		NA		NA		NA		NA		NA		NA		NA	
Chrysene	mg/kg	70	NA		NA		NA		NA		NA		NA		NA		NA	
Dibenz(a,h)anthracene	mg/kg	0.7	NA		NA		NA		NA		NA		NA		NA		NA	
Fluoranthene	mg/kg	1000	NA		NA		NA		NA		NA		NA		NA		NA	
Fluorene	mg/kg	1000	NA		NA		NA		NA		NA		NA		NA		NA	
Indeno(1,2,3-cd)pyrene	mg/kg	7	NA		NA		NA		NA		NA		NA		NA		NA	
Naphthalene	mg/kg	500	NA		NA		NA		NA		NA		NA		NA		NA	
Phenanthrene	mg/kg	500	NA		NA		NA		NA		NA		NA		NA		NA	
Pyrene	mg/kg	1000	NA		NA		NA		NA		NA		NA		NA		NA	
C11-C22 Aromatics	mg/kg	1000	NA		NA		NA		NA		NA		NA		NA		NA	
C19-C36 Aliphatics	mg/kg	3000	NA		NA		NA		NA		NA		NA		NA		NA	
C9-C18 Aliphatics	mg/kg	1000	NA		NA		NA		NA		NA		NA		NA		NA	
Volatile Petroleum Hydrocarbons (VPH)																		
Benzene	mg/kg	40	NA		NA		NA		NA		NA		NA		NA		NA	
Ethylbenzene	mg/kg	500	NA		NA		NA		NA		NA		NA		NA		NA	
Methyl tert butyl ether (MTBE)	mg/kg	100	NA		NA		NA		NA		NA		NA		NA		NA	
Naphthalene	mg/kg	500	NA		NA		NA		NA		NA		NA		NA		NA	
Toluene	mg/kg	500	NA		NA		NA		NA		NA		NA		NA		NA	
Xylene, m,p-	mg/kg	~	NA		NA		NA		NA		NA		NA		NA		NA	
Xylene, o-	mg/kg	~	NA		NA		NA		NA		NA		NA		NA		NA	
Xylene (Total)	mg/kg	500	NA		NA		NA		NA		NA		NA		NA		NA	
C5-C8 Aliphatics	mg/kg	100	NA		NA		NA		NA		NA		NA		NA		NA	
C9-C10 Aromatics	mg/kg	100	NA		NA		NA		NA		NA		NA		NA		NA	
C9-C12 Aliphatics	mg/kg	1000	NA		NA		NA		NA		NA		NA		NA		NA	

QC by ACE 6/16/2023

Notes:

1	Standards are from the Massachusetts Contingency Plan, 310 CMR 40.0000
mg/kg	milligrams per kilogram
U	not detected above laboratory reporting limit
Y	calculated value
NA	Not Analyzed
~	No applicable Method 1 Cleanup Standard
Bold	Detected above laboratory reporting limit
Bold	Detected above MCP Method 1 Cleanup Standards

\\wse03.local\WSE\Projects\MA\Springfield MA\ENG23-0351 - ES Pinevale Assessment\Report\Tables\[Table 1_Soil Re

Table 1
Summary of Soil Analytical Results - May 2023 Soil Borings
E/S Pinevale
Springfield, Massachusetts

Parameter	Units	Method 1 Cleanup Standard[1]	OTP-4A		OTP-6A				OTP-8A	
							DUP-4			
			0 - 2 ft		0 - 3 ft		0 - 3 ft		0 - 1.5 ft	
			5/18/2023		5/16/2023		5/16/2023		5/16/2023	
		S-1/GW-3	Result	Flag	Result	Flag	Result	Flag	Result	Flag
Metals - 6010/7471										
Barium	mg/kg	1000	NA		NA		NA		NA	
Cadmium	mg/kg	70	NA		NA		NA		NA	
Lead	mg/kg	200	**26**		**9.3**		NA		**63**	
Semi-Volatile Organic Compounds (SVOCs) - 8270										
Naphthalene	mg/kg	500	0.79	U	0.18	U	0.18	U	0.22	U
2-Methylnaphthalene	mg/kg	300	0.79	U	0.18	U	0.18	U	0.22	U
Acenaphthene	mg/kg	1000	0.79	U	**0.22**		0.18	U	0.22	U
Acenaphthylene	mg/kg	10	0.79	U	0.18	U	0.18	U	0.22	U
Anthracene	mg/kg	1000	**2.1**		**0.45**		0.18	U	**0.26**	
Benz(a)anthracene	mg/kg	7	**23**		**1.2**		0.18	U	**1**	
Benzo(a)pyrene	mg/kg	2	**32**		**1.2**		0.18	U	**0.99**	
Benzo(b)fluoranthene	mg/kg	7	**41**		**1.6**		0.18	U	**1.3**	
Benzo(g,h,i)perylene	mg/kg	1000	**31**		**0.82**		0.18	U	**0.76**	
Benzo(k)fluoranthene	mg/kg	70	**16**		**0.66**		0.18	U	**0.5**	
Chrysene	mg/kg	70	**26**		**1.2**		0.18	U	**1**	
Dibenz(a,h)anthracene	mg/kg	0.7	**6.5**		0.18	U	0.18	U	0.22	U
Fluoranthene	mg/kg	1000	**47**		**2.8**		0.18	U	**2.3**	
Fluorene	mg/kg	1000	0.79	U	0.18	U	0.18	U	0.22	U
Indeno(1,2,3-cd)pyrene	mg/kg	7	**28**		**0.8**		0.18	U	**0.77**	
Phenanthrene	mg/kg	500	**4.7**		**1.9**		0.18	U	**1.3**	
Pyrene	mg/kg	1000	**60**		**2.2**		0.18	U	**1.7**	
Extractable Petroleum Hydrocarbons (EPH)										
2-Methylnaphthalene	mg/kg	300	NA		NA		NA		NA	
Acenaphthene	mg/kg	1000	NA		NA		NA		NA	
Acenaphthylene	mg/kg	10	NA		NA		NA		NA	
Anthracene	mg/kg	1000	NA		NA		NA		NA	
Benz(a)anthracene	mg/kg	7	NA		NA		NA		NA	
Benzo(a)pyrene	mg/kg	2	NA		NA		NA		NA	
Benzo(b)fluoranthene	mg/kg	7	NA		NA		NA		NA	
Benzo(g,h,i)perylene	mg/kg	1000	NA		NA		NA		NA	
Benzo(k)fluoranthene	mg/kg	70	NA		NA		NA		NA	
Chrysene	mg/kg	70	NA		NA		NA		NA	
Dibenz(a,h)anthracene	mg/kg	0.7	NA		NA		NA		NA	
Fluoranthene	mg/kg	1000	NA		NA		NA		NA	
Fluorene	mg/kg	1000	NA		NA		NA		NA	
Indeno(1,2,3-cd)pyrene	mg/kg	7	NA		NA		NA		NA	
Naphthalene	mg/kg	500	NA		NA		NA		NA	
Phenanthrene	mg/kg	500	NA		NA		NA		NA	
Pyrene	mg/kg	1000	NA		NA		NA		NA	
C11-C22 Aromatics	mg/kg	1000	NA		NA		NA		NA	
C19-C36 Aliphatics	mg/kg	3000	NA		NA		NA		NA	
C9-C18 Aliphatics	mg/kg	1000	NA		NA		NA		NA	
Volatile Petroleum Hydrocarbons (VPH)										
Benzene	mg/kg	40	NA		NA		NA		NA	
Ethylbenzene	mg/kg	500	NA		NA		NA		NA	
Methyl tert butyl ether (MTBE)	mg/kg	100	NA		NA		NA		NA	
Naphthalene	mg/kg	500	NA		NA		NA		NA	
Toluene	mg/kg	500	NA		NA		NA		NA	
Xylene, m,p-	mg/kg	~	NA		NA		NA		NA	
Xylene, o-	mg/kg	~	NA		NA		NA		NA	
Xylene (Total)	mg/kg	500	NA		NA		NA		NA	
C5-C8 Aliphatics	mg/kg	100	NA		NA		NA		NA	
C9-C10 Aromatics	mg/kg	100	NA		NA		NA		NA	
C9-C12 Aliphatics	mg/kg	1000	NA		NA		NA		NA	

QC by ACE 6/16/2023

Notes:

1	Standards are from the Massachusetts Contingency Plan, 310 CMR 40.0000
mg/kg	milligrams per kilogram
U	not detected above laboratory reporting limit
Y	calculated value
NA	Not Analyzed
~	No applicable Method 1 Cleanup Standard
Bold	Detected above laboratory reporting limit
Bold	Detected above MCP Method 1 Cleanup Standards

\\wse03.local\WSE\Projects\MA\Springfield MA\ENG23-0351 - ES Pinevale Assessment\Report\Tables\[Table 1_Soil Re

Table 2
Summary of Scanning Electron Microscopy Sample Analytical Results
E/S Pinevale
Springfield, Massachusetts

Location	Sample Date	Depth (ft)	General Material Description	SEM Results
OTP-6A	5/16/2023	0-3	Light to dark brown/orange F-C SAND with trace to little gravel, trace organics (roots, mulch, grass), moist, no odor	Trace wood ash, light asphalt
OTP-8A	5/16/2023	0-1.5	Brown F-M SAND with trace organics (roots), trace small gravel, damp, no odor	Light coal, light coal ash, trace wood ash, trace tar
OTP-4A	5/18/2023	0-2	Brown F-C SAND with trace gravel, organics (roots), moist, no odor	Light coal, trace coal ash, light wood ash
DP-2A	5/18/2023	0-2	Brown F-C SAND with trace gravel, ash, brick, and organics (roots), damp, no odor	Trace coal ash, moderate tar

QC by EL on 10/03/2023

Abbreviations:
SEM = Scanning Electron Microscopy

Table 3
Summary of Groundwater Analytical Results
E/S Pinevale
Springfield, Massachusetts

Parameter	Units	Method 1 Cleanup Standard[1]	MW-205A		MW-CM-38N		MW-CM-43N		MW-CM-53N				EW-1		EW-2		EW-3		MW-205A		MW-CM-38N				MW-CM-43N		MW-CM-53N	
											DUP-1												DUP-1					
			6/1/2023		6/1/2023		6/1/2023		6/1/2023		6/1/2023		8/25/2023		8/25/2023		8/25/2023		8/25/2023		8/25/2023		8/25/2023		8/25/2023		8/25/2023	
		GW-3	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag
Metals - 6020B/7470A																												
Antimony	ug/l	8000	NA		NA		NA		NA		NA		1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
Arsenic	ug/l	900	NA		NA		NA		NA		NA		1	U	1	U	1	U	1	U	**21**		**21**		**1.2**		1	U
Barium	ug/l	50000	NA		NA		NA		**180**		**190**		**90**		**86**		**290**		**320**		**350**		**350**		**140**		**180**	
Beryllium	ug/l	200	NA		NA		NA		NA		NA		0.4	U	0.4	U	0.4	U	0.4	U	0.4	U	0.4	U	0.4	U	0.4	U
Cadmium	ug/l	4	**2.2**		NA		NA		0.2	U	0.2	U	0.2	U	0.2	U	0.2	U	**0.28**		0.2	U	0.2	U	0.2	U	0.2	U
Chromium	ug/l	300	NA		NA		NA		NA		NA		5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U
Lead	ug/l	10	NA		0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Mercury	mg/l	0.02	NA		NA		NA		NA		NA		0.0002	U	0.0002	U	0.0002	U	0.0002	U	0.0002	U	0.0002	U	0.0002	U	0.0002	U
Nickel	ug/l	200	NA		NA		NA		NA		NA		5	U	5	U	**6.9**		5	U	5	U	5	U	5	U	5	U
Selenium	ug/l	100	NA		NA		NA		NA		NA		5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U
Silver	ug/l	7	NA		NA		NA		NA		NA		0.2	U	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U
Thallium	ug/l	3000	NA		NA		NA		NA		NA		0.2	U	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U
Vanadium	ug/l	4000	NA		NA		NA		NA		NA		5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U
Zinc	ug/l	900	NA		NA		NA		NA		NA		10	U	10	U	**49**		**10**		10	U	10	U	10	U	10	U
Volatile Organic Compounds (VOCs) - 8260D																												
Acetone	ug/l	50000	NA		NA		NA		NA		NA		10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Tert-Amyl Methyl Ether	ug/l	~	NA		NA		NA		NA		NA		0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Benzene	ug/l	10000	NA		NA		NA		NA		NA		1	U	1	U	1	U	1	U	**1.2**		**1.3**		1	U	1	U
Bromobenzene	ug/l	~	NA		NA		NA		NA		NA		1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
Bromochloromethane	ug/l	~	NA		NA		NA		NA		NA		1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
Bromodichloromethane	ug/l	50000	NA		NA		NA		NA		NA		1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
Bromoform	ug/l	50000	NA		NA		NA		NA		NA		1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
Bromomethane	ug/l	800	NA		NA		NA		NA		NA		2	U	2	U	2	U	2	U	2	U	2	U	2	U	2	U
2-Butanone (MEK)	ug/l	50000	NA		NA		NA		NA		NA		10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
N-Butylbenzene	ug/l	~	NA		NA		NA		NA		NA		**1**		1	U	1	U	1	U	**4.1**		**4.1**		**1.6**		1	U
Sec-Butylbenzene	ug/l	~	NA		NA		NA		NA		NA		**1.5**		1	U	1	U	**1.4**		**4.2**		**4.2**		**1.5**		1	U
Tert-Butylbenzene	ug/l	~	NA		NA		NA		NA		NA		1	U	1	U	1	U	1	U	**1.6**		**1.5**		1	U	1	U
Tert-Butylethyl Ether	ug/l	~	NA		NA		NA		NA		NA		0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Carbon Disulfide	ug/l	~	NA		NA		NA		NA		NA		5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U
Carbon Tetrachloride	ug/l	5000	NA		NA		NA		NA		NA		1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
Chlorobenzene	ug/l	1000	NA		NA		NA		NA		NA		1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
Chlorodibromomethane	ug/l	50000	NA		NA		NA		NA		NA		0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Chloroethane	ug/l	~	NA		NA		NA		NA		NA		2	U	2	U	2	U	2	U	2	U	2	U	2	U	2	U
Chloroform	ug/l	20000	NA		NA		NA		NA		NA		2	U	2	U	2	U	2	U	2	U	2	U	2	U	2	U
Chloromethane	ug/l	~	NA		NA		NA		NA		NA		2	U	2	U	2	U	2	U	2	U	2	U	2	U	2	U
2-Chlorotoluene	ug/l	~	NA		NA		NA		NA		NA		1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
4-Chlorotoluene	ug/l	~	NA		NA		NA		NA		NA		1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
1,2-Dibromo-3-Chloropropane	ug/l	~	NA		NA		NA		NA		NA		2	U	2	U	2	U	2	U	2	U	2	U	2	U	2	U
1,2-Dibromoethane (EDB)	ug/l	50000	NA		NA		NA		NA		NA		0.50	U	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
Dibromomethane	ug/l	~	NA		NA		NA		NA		NA		1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
1,2-Dichlorobenzene	ug/l	2000	NA		NA		NA		NA		NA		1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
1,3-Dichlorobenzene	ug/l	50000	NA		NA		NA		NA		NA		1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
1,4-Dichlorobenzene	ug/l	8000	NA		NA		NA		NA		NA		1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
Dichlorodifluoromethane	ug/l	~	NA		NA		NA		NA		NA		2	U	2	U	2	U	2	U	2	U	2	U	2	U	2	U
1,1-Dichloroethane	ug/l	20000	NA		NA		NA		NA		NA		1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
1,2-Dichloroethane	ug/l	20000	NA		NA		NA		NA		NA		1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
1,1-Dichloroethylene	ug/l	30000	NA		NA		NA		NA		NA		1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
Cis-1,2-Dichloroethylene	ug/l	50000	NA		NA		NA		NA		NA		1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
Trans-1,2-Dichloroethylene	ug/l	50000	NA		NA		NA		NA		NA		1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
1,2-Dichloropropane	ug/l	50000	NA		NA		NA		NA		NA		1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
1,3-Dichloropropane	ug/l	~	NA		NA		NA		NA		NA		0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
2,2-Dichloropropane	ug/l	~	NA		NA		NA		NA		NA		1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
1,1-Dichloropropene	ug/l	~	NA		NA		NA		NA		NA		0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Cis-1,3-Dichloropropene	ug/l	200	NA		NA		NA		NA		NA		0.4	U	0.4	U	0.4	U	0.4	U	0.4	U	0.4	U	0.4	U	0.4	U
Trans-1,3-Dichloropropene	ug/l	200	NA		NA		NA		NA		NA		0.4	U	0.4	U	0.4	U	0.4	U	0.4	U	0.4	U	0.4	U	0.4	U
Diethyl Ether	ug/l	~	NA		NA		NA		NA		NA		2	U	2	U	2	U	2	U	2	U	2	U	2	U	2	U
Diisopropyl Ether	ug/l	~	NA		NA		NA		NA		NA		0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
1,4-Dioxane	ug/l	50000	NA		NA		NA		NA		NA		50	U	50	U	50	U	50	U	50	U	50	U	50	U	50	U
Ethylbenzene	ug/l	5000	NA		NA		NA		NA		NA		**2.2**		1	U	1	U	1	U	**39**		**39**		1	U	1	U
Hexachlorobutadiene	ug/l	3000	NA		NA		NA		NA		NA		0.6	U	0.6	U	0.6	U	0.6	U	0.6	U	0.6	U	0.6	U	0.6	U
2-Hexanone	ug/l	~	NA		NA		NA		NA		NA		10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Isopropylbenzene	ug/l	~	NA		NA		NA		NA		NA		**1.9**		1	U	1	U	1	U	**10**		**10**		1	U	1	U
P-Isopropyltoluene	ug/l	~	NA		NA		NA		NA		NA		1	U	1	U	1	U	1	U	**1.8**		**1.8**		1	U	1	U
Methyl Tert-Butyl Ether (MTBE)	ug/l	50000	NA		NA		NA		NA		NA		1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
Methylene Chloride	ug/l	50000	NA		NA		NA		NA		NA		5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U
4-Methyl-2-Pentanone (MIBK)	ug/l	50000	NA		NA		NA		NA		NA		10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Naphthalene	ug/l	20000	NA		NA		NA		NA		NA		**31**		2	U	2	U	2	U	**170**		**170**		2	U	2	U
N-Propylbenzene	ug/l	~	NA		NA		NA		NA		NA		**2.4**		1	U	1	U	1	U	**16**		**15**		1	U	1	U
Styrene	ug/l	6000	NA		NA		NA		NA		NA		1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
1,1,1,2-Tetrachloroethane	ug/l	50000	NA		NA		NA		NA		NA		1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
1,1,2,2-Tetrachloroethane	ug/l	50000	NA		NA		NA		NA		NA		0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Tetrachloroethylene	ug/l	30000	NA		NA		NA		NA		NA		1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
Tetrahydrofuran	ug/l	~	NA		NA		NA		NA		NA		2	U	2	U	2	U	2	U	2	U	2	U	2	U	2	U
Toluene	ug/l	40000	NA		NA		NA		NA		NA		1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
1,2,3-Trichlorobenzene	ug/l	~	NA		NA		NA		NA		NA		2	U	2	U	2	U	2	U	2	U	2	U	2	U	2	U
1,2,4-Trichlorobenzene	ug/l	50000	NA		NA		NA		NA		NA		1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
1,1,1-Trichloroethane	ug/l	20000	NA		NA		NA		NA		NA		1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
1,1,2-Trichloroethane	ug/l	50000	NA		NA		NA		NA		NA		1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
Trichloroethylene	ug/l	5000	NA		NA		NA		NA		NA		1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
Trichlorofluoromethane	ug/l	~	NA		NA		NA		NA		NA		2	U	2	U	2	U	2	U	2	U	2	U	2	U	2	U
1,2,3-Trichloropropane	ug/l	~	NA		NA		NA		NA		NA		2	U	2	U	2	U	2	U	2	U	2	U	2	U	2	U
1,2,4-Trimethylbenzene	ug/l	~	NA		NA		NA		NA		NA		1	U	1	U	1	U	1	U	**24**		**26**		1	U	1	U
1,3,5-Trimethylbenzene	ug/l	~	NA		NA		NA		NA		NA		1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
Vinyl Chloride	ug/l	50000	NA		NA		NA		NA		NA		2	U	2	U	2	U	2	U	2	U	2	U	2	U	2	U
M/P-Xylene	ug/l	5000	NA		NA		NA		NA		NA		2	U	2	U	2	U	2	U	**4**		**3.9**		2	U	2	U
O-Xylene	ug/l	5000	NA		NA		NA		NA		NA		1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
Total VOCs	ug/l	~	NA		NA		NA		NA		NA		**40**		ND		ND		**1.4**		**275.9**		**276.8**		**3.1**		ND	
Semi-Volatile Organic Compounds (SVOCs) - 8270E																												
Biphenyl	ug/l	50000	NA		NA		NA		NA		NA		20	U	19	U	20	U	19	U	19	U	19	U	19	U	19	U
Acenaphthene	ug/l	10000	NA		NA		NA		NA		NA		5	U	4.9	U	5	U	4.8	U	4.7	U	4.6	U	4.7	U	4.6	U
Acenaphthylene	ug/l	40	NA		NA		NA		NA		NA		5	U	4.9	U	5	U	4.8	U	4.7	U	4.6	U	4.7	U	4.6	U
Acetophenone	ug/l	~	NA		NA		NA		NA		NA		9.9	U	9.7	U	9.9	U	9.5	U	9.3	U	9.3	U	9.3	U	9.3	U
Aniline	ug/l	~	NA		NA		NA		NA		NA		20	U	19	U	20	U	19	U	19	U	19	U	19	U	19	U
Anthracene	ug/l	30	NA		NA		NA		NA		NA		5	U	4.9	U	5	U	4.8	U	4.7	U	4.6	U	4.7	U	4.6	U
Benzo(a)anthracene	ug/l	1000	NA		NA		NA		NA		NA		5	U	4.9	U	5.0	U	4.8	U	4.7	U	4.6	U	4.7	U	4.6	U
Benzo(a)pyrene	ug/l	500	NA		NA		NA		NA		NA		5	U	4.9	U	5.0	U	4.8	U	4.7	U	4.6	U	4.7	U	4.6	U
Benzo(b)fluoranthene	ug/l	400	NA		NA		NA		NA		NA		5	U	4.9	U	5.0	U	4.8	U	4.7	U	4.6	U	4.7	U	4.6	U
Benzo(g,h,i)perylene	ug/l	20	NA		NA		NA		NA		NA		5	U	4.9	U	5	U	4.8	U	4.7	U	4.6	U	4.7	U	4.6	U
Benzo(k)fluoranthene	ug/l	100	NA		NA		NA		NA		NA		5	U	4.9	U	5.0	U	4.8	U	4.7	U	4.6	U	4.7	U	4.6	U
Bis(2-chloroethoxy)methane	ug/l	~	NA		NA		NA		NA		NA		9.9	U	9.7	U	9.9	U	9.5	U	9.3	U	9.3	U	9.3	U	9.3	U
Bis(2-chloroethyl)ether	ug/l	50000	NA		NA		NA		NA		NA		9.9	U	9.7	U	9.9	U	9.5	U	9.3	U	9.3	U	9.3	U	9.3	U
Bis(2-chloroisopropyl)ether	ug/l	50000	NA		NA		NA		NA		NA		9.9	U	9.7	U	9.9	U	9.5	U	9.3	U	9.3	U	9.3	U	9.3	U
Bis(2-ethylhexyl)phthalate	ug/l	50000	NA		NA		NA		NA		NA		9.9	U	9.7	U	9.9	U	9.5	U	9.3	U	9.3	U	9.3	U	9.3	U
4-Bromophenyl Phenyl Ether	ug/l	~	NA		NA		NA		NA		NA		9.9	U	9.7	U	9.9	U	9.5	U	9.3	U	9.3	U	9.3	U	9.3	U
Butylbenzylphthalate	ug/l	~	NA		NA		NA		NA		NA		9.9	U	9.7	U	9.9	U	9.5	U	9.3	U	9.3	U	9.3	U	9.3	U
4-Chloroaniline	ug/l	300	NA		NA		NA		NA		NA		9.9	U	9.7	U	9.9	U	9.5	U	9.3	U	9.3	U	9.3	U	9.3	U
2-Chloronaphthalene	ug/l	~	NA		NA		NA		NA		NA		9.9	U	9.7	U	9.9	U	9.5	U	9.3	U	9.3	U	9.3	U	9.3	U
2-Chlorophenol	ug/l	7000	NA		NA		NA		NA		NA		9.9	U	9.7	U	9.9	U	9.5	U	9.3	U	9.3	U	9.3	U	9.3	U
Chrysene	ug/l	70	NA		NA		NA		NA		NA		5	U	4.9	U	5.0	U	4.8	U	4.7	U	4.6	U	4.7	U	4.6	U
Dibenz(a,h)anthracene	ug/l	40	NA		NA		NA		NA		NA		5	U	4.9	U	5.0	U	4.8	U	4.7	U	4.6	U	4.7	U	4.6	U
Dibenzofuran	ug/l	~	NA		NA		NA		NA		NA		5	U	4.9	U	5	U	4.8	U	4.7	U	4.6	U	4.7	U	4.6	U
Di-N-Butylphthalate	ug/l	~	NA		NA		NA		NA		NA		9.9	U	9.7	U	9.9	U	9.5	U	9.3	U	9.3	U	9.3	U	9.3	U
1,2-Dichlorobenzene	ug/l	2000	NA		NA		NA		NA		NA		5	U	4.9	U	5	U	4.8	U	4.7	U	4.6	U	4.7	U	4.6	U
1,3-Dichlorobenzene	ug/l	50000	NA		NA		NA		NA		NA		5	U	4.9	U	5	U	4.8	U	4.7	U	4.6	U	4.7	U	4.6	U
1,4-Dichlorobenzene	ug/l	8000	NA		NA		NA		NA		NA		5	U	4.9	U	5	U	4.8	U	4.7	U	4.6	U	4.7	U	4.6	U
3,3'-Dichlorobenzidine	ug/l	2000	NA		NA		NA		NA		NA		9.9	U	9.7	U	9.9	U	9.5	U	9.3	U	9.3	U	9.3	U	9.3	U
2,4-Dichlorophenol	ug/l	2000	NA		NA		NA		NA		NA		9.9	U	9.7	U	9.9	U	9.5	U	9.3	U	9.3	U	9.3	U	9.3	U
Diethylphthalate	ug/l	9000	NA		NA		NA		NA		NA		9.9	U	9.7	U	9.9	U	9.5	U	9.3	U	9.3	U	9.3	U	9.3	U
2,4-Dimethylphenol	ug/l	50000	NA		NA		NA		NA		NA		9.9	U	9.7	U	9.9	U	9.5	U	9.3	U	9.3	U	9.3	U	9.3	U
Dimethylphthalate	ug/l	50000	NA		NA		NA		NA		NA		9.9	U	9.7	U	9.9	U	9.5	U	9.3	U	9.3	U	9.3	U	9.3	U
2,4-Dinitrophenol	ug/l	20000	NA		NA		NA		NA		NA		9.9	U	9.7	U	9.9	U	9.5	U	9.3	U	9.3	U	9.3	U	9.3	U
2,4-Dinitrotoluene	ug/l	50000	NA		NA		NA		NA		NA		9.9	U	9.7	U	9.9	U	9.5	U	9.3	U	9.3	U	9.3	U	9.3	U
2,6-Dinitrotoluene	ug/l	~	NA		NA		NA		NA		NA		9.9	U	9.7	U	9.9	U	9.5	U	9.3	U	9.3	U	9.3	U	9.3	U
Di-N-Octylphthalate	ug/l	~	NA		NA		NA		NA		NA		9.9	U	9.7	U	9.9	U	9.5	U	9.3	U	9.3	U	9.3	U	9.3	U
1,2-Diphenylhydrazine (Azobenzene)	ug/l	~	NA		NA		NA		NA		NA		9.9	U	9.7	U	9.9	U	9.5	U	9.3	U	9.3	U	9.3	U	9.3	U
Fluoranthene	ug/l	200	NA		NA		NA		NA		NA		5	U	4.9	U	5	U	4.8	U	4.7	U	4.6	U	4.7	U	4.6	U
Fluorene	ug/l	40	NA		NA		NA		NA		NA		5	U	4.9	U	5	U	4.8	U	**5.1**		4.6	U	4.7	U	4.6	U
Hexachlorobenzene	ug/l	6000	NA		NA		NA		NA		NA		9.9	U	9.7	U	9.9	U	9.5	U	9.3	U	9.3	U	9.3	U	9.3	U
Hexachlorobutadiene	ug/l	3000	NA		NA		NA		NA		NA		9.9	U	9.7	U	9.9	U	9.5	U	9.3	U	9.3	U	9.3	U	9.3	U
Hexachloroethane	ug/l	50000	NA		NA		NA		NA		NA		9.9	U	9.7	U	9.9	U	9.5	U	9.3	U	9.3	U	9.3	U	9.3	U
Indeno(1,2,3-cd)pyrene	ug/l	100	NA		NA		NA		NA		NA		5	U	4.9	U	5.0	U	4.8	U	4.7	U	4.6	U	4.7	U	4.6	U
Isophorone	ug/l	~	NA		NA		NA		NA		NA		9.9	U	9.7	U	9.9	U	9.5	U	9.3	U	9.3	U	9.3	U	9.3	U
2-Methylnaphthalene	ug/l	20000	NA		NA		NA		NA		NA		**32**		4.9	U	5	U	4.8	U	**82**		**76**		4.7	U	4.6	U
O-Cresol	ug/l	~	NA		NA		NA		NA		NA		9.9	U	9.7	U	9.9	U	9.5	U	9.3	U	9.3	U	9.3	U	9.3	U
M/P-Cresol	ug/l	~	NA		NA		NA		NA		NA		9.9	U	9.7	U	9.9	U	9.5	U	9.3	U	9.3	U	9.3	U	9.3	U
Naphthalene	ug/l	20000	NA		NA		NA		NA		NA		**18**		4.9	U	5	U	4.8	U	**100**		**89**		4.7	U	4.6	U
Nitrobenzene	ug/l	~	NA		NA		NA		NA		NA		9.9	U	9.7	U	9.9	U	9.5	U	9.3	U	9.3	U	9.3	U	9.3	U
2-Nitrophenol	ug/l	~	NA		NA		NA		NA		NA		9.9	U	9.7	U	9.9	U	9.5	U	9.3	U	9.3	U	9.3	U	9.3	U
4-Nitrophenol	ug/l	~	NA		NA		NA		NA		NA		9.9	U	9.7	U	9.9	U	9.5	U	9.3	U	9.3	U	9.3	U	9.3	U
Pentachlorophenol	ug/l	200	NA		NA		NA		NA		NA		9.9	U	9.7	U	9.9	U	9.5	U	9.3	U	9.3	U	9.3	U	9.3	U
Phenanthrene	ug/l	10000	NA		NA		NA		NA		NA		5	U	4.9	U	5	U	4.8	U	4.7	U	4.6	U	4.7	U	4.6	U
Phenol	ug/l	2000	NA		NA		NA		NA		NA		9.9	U	9.7	U	9.9	U	9.5	U	9.3	U	9.3	U	9.3	U	9.3	U
Pyrene	ug/l	20	NA		NA		NA		NA		NA		5	U	4.9	U	5	U	4.8	U	4.7	U	4.6	U	4.7	U	4.6	U
Pyridine	ug/l	~	NA		NA		NA		NA		NA		20	U	19	U	20	U	19	U	19	U	19	U	19	U	19	U
1,2,4-Trichlorobenzene	ug/l	50000	NA		NA		NA		NA		NA		5	U	4.9	U	5	U	4.8	U	4.7	U	4.6	U	4.7	U	4.6	U
2,4,5-Trichlorophenol	ug/l	3000	NA		NA		NA		NA		NA		9.9	U	9.7	U	9.9	U	9.5	U	9.3	U	9.3	U	9.3	U	9.3	U
2,4,6-Trichlorophenol	ug/l	500	NA		NA		NA		NA		NA		9.9	U	9.7	U	9.9	U	9.5	U	9.3	U	9.3	U	9.3	U	9.3	U
Total SVOCs	ug/l	~	NA		NA		NA		NA		NA		**50**		ND		ND		ND		**187.1**		**165**		ND		ND	

QC by EL on 10/03/2023

Notes:

1	Standards are from the Massachusetts Contingency Plan, 310 CMR 40.0000
ug/l	micrograms per liter (parts per billion)
mg/l	milligrams per liter
~	No standard available
U	not detected above laboratory reporting limit
NA	Not Analyzed
Bold	Detected above laboratory reporting limit
Bold	Detected above MCP Method 1 Cleanup Standards

\\wse03.local\WSE\Projects\MA\Springfield MA\ENG23-0351 - ES Pinevale Assessment\Report\Tables\[Table 3_GW Results_08.25.2023.xlsx]Results

APPENDIX A

Historical Data Tables and Figures

Table 2
Soil Analytical Results: Test Pits, 2006
Extractable and Volatile Petroleum Hydrocarbons (EPH/VPH) & PCBs
Concentrations in mg/kg
Factory Parcel / Pinevale Street
Former Chapman Valve/Crane Company

Sample Location:	TP-3	TP-7	TP-9	TP-14	TP-16	TP-18	**MADEP Asb Fill Background**	**RCS-1 Standard**	**UCLs**
Depth (feet.):	0.6-1	1-2	1-2	1-2	2-4	10-12			
Date Collected:	06/26/2006	06/26/2006	06/26/2006	07/26/2006	07/26/06	06/26/2006			
PID Reading:	0.0	0.0	0.0	0.0	0.0	123.0	NA	NA	NA
Volatile Petroleum Hydrocarbons									
C5-C8 Aliphatics	---	---	---	---	---	26.2	NA	100	5,000
C9-C12 Aliphatics	---	---	---	---	---	193	NA	1,000	20,000
C9-C10 Aromatics	---	---	---	---	---	**277**	NA	100	5,000
VPH Target Analytes									
Benzene	---	---	---	---	---	<0.067	NA	30	9,000
Ethylbenzene	---	---	---	---	---	0.66	NA	500	10,000
Methyl tert-butyl ether	---	---	---	---	---	<0.067	NA	100	5,000
Naphthalene	---	---	---	---	---	5.84	NA	500	10,000
Toluene	---	---	---	---	---	<0.067	NA	500	10,000
Xylenes (total)	---	---	---	---	---	0.80	NA	300	10,000
Extractable Petroleum Hydrocarbons									
C9-C18 Aliphatics	<303	---	<33.6			**1,520**	NA	1,000	20,000
C19-C36 Aliphatics	**9,320**	---	<33.6			877	NA	2,500	20,000
C11-C22 Aromatics	**1,790**	---	<33.6			792	NA	800	10,000
EPH Target Analytes									
Naphthalene	13.3	---	<0.2			3.4	1	500	10,000
2-Methylnaphthalene	8.3	---	<0.2			4.5	1	500	10,000
Acenaphthylene	54.7	---	<0.2			3.3	1	100	10,000
Acenaphthene	19.2	---	<0.2			5.3	2	1,000	10,000
Fluorene	23.9	---	<0.2			6	2	1,000	10,000
Phenanthrene	**616**	---	<0.2			2	20	100	10,000
Anthracene	154	---	0.2			0.4	4	1,000	10,000
Fluoranthene	459	---	0.3			0.8	10	1,000	10,000
Pyrene	429	---	0.3			0.4	20	1,000	10,000
Benzo(a)anthracene	**184**	---	0.3			0.1	9	7	3,000
Chrysene	**145**	---	0.7			<0.2	7	7	400
Benzo(b)fluoranthene	**104**	---	2.1			<0.2	8	7	3,000
Benzo(k)fluoranthene	**117**	---	<0.2			<0.2	4	70	10,000
Benzo(a)pyrene	**115**	---	0.3			<0.2	7	2	300
Indeno(1,2,3-cd)pyrene	**71.1**	---	0.8			<0.2	3	7	3,000
Dibenzo(a,h)anthracene	**11.2**	---	<0.2			<0.2	1	0.7	300
Benzo(g,h,i)perylene	56.1	---	0.7			<0.2	3	1,000	10,000
Polychlorinated biphenyls (PCBs; mg/kg)									
Aroclor 1254	**2.05**	---	---	---	---	---	NA	2	100

NOTES:
1. Concentrations in mg/kg (parts per million) on a dry weight basis.
2. "<" indicates not detected; value is sample-specific quantitation limit.
3. MCP Method 1 soil standards from 310 CMR 40.0975(6).
4. "UCLs" = Upper Concentration Limits, from 310 CMR 40.0996(7). "NS" indicates no standard.
"Technical Update: Background Levels of
6. "PID"=Photoionization detector soil headspace measurement in parts per million.
7. Values shown in bold exceed Method 1 S-1/GW-3 standards.
8. "---" indicates not analyzed for this parameter.

Table 3
Soil Analytical Results: Test Pits, 2006
Inorganic Analytes
Concentrations in mg/kg
Factory Parcel / Pinevale Street
Former Chapman Valve/Crane Company

Sample Location:	TP-3	TP-7	TP-9	TP-14	TP-16	**MADEP Ash Fill Background**	**RCS-1 Standard**	**UCLs**
Depth (feet):	0.6-1	1-2	1-2	1-2	2-4			
Date Collected:	06/26/2006	06/26/2006	06/26/2006	07/26/2006	07/26/06			
Arsenic	6.19	19.0	3.13	<2.74	**22.7**	20	20	200
Barium	39.8	203	26.7	72.2	42.2	50	1,000	10,000
Cadmium	0.33	<0.31	0.73	<0.28	<0.31	3	2	300
Chromium (IV or total)*	19.1	8.09	26.5	24	16.2	40	30	2,000
Lead	80.7	163	30.5	21.9	**1040**	600	300	3,000
Mercury	0.027	0.089	<0.009	0.562	0.054	1	20	300
Selenium	<5.05	<6.08	<5.59	<5.47	<6.04	1	400	8,000
Silver	<0.51	<0.61	<0.56	<0.55	<0.61	5	100	2,000

NOTES:
1. Concentrations in milligrams per kilogram (mg/kg, or parts per million) on a dry weight basis.
2. "<" indicates not detected; value is sample-specific quantitation limit.
3. MCP Method 1 soil standards from 310 CMR 40.0975(6).
4. UCLs = Upper Concentration Limits, from 310 CMR 40.0996(7). "NS" indicates no standard.
5. Background values from MADEP "Technical Update: Background Levels of Polycyclic Aromatic Hydrocarbons and Metals in Soil", May 23, 2002.

* Per the 4/06 MCP, chromium is assumed to be hexavalent unless testing is done to prove otherwise.

Table 4
Soil Analytical Results: Volatile and Extractable Petroleum Hydrocarbons (VPH/EPH)
Former Chapman Valve Site
Pinevale Street, Springfield

Sample No.:	CM-22	CM-23	CM-25	CM-38	CM-43	CM-45	MADEP Ash Fill Background	Reportable Conc. RCS-1	Method 1 Standards S-1 / GW-2	Method 1 Standards S-1 / GW-3
Depth (feet):	15-17	7-9	11-13	11-13	10-12	10-12				
Date Collected:	9/24/09	9/24/09	9/25/09	10/1/09	10/2/09	10/27/09				
PID Reading (ppmv):	92.1	2.4	118	120	131	0	NA	NA	NA	NA
Semivolatiles (Method 8270)	--	ND	--	--	--	--				
VPH Fractions										
C5-C8 Aliphatics	<16	--	<20	30	<23	--	NA	100	100	100
C9-C12 Aliphatics	140	--	<13	58	37	--	NA	1,000	1,000	1,000
C9-C10 Aromatics	**270**	--	<13	**150**	**170**	--	NA	100	100	100
VPH Target Compounds										
Benzene	<0.052	--	<0.066	<0.086	<0.078	--	NA	2	30	30
Ethylbenzene	0.39	--	<0.066	0.28	0.094	--	NA	40	500	500
Methyl tert-butyl ether	<0.052	--	<0.066	<0.086		--	NA	0.1	100	100
Naphthalene	2.2	--	<0.66	2.8	1.1	--	NA	4	40	500
Toluene	<0.052	--	<0.066	<0.086	<0.078	--	NA	30	500	500
Xylenes (total)	0.54	---	<0.20	1.1	0.27	--	NA	300	300	500
EPH Fractions										
C9-C18 Aliphatics	**1,200**	--	18	970	**2,400**	<12	NA	1,000	1,000	1,000
C19-C36 Aliphatics	190	--	11	120	520	48	NA	3,000	3,000	3,000
C11-C22 Aromatics	300	--	13	530	890	24	NA	1,000	1,000	1,000
EPH Target Compounds										
Acenaphthene	1.2	--	<0.11	1.5	0.28	0.13	2	4	1,000	1,000
Acenaphthylene	**1.4**	--	<0.11	**3.9**	0.62	<0.12	1	1	600	10
Anthracene	<0.11	--	<0.11	<0.11	<0.11	0.25	4	1,000	1,000	1,000
Benzo(a)anthracene	<0.11	--	<0.11	<0.11	<0.11	0.68	9	7	7	7
Benzo(a)pyrene	<0.11	--	<0.11	<0.11	<0.11	0.58	7	2	2	2
Benzo(b)fluoranthene	<0.11	--	<0.11	<0.11	<0.11	0.89	8	7	7	7
Benzo(g,h,i)perylene	<0.11	--	<0.11	<0.11	<0.11	0.38	3	1,000	1,000	1,000
Benzo(k)fluoranthene	<0.11	--	<0.11	<0.11	<0.11	0.33	4	70	70	70
Chrysene	<0.11	--	<0.11	<0.11	<0.11	0.83	7	70	70	70
Fluoranthene	0.4	--	<0.11	<0.11	0.4	1.6	10	1,000	1,000	1,000
Fluorene	1.8	--	<0.11	3.3	1.6	0.2	2	1,000	1,000	1,000
Indeno(1,2,3-cd)pyrene	<0.11	--	<0.11	<0.11	<0.11	0.41	3	7	7	7
2-Methylnaphthalene	**4.1**	--	<0.11	**9.9**	**1.6**	<0.12	1	0.7	80	300
Naphthalene	1.9	--	<0.11	1.9	0.42	<0.12	1	4	40	500
Phenanthrene	0.59	--	<0.11	1.7	<0.11	1.3	20	10	500	500
Pyrene	0.47	--	<0.11	<0.11	<0.11	1.5	20	1,000	1,000	1,000

NOTES:
1. Concentrations in mg/kg (parts per million) on a dry weight basis.
2. "<" indicates not detected; value is sample-specific quantitation limit.
3. "RC-S" = Reportable concentration from 310 CMR 40.1600.
4. Background values from MassDEP "Technical Update: Background Levels of Polycyclic Aromatic Hydrocarbons and Metals in Soil", May 23, 2002.
5. "PID"=Photoionization detector soil headspace measurement in parts per million by volume.
6. Values shown in **bold** exceed Method 1 standards.
7. "---" indicates not analyzed for this parameter. "ND" indicates none of the target analytes for this analysis were detected.

Table 5
Soil Analytical Results: RCRA 8 Metals and PCBs
Former Chapman Valve Site
Pinevale Street, Springfield

Sample No.:	CM-15	CM-16	CM-17	CM-18	CM-19	CM-20	CM-21	CM-22	CM-23	CM-23A		CM-24	CM-25	CM-26	CM-27	CM-28	CM-29	MassDEP Natural Soil Background	MassDEP Ash Fill Background	Reportable Conc. RCS-1
Depth (feet):	1-3	1-3	1-3	2-4	2-4	0-2	1-3	1-3	1-3	1-3	3-5	1-3	1-3	0-2	0-2	1-3	1-3			
Date Collected:	9/22/09	9/22/09	9/22/09	9/22/09	9/23/09	9/23/09	9/24/09	9/24/09	9/24/09	10/27/09	10/27/09	9/25/09	9/25/09	9/25/09	9/25/09	9/28/09	9/28/09			
RCRA 8 Metals																				
Arsenic	5.6	3.3	2.9	3.2	3.9	4.1	2.8	<2.6	7.3	--	--	4.6	3.5	3.2	3.9	<2.7	<2.6	20	20	20
Barium	47	54	50	43	75	33	63	26	95	--	--	63	23	78	32	63	68	50	50	1,000
Cadmium	<0.26	<0.27	<0.26	<0.28	<0.27	<0.27	0.27	<0.26	0.98	--	--	0.29	<0.27	0.38	<0.26	<0.27	0.3	2	3	2
Chromium VI	--	--	--	--	--	--	--	--	--	2.0	<0.98	--	--	--	--	--	--	30	40	30
Chromium (III)*	12	11	11	8.8	14	11	14	7.3	99	19	12	12	10	18	11	16	9.9	30	40	1,000
Lead	4.1	2.3	2.9	6.7	5.3	8.5	15	3.4	170	--	--	21	3.5	5.8	14	5.4	9.5	100	600	300
Mercury	<0.022	<0.022	<0.019	<0.019	<0.017	<0.018	<0.022	0.031	0.032	--	--	0.026	<0.023	<0.016	0.033	<0.014	<0.018	0.3	1	20
Selenium	<5.2	<5.3	<5.2	<5.6	<5.4	<5.4	<5.1	<5.2	<5.9	--	--	<5.3	<5.5	<5.3	<5.1	<5.3	<5.2	0.5	1	400
Silver	<0.52	<0.53	<0.52	<0.56	<0.54	<0.54	<0.51	<0.52	<0.59	--	--	<0.53	<0.55	<0.53	<0.51	<0.53	<0.52	0.6	5	100
PCBs (total)	--	--	--	<0.11	--	--	--	<0.10	<0.12	--	--	--	<0.11	--	<0.10	--	--	--	--	2

NOTES:

1. Concentrations in milligrams per kilogram (mg/kg, or parts per million) on a dry weight basis.
2. "<" indicates not detected; value is sample-specific quantitation limit.
3. "RCS-1" = Reportable concentration from 310 CMR 40.1600.
4. Background values from MassDEP "Technical Update: Background Levels of Polycyclic Aromatic Hydrocarbons and Metals in Soil", May 23, 2002.
5. Values shown in **bold** exceed Method 1 standards.
6. "NA" = Not applicable or not available. "NS" indicates no standard.
7. "--" indicates not analyzed for this parameter.
8. Per the 4/06 MCP, chromium is assumed to be hexavalent unless testing is done to prove otherwise.

Table 5 (continued)
Soil Analytical Results: RCRA 8 Metals and PCBs
Former Chapman Valve Site
Pinevale Street, Springfield

Sample No.:	CM-30	CM-31	CM-32	CM-33	CM-34	CM-35	CM-36	CM-37	CM-38	CM-39	CM-40	CM-40A		CM-41	CM-42	CM-43	CM-44	MassDEP Natural Soil Background	MassDEP Ash Fill Background	Reportable Conc. RCS-1
Depth (feet):	1-3	1-3	1-3	1-3	1-3	1-3	1-3	1-3	0.5-1	0-2	0-2	0-2	2-4	1-3	1-3	1-3	0-2			
Date Collected:	9/28/09	9/28/09	9/29/09	9/29/09	9/29/09	9/29/09	9/30/09	9/30/09	10/1/09	10/1/09	10/1/09	10/28/09	10/28/09	10/2/09	10/2/09	10/2/09	10/2/09			
RCRA 8 Metals																				
Arsenic	2.9	3.7	<2.8	3.2	4.5	6	5.3	3.1	5.9	8.5	6.4	--	--	<2.6	2.6	3.9	5.9	20	20	20
Barium	38	38	53	35	110	25	45	48	62	390	**1700**	--	--	25	33	120	120	50	50	1,000
Cadmium	<0.26	<0.27	<0.28	<0.27	<0.26	<0.25	0.31	<0.26	0.28	1.9	**2.2**	--	--	<0.26	<0.26	0.51	1.2	2	3	2
Chromium VI	--	--	--	--	--	--	--	--	--	--	--	<5.4	2.0	--	--	--	--	30	40	30
Chromium (III)*	8.5	11	8.8	9.3	20	7.8	14	12	20	63	70	54	11	7	8.9	18	25	30	40	1,000
Lead	3.9	12	5.2	5.5	3.6	4.6	65	2.1	13	**550**	290	--	--	3.6	5.5	27	110	100	600	300
Mercury	0.02	0.027	<0.016	<0.020	0.022	<0.020	<0.025	<0.022	0.027	0.26	0.36	--	--	<0.021	<0.016	0.038	0.29	0.3	1	20
Selenium	<5.2	<5.4	<5.5	<5.3	<5.3	<5.0	<5.5	<5.3	<5.3	<5.6	<6.1	--	--	<5.3	<5.1	<5.3	<5.7	0.5	1	400
Silver	<0.52	<0.54	<0.55	<0.53	<0.53	<0.50	<0.55	<0.53	<0.53	1.6	<0.61	--	--	<0.53	<0.51	<0.53	<0.57	0.6	5	100
PCBs (total)	--	--	<0.11	--	<0.11	--	--	<0.11	<0.11	<0.11	--	--	--	--	<0.10	--	<0.11	--	--	2

NOTES:

1. Concentrations in milligrams per kilogram (mg/kg, or parts per million) on a dry weight basis.
2. "<" indicates not detected; value is sample-specific quantitation limit.
3. "RCS-1" = Reportable concentration from 310 CMR 40.1600.
4. Background values from MassDEP "Technical Update: Background Levels of Polycyclic Aromatic Hydrocarbons and Metals in Soil", May 23, 2002.
5. Values shown in **bold** exceed Method 1 standards.
6. "NA" = Not applicable or not available. "NS" indicates no standard.
7. "--" indicates not analyzed for this parameter.
8. Per the 4/06 MCP, chromium is assumed to be hexavalent unless testing is done to prove otherwise.

Table 5 (continued)
Soil Analytical Results: RCRA 8 Metals and PCBs
Former Chapman Valve Site
Pinevale Street, Springfield

Sample No.:	CM-45	CM-46		CM-47		CM-48		CM-49		CM-50	CM-51	CM-52	CM-53		CM-54		CM-55		MassDEP Natural Soil Background	Reportable Conc. RCS-1
Depth (feet):	0-2	1-3	3-5	0-2	2-4	1-3	3-5	1-3	3-5	1-3	1-3	1-3	0-2	2-4	0-2	2-4	0-2	4-6		
Date Collected:	10/27/09	10/27/09	10/27/09	10/27/09	10/27/09	10/27/09	10/27/09	10/27/09	10/27/09	10/28/09	10/28/09	10/28/09	10/28/09	10/28/09	10/28/09	10/28/09	10/28/09	10/28/09		
RCRA 8 Metals																				
Arsenic	10	--	--	--	--	--	--	--	--	4.4	4.9	9.5	--	--	--	--	--	--	20	20
Barium	230	--	--	--	--	--	--	--	--	33	33	86	**2,400**	290	**3,300**	280	460	120	50	1,000
Cadmium	1.7	--	--	--	--	--	--	--	--	<0.27	<0.28	**3.3**	**2.4**	0.64	**4.4**	0.61	1.4	1.3	2	2
Chromium VI	--	1.7	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	30	30
Chromium (IIII)*	10	550	8.2	13	25	5.0	7.8	8.7	6.2	10	22	48	120	16	130	13.0	60	17.0	30	1,000
Lead	160	--	--	--	--	--	--	--	--	3.8	36	260	**400**	54	**300**	110	280	100	100	300
Mercury	0.086	--	--	--	--	--	--	--	--	<0.019	0.12	5	--	--	--	--	--	--	0.3	20
Selenium	<6.1	--	--	--	--	--	--	--	--	<5.4	<5.6	<5.8	--	--	--	--	--	--	0.5	400
Silver	<0.61	--	--	--	--	--	--	--	--	<0.54	<0.56	<0.58	--	--	--	--	--	--	0.6	100
PCBs (total)	--	--	--	--	--	--	--	--	--	<0.11	<0.11	<0.11	--	--	--	--	--	--	--	2

NOTES:

1. Concentrations in milligrams per kilogram (mg/kg, or parts per million) on a dry weight basis.
2. "<" indicates not detected; value is sample-specific quantitation limit.
3. "RCS-1" = Reportable concentration from 310 CMR 40.1600.
4. Background values from MassDEP "Technical Update: Background Levels of Polycyclic Aromatic Hydrocarbons and Metals in Soil", May 23, 2002.
5. Values shown in **bold** exceed Method 1 standards.
6. "NA" = Not applicable or not available. "NS" indicates no standard.
7. "--" indicates not analyzed for this parameter.
8. Per the 4/06 MCP, chromium is assumed to be hexavalent unless testing is done to prove otherwise.

Table 5 (continued)
Soil Analytical Results: RCRA 8 Metals and PCBs
Former Chapman Valve/Crane Manufacturing Site
Pinevale Street, Springfield
Springfield, Massachusetts

Sample No.:	OTP-4	OTP-4	OTP-6	OTP-8	DP-1	DP-2	DP-3	MassDEP Natural Soil Background	MassDEP Ash Fill Background	Reportable Conc. RCS-1
Depth (feet):	0-2	3-4	0-3	0-2	0-2	0-1.5	0-2			
Date Collected:	11/12/09	11/12/09	11/12/09	11/12/09	11/12/09	11/12/09	11/12/09			
RCRA 8 Metals										
Arsenic	4.6	5.7	5.7	3.8	3.7	6.4	3.5	20	20	20
Barium	62	46	480	240	170	110	35	50	50	1,000
Cadmium	0.29	<0.31	0.84	1.3	0.38	0.67	<0.27	2	3	2
Chromium VI	--	--	--	--	--	--	--	30	40	30
Chromium (III)*	13	7.9	25	24	9.9	13	9.8	30	40	1,000
Lead	32	12	170	140	29	66	32	100	600	300
Mercury	1.2	0.043	0.066	0.26	0.073	0.18	0.025	0.3	1	20
Selenium	<5.3	<6.2	<5.4	<5.6	<5.4	<5.6	<5.4	0.5	1	400
Silver	0.78	<0.62	<0.54	<0.56	<0.54	<0.56	<0.54	0.6	5	100

NOTES:

1. Concentrations in milligrams per kilogram (mg/kg, or parts per million) on a dry weight basis.
2. "<" indicates not detected; value is sample-specific quantitation limit.
3. "RCS-1" = Reportable concentration from 310 CMR 40.1600.
4. Background values from MassDEP "Technical Update: Background Levels of Polycyclic Aromatic Hydrocarbons and Metals in Soil", May 23, 2002.
5. Values shown in **bold** exceed Method 1 standards.
6. "NA" = Not applicable or not available. "NS" indicates no standard.
7. "--" indicates not analyzed for this parameter.
8. Per the 4/06 MCP, chromium is assumed to be hexavalent unless testing is done to prove otherwise.

Table 6
Soil Analytical Results: Test Pits, 2009
Former Chapman Valve/Crane Manufacturing Site
Pinevale Street
Springfield, Massachusetts

Sample No.:	OTP-4	OTP-4	OTP-6	OTP-8	DP-1	DP-2	DP-3	BT-E	BT-B	BT-W	Reportable Conc. RCS-1
Depth (feet):	0-2	3-4	0-3	0-2	0-2	0-1.5	0-2	---	---	---	
Date Collected:	11/12/09	11/12/09	11/12/09	11/12/09	11/12/09	11/12/09	11/12/09	11/12/09	11/12/09	11/12/09	
Volatile Organic Compounds											
n-Butylbenzene	---	---	< 0.011	---	---	---	---	1.4	<0.0059	<0.0078	NS
sec-Butylbenzene	---	---	<0.0022	---	---	---	---	0.49	<0.0012	<0.0016	NS
4-Isopropyltoluene	---	---	<0.0022	---	---	---	---	1.2	<0.0012	<0.0016	100
1,2,4-Trimethylbenzene	---	---	<0.0022	---	---	---	---	1.8	<0.0012	<0.0016	1,000
1,3,5-Trimethylbenzene	---	---	<0.0022	---	---	---	---	1.1	<0.0012	<0.0016	10
Xylenes (total)	---	---	<0.0066	---	---	---	---	1.19	<0.0036	<0.0047	300
VPH Fractions											
C5-C8 Aliphatics	--	--	--	--	--	--	--	<200	--	--	100
C9-C12 Aliphatics	--	--	--	--	--	--	--	330	--	--	1,000
C9-C10 Aromatics	--	--	--	--	--	--	--	**650**	--	--	100
VPH Target Compounds											
Benzene	--	--	--	--	--	--	--	<0.68	--	--	2
Ethylbenzene	--	--	--	--	--	--	--	<0.68	--	--	40
Methyl tert-butyl ether	--	--	--	--	--	--	--	<0.68	--	--	0.1
Naphthalene	--	--	--	--	--	--	--	**24**	--	--	4
Toluene	--	--	--	--	--	--	--	<0.68	--	--	30
Xylenes (total)	--	--	--	--	--	--	--	4.8	--	--	300
EPH Fractions											
C9-C18 Aliphatics	<21	<25	<54	<56	<22	<56	<11	**9,800**	--	--	1,000
C19-C36 Aliphatics	23	<25	<54	110	<22	58	<11	2,600	--	--	3,000
C11-C22 Aromatics	120	120	470	200	65	210	14	**3,500**	--	--	1,000
EPH Target Compounds											
Acenaphthene	0.49	<0.25	**8.4**	1.5	0.42	1.5	<0.11	**7.4**	--	--	4
Acenaphthylene	0.52	<0.25	<0.54	<0.56	<0.22	<0.56	<0.11	**1.5**	--	--	1
Anthracene	2.1	<0.25	19	2.8	0.8	3.3	0.13	5.8	--	--	1,000
Benzo(a)anthracene	**7.2**	<0.25	**38**	**11**	3.2	**10**	0.26	4.1	--	--	7
Benzo(a)pyrene	**6.6**	<0.25	**32**	**10**	**3.2**	**9.2**	0.24	**3.6**	--	--	2
Benzo(b)fluoranthene	**9.6**	<0.25	**46**	**16**	4.6	**15**	0.34	5.5	--	--	7
Benzo(g,h,i)perylene	4.2	<0.25	21	7.4	2.3	6	0.14	2.6	--	--	1,000
Benzo(k)fluoranthene	3.3	<0.25	17	5.6	1.7	5.2	0.13	2	--	--	70
Chrysene	8.2	<0.25	41	13	3.7	12	0.3	4.9	--	--	70
Dibenzo(a,h)anthracene	**1.2**	<0.25	**5.9**	**2**	0.62	**1.9**	<0.11	**0.71**	--	--	0.7
Fluoranthene	16	<0.25	97	23	6.7	23	0.6	10	--	--	1,000
Fluorene	0.98	0.32	10	1.5	0.4	1.5	0.12	9.7	--	--	1,000
Indeno(1,2,3-cd)pyrene	4.6	<0.25	**22**	**7.8**	2.4	**7.1**	0.16	2.7	--	--	7
2-Methylnaphthalene	<0.21	<0.25	**2.2**	<0.56	<0.22	<0.56	<0.11	**12**	--	--	0.7
Naphthalene	<0.21	<0.25	**6.8**	0.84	<0.22	<0.56	<0.11	**11**	--	--	4
Phenanthrene	**11**	0.33	**84**	**15**	3.3	**15**	0.52	4.6	--	--	10
Pyrene	16	<0.25	89	22	6.8	22	0.59	17	--	--	1,000
PCBs (total)	<0.11	<0.12	<0.11	<0.11	<0.11	<0.11	<0.11	--	--	--	2

NOTES:
1. Concentrations in mg/kg (parts per million) on a dry weight basis.
2. "<" indicates not detected; value is sample-specific quantitation limit.
3. "RC-S" = Reportable concentration from 310 CMR 40.1600.
4. Background values from MassDEP "Technical Update: Background Levels of Polycyclic Aromatic Hydrocarbons and Metals in Soil", May 23, 2002.
5. "PID"=Photoionization detector soil headspace measurement in parts per million by volume.
6. Values shown in **bold** exceed Method 1 standards.
7. "---" indicates not analyzed for this parameter. "ND" indicates none of the target analytes for this analysis were detected.

Table 8
Groundwater Analytical Results
Former Chapman Valve Site
Pinevale Street, Springfield

Well No.:	CM-17	CM-22	CM-25	CM-34	CM-36	CM-37	CM-38	CM-39	CM-41	CM-42	CM-43	CM-45	CM-50	CM-53	MW-204	MW-205	MW-201	MW-202	MW-35		GW-2	GW-3
Sample Date:	10/5/09	10/6/09	10/6/09	10/5/09	10/5/09	10/5/09	10/6/09	10/5/09	10/6/09	10/5/09	11/3/09	11/3/09	11/3/09	11/3/09	10/5/09	10/5/09	10/5/09	10/6/09	10/5/09	RCGW-2	Standard	Standard
VPH Fractions																						
C9-C12 Aliphatics	< 0.10	0.64	0.640	< 0.10	< 0.10	< 0.10	<0.500	< 0.10	< 0.10	< 0.10	0.2	<0.10	<0.10	<0.10	0.12	0.17	0.15	0.21	0.13	5	5	50
C9-C10 Aromatics	< 0.10	0.36	0.900	< 0.10	< 0.10	< 0.10	1.0	< 0.10	< 0.10	< 0.10	<0.20	<0.10	<0.10	<0.10	0.15	<0.10	<0.10	<0.10	0.16	7	7	50
VPH Target Compounds																						
Naphthalene	<0.01	<0.01	0.086	<0.01	<0.01	<0.01	0.25	<0.01	< 0.01	<0.01	<0.02	0.11	<0.10	<0.10	<0.01	<0.01	<0.01	<0.01	<0.01	1	1	20
EPH Fractions																						
C9-C18 Aliphatics	< 0.15	0.45	0.84	< 0.15	< 0.15	< 0.15	**8.4**	< 0.15	<0.150	< 0.15	**44**	<0.15	0.3	<0.15	< 0.15	< 0.15	< 0.15	< 0.15	< 0.15	5	5	50
C19-C36 Aliphatics	< 0.15	<0.150	<0.150	< 0.15	< 0.15	< 0.15	1.1	< 0.15	<0.150	< 0.15	13	<0.15	<0.15	<0.15	< 0.15	< 0.15	< 0.15	< 0.15	< 0.15	50	NA	50
C11-C22 Aromatics	< 0.10	0.46	0.74	< 0.10	< 0.10	< 0.10	**5**	0.11	0.1	< 0.10	**12**	0.13	0.21	<0.10	0.34	0.17	0.18	0.24	0.41	5	50	5
EPH Target Compounds																						
Acenaphthene	< 0.002	< 0.003	0.004	< 0.002	< 0.002	< 0.002	0.011	< 0.002	< 0.002	< 0.002	<0.002	<0.002	< 0.002	0.002	< 0.002	< 0.002	< 0.002	< 0.002	0.0024	6	NA	6
Acenaphthylene	< 0.002	0.007	0.011	< 0.002	< 0.002	< 0.002	**0.055**	< 0.002	< 0.002	< 0.002	0.03	<0.002	< 0.002	<0.002	0.005	< 0.002	< 0.002	< 0.002	0.008	0.04	10	0.04
Benzo(a)anthracene	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	0.003	<0.002	< 0.002	0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	1	NA	1
Benzo(a)pyrene	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	0.002	<0.002	< 0.002	0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	0.5	NA	0.5
Benzo(b)fluoranthene	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	0.003	<0.002	< 0.002	0.003	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	0.4	NA	0.4
Chrysene	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	0.004	<0.002	< 0.002	<0.003	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	0.07	NA	0.07
Fluoranthene	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	0.015	0.003	< 0.002	0.006	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	0.2	NA	0.2
Fluorene	< 0.002	0.004	0.0065	< 0.002	< 0.002	< 0.002	0.032	< 0.002	< 0.002	< 0.002	0.028	0.003	< 0.002	<0.002	0.005	< 0.002	< 0.002	< 0.002	0.004	0.04	NA	0.04
2-Methylnaphthalene	< 0.002	0.039	0.047	< 0.002	< 0.002	< 0.002	0.38	0.004	< 0.002	< 0.002	0.032	<0.002	< 0.002	<0.002	0.003	< 0.002	< 0.002	< 0.002	< 0.002	2	2	20
Naphthalene	< 0.002	0.008	0.048	< 0.002	< 0.002	< 0.002	0.13	0.016	< 0.002	< 0.002	0.011	0.005	< 0.002	0.003	0.008	< 0.002	< 0.002	0.004	0.004	1	1	20
Phenanthrene	< 0.002	< 0.002	0.032	< 0.002	< 0.002	< 0.002	0.02	0.006	< 0.002	< 0.002	<0.002	0.007	< 0.002	0.006	< 0.002	< 0.002	< 0.002	< 0.002	0.0028	10	NA	10
Pyrene	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	0.011	0.003	< 0.002	0.006	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	0.02	NA	0.02
RCRA 8 Metals																						
Arsenic	< 0.002	<0.004	<0.002	< 0.002	< 0.002	< 0.002	0.0022	< 0.002	<0.002	< 0.002	0.003	0.004	<0.002	0.005	< 0.002	< 0.002	0.0075	0.0034	< 0.002	0.9	NA	0.9
Barium	< 0.25	0.27	0.52	0.29	< 0.25	< 0.25	< 0.25	< 0.25	<0.25	< 0.25	<0.25	<0.25	<0.25	<0.25	< 0.25	< 0.25	< 0.25	< 0.25	< 0.25	50	NA	50
Cadmium	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	0.003	<0.003	<0.003	<0.003	<0.003	**0.008**	<0.003	<0.003	<0.003	0.004	NA	0.004
Lead	< 0.005	0.0053	<0.005	< 0.005	< 0.005	0.0061	**0.01**	< 0.005	<0.05	< 0.005	**0.025**	**0.016**	<0.005	**0.01**	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	0.01	NA	0.01
Volatile Organic Compounds																						
Bromodichloromethane	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.020	<0.001	0.0013	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.006	0.006	50
n-Butylbenzene	< 0.001	0.0056	0.011	< 0.001	< 0.001	< 0.001	<0.020	< 0.001	<0.001	< 0.001	< 0.001	<0.001	<0.001	<0.001	0.0012	< 0.001	< 0.001	<0.001	0.0019	NS	NS	NS
sec-Butylbenzene	< 0.001	0.0027	0.0041	< 0.001	< 0.001	< 0.001	<0.020	< 0.001	<0.001	< 0.001	< 0.001	<0.001	<0.001	<0.001	< 0.001	0.0022	< 0.001	0.0012	0.0012	NS	NS	NS
tert-Butylbenzene	<0.001	<0.001	0.0016	<0.001	<0.001	<0.001	<0.020	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	NS	NS	NS
Carbon Disulfide	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.060	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	0.003	<0.003	<0.003	<0.003	<0.003	<0.003	10	NS	NS
Chloroform	<0.002	0.0022	<0.002	<0.002	<0.002	<0.002	<0.040	<0.002	0.006	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.05	0.05	20
Isopropylbenzene	<0.001	0.0013	0.0034	<0.001	<0.001	<0.001	<0.020	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	100	NS	NS
4-Isopropyltoluene	<0.001	0.005	0.0084	<0.001	<0.001	<0.001	<0.020	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	10	NS	NS
Naphthalene	< 0.002	<0.002	0.088	< 0.002	< 0.002	< 0.002	0.25	0.033	<0.002	< 0.002	< 0.002	0.007	<0.002	0.005	< 0.002	< 0.002	< 0.002	<0.002	0.0072	1	1	20
n-Propylbenzene	< 0.001	0.0031	0.0063	< 0.001	< 0.001	< 0.001	<0.020	< 0.001	<0.001	< 0.001	< 0.001	<0.001	<0.001	<0.001	< 0.001	< 0.001	< 0.001	< 0.001	0.0018	10	NS	NS
1,2,4-Trimethylbenzene	< 0.001	0.012	0.088	< 0.001	< 0.001	< 0.001	0.16	< 0.001	<0.001	< 0.001	< 0.001	<0.001	<0.001	<0.001	< 0.001	< 0.001	< 0.001	< 0.001	0.015	100	NS	NS
1,3,5-Trimethylbenzene	< 0.001	0.0042	0.032	< 0.001	< 0.001	< 0.001	0.045	< 0.001	<0.001	< 0.001	< 0.001	<0.001	<0.001	<0.001	< 0.001	< 0.001	< 0.001	< 0.001	0.0037	1	NS	NS
Xylenes (total)	< 0.003	<0.003	0.0036	< 0.003	< 0.003	< 0.003	<0.003	< 0.003	<0.003	< 0.003	< 0.003	<0.003	<0.003	<0.003	< 0.003	< 0.003	< 0.003	< 0.003	0.0028	5	9	5

NOTES:
1. Concentrations in milligrams per liter (mg/l, or parts per million).
2. "<" indicates not detected; value is quantitation limit.
3. RCGW = Reportable concentration for groundwater, from 310 CMR 40.1600.
4. MCP Method 1 groundwater standards from 310 CMR 40.0974(2).
5. Values shown in **bold** meet or exceed Method 1 standards.
6. "NA" = Not applicable.

NOT TO SCALE

NOTES:

1. THIS PLAN WAS DEVELOPED BY USING GOOGLE MAP AERIAL IMAGERY AND GPS DATA/WAYPOINTS IMPORTED INTO THE GOOGLE EARTH PRO APPLICATION.
2. THE IMAGERY AND DATA SHOULD BE CONSIDERED APPROXIMATE AND ACCURATE ONLY TO THE DEGREE IMPLIED BY THE METHOD(S) USED IN THE DEVELOPMENT OF THIS PLAN.

FORMER CRANE COMPANY PINEVALE STREET PROPERTY

SPRINGFIELD, MASSACHUSETTS

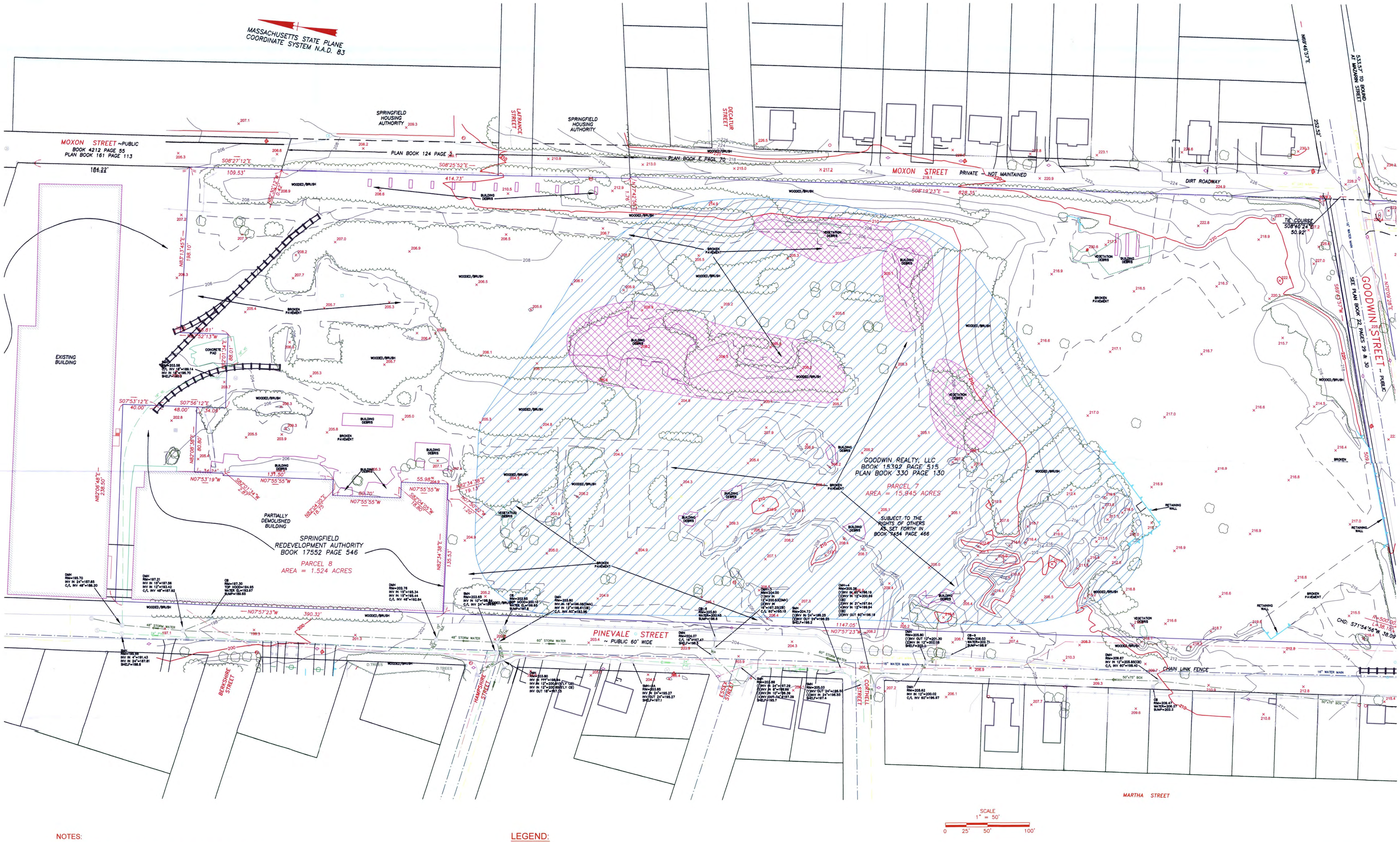
O'Reilly, Talbot & Okun [ASSOCIATES] ENGINEERING

293 Bridge Street, Suite 500
Springfield, Massachusetts 01103

PH: 413-788-6222
Fax: 413-788-8830

GOOGLE MAP IMAGERY WITH WAYPOINTS

FIGURE 1



NOTES:

1. BASE MAP PROVIDED TO OTO IN ELECTRONIC FORMAT; ORIGINAL PLAN DEVELOPED BY HERITAGE SURVEYS.
2. ALL DATA IS TO BE CONSIDERED ACCURATE ONLY TO THE DEGREE IMPLIED BY THE METHOD(S) USED IN THE DEVELOPMENT OF THIS PLAN.

LEGEND:

APPROXIMATE LOCATION OF SOIL AND CONSTRUCTION MATERIAL WITH ASBESTOS

APPROXIMATE LOCATION OF CONSTRUCTION DEBRIS (NON-SOIL OR ABC)

DESIGNED BY: RFK	DRAWN BY: CDA	DEBRIS LOCATION PLAN	
CHECKED BY: RFK	DATE: MARCH, 2010		
O'REILLY, TALBOT & OKUN ASSOCIATES ENGINEERING		FORMER CHAPMAN VALVE PINEVALE STREET - SPRINGFIELD, MASSACHUSETTS	
293 BRIDGE STREET SUITE 500 SPRINGFIELD, MA 01103	PHONE (413) 788-6222 EMAIL: OFFICE@OTO-ENV.COM	PROJECT No. J1749-42-01	FIGURE No. 2

TABLE 1

CHAPMAN VALVE
BULK ASBESTOS RESULTS

SAMPLE	LOCATION	RESULT
C-01	Roofing Material Waypoint #82	None Detected
C-02	Gray Fiberboard Material Waypoint #82	None Detected
C-03	Roofing Material Waypoint #82	None Detected
C-04	Black Cementitious Material Waypoint #82	30% Chrysotile Asbesos
C-05	Asphalt Type Paver Waypoint #82	None Detected
C-06	No Sample Submitted	----
C-07	Black Building Paper Waypoint #83	40% Chrysotile Asbesos
C-08	Gray Cementitious material Waypoint #83	30% Chrysotile Asbestos
C-09	Light Weight Concrete Waypoint #83	None Detected
C-10	Gray Cementitious Material Waypoint #83	30% Chrysotile Asbestos
C-11	Light Weight Concrete Waypoint #84	None Detected
C-12 `	Plaster on Wire Lath Waypoint #85	None Detected
C-13	Black Construction Paper Waypoint #85	None Detected
C-14	Wood Block Adhesive Waypoint #85	None Detected
C-15	Black Pipe Insulation Waypoint #85	2% Chrysotile Asbestos
C-16	Black Pipe on Concrete Waypoint #85	2% Chrysotile Asbestos
C-17	Light Weight Concrete Waypoint #86	None Detected

TABLE 1 (continued)

CHAPMAN VALVE
BULK ASBESTOS RESULTS

SAMPLE	LOCATION	RESULT
C-18	Roofing Material Waypoint #87	8% Chrysotile Asbestos
C-19	Yellow Concrete Plaster Waypoint #87	None Detected
C-20	Gypsum Light Weight concrete Waypoint #87	None Detected
C-21	Roofing Material Waypoint #87	None Detected
C-22	Tan Floor Tile Waypoint #87	None Detected
C-23	Orange Brick Pavers Waypoint #87	None Detected
C-24	Ceramic Tile Grout Waypoint #88	None Detected
C-25	Soft Concrete Waypoint #88	None Detected
C-26	Roofing Material Waypoint #88	None Detected
C-27	Floor Tile Waypoint #88	None Detected
C-28	Floor Tile & Mastic Waypoint #89	8% Chrysotile Asbestos
C-29	Floor Tile & Mastic Waypoint #89	None Detected
C-30	Floor Tile & Mastic Waypoint #89	20% Chrysotile Asbestos

TABLE 1 (continued)

CHAPMAN VALVE
BULK ASBESTOS RESULTS

SAMPLE	LOCATION	RESULT
1208-01	Roofing Material Waypoint #90	None Detected
1208-02	Roofing Material Waypoint #91	None Detected
1208-03	Roofing Material Waypoint #91	None Detected
1208-04	Roofing Material Waypoint #91	None Detected
1208-05	Roofing Debris Waypoint #91	None Detected
1208-06	Floor tile Waypoint #100	5% Chrysotile Asbestos
1208-07	Roofing Material Waypoint #101	None Detected
1208-08	Roofing Material Waypoint #101	None Detected
1208-09	Roofing Material Waypoint #102	10% Chrysotile Asbestos
1208-10	Roofing Material Waypoint #103	None Detected
1208-11	Roofing Material Waypoint #104	None Detected
1208-12	Roofing Material Waypoint #105	None Detected
1208-13	Roofing Material Waypoint #105	None Detected
1208-14	Roofing Material Waypoint #106	None Detected
1208-15	Roofing Material Waypoint #106	2% Chrysotile Asbestos
1208-16	Floor Tile & Mastic Waypoint #107	10% Chrysotile Asbestos
1208-17	Floor Tile Waypoint #107	10% Chrysotile Asbestos

TABLE 1 (continued)

CHAPMAN VALVE
BULK ASBESTOS RESULTS

SAMPLE	LOCATION	RESULT
1208-18	Cementitious Material Waypoint #107	None Detected
1208-19	Linoleum Flooring Waypoint # 108	None Detected

Figure 2

Excavation Area Map

Former Chapman Valve/Crane Co.
Pinevale Street
Springfield, Massachusetts

EPA Region I
Superfund Technical Assessment and Response Team (START) IV
Contract No. EP-S3-15-01

TDD Number:	TO1-01-15-07-0046
Created by:	B. Mahany
Created on:	30 July 2015
Modified by:	C. Dupree
Modified on:	26 January 2016

LEGEND

- Soil Stockpile
- On-site Access Road
- Site Boundary
- Soil Grids
- Surface Debris
- Debris Pile

SS-## = Surface Soil Sample grid area
ACM = Asbestos-Containing Material

WESTON & SAMPON MARK-UP:

Location where confirmatory samples showed asbestos in soil

0 25 50 100 150 200 Feet

Data Sources:
Imagery: ESRI, i-cubed, USDA FSA, USGS AEX, GeoEye, Getmapping, Aerogrid, IGP
Topos: MicroPath
All other data: START

E:\MA_gis\Former Chapman Valve\Removal\0048_Figure 2-Excavation Area Map.mxd

TABLE 1

POST-EXCAVATION SOIL SAMPLE ASBESTOS RESULTS
FORMER CHAPMAN VALVE/CRANE CO. SITE
SPRINGFIELD, MASSACHUSETTS

SAMPLE LOCATION	Pile 7-C	Surface 1-C	Surface 3-C	Pile 5-C	ACM-74C1	SS-74/104-C	SS-08-C
SAMPLE NUMBER	D33481	D33482	D33483	D33484	D33485	D33486	D33487
LABORATORY NUMBER	AB58187	AB58188	AB58189	AB58190	AB58191	AB58192	AB58193
DATE SAMPLED	8/25/2015	8/25/2015	8/25/2015	8/25/2015	8/25/2015	8/25/2015	8/25/2015
COMPOUND							
Actinolite	ND	ND	ND	ND	ND	ND	ND
Amosite	ND	ND	ND	ND	ND	ND	ND
Anthophylite	ND	ND	ND	ND	ND	ND	ND
Chrysotile	ND	**trace**	**trace**	**present**	ND	ND	ND
Crocidolite	ND	ND	ND	ND	ND	ND	ND
Tremolite	ND	ND	ND	ND	ND	ND	ND

SAMPLE LOCATION	SS-18-C	Surface 4-C	Pile 4-C	SS-29-C	Surface 1-C2	Pile 5-C2	Surface 3-C2
SAMPLE NUMBER	D33488	D33499	D33500	D33501	D33502	D33503	D33504
LABORATORY NUMBER	AB58194	AB58213	AB58214	AB58215	AB58216	AB58217	AB58218
DATE SAMPLED	8/25/2015	8/28/2015	8/28/2015	8/28/2015	8/28/2015	8/28/2015	8/28/2015
COMPOUND							
Actinolite	ND	ND	ND	ND	ND	ND	ND
Amosite	ND	ND	ND	ND	ND	ND	ND
Anthophylite	ND	ND	ND	ND	ND	ND	ND
Chrysotile	**trace**	ND	ND	ND	ND	**trace**	**trace**
Crocidolite	ND	ND	**trace**	ND	ND	ND	ND
Tremolite	ND	ND	ND	ND	ND	ND	ND

SAMPLE LOCATION	SS-38-C	Fill-01	SS-18-C2	Pile 4-C2			
SAMPLE NUMBER	D33509	D33510	D33511	D33512			
LABORATORY NUMBER	AB58250	AB58251	AB58252	AB58253			
DATE SAMPLED	9/1/2015	9/1/2015	9/1/2015	9/1/2015			
COMPOUND							
Actinolite	ND	ND	ND	ND			
Amosite	ND	ND	ND	ND			
Anthophylite	ND	ND	ND	ND			
Chrysotile	ND	ND	ND	ND			
Crocidolite	ND	ND	ND	ND			
Tremolite	ND	ND	ND	ND			

NOTES:

1) Samples were analyzed by U.S. EPA Office of Environmental Measurement and Evaluation (OEME) New England Regional Laboratory (NERL) via Polarized Light Microscopy (PLM) with Dispersion Staining.
2) All quantities are estimated volume.
3) ND = Not Detected
4) trace = Trace Chrysotile/Crocidolite present, but much less than 1%.
5) present = Chrysotile present but less than 1%.

APPENDIX B

Field Logs – Soil Boring Logs and Monitoring Well Construction Logs

Weston & Sampson	PROJECT E/S Pinevale Springfield, MA	REPORT OF BORING No. BT-EN SHEET 1 OF 1 Project No. ENG23-0351 CHKD BY ACE

BORING Co.	New England Geotech, LLC	BORING LOCATION	See attached plan
FOREMAN	Maynor	GROUND SURFACE ELEV.	DATUM
WSE REPRESENTATIVE:	ACE & EL	DATE START 5/18/23	DATE END 5/18/23

SAMPLER: Track-mounted Geoprobe

CASING: DT 22 2.25-inch PVC liners w/o catcher

CASING SIZE: 2.25 in

GROUNDWATER OBSERVATIONS

DATE	TIME	WATER AT	CASING AT	STABILIZATION TIME
5/18/21		6'		

DEPTH (feet)	CASING (blows/ft)	SAMPLE No.	REC/PEN (in)	DEPTH (ft.)	BLOWS/6"	PID (ppm)	SAMPLE DESCRIPTION	NOTES	STRATUM DESCRIPTION
0	NA	1	30/60	0-5		0.0	0-6" Brown F-M SAND with trace organics (roots, mulch, leaves), trace gravel, dry, no odor		**Topsoil**
2							6"-25' Light brown F-C SAND with little gravel, damp, no odor		**Sand**
							2.5-3' Crushed concrete		**Concrete**
4							3-6' Light brown F-C SAND with little gravel, moist, no odor		**Sand**
6		2	35/60	5-10		0.0			
						0.1	6-7' Gray/brown F-C SAND with some gravel, wet, very slight petro-like odor		
8						0.0	7-10' Light brown F-C SAND with some gravel, pockets of black sand/crushed rock, wet, no odor		
10							EOB @ 10'		
12									
14									
16									

GRANULAR SOILS		COHESIVE SOILS	
BLOWS/FT	DENSITY	BLOWS/FT	DENSITY
0-4	V. LOOSE	0-2	V. SOFT
4-10	LOOSE	2-4	SOFT
10-30	M. DENSE	4-8	M. STIFF
30-50	DENSE	8-15	STIFF
> 50	V. DENSE	15-30	V. STIFF
		> 30	HARD

NOTES:
Groundwater @ 6'
Sampled EPH @ 3-6', VPH @ 6'

GENERAL NOTES: i) THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY BETWEEN SOIL TYPES. TRANSITIONS MAY BE GRADUAL.
ii) WATER LEVEL READINGS HAVE BEEN MADE IN THE DRILL HOLES AT TIMES AND UNDER CONDITIONS STATED ON THIS BORING LOG. FLUCTUATIONS IN THE LEVEL OF GROUNDWATER MAY OCCUR DUE TO OTHER FACTORS THAN THOSE PRESENT AT THE TIME MEASUREMENTS ARE MADE.

BORING No. BT-EN

Weston & Sampson	PROJECT E/S Pinevale Springfield, MA	REPORT OF BORING No. BT-ENW SHEET 1 OF 1 Project No. ENG23-0351 CHKD BY ACE

BORING Co.	New England Geotech, LLC	BORING LOCATION	See attached plan
FOREMAN	Maynor	GROUND SURFACE ELEV.	DATUM
WSE REPRESENTATIVE:	ACE & EL	DATE START 5/18/23	DATE END 5/18/23

SAMPLER: Track-mounted Geoprobe

CASING: DT 22 2.25-inch PVC liners w/o catcher

CASING SIZE: 2.25 in

GROUNDWATER OBSERVATIONS

DATE	TIME	WATER AT	CASING AT	STABILIZATION TIME
5/18/23		6'		

DEPTH (feet)	CASING (blows/ft)	SAMPLE No.	REC/PEN (in)	DEPTH (ft.)	BLOWS/6"	PID (ppm)	SAMPLE DESCRIPTION	NOTES	STRATUM DESCRIPTION
0	NA	1	42/60	0-5		0.0	0'3" Brown F-M SAND with some organics (mulch, grass, leaves, roots), dry, no odor		**Topsoil**
							3"-8" Crushed concrete		**Concrete**
2							8"-2' Reddish-brown F-M SAND with trace brick, trace mulch, moist, no odor		**Sand**
4							2-6.5' Light brown F-C SAND with little gravel, trace crushed rock, trace brick, moist, wet @ 6', no odor		
6		2	39/60	5-10		0.0			
8							6.5-10' Light brown M-C SAND with little gravel, wet, no odor		
10							EOB @ 10'		
12									
14									
16									

GRANULAR SOILS		COHESIVE SOILS	
BLOWS/FT	DENSITY	BLOWS/FT	DENSITY
0-4	V. LOOSE	0-2	V. SOFT
4-10	LOOSE	2-4	SOFT
10-30	M. DENSE	4-8	M. STIFF
30-50	DENSE	8-15	STIFF
> 50	V. DENSE	15-30	V. STIFF
		> 30	HARD

NOTES:
Groundwater @ 6'
Sampled EPH @ 3-6', VPH @ 6'

GENERAL NOTES: i) THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY BETWEEN SOIL TYPES. TRANSITIONS MAY BE GRADUAL.
ii) WATER LEVEL READINGS HAVE BEEN MADE IN THE DRILL HOLES AT TIMES AND UNDER CONDITIONS STATED ON THIS BORING LOG. FLUCTUATIONS IN THE LEVEL OF GROUNDWATER MAY OCCUR DUE TO OTHER FACTORS THAN THOSE PRESENT AT THE TIME MEASUREMENTS ARE MADE.

BORING No. BT-ENW

Weston & Sampson	PROJECT E/S Pinevale Springfield, MA	REPORT OF BORING No. BTE-E SHEET 1 OF 1 Project No. ENG23-0351 CHKD BY ACE

BORING Co.	New England Geotech, LLC	BORING LOCATION	See attached plan
FOREMAN	Maynor	GROUND SURFACE ELEV.	DATUM
WSE REPRESENTATIVE:	ACE & EL	DATE START 5/18/23	DATE END 5/18/23

SAMPLER: Track-mounted Geoprobe

CASING: DT 22 2.25-inch PVC liners w/o catcher

CASING SIZE: 2.25 in

GROUNDWATER OBSERVATIONS

DATE	TIME	WATER AT	CASING AT	STABILIZATION TIME
5/18/23		6.5'		

DEPTH (feet)	CASING (blows/ft)	SAMPLE No.	REC/PEN (in)	DEPTH (ft.)	BLOWS/6"	PID (ppm)	SAMPLE DESCRIPTION	NOTES	STRATUM DESCRIPTION
0	NA	1	42/60	0-5		0.0	0-6" Brown F-M SAND with trace organics (roots, leaves, mulch), trace gravel, dry, no odor		**Topsoil**
							6"-1' Crushed concrete		**Concrete**
2							1-6' Light brown F-C SAND with little gravel, little crushed rock, moist, no odor		**Sand**
4									
		2	36/60	5-10		0.0			
6									
8							6-10' Light brown F-C SAND with some gravel, trace brick, wet, no odor		
10									
							EOB @ 10'		
12									
14									
16									

GRANULAR SOILS		COHESIVE SOILS	
BLOWS/FT	DENSITY	BLOWS/FT	DENSITY
0-4	V. LOOSE	0-2	V. SOFT
4-10	LOOSE	2-4	SOFT
10-30	M. DENSE	4-8	M. STIFF
30-50	DENSE	8-15	STIFF
> 50	V. DENSE	15-30	V. STIFF
		> 30	HARD

NOTES:
Groundwater @ 6.5'
Sampled EPH @ 3.5-6.5', VPH @ 6.5'

GENERAL NOTES: i) THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY BETWEEN SOIL TYPES. TRANSITIONS MAY BE GRADUAL.
ii) WATER LEVEL READINGS HAVE BEEN MADE IN THE DRILL HOLES AT TIMES AND UNDER CONDITIONS STATED ON THIS BORING LOG. FLUCTUATIONS IN THE LEVEL OF GROUNDWATER MAY OCCUR DUE TO OTHER FACTORS THAN THOSE PRESENT AT THE TIME MEASUREMENTS ARE MADE.

BORING No. BTE-E

Weston & Sampson	PROJECT E/S Pinevale Springfield, MA	REPORT OF BORING No. BT-ESW SHEET 1 OF 1 Project No. ENG23-0351 CHKD BY ACE

BORING Co.	New England Geotech, LLC	BORING LOCATION	See attached plan
FOREMAN	Maynor	GROUND SURFACE ELEV.	DATUM
WSE REPRESENTATIVE:	ACE & EL	DATE START 5/18/23	DATE END 5/18/23

SAMPLER: Track-mounted Geoprobe

CASING: DT 22 2.25-inch PVC liners w/o catcher

CASING SIZE: 2.25 in

GROUNDWATER OBSERVATIONS

DATE	TIME	WATER AT	CASING AT	STABILIZATION TIME
5/18/23		7'		

DEPTH (feet)	CASING (blows/ft)	SAMPLE No.	REC/PEN (in)	DEPTH (ft.)	BLOWS/6"	PID (ppm)	SAMPLE DESCRIPTION	NOTES	STRATUM DESCRIPTION
0	NA	1	40/60	0-5		0.0	0-4' Brown fine SAND with trace gravel, trace organics (roots), damp, no odor		**Sand**
2									
4									
		2	23/60	5-10		0.0	4-6' Crushed red brick and concrete		**Concrete and brick**
6									
8							6-9' Brown F-M SAND with trace gravel, wet, no odor		**Sand**
10							9-10' Orange/brown F-C SAND with trace gravel, wet, no odor		
							EOB @ 10'		
12									
14									
16									

GRANULAR SOILS		COHESIVE SOILS	
BLOWS/FT	DENSITY	BLOWS/FT	DENSITY
0-4	V. LOOSE	0-2	V. SOFT
4-10	LOOSE	2-4	SOFT
10-30	M. DENSE	4-8	M. STIFF
30-50	DENSE	8-15	STIFF
> 50	V. DENSE	15-30	V. STIFF
		> 30	HARD

NOTES:
Groundwater at 7', deeper than at other locations due to higher elevation of boring.
Sampled EPH @ 4-7', VPH @ 6'

GENERAL NOTES: i) THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY BETWEEN SOIL TYPES. TRANSITIONS MAY BE GRADUAL.
ii) WATER LEVEL READINGS HAVE BEEN MADE IN THE DRILL HOLES AT TIMES AND UNDER CONDITIONS STATED ON THIS BORING LOG. FLUCTUATIONS IN THE LEVEL OF GROUNDWATER MAY OCCUR DUE TO OTHER FACTORS THAN THOSE PRESENT AT THE TIME MEASUREMENTS ARE MADE.

BORING No. BT-ESW

Weston & Sampson	PROJECT E/S Pinevale Springfield, MA	REPORT OF BORING No. CM-22N SHEET 1 OF 1 Project No. ENG23-0351 CHKD BY ACE

BORING Co.	New England Geotech, LLC	BORING LOCATION	See attached plan
FOREMAN	Maynor	GROUND SURFACE ELEV.	DATUM
WSE REPRESENTATIVE:	ACE & EL	DATE START 5/16/23	DATE END 5/16/23

SAMPLER: Track-mounted Geoprobe

CASING: DT 22 2.25-inch PVC liners w/o catcher

CASING SIZE: 2.25 in

GROUNDWATER OBSERVATIONS

DATE	TIME	WATER AT	CASING AT	STABILIZATION TIME
5/16/23		12'		

DEPTH (feet)	CASING (blows/ft)	SAMPLE No.	REC/PEN (in)	DEPTH (ft.)	BLOWS/6"	PID (ppm)	SAMPLE DESCRIPTION	NOTES	STRATUM DESCRIPTION
0	NA	1	29/60	0-5		0.0	0-5" Brown F-M SAND with trace organics (roots), trace gravel, dry, no odor		**Topsoil**
							5-10" Crushed concrete		**Concrete**
2							10"-5' Light/dark brown F-M SAND with trace gravel, trace crushed rock, trace brick, moist, no odor		**Sand**
4									
		2	45/60	5-10		0.0			
6									
8							5-12' Light brown F-C SAND, trace gravel, moist, no odor		
10									
		3	43/60	10-15		0.0			
12							12-13.5' Brown M-C SAND with some gravel, wet, no odor		
14							13.5-14' Gray M-C SAND with trace gravel, wet, strong petro-like odor		
						148.8	14-15' Gray/brown SILT with trace gravel, wet, strong petro-like odor		**Silt**
16							EOB @ 15'		

GRANULAR SOILS		COHESIVE SOILS	
BLOWS/FT	DENSITY	BLOWS/FT	DENSITY
0-4	V. LOOSE	0-2	V. SOFT
4-10	LOOSE	2-4	SOFT
10-30	M. DENSE	4-8	M. STIFF
30-50	DENSE	8-15	STIFF
> 50	V. DENSE	15-30	V. STIFF
		> 30	HARD

NOTES:
Groundwater @ 12'.
Sampled for EPH @ 9-12', VPH @ 12'

GENERAL NOTES: i) THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY BETWEEN SOIL TYPES. TRANSITIONS MAY BE GRADUAL.
ii) WATER LEVEL READINGS HAVE BEEN MADE IN THE DRILL HOLES AT TIMES AND UNDER CONDITIONS STATED ON THIS BORING LOG. FLUCTUATIONS IN THE LEVEL OF GROUNDWATER MAY OCCUR DUE TO OTHER FACTORS THAN THOSE PRESENT AT THE TIME MEASUREMENTS ARE MADE.

BORING No. CM-22N

Weston & Sampson	PROJECT E/S Pinevale Springfield, MA	REPORT OF BORING No. CM-22E SHEET 1 OF 1 Project No. ENG23-0351 CHKD BY ACE

BORING Co.	New England Geotech, LLC	BORING LOCATION	See attached plan
FOREMAN	Maynor	GROUND SURFACE ELEV.	DATUM
WSE REPRESENTATIVE:	ACE & EL	DATE START 5/16/23	DATE END 5/16/23

SAMPLER: Track-mounted Geoprobe

CASING: DT 22 2.25-inch PVC liners w/o catcher

CASING SIZE: 2.25 in

GROUNDWATER OBSERVATIONS

DATE	TIME	WATER AT	CASING AT	STABILIZATION TIME
5/16/23		11'		

DEPTH (feet)	CASING (blows/ft)	SAMPLE No.	REC/PEN (in)	DEPTH (ft.)	BLOWS/6"	PID (ppm)	SAMPLE DESCRIPTION	NOTES	STRATUM DESCRIPTION
0	NA	1	45/60	0-5		0.0	0-6" Brown F-M SAND with trace organics (roots, mulch, leaves), trace gravel, dry, no odor		**Topsoil**
							6"-1' Crushed concrete		**Concrete**
2							1-2.5' Brown F-C SAND with trace gravel, damp, no odor		**Sand**
4							2.5-6' Light brown F-M SAND, trace fine gravel, moist, no odor		
		2	44/60	5-10		0.0			
6									
8							6-10.5' Light brown F-C SAND with some gravel, moist, no odor		
10									
		3	36/60	10-15		0.0			
12							10.5-13.5' Brown F-C SAND with some gravel, wet, no odor		
						0.2			
14							13.5-15' Reddish-brown silty SAND with trace gravel, wet, no odor		
							EOB @ 15'		
16									

GRANULAR SOILS		COHESIVE SOILS	
BLOWS/FT	DENSITY	BLOWS/FT	DENSITY
0-4	V. LOOSE	0-2	V. SOFT
4-10	LOOSE	2-4	SOFT
10-30	M. DENSE	4-8	M. STIFF
30-50	DENSE	8-15	STIFF
> 50	V. DENSE	15-30	V. STIFF
		> 30	HARD

NOTES:
Groundwater @ 11'.
Sampled for EPH @ 8-11', VPH @ 11'
DUP-3 collected for EPH, VPH

GENERAL NOTES: i) THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY BETWEEN SOIL TYPES. TRANSITIONS MAY BE GRADUAL.
ii) WATER LEVEL READINGS HAVE BEEN MADE IN THE DRILL HOLES AT TIMES AND UNDER CONDITIONS STATED ON THIS BORING LOG. FLUCTUATIONS IN THE LEVEL OF GROUNDWATER MAY OCCUR DUE TO OTHER FACTORS THAN THOSE PRESENT AT THE TIME MEASUREMENTS ARE MADE.

BORING No. CM-22E

Weston & Sampson	PROJECT E/S Pinevale Springfield, MA	REPORT OF BORING No. CM-22S SHEET 1 OF 1 Project No. ENG23-0351 CHKD BY ACE

BORING Co.	New England Geotech, LLC	BORING LOCATION	See attached plan
FOREMAN	Maynor	GROUND SURFACE ELEV.	DATUM
WSE REPRESENTATIVE:	ACE & EL	DATE START 5/16/23	DATE END 5/16/23

SAMPLER: Track-mounted Geoprobe

CASING: DT 22 2.25-inch PVC liners w/o catcher

CASING SIZE: 2.25 in

GROUNDWATER OBSERVATIONS

DATE	TIME	WATER AT	CASING AT	STABILIZATION TIME
5/16/23		11'		

DEPTH (feet)	CASING (blows/ft)	SAMPLE No.	REC/PEN (in)	DEPTH (ft.)	BLOWS/6"	PID (ppm)	SAMPLE DESCRIPTION	NOTES	STRATUM DESCRIPTION
0	NA	1	43/60	0-5		0.0	0-7" Brown F-M SAND with trace organics (roots, mulch, leaves), trace gravel, dry, no odor		**Topsoil**
							7"-1' Crushed concrete		**Concrete**
2							1-3' Brown F-M SAND with trace gravel, pocket of crushed asphalt and brick @ 2.5', moist, no odor		**Sand**
4									
		2	42/60	5-10		0.0			
6							3-10' Light brown F-M SAND with trace gravel, pocket of crushed rock @ 6-7', moist, no odor		
8									
10									
		3	36/60	10-15		0.0			
12							10-13' Brown M-C SAND with some gravel, wet, no odor		
						104	13-13.5' Gray F-C SAND with trace gravel, wet, strong petro-like odor		
14							13.5-15' Gray/brown fine silty SAND, wet, strong petro-like odor		
							EOB @ 15'		
16									

GRANULAR SOILS		COHESIVE SOILS	
BLOWS/FT	DENSITY	BLOWS/FT	DENSITY
0-4	V. LOOSE	0-2	V. SOFT
4-10	LOOSE	2-4	SOFT
10-30	M. DENSE	4-8	M. STIFF
30-50	DENSE	8-15	STIFF
> 50	V. DENSE	15-30	V. STIFF
		> 30	HARD

NOTES:
Groundwater @ 11
Sampled for EPH @ 8-11', VPH @ 11'

GENERAL NOTES: i) THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY BETWEEN SOIL TYPES. TRANSITIONS MAY BE GRADUAL.
ii) WATER LEVEL READINGS HAVE BEEN MADE IN THE DRILL HOLES AT TIMES AND UNDER CONDITIONS STATED ON THIS BORING LOG. FLUCTUATIONS IN THE LEVEL OF GROUNDWATER MAY OCCUR DUE TO OTHER FACTORS THAN THOSE PRESENT AT THE TIME MEASUREMENTS ARE MADE.

BORING No. CM-22S

Weston & Sampson	PROJECT E/S Pinevale Springfield, MA	REPORT OF BORING No. CM-22W SHEET 1 OF 1 Project No. ENG23-0351 CHKD BY ACE

BORING Co.	New England Geotech, LLC	BORING LOCATION	See attached plan
FOREMAN	Maynor	GROUND SURFACE ELEV.	DATUM
WSE REPRESENTATIVE:	ACE & EL	DATE START 5/16/23	DATE END 5/16/23

SAMPLER: Track-mounted Geoprobe

CASING: DT 22 2.25-inch PVC liners w/o catcher

CASING SIZE: 2.25 in

GROUNDWATER OBSERVATIONS

DATE	TIME	WATER AT	CASING AT	STABILIZATION TIME
5/16/23		12.5'		

DEPTH (feet)	CASING (blows/ft)	SAMPLE No.	REC/PEN (in)	DEPTH (ft.)	BLOWS/6"	PID (ppm)	SAMPLE DESCRIPTION	NOTES	STRATUM DESCRIPTION
0	NA	1	40/60	0-5		0.0	0-3" Brown F-M SAND with trace organics (roots, leaves), trace gravel, dry, no odor		**Topsoil**
							3"-8" Crushed concrete		**Concrete**
2							8"-3' Brown M-C SAND with trace gravel, damp, no odor		**Sand**
4							3-4' Dark brown F-M SAND with trace gravel, damp, no odor		
		2	43/60	5-10		0.0	4-6' Tan F-M SAND with trace organics (roots), moist, no odor		
6									
8									
10							6-13' Light brown F-C SAND with trace gravel, moist, no odor, wet @ 12.5'		
		3	40/60	10-15		0.0			
12									
14							13-14' Brown C SAND with some gravel, wet, no odor		
						111.7	14-15' Gray C SAND with trace gravel (@15' Gray/brown silty sand), wet, strong petro-like odor		
							EOB @ 15'		
16									

GRANULAR SOILS		COHESIVE SOILS	
BLOWS/FT	DENSITY	BLOWS/FT	DENSITY
0-4	V. LOOSE	0-2	V. SOFT
4-10	LOOSE	2-4	SOFT
10-30	M. DENSE	4-8	M. STIFF
30-50	DENSE	8-15	STIFF
> 50	V. DENSE	15-30	V. STIFF
		> 30	HARD

NOTES:
Groundwater @ 12.5'
Sampled for EPH @ 9.5-12.5', VPH @ 12.5'

GENERAL NOTES: i) THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY BETWEEN SOIL TYPES. TRANSITIONS MAY BE GRADUAL.
ii) WATER LEVEL READINGS HAVE BEEN MADE IN THE DRILL HOLES AT TIMES AND UNDER CONDITIONS STATED ON THIS BORING LOG. FLUCTUATIONS IN THE LEVEL OF GROUNDWATER MAY OCCUR DUE TO OTHER FACTORS THAN THOSE PRESENT AT THE TIME MEASUREMENTS ARE MADE.

BORING No. CM-22W

Weston & Sampson	PROJECT E/S Pinevale Springfield, MA	REPORT OF BORING No. CM-38N-a SHEET 1 OF 1 Project No. ENG23-0351 CHKD BY ACE

BORING Co.	New England Geotech, LLC	BORING LOCATION	See attached plan
FOREMAN	Maynor	GROUND SURFACE ELEV.	DATUM
WSE REPRESENTATIVE:	ACE & EL	DATE START 5/16/23	DATE END 5/16/23

SAMPLER: Track-mounted Geoprobe

CASING: DT 22 2.25-inch PVC liners w/o catcher

CASING SIZE: 2.25 in

GROUNDWATER OBSERVATIONS

DATE	TIME	WATER AT	CASING AT	STABILIZATION TIME

DEPTH (feet)	CASING (blows/ft)	SAMPLE No.	REC/PEN (in)	DEPTH (ft.)	BLOWS/6"	PID (ppm)	SAMPLE DESCRIPTION	NOTES	STRATUM DESCRIPTION
0	NA	1	50/60	0-5		0.0	0-1' Crushed concrete		**Concrete**
2							1-3.5' Red crushed brick		**Brick**
4									
		2	60/60	5-10		0.0			
6							3.5-9' Red crushed brick and crushed rock		
8									
10							9-9.5' Dark brown/black F-M SAND with trace gravel, wet, strong petro-like odor 9.5-10' Gray F-C SAND, wet, strong petro-like odor		**Sand**
12							EOB @ 10'		
14									
16									

GRANULAR SOILS		COHESIVE SOILS	
BLOWS/FT	DENSITY	BLOWS/FT	DENSITY
0-4	V. LOOSE	0-2	V. SOFT
4-10	LOOSE	2-4	SOFT
10-30	M. DENSE	4-8	M. STIFF
30-50	DENSE	8-15	STIFF
> 50	V. DENSE	15-30	V. STIFF
		> 30	HARD

NOTES:
Sleeve recovery was mostly brick, cannot sample/install monitoring well here so moved original location 2 more times.

GENERAL NOTES: i) THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY BETWEEN SOIL TYPES. TRANSITIONS MAY BE GRADUAL.
ii) WATER LEVEL READINGS HAVE BEEN MADE IN THE DRILL HOLES AT TIMES AND UNDER CONDITIONS STATED ON THIS BORING LOG. FLUCTUATIONS IN THE LEVEL OF GROUNDWATER MAY OCCUR DUE TO OTHER FACTORS THAN THOSE PRESENT AT THE TIME MEASUREMENTS ARE MADE.

BORING No. CM-38N-a

Weston & Sampson	PROJECT E/S Pinevale Springfield, MA	REPORT OF BORING No. CM-38N-b SHEET 1 OF 1 Project No. ENG23-0351 CHKD BY ACE

BORING Co.	New England Geotech, LLC	BORING LOCATION	See attached plan
FOREMAN	Maynor	GROUND SURFACE ELEV.	DATUM
WSE REPRESENTATIVE:	ACE & EL	DATE START 5/16/23	DATE END 5/16/23

SAMPLER: Track-mounted Geoprobe

CASING: DT 22 2.25-inch PVC liners w/o catcher

CASING SIZE: 2.25 in

GROUNDWATER OBSERVATIONS

DATE	TIME	WATER AT	CASING AT	STABILIZATION TIME

DEPTH (feet)	CASING (blows/ft)	SAMPLE No.	REC/PEN (in)	DEPTH (ft.)	BLOWS/6"	PID (ppm)	SAMPLE DESCRIPTION	NOTES	STRATUM DESCRIPTION
0	NA	1	36/60	0-5		0.0	0-1.5' Crushed concrete		**Concrete**
2							1.5-5' Crushed brick and rock, trace asphalt pieces, pocket of soil @ 4', dry, no odor		**Brick**
4									
		2	0/60	5-10		0.0	EOB @ 5'		
6									
8									
10									
12									
14									
16									

GRANULAR SOILS		COHESIVE SOILS	
BLOWS/FT	DENSITY	BLOWS/FT	DENSITY
0-4	V. LOOSE	0-2	V. SOFT
4-10	LOOSE	2-4	SOFT
10-30	M. DENSE	4-8	M. STIFF
30-50	DENSE	8-15	STIFF
> 50	V. DENSE	15-30	V. STIFF
		> 30	HARD

NOTES:

Second attempt at CM-38N location for soil sample and monitoring well install. Refusal, mostly brick + concrete, 5-10' no recovery

GENERAL NOTES: i) THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY BETWEEN SOIL TYPES. TRANSITIONS MAY BE GRADUAL.

ii) WATER LEVEL READINGS HAVE BEEN MADE IN THE DRILL HOLES AT TIMES AND UNDER CONDITIONS STATED ON THIS BORING LOG. FLUCTUATIONS IN THE LEVEL OF GROUNDWATER MAY OCCUR DUE TO OTHER FACTORS THAN THOSE PRESENT AT THE TIME MEASUREMENTS ARE MADE.

BORING No. CM-38N-b

Weston & Sampson	PROJECT E/S Pinevale Springfield, MA	REPORT OF BORING No. CM-38N-c SHEET 1 OF 1 Project No. ENG23-0351 CHKD BY ACE

BORING Co.	New England Geotech, LLC	BORING LOCATION	See attached plan
FOREMAN	Maynor	GROUND SURFACE ELEV.	DATUM
WSE REPRESENTATIVE:	ACE & EL	DATE START 5/18/21	DATE END 5/18/21

SAMPLER: Track-mounted Geoprobe

CASING: DT 22 2.25-inch PVC liners w/o catcher

CASING SIZE: 2.25 in

GROUNDWATER OBSERVATIONS

DATE	TIME	WATER AT	CASING AT	STABILIZATION TIME
5/16/23		6.5'		

DEPTH (feet)	CASING (blows/ft)	SAMPLE No.	REC/PEN (in)	DEPTH (ft.)	BLOWS/6"	PID (ppm)	SAMPLE DESCRIPTION	NOTES	STRATUM DESCRIPTION
0	NA	1	37/60	0-5		0.0	0-10" Concrete		**Concrete**
							10"-2' Brown F-M SAND with trace asphalt, trace gravel, moist, no odor		**Sand**
2							2-3' Crushed rock / concrete		
4							3-6' Brown F-C SAND with trace gravel, moist, no odor		
		2	37/60	5-10					
6							6-7' Dark brown F SAND, trace gravel, wet, petroleum-like odor		
						130.2			
8							7-9' Dark brown/black silty SAND with trace organics (roots), strong petroleum-like odor, wet		
						32.1			
10							9-10' Gray F-C SAND, wet, strong petroleum-like odor		
						261.5	EOB @ 10'		
12									
14									
16									

GRANULAR SOILS		COHESIVE SOILS	
BLOWS/FT	DENSITY	BLOWS/FT	DENSITY
0-4	V. LOOSE	0-2	V. SOFT
4-10	LOOSE	2-4	SOFT
10-30	M. DENSE	4-8	M. STIFF
30-50	DENSE	8-15	STIFF
> 50	V. DENSE	15-30	V. STIFF
		> 30	HARD

NOTES:

3rd attempt drilling to get outside refusal/building brick/concrete area
Moved 22.5' north of original CM-38N location
MW installed stick-up, screened 4-14'
Sampled EPH and Pb @ 3.5-6.5', VPH @ 6.5'

GENERAL NOTES: i) THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY BETWEEN SOIL TYPES. TRANSITIONS MAY BE GRADUAL.
ii) WATER LEVEL READINGS HAVE BEEN MADE IN THE DRILL HOLES AT TIMES AND UNDER CONDITIONS STATED ON THIS BORING LOG. FLUCTUATIONS IN THE LEVEL OF GROUNDWATER MAY OCCUR DUE TO OTHER FACTORS THAN THOSE PRESENT AT THE TIME MEASUREMENTS ARE MADE.

BORING No. CM-38N-c

Weston & Sampson	PROJECT E/S Pinevale Springfield, MA	REPORT OF BORING No. CM-38NW SHEET 1 OF 1 Project No. ENG23-0351 CHKD BY ACE

BORING Co.	New England Geotech, LLC	BORING LOCATION	See attached plan
FOREMAN	Maynor	GROUND SURFACE ELEV.	DATUM
WSE REPRESENTATIVE:	ACE & EL	DATE START 5/16/21	DATE END 5/16/21

SAMPLER: Track-mounted Geoprobe

CASING: DT 22 2.25-inch PVC liners w/o catcher

CASING SIZE: 2.25 in

GROUNDWATER OBSERVATIONS

DATE	TIME	WATER AT	CASING AT	STABILIZATION TIME
5/16/23		7.5'		

DEPTH (feet)	CASING (blows/ft)	SAMPLE No.	REC/PEN (in)	DEPTH (ft.)	BLOWS/6"	PID (ppm)	SAMPLE DESCRIPTION	NOTES	STRATUM DESCRIPTION
0	NA	1	23/60	0-5		0.0	0-1' Crushed concrete		**Concrete**
2							1-6' Light brown F-M SAND with trace silt, trace gravel, moist, no odor		**Sand**
4									
		2	28/60	5-10					
6							6-8' Reddish brown F SAND with silt, trace gravel, wet @ 7.5', no odor		
8						16.1	8-10.5' Dark brown F silty SAND with some organics (roots, mulch), wet, slight petroleum-like odor, no sheen		
10		3	42/60	10-15					
12						330.6	10.5-14' Gray M-C SAND with trace gravel, wet, strong petroleum-like odor		
14						3.6	14-15' Light brown F-C SAND with trace gravel, wet, petroleum-like odor		
16							EOB @ 15'		

GRANULAR SOILS		COHESIVE SOILS	
BLOWS/FT	DENSITY	BLOWS/FT	DENSITY
0-4	V. LOOSE	0-2	V. SOFT
4-10	LOOSE	2-4	SOFT
10-30	M. DENSE	4-8	M. STIFF
30-50	DENSE	8-15	STIFF
> 50	V. DENSE	15-30	V. STIFF
		> 30	HARD

NOTES:
Groundwater @ 7.5'
Sampled for EPH and Pb @ 4.5-7.5', VPH @ 7.5'

GENERAL NOTES: i) THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY BETWEEN SOIL TYPES. TRANSITIONS MAY BE GRADUAL.
ii) WATER LEVEL READINGS HAVE BEEN MADE IN THE DRILL HOLES AT TIMES AND UNDER CONDITIONS STATED ON THIS BORING LOG. FLUCTUATIONS IN THE LEVEL OF GROUNDWATER MAY OCCUR DUE TO OTHER FACTORS THAN THOSE PRESENT AT THE TIME MEASUREMENTS ARE MADE.

BORING No. CM-38NW

Weston & Sampson	PROJECT E/S Pinevale Springfield, MA	REPORT OF BORING No. CM-38E SHEET 1 OF 1 Project No. ENG23-0351 CHKD BY ACE

BORING Co.	New England Geotech, LLC	BORING LOCATION	See attached plan
FOREMAN	Maynor	GROUND SURFACE ELEV.	DATUM
WSE REPRESENTATIVE:	ACE & EL	DATE START 5/17/23	DATE END 5/17/23

SAMPLER: Track-mounted Geoprobe

CASING: DT 22 2.25-inch PVC liners w/o catcher

CASING SIZE: 2.25 in

GROUNDWATER OBSERVATIONS

DATE	TIME	WATER AT	CASING AT	STABILIZATION TIME
5/17/23		7.5'		

DEPTH (feet)	CASING (blows/ft)	SAMPLE No.	REC/PEN (in)	DEPTH (ft.)	BLOWS/6"	PID (ppm)	SAMPLE DESCRIPTION	NOTES	STRATUM DESCRIPTION
0	NA	1	28/60	0-5		0.0	0-4" Brown F-M SAND with trace organics (roots, leaves), dry, no odor		**Topsoil**
							4"-1' Crushed concrete		**Concrete**
2							1-2.5' Dark brown F-M SAND with some gravel, trace organics (roots), moist, no odor		**Sand**
4							2.5-4' Asphalt with crushed rock		
6		2	29/60	5-10		0.0	4-7' Light brown F-C SAND with trace gravel, moist, no odor, trace organics (roots)		
8							7-9.5' Gray/brown F-C SAND with some gravel, wet @ 7.5', slight petroleum-like odor. Pocket of dark brown silty SAND @ 7.5-8'		
10						220	9.5-10' Gray F-C sand, wet, strong petroleum-like odor		
							EOB @ 10'		
12									
14									
16									

GRANULAR SOILS		COHESIVE SOILS	
BLOWS/FT	DENSITY	BLOWS/FT	DENSITY
0-4	V. LOOSE	0-2	V. SOFT
4-10	LOOSE	2-4	SOFT
10-30	M. DENSE	4-8	M. STIFF
30-50	DENSE	8-15	STIFF
> 50	V. DENSE	15-30	V. STIFF
		> 30	HARD

NOTES:
Groundwater @ 7.5'
Sampled EPH and PB @ 4.5-7.5', VPH @ 7.5'
DUP-1 collected here for EPH, Pb, and VPH
MS/MSD-2 collected here for Pb

GENERAL NOTES: i) THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY BETWEEN SOIL TYPES. TRANSITIONS MAY BE GRADUAL.
ii) WATER LEVEL READINGS HAVE BEEN MADE IN THE DRILL HOLES AT TIMES AND UNDER CONDITIONS STATED ON THIS BORING LOG. FLUCTUATIONS IN THE LEVEL OF GROUNDWATER MAY OCCUR DUE TO OTHER FACTORS THAN THOSE PRESENT AT THE TIME MEASUREMENTS ARE MADE.

BORING No. CM-38E

Weston & Sampson	PROJECT E/S Pinevale Springfield, MA	REPORT OF BORING No. CM-38SE SHEET 1 OF 1 Project No. ENG23-0351 CHKD BY ACE

BORING Co.	New England Geotech, LLC	BORING LOCATION	See attached plan
FOREMAN	Maynor	GROUND SURFACE ELEV.	DATUM
WSE REPRESENTATIVE:	ACE & EL	DATE START 5/17/23	DATE END 5/17/23

SAMPLER: Track-mounted Geoprobe

CASING: DT 22 2.25-inch PVC liners w/o catcher

CASING SIZE: 2.25 in

GROUNDWATER OBSERVATIONS

DATE	TIME	WATER AT	CASING AT	STABILIZATION TIME
5/17/23		7'		

DEPTH (feet)	CASING (blows/ft)	SAMPLE No.	REC/PEN (in)	DEPTH (ft.)	BLOWS/6"	PID (ppm)	SAMPLE DESCRIPTION	NOTES	STRATUM DESCRIPTION
0	NA	1	32/60	0-5		0.0	0-10" Crushed concrete		**Concrete**
2							10"-7' Brown F-M SAND with trace gravel, trace organics (roots), pocket of white/gray crushed rock and sand @ 3.5', moist		**Sand**
4									
		2	50/60	5-10					
6						0.1			
8							7-8' Dark brown F silty SAND, trace organics (roots), wet, petroleum-like odor		
						119.7	8-10' Gray F-M SAND, trace organics (mulch), trace gravel, wet, strong petroleum-like odor		
10						224.6			
12							EOB @ 10'		
14									
16									

GRANULAR SOILS		COHESIVE SOILS	
BLOWS/FT	DENSITY	BLOWS/FT	DENSITY
0-4	V. LOOSE	0-2	V. SOFT
4-10	LOOSE	2-4	SOFT
10-30	M. DENSE	4-8	M. STIFF
30-50	DENSE	8-15	STIFF
> 50	V. DENSE	15-30	V. STIFF
		> 30	HARD

NOTES:
Groundwater @ 7'
Sampled EPH and Pb @ 4-7', VPH @ 7'

GENERAL NOTES: i) THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY BETWEEN SOIL TYPES. TRANSITIONS MAY BE GRADUAL.
ii) WATER LEVEL READINGS HAVE BEEN MADE IN THE DRILL HOLES AT TIMES AND UNDER CONDITIONS STATED ON THIS BORING LOG. FLUCTUATIONS IN THE LEVEL OF GROUNDWATER MAY OCCUR DUE TO OTHER FACTORS THAN THOSE PRESENT AT THE TIME MEASUREMENTS ARE MADE.

BORING No. CM-38SE

Weston & Sampson	PROJECT E/S Pinevale Springfield, MA	REPORT OF BORING No. CM-38SW SHEET 1 OF 1 Project No. ENG23-0351 CHKD BY ACE

BORING Co.	New England Geotech, LLC	BORING LOCATION	See attached plan
FOREMAN	Maynor	GROUND SURFACE ELEV.	DATUM
WSE REPRESENTATIVE:	ACE & EL	DATE START 5/16/23	DATE END 5/16/23

SAMPLER: Track-mounted Geoprobe

CASING: DT 22 2.25-inch PVC liners w/o catcher

CASING SIZE: 2.25 in

GROUNDWATER OBSERVATIONS

DATE	TIME	WATER AT	CASING AT	STABILIZATION TIME
5/16/23		7.5'		

DEPTH (feet)	CASING (blows/ft)	SAMPLE No.	REC/PEN (in)	DEPTH (ft.)	BLOWS/6"	PID (ppm)	SAMPLE DESCRIPTION	NOTES	STRATUM DESCRIPTION
0	NA	1	0/60	0-5			0-5' No recovery, > 1' concrete, void below concrete (sleeve dropped to 5' when drilled past concrete)		**Concrete**
2									
4									
		2	23/60	5-10		0.0	5-9' Light to dark brown F-C SAND with trace silt, trace gravel, wet at 7.5', no odor		**Sand**
6									
8									
10							9-10' Light brown C SAND, trace gravel, wet, no odor		
		3	42/60	10-15		1.0	10-11.5' Dark brown F silty SAND with some organics (mulch, roots), trace brick, wet, slight petroleum-like odor, no sheen		
						32.4			
12							11.5-15' Gray M-C SAND with trace F gravel, wet, strong petroleum-like odor		
						309.6			
14									
						12.2			
16							EOB @ 15'		

GRANULAR SOILS		COHESIVE SOILS	
BLOWS/FT	DENSITY	BLOWS/FT	DENSITY
0-4	V. LOOSE	0-2	V. SOFT
4-10	LOOSE	2-4	SOFT
10-30	M. DENSE	4-8	M. STIFF
30-50	DENSE	8-15	STIFF
> 50	V. DENSE	15-30	V. STIFF
		> 30	HARD

NOTES:
Groundwater @ 7.5'
Sampled for EPH and Pb @ 4.5-7.5', VPH @ 7.5'

GENERAL NOTES: i) THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY BETWEEN SOIL TYPES. TRANSITIONS MAY BE GRADUAL.
ii) WATER LEVEL READINGS HAVE BEEN MADE IN THE DRILL HOLES AT TIMES AND UNDER CONDITIONS STATED ON THIS BORING LOG. FLUCTUATIONS IN THE LEVEL OF GROUNDWATER MAY OCCUR DUE TO OTHER FACTORS THAN THOSE PRESENT AT THE TIME MEASUREMENTS ARE MADE.

BORING No. CM-38SW

Weston & Sampson	PROJECT E/S Pinevale Springfield, MA	REPORT OF BORING No. CM-39N SHEET 1 OF 1 Project No. ENG23-0351 CHKD BY ACE

BORING Co.	New England Geotech, LLC	BORING LOCATION	See attached plan
FOREMAN	Maynor	GROUND SURFACE ELEV.	DATUM
WSE REPRESENTATIVE:	ACE & EL	DATE START 5/17/23	DATE END 5/17/23

SAMPLER: Track-mounted Geoprobe

CASING: DT 22 2.25-inch PVC liners w/o catcher

CASING SIZE: 2.25 in

GROUNDWATER OBSERVATIONS

DATE	TIME	WATER AT	CASING AT	STABILIZATION TIME

DEPTH (feet)	CASING (blows/ft)	SAMPLE No.	REC/PEN (in)	DEPTH (ft.)	BLOWS/6"	PID (ppm)	SAMPLE DESCRIPTION	NOTES	STRATUM DESCRIPTION
0	NA	1	27/60	0-5		0.0	0-3' Brown F-M SAND with trace crushed brick, trace organics (roots, leaves), trace gravel. Pocket of brick @ 3'. Dry, no odor.		**Sand**
2									
4							3-4' Crushed concrete		**Concrete**
6		2	10/60	5-10		0.0	4-7' Brown F-M SAND, trace gravel, trace crushed black rock, moist, no odor		**Sand**
8							EOB @ 7'		
10									
12									
14									
16									

GRANULAR SOILS		COHESIVE SOILS	
BLOWS/FT	DENSITY	BLOWS/FT	DENSITY
0-4	V. LOOSE	0-2	V. SOFT
4-10	LOOSE	2-4	SOFT
10-30	M. DENSE	4-8	M. STIFF
30-50	DENSE	8-15	STIFF
> 50	V. DENSE	15-30	V. STIFF
		> 30	HARD

NOTES:
Sampled Pb @ 0-2' (collected below concrete)
Historical CM-39 location taken within building slab footprint

GENERAL NOTES: i) THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY BETWEEN SOIL TYPES. TRANSITIONS MAY BE GRADUAL.
ii) WATER LEVEL READINGS HAVE BEEN MADE IN THE DRILL HOLES AT TIMES AND UNDER CONDITIONS STATED ON THIS BORING LOG. FLUCTUATIONS IN THE LEVEL OF GROUNDWATER MAY OCCUR DUE TO OTHER FACTORS THAN THOSE PRESENT AT THE TIME MEASUREMENTS ARE MADE.

BORING No. CM-39N

Weston & Sampson	PROJECT E/S Pinevale Springfield, MA	REPORT OF BORING No. CM-39E SHEET 1 OF 1 Project No. ENG23-0351 CHKD BY ACE

BORING Co.	New England Geotech, LLC	BORING LOCATION	See attached plan
FOREMAN	Maynor	GROUND SURFACE ELEV.	DATUM
WSE REPRESENTATIVE:	ACE & EL	DATE START 5/17/23	DATE END 5/17/23

SAMPLER: Track-mounted Geoprobe

CASING: DT 22 2.25-inch PVC liners w/o catcher

CASING SIZE: 2.25 in

GROUNDWATER OBSERVATIONS

DATE	TIME	WATER AT	CASING AT	STABILIZATION TIME
5/17/23		8'		

DEPTH (feet)	CASING (blows/ft)	SAMPLE No.	REC/PEN (in)	DEPTH (ft.)	BLOWS/6"	PID (ppm)	SAMPLE DESCRIPTION	NOTES	STRATUM DESCRIPTION
0	NA	1	47/60	0-5		0.0	0-2' Brown F-M SAND with trace crushed brick, trace gravel, trace organics (roots, mulch), damp, no odor		**Sand**
2									
4							2-4' Crushed concrete		**Concrete**
6		2	33/60	5-10		0.0	4-8' Brown F-M SAND with trace gravel, damp, no odor		**Sand**
8							8-9' Dark brown F silty SAND with trace organics (roots), wet, no odor		
10							9-10' Light brown F SAND, wet, no odor		
12							EOB @ 10'		
14									
16									

GRANULAR SOILS		COHESIVE SOILS	
BLOWS/FT	DENSITY	BLOWS/FT	DENSITY
0-4	V. LOOSE	0-2	V. SOFT
4-10	LOOSE	2-4	SOFT
10-30	M. DENSE	4-8	M. STIFF
30-50	DENSE	8-15	STIFF
> 50	V. DENSE	15-30	V. STIFF
		> 30	HARD

NOTES:
Sampled Pb @ 0-2' (collected below concrete)
Historical CM-39 location taken within building slab footprint

GENERAL NOTES: i) THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY BETWEEN SOIL TYPES. TRANSITIONS MAY BE GRADUAL.
ii) WATER LEVEL READINGS HAVE BEEN MADE IN THE DRILL HOLES AT TIMES AND UNDER CONDITIONS STATED ON THIS BORING LOG. FLUCTUATIONS IN THE LEVEL OF GROUNDWATER MAY OCCUR DUE TO OTHER FACTORS THAN THOSE PRESENT AT THE TIME MEASUREMENTS ARE MADE.

BORING No. CM-39E

Weston & Sampson	PROJECT E/S Pinevale Springfield, MA	REPORT OF BORING No. CM-39S SHEET 1 OF 1 Project No. ENG23-0351 CHKD BY ACE

BORING Co.	New England Geotech, LLC	BORING LOCATION	See attached plan
FOREMAN	Maynor	GROUND SURFACE ELEV.	DATUM
WSE REPRESENTATIVE:	ACE & EL	DATE START 5/17/23	DATE END 5/17/23

SAMPLER: Track-mounted Geoprobe

CASING: DT 22 2.25-inch PVC liners w/o catcher

CASING SIZE: 2.25 in

GROUNDWATER OBSERVATIONS

DATE	TIME	WATER AT	CASING AT	STABILIZATION TIME

DEPTH (feet)	CASING (blows/ft)	SAMPLE No.	REC/PEN (in)	DEPTH (ft.)	BLOWS/6"	PID (ppm)	SAMPLE DESCRIPTION	NOTES	STRATUM DESCRIPTION
0	NA	1	45/60	0-5		0.0	0-2' Brown F-M SAND with trace crushed brick, trace gravel, trace organics (roots, mulch), dry, no odor		**Sand**
2							2-3' Crushed concrete		**Concrete**
4							3-3.5' Dark brown M-C SAND with trace gravel, moist, no odor 3.5-4.5' Light brown F-C SAND with some crushed rock, moist, no odor 4.5-5' Dark brown M-C SAND with some M-C gravel, moist, no odor		**Sand**
6							EOB @ 5'		
8									
10									
12									
14									
16									

GRANULAR SOILS		COHESIVE SOILS	
BLOWS/FT	DENSITY	BLOWS/FT	DENSITY
0-4	V. LOOSE	0-2	V. SOFT
4-10	LOOSE	2-4	SOFT
10-30	M. DENSE	4-8	M. STIFF
30-50	DENSE	8-15	STIFF
> 50	V. DENSE	15-30	V. STIFF
		> 30	HARD

NOTES:
Sampled Pb @ 0-2' (collected below concrete)
Historical CM-39 location taken within building slab footprint

GENERAL NOTES: i) THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY BETWEEN SOIL TYPES. TRANSITIONS MAY BE GRADUAL.
ii) WATER LEVEL READINGS HAVE BEEN MADE IN THE DRILL HOLES AT TIMES AND UNDER CONDITIONS STATED ON THIS BORING LOG. FLUCTUATIONS IN THE LEVEL OF GROUNDWATER MAY OCCUR DUE TO OTHER FACTORS THAN THOSE PRESENT AT THE TIME MEASUREMENTS ARE MADE.

BORING No. CM-39S

Weston & Sampson	PROJECT E/S Pinevale Springfield, MA	REPORT OF BORING No. CM-39W SHEET 1 OF 1 Project No. ENG23-0351 CHKD BY ACE

BORING Co.	New England Geotech, LLC	BORING LOCATION	See attached plan
FOREMAN	Maynor	GROUND SURFACE ELEV.	DATUM
WSE REPRESENTATIVE:	ACE & EL	DATE START 5/17/23	DATE END 5/17/23

SAMPLER: Track-mounted Geoprobe

CASING: DT 22 2.25-inch PVC liners w/o catcher

CASING SIZE: 2.25 in

GROUNDWATER OBSERVATIONS

DATE	TIME	WATER AT	CASING AT	STABILIZATION TIME

DEPTH (feet)	CASING (blows/ft)	SAMPLE No.	REC/PEN (in)	DEPTH (ft.)	BLOWS/6"	PID (ppm)	SAMPLE DESCRIPTION	NOTES	STRATUM DESCRIPTION
0	NA	1	37/60	0-5		0.0	0-1.5' Crushed concrete with trace brick		**Concrete**
2							1.5-5' Light brown to brown F-C SAND with little gravel, pocket of black rock (shale) @ 3', moist, no odor		**Sand**
4									
6							EOB @ 5'		
8									
10									
12									
14									
16									

GRANULAR SOILS		COHESIVE SOILS	
BLOWS/FT	DENSITY	BLOWS/FT	DENSITY
0-4	V. LOOSE	0-2	V. SOFT
4-10	LOOSE	2-4	SOFT
10-30	M. DENSE	4-8	M. STIFF
30-50	DENSE	8-15	STIFF
> 50	V. DENSE	15-30	V. STIFF
		> 30	HARD

NOTES:
Sampled for Pb @ 0-2' (collected below concrete)
Historical CM-39 location taken within building slab footprint

GENERAL NOTES: i) THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY BETWEEN SOIL TYPES. TRANSITIONS MAY BE GRADUAL.
ii) WATER LEVEL READINGS HAVE BEEN MADE IN THE DRILL HOLES AT TIMES AND UNDER CONDITIONS STATED ON THIS BORING LOG. FLUCTUATIONS IN THE LEVEL OF GROUNDWATER MAY OCCUR DUE TO OTHER FACTORS THAN THOSE PRESENT AT THE TIME MEASUREMENTS ARE MADE.

BORING No. CM-39W

Weston & Sampson	PROJECT E/S Pinevale Springfield, MA	REPORT OF BORING No. CM-53N SHEET 1 OF 1 Project No. ENG23-0351 CHKD BY ACE

BORING Co.	New England Geotech, LLC	BORING LOCATION	See attached plan
FOREMAN	Maynor	GROUND SURFACE ELEV.	DATUM
WSE REPRESENTATIVE:	ACE & EL	DATE START 5/15/23	DATE END 5/15/23

SAMPLER: Track-mounted Geoprobe

CASING: DT 22 2.25-inch PVC liners w/o catcher

CASING SIZE: 2.25 in

GROUNDWATER OBSERVATIONS

DATE	TIME	WATER AT	CASING AT	STABILIZATION TIME
5/15/23		8.5'		

DEPTH (feet)	CASING (blows/ft)	SAMPLE No.	REC/PEN (in)	DEPTH (ft.)	BLOWS/6"	PID (ppm)	SAMPLE DESCRIPTION	NOTES	STRATUM DESCRIPTION
0	NA	1	32/60	0-5		0.0	0-1' Brown F SAND with some organics (roots, mulch, leaves), damp, no odor		**Topsoil**
2							1-3' Dark brown F-M SAND with trace gravel, trace organics (roots), damp, no odor		**Sand**
4							3-4' Red crushed brick		**Brick**
							4-5' Crushed white concrete		**Concrete**
6		2	35/60	5-10		0.0	5-6' Red crushed brick, rubber and metal debris @ 6'		**Urban fill**
8							6-7' Gray/brown F-M SAND with little crushed rock, moist, no odor		**Sand**
10		3	60/60	10-15		0.0	7-15' Brown F SAND with some silt, trace gravel, wet @ 8', no odor		
12									
14									
16							EOB @ 15'		

GRANULAR SOILS		COHESIVE SOILS	
BLOWS/FT	DENSITY	BLOWS/FT	DENSITY
0-4	V. LOOSE	0-2	V. SOFT
4-10	LOOSE	2-4	SOFT
10-30	M. DENSE	4-8	M. STIFF
30-50	DENSE	8-15	STIFF
> 50	V. DENSE	15-30	V. STIFF
		> 30	HARD

NOTES:
Groundwater @ 8.5'
Monitoring well installed stick-up, screened 2.5-12.5' (refusal at 12.5' during installation)
Sampled for Ba, Cd, and Pb @ 0-2'

GENERAL NOTES: i) THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY BETWEEN SOIL TYPES. TRANSITIONS MAY BE GRADUAL.
ii) WATER LEVEL READINGS HAVE BEEN MADE IN THE DRILL HOLES AT TIMES AND UNDER CONDITIONS STATED ON THIS BORING LOG. FLUCTUATIONS IN THE LEVEL OF GROUNDWATER MAY OCCUR DUE TO OTHER FACTORS THAN THOSE PRESENT AT THE TIME MEASUREMENTS ARE MADE.

BORING No. CM-53N

Weston & Sampson	PROJECT E/S Pinevale Springfield, MA	REPORT OF BORING No. CM-53E SHEET 1 OF 1 Project No. ENG23-0351 CHKD BY ACE

BORING Co.	New England Geotech, LLC	BORING LOCATION	See attached plan
FOREMAN	Maynor	GROUND SURFACE ELEV.	DATUM
WSE REPRESENTATIVE:	ACE & EL	DATE START 5/15/23	DATE END 5/15/23

SAMPLER: Track-mounted Geoprobe

CASING: DT 22 2.25-inch PVC liners w/o catcher

CASING SIZE: 2.25 in

GROUNDWATER OBSERVATIONS

DATE	TIME	WATER AT	CASING AT	STABILIZATION TIME

DEPTH (feet)	CASING (blows/ft)	SAMPLE No.	REC/PEN (in)	DEPTH (ft.)	BLOWS/6"	PID (ppm)	SAMPLE DESCRIPTION	NOTES	STRATUM DESCRIPTION
0	NA	1	24/24	0-2		0.0	0-2" Mulch		**Topsoil**
							2"-2' Light brown M-C SAND with trace gravel, moist, no odor, trace crushed rock		**Sand**
2							EOB @ 2'		
4									
6									
8									
10									
12									
14									
16									

GRANULAR SOILS		COHESIVE SOILS	
BLOWS/FT	DENSITY	BLOWS/FT	DENSITY
0-4	V. LOOSE	0-2	V. SOFT
4-10	LOOSE	2-4	SOFT
10-30	M. DENSE	4-8	M. STIFF
30-50	DENSE	8-15	STIFF
> 50	V. DENSE	15-30	V. STIFF
		> 30	HARD

NOTES:
Sampled for Cd, Ba, and Pb @ 0-2'
DUP-2 collected for Cd, Ba, and Pb @ 0-2'
MS/MSD-1 collected for MS/MSD Cd, Ba, Pb @ 0-2'

GENERAL NOTES: i) THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY BETWEEN SOIL TYPES. TRANSITIONS MAY BE GRADUAL.
ii) WATER LEVEL READINGS HAVE BEEN MADE IN THE DRILL HOLES AT TIMES AND UNDER CONDITIONS STATED ON THIS BORING LOG. FLUCTUATIONS IN THE LEVEL OF GROUNDWATER MAY OCCUR DUE TO OTHER FACTORS THAN THOSE PRESENT AT THE TIME MEASUREMENTS ARE MADE.

BORING No. CM-53E

Weston & Sampson	PROJECT E/S Pinevale Springfield, MA	REPORT OF BORING No. CM-53SE SHEET 1 OF 1 Project No. ENG23-0351 CHKD BY ACE

BORING Co.	New England Geotech, LLC	BORING LOCATION	See attached plan
FOREMAN	Maynor	GROUND SURFACE ELEV.	DATUM
WSE REPRESENTATIVE:	ACE & EL	DATE START 5/15/23	DATE END 5/15/23

SAMPLER: Track-mounted Geoprobe

CASING: DT 22 2.25-inch PVC liners w/o catcher

CASING SIZE: 2.25 in

GROUNDWATER OBSERVATIONS

DATE	TIME	WATER AT	CASING AT	STABILIZATION TIME

DEPTH (feet)	CASING (blows/ft)	SAMPLE No.	REC/PEN (in)	DEPTH (ft.)	BLOWS/6"	PID (ppm)	SAMPLE DESCRIPTION	NOTES	STRATUM DESCRIPTION
0	NA	1	24/24	0-2		0.0	0-1' Concrete		**Concrete**
							1-2' Light brown F-C SAND with little gravel, moist, no odor		**Sand**
2							EOB @ 2'		
4									
6									
8									
10									
12									
14									
16									

GRANULAR SOILS		COHESIVE SOILS	
BLOWS/FT	DENSITY	BLOWS/FT	DENSITY
0-4	V. LOOSE	0-2	V. SOFT
4-10	LOOSE	2-4	SOFT
10-30	M. DENSE	4-8	M. STIFF
30-50	DENSE	8-15	STIFF
> 50	V. DENSE	15-30	V. STIFF
		> 30	HARD

NOTES:
Sampled 1-2' for Cd, Ba, Pb

GENERAL NOTES: i) THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY BETWEEN SOIL TYPES. TRANSITIONS MAY BE GRADUAL.
ii) WATER LEVEL READINGS HAVE BEEN MADE IN THE DRILL HOLES AT TIMES AND UNDER CONDITIONS STATED ON THIS BORING LOG. FLUCTUATIONS IN THE LEVEL OF GROUNDWATER MAY OCCUR DUE TO OTHER FACTORS THAN THOSE PRESENT AT THE TIME MEASUREMENTS ARE MADE.

BORING No. CM-53SE

Weston & Sampson	PROJECT E/S Pinevale Springfield, MA	REPORT OF BORING No. CM-53SW SHEET 1 OF 1 Project No. ENG23-0351 CHKD BY ACE

BORING Co.	New England Geotech, LLC	BORING LOCATION	See attached plan
FOREMAN	Maynor	GROUND SURFACE ELEV.	DATUM
WSE REPRESENTATIVE:	ACE & EL	DATE START 5/15/23	DATE END 5/15/23

SAMPLER: Track-mounted Geoprobe

CASING: DT 22 2.25-inch PVC liners w/o catcher

CASING SIZE: 2.25 in

GROUNDWATER OBSERVATIONS

DATE	TIME	WATER AT	CASING AT	STABILIZATION TIME

DEPTH (feet)	CASING (blows/ft)	SAMPLE No.	REC/PEN (in)	DEPTH (ft.)	BLOWS/6"	PID (ppm)	SAMPLE DESCRIPTION	NOTES	STRATUM DESCRIPTION
0	NA	1	24/24	0-2		0.0	0-6" Concrete		**Concrete**
							6"-15" Light brown F-M SAND with trace crushed rock and gravel, dry, no odor 15"-2' Brown F SAND with silt, trace F gravel, moist, no odor		**Sand**
2							EOB @ 2'		
4									
6									
8									
10									
12									
14									
16									

GRANULAR SOILS		COHESIVE SOILS	
BLOWS/FT	DENSITY	BLOWS/FT	DENSITY
0-4	V. LOOSE	0-2	V. SOFT
4-10	LOOSE	2-4	SOFT
10-30	M. DENSE	4-8	M. STIFF
30-50	DENSE	8-15	STIFF
> 50	V. DENSE	15-30	V. STIFF
		> 30	HARD

NOTES:
Sampled for Cd, Ba, and Pb @ 6"-2'

GENERAL NOTES: i) THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY BETWEEN SOIL TYPES. TRANSITIONS MAY BE GRADUAL.
ii) WATER LEVEL READINGS HAVE BEEN MADE IN THE DRILL HOLES AT TIMES AND UNDER CONDITIONS STATED ON THIS BORING LOG. FLUCTUATIONS IN THE LEVEL OF GROUNDWATER MAY OCCUR DUE TO OTHER FACTORS THAN THOSE PRESENT AT THE TIME MEASUREMENTS ARE MADE.

BORING No. CM-53SW

Weston & Sampson	PROJECT E/S Pinevale Springfield, MA	REPORT OF BORING No. CM-53W-a SHEET 1 OF 1 Project No. ENG23-0351 CHKD BY ACE

BORING Co.	New England Geotech, LLC	BORING LOCATION	See attached plan
FOREMAN	Maynor	GROUND SURFACE ELEV.	DATUM
WSE REPRESENTATIVE:	ACE & EL	DATE START 5/15/23	DATE END 5/15/23

SAMPLER: Track-mounted Geoprobe

CASING: DT 22 2.25-inch PVC liners w/o catcher

CASING SIZE: 2.25 in

GROUNDWATER OBSERVATIONS

DATE	TIME	WATER AT	CASING AT	STABILIZATION TIME

DEPTH (feet)	CASING (blows/ft)	SAMPLE No.	REC/PEN (in)	DEPTH (ft.)	BLOWS/6"	PID (ppm)	SAMPLE DESCRIPTION	NOTES	STRATUM DESCRIPTION
0	NA	1	22/24	0-2		0.0	0-8" Dark brown F-M SAND with some organics (roots), trace F gravel, dry, no odor		**Topsoil**
2							8"-2' Red crushed brick with trace debris (rope, crushed rock)		**Brick**
							EOB @ 2'		
4									
6									
8									
10									
12									
14									
16									

GRANULAR SOILS		COHESIVE SOILS	
BLOWS/FT	DENSITY	BLOWS/FT	DENSITY
0-4	V. LOOSE	0-2	V. SOFT
4-10	LOOSE	2-4	SOFT
10-30	M. DENSE	4-8	M. STIFF
30-50	DENSE	8-15	STIFF
> 50	V. DENSE	15-30	V. STIFF
		> 30	HARD

NOTES:

4 attempts to collect enough volume for DUPs but all sleeves had brick @ 8"

No sample at this location, moved south to CM-53W-b

GENERAL NOTES: i) THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY BETWEEN SOIL TYPES. TRANSITIONS MAY BE GRADUAL.

ii) WATER LEVEL READINGS HAVE BEEN MADE IN THE DRILL HOLES AT TIMES AND UNDER CONDITIONS STATED ON THIS BORING LOG. FLUCTUATIONS IN THE LEVEL OF GROUNDWATER MAY OCCUR DUE TO OTHER FACTORS THAN THOSE PRESENT AT THE TIME MEASUREMENTS ARE MADE.

BORING No. CM-53W-a

Weston & Sampson	PROJECT E/S Pinevale Springfield, MA	REPORT OF BORING No. CM-53W-b SHEET 1 OF 1 Project No. ENG23-0351 CHKD BY ACE

BORING Co.	New England Geotech, LLC	BORING LOCATION	See attached plan
FOREMAN	Maynor	GROUND SURFACE ELEV.	DATUM
WSE REPRESENTATIVE:	ACE & EL	DATE START 1/0/00	DATE END 1/0/00

SAMPLER: Track-mounted Geoprobe

CASING: DT 22 2.25-inch PVC liners w/o catcher

CASING SIZE: 2.25 in

GROUNDWATER OBSERVATIONS

DATE	TIME	WATER AT	CASING AT	STABILIZATION TIME

DEPTH (feet)	CASING (blows/ft)	SAMPLE No.	REC/PEN (in)	DEPTH (ft.)	BLOWS/6"	PID (ppm)	SAMPLE DESCRIPTION	NOTES	STRATUM DESCRIPTION
0	NA	1	22/24	0-2		0.0	0-6" Concrete		**Concrete**
							6"-22" Light brown M-C SAND with trace gravel, moist, no odor		**Sand**
2							22-24" Crushed rock		**Rock**
							EOB @ 2'		
4									
6									
8									
10									
12									
14									
16									

GRANULAR SOILS		COHESIVE SOILS	
BLOWS/FT	DENSITY	BLOWS/FT	DENSITY
0-4	V. LOOSE	0-2	V. SOFT
4-10	LOOSE	2-4	SOFT
10-30	M. DENSE	4-8	M. STIFF
30-50	DENSE	8-15	STIFF
> 50	V. DENSE	15-30	V. STIFF
		> 30	HARD

NOTES:
Moved south between original CM-53W location and CM-53SW
Sampled for Cd, Ba, and Pb @ 6"-2'

GENERAL NOTES: i) THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY BETWEEN SOIL TYPES. TRANSITIONS MAY BE GRADUAL.
ii) WATER LEVEL READINGS HAVE BEEN MADE IN THE DRILL HOLES AT TIMES AND UNDER CONDITIONS STATED ON THIS BORING LOG. FLUCTUATIONS IN THE LEVEL OF GROUNDWATER MAY OCCUR DUE TO OTHER FACTORS THAN THOSE PRESENT AT THE TIME MEASUREMENTS ARE MADE.

BORING No. CM-53W-b

Weston & Sampson	PROJECT E/S Pinevale Springfield, MA	REPORT OF BORING No. DP-2A / CM-43N SHEET 1 OF 1 Project No. ENG23-0351 CHKD BY ACE

BORING Co.	New England Geotech, LLC	BORING LOCATION	See attached plan
FOREMAN	Maynor	GROUND SURFACE ELEV.	DATUM
WSE REPRESENTATIVE:	ACE & EL	DATE START 5/18/23	DATE END 5/18/23

SAMPLER: Track-mounted Geoprobe

CASING: DT 22 2.25-inch PVC liners w/o catcher

CASING SIZE: 2.25 in

GROUNDWATER OBSERVATIONS

DATE	TIME	WATER AT	CASING AT	STABILIZATION TIME
5/18/23		9'		

DEPTH (feet)	CASING (blows/ft)	SAMPLE No.	REC/PEN (in)	DEPTH (ft.)	BLOWS/6"	PID (ppm)	SAMPLE DESCRIPTION	NOTES	STRATUM DESCRIPTION
0	NA	1	40/60	0-5		0.0			
2									
							0-6' Brown F-M SAND with trace gravel, ash, brick, and organics (roots), damp, no odor		
4									
		2	40/60	5-10		0.0			
6							6-7.5' Brown F-C SAND with pockets of light brown and dark brown sand, with trace gravel, brick, slag, and ash. Moist, no odor		
8							7.5'-8.5' Dark brown F SAND, peat-like, trace organics (roots), moist, organic odor		**Sand**
10							8.5-11' Gray F-C SAND, wet @ 9-10', very slight stale petroleum-like odor		
		3	37/60	10-15					
						0.6			
12							11-13' Light orange / brown C SAND with trace gravel, wet, slight petroleum-like odor		
14							13-15' Gray F SAND with trace gravel, wet, strong petroleum-like odor		
						5.1			
16							EOB @ 15'		

GRANULAR SOILS		COHESIVE SOILS	
BLOWS/FT	DENSITY	BLOWS/FT	DENSITY
0-4	V. LOOSE	0-2	V. SOFT
4-10	LOOSE	2-4	SOFT
10-30	M. DENSE	4-8	M. STIFF
30-50	DENSE	8-15	STIFF
> 50	V. DENSE	15-30	V. STIFF
		> 30	HARD

NOTES:
Groundwater @ 9'
DP-2A sampled for PAH, lead, coal ash @ 0-2'
CM-43N sampled for EPH and lead @ 8-11', VPH @ 11'
Monitoring well installed stick-up, screened 6.5-16.5'

GENERAL NOTES: i) THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY BETWEEN SOIL TYPES. TRANSITIONS MAY BE GRADUAL.
ii) WATER LEVEL READINGS HAVE BEEN MADE IN THE DRILL HOLES AT TIMES AND UNDER CONDITIONS STATED ON THIS BORING LOG. FLUCTUATIONS IN THE LEVEL OF GROUNDWATER MAY OCCUR DUE TO OTHER FACTORS THAN THOSE PRESENT AT THE TIME MEASUREMENTS ARE MADE.

BORING No. DP-2A / CM-43N

Weston & Sampson	PROJECT E/S Pinevale Springfield, MA	REPORT OF BORING No. CM-43NW SHEET 1 OF 1 Project No. ENG23-0351 CHKD BY ACE

BORING Co.	New England Geotech, LLC	BORING LOCATION	See attached plan
FOREMAN	Maynor	GROUND SURFACE ELEV.	DATUM
WSE REPRESENTATIVE:	ACE & EL	DATE START 5/18/23	DATE END 5/18/23

SAMPLER: Track-mounted Geoprobe

CASING: DT 22 2.25-inch PVC liners w/o catcher

CASING SIZE: 2.25 in

GROUNDWATER OBSERVATIONS

DATE	TIME	WATER AT	CASING AT	STABILIZATION TIME
5/18/23		7.5'		

DEPTH (feet)	CASING (blows/ft)	SAMPLE No.	REC/PEN (in)	DEPTH (ft.)	BLOWS/6"	PID (ppm)	SAMPLE DESCRIPTION	NOTES	STRATUM DESCRIPTION
0	NA	1	30/60	0-5		0.0			
							0-2.5' Crushed brick		**Brick**
2									
							2.5-3' Crushed concrete		**Concrete**
4							3-6' Light brown C SAND with trace gravel, damp, no odor		**Sand**
		2	40/60	5-10		0.0			
6							6-8' Dark brown F-M SAND with trace gravel, moist, no odor		
8							7-9.5' Light brown/gray F SAND with pocket of dark brown organic material @ 8', trace gravel, wet, no odor		
10							9.5-10' Orange/brown M-C SAND, trace gravel, wet, no odor		
							EOB @ 10'		
12									
14									
16									

GRANULAR SOILS		COHESIVE SOILS	
BLOWS/FT	DENSITY	BLOWS/FT	DENSITY
0-4	V. LOOSE	0-2	V. SOFT
4-10	LOOSE	2-4	SOFT
10-30	M. DENSE	4-8	M. STIFF
30-50	DENSE	8-15	STIFF
> 50	V. DENSE	15-30	V. STIFF
		> 30	HARD

NOTES:
Groundwater @ 7.5'
Sampled for EPH and Pb @ 5-8', VPH @ 8'

GENERAL NOTES: i) THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY BETWEEN SOIL TYPES. TRANSITIONS MAY BE GRADUAL.
ii) WATER LEVEL READINGS HAVE BEEN MADE IN THE DRILL HOLES AT TIMES AND UNDER CONDITIONS STATED ON THIS BORING LOG. FLUCTUATIONS IN THE LEVEL OF GROUNDWATER MAY OCCUR DUE TO OTHER FACTORS THAN THOSE PRESENT AT THE TIME MEASUREMENTS ARE MADE.

BORING No. CM-43NW

Weston & Sampson	PROJECT E/S Pinevale Springfield, MA	REPORT OF BORING No. CM-43SW SHEET 1 OF 1 Project No. ENG23-0351 CHKD BY ACE

BORING Co.	New England Geotech, LLC	BORING LOCATION	See attached plan
FOREMAN	Maynor	GROUND SURFACE ELEV.	DATUM
WSE REPRESENTATIVE:	ACE & EL	DATE START 5/18/23	DATE END 5/18/23

SAMPLER: Track-mounted Geoprobe

CASING: DT 22 2.25-inch PVC liners w/o catcher

CASING SIZE: 2.25 in

GROUNDWATER OBSERVATIONS

DATE	TIME	WATER AT	CASING AT	STABILIZATION TIME
5/18/23		7.5'		

DEPTH (feet)	CASING (blows/ft)	SAMPLE No.	REC/PEN (in)	DEPTH (ft.)	BLOWS/6"	PID (ppm)	SAMPLE DESCRIPTION	NOTES	STRATUM DESCRIPTION
0	NA	1	35/60	0-5		0.0	0-2.5' Brown F-M SAND with trace gravel, some crushed brick, trace organics (roots), dry, no odor		**Sand**
2									
							2.5-3' Crushed concrete		**Concrete**
4							3-7' Brown F-M SAND with trace gravel, damp, no odor		**Sand**
		2	40/60	5-10		0.0			
6									
8							7-9.5' Brown F SAND, trace organics (roots), wet, no odor		
10							9.5-10' Light orange/brown F-C SAND with trace gravel, wet, no odor		
							EOB @ 10'		
12									
14									
16									

GRANULAR SOILS		COHESIVE SOILS	
BLOWS/FT	DENSITY	BLOWS/FT	DENSITY
0-4	V. LOOSE	0-2	V. SOFT
4-10	LOOSE	2-4	SOFT
10-30	M. DENSE	4-8	M. STIFF
30-50	DENSE	8-15	STIFF
> 50	V. DENSE	15-30	V. STIFF
		> 30	HARD

NOTES:
Sampled for EPH and Pb @ 5-8', VPH @ 8'

GENERAL NOTES: i) THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY BETWEEN SOIL TYPES. TRANSITIONS MAY BE GRADUAL.
ii) WATER LEVEL READINGS HAVE BEEN MADE IN THE DRILL HOLES AT TIMES AND UNDER CONDITIONS STATED ON THIS BORING LOG. FLUCTUATIONS IN THE LEVEL OF GROUNDWATER MAY OCCUR DUE TO OTHER FACTORS THAN THOSE PRESENT AT THE TIME MEASUREMENTS ARE MADE.

BORING No. CM-43SW

Weston & Sampson	PROJECT E/S Pinevale Springfield, MA	REPORT OF BORING No. CM-45A SHEET 1 OF 1 Project No. ENG23-0351 CHKD BY ACE

BORING Co.	New England Geotech, LLC	BORING LOCATION	See attached plan
FOREMAN	Maynor	GROUND SURFACE ELEV.	DATUM
WSE REPRESENTATIVE:	ACE & EL	DATE START 5/18/23	DATE END 5/18/23

SAMPLER: Track-mounted Geoprobe

CASING: DT 22 2.25-inch PVC liners w/o catcher

CASING SIZE: 2.25 in

GROUNDWATER OBSERVATIONS

DATE	TIME	WATER AT	CASING AT	STABILIZATION TIME

DEPTH (feet)	CASING (blows/ft)	SAMPLE No.	REC/PEN (in)	DEPTH (ft.)	BLOWS/6"	PID (ppm)	SAMPLE DESCRIPTION	NOTES	STRATUM DESCRIPTION
0	NA						**SEE NOTES SECTION**		
2									
4									
6									
8									
10									
12									
14									
16									

GRANULAR SOILS		COHESIVE SOILS	
BLOWS/FT	DENSITY	BLOWS/FT	DENSITY
0-4	V. LOOSE	0-2	V. SOFT
4-10	LOOSE	2-4	SOFT
10-30	M. DENSE	4-8	M. STIFF
30-50	DENSE	8-15	STIFF
> 50	V. DENSE	15-30	V. STIFF
		> 30	HARD

NOTES:

6 attempts to drill
- All material is brick, concrete
- Refusal @ 8.5' (wood)
- Boring attempts were ~22' west of existing monitoring well on-site

GENERAL NOTES: i) THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY BETWEEN SOIL TYPES. TRANSITIONS MAY BE GRADUAL.

ii) WATER LEVEL READINGS HAVE BEEN MADE IN THE DRILL HOLES AT TIMES AND UNDER CONDITIONS STATED ON THIS BORING LOG. FLUCTUATIONS IN THE LEVEL OF GROUNDWATER MAY OCCUR DUE TO OTHER FACTORS THAN THOSE PRESENT AT THE TIME MEASUREMENTS ARE MADE.

BORING No. CM-45A

Weston & Sampson	PROJECT E/S Pinevale Springfield, MA	REPORT OF BORING No. CM-52N SHEET 1 OF 1 Project No. ENG23-0351 CHKD BY ACE

BORING Co.	New England Geotech, LLC	BORING LOCATION	See attached plan
FOREMAN	Maynor	GROUND SURFACE ELEV.	DATUM
WSE REPRESENTATIVE:	ACE & EL	DATE START 5/15/23	DATE END 5/15/23

SAMPLER: Track-mounted Geoprobe

CASING: DT 22 2.25-inch PVC liners w/o catcher

CASING SIZE: 2.25 in

GROUNDWATER OBSERVATIONS

DATE	TIME	WATER AT	CASING AT	STABILIZATION TIME

DEPTH (feet)	CASING (blows/ft)	SAMPLE No.	REC/PEN (in)	DEPTH (ft.)	BLOWS/6"	PID (ppm)	SAMPLE DESCRIPTION	NOTES	STRATUM DESCRIPTION
0	NA	1	36/36	0-3		0.0	0-1' Concrete		**Concrete**
2							1-2' Light to dark brown F-M SAND, trace gravel and silt, moist, no odor 2-3' Brown F SAND, some silt, trace F gravel, moist, no odor, trace organics		**Sand**
4							EOB @ 3'		
6									
8									
10									
12									
14									
16									

GRANULAR SOILS		COHESIVE SOILS	
BLOWS/FT	DENSITY	BLOWS/FT	DENSITY
0-4	V. LOOSE	0-2	V. SOFT
4-10	LOOSE	2-4	SOFT
10-30	M. DENSE	4-8	M. STIFF
30-50	DENSE	8-15	STIFF
> 50	V. DENSE	15-30	V. STIFF
		> 30	HARD

NOTES:
Sampled for Cd @ 1-3'

GENERAL NOTES: i) THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY BETWEEN SOIL TYPES. TRANSITIONS MAY BE GRADUAL.
ii) WATER LEVEL READINGS HAVE BEEN MADE IN THE DRILL HOLES AT TIMES AND UNDER CONDITIONS STATED ON THIS BORING LOG. FLUCTUATIONS IN THE LEVEL OF GROUNDWATER MAY OCCUR DUE TO OTHER FACTORS THAN THOSE PRESENT AT THE TIME MEASUREMENTS ARE MADE.

BORING No. CM-52N

Weston & Sampson	PROJECT E/S Pinevale Springfield, MA	REPORT OF BORING No. CM-52E SHEET 1 OF 1 Project No. ENG23-0351 CHKD BY ACE

BORING Co.	New England Geotech, LLC	BORING LOCATION	See attached plan
FOREMAN	Maynor	GROUND SURFACE ELEV.	DATUM
WSE REPRESENTATIVE:	ACE & EL	DATE START 5/15/23	DATE END 5/15/23

SAMPLER: Track-mounted Geoprobe

CASING: DT 22 2.25-inch PVC liners w/o catcher

CASING SIZE: 2.25 in

GROUNDWATER OBSERVATIONS

DATE	TIME	WATER AT	CASING AT	STABILIZATION TIME

DEPTH (feet)	CASING (blows/ft)	SAMPLE No.	REC/PEN (in)	DEPTH (ft.)	BLOWS/6"	PID (ppm)	SAMPLE DESCRIPTION	NOTES	STRATUM DESCRIPTION
0	NA	1	32/36	0-3		0.0	0-6" Brown F-M SAND with some organics (leaves, roots, wood). Dry, no odor		**Topsoil**
2							6"-2' Brown F-M SAND with trace gravel, brick (red) and crushed rock. Moist, no odor. 2-3' Light brown F-M SAND with trace gravel and silt. Moist, no odor.		**Sand**
4							EOB @ 3'		
6									
8									
10									
12									
14									
16									

GRANULAR SOILS		COHESIVE SOILS	
BLOWS/FT	DENSITY	BLOWS/FT	DENSITY
0-4	V. LOOSE	0-2	V. SOFT
4-10	LOOSE	2-4	SOFT
10-30	M. DENSE	4-8	M. STIFF
30-50	DENSE	8-15	STIFF
> 50	V. DENSE	15-30	V. STIFF
		> 30	HARD

NOTES:
Sampled for Cd @ 1-3'

GENERAL NOTES: i) THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY BETWEEN SOIL TYPES. TRANSITIONS MAY BE GRADUAL.
ii) WATER LEVEL READINGS HAVE BEEN MADE IN THE DRILL HOLES AT TIMES AND UNDER CONDITIONS STATED ON THIS BORING LOG. FLUCTUATIONS IN THE LEVEL OF GROUNDWATER MAY OCCUR DUE TO OTHER FACTORS THAN THOSE PRESENT AT THE TIME MEASUREMENTS ARE MADE.

BORING No. CM-52E

Weston & Sampson	PROJECT E/S Pinevale Springfield, MA	REPORT OF BORING No. CM-52S SHEET 1 OF 1 Project No. ENG23-0351 CHKD BY ACE

BORING Co.	New England Geotech, LLC	BORING LOCATION	See attached plan
FOREMAN	Maynor	GROUND SURFACE ELEV.	DATUM
WSE REPRESENTATIVE:	ACE & EL	DATE START 5/15/23	DATE END 5/15/23

SAMPLER: Track-mounted Geoprobe

CASING: DT 22 2.25-inch PVC liners w/o catcher

CASING SIZE: 2.25 in

GROUNDWATER OBSERVATIONS

DATE	TIME	WATER AT	CASING AT	STABILIZATION TIME

DEPTH (feet)	CASING (blows/ft)	SAMPLE No.	REC/PEN (in)	DEPTH (ft.)	BLOWS/6"	PID (ppm)	SAMPLE DESCRIPTION	NOTES	STRATUM DESCRIPTION
0	NA	1	28/36	0-3		0.0	0-14" Concrete		**Concrete**
							14"-2' Brown F SAND with some silt. Trace fine gravel and organics (roots). Moist, no odor. 2-3' Light brown, F-M SAND. Trace gravel and silt. Moist, no odor.		**Sand**
2									
							EOB @ 3'		
4									
6									
8									
10									
12									
14									
16									

GRANULAR SOILS		COHESIVE SOILS	
BLOWS/FT	DENSITY	BLOWS/FT	DENSITY
0-4	V. LOOSE	0-2	V. SOFT
4-10	LOOSE	2-4	SOFT
10-30	M. DENSE	4-8	M. STIFF
30-50	DENSE	8-15	STIFF
> 50	V. DENSE	15-30	V. STIFF
		> 30	HARD

NOTES:

Sampled for Cd @ 14"-3'

Removed a wood block from wood block flooring area and began drilling at concrete slab below

GENERAL NOTES: i) THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY BETWEEN SOIL TYPES. TRANSITIONS MAY BE GRADUAL.

ii) WATER LEVEL READINGS HAVE BEEN MADE IN THE DRILL HOLES AT TIMES AND UNDER CONDITIONS STATED ON THIS BORING LOG. FLUCTUATIONS IN THE LEVEL OF GROUNDWATER MAY OCCUR DUE TO OTHER FACTORS THAN THOSE PRESENT AT THE TIME MEASUREMENTS ARE MADE.

BORING No. CM-52S

Weston & Sampson	PROJECT E/S Pinevale Springfield, MA	REPORT OF BORING No. CM-52W SHEET 1 OF 1 Project No. ENG23-0351 CHKD BY ACE

BORING Co.	New England Geotech, LLC	BORING LOCATION	See attached plan
FOREMAN	Maynor	GROUND SURFACE ELEV.	DATUM
WSE REPRESENTATIVE:	ACE & EL	DATE START 5/15/23	DATE END 5/15/23

SAMPLER: Track-mounted Geoprobe

CASING: DT 22 2.25-inch PVC liners w/o catcher

CASING SIZE: 2.25 in

GROUNDWATER OBSERVATIONS

DATE	TIME	WATER AT	CASING AT	STABILIZATION TIME

DEPTH (feet)	CASING (blows/ft)	SAMPLE No.	REC/PEN (in)	DEPTH (ft.)	BLOWS/6"	PID (ppm)	SAMPLE DESCRIPTION	NOTES	STRATUM DESCRIPTION
0	NA	1	50/60	0-5		0.0	0-5" Concrete		**Concrete**
							5"-12" Black crushed asphalt		**Asphalt**
2							1-3' Light to dark brown F-M SAND, trace gravel, trace silt, moist, no odor		**Sand**
4							3-5' Brown F SAND with some silt and trace fine gravel. Moist, no odor.		
							EOB @ 5'		
6									
8									
10									
12									
14									
16									

GRANULAR SOILS		COHESIVE SOILS	
BLOWS/FT	DENSITY	BLOWS/FT	DENSITY
0-4	V. LOOSE	0-2	V. SOFT
4-10	LOOSE	2-4	SOFT
10-30	M. DENSE	4-8	M. STIFF
30-50	DENSE	8-15	STIFF
> 50	V. DENSE	15-30	V. STIFF
		> 30	HARD

NOTES:
Sampled for Cd @ 1-3'

GENERAL NOTES: i) THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY BETWEEN SOIL TYPES. TRANSITIONS MAY BE GRADUAL.
ii) WATER LEVEL READINGS HAVE BEEN MADE IN THE DRILL HOLES AT TIMES AND UNDER CONDITIONS STATED ON THIS BORING LOG. FLUCTUATIONS IN THE LEVEL OF GROUNDWATER MAY OCCUR DUE TO OTHER FACTORS THAN THOSE PRESENT AT THE TIME MEASUREMENTS ARE MADE.

BORING No. CM-52W

Weston & Sampson	PROJECT E/S Pinevale Springfield, MA	REPORT OF BORING No. MW-205A SHEET 1 OF 1 Project No. ENG23-0351 CHKD BY ACE

BORING Co.	New England Geotech, LLC	BORING LOCATION	See attached plan
FOREMAN	Maynor	GROUND SURFACE ELEV.	DATUM
WSE REPRESENTATIVE:	ACE & EL	DATE START 5/15/23	DATE END 5/15/23

SAMPLER: Track-mounted Geoprobe

CASING: DT 22 2.25-inch PVC liners w/o catcher

CASING SIZE: 2.25 in

GROUNDWATER OBSERVATIONS

DATE	TIME	WATER AT	CASING AT	STABILIZATION TIME
5/15/23		8'		

DEPTH (feet)	CASING (blows/ft)	SAMPLE No.	REC/PEN (in)	DEPTH (ft.)	BLOWS/6"	PID (ppm)	SAMPLE DESCRIPTION	NOTES	STRATUM DESCRIPTION
0	NA	1	22/60	0-5		0.0	0-5" Concrete		**Concrete**
							5"-1.5' Brown F-C SAND with trace gravel and brick. Moist, no odor. Pocket of light yellow/tan crushed rock @ 1.5'		**Sand**
2							1.5-8' Brown F-M SAND, trace silt, trace fine gravel, trace organics (roots), pocket of crushed brick at 8'. Moist, no odor.		
4									
		2	23/60	5-10		0.0			
6									
8							8-9' Gray F-M SAND with trace silt. Wet, no odor.		
10		3	55/60	10-15		0.0	9-15' Light brown, F-C SAND, trace gravel. Wet, no odor.		
12									
14									
16							EOB @ 15'		

GRANULAR SOILS		COHESIVE SOILS	
BLOWS/FT	DENSITY	BLOWS/FT	DENSITY
0-4	V. LOOSE	0-2	V. SOFT
4-10	LOOSE	2-4	SOFT
10-30	M. DENSE	4-8	M. STIFF
30-50	DENSE	8-15	STIFF
> 50	V. DENSE	15-30	V. STIFF
		> 30	HARD

NOTES:
Groundwater @ 8'
MW-205A monitoring well installed, flush-mount, screened 5-15'
Sampled for Cd @ 5"-3'

GENERAL NOTES: i) THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY BETWEEN SOIL TYPES. TRANSITIONS MAY BE GRADUAL.
ii) WATER LEVEL READINGS HAVE BEEN MADE IN THE DRILL HOLES AT TIMES AND UNDER CONDITIONS STATED ON THIS BORING LOG. FLUCTUATIONS IN THE LEVEL OF GROUNDWATER MAY OCCUR DUE TO OTHER FACTORS THAN THOSE PRESENT AT THE TIME MEASUREMENTS ARE MADE.

