Blackstone Environmental Solutions, LLC

Environmental Consulting and Licensed Site Professional Services

Erik Johnson
Bureau of Waste Site Cleanup
Northeast Regional Office
MA Department of Environmental Protection
150 Presidential Way
Woburn, MA 01801

October 18, 2023
Project #1843

RE: Imminent Hazard Evaluation Results
Vacant Parcels
14 and 16 Barnes Road
Salem, MA 01970
RTN 3-38273

Dear Mr. Johnson:

Blackstone Environmental Solutions LLC (BES) on behalf of JL Realty Trust, JMI Realty Trust, and Barnes Road Trust is providing this Imminent Hazard Evaluation Results submittal associated with the release of oil and/or hazardous material (OHM) reported under Massachusetts Department of Environmental Protection (MassDEP) Release Tracking Number 3-38273 at portions of the vacant land located at 14 Barnes Road and 16 Barnes Road in Salem, Massachusetts. These two properties are part of the larger Disposal Site associated with RTN 3-38273 and include portions of the properties at 9 Cedar Road, 12 Cedar Road, 14 Cedar Road, 15 Cedar Road, and 16 Cedar Road. While most of these areas are exceptionally difficult to reach on foot, due to dense trees and vegetation, wetlands, surface water body, steep slopes and no roadways, the information here reported concerns the areas which, with trespass, could be accessed although with difficulty and no trails.

BES in coordination with its subcontracted risk assessor, O'Reilly, Talbot, & Okun Associates (OTO) of Westborough, MA has attached the Imminent Hazard Evaluation Results prepared for 14 and 16 Barnes Road along with the supporting figures and soil laboratory analytical report. Specifically, this IHE was performed to evaluate the risks associated the potential trespasser exposure pathway via dermal contact to soil at 14 Barnes Road and 16 Barnes Road. The laboratory soil sampling activities was performed at the aforementioned properties on September 27, 2023. A summary of findings outlined in the Imminent Hazard Evaluation are noted below:

- **A condition of No Imminent Hazard exists for human health, safety, and the environment for the surficial soil at 14 Barnes Road and 16 Barnes Road properties at the Site.**

MassDEP Bureau of Waste Site Cleanup (BWSC) Form 105 has been filed with this submittal via eDEP for RTN 3-38273. Should you have any questions or require additional information, please do not hesitate to contact the undersigned.

Sincerely,
Blackstone Environmental Solutions, LLC

Michael C. Bricher, LSP, P.G.
Principal

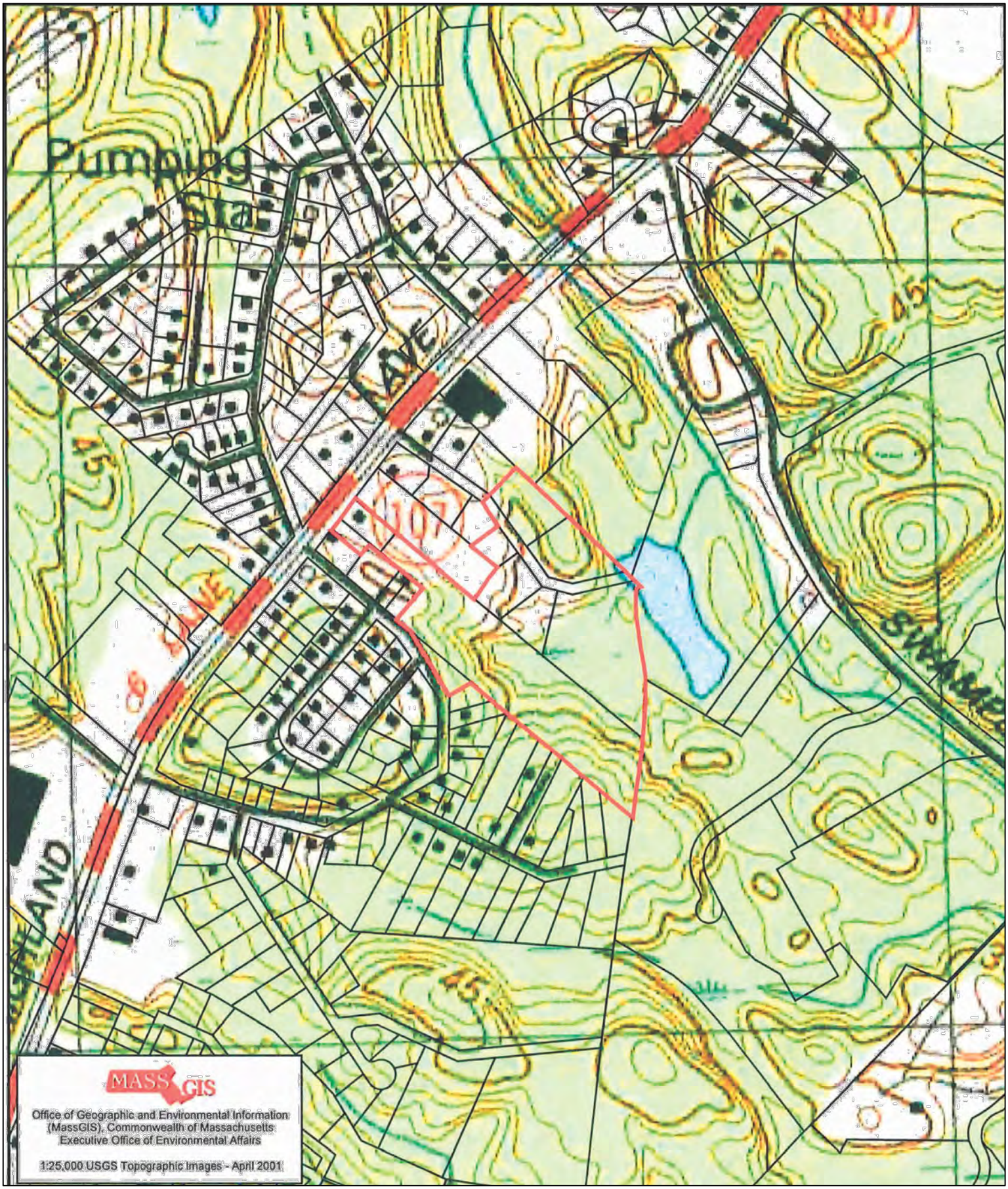
List Of Attachments

Figures
Figure 1: Site Locus
Figure 2: Site Plan

Appendix A- Imminent Hazard Evaluation prepared by O'Reilly Talbot & Okun Associates
Appendix B- Soil Laboratory Analytical Report

CC: Kathleen Ingemi, 381 Highland Avenue, Salem, MA 01970
Jamy Buchanan Madeja, Esq., Buchanan & Associates, 100 Cambridge Street, Suite 1400, Boston, MA 02114
Board of Health, City of Salem, Public Health Agent, Mr. David Greenbaum, RS.
dgreenbaum@Salem.com
City Solicitor, Elizabeth Rennard, City Hall, 93 Washington Street, Salem, MA 01970
brennard@salem.com

FIGURES



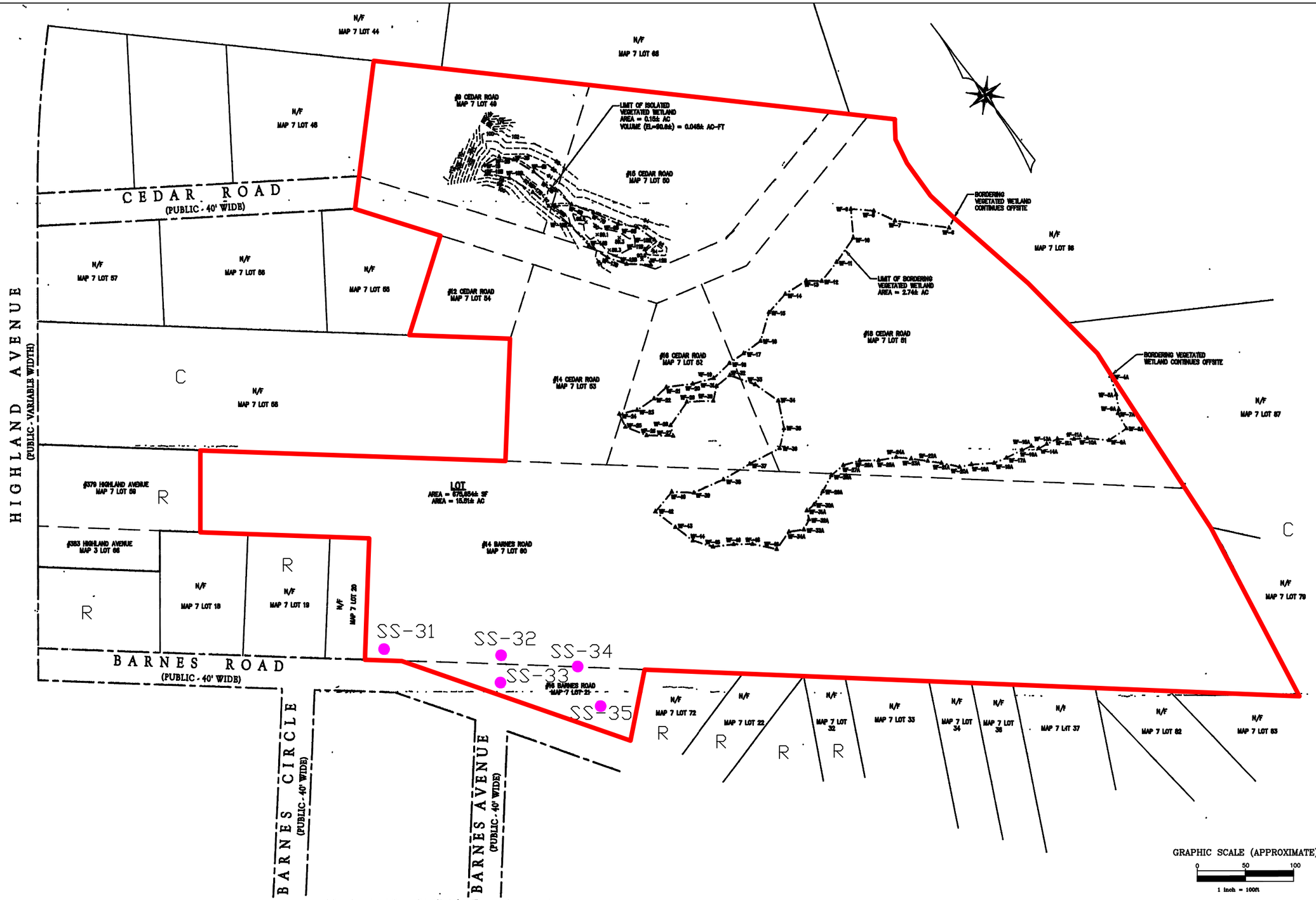
SOURCE: SALEM AND LYNN, MA USGS QUADRANGLE TOPOGRAPHIC MAPS

SITE LOCUS

BLACKSTONE ENVIRONMENTAL SOLUTIONS, LLC.
76 BAY VIEW DRIVE
SHREWSBURY, MASSACHUSETTS 01545
TEL. (508) 612-4720

SCALE: NTS
DATE: 09/06/2023
DRAWN: KGP
PROJECT: 1843
FIGURE: 1

LOCATION
MULTIPLE PARCELS
HIGHLAND AVENUE, BARNES ROAD, AND CEDAR ROAD
SALEM, MASSACHUSETTS



LEGEND

- : SUBJECT PARCELS BOUNDARY
- : SURFICIAL SOIL SAMPLE
- C : COMMERCIAL
- R : RESIDENTIAL

SITE PLAN

BLACKSTONE ENVIRONMENTAL SOLUTIONS, LLC.
76 BAY VIEW DRIVE
SHREWSBURY, MASSACHUSETTS 01545
TEL. (508) 615-4788

SCALE: 1" = 100'	LOCATION: MULTIPLE PARCELS HIGHLAND AVENUE, BARNES ROAD, AND CEDAR ROAD SALEM, MASSACHUSETTS
DATE: 10/3/2023	
DRAWN: KGP	
PROJECT: 1843	
FIGURE: 2	

APPENDIX A

O'Reilly, Talbot & Okun
ENGINEERING ASSOCIATES

October 17, 2023
File No: 5210-11-01

Prepared for:
Blackstone Environmental Solutions, LLC
76 Bay View Drive
Shrewsbury, Massachusetts 01545

IMMINENT HAZARD EVALUATION
Vacant Parcels
14 and 16 Barnes Road
Salem, Massachusetts
MassDEP RTN 3-38273

Prepared by:
O'Reilly, Talbot & Okun Associates, Inc.
Westborough, MA 01581

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1.0 INTRODUCTION

This report presents an Imminent Hazard Evaluation (IHE) for the release of oil and/or hazardous material (OHM) at portions of the 14 Barnes Road and 16 Barnes Road properties in Salem, Massachusetts. These two properties are part of the larger Massachusetts Department of Environmental Protection (MassDEP) Disposal Site assigned Release Tracking Number (RTN) 3-38273 (the "Site"). The Site includes portions of the properties at 14 Barnes, 9 Cedar Road, 12 Cedar Road, 14 Cedar Road, 15 Cedar Road, and 16 Cedar Road.

