FY22 MVP Action Grant
Sediment Management Report

City of Haverhill
Haverhill, Massachusetts

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City of Haverhill, Massachusetts

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1 Introduction

In support of a feasibility investigation for the removal of the Little River Dam located in Haverhill, Massachusetts, a supplemental environmental site assessment (ESA) was performed to obtain a sufficient dataset for required permitting and sediment management planning for impounded sediments that would potentially be mobilized as a result of dam removal. The subject area for this investigation was a segment of the Little River, between the dam at Winter Street and an overpass on Interstate 495 in Haverhill, Massachusetts.

1.1 Project Area Location and Description

The Little River flows from north to south, bounded to the east and west by a mix of commercial, residential, and open space use (including public park land and a cemetery). Additionally, a railroad runs north to south parallel to the river, along the eastern riverbank for approximately 3,500 feet north from the dam, then crossing the river on a bridge and running on the western side. Downstream of the dam at Winter Street, the river enters a culvert, eventually discharging to the Merrimack River approximately one-half mile southeast of the dam.

1.2 Project Objectives

A preliminary sediment quality investigation was conducted in November 2020 to provide a preliminary evaluation of sediment quality within the impounded portion of the Little River. The November 2020 field activities are described below, and generated field and analytical data supporting a preliminary evaluation of sediment management alternatives for the project. The purpose of the September 2021 supplemental ESA was to provide additional data regarding river sediment quality, in order to identify additional environmental conditions in the study area, and to further delineate previously identified areas of contamination which could warrant sediment removal or stabilization prior to changing the flow characteristics of the river due to full dam breach conditions.

The Massachusetts 401 Water Quality Certification process (enumerated at 314 CMR 9.00) requires that the sediment quality must be characterized at a rate of no less than one core per 1,000 cubic yards of material to be dredged as part of the project. Therefore, one primary objective of this sediment investigation has been the collection of data as necessary to support the 401 Water Quality Certification process. The parameters required are outlined below in *Section 2.1*.

In addition, sediments containing hazardous materials were encountered in 2020 in a portion of the river channel. In 2021, additional sampling was performed to further evaluate the nature and extent of sediment contamination in order to support a sediment management strategy specific to this material.

Thereafter, sediment management alternatives were evaluated. The evaluation, summarized herein, included evaluation and designation of sediment which warranted ex-situ handling and disposal, and material which may be allowed to redistribute downstream.

2 Field Investigations

Field investigations were performed in November 2020 and September 2021. Both investigations involved the collection of sediment samples for field characterization and laboratory analysis. The 2021 sampling activities included two separate mobilizations, to evaluate the breadth of sediment conditions along the reach, and to perform a more focused evaluation of sediment quality near the dam at the southern end of the project. The field activities are summarized below.

2.1 November 2020

A preliminary sediment quality investigation was conducted on November 17, 2020 and focused on the reach of the Little River north of Winter Street, in Haverhill, Massachusetts and extending approximately 3,500 feet northward, upstream to a bend in the Little River just south of the railroad overpass. During the November 2020 field investigation, the sediment cores were advanced through the presumed ponded sediment until the native substrate was identified by TG&B Marine Services, using increases in material resistance as an indicator of underlying native material. Fuss & O'Neill personnel logged the conditions of the recovered material, including recovery amount, texture (gradation), moisture content, color, odors, and observations of anthropogenic material. Samples at one (1) foot intervals were field-screened for total organic vapors (TOV) using a photoionization detector (PID). Refer to sediment boring logs in *Appendix A* and site photos in *Appendix B*.

The sediment evaluation was performed on three "transect" locations, with samples collected at the left and right banks and center of channel in each transect location. Grab samples were collected at three locations per transect across a total of three (3) sampling transects (Transect #1, Transect #2, and Transect #3) to provide an initial assessment of sediment quality along the lower reach of the Little River that is ponded by the Little River Dam. Transect locations are depicted on the attached *Figure 2*.