BORING No. MW-205A

Weston & Sampson	PROJECT E/S Pinevale Springfield, MA	REPORT OF BORING No. OTP-4A SHEET 1 OF 1 Project No. ENG23-0351 CHKD BY ACE

BORING Co.	New England Geotech, LLC	BORING LOCATION	See attached plan
FOREMAN	Maynor	GROUND SURFACE ELEV.	DATUM
WSE REPRESENTATIVE:	ACE & EL	DATE START 5/18/23	DATE END 5/18/23

SAMPLER: Track-mounted Geoprobe

CASING: DT 22 2.25-inch PVC liners w/o catcher

CASING SIZE: 2.25 in

GROUNDWATER OBSERVATIONS

DATE	TIME	WATER AT	CASING AT	STABILIZATION TIME

DEPTH (feet)	CASING (blows/ft)	SAMPLE No.	REC/PEN (in)	DEPTH (ft.)	BLOWS/6"	PID (ppm)	SAMPLE DESCRIPTION	NOTES	STRATUM DESCRIPTION
0	NA	1	42/60	0-5		0.0	0-3" Brown F-M SAND with trace organics (roots, mulch, leaves), trace gravel, dry, no odor.		**Topsoil**
							3"-6" Crushed concrete		**Concrete**
2							6"-2.5' Brown F-C SAND with trace gravel, organics (roots), moist, no odor		**Sand**
4							2.5-5' Light brown F-M SAND with trace F gravel, moist, no odor		
6							EOB @ 5'		
8									
10									
12									
14									
16									

GRANULAR SOILS		COHESIVE SOILS	
BLOWS/FT	DENSITY	BLOWS/FT	DENSITY
0-4	V. LOOSE	0-2	V. SOFT
4-10	LOOSE	2-4	SOFT
10-30	M. DENSE	4-8	M. STIFF
30-50	DENSE	8-15	STIFF
> 50	V. DENSE	15-30	V. STIFF
		> 30	HARD

NOTES:
Sampled for PAHs, Pb, coal ash @ 0-2' (collected below concrete)

GENERAL NOTES: i) THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY BETWEEN SOIL TYPES. TRANSITIONS MAY BE GRADUAL.
ii) WATER LEVEL READINGS HAVE BEEN MADE IN THE DRILL HOLES AT TIMES AND UNDER CONDITIONS STATED ON THIS BORING LOG. FLUCTUATIONS IN THE LEVEL OF GROUNDWATER MAY OCCUR DUE TO OTHER FACTORS THAN THOSE PRESENT AT THE TIME MEASUREMENTS ARE MADE.

BORING No. OTP-4A

Weston & Sampson	PROJECT E/S Pinevale Springfield, MA	REPORT OF BORING No. OTP-6A SHEET 1 OF 1 Project No. ENG23-0351 CHKD BY ACE

BORING Co.	New England Geotech, LLC	BORING LOCATION	See attached plan
FOREMAN	Maynor	GROUND SURFACE ELEV.	DATUM
WSE REPRESENTATIVE:	ACE & EL	DATE START 5/16/23	DATE END 5/16/23

SAMPLER: Track-mounted Geoprobe

CASING: DT 22 2.25-inch PVC liners w/o catcher

CASING SIZE: 2.25 in

GROUNDWATER OBSERVATIONS

DATE	TIME	WATER AT	CASING AT	STABILIZATION TIME

DEPTH (feet)	CASING (blows/ft)	SAMPLE No.	REC/PEN (in)	DEPTH (ft.)	BLOWS/6"	PID (ppm)	SAMPLE DESCRIPTION	NOTES	STRATUM DESCRIPTION
0	NA	1	34/36	0-3		0.0	0-1' Dark brown F-M SAND with trace F gravel, trace organics (roots, mulch, grass), moist, organic odor		**Topsoil**
2							1-2' Brown F-M SAND with little gravel, moist, no odor 2-3' Light brown/orange F-C SAND, trace gravel, moist, no odor		**SAND**
4							EOB @ 3'		
6									
8									
10									
12									
14									
16									

GRANULAR SOILS		COHESIVE SOILS	
BLOWS/FT	DENSITY	BLOWS/FT	DENSITY
0-4	V. LOOSE	0-2	V. SOFT
4-10	LOOSE	2-4	SOFT
10-30	M. DENSE	4-8	M. STIFF
30-50	DENSE	8-15	STIFF
> 50	V. DENSE	15-30	V. STIFF
		> 30	HARD

NOTES:

3 sleeves drilled 0-3' adjacent to each other to collect enough volume for four 8-oz jars.
Sampled for PAHs, lead, coal ash @ 0-3'
DUP-4 collected for PAHs

GENERAL NOTES: i) THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY BETWEEN SOIL TYPES. TRANSITIONS MAY BE GRADUAL.
ii) WATER LEVEL READINGS HAVE BEEN MADE IN THE DRILL HOLES AT TIMES AND UNDER CONDITIONS STATED ON THIS BORING LOG. FLUCTUATIONS IN THE LEVEL OF GROUNDWATER MAY OCCUR DUE TO OTHER FACTORS THAN THOSE PRESENT AT THE TIME MEASUREMENTS ARE MADE.

BORING No. OTP-6A

Weston & Sampson	PROJECT E/S Pinevale Springfield, MA	REPORT OF BORING No. OTP-8A SHEET 1 OF 1 Project No. ENG23-0351 CHKD BY ACE

BORING Co.	New England Geotech, LLC	BORING LOCATION	See attached plan
FOREMAN	Maynor	GROUND SURFACE ELEV.	DATUM
WSE REPRESENTATIVE:	ACE & EL	DATE START 5/15/23	DATE END 5/15/23

SAMPLER: Track-mounted Geoprobe

CASING: DT 22 2.25-inch PVC liners w/o catcher

CASING SIZE: 2.25 in

GROUNDWATER OBSERVATIONS

DATE	TIME	WATER AT	CASING AT	STABILIZATION TIME

DEPTH (feet)	CASING (blows/ft)	SAMPLE No.	REC/PEN (in)	DEPTH (ft.)	BLOWS/6"	PID (ppm)	SAMPLE DESCRIPTION	NOTES	STRATUM DESCRIPTION
0	NA	1	24/24	0-2		0.0	0-1.5' Brown F-M SAND with trace organics (roots), trace small gravel, damp, no odor		**Sand**
2							1.5-2' Red crushed brick, 2" of asphalt at 2'		**Brick**
							EOB @ 2'		
4									
6									
8									
10									
12									
14									
16									

GRANULAR SOILS		COHESIVE SOILS	
BLOWS/FT	DENSITY	BLOWS/FT	DENSITY
0-4	V. LOOSE	0-2	V. SOFT
4-10	LOOSE	2-4	SOFT
10-30	M. DENSE	4-8	M. STIFF
30-50	DENSE	8-15	STIFF
> 50	V. DENSE	15-30	V. STIFF
		> 30	HARD

NOTES:
5 attempts to get full 2' soil recovery - kept hitting brick
Sampled for PAHs, lead, coal ash @ 0-1.5'

GENERAL NOTES: i) THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY BETWEEN SOIL TYPES. TRANSITIONS MAY BE GRADUAL.
ii) WATER LEVEL READINGS HAVE BEEN MADE IN THE DRILL HOLES AT TIMES AND UNDER CONDITIONS STATED ON THIS BORING LOG. FLUCTUATIONS IN THE LEVEL OF GROUNDWATER MAY OCCUR DUE TO OTHER FACTORS THAN THOSE PRESENT AT THE TIME MEASUREMENTS ARE MADE.

BORING No. OTP-8A

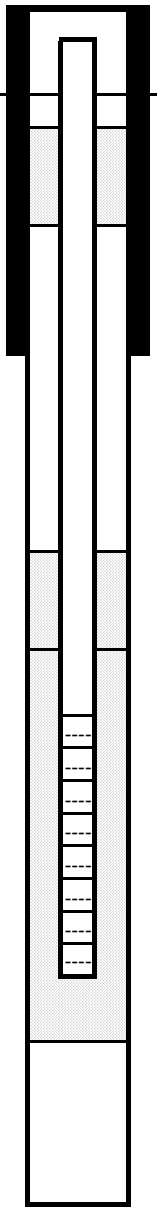
GROUNDWATER MONITORING WELL INSTALLATION REPORT

PROJECT NAME/NO.	E/S Pinevale ENG 23-0351			**MONITORING WELL NO.**	
LOCATION	Springfield, MA			**MW-CM-38N**	
CLIENT	City of Springfield			ELEVATION	
CONTRACTOR	New England Geotech	DRILLER	Maynor	TOP OF PVC	NR
WSE REP.	ACE, EL	DATE	5/18/23	DEPTH TO GROUNDWATER FROM	
CHECKED BY	ACE	DATE	9/30/23	TOP OF PVC	9.62

GROUND ELEVATION

GENERAL SOIL CONDITIONS

(NOT TO SCALE)



<---------	STICK-UP	(GROUND SURFACE)
	THICKNESS OF SURFACE SEAL(S)	1'
<---------	TYPE OF SURFACE SEAL(S)	Cement
	TYPE OF SURFACE CASING	STICK-UP
<---------	ID OF SURFACE CASING	4"
<---------	DEPTH BOTTOM OF CASING	3'
	ID OF RISER PIPE	2"
<---------	TYPE OF RISER PIPE	PVC
<---------	TYPE OF BACKFILL AROUND RISER PIPE	No. 2 Sand
	DEPTH TOP OF SEAL	2'
<---------	TYPE OF SEAL	Bentonite
	DEPTH BOTTOM OF SEAL/TOP OF SAND COLUMN	3'
<---------	DEPTH TOP OF SCREEN	4'
	TYPE OF SCREEN	PVC
<---------	SIZE OPENINGS	0.01"
	ID OF SCREEN	2"
<---------	TYPE OF BACKFILL AROUND SCREEN	No. 2 Sand
<---------	DEPTH BOTTOM OF SCREEN	14'
<---------	DEPTH BOTTOM OF SAND COLUMN	14'
<---------	TYPE OF BACKFILL BELOW SCREEN	N/A
2" <---------	DIAMETER OF BOREHOLE	2"
<---------	DEPTH BOTTOM OF BOREHOLE	14'

NOTES:

MONITORING WELL NO.
MW-CM-38N

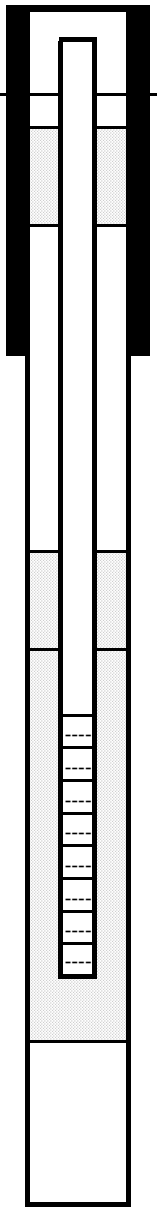
Weston & Sampson

GROUNDWATER MONITORING WELL INSTALLATION REPORT

PROJECT NAME/NO.	E/S Pinevale ENG 23-0351			**MONITORING WELL NO.**	
LOCATION	Springfield, MA			**MW-CM-53N**	
CLIENT	City of Springfield			ELEVATION	
CONTRACTOR	New England Geotech	DRILLER	Maynor	TOP OF PVC	NR
WSE REP.	ACE, EL	DATE	5/15/23	DEPTH TO GROUNDWATER FROM	
CHECKED BY	ACE	DATE	9/30/23	TOP OF PVC	8.90

GROUND ELEVATION

GENERAL SOIL CONDITIONS (NOT TO SCALE)



<---------	STICK-UP	(GROUND SURFACE)
	THICKNESS OF SURFACE SEAL(S)	0.5'
<---------	TYPE OF SURFACE SEAL(S)	Cement
	TYPE OF SURFACE CASING	STICK-UP
<---------	ID OF SURFACE CASING	4"
<---------	DEPTH BOTTOM OF CASING	3'
	ID OF RISER PIPE	2"
<---------	TYPE OF RISER PIPE	PVC
<---------	TYPE OF BACKFILL AROUND RISER PIPE	N/A
	DEPTH TOP OF SEAL	0.5'
<---------	TYPE OF SEAL	Bentonite
	DEPTH BOTTOM OF SEAL/TOP OF SAND COLUMN	1.5'
<---------	DEPTH TOP OF SCREEN	2.5'
	TYPE OF SCREEN	PVC
<---------	SIZE OPENINGS	0.01"
	ID OF SCREEN	2"
<---------	TYPE OF BACKFILL AROUND SCREEN	No. 2 Sand
<---------	DEPTH BOTTOM OF SCREEN	12.5'
<---------	DEPTH BOTTOM OF SAND COLUMN	12.5'
<---------	TYPE OF BACKFILL BELOW SCREEN	N/A
2" <---------	DIAMETER OF BOREHOLE	2"
<---------	DEPTH BOTTOM OF BOREHOLE	12.5'

NOTES:

MONITORING WELL NO.
MW-CM-53N

Weston & Sampson

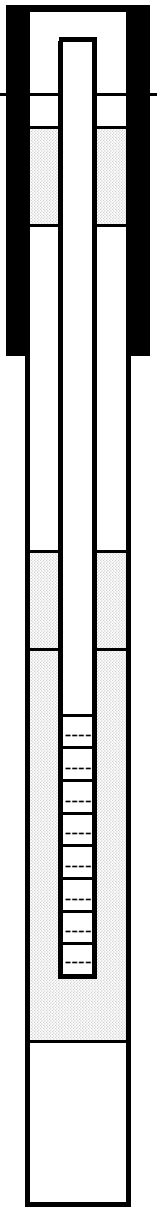
GROUNDWATER MONITORING WELL INSTALLATION REPORT

PROJECT NAME/NO.	E/S Pinevale ENG 23-0351			**MONITORING WELL NO.**	
LOCATION	Springfield, MA			**MW-CM-43N**	
CLIENT	City of Springfield			ELEVATION	
CONTRACTOR	New England Geotech	DRILLER	Maynor	TOP OF PVC	NR
WSE REP.	ACE, EL	DATE	5/18/23	DEPTH TO GROUNDWATER FROM	
CHECKED BY	ACE	DATE	9/30/23	TOP OF PVC	11.80

GROUND ELEVATION

GENERAL SOIL CONDITIONS

(NOT TO SCALE)



<---------	STICK-UP	(GROUND SURFACE)
	THICKNESS OF SURFACE SEAL(S)	1'
<---------	TYPE OF SURFACE SEAL(S)	Cement
	TYPE OF SURFACE CASING	STICK-UP
<---------	ID OF SURFACE CASING	4"
<---------	DEPTH BOTTOM OF CASING	3'
	ID OF RISER PIPE	2"
<---------	TYPE OF RISER PIPE	PVC
<---------	TYPE OF BACKFILL AROUND RISER PIPE	No. 2 Sand
	DEPTH TOP OF SEAL	4.5'
<---------	TYPE OF SEAL	Bentonite
	DEPTH BOTTOM OF SEAL/TOP OF SAND COLUMN	5.5'
<---------	DEPTH TOP OF SCREEN	6.5'
	TYPE OF SCREEN	PVC
<---------	SIZE OPENINGS	0.01"
	ID OF SCREEN	2"
<---------	TYPE OF BACKFILL AROUND SCREEN	No. 2 Sand
<---------	DEPTH BOTTOM OF SCREEN	16.5'
<---------	DEPTH BOTTOM OF SAND COLUMN	16.5'
<---------	TYPE OF BACKFILL BELOW SCREEN	N/A
2" <---------	DIAMETER OF BOREHOLE	2"
<---------	DEPTH BOTTOM OF BOREHOLE	16.5'

NOTES:

MONITORING WELL NO.
MW-CM-43N

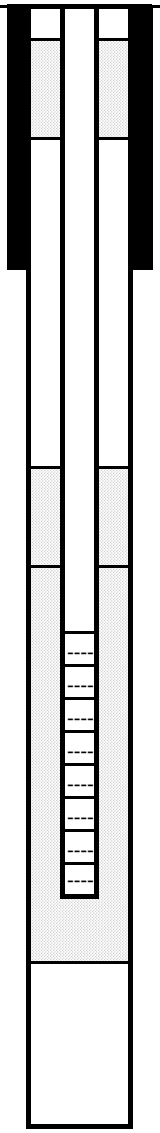
Weston & Sampson

GROUNDWATER MONITORING WELL INSTALLATION REPORT

PROJECT NAME/NO.	E/S Pinevale ENG23-0351			**MONITORING WELL NO.**	
LOCATION	Springfield, Massachusetts			**MW-205A**	
CLIENT	City of Springfield			ELEVATION	
CONTRACTOR	New England Geotech	DRILLER	Maynor	TOP OF PVC	NR
WSE REP.	ACE, EL	DATE	5/15/23	DEPTH TO GROUNDWATER FROM	
CHECKED BY	ACE	DATE	9/30/23	TOP OF PVC	7.01

GROUND ELEVATION <--------- FLUSH-MOUNTED ROADBOX (GROUND SURFACE)

GENERAL SOIL CONDITIONS
(NOT TO SCALE)



	THICKNESS OF SURFACE SEAL(S)	1'
<---------	TYPE OF SURFACE SEAL(S)	Cement
	TYPE OF SURFACE CASING	Flush-mount
<---------	ID OF SURFACE CASING	4"
<---------	DEPTH BOTTOM OF CASING	3'
	ID OF RISER PIPE	2"
<---------	TYPE OF RISER PIPE	PVC
<---------	TYPE OF BACKFILL AROUND RISER PIPE	No. 2 Sand
	DEPTH TOP OF SEAL	3'
<---------	TYPE OF SEAL	Bentonite
	DEPTH BOTTOM OF SEAL/TOP OF SAND COLUMN	4'
<---------	DEPTH TOP OF SCREEN	5'
	TYPE OF SCREEN	PVC
<---------	SIZE OPENINGS	0.01"
	ID OF SCREEN	2"
<---------	TYPE OF BACKFILL AROUND SCREEN	No. 2 Sand
<---------	DEPTH BOTTOM OF SCREEN	15'
<---------	DEPTH BOTTOM OF SAND COLUMN	15'
<---------	TYPE OF BACKFILL BELOW SCREEN	N/A
<---------	DIAMETER OF BOREHOLE	2"
<---------	DEPTH BOTTOM OF BOREHOLE	15'

NOTES:

MONITORING WELL NO.
MW-205A

Weston & Sampson

APPENDIX C
Laboratory Analytical Reports

con-test®
A Pace Analytical® Laboratory

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

June 6, 2023

Joe Spencer
Weston & Sampson Engineers MA
55 Walkers Brook Drive
Reading, MA 01867

Project Location: Springfield, MA
Client Job Number:
Project Number: ENG23-0351
Laboratory Work Order Number: 23E2241

Enclosed are results of analyses for samples as received by the laboratory on May 16, 2023. If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Rebecca Faust
Project Manager

Table of Contents

Sample Summary 4

Case Narrative 6

Sample Results 7

23E2241-01 7

23E2241-02 9

23E2241-03 11

23E2241-04 13

23E2241-05 15

23E2241-06 17

23E2241-07 19

23E2241-08 21

23E2241-09 23

23E2241-10 25

23E2241-11 27

23E2241-12 29

23E2241-13 32

23E2241-14 35

23E2241-15 38

23E2241-16 41

23E2241-17 45

23E2241-18 49

23E2241-19 52

Sample Preparation Information 54

QC Data 56

Semivolatile Organic Compounds by GC/MS 56

Table of Contents (continued)

B340861 56

Petroleum Hydrocarbons Analyses - EPH 58

B340848 58

Petroleum Hydrocarbons Analyses - VPH 60

B340496 60

Metals Analyses (Total) 62

B340817 62

Flag/Qualifier Summary 63

Certifications 64

Chain of Custody/Sample Receipt 67

con-test® A Pace Analytical® Laboratory

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Weston & Sampson Engineers MA
55 Walkers Brook Drive
Reading, MA 01867
ATTN: Joe Spencer

REPORT DATE: 6/6/2023

PURCHASE ORDER NUMBER:

PROJECT NUMBER: ENG23-0351

ANALYTICAL SUMMARY

WORK ORDER NUMBER: 23E2241

The results of analyses performed on the following samples submitted to CON-TEST, a Pace Analytical Laboratory, are found in this report.

PROJECT LOCATION: Springfield, MA

FIELD SAMPLE #	LAB ID:	MATRIX	SAMPLE DESCRIPTION	TEST	SUB LAB
CM-52W (1-3)	23E2241-01	Soil		SM 2540G	
				SW-846 6010D	
CM-52N (1-3)	23E2241-02	Soil		SM 2540G	
				SW-846 6010D	
CM-52S (14in- 3ft)	23E2241-03	Soil		SM 2540G	
				SW-846 6010D	
CM-52E (1-3)	23E2241-04	Soil		SM 2540G	
				SW-846 6010D	
MW-205A (5in-3ft)	23E2241-05	Soil		SM 2540G	
				SW-846 6010D	
DUP-2	23E2241-06	Soil		SM 2540G	
				SW-846 6010D	
CM-53SE (1-2)	23E2241-07	Soil		SM 2540G	
				SW-846 6010D	
CM-53W (6in-2 ft)	23E2241-08	Soil		SM 2540G	
				SW-846 6010D	
CM-53SW (6in-2ft)	23E2241-09	Soil		SM 2540G	
				SW-846 6010D	
CM-53N (0-2)	23E2241-10	Soil		SM 2540G	
				SW-846 6010D	
CM-53E (0-2)	23E2241-11	Soil		SM 2540G	
				SW-846 6010D	
CM-22N (9-12)	23E2241-12	Soil		MADEP EPH rev 2.1	
				MADEP-VPH-Feb 2018 Rev 2.1	
				SM 2540G	
CM-22S (8-11)	23E2241-13	Soil		MADEP EPH rev 2.1	
				MADEP-VPH-Feb 2018 Rev 2.1	
				SM 2540G	
CM-22E (8-11)	23E2241-14	Soil		MADEP EPH rev 2.1	
				MADEP-VPH-Feb 2018 Rev 2.1	
				SM 2540G	
CM-22W (9.5-12.5)	23E2241-15	Soil		MADEP EPH rev 2.1	
				MADEP-VPH-Feb 2018 Rev 2.1	
				SM 2540G	
OTP-6A (0-3)	23E2241-16	Soil		PLM/SEM	N/A cert.
				SM 2540G	
				SW-846 6010D	
				SW-846 8270E	

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Weston & Sampson Engineers MA
55 Walkers Brook Drive
Reading, MA 01867
ATTN: Joe Spencer

REPORT DATE: 6/6/2023

PURCHASE ORDER NUMBER:

PROJECT NUMBER: ENG23-0351

ANALYTICAL SUMMARY

WORK ORDER NUMBER: 23E2241

The results of analyses performed on the following samples submitted to CON-TEST, a Pace Analytical Laboratory, are found in this report.

PROJECT LOCATION: Springfield, MA

FIELD SAMPLE #	LAB ID:	MATRIX	SAMPLE DESCRIPTION	TEST	SUB LAB
OTP-8A (0-1.5)	23E2241-17	Soil		PLM/SEM	N/A cert.
				SM 2540G	
				SW-846 6010D	
				SW-846 8270E	
DUP-3	23E2241-18	Soil		MADEP EPH rev 2.1	
				MADEP-VPH-Feb 2018 Rev 2.1	
				SM 2540G	
DUP-4	23E2241-19	Soil		SM 2540G	
				SW-846 8270E	

con-test® A Pace Analytical® Laboratory

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

CASE NARRATIVE SUMMARY

All reported results are within defined laboratory quality control objectives unless listed below or otherwise qualified in this report.

For method 8270E, only PAHs were requested and reported.

SM 2540G

Qualifications:

H-06

Sample was extracted past the recommended holding time.

Analyte & Samples(s) Qualified:

% Solids

23E2241-12[CM-22N (9-12)], 23E2241-13[CM-22S (8-11)], 23E2241-14[CM-22E (8-11)], 23E2241-15[CM-22W (9.5-12.5)], 23E2241-16[OTP-6A (0-3)], 23E2241-17[OTP-8A (0-1.5)], 23E2241-18[DUP-3], 23E2241-19[DUP-4]

SW-846 6010D

Qualifications:

M-12

The reporting limit verification for the AIHA lead program is outside of control limits for this element. Any reported result at or near the detection limit may be biased on the low side.

Analyte & Samples(s) Qualified:

Lead

23E2241-06[DUP-2], 23E2241-07[CM-53SE (1-2)], 23E2241-08[CM-53 W (6in-2 ft)], 23E2241-09[CM-53SW (6in-2ft)], 23E2241-10[CM-53N (0-2)], 23E2241-11[CM-53E (0-2)], 23E2241-16[OTP-6A (0-3)], 23E2241-17[OTP-8A (0-1.5)], B340817-SRM1

MS-22

Either matrix spike or MS duplicate is outside of control limits, but the other is within limits. RPD between the two MS/MSD results is within method specified criteria.

Analyte & Samples(s) Qualified:

Barium

23E2241-07[CM-53SE (1-2)], B340817-MS1

MADEP-VPH-Feb 2018 Rev 2.1

No significant modifications were made to the method. All VPH samples were received preserved properly in methanol with a soil/methanol ratio of 1:1 +/- 25% completely covered by methanol in the proper containers specified on the chain-of-custody form unless specified in this narrative.

Analytical column used for VPH analysis is Restek, Rtx-502.2, 105meter, 0.53mmID, 3um df. Trap used for VPH analysis is Carbopack B/CarboSieveS-III.

The results of analyses reported only relate to samples submitted to Con-Test, a Pace Analytical Laboratory, for testing.
I certify that the analyses listed above, unless specifically listed as subcontracted, if any, were performed under my direction according to the approved methodologies listed in this document, and that based upon my inquiry of those individuals immediately responsible for obtaining the information, the material contained in this report is, to the best of my knowledge and belief, accurate and complete.

Lisa A. Worthington
Technical Representative

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Springfield, MA
Sample Description:
Work Order: 23E2241

Date Received: 5/16/2023

Field Sample #: CM-52W (1-3)
Sampled: 5/15/2023 10:40

Sample ID: 23E2241-01

Sample Matrix: Soil

Metals Analyses (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Cadmium	ND	0.37	mg/Kg dry	1		SW-846 6010D	5/19/23	5/23/23 1:01	NC

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Springfield, MA
Sample Description:
Work Order: 23E2241

Date Received: 5/16/2023

Field Sample #: CM-52W (1-3)
Sampled: 5/15/2023 10:40

Sample ID: 23E2241-01

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	89.0		% Wt	1		SM 2540G	5/22/23	5/22/23 13:05	MJH

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Springfield, MA
Sample Description:
Work Order: 23E2241

Date Received: 5/16/2023

Field Sample #: CM-52N (1-3)
Sampled: 5/15/2023 10:50

Sample ID: 23E2241-02

Sample Matrix: Soil

Metals Analyses (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Cadmium	ND	0.39	mg/Kg dry	1		SW-846 6010D	5/19/23	5/23/23 1:08	NC

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Springfield, MA
Sample Description:
Work Order: 23E2241

Date Received: 5/16/2023

Field Sample #: CM-52N (1-3)
Sampled: 5/15/2023 10:50

Sample ID: 23E2241-02

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	80.1		% Wt	1		SM 2540G	5/22/23	5/22/23 13:05	MJH

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Springfield, MA
Sample Description:
Work Order: 23E2241

Date Received: 5/16/2023

Field Sample #: CM-52S (14in- 3ft)
Sampled: 5/15/2023 10:58

Sample ID: 23E2241-03

Sample Matrix: Soil

Metals Analyses (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Cadmium	ND	0.39	mg/Kg dry	1		SW-846 6010D	5/19/23	5/23/23 1:15	NC

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Springfield, MA
Sample Description:
Work Order: 23E2241

Date Received: 5/16/2023

Field Sample #: CM-52S (14in- 3ft)
Sampled: 5/15/2023 10:58

Sample ID: 23E2241-03

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	83.7		% Wt	1		SM 2540G	5/22/23	5/22/23 13:05	MJH

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Springfield, MA
Sample Description:
Work Order: 23E2241

Date Received: 5/16/2023

Field Sample #: CM-52E (1-3)
Sampled: 5/15/2023 11:07

Sample ID: 23E2241-04

Sample Matrix: Soil

Metals Analyses (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Cadmium	ND	0.36	mg/Kg dry	1		SW-846 6010D	5/19/23	5/23/23 1:22	NC

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Springfield, MA
Sample Description:
Work Order: 23E2241

Date Received: 5/16/2023

Field Sample #: CM-52E (1-3)
Sampled: 5/15/2023 11:07

Sample ID: 23E2241-04

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	89.5		% Wt	1		SM 2540G	5/22/23	5/22/23 13:05	MJH

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Springfield, MA
Sample Description:
Work Order: 23E2241

Date Received: 5/16/2023

Field Sample #: MW-205A (5in-3ft)
Sampled: 5/15/2023 11:51

Sample ID: 23E2241-05

Sample Matrix: Soil

Metals Analyses (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Cadmium	1.1	0.35	mg/Kg dry	1		SW-846 6010D	5/19/23	5/23/23 1:29	NC

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Springfield, MA
Sample Description:
Work Order: 23E2241

Date Received: 5/16/2023

Field Sample #: MW-205A (5in-3ft)
Sampled: 5/15/2023 11:51

Sample ID: 23E2241-05

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	91.6		% Wt	1		SM 2540G	5/22/23	5/22/23 13:05	MJH

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Springfield, MA
Sample Description:
Work Order: 23E2241

Date Received: 5/16/2023

Field Sample #: DUP-2
Sampled: 5/15/2023 00:00

Sample ID: 23E2241-06

Sample Matrix: Soil

Metals Analyses (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Barium	16	1.7	mg/Kg dry	1		SW-846 6010D	5/19/23	5/23/23 1:36	NC
Cadmium	ND	0.35	mg/Kg dry	1		SW-846 6010D	5/19/23	5/23/23 1:36	NC
Lead	2.1	0.52	mg/Kg dry	1	M-12	SW-846 6010D	5/19/23	5/24/23 0:48	MJH

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Springfield, MA
Sample Description:
Work Order: 23E2241

Date Received: 5/16/2023

Field Sample #: DUP-2
Sampled: 5/15/2023 00:00

Sample ID: 23E2241-06

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	94.9		% Wt	1		SM 2540G	5/22/23	5/22/23 13:05	MJH

con-test® A Pace Analytical® Laboratory

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Springfield, MA
Sample Description:
Work Order: 23E2241

Date Received: 5/16/2023

Field Sample #: CM-53SE (1-2)
Sampled: 5/15/2023 14:00

Sample ID: 23E2241-07

Sample Matrix: Soil

Metals Analyses (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Barium	48	1.7	mg/Kg dry	1	MS-22	SW-846 6010D	5/19/23	5/23/23 0:54	NC
Cadmium	ND	0.35	mg/Kg dry	1		SW-846 6010D	5/19/23	5/23/23 0:54	NC
Lead	2.7	0.52	mg/Kg dry	1	M-12	SW-846 6010D	5/19/23	5/24/23 0:44	MJH

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Springfield, MA
Sample Description:
Work Order: 23E2241

Date Received: 5/16/2023

Field Sample #: CM-53SE (1-2)
Sampled: 5/15/2023 14:00

Sample ID: 23E2241-07

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	94.0		% Wt	1		SM 2540G	5/22/23	5/22/23 13:05	MJH

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Springfield, MA
Sample Description:
Work Order: 23E2241

Date Received: 5/16/2023

Field Sample #: CM-53W (6in-2 ft)
Sampled: 5/15/2023 13:55

Sample ID: 23E2241-08

Sample Matrix: Soil

Metals Analyses (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Barium	35	1.7	mg/Kg dry	1		SW-846 6010D	5/19/23	5/23/23 1:43	NC
Cadmium	ND	0.34	mg/Kg dry	1		SW-846 6010D	5/19/23	5/23/23 1:43	NC
Lead	5.3	0.51	mg/Kg dry	1	M-12	SW-846 6010D	5/19/23	5/24/23 0:53	MJH

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Springfield, MA
Sample Description:
Work Order: 23E2241

Date Received: 5/16/2023

Field Sample #: CM-53W (6in-2 ft)
Sampled: 5/15/2023 13:55

Sample ID: 23E2241-08

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	94.2		% Wt	1		SM 2540G	5/22/23	5/22/23 13:05	MJH

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Springfield, MA
Sample Description:
Work Order: 23E2241

Date Received: 5/16/2023

Field Sample #: CM-53SW (6in-2ft)
Sampled: 5/15/2023 13:45

Sample ID: 23E2241-09

Sample Matrix: Soil

Metals Analyses (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Barium	73	1.7	mg/Kg dry	1		SW-846 6010D	5/19/23	5/23/23 1:50	NC
Cadmium	ND	0.35	mg/Kg dry	1		SW-846 6010D	5/19/23	5/23/23 1:50	NC
Lead	3.6	0.52	mg/Kg dry	1	M-12	SW-846 6010D	5/19/23	5/24/23 0:58	MJH

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Springfield, MA
Sample Description:
Work Order: 23E2241

Date Received: 5/16/2023

Field Sample #: CM-53SW (6in-2ft)
Sampled: 5/15/2023 13:45

Sample ID: 23E2241-09

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	92.7		% Wt	1		SM 2540G	5/22/23	5/22/23 13:05	MJH

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Springfield, MA
Sample Description:
Work Order: 23E2241

Date Received: 5/16/2023

Field Sample #: CM-53N (0-2)
Sampled: 5/15/2023 13:00

Sample ID: 23E2241-10

Sample Matrix: Soil

Metals Analyses (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Barium	30	2.3	mg/Kg dry	1		SW-846 6010D	5/19/23	5/23/23 2:09	NC
Cadmium	ND	0.46	mg/Kg dry	1		SW-846 6010D	5/19/23	5/23/23 2:09	NC
Lead	4.9	0.69	mg/Kg dry	1	M-12	SW-846 6010D	5/19/23	5/24/23 1:02	MJH

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Springfield, MA
Sample Description:
Work Order: 23E2241

Date Received: 5/16/2023

Field Sample #: CM-53N (0-2)
Sampled: 5/15/2023 13:00

Sample ID: 23E2241-10

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	71.3		% Wt	1		SM 2540G	5/22/23	5/22/23 13:05	MJH

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Springfield, MA
Sample Description:
Work Order: 23E2241

Date Received: 5/16/2023

Field Sample #: CM-53E (0-2)
Sampled: 5/15/2023 13:27

Sample ID: 23E2241-11

Sample Matrix: Soil

Metals Analyses (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Barium	22	1.7	mg/Kg dry	1		SW-846 6010D	5/19/23	5/23/23 2:16	NC
Cadmium	ND	0.34	mg/Kg dry	1		SW-846 6010D	5/19/23	5/23/23 2:16	NC
Lead	4.3	0.51	mg/Kg dry	1	M-12	SW-846 6010D	5/19/23	5/24/23 1:07	MJH

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Springfield, MA
Sample Description:
Work Order: 23E2241

Date Received: 5/16/2023

Field Sample #: CM-53E (0-2)
Sampled: 5/15/2023 13:27

Sample ID: 23E2241-11

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	92.7		% Wt	1		SM 2540G	5/22/23	5/22/23 13:05	MJH

con-test® A Pace Analytical® Laboratory

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Springfield, MA
Sample Description:
Work Order: 23E2241

Date Received: 5/16/2023

Field Sample #: CM-22N (9-12)
Sampled: 5/16/2023 09:45

Sample ID: 23E2241-12

Sample Matrix: Soil

Petroleum Hydrocarbons Analyses - EPH

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
C9-C18 Aliphatics	ND	12	mg/Kg dry	1		MADEP EPH rev 2.1	5/19/23	5/24/23 21:05	GJB
C19-C36 Aliphatics	ND	12	mg/Kg dry	1		MADEP EPH rev 2.1	5/19/23	5/24/23 21:05	GJB
Unadjusted C11-C22 Aromatics	ND	12	mg/Kg dry	1		MADEP EPH rev 2.1	5/19/23	5/24/23 21:05	GJB
C11-C22 Aromatics	ND	12	mg/Kg dry	1		MADEP EPH rev 2.1	5/19/23	5/24/23 21:05	GJB
Acenaphthene	ND	0.12	mg/Kg dry	1		MADEP EPH rev 2.1	5/19/23	5/24/23 21:05	GJB
Acenaphthylene	ND	0.12	mg/Kg dry	1		MADEP EPH rev 2.1	5/19/23	5/24/23 21:05	GJB
Anthracene	ND	0.12	mg/Kg dry	1		MADEP EPH rev 2.1	5/19/23	5/24/23 21:05	GJB
Benzo(a)anthracene	ND	0.12	mg/Kg dry	1		MADEP EPH rev 2.1	5/19/23	5/24/23 21:05	GJB
Benzo(a)pyrene	ND	0.12	mg/Kg dry	1		MADEP EPH rev 2.1	5/19/23	5/24/23 21:05	GJB
Benzo(b)fluoranthene	ND	0.12	mg/Kg dry	1		MADEP EPH rev 2.1	5/19/23	5/24/23 21:05	GJB
Benzo(g,h,i)perylene	ND	0.12	mg/Kg dry	1		MADEP EPH rev 2.1	5/19/23	5/24/23 21:05	GJB
Benzo(k)fluoranthene	ND	0.12	mg/Kg dry	1		MADEP EPH rev 2.1	5/19/23	5/24/23 21:05	GJB
Chrysene	ND	0.12	mg/Kg dry	1		MADEP EPH rev 2.1	5/19/23	5/24/23 21:05	GJB
Dibenz(a,h)anthracene	ND	0.12	mg/Kg dry	1		MADEP EPH rev 2.1	5/19/23	5/24/23 21:05	GJB
Fluoranthene	ND	0.12	mg/Kg dry	1		MADEP EPH rev 2.1	5/19/23	5/24/23 21:05	GJB
Fluorene	ND	0.12	mg/Kg dry	1		MADEP EPH rev 2.1	5/19/23	5/24/23 21:05	GJB
Indeno(1,2,3-cd)pyrene	ND	0.12	mg/Kg dry	1		MADEP EPH rev 2.1	5/19/23	5/24/23 21:05	GJB
2-Methylnaphthalene	ND	0.12	mg/Kg dry	1		MADEP EPH rev 2.1	5/19/23	5/24/23 21:05	GJB
Naphthalene	ND	0.12	mg/Kg dry	1		MADEP EPH rev 2.1	5/19/23	5/24/23 21:05	GJB
Phenanthrene	ND	0.12	mg/Kg dry	1		MADEP EPH rev 2.1	5/19/23	5/24/23 21:05	GJB
Pyrene	ND	0.12	mg/Kg dry	1		MADEP EPH rev 2.1	5/19/23	5/24/23 21:05	GJB

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Chlorooctadecane (COD)	60.0	40-140		5/24/23 21:05
o-Terphenyl (OTP)	62.1	40-140		5/24/23 21:05
2-Bromonaphthalene	80.4	40-140		5/24/23 21:05
2-Fluorobiphenyl	77.4	40-140		5/24/23 21:05

con-test® A Pace Analytical® Laboratory

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Springfield, MA
Sample Description:
Work Order: 23E2241

Date Received: 5/16/2023

Field Sample #: CM-22N (9-12)
Sampled: 5/16/2023 09:45

Sample ID: 23E2241-12

Sample Matrix: Soil

Petroleum Hydrocarbons Analyses - VPH

Soil/Methanol Preservation Ratio: 0.98

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Unadjusted C5-C8 Aliphatics	ND	14	mg/Kg dry	1		MADEP-VPH-Feb 2018 Rev 2.1	5/17/23	5/17/23 14:59	EEH
C5-C8 Aliphatics	ND	14	mg/Kg dry	1		MADEP-VPH-Feb 2018 Rev 2.1	5/17/23	5/17/23 14:59	EEH
Unadjusted C9-C12 Aliphatics	ND	14	mg/Kg dry	1		MADEP-VPH-Feb 2018 Rev 2.1	5/17/23	5/17/23 14:59	EEH
C9-C12 Aliphatics	ND	14	mg/Kg dry	1		MADEP-VPH-Feb 2018 Rev 2.1	5/17/23	5/17/23 14:59	EEH
C9-C10 Aromatics	ND	14	mg/Kg dry	1		MADEP-VPH-Feb 2018 Rev 2.1	5/17/23	5/17/23 14:59	EEH
Benzene	ND	0.070	mg/Kg dry	1		MADEP-VPH-Feb 2018 Rev 2.1	5/17/23	5/17/23 14:59	EEH
Ethylbenzene	ND	0.070	mg/Kg dry	1		MADEP-VPH-Feb 2018 Rev 2.1	5/17/23	5/17/23 14:59	EEH
Methyl tert-Butyl Ether (MTBE)	ND	0.070	mg/Kg dry	1		MADEP-VPH-Feb 2018 Rev 2.1	5/17/23	5/17/23 14:59	EEH
Naphthalene	ND	0.35	mg/Kg dry	1		MADEP-VPH-Feb 2018 Rev 2.1	5/17/23	5/17/23 14:59	EEH
Toluene	ND	0.070	mg/Kg dry	1		MADEP-VPH-Feb 2018 Rev 2.1	5/17/23	5/17/23 14:59	EEH
m+p Xylene	ND	0.14	mg/Kg dry	1		MADEP-VPH-Feb 2018 Rev 2.1	5/17/23	5/17/23 14:59	EEH
o-Xylene	ND	0.070	mg/Kg dry	1		MADEP-VPH-Feb 2018 Rev 2.1	5/17/23	5/17/23 14:59	EEH

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
2,5-Dibromotoluene (FID)	84.5	70-130		5/17/23 14:59
2,5-Dibromotoluene (PID)	84.1	70-130		5/17/23 14:59

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Springfield, MA
Sample Description:
Work Order: 23E2241

Date Received: 5/16/2023

Field Sample #: CM-22N (9-12)
Sampled: 5/16/2023 09:45

Sample ID: 23E2241-12

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	84.0		% Wt	1	H-06	SM 2540G	5/26/23	5/26/23 10:11	JLC

con-test® A Pace Analytical® Laboratory

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Springfield, MA
Sample Description:
Work Order: 23E2241

Date Received: 5/16/2023

Field Sample #: CM-22S (8-11)
Sampled: 5/16/2023 11:00

Sample ID: 23E2241-13

Sample Matrix: Soil

Petroleum Hydrocarbons Analyses - EPH

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
C9-C18 Aliphatics	ND	11	mg/Kg dry	1		MADEP EPH rev 2.1	5/19/23	5/24/23 21:24	GJB
C19-C36 Aliphatics	ND	11	mg/Kg dry	1		MADEP EPH rev 2.1	5/19/23	5/24/23 21:24	GJB
Unadjusted C11-C22 Aromatics	ND	11	mg/Kg dry	1		MADEP EPH rev 2.1	5/19/23	5/24/23 21:24	GJB
C11-C22 Aromatics	ND	11	mg/Kg dry	1		MADEP EPH rev 2.1	5/19/23	5/24/23 21:24	GJB
Acenaphthene	ND	0.11	mg/Kg dry	1		MADEP EPH rev 2.1	5/19/23	5/24/23 21:24	GJB
Acenaphthylene	ND	0.11	mg/Kg dry	1		MADEP EPH rev 2.1	5/19/23	5/24/23 21:24	GJB
Anthracene	ND	0.11	mg/Kg dry	1		MADEP EPH rev 2.1	5/19/23	5/24/23 21:24	GJB
Benzo(a)anthracene	ND	0.11	mg/Kg dry	1		MADEP EPH rev 2.1	5/19/23	5/24/23 21:24	GJB
Benzo(a)pyrene	ND	0.11	mg/Kg dry	1		MADEP EPH rev 2.1	5/19/23	5/24/23 21:24	GJB
Benzo(b)fluoranthene	ND	0.11	mg/Kg dry	1		MADEP EPH rev 2.1	5/19/23	5/24/23 21:24	GJB
Benzo(g,h,i)perylene	ND	0.11	mg/Kg dry	1		MADEP EPH rev 2.1	5/19/23	5/24/23 21:24	GJB
Benzo(k)fluoranthene	ND	0.11	mg/Kg dry	1		MADEP EPH rev 2.1	5/19/23	5/24/23 21:24	GJB
Chrysene	ND	0.11	mg/Kg dry	1		MADEP EPH rev 2.1	5/19/23	5/24/23 21:24	GJB
Dibenz(a,h)anthracene	ND	0.11	mg/Kg dry	1		MADEP EPH rev 2.1	5/19/23	5/24/23 21:24	GJB
Fluoranthene	ND	0.11	mg/Kg dry	1		MADEP EPH rev 2.1	5/19/23	5/24/23 21:24	GJB
Fluorene	ND	0.11	mg/Kg dry	1		MADEP EPH rev 2.1	5/19/23	5/24/23 21:24	GJB
Indeno(1,2,3-cd)pyrene	ND	0.11	mg/Kg dry	1		MADEP EPH rev 2.1	5/19/23	5/24/23 21:24	GJB
2-Methylnaphthalene	ND	0.11	mg/Kg dry	1		MADEP EPH rev 2.1	5/19/23	5/24/23 21:24	GJB
Naphthalene	ND	0.11	mg/Kg dry	1		MADEP EPH rev 2.1	5/19/23	5/24/23 21:24	GJB
Phenanthrene	ND	0.11	mg/Kg dry	1		MADEP EPH rev 2.1	5/19/23	5/24/23 21:24	GJB
Pyrene	ND	0.11	mg/Kg dry	1		MADEP EPH rev 2.1	5/19/23	5/24/23 21:24	GJB

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Chlorooctadecane (COD)	47.6	40-140		5/24/23 21:24
o-Terphenyl (OTP)	54.4	40-140		5/24/23 21:24
2-Bromonaphthalene	85.2	40-140		5/24/23 21:24
2-Fluorobiphenyl	82.7	40-140		5/24/23 21:24

con-test® A Pace Analytical® Laboratory

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Springfield, MA
Sample Description:
Work Order: 23E2241

Date Received: 5/16/2023

Field Sample #: CM-22S (8-11)
Sampled: 5/16/2023 11:00

Sample ID: 23E2241-13

Sample Matrix: Soil

Petroleum Hydrocarbons Analyses - VPH

Soil/Methanol Preservation Ratio: 1.05

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Unadjusted C5-C8 Aliphatics	ND	11	mg/Kg dry	1		MADEP-VPH-Feb 2018 Rev 2.1	5/17/23	5/17/23 15:28	EEH
C5-C8 Aliphatics	ND	11	mg/Kg dry	1		MADEP-VPH-Feb 2018 Rev 2.1	5/17/23	5/17/23 15:28	EEH
Unadjusted C9-C12 Aliphatics	ND	11	mg/Kg dry	1		MADEP-VPH-Feb 2018 Rev 2.1	5/17/23	5/17/23 15:28	EEH
C9-C12 Aliphatics	ND	11	mg/Kg dry	1		MADEP-VPH-Feb 2018 Rev 2.1	5/17/23	5/17/23 15:28	EEH
C9-C10 Aromatics	ND	11	mg/Kg dry	1		MADEP-VPH-Feb 2018 Rev 2.1	5/17/23	5/17/23 15:28	EEH
Benzene	ND	0.054	mg/Kg dry	1		MADEP-VPH-Feb 2018 Rev 2.1	5/17/23	5/17/23 15:28	EEH
Ethylbenzene	ND	0.054	mg/Kg dry	1		MADEP-VPH-Feb 2018 Rev 2.1	5/17/23	5/17/23 15:28	EEH
Methyl tert-Butyl Ether (MTBE)	ND	0.054	mg/Kg dry	1		MADEP-VPH-Feb 2018 Rev 2.1	5/17/23	5/17/23 15:28	EEH
Naphthalene	ND	0.27	mg/Kg dry	1		MADEP-VPH-Feb 2018 Rev 2.1	5/17/23	5/17/23 15:28	EEH
Toluene	ND	0.054	mg/Kg dry	1		MADEP-VPH-Feb 2018 Rev 2.1	5/17/23	5/17/23 15:28	EEH
m+p Xylene	ND	0.11	mg/Kg dry	1		MADEP-VPH-Feb 2018 Rev 2.1	5/17/23	5/17/23 15:28	EEH
o-Xylene	ND	0.054	mg/Kg dry	1		MADEP-VPH-Feb 2018 Rev 2.1	5/17/23	5/17/23 15:28	EEH

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
2,5-Dibromotoluene (FID)	106	70-130		5/17/23 15:28
2,5-Dibromotoluene (PID)	102	70-130		5/17/23 15:28

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Springfield, MA
Sample Description:
Work Order: 23E2241

Date Received: 5/16/2023

Field Sample #: CM-22S (8-11)
Sampled: 5/16/2023 11:00

Sample ID: 23E2241-13

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	94.0		% Wt	1	H-06	SM 2540G	5/25/23	5/25/23 8:38	NC

con-test® A Pace Analytical® Laboratory

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Springfield, MA
Sample Description:
Work Order: 23E2241

Date Received: 5/16/2023

Field Sample #: CM-22E (8-11)
Sampled: 5/16/2023 10:25

Sample ID: 23E2241-14

Sample Matrix: Soil

Petroleum Hydrocarbons Analyses - EPH

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
C9-C18 Aliphatics	ND	11	mg/Kg dry	1		MADEP EPH rev 2.1	5/19/23	5/24/23 21:44	GJB
C19-C36 Aliphatics	ND	11	mg/Kg dry	1		MADEP EPH rev 2.1	5/19/23	5/24/23 21:44	GJB
Unadjusted C11-C22 Aromatics	ND	11	mg/Kg dry	1		MADEP EPH rev 2.1	5/19/23	5/24/23 21:44	GJB
C11-C22 Aromatics	ND	11	mg/Kg dry	1		MADEP EPH rev 2.1	5/19/23	5/24/23 21:44	GJB
Acenaphthene	ND	0.11	mg/Kg dry	1		MADEP EPH rev 2.1	5/19/23	5/24/23 21:44	GJB
Acenaphthylene	ND	0.11	mg/Kg dry	1		MADEP EPH rev 2.1	5/19/23	5/24/23 21:44	GJB
Anthracene	ND	0.11	mg/Kg dry	1		MADEP EPH rev 2.1	5/19/23	5/24/23 21:44	GJB
Benzo(a)anthracene	ND	0.11	mg/Kg dry	1		MADEP EPH rev 2.1	5/19/23	5/24/23 21:44	GJB
Benzo(a)pyrene	ND	0.11	mg/Kg dry	1		MADEP EPH rev 2.1	5/19/23	5/24/23 21:44	GJB
Benzo(b)fluoranthene	ND	0.11	mg/Kg dry	1		MADEP EPH rev 2.1	5/19/23	5/24/23 21:44	GJB
Benzo(g,h,i)perylene	ND	0.11	mg/Kg dry	1		MADEP EPH rev 2.1	5/19/23	5/24/23 21:44	GJB
Benzo(k)fluoranthene	ND	0.11	mg/Kg dry	1		MADEP EPH rev 2.1	5/19/23	5/24/23 21:44	GJB
Chrysene	ND	0.11	mg/Kg dry	1		MADEP EPH rev 2.1	5/19/23	5/24/23 21:44	GJB
Dibenz(a,h)anthracene	ND	0.11	mg/Kg dry	1		MADEP EPH rev 2.1	5/19/23	5/24/23 21:44	GJB
Fluoranthene	ND	0.11	mg/Kg dry	1		MADEP EPH rev 2.1	5/19/23	5/24/23 21:44	GJB
Fluorene	ND	0.11	mg/Kg dry	1		MADEP EPH rev 2.1	5/19/23	5/24/23 21:44	GJB
Indeno(1,2,3-cd)pyrene	ND	0.11	mg/Kg dry	1		MADEP EPH rev 2.1	5/19/23	5/24/23 21:44	GJB
2-Methylnaphthalene	ND	0.11	mg/Kg dry	1		MADEP EPH rev 2.1	5/19/23	5/24/23 21:44	GJB
Naphthalene	ND	0.11	mg/Kg dry	1		MADEP EPH rev 2.1	5/19/23	5/24/23 21:44	GJB
Phenanthrene	ND	0.11	mg/Kg dry	1		MADEP EPH rev 2.1	5/19/23	5/24/23 21:44	GJB
Pyrene	ND	0.11	mg/Kg dry	1		MADEP EPH rev 2.1	5/19/23	5/24/23 21:44	GJB

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Chlorooctadecane (COD)	44.6	40-140		5/24/23 21:44
o-Terphenyl (OTP)	57.3	40-140		5/24/23 21:44
2-Bromonaphthalene	89.7	40-140		5/24/23 21:44
2-Fluorobiphenyl	86.9	40-140		5/24/23 21:44

con-test® A Pace Analytical® Laboratory

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Springfield, MA
Sample Description:
Work Order: 23E2241

Date Received: 5/16/2023

Field Sample #: CM-22E (8-11)
Sampled: 5/16/2023 10:25

Sample ID: 23E2241-14

Sample Matrix: Soil

Petroleum Hydrocarbons Analyses - VPH

Soil/Methanol Preservation Ratio: 1.02

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Unadjusted C5-C8 Aliphatics	ND	13	mg/Kg dry	1		MADEP-VPH-Feb 2018 Rev 2.1	5/17/23	5/17/23 15:58	EEH
C5-C8 Aliphatics	ND	13	mg/Kg dry	1		MADEP-VPH-Feb 2018 Rev 2.1	5/17/23	5/17/23 15:58	EEH
Unadjusted C9-C12 Aliphatics	ND	13	mg/Kg dry	1		MADEP-VPH-Feb 2018 Rev 2.1	5/17/23	5/17/23 15:58	EEH
C9-C12 Aliphatics	ND	13	mg/Kg dry	1		MADEP-VPH-Feb 2018 Rev 2.1	5/17/23	5/17/23 15:58	EEH
C9-C10 Aromatics	ND	13	mg/Kg dry	1		MADEP-VPH-Feb 2018 Rev 2.1	5/17/23	5/17/23 15:58	EEH
Benzene	ND	0.065	mg/Kg dry	1		MADEP-VPH-Feb 2018 Rev 2.1	5/17/23	5/17/23 15:58	EEH
Ethylbenzene	ND	0.065	mg/Kg dry	1		MADEP-VPH-Feb 2018 Rev 2.1	5/17/23	5/17/23 15:58	EEH
Methyl tert-Butyl Ether (MTBE)	ND	0.065	mg/Kg dry	1		MADEP-VPH-Feb 2018 Rev 2.1	5/17/23	5/17/23 15:58	EEH
Naphthalene	ND	0.32	mg/Kg dry	1		MADEP-VPH-Feb 2018 Rev 2.1	5/17/23	5/17/23 15:58	EEH
Toluene	ND	0.065	mg/Kg dry	1		MADEP-VPH-Feb 2018 Rev 2.1	5/17/23	5/17/23 15:58	EEH
m+p Xylene	ND	0.13	mg/Kg dry	1		MADEP-VPH-Feb 2018 Rev 2.1	5/17/23	5/17/23 15:58	EEH
o-Xylene	ND	0.065	mg/Kg dry	1		MADEP-VPH-Feb 2018 Rev 2.1	5/17/23	5/17/23 15:58	EEH

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
2,5-Dibromotoluene (FID)	94.5	70-130		5/17/23 15:58
2,5-Dibromotoluene (PID)	94.2	70-130		5/17/23 15:58

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Springfield, MA
Sample Description:
Work Order: 23E2241

Date Received: 5/16/2023

Field Sample #: CM-22E (8-11)
Sampled: 5/16/2023 10:25

Sample ID: 23E2241-14

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	86.4		% Wt	1	H-06	SM 2540G	5/25/23	5/25/23 8:38	NC

con-test® A Pace Analytical® Laboratory

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Springfield, MA
Sample Description:
Work Order: 23E2241

Date Received: 5/16/2023

Field Sample #: CM-22W (9.5-12.5)
Sampled: 5/16/2023 09:17

Sample ID: 23E2241-15

Sample Matrix: Soil

Petroleum Hydrocarbons Analyses - EPH

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
C9-C18 Aliphatics	ND	11	mg/Kg dry	1		MADEP EPH rev 2.1	5/19/23	5/24/23 22:03	GJB
C19-C36 Aliphatics	ND	11	mg/Kg dry	1		MADEP EPH rev 2.1	5/19/23	5/24/23 22:03	GJB
Unadjusted C11-C22 Aromatics	ND	11	mg/Kg dry	1		MADEP EPH rev 2.1	5/19/23	5/24/23 22:03	GJB
C11-C22 Aromatics	ND	11	mg/Kg dry	1		MADEP EPH rev 2.1	5/19/23	5/24/23 22:03	GJB
Acenaphthene	ND	0.11	mg/Kg dry	1		MADEP EPH rev 2.1	5/19/23	5/24/23 22:03	GJB
Acenaphthylene	ND	0.11	mg/Kg dry	1		MADEP EPH rev 2.1	5/19/23	5/24/23 22:03	GJB
Anthracene	ND	0.11	mg/Kg dry	1		MADEP EPH rev 2.1	5/19/23	5/24/23 22:03	GJB
Benzo(a)anthracene	ND	0.11	mg/Kg dry	1		MADEP EPH rev 2.1	5/19/23	5/24/23 22:03	GJB
Benzo(a)pyrene	ND	0.11	mg/Kg dry	1		MADEP EPH rev 2.1	5/19/23	5/24/23 22:03	GJB
Benzo(b)fluoranthene	ND	0.11	mg/Kg dry	1		MADEP EPH rev 2.1	5/19/23	5/24/23 22:03	GJB
Benzo(g,h,i)perylene	ND	0.11	mg/Kg dry	1		MADEP EPH rev 2.1	5/19/23	5/24/23 22:03	GJB
Benzo(k)fluoranthene	ND	0.11	mg/Kg dry	1		MADEP EPH rev 2.1	5/19/23	5/24/23 22:03	GJB
Chrysene	ND	0.11	mg/Kg dry	1		MADEP EPH rev 2.1	5/19/23	5/24/23 22:03	GJB
Dibenz(a,h)anthracene	ND	0.11	mg/Kg dry	1		MADEP EPH rev 2.1	5/19/23	5/24/23 22:03	GJB
Fluoranthene	ND	0.11	mg/Kg dry	1		MADEP EPH rev 2.1	5/19/23	5/24/23 22:03	GJB
Fluorene	ND	0.11	mg/Kg dry	1		MADEP EPH rev 2.1	5/19/23	5/24/23 22:03	GJB
Indeno(1,2,3-cd)pyrene	ND	0.11	mg/Kg dry	1		MADEP EPH rev 2.1	5/19/23	5/24/23 22:03	GJB
2-Methylnaphthalene	ND	0.11	mg/Kg dry	1		MADEP EPH rev 2.1	5/19/23	5/24/23 22:03	GJB
Naphthalene	ND	0.11	mg/Kg dry	1		MADEP EPH rev 2.1	5/19/23	5/24/23 22:03	GJB
Phenanthrene	ND	0.11	mg/Kg dry	1		MADEP EPH rev 2.1	5/19/23	5/24/23 22:03	GJB
Pyrene	ND	0.11	mg/Kg dry	1		MADEP EPH rev 2.1	5/19/23	5/24/23 22:03	GJB

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Chlorooctadecane (COD)	47.1	40-140		5/24/23 22:03
o-Terphenyl (OTP)	52.5	40-140		5/24/23 22:03
2-Bromonaphthalene	84.9	40-140		5/24/23 22:03
2-Fluorobiphenyl	82.4	40-140		5/24/23 22:03

con-test® A Pace Analytical® Laboratory

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Springfield, MA
Sample Description:
Work Order: 23E2241

Date Received: 5/16/2023

Field Sample #: CM-22W (9.5-12.5)
Sampled: 5/16/2023 09:17

Sample ID: 23E2241-15

Sample Matrix: Soil

Petroleum Hydrocarbons Analyses - VPH

Soil/Methanol Preservation Ratio: 1.08

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Unadjusted C5-C8 Aliphatics	ND	11	mg/Kg dry	1		MADEP-VPH-Feb 2018 Rev 2.1	5/17/23	5/17/23 16:27	EEH
C5-C8 Aliphatics	ND	11	mg/Kg dry	1		MADEP-VPH-Feb 2018 Rev 2.1	5/17/23	5/17/23 16:27	EEH
Unadjusted C9-C12 Aliphatics	ND	11	mg/Kg dry	1		MADEP-VPH-Feb 2018 Rev 2.1	5/17/23	5/17/23 16:27	EEH
C9-C12 Aliphatics	ND	11	mg/Kg dry	1		MADEP-VPH-Feb 2018 Rev 2.1	5/17/23	5/17/23 16:27	EEH
C9-C10 Aromatics	ND	11	mg/Kg dry	1		MADEP-VPH-Feb 2018 Rev 2.1	5/17/23	5/17/23 16:27	EEH
Benzene	ND	0.055	mg/Kg dry	1		MADEP-VPH-Feb 2018 Rev 2.1	5/17/23	5/17/23 16:27	EEH
Ethylbenzene	ND	0.055	mg/Kg dry	1		MADEP-VPH-Feb 2018 Rev 2.1	5/17/23	5/17/23 16:27	EEH
Methyl tert-Butyl Ether (MTBE)	ND	0.055	mg/Kg dry	1		MADEP-VPH-Feb 2018 Rev 2.1	5/17/23	5/17/23 16:27	EEH
Naphthalene	ND	0.28	mg/Kg dry	1		MADEP-VPH-Feb 2018 Rev 2.1	5/17/23	5/17/23 16:27	EEH
Toluene	ND	0.055	mg/Kg dry	1		MADEP-VPH-Feb 2018 Rev 2.1	5/17/23	5/17/23 16:27	EEH
m+p Xylene	ND	0.11	mg/Kg dry	1		MADEP-VPH-Feb 2018 Rev 2.1	5/17/23	5/17/23 16:27	EEH
o-Xylene	ND	0.055	mg/Kg dry	1		MADEP-VPH-Feb 2018 Rev 2.1	5/17/23	5/17/23 16:27	EEH

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
2,5-Dibromotoluene (FID)	87.0	70-130		5/17/23 16:27
2,5-Dibromotoluene (PID)	86.7	70-130		5/17/23 16:27

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Springfield, MA
Sample Description:
Work Order: 23E2241

Date Received: 5/16/2023

Field Sample #: CM-22W (9.5-12.5)
Sampled: 5/16/2023 09:17

Sample ID: 23E2241-15

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	91.6		% Wt	1	H-06	SM 2540G	5/25/23	5/25/23 8:38	NC

con-test® A Pace Analytical® Laboratory

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Springfield, MA
Sample Description:
Work Order: 23E2241

Date Received: 5/16/2023

Field Sample #: OTP-6A (0-3)
Sampled: 5/16/2023 11:25

Sample ID: 23E2241-16

Sample Matrix: Soil

Semivolatile Organic Compounds by GC/MS

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Acenaphthene	0.22	0.18	mg/Kg dry	1		SW-846 8270E	5/19/23	5/23/23 15:41	BGL
Acenaphthylene	ND	0.18	mg/Kg dry	1		SW-846 8270E	5/19/23	5/23/23 15:41	BGL
Anthracene	0.45	0.18	mg/Kg dry	1		SW-846 8270E	5/19/23	5/23/23 15:41	BGL
Benzo(a)anthracene	1.2	0.18	mg/Kg dry	1		SW-846 8270E	5/19/23	5/23/23 15:41	BGL
Benzo(a)pyrene	1.2	0.18	mg/Kg dry	1		SW-846 8270E	5/19/23	5/23/23 15:41	BGL
Benzo(b)fluoranthene	1.6	0.18	mg/Kg dry	1		SW-846 8270E	5/19/23	5/23/23 15:41	BGL
Benzo(g,h,i)perylene	0.82	0.18	mg/Kg dry	1		SW-846 8270E	5/19/23	5/23/23 15:41	BGL
Benzo(k)fluoranthene	0.66	0.18	mg/Kg dry	1		SW-846 8270E	5/19/23	5/23/23 15:41	BGL
Chrysene	1.2	0.18	mg/Kg dry	1		SW-846 8270E	5/19/23	5/23/23 15:41	BGL
Dibenz(a,h)anthracene	ND	0.18	mg/Kg dry	1		SW-846 8270E	5/19/23	5/23/23 15:41	BGL
Fluoranthene	2.8	0.18	mg/Kg dry	1		SW-846 8270E	5/19/23	5/23/23 15:41	BGL
Fluorene	ND	0.18	mg/Kg dry	1		SW-846 8270E	5/19/23	5/23/23 15:41	BGL
Indeno(1,2,3-cd)pyrene	0.80	0.18	mg/Kg dry	1		SW-846 8270E	5/19/23	5/23/23 15:41	BGL
2-Methylnaphthalene	ND	0.18	mg/Kg dry	1		SW-846 8270E	5/19/23	5/23/23 15:41	BGL
Naphthalene	ND	0.18	mg/Kg dry	1		SW-846 8270E	5/19/23	5/23/23 15:41	BGL
Phenanthrene	1.9	0.18	mg/Kg dry	1		SW-846 8270E	5/19/23	5/23/23 15:41	BGL
Pyrene	2.2	0.18	mg/Kg dry	1		SW-846 8270E	5/19/23	5/23/23 15:41	BGL

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Nitrobenzene-d5	66.3	30-130		5/23/23 15:41
2-Fluorobiphenyl	76.3	30-130		5/23/23 15:41
p-Terphenyl-d14	78.3	30-130		5/23/23 15:41

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Springfield, MA
Sample Description:
Work Order: 23E2241

Date Received: 5/16/2023

Field Sample #: OTP-6A (0-3)
Sampled: 5/16/2023 11:25

Sample ID: 23E2241-16

Sample Matrix: Soil

Metals Analyses (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Lead	9.3	0.50	mg/Kg dry	1	M-12	SW-846 6010D	5/19/23	5/24/23 1:12	MJH

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Springfield, MA
Sample Description:
Work Order: 23E2241

Date Received: 5/16/2023

Field Sample #: OTP-6A (0-3)
Sampled: 5/16/2023 11:25

Sample ID: 23E2241-16

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	95.4		% Wt	1	H-06	SM 2540G	5/25/23	5/25/23 8:38	NC

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Springfield, MA
Sample Description:
Work Order: 23E2241

Date Received: 5/16/2023

Field Sample #: OTP-6A (0-3)
Sampled: 5/16/2023 11:25

Sample ID: 23E2241-16

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
See Attached Subcontracted Report	-		N/A	1		PLM/SEM			MVL

con-test® A Pace Analytical® Laboratory

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Springfield, MA | Sample Description: | Work Order: 23E2241

Date Received: 5/16/2023

Field Sample #: OTP-8A (0-1.5) | Sampled: 5/16/2023 11:55

Sample ID: 23E2241-17

Sample Matrix: Soil

Semivolatile Organic Compounds by GC/MS

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Acenaphthene	ND	0.22	mg/Kg dry	1		SW-846 8270E	5/19/23	5/24/23 16:32	BGL
Acenaphthylene	ND	0.22	mg/Kg dry	1		SW-846 8270E	5/19/23	5/24/23 16:32	BGL
Anthracene	0.26	0.22	mg/Kg dry	1		SW-846 8270E	5/19/23	5/24/23 16:32	BGL
Benzo(a)anthracene	1.0	0.22	mg/Kg dry	1		SW-846 8270E	5/19/23	5/24/23 16:32	BGL
Benzo(a)pyrene	0.99	0.22	mg/Kg dry	1		SW-846 8270E	5/19/23	5/24/23 16:32	BGL
Benzo(b)fluoranthene	1.3	0.22	mg/Kg dry	1		SW-846 8270E	5/19/23	5/24/23 16:32	BGL
Benzo(g,h,i)perylene	0.76	0.22	mg/Kg dry	1		SW-846 8270E	5/19/23	5/24/23 16:32	BGL
Benzo(k)fluoranthene	0.50	0.22	mg/Kg dry	1		SW-846 8270E	5/19/23	5/24/23 16:32	BGL
Chrysene	1.0	0.22	mg/Kg dry	1		SW-846 8270E	5/19/23	5/24/23 16:32	BGL
Dibenz(a,h)anthracene	ND	0.22	mg/Kg dry	1		SW-846 8270E	5/19/23	5/24/23 16:32	BGL
Fluoranthene	2.3	0.22	mg/Kg dry	1		SW-846 8270E	5/19/23	5/24/23 16:32	BGL
Fluorene	ND	0.22	mg/Kg dry	1		SW-846 8270E	5/19/23	5/24/23 16:32	BGL
Indeno(1,2,3-cd)pyrene	0.77	0.22	mg/Kg dry	1		SW-846 8270E	5/19/23	5/24/23 16:32	BGL
2-Methylnaphthalene	ND	0.22	mg/Kg dry	1		SW-846 8270E	5/19/23	5/24/23 16:32	BGL
Naphthalene	ND	0.22	mg/Kg dry	1		SW-846 8270E	5/19/23	5/24/23 16:32	BGL
Phenanthrene	1.3	0.22	mg/Kg dry	1		SW-846 8270E	5/19/23	5/24/23 16:32	BGL
Pyrene	1.7	0.22	mg/Kg dry	1		SW-846 8270E	5/19/23	5/24/23 16:32	BGL

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Nitrobenzene-d5	53.0	30-130		5/24/23 16:32
2-Fluorobiphenyl	67.9	30-130		5/24/23 16:32
p-Terphenyl-d14	73.3	30-130		5/24/23 16:32

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Springfield, MA
Sample Description:
Work Order: 23E2241

Date Received: 5/16/2023

Field Sample #: OTP-8A (0-1.5)
Sampled: 5/16/2023 11:55

Sample ID: 23E2241-17

Sample Matrix: Soil

Metals Analyses (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Lead	63	0.64	mg/Kg dry	1	M-12	SW-846 6010D	5/19/23	5/24/23 1:16	MJH

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Springfield, MA
Sample Description:
Work Order: 23E2241

Date Received: 5/16/2023

Field Sample #: OTP-8A (0-1.5)
Sampled: 5/16/2023 11:55

Sample ID: 23E2241-17

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	77.4		% Wt	1	H-06	SM 2540G	5/25/23	5/25/23 8:38	NC

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Springfield, MA
Sample Description:
Work Order: 23E2241

Date Received: 5/16/2023

Field Sample #: OTP-8A (0-1.5)
Sampled: 5/16/2023 11:55

Sample ID: 23E2241-17

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
See Attached Subcontracted Report	-		N/A	1		PLM/SEM			MVL

con-test® A Pace Analytical® Laboratory

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Springfield, MA
Sample Description:
Work Order: 23E2241

Date Received: 5/16/2023

Field Sample #: DUP-3
Sampled: 5/16/2023 00:00

Sample ID: 23E2241-18

Sample Matrix: Soil

Petroleum Hydrocarbons Analyses - EPH

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
C9-C18 Aliphatics	ND	11	mg/Kg dry	1		MADEP EPH rev 2.1	5/19/23	5/24/23 22:22	GJB
C19-C36 Aliphatics	ND	11	mg/Kg dry	1		MADEP EPH rev 2.1	5/19/23	5/24/23 22:22	GJB
Unadjusted C11-C22 Aromatics	ND	11	mg/Kg dry	1		MADEP EPH rev 2.1	5/19/23	5/24/23 22:22	GJB
C11-C22 Aromatics	ND	11	mg/Kg dry	1		MADEP EPH rev 2.1	5/19/23	5/24/23 22:22	GJB
Acenaphthene	ND	0.11	mg/Kg dry	1		MADEP EPH rev 2.1	5/19/23	5/24/23 22:22	GJB
Acenaphthylene	ND	0.11	mg/Kg dry	1		MADEP EPH rev 2.1	5/19/23	5/24/23 22:22	GJB
Anthracene	ND	0.11	mg/Kg dry	1		MADEP EPH rev 2.1	5/19/23	5/24/23 22:22	GJB
Benzo(a)anthracene	ND	0.11	mg/Kg dry	1		MADEP EPH rev 2.1	5/19/23	5/24/23 22:22	GJB
Benzo(a)pyrene	ND	0.11	mg/Kg dry	1		MADEP EPH rev 2.1	5/19/23	5/24/23 22:22	GJB
Benzo(b)fluoranthene	ND	0.11	mg/Kg dry	1		MADEP EPH rev 2.1	5/19/23	5/24/23 22:22	GJB
Benzo(g,h,i)perylene	ND	0.11	mg/Kg dry	1		MADEP EPH rev 2.1	5/19/23	5/24/23 22:22	GJB
Benzo(k)fluoranthene	ND	0.11	mg/Kg dry	1		MADEP EPH rev 2.1	5/19/23	5/24/23 22:22	GJB
Chrysene	ND	0.11	mg/Kg dry	1		MADEP EPH rev 2.1	5/19/23	5/24/23 22:22	GJB
Dibenz(a,h)anthracene	ND	0.11	mg/Kg dry	1		MADEP EPH rev 2.1	5/19/23	5/24/23 22:22	GJB
Fluoranthene	ND	0.11	mg/Kg dry	1		MADEP EPH rev 2.1	5/19/23	5/24/23 22:22	GJB
Fluorene	ND	0.11	mg/Kg dry	1		MADEP EPH rev 2.1	5/19/23	5/24/23 22:22	GJB
Indeno(1,2,3-cd)pyrene	ND	0.11	mg/Kg dry	1		MADEP EPH rev 2.1	5/19/23	5/24/23 22:22	GJB
2-Methylnaphthalene	ND	0.11	mg/Kg dry	1		MADEP EPH rev 2.1	5/19/23	5/24/23 22:22	GJB
Naphthalene	ND	0.11	mg/Kg dry	1		MADEP EPH rev 2.1	5/19/23	5/24/23 22:22	GJB
Phenanthrene	ND	0.11	mg/Kg dry	1		MADEP EPH rev 2.1	5/19/23	5/24/23 22:22	GJB
Pyrene	ND	0.11	mg/Kg dry	1		MADEP EPH rev 2.1	5/19/23	5/24/23 22:22	GJB

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Chlorooctadecane (COD)	54.6	40-140		5/24/23 22:22
o-Terphenyl (OTP)	62.4	40-140		5/24/23 22:22
2-Bromonaphthalene	88.9	40-140		5/24/23 22:22
2-Fluorobiphenyl	85.8	40-140		5/24/23 22:22

con-test® A Pace Analytical® Laboratory

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Springfield, MA
Sample Description:
Work Order: 23E2241

Date Received: 5/16/2023

Field Sample #: DUP-3
Sampled: 5/16/2023 00:00

Sample ID: 23E2241-18

Sample Matrix: Soil

Petroleum Hydrocarbons Analyses - VPH

Soil/Methanol Preservation Ratio: 1.12

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Unadjusted C5-C8 Aliphatics	ND	10	mg/Kg dry	1		MADEP-VPH-Feb 2018 Rev 2.1	5/17/23	5/17/23 16:57	EEH
C5-C8 Aliphatics	ND	10	mg/Kg dry	1		MADEP-VPH-Feb 2018 Rev 2.1	5/17/23	5/17/23 16:57	EEH
Unadjusted C9-C12 Aliphatics	ND	10	mg/Kg dry	1		MADEP-VPH-Feb 2018 Rev 2.1	5/17/23	5/17/23 16:57	EEH
C9-C12 Aliphatics	ND	10	mg/Kg dry	1		MADEP-VPH-Feb 2018 Rev 2.1	5/17/23	5/17/23 16:57	EEH
C9-C10 Aromatics	ND	10	mg/Kg dry	1		MADEP-VPH-Feb 2018 Rev 2.1	5/17/23	5/17/23 16:57	EEH
Benzene	ND	0.051	mg/Kg dry	1		MADEP-VPH-Feb 2018 Rev 2.1	5/17/23	5/17/23 16:57	EEH
Ethylbenzene	ND	0.051	mg/Kg dry	1		MADEP-VPH-Feb 2018 Rev 2.1	5/17/23	5/17/23 16:57	EEH
Methyl tert-Butyl Ether (MTBE)	ND	0.051	mg/Kg dry	1		MADEP-VPH-Feb 2018 Rev 2.1	5/17/23	5/17/23 16:57	EEH
Naphthalene	ND	0.25	mg/Kg dry	1		MADEP-VPH-Feb 2018 Rev 2.1	5/17/23	5/17/23 16:57	EEH
Toluene	ND	0.051	mg/Kg dry	1		MADEP-VPH-Feb 2018 Rev 2.1	5/17/23	5/17/23 16:57	EEH
m+p Xylene	ND	0.10	mg/Kg dry	1		MADEP-VPH-Feb 2018 Rev 2.1	5/17/23	5/17/23 16:57	EEH
o-Xylene	ND	0.051	mg/Kg dry	1		MADEP-VPH-Feb 2018 Rev 2.1	5/17/23	5/17/23 16:57	EEH

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
2,5-Dibromotoluene (FID)	105	70-130		5/17/23 16:57
2,5-Dibromotoluene (PID)	103	70-130		5/17/23 16:57

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Springfield, MA
Sample Description:
Work Order: 23E2241

Date Received: 5/16/2023

Field Sample #: DUP-3
Sampled: 5/16/2023 00:00

Sample ID: 23E2241-18

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	94.1		% Wt	1	H-06	SM 2540G	5/25/23	5/25/23 8:38	NC

con-test® A Pace Analytical® Laboratory

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Springfield, MA
Sample Description:
Work Order: 23E2241

Date Received: 5/16/2023

Field Sample #: DUP-4
Sampled: 5/16/2023 00:00

Sample ID: 23E2241-19

Sample Matrix: Soil

Semivolatile Organic Compounds by GC/MS

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Acenaphthene	ND	0.18	mg/Kg dry	1		SW-846 8270E	5/19/23	5/24/23 16:55	BGL
Acenaphthylene	ND	0.18	mg/Kg dry	1		SW-846 8270E	5/19/23	5/24/23 16:55	BGL
Anthracene	ND	0.18	mg/Kg dry	1		SW-846 8270E	5/19/23	5/24/23 16:55	BGL
Benzo(a)anthracene	ND	0.18	mg/Kg dry	1		SW-846 8270E	5/19/23	5/24/23 16:55	BGL
Benzo(a)pyrene	ND	0.18	mg/Kg dry	1		SW-846 8270E	5/19/23	5/24/23 16:55	BGL
Benzo(b)fluoranthene	ND	0.18	mg/Kg dry	1		SW-846 8270E	5/19/23	5/24/23 16:55	BGL
Benzo(g,h,i)perylene	ND	0.18	mg/Kg dry	1		SW-846 8270E	5/19/23	5/24/23 16:55	BGL
Benzo(k)fluoranthene	ND	0.18	mg/Kg dry	1		SW-846 8270E	5/19/23	5/24/23 16:55	BGL
Chrysene	ND	0.18	mg/Kg dry	1		SW-846 8270E	5/19/23	5/24/23 16:55	BGL
Dibenz(a,h)anthracene	ND	0.18	mg/Kg dry	1		SW-846 8270E	5/19/23	5/24/23 16:55	BGL
Fluoranthene	ND	0.18	mg/Kg dry	1		SW-846 8270E	5/19/23	5/24/23 16:55	BGL
Fluorene	ND	0.18	mg/Kg dry	1		SW-846 8270E	5/19/23	5/24/23 16:55	BGL
Indeno(1,2,3-cd)pyrene	ND	0.18	mg/Kg dry	1		SW-846 8270E	5/19/23	5/24/23 16:55	BGL
2-Methylnaphthalene	ND	0.18	mg/Kg dry	1		SW-846 8270E	5/19/23	5/24/23 16:55	BGL
Naphthalene	ND	0.18	mg/Kg dry	1		SW-846 8270E	5/19/23	5/24/23 16:55	BGL
Phenanthrene	ND	0.18	mg/Kg dry	1		SW-846 8270E	5/19/23	5/24/23 16:55	BGL
Pyrene	ND	0.18	mg/Kg dry	1		SW-846 8270E	5/19/23	5/24/23 16:55	BGL

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Nitrobenzene-d5	56.8	30-130		5/24/23 16:55
2-Fluorobiphenyl	74.6	30-130		5/24/23 16:55
p-Terphenyl-d14	82.9	30-130		5/24/23 16:55

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Springfield, MA
Sample Description:
Work Order: 23E2241

Date Received: 5/16/2023

Field Sample #: DUP-4
Sampled: 5/16/2023 00:00

Sample ID: 23E2241-19

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	95.4		% Wt	1	H-06	SM 2540G	5/25/23	5/25/23 8:38	NC

con-test® A Pace Analytical® Laboratory

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Sample Extraction Data

Prep Method:SW-846 3546 **Analytical Method:MADEP EPH rev 2.1**

Lab Number [Field ID]	Batch	Initial [g]	Final [mL]	Date
23E2241-12 [CM-22N (9-12)]	B340848	20.1	2.00	05/19/23
23E2241-13 [CM-22S (8-11)]	B340848	20.1	2.00	05/19/23
23E2241-14 [CM-22E (8-11)]	B340848	20.3	2.00	05/19/23
23E2241-15 [CM-22W (9.5-12.5)]	B340848	20.1	2.00	05/19/23
23E2241-18 [DUP-3]	B340848	20.2	2.00	05/19/23

Prep Method:MA VPH **Analytical Method:MADEP-VPH-Feb 2018 Rev 2.1**

Lab Number [Field ID]	Batch	Initial [g]	Final [mL]	Date
23E2241-12 [CM-22N (9-12)]	B340496	14.8	17.4	05/17/23
23E2241-13 [CM-22S (8-11)]	B340496	15.7	15.9	05/17/23
23E2241-14 [CM-22E (8-11)]	B340496	15.3	17.1	05/17/23
23E2241-15 [CM-22W (9.5-12.5)]	B340496	16.2	16.4	05/17/23
23E2241-18 [DUP-3]	B340496	16.8	16.0	05/17/23

Prep Method:% Solids **Analytical Method:SM 2540G**

Lab Number [Field ID]	Batch	Date
23E2241-01 [CM-52W (1-3)]	B340988	05/22/23
23E2241-02 [CM-52N (1-3)]	B340988	05/22/23
23E2241-03 [CM-52S (14in- 3ft)]	B340988	05/22/23
23E2241-04 [CM-52E (1-3)]	B340988	05/22/23
23E2241-05 [MW-205A (5in-3ft)]	B340988	05/22/23
23E2241-06 [DUP-2]	B340988	05/22/23
23E2241-07 [CM-53SE (1-2)]	B340988	05/22/23
23E2241-08 [CM-53W (6in-2 ft)]	B340988	05/22/23
23E2241-09 [CM-53SW (6in-2ft)]	B340988	05/22/23
23E2241-10 [CM-53N (0-2)]	B340988	05/22/23
23E2241-11 [CM-53E (0-2)]	B340988	05/22/23

Prep Method:% Solids **Analytical Method:SM 2540G**

Lab Number [Field ID]	Batch	Date
23E2241-13 [CM-22S (8-11)]	B341363	05/25/23
23E2241-14 [CM-22E (8-11)]	B341363	05/25/23
23E2241-15 [CM-22W (9.5-12.5)]	B341363	05/25/23
23E2241-16 [OTP-6A (0-3)]	B341363	05/25/23
23E2241-17 [OTP-8A (0-1.5)]	B341363	05/25/23
23E2241-18 [DUP-3]	B341363	05/25/23
23E2241-19 [DUP-4]	B341363	05/25/23

Prep Method:% Solids **Analytical Method:SM 2540G**

Lab Number [Field ID]	Batch	Date
23E2241-12 [CM-22N (9-12)]	B341517	05/26/23

Prep Method:SW-846 3050B **Analytical Method:SW-846 6010D**

Lab Number [Field ID]	Batch	Initial [g]	Final [mL]	Date

con-test® A Pace Analytical® Laboratory

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Sample Extraction Data

Prep Method:SW-846 3050B **Analytical Method:SW-846 6010D**

Lab Number [Field ID]	Batch	Initial [g]	Final [mL]	Date
23E2241-01 [CM-52W (1-3)]	B340817	1.51	50.0	05/19/23
23E2241-02 [CM-52N (1-3)]	B340817	1.58	50.0	05/19/23
23E2241-03 [CM-52S (14in- 3ft)]	B340817	1.54	50.0	05/19/23
23E2241-04 [CM-52E (1-3)]	B340817	1.54	50.0	05/19/23
23E2241-05 [MW-205A (5in-3ft)]	B340817	1.55	50.0	05/19/23
23E2241-06 [DUP-2]	B340817	1.52	50.0	05/19/23
23E2241-07 [CM-53SE (1-2)]	B340817	1.52	50.0	05/19/23
23E2241-08 [CM-53W (6in-2 ft)]	B340817	1.55	50.0	05/19/23
23E2241-09 [CM-53SW (6in-2ft)]	B340817	1.54	50.0	05/19/23
23E2241-10 [CM-53N (0-2)]	B340817	1.52	50.0	05/19/23
23E2241-11 [CM-53E (0-2)]	B340817	1.58	50.0	05/19/23
23E2241-16 [OTP-6A (0-3)]	B340817	1.56	50.0	05/19/23
23E2241-17 [OTP-8A (0-1.5)]	B340817	1.52	50.0	05/19/23

Prep Method:SW-846 3546 **Analytical Method:SW-846 8270E**

Lab Number [Field ID]	Batch	Initial [g]	Final [mL]	Date
23E2241-16 [OTP-6A (0-3)]	B340861	30.0	1.00	05/19/23
23E2241-17 [OTP-8A (0-1.5)]	B340861	30.2	1.00	05/19/23
23E2241-19 [DUP-4]	B340861	30.0	1.00	05/19/23

con-test® A Pace Analytical® Laboratory

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

QUALITY CONTROL

Semivolatile Organic Compounds by GC/MS - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B340861 - SW-846 3546										
Blank (B340861-BLK1)				Prepared: 05/19/23 Analyzed: 05/23/23						
Acenaphthene	ND	0.17	mg/Kg wet							
Acenaphthylene	ND	0.17	mg/Kg wet							
Anthracene	ND	0.17	mg/Kg wet							
Benzo(a)anthracene	ND	0.17	mg/Kg wet							
Benzo(a)pyrene	ND	0.17	mg/Kg wet							
Benzo(b)fluoranthene	ND	0.17	mg/Kg wet							
Benzo(g,h,i)perylene	ND	0.17	mg/Kg wet							
Benzo(k)fluoranthene	ND	0.17	mg/Kg wet							
Chrysene	ND	0.17	mg/Kg wet							
Dibenz(a,h)anthracene	ND	0.17	mg/Kg wet							
Fluoranthene	ND	0.17	mg/Kg wet							
Fluorene	ND	0.17	mg/Kg wet							
Indeno(1,2,3-cd)pyrene	ND	0.17	mg/Kg wet							
2-Methylnaphthalene	ND	0.17	mg/Kg wet							
Naphthalene	ND	0.17	mg/Kg wet							
Phenanthrene	ND	0.17	mg/Kg wet							
Pyrene	ND	0.17	mg/Kg wet							
Surrogate: Nitrobenzene-d5	*2.25*		mg/Kg wet	3.32		67.8	30-130			
Surrogate: 2-Fluorobiphenyl	*2.42*		mg/Kg wet	3.32		73.0	30-130			
Surrogate: p-Terphenyl-d14	*2.99*		mg/Kg wet	3.32		90.0	30-130			
LCS (B340861-BS1)				Prepared: 05/19/23 Analyzed: 05/23/23						
Acenaphthene	1.13	0.17	mg/Kg wet	1.66		67.9	40-140			
Acenaphthylene	1.11	0.17	mg/Kg wet	1.66		67.0	40-140			
Anthracene	1.11	0.17	mg/Kg wet	1.66		66.8	40-140			
Benzo(a)anthracene	1.09	0.17	mg/Kg wet	1.66		65.4	40-140			
Benzo(a)pyrene	1.04	0.17	mg/Kg wet	1.66		62.4	40-140			
Benzo(b)fluoranthene	1.17	0.17	mg/Kg wet	1.66		70.7	40-140			
Benzo(g,h,i)perylene	1.20	0.17	mg/Kg wet	1.66		72.5	40-140			
Benzo(k)fluoranthene	1.16	0.17	mg/Kg wet	1.66		70.0	40-140			
Chrysene	1.06	0.17	mg/Kg wet	1.66		64.0	40-140			
Dibenz(a,h)anthracene	1.14	0.17	mg/Kg wet	1.66		68.5	40-140			
Fluoranthene	0.990	0.17	mg/Kg wet	1.66		59.6	40-140			
Fluorene	1.11	0.17	mg/Kg wet	1.66		66.8	40-140			
Indeno(1,2,3-cd)pyrene	1.18	0.17	mg/Kg wet	1.66		71.0	40-140			
2-Methylnaphthalene	1.01	0.17	mg/Kg wet	1.66		60.6	40-140			
Naphthalene	1.09	0.17	mg/Kg wet	1.66		65.8	40-140			
Phenanthrene	1.11	0.17	mg/Kg wet	1.66		66.9	40-140			
Pyrene	1.18	0.17	mg/Kg wet	1.66		70.9	40-140			
Surrogate: Nitrobenzene-d5	*2.24*		mg/Kg wet	3.32		67.4	30-130			
Surrogate: 2-Fluorobiphenyl	*2.42*		mg/Kg wet	3.32		72.9	30-130			
Surrogate: p-Terphenyl-d14	*2.67*		mg/Kg wet	3.32		80.5	30-130			

con-test® A Pace Analytical® Laboratory

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

QUALITY CONTROL

Semivolatile Organic Compounds by GC/MS - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B340861 - SW-846 3546										
LCS Dup (B340861-BSD1)				Prepared: 05/19/23 Analyzed: 05/23/23						
Acenaphthene	1.11	0.17	mg/Kg wet	1.65		67.3	40-140	1.55	30	
Acenaphthylene	1.11	0.17	mg/Kg wet	1.65		67.5	40-140	0.0377	30	
Anthracene	1.10	0.17	mg/Kg wet	1.65		66.9	40-140	0.602	30	
Benzo(a)anthracene	1.05	0.17	mg/Kg wet	1.65		63.7	40-140	3.33	30	
Benzo(a)pyrene	1.01	0.17	mg/Kg wet	1.65		61.5	40-140	2.21	30	
Benzo(b)fluoranthene	1.12	0.17	mg/Kg wet	1.65		68.0	40-140	4.44	30	
Benzo(g,h,i)perylene	1.16	0.17	mg/Kg wet	1.65		70.5	40-140	3.46	30	
Benzo(k)fluoranthene	1.15	0.17	mg/Kg wet	1.65		69.9	40-140	0.834	30	
Chrysene	1.04	0.17	mg/Kg wet	1.65		63.0	40-140	2.17	30	
Dibenz(a,h)anthracene	1.12	0.17	mg/Kg wet	1.65		67.8	40-140	1.63	30	
Fluoranthene	0.976	0.17	mg/Kg wet	1.65		59.1	40-140	1.44	30	
Fluorene	1.11	0.17	mg/Kg wet	1.65		67.0	40-140	0.393	30	
Indeno(1,2,3-cd)pyrene	1.14	0.17	mg/Kg wet	1.65		68.9	40-140	3.58	30	
2-Methylnaphthalene	0.987	0.17	mg/Kg wet	1.65		59.8	40-140	1.93	30	
Naphthalene	1.05	0.17	mg/Kg wet	1.65		63.6	40-140	4.15	30	
Phenanthrene	1.10	0.17	mg/Kg wet	1.65		66.8	40-140	0.932	30	
Pyrene	1.14	0.17	mg/Kg wet	1.65		68.8	40-140	3.64	30	
Surrogate: Nitrobenzene-d5	*2.11*		mg/Kg wet	3.30		63.9	30-130			
Surrogate: 2-Fluorobiphenyl	*2.36*		mg/Kg wet	3.30		71.6	30-130			
Surrogate: p-Terphenyl-d14	*2.58*		mg/Kg wet	3.30		78.3	30-130			

con-test® A Pace Analytical® Laboratory

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

QUALITY CONTROL

Petroleum Hydrocarbons Analyses - EPH - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B340848 - SW-846 3546										
Blank (B340848-BLK1)				Prepared: 05/19/23 Analyzed: 05/22/23						
C9-C18 Aliphatics	ND	10	mg/Kg wet							
C19-C36 Aliphatics	ND	10	mg/Kg wet							
Unadjusted C11-C22 Aromatics	ND	10	mg/Kg wet							
C11-C22 Aromatics	ND	10	mg/Kg wet							
Acenaphthene	ND	0.10	mg/Kg wet							
Acenaphthylene	ND	0.10	mg/Kg wet							
Anthracene	ND	0.10	mg/Kg wet							
Benzo(a)anthracene	ND	0.10	mg/Kg wet							
Benzo(a)pyrene	ND	0.10	mg/Kg wet							
Benzo(b)fluoranthene	ND	0.10	mg/Kg wet							
Benzo(g,h,i)perylene	ND	0.10	mg/Kg wet							
Benzo(k)fluoranthene	ND	0.10	mg/Kg wet							
Chrysene	ND	0.10	mg/Kg wet							
Dibenz(a,h)anthracene	ND	0.10	mg/Kg wet							
Fluoranthene	ND	0.10	mg/Kg wet							
Fluorene	ND	0.10	mg/Kg wet							
Indeno(1,2,3-cd)pyrene	ND	0.10	mg/Kg wet							
2-Methylnaphthalene	ND	0.10	mg/Kg wet							
Naphthalene	ND	0.10	mg/Kg wet							
Phenanthrene	ND	0.10	mg/Kg wet							
Pyrene	ND	0.10	mg/Kg wet							
Naphthalene-aliphatic fraction	ND	0.10	mg/Kg wet							
2-Methylnaphthalene-aliphatic fraction	ND	0.10	mg/Kg wet							
Surrogate: Chlorooctadecane (COD)	*2.78*		mg/Kg wet	5.00		55.6	40-140			
Surrogate: o-Terphenyl (OTP)	*3.00*		mg/Kg wet	5.00		60.0	40-140			
Surrogate: 2-Bromonaphthalene	*4.15*		mg/Kg wet	5.00		83.1	40-140			
Surrogate: 2-Fluorobiphenyl	*4.04*		mg/Kg wet	5.00		80.8	40-140			
LCS (B340848-BS1)				Prepared: 05/19/23 Analyzed: 05/22/23						
C9-C18 Aliphatics	23.6	10	mg/Kg wet	30.0		78.6	40-140			
C19-C36 Aliphatics	36.1	10	mg/Kg wet	40.0		90.3	40-140			
Unadjusted C11-C22 Aromatics	62.8	10	mg/Kg wet	85.0		73.9	40-140			
Acenaphthene	3.44	0.10	mg/Kg wet	5.00		68.8	40-140			
Acenaphthylene	3.18	0.10	mg/Kg wet	5.00		63.7	40-140			
Anthracene	3.53	0.10	mg/Kg wet	5.00		70.7	40-140			
Benzo(a)anthracene	3.47	0.10	mg/Kg wet	5.00		69.4	40-140			
Benzo(a)pyrene	3.52	0.10	mg/Kg wet	5.00		70.4	40-140			
Benzo(b)fluoranthene	3.29	0.10	mg/Kg wet	5.00		65.8	40-140			
Benzo(g,h,i)perylene	3.17	0.10	mg/Kg wet	5.00		63.4	40-140			
Benzo(k)fluoranthene	3.24	0.10	mg/Kg wet	5.00		64.8	40-140			
Chrysene	3.75	0.10	mg/Kg wet	5.00		74.9	40-140			
Dibenz(a,h)anthracene	3.37	0.10	mg/Kg wet	5.00		67.5	40-140			
Fluoranthene	3.38	0.10	mg/Kg wet	5.00		67.7	40-140			
Fluorene	3.57	0.10	mg/Kg wet	5.00		71.3	40-140			
Indeno(1,2,3-cd)pyrene	3.26	0.10	mg/Kg wet	5.00		65.2	40-140			
2-Methylnaphthalene	3.35	0.10	mg/Kg wet	5.00		66.9	40-140			
Naphthalene	3.21	0.10	mg/Kg wet	5.00		64.2	40-140			
Phenanthrene	3.52	0.10	mg/Kg wet	5.00		70.5	40-140			
Pyrene	3.46	0.10	mg/Kg wet	5.00		69.3	40-140			
Naphthalene-aliphatic fraction	ND	0.10	mg/Kg wet	5.00			0-5			
2-Methylnaphthalene-aliphatic fraction	ND	0.10	mg/Kg wet	5.00			0-5			
Surrogate: Chlorooctadecane (COD)	*2.98*		mg/Kg wet	5.00		59.5	40-140			

con-test® A Pace Analytical® Laboratory

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

QUALITY CONTROL

Petroleum Hydrocarbons Analyses - EPH - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B340848 - SW-846 3546										
LCS (B340848-BS1)				Prepared: 05/19/23 Analyzed: 05/22/23						
Surrogate: o-Terphenyl (OTP)	*2.90*		mg/Kg wet	5.00		57.9	40-140			
Surrogate: 2-Bromonaphthalene	*4.20*		mg/Kg wet	5.00		84.0	40-140			
Surrogate: 2-Fluorobiphenyl	*4.10*		mg/Kg wet	5.00		82.1	40-140			
LCS Dup (B340848-BSD1)				Prepared: 05/19/23 Analyzed: 05/22/23						
C9-C18 Aliphatics	21.7	10	mg/Kg wet	30.0		72.3	40-140	8.31	25	
C19-C36 Aliphatics	34.6	10	mg/Kg wet	40.0		86.4	40-140	4.43	25	
Unadjusted C11-C22 Aromatics	59.9	10	mg/Kg wet	85.0		70.5	40-140	4.63	25	
Acenaphthene	3.10	0.10	mg/Kg wet	5.00		61.9	40-140	10.5	25	
Acenaphthylene	2.83	0.10	mg/Kg wet	5.00		56.6	40-140	11.8	25	
Anthracene	3.36	0.10	mg/Kg wet	5.00		67.2	40-140	5.07	25	
Benzo(a)anthracene	3.32	0.10	mg/Kg wet	5.00		66.5	40-140	4.27	25	
Benzo(a)pyrene	3.38	0.10	mg/Kg wet	5.00		67.6	40-140	4.01	25	
Benzo(b)fluoranthene	3.15	0.10	mg/Kg wet	5.00		63.0	40-140	4.31	25	
Benzo(g,h,i)perylene	3.04	0.10	mg/Kg wet	5.00		60.9	40-140	4.08	25	
Benzo(k)fluoranthene	3.11	0.10	mg/Kg wet	5.00		62.1	40-140	4.15	25	
Chrysene	3.59	0.10	mg/Kg wet	5.00		71.9	40-140	4.20	25	
Dibenz(a,h)anthracene	3.27	0.10	mg/Kg wet	5.00		65.4	40-140	3.05	25	
Fluoranthene	3.24	0.10	mg/Kg wet	5.00		64.8	40-140	4.35	25	
Fluorene	3.28	0.10	mg/Kg wet	5.00		65.6	40-140	8.41	25	
Indeno(1,2,3-cd)pyrene	3.12	0.10	mg/Kg wet	5.00		62.3	40-140	4.55	25	
2-Methylnaphthalene	2.96	0.10	mg/Kg wet	5.00		59.3	40-140	12.1	25	
Naphthalene	2.69	0.10	mg/Kg wet	5.00		53.8	40-140	17.6	25	
Phenanthrene	3.33	0.10	mg/Kg wet	5.00		66.5	40-140	5.80	25	
Pyrene	3.32	0.10	mg/Kg wet	5.00		66.4	40-140	4.27	25	
Naphthalene-aliphatic fraction	ND	0.10	mg/Kg wet	5.00			0-5			
2-Methylnaphthalene-aliphatic fraction	ND	0.10	mg/Kg wet	5.00			0-5			
Surrogate: Chlorooctadecane (COD)	*2.93*		mg/Kg wet	5.00		58.6	40-140			
Surrogate: o-Terphenyl (OTP)	*2.87*		mg/Kg wet	5.00		57.5	40-140			
Surrogate: 2-Bromonaphthalene	*4.36*		mg/Kg wet	5.00		87.3	40-140			
Surrogate: 2-Fluorobiphenyl	*4.26*		mg/Kg wet	5.00		85.2	40-140			

con-test® A Pace Analytical® Laboratory

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

QUALITY CONTROL

Petroleum Hydrocarbons Analyses - VPH - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B340496 - MA VPH										
Blank (B340496-BLK1)				Prepared & Analyzed: 05/17/23						
Unadjusted C5-C8 Aliphatics	ND	10	mg/Kg wet							
C5-C8 Aliphatics	ND	10	mg/Kg wet							
Unadjusted C9-C12 Aliphatics	ND	10	mg/Kg wet							
C9-C12 Aliphatics	ND	10	mg/Kg wet							
C9-C10 Aromatics	ND	10	mg/Kg wet							
Benzene	ND	0.050	mg/Kg wet							
Butylcyclohexane	ND	0.050	mg/Kg wet							
Decane	ND	0.050	mg/Kg wet							
Ethylbenzene	ND	0.050	mg/Kg wet							
Methyl tert-Butyl Ether (MTBE)	ND	0.050	mg/Kg wet							
2-Methylpentane	ND	0.050	mg/Kg wet							
Naphthalene	ND	0.25	mg/Kg wet							
Nonane	ND	0.050	mg/Kg wet							
Pentane	ND	0.050	mg/Kg wet							
Toluene	ND	0.050	mg/Kg wet							
1,2,4-Trimethylbenzene	ND	0.050	mg/Kg wet							
2,2,4-Trimethylpentane	ND	0.050	mg/Kg wet							
m+p Xylene	ND	0.10	mg/Kg wet							
o-Xylene	ND	0.050	mg/Kg wet							
Surrogate: 2,5-Dibromotoluene (FID)	*38.5*		µg/L	40.0		96.3	70-130			
Surrogate: 2,5-Dibromotoluene (PID)	*38.8*		µg/L	40.0		97.0	70-130			
LCS (B340496-BS1)				Prepared & Analyzed: 05/17/23						
Unadjusted C5-C8 Aliphatics	7.93	10	mg/Kg wet	7.50		106	70-130			
Unadjusted C9-C12 Aliphatics	7.30	10	mg/Kg wet	7.50		97.3	70-130			
C9-C10 Aromatics	2.60	10	mg/Kg wet	2.50		104	70-130			
Benzene	2.58	0.050	mg/Kg wet	2.50		103	70-130			
Butylcyclohexane	2.65	0.050	mg/Kg wet	2.50		106	70-130			
Decane	1.95	0.050	mg/Kg wet	2.50		77.9	70-130			
Ethylbenzene	2.55	0.050	mg/Kg wet	2.50		102	70-130			
Methyl tert-Butyl Ether (MTBE)	2.49	0.050	mg/Kg wet	2.50		99.6	70-130			
2-Methylpentane	2.75	0.050	mg/Kg wet	2.50		110	70-130			
Naphthalene	2.21	0.25	mg/Kg wet	2.50		88.2	70-130			
Nonane	2.70	0.050	mg/Kg wet	2.50		108	30-130			
Pentane	2.81	0.050	mg/Kg wet	2.50		112	70-130			
Toluene	2.52	0.050	mg/Kg wet	2.50		101	70-130			
1,2,4-Trimethylbenzene	2.60	0.050	mg/Kg wet	2.50		104	70-130			
2,2,4-Trimethylpentane	2.38	0.050	mg/Kg wet	2.50		95.1	70-130			
m+p Xylene	5.05	0.10	mg/Kg wet	5.00		101	70-130			
o-Xylene	2.56	0.050	mg/Kg wet	2.50		102	70-130			
Surrogate: 2,5-Dibromotoluene (FID)	*42.2*		µg/L	40.0		106	70-130			
Surrogate: 2,5-Dibromotoluene (PID)	*42.0*		µg/L	40.0		105	70-130			

con-test® A Pace Analytical® Laboratory

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

QUALITY CONTROL

Petroleum Hydrocarbons Analyses - VPH - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B340496 - MA VPH										
LCS Dup (B340496-BSD1)				Prepared & Analyzed: 05/17/23						
Unadjusted C5-C8 Aliphatics	8.03	10	mg/Kg wet	7.50		107	70-130	1.24	25	
Unadjusted C9-C12 Aliphatics	7.23	10	mg/Kg wet	7.50		96.3	70-130	0.968	25	
C9-C10 Aromatics	2.59	10	mg/Kg wet	2.50		104	70-130	0.389	25	
Benzene	2.62	0.050	mg/Kg wet	2.50		105	70-130	1.44	25	
Butylcyclohexane	2.63	0.050	mg/Kg wet	2.50		105	70-130	1.06	25	
Decane	1.93	0.050	mg/Kg wet	2.50		77.3	70-130	0.763	25	
Ethylbenzene	2.56	0.050	mg/Kg wet	2.50		102	70-130	0.398	25	
Methyl tert-Butyl Ether (MTBE)	2.54	0.050	mg/Kg wet	2.50		102	70-130	1.95	25	
2-Methylpentane	2.82	0.050	mg/Kg wet	2.50		113	70-130	2.79	25	
Naphthalene	2.20	0.25	mg/Kg wet	2.50		88.1	70-130	0.159	25	
Nonane	2.67	0.050	mg/Kg wet	2.50		107	30-130	1.03	25	
Pentane	2.84	0.050	mg/Kg wet	2.50		114	70-130	1.11	25	
Toluene	2.54	0.050	mg/Kg wet	2.50		102	70-130	0.899	25	
1,2,4-Trimethylbenzene	2.59	0.050	mg/Kg wet	2.50		104	70-130	0.389	25	
2,2,4-Trimethylpentane	2.37	0.050	mg/Kg wet	2.50		94.7	70-130	0.442	25	
m+p Xylene	5.06	0.10	mg/Kg wet	5.00		101	70-130	0.300	25	
o-Xylene	2.56	0.050	mg/Kg wet	2.50		102	70-130	0.0254	25	
Surrogate: 2,5-Dibromotoluene (FID)	*41.5*		µg/L	40.0		104	70-130			
Surrogate: 2,5-Dibromotoluene (PID)	*42.3*		µg/L	40.0		106	70-130			

con-test® A Pace Analytical® Laboratory

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

QUALITY CONTROL

Metals Analyses (Total) - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC		%REC Limits	RPD	RPD Limit	Notes
Batch B340817 - SW-846 3050B											
Blank (B340817-BLK1)				Prepared: 05/19/23 Analyzed: 05/22/23							
Barium	ND	1.6	mg/Kg wet								
Cadmium	ND	0.32	mg/Kg wet								
Blank (B340817-BLK2)				Prepared: 05/19/23 Analyzed: 05/23/23							
Lead	ND	0.48	mg/Kg wet								
LCS (B340817-BS1)				Prepared: 05/19/23 Analyzed: 05/23/23							
Barium	296	5.0	mg/Kg wet	297		99.7		82.2-118.2			
Cadmium	221	1.0	mg/Kg wet	221		100		82.4-117.2			
LCS (B340817-BS2)				Prepared: 05/19/23 Analyzed: 05/23/23							
Lead	227	1.5	mg/Kg wet	257		88.2		82.1-117.9			
LCS Dup (B340817-BSD1)				Prepared: 05/19/23 Analyzed: 05/23/23							
Barium	293	5.0	mg/Kg wet	297		98.7		82.2-118.2	1.06	20	
Cadmium	211	1.0	mg/Kg wet	221		95.5		82.4-117.2	4.69	20	
LCS Dup (B340817-BSD2)				Prepared: 05/19/23 Analyzed: 05/23/23							
Lead	224	1.5	mg/Kg wet	257		87.2		82.1-117.9	1.18	30	
Matrix Spike (B340817-MS1)	**Source: 23E2241-07**			Prepared: 05/19/23 Analyzed: 05/23/23							
Barium	70.9	1.8	mg/Kg dry	17.6	48.1	**130**	*	75-125			MS-22
Cadmium	17.4	0.35	mg/Kg dry	17.6	ND	98.9		75-125			
Matrix Spike (B340817-MS2)	**Source: 23E2241-07**			Prepared: 05/19/23 Analyzed: 05/24/23							
Lead	18.0	0.53	mg/Kg dry	17.6	2.65	87.4		75-125			
Matrix Spike Dup (B340817-MSD1)	**Source: 23E2241-07**			Prepared: 05/19/23 Analyzed: 05/23/23							
Barium	67.6	1.7	mg/Kg dry	17.4	48.1	112		75-125	4.83	35	
Cadmium	17.1	0.35	mg/Kg dry	17.4	ND	97.9		75-125	1.77	35	
Matrix Spike Dup (B340817-MSD2)	**Source: 23E2241-07**			Prepared: 05/19/23 Analyzed: 05/24/23							
Lead	18.7	0.52	mg/Kg dry	17.4	2.65	91.8		75-125	3.47	35	
Reference (B340817-SRM1) MRL CHECK				Prepared: 05/19/23 Analyzed: 05/23/23							
Lead	0.374	0.49	mg/Kg wet	0.495		**75.7**	*	80-120			M-12

con-test®
A Pace Analytical® Laboratory

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

FLAG/QUALIFIER SUMMARY

*	QC result is outside of established limits.
†	Wide recovery limits established for difficult compound.
‡	Wide RPD limits established for difficult compound.
#	Data exceeded client recommended or regulatory level
ND	Not Detected
RL	Reporting Limit is at the level of quantitation (LOQ)
DL	Detection Limit is the lower limit of detection determined by the MDL study
MCL	Maximum Contaminant Level
	Percent recoveries and relative percent differences (RPDs) are determined by the software using values in the calculation which have not been rounded.
	No results have been blank subtracted unless specified in the case narrative section.
H-06	Sample was extracted past the recommended holding time.
M-12	The reporting limit verification for the AIHA lead program is outside of control limits for this element. Any reported result at or near the detection limit may be biased on the low side.
MS-22	Either matrix spike or MS duplicate is outside of control limits, but the other is within limits. RPD between the two MS/MSD results is within method specified criteria.

con-test® A Pace Analytical® Laboratory

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

CERTIFICATIONS

Certified Analyses included in this Report

Analyte	Certifications
MADEP EPH rev 2.1 in Soil	
C9-C18 Aliphatics	CT,NC,ME,NH-P
C19-C36 Aliphatics	CT,NC,ME,NH-P
Unadjusted C11-C22 Aromatics	CT,NC,ME,NH-P
C11-C22 Aromatics	CT,NC,ME,NH-P
Acenaphthene	CT,NC,ME,NH-P
Acenaphthylene	CT,NC,ME,NH-P
Anthracene	CT,NC,ME,NH-P
Benzo(a)anthracene	CT,NC,ME,NH-P
Benzo(a)pyrene	CT,NC,ME,NH-P
Benzo(b)fluoranthene	CT,NC,ME,NH-P
Benzo(g,h,i)perylene	CT,NC,ME,NH-P
Benzo(k)fluoranthene	CT,NC,ME,NH-P
Chrysene	CT,NC,ME,NH-P
Dibenz(a,h)anthracene	CT,NC,ME,NH-P
Fluoranthene	CT,NC,ME,NH-P
Fluorene	CT,NC,ME
Indeno(1,2,3-cd)pyrene	CT,NC,ME,NH-P
2-Methylnaphthalene	CT,NC
Naphthalene	CT,NC,ME,NH-P
Phenanthrene	CT,NC,ME,NH-P
Pyrene	CT,NC,ME,NH-P
MADEP EPH rev 2.1 in Water	
C9-C18 Aliphatics	CT,NC,ME,NH-P
C19-C36 Aliphatics	CT,NC,ME,NH-P
Unadjusted C11-C22 Aromatics	CT,NC,ME,NH-P
C11-C22 Aromatics	CT,NC,ME,NH-P
Acenaphthene	CT,NC,ME,NH-P
Acenaphthylene	CT,NC,ME,NH-P
Anthracene	CT,NC,ME,NH-P
Benzo(a)anthracene	CT,NC,ME,NH-P
Benzo(a)pyrene	CT,NC,ME,NH-P
Benzo(b)fluoranthene	CT,NC,ME,NH-P
Benzo(g,h,i)perylene	CT,NC,ME,NH-P
Benzo(k)fluoranthene	CT,NC,ME,NH-P
Chrysene	CT,NC,ME,NH-P
Dibenz(a,h)anthracene	CT,NC,ME,NH-P
Fluoranthene	CT,NC,ME,NH-P
Fluorene	CT,NC,ME
Indeno(1,2,3-cd)pyrene	CT,NC,ME,NH-P
2-Methylnaphthalene	CT,NC
Naphthalene	CT,NC,ME,NH-P
Phenanthrene	CT,NC,ME,NH-P
Pyrene	CT,NC,ME,NH-P
MADEP-VPH-Feb 2018 Rev 2.1 in Soil	
Unadjusted C5-C8 Aliphatics	CT,NC,ME,NH-P
C5-C8 Aliphatics	CT,NC,ME,NH-P

con-test® A Pace Analytical® Laboratory

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

CERTIFICATIONS

Certified Analyses included in this Report

Analyte	Certifications
MADEP-VPH-Feb 2018 Rev 2.1 in Soil	
Unadjusted C9-C12 Aliphatics	CT,NC,ME,NH-P
C9-C12 Aliphatics	CT,NC,ME,NH-P
C9-C10 Aromatics	CT,NC,ME,NH-P
Benzene	CT,NC,ME,NH-P
Ethylbenzene	CT,NC,ME,NH-P
Methyl tert-Butyl Ether (MTBE)	CT,NC,ME,NH-P
Naphthalene	CT,NC,ME,NH-P
Toluene	CT,NC,ME,NH-P
m+p Xylene	CT,NC,ME,NH-P
o-Xylene	CT,NC,ME,NH-P
SW-846 6010D in Soil	
Barium	CT,NH,NY,ME,VA,NC
Cadmium	CT,NH,NY,ME,VA,NC
Lead	CT,NH,NY,AIHA,ME,VA,NC
SW-846 6010D in Water	
Barium	CT,NH,NY,ME,VA,NC
Cadmium	CT,NH,NY,ME,VA,NC
Lead	CT,NH,NY,ME,VA,NC
SW-846 8270E in Soil	
Acenaphthene	CT,NY,NH,ME,NC,VA
Acenaphthylene	CT,NY,NH,ME,NC,VA
Anthracene	CT,NY,NH,ME,NC,VA
Benzo(a)anthracene	CT,NY,NH,ME,NC,VA
Benzo(a)pyrene	CT,NY,NH,ME,NC,VA
Benzo(b)fluoranthene	CT,NY,NH,ME,NC,VA
Benzo(g,h,i)perylene	CT,NY,NH,ME,NC,VA
Benzo(k)fluoranthene	CT,NY,NH,ME,NC,VA
Chrysene	CT,NY,NH,ME,NC,VA
Dibenz(a,h)anthracene	CT,NY,NH,ME,NC,VA
Fluoranthene	CT,NY,NH,ME,NC,VA
Fluorene	CT,NY,NH,ME,NC,VA
Indeno(1,2,3-cd)pyrene	CT,NY,NH,ME,NC,VA
2-Methylnaphthalene	CT,NY,NH,ME,NC,VA
Naphthalene	CT,NY,NH,ME,NC,VA
Phenanthrene	CT,NY,NH,ME,NC,VA
Pyrene	CT,NY,NH,ME,NC,VA
SW-846 8270E in Water	
Acenaphthene	CT,NY,NH,ME,NC,VA
Acenaphthylene	CT,NY,NH,ME,NC,VA
Anthracene	CT,NY,NH,ME,NC,VA
Benzo(a)anthracene	CT,NY,NH,ME,NC,VA
Benzo(a)pyrene	CT,NY,NH,ME,NC,VA
Benzo(b)fluoranthene	CT,NY,NH,ME,NC,VA
Benzo(g,h,i)perylene	CT,NY,NH,ME,NC,VA
Benzo(k)fluoranthene	CT,NY,NH,ME,NC,VA

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

CERTIFICATIONS

Certified Analyses included in this Report

Analyte	Certifications
SW-846 8270E in Water	
Chrysene	CT,NY,NH,ME,NC,VA
Dibenz(a,h)anthracene	CT,NY,NH,ME,NC,VA
Fluoranthene	CT,NY,NH,ME,NC,VA
Fluorene	CT,NY,NH,ME,NC,VA
Indeno(1,2,3-cd)pyrene	CT,NY,NH,ME,NC,VA
2-Methylnaphthalene	CT,NY,NH,ME,NC,VA
Naphthalene	CT,NY,NH,ME,NC,VA
Phenanthrene	CT,NY,NH,ME,NC,VA
Pyrene	CT,NY,NH,ME,NC,VA

Con-Test, a Pace Environmental Laboratory, operates under the following certifications and accreditations:

Code	Description	Number	Expires
AIHA	AIHA-LAP, LLC - ISO 17025:2017	100033	03/1/2024
CT	Connecticut Department of Public Health	PH-0821	12/31/2024
NY	New York State Department of Health	10899 NELAP	04/1/2024
NH	New Hampshire Environmental Lab	2516 NELAP	02/5/2024
NC	North Carolina Div. of Water Quality	652	12/31/2023
ME	State of Maine	MA00100	06/9/2023
VA	Commonwealth of Virginia	460217	12/14/2023
NH-P	New Hampshire Environmental Lab	2557 NELAP	09/6/2023

23E2241

Pace Analytical®

Phone: 413-525-2332
Fax: 413-525-6405
Access COC's and Support Requests

http://www.pacelabs.com

CHAIN OF CUSTODY RECORD

39 Spruce Street
East Longmeadow, MA 01028

Doc # 381 Rev 5_07/13/2021

Page 1 of 3

Company Name: Weston and Sampson
Address: 55 Walkers Brook Dr Suite 100
Phone: 1800 SAMPSON Reading, MA 01867
Project Name: E/S Pinevale
Project Location: Springfield, MA
Project Number: ENG23-0351
Project Manager: Joe Spencer
Pace Quote Name/Number: INVOICES@WSEINC.com
Invoice Recipient: ~~WSEINC.COM~~
Sampled By: ACE, EL

Requested Turnaround Time
7-Day ☑ 10-Day ☐
PFAS 10-Day (std) ☐ Due Date:

Rush-Approval Required
1-Day ☐ 3-Day ☐
2-Day ☐ 4-Day ☐

Dissolved Metals Samples
○ Field Filtered
○ Lab to Filter

Orthophosphate Samples
○ Field Filtered
○ Lab to Filter

Data Delivery
Format: PDF ☑ EXCEL ☑
Other: envirodata edd
CLP Like Data Pkg Required: ☐
Email To: Spencer@wseinc.com
~~Fax To~~ #: eckert.Alison@wseinc.com, li.esther@wseinc.com

PCB ONLY
SOXHLET ☐
NON SOXHLET ☐

ANALYSIS REQUESTED

Pace Work Order#	Client Sample ID / Description	Beginning Date/Time	Ending Date/Time	COMP/GRAB	[1]Matrix Code	Conc Code	VIALS	GLASS	PLASTIC	BACTERIA	ENCORE	Cadmium Total	Barium Total	Lead Total
1	CM-52W (1-3)	5/15/23	10:40	C	S	U		1				X		
2	CM-52N (1-3)	5/15/23	10:50	C	S	U		1				X		
3	CM-52S (14"-3)	5/15/23	10:58	C	S	U		1				X		
4	CM-52E (1-3)	5/15/23	11:07	C	S	U		1				X		
5	MW-205A (5"-3)	5/15/23	11:51	C	S	U		1				X		
6	DUP-2	↓	—	↓	↓	↓		1				X	X	X
7	CM-53SE (1-2)		1400					1				X	X	X
8	MS/MSD-1		—					2				X	X	X
9	CM-53W (6"-2)		1355					1				X	X	X
10	CM-53SW (6"-2)		1345					1				X	X	X

Relinquished by: (signature) — Date/Time: 5/16/23 1240
Received by: (signature) — Date/Time: 5/16/23 12:40
Relinquished by: (signature) — Date/Time: 5/16/23 14
Received by: (signature) — Date/Time: 5/16/23 1440
Relinquished by: (signature) — Date/Time:
Received by: (signature) — Date/Time:
Relinquished by: (signature) — Date/Time:
Received by: (signature) — Date/Time:

Client Comments:

Detection Limit Requirements
MA: 5-1/GW-2; 5-1/GW-3
CT:
Other:

Special Requirements
☒ MA MCP Required
MCP Certification Form Required
☐ CT RCP Required
RCP Certification Form Required
☐ MA State DW Required
PWSID #

Please use the following codes to indicate possible sample concentration within the Conc Code column above:
H - High; M - Medium; L - Low; C - Clean; U - Unknown

MELAC and AIHA-LAP, LLC Accredited

Project Entity
Government ☐ Municipality ☒ MWRA ☐ WRTA ☐
Federal ☐ 21 J ☐ School ☐
City ☐ Brownfield ☐ MBTA ☐

Other
☐ Chromatogram
☐ AIHA-LAP,LLC

Lab Comments:

Disclaimer: Pace Analytical is not responsible for any omitted information on the Chain of Custody. The Chain of Custody is a legal document that must be complete and accurate and is used to determine what analyses the laboratory will perform. Any missing information is not the laboratory's responsibility. Pace Analytical values your partnership on each project and will try to assist with missing information, but will not be held accountable.

[2] Preservation Code
Courier Use Only
Total Number Of:
VIALS
GLASS
PLASTIC
BACTERIA
ENCORE

Glassware in the fridge? Y / N
Glassware in freezer? Y / N
Prepackaged Cooler? Y / N
*Pace Analytical is not responsible for missing samples from prepacked coolers

[1] **Matrix Codes:**
GW = Ground Water
WW = Waste Water
DW = Drinking Water
A = Air
S = Soil
SL = Sludge
SOL = Solid
O = Other (please define)

[2] **Preservation Codes:**
I = Iced
H = HCL
M = Methanol
N = Nitric Acid
S = Sulfuric Acid
B = Sodium Bisulfate
X = Sodium Hydroxide
T = Sodium Thiosulfate
O = Other (please define)

Table of Contents

23E2241

http://www.pacelabs.com

Doc # 381 Rev 5_07/13/2021

Pace Analytical®

Phone: 413-525-2332
Fax: 413-525-6405
Access COC's and Support Requests

CHAIN OF CUSTODY RECORD

39 Spruce Street
East Longmeadow, MA 01028

Page 2 of 3

Company Name:	Weston + Sampson
Address:	55 Walkers Brook Dr #100, Reading MA 01867
Phone:	1-800-SAMPSON
Project Name:	ES Pinevale
Project Location:	Springfield, MA
Project Number:	ENG 23-0351
Project Manager:	Joe Spencer
Pace Quote Name/Number:	
Invoice Recipient:	invoices@wseinc.com
Sampled By:	ACE, EL

Requested Turnaround Time
7-Day [X] 10-Day [ ]
PFAS 10-Day (std) [ ] Due Date:

Rush-Approval Required
1-Day [ ] 3-Day [ ]
2-Day [ ] 4-Day [ ]

Data Delivery
Format: PDF [X] EXCEL [X]
Other: Enviro data edd
CLP Like Data Pkg Required: [ ]
Email To: SPENCERJ@WSEINC.COM
Fax To#: ECKER.ALISON@WSEINC.COM, LI.ESTHER@WSEINC.COM

Dissolved Metals Samples
○ Field Filtered
○ Lab to Filter

Orthophosphate Samples
○ Field Filtered
○ Lab to Filter

PCB ONLY
SOXHLET [ ]
NON SOXHLET [ ]

ANALYSIS REQUESTED

Pace Work Order#	Client Sample ID / Description	Beginning Date/Time	Ending Date/Time	COMP/GRAB	[1]Matrix Code	Conc Code	VIALS	GLASS	PLASTIC	BACTERIA	ENCORE	Cadmium 6010 Total	Barium 6010 Total	Lead 6010 Total	PAHs	Coal Ash
10	CM-53N (0-2)	5/15/23	1300	C	S	U		1				X	X	X		
11	CM-53E (0-2)	↓	1327	↓	↓	↓		1				X	X	X		
	~~CTP-8A (0-1.5)~~	↓	~~1600~~	↓	↓	↓		~~1~~						X	X	X

ACE

Relinquished by: (signature)	Date/Time:
[signature]	5/16/23 1240
Received by: (signature)	Date/Time:
Jan Sabaue	5/16/23 12:40
Relinquished by: (signature)	Date/Time:
Jan Sabaue	5/16/23 1400
Received by: (signature)	Date/Time:
[signature]	5/16 1400
Relinquished by: (signature)	Date/Time:
Received by: (signature)	Date/Time:
Relinquished by: (signature)	Date/Time:
Received by: (signature)	Date/Time:

Client Comments:

Detection Limit Requirements
MA: S-1 / GW-2; S-1 / GW-3
CT:
Other:

Special Requirements
[X] MA MCP Required
MCP Certification Form Required
[ ] CT RCP Required
RCP Certification Form Required
[ ] MA State DW Required
PWSID #

Please use the following codes to indicate possible sample concentration within the Conc Code column above:
H - High; M - Medium; L - Low; C - Clean; U - Unknown

NELAC and AIHA-LAP, LLC Accredited

Project Entity
Government [ ] Municipality [X] MWRA [ ] WRTA [ ]
Federal [ ] 21 J [ ] School [ ]
City [ ] Brownfield [ ] MBTA [ ]

Other
[ ] Chromatogram
[ ] AIHA-LAP,LLC

Lab Comments:

Disclaimer: Pace Analytical is not responsible for any omitted information on the Chain of Custody. The Chain of Custody is a legal document that must be complete and accurate and is used to determine what analyses the laboratory will perform. Any missing information is not the laboratory's responsibility. Pace Analytical values your partnership on each project and will try to assist with missing information, but will not be held accountable.

[2] Preservation Code

Courier Use Only
Total Number Of:
VIALS____
GLASS____
PLASTIC____
BACTERIA____
ENCORE____

Glassware in the fridge? Y / N
Glassware in freezer? Y / N
Prepackaged Cooler? Y / N

*Pace Analytical is not responsible for missing samples from prepacked coolers

[1] **Matrix Codes:**
GW = Ground Water
WW = Waste Water
DW = Drinking Water
A = Air
S = Soil
SL = Sludge
SOL = Solid
O = Other (please define)

[2] **Preservation Codes:**
I = Iced
H = HCL
M = Methanol
N = Nitric Acid
S = Sulfuric Acid
B = Sodium Bisulfate
X = Sodium Hydroxide
T = Sodium Thiosulfate
O = Other (please define)

Table of Contents

23E2241

http://www.pacelabs.com

Doc # 381 Rev 5_07/13/2021

Pace Analytical®

Phone: 413-525-2332
Fax: 413-525-6405
Access COC's and Support Requests

CHAIN OF CUSTODY RECORD

39 Spruce Street
East Longmeadow, MA 01028

Company Name:	WHS
Address:	55 Walkers Brook Dr #100, Reading MA
Phone:	1-800-SAMPSON
Project Name:	ES Minivolt
Project Location:	Springfield, MA
Project Number:	ENG23-0351
Project Manager:	Joe Spencer
Pace Quote Name/Number:	
Invoice Recipient:	invoice@wseinc.com
Sampled By:	ACE, EL

Requested Turnaround Time: 7-Day ☒ 10-Day ☐ PFAS 10-Day (std) ☐ Due Date:

Rush-Approval Required: 1-Day ☐ 3-Day ☐ 2-Day ☐ 4-Day ☐

Dissolved Metals Samples: ○ Field Filtered ○ Lab to Filter

Orthophosphate Samples: ○ Field Filtered ○ Lab to Filter

Data Delivery: Format: PDF ☒ EXCEL ☒
Other: enviro data edd
CLP Like Data Pkg Required: ☐
Email To: SPENCER.J@WSEINC.COM
Fax To#: ECKER.ALISON@WSEINC.COM LE.ESTHER@WSEINC.COM

PCB ONLY
SOXHLET ☐
NON SOXHLET ☐

ANALYSIS REQUESTED

Pace Work Order#	Client Sample ID / Description	Beginning Date/Time	Ending Date/Time	COMP/GRAB	[1]Matrix Code	Conc Code	VIALS	GLASS	PLASTIC	BACTERIA	ENCORE	EPH	VPH	PAHs	Lead 6010 Total	Coal Ash							
12	CM-22N (9-12)	5/16/23	0945	C	S	U	1	1				X	X										
13	CM-22S (8-11)	↓	1100	↓	↓	↓	1	1				X	X										
14	CM-22E (8-11)		1025				1	1				X	X										
15	CM-22W (9.5-12.5)		0917				1	1				X	X										
16	OTP-6A (0-3)		1125					2						X	X	X							
17	OTP-8A (0-1.5)		1155					2						X	X	X							
18	DUP-3		—				1	1				X	X										
19	DUP-4		—					2						X	X	X							

ACE

Relinquished by: (signature) — Date/Time: 5/16/23 1240
Received by: (signature) Sam Sabaio — Date/Time: 5/16/23 12:40
Relinquished by: (signature) Sam Sabaio — Date/Time: 5/16/23 14:40
Received by: (signature) — Date/Time: 5/16/23 1440
Relinquished by: (signature) — Date/Time:
Received by: (signature) — Date/Time:
Relinquished by: (signature) — Date/Time:
Received by: (signature) — Date/Time:

Client Comments:

Detection Limit Requirements: MA: S-1 / Gw-2; S-1 / Gw-3; CT:; Other:

Special Requirements:
☒ MA MCP Required
MCP Certification Form Required
☐ CT RCP Required
RCP Certification Form Required
☐ MA State DW Required
PWSID #

Please use the following codes to indicate possible sample concentration within the Conc Code column above: H - High; M - Medium; L - Low; C - Clean; U - Unknown

NELAC and AIHA-LAP, LLC Accredited

Project Entity: Government ☐ Municipality ☒ MWRA ☐ WRTA ☐ Federal ☐ 21 J ☐ School ☐ City ☐ Brownfield ☐ MBTA ☐

Other: ☐ Chromatogram ☐ AIHA-LAP,LLC

Lab Comments:

Disclaimer: Pace Analytical is not responsible for any omitted information on the Chain of Custody. The Chain of Custody is a legal document that must be complete and accurate and is used to determine what analyses the laboratory will perform. Any missing information is not the laboratory's responsibility. Pace Analytical values your partnership on each project and will try to assist with missing information, but will not be held accountable.

[2] Preservation Code

Courier Use Only
Total Number Of:
VIALS
GLASS
PLASTIC
BACTERIA
ENCORE

Glassware in the fridge? Y / N
Glassware in freezer? Y / N
Prepackaged Cooler? Y / N

*Pace Analytical is not responsible for missing samples from prepacked coolers

[1] **Matrix Codes:**
GW = Ground Water
WW = Waste Water
DW = Drinking Water
A = Air
S = Soil
SL = Sludge
SOL = Solid
O = Other (please define)

[2] **Preservation Codes:**
I = Iced
H = HCL
M = Methanol
N = Nitric Acid
S = Sulfuric Acid
B = Sodium Bisulfate
X = Sodium Hydroxide
T = Sodium Thiosulfate
O = Other (please define)

Table of Contents

39 Spruce St.
East Longmeadow, MA. 01028
P: 413-525-2332
F:413-525-6405
www.pacelabs.com

ENV-FRM-ELON-0001 V05__Sample Receiving Checklist

Log In Back-Sheet

Login Sample Receipt Checklist – (Rejection Criteria Listing – Using Acceptance Policy) Any False statement will be brought to the attention of the Client – True or False

Pace PEOPLE ADVANCING SCIENCE

Client: W+S
Project: E/S Pinevale (EN623-0351)
MCP/RCP Required: MA-MCP
Deliverable Package Requirement: S-1, GW-2/3
Location: Pinevale St, Springfield, MA
PWSID# (When Applicable): n/a
Arrival Method:
Courier ☑ Fed Ex ☐ Walk In ☐ Other ☐
Received By / Date / Time: Mcm 5/16/23 1440
Back-Sheet By / Date / Time: Mcm 5/16/23 1519
Temperature Method: Gun # 5
Temp ☑ < 6° C Actual Temperature: 35
Rush Samples: Yes / No Notify: No
Short Hold: Yes / No Notify: No

	True	False
Received on Ice	☑	☐
Received in Cooler	☑	☐
Custody Seal: DATE TIME	☐	☑
COC Relinquished	☑	☐
COC/Samples Labels Agree	☑	☐
All Samples in Good Condition	☑	☐
Samples Received within Holding Time	☑	☐
Is there enough Volume	☑	☐
Proper Media/Container Used	☑	☐
Splitting Samples Required	☐	☑
MS/MSD	☑	☐
Trip Blanks	☐	☑
Lab to Filters	☐	☑
COC Legible	☑	☐

COC Included: (Check all included)

Client	☑	Analysis	☑	Sampler Name	☑
Project	☑	IDs	☑	Collection Date/Time	☑

All Samples Proper pH: N/A ☐ ☐

Notes regarding Samples/COC outside of SOP:

Additional Container Notes

Sample	Soils Jars (Circle Amb/Clear)				Ambers							Plastics										VOA Vials					Other / Fill in					
					1 Liter			250mL			100mL	1 Liter		500mL		250mL																
	16oz Amb/Clear	8oz Amb/Clear	4oz Amb/Clear	2oz Amb/Clear	Unpreserved	HCL	Sulfuric	Sulfuric	Phosphoric	HCl	Unpreserved	Unpreserved	Sulfuric	Unpreserved	Sulfuric	Unpreserved	Trizma	Sulfuric	Nitric	NaOH	NaOH/Zinc	Unpreserved	HCl	MeOH	D.I. Water	BiSulfate	Col/Bact					
1		1																														
2		1																														
3		1																														
4		1																														
5		1																														
6		1																														
7		3																														
8		1																														
9		1																														
10		1																														
11		1																														
12		1																						1								
13		1																						1								
14		1																						1								
15		1																						1								
16		2																														
17		2																														
18		1																						1								
19		2																														
20																																

Table of Contents

Pace New England

MicroVision Labs Coal Ash Report, Job # 15965
Pace New England Project#: 23E2241

Scope of Work:

This report covers the methods and findings of the Coal/Coal Ash analysis that MicroVision Laboratories, Inc. conducted on two (2) soil samples submitted for testing from the 23E2241 project. The purpose of this analysis was to detect and document any coal, coal ash, wood ash or asphalt that may be present in the submitted soil samples by use of a combination of microscopy techniques including SEM/EDS, PLM, and macroscopic inspection. The results presented in this report relate only to the samples examined and as received.

Methods:

MicroVision Labs is accredited to the ISO/IEC 17025:2017 standard. This analysis follows our in house SOP #MVL05 (Microscopic Analysis for Coal, Coal Ash and Wood Ash). This method is listed on our certificate of accreditation and has been validated.

Findings:

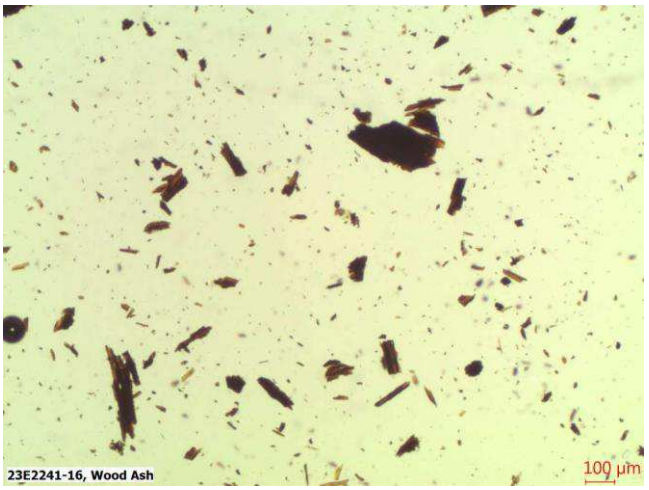
The following pages display the data for each particle type detected in the samples for this project. Each page contains a PLM image, SEM image, and EDS spectrum for the particle types detected for these samples as well as particle type descriptions and observations.

MicroVision Laboratories, Inc. 187 Billerica Road, Chelmsford, MA 01824
Phone: (978) 250-9909 Fax: (978) 250-9901 Email: Sales@MicroVisionLabs.com
www.MicroVisionLabs.com

Sample: 23E2241-16

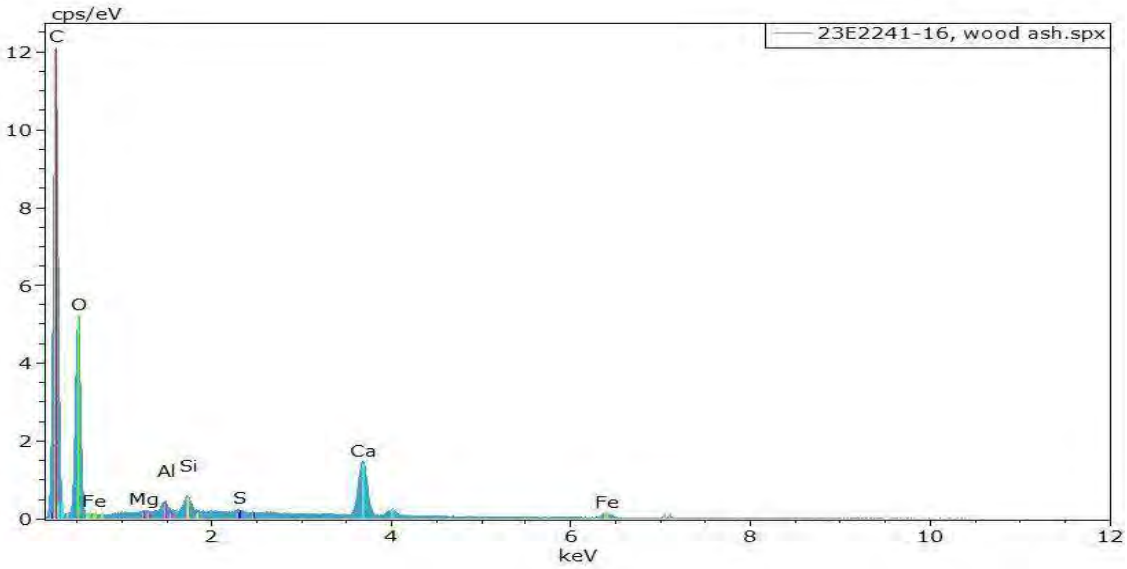
Number of Suspect Particle Types: Two (2)

Wood Ash: This particle type consisted of four (4) friable, black grains approximately 2-4mm in length. The PLM examination indicated this particle type to be consistent with wood ash. The PLM and SEM photos show the cellular structure typical of wood still present in these grains.

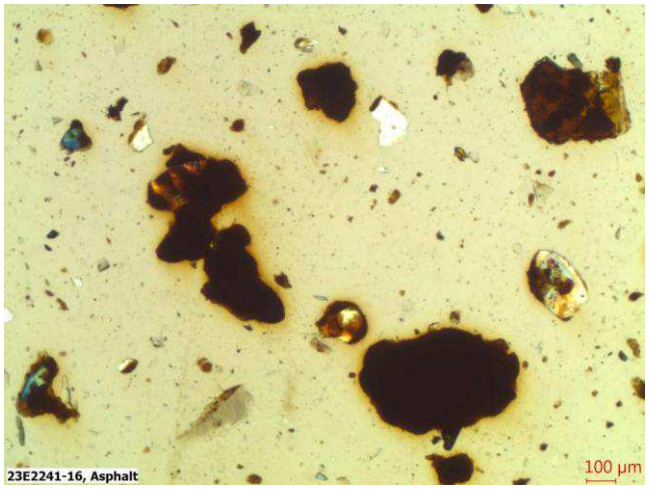


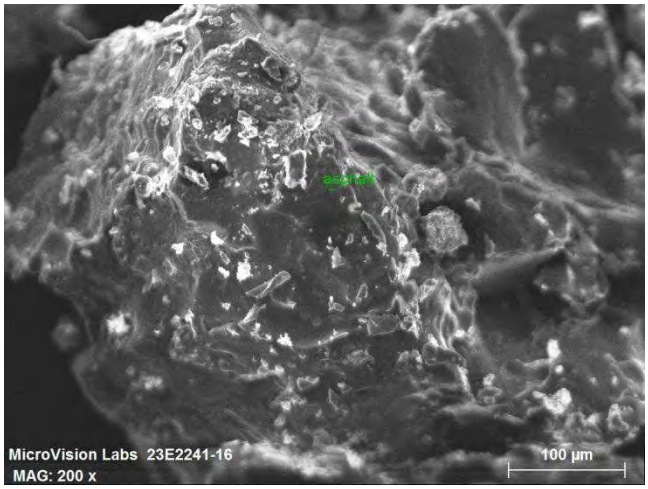
[redacted] [redacted]

The EDS spectrum, shown below, indicates this particle type is wood ash. The analysis for this particle shows concentrations of carbon, oxygen, magnesium, aluminum, silicon, sulfur, calcium, and iron.



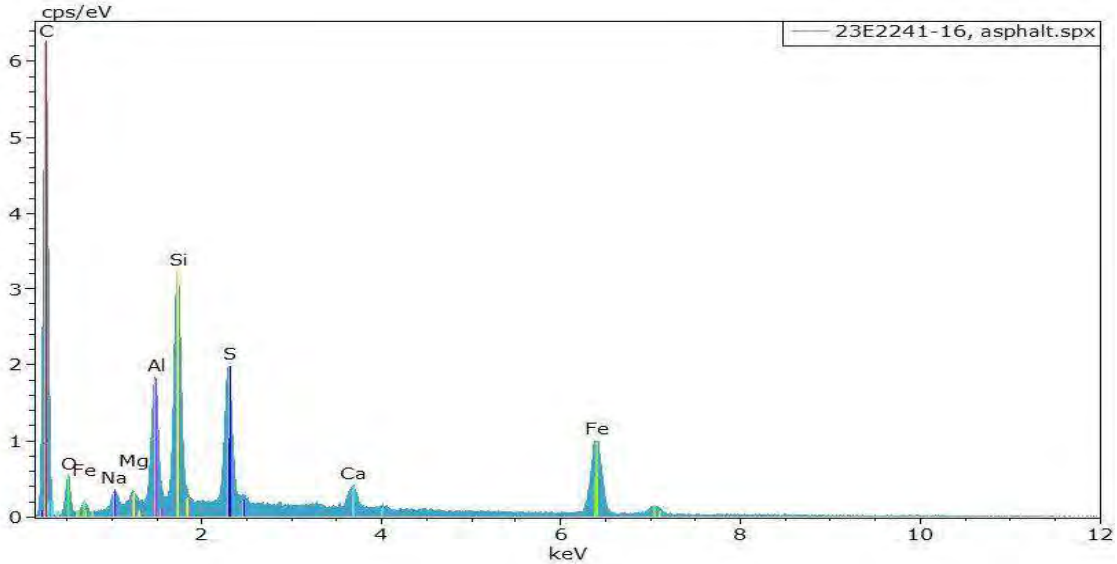
Asphalt: This particle type consisted of seven (7) ductile, black grains approximately 2-17mm in diameter. These grains had mineral matter embedded in and stuck to them. During the PLM examination, these particles slowly dissolved in the mounting oil which is a typical characteristic of asphalt. The PLM image shows the dissolving asphalt particles, and the SEM image illustrates the morphology of asphalt with the embedded mineral grains.





[redacted] [redacted]

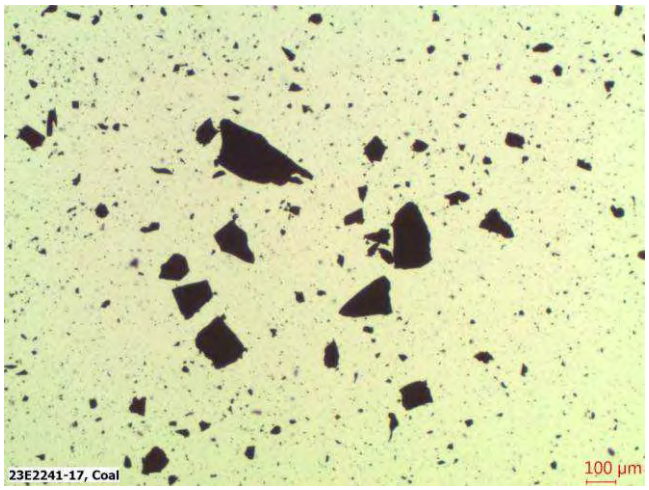
The EDS spectrum, shown below, indicates this particle type is asphalt. The analysis for this particle shows concentrations of carbon, oxygen, sodium, magnesium, aluminum, silicon, sulfur, calcium, and iron.



Sample: 23E2241-17

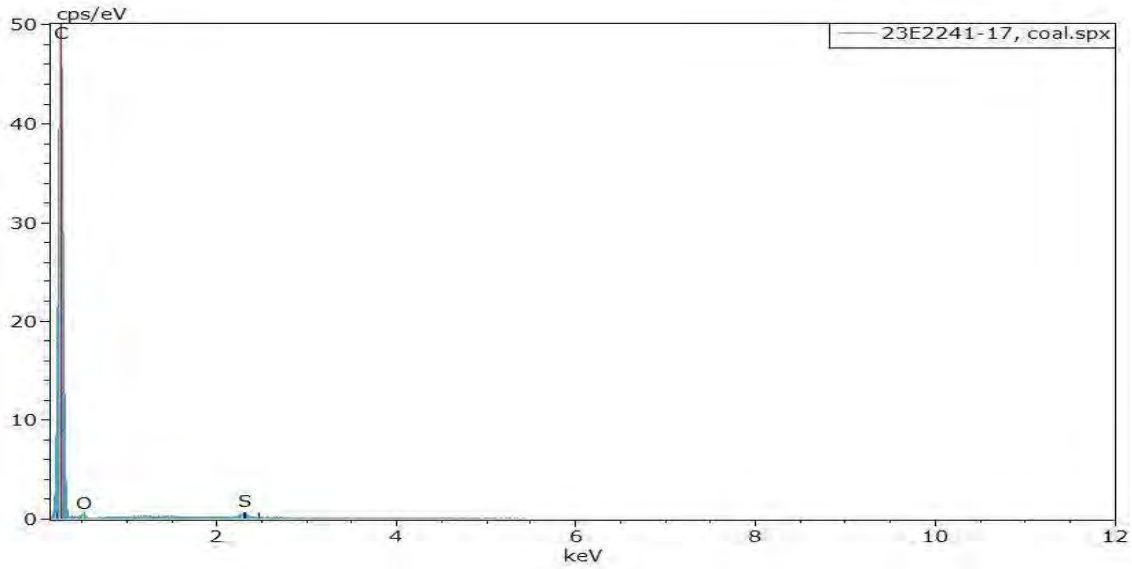
Number of Suspect Particle Types: Four (4)

Coal: This particle type consisted of twelve (12) shiny, black grains approximately 1-12mm in diameter. The PLM examination indicated this particle type to be consistent with coal. The PLM and SEM images of this particle type show the angular edges and typical conchoidal fractures found in coal.

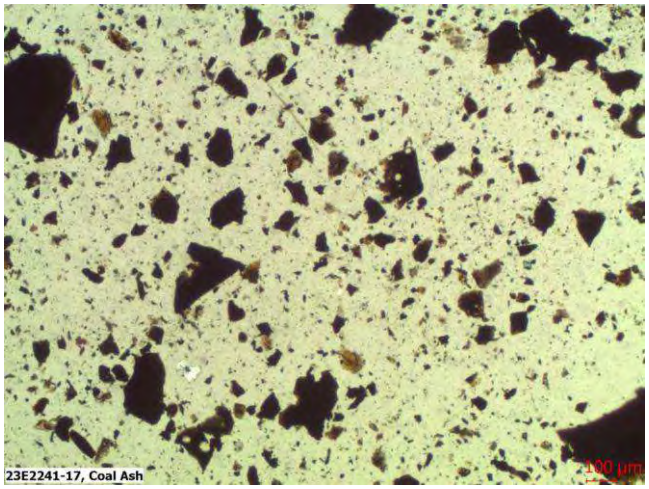


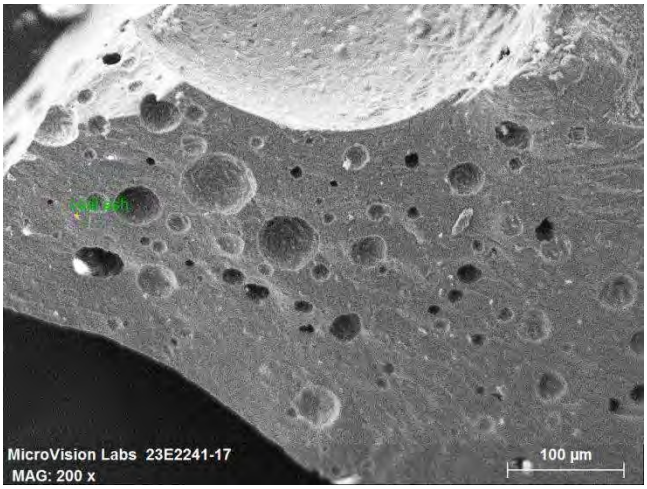
[redacted] [redacted]

The EDS spectrum, shown below, confirms that this particle type is coal. The analysis for this particle shows concentrations of carbon, oxygen, and sulfur.



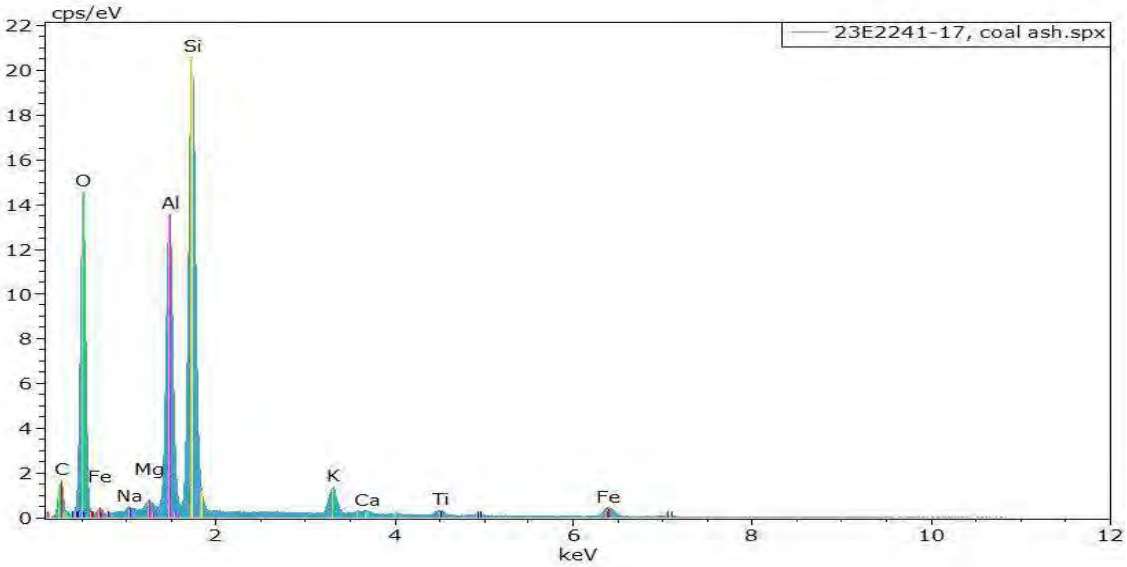
Coal Ash: This particle type consisted of ten (10) dark, porous grains approximately 3-13mm in diameter. The PLM examination indicated this particle type to be consistent with coal ash. The PLM and SEM images show the spherical gas voids that formed during combustion.



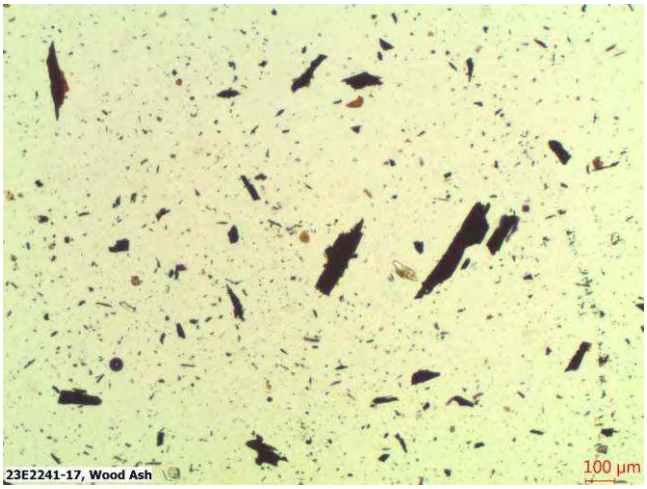


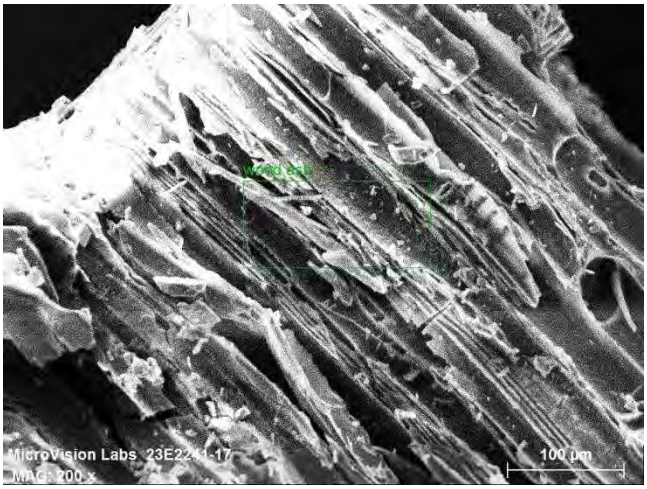
[redacted] [redacted]

The EDS spectrum, shown below, indicates this particle type is coal ash. The analysis for this particle shows concentrations of carbon, oxygen, sodium, magnesium, aluminum, silicon, potassium, calcium, titanium and iron.



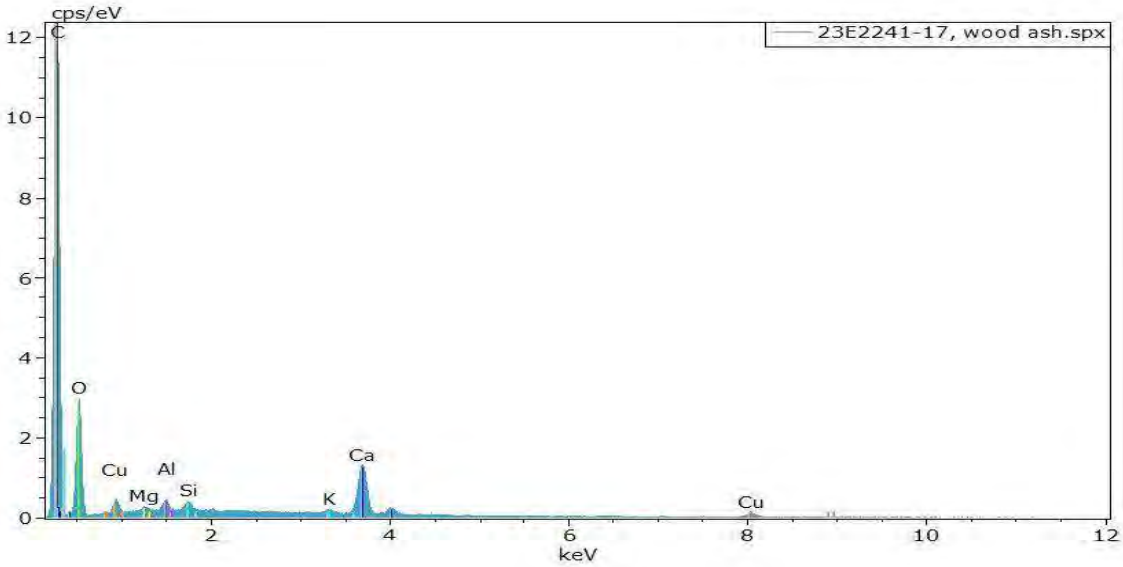
Wood Ash: This particle type consisted of two (2) friable, black grains approximately 2-6mm in length. The PLM examination indicated this particle type to be consistent with wood ash. The PLM and SEM photos show the cellular structure typical of wood still present in these grains.



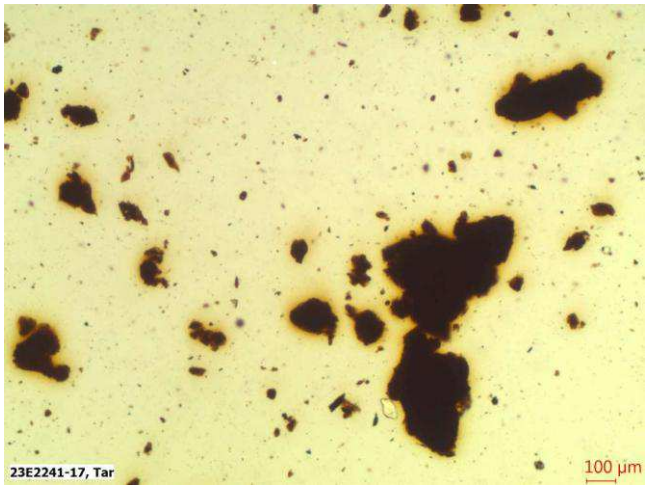


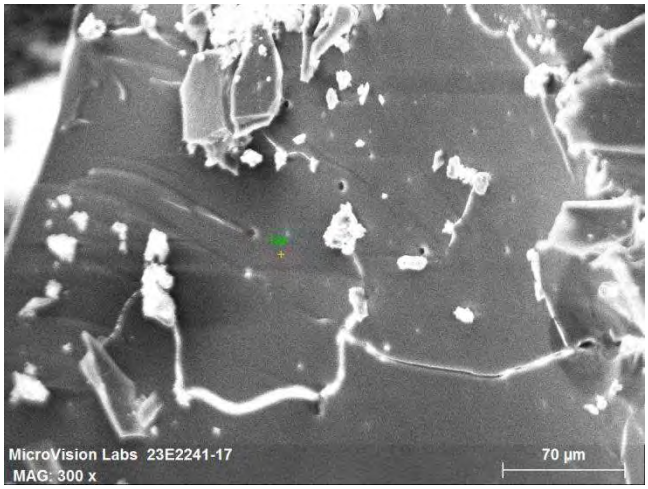
[redacted] [redacted]

The EDS spectrum, shown below, indicates this particle type is wood ash. The analysis for this particle shows concentrations of carbon, oxygen, magnesium, aluminum, silicon, potassium, calcium, and copper.



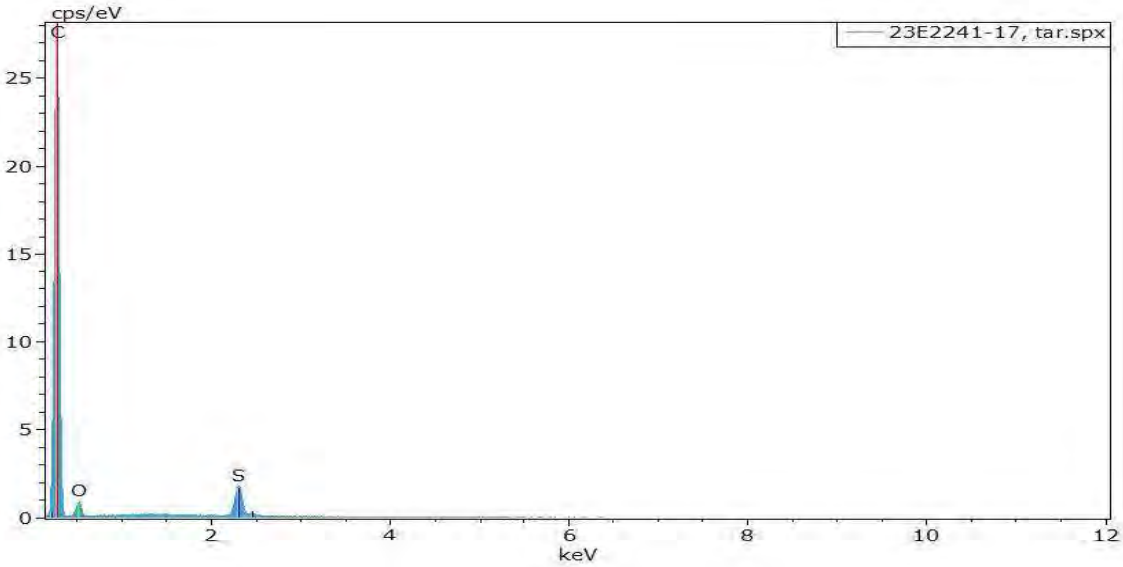
Tar: This particle type consisted of two (2) dark, ductile grains approximately 2-4mm in diameter. During the PLM examination these particles slowly dissolved in the mounting oil which is a typical characteristic of tar. The PLM image shows the dissolving tar particles, and the SEM image illustrates the morphology of tar.





[redacted] [redacted]

The EDS spectrum, shown below, indicates this particle type is tar. The analysis for this particle shows concentrations of carbon, oxygen, and sulfur.



Results Summary Table:

Sample Name	Material Detected
23E2241-16	**Wood Ash (trace), Asphalt (light)**
23E2241-17	**Coal (light), Coal Ash (light), Wood Ash (trace), Tar (trace)**

The concentrations of the particle types detected in these samples are listed in parenthesis in the table above and are based on the number of particles found and the relative difficulty in finding them. The concentration information is listed for informational purposes only and has no bearing on exemption status.

Please let us know if you have any questions about this analysis or if there is anything else we can do for you.

Sincerely,

Denise Weidler
Analytical Microscopist

Reviewed by: TW

15965

SUBCONTRACT CHAIN OF CUSTODY

Pace New England

23E2241

SENDING LABORATORY:	**RECEIVING LABORATORY:**
Pace New England	MicroVision Laboratories
39 Spruce Street	187 Billerica Road
East Longmeadow, MA 01028	Chelmsford, MA 01824
Phone: 413.525.2332	Phone :(978) 250-9909
Fax: 413.525.6405	Fax: (978) 250-9901
Project Manager: Rebecca Faust	

Analysis	Sample Name	Due		Expires	Comments
Sample ID: 23E2241-16	**OTP-6A (0-3)**	**Soil**	**Sampled:**	**05/16/23 11:25**	**MA MCP, S-1/GW-2/3**
S-Coal Ash		05/25/23 17:00		02/08/26 11:25	
Containers Supplied:					
8 oz amber glass jar (B)					
Sample ID: 23E2241-17	**OTP-8A (0-1.5)**	**Soil**	**Sampled:**	**05/16/23 11:55**	**MA MCP, S-1/GW-2/3**
S-Coal Ash		05/25/23 17:00		02/08/26 11:55	
Containers Supplied:					
8 oz amber glass jar (B)					

Released By	Date	Received By	Date
PA Co	1134 5-17-23	MVL	5/17/23 11:33 am

Page 1 of 1

MADEP MCP Analytical Method Report Certification Form

Laboratory Name: Pace New England	Project #: 23E2241
Project Location: Springfield, MA	RTN:

This Form provides certifications for the following data set: [list Laboratory Sample ID Number(s)]

23E2241-01 thru 23E2241-19

Matrices: Soil

CAM Protocol (check all that below)

8260 VOC CAM II A ( )	7470/7471 Hg CAM IIIB ( )	MassDEP VPH (GC/PID/FID) CAM IV A (X)	8082 PCB CAM V A ( )	9014 Total Cyanide/PAC CAM VI A ( )	6860 Perchlorate CAM VIII B ( )
8270 SVOC CAM II B (X)	7010 Metals CAM III C ( )	MassDEP VPH (GC/MS) CAM IV C ( )	8081 Pesticides CAM V B ( )	7196 Hex Cr CAM VI B ( )	MassDEP APH CAM IX A ( )
6010 Metals CAM III A (X)	6020 Metals CAM III D ( )	MassDEP EPH CAM IV B (X)	8151 Herbicides CAM V C ( )	8330 Explosives CAM VIII A ( )	TO-15 VOC CAM IX B ( )

Affirmative response to Questions A throughF is required for "Presumptive Certainty" status

A	Were all samples received in a condition consistent with those described on the Chain-of-Custody, properly preserved (including temperature) in the field or laboratory, and prepared/analyzed within method holding times?	☑ Yes	☐ No[1]
B	Were the analytical method(s) and all associated QC requirements specificed in the selected CAM protocol(s) followed?	☑ Yes	☐ No[1]
C	Were all required corrective actions and analytical response actions specified in the selected CAM protocol(s) implemented for all identified performance standard non-conformances?	☑ Yes	☐ No[1]
D	Does the laboratory report comply with all the reporting requirements specified in CAM VII A, Quality Assurance and Quality Control Guidlines for the Acquisition and Reporting of Analytical Data?	☑ Yes	☐ No[1]
E a	VPH, EPH, and APH Methods only: Was each method conducted without significant modification(s)? (Refer to the individual method(s) for a list of significant modifications).	☑ Yes	☐ No[1]
E b	APH and TO-15 Methods only: Was the complete analyte list reported for each method?	☐ Yes	☐ No[1]
F	Were all applicable CAM protocol QC and performance standard non-conformances identified and evaluated in a laboratory narrative (including all No responses to Qestions A through E)?	☑ Yes	☐ No[1]

A response to questions G, H and I below is required for "Presumptive Certainty" status

G	Were the reporting limits at or below all CAM reporting limits specified in the selected CAM protocol(s)?	☑ Yes	☐ No[1]

***Data User Note:* Data that achieve "Presumptive Certainty" status may not necessarily meet the data usability and representativeness requirements described in 310 CMR 40. 1056 (2)(k) and WSC-07-350.**

H	Were all QC perfomance standards specified in the CAM protocol(s) achieved?	☐ Yes	☑ No[1]
I	Were results reported for the complete analyte list specified in the selected CAM protocol(s)?	☐ Yes	☑ No[1]

[1] *All Negative responses must be addressed in an attached Environmental Laboratory case narrative.*

I, the undersigned, attest under the pains and penalties of perjury that, based upon my personal inquiry of those responsible for obtaining the information, the material contained in this analytical report is, to the best of my knowledge and belief, accurate and complete.

Signature: Lisa Worthington

Position: Technical Representative

Printed Name: Lisa A. Worthington

Date: 06/06/23

con-test®
A Pace Analytical® Laboratory

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

June 6, 2023

Joe Spencer
Weston & Sampson Engineers MA
55 Walkers Brook Drive
Reading, MA 01867

Project Location: Springfield, MA
Client Job Number:
Project Number: ENG23-0351
Laboratory Work Order Number: 23E2444

Enclosed are results of analyses for samples as received by the laboratory on May 17, 2023. If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Rebecca Faust
Project Manager

Table of Contents

Sample Summary 3

Case Narrative 4

Sample Results 7

23E2444-01 7

23E2444-02 11

23E2444-03 15

23E2444-04 19

23E2444-05 23

Sample Preparation Information 27

QC Data 28

Petroleum Hydrocarbons Analyses - EPH 28

B340848 28

B341656 30

Petroleum Hydrocarbons Analyses - VPH 33

B340628 33

Metals Analyses (Total) 36

B340774 36

Flag/Qualifier Summary 37

Certifications 38

Chain of Custody/Sample Receipt 40

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Weston & Sampson Engineers MA
55 Walkers Brook Drive
Reading, MA 01867
ATTN: Joe Spencer

REPORT DATE: 6/6/2023

PURCHASE ORDER NUMBER:

PROJECT NUMBER: ENG23-0351

ANALYTICAL SUMMARY

WORK ORDER NUMBER: 23E2444

The results of analyses performed on the following samples submitted to CON-TEST, a Pace Analytical Laboratory, are found in this report.

PROJECT LOCATION: Springfield, MA

FIELD SAMPLE #	LAB ID:	MATRIX	SAMPLE DESCRIPTION	TEST	SUB LAB
CM-38SW(4.5-7.5)	23E2444-01	Soil		MADEP EPH rev 2.1	
				MADEP-VPH-Feb 2018 Rev 2.1	
				SM 2540G	
				SW-846 6010D	
CM-38NW(4.5-7.5)	23E2444-02	Soil		MADEP EPH rev 2.1	
				MADEP-VPH-Feb 2018 Rev 2.1	
				SM 2540G	
				SW-846 6010D	
CM-38N(3.5-6.5)	23E2444-03	Soil		MADEP EPH rev 2.1	
				MADEP-VPH-Feb 2018 Rev 2.1	
				SM 2540G	
				SW-846 6010D	
CM-38E(4.5-7.5)	23E2444-04	Soil		MADEP EPH rev 2.1	
				MADEP-VPH-Feb 2018 Rev 2.1	
				SM 2540G	
				SW-846 6010D	
DUP-1	23E2444-05	Soil		MADEP EPH rev 2.1	
				MADEP-VPH-Feb 2018 Rev 2.1	
				SM 2540G	
				SW-846 6010D	

con-test®
A Pace Analytical® Laboratory

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

CASE NARRATIVE SUMMARY

All reported results are within defined laboratory quality control objectives unless listed below or otherwise qualified in this report.