The IHE was completed as part of the Immediate Response Action (Plan) submitted by Blackstone Environmental Solutions LLC (BES) to MassDEP in October 2023. The Site information provided in the IRA and the subsequent soil data provided by BES for 14 and 16 Barnes Road were used in the IHE.

The IHE was completed in accordance with MassDEP regulations under the Massachusetts Contingency Plan (MCP: 310 CMR 40.0950) and applicable MassDEP guidance.

On August 11, 2023, MassDEP was notified on behalf of Barnes Road Trust that the vacant property located at 14 Barnes Road has triggered a MCP 2-hour reporting condition (i.e., potential Imminent Hazard Condition). The 14 Barnes Road property is located immediately adjacent to 14 Cedar Road. The dataset generated as part of an assessment by Weston & Sampson on October 9, 2020, includes a total polychlorinated biphenyls (PCB) concentration of 118.3 mg/kg that was collected in the top 6 inches of material at location N-9. This PCB concentration is above the notification threshold for the purpose of fulfilling the "Two Hour" release notification obligations of 310 CMR 30.0311(7), as a "Could Pose" Imminent Hazard to human health.

MassDEP verbally approved environmental response actions to be conducted under RTN 3-38273 for 12 Cedar Road, 14 Cedar Road, and 14 Barnes Road, and includes but not limited to an expedited subsurface investigation program to address the potential Imminent Hazard condition to human health at the Site. The assessment activities will be performed to further investigate the source of the shallow heavy metals, including chromium and lead, and PCB impacted soils. Also, MassDEP has approved the installation of a security fence along the southern boundary of 16 Barnes Road in order to restrict access to 14 Barnes Road via a trespasser scenario.

On August 28, 2023, a Site inspection was conducted with representatives of MassDEP, Ash Desmond (Bureau of Waste Site Cleanup BWSC][) and Andrew Danikas (asbestos inspector), and Michael Bricher, LSP, of BES. The inspection consisted of a walkthrough of 14 Barnes, 16 Barnes Road, 9 Cedar Road, 12 Cedar Road, and 15 Cedar Road. Due to the dense forest land, poison ivy/oak vegetation, thorns, ticks, wetlands, and terrain (i.e., physical barriers), access was limited at each of the aforementioned properties. A summary of Site observations for 14 and 16 Barnes Road is noted below.

16 Barnes Road: This property was accessed from the south along Barnes Road. MassDEP and BES reviewed the area along the southern property boundary for the installation of a potential fence installation. We agreed that there would need to be a significant amount of tree/vegetation removal and to go around a bedrock outcrop to complete the fence installation along the southern property boundary line. It was also noted that a significant elevation drop at approximately 100 feet from the road going straight in towards 14/16 Barnes Road property boundary and that it would be unsafe to access 14 Barnes Road from the southwest. Also, we noted multiple construction/ demolition/solid waste debris (i.e., brick, asphalt, concrete/tires/metal, broken tiles) along the property boundary for 14 and 16 Barnes Road. Asbestos Inspector Danikas collected two samples of the tile and roofing material for asbestos. It was later confirmed by MassDEP that the tile sample tested positive for asbestos.

According to the property owner, Kathleen Ingemi for JMI Realty Trust, this area of 16 Barnes Road has been subject to illegal dumping activities over the years by nearby owners. Nonetheless, this area of the Site will need to be assessed by a licensed asbestos inspector/management company.

14 Barnes Road: MassDEP and BES accessed 14 Barnes Road from the west via 379-381 Highland Avenue. Access was limited to the westernmost portion of 14 Barnes Road due to physical barriers. There was some solid waste debris (tires, metal, brick, concrete, abandoned storage shed) observed in this area, but MassDEP asbestos inspector did not identify any potential asbestos containing material at the surface.

Containment Measure Actions: At the time of release notification for 14 Barnes Road, BES presented a verbal IRA Plan to MassDEP to erect a 6-foot-high chain-link security fence along the southern boundary of 16 Barnes Road to restrict access to the heavy metal and PCB impacted surficial soil areas reported at the Site. Based on the MassDEP/BES Site Visit on August 28, 2023, there are logistical challenges (i.e., physical barriers) with installing a security fence along the southern boundary of 16 Barnes Road. Based on feedback received by BES from Mr. Erik Johnson of MassDEP BWSC on August 30, 2023, MassDEP would consider using the existing physical barriers on 16 Barnes Road in lieu of a security fence if surficial soil data shows that the heavy metals and PCBs are below Imminent Hazard levels.

Following the completion of the upcoming IH Evaluation for potential trespasser exposure via dermal contact to soil at 14 and 16 Barnes Road, the need to supplement the existing physical barriers with additional containment measures will be assessed.

2.0 SURFICIAL SOIL SAMPLING

On September 27, 2023, BES personnel conducted a surficial soil assessment program on 14 and 16 Barnes Road. The assessment program area was divided into 5 zones for surficial soil sampling. These five sampling zones were identified as SS-31, SS-32, SS-33, SS-34, and SS-35. The sampling zones were strategically selected to represent areas that would most easily be accessed in a trespasser scenario from

Barnes Road. Approximately 330 feet of street frontage exists along the southern boundary for 16 Barnes Road. Refer to IRA Plan Figure 2-Soil Sample Location Map for a depiction of the five sampling zones.

As previously noted, this area of the Site consists of thick wooded vegetation with exposed bedrock outcroppings. Also, multiple construction/demolition/solid waste debris material (i.e., brick, asphalt, concrete/tires/metal, broken tiles) was observed during this assessment program.

The soil samples were collected at a depth of 0 to 1' below grade using a hand auger. The soil samples comprised mostly of organics with some silts, sands, and gravel. There were no overt petroleum odors, soil staining, or visual evidence of release of oil and/or hazardous material at these locations. Also, soil samples were field screened for total volatile organic compounds (TVOCs) with a photoionization detector (PID) equipped with a 10.6 eV lamp and calibrated to 100 ppmv isobutylene utilizing the MassDEP approved "Jar Headspace Analytical Screening Procedure". The PID screening reading results for all soil samples were non-detect (0.0 parts per million (ppm).

A total of five soil samples (i.e., SS-31 through SS-35) were collected and submitted to New England Testing Laboratory (NET Lab) of West Warwick, RI under standard chain of custody (COC) procedures for the following analyses: MCP 14 Metals by EPA Method 6000/7000; and polychlorinated biphenyls (PCBs) by EPA Method 8082A. In addition, soil sample SS-32 as submitted for SVOC laboratory analysis via EPA Method 8270. These soil sample laboratory analytical results will be presented in the IRA Status Report #1, anticipated for MassDEP submittal on or before December 5, 2023.

The analytical results for detected analytes are presented in Table 1. It is noted on this table that PCBs were not detected at analytical detection limits less than 86 ug/kg. Metals were detected in each sample. SVOCs, primarily polycyclic aromatic hydrocarbons (PAHs), were detected in the one sample (SS-3) analyzed for this group of compounds. It is also noted that the maximum concentration of arsenic, cadmium, and mercury are below MassDEP's Background Concentrations in "Natural" Soil (MassDEP, 2002). These three metals are not considered to be constituents of concern for this IHE.

2.0 SITE-SPECIFIC IMMINENT HAZARD EVALUATION FOR HUMAN HEALTH

The Site-specific exposures considered in this IHE (310 CMR 40.0953) are as follows. The short period of time considered in the evaluation was five years. For the evaluation of soil-related exposures, the level of OHM starting at zero to twelve inches within the ground surface were used in the development of Exposure EPCs. No hot spots were not identified for the subject portions of the Site. The IHE was focused on the detected metals (exceeding MassDEP Background Concentrations for "Natural" Soil [MassDEP, 2002]), and SVOCs as constituents of concern. Maximum detected concentrations were used as EPCs.

The IHE was conducted in a manner, which results in conservative estimates of potential exposures. The IHE clearly identifies and explains the basis for exposure parameters chosen for the Risk Characterization.

The characterization of the risk of harm to human health was conducted using a Method 3 approach, as described in 310 CMR 40.0993. The toxicity information used to characterize risk is consistent with the type and duration of exposure under evaluation, and primary consideration given to information developed by MassDEP (310 CMR 40.0955(2)(a)).

2.1 IMMINENT HAZARD EVALUATION FOR TRESPASSERS

The properties at 14 and 16 Barnes Road are currently undeveloped. However, the closest occupied residential building is less than 500 feet away. Therefore, members of the general public could trespass on these properties in the absence of barriers.

Therefore, the IHE for human health was evaluated for a trespasser that would occasionally access the properties. Direct contact risks to soil by trespassers were calculated using the MassDEP Method 3 Imminent Hazard Assessment for Trespasser Exposed to Chemicals in Soil - Shortform 2012 (sf12tsih) (Vlookup Version 0315). (Attachment 1).

The default exposure assumptions in this Shortform for subchronic noncancer effects assumes the receptor is a 11 to 12 year old, soil ingestion rate of 50 mg/day, exposure frequency of 2 days/week for 30 weeks (60 days/year), and exposure period of 1 year for noncancer subchronic effects (Table TSIH-4, Sheet: Exp). The equations to calculate noncancer risk for a trespasser are presented in Table TSIH-3, Sheet: NC Eq.

For carcinogenic effects, the receptor is a 11 to 16 year old, soil ingestion rate of 50 mg/day, exposure frequency of 2 days/week for 30 weeks (60 days/year), and exposure period of 5 years over a 70 year lifetime (Table TSIH-4, Sheet: Exp). The equations to calculate cancer risk for a trespasser are presented in Table TSIH-2, Sheet: C Eq.

Exposure point concentrations (EPCs) were selected from the five samples (SS-31 to SS-35) as the maximum detected concentrations of detected analytes (Table 1). These EPCs were input into the Shortform (Table TSIH-2, Sheet: EPCs).

The toxicity values for COCs are encoded in the Shortform (Table TSIH-5; Sheet: Chem). It is noted that chromium was evaluated in the trivalent form. Hexavalent chromium was not detected in the sediments in the Mill Pond, nor in other soil, lagoon, and sediment samples collected for the ADW Disposal Site.

Subchronic noncarcinogenic risks were calculated as the Hazard Index (HI). Cancer risks were calculated as the Excess Lifetime Cancer Risk (ELCR) (Table TSIH-2, Sheet: EPCs).

The total IH noncancer risk HI from soil exposure by trespassers is 0.08. This value is well below the MassDEP IH noncancer risk limit for HI of 10, with the Hazard Quotient for lead being less than 1. The total IH cancer risk ELCR from soil exposure by trespassers is 8E-07. This value is well below the MassDEP IH cancer risk ELCR of 1E-05.