Three (3) composite sediment samples, each consisting of sediment from the left, right and center of the river channel at the respective transect, were submitted to Con-Test Analytical Laboratory (Con-Test, now Pace Analytical) in East Longmeadow, Massachusetts, and Thielsch Engineering in Cranston, Rhode Island, for the following parameters:

- Extractable petroleum hydrocarbons (EPHs) with Target Polycyclic Aromatic Hydrocarbons (PAHs) via MassDEP Method EPH rev 2.1,
- Total metals (Arsenic, Barium, Cadmium, Chromium, Copper, Lead, Mercury, Nickel, Selenium, Silver, and Zinc) via United States Environmental Protection Agency (USEPA) Method 6010D/7471B[1],
- Polychlorinated biphenyls (PCBs) via USEPA Method 8082A,
- Herbicides via USEPA Method 8151A,
- Pesticides via USEPA Method 8081B,
- Volatile organic compounds (VOCs) via USEPA Method 8260C,

[1] Metals list includes RCRA 8 Metals and Copper, Nickel, and Zinc applicable to the 314 CMR 9: 401 WQC

- Polycyclic aromatic hydrocarbons (PAHs) by the USEPA semi-volatile organic compound (SVOC) method, USEPA Method 8270 D-E,
- Total organic carbon (TOC) via USEPA Method 9060A, and
- Leachable lead via the Toxicity Characteristic Leaching Procedure (TCLP), USEPA Methods 1311 and 6010D; for one of three samples.[2]
- Particle size distribution report via sieve analysis (gradation test).
- A trip blank was collected to detect and identify any VOC contamination between samples during travel to and from the laboratory.

Detailed findings were included in a December 2020 summary report, and are summarized below. The analytical data set from the 2020 sampling is included herein as *Table 1*. Sediment analytical data were compared to the Consensus-Based Probable Effects Concentrations (PECs), per DD MacDonald et. al.[3] The data were further compared to MassDEP's Maximum Allowable Contaminant Levels (MACLs) for sediment reuse at lined Massachusetts landfills.[4] As a result of the November 2020 field investigation, Fuss & O'Neill developed the following preliminary conclusions regarding the sediment conditions:

- Sediment accumulation was observed at a lesser thickness in the vicinity of the dam (Transect #1) when compared to upstream transects (Transect #2 and Transect #3).
- The total concentrations of PCBs and VOCs for the samples collected at Transect #2 exceeded the MACL for reuse at a lined landfill.
- Levels of contaminants, specifically PAHs, identified in Transect #1 and Transect #2, which exceeded the respective PECs, warranted further assessment and delineation to determine the extent of impacted sediment and the overall stability of the material.

Following the November 2020 investigation, it was determined that additional investigation was warranted to further refine the conceptual site model.

2.2 September 2021

Utilizing the data and information collected during the November 2020 field investigation, Fuss & O'Neill developed a supplemental investigation to gather additional data to evaluate the nature and extent of PCB- and PAH-impacted sediment, and to complete the dataset required for future 401 WQC permitting. Additionally, the field investigation intended to provide more precise estimates of impacted sediment volume within the impounded portion of the Little River to better understand the level of effort that would be required for sediment removal and disposal. The 2021 investigation activities were generally divided into two phases, with the following objectives:

[2] A material may exhibit a characteristic of toxicity by leaching action if a total concentration exceeds 20-times the numerical characteristic levels for hazardous wastes per 40 CFR 261.24. TCLP analysis is performed to determine the actual leaching potential to demonstrate whether a material exhibits a toxicity characteristic and warrants management as hazardous waste.

[3] MacDonald et al., *Development and Evaluation of Consensus-Based Sediment Quality Guidelines for Freshwater Ecosystems*, 2000.