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

MADEP EPH rev 2.1

Qualifications:

MS-22

Either matrix spike or MS duplicate is outside of control limits, but the other is within limits. RPD between the two MS/MSD results is within method specified criteria.

Analyte & Samples(s) Qualified:

Naphthalene
B340848-MSD1

S-01

The surrogate recovery for this sample is not available due to sample dilution below the surrogate reporting limit required from high analyte concentration and/or matrix interferences.

Analyte & Samples(s) Qualified:

Chlorooctadecane (COD)
23E2444-03RE4[CM-38N(3.5-6.5)]

MADEP-VPH-Feb 2018 Rev 2.1

Qualifications:

MS-15

Matrix spike and matrix spike duplicate recoveries are outside of control limits. Data validation is not affected since results for this compound in this sample are "not detected", and recovery bias is on the high side.

Analyte & Samples(s) Qualified:

2,2,4-Trimethylpentane
B340628-MS1, B340628-MSD1

2-Methylpentane
B340628-MS1, B340628-MSD1

Butylcyclohexane
B340628-MS1, B340628-MSD1

Decane
B340628-MS1, B340628-MSD1

Nonane
B340628-MS1, B340628-MSD1

Pentane
B340628-MS1, B340628-MSD1

RL-05

Elevated reporting limit due to high concentration of target compounds. MA CAM reporting limit not met.

Analyte & Samples(s) Qualified:

Benzene
23E2444-03[CM-38N(3.5-6.5)]

C5-C8 Aliphatics
23E2444-03[CM-38N(3.5-6.5)]

Ethylbenzene
23E2444-03[CM-38N(3.5-6.5)]

m+p Xylene
23E2444-03[CM-38N(3.5-6.5)]

Methyl tert-Butyl Ether (MTBE)
23E2444-03[CM-38N(3.5-6.5)]

Naphthalene
23E2444-03[CM-38N(3.5-6.5)]

o-Xylene
23E2444-03[CM-38N(3.5-6.5)]

Toluene
23E2444-03[CM-38N(3.5-6.5)]

Unadjusted C5-C8 Aliphatics
23E2444-03[CM-38N(3.5-6.5)]

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

S-03

Surrogate recovery outside of control limits due to suspected sample matrix interference.

Analyte & Samples(s) Qualified:

2,5-Dibromotoluene (FID)
B340628-MS1, B340628-MSD1

2,5-Dibromotoluene (PID)
B340628-MS1, B340628-MSD1

S-15

Surrogate recovery outside of control limits due to suspected sample matrix interference. Chromatogram(s) is attached.

Analyte & Samples(s) Qualified:

2,5-Dibromotoluene (FID)
23E2444-03[CM-38N(3.5-6.5)]

2,5-Dibromotoluene (PID)
23E2444-03[CM-38N(3.5-6.5)]

S-17

Surrogate recovery is outside of control limits. Data validation is not affected since all associated results are less than the reporting limit and bias is on the high side.

Analyte & Samples(s) Qualified:

2,5-Dibromotoluene (FID)
23E2444-04[CM-38E(4.5-7.5)]

2,5-Dibromotoluene (PID)
23E2444-04[CM-38E(4.5-7.5)]

SM 2540G

Qualifications:

H-06

Sample was extracted past the recommended holding time.

Analyte & Samples(s) Qualified:

% Solids
23E2444-01[CM-38SW(4.5-7.5)], 23E2444-02[CM-38NW(4.5-7.5)], 23E2444-03[CM-38N(3.5-6.5)], 23E2444-04[CM-38E(4.5-7.5)], 23E2444-05[DUP-1]

MADEP-VPH-Feb 2018 Rev 2.1

No significant modifications were made to the method. All VPH samples were received preserved properly in methanol with a soil/methanol ratio of 1:1 +/- 25% completely covered by methanol in the proper containers specified on the chain-of-custody form unless specified in this narrative.

Analytical column used for VPH analysis is Restek, Rtx-502.2, 105meter, 0.53mmID, 3um df. Trap used for VPH analysis is Carbopack B/CarboSieveS-III.

The results of analyses reported only relate to samples submitted to Con-Test, a Pace Analytical Laboratory, for testing.
I certify that the analyses listed above, unless specifically listed as subcontracted, if any, were performed under my direction according to the approved methodologies listed in this document, and that based upon my inquiry of those individuals immediately responsible for obtaining the information, the material contained in this report is, to the best of my knowledge and belief, accurate and complete.

Meghan E. Kelley
Reporting Specialist

con-test® A Pace Analytical® Laboratory

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Springfield, MA
Sample Description:
Work Order: 23E2444

Date Received: 5/17/2023

Field Sample #: CM-38SW(4.5-7.5)
Sampled: 5/16/2023 13:30

Sample ID: 23E2444-01

Sample Matrix: Soil

Petroleum Hydrocarbons Analyses - EPH

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
C9-C18 Aliphatics	ND	11	mg/Kg dry	1		MADEP EPH rev 2.1	5/19/23	5/26/23 21:04	RDD
C19-C36 Aliphatics	ND	11	mg/Kg dry	1		MADEP EPH rev 2.1	5/19/23	5/26/23 21:04	RDD
Unadjusted C11-C22 Aromatics	ND	11	mg/Kg dry	1		MADEP EPH rev 2.1	5/19/23	5/26/23 21:04	RDD
C11-C22 Aromatics	ND	11	mg/Kg dry	1		MADEP EPH rev 2.1	5/19/23	5/26/23 21:04	RDD
Acenaphthene	ND	0.11	mg/Kg dry	1		MADEP EPH rev 2.1	5/19/23	5/26/23 21:04	RDD
Acenaphthylene	ND	0.11	mg/Kg dry	1		MADEP EPH rev 2.1	5/19/23	5/26/23 21:04	RDD
Anthracene	ND	0.11	mg/Kg dry	1		MADEP EPH rev 2.1	5/19/23	5/26/23 21:04	RDD
Benzo(a)anthracene	ND	0.11	mg/Kg dry	1		MADEP EPH rev 2.1	5/19/23	5/26/23 21:04	RDD
Benzo(a)pyrene	ND	0.11	mg/Kg dry	1		MADEP EPH rev 2.1	5/19/23	5/26/23 21:04	RDD
Benzo(b)fluoranthene	ND	0.11	mg/Kg dry	1		MADEP EPH rev 2.1	5/19/23	5/26/23 21:04	RDD
Benzo(g,h,i)perylene	ND	0.11	mg/Kg dry	1		MADEP EPH rev 2.1	5/19/23	5/26/23 21:04	RDD
Benzo(k)fluoranthene	ND	0.11	mg/Kg dry	1		MADEP EPH rev 2.1	5/19/23	5/26/23 21:04	RDD
Chrysene	ND	0.11	mg/Kg dry	1		MADEP EPH rev 2.1	5/19/23	5/26/23 21:04	RDD
Dibenz(a,h)anthracene	ND	0.11	mg/Kg dry	1		MADEP EPH rev 2.1	5/19/23	5/26/23 21:04	RDD
Fluoranthene	ND	0.11	mg/Kg dry	1		MADEP EPH rev 2.1	5/19/23	5/26/23 21:04	RDD
Fluorene	ND	0.11	mg/Kg dry	1		MADEP EPH rev 2.1	5/19/23	5/26/23 21:04	RDD
Indeno(1,2,3-cd)pyrene	ND	0.11	mg/Kg dry	1		MADEP EPH rev 2.1	5/19/23	5/26/23 21:04	RDD
2-Methylnaphthalene	ND	0.11	mg/Kg dry	1		MADEP EPH rev 2.1	5/19/23	5/26/23 21:04	RDD
Naphthalene	ND	0.11	mg/Kg dry	1		MADEP EPH rev 2.1	5/19/23	5/26/23 21:04	RDD
Phenanthrene	ND	0.11	mg/Kg dry	1		MADEP EPH rev 2.1	5/19/23	5/26/23 21:04	RDD
Pyrene	ND	0.11	mg/Kg dry	1		MADEP EPH rev 2.1	5/19/23	5/26/23 21:04	RDD

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Chlorooctadecane (COD)	50.3	40-140		5/26/23 21:04
o-Terphenyl (OTP)	55.4	40-140		5/26/23 21:04
2-Bromonaphthalene	92.4	40-140		5/26/23 21:04
2-Fluorobiphenyl	89.2	40-140		5/26/23 21:04

con-test® A Pace Analytical® Laboratory

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Springfield, MA
Sample Description:
Work Order: 23E2444

Date Received: 5/17/2023

Field Sample #: CM-38SW(4.5-7.5)
Sampled: 5/16/2023 13:30

Sample ID: 23E2444-01

Sample Matrix: Soil

Petroleum Hydrocarbons Analyses - VPH

Soil/Methanol Preservation Ratio: 1.04

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Unadjusted C5-C8 Aliphatics	ND	13	mg/Kg dry	1		MADEP-VPH-Feb 2018 Rev 2.1	5/18/23	5/18/23 14:22	EEH
C5-C8 Aliphatics	ND	13	mg/Kg dry	1		MADEP-VPH-Feb 2018 Rev 2.1	5/18/23	5/18/23 14:22	EEH
Unadjusted C9-C12 Aliphatics	ND	13	mg/Kg dry	1		MADEP-VPH-Feb 2018 Rev 2.1	5/18/23	5/18/23 14:22	EEH
C9-C12 Aliphatics	ND	13	mg/Kg dry	1		MADEP-VPH-Feb 2018 Rev 2.1	5/18/23	5/18/23 14:22	EEH
C9-C10 Aromatics	ND	13	mg/Kg dry	1		MADEP-VPH-Feb 2018 Rev 2.1	5/18/23	5/18/23 14:22	EEH
Benzene	ND	0.063	mg/Kg dry	1		MADEP-VPH-Feb 2018 Rev 2.1	5/18/23	5/18/23 14:22	EEH
Ethylbenzene	ND	0.063	mg/Kg dry	1		MADEP-VPH-Feb 2018 Rev 2.1	5/18/23	5/18/23 14:22	EEH
Methyl tert-Butyl Ether (MTBE)	ND	0.063	mg/Kg dry	1		MADEP-VPH-Feb 2018 Rev 2.1	5/18/23	5/18/23 14:22	EEH
Naphthalene	ND	0.31	mg/Kg dry	1		MADEP-VPH-Feb 2018 Rev 2.1	5/18/23	5/18/23 14:22	EEH
Toluene	ND	0.063	mg/Kg dry	1		MADEP-VPH-Feb 2018 Rev 2.1	5/18/23	5/18/23 14:22	EEH
m+p Xylene	ND	0.13	mg/Kg dry	1		MADEP-VPH-Feb 2018 Rev 2.1	5/18/23	5/18/23 14:22	EEH
o-Xylene	ND	0.063	mg/Kg dry	1		MADEP-VPH-Feb 2018 Rev 2.1	5/18/23	5/18/23 14:22	EEH

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
2,5-Dibromotoluene (FID)	81.2	70-130		5/18/23 14:22
2,5-Dibromotoluene (PID)	80.8	70-130		5/18/23 14:22

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Springfield, MA
Sample Description:
Work Order: 23E2444

Date Received: 5/17/2023

Field Sample #: CM-38SW(4.5-7.5)
Sampled: 5/16/2023 13:30

Sample ID: 23E2444-01

Sample Matrix: Soil

Metals Analyses (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Lead	7.0	0.56	mg/Kg dry	1		SW-846 6010D	5/19/23	5/22/23 18:08	HNN

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Springfield, MA
Sample Description:
Work Order: 23E2444

Date Received: 5/17/2023

Field Sample #: CM-38SW(4.5-7.5)
Sampled: 5/16/2023 13:30

Sample ID: 23E2444-01

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	88.0		% Wt	1	H-06	SM 2540G	5/26/23	5/26/23 10:11	JLC

con-test® A Pace Analytical® Laboratory

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Springfield, MA
Sample Description:
Work Order: 23E2444

Date Received: 5/17/2023

Field Sample #: CM-38NW(4.5-7.5)
Sampled: 5/16/2023 14:05

Sample ID: 23E2444-02

Sample Matrix: Soil

Petroleum Hydrocarbons Analyses - EPH

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
C9-C18 Aliphatics	ND	11	mg/Kg dry	1		MADEP EPH rev 2.1	5/19/23	5/26/23 21:23	RDD
C19-C36 Aliphatics	ND	11	mg/Kg dry	1		MADEP EPH rev 2.1	5/19/23	5/26/23 21:23	RDD
Unadjusted C11-C22 Aromatics	ND	11	mg/Kg dry	1		MADEP EPH rev 2.1	5/19/23	5/26/23 21:23	RDD
C11-C22 Aromatics	ND	11	mg/Kg dry	1		MADEP EPH rev 2.1	5/19/23	5/26/23 21:23	RDD
Acenaphthene	ND	0.11	mg/Kg dry	1		MADEP EPH rev 2.1	5/19/23	5/26/23 21:23	RDD
Acenaphthylene	ND	0.11	mg/Kg dry	1		MADEP EPH rev 2.1	5/19/23	5/26/23 21:23	RDD
Anthracene	ND	0.11	mg/Kg dry	1		MADEP EPH rev 2.1	5/19/23	5/26/23 21:23	RDD
Benzo(a)anthracene	0.12	0.11	mg/Kg dry	1		MADEP EPH rev 2.1	5/19/23	5/26/23 21:23	RDD
Benzo(a)pyrene	0.13	0.11	mg/Kg dry	1		MADEP EPH rev 2.1	5/19/23	5/26/23 21:23	RDD
Benzo(b)fluoranthene	ND	0.11	mg/Kg dry	1		MADEP EPH rev 2.1	5/19/23	5/26/23 21:23	RDD
Benzo(g,h,i)perylene	0.12	0.11	mg/Kg dry	1		MADEP EPH rev 2.1	5/19/23	5/26/23 21:23	RDD
Benzo(k)fluoranthene	ND	0.11	mg/Kg dry	1		MADEP EPH rev 2.1	5/19/23	5/26/23 21:23	RDD
Chrysene	0.18	0.11	mg/Kg dry	1		MADEP EPH rev 2.1	5/19/23	5/26/23 21:23	RDD
Dibenz(a,h)anthracene	ND	0.11	mg/Kg dry	1		MADEP EPH rev 2.1	5/19/23	5/26/23 21:23	RDD
Fluoranthene	0.31	0.11	mg/Kg dry	1		MADEP EPH rev 2.1	5/19/23	5/26/23 21:23	RDD
Fluorene	ND	0.11	mg/Kg dry	1		MADEP EPH rev 2.1	5/19/23	5/26/23 21:23	RDD
Indeno(1,2,3-cd)pyrene	ND	0.11	mg/Kg dry	1		MADEP EPH rev 2.1	5/19/23	5/26/23 21:23	RDD
2-Methylnaphthalene	ND	0.11	mg/Kg dry	1		MADEP EPH rev 2.1	5/19/23	5/26/23 21:23	RDD
Naphthalene	ND	0.11	mg/Kg dry	1		MADEP EPH rev 2.1	5/19/23	5/26/23 21:23	RDD
Phenanthrene	0.23	0.11	mg/Kg dry	1		MADEP EPH rev 2.1	5/19/23	5/26/23 21:23	RDD
Pyrene	0.29	0.11	mg/Kg dry	1		MADEP EPH rev 2.1	5/19/23	5/26/23 21:23	RDD

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Chlorooctadecane (COD)	48.0	40-140		5/26/23 21:23
o-Terphenyl (OTP)	44.0	40-140		5/26/23 21:23
2-Bromonaphthalene	83.6	40-140		5/26/23 21:23
2-Fluorobiphenyl	81.9	40-140		5/26/23 21:23

con-test® A Pace Analytical® Laboratory

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Springfield, MA
Sample Description:
Work Order: 23E2444

Date Received: 5/17/2023

Field Sample #: CM-38NW(4.5-7.5)
Sampled: 5/16/2023 14:05

Sample ID: 23E2444-02

Sample Matrix: Soil

Petroleum Hydrocarbons Analyses - VPH

Soil/Methanol Preservation Ratio: 0.98

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Unadjusted C5-C8 Aliphatics	ND	12	mg/Kg dry	1		MADEP-VPH-Feb 2018 Rev 2.1	5/18/23	5/18/23 14:51	EEH
C5-C8 Aliphatics	ND	12	mg/Kg dry	1		MADEP-VPH-Feb 2018 Rev 2.1	5/18/23	5/18/23 14:51	EEH
Unadjusted C9-C12 Aliphatics	ND	12	mg/Kg dry	1		MADEP-VPH-Feb 2018 Rev 2.1	5/18/23	5/18/23 14:51	EEH
C9-C12 Aliphatics	ND	12	mg/Kg dry	1		MADEP-VPH-Feb 2018 Rev 2.1	5/18/23	5/18/23 14:51	EEH
C9-C10 Aromatics	ND	12	mg/Kg dry	1		MADEP-VPH-Feb 2018 Rev 2.1	5/18/23	5/18/23 14:51	EEH
Benzene	ND	0.062	mg/Kg dry	1		MADEP-VPH-Feb 2018 Rev 2.1	5/18/23	5/18/23 14:51	EEH
Ethylbenzene	ND	0.062	mg/Kg dry	1		MADEP-VPH-Feb 2018 Rev 2.1	5/18/23	5/18/23 14:51	EEH
Methyl tert-Butyl Ether (MTBE)	ND	0.062	mg/Kg dry	1		MADEP-VPH-Feb 2018 Rev 2.1	5/18/23	5/18/23 14:51	EEH
Naphthalene	ND	0.31	mg/Kg dry	1		MADEP-VPH-Feb 2018 Rev 2.1	5/18/23	5/18/23 14:51	EEH
Toluene	ND	0.062	mg/Kg dry	1		MADEP-VPH-Feb 2018 Rev 2.1	5/18/23	5/18/23 14:51	EEH
m+p Xylene	ND	0.12	mg/Kg dry	1		MADEP-VPH-Feb 2018 Rev 2.1	5/18/23	5/18/23 14:51	EEH
o-Xylene	ND	0.062	mg/Kg dry	1		MADEP-VPH-Feb 2018 Rev 2.1	5/18/23	5/18/23 14:51	EEH

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
2,5-Dibromotoluene (FID)	87.6	70-130		5/18/23 14:51
2,5-Dibromotoluene (PID)	85.1	70-130		5/18/23 14:51

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Springfield, MA
Sample Description:
Work Order: 23E2444

Date Received: 5/17/2023

Field Sample #: CM-38NW(4.5-7.5)
Sampled: 5/16/2023 14:05

Sample ID: 23E2444-02

Sample Matrix: Soil

Metals Analyses (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Lead	8.9	0.54	mg/Kg dry	1		SW-846 6010D	5/19/23	5/22/23 18:13	HNN

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Springfield, MA
Sample Description:
Work Order: 23E2444

Date Received: 5/17/2023

Field Sample #: CM-38NW(4.5-7.5)
Sampled: 5/16/2023 14:05

Sample ID: 23E2444-02

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	90.3		% Wt	1	H-06	SM 2540G	5/26/23	5/26/23 10:11	JLC

con-test® A Pace Analytical® Laboratory

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Springfield, MA
Sample Description:
Work Order: 23E2444

Date Received: 5/17/2023

Field Sample #: CM-38N(3.5-6.5)
Sampled: 5/16/2023 15:10

Sample ID: 23E2444-03

Sample Matrix: Soil

Petroleum Hydrocarbons Analyses - EPH

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
C9-C18 Aliphatics	2800	330	mg/Kg dry	30		MADEP EPH rev 2.1	5/30/23	6/2/23 13:22	RDD
C19-C36 Aliphatics	450	44	mg/Kg dry	4		MADEP EPH rev 2.1	5/30/23	6/2/23 13:42	RDD
Unadjusted C11-C22 Aromatics	640	55	mg/Kg dry	5		MADEP EPH rev 2.1	5/30/23	6/2/23 13:22	RDD
C11-C22 Aromatics	610	55	mg/Kg dry	5		MADEP EPH rev 2.1	5/30/23	6/2/23 13:22	GJB
Acenaphthene	0.15	0.11	mg/Kg dry	1		MADEP EPH rev 2.1	5/30/23	6/1/23 6:26	GJB
Acenaphthylene	ND	0.11	mg/Kg dry	1		MADEP EPH rev 2.1	5/30/23	6/1/23 6:26	GJB
Anthracene	0.39	0.11	mg/Kg dry	1		MADEP EPH rev 2.1	5/30/23	6/1/23 6:26	GJB
Benzo(a)anthracene	1.8	0.11	mg/Kg dry	1		MADEP EPH rev 2.1	5/30/23	6/1/23 6:26	GJB
Benzo(a)pyrene	2.2	0.11	mg/Kg dry	1		MADEP EPH rev 2.1	5/30/23	6/1/23 6:26	GJB
Benzo(b)fluoranthene	2.8	0.11	mg/Kg dry	1		MADEP EPH rev 2.1	5/30/23	6/1/23 6:26	GJB
Benzo(g,h,i)perylene	1.6	0.11	mg/Kg dry	1		MADEP EPH rev 2.1	5/30/23	6/1/23 6:26	GJB
Benzo(k)fluoranthene	1.0	0.11	mg/Kg dry	1		MADEP EPH rev 2.1	5/30/23	6/1/23 6:26	GJB
Chrysene	2.4	0.11	mg/Kg dry	1		MADEP EPH rev 2.1	5/30/23	6/1/23 6:26	GJB
Dibenz(a,h)anthracene	0.41	0.11	mg/Kg dry	1		MADEP EPH rev 2.1	5/30/23	6/1/23 6:26	GJB
Fluoranthene	3.0	0.11	mg/Kg dry	1		MADEP EPH rev 2.1	5/30/23	6/1/23 6:26	GJB
Fluorene	ND	0.11	mg/Kg dry	1		MADEP EPH rev 2.1	5/30/23	6/1/23 6:26	GJB
Indeno(1,2,3-cd)pyrene	1.5	0.11	mg/Kg dry	1		MADEP EPH rev 2.1	5/30/23	6/1/23 6:26	GJB
2-Methylnaphthalene	0.12	0.11	mg/Kg dry	1		MADEP EPH rev 2.1	5/30/23	6/1/23 6:26	GJB
Naphthalene	ND	0.11	mg/Kg dry	1		MADEP EPH rev 2.1	5/30/23	6/1/23 6:26	GJB
Phenanthrene	2.2	0.11	mg/Kg dry	1		MADEP EPH rev 2.1	5/30/23	6/1/23 6:26	GJB
Pyrene	3.6	0.11	mg/Kg dry	1		MADEP EPH rev 2.1	5/30/23	6/1/23 6:26	GJB

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Chlorooctadecane (COD)	52.8	40-140		6/1/23 6:26
Chlorooctadecane (COD)	*	40-140	S-01	6/2/23 13:22
Chlorooctadecane (COD)	62.3	40-140		6/2/23 13:42
o-Terphenyl (OTP)	67.1	40-140		6/1/23 6:26
o-Terphenyl (OTP)	75.2	40-140		6/2/23 13:22
2-Bromonaphthalene	71.4	40-140		6/1/23 6:26
2-Fluorobiphenyl	64.5	40-140		6/1/23 6:26

con-test® A Pace Analytical® Laboratory

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Springfield, MA
Sample Description:
Work Order: 23E2444

Date Received: 5/17/2023

Field Sample #: CM-38N(3.5-6.5)
Sampled: 5/16/2023 15:10

Sample ID: 23E2444-03

Sample Matrix: Soil

Petroleum Hydrocarbons Analyses - VPH

Soil/Methanol Preservation Ratio: 1.06

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Unadjusted C5-C8 Aliphatics	ND	110	mg/Kg dry	10	RL-05	MADEP-VPH-Feb 2018 Rev 2.1	5/18/23	5/18/23 16:19	EEH
C5-C8 Aliphatics	ND	110	mg/Kg dry	10	RL-05	MADEP-VPH-Feb 2018 Rev 2.1	5/18/23	5/18/23 16:19	EEH
Unadjusted C9-C12 Aliphatics	670	110	mg/Kg dry	10		MADEP-VPH-Feb 2018 Rev 2.1	5/18/23	5/18/23 16:19	EEH
C9-C12 Aliphatics	140	110	mg/Kg dry	10		MADEP-VPH-Feb 2018 Rev 2.1	5/18/23	5/18/23 16:19	EEH
C9-C10 Aromatics	530	110	mg/Kg dry	10		MADEP-VPH-Feb 2018 Rev 2.1	5/18/23	5/18/23 16:19	EEH
Benzene	ND	0.57	mg/Kg dry	10	RL-05	MADEP-VPH-Feb 2018 Rev 2.1	5/18/23	5/18/23 16:19	EEH
Ethylbenzene	ND	0.57	mg/Kg dry	10	RL-05	MADEP-VPH-Feb 2018 Rev 2.1	5/18/23	5/18/23 16:19	EEH
Methyl tert-Butyl Ether (MTBE)	ND	0.57	mg/Kg dry	10	RL-05	MADEP-VPH-Feb 2018 Rev 2.1	5/18/23	5/18/23 16:19	EEH
Naphthalene	ND	2.9	mg/Kg dry	10	RL-05	MADEP-VPH-Feb 2018 Rev 2.1	5/18/23	5/18/23 16:19	EEH
Toluene	ND	0.57	mg/Kg dry	10	RL-05	MADEP-VPH-Feb 2018 Rev 2.1	5/18/23	5/18/23 16:19	EEH
m+p Xylene	ND	1.1	mg/Kg dry	10	RL-05	MADEP-VPH-Feb 2018 Rev 2.1	5/18/23	5/18/23 16:19	EEH
o-Xylene	ND	0.57	mg/Kg dry	10	RL-05	MADEP-VPH-Feb 2018 Rev 2.1	5/18/23	5/18/23 16:19	EEH

Surrogates	% Recovery		Recovery Limits	Flag/Qual	
2,5-Dibromotoluene (FID)	**260**	*	70-130	S-15	5/18/23 16:19
2,5-Dibromotoluene (PID)	**199**	*	70-130	S-15	5/18/23 16:19

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Springfield, MA
Sample Description:
Work Order: 23E2444

Date Received: 5/17/2023

Field Sample #: CM-38N(3.5-6.5)
Sampled: 5/16/2023 15:10

Sample ID: 23E2444-03

Sample Matrix: Soil

Metals Analyses (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Lead	130	0.55	mg/Kg dry	1		SW-846 6010D	5/19/23	5/22/23 18:30	HNN

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Springfield, MA
Sample Description:
Work Order: 23E2444

Date Received: 5/17/2023

Field Sample #: CM-38N(3.5-6.5)
Sampled: 5/16/2023 15:10

Sample ID: 23E2444-03

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	90.4		% Wt	1	H-06	SM 2540G	5/26/23	5/26/23 10:11	JLC

con-test® A Pace Analytical® Laboratory

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Springfield, MA
Sample Description:
Work Order: 23E2444

Date Received: 5/17/2023

Field Sample #: CM-38E(4.5-7.5)
Sampled: 5/16/2023 15:10

Sample ID: 23E2444-04

Sample Matrix: Soil

Petroleum Hydrocarbons Analyses - EPH

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
C9-C18 Aliphatics	15	11	mg/Kg dry	1		MADEP EPH rev 2.1	5/19/23	5/24/23 23:20	GJB
C19-C36 Aliphatics	15	11	mg/Kg dry	1		MADEP EPH rev 2.1	5/19/23	5/24/23 23:20	GJB
Unadjusted C11-C22 Aromatics	77	11	mg/Kg dry	1		MADEP EPH rev 2.1	5/19/23	5/24/23 23:20	GJB
C11-C22 Aromatics	45	11	mg/Kg dry	1		MADEP EPH rev 2.1	5/19/23	5/24/23 23:20	GJB
Acenaphthene	0.70	0.11	mg/Kg dry	1		MADEP EPH rev 2.1	5/19/23	5/24/23 23:20	GJB
Acenaphthylene	0.43	0.11	mg/Kg dry	1		MADEP EPH rev 2.1	5/19/23	5/24/23 23:20	GJB
Anthracene	1.5	0.11	mg/Kg dry	1		MADEP EPH rev 2.1	5/19/23	5/24/23 23:20	GJB
Benzo(a)anthracene	1.7	0.11	mg/Kg dry	1		MADEP EPH rev 2.1	5/19/23	5/24/23 23:20	GJB
Benzo(a)pyrene	1.6	0.11	mg/Kg dry	1		MADEP EPH rev 2.1	5/19/23	5/24/23 23:20	GJB
Benzo(b)fluoranthene	1.9	0.11	mg/Kg dry	1		MADEP EPH rev 2.1	5/19/23	5/24/23 23:20	GJB
Benzo(g,h,i)perylene	1.1	0.11	mg/Kg dry	1		MADEP EPH rev 2.1	5/19/23	5/24/23 23:20	GJB
Benzo(k)fluoranthene	0.70	0.11	mg/Kg dry	1		MADEP EPH rev 2.1	5/19/23	5/24/23 23:20	GJB
Chrysene	1.9	0.11	mg/Kg dry	1		MADEP EPH rev 2.1	5/19/23	5/24/23 23:20	GJB
Dibenz(a,h)anthracene	0.23	0.11	mg/Kg dry	1		MADEP EPH rev 2.1	5/19/23	5/24/23 23:20	GJB
Fluoranthene	5.0	0.11	mg/Kg dry	1		MADEP EPH rev 2.1	5/19/23	5/24/23 23:20	GJB
Fluorene	0.87	0.11	mg/Kg dry	1		MADEP EPH rev 2.1	5/19/23	5/24/23 23:20	GJB
Indeno(1,2,3-cd)pyrene	1.1	0.11	mg/Kg dry	1		MADEP EPH rev 2.1	5/19/23	5/24/23 23:20	GJB
2-Methylnaphthalene	0.53	0.11	mg/Kg dry	1		MADEP EPH rev 2.1	5/19/23	5/24/23 23:20	GJB
Naphthalene	1.6	0.11	mg/Kg dry	1		MADEP EPH rev 2.1	5/19/23	5/24/23 23:20	GJB
Phenanthrene	6.7	0.11	mg/Kg dry	1		MADEP EPH rev 2.1	5/19/23	5/24/23 23:20	GJB
Pyrene	4.8	0.11	mg/Kg dry	1		MADEP EPH rev 2.1	5/19/23	5/24/23 23:20	GJB

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Chlorooctadecane (COD)	49.7	40-140		5/24/23 23:20
o-Terphenyl (OTP)	59.8	40-140		5/24/23 23:20
2-Bromonaphthalene	92.7	40-140		5/24/23 23:20
2-Fluorobiphenyl	89.6	40-140		5/24/23 23:20

con-test® A Pace Analytical® Laboratory

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Springfield, MA
Sample Description:
Work Order: 23E2444

Date Received: 5/17/2023

Field Sample #: CM-38E(4.5-7.5)
Sampled: 5/16/2023 15:10

Sample ID: 23E2444-04

Sample Matrix: Soil

Petroleum Hydrocarbons Analyses - VPH

Soil/Methanol Preservation Ratio: 1.07

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Unadjusted C5-C8 Aliphatics	ND	12	mg/Kg dry	1		MADEP-VPH-Feb 2018 Rev 2.1	5/18/23	5/18/23 15:20	EEH
C5-C8 Aliphatics	ND	12	mg/Kg dry	1		MADEP-VPH-Feb 2018 Rev 2.1	5/18/23	5/18/23 15:20	EEH
Unadjusted C9-C12 Aliphatics	ND	12	mg/Kg dry	1		MADEP-VPH-Feb 2018 Rev 2.1	5/18/23	5/18/23 15:20	EEH
C9-C12 Aliphatics	ND	12	mg/Kg dry	1		MADEP-VPH-Feb 2018 Rev 2.1	5/18/23	5/18/23 15:20	EEH
C9-C10 Aromatics	ND	12	mg/Kg dry	1		MADEP-VPH-Feb 2018 Rev 2.1	5/18/23	5/18/23 15:20	EEH
Benzene	ND	0.058	mg/Kg dry	1		MADEP-VPH-Feb 2018 Rev 2.1	5/18/23	5/18/23 15:20	EEH
Ethylbenzene	ND	0.058	mg/Kg dry	1		MADEP-VPH-Feb 2018 Rev 2.1	5/18/23	5/18/23 15:20	EEH
Methyl tert-Butyl Ether (MTBE)	ND	0.058	mg/Kg dry	1		MADEP-VPH-Feb 2018 Rev 2.1	5/18/23	5/18/23 15:20	EEH
Naphthalene	ND	0.29	mg/Kg dry	1		MADEP-VPH-Feb 2018 Rev 2.1	5/18/23	5/18/23 15:20	EEH
Toluene	ND	0.058	mg/Kg dry	1		MADEP-VPH-Feb 2018 Rev 2.1	5/18/23	5/18/23 15:20	EEH
m+p Xylene	ND	0.12	mg/Kg dry	1		MADEP-VPH-Feb 2018 Rev 2.1	5/18/23	5/18/23 15:20	EEH
o-Xylene	ND	0.058	mg/Kg dry	1		MADEP-VPH-Feb 2018 Rev 2.1	5/18/23	5/18/23 15:20	EEH

Surrogates	% Recovery		Recovery Limits	Flag/Qual	
2,5-Dibromotoluene (FID)	**142**	*	70-130	S-17	5/18/23 15:20
2,5-Dibromotoluene (PID)	130		70-130	S-17	5/18/23 15:20

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Springfield, MA
Sample Description:
Work Order: 23E2444

Date Received: 5/17/2023

Field Sample #: CM-38E(4.5-7.5)
Sampled: 5/16/2023 15:10

Sample ID: 23E2444-04

Sample Matrix: Soil

Metals Analyses (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Lead	5.9	0.55	mg/Kg dry	1		SW-846 6010D	5/19/23	5/22/23 17:04	HNN

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Springfield, MA
Sample Description:
Work Order: 23E2444

Date Received: 5/17/2023

Field Sample #: CM-38E(4.5-7.5)
Sampled: 5/16/2023 15:10

Sample ID: 23E2444-04

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	89.9		% Wt	1	H-06	SM 2540G	5/26/23	5/26/23 10:11	JLC

con-test® A Pace Analytical® Laboratory

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Springfield, MA
Sample Description:
Work Order: 23E2444

Date Received: 5/17/2023

Field Sample #: DUP-1
Sampled: 5/16/2023 00:00

Sample ID: 23E2444-05

Sample Matrix: Soil

Petroleum Hydrocarbons Analyses - EPH

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
C9-C18 Aliphatics	20	11	mg/Kg dry	1		MADEP EPH rev 2.1	5/30/23	6/1/23 6:45	GJB
C19-C36 Aliphatics	12	11	mg/Kg dry	1		MADEP EPH rev 2.1	5/30/23	6/1/23 6:45	GJB
Unadjusted C11-C22 Aromatics	62	11	mg/Kg dry	1		MADEP EPH rev 2.1	5/30/23	6/1/23 6:45	GJB
C11-C22 Aromatics	39	11	mg/Kg dry	1		MADEP EPH rev 2.1	5/30/23	6/1/23 6:45	GJB
Acenaphthene	0.46	0.11	mg/Kg dry	1		MADEP EPH rev 2.1	5/30/23	6/1/23 6:45	GJB
Acenaphthylene	0.29	0.11	mg/Kg dry	1		MADEP EPH rev 2.1	5/30/23	6/1/23 6:45	GJB
Anthracene	1.2	0.11	mg/Kg dry	1		MADEP EPH rev 2.1	5/30/23	6/1/23 6:45	GJB
Benzo(a)anthracene	1.3	0.11	mg/Kg dry	1		MADEP EPH rev 2.1	5/30/23	6/1/23 6:45	GJB
Benzo(a)pyrene	1.3	0.11	mg/Kg dry	1		MADEP EPH rev 2.1	5/30/23	6/1/23 6:45	GJB
Benzo(b)fluoranthene	1.4	0.11	mg/Kg dry	1		MADEP EPH rev 2.1	5/30/23	6/1/23 6:45	GJB
Benzo(g,h,i)perylene	0.86	0.11	mg/Kg dry	1		MADEP EPH rev 2.1	5/30/23	6/1/23 6:45	GJB
Benzo(k)fluoranthene	0.56	0.11	mg/Kg dry	1		MADEP EPH rev 2.1	5/30/23	6/1/23 6:45	GJB
Chrysene	1.4	0.11	mg/Kg dry	1		MADEP EPH rev 2.1	5/30/23	6/1/23 6:45	GJB
Dibenz(a,h)anthracene	0.18	0.11	mg/Kg dry	1		MADEP EPH rev 2.1	5/30/23	6/1/23 6:45	GJB
Fluoranthene	3.7	0.11	mg/Kg dry	1		MADEP EPH rev 2.1	5/30/23	6/1/23 6:45	GJB
Fluorene	0.61	0.11	mg/Kg dry	1		MADEP EPH rev 2.1	5/30/23	6/1/23 6:45	GJB
Indeno(1,2,3-cd)pyrene	0.85	0.11	mg/Kg dry	1		MADEP EPH rev 2.1	5/30/23	6/1/23 6:45	GJB
2-Methylnaphthalene	0.30	0.11	mg/Kg dry	1		MADEP EPH rev 2.1	5/30/23	6/1/23 6:45	GJB
Naphthalene	1.0	0.11	mg/Kg dry	1		MADEP EPH rev 2.1	5/30/23	6/1/23 6:45	GJB
Phenanthrene	4.7	0.11	mg/Kg dry	1		MADEP EPH rev 2.1	5/30/23	6/1/23 6:45	GJB
Pyrene	3.6	0.11	mg/Kg dry	1		MADEP EPH rev 2.1	5/30/23	6/1/23 6:45	GJB

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Chlorooctadecane (COD)	59.0	40-140		6/1/23 6:45
o-Terphenyl (OTP)	63.3	40-140		6/1/23 6:45
2-Bromonaphthalene	85.2	40-140		6/1/23 6:45
2-Fluorobiphenyl	83.2	40-140		6/1/23 6:45

con-test® A Pace Analytical® Laboratory

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Springfield, MA
Sample Description:
Work Order: 23E2444

Date Received: 5/17/2023

Field Sample #: DUP-1
Sampled: 5/16/2023 00:00

Sample ID: 23E2444-05

Sample Matrix: Soil

Petroleum Hydrocarbons Analyses - VPH

Soil/Methanol Preservation Ratio: 1.11

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Unadjusted C5-C8 Aliphatics	ND	11	mg/Kg dry	1		MADEP-VPH-Feb 2018 Rev 2.1	5/18/23	5/18/23 15:50	EEH
C5-C8 Aliphatics	ND	11	mg/Kg dry	1		MADEP-VPH-Feb 2018 Rev 2.1	5/18/23	5/18/23 15:50	EEH
Unadjusted C9-C12 Aliphatics	ND	11	mg/Kg dry	1		MADEP-VPH-Feb 2018 Rev 2.1	5/18/23	5/18/23 15:50	EEH
C9-C12 Aliphatics	ND	11	mg/Kg dry	1		MADEP-VPH-Feb 2018 Rev 2.1	5/18/23	5/18/23 15:50	EEH
C9-C10 Aromatics	ND	11	mg/Kg dry	1		MADEP-VPH-Feb 2018 Rev 2.1	5/18/23	5/18/23 15:50	EEH
Benzene	ND	0.054	mg/Kg dry	1		MADEP-VPH-Feb 2018 Rev 2.1	5/18/23	5/18/23 15:50	EEH
Ethylbenzene	ND	0.054	mg/Kg dry	1		MADEP-VPH-Feb 2018 Rev 2.1	5/18/23	5/18/23 15:50	EEH
Methyl tert-Butyl Ether (MTBE)	ND	0.054	mg/Kg dry	1		MADEP-VPH-Feb 2018 Rev 2.1	5/18/23	5/18/23 15:50	EEH
Naphthalene	ND	0.27	mg/Kg dry	1		MADEP-VPH-Feb 2018 Rev 2.1	5/18/23	5/18/23 15:50	EEH
Toluene	ND	0.054	mg/Kg dry	1		MADEP-VPH-Feb 2018 Rev 2.1	5/18/23	5/18/23 15:50	EEH
m+p Xylene	ND	0.11	mg/Kg dry	1		MADEP-VPH-Feb 2018 Rev 2.1	5/18/23	5/18/23 15:50	EEH
o-Xylene	ND	0.054	mg/Kg dry	1		MADEP-VPH-Feb 2018 Rev 2.1	5/18/23	5/18/23 15:50	EEH

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
2,5-Dibromotoluene (FID)	124	70-130		5/18/23 15:50
2,5-Dibromotoluene (PID)	117	70-130		5/18/23 15:50

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Springfield, MA
Sample Description:
Work Order: 23E2444

Date Received: 5/17/2023

Field Sample #: DUP-1
Sampled: 5/16/2023 00:00

Sample ID: 23E2444-05

Sample Matrix: Soil

Metals Analyses (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Lead	4.8	0.55	mg/Kg dry	1		SW-846 6010D	5/19/23	5/22/23 18:35	HNN

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Springfield, MA
Sample Description:
Work Order: 23E2444

Date Received: 5/17/2023

Field Sample #: DUP-1
Sampled: 5/16/2023 00:00

Sample ID: 23E2444-05

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	91.0		% Wt	1	H-06	SM 2540G	5/26/23	5/26/23 10:11	JLC

con-test® A Pace Analytical® Laboratory

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Sample Extraction Data

Prep Method:SW-846 3546 **Analytical Method:MADEP EPH rev 2.1**

Lab Number [Field ID]	Batch	Initial [g]	Final [mL]	Date
23E2444-01 [CM-38SW(4.5-7.5)]	B340848	20.1	2.00	05/19/23
23E2444-02 [CM-38NW(4.5-7.5)]	B340848	20.2	2.00	05/19/23
23E2444-04 [CM-38E(4.5-7.5)]	B340848	20.0	2.00	05/19/23

Prep Method:SW-846 3546 **Analytical Method:MADEP EPH rev 2.1**

Lab Number [Field ID]	Batch	Initial [g]	Final [mL]	Date
23E2444-03RE3 [CM-38N(3.5-6.5)]	B341656	20.0	2.00	05/30/23
23E2444-03RE4 [CM-38N(3.5-6.5)]	B341656	20.0	2.00	05/30/23
23E2444-03RE5 [CM-38N(3.5-6.5)]	B341656	20.0	2.00	05/30/23
23E2444-05RE1 [DUP-1]	B341656	20.0	2.00	05/30/23

Prep Method:MA VPH **Analytical Method:MADEP-VPH-Feb 2018 Rev 2.1**

Lab Number [Field ID]	Batch	Initial [g]	Final [mL]	Date
23E2444-01 [CM-38SW(4.5-7.5)]	B340628	15.7	17.2	05/18/23
23E2444-02 [CM-38NW(4.5-7.5)]	B340628	14.7	16.4	05/18/23
23E2444-03 [CM-38N(3.5-6.5)]	B340628	15.9	16.5	05/18/23
23E2444-04 [CM-38E(4.5-7.5)]	B340628	16.0	16.6	05/18/23
23E2444-05 [DUP-1]	B340628	16.7	16.5	05/18/23

Prep Method:% Solids **Analytical Method:SM 2540G**

Lab Number [Field ID]	Batch	Date
23E2444-01 [CM-38SW(4.5-7.5)]	B341517	05/26/23
23E2444-02 [CM-38NW(4.5-7.5)]	B341517	05/26/23
23E2444-03 [CM-38N(3.5-6.5)]	B341517	05/26/23
23E2444-04 [CM-38E(4.5-7.5)]	B341517	05/26/23
23E2444-05 [DUP-1]	B341517	05/26/23

Prep Method:SW-846 3050B **Analytical Method:SW-846 6010D**

Lab Number [Field ID]	Batch	Initial [g]	Final [mL]	Date
23E2444-01 [CM-38SW(4.5-7.5)]	B340774	1.53	50.0	05/19/23
23E2444-02 [CM-38NW(4.5-7.5)]	B340774	1.53	50.0	05/19/23
23E2444-03 [CM-38N(3.5-6.5)]	B340774	1.52	50.0	05/19/23
23E2444-04 [CM-38E(4.5-7.5)]	B340774	1.52	50.0	05/19/23
23E2444-05 [DUP-1]	B340774	1.51	50.0	05/19/23

con-test® A Pace Analytical® Laboratory

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

QUALITY CONTROL

Petroleum Hydrocarbons Analyses - EPH - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B340848 - SW-846 3546										
Blank (B340848-BLK1)				Prepared: 05/19/23 Analyzed: 05/22/23						
C9-C18 Aliphatics	ND	10	mg/Kg wet							
C19-C36 Aliphatics	ND	10	mg/Kg wet							
Unadjusted C11-C22 Aromatics	ND	10	mg/Kg wet							
C11-C22 Aromatics	ND	10	mg/Kg wet							
Acenaphthene	ND	0.10	mg/Kg wet							
Acenaphthylene	ND	0.10	mg/Kg wet							
Anthracene	ND	0.10	mg/Kg wet							
Benzo(a)anthracene	ND	0.10	mg/Kg wet							
Benzo(a)pyrene	ND	0.10	mg/Kg wet							
Benzo(b)fluoranthene	ND	0.10	mg/Kg wet							
Benzo(g,h,i)perylene	ND	0.10	mg/Kg wet							
Benzo(k)fluoranthene	ND	0.10	mg/Kg wet							
Chrysene	ND	0.10	mg/Kg wet							
Dibenz(a,h)anthracene	ND	0.10	mg/Kg wet							
Fluoranthene	ND	0.10	mg/Kg wet							
Fluorene	ND	0.10	mg/Kg wet							
Indeno(1,2,3-cd)pyrene	ND	0.10	mg/Kg wet							
2-Methylnaphthalene	ND	0.10	mg/Kg wet							
Naphthalene	ND	0.10	mg/Kg wet							
Phenanthrene	ND	0.10	mg/Kg wet							
Pyrene	ND	0.10	mg/Kg wet							
Naphthalene-aliphatic fraction	ND	0.10	mg/Kg wet							
2-Methylnaphthalene-aliphatic fraction	ND	0.10	mg/Kg wet							
Surrogate: Chlorooctadecane (COD)	*2.78*		mg/Kg wet	5.00		55.6	40-140			
Surrogate: o-Terphenyl (OTP)	*3.00*		mg/Kg wet	5.00		60.0	40-140			
Surrogate: 2-Bromonaphthalene	*4.15*		mg/Kg wet	5.00		83.1	40-140			
Surrogate: 2-Fluorobiphenyl	*4.04*		mg/Kg wet	5.00		80.8	40-140			
LCS (B340848-BS1)				Prepared: 05/19/23 Analyzed: 05/22/23						
C9-C18 Aliphatics	23.6	10	mg/Kg wet	30.0		78.6	40-140			
C19-C36 Aliphatics	36.1	10	mg/Kg wet	40.0		90.3	40-140			
Unadjusted C11-C22 Aromatics	62.8	10	mg/Kg wet	85.0		73.9	40-140			
Acenaphthene	3.44	0.10	mg/Kg wet	5.00		68.8	40-140			
Acenaphthylene	3.18	0.10	mg/Kg wet	5.00		63.7	40-140			
Anthracene	3.53	0.10	mg/Kg wet	5.00		70.7	40-140			
Benzo(a)anthracene	3.47	0.10	mg/Kg wet	5.00		69.4	40-140			
Benzo(a)pyrene	3.52	0.10	mg/Kg wet	5.00		70.4	40-140			
Benzo(b)fluoranthene	3.29	0.10	mg/Kg wet	5.00		65.8	40-140			
Benzo(g,h,i)perylene	3.17	0.10	mg/Kg wet	5.00		63.4	40-140			
Benzo(k)fluoranthene	3.24	0.10	mg/Kg wet	5.00		64.8	40-140			
Chrysene	3.75	0.10	mg/Kg wet	5.00		74.9	40-140			
Dibenz(a,h)anthracene	3.37	0.10	mg/Kg wet	5.00		67.5	40-140			
Fluoranthene	3.38	0.10	mg/Kg wet	5.00		67.7	40-140			
Fluorene	3.57	0.10	mg/Kg wet	5.00		71.3	40-140			
Indeno(1,2,3-cd)pyrene	3.26	0.10	mg/Kg wet	5.00		65.2	40-140			
2-Methylnaphthalene	3.35	0.10	mg/Kg wet	5.00		66.9	40-140			
Naphthalene	3.21	0.10	mg/Kg wet	5.00		64.2	40-140			
Phenanthrene	3.52	0.10	mg/Kg wet	5.00		70.5	40-140			
Pyrene	3.46	0.10	mg/Kg wet	5.00		69.3	40-140			
Naphthalene-aliphatic fraction	ND	0.10	mg/Kg wet	5.00			0-5			
2-Methylnaphthalene-aliphatic fraction	ND	0.10	mg/Kg wet	5.00			0-5			
Surrogate: Chlorooctadecane (COD)	*2.98*		mg/Kg wet	5.00		59.5	40-140			

con-test® A Pace Analytical® Laboratory

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

QUALITY CONTROL

Petroleum Hydrocarbons Analyses - EPH - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B340848 - SW-846 3546										
LCS (B340848-BS1)				Prepared: 05/19/23 Analyzed: 05/22/23						
Surrogate: o-Terphenyl (OTP)	*2.90*		mg/Kg wet	5.00		57.9	40-140			
Surrogate: 2-Bromonaphthalene	*4.20*		mg/Kg wet	5.00		84.0	40-140			
Surrogate: 2-Fluorobiphenyl	*4.10*		mg/Kg wet	5.00		82.1	40-140			
LCS Dup (B340848-BSD1)				Prepared: 05/19/23 Analyzed: 05/22/23						
C9-C18 Aliphatics	21.7	10	mg/Kg wet	30.0		72.3	40-140	8.31	25	
C19-C36 Aliphatics	34.6	10	mg/Kg wet	40.0		86.4	40-140	4.43	25	
Unadjusted C11-C22 Aromatics	59.9	10	mg/Kg wet	85.0		70.5	40-140	4.63	25	
Acenaphthene	3.10	0.10	mg/Kg wet	5.00		61.9	40-140	10.5	25	
Acenaphthylene	2.83	0.10	mg/Kg wet	5.00		56.6	40-140	11.8	25	
Anthracene	3.36	0.10	mg/Kg wet	5.00		67.2	40-140	5.07	25	
Benzo(a)anthracene	3.32	0.10	mg/Kg wet	5.00		66.5	40-140	4.27	25	
Benzo(a)pyrene	3.38	0.10	mg/Kg wet	5.00		67.6	40-140	4.01	25	
Benzo(b)fluoranthene	3.15	0.10	mg/Kg wet	5.00		63.0	40-140	4.31	25	
Benzo(g,h,i)perylene	3.04	0.10	mg/Kg wet	5.00		60.9	40-140	4.08	25	
Benzo(k)fluoranthene	3.11	0.10	mg/Kg wet	5.00		62.1	40-140	4.15	25	
Chrysene	3.59	0.10	mg/Kg wet	5.00		71.9	40-140	4.20	25	
Dibenz(a,h)anthracene	3.27	0.10	mg/Kg wet	5.00		65.4	40-140	3.05	25	
Fluoranthene	3.24	0.10	mg/Kg wet	5.00		64.8	40-140	4.35	25	
Fluorene	3.28	0.10	mg/Kg wet	5.00		65.6	40-140	8.41	25	
Indeno(1,2,3-cd)pyrene	3.12	0.10	mg/Kg wet	5.00		62.3	40-140	4.55	25	
2-Methylnaphthalene	2.96	0.10	mg/Kg wet	5.00		59.3	40-140	12.1	25	
Naphthalene	2.69	0.10	mg/Kg wet	5.00		53.8	40-140	17.6	25	
Phenanthrene	3.33	0.10	mg/Kg wet	5.00		66.5	40-140	5.80	25	
Pyrene	3.32	0.10	mg/Kg wet	5.00		66.4	40-140	4.27	25	
Naphthalene-aliphatic fraction	ND	0.10	mg/Kg wet	5.00			0-5			
2-Methylnaphthalene-aliphatic fraction	ND	0.10	mg/Kg wet	5.00			0-5			
Surrogate: Chlorooctadecane (COD)	*2.93*		mg/Kg wet	5.00		58.6	40-140			
Surrogate: o-Terphenyl (OTP)	*2.87*		mg/Kg wet	5.00		57.5	40-140			
Surrogate: 2-Bromonaphthalene	*4.36*		mg/Kg wet	5.00		87.3	40-140			
Surrogate: 2-Fluorobiphenyl	*4.26*		mg/Kg wet	5.00		85.2	40-140			
Matrix Spike (B340848-MS1)		**Source: 23E2444-04**		Prepared: 05/19/23 Analyzed: 05/24/23						
C9-C18 Aliphatics	33.4	11	mg/Kg dry	33.4	15.1	54.8	40-140			
C19-C36 Aliphatics	45.7	11	mg/Kg dry	44.5	15.3	68.2	40-140			
Unadjusted C11-C22 Aromatics	148	11	mg/Kg dry	94.6	77.0	75.0	40-140			
Acenaphthene	4.77	0.11	mg/Kg dry	5.56	0.696	73.2	40-140			
Acenaphthylene	4.27	0.11	mg/Kg dry	5.56	0.429	69.0	40-140			
Anthracene	5.81	0.11	mg/Kg dry	5.56	1.46	78.3	40-140			
Benzo(a)anthracene	5.89	0.11	mg/Kg dry	5.56	1.70	75.3	40-140			
Benzo(a)pyrene	5.68	0.11	mg/Kg dry	5.56	1.62	72.9	40-140			
Benzo(b)fluoranthene	5.76	0.11	mg/Kg dry	5.56	1.86	70.1	40-140			
Benzo(g,h,i)perylene	4.68	0.11	mg/Kg dry	5.56	1.09	64.6	40-140			
Benzo(k)fluoranthene	4.58	0.11	mg/Kg dry	5.56	0.701	69.7	40-140			
Chrysene	6.33	0.11	mg/Kg dry	5.56	1.92	79.4	40-140			
Dibenz(a,h)anthracene	4.14	0.11	mg/Kg dry	5.56	0.228	70.3	40-140			
Fluoranthene	9.28	0.11	mg/Kg dry	5.56	5.05	76.1	40-140			
Fluorene	5.16	0.11	mg/Kg dry	5.56	0.865	77.3	40-140			
Indeno(1,2,3-cd)pyrene	4.83	0.11	mg/Kg dry	5.56	1.06	67.7	40-140			
2-Methylnaphthalene	4.46	0.11	mg/Kg dry	5.56	0.528	70.7	40-140			
Naphthalene	5.21	0.11	mg/Kg dry	5.56	1.64	64.3	40-140			
Phenanthrene	11.1	0.11	mg/Kg dry	5.56	6.70	79.4	40-140			

con-test® A Pace Analytical® Laboratory

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

QUALITY CONTROL

Petroleum Hydrocarbons Analyses - EPH - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC		%REC Limits	RPD	RPD Limit	Notes
Batch B340848 - SW-846 3546											
Matrix Spike (B340848-MS1)		**Source: 23E2444-04**		Prepared: 05/19/23 Analyzed: 05/24/23							
Pyrene	9.12	0.11	mg/Kg dry	5.56	4.78	77.9		40-140			
Surrogate: Chlorooctadecane (COD)	*2.93*		mg/Kg dry	5.56		52.7		40-140			
Surrogate: o-Terphenyl (OTP)	*3.94*		mg/Kg dry	5.56		70.8		40-140			
Surrogate: 2-Bromonaphthalene	*5.41*		mg/Kg dry	5.56		97.3		40-140			
Surrogate: 2-Fluorobiphenyl	*5.21*		mg/Kg dry	5.56		93.6		40-140			
Matrix Spike Dup (B340848-MSD1)		**Source: 23E2444-04**		Prepared: 05/19/23 Analyzed: 05/24/23							
C9-C18 Aliphatics	32.3	11	mg/Kg dry	33.4	15.1	51.5		40-140	3.31	50	
C19-C36 Aliphatics	46.5	11	mg/Kg dry	44.5	15.3	70.0		40-140	1.71	50	
Unadjusted C11-C22 Aromatics	121	11	mg/Kg dry	94.6	77.0	46.1		40-140	20.4	50	
Acenaphthene	3.81	0.11	mg/Kg dry	5.56	0.696	56.1		40-140	22.2	50	
Acenaphthylene	3.32	0.11	mg/Kg dry	5.56	0.429	52.0		40-140	24.9	50	
Anthracene	4.76	0.11	mg/Kg dry	5.56	1.46	59.3		40-140	20.0	50	
Benzo(a)anthracene	4.87	0.11	mg/Kg dry	5.56	1.70	56.9		40-140	19.0	50	
Benzo(a)pyrene	4.62	0.11	mg/Kg dry	5.56	1.62	53.8		40-140	20.7	50	
Benzo(b)fluoranthene	4.65	0.11	mg/Kg dry	5.56	1.86	50.0		40-140	21.5	50	
Benzo(g,h,i)perylene	3.51	0.11	mg/Kg dry	5.56	1.09	43.7		40-140	28.4	50	
Benzo(k)fluoranthene	3.71	0.11	mg/Kg dry	5.56	0.701	54.1		40-140	20.9	50	
Chrysene	5.23	0.11	mg/Kg dry	5.56	1.92	59.6		40-140	19.0	50	
Dibenz(a,h)anthracene	3.27	0.11	mg/Kg dry	5.56	0.228	54.6		40-140	23.6	50	
Fluoranthene	7.70	0.11	mg/Kg dry	5.56	5.05	47.6		40-140	18.7	50	
Fluorene	4.26	0.11	mg/Kg dry	5.56	0.865	61.0		40-140	19.3	50	
Indeno(1,2,3-cd)pyrene	3.78	0.11	mg/Kg dry	5.56	1.06	48.9		40-140	24.4	50	
2-Methylnaphthalene	3.24	0.11	mg/Kg dry	5.56	0.528	48.7		40-140	31.7	50	
Naphthalene	3.39	0.11	mg/Kg dry	5.56	1.64	**31.5**	*	40-140	42.4	50	MS-22
Phenanthrene	9.32	0.11	mg/Kg dry	5.56	6.70	47.0		40-140	17.7	50	
Pyrene	7.58	0.11	mg/Kg dry	5.56	4.78	50.3		40-140	18.3	50	
Surrogate: Chlorooctadecane (COD)	*2.96*		mg/Kg dry	5.56		53.2		40-140			
Surrogate: o-Terphenyl (OTP)	*3.17*		mg/Kg dry	5.56		57.0		40-140			
Surrogate: 2-Bromonaphthalene	*4.86*		mg/Kg dry	5.56		87.4		40-140			
Surrogate: 2-Fluorobiphenyl	*4.67*		mg/Kg dry	5.56		84.0		40-140			
Batch B341656 - SW-846 3546											
Blank (B341656-BLK1)				Prepared: 05/30/23 Analyzed: 06/01/23							
C9-C18 Aliphatics	ND	10	mg/Kg wet								
C19-C36 Aliphatics	ND	10	mg/Kg wet								
Unadjusted C11-C22 Aromatics	ND	10	mg/Kg wet								
C11-C22 Aromatics	ND	10	mg/Kg wet								
Acenaphthene	ND	0.10	mg/Kg wet								
Acenaphthylene	ND	0.10	mg/Kg wet								
Anthracene	ND	0.10	mg/Kg wet								
Benzo(a)anthracene	ND	0.10	mg/Kg wet								
Benzo(a)pyrene	ND	0.10	mg/Kg wet								
Benzo(b)fluoranthene	ND	0.10	mg/Kg wet								
Benzo(g,h,i)perylene	ND	0.10	mg/Kg wet								
Benzo(k)fluoranthene	ND	0.10	mg/Kg wet								
Chrysene	ND	0.10	mg/Kg wet								
Dibenz(a,h)anthracene	ND	0.10	mg/Kg wet								
Fluoranthene	ND	0.10	mg/Kg wet								
Fluorene	ND	0.10	mg/Kg wet								
Indeno(1,2,3-cd)pyrene	ND	0.10	mg/Kg wet								
2-Methylnaphthalene	ND	0.10	mg/Kg wet								

con-test® A Pace Analytical® Laboratory

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

QUALITY CONTROL

Petroleum Hydrocarbons Analyses - EPH - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B341656 - SW-846 3546										
Blank (B341656-BLK1)				Prepared: 05/30/23 Analyzed: 06/01/23						
Naphthalene	ND	0.10	mg/Kg wet							
Phenanthrene	ND	0.10	mg/Kg wet							
Pyrene	ND	0.10	mg/Kg wet							
Naphthalene-aliphatic fraction	ND	0.10	mg/Kg wet							
2-Methylnaphthalene-aliphatic fraction	ND	0.10	mg/Kg wet							
Surrogate: Chlorooctadecane (COD)	*2.97*		mg/Kg wet	5.00		59.4	40-140			
Surrogate: o-Terphenyl (OTP)	*2.95*		mg/Kg wet	5.00		59.0	40-140			
Surrogate: 2-Bromonaphthalene	*3.99*		mg/Kg wet	5.00		79.8	40-140			
Surrogate: 2-Fluorobiphenyl	*3.86*		mg/Kg wet	5.00		77.2	40-140			
LCS (B341656-BS1)				Prepared: 05/30/23 Analyzed: 06/01/23						
C9-C18 Aliphatics	26.7	10	mg/Kg wet	30.0		89.0	40-140			
C19-C36 Aliphatics	37.5	10	mg/Kg wet	40.0		93.7	40-140			
Unadjusted C11-C22 Aromatics	66.1	10	mg/Kg wet	85.0		77.7	40-140			
Acenaphthene	3.63	0.10	mg/Kg wet	5.00		72.7	40-140			
Acenaphthylene	3.34	0.10	mg/Kg wet	5.00		66.9	40-140			
Anthracene	3.94	0.10	mg/Kg wet	5.00		78.8	40-140			
Benzo(a)anthracene	3.78	0.10	mg/Kg wet	5.00		75.5	40-140			
Benzo(a)pyrene	3.73	0.10	mg/Kg wet	5.00		74.7	40-140			
Benzo(b)fluoranthene	3.50	0.10	mg/Kg wet	5.00		70.0	40-140			
Benzo(g,h,i)perylene	3.26	0.10	mg/Kg wet	5.00		65.2	40-140			
Benzo(k)fluoranthene	3.46	0.10	mg/Kg wet	5.00		69.2	40-140			
Chrysene	4.07	0.10	mg/Kg wet	5.00		81.4	40-140			
Dibenz(a,h)anthracene	3.54	0.10	mg/Kg wet	5.00		70.8	40-140			
Fluoranthene	3.75	0.10	mg/Kg wet	5.00		74.9	40-140			
Fluorene	3.86	0.10	mg/Kg wet	5.00		77.2	40-140			
Indeno(1,2,3-cd)pyrene	3.37	0.10	mg/Kg wet	5.00		67.5	40-140			
2-Methylnaphthalene	3.44	0.10	mg/Kg wet	5.00		68.8	40-140			
Naphthalene	3.15	0.10	mg/Kg wet	5.00		62.9	40-140			
Phenanthrene	3.93	0.10	mg/Kg wet	5.00		78.5	40-140			
Pyrene	3.83	0.10	mg/Kg wet	5.00		76.6	40-140			
Naphthalene-aliphatic fraction	ND	0.10	mg/Kg wet	5.00			0-5			
2-Methylnaphthalene-aliphatic fraction	ND	0.10	mg/Kg wet	5.00			0-5			
Surrogate: Chlorooctadecane (COD)	*3.12*		mg/Kg wet	5.00		62.3	40-140			
Surrogate: o-Terphenyl (OTP)	*3.18*		mg/Kg wet	5.00		63.7	40-140			
Surrogate: 2-Bromonaphthalene	*3.92*		mg/Kg wet	5.00		78.5	40-140			
Surrogate: 2-Fluorobiphenyl	*3.81*		mg/Kg wet	5.00		76.2	40-140			
LCS Dup (B341656-BSD1)				Prepared: 05/30/23 Analyzed: 06/01/23						
C9-C18 Aliphatics	23.1	10	mg/Kg wet	30.0		77.0	40-140	14.4	25	
C19-C36 Aliphatics	34.1	10	mg/Kg wet	40.0		85.3	40-140	9.38	25	
Unadjusted C11-C22 Aromatics	65.2	10	mg/Kg wet	85.0		76.7	40-140	1.39	25	
Acenaphthene	3.52	0.10	mg/Kg wet	5.00		70.5	40-140	3.07	25	
Acenaphthylene	3.24	0.10	mg/Kg wet	5.00		64.8	40-140	3.21	25	
Anthracene	3.92	0.10	mg/Kg wet	5.00		78.3	40-140	0.547	25	
Benzo(a)anthracene	3.75	0.10	mg/Kg wet	5.00		75.1	40-140	0.579	25	
Benzo(a)pyrene	3.71	0.10	mg/Kg wet	5.00		74.1	40-140	0.723	25	
Benzo(b)fluoranthene	3.46	0.10	mg/Kg wet	5.00		69.2	40-140	1.15	25	
Benzo(g,h,i)perylene	3.25	0.10	mg/Kg wet	5.00		64.9	40-140	0.421	25	
Benzo(k)fluoranthene	3.42	0.10	mg/Kg wet	5.00		68.4	40-140	1.15	25	
Chrysene	4.07	0.10	mg/Kg wet	5.00		81.5	40-140	0.0565	25	
Dibenz(a,h)anthracene	3.52	0.10	mg/Kg wet	5.00		70.4	40-140	0.572	25	

con-test® A Pace Analytical® Laboratory

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

QUALITY CONTROL

Petroleum Hydrocarbons Analyses - EPH - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B341656 - SW-846 3546										
LCS Dup (B341656-BSD1)				Prepared: 05/30/23 Analyzed: 06/01/23						
Fluoranthene	3.69	0.10	mg/Kg wet	5.00		73.9	40-140	1.44	25	
Fluorene	3.84	0.10	mg/Kg wet	5.00		76.7	40-140	0.541	25	
Indeno(1,2,3-cd)pyrene	3.34	0.10	mg/Kg wet	5.00		66.9	40-140	0.893	25	
2-Methylnaphthalene	3.34	0.10	mg/Kg wet	5.00		66.9	40-140	2.88	25	
Naphthalene	3.05	0.10	mg/Kg wet	5.00		60.9	40-140	3.29	25	
Phenanthrene	3.91	0.10	mg/Kg wet	5.00		78.2	40-140	0.375	25	
Pyrene	3.77	0.10	mg/Kg wet	5.00		75.3	40-140	1.63	25	
Naphthalene-aliphatic fraction	ND	0.10	mg/Kg wet	5.00			0-5			
2-Methylnaphthalene-aliphatic fraction	ND	0.10	mg/Kg wet	5.00			0-5			
Surrogate: Chlorooctadecane (COD)	*2.90*		mg/Kg wet	5.00		58.0	40-140			
Surrogate: o-Terphenyl (OTP)	*3.05*		mg/Kg wet	5.00		61.1	40-140			
Surrogate: 2-Bromonaphthalene	*4.02*		mg/Kg wet	5.00		80.4	40-140			
Surrogate: 2-Fluorobiphenyl	*3.90*		mg/Kg wet	5.00		78.0	40-140			

con-test® A Pace Analytical® Laboratory

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

QUALITY CONTROL

Petroleum Hydrocarbons Analyses - VPH - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B340628 - MA VPH										
Blank (B340628-BLK1)				Prepared & Analyzed: 05/18/23						
Unadjusted C5-C8 Aliphatics	ND	10	mg/Kg wet							
C5-C8 Aliphatics	ND	10	mg/Kg wet							
Unadjusted C9-C12 Aliphatics	ND	10	mg/Kg wet							
C9-C12 Aliphatics	ND	10	mg/Kg wet							
C9-C10 Aromatics	ND	10	mg/Kg wet							
Benzene	ND	0.050	mg/Kg wet							
Butylcyclohexane	ND	0.050	mg/Kg wet							
Decane	ND	0.050	mg/Kg wet							
Ethylbenzene	ND	0.050	mg/Kg wet							
Methyl tert-Butyl Ether (MTBE)	ND	0.050	mg/Kg wet							
2-Methylpentane	ND	0.050	mg/Kg wet							
Naphthalene	ND	0.25	mg/Kg wet							
Nonane	ND	0.050	mg/Kg wet							
Pentane	ND	0.050	mg/Kg wet							
Toluene	ND	0.050	mg/Kg wet							
1,2,4-Trimethylbenzene	ND	0.050	mg/Kg wet							
2,2,4-Trimethylpentane	ND	0.050	mg/Kg wet							
m+p Xylene	ND	0.10	mg/Kg wet							
o-Xylene	ND	0.050	mg/Kg wet							
Surrogate: 2,5-Dibromotoluene (FID)	*31.9*		µg/L	40.0		79.8	70-130			
Surrogate: 2,5-Dibromotoluene (PID)	*31.0*		µg/L	40.0		77.5	70-130			
LCS (B340628-BS1)				Prepared & Analyzed: 05/18/23						
Unadjusted C5-C8 Aliphatics	8.07	10	mg/Kg wet	7.50		108	70-130			
Unadjusted C9-C12 Aliphatics	7.42	10	mg/Kg wet	7.50		98.9	70-130			
C9-C10 Aromatics	2.70	10	mg/Kg wet	2.50		108	70-130			
Benzene	2.61	0.050	mg/Kg wet	2.50		105	70-130			
Butylcyclohexane	2.68	0.050	mg/Kg wet	2.50		107	70-130			
Decane	2.00	0.050	mg/Kg wet	2.50		80.2	70-130			
Ethylbenzene	2.61	0.050	mg/Kg wet	2.50		104	70-130			
Methyl tert-Butyl Ether (MTBE)	2.51	0.050	mg/Kg wet	2.50		101	70-130			
2-Methylpentane	2.78	0.050	mg/Kg wet	2.50		111	70-130			
Naphthalene	2.13	0.25	mg/Kg wet	2.50		85.3	70-130			
Nonane	2.73	0.050	mg/Kg wet	2.50		109	30-130			
Pentane	2.89	0.050	mg/Kg wet	2.50		115	70-130			
Toluene	2.56	0.050	mg/Kg wet	2.50		103	70-130			
1,2,4-Trimethylbenzene	2.70	0.050	mg/Kg wet	2.50		108	70-130			
2,2,4-Trimethylpentane	2.40	0.050	mg/Kg wet	2.50		96.2	70-130			
m+p Xylene	5.20	0.10	mg/Kg wet	5.00		104	70-130			
o-Xylene	2.64	0.050	mg/Kg wet	2.50		106	70-130			
Surrogate: 2,5-Dibromotoluene (FID)	*40.0*		µg/L	40.0		100	70-130			
Surrogate: 2,5-Dibromotoluene (PID)	*39.6*		µg/L	40.0		99.0	70-130			

con-test® A Pace Analytical® Laboratory

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

QUALITY CONTROL

Petroleum Hydrocarbons Analyses - VPH - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC		%REC Limits	RPD	RPD Limit	Notes
Batch B340628 - MA VPH											
LCS Dup (B340628-BSD1)				Prepared & Analyzed: 05/18/23							
Unadjusted C5-C8 Aliphatics	7.57	10	mg/Kg wet	7.50		101		70-130	6.32	25	
Unadjusted C9-C12 Aliphatics	7.23	10	mg/Kg wet	7.50		96.4		70-130	2.58	25	
C9-C10 Aromatics	2.67	10	mg/Kg wet	2.50		107		70-130	1.03	25	
Benzene	2.63	0.050	mg/Kg wet	2.50		105		70-130	0.523	25	
Butylcyclohexane	2.63	0.050	mg/Kg wet	2.50		105		70-130	1.94	25	
Decane	1.93	0.050	mg/Kg wet	2.50		77.2		70-130	3.78	25	
Ethylbenzene	2.57	0.050	mg/Kg wet	2.50		103		70-130	1.55	25	
Methyl tert-Butyl Ether (MTBE)	2.57	0.050	mg/Kg wet	2.50		103		70-130	2.00	25	
2-Methylpentane	2.69	0.050	mg/Kg wet	2.50		107		70-130	3.23	25	
Naphthalene	2.17	0.25	mg/Kg wet	2.50		86.8		70-130	1.73	25	
Nonane	2.67	0.050	mg/Kg wet	2.50		107		30-130	2.33	25	
Pentane	2.59	0.050	mg/Kg wet	2.50		104		70-130	10.7	25	
Toluene	2.55	0.050	mg/Kg wet	2.50		102		70-130	0.379	25	
1,2,4-Trimethylbenzene	2.67	0.050	mg/Kg wet	2.50		107		70-130	1.03	25	
2,2,4-Trimethylpentane	2.29	0.050	mg/Kg wet	2.50		91.7		70-130	4.80	25	
m+p Xylene	5.13	0.10	mg/Kg wet	5.00		103		70-130	1.50	25	
o-Xylene	2.60	0.050	mg/Kg wet	2.50		104		70-130	1.61	25	
Surrogate: 2,5-Dibromotoluene (FID)	*40.4*		µg/L	40.0		101		70-130			
Surrogate: 2,5-Dibromotoluene (PID)	*40.3*		µg/L	40.0		101		70-130			
Matrix Spike (B340628-MS1)		**Source: 23E2444-04**		Prepared: 05/18/23 Analyzed: 05/19/23							
Benzene	3.24	0.058	mg/Kg dry	2.88	ND	112		70-130			
Butylcyclohexane	5.24	0.058	mg/Kg dry	2.88	ND	**182**	*	70-130			MS-15
Decane	4.22	0.058	mg/Kg dry	2.88	ND	**146**	*	70-130			MS-15
Ethylbenzene	3.23	0.058	mg/Kg dry	2.88	ND	112		70-130			
Methyl tert-Butyl Ether (MTBE)	3.02	0.058	mg/Kg dry	2.88	ND	105		70-130			
2-Methylpentane	3.99	0.058	mg/Kg dry	2.88	ND	**138**	*	70-130			MS-15
Naphthalene	2.80	0.29	mg/Kg dry	2.88	ND	97.2		70-130			
Nonane	5.36	0.058	mg/Kg dry	2.88	ND	**186**	*	30-130			MS-15
Pentane	3.99	0.058	mg/Kg dry	2.88	ND	**138**	*	70-130			MS-15
Toluene	3.19	0.058	mg/Kg dry	2.88	ND	110		70-130			
1,2,4-Trimethylbenzene	3.26	0.058	mg/Kg dry	2.88	ND	113		70-130			
2,2,4-Trimethylpentane	4.84	0.058	mg/Kg dry	2.88	ND	**168**	*	70-130			MS-15
m+p Xylene	6.41	0.12	mg/Kg dry	5.77	ND	111		70-130			
o-Xylene	3.20	0.058	mg/Kg dry	2.88	ND	111		70-130			
Surrogate: 2,5-Dibromotoluene (FID)	*67.7*		µg/L	40.0		**169**	*	70-130			S-03
Surrogate: 2,5-Dibromotoluene (PID)	*61.8*		µg/L	40.0		**155**	*	70-130			S-03
Matrix Spike Dup (B340628-MSD1)		**Source: 23E2444-04**		Prepared: 05/18/23 Analyzed: 05/19/23							
Benzene	3.35	0.058	mg/Kg dry	2.88	ND	116		70-130	3.37	50	
Butylcyclohexane	5.49	0.058	mg/Kg dry	2.88	ND	**191**	*	70-130	4.67	50	MS-15
Decane	4.34	0.058	mg/Kg dry	2.88	ND	**151**	*	70-130	2.82	50	MS-15
Ethylbenzene	3.32	0.058	mg/Kg dry	2.88	ND	115		70-130	2.76	50	
Methyl tert-Butyl Ether (MTBE)	3.12	0.058	mg/Kg dry	2.88	ND	108		70-130	3.09	50	
2-Methylpentane	4.06	0.058	mg/Kg dry	2.88	ND	**141**	*	70-130	1.75	50	MS-15
Naphthalene	2.88	0.29	mg/Kg dry	2.88	ND	99.9		70-130	2.77	50	
Nonane	5.47	0.058	mg/Kg dry	2.88	ND	**190**	*	30-130	2.15	50	MS-15
Pentane	3.95	0.058	mg/Kg dry	2.88	ND	**137**	*	70-130	0.956	50	MS-15
Toluene	3.28	0.058	mg/Kg dry	2.88	ND	114		70-130	2.88	50	
1,2,4-Trimethylbenzene	3.57	0.058	mg/Kg dry	2.88	ND	124		70-130	9.16	50	
2,2,4-Trimethylpentane	5.00	0.058	mg/Kg dry	2.88	ND	**173**	*	70-130	3.21	50	MS-15
m+p Xylene	6.62	0.12	mg/Kg dry	5.77	ND	115		70-130	3.21	20	

con-test® A Pace Analytical® Laboratory

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

QUALITY CONTROL

Petroleum Hydrocarbons Analyses - VPH - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC		%REC Limits	RPD	RPD Limit	Notes
Batch B340628 - MA VPH											
Matrix Spike Dup (B340628-MSD1)		**Source: 23E2444-04**		Prepared: 05/18/23 Analyzed: 05/19/23							
o-Xylene	3.29	0.058	mg/Kg dry	2.88	ND	114		70-130	2.84	50	
Surrogate: 2,5-Dibromotoluene (FID)	*58.7*		µg/L	40.0		**147**	*	70-130			S-03
Surrogate: 2,5-Dibromotoluene (PID)	*55.1*		µg/L	40.0		**138**	*	70-130			S-03

con-test® A Pace Analytical® Laboratory

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

QUALITY CONTROL

Metals Analyses (Total) - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B340774 - SW-846 3050B										
Blank (B340774-BLK2)				Prepared: 05/19/23 Analyzed: 05/22/23						
Lead	ND	0.49	mg/Kg wet							
LCS (B340774-BS2)				Prepared: 05/19/23 Analyzed: 05/22/23						
Lead	232	1.5	mg/Kg wet	257		90.2	82.1-117.9			
LCS Dup (B340774-BSD2)				Prepared: 05/19/23 Analyzed: 05/22/23						
Lead	231	1.5	mg/Kg wet	257		89.8	82.1-117.9	0.376	30	
Matrix Spike (B340774-MS2)		**Source: 23E2444-04**		Prepared: 05/19/23 Analyzed: 05/22/23						
Lead	21.7	0.55	mg/Kg dry	18.4	5.93	85.9	75-125			
Matrix Spike Dup (B340774-MSD2)		**Source: 23E2444-04**		Prepared: 05/19/23 Analyzed: 05/22/23						
Lead	20.5	0.55	mg/Kg dry	18.4	5.93	79.0	75-125	5.99	35	
Reference (B340774-SRM1) MRL CHECK				Prepared: 05/19/23 Analyzed: 05/22/23						
Lead	0.440	0.49	mg/Kg wet	0.494		89.1	80-120			

con-test® A Pace Analytical® Laboratory

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

FLAG/QUALIFIER SUMMARY

*	QC result is outside of established limits.
†	Wide recovery limits established for difficult compound.
‡	Wide RPD limits established for difficult compound.
#	Data exceeded client recommended or regulatory level
ND	Not Detected
RL	Reporting Limit is at the level of quantitation (LOQ)
DL	Detection Limit is the lower limit of detection determined by the MDL study
MCL	Maximum Contaminant Level
	Percent recoveries and relative percent differences (RPDs) are determined by the software using values in the calculation which have not been rounded.
	No results have been blank subtracted unless specified in the case narrative section.
H-06	Sample was extracted past the recommended holding time.
MS-15	Matrix spike and matrix spike duplicate recoveries are outside of control limits. Data validation is not affected since results for this compound in this sample are "not detected", and recovery bias is on the high side.
MS-22	Either matrix spike or MS duplicate is outside of control limits, but the other is within limits. RPD between the two MS/MSD results is within method specified criteria.
RL-05	Elevated reporting limit due to high concentration of target compounds. MA CAM reporting limit not met.
S-01	The surrogate recovery for this sample is not available due to sample dilution below the surrogate reporting limit required from high analyte concentration and/or matrix interferences.
S-03	Surrogate recovery outside of control limits due to suspected sample matrix interference.
S-15	Surrogate recovery outside of control limits due to suspected sample matrix interference. Chromatogram(s) is attached.
S-17	Surrogate recovery is outside of control limits. Data validation is not affected since all associated results are less than the reporting limit and bias is on the high side.

con-test® A Pace Analytical® Laboratory

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

CERTIFICATIONS

Certified Analyses included in this Report

Analyte	Certifications
MADEP EPH rev 2.1 in Soil	
C9-C18 Aliphatics	CT,NC,ME,NH-P
C19-C36 Aliphatics	CT,NC,ME,NH-P
Unadjusted C11-C22 Aromatics	CT,NC,ME,NH-P
C11-C22 Aromatics	CT,NC,ME,NH-P
Acenaphthene	CT,NC,ME,NH-P
Acenaphthylene	CT,NC,ME,NH-P
Anthracene	CT,NC,ME,NH-P
Benzo(a)anthracene	CT,NC,ME,NH-P
Benzo(a)pyrene	CT,NC,ME,NH-P
Benzo(b)fluoranthene	CT,NC,ME,NH-P
Benzo(g,h,i)perylene	CT,NC,ME,NH-P
Benzo(k)fluoranthene	CT,NC,ME,NH-P
Chrysene	CT,NC,ME,NH-P
Dibenz(a,h)anthracene	CT,NC,ME,NH-P
Fluoranthene	CT,NC,ME,NH-P
Fluorene	CT,NC,ME
Indeno(1,2,3-cd)pyrene	CT,NC,ME,NH-P
2-Methylnaphthalene	CT,NC
Naphthalene	CT,NC,ME,NH-P
Phenanthrene	CT,NC,ME,NH-P
Pyrene	CT,NC,ME,NH-P
MADEP EPH rev 2.1 in Water	
C9-C18 Aliphatics	CT,NC,ME,NH-P
C19-C36 Aliphatics	CT,NC,ME,NH-P
Unadjusted C11-C22 Aromatics	CT,NC,ME,NH-P
C11-C22 Aromatics	CT,NC,ME,NH-P
Acenaphthene	CT,NC,ME,NH-P
Acenaphthylene	CT,NC,ME,NH-P
Anthracene	CT,NC,ME,NH-P
Benzo(a)anthracene	CT,NC,ME,NH-P
Benzo(a)pyrene	CT,NC,ME,NH-P
Benzo(b)fluoranthene	CT,NC,ME,NH-P
Benzo(g,h,i)perylene	CT,NC,ME,NH-P
Benzo(k)fluoranthene	CT,NC,ME,NH-P
Chrysene	CT,NC,ME,NH-P
Dibenz(a,h)anthracene	CT,NC,ME,NH-P
Fluoranthene	CT,NC,ME,NH-P
Fluorene	CT,NC,ME
Indeno(1,2,3-cd)pyrene	CT,NC,ME,NH-P
2-Methylnaphthalene	CT,NC
Naphthalene	CT,NC,ME,NH-P
Phenanthrene	CT,NC,ME,NH-P
Pyrene	CT,NC,ME,NH-P
MADEP-VPH-Feb 2018 Rev 2.1 in Soil	
Unadjusted C5-C8 Aliphatics	CT,NC,ME,NH-P
C5-C8 Aliphatics	CT,NC,ME,NH-P

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

CERTIFICATIONS

Certified Analyses included in this Report

Analyte	Certifications
MADEP-VPH-Feb 2018 Rev 2.1 in Soil	
Unadjusted C9-C12 Aliphatics	CT,NC,ME,NH-P
C9-C12 Aliphatics	CT,NC,ME,NH-P
C9-C10 Aromatics	CT,NC,ME,NH-P
Benzene	CT,NC,ME,NH-P
Ethylbenzene	CT,NC,ME,NH-P
Methyl tert-Butyl Ether (MTBE)	CT,NC,ME,NH-P
Naphthalene	CT,NC,ME,NH-P
Toluene	CT,NC,ME,NH-P
m+p Xylene	CT,NC,ME,NH-P
o-Xylene	CT,NC,ME,NH-P
SW-846 6010D in Soil	
Lead	CT,NH,NY,AIHA,ME,VA,NC
SW-846 6010D in Water	
Lead	CT,NH,NY,ME,VA,NC

Con-Test, a Pace Environmental Laboratory, operates under the following certifications and accreditations:

Code	Description	Number	Expires
AIHA	AIHA-LAP, LLC - ISO 17025:2017	100033	03/1/2024
CT	Connecticut Department of Public Health	PH-0821	12/31/2024
NY	New York State Department of Health	10899 NELAP	04/1/2024
NH	New Hampshire Environmental Lab	2516 NELAP	02/5/2024
NC	North Carolina Div. of Water Quality	652	12/31/2023
ME	State of Maine	MA00100	06/9/2023
VA	Commonwealth of Virginia	460217	12/14/2023
NH-P	New Hampshire Environmental Lab	2557 NELAP	09/6/2023

23E2444

http://www.pacelabs.com

Doc # 381 Rev 5_07/13/2021

Pace Analytical®

Phone: 413-525-2332
Fax: 413-525-6405
Access COC's and Support Requests

CHAIN OF CUSTODY RECORD

39 Spruce Street
East Longmeadow, MA 01028

Page 1 of 1

Company Name: Weston + Sampson
Address: 55 Walkers Brook Dr #100 Reading, MA
Phone: 1-800-SAMPSON
Project Name: ES Pinevale
Project Location: Springfield, MA
Project Number: ENG-23-0351
Project Manager: Joe Spencer
Pace Quote Name/Number:
Invoice Recipient: invoices@wseinc.com
Sampled By: ACE, EL

Requested Turnaround Time
7-Day ☒ 10-Day ☐
PFAS 10-Day (std) ☐ Due Date:

Rush-Approval Required
1-Day ☐ 3-Day ☐
2-Day ☐ 4-Day ☐

Data Delivery
Format: PDF ☒ EXCEL ☒
Other: enviroData edd
CLP Like Data Pkg Required: ☐
Email To: SPENCERJ@WSEINC.com
~~Fax To #:~~ ECKER.ALISON@WSEINC.com, LI.ESTHER@WSEINC.com

Dissolved Metals Samples
○ Field Filtered
○ Lab to Filter

Orthophosphate Samples
○ Field Filtered
○ Lab to Filter

PCB ONLY
SOXHLET ☐
NON SOXHLET ☐

ANALYSIS REQUESTED

Pace Work Order#	Client Sample ID / Description	Beginning Date/Time	Ending Date/Time	COMP/GRAB	[1]Matrix Code	Conc Code	VIALS	GLASS	PLASTIC	BACTERIA	ENCORE	EPH	VPH	Lead (6010) Total								[2] Preservation Code
1	CM-38 SW (4.5-7.5)	5/16/23	1330	C/G	S	U	1	1				X	X	X								
2	CM-38 NW (4.5-7.5)	5/16/23	1405	C/G	↓	↓	1	1				X	X	X								
3	CM-38N (3.5-6.5)	5/16/23	1510	C/G			1	1				X	X	X								
4	CM-38E (4.5-7.5)	5/17/23	0905	C/G			1	1				X	X	X								
	MS/MSD-2	↓	—	C				2						X								
5	DUP-1		—	C/G			1	1				X	X	X								

Courier Use Only
Total Number Of:
VIALS
GLASS
PLASTIC
BACTERIA
ENCORE

Glassware in the fridge? Y / N
Glassware in freezer? Y / N
Prepackaged Cooler? Y / N
*Pace Analytical is not responsible for missing samples from prepacked coolers

[1] **Matrix Codes:**
GW = Ground Water
WW = Waste Water
DW = Drinking Water
A = Air
S = Soil
SL = Sludge
SOL = Solid
O = Other (please define)

[2] **Preservation Codes:**
I = Iced
H = HCL
M = Methanol
N = Nitric Acid
S = Sulfuric Acid
B = Sodium Bisulfate
X = Sodium Hydroxide
T = Sodium Thiosulfate
O = Other (please define)

Relinquished by: (signature)	Date/Time:
[signature]	5/17/23 1225
Received by: (signature)	Date/Time:
[signature] 12:25	5-17-23
Relinquished by: (signature)	Date/Time:
[signature] 12:50	5-17-23
Received by: (signature)	Date/Time:
[signature]	5/17/23 1250
Relinquished by: (signature)	Date/Time:
Received by: (signature)	Date/Time:
Relinquished by: (signature)	Date/Time:
Received by: (signature)	Date/Time:

Client Comments:

Detection Limit Requirements
MA 5-1/Gw-2
5-1/Gw-3
CT

Special Requirements
☒ MA MCP Required
MCP Certification Form Required
☐ CT RCP Required
RCP Certification Form Required
☐ MA State DW Required
PWSID #

Please use the following codes to indicate possible sample concentration within the Conc Code column above:
H - High; M - Medium; L - Low; C - Clean; U - Unknown

NELAC and AIHA-LAP, LLC Accredited

Project Entity
Government ☐ Municipality ☒ MWRA ☐ WRTA ☐
Federal ☐ 21 J ☐ School ☐
City ☐ Brownfield ☐ MBTA ☐

Other
☐ Chromatogram
☐ AIHA-LAP,LLC

Comments:

Disclaimer: Pace Analytical is not responsible for any omitted information on the Chain of Custody. The Chain of Custody is a legal document that must be complete and accurate and is used to determine what analyses the laboratory will perform. Any missing information is not the laboratory's responsibility. Pace Analytical values your partnership on each project and will try to assist with missing information, but will not be held accountable.

RF

Table of Contents

39 Spruce St.
East Longmeadow, MA. 01028
P: 413-525-2332
F:413-525-6405
www.pacelabs.com

ENV-FRM-ELON-0001 V05__Sample Receiving Checklist

Log In Back-Sheet

Login Sample Receipt Checklist – (Rejection Criteria Listing – Using Acceptance Policy) Any False statement will be brought to the attention of the Client – True or False

Pace
PEOPLE ADVANCING SCIENCE

Client W+S
Project ES Pinevale
MCP/RCP Required MCP
Deliverable Package Requirement S-1/GW-2,3
Location Springfield, MA
PWSID# (When Applicable) N/A
Arrival Method:

Courier ☒ Fed Ex ☐ Walk In ☐ Other ☐

Received By / Date / Time LA 5/17/23 1250
Back-Sheet By / Date / Time DMW 5/17/23 1625
Temperature Method GUN # 5
Temp ☒ < 6° C Actual Temperature 2.3
Rush Samples: Yes / (No) Notify
Short Hold: Yes / (No) Notify

	True	False
Received on Ice	☒	☐
Received in Cooler	☒	☐
Custody Seal: DATE TIME	☐	☒
COC Relinquished	☒	☐
COC/Samples Labels Agree	☒	☐
All Samples in Good Condition	☒	☐
Samples Received within Holding Time	☒	☐
Is there enough Volume	☒	☐
Proper Media/Container Used	☒	☐
Splitting Samples Required	☐	☒
MS/MSD	☒	☐
Trip Blanks	☐	☒
Lab to Filters	☐	☒
COC Legible	☒	☐

COC Included: (Check all included)

Client	☒	Analysis	☒	Sampler Name	☒
Project	☒	IDs	☒	Collection Date/Time	☒

All Samples Proper pH: (N/A) ☐ ☐

Notes regarding Samples/COC outside of SOP:

Additional Container Notes

Sample	Soils Jars (Circle Amb/Clear)				Ambers							Plastics										VOA Vials					Other / Fill in					
					1 Liter			250mL			100mL	1 Liter		500mL		250mL																
	16oz Amb/Clear	8oz Amb/Clear	4oz Amb/Clear	2oz Amb/Clear	Unpreserved	HCL	Sulfuric	Sulfuric	Phosphoric	HCl	Unpreserved	Unpreserved	Sulfuric	Unpreserved	Sulfuric	Unpreserved	Trizma	Sulfuric	Nitric	NaOH	NaOH/Zinc	Unpreserved	HCl	MeOH	D.I. Water	BiSulfate	Col/Bact					
1		1																						1								
2		1																						1								
3		1																						1								
4		1																						1								
5		2																														
6		1																						1								
7																																
8																																
9																																
10																																
11																																
12																																
13																																
14																																
15																																
16																																
17																																
18																																
19																																
20																																

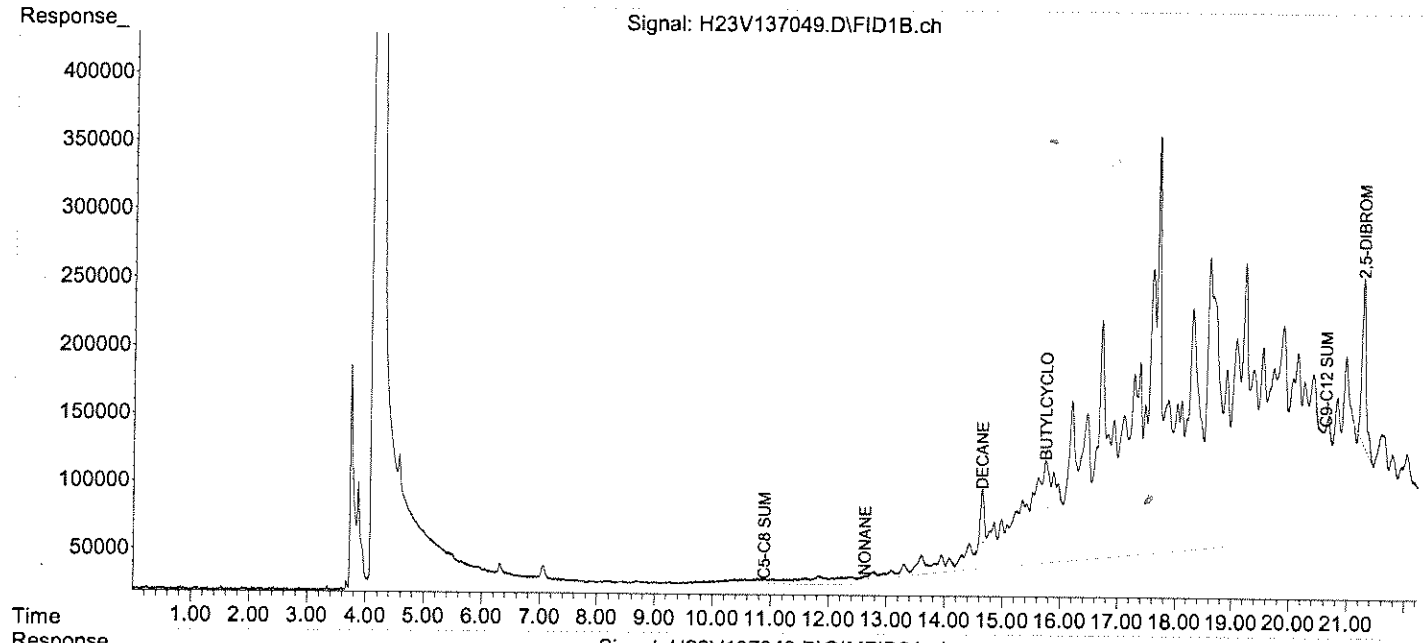
Table of Contents

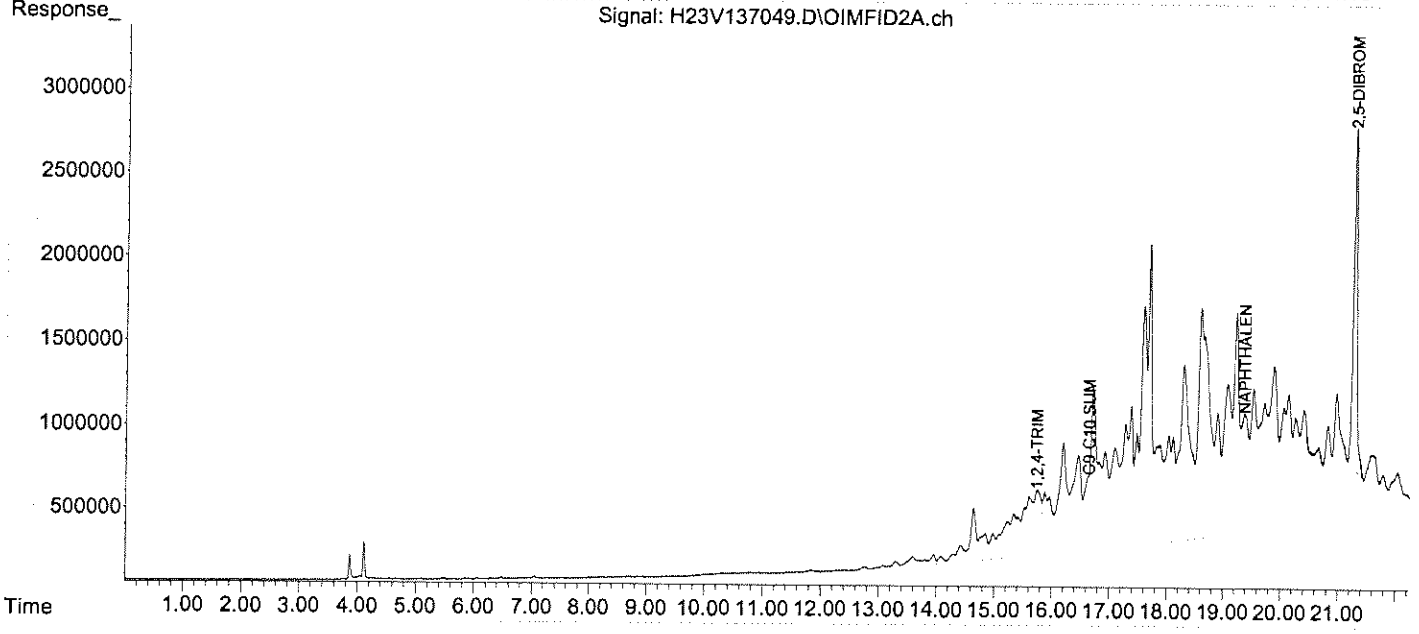
Quantitation Report (QT Reviewed)

Data Path : C:\msdchem\1\data\051723\
Data File : H23V137049.D
Signal(s) : Signal #1: FID1B.ch Signal #2: OIMFID2A.ch
Acq On : 18 May 2023 04:19 pm
Operator :
Sample : 23E2444-03 @ 500X MEOH Inst : VPHGC3
Misc :
ALS Vial : 49 Sample Multiplier: 1

Integration File signal 1: events.e
Integration File signal 2: events2.e
Quant Time: May 19 05:12:44 2023
Quant Method : C:\msdchem\1\methods\VJ011823.M
Quant Title : VPHNEW
QLast Update : Tue May 16 05:36:28 2023
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal #1 Phase : Signal #2 Phase:
Signal #1 Info : Signal #2 Info :





MADEP MCP Analytical Method Report Certification Form

Laboratory Name: Pace New England	Project #: 23E2444
Project Location: Springfield, MA	RTN:

This Form provides certifications for the following data set: [list Laboratory Sample ID Number(s)]

23E2444-01 thru 23E2444-05

Matrices: Soil

CAM Protocol (check all that below)

8260 VOC CAM II A ( )	7470/7471 Hg CAM IIIB ( )	MassDEP VPH (GC/PID/FID) CAM IV A (X)	8082 PCB CAM V A ( )	9014 Total Cyanide/PAC CAM VI A ( )	6860 Perchlorate CAM VIII B ( )
8270 SVOC CAM II B ( )	7010 Metals CAM III C ( )	MassDEP VPH (GC/MS) CAM IV C ( )	8081 Pesticides CAM V B ( )	7196 Hex Cr CAM VI B ( )	MassDEP APH CAM IX A ( )
6010 Metals CAM III A (X)	6020 Metals CAM III D ( )	MassDEP EPH CAM IV B (X)	8151 Herbicides CAM V C ( )	8330 Explosives CAM VIII A ( )	TO-15 VOC CAM IX B ( )

Affirmative response to Questions A throughF is required for "Presumptive Certainty" status

A	Were all samples received in a condition consistent with those described on the Chain-of-Custody, properly preserved (including temperature) in the field or laboratory, and prepared/analyzed within method holding times?	☑ Yes	☐ No[1]
B	Were the analytical method(s) and all associated QC requirements specificed in the selected CAM protocol(s) followed?	☑ Yes	☐ No[1]
C	Were all required corrective actions and analytical response actions specified in the selected CAM protocol(s) implemented for all identified performance standard non-conformances?	☑ Yes	☐ No[1]
D	Does the laboratory report comply with all the reporting requirements specified in CAM VII A, Quality Assurance and Quality Control Guidlines for the Acquisition and Reporting of Analytical Data?	☑ Yes	☐ No[1]
E a	VPH, EPH, and APH Methods only: Was each method conducted without significant modification(s)? (Refer to the individual method(s) for a list of significant modifications).	☑ Yes	☐ No[1]
E b	APH and TO-15 Methods only: Was the complete analyte list reported for each method?	☐ Yes	☐ No[1]
F	Were all applicable CAM protocol QC and performance standard non-conformances identified and evaluated in a laboratory narrative (including all No responses to Qestions A through E)?	☑ Yes	☐ No[1]

A response to questions G, H and I below is required for "Presumptive Certainty" status

G	Were the reporting limits at or below all CAM reporting limits specified in the selected CAM protocol(s)?	☐ Yes	☑ No[1]

***Data User Note:* Data that achieve "Presumptive Certainty" status may not necessarily meet the data usability and representativeness requirements described in 310 CMR 40. 1056 (2)(k) and WSC-07-350.**

H	Were all QC perfomance standards specified in the CAM protocol(s) achieved?	☐ Yes	☑ No[1]
I	Were results reported for the complete analyte list specified in the selected CAM protocol(s)?	☐ Yes	☑ No[1]

[1] *All Negative responses must be addressed in an attached Environmental Laboratory case narrative.*

I, the undersigned, attest under the pains and penalties of perjury that, based upon my personal inquiry of those responsible for obtaining the information, the material contained in this analytical report is, to the best of my knowledge and belief, accurate and complete.

Signature: Meghan E. Kelley Position: Reporting Specialist

Printed Name: Meghan E. Kelley Date: 06/06/23

con-test®
A Pace Analytical® Laboratory

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

June 6, 2023

Joe Spencer
Weston & Sampson Engineers MA
55 Walkers Brook Drive
Reading, MA 01867

Project Location: Springfield, MA
Client Job Number:
Project Number: ENG23-0351
Laboratory Work Order Number: 23E2609

Enclosed are results of analyses for samples as received by the laboratory on May 18, 2023. If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Rebecca Faust
Project Manager

Table of Contents

Sample Summary 4

Case Narrative 5

Sample Results 8

23E2609-01 8

23E2609-02 12

23E2609-03 14

23E2609-04 16

23E2609-05 18

23E2609-06 20

23E2609-07 24

23E2609-08 27

Sample Preparation Information 30

QC Data 31

Semivolatile Organic Compounds by GC/MS 31

B341300 31

Petroleum Hydrocarbons Analyses - EPH 33

B341174 33

Petroleum Hydrocarbons Analyses - VPH 35

B340779 35

Metals Analyses (Total) 37

B340929 37

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total) 38

B341391 38

Flag/Qualifier Summary 39

Certifications 40

Table of Contents (continued)

Chain of Custody/Sample Receipt 43

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Weston & Sampson Engineers MA
55 Walkers Brook Drive
Reading, MA 01867
ATTN: Joe Spencer

REPORT DATE: 6/6/2023

PURCHASE ORDER NUMBER:

PROJECT NUMBER: ENG23-0351

ANALYTICAL SUMMARY

WORK ORDER NUMBER: 23E2609

The results of analyses performed on the following samples submitted to CON-TEST, a Pace Analytical Laboratory, are found in this report.

PROJECT LOCATION: Springfield, MA

FIELD SAMPLE #	LAB ID:	MATRIX	SAMPLE DESCRIPTION	TEST	SUB LAB
CM-38SE (4-7)	23E2609-01	Soil		MADEP EPH rev 2.1	
				MADEP-VPH-Feb 2018 Rev 2.1	
				SM 2540G	
				SW-846 6010D	
CM-39N (0-2)	23E2609-02	Soil		SM 2540G	
				SW-846 6010D	
CM-39S (0-2)	23E2609-03	Soil		SM 2540G	
				SW-846 6010D	
CM-39E (0-2)	23E2609-04	Soil		SM 2540G	
				SW-846 6010D	
CM-39W (0-2)	23E2609-05	Soil		SM 2540G	
				SW-846 6010D	
OTP-4A (0-2)	23E2609-06	Soil		PLM/SEM	N/A cert.
				SM 2540G	
				SW-846 6010D	
				SW-846 8270E	
BT-EN (3-6)	23E2609-07	Soil		MADEP EPH rev 2.1	
				MADEP-VPH-Feb 2018 Rev 2.1	
				SM 2540G	
BTE-E (3.5-6.5)	23E2609-08	Soil		MADEP EPH rev 2.1	
				MADEP-VPH-Feb 2018 Rev 2.1	
				SM 2540G	

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

CASE NARRATIVE SUMMARY

All reported results are within defined laboratory quality control objectives unless listed below or otherwise qualified in this report.

For method 8270E, only PAHs were requested and reported.

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

MADEP EPH rev 2.1

Qualifications:

S-15

Surrogate recovery outside of control limits due to suspected sample matrix interference. Chromatogram(s) is attached.

Analyte & Samples(s) Qualified:

o-Terphenyl (OTP)
23E2609-01[CM-38SE (4-7)], 23E2609-01RE1[CM-38SE (4-7)]

MADEP-VPH-Feb 2018 Rev 2.1

Qualifications:

RL-05

Elevated reporting limit due to high concentration of target compounds. MA CAM reporting limit not met.

Analyte & Samples(s) Qualified:

Benzene
23E2609-01[CM-38SE (4-7)]

C5-C8 Aliphatics
23E2609-01[CM-38SE (4-7)]

Ethylbenzene
23E2609-01[CM-38SE (4-7)]

m+p Xylene
23E2609-01[CM-38SE (4-7)]

Methyl tert-Butyl Ether (MTBE)
23E2609-01[CM-38SE (4-7)]

Naphthalene
23E2609-01[CM-38SE (4-7)]

o-Xylene
23E2609-01[CM-38SE (4-7)]

Toluene
23E2609-01[CM-38SE (4-7)]

Unadjusted C5-C8 Aliphatics
23E2609-01[CM-38SE (4-7)]

S-15

Surrogate recovery outside of control limits due to suspected sample matrix interference. Chromatogram(s) is attached.

Analyte & Samples(s) Qualified:

2,5-Dibromotoluene (FID)
23E2609-01[CM-38SE (4-7)]

2,5-Dibromotoluene (PID)
23E2609-01[CM-38SE (4-7)]

V-37

For VPH analysis, the average of the three marker compounds passes criteria.

Analyte & Samples(s) Qualified:

Pentane
S088000-CCV2

SW-846 6010D

Qualifications:

MS-19

Sample to spike ratio is greater than or equal to 4:1. Spiked amount is not representative of the native amount in the sample. Appropriate or meaningful recoveries cannot be calculated.

Analyte & Samples(s) Qualified:

Lead
23E2609-01[CM-38SE (4-7)], B340929-MS2

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

R-02

Duplicate RPD is outside of control limits. Outlier can be attributed to sample non-homogeneity encountered during sample prep.

Analyte & Samples(s) Qualified:

Lead

23E2609-01[CM-38SE (4-7)], B340929-DUP2

SW-846 8270E

Qualifications:

RL-08

Elevated reporting limit due to sample matrix interference. MA CAM reporting limit not met.

Analyte & Samples(s) Qualified:

23E2609-06[OTP-4A (0-2)]

MADEP-VPH-Feb 2018 Rev 2.1

No significant modifications were made to the method. All VPH samples were received preserved properly in methanol with a soil/methanol ratio of 1:1 +/- 25% completely covered by methanol in the proper containers specified on the chain-of-custody form unless specified in this narrative.

Analytical column used for VPH analysis is Restek, Rtx-502.2, 105meter, 0.53mmID, 3um df. Trap used for VPH analysis is Carbopack B/CarboSieveS-III.

The results of analyses reported only relate to samples submitted to Con-Test, a Pace Analytical Laboratory, for testing.
I certify that the analyses listed above, unless specifically listed as subcontracted, if any, were performed under my direction according to the approved methodologies listed in this document, and that based upon my inquiry of those individuals immediately responsible for obtaining the information, the material contained in this report is, to the best of my knowledge and belief, accurate and complete.

Lisa A. Worthington
Technical Representative

con-test® A Pace Analytical® Laboratory

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Springfield, MA
Sample Description:
Work Order: 23E2609

Date Received: 5/18/2023

Field Sample #: CM-38SE (4-7)
Sampled: 5/17/2023 13:00

Sample ID: 23E2609-01

Sample Matrix: Soil

Petroleum Hydrocarbons Analyses - EPH

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
C9-C18 Aliphatics	12	11	mg/Kg dry	1		MADEP EPH rev 2.1	5/23/23	5/27/23 17:22	GJB
C19-C36 Aliphatics	24	11	mg/Kg dry	1		MADEP EPH rev 2.1	5/23/23	5/27/23 17:22	GJB
Unadjusted C11-C22 Aromatics	360	11	mg/Kg dry	1		MADEP EPH rev 2.1	5/23/23	5/27/23 17:22	GJB
C11-C22 Aromatics	180	11	mg/Kg dry	1		MADEP EPH rev 2.1	5/23/23	5/27/23 17:22	GJB
Acenaphthene	2.8	0.11	mg/Kg dry	1		MADEP EPH rev 2.1	5/23/23	5/27/23 17:22	GJB
Acenaphthylene	2.1	0.11	mg/Kg dry	1		MADEP EPH rev 2.1	5/23/23	5/27/23 17:22	GJB
Anthracene	7.3	0.11	mg/Kg dry	1		MADEP EPH rev 2.1	5/23/23	5/27/23 17:22	GJB
Benzo(a)anthracene	9.5	0.11	mg/Kg dry	1		MADEP EPH rev 2.1	5/23/23	5/27/23 17:22	GJB
Benzo(a)pyrene	8.1	0.11	mg/Kg dry	1		MADEP EPH rev 2.1	5/23/23	5/27/23 17:22	GJB
Benzo(b)fluoranthene	9.5	0.11	mg/Kg dry	1		MADEP EPH rev 2.1	5/23/23	5/27/23 17:22	GJB
Benzo(g,h,i)perylene	4.3	0.11	mg/Kg dry	1		MADEP EPH rev 2.1	5/23/23	5/27/23 17:22	GJB
Benzo(k)fluoranthene	3.6	0.11	mg/Kg dry	1		MADEP EPH rev 2.1	5/23/23	5/27/23 17:22	GJB
Chrysene	10	0.11	mg/Kg dry	1		MADEP EPH rev 2.1	5/23/23	5/27/23 17:22	GJB
Dibenz(a,h)anthracene	1.1	0.11	mg/Kg dry	1		MADEP EPH rev 2.1	5/23/23	5/27/23 17:22	GJB
Fluoranthene	31	0.22	mg/Kg dry	2		MADEP EPH rev 2.1	5/23/23	5/28/23 8:27	GJB
Fluorene	4.6	0.11	mg/Kg dry	1		MADEP EPH rev 2.1	5/23/23	5/27/23 17:22	GJB
Indeno(1,2,3-cd)pyrene	4.7	0.11	mg/Kg dry	1		MADEP EPH rev 2.1	5/23/23	5/27/23 17:22	GJB
2-Methylnaphthalene	2.4	0.11	mg/Kg dry	1		MADEP EPH rev 2.1	5/23/23	5/27/23 17:22	GJB
Naphthalene	9.1	0.11	mg/Kg dry	1		MADEP EPH rev 2.1	5/23/23	5/27/23 17:22	GJB
Phenanthrene	36	0.22	mg/Kg dry	2		MADEP EPH rev 2.1	5/23/23	5/28/23 8:27	GJB
Pyrene	30	0.22	mg/Kg dry	2		MADEP EPH rev 2.1	5/23/23	5/28/23 8:27	GJB

Surrogates	% Recovery		Recovery Limits	Flag/Qual	
Chlorooctadecane (COD)	40.0		40-140		5/27/23 17:22
o-Terphenyl (OTP)	**37.0**	*	40-140	S-15	5/27/23 17:22
o-Terphenyl (OTP)	**37.7**	*	40-140	S-15	5/28/23 8:27
2-Bromonaphthalene	99.2		40-140		5/27/23 17:22
2-Fluorobiphenyl	96.7		40-140		5/27/23 17:22

con-test® A Pace Analytical® Laboratory

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Springfield, MA
Sample Description:
Work Order: 23E2609

Date Received: 5/18/2023

Field Sample #: CM-38SE (4-7)
Sampled: 5/17/2023 13:00

Sample ID: 23E2609-01

Sample Matrix: Soil

Petroleum Hydrocarbons Analyses - VPH

Soil/Methanol Preservation Ratio: 1.12

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Unadjusted C5-C8 Aliphatics	ND	110	mg/Kg dry	10	RL-05	MADEP-VPH-Feb 2018 Rev 2.1	5/19/23	5/19/23 17:49	EEH
C5-C8 Aliphatics	ND	110	mg/Kg dry	10	RL-05	MADEP-VPH-Feb 2018 Rev 2.1	5/19/23	5/19/23 17:49	EEH
Unadjusted C9-C12 Aliphatics	530	110	mg/Kg dry	10		MADEP-VPH-Feb 2018 Rev 2.1	5/19/23	5/19/23 17:49	EEH
C9-C12 Aliphatics	190	110	mg/Kg dry	10		MADEP-VPH-Feb 2018 Rev 2.1	5/19/23	5/19/23 17:49	EEH
C9-C10 Aromatics	340	110	mg/Kg dry	10		MADEP-VPH-Feb 2018 Rev 2.1	5/19/23	5/19/23 17:49	EEH
Benzene	ND	0.53	mg/Kg dry	10	RL-05	MADEP-VPH-Feb 2018 Rev 2.1	5/19/23	5/19/23 17:49	EEH
Ethylbenzene	ND	0.53	mg/Kg dry	10	RL-05	MADEP-VPH-Feb 2018 Rev 2.1	5/19/23	5/19/23 17:49	EEH
Methyl tert-Butyl Ether (MTBE)	ND	0.53	mg/Kg dry	10	RL-05	MADEP-VPH-Feb 2018 Rev 2.1	5/19/23	5/19/23 17:49	EEH
Naphthalene	ND	2.7	mg/Kg dry	10	RL-05	MADEP-VPH-Feb 2018 Rev 2.1	5/19/23	5/19/23 17:49	EEH
Toluene	ND	0.53	mg/Kg dry	10	RL-05	MADEP-VPH-Feb 2018 Rev 2.1	5/19/23	5/19/23 17:49	EEH
m+p Xylene	ND	1.1	mg/Kg dry	10	RL-05	MADEP-VPH-Feb 2018 Rev 2.1	5/19/23	5/19/23 17:49	EEH
o-Xylene	ND	0.53	mg/Kg dry	10	RL-05	MADEP-VPH-Feb 2018 Rev 2.1	5/19/23	5/19/23 17:49	EEH

Surrogates	% Recovery		Recovery Limits	Flag/Qual	
2,5-Dibromotoluene (FID)	**227**	*	70-130	S-15	5/19/23 17:49
2,5-Dibromotoluene (PID)	**209**	*	70-130	S-15	5/19/23 17:49

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Springfield, MA
Sample Description:
Work Order: 23E2609

Date Received: 5/18/2023

Field Sample #: CM-38SE (4-7)
Sampled: 5/17/2023 13:00

Sample ID: 23E2609-01

Sample Matrix: Soil

Metals Analyses (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Lead	150	0.54	mg/Kg dry	1	MS-19, R-02	SW-846 6010D	5/22/23	5/24/23 20:07	MJH

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Springfield, MA
Sample Description:
Work Order: 23E2609

Date Received: 5/18/2023

Field Sample #: CM-38SE (4-7)
Sampled: 5/17/2023 13:00

Sample ID: 23E2609-01

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	91.8		% Wt	1		SM 2540G	5/24/23	5/24/23 8:27	ATP

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Springfield, MA
Sample Description:
Work Order: 23E2609

Date Received: 5/18/2023

Field Sample #: CM-39N (0-2)
Sampled: 5/17/2023 15:55

Sample ID: 23E2609-02

Sample Matrix: Soil

Metals Analyses (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Lead	26	0.53	mg/Kg dry	1		SW-846 6010D	5/22/23	5/23/23 14:21	MJH

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Springfield, MA
Sample Description:
Work Order: 23E2609

Date Received: 5/18/2023

Field Sample #: CM-39N (0-2)
Sampled: 5/17/2023 15:55

Sample ID: 23E2609-02

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	91.4		% Wt	1		SM 2540G	5/24/23	5/24/23 8:27	ATP

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Springfield, MA
Sample Description:
Work Order: 23E2609

Date Received: 5/18/2023

Field Sample #: CM-39S (0-2)
Sampled: 5/17/2023 15:10

Sample ID: 23E2609-03

Sample Matrix: Soil

Metals Analyses (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Lead	150	0.53	mg/Kg dry	1		SW-846 6010D	5/22/23	5/23/23 14:45	MJH

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Springfield, MA
Sample Description:
Work Order: 23E2609

Date Received: 5/18/2023

Field Sample #: CM-39S (0-2)
Sampled: 5/17/2023 15:10

Sample ID: 23E2609-03

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	92.8		% Wt	1		SM 2540G	5/24/23	5/24/23 8:27	ATP

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Springfield, MA
Sample Description:
Work Order: 23E2609

Date Received: 5/18/2023

Field Sample #: CM-39E (0-2)
Sampled: 5/17/2023 15:35

Sample ID: 23E2609-04

Sample Matrix: Soil

Metals Analyses (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Lead	120	0.52	mg/Kg dry	1		SW-846 6010D	5/22/23	5/23/23 14:52	MJH

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Springfield, MA
Sample Description:
Work Order: 23E2609

Date Received: 5/18/2023

Field Sample #: CM-39E (0-2)
Sampled: 5/17/2023 15:35

Sample ID: 23E2609-04

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	91.4		% Wt	1		SM 2540G	5/24/23	5/24/23 8:27	ATP

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Springfield, MA
Sample Description:
Work Order: 23E2609

Date Received: 5/18/2023

Field Sample #: CM-39W (0-2)
Sampled: 5/17/2023 15:00

Sample ID: 23E2609-05

Sample Matrix: Soil

Metals Analyses (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Lead	47	0.54	mg/Kg dry	1		SW-846 6010D	5/22/23	5/23/23 14:59	MJH

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Springfield, MA
Sample Description:
Work Order: 23E2609

Date Received: 5/18/2023

Field Sample #: CM-39W (0-2)
Sampled: 5/17/2023 15:00

Sample ID: 23E2609-05

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	91.3		% Wt	1		SM 2540G	5/24/23	5/24/23 8:27	ATP

con-test® A Pace Analytical® Laboratory

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Springfield, MA | Sample Description: | Work Order: 23E2609

Date Received: 5/18/2023

Field Sample #: OTP-4A (0-2) | Sampled: 5/18/2023 09:15

Sample ID: 23E2609-06

Sample Matrix: Soil

Sample Flags: RL-08

Semivolatile Organic Compounds by GC/MS

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Acenaphthene	ND	0.79	mg/Kg dry	2		SW-846 8270E	5/24/23	5/26/23 13:59	BGL
Acenaphthylene	ND	0.79	mg/Kg dry	2		SW-846 8270E	5/24/23	5/26/23 13:59	BGL
Anthracene	2.1	0.79	mg/Kg dry	2		SW-846 8270E	5/24/23	5/26/23 13:59	BGL
Benzo(a)anthracene	23	7.9	mg/Kg dry	20		SW-846 8270E	5/24/23	5/26/23 14:22	BGL
Benzo(a)pyrene	32	7.9	mg/Kg dry	20		SW-846 8270E	5/24/23	5/26/23 14:22	BGL
Benzo(b)fluoranthene	41	7.9	mg/Kg dry	20		SW-846 8270E	5/24/23	5/26/23 14:22	BGL
Benzo(g,h,i)perylene	31	7.9	mg/Kg dry	20		SW-846 8270E	5/24/23	5/26/23 14:22	BGL
Benzo(k)fluoranthene	16	7.9	mg/Kg dry	20		SW-846 8270E	5/24/23	5/26/23 14:22	BGL
Chrysene	26	7.9	mg/Kg dry	20		SW-846 8270E	5/24/23	5/26/23 14:22	BGL
Dibenz(a,h)anthracene	6.5	0.79	mg/Kg dry	2		SW-846 8270E	5/24/23	5/26/23 13:59	BGL
Fluoranthene	47	7.9	mg/Kg dry	20		SW-846 8270E	5/24/23	5/26/23 14:22	BGL
Fluorene	ND	0.79	mg/Kg dry	2		SW-846 8270E	5/24/23	5/26/23 13:59	BGL
Indeno(1,2,3-cd)pyrene	28	7.9	mg/Kg dry	20		SW-846 8270E	5/24/23	5/26/23 14:22	BGL
2-Methylnaphthalene	ND	0.79	mg/Kg dry	2		SW-846 8270E	5/24/23	5/26/23 13:59	BGL
Naphthalene	ND	0.79	mg/Kg dry	2		SW-846 8270E	5/24/23	5/26/23 13:59	BGL
Phenanthrene	4.7	0.79	mg/Kg dry	2		SW-846 8270E	5/24/23	5/26/23 13:59	BGL
Pyrene	60	7.9	mg/Kg dry	20		SW-846 8270E	5/24/23	5/26/23 14:22	BGL

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Nitrobenzene-d5	78.9	30-130		5/26/23 13:59
Nitrobenzene-d5	70.4	30-130		5/26/23 14:22
2-Fluorobiphenyl	81.4	30-130		5/26/23 13:59
2-Fluorobiphenyl	74.8	30-130		5/26/23 14:22
p-Terphenyl-d14	87.7	30-130		5/26/23 13:59
p-Terphenyl-d14	88.8	30-130		5/26/23 14:22

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Springfield, MA
Sample Description:
Work Order: 23E2609

Date Received: 5/18/2023

Field Sample #: OTP-4A (0-2)
Sampled: 5/18/2023 09:15

Sample ID: 23E2609-06

Sample Matrix: Soil

Metals Analyses (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Lead	26	0.58	mg/Kg dry	1		SW-846 6010D	5/22/23	5/23/23 15:05	MJH

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Springfield, MA
Sample Description:
Work Order: 23E2609

Date Received: 5/18/2023

Field Sample #: OTP-4A (0-2)
Sampled: 5/18/2023 09:15

Sample ID: 23E2609-06

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	86.5		% Wt	1		SM 2540G	5/25/23	5/25/23 11:30	JLC

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Springfield, MA
Sample Description:
Work Order: 23E2609

Date Received: 5/18/2023

Field Sample #: OTP-4A (0-2)
Sampled: 5/18/2023 09:15

Sample ID: 23E2609-06

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
See Attached Subcontracted Report	-		N/A	1		PLM/SEM			MVL

con-test® A Pace Analytical® Laboratory

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Springfield, MA
Sample Description:
Work Order: 23E2609

Date Received: 5/18/2023

Field Sample #: BT-EN (3-6)
Sampled: 5/18/2023 09:45

Sample ID: 23E2609-07

Sample Matrix: Soil

Petroleum Hydrocarbons Analyses - EPH

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
C9-C18 Aliphatics	ND	11	mg/Kg dry	1		MADEP EPH rev 2.1	5/23/23	5/27/23 17:03	GJB
C19-C36 Aliphatics	ND	11	mg/Kg dry	1		MADEP EPH rev 2.1	5/23/23	5/27/23 17:03	GJB
Unadjusted C11-C22 Aromatics	12	11	mg/Kg dry	1		MADEP EPH rev 2.1	5/23/23	5/27/23 17:03	GJB
C11-C22 Aromatics	ND	11	mg/Kg dry	1		MADEP EPH rev 2.1	5/23/23	5/27/23 17:03	GJB
Acenaphthene	ND	0.11	mg/Kg dry	1		MADEP EPH rev 2.1	5/23/23	5/27/23 17:03	GJB
Acenaphthylene	ND	0.11	mg/Kg dry	1		MADEP EPH rev 2.1	5/23/23	5/27/23 17:03	GJB
Anthracene	ND	0.11	mg/Kg dry	1		MADEP EPH rev 2.1	5/23/23	5/27/23 17:03	GJB
Benzo(a)anthracene	0.19	0.11	mg/Kg dry	1		MADEP EPH rev 2.1	5/23/23	5/27/23 17:03	GJB
Benzo(a)pyrene	0.21	0.11	mg/Kg dry	1		MADEP EPH rev 2.1	5/23/23	5/27/23 17:03	GJB
Benzo(b)fluoranthene	0.28	0.11	mg/Kg dry	1		MADEP EPH rev 2.1	5/23/23	5/27/23 17:03	GJB
Benzo(g,h,i)perylene	0.23	0.11	mg/Kg dry	1		MADEP EPH rev 2.1	5/23/23	5/27/23 17:03	GJB
Benzo(k)fluoranthene	0.11	0.11	mg/Kg dry	1		MADEP EPH rev 2.1	5/23/23	5/27/23 17:03	GJB
Chrysene	0.26	0.11	mg/Kg dry	1		MADEP EPH rev 2.1	5/23/23	5/27/23 17:03	GJB
Dibenz(a,h)anthracene	ND	0.11	mg/Kg dry	1		MADEP EPH rev 2.1	5/23/23	5/27/23 17:03	GJB
Fluoranthene	0.48	0.11	mg/Kg dry	1		MADEP EPH rev 2.1	5/23/23	5/27/23 17:03	GJB
Fluorene	ND	0.11	mg/Kg dry	1		MADEP EPH rev 2.1	5/23/23	5/27/23 17:03	GJB
Indeno(1,2,3-cd)pyrene	0.16	0.11	mg/Kg dry	1		MADEP EPH rev 2.1	5/23/23	5/27/23 17:03	GJB
2-Methylnaphthalene	ND	0.11	mg/Kg dry	1		MADEP EPH rev 2.1	5/23/23	5/27/23 17:03	GJB
Naphthalene	ND	0.11	mg/Kg dry	1		MADEP EPH rev 2.1	5/23/23	5/27/23 17:03	GJB
Phenanthrene	0.30	0.11	mg/Kg dry	1		MADEP EPH rev 2.1	5/23/23	5/27/23 17:03	GJB
Pyrene	0.47	0.11	mg/Kg dry	1		MADEP EPH rev 2.1	5/23/23	5/27/23 17:03	GJB

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Chlorooctadecane (COD)	64.9	40-140		5/27/23 17:03
o-Terphenyl (OTP)	68.7	40-140		5/27/23 17:03
2-Bromonaphthalene	99.8	40-140		5/27/23 17:03
2-Fluorobiphenyl	98.5	40-140		5/27/23 17:03

con-test® A Pace Analytical® Laboratory

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Springfield, MA
Sample Description:
Work Order: 23E2609

Date Received: 5/18/2023

Field Sample #: BT-EN (3-6)
Sampled: 5/18/2023 09:45

Sample ID: 23E2609-07

Sample Matrix: Soil

Petroleum Hydrocarbons Analyses - VPH

Soil/Methanol Preservation Ratio: 1.04

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Unadjusted C5-C8 Aliphatics	ND	11	mg/Kg dry	1		MADEP-VPH-Feb 2018 Rev 2.1	5/19/23	5/19/23 21:15	EEH
C5-C8 Aliphatics	ND	11	mg/Kg dry	1		MADEP-VPH-Feb 2018 Rev 2.1	5/19/23	5/19/23 21:15	EEH
Unadjusted C9-C12 Aliphatics	ND	11	mg/Kg dry	1		MADEP-VPH-Feb 2018 Rev 2.1	5/19/23	5/19/23 21:15	EEH
C9-C12 Aliphatics	ND	11	mg/Kg dry	1		MADEP-VPH-Feb 2018 Rev 2.1	5/19/23	5/19/23 21:15	EEH
C9-C10 Aromatics	ND	11	mg/Kg dry	1		MADEP-VPH-Feb 2018 Rev 2.1	5/19/23	5/19/23 21:15	EEH
Benzene	ND	0.053	mg/Kg dry	1		MADEP-VPH-Feb 2018 Rev 2.1	5/19/23	5/19/23 21:15	EEH
Ethylbenzene	ND	0.053	mg/Kg dry	1		MADEP-VPH-Feb 2018 Rev 2.1	5/19/23	5/19/23 21:15	EEH
Methyl tert-Butyl Ether (MTBE)	ND	0.053	mg/Kg dry	1		MADEP-VPH-Feb 2018 Rev 2.1	5/19/23	5/19/23 21:15	EEH
Naphthalene	ND	0.26	mg/Kg dry	1		MADEP-VPH-Feb 2018 Rev 2.1	5/19/23	5/19/23 21:15	EEH
Toluene	ND	0.053	mg/Kg dry	1		MADEP-VPH-Feb 2018 Rev 2.1	5/19/23	5/19/23 21:15	EEH
m+p Xylene	ND	0.11	mg/Kg dry	1		MADEP-VPH-Feb 2018 Rev 2.1	5/19/23	5/19/23 21:15	EEH
o-Xylene	ND	0.053	mg/Kg dry	1		MADEP-VPH-Feb 2018 Rev 2.1	5/19/23	5/19/23 21:15	EEH

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
2,5-Dibromotoluene (FID)	96.7	70-130		5/19/23 21:15
2,5-Dibromotoluene (PID)	99.0	70-130		5/19/23 21:15

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Springfield, MA
Sample Description:
Work Order: 23E2609

Date Received: 5/18/2023

Field Sample #: BT-EN (3-6)
Sampled: 5/18/2023 09:45

Sample ID: 23E2609-07

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	95.2		% Wt	1		SM 2540G	5/25/23	5/25/23 11:30	JLC

con-test® A Pace Analytical® Laboratory

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Springfield, MA | Sample Description: | Work Order: 23E2609

Date Received: 5/18/2023

Field Sample #: BTE-E (3.5-6.5) | Sampled: 5/18/2023 10:20

Sample ID: 23E2609-08

Sample Matrix: Soil

Petroleum Hydrocarbons Analyses - EPH

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
C9-C18 Aliphatics	ND	10	mg/Kg dry	1		MADEP EPH rev 2.1	5/23/23	5/27/23 12:15	GJB
C19-C36 Aliphatics	ND	10	mg/Kg dry	1		MADEP EPH rev 2.1	5/23/23	5/27/23 12:15	GJB
Unadjusted C11-C22 Aromatics	ND	10	mg/Kg dry	1		MADEP EPH rev 2.1	5/23/23	5/27/23 12:15	GJB
C11-C22 Aromatics	ND	10	mg/Kg dry	1		MADEP EPH rev 2.1	5/23/23	5/27/23 12:15	GJB
Acenaphthene	ND	0.10	mg/Kg dry	1		MADEP EPH rev 2.1	5/23/23	5/27/23 12:15	GJB
Acenaphthylene	ND	0.10	mg/Kg dry	1		MADEP EPH rev 2.1	5/23/23	5/27/23 12:15	GJB
Anthracene	ND	0.10	mg/Kg dry	1		MADEP EPH rev 2.1	5/23/23	5/27/23 12:15	GJB
Benzo(a)anthracene	ND	0.10	mg/Kg dry	1		MADEP EPH rev 2.1	5/23/23	5/27/23 12:15	GJB
Benzo(a)pyrene	ND	0.10	mg/Kg dry	1		MADEP EPH rev 2.1	5/23/23	5/27/23 12:15	GJB
Benzo(b)fluoranthene	ND	0.10	mg/Kg dry	1		MADEP EPH rev 2.1	5/23/23	5/27/23 12:15	GJB
Benzo(g,h,i)perylene	ND	0.10	mg/Kg dry	1		MADEP EPH rev 2.1	5/23/23	5/27/23 12:15	GJB
Benzo(k)fluoranthene	ND	0.10	mg/Kg dry	1		MADEP EPH rev 2.1	5/23/23	5/27/23 12:15	GJB
Chrysene	ND	0.10	mg/Kg dry	1		MADEP EPH rev 2.1	5/23/23	5/27/23 12:15	GJB
Dibenz(a,h)anthracene	ND	0.10	mg/Kg dry	1		MADEP EPH rev 2.1	5/23/23	5/27/23 12:15	GJB
Fluoranthene	ND	0.10	mg/Kg dry	1		MADEP EPH rev 2.1	5/23/23	5/27/23 12:15	GJB
Fluorene	ND	0.10	mg/Kg dry	1		MADEP EPH rev 2.1	5/23/23	5/27/23 12:15	GJB
Indeno(1,2,3-cd)pyrene	ND	0.10	mg/Kg dry	1		MADEP EPH rev 2.1	5/23/23	5/27/23 12:15	GJB
2-Methylnaphthalene	ND	0.10	mg/Kg dry	1		MADEP EPH rev 2.1	5/23/23	5/27/23 12:15	GJB
Naphthalene	ND	0.10	mg/Kg dry	1		MADEP EPH rev 2.1	5/23/23	5/27/23 12:15	GJB
Phenanthrene	ND	0.10	mg/Kg dry	1		MADEP EPH rev 2.1	5/23/23	5/27/23 12:15	GJB
Pyrene	ND	0.10	mg/Kg dry	1		MADEP EPH rev 2.1	5/23/23	5/27/23 12:15	GJB

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Chlorooctadecane (COD)	58.0	40-140		5/27/23 12:15
o-Terphenyl (OTP)	61.9	40-140		5/27/23 12:15
2-Bromonaphthalene	95.9	40-140		5/27/23 12:15
2-Fluorobiphenyl	93.2	40-140		5/27/23 12:15

con-test® A Pace Analytical® Laboratory

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Springfield, MA | Sample Description: | Work Order: 23E2609

Date Received: 5/18/2023

Field Sample #: BTE-E (3.5-6.5) | Sampled: 5/18/2023 10:20

Sample ID: 23E2609-08

Sample Matrix: Soil

Petroleum Hydrocarbons Analyses - VPH

Soil/Methanol Preservation Ratio: 1.08

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Unadjusted C5-C8 Aliphatics	ND	10	mg/Kg dry	1		MADEP-VPH-Feb 2018 Rev 2.1	5/19/23	5/19/23 21:45	EEH
C5-C8 Aliphatics	ND	10	mg/Kg dry	1		MADEP-VPH-Feb 2018 Rev 2.1	5/19/23	5/19/23 21:45	EEH
Unadjusted C9-C12 Aliphatics	ND	10	mg/Kg dry	1		MADEP-VPH-Feb 2018 Rev 2.1	5/19/23	5/19/23 21:45	EEH
C9-C12 Aliphatics	ND	10	mg/Kg dry	1		MADEP-VPH-Feb 2018 Rev 2.1	5/19/23	5/19/23 21:45	EEH
C9-C10 Aromatics	ND	10	mg/Kg dry	1		MADEP-VPH-Feb 2018 Rev 2.1	5/19/23	5/19/23 21:45	EEH
Benzene	ND	0.050	mg/Kg dry	1		MADEP-VPH-Feb 2018 Rev 2.1	5/19/23	5/19/23 21:45	EEH
Ethylbenzene	ND	0.050	mg/Kg dry	1		MADEP-VPH-Feb 2018 Rev 2.1	5/19/23	5/19/23 21:45	EEH
Methyl tert-Butyl Ether (MTBE)	ND	0.050	mg/Kg dry	1		MADEP-VPH-Feb 2018 Rev 2.1	5/19/23	5/19/23 21:45	EEH
Naphthalene	ND	0.25	mg/Kg dry	1		MADEP-VPH-Feb 2018 Rev 2.1	5/19/23	5/19/23 21:45	EEH
Toluene	ND	0.050	mg/Kg dry	1		MADEP-VPH-Feb 2018 Rev 2.1	5/19/23	5/19/23 21:45	EEH
m+p Xylene	ND	0.10	mg/Kg dry	1		MADEP-VPH-Feb 2018 Rev 2.1	5/19/23	5/19/23 21:45	EEH
o-Xylene	ND	0.050	mg/Kg dry	1		MADEP-VPH-Feb 2018 Rev 2.1	5/19/23	5/19/23 21:45	EEH

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
2,5-Dibromotoluene (FID)	91.4	70-130		5/19/23 21:45
2,5-Dibromotoluene (PID)	91.5	70-130		5/19/23 21:45

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Springfield, MA
Sample Description:
Work Order: 23E2609

Date Received: 5/18/2023

Field Sample #: BTE-E (3.5-6.5)
Sampled: 5/18/2023 10:20

Sample ID: 23E2609-08

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	95.9		% Wt	1		SM 2540G	5/25/23	5/25/23 11:30	JLC

con-test® A Pace Analytical® Laboratory

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Sample Extraction Data

Prep Method:SW-846 3546 **Analytical Method:MADEP EPH rev 2.1**

Lab Number [Field ID]	Batch	Initial [g]	Final [mL]	Date
23E2609-01 [CM-38SE (4-7)]	B341174	20.2	2.00	05/23/23
23E2609-01RE1 [CM-38SE (4-7)]	B341174	20.2	2.00	05/23/23
23E2609-07 [BT-EN (3-6)]	B341174	20.0	2.00	05/23/23
23E2609-08 [BTE-E (3.5-6.5)]	B341174	20.0	2.00	05/23/23

Prep Method:MA VPH **Analytical Method:MADEP-VPH-Feb 2018 Rev 2.1**

Lab Number [Field ID]	Batch	Initial [g]	Final [mL]	Date
23E2609-01 [CM-38SE (4-7)]	B340779	16.8	16.4	05/19/23
23E2609-07 [BT-EN (3-6)]	B340779	15.6	15.8	05/19/23
23E2609-08 [BTE-E (3.5-6.5)]	B340779	16.2	15.7	05/19/23

Prep Method:% Solids **Analytical Method:SM 2540G**

Lab Number [Field ID]	Batch	Date
23E2609-01 [CM-38SE (4-7)]	B341215	05/24/23
23E2609-02 [CM-39N (0-2)]	B341215	05/24/23
23E2609-03 [CM-39S (0-2)]	B341215	05/24/23
23E2609-04 [CM-39E (0-2)]	B341215	05/24/23
23E2609-05 [CM-39W (0-2)]	B341215	05/24/23

Prep Method:% Solids **Analytical Method:SM 2540G**

Lab Number [Field ID]	Batch	Date
23E2609-06 [OTP-4A (0-2)]	B341391	05/25/23
23E2609-07 [BT-EN (3-6)]	B341391	05/25/23
23E2609-08 [BTE-E (3.5-6.5)]	B341391	05/25/23

Prep Method:SW-846 3050B **Analytical Method:SW-846 6010D**

Lab Number [Field ID]	Batch	Initial [g]	Final [mL]	Date
23E2609-01 [CM-38SE (4-7)]	B340929	1.51	50.0	05/22/23
23E2609-02 [CM-39N (0-2)]	B340929	1.54	50.0	05/22/23
23E2609-03 [CM-39S (0-2)]	B340929	1.52	50.0	05/22/23
23E2609-04 [CM-39E (0-2)]	B340929	1.58	50.0	05/22/23
23E2609-05 [CM-39W (0-2)]	B340929	1.52	50.0	05/22/23
23E2609-06 [OTP-4A (0-2)]	B340929	1.51	50.0	05/22/23

Prep Method:SW-846 3546 **Analytical Method:SW-846 8270E**

Lab Number [Field ID]	Batch	Initial [g]	Final [mL]	Date
23E2609-06 [OTP-4A (0-2)]	B341300	30.0	2.00	05/24/23
23E2609-06RE1 [OTP-4A (0-2)]	B341300	30.0	2.00	05/24/23

con-test® A Pace Analytical® Laboratory

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

QUALITY CONTROL

Semivolatile Organic Compounds by GC/MS - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B341300 - SW-846 3546										
Blank (B341300-BLK1)				Prepared: 05/24/23 Analyzed: 05/25/23						
Acenaphthene	ND	0.17	mg/Kg wet							
Acenaphthylene	ND	0.17	mg/Kg wet							
Anthracene	ND	0.17	mg/Kg wet							
Benzo(a)anthracene	ND	0.17	mg/Kg wet							
Benzo(a)pyrene	ND	0.17	mg/Kg wet							
Benzo(b)fluoranthene	ND	0.17	mg/Kg wet							
Benzo(g,h,i)perylene	ND	0.17	mg/Kg wet							
Benzo(k)fluoranthene	ND	0.17	mg/Kg wet							
Chrysene	ND	0.17	mg/Kg wet							
Dibenz(a,h)anthracene	ND	0.17	mg/Kg wet							
Fluoranthene	ND	0.17	mg/Kg wet							
Fluorene	ND	0.17	mg/Kg wet							
Indeno(1,2,3-cd)pyrene	ND	0.17	mg/Kg wet							
2-Methylnaphthalene	ND	0.17	mg/Kg wet							
Naphthalene	ND	0.17	mg/Kg wet							
Phenanthrene	ND	0.17	mg/Kg wet							
Pyrene	ND	0.17	mg/Kg wet							
Surrogate: Nitrobenzene-d5	*2.07*		mg/Kg wet	3.33		62.2	30-130			
Surrogate: 2-Fluorobiphenyl	*2.24*		mg/Kg wet	3.33		67.2	30-130			
Surrogate: p-Terphenyl-d14	*2.79*		mg/Kg wet	3.33		83.7	30-130			
LCS (B341300-BS1)				Prepared: 05/24/23 Analyzed: 05/25/23						
Acenaphthene	1.08	0.17	mg/Kg wet	1.67		64.8	40-140			
Acenaphthylene	1.08	0.17	mg/Kg wet	1.67		64.6	40-140			
Anthracene	1.14	0.17	mg/Kg wet	1.67		68.5	40-140			
Benzo(a)anthracene	1.12	0.17	mg/Kg wet	1.67		67.2	40-140			
Benzo(a)pyrene	1.07	0.17	mg/Kg wet	1.67		64.0	40-140			
Benzo(b)fluoranthene	1.21	0.17	mg/Kg wet	1.67		72.5	40-140			
Benzo(g,h,i)perylene	1.15	0.17	mg/Kg wet	1.67		69.0	40-140			
Benzo(k)fluoranthene	1.21	0.17	mg/Kg wet	1.67		72.5	40-140			
Chrysene	1.09	0.17	mg/Kg wet	1.67		65.4	40-140			
Dibenz(a,h)anthracene	1.12	0.17	mg/Kg wet	1.67		67.3	40-140			
Fluoranthene	1.09	0.17	mg/Kg wet	1.67		65.2	40-140			
Fluorene	1.12	0.17	mg/Kg wet	1.67		66.9	40-140			
Indeno(1,2,3-cd)pyrene	1.11	0.17	mg/Kg wet	1.67		66.6	40-140			
2-Methylnaphthalene	0.954	0.17	mg/Kg wet	1.67		57.3	40-140			
Naphthalene	0.998	0.17	mg/Kg wet	1.67		59.9	40-140			
Phenanthrene	1.13	0.17	mg/Kg wet	1.67		67.6	40-140			
Pyrene	1.13	0.17	mg/Kg wet	1.67		67.5	40-140			
Surrogate: Nitrobenzene-d5	*2.08*		mg/Kg wet	3.33		62.5	30-130			
Surrogate: 2-Fluorobiphenyl	*2.28*		mg/Kg wet	3.33		68.4	30-130			
Surrogate: p-Terphenyl-d14	*2.70*		mg/Kg wet	3.33		80.9	30-130			

con-test® A Pace Analytical® Laboratory

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

QUALITY CONTROL

Semivolatile Organic Compounds by GC/MS - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B341300 - SW-846 3546										
LCS Dup (B341300-BSD1)				Prepared: 05/24/23 Analyzed: 05/25/23						
Acenaphthene	1.02	0.17	mg/Kg wet	1.67		61.5	40-140	5.23	30	
Acenaphthylene	1.02	0.17	mg/Kg wet	1.67		61.3	40-140	5.28	30	
Anthracene	1.15	0.17	mg/Kg wet	1.67		68.8	40-140	0.379	30	
Benzo(a)anthracene	1.12	0.17	mg/Kg wet	1.67		67.3	40-140	0.119	30	
Benzo(a)pyrene	1.07	0.17	mg/Kg wet	1.67		64.3	40-140	0.405	30	
Benzo(b)fluoranthene	1.19	0.17	mg/Kg wet	1.67		71.5	40-140	1.47	30	
Benzo(g,h,i)perylene	1.15	0.17	mg/Kg wet	1.67		68.9	40-140	0.203	30	
Benzo(k)fluoranthene	1.22	0.17	mg/Kg wet	1.67		73.4	40-140	1.18	30	
Chrysene	1.08	0.17	mg/Kg wet	1.67		64.8	40-140	0.952	30	
Dibenz(a,h)anthracene	1.15	0.17	mg/Kg wet	1.67		69.0	40-140	2.46	30	
Fluoranthene	1.10	0.17	mg/Kg wet	1.67		66.0	40-140	1.16	30	
Fluorene	1.10	0.17	mg/Kg wet	1.67		66.2	40-140	0.991	30	
Indeno(1,2,3-cd)pyrene	1.14	0.17	mg/Kg wet	1.67		68.7	40-140	3.14	30	
2-Methylnaphthalene	0.878	0.17	mg/Kg wet	1.67		52.7	40-140	8.37	30	
Naphthalene	0.912	0.17	mg/Kg wet	1.67		54.7	40-140	8.97	30	
Phenanthrene	1.13	0.17	mg/Kg wet	1.67		67.8	40-140	0.296	30	
Pyrene	1.08	0.17	mg/Kg wet	1.67		64.7	40-140	4.36	30	
Surrogate: Nitrobenzene-d5	*1.89*		mg/Kg wet	3.33		56.6	30-130			
Surrogate: 2-Fluorobiphenyl	*2.12*		mg/Kg wet	3.33		63.5	30-130			
Surrogate: p-Terphenyl-d14	*2.55*		mg/Kg wet	3.33		76.5	30-130			

con-test® A Pace Analytical® Laboratory

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

QUALITY CONTROL

Petroleum Hydrocarbons Analyses - EPH - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B341174 - SW-846 3546										
Blank (B341174-BLK1)				Prepared: 05/23/23 Analyzed: 05/26/23						
C9-C18 Aliphatics	ND	10	mg/Kg wet							
C19-C36 Aliphatics	ND	10	mg/Kg wet							
Unadjusted C11-C22 Aromatics	ND	10	mg/Kg wet							
C11-C22 Aromatics	ND	10	mg/Kg wet							
Acenaphthene	ND	0.10	mg/Kg wet							
Acenaphthylene	ND	0.10	mg/Kg wet							
Anthracene	ND	0.10	mg/Kg wet							
Benzo(a)anthracene	ND	0.10	mg/Kg wet							
Benzo(a)pyrene	ND	0.10	mg/Kg wet							
Benzo(b)fluoranthene	ND	0.10	mg/Kg wet							
Benzo(g,h,i)perylene	ND	0.10	mg/Kg wet							
Benzo(k)fluoranthene	ND	0.10	mg/Kg wet							
Chrysene	ND	0.10	mg/Kg wet							
Dibenz(a,h)anthracene	ND	0.10	mg/Kg wet							
Fluoranthene	ND	0.10	mg/Kg wet							
Fluorene	ND	0.10	mg/Kg wet							
Indeno(1,2,3-cd)pyrene	ND	0.10	mg/Kg wet							
2-Methylnaphthalene	ND	0.10	mg/Kg wet							
Naphthalene	ND	0.10	mg/Kg wet							
Phenanthrene	ND	0.10	mg/Kg wet							
Pyrene	ND	0.10	mg/Kg wet							
Naphthalene-aliphatic fraction	ND	0.10	mg/Kg wet							
2-Methylnaphthalene-aliphatic fraction	ND	0.10	mg/Kg wet							
Surrogate: Chlorooctadecane (COD)	*2.92*		mg/Kg wet	5.00		58.4	40-140			
Surrogate: o-Terphenyl (OTP)	*2.82*		mg/Kg wet	5.00		56.3	40-140			
Surrogate: 2-Bromonaphthalene	*4.13*		mg/Kg wet	5.00		82.7	40-140			
Surrogate: 2-Fluorobiphenyl	*4.01*		mg/Kg wet	5.00		80.2	40-140			
LCS (B341174-BS1)				Prepared: 05/23/23 Analyzed: 05/26/23						
C9-C18 Aliphatics	22.1	10	mg/Kg wet	29.9		74.1	40-140			
C19-C36 Aliphatics	30.2	10	mg/Kg wet	39.8		75.9	40-140			
Unadjusted C11-C22 Aromatics	62.5	10	mg/Kg wet	84.6		73.9	40-140			
Acenaphthene	3.45	0.10	mg/Kg wet	4.98		69.4	40-140			
Acenaphthylene	3.17	0.10	mg/Kg wet	4.98		63.8	40-140			
Anthracene	3.57	0.10	mg/Kg wet	4.98		71.8	40-140			
Benzo(a)anthracene	3.49	0.10	mg/Kg wet	4.98		70.1	40-140			
Benzo(a)pyrene	3.45	0.10	mg/Kg wet	4.98		69.3	40-140			
Benzo(b)fluoranthene	3.26	0.10	mg/Kg wet	4.98		65.6	40-140			
Benzo(g,h,i)perylene	3.06	0.10	mg/Kg wet	4.98		61.6	40-140			
Benzo(k)fluoranthene	3.19	0.10	mg/Kg wet	4.98		64.2	40-140			
Chrysene	3.76	0.10	mg/Kg wet	4.98		75.6	40-140			
Dibenz(a,h)anthracene	3.29	0.10	mg/Kg wet	4.98		66.1	40-140			
Fluoranthene	3.43	0.10	mg/Kg wet	4.98		69.0	40-140			
Fluorene	3.58	0.10	mg/Kg wet	4.98		71.9	40-140			
Indeno(1,2,3-cd)pyrene	3.14	0.10	mg/Kg wet	4.98		63.0	40-140			
2-Methylnaphthalene	3.41	0.10	mg/Kg wet	4.98		68.6	40-140			
Naphthalene	3.17	0.10	mg/Kg wet	4.98		63.8	40-140			
Phenanthrene	3.60	0.10	mg/Kg wet	4.98		72.4	40-140			
Pyrene	3.50	0.10	mg/Kg wet	4.98		70.4	40-140			
Naphthalene-aliphatic fraction	ND	0.10	mg/Kg wet	4.98			0-5			
2-Methylnaphthalene-aliphatic fraction	ND	0.10	mg/Kg wet	4.98			0-5			
Surrogate: Chlorooctadecane (COD)	*2.59*		mg/Kg wet	4.98		52.1	40-140			

con-test® A Pace Analytical® Laboratory

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

QUALITY CONTROL

Petroleum Hydrocarbons Analyses - EPH - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B341174 - SW-846 3546										
LCS (B341174-BS1)				Prepared: 05/23/23 Analyzed: 05/26/23						
Surrogate: o-Terphenyl (OTP)	*3.06*		mg/Kg wet	4.98		61.5	40-140			
Surrogate: 2-Bromonaphthalene	*4.49*		mg/Kg wet	4.98		90.3	40-140			
Surrogate: 2-Fluorobiphenyl	*4.41*		mg/Kg wet	4.98		88.7	40-140			
LCS Dup (B341174-BSD1)				Prepared: 05/23/23 Analyzed: 05/26/23						
C9-C18 Aliphatics	21.4	9.9	mg/Kg wet	29.6		72.5	40-140	3.17	25	
C19-C36 Aliphatics	33.5	9.9	mg/Kg wet	39.4		85.0	40-140	10.3	25	
Unadjusted C11-C22 Aromatics	58.0	9.9	mg/Kg wet	83.7		69.3	40-140	7.44	25	
Acenaphthene	3.17	0.099	mg/Kg wet	4.93		64.3	40-140	8.66	25	
Acenaphthylene	2.91	0.099	mg/Kg wet	4.93		59.0	40-140	8.86	25	
Anthracene	3.31	0.099	mg/Kg wet	4.93		67.1	40-140	7.82	25	
Benzo(a)anthracene	3.25	0.099	mg/Kg wet	4.93		66.0	40-140	7.08	25	
Benzo(a)pyrene	3.22	0.099	mg/Kg wet	4.93		65.4	40-140	6.73	25	
Benzo(b)fluoranthene	3.05	0.099	mg/Kg wet	4.93		62.0	40-140	6.69	25	
Benzo(g,h,i)perylene	2.85	0.099	mg/Kg wet	4.93		57.8	40-140	7.19	25	
Benzo(k)fluoranthene	2.98	0.099	mg/Kg wet	4.93		60.4	40-140	6.98	25	
Chrysene	3.51	0.099	mg/Kg wet	4.93		71.2	40-140	7.11	25	
Dibenz(a,h)anthracene	3.08	0.099	mg/Kg wet	4.93		62.4	40-140	6.72	25	
Fluoranthene	3.19	0.099	mg/Kg wet	4.93		64.8	40-140	7.35	25	
Fluorene	3.31	0.099	mg/Kg wet	4.93		67.1	40-140	7.88	25	
Indeno(1,2,3-cd)pyrene	2.94	0.099	mg/Kg wet	4.93		59.6	40-140	6.56	25	
2-Methylnaphthalene	3.04	0.099	mg/Kg wet	4.93		61.8	40-140	11.5	25	
Naphthalene	2.90	0.099	mg/Kg wet	4.93		58.8	40-140	9.04	25	
Phenanthrene	3.32	0.099	mg/Kg wet	4.93		67.3	40-140	8.20	25	
Pyrene	3.26	0.099	mg/Kg wet	4.93		66.2	40-140	7.11	25	
Naphthalene-aliphatic fraction	ND	0.099	mg/Kg wet	4.93			0-5			
2-Methylnaphthalene-aliphatic fraction	ND	0.099	mg/Kg wet	4.93			0-5			
Surrogate: Chlorooctadecane (COD)	*2.87*		mg/Kg wet	4.93		58.3	40-140			
Surrogate: o-Terphenyl (OTP)	*2.82*		mg/Kg wet	4.93		57.2	40-140			
Surrogate: 2-Bromonaphthalene	*4.12*		mg/Kg wet	4.93		83.7	40-140			
Surrogate: 2-Fluorobiphenyl	*4.05*		mg/Kg wet	4.93		82.3	40-140			

con-test® A Pace Analytical® Laboratory

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

QUALITY CONTROL

Petroleum Hydrocarbons Analyses - VPH - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B340779 - MA VPH										
Blank (B340779-BLK1)				Prepared & Analyzed: 05/19/23						
Unadjusted C5-C8 Aliphatics	ND	10	mg/Kg wet							
C5-C8 Aliphatics	ND	10	mg/Kg wet							
Unadjusted C9-C12 Aliphatics	ND	10	mg/Kg wet							
C9-C12 Aliphatics	ND	10	mg/Kg wet							
C9-C10 Aromatics	ND	10	mg/Kg wet							
Benzene	ND	0.050	mg/Kg wet							
Butylcyclohexane	ND	0.050	mg/Kg wet							
Decane	ND	0.050	mg/Kg wet							
Ethylbenzene	ND	0.050	mg/Kg wet							
Methyl tert-Butyl Ether (MTBE)	ND	0.050	mg/Kg wet							
2-Methylpentane	ND	0.050	mg/Kg wet							
Naphthalene	ND	0.25	mg/Kg wet							
Nonane	ND	0.050	mg/Kg wet							
Pentane	ND	0.050	mg/Kg wet							
Toluene	ND	0.050	mg/Kg wet							
1,2,4-Trimethylbenzene	ND	0.050	mg/Kg wet							
2,2,4-Trimethylpentane	ND	0.050	mg/Kg wet							
m+p Xylene	ND	0.10	mg/Kg wet							
o-Xylene	ND	0.050	mg/Kg wet							
Surrogate: 2,5-Dibromotoluene (FID)	*33.4*		µg/L	40.0		83.5	70-130			
Surrogate: 2,5-Dibromotoluene (PID)	*33.5*		µg/L	40.0		83.7	70-130			
LCS (B340779-BS1)				Prepared & Analyzed: 05/19/23						
Unadjusted C5-C8 Aliphatics	8.19	10	mg/Kg wet	7.50		109	70-130			
Unadjusted C9-C12 Aliphatics	7.33	10	mg/Kg wet	7.50		97.7	70-130			
C9-C10 Aromatics	2.65	10	mg/Kg wet	2.50		106	70-130			
Benzene	2.68	0.050	mg/Kg wet	2.50		107	70-130			
Butylcyclohexane	2.65	0.050	mg/Kg wet	2.50		106	70-130			
Decane	1.97	0.050	mg/Kg wet	2.50		79.0	70-130			
Ethylbenzene	2.66	0.050	mg/Kg wet	2.50		107	70-130			
Methyl tert-Butyl Ether (MTBE)	2.55	0.050	mg/Kg wet	2.50		102	70-130			
2-Methylpentane	2.87	0.050	mg/Kg wet	2.50		115	70-130			
Naphthalene	2.22	0.25	mg/Kg wet	2.50		88.8	70-130			
Nonane	2.70	0.050	mg/Kg wet	2.50		108	30-130			
Pentane	2.87	0.050	mg/Kg wet	2.50		115	70-130			
Toluene	2.63	0.050	mg/Kg wet	2.50		105	70-130			
1,2,4-Trimethylbenzene	2.65	0.050	mg/Kg wet	2.50		106	70-130			
2,2,4-Trimethylpentane	2.45	0.050	mg/Kg wet	2.50		97.8	70-130			
m+p Xylene	5.30	0.10	mg/Kg wet	5.00		106	70-130			
o-Xylene	2.68	0.050	mg/Kg wet	2.50		107	70-130			
Surrogate: 2,5-Dibromotoluene (FID)	*36.8*		µg/L	40.0		92.1	70-130			
Surrogate: 2,5-Dibromotoluene (PID)	*37.8*		µg/L	40.0		94.4	70-130			

con-test® A Pace Analytical® Laboratory

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

QUALITY CONTROL

Petroleum Hydrocarbons Analyses - VPH - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B340779 - MA VPH										
LCS Dup (B340779-BSD1)				Prepared & Analyzed: 05/19/23						
Unadjusted C5-C8 Aliphatics	7.81	10	mg/Kg wet	7.50		104	70-130	4.66	25	
Unadjusted C9-C12 Aliphatics	7.38	10	mg/Kg wet	7.50		98.4	70-130	0.686	25	
C9-C10 Aromatics	2.69	10	mg/Kg wet	2.50		108	70-130	1.61	25	
Benzene	2.69	0.050	mg/Kg wet	2.50		108	70-130	0.504	25	
Butylcyclohexane	2.69	0.050	mg/Kg wet	2.50		107	70-130	1.35	25	
Decane	1.99	0.050	mg/Kg wet	2.50		79.5	70-130	0.684	25	
Ethylbenzene	2.68	0.050	mg/Kg wet	2.50		107	70-130	0.650	25	
Methyl tert-Butyl Ether (MTBE)	2.52	0.050	mg/Kg wet	2.50		101	70-130	1.14	25	
2-Methylpentane	2.83	0.050	mg/Kg wet	2.50		113	70-130	1.17	25	
Naphthalene	2.19	0.25	mg/Kg wet	2.50		87.5	70-130	1.49	25	
Nonane	2.70	0.050	mg/Kg wet	2.50		108	30-130	0.0278	25	
Pentane	2.53	0.050	mg/Kg wet	2.50		101	70-130	12.6	25	
Toluene	2.65	0.050	mg/Kg wet	2.50		106	70-130	0.624	25	
1,2,4-Trimethylbenzene	2.69	0.050	mg/Kg wet	2.50		108	70-130	1.61	25	
2,2,4-Trimethylpentane	2.45	0.050	mg/Kg wet	2.50		97.8	70-130	0.0245	25	
m+p Xylene	5.35	0.10	mg/Kg wet	5.00		107	70-130	0.921	25	
o-Xylene	2.69	0.050	mg/Kg wet	2.50		108	70-130	0.391	25	
Surrogate: 2,5-Dibromotoluene (FID)	*35.9*		µg/L	40.0		89.6	70-130			
Surrogate: 2,5-Dibromotoluene (PID)	*38.1*		µg/L	40.0		95.3	70-130			

con-test® A Pace Analytical® Laboratory

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

QUALITY CONTROL

Metals Analyses (Total) - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC		%REC Limits	RPD		RPD Limit	Notes
Batch B340929 - SW-846 3050B												
Blank (B340929-BLK1)				Prepared: 05/22/23 Analyzed: 05/23/23								
Lead	ND	0.50	mg/Kg wet									
Blank (B340929-BLK2)				Prepared: 05/22/23 Analyzed: 05/24/23								
Lead	ND	0.50	mg/Kg wet									
LCS (B340929-BS1)				Prepared: 05/22/23 Analyzed: 05/23/23								
Lead	226	1.5	mg/Kg wet	257		87.8		82.1-117.9				
LCS (B340929-BS2)				Prepared: 05/22/23 Analyzed: 05/24/23								
Lead	249	1.5	mg/Kg wet	257		96.9		82.1-117.9				
LCS Dup (B340929-BSD1)				Prepared: 05/22/23 Analyzed: 05/23/23								
Lead	237	1.5	mg/Kg wet	257		92.1		82.1-117.9	4.77		30	
LCS Dup (B340929-BSD2)				Prepared: 05/22/23 Analyzed: 05/24/23								
Lead	260	1.5	mg/Kg wet	257		101		82.1-117.9	4.43		30	
Duplicate (B340929-DUP2)	**Source: 23E2609-01**			Prepared: 05/22/23 Analyzed: 05/24/23								
Lead	236	0.53	mg/Kg dry		151				**44.2**	*	35	R-02
Matrix Spike (B340929-MS2)	**Source: 23E2609-01**			Prepared: 05/22/23 Analyzed: 05/24/23								
Lead	188	0.54	mg/Kg dry	18.0	151	**207**	*	75-125				MS-19
Reference (B340929-SRM1) MRL CHECK				Prepared: 05/22/23 Analyzed: 05/23/23								
Lead	0.418	0.49	mg/Kg wet	0.489		85.6		80-120				

con-test® A Pace Analytical® Laboratory

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

QUALITY CONTROL

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total) - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B341391 - % Solids										
Duplicate (B341391-DUP1)		**Source: 23E2609-07**		Prepared & Analyzed: 05/25/23						
% Solids	95.3		% Wt		95.2			0.109	10	
Duplicate (B341391-DUP2)		**Source: 23E2609-08**		Prepared & Analyzed: 05/25/23						
% Solids	95.8		% Wt		95.9			0.0935	10	
Duplicate (B341391-DUP4)		**Source: 23E2609-06**		Prepared & Analyzed: 05/25/23						
% Solids	87.5		% Wt		86.5			1.19	10	

con-test®
A Pace Analytical® Laboratory

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

FLAG/QUALIFIER SUMMARY

*	QC result is outside of established limits.
†	Wide recovery limits established for difficult compound.
‡	Wide RPD limits established for difficult compound.
#	Data exceeded client recommended or regulatory level
ND	Not Detected
RL	Reporting Limit is at the level of quantitation (LOQ)
DL	Detection Limit is the lower limit of detection determined by the MDL study
MCL	Maximum Contaminant Level
	Percent recoveries and relative percent differences (RPDs) are determined by the software using values in the calculation which have not been rounded.
	No results have been blank subtracted unless specified in the case narrative section.
MS-19	Sample to spike ratio is greater than or equal to 4:1. Spiked amount is not representative of the native amount in the sample. Appropriate or meaningful recoveries cannot be calculated.
R-02	Duplicate RPD is outside of control limits. Outlier can be attributed to sample non-homogeneity encountered during sample prep.
RL-05	Elevated reporting limit due to high concentration of target compounds. MA CAM reporting limit not met.
RL-08	Elevated reporting limit due to sample matrix interference. MA CAM reporting limit not met.
S-15	Surrogate recovery outside of control limits due to suspected sample matrix interference. Chromatogram(s) is attached.
V-37	For VPH analysis, the average of the three marker compounds passes criteria.

con-test® A Pace Analytical® Laboratory

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

CERTIFICATIONS

Certified Analyses included in this Report

Analyte	Certifications
MADEP EPH rev 2.1 in Soil	
C9-C18 Aliphatics	CT,NC,ME,NH-P
C19-C36 Aliphatics	CT,NC,ME,NH-P
Unadjusted C11-C22 Aromatics	CT,NC,ME,NH-P
C11-C22 Aromatics	CT,NC,ME,NH-P
Acenaphthene	CT,NC,ME,NH-P
Acenaphthylene	CT,NC,ME,NH-P
Anthracene	CT,NC,ME,NH-P
Benzo(a)anthracene	CT,NC,ME,NH-P
Benzo(a)pyrene	CT,NC,ME,NH-P
Benzo(b)fluoranthene	CT,NC,ME,NH-P
Benzo(g,h,i)perylene	CT,NC,ME,NH-P
Benzo(k)fluoranthene	CT,NC,ME,NH-P
Chrysene	CT,NC,ME,NH-P
Dibenz(a,h)anthracene	CT,NC,ME,NH-P
Fluoranthene	CT,NC,ME,NH-P
Fluorene	CT,NC,ME
Indeno(1,2,3-cd)pyrene	CT,NC,ME,NH-P
2-Methylnaphthalene	CT,NC
Naphthalene	CT,NC,ME,NH-P
Phenanthrene	CT,NC,ME,NH-P
Pyrene	CT,NC,ME,NH-P
MADEP EPH rev 2.1 in Water	
C9-C18 Aliphatics	CT,NC,ME,NH-P
C19-C36 Aliphatics	CT,NC,ME,NH-P
Unadjusted C11-C22 Aromatics	CT,NC,ME,NH-P
C11-C22 Aromatics	CT,NC,ME,NH-P
Acenaphthene	CT,NC,ME,NH-P
Acenaphthylene	CT,NC,ME,NH-P
Anthracene	CT,NC,ME,NH-P
Benzo(a)anthracene	CT,NC,ME,NH-P
Benzo(a)pyrene	CT,NC,ME,NH-P
Benzo(b)fluoranthene	CT,NC,ME,NH-P
Benzo(g,h,i)perylene	CT,NC,ME,NH-P
Benzo(k)fluoranthene	CT,NC,ME,NH-P
Chrysene	CT,NC,ME,NH-P
Dibenz(a,h)anthracene	CT,NC,ME,NH-P
Fluoranthene	CT,NC,ME,NH-P
Fluorene	CT,NC,ME
Indeno(1,2,3-cd)pyrene	CT,NC,ME,NH-P
2-Methylnaphthalene	CT,NC
Naphthalene	CT,NC,ME,NH-P
Phenanthrene	CT,NC,ME,NH-P
Pyrene	CT,NC,ME,NH-P
MADEP-VPH-Feb 2018 Rev 2.1 in Soil	
Unadjusted C5-C8 Aliphatics	CT,NC,ME,NH-P
C5-C8 Aliphatics	CT,NC,ME,NH-P

con-test® A Pace Analytical® Laboratory

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

CERTIFICATIONS

Certified Analyses included in this Report

Analyte	Certifications
MADEP-VPH-Feb 2018 Rev 2.1 in Soil	
Unadjusted C9-C12 Aliphatics	CT,NC,ME,NH-P
C9-C12 Aliphatics	CT,NC,ME,NH-P
C9-C10 Aromatics	CT,NC,ME,NH-P
Benzene	CT,NC,ME,NH-P
Ethylbenzene	CT,NC,ME,NH-P
Methyl tert-Butyl Ether (MTBE)	CT,NC,ME,NH-P
Naphthalene	CT,NC,ME,NH-P
Toluene	CT,NC,ME,NH-P
m+p Xylene	CT,NC,ME,NH-P
o-Xylene	CT,NC,ME,NH-P
SW-846 6010D in Soil	
Lead	CT,NH,NY,AIHA,ME,VA,NC
SW-846 6010D in Water	
Lead	CT,NH,NY,ME,VA,NC
SW-846 8270E in Soil	
Acenaphthene	CT,NY,NH,ME,NC,VA
Acenaphthylene	CT,NY,NH,ME,NC,VA
Anthracene	CT,NY,NH,ME,NC,VA
Benzo(a)anthracene	CT,NY,NH,ME,NC,VA
Benzo(a)pyrene	CT,NY,NH,ME,NC,VA
Benzo(b)fluoranthene	CT,NY,NH,ME,NC,VA
Benzo(g,h,i)perylene	CT,NY,NH,ME,NC,VA
Benzo(k)fluoranthene	CT,NY,NH,ME,NC,VA
Chrysene	CT,NY,NH,ME,NC,VA
Dibenz(a,h)anthracene	CT,NY,NH,ME,NC,VA
Fluoranthene	CT,NY,NH,ME,NC,VA
Fluorene	CT,NY,NH,ME,NC,VA
Indeno(1,2,3-cd)pyrene	CT,NY,NH,ME,NC,VA
2-Methylnaphthalene	CT,NY,NH,ME,NC,VA
Naphthalene	CT,NY,NH,ME,NC,VA
Phenanthrene	CT,NY,NH,ME,NC,VA
Pyrene	CT,NY,NH,ME,NC,VA
SW-846 8270E in Water	
Acenaphthene	CT,NY,NH,ME,NC,VA
Acenaphthylene	CT,NY,NH,ME,NC,VA
Anthracene	CT,NY,NH,ME,NC,VA
Benzo(a)anthracene	CT,NY,NH,ME,NC,VA
Benzo(a)pyrene	CT,NY,NH,ME,NC,VA
Benzo(b)fluoranthene	CT,NY,NH,ME,NC,VA
Benzo(g,h,i)perylene	CT,NY,NH,ME,NC,VA
Benzo(k)fluoranthene	CT,NY,NH,ME,NC,VA
Chrysene	CT,NY,NH,ME,NC,VA
Dibenz(a,h)anthracene	CT,NY,NH,ME,NC,VA
Fluoranthene	CT,NY,NH,ME,NC,VA
Fluorene	CT,NY,NH,ME,NC,VA

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

CERTIFICATIONS

Certified Analyses included in this Report

Analyte	Certifications
SW-846 8270E in Water	
Indeno(1,2,3-cd)pyrene	CT,NY,NH,ME,NC,VA
2-Methylnaphthalene	CT,NY,NH,ME,NC,VA
Naphthalene	CT,NY,NH,ME,NC,VA
Phenanthrene	CT,NY,NH,ME,NC,VA
Pyrene	CT,NY,NH,ME,NC,VA

Con-Test, a Pace Environmental Laboratory, operates under the following certifications and accreditations:

Code	Description	Number	Expires
AIHA	AIHA-LAP, LLC - ISO 17025:2017	100033	03/1/2024
CT	Connecticut Department of Public Health	PH-0821	12/31/2024
NY	New York State Department of Health	10899 NELAP	04/1/2024
NH	New Hampshire Environmental Lab	2516 NELAP	02/5/2024
NC	North Carolina Div. of Water Quality	652	12/31/2023
ME	State of Maine	MA00100	06/9/2023
VA	Commonwealth of Virginia	460217	12/14/2023
NH-P	New Hampshire Environmental Lab	2557 NELAP	09/6/2023

23E2609 RF

http://www.pacelabs.com

Doc # 381 Rev 5_07/13/2021

Pace Analytical®

Phone: 413-525-2332
Fax: 413-525-6405

CHAIN OF CUSTODY RECORD

39 Spruce Street
East Longmeadow, MA 01028

Page 1 of 1

Access COC's and Support Requests

Company Name:	Weston & Sampson
Address:	55 Walkers Brook Dr. #100, Reading, MA
Phone:	1-800-SAMPSON
Project Name:	ES Pinevale
Project Location:	Springfield, MA
Project Number:	ENG 23-0351
Project Manager:	Joe Spencer
Pace Quote Name/Number:	
Invoice Recipient:	invoices@wseinc.com
Sampled By:	ACE, EL

Requested Turnaround Time
7-Day [X] 10-Day [ ]
PFAS 10-Day (std) [ ] Due Date:

Rush-Approval Required
1-Day [ ] 3-Day [ ]
2-Day [ ] 4-Day [ ]

Data Delivery
Format: PDF [X] EXCEL [X]
Other: enviro data edd
CLP Like Data Pkg Required: [ ]
Email To: SPENCERJ@WSEINC.COM
~~Fax To #:~~ ECKER.ALISON@WSEINC.COM, LI.ESTHER@WSEINC.COM

Dissolved Metals Samples
○ Field Filtered
○ Lab to Filter

Orthophosphate Samples
○ Field Filtered
○ Lab to Filter

PCB ONLY
SOXHLET [ ]
NON SOXHLET [ ]

ANALYSIS REQUESTED

Pace Work Order#	Client Sample ID / Description	Beginning Date/Time	Ending Date/Time	COMP/GRAB	[1]Matrix Code	Conc Code	VIALS	GLASS	PLASTIC	BACTERIA	ENCORE	EPH	VPH	Lead 6010 Total	QAHs	Coal Ash
												1	M	1	1	1
1	CM-38SE (4-7)	5/17/23	1300	C/G	S	U	1	1				X	X	X		
2	CM-39N (0-2)	↓	1555	C	↓	↓		1						X		
3	CM-39S (0-2)	↓	1510	↓	↓	↓		1						X		
4	CM-39E (0-2)	↓	1535	↓	↓	↓		1						X		
5	CM-39W (0-2)	↓	1500	↓	↓	↓		1						X		
6	OTP-4A (0-2)	5/18/23	0915	C	↓	↓		2						X	X	X
7	BT-EN (3-6)	↓	0945	C/G	↓	↓	1	1				X	X			
8	BTE-E (3.5-6.5)	↓	1020	C/G	↓	↓	1	1				X	X			

[2] Preservation Code

Courier Use Only
Total Number Of:
VIALS____
GLASS____
PLASTIC____
BACTERIA____
ENCORE____

Glassware in the fridge? Y / N
Glassware in freezer? Y / N
Prepackaged Cooler? Y / N

*Pace Analytical is not responsible for missing samples from prepacked coolers

[1] **Matrix Codes:**
GW = Ground Water
WW = Waste Water
DW = Drinking Water
A = Air
S = Soil
SL = Sludge
SOL = Solid
O = Other (please define)

[2] **Preservation Codes:**
I = Iced
H = HCL
M = Methanol
N = Nitric Acid
S = Sulfuric Acid
B = Sodium Bisulfate
X = Sodium Hydroxide
T = Sodium Thiosulfate
O = Other (please define)

Relinquished by: (signature)	Date/Time:
[signature] 5/18/23	1058
Received by: (signature) [signature] Pace	Date/Time: 1058 5/18/23
Relinquished by: (signature) [signature] Pace	Date/Time: 1225 5/18/23
Received by: (signature) [signature] 27	Date/Time: 5-18-23 19:10
Relinquished by: (signature)	Date/Time:
Received by: (signature)	Date/Time:
Relinquished by: (signature)	Date/Time:
Received by: (signature)	Date/Time:

Client Comments:

Detection Limit Requirements
MA: S-1 / GW-2
S-1 / GW-3
CT:
Other:

Special Requirements
[X] MA MCP Required
MCP Certification Form Required
[ ] CT RCP Required
RCP Certification Form Required
[ ] MA State DW Required
PWSID #

Please use the following codes to indicate possible sample concentration within the Conc Code column above:
H - High; M - Medium; L - Low; C - Clean; U - Unknown

NELAC and AIHA-LAP, LLC Accredited

Project Entity
Government [ ] Municipality [X] MWRA [ ] WRTA [ ]
Federal [ ] 21 J [ ] School [ ]
City [ ] Brownfield [ ] MBTA [ ]

Other
[ ] Chromatogram
[ ] AIHA-LAP,LLC

Lab Comments:

Disclaimer: Pace Analytical is not responsible for any omitted information on the Chain of Custody. The Chain of Custody is a legal document that must be complete and accurate and is used to determine what analyses the laboratory will perform. Any missing information is not the laboratory's responsibility. Pace Analytical values your partnership on each project and will try to assist with missing information, but will not be held accountable.