Therefore, a condition of No Imminent Hazard was concluded for trespassers.

3.0 SITE-SPECIFIC IMMINENT HAZARD EVALUATION FOR SAFETY

In accordance with Section 310 CMR 40.0960 of MCP, the Site was also evaluated for the risk of harm to safety associated with current and reasonably foreseeable conditions at the site. In general, this evaluation considers acute hazards such as fire and explosion, the potential for exposure to acute concentrations that might be immediately threatening to life or health, and the potential for chronic exposure levels to the general public that might result from ongoing uncontrolled releases.

According to the MCP, the following Site conditions indicate a condition of No Significant Risk of harm to safety exists at the site:

- No applicable or suitably analogous safety standards were identified for the site (310 CMR 40.0960(2)); therefore, there were no exceedances of these standards.
- No rusted or corroded drums or containers, open pits, lagoons, or other dangerous structures were observed on the site (310 CMR 40.0960(3)(a)).
- There is no present threat of fire or explosion, including the presence of explosive vapors resulting from a release of OHM (310 CMR 40.0960(3)(b)).
- No uncontained material which exhibit the characteristics of corrosivity, reactivity or flammability exists at the site (310 CMR 40.0960(3)(c)).

Therefore, a condition of No Imminent Hazard exists for Safety.

4.0 SITE-SPECIFIC IMMINENT HAZARD EVALUATION FOR THE ENVIRONMENT

An IH to the environment would exist with evidence of stressed biota or immediate or acute adverse impacts to freshwater or saltwater fish populations. These conditions do not exist. Therefore, a condition of No Imminent Hazard to the environment was concluded.

5.0 CONCLUSIONS

A **condition of No Imminent Hazard exists** for human health, safety, and the environment exists for the surficial soil at 14 Barnes Road and 16 Barnes Road properties at the Site.

REFERENCES

Massachusetts Department of Environmental Protection (MassDEP). 1995. *Guidance for Disposal Site Risk Characterization - In Support of the Massachusetts Contingency Plan*. July 1995.

MassDEP. 2002. *Background Levels of Polycyclic Aromatic Hydrocarbons and Metals in Soil. Technical Update.* May 2002.

MassDEP. 2014, updated 2019. *310 CMR 40.0000, the Massachusetts Contingency Plan.* Effective June 2014. Updated December 2019.

MassDEP. 2015. *ShortForms for Human Health Risk Assessment under the MCP.* ShortForm Version 10-12. Vlookup Version v0315.

TABLES and ATTACHEMENTS

Table 1
Soil Exposure Point Concentrations (EPCs) - Metals SVOCs
Vacant Parcels
Cedar Road Barnes Road
Salem, MA

Sample ID & Depth Sample Date Soil Material							**SS-31/0-1'** 9/27/2023 Organics		**SS-32/0-1'** 9/27/2023 Organics		**SS-33/0-1'** 9/27/2023 Organics		**SS-34/0-1'** 9/27/2023 Organics		**SS-35/0-1'** 9/27/2023 Organics		**Maximum Detected Concentration**
Compound Name	RCS-1	S-1 SOIL & GW-2	S-1 SOIL & GW-3	UCL	MassDEP "Natural' Soil Background	Units	Sample Result	Reporting Limit	Sample Result	Reporting Limit	Sample Result	Reporting Limit	Sample Result	Reporting Limit	Sample Result	Reporting Limit	
Total Metals																	
Antimony	20	20	20	300	1	mg/kg	7.08	1.01	2.52	1.01	ND	0.9	ND	0.85	ND	0.83	7.08
Arsenic	20	20	20	500	20	mg/kg	5.12	1.53	5.46	1.53	3.72	1.37	3.63	1.29	3.52	1.25	5.46
Barium	1000	1000	1000	10000	50	mg/kg	38.7	0.51	106	0.5	41.5	0.45	58.1	0.42	41.5	0.41	106
Beryllium	90	90	90	2000	0.4	mg/kg	ND	0.51	ND	0.5	0.49	0.45	0.5	0.42	0.47	0.41	0.5
Cadmium	70	70	70	1000	2	mg/kg	ND	0.77	1.42	0.76	0.7	0.68	0.92	0.64	0.63	0.63	1.42
Chromium	100	100	100	2000	30	mg/kg	9.78	0.77	42.6	0.76	12.4	0.68	15.7	0.64	15.8	0.63	42.6
Lead	200	200	200	6000	100	mg/kg	41.7	0.77	**252**	0.76	44	0.68	69.7	0.64	46.5	0.63	**252**
Nickel	600	600	600	10000	20	mg/kg	7.68	0.77	17.2	0.76	14.2	0.68	13.8	0.64	15.8	0.63	17.2
Vanadium	400	400	400	7000	30	mg/kg	31.7	0.51	69.2	0.5	39.7	0.45	55.9	0.42	36	0.41	69.2
Zinc	1000	1000	1000	10000	100	mg/kg	54.2	3.1	169	3.1	94.8	2.7	104	2.6	81.9	2.5	169
Mercury	20	20	20	300	0.3	mg/kg	ND	0.185	0.253	0.156	ND	0.152	ND	0.16	ND	0.161	0.253
Semivolatile organic compounds																	
Acenaphthene	4000	1000000	1000000	1.00E+07	500	ug/kg			1,420	828							1,420
Acenaphthylene	1000	600000	10000	1.00E+07	500	ug/kg			912	828							912
Anthracene	1000000	1000000	1000000	1.00E+07	1,000	ug/kg			4,590	828							4,590
Benzo(a)anthracene	7000	7000	7000	3000000	2,000	ug/kg			**12,500**	828							**12,500**
Benzo(a)pyrene	2000	2000	2000	300000	2,000	ug/kg			**12,700**	828							**12,700**
Benzo(b)fluoranthene	7000	7000	7000	3000000	2,000	ug/kg			**16,400**	828							**16,400**
Benzo(g,h,i)perylene	1000000	1000000	1000000	1.00E+07	1,000	ug/kg			9,340	828							9,340
Benzo(k)fluoranthene	70000	70000	70000	1.00E+07	1,000	ug/kg			5,990	828							5,990
Biphenyl	50	6000	1000000	1.00E+07		ug/kg			**233**	191							**233**
Chrysene	70000	70000	70000	1.00E+07	2,000	ug/kg			13,800	828							13,800
Dibenz(a,h)anthracene	700	700	700	300000	500	ug/kg			**2,420**	828							**2,420**
Dibenzofuran	100000					ug/kg			1,340	828							1,340
Fluoranthene	1000000	1000000	1000000	1.00E+07	4,000	ug/kg			25,200	828							25,200
Fluorene	1000000	1000000	1000000	1.00E+07	1,000	ug/kg			2,030	828							2,030
Indeno(1,2,3-cd)pyrene	7000	7000	7000	3000000	1,000	ug/kg			**9,040**	828							**9,040**
Naphthalene	4000	20000	500000	1.00E+07	500	ug/kg			1,150	828							1,150
Phenanthrene	10000	500000	500000	1.00E+07	3,000	ug/kg			**22,000**	828							**22,000**
Pyrene	1000000	1000000	1000000	1.00E+07	4,000	ug/kg			25,600	828							25,600

Notes:
mg/kg= milligrams per kilogram (parts per million)
ND = not detected above the lab reporting limits shown
Bold/Highlighted values exceed MassDEP Most Stringent Standard
UCL- MassDEP Upper Concentration Limit
-- = Analyte not sampled for
ug/Kg = micrograms per kilogram (parts per billion)
NE = No Method 1 Standard or UCL available
14 Barnes Road =
16 Barnes Road =

Table 1A
Summary of Soil Sample Analytical Results-PCBs
Vacant Parcels
Cedar Road Barnes Road
Salem, MA

Sample ID & Depth Sample Date Soil Material										SS-31/0-1' 9/27/2023 Organics		SS-32/0-1' 9/27/2023 Organics		SS-33/0-1' 9/27/2023 Organics		SS-34/0-1' 9/27/2023 Organics		SS-35/0-1' 9/27/2023 Organics	
Compound Name	RCS-1	S-1 SOIL & GW-2	S-1 SOIL & GW-3	S-2 SOIL & GW-2	S-2 SOIL & GW-3	S-3 SOIL & GW-2	S-3 SOIL & GW-3	UCL	Units	Sample Result	Reporting Limit	Sample Result	Reporting Limit	Sample Result	Reporting Limit	Sample Result	Reporting Limit	Sample Result	Reporting Limit
Aroclor-1016	1000	1000	1000	4000	4000	4000	4000	100000	ug/kg	ND	86	ND	82	ND	79	ND	77	ND	78
Aroclor-1221	1000	1000	1000	4000	4000	4000	4000	100000	ug/kg	ND	86	ND	82	ND	79	ND	77	ND	78
Aroclor-1232	1000	1000	1000	4000	4000	4000	4000	100000	ug/kg	ND	86	ND	82	ND	79	ND	77	ND	78
Aroclor-1242	1000	1000	1000	4000	4000	4000	4000	100000	ug/kg	ND	86	ND	82	ND	79	ND	77	ND	78
Aroclor-1248	1000	1000	1000	4000	4000	4000	4000	100000	ug/kg	ND	86	ND	82	ND	79	ND	77	ND	78
Aroclor-1254	1000	1000	1000	4000	4000	4000	4000	100000	ug/kg	ND	86	ND	82	ND	79	ND	77	ND	78
Aroclor-1260	1000	1000	1000	4000	4000	4000	4000	100000	ug/kg	ND	86	ND	82	ND	79	ND	77	ND	78
Aroclor-1262	1000	1000	1000	4000	4000	4000	4000	100000	ug/kg	ND	86	ND	82	ND	79	ND	77	ND	78
Aroclor-1268	1000	1000	1000	4000	4000	4000	4000	100000	ug/kg	ND	86	ND	82	ND	79	ND	77	ND	78
PCBs (Total)	1000	1000	1000	4000	4000	4000	4000	100000	ug/kg	ND	86	ND	82	ND	79	ND	77	ND	78

Notes:
mg/kg= milligrams per kilogram (parts per million)
ND = not detected above the lab reporting limits shown
UCL- MassDEP Upper Concentration Limit
Bold/Highlighted values exceed MassDEP/EPA Unrestictive Use
-- = Analyte not sampled for
ug/Kg = micrograms per kilogram (parts per billion)
NE = No Method 1 Standard or UCL available
14 Barnes Road =
16 Barnes Road =
12 Cedar Road =
14Cedar Road=

Method 3 Imminent Hazard Risk Assessment for a Trespasser Exposed to Chemicals in Soil Shortform 2012 (sf12tsih)

Index

Tab	
EPCs	Table TSIH-1: Select chemicals and enter Exposure Point Concentrations (EPCs). Estimated risks are shown to the right.
C Eq	Table TSIH-2: Equations to calculate cancer risks
NC Eq	Table TSIH-3: Equations to calculate noncancer risks
Exp	Table TSIH-4: Definitions and exposure factors
Chem	Table TSIH-5: Chemical-specific data
Cyanide	Table TSIH-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
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Boston, MA 02108 USA
Telephone: (617) 556-1165
Fax: (617) 556-1006
Email: Lydia.Thompson@state.ma.us

Trespasser - Soil: Table TSIH-1
Exposure Point Concentration (EPC)
Based on Trespasser Ages 11-16 (Cancer) and 11-12 (Non-Cancer)