[4] MassDEP, 1994. *Interim Policy #COMM-94-007, Interim Policy for Sampling, Analysis, Handling and Tracking Requirements for Dredged Sediment Reused or Disposed at Massachusetts Permitted Landfills.*

- The "Breadth" phase involved the advancement of additional transects within the study area, to as far north as Interstate 495 (approximately 1.5 miles north and upstream of the dam), in order to gather additional data on the general sediment quality in the river. For the first phase, samples were collected at six (6) additional transects. The review of analytical data collected was used to inform the additional locations selected for more strategic sampling during the subsequent phase.
- The subsequent "Detail" phase involved the collection of grab samples of sediment in targeted areas, where contaminants of concern were identified during the Breadth phase and/or the 2020 investigation. These sampling activities were performed to determine the concentrations of contaminants of concern in greater detail and to further support an evaluation of contaminant mobility in the event of a sediment release.

The September 2021 field investigation focused upstream of Little River Dam just north of Winter Street, extending to near the I-495 bridge in Haverhill, Massachusetts. The Little River Dam forms the southern boundary of the study. A site location map is included in *Figure 1*.

Prior to the field investigation, due diligence was performed to assess the presence of known environmentally impacted sites in the surrounding area and potential preferential pathways for petroleum or other hazardous material (OHM) impacts (outfalls and other stormwater runoff entry points). In addition, in September 2021, Fuss & O'Neill reached out to National Grid USA Service Company, LLC (National Grid) to discuss the historical and current status of multiple known environmental conditions along the reach of the impounded section of the Little River, for which they are the Responsible Party (RP). The results of this due diligence and these discussions were used to better inform transect location selection for sediment quality analysis.

2.2.1 Breadth Phase

The first phase of the supplemental field investigation of the pond sediment was conducted on September 7 and 8, 2021, during which the sediment was measured, sampled, and observed at six locations between Winter Street and I-495. A total of six (6) transect locations (Transect #4, Transect #5, Transect #6, Transect #7, Transect #8, and Transect #9) were designated along the river upstream of the dam. These specified sample locations above were selected to provide a representative assessment of sediment quality along the reach of the Little River that is impounded by the Little River Dam, as sediment at these locations could become mobilized as a result of increased river velocity following dam removal.

At all transect locations, three sediment borings (i.e. river left, right, and center) were advanced by TG&B Marine Services, Inc. Borings were advanced using a slide hammer method under the supervision of Fuss & O'Neill. A site plan is included in *Figure 2*. Generally, TG&B Marine Services advanced the sediment cores through the presumed ponded sediment until the native substrate was identified based off of material resistance. Fuss & O'Neill personnel logged the sediment conditions, including depth and thickness of sediment, recovery amount, texture (gradation), moisture content, color, odors, and observations of anthropogenic material. Samples at one (1) foot intervals were field-screened for total organic vapors (TOV) using a photoionization detector (PID). Refer to sediment boring logs in *Appendix A* and site photos in *Appendix B*.

At each of the upstream transect locations, the three cores of recovered pond sediment were composited into one sample. A total of six (6) composite sediment samples were submitted to Pace Analytical (Pace, previously Con-Test) in East Longmeadow, Massachusetts, and Thielsch Engineering in Braintree, Massachusetts, for the following parameters:

- EPH via MassDEP Method EPH rev 2.1,
- Total metals (Arsenic, Cadmium, Chromium, Copper, Lead, Mercury, Nickel, and Zinc) via United States Environmental Protection Agency (USEPA) Method 6010D/7471B[5],
- PCBs via USEPA Method 8082A,
- Herbicides via USEPA Method 8151A,
- Pesticides via USEPA Method 8081B,
- VOCs via USEPA Method 8260C,
- PAHs by USEPA Method 8270 D-E,
- TOC via USEPA Method 9060A, and
- Leachable lead by TCLP via USEPA Method 6010D; for one of six samples.
- Particle size distribution report via ASTM D-6913
- Moisture content via ASTM – D2216
- A trip blank was collected to detect and identify any VOC contamination between samples during travel to and from the laboratory.

A summary of the sediment samples submitted for laboratory analysis is included below in *Table 2*.