Table of Contents

39 Spruce St.
East Longmeadow, MA. 01028
P: 413-525-2332
F:413-525-6405
www.pacelabs.com

ENV-FRM-ELON-0001 V05__Sample Receiving Checklist

Log In Back-Sheet

Login Sample Receipt Checklist – (Rejection Criteria Listing – Using Acceptance Policy) Any False statement will be brought to the attention of the Client – True or False

Pace
PEOPLE ADVANCING SCIENCE

Client W+S
Project ES Pinnak (ENG23-0851)
MCP/RCP Required MA-MCP
Deliverable Package Requirement S-1, GW-2/3
Location Springfield, MA
PWSID# (When Applicable) n/a
Arrival Method:

Courier ☑ Fed Ex ☐ Walk In ☐ Other ☐

Received By / Date / Time SB 5/18/23 1410
Back-Sheet By / Date / Time MKM 5/18/23 1445
Temperature Method Gun # 5
Temp ☑ < 6° C Actual Temperature 27
Rush Samples: Yes / No Notify No
Short Hold: Yes / No Notify No

	True	False
Received on Ice	☑	☐
Received in Cooler	☑	☐
Custody Seal: DATE ____ TIME ____	☐	☑
COC Relinquished	☑	☐
COC/Samples Labels Agree	☑	☐
All Samples in Good Condition	☑	☐
Samples Received within Holding Time	☑	☐
Is there enough Volume	☑	☐
Proper Media/Container Used	☑	☐
Splitting Samples Required	☐	☑
MS/MSD	☐	☑
Trip Blanks	☐	☑
Lab to Filters	☐	☑
COC Legible	☑	☐

COC Included: (Check all included)

Client	☑	Analysis	☑	Sampler Name	☑
Project	☑	IDs	☑	Collection Date/Time	☑

All Samples Proper pH: (N/A) ☐ ☐

Notes regarding Samples/COC outside of SOP:

Additional Container Notes

Sample	Soils Jars (Circle Amb/Clear)				Ambers							Plastics										VOA Vials					Other / Fill in					
					1 Liter			250mL			100mL	1 Liter		500mL		250mL																
	16oz Amb/Clear	8oz Amb/Clear	4oz Amb/Clear	2oz Amb/Clear	Unpreserved	HCL	Sulfuric	Sulfuric	Phosphoric	HCl	Unpreserved	Unpreserved	Sulfuric	Unpreserved	Sulfuric	Unpreserved	Trizma	Sulfuric	Nitric	NaOH	NaOH/Zinc	Unpreserved	HCl	MeOH	D.I. Water	BiSulfate	Col/Bact					
1		1																						1								
2		1																														
3		1																														
4		1																														
5		1																														
6		2																														
7		1																						1								
8		1																						1								
9																																
10																																
11																																
12																																
13																																
14																																
15																																
16																																
17																																
18																																
19																																
20																																

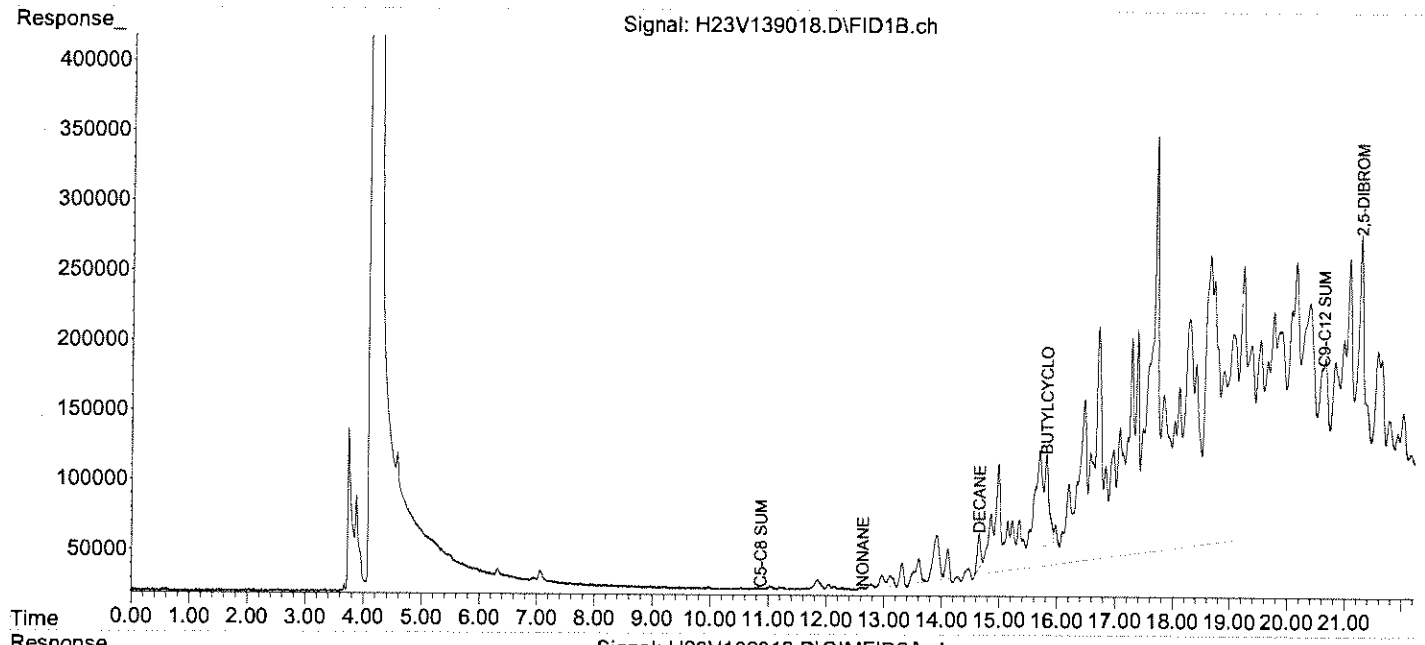
Table of Contents

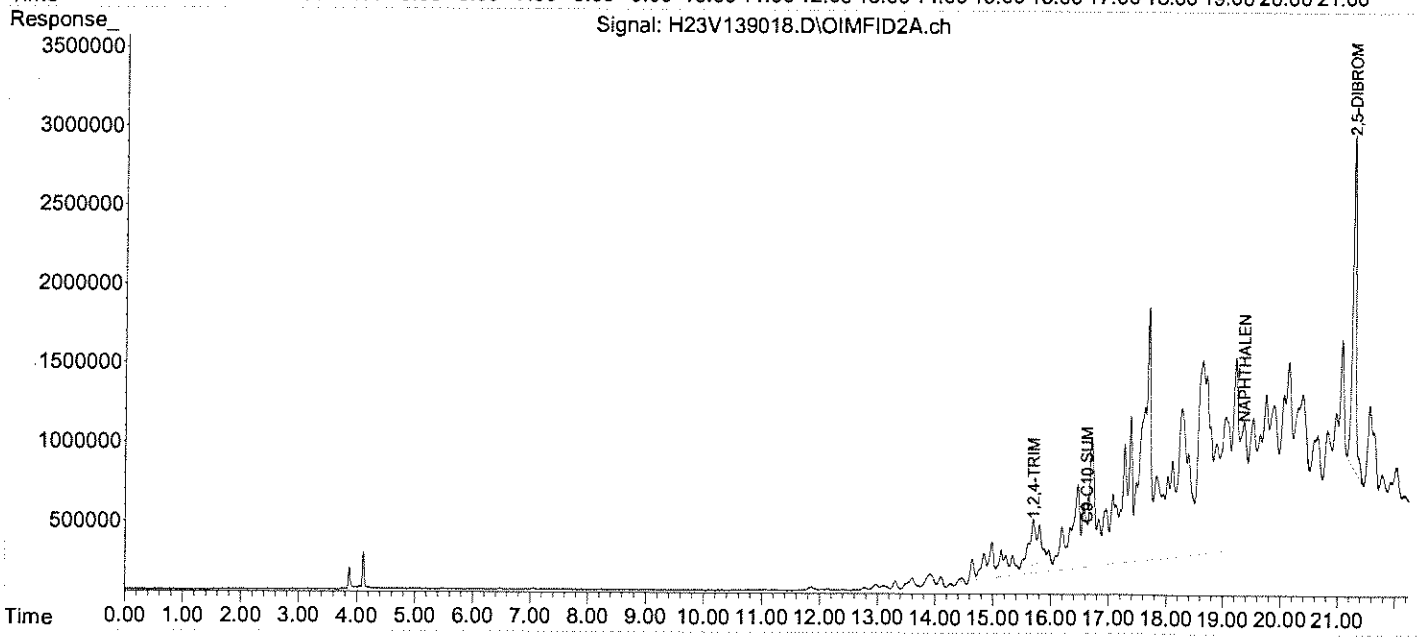
Quantitation Report (QT Reviewed)

Data Path : C:\msdchem\1\data\051923\
Data File : H23V139018.D
Signal(s) : Signal #1: FID1B.ch Signal #2: OIMFID2A.ch
Acq On : 19 May 2023 05:49 pm
Operator :
Sample : 23E2609-01 @ 500X MEOH Inst : VPHGC3
Misc :
ALS Vial : 18 Sample Multiplier: 1

Integration File signal 1: events.e
Integration File signal 2: events2.e
Quant Time: May 22 08:18:16 2023
Quant Method : C:\msdchem\1\methods\VJ011823.M
Quant Title : VPHNEW
QLast Update : Tue May 16 05:36:28 2023
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal #1 Phase : Signal #2 Phase:
Signal #1 Info : Signal #2 Info :



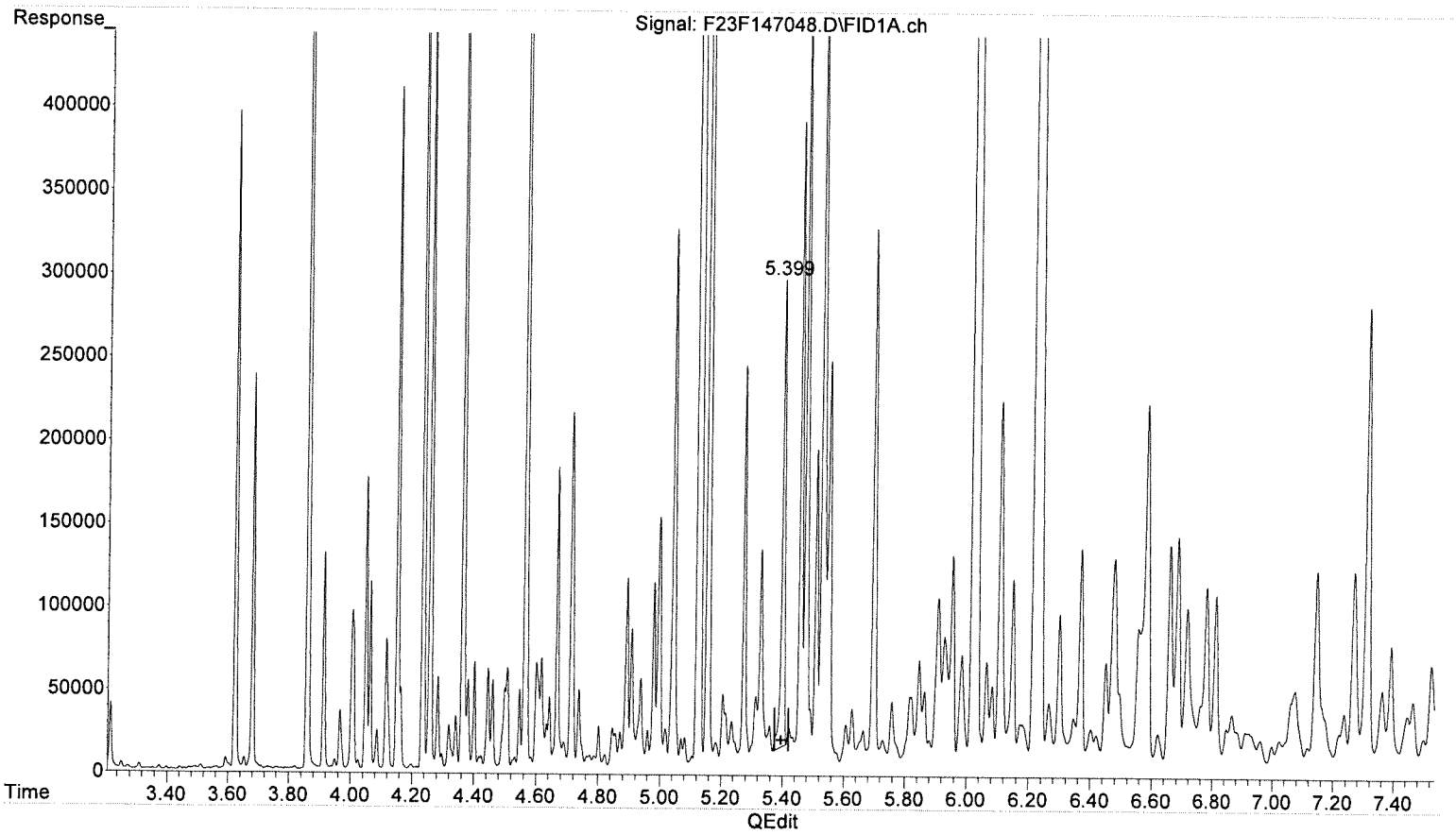


Quantitation Report (Qedit)

Data Path : C:\msdchem\1\data\F052723\
Data File : F23F147048.D
Signal(s) : Signal #1: FID1A.ch Signal #2: FID2B.ch
Acq On : 27 May 2023 5:22 pm
Operator : GJB
Sample : 23E2609-01 Inst : GCFID6
Misc :
ALS Vial : 46 (Sig #1); 45 (Sig #2) Sample Multiplier: 1

Integration File signal 1: events.e
Integration File signal 2: TEST.E
Quant Time: May 30 09:06:47 2023
Quant Method : C:\msdchem\1\methods\EPHQ_09.m
Quant Title : EPH-FID6-10/05/2020
QLast Update : Fri Aug 12 09:14:42 2022
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal #1 Phase : Signal #2 Phase:
Signal #1 Info : Signal #2 Info :



(10) o-Terphenyl (OTP) (S)

5.400min 18.485 ug/mL

response 1772144

matrix interference

Checked by:
Gabrielle J. Biseinere MAY 30 2023

(+) = Expected Retention Time
EPHQ_09.m Tue May 30 12:18:41 2023

Pace New England

MicroVision Labs Coal Ash Report, Job # 15972
Pace New England Project#: 23E2609

Scope of Work:

This report covers the methods and findings of the Coal/Coal Ash analysis that MicroVision Laboratories, Inc. conducted on one (1) soil sample submitted for testing from the 23E2609 project. The purpose of this analysis was to detect and document any coal, coal ash, wood ash or asphalt that may be present in the submitted soil sample by use of a combination of microscopy techniques including SEM/EDS, PLM, and macroscopic inspection. The results presented in this report relate only to the samples examined and as received.

Methods:

MicroVision Labs is accredited to the ISO/IEC 17025:2017 standard. This analysis follows our in house SOP #MVL05 (Microscopic Analysis for Coal, Coal Ash and Wood Ash). This method is listed on our certificate of accreditation and has been validated.

Findings:

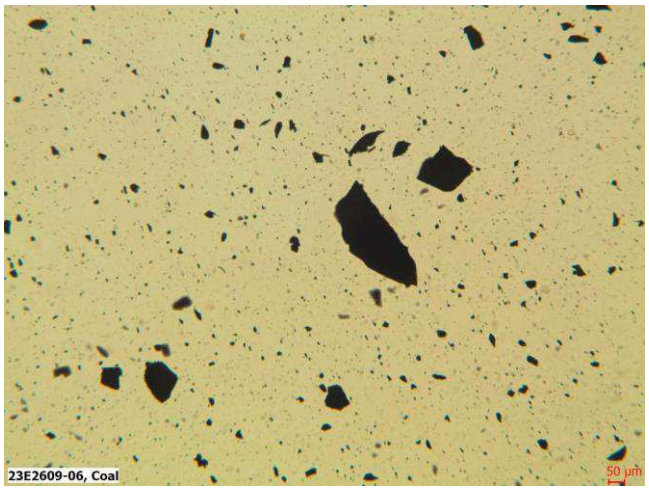
The following pages display the data for each particle type detected in the sample for this project. Each page contains a PLM image, SEM image, and EDS spectrum for the particle types detected for this sample as well as particle type descriptions and observations.

MicroVision Laboratories, Inc. 187 Billerica Road, Chelmsford, MA 01824
Phone: (978) 250-9909 Fax: (978) 250-9901 Email: Sales@MicroVisionLabs.com
www.MicroVisionLabs.com

Sample: 23E2609-06

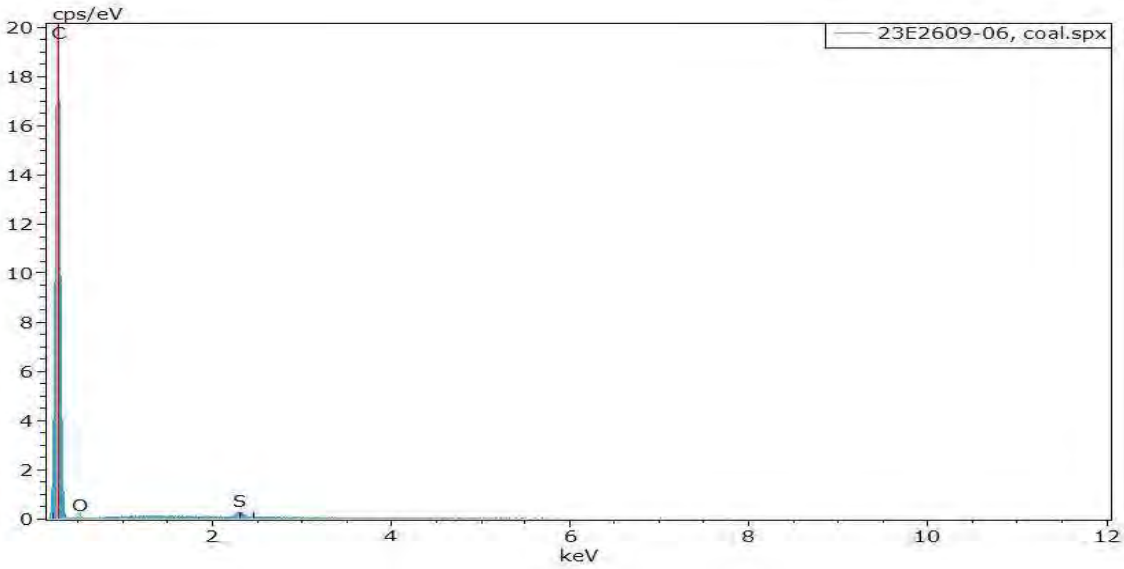
Number of Suspect Particle Types: Three (3)

Coal: This particle type consisted of nine (9) shiny, black grains approximately 1-8mm in diameter. The PLM examination indicated this particle type to be consistent with coal. The PLM and SEM images of this particle type show the angular edges and typical conchoidal fractures found in coal.

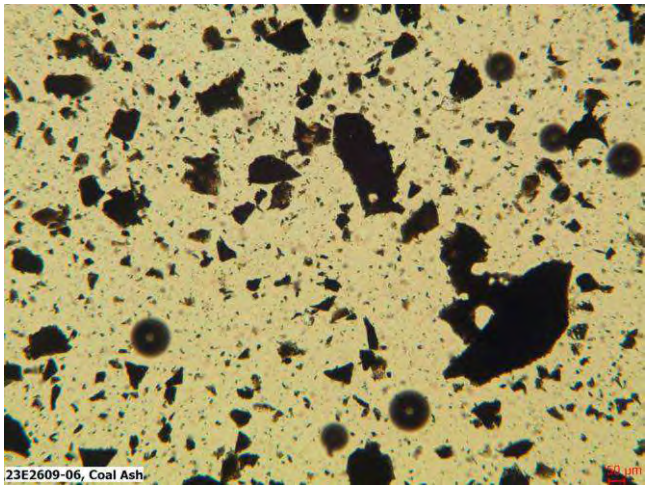


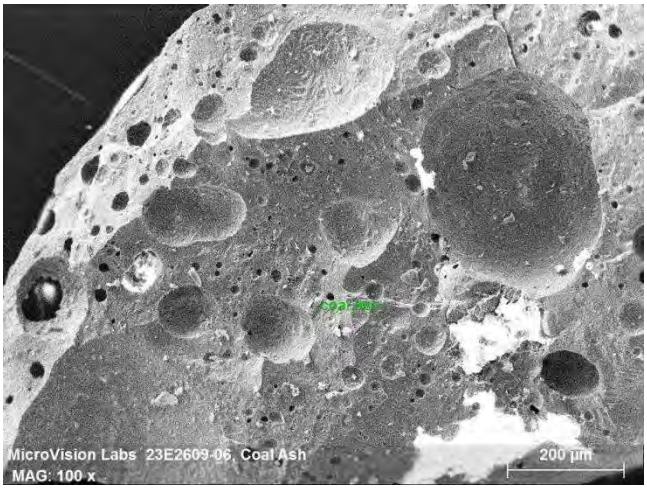
[redacted] [redacted]

The EDS spectrum, shown below, confirms that this particle type is coal. The analysis for this particle shows concentrations of carbon, oxygen, and sulfur.



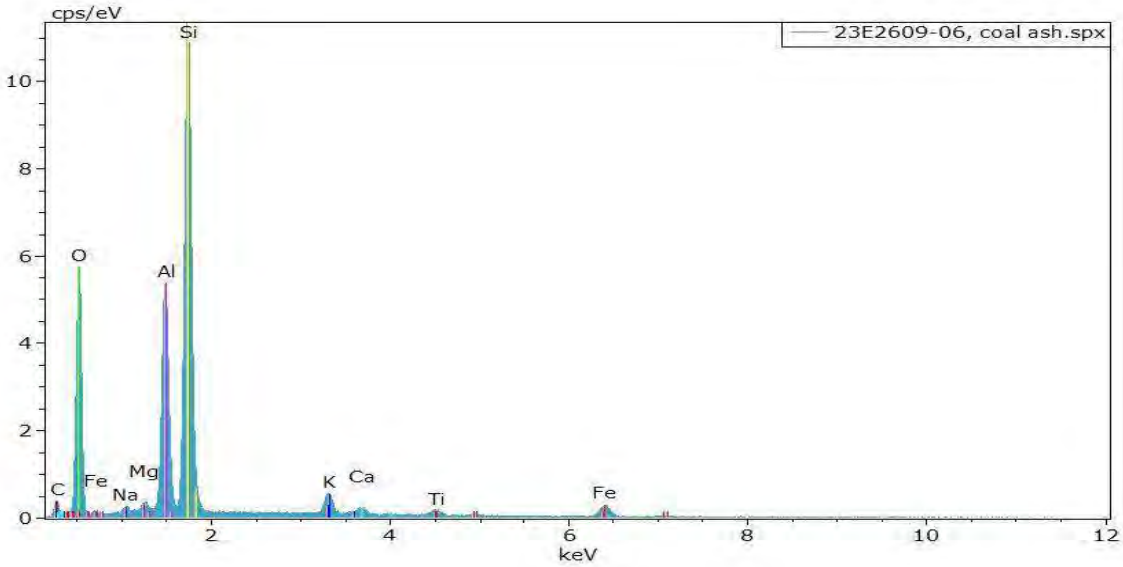
Coal Ash: This particle type consisted of four (4) dark, porous grains approximately 2-6mm in diameter. The PLM examination indicated this particle type to be consistent with coal ash. The PLM and SEM images show the spherical gas voids that formed during combustion.



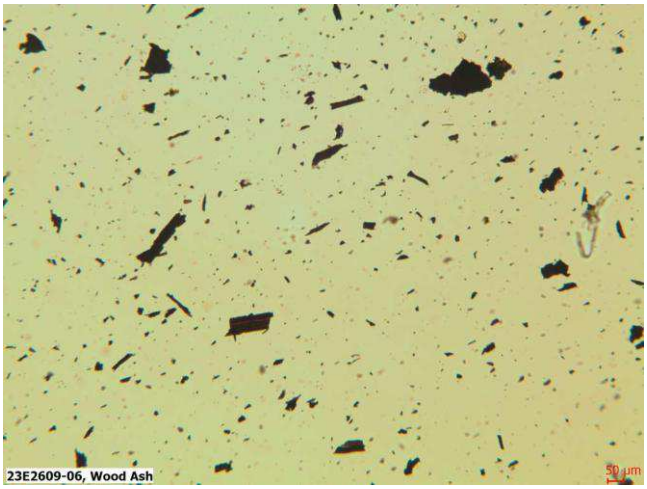


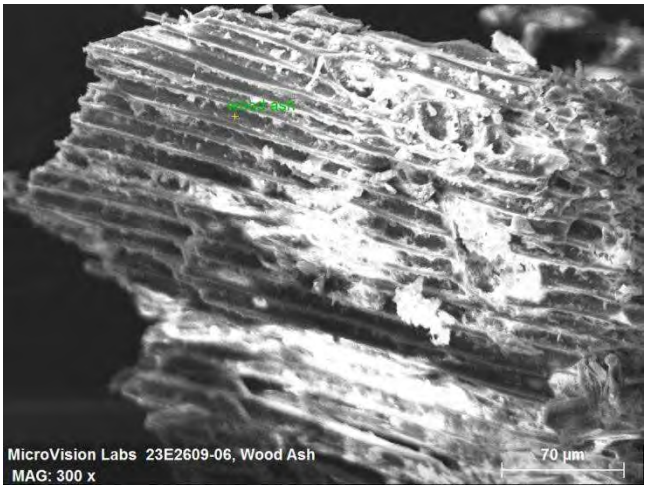
[redacted] [redacted]

The EDS spectrum, shown below, indicates this particle type is coal ash. The analysis for this particle shows concentrations of carbon, oxygen, sodium, magnesium, aluminum, silicon, potassium, calcium, titanium and iron.



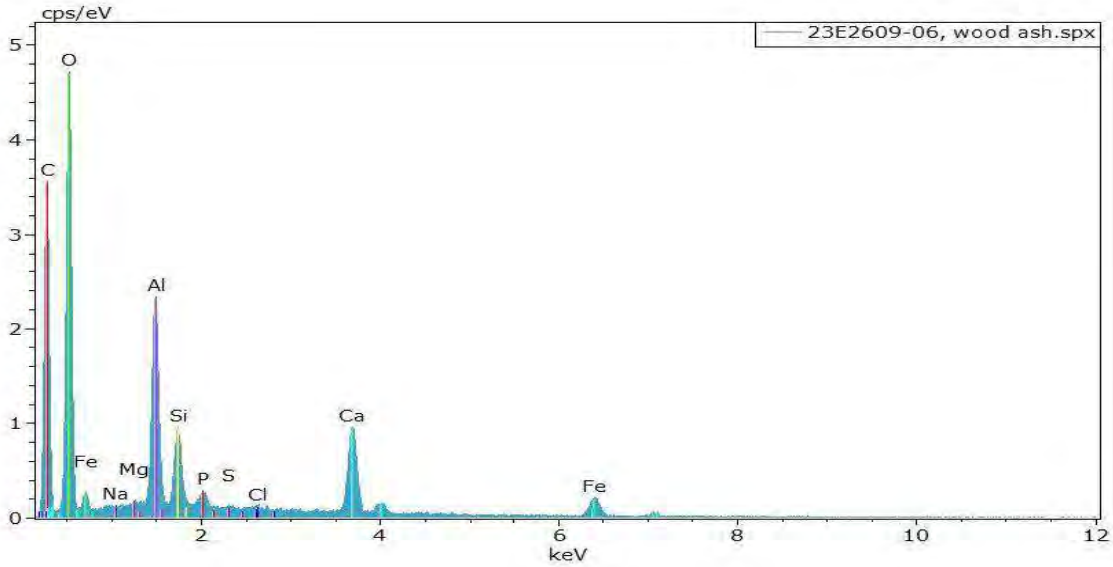
Wood Ash: This particle type consisted of six (6) friable, black grains approximately 1-3mm in length. The PLM examination indicated this particle type to be consistent with wood ash. The PLM and SEM photos show the cellular structure typical of wood still present in these grains.





[redacted] [redacted]

The EDS spectrum, shown below, indicates this particle type is wood ash. The analysis for this particle shows concentrations of carbon, oxygen, sodium, magnesium, aluminum, silicon, phosphorus, sulfur, chlorine, calcium, and iron.



Results Summary Table:

Sample Name	Material Detected
23E2609-06	**Coal (light), Coal Ash (trace), Wood Ash (light)**

The concentrations of the particle types detected in this sample are listed in parenthesis in the table above and are based on the number of particles found and the relative difficulty in finding them. The concentration information is listed for informational purposes only and has no bearing on exemption status.

Please let us know if you have any questions about this analysis or if there is anything else we can do for you.

Sincerely,

Denise Weidler
Analytical Microscopist

Reviewed by: TW

15972

SUBCONTRACT CHAIN OF CUSTODY

Pace New England

23E2609

SENDING LABORATORY:	**RECEIVING LABORATORY:**
Pace New England	MicroVision Laboratories
39 Spruce Street	187 Billerica Road
East Longmeadow, MA 01028	Chelmsford, MA 01824
Phone: 413.525.2332	Phone :(978) 250-9909
Fax: 413.525.6405	Fax: (978) 250-9901
Project Manager: Rebecca Faust	

Analysis	Sample Name	Due	Expires	Comments
Sample ID: 23E2609-06	**CM-39N (0-2)**	**Soil**	**Sampled: 05/17/23 15:55**	
S-Coal Ash		05/25/23 17:00	02/09/26 15:55	
Containers Supplied:				
8 oz amber glass jar (B)				

Released By	Date	Received By	Date
[signature]	5/19/23 9.33	[signature]	5/19/23
Released By	Date	Received By	Date

Page 1 of 1

MADEP MCP Analytical Method Report Certification Form

Laboratory Name: Pace New England	Project #: 23E2609
Project Location: Springfield, MA	RTN:

This Form provides certifications for the following data set: [list Laboratory Sample ID Number(s)]

23E2609-01 thru 23E2609-08

Matrices: Soil

CAM Protocol (check all that below)

8260 VOC CAM II A ( )	7470/7471 Hg CAM IIIB ( )	MassDEP VPH (GC/PID/FID) CAM IV A (X)	8082 PCB CAM V A ( )	9014 Total Cyanide/PAC CAM VI A ( )	6860 Perchlorate CAM VIII B ( )
8270 SVOC CAM II B (X)	7010 Metals CAM III C ( )	MassDEP VPH (GC/MS) CAM IV C ( )	8081 Pesticides CAM V B ( )	7196 Hex Cr CAM VI B ( )	MassDEP APH CAM IX A ( )
6010 Metals CAM III A (X)	6020 Metals CAM III D ( )	MassDEP EPH CAM IV B (X)	8151 Herbicides CAM V C ( )	8330 Explosives CAM VIII A ( )	TO-15 VOC CAM IX B ( )

Affirmative response to Questions A throughF is required for "Presumptive Certainty" status

A	Were all samples received in a condition consistent with those described on the Chain-of-Custody, properly preserved (including temperature) in the field or laboratory, and prepared/analyzed within method holding times?	☑ Yes	☐ No[1]
B	Were the analytical method(s) and all associated QC requirements specificed in the selected CAM protocol(s) followed?	☑ Yes	☐ No[1]
C	Were all required corrective actions and analytical response actions specified in the selected CAM protocol(s) implemented for all identified performance standard non-conformances?	☑ Yes	☐ No[1]
D	Does the laboratory report comply with all the reporting requirements specified in CAM VII A, Quality Assurance and Quality Control Guidlines for the Acquisition and Reporting of Analytical Data?	☑ Yes	☐ No[1]
E a	VPH, EPH, and APH Methods only: Was each method conducted without significant modification(s)? (Refer to the individual method(s) for a list of significant modifications).	☑ Yes	☐ No[1]
E b	APH and TO-15 Methods only: Was the complete analyte list reported for each method?	☐ Yes	☐ No[1]
F	Were all applicable CAM protocol QC and performance standard non-conformances identified and evaluated in a laboratory narrative (including all No responses to Qestions A through E)?	☑ Yes	☐ No[1]

A response to questions G, H and I below is required for "Presumptive Certainty" status

G	Were the reporting limits at or below all CAM reporting limits specified in the selected CAM protocol(s)?	☐ Yes	☑ No[1]

***Data User Note:* Data that achieve "Presumptive Certainty" status may not necessarily meet the data usability and representativeness requirements described in 310 CMR 40. 1056 (2)(k) and WSC-07-350.**

H	Were all QC perfomance standards specified in the CAM protocol(s) achieved?	☐ Yes	☑ No[1]
I	Were results reported for the complete analyte list specified in the selected CAM protocol(s)?	☐ Yes	☑ No[1]

[1] *All Negative responses must be addressed in an attached Environmental Laboratory case narrative.*

I, the undersigned, attest under the pains and penalties of perjury that, based upon my personal inquiry of those responsible for obtaining the information, the material contained in this analytical report is, to the best of my knowledge and belief, accurate and complete.

Signature: Lisa Worthington Position: Technical Representative

Printed Name: Lisa A. Worthington Date: 06/06/23

Ecker, Alison

From: Rebecca Faust <Rebecca.Faust@pacelabs.com>
Sent: Monday, October 2, 2023 1:58 PM
To: Ecker, Alison
Cc: Spencer, Joseph
Subject: RE: ES Pinevale Coal Ash - Question about sample

Hi Alison,

I am sorry about this error. The sample that was submitted was in fact OTP-4A. I looked back and it looks like our sample receiving made an ID error and edit after printing the subpaperwork without going back and updating the ID.

Thank You,

Rebecca Faust

Project Manager I

39 Spruce Street, East Longmeadow, MA 01028

o: 413.525.2332 | f: 413.525.6405 | direct line: 413-486-5061 I pacelabs.com

"Exciting Operational Update: Reduced volume capabilities are here! Starting April 24th, East Longmeadow bottle orders will be fulfilled using the reduced volume 100mL amber jars, replacing 1 liter ambers, for your aqueous Semi-volatile (8270), Pesticide (8081), PCB (8082) analyses. Reporting lists and Detection limits will remain the same. Ask your Account Executive or Project Manager for more info".

From: Ecker, Alison <Ecker.Alison@wseinc.com>
Sent: Monday, October 2, 2023 5:58 AM
To: Rebecca Faust <Rebecca.Faust@pacelabs.com>
Cc: Spencer, Joseph <SpencerJ@wseinc.com>
Subject: ES Pinevale Coal Ash - Question about sample

CAUTION: This email originated from outside Pace Analytical. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Hi Rebecca,

I was reviewing the coal ash report (attached) we received a few months ago for the ES Pinevale Springfield project and noticed an inconsistency in the Sample ID reported. The subcontract COC lists the Sample ID as 23E2609-06 with CM-39N (0-2), but the Pace Lab ID for 23E2609-06 goes with the W&S sample OTP-4A(0-2) on the Pace lab report (see pictures below).

Could you please let me know if the sample submitted for this coal ash report was CM-39N or OTP-4A?

Thank you!
Alison

15972

SUBCONTRACT CHAIN OF CUSTODY

Pace New England

23E2609

SENDING LABORATORY:	**RECEIVING LABORATORY:**
Pace New England	MicroVision Laboratories
39 Spruce Street	187 Billerica Road
East Longmeadow, MA 01028	Chelmsford, MA 01824
Phone: 413.525.2332	Phone :(978) 250-9909
Fax: 413.525.6405	Fax: (978) 250-9901
Project Manager: Rebecca Faust	

Analysis	Sample Name	Due	Expires	Comments
Sample ID: 23E2609-06	**CM-39N (0-2)**	**Soil**	**Sampled: 05/17/23 15:55**	
S-Coal Ash		05/25/23 17:00	02/09/26 15:55	
Containers Supplied:				
8 oz amber glass jar (B)				

FIELD SAMPLE #	LAB ID:	MATRIX	SAMPLE DESCRIPTION	TEST	SUB LAB
CM-38SE (4-7)	23E2609-01	Soil		MADEP EPH rev 2.1	
				MADEP-VPH-Feb 2018 Rev 2.1	
				SM 2540G	
				SW-846 6010D	
CM-39N (0-2)	23E2609-02	Soil		SM 2540G	
				SW-846 6010D	
CM-39S (0-2)	23E2609-03	Soil		SM 2540G	
				SW-846 6010D	
CM-39E (0-2)	23E2609-04	Soil		SM 2540G	
				SW-846 6010D	
CM-39W (0-2)	23E2609-05	Soil		SM 2540G	
				SW-846 6010D	
OTP-4A (0-2)	23E2609-06	Soil		PLM/SEM	N/A cert.
				SM 2540G	
				SW-846 6010D	
				SW-846 8270E	

Alison Ecker, EIT
ENGINEER II
direct: 781-909-4023
cell: 941-447-7331

Weston & Sampson
55 Walkers Brook Drive, Suite 100 | Reading, MA 01867
tel: 978-532-1900
westonandsampson.com

Follow us on Facebook | Twitter | LinkedIn

Facebook | Twitter | LinkedIn

The contents of this e-mail and any attachments are the property of the Weston & Sampson companies. The e-mail contents are only to be used by the intended recipient of the e-mail. If you are not the intended recipient, then use, disclosure, copying, distribution or reliance on the e-mail is prohibited. All professional advice from us should be obtained in writing (not e-mail).

NOTICE-- The contents of this email and any attachments may contain confidential, privileged, and/or legally protected information and are for the sole use of the addressee(s). Any review or distribution by others is strictly prohibited. If you are not the intended recipient, please contact the sender immediately and delete any copies.

Please consider the environment before printing this email

con-test®
A Pace Analytical® Laboratory

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

June 6, 2023

Joe Spencer
Weston & Sampson Engineers MA
55 Walkers Brook Drive
Reading, MA 01867

Project Location: Springfield, MA
Client Job Number:
Project Number: ENG23-0351
Laboratory Work Order Number: 23E2637

Enclosed are results of analyses for samples as received by the laboratory on May 18, 2023. If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Rebecca Faust
Project Manager

Table of Contents

Sample Summary 3

Case Narrative 4

Sample Results 5

23E2637-01 5

23E2637-02 8

23E2637-03 11

23E2637-04 15

23E2637-05 19

23E2637-06 23

Sample Preparation Information 27

QC Data 28

Semivolatile Organic Compounds by GC/MS 28

B341300 28

Petroleum Hydrocarbons Analyses - EPH 30

B340848 30

B341020 31

Petroleum Hydrocarbons Analyses - VPH 34

B340781 34

Metals Analyses (Total) 36

B340929 36

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total) 37

B341391 37

Flag/Qualifier Summary 38

Certifications 39

Chain of Custody/Sample Receipt 42

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Weston & Sampson Engineers MA
55 Walkers Brook Drive
Reading, MA 01867
ATTN: Joe Spencer

REPORT DATE: 6/6/2023

PURCHASE ORDER NUMBER:

PROJECT NUMBER: ENG23-0351

ANALYTICAL SUMMARY

WORK ORDER NUMBER: 23E2637

The results of analyses performed on the following samples submitted to CON-TEST, a Pace Analytical Laboratory, are found in this report.

PROJECT LOCATION: Springfield, MA

FIELD SAMPLE #	LAB ID:	MATRIX	SAMPLE DESCRIPTION	TEST	SUB LAB
BT-ENW (3-6)	23E2637-01	Soil		MADEP EPH rev 2.1	
				MADEP-VPH-Feb 2018 Rev 2.1	
				SM 2540G	
BT-ESW (4-7)	23E2637-02	Soil		MADEP EPH rev 2.1	
				MADEP-VPH-Feb 2018 Rev 2.1	
				SM 2540G	
DP-2A (0-2)	23E2637-03	Soil		PLM/SEM	N/A cert.
				SM 2540G	
				SW-846 6010D	
				SW-846 8270E	
CM-43N (8-11)	23E2637-04	Soil		MADEP EPH rev 2.1	
				MADEP-VPH-Feb 2018 Rev 2.1	
				SM 2540G	
				SW-846 6010D	
CM-43SW (5-8)	23E2637-05	Soil		MADEP EPH rev 2.1	
				MADEP-VPH-Feb 2018 Rev 2.1	
				SM 2540G	
				SW-846 6010D	
CM-43NW (5-8)	23E2637-06	Soil		MADEP EPH rev 2.1	
				MADEP-VPH-Feb 2018 Rev 2.1	
				SM 2540G	
				SW-846 6010D	

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

CASE NARRATIVE SUMMARY

All reported results are within defined laboratory quality control objectives unless listed below or otherwise qualified in this report.

For method 8270E, only PAHs were requested and reported.

MADEP-VPH-Feb 2018 Rev 2.1

Qualifications:

V-37

For VPH analysis, the average of the three marker compounds passes criteria.

Analyte & Samples(s) Qualified:

2,2,4-Trimethylpentane
S087895-CCV2

MADEP-VPH-Feb 2018 Rev 2.1

No significant modifications were made to the method. All VPH samples were received preserved properly in methanol with a soil/methanol ratio of 1:1 +/- 25% completely covered by methanol in the proper containers specified on the chain-of-custody form unless specified in this narrative.

Analytical column used for VPH analysis is Restek, Rtx-502.2, 105meter, 0.53mmID, 3um df. Trap used for VPH analysis is Carbopack B/CarboSieveS-III.

The results of analyses reported only relate to samples submitted to Con-Test, a Pace Analytical Laboratory, for testing.
I certify that the analyses listed above, unless specifically listed as subcontracted, if any, were performed under my direction according to the approved methodologies listed in this document, and that based upon my inquiry of those individuals immediately responsible for obtaining the information, the material contained in this report is, to the best of my knowledge and belief, accurate and complete.

Lisa A. Worthington
Technical Representative

con-test® A Pace Analytical® Laboratory

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Springfield, MA
Sample Description:
Work Order: 23E2637

Date Received: 5/18/2023

Field Sample #: BT-ENW (3-6)
Sampled: 5/18/2023 10:45

Sample ID: 23E2637-01

Sample Matrix: Soil

Petroleum Hydrocarbons Analyses - EPH

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
C9-C18 Aliphatics	ND	11	mg/Kg dry	1		MADEP EPH rev 2.1	5/19/23	5/27/23 2:51	RDD
C19-C36 Aliphatics	ND	11	mg/Kg dry	1		MADEP EPH rev 2.1	5/19/23	5/27/23 2:51	RDD
Unadjusted C11-C22 Aromatics	ND	11	mg/Kg dry	1		MADEP EPH rev 2.1	5/19/23	5/27/23 2:51	RDD
C11-C22 Aromatics	ND	11	mg/Kg dry	1		MADEP EPH rev 2.1	5/19/23	5/27/23 2:51	RDD
Acenaphthene	ND	0.11	mg/Kg dry	1		MADEP EPH rev 2.1	5/19/23	5/27/23 2:51	RDD
Acenaphthylene	ND	0.11	mg/Kg dry	1		MADEP EPH rev 2.1	5/19/23	5/27/23 2:51	RDD
Anthracene	ND	0.11	mg/Kg dry	1		MADEP EPH rev 2.1	5/19/23	5/27/23 2:51	RDD
Benzo(a)anthracene	ND	0.11	mg/Kg dry	1		MADEP EPH rev 2.1	5/19/23	5/27/23 2:51	RDD
Benzo(a)pyrene	ND	0.11	mg/Kg dry	1		MADEP EPH rev 2.1	5/19/23	5/27/23 2:51	RDD
Benzo(b)fluoranthene	ND	0.11	mg/Kg dry	1		MADEP EPH rev 2.1	5/19/23	5/27/23 2:51	RDD
Benzo(g,h,i)perylene	ND	0.11	mg/Kg dry	1		MADEP EPH rev 2.1	5/19/23	5/27/23 2:51	RDD
Benzo(k)fluoranthene	ND	0.11	mg/Kg dry	1		MADEP EPH rev 2.1	5/19/23	5/27/23 2:51	RDD
Chrysene	ND	0.11	mg/Kg dry	1		MADEP EPH rev 2.1	5/19/23	5/27/23 2:51	RDD
Dibenz(a,h)anthracene	ND	0.11	mg/Kg dry	1		MADEP EPH rev 2.1	5/19/23	5/27/23 2:51	RDD
Fluoranthene	ND	0.11	mg/Kg dry	1		MADEP EPH rev 2.1	5/19/23	5/27/23 2:51	RDD
Fluorene	ND	0.11	mg/Kg dry	1		MADEP EPH rev 2.1	5/19/23	5/27/23 2:51	RDD
Indeno(1,2,3-cd)pyrene	ND	0.11	mg/Kg dry	1		MADEP EPH rev 2.1	5/19/23	5/27/23 2:51	RDD
2-Methylnaphthalene	ND	0.11	mg/Kg dry	1		MADEP EPH rev 2.1	5/19/23	5/27/23 2:51	RDD
Naphthalene	ND	0.11	mg/Kg dry	1		MADEP EPH rev 2.1	5/19/23	5/27/23 2:51	RDD
Phenanthrene	ND	0.11	mg/Kg dry	1		MADEP EPH rev 2.1	5/19/23	5/27/23 2:51	RDD
Pyrene	ND	0.11	mg/Kg dry	1		MADEP EPH rev 2.1	5/19/23	5/27/23 2:51	RDD

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Chlorooctadecane (COD)	51.0	40-140		5/27/23 2:51
o-Terphenyl (OTP)	54.0	40-140		5/27/23 2:51
2-Bromonaphthalene	92.0	40-140		5/27/23 2:51
2-Fluorobiphenyl	88.4	40-140		5/27/23 2:51

con-test® A Pace Analytical® Laboratory

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Springfield, MA
Sample Description:
Work Order: 23E2637

Date Received: 5/18/2023

Field Sample #: BT-ENW (3-6)
Sampled: 5/18/2023 10:45

Sample ID: 23E2637-01

Sample Matrix: Soil

Petroleum Hydrocarbons Analyses - VPH

Soil/Methanol Preservation Ratio: 1.03

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Unadjusted C5-C8 Aliphatics	ND	11	mg/Kg dry	1		MADEP-VPH-Feb 2018 Rev 2.1	5/19/23	5/19/23 15:13	EEH
C5-C8 Aliphatics	ND	11	mg/Kg dry	1		MADEP-VPH-Feb 2018 Rev 2.1	5/19/23	5/19/23 15:13	EEH
Unadjusted C9-C12 Aliphatics	ND	11	mg/Kg dry	1		MADEP-VPH-Feb 2018 Rev 2.1	5/19/23	5/19/23 15:13	EEH
C9-C12 Aliphatics	ND	11	mg/Kg dry	1		MADEP-VPH-Feb 2018 Rev 2.1	5/19/23	5/19/23 15:13	EEH
C9-C10 Aromatics	ND	11	mg/Kg dry	1		MADEP-VPH-Feb 2018 Rev 2.1	5/19/23	5/19/23 15:13	EEH
Benzene	ND	0.054	mg/Kg dry	1		MADEP-VPH-Feb 2018 Rev 2.1	5/19/23	5/19/23 15:13	EEH
Ethylbenzene	ND	0.054	mg/Kg dry	1		MADEP-VPH-Feb 2018 Rev 2.1	5/19/23	5/19/23 15:13	EEH
Methyl tert-Butyl Ether (MTBE)	ND	0.054	mg/Kg dry	1		MADEP-VPH-Feb 2018 Rev 2.1	5/19/23	5/19/23 15:13	EEH
Naphthalene	ND	0.27	mg/Kg dry	1		MADEP-VPH-Feb 2018 Rev 2.1	5/19/23	5/19/23 15:13	EEH
Toluene	ND	0.054	mg/Kg dry	1		MADEP-VPH-Feb 2018 Rev 2.1	5/19/23	5/19/23 15:13	EEH
m+p Xylene	ND	0.11	mg/Kg dry	1		MADEP-VPH-Feb 2018 Rev 2.1	5/19/23	5/19/23 15:13	EEH
o-Xylene	ND	0.054	mg/Kg dry	1		MADEP-VPH-Feb 2018 Rev 2.1	5/19/23	5/19/23 15:13	EEH

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
2,5-Dibromotoluene (FID)	107	70-130		5/19/23 15:13
2,5-Dibromotoluene (PID)	110	70-130		5/19/23 15:13

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Springfield, MA
Sample Description:
Work Order: 23E2637

Date Received: 5/18/2023

Field Sample #: BT-ENW (3-6)
Sampled: 5/18/2023 10:45

Sample ID: 23E2637-01

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	94.5		% Wt	1		SM 2540G	5/25/23	5/25/23 11:30	JLC

con-test® A Pace Analytical® Laboratory

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Springfield, MA
Sample Description:
Work Order: 23E2637

Date Received: 5/18/2023

Field Sample #: BT-ESW (4-7)
Sampled: 5/18/2023 11:15

Sample ID: 23E2637-02

Sample Matrix: Soil

Petroleum Hydrocarbons Analyses - EPH

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
C9-C18 Aliphatics	ND	11	mg/Kg dry	1		MADEP EPH rev 2.1	5/19/23	5/27/23 3:29	RDD
C19-C36 Aliphatics	27	11	mg/Kg dry	1		MADEP EPH rev 2.1	5/19/23	5/27/23 3:29	RDD
Unadjusted C11-C22 Aromatics	21	11	mg/Kg dry	1		MADEP EPH rev 2.1	5/19/23	5/27/23 3:29	RDD
C11-C22 Aromatics	17	11	mg/Kg dry	1		MADEP EPH rev 2.1	5/19/23	5/27/23 3:29	RDD
Acenaphthene	ND	0.11	mg/Kg dry	1		MADEP EPH rev 2.1	5/19/23	5/27/23 3:29	RDD
Acenaphthylene	ND	0.11	mg/Kg dry	1		MADEP EPH rev 2.1	5/19/23	5/27/23 3:29	RDD
Anthracene	ND	0.11	mg/Kg dry	1		MADEP EPH rev 2.1	5/19/23	5/27/23 3:29	RDD
Benzo(a)anthracene	0.35	0.11	mg/Kg dry	1		MADEP EPH rev 2.1	5/19/23	5/27/23 3:29	RDD
Benzo(a)pyrene	0.37	0.11	mg/Kg dry	1		MADEP EPH rev 2.1	5/19/23	5/27/23 3:29	RDD
Benzo(b)fluoranthene	0.49	0.11	mg/Kg dry	1		MADEP EPH rev 2.1	5/19/23	5/27/23 3:29	RDD
Benzo(g,h,i)perylene	0.29	0.11	mg/Kg dry	1		MADEP EPH rev 2.1	5/19/23	5/27/23 3:29	RDD
Benzo(k)fluoranthene	0.19	0.11	mg/Kg dry	1		MADEP EPH rev 2.1	5/19/23	5/27/23 3:29	RDD
Chrysene	0.44	0.11	mg/Kg dry	1		MADEP EPH rev 2.1	5/19/23	5/27/23 3:29	RDD
Dibenz(a,h)anthracene	ND	0.11	mg/Kg dry	1		MADEP EPH rev 2.1	5/19/23	5/27/23 3:29	RDD
Fluoranthene	0.62	0.11	mg/Kg dry	1		MADEP EPH rev 2.1	5/19/23	5/27/23 3:29	RDD
Fluorene	ND	0.11	mg/Kg dry	1		MADEP EPH rev 2.1	5/19/23	5/27/23 3:29	RDD
Indeno(1,2,3-cd)pyrene	0.23	0.11	mg/Kg dry	1		MADEP EPH rev 2.1	5/19/23	5/27/23 3:29	RDD
2-Methylnaphthalene	ND	0.11	mg/Kg dry	1		MADEP EPH rev 2.1	5/19/23	5/27/23 3:29	RDD
Naphthalene	ND	0.11	mg/Kg dry	1		MADEP EPH rev 2.1	5/19/23	5/27/23 3:29	RDD
Phenanthrene	0.22	0.11	mg/Kg dry	1		MADEP EPH rev 2.1	5/19/23	5/27/23 3:29	RDD
Pyrene	0.61	0.11	mg/Kg dry	1		MADEP EPH rev 2.1	5/19/23	5/27/23 3:29	RDD

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Chlorooctadecane (COD)	48.5	40-140		5/27/23 3:29
o-Terphenyl (OTP)	64.7	40-140		5/27/23 3:29
2-Bromonaphthalene	110	40-140		5/27/23 3:29
2-Fluorobiphenyl	105	40-140		5/27/23 3:29

con-test® A Pace Analytical® Laboratory

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Springfield, MA
Sample Description:
Work Order: 23E2637

Date Received: 5/18/2023

Field Sample #: BT-ESW (4-7)
Sampled: 5/18/2023 11:15

Sample ID: 23E2637-02

Sample Matrix: Soil

Petroleum Hydrocarbons Analyses - VPH

Soil/Methanol Preservation Ratio: 1.07

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Unadjusted C5-C8 Aliphatics	ND	12	mg/Kg dry	1		MADEP-VPH-Feb 2018 Rev 2.1	5/19/23	5/19/23 15:51	EEH
C5-C8 Aliphatics	ND	12	mg/Kg dry	1		MADEP-VPH-Feb 2018 Rev 2.1	5/19/23	5/19/23 15:51	EEH
Unadjusted C9-C12 Aliphatics	ND	12	mg/Kg dry	1		MADEP-VPH-Feb 2018 Rev 2.1	5/19/23	5/19/23 15:51	EEH
C9-C12 Aliphatics	ND	12	mg/Kg dry	1		MADEP-VPH-Feb 2018 Rev 2.1	5/19/23	5/19/23 15:51	EEH
C9-C10 Aromatics	ND	12	mg/Kg dry	1		MADEP-VPH-Feb 2018 Rev 2.1	5/19/23	5/19/23 15:51	EEH
Benzene	ND	0.058	mg/Kg dry	1		MADEP-VPH-Feb 2018 Rev 2.1	5/19/23	5/19/23 15:51	EEH
Ethylbenzene	ND	0.058	mg/Kg dry	1		MADEP-VPH-Feb 2018 Rev 2.1	5/19/23	5/19/23 15:51	EEH
Methyl tert-Butyl Ether (MTBE)	ND	0.058	mg/Kg dry	1		MADEP-VPH-Feb 2018 Rev 2.1	5/19/23	5/19/23 15:51	EEH
Naphthalene	ND	0.29	mg/Kg dry	1		MADEP-VPH-Feb 2018 Rev 2.1	5/19/23	5/19/23 15:51	EEH
Toluene	ND	0.058	mg/Kg dry	1		MADEP-VPH-Feb 2018 Rev 2.1	5/19/23	5/19/23 15:51	EEH
m+p Xylene	ND	0.12	mg/Kg dry	1		MADEP-VPH-Feb 2018 Rev 2.1	5/19/23	5/19/23 15:51	EEH
o-Xylene	ND	0.058	mg/Kg dry	1		MADEP-VPH-Feb 2018 Rev 2.1	5/19/23	5/19/23 15:51	EEH

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
2,5-Dibromotoluene (FID)	112	70-130		5/19/23 15:51
2,5-Dibromotoluene (PID)	112	70-130		5/19/23 15:51

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Springfield, MA
Sample Description:
Work Order: 23E2637

Date Received: 5/18/2023

Field Sample #: BT-ESW (4-7)
Sampled: 5/18/2023 11:15

Sample ID: 23E2637-02

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	89.3		% Wt	1		SM 2540G	5/25/23	5/25/23 11:30	JLC

con-test® A Pace Analytical® Laboratory

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Springfield, MA
Sample Description:
Work Order: 23E2637

Date Received: 5/18/2023

Field Sample #: DP-2A (0-2)
Sampled: 5/18/2023 13:15

Sample ID: 23E2637-03

Sample Matrix: Soil

Semivolatile Organic Compounds by GC/MS

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Acenaphthene	0.94	0.37	mg/Kg dry	2		SW-846 8270E	5/24/23	5/26/23 13:13	BGL
Acenaphthylene	0.45	0.37	mg/Kg dry	2		SW-846 8270E	5/24/23	5/26/23 13:13	BGL
Anthracene	2.5	0.37	mg/Kg dry	2		SW-846 8270E	5/24/23	5/26/23 13:13	BGL
Benzo(a)anthracene	8.0	0.37	mg/Kg dry	2		SW-846 8270E	5/24/23	5/26/23 13:13	BGL
Benzo(a)pyrene	7.9	0.37	mg/Kg dry	2		SW-846 8270E	5/24/23	5/26/23 13:13	BGL
Benzo(b)fluoranthene	11	1.9	mg/Kg dry	10		SW-846 8270E	5/24/23	5/26/23 13:36	BGL
Benzo(g,h,i)perylene	5.6	0.37	mg/Kg dry	2		SW-846 8270E	5/24/23	5/26/23 13:13	BGL
Benzo(k)fluoranthene	4.3	0.37	mg/Kg dry	2		SW-846 8270E	5/24/23	5/26/23 13:13	BGL
Chrysene	7.9	0.37	mg/Kg dry	2		SW-846 8270E	5/24/23	5/26/23 13:13	BGL
Dibenz(a,h)anthracene	1.4	0.37	mg/Kg dry	2		SW-846 8270E	5/24/23	5/26/23 13:13	BGL
Fluoranthene	20	1.9	mg/Kg dry	10		SW-846 8270E	5/24/23	5/26/23 13:36	BGL
Fluorene	0.82	0.37	mg/Kg dry	2		SW-846 8270E	5/24/23	5/26/23 13:13	BGL
Indeno(1,2,3-cd)pyrene	5.9	0.37	mg/Kg dry	2		SW-846 8270E	5/24/23	5/26/23 13:13	BGL
2-Methylnaphthalene	ND	0.37	mg/Kg dry	2		SW-846 8270E	5/24/23	5/26/23 13:13	BGL
Naphthalene	0.39	0.37	mg/Kg dry	2		SW-846 8270E	5/24/23	5/26/23 13:13	BGL
Phenanthrene	12	1.9	mg/Kg dry	10		SW-846 8270E	5/24/23	5/26/23 13:36	BGL
Pyrene	17	1.9	mg/Kg dry	10		SW-846 8270E	5/24/23	5/26/23 13:36	BGL

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Nitrobenzene-d5	60.9	30-130		5/26/23 13:36
Nitrobenzene-d5	57.4	30-130		5/26/23 13:13
2-Fluorobiphenyl	69.2	30-130		5/26/23 13:36
2-Fluorobiphenyl	63.7	30-130		5/26/23 13:13
p-Terphenyl-d14	73.6	30-130		5/26/23 13:36
p-Terphenyl-d14	67.7	30-130		5/26/23 13:13

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Springfield, MA
Sample Description:
Work Order: 23E2637

Date Received: 5/18/2023

Field Sample #: DP-2A (0-2)
Sampled: 5/18/2023 13:15

Sample ID: 23E2637-03

Sample Matrix: Soil

Metals Analyses (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Lead	92	0.54	mg/Kg dry	1		SW-846 6010D	5/22/23	5/23/23 15:10	MJH

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Springfield, MA
Sample Description:
Work Order: 23E2637

Date Received: 5/18/2023

Field Sample #: DP-2A (0-2)
Sampled: 5/18/2023 13:15

Sample ID: 23E2637-03

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	90.8		% Wt	1		SM 2540G	5/25/23	5/25/23 11:30	JLC

con-test® A Pace Analytical® Laboratory

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Springfield, MA | Sample Description: | Work Order: 23E2637

Date Received: 5/18/2023

Field Sample #: DP-2A (0-2) | Sampled: 5/18/2023 13:15

Sample ID: 23E2637-03

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
See Attached Subcontracted Report	-		N/A	1		PLM/SEM			MVL

con-test® A Pace Analytical® Laboratory

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Springfield, MA
Sample Description:
Work Order: 23E2637

Date Received: 5/18/2023

Field Sample #: CM-43N (8-11)
Sampled: 5/18/2023 13:20

Sample ID: 23E2637-04

Sample Matrix: Soil

Petroleum Hydrocarbons Analyses - EPH

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
C9-C18 Aliphatics	ND	12	mg/Kg dry	1		MADEP EPH rev 2.1	5/22/23	5/27/23 3:10	RDD
C19-C36 Aliphatics	24	12	mg/Kg dry	1		MADEP EPH rev 2.1	5/22/23	5/27/23 3:10	RDD
Unadjusted C11-C22 Aromatics	15	12	mg/Kg dry	1		MADEP EPH rev 2.1	5/22/23	5/27/23 3:10	RDD
C11-C22 Aromatics	15	12	mg/Kg dry	1		MADEP EPH rev 2.1	5/22/23	5/27/23 3:10	RDD
Acenaphthene	ND	0.12	mg/Kg dry	1		MADEP EPH rev 2.1	5/22/23	5/27/23 3:10	RDD
Acenaphthylene	ND	0.12	mg/Kg dry	1		MADEP EPH rev 2.1	5/22/23	5/27/23 3:10	RDD
Anthracene	ND	0.12	mg/Kg dry	1		MADEP EPH rev 2.1	5/22/23	5/27/23 3:10	RDD
Benzo(a)anthracene	ND	0.12	mg/Kg dry	1		MADEP EPH rev 2.1	5/22/23	5/27/23 3:10	RDD
Benzo(a)pyrene	ND	0.12	mg/Kg dry	1		MADEP EPH rev 2.1	5/22/23	5/27/23 3:10	RDD
Benzo(b)fluoranthene	ND	0.12	mg/Kg dry	1		MADEP EPH rev 2.1	5/22/23	5/27/23 3:10	RDD
Benzo(g,h,i)perylene	ND	0.12	mg/Kg dry	1		MADEP EPH rev 2.1	5/22/23	5/27/23 3:10	RDD
Benzo(k)fluoranthene	ND	0.12	mg/Kg dry	1		MADEP EPH rev 2.1	5/22/23	5/27/23 3:10	RDD
Chrysene	ND	0.12	mg/Kg dry	1		MADEP EPH rev 2.1	5/22/23	5/27/23 3:10	RDD
Dibenz(a,h)anthracene	ND	0.12	mg/Kg dry	1		MADEP EPH rev 2.1	5/22/23	5/27/23 3:10	RDD
Fluoranthene	ND	0.12	mg/Kg dry	1		MADEP EPH rev 2.1	5/22/23	5/27/23 3:10	RDD
Fluorene	ND	0.12	mg/Kg dry	1		MADEP EPH rev 2.1	5/22/23	5/27/23 3:10	RDD
Indeno(1,2,3-cd)pyrene	ND	0.12	mg/Kg dry	1		MADEP EPH rev 2.1	5/22/23	5/27/23 3:10	RDD
2-Methylnaphthalene	ND	0.12	mg/Kg dry	1		MADEP EPH rev 2.1	5/22/23	5/27/23 3:10	RDD
Naphthalene	ND	0.12	mg/Kg dry	1		MADEP EPH rev 2.1	5/22/23	5/27/23 3:10	RDD
Phenanthrene	ND	0.12	mg/Kg dry	1		MADEP EPH rev 2.1	5/22/23	5/27/23 3:10	RDD
Pyrene	ND	0.12	mg/Kg dry	1		MADEP EPH rev 2.1	5/22/23	5/27/23 3:10	RDD

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Chlorooctadecane (COD)	48.3	40-140		5/27/23 3:10
o-Terphenyl (OTP)	53.7	40-140		5/27/23 3:10
2-Bromonaphthalene	89.9	40-140		5/27/23 3:10
2-Fluorobiphenyl	86.8	40-140		5/27/23 3:10

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Springfield, MA
Sample Description:
Work Order: 23E2637

Date Received: 5/18/2023

Field Sample #: CM-43N (8-11)
Sampled: 5/18/2023 13:20

Sample ID: 23E2637-04

Sample Matrix: Soil

Petroleum Hydrocarbons Analyses - VPH

Soil/Methanol Preservation Ratio: 1.14

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Unadjusted C5-C8 Aliphatics	ND	12	mg/Kg dry	1		MADEP-VPH-Feb 2018 Rev 2.1	5/19/23	5/19/23 16:29	EEH
C5-C8 Aliphatics	ND	12	mg/Kg dry	1		MADEP-VPH-Feb 2018 Rev 2.1	5/19/23	5/19/23 16:29	EEH
Unadjusted C9-C12 Aliphatics	ND	12	mg/Kg dry	1		MADEP-VPH-Feb 2018 Rev 2.1	5/19/23	5/19/23 16:29	EEH
C9-C12 Aliphatics	ND	12	mg/Kg dry	1		MADEP-VPH-Feb 2018 Rev 2.1	5/19/23	5/19/23 16:29	EEH
C9-C10 Aromatics	ND	12	mg/Kg dry	1		MADEP-VPH-Feb 2018 Rev 2.1	5/19/23	5/19/23 16:29	EEH
Benzene	ND	0.059	mg/Kg dry	1		MADEP-VPH-Feb 2018 Rev 2.1	5/19/23	5/19/23 16:29	EEH
Ethylbenzene	ND	0.059	mg/Kg dry	1		MADEP-VPH-Feb 2018 Rev 2.1	5/19/23	5/19/23 16:29	EEH
Methyl tert-Butyl Ether (MTBE)	ND	0.059	mg/Kg dry	1		MADEP-VPH-Feb 2018 Rev 2.1	5/19/23	5/19/23 16:29	EEH
Naphthalene	ND	0.29	mg/Kg dry	1		MADEP-VPH-Feb 2018 Rev 2.1	5/19/23	5/19/23 16:29	EEH
Toluene	ND	0.059	mg/Kg dry	1		MADEP-VPH-Feb 2018 Rev 2.1	5/19/23	5/19/23 16:29	EEH
m+p Xylene	ND	0.12	mg/Kg dry	1		MADEP-VPH-Feb 2018 Rev 2.1	5/19/23	5/19/23 16:29	EEH
o-Xylene	ND	0.059	mg/Kg dry	1		MADEP-VPH-Feb 2018 Rev 2.1	5/19/23	5/19/23 16:29	EEH

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
2,5-Dibromotoluene (FID)	105	70-130		5/19/23 16:29
2,5-Dibromotoluene (PID)	108	70-130		5/19/23 16:29

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Springfield, MA
Sample Description:
Work Order: 23E2637

Date Received: 5/18/2023

Field Sample #: CM-43N (8-11)
Sampled: 5/18/2023 13:20

Sample ID: 23E2637-04

Sample Matrix: Soil

Metals Analyses (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Lead	120	0.58	mg/Kg dry	1		SW-846 6010D	5/22/23	5/23/23 15:17	MJH

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Springfield, MA
Sample Description:
Work Order: 23E2637

Date Received: 5/18/2023

Field Sample #: CM-43N (8-11)
Sampled: 5/18/2023 13:20

Sample ID: 23E2637-04

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	86.2		% Wt	1		SM 2540G	5/25/23	5/25/23 11:30	JLC

con-test® A Pace Analytical® Laboratory

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Springfield, MA | Sample Description: | Work Order: 23E2637

Date Received: 5/18/2023

Field Sample #: CM-43SW (5-8) | Sampled: 5/18/2023 14:05

Sample ID: 23E2637-05

Sample Matrix: Soil

Petroleum Hydrocarbons Analyses - EPH

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
C9-C18 Aliphatics	ND	11	mg/Kg dry	1		MADEP EPH rev 2.1	5/22/23	5/27/23 21:12	GJB
C19-C36 Aliphatics	ND	11	mg/Kg dry	1		MADEP EPH rev 2.1	5/22/23	5/27/23 21:12	GJB
Unadjusted C11-C22 Aromatics	34	11	mg/Kg dry	1		MADEP EPH rev 2.1	5/22/23	5/27/23 21:12	GJB
C11-C22 Aromatics	22	11	mg/Kg dry	1		MADEP EPH rev 2.1	5/22/23	5/27/23 21:12	GJB
Acenaphthene	ND	0.11	mg/Kg dry	1		MADEP EPH rev 2.1	5/22/23	5/27/23 21:12	GJB
Acenaphthylene	ND	0.11	mg/Kg dry	1		MADEP EPH rev 2.1	5/22/23	5/27/23 21:12	GJB
Anthracene	0.18	0.11	mg/Kg dry	1		MADEP EPH rev 2.1	5/22/23	5/27/23 21:12	GJB
Benzo(a)anthracene	0.96	0.11	mg/Kg dry	1		MADEP EPH rev 2.1	5/22/23	5/27/23 21:12	GJB
Benzo(a)pyrene	1.2	0.11	mg/Kg dry	1		MADEP EPH rev 2.1	5/22/23	5/27/23 21:12	GJB
Benzo(b)fluoranthene	1.4	0.11	mg/Kg dry	1		MADEP EPH rev 2.1	5/22/23	5/27/23 21:12	GJB
Benzo(g,h,i)perylene	0.87	0.11	mg/Kg dry	1		MADEP EPH rev 2.1	5/22/23	5/27/23 21:12	GJB
Benzo(k)fluoranthene	0.49	0.11	mg/Kg dry	1		MADEP EPH rev 2.1	5/22/23	5/27/23 21:12	GJB
Chrysene	1.1	0.11	mg/Kg dry	1		MADEP EPH rev 2.1	5/22/23	5/27/23 21:12	GJB
Dibenz(a,h)anthracene	0.17	0.11	mg/Kg dry	1		MADEP EPH rev 2.1	5/22/23	5/27/23 21:12	GJB
Fluoranthene	2.1	0.11	mg/Kg dry	1		MADEP EPH rev 2.1	5/22/23	5/27/23 21:12	GJB
Fluorene	ND	0.11	mg/Kg dry	1		MADEP EPH rev 2.1	5/22/23	5/27/23 21:12	GJB
Indeno(1,2,3-cd)pyrene	0.83	0.11	mg/Kg dry	1		MADEP EPH rev 2.1	5/22/23	5/27/23 21:12	GJB
2-Methylnaphthalene	ND	0.11	mg/Kg dry	1		MADEP EPH rev 2.1	5/22/23	5/27/23 21:12	GJB
Naphthalene	ND	0.11	mg/Kg dry	1		MADEP EPH rev 2.1	5/22/23	5/27/23 21:12	GJB
Phenanthrene	0.69	0.11	mg/Kg dry	1		MADEP EPH rev 2.1	5/22/23	5/27/23 21:12	GJB
Pyrene	2.1	0.11	mg/Kg dry	1		MADEP EPH rev 2.1	5/22/23	5/27/23 21:12	GJB

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Chlorooctadecane (COD)	54.3	40-140		5/27/23 21:12
o-Terphenyl (OTP)	53.3	40-140		5/27/23 21:12
2-Bromonaphthalene	83.4	40-140		5/27/23 21:12
2-Fluorobiphenyl	82.9	40-140		5/27/23 21:12

con-test® A Pace Analytical® Laboratory

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Springfield, MA
Sample Description:
Work Order: 23E2637

Date Received: 5/18/2023

Field Sample #: CM-43SW (5-8)
Sampled: 5/18/2023 14:05

Sample ID: 23E2637-05

Sample Matrix: Soil

Petroleum Hydrocarbons Analyses - VPH

Soil/Methanol Preservation Ratio: 1.21

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Unadjusted C5-C8 Aliphatics	ND	11	mg/Kg dry	1		MADEP-VPH-Feb 2018 Rev 2.1	5/19/23	5/19/23 17:07	EEH
C5-C8 Aliphatics	ND	11	mg/Kg dry	1		MADEP-VPH-Feb 2018 Rev 2.1	5/19/23	5/19/23 17:07	EEH
Unadjusted C9-C12 Aliphatics	ND	11	mg/Kg dry	1		MADEP-VPH-Feb 2018 Rev 2.1	5/19/23	5/19/23 17:07	EEH
C9-C12 Aliphatics	ND	11	mg/Kg dry	1		MADEP-VPH-Feb 2018 Rev 2.1	5/19/23	5/19/23 17:07	EEH
C9-C10 Aromatics	ND	11	mg/Kg dry	1		MADEP-VPH-Feb 2018 Rev 2.1	5/19/23	5/19/23 17:07	EEH
Benzene	ND	0.053	mg/Kg dry	1		MADEP-VPH-Feb 2018 Rev 2.1	5/19/23	5/19/23 17:07	EEH
Ethylbenzene	ND	0.053	mg/Kg dry	1		MADEP-VPH-Feb 2018 Rev 2.1	5/19/23	5/19/23 17:07	EEH
Methyl tert-Butyl Ether (MTBE)	ND	0.053	mg/Kg dry	1		MADEP-VPH-Feb 2018 Rev 2.1	5/19/23	5/19/23 17:07	EEH
Naphthalene	ND	0.26	mg/Kg dry	1		MADEP-VPH-Feb 2018 Rev 2.1	5/19/23	5/19/23 17:07	EEH
Toluene	ND	0.053	mg/Kg dry	1		MADEP-VPH-Feb 2018 Rev 2.1	5/19/23	5/19/23 17:07	EEH
m+p Xylene	ND	0.11	mg/Kg dry	1		MADEP-VPH-Feb 2018 Rev 2.1	5/19/23	5/19/23 17:07	EEH
o-Xylene	ND	0.053	mg/Kg dry	1		MADEP-VPH-Feb 2018 Rev 2.1	5/19/23	5/19/23 17:07	EEH

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
2,5-Dibromotoluene (FID)	109	70-130		5/19/23 17:07
2,5-Dibromotoluene (PID)	116	70-130		5/19/23 17:07

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Springfield, MA
Sample Description:
Work Order: 23E2637

Date Received: 5/18/2023

Field Sample #: CM-43SW (5-8)
Sampled: 5/18/2023 14:05

Sample ID: 23E2637-05

Sample Matrix: Soil

Metals Analyses (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Lead	34	0.55	mg/Kg dry	1		SW-846 6010D	5/22/23	5/23/23 15:23	MJH

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Springfield, MA
Sample Description:
Work Order: 23E2637

Date Received: 5/18/2023

Field Sample #: CM-43SW (5-8)
Sampled: 5/18/2023 14:05

Sample ID: 23E2637-05

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	88.7		% Wt	1		SM 2540G	5/25/23	5/25/23 11:30	JLC

con-test® A Pace Analytical® Laboratory

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Springfield, MA
Sample Description:
Work Order: 23E2637

Date Received: 5/18/2023

Field Sample #: CM-43NW (5-8)
Sampled: 5/18/2023 14:20

Sample ID: 23E2637-06

Sample Matrix: Soil

Petroleum Hydrocarbons Analyses - EPH

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
C9-C18 Aliphatics	ND	11	mg/Kg dry	1		MADEP EPH rev 2.1	5/22/23	5/27/23 21:31	GJB
C19-C36 Aliphatics	ND	11	mg/Kg dry	1		MADEP EPH rev 2.1	5/22/23	5/27/23 21:31	GJB
Unadjusted C11-C22 Aromatics	22	11	mg/Kg dry	1		MADEP EPH rev 2.1	5/22/23	5/27/23 21:31	GJB
C11-C22 Aromatics	17	11	mg/Kg dry	1		MADEP EPH rev 2.1	5/22/23	5/27/23 21:31	GJB
Acenaphthene	ND	0.11	mg/Kg dry	1		MADEP EPH rev 2.1	5/22/23	5/27/23 21:31	GJB
Acenaphthylene	ND	0.11	mg/Kg dry	1		MADEP EPH rev 2.1	5/22/23	5/27/23 21:31	GJB
Anthracene	0.12	0.11	mg/Kg dry	1		MADEP EPH rev 2.1	5/22/23	5/27/23 21:31	GJB
Benzo(a)anthracene	0.43	0.11	mg/Kg dry	1		MADEP EPH rev 2.1	5/22/23	5/27/23 21:31	GJB
Benzo(a)pyrene	0.47	0.11	mg/Kg dry	1		MADEP EPH rev 2.1	5/22/23	5/27/23 21:31	GJB
Benzo(b)fluoranthene	0.56	0.11	mg/Kg dry	1		MADEP EPH rev 2.1	5/22/23	5/27/23 21:31	GJB
Benzo(g,h,i)perylene	0.31	0.11	mg/Kg dry	1		MADEP EPH rev 2.1	5/22/23	5/27/23 21:31	GJB
Benzo(k)fluoranthene	0.22	0.11	mg/Kg dry	1		MADEP EPH rev 2.1	5/22/23	5/27/23 21:31	GJB
Chrysene	0.52	0.11	mg/Kg dry	1		MADEP EPH rev 2.1	5/22/23	5/27/23 21:31	GJB
Dibenz(a,h)anthracene	ND	0.11	mg/Kg dry	1		MADEP EPH rev 2.1	5/22/23	5/27/23 21:31	GJB
Fluoranthene	0.88	0.11	mg/Kg dry	1		MADEP EPH rev 2.1	5/22/23	5/27/23 21:31	GJB
Fluorene	ND	0.11	mg/Kg dry	1		MADEP EPH rev 2.1	5/22/23	5/27/23 21:31	GJB
Indeno(1,2,3-cd)pyrene	0.32	0.11	mg/Kg dry	1		MADEP EPH rev 2.1	5/22/23	5/27/23 21:31	GJB
2-Methylnaphthalene	ND	0.11	mg/Kg dry	1		MADEP EPH rev 2.1	5/22/23	5/27/23 21:31	GJB
Naphthalene	ND	0.11	mg/Kg dry	1		MADEP EPH rev 2.1	5/22/23	5/27/23 21:31	GJB
Phenanthrene	0.63	0.11	mg/Kg dry	1		MADEP EPH rev 2.1	5/22/23	5/27/23 21:31	GJB
Pyrene	0.89	0.11	mg/Kg dry	1		MADEP EPH rev 2.1	5/22/23	5/27/23 21:31	GJB

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Chlorooctadecane (COD)	59.2	40-140		5/27/23 21:31
o-Terphenyl (OTP)	55.8	40-140		5/27/23 21:31
2-Bromonaphthalene	81.7	40-140		5/27/23 21:31
2-Fluorobiphenyl	82.2	40-140		5/27/23 21:31

con-test® A Pace Analytical® Laboratory

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Springfield, MA
Sample Description:
Work Order: 23E2637

Date Received: 5/18/2023

Field Sample #: CM-43NW (5-8)
Sampled: 5/18/2023 14:20

Sample ID: 23E2637-06

Sample Matrix: Soil

Petroleum Hydrocarbons Analyses - VPH

Soil/Methanol Preservation Ratio: 1.12

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Unadjusted C5-C8 Aliphatics	ND	11	mg/Kg dry	1		MADEP-VPH-Feb 2018 Rev 2.1	5/19/23	5/19/23 17:46	EEH
C5-C8 Aliphatics	ND	11	mg/Kg dry	1		MADEP-VPH-Feb 2018 Rev 2.1	5/19/23	5/19/23 17:46	EEH
Unadjusted C9-C12 Aliphatics	ND	11	mg/Kg dry	1		MADEP-VPH-Feb 2018 Rev 2.1	5/19/23	5/19/23 17:46	EEH
C9-C12 Aliphatics	ND	11	mg/Kg dry	1		MADEP-VPH-Feb 2018 Rev 2.1	5/19/23	5/19/23 17:46	EEH
C9-C10 Aromatics	ND	11	mg/Kg dry	1		MADEP-VPH-Feb 2018 Rev 2.1	5/19/23	5/19/23 17:46	EEH
Benzene	ND	0.054	mg/Kg dry	1		MADEP-VPH-Feb 2018 Rev 2.1	5/19/23	5/19/23 17:46	EEH
Ethylbenzene	ND	0.054	mg/Kg dry	1		MADEP-VPH-Feb 2018 Rev 2.1	5/19/23	5/19/23 17:46	EEH
Methyl tert-Butyl Ether (MTBE)	ND	0.054	mg/Kg dry	1		MADEP-VPH-Feb 2018 Rev 2.1	5/19/23	5/19/23 17:46	EEH
Naphthalene	ND	0.27	mg/Kg dry	1		MADEP-VPH-Feb 2018 Rev 2.1	5/19/23	5/19/23 17:46	EEH
Toluene	ND	0.054	mg/Kg dry	1		MADEP-VPH-Feb 2018 Rev 2.1	5/19/23	5/19/23 17:46	EEH
m+p Xylene	ND	0.11	mg/Kg dry	1		MADEP-VPH-Feb 2018 Rev 2.1	5/19/23	5/19/23 17:46	EEH
o-Xylene	ND	0.054	mg/Kg dry	1		MADEP-VPH-Feb 2018 Rev 2.1	5/19/23	5/19/23 17:46	EEH

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
2,5-Dibromotoluene (FID)	113	70-130		5/19/23 17:46
2,5-Dibromotoluene (PID)	117	70-130		5/19/23 17:46

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Springfield, MA
Sample Description:
Work Order: 23E2637

Date Received: 5/18/2023

Field Sample #: CM-43NW (5-8)
Sampled: 5/18/2023 14:20

Sample ID: 23E2637-06

Sample Matrix: Soil

Metals Analyses (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Lead	70	0.52	mg/Kg dry	1		SW-846 6010D	5/22/23	5/23/23 15:28	MJH

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Springfield, MA
Sample Description:
Work Order: 23E2637

Date Received: 5/18/2023

Field Sample #: CM-43NW (5-8)
Sampled: 5/18/2023 14:20

Sample ID: 23E2637-06

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	91.3		% Wt	1		SM 2540G	5/25/23	5/25/23 11:30	JLC

con-test® A Pace Analytical® Laboratory

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Sample Extraction Data

Prep Method:SW-846 3546 **Analytical Method:MADEP EPH rev 2.1**

Lab Number [Field ID]	Batch	Initial [g]	Final [mL]	Date
23E2637-01 [BT-ENW (3-6)]	B340848	20.1	2.00	05/19/23
23E2637-02 [BT-ESW (4-7)]	B340848	20.2	2.00	05/19/23

Prep Method:SW-846 3546 **Analytical Method:MADEP EPH rev 2.1**

Lab Number [Field ID]	Batch	Initial [g]	Final [mL]	Date
23E2637-04 [CM-43N (8-11)]	B341020	20.1	2.00	05/22/23
23E2637-05 [CM-43SW (5-8)]	B341020	20.1	2.00	05/22/23
23E2637-06 [CM-43NW (5-8)]	B341020	20.0	2.00	05/22/23

Prep Method:MA VPH **Analytical Method:MADEP-VPH-Feb 2018 Rev 2.1**

Lab Number [Field ID]	Batch	Initial [g]	Final [mL]	Date
23E2637-01 [BT-ENW (3-6)]	B340781	15.5	15.8	05/19/23
23E2637-02 [BT-ESW (4-7)]	B340781	16.0	16.7	05/19/23
23E2637-04 [CM-43N (8-11)]	B340781	17.1	17.4	05/19/23
23E2637-05 [CM-43SW (5-8)]	B340781	18.2	17.0	05/19/23
23E2637-06 [CM-43NW (5-8)]	B340781	16.8	16.5	05/19/23

Prep Method:% Solids **Analytical Method:SM 2540G**

Lab Number [Field ID]	Batch	Date
23E2637-01 [BT-ENW (3-6)]	B341391	05/25/23
23E2637-02 [BT-ESW (4-7)]	B341391	05/25/23
23E2637-03 [DP-2A (0-2)]	B341391	05/25/23
23E2637-04 [CM-43N (8-11)]	B341391	05/25/23
23E2637-05 [CM-43SW (5-8)]	B341391	05/25/23
23E2637-06 [CM-43NW (5-8)]	B341391	05/25/23

Prep Method:SW-846 3050B **Analytical Method:SW-846 6010D**

Lab Number [Field ID]	Batch	Initial [g]	Final [mL]	Date
23E2637-03 [DP-2A (0-2)]	B340929	1.52	50.0	05/22/23
23E2637-04 [CM-43N (8-11)]	B340929	1.51	50.0	05/22/23
23E2637-05 [CM-43SW (5-8)]	B340929	1.53	50.0	05/22/23
23E2637-06 [CM-43NW (5-8)]	B340929	1.58	50.0	05/22/23

Prep Method:SW-846 3546 **Analytical Method:SW-846 8270E**

Lab Number [Field ID]	Batch	Initial [g]	Final [mL]	Date
23E2637-03 [DP-2A (0-2)]	B341300	30.0	1.00	05/24/23
23E2637-03RE1 [DP-2A (0-2)]	B341300	30.0	1.00	05/24/23

con-test® A Pace Analytical® Laboratory

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

QUALITY CONTROL

Semivolatile Organic Compounds by GC/MS - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B341300 - SW-846 3546										
Blank (B341300-BLK1)				Prepared: 05/24/23 Analyzed: 05/25/23						
Acenaphthene	ND	0.17	mg/Kg wet							
Acenaphthylene	ND	0.17	mg/Kg wet							
Anthracene	ND	0.17	mg/Kg wet							
Benzo(a)anthracene	ND	0.17	mg/Kg wet							
Benzo(a)pyrene	ND	0.17	mg/Kg wet							
Benzo(b)fluoranthene	ND	0.17	mg/Kg wet							
Benzo(g,h,i)perylene	ND	0.17	mg/Kg wet							
Benzo(k)fluoranthene	ND	0.17	mg/Kg wet							
Chrysene	ND	0.17	mg/Kg wet							
Dibenz(a,h)anthracene	ND	0.17	mg/Kg wet							
Fluoranthene	ND	0.17	mg/Kg wet							
Fluorene	ND	0.17	mg/Kg wet							
Indeno(1,2,3-cd)pyrene	ND	0.17	mg/Kg wet							
2-Methylnaphthalene	ND	0.17	mg/Kg wet							
Naphthalene	ND	0.17	mg/Kg wet							
Phenanthrene	ND	0.17	mg/Kg wet							
Pyrene	ND	0.17	mg/Kg wet							
Surrogate: Nitrobenzene-d5	*2.07*		mg/Kg wet	3.33		62.2	30-130			
Surrogate: 2-Fluorobiphenyl	*2.24*		mg/Kg wet	3.33		67.2	30-130			
Surrogate: p-Terphenyl-d14	*2.79*		mg/Kg wet	3.33		83.7	30-130			
LCS (B341300-BS1)				Prepared: 05/24/23 Analyzed: 05/25/23						
Acenaphthene	1.08	0.17	mg/Kg wet	1.67		64.8	40-140			
Acenaphthylene	1.08	0.17	mg/Kg wet	1.67		64.6	40-140			
Anthracene	1.14	0.17	mg/Kg wet	1.67		68.5	40-140			
Benzo(a)anthracene	1.12	0.17	mg/Kg wet	1.67		67.2	40-140			
Benzo(a)pyrene	1.07	0.17	mg/Kg wet	1.67		64.0	40-140			
Benzo(b)fluoranthene	1.21	0.17	mg/Kg wet	1.67		72.5	40-140			
Benzo(g,h,i)perylene	1.15	0.17	mg/Kg wet	1.67		69.0	40-140			
Benzo(k)fluoranthene	1.21	0.17	mg/Kg wet	1.67		72.5	40-140			
Chrysene	1.09	0.17	mg/Kg wet	1.67		65.4	40-140			
Dibenz(a,h)anthracene	1.12	0.17	mg/Kg wet	1.67		67.3	40-140			
Fluoranthene	1.09	0.17	mg/Kg wet	1.67		65.2	40-140			
Fluorene	1.12	0.17	mg/Kg wet	1.67		66.9	40-140			
Indeno(1,2,3-cd)pyrene	1.11	0.17	mg/Kg wet	1.67		66.6	40-140			
2-Methylnaphthalene	0.954	0.17	mg/Kg wet	1.67		57.3	40-140			
Naphthalene	0.998	0.17	mg/Kg wet	1.67		59.9	40-140			
Phenanthrene	1.13	0.17	mg/Kg wet	1.67		67.6	40-140			
Pyrene	1.13	0.17	mg/Kg wet	1.67		67.5	40-140			
Surrogate: Nitrobenzene-d5	*2.08*		mg/Kg wet	3.33		62.5	30-130			
Surrogate: 2-Fluorobiphenyl	*2.28*		mg/Kg wet	3.33		68.4	30-130			
Surrogate: p-Terphenyl-d14	*2.70*		mg/Kg wet	3.33		80.9	30-130			

con-test® A Pace Analytical® Laboratory

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

QUALITY CONTROL

Semivolatile Organic Compounds by GC/MS - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B341300 - SW-846 3546										
LCS Dup (B341300-BSD1)				Prepared: 05/24/23 Analyzed: 05/25/23						
Acenaphthene	1.02	0.17	mg/Kg wet	1.67		61.5	40-140	5.23	30	
Acenaphthylene	1.02	0.17	mg/Kg wet	1.67		61.3	40-140	5.28	30	
Anthracene	1.15	0.17	mg/Kg wet	1.67		68.8	40-140	0.379	30	
Benzo(a)anthracene	1.12	0.17	mg/Kg wet	1.67		67.3	40-140	0.119	30	
Benzo(a)pyrene	1.07	0.17	mg/Kg wet	1.67		64.3	40-140	0.405	30	
Benzo(b)fluoranthene	1.19	0.17	mg/Kg wet	1.67		71.5	40-140	1.47	30	
Benzo(g,h,i)perylene	1.15	0.17	mg/Kg wet	1.67		68.9	40-140	0.203	30	
Benzo(k)fluoranthene	1.22	0.17	mg/Kg wet	1.67		73.4	40-140	1.18	30	
Chrysene	1.08	0.17	mg/Kg wet	1.67		64.8	40-140	0.952	30	
Dibenz(a,h)anthracene	1.15	0.17	mg/Kg wet	1.67		69.0	40-140	2.46	30	
Fluoranthene	1.10	0.17	mg/Kg wet	1.67		66.0	40-140	1.16	30	
Fluorene	1.10	0.17	mg/Kg wet	1.67		66.2	40-140	0.991	30	
Indeno(1,2,3-cd)pyrene	1.14	0.17	mg/Kg wet	1.67		68.7	40-140	3.14	30	
2-Methylnaphthalene	0.878	0.17	mg/Kg wet	1.67		52.7	40-140	8.37	30	
Naphthalene	0.912	0.17	mg/Kg wet	1.67		54.7	40-140	8.97	30	
Phenanthrene	1.13	0.17	mg/Kg wet	1.67		67.8	40-140	0.296	30	
Pyrene	1.08	0.17	mg/Kg wet	1.67		64.7	40-140	4.36	30	
Surrogate: Nitrobenzene-d5	*1.89*		mg/Kg wet	3.33		56.6	30-130			
Surrogate: 2-Fluorobiphenyl	*2.12*		mg/Kg wet	3.33		63.5	30-130			
Surrogate: p-Terphenyl-d14	*2.55*		mg/Kg wet	3.33		76.5	30-130			

con-test® A Pace Analytical® Laboratory

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

QUALITY CONTROL

Petroleum Hydrocarbons Analyses - EPH - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B340848 - SW-846 3546										
Blank (B340848-BLK1)				Prepared: 05/19/23 Analyzed: 05/22/23						
C9-C18 Aliphatics	ND	10	mg/Kg wet							
C19-C36 Aliphatics	ND	10	mg/Kg wet							
Unadjusted C11-C22 Aromatics	ND	10	mg/Kg wet							
C11-C22 Aromatics	ND	10	mg/Kg wet							
Acenaphthene	ND	0.10	mg/Kg wet							
Acenaphthylene	ND	0.10	mg/Kg wet							
Anthracene	ND	0.10	mg/Kg wet							
Benzo(a)anthracene	ND	0.10	mg/Kg wet							
Benzo(a)pyrene	ND	0.10	mg/Kg wet							
Benzo(b)fluoranthene	ND	0.10	mg/Kg wet							
Benzo(g,h,i)perylene	ND	0.10	mg/Kg wet							
Benzo(k)fluoranthene	ND	0.10	mg/Kg wet							
Chrysene	ND	0.10	mg/Kg wet							
Dibenz(a,h)anthracene	ND	0.10	mg/Kg wet							
Fluoranthene	ND	0.10	mg/Kg wet							
Fluorene	ND	0.10	mg/Kg wet							
Indeno(1,2,3-cd)pyrene	ND	0.10	mg/Kg wet							
2-Methylnaphthalene	ND	0.10	mg/Kg wet							
Naphthalene	ND	0.10	mg/Kg wet							
Phenanthrene	ND	0.10	mg/Kg wet							
Pyrene	ND	0.10	mg/Kg wet							
Naphthalene-aliphatic fraction	ND	0.10	mg/Kg wet							
2-Methylnaphthalene-aliphatic fraction	ND	0.10	mg/Kg wet							
Surrogate: Chlorooctadecane (COD)	*2.78*		mg/Kg wet	5.00		55.6	40-140			
Surrogate: o-Terphenyl (OTP)	*3.00*		mg/Kg wet	5.00		60.0	40-140			
Surrogate: 2-Bromonaphthalene	*4.15*		mg/Kg wet	5.00		83.1	40-140			
Surrogate: 2-Fluorobiphenyl	*4.04*		mg/Kg wet	5.00		80.8	40-140			
LCS (B340848-BS1)				Prepared: 05/19/23 Analyzed: 05/22/23						
C9-C18 Aliphatics	23.6	10	mg/Kg wet	30.0		78.6	40-140			
C19-C36 Aliphatics	36.1	10	mg/Kg wet	40.0		90.3	40-140			
Unadjusted C11-C22 Aromatics	62.8	10	mg/Kg wet	85.0		73.9	40-140			
Acenaphthene	3.44	0.10	mg/Kg wet	5.00		68.8	40-140			
Acenaphthylene	3.18	0.10	mg/Kg wet	5.00		63.7	40-140			
Anthracene	3.53	0.10	mg/Kg wet	5.00		70.7	40-140			
Benzo(a)anthracene	3.47	0.10	mg/Kg wet	5.00		69.4	40-140			
Benzo(a)pyrene	3.52	0.10	mg/Kg wet	5.00		70.4	40-140			
Benzo(b)fluoranthene	3.29	0.10	mg/Kg wet	5.00		65.8	40-140			
Benzo(g,h,i)perylene	3.17	0.10	mg/Kg wet	5.00		63.4	40-140			
Benzo(k)fluoranthene	3.24	0.10	mg/Kg wet	5.00		64.8	40-140			
Chrysene	3.75	0.10	mg/Kg wet	5.00		74.9	40-140			
Dibenz(a,h)anthracene	3.37	0.10	mg/Kg wet	5.00		67.5	40-140			
Fluoranthene	3.38	0.10	mg/Kg wet	5.00		67.7	40-140			
Fluorene	3.57	0.10	mg/Kg wet	5.00		71.3	40-140			
Indeno(1,2,3-cd)pyrene	3.26	0.10	mg/Kg wet	5.00		65.2	40-140			
2-Methylnaphthalene	3.35	0.10	mg/Kg wet	5.00		66.9	40-140			
Naphthalene	3.21	0.10	mg/Kg wet	5.00		64.2	40-140			
Phenanthrene	3.52	0.10	mg/Kg wet	5.00		70.5	40-140			
Pyrene	3.46	0.10	mg/Kg wet	5.00		69.3	40-140			
Naphthalene-aliphatic fraction	ND	0.10	mg/Kg wet	5.00			0-5			
2-Methylnaphthalene-aliphatic fraction	ND	0.10	mg/Kg wet	5.00			0-5			
Surrogate: Chlorooctadecane (COD)	*2.98*		mg/Kg wet	5.00		59.5	40-140			

con-test® A Pace Analytical® Laboratory

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

QUALITY CONTROL

Petroleum Hydrocarbons Analyses - EPH - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B340848 - SW-846 3546										
LCS (B340848-BS1)				Prepared: 05/19/23 Analyzed: 05/22/23						
Surrogate: o-Terphenyl (OTP)	*2.90*		mg/Kg wet	5.00		57.9	40-140			
Surrogate: 2-Bromonaphthalene	*4.20*		mg/Kg wet	5.00		84.0	40-140			
Surrogate: 2-Fluorobiphenyl	*4.10*		mg/Kg wet	5.00		82.1	40-140			
LCS Dup (B340848-BSD1)				Prepared: 05/19/23 Analyzed: 05/22/23						
C9-C18 Aliphatics	21.7	10	mg/Kg wet	30.0		72.3	40-140	8.31	25	
C19-C36 Aliphatics	34.6	10	mg/Kg wet	40.0		86.4	40-140	4.43	25	
Unadjusted C11-C22 Aromatics	59.9	10	mg/Kg wet	85.0		70.5	40-140	4.63	25	
Acenaphthene	3.10	0.10	mg/Kg wet	5.00		61.9	40-140	10.5	25	
Acenaphthylene	2.83	0.10	mg/Kg wet	5.00		56.6	40-140	11.8	25	
Anthracene	3.36	0.10	mg/Kg wet	5.00		67.2	40-140	5.07	25	
Benzo(a)anthracene	3.32	0.10	mg/Kg wet	5.00		66.5	40-140	4.27	25	
Benzo(a)pyrene	3.38	0.10	mg/Kg wet	5.00		67.6	40-140	4.01	25	
Benzo(b)fluoranthene	3.15	0.10	mg/Kg wet	5.00		63.0	40-140	4.31	25	
Benzo(g,h,i)perylene	3.04	0.10	mg/Kg wet	5.00		60.9	40-140	4.08	25	
Benzo(k)fluoranthene	3.11	0.10	mg/Kg wet	5.00		62.1	40-140	4.15	25	
Chrysene	3.59	0.10	mg/Kg wet	5.00		71.9	40-140	4.20	25	
Dibenz(a,h)anthracene	3.27	0.10	mg/Kg wet	5.00		65.4	40-140	3.05	25	
Fluoranthene	3.24	0.10	mg/Kg wet	5.00		64.8	40-140	4.35	25	
Fluorene	3.28	0.10	mg/Kg wet	5.00		65.6	40-140	8.41	25	
Indeno(1,2,3-cd)pyrene	3.12	0.10	mg/Kg wet	5.00		62.3	40-140	4.55	25	
2-Methylnaphthalene	2.96	0.10	mg/Kg wet	5.00		59.3	40-140	12.1	25	
Naphthalene	2.69	0.10	mg/Kg wet	5.00		53.8	40-140	17.6	25	
Phenanthrene	3.33	0.10	mg/Kg wet	5.00		66.5	40-140	5.80	25	
Pyrene	3.32	0.10	mg/Kg wet	5.00		66.4	40-140	4.27	25	
Naphthalene-aliphatic fraction	ND	0.10	mg/Kg wet	5.00			0-5			
2-Methylnaphthalene-aliphatic fraction	ND	0.10	mg/Kg wet	5.00			0-5			
Surrogate: Chlorooctadecane (COD)	*2.93*		mg/Kg wet	5.00		58.6	40-140			
Surrogate: o-Terphenyl (OTP)	*2.87*		mg/Kg wet	5.00		57.5	40-140			
Surrogate: 2-Bromonaphthalene	*4.36*		mg/Kg wet	5.00		87.3	40-140			
Surrogate: 2-Fluorobiphenyl	*4.26*		mg/Kg wet	5.00		85.2	40-140			
Batch B341020 - SW-846 3546										
Blank (B341020-BLK1)				Prepared: 05/22/23 Analyzed: 05/26/23						
C9-C18 Aliphatics	ND	10	mg/Kg wet							
C19-C36 Aliphatics	ND	10	mg/Kg wet							
Unadjusted C11-C22 Aromatics	ND	10	mg/Kg wet							
C11-C22 Aromatics	ND	10	mg/Kg wet							
Acenaphthene	ND	0.10	mg/Kg wet							
Acenaphthylene	ND	0.10	mg/Kg wet							
Anthracene	ND	0.10	mg/Kg wet							
Benzo(a)anthracene	ND	0.10	mg/Kg wet							
Benzo(a)pyrene	ND	0.10	mg/Kg wet							
Benzo(b)fluoranthene	ND	0.10	mg/Kg wet							
Benzo(g,h,i)perylene	ND	0.10	mg/Kg wet							
Benzo(k)fluoranthene	ND	0.10	mg/Kg wet							
Chrysene	ND	0.10	mg/Kg wet							
Dibenz(a,h)anthracene	ND	0.10	mg/Kg wet							
Fluoranthene	ND	0.10	mg/Kg wet							
Fluorene	ND	0.10	mg/Kg wet							
Indeno(1,2,3-cd)pyrene	ND	0.10	mg/Kg wet							
2-Methylnaphthalene	ND	0.10	mg/Kg wet							

con-test® A Pace Analytical® Laboratory

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

QUALITY CONTROL

Petroleum Hydrocarbons Analyses - EPH - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B341020 - SW-846 3546										
Blank (B341020-BLK1)				Prepared: 05/22/23 Analyzed: 05/26/23						
Naphthalene	ND	0.10	mg/Kg wet							
Phenanthrene	ND	0.10	mg/Kg wet							
Pyrene	ND	0.10	mg/Kg wet							
Naphthalene-aliphatic fraction	ND	0.10	mg/Kg wet							
2-Methylnaphthalene-aliphatic fraction	ND	0.10	mg/Kg wet							
Surrogate: Chlorooctadecane (COD)	*2.48*		mg/Kg wet	5.00		49.7	40-140			
Surrogate: o-Terphenyl (OTP)	*3.41*		mg/Kg wet	5.00		68.1	40-140			
Surrogate: 2-Bromonaphthalene	*5.24*		mg/Kg wet	5.00		105	40-140			
Surrogate: 2-Fluorobiphenyl	*5.14*		mg/Kg wet	5.00		103	40-140			
LCS (B341020-BS1)				Prepared: 05/22/23 Analyzed: 05/26/23						
C9-C18 Aliphatics	22.4	10	mg/Kg wet	30.0		74.6	40-140			
C19-C36 Aliphatics	28.9	10	mg/Kg wet	40.0		72.2	40-140			
Unadjusted C11-C22 Aromatics	59.2	10	mg/Kg wet	85.0		69.7	40-140			
Acenaphthene	3.35	0.10	mg/Kg wet	5.00		67.1	40-140			
Acenaphthylene	3.09	0.10	mg/Kg wet	5.00		61.7	40-140			
Anthracene	3.40	0.10	mg/Kg wet	5.00		68.0	40-140			
Benzo(a)anthracene	3.31	0.10	mg/Kg wet	5.00		66.1	40-140			
Benzo(a)pyrene	3.26	0.10	mg/Kg wet	5.00		65.2	40-140			
Benzo(b)fluoranthene	3.11	0.10	mg/Kg wet	5.00		62.3	40-140			
Benzo(g,h,i)perylene	2.92	0.10	mg/Kg wet	5.00		58.4	40-140			
Benzo(k)fluoranthene	3.03	0.10	mg/Kg wet	5.00		60.6	40-140			
Chrysene	3.56	0.10	mg/Kg wet	5.00		71.1	40-140			
Dibenz(a,h)anthracene	3.12	0.10	mg/Kg wet	5.00		62.4	40-140			
Fluoranthene	3.29	0.10	mg/Kg wet	5.00		65.7	40-140			
Fluorene	3.49	0.10	mg/Kg wet	5.00		69.9	40-140			
Indeno(1,2,3-cd)pyrene	2.99	0.10	mg/Kg wet	5.00		59.7	40-140			
2-Methylnaphthalene	3.32	0.10	mg/Kg wet	5.00		66.4	40-140			
Naphthalene	3.09	0.10	mg/Kg wet	5.00		61.8	40-140			
Phenanthrene	3.44	0.10	mg/Kg wet	5.00		68.9	40-140			
Pyrene	3.35	0.10	mg/Kg wet	5.00		67.0	40-140			
Naphthalene-aliphatic fraction	ND	0.10	mg/Kg wet	5.00			0-5			
2-Methylnaphthalene-aliphatic fraction	ND	0.10	mg/Kg wet	5.00			0-5			
Surrogate: Chlorooctadecane (COD)	*2.25*		mg/Kg wet	5.00		44.9	40-140			
Surrogate: o-Terphenyl (OTP)	*2.98*		mg/Kg wet	5.00		59.7	40-140			
Surrogate: 2-Bromonaphthalene	*4.50*		mg/Kg wet	5.00		90.1	40-140			
Surrogate: 2-Fluorobiphenyl	*4.45*		mg/Kg wet	5.00		89.1	40-140			
LCS Dup (B341020-BSD1)				Prepared: 05/22/23 Analyzed: 05/26/23						
C9-C18 Aliphatics	23.3	10	mg/Kg wet	30.0		77.6	40-140	4.04	25	
C19-C36 Aliphatics	32.7	10	mg/Kg wet	40.0		81.7	40-140	12.4	25	
Unadjusted C11-C22 Aromatics	71.1	10	mg/Kg wet	85.0		83.7	40-140	18.2	25	
Acenaphthene	3.96	0.10	mg/Kg wet	5.00		79.2	40-140	16.6	25	
Acenaphthylene	3.66	0.10	mg/Kg wet	5.00		73.3	40-140	17.1	25	
Anthracene	4.10	0.10	mg/Kg wet	5.00		81.9	40-140	18.5	25	
Benzo(a)anthracene	4.00	0.10	mg/Kg wet	5.00		79.9	40-140	18.9	25	
Benzo(a)pyrene	3.96	0.10	mg/Kg wet	5.00		79.2	40-140	19.3	25	
Benzo(b)fluoranthene	3.77	0.10	mg/Kg wet	5.00		75.4	40-140	19.0	25	
Benzo(g,h,i)perylene	3.55	0.10	mg/Kg wet	5.00		71.0	40-140	19.3	25	
Benzo(k)fluoranthene	3.67	0.10	mg/Kg wet	5.00		73.4	40-140	19.1	25	
Chrysene	4.29	0.10	mg/Kg wet	5.00		85.8	40-140	18.7	25	
Dibenz(a,h)anthracene	3.79	0.10	mg/Kg wet	5.00		75.9	40-140	19.5	25	

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

QUALITY CONTROL

Petroleum Hydrocarbons Analyses - EPH - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B341020 - SW-846 3546										
LCS Dup (B341020-BSD1)				Prepared: 05/22/23 Analyzed: 05/26/23						
Fluoranthene	3.95	0.10	mg/Kg wet	5.00		79.0	40-140	18.3	25	
Fluorene	3.99	0.10	mg/Kg wet	5.00		79.8	40-140	13.3	25	
Indeno(1,2,3-cd)pyrene	3.63	0.10	mg/Kg wet	5.00		72.6	40-140	19.4	25	
2-Methylnaphthalene	3.92	0.10	mg/Kg wet	5.00		78.4	40-140	16.6	25	
Naphthalene	3.67	0.10	mg/Kg wet	5.00		73.5	40-140	17.2	25	
Phenanthrene	4.16	0.10	mg/Kg wet	5.00		83.3	40-140	18.9	25	
Pyrene	4.02	0.10	mg/Kg wet	5.00		80.3	40-140	18.0	25	
Naphthalene-aliphatic fraction	ND	0.10	mg/Kg wet	5.00			0-5			
2-Methylnaphthalene-aliphatic fraction	ND	0.10	mg/Kg wet	5.00			0-5			
Surrogate: Chlorooctadecane (COD)	*2.62*		mg/Kg wet	5.00		52.5	40-140			
Surrogate: o-Terphenyl (OTP)	*3.49*		mg/Kg wet	5.00		69.7	40-140			
Surrogate: 2-Bromonaphthalene	*4.90*		mg/Kg wet	5.00		97.9	40-140			
Surrogate: 2-Fluorobiphenyl	*4.91*		mg/Kg wet	5.00		98.1	40-140			

con-test® A Pace Analytical® Laboratory

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

QUALITY CONTROL

Petroleum Hydrocarbons Analyses - VPH - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B340781 - MA VPH										
Blank (B340781-BLK1)				Prepared & Analyzed: 05/19/23						
Unadjusted C5-C8 Aliphatics	ND	10	mg/Kg wet							
C5-C8 Aliphatics	ND	10	mg/Kg wet							
Unadjusted C9-C12 Aliphatics	ND	10	mg/Kg wet							
C9-C12 Aliphatics	ND	10	mg/Kg wet							
C9-C10 Aromatics	ND	10	mg/Kg wet							
Benzene	ND	0.050	mg/Kg wet							
Butylcyclohexane	ND	0.050	mg/Kg wet							
Decane	ND	0.050	mg/Kg wet							
Ethylbenzene	ND	0.050	mg/Kg wet							
Methyl tert-Butyl Ether (MTBE)	ND	0.050	mg/Kg wet							
2-Methylpentane	ND	0.050	mg/Kg wet							
Naphthalene	ND	0.25	mg/Kg wet							
Nonane	ND	0.050	mg/Kg wet							
Pentane	ND	0.050	mg/Kg wet							
Toluene	ND	0.050	mg/Kg wet							
1,2,4-Trimethylbenzene	ND	0.050	mg/Kg wet							
2,2,4-Trimethylpentane	ND	0.050	mg/Kg wet							
m+p Xylene	ND	0.10	mg/Kg wet							
o-Xylene	ND	0.050	mg/Kg wet							
Surrogate: 2,5-Dibromotoluene (FID)	*36.4*		µg/L	40.0		91.0	70-130			
Surrogate: 2,5-Dibromotoluene (PID)	*37.7*		µg/L	40.0		94.3	70-130			
LCS (B340781-BS1)				Prepared & Analyzed: 05/19/23						
Unadjusted C5-C8 Aliphatics	7.95	10	mg/Kg wet	7.50		106	70-130			
Unadjusted C9-C12 Aliphatics	8.61	10	mg/Kg wet	7.50		115	70-130			
C9-C10 Aromatics	2.18	10	mg/Kg wet	2.50		87.2	70-130			
Benzene	2.48	0.050	mg/Kg wet	2.50		99.2	70-130			
Butylcyclohexane	3.11	0.050	mg/Kg wet	2.50		124	70-130			
Decane	2.53	0.050	mg/Kg wet	2.50		101	70-130			
Ethylbenzene	2.15	0.050	mg/Kg wet	2.50		86.0	70-130			
Methyl tert-Butyl Ether (MTBE)	2.18	0.050	mg/Kg wet	2.50		87.2	70-130			
2-Methylpentane	2.79	0.050	mg/Kg wet	2.50		112	70-130			
Naphthalene	2.40	0.25	mg/Kg wet	2.50		96.1	70-130			
Nonane	2.98	0.050	mg/Kg wet	2.50		119	30-130			
Pentane	3.07	0.050	mg/Kg wet	2.50		123	70-130			
Toluene	2.17	0.050	mg/Kg wet	2.50		86.7	70-130			
1,2,4-Trimethylbenzene	2.18	0.050	mg/Kg wet	2.50		87.2	70-130			
2,2,4-Trimethylpentane	2.09	0.050	mg/Kg wet	2.50		83.7	70-130			
m+p Xylene	4.28	0.10	mg/Kg wet	5.00		85.6	70-130			
o-Xylene	2.15	0.050	mg/Kg wet	2.50		86.1	70-130			
Surrogate: 2,5-Dibromotoluene (FID)	*41.7*		µg/L	40.0		104	70-130			
Surrogate: 2,5-Dibromotoluene (PID)	*43.5*		µg/L	40.0		109	70-130			

con-test® A Pace Analytical® Laboratory

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

QUALITY CONTROL

Petroleum Hydrocarbons Analyses - VPH - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B340781 - MA VPH										
LCS Dup (B340781-BSD1)				Prepared & Analyzed: 05/19/23						
Unadjusted C5-C8 Aliphatics	7.99	10	mg/Kg wet	7.50		107	70-130	0.458	25	
Unadjusted C9-C12 Aliphatics	8.94	10	mg/Kg wet	7.50		119	70-130	3.79	25	
C9-C10 Aromatics	2.24	10	mg/Kg wet	2.50		89.8	70-130	2.85	25	
Benzene	2.59	0.050	mg/Kg wet	2.50		104	70-130	4.32	25	
Butylcyclohexane	3.17	0.050	mg/Kg wet	2.50		127	70-130	2.05	25	
Decane	2.68	0.050	mg/Kg wet	2.50		107	70-130	5.88	25	
Ethylbenzene	2.24	0.050	mg/Kg wet	2.50		89.7	70-130	4.22	25	
Methyl tert-Butyl Ether (MTBE)	2.19	0.050	mg/Kg wet	2.50		87.8	70-130	0.707	25	
2-Methylpentane	2.77	0.050	mg/Kg wet	2.50		111	70-130	0.877	25	
Naphthalene	2.58	0.25	mg/Kg wet	2.50		103	70-130	7.33	25	
Nonane	3.09	0.050	mg/Kg wet	2.50		124	30-130	3.81	25	
Pentane	3.14	0.050	mg/Kg wet	2.50		126	70-130	2.38	25	
Toluene	2.21	0.050	mg/Kg wet	2.50		88.5	70-130	2.02	25	
1,2,4-Trimethylbenzene	2.24	0.050	mg/Kg wet	2.50		89.8	70-130	2.85	25	
2,2,4-Trimethylpentane	2.08	0.050	mg/Kg wet	2.50		83.2	70-130	0.625	25	
m+p Xylene	4.51	0.10	mg/Kg wet	5.00		90.2	70-130	5.21	25	
o-Xylene	2.23	0.050	mg/Kg wet	2.50		89.1	70-130	3.35	25	
Surrogate: 2,5-Dibromotoluene (FID)	*39.3*		µg/L	40.0		98.4	70-130			
Surrogate: 2,5-Dibromotoluene (PID)	*42.7*		µg/L	40.0		107	70-130			

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

QUALITY CONTROL

Metals Analyses (Total) - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B340929 - SW-846 3050B										
Blank (B340929-BLK1)				Prepared: 05/22/23 Analyzed: 05/23/23						
Lead	ND	0.50	mg/Kg wet							
Blank (B340929-BLK2)				Prepared: 05/22/23 Analyzed: 05/24/23						
Lead	ND	0.50	mg/Kg wet							
LCS (B340929-BS1)				Prepared: 05/22/23 Analyzed: 05/23/23						
Lead	226	1.5	mg/Kg wet	257		87.8	82.1-117.9			
LCS (B340929-BS2)				Prepared: 05/22/23 Analyzed: 05/24/23						
Lead	249	1.5	mg/Kg wet	257		96.9	82.1-117.9			
LCS Dup (B340929-BSD1)				Prepared: 05/22/23 Analyzed: 05/23/23						
Lead	237	1.5	mg/Kg wet	257		92.1	82.1-117.9	4.77	30	
LCS Dup (B340929-BSD2)				Prepared: 05/22/23 Analyzed: 05/24/23						
Lead	260	1.5	mg/Kg wet	257		101	82.1-117.9	4.43	30	
Reference (B340929-SRM1) MRL CHECK				Prepared: 05/22/23 Analyzed: 05/23/23						
Lead	0.418	0.49	mg/Kg wet	0.489		85.6	80-120			

con-test® A Pace Analytical® Laboratory

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

QUALITY CONTROL

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total) - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B341391 - % Solids										
Duplicate (B341391-DUP3)		**Source: 23E2637-01**		Prepared & Analyzed: 05/25/23						
% Solids	94.0		% Wt		94.5			0.508	10	
Duplicate (B341391-DUP5)		**Source: 23E2637-06**		Prepared & Analyzed: 05/25/23						
% Solids	91.8		% Wt		91.3			0.481	10	

con-test® A Pace Analytical® Laboratory

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

FLAG/QUALIFIER SUMMARY

*	QC result is outside of established limits.
†	Wide recovery limits established for difficult compound.
‡	Wide RPD limits established for difficult compound.
#	Data exceeded client recommended or regulatory level
ND	Not Detected
RL	Reporting Limit is at the level of quantitation (LOQ)
DL	Detection Limit is the lower limit of detection determined by the MDL study
MCL	Maximum Contaminant Level
	Percent recoveries and relative percent differences (RPDs) are determined by the software using values in the calculation which have not been rounded.
	No results have been blank subtracted unless specified in the case narrative section.
V-37	For VPH analysis, the average of the three marker compounds passes criteria.

con-test® A Pace Analytical® Laboratory

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

CERTIFICATIONS

Certified Analyses included in this Report

Analyte	Certifications
MADEP EPH rev 2.1 in Soil	
C9-C18 Aliphatics	CT,NC,ME,NH-P
C19-C36 Aliphatics	CT,NC,ME,NH-P
Unadjusted C11-C22 Aromatics	CT,NC,ME,NH-P
C11-C22 Aromatics	CT,NC,ME,NH-P
Acenaphthene	CT,NC,ME,NH-P
Acenaphthylene	CT,NC,ME,NH-P
Anthracene	CT,NC,ME,NH-P
Benzo(a)anthracene	CT,NC,ME,NH-P
Benzo(a)pyrene	CT,NC,ME,NH-P
Benzo(b)fluoranthene	CT,NC,ME,NH-P
Benzo(g,h,i)perylene	CT,NC,ME,NH-P
Benzo(k)fluoranthene	CT,NC,ME,NH-P
Chrysene	CT,NC,ME,NH-P
Dibenz(a,h)anthracene	CT,NC,ME,NH-P
Fluoranthene	CT,NC,ME,NH-P
Fluorene	CT,NC,ME
Indeno(1,2,3-cd)pyrene	CT,NC,ME,NH-P
2-Methylnaphthalene	CT,NC
Naphthalene	CT,NC,ME,NH-P
Phenanthrene	CT,NC,ME,NH-P
Pyrene	CT,NC,ME,NH-P
MADEP EPH rev 2.1 in Water	
C9-C18 Aliphatics	CT,NC,ME,NH-P
C19-C36 Aliphatics	CT,NC,ME,NH-P
Unadjusted C11-C22 Aromatics	CT,NC,ME,NH-P
C11-C22 Aromatics	CT,NC,ME,NH-P
Acenaphthene	CT,NC,ME,NH-P
Acenaphthylene	CT,NC,ME,NH-P
Anthracene	CT,NC,ME,NH-P
Benzo(a)anthracene	CT,NC,ME,NH-P
Benzo(a)pyrene	CT,NC,ME,NH-P
Benzo(b)fluoranthene	CT,NC,ME,NH-P
Benzo(g,h,i)perylene	CT,NC,ME,NH-P
Benzo(k)fluoranthene	CT,NC,ME,NH-P
Chrysene	CT,NC,ME,NH-P
Dibenz(a,h)anthracene	CT,NC,ME,NH-P
Fluoranthene	CT,NC,ME,NH-P
Fluorene	CT,NC,ME
Indeno(1,2,3-cd)pyrene	CT,NC,ME,NH-P
2-Methylnaphthalene	CT,NC
Naphthalene	CT,NC,ME,NH-P
Phenanthrene	CT,NC,ME,NH-P
Pyrene	CT,NC,ME,NH-P
MADEP-VPH-Feb 2018 Rev 2.1 in Soil	
Unadjusted C5-C8 Aliphatics	CT,NC,ME,NH-P
C5-C8 Aliphatics	CT,NC,ME,NH-P

con-test® A Pace Analytical® Laboratory

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

CERTIFICATIONS

Certified Analyses included in this Report

Analyte	Certifications
MADEP-VPH-Feb 2018 Rev 2.1 in Soil	
Unadjusted C9-C12 Aliphatics	CT,NC,ME,NH-P
C9-C12 Aliphatics	CT,NC,ME,NH-P
C9-C10 Aromatics	CT,NC,ME,NH-P
Benzene	CT,NC,ME,NH-P
Ethylbenzene	CT,NC,ME,NH-P
Methyl tert-Butyl Ether (MTBE)	CT,NC,ME,NH-P
Naphthalene	CT,NC,ME,NH-P
Toluene	CT,NC,ME,NH-P
m+p Xylene	CT,NC,ME,NH-P
o-Xylene	CT,NC,ME,NH-P
SW-846 6010D in Soil	
Lead	CT,NH,NY,AIHA,ME,VA,NC
SW-846 6010D in Water	
Lead	CT,NH,NY,ME,VA,NC
SW-846 8270E in Soil	
Acenaphthene	CT,NY,NH,ME,NC,VA
Acenaphthylene	CT,NY,NH,ME,NC,VA
Anthracene	CT,NY,NH,ME,NC,VA
Benzo(a)anthracene	CT,NY,NH,ME,NC,VA
Benzo(a)pyrene	CT,NY,NH,ME,NC,VA
Benzo(b)fluoranthene	CT,NY,NH,ME,NC,VA
Benzo(g,h,i)perylene	CT,NY,NH,ME,NC,VA
Benzo(k)fluoranthene	CT,NY,NH,ME,NC,VA
Chrysene	CT,NY,NH,ME,NC,VA
Dibenz(a,h)anthracene	CT,NY,NH,ME,NC,VA
Fluoranthene	CT,NY,NH,ME,NC,VA
Fluorene	CT,NY,NH,ME,NC,VA
Indeno(1,2,3-cd)pyrene	CT,NY,NH,ME,NC,VA
2-Methylnaphthalene	CT,NY,NH,ME,NC,VA
Naphthalene	CT,NY,NH,ME,NC,VA
Phenanthrene	CT,NY,NH,ME,NC,VA
Pyrene	CT,NY,NH,ME,NC,VA
SW-846 8270E in Water	
Acenaphthene	CT,NY,NH,ME,NC,VA
Acenaphthylene	CT,NY,NH,ME,NC,VA
Anthracene	CT,NY,NH,ME,NC,VA
Benzo(a)anthracene	CT,NY,NH,ME,NC,VA
Benzo(a)pyrene	CT,NY,NH,ME,NC,VA
Benzo(b)fluoranthene	CT,NY,NH,ME,NC,VA
Benzo(g,h,i)perylene	CT,NY,NH,ME,NC,VA
Benzo(k)fluoranthene	CT,NY,NH,ME,NC,VA
Chrysene	CT,NY,NH,ME,NC,VA
Dibenz(a,h)anthracene	CT,NY,NH,ME,NC,VA
Fluoranthene	CT,NY,NH,ME,NC,VA
Fluorene	CT,NY,NH,ME,NC,VA

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

CERTIFICATIONS

Certified Analyses included in this Report

Analyte	Certifications
SW-846 8270E in Water	
Indeno(1,2,3-cd)pyrene	CT,NY,NH,ME,NC,VA
2-Methylnaphthalene	CT,NY,NH,ME,NC,VA
Naphthalene	CT,NY,NH,ME,NC,VA
Phenanthrene	CT,NY,NH,ME,NC,VA
Pyrene	CT,NY,NH,ME,NC,VA

Con-Test, a Pace Environmental Laboratory, operates under the following certifications and accreditations:

Code	Description	Number	Expires
AIHA	AIHA-LAP, LLC - ISO 17025:2017	100033	03/1/2024
CT	Connecticut Department of Public Health	PH-0821	12/31/2024
NY	New York State Department of Health	10899 NELAP	04/1/2024
NH	New Hampshire Environmental Lab	2516 NELAP	02/5/2024
NC	North Carolina Div. of Water Quality	652	12/31/2023
ME	State of Maine	MA00100	06/9/2023
VA	Commonwealth of Virginia	460217	12/14/2023
NH-P	New Hampshire Environmental Lab	2557 NELAP	09/6/2023

23E2637 RF

Pace Analytical®

Phone: 413-525-2332
Fax: 413-525-6405
Access COC's and Support Requests

http://www.pacelabs.com

CHAIN OF CUSTODY RECORD

39 Spruce Street
East Longmeadow, MA 01028

Doc # 381 Rev 5_07/13/2021

Page 1 of 1

Company Name:	Weston + Sampson
Address:	55 Walkers Brook Dr #100, Reading, MA
Phone:	1-800-SAMPSON
Project Name:	ES Pinevale
Project Location:	Springfield, MA
Project Number:	ENG23-0315
Project Manager:	Joe Spencer
Pace Quote Name/Number:	
Invoice Recipient:	invoices@wseinc.com
Sampled By:	ACE, EL

Requested Turnaround Time: 7-Day [X] 10-Day [ ]; PFAS 10-Day (std) [ ] Due Date:

Rush-Approval Required: 1-Day [ ] 3-Day [ ]; 2-Day [ ] 4-Day [ ]

Data Delivery: Format: PDF [X] EXCEL [X]; Other: Envirodata edd; CLP Like Data Pkg Required: [ ]; Email To: SPENCERJ@WSEINC.COM; ~~Fax To~~#: ECKER.ALISON@WSEINC.COM, LI.ESTHER@WSEINC.COM

Dissolved Metals Samples: O Field Filtered; O Lab to Filter

Orthophosphate Samples: O Field Filtered; O Lab to Filter

PCB ONLY: SOXHLET [ ]; NON SOXHLET [ ]

ANALYSIS REQUESTED

Pace Work Order#	Client Sample ID / Description	Beginning Date/Time	Ending Date/Time	COMP/GRAB	[1]Matrix Code	Conc Code	VIALS	GLASS	PLASTIC	BACTERIA	ENCORE	EPH w/ targets (1)	VPH (1)	Lead (6010 Total) (1)	PAHs (1)	Coal Ash (1)
1	BT-ENW(3-6)	5/18/23	1045	C/G	S	U	1	1				X	X			
2	BT-ESW(4-7)	↓	1115	C/G	↓	↓	1	1				X	X			
3	DP-2A (0-2)		1315	C				2						X	X	X
4	CM-43N(8-11)		1320	C/G				1				X	X	X		
5	CM-43SW(5-8)		1405	C/G			1	1				X	X	X		
6	CM-43NW(5-8)		1420	C/G			1	1				X	X	X		

[2] Preservation Code

Courier Use Only
Total Number Of:
VIALS
GLASS
PLASTIC
BACTERIA
ENCORE

Glassware in the fridge? Y / N

Glassware in freezer? Y / N

Prepackaged Cooler? Y / N

*Pace Analytical is not responsible for missing samples from prepacked coolers

[1] **Matrix Codes:**
GW = Ground Water
WW = Waste Water
DW = Drinking Water
A = Air
S = Soil
SL = Sludge
SOL = Solid
O = Other (please define)

[2] **Preservation Codes:**
I = Iced
H = HCL
M = Methanol
N = Nitric Acid
S = Sulfuric Acid
B = Sodium Bisulfate
X = Sodium Hydroxide
T = Sodium Thiosulfate
O = Other (please define)

Relinquished by: (signature)	Date/Time: 5/18/23 1727
Received by: (signature)	Date/Time: 5/18/23 1727
Relinquished by: (signature)	Date/Time:
Received by: (signature)	Date/Time:
Relinquished by: (signature)	Date/Time:
Received by: (signature)	Date/Time:
Relinquished by: (signature)	Date/Time:
Received by: (signature)	Date/Time:

Client Comments:

Detection Limit Requirements: MA S-1/GW-2; S-1/GW-3; GW:; Other:

Special Requirements:
[X] MA MCP Required
[ ] MCP Certification Form Required
[ ] CT RCP Required
[ ] RCP Certification Form Required
[ ] MA State DW Required
PWSID #

Please use the following codes to indicate possible sample concentration within the Conc Code column above: H - High; M - Medium; L - Low; C - Clean; U - Unknown

NELAC and AIHA-LAP, LLC Accredited

Project Entity: Government [ ] Municipality [X] MWRA [ ] WRTA [ ]; Federal [ ] 21 J [ ] School [ ]; City [ ] Brownfield [ ] MBTA [ ]

Other: [ ] Chromatogram; [ ] AIHA-LAP,LLC

Lab Comments:

Disclaimer: Pace Analytical is not responsible for any omitted information on the Chain of Custody. The Chain of Custody is a legal document that must be complete and accurate and is used to determine what analyses the laboratory will perform. Any missing information is not the laboratory's responsibility. Pace Analytical values your partnership on each project and will try to assist with missing information, but will not be held accountable.

Table of Contents

39 Spruce St.
East Longmeadow, MA. 01028
P: 413-525-2332
F:413-525-6405
www.pacelabs.com

ENV-FRM-ELON-0001 V05__Sample Receiving Checklist

Log In Back-Sheet

Login Sample Receipt Checklist – (Rejection Criteria Listing – Using Acceptance Policy) Any False statement will be brought to the attention of the Client – True or False

Pace
PEOPLE ADVANCING SCIENCE

Client W & S

Project ES Pinevale

MCP/RCP Required MA MCP

Deliverable Package Requirement S-1/GW-2/3

Location Springfield, MA

PWSID# (When Applicable) MA

Arrival Method:

Courier ☐ Fed Ex ☐ Walk In ☑ Other ☐

Received By / Date / Time GE 5/18/23 1727

Back-Sheet By / Date / Time GE 5/18/23 1826

Temperature Method Gun # 5

Temp ☑ < 6° C Actual Temperature 26

Rush Samples: Yes / (No) Notify

Short Hold: Yes / (No) Notify

	True	False
Received on Ice	☑	☐
Received in Cooler	☑	☐
Custody Seal: DATE TIME	☐	☑
COC Relinquished	☑	☐
COC/Samples Labels Agree	☑	☐
All Samples in Good Condition	☑	☐
Samples Received within Holding Time	☑	☐
Is there enough Volume	☑	☐
Proper Media/Container Used	☑	☐
Splitting Samples Required	☐	☑
MS/MSD	☐	☑
Trip Blanks	☐	☑
Lab to Filters	☐	☑
COC Legible	☑	☐

COC Included: (Check all included)

Client	☑	Analysis	☑	Sampler Name	☑
Project	☑	IDs	☑	Collection Date/Time	☑

All Samples Proper pH: (N/A) ☐ ☐

Notes regarding Samples/COC outside of SOP:

Additional Container Notes

Sample	Soils Jars (Circle Amb/Clear)				Ambers							Plastics										VOA Vials					Other / Fill in					
					1 Liter			250mL			100mL	1 Liter		500mL		250mL																
	16oz Amb/Clear	8oz Amb/Clear	4oz Amb/Clear	2oz Amb/Clear	Unpreserved	HCL	Sulfuric	Sulfuric	Phosphoric	HCl	Unpreserved	Unpreserved	Sulfuric	Unpreserved	Sulfuric	Unpreserved	Trizma	Sulfuric	Nitric	NaOH	NaOH/Zinc	Unpreserved	HCl	MeOH	D.I. Water	BiSulfate	Col/Bact					
1		1																						1								
2		1																						1								
3		2																														
4		1																						1								
5		1																						1								
6		1																						1								
7																																
8																																
9																																
10																																
11																																
12																																
13																																
14																																
15																																
16																																
17																																
18																																
19																																
20																																

Table of Contents

Pace New England

MicroVision Labs Coal Ash Report, Job # 15971
Pace New England Project#: 23E2637

Scope of Work:

This report covers the methods and findings of the Coal/Coal Ash analysis that MicroVision Laboratories, Inc. conducted on one (1) soil sample submitted for testing from the 23E2637 project. The purpose of this analysis was to detect and document any coal, coal ash, wood ash or asphalt that may be present in the submitted soil sample by use of a combination of microscopy techniques including SEM/EDS, PLM, and macroscopic inspection. The results presented in this report relate only to the samples examined and as received.

Methods:

MicroVision Labs is accredited to the ISO/IEC 17025:2017 standard. This analysis follows our in house SOP #MVL05 (Microscopic Analysis for Coal, Coal Ash and Wood Ash). This method is listed on our certificate of accreditation and has been validated.

Findings:

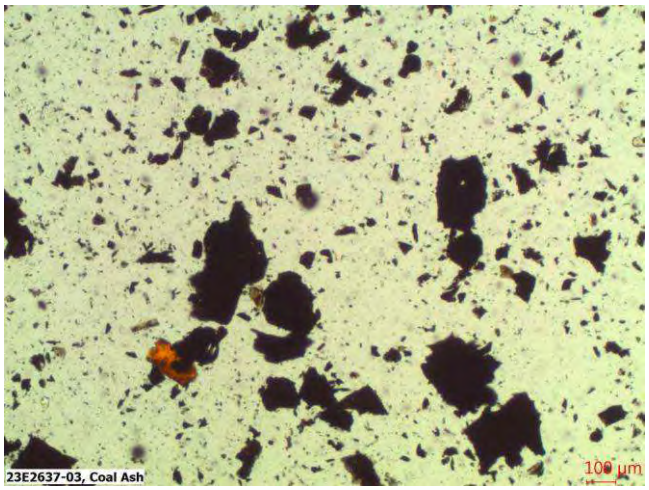
The following pages display the data for each particle type detected in the sample for this project. Each page contains a PLM image, SEM image, and EDS spectrum for the particle types detected for this sample as well as particle type descriptions and observations.

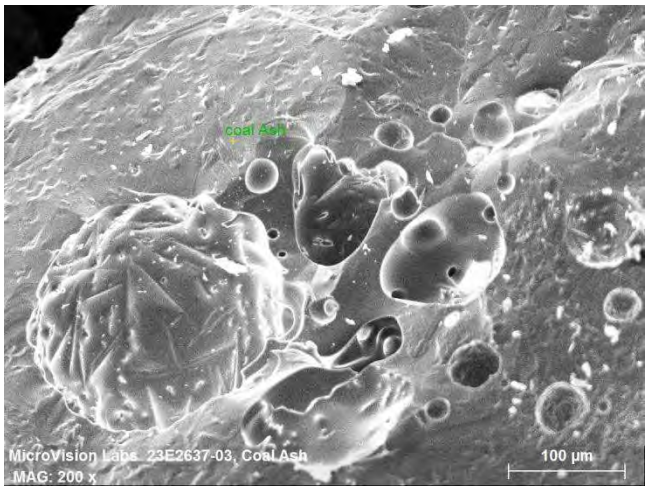
MicroVision Laboratories, Inc. 187 Billerica Road, Chelmsford, MA 01824
Phone: (978) 250-9909 Fax: (978) 250-9901 Email: Sales@MicroVisionLabs.com
www.MicroVisionLabs.com

Sample: 23E2637-03

Number of Suspect Particle Types: Two (2)

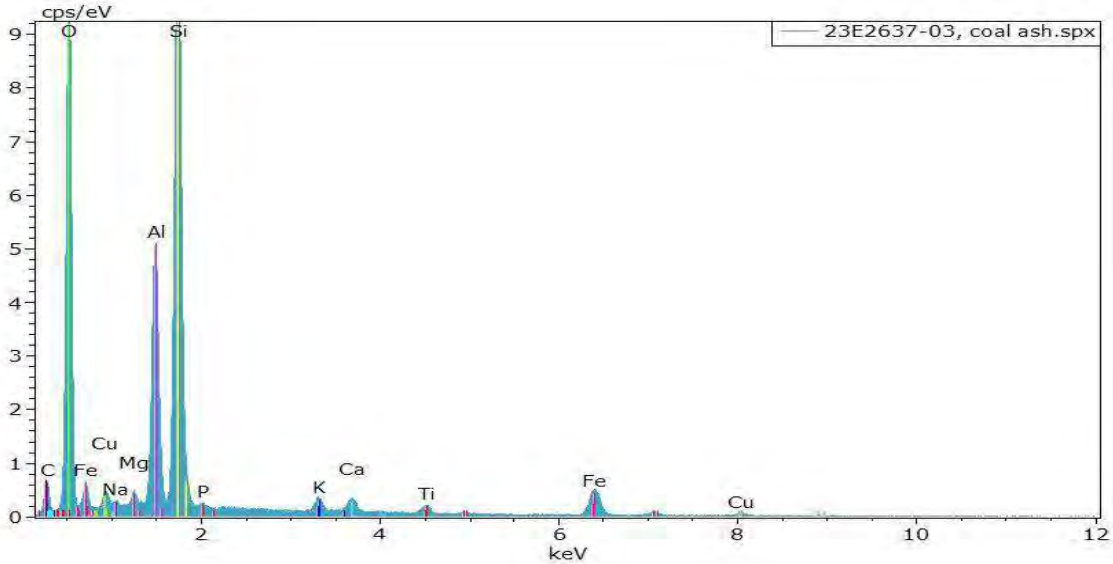
Coal Ash: This particle type consisted of seven (7) dark, porous grains approximately 2-6mm in diameter. The PLM examination indicated this particle type to be consistent with coal ash. The PLM and SEM images show the spherical gas voids that formed during combustion.



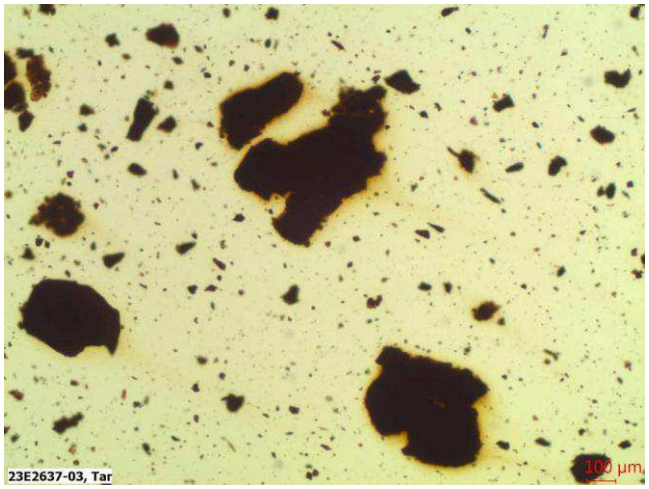


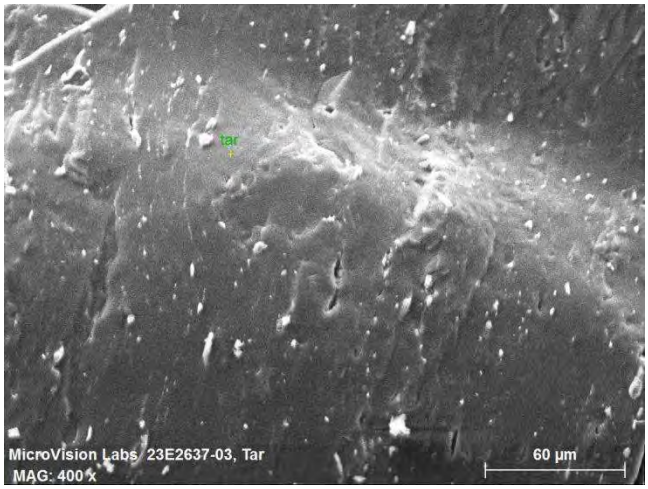
[redacted] [redacted]

The EDS spectrum, shown below, indicates this particle type is coal ash. The analysis for this particle shows concentrations of carbon, oxygen, sodium, magnesium, aluminum, silicon, phosphorus, potassium, calcium, titanium, iron, and copper.



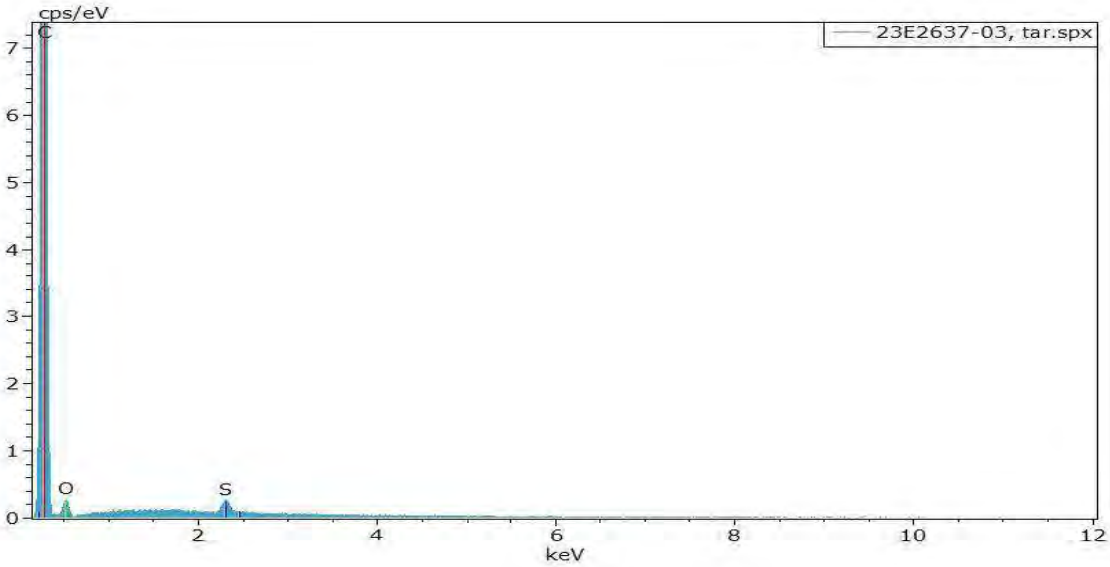
Tar: This particle type consisted of thirty-three (33) dark, ductile grains approximately 1-13mm in diameter. During the PLM examination these particles slowly dissolved in the mounting oil which is a typical characteristic of tar. The PLM image shows the dissolving tar particles, and the SEM image illustrates the morphology of tar.





[redacted] [redacted]

The EDS spectrum, shown below, indicates this particle type is tar. The analysis for this particle shows concentrations of carbon, oxygen, and sulfur.



Results Summary Table:

Sample Name	Material Detected
23E2637-03	**Coal Ash (light), Tar (moderate)**

The concentrations of the particle types detected in this sample are listed in parenthesis in the table above and are based on the number of particles found and the relative difficulty in finding them. The concentration information is listed for informational purposes only and has no bearing on exemption status.

Please let us know if you have any questions about this analysis or if there is anything else we can do for you.

Sincerely,

Denise Weidler
Analytical Microscopist

Reviewed by: TW

15971

SUBCONTRACT CHAIN OF CUSTODY

Pace New England

23E2637

SENDING LABORATORY:	**RECEIVING LABORATORY:**
Pace New England	MicroVision Laboratories
39 Spruce Street	187 Billerica Road
East Longmeadow, MA 01028	Chelmsford, MA 01824
Phone: 413.525.2332	Phone :(978) 250-9909
Fax: 413.525.6405	Fax: (978) 250-9901
Project Manager: Rebecca Faust	

Analysis	Sample Name	Due	Expires	Comments
Sample ID: 23E2637-03	**DP-2A (0-2)**	**Soil**	**Sampled: 05/18/23 13:15**	
S-Coal Ash		05/25/23 17:00	02/10/26 13:15	
Containers Supplied:				
8 oz amber glass jar (A)				

9.37

Released By	Date	Received By	Date
Joe [illegible]	5/19/23	[illegible]	5/19/23
Released By	Date	Received By	Date

Page 1 of 1

MADEP MCP Analytical Method Report Certification Form

Laboratory Name: Pace New England	Project #: 23E2637
Project Location: Springfield, MA	RTN:

This Form provides certifications for the following data set: [list Laboratory Sample ID Number(s)]

23E2637-01 thru 23E2637-06

Matrices: Soil

CAM Protocol (check all that below)

8260 VOC CAM II A ( )	7470/7471 Hg CAM IIIB ( )	MassDEP VPH (GC/PID/FID) CAM IV A (X)	8082 PCB CAM V A ( )	9014 Total Cyanide/PAC CAM VI A ( )	6860 Perchlorate CAM VIII B ( )
8270 SVOC CAM II B (X)	7010 Metals CAM III C ( )	MassDEP VPH (GC/MS) CAM IV C ( )	8081 Pesticides CAM V B ( )	7196 Hex Cr CAM VI B ( )	MassDEP APH CAM IX A ( )
6010 Metals CAM III A (X)	6020 Metals CAM III D ( )	MassDEP EPH CAM IV B (X)	8151 Herbicides CAM V C ( )	8330 Explosives CAM VIII A ( )	TO-15 VOC CAM IX B ( )

Affirmative response to Questions A throughF is required for "Presumptive Certainty" status

A	Were all samples received in a condition consistent with those described on the Chain-of-Custody, properly preserved (including temperature) in the field or laboratory, and prepared/analyzed within method holding times?	☑ Yes	☐ No[1]
B	Were the analytical method(s) and all associated QC requirements specificed in the selected CAM protocol(s) followed?	☑ Yes	☐ No[1]
C	Were all required corrective actions and analytical response actions specified in the selected CAM protocol(s) implemented for all identified performance standard non-conformances?	☑ Yes	☐ No[1]
D	Does the laboratory report comply with all the reporting requirements specified in CAM VII A, Quality Assurance and Quality Control Guidlines for the Acquisition and Reporting of Analytical Data?	☑ Yes	☐ No[1]
E a	VPH, EPH, and APH Methods only: Was each method conducted without significant modification(s)? (Refer to the individual method(s) for a list of significant modifications).	☑ Yes	☐ No[1]
E b	APH and TO-15 Methods only: Was the complete analyte list reported for each method?	☐ Yes	☐ No[1]
F	Were all applicable CAM protocol QC and performance standard non-conformances identified and evaluated in a laboratory narrative (including all No responses to Qestions A through E)?	☑ Yes	☐ No[1]

A response to questions G, H and I below is required for "Presumptive Certainty" status

G	Were the reporting limits at or below all CAM reporting limits specified in the selected CAM protocol(s)?	☑ Yes	☐ No[1]

***Data User Note:* Data that achieve "Presumptive Certainty" status may not necessarily meet the data usability and representativeness requirements described in 310 CMR 40. 1056 (2)(k) and WSC-07-350.**

H	Were all QC perfomance standards specified in the CAM protocol(s) achieved?	☑ Yes	☐ No[1]
I	Were results reported for the complete analyte list specified in the selected CAM protocol(s)?	☐ Yes	☑ No[1]

[1] *All Negative responses must be addressed in an attached Environmental Laboratory case narrative.*

I, the undersigned, attest under the pains and penalties of perjury that, based upon my personal inquiry of those responsible for obtaining the information, the material contained in this analytical report is, to the best of my knowledge and belief, accurate and complete.

Signature: Lisa Worthington

Position: Technical Representative

Printed Name: Lisa A. Worthington

Date: 06/06/23

con-test®
A Pace Analytical® Laboratory

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

June 8, 2023

Joe Spencer
Weston & Sampson Engineers MA
55 Walkers Brook Drive
Reading, MA 01867

Project Location: Springfield, MA
Client Job Number:
Project Number: ENG23-0351
Laboratory Work Order Number: 23F0342

Enclosed are results of analyses for samples as received by the laboratory on June 2, 2023. If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Rebecca Faust
Project Manager

Table of Contents

Sample Summary 3

Case Narrative 4

Sample Results 5

23F0342-01 5

23F0342-02 6

23F0342-03 7

23F0342-04 8

23F0342-05 9

Sample Preparation Information 10

QC Data 11

Metals Analyses (Dissolved) 11

B342162 11

Flag/Qualifier Summary 12

Certifications 13

Chain of Custody/Sample Receipt 14

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Weston & Sampson Engineers MA
55 Walkers Brook Drive
Reading, MA 01867
ATTN: Joe Spencer

REPORT DATE: 6/8/2023

PURCHASE ORDER NUMBER:

PROJECT NUMBER: ENG23-0351

ANALYTICAL SUMMARY

WORK ORDER NUMBER: 23F0342

The results of analyses performed on the following samples submitted to CON-TEST, a Pace Analytical Laboratory, are found in this report.

PROJECT LOCATION: Springfield, MA

FIELD SAMPLE #	LAB ID:	MATRIX	SAMPLE DESCRIPTION	TEST	SUB LAB
MW-CM-38N	23F0342-01	Ground Water		SW-846 6020B	
MW-CM-43N	23F0342-02	Ground Water		SW-846 6020B	
MW-205A	23F0342-03	Ground Water		SW-846 6020B	
MW-CM-53N	23F0342-04	Ground Water		SW-846 6020B	
DUP-1	23F0342-05	Ground Water		SW-846 6020B	

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

CASE NARRATIVE SUMMARY

All reported results are within defined laboratory quality control objectives unless listed below or otherwise qualified in this report.

The results of analyses reported only relate to samples submitted to Con-Test, a Pace Analytical Laboratory, for testing.
I certify that the analyses listed above, unless specifically listed as subcontracted, if any, were performed under my direction according to the approved methodologies listed in this document, and that based upon my inquiry of those individuals immediately responsible for obtaining the information, the material contained in this report is, to the best of my knowledge and belief, accurate and complete.

Lisa A. Worthington
Technical Representative

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Springfield, MA
Sample Description:
Work Order: 23F0342

Date Received: 6/2/2023

Field Sample #: MW-CM-38N
Sampled: 6/1/2023 11:00

Sample ID: 23F0342-01

Sample Matrix: Ground Water

Metals Analyses (Dissolved)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Lead	ND	0.50	µg/L	1		SW-846 6020B	6/3/23	6/7/23 14:48	QNW

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Springfield, MA
Sample Description:
Work Order: 23F0342

Date Received: 6/2/2023

Field Sample #: MW-CM-43N
Sampled: 6/1/2023 11:45

Sample ID: 23F0342-02

Sample Matrix: Ground Water

Metals Analyses (Dissolved)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Lead	ND	0.50	µg/L	1		SW-846 6020B	6/3/23	6/7/23 14:50	QNW

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Springfield, MA
Sample Description:
Work Order: 23F0342

Date Received: 6/2/2023

Field Sample #: MW-205A
Sampled: 6/1/2023 13:10

Sample ID: 23F0342-03

Sample Matrix: Ground Water

Metals Analyses (Dissolved)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Cadmium	2.2	0.20	µg/L	1		SW-846 6020B	6/3/23	6/7/23 14:53	QNW

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Springfield, MA
Sample Description:
Work Order: 23F0342

Date Received: 6/2/2023

Field Sample #: MW-CM-53N
Sampled: 6/1/2023 13:25

Sample ID: 23F0342-04

Sample Matrix: Ground Water

Metals Analyses (Dissolved)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Barium	180	10	µg/L	1		SW-846 6020B	6/3/23	6/7/23 14:55	QNW
Cadmium	ND	0.20	µg/L	1		SW-846 6020B	6/3/23	6/7/23 14:55	QNW
Lead	ND	0.50	µg/L	1		SW-846 6020B	6/3/23	6/7/23 14:55	QNW

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Springfield, MA
Sample Description:
Work Order: 23F0342

Date Received: 6/2/2023

Field Sample #: DUP-1
Sampled: 6/1/2023 00:00

Sample ID: 23F0342-05

Sample Matrix: Ground Water

Metals Analyses (Dissolved)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Barium	190	10	µg/L	1		SW-846 6020B	6/3/23	6/7/23 14:45	QNW
Cadmium	ND	0.20	µg/L	1		SW-846 6020B	6/3/23	6/7/23 14:45	QNW
Lead	ND	0.50	µg/L	1		SW-846 6020B	6/3/23	6/7/23 14:45	QNW

con-test®
A Pace Analytical® Laboratory

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Sample Extraction Data

Prep Method:SW-846 3005A Dissolved **Analytical Method:SW-846 6020B**

Lab Number [Field ID]	Batch	Initial [mL]	Final [mL]	Date
23F0342-01 [MW-CM-38N]	B342162	10.0	10.0	06/03/23
23F0342-02 [MW-CM-43N]	B342162	10.0	10.0	06/03/23
23F0342-03 [MW-205A]	B342162	10.0	10.0	06/03/23
23F0342-04 [MW-CM-53N]	B342162	10.0	10.0	06/03/23
23F0342-05 [DUP-1]	B342162	10.0	10.0	06/03/23

con-test® A Pace Analytical® Laboratory

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

QUALITY CONTROL

Metals Analyses (Dissolved) - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B342162 - SW-846 3005A Dissolved										
Blank (B342162-BLK1)				Prepared: 06/03/23 Analyzed: 06/07/23						
Barium	ND	10	µg/L							
Cadmium	ND	0.20	µg/L							
Lead	ND	0.50	µg/L							
LCS (B342162-BS1)				Prepared: 06/03/23 Analyzed: 06/07/23						
Barium	488	10	µg/L	500		97.6	80-120			
Cadmium	101	0.20	µg/L	100		101	80-120			
Lead	103	0.50	µg/L	100		103	80-120			
Duplicate (B342162-DUP1)		**Source: 23F0342-05**		Prepared: 06/03/23 Analyzed: 06/07/23						
Barium	192	10	µg/L		193			0.622	20	
Cadmium	ND	0.20	µg/L		ND			NC	20	
Lead	ND	0.50	µg/L		ND			NC	20	
Matrix Spike (B342162-MS1)		**Source: 23F0342-05**		Prepared: 06/03/23 Analyzed: 06/07/23						
Barium	289	12	µg/L	100	193	95.5	75-125			
Cadmium	26.1	0.25	µg/L	25.0	ND	104	75-125			
Lead	24.5	0.62	µg/L	25.0	ND	97.9	75-125			

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

FLAG/QUALIFIER SUMMARY

*	QC result is outside of established limits.
†	Wide recovery limits established for difficult compound.
‡	Wide RPD limits established for difficult compound.
#	Data exceeded client recommended or regulatory level
ND	Not Detected
RL	Reporting Limit is at the level of quantitation (LOQ)
DL	Detection Limit is the lower limit of detection determined by the MDL study
MCL	Maximum Contaminant Level

Percent recoveries and relative percent differences (RPDs) are determined by the software using values in the calculation which have not been rounded.

No results have been blank subtracted unless specified in the case narrative section.

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

CERTIFICATIONS

Certified Analyses included in this Report

Analyte	Certifications
SW-846 6020B in Water	
Barium	MA,NY,CT,NC,NH,ME,VA
Cadmium	CT,NH,NY,NC,ME,VA
Lead	CT,NH,NY,NC,ME,VA

Con-Test, a Pace Environmental Laboratory, operates under the following certifications and accreditations:

Code	Description	Number	Expires
MA	Massachusetts DEP	M-MA100	06/30/2024
CT	Connecticut Department of Public Health	PH-0821	12/31/2024
NY	New York State Department of Health	10899 NELAP	04/1/2024
NH	New Hampshire Environmental Lab	2516 NELAP	02/5/2024
NC	North Carolina Div. of Water Quality	652	12/31/2023
ME	State of Maine	MA00100	06/9/2025
VA	Commonwealth of Virginia	460217	12/14/2023

23F0342 RF

http://www.pacelabs.com

Doc # 381 Rev 5_07/13/2021

Pace Analytical®

Phone: 413-525-2332
Fax: 413-525-6405

CHAIN OF CUSTODY RECORD

39 Spruce Street
East Longmeadow, MA 01028

Page 1 of 1

Access COC's and Support Requests

Company Name:	Weston & Sampson
Address:	55 Walkers Brook Dr #100, Reading, MA
Phone:	1-800-SAMPSON
Project Name:	ES Pinevale
Project Location:	Springfield, MA
Project Number:	ENG23-0351
Project Manager:	Joe Spencer
Pace Quote Name/Number:	
Invoice Recipient:	invoices@wseinc.com
Sampled By:	ACE EL

Requested Turnaround Time
7-Day ☐ 10-Day ☐ STANDARD
PFAS 10-Day (std) ☐ Due Date:

Rush-Approval Required
1-Day ☐ 3-Day ☐
2-Day ☐ 4-Day ☐

Data Delivery
Format: PDF ☒ EXCEL ☒
Other: envirodata
CLP Like Data Pkg Required: ☐
Email To: SPENCERJ@WSEINC.COM
~~Fax To #:~~ ECKER.ALISON@WSEINC.COM LI.ESTHER@WSEINC.COM

Dissolved Metals Samples
☒ Field Filtered,
○ Lab to Filter

Orthophosphate Samples
○ Field Filtered
○ Lab to Filter

PCB ONLY
SOXHLET ☐
NON SOXHLET ☐

ANALYSIS REQUESTED

Pace Work Order#	Client Sample ID / Description	Beginning Date/Time	Ending Date/Time	COMP/GRAB	[1]Matrix Code	Conc Code	VIALS	GLASS	PLASTIC	BACTERIA	ENCORE	Dissolved Lead (N)	Dissolved Cadmium (N)	Dissolved Barium (N)
1	MW-CM-38N	6/1/23	1100	G	GW	U			1			X		
2	MW-CM-43N	↓	1145	↓	↓	↓			1			X		
3	MW-205A	↓	1310	↓	↓	↓			1				X	
4	MW-CM-53N	↓	1325	↓	↓	↓			1			X	X	X
5	DUP-1	↓	—	↓	↓	↓			1			X	X	X

[2] Preservation Code

Courier Use Only
Total Number Of:
VIALS____
GLASS____
PLASTIC____
BACTERIA____
ENCORE____

Glassware in the fridge? Y / N
Glassware in freezer? Y / N
Prepackaged Cooler? Y / N

*Pace Analytical is not responsible for missing samples from prepacked coolers

[1] Matrix Codes:
GW = Ground Water
WW = Waste Water
DW = Drinking Water
A = Air
S = Soil
SL = Sludge
SOL = Solid
O = Other (please define)

[2] Preservation Codes:
I = Iced
H = HCL
M = Methanol
N = Nitric Acid
S = Sulfuric Acid
B = Sodium Bisulfate
X = Sodium Hydroxide
T = Sodium Thiosulfate
O = Other (please define)

Relinquished by: (signature)	Date/Time:
[signature]	6/1/23 2000
Received by: (signature)	Date/Time:
[signature]	6/2/23 1425
Relinquished by: (signature)	Date/Time:
[signature]	6/2/23 1812
Received by: (signature)	Date/Time:
[signature] 55	6/2/23 1812
Relinquished by: (signature)	Date/Time:
Received by: (signature)	Date/Time:
Relinquished by: (signature)	Date/Time:
Received by: (signature)	Date/Time:

Client Comments: Standard TAT

Detection Limit Requirements		Special Requirements	
MA	GW-3	☒	MA MCP Required
			MCP Certification Form Required
		☐	CT RCP Required
CT			RCP Certification Form Required
		☐	MA State DW Required
Other:		PWSID #	

Please use the following codes to indicate possible sample concentration within the Conc Code column above:
H - High; M - Medium; L - Low; C - Clean; U - Unknown

NELAC and AIHA-LAP, LLC Accredited

Project Entity
Government ☐ Municipality ☐ MWRA ☐ WRTA ☐
Federal ☐ 21 J ☐ School ☐
City ☐ Brownfield ☐ MBTA ☐

Other
☐ Chromatogram
☐ AIHA-LAP,LLC

Comments:

Disclaimer: Pace Analytical is not responsible for any omitted information on the Chain of Custody. The Chain of Custody is a legal document that must be complete and accurate and is used to determine what analyses the laboratory will perform. Any missing information is not the laboratory's responsibility. Pace Analytical values your partnership on each project and will try to assist with missing information, but will not be held accountable.

Table of Contents

39 Spruce St.
East Longmeadow, MA. 01028
P: 413-525-2332
F:413-525-6405
www.pacelabs.com

ENV-FRM-ELON-0001 V05__Sample Receiving Checklist

Log In Back-Sheet

Login Sample Receipt Checklist – (Rejection Criteria Listing – Using Acceptance Policy) Any False statement will be brought to the attention of the Client – True or False

Pace
PEOPLE ADVANCING SCIENCE

Client: W+S
Project: ES Pinevale
MCP/RCP Required: MA-MCP
Deliverable Package Requirement: GW-9
Location: Springfield, MA
PWSID# (When Applicable): n/a
Arrival Method:
Courier ☑ Fed Ex ☐ Walk In ☐ Other ☐
Received By / Date / Time: Mcp 6/2/23 1812
~~Back-Sheet By / Date / Time~~: Mcp 6/2/23 1848
Temperature Method: Gun # 5
Temp ☑ < 6° C Actual Temperature: 5.5
Rush Samples: Yes / No Notify: No
Short Hold: Yes / No Notify: No

	True	False
Received on Ice	☑	☐
Received in Cooler	☑	☐
Custody Seal: DATE TIME	☐	☑
COC Relinquished	☑	☐
COC/Samples Labels Agree	☑	☐
All Samples in Good Condition	☑	☐
Samples Received within Holding Time	☑	☐
~~Is there enough Volume~~	☑	☐
Proper Media/Container Used	☑	☐
Splitting Samples Required	☐	☑
MS/MSD	☐	☑
Trip Blanks	☐	☑
Lab to Filters	☐	☑
COC Legible	☑	☐

COC Included: (Check all included)

Client ☑ Analysis ☑ Sampler Name ☑
Project ☑ IDs ☑ Collection Date/Time ☑

All Samples Proper pH: N/A ☑ ☐

Notes regarding Samples/COC outside of SOP:

Additional Container Notes

Sample	Soils Jars (Circle Amb/Clear)				Ambers							Plastics										VOA Vials					Other / Fill in					
					1 Liter			250mL			100mL	1 Liter		500mL		250mL																
	16oz Amb/Clear	8oz Amb/Clear	4oz Amb/Clear	2oz Amb/Clear	Unpreserved	HCL	Sulfuric	Sulfuric	Phosphoric	HCl	Unpreserved	Unpreserved	Sulfuric	Unpreserved	Sulfuric	Unpreserved	Trizma	Sulfuric	Nitric	NaOH	NaOH/Zinc	Unpreserved	HCl	MeOH	D.I. Water	BiSulfate	Col/Bact					
1																																
2																			1													
3																			1													
4																			1													
5																			1													
6																			1													
7																																
8																																
9																																
10																																
11																																
12																																
13																																
14																																
15																																
16																																
17																																
18																																
19																																
20																																

Table of Contents

MADEP MCP Analytical Method Report Certification Form

Laboratory Name: Pace New England	Project #: 23F0342
Project Location: Springfield, MA	RTN:

This Form provides certifications for the following data set: [list Laboratory Sample ID Number(s)]

23F0342-01 thru 23F0342-05

Matrices: Water

CAM Protocol (check all that below)

8260 VOC CAM II A ( )	7470/7471 Hg CAM IIIB ( )	MassDEP VPH (GC/PID/FID) CAM IV A ( )	8082 PCB CAM V A ( )	9014 Total Cyanide/PAC CAM VI A ( )	6860 Perchlorate CAM VIII B ( )
8270 SVOC CAM II B ( )	7010 Metals CAM III C ( )	MassDEP VPH (GC/MS) CAM IV C ( )	8081 Pesticides CAM V B ( )	7196 Hex Cr CAM VI B ( )	MassDEP APH CAM IX A ( )
6010 Metals CAM III A ( )	6020 Metals CAM III D (X)	MassDEP EPH CAM IV B ( )	8151 Herbicides CAM V C ( )	8330 Explosives CAM VIII A ( )	TO-15 VOC CAM IX B ( )

Affirmative response to Questions A throughF is required for "Presumptive Certainty" status

A	Were all samples received in a condition consistent with those described on the Chain-of-Custody, properly preserved (including temperature) in the field or laboratory, and prepared/analyzed within method holding times?	☑ Yes	☐ No[1]
B	Were the analytical method(s) and all associated QC requirements specificed in the selected CAM protocol(s) followed?	☑ Yes	☐ No[1]
C	Were all required corrective actions and analytical response actions specified in the selected CAM protocol(s) implemented for all identified performance standard non-conformances?	☑ Yes	☐ No[1]
D	Does the laboratory report comply with all the reporting requirements specified in CAM VII A, Quality Assurance and Quality Control Guidlines for the Acquisition and Reporting of Analytical Data?	☑ Yes	☐ No[1]
E a	VPH, EPH, and APH Methods only: Was each method conducted without significant modification(s)? (Refer to the individual method(s) for a list of significant modifications).	☐ Yes	☐ No[1]
E b	APH and TO-15 Methods only: Was the complete analyte list reported for each method?	☐ Yes	☐ No[1]
F	Were all applicable CAM protocol QC and performance standard non-conformances identified and evaluated in a laboratory narrative (including all No responses to Qestions A through E)?	☑ Yes	☐ No[1]

A response to questions G, H and I below is required for "Presumptive Certainty" status

G	Were the reporting limits at or below all CAM reporting limits specified in the selected CAM protocol(s)?	☑ Yes	☐ No[1]

***Data User Note:* Data that achieve "Presumptive Certainty" status may not necessarily meet the data usability and representativeness requirements described in 310 CMR 40. 1056 (2)(k) and WSC-07-350.**

H	Were all QC perfomance standards specified in the CAM protocol(s) achieved?	☑ Yes	☐ No[1]
I	Were results reported for the complete analyte list specified in the selected CAM protocol(s)?	☐ Yes	☑ No[1]

[1] *All Negative responses must be addressed in an attached Environmental Laboratory case narrative.*

I, the undersigned, attest under the pains and penalties of perjury that, based upon my personal inquiry of those responsible for obtaining the information, the material contained in this analytical report is, to the best of my knowledge and belief, accurate and complete.