ShortForm Version 10-12
Vlookup Version v0315

ELCR (all chemicals) = 7.8E-07
HI (all chemicals) = 8.3E-02

****Do not insert or delete any rows****
Click on empty cell below and select OHM using arrow.

Oil or Hazardous Material	EPC (mg/kg)	$ELCR_{ingestion}$	$ELCR_{dermal}$	$ELCR_{total}$	Subchronic HQ_{ing}	Subchronic HQ_{derm}	HQ_{total}
ANTIMONY	7.08				6.3E-03	4.4E-03	1.1E-02
BARIUM	106				5.4E-04	3.7E-04	9.1E-04
BERYLLIUM	0.5				3.5E-05	2.5E-05	6.0E-05
CHROMIUM (TOTAL)	42.6				7.6E-04	5.2E-04	1.3E-03
LEAD	252				6.0E-02	5.0E-03	6.5E-02
NICKEL	17.2				3.0E-04	4.2E-04	7.3E-04
VANADIUM	69.2				2.7E-03	1.9E-03	4.6E-03
ZINC	169				2.0E-04	1.4E-04	3.4E-04
ACENAPHTHENE	1.42				7.6E-07	1.7E-06	2.5E-06
ACENAPHTHYLENE	0.912				3.2E-07	7.5E-07	1.1E-06
ANTHRACENE	4.59				4.9E-07	1.1E-06	1.6E-06
BENZO(a)ANTHRACENE	12.5	3.3E-08	1.7E-08	5.1E-08	4.4E-06	2.0E-06	6.5E-06
BENZO(a)PYRENE	12.7	3.4E-07	1.8E-07	5.2E-07	4.5E-06	2.1E-06	6.6E-06
BENZO(b)FLUORANTHENE	16.4	4.4E-08	2.3E-08	6.7E-08	5.8E-06	2.7E-06	8.5E-06
BENZO(g,h,i)PERYLENE	9.34				3.3E-06	7.7E-06	1.1E-05
BENZO(k)FLUORANTHENE	5.99	1.6E-09	8.3E-10	2.4E-09	2.1E-06	9.8E-07	3.1E-06
BIPHENYL, 1,1-	0.233	2.3E-11	1.8E-11	4.0E-11	1.7E-07	1.1E-07	2.8E-07
CHRYSENE	13.8	3.7E-09	1.9E-09	5.6E-09	4.9E-06	2.3E-06	7.2E-06
DIBENZO(a,h)ANTHRACENE	2.42	6.5E-08	3.4E-08	9.8E-08	8.6E-07	4.0E-07	1.3E-06
FLUORANTHENE	25.2				2.7E-05	6.2E-05	8.9E-05
FLUORENE	2.03				5.4E-07	1.2E-06	1.8E-06
INDENO(1,2,3-cd)PYRENE	9.04	2.4E-08	1.3E-08	3.7E-08	3.2E-06	1.5E-06	4.7E-06
NAPHTHALENE	1.15				6.1E-07	1.4E-06	2.0E-06
PHENANTHRENE	22				7.8E-06	1.8E-05	2.6E-05
PYRENE	25.6				9.1E-06	2.1E-05	3.0E-05

Note! Cr(VI) limit is 200 mg/kg due to contact dermititis.
Note! Lead IH HQ limit is 1, not 10.

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Trespasser - Soil: Table TSIH-2
Equations to Calculate Cancer Risk for a Trespasser (Age 11-16 years)

Vlookup Version v0315

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

$$ELCR_{derm} = LADD_{derm} * CSF$$

$$LADD_{derm} = \frac{[OHM]_{soil} * SA * RAF_{c\text{-}derm} * SAF * EF_{derm} * ED * EP * C}{BW * AP_{lifetime}}$$

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
$EF_{ing,derm}$	0.164	event/day
ED	1	day/event
EP	5	years
C	0.000001	kg/mg
BW	48.2	kg
$AP_{(lifetime)}$	70	years
SA	2796	cm^2 / day
SAF	0.14	mg/cm^2

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Trespasser - Soil: Table TSIH-3
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

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Trespasser - Soil: Table TSIH-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)
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_{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
$EP_{(11\text{-}16)}$ - Exposure Period for age group 11-16	5	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
$BW_{(11\text{-}16)}$ - Body Weight for age group 11-16	48.2	kg	Ibid
$AP_{subchronic}$ - Averaging Period for subchronic noncancer	0.577	years	30 weeks
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.
$SA_{(11\text{-}16)}$ - Surface Area for age group 11-16	2796.1	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.

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Trespasser - Soil: Table TSIH-5
Chemical-Specific Data

Vlookup Version v0315

Oil or Hazardous Material	CSF $(mg/kg\text{-}day)^{-1}$	$RAF_{c\text{-}ing}$	$RAF_{c\text{-}derm}$	Subchronic RfD mg/kg-day	Subchronic $RAF_{nc\text{-}ing}$	Subchronic $RAF_{nc\text{-}derm}$
ANTIMONY				4.0E-04	1	0.1
BARIUM				7.0E-02	1	0.1
BERYLLIUM				5.0E-03	1	0.1
CHROMIUM (TOTAL)				2.0E-02	1	0.1
LEAD				7.5E-04	0.5	0.006
NICKEL				2.0E-02	1	0.2
VANADIUM				9.0E-03	1	0.1
ZINC				3.0E-01	1	0.1
ACENAPHTHENE				2.0E-01	0.3	0.1
ACENAPHTHYLENE				3.0E-01	0.3	0.1
ANTHRACENE				1.0E+00	0.3	0.1
BENZO(a)ANTHRACENE				3.0E-01	0.3	0.02
BENZO(a)PYRENE				3.0E-01	0.3	0.02
BENZO(b)FLUORANTHENE				3.0E-01	0.3	0.02
BENZO(g,h,i)PERYLENE				3.0E-01	0.3	0.1
BENZO(k)FLUORANTHENE				3.0E-01	0.3	0.02
BIPHENYL, 1,1-				5.0E-01	1	0.1
CHRYSENE				3.0E-01	0.3	0.02
DIBENZO(a,h)ANTHRACENI				3.0E-01	0.3	0.02
FLUORANTHENE				1.0E-01	0.3	0.1
FLUORENE				4.0E-01	0.3	0.1
INDENO(1,2,3-cd)PYRENE				3.0E-01	0.3	0.02
NAPHTHALENE				2.0E-01	0.3	0.1

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Trespasser - Soil: Table TSIH-6
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) $_{11\text{-}12}$	40.3	kg
IR $_{(1\text{-time reasonable max})}$	50	mg
Conversion Factor	1.0E-06	kg soil / mg soil
RAF	1	(unitless)

The toxicological basis for estimating an allowable one-time 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

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Trespasser - Soil: Table TSIH-6
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:

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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.

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APPENDIX B

New England Testing Laboratory, Inc.
(401) 353-3420

REPORT OF ANALYTICAL RESULTS

NETLAB Work Order Number: 3I29014
Client Project: 1843 - 16 Barnes Rd, Salem

Report Date: 06-October-2023

Prepared for:

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Blackstone Environmental Solutions
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Shrewsbury, MA 01545

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Samples Submitted :

The samples listed below were submitted to New England Testing Laboratory on 09/29/23. The group of samples appearing in this report was assigned an internal identification number (case number) for laboratory information management purposes. The client's designations for the individual samples, along with our case numbers, are used to identify the samples in this report. This report of analytical results pertains only to the sample(s) provided to us by the client which are indicated on the custody record. The case number for this sample submission is 3I29014. Custody records are included in this report.

Lab ID	Sample	Matrix	Date Sampled	Date Received
3I29014-01	SS-31/0-1'	Soil	09/27/2023	09/29/2023
3I29014-02	SS-32/0-1'	Soil	09/27/2023	09/29/2023
3I29014-03	SS-33/0-1'	Soil	09/27/2023	09/29/2023
3I29014-04	SS-34/0-1'	Soil	09/27/2023	09/29/2023
3I29014-05	SS-35/0-1'	Soil	09/27/2023	09/29/2023

Request for Analysis

At the client's request, the analyses presented in the following table were performed on the samples submitted.

SS-31/0-1' (Lab Number: 3I29014-01)

Analysis	Method
Antimony	EPA 6010C
Arsenic	EPA 6010C
Barium	EPA 6010C
Beryllium	EPA 6010C
Cadmium	EPA 6010C
Chromium	EPA 6010C
Lead	EPA 6010C
Mercury	EPA 7471B
Nickel	EPA 6010C
PCBs	EPA 8082A
Selenium	EPA 6010C
Silver	EPA 6010C
Thallium	EPA 6010C
Vanadium	EPA 6010C
Zinc	EPA 6010C

SS-32/0-1' (Lab Number: 3I29014-02)

Analysis	Method
Antimony	EPA 6010C
Arsenic	EPA 6010C
Barium	EPA 6010C
Beryllium	EPA 6010C
Cadmium	EPA 6010C
Chromium	EPA 6010C
Lead	EPA 6010C
Mercury	EPA 7471B
Nickel	EPA 6010C
PCBs	EPA 8082A
Selenium	EPA 6010C
Semivolatile Organic Compounds	EPA 8270D
Silver	EPA 6010C
Thallium	EPA 6010C
Vanadium	EPA 6010C
Zinc	EPA 6010C

SS-33/0-1' (Lab Number: 3I29014-03)

Analysis	Method
Antimony	EPA 6010C
Arsenic	EPA 6010C
Barium	EPA 6010C
Beryllium	EPA 6010C
Cadmium	EPA 6010C
Chromium	EPA 6010C
Lead	EPA 6010C
Mercury	EPA 7471B
Nickel	EPA 6010C
PCBs	EPA 8082A
Selenium	EPA 6010C
Silver	EPA 6010C

Request for Analysis (continued)

SS-33/0-1' (Lab Number: 3I29014-03) (continued)

Analysis	Method
Thallium	EPA 6010C
Vanadium	EPA 6010C
Zinc	EPA 6010C

SS-34/0-1' (Lab Number: 3I29014-04)

Analysis	Method
Antimony	EPA 6010C
Arsenic	EPA 6010C
Barium	EPA 6010C
Beryllium	EPA 6010C
Cadmium	EPA 6010C
Chromium	EPA 6010C
Lead	EPA 6010C
Mercury	EPA 7471B
Nickel	EPA 6010C
PCBs	EPA 8082A
Selenium	EPA 6010C
Silver	EPA 6010C
Thallium	EPA 6010C
Vanadium	EPA 6010C
Zinc	EPA 6010C

SS-35/0-1' (Lab Number: 3I29014-05)

Analysis	Method
Antimony	EPA 6010C
Arsenic	EPA 6010C
Barium	EPA 6010C
Beryllium	EPA 6010C
Cadmium	EPA 6010C
Chromium	EPA 6010C
Lead	EPA 6010C
Mercury	EPA 7471B
Nickel	EPA 6010C
PCBs	EPA 8082A
Selenium	EPA 6010C
Silver	EPA 6010C
Thallium	EPA 6010C
Vanadium	EPA 6010C
Zinc	EPA 6010C

Method References

Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, SW846, USEPA

Case Narrative

Sample Receipt:

The samples associated with this work order were received in appropriately cooled and preserved containers. The chain of custody was adequately completed and corresponded to the samples submitted.

Exceptions: None

Analysis:

All samples were prepared and analyzed within method specified holding times and according to NETLAB's documented standard operating procedures. The results for the associated calibration, method blank and laboratory control sample (LCS) were within method specified quality control requirements and allowances. Results for all soil samples, unless otherwise indicated, are reported on a dry weight basis.