Table 2
Summary of Sediment Samples – Breadth Sampling Program

Location	Sample Date	Sample Number	Composite Sample Depth Range (fbws)	TOV Result (ppmv)	Analysis
Transect #4	09/07/21	0907-04	4.0-14.1	0.2	EPH, Total Metals, PCB, Herbicides, Pesticides, VOC, PAH, TOC, Sieve, Moisture Content
Transect #5		0907-03	2.5-8.9	1.0	
Transect #6		0907-02	3.1-12	34.4	
Transect #7		0907-05	5.2-13.4	5.2	
Transect #8	09/08/21	0908-07	1.0-5.9	ND	
Transect #9		0908-08	1.0-4.5	0.7	

Notes: Only the last six digits of the sample identification number are listed.
ppmv: parts per million by volume
fbws: feet below water surface
ND: Below equipment detection limits

[5] Metals list applicable to 314 CMR 9: 401 Water Quality Certification

The general sediment conditions as observed in the borings included organic silt, occasionally overlain by fine gravel, which was observed to be underlain by a native horizon consisting of sandy silt. The borings observed at Transect #4, located immediately upstream from the dam, consisted of a shallow horizon of pond sediment of approximately one-half foot in depth. Similar sediment thickness of about one-half foot in depth was observed at Transect #7, Transect #8, and Transect #9 located further upstream from the Hilldale Cemetery to approximately 1,100 south of the I-495 bridge. The borings observed at Transect #5 and Transect #6, located approximately 1,500 feet upstream from the Little River Dam, were observed to have a greater accumulation of sediment from approximately 0.5 to 4.0 feet in thickness. More detailed information regarding water and sediment depth can be found in the sediment boring logs in *Appendix A*.

The TOV readings ranged from below the instrument detection limit (0.1 ppmv) to a maximum of 34.4 ppmv. The highest PID reading was recorded within the sediment material at Transect #6, river center. Petroleum odor was observed at the river right, left and center of Transect #6.

2.2.2 Detail Phase

The second phase of the supplemental field investigation of the pond sediment was conducted on September 17, 2021. Sediment conditions were measured, sampled, and observed within the context of the site. Specifically, samples were collected from areas between and around transects where hazardous materials had been identified during the earlier phases of work, in order to provide a more granular data set with respect to sediment conditions in those areas. As such, sample locations and parameters were targeted to conditions identified in the earlier phases, rather than the broad-based sampling guidance of the 401 Water Quality Certification regulations.

A total of ten (10) grab locations (SED-1, SED-2, SED-3, SED-4, SED-5, SED-6, SED-7, SED-8, SED-9, and SED-10) were designated along the river upstream of the dam. The grab samples were collected from individual points in the river sediment, and were submitted to the laboratory on a point-basis, in contrast to the composite samples submitted for each transect under the 2020 and 2021 Breadth phases of investigation. These specified sample locations above were selected to further delineate areas of concern identified during the previous sampling activities to provide more accurate estimate of impacted sediment quantity(s).

At all grab locations, sediment borings were advanced by TG&B Marine Services, Inc. Borings were advanced using a slide hammer method under the supervision of Fuss & O'Neill. A site plan is included as *Figure 2*.

At each of the ten upstream grab locations, up to 2.5 feet of each core of recovered pond sediment was composited into one sample. A total of ten (10) composite sediment samples were submitted to Pace in East Longmeadow, Massachusetts, and Thielsch Engineering in Braintree, Massachusetts, for the following parameters:

- EPHs via MassDEP Method EPH rev 2.1,
- Total metals (Arsenic and Lead) via USEPA Method 6010D,
- PCBs via USEPA Method 8082A,
- PAHs by USEPA Method 8270 D-E,

- Particle size distribution report via ASTM D-6913
- Moisture content via ASTM – D2216

A summary of the sediment samples submitted for laboratory analysis is included below in *Table 3*.