Signature: Lisa Worthington

Position: Technical Representative

Printed Name: Lisa A. Worthington

Date: 06/08/23

con-test®
A Pace Analytical® Laboratory

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

September 11, 2023

Joe Spencer
Weston & Sampson Engineers MA
55 Walkers Brook Drive
Reading, MA 01867

Project Location: Springfield, MA
Client Job Number:
Project Number: ENG23-0315
Laboratory Work Order Number: 23H3880

Enclosed are results of analyses for samples as received by the laboratory on August 25, 2023. If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Rebecca Faust
Project Manager

Table of Contents

Sample Summary 4

Case Narrative 5

Sample Results 11

23H3880-01 11

23H3880-02 16

23H3880-03 21

23H3880-04 26

23H3880-05 31

23H3880-06 36

23H3880-07 41

23H3880-08 46

Sample Preparation Information 51

QC Data 53

Volatile Organic Compounds by GC/MS 53

B350426 53

B350462 57

B350530 62

Semivolatile Organic Compounds by GC/MS 67

B350505 67

B350766 71

Metals Analyses (Dissolved) 75

B350340 75

B350368 75

Flag/Qualifier Summary 77

Certifications 78

Table of Contents (continued)

Chain of Custody/Sample Receipt 82

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Weston & Sampson Engineers MA
55 Walkers Brook Drive
Reading, MA 01867
ATTN: Joe Spencer

REPORT DATE: 9/11/2023

PURCHASE ORDER NUMBER:

PROJECT NUMBER: ENG23-0315

ANALYTICAL SUMMARY

WORK ORDER NUMBER: 23H3880

The results of analyses performed on the following samples submitted to CON-TEST, a Pace Analytical Laboratory, are found in this report.

PROJECT LOCATION: Springfield, MA

FIELD SAMPLE #	LAB ID:	MATRIX	SAMPLE DESCRIPTION	TEST	SUB LAB
EW-1	23H3880-01	Ground Water		SW-846 6020B	
				SW-846 7470A	
				SW-846 8260D	
				SW-846 8270E	
EW-2	23H3880-02	Ground Water		SW-846 6020B	
				SW-846 7470A	
				SW-846 8260D	
				SW-846 8270E	
EW-3	23H3880-03	Ground Water		SW-846 6020B	
				SW-846 7470A	
				SW-846 8260D	
				SW-846 8270E	
MW-CM-43N	23H3880-04	Ground Water		SW-846 6020B	
				SW-846 7470A	
				SW-846 8260D	
				SW-846 8270E	
MW-205A	23H3880-05	Ground Water		SW-846 6020B	
				SW-846 7470A	
				SW-846 8260D	
				SW-846 8270E	
MW-CM-38N	23H3880-06	Ground Water		SW-846 6020B	
				SW-846 7470A	
				SW-846 8260D	
				SW-846 8270E	
MW-CM-53N	23H3880-07	Ground Water		SW-846 6020B	
				SW-846 7470A	
				SW-846 8260D	
				SW-846 8270E	
DUP-1	23H3880-08	Ground Water		SW-846 6020B	
				SW-846 7470A	
				SW-846 8260D	
				SW-846 8270E	

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

CASE NARRATIVE SUMMARY

All reported results are within defined laboratory quality control objectives unless listed below or otherwise qualified in this report.

con-test® A Pace Analytical® Laboratory

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

SW-846 8260D

Qualifications:

L-04

Laboratory fortified blank/laboratory control sample recovery and duplicate recovery are outside of control limits. Reported value for this compound is likely to be biased on the low side.

Analyte & Samples(s) Qualified:

Naphthalene
23H3880-01[EW-1], 23H3880-02[EW-2], 23H3880-07[MW-CM-53N], B350462-BLK1, B350462-BS1, B350462-BSD1, B350530-BLK1, B350530-BS1, B350530-BSD1, S092869-CCV1

L-07

Either laboratory fortified blank/laboratory control sample or duplicate recovery is outside of control limits, but the other is within limits. RPD between the two LFB/LCS results is within method specified criteria.

Analyte & Samples(s) Qualified:

Bromochloromethane
B350530-BS1

L-07A

Either laboratory fortified blank/laboratory control sample or duplicate recovery is outside of control limits, but the other is within limits. RPD outside of control limits. Reduced precision anticipated for any reported result for this compound.

Analyte & Samples(s) Qualified:

2,2-Dichloropropane
B350426-BSD1

R-05

Laboratory fortified blank duplicate RPD is outside of control limits. Reduced precision is anticipated for any reported value for this compound.

Analyte & Samples(s) Qualified:

2,2-Dichloropropane
23H3880-03[EW-3], 23H3880-04[MW-CM-43N], 23H3880-05[MW-205A], 23H3880-06[MW-CM-38N], 23H3880-08[DUP-1], B350426-BLK1, B350426-BS1, B350426-BSD1, S092761-CCV1

tert-Amyl Methyl Ether (TAME)
23H3880-03[EW-3], 23H3880-04[MW-CM-43N], 23H3880-05[MW-205A], 23H3880-06[MW-CM-38N], 23H3880-08[DUP-1], B350426-BLK1, B350426-BS1, B350426-BSD1, S092761-CCV1

tert-Butyl Ethyl Ether (TBEE)
23H3880-03[EW-3], 23H3880-04[MW-CM-43N], 23H3880-05[MW-205A], 23H3880-06[MW-CM-38N], 23H3880-08[DUP-1], B350426-BLK1, B350426-BS1, B350426-BSD1, S092761-CCV1

RL-07

Elevated reporting limit based on lowest point in calibration.
MA CAM reporting limit not met.

Analyte & Samples(s) Qualified:

Carbon Disulfide
23H3880-01[EW-1], 23H3880-02[EW-2], 23H3880-03[EW-3], 23H3880-04[MW-CM-43N], 23H3880-05[MW-205A], 23H3880-06[MW-CM-38N], 23H3880-08[DUP-1]

Methylene Chloride
23H3880-01[EW-1], 23H3880-02[EW-2], 23H3880-03[EW-3], 23H3880-04[MW-CM-43N], 23H3880-05[MW-205A], 23H3880-06[MW-CM-38N], 23H3880-08[DUP-1]

V-05

Continuing calibration verification (CCV) did not meet method specifications and was biased on the low side for this compound.

Analyte & Samples(s) Qualified:

1,2,4-Trichlorobenzene
23H3880-01[EW-1], 23H3880-02[EW-2], B350462-BLK1, B350462-BS1, B350462-BSD1, S092803-CCV1

1,4-Dioxane
23H3880-01[EW-1], 23H3880-02[EW-2], 23H3880-07[MW-CM-53N], B350462-BLK1, B350462-BS1, B350462-BSD1, B350530-BLK1, B350530-BS1, B350530-BSD1, S092803-CCV1, S092869-CCV1

Bromoform
23H3880-01[EW-1], 23H3880-02[EW-2], 23H3880-07[MW-CM-53N], B350462-BLK1, B350462-BS1, B350462-BSD1, B350530-BLK1, B350530-BS1, B350530-BSD1, S092803-CCV1, S092869-CCV1

Naphthalene
23H3880-01[EW-1], 23H3880-02[EW-2], 23H3880-07[MW-CM-53N], B350462-BLK1, B350462-BS1, B350462-BSD1, B350530-BLK1, B350530-BS1, B350530-BSD1, S092803-CCV1, S092869-CCV1

V-16

Response factor is less than method specified minimum acceptable value. Reduced precision and accuracy may be associated with reported result.

Analyte & Samples(s) Qualified:

1,4-Dioxane
S092761-CCV1, S092803-CCV1, S092869-CCV1

con-test® A Pace Analytical® Laboratory

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

V-20

Continuing calibration verification (CCV) did not meet method specifications and was biased on the high side. Data validation is not affected since sample result was "not detected" for this compound.

Analyte & Samples(s) Qualified:

Bromochloromethane
B350462-BS1, B350462-BSD1, B350530-BS1, B350530-BSD1, S092803-CCV1, S092869-CCV1

Bromomethane
B350530-BS1, B350530-BSD1, S092869-CCV1

Chloromethane
B350462-BS1, B350462-BSD1, B350530-BS1, B350530-BSD1, S092803-CCV1, S092869-CCV1

Vinyl Chloride
B350426-BS1, B350426-BSD1, B350530-BS1, B350530-BSD1, S092761-CCV1, S092869-CCV1

V-34

Initial calibration verification (ICV) did not meet method specifications and was biased on the low side for this compound. Reported result is estimated.

Analyte & Samples(s) Qualified:

Bromomethane
23H3880-03[EW-3], 23H3880-04[MW-CM-43N], 23H3880-05[MW-205A], 23H3880-06[MW-CM-38N], 23H3880-08[DUP-1], B350426-BLK1, B350426-BS1, B350426-BSD1, S092761-CCV1

Chloromethane
23H3880-03[EW-3], 23H3880-04[MW-CM-43N], 23H3880-05[MW-205A], 23H3880-06[MW-CM-38N], 23H3880-08[DUP-1], B350426-BLK1, B350426-BS1, B350426-BSD1, S092761-CCV1

V-35

Initial calibration verification (ICV) did not meet method specifications and was biased on the high side for this compound. Reported result is estimated.

Analyte & Samples(s) Qualified:

Acetone
B350426-BS1, B350426-BSD1, S092761-CCV1

SW-846 8270E

Qualifications:

B-02

Bis(2-ethylhexyl)phthalate is a common laboratory contaminant.

Analyte & Samples(s) Qualified:

Bis(2-Ethylhexyl)phthalate
B350766-BLK1

L-04

Laboratory fortified blank/laboratory control sample recovery and duplicate recovery are outside of control limits. Reported value for this compound is likely to be biased on the low side.

Analyte & Samples(s) Qualified:

1,2,4-Trichlorobenzene
23H3880-01[EW-1], 23H3880-02[EW-2], 23H3880-03[EW-3], 23H3880-04[MW-CM-43N], 23H3880-05[MW-205A], 23H3880-06[MW-CM-38N], 23H3880-07[MW-CM-53N], 23H3880-08[DUP-1], B350505-BLK1, B350505-BS1, B350505-BSD1, B350766-BLK1, B350766-BS1, B350766-BSD1

1,2-Dichlorobenzene
B350766-BLK1, B350766-BS1, B350766-BSD1

1,3-Dichlorobenzene
23H3880-01[EW-1], 23H3880-02[EW-2], 23H3880-03[EW-3], 23H3880-04[MW-CM-43N], 23H3880-05[MW-205A], 23H3880-06[MW-CM-38N], 23H3880-07[MW-CM-53N], 23H3880-08[DUP-1], B350505-BLK1, B350505-BS1, B350505-BSD1, B350766-BLK1, B350766-BS1, B350766-BSD1

1,4-Dichlorobenzene
23H3880-01[EW-1], 23H3880-02[EW-2], 23H3880-03[EW-3], 23H3880-04[MW-CM-43N], 23H3880-05[MW-205A], 23H3880-06[MW-CM-38N], 23H3880-07[MW-CM-53N], 23H3880-08[DUP-1], B350505-BLK1, B350505-BS1, B350505-BSD1, B350766-BLK1, B350766-BS1, B350766-BSD1

Hexachlorobutadiene
23H3880-01[EW-1], 23H3880-02[EW-2], 23H3880-03[EW-3], 23H3880-04[MW-CM-43N], 23H3880-05[MW-205A], 23H3880-06[MW-CM-38N], 23H3880-07[MW-CM-53N], 23H3880-08[DUP-1], B350505-BLK1, B350505-BS1, B350505-BSD1, B350766-BLK1, B350766-BS1, B350766-BSD1

Hexachloroethane
23H3880-01[EW-1], 23H3880-02[EW-2], 23H3880-03[EW-3], 23H3880-04[MW-CM-43N], 23H3880-05[MW-205A], 23H3880-06[MW-CM-38N], 23H3880-07[MW-CM-53N], 23H3880-08[DUP-1], B350505-BLK1, B350505-BS1, B350505-BSD1, B350766-BLK1, B350766-BS1, B350766-BSD1

Naphthalene
B350766-BLK1, B350766-BS1, B350766-BSD1

con-test® A Pace Analytical® Laboratory

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

L-07

Either laboratory fortified blank/laboratory control sample or duplicate recovery is outside of control limits, but the other is within limits. RPD between the two LFB/LCS results is within method specified criteria.

Analyte & Samples(s) Qualified:

1,2-Dichlorobenzene
B350505-BS1

L-07A

Either laboratory fortified blank/laboratory control sample or duplicate recovery is outside of control limits, but the other is within limits. RPD outside of control limits. Reduced precision anticipated for any reported result for this compound.

Analyte & Samples(s) Qualified:

2,4,5-Trichlorophenol
B350505-BSD1, B350766-BSD1

2,4,6-Trichlorophenol
B350505-BSD1, B350766-BSD1

2,4-Dichlorophenol
B350505-BSD1, B350766-BSD1

2,4-Dinitrophenol
B350505-BSD1, B350766-BSD1

2-Chlorophenol
B350766-BSD1

2-Nitrophenol
B350505-BSD1, B350766-BSD1

4-Nitrophenol
B350505-BSD1

Pentachlorophenol
B350505-BSD1, B350766-BSD1

Pyridine
B350505-BS1

R-05

Laboratory fortified blank duplicate RPD is outside of control limits. Reduced precision is anticipated for any reported value for this compound.

Analyte & Samples(s) Qualified:

2,4,5-Trichlorophenol
B350505-BS1, B350766-BS1

2,4,6-Trichlorophenol
B350505-BS1, B350766-BS1

2,4-Dichlorophenol
B350505-BS1, B350766-BS1

2,4-Dinitrophenol
B350505-BS1, B350766-BS1

2-Chlorophenol
B350505-BS1, B350505-BSD1, B350766-BS1

2-Nitrophenol
B350505-BS1, B350766-BS1

4-Nitrophenol
B350505-BS1, B350766-BS1, B350766-BSD1

Aniline
B350505-BS1, B350505-BSD1

Pentachlorophenol
B350505-BS1, B350766-BS1

Phenol
B350505-BS1, B350505-BSD1, B350766-BS1, B350766-BSD1

Pyridine
B350505-BSD1

con-test® A Pace Analytical® Laboratory

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

S-26

Surrogate outside of control limits.

Analyte & Samples(s) Qualified:

2,4,6-Tribromophenol
B350505-BLK1, B350766-BSD1

2-Fluorobiphenyl
B350505-BLK1

2-Fluorophenol
B350505-BSD1, B350766-BSD1

Nitrobenzene-d5
B350505-BLK1

p-Terphenyl-d14
B350505-BLK1

V-04

Initial calibration did not meet method specifications. Compound was calibrated using a response factor where %RSD is outside of method specified criteria. Reported result is estimated.

Analyte & Samples(s) Qualified:

2,4-Dinitrophenol
23H3880-01[EW-1], 23H3880-02[EW-2], 23H3880-03[EW-3], 23H3880-04[MW-CM-43N], 23H3880-05[MW-205A], 23H3880-06[MW-CM-38N], 23H3880-07[MW-CM-53N], 23H3880-08[DUP-1], B350505-BLK1, B350505-BS1, B350505-BSD1, B350766-BLK1, B350766-BS1, B350766-BSD1, S092861-CCV1, S093106-CCV1

Bis(2-Ethylhexyl)phthalate
23H3880-01[EW-1], 23H3880-02[EW-2], 23H3880-03[EW-3], 23H3880-04[MW-CM-43N], 23H3880-05[MW-205A], 23H3880-06[MW-CM-38N], 23H3880-07[MW-CM-53N], 23H3880-08[DUP-1], B350505-BLK1, B350505-BS1, B350505-BSD1, B350766-BLK1, B350766-BS1, B350766-BSD1, S092861-CCV1, S093106-CCV1

Di-n-octylphthalate
23H3880-01[EW-1], 23H3880-02[EW-2], 23H3880-03[EW-3], 23H3880-04[MW-CM-43N], 23H3880-05[MW-205A], 23H3880-06[MW-CM-38N], 23H3880-07[MW-CM-53N], 23H3880-08[DUP-1], B350505-BLK1, B350505-BS1, B350505-BSD1, B350766-BLK1, B350766-BS1, B350766-BSD1, S092861-CCV1, S093106-CCV1

V-05

Continuing calibration verification (CCV) did not meet method specifications and was biased on the low side for this compound.

Analyte & Samples(s) Qualified:

4-Nitrophenol
23H3880-01[EW-1], 23H3880-02[EW-2], 23H3880-03[EW-3], 23H3880-04[MW-CM-43N], 23H3880-05[MW-205A], 23H3880-06[MW-CM-38N], 23H3880-07[MW-CM-53N], 23H3880-08[DUP-1], B350505-BLK1, B350505-BS1, B350505-BSD1, S092861-CCV1

Aniline
23H3880-01[EW-1], 23H3880-02[EW-2], 23H3880-03[EW-3], 23H3880-04[MW-CM-43N], 23H3880-05[MW-205A], 23H3880-06[MW-CM-38N], 23H3880-07[MW-CM-53N], 23H3880-08[DUP-1], B350505-BLK1, B350505-BS1, B350505-BSD1, B350766-BLK1, B350766-BS1, B350766-BSD1, S092861-CCV1, S093106-CCV1

V-06

Continuing calibration verification (CCV) did not meet method specifications and was biased on the high side for this compound.

Analyte & Samples(s) Qualified:

Bis(2-chloroisopropyl)ether
B350505-BS1, B350505-BSD1, B350766-BS1, B350766-BSD1, S092861-CCV1, S093106-CCV1

V-20

Continuing calibration verification (CCV) did not meet method specifications and was biased on the high side. Data validation is not affected since sample result was "not detected" for this compound.

Analyte & Samples(s) Qualified:

Bis(2-chloroisopropyl)ether
23H3880-01[EW-1], 23H3880-02[EW-2], 23H3880-03[EW-3], 23H3880-04[MW-CM-43N], 23H3880-05[MW-205A], 23H3880-06[MW-CM-38N], 23H3880-07[MW-CM-53N], 23H3880-08[DUP-1], B350505-BLK1, B350766-BLK1

V-35

Initial calibration verification (ICV) did not meet method specifications and was biased on the high side for this compound. Reported result is estimated.

Analyte & Samples(s) Qualified:

Butylbenzylphthalate
23H3880-01[EW-1], 23H3880-02[EW-2], 23H3880-03[EW-3], 23H3880-04[MW-CM-43N], 23H3880-05[MW-205A], 23H3880-06[MW-CM-38N], 23H3880-07[MW-CM-53N], 23H3880-08[DUP-1], B350505-BLK1, B350505-BS1, B350505-BSD1, B350766-BLK1, B350766-BS1, B350766-BSD1, S092861-CCV1, S093106-CCV1

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

The results of analyses reported only relate to samples submitted to Con-Test, a Pace Analytical Laboratory, for testing.
I certify that the analyses listed above, unless specifically listed as subcontracted, if any, were performed under my direction according to the approved methodologies listed in this document, and that based upon my inquiry of those individuals immediately responsible for obtaining the information, the material contained in this report is, to the best of my knowledge and belief, accurate and complete.

Meghan E. Kelley
Reporting Specialist

con-test® A Pace Analytical® Laboratory

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Springfield, MA
Sample Description:
Work Order: 23H3880
Date Received: 8/25/2023
Field Sample #: EW-1
Sampled: 8/25/2023 10:20
Sample ID: 23H3880-01
Sample Matrix: Ground Water

Volatile Organic Compounds by GC/MS

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Acetone	ND	10	µg/L	1		SW-846 8260D	8/29/23	8/30/23 17:51	MFF
tert-Amyl Methyl Ether (TAME)	ND	0.50	µg/L	1		SW-846 8260D	8/29/23	8/30/23 17:51	MFF
Benzene	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/30/23 17:51	MFF
Bromobenzene	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/30/23 17:51	MFF
Bromochloromethane	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/30/23 17:51	MFF
Bromodichloromethane	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/30/23 17:51	MFF
Bromoform	ND	1.0	µg/L	1	V-05	SW-846 8260D	8/29/23	8/30/23 17:51	MFF
Bromomethane	ND	2.0	µg/L	1		SW-846 8260D	8/29/23	8/30/23 17:51	MFF
2-Butanone (MEK)	ND	10	µg/L	1		SW-846 8260D	8/29/23	8/30/23 17:51	MFF
n-Butylbenzene	1.0	1.0	µg/L	1		SW-846 8260D	8/29/23	8/30/23 17:51	MFF
sec-Butylbenzene	1.5	1.0	µg/L	1		SW-846 8260D	8/29/23	8/30/23 17:51	MFF
tert-Butylbenzene	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/30/23 17:51	MFF
tert-Butyl Ethyl Ether (TBEE)	ND	0.50	µg/L	1		SW-846 8260D	8/29/23	8/30/23 17:51	MFF
Carbon Disulfide	ND	5.0	µg/L	1	RL-07	SW-846 8260D	8/29/23	8/30/23 17:51	MFF
Carbon Tetrachloride	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/30/23 17:51	MFF
Chlorobenzene	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/30/23 17:51	MFF
Chlorodibromomethane	ND	0.50	µg/L	1		SW-846 8260D	8/29/23	8/30/23 17:51	MFF
Chloroethane	ND	2.0	µg/L	1		SW-846 8260D	8/29/23	8/30/23 17:51	MFF
Chloroform	ND	2.0	µg/L	1		SW-846 8260D	8/29/23	8/30/23 17:51	MFF
Chloromethane	ND	2.0	µg/L	1		SW-846 8260D	8/29/23	8/30/23 17:51	MFF
2-Chlorotoluene	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/30/23 17:51	MFF
4-Chlorotoluene	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/30/23 17:51	MFF
1,2-Dibromo-3-chloropropane (DBCP)	ND	2.0	µg/L	1		SW-846 8260D	8/29/23	8/30/23 17:51	MFF
1,2-Dibromoethane (EDB)	ND	0.50	µg/L	1		SW-846 8260D	8/29/23	8/30/23 17:51	MFF
Dibromomethane	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/30/23 17:51	MFF
1,2-Dichlorobenzene	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/30/23 17:51	MFF
1,3-Dichlorobenzene	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/30/23 17:51	MFF
1,4-Dichlorobenzene	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/30/23 17:51	MFF
Dichlorodifluoromethane (Freon 12)	ND	2.0	µg/L	1		SW-846 8260D	8/29/23	8/30/23 17:51	MFF
1,1-Dichloroethane	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/30/23 17:51	MFF
1,2-Dichloroethane	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/30/23 17:51	MFF
1,1-Dichloroethylene	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/30/23 17:51	MFF
cis-1,2-Dichloroethylene	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/30/23 17:51	MFF
trans-1,2-Dichloroethylene	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/30/23 17:51	MFF
1,2-Dichloropropane	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/30/23 17:51	MFF
1,3-Dichloropropane	ND	0.50	µg/L	1		SW-846 8260D	8/29/23	8/30/23 17:51	MFF
2,2-Dichloropropane	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/30/23 17:51	MFF
1,1-Dichloropropene	ND	0.50	µg/L	1		SW-846 8260D	8/29/23	8/30/23 17:51	MFF
cis-1,3-Dichloropropene	ND	0.40	µg/L	1		SW-846 8260D	8/29/23	8/30/23 17:51	MFF
trans-1,3-Dichloropropene	ND	0.40	µg/L	1		SW-846 8260D	8/29/23	8/30/23 17:51	MFF
Diethyl Ether	ND	2.0	µg/L	1		SW-846 8260D	8/29/23	8/30/23 17:51	MFF
Diisopropyl Ether (DIPE)	ND	0.50	µg/L	1		SW-846 8260D	8/29/23	8/30/23 17:51	MFF
1,4-Dioxane	ND	50	µg/L	1	V-05	SW-846 8260D	8/29/23	8/30/23 17:51	MFF
Ethylbenzene	2.2	1.0	µg/L	1		SW-846 8260D	8/29/23	8/30/23 17:51	MFF

con-test® A Pace Analytical® Laboratory

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Springfield, MA
Sample Description:
Work Order: 23H3880

Date Received: 8/25/2023

Field Sample #: EW-1
Sampled: 8/25/2023 10:20

Sample ID: 23H3880-01

Sample Matrix: Ground Water

Volatile Organic Compounds by GC/MS

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Hexachlorobutadiene	ND	0.60	µg/L	1		SW-846 8260D	8/29/23	8/30/23 17:51	MFF
2-Hexanone (MBK)	ND	10	µg/L	1		SW-846 8260D	8/29/23	8/30/23 17:51	MFF
Isopropylbenzene (Cumene)	1.9	1.0	µg/L	1		SW-846 8260D	8/29/23	8/30/23 17:51	MFF
p-Isopropyltoluene (p-Cymene)	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/30/23 17:51	MFF
Methyl tert-Butyl Ether (MTBE)	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/30/23 17:51	MFF
Methylene Chloride	ND	5.0	µg/L	1	RL-07	SW-846 8260D	8/29/23	8/30/23 17:51	MFF
4-Methyl-2-pentanone (MIBK)	ND	10	µg/L	1		SW-846 8260D	8/29/23	8/30/23 17:51	MFF
Naphthalene	31	2.0	µg/L	1	L-04, V-05	SW-846 8260D	8/29/23	8/30/23 17:51	MFF
n-Propylbenzene	2.4	1.0	µg/L	1		SW-846 8260D	8/29/23	8/30/23 17:51	MFF
Styrene	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/30/23 17:51	MFF
1,1,1,2-Tetrachloroethane	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/30/23 17:51	MFF
1,1,2,2-Tetrachloroethane	ND	0.50	µg/L	1		SW-846 8260D	8/29/23	8/30/23 17:51	MFF
Tetrachloroethylene	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/30/23 17:51	MFF
Tetrahydrofuran	ND	2.0	µg/L	1		SW-846 8260D	8/29/23	8/30/23 17:51	MFF
Toluene	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/30/23 17:51	MFF
1,2,3-Trichlorobenzene	ND	2.0	µg/L	1		SW-846 8260D	8/29/23	8/30/23 17:51	MFF
1,2,4-Trichlorobenzene	ND	1.0	µg/L	1	V-05	SW-846 8260D	8/29/23	8/30/23 17:51	MFF
1,1,1-Trichloroethane	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/30/23 17:51	MFF
1,1,2-Trichloroethane	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/30/23 17:51	MFF
Trichloroethylene	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/30/23 17:51	MFF
Trichlorofluoromethane (Freon 11)	ND	2.0	µg/L	1		SW-846 8260D	8/29/23	8/30/23 17:51	MFF
1,2,3-Trichloropropane	ND	2.0	µg/L	1		SW-846 8260D	8/29/23	8/30/23 17:51	MFF
1,2,4-Trimethylbenzene	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/30/23 17:51	MFF
1,3,5-Trimethylbenzene	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/30/23 17:51	MFF
Vinyl Chloride	ND	2.0	µg/L	1		SW-846 8260D	8/29/23	8/30/23 17:51	MFF
m+p Xylene	ND	2.0	µg/L	1		SW-846 8260D	8/29/23	8/30/23 17:51	MFF
o-Xylene	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/30/23 17:51	MFF

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
1,2-Dichloroethane-d4	106	70-130		8/30/23 17:51
Toluene-d8	97.7	70-130		8/30/23 17:51
4-Bromofluorobenzene	89.0	70-130		8/30/23 17:51

con-test® A Pace Analytical® Laboratory

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Springfield, MA
Sample Description:
Work Order: 23H3880

Date Received: 8/25/2023

Field Sample #: EW-1
Sampled: 8/25/2023 10:20

Sample ID: 23H3880-01

Sample Matrix: Ground Water

Semivolatile Organic Compounds by GC/MS

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Biphenyl	ND	20	µg/L	1		SW-846 8270E	8/29/23	8/31/23 17:34	BGL
Acenaphthene	ND	5.0	µg/L	1		SW-846 8270E	8/29/23	8/31/23 17:34	BGL
Acenaphthylene	ND	5.0	µg/L	1		SW-846 8270E	8/29/23	8/31/23 17:34	BGL
Acetophenone	ND	9.9	µg/L	1		SW-846 8270E	8/29/23	8/31/23 17:34	BGL
Aniline	ND	20	µg/L	1	V-05	SW-846 8270E	8/29/23	8/31/23 17:34	BGL
Anthracene	ND	5.0	µg/L	1		SW-846 8270E	8/29/23	8/31/23 17:34	BGL
Benzo(a)anthracene	ND	5.0	µg/L	1		SW-846 8270E	8/29/23	8/31/23 17:34	BGL
Benzo(a)pyrene	ND	5.0	µg/L	1		SW-846 8270E	8/29/23	8/31/23 17:34	BGL
Benzo(b)fluoranthene	ND	5.0	µg/L	1		SW-846 8270E	8/29/23	8/31/23 17:34	BGL
Benzo(g,h,i)perylene	ND	5.0	µg/L	1		SW-846 8270E	8/29/23	8/31/23 17:34	BGL
Benzo(k)fluoranthene	ND	5.0	µg/L	1		SW-846 8270E	8/29/23	8/31/23 17:34	BGL
Bis(2-chloroethoxy)methane	ND	9.9	µg/L	1		SW-846 8270E	8/29/23	8/31/23 17:34	BGL
Bis(2-chloroethyl)ether	ND	9.9	µg/L	1		SW-846 8270E	8/29/23	8/31/23 17:34	BGL
Bis(2-chloroisopropyl)ether	ND	9.9	µg/L	1	V-20	SW-846 8270E	8/29/23	8/31/23 17:34	BGL
Bis(2-Ethylhexyl)phthalate	ND	9.9	µg/L	1	V-04	SW-846 8270E	8/29/23	8/31/23 17:34	BGL
4-Bromophenylphenylether	ND	9.9	µg/L	1		SW-846 8270E	8/29/23	8/31/23 17:34	BGL
Butylbenzylphthalate	ND	9.9	µg/L	1	V-35	SW-846 8270E	8/29/23	8/31/23 17:34	BGL
4-Chloroaniline	ND	9.9	µg/L	1		SW-846 8270E	8/29/23	8/31/23 17:34	BGL
2-Chloronaphthalene	ND	9.9	µg/L	1		SW-846 8270E	8/29/23	8/31/23 17:34	BGL
2-Chlorophenol	ND	9.9	µg/L	1		SW-846 8270E	8/29/23	8/31/23 17:34	BGL
Chrysene	ND	5.0	µg/L	1		SW-846 8270E	8/29/23	8/31/23 17:34	BGL
Dibenz(a,h)anthracene	ND	5.0	µg/L	1		SW-846 8270E	8/29/23	8/31/23 17:34	BGL
Dibenzofuran	ND	5.0	µg/L	1		SW-846 8270E	8/29/23	8/31/23 17:34	BGL
Di-n-butylphthalate	ND	9.9	µg/L	1		SW-846 8270E	8/29/23	8/31/23 17:34	BGL
1,2-Dichlorobenzene	ND	5.0	µg/L	1		SW-846 8270E	8/29/23	8/31/23 17:34	BGL
1,3-Dichlorobenzene	ND	5.0	µg/L	1	L-04	SW-846 8270E	8/29/23	8/31/23 17:34	BGL
1,4-Dichlorobenzene	ND	5.0	µg/L	1	L-04	SW-846 8270E	8/29/23	8/31/23 17:34	BGL
3,3-Dichlorobenzidine	ND	9.9	µg/L	1		SW-846 8270E	8/29/23	8/31/23 17:34	BGL
2,4-Dichlorophenol	ND	9.9	µg/L	1		SW-846 8270E	8/29/23	8/31/23 17:34	BGL
Diethylphthalate	ND	9.9	µg/L	1		SW-846 8270E	8/29/23	8/31/23 17:34	BGL
2,4-Dimethylphenol	ND	9.9	µg/L	1		SW-846 8270E	8/29/23	8/31/23 17:34	BGL
Dimethylphthalate	ND	9.9	µg/L	1		SW-846 8270E	8/29/23	8/31/23 17:34	BGL
2,4-Dinitrophenol	ND	9.9	µg/L	1	V-04	SW-846 8270E	8/29/23	8/31/23 17:34	BGL
2,4-Dinitrotoluene	ND	9.9	µg/L	1		SW-846 8270E	8/29/23	8/31/23 17:34	BGL
2,6-Dinitrotoluene	ND	9.9	µg/L	1		SW-846 8270E	8/29/23	8/31/23 17:34	BGL
Di-n-octylphthalate	ND	9.9	µg/L	1	V-04	SW-846 8270E	8/29/23	8/31/23 17:34	BGL
1,2-Diphenylhydrazine/Azobenzene	ND	9.9	µg/L	1		SW-846 8270E	8/29/23	8/31/23 17:34	BGL
Fluoranthene	ND	5.0	µg/L	1		SW-846 8270E	8/29/23	8/31/23 17:34	BGL
Fluorene	ND	5.0	µg/L	1		SW-846 8270E	8/29/23	8/31/23 17:34	BGL
Hexachlorobenzene	ND	9.9	µg/L	1		SW-846 8270E	8/29/23	8/31/23 17:34	BGL
Hexachlorobutadiene	ND	9.9	µg/L	1	L-04	SW-846 8270E	8/29/23	8/31/23 17:34	BGL
Hexachloroethane	ND	9.9	µg/L	1	L-04	SW-846 8270E	8/29/23	8/31/23 17:34	BGL
Indeno(1,2,3-cd)pyrene	ND	5.0	µg/L	1		SW-846 8270E	8/29/23	8/31/23 17:34	BGL
Isophorone	ND	9.9	µg/L	1		SW-846 8270E	8/29/23	8/31/23 17:34	BGL

con-test® A Pace Analytical® Laboratory

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Springfield, MA
Sample Description:
Work Order: 23H3880

Date Received: 8/25/2023

Field Sample #: EW-1
Sampled: 8/25/2023 10:20

Sample ID: 23H3880-01

Sample Matrix: Ground Water

Semivolatile Organic Compounds by GC/MS

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
2-Methylnaphthalene	32	5.0	µg/L	1		SW-846 8270E	8/29/23	8/31/23 17:34	BGL
2-Methylphenol	ND	9.9	µg/L	1		SW-846 8270E	8/29/23	8/31/23 17:34	BGL
3/4-Methylphenol	ND	9.9	µg/L	1		SW-846 8270E	8/29/23	8/31/23 17:34	BGL
Naphthalene	18	5.0	µg/L	1		SW-846 8270E	8/29/23	8/31/23 17:34	BGL
Nitrobenzene	ND	9.9	µg/L	1		SW-846 8270E	8/29/23	8/31/23 17:34	BGL
2-Nitrophenol	ND	9.9	µg/L	1		SW-846 8270E	8/29/23	8/31/23 17:34	BGL
4-Nitrophenol	ND	9.9	µg/L	1	V-05	SW-846 8270E	8/29/23	8/31/23 17:34	BGL
Pentachlorophenol	ND	9.9	µg/L	1		SW-846 8270E	8/29/23	8/31/23 17:34	BGL
Phenanthrene	ND	5.0	µg/L	1		SW-846 8270E	8/29/23	8/31/23 17:34	BGL
Phenol	ND	9.9	µg/L	1		SW-846 8270E	8/29/23	8/31/23 17:34	BGL
Pyrene	ND	5.0	µg/L	1		SW-846 8270E	8/29/23	8/31/23 17:34	BGL
Pyridine	ND	20	µg/L	1		SW-846 8270E	8/29/23	8/31/23 17:34	BGL
1,2,4-Trichlorobenzene	ND	5.0	µg/L	1	L-04	SW-846 8270E	8/29/23	8/31/23 17:34	BGL
2,4,5-Trichlorophenol	ND	9.9	µg/L	1		SW-846 8270E	8/29/23	8/31/23 17:34	BGL
2,4,6-Trichlorophenol	ND	9.9	µg/L	1		SW-846 8270E	8/29/23	8/31/23 17:34	BGL

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
2-Fluorophenol	65.6	15-110		8/31/23 17:34
Phenol-d6	47.1	15-110		8/31/23 17:34
Nitrobenzene-d5	79.2	30-130		8/31/23 17:34
2-Fluorobiphenyl	75.9	30-130		8/31/23 17:34
2,4,6-Tribromophenol	83.1	15-110		8/31/23 17:34
p-Terphenyl-d14	98.0	30-130		8/31/23 17:34

con-test® A Pace Analytical® Laboratory

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Springfield, MA
Sample Description:
Work Order: 23H3880

Date Received: 8/25/2023

Field Sample #: EW-1
Sampled: 8/25/2023 10:20

Sample ID: 23H3880-01

Sample Matrix: Ground Water

Metals Analyses (Dissolved)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Antimony	ND	1.0	µg/L	1		SW-846 6020B	8/26/23	8/30/23 8:19	NC
Arsenic	ND	1.0	µg/L	1		SW-846 6020B	8/26/23	8/30/23 8:19	NC
Barium	90	10	µg/L	1		SW-846 6020B	8/26/23	8/29/23 14:00	NC
Beryllium	ND	0.40	µg/L	1		SW-846 6020B	8/26/23	8/29/23 14:00	NC
Cadmium	ND	0.20	µg/L	1		SW-846 6020B	8/26/23	8/29/23 14:00	NC
Chromium	ND	5.0	µg/L	1		SW-846 6020B	8/26/23	8/30/23 8:19	NC
Lead	ND	0.50	µg/L	1		SW-846 6020B	8/26/23	8/29/23 14:00	NC
Mercury	ND	0.00020	mg/L	1		SW-846 7470A	8/28/23	8/28/23 13:43	AAJ
Nickel	ND	5.0	µg/L	1		SW-846 6020B	8/26/23	8/29/23 14:00	NC
Selenium	ND	5.0	µg/L	1		SW-846 6020B	8/26/23	8/29/23 14:00	NC
Silver	ND	0.20	µg/L	1		SW-846 6020B	8/26/23	8/29/23 14:00	NC
Thallium	ND	0.20	µg/L	1		SW-846 6020B	8/26/23	8/29/23 14:00	NC
Vanadium	ND	5.0	µg/L	1		SW-846 6020B	8/26/23	8/29/23 14:00	NC
Zinc	ND	10	µg/L	1		SW-846 6020B	8/26/23	8/29/23 14:00	NC

con-test® A Pace Analytical® Laboratory

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Springfield, MA
Sample Description:
Work Order: 23H3880

Date Received: 8/25/2023

Field Sample #: EW-2
Sampled: 8/25/2023 11:20

Sample ID: 23H3880-02

Sample Matrix: Ground Water

Volatile Organic Compounds by GC/MS

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Acetone	ND	10	µg/L	1		SW-846 8260D	8/29/23	8/30/23 18:17	MFF
tert-Amyl Methyl Ether (TAME)	ND	0.50	µg/L	1		SW-846 8260D	8/29/23	8/30/23 18:17	MFF
Benzene	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/30/23 18:17	MFF
Bromobenzene	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/30/23 18:17	MFF
Bromochloromethane	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/30/23 18:17	MFF
Bromodichloromethane	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/30/23 18:17	MFF
Bromoform	ND	1.0	µg/L	1	V-05	SW-846 8260D	8/29/23	8/30/23 18:17	MFF
Bromomethane	ND	2.0	µg/L	1		SW-846 8260D	8/29/23	8/30/23 18:17	MFF
2-Butanone (MEK)	ND	10	µg/L	1		SW-846 8260D	8/29/23	8/30/23 18:17	MFF
n-Butylbenzene	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/30/23 18:17	MFF
sec-Butylbenzene	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/30/23 18:17	MFF
tert-Butylbenzene	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/30/23 18:17	MFF
tert-Butyl Ethyl Ether (TBEE)	ND	0.50	µg/L	1		SW-846 8260D	8/29/23	8/30/23 18:17	MFF
Carbon Disulfide	ND	5.0	µg/L	1	RL-07	SW-846 8260D	8/29/23	8/30/23 18:17	MFF
Carbon Tetrachloride	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/30/23 18:17	MFF
Chlorobenzene	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/30/23 18:17	MFF
Chlorodibromomethane	ND	0.50	µg/L	1		SW-846 8260D	8/29/23	8/30/23 18:17	MFF
Chloroethane	ND	2.0	µg/L	1		SW-846 8260D	8/29/23	8/30/23 18:17	MFF
Chloroform	ND	2.0	µg/L	1		SW-846 8260D	8/29/23	8/30/23 18:17	MFF
Chloromethane	ND	2.0	µg/L	1		SW-846 8260D	8/29/23	8/30/23 18:17	MFF
2-Chlorotoluene	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/30/23 18:17	MFF
4-Chlorotoluene	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/30/23 18:17	MFF
1,2-Dibromo-3-chloropropane (DBCP)	ND	2.0	µg/L	1		SW-846 8260D	8/29/23	8/30/23 18:17	MFF
1,2-Dibromoethane (EDB)	ND	0.50	µg/L	1		SW-846 8260D	8/29/23	8/30/23 18:17	MFF
Dibromomethane	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/30/23 18:17	MFF
1,2-Dichlorobenzene	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/30/23 18:17	MFF
1,3-Dichlorobenzene	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/30/23 18:17	MFF
1,4-Dichlorobenzene	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/30/23 18:17	MFF
Dichlorodifluoromethane (Freon 12)	ND	2.0	µg/L	1		SW-846 8260D	8/29/23	8/30/23 18:17	MFF
1,1-Dichloroethane	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/30/23 18:17	MFF
1,2-Dichloroethane	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/30/23 18:17	MFF
1,1-Dichloroethylene	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/30/23 18:17	MFF
cis-1,2-Dichloroethylene	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/30/23 18:17	MFF
trans-1,2-Dichloroethylene	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/30/23 18:17	MFF
1,2-Dichloropropane	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/30/23 18:17	MFF
1,3-Dichloropropane	ND	0.50	µg/L	1		SW-846 8260D	8/29/23	8/30/23 18:17	MFF
2,2-Dichloropropane	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/30/23 18:17	MFF
1,1-Dichloropropene	ND	0.50	µg/L	1		SW-846 8260D	8/29/23	8/30/23 18:17	MFF
cis-1,3-Dichloropropene	ND	0.40	µg/L	1		SW-846 8260D	8/29/23	8/30/23 18:17	MFF
trans-1,3-Dichloropropene	ND	0.40	µg/L	1		SW-846 8260D	8/29/23	8/30/23 18:17	MFF
Diethyl Ether	ND	2.0	µg/L	1		SW-846 8260D	8/29/23	8/30/23 18:17	MFF
Diisopropyl Ether (DIPE)	ND	0.50	µg/L	1		SW-846 8260D	8/29/23	8/30/23 18:17	MFF
1,4-Dioxane	ND	50	µg/L	1	V-05	SW-846 8260D	8/29/23	8/30/23 18:17	MFF
Ethylbenzene	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/30/23 18:17	MFF

con-test® A Pace Analytical® Laboratory

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Springfield, MA
Sample Description:
Work Order: 23H3880

Date Received: 8/25/2023

Field Sample #: EW-2
Sampled: 8/25/2023 11:20

Sample ID: 23H3880-02

Sample Matrix: Ground Water

Volatile Organic Compounds by GC/MS

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Hexachlorobutadiene	ND	0.60	µg/L	1		SW-846 8260D	8/29/23	8/30/23 18:17	MFF
2-Hexanone (MBK)	ND	10	µg/L	1		SW-846 8260D	8/29/23	8/30/23 18:17	MFF
Isopropylbenzene (Cumene)	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/30/23 18:17	MFF
p-Isopropyltoluene (p-Cymene)	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/30/23 18:17	MFF
Methyl tert-Butyl Ether (MTBE)	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/30/23 18:17	MFF
Methylene Chloride	ND	5.0	µg/L	1	RL-07	SW-846 8260D	8/29/23	8/30/23 18:17	MFF
4-Methyl-2-pentanone (MIBK)	ND	10	µg/L	1		SW-846 8260D	8/29/23	8/30/23 18:17	MFF
Naphthalene	ND	2.0	µg/L	1	L-04, V-05	SW-846 8260D	8/29/23	8/30/23 18:17	MFF
n-Propylbenzene	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/30/23 18:17	MFF
Styrene	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/30/23 18:17	MFF
1,1,1,2-Tetrachloroethane	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/30/23 18:17	MFF
1,1,2,2-Tetrachloroethane	ND	0.50	µg/L	1		SW-846 8260D	8/29/23	8/30/23 18:17	MFF
Tetrachloroethylene	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/30/23 18:17	MFF
Tetrahydrofuran	ND	2.0	µg/L	1		SW-846 8260D	8/29/23	8/30/23 18:17	MFF
Toluene	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/30/23 18:17	MFF
1,2,3-Trichlorobenzene	ND	2.0	µg/L	1		SW-846 8260D	8/29/23	8/30/23 18:17	MFF
1,2,4-Trichlorobenzene	ND	1.0	µg/L	1	V-05	SW-846 8260D	8/29/23	8/30/23 18:17	MFF
1,1,1-Trichloroethane	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/30/23 18:17	MFF
1,1,2-Trichloroethane	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/30/23 18:17	MFF
Trichloroethylene	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/30/23 18:17	MFF
Trichlorofluoromethane (Freon 11)	ND	2.0	µg/L	1		SW-846 8260D	8/29/23	8/30/23 18:17	MFF
1,2,3-Trichloropropane	ND	2.0	µg/L	1		SW-846 8260D	8/29/23	8/30/23 18:17	MFF
1,2,4-Trimethylbenzene	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/30/23 18:17	MFF
1,3,5-Trimethylbenzene	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/30/23 18:17	MFF
Vinyl Chloride	ND	2.0	µg/L	1		SW-846 8260D	8/29/23	8/30/23 18:17	MFF
m+p Xylene	ND	2.0	µg/L	1		SW-846 8260D	8/29/23	8/30/23 18:17	MFF
o-Xylene	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/30/23 18:17	MFF

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
1,2-Dichloroethane-d4	110	70-130		8/30/23 18:17
Toluene-d8	101	70-130		8/30/23 18:17
4-Bromofluorobenzene	86.6	70-130		8/30/23 18:17

con-test® A Pace Analytical® Laboratory

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Springfield, MA
Sample Description:
Work Order: 23H3880
Date Received: 8/25/2023
Field Sample #: EW-2
Sampled: 8/25/2023 11:20
Sample ID: 23H3880-02
Sample Matrix: Ground Water

Semivolatile Organic Compounds by GC/MS

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Biphenyl	ND	19	µg/L	1		SW-846 8270E	8/29/23	8/31/23 17:55	BGL
Acenaphthene	ND	4.9	µg/L	1		SW-846 8270E	8/29/23	8/31/23 17:55	BGL
Acenaphthylene	ND	4.9	µg/L	1		SW-846 8270E	8/29/23	8/31/23 17:55	BGL
Acetophenone	ND	9.7	µg/L	1		SW-846 8270E	8/29/23	8/31/23 17:55	BGL
Aniline	ND	19	µg/L	1	V-05	SW-846 8270E	8/29/23	8/31/23 17:55	BGL
Anthracene	ND	4.9	µg/L	1		SW-846 8270E	8/29/23	8/31/23 17:55	BGL
Benzo(a)anthracene	ND	4.9	µg/L	1		SW-846 8270E	8/29/23	8/31/23 17:55	BGL
Benzo(a)pyrene	ND	4.9	µg/L	1		SW-846 8270E	8/29/23	8/31/23 17:55	BGL
Benzo(b)fluoranthene	ND	4.9	µg/L	1		SW-846 8270E	8/29/23	8/31/23 17:55	BGL
Benzo(g,h,i)perylene	ND	4.9	µg/L	1		SW-846 8270E	8/29/23	8/31/23 17:55	BGL
Benzo(k)fluoranthene	ND	4.9	µg/L	1		SW-846 8270E	8/29/23	8/31/23 17:55	BGL
Bis(2-chloroethoxy)methane	ND	9.7	µg/L	1		SW-846 8270E	8/29/23	8/31/23 17:55	BGL
Bis(2-chloroethyl)ether	ND	9.7	µg/L	1		SW-846 8270E	8/29/23	8/31/23 17:55	BGL
Bis(2-chloroisopropyl)ether	ND	9.7	µg/L	1	V-20	SW-846 8270E	8/29/23	8/31/23 17:55	BGL
Bis(2-Ethylhexyl)phthalate	ND	9.7	µg/L	1	V-04	SW-846 8270E	8/29/23	8/31/23 17:55	BGL
4-Bromophenylphenylether	ND	9.7	µg/L	1		SW-846 8270E	8/29/23	8/31/23 17:55	BGL
Butylbenzylphthalate	ND	9.7	µg/L	1	V-35	SW-846 8270E	8/29/23	8/31/23 17:55	BGL
4-Chloroaniline	ND	9.7	µg/L	1		SW-846 8270E	8/29/23	8/31/23 17:55	BGL
2-Chloronaphthalene	ND	9.7	µg/L	1		SW-846 8270E	8/29/23	8/31/23 17:55	BGL
2-Chlorophenol	ND	9.7	µg/L	1		SW-846 8270E	8/29/23	8/31/23 17:55	BGL
Chrysene	ND	4.9	µg/L	1		SW-846 8270E	8/29/23	8/31/23 17:55	BGL
Dibenz(a,h)anthracene	ND	4.9	µg/L	1		SW-846 8270E	8/29/23	8/31/23 17:55	BGL
Dibenzofuran	ND	4.9	µg/L	1		SW-846 8270E	8/29/23	8/31/23 17:55	BGL
Di-n-butylphthalate	ND	9.7	µg/L	1		SW-846 8270E	8/29/23	8/31/23 17:55	BGL
1,2-Dichlorobenzene	ND	4.9	µg/L	1		SW-846 8270E	8/29/23	8/31/23 17:55	BGL
1,3-Dichlorobenzene	ND	4.9	µg/L	1	L-04	SW-846 8270E	8/29/23	8/31/23 17:55	BGL
1,4-Dichlorobenzene	ND	4.9	µg/L	1	L-04	SW-846 8270E	8/29/23	8/31/23 17:55	BGL
3,3-Dichlorobenzidine	ND	9.7	µg/L	1		SW-846 8270E	8/29/23	8/31/23 17:55	BGL
2,4-Dichlorophenol	ND	9.7	µg/L	1		SW-846 8270E	8/29/23	8/31/23 17:55	BGL
Diethylphthalate	ND	9.7	µg/L	1		SW-846 8270E	8/29/23	8/31/23 17:55	BGL
2,4-Dimethylphenol	ND	9.7	µg/L	1		SW-846 8270E	8/29/23	8/31/23 17:55	BGL
Dimethylphthalate	ND	9.7	µg/L	1		SW-846 8270E	8/29/23	8/31/23 17:55	BGL
2,4-Dinitrophenol	ND	9.7	µg/L	1	V-04	SW-846 8270E	8/29/23	8/31/23 17:55	BGL
2,4-Dinitrotoluene	ND	9.7	µg/L	1		SW-846 8270E	8/29/23	8/31/23 17:55	BGL
2,6-Dinitrotoluene	ND	9.7	µg/L	1		SW-846 8270E	8/29/23	8/31/23 17:55	BGL
Di-n-octylphthalate	ND	9.7	µg/L	1	V-04	SW-846 8270E	8/29/23	8/31/23 17:55	BGL
1,2-Diphenylhydrazine/Azobenzene	ND	9.7	µg/L	1		SW-846 8270E	8/29/23	8/31/23 17:55	BGL
Fluoranthene	ND	4.9	µg/L	1		SW-846 8270E	8/29/23	8/31/23 17:55	BGL
Fluorene	ND	4.9	µg/L	1		SW-846 8270E	8/29/23	8/31/23 17:55	BGL
Hexachlorobenzene	ND	9.7	µg/L	1		SW-846 8270E	8/29/23	8/31/23 17:55	BGL
Hexachlorobutadiene	ND	9.7	µg/L	1	L-04	SW-846 8270E	8/29/23	8/31/23 17:55	BGL
Hexachloroethane	ND	9.7	µg/L	1	L-04	SW-846 8270E	8/29/23	8/31/23 17:55	BGL
Indeno(1,2,3-cd)pyrene	ND	4.9	µg/L	1		SW-846 8270E	8/29/23	8/31/23 17:55	BGL
Isophorone	ND	9.7	µg/L	1		SW-846 8270E	8/29/23	8/31/23 17:55	BGL

con-test® A Pace Analytical® Laboratory

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Springfield, MA
Sample Description:
Work Order: 23H3880

Date Received: 8/25/2023

Field Sample #: EW-2
Sampled: 8/25/2023 11:20

Sample ID: 23H3880-02

Sample Matrix: Ground Water

Semivolatile Organic Compounds by GC/MS

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
2-Methylnaphthalene	ND	4.9	µg/L	1		SW-846 8270E	8/29/23	8/31/23 17:55	BGL
2-Methylphenol	ND	9.7	µg/L	1		SW-846 8270E	8/29/23	8/31/23 17:55	BGL
3/4-Methylphenol	ND	9.7	µg/L	1		SW-846 8270E	8/29/23	8/31/23 17:55	BGL
Naphthalene	ND	4.9	µg/L	1		SW-846 8270E	8/29/23	8/31/23 17:55	BGL
Nitrobenzene	ND	9.7	µg/L	1		SW-846 8270E	8/29/23	8/31/23 17:55	BGL
2-Nitrophenol	ND	9.7	µg/L	1		SW-846 8270E	8/29/23	8/31/23 17:55	BGL
4-Nitrophenol	ND	9.7	µg/L	1	V-05	SW-846 8270E	8/29/23	8/31/23 17:55	BGL
Pentachlorophenol	ND	9.7	µg/L	1		SW-846 8270E	8/29/23	8/31/23 17:55	BGL
Phenanthrene	ND	4.9	µg/L	1		SW-846 8270E	8/29/23	8/31/23 17:55	BGL
Phenol	ND	9.7	µg/L	1		SW-846 8270E	8/29/23	8/31/23 17:55	BGL
Pyrene	ND	4.9	µg/L	1		SW-846 8270E	8/29/23	8/31/23 17:55	BGL
Pyridine	ND	19	µg/L	1		SW-846 8270E	8/29/23	8/31/23 17:55	BGL
1,2,4-Trichlorobenzene	ND	4.9	µg/L	1	L-04	SW-846 8270E	8/29/23	8/31/23 17:55	BGL
2,4,5-Trichlorophenol	ND	9.7	µg/L	1		SW-846 8270E	8/29/23	8/31/23 17:55	BGL
2,4,6-Trichlorophenol	ND	9.7	µg/L	1		SW-846 8270E	8/29/23	8/31/23 17:55	BGL

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
2-Fluorophenol	62.4	15-110		8/31/23 17:55
Phenol-d6	45.8	15-110		8/31/23 17:55
Nitrobenzene-d5	73.6	30-130		8/31/23 17:55
2-Fluorobiphenyl	74.8	30-130		8/31/23 17:55
2,4,6-Tribromophenol	81.6	15-110		8/31/23 17:55
p-Terphenyl-d14	101	30-130		8/31/23 17:55

con-test® A Pace Analytical® Laboratory

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Springfield, MA
Sample Description:
Work Order: 23H3880

Date Received: 8/25/2023

Field Sample #: EW-2
Sampled: 8/25/2023 11:20

Sample ID: 23H3880-02

Sample Matrix: Ground Water

Metals Analyses (Dissolved)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Antimony	ND	1.0	µg/L	1		SW-846 6020B	8/26/23	8/30/23 8:21	NC
Arsenic	ND	1.0	µg/L	1		SW-846 6020B	8/26/23	8/30/23 8:21	NC
Barium	86	10	µg/L	1		SW-846 6020B	8/26/23	8/29/23 14:03	NC
Beryllium	ND	0.40	µg/L	1		SW-846 6020B	8/26/23	8/29/23 14:03	NC
Cadmium	ND	0.20	µg/L	1		SW-846 6020B	8/26/23	8/29/23 14:03	NC
Chromium	ND	5.0	µg/L	1		SW-846 6020B	8/26/23	8/30/23 8:21	NC
Lead	ND	0.50	µg/L	1		SW-846 6020B	8/26/23	8/29/23 14:03	NC
Mercury	ND	0.00020	mg/L	1		SW-846 7470A	8/28/23	8/28/23 13:45	AAJ
Nickel	ND	5.0	µg/L	1		SW-846 6020B	8/26/23	8/29/23 14:03	NC
Selenium	ND	5.0	µg/L	1		SW-846 6020B	8/26/23	8/29/23 14:03	NC
Silver	ND	0.20	µg/L	1		SW-846 6020B	8/26/23	8/29/23 14:03	NC
Thallium	ND	0.20	µg/L	1		SW-846 6020B	8/26/23	8/29/23 14:03	NC
Vanadium	ND	5.0	µg/L	1		SW-846 6020B	8/26/23	8/29/23 14:03	NC
Zinc	ND	10	µg/L	1		SW-846 6020B	8/26/23	8/29/23 14:03	NC

con-test® A Pace Analytical® Laboratory

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Springfield, MA
Sample Description:
Work Order: 23H3880
Date Received: 8/25/2023
Field Sample #: EW-3
Sampled: 8/25/2023 13:00
Sample ID: 23H3880-03
Sample Matrix: Ground Water

Volatile Organic Compounds by GC/MS

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Acetone	ND	10	µg/L	1		SW-846 8260D	8/29/23	8/29/23 13:01	EEH
tert-Amyl Methyl Ether (TAME)	ND	0.50	µg/L	1	R-05	SW-846 8260D	8/29/23	8/29/23 13:01	EEH
Benzene	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/29/23 13:01	EEH
Bromobenzene	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/29/23 13:01	EEH
Bromochloromethane	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/29/23 13:01	EEH
Bromodichloromethane	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/29/23 13:01	EEH
Bromoform	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/29/23 13:01	EEH
Bromomethane	ND	2.0	µg/L	1	V-34	SW-846 8260D	8/29/23	8/29/23 13:01	EEH
2-Butanone (MEK)	ND	10	µg/L	1		SW-846 8260D	8/29/23	8/29/23 13:01	EEH
n-Butylbenzene	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/29/23 13:01	EEH
sec-Butylbenzene	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/29/23 13:01	EEH
tert-Butylbenzene	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/29/23 13:01	EEH
tert-Butyl Ethyl Ether (TBEE)	ND	0.50	µg/L	1	R-05	SW-846 8260D	8/29/23	8/29/23 13:01	EEH
Carbon Disulfide	ND	5.0	µg/L	1	RL-07	SW-846 8260D	8/29/23	8/29/23 13:01	EEH
Carbon Tetrachloride	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/29/23 13:01	EEH
Chlorobenzene	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/29/23 13:01	EEH
Chlorodibromomethane	ND	0.50	µg/L	1		SW-846 8260D	8/29/23	8/29/23 13:01	EEH
Chloroethane	ND	2.0	µg/L	1		SW-846 8260D	8/29/23	8/29/23 13:01	EEH
Chloroform	ND	2.0	µg/L	1		SW-846 8260D	8/29/23	8/29/23 13:01	EEH
Chloromethane	ND	2.0	µg/L	1	V-34	SW-846 8260D	8/29/23	8/29/23 13:01	EEH
2-Chlorotoluene	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/29/23 13:01	EEH
4-Chlorotoluene	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/29/23 13:01	EEH
1,2-Dibromo-3-chloropropane (DBCP)	ND	2.0	µg/L	1		SW-846 8260D	8/29/23	8/29/23 13:01	EEH
1,2-Dibromoethane (EDB)	ND	0.50	µg/L	1		SW-846 8260D	8/29/23	8/29/23 13:01	EEH
Dibromomethane	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/29/23 13:01	EEH
1,2-Dichlorobenzene	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/29/23 13:01	EEH
1,3-Dichlorobenzene	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/29/23 13:01	EEH
1,4-Dichlorobenzene	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/29/23 13:01	EEH
Dichlorodifluoromethane (Freon 12)	ND	2.0	µg/L	1		SW-846 8260D	8/29/23	8/29/23 13:01	EEH
1,1-Dichloroethane	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/29/23 13:01	EEH
1,2-Dichloroethane	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/29/23 13:01	EEH
1,1-Dichloroethylene	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/29/23 13:01	EEH
cis-1,2-Dichloroethylene	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/29/23 13:01	EEH
trans-1,2-Dichloroethylene	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/29/23 13:01	EEH
1,2-Dichloropropane	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/29/23 13:01	EEH
1,3-Dichloropropane	ND	0.50	µg/L	1		SW-846 8260D	8/29/23	8/29/23 13:01	EEH
2,2-Dichloropropane	ND	1.0	µg/L	1	R-05	SW-846 8260D	8/29/23	8/29/23 13:01	EEH
1,1-Dichloropropene	ND	0.50	µg/L	1		SW-846 8260D	8/29/23	8/29/23 13:01	EEH
cis-1,3-Dichloropropene	ND	0.40	µg/L	1		SW-846 8260D	8/29/23	8/29/23 13:01	EEH
trans-1,3-Dichloropropene	ND	0.40	µg/L	1		SW-846 8260D	8/29/23	8/29/23 13:01	EEH
Diethyl Ether	ND	2.0	µg/L	1		SW-846 8260D	8/29/23	8/29/23 13:01	EEH
Diisopropyl Ether (DIPE)	ND	0.50	µg/L	1		SW-846 8260D	8/29/23	8/29/23 13:01	EEH
1,4-Dioxane	ND	50	µg/L	1		SW-846 8260D	8/29/23	8/29/23 13:01	EEH
Ethylbenzene	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/29/23 13:01	EEH

con-test® A Pace Analytical® Laboratory

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Springfield, MA
Sample Description:
Work Order: 23H3880

Date Received: 8/25/2023

Field Sample #: EW-3
Sampled: 8/25/2023 13:00

Sample ID: 23H3880-03

Sample Matrix: Ground Water

Volatile Organic Compounds by GC/MS

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Hexachlorobutadiene	ND	0.60	µg/L	1		SW-846 8260D	8/29/23	8/29/23 13:01	EEH
2-Hexanone (MBK)	ND	10	µg/L	1		SW-846 8260D	8/29/23	8/29/23 13:01	EEH
Isopropylbenzene (Cumene)	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/29/23 13:01	EEH
p-Isopropyltoluene (p-Cymene)	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/29/23 13:01	EEH
Methyl tert-Butyl Ether (MTBE)	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/29/23 13:01	EEH
Methylene Chloride	ND	5.0	µg/L	1	RL-07	SW-846 8260D	8/29/23	8/29/23 13:01	EEH
4-Methyl-2-pentanone (MIBK)	ND	10	µg/L	1		SW-846 8260D	8/29/23	8/29/23 13:01	EEH
Naphthalene	ND	2.0	µg/L	1		SW-846 8260D	8/29/23	8/29/23 13:01	EEH
n-Propylbenzene	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/29/23 13:01	EEH
Styrene	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/29/23 13:01	EEH
1,1,1,2-Tetrachloroethane	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/29/23 13:01	EEH
1,1,2,2-Tetrachloroethane	ND	0.50	µg/L	1		SW-846 8260D	8/29/23	8/29/23 13:01	EEH
Tetrachloroethylene	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/29/23 13:01	EEH
Tetrahydrofuran	ND	2.0	µg/L	1		SW-846 8260D	8/29/23	8/29/23 13:01	EEH
Toluene	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/29/23 13:01	EEH
1,2,3-Trichlorobenzene	ND	2.0	µg/L	1		SW-846 8260D	8/29/23	8/29/23 13:01	EEH
1,2,4-Trichlorobenzene	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/29/23 13:01	EEH
1,1,1-Trichloroethane	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/29/23 13:01	EEH
1,1,2-Trichloroethane	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/29/23 13:01	EEH
Trichloroethylene	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/29/23 13:01	EEH
Trichlorofluoromethane (Freon 11)	ND	2.0	µg/L	1		SW-846 8260D	8/29/23	8/29/23 13:01	EEH
1,2,3-Trichloropropane	ND	2.0	µg/L	1		SW-846 8260D	8/29/23	8/29/23 13:01	EEH
1,2,4-Trimethylbenzene	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/29/23 13:01	EEH
1,3,5-Trimethylbenzene	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/29/23 13:01	EEH
Vinyl Chloride	ND	2.0	µg/L	1		SW-846 8260D	8/29/23	8/29/23 13:01	EEH
m+p Xylene	ND	2.0	µg/L	1		SW-846 8260D	8/29/23	8/29/23 13:01	EEH
o-Xylene	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/29/23 13:01	EEH

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
1,2-Dichloroethane-d4	97.6	70-130		8/29/23 13:01
Toluene-d8	105	70-130		8/29/23 13:01
4-Bromofluorobenzene	101	70-130		8/29/23 13:01

con-test® A Pace Analytical® Laboratory

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Springfield, MA
Sample Description:
Work Order: 23H3880
Date Received: 8/25/2023
Field Sample #: EW-3
Sampled: 8/25/2023 13:00
Sample ID: 23H3880-03
Sample Matrix: Ground Water

Semivolatile Organic Compounds by GC/MS

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Biphenyl	ND	20	µg/L	1		SW-846 8270E	8/29/23	8/31/23 18:17	BGL
Acenaphthene	ND	5.0	µg/L	1		SW-846 8270E	8/29/23	8/31/23 18:17	BGL
Acenaphthylene	ND	5.0	µg/L	1		SW-846 8270E	8/29/23	8/31/23 18:17	BGL
Acetophenone	ND	9.9	µg/L	1		SW-846 8270E	8/29/23	8/31/23 18:17	BGL
Aniline	ND	20	µg/L	1	V-05	SW-846 8270E	8/29/23	8/31/23 18:17	BGL
Anthracene	ND	5.0	µg/L	1		SW-846 8270E	8/29/23	8/31/23 18:17	BGL
Benzo(a)anthracene	ND	5.0	µg/L	1		SW-846 8270E	8/29/23	8/31/23 18:17	BGL
Benzo(a)pyrene	ND	5.0	µg/L	1		SW-846 8270E	8/29/23	8/31/23 18:17	BGL
Benzo(b)fluoranthene	ND	5.0	µg/L	1		SW-846 8270E	8/29/23	8/31/23 18:17	BGL
Benzo(g,h,i)perylene	ND	5.0	µg/L	1		SW-846 8270E	8/29/23	8/31/23 18:17	BGL
Benzo(k)fluoranthene	ND	5.0	µg/L	1		SW-846 8270E	8/29/23	8/31/23 18:17	BGL
Bis(2-chloroethoxy)methane	ND	9.9	µg/L	1		SW-846 8270E	8/29/23	8/31/23 18:17	BGL
Bis(2-chloroethyl)ether	ND	9.9	µg/L	1		SW-846 8270E	8/29/23	8/31/23 18:17	BGL
Bis(2-chloroisopropyl)ether	ND	9.9	µg/L	1	V-20	SW-846 8270E	8/29/23	8/31/23 18:17	BGL
Bis(2-Ethylhexyl)phthalate	ND	9.9	µg/L	1	V-04	SW-846 8270E	8/29/23	8/31/23 18:17	BGL
4-Bromophenylphenylether	ND	9.9	µg/L	1		SW-846 8270E	8/29/23	8/31/23 18:17	BGL
Butylbenzylphthalate	ND	9.9	µg/L	1	V-35	SW-846 8270E	8/29/23	8/31/23 18:17	BGL
4-Chloroaniline	ND	9.9	µg/L	1		SW-846 8270E	8/29/23	8/31/23 18:17	BGL
2-Chloronaphthalene	ND	9.9	µg/L	1		SW-846 8270E	8/29/23	8/31/23 18:17	BGL
2-Chlorophenol	ND	9.9	µg/L	1		SW-846 8270E	8/29/23	8/31/23 18:17	BGL
Chrysene	ND	5.0	µg/L	1		SW-846 8270E	8/29/23	8/31/23 18:17	BGL
Dibenz(a,h)anthracene	ND	5.0	µg/L	1		SW-846 8270E	8/29/23	8/31/23 18:17	BGL
Dibenzofuran	ND	5.0	µg/L	1		SW-846 8270E	8/29/23	8/31/23 18:17	BGL
Di-n-butylphthalate	ND	9.9	µg/L	1		SW-846 8270E	8/29/23	8/31/23 18:17	BGL
1,2-Dichlorobenzene	ND	5.0	µg/L	1		SW-846 8270E	8/29/23	8/31/23 18:17	BGL
1,3-Dichlorobenzene	ND	5.0	µg/L	1	L-04	SW-846 8270E	8/29/23	8/31/23 18:17	BGL
1,4-Dichlorobenzene	ND	5.0	µg/L	1	L-04	SW-846 8270E	8/29/23	8/31/23 18:17	BGL
3,3-Dichlorobenzidine	ND	9.9	µg/L	1		SW-846 8270E	8/29/23	8/31/23 18:17	BGL
2,4-Dichlorophenol	ND	9.9	µg/L	1		SW-846 8270E	8/29/23	8/31/23 18:17	BGL
Diethylphthalate	ND	9.9	µg/L	1		SW-846 8270E	8/29/23	8/31/23 18:17	BGL
2,4-Dimethylphenol	ND	9.9	µg/L	1		SW-846 8270E	8/29/23	8/31/23 18:17	BGL
Dimethylphthalate	ND	9.9	µg/L	1		SW-846 8270E	8/29/23	8/31/23 18:17	BGL
2,4-Dinitrophenol	ND	9.9	µg/L	1	V-04	SW-846 8270E	8/29/23	8/31/23 18:17	BGL
2,4-Dinitrotoluene	ND	9.9	µg/L	1		SW-846 8270E	8/29/23	8/31/23 18:17	BGL
2,6-Dinitrotoluene	ND	9.9	µg/L	1		SW-846 8270E	8/29/23	8/31/23 18:17	BGL
Di-n-octylphthalate	ND	9.9	µg/L	1	V-04	SW-846 8270E	8/29/23	8/31/23 18:17	BGL
1,2-Diphenylhydrazine/Azobenzene	ND	9.9	µg/L	1		SW-846 8270E	8/29/23	8/31/23 18:17	BGL
Fluoranthene	ND	5.0	µg/L	1		SW-846 8270E	8/29/23	8/31/23 18:17	BGL
Fluorene	ND	5.0	µg/L	1		SW-846 8270E	8/29/23	8/31/23 18:17	BGL
Hexachlorobenzene	ND	9.9	µg/L	1		SW-846 8270E	8/29/23	8/31/23 18:17	BGL
Hexachlorobutadiene	ND	9.9	µg/L	1	L-04	SW-846 8270E	8/29/23	8/31/23 18:17	BGL
Hexachloroethane	ND	9.9	µg/L	1	L-04	SW-846 8270E	8/29/23	8/31/23 18:17	BGL
Indeno(1,2,3-cd)pyrene	ND	5.0	µg/L	1		SW-846 8270E	8/29/23	8/31/23 18:17	BGL
Isophorone	ND	9.9	µg/L	1		SW-846 8270E	8/29/23	8/31/23 18:17	BGL

con-test® A Pace Analytical® Laboratory

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Springfield, MA
Sample Description:
Work Order: 23H3880

Date Received: 8/25/2023

Field Sample #: EW-3
Sampled: 8/25/2023 13:00

Sample ID: 23H3880-03

Sample Matrix: Ground Water

Semivolatile Organic Compounds by GC/MS

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
2-Methylnaphthalene	ND	5.0	µg/L	1		SW-846 8270E	8/29/23	8/31/23 18:17	BGL
2-Methylphenol	ND	9.9	µg/L	1		SW-846 8270E	8/29/23	8/31/23 18:17	BGL
3/4-Methylphenol	ND	9.9	µg/L	1		SW-846 8270E	8/29/23	8/31/23 18:17	BGL
Naphthalene	ND	5.0	µg/L	1		SW-846 8270E	8/29/23	8/31/23 18:17	BGL
Nitrobenzene	ND	9.9	µg/L	1		SW-846 8270E	8/29/23	8/31/23 18:17	BGL
2-Nitrophenol	ND	9.9	µg/L	1		SW-846 8270E	8/29/23	8/31/23 18:17	BGL
4-Nitrophenol	ND	9.9	µg/L	1	V-05	SW-846 8270E	8/29/23	8/31/23 18:17	BGL
Pentachlorophenol	ND	9.9	µg/L	1		SW-846 8270E	8/29/23	8/31/23 18:17	BGL
Phenanthrene	ND	5.0	µg/L	1		SW-846 8270E	8/29/23	8/31/23 18:17	BGL
Phenol	ND	9.9	µg/L	1		SW-846 8270E	8/29/23	8/31/23 18:17	BGL
Pyrene	ND	5.0	µg/L	1		SW-846 8270E	8/29/23	8/31/23 18:17	BGL
Pyridine	ND	20	µg/L	1		SW-846 8270E	8/29/23	8/31/23 18:17	BGL
1,2,4-Trichlorobenzene	ND	5.0	µg/L	1	L-04	SW-846 8270E	8/29/23	8/31/23 18:17	BGL
2,4,5-Trichlorophenol	ND	9.9	µg/L	1		SW-846 8270E	8/29/23	8/31/23 18:17	BGL
2,4,6-Trichlorophenol	ND	9.9	µg/L	1		SW-846 8270E	8/29/23	8/31/23 18:17	BGL

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
2-Fluorophenol	66.6	15-110		8/31/23 18:17
Phenol-d6	47.4	15-110		8/31/23 18:17
Nitrobenzene-d5	80.1	30-130		8/31/23 18:17
2-Fluorobiphenyl	76.3	30-130		8/31/23 18:17
2,4,6-Tribromophenol	83.4	15-110		8/31/23 18:17
p-Terphenyl-d14	102	30-130		8/31/23 18:17

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Springfield, MA
Sample Description:
Work Order: 23H3880

Date Received: 8/25/2023

Field Sample #: EW-3
Sampled: 8/25/2023 13:00

Sample ID: 23H3880-03

Sample Matrix: Ground Water

Metals Analyses (Dissolved)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Antimony	ND	1.0	µg/L	1		SW-846 6020B	8/26/23	8/30/23 8:23	NC
Arsenic	ND	1.0	µg/L	1		SW-846 6020B	8/26/23	8/30/23 8:23	NC
Barium	290	10	µg/L	1		SW-846 6020B	8/26/23	8/29/23 14:07	NC
Beryllium	ND	0.40	µg/L	1		SW-846 6020B	8/26/23	8/29/23 14:07	NC
Cadmium	ND	0.20	µg/L	1		SW-846 6020B	8/26/23	8/29/23 14:07	NC
Chromium	ND	5.0	µg/L	1		SW-846 6020B	8/26/23	8/30/23 8:23	NC
Lead	ND	0.50	µg/L	1		SW-846 6020B	8/26/23	8/29/23 14:07	NC
Mercury	ND	0.00020	mg/L	1		SW-846 7470A	8/28/23	8/28/23 13:47	AAJ
Nickel	6.9	5.0	µg/L	1		SW-846 6020B	8/26/23	8/29/23 14:07	NC
Selenium	ND	5.0	µg/L	1		SW-846 6020B	8/26/23	8/29/23 14:07	NC
Silver	ND	0.20	µg/L	1		SW-846 6020B	8/26/23	8/29/23 14:07	NC
Thallium	ND	0.20	µg/L	1		SW-846 6020B	8/26/23	8/29/23 14:07	NC
Vanadium	ND	5.0	µg/L	1		SW-846 6020B	8/26/23	8/29/23 14:07	NC
Zinc	49	10	µg/L	1		SW-846 6020B	8/26/23	8/29/23 14:07	NC

con-test® A Pace Analytical® Laboratory

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Springfield, MA
Sample Description:
Work Order: 23H3880
Date Received: 8/25/2023
Field Sample #: MW-CM-43N
Sampled: 8/25/2023 11:30
Sample ID: 23H3880-04
Sample Matrix: Ground Water

Volatile Organic Compounds by GC/MS

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Acetone	ND	10	µg/L	1		SW-846 8260D	8/29/23	8/29/23 13:29	EEH
tert-Amyl Methyl Ether (TAME)	ND	0.50	µg/L	1	R-05	SW-846 8260D	8/29/23	8/29/23 13:29	EEH
Benzene	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/29/23 13:29	EEH
Bromobenzene	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/29/23 13:29	EEH
Bromochloromethane	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/29/23 13:29	EEH
Bromodichloromethane	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/29/23 13:29	EEH
Bromoform	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/29/23 13:29	EEH
Bromomethane	ND	2.0	µg/L	1	V-34	SW-846 8260D	8/29/23	8/29/23 13:29	EEH
2-Butanone (MEK)	ND	10	µg/L	1		SW-846 8260D	8/29/23	8/29/23 13:29	EEH
n-Butylbenzene	1.6	1.0	µg/L	1		SW-846 8260D	8/29/23	8/29/23 13:29	EEH
sec-Butylbenzene	1.5	1.0	µg/L	1		SW-846 8260D	8/29/23	8/29/23 13:29	EEH
tert-Butylbenzene	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/29/23 13:29	EEH
tert-Butyl Ethyl Ether (TBEE)	ND	0.50	µg/L	1	R-05	SW-846 8260D	8/29/23	8/29/23 13:29	EEH
Carbon Disulfide	ND	5.0	µg/L	1	RL-07	SW-846 8260D	8/29/23	8/29/23 13:29	EEH
Carbon Tetrachloride	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/29/23 13:29	EEH
Chlorobenzene	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/29/23 13:29	EEH
Chlorodibromomethane	ND	0.50	µg/L	1		SW-846 8260D	8/29/23	8/29/23 13:29	EEH
Chloroethane	ND	2.0	µg/L	1		SW-846 8260D	8/29/23	8/29/23 13:29	EEH
Chloroform	ND	2.0	µg/L	1		SW-846 8260D	8/29/23	8/29/23 13:29	EEH
Chloromethane	ND	2.0	µg/L	1	V-34	SW-846 8260D	8/29/23	8/29/23 13:29	EEH
2-Chlorotoluene	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/29/23 13:29	EEH
4-Chlorotoluene	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/29/23 13:29	EEH
1,2-Dibromo-3-chloropropane (DBCP)	ND	2.0	µg/L	1		SW-846 8260D	8/29/23	8/29/23 13:29	EEH
1,2-Dibromoethane (EDB)	ND	0.50	µg/L	1		SW-846 8260D	8/29/23	8/29/23 13:29	EEH
Dibromomethane	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/29/23 13:29	EEH
1,2-Dichlorobenzene	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/29/23 13:29	EEH
1,3-Dichlorobenzene	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/29/23 13:29	EEH
1,4-Dichlorobenzene	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/29/23 13:29	EEH
Dichlorodifluoromethane (Freon 12)	ND	2.0	µg/L	1		SW-846 8260D	8/29/23	8/29/23 13:29	EEH
1,1-Dichloroethane	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/29/23 13:29	EEH
1,2-Dichloroethane	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/29/23 13:29	EEH
1,1-Dichloroethylene	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/29/23 13:29	EEH
cis-1,2-Dichloroethylene	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/29/23 13:29	EEH
trans-1,2-Dichloroethylene	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/29/23 13:29	EEH
1,2-Dichloropropane	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/29/23 13:29	EEH
1,3-Dichloropropane	ND	0.50	µg/L	1		SW-846 8260D	8/29/23	8/29/23 13:29	EEH
2,2-Dichloropropane	ND	1.0	µg/L	1	R-05	SW-846 8260D	8/29/23	8/29/23 13:29	EEH
1,1-Dichloropropene	ND	0.50	µg/L	1		SW-846 8260D	8/29/23	8/29/23 13:29	EEH
cis-1,3-Dichloropropene	ND	0.40	µg/L	1		SW-846 8260D	8/29/23	8/29/23 13:29	EEH
trans-1,3-Dichloropropene	ND	0.40	µg/L	1		SW-846 8260D	8/29/23	8/29/23 13:29	EEH
Diethyl Ether	ND	2.0	µg/L	1		SW-846 8260D	8/29/23	8/29/23 13:29	EEH
Diisopropyl Ether (DIPE)	ND	0.50	µg/L	1		SW-846 8260D	8/29/23	8/29/23 13:29	EEH
1,4-Dioxane	ND	50	µg/L	1		SW-846 8260D	8/29/23	8/29/23 13:29	EEH
Ethylbenzene	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/29/23 13:29	EEH

con-test® A Pace Analytical® Laboratory

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Springfield, MA
Sample Description:
Work Order: 23H3880

Date Received: 8/25/2023

Field Sample #: MW-CM-43N
Sampled: 8/25/2023 11:30

Sample ID: 23H3880-04

Sample Matrix: Ground Water

Volatile Organic Compounds by GC/MS

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Hexachlorobutadiene	ND	0.60	µg/L	1		SW-846 8260D	8/29/23	8/29/23 13:29	EEH
2-Hexanone (MBK)	ND	10	µg/L	1		SW-846 8260D	8/29/23	8/29/23 13:29	EEH
Isopropylbenzene (Cumene)	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/29/23 13:29	EEH
p-Isopropyltoluene (p-Cymene)	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/29/23 13:29	EEH
Methyl tert-Butyl Ether (MTBE)	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/29/23 13:29	EEH
Methylene Chloride	ND	5.0	µg/L	1	RL-07	SW-846 8260D	8/29/23	8/29/23 13:29	EEH
4-Methyl-2-pentanone (MIBK)	ND	10	µg/L	1		SW-846 8260D	8/29/23	8/29/23 13:29	EEH
Naphthalene	ND	2.0	µg/L	1		SW-846 8260D	8/29/23	8/29/23 13:29	EEH
n-Propylbenzene	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/29/23 13:29	EEH
Styrene	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/29/23 13:29	EEH
1,1,1,2-Tetrachloroethane	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/29/23 13:29	EEH
1,1,2,2-Tetrachloroethane	ND	0.50	µg/L	1		SW-846 8260D	8/29/23	8/29/23 13:29	EEH
Tetrachloroethylene	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/29/23 13:29	EEH
Tetrahydrofuran	ND	2.0	µg/L	1		SW-846 8260D	8/29/23	8/29/23 13:29	EEH
Toluene	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/29/23 13:29	EEH
1,2,3-Trichlorobenzene	ND	2.0	µg/L	1		SW-846 8260D	8/29/23	8/29/23 13:29	EEH
1,2,4-Trichlorobenzene	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/29/23 13:29	EEH
1,1,1-Trichloroethane	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/29/23 13:29	EEH
1,1,2-Trichloroethane	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/29/23 13:29	EEH
Trichloroethylene	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/29/23 13:29	EEH
Trichlorofluoromethane (Freon 11)	ND	2.0	µg/L	1		SW-846 8260D	8/29/23	8/29/23 13:29	EEH
1,2,3-Trichloropropane	ND	2.0	µg/L	1		SW-846 8260D	8/29/23	8/29/23 13:29	EEH
1,2,4-Trimethylbenzene	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/29/23 13:29	EEH
1,3,5-Trimethylbenzene	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/29/23 13:29	EEH
Vinyl Chloride	ND	2.0	µg/L	1		SW-846 8260D	8/29/23	8/29/23 13:29	EEH
m+p Xylene	ND	2.0	µg/L	1		SW-846 8260D	8/29/23	8/29/23 13:29	EEH
o-Xylene	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/29/23 13:29	EEH

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
1,2-Dichloroethane-d4	99.4	70-130		8/29/23 13:29
Toluene-d8	105	70-130		8/29/23 13:29
4-Bromofluorobenzene	97.7	70-130		8/29/23 13:29

con-test® A Pace Analytical® Laboratory

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Springfield, MA
Sample Description:
Work Order: 23H3880
Date Received: 8/25/2023
Field Sample #: MW-CM-43N
Sampled: 8/25/2023 11:30
Sample ID: 23H3880-04
Sample Matrix: Ground Water

Semivolatile Organic Compounds by GC/MS

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Biphenyl	ND	19	µg/L	1		SW-846 8270E	8/29/23	8/31/23 18:38	BGL
Acenaphthene	ND	4.7	µg/L	1		SW-846 8270E	8/29/23	8/31/23 18:38	BGL
Acenaphthylene	ND	4.7	µg/L	1		SW-846 8270E	8/29/23	8/31/23 18:38	BGL
Acetophenone	ND	9.3	µg/L	1		SW-846 8270E	8/29/23	8/31/23 18:38	BGL
Aniline	ND	19	µg/L	1	V-05	SW-846 8270E	8/29/23	8/31/23 18:38	BGL
Anthracene	ND	4.7	µg/L	1		SW-846 8270E	8/29/23	8/31/23 18:38	BGL
Benzo(a)anthracene	ND	4.7	µg/L	1		SW-846 8270E	8/29/23	8/31/23 18:38	BGL
Benzo(a)pyrene	ND	4.7	µg/L	1		SW-846 8270E	8/29/23	8/31/23 18:38	BGL
Benzo(b)fluoranthene	ND	4.7	µg/L	1		SW-846 8270E	8/29/23	8/31/23 18:38	BGL
Benzo(g,h,i)perylene	ND	4.7	µg/L	1		SW-846 8270E	8/29/23	8/31/23 18:38	BGL
Benzo(k)fluoranthene	ND	4.7	µg/L	1		SW-846 8270E	8/29/23	8/31/23 18:38	BGL
Bis(2-chloroethoxy)methane	ND	9.3	µg/L	1		SW-846 8270E	8/29/23	8/31/23 18:38	BGL
Bis(2-chloroethyl)ether	ND	9.3	µg/L	1		SW-846 8270E	8/29/23	8/31/23 18:38	BGL
Bis(2-chloroisopropyl)ether	ND	9.3	µg/L	1	V-20	SW-846 8270E	8/29/23	8/31/23 18:38	BGL
Bis(2-Ethylhexyl)phthalate	ND	9.3	µg/L	1	V-04	SW-846 8270E	8/29/23	8/31/23 18:38	BGL
4-Bromophenylphenylether	ND	9.3	µg/L	1		SW-846 8270E	8/29/23	8/31/23 18:38	BGL
Butylbenzylphthalate	ND	9.3	µg/L	1	V-35	SW-846 8270E	8/29/23	8/31/23 18:38	BGL
4-Chloroaniline	ND	9.3	µg/L	1		SW-846 8270E	8/29/23	8/31/23 18:38	BGL
2-Chloronaphthalene	ND	9.3	µg/L	1		SW-846 8270E	8/29/23	8/31/23 18:38	BGL
2-Chlorophenol	ND	9.3	µg/L	1		SW-846 8270E	8/29/23	8/31/23 18:38	BGL
Chrysene	ND	4.7	µg/L	1		SW-846 8270E	8/29/23	8/31/23 18:38	BGL
Dibenz(a,h)anthracene	ND	4.7	µg/L	1		SW-846 8270E	8/29/23	8/31/23 18:38	BGL
Dibenzofuran	ND	4.7	µg/L	1		SW-846 8270E	8/29/23	8/31/23 18:38	BGL
Di-n-butylphthalate	ND	9.3	µg/L	1		SW-846 8270E	8/29/23	8/31/23 18:38	BGL
1,2-Dichlorobenzene	ND	4.7	µg/L	1		SW-846 8270E	8/29/23	8/31/23 18:38	BGL
1,3-Dichlorobenzene	ND	4.7	µg/L	1	L-04	SW-846 8270E	8/29/23	8/31/23 18:38	BGL
1,4-Dichlorobenzene	ND	4.7	µg/L	1	L-04	SW-846 8270E	8/29/23	8/31/23 18:38	BGL
3,3-Dichlorobenzidine	ND	9.3	µg/L	1		SW-846 8270E	8/29/23	8/31/23 18:38	BGL
2,4-Dichlorophenol	ND	9.3	µg/L	1		SW-846 8270E	8/29/23	8/31/23 18:38	BGL
Diethylphthalate	ND	9.3	µg/L	1		SW-846 8270E	8/29/23	8/31/23 18:38	BGL
2,4-Dimethylphenol	ND	9.3	µg/L	1		SW-846 8270E	8/29/23	8/31/23 18:38	BGL
Dimethylphthalate	ND	9.3	µg/L	1		SW-846 8270E	8/29/23	8/31/23 18:38	BGL
2,4-Dinitrophenol	ND	9.3	µg/L	1	V-04	SW-846 8270E	8/29/23	8/31/23 18:38	BGL
2,4-Dinitrotoluene	ND	9.3	µg/L	1		SW-846 8270E	8/29/23	8/31/23 18:38	BGL
2,6-Dinitrotoluene	ND	9.3	µg/L	1		SW-846 8270E	8/29/23	8/31/23 18:38	BGL
Di-n-octylphthalate	ND	9.3	µg/L	1	V-04	SW-846 8270E	8/29/23	8/31/23 18:38	BGL
1,2-Diphenylhydrazine/Azobenzene	ND	9.3	µg/L	1		SW-846 8270E	8/29/23	8/31/23 18:38	BGL
Fluoranthene	ND	4.7	µg/L	1		SW-846 8270E	8/29/23	8/31/23 18:38	BGL
Fluorene	ND	4.7	µg/L	1		SW-846 8270E	8/29/23	8/31/23 18:38	BGL
Hexachlorobenzene	ND	9.3	µg/L	1		SW-846 8270E	8/29/23	8/31/23 18:38	BGL
Hexachlorobutadiene	ND	9.3	µg/L	1	L-04	SW-846 8270E	8/29/23	8/31/23 18:38	BGL
Hexachloroethane	ND	9.3	µg/L	1	L-04	SW-846 8270E	8/29/23	8/31/23 18:38	BGL
Indeno(1,2,3-cd)pyrene	ND	4.7	µg/L	1		SW-846 8270E	8/29/23	8/31/23 18:38	BGL
Isophorone	ND	9.3	µg/L	1		SW-846 8270E	8/29/23	8/31/23 18:38	BGL

con-test® A Pace Analytical® Laboratory

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Springfield, MA
Sample Description:
Work Order: 23H3880

Date Received: 8/25/2023

Field Sample #: MW-CM-43N
Sampled: 8/25/2023 11:30

Sample ID: 23H3880-04

Sample Matrix: Ground Water

Semivolatile Organic Compounds by GC/MS

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
2-Methylnaphthalene	ND	4.7	µg/L	1		SW-846 8270E	8/29/23	8/31/23 18:38	BGL
2-Methylphenol	ND	9.3	µg/L	1		SW-846 8270E	8/29/23	8/31/23 18:38	BGL
3/4-Methylphenol	ND	9.3	µg/L	1		SW-846 8270E	8/29/23	8/31/23 18:38	BGL
Naphthalene	ND	4.7	µg/L	1		SW-846 8270E	8/29/23	8/31/23 18:38	BGL
Nitrobenzene	ND	9.3	µg/L	1		SW-846 8270E	8/29/23	8/31/23 18:38	BGL
2-Nitrophenol	ND	9.3	µg/L	1		SW-846 8270E	8/29/23	8/31/23 18:38	BGL
4-Nitrophenol	ND	9.3	µg/L	1	V-05	SW-846 8270E	8/29/23	8/31/23 18:38	BGL
Pentachlorophenol	ND	9.3	µg/L	1		SW-846 8270E	8/29/23	8/31/23 18:38	BGL
Phenanthrene	ND	4.7	µg/L	1		SW-846 8270E	8/29/23	8/31/23 18:38	BGL
Phenol	ND	9.3	µg/L	1		SW-846 8270E	8/29/23	8/31/23 18:38	BGL
Pyrene	ND	4.7	µg/L	1		SW-846 8270E	8/29/23	8/31/23 18:38	BGL
Pyridine	ND	19	µg/L	1		SW-846 8270E	8/29/23	8/31/23 18:38	BGL
1,2,4-Trichlorobenzene	ND	4.7	µg/L	1	L-04	SW-846 8270E	8/29/23	8/31/23 18:38	BGL
2,4,5-Trichlorophenol	ND	9.3	µg/L	1		SW-846 8270E	8/29/23	8/31/23 18:38	BGL
2,4,6-Trichlorophenol	ND	9.3	µg/L	1		SW-846 8270E	8/29/23	8/31/23 18:38	BGL

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
2-Fluorophenol	58.2	15-110		8/31/23 18:38
Phenol-d6	40.8	15-110		8/31/23 18:38
Nitrobenzene-d5	74.0	30-130		8/31/23 18:38
2-Fluorobiphenyl	76.2	30-130		8/31/23 18:38
2,4,6-Tribromophenol	82.3	15-110		8/31/23 18:38
p-Terphenyl-d14	98.9	30-130		8/31/23 18:38

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Springfield, MA
Sample Description:
Work Order: 23H3880

Date Received: 8/25/2023

Field Sample #: MW-CM-43N
Sampled: 8/25/2023 11:30

Sample ID: 23H3880-04

Sample Matrix: Ground Water

Metals Analyses (Dissolved)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Antimony	ND	1.0	µg/L	1		SW-846 6020B	8/26/23	8/30/23 8:26	NC
Arsenic	1.2	1.0	µg/L	1		SW-846 6020B	8/26/23	8/30/23 8:26	NC
Barium	140	10	µg/L	1		SW-846 6020B	8/26/23	8/29/23 14:10	NC
Beryllium	ND	0.40	µg/L	1		SW-846 6020B	8/26/23	8/29/23 14:10	NC
Cadmium	ND	0.20	µg/L	1		SW-846 6020B	8/26/23	8/29/23 14:10	NC
Chromium	ND	5.0	µg/L	1		SW-846 6020B	8/26/23	8/30/23 8:26	NC
Lead	ND	0.50	µg/L	1		SW-846 6020B	8/26/23	8/29/23 14:10	NC
Mercury	ND	0.00020	mg/L	1		SW-846 7470A	8/28/23	8/28/23 13:48	AAJ
Nickel	ND	5.0	µg/L	1		SW-846 6020B	8/26/23	8/29/23 14:10	NC
Selenium	ND	5.0	µg/L	1		SW-846 6020B	8/26/23	8/29/23 14:10	NC
Silver	ND	0.20	µg/L	1		SW-846 6020B	8/26/23	8/29/23 14:10	NC
Thallium	ND	0.20	µg/L	1		SW-846 6020B	8/26/23	8/29/23 14:10	NC
Vanadium	ND	5.0	µg/L	1		SW-846 6020B	8/26/23	8/29/23 14:10	NC
Zinc	ND	10	µg/L	1		SW-846 6020B	8/26/23	8/29/23 14:10	NC

con-test® A Pace Analytical® Laboratory

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Springfield, MA
Sample Description:
Work Order: 23H3880
Date Received: 8/25/2023
Field Sample #: MW-205A
Sampled: 8/25/2023 12:45
Sample ID: 23H3880-05
Sample Matrix: Ground Water

Volatile Organic Compounds by GC/MS

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Acetone	ND	10	µg/L	1		SW-846 8260D	8/29/23	8/29/23 13:56	EEH
tert-Amyl Methyl Ether (TAME)	ND	0.50	µg/L	1	R-05	SW-846 8260D	8/29/23	8/29/23 13:56	EEH
Benzene	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/29/23 13:56	EEH
Bromobenzene	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/29/23 13:56	EEH
Bromochloromethane	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/29/23 13:56	EEH
Bromodichloromethane	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/29/23 13:56	EEH
Bromoform	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/29/23 13:56	EEH
Bromomethane	ND	2.0	µg/L	1	V-34	SW-846 8260D	8/29/23	8/29/23 13:56	EEH
2-Butanone (MEK)	ND	10	µg/L	1		SW-846 8260D	8/29/23	8/29/23 13:56	EEH
n-Butylbenzene	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/29/23 13:56	EEH
sec-Butylbenzene	1.4	1.0	µg/L	1		SW-846 8260D	8/29/23	8/29/23 13:56	EEH
tert-Butylbenzene	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/29/23 13:56	EEH
tert-Butyl Ethyl Ether (TBEE)	ND	0.50	µg/L	1	R-05	SW-846 8260D	8/29/23	8/29/23 13:56	EEH
Carbon Disulfide	ND	5.0	µg/L	1	RL-07	SW-846 8260D	8/29/23	8/29/23 13:56	EEH
Carbon Tetrachloride	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/29/23 13:56	EEH
Chlorobenzene	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/29/23 13:56	EEH
Chlorodibromomethane	ND	0.50	µg/L	1		SW-846 8260D	8/29/23	8/29/23 13:56	EEH
Chloroethane	ND	2.0	µg/L	1		SW-846 8260D	8/29/23	8/29/23 13:56	EEH
Chloroform	ND	2.0	µg/L	1		SW-846 8260D	8/29/23	8/29/23 13:56	EEH
Chloromethane	ND	2.0	µg/L	1	V-34	SW-846 8260D	8/29/23	8/29/23 13:56	EEH
2-Chlorotoluene	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/29/23 13:56	EEH
4-Chlorotoluene	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/29/23 13:56	EEH
1,2-Dibromo-3-chloropropane (DBCP)	ND	2.0	µg/L	1		SW-846 8260D	8/29/23	8/29/23 13:56	EEH
1,2-Dibromoethane (EDB)	ND	0.50	µg/L	1		SW-846 8260D	8/29/23	8/29/23 13:56	EEH
Dibromomethane	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/29/23 13:56	EEH
1,2-Dichlorobenzene	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/29/23 13:56	EEH
1,3-Dichlorobenzene	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/29/23 13:56	EEH
1,4-Dichlorobenzene	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/29/23 13:56	EEH
Dichlorodifluoromethane (Freon 12)	ND	2.0	µg/L	1		SW-846 8260D	8/29/23	8/29/23 13:56	EEH
1,1-Dichloroethane	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/29/23 13:56	EEH
1,2-Dichloroethane	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/29/23 13:56	EEH
1,1-Dichloroethylene	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/29/23 13:56	EEH
cis-1,2-Dichloroethylene	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/29/23 13:56	EEH
trans-1,2-Dichloroethylene	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/29/23 13:56	EEH
1,2-Dichloropropane	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/29/23 13:56	EEH
1,3-Dichloropropane	ND	0.50	µg/L	1		SW-846 8260D	8/29/23	8/29/23 13:56	EEH
2,2-Dichloropropane	ND	1.0	µg/L	1	R-05	SW-846 8260D	8/29/23	8/29/23 13:56	EEH
1,1-Dichloropropene	ND	0.50	µg/L	1		SW-846 8260D	8/29/23	8/29/23 13:56	EEH
cis-1,3-Dichloropropene	ND	0.40	µg/L	1		SW-846 8260D	8/29/23	8/29/23 13:56	EEH
trans-1,3-Dichloropropene	ND	0.40	µg/L	1		SW-846 8260D	8/29/23	8/29/23 13:56	EEH
Diethyl Ether	ND	2.0	µg/L	1		SW-846 8260D	8/29/23	8/29/23 13:56	EEH
Diisopropyl Ether (DIPE)	ND	0.50	µg/L	1		SW-846 8260D	8/29/23	8/29/23 13:56	EEH
1,4-Dioxane	ND	50	µg/L	1		SW-846 8260D	8/29/23	8/29/23 13:56	EEH
Ethylbenzene	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/29/23 13:56	EEH

con-test® A Pace Analytical® Laboratory

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Springfield, MA
Sample Description:
Work Order: 23H3880

Date Received: 8/25/2023

Field Sample #: MW-205A
Sampled: 8/25/2023 12:45

Sample ID: 23H3880-05

Sample Matrix: Ground Water

Volatile Organic Compounds by GC/MS

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Hexachlorobutadiene	ND	0.60	µg/L	1		SW-846 8260D	8/29/23	8/29/23 13:56	EEH
2-Hexanone (MBK)	ND	10	µg/L	1		SW-846 8260D	8/29/23	8/29/23 13:56	EEH
Isopropylbenzene (Cumene)	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/29/23 13:56	EEH
p-Isopropyltoluene (p-Cymene)	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/29/23 13:56	EEH
Methyl tert-Butyl Ether (MTBE)	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/29/23 13:56	EEH
Methylene Chloride	ND	5.0	µg/L	1	RL-07	SW-846 8260D	8/29/23	8/29/23 13:56	EEH
4-Methyl-2-pentanone (MIBK)	ND	10	µg/L	1		SW-846 8260D	8/29/23	8/29/23 13:56	EEH
Naphthalene	ND	2.0	µg/L	1		SW-846 8260D	8/29/23	8/29/23 13:56	EEH
n-Propylbenzene	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/29/23 13:56	EEH
Styrene	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/29/23 13:56	EEH
1,1,1,2-Tetrachloroethane	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/29/23 13:56	EEH
1,1,2,2-Tetrachloroethane	ND	0.50	µg/L	1		SW-846 8260D	8/29/23	8/29/23 13:56	EEH
Tetrachloroethylene	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/29/23 13:56	EEH
Tetrahydrofuran	ND	2.0	µg/L	1		SW-846 8260D	8/29/23	8/29/23 13:56	EEH
Toluene	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/29/23 13:56	EEH
1,2,3-Trichlorobenzene	ND	2.0	µg/L	1		SW-846 8260D	8/29/23	8/29/23 13:56	EEH
1,2,4-Trichlorobenzene	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/29/23 13:56	EEH
1,1,1-Trichloroethane	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/29/23 13:56	EEH
1,1,2-Trichloroethane	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/29/23 13:56	EEH
Trichloroethylene	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/29/23 13:56	EEH
Trichlorofluoromethane (Freon 11)	ND	2.0	µg/L	1		SW-846 8260D	8/29/23	8/29/23 13:56	EEH
1,2,3-Trichloropropane	ND	2.0	µg/L	1		SW-846 8260D	8/29/23	8/29/23 13:56	EEH
1,2,4-Trimethylbenzene	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/29/23 13:56	EEH
1,3,5-Trimethylbenzene	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/29/23 13:56	EEH
Vinyl Chloride	ND	2.0	µg/L	1		SW-846 8260D	8/29/23	8/29/23 13:56	EEH
m+p Xylene	ND	2.0	µg/L	1		SW-846 8260D	8/29/23	8/29/23 13:56	EEH
o-Xylene	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/29/23 13:56	EEH

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
1,2-Dichloroethane-d4	98.7	70-130		8/29/23 13:56
Toluene-d8	105	70-130		8/29/23 13:56
4-Bromofluorobenzene	98.1	70-130		8/29/23 13:56

con-test® A Pace Analytical® Laboratory

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Springfield, MA
Sample Description:
Work Order: 23H3880
Date Received: 8/25/2023
Field Sample #: MW-205A
Sampled: 8/25/2023 12:45
Sample ID: 23H3880-05
Sample Matrix: Ground Water

Semivolatile Organic Compounds by GC/MS

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Biphenyl	ND	19	µg/L	1		SW-846 8270E	8/29/23	8/31/23 19:00	BGL
Acenaphthene	ND	4.8	µg/L	1		SW-846 8270E	8/29/23	8/31/23 19:00	BGL
Acenaphthylene	ND	4.8	µg/L	1		SW-846 8270E	8/29/23	8/31/23 19:00	BGL
Acetophenone	ND	9.5	µg/L	1		SW-846 8270E	8/29/23	8/31/23 19:00	BGL
Aniline	ND	19	µg/L	1	V-05	SW-846 8270E	8/29/23	8/31/23 19:00	BGL
Anthracene	ND	4.8	µg/L	1		SW-846 8270E	8/29/23	8/31/23 19:00	BGL
Benzo(a)anthracene	ND	4.8	µg/L	1		SW-846 8270E	8/29/23	8/31/23 19:00	BGL
Benzo(a)pyrene	ND	4.8	µg/L	1		SW-846 8270E	8/29/23	8/31/23 19:00	BGL
Benzo(b)fluoranthene	ND	4.8	µg/L	1		SW-846 8270E	8/29/23	8/31/23 19:00	BGL
Benzo(g,h,i)perylene	ND	4.8	µg/L	1		SW-846 8270E	8/29/23	8/31/23 19:00	BGL
Benzo(k)fluoranthene	ND	4.8	µg/L	1		SW-846 8270E	8/29/23	8/31/23 19:00	BGL
Bis(2-chloroethoxy)methane	ND	9.5	µg/L	1		SW-846 8270E	8/29/23	8/31/23 19:00	BGL
Bis(2-chloroethyl)ether	ND	9.5	µg/L	1		SW-846 8270E	8/29/23	8/31/23 19:00	BGL
Bis(2-chloroisopropyl)ether	ND	9.5	µg/L	1	V-20	SW-846 8270E	8/29/23	8/31/23 19:00	BGL
Bis(2-Ethylhexyl)phthalate	ND	9.5	µg/L	1	V-04	SW-846 8270E	8/29/23	8/31/23 19:00	BGL
4-Bromophenylphenylether	ND	9.5	µg/L	1		SW-846 8270E	8/29/23	8/31/23 19:00	BGL
Butylbenzylphthalate	ND	9.5	µg/L	1	V-35	SW-846 8270E	8/29/23	8/31/23 19:00	BGL
4-Chloroaniline	ND	9.5	µg/L	1		SW-846 8270E	8/29/23	8/31/23 19:00	BGL
2-Chloronaphthalene	ND	9.5	µg/L	1		SW-846 8270E	8/29/23	8/31/23 19:00	BGL
2-Chlorophenol	ND	9.5	µg/L	1		SW-846 8270E	8/29/23	8/31/23 19:00	BGL
Chrysene	ND	4.8	µg/L	1		SW-846 8270E	8/29/23	8/31/23 19:00	BGL
Dibenz(a,h)anthracene	ND	4.8	µg/L	1		SW-846 8270E	8/29/23	8/31/23 19:00	BGL
Dibenzofuran	ND	4.8	µg/L	1		SW-846 8270E	8/29/23	8/31/23 19:00	BGL
Di-n-butylphthalate	ND	9.5	µg/L	1		SW-846 8270E	8/29/23	8/31/23 19:00	BGL
1,2-Dichlorobenzene	ND	4.8	µg/L	1		SW-846 8270E	8/29/23	8/31/23 19:00	BGL
1,3-Dichlorobenzene	ND	4.8	µg/L	1	L-04	SW-846 8270E	8/29/23	8/31/23 19:00	BGL
1,4-Dichlorobenzene	ND	4.8	µg/L	1	L-04	SW-846 8270E	8/29/23	8/31/23 19:00	BGL
3,3-Dichlorobenzidine	ND	9.5	µg/L	1		SW-846 8270E	8/29/23	8/31/23 19:00	BGL
2,4-Dichlorophenol	ND	9.5	µg/L	1		SW-846 8270E	8/29/23	8/31/23 19:00	BGL
Diethylphthalate	ND	9.5	µg/L	1		SW-846 8270E	8/29/23	8/31/23 19:00	BGL
2,4-Dimethylphenol	ND	9.5	µg/L	1		SW-846 8270E	8/29/23	8/31/23 19:00	BGL
Dimethylphthalate	ND	9.5	µg/L	1		SW-846 8270E	8/29/23	8/31/23 19:00	BGL
2,4-Dinitrophenol	ND	9.5	µg/L	1	V-04	SW-846 8270E	8/29/23	8/31/23 19:00	BGL
2,4-Dinitrotoluene	ND	9.5	µg/L	1		SW-846 8270E	8/29/23	8/31/23 19:00	BGL
2,6-Dinitrotoluene	ND	9.5	µg/L	1		SW-846 8270E	8/29/23	8/31/23 19:00	BGL
Di-n-octylphthalate	ND	9.5	µg/L	1	V-04	SW-846 8270E	8/29/23	8/31/23 19:00	BGL
1,2-Diphenylhydrazine/Azobenzene	ND	9.5	µg/L	1		SW-846 8270E	8/29/23	8/31/23 19:00	BGL
Fluoranthene	ND	4.8	µg/L	1		SW-846 8270E	8/29/23	8/31/23 19:00	BGL
Fluorene	ND	4.8	µg/L	1		SW-846 8270E	8/29/23	8/31/23 19:00	BGL
Hexachlorobenzene	ND	9.5	µg/L	1		SW-846 8270E	8/29/23	8/31/23 19:00	BGL
Hexachlorobutadiene	ND	9.5	µg/L	1	L-04	SW-846 8270E	8/29/23	8/31/23 19:00	BGL
Hexachloroethane	ND	9.5	µg/L	1	L-04	SW-846 8270E	8/29/23	8/31/23 19:00	BGL
Indeno(1,2,3-cd)pyrene	ND	4.8	µg/L	1		SW-846 8270E	8/29/23	8/31/23 19:00	BGL
Isophorone	ND	9.5	µg/L	1		SW-846 8270E	8/29/23	8/31/23 19:00	BGL

con-test® A Pace Analytical® Laboratory

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Springfield, MA | Sample Description: | Work Order: 23H3880

Date Received: 8/25/2023

Field Sample #: MW-205A | Sampled: 8/25/2023 12:45

Sample ID: 23H3880-05

Sample Matrix: Ground Water

Semivolatile Organic Compounds by GC/MS

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
2-Methylnaphthalene	ND	4.8	µg/L	1		SW-846 8270E	8/29/23	8/31/23 19:00	BGL
2-Methylphenol	ND	9.5	µg/L	1		SW-846 8270E	8/29/23	8/31/23 19:00	BGL
3/4-Methylphenol	ND	9.5	µg/L	1		SW-846 8270E	8/29/23	8/31/23 19:00	BGL
Naphthalene	ND	4.8	µg/L	1		SW-846 8270E	8/29/23	8/31/23 19:00	BGL
Nitrobenzene	ND	9.5	µg/L	1		SW-846 8270E	8/29/23	8/31/23 19:00	BGL
2-Nitrophenol	ND	9.5	µg/L	1		SW-846 8270E	8/29/23	8/31/23 19:00	BGL
4-Nitrophenol	ND	9.5	µg/L	1	V-05	SW-846 8270E	8/29/23	8/31/23 19:00	BGL
Pentachlorophenol	ND	9.5	µg/L	1		SW-846 8270E	8/29/23	8/31/23 19:00	BGL
Phenanthrene	ND	4.8	µg/L	1		SW-846 8270E	8/29/23	8/31/23 19:00	BGL
Phenol	ND	9.5	µg/L	1		SW-846 8270E	8/29/23	8/31/23 19:00	BGL
Pyrene	ND	4.8	µg/L	1		SW-846 8270E	8/29/23	8/31/23 19:00	BGL
Pyridine	ND	19	µg/L	1		SW-846 8270E	8/29/23	8/31/23 19:00	BGL
1,2,4-Trichlorobenzene	ND	4.8	µg/L	1	L-04	SW-846 8270E	8/29/23	8/31/23 19:00	BGL
2,4,5-Trichlorophenol	ND	9.5	µg/L	1		SW-846 8270E	8/29/23	8/31/23 19:00	BGL
2,4,6-Trichlorophenol	ND	9.5	µg/L	1		SW-846 8270E	8/29/23	8/31/23 19:00	BGL

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
2-Fluorophenol	55.3	15-110		8/31/23 19:00
Phenol-d6	37.7	15-110		8/31/23 19:00
Nitrobenzene-d5	70.3	30-130		8/31/23 19:00
2-Fluorobiphenyl	68.9	30-130		8/31/23 19:00
2,4,6-Tribromophenol	81.3	15-110		8/31/23 19:00
p-Terphenyl-d14	92.8	30-130		8/31/23 19:00

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Springfield, MA
Sample Description:
Work Order: 23H3880

Date Received: 8/25/2023

Field Sample #: MW-205A
Sampled: 8/25/2023 12:45

Sample ID: 23H3880-05

Sample Matrix: Ground Water

Metals Analyses (Dissolved)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Antimony	ND	1.0	µg/L	1		SW-846 6020B	8/26/23	8/30/23 8:28	NC
Arsenic	ND	1.0	µg/L	1		SW-846 6020B	8/26/23	8/30/23 8:28	NC
Barium	320	10	µg/L	1		SW-846 6020B	8/26/23	8/29/23 14:20	NC
Beryllium	ND	0.40	µg/L	1		SW-846 6020B	8/26/23	8/29/23 14:20	NC
Cadmium	0.28	0.20	µg/L	1		SW-846 6020B	8/26/23	8/29/23 14:20	NC
Chromium	ND	5.0	µg/L	1		SW-846 6020B	8/26/23	8/30/23 8:28	NC
Lead	ND	0.50	µg/L	1		SW-846 6020B	8/26/23	8/29/23 14:20	NC
Mercury	ND	0.00020	mg/L	1		SW-846 7470A	8/28/23	8/28/23 13:50	AAJ
Nickel	ND	5.0	µg/L	1		SW-846 6020B	8/26/23	8/29/23 14:20	NC
Selenium	ND	5.0	µg/L	1		SW-846 6020B	8/26/23	8/29/23 14:20	NC
Silver	ND	0.20	µg/L	1		SW-846 6020B	8/26/23	8/29/23 14:20	NC
Thallium	ND	0.20	µg/L	1		SW-846 6020B	8/26/23	8/29/23 14:20	NC
Vanadium	ND	5.0	µg/L	1		SW-846 6020B	8/26/23	8/29/23 14:20	NC
Zinc	10	10	µg/L	1		SW-846 6020B	8/26/23	8/29/23 14:20	NC

con-test® A Pace Analytical® Laboratory

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Springfield, MA
Sample Description:
Work Order: 23H3880
Date Received: 8/25/2023
Field Sample #: MW-CM-38N
Sampled: 8/25/2023 10:00
Sample ID: 23H3880-06
Sample Matrix: Ground Water

Volatile Organic Compounds by GC/MS

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Acetone	ND	10	µg/L	1		SW-846 8260D	8/29/23	8/29/23 14:23	EEH
tert-Amyl Methyl Ether (TAME)	ND	0.50	µg/L	1	R-05	SW-846 8260D	8/29/23	8/29/23 14:23	EEH
Benzene	1.2	1.0	µg/L	1		SW-846 8260D	8/29/23	8/29/23 14:23	EEH
Bromobenzene	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/29/23 14:23	EEH
Bromochloromethane	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/29/23 14:23	EEH
Bromodichloromethane	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/29/23 14:23	EEH
Bromoform	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/29/23 14:23	EEH
Bromomethane	ND	2.0	µg/L	1	V-34	SW-846 8260D	8/29/23	8/29/23 14:23	EEH
2-Butanone (MEK)	ND	10	µg/L	1		SW-846 8260D	8/29/23	8/29/23 14:23	EEH
n-Butylbenzene	4.1	1.0	µg/L	1		SW-846 8260D	8/29/23	8/29/23 14:23	EEH
sec-Butylbenzene	4.2	1.0	µg/L	1		SW-846 8260D	8/29/23	8/29/23 14:23	EEH
tert-Butylbenzene	1.6	1.0	µg/L	1		SW-846 8260D	8/29/23	8/29/23 14:23	EEH
tert-Butyl Ethyl Ether (TBEE)	ND	0.50	µg/L	1	R-05	SW-846 8260D	8/29/23	8/29/23 14:23	EEH
Carbon Disulfide	ND	5.0	µg/L	1	RL-07	SW-846 8260D	8/29/23	8/29/23 14:23	EEH
Carbon Tetrachloride	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/29/23 14:23	EEH
Chlorobenzene	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/29/23 14:23	EEH
Chlorodibromomethane	ND	0.50	µg/L	1		SW-846 8260D	8/29/23	8/29/23 14:23	EEH
Chloroethane	ND	2.0	µg/L	1		SW-846 8260D	8/29/23	8/29/23 14:23	EEH
Chloroform	ND	2.0	µg/L	1		SW-846 8260D	8/29/23	8/29/23 14:23	EEH
Chloromethane	ND	2.0	µg/L	1	V-34	SW-846 8260D	8/29/23	8/29/23 14:23	EEH
2-Chlorotoluene	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/29/23 14:23	EEH
4-Chlorotoluene	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/29/23 14:23	EEH
1,2-Dibromo-3-chloropropane (DBCP)	ND	2.0	µg/L	1		SW-846 8260D	8/29/23	8/29/23 14:23	EEH
1,2-Dibromoethane (EDB)	ND	0.50	µg/L	1		SW-846 8260D	8/29/23	8/29/23 14:23	EEH
Dibromomethane	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/29/23 14:23	EEH
1,2-Dichlorobenzene	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/29/23 14:23	EEH
1,3-Dichlorobenzene	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/29/23 14:23	EEH
1,4-Dichlorobenzene	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/29/23 14:23	EEH
Dichlorodifluoromethane (Freon 12)	ND	2.0	µg/L	1		SW-846 8260D	8/29/23	8/29/23 14:23	EEH
1,1-Dichloroethane	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/29/23 14:23	EEH
1,2-Dichloroethane	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/29/23 14:23	EEH
1,1-Dichloroethylene	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/29/23 14:23	EEH
cis-1,2-Dichloroethylene	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/29/23 14:23	EEH
trans-1,2-Dichloroethylene	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/29/23 14:23	EEH
1,2-Dichloropropane	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/29/23 14:23	EEH
1,3-Dichloropropane	ND	0.50	µg/L	1		SW-846 8260D	8/29/23	8/29/23 14:23	EEH
2,2-Dichloropropane	ND	1.0	µg/L	1	R-05	SW-846 8260D	8/29/23	8/29/23 14:23	EEH
1,1-Dichloropropene	ND	0.50	µg/L	1		SW-846 8260D	8/29/23	8/29/23 14:23	EEH
cis-1,3-Dichloropropene	ND	0.40	µg/L	1		SW-846 8260D	8/29/23	8/29/23 14:23	EEH
trans-1,3-Dichloropropene	ND	0.40	µg/L	1		SW-846 8260D	8/29/23	8/29/23 14:23	EEH
Diethyl Ether	ND	2.0	µg/L	1		SW-846 8260D	8/29/23	8/29/23 14:23	EEH
Diisopropyl Ether (DIPE)	ND	0.50	µg/L	1		SW-846 8260D	8/29/23	8/29/23 14:23	EEH
1,4-Dioxane	ND	50	µg/L	1		SW-846 8260D	8/29/23	8/29/23 14:23	EEH
Ethylbenzene	39	1.0	µg/L	1		SW-846 8260D	8/29/23	8/29/23 14:23	EEH

con-test® A Pace Analytical® Laboratory

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Springfield, MA
Sample Description:
Work Order: 23H3880

Date Received: 8/25/2023

Field Sample #: MW-CM-38N
Sampled: 8/25/2023 10:00

Sample ID: 23H3880-06

Sample Matrix: Ground Water

Volatile Organic Compounds by GC/MS

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Hexachlorobutadiene	ND	0.60	µg/L	1		SW-846 8260D	8/29/23	8/29/23 14:23	EEH
2-Hexanone (MBK)	ND	10	µg/L	1		SW-846 8260D	8/29/23	8/29/23 14:23	EEH
Isopropylbenzene (Cumene)	10	1.0	µg/L	1		SW-846 8260D	8/29/23	8/29/23 14:23	EEH
p-Isopropyltoluene (p-Cymene)	1.8	1.0	µg/L	1		SW-846 8260D	8/29/23	8/29/23 14:23	EEH
Methyl tert-Butyl Ether (MTBE)	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/29/23 14:23	EEH
Methylene Chloride	ND	5.0	µg/L	1	RL-07	SW-846 8260D	8/29/23	8/29/23 14:23	EEH
4-Methyl-2-pentanone (MIBK)	ND	10	µg/L	1		SW-846 8260D	8/29/23	8/29/23 14:23	EEH
Naphthalene	170	2.0	µg/L	1		SW-846 8260D	8/29/23	8/29/23 14:23	EEH
n-Propylbenzene	16	1.0	µg/L	1		SW-846 8260D	8/29/23	8/29/23 14:23	EEH
Styrene	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/29/23 14:23	EEH
1,1,1,2-Tetrachloroethane	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/29/23 14:23	EEH
1,1,2,2-Tetrachloroethane	ND	0.50	µg/L	1		SW-846 8260D	8/29/23	8/29/23 14:23	EEH
Tetrachloroethylene	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/29/23 14:23	EEH
Tetrahydrofuran	ND	2.0	µg/L	1		SW-846 8260D	8/29/23	8/29/23 14:23	EEH
Toluene	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/29/23 14:23	EEH
1,2,3-Trichlorobenzene	ND	2.0	µg/L	1		SW-846 8260D	8/29/23	8/29/23 14:23	EEH
1,2,4-Trichlorobenzene	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/29/23 14:23	EEH
1,1,1-Trichloroethane	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/29/23 14:23	EEH
1,1,2-Trichloroethane	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/29/23 14:23	EEH
Trichloroethylene	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/29/23 14:23	EEH
Trichlorofluoromethane (Freon 11)	ND	2.0	µg/L	1		SW-846 8260D	8/29/23	8/29/23 14:23	EEH
1,2,3-Trichloropropane	ND	2.0	µg/L	1		SW-846 8260D	8/29/23	8/29/23 14:23	EEH
1,2,4-Trimethylbenzene	24	1.0	µg/L	1		SW-846 8260D	8/29/23	8/29/23 14:23	EEH
1,3,5-Trimethylbenzene	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/29/23 14:23	EEH
Vinyl Chloride	ND	2.0	µg/L	1		SW-846 8260D	8/29/23	8/29/23 14:23	EEH
m+p Xylene	4.0	2.0	µg/L	1		SW-846 8260D	8/29/23	8/29/23 14:23	EEH
o-Xylene	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/29/23 14:23	EEH

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
1,2-Dichloroethane-d4	99.3	70-130		8/29/23 14:23
Toluene-d8	105	70-130		8/29/23 14:23
4-Bromofluorobenzene	103	70-130		8/29/23 14:23

con-test® A Pace Analytical® Laboratory

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Springfield, MA
Sample Description:
Work Order: 23H3880
Date Received: 8/25/2023
Field Sample #: MW-CM-38N
Sampled: 8/25/2023 10:00
Sample ID: 23H3880-06
Sample Matrix: Ground Water

Semivolatile Organic Compounds by GC/MS

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Biphenyl	ND	19	µg/L	1		SW-846 8270E	8/29/23	8/31/23 19:21	BGL
Acenaphthene	ND	4.7	µg/L	1		SW-846 8270E	8/29/23	8/31/23 19:21	BGL
Acenaphthylene	ND	4.7	µg/L	1		SW-846 8270E	8/29/23	8/31/23 19:21	BGL
Acetophenone	ND	9.3	µg/L	1		SW-846 8270E	8/29/23	8/31/23 19:21	BGL
Aniline	ND	19	µg/L	1	V-05	SW-846 8270E	8/29/23	8/31/23 19:21	BGL
Anthracene	ND	4.7	µg/L	1		SW-846 8270E	8/29/23	8/31/23 19:21	BGL
Benzo(a)anthracene	ND	4.7	µg/L	1		SW-846 8270E	8/29/23	8/31/23 19:21	BGL
Benzo(a)pyrene	ND	4.7	µg/L	1		SW-846 8270E	8/29/23	8/31/23 19:21	BGL
Benzo(b)fluoranthene	ND	4.7	µg/L	1		SW-846 8270E	8/29/23	8/31/23 19:21	BGL
Benzo(g,h,i)perylene	ND	4.7	µg/L	1		SW-846 8270E	8/29/23	8/31/23 19:21	BGL
Benzo(k)fluoranthene	ND	4.7	µg/L	1		SW-846 8270E	8/29/23	8/31/23 19:21	BGL
Bis(2-chloroethoxy)methane	ND	9.3	µg/L	1		SW-846 8270E	8/29/23	8/31/23 19:21	BGL
Bis(2-chloroethyl)ether	ND	9.3	µg/L	1		SW-846 8270E	8/29/23	8/31/23 19:21	BGL
Bis(2-chloroisopropyl)ether	ND	9.3	µg/L	1	V-20	SW-846 8270E	8/29/23	8/31/23 19:21	BGL
Bis(2-Ethylhexyl)phthalate	ND	9.3	µg/L	1	V-04	SW-846 8270E	8/29/23	8/31/23 19:21	BGL
4-Bromophenylphenylether	ND	9.3	µg/L	1		SW-846 8270E	8/29/23	8/31/23 19:21	BGL
Butylbenzylphthalate	ND	9.3	µg/L	1	V-35	SW-846 8270E	8/29/23	8/31/23 19:21	BGL
4-Chloroaniline	ND	9.3	µg/L	1		SW-846 8270E	8/29/23	8/31/23 19:21	BGL
2-Chloronaphthalene	ND	9.3	µg/L	1		SW-846 8270E	8/29/23	8/31/23 19:21	BGL
2-Chlorophenol	ND	9.3	µg/L	1		SW-846 8270E	8/29/23	8/31/23 19:21	BGL
Chrysene	ND	4.7	µg/L	1		SW-846 8270E	8/29/23	8/31/23 19:21	BGL
Dibenz(a,h)anthracene	ND	4.7	µg/L	1		SW-846 8270E	8/29/23	8/31/23 19:21	BGL
Dibenzofuran	ND	4.7	µg/L	1		SW-846 8270E	8/29/23	8/31/23 19:21	BGL
Di-n-butylphthalate	ND	9.3	µg/L	1		SW-846 8270E	8/29/23	8/31/23 19:21	BGL
1,2-Dichlorobenzene	ND	4.7	µg/L	1		SW-846 8270E	8/29/23	8/31/23 19:21	BGL
1,3-Dichlorobenzene	ND	4.7	µg/L	1	L-04	SW-846 8270E	8/29/23	8/31/23 19:21	BGL
1,4-Dichlorobenzene	ND	4.7	µg/L	1	L-04	SW-846 8270E	8/29/23	8/31/23 19:21	BGL
3,3-Dichlorobenzidine	ND	9.3	µg/L	1		SW-846 8270E	8/29/23	8/31/23 19:21	BGL
2,4-Dichlorophenol	ND	9.3	µg/L	1		SW-846 8270E	8/29/23	8/31/23 19:21	BGL
Diethylphthalate	ND	9.3	µg/L	1		SW-846 8270E	8/29/23	8/31/23 19:21	BGL
2,4-Dimethylphenol	ND	9.3	µg/L	1		SW-846 8270E	8/29/23	8/31/23 19:21	BGL
Dimethylphthalate	ND	9.3	µg/L	1		SW-846 8270E	8/29/23	8/31/23 19:21	BGL
2,4-Dinitrophenol	ND	9.3	µg/L	1	V-04	SW-846 8270E	8/29/23	8/31/23 19:21	BGL
2,4-Dinitrotoluene	ND	9.3	µg/L	1		SW-846 8270E	8/29/23	8/31/23 19:21	BGL
2,6-Dinitrotoluene	ND	9.3	µg/L	1		SW-846 8270E	8/29/23	8/31/23 19:21	BGL
Di-n-octylphthalate	ND	9.3	µg/L	1	V-04	SW-846 8270E	8/29/23	8/31/23 19:21	BGL
1,2-Diphenylhydrazine/Azobenzene	ND	9.3	µg/L	1		SW-846 8270E	8/29/23	8/31/23 19:21	BGL
Fluoranthene	ND	4.7	µg/L	1		SW-846 8270E	8/29/23	8/31/23 19:21	BGL
Fluorene	5.1	4.7	µg/L	1		SW-846 8270E	8/29/23	8/31/23 19:21	BGL
Hexachlorobenzene	ND	9.3	µg/L	1		SW-846 8270E	8/29/23	8/31/23 19:21	BGL
Hexachlorobutadiene	ND	9.3	µg/L	1	L-04	SW-846 8270E	8/29/23	8/31/23 19:21	BGL
Hexachloroethane	ND	9.3	µg/L	1	L-04	SW-846 8270E	8/29/23	8/31/23 19:21	BGL
Indeno(1,2,3-cd)pyrene	ND	4.7	µg/L	1		SW-846 8270E	8/29/23	8/31/23 19:21	BGL
Isophorone	ND	9.3	µg/L	1		SW-846 8270E	8/29/23	8/31/23 19:21	BGL

con-test® A Pace Analytical® Laboratory

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Springfield, MA | Sample Description: | Work Order: 23H3880

Date Received: 8/25/2023

Field Sample #: MW-CM-38N | Sampled: 8/25/2023 10:00

Sample ID: 23H3880-06

Sample Matrix: Ground Water

Semivolatile Organic Compounds by GC/MS

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
2-Methylnaphthalene	82	4.7	µg/L	1		SW-846 8270E	8/29/23	8/31/23 19:21	BGL
2-Methylphenol	ND	9.3	µg/L	1		SW-846 8270E	8/29/23	8/31/23 19:21	BGL
3/4-Methylphenol	ND	9.3	µg/L	1		SW-846 8270E	8/29/23	8/31/23 19:21	BGL
Naphthalene	100	4.7	µg/L	1		SW-846 8270E	8/29/23	8/31/23 19:21	BGL
Nitrobenzene	ND	9.3	µg/L	1		SW-846 8270E	8/29/23	8/31/23 19:21	BGL
2-Nitrophenol	ND	9.3	µg/L	1		SW-846 8270E	8/29/23	8/31/23 19:21	BGL
4-Nitrophenol	ND	9.3	µg/L	1	V-05	SW-846 8270E	8/29/23	8/31/23 19:21	BGL
Pentachlorophenol	ND	9.3	µg/L	1		SW-846 8270E	8/29/23	8/31/23 19:21	BGL
Phenanthrene	ND	4.7	µg/L	1		SW-846 8270E	8/29/23	8/31/23 19:21	BGL
Phenol	ND	9.3	µg/L	1		SW-846 8270E	8/29/23	8/31/23 19:21	BGL
Pyrene	ND	4.7	µg/L	1		SW-846 8270E	8/29/23	8/31/23 19:21	BGL
Pyridine	ND	19	µg/L	1		SW-846 8270E	8/29/23	8/31/23 19:21	BGL
1,2,4-Trichlorobenzene	ND	4.7	µg/L	1	L-04	SW-846 8270E	8/29/23	8/31/23 19:21	BGL
2,4,5-Trichlorophenol	ND	9.3	µg/L	1		SW-846 8270E	8/29/23	8/31/23 19:21	BGL
2,4,6-Trichlorophenol	ND	9.3	µg/L	1		SW-846 8270E	8/29/23	8/31/23 19:21	BGL

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
2-Fluorophenol	68.1	15-110		8/31/23 19:21
Phenol-d6	48.5	15-110		8/31/23 19:21
Nitrobenzene-d5	86.2	30-130		8/31/23 19:21
2-Fluorobiphenyl	84.6	30-130		8/31/23 19:21
2,4,6-Tribromophenol	93.4	15-110		8/31/23 19:21
p-Terphenyl-d14	115	30-130		8/31/23 19:21

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Springfield, MA
Sample Description:
Work Order: 23H3880

Date Received: 8/25/2023

Field Sample #: MW-CM-38N
Sampled: 8/25/2023 10:00

Sample ID: 23H3880-06

Sample Matrix: Ground Water

Metals Analyses (Dissolved)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Antimony	ND	1.0	µg/L	1		SW-846 6020B	8/26/23	8/30/23 8:30	NC
Arsenic	21	1.0	µg/L	1		SW-846 6020B	8/26/23	8/30/23 8:30	NC
Barium	350	10	µg/L	1		SW-846 6020B	8/26/23	8/29/23 14:24	NC
Beryllium	ND	0.40	µg/L	1		SW-846 6020B	8/26/23	8/29/23 14:24	NC
Cadmium	ND	0.20	µg/L	1		SW-846 6020B	8/26/23	8/29/23 14:24	NC
Chromium	ND	5.0	µg/L	1		SW-846 6020B	8/26/23	8/30/23 8:30	NC
Lead	ND	0.50	µg/L	1		SW-846 6020B	8/26/23	8/29/23 14:24	NC
Mercury	ND	0.00020	mg/L	1		SW-846 7470A	8/28/23	8/28/23 13:52	AAJ
Nickel	ND	5.0	µg/L	1		SW-846 6020B	8/26/23	8/29/23 14:24	NC
Selenium	ND	5.0	µg/L	1		SW-846 6020B	8/26/23	8/29/23 14:24	NC
Silver	ND	0.20	µg/L	1		SW-846 6020B	8/26/23	8/29/23 14:24	NC
Thallium	ND	0.20	µg/L	1		SW-846 6020B	8/26/23	8/29/23 14:24	NC
Vanadium	ND	5.0	µg/L	1		SW-846 6020B	8/26/23	8/29/23 14:24	NC
Zinc	ND	10	µg/L	1		SW-846 6020B	8/26/23	8/29/23 14:24	NC

con-test® A Pace Analytical® Laboratory

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Springfield, MA
Sample Description:
Work Order: 23H3880
Date Received: 8/25/2023
Field Sample #: MW-CM-53N
Sampled: 8/25/2023 13:30
Sample ID: 23H3880-07
Sample Matrix: Ground Water

Volatile Organic Compounds by GC/MS

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Acetone	ND	10	µg/L	1		SW-846 8260D	8/29/23	8/31/23 14:49	MFF
tert-Amyl Methyl Ether (TAME)	ND	0.50	µg/L	1		SW-846 8260D	8/29/23	8/31/23 14:49	MFF
Benzene	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/31/23 14:49	MFF
Bromobenzene	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/31/23 14:49	MFF
Bromochloromethane	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/31/23 14:49	MFF
Bromodichloromethane	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/31/23 14:49	MFF
Bromoform	ND	1.0	µg/L	1	V-05	SW-846 8260D	8/29/23	8/31/23 14:49	MFF
Bromomethane	ND	2.0	µg/L	1		SW-846 8260D	8/29/23	8/31/23 14:49	MFF
2-Butanone (MEK)	ND	10	µg/L	1		SW-846 8260D	8/29/23	8/31/23 14:49	MFF
n-Butylbenzene	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/31/23 14:49	MFF
sec-Butylbenzene	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/31/23 14:49	MFF
tert-Butylbenzene	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/31/23 14:49	MFF
tert-Butyl Ethyl Ether (TBEE)	ND	0.50	µg/L	1		SW-846 8260D	8/29/23	8/31/23 14:49	MFF
Carbon Disulfide	ND	5.0	µg/L	1		SW-846 8260D	8/29/23	8/31/23 14:49	MFF
Carbon Tetrachloride	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/31/23 14:49	MFF
Chlorobenzene	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/31/23 14:49	MFF
Chlorodibromomethane	ND	0.50	µg/L	1		SW-846 8260D	8/29/23	8/31/23 14:49	MFF
Chloroethane	ND	2.0	µg/L	1		SW-846 8260D	8/29/23	8/31/23 14:49	MFF
Chloroform	ND	2.0	µg/L	1		SW-846 8260D	8/29/23	8/31/23 14:49	MFF
Chloromethane	ND	2.0	µg/L	1		SW-846 8260D	8/29/23	8/31/23 14:49	MFF
2-Chlorotoluene	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/31/23 14:49	MFF
4-Chlorotoluene	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/31/23 14:49	MFF
1,2-Dibromo-3-chloropropane (DBCP)	ND	2.0	µg/L	1		SW-846 8260D	8/29/23	8/31/23 14:49	MFF
1,2-Dibromoethane (EDB)	ND	0.50	µg/L	1		SW-846 8260D	8/29/23	8/31/23 14:49	MFF
Dibromomethane	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/31/23 14:49	MFF
1,2-Dichlorobenzene	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/31/23 14:49	MFF
1,3-Dichlorobenzene	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/31/23 14:49	MFF
1,4-Dichlorobenzene	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/31/23 14:49	MFF
Dichlorodifluoromethane (Freon 12)	ND	2.0	µg/L	1		SW-846 8260D	8/29/23	8/31/23 14:49	MFF
1,1-Dichloroethane	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/31/23 14:49	MFF
1,2-Dichloroethane	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/31/23 14:49	MFF
1,1-Dichloroethylene	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/31/23 14:49	MFF
cis-1,2-Dichloroethylene	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/31/23 14:49	MFF
trans-1,2-Dichloroethylene	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/31/23 14:49	MFF
1,2-Dichloropropane	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/31/23 14:49	MFF
1,3-Dichloropropane	ND	0.50	µg/L	1		SW-846 8260D	8/29/23	8/31/23 14:49	MFF
2,2-Dichloropropane	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/31/23 14:49	MFF
1,1-Dichloropropene	ND	0.50	µg/L	1		SW-846 8260D	8/29/23	8/31/23 14:49	MFF
cis-1,3-Dichloropropene	ND	0.40	µg/L	1		SW-846 8260D	8/29/23	8/31/23 14:49	MFF
trans-1,3-Dichloropropene	ND	0.40	µg/L	1		SW-846 8260D	8/29/23	8/31/23 14:49	MFF
Diethyl Ether	ND	2.0	µg/L	1		SW-846 8260D	8/29/23	8/31/23 14:49	MFF
Diisopropyl Ether (DIPE)	ND	0.50	µg/L	1		SW-846 8260D	8/29/23	8/31/23 14:49	MFF
1,4-Dioxane	ND	50	µg/L	1	V-05	SW-846 8260D	8/29/23	8/31/23 14:49	MFF
Ethylbenzene	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/31/23 14:49	MFF

con-test® A Pace Analytical® Laboratory

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Springfield, MA
Sample Description:
Work Order: 23H3880

Date Received: 8/25/2023

Field Sample #: MW-CM-53N
Sampled: 8/25/2023 13:30

Sample ID: 23H3880-07

Sample Matrix: Ground Water

Volatile Organic Compounds by GC/MS

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Hexachlorobutadiene	ND	0.60	µg/L	1		SW-846 8260D	8/29/23	8/31/23 14:49	MFF
2-Hexanone (MBK)	ND	10	µg/L	1		SW-846 8260D	8/29/23	8/31/23 14:49	MFF
Isopropylbenzene (Cumene)	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/31/23 14:49	MFF
p-Isopropyltoluene (p-Cymene)	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/31/23 14:49	MFF
Methyl tert-Butyl Ether (MTBE)	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/31/23 14:49	MFF
Methylene Chloride	ND	5.0	µg/L	1		SW-846 8260D	8/29/23	8/31/23 14:49	MFF
4-Methyl-2-pentanone (MIBK)	ND	10	µg/L	1		SW-846 8260D	8/29/23	8/31/23 14:49	MFF
Naphthalene	ND	2.0	µg/L	1	L-04, V-05	SW-846 8260D	8/29/23	8/31/23 14:49	MFF
n-Propylbenzene	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/31/23 14:49	MFF
Styrene	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/31/23 14:49	MFF
1,1,1,2-Tetrachloroethane	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/31/23 14:49	MFF
1,1,2,2-Tetrachloroethane	ND	0.50	µg/L	1		SW-846 8260D	8/29/23	8/31/23 14:49	MFF
Tetrachloroethylene	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/31/23 14:49	MFF
Tetrahydrofuran	ND	2.0	µg/L	1		SW-846 8260D	8/29/23	8/31/23 14:49	MFF
Toluene	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/31/23 14:49	MFF
1,2,3-Trichlorobenzene	ND	2.0	µg/L	1		SW-846 8260D	8/29/23	8/31/23 14:49	MFF
1,2,4-Trichlorobenzene	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/31/23 14:49	MFF
1,1,1-Trichloroethane	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/31/23 14:49	MFF
1,1,2-Trichloroethane	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/31/23 14:49	MFF
Trichloroethylene	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/31/23 14:49	MFF
Trichlorofluoromethane (Freon 11)	ND	2.0	µg/L	1		SW-846 8260D	8/29/23	8/31/23 14:49	MFF
1,2,3-Trichloropropane	ND	2.0	µg/L	1		SW-846 8260D	8/29/23	8/31/23 14:49	MFF
1,2,4-Trimethylbenzene	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/31/23 14:49	MFF
1,3,5-Trimethylbenzene	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/31/23 14:49	MFF
Vinyl Chloride	ND	2.0	µg/L	1		SW-846 8260D	8/29/23	8/31/23 14:49	MFF
m+p Xylene	ND	2.0	µg/L	1		SW-846 8260D	8/29/23	8/31/23 14:49	MFF
o-Xylene	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/31/23 14:49	MFF

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
1,2-Dichloroethane-d4	111	70-130		8/31/23 14:49
Toluene-d8	99.2	70-130		8/31/23 14:49
4-Bromofluorobenzene	84.6	70-130		8/31/23 14:49

con-test® A Pace Analytical® Laboratory

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Springfield, MA
Sample Description:
Work Order: 23H3880
Date Received: 8/25/2023
Field Sample #: MW-CM-53N
Sampled: 8/25/2023 13:30
Sample ID: 23H3880-07
Sample Matrix: Ground Water

Semivolatile Organic Compounds by GC/MS

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Biphenyl	ND	19	µg/L	1		SW-846 8270E	8/29/23	8/31/23 19:43	BGL
Acenaphthene	ND	4.6	µg/L	1		SW-846 8270E	8/29/23	8/31/23 19:43	BGL
Acenaphthylene	ND	4.6	µg/L	1		SW-846 8270E	8/29/23	8/31/23 19:43	BGL
Acetophenone	ND	9.3	µg/L	1		SW-846 8270E	8/29/23	8/31/23 19:43	BGL
Aniline	ND	19	µg/L	1	V-05	SW-846 8270E	8/29/23	8/31/23 19:43	BGL
Anthracene	ND	4.6	µg/L	1		SW-846 8270E	8/29/23	8/31/23 19:43	BGL
Benzo(a)anthracene	ND	4.6	µg/L	1		SW-846 8270E	8/29/23	8/31/23 19:43	BGL
Benzo(a)pyrene	ND	4.6	µg/L	1		SW-846 8270E	8/29/23	8/31/23 19:43	BGL
Benzo(b)fluoranthene	ND	4.6	µg/L	1		SW-846 8270E	8/29/23	8/31/23 19:43	BGL
Benzo(g,h,i)perylene	ND	4.6	µg/L	1		SW-846 8270E	8/29/23	8/31/23 19:43	BGL
Benzo(k)fluoranthene	ND	4.6	µg/L	1		SW-846 8270E	8/29/23	8/31/23 19:43	BGL
Bis(2-chloroethoxy)methane	ND	9.3	µg/L	1		SW-846 8270E	8/29/23	8/31/23 19:43	BGL
Bis(2-chloroethyl)ether	ND	9.3	µg/L	1		SW-846 8270E	8/29/23	8/31/23 19:43	BGL
Bis(2-chloroisopropyl)ether	ND	9.3	µg/L	1	V-20	SW-846 8270E	8/29/23	8/31/23 19:43	BGL
Bis(2-Ethylhexyl)phthalate	ND	9.3	µg/L	1	V-04	SW-846 8270E	8/29/23	8/31/23 19:43	BGL
4-Bromophenylphenylether	ND	9.3	µg/L	1		SW-846 8270E	8/29/23	8/31/23 19:43	BGL
Butylbenzylphthalate	ND	9.3	µg/L	1	V-35	SW-846 8270E	8/29/23	8/31/23 19:43	BGL
4-Chloroaniline	ND	9.3	µg/L	1		SW-846 8270E	8/29/23	8/31/23 19:43	BGL
2-Chloronaphthalene	ND	9.3	µg/L	1		SW-846 8270E	8/29/23	8/31/23 19:43	BGL
2-Chlorophenol	ND	9.3	µg/L	1		SW-846 8270E	8/29/23	8/31/23 19:43	BGL
Chrysene	ND	4.6	µg/L	1		SW-846 8270E	8/29/23	8/31/23 19:43	BGL
Dibenz(a,h)anthracene	ND	4.6	µg/L	1		SW-846 8270E	8/29/23	8/31/23 19:43	BGL
Dibenzofuran	ND	4.6	µg/L	1		SW-846 8270E	8/29/23	8/31/23 19:43	BGL
Di-n-butylphthalate	ND	9.3	µg/L	1		SW-846 8270E	8/29/23	8/31/23 19:43	BGL
1,2-Dichlorobenzene	ND	4.6	µg/L	1		SW-846 8270E	8/29/23	8/31/23 19:43	BGL
1,3-Dichlorobenzene	ND	4.6	µg/L	1	L-04	SW-846 8270E	8/29/23	8/31/23 19:43	BGL
1,4-Dichlorobenzene	ND	4.6	µg/L	1	L-04	SW-846 8270E	8/29/23	8/31/23 19:43	BGL
3,3-Dichlorobenzidine	ND	9.3	µg/L	1		SW-846 8270E	8/29/23	8/31/23 19:43	BGL
2,4-Dichlorophenol	ND	9.3	µg/L	1		SW-846 8270E	8/29/23	8/31/23 19:43	BGL
Diethylphthalate	ND	9.3	µg/L	1		SW-846 8270E	8/29/23	8/31/23 19:43	BGL
2,4-Dimethylphenol	ND	9.3	µg/L	1		SW-846 8270E	8/29/23	8/31/23 19:43	BGL
Dimethylphthalate	ND	9.3	µg/L	1		SW-846 8270E	8/29/23	8/31/23 19:43	BGL
2,4-Dinitrophenol	ND	9.3	µg/L	1	V-04	SW-846 8270E	8/29/23	8/31/23 19:43	BGL
2,4-Dinitrotoluene	ND	9.3	µg/L	1		SW-846 8270E	8/29/23	8/31/23 19:43	BGL
2,6-Dinitrotoluene	ND	9.3	µg/L	1		SW-846 8270E	8/29/23	8/31/23 19:43	BGL
Di-n-octylphthalate	ND	9.3	µg/L	1	V-04	SW-846 8270E	8/29/23	8/31/23 19:43	BGL
1,2-Diphenylhydrazine/Azobenzene	ND	9.3	µg/L	1		SW-846 8270E	8/29/23	8/31/23 19:43	BGL
Fluoranthene	ND	4.6	µg/L	1		SW-846 8270E	8/29/23	8/31/23 19:43	BGL
Fluorene	ND	4.6	µg/L	1		SW-846 8270E	8/29/23	8/31/23 19:43	BGL
Hexachlorobenzene	ND	9.3	µg/L	1		SW-846 8270E	8/29/23	8/31/23 19:43	BGL
Hexachlorobutadiene	ND	9.3	µg/L	1	L-04	SW-846 8270E	8/29/23	8/31/23 19:43	BGL
Hexachloroethane	ND	9.3	µg/L	1	L-04	SW-846 8270E	8/29/23	8/31/23 19:43	BGL
Indeno(1,2,3-cd)pyrene	ND	4.6	µg/L	1		SW-846 8270E	8/29/23	8/31/23 19:43	BGL
Isophorone	ND	9.3	µg/L	1		SW-846 8270E	8/29/23	8/31/23 19:43	BGL

con-test® A Pace Analytical® Laboratory

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Springfield, MA
Sample Description:
Work Order: 23H3880

Date Received: 8/25/2023

Field Sample #: MW-CM-53N
Sampled: 8/25/2023 13:30

Sample ID: 23H3880-07

Sample Matrix: Ground Water

Semivolatile Organic Compounds by GC/MS

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
2-Methylnaphthalene	ND	4.6	µg/L	1		SW-846 8270E	8/29/23	8/31/23 19:43	BGL
2-Methylphenol	ND	9.3	µg/L	1		SW-846 8270E	8/29/23	8/31/23 19:43	BGL
3/4-Methylphenol	ND	9.3	µg/L	1		SW-846 8270E	8/29/23	8/31/23 19:43	BGL
Naphthalene	ND	4.6	µg/L	1		SW-846 8270E	8/29/23	8/31/23 19:43	BGL
Nitrobenzene	ND	9.3	µg/L	1		SW-846 8270E	8/29/23	8/31/23 19:43	BGL
2-Nitrophenol	ND	9.3	µg/L	1		SW-846 8270E	8/29/23	8/31/23 19:43	BGL
4-Nitrophenol	ND	9.3	µg/L	1	V-05	SW-846 8270E	8/29/23	8/31/23 19:43	BGL
Pentachlorophenol	ND	9.3	µg/L	1		SW-846 8270E	8/29/23	8/31/23 19:43	BGL
Phenanthrene	ND	4.6	µg/L	1		SW-846 8270E	8/29/23	8/31/23 19:43	BGL
Phenol	ND	9.3	µg/L	1		SW-846 8270E	8/29/23	8/31/23 19:43	BGL
Pyrene	ND	4.6	µg/L	1		SW-846 8270E	8/29/23	8/31/23 19:43	BGL
Pyridine	ND	19	µg/L	1		SW-846 8270E	8/29/23	8/31/23 19:43	BGL
1,2,4-Trichlorobenzene	ND	4.6	µg/L	1	L-04	SW-846 8270E	8/29/23	8/31/23 19:43	BGL
2,4,5-Trichlorophenol	ND	9.3	µg/L	1		SW-846 8270E	8/29/23	8/31/23 19:43	BGL
2,4,6-Trichlorophenol	ND	9.3	µg/L	1		SW-846 8270E	8/29/23	8/31/23 19:43	BGL

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
2-Fluorophenol	64.3	15-110		8/31/23 19:43
Phenol-d6	45.1	15-110		8/31/23 19:43
Nitrobenzene-d5	78.7	30-130		8/31/23 19:43
2-Fluorobiphenyl	76.0	30-130		8/31/23 19:43
2,4,6-Tribromophenol	99.6	15-110		8/31/23 19:43
p-Terphenyl-d14	97.4	30-130		8/31/23 19:43

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Springfield, MA
Sample Description:
Work Order: 23H3880

Date Received: 8/25/2023

Field Sample #: MW-CM-53N
Sampled: 8/25/2023 13:30

Sample ID: 23H3880-07

Sample Matrix: Ground Water

Metals Analyses (Dissolved)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Antimony	ND	1.0	µg/L	1		SW-846 6020B	8/26/23	8/30/23 8:33	NC
Arsenic	ND	1.0	µg/L	1		SW-846 6020B	8/26/23	8/30/23 8:33	NC
Barium	180	10	µg/L	1		SW-846 6020B	8/26/23	8/29/23 14:27	NC
Beryllium	ND	0.40	µg/L	1		SW-846 6020B	8/26/23	8/29/23 14:27	NC
Cadmium	ND	0.20	µg/L	1		SW-846 6020B	8/26/23	8/29/23 14:27	NC
Chromium	ND	5.0	µg/L	1		SW-846 6020B	8/26/23	8/30/23 8:33	NC
Lead	ND	0.50	µg/L	1		SW-846 6020B	8/26/23	8/29/23 14:27	NC
Mercury	ND	0.00020	mg/L	1		SW-846 7470A	8/28/23	8/28/23 13:54	AAJ
Nickel	ND	5.0	µg/L	1		SW-846 6020B	8/26/23	8/29/23 14:27	NC
Selenium	ND	5.0	µg/L	1		SW-846 6020B	8/26/23	8/29/23 14:27	NC
Silver	ND	0.20	µg/L	1		SW-846 6020B	8/26/23	8/29/23 14:27	NC
Thallium	ND	0.20	µg/L	1		SW-846 6020B	8/26/23	8/29/23 14:27	NC
Vanadium	ND	5.0	µg/L	1		SW-846 6020B	8/26/23	8/29/23 14:27	NC
Zinc	ND	10	µg/L	1		SW-846 6020B	8/26/23	8/29/23 14:27	NC

con-test® A Pace Analytical® Laboratory

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Springfield, MA
Sample Description:
Work Order: 23H3880
Date Received: 8/25/2023
Field Sample #: DUP-1
Sampled: 8/25/2023 00:00
Sample ID: 23H3880-08
Sample Matrix: Ground Water

Volatile Organic Compounds by GC/MS

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Acetone	ND	10	µg/L	1		SW-846 8260D	8/29/23	8/29/23 15:18	EEH
tert-Amyl Methyl Ether (TAME)	ND	0.50	µg/L	1	R-05	SW-846 8260D	8/29/23	8/29/23 15:18	EEH
Benzene	1.3	1.0	µg/L	1		SW-846 8260D	8/29/23	8/29/23 15:18	EEH
Bromobenzene	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/29/23 15:18	EEH
Bromochloromethane	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/29/23 15:18	EEH
Bromodichloromethane	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/29/23 15:18	EEH
Bromoform	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/29/23 15:18	EEH
Bromomethane	ND	2.0	µg/L	1	V-34	SW-846 8260D	8/29/23	8/29/23 15:18	EEH
2-Butanone (MEK)	ND	10	µg/L	1		SW-846 8260D	8/29/23	8/29/23 15:18	EEH
n-Butylbenzene	4.1	1.0	µg/L	1		SW-846 8260D	8/29/23	8/29/23 15:18	EEH
sec-Butylbenzene	4.2	1.0	µg/L	1		SW-846 8260D	8/29/23	8/29/23 15:18	EEH
tert-Butylbenzene	1.5	1.0	µg/L	1		SW-846 8260D	8/29/23	8/29/23 15:18	EEH
tert-Butyl Ethyl Ether (TBEE)	ND	0.50	µg/L	1	R-05	SW-846 8260D	8/29/23	8/29/23 15:18	EEH
Carbon Disulfide	ND	5.0	µg/L	1	RL-07	SW-846 8260D	8/29/23	8/29/23 15:18	EEH
Carbon Tetrachloride	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/29/23 15:18	EEH
Chlorobenzene	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/29/23 15:18	EEH
Chlorodibromomethane	ND	0.50	µg/L	1		SW-846 8260D	8/29/23	8/29/23 15:18	EEH
Chloroethane	ND	2.0	µg/L	1		SW-846 8260D	8/29/23	8/29/23 15:18	EEH
Chloroform	ND	2.0	µg/L	1		SW-846 8260D	8/29/23	8/29/23 15:18	EEH
Chloromethane	ND	2.0	µg/L	1	V-34	SW-846 8260D	8/29/23	8/29/23 15:18	EEH
2-Chlorotoluene	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/29/23 15:18	EEH
4-Chlorotoluene	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/29/23 15:18	EEH
1,2-Dibromo-3-chloropropane (DBCP)	ND	2.0	µg/L	1		SW-846 8260D	8/29/23	8/29/23 15:18	EEH
1,2-Dibromoethane (EDB)	ND	0.50	µg/L	1		SW-846 8260D	8/29/23	8/29/23 15:18	EEH
Dibromomethane	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/29/23 15:18	EEH
1,2-Dichlorobenzene	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/29/23 15:18	EEH
1,3-Dichlorobenzene	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/29/23 15:18	EEH
1,4-Dichlorobenzene	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/29/23 15:18	EEH
Dichlorodifluoromethane (Freon 12)	ND	2.0	µg/L	1		SW-846 8260D	8/29/23	8/29/23 15:18	EEH
1,1-Dichloroethane	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/29/23 15:18	EEH
1,2-Dichloroethane	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/29/23 15:18	EEH
1,1-Dichloroethylene	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/29/23 15:18	EEH
cis-1,2-Dichloroethylene	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/29/23 15:18	EEH
trans-1,2-Dichloroethylene	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/29/23 15:18	EEH
1,2-Dichloropropane	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/29/23 15:18	EEH
1,3-Dichloropropane	ND	0.50	µg/L	1		SW-846 8260D	8/29/23	8/29/23 15:18	EEH
2,2-Dichloropropane	ND	1.0	µg/L	1	R-05	SW-846 8260D	8/29/23	8/29/23 15:18	EEH
1,1-Dichloropropene	ND	0.50	µg/L	1		SW-846 8260D	8/29/23	8/29/23 15:18	EEH
cis-1,3-Dichloropropene	ND	0.40	µg/L	1		SW-846 8260D	8/29/23	8/29/23 15:18	EEH
trans-1,3-Dichloropropene	ND	0.40	µg/L	1		SW-846 8260D	8/29/23	8/29/23 15:18	EEH
Diethyl Ether	ND	2.0	µg/L	1		SW-846 8260D	8/29/23	8/29/23 15:18	EEH
Diisopropyl Ether (DIPE)	ND	0.50	µg/L	1		SW-846 8260D	8/29/23	8/29/23 15:18	EEH
1,4-Dioxane	ND	50	µg/L	1		SW-846 8260D	8/29/23	8/29/23 15:18	EEH
Ethylbenzene	39	1.0	µg/L	1		SW-846 8260D	8/29/23	8/29/23 15:18	EEH

con-test® A Pace Analytical® Laboratory

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Springfield, MA
Sample Description:
Work Order: 23H3880

Date Received: 8/25/2023

Field Sample #: DUP-1
Sampled: 8/25/2023 00:00

Sample ID: 23H3880-08

Sample Matrix: Ground Water

Volatile Organic Compounds by GC/MS

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Hexachlorobutadiene	ND	0.60	µg/L	1		SW-846 8260D	8/29/23	8/29/23 15:18	EEH
2-Hexanone (MBK)	ND	10	µg/L	1		SW-846 8260D	8/29/23	8/29/23 15:18	EEH
Isopropylbenzene (Cumene)	10	1.0	µg/L	1		SW-846 8260D	8/29/23	8/29/23 15:18	EEH
p-Isopropyltoluene (p-Cymene)	1.8	1.0	µg/L	1		SW-846 8260D	8/29/23	8/29/23 15:18	EEH
Methyl tert-Butyl Ether (MTBE)	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/29/23 15:18	EEH
Methylene Chloride	ND	5.0	µg/L	1	RL-07	SW-846 8260D	8/29/23	8/29/23 15:18	EEH
4-Methyl-2-pentanone (MIBK)	ND	10	µg/L	1		SW-846 8260D	8/29/23	8/29/23 15:18	EEH
Naphthalene	170	2.0	µg/L	1		SW-846 8260D	8/29/23	8/29/23 15:18	EEH
n-Propylbenzene	15	1.0	µg/L	1		SW-846 8260D	8/29/23	8/29/23 15:18	EEH
Styrene	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/29/23 15:18	EEH
1,1,1,2-Tetrachloroethane	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/29/23 15:18	EEH
1,1,2,2-Tetrachloroethane	ND	0.50	µg/L	1		SW-846 8260D	8/29/23	8/29/23 15:18	EEH
Tetrachloroethylene	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/29/23 15:18	EEH
Tetrahydrofuran	ND	2.0	µg/L	1		SW-846 8260D	8/29/23	8/29/23 15:18	EEH
Toluene	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/29/23 15:18	EEH
1,2,3-Trichlorobenzene	ND	2.0	µg/L	1		SW-846 8260D	8/29/23	8/29/23 15:18	EEH
1,2,4-Trichlorobenzene	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/29/23 15:18	EEH
1,1,1-Trichloroethane	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/29/23 15:18	EEH
1,1,2-Trichloroethane	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/29/23 15:18	EEH
Trichloroethylene	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/29/23 15:18	EEH
Trichlorofluoromethane (Freon 11)	ND	2.0	µg/L	1		SW-846 8260D	8/29/23	8/29/23 15:18	EEH
1,2,3-Trichloropropane	ND	2.0	µg/L	1		SW-846 8260D	8/29/23	8/29/23 15:18	EEH
1,2,4-Trimethylbenzene	26	1.0	µg/L	1		SW-846 8260D	8/29/23	8/29/23 15:18	EEH
1,3,5-Trimethylbenzene	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/29/23 15:18	EEH
Vinyl Chloride	ND	2.0	µg/L	1		SW-846 8260D	8/29/23	8/29/23 15:18	EEH
m+p Xylene	3.9	2.0	µg/L	1		SW-846 8260D	8/29/23	8/29/23 15:18	EEH
o-Xylene	ND	1.0	µg/L	1		SW-846 8260D	8/29/23	8/29/23 15:18	EEH

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
1,2-Dichloroethane-d4	101	70-130		8/29/23 15:18
Toluene-d8	104	70-130		8/29/23 15:18
4-Bromofluorobenzene	99.8	70-130		8/29/23 15:18

con-test® A Pace Analytical® Laboratory

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Springfield, MA
Sample Description:
Work Order: 23H3880
Date Received: 8/25/2023
Field Sample #: DUP-1
Sampled: 8/25/2023 00:00
Sample ID: 23H3880-08
Sample Matrix: Ground Water

Semivolatile Organic Compounds by GC/MS

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Biphenyl	ND	19	µg/L	1		SW-846 8270E	8/29/23	8/31/23 20:04	BGL
Acenaphthene	ND	4.6	µg/L	1		SW-846 8270E	8/29/23	8/31/23 20:04	BGL
Acenaphthylene	ND	4.6	µg/L	1		SW-846 8270E	8/29/23	8/31/23 20:04	BGL
Acetophenone	ND	9.3	µg/L	1		SW-846 8270E	8/29/23	8/31/23 20:04	BGL
Aniline	ND	19	µg/L	1	V-05	SW-846 8270E	8/29/23	8/31/23 20:04	BGL
Anthracene	ND	4.6	µg/L	1		SW-846 8270E	8/29/23	8/31/23 20:04	BGL
Benzo(a)anthracene	ND	4.6	µg/L	1		SW-846 8270E	8/29/23	8/31/23 20:04	BGL
Benzo(a)pyrene	ND	4.6	µg/L	1		SW-846 8270E	8/29/23	8/31/23 20:04	BGL
Benzo(b)fluoranthene	ND	4.6	µg/L	1		SW-846 8270E	8/29/23	8/31/23 20:04	BGL
Benzo(g,h,i)perylene	ND	4.6	µg/L	1		SW-846 8270E	8/29/23	8/31/23 20:04	BGL
Benzo(k)fluoranthene	ND	4.6	µg/L	1		SW-846 8270E	8/29/23	8/31/23 20:04	BGL
Bis(2-chloroethoxy)methane	ND	9.3	µg/L	1		SW-846 8270E	8/29/23	8/31/23 20:04	BGL
Bis(2-chloroethyl)ether	ND	9.3	µg/L	1		SW-846 8270E	8/29/23	8/31/23 20:04	BGL
Bis(2-chloroisopropyl)ether	ND	9.3	µg/L	1	V-20	SW-846 8270E	8/29/23	8/31/23 20:04	BGL
Bis(2-Ethylhexyl)phthalate	ND	9.3	µg/L	1	V-04	SW-846 8270E	8/29/23	8/31/23 20:04	BGL
4-Bromophenylphenylether	ND	9.3	µg/L	1		SW-846 8270E	8/29/23	8/31/23 20:04	BGL
Butylbenzylphthalate	ND	9.3	µg/L	1	V-35	SW-846 8270E	8/29/23	8/31/23 20:04	BGL
4-Chloroaniline	ND	9.3	µg/L	1		SW-846 8270E	8/29/23	8/31/23 20:04	BGL
2-Chloronaphthalene	ND	9.3	µg/L	1		SW-846 8270E	8/29/23	8/31/23 20:04	BGL
2-Chlorophenol	ND	9.3	µg/L	1		SW-846 8270E	8/29/23	8/31/23 20:04	BGL
Chrysene	ND	4.6	µg/L	1		SW-846 8270E	8/29/23	8/31/23 20:04	BGL
Dibenz(a,h)anthracene	ND	4.6	µg/L	1		SW-846 8270E	8/29/23	8/31/23 20:04	BGL
Dibenzofuran	ND	4.6	µg/L	1		SW-846 8270E	8/29/23	8/31/23 20:04	BGL
Di-n-butylphthalate	ND	9.3	µg/L	1		SW-846 8270E	8/29/23	8/31/23 20:04	BGL
1,2-Dichlorobenzene	ND	4.6	µg/L	1		SW-846 8270E	8/29/23	8/31/23 20:04	BGL
1,3-Dichlorobenzene	ND	4.6	µg/L	1	L-04	SW-846 8270E	8/29/23	8/31/23 20:04	BGL
1,4-Dichlorobenzene	ND	4.6	µg/L	1	L-04	SW-846 8270E	8/29/23	8/31/23 20:04	BGL
3,3-Dichlorobenzidine	ND	9.3	µg/L	1		SW-846 8270E	8/29/23	8/31/23 20:04	BGL
2,4-Dichlorophenol	ND	9.3	µg/L	1		SW-846 8270E	8/29/23	8/31/23 20:04	BGL
Diethylphthalate	ND	9.3	µg/L	1		SW-846 8270E	8/29/23	8/31/23 20:04	BGL
2,4-Dimethylphenol	ND	9.3	µg/L	1		SW-846 8270E	8/29/23	8/31/23 20:04	BGL
Dimethylphthalate	ND	9.3	µg/L	1		SW-846 8270E	8/29/23	8/31/23 20:04	BGL
2,4-Dinitrophenol	ND	9.3	µg/L	1	V-04	SW-846 8270E	8/29/23	8/31/23 20:04	BGL
2,4-Dinitrotoluene	ND	9.3	µg/L	1		SW-846 8270E	8/29/23	8/31/23 20:04	BGL
2,6-Dinitrotoluene	ND	9.3	µg/L	1		SW-846 8270E	8/29/23	8/31/23 20:04	BGL
Di-n-octylphthalate	ND	9.3	µg/L	1	V-04	SW-846 8270E	8/29/23	8/31/23 20:04	BGL
1,2-Diphenylhydrazine/Azobenzene	ND	9.3	µg/L	1		SW-846 8270E	8/29/23	8/31/23 20:04	BGL
Fluoranthene	ND	4.6	µg/L	1		SW-846 8270E	8/29/23	8/31/23 20:04	BGL
Fluorene	ND	4.6	µg/L	1		SW-846 8270E	8/29/23	8/31/23 20:04	BGL
Hexachlorobenzene	ND	9.3	µg/L	1		SW-846 8270E	8/29/23	8/31/23 20:04	BGL
Hexachlorobutadiene	ND	9.3	µg/L	1	L-04	SW-846 8270E	8/29/23	8/31/23 20:04	BGL
Hexachloroethane	ND	9.3	µg/L	1	L-04	SW-846 8270E	8/29/23	8/31/23 20:04	BGL
Indeno(1,2,3-cd)pyrene	ND	4.6	µg/L	1		SW-846 8270E	8/29/23	8/31/23 20:04	BGL
Isophorone	ND	9.3	µg/L	1		SW-846 8270E	8/29/23	8/31/23 20:04	BGL

con-test® A Pace Analytical® Laboratory

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Springfield, MA
Sample Description:
Work Order: 23H3880

Date Received: 8/25/2023

Field Sample #: DUP-1
Sampled: 8/25/2023 00:00

Sample ID: 23H3880-08

Sample Matrix: Ground Water

Semivolatile Organic Compounds by GC/MS

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
2-Methylnaphthalene	76	4.6	µg/L	1		SW-846 8270E	8/29/23	8/31/23 20:04	BGL
2-Methylphenol	ND	9.3	µg/L	1		SW-846 8270E	8/29/23	8/31/23 20:04	BGL
3/4-Methylphenol	ND	9.3	µg/L	1		SW-846 8270E	8/29/23	8/31/23 20:04	BGL
Naphthalene	89	4.6	µg/L	1		SW-846 8270E	8/29/23	8/31/23 20:04	BGL
Nitrobenzene	ND	9.3	µg/L	1		SW-846 8270E	8/29/23	8/31/23 20:04	BGL
2-Nitrophenol	ND	9.3	µg/L	1		SW-846 8270E	8/29/23	8/31/23 20:04	BGL
4-Nitrophenol	ND	9.3	µg/L	1	V-05	SW-846 8270E	8/29/23	8/31/23 20:04	BGL
Pentachlorophenol	ND	9.3	µg/L	1		SW-846 8270E	8/29/23	8/31/23 20:04	BGL
Phenanthrene	ND	4.6	µg/L	1		SW-846 8270E	8/29/23	8/31/23 20:04	BGL
Phenol	ND	9.3	µg/L	1		SW-846 8270E	8/29/23	8/31/23 20:04	BGL
Pyrene	ND	4.6	µg/L	1		SW-846 8270E	8/29/23	8/31/23 20:04	BGL
Pyridine	ND	19	µg/L	1		SW-846 8270E	8/29/23	8/31/23 20:04	BGL
1,2,4-Trichlorobenzene	ND	4.6	µg/L	1	L-04	SW-846 8270E	8/29/23	8/31/23 20:04	BGL
2,4,5-Trichlorophenol	ND	9.3	µg/L	1		SW-846 8270E	8/29/23	8/31/23 20:04	BGL
2,4,6-Trichlorophenol	ND	9.3	µg/L	1		SW-846 8270E	8/29/23	8/31/23 20:04	BGL

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
2-Fluorophenol	60.0	15-110		8/31/23 20:04
Phenol-d6	42.6	15-110		8/31/23 20:04
Nitrobenzene-d5	76.1	30-130		8/31/23 20:04
2-Fluorobiphenyl	75.8	30-130		8/31/23 20:04
2,4,6-Tribromophenol	81.2	15-110		8/31/23 20:04
p-Terphenyl-d14	97.1	30-130		8/31/23 20:04

con-test® A Pace Analytical® Laboratory

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Springfield, MA
Sample Description:
Work Order: 23H3880

Date Received: 8/25/2023

Field Sample #: DUP-1
Sampled: 8/25/2023 00:00

Sample ID: 23H3880-08

Sample Matrix: Ground Water

Metals Analyses (Dissolved)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Antimony	ND	1.0	µg/L	1		SW-846 6020B	8/26/23	8/30/23 8:35	NC
Arsenic	21	1.0	µg/L	1		SW-846 6020B	8/26/23	8/30/23 8:35	NC
Barium	350	10	µg/L	1		SW-846 6020B	8/26/23	8/29/23 12:18	NC
Beryllium	ND	0.40	µg/L	1		SW-846 6020B	8/26/23	8/29/23 12:18	NC
Cadmium	ND	0.20	µg/L	1		SW-846 6020B	8/26/23	8/29/23 12:18	NC
Chromium	ND	5.0	µg/L	1		SW-846 6020B	8/26/23	8/30/23 8:35	NC
Lead	ND	0.50	µg/L	1		SW-846 6020B	8/26/23	8/29/23 12:18	NC
Mercury	ND	0.00020	mg/L	1		SW-846 7470A	8/28/23	8/28/23 13:56	AAJ
Nickel	ND	5.0	µg/L	1		SW-846 6020B	8/26/23	8/29/23 12:18	NC
Selenium	ND	5.0	µg/L	1		SW-846 6020B	8/26/23	8/29/23 12:18	NC
Silver	ND	0.20	µg/L	1		SW-846 6020B	8/26/23	8/29/23 12:18	NC
Thallium	ND	0.20	µg/L	1		SW-846 6020B	8/26/23	8/29/23 12:18	NC
Vanadium	ND	5.0	µg/L	1		SW-846 6020B	8/26/23	8/29/23 12:18	NC
Zinc	ND	10	µg/L	1		SW-846 6020B	8/26/23	8/29/23 12:18	NC

con-test® A Pace Analytical® Laboratory

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Sample Extraction Data

Prep Method:SW-846 3005A Dissolved **Analytical Method:SW-846 6020B**

Lab Number [Field ID]	Batch	Initial [mL]	Final [mL]	Date
23H3880-01 [EW-1]	B350368	50.0	50.0	08/26/23
23H3880-02 [EW-2]	B350368	50.0	50.0	08/26/23
23H3880-03 [EW-3]	B350368	50.0	50.0	08/26/23
23H3880-04 [MW-CM-43N]	B350368	50.0	50.0	08/26/23
23H3880-05 [MW-205A]	B350368	50.0	50.0	08/26/23
23H3880-06 [MW-CM-38N]	B350368	50.0	50.0	08/26/23
23H3880-07 [MW-CM-53N]	B350368	50.0	50.0	08/26/23
23H3880-08 [DUP-1]	B350368	50.0	50.0	08/26/23