Exceptions: None

Results: Total Metals

Sample: SS-31/0-1'

Lab Number: 3I29014-01 (Soil)

Analyte	Result	Qual	Reporting Limit	Units	Date Prepared	Date Analyzed
Antimony	**7.08**		1.01	mg/kg	10/02/23	10/05/23
Arsenic	**5.12**		1.53	mg/kg	10/02/23	10/05/23
Barium	**38.7**		0.51	mg/kg	10/02/23	10/05/23
Beryllium	ND		0.51	mg/kg	10/02/23	10/05/23
Cadmium	ND		0.77	mg/kg	10/02/23	10/05/23
Chromium	**9.78**		0.77	mg/kg	10/02/23	10/05/23
Lead	**41.7**		0.77	mg/kg	10/02/23	10/05/23
Mercury	ND		0.185	mg/kg	10/02/23	10/02/23
Nickel	**7.68**		0.77	mg/kg	10/02/23	10/05/23
Selenium	ND		1.53	mg/kg	10/02/23	10/05/23
Silver	ND		1.53	mg/kg	10/02/23	10/05/23
Vanadium	**31.7**		0.51	mg/kg	10/02/23	10/05/23
Zinc	**54.2**		3.1	mg/kg	10/02/23	10/05/23
Thallium	ND		0.51	mg/kg	10/02/23	10/05/23

Results: Total Metals

Sample: SS-32/0-1'

Lab Number: 3I29014-02 (Soil)

Analyte	Result	Qual	Reporting Limit	Units	Date Prepared	Date Analyzed
Antimony	**2.52**		1.01	mg/kg	10/02/23	10/05/23
Arsenic	**5.46**		1.53	mg/kg	10/02/23	10/05/23
Barium	**106**		0.50	mg/kg	10/02/23	10/05/23
Beryllium	ND		0.50	mg/kg	10/02/23	10/05/23
Cadmium	**1.42**		0.76	mg/kg	10/02/23	10/05/23
Chromium	**42.6**		0.76	mg/kg	10/02/23	10/05/23
Lead	**252**		0.76	mg/kg	10/02/23	10/05/23
Mercury	**0.253**		0.156	mg/kg	10/02/23	10/02/23
Nickel	**17.2**		0.76	mg/kg	10/02/23	10/05/23
Selenium	ND		1.53	mg/kg	10/02/23	10/05/23
Silver	ND		1.53	mg/kg	10/02/23	10/05/23
Vanadium	**69.2**		0.50	mg/kg	10/02/23	10/05/23
Zinc	**169**		3.1	mg/kg	10/02/23	10/05/23
Thallium	ND		0.50	mg/kg	10/02/23	10/05/23

Results: Total Metals

Sample: SS-33/0-1'

Lab Number: 3I29014-03 (Soil)

Analyte	Result	Qual	Reporting Limit	Units	Date Prepared	Date Analyzed
Antimony	ND		0.90	mg/kg	10/02/23	10/05/23
Arsenic	**3.72**		1.37	mg/kg	10/02/23	10/05/23
Barium	**41.5**		0.45	mg/kg	10/02/23	10/05/23
Beryllium	**0.49**		0.45	mg/kg	10/02/23	10/05/23
Cadmium	**0.70**		0.68	mg/kg	10/02/23	10/05/23
Chromium	**12.4**		0.68	mg/kg	10/02/23	10/05/23
Lead	**44.0**		0.68	mg/kg	10/02/23	10/05/23
Mercury	ND		0.152	mg/kg	10/02/23	10/02/23
Nickel	**14.2**		0.68	mg/kg	10/02/23	10/05/23
Selenium	ND		1.37	mg/kg	10/02/23	10/05/23
Silver	ND		1.37	mg/kg	10/02/23	10/05/23
Vanadium	**39.7**		0.45	mg/kg	10/02/23	10/05/23
Zinc	**94.8**		2.7	mg/kg	10/02/23	10/05/23
Thallium	ND		0.45	mg/kg	10/02/23	10/05/23

Results: Total Metals

Sample: SS-34/0-1'

Lab Number: 3I29014-04 (Soil)

Analyte	Result	Qual	Reporting Limit	Units	Date Prepared	Date Analyzed
Antimony	ND		0.85	mg/kg	10/02/23	10/05/23
Arsenic	**3.63**		1.29	mg/kg	10/02/23	10/05/23
Barium	**58.1**		0.42	mg/kg	10/02/23	10/05/23
Beryllium	**0.50**		0.42	mg/kg	10/02/23	10/05/23
Cadmium	**0.92**		0.64	mg/kg	10/02/23	10/05/23
Chromium	**15.7**		0.64	mg/kg	10/02/23	10/05/23
Lead	**69.7**		0.64	mg/kg	10/02/23	10/05/23
Mercury	ND		0.160	mg/kg	10/02/23	10/02/23
Nickel	**13.8**		0.64	mg/kg	10/02/23	10/05/23
Selenium	ND		1.29	mg/kg	10/02/23	10/05/23
Silver	ND		1.29	mg/kg	10/02/23	10/05/23
Vanadium	**55.9**		0.42	mg/kg	10/02/23	10/05/23
Zinc	**104**		2.6	mg/kg	10/02/23	10/05/23
Thallium	ND		0.42	mg/kg	10/02/23	10/05/23

Results: Total Metals

Sample: SS-35/0-1'

Lab Number: 3I29014-05 (Soil)

Analyte	Result	Qual	Reporting Limit	Units	Date Prepared	Date Analyzed
Antimony	ND		0.83	mg/kg	10/02/23	10/05/23
Arsenic	**3.52**		1.25	mg/kg	10/02/23	10/05/23
Barium	**41.5**		0.41	mg/kg	10/02/23	10/05/23
Beryllium	**0.47**		0.41	mg/kg	10/02/23	10/05/23
Cadmium	**0.63**		0.63	mg/kg	10/02/23	10/05/23
Chromium	**15.8**		0.63	mg/kg	10/02/23	10/05/23
Lead	**46.5**		0.63	mg/kg	10/02/23	10/05/23
Mercury	ND		0.161	mg/kg	10/02/23	10/02/23
Nickel	**15.8**		0.63	mg/kg	10/02/23	10/05/23
Selenium	ND		1.25	mg/kg	10/02/23	10/05/23
Silver	ND		1.25	mg/kg	10/02/23	10/05/23
Vanadium	**36.0**		0.41	mg/kg	10/02/23	10/05/23
Zinc	**81.9**		2.5	mg/kg	10/02/23	10/05/23
Thallium	ND		0.41	mg/kg	10/02/23	10/05/23

Results: Semivolatile organic compounds

Sample: SS-32/0-1'

Lab Number: 3I29014-02 (Soil)

Analyte	Result	Qual	Reporting Limit	Units	Date Prepared	Date Analyzed
1,2,4-Trichlorobenzene	ND		828	ug/kg	09/30/23	10/04/23
1,2-Dichlorobenzene	ND		828	ug/kg	09/30/23	10/04/23
1,3-Dichlorobenzene	ND		828	ug/kg	09/30/23	10/04/23
1,4-Dichlorobenzene	ND		828	ug/kg	09/30/23	10/04/23
Phenol	ND		828	ug/kg	09/30/23	10/04/23
2,4,5-Trichlorophenol	ND		828	ug/kg	09/30/23	10/04/23
2,4,6-Trichlorophenol	ND		828	ug/kg	09/30/23	10/04/23
2,4-Dichlorophenol	ND		828	ug/kg	09/30/23	10/04/23
2,4-Dimethylphenol	ND		2100	ug/kg	09/30/23	10/04/23
2,4-Dinitrophenol	ND		2100	ug/kg	09/30/23	10/04/23
2,4-Dinitrotoluene	ND		828	ug/kg	09/30/23	10/04/23
2,6-Dinitrotoluene	ND		828	ug/kg	09/30/23	10/04/23
2-Chloronaphthalene	ND		828	ug/kg	09/30/23	10/04/23
2-Chlorophenol	ND		828	ug/kg	09/30/23	10/04/23
2-Methylnaphthalene	ND		828	ug/kg	09/30/23	10/04/23
Nitrobenzene	ND		828	ug/kg	09/30/23	10/04/23
2-Methylphenol	ND		828	ug/kg	09/30/23	10/04/23
2-Nitroaniline	ND		828	ug/kg	09/30/23	10/04/23
2-Nitrophenol	ND		2100	ug/kg	09/30/23	10/04/23
3,3'-Dichlorobenzidine	ND		2100	ug/kg	09/30/23	10/04/23
3-Nitroaniline	ND		828	ug/kg	09/30/23	10/04/23
4,6-Dinitro-2-methylphenol	ND		2100	ug/kg	09/30/23	10/04/23
4-Bromophenyl phenyl ether	ND		828	ug/kg	09/30/23	10/04/23
4-Chloro-3-methylphenol	ND		828	ug/kg	09/30/23	10/04/23
4-Chloroaniline	ND		828	ug/kg	09/30/23	10/04/23
4-Chlorophenyl phenyl ether	ND		828	ug/kg	09/30/23	10/04/23
4-Nitroaniline	ND		828	ug/kg	09/30/23	10/04/23
4-Nitrophenol	ND		2100	ug/kg	09/30/23	10/04/23
Acenaphthene	**1420**		828	ug/kg	09/30/23	10/04/23
Acenaphthylene	**912**		828	ug/kg	09/30/23	10/04/23
Aniline	ND		828	ug/kg	09/30/23	10/04/23
Anthracene	**4590**		828	ug/kg	09/30/23	10/04/23
Benzo(a)anthracene	**12500**		828	ug/kg	09/30/23	10/04/23
Benzo(a)pyrene	**12700**		828	ug/kg	09/30/23	10/04/23
Benzo(b)fluoranthene	**16400**		828	ug/kg	09/30/23	10/04/23
Benzo(g,h,i)perylene	**9340**		828	ug/kg	09/30/23	10/04/23
Benzo(k)fluoranthene	**5990**		828	ug/kg	09/30/23	10/04/23
Benzoic acid	ND		6370	ug/kg	09/30/23	10/04/23
Biphenyl	**233**		191	ug/kg	09/30/23	10/04/23
Bis(2-chloroethoxy)methane	ND		828	ug/kg	09/30/23	10/04/23
Bis(2-chloroethyl)ether	ND		828	ug/kg	09/30/23	10/04/23
Bis(2-chloroisopropyl)ether	ND		828	ug/kg	09/30/23	10/04/23
Bis(2-ethylhexyl)phthalate	ND		2550	ug/kg	09/30/23	10/04/23
Butyl benzyl phthalate	ND		828	ug/kg	09/30/23	10/04/23
Chrysene	**13800**		828	ug/kg	09/30/23	10/04/23
Di-n-octyl phthalate	ND		1270	ug/kg	09/30/23	10/04/23
Dibenz(a,h)anthracene	**2420**		828	ug/kg	09/30/23	10/04/23
Dibenzofuran	**1340**		828	ug/kg	09/30/23	10/04/23

Results: Semivolatile organic compounds (Continued)

Sample: SS-32/0-1' (Continued)

Lab Number: 3I29014-02 (Soil)

Analyte	Result	Qual	Reporting Limit	Units	Date Prepared	Date Analyzed
Diethyl phthalate	ND		828	ug/kg	09/30/23	10/04/23
Dimethyl phthalate	ND		2100	ug/kg	09/30/23	10/04/23
Di-n-butyl phthalate	ND		1270	ug/kg	09/30/23	10/04/23
Fluoranthene	**25200**		828	ug/kg	09/30/23	10/04/23
Fluorene	**2030**		828	ug/kg	09/30/23	10/04/23
Hexachlorobenzene	ND		828	ug/kg	09/30/23	10/04/23
Hexachlorobutadiene	ND		828	ug/kg	09/30/23	10/04/23
Hexachlorocyclopentadiene	ND		2100	ug/kg	09/30/23	10/04/23
Hexachloroethane	ND		828	ug/kg	09/30/23	10/04/23
Indeno(1,2,3-cd)pyrene	**9040**		828	ug/kg	09/30/23	10/04/23
Isophorone	ND		828	ug/kg	09/30/23	10/04/23
Naphthalene	**1150**		828	ug/kg	09/30/23	10/04/23
N-Nitrosodimethylamine	ND		828	ug/kg	09/30/23	10/04/23
N-Nitrosodi-n-propylamine	ND		828	ug/kg	09/30/23	10/04/23
N-Nitrosodiphenylamine	ND		828	ug/kg	09/30/23	10/04/23
Pentachlorophenol	ND		2100	ug/kg	09/30/23	10/04/23
Phenanthrene	**22000**		828	ug/kg	09/30/23	10/04/23
Pyrene	**25600**		828	ug/kg	09/30/23	10/04/23
m&p-Cresol	ND		1660	ug/kg	09/30/23	10/04/23
Pyridine	ND		828	ug/kg	09/30/23	10/04/23
Azobenzene	ND		828	ug/kg	09/30/23	10/04/23
Total Dichlorobenzene	ND		828	ug/kg	09/30/23	10/04/23