Table 3
Summary of Sediment Samples – Detailed Sampling Program

Location	Sample Date	Sample Number	Composite Sample Depth Range (fbws)	TOV Result (ppmv)	Analysis
SED-1	09/17/21	0917-01	0-2	1.5	Total Metals, PCBs, Sieve, Moisture Content
SED-2		0917-03	0-2	0.6	
SED-3		0917-02	0-2.5	2.5	
SED-4		0917-05	0-2	ND	Total Metals, PCB, PAHs, EPH fractions, Sieve, Moisture Content
SED-5		0917-06	0-2	0.1	
SED-6		0917-07	0-2	0.2	
SED-7		0917-04	0-2	ND	
SED-8		0917-10	0-1.6	0.1	
SED-9		0917-09	0-1	1.0	
SED-10		0917-08	0-0.9	ND	

Notes: Only the last six digits of the sample identification number are listed.
ppmv: parts per million by volume
fbws: feet below water surface
ND: Below equipment detection limits

The general subsurface conditions as observed in the borings included organic silt, occasionally overlain by fine gravel, which was observed to be underlain by a native horizon consisting of sandy silt. Sediment thickness observed were consistent with the observations described above at the transect locations. More detailed information regarding water and sediment depth is included in the sediment boring logs in *Appendix A*.

The TOV readings ranged from below the instrument detection limit (0.1 ppmv) to 2.5 ppmv. The highest PID reading was recorded within the sediment material at SED-3, river right. Petroleum odors were observed at sediment locations SED-2, SED-3, SED-8, SED-9, SED-10. In addition, a sheen was observed at SED-2. Sediment locations SED-2 and SED-3 were located in the immediate vicinity of Transect #2, while SED-8, SED-9 and SED-10 were located immediately upstream of the dam.

3 Analytical Results and Data Analysis

As noted above, analytical data from the 2020 event are included herein in *Table 1* and summarized in *Section 2.1*. Additional investigation was performed in 2021 to develop a more robust understanding of sediment quality within the reach.

3.1 Breadth Phase - Sediment Analytical Results and Data Analysis

The Pace and Thielsch Engineering laboratory analytical reports are included in *Appendix C*. Sediment analytical data is summarized in *Table 4*. The following is a summary of the sediment conditions based on the September 7 and 8, 2021 sampling event (note that a detection above a laboratory reporting limit does not necessarily indicate the exceedance of applicable regulatory criteria, which are discussed later in this section):

- A total of six (6) metals (arsenic, chromium, copper, lead, nickel, and zinc) were detected above the laboratory reporting limits in each of the six sediment composite samples. Cadmium and mercury were detected above laboratory reporting limits in the composite samples collected from Transect #5 and Transect #6. Additionally, mercury was detected above laboratory reporting limits in the composite sample collected from Transect #4.
    - The total lead concentration in Transect #6 was 260 mg/kg. The sample was analyzed for leachable lead via TCLP extraction. Leachable lead was detected at a concentration of 1.3 mg/l, less than the USEPA characteristic of toxicity (5.0 mg/l). Therefore, this material does not exhibit a characteristic of lead toxicity requiring hazardous waste management pursuant to 40 CFR 261.24.
- Total PCBs were detected above laboratory reporting limits in composite samples collected from Transects #5 and #6 at concentrations of 0.13 mg/kg and 0.33 mg/kg, respectively. PCBs were not detected above laboratory reporting limits in the remaining samples.
- PAHs were detected above laboratory reporting limits in four transect composite samples (Transect #4, Transect #5, Transect #6, and Transect #7) using USEPA Method 8270 and in all six transects by MassDEP EPH method. The highest aggregate PAHs concentration was reported in the composite sample collected from Transect #7 with a result of 133.04 mg/kg.
- EPH Ranges, specifically including C19-C36 aliphatic and C11-C12 aromatic hydrocarbons, were detected in all six transect composite samples above laboratory reporting limits. C9-C18 aliphatic hydrocarbons were detected in three samples, from Transects #4, #5 and #6. The maximum aggregate EPH concentration was reported in the sample from Transect #6, at a total concentration of 2,420 mg/kg.
- Nine VOCs, generally associated with petroleum, were detected above laboratory reporting limits in the sediment composite sample taken from one transect location (Transect #6). Six of the nine listed VOCs above were also detected above laboratory reporting limits in the composite sample taken from Transect #5. No VOCs were detected in the samples from Transects #4, #7, #8, or #9.
- TOC content was detected above laboratory reporting limits in all six sediment composite samples, ranging from 14,000 (1.4% by weight) to 91,000 mg/kg (9.1% by weight).
- Herbicides and pesticides were not detected above laboratory reporting limits in the six sediment composite samples.
- All results for the Trip Blank collected were below the laboratory detection limits.
- Sieve analysis indicated Transect #4 was grey clay and the other transects (Transect #5, Transect #6, Transect #7, Transect #8, and Transect #9) was grey clayey sand.