Prep Method:SW-846 7470A Dissolved **Analytical Method:SW-846 7470A**

Lab Number [Field ID]	Batch	Initial [mL]	Final [mL]	Date
23H3880-01 [EW-1]	B350340	10.0	10.0	08/28/23
23H3880-02 [EW-2]	B350340	10.0	10.0	08/28/23
23H3880-03 [EW-3]	B350340	10.0	10.0	08/28/23
23H3880-04 [MW-CM-43N]	B350340	10.0	10.0	08/28/23
23H3880-05 [MW-205A]	B350340	10.0	10.0	08/28/23
23H3880-06 [MW-CM-38N]	B350340	10.0	10.0	08/28/23
23H3880-07 [MW-CM-53N]	B350340	10.0	10.0	08/28/23
23H3880-08 [DUP-1]	B350340	10.0	10.0	08/28/23

Prep Method:SW-846 5030B **Analytical Method:SW-846 8260D**

Lab Number [Field ID]	Batch	Initial [mL]	Final [mL]	Date
23H3880-03 [EW-3]	B350426	5	5.00	08/29/23
23H3880-04 [MW-CM-43N]	B350426	5	5.00	08/29/23
23H3880-05 [MW-205A]	B350426	5	5.00	08/29/23
23H3880-06 [MW-CM-38N]	B350426	5	5.00	08/29/23
23H3880-08 [DUP-1]	B350426	5	5.00	08/29/23

Prep Method:SW-846 5030B **Analytical Method:SW-846 8260D**

Lab Number [Field ID]	Batch	Initial [mL]	Final [mL]	Date
23H3880-01 [EW-1]	B350462	5	5.00	08/29/23
23H3880-02 [EW-2]	B350462	5	5.00	08/29/23

Prep Method:SW-846 5030B **Analytical Method:SW-846 8260D**

Lab Number [Field ID]	Batch	Initial [mL]	Final [mL]	Date
23H3880-07 [MW-CM-53N]	B350530	5	5.00	08/29/23

Prep Method:SW-846 3510C **Analytical Method:SW-846 8270E**

Lab Number [Field ID]	Batch	Initial [mL]	Final [mL]	Date
23H3880-01 [EW-1]	B350505	101	1.00	08/29/23
23H3880-02 [EW-2]	B350505	103	1.00	08/29/23
23H3880-03 [EW-3]	B350505	101	1.00	08/29/23
23H3880-04 [MW-CM-43N]	B350505	107	1.00	08/29/23
23H3880-05 [MW-205A]	B350505	105	1.00	08/29/23

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Sample Extraction Data

Prep Method:SW-846 3510C **Analytical Method:SW-846 8270E**

Lab Number [Field ID]	Batch	Initial [mL]	Final [mL]	Date
23H3880-06 [MW-CM-38N]	B350505	107	1.00	08/29/23
23H3880-07 [MW-CM-53N]	B350505	108	1.00	08/29/23
23H3880-08 [DUP-1]	B350505	108	1.00	08/29/23

con-test® A Pace Analytical® Laboratory

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

QUALITY CONTROL

Volatile Organic Compounds by GC/MS - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B350426 - SW-846 5030B										
Blank (B350426-BLK1)				Prepared & Analyzed: 08/29/23						
Acetone	ND	10	µg/L							
tert-Amyl Methyl Ether (TAME)	ND	0.50	µg/L							R-05
Benzene	ND	1.0	µg/L							
Bromobenzene	ND	1.0	µg/L							
Bromochloromethane	ND	1.0	µg/L							
Bromodichloromethane	ND	1.0	µg/L							
Bromoform	ND	1.0	µg/L							
Bromomethane	ND	2.0	µg/L							V-34
2-Butanone (MEK)	ND	10	µg/L							
n-Butylbenzene	ND	1.0	µg/L							
sec-Butylbenzene	ND	1.0	µg/L							
tert-Butylbenzene	ND	1.0	µg/L							
tert-Butyl Ethyl Ether (TBEE)	ND	0.50	µg/L							R-05
Carbon Disulfide	ND	5.0	µg/L							
Carbon Tetrachloride	ND	1.0	µg/L							
Chlorobenzene	ND	1.0	µg/L							
Chlorodibromomethane	ND	0.50	µg/L							
Chloroethane	ND	2.0	µg/L							
Chloroform	ND	2.0	µg/L							
Chloromethane	ND	2.0	µg/L							V-34
2-Chlorotoluene	ND	1.0	µg/L							
4-Chlorotoluene	ND	1.0	µg/L							
1,2-Dibromo-3-chloropropane (DBCP)	ND	2.0	µg/L							
1,2-Dibromoethane (EDB)	ND	0.50	µg/L							
Dibromomethane	ND	1.0	µg/L							
1,2-Dichlorobenzene	ND	1.0	µg/L							
1,3-Dichlorobenzene	ND	1.0	µg/L							
1,4-Dichlorobenzene	ND	1.0	µg/L							
Dichlorodifluoromethane (Freon 12)	ND	2.0	µg/L							
1,1-Dichloroethane	ND	1.0	µg/L							
1,2-Dichloroethane	ND	1.0	µg/L							
1,1-Dichloroethylene	ND	1.0	µg/L							
cis-1,2-Dichloroethylene	ND	1.0	µg/L							
trans-1,2-Dichloroethylene	ND	1.0	µg/L							
1,2-Dichloropropane	ND	1.0	µg/L							
1,3-Dichloropropane	ND	0.50	µg/L							
2,2-Dichloropropane	ND	1.0	µg/L							R-05
1,1-Dichloropropene	ND	0.50	µg/L							
cis-1,3-Dichloropropene	ND	0.40	µg/L							
trans-1,3-Dichloropropene	ND	0.40	µg/L							
Diethyl Ether	ND	2.0	µg/L							
Diisopropyl Ether (DIPE)	ND	0.50	µg/L							
1,4-Dioxane	ND	50	µg/L							
Ethylbenzene	ND	1.0	µg/L							
Hexachlorobutadiene	ND	0.60	µg/L							
2-Hexanone (MBK)	ND	10	µg/L							
Isopropylbenzene (Cumene)	ND	1.0	µg/L							
p-Isopropyltoluene (p-Cymene)	ND	1.0	µg/L							
Methyl tert-Butyl Ether (MTBE)	ND	1.0	µg/L							
Methylene Chloride	ND	5.0	µg/L							
4-Methyl-2-pentanone (MIBK)	ND	10	µg/L							
Naphthalene	ND	2.0	µg/L							

con-test® A Pace Analytical® Laboratory

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

QUALITY CONTROL

Volatile Organic Compounds by GC/MS - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes	
Batch B350426 - SW-846 5030B											
Blank (B350426-BLK1)				Prepared & Analyzed: 08/29/23							
n-Propylbenzene	ND	1.0	µg/L								
Styrene	ND	1.0	µg/L								
1,1,1,2-Tetrachloroethane	ND	1.0	µg/L								
1,1,2,2-Tetrachloroethane	ND	0.50	µg/L								
Tetrachloroethylene	ND	1.0	µg/L								
Tetrahydrofuran	ND	2.0	µg/L								
Toluene	ND	1.0	µg/L								
1,2,3-Trichlorobenzene	ND	2.0	µg/L								
1,2,4-Trichlorobenzene	ND	1.0	µg/L								
1,1,1-Trichloroethane	ND	1.0	µg/L								
1,1,2-Trichloroethane	ND	1.0	µg/L								
Trichloroethylene	ND	1.0	µg/L								
Trichlorofluoromethane (Freon 11)	ND	2.0	µg/L								
1,2,3-Trichloropropane	ND	2.0	µg/L								
1,2,4-Trimethylbenzene	ND	1.0	µg/L								
1,3,5-Trimethylbenzene	ND	1.0	µg/L								
Vinyl Chloride	ND	2.0	µg/L								
m+p Xylene	ND	2.0	µg/L								
o-Xylene	ND	1.0	µg/L								
Surrogate: 1,2-Dichloroethane-d4	*24.1*		µg/L	25.0		96.6	70-130				
Surrogate: Toluene-d8	*25.6*		µg/L	25.0		102	70-130				
Surrogate: 4-Bromofluorobenzene	*25.2*		µg/L	25.0		101	70-130				
LCS (B350426-BS1)				Prepared & Analyzed: 08/29/23							
Acetone	106	10	µg/L	100		106	40-160			V-35	†
tert-Amyl Methyl Ether (TAME)	10.1	0.50	µg/L	10.0		101	70-130			R-05	
Benzene	11.9	1.0	µg/L	10.0		119	70-130				
Bromobenzene	11.4	1.0	µg/L	10.0		114	70-130				
Bromochloromethane	12.4	1.0	µg/L	10.0		124	70-130				
Bromodichloromethane	12.5	1.0	µg/L	10.0		125	70-130				
Bromoform	11.1	1.0	µg/L	10.0		111	70-130				
Bromomethane	10.4	2.0	µg/L	10.0		104	40-160			V-34	†
2-Butanone (MEK)	109	10	µg/L	100		109	40-160				†
n-Butylbenzene	11.1	1.0	µg/L	10.0		111	70-130				
sec-Butylbenzene	10.8	1.0	µg/L	10.0		108	70-130				
tert-Butylbenzene	10.9	1.0	µg/L	10.0		109	70-130				
tert-Butyl Ethyl Ether (TBEE)	10.6	0.50	µg/L	10.0		106	70-130			R-05	
Carbon Disulfide	110	5.0	µg/L	100		110	70-130				
Carbon Tetrachloride	12.2	1.0	µg/L	10.0		122	70-130				
Chlorobenzene	11.2	1.0	µg/L	10.0		112	70-130				
Chlorodibromomethane	12.0	0.50	µg/L	10.0		120	70-130				
Chloroethane	9.28	2.0	µg/L	10.0		92.8	70-130				
Chloroform	11.8	2.0	µg/L	10.0		118	70-130				
Chloromethane	11.5	2.0	µg/L	10.0		115	40-160			V-34	†
2-Chlorotoluene	10.1	1.0	µg/L	10.0		101	70-130				
4-Chlorotoluene	11.4	1.0	µg/L	10.0		114	70-130				
1,2-Dibromo-3-chloropropane (DBCP)	9.69	2.0	µg/L	10.0		96.9	70-130				
1,2-Dibromoethane (EDB)	11.6	0.50	µg/L	10.0		116	70-130				
Dibromomethane	11.7	1.0	µg/L	10.0		117	70-130				
1,2-Dichlorobenzene	11.0	1.0	µg/L	10.0		110	70-130				
1,3-Dichlorobenzene	11.0	1.0	µg/L	10.0		110	70-130				
1,4-Dichlorobenzene	10.7	1.0	µg/L	10.0		107	70-130				

con-test® A Pace Analytical® Laboratory

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

QUALITY CONTROL

Volatile Organic Compounds by GC/MS - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes	
Batch B350426 - SW-846 5030B											
LCS (B350426-BS1)				Prepared & Analyzed: 08/29/23							
Dichlorodifluoromethane (Freon 12)	11.1	2.0	µg/L	10.0		111	40-160				†
1,1-Dichloroethane	12.0	1.0	µg/L	10.0		120	70-130				
1,2-Dichloroethane	11.0	1.0	µg/L	10.0		110	70-130				
1,1-Dichloroethylene	12.2	1.0	µg/L	10.0		122	70-130				
cis-1,2-Dichloroethylene	11.8	1.0	µg/L	10.0		118	70-130				
trans-1,2-Dichloroethylene	11.7	1.0	µg/L	10.0		117	70-130				
1,2-Dichloropropane	11.3	1.0	µg/L	10.0		113	70-130				
1,3-Dichloropropane	11.4	0.50	µg/L	10.0		114	70-130				
2,2-Dichloropropane	7.62	1.0	µg/L	10.0		76.2	70-130			R-05	
1,1-Dichloropropene	11.9	0.50	µg/L	10.0		119	70-130				
cis-1,3-Dichloropropene	10.8	0.40	µg/L	10.0		108	70-130				
trans-1,3-Dichloropropene	10.3	0.40	µg/L	10.0		103	70-130				
Diethyl Ether	12.4	2.0	µg/L	10.0		124	70-130				
Diisopropyl Ether (DIPE)	12.4	0.50	µg/L	10.0		124	70-130				
1,4-Dioxane	99.0	50	µg/L	100		99.0	40-160				†
Ethylbenzene	11.3	1.0	µg/L	10.0		113	70-130				
Hexachlorobutadiene	11.3	0.60	µg/L	10.0		113	70-130				
2-Hexanone (MBK)	117	10	µg/L	100		117	40-160				†
Isopropylbenzene (Cumene)	11.0	1.0	µg/L	10.0		110	70-130				
p-Isopropyltoluene (p-Cymene)	10.8	1.0	µg/L	10.0		108	70-130				
Methyl tert-Butyl Ether (MTBE)	10.9	1.0	µg/L	10.0		109	70-130				
Methylene Chloride	10.1	5.0	µg/L	10.0		101	70-130				
4-Methyl-2-pentanone (MIBK)	118	10	µg/L	100		118	40-160				†
Naphthalene	10.4	2.0	µg/L	10.0		104	70-130				
n-Propylbenzene	11.3	1.0	µg/L	10.0		113	70-130				
Styrene	11.2	1.0	µg/L	10.0		112	70-130				
1,1,1,2-Tetrachloroethane	11.1	1.0	µg/L	10.0		111	70-130				
1,1,2,2-Tetrachloroethane	11.2	0.50	µg/L	10.0		112	70-130				
Tetrachloroethylene	11.4	1.0	µg/L	10.0		114	70-130				
Tetrahydrofuran	11.4	2.0	µg/L	10.0		114	70-130				
Toluene	11.7	1.0	µg/L	10.0		117	70-130				
1,2,3-Trichlorobenzene	10.8	2.0	µg/L	10.0		108	70-130				
1,2,4-Trichlorobenzene	10.9	1.0	µg/L	10.0		109	70-130				
1,1,1-Trichloroethane	12.0	1.0	µg/L	10.0		120	70-130				
1,1,2-Trichloroethane	11.9	1.0	µg/L	10.0		119	70-130				
Trichloroethylene	11.7	1.0	µg/L	10.0		117	70-130				
Trichlorofluoromethane (Freon 11)	12.1	2.0	µg/L	10.0		121	70-130				
1,2,3-Trichloropropane	11.2	2.0	µg/L	10.0		112	70-130				
1,2,4-Trimethylbenzene	11.0	1.0	µg/L	10.0		110	70-130				
1,3,5-Trimethylbenzene	11.1	1.0	µg/L	10.0		111	70-130				
Vinyl Chloride	12.9	2.0	µg/L	10.0		129	70-130			V-20	
m+p Xylene	22.7	2.0	µg/L	20.0		114	70-130				
o-Xylene	11.4	1.0	µg/L	10.0		114	70-130				
Surrogate: 1,2-Dichloroethane-d4	*25.7*		µg/L	25.0		103	70-130				
Surrogate: Toluene-d8	*25.7*		µg/L	25.0		103	70-130				
Surrogate: 4-Bromofluorobenzene	*25.1*		µg/L	25.0		100	70-130				

con-test® A Pace Analytical® Laboratory

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

QUALITY CONTROL

Volatile Organic Compounds by GC/MS - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC		%REC Limits	RPD		RPD Limit	Notes	
Batch B350426 - SW-846 5030B													
LCS Dup (B350426-BSD1)				Prepared & Analyzed: 08/29/23									
Acetone	95.8	10	µg/L	100		95.8		40-160	10.0		20	V-35	†
tert-Amyl Methyl Ether (TAME)	7.40	0.50	µg/L	10.0		74.0		70-130	**31.0**	*	20	R-05	
Benzene	11.7	1.0	µg/L	10.0		117		70-130	1.69		20		
Bromobenzene	11.7	1.0	µg/L	10.0		117		70-130	1.82		20		
Bromochloromethane	11.8	1.0	µg/L	10.0		118		70-130	5.12		20		
Bromodichloromethane	11.9	1.0	µg/L	10.0		119		70-130	4.58		20		
Bromoform	9.94	1.0	µg/L	10.0		99.4		70-130	10.7		20		
Bromomethane	10.5	2.0	µg/L	10.0		105		40-160	0.477		20	V-34	†
2-Butanone (MEK)	93.5	10	µg/L	100		93.5		40-160	15.3		20		†
n-Butylbenzene	11.2	1.0	µg/L	10.0		112		70-130	1.26		20		
sec-Butylbenzene	11.1	1.0	µg/L	10.0		111		70-130	3.10		20		
tert-Butylbenzene	11.1	1.0	µg/L	10.0		111		70-130	1.54		20		
tert-Butyl Ethyl Ether (TBEE)	8.13	0.50	µg/L	10.0		81.3		70-130	**26.1**	*	20	R-05	
Carbon Disulfide	110	5.0	µg/L	100		110		70-130	0.209		20		
Carbon Tetrachloride	11.8	1.0	µg/L	10.0		118		70-130	3.49		20		
Chlorobenzene	11.3	1.0	µg/L	10.0		113		70-130	0.355		20		
Chlorodibromomethane	11.5	0.50	µg/L	10.0		115		70-130	4.76		20		
Chloroethane	8.06	2.0	µg/L	10.0		80.6		70-130	14.1		20		
Chloroform	11.8	2.0	µg/L	10.0		118		70-130	0.508		20		
Chloromethane	12.9	2.0	µg/L	10.0		129		40-160	12.0		20	V-34	†
2-Chlorotoluene	10.1	1.0	µg/L	10.0		101		70-130	0.0991		20		
4-Chlorotoluene	11.6	1.0	µg/L	10.0		116		70-130	1.74		20		
1,2-Dibromo-3-chloropropane (DBCP)	8.46	2.0	µg/L	10.0		84.6		70-130	13.6		20		
1,2-Dibromoethane (EDB)	10.4	0.50	µg/L	10.0		104		70-130	10.4		20		
Dibromomethane	11.2	1.0	µg/L	10.0		112		70-130	4.53		20		
1,2-Dichlorobenzene	11.2	1.0	µg/L	10.0		112		70-130	1.89		20		
1,3-Dichlorobenzene	11.2	1.0	µg/L	10.0		112		70-130	1.35		20		
1,4-Dichlorobenzene	11.1	1.0	µg/L	10.0		111		70-130	3.75		20		
Dichlorodifluoromethane (Freon 12)	11.1	2.0	µg/L	10.0		111		40-160	0.270		20		†
1,1-Dichloroethane	11.5	1.0	µg/L	10.0		115		70-130	3.66		20		
1,2-Dichloroethane	10.8	1.0	µg/L	10.0		108		70-130	2.20		20		
1,1-Dichloroethylene	12.3	1.0	µg/L	10.0		123		70-130	0.489		20		
cis-1,2-Dichloroethylene	11.9	1.0	µg/L	10.0		119		70-130	0.506		20		
trans-1,2-Dichloroethylene	11.5	1.0	µg/L	10.0		115		70-130	1.38		20		
1,2-Dichloropropane	11.4	1.0	µg/L	10.0		114		70-130	0.705		20		
1,3-Dichloropropane	11.3	0.50	µg/L	10.0		113		70-130	1.58		20		
2,2-Dichloropropane	5.43	1.0	µg/L	10.0		**54.3**	*	70-130	**33.6**	*	20	L-07A, R-05	
1,1-Dichloropropene	11.9	0.50	µg/L	10.0		119		70-130	0.336		20		
cis-1,3-Dichloropropene	9.93	0.40	µg/L	10.0		99.3		70-130	8.02		20		
trans-1,3-Dichloropropene	9.50	0.40	µg/L	10.0		95.0		70-130	8.18		20		
Diethyl Ether	12.1	2.0	µg/L	10.0		121		70-130	2.36		20		
Diisopropyl Ether (DIPE)	11.9	0.50	µg/L	10.0		119		70-130	4.21		20		
1,4-Dioxane	106	50	µg/L	100		106		40-160	6.82		20		†
Ethylbenzene	11.5	1.0	µg/L	10.0		115		70-130	2.37		20		
Hexachlorobutadiene	11.2	0.60	µg/L	10.0		112		70-130	1.06		20		
2-Hexanone (MBK)	106	10	µg/L	100		106		40-160	10.4		20		†
Isopropylbenzene (Cumene)	11.4	1.0	µg/L	10.0		114		70-130	3.47		20		
p-Isopropyltoluene (p-Cymene)	11.2	1.0	µg/L	10.0		112		70-130	3.19		20		
Methyl tert-Butyl Ether (MTBE)	9.19	1.0	µg/L	10.0		91.9		70-130	16.7		20		
Methylene Chloride	8.46	5.0	µg/L	10.0		84.6		70-130	17.7		20		
4-Methyl-2-pentanone (MIBK)	109	10	µg/L	100		109		40-160	7.69		20		†
Naphthalene	9.74	2.0	µg/L	10.0		97.4		70-130	7.03		20		

con-test® A Pace Analytical® Laboratory

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

QUALITY CONTROL

Volatile Organic Compounds by GC/MS - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B350426 - SW-846 5030B										
LCS Dup (B350426-BSD1)				Prepared & Analyzed: 08/29/23						
n-Propylbenzene	11.8	1.0	µg/L	10.0		118	70-130	4.60	20	
Styrene	11.4	1.0	µg/L	10.0		114	70-130	1.42	20	
1,1,1,2-Tetrachloroethane	11.5	1.0	µg/L	10.0		115	70-130	3.28	20	
1,1,2,2-Tetrachloroethane	10.8	0.50	µg/L	10.0		108	70-130	3.00	20	
Tetrachloroethylene	11.6	1.0	µg/L	10.0		116	70-130	1.91	20	
Tetrahydrofuran	11.0	2.0	µg/L	10.0		110	70-130	3.30	20	
Toluene	11.8	1.0	µg/L	10.0		118	70-130	0.0851	20	
1,2,3-Trichlorobenzene	10.2	2.0	µg/L	10.0		102	70-130	5.70	20	
1,2,4-Trichlorobenzene	10.9	1.0	µg/L	10.0		109	70-130	0.643	20	
1,1,1-Trichloroethane	11.8	1.0	µg/L	10.0		118	70-130	1.60	20	
1,1,2-Trichloroethane	11.6	1.0	µg/L	10.0		116	70-130	2.38	20	
Trichloroethylene	12.1	1.0	µg/L	10.0		121	70-130	2.94	20	
Trichlorofluoromethane (Freon 11)	12.2	2.0	µg/L	10.0		122	70-130	0.412	20	
1,2,3-Trichloropropane	11.2	2.0	µg/L	10.0		112	70-130	0.357	20	
1,2,4-Trimethylbenzene	11.2	1.0	µg/L	10.0		112	70-130	1.71	20	
1,3,5-Trimethylbenzene	11.6	1.0	µg/L	10.0		116	70-130	4.22	20	
Vinyl Chloride	12.8	2.0	µg/L	10.0		128	70-130	0.545	20	V-20
m+p Xylene	23.1	2.0	µg/L	20.0		116	70-130	1.70	20	
o-Xylene	11.5	1.0	µg/L	10.0		115	70-130	0.786	20	
Surrogate: 1,2-Dichloroethane-d4	*25.1*		µg/L	25.0		100	70-130			
Surrogate: Toluene-d8	*26.0*		µg/L	25.0		104	70-130			
Surrogate: 4-Bromofluorobenzene	*25.7*		µg/L	25.0		103	70-130			
Batch B350462 - SW-846 5030B										
Blank (B350462-BLK1)				Prepared: 08/29/23 Analyzed: 08/30/23						
Acetone	ND	10	µg/L							
tert-Amyl Methyl Ether (TAME)	ND	0.50	µg/L							
Benzene	ND	1.0	µg/L							
Bromobenzene	ND	1.0	µg/L							
Bromochloromethane	ND	1.0	µg/L							
Bromodichloromethane	ND	1.0	µg/L							
Bromoform	ND	1.0	µg/L							V-05
Bromomethane	ND	2.0	µg/L							
2-Butanone (MEK)	ND	10	µg/L							
n-Butylbenzene	ND	1.0	µg/L							
sec-Butylbenzene	ND	1.0	µg/L							
tert-Butylbenzene	ND	1.0	µg/L							
tert-Butyl Ethyl Ether (TBEE)	ND	0.50	µg/L							
Carbon Disulfide	ND	5.0	µg/L							
Carbon Tetrachloride	ND	1.0	µg/L							
Chlorobenzene	ND	1.0	µg/L							
Chlorodibromomethane	ND	0.50	µg/L							
Chloroethane	ND	2.0	µg/L							
Chloroform	ND	2.0	µg/L							
Chloromethane	ND	2.0	µg/L							
2-Chlorotoluene	ND	1.0	µg/L							
4-Chlorotoluene	ND	1.0	µg/L							
1,2-Dibromo-3-chloropropane (DBCP)	ND	2.0	µg/L							
1,2-Dibromoethane (EDB)	ND	0.50	µg/L							
Dibromomethane	ND	1.0	µg/L							
1,2-Dichlorobenzene	ND	1.0	µg/L							
1,3-Dichlorobenzene	ND	1.0	µg/L							

con-test® A Pace Analytical® Laboratory

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

QUALITY CONTROL

Volatile Organic Compounds by GC/MS - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B350462 - SW-846 5030B										
Blank (B350462-BLK1)				Prepared: 08/29/23 Analyzed: 08/30/23						
1,4-Dichlorobenzene	ND	1.0	µg/L							
Dichlorodifluoromethane (Freon 12)	ND	2.0	µg/L							
1,1-Dichloroethane	ND	1.0	µg/L							
1,2-Dichloroethane	ND	1.0	µg/L							
1,1-Dichloroethylene	ND	1.0	µg/L							
cis-1,2-Dichloroethylene	ND	1.0	µg/L							
trans-1,2-Dichloroethylene	ND	1.0	µg/L							
1,2-Dichloropropane	ND	1.0	µg/L							
1,3-Dichloropropane	ND	0.50	µg/L							
2,2-Dichloropropane	ND	1.0	µg/L							
1,1-Dichloropropene	ND	0.50	µg/L							
cis-1,3-Dichloropropene	ND	0.40	µg/L							
trans-1,3-Dichloropropene	ND	0.40	µg/L							
Diethyl Ether	ND	2.0	µg/L							
Diisopropyl Ether (DIPE)	ND	0.50	µg/L							
1,4-Dioxane	ND	50	µg/L							V-05
Ethylbenzene	ND	1.0	µg/L							
Hexachlorobutadiene	ND	0.60	µg/L							
2-Hexanone (MBK)	ND	10	µg/L							
Isopropylbenzene (Cumene)	ND	1.0	µg/L							
p-Isopropyltoluene (p-Cymene)	ND	1.0	µg/L							
Methyl tert-Butyl Ether (MTBE)	ND	1.0	µg/L							
Methylene Chloride	ND	5.0	µg/L							
4-Methyl-2-pentanone (MIBK)	ND	10	µg/L							
Naphthalene	ND	2.0	µg/L							L-04, V-05
n-Propylbenzene	ND	1.0	µg/L							
Styrene	ND	1.0	µg/L							
1,1,1,2-Tetrachloroethane	ND	1.0	µg/L							
1,1,2,2-Tetrachloroethane	ND	0.50	µg/L							
Tetrachloroethylene	ND	1.0	µg/L							
Tetrahydrofuran	ND	2.0	µg/L							
Toluene	ND	1.0	µg/L							
1,2,3-Trichlorobenzene	ND	2.0	µg/L							
1,2,4-Trichlorobenzene	ND	1.0	µg/L							V-05
1,1,1-Trichloroethane	ND	1.0	µg/L							
1,1,2-Trichloroethane	ND	1.0	µg/L							
Trichloroethylene	ND	1.0	µg/L							
Trichlorofluoromethane (Freon 11)	ND	2.0	µg/L							
1,2,3-Trichloropropane	ND	2.0	µg/L							
1,2,4-Trimethylbenzene	ND	1.0	µg/L							
1,3,5-Trimethylbenzene	ND	1.0	µg/L							
Vinyl Chloride	ND	2.0	µg/L							
m+p Xylene	ND	2.0	µg/L							
o-Xylene	ND	1.0	µg/L							
Surrogate: 1,2-Dichloroethane-d4	*27.7*		µg/L	25.0		111	70-130			
Surrogate: Toluene-d8	*24.8*		µg/L	25.0		99.1	70-130			
Surrogate: 4-Bromofluorobenzene	*20.9*		µg/L	25.0		83.6	70-130			

con-test® A Pace Analytical® Laboratory

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

QUALITY CONTROL

Volatile Organic Compounds by GC/MS - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC		%REC Limits	RPD	RPD Limit	Notes	
Batch B350462 - SW-846 5030B												
LCS (B350462-BS1)				Prepared: 08/29/23 Analyzed: 08/30/23								
Acetone	104	10	µg/L	100		104		40-160				†
tert-Amyl Methyl Ether (TAME)	9.94	0.50	µg/L	10.0		99.4		70-130				
Benzene	11.9	1.0	µg/L	10.0		119		70-130				
Bromobenzene	9.91	1.0	µg/L	10.0		99.1		70-130				
Bromochloromethane	12.6	1.0	µg/L	10.0		126		70-130			V-20	
Bromodichloromethane	10.9	1.0	µg/L	10.0		109		70-130				
Bromoform	7.97	1.0	µg/L	10.0		79.7		70-130			V-05	
Bromomethane	11.7	2.0	µg/L	10.0		117		40-160				†
2-Butanone (MEK)	119	10	µg/L	100		119		40-160				†
n-Butylbenzene	9.71	1.0	µg/L	10.0		97.1		70-130				
sec-Butylbenzene	9.63	1.0	µg/L	10.0		96.3		70-130				
tert-Butylbenzene	8.91	1.0	µg/L	10.0		89.1		70-130				
tert-Butyl Ethyl Ether (TBEE)	10.3	0.50	µg/L	10.0		103		70-130				
Carbon Disulfide	105	5.0	µg/L	100		105		70-130				
Carbon Tetrachloride	11.2	1.0	µg/L	10.0		112		70-130				
Chlorobenzene	10.1	1.0	µg/L	10.0		101		70-130				
Chlorodibromomethane	10.3	0.50	µg/L	10.0		103		70-130				
Chloroethane	10.6	2.0	µg/L	10.0		106		70-130				
Chloroform	11.2	2.0	µg/L	10.0		112		70-130				
Chloromethane	16.0	2.0	µg/L	10.0		160		40-160			V-20, L-14	†
2-Chlorotoluene	9.60	1.0	µg/L	10.0		96.0		70-130				
4-Chlorotoluene	9.75	1.0	µg/L	10.0		97.5		70-130				
1,2-Dibromo-3-chloropropane (DBCP)	8.90	2.0	µg/L	10.0		89.0		70-130				
1,2-Dibromoethane (EDB)	10.4	0.50	µg/L	10.0		104		70-130				
Dibromomethane	10.6	1.0	µg/L	10.0		106		70-130				
1,2-Dichlorobenzene	10.2	1.0	µg/L	10.0		102		70-130				
1,3-Dichlorobenzene	10.3	1.0	µg/L	10.0		103		70-130				
1,4-Dichlorobenzene	9.92	1.0	µg/L	10.0		99.2		70-130				
Dichlorodifluoromethane (Freon 12)	9.88	2.0	µg/L	10.0		98.8		40-160				†
1,1-Dichloroethane	11.4	1.0	µg/L	10.0		114		70-130				
1,2-Dichloroethane	10.2	1.0	µg/L	10.0		102		70-130				
1,1-Dichloroethylene	10.5	1.0	µg/L	10.0		105		70-130				
cis-1,2-Dichloroethylene	10.6	1.0	µg/L	10.0		106		70-130				
trans-1,2-Dichloroethylene	10.3	1.0	µg/L	10.0		103		70-130				
1,2-Dichloropropane	11.7	1.0	µg/L	10.0		117		70-130				
1,3-Dichloropropane	10.8	0.50	µg/L	10.0		108		70-130				
2,2-Dichloropropane	9.35	1.0	µg/L	10.0		93.5		70-130				
1,1-Dichloropropene	10.6	0.50	µg/L	10.0		106		70-130				
cis-1,3-Dichloropropene	10.9	0.40	µg/L	10.0		109		70-130				
trans-1,3-Dichloropropene	10.6	0.40	µg/L	10.0		106		70-130				
Diethyl Ether	11.1	2.0	µg/L	10.0		111		70-130				
Diisopropyl Ether (DIPE)	11.9	0.50	µg/L	10.0		119		70-130				
1,4-Dioxane	76.2	50	µg/L	100		76.2		40-160			V-05	†
Ethylbenzene	9.57	1.0	µg/L	10.0		95.7		70-130				
Hexachlorobutadiene	11.1	0.60	µg/L	10.0		111		70-130				
2-Hexanone (MBK)	92.2	10	µg/L	100		92.2		40-160				†
Isopropylbenzene (Cumene)	8.88	1.0	µg/L	10.0		88.8		70-130				
p-Isopropyltoluene (p-Cymene)	9.19	1.0	µg/L	10.0		91.9		70-130				
Methyl tert-Butyl Ether (MTBE)	10.4	1.0	µg/L	10.0		104		70-130				
Methylene Chloride	11.3	5.0	µg/L	10.0		113		70-130				
4-Methyl-2-pentanone (MIBK)	100	10	µg/L	100		100		40-160				†
Naphthalene	6.34	2.0	µg/L	10.0		**63.4**	*	70-130			L-04, V-05	

con-test® A Pace Analytical® Laboratory

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

QUALITY CONTROL

Volatile Organic Compounds by GC/MS - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes	
Batch B350462 - SW-846 5030B											
LCS (B350462-BS1)				Prepared: 08/29/23 Analyzed: 08/30/23							
n-Propylbenzene	9.67	1.0	µg/L	10.0		96.7	70-130				
Styrene	9.43	1.0	µg/L	10.0		94.3	70-130				
1,1,1,2-Tetrachloroethane	10.1	1.0	µg/L	10.0		101	70-130				
1,1,2,2-Tetrachloroethane	9.83	0.50	µg/L	10.0		98.3	70-130				
Tetrachloroethylene	10.2	1.0	µg/L	10.0		102	70-130				
Tetrahydrofuran	10.4	2.0	µg/L	10.0		104	70-130				
Toluene	10.7	1.0	µg/L	10.0		107	70-130				
1,2,3-Trichlorobenzene	8.45	2.0	µg/L	10.0		84.5	70-130				
1,2,4-Trichlorobenzene	8.18	1.0	µg/L	10.0		81.8	70-130			V-05	
1,1,1-Trichloroethane	10.7	1.0	µg/L	10.0		107	70-130				
1,1,2-Trichloroethane	10.8	1.0	µg/L	10.0		108	70-130				
Trichloroethylene	10.2	1.0	µg/L	10.0		102	70-130				
Trichlorofluoromethane (Freon 11)	9.96	2.0	µg/L	10.0		99.6	70-130				
1,2,3-Trichloropropane	12.4	2.0	µg/L	10.0		124	70-130				
1,2,4-Trimethylbenzene	9.12	1.0	µg/L	10.0		91.2	70-130				
1,3,5-Trimethylbenzene	9.13	1.0	µg/L	10.0		91.3	70-130				
Vinyl Chloride	11.8	2.0	µg/L	10.0		118	70-130				
m+p Xylene	19.2	2.0	µg/L	20.0		96.0	70-130				
o-Xylene	9.09	1.0	µg/L	10.0		90.9	70-130				
Surrogate: 1,2-Dichloroethane-d4	*27.7*		µg/L	25.0		111	70-130				
Surrogate: Toluene-d8	*26.5*		µg/L	25.0		106	70-130				
Surrogate: 4-Bromofluorobenzene	*23.3*		µg/L	25.0		93.2	70-130				
LCS Dup (B350462-BSD1)				Prepared: 08/29/23 Analyzed: 08/30/23							
Acetone	100	10	µg/L	100		100	40-160	3.27	20		†
tert-Amyl Methyl Ether (TAME)	9.98	0.50	µg/L	10.0		99.8	70-130	0.402	20		
Benzene	11.7	1.0	µg/L	10.0		117	70-130	1.35	20		
Bromobenzene	9.54	1.0	µg/L	10.0		95.4	70-130	3.80	20		
Bromochloromethane	12.8	1.0	µg/L	10.0		128	70-130	1.65	20	V-20	
Bromodichloromethane	10.4	1.0	µg/L	10.0		104	70-130	4.49	20		
Bromoform	7.83	1.0	µg/L	10.0		78.3	70-130	1.77	20	V-05	
Bromomethane	11.9	2.0	µg/L	10.0		119	40-160	1.27	20		†
2-Butanone (MEK)	115	10	µg/L	100		115	40-160	2.78	20		†
n-Butylbenzene	9.62	1.0	µg/L	10.0		96.2	70-130	0.931	20		
sec-Butylbenzene	9.23	1.0	µg/L	10.0		92.3	70-130	4.24	20		
tert-Butylbenzene	8.66	1.0	µg/L	10.0		86.6	70-130	2.85	20		
tert-Butyl Ethyl Ether (TBEE)	10.4	0.50	µg/L	10.0		104	70-130	0.771	20		
Carbon Disulfide	105	5.0	µg/L	100		105	70-130	0.238	20		
Carbon Tetrachloride	10.6	1.0	µg/L	10.0		106	70-130	5.24	20		
Chlorobenzene	9.97	1.0	µg/L	10.0		99.7	70-130	1.59	20		
Chlorodibromomethane	9.72	0.50	µg/L	10.0		97.2	70-130	5.41	20		
Chloroethane	10.4	2.0	µg/L	10.0		104	70-130	1.14	20		
Chloroform	11.0	2.0	µg/L	10.0		110	70-130	2.35	20		
Chloromethane	14.9	2.0	µg/L	10.0		149	40-160	6.66	20	L-14, V-20	†
2-Chlorotoluene	9.30	1.0	µg/L	10.0		93.0	70-130	3.17	20		
4-Chlorotoluene	9.56	1.0	µg/L	10.0		95.6	70-130	1.97	20		
1,2-Dibromo-3-chloropropane (DBCP)	8.48	2.0	µg/L	10.0		84.8	70-130	4.83	20		
1,2-Dibromoethane (EDB)	10.4	0.50	µg/L	10.0		104	70-130	0.192	20		
Dibromomethane	10.5	1.0	µg/L	10.0		105	70-130	1.13	20		
1,2-Dichlorobenzene	9.92	1.0	µg/L	10.0		99.2	70-130	2.69	20		
1,3-Dichlorobenzene	10.2	1.0	µg/L	10.0		102	70-130	0.681	20		
1,4-Dichlorobenzene	10.2	1.0	µg/L	10.0		102	70-130	2.98	20		

con-test® A Pace Analytical® Laboratory

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

QUALITY CONTROL

Volatile Organic Compounds by GC/MS - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC		%REC Limits	RPD	RPD Limit	Notes	
Batch B350462 - SW-846 5030B												
LCS Dup (B350462-BSD1)				Prepared: 08/29/23 Analyzed: 08/30/23								
Dichlorodifluoromethane (Freon 12)	9.40	2.0	µg/L	10.0		94.0		40-160	4.98	20		†
1,1-Dichloroethane	11.4	1.0	µg/L	10.0		114		70-130	0.526	20		
1,2-Dichloroethane	10.2	1.0	µg/L	10.0		102		70-130	0.294	20		
1,1-Dichloroethylene	10.4	1.0	µg/L	10.0		104		70-130	1.15	20		
cis-1,2-Dichloroethylene	10.7	1.0	µg/L	10.0		107		70-130	1.03	20		
trans-1,2-Dichloroethylene	10.2	1.0	µg/L	10.0		102		70-130	0.875	20		
1,2-Dichloropropane	11.0	1.0	µg/L	10.0		110		70-130	6.08	20		
1,3-Dichloropropane	10.4	0.50	µg/L	10.0		104		70-130	3.60	20		
2,2-Dichloropropane	8.91	1.0	µg/L	10.0		89.1		70-130	4.82	20		
1,1-Dichloropropene	10.4	0.50	µg/L	10.0		104		70-130	1.62	20		
cis-1,3-Dichloropropene	10.4	0.40	µg/L	10.0		104		70-130	4.04	20		
trans-1,3-Dichloropropene	10.3	0.40	µg/L	10.0		103		70-130	2.58	20		
Diethyl Ether	11.2	2.0	µg/L	10.0		112		70-130	1.34	20		
Diisopropyl Ether (DIPE)	12.0	0.50	µg/L	10.0		120		70-130	0.837	20		
1,4-Dioxane	80.9	50	µg/L	100		80.9		40-160	6.02	20	V-05	†
Ethylbenzene	9.51	1.0	µg/L	10.0		95.1		70-130	0.629	20		
Hexachlorobutadiene	10.1	0.60	µg/L	10.0		101		70-130	9.69	20		
2-Hexanone (MBK)	91.9	10	µg/L	100		91.9		40-160	0.293	20		†
Isopropylbenzene (Cumene)	8.72	1.0	µg/L	10.0		87.2		70-130	1.82	20		
p-Isopropyltoluene (p-Cymene)	8.96	1.0	µg/L	10.0		89.6		70-130	2.53	20		
Methyl tert-Butyl Ether (MTBE)	10.2	1.0	µg/L	10.0		102		70-130	2.91	20		
Methylene Chloride	11.0	5.0	µg/L	10.0		110		70-130	3.23	20		
4-Methyl-2-pentanone (MIBK)	97.0	10	µg/L	100		97.0		40-160	3.36	20		†
Naphthalene	6.13	2.0	µg/L	10.0		**61.3**	*	70-130	3.37	20	L-04, V-05	
n-Propylbenzene	9.47	1.0	µg/L	10.0		94.7		70-130	2.09	20		
Styrene	9.30	1.0	µg/L	10.0		93.0		70-130	1.39	20		
1,1,1,2-Tetrachloroethane	10.1	1.0	µg/L	10.0		101		70-130	0.0987	20		
1,1,2,2-Tetrachloroethane	9.38	0.50	µg/L	10.0		93.8		70-130	4.69	20		
Tetrachloroethylene	9.96	1.0	µg/L	10.0		99.6		70-130	2.77	20		
Tetrahydrofuran	10.2	2.0	µg/L	10.0		102		70-130	1.26	20		
Toluene	10.7	1.0	µg/L	10.0		107		70-130	0.0938	20		
1,2,3-Trichlorobenzene	7.97	2.0	µg/L	10.0		79.7		70-130	5.85	20		
1,2,4-Trichlorobenzene	7.87	1.0	µg/L	10.0		78.7		70-130	3.86	20	V-05	
1,1,1-Trichloroethane	10.8	1.0	µg/L	10.0		108		70-130	0.932	20		
1,1,2-Trichloroethane	10.9	1.0	µg/L	10.0		109		70-130	0.737	20		
Trichloroethylene	10.2	1.0	µg/L	10.0		102		70-130	0.685	20		
Trichlorofluoromethane (Freon 11)	9.62	2.0	µg/L	10.0		96.2		70-130	3.47	20		
1,2,3-Trichloropropane	11.9	2.0	µg/L	10.0		119		70-130	4.45	20		
1,2,4-Trimethylbenzene	8.98	1.0	µg/L	10.0		89.8		70-130	1.55	20		
1,3,5-Trimethylbenzene	8.94	1.0	µg/L	10.0		89.4		70-130	2.10	20		
Vinyl Chloride	11.6	2.0	µg/L	10.0		116		70-130	1.72	20		
m+p Xylene	19.1	2.0	µg/L	20.0		95.6		70-130	0.365	20		
o-Xylene	9.04	1.0	µg/L	10.0		90.4		70-130	0.552	20		
Surrogate: 1,2-Dichloroethane-d4	*26.7*		µg/L	25.0		107		70-130				
Surrogate: Toluene-d8	*26.7*		µg/L	25.0		107		70-130				
Surrogate: 4-Bromofluorobenzene	*23.4*		µg/L	25.0		93.7		70-130				

con-test® A Pace Analytical® Laboratory

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

QUALITY CONTROL

Volatile Organic Compounds by GC/MS - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B350530 - SW-846 5030B										
Blank (B350530-BLK1)				Prepared: 08/30/23 Analyzed: 08/31/23						
Acetone	ND	10	µg/L							
tert-Amyl Methyl Ether (TAME)	ND	0.50	µg/L							
Benzene	ND	1.0	µg/L							
Bromobenzene	ND	1.0	µg/L							
Bromochloromethane	ND	1.0	µg/L							
Bromodichloromethane	ND	1.0	µg/L							
Bromoform	ND	1.0	µg/L							V-05
Bromomethane	ND	2.0	µg/L							
2-Butanone (MEK)	ND	10	µg/L							
n-Butylbenzene	ND	1.0	µg/L							
sec-Butylbenzene	ND	1.0	µg/L							
tert-Butylbenzene	ND	1.0	µg/L							
tert-Butyl Ethyl Ether (TBEE)	ND	0.50	µg/L							
Carbon Disulfide	ND	5.0	µg/L							
Carbon Tetrachloride	ND	1.0	µg/L							
Chlorobenzene	ND	1.0	µg/L							
Chlorodibromomethane	ND	0.50	µg/L							
Chloroethane	ND	2.0	µg/L							
Chloroform	ND	2.0	µg/L							
Chloromethane	ND	2.0	µg/L							
2-Chlorotoluene	ND	1.0	µg/L							
4-Chlorotoluene	ND	1.0	µg/L							
1,2-Dibromo-3-chloropropane (DBCP)	ND	2.0	µg/L							
1,2-Dibromoethane (EDB)	ND	0.50	µg/L							
Dibromomethane	ND	1.0	µg/L							
1,2-Dichlorobenzene	ND	1.0	µg/L							
1,3-Dichlorobenzene	ND	1.0	µg/L							
1,4-Dichlorobenzene	ND	1.0	µg/L							
Dichlorodifluoromethane (Freon 12)	ND	2.0	µg/L							
1,1-Dichloroethane	ND	1.0	µg/L							
1,2-Dichloroethane	ND	1.0	µg/L							
1,1-Dichloroethylene	ND	1.0	µg/L							
cis-1,2-Dichloroethylene	ND	1.0	µg/L							
trans-1,2-Dichloroethylene	ND	1.0	µg/L							
1,2-Dichloropropane	ND	1.0	µg/L							
1,3-Dichloropropane	ND	0.50	µg/L							
2,2-Dichloropropane	ND	1.0	µg/L							
1,1-Dichloropropene	ND	0.50	µg/L							
cis-1,3-Dichloropropene	ND	0.40	µg/L							
trans-1,3-Dichloropropene	ND	0.40	µg/L							
Diethyl Ether	ND	2.0	µg/L							
Diisopropyl Ether (DIPE)	ND	0.50	µg/L							
1,4-Dioxane	ND	50	µg/L							V-05
Ethylbenzene	ND	1.0	µg/L							
Hexachlorobutadiene	ND	0.60	µg/L							
2-Hexanone (MBK)	ND	10	µg/L							
Isopropylbenzene (Cumene)	ND	1.0	µg/L							
p-Isopropyltoluene (p-Cymene)	ND	1.0	µg/L							
Methyl tert-Butyl Ether (MTBE)	ND	1.0	µg/L							
Methylene Chloride	ND	5.0	µg/L							
4-Methyl-2-pentanone (MIBK)	ND	10	µg/L							
Naphthalene	ND	2.0	µg/L							L-04, V-05

con-test® A Pace Analytical® Laboratory

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

QUALITY CONTROL

Volatile Organic Compounds by GC/MS - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC		%REC Limits	RPD	RPD Limit	Notes	
Batch B350530 - SW-846 5030B												
Blank (B350530-BLK1)				Prepared: 08/30/23 Analyzed: 08/31/23								
n-Propylbenzene	ND	1.0	µg/L									
Styrene	ND	1.0	µg/L									
1,1,1,2-Tetrachloroethane	ND	1.0	µg/L									
1,1,2,2-Tetrachloroethane	ND	0.50	µg/L									
Tetrachloroethylene	ND	1.0	µg/L									
Tetrahydrofuran	ND	2.0	µg/L									
Toluene	ND	1.0	µg/L									
1,2,3-Trichlorobenzene	ND	2.0	µg/L									
1,2,4-Trichlorobenzene	ND	1.0	µg/L									
1,1,1-Trichloroethane	ND	1.0	µg/L									
1,1,2-Trichloroethane	ND	1.0	µg/L									
Trichloroethylene	ND	1.0	µg/L									
Trichlorofluoromethane (Freon 11)	ND	2.0	µg/L									
1,2,3-Trichloropropane	ND	2.0	µg/L									
1,2,4-Trimethylbenzene	ND	1.0	µg/L									
1,3,5-Trimethylbenzene	ND	1.0	µg/L									
Vinyl Chloride	ND	2.0	µg/L									
m+p Xylene	ND	2.0	µg/L									
o-Xylene	ND	1.0	µg/L									
Surrogate: 1,2-Dichloroethane-d4	*27.0*		µg/L	25.0		108		70-130				
Surrogate: Toluene-d8	*25.1*		µg/L	25.0		100		70-130				
Surrogate: 4-Bromofluorobenzene	*21.7*		µg/L	25.0		86.7		70-130				
LCS (B350530-BS1)				Prepared: 08/30/23 Analyzed: 08/31/23								
Acetone	108	10	µg/L	100		108		40-160				†
tert-Amyl Methyl Ether (TAME)	10.2	0.50	µg/L	10.0		102		70-130				
Benzene	11.9	1.0	µg/L	10.0		119		70-130				
Bromobenzene	9.86	1.0	µg/L	10.0		98.6		70-130				
Bromochloromethane	13.1	1.0	µg/L	10.0		**131**	*	70-130			L-07, V-20	
Bromodichloromethane	10.8	1.0	µg/L	10.0		108		70-130				
Bromoform	7.91	1.0	µg/L	10.0		79.1		70-130			V-05	
Bromomethane	12.6	2.0	µg/L	10.0		126		40-160			V-20	†
2-Butanone (MEK)	120	10	µg/L	100		120		40-160				†
n-Butylbenzene	10.3	1.0	µg/L	10.0		103		70-130				
sec-Butylbenzene	9.46	1.0	µg/L	10.0		94.6		70-130				
tert-Butylbenzene	8.84	1.0	µg/L	10.0		88.4		70-130				
tert-Butyl Ethyl Ether (TBEE)	10.8	0.50	µg/L	10.0		108		70-130				
Carbon Disulfide	110	5.0	µg/L	100		110		70-130				
Carbon Tetrachloride	10.9	1.0	µg/L	10.0		109		70-130				
Chlorobenzene	10.1	1.0	µg/L	10.0		101		70-130				
Chlorodibromomethane	9.85	0.50	µg/L	10.0		98.5		70-130				
Chloroethane	10.3	2.0	µg/L	10.0		103		70-130				
Chloroform	11.4	2.0	µg/L	10.0		114		70-130				
Chloromethane	15.2	2.0	µg/L	10.0		152		40-160			V-20, L-14	†
2-Chlorotoluene	9.60	1.0	µg/L	10.0		96.0		70-130				
4-Chlorotoluene	9.52	1.0	µg/L	10.0		95.2		70-130				
1,2-Dibromo-3-chloropropane (DBCP)	8.68	2.0	µg/L	10.0		86.8		70-130				
1,2-Dibromoethane (EDB)	10.2	0.50	µg/L	10.0		102		70-130				
Dibromomethane	10.6	1.0	µg/L	10.0		106		70-130				
1,2-Dichlorobenzene	9.89	1.0	µg/L	10.0		98.9		70-130				
1,3-Dichlorobenzene	9.94	1.0	µg/L	10.0		99.4		70-130				
1,4-Dichlorobenzene	9.68	1.0	µg/L	10.0		96.8		70-130				

con-test® A Pace Analytical® Laboratory

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

QUALITY CONTROL

Volatile Organic Compounds by GC/MS - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC		%REC Limits	RPD	RPD Limit	Notes	
Batch B350530 - SW-846 5030B												
LCS (B350530-BS1)				Prepared: 08/30/23 Analyzed: 08/31/23								
Dichlorodifluoromethane (Freon 12)	11.7	2.0	µg/L	10.0		117		40-160				†
1,1-Dichloroethane	11.2	1.0	µg/L	10.0		112		70-130				
1,2-Dichloroethane	9.84	1.0	µg/L	10.0		98.4		70-130				
1,1-Dichloroethylene	10.5	1.0	µg/L	10.0		105		70-130				
cis-1,2-Dichloroethylene	10.8	1.0	µg/L	10.0		108		70-130				
trans-1,2-Dichloroethylene	10.6	1.0	µg/L	10.0		106		70-130				
1,2-Dichloropropane	11.1	1.0	µg/L	10.0		111		70-130				
1,3-Dichloropropane	10.4	0.50	µg/L	10.0		104		70-130				
2,2-Dichloropropane	9.70	1.0	µg/L	10.0		97.0		70-130				
1,1-Dichloropropene	11.1	0.50	µg/L	10.0		111		70-130				
cis-1,3-Dichloropropene	10.6	0.40	µg/L	10.0		106		70-130				
trans-1,3-Dichloropropene	10.4	0.40	µg/L	10.0		104		70-130				
Diethyl Ether	11.0	2.0	µg/L	10.0		110		70-130				
Diisopropyl Ether (DIPE)	12.0	0.50	µg/L	10.0		120		70-130				
1,4-Dioxane	79.0	50	µg/L	100		79.0		40-160			V-05	†
Ethylbenzene	9.53	1.0	µg/L	10.0		95.3		70-130				
Hexachlorobutadiene	10.8	0.60	µg/L	10.0		108		70-130				
2-Hexanone (MBK)	99.6	10	µg/L	100		99.6		40-160				†
Isopropylbenzene (Cumene)	9.09	1.0	µg/L	10.0		90.9		70-130				
p-Isopropyltoluene (p-Cymene)	9.58	1.0	µg/L	10.0		95.8		70-130				
Methyl tert-Butyl Ether (MTBE)	10.3	1.0	µg/L	10.0		103		70-130				
Methylene Chloride	11.0	5.0	µg/L	10.0		110		70-130				
4-Methyl-2-pentanone (MIBK)	97.1	10	µg/L	100		97.1		40-160				†
Naphthalene	6.64	2.0	µg/L	10.0		**66.4**	*	70-130			L-04, V-05	
n-Propylbenzene	9.76	1.0	µg/L	10.0		97.6		70-130				
Styrene	9.18	1.0	µg/L	10.0		91.8		70-130				
1,1,1,2-Tetrachloroethane	9.72	1.0	µg/L	10.0		97.2		70-130				
1,1,2,2-Tetrachloroethane	9.67	0.50	µg/L	10.0		96.7		70-130				
Tetrachloroethylene	10.4	1.0	µg/L	10.0		104		70-130				
Tetrahydrofuran	10.2	2.0	µg/L	10.0		102		70-130				
Toluene	10.3	1.0	µg/L	10.0		103		70-130				
1,2,3-Trichlorobenzene	8.58	2.0	µg/L	10.0		85.8		70-130				
1,2,4-Trichlorobenzene	8.44	1.0	µg/L	10.0		84.4		70-130				
1,1,1-Trichloroethane	11.2	1.0	µg/L	10.0		112		70-130				
1,1,2-Trichloroethane	10.3	1.0	µg/L	10.0		103		70-130				
Trichloroethylene	10.3	1.0	µg/L	10.0		103		70-130				
Trichlorofluoromethane (Freon 11)	10.4	2.0	µg/L	10.0		104		70-130				
1,2,3-Trichloropropane	9.24	2.0	µg/L	10.0		92.4		70-130				
1,2,4-Trimethylbenzene	8.84	1.0	µg/L	10.0		88.4		70-130				
1,3,5-Trimethylbenzene	9.11	1.0	µg/L	10.0		91.1		70-130				
Vinyl Chloride	12.3	2.0	µg/L	10.0		123		70-130			V-20	
m+p Xylene	19.0	2.0	µg/L	20.0		95.2		70-130				
o-Xylene	9.08	1.0	µg/L	10.0		90.8		70-130				
Surrogate: 1,2-Dichloroethane-d4	*27.4*		µg/L	25.0		110		70-130				
Surrogate: Toluene-d8	*26.2*		µg/L	25.0		105		70-130				
Surrogate: 4-Bromofluorobenzene	*23.4*		µg/L	25.0		93.6		70-130				

con-test® A Pace Analytical® Laboratory

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

QUALITY CONTROL

Volatile Organic Compounds by GC/MS - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC		%REC Limits	RPD	RPD Limit	Notes	
Batch B350530 - SW-846 5030B												
LCS Dup (B350530-BSD1)				Prepared: 08/30/23 Analyzed: 08/31/23								
Acetone	109	10	µg/L	100		109		40-160	0.212	20		†
tert-Amyl Methyl Ether (TAME)	10.1	0.50	µg/L	10.0		101		70-130	0.988	20		
Benzene	11.6	1.0	µg/L	10.0		116		70-130	2.29	20		
Bromobenzene	9.93	1.0	µg/L	10.0		99.3		70-130	0.707	20		
Bromochloromethane	13.0	1.0	µg/L	10.0		130		70-130	0.537	20	V-20	
Bromodichloromethane	10.7	1.0	µg/L	10.0		107		70-130	1.02	20		
Bromoform	7.66	1.0	µg/L	10.0		76.6		70-130	3.21	20	V-05	
Bromomethane	12.6	2.0	µg/L	10.0		126		40-160	0.317	20	V-20	†
2-Butanone (MEK)	118	10	µg/L	100		118		40-160	1.18	20		†
n-Butylbenzene	10.2	1.0	µg/L	10.0		102		70-130	0.681	20		
sec-Butylbenzene	9.47	1.0	µg/L	10.0		94.7		70-130	0.106	20		
tert-Butylbenzene	8.73	1.0	µg/L	10.0		87.3		70-130	1.25	20		
tert-Butyl Ethyl Ether (TBEE)	10.8	0.50	µg/L	10.0		108		70-130	0.462	20		
Carbon Disulfide	109	5.0	µg/L	100		109		70-130	0.769	20		
Carbon Tetrachloride	11.0	1.0	µg/L	10.0		110		70-130	1.19	20		
Chlorobenzene	9.99	1.0	µg/L	10.0		99.9		70-130	0.897	20		
Chlorodibromomethane	10.1	0.50	µg/L	10.0		101		70-130	2.90	20		
Chloroethane	10.4	2.0	µg/L	10.0		104		70-130	0.867	20		
Chloroform	11.1	2.0	µg/L	10.0		111		70-130	3.10	20		
Chloromethane	14.8	2.0	µg/L	10.0		148		40-160	2.66	20	L-14, V-20	†
2-Chlorotoluene	9.45	1.0	µg/L	10.0		94.5		70-130	1.57	20		
4-Chlorotoluene	9.75	1.0	µg/L	10.0		97.5		70-130	2.39	20		
1,2-Dibromo-3-chloropropane (DBCP)	8.76	2.0	µg/L	10.0		87.6		70-130	0.917	20		
1,2-Dibromoethane (EDB)	10.5	0.50	µg/L	10.0		105		70-130	3.00	20		
Dibromomethane	10.4	1.0	µg/L	10.0		104		70-130	1.24	20		
1,2-Dichlorobenzene	9.61	1.0	µg/L	10.0		96.1		70-130	2.87	20		
1,3-Dichlorobenzene	10.0	1.0	µg/L	10.0		100		70-130	0.702	20		
1,4-Dichlorobenzene	9.84	1.0	µg/L	10.0		98.4		70-130	1.64	20		
Dichlorodifluoromethane (Freon 12)	11.4	2.0	µg/L	10.0		114		40-160	2.25	20		†
1,1-Dichloroethane	11.4	1.0	µg/L	10.0		114		70-130	1.94	20		
1,2-Dichloroethane	10.1	1.0	µg/L	10.0		101		70-130	3.00	20		
1,1-Dichloroethylene	10.3	1.0	µg/L	10.0		103		70-130	1.64	20		
cis-1,2-Dichloroethylene	11.0	1.0	µg/L	10.0		110		70-130	1.10	20		
trans-1,2-Dichloroethylene	10.7	1.0	µg/L	10.0		107		70-130	1.32	20		
1,2-Dichloropropane	11.4	1.0	µg/L	10.0		114		70-130	2.85	20		
1,3-Dichloropropane	10.7	0.50	µg/L	10.0		107		70-130	2.94	20		
2,2-Dichloropropane	9.54	1.0	µg/L	10.0		95.4		70-130	1.66	20		
1,1-Dichloropropene	11.0	0.50	µg/L	10.0		110		70-130	1.72	20		
cis-1,3-Dichloropropene	10.6	0.40	µg/L	10.0		106		70-130	0.471	20		
trans-1,3-Dichloropropene	10.5	0.40	µg/L	10.0		105		70-130	1.34	20		
Diethyl Ether	10.7	2.0	µg/L	10.0		107		70-130	3.03	20		
Diisopropyl Ether (DIPE)	11.5	0.50	µg/L	10.0		115		70-130	3.74	20		
1,4-Dioxane	91.6	50	µg/L	100		91.6		40-160	14.7	20	V-05	†
Ethylbenzene	9.66	1.0	µg/L	10.0		96.6		70-130	1.35	20		
Hexachlorobutadiene	11.2	0.60	µg/L	10.0		112		70-130	3.55	20		
2-Hexanone (MBK)	99.1	10	µg/L	100		99.1		40-160	0.544	20		†
Isopropylbenzene (Cumene)	8.88	1.0	µg/L	10.0		88.8		70-130	2.34	20		
p-Isopropyltoluene (p-Cymene)	9.18	1.0	µg/L	10.0		91.8		70-130	4.26	20		
Methyl tert-Butyl Ether (MTBE)	10.2	1.0	µg/L	10.0		102		70-130	0.681	20		
Methylene Chloride	10.9	5.0	µg/L	10.0		109		70-130	0.457	20		
4-Methyl-2-pentanone (MIBK)	97.6	10	µg/L	100		97.6		40-160	0.452	20		†
Naphthalene	6.51	2.0	µg/L	10.0		**65.1**	*	70-130	1.98	20	L-04, V-05	

con-test® A Pace Analytical® Laboratory

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

QUALITY CONTROL

Volatile Organic Compounds by GC/MS - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B350530 - SW-846 5030B										
LCS Dup (B350530-BSD1)				Prepared: 08/30/23 Analyzed: 08/31/23						
n-Propylbenzene	9.72	1.0	µg/L	10.0		97.2	70-130	0.411	20	
Styrene	9.41	1.0	µg/L	10.0		94.1	70-130	2.47	20	
1,1,1,2-Tetrachloroethane	9.96	1.0	µg/L	10.0		99.6	70-130	2.44	20	
1,1,2,2-Tetrachloroethane	9.23	0.50	µg/L	10.0		92.3	70-130	4.66	20	
Tetrachloroethylene	10.5	1.0	µg/L	10.0		105	70-130	1.34	20	
Tetrahydrofuran	10.7	2.0	µg/L	10.0		107	70-130	4.88	20	
Toluene	10.7	1.0	µg/L	10.0		107	70-130	3.80	20	
1,2,3-Trichlorobenzene	8.34	2.0	µg/L	10.0		83.4	70-130	2.84	20	
1,2,4-Trichlorobenzene	8.32	1.0	µg/L	10.0		83.2	70-130	1.43	20	
1,1,1-Trichloroethane	10.9	1.0	µg/L	10.0		109	70-130	2.53	20	
1,1,2-Trichloroethane	10.6	1.0	µg/L	10.0		106	70-130	3.05	20	
Trichloroethylene	10.5	1.0	µg/L	10.0		105	70-130	1.73	20	
Trichlorofluoromethane (Freon 11)	10.3	2.0	µg/L	10.0		103	70-130	1.64	20	
1,2,3-Trichloropropane	9.42	2.0	µg/L	10.0		94.2	70-130	1.93	20	
1,2,4-Trimethylbenzene	9.06	1.0	µg/L	10.0		90.6	70-130	2.46	20	
1,3,5-Trimethylbenzene	9.12	1.0	µg/L	10.0		91.2	70-130	0.110	20	
Vinyl Chloride	12.4	2.0	µg/L	10.0		124	70-130	0.0810	20	V-20
m+p Xylene	19.2	2.0	µg/L	20.0		96.1	70-130	0.888	20	
o-Xylene	8.92	1.0	µg/L	10.0		89.2	70-130	1.78	20	
Surrogate: 1,2-Dichloroethane-d4	*26.0*		µg/L	25.0		104	70-130			
Surrogate: Toluene-d8	*26.2*		µg/L	25.0		105	70-130			
Surrogate: 4-Bromofluorobenzene	*23.0*		µg/L	25.0		92.2	70-130			

con-test® A Pace Analytical® Laboratory

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

QUALITY CONTROL

Semivolatile Organic Compounds by GC/MS - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B350505 - SW-846 3510C										
Blank (B350505-BLK1)				Prepared: 08/29/23 Analyzed: 08/31/23						
Biphenyl	ND	20	µg/L							
Acenaphthene	ND	5.0	µg/L							
Acenaphthylene	ND	5.0	µg/L							
Acetophenone	ND	10	µg/L							
Aniline	ND	20	µg/L							V-05
Anthracene	ND	5.0	µg/L							
Benzo(a)anthracene	ND	5.0	µg/L							
Benzo(a)pyrene	ND	5.0	µg/L							
Benzo(b)fluoranthene	ND	5.0	µg/L							
Benzo(g,h,i)perylene	ND	5.0	µg/L							
Benzo(k)fluoranthene	ND	5.0	µg/L							
Bis(2-chloroethoxy)methane	ND	10	µg/L							
Bis(2-chloroethyl)ether	ND	10	µg/L							
Bis(2-chloroisopropyl)ether	ND	10	µg/L							V-20
Bis(2-Ethylhexyl)phthalate	ND	10	µg/L							V-04
4-Bromophenylphenylether	ND	10	µg/L							
Butylbenzylphthalate	ND	10	µg/L							V-35
4-Chloroaniline	ND	10	µg/L							
2-Chloronaphthalene	ND	10	µg/L							
2-Chlorophenol	ND	10	µg/L							
Chrysene	ND	5.0	µg/L							
Dibenz(a,h)anthracene	ND	5.0	µg/L							
Dibenzofuran	ND	5.0	µg/L							
Di-n-butylphthalate	ND	10	µg/L							
1,2-Dichlorobenzene	ND	5.0	µg/L							
1,3-Dichlorobenzene	ND	5.0	µg/L							L-04
1,4-Dichlorobenzene	ND	5.0	µg/L							L-04
3,3-Dichlorobenzidine	ND	10	µg/L							
2,4-Dichlorophenol	ND	10	µg/L							
Diethylphthalate	ND	10	µg/L							
2,4-Dimethylphenol	ND	10	µg/L							
Dimethylphthalate	ND	10	µg/L							
2,4-Dinitrophenol	ND	10	µg/L							V-04
2,4-Dinitrotoluene	ND	10	µg/L							
2,6-Dinitrotoluene	ND	10	µg/L							
Di-n-octylphthalate	ND	10	µg/L							V-04
1,2-Diphenylhydrazine/Azobenzene	ND	10	µg/L							
Fluoranthene	ND	5.0	µg/L							
Fluorene	ND	5.0	µg/L							
Hexachlorobenzene	ND	10	µg/L							
Hexachlorobutadiene	ND	10	µg/L							L-04
Hexachloroethane	ND	10	µg/L							L-04
Indeno(1,2,3-cd)pyrene	ND	5.0	µg/L							
Isophorone	ND	10	µg/L							
2-Methylnaphthalene	ND	5.0	µg/L							
2-Methylphenol	ND	10	µg/L							
3/4-Methylphenol	ND	10	µg/L							
Naphthalene	ND	5.0	µg/L							
Nitrobenzene	ND	10	µg/L							
2-Nitrophenol	ND	10	µg/L							
4-Nitrophenol	ND	10	µg/L							V-05
Pentachlorophenol	ND	10	µg/L							

con-test® A Pace Analytical® Laboratory

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

QUALITY CONTROL

Semivolatile Organic Compounds by GC/MS - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC		%REC Limits	RPD	RPD Limit	Notes	
Batch B350505 - SW-846 3510C												
Blank (B350505-BLK1)				Prepared: 08/29/23 Analyzed: 08/31/23								
Phenanthrene	ND	5.0	µg/L									
Phenol	ND	10	µg/L									
Pyrene	ND	5.0	µg/L									
Pyridine	ND	20	µg/L									
1,2,4-Trichlorobenzene	ND	5.0	µg/L								L-04	
2,4,5-Trichlorophenol	ND	10	µg/L									
2,4,6-Trichlorophenol	ND	10	µg/L									
Surrogate: 2-Fluorophenol	*163*		µg/L	400		40.9		15-110				
Surrogate: Phenol-d6	*142*		µg/L	400		35.4		15-110				
Surrogate: Nitrobenzene-d5	*6.66*		µg/L	200		**3.33**	*	30-130			S-26	
Surrogate: 2-Fluorobiphenyl	*4.43*		µg/L	200		**2.22**	*	30-130			S-26	
Surrogate: 2,4,6-Tribromophenol	*8.55*		µg/L	400		**2.14**	*	15-110			S-26	
Surrogate: p-Terphenyl-d14	*8.34*		µg/L	200		**4.17**	*	30-130			S-26	
LCS (B350505-BS1)				Prepared: 08/29/23 Analyzed: 08/31/23								
Biphenyl	62.5	20	µg/L	100		62.5		40-140				
Acenaphthene	74.4	5.0	µg/L	100		74.4		40-140				
Acenaphthylene	76.3	5.0	µg/L	100		76.3		40-140				
Acetophenone	78.0	10	µg/L	100		78.0		40-140				
Aniline	54.6	20	µg/L	100		54.6		40-140			R-05, V-05	
Anthracene	82.8	5.0	µg/L	100		82.8		40-140				
Benzo(a)anthracene	86.6	5.0	µg/L	100		86.6		40-140				
Benzo(a)pyrene	87.0	5.0	µg/L	100		87.0		40-140				
Benzo(b)fluoranthene	86.7	5.0	µg/L	100		86.7		40-140				
Benzo(g,h,i)perylene	82.5	5.0	µg/L	100		82.5		40-140				
Benzo(k)fluoranthene	92.9	5.0	µg/L	100		92.9		40-140				
Bis(2-chloroethoxy)methane	80.8	10	µg/L	100		80.8		40-140				
Bis(2-chloroethyl)ether	93.4	10	µg/L	100		93.4		40-140				
Bis(2-chloroisopropyl)ether	110	10	µg/L	100		110		40-140			V-06	
Bis(2-Ethylhexyl)phthalate	98.2	10	µg/L	100		98.2		40-140			V-04	
4-Bromophenylphenylether	81.1	10	µg/L	100		81.1		40-140				
Butylbenzylphthalate	112	10	µg/L	100		112		40-140			V-35	
4-Chloroaniline	75.8	10	µg/L	100		75.8		15-140				†
2-Chloronaphthalene	57.9	10	µg/L	100		57.9		40-140				
2-Chlorophenol	79.5	10	µg/L	100		79.5		30-130			R-05	
Chrysene	80.2	5.0	µg/L	100		80.2		40-140				
Dibenz(a,h)anthracene	89.9	5.0	µg/L	100		89.9		40-140				
Dibenzofuran	74.7	5.0	µg/L	100		74.7		40-140				
Di-n-butylphthalate	87.6	10	µg/L	100		87.6		40-140				
1,2-Dichlorobenzene	39.5	5.0	µg/L	100		**39.5**	*	40-140			L-07	
1,3-Dichlorobenzene	38.1	5.0	µg/L	100		**38.1**	*	40-140			L-04	
1,4-Dichlorobenzene	37.9	5.0	µg/L	100		**37.9**	*	40-140			L-04	
3,3-Dichlorobenzidine	99.8	10	µg/L	100		99.8		40-140				
2,4-Dichlorophenol	81.4	10	µg/L	100		81.4		30-130			R-05	
Diethylphthalate	76.7	10	µg/L	100		76.7		40-140				
2,4-Dimethylphenol	72.2	10	µg/L	100		72.2		30-130				
Dimethylphthalate	80.4	10	µg/L	100		80.4		40-140				
2,4-Dinitrophenol	85.3	10	µg/L	100		85.3		15-140			R-05, V-04	†
2,4-Dinitrotoluene	84.5	10	µg/L	100		84.5		40-140				
2,6-Dinitrotoluene	92.7	10	µg/L	100		92.7		40-140				
Di-n-octylphthalate	111	10	µg/L	100		111		40-140			V-04	
1,2-Diphenylhydrazine/Azobenzene	83.6	10	µg/L	100		83.6		40-140				

con-test® A Pace Analytical® Laboratory

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

QUALITY CONTROL

Semivolatile Organic Compounds by GC/MS - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC		%REC Limits	RPD	RPD Limit	Notes	
Batch B350505 - SW-846 3510C												
LCS (B350505-BS1)				Prepared: 08/29/23 Analyzed: 08/31/23								
Fluoranthene	78.1	5.0	µg/L	100		78.1		40-140				
Fluorene	76.6	5.0	µg/L	100		76.6		40-140				
Hexachlorobenzene	81.3	10	µg/L	100		81.3		40-140				
Hexachlorobutadiene	33.2	10	µg/L	100		**33.2**	*	40-140			L-04	
Hexachloroethane	33.6	10	µg/L	100		**33.6**	*	40-140			L-04	
Indeno(1,2,3-cd)pyrene	89.7	5.0	µg/L	100		89.7		40-140				
Isophorone	82.8	10	µg/L	100		82.8		40-140				
2-Methylnaphthalene	49.3	5.0	µg/L	100		49.3		40-140				
2-Methylphenol	76.5	10	µg/L	100		76.5		30-130				
3/4-Methylphenol	74.3	10	µg/L	100		74.3		30-130				
Naphthalene	44.7	5.0	µg/L	100		44.7		40-140				
Nitrobenzene	69.6	10	µg/L	100		69.6		40-140				
2-Nitrophenol	82.4	10	µg/L	100		82.4		30-130			R-05	
4-Nitrophenol	46.9	10	µg/L	100		46.9		15-140			R-05, V-05	†
Pentachlorophenol	81.5	10	µg/L	100		81.5		30-130			R-05	
Phenanthrene	80.1	5.0	µg/L	100		80.1		40-140				
Phenol	44.1	10	µg/L	100		44.1		15-140			R-05	†
Pyrene	89.3	5.0	µg/L	100		89.3		40-140				
Pyridine	9.87	20	µg/L	100		**9.87**	*	10-140			L-07A	†
1,2,4-Trichlorobenzene	37.6	5.0	µg/L	100		**37.6**	*	40-140			L-04	
2,4,5-Trichlorophenol	86.2	10	µg/L	100		86.2		30-130			R-05	
2,4,6-Trichlorophenol	89.0	10	µg/L	100		89.0		30-130			R-05	
Surrogate: 2-Fluorophenol	*289*		µg/L	400		72.3		15-110				
Surrogate: Phenol-d6	*205*		µg/L	400		51.3		15-110				
Surrogate: Nitrobenzene-d5	*174*		µg/L	200		86.9		30-130				
Surrogate: 2-Fluorobiphenyl	*183*		µg/L	200		91.4		30-130				
Surrogate: 2,4,6-Tribromophenol	*387*		µg/L	400		96.7		15-110				
Surrogate: p-Terphenyl-d14	*209*		µg/L	200		104		30-130				
LCS Dup (B350505-BSD1)				Prepared: 08/29/23 Analyzed: 08/31/23								
Biphenyl	62.5	20	µg/L	100		62.5		40-140	0.112	20		
Acenaphthene	73.6	5.0	µg/L	100		73.6		40-140	1.03	20		
Acenaphthylene	77.1	5.0	µg/L	100		77.1		40-140	1.02	20		
Acetophenone	86.5	10	µg/L	100		86.5		40-140	10.4	20		
Aniline	75.0	20	µg/L	100		75.0		40-140	**31.5**	* 20	V-05, R-05	
Anthracene	85.2	5.0	µg/L	100		85.2		40-140	2.87	20		
Benzo(a)anthracene	89.4	5.0	µg/L	100		89.4		40-140	3.17	20		
Benzo(a)pyrene	90.0	5.0	µg/L	100		90.0		40-140	3.49	20		
Benzo(b)fluoranthene	90.2	5.0	µg/L	100		90.2		40-140	3.90	20		
Benzo(g,h,i)perylene	79.1	5.0	µg/L	100		79.1		40-140	4.19	20		
Benzo(k)fluoranthene	96.5	5.0	µg/L	100		96.5		40-140	3.78	20		
Bis(2-chloroethoxy)methane	87.4	10	µg/L	100		87.4		40-140	7.88	20		
Bis(2-chloroethyl)ether	98.8	10	µg/L	100		98.8		40-140	5.63	20		
Bis(2-chloroisopropyl)ether	119	10	µg/L	100		119		40-140	7.72	20	V-06	
Bis(2-Ethylhexyl)phthalate	104	10	µg/L	100		104		40-140	5.55	20	V-04	
4-Bromophenylphenylether	82.2	10	µg/L	100		82.2		40-140	1.37	20		
Butylbenzylphthalate	121	10	µg/L	100		121		40-140	7.23	20	V-35	
4-Chloroaniline	87.1	10	µg/L	100		87.1		15-140	13.9	20		†
2-Chloronaphthalene	54.8	10	µg/L	100		54.8		40-140	5.43	20		
2-Chlorophenol	31.1	10	µg/L	100		31.1		30-130	**87.4**	* 20	R-05	
Chrysene	82.0	5.0	µg/L	100		82.0		40-140	2.13	20		
Dibenz(a,h)anthracene	84.8	5.0	µg/L	100		84.8		40-140	5.91	20		

con-test® A Pace Analytical® Laboratory

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

QUALITY CONTROL

Semivolatile Organic Compounds by GC/MS - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC		%REC Limits	RPD		RPD Limit	Notes	
Batch B350505 - SW-846 3510C													
LCS Dup (B350505-BSD1)				Prepared: 08/29/23 Analyzed: 08/31/23									
Dibenzofuran	76.5	5.0	µg/L	100		76.5		40-140	2.43		20		
Di-n-butylphthalate	92.2	10	µg/L	100		92.2		40-140	5.10		20		
1,2-Dichlorobenzene	40.2	5.0	µg/L	100		40.2		40-140	1.76		20		
1,3-Dichlorobenzene	36.8	5.0	µg/L	100		**36.8**	*	40-140	3.39		20	L-04	
1,4-Dichlorobenzene	37.7	5.0	µg/L	100		**37.7**	*	40-140	0.423		20	L-04	
3,3-Dichlorobenzidine	104	10	µg/L	100		104		40-140	3.84		20		
2,4-Dichlorophenol	29.5	10	µg/L	100		**29.5**	*	30-130	**93.5**	*	20	L-07A	
Diethylphthalate	84.2	10	µg/L	100		84.2		40-140	9.34		20		
2,4-Dimethylphenol	76.4	10	µg/L	100		76.4		30-130	5.70		20		
Dimethylphthalate	85.9	10	µg/L	100		85.9		40-140	6.53		20		
2,4-Dinitrophenol	2.74	10	µg/L	100		**2.74**	*	15-140	**188**	*	20	L-07A, V-04	†
2,4-Dinitrotoluene	91.9	10	µg/L	100		91.9		40-140	8.43		20		
2,6-Dinitrotoluene	100	10	µg/L	100		100		40-140	8.06		20		
Di-n-octylphthalate	121	10	µg/L	100		121		40-140	9.16		20	V-04	
1,2-Diphenylhydrazine/Azobenzene	82.1	10	µg/L	100		82.1		40-140	1.82		20		
Fluoranthene	82.3	5.0	µg/L	100		82.3		40-140	5.15		20		
Fluorene	80.6	5.0	µg/L	100		80.6		40-140	5.09		20		
Hexachlorobenzene	81.6	10	µg/L	100		81.6		40-140	0.344		20		
Hexachlorobutadiene	32.8	10	µg/L	100		**32.8**	*	40-140	1.06		20	L-04	
Hexachloroethane	34.7	10	µg/L	100		**34.7**	*	40-140	3.22		20	L-04	
Indeno(1,2,3-cd)pyrene	87.6	5.0	µg/L	100		87.6		40-140	2.34		20		
Isophorone	90.7	10	µg/L	100		90.7		40-140	9.15		20		
2-Methylnaphthalene	53.6	5.0	µg/L	100		53.6		40-140	8.51		20		
2-Methylphenol	83.4	10	µg/L	100		83.4		30-130	8.58		20		
3/4-Methylphenol	75.8	10	µg/L	100		75.8		30-130	1.95		20		
Naphthalene	45.1	5.0	µg/L	100		45.1		40-140	0.980		20		
Nitrobenzene	72.7	10	µg/L	100		72.7		40-140	4.47		20		
2-Nitrophenol	20.8	10	µg/L	100		**20.8**	*	30-130	**119**	*	20	L-07A	
4-Nitrophenol	9.63	10	µg/L	100		**9.63**	*	15-140	**132**	*	20	L-07A, V-05	†
Pentachlorophenol	14.5	10	µg/L	100		**14.5**	*	30-130	**139**	*	20	L-07A	
Phenanthrene	81.8	5.0	µg/L	100		81.8		40-140	2.08		20		
Phenol	29.5	10	µg/L	100		29.5		15-140	**39.7**	*	20	R-05	†
Pyrene	93.9	5.0	µg/L	100		93.9		40-140	5.03		20		
Pyridine	31.7	20	µg/L	100		31.7		10-140	**105**	*	50	R-05	† ‡
1,2,4-Trichlorobenzene	37.3	5.0	µg/L	100		**37.3**	*	40-140	0.961		20	L-04	
2,4,5-Trichlorophenol	16.0	10	µg/L	100		**16.0**	*	30-130	**137**	*	20	L-07A	
2,4,6-Trichlorophenol	7.02	10	µg/L	100		**7.02**	*	30-130	**171**	*	20	L-07A	
Surrogate: 2-Fluorophenol	*51.0*		µg/L	400		**12.7**	*	15-110				S-26	
Surrogate: Phenol-d6	*128*		µg/L	400		32.0		15-110					
Surrogate: Nitrobenzene-d5	*167*		µg/L	200		83.5		30-130					
Surrogate: 2-Fluorobiphenyl	*159*		µg/L	200		79.7		30-130					
Surrogate: 2,4,6-Tribromophenol	*65.2*		µg/L	400		16.3		15-110					
Surrogate: p-Terphenyl-d14	*201*		µg/L	200		101		30-130					

con-test® A Pace Analytical® Laboratory

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

QUALITY CONTROL

Semivolatile Organic Compounds by GC/MS - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B350766 - SW-846 3510C										
Blank (B350766-BLK1)				Prepared: 08/31/23 Analyzed: 09/07/23						
Biphenyl	ND	20	µg/L							
Acenaphthene	ND	5.0	µg/L							
Acenaphthylene	ND	5.0	µg/L							
Acetophenone	ND	10	µg/L							
Aniline	ND	20	µg/L							V-05
Anthracene	ND	5.0	µg/L							
Benzo(a)anthracene	ND	5.0	µg/L							
Benzo(a)pyrene	ND	5.0	µg/L							
Benzo(b)fluoranthene	ND	5.0	µg/L							
Benzo(g,h,i)perylene	ND	5.0	µg/L							
Benzo(k)fluoranthene	ND	5.0	µg/L							
Bis(2-chloroethoxy)methane	ND	10	µg/L							
Bis(2-chloroethyl)ether	ND	10	µg/L							
Bis(2-chloroisopropyl)ether	ND	10	µg/L							V-20
Bis(2-Ethylhexyl)phthalate	ND	10	µg/L							B-02, V-04
4-Bromophenylphenylether	ND	10	µg/L							
Butylbenzylphthalate	ND	10	µg/L							V-35
4-Chloroaniline	ND	10	µg/L							
2-Chloronaphthalene	ND	10	µg/L							
2-Chlorophenol	ND	10	µg/L							
Chrysene	ND	5.0	µg/L							
Dibenz(a,h)anthracene	ND	5.0	µg/L							
Dibenzofuran	ND	5.0	µg/L							
Di-n-butylphthalate	ND	10	µg/L							
1,2-Dichlorobenzene	ND	5.0	µg/L							L-04
1,3-Dichlorobenzene	ND	5.0	µg/L							L-04
1,4-Dichlorobenzene	ND	5.0	µg/L							L-04
3,3-Dichlorobenzidine	ND	10	µg/L							
2,4-Dichlorophenol	ND	10	µg/L							
Diethylphthalate	ND	10	µg/L							
2,4-Dimethylphenol	ND	10	µg/L							
Dimethylphthalate	ND	10	µg/L							
2,4-Dinitrophenol	ND	10	µg/L							V-04
2,4-Dinitrotoluene	ND	10	µg/L							
2,6-Dinitrotoluene	ND	10	µg/L							
Di-n-octylphthalate	ND	10	µg/L							V-04
1,2-Diphenylhydrazine/Azobenzene	ND	10	µg/L							
Fluoranthene	ND	5.0	µg/L							
Fluorene	ND	5.0	µg/L							
Hexachlorobenzene	ND	10	µg/L							
Hexachlorobutadiene	ND	10	µg/L							L-04
Hexachloroethane	ND	10	µg/L							L-04
Indeno(1,2,3-cd)pyrene	ND	5.0	µg/L							
Isophorone	ND	10	µg/L							
2-Methylnaphthalene	ND	5.0	µg/L							
2-Methylphenol	ND	10	µg/L							
3/4-Methylphenol	ND	10	µg/L							
Naphthalene	ND	5.0	µg/L							L-04
Nitrobenzene	ND	10	µg/L							
2-Nitrophenol	ND	10	µg/L							
4-Nitrophenol	ND	10	µg/L							
Pentachlorophenol	ND	10	µg/L							

con-test® A Pace Analytical® Laboratory

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

QUALITY CONTROL

Semivolatile Organic Compounds by GC/MS - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC		%REC Limits	RPD	RPD Limit	Notes	
Batch B350766 - SW-846 3510C												
Blank (B350766-BLK1)				Prepared: 08/31/23 Analyzed: 09/07/23								
Phenanthrene	ND	5.0	µg/L									
Phenol	ND	10	µg/L									
Pyrene	ND	5.0	µg/L									
Pyridine	ND	20	µg/L									
1,2,4-Trichlorobenzene	ND	5.0	µg/L								L-04	
2,4,5-Trichlorophenol	ND	10	µg/L									
2,4,6-Trichlorophenol	ND	10	µg/L									
Surrogate: 2-Fluorophenol	*369*		µg/L	400		92.2		15-110				
Surrogate: Phenol-d6	*290*		µg/L	400		72.5		15-110				
Surrogate: Nitrobenzene-d5	*184*		µg/L	200		91.8		30-130				
Surrogate: 2-Fluorobiphenyl	*165*		µg/L	200		82.3		30-130				
Surrogate: 2,4,6-Tribromophenol	*391*		µg/L	400		97.7		15-110				
Surrogate: p-Terphenyl-d14	*223*		µg/L	200		111		30-130				
LCS (B350766-BS1)				Prepared: 08/31/23 Analyzed: 09/07/23								
Biphenyl	57.7	20	µg/L	100		57.7		40-140				
Acenaphthene	68.3	5.0	µg/L	100		68.3		40-140				
Acenaphthylene	72.1	5.0	µg/L	100		72.1		40-140				
Acetophenone	81.4	10	µg/L	100		81.4		40-140				
Aniline	61.8	20	µg/L	100		61.8		40-140			V-05	
Anthracene	79.5	5.0	µg/L	100		79.5		40-140				
Benzo(a)anthracene	80.0	5.0	µg/L	100		80.0		40-140				
Benzo(a)pyrene	81.9	5.0	µg/L	100		81.9		40-140				
Benzo(b)fluoranthene	83.0	5.0	µg/L	100		83.0		40-140				
Benzo(g,h,i)perylene	77.8	5.0	µg/L	100		77.8		40-140				
Benzo(k)fluoranthene	88.0	5.0	µg/L	100		88.0		40-140				
Bis(2-chloroethoxy)methane	84.8	10	µg/L	100		84.8		40-140				
Bis(2-chloroethyl)ether	94.5	10	µg/L	100		94.5		40-140				
Bis(2-chloroisopropyl)ether	110	10	µg/L	100		110		40-140			V-06	
Bis(2-Ethylhexyl)phthalate	91.4	10	µg/L	100		91.4		40-140			V-04	
4-Bromophenylphenylether	77.0	10	µg/L	100		77.0		40-140				
Butylbenzylphthalate	106	10	µg/L	100		106		40-140			V-35	
4-Chloroaniline	70.1	10	µg/L	100		70.1		15-140				†
2-Chloronaphthalene	50.8	10	µg/L	100		50.8		40-140				
2-Chlorophenol	79.7	10	µg/L	100		79.7		30-130			R-05	
Chrysene	75.6	5.0	µg/L	100		75.6		40-140				
Dibenz(a,h)anthracene	83.3	5.0	µg/L	100		83.3		40-140				
Dibenzofuran	71.9	5.0	µg/L	100		71.9		40-140				
Di-n-butylphthalate	83.2	10	µg/L	100		83.2		40-140				
1,2-Dichlorobenzene	35.8	5.0	µg/L	100		**35.8**	*	40-140			L-04	
1,3-Dichlorobenzene	32.7	5.0	µg/L	100		**32.7**	*	40-140			L-04	
1,4-Dichlorobenzene	33.0	5.0	µg/L	100		**33.0**	*	40-140			L-04	
3,3-Dichlorobenzidine	92.6	10	µg/L	100		92.6		40-140				
2,4-Dichlorophenol	83.7	10	µg/L	100		83.7		30-130			R-05	
Diethylphthalate	75.7	10	µg/L	100		75.7		40-140				
2,4-Dimethylphenol	72.5	10	µg/L	100		72.5		30-130				
Dimethylphthalate	78.8	10	µg/L	100		78.8		40-140				
2,4-Dinitrophenol	85.0	10	µg/L	100		85.0		15-140			R-05, V-04	†
2,4-Dinitrotoluene	81.6	10	µg/L	100		81.6		40-140				
2,6-Dinitrotoluene	90.8	10	µg/L	100		90.8		40-140				
Di-n-octylphthalate	96.3	10	µg/L	100		96.3		40-140			V-04	
1,2-Diphenylhydrazine/Azobenzene	79.5	10	µg/L	100		79.5		40-140				

con-test® A Pace Analytical® Laboratory

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

QUALITY CONTROL

Semivolatile Organic Compounds by GC/MS - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC		%REC Limits	RPD	RPD Limit	Notes	
Batch B350766 - SW-846 3510C												
LCS (B350766-BS1)				Prepared: 08/31/23 Analyzed: 09/07/23								
Fluoranthene	74.0	5.0	µg/L	100		74.0		40-140				
Fluorene	72.7	5.0	µg/L	100		72.7		40-140				
Hexachlorobenzene	78.4	10	µg/L	100		78.4		40-140				
Hexachlorobutadiene	29.5	10	µg/L	100		**29.5**	*	40-140			L-04	
Hexachloroethane	28.5	10	µg/L	100		**28.5**	*	40-140			L-04	
Indeno(1,2,3-cd)pyrene	84.4	5.0	µg/L	100		84.4		40-140				
Isophorone	85.8	10	µg/L	100		85.8		40-140				
2-Methylnaphthalene	43.8	5.0	µg/L	100		43.8		40-140				
2-Methylphenol	78.1	10	µg/L	100		78.1		30-130				
3/4-Methylphenol	73.3	10	µg/L	100		73.3		30-130				
Naphthalene	39.8	5.0	µg/L	100		**39.8**	*	40-140			L-04	
Nitrobenzene	70.7	10	µg/L	100		70.7		40-140				
2-Nitrophenol	83.1	10	µg/L	100		83.1		30-130			R-05	
4-Nitrophenol	40.6	10	µg/L	100		40.6		15-140			R-05	†
Pentachlorophenol	80.0	10	µg/L	100		80.0		30-130			R-05	
Phenanthrene	75.8	5.0	µg/L	100		75.8		40-140				
Phenol	41.1	10	µg/L	100		41.1		15-140			R-05	†
Pyrene	84.2	5.0	µg/L	100		84.2		40-140				
Pyridine	28.7	20	µg/L	100		28.7		10-140				†
1,2,4-Trichlorobenzene	32.5	5.0	µg/L	100		**32.5**	*	40-140			L-04	
2,4,5-Trichlorophenol	84.1	10	µg/L	100		84.1		30-130			R-05	
2,4,6-Trichlorophenol	83.2	10	µg/L	100		83.2		30-130			R-05	
Surrogate: 2-Fluorophenol	*278*		µg/L	400		69.5		15-110				
Surrogate: Phenol-d6	*195*		µg/L	400		48.8		15-110				
Surrogate: Nitrobenzene-d5	*181*		µg/L	200		90.3		30-130				
Surrogate: 2-Fluorobiphenyl	*172*		µg/L	200		85.9		30-130				
Surrogate: 2,4,6-Tribromophenol	*387*		µg/L	400		96.7		15-110				
Surrogate: p-Terphenyl-d14	*200*		µg/L	200		99.9		30-130				
LCS Dup (B350766-BSD1)				Prepared: 08/31/23 Analyzed: 09/07/23								
Biphenyl	58.8	20	µg/L	100		58.8		40-140	1.99	20		
Acenaphthene	69.6	5.0	µg/L	100		69.6		40-140	1.86	20		
Acenaphthylene	73.5	5.0	µg/L	100		73.5		40-140	1.92	20		
Acetophenone	77.7	10	µg/L	100		77.7		40-140	4.64	20		
Aniline	65.6	20	µg/L	100		65.6		40-140	6.04	20	V-05	
Anthracene	79.8	5.0	µg/L	100		79.8		40-140	0.276	20		
Benzo(a)anthracene	82.9	5.0	µg/L	100		82.9		40-140	3.62	20		
Benzo(a)pyrene	82.1	5.0	µg/L	100		82.1		40-140	0.183	20		
Benzo(b)fluoranthene	83.5	5.0	µg/L	100		83.5		40-140	0.673	20		
Benzo(g,h,i)perylene	79.2	5.0	µg/L	100		79.2		40-140	1.83	20		
Benzo(k)fluoranthene	88.7	5.0	µg/L	100		88.7		40-140	0.792	20		
Bis(2-chloroethoxy)methane	81.4	10	µg/L	100		81.4		40-140	4.09	20		
Bis(2-chloroethyl)ether	91.1	10	µg/L	100		91.1		40-140	3.64	20		
Bis(2-chloroisopropyl)ether	107	10	µg/L	100		107		40-140	2.42	20	V-06	
Bis(2-Ethylhexyl)phthalate	94.4	10	µg/L	100		94.4		40-140	3.21	20	V-04	
4-Bromophenylphenylether	78.4	10	µg/L	100		78.4		40-140	1.80	20		
Butylbenzylphthalate	111	10	µg/L	100		111		40-140	4.71	20	V-35	
4-Chloroaniline	74.2	10	µg/L	100		74.2		15-140	5.70	20		†
2-Chloronaphthalene	53.9	10	µg/L	100		53.9		40-140	5.88	20		
2-Chlorophenol	20.0	10	µg/L	100		**20.0**	*	30-130	**120** *	20	L-07A	
Chrysene	76.0	5.0	µg/L	100		76.0		40-140	0.528	20		
Dibenz(a,h)anthracene	83.0	5.0	µg/L	100		83.0		40-140	0.253	20		

con-test® A Pace Analytical® Laboratory

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

QUALITY CONTROL

Semivolatile Organic Compounds by GC/MS - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC		%REC Limits	RPD		RPD Limit	Notes	
Batch B350766 - SW-846 3510C													
LCS Dup (B350766-BSD1)				Prepared: 08/31/23 Analyzed: 09/07/23									
Dibenzofuran	73.4	5.0	µg/L	100		73.4		40-140	2.00		20		
Di-n-butylphthalate	83.1	10	µg/L	100		83.1		40-140	0.168		20		
1,2-Dichlorobenzene	34.6	5.0	µg/L	100		**34.6**	*	40-140	3.61		20	L-04	
1,3-Dichlorobenzene	31.7	5.0	µg/L	100		**31.7**	*	40-140	3.23		20	L-04	
1,4-Dichlorobenzene	31.9	5.0	µg/L	100		**31.9**	*	40-140	3.33		20	L-04	
3,3-Dichlorobenzidine	95.8	10	µg/L	100		95.8		40-140	3.43		20		
2,4-Dichlorophenol	20.4	10	µg/L	100		**20.4**	*	30-130	**122**	*	20	L-07A	
Diethylphthalate	74.0	10	µg/L	100		74.0		40-140	2.22		20		
2,4-Dimethylphenol	66.8	10	µg/L	100		66.8		30-130	8.08		20		
Dimethylphthalate	77.7	10	µg/L	100		77.7		40-140	1.34		20		
2,4-Dinitrophenol	0.900	10	µg/L	100		**0.900**	*	15-140	**196**	*	20	L-07A, V-04	†
2,4-Dinitrotoluene	80.0	10	µg/L	100		80.0		40-140	2.00		20		
2,6-Dinitrotoluene	89.8	10	µg/L	100		89.8		40-140	1.12		20		
Di-n-octylphthalate	100	10	µg/L	100		100		40-140	4.10		20	V-04	
1,2-Diphenylhydrazine/Azobenzene	81.5	10	µg/L	100		81.5		40-140	2.40		20		
Fluoranthene	75.1	5.0	µg/L	100		75.1		40-140	1.46		20		
Fluorene	73.9	5.0	µg/L	100		73.9		40-140	1.68		20		
Hexachlorobenzene	78.8	10	µg/L	100		78.8		40-140	0.509		20		
Hexachlorobutadiene	28.2	10	µg/L	100		**28.2**	*	40-140	4.50		20	L-04	
Hexachloroethane	27.9	10	µg/L	100		**27.9**	*	40-140	2.13		20	L-04	
Indeno(1,2,3-cd)pyrene	85.9	5.0	µg/L	100		85.9		40-140	1.77		20		
Isophorone	84.3	10	µg/L	100		84.3		40-140	1.67		20		
2-Methylnaphthalene	45.6	5.0	µg/L	100		45.6		40-140	4.21		20		
2-Methylphenol	69.0	10	µg/L	100		69.0		30-130	12.3		20		
3/4-Methylphenol	60.1	10	µg/L	100		60.1		30-130	19.7		20		
Naphthalene	39.1	5.0	µg/L	100		**39.1**	*	40-140	1.70		20	L-04	
Nitrobenzene	69.8	10	µg/L	100		69.8		40-140	1.25		20		
2-Nitrophenol	13.3	10	µg/L	100		**13.3**	*	30-130	**145**	*	20	L-07A	
4-Nitrophenol	15.8	10	µg/L	100		15.8		15-140	**88.0**	*	20	R-05	†
Pentachlorophenol	12.2	10	µg/L	100		**12.2**	*	30-130	**147**	*	20	L-07A	
Phenanthrene	77.6	5.0	µg/L	100		77.6		40-140	2.31		20		
Phenol	18.8	10	µg/L	100		18.8		15-140	**74.5**	*	20	R-05	†
Pyrene	86.7	5.0	µg/L	100		86.7		40-140	2.89		20		
Pyridine	42.9	20	µg/L	100		42.9		10-140	39.7		50		† ‡
1,2,4-Trichlorobenzene	31.9	5.0	µg/L	100		**31.9**	*	40-140	1.77		20	L-04	
2,4,5-Trichlorophenol	10.4	10	µg/L	100		**10.4**	*	30-130	**156**	*	20	L-07A	
2,4,6-Trichlorophenol	3.88	10	µg/L	100		**3.88**	*	30-130	**182**	*	20	L-07A	
Surrogate: 2-Fluorophenol	*26.4*		µg/L	400		**6.61**	*	15-110				S-26	
Surrogate: Phenol-d6	*81.7*		µg/L	400		20.4		15-110					
Surrogate: Nitrobenzene-d5	*160*		µg/L	200		79.9		30-130					
Surrogate: 2-Fluorobiphenyl	*156*		µg/L	200		78.1		30-130					
Surrogate: 2,4,6-Tribromophenol	*42.8*		µg/L	400		**10.7**	*	15-110				S-26	
Surrogate: p-Terphenyl-d14	*187*		µg/L	200		93.3		30-130					

con-test® A Pace Analytical® Laboratory

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

QUALITY CONTROL

Metals Analyses (Dissolved) - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B350340 - SW-846 7470A Dissolved										
Blank (B350340-BLK1)				Prepared & Analyzed: 08/28/23						
Mercury	ND	0.00020	mg/L							
LCS (B350340-BS1)				Prepared & Analyzed: 08/28/23						
Mercury	0.00358	0.00020	mg/L	0.00402		89.1	80-120			
LCS Dup (B350340-BSD1)				Prepared & Analyzed: 08/28/23						
Mercury	0.00414	0.00020	mg/L	0.00402		103	80-120	14.5	20	
Duplicate (B350340-DUP1)		**Source: 23H3880-01**		Prepared & Analyzed: 08/28/23						
Mercury	ND	0.00020	mg/L		ND			NC	20	
Matrix Spike (B350340-MS1)		**Source: 23H3880-01**		Prepared & Analyzed: 08/28/23						
Mercury	0.00427	0.00020	mg/L	0.00402	ND	106	75-125			
Batch B350368 - SW-846 3005A Dissolved										
Blank (B350368-BLK1)				Prepared: 08/28/23 Analyzed: 08/29/23						
Barium	ND	10	µg/L							
Beryllium	ND	0.40	µg/L							
Cadmium	ND	0.20	µg/L							
Lead	ND	0.50	µg/L							
Nickel	ND	5.0	µg/L							
Selenium	ND	5.0	µg/L							
Silver	ND	0.20	µg/L							
Thallium	ND	0.20	µg/L							
Vanadium	ND	5.0	µg/L							
Zinc	ND	10	µg/L							
Blank (B350368-BLK2)				Prepared: 08/28/23 Analyzed: 08/30/23						
Antimony	ND	1.0	µg/L							
Arsenic	ND	1.0	µg/L							
Chromium	ND	5.0	µg/L							
LCS (B350368-BS1)				Prepared: 08/28/23 Analyzed: 08/29/23						
Barium	507	100	µg/L	500		101	80-120			
Beryllium	521	4.0	µg/L	500		104	80-120			
Cadmium	526	2.0	µg/L	500		105	80-120			
Lead	522	5.0	µg/L	500		104	80-120			
Nickel	503	50	µg/L	500		101	80-120			
Selenium	499	50	µg/L	500		99.9	80-120			
Silver	511	2.0	µg/L	500		102	80-120			
Thallium	533	2.0	µg/L	500		107	80-120			
Vanadium	501	50	µg/L	500		100	80-120			
Zinc	1040	100	µg/L	1000		104	80-120			

con-test® A Pace Analytical® Laboratory

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

QUALITY CONTROL

Metals Analyses (Dissolved) - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B350368 - SW-846 3005A Dissolved										
LCS (B350368-BS2)				Prepared: 08/28/23 Analyzed: 08/30/23						
Antimony	551	10	µg/L	500		110	80-120			
Arsenic	525	10	µg/L	500		105	80-120			
Chromium	506	50	µg/L	500		101	80-120			
LCS Dup (B350368-BSD1)				Prepared: 08/28/23 Analyzed: 08/29/23						
Barium	507	100	µg/L	500		101	80-120	0.0648	20	
Beryllium	525	4.0	µg/L	500		105	80-120	0.835	20	
Cadmium	530	2.0	µg/L	500		106	80-120	0.657	20	
Lead	524	5.0	µg/L	500		105	80-120	0.363	20	
Nickel	502	50	µg/L	500		100	80-120	0.232	20	
Selenium	513	50	µg/L	500		103	80-120	2.64	20	
Silver	515	2.0	µg/L	500		103	80-120	0.832	20	
Thallium	531	2.0	µg/L	500		106	80-120	0.235	20	
Vanadium	501	50	µg/L	500		100	80-120	0.0225	20	
Zinc	1040	100	µg/L	1000		104	80-120	0.0670	20	
LCS Dup (B350368-BSD2)				Prepared: 08/28/23 Analyzed: 08/30/23						
Antimony	555	10	µg/L	500		111	80-120	0.815	20	
Arsenic	532	10	µg/L	500		106	80-120	1.24	20	
Chromium	531	50	µg/L	500		106	80-120	4.77	20	

con-test® A Pace Analytical® Laboratory

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

FLAG/QUALIFIER SUMMARY

*	QC result is outside of established limits.
†	Wide recovery limits established for difficult compound.
‡	Wide RPD limits established for difficult compound.
#	Data exceeded client recommended or regulatory level
ND	Not Detected
RL	Reporting Limit is at the level of quantitation (LOQ)
DL	Detection Limit is the lower limit of detection determined by the MDL study
MCL	Maximum Contaminant Level
	Percent recoveries and relative percent differences (RPDs) are determined by the software using values in the calculation which have not been rounded.
	No results have been blank subtracted unless specified in the case narrative section.
B-02	Bis(2-ethylhexyl)phthalate is a common laboratory contaminant.
L-04	Laboratory fortified blank/laboratory control sample recovery and duplicate recovery are outside of control limits. Reported value for this compound is likely to be biased on the low side.
L-07	Either laboratory fortified blank/laboratory control sample or duplicate recovery is outside of control limits, but the other is within limits. RPD between the two LFB/LCS results is within method specified criteria.
L-07A	Either laboratory fortified blank/laboratory control sample or duplicate recovery is outside of control limits, but the other is within limits. RPD outside of control limits. Reduced precision anticipated for any reported result for this compound.
L-14	Compound classified by MA CAM as difficult with acceptable recoveries of 40-160%. Recovery does not meet 70-130% criteria but does meet difficult compound criteria.
R-05	Laboratory fortified blank duplicate RPD is outside of control limits. Reduced precision is anticipated for any reported value for this compound.
RL-07	Elevated reporting limit based on lowest point in calibration. MA CAM reporting limit not met.
S-26	Surrogate outside of control limits.
V-04	Initial calibration did not meet method specifications. Compound was calibrated using a response factor where %RSD is outside of method specified criteria. Reported result is estimated.
V-05	Continuing calibration verification (CCV) did not meet method specifications and was biased on the low side for this compound.
V-06	Continuing calibration verification (CCV) did not meet method specifications and was biased on the high side for this compound.
V-16	Response factor is less than method specified minimum acceptable value. Reduced precision and accuracy may be associated with reported result.
V-20	Continuing calibration verification (CCV) did not meet method specifications and was biased on the high side. Data validation is not affected since sample result was "not detected" for this compound.
V-34	Initial calibration verification (ICV) did not meet method specifications and was biased on the low side for this compound. Reported result is estimated.
V-35	Initial calibration verification (ICV) did not meet method specifications and was biased on the high side for this compound. Reported result is estimated.

con-test® A Pace Analytical® Laboratory

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

CERTIFICATIONS

Certified Analyses included in this Report

Analyte	Certifications
SW-846 6020B in Water	
Antimony	CT,NH,NY,ME,VA,NC
Arsenic	CT,NH,NY,NC,ME,VA
Barium	MA,NY,CT,NC,NH,ME,VA
Beryllium	CT,NH,NY,NC,ME,VA
Cadmium	CT,NH,NY,NC,ME,VA
Chromium	CT,NH,NY,NC,ME,VA
Lead	CT,NH,NY,NC,ME,VA
Nickel	CT,NH,NY,NC,ME,VA
Selenium	CT,NH,NY,NC,ME,VA
Silver	CT,NC,NH,NY,ME,VA
Thallium	CT,NH,NY,NC,ME,VA
Vanadium	CT,NH,NY,NC,ME,VA
Zinc	CT,NH,NY,NC,ME,VA
SW-846 7470A in Water	
Mercury	CT,NH,NY,NC,ME,VA
SW-846 8260D in Water	
Acetone	CT,NH,NY,ME
tert-Amyl Methyl Ether (TAME)	NH,NY,ME
Benzene	CT,NH,NY,ME
Bromobenzene	ME
Bromochloromethane	NH,NY,ME
Bromodichloromethane	CT,NH,NY,ME
Bromoform	CT,NH,NY,ME
Bromomethane	CT,NH,NY,ME
2-Butanone (MEK)	CT,NH,NY,ME
n-Butylbenzene	NY,ME
sec-Butylbenzene	NY,ME
tert-Butylbenzene	NY,ME
tert-Butyl Ethyl Ether (TBEE)	NH,NY,ME
Carbon Disulfide	CT,NH,NY,ME
Carbon Tetrachloride	CT,NH,NY,ME
Chlorobenzene	CT,NH,NY,ME
Chlorodibromomethane	CT,NH,NY,ME
Chloroethane	CT,NH,NY,ME
Chloroform	CT,NH,NY,ME
Chloromethane	CT,NH,NY,ME
2-Chlorotoluene	NY,ME
4-Chlorotoluene	NY,ME
1,2-Dibromo-3-chloropropane (DBCP)	NY
1,2-Dibromoethane (EDB)	NY
Dibromomethane	NH,NY,ME
1,2-Dichlorobenzene	CT,NY,ME
1,3-Dichlorobenzene	CT,NH,NY,ME
1,4-Dichlorobenzene	CT,NH,NY,ME
Dichlorodifluoromethane (Freon 12)	NH,NY,ME
1,1-Dichloroethane	CT,NH,NY,ME

con-test® A Pace Analytical® Laboratory

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

CERTIFICATIONS

Certified Analyses included in this Report

Analyte	Certifications
SW-846 8260D in Water	
1,2-Dichloroethane	CT,NH,NY,ME
1,1-Dichloroethylene	CT,NH,NY,ME
cis-1,2-Dichloroethylene	NY,ME
trans-1,2-Dichloroethylene	CT,NH,NY,ME
1,2-Dichloropropane	CT,NH,NY,ME
1,3-Dichloropropane	NY,ME
2,2-Dichloropropane	NH,NY,ME
1,1-Dichloropropene	NH,NY,ME
cis-1,3-Dichloropropene	CT,NH,NY,ME
trans-1,3-Dichloropropene	CT,NH,NY,ME
Diisopropyl Ether (DIPE)	NH,NY,ME
Ethylbenzene	CT,NH,NY,ME
Hexachlorobutadiene	CT,NH,NY,ME
2-Hexanone (MBK)	CT,NH,NY,ME
Isopropylbenzene (Cumene)	NY,ME
p-Isopropyltoluene (p-Cymene)	CT,NH,NY,ME
Methyl tert-Butyl Ether (MTBE)	CT,NH,NY,ME
Methylene Chloride	CT,NH,NY,ME
4-Methyl-2-pentanone (MIBK)	CT,NH,NY,ME
Naphthalene	NH,NY,ME
n-Propylbenzene	CT,NH,NY,ME
Styrene	CT,NH,NY,ME
1,1,1,2-Tetrachloroethane	CT,NH,NY,ME
1,1,2,2-Tetrachloroethane	CT,NH,NY,ME
Tetrachloroethylene	CT,NH,NY,ME
Toluene	CT,NH,NY,ME
1,2,3-Trichlorobenzene	NH,NY,ME
1,2,4-Trichlorobenzene	CT,NH,NY,ME
1,1,1-Trichloroethane	CT,NH,NY,ME
1,1,2-Trichloroethane	CT,NH,NY,ME
Trichloroethylene	CT,NH,NY,ME
Trichlorofluoromethane (Freon 11)	CT,NH,NY,ME
1,2,3-Trichloropropane	NH,NY,ME
1,2,4-Trimethylbenzene	NY,ME
1,3,5-Trimethylbenzene	NY,ME
Vinyl Chloride	CT,NH,NY,ME
m+p Xylene	CT,NH,NY,ME
o-Xylene	CT,NH,NY,ME
SW-846 8270E in Water	
Acenaphthene	CT,NY,NH
Acenaphthylene	CT,NY,NH
Acetophenone	NY
Aniline	CT,NY
Anthracene	CT,NY,NH
Benzo(a)anthracene	CT,NY,NH
Benzo(a)pyrene	CT,NY,NH

con-test® A Pace Analytical® Laboratory

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

CERTIFICATIONS

Certified Analyses included in this Report

Analyte	Certifications
SW-846 8270E in Water	
Benzo(b)fluoranthene	CT,NY,NH
Benzo(g,h,i)perylene	CT,NY,NH
Benzo(k)fluoranthene	CT,NY,NH
Bis(2-chloroethoxy)methane	CT,NY,NH
Bis(2-chloroethyl)ether	CT,NY,NH
Bis(2-chloroisopropyl)ether	CT,NY,NH
Bis(2-Ethylhexyl)phthalate	CT,NY,NH
4-Bromophenylphenylether	CT,NY,NH
Butylbenzylphthalate	CT,NY,NH
4-Chloroaniline	CT,NY,NH
2-Chloronaphthalene	CT,NY,NH
2-Chlorophenol	CT,NY,NH
Chrysene	CT,NY,NH
Dibenz(a,h)anthracene	CT,NY,NH
Dibenzofuran	CT,NY,NH
Di-n-butylphthalate	CT,NY,NH
1,2-Dichlorobenzene	CT,NY,NH
1,3-Dichlorobenzene	CT,NY,NH
1,4-Dichlorobenzene	CT,NY,NH
3,3-Dichlorobenzidine	CT,NY,NH
2,4-Dichlorophenol	CT,NY,NH
Diethylphthalate	CT,NY,NH
2,4-Dimethylphenol	CT,NY,NH
Dimethylphthalate	CT,NY,NH
2,4-Dinitrophenol	CT,NY,NH
2,4-Dinitrotoluene	CT,NY,NH
2,6-Dinitrotoluene	CT,NY,NH
Di-n-octylphthalate	CT,NY,NH
1,2-Diphenylhydrazine/Azobenzene	NY
Fluoranthene	CT,NY,NH
Fluorene	NY,NH
Hexachlorobenzene	CT,NY,NH
Hexachlorobutadiene	CT,NY,NH
Hexachloroethane	CT,NY,NH
Indeno(1,2,3-cd)pyrene	CT,NY,NH
Isophorone	CT,NY,NH
2-Methylnaphthalene	CT,NY,NH
2-Methylphenol	CT,NY,NH
3/4-Methylphenol	CT,NY,NH
Naphthalene	CT,NY,NH
Nitrobenzene	CT,NY,NH
2-Nitrophenol	CT,NY,NH
4-Nitrophenol	CT,NY,NH
Pentachlorophenol	CT,NY,NH
Phenanthrene	CT,NY,NH
Phenol	CT,NY,NH
Pyrene	CT,NY,NH

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

CERTIFICATIONS

Certified Analyses included in this Report

Analyte	Certifications
SW-846 8270E in Water	
1,2,4-Trichlorobenzene	CT,NY,NH
2,4,5-Trichlorophenol	CT,NY,NH
2,4,6-Trichlorophenol	CT,NY,NH

Con-Test, a Pace Environmental Laboratory, operates under the following certifications and accreditations:

Code	Description	Number	Expires
MA	Massachusetts DEP	M-MA100	06/30/2024
CT	Connecticut Department of Public Health	PH-0821	12/31/2024
NY	New York State Department of Health	10899 NELAP	04/1/2024
NH	New Hampshire Environmental Lab	2516 NELAP	02/5/2024
NC	North Carolina Div. of Water Quality	652	12/31/2023
ME	State of Maine	MA00100	06/9/2025
VA	Commonwealth of Virginia	460217	12/14/2023

23H3880

Pace Analytical®

Phone: 413-525-2332
Fax: 413-525-6405
Access COC's and Support Requests

http://www.pacelabs.com

CHAIN OF CUSTODY RECORD

39 Spruce Street
East Longmeadow, MA 01028

Doc # 381 Rev 5_07/13/2021

Page 1 of 1

Company Name:	Weston + Sampson
Address:	55 Walkers Brook Dr #100, Reading, MA
Phone:	1-800-SAMPSON
Project Name:	ES Pinevale
Project Location:	Springfield, MA
Project Number:	ENG23-0315
Project Manager:	Joe Spencer
Pace Quote Name/Number:	
Invoice Recipient:	invoices@wseinc.com
Sampled By:	ACE, EL

Requested Turnaround Time: 7-Day ☐ 10-Day ☐ PFAS 10-Day (std) ☐ STANDARD Due Date:

Rush-Approval Required: 1-Day ☐ 3-Day ☐ 2-Day ☐ 4-Day ☐

Data Delivery: Format: PDF ☒ EXCEL ☒
Other: envirodata edd
CLP Like Data Pkg Required: ☐
Email To: SPENCERJ@WSEINC.COM
~~Fax To #:~~ ECKER.ALISON@WSEINC.COM, LT.ESTHER@WSEINC.COM

Dissolved Metals Samples: ☒ Field Filtered ○ Lab to Filter

Orthophosphate Samples: ○ Field Filtered ○ Lab to Filter

PCB ONLY: SOXHLET ☐ NON SOXHLET ☐

ANALYSIS REQUESTED

Pace Work Order#	Client Sample ID / Description	Beginning Date/Time	Ending Date/Time	COMP/GRAB	[1]Matrix Code	Conc Code	VIALS	GLASS	PLASTIC	BACTERIA	ENCORE	MCP 14 Metals	VOCs	SVOCs
1	EW-1	8/25/23	1020	G	GW	U	2	2	1			X	X	X
2	EW-2		1120				2	2	1			X	X	X
3	EW-3		1300				2	2	1			X	X	X
4	MW-CM-43N		1130				2	2	1			X	X	X
5	MW-205A		1245				2	2	1			X	X	X
6	MW-CM-38N		1000				2	2	1			X	X	X
7	MW-CM-53N		1330				2	2	1			X	X	X
8	DUP-1		—				2	2	1			X	X	X

[2] Preservation Code

Courier Use Only
Total Number Of:
VIALS_____
GLASS_____
PLASTIC_____
BACTERIA_____
ENCORE_____

Glassware in the fridge? Y / N
Glassware in freezer? Y / N
Prepackaged Cooler? Y / N

*Pace Analytical is not responsible for missing samples from prepacked coolers

[1] **Matrix Codes:**
GW = Ground Water
WW = Waste Water
DW = Drinking Water
A = Air
S = Soil
SL = Sludge
SOL = Solid
O = Other (please define)

[2] **Preservation Codes:**
I = Iced
H = HCL
M = Methanol
N = Nitric Acid
S = Sulfuric Acid
B = Sodium Bisulfate
X = Sodium Hydroxide
T = Sodium Thiosulfate
O = Other (please define)

Relinquished by: (signature)	8/25/23	Date/Time: 1500
Received by: (signature)	18.0°C	Date/Time: 8-25-23 1500
Relinquished by: (signature)		Date/Time:
Received by: (signature)		Date/Time:
Relinquished by: (signature)		Date/Time:
Received by: (signature)		Date/Time:
Relinquished by: (signature)		Date/Time:
Received by: (signature)		Date/Time:

Client Comments:

Detection Limit Requirements
MA: GW-2, GW-3
CT:
Other:

Special Requirements
☒ MA MCP Required
MCP Certification Form Required
☐ CT RCP Required
RCP Certification Form Required
☐ MA State DW Required
PWSID #

Please use the following codes to indicate possible sample concentration within the Conc Code column above:
H - High; M - Medium; L - Low; C - Clean; U - Unknown

NELAC and AIHA-LAP, LLC Accredited

Project Entity
Government ☐ Municipality ☒ MWRA ☐ WRTA ☐
Federal ☐ 21 J ☐ School ☐
City ☐ Brownfield ☐ MBTA ☐

Other
☐ Chromatogram
☐ AIHA-LAP,LLC

Lab Comments:

Disclaimer: Pace Analytical is not responsible for any omitted information on the Chain of Custody. The Chain of Custody is a legal document that must be complete and accurate and is used to determine what analyses the laboratory will perform. Any missing information is not the laboratory's responsibility. Pace Analytical values your partnership on each project and will try to assist with missing information, but will not be held accountable.

RF

Table of Contents

Pace ANALYTICAL SERVICES	DC#_Title: ENV-FRM-ELON-0001 v07_Sample Receiving Checklist
	Effective Date: 07/13/2023

Log In Back-Sheet

Client W&S

Project ES Pinevale

MCP/RCP Required MA MCP

Deliverable Package Requirement GW-1/3

Location MA

PWSID# (When Applicable) NA

Arrival Method:

Courier ☐ Fed Ex ☐ Walk In ☑ Other ☐

Received By / Date / Time AMM 8/25/23 1500

Back-Sheet By / Date / Time SC 8/25/23 1941

Temperature Method GUN # 5

Temp < 6° C Actual Temperature 18.0

Rush Samples: Yes / (No) Notify

Short Hold: Yes / (No) Notify

Notes regarding Samples/COC outside of SOP:

Login Sample Receipt Checklist – (Rejection Criteria Listing – Using Acceptance Policy) Any False statement will be brought to the attention of the Client – True or False

	True	False
Received on Ice	☑	☐
Received in Cooler	☑	☐
Custody Seal: DATE TIME	☐	☑
COC Relinquished	☑	☐
COC/Samples Labels Agree	☑	☐
All Samples in Good Condition	☑	☐
Samples Received within Holding Time	☑	☐
Is there enough Volume	☑	☐
Proper Media/Container Used	☑	☐
Splitting Samples Required	☐	☑
MS/MSD	☐	☑
Trip Blanks	☐	☑
Lab to Filters	☐	☑
COC Legible	☑	☐

COC Included: (Check all included)

Client	☑	Analysis	☑	Sampler Name	☑
Project	☑	IDs	☑	Collection Date/Time	☑

All Samples Proper pH: N/A ☑ ☐

Additional Container Notes

Note: West Virginia requires all samples to have their temperature taken. Note any outliers.

Qualtrax ID: 120836

DC#_Title: ENV-FRM-ELON-0001 v07_Sample Receiving Checklist
Effective Date: 07/13/2023

Pace ANALYTICAL SERVICES

Container	Size	Type	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Sample			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Soils Jars	(Circle Amb/Clear)	16oz Amb/Clear																				
		8oz Amb/Clear																				
		4oz Amb/Clear																				
		2oz Amb/Clear																				
Ambers	1 Liter	Unpreserved																				
		HCL																				
		Sulfuric																				
	250mL	Sulfuric																				
		Phosphoric																				
		HCl																				
	100mL	Unpreserved	2	—	—	—	—	—	—	—												
Plastics	1 Liter	Unpreserved																				
		Sulfuric																				
	500mL	Unpreserved																				
		Sulfuric																				
	250mL	Unpreserved																				
		Trizma																				
		Sulfuric																				
		Nitric	1	—	—	—	—	—	—	—												
		NaOH																				
		Ammonium Acetate																				
		NaOH/Zinc																				
VOA Vials		Unpreserved																				
		HCl	2	—	—	—	—	—	—	—												
		MeOH																				
		D.I. Water																				
		BiSulfate																				
Other / Fill in		Col/Bact																				

Qualtrax ID: 120836

Page 2 of 2

MADEP MCP Analytical Method Report Certification Form

Laboratory Name: Pace New England	Project #: 23H3880
Project Location: Springfield, MA	RTN:

This Form provides certifications for the following data set: [list Laboratory Sample ID Number(s)]

23H3880-01 thru 23H3880-08

Matrices: Water

CAM Protocol (check all that below)

8260 VOC CAM II A (X)	7470/7471 Hg CAM IIIB (X)	MassDEP VPH (GC/PID/FID) CAM IV A ( )	8082 PCB CAM V A ( )	9014 Total Cyanide/PAC CAM VI A ( )	6860 Perchlorate CAM VIII B ( )
8270 SVOC CAM II B (X)	7010 Metals CAM III C ( )	MassDEP VPH (GC/MS) CAM IV C ( )	8081 Pesticides CAM V B ( )	7196 Hex Cr CAM VI B ( )	MassDEP APH CAM IX A ( )
6010 Metals CAM III A ( )	6020 Metals CAM III D (X)	MassDEP EPH CAM IV B ( )	8151 Herbicides CAM V C ( )	8330 Explosives CAM VIII A ( )	TO-15 VOC CAM IX B ( )

Affirmative response to Questions A throughF is required for "Presumptive Certainty" status

A	Were all samples received in a condition consistent with those described on the Chain-of-Custody, properly preserved (including temperature) in the field or laboratory, and prepared/analyzed within method holding times?	☑ Yes	☐ No[1]
B	Were the analytical method(s) and all associated QC requirements specificed in the selected CAM protocol(s) followed?	☑ Yes	☐ No[1]
C	Were all required corrective actions and analytical response actions specified in the selected CAM protocol(s) implemented for all identified performance standard non-conformances?	☑ Yes	☐ No[1]
D	Does the laboratory report comply with all the reporting requirements specified in CAM VII A, Quality Assurance and Quality Control Guidlines for the Acquisition and Reporting of Analytical Data?	☑ Yes	☐ No[1]
E a	VPH, EPH, and APH Methods only: Was each method conducted without significant modification(s)? (Refer to the individual method(s) for a list of significant modifications).	☐ Yes	☐ No[1]
E b	APH and TO-15 Methods only: Was the complete analyte list reported for each method?	☐ Yes	☐ No[1]
F	Were all applicable CAM protocol QC and performance standard non-conformances identified and evaluated in a laboratory narrative (including all No responses to Qestions A through E)?	☑ Yes	☐ No[1]

A response to questions G, H and I below is required for "Presumptive Certainty" status

G	Were the reporting limits at or below all CAM reporting limits specified in the selected CAM protocol(s)?	☐ Yes	☑ No[1]

***Data User Note:* Data that achieve "Presumptive Certainty" status may not necessarily meet the data usability and representativeness requirements described in 310 CMR 40. 1056 (2)(k) and WSC-07-350.**

H	Were all QC perfomance standards specified in the CAM protocol(s) achieved?	☐ Yes	☑ No[1]
I	Were results reported for the complete analyte list specified in the selected CAM protocol(s)?	☑ Yes	☐ No[1]

[1] *All Negative responses must be addressed in an attached Environmental Laboratory case narrative.*

I, the undersigned, attest under the pains and penalties of perjury that, based upon my personal inquiry of those responsible for obtaining the information, the material contained in this analytical report is, to the best of my knowledge and belief, accurate and complete.

Signature: Meghan E. Kelley Position: Reporting Specialist

Printed Name: Meghan E. Kelley Date: 09/11/23

APPENDIX D

Supporting Documentation for Risk Characterization

Table 1
Summary of Analytical Data for Soil Samples (All Soil)
E/S Pinevale
Springfield, Massachusetts

Constituent	Frequency of Detection	Range Detected (mg/kg)	Location of Maximum Detected Concentration	Arithmetic Mean Concentration (mg/kg)
Metals				
Arsenic	40 / 46	2.6 - 23	TP-16	5
Barium	58 / 58	16 - 3,300	CM-54	218
Cadmium	27 / 63	0.27 - 4.4	CM-54	0.56
Chromium VI	3 / 5	1.7 - 2	CM-23A	1.55
Chromium (IV or total)*	64 / 64	5 - 550	CM-46	30
Lead	75 / 75	2.1 - 1,040	TP-16	80
Mercury	26 / 46	0.02 - 5	CM-46	0.20
Silver	2 / 46	0.78 - 1.6	CM-46	0.31
Extractable Petroleum Hydrocarbons (EPH)				
C9-C18 Aliphatic Hydrocarbons	10 / 34	12 - 9,800	BT-E	563
C19-C36 Aliphatic Hydrocarbons	17 / 34	11 - 9,320	TP-3	428
C11-C22 Aromatic Hydrocarbons	23 / 34	13 - 3,500	BT-E	296
Polycyclic Aromatic Hydrocarbons (PAHs)				
Acenaphthene	18 / 39	0.1 - 19	TP-3	1.4
Acenaphthylene	11 / 39	0.3 - 55	TP-3	1.8
Anthracene	21 / 39	0.1 - 154	TP-3	5.3
Benz(a)anthracene	24 / 39	0.1 - 184	TP-3	7.9
Benzo(a)pyrene	23 / 39	0.1 - 115	TP-3	6.1
Benzo(b)fluoranthene	22 / 39	0.3 - 104	TP-3	7.1
Benzo(g,h,i)perylene	23 / 39	0.1 - 56	TP-3	3.8
Benzo(k)fluoranthene	21 / 39	0.1 - 117	TP-3	4.7
Chrysene	23 / 39	0.2 - 145	TP-3	7.3
Dibenz(a,h)anthracene	14 / 39	0.2 - 11	TP-3	0.9
Fluoranthene	26 / 39	0.3 - 459	TP-3	19.5
Fluorene	18 / 39	0.1 - 24	TP-3	1.8
Indeno(1,2,3-cd)pyrene	22 / 39	0.2 - 71	TP-3	4.2
2-Methylnapthalene	11 / 39	0.1 - 12	BT-E	1.3
Naphthalene	12 / 39	0.4 - 13	TP-3	1
Phenanthrene	26 / 39	0.2 - 616	TP-3	21
Pyrene	25 / 39	0.3 - 429	TP-3	19
Volatile Petroleum Hydrocarbons				
C5-C8 Aliphatics	2 / 24	26.2 - 30	CM-38	8.5
C9-C12 Aliphatics	7 / 24	37 - 330	BT-E	49
C9-C10 Aromatics	7 / 24	150 - 650	BT-E	104
Volatile Organic Compounds				
Ethylbenzene	4 / 24	0.1 - 0.7	TP-18	0.12
Naphthalene	5 / 24	1.1 - 24	BT-E	1.7
Xylenes, total	5 / 24	0.3 - 4.8	BT-E	0.4
Polychlorinated Biphenyls	1 / 23	2.1	TP-3	0.1

Notes:

1. For the purpose of calculating arithmetic mean concentrations, one-half the method detection limit was used to represent the concentrations of constituents reported as non-detects (ND).

2. Analytical results were based on samples collected between September 2009 and May 2023.

3 NC = Not calculated.

Table 2
Summary of Analytical Data for Soil Samples (0 to 15 feet)
E/S Pinevale
Springfield, Massachusetts

Constituent	Frequency of Detection	Range Detected (mg/kg)	Location of Maximum Detected Concentration	Arithmetic Mean Concentration (mg/kg)	95% Upper Confidence Limit (UCL) w/o NDs (mg/kg)	Selected as COPC?	If No, Reason for Exclusion? If Yes, EPC Selection?
Metals							
Arsenic	40 / 46	2.6 - 23	TP-16	5	6	Yes	95% student's t
Barium	58 / 58	16 - 3,300	CM-54	218	539	Yes	95% UCL Chebyshev
Cadmium	27 / 63	0.27 - 4.4	CM-54	0.56	NC	Yes	Max conc used
Chromium VI	2 / 4	2 - 2	CM-23A	1.50	NC	Yes	Max conc used
Chromium (IV or total)*	64 / 64	5 - 550	CM-46	30	69	Yes	95% UCL Chebyshev
Lead	75 / 75	2.1 - 1,040	TP-16	80	156	Yes	95% UCL Chebyshev
Mercury	26 / 46	0.02 - 5	CM-46	0.20	0.69	Yes	95% UCL Chebyshev
Silver	2 / 46	0.78 - 1.6	CM-46	0.31	NC	No	Below Background
Extractable Petroleum Hydrocarbons (EPH)							
C9-C18 Aliphatic Hydrocarbons	9 / 33	12 - 9,800	BT-E	543	NC	Yes	Max conc used
C19-C36 Aliphatic Hydrocarbons	16 / 33	11 - 9,320	TP-3	436	NC	Yes	Max conc used
C11-C22 Aromatic Hydrocarbons	22 / 33	13 - 3,500	BT-E	296	NC	Yes	Max conc used
Polycyclic Aromatic Hydrocarbons (PAHs)							
Acenaphthene	17 / 38	0.1 - 19	TP-3	1.4	NC	Yes	Max conc used
Acenaphthylene	10 / 38	0.3 - 55	TP-3	1.9	NC	Yes	Max conc used
Anthracene	21 / 38	0.1 - 154	TP-3	5.4	NC	Yes	Max conc used
Benz(a)anthracene	24 / 38	0.1 - 184	TP-3	8.1	30	Yes	95% UCL Chebyshev
Benzo(a)pyrene	23 / 38	0.1 - 115	TP-3	6.3	20	Yes	95% UCL Chebyshev
Benzo(b)fluoranthene	22 / 38	0.3 - 104	TP-3	7.3	21	Yes	95% UCL Chebyshev
Benzo(g,h,i)perylene	23 / 38	0.1 - 56	TP-3	3.9	NC	Yes	Max conc used
Benzo(k)fluoranthene	21 / 38	0.1 - 117	TP-3	4.8	NC	Yes	Max conc used
Chrysene	23 / 38	0.2 - 145	TP-3	7.5	NC	Yes	Max conc used
Dibenz(a,h)anthracene	14 / 38	0.2 - 11	TP-3	0.9	3	Yes	95% UCL Chebyshev
Fluoranthene	25 / 38	0.3 - 459	TP-3	20.0	NC	Yes	Max conc used
Fluorene	17 / 38	0.1 - 24	TP-3	1.8	NC	Yes	Max conc used
Indeno(1,2,3-cd)pyrene	22 / 38	0.2 - 71	TP-3	4.3	13	Yes	95% UCL Chebyshev
2-Methylnapthalene	10 / 38	0.1 - 12	BT-E	1.2	NC	Yes	Max conc used
Naphthalene	11 / 38	0.4 - 13	TP-3	1	NC	No	Detected at higher conc via Target VOCs
Phenanthrene	25 / 38	0.2 - 616	TP-3	22	NC	Yes	Max conc used
Pyrene	24 / 38	0.3 - 429	TP-3	19	NC	Yes	Max conc used
Volatile Petroleum Hydrocarbons							
C5-C8 Aliphatics	2 / 23	26.2 - 30	CM-38	8.5	NC	Yes	Max conc used
C9-C12 Aliphatics	6 / 23	37 - 330	BT-E	46	NC	Yes	Max conc used
C9-C10 Aromatics	6 / 23	150 - 650	BT-E	96	NC	Yes	Max conc used
Volatile Organic Compounds							
Ethylbenzene	3 / 23	0.1 - 0.7	TP-18	0.10	NC	Yes	Max conc used
Naphthalene	4 / 23	1.1 - 24	BT-E	1.7	NC	No	Detected at higher conc via Target PAHs
Xylenes, total	4 / 23	0.3 - 4.8	BT-E	0.4	NC	Yes	Max conc used
Polychlorinated Biphenyls	1 / 23	2.1	TP-3	0.1			

Notes:

1. For the purpose of calculating arithmetic mean concentrations, one-half the method detection limit was used to represent the concentrations of constituents reported as non-detects (ND).

2. Analytical results were based on samples collected between September 2009 and May 2023.

3 NC = Not calculated.

Table 3
Summary of Analytical Data for Surface Soil Samples (0 to 3 feet below grade)
E/S Pinevale
Springfield, Massachusetts

Constituent	Frequency of Detection	Range Detected (mg/kg)	Location of Maximum Detected Concentration	Arithmetic Mean Concentration (mg/kg)	95% Upper Confidence Limit (UCL) w/o NDs (mg/kg)	Selected as COPC?	If No, Reason for Exclusion? If Yes, EPC Selection?
Metals							
Arsenic	39 / 45	2.6 - 23	TP-16	5	6	Yes	95% student's t
Barium	56 / 56	16 - 3,300	CM-54	223	539	Yes	95% UCL Chebyshev
Cadmium	26 / 61	0.27 - 4.4	CM-54	0.56	NC	Yes	Max conc used
Chromium VI	2 / 3	2 - 2	CM-23A	2.00	NC	Yes	Max conc used
Chromium (IV or total)*	58 / 58	5 - 550	CM-46	32	69	Yes	95% UCL Chebyshev
Lead	64 / 64	2.1 - 1,040	TP-16	83	169	Yes	95% UCL Chebyshev
Mercury	25 / 45	0.02 - 5	CM-46	0.20	0.69	Yes	95% UCL Chebyshev
Silver	2 / 45	0.78 - 1.6	CM-46	0.31	NC	No	Below Background
Extractable Petroleum Hydrocarbons (EPH)							
C9-C18 Aliphatic Hydrocarbons	1 / 9	9,800	BT-E	1,120	NC	Yes	Max conc used
C19-C36 Aliphatic Hydrocarbons	5 / 9	23 - 9,320	TP-3	1,352	NC	Yes	Max conc used
C11-C22 Aromatic Hydrocarbons	8 / 9	14 - 3,500	BT-E	710	NC	Yes	Max conc used
Polycyclic Aromatic Hydrocarbons (PAHs)							
Acenaphthene	9 / 14	0.2 - 19	TP-3	2.9	NC	Yes	Max conc used
Acenaphthylene	4 / 14	0.5 - 55	TP-3	4.2	NC	Yes	Max conc used
Anthracene	13 / 14	0.1 - 154	TP-3	13.8	NC	Yes	Max conc used
Benz(a)anthracene	13 / 14	0.3 - 184	TP-3	20.8	60	Yes	95% UCL Adjusted Gamma
Benzo(a)pyrene	13 / 14	0.2 - 115	TP-3	15.9	43	Yes	95% UCL Adjusted Gamma
Benzo(b)fluoranthene	13 / 14	0.3 - 104	TP-3	18.4	45	Yes	95% UCL Adjusted Gamma
Benzo(g,h,i)perylene	13 / 14	0.1 - 56	TP-3	9.9	NC	Yes	Max conc used
Benzo(k)fluoranthene	12 / 14	0.1 - 117	TP-3	12.4	NC	Yes	Max conc used
Chrysene	13 / 14	0.3 - 145	TP-3	18.9	NC	Yes	Max conc used
Dibenz(a,h)anthracene	9 / 14	0.6 - 11	TP-3	2.3	5	Yes	95% UCL Adjusted Gamma
Fluoranthene	13 / 14	0.3 - 459	TP-3	50.6	NC	Yes	Max conc used
Fluorene	9 / 14	0.1 - 24	TP-3	3.6	NC	Yes	Max conc used
Indeno(1,2,3-cd)pyrene	13 / 14	0.2 - 71	TP-3	11.0	28	Yes	95% UCL Adjusted Gamma
2-Methylnapthalene	3 / 14	2.2 - 12	BT-E	1.7	NC	Yes	Max conc used
Naphthalene	5 / 14	0.4 - 13	TP-3	2	NC	Yes	Max conc used
Phenanthrene	12 / 14	0.5 - 616	TP-3	55	NC	Yes	Max conc used
Pyrene	13 / 14	0.3 - 429	TP-3	49	NC	Yes	Max conc used
Volatile Petroleum Hydrocarbons							
C9-C12 Aliphatics	1 / 1	330 - 330	BT-E	330	NC	Yes	Max conc used
C9-C10 Aromatics	1 / 1	650 - 650	BT-E	650	NC	Yes	Max conc used
Volatile Organic Compounds							
Naphthalene	1 / 1	24	BT-E	24.0	NC	No	Detected at higher conc via Target PAHs
Xylenes, total	1 / 1	4.8	BT-E	4.8	NC	Yes	Max conc used
Polychlorinated Biphenyls	1 / 22	2.1	TP-3	0.1	NC	Yes	Max conc used

Notes:

1. For the purpose of calculating arithmetic mean concentrations, one-half the method detection limit was used to represent the concentrations of constituents reported as non-detects (ND).

2. Analytical results were based on samples collected between September 2009 and May 2023.

3 NC = Not calculated.

Table 4
Summary of Analytical Data for Soil Samples (0 to 6 feet)
E/S Pinevale
Springfield, Massachusetts

Constituent	Frequency of Detection	Range Detected (mg/kg)	Location of Maximum Detected Concentration	Arithmetic Mean Concentration (mg/kg)	95% Upper Confidence Limit (UCL) w/o NDs (mg/kg)	Selected as COPC?	If No, Reason for Exclusion? If Yes, EPC Selection?
Metals							
Arsenic	40 / 46	2.6 - 23	TP-16	5	6	Yes	95% student's t
Barium	58 / 58	16 - 3,300	CM-54	218	539	Yes	95% UCL Chebyshev
Cadmium	27 / 63	0.27 - 4.4	CM-54	0.56	NC	Yes	Max conc used
Chromium VI	2 / 4	2 - 2	CM-23A	1.50	NC	Yes	Max conc used
Chromium (IV or total)*	64 / 64	5 - 550	CM-46	30	69	Yes	95% UCL Chebyshev
Lead	74 / 74	2.1 - 1,040	TP-16	79	156	Yes	95% UCL Chebyshev
Mercury	26 / 46	0.02 - 5	CM-46	0.20	0.69	Yes	95% UCL Chebyshev
Silver	2 / 46	0.78 - 1.6	CM-46	0.31	NC	No	Below Background
Extractable Petroleum Hydrocarbons (EPH)							
C9-C18 Aliphatic Hydrocarbons	5 / 22	12 - 9,800	BT-E	590	NC	Yes	Max conc used
C19-C36 Aliphatic Hydrocarbons	10 / 22	12 - 9,320	TP-3	580	NC	Yes	Max conc used
C11-C22 Aromatic Hydrocarbons	16 / 22	14 - 3,500	BT-E	339	NC	Yes	Max conc used
Polycyclic Aromatic Hydrocarbons (PAHs)							
Acenaphthene	13 / 27	0.2 - 19	TP-3	1.7	NC	Yes	Max conc used
Acenaphthylene	7 / 27	0.3 - 55	TP-3	2.3	NC	Yes	Max conc used
Anthracene	19 / 27	0.1 - 154	TP-3	7.6	NC	Yes	Max conc used
Benz(a)anthracene	22 / 27	0.1 - 184	TP-3	11.4	41	Yes	95% UCL Chebyshev
Benzo(a)pyrene	22 / 27	0.1 - 115	TP-3	8.8	17	Yes	95% UCL Chebyshev
Benzo(b)fluoranthene	21 / 27	0.3 - 104	TP-3	10.3	20	Yes	95% UCL Adjusted Gamma
Benzo(g,h,i)perylene	22 / 27	0.1 - 56	TP-3	5.5	NC	Yes	Max conc used
Benzo(k)fluoranthene	20 / 27	0.1 - 117	TP-3	6.7	NC	Yes	Max conc used
Chrysene	22 / 27	0.2 - 145	TP-3	10.5	NC	Yes	Max conc used
Dibenz(a,h)anthracene	14 / 27	0.2 - 11	TP-3	1.3	3	Yes	95% UCL Chebyshev
Fluoranthene	22 / 27	0.3 - 459	TP-3	28.0	NC	Yes	Max conc used
Fluorene	13 / 27	0.1 - 24	TP-3	2.1	NC	Yes	Max conc used
Indeno(1,2,3-cd)pyrene	21 / 27	0.2 - 71	TP-3	6.1	18	Yes	95% UCL Chebyshev
2-Methylnapthalene	7 / 27	0.1 - 12	BT-E	1.0	NC	Yes	Max conc used
Naphthalene	8 / 27	0.4 - 13	TP-3	2	NC	No	Detected at higher conc via Target VOCs
Phenanthrene	22 / 27	0.2 - 616	TP-3	30	NC	Yes	Max conc used
Pyrene	22 / 27	0.3 - 429	TP-3	27	NC	Yes	Max conc used
Volatile Petroleum Hydrocarbons							
C9-C12 Aliphatics	3 / 13	140 - 330	BT-E	55	NC	Yes	Max conc used
C9-C10 Aromatics	3 / 13	340 - 650	BT-E	121	NC	Yes	Max conc used
Volatile Organic Compounds							
Naphthalene	1 / 13	24	BT-E	2.2	NC	No	Max conc used
Xylenes, total	1 / 13	4.8	BT-E	0.6	NC	Yes	Max conc used
Polychlorinated Biphenyls	1 / 23	2.1	TP-3	0.1	NC	Yes	Max conc used

Notes:

1. For the purpose of calculating arithmetic mean concentrations, one-half the method detection limit was used to represent the concentrations of constituents reported as non-detects (ND).

2. Analytical results were based on samples collected between September 2009 and May 2023.

3 NC = Not calculated.

Table 5
Summary of Analytical Data for Groundwater Samples
E/S Pinevale
Springfield, Massachusetts

Constituent	Frequency of Detection	Range Detected (ug/L)	Location of Maximum Detected Concentration	Arithmetic Mean Concentration (ug/L)	Selected as COPC?	If No, Reason for Exclusion? If Yes, EPC Selection?
Metals						
Arsenic	2 / 7	1.2 - 21	MW-CM-38N	4	Yes	Max conc used
Barium	7 / 7	86 - 320	MW-205A	196	Yes	Max conc used
Cadmium	1 / 7	1.24 - 1.24	MW-205A	0.26	Yes	Max conc used
Nickel	1 / 7	6.9	EW-3	3	Yes	Max conc used
Zinc	2 / 7	10 - 49	EW-3	12	Yes	Max conc used
Volatile Organic Compounds						
Benzene	1 / 7	1.3	MW-CM-38N	0.6	Yes	Max conc used
n-Butylbenzene	3 / 7	1.0 - 4	MW-CM-38N	1.2	Reviewed	Part of C9 to C10 Aromatic Fractions
sec-Butylbenzene	4 / 7	1.4 - 4	MW-CM-38N	1.4	Reviewed	Part of C9 to C10 Aromatic Fractions
tert-Butylbenzene	1 / 7	2	MW-CM-38N	0.7	Reviewed	Part of C9 to C10 Aromatic Fractions
Ethylbenzene	2 / 7	2 - 39	MW-CM-38N	6	Yes	Max conc used
Isopropylbenzene	2 / 7	2 - 10	MW-CM-38N	2	Reviewed	Part of C9 to C10 Aromatic Fractions
p-Isopropyltoluene	1 / 7	2	MW-CM-38N	0.7	Reviewed	Part of C9 to C10 Aromatic Fractions
Naphthalene	2 / 7	31 - 170	MW-CM-38N	29	Yes	Max conc used
n-Propylbenzene	2 / 7	2 - 16	MW-CM-38N	3	Reviewed	Part of C9 to C10 Aromatic Fractions
1,2,4-Trimethylbenzene	1 / 7	25	MW-CM-38N	4	Reviewed	Part of C9 to C10 Aromatic Fractions
Xylenes, Total	1 / 7	4	MW-CM-38N	1.0	Yes	Max conc used
Semi-Volatile Organic Compounds						
Fluorene	1 / 7	5	MW-CM-38N	3	Yes	Max conc used
2-Methylnaphthalene	2 / 7	32 - 79	MW-CM-38N	18	Yes	Max conc used
Naphthalene	2 / 7	18 - 95	MW-CM-38N	18	No	Higher concentrations via VOCs

Notes:

1. For the purpose of calculating arithmetic mean concentrations, one-half the method detection limit was used to represent the concentrations of constituents reported as non-detects (ND).

2. Analytical results were based on groundwater samples collected from monitoring wells between June and August 2023.

3. VOCs considered part of the C9 to C10 aromatic fraction were summed and compared to applicable standards when appropriate. Since concentrations were below standards, no further assessment was performed.

Table 6
Comparison of Detected PAHs and Metals in Soil to Massachusetts Background Concentrations
E/S Pinevale
Springfield, Massachusetts

Constituent	Maximum Detected Concentration mg/kg	Massachusetts Background Concentration In Soil Containing Anthropogenic Fill Material mg/kg	
Metals			
Arsenic	22.7	20	*
Barium	3300	50	*
Cadmium	4.4	3	*
Chromium VI	2	40	
Chromium (IV or total)*	550	40	*
Lead	1040	600	*
Mercury	5	1	*
Silver	1.6	5	
Polycyclic Aromatic Hydrocarbons (PAHs)			
Acenaphthene	19	2	*
Acenaphthylene	55	1	*
Anthracene	154	4	*
Benz(a)anthracene	184	9	*
Benzo(a)pyrene	115	7	*
Benzo(b)fluoranthene	104	8	*
Benzo(g,h,i)perylene	56	3	*
Benzo(k)fluoranthene	117	4	*
Chrysene	145	7	*
Dibenz(a,h)anthracene	11	1	*
Fluoranthene	459	10	*
Fluorene	24	2	*
Indeno(1,2,3-cd)pyrene	71	3	*
2-Methylnapthalene	12	1	*
Naphthalene	13	1	*
Phenanthrene	616	20	*
Pyrene	429	20	*

Notes:

1. The Massachusetts Background Concentration was obtained from MADEP (2002) Characterizing Risks Posed by Petroleum Contaminated Sites: Implementation of the MADEP VPH/EPH Approach, Final Policy, Policy #WSC-02-411

2. * Indicates maximum detected concentration in Site soil exceeds background concentration in soil.

Table 7
Summary of Results - Soil 0 to 15 feet below grade
E/S Pinevale
Springfield, Massachusetts

Potential Receptor	Exposure Media	Exposure and Migration Pathway	Hazard Index Subchronic	Hazard Index Chronic	ELCR
Soil 0 to 15 feet					
On-Site Resident	Surface and Subsurface Soil	Incidental Ingestion and Dermal Contact	2.0	2.3	1E-05
		Total:	**2.0**	**2.3**	**1E-05**
		DEP Risk Limit:	1	1	1E-05
		Exceeds DEP Risk Limit?	**YES**	**YES**	**NO***
Park Visitor	Surface and Subsurface Soil	Incidental Ingestion and Dermal Contact	1.2	1.4	7E-06
		Total:	**1.2**	**1.4**	**7E-06**
		DEP Risk Limit:	1	1	1E-05
		Exceeds DEP Risk Limit?	**NO***	**NO***	**NO**
Employee	Surface and Subsurface Soil	Incidental Ingestion and Dermal Contact and Inhalation of Soil-Derived Particulates in Air	NC	0.2	2E-06
		Total:	**NC**	**0.2**	**2E-06**
		DEP Risk Limit:	1	1	1E-05
		Exceeds DEP Risk Limit?	**NO**	**NO**	**NO**
Trespasser	Surface and Subsurface Soil	Incidental Ingestion and Dermal Contact	0.1	0.2	5E-07
		Total:	**0.1**	**0.2**	**5E-07**
		DEP Risk Limit:	1	1	1E-05
		Exceeds DEP Risk Limit?	**NO**	**NO**	**NO**
Construction Worker	Surface and Subsurface Soil	Incidental Ingestion and Dermal Contact and Inhalation of Soil-Derived Particulates in Air	0.9	NA	5E-07
	Groundwater	Dermal Contact	0.005	NA	2E-10
		Total:	**0.9**	**NA**	**5E-07**
		DEP Risk Limit:	1	1	1E-05
		Exceeds DEP Risk Limit?	**NO**	**NO**	**NO**

1. NA = Not Applicable, NC = Not Calculated, ELCR = Excess Lifetime Cancer Risk.

Table 8
Summary of Results - Soil 0 to 3 or 0 to 6 feet below grade
E/S Pinevale
Springfield, Massachusetts

Potential Receptor	Exposure Media	Exposure and Migration Pathway	Hazard Index Subchronic	Hazard Index Chronic	ELCR
Soil 0 to 3 feet					
On-Site Resident	Surface and Subsurface Soil	Incidental Ingestion and Dermal Contact	2.2	2.4	2E-05
		Total:	**2.2**	**2.4**	**2E-05**
		DEP Risk Limit:	1	1	1E-05
		Exceeds DEP Risk Limit?	**YES**	**YES**	**YES**
Park Visitor	Surface and Subsurface Soil	Incidental Ingestion and Dermal Contact	1.3	1.5	1E-05
		Total:	**1.3**	**1.5**	**1E-05**
		DEP Risk Limit:	1	1	1E-05
		Exceeds DEP Risk Limit?	**NO***	**YES**	**NO***
Employee	Surface and Subsurface Soil	Incidental Ingestion and Dermal Contact and Inhalation of Soil-Derived Particulates in Air	NC	0.2	3E-06
		Total:	**NC**	**0.2**	**3E-06**
		DEP Risk Limit:	1	1	1E-05
		Exceeds DEP Risk Limit?	**NO**	**NO**	**NO**
Trespasser	Surface and Subsurface Soil	Incidental Ingestion and Dermal Contact	0.1	0.2	7E-07
		Total:	**0.1**	**0.2**	**7E-07**
		DEP Risk Limit:	1	1	1E-05
Soil 0 to 6 feet		Exceeds DEP Risk Limit?	**NO**	**NO**	**NO**
Construction Worker	Surface and Subsurface Soil	Incidental Ingestion and Dermal Contact and Inhalation of Soil-Derived Particulates in Air	0.8	NA	5E-07
	Groundwater	Dermal Contact	0.005	NA	2E-10
		Total:	**0.8**	**NA**	**5E-07**
		DEP Risk Limit:	1	1	1E-05
		Exceeds DEP Risk Limit?	**NO**	**NO**	**NO**

1. NA = Not Applicable, NC = Not Calculated, ELCR = Excess Lifetime Cancer Risk.

Table 9
Comparison of Detected Concentrations in Soil to Upper Concentration Limits
E/S Pinevale
Springfield, Massachusetts

Constituent	All Soil Maximum Detected Concentrations mg/kg	Soil UCL mg/kg
Metals		
Arsenic	22.7	500
Barium	3300	10000
Cadmium	4.4	1000
Chromium VI	2	2000
Chromium (IV or total)*	550	2000
Lead	1040	6000
Mercury	5	300
Extractable Petroleum Hydrocarbons (EPH)		
C9-C18 Aliphatic Hydrocarbons	9,800	20,000
C19-C36 Aliphatic Hydrocarbons	9,320	20,000
C11-C22 Aromatic Hydrocarbons	3,500	10,000
Polycyclic Aromatic Hydrocarbons (PAHs)		
Acenaphthene	19	10,000
Acenaphthylene	55	10,000
Anthracene	154	10,000
Benz(a)anthracene	184	3,000
Benzo(a)pyrene	115	300
Benzo(b)fluoranthene	104	3,000
Benzo(g,h,i)perylene	56	10,000
Benzo(k)fluoranthene	117	10,000
Chrysene	145	10,000
Dibenz(a,h)anthracene	11	300
Fluoranthene	459	10,000
Fluorene	24	10,000
Indeno(1,2,3-cd)pyrene	71	3,000
2-Methylnapthalene	12	5,000
Naphthalene	13	10,000
Phenanthrene	616	10,000
Pyrene	429	10,000
Volatile Petroleum Hydrocarbons		
C5-C8 Aliphatics	30	5,000
C9-C12 Aliphatics	330	20,000
C9-C10 Aromatics	650	5,000
Volatile Organic Compounds		
Ethylbenzene	0.7	10,000
Naphthalene	24	10,000
Xylenes, total	4.8	10,000
Polychlorinated Biphenyls	2.1	100

Notes:

1. MCP Table 6 - 310 CMR 40.0996(7), Upper Concentration Limits in Soil 2014 Massachusetts Contingency Plan.

2. NA = Not Analyzed; * = Concentration exceeds UCL.

Table 10
Comparison of Detected Concentrations in Groundwater to Upper Concentration Limits
E/S Pinevale
Springfield, Massachusetts

Constituent	Arithmetic Mean Detected Concentration ug/L	Maximum Detected Concentration ug/L	Groundwater UCL ug/L
Metals			
Arsenic	4	21	9,000
Barium	196	320	100,000
Cadmium	0.3	1.24	50
Nickel	3	6.9	2,000
Zinc	12	49	50,000
Volatile Organic Compounds			
Benzene	0.6	1.3	100,000
n-Butylbenzene	1.2	4	NA
sec-Butylbenzene	1.4	4	NA
tert-Butylbenzene	0.7	2	NA
Ethylbenzene	6	39	100,000
Isopropylbenzene	2	10	NA
p-Isopropyltoluene	0.7	2	NA
Naphthalene	29	170	100,000
n-Propylbenzene	3	16	NA
1,2,4-Trimethylbenzene	4	25	NA
Xylenes, Total	1.0	4	100,000
Semi-Volatile Organic Compounds			
Fluorene	3	5	400
2-Methylnaphthalene	18	79	100,000
Naphthalene	18	95	100,000

Notes:

1. MCP Table 6 - 310 CMR 40.0996(7), Upper Concentration Limits in Groundwater 2014 Massachusetts Contingency Plan.

2. The UCL for C9 to C10 Aromatic Fractions is 100,000 mg/kg; summed concentrations of VOCs included in this fraction, 62 ug/L, are well below this value.

Table 11
Comparisons of Arithmetic Mean Concentrations for Surface Soil to Ecological Soil Screening Levels
E/S Pinevale
Springfield, Massachusetts

Constituent	Arithmetic Mean Concentration (mg/kg)	Ecological Soil Screening Levels			
		Plants (mg/kg)	Soil Invertebrates (mg/kg)	Wildlife Avian (mg/kg)	Wildlife Mammalian (mg/kg)
Metals					
Arsenic	5	18	NA	43	46
Barium	223	NA	330	NA	2,000
Cadmium	0.56	32	140	0.77	0.36
Chromium VI	2.00	NA	NA	NA	130
Chromium (IV or total)*	32	NA	NA	26	34
Lead	83	120	1,700	11	56
Mercury	0.20	NA	NA	NA	NA
Silver	0.31	560	NA	4	14
Extractable Petroleum Hydrocarbons (EPH)					
C9-C18 Aliphatic Hydrocarbons	1,120	NA	NA	NA	NA
C19-C36 Aliphatic Hydrocarbons	1,352	NA	NA	NA	NA
C11-C22 Aromatic Hydrocarbons	710	NA	NA	NA	NA
Polycyclic Aromatic Hydrocarbons (PAHs)					
Acenaphthene	2.9	NA	NA	NA	NA
Acenaphthylene	4.2	NA	NA	NA	NA
Anthracene	13.8	NA	NA	NA	NA
Benz(a)anthracene	20.8	NA	NA	NA	NA
Benzo(a)pyrene	15.9	NA	NA	NA	NA
Benzo(b)fluoranthene	18.4	NA	NA	NA	NA
Benzo(g,h,i)perylene	9.9	NA	NA	NA	NA
Benzo(k)fluoranthene	12.4	NA	NA	NA	NA
Chrysene	18.9	NA	NA	NA	NA
Dibenz(a,h)anthracene	2.3	NA	NA	NA	NA
Fluoranthene	50.6	NA	NA	NA	NA
Fluorene	3.6	NA	NA	NA	NA
Indeno(1,2,3-cd)pyrene	11.0	NA	NA	NA	NA
2-Methylnapthalene	1.7	NA	NA	NA	NA
Naphthalene	2	NA	NA	NA	NA
Phenanthrene	55	NA	NA	NA	NA
Pyrene	49	NA	NA	NA	NA
Sum Low Molecular Weight	183	NA	29	NA	100
Sum High Molecular Weight	110	NA	18	NA	1.1
Volatile Petroleum Hydrocarbons					
C9-C12 Aliphatics	330	NA	NA	NA	NA
C9-C10 Aromatics	650	NA	NA	NA	NA
Volatile Organic Compounds					
Naphthalene	24	NA	29	NA	100
Xylenes, total	4.8	NA	NA	NA	NA
Polychlorinated Biphenyls	0.1	NA	NA	NA	NA

Notes:

1. For the purpose of calculating arithmetic mean concentrations, one-half the method detection limit was used to represent the concentrations of constituents reported as non-detects (ND).

2. Analytical results were based on samples collected between September 2009 and May 2023.

3. NA = Not available.

4. Highlighting indicates EPC is greater than the Eco SSL.

5. Low Molecular Weight
   Acenaphthene
   Acenaphthylene
   Anthracene
   Fluoranthene
   Fluorene
   2-Methylnapthalene
   Naphthalene
   Phenanthrene
   Pyrene

   High Molecular Weight
   Benz(a)anthracene
   Benzo(a)pyrene
   Benzo(b)fluoranthene
   Benzo(g,h,i)perylene
   Benzo(k)fluoranthene
   Chrysene
   Dibenz(a,h)anthracene
   Indeno(1,2,3-cd)pyrene

Table 12
Comparison of Estimated Surface Water Concentrations to Ambient Water Quality Criteria Benchmarks
E/S Pinevale
Springfield, Massachusetts

Constituent	Maximum Detected Concentration in Groundwater ug/L	Method 1 GW-3 Groundwater Standard ug/L	Estimated Surface Water Concentration ug/L	Surface Water Ambient Water Quality Benchmarks ug/L
Metals				
Arsenic	21	900	0.16	36
Barium	320	50,000	2.4	41,000
Cadmium	1.24	4	0.01	0.094
Nickel	6.9	200	0.05	8.2
Zinc	49	900	0.37	36
Volatile Organic Compounds				
Benzene	1	50,000	0.009	460
n-Butylbenzene	4	NA	NC	NA
sec-Butylbenzene	4	NA	NC	NA
tert-Butylbenzene	2	NA	NC	NA
Ethylbenzene	39	5,000	0.3	181
Isopropylbenzene	10	NA	NC	NA
p-Isopropyltoluene	2	NA	NC	NA
Naphthalene	170	20,000	0.13	72
n-Propylbenzene	16	NA	NC	NA
1,2,4-Trimethylbenzene	25	NA	NC	NA
Xylenes, Total	4	5,000	0.03	200
sum C9 to C10 Aromatic Fractions	62	50,000	NC	NA
Semi-Volatile Organic Compounds				
Fluorene	5	40	0.0037	0.14
2-Methylnaphthalene	79	20,000	0.060	70

Notes:

1. Surface Water Benchmarks Used as GW-3 Target Values were obtained from Development of MCP Risk-Based Levels for Soil and Groundwater, 2014.

2. Dilution was calculated as follows:

   30ft x 30ft source area, DF = 303 (distance in feet) -1.365, r2 =0.99
   The distance between the site and Long Pond, the closest surface water body to the subject property, is approximately 1,200 feet.
   Dilution = 0.019
   Dilution Factor Calculation was obtained from MADEP (2002) Characterizing Risks Posed by Petroleum Contaminated Sites: Implementation of the MADEP VPH/EPH Approach, Final Policy, Policy #WSC-02-411, October 31.

3. MassDEP attenuation factors (constituent-specific) were applied to account for additional dilution once the groundwater enters the surface water of Long Pond.

4. n-Butylbenzene, sec-butylbenzene, tert-butylbenzene, isopropylbenzene, p-isopropyltoluene, n-propylbenzene, and 1,2,4-trimethylbenzene are part of the C9 to C10 aromatic fraction. Summed concentrations were less than Method 1 GW-3 standard for C9 to C10 aromatic fraction and were not reviewed further.