Surrogate(s)	Recovery%	Limits		
Nitrobenzene-d5	*76.5%*	*30-126*	09/30/23	10/04/23
p-Terphenyl-d14	*99.7%*	*40-130*	09/30/23	10/04/23
2-Fluorobiphenyl	*81.2%*	*34-130*	09/30/23	10/04/23
Phenol-d6	*62.4%*	*30-130*	09/30/23	10/04/23
2,4,6-Tribromophenol	*91.6%*	*30-135*	09/30/23	10/04/23
2-Fluorophenol	*60.5%*	*30-130*	09/30/23	10/04/23

Results: Polychlorinated Biphenyls (PCBs)

Sample: SS-31/0-1'

Lab Number: 3I29014-01 (Soil)

Analyte	Result	Qual	Reporting Limit	Units	Date Prepared	Date Analyzed
Aroclor-1016	ND		86	ug/kg	09/30/23	10/03/23
Aroclor-1221	ND		86	ug/kg	09/30/23	10/03/23
Aroclor-1232	ND		86	ug/kg	09/30/23	10/03/23
Aroclor-1242	ND		86	ug/kg	09/30/23	10/03/23
Aroclor-1248	ND		86	ug/kg	09/30/23	10/03/23
Aroclor-1254	ND		86	ug/kg	09/30/23	10/03/23
Aroclor-1260	ND		86	ug/kg	09/30/23	10/03/23
Aroclor-1262	ND		86	ug/kg	09/30/23	10/03/23
Aroclor-1268	ND		86	ug/kg	09/30/23	10/03/23
PCBs (Total)	ND		86	ug/kg	09/30/23	10/03/23

Surrogate(s)	Recovery%	Limits		
2,4,5,6-Tetrachloro-m-xylene (TCMX)	*77.2%*	*36.2-130*	09/30/23	10/03/23
Decachlorobiphenyl (DCBP)	*92.1%*	*43.3-130*	09/30/23	10/03/23

Results: Polychlorinated Biphenyls (PCBs)

Sample: SS-32/0-1'

Lab Number: 3I29014-02 (Soil)

Analyte	Result	Qual	Reporting Limit	Units	Date Prepared	Date Analyzed
Aroclor-1016	ND		82	ug/kg	09/30/23	10/03/23
Aroclor-1221	ND		82	ug/kg	09/30/23	10/03/23
Aroclor-1232	ND		82	ug/kg	09/30/23	10/03/23
Aroclor-1242	ND		82	ug/kg	09/30/23	10/03/23
Aroclor-1248	ND		82	ug/kg	09/30/23	10/03/23
Aroclor-1254	ND		82	ug/kg	09/30/23	10/03/23
Aroclor-1260	ND		82	ug/kg	09/30/23	10/03/23
Aroclor-1262	ND		82	ug/kg	09/30/23	10/03/23
Aroclor-1268	ND		82	ug/kg	09/30/23	10/03/23
PCBs (Total)	ND		82	ug/kg	09/30/23	10/03/23

Surrogate(s)	Recovery%	Limits		
2,4,5,6-Tetrachloro-m-xylene (TCMX)	*49.7%*	*36.2-130*	09/30/23	10/03/23
Decachlorobiphenyl (DCBP)	*61.1%*	*43.3-130*	09/30/23	10/03/23

Results: Polychlorinated Biphenyls (PCBs)

Sample: SS-33/0-1'

Lab Number: 3I29014-03 (Soil)

Analyte	Result	Qual	Reporting Limit	Units	Date Prepared	Date Analyzed
Aroclor-1016	ND		79	ug/kg	09/30/23	10/03/23
Aroclor-1221	ND		79	ug/kg	09/30/23	10/03/23
Aroclor-1232	ND		79	ug/kg	09/30/23	10/03/23
Aroclor-1242	ND		79	ug/kg	09/30/23	10/03/23
Aroclor-1248	ND		79	ug/kg	09/30/23	10/03/23
Aroclor-1254	ND		79	ug/kg	09/30/23	10/03/23
Aroclor-1260	ND		79	ug/kg	09/30/23	10/03/23
Aroclor-1262	ND		79	ug/kg	09/30/23	10/03/23
Aroclor-1268	ND		79	ug/kg	09/30/23	10/03/23
PCBs (Total)	ND		79	ug/kg	09/30/23	10/03/23

Surrogate(s)	Recovery%	Limits		
2,4,5,6-Tetrachloro-m-xylene (TCMX)	*84.4%*	*36.2-130*	09/30/23	10/03/23
Decachlorobiphenyl (DCBP)	*58.1%*	*43.3-130*	09/30/23	10/03/23

Results: Polychlorinated Biphenyls (PCBs)

Sample: SS-34/0-1'

Lab Number: 3I29014-04 (Soil)

Analyte	Result	Qual	Reporting Limit	Units	Date Prepared	Date Analyzed
Aroclor-1016	ND		77	ug/kg	09/30/23	10/03/23
Aroclor-1221	ND		77	ug/kg	09/30/23	10/03/23
Aroclor-1232	ND		77	ug/kg	09/30/23	10/03/23
Aroclor-1242	ND		77	ug/kg	09/30/23	10/03/23
Aroclor-1248	ND		77	ug/kg	09/30/23	10/03/23
Aroclor-1254	ND		77	ug/kg	09/30/23	10/03/23
Aroclor-1260	ND		77	ug/kg	09/30/23	10/03/23
Aroclor-1262	ND		77	ug/kg	09/30/23	10/03/23
Aroclor-1268	ND		77	ug/kg	09/30/23	10/03/23
PCBs (Total)	ND		77	ug/kg	09/30/23	10/03/23

Surrogate(s)	Recovery%	Limits		
2,4,5,6-Tetrachloro-m-xylene (TCMX)	*64.6%*	*36.2-130*	09/30/23	10/03/23
Decachlorobiphenyl (DCBP)	*56.0%*	*43.3-130*	09/30/23	10/03/23

Results: Polychlorinated Biphenyls (PCBs)

Sample: SS-35/0-1'

Lab Number: 3I29014-05 (Soil)

Analyte	Result	Qual	Reporting Limit	Units	Date Prepared	Date Analyzed
Aroclor-1016	ND		78	ug/kg	09/30/23	10/03/23
Aroclor-1221	ND		78	ug/kg	09/30/23	10/03/23
Aroclor-1232	ND		78	ug/kg	09/30/23	10/03/23
Aroclor-1242	ND		78	ug/kg	09/30/23	10/03/23
Aroclor-1248	ND		78	ug/kg	09/30/23	10/03/23
Aroclor-1254	ND		78	ug/kg	09/30/23	10/03/23
Aroclor-1260	ND		78	ug/kg	09/30/23	10/03/23
Aroclor-1262	ND		78	ug/kg	09/30/23	10/03/23
Aroclor-1268	ND		78	ug/kg	09/30/23	10/03/23
PCBs (Total)	ND		78	ug/kg	09/30/23	10/03/23

Surrogate(s)	Recovery%	Limits		
2,4,5,6-Tetrachloro-m-xylene (TCMX)	*61.6%*	*36.2-130*	09/30/23	10/03/23
Decachlorobiphenyl (DCBP)	*55.1%*	*43.3-130*	09/30/23	10/03/23

Quality Control

Total Metals

Analyte	Result	Qual	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch: B3J0019 - Metals Digestion Soils										
Blank (B3J0019-BLK1)					Prepared & Analyzed: 10/02/23					
Selenium	ND		1.00	mg/kg						
Cadmium	ND		0.50	mg/kg						
Arsenic	ND		1.00	mg/kg						
Nickel	ND		0.50	mg/kg						
Beryllium	ND		0.33	mg/kg						
Chromium	ND		0.50	mg/kg						
Antimony	ND		0.66	mg/kg						
Lead	ND		0.50	mg/kg						
Vanadium	ND		0.33	mg/kg						
Barium	ND		0.33	mg/kg						
Zinc	ND		2.0	mg/kg						
Silver	ND		1.00	mg/kg						
Thallium	ND		0.33	mg/kg						
LCS (B3J0019-BS1)					Prepared: 10/02/23 Analyzed: 10/05/23					
Barium	115		0.33	mg/kg	100		115	85-115		
Cadmium	105		0.50	mg/kg	100		105	85-115		
Beryllium	22.2		0.33	mg/kg	20.0		111	85-115		
Chromium	104		0.50	mg/kg	100		104	85-115		
Lead	101		0.50	mg/kg	100		101	85-115		
Antimony	107		0.66	mg/kg	100		107	85-115		
Selenium	21.6		1.00	mg/kg	20.0		108	85-115		
Vanadium	107		0.33	mg/kg	100		107	85-115		
Zinc	110		2.0	mg/kg	100		110	85-115		
Nickel	102		0.50	mg/kg	100		102	85-112		
Arsenic	20.5		1.00	mg/kg	20.0		103	85-115		
Silver	44.3		1.00	mg/kg	40.0		111	85-115		
Thallium	100		0.33	mg/kg	100		100	85-115		

Quality Control
(Continued)

Total Metals (Continued)

Analyte	Result	Qual	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch: B3J0052 - Metals Cold-Vapor Mercury										
Blank (B3J0052-BLK1)					Prepared & Analyzed: 10/02/23					
Mercury	ND		0.100	mg/kg						
LCS (B3J0052-BS1)					Prepared & Analyzed: 10/02/23					
Mercury	0.360		0.100	mg/kg	0.357		101	93-114		
LCS Dup (B3J0052-BSD1)					Prepared & Analyzed: 10/02/23					
Mercury	0.365		0.100	mg/kg	0.357		102	93-114	1.44	200
Matrix Spike (B3J0052-MS1)		Source: 3I29003-01			Prepared & Analyzed: 10/02/23					
Mercury	0.741		0.184	mg/kg dry	0.658	0.133	92.5	80-120		
Matrix Spike (B3J0052-MS2)		Source: 3I29030-01			Prepared & Analyzed: 10/02/23					
Mercury	0.650		0.173	mg/kg dry	0.618	0.126	84.8	80-120		
Matrix Spike Dup (B3J0052-MSD1)		Source: 3I29003-01			Prepared & Analyzed: 10/02/23					
Mercury	0.684		0.165	mg/kg dry	0.588	0.133	93.6	80-120	8.11	20