The sediment analytical results were compared to the MassDEP MACLs for Sediment Reuse at Lined Landfills (*Comm 94-007)* The following summarizes the exceedances when compared to the applicable sediment standards:

- The total VOC concentrations collected at Transect #6 (13.82 mg/kg) exceeded the MACL for sediment reuse at lined landfills.
- Total PAH concentration of 133.04 mg/kg collected at Transect #7 exceeded the MACL.

Sediment analytical data were further compared to consensus-based PECs. The PECs are "intended to identify contaminant concentrations above which harmful effects on sediment-dwelling organisms were expected to occur frequently"[6].

- The total Lead concentration of 260 mg/kg collected from Transect #6 exceeded the PEC.
- The total PCB concentration detected at Transect #5 and Transect #6 exceeded the PEC.
- The concentrations of multiple PAHs, including anthracene, fluorene, phenanthrene, and pyrene in samples from Transects #5, #6, and #7 exceeded the respective PECs. The aggregate PAH concentration of 133.04 mg/kg in the sample from Transect #7 exceeded the MACL.
- The concentration of naphthalene detected in Transect #6 exceeded the PEC.
- EPH compounds anthracene, benzo(a)anthracene, benzo(a)pyrene, chrysene, fluoranthene, fluorene, naphthalene, phenanthrene, and pyrene from Transect #4 – Transect #8 exceeded their respective PEC.

All other analytical data was below applicable PECs and MACLs.

3.2 Detail Phase - Sediment Analytical Results and Data Analysis

The Pace and Thielsch Engineering laboratory analytical reports are included in *Appendix C*. Sediment analytical data is summarized in *Table 5*. The following is a summary of the sediment conditions based on the September 17, 2021 sampling event (note that a detection above a laboratory reporting limit does not necessarily indicate the exceedance of applicable regulatory criteria, which are discussed later in this section):

- Lead was detected above the laboratory reporting limits in each of the ten individual sediment composite samples. The concentrations in eight of ten samples ranged from 150 to 600 mg/kg. Arsenic was detected above the laboratory limits for all individual sediment composite samples except for the SED-5 sample location.
- Total PCBs were detected above laboratory reporting limits in samples collected from SED-1, SED-2, and SED-4 at a concentration of 0.20 mg/kg, 0.23 mg/kg, and 0.20 mg/kg, respectfully. PCBs were not detected above laboratory reporting limits in the remaining seven sample locations.

[6] MacDonald et al., *Development and Evaluation of Consensus-Based Sediment Quality Guidelines for Freshwater Ecosystems*, 2000.

- A total of 16 PAH compounds were detected above laboratory reporting limits in six sample locations (SED-4, SED-6, SED-7, SED-8, SED-9, and SED-10). The highest total PAHs were reported in the composite sample collected from SED-10 with a result of 99.03 mg/kg.
- EPH fractions were detected in six sample locations above laboratory reporting limits. The maximum total EPH (C9-C18 aliphatics, C19-C36 aliphatics, and C11-C22 aromatics) was 1,059 mg/kg in sediment sample SED-4.
- Sieve analysis indicated SED-5 was dark brown clayey sand and SED-6 was dark brown clay. The moisture content for SED-5 and SED-6 was 28.7% and 56.0%, respectively.

The sediment analytical results were compared to the MassDEP MACLs for Sediment Reuse at Lined Landfills (*Comm 94-007)* The following summarizes the exceedances when compared to the applicable sediment standards:

- The total arsenic concentration of sample location SED-3 (41 mg/kg) exceeded the MACL (40 mg/kg).
- The aggregate PAH concentration in sediment sample SED-10 (99.03 mg/kg) was effectively equal to the MACL (100 mg/kg).