Soil Data - All Data
E/S Pinevale
Springfield, Massachusetts

Sample ID:	BTE-E		BT-EN		BT-ENW		BT-ESW		CM-22E		CM-22E		CM-22N	
Depth:	3.5 - 6.5 ft		3 - 6 ft		3 - 6 ft		4 - 7 ft		8 - 11 ft		8 - 11 ft		9 - 12 ft	
Sample Date:	5/18/2023		5/18/2023		5/18/2023		5/18/2023		5/16/2023		5/16/2023		5/16/2023	
ANALYTES	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*
Metals														
Arsenic														
Barium														
Cadmium														
Chromium VI														
Chromium (IV or total)*														
Lead														
Mercury														
Selenium														
Silver														
Extractable Petroleum Hydrocarbons (EPH)														
C9-C18 Aliphatic Hydrocarbons	ND	10	ND	11	ND	11	ND	11	ND	11	ND	11	ND	12
C19-C36 Aliphatic Hydrocarbons	ND	10	ND	11	ND	11	27		ND	11	ND	11	ND	12
C11-C22 Aromatic Hydrocarbons	ND	10	ND	11	ND	11	17		ND	11	ND	11	ND	12
Polycyclic Aromatic Hydrocarbons (PAHs)														
Acenaphthene	ND	0.1	ND	0.11	ND	0.11	ND	0.11	ND	0.11	ND	0.11	ND	0.12
Acenaphthylene	ND	0.1	ND	0.11	ND	0.11	ND	0.11	ND	0.11	ND	0.11	ND	0.12
Anthracene	ND	0.1	ND	0.11	ND	0.11	ND	0.11	ND	0.11	ND	0.11	ND	0.12
Benz(a)anthracene	ND	0.1	0.19		ND	0.11	0.35		ND	0.11	ND	0.11	ND	0.12
Benzo(a)pyrene	ND	0.1	0.21		ND	0.11	0.37		ND	0.11	ND	0.11	ND	0.12
Benzo(b)fluoranthene	ND	0.1	0.28		ND	0.11	0.49		ND	0.11	ND	0.11	ND	0.12
Benzo(g,h,i)perylene	ND	0.1	0.23		ND	0.11	0.29		ND	0.11	ND	0.11	ND	0.12
Benzo(k)fluoranthene	ND	0.1	0.11		ND	0.11	0.19		ND	0.11	ND	0.11	ND	0.12
Chrysene	ND	0.1	0.26		ND	0.11	0.44		ND	0.11	ND	0.11	ND	0.12
Dibenz(a,h)anthracene	ND	0.1	ND	0.11	ND	0.11	ND	0.11	ND	0.11	ND	0.11	ND	0.12
Fluoranthene	ND	0.1	0.48		ND	0.11	0.62		ND	0.11	ND	0.11	ND	0.12
Fluorene	ND	0.1	ND	0.11	ND	0.11	ND	0.11	ND	0.11	ND	0.11	ND	0.12
Indeno(1,2,3-cd)pyrene	ND	0.1	0.16		ND	0.11	0.23		ND	0.11	ND	0.11	ND	0.12
2-Methylnapthalene	ND	0.1	ND	0.11	ND	0.11	ND	0.11	ND	0.11	ND	0.11	ND	0.12
Naphthalene	ND	0.1	ND	0.11	ND	0.11	ND	0.11	ND	0.11	ND	0.11	ND	0.12
Phenanthrene	ND	0.1	0.3		ND	0.11	0.22		ND	0.11	ND	0.11	ND	0.12
Pyrene	ND	0.1	0.47		ND	0.11	0.61		ND	0.11	ND	0.11	ND	0.12
Volatile Petroleum Hydrocarbons														
C5-C8 Aliphatics	ND	10	ND	11	ND	11	ND	12	ND	13	ND	10	ND	14
C9-C12 Aliphatics	ND	10	ND	11	ND	11	ND	12	ND	13	ND	10	ND	14
C9-C10 Aromatics	ND	10	ND	11	ND	11	ND	12	ND	13	ND	10	ND	14

Soil Data - All Data
E/S Pinevale
Springfield, Massachusetts

Sample ID:	BTE-E		BT-EN		BT-ENW		BT-ESW		CM-22E		CM-22E		CM-22N	
Depth:	3.5 - 6.5 ft		3 - 6 ft		3 - 6 ft		4 - 7 ft		8 - 11 ft		8 - 11 ft		9 - 12 ft	
Sample Date:	5/18/2023		5/18/2023		5/18/2023		5/18/2023		5/16/2023		5/16/2023		5/16/2023	
ANALYTES	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*
Volatile Organic Compounds														
Benzene	ND	0.05	ND	0.053	ND	0.054	ND	0.058	ND	0.065	ND	0.051	ND	0.07
Ethylbenzene	ND	0.05	ND	0.053	ND	0.054	ND	0.058	ND	0.065	ND	0.051	ND	0.07
MTBE	ND	0.05	ND	0.053	ND	0.054	ND	0.058	ND	0.065	ND	0.051	ND	0.07
Naphthalene	ND	0.25	ND	0.26	ND	0.27	ND	0.29	ND	0.32	ND	0.25	ND	0.35
Toluene	ND	0.05	ND	0.053	ND	0.054	ND	0.058	ND	0.065	ND	0.051	ND	0.07
Xylenes, total	ND	0.15	ND	0.163	ND	0.164	ND	0.178	ND	0.195	ND	0.151	ND	0.21
Polychlorinated Biphenyls														

Soil Data - All Data
E/S Pinevale
Springfield, Massachusetts

Sample ID:	CM-22S		CM-22W		CM-38E		CM-38E		CM-38N		CM-38NW		CM-38SE	
Depth:	8 - 11 ft		9.5 - 12.5 ft		4.5 - 7.5 ft		4.5 - 7.5 ft		3.5 - 6.5 ft		4.5 - 7.5 ft		4 - 7 ft	
Sample Date:	5/16/2023		5/16/2023		5/16/2023		5/16/2023		5/16/2023		5/16/2023		5/17/2023	
ANALYTES	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*
Metals														
Arsenic														
Barium														
Cadmium														
Chromium VI														
Chromium (IV or total)*														
Lead					5.9		5		130		8.9		150	
Mercury														
Selenium														
Silver														
Extractable Petroleum Hydrocarbons (EPH)														
C9-C18 Aliphatic Hydrocarbons	ND	11	ND	11	15		20		2800		ND	11	12	
C19-C36 Aliphatic Hydrocarbons	ND	11	ND	11	15		12		450		ND	11	24	
C11-C22 Aromatic Hydrocarbons	ND	11	ND	11	45		39		610		ND	11	180	
Polycyclic Aromatic Hydrocarbons (PAHs)													176.1	
Acenaphthene	ND	0.11	ND	0.11	0.7		0.5		0.15		ND	0.11	2.8	
Acenaphthylene	ND	0.11	ND	0.11	0.43		0.3		ND	0.11	ND	0.11	2.1	
Anthracene	ND	0.11	ND	0.11	1.5		1.2		0.39		ND	0.11	7.3	
Benz(a)anthracene	ND	0.11	ND	0.11	1.7		1.3		1.8		0.12		9.5	
Benzo(a)pyrene	ND	0.11	ND	0.11	1.6		1.3		2.2		0.13		8.1	
Benzo(b)fluoranthene	ND	0.11	ND	0.11	1.9		1.4		2.8		ND	0.11	9.5	
Benzo(g,h,i)perylene	ND	0.11	ND	0.11	1.1		0.9		1.6		0.12		4.3	
Benzo(k)fluoranthene	ND	0.11	ND	0.11	0.7		0.6		1		ND	0.11	3.6	
Chrysene	ND	0.11	ND	0.11	1.9		1.4		2.4		0.18		10	
Dibenz(a,h)anthracene	ND	0.11	ND	0.11	0.23		0.2		0.41		ND	0.11	1.1	
Fluoranthene	ND	0.11	ND	0.11	5		3.7		3		0.31		31	
Fluorene	ND	0.11	ND	0.11	0.87		0.6		ND	0.11	ND	0.11	4.6	
Indeno(1,2,3-cd)pyrene	ND	0.11	ND	0.11	1.1		0.9		1.5		ND	0.11	4.7	
2-Methylnapthalene	ND	0.11	ND	0.11	0.53		0.3		0.12		ND	0.11	2.4	
Naphthalene	ND	0.11	ND	0.11	1.6		1.0		ND	0.11	ND	0.11	9.1	
Phenanthrene	ND	0.11	ND	0.11	6.7		5		2.2		0.23		36	
Pyrene	ND	0.11	ND	0.11	4.8		4		3.6		0.29		30	
Volatile Petroleum Hydrocarbons														
C5-C8 Aliphatics	ND	11	ND	11	ND	12	ND	11	ND	110	ND	12	ND	110
C9-C12 Aliphatics	ND	11	ND	11	ND	12	ND	11	140		ND	12	190	
C9-C10 Aromatics	ND	11	ND	11	ND	12	ND	11	530		ND	12	340	

Soil Data - All Data
E/S Pinevale
Springfield, Massachusetts

Sample ID:	CM-22S		CM-22W		CM-38E		CM-38E		CM-38N		CM-38NW		CM-38SE	
Depth:	8 - 11 ft		9.5 - 12.5 ft		4.5 - 7.5 ft		4.5 - 7.5 ft		3.5 - 6.5 ft		4.5 - 7.5 ft		4 - 7 ft	
Sample Date:	5/16/2023		5/16/2023		5/16/2023		5/16/2023		5/16/2023		5/16/2023		5/17/2023	
ANALYTES	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*
Volatile Organic Compounds														
Benzene	ND	0.054	ND	0.055	ND	0.058	ND	0.054	ND	0.57	ND	0.062	ND	0.53
Ethylbenzene	ND	0.054	ND	0.055	ND	0.058	ND	0.054	ND	0.57	ND	0.062	ND	0.53
MTBE	ND	0.054	ND	0.055	ND	0.058	ND	0.054	ND	0.57	ND	0.062	ND	0.53
Naphthalene	ND	0.27	ND	0.28	ND	0.29	ND	0.27	ND	2.9	ND	0.31	ND	2.7
Toluene	ND	0.054	ND	0.055	ND	0.058	ND	0.054	ND	0.57	ND	0.062	ND	0.53
Xylenes, total	ND	0.164	ND	0.165	ND	0.178	ND	0.164	ND	1.67	ND	0.182	ND	1.63
Polychlorinated Biphenyls														

Soil Data - All Data
E/S Pinevale
Springfield, Massachusetts

Sample ID:	CM-38SW		CM-39E		CM-39N		CM-39S		CM-39W		CM-43N		CM-43NW		CM-43SW		CM-52E	
Depth:	4.5 - 7.5 ft		0 - 2 ft		0 - 2 ft		0 - 2 ft		0 - 2 ft		8 - 11 ft		5 - 8 ft		5 - 8 ft		1 - 3 ft	
Sample Date:	5/16/2023		5/17/2023		5/17/2023		5/17/2023		5/17/2023		5/18/2023		5/18/2023		5/18/23		5/15/23	
ANALYTES	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*
Metals																		
Arsenic																		
Barium																		
Cadmium																	ND	0.36
Chromium VI																		
Chromium (IV or total)*																		
Lead	7		120		26		150		47		120		70		34			
Mercury																		
Selenium																		
Silver																		
Extractable Petroleum Hydrocarbons (EPH)																		
C9-C18 Aliphatic Hydrocarbons	ND	11									ND	12	ND	11	ND	11		
C19-C36 Aliphatic Hydrocarbons	ND	11									24		ND	11	ND	11		
C11-C22 Aromatic Hydrocarbons	ND	11									15		17		22			
Polycyclic Aromatic Hydrocarbons (PAHs)																		
Acenaphthene	ND	0.11									ND	0.12	ND	0.11	ND	0.11		
Acenaphthylene	ND	0.11									ND	0.12	ND	0.11	ND	0.11		
Anthracene	ND	0.11									ND	0.12	0.12		0.18			
Benz(a)anthracene	ND	0.11									ND	0.12	0.43		0.96			
Benzo(a)pyrene	ND	0.11									ND	0.12	0.47		1.2			
Benzo(b)fluoranthene	ND	0.11									ND	0.12	0.56		1.4			
Benzo(g,h,i)perylene	ND	0.11									ND	0.12	0.31		0.87			
Benzo(k)fluoranthene	ND	0.11									ND	0.12	0.22		0.49			
Chrysene	ND	0.11									ND	0.12	0.52		1.1			
Dibenz(a,h)anthracene	ND	0.11									ND	0.12	ND	0.11	0.17			
Fluoranthene	ND	0.11									ND	0.12	0.88		2.1			
Fluorene	ND	0.11									ND	0.12	ND	0.11	ND	0.11		
Indeno(1,2,3-cd)pyrene	ND	0.11									ND	0.12	0.32		0.83			
2-Methylnapthalene	ND	0.11									ND	0.12	ND	0.11	ND	0.11		
Naphthalene	ND	0.11									ND	0.12	ND	0.11	ND	0.11		
Phenanthrene	ND	0.11									ND	0.12	0.63		0.69			
Pyrene	ND	0.11									ND	0.12	0.89		2.1			
Volatile Petroleum Hydrocarbons																		
C5-C8 Aliphatics	ND	13									ND	12	ND	11	ND	11		
C9-C12 Aliphatics	ND	13									ND	12	ND	11	ND	11		
C9-C10 Aromatics	ND	13									ND	12	ND	11	ND	11		

Soil Data - All Data
E/S Pinevale
Springfield, Massachusetts

Sample ID:	CM-38SW		CM-39E		CM-39N		CM-39S		CM-39W		CM-43N		CM-43NW		CM-43SW		CM-52E	
Depth:	4.5 - 7.5 ft		0 - 2 ft		0 - 2 ft		0 - 2 ft		0 - 2 ft		8 - 11 ft		5 - 8 ft		5 - 8 ft		1 - 3 ft	
Sample Date:	5/16/2023		5/17/2023		5/17/2023		5/17/2023		5/17/2023		5/18/2023		5/18/2023		5/18/23		5/15/23	
ANALYTES	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*
Volatile Organic Compounds																		
Benzene	ND	0.063									ND	0.059	ND	0.054	ND	0.053		
Ethylbenzene	ND	0.063									ND	0.059	ND	0.054	ND	0.053		
MTBE	ND	0.063									ND	0.059	ND	0.054	ND	0.053		
Naphthalene	ND	0.31									ND	0.29	ND	0.27	ND	0.26		
Toluene	ND	0.063									ND	0.059	ND	0.054	ND	0.053		
Xylenes, total	ND	0.193									ND	0.179	ND	0.164	ND	0.163		
Polychlorinated Biphenyls																		

Soil Data - All Data
E/S Pinevale
Springfield, Massachusetts

Sample ID:	CM-52N		CM-52S		CM-52W		CM-53E				CM-53N		CM-53SE		CM-53SW	
Depth:	1 - 3 ft		1.2 - 3 ft		1 - 3 ft		0 - 2 ft		0 - 2 ft		0 - 2 ft		1 - 2 ft		0.5 - 2 ft	
Sample Date:	5/15/23		5/15/23		5/15/23		5/15/23		5/15/23		5/15/23		5/15/23		5/15/23	
ANALYTES	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*
Metals																
Arsenic																
Barium							22		16		30		48		73	
Cadmium	ND	0.39	ND	0.39	ND	0.37	ND	0.34	ND	0.35	ND	0.46	ND	0.35	ND	0.35
Chromium VI																
Chromium (IV or total)*																
Lead							4.3		2.1		4.9		2.7		3.6	
Mercury																
Selenium																
Silver																
Extractable Petroleum Hydrocarbons (EPH)																
C9-C18 Aliphatic Hydrocarbons																
C19-C36 Aliphatic Hydrocarbons																
C11-C22 Aromatic Hydrocarbons																
Polycyclic Aromatic Hydrocarbons (PAHs)																
Acenaphthene																
Acenaphthylene																
Anthracene																
Benz(a)anthracene																
Benzo(a)pyrene																
Benzo(b)fluoranthene																
Benzo(g,h,i)perylene																
Benzo(k)fluoranthene																
Chrysene																
Dibenz(a,h)anthracene																
Fluoranthene																
Fluorene																
Indeno(1,2,3-cd)pyrene																
2-Methylnapthalene																
Naphthalene																
Phenanthrene																
Pyrene																
Volatile Petroleum Hydrocarbons																
C5-C8 Aliphatics																
C9-C12 Aliphatics																
C9-C10 Aromatics																

Soil Data - All Data
E/S Pinevale
Springfield, Massachusetts

Sample ID:	CM-52N		CM-52S		CM-52W		CM-53E				CM-53N		CM-53SE		CM-53SW	
Depth:	1 - 3 ft		1.2 - 3 ft		1 - 3 ft		0 - 2 ft		0 - 2 ft		0 - 2 ft		1 - 2 ft		0.5 - 2 ft	
Sample Date:	5/15/23		5/15/23		5/15/23		5/15/23		5/15/23		5/15/23		5/15/23		5/15/23	
ANALYTES	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*
Volatile Organic Compounds																
Benzene																
Ethylbenzene																
MTBE																
Naphthalene																
Toluene																
Xylenes, total																
Polychlorinated Biphenyls																

Soil Data - All Data
E/S Pinevale
Springfield, Massachusetts

Sample ID:	CM-53W		DP-2A		MW-205A		OTP-4A		OTP-6A		OTP-6A		OTP-8A		TP-3		TP-9		TP-18	
Depth:	0.5 - 2 ft		0 - 2 ft		0.42 - 3 ft		0 - 2 ft		0 - 3 ft		0 - 3 ft		0 - 1.5 ft		0.6-1		1-2		10-12	
Sample Date:	5/15/23		5/18/23		5/15/23		5/18/23		5/16/23		5/16/23		5/16/23		6/26/06		6/26/06		6/26/06	
ANALYTES	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*
Metals																				
Arsenic															6.19		3.13			
Barium	35														39.8		26.7			
Cadmium	ND	0.34			1.1										0.33		0.73			
Chromium VI																				
Chromium (IV or total)*															19.1		26.5			
Lead	5.3		92				26		9.3				63		80.7		30.5			
Mercury															0.027		ND	0.009		
Selenium															ND	5.05	ND	5.59		
Silver															ND	0.51	ND	0.56		
Extractable Petroleum Hydrocarbons (EPH)																				
C9-C18 Aliphatic Hydrocarbons															ND	303	ND	33.6	1520	
C19-C36 Aliphatic Hydrocarbons															9320		ND	33.6	877	
C11-C22 Aromatic Hydrocarbons															1790		ND	33.6	792	
Polycyclic Aromatic Hydrocarbons (PAHs)							317.3								2580.8					
Acenaphthene			0.94				ND	0.79	0.22		ND	0.18	ND	0.22	19.2		ND	0.2	5.3	
Acenaphthylene			0.45				ND	0.79	ND	0.18	ND	0.18	ND	0.22	54.7		ND	0.2	3.3	
Anthracene			2.5				2.1		0.45		ND	0.18	0.26		154		0.2		0.4	
Benz(a)anthracene			8				23		1.2		ND	0.18	1		184		0.3		0.1	
Benzo(a)pyrene			7.9				32		1.2		ND	0.18	0.99		115		0.3		ND	0.2
Benzo(b)fluoranthene			11				41		1.6		ND	0.18	1.3		104		2.1		ND	0.2
Benzo(g,h,i)perylene			5.6				31		0.82		ND	0.18	0.76		56.1		0.7		ND	0.2
Benzo(k)fluoranthene			4.3				16		0.66		ND	0.18	0.5		117		ND	0.2	ND	0.2
Chrysene			7.9				26		1.2		ND	0.18	1		145		0.7		ND	0.2
Dibenz(a,h)anthracene			1.4				6.5		ND	0.18	ND	0.18	ND	0.22	11.2		ND	0.2	ND	0.2
Fluoranthene			20				47		2.8		ND	0.18	2.3		459		0.3		0.8	
Fluorene			0.82				ND	0.79	ND	0.18	ND	0.18	ND	0.22	23.9		ND	0.2	6	
Indeno(1,2,3-cd)pyrene			5.9				28		0.8		ND	0.18	0.77		71.1		0.8		ND	0.2
2-Methylnapthalene			ND	0.37			ND	0.79	ND	0.18	ND	0.18	ND	0.22	8.3		ND	0.2	4.5	
Naphthalene			0.39				ND	0.79	ND	0.18	ND	0.18	ND	0.22	13.3		ND	0.2	3.4	
Phenanthrene			12				4.7		1.9		ND	0.18	1.3		616		ND	0.2	2	
Pyrene			17				60		2.2		ND	0.18	1.7		429		0.3		0.4	
Volatile Petroleum Hydrocarbons																				
C5-C8 Aliphatics																			26.2	
C9-C12 Aliphatics																			193	
C9-C10 Aromatics																			277	

Soil Data - All Data
E/S Pinevale
Springfield, Massachusetts

Sample ID:	CM-53W		DP-2A		MW-205A		OTP-4A		OTP-6A		OTP-6A		OTP-8A		TP-3		TP-9		TP-18	
Depth:	0.5 - 2 ft		0 - 2 ft		0.42 - 3 ft		0 - 2 ft		0 - 3 ft		0 - 3 ft		0 - 1.5 ft		0.6-1		1-2		10-12	
Sample Date:	5/15/23		5/18/23		5/15/23		5/18/23		5/16/23		5/16/23		5/16/23		6/26/06		6/26/06		6/26/06	
ANALYTES	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*
Volatile Organic Compounds																				
Benzene																			ND	0.067
Ethylbenzene																			0.66	
MTBE																			ND	0.067
Naphthalene																			5.84	
Toluene																			ND	0.067
Xylenes, total																			0.8	
Polychlorinated Biphenyls															2.05					

Soil Data - All Data
E/S Pinevale
Springfield, Massachusetts

Sample ID:	TP-7		TP-14		TP-16		CM-22		CM-23		CM-25		CM-38		CM-43		CM-45		BT-E	
Depth:	1-2		1-2		2-4		15-17		7-9		11-13		11-13		10-12		10-12			
Sample Date:	6/26/06		7/26/06		7/26/06		9/24/09		9/24/09		9/25/09		10/1/09		10/2/09		10/27/09		11/12/09	
ANALYTES	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*3604*	
Metals																				
Arsenic	19		ND	2.74	22.7															
Barium	203		72.2		42.2															
Cadmium	ND	0.31	ND	0.28	ND	0.31														
Chromium VI																				
Chromium (IV or total)*	8.09		24		16.2															
Lead	163		21.9		1040															
Mercury	0.089		0.562		0.054															
Selenium	ND	6.08	ND	5.47	ND	6.04														
Silver	ND	0.61	ND	0.55	ND	0.61														
Extractable Petroleum Hydrocarbons (EPH)																				
C9-C18 Aliphatic Hydrocarbons							1200				18		970		2400		ND	12	9800	
C19-C36 Aliphatic Hydrocarbons							190				11		120		520		48		2600	
C11-C22 Aromatic Hydrocarbons							300				13		530		890		24		3500	
Polycyclic Aromatic Hydrocarbons (PAHs)																				
Acenaphthene							1.2				ND	0.11	1.5		0.28		0.13		7.4	
Acenaphthylene							1.4				ND	0.11	3.9		0.62		ND	0.12	1.5	
Anthracene							ND	0.11			ND	0.11	ND	0.11	ND	0.11	0.25		5.8	
Benz(a)anthracene							ND	0.11			ND	0.11	ND	0.11	ND	0.11	0.68		4.1	
Benzo(a)pyrene							ND	0.11			ND	0.11	ND	0.11	ND	0.11	0.58		3.6	
Benzo(b)fluoranthene							ND	0.11			ND	0.11	ND	0.11	ND	0.11	0.89		5.5	
Benzo(g,h,i)perylene							ND	0.11			ND	0.11	ND	0.11	ND	0.11	0.38		2.6	
Benzo(k)fluoranthene							ND	0.11			ND	0.11	ND	0.11	ND	0.11	0.33		2	
Chrysene							ND	0.11			ND	0.11	ND	0.11	ND	0.11	0.83		4.9	
Dibenz(a,h)anthracene							ND	0.11			ND	0.11	ND	0.11	ND	0.11	ND	0.12	0.71	
Fluoranthene							0.4				ND	0.11	ND	0.11	0.4		1.6		10	
Fluorene							1.8				ND	0.11	3.3		1.6		0.2		9.7	
Indeno(1,2,3-cd)pyrene							ND	0.11			ND	0.11	ND	0.11	ND	0.11	0.41		2.7	
2-Methylnapthalene							4.1				ND	0.11	9.9		1.6		ND	0.12	12	
Naphthalene							1.9				ND	0.11	1.9		0.42		ND	0.12	11	
Phenanthrene							0.59				ND	0.11	1.7		ND	0.11	1.3		4.6	
Pyrene							0.47				ND	0.11	ND	0.11	ND	0.11	1.5		17	
Volatile Petroleum Hydrocarbons																				
C5-C8 Aliphatics							ND	16			ND	20	30		ND	23			ND	200
C9-C12 Aliphatics							140				ND	13	58		37				330	
C9-C10 Aromatics							270				ND	13	150		170				650	

Soil Data - All Data
E/S Pinevale
Springfield, Massachusetts

Sample ID:	TP-7		TP-14		TP-16		CM-22		CM-23		CM-25		CM-38		CM-43		CM-45		BT-E	
Depth:	1-2		1-2		2-4		15-17		7-9		11-13		11-13		10-12		10-12			
Sample Date:	6/26/06		7/26/06		7/26/06		9/24/09		9/24/09		9/25/09		10/1/09		10/2/09		10/27/09		11/12/09	
ANALYTES	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*3604*	
Volatile Organic Compounds																				
Benzene							ND	0.052			ND	0.066	ND	0.086	ND	0.078			ND	0.68
Ethylbenzene							0.39				ND	0.066	0.28		0.094				ND	0.68
MTBE							ND	0.052			ND	0.066	ND	0.086					ND	0.68
Naphthalene							2.2				ND	0.66	2.8		1.1				24	
Toluene							ND	0.052			ND	0.066	ND	0.086	ND	0.078			ND	0.68
Xylenes, total							0.54				ND	0.2	1.1		0.27				4.8	
Polychlorinated Biphenyls																				

Soil Data - All Data
E/S Pinevale
Springfield, Massachusetts

Sample ID:	CM-15		CM-16		CM-17		CM-18		CM-19		CM-20		CM-21	
Depth:	1-3		1-3		1-3		2-4		2-4		0-2		1-3	
Sample Date:	9/22/2009		9/22/2009		9/22/2009		9/22/2009		9/23/2009		9/23/2009		9/24/2009	
ANALYTES	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*
Metals														
Arsenic	5.6		3.3		2.9		3.2		3.9		4.1		2.8	
Barium	47		54		50		43		75		33		63	
Cadmium	ND	0.26	ND	0.27	ND	0.26	ND	0.28	ND	0.27	ND	0.27	0.27	
Chromium VI														
Chromium (IV or total)*	12		11		11		8.8		14		11		14	
Lead	4.1		2.3		2.9		6.7		5.3		8.5		15	
Mercury	ND	0.022	ND	0.022	ND	0.019	ND	0.019	ND	0.017	ND	0.018	ND	0.022
Selenium	ND	5.2	ND	5.3	ND	5.2	ND	5.6	ND	5.4	ND	5.4	ND	5.1
Silver	ND	0.52	ND	0.53	ND	0.52	ND	0.56	ND	0.54	ND	0.54	ND	0.51
Extractable Petroleum Hydrocarbons (EPH)														
C9-C18 Aliphatic Hydrocarbons														
C19-C36 Aliphatic Hydrocarbons														
C11-C22 Aromatic Hydrocarbons														
Polycyclic Aromatic Hydrocarbons (PAHs)														
Acenaphthene														
Acenaphthylene														
Anthracene														
Benz(a)anthracene														
Benzo(a)pyrene														
Benzo(b)fluoranthene														
Benzo(g,h,i)perylene														
Benzo(k)fluoranthene														
Chrysene														
Dibenz(a,h)anthracene														
Fluoranthene														
Fluorene														
Indeno(1,2,3-cd)pyrene														
2-Methylnapthalene														
Naphthalene														
Phenanthrene														
Pyrene														
Volatile Petroleum Hydrocarbons														
C5-C8 Aliphatics														
C9-C12 Aliphatics														
C9-C10 Aromatics														

Soil Data - All Data
E/S Pinevale
Springfield, Massachusetts

Sample ID:	CM-15		CM-16		CM-17		CM-18		CM-19		CM-20		CM-21	
Depth:	1-3		1-3		1-3		2-4		2-4		0-2		1-3	
Sample Date:	9/22/2009		9/22/2009		9/22/2009		9/22/2009		9/23/2009		9/23/2009		9/24/2009	
ANALYTES	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*
Volatile Organic Compounds														
Benzene														
Ethylbenzene														
MTBE														
Naphthalene														
Toluene														
Xylenes, total														
Polychlorinated Biphenyls							ND	0.11						

Soil Data - All Data
E/S Pinevale
Springfield, Massachusetts

Sample ID:	CM-22		CM-23		CM-23A				CM-24		CM-25		CM-26	
Depth:	1-3		1-3		1-3		3-5		1-3		1-3		0-2	
Sample Date:	9/24/2009		9/24/2009		10/27/2009		10/27/2009		9/25/2009		9/25/2009		9/25/2009	
ANALYTES	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*
Metals														
Arsenic	ND	2.6	7.3						4.6		3.5		3.2	
Barium	26		95						63		23		78	
Cadmium	ND	0.26	0.98						0.29		ND	0.27	0.38	
Chromium VI					2		ND	0.98						
Chromium (IV or total)*	7.3		99		19		12		12		10		18	
Lead	3.4		170						21		3.5		5.8	
Mercury	0.031		0.032						0.026		ND	0.023	ND	0.016
Selenium	ND	5.2	ND	5.9					ND	5.3	ND	5.5	ND	5.3
Silver	ND	0.52	ND	0.59					ND	0.53	ND	0.55	ND	0.53
Extractable Petroleum Hydrocarbons (EPH)														
C9-C18 Aliphatic Hydrocarbons														
C19-C36 Aliphatic Hydrocarbons														
C11-C22 Aromatic Hydrocarbons														
Polycyclic Aromatic Hydrocarbons (PAHs)														
Acenaphthene														
Acenaphthylene														
Anthracene														
Benz(a)anthracene														
Benzo(a)pyrene														
Benzo(b)fluoranthene														
Benzo(g,h,i)perylene														
Benzo(k)fluoranthene														
Chrysene														
Dibenz(a,h)anthracene														
Fluoranthene														
Fluorene														
Indeno(1,2,3-cd)pyrene														
2-Methylnapthalene														
Naphthalene														
Phenanthrene														
Pyrene														
Volatile Petroleum Hydrocarbons														
C5-C8 Aliphatics														
C9-C12 Aliphatics														
C9-C10 Aromatics														

Soil Data - All Data
E/S Pinevale
Springfield, Massachusetts

Sample ID:	CM-22		CM-23		CM-23A				CM-24		CM-25		CM-26	
Depth:	1-3		1-3		1-3		3-5		1-3		1-3		0-2	
Sample Date:	9/24/2009		9/24/2009		10/27/2009		10/27/2009		9/25/2009		9/25/2009		9/25/2009	
ANALYTES	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*
Volatile Organic Compounds														
Benzene														
Ethylbenzene														
MTBE														
Naphthalene														
Toluene														
Xylenes, total														
Polychlorinated Biphenyls	ND	0.1	ND	0.12							ND	0.11		

Soil Data - All Data
E/S Pinevale
Springfield, Massachusetts

Sample ID:	CM-27		CM-28		CM-29		CM-30		CM-31		CM-32		CM-33		CM-34		CM-35	
Depth:	0-2		1-3		1-3		1-3		1-3		1-3		1-3		1-3		1-3	
Sample Date:	9/25/2009		9/28/2009		9/28/2009		9/28/2009		9/28/2009		9/29/2009		9/29/2009		9/29/09		9/29/09	
ANALYTES	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*
Metals																		
Arsenic	3.9		ND	2.7	ND	2.6	2.9		3.7		ND	2.8	3.2		4.5		6	
Barium	32		63		68		38		38		53		35		110		25	
Cadmium	ND	0.26	ND	0.27	0.3		ND	0.26	ND	0.27	ND	0.28	ND	0.27	ND	0.26	ND	0.25
Chromium VI																		
Chromium (IV or total)*	11		16		9.9		8.5		11		8.8		9.3		20		7.8	
Lead	14		5.4		9.5		3.9		12		5.2		5.5		3.6		4.6	
Mercury	0.033		ND	0.014	ND	0.018	0.02		0.027		ND	0.016	ND	0.02	0.022		ND	0.02
Selenium	ND	5.1	ND	5.3	ND	5.2	ND	5.2	ND	5.4	ND	5.5	ND	5.3	ND	5.3	ND	5
Silver	ND	0.51	ND	0.53	ND	0.52	ND	0.52	ND	0.54	ND	0.55	ND	0.53	ND	0.53	ND	0.5
Extractable Petroleum Hydrocarbons (EPH)																		
C9-C18 Aliphatic Hydrocarbons																		
C19-C36 Aliphatic Hydrocarbons																		
C11-C22 Aromatic Hydrocarbons																		
Polycyclic Aromatic Hydrocarbons (PAHs)																		
Acenaphthene																		
Acenaphthylene																		
Anthracene																		
Benz(a)anthracene																		
Benzo(a)pyrene																		
Benzo(b)fluoranthene																		
Benzo(g,h,i)perylene																		
Benzo(k)fluoranthene																		
Chrysene																		
Dibenz(a,h)anthracene																		
Fluoranthene																		
Fluorene																		
Indeno(1,2,3-cd)pyrene																		
2-Methylnapthalene																		
Naphthalene																		
Phenanthrene																		
Pyrene																		
Volatile Petroleum Hydrocarbons																		
C5-C8 Aliphatics																		
C9-C12 Aliphatics																		
C9-C10 Aromatics																		

Soil Data - All Data
E/S Pinevale
Springfield, Massachusetts

Sample ID:	CM-27		CM-28		CM-29		CM-30		CM-31		CM-32		CM-33		CM-34		CM-35	
Depth:	0-2		1-3		1-3		1-3		1-3		1-3		1-3		1-3		1-3	
Sample Date:	9/25/2009		9/28/2009		9/28/2009		9/28/2009		9/28/2009		9/29/2009		9/29/2009		9/29/09		9/29/09	
ANALYTES	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*
Volatile Organic Compounds																		
Benzene																		
Ethylbenzene																		
MTBE																		
Naphthalene																		
Toluene																		
Xylenes, total																		
Polychlorinated Biphenyls	ND	0.1									ND	0.11			ND	0.11		

Soil Data - All Data
E/S Pinevale
Springfield, Massachusetts

Sample ID:	CM-36		CM-37		CM-38		CM-39		CM-40		CM-40A				CM-41	
Depth:	1-3		1-3		0.5-1		0-2		0-2		0-2		2-4		1-3	
Sample Date:	9/30/09		9/30/09		10/1/09		10/1/09		10/1/09		10/28/09		10/28/09		10/2/09	
ANALYTES	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*
Metals																
Arsenic	5.3		3.1		5.9		8.5		6.4						ND	2.6
Barium	45		48		62		390		1700						25	
Cadmium	0.31		ND	0.26	0.28		1.9		2.2						ND	0.26
Chromium VI											ND	5.4	2			
Chromium (IV or total)*	14		12		20		63		70		54		11		7	
Lead	65		2.1		13		550		290						3.6	
Mercury	ND	0.025	ND	0.022	0.027		0.26		0.36						ND	0.021
Selenium	ND	5.5	ND	5.3	ND	5.3	ND	5.6	ND	6.1					ND	5.3
Silver	ND	0.55	ND	0.53	ND	0.53	1.6		ND	0.61					ND	0.53
Extractable Petroleum Hydrocarbons (EPH)																
C9-C18 Aliphatic Hydrocarbons																
C19-C36 Aliphatic Hydrocarbons																
C11-C22 Aromatic Hydrocarbons																
Polycyclic Aromatic Hydrocarbons (PAHs)																
Acenaphthene																
Acenaphthylene																
Anthracene																
Benz(a)anthracene																
Benzo(a)pyrene																
Benzo(b)fluoranthene																
Benzo(g,h,i)perylene																
Benzo(k)fluoranthene																
Chrysene																
Dibenz(a,h)anthracene																
Fluoranthene																
Fluorene																
Indeno(1,2,3-cd)pyrene																
2-Methylnapthalene																
Naphthalene																
Phenanthrene																
Pyrene																
Volatile Petroleum Hydrocarbons																
C5-C8 Aliphatics																
C9-C12 Aliphatics																
C9-C10 Aromatics																

Soil Data - All Data
E/S Pinevale
Springfield, Massachusetts

Sample ID:	CM-36		CM-37		CM-38		CM-39		CM-40		CM-40A				CM-41	
Depth:	1-3		1-3		0.5-1		0-2		0-2		0-2		2-4		1-3	
Sample Date:	9/30/09		9/30/09		10/1/09		10/1/09		10/1/09		10/28/09		10/28/09		10/2/09	
ANALYTES	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*
Volatile Organic Compounds																
Benzene																
Ethylbenzene																
MTBE																
Naphthalene																
Toluene																
Xylenes, total																
Polychlorinated Biphenyls			ND	0.11	ND	0.11	ND	0.11								

Soil Data - All Data
E/S Pinevale
Springfield, Massachusetts

Sample ID:	CM-42		CM-43		CM-44		CM-45		CM-46				CM-47				CM-48			
Depth:	1-3		1-3		0-2		0-2		1-3		3-5		0-2		2-4		1-3		3-5	
Sample Date:	10/2/09		10/2/09		10/2/09		10/27/09		10/27/09		10/27/09		10/27/09		10/27/09		10/27/09		10/27/09	
ANALYTES	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*
Metals																				
Arsenic	2.6		3.9		5.9		10													
Barium	33		120		120		230													
Cadmium	ND	0.26	0.51		1.2		1.7													
Chromium VI									1.7											
Chromium (IV or total)*	8.9		18		25		10		550		8.2		13		25		5		7.8	
Lead	5.5		27		110		160													
Mercury	ND	0.016	0.038		0.29		0.086													
Selenium	ND	5.1	ND	5.3	ND	5.7	ND	6.1												
Silver	ND	0.51	ND	0.53	ND	0.57	ND	0.61												
Extractable Petroleum Hydrocarbons (EPH)																				
C9-C18 Aliphatic Hydrocarbons																				
C19-C36 Aliphatic Hydrocarbons																				
C11-C22 Aromatic Hydrocarbons																				
Polycyclic Aromatic Hydrocarbons (PAHs)																				
Acenaphthene																				
Acenaphthylene																				
Anthracene																				
Benz(a)anthracene																				
Benzo(a)pyrene																				
Benzo(b)fluoranthene																				
Benzo(g,h,i)perylene																				
Benzo(k)fluoranthene																				
Chrysene																				
Dibenz(a,h)anthracene																				
Fluoranthene																				
Fluorene																				
Indeno(1,2,3-cd)pyrene																				
2-Methylnapthalene																				
Naphthalene																				
Phenanthrene																				
Pyrene																				
Volatile Petroleum Hydrocarbons																				
C5-C8 Aliphatics																				
C9-C12 Aliphatics																				
C9-C10 Aromatics																				

Soil Data - All Data
E/S Pinevale
Springfield, Massachusetts

Sample ID:	CM-42		CM-43		CM-44		CM-45		CM-46				CM-47				CM-48			
Depth:	1-3		1-3		0-2		0-2		1-3		3-5		0-2		2-4		1-3		3-5	
Sample Date:	10/2/09		10/2/09		10/2/09		10/27/09		10/27/09		10/27/09		10/27/09		10/27/09		10/27/09		10/27/09	
ANALYTES	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*
Volatile Organic Compounds																				
Benzene																				
Ethylbenzene																				
MTBE																				
Naphthalene																				
Toluene																				
Xylenes, total																				
Polychlorinated Biphenyls	ND	0.1			ND	0.11														

Soil Data - All Data
E/S Pinevale
Springfield, Massachusetts

Sample ID:	CM-49				CM-50		CM-51		CM-52		CM-53				CM-54				CM-55			
Depth:	1-3		3-5		1-3		1-3		1-3		0-2		2-4		0-2		2-4		0-2		4-6	
Sample Date:	10/27/09		10/27/09		10/28/09		10/28/09		10/28/09		10/28/09		10/28/09		10/28/09		10/28/09		10/28/09		10/28/09	
ANALYTES	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*
Metals																						
Arsenic					4.4		4.9		9.5													
Barium					33		33		86		2400		290		3300		280		460		120	
Cadmium					ND	0.27	ND	0.28	3.3		2.4		0.64		4.4		0.61		1.4		1.3	
Chromium VI																						
Chromium (IV or total)*	8.7		6.2		10		22		48		120		16		130		13		60		17	
Lead					3.8		36		260		400		54		300		110		280		100	
Mercury					ND	0.019	0.12		5													
Selenium					ND	5.4	ND	5.6	ND	5.8												
Silver					ND	0.54	ND	0.56	ND	0.58												
Extractable Petroleum Hydrocarbons (EPH)																						
C9-C18 Aliphatic Hydrocarbons																						
C19-C36 Aliphatic Hydrocarbons																						
C11-C22 Aromatic Hydrocarbons																						
Polycyclic Aromatic Hydrocarbons (PAHs)																						
Acenaphthene																						
Acenaphthylene																						
Anthracene																						
Benz(a)anthracene																						
Benzo(a)pyrene																						
Benzo(b)fluoranthene																						
Benzo(g,h,i)perylene																						
Benzo(k)fluoranthene																						
Chrysene																						
Dibenz(a,h)anthracene																						
Fluoranthene																						
Fluorene																						
Indeno(1,2,3-cd)pyrene																						
2-Methylnapthalene																						
Naphthalene																						
Phenanthrene																						
Pyrene																						
Volatile Petroleum Hydrocarbons																						
C5-C8 Aliphatics																						
C9-C12 Aliphatics																						
C9-C10 Aromatics																						

Soil Data - All Data
E/S Pinevale
Springfield, Massachusetts

Sample ID:	CM-49				CM-50		CM-51		CM-52		CM-53				CM-54				CM-55			
Depth:	1-3		3-5		1-3		1-3		1-3		0-2		2-4		0-2		2-4		0-2		4-6	
Sample Date:	10/27/09		10/27/09		10/28/09		10/28/09		10/28/09		10/28/09		10/28/09		10/28/09		10/28/09		10/28/09		10/28/09	
ANALYTES	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*
Volatile Organic Compounds																						
Benzene																						
Ethylbenzene																						
MTBE																						
Naphthalene																						
Toluene																						
Xylenes, total																						
Polychlorinated Biphenyls					ND	0.11	ND	0.11	ND	0.11												

Soil Data - All Data
E/S Pinevale
Springfield, Massachusetts

Sample ID:	OTP-4		OTP-4		OTP-6		OTP-8		DP-1		DP-2		DP-3	
Depth:	0-2		3-4		0-3		0-2		0-2		0-1.5		0-2	
Sample Date:	11/12/09		11/12/09		11/12/09		11/12/09		11/12/09		11/12/09		11/12/09	
ANALYTES	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*
Metals														
Arsenic	4.6		5.7		5.7		3.8		3.7		6.4		3.5	
Barium	62		46		480		240		170		110		35	
Cadmium	0.29		ND	0.31	0.84		1.3		0.38		0.67		ND	0.27
Chromium VI														
Chromium (IV or total)*	13		7.9		25		24		9.9		13		9.8	
Lead	32		12		170		140		29		66		32	
Mercury	1.2		0.043		0.066		0.26		0.073		0.18		0.025	
Selenium	ND	5.3	ND	6.2	ND	5.4	ND	5.6	ND	5.4	ND	5.6	ND	5.4
Silver	0.78		ND	0.62	ND	0.54	ND	0.56	ND	0.54	ND	0.56	ND	0.54
Extractable Petroleum Hydrocarbons (EPH)														
C9-C18 Aliphatic Hydrocarbons	ND	21	ND	25	ND	54	ND	56	ND	22	ND	56	ND	11
C19-C36 Aliphatic Hydrocarbons	23		ND	25	ND	54	110		ND	22	58		ND	11
C11-C22 Aromatic Hydrocarbons	120		120		470		200		65		210		14	
Polycyclic Aromatic Hydrocarbons (PAHs)														
Acenaphthene	0.49		ND	0.25	8.4		1.5		0.42		1.5		ND	0.11
Acenaphthylene	0.52		ND	0.25	ND	0.54	ND	0.56	ND	0.22	ND	0.56	ND	0.11
Anthracene	2.1		ND	0.25	19		2.8		0.8		3.3		0.13	
Benz(a)anthracene	7.2		ND	0.25	38		11		3.2		10		0.26	
Benzo(a)pyrene	6.6		ND	0.25	32		10		3.2		9.2		0.24	
Benzo(b)fluoranthene	9.6		ND	0.25	46		16		4.6		15		0.34	
Benzo(g,h,i)perylene	4.2		ND	0.25	21		7.4		2.3		6		0.14	
Benzo(k)fluoranthene	3.3		ND	0.25	17		5.6		1.7		5.2		0.13	
Chrysene	8.2		ND	0.25	41		13		3.7		12		0.3	
Dibenz(a,h)anthracene	1.2		ND	0.25	5.9		2		0.62		1.9		ND	0.11
Fluoranthene	16		ND	0.25	97		23		6.7		23		0.6	
Fluorene	0.98		0.32		10		1.5		0.4		1.5		0.12	
Indeno(1,2,3-cd)pyrene	4.6		ND	0.25	22		7.8		2.4		7.1		0.16	
2-Methylnapthalene	ND	0.21	ND	0.25	2.2		ND	0.56	ND	0.22	ND	0.56	ND	0.11
Naphthalene	ND	0.21	ND	0.25	6.8		0.84		ND	0.22	ND	0.56	ND	0.11
Phenanthrene	11		0.33		84		15		3.3		15		0.52	
Pyrene	16		ND	0.25	89		22		6.8		22		0.59	
Volatile Petroleum Hydrocarbons														
C5-C8 Aliphatics														
C9-C12 Aliphatics														
C9-C10 Aromatics														

Soil Data - All Data
E/S Pinevale
Springfield, Massachusetts

Sample ID:	OTP-4		OTP-4		OTP-6		OTP-8		DP-1		DP-2		DP-3	
Depth:	0-2		3-4		0-3		0-2		0-2		0-1.5		0-2	
Sample Date:	11/12/09		11/12/09		11/12/09		11/12/09		11/12/09		11/12/09		11/12/09	
ANALYTES	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*
Volatile Organic Compounds														
Benzene														
Ethylbenzene														
MTBE														
Naphthalene														
Toluene														
Xylenes, total														
Polychlorinated Biphenyls	ND	0.11	ND	0.12	ND	0.11	ND	0.11	ND	0.11	ND	0.11	ND	0.11

Soil Data - All Data
E/S Pinevale
Springfield, Massachusetts

Sample ID: Depth: Sample Date: ANALYTES	Minimum Min	Maximum Max	# Detected Samples Samples	Total Number Samples	Arithmetic Mean Mean	Location of Max Max Detected
Metals						
Arsenic	2.6	22.7	40	46	5	TP-16
Barium	16	3300	58	58	218	CM-54
Cadmium	0.27	4.4	27	63	0.56	CM-54
Chromium VI	1.7	2	3	5	2	CM-23A
Chromium (IV or total)*	5	550	64	64	30	CM-46
Lead	2.1	1040	75	75	80	TP-16
Mercury	0.02	5	26	46	0.20	CM-46
Selenium	0	0	0	46	3	ND
Silver	0.78	1.6	2	46	0.31	CM-46
Extractable Petroleum Hydrocarbons (EPH)						
C9-C18 Aliphatic Hydrocarbons	12	9800	10	34	563	BT-E
C19-C36 Aliphatic Hydrocarbons	11	9320	17	34	428	TP-3
C11-C22 Aromatic Hydrocarbons	13	3500	23	34	296	BT-E
Polycyclic Aromatic Hydrocarbons (PAHs)						
Acenaphthene	0.13	19.2	18	39	1.39	TP-3
Acenaphthylene	0.29	54.7	11	39	1.85	TP-3
Anthracene	0.12	154	21	39	5.28	TP-3
Benz(a)anthracene	0.1	184	24	39	7.93	TP-3
Benzo(a)pyrene	0.13	115	23	39	6.14	TP-3
Benzo(b)fluoranthene	0.28	104	22	39	7.14	TP-3
Benzo(g,h,i)perylene	0.12	56.1	23	39	3.84	TP-3
Benzo(k)fluoranthene	0.11	117	21	39	4.66	TP-3
Chrysene	0.18	145	23	39	7.31	TP-3
Dibenz(a,h)anthracene	0.17	11.2	14	39	0.90	TP-3
Fluoranthene	0.3	459	26	39	19.46	TP-3
Fluorene	0.12	23.9	18	39	1.79	TP-3
Indeno(1,2,3-cd)pyrene	0.16	71.1	22	39	4.24	TP-3
2-Methylnapthalene	0.12	12	11	39	1.25	BT-E
Naphthalene	0.39	13.3	12	39	1.39	TP-3
Phenanthrene	0.22	616	26	39	21.22	TP-3
Pyrene	0.29	429	25	39	18.80	TP-3
Volatile Petroleum Hydrocarbons						
C5-C8 Aliphatics	26.2	30	2	24	8.48571429	CM-38
C9-C12 Aliphatics	37	330	7	24	49	BT-E
C9-C10 Aromatics	150	650	7	24	104	BT-E

Soil Data - All Data
E/S Pinevale
Springfield, Massachusetts

Sample ID: Depth: Sample Date: ANALYTES	Minimum Min	Maximum Max	# Detected Samples Samples	Total Number Samples	Arithmetic Mean Mean	Location of Max Max Detected
Volatile Organic Compounds						
Benzene	0	0	0	24	0.06	ND
Ethylbenzene	0.094	0.66	4	24	0.12	TP-18
MTBE	0	0	0	23	0.06	ND
Naphthalene	1.1	24	5	24	1.72	BT-E
Toluene	0	0	0	24	0.06	ND
Xylenes, total	0.27	4.8	5	24	0.44	BT-E
Polychlorinated Biphenyls	2.05	2.05	1	23	0.14	TP-3

Soil Data - 0 to 15 feet
E/S Pinevale
Springfield, Massachusetts

Sample ID:	BTE-E		BT-EN		BT-ENW		BT-ESW		CM-22E		CM-22E		CM-22N	
Depth:	3.5 - 6.5 ft		3 - 6 ft		3 - 6 ft		4 - 7 ft		8 - 11 ft		8 - 11 ft		9 - 12 ft	
Sample Date:	5/18/2023		5/18/2023		5/18/2023		5/18/2023		5/16/2023		5/16/2023		5/16/2023	
ANALYTES	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*
Metals														
Arsenic														
Barium														
Cadmium														
Chromium VI														
Chromium (IV or total)*														
Lead														
Mercury														
Selenium														
Silver														
Extractable Petroleum Hydrocarbons (EPH)														
C9-C18 Aliphatic Hydrocarbons	ND	10	ND	11	ND	11	ND	11	ND	11	ND	11	ND	12
C19-C36 Aliphatic Hydrocarbons	ND	10	ND	11	ND	11	27		ND	11	ND	11	ND	12
C11-C22 Aromatic Hydrocarbons	ND	10	ND	11	ND	11	17		ND	11	ND	11	ND	12
Polycyclic Aromatic Hydrocarbons (PAHs)														
Acenaphthene	ND	0.1	ND	0.11	ND	0.11	ND	0.11	ND	0.11	ND	0.11	ND	0.12
Acenaphthylene	ND	0.1	ND	0.11	ND	0.11	ND	0.11	ND	0.11	ND	0.11	ND	0.12
Anthracene	ND	0.1	ND	0.11	ND	0.11	ND	0.11	ND	0.11	ND	0.11	ND	0.12
Benz(a)anthracene	ND	0.1	0.19		ND	0.11	0.35		ND	0.11	ND	0.11	ND	0.12
Benzo(a)pyrene	ND	0.1	0.21		ND	0.11	0.37		ND	0.11	ND	0.11	ND	0.12
Benzo(b)fluoranthene	ND	0.1	0.28		ND	0.11	0.49		ND	0.11	ND	0.11	ND	0.12
Benzo(g,h,i)perylene	ND	0.1	0.23		ND	0.11	0.29		ND	0.11	ND	0.11	ND	0.12
Benzo(k)fluoranthene	ND	0.1	0.11		ND	0.11	0.19		ND	0.11	ND	0.11	ND	0.12
Chrysene	ND	0.1	0.26		ND	0.11	0.44		ND	0.11	ND	0.11	ND	0.12
Dibenz(a,h)anthracene	ND	0.1	ND	0.11	ND	0.11	ND	0.11	ND	0.11	ND	0.11	ND	0.12
Fluoranthene	ND	0.1	0.48		ND	0.11	0.62		ND	0.11	ND	0.11	ND	0.12
Fluorene	ND	0.1	ND	0.11	ND	0.11	ND	0.11	ND	0.11	ND	0.11	ND	0.12
Indeno(1,2,3-cd)pyrene	ND	0.1	0.16		ND	0.11	0.23		ND	0.11	ND	0.11	ND	0.12
2-Methylnapthalene	ND	0.1	ND	0.11	ND	0.11	ND	0.11	ND	0.11	ND	0.11	ND	0.12
Naphthalene	ND	0.1	ND	0.11	ND	0.11	ND	0.11	ND	0.11	ND	0.11	ND	0.12
Phenanthrene	ND	0.1	0.3		ND	0.11	0.22		ND	0.11	ND	0.11	ND	0.12
Pyrene	ND	0.1	0.47		ND	0.11	0.61		ND	0.11	ND	0.11	ND	0.12
Volatile Petroleum Hydrocarbons														
C5-C8 Aliphatics	ND	10	ND	11	ND	11	ND	12	ND	13	ND	10	ND	14
C9-C12 Aliphatics	ND	10	ND	11	ND	11	ND	12	ND	13	ND	10	ND	14
C9-C10 Aromatics	ND	10	ND	11	ND	11	ND	12	ND	13	ND	10	ND	14

Soil Data - 0 to 15 feet
E/S Pinevale
Springfield, Massachusetts

Sample ID:	BTE-E		BT-EN		BT-ENW		BT-ESW		CM-22E		CM-22E		CM-22N	
Depth:	3.5 - 6.5 ft		3 - 6 ft		3 - 6 ft		4 - 7 ft		8 - 11 ft		8 - 11 ft		9 - 12 ft	
Sample Date:	5/18/2023		5/18/2023		5/18/2023		5/18/2023		5/16/2023		5/16/2023		5/16/2023	
ANALYTES	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*
Volatile Organic Compounds														
Benzene	ND	0.05	ND	0.053	ND	0.054	ND	0.058	ND	0.065	ND	0.051	ND	0.07
Ethylbenzene	ND	0.05	ND	0.053	ND	0.054	ND	0.058	ND	0.065	ND	0.051	ND	0.07
MTBE	ND	0.05	ND	0.053	ND	0.054	ND	0.058	ND	0.065	ND	0.051	ND	0.07
Naphthalene	ND	0.25	ND	0.26	ND	0.27	ND	0.29	ND	0.32	ND	0.25	ND	0.35
Toluene	ND	0.05	ND	0.053	ND	0.054	ND	0.058	ND	0.065	ND	0.051	ND	0.07
Xylenes, total	ND	0.15	ND	0.163	ND	0.164	ND	0.178	ND	0.195	ND	0.151	ND	0.21
Polychlorinated Biphenyls														

Soil Data - 0 to 15 feet
E/S Pinevale
Springfield, Massachusetts

Sample ID:	CM-22S		CM-22W		CM-38E		CM-38E		CM-38N		CM-38NW		CM-38SE	
Depth:	8 - 11 ft		9.5 - 12.5 ft		4.5 - 7.5 ft		4.5 - 7.5 ft		3.5 - 6.5 ft		4.5 - 7.5 ft		4 - 7 ft	
Sample Date:	5/16/2023		5/16/2023		5/16/2023		5/16/2023		5/16/2023		5/16/2023		5/17/2023	
ANALYTES	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*
Metals														
Arsenic														
Barium														
Cadmium														
Chromium VI														
Chromium (IV or total)*														
Lead					5.9		5		130		8.9		150	
Mercury														
Selenium														
Silver														
Extractable Petroleum Hydrocarbons (EPH)														
C9-C18 Aliphatic Hydrocarbons	ND	11	ND	11	15		20		2800		ND	11	12	
C19-C36 Aliphatic Hydrocarbons	ND	11	ND	11	15		12		450		ND	11	24	
C11-C22 Aromatic Hydrocarbons	ND	11	ND	11	45		39		610		ND	11	180	
Polycyclic Aromatic Hydrocarbons (PAHs)														
Acenaphthene	ND	0.11	ND	0.11	0.7		0.5		0.15		ND	0.11	2.8	
Acenaphthylene	ND	0.11	ND	0.11	0.43		0.3		ND	0.11	ND	0.11	2.1	
Anthracene	ND	0.11	ND	0.11	1.5		1.2		0.39		ND	0.11	7.3	
Benz(a)anthracene	ND	0.11	ND	0.11	1.7		1.3		1.8		0.12		9.5	
Benzo(a)pyrene	ND	0.11	ND	0.11	1.6		1.3		2.2		0.13		8.1	
Benzo(b)fluoranthene	ND	0.11	ND	0.11	1.9		1.4		2.8		ND	0.11	9.5	
Benzo(g,h,i)perylene	ND	0.11	ND	0.11	1.1		0.9		1.6		0.12		4.3	
Benzo(k)fluoranthene	ND	0.11	ND	0.11	0.7		0.6		1		ND	0.11	3.6	
Chrysene	ND	0.11	ND	0.11	1.9		1.4		2.4		0.18		10	
Dibenz(a,h)anthracene	ND	0.11	ND	0.11	0.23		0.2		0.41		ND	0.11	1.1	
Fluoranthene	ND	0.11	ND	0.11	5		3.7		3		0.31		31	
Fluorene	ND	0.11	ND	0.11	0.87		0.6		ND	0.11	ND	0.11	4.6	
Indeno(1,2,3-cd)pyrene	ND	0.11	ND	0.11	1.1		0.9		1.5		ND	0.11	4.7	
2-Methylnapthalene	ND	0.11	ND	0.11	0.53		0.3		0.12		ND	0.11	2.4	
Naphthalene	ND	0.11	ND	0.11	1.6		1.0		ND	0.11	ND	0.11	9.1	
Phenanthrene	ND	0.11	ND	0.11	6.7		5		2.2		0.23		36	
Pyrene	ND	0.11	ND	0.11	4.8		4		3.6		0.29		30	
Volatile Petroleum Hydrocarbons														
C5-C8 Aliphatics	ND	11	ND	11	ND	12	ND	11	ND	110	ND	12	ND	110
C9-C12 Aliphatics	ND	11	ND	11	ND	12	ND	11	140		ND	12	190	
C9-C10 Aromatics	ND	11	ND	11	ND	12	ND	11	530		ND	12	340	

Soil Data - 0 to 15 feet
E/S Pinevale
Springfield, Massachusetts

Sample ID:	CM-22S		CM-22W		CM-38E		CM-38E		CM-38N		CM-38NW		CM-38SE	
Depth:	8 - 11 ft		9.5 - 12.5 ft		4.5 - 7.5 ft		4.5 - 7.5 ft		3.5 - 6.5 ft		4.5 - 7.5 ft		4 - 7 ft	
Sample Date:	5/16/2023		5/16/2023		5/16/2023		5/16/2023		5/16/2023		5/16/2023		5/17/2023	
ANALYTES	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*
Volatile Organic Compounds														
Benzene	ND	0.054	ND	0.055	ND	0.058	ND	0.054	ND	0.57	ND	0.062	ND	0.53
Ethylbenzene	ND	0.054	ND	0.055	ND	0.058	ND	0.054	ND	0.57	ND	0.062	ND	0.53
MTBE	ND	0.054	ND	0.055	ND	0.058	ND	0.054	ND	0.57	ND	0.062	ND	0.53
Naphthalene	ND	0.27	ND	0.28	ND	0.29	ND	0.27	ND	2.9	ND	0.31	ND	2.7
Toluene	ND	0.054	ND	0.055	ND	0.058	ND	0.054	ND	0.57	ND	0.062	ND	0.53
Xylenes, total	ND	0.164	ND	0.165	ND	0.178	ND	0.164	ND	1.67	ND	0.182	ND	1.63
Polychlorinated Biphenyls														

Soil Data - 0 to 15 feet
E/S Pinevale
Springfield, Massachusetts

Sample ID:	CM-38SW		CM-39E		CM-39N		CM-39S		CM-39W		CM-43N		CM-43NW		CM-43SW		CM-52E	
Depth:	4.5 - 7.5 ft		0 - 2 ft		0 - 2 ft		0 - 2 ft		0 - 2 ft		8 - 11 ft		5 - 8 ft		5 - 8 ft		1 - 3 ft	
Sample Date:	5/16/2023		5/17/2023		5/17/2023		5/17/2023		5/17/2023		5/18/2023		5/18/2023		5/18/23		5/15/23	
ANALYTES	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*
Metals																		
Arsenic																		
Barium																		
Cadmium																	ND	0.36
Chromium VI																		
Chromium (IV or total)*																		
Lead	7		120		26		150		47		120		70		34			
Mercury																		
Selenium																		
Silver																		
Extractable Petroleum Hydrocarbons (EPH)																		
C9-C18 Aliphatic Hydrocarbons	ND	11									ND	12	ND	11	ND	11		
C19-C36 Aliphatic Hydrocarbons	ND	11									24		ND	11	ND	11		
C11-C22 Aromatic Hydrocarbons	ND	11									15		17		22			
Polycyclic Aromatic Hydrocarbons (PAHs)																		
Acenaphthene	ND	0.11									ND	0.12	ND	0.11	ND	0.11		
Acenaphthylene	ND	0.11									ND	0.12	ND	0.11	ND	0.11		
Anthracene	ND	0.11									ND	0.12	0.12		0.18			
Benz(a)anthracene	ND	0.11									ND	0.12	0.43		0.96			
Benzo(a)pyrene	ND	0.11									ND	0.12	0.47		1.2			
Benzo(b)fluoranthene	ND	0.11									ND	0.12	0.56		1.4			
Benzo(g,h,i)perylene	ND	0.11									ND	0.12	0.31		0.87			
Benzo(k)fluoranthene	ND	0.11									ND	0.12	0.22		0.49			
Chrysene	ND	0.11									ND	0.12	0.52		1.1			
Dibenz(a,h)anthracene	ND	0.11									ND	0.12	ND	0.11	0.17			
Fluoranthene	ND	0.11									ND	0.12	0.88		2.1			
Fluorene	ND	0.11									ND	0.12	ND	0.11	ND	0.11		
Indeno(1,2,3-cd)pyrene	ND	0.11									ND	0.12	0.32		0.83			
2-Methylnapthalene	ND	0.11									ND	0.12	ND	0.11	ND	0.11		
Naphthalene	ND	0.11									ND	0.12	ND	0.11	ND	0.11		
Phenanthrene	ND	0.11									ND	0.12	0.63		0.69			
Pyrene	ND	0.11									ND	0.12	0.89		2.1			
Volatile Petroleum Hydrocarbons																		
C5-C8 Aliphatics	ND	13									ND	12	ND	11	ND	11		
C9-C12 Aliphatics	ND	13									ND	12	ND	11	ND	11		
C9-C10 Aromatics	ND	13									ND	12	ND	11	ND	11		

Soil Data - 0 to 15 feet
E/S Pinevale
Springfield, Massachusetts

Sample ID:	CM-38SW		CM-39E		CM-39N		CM-39S		CM-39W		CM-43N		CM-43NW		CM-43SW		CM-52E	
Depth:	4.5 - 7.5 ft		0 - 2 ft		0 - 2 ft		0 - 2 ft		0 - 2 ft		8 - 11 ft		5 - 8 ft		5 - 8 ft		1 - 3 ft	
Sample Date:	5/16/2023		5/17/2023		5/17/2023		5/17/2023		5/17/2023		5/18/2023		5/18/2023		5/18/23		5/15/23	
ANALYTES	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*
Volatile Organic Compounds																		
Benzene	ND	0.063									ND	0.059	ND	0.054	ND	0.053		
Ethylbenzene	ND	0.063									ND	0.059	ND	0.054	ND	0.053		
MTBE	ND	0.063									ND	0.059	ND	0.054	ND	0.053		
Naphthalene	ND	0.31									ND	0.29	ND	0.27	ND	0.26		
Toluene	ND	0.063									ND	0.059	ND	0.054	ND	0.053		
Xylenes, total	ND	0.193									ND	0.179	ND	0.164	ND	0.163		
Polychlorinated Biphenyls																		

Soil Data - 0 to 15 feet
E/S Pinevale
Springfield, Massachusetts

Sample ID:	CM-52N		CM-52S		CM-52W		CM-53E				CM-53N		CM-53SE		CM-53SW	
Depth:	1 - 3 ft		1.2 - 3 ft		1 - 3 ft		0 - 2 ft		0 - 2 ft		0 - 2 ft		1 - 2 ft		0.5 - 2 ft	
Sample Date:	5/15/23		5/15/23		5/15/23		5/15/23		5/15/23		5/15/23		5/15/23		5/15/23	
ANALYTES	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*
Metals																
Arsenic																
Barium							22		16		30		48		73	
Cadmium	ND	0.39	ND	0.39	ND	0.37	ND	0.34	ND	0.35	ND	0.46	ND	0.35	ND	0.35
Chromium VI																
Chromium (IV or total)*																
Lead							4.3		2.1		4.9		2.7		3.6	
Mercury																
Selenium																
Silver																
Extractable Petroleum Hydrocarbons (EPH)																
C9-C18 Aliphatic Hydrocarbons																
C19-C36 Aliphatic Hydrocarbons																
C11-C22 Aromatic Hydrocarbons																
Polycyclic Aromatic Hydrocarbons (PAHs)																
Acenaphthene																
Acenaphthylene																
Anthracene																
Benz(a)anthracene																
Benzo(a)pyrene																
Benzo(b)fluoranthene																
Benzo(g,h,i)perylene																
Benzo(k)fluoranthene																
Chrysene																
Dibenz(a,h)anthracene																
Fluoranthene																
Fluorene																
Indeno(1,2,3-cd)pyrene																
2-Methylnapthalene																
Naphthalene																
Phenanthrene																
Pyrene																
Volatile Petroleum Hydrocarbons																
C5-C8 Aliphatics																
C9-C12 Aliphatics																
C9-C10 Aromatics																

Soil Data - 0 to 15 feet
E/S Pinevale
Springfield, Massachusetts

Sample ID:	CM-52N		CM-52S		CM-52W		CM-53E				CM-53N		CM-53SE		CM-53SW	
Depth:	1 - 3 ft		1.2 - 3 ft		1 - 3 ft		0 - 2 ft		0 - 2 ft		0 - 2 ft		1 - 2 ft		0.5 - 2 ft	
Sample Date:	5/15/23		5/15/23		5/15/23		5/15/23		5/15/23		5/15/23		5/15/23		5/15/23	
ANALYTES	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*
Volatile Organic Compounds																
Benzene																
Ethylbenzene																
MTBE																
Naphthalene																
Toluene																
Xylenes, total																
Polychlorinated Biphenyls																

Soil Data - 0 to 15 feet
E/S Pinevale
Springfield, Massachusetts

Sample ID:	CM-53W		DP-2A		MW-205A		OTP-4A		OTP-6A		OTP-6A		OTP-8A		TP-3		TP-9		TP-18	
Depth:	0.5 - 2 ft		0 - 2 ft		0.42 - 3 ft		0 - 2 ft		0 - 3 ft		0 - 3 ft		0 - 1.5 ft		0.6-1		1-2		10-12	
Sample Date:	5/15/23		5/18/23		5/15/23		5/18/23		5/16/23		5/16/23		5/16/23		6/26/06		6/26/06		6/26/06	
ANALYTES	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*
Metals																				
Arsenic															6.19		3.13			
Barium	35														39.8		26.7			
Cadmium	ND	0.34			1.1										0.33		0.73			
Chromium VI																				
Chromium (IV or total)*															19.1		26.5			
Lead	5.3		92				26		9.3				63		80.7		30.5			
Mercury															0.027		ND	0.009		
Selenium															ND	5.05	ND	5.59		
Silver															ND	0.51	ND	0.56		
Extractable Petroleum Hydrocarbons (EPH)																				
C9-C18 Aliphatic Hydrocarbons															ND	303	ND	33.6	1520	
C19-C36 Aliphatic Hydrocarbons															9320		ND	33.6	877	
C11-C22 Aromatic Hydrocarbons															1790		ND	33.6	792	
Polycyclic Aromatic Hydrocarbons (PAHs)																				
Acenaphthene			0.94				ND	0.79	0.22		ND	0.18	ND	0.22	19.2		ND	0.2	5.3	
Acenaphthylene			0.45				ND	0.79	ND	0.18	ND	0.18	ND	0.22	54.7		ND	0.2	3.3	
Anthracene			2.5				2.1		0.45		ND	0.18	0.26		154		0.2		0.4	
Benz(a)anthracene			8				23		1.2		ND	0.18	1		184		0.3		0.1	
Benzo(a)pyrene			7.9				32		1.2		ND	0.18	0.99		115		0.3		ND	0.2
Benzo(b)fluoranthene			11				41		1.6		ND	0.18	1.3		104		2.1		ND	0.2
Benzo(g,h,i)perylene			5.6				31		0.82		ND	0.18	0.76		56.1		0.7		ND	0.2
Benzo(k)fluoranthene			4.3				16		0.66		ND	0.18	0.5		117		ND	0.2	ND	0.2
Chrysene			7.9				26		1.2		ND	0.18	1		145		0.7		ND	0.2
Dibenz(a,h)anthracene			1.4				6.5		ND	0.18	ND	0.18	ND	0.22	11.2		ND	0.2	ND	0.2
Fluoranthene			20				47		2.8		ND	0.18	2.3		459		0.3		0.8	
Fluorene			0.82				ND	0.79	ND	0.18	ND	0.18	ND	0.22	23.9		ND	0.2	6	
Indeno(1,2,3-cd)pyrene			5.9				28		0.8		ND	0.18	0.77		71.1		0.8		ND	0.2
2-Methylnapthalene			ND	0.37			ND	0.79	ND	0.18	ND	0.18	ND	0.22	8.3		ND	0.2	4.5	
Naphthalene			0.39				ND	0.79	ND	0.18	ND	0.18	ND	0.22	13.3		ND	0.2	3.4	
Phenanthrene			12				4.7		1.9		ND	0.18	1.3		616		ND	0.2	2	
Pyrene			17				60		2.2		ND	0.18	1.7		429		0.3		0.4	
Volatile Petroleum Hydrocarbons																				
C5-C8 Aliphatics																			26.2	
C9-C12 Aliphatics																			193	
C9-C10 Aromatics																			277	

Soil Data - 0 to 15 feet
E/S Pinevale
Springfield, Massachusetts

Sample ID:	CM-53W		DP-2A		MW-205A		OTP-4A		OTP-6A		OTP-6A		OTP-8A		TP-3		TP-9		TP-18	
Depth:	0.5 - 2 ft		0 - 2 ft		0.42 - 3 ft		0 - 2 ft		0 - 3 ft		0 - 3 ft		0 - 1.5 ft		0.6-1		1-2		10-12	
Sample Date:	5/15/23		5/18/23		5/15/23		5/18/23		5/16/23		5/16/23		5/16/23		6/26/06		6/26/06		6/26/06	
ANALYTES	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*
Volatile Organic Compounds																				
Benzene																			ND	0.067
Ethylbenzene																			0.66	
MTBE																			ND	0.067
Naphthalene																			5.84	
Toluene																			ND	0.067
Xylenes, total																			0.8	
Polychlorinated Biphenyls															2.05					

Soil Data - 0 to 15 feet
E/S Pinevale
Springfield, Massachusetts

Sample ID:	TP-7		TP-14		TP-16		CM-23		CM-25		CM-38		CM-43		CM-45		BT-E	
Depth:	1-2		1-2		2-4		7-9		11-13		11-13		10-12		10-12			
Sample Date:	6/26/06		7/26/06		7/26/06		9/24/09		9/25/09		10/1/09		10/2/09		10/27/09		11/12/09	
ANALYTES	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*3604*	
Metals																		
Arsenic	19		ND	2.74	22.7													
Barium	203		72.2		42.2													
Cadmium	ND	0.31	ND	0.28	ND	0.31												
Chromium VI																		
Chromium (IV or total)*	8.09		24		16.2													
Lead	163		21.9		1040													
Mercury	0.089		0.562		0.054													
Selenium	ND	6.08	ND	5.47	ND	6.04												
Silver	ND	0.61	ND	0.55	ND	0.61												
Extractable Petroleum Hydrocarbons (EPH)																		
C9-C18 Aliphatic Hydrocarbons									18		970		2400		ND	12	9800	
C19-C36 Aliphatic Hydrocarbons									11		120		520		48		2600	
C11-C22 Aromatic Hydrocarbons									13		530		890		24		3500	
Polycyclic Aromatic Hydrocarbons (PAHs)																		
Acenaphthene									ND	0.11	1.5		0.28		0.13		7.4	
Acenaphthylene									ND	0.11	3.9		0.62		ND	0.12	1.5	
Anthracene									ND	0.11	ND	0.11	ND	0.11	0.25		5.8	
Benz(a)anthracene									ND	0.11	ND	0.11	ND	0.11	0.68		4.1	
Benzo(a)pyrene									ND	0.11	ND	0.11	ND	0.11	0.58		3.6	
Benzo(b)fluoranthene									ND	0.11	ND	0.11	ND	0.11	0.89		5.5	
Benzo(g,h,i)perylene									ND	0.11	ND	0.11	ND	0.11	0.38		2.6	
Benzo(k)fluoranthene									ND	0.11	ND	0.11	ND	0.11	0.33		2	
Chrysene									ND	0.11	ND	0.11	ND	0.11	0.83		4.9	
Dibenz(a,h)anthracene									ND	0.11	ND	0.11	ND	0.11	ND	0.12	0.71	
Fluoranthene									ND	0.11	ND	0.11	0.4		1.6		10	
Fluorene									ND	0.11	3.3		1.6		0.2		9.7	
Indeno(1,2,3-cd)pyrene									ND	0.11	ND	0.11	ND	0.11	0.41		2.7	
2-Methylnapthalene									ND	0.11	9.9		1.6		ND	0.12	12	
Naphthalene									ND	0.11	1.9		0.42		ND	0.12	11	
Phenanthrene									ND	0.11	1.7		ND	0.11	1.3		4.6	
Pyrene									ND	0.11	ND	0.11	ND	0.11	1.5		17	
Volatile Petroleum Hydrocarbons																		
C5-C8 Aliphatics									ND	20	30		ND	23			ND	200
C9-C12 Aliphatics									ND	13	58		37				330	
C9-C10 Aromatics									ND	13	150		170				650	

Soil Data - 0 to 15 feet
E/S Pinevale
Springfield, Massachusetts

Sample ID:	TP-7		TP-14		TP-16		CM-23		CM-25		CM-38		CM-43		CM-45		BT-E	
Depth:	1-2		1-2		2-4		7-9		11-13		11-13		10-12		10-12			
Sample Date:	6/26/06		7/26/06		7/26/06		9/24/09		9/25/09		10/1/09		10/2/09		10/27/09		11/12/09	
ANALYTES	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*3604*	
Volatile Organic Compounds																		
Benzene									ND	0.066	ND	0.086	ND	0.078			ND	0.68
Ethylbenzene									ND	0.066	0.28		0.094				ND	0.68
MTBE									ND	0.066	ND	0.086					ND	0.68
Naphthalene									ND	0.66	2.8		1.1				24	
Toluene									ND	0.066	ND	0.086	ND	0.078			ND	0.68
Xylenes, total									ND	0.2	1.1		0.27				4.8	
Polychlorinated Biphenyls																		

Soil Data - 0 to 15 feet
E/S Pinevale
Springfield, Massachusetts

Sample ID:	CM-15		CM-16		CM-17		CM-18		CM-19		CM-20		CM-21	
Depth:	1-3		1-3		1-3		2-4		2-4		0-2		1-3	
Sample Date:	9/22/2009		9/22/2009		9/22/2009		9/22/2009		9/23/2009		9/23/2009		9/24/2009	
ANALYTES	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*
Metals														
Arsenic	5.6		3.3		2.9		3.2		3.9		4.1		2.8	
Barium	47		54		50		43		75		33		63	
Cadmium	ND	0.26	ND	0.27	ND	0.26	ND	0.28	ND	0.27	ND	0.27	0.27	
Chromium VI														
Chromium (VI or total)*	12		11		11		8.8		14		11		14	
Lead	4.1		2.3		2.9		6.7		5.3		8.5		15	
Mercury	ND	0.022	ND	0.022	ND	0.019	ND	0.019	ND	0.017	ND	0.018	ND	0.022
Selenium	ND	5.2	ND	5.3	ND	5.2	ND	5.6	ND	5.4	ND	5.4	ND	5.1
Silver	ND	0.52	ND	0.53	ND	0.52	ND	0.56	ND	0.54	ND	0.54	ND	0.51
Extractable Petroleum Hydrocarbons (EPH)														
C9-C18 Aliphatic Hydrocarbons														
C19-C36 Aliphatic Hydrocarbons														
C11-C22 Aromatic Hydrocarbons														
Polycyclic Aromatic Hydrocarbons (PAHs)														
Acenaphthene														
Acenaphthylene														
Anthracene														
Benz(a)anthracene														
Benzo(a)pyrene														
Benzo(b)fluoranthene														
Benzo(g,h,i)perylene														
Benzo(k)fluoranthene														
Chrysene														
Dibenz(a,h)anthracene														
Fluoranthene														
Fluorene														
Indeno(1,2,3-cd)pyrene														
2-Methylnapthalene														
Naphthalene														
Phenanthrene														
Pyrene														
Volatile Petroleum Hydrocarbons														
C5-C8 Aliphatics														
C9-C12 Aliphatics														
C9-C10 Aromatics														

Soil Data - 0 to 15 feet
E/S Pinevale
Springfield, Massachusetts

Sample ID:	CM-15		CM-16		CM-17		CM-18		CM-19		CM-20		CM-21	
Depth:	1-3		1-3		1-3		2-4		2-4		0-2		1-3	
Sample Date:	9/22/2009		9/22/2009		9/22/2009		9/22/2009		9/23/2009		9/23/2009		9/24/2009	
ANALYTES	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*
Volatile Organic Compounds														
Benzene														
Ethylbenzene														
MTBE														
Naphthalene														
Toluene														
Xylenes, total														
Polychlorinated Biphenyls							ND	0.11						

Soil Data - 0 to 15 feet
E/S Pinevale
Springfield, Massachusetts

Sample ID:	CM-22		CM-23		CM-23A				CM-24		CM-25		CM-26	
Depth:	1-3		1-3		1-3		3-5		1-3		1-3		0-2	
Sample Date:	9/24/2009		9/24/2009		10/27/2009		10/27/2009		9/25/2009		9/25/2009		9/25/2009	
ANALYTES	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*
Metals														
Arsenic	ND	2.6	7.3						4.6		3.5		3.2	
Barium	26		95						63		23		78	
Cadmium	ND	0.26	0.98						0.29		ND	0.27	0.38	
Chromium VI					2		ND	0.98						
Chromium (VI or total)*	7.3		99		19		12		12		10		18	
Lead	3.4		170						21		3.5		5.8	
Mercury	0.031		0.032						0.026		ND	0.023	ND	0.016
Selenium	ND	5.2	ND	5.9					ND	5.3	ND	5.5	ND	5.3
Silver	ND	0.52	ND	0.59					ND	0.53	ND	0.55	ND	0.53
Extractable Petroleum Hydrocarbons (EPH)														
C9-C18 Aliphatic Hydrocarbons														
C19-C36 Aliphatic Hydrocarbons														
C11-C22 Aromatic Hydrocarbons														
Polycyclic Aromatic Hydrocarbons (PAHs)														
Acenaphthene														
Acenaphthylene														
Anthracene														
Benz(a)anthracene														
Benzo(a)pyrene														
Benzo(b)fluoranthene														
Benzo(g,h,i)perylene														
Benzo(k)fluoranthene														
Chrysene														
Dibenz(a,h)anthracene														
Fluoranthene														
Fluorene														
Indeno(1,2,3-cd)pyrene														
2-Methylnapthalene														
Naphthalene														
Phenanthrene														
Pyrene														
Volatile Petroleum Hydrocarbons														
C5-C8 Aliphatics														
C9-C12 Aliphatics														
C9-C10 Aromatics														

Soil Data - 0 to 15 feet
E/S Pinevale
Springfield, Massachusetts

Sample ID:	CM-22		CM-23		CM-23A				CM-24		CM-25		CM-26	
Depth:	1-3		1-3		1-3		3-5		1-3		1-3		0-2	
Sample Date:	9/24/2009		9/24/2009		10/27/2009		10/27/2009		9/25/2009		9/25/2009		9/25/2009	
ANALYTES	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*
Volatile Organic Compounds														
Benzene														
Ethylbenzene														
MTBE														
Naphthalene														
Toluene														
Xylenes, total														
Polychlorinated Biphenyls	ND	0.1	ND	0.12							ND	0.11		

Soil Data - 0 to 15 feet
E/S Pinevale
Springfield, Massachusetts

Sample ID:	CM-27		CM-28		CM-29		CM-30		CM-31		CM-32		CM-33		CM-34		CM-35	
Depth:	0-2		1-3		1-3		1-3		1-3		1-3		1-3		1-3		1-3	
Sample Date:	9/25/2009		9/28/2009		9/28/2009		9/28/2009		9/28/2009		9/29/2009		9/29/2009		9/29/09		9/29/09	
ANALYTES	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*
Metals																		
Arsenic	3.9		ND	2.7	ND	2.6	2.9		3.7		ND	2.8	3.2		4.5		6	
Barium	32		63		68		38		38		53		35		110		25	
Cadmium	ND	0.26	ND	0.27	0.3		ND	0.26	ND	0.27	ND	0.28	ND	0.27	ND	0.26	ND	0.25
Chromium VI																		
Chromium (VI or total)*	11		16		9.9		8.5		11		8.8		9.3		20		7.8	
Lead	14		5.4		9.5		3.9		12		5.2		5.5		3.6		4.6	
Mercury	0.033		ND	0.014	ND	0.018	0.02		0.027		ND	0.016	ND	0.02	0.022		ND	0.02
Selenium	ND	5.1	ND	5.3	ND	5.2	ND	5.2	ND	5.4	ND	5.5	ND	5.3	ND	5.3	ND	5
Silver	ND	0.51	ND	0.53	ND	0.52	ND	0.52	ND	0.54	ND	0.55	ND	0.53	ND	0.53	ND	0.5
Extractable Petroleum Hydrocarbons (EPH)																		
C9-C18 Aliphatic Hydrocarbons																		
C19-C36 Aliphatic Hydrocarbons																		
C11-C22 Aromatic Hydrocarbons																		
Polycyclic Aromatic Hydrocarbons (PAHs)																		
Acenaphthene																		
Acenaphthylene																		
Anthracene																		
Benz(a)anthracene																		
Benzo(a)pyrene																		
Benzo(b)fluoranthene																		
Benzo(g,h,i)perylene																		
Benzo(k)fluoranthene																		
Chrysene																		
Dibenz(a,h)anthracene																		
Fluoranthene																		
Fluorene																		
Indeno(1,2,3-cd)pyrene																		
2-Methylnapthalene																		
Naphthalene																		
Phenanthrene																		
Pyrene																		
Volatile Petroleum Hydrocarbons																		
C5-C8 Aliphatics																		
C9-C12 Aliphatics																		
C9-C10 Aromatics																		

Soil Data - 0 to 15 feet
E/S Pinevale
Springfield, Massachusetts

Sample ID:	CM-27		CM-28		CM-29		CM-30		CM-31		CM-32		CM-33		CM-34		CM-35	
Depth:	0-2		1-3		1-3		1-3		1-3		1-3		1-3		1-3		1-3	
Sample Date:	9/25/2009		9/28/2009		9/28/2009		9/28/2009		9/28/2009		9/29/2009		9/29/2009		9/29/09		9/29/09	
ANALYTES	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*
Volatile Organic Compounds																		
Benzene																		
Ethylbenzene																		
MTBE																		
Naphthalene																		
Toluene																		
Xylenes, total																		
Polychlorinated Biphenyls	ND	0.1									ND	0.11			ND	0.11		

Soil Data - 0 to 15 feet
E/S Pinevale
Springfield, Massachusetts

Sample ID:	CM-36		CM-37		CM-38		CM-39		CM-40		CM-40A				CM-41	
Depth:	1-3		1-3		0.5-1		0-2		0-2		0-2		2-4		1-3	
Sample Date:	9/30/09		9/30/09		10/1/09		10/1/09		10/1/09		10/28/09		10/28/09		10/2/09	
ANALYTES	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*
Metals																
Arsenic	5.3		3.1		5.9		8.5		6.4						ND	2.6
Barium	45		48		62		390		1700						25	
Cadmium	0.31		ND	0.26	0.28		1.9		2.2						ND	0.26
Chromium VI											ND	5.4	2			
Chromium (VI or total)*	14		12		20		63		70		54		11		7	
Lead	65		2.1		13		550		290						3.6	
Mercury	ND	0.025	ND	0.022	0.027		0.26		0.36						ND	0.021
Selenium	ND	5.5	ND	5.3	ND	5.3	ND	5.6	ND	6.1					ND	5.3
Silver	ND	0.55	ND	0.53	ND	0.53	1.6		ND	0.61					ND	0.53
Extractable Petroleum Hydrocarbons (EPH)																
C9-C18 Aliphatic Hydrocarbons																
C19-C36 Aliphatic Hydrocarbons																
C11-C22 Aromatic Hydrocarbons																
Polycyclic Aromatic Hydrocarbons (PAHs)																
Acenaphthene																
Acenaphthylene																
Anthracene																
Benz(a)anthracene																
Benzo(a)pyrene																
Benzo(b)fluoranthene																
Benzo(g,h,i)perylene																
Benzo(k)fluoranthene																
Chrysene																
Dibenz(a,h)anthracene																
Fluoranthene																
Fluorene																
Indeno(1,2,3-cd)pyrene																
2-Methylnapthalene																
Naphthalene																
Phenanthrene																
Pyrene																
Volatile Petroleum Hydrocarbons																
C5-C8 Aliphatics																
C9-C12 Aliphatics																
C9-C10 Aromatics																

Soil Data - 0 to 15 feet
E/S Pinevale
Springfield, Massachusetts

Sample ID:	CM-36		CM-37		CM-38		CM-39		CM-40		CM-40A				CM-41	
Depth:	1-3		1-3		0.5-1		0-2		0-2		0-2		2-4		1-3	
Sample Date:	9/30/09		9/30/09		10/1/09		10/1/09		10/1/09		10/28/09		10/28/09		10/2/09	
ANALYTES	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*
Volatile Organic Compounds																
Benzene																
Ethylbenzene																
MTBE																
Naphthalene																
Toluene																
Xylenes, total																
Polychlorinated Biphenyls			ND	0.11	ND	0.11	ND	0.11								

Soil Data - 0 to 15 feet
E/S Pinevale
Springfield, Massachusetts

Sample ID:	CM-42		CM-43		CM-44		CM-45		CM-46				CM-47				CM-48			
Depth:	1-3		1-3		0-2		0-2		1-3		3-5		0-2		2-4		1-3		3-5	
Sample Date:	10/2/09		10/2/09		10/2/09		10/27/09		10/27/09		10/27/09		10/27/09		10/27/09		10/27/09		10/27/09	
ANALYTES	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*
Metals																				
Arsenic	2.6		3.9		5.9		10													
Barium	33		120		120		230													
Cadmium	ND	0.26	0.51		1.2		1.7													
Chromium VI																				
Chromium (VI or total)*	8.9		18		25		10		550		8.2		13		25		5		7.8	
Lead	5.5		27		110		160													
Mercury	ND	0.016	0.038		0.29		0.086													
Selenium	ND	5.1	ND	5.3	ND	5.7	ND	6.1												
Silver	ND	0.51	ND	0.53	ND	0.57	ND	0.61												
Extractable Petroleum Hydrocarbons (EPH)																				
C9-C18 Aliphatic Hydrocarbons																				
C19-C36 Aliphatic Hydrocarbons																				
C11-C22 Aromatic Hydrocarbons																				
Polycyclic Aromatic Hydrocarbons (PAHs)																				
Acenaphthene																				
Acenaphthylene																				
Anthracene																				
Benz(a)anthracene																				
Benzo(a)pyrene																				
Benzo(b)fluoranthene																				
Benzo(g,h,i)perylene																				
Benzo(k)fluoranthene																				
Chrysene																				
Dibenz(a,h)anthracene																				
Fluoranthene																				
Fluorene																				
Indeno(1,2,3-cd)pyrene																				
2-Methylnapthalene																				
Naphthalene																				
Phenanthrene																				
Pyrene																				
Volatile Petroleum Hydrocarbons																				
C5-C8 Aliphatics																				
C9-C12 Aliphatics																				
C9-C10 Aromatics																				

Soil Data - 0 to 15 feet
E/S Pinevale
Springfield, Massachusetts

Sample ID:	CM-42		CM-43		CM-44		CM-45		CM-46				CM-47				CM-48			
Depth:	1-3		1-3		0-2		0-2		1-3		3-5		0-2		2-4		1-3		3-5	
Sample Date:	10/2/09		10/2/09		10/2/09		10/27/09		10/27/09		10/27/09		10/27/09		10/27/09		10/27/09		10/27/09	
ANALYTES	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*
Volatile Organic Compounds																				
Benzene																				
Ethylbenzene																				
MTBE																				
Naphthalene																				
Toluene																				
Xylenes, total																				
Polychlorinated Biphenyls	ND	0.1			ND	0.11														

Soil Data - 0 to 15 feet
E/S Pinevale
Springfield, Massachusetts

Sample ID:	CM-49				CM-50		CM-51		CM-52		CM-53				CM-54				CM-55			
Depth:	1-3		3-5		1-3		1-3		1-3		0-2		2-4		0-2		2-4		0-2		4-6	
Sample Date:	10/27/09		10/27/09		10/28/09		10/28/09		10/28/09		10/28/09		10/28/09		10/28/09		10/28/09		10/28/09		10/28/09	
ANALYTES	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*
Metals																						
Arsenic					4.4		4.9		9.5													
Barium					33		33		86		2400		290		3300		280		460		120	
Cadmium					ND	0.27	ND	0.28	3.3		2.4		0.64		4.4		0.61		1.4		1.3	
Chromium VI																						
Chromium (VI or total)*	8.7		6.2		10		22		48		120		16		130		13		60		17	
Lead					3.8		36		260		400		54		300		110		280		100	
Mercury					ND	0.019	0.12		5													
Selenium					ND	5.4	ND	5.6	ND	5.8												
Silver					ND	0.54	ND	0.56	ND	0.58												
Extractable Petroleum Hydrocarbons (EPH)																						
C9-C18 Aliphatic Hydrocarbons																						
C19-C36 Aliphatic Hydrocarbons																						
C11-C22 Aromatic Hydrocarbons																						
Polycyclic Aromatic Hydrocarbons (PAHs)																						
Acenaphthene																						
Acenaphthylene																						
Anthracene																						
Benz(a)anthracene																						
Benzo(a)pyrene																						
Benzo(b)fluoranthene																						
Benzo(g,h,i)perylene																						
Benzo(k)fluoranthene																						
Chrysene																						
Dibenz(a,h)anthracene																						
Fluoranthene																						
Fluorene																						
Indeno(1,2,3-cd)pyrene																						
2-Methylnapthalene																						
Naphthalene																						
Phenanthrene																						
Pyrene																						
Volatile Petroleum Hydrocarbons																						
C5-C8 Aliphatics																						
C9-C12 Aliphatics																						
C9-C10 Aromatics																						

Soil Data - 0 to 15 feet
E/S Pinevale
Springfield, Massachusetts

Sample ID:	CM-49				CM-50		CM-51		CM-52		CM-53				CM-54				CM-55			
Depth:	1-3		3-5		1-3		1-3		1-3		0-2		2-4		0-2		2-4		0-2		4-6	
Sample Date:	10/27/09		10/27/09		10/28/09		10/28/09		10/28/09		10/28/09		10/28/09		10/28/09		10/28/09		10/28/09		10/28/09	
ANALYTES	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*
Volatile Organic Compounds																						
Benzene																						
Ethylbenzene																						
MTBE																						
Naphthalene																						
Toluene																						
Xylenes, total																						
Polychlorinated Biphenyls					ND	0.11	ND	0.11	ND	0.11												

Soil Data - 0 to 15 feet
E/S Pinevale
Springfield, Massachusetts

Sample ID:	OTP-4		OTP-4		OTP-6		OTP-8		DP-1		DP-2		DP-3	
Depth:	0-2		3-4		0-3		0-2		0-2		0-1.5		0-2	
Sample Date:	11/12/09		11/12/09		11/12/09		11/12/09		11/12/09		11/12/09		11/12/09	
ANALYTES	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*
Metals														
Arsenic	4.6		5.7		5.7		3.8		3.7		6.4		3.5	
Barium	62		46		480		240		170		110		35	
Cadmium	0.29		ND	0.31	0.84		1.3		0.38		0.67		ND	0.27
Chromium VI														
Chromium (VI or total)*	13		7.9		25		24		9.9		13		9.8	
Lead	32		12		170		140		29		66		32	
Mercury	1.2		0.043		0.066		0.26		0.073		0.18		0.025	
Selenium	ND	5.3	ND	6.2	ND	5.4	ND	5.6	ND	5.4	ND	5.6	ND	5.4
Silver	0.78		ND	0.62	ND	0.54	ND	0.56	ND	0.54	ND	0.56	ND	0.54
Extractable Petroleum Hydrocarbons (EPH)														
C9-C18 Aliphatic Hydrocarbons	ND	21	ND	25	ND	54	ND	56	ND	22	ND	56	ND	11
C19-C36 Aliphatic Hydrocarbons	23		ND	25	ND	54	110		ND	22	58		ND	11
C11-C22 Aromatic Hydrocarbons	120		120		470		200		65		210		14	
Polycyclic Aromatic Hydrocarbons (PAHs)														
Acenaphthene	0.49		ND	0.25	8.4		1.5		0.42		1.5		ND	0.11
Acenaphthylene	0.52		ND	0.25	ND	0.54	ND	0.56	ND	0.22	ND	0.56	ND	0.11
Anthracene	2.1		ND	0.25	19		2.8		0.8		3.3		0.13	
Benz(a)anthracene	7.2		ND	0.25	38		11		3.2		10		0.26	
Benzo(a)pyrene	6.6		ND	0.25	32		10		3.2		9.2		0.24	
Benzo(b)fluoranthene	9.6		ND	0.25	46		16		4.6		15		0.34	
Benzo(g,h,i)perylene	4.2		ND	0.25	21		7.4		2.3		6		0.14	
Benzo(k)fluoranthene	3.3		ND	0.25	17		5.6		1.7		5.2		0.13	
Chrysene	8.2		ND	0.25	41		13		3.7		12		0.3	
Dibenz(a,h)anthracene	1.2		ND	0.25	5.9		2		0.62		1.9		ND	0.11
Fluoranthene	16		ND	0.25	97		23		6.7		23		0.6	
Fluorene	0.98		0.32		10		1.5		0.4		1.5		0.12	
Indeno(1,2,3-cd)pyrene	4.6		ND	0.25	22		7.8		2.4		7.1		0.16	
2-Methylnapthalene	ND	0.21	ND	0.25	2.2		ND	0.56	ND	0.22	ND	0.56	ND	0.11
Naphthalene	ND	0.21	ND	0.25	6.8		0.84		ND	0.22	ND	0.56	ND	0.11
Phenanthrene	11		0.33		84		15		3.3		15		0.52	
Pyrene	16		ND	0.25	89		22		6.8		22		0.59	
Volatile Petroleum Hydrocarbons														
C5-C8 Aliphatics														
C9-C12 Aliphatics														
C9-C10 Aromatics														

Soil Data - 0 to 15 feet
E/S Pinevale
Springfield, Massachusetts

Sample ID:	OTP-4		OTP-4		OTP-6		OTP-8		DP-1		DP-2		DP-3	
Depth:	0-2		3-4		0-3		0-2		0-2		0-1.5		0-2	
Sample Date:	11/12/09		11/12/09		11/12/09		11/12/09		11/12/09		11/12/09		11/12/09	
ANALYTES	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*
Volatile Organic Compounds														
Benzene														
Ethylbenzene														
MTBE														
Naphthalene														
Toluene														
Xylenes, total														
Polychlorinated Biphenyls	ND	0.11	ND	0.12	ND	0.11	ND	0.11	ND	0.11	ND	0.11	ND	0.11

Soil Data - 0 to 15 feet
E/S Pinevale
Springfield, Massachusetts

Sample ID: Depth: Sample Date: ANALYTES	Minimum Min	Maximum Max	# Detected Samples Samples	Total Number Samples	Arithmetic Mean Mean	Location of Max Max Detected
Metals						
Arsenic	2.6	22.7	40	46	5	TP-16
Barium	16	3300	58	58	218	CM-54
Cadmium	0.27	4.4	27	63	0.56	CM-54
Chromium VI	2	2	2	4	1	CM-23A
Chromium (VI or total)*	5	550	64	64	30	CM-46
Lead	2.1	1040	75	75	80	TP-16
Mercury	0.02	5	26	46	0.20	CM-46
Selenium	0	0	0	46	3	ND
Silver	0.78	1.6	2	46	0.31	CM-46
Extractable Petroleum Hydrocarbons (EPH)						
C9-C18 Aliphatic Hydrocarbons	12	9800	9	33	543	BT-E
C19-C36 Aliphatic Hydrocarbons	11	9320	16	33	436	TP-3
C11-C22 Aromatic Hydrocarbons	13	3500	22	33	296	BT-E
Polycyclic Aromatic Hydrocarbons (PAHs)						
Acenaphthene	0.13	19.2	17	38	1.40	TP-3
Acenaphthylene	0.29	54.7	10	38	1.86	TP-3
Anthracene	0.12	154	21	38	5.42	TP-3
Benz(a)anthracene	0.1	184	24	38	8.14	TP-3
Benzo(a)pyrene	0.13	115	23	38	6.30	TP-3
Benzo(b)fluoranthene	0.28	104	22	38	7.32	TP-3
Benzo(g,h,i)perylene	0.12	56.1	23	38	3.94	TP-3
Benzo(k)fluoranthene	0.11	117	21	38	4.78	TP-3
Chrysene	0.18	145	23	38	7.50	TP-3
Dibenz(a,h)anthracene	0.17	11.2	14	38	0.92	TP-3
Fluoranthene	0.3	459	25	38	19.96	TP-3
Fluorene	0.12	23.9	17	38	1.79	TP-3
Indeno(1,2,3-cd)pyrene	0.16	71.1	22	38	4.35	TP-3
2-Methylnapthalene	0.12	12	10	38	1.18	BT-E
Naphthalene	0.39	13.3	11	38	1.37	TP-3
Phenanthrene	0.22	616	25	38	21.77	TP-3
Pyrene	0.29	429	24	38	19.28	TP-3
Volatile Petroleum Hydrocarbons						
C5-C8 Aliphatics	26.2	30	2	23	8.51	CM-38
C9-C12 Aliphatics	37	330	6	23	46	BT-E
C9-C10 Aromatics	150	650	6	23	96	BT-E

Soil Data - 0 to 15 feet
E/S Pinevale
Springfield, Massachusetts

Sample ID: Depth: Sample Date: ANALYTES	Minimum Min	Maximum Max	# Detected Samples Samples	Total Number Samples	Arithmetic Mean Mean	Location of Max Max Detected
Volatile Organic Compounds						
Benzene	0	0	0	23	0.07	ND
Ethylbenzene	0.094	0.66	3	23	0.10	TP-18
MTBE	0	0	0	22	0.07	ND
Naphthalene	1.1	24	4	23	1.70	BT-E
Toluene	0	0	0	23	0.07	ND
Xylenes, total	0.27	4.8	4	23	0.44	BT-E
Polychlorinated Biphenyls	2.05	2.05	1	23	0.14	TP-3

Soil Data - 0 to 3 feet
E/S Pinevale
Springfield, Massachusetts

Sample ID:	CM-39E		CM-39N		CM-39S		CM-39W		CM-52E		CM-52N		CM-52S		CM-52W	
Depth:	0 - 2 ft		0 - 2 ft		0 - 2 ft		0 - 2 ft		1 - 3 ft		1 - 3 ft		1.2 - 3 ft		1 - 3 ft	
Sample Date:	5/17/2023		5/17/2023		5/17/2023		5/17/2023		5/15/23		5/15/23		5/15/23		5/15/23	
ANALYTES	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*
Metals																
Arsenic																
Barium																
Cadmium									ND	0.36	ND	0.39	ND	0.39	ND	0.37
Chromium VI																
Chromium (IV or total)*																
Lead	120		26		150		47									
Mercury																
Selenium																
Silver																
Extractable Petroleum Hydrocarbons (EPH)																
C9-C18 Aliphatic Hydrocarbons																
C19-C36 Aliphatic Hydrocarbons																
C11-C22 Aromatic Hydrocarbons																
Polycyclic Aromatic Hydrocarbons (PAHs)																
Acenaphthene																
Acenaphthylene																
Anthracene																
Benz(a)anthracene																
Benzo(a)pyrene																
Benzo(b)fluoranthene																
Benzo(g,h,i)perylene																
Benzo(k)fluoranthene																
Chrysene																
Dibenz(a,h)anthracene																
Fluoranthene																
Fluorene																
Indeno(1,2,3-cd)pyrene																
2-Methylnapthalene																
Naphthalene																
Phenanthrene																
Pyrene																
Volatile Petroleum Hydrocarbons																
C5-C8 Aliphatics																
C9-C12 Aliphatics																
C9-C10 Aromatics																

Soil Data - 0 to 3 feet
E/S Pinevale
Springfield, Massachusetts

Sample ID:	CM-39E		CM-39N		CM-39S		CM-39W		CM-52E		CM-52N		CM-52S		CM-52W	
Depth:	0 - 2 ft		0 - 2 ft		0 - 2 ft		0 - 2 ft		1 - 3 ft		1 - 3 ft		1.2 - 3 ft		1 - 3 ft	
Sample Date:	5/17/2023		5/17/2023		5/17/2023		5/17/2023		5/15/23		5/15/23		5/15/23		5/15/23	
ANALYTES	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*
Volatile Organic Compounds																
Benzene																
Ethylbenzene																
MTBE																
Naphthalene																
Toluene																
Xylenes, total																
Polychlorinated Biphenyls																

Soil Data - 0 to 3 feet
E/S Pinevale
Springfield, Massachusetts

Sample ID:	CM-53E		CM-53E		CM-53N		CM-53SE		CM-53SW		CM-53W		DP-2A		MW-205A		OTP-4A	
Depth:	0 - 2 ft		0 - 2 ft		0 - 2 ft		1 - 2 ft		0.5 - 2 ft		0.5 - 2 ft		0 - 2 ft		0.42 - 3 ft		0 - 2 ft	
Sample Date:	5/15/23		5/15/23		5/15/23		5/15/23		5/15/23		5/15/23		5/18/23		5/15/23		5/18/23	
ANALYTES	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*
Metals																		
Arsenic																		
Barium	22		16		30		48		73		35							
Cadmium	ND	0.34	ND	0.35	ND	0.46	ND	0.35	ND	0.35	ND	0.34			1.1			
Chromium VI																		
Chromium (IV or total)*																		
Lead	4.3		2.1		4.9		2.7		3.6		5.3		92				26	
Mercury																		
Selenium																		
Silver																		
Extractable Petroleum Hydrocarbons (EPH)																		
C9-C18 Aliphatic Hydrocarbons																		
C19-C36 Aliphatic Hydrocarbons																		
C11-C22 Aromatic Hydrocarbons																		
Polycyclic Aromatic Hydrocarbons (PAHs)																		
Acenaphthene													0.94				ND	0.79
Acenaphthylene													0.45				ND	0.79
Anthracene													2.5				2.1	
Benz(a)anthracene													8				23	
Benzo(a)pyrene													7.9				32	
Benzo(b)fluoranthene													11				41	
Benzo(g,h,i)perylene													5.6				31	
Benzo(k)fluoranthene													4.3				16	
Chrysene													7.9				26	
Dibenz(a,h)anthracene													1.4				6.5	
Fluoranthene													20				47	
Fluorene													0.82				ND	0.79
Indeno(1,2,3-cd)pyrene													5.9				28	
2-Methylnapthalene													ND	0.37			ND	0.79
Naphthalene													0.39				ND	0.79
Phenanthrene													12				4.7	
Pyrene													17				60	
Volatile Petroleum Hydrocarbons																		
C5-C8 Aliphatics																		
C9-C12 Aliphatics																		
C9-C10 Aromatics																		

Soil Data - 0 to 3 feet
E/S Pinevale
Springfield, Massachusetts

Sample ID:	CM-53E		CM-53E		CM-53N		CM-53SE		CM-53SW		CM-53W		DP-2A		MW-205A		OTP-4A	
Depth:	0 - 2 ft		0 - 2 ft		0 - 2 ft		1 - 2 ft		0.5 - 2 ft		0.5 - 2 ft		0 - 2 ft		0.42 - 3 ft		0 - 2 ft	
Sample Date:	5/15/23		5/15/23		5/15/23		5/15/23		5/15/23		5/15/23		5/18/23		5/15/23		5/18/23	
ANALYTES	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*
Volatile Organic Compounds																		
Benzene																		
Ethylbenzene																		
MTBE																		
Naphthalene																		
Toluene																		
Xylenes, total																		
Polychlorinated Biphenyls																		

Soil Data - 0 to 3 feet
E/S Pinevale
Springfield, Massachusetts

Sample ID:	OTP-6A		OTP-6A		OTP-8A		TP-3		TP-9		TP-7		TP-14		TP-16		BT-E	
Depth:	0 - 3 ft		0 - 3 ft		0 - 1.5 ft		0.6-1		1-2		1-2		1-2		2-4			
Sample Date:	5/16/23		5/16/23		5/16/23		6/26/06		6/26/06		6/26/06		7/26/06		7/26/06		11/12/09	
ANALYTES	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*
Metals																		
Arsenic							6.19		3.13		19		ND	2.74	22.7			
Barium							39.8		26.7		203		72.2		42.2			
Cadmium							0.33		0.73		ND	0.31	ND	0.28	ND	0.31		
Chromium VI																		
Chromium (IV or total)*							19.1		26.5		8.09		24		16.2			
Lead	9.3				63		80.7		30.5		163		21.9		1040			
Mercury							0.027		ND	0.009	0.089		0.562		0.054			
Selenium							ND	5.05	ND	5.59	ND	6.08	ND	5.47	ND	6.04		
Silver							ND	0.51	ND	0.56	ND	0.61	ND	0.55	ND	0.61		
Extractable Petroleum Hydrocarbons (EPH)																		
C9-C18 Aliphatic Hydrocarbons							ND	303	ND	33.6							9800	
C19-C36 Aliphatic Hydrocarbons							9320		ND	33.6							2600	
C11-C22 Aromatic Hydrocarbons							1790		ND	33.6							3500	
Polycyclic Aromatic Hydrocarbons (PAHs)																		
Acenaphthene	0.22		ND	0.18	ND	0.22	19.2		ND	0.2							7.4	
Acenaphthylene	ND	0.18	ND	0.18	ND	0.22	54.7		ND	0.2							1.5	
Anthracene	0.45		ND	0.18	0.26		154		0.2								5.8	
Benz(a)anthracene	1.2		ND	0.18	1		184		0.3								4.1	
Benzo(a)pyrene	1.2		ND	0.18	0.99		115		0.3								3.6	
Benzo(b)fluoranthene	1.6		ND	0.18	1.3		104		2.1								5.5	
Benzo(g,h,i)perylene	0.82		ND	0.18	0.76		56.1		0.7								2.6	
Benzo(k)fluoranthene	0.66		ND	0.18	0.5		117		ND	0.2							2	
Chrysene	1.2		ND	0.18	1		145		0.7								4.9	
Dibenz(a,h)anthracene	ND	0.18	ND	0.18	ND	0.22	11.2		ND	0.2							0.71	
Fluoranthene	2.8		ND	0.18	2.3		459		0.3								10	
Fluorene	ND	0.18	ND	0.18	ND	0.22	23.9		ND	0.2							9.7	
Indeno(1,2,3-cd)pyrene	0.8		ND	0.18	0.77		71.1		0.8								2.7	
2-Methylnapthalene	ND	0.18	ND	0.18	ND	0.22	8.3		ND	0.2							12	
Naphthalene	ND	0.18	ND	0.18	ND	0.22	13.3		ND	0.2							11	
Phenanthrene	1.9		ND	0.18	1.3		616		ND	0.2							4.6	
Pyrene	2.2		ND	0.18	1.7		429		0.3								17	
Volatile Petroleum Hydrocarbons																		
C5-C8 Aliphatics																	ND	200
C9-C12 Aliphatics																	330	
C9-C10 Aromatics																	650	

Soil Data - 0 to 3 feet
E/S Pinevale
Springfield, Massachusetts

Sample ID:	OTP-6A		OTP-6A		OTP-8A		TP-3		TP-9		TP-7		TP-14		TP-16		BT-E	
Depth:	0 - 3 ft		0 - 3 ft		0 - 1.5 ft		0.6-1		1-2		1-2		1-2		2-4			
Sample Date:	5/16/23		5/16/23		5/16/23		6/26/06		6/26/06		6/26/06		7/26/06		7/26/06		11/12/09	
ANALYTES	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*
Volatile Organic Compounds																		
Benzene																	ND	0.68
Ethylbenzene																	ND	0.68
MTBE																	ND	0.68
Naphthalene																	24	
Toluene																	ND	0.68
Xylenes, total																	4.8	
Polychlorinated Biphenyls							2.05											

Soil Data - 0 to 3 feet
E/S Pinevale
Springfield, Massachusetts

Sample ID: Depth: Sample Date: ANALYTES	Minimum Min	Maximum Max	# Detected Samples Samples	Total Number Samples	Arithmetic Mean Mean	Location of Max Max Detected
Metals						
Arsenic	3.13	22.7	4	5	10.478	TP-16
Barium	16	203	11	11	55.2636364	TP-7
Cadmium	0.33	1.1	3	16	0.27875	MW-205A
Chromium VI	0	ND	0	0	NA	ND
Chromium (IV or total)*	8.09	26.5	5	5	18.778	TP-9
Lead	2.1	1040	19	19	99.5947368	TP-16
Mercury	0.027	0.562	4	5	0.1473	TP-14
Selenium	0	ND	0	5	NCC	ND
Silver	0	ND	0	5	NCC	ND
Extractable Petroleum Hydrocarbons (EPH)						
C9-C18 Aliphatic Hydrocarbons	9800	9800	1	3	3323	BT-E
C19-C36 Aliphatic Hydrocarbons	2600	9320	2	3	3979	TP-3
C11-C22 Aromatic Hydrocarbons	1790	3500	2	3	1769	BT-E
Polycyclic Aromatic Hydrocarbons (PAHs)						
Acenaphthene	0.22	19.2	4	8	3.56	TP-3
Acenaphthylene	0.45	54.7	3	8	7.18	TP-3
Anthracene	0.2	154	7	8	20.68	TP-3
Benz(a)anthracene	0.3	184	7	8	27.71	TP-3
Benzo(a)pyrene	0.3	115	7	8	20.14	TP-3
Benzo(b)fluoranthene	1.3	104	7	8	20.82	TP-3
Benzo(g,h,i)perylene	0.7	56.1	7	8	12.21	TP-3
Benzo(k)fluoranthene	0.5	117	6	8	17.58	TP-3
Chrysene	0.7	145	7	8	23.35	TP-3
Dibenz(a,h)anthracene	0.71	11.2	4	8	2.53	TP-3
Fluoranthene	0.3	459	7	8	67.69	TP-3
Fluorene	0.82	23.9	3	8	4.40	TP-3
Indeno(1,2,3-cd)pyrene	0.77	71.1	7	8	13.77	TP-3
2-Methylnapthalene	8.3	12	2	8	2.66	BT-E
Naphthalene	0.39	13.3	3	8	3.18	TP-3
Phenanthrene	1.3	616	6	8	80.09	TP-3
Pyrene	0.3	429	7	8	65.91	TP-3
Volatile Petroleum Hydrocarbons						
C5-C8 Aliphatics	0	ND	0	1	NCC	ND
C9-C12 Aliphatics	330	330	1	1	330	BT-E
C9-C10 Aromatics	650	650	1	1	650	BT-E

Soil Data - 0 to 3 feet
E/S Pinevale
Springfield, Massachusetts

Sample ID: Depth: Sample Date: ANALYTES	Minimum Min	Maximum Max	# Detected Samples Samples	Total Number Samples	Arithmetic Mean Mean	Location of Max Max Detected
Volatile Organic Compounds						
Benzene	0	ND	0	1	NCC	ND
Ethylbenzene	0	ND	0	1	NCC	ND
MTBE	0	ND	0	1	NCC	ND
Naphthalene	24	24	1	1	24.00	BT-E
Toluene	0	ND	0	1	NCC	ND
Xylenes, total	4.8	4.8	1	1	4.80	BT-E
Polychlorinated Biphenyls	2.05	2.05	1	1	2.05	TP-3

Soil Data - 0 to 3 feet
E/S Pinevale
Springfield, Massachusetts

Sample ID:	CM-15		CM-16		CM-17		CM-18		CM-19		CM-20		CM-21	
Depth:	1-3		1-3		1-3		2-4		2-4		0-2		1-3	
Sample Date:	9/22/2009		9/22/2009		9/22/2009		9/22/2009		9/23/2009		9/23/2009		9/24/2009	
ANALYTES	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*
Metals														
Arsenic	5.6		3.3		2.9		3.2		3.9		4.1		2.8	
Barium	47		54		50		43		75		33		63	
Cadmium	ND	0.26	ND	0.27	ND	0.26	ND	0.28	ND	0.27	ND	0.27	0.27	
Chromium VI														
Chromium (total)*	12		11		11		8.8		14		11		14	
Lead	4.1		2.3		2.9		6.7		5.3		8.5		15	
Mercury	ND	0.022	ND	0.022	ND	0.019	ND	0.019	ND	0.017	ND	0.018	ND	0.022
Selenium	ND	5.2	ND	5.3	ND	5.2	ND	5.6	ND	5.4	ND	5.4	ND	5.1
Silver	ND	0.52	ND	0.53	ND	0.52	ND	0.56	ND	0.54	ND	0.54	ND	0.51
Extractable Petroleum Hydrocarbons (EPH)														
C9-C18 Aliphatic Hydrocarbons														
C19-C36 Aliphatic Hydrocarbons														
C11-C22 Aromatic Hydrocarbons														
Polycyclic Aromatic Hydrocarbons (PAHs)														
Acenaphthene														
Acenaphthylene														
Anthracene														
Benz(a)anthracene														
Benzo(a)pyrene														
Benzo(b)fluoranthene														
Benzo(g,h,i)perylene														
Benzo(k)fluoranthene														
Chrysene														
Dibenz(a,h)anthracene														
Fluoranthene														
Fluorene														
Indeno(1,2,3-cd)pyrene														
2-Methylnapthalene														
Naphthalene														
Phenanthrene														
Pyrene														
Volatile Petroleum Hydrocarbons														
C5-C8 Aliphatics														
C9-C12 Aliphatics														
C9-C10 Aromatics														

Soil Data - 0 to 3 feet
E/S Pinevale
Springfield, Massachusetts

Sample ID:	CM-15		CM-16		CM-17		CM-18		CM-19		CM-20		CM-21	
Depth:	1-3		1-3		1-3		2-4		2-4		0-2		1-3	
Sample Date:	9/22/2009		9/22/2009		9/22/2009		9/22/2009		9/23/2009		9/23/2009		9/24/2009	
ANALYTES	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*
Volatile Organic Compounds														
Benzene														
Ethylbenzene														
MTBE														
Naphthalene														
Toluene														
Xylenes, total														
Polychlorinated Biphenyls							ND	0.11						

Soil Data - 0 to 3 feet
E/S Pinevale
Springfield, Massachusetts

Sample ID:	CM-22		CM-23		CM-23A		CM-24		CM-25		CM-26	
Depth:	1-3		1-3		1-3		1-3		1-3		0-2	
Sample Date:	9/24/2009		9/24/2009		10/27/2009		9/25/2009		9/25/2009		9/25/2009	
ANALYTES	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*
Metals												
Arsenic	ND	2.6	7.3				4.6		3.5		3.2	
Barium	26		95				63		23		78	
Cadmium	ND	0.26	0.98				0.29		ND	0.27	0.38	
Chromium VI					2							
Chromium (total)*	7.3		99		19		12		10		18	
Lead	3.4		170				21		3.5		5.8	
Mercury	0.031		0.032				0.026		ND	0.023	ND	0.016
Selenium	ND	5.2	ND	5.9			ND	5.3	ND	5.5	ND	5.3
Silver	ND	0.52	ND	0.59			ND	0.53	ND	0.55	ND	0.53
Extractable Petroleum Hydrocarbons (EPH)												
C9-C18 Aliphatic Hydrocarbons												
C19-C36 Aliphatic Hydrocarbons												
C11-C22 Aromatic Hydrocarbons												
Polycyclic Aromatic Hydrocarbons (PAHs)												
Acenaphthene												
Acenaphthylene												
Anthracene												
Benz(a)anthracene												
Benzo(a)pyrene												
Benzo(b)fluoranthene												
Benzo(g,h,i)perylene												
Benzo(k)fluoranthene												
Chrysene												
Dibenz(a,h)anthracene												
Fluoranthene												
Fluorene												
Indeno(1,2,3-cd)pyrene												
2-Methylnapthalene												
Naphthalene												
Phenanthrene												
Pyrene												
Volatile Petroleum Hydrocarbons												
C5-C8 Aliphatics												
C9-C12 Aliphatics												
C9-C10 Aromatics												

Soil Data - 0 to 3 feet
E/S Pinevale
Springfield, Massachusetts

Sample ID:	CM-22		CM-23		CM-23A		CM-24		CM-25		CM-26	
Depth:	1-3		1-3		1-3		1-3		1-3		0-2	
Sample Date:	9/24/2009		9/24/2009		10/27/2009		9/25/2009		9/25/2009		9/25/2009	
ANALYTES	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*
Volatile Organic Compounds												
Benzene												
Ethylbenzene												
MTBE												
Naphthalene												
Toluene												
Xylenes, total												
Polychlorinated Biphenyls	ND	0.1	ND	0.12					ND	0.11		

Soil Data - 0 to 3 feet
E/S Pinevale
Springfield, Massachusetts

Sample ID:	CM-27		CM-28		CM-29		CM-30		CM-31		CM-32		CM-33		CM-34		CM-35	
Depth:	0-2		1-3		1-3		1-3		1-3		1-3		1-3		1-3		1-3	
Sample Date:	9/25/2009		9/28/2009		9/28/2009		9/28/2009		9/28/2009		9/29/2009		9/29/2009		9/29/09		9/29/09	
ANALYTES	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*
Metals																		
Arsenic	3.9		ND	2.7	ND	2.6	2.9		3.7		ND	2.8	3.2		4.5		6	
Barium	32		63		68		38		38		53		35		110		25	
Cadmium	ND	0.26	ND	0.27	0.3		ND	0.26	ND	0.27	ND	0.28	ND	0.27	ND	0.26	ND	0.25
Chromium VI																		
Chromium (total)*	11		16		9.9		8.5		11		8.8		9.3		20		7.8	
Lead	14		5.4		9.5		3.9		12		5.2		5.5		3.6		4.6	
Mercury	0.033		ND	0.014	ND	0.018	0.02		0.027		ND	0.016	ND	0.02	0.022		ND	0.02
Selenium	ND	5.1	ND	5.3	ND	5.2	ND	5.2	ND	5.4	ND	5.5	ND	5.3	ND	5.3	ND	5
Silver	ND	0.51	ND	0.53	ND	0.52	ND	0.52	ND	0.54	ND	0.55	ND	0.53	ND	0.53	ND	0.5
Extractable Petroleum Hydrocarbons (EPH)																		
C9-C18 Aliphatic Hydrocarbons																		
C19-C36 Aliphatic Hydrocarbons																		
C11-C22 Aromatic Hydrocarbons																		
Polycyclic Aromatic Hydrocarbons (PAHs)																		
Acenaphthene																		
Acenaphthylene																		
Anthracene																		
Benz(a)anthracene																		
Benzo(a)pyrene																		
Benzo(b)fluoranthene																		
Benzo(g,h,i)perylene																		
Benzo(k)fluoranthene																		
Chrysene																		
Dibenz(a,h)anthracene																		
Fluoranthene																		
Fluorene																		
Indeno(1,2,3-cd)pyrene																		
2-Methylnapthalene																		
Naphthalene																		
Phenanthrene																		
Pyrene																		
Volatile Petroleum Hydrocarbons																		
C5-C8 Aliphatics																		
C9-C12 Aliphatics																		
C9-C10 Aromatics																		

Soil Data - 0 to 3 feet
E/S Pinevale
Springfield, Massachusetts

Sample ID:	CM-27		CM-28		CM-29		CM-30		CM-31		CM-32		CM-33		CM-34		CM-35	
Depth:	0-2		1-3		1-3		1-3		1-3		1-3		1-3		1-3		1-3	
Sample Date:	9/25/2009		9/28/2009		9/28/2009		9/28/2009		9/28/2009		9/29/2009		9/29/2009		9/29/09		9/29/09	
ANALYTES	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*
Volatile Organic Compounds																		
Benzene																		
Ethylbenzene																		
MTBE																		
Naphthalene																		
Toluene																		
Xylenes, total																		
Polychlorinated Biphenyls	ND	0.1									ND	0.11			ND	0.11		

Soil Data - 0 to 3 feet
E/S Pinevale
Springfield, Massachusetts

Sample ID:	CM-36		CM-37		CM-38		CM-39		CM-40		CM-40A		CM-40A		CM-41	
Depth:	1-3		1-3		0.5-1		0-2		0-2		0-2		2-4		1-3	
Sample Date:	9/30/09		9/30/09		10/1/09		10/1/09		10/1/09		10/28/09		10/28/09		10/2/09	
ANALYTES	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*
Metals																
Arsenic	5.3		3.1		5.9		8.5		6.4						ND	2.6
Barium	45		48		62		390		1700						25	
Cadmium	0.31		ND	0.26	0.28		1.9		2.2						ND	0.26
Chromium VI											ND	5.4	2			
Chromium (total)*	14		12		20		63		70		54		11		7	
Lead	65		2.1		13		550		290						3.6	
Mercury	ND	0.025	ND	0.022	0.027		0.26		0.36						ND	0.021
Selenium	ND	5.5	ND	5.3	ND	5.3	ND	5.6	ND	6.1					ND	5.3
Silver	ND	0.55	ND	0.53	ND	0.53	1.6		ND	0.61					ND	0.53
Extractable Petroleum Hydrocarbons (EPH)																
C9-C18 Aliphatic Hydrocarbons																
C19-C36 Aliphatic Hydrocarbons																
C11-C22 Aromatic Hydrocarbons																
Polycyclic Aromatic Hydrocarbons (PAHs)																
Acenaphthene																
Acenaphthylene																
Anthracene																
Benz(a)anthracene																
Benzo(a)pyrene																
Benzo(b)fluoranthene																
Benzo(g,h,i)perylene																
Benzo(k)fluoranthene																
Chrysene																
Dibenz(a,h)anthracene																
Fluoranthene																
Fluorene																
Indeno(1,2,3-cd)pyrene																
2-Methylnapthalene																
Naphthalene																
Phenanthrene																
Pyrene																
Volatile Petroleum Hydrocarbons																
C5-C8 Aliphatics																
C9-C12 Aliphatics																
C9-C10 Aromatics																

Soil Data - 0 to 3 feet
E/S Pinevale
Springfield, Massachusetts

Sample ID:	CM-36		CM-37		CM-38		CM-39		CM-40		CM-40A		CM-40A		CM-41	
Depth:	1-3		1-3		0.5-1		0-2		0-2		0-2		2-4		1-3	
Sample Date:	9/30/09		9/30/09		10/1/09		10/1/09		10/1/09		10/28/09		10/28/09		10/2/09	
ANALYTES	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*
Volatile Organic Compounds																
Benzene																
Ethylbenzene																
MTBE																
Naphthalene																
Toluene																
Xylenes, total																
Polychlorinated Biphenyls			ND	0.11	ND	0.11	ND	0.11								

Soil Data - 0 to 3 feet
E/S Pinevale
Springfield, Massachusetts

Sample ID:	CM-42		CM-43		CM-44		CM-45		CM-46		CM-47		CM-47		CM-48		CM-49		CM-50	
Depth:	1-3		1-3		0-2		0-2		1-3		0-2		2-4		1-3		1-3		1-3	
Sample Date:	10/2/09		10/2/09		10/2/09		10/27/09		10/27/09		10/27/09		10/27/09		10/27/09		10/27/09		10/28/09	
ANALYTES	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*
Metals																				
Arsenic	2.6		3.9		5.9		10												4.4	
Barium	33		120		120		230												33	
Cadmium	ND	0.26	0.51		1.2		1.7												ND	0.27
Chromium VI																				
Chromium (total)*	8.9		18		25		10		550		13		25		5		8.7		10	
Lead	5.5		27		110		160												3.8	
Mercury	ND	0.016	0.038		0.29		0.086												ND	0.019
Selenium	ND	5.1	ND	5.3	ND	5.7	ND	6.1											ND	5.4
Silver	ND	0.51	ND	0.53	ND	0.57	ND	0.61											ND	0.54
Extractable Petroleum Hydrocarbons (EPH)																				
C9-C18 Aliphatic Hydrocarbons																				
C19-C36 Aliphatic Hydrocarbons																				
C11-C22 Aromatic Hydrocarbons																				
Polycyclic Aromatic Hydrocarbons (PAHs)																				
Acenaphthene																				
Acenaphthylene																				
Anthracene																				
Benz(a)anthracene																				
Benzo(a)pyrene																				
Benzo(b)fluoranthene																				
Benzo(g,h,i)perylene																				
Benzo(k)fluoranthene																				
Chrysene																				
Dibenz(a,h)anthracene																				
Fluoranthene																				
Fluorene																				
Indeno(1,2,3-cd)pyrene																				
2-Methylnapthalene																				
Naphthalene																				
Phenanthrene																				
Pyrene																				
Volatile Petroleum Hydrocarbons																				
C5-C8 Aliphatics																				
C9-C12 Aliphatics																				
C9-C10 Aromatics																				

Soil Data - 0 to 3 feet
E/S Pinevale
Springfield, Massachusetts

Sample ID:	CM-42		CM-43		CM-44		CM-45		CM-46		CM-47		CM-47		CM-48		CM-49		CM-50	
Depth:	1-3		1-3		0-2		0-2		1-3		0-2		2-4		1-3		1-3		1-3	
Sample Date:	10/2/09		10/2/09		10/2/09		10/27/09		10/27/09		10/27/09		10/27/09		10/27/09		10/27/09		10/28/09	
ANALYTES	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*
Volatile Organic Compounds																				
Benzene																				
Ethylbenzene																				
MTBE																				
Naphthalene																				
Toluene																				
Xylenes, total																				
Polychlorinated Biphenyls	ND	0.1			ND	0.11													ND	0.11

Soil Data - 0 to 3 feet
E/S Pinevale
Springfield, Massachusetts

Sample ID:	CM-51		CM-52		CM-53		CM-53		CM-54		CM-54		CM-55		OTP-4		OTP-6		OTP-8		DP-1	
Depth:	1-3		1-3		0-2		2-4		0-2		2-4		0-2		0-2		0-3		0-2		0-2	
Sample Date:	10/28/09		10/28/09		10/28/09		10/28/09		10/28/09		10/28/09		10/28/09		11/12/09		11/12/09		11/12/09		11/12/09	
ANALYTES	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*
Metals																						
Arsenic	4.9		9.5												4.6		5.7		3.8		3.7	
Barium	33		86		2400		290		3300		280		460		62		480		240		170	
Cadmium	ND	0.28	3.3		2.4		0.64		4.4		0.61		1.4		0.29		0.84		1.3		0.38	
Chromium VI																						
Chromium (total)*	22		48		120		16		130		13		60		13		25		24		9.9	
Lead	36		260		400		54		300		110		280		32		170		140		29	
Mercury	0.12		5												1.2		0.066		0.26		0.073	
Selenium	ND	5.6	ND	5.8											ND	5.3	ND	5.4	ND	5.6	ND	5.4
Silver	ND	0.56	ND	0.58											0.78		ND	0.54	ND	0.56	ND	0.54
Extractable Petroleum Hydrocarbons (EPH)																						
C9-C18 Aliphatic Hydrocarbons															ND	21	ND	54	ND	56	ND	22
C19-C36 Aliphatic Hydrocarbons															23		ND	54	110		ND	22
C11-C22 Aromatic Hydrocarbons															120		470		200		65	
Polycyclic Aromatic Hydrocarbons (PAHs)																						
Acenaphthene															0.49		8.4		1.5		0.42	
Acenaphthylene															0.52		ND	0.54	ND	0.56	ND	0.22
Anthracene															2.1		19		2.8		0.8	
Benz(a)anthracene															7.2		38		11		3.2	
Benzo(a)pyrene															6.6		32		10		3.2	
Benzo(b)fluoranthene															9.6		46		16		4.6	
Benzo(g,h,i)perylene															4.2		21		7.4		2.3	
Benzo(k)fluoranthene															3.3		17		5.6		1.7	
Chrysene															8.2		41		13		3.7	
Dibenz(a,h)anthracene															1.2		5.9		2		0.62	
Fluoranthene															16		97		23		6.7	
Fluorene															0.98		10		1.5		0.4	
Indeno(1,2,3-cd)pyrene															4.6		22		7.8		2.4	
2-Methylnapthalene															ND	0.21	2.2		ND	0.56	ND	0.22
Naphthalene															ND	0.21	6.8		0.84		ND	0.22
Phenanthrene															11		84		15		3.3	
Pyrene															16		89		22		6.8	
Volatile Petroleum Hydrocarbons																						
C5-C8 Aliphatics																						
C9-C12 Aliphatics																						
C9-C10 Aromatics																						

Soil Data - 0 to 3 feet
E/S Pinevale
Springfield, Massachusetts

Sample ID:	CM-51		CM-52		CM-53		CM-53		CM-54		CM-54		CM-55		OTP-4		OTP-6		OTP-8		DP-1	
Depth:	1-3		1-3		0-2		2-4		0-2		2-4		0-2		0-2		0-3		0-2		0-2	
Sample Date:	10/28/09		10/28/09		10/28/09		10/28/09		10/28/09		10/28/09		10/28/09		11/12/09		11/12/09		11/12/09		11/12/09	
ANALYTES	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*
Volatile Organic Compounds																						
Benzene																						
Ethylbenzene																						
MTBE																						
Naphthalene																						
Toluene																						
Xylenes, total																						
Polychlorinated Biphenyls	ND	0.11	ND	0.11											ND	0.11	ND	0.11	ND	0.11	ND	0.11

Soil Data - 0 to 3 feet
E/S Pinevale
Springfield, Massachusetts

Sample ID:	DP-2		DP-3	
Depth:	0-1.5		0-2	
Sample Date:	11/12/09		11/12/09	
ANALYTES	*Result*	*MDL*	*Result*	*MDL*
Metals				
Arsenic	6.4		3.5	
Barium	110		35	
Cadmium	0.67		ND	0.27
Chromium VI				
Chromium (total)*	13		9.8	
Lead	66		32	
Mercury	0.18		0.025	
Selenium	ND	5.6	ND	5.4
Silver	ND	0.56	ND	0.54
Extractable Petroleum Hydrocarbons (EPH)				
C9-C18 Aliphatic Hydrocarbons	ND	56	ND	11
C19-C36 Aliphatic Hydrocarbons	58		ND	11
C11-C22 Aromatic Hydrocarbons	210		14	
Polycyclic Aromatic Hydrocarbons (PAHs)				
Acenaphthene	1.5		ND	0.11
Acenaphthylene	ND	0.56	ND	0.11
Anthracene	3.3		0.13	
Benz(a)anthracene	10		0.26	
Benzo(a)pyrene	9.2		0.24	
Benzo(b)fluoranthene	15		0.34	
Benzo(g,h,i)perylene	6		0.14	
Benzo(k)fluoranthene	5.2		0.13	
Chrysene	12		0.3	
Dibenz(a,h)anthracene	1.9		ND	0.11
Fluoranthene	23		0.6	
Fluorene	1.5		0.12	
Indeno(1,2,3-cd)pyrene	7.1		0.16	
2-Methylnapthalene	ND	0.56	ND	0.11
Naphthalene	ND	0.56	ND	0.11
Phenanthrene	15		0.52	
Pyrene	22		0.59	
Volatile Petroleum Hydrocarbons				
C5-C8 Aliphatics				
C9-C12 Aliphatics				
C9-C10 Aromatics				

Soil Data - 0 to 3 feet
E/S Pinevale
Springfield, Massachusetts

Sample ID:	DP-2		DP-3	
Depth:	0-1.5		0-2	
Sample Date:	11/12/09		11/12/09	
ANALYTES	*Result*	*MDL*	*Result*	*MDL*
Volatile Organic Compounds				
Benzene				
Ethylbenzene				
MTBE				
Naphthalene				
Toluene				
Xylenes, total				
Polychlorinated Biphenyls	ND	0.11	ND	0.11

Soil Data - 0 to 3 feet
E/S Pinevale
Springfield, Massachusetts

Sample ID: Depth: Sample Date: ANALYTES	Minimum Min	Maximum Max	# Detected Samples Samples	Total Number Samples	Arithmetic Mean Mean	Location of Max Max Detected
Metals						
Arsenic	2.6	22.7	39	45	5	TP-16
Barium	16	3300	56	56	223	CM-54
Cadmium	0.27	4.4	26	61	0.56	CM-54
Chromium VI	2	2	2	3	2	CM-23A
Chromium (total)*	5	550	58	58	32	CM-46
Lead	2.1	1040	64	64	83	TP-16
Mercury	0.02	5	25	45	0.20	CM-46
Selenium	0	0	0	45	3	ND
Silver	0.78	1.6	2	45	0.31	CM-46
Extractable Petroleum Hydrocarbons (EPH)						
C9-C18 Aliphatic Hydrocarbons	9800	9800	1	9	1120	BT-E
C19-C36 Aliphatic Hydrocarbons	23	9320	5	9	1352	TP-3
C11-C22 Aromatic Hydrocarbons	14	3500	8	9	710	BT-E
Polycyclic Aromatic Hydrocarbons (PAHs)						
Acenaphthene	0.22	19.2	9	14	2.92	TP-3
Acenaphthylene	0.45	54.7	4	14	4.21	TP-3
Anthracene	0.13	154	13	14	13.82	TP-3
Benz(a)anthracene	0.26	184	13	14	20.81	TP-3
Benzo(a)pyrene	0.24	115	13	14	15.88	TP-3
Benzo(b)fluoranthene	0.34	104	13	14	18.44	TP-3
Benzo(g,h,i)perylene	0.14	56.1	13	14	9.91	TP-3
Benzo(k)fluoranthene	0.13	117	12	14	12.40	TP-3
Chrysene	0.3	145	13	14	18.93	TP-3
Dibenz(a,h)anthracene	0.62	11.2	9	14	2.28	TP-3
Fluoranthene	0.3	459	13	14	50.56	TP-3
Fluorene	0.12	23.9	9	14	3.55	TP-3
Indeno(1,2,3-cd)pyrene	0.16	71.1	13	14	11.02	TP-3
2-Methylnapthalene	2.2	12	3	14	1.74	BT-E
Naphthalene	0.39	13.3	5	14	2.40	TP-3
Phenanthrene	0.52	616	12	14	54.97	TP-3
Pyrene	0.3	429	13	14	48.83	TP-3
Volatile Petroleum Hydrocarbons						
C5-C8 Aliphatics	0	0	0	1	100	ND
C9-C12 Aliphatics	330	330	1	1	330	BT-E
C9-C10 Aromatics	650	650	1	1	650	BT-E

Soil Data - 0 to 3 feet
E/S Pinevale
Springfield, Massachusetts

Sample ID: Depth: Sample Date: ANALYTES	Minimum Min	Maximum Max	# Detected Samples Samples	Total Number Samples	Arithmetic Mean Mean	Location of Max Max Detected
Volatile Organic Compounds						
Benzene	0	0	0	1	0.34	ND
Ethylbenzene	0	0	0	1	0.34	ND
MTBE	0	0	0	1	0.34	ND
Naphthalene	24	24	1	1	24.00	BT-E
Toluene	0	0	0	1	0.34	ND
Xylenes, total	4.8	4.8	1	1	4.80	BT-E
Polychlorinated Biphenyls	2.05	2.05	1	22	0.15	TP-3

Soil Data - 0 to 6 feet
E/S Pinevale
Springfield, Massachusetts

Sample ID:	BTE-E		BT-EN		BT-ENW		BT-ESW		CM-38E		CM-38E		CM-38N		CM-38NW	
Depth:	3.5 - 6.5 ft		3 - 6 ft		3 - 6 ft		4 - 7 ft		4.5 - 7.5 ft		4.5 - 7.5 ft		3.5 - 6.5 ft		4.5 - 7.5 ft	
Sample Date:	5/18/2023		5/18/2023		5/18/2023		5/18/2023		5/16/2023		5/16/2023		5/16/2023		5/16/2023	
ANALYTES	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*
Metals																
Arsenic																
Barium																
Cadmium																
Chromium VI																
Chromium (IV or total)*																
Lead									5.9		5		130		8.9	
Mercury																
Selenium																
Silver																
Extractable Petroleum Hydrocarbons (EPH)																
C9-C18 Aliphatic Hydrocarbons	ND	10	ND	11	ND	11	ND	11	15		20		2800		ND	11
C19-C36 Aliphatic Hydrocarbons	ND	10	ND	11	ND	11	27		15		12		450		ND	11
C11-C22 Aromatic Hydrocarbons	ND	10	ND	11	ND	11	17		45		39		610		ND	11
Polycyclic Aromatic Hydrocarbons (PAHs)																
Acenaphthene	ND	0.1	ND	0.11	ND	0.11	ND	0.11	0.7		0.5		0.15		ND	0.11
Acenaphthylene	ND	0.1	ND	0.11	ND	0.11	ND	0.11	0.43		0.3		ND	0.11	ND	0.11
Anthracene	ND	0.1	ND	0.11	ND	0.11	ND	0.11	1.5		1.2		0.39		ND	0.11
Benz(a)anthracene	ND	0.1	0.19		ND	0.11	0.35		1.7		1.3		1.8		0.12	
Benzo(a)pyrene	ND	0.1	0.21		ND	0.11	0.37		1.6		1.3		2.2		0.13	
Benzo(b)fluoranthene	ND	0.1	0.28		ND	0.11	0.49		1.9		1.4		2.8		ND	0.11
Benzo(g,h,i)perylene	ND	0.1	0.23		ND	0.11	0.29		1.1		0.9		1.6		0.12	
Benzo(k)fluoranthene	ND	0.1	0.11		ND	0.11	0.19		0.7		0.6		1		ND	0.11
Chrysene	ND	0.1	0.26		ND	0.11	0.44		1.9		1.4		2.4		0.18	
Dibenz(a,h)anthracene	ND	0.1	ND	0.11	ND	0.11	ND	0.11	0.23		0.2		0.41		ND	0.11
Fluoranthene	ND	0.1	0.48		ND	0.11	0.62		5		3.7		3		0.31	
Fluorene	ND	0.1	ND	0.11	ND	0.11	ND	0.11	0.87		0.6		ND	0.11	ND	0.11
Indeno(1,2,3-cd)pyrene	ND	0.1	0.16		ND	0.11	0.23		1.1		0.9		1.5		ND	0.11
2-Methylnapthalene	ND	0.1	ND	0.11	ND	0.11	ND	0.11	0.53		0.3		0.12		ND	0.11
Naphthalene	ND	0.1	ND	0.11	ND	0.11	ND	0.11	1.6		1.0		ND	0.11	ND	0.11
Phenanthrene	ND	0.1	0.3		ND	0.11	0.22		6.7		5		2.2		0.23	
Pyrene	ND	0.1	0.47		ND	0.11	0.61		4.8		4		3.6		0.29	
Volatile Petroleum Hydrocarbons																
C5-C8 Aliphatics	ND	10	ND	11	ND	11	ND	12	ND	12	ND	11	ND	110	ND	12
C9-C12 Aliphatics	ND	10	ND	11	ND	11	ND	12	ND	12	ND	11	140		ND	12
C9-C10 Aromatics	ND	10	ND	11	ND	11	ND	12	ND	12	ND	11	530		ND	12

Soil Data - 0 to 6 feet
E/S Pinevale
Springfield, Massachusetts

Sample ID:	BTE-E		BT-EN		BT-ENW		BT-ESW		CM-38E		CM-38E		CM-38N		CM-38NW	
Depth:	3.5 - 6.5 ft		3 - 6 ft		3 - 6 ft		4 - 7 ft		4.5 - 7.5 ft		4.5 - 7.5 ft		3.5 - 6.5 ft		4.5 - 7.5 ft	
Sample Date:	5/18/2023		5/18/2023		5/18/2023		5/18/2023		5/16/2023		5/16/2023		5/16/2023		5/16/2023	
ANALYTES	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*
Volatile Organic Compounds																
Benzene	ND	0.05	ND	0.053	ND	0.054	ND	0.058	ND	0.058	ND	0.054	ND	0.57	ND	0.062
Ethylbenzene	ND	0.05	ND	0.053	ND	0.054	ND	0.058	ND	0.058	ND	0.054	ND	0.57	ND	0.062
MTBE	ND	0.05	ND	0.053	ND	0.054	ND	0.058	ND	0.058	ND	0.054	ND	0.57	ND	0.062
Naphthalene	ND	0.25	ND	0.26	ND	0.27	ND	0.29	ND	0.29	ND	0.27	ND	2.9	ND	0.31
Toluene	ND	0.05	ND	0.053	ND	0.054	ND	0.058	ND	0.058	ND	0.054	ND	0.57	ND	0.062
Xylenes, total	ND	0.15	ND	0.163	ND	0.164	ND	0.178	ND	0.178	ND	0.164	ND	1.67	ND	0.182
Polychlorinated Biphenyls																

Soil Data - 0 to 6 feet
E/S Pinevale
Springfield, Massachusetts

Sample ID:	CM-38SE	
Depth:	4 - 7 ft	
Sample Date:	5/17/2023	
ANALYTES	*Result*	*MDL*
Metals		
Arsenic		
Barium		
Cadmium		
Chromium VI		
Chromium (IV or total)*		
Lead	150	
Mercury		
Selenium		
Silver		
Extractable Petroleum Hydrocarbons (EPH)		
C9-C18 Aliphatic Hydrocarbons	12	
C19-C36 Aliphatic Hydrocarbons	24	
C11-C22 Aromatic Hydrocarbons	180	
Polycyclic Aromatic Hydrocarbons (PAHs)		
Acenaphthene	2.8	
Acenaphthylene	2.1	
Anthracene	7.3	
Benz(a)anthracene	9.5	
Benzo(a)pyrene	8.1	
Benzo(b)fluoranthene	9.5	
Benzo(g,h,i)perylene	4.3	
Benzo(k)fluoranthene	3.6	
Chrysene	10	
Dibenz(a,h)anthracene	1.1	
Fluoranthene	31	
Fluorene	4.6	
Indeno(1,2,3-cd)pyrene	4.7	
2-Methylnapthalene	2.4	
Naphthalene	9.1	
Phenanthrene	36	
Pyrene	30	
Volatile Petroleum Hydrocarbons		
C5-C8 Aliphatics	ND	110
C9-C12 Aliphatics	190	
C9-C10 Aromatics	340	

Soil Data - 0 to 6 feet
E/S Pinevale
Springfield, Massachusetts

Sample ID:	CM-38SE	
Depth:	4 - 7 ft	
Sample Date:	5/17/2023	
ANALYTES	*Result*	*MDL*
Volatile Organic Compounds		
Benzene	ND	0.53
Ethylbenzene	ND	0.53
MTBE	ND	0.53
Naphthalene	ND	2.7
Toluene	ND	0.53
Xylenes, total	ND	1.63
Polychlorinated Biphenyls		

Soil Data - 0 to 6 feet
E/S Pinevale
Springfield, Massachusetts

Sample ID:	CM-38SW		CM-39E		CM-39N		CM-39S		CM-39W		CM-43NW		CM-43SW		CM-52E	
Depth:	4.5 - 7.5 ft		0 - 2 ft		0 - 2 ft		0 - 2 ft		0 - 2 ft		5 - 8 ft		5 - 8 ft		1 - 3 ft	
Sample Date:	5/16/2023		5/17/2023		5/17/2023		5/17/2023		5/17/2023		5/18/2023		5/18/23		5/15/23	
ANALYTES	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*
Metals																
Arsenic																
Barium																
Cadmium															ND	0.36
Chromium VI																
Chromium (IV or total)*																
Lead	7		120		26		150		47		70		34			
Mercury																
Selenium																
Silver																
Extractable Petroleum Hydrocarbons (EPH)																
C9-C18 Aliphatic Hydrocarbons	ND	11									ND	11	ND	11		
C19-C36 Aliphatic Hydrocarbons	ND	11									ND	11	ND	11		
C11-C22 Aromatic Hydrocarbons	ND	11									17		22			
Polycyclic Aromatic Hydrocarbons (PAHs)																
Acenaphthene	ND	0.11									ND	0.11	ND	0.11		
Acenaphthylene	ND	0.11									ND	0.11	ND	0.11		
Anthracene	ND	0.11									0.12		0.18			
Benz(a)anthracene	ND	0.11									0.43		0.96			
Benzo(a)pyrene	ND	0.11									0.47		1.2			
Benzo(b)fluoranthene	ND	0.11									0.56		1.4			
Benzo(g,h,i)perylene	ND	0.11									0.31		0.87			
Benzo(k)fluoranthene	ND	0.11									0.22		0.49			
Chrysene	ND	0.11									0.52		1.1			
Dibenz(a,h)anthracene	ND	0.11									ND	0.11	0.17			
Fluoranthene	ND	0.11									0.88		2.1			
Fluorene	ND	0.11									ND	0.11	ND	0.11		
Indeno(1,2,3-cd)pyrene	ND	0.11									0.32		0.83			
2-Methylnapthalene	ND	0.11									ND	0.11	ND	0.11		
Naphthalene	ND	0.11									ND	0.11	ND	0.11		
Phenanthrene	ND	0.11									0.63		0.69			
Pyrene	ND	0.11									0.89		2.1			
Volatile Petroleum Hydrocarbons																
C5-C8 Aliphatics	ND	13									ND	11	ND	11		
C9-C12 Aliphatics	ND	13									ND	11	ND	11		
C9-C10 Aromatics	ND	13									ND	11	ND	11		

Soil Data - 0 to 6 feet
E/S Pinevale
Springfield, Massachusetts

Sample ID:	CM-38SW		CM-39E		CM-39N		CM-39S		CM-39W		CM-43NW		CM-43SW		CM-52E	
Depth:	4.5 - 7.5 ft		0 - 2 ft		0 - 2 ft		0 - 2 ft		0 - 2 ft		5 - 8 ft		5 - 8 ft		1 - 3 ft	
Sample Date:	5/16/2023		5/17/2023		5/17/2023		5/17/2023		5/17/2023		5/18/2023		5/18/23		5/15/23	
ANALYTES	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*
Volatile Organic Compounds																
Benzene	ND	0.063									ND	0.054	ND	0.053		
Ethylbenzene	ND	0.063									ND	0.054	ND	0.053		
MTBE	ND	0.063									ND	0.054	ND	0.053		
Naphthalene	ND	0.31									ND	0.27	ND	0.26		
Toluene	ND	0.063									ND	0.054	ND	0.053		
Xylenes, total	ND	0.193									ND	0.164	ND	0.163		
Polychlorinated Biphenyls																

Soil Data - 0 to 6 feet
E/S Pinevale
Springfield, Massachusetts

Sample ID:	CM-52N		CM-52S		CM-52W		CM-53E				CM-53N		CM-53SE		CM-53SW	
Depth:	1 - 3 ft		1.2 - 3 ft		1 - 3 ft		0 - 2 ft		0 - 2 ft		0 - 2 ft		1 - 2 ft		0.5 - 2 ft	
Sample Date:	5/15/23		5/15/23		5/15/23		5/15/23		5/15/23		5/15/23		5/15/23		5/15/23	
ANALYTES	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*
Metals																
Arsenic																
Barium							22		16		30		48		73	
Cadmium	ND	0.39	ND	0.39	ND	0.37	ND	0.34	ND	0.35	ND	0.46	ND	0.35	ND	0.35
Chromium VI																
Chromium (IV or total)*																
Lead							4.3		2.1		4.9		2.7		3.6	
Mercury																
Selenium																
Silver																
Extractable Petroleum Hydrocarbons (EPH)																
C9-C18 Aliphatic Hydrocarbons																
C19-C36 Aliphatic Hydrocarbons																
C11-C22 Aromatic Hydrocarbons																
Polycyclic Aromatic Hydrocarbons (PAHs)																
Acenaphthene																
Acenaphthylene																
Anthracene																
Benz(a)anthracene																
Benzo(a)pyrene																
Benzo(b)fluoranthene																
Benzo(g,h,i)perylene																
Benzo(k)fluoranthene																
Chrysene																
Dibenz(a,h)anthracene																
Fluoranthene																
Fluorene																
Indeno(1,2,3-cd)pyrene																
2-Methylnapthalene																
Naphthalene																
Phenanthrene																
Pyrene																
Volatile Petroleum Hydrocarbons																
C5-C8 Aliphatics																
C9-C12 Aliphatics																
C9-C10 Aromatics																

Soil Data - 0 to 6 feet
E/S Pinevale
Springfield, Massachusetts

Sample ID:	CM-52N		CM-52S		CM-52W		CM-53E				CM-53N		CM-53SE		CM-53SW	
Depth:	1 - 3 ft		1.2 - 3 ft		1 - 3 ft		0 - 2 ft		0 - 2 ft		0 - 2 ft		1 - 2 ft		0.5 - 2 ft	
Sample Date:	5/15/23		5/15/23		5/15/23		5/15/23		5/15/23		5/15/23		5/15/23		5/15/23	
ANALYTES	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*
Volatile Organic Compounds																
Benzene																
Ethylbenzene																
MTBE																
Naphthalene																
Toluene																
Xylenes, total																
Polychlorinated Biphenyls																

Soil Data - 0 to 6 feet
E/S Pinevale
Springfield, Massachusetts

Sample ID:	CM-53W		DP-2A		MW-205A		OTP-4A		OTP-6A		OTP-6A		OTP-8A		TP-3		TP-9	
Depth:	0.5 - 2 ft		0 - 2 ft		0.42 - 3 ft		0 - 2 ft		0 - 3 ft		0 - 3 ft		0 - 1.5 ft		0.6-1		1-2	
Sample Date:	5/15/23		5/18/23		5/15/23		5/18/23		5/16/23		5/16/23		5/16/23		6/26/06		6/26/06	
ANALYTES	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*
Metals																		
Arsenic															6.19		3.13	
Barium	35														39.8		26.7	
Cadmium	ND	0.34			1.1										0.33		0.73	
Chromium VI																		
Chromium (IV or total)*															19.1		26.5	
Lead	5.3		92				26		9.3				63		80.7		30.5	
Mercury															0.027		ND	0.009
Selenium															ND	5.05	ND	5.59
Silver															ND	0.51	ND	0.56
Extractable Petroleum Hydrocarbons (EPH)																		
C9-C18 Aliphatic Hydrocarbons															ND	303	ND	33.6
C19-C36 Aliphatic Hydrocarbons															9320		ND	33.6
C11-C22 Aromatic Hydrocarbons															1790		ND	33.6
Polycyclic Aromatic Hydrocarbons (PAHs)																		
Acenaphthene			0.94				ND	0.79	0.22		ND	0.18	ND	0.22	19.2		ND	0.2
Acenaphthylene			0.45				ND	0.79	ND	0.18	ND	0.18	ND	0.22	54.7		ND	0.2
Anthracene			2.5				2.1		0.45		ND	0.18	0.26		154		0.2	
Benz(a)anthracene			8				23		1.2		ND	0.18	1		184		0.3	
Benzo(a)pyrene			7.9				32		1.2		ND	0.18	0.99		115		0.3	
Benzo(b)fluoranthene			11				41		1.6		ND	0.18	1.3		104		2.1	
Benzo(g,h,i)perylene			5.6				31		0.82		ND	0.18	0.76		56.1		0.7	
Benzo(k)fluoranthene			4.3				16		0.66		ND	0.18	0.5		117		ND	0.2
Chrysene			7.9				26		1.2		ND	0.18	1		145		0.7	
Dibenz(a,h)anthracene			1.4				6.5		ND	0.18	ND	0.18	ND	0.22	11.2		ND	0.2
Fluoranthene			20				47		2.8		ND	0.18	2.3		459		0.3	
Fluorene			0.82				ND	0.79	ND	0.18	ND	0.18	ND	0.22	23.9		ND	0.2
Indeno(1,2,3-cd)pyrene			5.9				28		0.8		ND	0.18	0.77		71.1		0.8	
2-Methylnapthalene			ND	0.37			ND	0.79	ND	0.18	ND	0.18	ND	0.22	8.3		ND	0.2
Naphthalene			0.39				ND	0.79	ND	0.18	ND	0.18	ND	0.22	13.3		ND	0.2
Phenanthrene			12				4.7		1.9		ND	0.18	1.3		616		ND	0.2
Pyrene			17				60		2.2		ND	0.18	1.7		429		0.3	
Volatile Petroleum Hydrocarbons																		
C5-C8 Aliphatics																		
C9-C12 Aliphatics																		
C9-C10 Aromatics																		

Soil Data - 0 to 6 feet
E/S Pinevale
Springfield, Massachusetts

Sample ID:	CM-53W		DP-2A		MW-205A		OTP-4A		OTP-6A		OTP-6A		OTP-8A		TP-3		TP-9	
Depth:	0.5 - 2 ft		0 - 2 ft		0.42 - 3 ft		0 - 2 ft		0 - 3 ft		0 - 3 ft		0 - 1.5 ft		0.6-1		1-2	
Sample Date:	5/15/23		5/18/23		5/15/23		5/18/23		5/16/23		5/16/23		5/16/23		6/26/06		6/26/06	
ANALYTES	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*
Volatile Organic Compounds																		
Benzene																		
Ethylbenzene																		
MTBE																		
Naphthalene																		
Toluene																		
Xylenes, total																		
Polychlorinated Biphenyls															2.05			

Soil Data - 0 to 6 feet
E/S Pinevale
Springfield, Massachusetts

Sample ID:	TP-7		TP-14		TP-16		BT-E	
Depth:	1-2		1-2		2-4			
Sample Date:	6/26/06		7/26/06		7/26/06		11/12/09	
ANALYTES	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*3604*	
Metals								
Arsenic	19		ND	2.74	22.7			
Barium	203		72.2		42.2			
Cadmium	ND	0.31	ND	0.28	ND	0.31		
Chromium VI								
Chromium (IV or total)*	8.09		24		16.2			
Lead	163		21.9		1040			
Mercury	0.089		0.562		0.054			
Selenium	ND	6.08	ND	5.47	ND	6.04		
Silver	ND	0.61	ND	0.55	ND	0.61		
Extractable Petroleum Hydrocarbons (EPH)								
C9-C18 Aliphatic Hydrocarbons							9800	
C19-C36 Aliphatic Hydrocarbons							2600	
C11-C22 Aromatic Hydrocarbons							3500	
Polycyclic Aromatic Hydrocarbons (PAHs)								
Acenaphthene							7.4	
Acenaphthylene							1.5	
Anthracene							5.8	
Benz(a)anthracene							4.1	
Benzo(a)pyrene							3.6	
Benzo(b)fluoranthene							5.5	
Benzo(g,h,i)perylene							2.6	
Benzo(k)fluoranthene							2	
Chrysene							4.9	
Dibenz(a,h)anthracene							0.71	
Fluoranthene							10	
Fluorene							9.7	
Indeno(1,2,3-cd)pyrene							2.7	
2-Methylnapthalene							12	
Naphthalene							11	
Phenanthrene							4.6	
Pyrene							17	
Volatile Petroleum Hydrocarbons								
C5-C8 Aliphatics							ND	200
C9-C12 Aliphatics							330	
C9-C10 Aromatics							650	

Soil Data - 0 to 6 feet
E/S Pinevale
Springfield, Massachusetts

Sample ID:	TP-7		TP-14		TP-16		BT-E	
Depth:	1-2		1-2		2-4			
Sample Date:	6/26/06		7/26/06		7/26/06		11/12/09	
ANALYTES	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*3604*	
Volatile Organic Compounds								
Benzene							ND	0.68
Ethylbenzene							ND	0.68
MTBE							ND	0.68
Naphthalene							24	
Toluene							ND	0.68
Xylenes, total							4.8	
Polychlorinated Biphenyls								

Soil Data - 0 to 6 feet
E/S Pinevale
Springfield, Massachusetts

Sample ID:	CM-15		CM-16		CM-17		CM-18		CM-19		CM-20		CM-21	
Depth:	1-3		1-3		1-3		2-4		2-4		0-2		1-3	
Sample Date:	9/22/2009		9/22/2009		9/22/2009		9/22/2009		9/23/2009		9/23/2009		9/24/2009	
ANALYTES	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*
Metals														
Arsenic	5.6		3.3		2.9		3.2		3.9		4.1		2.8	
Barium	47		54		50		43		75		33		63	
Cadmium	ND	0.26	ND	0.27	ND	0.26	ND	0.28	ND	0.27	ND	0.27	0.27	
Chromium VI														
Chromium (IV or total)*	12		11		11		8.8		14		11		14	
Lead	4.1		2.3		2.9		6.7		5.3		8.5		15	
Mercury	ND	0.022	ND	0.022	ND	0.019	ND	0.019	ND	0.017	ND	0.018	ND	0.022
Selenium	ND	5.2	ND	5.3	ND	5.2	ND	5.6	ND	5.4	ND	5.4	ND	5.1
Silver	ND	0.52	ND	0.53	ND	0.52	ND	0.56	ND	0.54	ND	0.54	ND	0.51
Extractable Petroleum Hydrocarbons (EPH)														
C9-C18 Aliphatic Hydrocarbons														
C19-C36 Aliphatic Hydrocarbons														
C11-C22 Aromatic Hydrocarbons														
Polycyclic Aromatic Hydrocarbons (PAHs)														
Acenaphthene														
Acenaphthylene														
Anthracene														
Benz(a)anthracene														
Benzo(a)pyrene														
Benzo(b)fluoranthene														
Benzo(g,h,i)perylene														
Benzo(k)fluoranthene														
Chrysene														
Dibenz(a,h)anthracene														
Fluoranthene														
Fluorene														
Indeno(1,2,3-cd)pyrene														
2-Methylnapthalene														
Naphthalene														
Phenanthrene														
Pyrene														
Volatile Petroleum Hydrocarbons														
C5-C8 Aliphatics														
C9-C12 Aliphatics														
C9-C10 Aromatics														

Soil Data - 0 to 6 feet
E/S Pinevale
Springfield, Massachusetts

Sample ID:	CM-15		CM-16		CM-17		CM-18		CM-19		CM-20		CM-21	
Depth:	1-3		1-3		1-3		2-4		2-4		0-2		1-3	
Sample Date:	9/22/2009		9/22/2009		9/22/2009		9/22/2009		9/23/2009		9/23/2009		9/24/2009	
ANALYTES	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*
Volatile Organic Compounds														
Benzene														
Ethylbenzene														
MTBE														
Naphthalene														
Toluene														
Xylenes, total														
Polychlorinated Biphenyls							ND	0.11						

Soil Data - 0 to 6 feet
E/S Pinevale
Springfield, Massachusetts

Sample ID:	CM-22		CM-23		CM-23A				CM-24		CM-25		CM-26	
Depth:	1-3		1-3		1-3		3-5		1-3		1-3		0-2	
Sample Date:	9/24/2009		9/24/2009		10/27/2009		10/27/2009		9/25/2009		9/25/2009		9/25/2009	
ANALYTES	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*
Metals														
Arsenic	ND	2.6	7.3						4.6		3.5		3.2	
Barium	26		95						63		23		78	
Cadmium	ND	0.26	0.98						0.29		ND	0.27	0.38	
Chromium VI					2		ND	0.98						
Chromium (IV or total)*	7.3		99		19		12		12		10		18	
Lead	3.4		170						21		3.5		5.8	
Mercury	0.031		0.032						0.026		ND	0.023	ND	0.016
Selenium	ND	5.2	ND	5.9					ND	5.3	ND	5.5	ND	5.3
Silver	ND	0.52	ND	0.59					ND	0.53	ND	0.55	ND	0.53
Extractable Petroleum Hydrocarbons (EPH)														
C9-C18 Aliphatic Hydrocarbons														
C19-C36 Aliphatic Hydrocarbons														
C11-C22 Aromatic Hydrocarbons														
Polycyclic Aromatic Hydrocarbons (PAHs)														
Acenaphthene														
Acenaphthylene														
Anthracene														
Benz(a)anthracene														
Benzo(a)pyrene														
Benzo(b)fluoranthene														
Benzo(g,h,i)perylene														
Benzo(k)fluoranthene														
Chrysene														
Dibenz(a,h)anthracene														
Fluoranthene														
Fluorene														
Indeno(1,2,3-cd)pyrene														
2-Methylnapthalene														
Naphthalene														
Phenanthrene														
Pyrene														
Volatile Petroleum Hydrocarbons														
C5-C8 Aliphatics														
C9-C12 Aliphatics														
C9-C10 Aromatics														

Soil Data - 0 to 6 feet
E/S Pinevale
Springfield, Massachusetts

Sample ID:	CM-22		CM-23		CM-23A				CM-24		CM-25		CM-26	
Depth:	1-3		1-3		1-3		3-5		1-3		1-3		0-2	
Sample Date:	9/24/2009		9/24/2009		10/27/2009		10/27/2009		9/25/2009		9/25/2009		9/25/2009	
ANALYTES	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*
Volatile Organic Compounds														
Benzene														
Ethylbenzene														
MTBE														
Naphthalene														
Toluene														
Xylenes, total														
Polychlorinated Biphenyls	ND	0.1	ND	0.12							ND	0.11		

Soil Data - 0 to 6 feet
E/S Pinevale
Springfield, Massachusetts

Sample ID:	CM-27		CM-28		CM-29		CM-30		CM-31		CM-32		CM-33		CM-34		CM-35	
Depth:	0-2		1-3		1-3		1-3		1-3		1-3		1-3		1-3		1-3	
Sample Date:	9/25/2009		9/28/2009		9/28/2009		9/28/2009		9/28/2009		9/29/2009		9/29/2009		9/29/09		9/29/09	
ANALYTES	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*
Metals																		
Arsenic	3.9		ND	2.7	ND	2.6	2.9		3.7		ND	2.8	3.2		4.5		6	
Barium	32		63		68		38		38		53		35		110		25	
Cadmium	ND	0.26	ND	0.27	0.3		ND	0.26	ND	0.27	ND	0.28	ND	0.27	ND	0.26	ND	0.25
Chromium VI																		
Chromium (IV or total)*	11		16		9.9		8.5		11		8.8		9.3		20		7.8	
Lead	14		5.4		9.5		3.9		12		5.2		5.5		3.6		4.6	
Mercury	0.033		ND	0.014	ND	0.018	0.02		0.027		ND	0.016	ND	0.02	0.022		ND	0.02
Selenium	ND	5.1	ND	5.3	ND	5.2	ND	5.2	ND	5.4	ND	5.5	ND	5.3	ND	5.3	ND	5
Silver	ND	0.51	ND	0.53	ND	0.52	ND	0.52	ND	0.54	ND	0.55	ND	0.53	ND	0.53	ND	0.5
Extractable Petroleum Hydrocarbons (EPH)																		
C9-C18 Aliphatic Hydrocarbons																		
C19-C36 Aliphatic Hydrocarbons																		
C11-C22 Aromatic Hydrocarbons																		
Polycyclic Aromatic Hydrocarbons (PAHs)																		
Acenaphthene																		
Acenaphthylene																		
Anthracene																		
Benz(a)anthracene																		
Benzo(a)pyrene																		
Benzo(b)fluoranthene																		
Benzo(g,h,i)perylene																		
Benzo(k)fluoranthene																		
Chrysene																		
Dibenz(a,h)anthracene																		
Fluoranthene																		
Fluorene																		
Indeno(1,2,3-cd)pyrene																		
2-Methylnapthalene																		
Naphthalene																		
Phenanthrene																		
Pyrene																		
Volatile Petroleum Hydrocarbons																		
C5-C8 Aliphatics																		
C9-C12 Aliphatics																		
C9-C10 Aromatics																		

Soil Data - 0 to 6 feet
E/S Pinevale
Springfield, Massachusetts

Sample ID:	CM-27		CM-28		CM-29		CM-30		CM-31		CM-32		CM-33		CM-34		CM-35	
Depth:	0-2		1-3		1-3		1-3		1-3		1-3		1-3		1-3		1-3	
Sample Date:	9/25/2009		9/28/2009		9/28/2009		9/28/2009		9/28/2009		9/29/2009		9/29/2009		9/29/09		9/29/09	
ANALYTES	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*
Volatile Organic Compounds																		
Benzene																		
Ethylbenzene																		
MTBE																		
Naphthalene																		
Toluene																		
Xylenes, total																		
Polychlorinated Biphenyls	ND	0.1									ND	0.11			ND	0.11		

Soil Data - 0 to 6 feet
E/S Pinevale
Springfield, Massachusetts

Sample ID:	CM-36		CM-37		CM-38		CM-39		CM-40		CM-40A				CM-41	
Depth:	1-3		1-3		0.5-1		0-2		0-2		0-2		2-4		1-3	
Sample Date:	9/30/09		9/30/09		10/1/09		10/1/09		10/1/09		10/28/09		10/28/09		10/2/09	
ANALYTES	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*
Metals																
Arsenic	5.3		3.1		5.9		8.5		6.4						ND	2.6
Barium	45		48		62		390		1700						25	
Cadmium	0.31		ND	0.26	0.28		1.9		2.2						ND	0.26
Chromium VI											ND	5.4	2			
Chromium (IV or total)*	14		12		20		63		70		54		11		7	
Lead	65		2.1		13		550		290						3.6	
Mercury	ND	0.025	ND	0.022	0.027		0.26		0.36						ND	0.021
Selenium	ND	5.5	ND	5.3	ND	5.3	ND	5.6	ND	6.1					ND	5.3
Silver	ND	0.55	ND	0.53	ND	0.53	1.6		ND	0.61					ND	0.53
Extractable Petroleum Hydrocarbons (EPH)																
C9-C18 Aliphatic Hydrocarbons																
C19-C36 Aliphatic Hydrocarbons																
C11-C22 Aromatic Hydrocarbons																
Polycyclic Aromatic Hydrocarbons (PAHs)																
Acenaphthene																
Acenaphthylene																
Anthracene																
Benz(a)anthracene																
Benzo(a)pyrene																
Benzo(b)fluoranthene																
Benzo(g,h,i)perylene																
Benzo(k)fluoranthene																
Chrysene																
Dibenz(a,h)anthracene																
Fluoranthene																
Fluorene																
Indeno(1,2,3-cd)pyrene																
2-Methylnapthalene																
Naphthalene																
Phenanthrene																
Pyrene																
Volatile Petroleum Hydrocarbons																
C5-C8 Aliphatics																
C9-C12 Aliphatics																
C9-C10 Aromatics																

Soil Data - 0 to 6 feet
E/S Pinevale
Springfield, Massachusetts

Sample ID:	CM-36		CM-37		CM-38		CM-39		CM-40		CM-40A				CM-41	
Depth:	1-3		1-3		0.5-1		0-2		0-2		0-2		2-4		1-3	
Sample Date:	9/30/09		9/30/09		10/1/09		10/1/09		10/1/09		10/28/09		10/28/09		10/2/09	
ANALYTES	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*
Volatile Organic Compounds																
Benzene																
Ethylbenzene																
MTBE																
Naphthalene																
Toluene																
Xylenes, total																
Polychlorinated Biphenyls			ND	0.11	ND	0.11	ND	0.11								

Soil Data - 0 to 6 feet
E/S Pinevale
Springfield, Massachusetts

Sample ID:	CM-42		CM-43		CM-44		CM-45		CM-46			CM-47			CM-48		
Depth:	1-3		1-3		0-2		0-2		1-3		3-5	0-2		2-4	1-3		3-5
Sample Date:	10/2/09		10/2/09		10/2/09		10/27/09		10/27/09		10/27/09	10/27/09		10/27/09	10/27/09		10/27/09
ANALYTES	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*
Metals																	
Arsenic	2.6		3.9		5.9		10										
Barium	33		120		120		230										
Cadmium	ND	0.26	0.51		1.2		1.7										
Chromium VI																	
Chromium (IV or total)*	8.9		18		25		10		550		8.2	13		25	5		7.8
Lead	5.5		27		110		160										
Mercury	ND	0.016	0.038		0.29		0.086										
Selenium	ND	5.1	ND	5.3	ND	5.7	ND	6.1									
Silver	ND	0.51	ND	0.53	ND	0.57	ND	0.61									
Extractable Petroleum Hydrocarbons (EPH)																	
C9-C18 Aliphatic Hydrocarbons																	
C19-C36 Aliphatic Hydrocarbons																	
C11-C22 Aromatic Hydrocarbons																	
Polycyclic Aromatic Hydrocarbons (PAHs)																	
Acenaphthene																	
Acenaphthylene																	
Anthracene																	
Benz(a)anthracene																	
Benzo(a)pyrene																	
Benzo(b)fluoranthene																	
Benzo(g,h,i)perylene																	
Benzo(k)fluoranthene																	
Chrysene																	
Dibenz(a,h)anthracene																	
Fluoranthene																	
Fluorene																	
Indeno(1,2,3-cd)pyrene																	
2-Methylnapthalene																	
Naphthalene																	
Phenanthrene																	
Pyrene																	
Volatile Petroleum Hydrocarbons																	
C5-C8 Aliphatics																	
C9-C12 Aliphatics																	
C9-C10 Aromatics																	

Soil Data - 0 to 6 feet
E/S Pinevale
Springfield, Massachusetts

Sample ID:	CM-42		CM-43		CM-44		CM-45		CM-46				CM-47				CM-48			
Depth:	1-3		1-3		0-2		0-2		1-3		3-5		0-2		2-4		1-3		3-5	
Sample Date:	10/2/09		10/2/09		10/2/09		10/27/09		10/27/09		10/27/09		10/27/09		10/27/09		10/27/09		10/27/09	
ANALYTES	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*
Volatile Organic Compounds																				
Benzene																				
Ethylbenzene																				
MTBE																				
Naphthalene																				
Toluene																				
Xylenes, total																				
Polychlorinated Biphenyls	ND	0.1			ND	0.11														

Soil Data - 0 to 6 feet
E/S Pinevale
Springfield, Massachusetts

Sample ID:	CM-49				CM-50		CM-51		CM-52		CM-53				CM-54				CM-55			
Depth:	1-3		3-5		1-3		1-3		1-3		0-2		2-4		0-2		2-4		0-2		4-6	
Sample Date:	10/27/09		10/27/09		10/28/09		10/28/09		10/28/09		10/28/09		10/28/09		10/28/09		10/28/09		10/28/09		10/28/09	
ANALYTES	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*
Metals																						
Arsenic					4.4		4.9		9.5													
Barium					33		33		86		2400		290		3300		280		460		120	
Cadmium					ND	0.27	ND	0.28	3.3		2.4		0.64		4.4		0.61		1.4		1.3	
Chromium VI																						
Chromium (IV or total)*	8.7		6.2		10		22		48		120		16		130		13		60		17	
Lead					3.8		36		260		400		54		300		110		280		100	
Mercury					ND	0.019	0.12		5													
Selenium					ND	5.4	ND	5.6	ND	5.8												
Silver					ND	0.54	ND	0.56	ND	0.58												
Extractable Petroleum Hydrocarbons (EPH)																						
C9-C18 Aliphatic Hydrocarbons																						
C19-C36 Aliphatic Hydrocarbons																						
C11-C22 Aromatic Hydrocarbons																						
Polycyclic Aromatic Hydrocarbons (PAHs)																						
Acenaphthene																						
Acenaphthylene																						
Anthracene																						
Benz(a)anthracene																						
Benzo(a)pyrene																						
Benzo(b)fluoranthene																						
Benzo(g,h,i)perylene																						
Benzo(k)fluoranthene																						
Chrysene																						
Dibenz(a,h)anthracene																						
Fluoranthene																						
Fluorene																						
Indeno(1,2,3-cd)pyrene																						
2-Methylnapthalene																						
Naphthalene																						
Phenanthrene																						
Pyrene																						
Volatile Petroleum Hydrocarbons																						
C5-C8 Aliphatics																						
C9-C12 Aliphatics																						
C9-C10 Aromatics																						

Soil Data - 0 to 6 feet
E/S Pinevale
Springfield, Massachusetts

Sample ID:	CM-49				CM-50		CM-51		CM-52		CM-53				CM-54				CM-55			
Depth:	1-3		3-5		1-3		1-3		1-3		0-2		2-4		0-2		2-4		0-2		4-6	
Sample Date:	10/27/09		10/27/09		10/28/09		10/28/09		10/28/09		10/28/09		10/28/09		10/28/09		10/28/09		10/28/09		10/28/09	
ANALYTES	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*
Volatile Organic Compounds																						
Benzene																						
Ethylbenzene																						
MTBE																						
Naphthalene																						
Toluene																						
Xylenes, total																						
Polychlorinated Biphenyls					ND	0.11	ND	0.11	ND	0.11												

Soil Data - 0 to 6 feet
E/S Pinevale
Springfield, Massachusetts

Sample ID:	OTP-4		OTP-4		OTP-6		OTP-8		DP-1		DP-2		DP-3	
Depth:	0-2		3-4		0-3		0-2		0-2		0-1.5		0-2	
Sample Date:	11/12/09		11/12/09		11/12/09		11/12/09		11/12/09		11/12/09		11/12/09	
ANALYTES	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*
Metals														
Arsenic	4.6		5.7		5.7		3.8		3.7		6.4		3.5	
Barium	62		46		480		240		170		110		35	
Cadmium	0.29		ND	0.31	0.84		1.3		0.38		0.67		ND	0.27
Chromium VI														
Chromium (IV or total)*	13		7.9		25		24		9.9		13		9.8	
Lead	32		12		170		140		29		66		32	
Mercury	1.2		0.043		0.066		0.26		0.073		0.18		0.025	
Selenium	ND	5.3	ND	6.2	ND	5.4	ND	5.6	ND	5.4	ND	5.6	ND	5.4
Silver	0.78		ND	0.62	ND	0.54	ND	0.56	ND	0.54	ND	0.56	ND	0.54
Extractable Petroleum Hydrocarbons (EPH)														
C9-C18 Aliphatic Hydrocarbons	ND	21	ND	25	ND	54	ND	56	ND	22	ND	56	ND	11
C19-C36 Aliphatic Hydrocarbons	23		ND	25	ND	54	110		ND	22	58		ND	11
C11-C22 Aromatic Hydrocarbons	120		120		470		200		65		210		14	
Polycyclic Aromatic Hydrocarbons (PAHs)														
Acenaphthene	0.49		ND	0.25	8.4		1.5		0.42		1.5		ND	0.11
Acenaphthylene	0.52		ND	0.25	ND	0.54	ND	0.56	ND	0.22	ND	0.56	ND	0.11
Anthracene	2.1		ND	0.25	19		2.8		0.8		3.3		0.13	
Benz(a)anthracene	7.2		ND	0.25	38		11		3.2		10		0.26	
Benzo(a)pyrene	6.6		ND	0.25	32		10		3.2		9.2		0.24	
Benzo(b)fluoranthene	9.6		ND	0.25	46		16		4.6		15		0.34	
Benzo(g,h,i)perylene	4.2		ND	0.25	21		7.4		2.3		6		0.14	
Benzo(k)fluoranthene	3.3		ND	0.25	17		5.6		1.7		5.2		0.13	
Chrysene	8.2		ND	0.25	41		13		3.7		12		0.3	
Dibenz(a,h)anthracene	1.2		ND	0.25	5.9		2		0.62		1.9		ND	0.11
Fluoranthene	16		ND	0.25	97		23		6.7		23		0.6	
Fluorene	0.98		0.32		10		1.5		0.4		1.5		0.12	
Indeno(1,2,3-cd)pyrene	4.6		ND	0.25	22		7.8		2.4		7.1		0.16	
2-Methylnapthalene	ND	0.21	ND	0.25	2.2		ND	0.56	ND	0.22	ND	0.56	ND	0.11
Naphthalene	ND	0.21	ND	0.25	6.8		0.84		ND	0.22	ND	0.56	ND	0.11
Phenanthrene	11		0.33		84		15		3.3		15		0.52	
Pyrene	16		ND	0.25	89		22		6.8		22		0.59	
Volatile Petroleum Hydrocarbons														
C5-C8 Aliphatics														
C9-C12 Aliphatics														
C9-C10 Aromatics														

Soil Data - 0 to 6 feet
E/S Pinevale
Springfield, Massachusetts

Sample ID:	OTP-4		OTP-4		OTP-6		OTP-8		DP-1		DP-2		DP-3	
Depth:	0-2		3-4		0-3		0-2		0-2		0-1.5		0-2	
Sample Date:	11/12/09		11/12/09		11/12/09		11/12/09		11/12/09		11/12/09		11/12/09	
ANALYTES	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*
Volatile Organic Compounds														
Benzene														
Ethylbenzene														
MTBE														
Naphthalene														
Toluene														
Xylenes, total														
Polychlorinated Biphenyls	ND	0.11	ND	0.12	ND	0.11	ND	0.11	ND	0.11	ND	0.11	ND	0.11

Soil Data - 0 to 6 feet
E/S Pinevale
Springfield, Massachusetts

Sample ID: Depth: Sample Date: ANALYTES	Minimum Min	Maximum Max	# Detected Samples Samples	Total Number Samples	Arithmetic Mean Mean	Location of Max Max Detected
Metals						
Arsenic	2.6	22.7	40	46	5	TP-16
Barium	16	3300	58	58	218	CM-54
Cadmium	0.27	4.4	27	63	0.56	CM-54
Chromium VI	2	2	2	4	1	CM-23A
Chromium (IV or total)*	5	550	64	64	30	CM-46
Lead	2.1	1040	74	74	79	TP-16
Mercury	0.02	5	26	46	0.20	CM-46
Selenium	0	0	0	46	3	ND
Silver	0.78	1.6	2	46	0.31	CM-46
Extractable Petroleum Hydrocarbons (EPH)						
C9-C18 Aliphatic Hydrocarbons	12	9800	5	22	590	BT-E
C19-C36 Aliphatic Hydrocarbons	12	9320	10	22	580	TP-3
C11-C22 Aromatic Hydrocarbons	14	3500	16	22	339	BT-E
Polycyclic Aromatic Hydrocarbons (PAHs)						
Acenaphthene	0.15	19.2	13	27	1.68	TP-3
Acenaphthylene	0.29	54.7	7	27	2.31	TP-3
Anthracene	0.12	154	19	27	7.58	TP-3
Benz(a)anthracene	0.12	184	22	27	11.41	TP-3
Benzo(a)pyrene	0.13	115	22	27	8.82	TP-3
Benzo(b)fluoranthene	0.28	104	21	27	10.25	TP-3
Benzo(g,h,i)perylene	0.12	56.1	22	27	5.51	TP-3
Benzo(k)fluoranthene	0.11	117	20	27	6.70	TP-3
Chrysene	0.18	145	22	27	10.50	TP-3
Dibenz(a,h)anthracene	0.17	11.2	14	27	1.28	TP-3
Fluoranthene	0.3	459	22	27	27.97	TP-3
Fluorene	0.12	23.9	13	27	2.10	TP-3
Indeno(1,2,3-cd)pyrene	0.16	71.1	21	27	6.08	TP-3
2-Methylnapthalene	0.12	12	7	27	1.04	BT-E
Naphthalene	0.39	13.3	8	27	1.70	TP-3
Phenanthrene	0.22	616	22	27	30.43	TP-3
Pyrene	0.29	429	22	27	27.05	TP-3
Volatile Petroleum Hydrocarbons						
C5-C8 Aliphatics	0	0	0	13	20.5	ND
C9-C12 Aliphatics	140	330	3	13	55	BT-E
C9-C10 Aromatics	340	650	3	13	121	BT-E

Soil Data - 0 to 6 feet
E/S Pinevale
Springfield, Massachusetts

Sample ID: Depth: Sample Date: ANALYTES	Minimum Min	Maximum Max	# Detected Samples Samples	Total Number Samples	Arithmetic Mean Mean	Location of Max Max Detected
Volatile Organic Compounds						
Benzene	0	0	0	13	0.09	ND
Ethylbenzene	0	0	0	13	0.09	ND
MTBE	0	0	0	13	0.09	ND
Naphthalene	24	24	1	13	2.17	BT-E
Toluene	0	0	0	13	0.09	ND
Xylenes, total	4.8	4.8	1	13	0.56	BT-E
Polychlorinated Biphenyls	2.05	2.05	1	23	0.14	TP-3

Groundwater Analytical Data
June to August 2023
E/S Pinevale
Springfield, Massachusetts

Sample ID:	MW-205A		MW-CM-53N		EW-1		EW-2		EW-3		MW-205A		MW-205A		MW-CM-38N		MW-CM-38N		MW-CM-43N		MW-CM-53N	
Sample Date:	6/1/2023		6/1/2023		8/25/2023		8/25/2023		8/25/2023		8/25/2023		Average		8/25/2023		Average		8/25/2023		8/25/2023	
ANALYTES	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*
Metals																						
Arsenic					ND	1	ND	1	ND	1	ND	1	ND	1	21		21		1.2		ND	1
Barium			185		90		86		290		320		320		350		267.5		140		180	
Cadmium	2.2		ND	0.2	ND	0.2	ND	0.2	ND	0.2	0.28		1.24		ND	0.2	ND	0.2	ND	0.2	ND	0.2
Nickel					ND	5	ND	5	6.9		ND	5	ND	5	ND	5	ND	5	ND	5	ND	5
Zinc					ND	10	ND	10	49		10		10		ND	10	ND	10	ND	10	ND	10
Volatile Organic Compounds																						
Benzene					ND	1	ND	1	ND	1	ND	1	ND	1	1.25		1.25		ND	1	ND	1
n-Butylbenzene					1		ND	1	ND	1	ND	1	ND	1	4.1		4.1		1.6		ND	1
sec-Butylbenzene					1.5		ND	1	ND	1	1		1		4.2		4.2		1.5		ND	1
tert-Butylbenzene					ND	1	ND	1	ND	1	ND	1	ND	1	1.55		1.55		ND	1	ND	1
Ethylbenzene					2.2		ND	1	ND	1	ND	1	ND	1	39		39		ND	1	ND	1
Isopropylbenzene					1.9		ND	1	ND	1	ND	1	ND	1	10		10		ND	1	ND	1
p-Isopropyltoluene					ND	1.0	ND	1	ND	1	ND	1	ND	1	1.8		1.8		ND	1	ND	1.0
Naphthalene					31		ND	2	ND	2	ND	2	ND	2	170		170		ND	2	ND	2
n-Propylbenzene					2.4		ND	1	ND	1	ND	1	ND	1	15.5		15.5		ND	1	ND	1
1,2,4-Trimethylbenzene					ND	1	ND	1	ND	1	ND	1	ND	1	25		25		ND	1	ND	1
Xylenes, Total					ND	1	ND	1	ND	1	ND	1	ND	1	3.95		3.95		ND	1	ND	1
Semi-Volatile Organic Compounds																						
Fluorene					ND	5	ND	4.9	ND	5	ND	4.8	ND	4.8	4.85		4.85		ND	4.7	ND	4.6
2-Methylnaphthalene					32		ND	4.9	ND	5	ND	4.8	ND	4.8	79		79		ND	4.7	ND	4.6
Naphthalene					18		ND	4.9	ND	5	ND	4.8	ND	4.8	94.5		94.5		ND	4.7	ND	4.6

Data units are ug/L

Groundwater Analytical Data
June to August 2023
E/S Pinevale
Springfield, Massachusetts

Sample ID:	EW-1		EW-2		EW-3		MW-205A		MW-CM-38N		MW-CM-43N		MW-CM-53N	
Sample Date:	8/25/2023		8/25/2023		8/25/2023		Average		Average		8/25/2023		8/25/2023	
ANALYTES	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*	*Result*	*MDL*
Metals														
Arsenic	ND	1	ND	1	ND	1	ND	1	21		1.2		ND	1
Barium	90		86		290		320		267.5		140		180	
Cadmium	ND	0.2	ND	0.2	ND	0.2	1.24		ND	0.2	ND	0.2	ND	0.2
Nickel	ND	5	ND	5	6.9		ND	5	ND	5	ND	5	ND	5
Zinc	ND	10	ND	10	49		10		ND	10	ND	10	ND	10
Volatile Organic Compounds														
Benzene	ND	1	ND	1	ND	1	ND	1	1.25		ND	1	ND	1
n-Butylbenzene	1		ND	1	ND	1	ND	1	4.1		1.6		ND	1
sec-Butylbenzene	1.5		ND	1	ND	1	1		4.2		1.5		ND	1
tert-Butylbenzene	ND	1	ND	1	ND	1	ND	1	1.55		ND	1	ND	1
Ethylbenzene	2.2		ND	1	ND	1	ND	1	39		ND	1	ND	1
Isopropylbenzene	1.9		ND	1	ND	1	ND	1	10		ND	1	ND	1
p-Isopropyltoluene	ND	1.0	ND	1	ND	1	ND	1	1.8		ND	1	ND	1.0
Naphthalene	31		ND	2	ND	2	ND	2	170		ND	2	ND	2
n-Propylbenzene	2.4		ND	1	ND	1	ND	1	15.5		ND	1	ND	1
1,2,4-Trimethylbenzene	ND	1	ND	1	ND	1	ND	1	25		ND	1	ND	1
Xylenes, Total	ND	1	ND	1	ND	1	ND	1	3.95		ND	1	ND	1
Semi-Volatile Organic Compounds														
Fluorene	ND	5	ND	4.9	ND	5	ND	4.8	4.85		ND	4.7	ND	4.6
2-Methylnaphthalene	32		ND	4.9	ND	5	ND	4.8	79		ND	4.7	ND	4.6
Naphthalene	18		ND	4.9	ND	5	ND	4.8	94.5		ND	4.7	ND	4.6

Data units are ug/L

Groundwater Analytical Data
June to August 2023
E/S Pinevale
Springfield, Massachusetts

Sample ID: Sample Date: ANALYTES	Min	Max	Samples	Number Samples	Mean	LOCATION OF MAX DETECTED
Metals						
Arsenic	1.2	21	2	7	3.529	MW-CM-38N
Barium	86	320	7	7	196.2	MW-205A
Cadmium	1.24	1.24	1	7	0.263	MW-205A
Nickel	6.9	6.9	1	7	3.129	EW-3
Zinc	10	49	2	7	12	EW-3
Volatile Organic Compounds						
Benzene	1.25	1.25	1	7	0.607	MW-CM-38N
n-Butylbenzene	1	4.1	3	7	1.243	MW-CM-38N
sec-Butylbenzene	1.4	4.2	4	7	1.443	MW-CM-38N
tert-Butylbenzene	1.55	1.55	1	7	0.65	MW-CM-38N
Ethylbenzene	2.2	39	2	7	6.243	MW-CM-38N
Isopropylbenzene	1.9	10	2	7	2.057	MW-CM-38N
p-Isopropyltoluene	1.8	1.8	1	7	0.686	MW-CM-38N
Naphthalene	31	170	2	7	29.43	MW-CM-38N
n-Propylbenzene	2.4	15.5	2	7	2.914	MW-CM-38N
1,2,4-Trimethylbenzene	25	25	1	7	4	MW-CM-38N
Xylenes, Total	4	4	1	7	1	MW-CM-38N
Semi-Volatile Organic Compounds						
Fluorene	4.85	4.85	1	7	2.764	MW-CM-38N
2-Methylnaphthalene	32	79	2	7	17.57	MW-CM-38N
Naphthalene	18	95	2	7	18	MW-CM-38N

Method 3 Risk Assessment for Resident Exposed to Chemicals in Soil - Shortform 2012 (sf12rs)

Index

Tab	
EPCs	Table RS-1: Select chemicals and enter Exposure Point Concentrations (EPCs). Estimated risks are shown to the right.
	Table RS-2: Produce risk. Select chemical and enter EPCs.
C Eq	Table RS-3: Equations to calculate cancer risks
cNC Eq	Table RS-4: Equations to calculate chronic noncancer risks
scNC Eq	Table RS-5: Equations to calculate subchronic noncancer risks
Exp	Table RS-6: Definitions and exposure factors
Produce	Table RS-7: Equations to calculate produce ingestion rate
Chem	Table RS-8: Chemical-specific data
Cyanide	Table RS-9: Cyanide Calculations

Spreadsheets designed by Andrew Friedmann, MassDEP
Questions and Comments may be addressed to:
Lydia Thompson
Massachusetts Department of Environmental Protection
Office of Research and Standards
One Winter Street
Boston, MA 02108 USA
Telephone: (617) 556-1165
Fax: (617) 556-1006
Email: Lydia.Thompson@state.ma.us

Resident - Soil: Table RS-1 (0 to 15 feet)
Exposure Point Concentration (EPC)
Based on Resident Ages 1-31 (Cancer), 1-8 (Chronic Noncancer), and 1-2 (Subchronic Noncancer)

ShortForm Version 10-12
Vlookup Versionv0315

ELCR (all chemicals) = 1.2E-05
Chronic HI (all chemicals) = 2.3E+00
Subchronic HI (all chemicals) = 2.0E+00

Do not insert or delete any rows
Click on empty cell below and select OHM using arrow.