Semivolatile organic compounds

Analyte	Result	Qual	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch: B3I1316 - 1_Semivolatiles Extractions										
Blank (B3I1316-BLK1)					Prepared: 09/30/23 Analyzed: 10/02/23					
1,2,4-Trichlorobenzene	ND		129	ug/kg						
1,2-Dichlorobenzene	ND		129	ug/kg						
1,3-Dichlorobenzene	ND		129	ug/kg						
1,4-Dichlorobenzene	ND		129	ug/kg						
Phenol	ND		129	ug/kg						
2,4,5-Trichlorophenol	ND		129	ug/kg						
2,4,6-Trichlorophenol	ND		129	ug/kg						
2,4-Dichlorophenol	ND		129	ug/kg						
2,4-Dimethylphenol	ND		328	ug/kg						
2,4-Dinitrophenol	ND		328	ug/kg						
2,4-Dinitrotoluene	ND		129	ug/kg						
2,6-Dinitrotoluene	ND		129	ug/kg						
2-Chloronaphthalene	ND		129	ug/kg						
2-Chlorophenol	ND		129	ug/kg						
2-Methylnaphthalene	ND		129	ug/kg						
Nitrobenzene	ND		129	ug/kg						
2-Methylphenol	ND		129	ug/kg						
2-Nitroaniline	ND		129	ug/kg						
2-Nitrophenol	ND		328	ug/kg						
3,3'-Dichlorobenzidine	ND		328	ug/kg						
3-Nitroaniline	ND		129	ug/kg						
4,6-Dinitro-2-methylphenol	ND		328	ug/kg						
4-Bromophenyl phenyl ether	ND		129	ug/kg						
4-Chloro-3-methylphenol	ND		129	ug/kg						
4-Chloroaniline	ND		129	ug/kg						
4-Chlorophenyl phenyl ether	ND		129	ug/kg						
4-Nitroaniline	ND		129	ug/kg						
4-Nitrophenol	ND		328	ug/kg						
Acenaphthene	ND		129	ug/kg						
Acenaphthylene	ND		129	ug/kg						
Aniline	ND		129	ug/kg						
Anthracene	ND		129	ug/kg						
Benzo(a)anthracene	ND		129	ug/kg						
Benzo(a)pyrene	ND		129	ug/kg						
Benzo(b)fluoranthene	ND		129	ug/kg						
Benzo(g,h,i)perylene	ND		129	ug/kg						
Benzo(k)fluoranthene	ND		129	ug/kg						
Benzoic acid	ND		993	ug/kg						
Biphenyl	ND		30	ug/kg						
Bis(2-chloroethoxy)methane	ND		129	ug/kg						
Bis(2-chloroethyl)ether	ND		129	ug/kg						
Bis(2-chloroisopropyl)ether	ND		129	ug/kg						
Bis(2-ethylhexyl)phthalate	ND		397	ug/kg						
Butyl benzyl phthalate	ND		129	ug/kg						
Chrysene	ND		129	ug/kg						
Di-n-octyl phthalate	ND		199	ug/kg						
Dibenz(a,h)anthracene	ND		129	ug/kg						
Dibenzofuran	ND		129	ug/kg						
Diethyl phthalate	ND		129	ug/kg						
Dimethyl phthalate	ND		328	ug/kg						
Di-n-butyl phthalate	ND		199	ug/kg						
Fluoranthene	ND		129	ug/kg						
Fluorene	ND		129	ug/kg						
Hexachlorobenzene	ND		129	ug/kg						
Hexachlorobutadiene	ND		129	ug/kg						
Hexachlorocyclopentadiene	ND		328	ug/kg						
Hexachloroethane	ND		129	ug/kg						

Semivolatile organic compounds (Continued)

Analyte	Result	Qual	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch: B3I1316 - 1_Semivolatiles Extractions (Continued)										
Blank (B3I1316-BLK1)					Prepared: 09/30/23 Analyzed: 10/02/23					
Indeno(1,2,3-cd)pyrene	ND		129	ug/kg						
Isophorone	ND		129	ug/kg						
Naphthalene	ND		129	ug/kg						
N-Nitrosodimethylamine	ND		129	ug/kg						
N-Nitrosodi-n-propylamine	ND		129	ug/kg						
N-Nitrosodiphenylamine	ND		129	ug/kg						
Pentachlorophenol	ND		328	ug/kg						
Phenanthrene	ND		129	ug/kg						
Pyrene	ND		129	ug/kg						
m&p-Cresol	ND		258	ug/kg						
Pyridine	ND		129	ug/kg						
Azobenzene	ND		129	ug/kg						
Total Dichlorobenzene	ND		129	ug/kg						
Surrogate: Nitrobenzene-d5			*1350*	ug/kg	*3310*		*40.7*	*30-126*		
Surrogate: p-Terphenyl-d14			*1510*	ug/kg	*3310*		*45.7*	*40-130*		
Surrogate: 2-Fluorobiphenyl			*1260*	ug/kg	*3310*		*38.2*	*34-130*		
Surrogate: Phenol-d6			*1200*	ug/kg	*3310*		*36.3*	*30-130*		
Surrogate: 2,4,6-Tribromophenol			*1230*	ug/kg	*3310*		*37.1*	*30-135*		
Surrogate: 2-Fluorophenol			*1220*	ug/kg	*3310*		*36.8*	*30-130*		
LCS (B3I1316-BS1)					Prepared: 09/30/23 Analyzed: 10/02/23					
1,2,4-Trichlorobenzene	1510		129	ug/kg	3310		45.7	40-130		
1,2-Dichlorobenzene	1470		129	ug/kg	3310		44.4	40-130		
1,3-Dichlorobenzene	1410		129	ug/kg	3310		42.6	40-130		
1,4-Dichlorobenzene	1360		129	ug/kg	3310		40.9	40-130		
Phenol	1470		129	ug/kg	3310		44.5	40-130		
2,4,5-Trichlorophenol	1680		129	ug/kg	3310		50.8	40-130		
2,4,6-Trichlorophenol	1680		129	ug/kg	3310		50.8	40-130		
2,4-Dichlorophenol	1670		129	ug/kg	3310		50.5	40-130		
2,4-Dimethylphenol	1560		328	ug/kg	3310		47.1	40-130		
2,4-Dinitrophenol	1530		328	ug/kg	3310		46.3	15-140		
2,4-Dinitrotoluene	1830		129	ug/kg	3310		55.2	40-130		
2,6-Dinitrotoluene	1800		129	ug/kg	3310		54.4	40-130		
2-Chloronaphthalene	1530		129	ug/kg	3310		46.1	40-130		
2-Chlorophenol	1490		129	ug/kg	3310		45.1	40-130		
2-Methylnaphthalene	1580		129	ug/kg	3310		47.7	40-130		
Nitrobenzene	1570		129	ug/kg	3310		47.4	40-130		
2-Methylphenol	1600		129	ug/kg	3310		48.3	40-130		
2-Nitroaniline	1890		129	ug/kg	3310		57.0	40-130		
2-Nitrophenol	1820		328	ug/kg	3310		54.9	40-130		
3-Nitroaniline	1920		129	ug/kg	3310		57.9	40-130		
4,6-Dinitro-2-methylphenol	1820		328	ug/kg	3310		54.9	30-130		
4-Bromophenyl phenyl ether	1810		129	ug/kg	3310		54.7	40-130		
4-Chloro-3-methylphenol	1690		129	ug/kg	3310		50.9	40-130		
4-Chlorophenyl phenyl ether	1800		129	ug/kg	3310		54.3	40-130		
4-Nitroaniline	1800		129	ug/kg	3310		54.5	40-130		
4-Nitrophenol	2050		328	ug/kg	3310		62.0	40-130		
Acenaphthene	1580		129	ug/kg	3310		47.7	40-130		
Acenaphthylene	1650		129	ug/kg	3310		49.7	40-130		
Anthracene	1890		129	ug/kg	3310		57.1	40-130		
Benzo(a)anthracene	1840		129	ug/kg	3310		55.5	40-130		
Benzo(a)pyrene	1910		129	ug/kg	3310		57.8	40-130		
Benzo(b)fluoranthene	1970		129	ug/kg	3310		59.4	40-130		
Benzo(g,h,i)perylene	1970		129	ug/kg	3310		59.5	40-130		
Benzo(k)fluoranthene	2010		129	ug/kg	3310		60.8	40-130		
Biphenyl	420		30	ug/kg	828		50.7	40-130		
Bis(2-chloroethoxy)methane	1690		129	ug/kg	3310		51.1	40-130		

Quality Control
(Continued)

Semivolatile organic compounds (Continued)

Analyte	Result	Qual	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch: B3I1316 - 1_Semivolatiles Extractions (Continued)										
LCS (B3I1316-BS1)					Prepared: 09/30/23 Analyzed: 10/02/23					
Bis(2-chloroethyl)ether	1580		129	ug/kg	3310		47.7	40-130		
Bis(2-chloroisopropyl)ether	1610		129	ug/kg	3310		48.7	40-130		
Bis(2-ethylhexyl)phthalate	2110		397	ug/kg	3310		63.8	40-130		
Butyl benzyl phthalate	2040		129	ug/kg	3310		61.7	40-130		
Chrysene	1920		129	ug/kg	3310		58.0	40-130		
Di-n-octyl phthalate	1920		199	ug/kg	3310		58.1	40-130		
Dibenz(a,h)anthracene	2010		129	ug/kg	3310		60.8	40-130		
Dibenzofuran	1700		129	ug/kg	3310		51.5	40-130		
Diethyl phthalate	1770		129	ug/kg	3310		53.6	40-130		
Dimethyl phthalate	1700		328	ug/kg	3310		51.3	40-130		
Di-n-butyl phthalate	2060		199	ug/kg	3310		62.3	40-130		
Fluoranthene	1990		129	ug/kg	3310		60.2	40-130		
Fluorene	1770		129	ug/kg	3310		53.3	40-130		
Hexachlorobenzene	1750		129	ug/kg	3310		52.7	40-130		
Hexachlorobutadiene	1670		129	ug/kg	3310		50.3	40-130		
Hexachlorocyclopentadiene	1650		328	ug/kg	3310		49.8	40-130		
Hexachloroethane	1460		129	ug/kg	3310		44.0	40-130		
Indeno(1,2,3-cd)pyrene	1900		129	ug/kg	3310		57.5	40-130		
Isophorone	1650		129	ug/kg	3310		49.9	40-130		
Naphthalene	1630		129	ug/kg	3310		49.1	40-130		
N-Nitrosodimethylamine	1340		129	ug/kg	3310		40.6	40-130		
N-Nitrosodi-n-propylamine	1580		129	ug/kg	3310		47.8	40-130		
N-Nitrosodiphenylamine	2180		129	ug/kg	3310		66.0	40-130		
Pentachlorophenol	1930		328	ug/kg	3310		58.1	15-140		
Phenanthrene	1880		129	ug/kg	3310		56.8	40-130		
Pyrene	1840		129	ug/kg	3310		55.6	40-130		
m&p-Cresol	1610		258	ug/kg	3310		48.6	40-130		
Surrogate: Nitrobenzene-d5			*1760*	ug/kg	*3310*		*53.0*	*30-126*		
Surrogate: p-Terphenyl-d14			*2060*	ug/kg	*3310*		*62.3*	*40-130*		
Surrogate: 2-Fluorobiphenyl			*1700*	ug/kg	*3310*		*51.3*	*34-130*		
Surrogate: Phenol-d6			*1660*	ug/kg	*3310*		*50.2*	*30-130*		
Surrogate: 2,4,6-Tribromophenol			*2260*	ug/kg	*3310*		*68.3*	*30-135*		
Surrogate: 2-Fluorophenol			*1630*	ug/kg	*3310*		*49.1*	*30-130*		

Semivolatile organic compounds (Continued)

Analyte	Result	Qual	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch: B3I1316 - 1_Semivolatiles Extractions (Continued)										
LCS Dup (B3I1316-BSD1)					Prepared: 09/30/23 Analyzed: 10/02/23					
1,2,4-Trichlorobenzene	1750		129	ug/kg	3310		52.8	40-130	14.4	30
1,2-Dichlorobenzene	1650		129	ug/kg	3310		49.7	40-130	11.2	30
1,3-Dichlorobenzene	1590		129	ug/kg	3310		48.1	40-130	12.1	30
1,4-Dichlorobenzene	1550		129	ug/kg	3310		47.0	40-130	13.7	30
Phenol	1620		129	ug/kg	3310		48.8	40-130	9.13	30
2,4,5-Trichlorophenol	1840		129	ug/kg	3310		55.7	40-130	9.16	30
2,4,6-Trichlorophenol	1870		129	ug/kg	3310		56.5	40-130	10.6	30
2,4-Dichlorophenol	1860		129	ug/kg	3310		56.3	40-130	10.7	30
2,4-Dimethylphenol	1700		328	ug/kg	3310		51.3	40-130	8.49	30
2,4-Dinitrophenol	842		328	ug/kg	3310		25.4	15-140	58.3	30
2,4-Dinitrotoluene	1910		129	ug/kg	3310		57.6	40-130	4.32	30
2,6-Dinitrotoluene	1940		129	ug/kg	3310		58.7	40-130	7.64	30
2-Chloronaphthalene	1710		129	ug/kg	3310		51.6	40-130	11.3	30
2-Chlorophenol	1710		129	ug/kg	3310		51.7	40-130	13.6	30
2-Methylnaphthalene	1800		129	ug/kg	3310		54.4	40-130	13.2	30
Nitrobenzene	1770		129	ug/kg	3310		53.5	40-130	12.1	30
2-Methylphenol	1750		129	ug/kg	3310		52.8	40-130	8.90	30
2-Nitroaniline	2010		129	ug/kg	3310		60.8	40-130	6.45	30
2-Nitrophenol	2170		328	ug/kg	3310		65.6	40-130	17.7	30
3-Nitroaniline	2050		129	ug/kg	3310		62.1	40-130	6.94	30
4,6-Dinitro-2-methylphenol	1560		328	ug/kg	3310		47.0	30-130	15.4	30
4-Bromophenyl phenyl ether	1960		129	ug/kg	3310		59.3	40-130	8.08	30
4-Chloro-3-methylphenol	1880		129	ug/kg	3310		56.9	40-130	11.1	30
4-Chlorophenyl phenyl ether	1890		129	ug/kg	3310		57.2	40-130	5.24	30
4-Nitroaniline	1900		129	ug/kg	3310		57.3	40-130	5.08	30
4-Nitrophenol	2080		328	ug/kg	3310		62.8	40-130	1.38	30
Acenaphthene	1800		129	ug/kg	3310		54.4	40-130	13.2	30
Acenaphthylene	1800		129	ug/kg	3310		54.5	40-130	9.17	30
Anthracene	2010		129	ug/kg	3310		60.6	40-130	6.05	30
Benzo(a)anthracene	1900		129	ug/kg	3310		57.3	40-130	3.19	30
Benzo(a)pyrene	2010		129	ug/kg	3310		60.6	40-130	4.80	30
Benzo(b)fluoranthene	2000		129	ug/kg	3310		60.5	40-130	1.80	30
Benzo(g,h,i)perylene	2020		129	ug/kg	3310		61.1	40-130	2.65	30
Benzo(k)fluoranthene	2070		129	ug/kg	3310		62.4	40-130	2.50	30
Biphenyl	470		30	ug/kg	828		56.7	40-130	11.2	30
Bis(2-chloroethoxy)methane	1920		129	ug/kg	3310		57.8	40-130	12.3	30
Bis(2-chloroethyl)ether	1760		129	ug/kg	3310		53.3	40-130	11.0	30
Bis(2-chloroisopropyl)ether	1800		129	ug/kg	3310		54.4	40-130	11.1	30
Bis(2-ethylhexyl)phthalate	2200		397	ug/kg	3310		66.5	40-130	4.15	30
Butyl benzyl phthalate	2120		129	ug/kg	3310		64.1	40-130	3.79	30
Chrysene	1950		129	ug/kg	3310		58.9	40-130	1.54	30
Di-n-octyl phthalate	1990		199	ug/kg	3310		60.2	40-130	3.58	30
Dibenz(a,h)anthracene	2020		129	ug/kg	3310		60.9	40-130	0.164	30
Dibenzofuran	1840		129	ug/kg	3310		55.5	40-130	7.59	30
Diethyl phthalate	1860		129	ug/kg	3310		56.1	40-130	4.63	30
Dimethyl phthalate	1800		328	ug/kg	3310		54.4	40-130	5.71	30
Di-n-butyl phthalate	2180		199	ug/kg	3310		65.9	40-130	5.61	30
Fluoranthene	2070		129	ug/kg	3310		62.5	40-130	3.78	30
Fluorene	1880		129	ug/kg	3310		56.8	40-130	6.32	30
Hexachlorobenzene	1860		129	ug/kg	3310		56.3	40-130	6.53	30
Hexachlorobutadiene	1920		129	ug/kg	3310		57.8	40-130	13.9	30
Hexachlorocyclopentadiene	1890		328	ug/kg	3310		56.9	40-130	13.5	30
Hexachloroethane	1640		129	ug/kg	3310		49.6	40-130	12.0	30
Indeno(1,2,3-cd)pyrene	1940		129	ug/kg	3310		58.6	40-130	1.83	30
Isophorone	1850		129	ug/kg	3310		55.9	40-130	11.4	30
Naphthalene	1840		129	ug/kg	3310		55.6	40-130	12.3	30
N-Nitrosodimethylamine	1530		129	ug/kg	3310		46.1	40-130	13.7	30

Quality Control
(Continued)

Semivolatile organic compounds (Continued)

Analyte	Result	Qual	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch: B3I1316 - 1_Semivolatiles Extractions (Continued)										
LCS Dup (B3I1316-BSD1)					Prepared: 09/30/23 Analyzed: 10/02/23					
N-Nitrosodi-n-propylamine	1810		129	ug/kg	3310		54.7	40-130	13.4	30
N-Nitrosodiphenylamine	2350		129	ug/kg	3310		71.1	40-130	7.44	30
Pentachlorophenol	1640		328	ug/kg	3310		49.4	15-140	16.3	30
Phenanthrene	1950		129	ug/kg	3310		59.0	40-130	3.83	30
Pyrene	1920		129	ug/kg	3310		57.9	40-130	3.95	30
m&p-Cresol	1800		258	ug/kg	3310		54.3	40-130	11.1	30
Surrogate: Nitrobenzene-d5			*2000*	ug/kg	*3310*		*60.5*	*30-126*		
Surrogate: p-Terphenyl-d14			*2190*	ug/kg	*3310*		*66.2*	*40-130*		
Surrogate: 2-Fluorobiphenyl			*1910*	ug/kg	*3310*		*57.7*	*34-130*		
Surrogate: Phenol-d6			*1830*	ug/kg	*3310*		*55.2*	*30-130*		
Surrogate: 2,4,6-Tribromophenol			*2400*	ug/kg	*3310*		*72.5*	*30-135*		
Surrogate: 2-Fluorophenol			*1800*	ug/kg	*3310*		*54.5*	*30-130*		

Quality Control
(Continued)

Polychlorinated Biphenyls (PCBs)

Analyte	Result	Qual	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch: B3I1318 - 1_Semivolatiles Extractions										
Blank (B3I1318-BLK1)					Prepared: 09/30/23 Analyzed: 10/03/23					
Aroclor-1016	ND		66	ug/kg						
Aroclor-1221	ND		66	ug/kg						
Aroclor-1232	ND		66	ug/kg						
Aroclor-1242	ND		66	ug/kg						
Aroclor-1248	ND		66	ug/kg						
Aroclor-1254	ND		66	ug/kg						
Aroclor-1260	ND		66	ug/kg						
Aroclor-1262	ND		66	ug/kg						
Aroclor-1268	ND		66	ug/kg						
PCBs (Total)	ND		66	ug/kg						
Surrogate: 2,4,5,6-Tetrachloro-m-xylene (TCMX)			*10.7*	ug/kg	*13.3*		*80.3*	*36.2-130*		
Surrogate: Decachlorobiphenyl (DCBP)			*13.2*	ug/kg	*13.3*		*98.7*	*43.3-130*		
LCS (B3I1318-BS1)					Prepared: 09/30/23 Analyzed: 10/03/23					
Aroclor-1016	146		66	ug/kg	167		87.4	58.2-125		
Aroclor-1260	144		66	ug/kg	167		86.2	65.5-130		
Surrogate: 2,4,5,6-Tetrachloro-m-xylene (TCMX)			*10.6*	ug/kg	*13.3*		*79.3*	*36.2-130*		
Surrogate: Decachlorobiphenyl (DCBP)			*12.4*	ug/kg	*13.3*		*93.1*	*43.3-130*		
LCS Dup (B3I1318-BSD1)					Prepared: 09/30/23 Analyzed: 10/03/23					
Aroclor-1016	147		66	ug/kg	167		88.3	58.2-125	1.08	20
Aroclor-1260	153		66	ug/kg	167		91.7	65.5-130	6.14	20
Surrogate: 2,4,5,6-Tetrachloro-m-xylene (TCMX)			*11.6*	ug/kg	*13.3*		*86.9*	*36.2-130*		
Surrogate: Decachlorobiphenyl (DCBP)			*12.9*	ug/kg	*13.3*		*96.9*	*43.3-130*		

Notes and Definitions

Item	Definition
Wet	Sample results reported on a wet weight basis.
ND	Analyte NOT DETECTED at or above the reporting limit.

NEW ENGLAND TESTING LABORATORY, INC.
59 Greenhill Street
West Warwick, RI 02893
1-888-863-8522

CHAIN OF CUSTODY RECORD

3 I 2 9014 X

PROJ. NO. 1843 | PROJECT NAME/LOCATION: 16 BARNES ROAD, Salem, MA

CLIENT: BLACKSTONE ENVIRONMENTAL SOLUTIONS, LLC

REPORT TO:

INVOICE TO: MICHAEL BRICHER

DATE	TIME	COMP	GRAB	SAMPLE I.D.	AQUEOUS	SOIL	OTHER	NO. OF CONTAINERS	PRESERVATIVE	TESTS** MCP 14 METALS	PCBs - 8082	SVOCs - 8270				REMARKS
9/27/23	12:50	X		SS-31/0-1'		X		1	—	X	X					
	1:10	X		SS-32/0-1'		X		1	—	X	X	X				
	1:30	X		SS-33/0-1'		X		1	—	X	X					
	1:55	X		SS-34/0-1'		X		1	—	X	X					
	2:15	X		SS-35/0-1'		X		1	—	X	X					

Sampled by: (Signature)	Date/Time	Received by: (Signature)	Date/Time
Matthew Bricher	9/27/23 4:00pm	BES Fridge	9/28/23 4:00 pm
Relinquished by: (Signature)	Date/Time	Received by: (Signature)	Date/Time
	9/30/23 1030		9/29 1030
Relinquished by: (Signature)	Date/Time	Received for Laboratory by: (Signature)	Date/Time
	9/29/550	LIR	9/24 1550

Laboratory Remarks:
Temp. received: 5
Cooled ☐

Special Instructions:
List Specific Detection Limit Requirements: MCP RCS-1 Soil STANDARDS

Turnaround (Business Days)

**NETlab subcontracts the following tests: Radiologicals, Radon, Asbestos, UCMRs, Perchlorate, Bromate, Bromide, Sieve, Salmonella, Carbamates, CT ETPH

MassDEP Analytical Protocol Certification Form

Laboratory Name: New England Testing Laboratory, Inc. Project #: 1843

Project Location: Salem, MA RTN:

This Form provides certifications for the following data set: list Laboratory Sample ID Number(s): 3I29014

Matrices: ☐ Groundwater/Surface Water ☒ Soil/Sediment ☐ Drinking Water ☐ Air ☐ Other:

CAM Protocol (check all that apply below):

8260 VOC CAM II A ☐	7470/7471 Hg CAM III B ☒	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 ☐	MassDEP EPH CAM IV B ☐	8151 Herbicides CAM V C ☐	8330 Explosives CAM VIII A ☐	TO-15 VOC CAM IX B ☐

Affirmative Responses to Questions A through F are 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
B	Were the analytical method(s) and all associated QC requirements specified in the selected CAM protocol(s) followed?	☒ Yes ☐ No
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
D	Does the laboratory report comply with all the reporting requirements specified in CAM VII A, "Quality Assurance and Quality Control Guidelines for the Acquisition and Reporting of Analytical Data"?	☒ Yes ☐ No
E	VPH, EPH, APH, and TO-15 only 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). b. APH and TO-15 Methods only: Was the complete analyte list reported for each method?	☐ Yes ☐ No ☐ Yes ☐ No
F	Were all applicable CAM protocol QC and performance standard non-conformances identified and evaluated in a laboratory narrative (including all "No" responses to Questions A through E)?	☒ Yes ☐ No

Responses to Questions G, H and I below are 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 performance 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 laboratory 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, is accurate and complete.

Signature: _____ **Position:** Laboratory Director

Printed Name: Richard Warila **Date**: 10/6/2023