Oil or Hazardous Material	EPC (mg/kg)	$ELCR_{ingestion}$	$ELCR_{dermal}$	Derm & Ing $ELCR_{total}$	Chronic HQ_{ing}	Chronic HQ_{derm}	Derm & Ing HQ_{total}	Subchronic HQ_{ing}	Subchronic HQ_{derm}	Derm & Ing HQ_{total}	
ARSENIC	6.2E+00	1.7E-06	1.1E-06	2.8E-06	2.5E-02	1.3E-02	3.8E-02	6.8E-02	2.4E-02	9.3E-02	
BARIUM	5.4E+02				6.5E-03	5.6E-03	1.2E-02	5.1E-02	3.0E-02	8.1E-02	
CADMIUM	4.4E+00				1.1E-02	1.8E-03	1.2E-02	2.9E-02	3.4E-03	3.3E-02	
CHROMIUM(VI)	2.0E+00				1.6E-03	1.4E-03	3.0E-03	6.7E-04	3.9E-04	1.1E-03	**Note! Cr(VI) limit is 200 mg/kg due to contact dermititis.**
CHROMIUM (TOTAL)	6.9E+01				5.5E-02	4.7E-02	1.0E-01	2.3E-02	1.3E-02	3.6E-02	**Note! Cr(VI) limit is 200 mg/kg due to contact dermititis.**
LEAD	1.6E+02				2.5E-01	2.6E-02	2.8E-01	6.9E-01	4.9E-02	7.4E-01	**Note! Lead IH HQ limit is 1, not 10.**
MERCURY	6.9E-01				2.8E-03	4.7E-03	7.5E-03	7.6E-03	8.9E-03	1.7E-02	
ALIPHATICS C9 to C18	9.8E+03				2.4E-01	4.0E-01	6.4E-01	6.5E-02	7.6E-02	1.4E-01	
ALIPHATICS C19 to C36	9.3E+03				1.1E-02	1.9E-02	3.1E-02	1.0E-02	1.2E-02	2.2E-02	
AROMATICS C11 to C22	3.5E+03				8.5E-02	2.4E-01	3.3E-01	2.3E-02	4.6E-02	6.9E-02	
ACENAPHTHENE	1.9E+01				2.3E-04	6.6E-04	8.9E-04	1.9E-04	3.7E-04	5.7E-04	
ACENAPHTHYLENE	5.5E+01				1.3E-03	3.8E-03	5.1E-03	3.7E-04	7.1E-04	1.1E-03	
ANTHRACENE	1.5E+02				3.7E-04	1.1E-03	1.4E-03	3.1E-04	6.0E-04	9.1E-04	
BENZO(a)ANTHRACENE	3.0E+01	3.3E-07	2.3E-07	5.6E-07	7.2E-04	4.1E-04	1.1E-03	2.0E-04	7.7E-05	2.7E-04	
BENZO(a)PYRENE	2.0E+01	2.3E-06	1.6E-06	3.8E-06	4.9E-02	2.8E-02	7.7E-02	1.3E-01	5.2E-02	1.9E-01	
BENZO(b)FLUORANTHENE	2.1E+01	2.3E-07	1.6E-07	4.0E-07	5.0E-04	2.9E-04	7.9E-04	1.4E-04	5.4E-05	1.9E-04	
BENZO(g,h,i)PERYLENE	5.6E+01				1.4E-03	3.9E-03	5.2E-03	3.7E-04	7.3E-04	1.1E-03	
BENZO(k)FLUORANTHENE	1.2E+02	1.3E-07	9.1E-08	2.2E-07	2.8E-03	1.6E-03	4.4E-03	7.8E-04	3.0E-04	1.1E-03	
CHRYSENE	1.5E+02	1.6E-07	1.1E-07	2.8E-07	3.5E-03	2.0E-03	5.5E-03	9.7E-04	3.8E-04	1.3E-03	
DIBENZO(a,h)ANTHRACENE	2.5E+00	2.8E-07	2.0E-07	4.8E-07	6.1E-05	3.5E-05	9.6E-05	1.7E-05	6.6E-06	2.3E-05	
FLUORANTHENE	4.6E+02				8.3E-03	2.4E-02	3.2E-02	9.2E-03	1.8E-02	2.7E-02	
FLUORENE	2.4E+01				4.3E-04	1.2E-03	1.7E-03	1.2E-04	2.3E-04	3.5E-04	
INDENO(1,2,3-cd)PYRENE	1.3E+01	1.5E-07	1.0E-07	2.5E-07	3.2E-04	1.8E-04	5.0E-04	8.8E-05	3.4E-05	1.2E-04	
METHYLNAPHTHALENE, 2-	1.2E+01				2.2E-03	6.2E-03	8.4E-03	6.0E-03	1.2E-02	1.8E-02	
PHENANTHRENE	6.2E+02				1.5E-02	4.2E-02	5.7E-02	4.1E-03	8.0E-03	1.2E-02	
PYRENE	4.3E+02				1.0E-02	2.9E-02	4.0E-02	2.9E-03	5.6E-03	8.4E-03	
ALIPHATICS C5 to C8	3.0E+01				1.8E-03	3.1E-03	4.9E-03	5.0E-04	5.9E-04	1.1E-03	
ALIPHATICS C9 to C12	3.3E+02				8.0E-03	1.4E-02	2.2E-02	2.2E-03	2.6E-03	4.8E-03	
AROMATICS C9 to C10	6.5E+02				5.3E-02	8.9E-02	1.4E-01	1.4E-02	1.7E-02	3.1E-02	
ETHYLBENZENE	6.6E-01				3.2E-05	8.2E-06	4.0E-05	8.8E-05	1.5E-05	1.0E-04	
NAPHTHALENE	2.4E+01				8.7E-04	2.5E-03	3.3E-03	2.4E-04	4.7E-04	7.1E-04	
XYLENES (Mixed Isomers)	4.8E+00				5.8E-05	1.5E-05	7.3E-05	8.0E-05	1.4E-05	9.4E-05	
POLYCHLORINATED BIPHENYLS (PCBs)	2.1E+00	1.5E-06	1.6E-06	3.1E-06	2.5E-01	2.1E-01	4.6E-01	2.7E-01	1.6E-01	4.3E-01	

MassDEP ORS
Contact: Lydia Thompson
Lydia.Thompson@state.ma.us
617-556-1165

Resident - Soil: Table RS-1 (0 to 3 feet)
Exposure Point Concentration (EPC)
Based on Resident Ages 1-31 (Cancer), 1-8 (Chronic Noncancer), and 1-2 (Subchronic Noncancer)

ShortForm Version 10-12
Vlookup Versionv0315

ELCR (all chemicals) = 1.8E-05
Chronic HI (all chemicals) = 2.4E+00
Subchronic HI (all chemicals) = 2.2E+00

Do not insert or delete any rows
Click on empty cell below and select OHM using arrow.

Oil or Hazardous Material	EPC (mg/kg)	$ELCR_{ingestion}$	$ELCR_{dermal}$	Derm & Ing $ELCR_{total}$	Chronic HQ_{ing}	Chronic HQ_{derm}	Derm & Ing HQ_{total}	Subchronic HQ_{ing}	Subchronic HQ_{derm}	Derm & Ing HQ_{total}	
ARSENIC	6.2E+00	1.7E-06	1.1E-06	2.8E-06	2.5E-02	1.3E-02	3.8E-02	6.8E-02	2.4E-02	9.3E-02	
BARIUM	5.4E+02				6.5E-03	5.6E-03	1.2E-02	5.1E-02	3.0E-02	8.1E-02	
CADMIUM	4.4E+00				1.1E-02	1.8E-03	1.2E-02	2.9E-02	3.4E-03	3.3E-02	
CHROMIUM(VI)	2.0E+00				1.6E-03	1.4E-03	3.0E-03	6.7E-04	3.9E-04	1.1E-03	**Note! Cr(VI) limit is 200 mg/kg due to contact dermititis.**
CHROMIUM (TOTAL)	6.9E+01				5.5E-02	4.7E-02	1.0E-01	2.3E-02	1.3E-02	3.6E-02	**Note! Cr(VI) limit is 200 mg/kg due to contact dermititis.**
LEAD	1.7E+02				2.7E-01	2.8E-02	3.0E-01	7.5E-01	5.3E-02	8.1E-01	**Note! Lead IH HQ limit is 1, not 10.**
MERCURY	6.9E-01				2.8E-03	4.7E-03	7.5E-03	7.6E-03	8.9E-03	1.7E-02	
ALIPHATICS C9 to C18	9.8E+03				2.4E-01	4.0E-01	6.4E-01	6.5E-02	7.6E-02	1.4E-01	
ALIPHATICS C19 to C36	9.3E+03				1.1E-02	1.9E-02	3.1E-02	1.0E-02	1.2E-02	2.2E-02	
AROMATICS C11 to C22	3.5E+03				8.5E-02	2.4E-01	3.3E-01	2.3E-02	4.6E-02	6.9E-02	
ACENAPHTHENE	1.9E+01				2.3E-04	6.6E-04	8.9E-04	1.9E-04	3.7E-04	5.7E-04	
ACENAPHTHYLENE	5.5E+01				1.3E-03	3.8E-03	5.1E-03	3.7E-04	7.1E-04	1.1E-03	
ANTHRACENE	1.5E+02				3.7E-04	1.1E-03	1.4E-03	3.1E-04	6.0E-04	9.1E-04	
BENZO(a)ANTHRACENE	6.0E+01	6.7E-07	4.7E-07	1.1E-06	1.5E-03	8.3E-04	2.3E-03	4.0E-04	1.6E-04	5.6E-04	
BENZO(a)PYRENE	4.3E+01	4.8E-06	3.3E-06	8.1E-06	1.0E-01	5.9E-02	1.6E-01	2.9E-01	1.1E-01	4.0E-01	
BENZO(b)FLUORANTHENE	4.5E+01	5.1E-07	3.5E-07	8.6E-07	1.1E-03	6.2E-04	1.7E-03	3.0E-04	1.2E-04	4.2E-04	
BENZO(g,h,i)PERYLENE	5.6E+01				1.4E-03	3.9E-03	5.2E-03	3.7E-04	7.3E-04	1.1E-03	
BENZO(k)FLUORANTHENE	1.2E+02	1.3E-07	9.1E-08	2.2E-07	2.8E-03	1.6E-03	4.4E-03	7.8E-04	3.0E-04	1.1E-03	
CHRYSENE	1.5E+02	1.6E-07	1.1E-07	2.8E-07	3.5E-03	2.0E-03	5.5E-03	9.7E-04	3.8E-04	1.3E-03	
DIBENZO(a,h)ANTHRACENE	5.2E+00	5.8E-07	4.0E-07	9.9E-07	1.3E-04	7.2E-05	2.0E-04	3.5E-05	1.4E-05	4.8E-05	
FLUORANTHENE	4.6E+02				8.3E-03	2.4E-02	3.2E-02	9.2E-03	1.8E-02	2.7E-02	
FLUORENE	2.4E+01				4.3E-04	1.2E-03	1.7E-03	1.2E-04	2.3E-04	3.5E-04	
INDENO(1,2,3-cd)PYRENE	2.8E+01	3.2E-07	2.2E-07	5.3E-07	6.8E-04	3.9E-04	1.1E-03	1.9E-04	7.3E-05	2.6E-04	
METHYLNAPHTHALENE, 2-	1.2E+01				2.2E-03	6.2E-03	8.4E-03	6.0E-03	1.2E-02	1.8E-02	
PHENANTHRENE	6.2E+02				1.5E-02	4.2E-02	5.7E-02	4.1E-03	8.0E-03	1.2E-02	
PYRENE	4.3E+02				1.0E-02	2.9E-02	4.0E-02	2.9E-03	5.6E-03	8.4E-03	
ALIPHATICS C9 to C12	3.3E+02				8.0E-03	1.4E-02	2.2E-02	2.2E-03	2.6E-03	4.8E-03	
AROMATICS C9 to C10	6.5E+02				5.3E-02	8.9E-02	1.4E-01	1.4E-02	1.7E-02	3.1E-02	
NAPHTHALENE	2.4E+01				8.7E-04	2.5E-03	3.3E-03	2.4E-04	4.7E-04	7.1E-04	
XYLENES (Mixed Isomers)	4.8E+00				5.8E-05	1.5E-05	7.3E-05	8.0E-05	1.4E-05	9.4E-05	
POLYCHLORINATED BIPHENYLS (PCBs)	2.1E+00	1.5E-06	1.6E-06	3.1E-06	2.5E-01	2.1E-01	4.6E-01	2.7E-01	1.6E-01	4.3E-01	

MassDEP ORS
Contact: Lydia Thompson
Lydia.Thompson@state.ma.us
617-556-1165

Resident - Soil: Table RS-2
Exposure Point Concentration (EPC)
Based on Resident Ages 1-31 (Cancer), 1-8 (Chronic Noncancer), and 1-2 (Subchronic Noncancer)

Vlookup Versionv0315

ELCR (all chemicals) = 8E-04
Chronic HI (all chemicals) = 9E+01
Subchronic HI (all chemicals) = 7E+01

*Vegetable uptake is informational only and NOT included in totals on EPC tab.

Do not insert or delete any rows

Click on empty cell below and select OHM using arrow.

Oil or Hazardous Material	EPC (mg/kg)	Chronic		Subchronic
		$ELCR_{vegetable*}$	$HQ_{vegetable*}$	$HQ_{vegetable*}$
ARSENIC	6.2E+00	9.7E-05	7.3E-01	1.0E+00
BARIUM	5.4E+02			
CADMIUM	4.4E+00		1.2E+01	1.7E+01
CHROMIUM(VI)	2.0E+00		4.5E-02	9.7E-03
CHROMIUM (TOTAL)	6.9E+01		1.5E+00	3.3E-01
LEAD	1.7E+02		1.2E+01	1.7E+01
MERCURY	6.9E-01			
POLYCHLORINATED BIPHENYLS (PCBs)	2.1E+00	7.3E-04	6.1E+01	3.5E+01

MassDEP ORS
Contact: Lydia Thompson
Lydia.Thompson@state.ma.us
617-556-1165

Resident - Soil: Table RS-3
Equations to Calculate Cancer Risk for Resident (Age 1-31 years)

Vlookup Versionv0315

Cancer Risk from Ingestion

$$ELCR_{ing} = LADD_{ing(1\text{-}31)} * CSF$$

$$LADD_{ing\ (1\text{-}31)} = LADD_{ing\ (1\text{-}8)} + LADD_{ing\ (8\text{-}15)} + LADD_{ing\ (15\text{-}31)}$$

$$LADD_{ing\ (age\ group\ x)} = \frac{[OHM]_{soil} * IR_x * RAF_{c\text{-}ing} * EF_{ing} * ED * EP_x * C}{BW_x * AP_{lifetime}}$$

Cancer Risk from Dermal Absorption

$$ELCR_{derm} = LADD_{derm} * CSF$$

$$LADD_{derm\ (1\text{-}31)} = LADD_{derm\ (1\text{-}8)} + LADD_{derm\ (8\text{-}15)} + LADD_{derm\ (15\text{-}31)}$$

$$LADD_{derm(age\ group\ x)} = \frac{[OHM]_{soil} * SA_x * RAF_{c\text{-}derm} * SAF_x * EF_{derm} * ED * EP_x * C}{BW_x * AP_{lifetime}}$$

Cancer Risk from Homegrown Produce

$$ELCR_{produce} = LADD_{produce(1\text{-}31)} * CSF$$

$$LADD_{produce(1\text{-}31)} = LADD_{produce(1\text{-}8)} + LADD_{produce(8\text{-}15)} + LADD_{produce(15\text{-}31)}$$

$$LADD_{produce(age\ x)} = \frac{[OHM_{soil}] * PUF * PIR_x * RAF_{produce} * EF_{produce} * ED * EP_x * C}{BW_x * AP_{lifetime}}$$

Parameter	Value	Units
CSF	OHM specific	$(mg/kg\text{-}day)^{-1}$
LADD	age/OHM specific	mg/kg-day
$[OHM]_{soil}$	OHM specific	mg/kg
$IR_{(1\text{-}8)}$	100	mg/day
$IR_{(8\text{-}15)}$	50	mg/day
$IR_{(15\text{-}31)}$	50	mg/day
$PIR_{(1\text{-}8)}$	12,099	mg/day
$PIR_{(8\text{-}15)}$	17,809	mg/day
$PIR_{(15\text{-}31)}$	24,420	mg/day
$RAF_{c\text{-}ing}$	OHM specific	dimensionless
$RAF_{c\text{-}derm}$	OHM specific	dimensionless
$RAF_{c\text{-}produce}$	OHM specific	dimensionless
$EF_{ing,derm}$	0.412	event/day
$EF_{produce}$	1.00	event/day
ED	1	day/event
$EP_{(1\text{-}8)}$	7	years
$EP_{(8\text{-}15)}$	7	years
$EP_{(15\text{-}31)}$	16	years
C	0.000001	kg/mg
$BW_{(1\text{-}8)}$	17.0	kg
$BW_{(8\text{-}15)}$	39.9	kg
$BW_{(15\text{-}31)}$	58.7	kg
$AP_{(lifetime)}$	70	years
$SA_{(1\text{-}8)}$	2431	cm^2 / day
$SA_{(8\text{-}15)}$	4427	cm^2 / day
$SA_{(15\text{-}31)}$	5653	cm^2 / day
$SAF_{(1\text{-}8)}$	0.35	mg/cm^2
$SAF_{(8\text{-}15)}$	0.14	mg/cm^2
$SAF_{(15\text{-}31)}$	0.13	mg/cm^2
PUF	OHM specific	$(mg/mg)(mg/mg)^{-1}$

MassDEP ORS
Contact: Lydia Thompson
Lydia.Thompson@state.ma.us
617-556-1165

Resident - Soil: Table RS-4
Equations to Calculate Chronic Noncancer Risk for Resident Child (Age 1-8 years)

Vlookup Versionv0315

Chronic Noncancer Risk from Ingestion

$$HQ_{ing} = \frac{ADD_{ing}}{RfD}$$

$$ADD_{ing} = \frac{[OHM]_{soil} * IR * RAF_{nc\text{-}ing} * EF_{ing} * ED * EP * C}{BW * AP}$$

Chronic Noncancer Risk from Dermal Absorption

$$HQ_{derm} = \frac{ADD_{ing,derm}}{RfD}$$

$$ADD_{derm} = \frac{[OHM]_{soil} * SA * RAF_{nc\text{-}derm} * SAF * EF_{derm} * ED * EP * C}{BW * AP}$$

Chronic Noncancer Risk from Homegrown Produce

$$HQ_{produce} = \frac{ADD_{produce}}{RfD}$$

$$ADD_{produce} = \frac{[OHM_{soil}] * PUF * PIR * RAF_{produce} * EF_{produce} * ED * EP * C}{BW * AP}$$

Parameter	Value	Units
RfD	OHM specific	mg/kg-day
ADD	OHM specific	mg/kg-day
$[OHM]_{soil}$	OHM specific	mg/kg
IR	100	mg/day
PIR	12,099	mg/day
$RAF_{nc\text{-}ing}$	OHM specific	dimensionless
$RAF_{nc\text{-}derm}$	OHM specific	dimensionless
$RAF_{nc\text{-}produce}$	OHM specific	dimensionless
$EF_{ing,derm}$	0.412	event/day
$EF_{produce}$	1.00	event/day
ED	1	day/event
EP	7	years
C	0.000001	kg/mg
BW	17.0	kg
AP	7	year
SA	2431	cm^2 / day
SAF	0.35	mg/cm^2
PUF	OHM specific	$(mg/mg)(mg/mg)^{-1}$

MassDEP ORS
Contact: Lydia Thompson
Lydia.Thompson@state.ma.us
617-556-1165

Resident - Soil: Table RS-5
Equations to Calculate Subchronic Noncancer Risk for Resident Child (Age 1-2 years)

Vlookup Versionv0315

Subchronic Noncancer Risk from Ingestion

$$HQ_{ing} = \frac{ADD_{ing}}{RfD_{subchronic}}$$

$$ADD_{ing} = \frac{[OHM]_{soil} * IR * RAF_{nc\text{-}ing} * EF_{ing} * ED * EP * C}{BW * AP}$$

Subchronic Noncancer Risk from Dermal Absorption

$$HQ_{derm} = \frac{ADD_{derm}}{RfD_{subchronic}}$$

$$ADD_{derm} = \frac{[OHM]_{soil} * SA * RAF_{nc\text{-}derm} * SAF * EF_{derm} * ED * EP * C}{BW * AP}$$

Subchronic Noncancer Risk from Homegrown Produce

$$HQ_{produce} = \frac{ADD_{produce}}{RfD_{subchronic}}$$

$$ADD_{produce} = \frac{[OHM_{soil}] * PUF * PIR * RAF_{produce} * EF_{produce} * ED * EP * C}{BW * AP}$$

Parameter	Value	Units
RfD	OHM specific	mg/kg-day
ADD	OHM specific	mg/kg-day
$[OHM]_{soil}$	OHM specific	mg/kg
IR	100	mg/day
PIR	10,900	mg/day
$RAF_{nc\text{-}ing}$	OHM specific	dimensionless
$RAF_{nc\text{-}derm}$	OHM specific	dimensionless
$RAF_{nc\text{-}produce}$	OHM specific	dimensionless
$EF_{ing,derm}$	0.714	event/day
$EF_{produce}$	1.00	event/day
ED	1	day/event
EP	0.577	years
C	0.000001	kg/mg
BW	10.7	kg
AP	0.577	year
SA	1670	cm^2 / day
SAF	0.35	mg/cm^2
PUF	OHM specific	$(mg/mg)(mg/mg)^{-1}$

MassDEP ORS
Contact: Lydia Thompson
Lydia.Thompson@state.ma.us
617-556-1165

Resident - Soil: Table RS-6
Definitions and Exposure Factors

Vlookup Versionv0315

Parameter	Value	Units	Notes
ELCR - Excess Lifetime Cancer Risk	chemical specific	dimensionless	Pathway specific (ing =ingestion, derm=dermal, inh=inhalation)
CSF - Cancer Slope Factor	chemical specific	$(mg/kg\text{-}day)^{-1}$	see Table RS-7
LADD - Lifetime Average Daily Dose	chemical specific	mg/kg-day	Pathway specific
LADE - Lifetime Average Daily Exposure	chemical specific	$\mu g/m^3$	
HQ - Hazard Quotient	chemical specific	dimensionless	Pathway specific (ing =ingestion, derm=dermal, inh=inhalation)
RfD - Reference Dose	chemical specific	mg/kg-day	see Table RS-7
ADD - Average Daily Dose	chemical specific	mg/kg-day	Pathway specific
ADE - Average Daily Exposure	chemical specific	mg/m^3	
EPC - Exposure Point Concentration	chemical specific	mg/kg	
PUF - Plant Uptake Factor	chemical specific	$(mg/mg)(mg/mg)^{-1}$	See Table RS-7; $(mg_{OHM}/mg_{plant})/(mg_{OHM}/mg_{soil})^{-1}$
$IR_{(1\text{-}2)}$ - Soil Ingestion Rate for age group 1-2	100	mg/day	MADEP. 2002. Technical Update: Calculation of an Enhanced Soil Ingestion Rate. (http://www.mass.gov/dep/ors/orspubs.htm)
$IR_{(1\text{-}8)}$ - Soil Ingestion Rate for age group 1-8	100	mg/day	Ibid
$IR_{(8\text{-}15)}$ - Soil Ingestion Rate for age group 8-15	50	mg/day	Ibid
$IR_{(15\text{-}31)}$ - Soil Ingestion Rate for age group 15-31	50	mg/day	Ibid
$PIR_{(1\text{-}2)}$ = Produce Ingestion Rate for age group 1-2	10,900	mg/day	see Table RS-6
$PIR_{(1\text{-}8)}$ = Produce Ingestion Rate for age group 1-8	12,099	mg/day	see Table RS-6
$PIR_{(8\text{-}15)}$ = Produce Ingestion Rate for age group 8-15	17,809	mg/day	Ibid
$PIR_{(15\text{-}31)}$ = Produce Ingestion Rate for age group 15-31	24,420	mg/day	Ibid
RAF_c - Relative Absorption Factor for Cancer Effects	chemical specific	dimensionless	
$EF_{subchronic}$ - Exposure Frequency for subchronic ingestion or dermal exposure	0.714	event/day	5 days/week
$EF_{chronic}$ - Exposure Frequency for chronic ingestion or dermal exposure	0.412	event/day	5 days/week, 30 weeks/year
EF_{cancer} - Exposure Frequency for cancer, ingestion or dermal exposure	0.412	event/day	5 days/week, 30 weeks/year
$EF_{produce}$ - Exposure Frequency for produce ingestion, cancer and noncancer	1.00	event/day	
ED - Exposure Duration	1	day/event	
$EP_{(1\text{-}2)}$ - Exposure Period for age group 1-2	0.577	years	30 weeks
$EP_{(1\text{-}8)}$ - Exposure Period for age group 1-8	7	years	
$EP_{(8\text{-}15)}$ - Exposure Period for age group 8-15	7	years	
$EP_{(15\text{-}31)}$ - Exposure Period for age group 15-31	16	years	
$BW_{(1\text{-}2)}$ - Body Weight for age group 1-2	10.7	kg	U.S. EPA. 1997. Exposure Factors Handbook. Table 7-7, females.
$BW_{(1\text{-}8)}$ - Body Weight for age group 1-8	17.0	kg	Ibid
$BW_{(8\text{-}15)}$ - Body Weight for age group 8-15	39.9	kg	Ibid
$BW_{(15\text{-}31)}$ - Body Weight for age group 15-31	58.7	kg	Ibid
$AP_{subchronic}$ - Averaging Period for subchronic noncancer	0.577	years	30 weeks
$AP_{chronic}$ - Averaging Period for chronic noncancer	7	years	
AP_{cancer} - Averaging Period for lifetime	70	years	
$SA_{(1\text{-}2)}$ - Surface Area for age group 1-2	1670	cm^2 / day	50th percentile of face (1/3 head), forearms, hands, lower legs, and feet for females MADEP. 1995. Guidance for Disposal Site Risk Characterization. Appendix Table B-2.
$SA_{(1\text{-}8)}$ - Surface Area for age group 1-8	2431	cm^2 / day	Ibid
$SA_{(8\text{-}15)}$ - Surface Area for age group 8-15	4427	cm^2 / day	Ibid
$SA_{(15\text{-}31)}$ - Surface Area for age group 15-31	5653	cm^2 / day	Ibid
$SAF_{(1\text{-}2)}$ - Surface Adherence Factor for age group 1-2	0.35	mg/cm^2	All SAFs developed for ShortForm according to procedure outlined in MA DEP Technical Update:Weighted Skin-Soil Adherence Factors, April 2002
$SAF_{(1\text{-}8)}$ - Surface Adherence Factor for age group 1-8	0.35	mg/cm^2	
$SAF_{(8\text{-}15)}$ - Surface Adherence Factor for age group 8-15	0.14	mg/cm^2	
$SAF_{(15\text{-}31)}$ - Surface Adherence Factor for age group 15-31	0.13	mg/cm^2	

MassDEP ORS
Contact: Lydia Thompson
Lydia.Thompson@state.ma.us
617-556-1165

Resident - Soil: Table RS-7
Homegrown Produce Ingestion Rate

Vlookup Versionv0315

Data on mean produce ingestion rates (wet weight, ww) in the Northeast was obtained from the 1994-1996 Continuing Survey of Food Intakes by Individuals (USDA). Data for both genders were used for children under 6, while data for males was used for individuals 6 and older. The mean ingestion rates presented in the survey represent the arithmetic average of all individuals surveyed, regardless of whether or not they had consumed the produce item (e.g., an individual that did not consume the produce item was assigned a rate of 0 g/day). To determine the mean ingestion rate for individuals who ate each produce item, the ingestion rate for all individuals (consumers and nonconsumers) was divided by the percentage of individuals who ate the item (Table RS-7A). These mean ingestion rates for the produce consumers were summed to determine the total produce ingestion rate for each age-group and converted to dry weight assuming the produce items were all 90% water.

To convert mean ingestion rates for the age-groups studied in the survey to age-groups used in risk calculations, each age-group ingestion rate from the survey (i.e., 1 - 2 year olds, 3 - 5 year olds, 6 - 11 year olds, 12 - 19 year olds, and 20 - 39 year olds) was weighted according to the number of years spent in the risk calculation age group (i.e., 1 - 8 year olds, 8 - 15 year olds, and 15 - 31 year olds) (Table RS-7B). It was assumed that 25% of produce ingested was home-grown (Table RS-7C).

Table RS-7

	White Potatoes			Dark-green vegetables			Deep-yellow vegetables		
Age-groups studied in survey	Ingestion Rate for All g/d (ww)	% of individuals that consumed item.	Ingestion Rate for Consumers g/d (ww)	Ingestion Rate for All g/d (ww)	% of individuals that consumed item.	Ingestion Rate for Consumers g/d (ww)	Ingestion Rate for All g/d (ww)	% of individuals that consumed item.	Ingestion Rate for Consumers g/d (ww)
1-2	28	40.3	69.5	6	10.1	59.4	5	12.7	39.4
3-5	30	37.1	80.9	5	6.5	76.9	7	12.7	55.1
6-11	47	44.2	106.3	6	9.1	65.9	2	8.5	23.5
12-19	59	40.3	146.4	2	2.3	87.0	11	15.8	69.6
20-39	76	45.1	168.5	25	14.7	170.1	4	5.7	70.2

	Tomatoes			Lettuce			Green Beans		
Age-groups studied in survey	Ingestion Rate for All g/d (ww)	% of individuals that consumed item.	Ingestion Rate for Consumers g/d (ww)	Ingestion Rate for All g/d (ww)	% of individuals that consumed item.	Ingestion Rate for Consumers g/d (ww)	Ingestion Rate for All g/d (ww)	% of individuals that consumed item.	Ingestion Rate for Consumers g/d (ww)
1-2	10	27.9	35.8	1	6	16.7	7	12.1	57.9
3-5	10	37.1	27.0	4	14	28.6	3	5.7	52.6
6-11	20	42	47.6	8	14.9	53.7	1	2	50.0
12-19	29	45.2	64.2	19	28.7	66.2	2	2.4	83.3
20-39	48	50.9	94.3	18	29.6	60.8	4	3.7	108.1

Table RS-7a (continued)

Corn, Green peas, Lima beans	Melons, berries	Totals	Totals

MassDEP ORS
Contact: Lydia Thompson
Lydia.Thompson@state.ma.us
617-556-1165

Age-groups studied in survey	Ingestion Rate for All g/d (ww)	% of individuals that consumed item.	Ingestion Rate for Consumers g/d (ww)	Ingestion Rate for All g/d (ww)	% of individuals that consumed item.	Ingestion Rate for Consumers g/d (ww)	Wet Weight WWI g/day	Dry Weight DWI g/day
1-2	12	15	80.0	7	9	77.8	436.4	43.6
3-5	14	21.7	64.5	14	11.6	120.7	506.3	50.6
6-11	9	13.6	66.2	5	5.9	84.7	498.0	49.8
12-19	14	9.9	141.4	17	5	340.0	998.1	99.8
20-39	12	7.3	164.4	6	4.5	133.3	969.7	97.0

Table RS-7B

Age-groups studied in survey	Years spent in age-group 1-8 year old	Years spent in age-group 8-15 year old	Years spent in age-group 15-31 year old
1-2	2		
3-5	3		
6-11	2	4	
12-19		3	4
20-39			12
	7	7	16

Table RS-7C

	Produce Intake, dry weight			
	Child 1-2 years g/day	Child 1-8 years g/day	Child 8-15 years g/day	Adult 15-31 g/day
All Produce:	43.6	48.4	71.2	97.7
Homegrown:	10.9	12.1	17.8	24.4

MassDEP ORS
Contact: Lydia Thompson
Lydia.Thompson@state.ma.us
617-556-1165

Resident - Soil: Table RS-8
Chemical-Specific Data

Vlookup Versionv0315

Oil or Hazardous Material	CSF $(mg/kg\text{-}day)^{-1}$	$RAF_{c\text{-}ing}$	$RAF_{c\text{-}derm}$	$RAF_{c\text{-}prod}$	Chronic RfD mg/kg-day	Subchronic RfD mg/kg-day	Chronic $RAF_{nc\text{-}ing}$	Chronic $RAF_{nc\text{-}derm}$	Subchronic $RAF_{nc\text{-}ing}$	Subchronic $RAF_{nc\text{-}derm}$	$RAF_{nc\text{-}prod}$	PUF
ARSENIC	1.5E+00	0.50	0.03	1.00	3.0E-04	3.0E-04	0.5	0.03	0.5	0.03	1	0.05
BARIUM					2.0E-01	7.0E-02	1	0.1	1	0.1		
CADMIUM					5.0E-04	5.0E-04	0.5	0.01	0.5	0.01	1	1.9
CHROMIUM(VI)					3.0E-03	2.0E-02	1	0.1	1	0.1	1	0.095
CHROMIUM (TOTAL)					3.0E-03	2.0E-02	1	0.1	1	0.1	1	0.095
LEAD					7.5E-04	7.5E-04	0.5	0.006	0.5	0.006	0.5	0.15
MERCURY					3.0E-04	3.0E-04	0.5	0.1	0.5	0.1		
ALIPHATICS C9 to (					1.0E-01	1.0E+00	1	0.2	1	0.2		
ALIPHATICS C19 to					2.0E+00	6.0E+00	1	0.2	1	0.2		
AROMATICS C11 to					3.0E-02	3.0E-01	0.3	0.1	0.3	0.1		
ACENAPHTHENE					6.0E-02	2.0E-01	0.3	0.1	0.3	0.1		
ACENAPHTHYLENE					3.0E-02	3.0E-01	0.3	0.1	0.3	0.1		
ANTHRACENE					3.0E-01	1.0E+00	0.3	0.1	0.3	0.1		
BENZO(a)ANTHRACEN	1.0E-01	0.30	0.02		3.0E-02	3.0E-01	0.3	0.02	0.3	0.02		
BENZO(a)PYRENE	1.0E+00	0.30	0.02		3.0E-04	3.0E-04	0.3	0.02	0.3	0.02		
BENZO(b)FLUORANTHI	1.0E-01	0.30	0.02		3.0E-02	3.0E-01	0.3	0.02	0.3	0.02		
BENZO(g,h,i)PERYLENI					3.0E-02	3.0E-01	0.3	0.1	0.3	0.1		
BENZO(k)FLUORANTHI	1.0E-02	0.30	0.02		3.0E-02	3.0E-01	0.3	0.02	0.3	0.02		
CHRYSENE	1.0E-02	0.30	0.02		3.0E-02	3.0E-01	0.3	0.02	0.3	0.02		
DIBENZO(a,h)ANTHRA(	1.0E+00	0.30	0.02		3.0E-02	3.0E-01	0.3	0.02	0.3	0.02		
FLUORANTHENE					4.0E-02	1.0E-01	0.3	0.1	0.3	0.1		
FLUORENE					4.0E-02	4.0E-01	0.3	0.1	0.3	0.1		
INDENO(1,2,3-cd)PYRE	1.0E-01	0.30	0.02		3.0E-02	3.0E-01	0.3	0.02	0.3	0.02		
METHYLNAPHTHALEN					4.0E-03	4.0E-03	0.3	0.1	0.3	0.1		
PHENANTHRENE					3.0E-02	3.0E-01	0.3	0.1	0.3	0.1		
PYRENE					3.0E-02	3.0E-01	0.3	0.1	0.3	0.1		
ALIPHATICS C5 to					4.0E-02	4.0E-01	1	0.2	1	0.2		
ALIPHATICS C9 to (					1.0E-01	1.0E+00	1	0.2	1	0.2		
AROMATICS C9 to					3.0E-02	3.0E-01	1	0.2	1	0.2		
ETHYLBENZENE					5.0E-02	5.0E-02	1	0.03	1	0.03		
NAPHTHALENE					2.0E-02	2.0E-01	0.3	0.1	0.3	0.1		
XYLENES (Mixed Isome					2.0E-01	4.0E-01	1	0.03	1	0.03		
POLYCHLORINATED BI	2.0E+00	1.00	0.10	1.00	2.0E-05	5.0E-05	1	0.1	1	0.1	1	0.84

MassDEP ORS
Contact: Lydia Thompson
Lydia.Thompson@state.ma.us
617-556-1165

Resident - Soil: Table RS-9
Cyanide Calculations

The soil cyanide concentration limit set to protect a child resident against an acute, potentially lethal one-time dose of cyanide from incidental ingestion of contaminated soil is 100 mg/kg soil. This is the concentration of available cyanide in soil below which acute human health effects would not be expected following a one-time exposure. This soil concentration is calculated using the equation below with a pica-type soil ingestion of 1000 mg_{soil} and an available cyanide dose limit of 0.01 $mg/kg_{body\ weight}$.

MassDEP's guidance on evaluating the risk from a one-time cyanide dose considers cyanide's potentially lethal effects as well as information on cyanide metabolism:

> Cyanides are detoxified rapidly by the body, and a large acute dose which overwhelms the detoxification mechanism is potentially more toxic than the same dose distributed over a period of hours. (MassDEP *Background Documentation for the Development of an Available Cyanide Benchmark Concentration* , originally dated October 1992, Modified August 1998)

Assessment of a potential one-time dose requires an estimate of the maximum soil concentration the receptor could contact at any one time. The average soil concentration within a typical exposure area will underestimate the potential one-time dose. Therefore, to assess the acute risk of a one-time potentially lethal dose, the EPC for cyanide should be a conservative estimate of the maximum soil concentration.

The residential soil concentration limit to protect against adverse effects from an acute (one-time) exposure to cyanide is 100 mg/kg.

Concentration Calculation for Cyanide

$$\text{Concentration} = \frac{\text{HQ x Acute Dose Limit x BW}}{\text{IR x RAF x Conversion Factor}}$$

Parameter	Value	Units
HQ (Hazard Quotient)	1	(unitless)
Acute Dose Limit	0.01	mg avail. CN/ kg BW
BW (Body Weight) $_{1-2}$	10.7	kg
IR $_{(1\text{-time reasonable max})}$	1000	mg
Conversion Factor	1.0E-06	kg soil / mg soil
RAF	1	(unitless)

The toxicological basis for estimating an allowable one-time dose is documented in MassDEP's 1992 *Background Documentation for the Development of an "Available Cyanide" Benchmark Concentration,* which is published at: http://www.mass.gov/eea/docs/dep/toxics/stypes/dscyanide.pdf

MassDEP ORS
Contact: Lydia Thompson
Lydia.Thompson@state.ma.us
617-556-1165

Method 3 Risk Assessment for Park Visitor Exposed to Chemicals in Soil - Shortform 2012 (sf12ps)

Index

Tab	
EPCs	Table PS-1: Select chemicals and enter Exposure Point Concentrations (EPCs). Estimated risks are presented to the right.
C Eq	Table PS-2: Equations to calculate cancer risks
cNC Eq	Table PS-3: Equations to calculate chronic noncancer risks
scNC Eq	Table PS-4: Equations to calculate subchronic noncancer risks
Exp	Table PS-5: Definitions and exposure factors
Chem	Table PS-6: Chemical-specific data
Cyanide	Table PS-7: Cyanide calculations

Spreadsheets designed by Andrew Friedmann, MassDEP
Questions and Comments may be addressed to:
Lydia Thompson
Massachusetts Department of Environmental Protection
Office of Research and Standards
One Winter Street
Boston, MA 02108 USA
Telephone: (617) 556-1165
Fax: (617) 556-1006
Email: Lydia.Thompson@state.ma.us

Park Visitor - Soil: Table PS-1 - Soil 0 to 15 feet
Exposure Point Concentration (EPC)
Based on Visitor Ages 1-31 (Cancer), 1-8 (Chronic Noncancer), 1-2 (Subchronic Noncancer)

ShortForm Version 10-12

Vlookup Version v0315

ELCR (all chemicals) = 7.2E-06

Chronic HI (all chemicals) = 1.4E+00

Subchronic HI (all chemicals) = 1.2E+00

****Do not insert or delete any rows****

Click on empty cell below and select OHM using arrow.

Oil or Hazardous Material	EPC (mg/kg)	$ELCR_{ingestion}$	$ELCR_{dermal}$	$ELCR_{total}$	Chronic HQ_{ing}	Chronic HQ_{derm}	Chronic HQ_{total}	Subchronic HQ_{ing}	Subchronic HQ_{derm}	Subchronic HQ_{total}	
ARSENIC	6.2E+00	1.0E-06	6.4E-07	1.7E-06	1.5E-02	7.6E-03	2.3E-02	4.1E-02	1.4E-02	5.5E-02	
BARIUM	5.4E+02				3.9E-03	3.3E-03	7.2E-03	3.1E-02	1.8E-02	4.9E-02	
CADMIUM	4.4E+00				6.4E-03	1.1E-03	7.5E-03	1.8E-02	2.1E-03	2.0E-02	
CHROMIUM(VI)	2.0E+00				9.7E-04	8.2E-04	1.8E-03	4.0E-04	2.3E-04	6.3E-04	**Note! Cr(VI) limit is 200 mg/kg due to contact dermititis.**
CHROMIUM (TOTAL)	6.9E+01				3.3E-02	2.8E-02	6.2E-02	1.4E-02	8.0E-03	2.2E-02	**Note! Cr(VI) limit is 200 mg/kg due to contact dermititis.**
LEAD	1.6E+02				1.5E-01	1.5E-02	1.7E-01	4.2E-01	2.9E-02	4.4E-01	**Note! Lead IH HQ limit is 1, not 10.**
MERCURY	6.9E-01				1.7E-03	2.8E-03	4.5E-03	4.6E-03	5.3E-03	9.9E-03	
ALIPHATICS C9 to C18	9.8E+03				1.4E-01	2.4E-01	3.8E-01	3.9E-02	4.6E-02	8.5E-02	
ALIPHATICS C19 to C36	9.3E+03				6.8E-03	1.2E-02	1.8E-02	6.2E-03	7.3E-03	1.3E-02	
AROMATICS C11 to C22	3.5E+03				5.1E-02	1.4E-01	2.0E-01	1.4E-02	2.7E-02	4.1E-02	
ACENAPHTHENE	1.9E+01				1.4E-04	4.0E-04	5.4E-04	1.2E-04	2.2E-04	3.4E-04	
ACENAPHTHYLENE	5.5E+01				7.9E-04	2.3E-03	3.0E-03	2.2E-04	4.3E-04	6.5E-04	
ANTHRACENE	1.5E+02				2.2E-04	6.3E-04	8.6E-04	1.8E-04	3.6E-04	5.4E-04	
BENZO(a)ANTHRACENE	3.0E+01	2.0E-07	1.4E-07	3.4E-07	4.3E-04	2.4E-04	6.7E-04	1.2E-04	4.6E-05	1.6E-04	
BENZO(a)PYRENE	2.0E+01	1.4E-06	9.4E-07	2.3E-06	2.9E-02	1.7E-02	4.6E-02	8.1E-02	3.1E-02	1.1E-01	
BENZO(b)FLUORANTHENE	2.1E+01	1.4E-07	9.7E-08	2.4E-07	3.0E-04	1.7E-04	4.7E-04	8.3E-05	3.2E-05	1.2E-04	
BENZO(g,h,i)PERYLENE	5.6E+01				8.2E-04	2.3E-03	3.1E-03	2.2E-04	4.4E-04	6.6E-04	
BENZO(k)FLUORANTHENE	1.2E+02	7.9E-08	5.4E-08	1.3E-07	1.7E-03	9.6E-04	2.7E-03	4.7E-04	1.8E-04	6.5E-04	
CHRYSENE	1.5E+02	9.8E-08	6.7E-08	1.7E-07	2.1E-03	1.2E-03	3.3E-03	5.8E-04	2.3E-04	8.1E-04	
DIBENZO(a,h)ANTHRACENE	2.5E+00	1.7E-07	1.2E-07	2.9E-07	3.7E-05	2.1E-05	5.8E-05	1.0E-05	3.9E-06	1.4E-05	
FLUORANTHENE	4.6E+02				5.0E-03	1.4E-02	1.9E-02	5.5E-03	1.1E-02	1.6E-02	
FLUORENE	2.4E+01				2.6E-04	7.4E-04	1.0E-03	7.2E-05	1.4E-04	2.1E-04	
INDENO(1,2,3-cd)PYRENE	1.3E+01	8.9E-08	6.2E-08	1.5E-07	1.9E-04	1.1E-04	3.0E-04	5.3E-05	2.1E-05	7.4E-05	
METHYLNAPHTHALENE, 2-	1.2E+01				1.3E-03	3.7E-03	5.0E-03	3.6E-03	7.0E-03	1.1E-02	
PHENANTHRENE	6.2E+02				9.0E-03	2.5E-02	3.4E-02	2.5E-03	4.8E-03	7.3E-03	
PYRENE	4.3E+02				6.2E-03	1.8E-02	2.4E-02	1.7E-03	3.3E-03	5.1E-03	
ALIPHATICS C5 to C8	3.0E+01				1.1E-03	1.9E-03	2.9E-03	3.0E-04	3.5E-04	6.5E-04	
ALIPHATICS C9 to C12	3.3E+02				4.8E-03	8.2E-03	1.3E-02	1.3E-03	1.5E-03	2.9E-03	
AROMATICS C9 to C10	6.5E+02				3.1E-02	5.4E-02	8.5E-02	8.7E-03	1.0E-02	1.9E-02	
ETHYLBENZENE	6.6E-01				1.9E-05	4.9E-06	2.4E-05	5.3E-05	9.3E-06	6.2E-05	
NAPHTHALENE	2.4E+01				5.2E-04	1.5E-03	2.0E-03	1.4E-04	2.8E-04	4.2E-04	
XYLENES (Mixed Isomers)	4.8E+00				3.5E-05	8.9E-06	4.4E-05	4.8E-05	8.4E-06	5.6E-05	
POLYCHLORINATED BIPHENYLS (PCBs)	2.1E+00	9.2E-07	9.5E-07	1.9E-06	1.5E-01	1.3E-01	2.8E-01	1.6E-01	9.6E-02	2.6E-01	

Park Visitor - Soil: Table PS-1 - Soil 0 to 3 feet
Exposure Point Concentration (EPC)
Based on Visitor Ages 1-31 (Cancer), 1-8 (Chronic Noncancer), 1-2 (Subchronic Noncancer)

ShortForm Version 10-12

Vlookup Version v0315

ELCR (all chemicals) = 1.1E-05

Chronic HI (all chemicals) = 1.5E+00

Subchronic HI (all chemicals) = 1.3E+00

****Do not insert or delete any rows****

Click on empty cell below and select OHM using arrow.

Oil or Hazardous Material	EPC (mg/kg)	$ELCR_{ingestion}$	$ELCR_{dermal}$	$ELCR_{total}$	Chronic HQ_{ing}	Chronic HQ_{derm}	Chronic HQ_{total}	Subchronic HQ_{ing}	Subchronic HQ_{derm}	Subchronic HQ_{total}	
ARSENIC	6.2E+00	1.0E-06	6.4E-07	1.7E-06	1.5E-02	7.6E-03	2.3E-02	4.1E-02	1.4E-02	5.5E-02	
BARIUM	5.4E+02				3.9E-03	3.3E-03	7.2E-03	3.1E-02	1.8E-02	4.9E-02	
CADMIUM	4.4E+00				6.4E-03	1.1E-03	7.5E-03	1.8E-02	2.1E-03	2.0E-02	
CHROMIUM(VI)	2.0E+00				9.7E-04	8.2E-04	1.8E-03	4.0E-04	2.3E-04	6.3E-04	**Note! Cr(VI) limit is 200 mg/kg due to contact dermititis.**
CHROMIUM (TOTAL)	6.9E+01				3.3E-02	2.8E-02	6.2E-02	1.4E-02	8.0E-03	2.2E-02	**Note! Cr(VI) limit is 200 mg/kg due to contact dermititis.**
LEAD	1.7E+02				1.6E-01	1.7E-02	1.8E-01	4.5E-01	3.2E-02	4.8E-01	**Note! Lead IH HQ limit is 1, not 10.**
MERCURY	6.9E-01				1.7E-03	2.8E-03	4.5E-03	4.6E-03	5.3E-03	9.9E-03	
ALIPHATICS C9 to C18	9.8E+03				1.4E-01	2.4E-01	3.8E-01	3.9E-02	4.6E-02	8.5E-02	
ALIPHATICS C19 to C36	9.3E+03				6.8E-03	1.2E-02	1.8E-02	6.2E-03	7.3E-03	1.3E-02	
AROMATICS C11 to C22	3.5E+03				5.1E-02	1.4E-01	2.0E-01	1.4E-02	2.7E-02	4.1E-02	
ACENAPHTHENE	1.9E+01				1.4E-04	4.0E-04	5.4E-04	1.2E-04	2.2E-04	3.4E-04	
ACENAPHTHYLENE	5.5E+01				7.9E-04	2.3E-03	3.0E-03	2.2E-04	4.3E-04	6.5E-04	
ANTHRACENE	1.5E+02				2.2E-04	6.3E-04	8.6E-04	1.8E-04	3.6E-04	5.4E-04	
BENZO(a)ANTHRACENE	6.0E+01	4.0E-07	2.8E-07	6.8E-07	8.7E-04	5.0E-04	1.4E-03	2.4E-04	9.4E-05	3.3E-04	
BENZO(a)PYRENE	4.3E+01	2.9E-06	2.0E-06	4.9E-06	6.2E-02	3.5E-02	9.8E-02	1.7E-01	6.7E-02	2.4E-01	
BENZO(b)FLUORANTHENE	4.5E+01	3.1E-07	2.1E-07	5.2E-07	6.6E-04	3.7E-04	1.0E-03	1.8E-04	7.1E-05	2.5E-04	
BENZO(g,h,i)PERYLENE	5.6E+01				8.2E-04	2.3E-03	3.1E-03	2.2E-04	4.4E-04	6.6E-04	
BENZO(k)FLUORANTHENE	1.2E+02	7.9E-08	5.4E-08	1.3E-07	1.7E-03	9.6E-04	2.7E-03	4.7E-04	1.8E-04	6.5E-04	
CHRYSENE	1.5E+02	9.8E-08	6.7E-08	1.7E-07	2.1E-03	1.2E-03	3.3E-03	5.8E-04	2.3E-04	8.1E-04	
DIBENZO(a,h)ANTHRACENE	5.2E+00	3.5E-07	2.4E-07	5.9E-07	7.6E-05	4.3E-05	1.2E-04	2.1E-05	8.1E-06	2.9E-05	
FLUORANTHENE	4.6E+02				5.0E-03	1.4E-02	1.9E-02	5.5E-03	1.1E-02	1.6E-02	
FLUORENE	2.4E+01				2.6E-04	7.4E-04	1.0E-03	7.2E-05	1.4E-04	2.1E-04	
INDENO(1,2,3-cd)PYRENE	2.8E+01	1.9E-07	1.3E-07	3.2E-07	4.1E-04	2.3E-04	6.4E-04	1.1E-04	4.4E-05	1.6E-04	
METHYLNAPHTHALENE, 2-	1.2E+01				1.3E-03	3.7E-03	5.0E-03	3.6E-03	7.0E-03	1.1E-02	
PHENANTHRENE	6.2E+02				9.0E-03	2.5E-02	3.4E-02	2.5E-03	4.8E-03	7.3E-03	
PYRENE	4.3E+02				6.2E-03	1.8E-02	2.4E-02	1.7E-03	3.3E-03	5.1E-03	
ALIPHATICS C9 to C12	3.3E+02				4.8E-03	8.2E-03	1.3E-02	1.3E-03	1.5E-03	2.9E-03	
AROMATICS C9 to C10	6.5E+02				3.1E-02	5.4E-02	8.5E-02	8.7E-03	1.0E-02	1.9E-02	
NAPHTHALENE	2.4E+01				5.2E-04	1.5E-03	2.0E-03	1.4E-04	2.8E-04	4.2E-04	
XYLENES (Mixed Isomers)	4.8E+00				3.5E-05	8.9E-06	4.4E-05	4.8E-05	8.4E-06	5.6E-05	
POLYCHLORINATED BIPHENYLS (PCBs)	2.1E+00	9.2E-07	9.5E-07	1.9E-06	1.5E-01	1.3E-01	2.8E-01	1.6E-01	9.6E-02	2.6E-01	

MassDEP ORS
Contact: Lydia Thompson
Lydia.Thompson@state.ma.us
617-556-1165

Park Visitor - Soil: Table PS-2
Equations to Calculate Cancer Risk for Visitor (Age 1-31 years)

Cancer Risk from Ingestion

$$ELCR_{ing} = LADD_{ing(1\text{-}31)} * CSF$$

$$LADD_{ing\ (1\text{-}31)} = LADD_{ing\ (1\text{-}8)} + LADD_{ing\ (8\text{-}15)} + LADD_{ing\ (15\text{-}31)}$$

$$LADD_{ing\ (age\ group\ x)} = \frac{[OHM]_{soil} * IR_x * RAF_{c\text{-}ing} * EF_{ing} * ED * EP_x * C}{BW_x * AP_{lifetime}}$$

Cancer Risk from Dermal Absorption

$$ELCR_{derm} = LADD_{derm} * CSF$$

$$LADD_{derm\ (1\text{-}31)} = LADD_{derm\ (1\text{-}8)} + LADD_{derm\ (8\text{-}15)} + LADD_{derm\ (15\text{-}31)}$$

$$LADD_{derm(age\ group\ x)} = \frac{[OHM]_{soil} * SA_x * RAF_{c\text{-}derm} * SAF_x * EF_{derm} * ED * EP_x * C}{BW_x * AP_{lifetime}}$$

Vlookup Version v0315

Parameter	Value	Units
CSF	OHM specific	$(mg/kg\text{-}day)^{-1}$
LADD	age/OHM specific	mg/kg-day
$[OHM]_{soil}$	OHM specific	mg/kg
$IR_{(1\text{-}8)}$	100	mg/day
$IR_{(8\text{-}15)}$	50	mg/day
$IR_{(15\text{-}31)}$	50	mg/day
$RAF_{c\text{-}ing}$	OHM specific	dimensionless
$RAF_{c\text{-}derm}$	OHM specific	dimensionless
$EF_{ing,derm}$	0.247	event/day
ED	1	day/event
$EP_{(1\text{-}8)}$	7	years
$EP_{(8\text{-}15)}$	7	years
$EP_{(15\text{-}31)}$	16	years
C	0.000001	kg/mg
$BW_{(1\text{-}8)}$	17.0	kg
$BW_{(8\text{-}15)}$	39.9	kg
$BW_{(15\text{-}31)}$	58.7	kg
$AP_{(lifetime)}$	70	years
$SA_{(1\text{-}8)}$	2431	cm^2/day
$SA_{(8\text{-}15)}$	4427	cm^2/day
$SA_{(15\text{-}31)}$	5653	cm^2/day
$SAF_{(1\text{-}8)}$	0.35	mg/cm^2
$SAF_{(8\text{-}15)}$	0.14	mg/cm^2
$SAF_{(15\text{-}31)}$	0.13	mg/cm^2

MassDEP ORS
Contact: Lydia Thompson
Lydia.Thompson@state.ma.us
617-556-1165

Park Visitor - Soil: Table PS-3
Equations to Calculate Chronic Noncancer Risk for Visitor (Age 1-8 years)

Vlookup Version v0315

Chronic Noncancer Risk from Ingestion

$$HQ_{ing} = \frac{ADD_{ing}}{RfD}$$

$$ADD_{ing} = \frac{[OHM]_{soil} * IR * RAF_{nc\text{-}ing} * EF_{ing} * ED * EP * C}{BW * AP}$$

Chronic Noncancer Risk from Dermal Absorption

$$HQ_{derm} = \frac{ADD_{ing,derm}}{RfD}$$

$$ADD_{derm} = \frac{[OHM]_{soil} * SA * RAF_{nc\text{-}derm} * SAF * EF_{derm} * ED * EP * C}{BW * AP}$$

Parameter	Value	Units
RfD	OHM specific	mg/kg-day
ADD	OHM specific	mg/kg-day
$[OHM]_{soil}$	OHM specific	mg/kg
IR	100	mg/day
$RAF_{nc\text{-}ing}$	OHM specific	dimensionless
$RAF_{nc\text{-}derm}$	OHM specific	dimensionless
$EF_{ing,derm}$	0.247	event/day
ED	1	day/event
EP	7	years
C	0.000001	kg/mg
BW	17.0	kg
AP	7	year
SA	2431	cm^2/day
SAF	0.35	mg/cm^2

MassDEP ORS
Contact: Lydia Thompson
Lydia.Thompson@state.ma.us
617-556-1165

Park Visitor - Soil: Table PS-4
Equations to Calculate Subchronic Noncancer Risk for Visitor (Age 1-2 years)

Vlookup Version v0315

Subchronic Noncancer Risk from Ingestion

$$HQ_{ing} = \frac{ADD_{ing}}{RfD_{subchronic}}$$

$$ADD_{ing} = \frac{[OHM]_{soil} * IR * RAF_{nc\text{-}ing} * EF_{ing} * ED * EP * C}{BW * AP}$$

Subchronic Noncancer Risk from Dermal Absorption

$$HQ_{derm} = \frac{ADD_{derm}}{RfD_{subchronic}}$$

$$ADD_{derm} = \frac{[OHM]_{soil} * SA * RAF_{nc\text{-}derm} * SAF * EF_{derm} * ED * EP * C}{BW * AP}$$

Parameter	Value	Units
RfD	OHM specific	mg/kg-day
ADD	OHM specific	mg/kg-day
$[OHM]_{soil}$	OHM specific	mg/kg
IR	100	mg/day
$RAF_{nc\text{-}ing}$	OHM specific	dimensionless
$RAF_{nc\text{-}derm}$	OHM specific	dimensionless
$EF_{ing,derm}$	0.428	event/day
ED	1	day/event
EP	0.577	years
C	0.000001	kg/mg
BW	10.7	kg
AP	0.577	year
SA	1670	cm^2/day
SAF	0.35	mg/cm^2

MassDEP ORS
Contact: Lydia Thompson
Lydia.Thompson@state.ma.us
617-556-1165

Park Visitor - Soil: Table PS-5
Definitions and Exposure Factors

Vlookup Version v0315

Parameter	Value	Units	Notes
ELCR - Excess Lifetime Cancer Risk	chemical specific	dimensionless	Pathway specific (ing =ingestion, derm=dermal)
CSF - Cancer Slope Factor	chemical specific	$(mg/kg\text{-}day)^{-1}$	see Table PS-6
LADD - Lifetime Average Daily Dose	chemical specific	mg/kg-day	Pathway specific
HQ - Hazard Quotient	chemical specific	dimensionless	Pathway specific (ing =ingestion, derm=dermal)
RfD - Reference Dose	chemical specific	mg/kg-day	see Table PS-6
ADD - Average Daily Dose	chemical specific	mg/kg-day	Pathway specific
EPC - Exposure Point Concentration	chemical specific	mg/kg	
$IR_{(1-2)}$ - Soil Ingestion Rate for age group 1-2	100	mg/day	MADEP. 1995. Guidance for Disposal Site Risk Characterization. Appendix Table B-3.
$IR_{(1-8)}$ - Soil Ingestion Rate for age group 1-8	100	mg/day	Ibid
$IR_{(8-15)}$ - Soil Ingestion Rate for age group 8-15	50	mg/day	Ibid
$IR_{(15-31)}$ - Soil Ingestion Rate for age group 15-31	50	mg/day	Ibid
RAF_c - Relative Absorption Factor for Cancer Effects	chemical specific	dimensionless	Adjusts estimated dose to conform to the revelant CSF. See Table PS-6
RAF_{NC} - Relative Absorption Factor for non-Cancer Effects	chemical specific	dimensionless	Adjusts estimated dose to conform to the revelant RfD. See Table PS-6
$EF_{subchronic}$ - Exposure Frequency for subchronic exposure	0.428	event/day	3 events/week
$EF_{chronic,lifetime}$ - Exposure Frequency for chronic or lifetime exposure	0.247	event/day	3 events/week, 30 weeks/year
ED - Exposure Duration	1	day/event	
$EP_{(1-2)}$ - Exposure Period for age group 1-2	0.577	years	30 weeks
$EP_{(1-8)}$ - Exposure Period for age group 1-8	7	years	
$EP_{(8-15)}$ - Exposure Period for age group 8-15	7	years	
$EP_{(15-31)}$ - Exposure Period for age group 15-31	16	years	
$BW_{(1-2)}$ - Body Weight for age group 1-2, subchronic	10.7	kg	U.S. EPA. 1997. Exposure Factors Handbook. Table 7-7, females.
$BW_{(1-8)}$ - Body Weight for age group 1-8	17.0	kg	Ibid
$BW_{(8-15)}$ - Body Weight for age group 8-15	39.9	kg	Ibid
$BW_{(15-31)}$ - Body Weight for age group 15-31	58.7	kg	Ibid
$AP_{subchronic}$ - Averaging Period for subchronic noncancer	0.577	years	30 weeks
$AP_{chronic}$ - Averaging Period for chronic noncancer	7	years	
$AP_{lifetime}$ - Averaging Period for cancer/lifetime	70	years	
$SA_{(1-2)}$ - Surface Area for age group 1-2	1670	cm^2/day	50th percentile of face (1/3 head), forearms, hands, lower legs, and feet for females. MADEP 1995 Guidance for Disposal Site Risk Characterization, Appendix Table B-2.
$SA_{(1-8)}$ - Surface Area for age group 1-8	2431	cm^2 / day	Ibid
$SA_{(8-15)}$ - Surface Area for age group 8-15	4427	cm^2 / day	Ibid
$SA_{(15-31)}$ - Surface Area for age group 15-31	5653	cm^2 / day	Ibid
$SAF_{(1-2)}$ - Surface Adherence Factor for age group 1-2	0.35	mg_{soil} / cm^2	All SAFs developed for ShortForm according to procedure outlined in MADEP Technical
$SAF_{(1-8)}$ - Surface Adherence Factor for age group 1-8	0.35	mg_{soil} / cm^2	Update: Weighted Skin-Soil Adherence Factors, April 2002
$SAF_{(8-15)}$ - Surface Adherence Factor for age group 8-15	0.14	mg_{soil} / cm^2	
$SAF_{(15-31)}$ - Surface Adherence Factor for age group 15-31	0.13	mg_{soil} / cm^2	

MassDEP ORS
Contact: Lydia Thompson
Lydia.Thompson@state.ma.us
617-556-1165

Park Visitor - Soil: Table PS-6
Chemical-Specific Data

Vlookup Version v0315

Oil or Hazardous Material	CSF $(mg/kg\text{-}day)^{-1}$	$RAF_{c\text{-}ing}$	$RAF_{c\text{-}derm}$	Chronic RfD mg/kg-day	Subchronic RfD mg/kg-day	Chronic $RAF_{nc\text{-}ing}$	Chronic $RAF_{nc\text{-}derm}$	Subchronic $RAF_{nc\text{-}ing}$	Subchronic $RAF_{nc\text{-}derm}$
ARSENIC	1.5E+00	0.5	0.03	3.0E-04	3.0E-04	0.5	0.03	0.5	0.03
BARIUM				2.0E-01	7.0E-02	1	0.1	1	0.1
CADMIUM				5.0E-04	5.0E-04	0.5	0.01	0.5	0.01
CHROMIUM(VI)				3.0E-03	2.0E-02	1	0.1	1	0.1
CHROMIUM (TOTAL)				3.0E-03	2.0E-02	1	0.1	1	0.1
LEAD				7.5E-04	7.5E-04	0.5	0.006	0.5	0.006
MERCURY				3.0E-04	3.0E-04	0.5	0.1	0.5	0.1
ALIPHATICS C9 to C				1.0E-01	1.0E+00	1	0.2	1	0.2
ALIPHATICS C19 to				2.0E+00	6.0E+00	1	0.2	1	0.2
AROMATICS C11 to				3.0E-02	3.0E-01	0.3	0.1	0.3	0.1
ACENAPHTHENE				6.0E-02	2.0E-01	0.3	0.1	0.3	0.1
ACENAPHTHYLENE				3.0E-02	3.0E-01	0.3	0.1	0.3	0.1
ANTHRACENE				3.0E-01	1.0E+00	0.3	0.1	0.3	0.1
BENZO(a)ANTHRACENI	1.0E-01	0.3	0.02	3.0E-02	3.0E-01	0.3	0.02	0.3	0.02
BENZO(a)PYRENE	1.0E+00	0.3	0.02	3.0E-04	3.0E-04	0.3	0.02	0.3	0.02
BENZO(b)FLUORANTHE	1.0E-01	0.3	0.02	3.0E-02	3.0E-01	0.3	0.02	0.3	0.02
BENZO(g,h,i)PERYLENE				3.0E-02	3.0E-01	0.3	0.1	0.3	0.1
BENZO(k)FLUORANTHE	1.0E-02	0.3	0.02	3.0E-02	3.0E-01	0.3	0.02	0.3	0.02
CHRYSENE	1.0E-02	0.3	0.02	3.0E-02	3.0E-01	0.3	0.02	0.3	0.02
DIBENZO(a,h)ANTHRAC	1.0E+00	0.3	0.02	3.0E-02	3.0E-01	0.3	0.02	0.3	0.02
FLUORANTHENE				4.0E-02	1.0E-01	0.3	0.1	0.3	0.1
FLUORENE				4.0E-02	4.0E-01	0.3	0.1	0.3	0.1
INDENO(1,2,3-cd)PYREI	1.0E-01	0.3	0.02	3.0E-02	3.0E-01	0.3	0.02	0.3	0.02
METHYLNAPHTHALENE				4.0E-03	4.0E-03	0.3	0.1	0.3	0.1
PHENANTHRENE				3.0E-02	3.0E-01	0.3	0.1	0.3	0.1
PYRENE				3.0E-02	3.0E-01	0.3	0.1	0.3	0.1
ALIPHATICS C5 to				4.0E-02	4.0E-01	1	0.2	1	0.2
ALIPHATICS C9 to C				1.0E-01	1.0E+00	1	0.2	1	0.2
AROMATICS C9 to				3.0E-02	3.0E-01	1	0.2	1	0.2
ETHYLBENZENE				5.0E-02	5.0E-02	1	0.03	1	0.03
NAPHTHALENE				2.0E-02	2.0E-01	0.3	0.1	0.3	0.1
XYLENES (Mixed Isomer				2.0E-01	4.0E-01	1	0.03	1	0.03
POLYCHLORINATED BI	2.0E+00	1	0.1	2.0E-05	5.0E-05	1	0.1	1	0.1

MassDEP ORS
Contact: Lydia Thompson
Lydia.Thompson@state.ma.us
617-556-1165

Park Visitor - Soil: Table PS-7
Cyanide Calculations

The soil cyanide concentration limit set to protect a child park visitor against an acute, potentially lethal one-time dose of cyanide from incidental ingestion of contaminated soil is 100 mg/kg_{soil}. This is the concentration of available cyanide in soil below which acute human health effects would not be expected following a one-time exposure. This soil concentration is calculated using the equation below with a pica-type soil ingestion of 1000 mg_{soil} and an available cyanide dose limit of 0.01 $mg/kg_{body\ weight}$.

MassDEP's guidance on evaluating the risk from a one-time cyanide dose considers cyanide's potentially lethal effects as well as information on cyanide metabolism:

> Cyanides are detoxified rapidly by the body, and a large acute dose which overwhelms the detoxification mechanism is potentially more toxic than the same dose distributed over a period of hours. (MassDEP *Background Documentation for the Development of an Available Cyanide Benchmark Concentration* , originally dated October 1992, Modified August 1998)

Assessment of a potential one-time dose requires an estimate of the maximum soil concentration the receptor could contact at any one time. The average soil concentration within a typical exposure area will underestimate the potential one-time dose. Therefore, to assess the acute risk of a one-time potentially lethal dose, the EPC for cyanide should be a conservative estimate of the maximum soil concentration.

The soil concentration limit to protect park visitors against adverse effects from an acute (one-time) exposure to cyanide is 100 mg/kg.

Concentration Calculation for Cyanide

$$\text{Concentration} = \frac{\text{HQ x Acute Dose Limit x BW}}{\text{IR x RAF x Conversion Factor}}$$

Parameter	Value	Units
HQ (Hazard Quotient)	1	(unitless)
Acute Dose Limit	0.01	mg avail. CN/ kg BW
BW (Body Weight) $_{1-2}$	10.7	kg
IR $_{(1\text{-time reasonable max})}$	1000	mg
Conversion Factor	1.0E-06	kg soil / mg soil
RAF	1	(unitless)

The toxicological basis for estimating an allowable one-time dose is documented in MassDEP's 1992 *Background Documentation for the Development of an "Available Cyanide" Benchmark Concentration,* which is published at: http://www.mass.gov/eea/docs/dep/toxics/stypes/dscyanide.pdf

MassDEP ORS
Contact: Lydia Thompson
Lydia.Thompson@state.ma.us
617-556-1165

Method 3 Risk Assessment for Employee Exposed to Chemicals in Soil - Shortform 2012 (sf12em)

Index

Tab	
EPCs	Table EM-1: Select chemicals and enter Exposure Point Concentrations (EPCs). Estimated risks are shown to the right.
C Eq	Table EM-2: Equations to calculate cancer risks
cNC Eq	Table EM-3: Equations to calculate chronic noncancer risks
scNC Eq	Table EM-4: Equations to calculate subchronic noncancer risks
Exp	Table EM-5: Definitions and exposure factors
Produce	Table EM-6: Equations to calculate produce ingestion rate
Chem	Table EM-7: Chemical-specific data

Spreadsheets designed by Andrew Friedmann, MassDEP
Modified for employee receptor.

MassDEP ORS
Contact: Lydia Thompson
Lydia.Thompson@state.ma.us
617-556-1165

Employee - Soil: Table EM-1 - Soil 0 to 15 feet
Exposure Point Concentration (EPC)
Based on Employee

ShortForm Version 10-12
Vlookup Version v0414

ELCR (all chemicals) = 2E-06
Chronic HI (all chemicals) = 2E-01

Do not insert or delete any rows
Click on empty cell below and select OHM using arrow.

Oil or Hazardous Material	EPC (mg/kg)	$ELCR_{ingestion}$	$ELCR_{dermal}$	Derm & Ing $ELCR_{total}$	Chronic HQ_{ing}	Chronic HQ_{derm}	Derm & Ing HQ_{total}	
ARSENIC	6.2E+00	4.8E-07	6.0E-08	5.4E-07	2.8E-03	3.5E-04	3.1E-03	
BARIUM	5.4E+02				7.3E-04	1.5E-04	8.8E-04	
CADMIUM	4.4E+00				1.2E-03	5.0E-05	1.2E-03	
CHROMIUM(VI)	2.0E+00				1.8E-04	3.8E-05	2.2E-04	**Note! Cr(VI) limit is 200 mg/kg due to contact dermititis.**
CHROMIUM (TOTAL)	6.9E+01				6.2E-03	1.3E-03	7.5E-03	**Note! Cr(VI) limit is 200 mg/kg due to contact dermititis.**
LEAD	1.6E+02				2.8E-02	7.0E-04	2.9E-02	**Note! Lead IH HQ limit is 1, not 10.**
MERCURY	6.9E-01				3.1E-04	1.3E-04	4.4E-04	
ALIPHATICS C9 to C18	9.8E+03				2.6E-02	1.1E-02	3.7E-02	
ALIPHATICS C19 to C36	9.3E+03				1.3E-03	5.2E-04	1.8E-03	
AROMATICS C11 to C22	3.5E+03				9.5E-03	6.6E-03	1.6E-02	
ACENAPHTHENE	1.9E+01				2.6E-05	1.8E-05	4.4E-05	
ACENAPHTHYLENE	5.5E+01				1.5E-04	1.0E-04	2.5E-04	
ANTHRACENE	1.5E+02				4.2E-05	2.9E-05	7.0E-05	
BENZO(a)ANTHRACENE	3.0E+01	9.2E-08	1.3E-08	1.1E-07	8.0E-05	1.1E-05	9.1E-05	
BENZO(a)PYRENE	2.0E+01	6.3E-07	8.7E-08	7.2E-07	5.4E-03	7.6E-04	6.2E-03	
BENZO(b)FLUORANTHENE	2.1E+01	6.5E-08	9.0E-09	7.4E-08	5.6E-05	7.8E-06	6.4E-05	
BENZO(g,h,i)PERYLENE	5.6E+01				1.5E-04	1.1E-04	2.6E-04	
BENZO(k)FLUORANTHENE	1.2E+02	3.7E-08	5.1E-09	4.2E-08	3.2E-04	4.4E-05	3.6E-04	
CHRYSENE	1.5E+02	4.5E-08	6.3E-09	5.2E-08	3.9E-04	5.4E-05	4.5E-04	
DIBENZO(a,h)ANTHRACENE	2.5E+00	7.9E-08	1.1E-08	9.0E-08	6.8E-06	9.5E-07	7.8E-06	
FLUORANTHENE	4.6E+02				9.3E-04	6.5E-04	1.6E-03	
FLUORENE	2.4E+01				4.8E-05	3.4E-05	8.2E-05	
INDENO(1,2,3-cd)PYRENE	1.3E+01	4.1E-08	5.7E-09	4.7E-08	3.6E-05	5.0E-06	4.1E-05	
METHYLNAPHTHALENE, 2-	1.2E+01				2.4E-04	1.7E-04	4.1E-04	
PHENANTHRENE	6.2E+02				1.7E-03	1.2E-03	2.8E-03	
PYRENE	4.3E+02				1.2E-03	8.0E-04	2.0E-03	
ALIPHATICS C5 to C8	3.0E+01				2.0E-04	8.4E-05	2.9E-04	
ALIPHATICS C9 to C12	3.3E+02				8.9E-04	3.7E-04	1.3E-03	
AROMATICS C9 to C10	6.5E+02				5.9E-03	2.4E-03	8.3E-03	
ETHYLBENZENE	6.6E-01				3.6E-06	2.2E-07	3.8E-06	
NAPHTHALENE	2.4E+01				9.7E-05	6.8E-05	1.6E-04	
XYLENES (Mixed Isomers)	4.8E+00				6.5E-06	4.1E-07	6.9E-06	
POLYCHLORINATED BIPHENYLS (PCBs)	2.1E+00	4.3E-07	8.9E-08	5.2E-07	2.8E-02	5.8E-03	3.3E-02	

MassDEP ORS
Contact: Lydia Thompson
Lydia.Thompson@state.ma.us
617-556-1165

Employee - Soil: Table EM-1 - Soil 0 to 3 feet
Exposure Point Concentration (EPC)
Based on Employee

ShortForm Version 10-12
Vlookup Version v0414

ELCR (all chemicals) = 3E-06
Chronic HI (all chemicals) = 2E-01

Do not insert or delete any rows
Click on empty cell below and select OHM using arrow.

Oil or Hazardous Material	EPC (mg/kg)	$ELCR_{ingestion}$	$ELCR_{dermal}$	Derm & Ing $ELCR_{total}$	Chronic HQ_{ing}	Chronic HQ_{derm}	Derm & Ing HQ_{total}	
ARSENIC	6.2E+00	4.8E-07	6.0E-08	5.4E-07	2.8E-03	3.5E-04	3.1E-03	
BARIUM	5.4E+02				7.3E-04	1.5E-04	8.8E-04	
CADMIUM	4.4E+00				1.2E-03	5.0E-05	1.2E-03	
CHROMIUM(VI)	2.0E+00				1.8E-04	3.8E-05	2.2E-04	**Note! Cr(VI) limit is 200 mg/kg due to contact dermititis.**
CHROMIUM (TOTAL)	6.9E+01				6.2E-03	1.3E-03	7.5E-03	**Note! Cr(VI) limit is 200 mg/kg due to contact dermititis.**
LEAD	1.7E+02				3.0E-02	7.6E-04	3.1E-02	**Note! Lead IH HQ limit is 1, not 10.**
MERCURY	6.9E-01				3.1E-04	1.3E-04	4.4E-04	
ALIPHATICS C9 to C18	9.8E+03				2.6E-02	1.1E-02	3.7E-02	
ALIPHATICS C19 to C36	9.3E+03				1.3E-03	5.2E-04	1.8E-03	
AROMATICS C11 to C22	3.5E+03				9.5E-03	6.6E-03	1.6E-02	
ACENAPHTHENE	1.9E+01				2.6E-05	1.8E-05	4.4E-05	
ACENAPHTHYLENE	5.5E+01				1.5E-04	1.0E-04	2.5E-04	
ANTHRACENE	1.5E+02				4.2E-05	2.9E-05	7.0E-05	
BENZO(a)ANTHRACENE	6.0E+01	1.9E-07	2.6E-08	2.1E-07	1.6E-04	2.3E-05	1.8E-04	
BENZO(a)PYRENE	4.3E+01	1.3E-06	1.9E-07	1.5E-06	1.2E-02	1.6E-03	1.3E-02	
BENZO(b)FLUORANTHENE	4.5E+01	1.4E-07	2.0E-08	1.6E-07	1.2E-04	1.7E-05	1.4E-04	
BENZO(g,h,i)PERYLENE	5.6E+01				1.5E-04	1.1E-04	2.6E-04	
BENZO(k)FLUORANTHENE	1.2E+02	3.7E-08	5.1E-09	4.2E-08	3.2E-04	4.4E-05	3.6E-04	
CHRYSENE	1.5E+02	4.5E-08	6.3E-09	5.2E-08	3.9E-04	5.4E-05	4.5E-04	
DIBENZO(a,h)ANTHRACENE	5.2E+00	1.6E-07	2.3E-08	1.9E-07	1.4E-05	2.0E-06	1.6E-05	
FLUORANTHENE	4.6E+02				9.3E-04	6.5E-04	1.6E-03	
FLUORENE	2.4E+01				4.8E-05	3.4E-05	8.2E-05	
INDENO(1,2,3-cd)PYRENE	2.8E+01	8.8E-08	1.2E-08	1.0E-07	7.6E-05	1.1E-05	8.7E-05	
METHYLNAPHTHALENE, 2-	1.2E+01				2.4E-04	1.7E-04	4.1E-04	
PHENANTHRENE	6.2E+02				1.7E-03	1.2E-03	2.8E-03	
PYRENE	4.3E+02				1.2E-03	8.0E-04	2.0E-03	
ALIPHATICS C9 to C12	3.3E+02				8.9E-04	3.7E-04	1.3E-03	
AROMATICS C9 to C10	6.5E+02				5.9E-03	2.4E-03	8.3E-03	
NAPHTHALENE	2.4E+01				9.7E-05	6.8E-05	1.6E-04	
XYLENES (Mixed Isomers)	4.8E+00				6.5E-06	4.1E-07	6.9E-06	
POLYCHLORINATED BIPHENYLS (PCBs)	2.1E+00	4.3E-07	8.9E-08	5.2E-07	2.8E-02	5.8E-03	3.3E-02	

MassDEP ORS
Contact: Lydia Thompson
Lydia.Thompson@state.ma.us
617-556-1165

Employee - Soil: Table EM-2

Equations to Calculate Cancer Risk for Employee

Vlookup Version v0414

Parameter	Value	Units
CSF	OHM specific	$(mg/kg\text{-}day)^{-1}$
LADD	OHM specific	mg/kg-day
$[OHM]_{soil}$	OHM specific	mg/kg
IR	50	mg/day
$RAF_{c\text{-}ing}$	OHM specific	dimensionless
$RAF_{c\text{-}derm}$	OHM specific	dimensionless
$EF_{ing,derm}$	0.33	event/day
ED	1	day/event
EP	27	years
C	0.000001	kg/mg
BW	61.1	kg
$AP_{(lifetime)}$	70	years
SA	3473	cm^2 / day
SAF	0.03	mg/cm^2

Cancer Risk from Ingestion

$$ELCR_{ing} = LADD_{ing} * CSF$$

$$LADD_{ing} = \frac{[OHM]_{soil} * IR * RAF_{c\text{-}ing} * EF_{ing} * ED * EP * C}{BW * AP_{lifetime}}$$

Cancer Risk from Dermal Absorption

$$ELCR_{derm} = LADD_{derm} * CSF$$

$$LADD_{derm} = \frac{[OHM]_{soil} * SA * RAF_{c\text{-}derm} * SAF * EF_{derm} * ED * EP * C}{BW * AP_{lifetime}}$$

MassDEP ORS
Contact: Lydia Thompson
Lydia.Thompson@state.ma.us
617-556-1165

Employee - Soil: Table EM-3
Equations to Calculate Chronic Noncancer Risk for Employee

Vlookup Version v0414

Chronic Noncancer Risk from Ingestion

$$HQ_{ing} = \frac{ADD_{ing}}{RfD}$$

$$ADD_{ing} = \frac{[OHM]_{soil} * IR * RAF_{nc\text{-}ing} * EF_{ing} * ED * EP * C}{BW * AP}$$

Chronic Noncancer Risk from Dermal Absorption

$$HQ_{derm} = \frac{ADD_{ing,derm}}{RfD}$$

$$ADD_{derm} = \frac{[OHM]_{soil} * SA * RAF_{nc\text{-}derm} * SAF * EF_{derm} * ED * EP * C}{BW * AP}$$

Parameter	Value	Units
RfD	OHM specific	mg/kg-day
ADD	OHM specific	mg/kg-day
$[OHM]_{soil}$	OHM specific	mg/kg
IR	50	mg/day
$RAF_{nc\text{-}ing}$	OHM specific	dimensionless
$RAF_{nc\text{-}derm}$	OHM specific	dimensionless
$EF_{ing,derm}$	0.33	event/day
ED	1	day/event
EP	27	years
C	0.000001	kg/mg
BW	61.1	kg
AP	27	year
SA	3473	cm^2 / day
SAF	0.03	mg/cm^2

MassDEP ORS
Contact: Lydia Thompson
Lydia.Thompson@state.ma.us
617-556-1165

Employee - Soil: Table EM-4
Definitions and Exposure Factors

Vlookup Version v0414

Parameter	Value	Units	Notes
ELCR - Excess Lifetime Cancer Risk	chemical specific	dimensionless	Pathway specific (ing =ingestion, derm=dermal, inh=inhalation)
CSF - Cancer Slope Factor	chemical specific	$(mg/kg\text{-}day)^{-1}$	see Table EM-5
LADD - Lifetime Average Daily Dose	chemical specific	mg/kg-day	Pathway specific
LADE - Lifetime Average Daily Exposure	chemical specific	$\mu g/m^3$	
HQ - Hazard Quotient	chemical specific	dimensionless	Pathway specific (ing =ingestion, derm=dermal, inh=inhalation)
RfD - Reference Dose	chemical specific	mg/kg-day	see Table EM-5
ADD - Average Daily Dose	chemical specific	mg/kg-day	Pathway specific
ADE - Average Daily Exposure	chemical specific	mg/m^3	
EPC - Exposure Point Concentration	chemical specific	mg/kg	
IR - Soil Ingestion Rate	50	mg/day	MADEP. 2002. Technical Update: Calculation of an Enhanced Soil Ingestion Rate.
RAF_c - Relative Absorption Factor for Cancer Effects	chemical specific	dimensionless	(http://www.mass.gov/dep/ors/orspubs.htm)
$EF_{chronic}$ - Exposure Frequency for chronic ingestion or dermal exposure	0.33	event/day	4 days/week, 30 weeks/year
EF_{cancer} - Exposure Frequency for cancer, ingestion or dermal exposure	0.33	event/day	4 days/week, 30 weeks/year
ED - Exposure Duration	1	day/event	
EP - Exposure Period	27	years	
BW - Body Weight	61.1	kg	U.S. EPA. 1997. Exposure Factors Handbook. Table 7-7
$AP_{chronic}$ - Averaging Period for chronic noncancer	27	years	
AP_{cancer} - Averaging Period for lifetime	70	years	
SA - Surface Area	3473	cm^2 / day	50th percentile of face, forearms, hands, lower legs and feet for females.
			MADEP 1995 Guidance for Disposal Site Risk Characterization, Table B-2.
SAF - Surface Adherence Factor	0.03	mg/cm^2	SAF developed for ShortForm according to procedure outlined in MA DEP Technical Update:

MassDEP ORS
Contact: Lydia Thompson
Lydia.Thompson@state.ma.us
617-556-1165

Employee - Soil: Table EM-5
Chemical-Specific Data

Vlookup Version v0414

Oil or Hazardous Material	CSF $(mg/kg\text{-}day)^{-1}$	$RAF_{c\text{-}ing}$	$RAF_{c\text{-}derm}$	$RAF_{c\text{-}prod}$	Chronic RfD mg/kg-day	Subchronic RfD mg/kg-day	Chronic $RAF_{nc\text{-}ing}$	Chronic $RAF_{nc\text{-}derm}$	Subchronic $RAF_{nc\text{-}ing}$	Subchronic $RAF_{nc\text{-}derm}$	$RAF_{nc\text{-}prod}$	PUF
ARSENIC	1.5E+00	0.50	0.03	1.00	3.0E-04	3.0E-04	0.5	0.03	0.5	0.03	1	0.05
BARIUM					2.0E-01	7.0E-02	1	0.1	1	0.1		
CADMIUM					5.0E-04	5.0E-04	0.5	0.01	0.5	0.01	1	1.9
CHROMIUM(VI)					3.0E-03	2.0E-02	1	0.1	1	0.1	1	0.095
LEAD					7.5E-04	7.5E-04	0.5	0.006	0.5	0.006	0.5	0.15
MERCURY					3.0E-04	3.0E-04	0.5	0.1	0.5	0.1		
ALIPHATICS C19 to					2.0E+00	6.0E+00	1	0.2	1	0.2		
AROMATICS C11 to					3.0E-02	3.0E-01	0.3	0.1	0.3	0.1		
ACENAPHTHENE					6.0E-02	2.0E-01	0.3	0.1	0.3	0.1		
ACENAPHTHYLENE					3.0E-02	3.0E-01	0.3	0.1	0.3	0.1		
ANTHRACENE					3.0E-01	1.0E+00	0.3	0.1	0.3	0.1		
BENZO(a)ANTHRACENI	1.0E-01	0.30	0.02		3.0E-02	3.0E-01	0.3	0.02	0.3	0.02		
BENZO(a)PYRENE	1.0E+00	0.30	0.02		3.0E-04	3.0E-04	0.3	0.02	0.3	0.02		
BENZO(b)FLUORANTHE	1.0E-01	0.30	0.02		3.0E-02	3.0E-01	0.3	0.02	0.3	0.02		
BENZO(g,h,i)PERYLENE					3.0E-02	3.0E-01	0.3	0.1	0.3	0.1		
BENZO(k)FLUORANTHE	1.0E-02	0.30	0.02		3.0E-02	3.0E-01	0.3	0.02	0.3	0.02		
CHRYSENE	1.0E-02	0.30	0.02		3.0E-02	3.0E-01	0.3	0.02	0.3	0.02		
DIBENZO(a,h)ANTHRAC	1.0E+00	0.30	0.02		3.0E-02	3.0E-01	0.3	0.02	0.3	0.02		
FLUORANTHENE					4.0E-02	1.0E-01	0.3	0.1	0.3	0.1		
FLUORENE					4.0E-02	4.0E-01	0.3	0.1	0.3	0.1		
INDENO(1,2,3-cd)PYREI	1.0E-01	0.30	0.02		3.0E-02	3.0E-01	0.3	0.02	0.3	0.02		
METHYLNAPHTHALENE					4.0E-03	4.0E-03	0.3	0.1	0.3	0.1		
PHENANTHRENE					3.0E-02	3.0E-01	0.3	0.1	0.3	0.1		
PYRENE					3.0E-02	3.0E-01	0.3	0.1	0.3	0.1		
ALIPHATICS C5 to					4.0E-02	4.0E-01	1	0.2	1	0.2		
ALIPHATICS C9 to C					1.0E-01	1.0E+00	1	0.2	1	0.2		
AROMATICS C9 to					3.0E-02	3.0E-01	1	0.2	1	0.2		
ETHYLBENZENE					5.0E-02	5.0E-02	1	0.03	1	0.03		
NAPHTHALENE					2.0E-02	2.0E-01	0.3	0.1	0.3	0.1		
XYLENES (Mixed Isomer					2.0E-01	4.0E-01	1	0.03	1	0.03		
POLYCHLORINATED BI	2.0E+00	1.00	0.10	1.00	2.0E-05	5.0E-05	1	0.1	1	0.1	1	0.84

MassDEP ORS
Contact: Lydia Thompson
Lydia.Thompson@state.ma.us
617-556-1165

Method 3 Risk Assessment for a Trespasser Exposed to Chemicals in Soil - Shortform 2012 (sf12ts)

Index

Tab		
EPCs	Table TS-1:	Select chemicals and enter Exposure Point Concentrations (EPCs). Estimated risks are shown to the right.
C Eq	Table TS-2:	Equations to calculate cancer risks
cNC Eq	Table TS-3:	Equations to calculate chronic noncancer risks
scNC Eq	Table TS-4:	Equations to calculate subchronic noncancer risks
Exp	Table TS-5:	Definitions and exposure factors
Chem	Table TS-6:	Chemical-specific data
Cyanide	Table TS-7:	Cyanide calculations

Spreadsheets designed by Andrew Friedmann, MassDEP
Questions and Comments may be addressed to:
Lydia Thompson
Massachusetts Department of Environmental Protection
Office of Research and Standards
One Winter Street
Boston, MA 02108 USA
Telephone: (617) 556-1165
Fax: (617) 556-1006
Email: Lydia.Thompson@state.ma.us

Trespasser - Soil: Table TS-1 - 0 to 15 feet
Exposure Point Concentration (EPC)
Based on Trespasser Ages 11-18 (Cancer and Non-Cancer)

ShortForm Version 10-12
Vlookup Version v0315

ELCR (all chemicals) = 4.7E-07
Chronic HI (all chemicals) = 1.5E-01
Subchronic HI (all chemicals) = 1.1E-01

****Do not insert or delete any rows****
Click on empty cell below and select OHM using arrow.

Oil or Hazardous Material	EPC (mg/kg)	$ELCR_{ingestion}$	$ELCR_{dermal}$	$ELCR_{total}$	Chronic HQ_{ing}	Chronic HQ_{derm}	HQ_{total}	Subchronic HQ_{ing}	Subchronic HQ_{derm}	HQ_{total}	
ARSENIC	6.2E+00	7.5E-08	3.7E-08	1.1E-07	1.7E-03	8.2E-04	2.5E-03	3.6E-03	1.5E-03	5.2E-03	
BARIUM	5.4E+02				4.4E-04	3.6E-04	8.0E-04	2.7E-03	1.9E-03	4.6E-03	
CADMIUM	4.4E+00				7.1E-04	1.2E-04	8.3E-04	1.6E-03	2.2E-04	1.8E-03	
CHROMIUM(VI)	2.0E+00				1.1E-04	8.9E-05	2.0E-04	3.5E-05	2.5E-05	6.0E-05	**Note! Cr(VI) limit is 200 mg/kg due to contact dermititis.**
CHROMIUM (TOTAL)	6.9E+01				3.7E-03	3.1E-03	6.8E-03	1.2E-03	8.4E-04	2.1E-03	**Note! Cr(VI) limit is 200 mg/kg due to contact dermititis.**
LEAD	1.6E+02				1.7E-02	1.7E-03	1.9E-02	3.7E-02	3.1E-03	4.0E-02	
MERCURY	6.9E-01				1.8E-04	3.0E-04	4.9E-04	4.0E-04	5.6E-04	9.7E-04	
ALIPHATICS C9 to C18	9.8E+03				1.6E-02	2.6E-02	4.2E-02	3.5E-03	4.8E-03	8.3E-03	
ALIPHATICS C19 to C36	9.3E+03				7.6E-04	1.2E-03	2.0E-03	5.5E-04	7.6E-04	1.3E-03	
AROMATICS C11 to C22	3.5E+03				5.7E-03	1.6E-02	2.1E-02	1.2E-03	2.9E-03	4.1E-03	
ACENAPHTHENE	1.9E+01				1.6E-05	4.3E-05	5.8E-05	1.0E-05	2.4E-05	3.4E-05	
ACENAPHTHYLENE	5.5E+01				8.9E-05	2.4E-04	3.3E-04	1.9E-05	4.5E-05	6.4E-05	
ANTHRACENE	1.5E+02				2.5E-05	6.8E-05	9.3E-05	1.6E-05	3.8E-05	5.4E-05	
BENZO(a)ANTHRACENE	3.0E+01	1.4E-08	7.9E-09	2.2E-08	4.8E-05	2.6E-05	7.4E-05	1.0E-05	4.8E-06	1.5E-05	
BENZO(a)PYRENE	2.0E+01	9.8E-08	5.4E-08	1.5E-07	3.3E-03	1.8E-03	5.1E-03	7.1E-03	3.3E-03	1.0E-02	
BENZO(b)FLUORANTHENE	2.1E+01	1.0E-08	5.6E-09	1.6E-08	3.4E-05	1.9E-05	5.2E-05	7.4E-06	3.4E-06	1.1E-05	
BENZO(g,h,i)PERYLENE	5.6E+01				9.1E-05	2.5E-04	3.4E-04	2.0E-05	4.6E-05	6.6E-05	
BENZO(k)FLUORANTHENE	1.2E+02	5.7E-09	3.1E-09	8.8E-09	1.9E-04	1.0E-04	2.9E-04	4.1E-05	1.9E-05	6.1E-05	
CHRYSENE	1.5E+02	7.0E-09	3.9E-09	1.1E-08	2.3E-04	1.3E-04	3.6E-04	5.1E-05	2.4E-05	7.5E-05	
DIBENZO(a,h)ANTHRACENE	2.5E+00	1.2E-08	6.7E-09	1.9E-08	4.1E-06	2.2E-06	6.3E-06	9.0E-07	4.1E-07	1.3E-06	
FLUORANTHENE	4.6E+02				5.6E-04	1.5E-03	2.1E-03	4.9E-04	1.1E-03	1.6E-03	
FLUORENE	2.4E+01				2.9E-05	8.0E-05	1.1E-04	6.4E-06	1.5E-05	2.1E-05	
INDENO(1,2,3-cd)PYRENE	1.3E+01	6.4E-09	3.5E-09	1.0E-08	2.1E-05	1.2E-05	3.3E-05	4.7E-06	2.2E-06	6.9E-06	
METHYLNAPHTHALENE, 2-	1.2E+01				1.5E-04	4.0E-04	5.5E-04	3.2E-04	7.4E-04	1.1E-03	
PHENANTHRENE	6.2E+02				1.0E-03	2.7E-03	3.7E-03	2.2E-04	5.0E-04	7.2E-04	
PYRENE	4.3E+02				7.0E-04	1.9E-03	2.6E-03	1.5E-04	3.5E-04	5.0E-04	
ALIPHATICS C5 to C8	3.0E+01				1.2E-04	2.0E-04	3.2E-04	2.7E-05	3.7E-05	6.3E-05	
ALIPHATICS C9 to C12	3.3E+02				5.3E-04	8.8E-04	1.4E-03	1.2E-04	1.6E-04	2.8E-04	
AROMATICS C9 to C10	6.5E+02				3.5E-03	5.8E-03	9.3E-03	7.7E-04	1.1E-03	1.8E-03	
ETHYLBENZENE	6.6E-01				2.1E-06	5.3E-07	2.7E-06	4.7E-06	9.7E-07	5.7E-06	
NAPHTHALENE	2.4E+01				5.8E-05	1.6E-04	2.2E-04	1.3E-05	2.9E-05	4.2E-05	
XYLENES (Mixed Isomers)	4.8E+00				3.9E-06	9.6E-07	4.8E-06	4.3E-06	8.8E-07	5.1E-06	
POLYCHLORINATED BIPHENYLS (PCBs)	2.1E+00	6.6E-08	5.5E-08	1.2E-07	1.7E-02	1.4E-02	3.0E-02	1.5E-02	1.0E-02	2.5E-02	

MassDEP ORS
Contact: Lydia Thompson
Lydia.Thompson@state.ma.us
617-556-1165

Trespasser - Soil: Table TS-1 - 0 to 3 feet
Exposure Point Concentration (EPC)
Based on Trespasser Ages 11-18 (Cancer and Non-Cancer)

ShortForm Version 10-12
Vlookup Version v0315

ELCR (all chemicals) = 7.2E-07
Chronic HI (all chemicals) = 1.6E-01
Subchronic HI (all chemicals) = 1.3E-01

****Do not insert or delete any rows****
Click on empty cell below and select OHM using arrow.

Oil or Hazardous Material	EPC (mg/kg)	$ELCR_{ingestion}$	$ELCR_{dermal}$	$ELCR_{total}$	Chronic HQ_{ing}	Chronic HQ_{derm}	HQ_{total}	Subchronic HQ_{ing}	Subchronic HQ_{derm}	HQ_{total}	
ARSENIC	6.2E+00	7.5E-08	3.7E-08	1.1E-07	1.7E-03	8.2E-04	2.5E-03	3.6E-03	1.5E-03	5.2E-03	
BARIUM	5.4E+02				4.4E-04	3.6E-04	8.0E-04	2.7E-03	1.9E-03	4.6E-03	
CADMIUM	4.4E+00				7.1E-04	1.2E-04	8.3E-04	1.6E-03	2.2E-04	1.8E-03	
CHROMIUM(VI)	2.0E+00				1.1E-04	8.9E-05	2.0E-04	3.5E-05	2.5E-05	6.0E-05	**Note! Cr(VI) limit is 200 mg/kg due to contact dermititis.**
CHROMIUM (TOTAL)	6.9E+01				3.7E-03	3.1E-03	6.8E-03	1.2E-03	8.4E-04	2.1E-03	**Note! Cr(VI) limit is 200 mg/kg due to contact dermititis.**
LEAD	1.7E+02				1.8E-02	1.8E-03	2.0E-02	4.0E-02	3.3E-03	4.3E-02	
MERCURY	6.9E-01				1.8E-04	3.0E-04	4.9E-04	4.0E-04	5.6E-04	9.7E-04	
ALIPHATICS C9 to C18	9.8E+03				1.6E-02	2.6E-02	4.2E-02	3.5E-03	4.8E-03	8.3E-03	
ALIPHATICS C19 to C36	9.3E+03				7.6E-04	1.2E-03	2.0E-03	5.5E-04	7.6E-04	1.3E-03	
AROMATICS C11 to C22	3.5E+03				5.7E-03	1.6E-02	2.1E-02	1.2E-03	2.9E-03	4.1E-03	
ACENAPHTHENE	1.9E+01				1.6E-05	4.3E-05	5.8E-05	1.0E-05	2.4E-05	3.4E-05	
ACENAPHTHYLENE	5.5E+01				8.9E-05	2.4E-04	3.3E-04	1.9E-05	4.5E-05	6.4E-05	
ANTHRACENE	1.5E+02				2.5E-05	6.8E-05	9.3E-05	1.6E-05	3.8E-05	5.4E-05	
BENZO(a)ANTHRACENE	6.0E+01	2.9E-08	1.6E-08	4.5E-08	9.7E-05	5.3E-05	1.5E-04	2.1E-05	9.8E-06	3.1E-05	
BENZO(a)PYRENE	4.3E+01	2.1E-07	1.1E-07	3.2E-07	6.9E-03	3.8E-03	1.1E-02	1.5E-02	7.0E-03	2.2E-02	
BENZO(b)FLUORANTHENE	4.5E+01	2.2E-08	1.2E-08	3.4E-08	7.4E-05	4.0E-05	1.1E-04	1.6E-05	7.4E-06	2.4E-05	
BENZO(g,h,i)PERYLENE	5.6E+01				9.1E-05	2.5E-04	3.4E-04	2.0E-05	4.6E-05	6.6E-05	
BENZO(k)FLUORANTHENE	1.2E+02	5.7E-09	3.1E-09	8.8E-09	1.9E-04	1.0E-04	2.9E-04	4.1E-05	1.9E-05	6.1E-05	
CHRYSENE	1.5E+02	7.0E-09	3.9E-09	1.1E-08	2.3E-04	1.3E-04	3.6E-04	5.1E-05	2.4E-05	7.5E-05	
DIBENZO(a,h)ANTHRACENE	5.2E+00	2.5E-08	1.4E-08	3.9E-08	8.4E-06	4.6E-06	1.3E-05	1.8E-06	8.5E-07	2.7E-06	
FLUORANTHENE	4.6E+02				5.6E-04	1.5E-03	2.1E-03	4.9E-04	1.1E-03	1.6E-03	
FLUORENE	2.4E+01				2.9E-05	8.0E-05	1.1E-04	6.4E-06	1.5E-05	2.1E-05	
INDENO(1,2,3-cd)PYRENE	2.8E+01	1.4E-08	7.5E-09	2.1E-08	4.6E-05	2.5E-05	7.1E-05	1.0E-05	4.6E-06	1.5E-05	
METHYLNAPHTHALENE, 2-	1.2E+01				1.5E-04	4.0E-04	5.5E-04	3.2E-04	7.4E-04	1.1E-03	
PHENANTHRENE	6.2E+02				1.0E-03	2.7E-03	3.7E-03	2.2E-04	5.0E-04	7.2E-04	
PYRENE	4.3E+02				7.0E-04	1.9E-03	2.6E-03	1.5E-04	3.5E-04	5.0E-04	
ALIPHATICS C9 to C12	3.3E+02				5.3E-04	8.8E-04	1.4E-03	1.2E-04	1.6E-04	2.8E-04	
AROMATICS C9 to C10	6.5E+02				3.5E-03	5.8E-03	9.3E-03	7.7E-04	1.1E-03	1.8E-03	
NAPHTHALENE	2.4E+01				5.8E-05	1.6E-04	2.2E-04	1.3E-05	2.9E-05	4.2E-05	
XYLENES (Mixed Isomers)	4.8E+00				3.9E-06	9.6E-07	4.8E-06	4.3E-06	8.8E-07	5.1E-06	
POLYCHLORINATED BIPHENYLS (PCBs)	2.1E+00	6.6E-08	5.5E-08	1.2E-07	1.7E-02	1.4E-02	3.0E-02	1.5E-02	1.0E-02	2.5E-02	

MassDEP ORS
Contact: Lydia Thompson
Lydia.Thompson@state.ma.us
617-556-1165

Trespasser - Soil: Table TS-2
Equations to Calculate Cancer Risk for a Trespasser (Age 11-18 years)

Vlookup Version v0315

Parameter	Value	Units
CSF	OHM specific	$(mg/kg\text{-}day)^{-1}$
LADD	age/OHM specific	mg/kg-day
$[OHM]_{soil}$	OHM specific	mg/kg
IR	50	mg/day
$RAF_{c\text{-}ing}$	OHM specific	dimensionless
$RAF_{c\text{-}derm}$	OHM specific	dimensionless
$EF_{ing,derm}$	0.164	event/day
ED	1	day/event
EP	7	years
C	0.000001	kg/mg
BW	50.7	kg
$AP_{(lifetime)}$	70	years
SA	2940	cm^2 / day
SAF	0.14	mg/cm^2

Cancer Risk from Ingestion

$$ELCR_{ing} = LADD_{ing} * CSF$$

$$LADD_{ing} = \frac{[OHM]_{soil} * IR * RAF_{c\text{-}ing} * EF_{ing} * ED * EP * C}{BW * AP_{lifetime}}$$

Cancer Risk from Dermal Absorption

$$ELCR_{derm} = LADD_{derm} * CSF$$

$$LADD_{derm} = \frac{[OHM]_{soil} * SA * RAF_{c\text{-}derm} * SAF * EF_{derm} * ED * EP * C}{BW * AP_{lifetime}}$$

MassDEP ORS
Contact: Lydia Thompson
Lydia.Thompson@state.ma.us
617-556-1165

Trespasser - Soil: Table TS-3

Equations to Calculate Chronic Noncancer Risk for a Trespasser (Age 11-18 years)

Chronic Noncancer Risk from Ingestion

$$HQ_{ing} = \frac{ADD_{ing}}{RfD}$$

$$ADD_{ing} = \frac{[OHM]_{soil} * IR * RAF_{nc\text{-}ing} * EF_{ing} * ED * EP * C}{BW * AP}$$

Chronic Noncancer Risk from Dermal Absorption

$$HQ_{derm} = \frac{ADD_{ing,derm}}{RfD}$$

$$ADD_{derm} = \frac{[OHM]_{soil} * SA * RAF_{nc\text{-}derm} * SAF * EF_{derm} * ED * EP * C}{BW * AP}$$

Vlookup Version v0315

Parameter	Value	Units
RfD	OHM specific	mg/kg-day
ADD	OHM specific	mg/kg-day
$[OHM]_{soil}$	OHM specific	mg/kg
IR	50	mg/day
$RAF_{nc\text{-}ing}$	OHM specific	dimensionless
$RAF_{nc\text{-}derm}$	OHM specific	dimensionless
$EF_{ing,derm}$	0.164	event/day
ED	1	day/event
EP	7	years
C	0.000001	kg/mg
BW	50.7	kg
AP	7	year
SA	2940	cm^2 / day
SAF	0.14	mg/cm^2

MassDEP ORS
Contact: Lydia Thompson
Lydia.Thompson@state.ma.us
617-556-1165

Trespasser - Soil: Table TS-4

Equations to Calculate Subchronic Noncancer Risk for a Trespasser (Age 11-12 years)

Vlookup Version v0315

Subchronic Noncancer Risk from Ingestion

$$HQ_{ing} = \frac{ADD_{ing}}{RfD_{subchronic}}$$

$$ADD_{ing} = \frac{[OHM]_{soil} * IR * RAF_{nc\text{-}ing} * EF_{ing} * ED * EP * C}{BW * AP}$$

Subchronic Noncancer Risk from Dermal Absorption

$$HQ_{derm} = \frac{ADD_{derm}}{RfD_{subchronic}}$$

$$ADD_{derm} = \frac{[OHM]_{soil} * SA * RAF_{nc\text{-}derm} * SAF * EF_{derm} * ED * EP * C}{BW * AP}$$

Parameter	Value	Units
RfD	OHM specific	mg/kg-day
ADD	OHM specific	mg/kg-day
$[OHM]_{soil}$	OHM specific	mg/kg
IR	50	mg/day
$RAF_{nc\text{-}ing}$	OHM specific	dimensionless
$RAF_{nc\text{-}derm}$	OHM specific	dimensionless
$EF_{ing,derm}$	0.286	event/day
ED	1	day/event
EP	0.577	years
C	0.000001	kg/mg
BW	40.3	kg
AP	0.577	year
SA	2477	cm^2 / day
SAF	0.14	mg/cm^2

MassDEP ORS
Contact: Lydia Thompson
Lydia.Thompson@state.ma.us
617-556-1165

Trespasser - Soil: Table TS-5
Definitions and Exposure Factors

Vlookup Version v0315

Parameter	Value	Units	Notes
ELCR - Excess Lifetime Cancer Risk	chemical specific	dimensionless	Pathway specific (ing =ingestion, derm=dermal, inh=inhalation)
CSF - Cancer Slope Factor	chemical specific	$(mg/kg\text{-}day)^{-1}$	see Table RS-7
LADD - Lifetime Average Daily Dose	chemical specific	mg/kg-day	Pathway specific
HQ - Hazard Quotient	chemical specific	dimensionless	Pathway specific (ing =ingestion, derm=dermal, inh=inhalation)
RfD - Reference Dose	chemical specific	mg/kg-day	see Table RS-7
ADD - Average Daily Dose	chemical specific	mg/kg-day	Pathway specific
EPC - Exposure Point Concentration	chemical specific	mg/kg	
IR - Soil Ingestion Rate	50	mg/day	MADEP. 2002. Technical Update: Calculation of an Enhanced Soil Ingestion Rate. (http://www.mass.gov/dep/ors/orspubs.htm)
RAF_c - Relative Absorption Factor for Cancer Effects	chemical specific	dimensionless	
$EF_{subchronic}$ - Exposure Frequency for subchronic ingestion or dermal exposure	0.286	event/day	2 days/week
$EF_{chronic}$ - Exposure Frequency for chronic ingestion or dermal exposure	0.164	event/day	2 days/week, 30 weeks/year
EF_{cancer} - Exposure Frequency for cancer, ingestion or dermal exposure	0.164	event/day	2 days/week, 30 weeks/year
ED - Exposure Duration	1	day/event	
$EP_{(11\text{-}12)}$ - Exposure Period for age group 11-12	0.577	years	30 weeks
$EP_{(11\text{-}18)}$ - Exposure Period for age group 11-18	7	years	
$BW_{(11\text{-}12)}$ - Body Weight for age group 11-12	40.3	kg	U.S. EPA. 1997. Exposure Factors Handbook. Table 7-7
$BW_{(11\text{-}18)}$ - Body Weight for age group 11-18	50.7	kg	Ibid
$AP_{subchronic}$ - Averaging Period for subchronic noncancer	0.577	years	30 weeks
$AP_{chronic}$ - Averaging Period for chronic noncancer	7	years	
AP_{cancer} - Averaging Period for lifetime	70	years	
$SA_{(11\text{-}12)}$ - Surface Area for age group 11-12	2477	cm^2 / day	50th percentile of forearms, hands, and feet for females. MADEP 1995 Guidance for Disposal Site Risk Characterization, Table B-2.
$SA_{(11\text{-}18)}$ - Surface Area for age group 11-18	2940	cm^2 / day	Ibid
SAF - Surface Adherence Factor, Trespasser	0.14	mg/cm^2	SAF developed for ShortForm according to procedure outlined in MA DEP Technical Update: Weighted Skin-Soil Adherence Factors, April 2002.

MassDEP ORS
Contact: Lydia Thompson
Lydia.Thompson@state.ma.us
617-556-1165

Trespasser - Soil: Table TS-6
Chemical-Specific Data

Vlookup Version v0315

Oil or Hazardous Material	CSF $(mg/kg\text{-}day)^{-1}$	$RAF_{c\text{-}ing}$	$RAF_{c\text{-}derm}$	Chronic RfD mg/kg-day	Subchronic RfD mg/kg-day	Chronic $RAF_{nc\text{-}ing}$	Chronic $RAF_{nc\text{-}derm}$	Subchronic $RAF_{nc\text{-}ing}$	Subchronic $RAF_{nc\text{-}derm}$
ARSENIC	1.5E+00	0.50	0.03	3.0E-04	3.0E-04	0.5	0.03	0.5	0.03
BARIUM				2.0E-01	7.0E-02	1	0.1	1	0.1
CADMIUM				5.0E-04	5.0E-04	0.5	0.01	0.5	0.01
CHROMIUM(VI)				3.0E-03	2.0E-02	1	0.1	1	0.1
CHROMIUM (TOTAL)				3.0E-03	2.0E-02	1	0.1	1	0.1
LEAD				7.5E-04	7.5E-04	0.5	0.006	0.5	0.006
MERCURY				3.0E-04	3.0E-04	0.5	0.1	0.5	0.1
ALIPHATICS C9 to (				1.0E-01	1.0E+00	1	0.2	1	0.2
ALIPHATICS C19 to				2.0E+00	6.0E+00	1	0.2	1	0.2
AROMATICS C11 to				3.0E-02	3.0E-01	0.3	0.1	0.3	0.1
ACENAPHTHENE				6.0E-02	2.0E-01	0.3	0.1	0.3	0.1
ACENAPHTHYLENE				3.0E-02	3.0E-01	0.3	0.1	0.3	0.1
ANTHRACENE				3.0E-01	1.0E+00	0.3	0.1	0.3	0.1
BENZO(a)ANTHRACEN	1.0E-01	0.30	0.02	3.0E-02	3.0E-01	0.3	0.02	0.3	0.02
BENZO(a)PYRENE	1.0E+00	0.30	0.02	3.0E-04	3.0E-04	0.3	0.02	0.3	0.02
BENZO(b)FLUORANTH	1.0E-01	0.30	0.02	3.0E-02	3.0E-01	0.3	0.02	0.3	0.02
BENZO(g,h,i)PERYLENE				3.0E-02	3.0E-01	0.3	0.1	0.3	0.1
BENZO(k)FLUORANTH	1.0E-02	0.30	0.02	3.0E-02	3.0E-01	0.3	0.02	0.3	0.02
CHRYSENE	1.0E-02	0.30	0.02	3.0E-02	3.0E-01	0.3	0.02	0.3	0.02
DIBENZO(a,h)ANTHRA(	1.0E+00	0.30	0.02	3.0E-02	3.0E-01	0.3	0.02	0.3	0.02
FLUORANTHENE				4.0E-02	1.0E-01	0.3	0.1	0.3	0.1
FLUORENE				4.0E-02	4.0E-01	0.3	0.1	0.3	0.1
INDENO(1,2,3-cd)PYRE	1.0E-01	0.30	0.02	3.0E-02	3.0E-01	0.3	0.02	0.3	0.02
METHYLNAPHTHALENI				4.0E-03	4.0E-03	0.3	0.1	0.3	0.1
PHENANTHRENE				3.0E-02	3.0E-01	0.3	0.1	0.3	0.1
PYRENE				3.0E-02	3.0E-01	0.3	0.1	0.3	0.1
ALIPHATICS C5 to				4.0E-02	4.0E-01	1	0.2	1	0.2
ALIPHATICS C9 to (				1.0E-01	1.0E+00	1	0.2	1	0.2
AROMATICS C9 to				3.0E-02	3.0E-01	1	0.2	1	0.2
ETHYLBENZENE				5.0E-02	5.0E-02	1	0.03	1	0.03
NAPHTHALENE				2.0E-02	2.0E-01	0.3	0.1	0.3	0.1
XYLENES (Mixed Isome				2.0E-01	4.0E-01	1	0.03	1	0.03
POLYCHLORINATED BI	2.0E+00	1.00	0.10	2.0E-05	5.0E-05	1	0.1	1	0.1

MassDEP ORS
Contact: Lydia Thompson
Lydia.Thompson@state.ma.us
617-556-1165

Trespasser - Soil: Table TS-7
Cyanide Calculations

The soil cyanide concentration limit set to protect a trespasser against an acute, potentially lethal one-time dose of cyanide from incidental ingestion of contaminated soil is 8,000 mg/kg_{soil}. This is the concentration of available cyanide in soil below which acute human health effects would not be expected following a one-time exposure. This soil concentration is calculated using the equation below with a one-time soil ingestion estimate of 50 mg_{soil} and an available cyanide dose limit of 0.01 $mg/kg_{body\ weight}$.

MassDEP's guidance on evaluating the risk from a one-time cyanide dose considers cyanide's potentially lethal effects as well as information on cyanide metabolism:

> Cyanides are detoxified rapidly by the body, and a large acute dose which overwhelms the detoxification mechanism is potentially more toxic than the same dose distributed over a period of hours. (MassDEP *Background Documentation for the Development of an Available Cyanide Benchmark Concentration,* originally dated October 1992, Modified August 1998)

Assessment of a potential one-time dose requires an estimate of the maximum soil concentration the trespasser could contact at any one time. The average soil concentration within a typical exposure area will underestimate the potential one-time dose. Therefore, to assess the acute risk of a one-time potentially lethal dose, the EPC for cyanide should be a conservative estimate of the maximum soil concentration.

The trespasser soil concentration limit to protect against adverse effects from an acute (one-time) exposure to cyanide is 8000 mg/kg.

Concentration Calculation for Cyanide

$$\text{Concentration} = \frac{\text{HQ x Acute Dose Limit x BW}}{\text{IR x RAF x Conversion Factor}}$$

Parameter	Value	Units
HQ (Hazard Quotient)	1	(unitless)
Acute Dose Limit	0.01	mg avail. CN/ kg BW
BW (Body Weight) 11-12	40.3	kg
IR (1-time reasonable max)	50	mg
Conversion Factor	1.0E-06	kg soil / mg soil
RAF	1	(unitless)

The toxicological basis for estimating an allowable one-time dose is documented in MassDEP's 1992 *Background Documentation for the Development of an "Available Cyanide" Benchmark Concentration,* which is published at: http://www.mass.gov/eea/docs/dep/toxics/stypes/dscyanide.pdf

MassDEP ORS
Contact: Lydia Thompson
Lydia.Thompson@state.ma.us
617-556-1165

Trespasser - Soil: Table TS-7
Cyanide Calculations

The soil cyanide concentration limit set to protect a trespasser against an acute, potentially lethal one-time dose of cyanide from incidental ingestion of contaminated soil is 8,000 mg/kg_{soil}. This is the concentration of available cyanide in soil below which acute human health effects would not be expected following a one-time exposure. This soil concentration is calculated using the equation below with a one-time soil ingestion estimate of 50 mg_{soil} and an available cyanide dose limit of 0.01 $mg/kg_{body\ weight}$.

MassDEP's guidance on evaluating the risk from a one-time cyanide dose considers cyanide's potentially lethal effects as well as information on cyanide metabolism:

> Cyanides are detoxified rapidly by the body, and a large acute dose which overwhelms the detoxification mechanism is potentially more toxic than the same dose distributed over a period of hours. (MassDEP *Background Documentation for the Development of an Available Cyanide Benchmark Concentration,* originally dated October 1992, Modified August 1998)

Assessment of a potential one-time dose requires an estimate of the maximum soil concentration the trespasser could contact at any one time. The average soil concentration within a typical exposure area will underestimate the potential one-time dose. Therefore, to assess the acute risk of a one-time potentially lethal dose, the EPC for cyanide should be a conservative estimate of the maximum soil concentration.

The trespasser soil concentration limit to protect against adverse effects from an acute (one-time) exposure to cyanide is 8000 mg/kg.

MassDEP ORS
Contact: Lydia Thompson
Lydia.Thompson@state.ma.us
617-556-1165

Method 3 Risk Assessment for Chemicals in Soil - Construction Worker Shortform 2012 (sf12cw)

Index

Tab	
EPCs	Table CW-1: Select chemicals and enter Exposure Point Concentrations (EPCs). Estimated risks are shown to the right.
C Eq	Table CW-2: Equations to calculate cancer risks
NC Eq	Table CW-3: Equations to calculate noncancer risks
Exp	Table CW-4: Definitions and exposure factors
Chem	Table CW-5: Chemical-specific data
Cyanide	Table CW-6: Cyanide Calculations

Spreadsheets designed by Andrew Friedmann, MassDEP
Questions and Comments may be addressed to:
Lydia Thompson
Massachusetts Department of Environmental Protection
Office of Research and Standards
One Winter Street
Boston, MA 02108 USA
Telephone: (617) 556-1165
Fax: (617) 556-1006
Email: Lydia.Thompson@state.ma.us

Construction Worker - Soil: Table CW-1 (0 to 15 feet)
Exposure Point Concentration (EPC) and Risk
Based on Construction Worker 18-25 years of age

ShortForm Version 10-12
Vlookup Version v0315

ELCR (all chemicals) = 5.2E-07
HI (all chemicals) = 8.7E-01

****Do not insert or delete any rows****
Click on empty cell below and select OHM using arrow.

Oil or Hazardous Material (OHM)	EPC (mg/kg)	ELCR ingestion	ELCR dermal	ELCR inhalation GI	ELCR inhalation pulmonary	$ELCR_{total}$	Subchronic HQ_{ing}	Subchronic HQ_{derm}	Subchronic HQ_{inh-GI}	Subchronic HQ_{inh}	HQ_{total}	
ARSENIC	6.2E+00	4.1E-08	2.4E-08	1.1E-09	4.9E-09	7.1E-08	1.3E-02	7.6E-03	3.3E-04	1.1E-02	3.2E-02	
BARIUM	5.4E+02						9.5E-03	9.5E-03	2.5E-04	4.0E-03	2.3E-02	
CADMIUM	4.4E+00				2.1E-09	2.1E-09	5.4E-03	1.1E-03	1.4E-04	1.6E-02	2.3E-02	
CHROMIUM(VI)	2.0E+00				6.4E-09	6.4E-09	1.2E-04	1.2E-04	3.2E-06	2.5E-04	5.0E-04	**Note! Cr(VI) limit is 200 mg/kg due to contact dermititis.**
CHROMIUM (TOTAL)	6.9E+01				2.2E-07	2.2E-07	4.2E-03	4.3E-03	1.1E-04	8.5E-03	1.7E-02	**Note! Cr(VI) limit is 200 mg/kg due to contact dermititis.**
LEAD	1.6E+02						1.3E-01	1.5E-02	3.3E-03	5.8E-03	1.5E-01	
MERCURY	6.9E-01						1.4E-03	2.8E-03	3.6E-05	8.5E-05	4.4E-03	
ALIPHATICS C9 to C18	9.8E+03						1.2E-02	2.4E-02	3.1E-04	6.1E-04	3.7E-02	
ALIPHATICS C19 to C36	9.3E+03						1.9E-03	3.9E-03	5.0E-05		5.8E-03	
AROMATICS C11 to C22	3.5E+03						4.3E-03	1.4E-02	1.1E-04	2.6E-04	1.9E-02	
ACENAPHTHENE	1.9E+01						3.5E-05	1.2E-04	9.2E-07	1.4E-06	1.6E-04	
ACENAPHTHYLENE	5.5E+01						6.7E-05	2.3E-04	1.7E-06	4.1E-06	3.0E-04	
ANTHRACENE	1.5E+02						5.7E-05	1.9E-04	1.5E-06	1.1E-05	2.6E-04	
BENZO(a)ANTHRACENE	3.0E+01	7.8E-09	5.2E-09	2.0E-10	4.7E-10	1.4E-08	3.6E-05	2.4E-05	9.4E-07	2.2E-06	6.4E-05	
BENZO(a)PYRENE	2.0E+01	5.3E-08	3.6E-08	1.4E-09	3.2E-09	9.3E-08	2.5E-02	1.7E-02	6.4E-04	3.8E-01	4.2E-01	
BENZO(b)FLUORANTHENE	2.1E+01	5.5E-09	3.7E-09	1.4E-10	3.3E-10	9.6E-09	2.6E-05	1.7E-05	6.6E-07	1.6E-06	4.5E-05	
BENZO(g,h,i)PERYLENE	5.6E+01						6.9E-05	2.3E-04	1.8E-06	4.2E-06	3.1E-04	
BENZO(k)FLUORANTHENE	1.2E+02	3.1E-09	2.1E-09	8.0E-11	1.9E-10	5.4E-09	1.4E-04	9.7E-05	3.7E-06	8.7E-06	2.5E-04	
CHRYSENE	1.5E+02	3.8E-09	2.6E-09	9.9E-11	2.3E-10	6.7E-09	1.8E-04	1.2E-04	4.6E-06	1.1E-05	3.1E-04	
DIBENZO(a,h)ANTHRACENE	2.5E+00	6.7E-09	4.5E-09	1.7E-10	4.0E-10	1.2E-08	3.1E-06	2.1E-06	8.1E-08	1.9E-07	5.5E-06	
FLUORANTHENE	4.6E+02						1.7E-03	5.7E-03	4.4E-05	3.4E-05	7.5E-03	
FLUORENE	2.4E+01						2.2E-05	7.4E-05	5.7E-07	1.8E-06	9.9E-05	
INDENO(1,2,3-cd)PYRENE	1.3E+01	3.5E-09	2.3E-09	9.0E-11	2.1E-10	6.1E-09	1.6E-05	1.1E-05	4.2E-07	9.9E-07	2.9E-05	
METHYLNAPHTHALENE, 2-	1.2E+01						1.1E-03	3.7E-03	2.9E-05	8.9E-07	4.9E-03	
PHENANTHRENE	6.2E+02						7.6E-04	2.5E-03	2.0E-05	4.6E-05	3.4E-03	
PYRENE	4.3E+02						5.3E-04	1.8E-03	1.4E-05	3.2E-05	2.3E-03	
ALIPHATICS C5 to C8	3.0E+01						9.2E-05	1.9E-04	2.4E-06	5.6E-06	2.9E-04	
ALIPHATICS C9 to C12	3.3E+02						4.1E-04	8.2E-04	1.1E-05	2.0E-05	1.3E-03	
AROMATICS C9 to C10	6.5E+02						2.7E-03	5.4E-03	6.9E-05	4.8E-05	8.2E-03	
ETHYLBENZENE	6.6E-01						1.6E-05	4.9E-06	4.2E-07	2.7E-09	2.2E-05	
NAPHTHALENE	2.4E+01						4.4E-05	1.5E-04	1.1E-06	3.0E-04	4.9E-04	
XYLENES (Mixed Isomers)	4.8E+00						1.5E-05	4.5E-06	3.8E-07	4.5E-07	2.0E-05	
POLYCHLORINATED BIPHENYLS (PCBs)	2.1E+00	3.6E-08	3.6E-08	9.3E-10	5.4E-11	7.3E-08	5.0E-02	5.1E-02	1.3E-03	3.8E-03	1.1E-01	

MassDEP ORS
Contact: Lydia Thompson
Lydia.Thompson@state.ma.us
617-556-1165

Construction Worker - Soil: Table CW-1 (0 to 6 feet)
Exposure Point Concentration (EPC) and Risk
Based on Construction Worker 18-25 years of age

ShortForm Version 10-12
Vlookup Version v0315

ELCR (all chemicals) = 5.2E-07
HI (all chemicals) = 8.1E-01

****Do not insert or delete any rows****
Click on empty cell below and select OHM using arrow.

Oil or Hazardous Material (OHM)	EPC (mg/kg)	ELCR ingestion	ELCR dermal	ELCR inhalation GI	ELCR inhalation pulmonary	$ELCR_{total}$	Subchronic HQ_{ing}	Subchronic HQ_{derm}	Subchronic HQ_{inh-GI}	Subchronic HQ_{inh}	HQ_{total}	
ARSENIC	6.2E+00	4.1E-08	2.4E-08	1.1E-09	4.9E-09	7.1E-08	1.3E-02	7.6E-03	3.3E-04	1.1E-02	3.2E-02	
BARIUM	5.4E+02						9.5E-03	9.5E-03	2.5E-04	4.0E-03	2.3E-02	
CADMIUM	4.4E+00				2.1E-09	2.1E-09	5.4E-03	1.1E-03	1.4E-04	1.6E-02	2.3E-02	
CHROMIUM(VI)	2.0E+00				6.4E-09	6.4E-09	1.2E-04	1.2E-04	3.2E-06	2.5E-04	5.0E-04	**Note! Cr(VI) limit is 200 mg/kg due to contact dermititis.**
CHROMIUM (TOTAL)	6.9E+01				2.2E-07	2.2E-07	4.2E-03	4.3E-03	1.1E-04	8.5E-03	1.7E-02	**Note! Cr(VI) limit is 200 mg/kg due to contact dermititis.**
LEAD	1.6E+02						1.3E-01	1.6E-02	3.3E-03	5.8E-03	1.5E-01	
MERCURY	6.9E-01						1.4E-03	2.8E-03	3.6E-05	8.5E-05	4.4E-03	
ALIPHATICS C9 to C18	9.8E+03						1.2E-02	2.4E-02	3.1E-04	6.1E-04	3.7E-02	
ALIPHATICS C19 to C36	9.3E+03						1.9E-03	3.9E-03	5.0E-05		5.8E-03	
AROMATICS C11 to C22	3.5E+03						4.3E-03	1.4E-02	1.1E-04	2.6E-04	1.9E-02	
ACENAPHTHENE	1.9E+01						3.5E-05	1.2E-04	9.2E-07	1.4E-06	1.6E-04	
ACENAPHTHYLENE	5.5E+01						6.7E-05	2.3E-04	1.7E-06	4.1E-06	3.0E-04	
ANTHRACENE	1.5E+02						5.7E-05	1.9E-04	1.5E-06	1.1E-05	2.6E-04	
BENZO(a)ANTHRACENE	4.1E+01	1.1E-08	7.3E-09	2.8E-10	6.6E-10	1.9E-08	5.1E-05	3.4E-05	1.3E-06	3.1E-06	8.9E-05	
BENZO(a)PYRENE	1.7E+01	4.6E-08	3.1E-08	1.2E-09	2.8E-09	8.1E-08	2.1E-02	1.4E-02	5.6E-04	3.2E-01	3.6E-01	
BENZO(b)FLUORANTHENE	2.0E+01	5.2E-09	3.5E-09	1.4E-10	3.2E-10	9.2E-09	2.4E-05	1.6E-05	6.3E-07	1.5E-06	4.3E-05	
BENZO(g,h,i)PERYLENE	5.6E+01						6.9E-05	2.3E-04	1.8E-06	4.2E-06	3.1E-04	
BENZO(k)FLUORANTHENE	1.2E+02	3.1E-09	2.1E-09	8.0E-11	1.9E-10	5.4E-09	1.4E-04	9.7E-05	3.7E-06	8.7E-06	2.5E-04	
CHRYSENE	1.5E+02	3.8E-09	2.6E-09	9.9E-11	2.3E-10	6.7E-09	1.8E-04	1.2E-04	4.6E-06	1.1E-05	3.1E-04	
DIBENZO(a,h)ANTHRACENE	3.5E+00	9.1E-09	6.1E-09	2.4E-10	5.5E-10	1.6E-08	4.3E-06	2.9E-06	1.1E-07	2.6E-07	7.5E-06	
FLUORANTHENE	4.6E+02						1.7E-03	5.7E-03	4.4E-05	3.4E-05	7.5E-03	
FLUORENE	2.4E+01						2.2E-05	7.4E-05	5.7E-07	1.8E-06	9.9E-05	
INDENO(1,2,3-cd)PYRENE	1.8E+01	4.8E-09	3.2E-09	1.3E-10	2.9E-10	8.5E-09	2.3E-05	1.5E-05	5.9E-07	1.4E-06	4.0E-05	
METHYLNAPHTHALENE, 2-	1.2E+01						1.1E-03	3.7E-03	2.9E-05	8.9E-07	4.9E-03	
PHENANTHRENE	6.2E+02						7.6E-04	2.5E-03	2.0E-05	4.6E-05	3.4E-03	
PYRENE	4.3E+02						5.3E-04	1.8E-03	1.4E-05	3.2E-05	2.3E-03	
ALIPHATICS C9 to C12	3.3E+02						4.1E-04	8.2E-04	1.1E-05	2.0E-05	1.3E-03	
AROMATICS C9 to C10	6.5E+02						2.7E-03	5.4E-03	6.9E-05	4.8E-05	8.2E-03	
NAPHTHALENE	2.4E+01						4.4E-05	1.5E-04	1.1E-06	3.0E-04	4.9E-04	
XYLENES (Mixed Isomers)	4.8E+00						1.5E-05	4.5E-06	3.8E-07	4.5E-07	2.0E-05	
POLYCHLORINATED BIPHENYLS (PCBs)	2.1E+00	3.6E-08	3.6E-08	9.3E-10	5.4E-11	7.3E-08	5.0E-02	5.1E-02	1.3E-03	3.8E-03	1.1E-01	

MassDEP ORS
Contact: Lydia Thompson
Lydia.Thompson@state.ma.us
617-556-1165

Construction Worker - Soil: Table CW-2

Equations to Calculate Cancer Risk for Construction Worker

Vlookup Version v0315

Cancer Risk from Ingestion

$$ELCR_{ing} = LADD_{ing} * CSF_{oral}$$

$$LADD_{ing} = \frac{EPC * IR * RAF_{c\text{-}ing} * EF * ED_{ing} * EP * C1}{BW * AP_{lifetime}}$$

Cancer Risk from Dermal Absorption

$$ELCR_{derm} = LADD_{derm} * CSF_{oral}$$

$$LADD_{derm} = \frac{EPC * SA * AF * RAF_{c\text{-}derm} * EF * ED_{derm} * EP * C1}{BW * AP_{lifetime}}$$

Cancer Risk from Particulate Inhalation - Gastrointestinal Absorption

$$ELCR_{inh\text{-}GI} = LADD_{inh\text{-}GI} * CSF_{oral}$$

$$LADD_{inh\text{-}GI} = \frac{EPC * RCAF_{inh\text{-}gi} * PM_{10} * VR_{work} * RAF_{c\text{-}ing} * EF * ED_{inh} * EP * C2 * C3 * C4}{BW * AP_{lifetime}}$$

Cancer Risk from Particulate Inhalation - Pulmonary Absorption

$$ELCR_{inh} = LADD_{inh} * CSF_{inhalation}$$

$$LADD = \frac{EPC * RCAF_{inh} * PM_{10} * VR_{work} * RAF_{c\text{-}inh} * EF * ED_{inh} * EP * C2 * C3 * C4}{BW * AP_{lifetime}}$$

Parameter	Value	Units
CSF	OHM-specific	$(mg/kg\text{-}day)^{-1}$
LADD	age/OHM-specific	mg/kg-day
EPC	OHM-specific	mg/kg
IR	100	mg/day
$RAF_{c\text{-}ing}$	OHM-specific	dimensionless
$RAF_{c\text{-}derm}$	OHM-specific	dimensionless
$RAF_{c\text{-}inh}$	OHM-specific	dimensionless
EF	0.714	event/day
$ED_{ing\ \&\ derm}$	1	day/event
ED_{inh}	0.333	day/event
EP	182	days
C1	1.0E-06	kg/mg
C2	1.0E-09	kg/µg
C3	1440	min/days
C4	1.0E-03	m^3/L
BW	58.0	kg
$AP_{(lifetime)}$	25,550	days
VR_{work}	60	L/min
AF	0.29	mg/cm^2
SA	3473	cm^2/day
$RCAF_{inh\text{-}gi}$	1.5	dimensionless
$RCAF_{inh}$	0.5	dimensionless
PM_{10}	60	$\mu g/m^3$

MassDEP ORS
Contact: Lydia Thompson
Lydia.Thompson@state.ma.us
617-556-1165

Construction Worker - Soil: Table CW-3

Equations to Calculate Noncancer Risk for Construction Worker

Vlookup Version v0315

Noncancer Risk from Ingestion

$$HQ_{ing} = \frac{ADD_{ing}}{RfD_{oral\text{-}subchronic}}$$

$$ADD_{ing} = \frac{EPC * IR * RAF_{nc\text{-}ing} * EF * ED_{ing} * EP * C1}{BW * AP_{noncancer}}$$

Noncancer Risk from Dermal Absorption

$$HQ_{derm} = \frac{ADD_{derm}}{RfD_{oral\text{-}subchronic}}$$

$$ADD_{dermal} = \frac{EPC * SA * AF * RAF_{nc\text{-}derm} * EF * ED_{dermal} * EP * C1}{BW * AP_{noncancer}}$$

Noncancer Risk from Particulate Inhalation - Gastrointestinal Absorption

$$HQ_{inh\text{-}GI} = \frac{ADD_{inh\text{-}GI}}{RfD_{oral\text{-}subchronic}}$$

$$ADD_{inh\text{-}GI} = \frac{EPC * RCAF_{inh\text{-}gi} * PM_{10} * VR_{work} * RAF_{nc\text{-}ing} * EF * ED_{inh} * EP * C2 * C3 * C4}{BW * AP_{noncancer}}$$

Noncancer Risk from Particulate Inhalation - Pulmonary Absorption

$$HQ_{inh} = \frac{ADD}{RfD_{inhalation\text{-}subchronic}}$$

$$ADD_{inh} = \frac{EPC_{soil} * RCAF_{inh} * PM_{10} * VR_{work} * RAF_{nc\text{-}inh} * EF * ED_{inh} * EP * C2 * C3 * C4}{BW * AP_{noncancer}}$$

Parameter	Value	Units
RfD	OHM-specific	mg/kg-day
ADD	OHM-specific	mg/kg-day
EPC	OHM-specific	mg/kg
IR	100	mg/day
$RAF_{nc\text{-}ing}$	OHM-specific	dimensionless
$RAF_{nc\text{-}derm}$	OHM-specific	dimensionless
$RAF_{nc\text{-}inh}$	OHM-specific	dimensionless
EF	0.714	event/day
$ED_{ing\ \&\ derm}$	1	day/event
ED_{inh}	0.333	day/event
EP	182	days
C1	1.0E-06	kg/mg
C2	1.0E-09	kg/µg
C3	1440	min/days
C4	1.0E-03	m^3/L
BW	58.0	kg
$AP_{noncancer}$	182	days
VR_{work}	60	L/min
AF	0.29	mg/cm^2
SA	3473	cm^2/day
$RCAF_{inh\text{-}gi}$	1.5	dimensionless
$RCAF_{inh}$	0.5	dimensionless
PM10	60	$\mu g/m^3$

MassDEP ORS
Contact: Lydia Thompson
Lydia.Thompson@state.ma.us
617-556-1165

Construction Worker - Soil: Table CW-4
Definitions and Exposure Factors

Vlookup Version v0315

Parameter	Value	Units	Notes
ELCR - Excess Lifetime Cancer Risk	chemical specific	dimensionless	Pathway specific (ing =ingestion, derm=dermal, inh=inhalation)
HI - Hazard Index	chemical specific	dimensionless	Pathway specific (ing =ingestion, derm=dermal, inh=inhalation)
CSF - Cancer Slope Factor	chemical specific	$(mg/kg\text{-}day)^{-1}$	see Table CW-5.
RfD - Reference Dose	chemical specific	mg/kg-day	see Table CW-5.
LADD - Lifetime Average Daily Dose	chemical specific	mg/kg-day	Pathway specific. See Table CW-2.
ADD - Average Daily Dose	chemical specific	mg/kg-day	Pathway specific. See Table CW-3.
EPC - Exposure Point Concentration	chemical specific	mg/kg	see Table CW-1.
IR - Soil Ingestion Rate	100	mg/day	MADEP. 2002. Technical Update: Calculation of an Enhanced Soil Ingestion Rate. (http://www.mass.gov/dep/ors/orspubs.htm).
RAF_c - Relative Absorption Factor for Cancer Effects	chemical specific	dimensionless	Pathway specific - see Table CW-5.
RAF_{nc} - Relative Absorption Factor for Noncancer Effects	chemical specific	dimensionless	Pathway specific - see Table CW-5.
EF - Exposure Frequency	0.714	event/day	5 events (days) / 7 events (days) in a week; MADEP 1995 Guidance for Disposal Site Risk Characterization pg B-38.
$ED_{ing,derm}$ - Exposure Duration for ingestion or dermal exposure	1	day/event	
ED_{inh} - Exposure Duration for inhalation exposure	0.333	day/event	Represents 8 hours / event.
EP - Exposure Period	182	days	6 months; MADEP 1995 Guidance for Disposal Site Risk Characterization.
BW - Body Weight	58.0	kg	U.S. EPA. 1997. Exposure Factors Handbook. Table 7-7, Females, ages 18 - 25.
$AP_{(lifetime)}$ - Averaging Period for lifetime	25,550	days	Represents 70 years
$AP_{(noncancer)}$ - Averaging Period for noncancer	182	days	6 months; MADEP 1995 Guidance for Disposal Site Risk Characterization.
AF - Adherence Factor	0.29	mg/cm^2	MA DEP. 2002 Technical Update: Weighted Skin-Soil Adherence Factors. (http://www.mass.gov/dep/ors/orspubs.htm)
VR_{work} - Ventilation Rate during work (heavy exertion)	60	L/min	Table B-4 MADEP 1995 Guidance for Disposal Site Risk Characterization.
SA - Surface Area	3473	cm^2/day	MADEP. 1995. Guidance for Disposal Site Risk Characterization. 50th percentile for females. Appendix Table B-2.
$IFAF_{inh\text{-}gi}$ - Ingestion Fraction Adjustment Factor, gastrointestinal	1.5	dimensionless	MADEP 2007. Characterization of Risks Due to Inhalation of Particulates by Construction Workers
$IFAF_{inh}$ - Inhalation Fraction Adjustment Factor, inhalation	0.5	dimensionless	MADEP 2002. Characterization of Risks Due to Inhalation of Particulates by Construction Workers
PM10 - Concentration of PM_{10}	60	$\mu g/m^3$	MADEP 1995 Guidance for Disposal Site Risk Characterization pg B-11

MassDEP ORS
Contact: Lydia Thompson
Lydia.Thompson@state.ma.us
617-556-1165

Construction Worker - Soil: Table CW-5
Chemical-Specific Data

Vlookup Version v0315

Oil or Hazardous Material	Oral CSF $(mg/kg\text{-}day)^{-1}$	$RAF_{c\text{-}ing}$	$RAF_{c\text{-}derm}$	$RAF_{c\text{-}inh}$	Inhalation CSF $(mg/kg\text{-}day)^{-1}$	Subchronic Oral RfD mg/kg-day	Subchronic $RAF_{nc\text{-}ing}$	Subchronic $RAF_{nc\text{-}derm}$	Subchronic $RAF_{nc\text{-}inh}$	Subchronic Inhalation RfD
ARSENIC	1.5E+00	0.5	0.03	1	1.1E+01	3.0E-04	0.5	0.03	1	5.7E-06
BARIUM						7.0E-02	1	0.1	1	1.4E-03
CADMIUM					6.3E+00	5.0E-04	0.5	0.01	1	2.9E-06
CHROMIUM(VI)					4.2E+01	2.0E-02	1	0.1	1	8.6E-05
CHROMIUM (TOTAL)					4.2E+01	2.0E-02	1	0.1	1	8.6E-05
LEAD						7.5E-04	0.5	0.006	1	2.9E-04
MERCURY						3.0E-04	0.5	0.1	1	8.6E-05
ALIPHATICS C9 to C18						1.0E+00	1	0.2	1	1.7E-01
ALIPHATICS C19 to C36						6.0E+00	1	0.2		
AROMATICS C11 to C22						3.0E-01	0.3	0.1	1	1.4E-01
ACENAPHTHENE						2.0E-01	0.3	0.1	1	1.4E-01
ACENAPHTHYLENE						3.0E-01	0.3	0.1	1	1.4E-01
ANTHRACENE						1.0E+00	0.3	0.1	1	1.4E-01
BENZO(a)ANTHRACENE	1.0E-01	0.3	0.02	1	2.1E-01	3.0E-01	0.3	0.02	1	1.4E-01
BENZO(a)PYRENE	1.0E+00	0.3	0.02	1	2.1E+00	3.0E-04	0.3	0.02	1	5.7E-07
BENZO(b)FLUORANTHENE	1.0E-01	0.3	0.02	1	2.1E-01	3.0E-01	0.3	0.02	1	1.4E-01
BENZO(g,h,i)PERYLENE						3.0E-01	0.3	0.1	1	1.4E-01
BENZO(k)FLUORANTHENE	1.0E-02	0.3	0.02	1	2.1E-02	3.0E-01	0.3	0.02	1	1.4E-01
CHRYSENE	1.0E-02	0.3	0.02	1	2.1E-02	3.0E-01	0.3	0.02	1	1.4E-01
DIBENZO(a,h)ANTHRACENE	1.0E+00	0.3	0.02	1	2.1E+00	3.0E-01	0.3	0.02	1	1.4E-01
FLUORANTHENE						1.0E-01	0.3	0.1	1	1.4E-01
FLUORENE						4.0E-01	0.3	0.1	1	1.4E-01
INDENO(1,2,3-cd)PYRENE	1.0E-01	0.3	0.02	1	2.1E-01	3.0E-01	0.3	0.02	1	1.4E-01
METHYLNAPHTHALENE, 2-						4.0E-03	0.3	0.1	1	1.4E-01
PHENANTHRENE						3.0E-01	0.3	0.1	1	1.4E-01
PYRENE						3.0E-01	0.3	0.1	1	1.4E-01
ALIPHATICS C5 to C8						4.0E-01	1	0.2	1	5.7E-02
ALIPHATICS C9 to C12						1.0E+00	1	0.2	1	1.7E-01
AROMATICS C9 to C10						3.0E-01	1	0.2	1	1.4E-01
ETHYLBENZENE						5.0E-02	1	0.03	1	2.6E+00
NAPHTHALENE						2.0E-01	0.3	0.1	1	8.6E-04
XYLENES (Mixed Isomers)						4.0E-01	1	0.03	1	1.1E-01
POLYCHLORINATED BIPHENYLS (PCBs)	2.0E+00	1	0.1	1	3.5E-01	5.0E-05	1	0.1	1	5.7E-06

MassDEP ORS
Contact: Lydia Thompson
Lydia.Thompson@state.ma.us
617-556-1165

Construction Worker - Soil: Table CW-6
Cyanide Calculations

The soil cyanide concentration limit set to protect a construction worker against an acute, potentially lethal one-time dose of cyanide from incidental ingestion of contaminated soil is 12,000 mg/kg_{soil}. This is the concentration of available cyanide in soil below which acute human health effects would not be expected following a one-time exposure. This soil concentration is calculated using the equation below with a one-time soil ingestion estimate of 50 mg_{soil} and an available cyanide dose limit of 0.01 $mg/kg_{body\ weight}$.

MassDEP's guidance on evaluating the risk from a one-time cyanide dose considers cyanide's potentially lethal effects as well as information on cyanide metabolism:

> Cyanides are detoxified rapidly by the body, and a large acute dose which overwhelms the detoxification mechanism is potentially more toxic than the same dose distributed over a period of hours. (MassDEP *Background Documentation for the Development of an Available Cyanide Benchmark Concentration,* originally dated October 1992, Modified August 1998)

Assessment of a potential one-time dose requires an estimate of the maximum soil concentration the trespasser could contact at any one time. The average soil concentration within a typical exposure area will underestimate the potential one-time dose. Therefore, to assess the acute risk of a one-time potentially lethal dose, the EPC for cyanide should be a conservative estimate of the maximum concentration.

The construction worker soil concentration limit to protect against adverse effects from an acute (one-time) exposure to cyanide is 12,000 mg/kg.

Acute Concentration Calculation for Cyanide

$$\text{Concentration} = \frac{\text{HQ x Acute Dose Limit x BW}}{\text{IR x RAF x Conversion Factor}}$$

Parameter	Value	Units
HQ (Hazard Quotient)	1	(unitless)
Acute Dose Limit	0.01	mg avail. CN/ kg BW
BW (Body Weight) 11-12	58	kg
IR (1-time reasonable max)	50	mg
Conversion Factor	1.0E-06	kg soil / mg soil
RAF	1	(unitless)

The toxicological basis for estimating an allowable one-time dose is documented in MassDEP's 1992 *Background Documentation for the Development of an "Available Cyanide" Benchmark Concentration,* which is published at: http://www.mass.gov/eea/docs/dep/toxics/stypes/dscyanide.pdf

MassDEP ORS
Contact: Lydia Thompson
Lydia.Thompson@state.ma.us
617-556-1165

Method 3 Risk Assessment for Chemicals in Groundwater - Construction Worker

Index

Tab	
EPCs	Table CWGW-1: Select chemicals and enter Exposure Point Concentrations (EPCs). Associated risks are shown to the right.
C Eq	Table CWGW-2: Equations to calculate cancer risks.
NC Eq	Table CWGW-3: Equations to calculate noncancer risks.
Exp	Table CWGW-4: Definitions and exposure factors.
Chem	Table CWGW-5: Chemical-specific data.

Construction Worker - Groundwater: Table CWGW-1
Exposure Point Concentration (EPC) and Risk
Based on Construction Worker 18-25 years of age

Vlookup Version v0315

ELCR (all chemicals) = 2E-10

HI (all chemicals) = 5E-03

****Do not insert or delete any rows****

Click on empty cell below and select OHM using arrow.

Oil or Hazardous Material (OHM)	EPC (mg/L)	ELCR $_{dermal}$	$ELCR_{total}$	Subchronic HQ_{derm}	HQ_{total}
Arsenic	2.1E-02	1.8E-10	1.8E-10	5.7E-05	5.7E-05
Barium	3.5E-01			1.4E-05	1.4E-05
Cadmium	2.2E-03			1.2E-06	1.2E-06
Nickel	6.9E-03			3.7E-07	3.7E-07
Zinc	4.9E-02			2.7E-07	2.7E-07
Benzene	1.3E-03	5.9E-12	5.9E-12	1.5E-06	1.5E-06
Ethylbenzene	3.9E-02			3.1E-05	3.1E-05
Naphthalene	1.7E-01			1.1E-04	1.1E-04
Xylenes (mixed isomers)	4.0E-03			4.2E-07	4.2E-07
Fluorene	4.9E-03			3.7E-06	3.7E-06
Methylnaphthalene, 2-	7.9E-02			4.8E-03	4.8E-03

Construction Worker - Dermal Contact with Groundwater: Table CWGW-2
Equations to Calculate Cancer Risk for Construction Worker

Vlookup Version v0315

Cancer Risk from Dermal Absorption

$$ELCR_{derm} = LADD_{derm} * CSF_{oral}$$

$$LADD_{derm} = \frac{EPC * SA * RAF_{c\text{-}derm} * EF * ED_{dermal} * EP * C1 * Kp}{BW * AP_{lifetime}}$$

Parameter	Value	Units
RfD	OHM-specific	mg/kg-day
ADD	OHM-specific	mg/kg-day
EPC	OHM-specific	mg/L
$RAF_{c\text{-}derm}$	OHM-specific	dimensionless
Kp	OHM-specific	cm/hour
EF	0.714	event/day
ED_{derm}	1.0	hour/event
EP	182	days
C1	1.0E-03	1 liter/1000 cm3
BW	58.0	kg
$AP_{lifetime}$	25,550	days
SA	2206	cm^2

Construction Worker - Dermal Contact with Groundwater: Table CWGW-3
Equations to Calculate Noncancer Risk for Construction Worker

Vlookup Version v0315

Noncancer Risk from Dermal Absorption

$$HQ_{derm} = \frac{ADD_{derm}}{RfD_{oral\text{-}subchronic}}$$

$$ADD_{dermal} = \frac{EPC * SA * RAF_{nc\text{-}derm} * EF * ED_{dermal} * EP * C1 * Kp}{BW * AP_{noncancer}}$$

Parameter	Value	Units
RfD	OHM-specific	mg/kg-day
ADD	OHM-specific	mg/kg-day
EPC	OHM-specific	mg/L
$RAF_{nc\text{-}derm}$	OHM-specific	dimensionless
Kp	OHM-specific	cm/hour
EF	0.714	event/day
ED_{derm}	1.0	hour/event
EP	182	days
C1	1.0E-03	1 liter/1000 cm3
BW	58.0	kg
$AP_{noncancer}$	182	days
SA	2206	cm^2

Construction Worker - Dermal Contact with Groundwater: Table CWGW-4
Definitions and Exposure Factors

Vlookup Version v0315

Parameter	Value	Units	Notes
ELCR - Excess Lifetime Cancer Risk	chemical specific	dimensionless	Pathway specific (ing =ingestion, derm=dermal, inh=inhalation)
HI - Hazard Index	chemical specific	dimensionless	Pathway specific (ing =ingestion, derm=dermal, inh=inhalation)
CSF - Cancer Slope Factor	chemical specific	$(mg/kg\text{-}day)^{-1}$	see Table CWGW-5.
RfD - Reference Dose	chemical specific	mg/kg-day	see Table CWGW-5.
LADD - Lifetime Average Daily Dose	chemical specific	mg/kg-day	Pathway specific. See Table CWGW-2.
ADD - Average Daily Dose	chemical specific	mg/kg-day	Pathway specific. See Table CWGW-3.
EPC - Exposure Point Concentration	chemical specific	mg/L	see Table CWGW-1.
RAF_c - Relative Absorption Factor for Cancer Effects	chemical specific	dimensionless	Pathway specific - see Table CWGW-5.
RAF_{nc} - Relative Absorption Factor for Noncancer Effects	chemical specific	dimensionless	Pathway specific - see Table CWGW-5.
EF - Exposure Frequency	0.714	event/day	130 events / 182 days (or 5 days per week; MADEP 1995 Guidance for Disposal Site Risk Characterization pg B-38.
ED_{derm} - Exposure Duration for dermal exposure	1	hour/event	
EP - Exposure Period	182	days	6 months; MADEP 1995 Guidance for Disposal Site Risk Characterization.
BW - Body Weight	58.0	kg	U.S. EPA. 1997. Exposure Factors Handbook. Table 7-7, Females, ages 18 - 25.
$AP_{(lifetime)}$ - Averaging Period for lifetime	25,550	days	Represents 70 years
$AP_{(noncancer)}$ - Averaging Period for noncancer	182	days	6 months; MADEP 1995 Guidance for Disposal Site Risk Characterization.
SA - Surface Area	2206	cm^2/day	MADEP. 1995. Guidance for Disposal Site Risk Characterization. 50th percentile for males and females. Appendix Table B-2. forearms, hands

Construction Worker - Groundwater: Table CWGW-5
Chemical-Specific Data

Oil or Hazardous Material	Oral CSF $(mg/kg\text{-}day)^{-1}$	Kp	$RAF_{c\text{-}derm}$	Subchronic Oral RfD mg/kg-day	Subchronic $RAF_{nc\text{-}derm}$
Arsenic	1.5E+00	0.001	0.03	3.0E-04	3.0E-02
Barium		0.001		7.0E-02	1.0E-01
Cadmium		0.001		5.0E-04	1.0E-02
Nickel		0.0002		2.0E-02	2.0E-01
Zinc		0.0006		3.0E-01	1.0E-01
Benzene	5.5E-02	0.01476	0.03	1.0E-02	3.0E-02
Ethylbenzene		0.04846		5.0E-02	3.0E-02
Naphthalene		0.04584		2.0E-01	0.1
Xylenes (mixed isomers)		0.05229		4.0E-01	0.03
Fluorene		0.11194		4.0E-01	0.1
Methylnaphthalene, 2-		0.08962		4.0E-03	0.1

Attachment H

Best Management Practices for Non-commercial Gardening at Disposal Sites

There are residual levels of contaminants remaining in the soil. Gardeners should consider implementing BMPs to further reduce potential exposure to material in the soil, regardless of the contaminant levels remaining. Implementing BMPs such as those suggested below will allow safer gardening in a wider range of site conditions. Not every BMP is necessary for every single site, but a combination of BMPs appropriate for your particular site will help reduce the potential for additional exposure.

Construct Physical Controls and Improve Soil Conditions

Actions to minimize contact (covering the soil) and reduce contaminant levels (such as amending the soil) will further reduce potential risks. Many good gardening practices, like adding compost and soil amendments, improve the soil while reducing the amount of contaminants and exposure to them. Recommendations include:

- Build your garden away from areas known or suspected to be contaminated. In addition to areas where residual contamination may be present, as identified by the disposal site assessment, other sources of contamination can include painted structures (particularly older buildings that may have been painted with lead paint), roads and rail lines.
- Build a hedge or fence to reduce windblown contamination from mobile sources and busy streets.
- Cover existing soil and walkways with mulch, landscape fabric, stones, or bricks.
- Use mulch in your garden beds to reduce dust and soil splash back, reduce weed establishment, regulate soil temperature and moisture, and add organic matter.
- Use soil amendments (such as lime and compost) to maintain neutral pH and add organic matter to improve soil structure.
    - Not all amendments are the same; be sure to choose the right amendments for your soil - amendments that improve conditions at one garden may not work well in others.
    - Keep in mind that each amendment type will have different application amounts and techniques (e.g., rototilling), and may need to be maintained and reapplied (e.g., annually).
    - Be sure to work with your local or state regulatory agency, and ask if your municipality provides free compost or mulch. Obtain compost only from a

reputable source that can provide information regarding the quality and type of feedstock used to generate the compost.

- Add topsoil or clean fill from a reputable source that can provide information regarding the quality of the topsoil or fill to ensure the soil is safe for handling by children or gardeners of all ages and for food production.
- Build raised beds or container gardens.
    - Raised beds can be made by simply mounding soil into windrows or by building containers.
    - Raised beds help improve water drainage in heavy clay soils or low-lying areas. They also create accessible gardening locations for many users and allow for more precise soil management.
    - Foot traffic should not be necessary in the bed, so the soil does not become compacted and soil preparation in the coming years is minimized.
    - Place a water permeable fabric cover or geotextile as the bottom layer of your raised bed to further reduce exposure to soils of concern.
    - Sided beds can be made from wood, synthetic wood, stone, concrete block, brick or naturally rot-resistant woods such as cedar and redwood. Avoid using chemical-treated lumber for the raised bed because chemicals used in the treated wood could make their way into the soils and plants.

Minimize Ongoing Contact with or Ingestion of Soil

Actions to further reduce contact with soil during and after gardening activities can also minimize potential risks from any contaminants remaining in the soil.

- Do not use plants grown in contaminated soil for compost.
- Work in the garden when soil is moist or damp to minimize creation of dust.
- Avoid “double-digging” to decrease likelihood of moving deep soils to the surface.
- Wear gloves, long sleeves and pants while gardening to prevent skin exposure;
- Remove gardening shoes and garments before entering the home, and wash gardening clothes separately from other clothing.
- Wash hands after gardening.

- Wash all vegetables thoroughly.

For More Information

These recommended BMPs are consistent with federal, state and local guidance on urban gardening in general. MassDEP has additional information available online at: http://www.mass.gov/eea/agencies/massdep/cleanup/regulations/gardening-best-management-practices-at-disposal-sites.html