Sediment analytical data were further compared to consensus-based PECs. The PECs are "intended to identify contaminant concentrations above which harmful effects on sediment-dwelling organisms were expected to occur frequently"[7].

- The total lead concentrations in eight of the ten sample locations (SED-1, SED-2, SED-3, SED-4, SED-6, SED-8, SED-9, and SED-10) ranged from 150 to 600 mg/kg, which exceeded the PEC of 128 mg/kg.
- The total arsenic concentration of sample location SED-3 (41 mg/kg) exceeded the PEC (33 mg/kg).
- Anthracene, fluorene, 2-methylnaphthalene, naphthalene, phenanthrene, and/or pyrene collected from SED-4, SED-6, SED-7, SED-8, SED-9, and SED-10 exceeded their respective PECs. In addition, naphthalene detected in Transect #6 exceeded the PEC. Total PAH concentrations of SED-9 (36.59 mg/kg) and SED-10 (99.03 mg/kg) exceeded the PEC.

Sediment grab samples SED-1 through SED-3 were obtained as part of the detail phase were collected from areas adjacent to Transect #2 (where PAHs, PCBs and VOCs were detected previously). The remaining grab samples were collected immediately upstream of the dam within an approximately 200-foot reach. Therefore, sediment management strategies to address these conditions can be localized to the areas identified herein.

The additional 2021 sampling now indicates that approximately 1,000 cubic yards of sediment will have to be dredged and disposed of as regulated waste. The area of this impacted sediment was determined through sampling conducted in 2020 and during the September 2021 sediment quality investigation.

[7] MacDonald et al., *Development and Evaluation of Consensus-Based Sediment Quality Guidelines for Freshwater Ecosystems*, 2000.

The area of impacted sediment was then multiplied by the measured average depth of sediment to come up with the approximated volumetric estimate.

4 Conclusions

- In September 2021, Fuss & O'Neill performed a supplemental environmental site assessment (ESA) to obtain a sufficient dataset for required permitting and sediment management planning for impounded sediments that would potentially be mobilized as a result of removal of the Little River Dam in Haverhill, Massachusetts. Fuss & O'Neill developed the following conclusions in reference to the sediment conditions: Sediment in two general areas, including the vicinity of Transect #2 (performed in 2020) and the area immediately upstream of the dam, contains concentrations of hazardous materials, including PAHs, metals, and to a more localized extent VOCs and PCBs, which exceed the PECs.
- As noted in the 2020 sediment quality memorandum, the PCB condition may trigger ex-situ management of sediment from the vicinity of Transect #2.
- The majority of the reported concentrations that constituted hazardous materials in sediment were less than the MACLs and therefore, excavated sediment could generally be managed for disposal in lined in-state landfills. However, PCB-contaminated materials and sediment containing VOCs or PAHs at levels exceeding the MACLs may warrant specialized disposal.
- For dam removal, it was assumed that approximately 5,000 cubic yards of sediment will be removed from the river and sent for off-site disposal in order to re-establish the main river channel. It is assumed that approximately 1,000 cubic yards of that material will have to be disposed of as regulated waste. The balance (4,000 cubic yards) can be disposed of in lined landfills within the State.
- Based on the current information, the majority of the accumulated sediment in the impoundment does not represent a hazard to humans or the aquatic environment. With the approval of permitting agencies, the non-hazardous sediments can be allowed to redistribute naturally downstream or can be reused within the impoundment area.
- Analytical data showed that concentrations in the non-hazardous waste sediments were below applicable PECs and MACLs. The PEC exceedances in Transect #5, Transect #6, and Transect #7, while generally consistent with background conditions in area industrialized waterways, may warrant further consideration by the permitting agencies in the event that sediment release is proposed. If the permitting agencies decide to require relocation, removal, or stabilization of all sediment with an exceedance of the PEC, it would require management of the remaining mobile sediment.

5 Recommendations and Cost Estimate

The conclusions developed from both the November 2020 and September 2021 assessment activities have been used to identify and evaluate discrete areas of contamination within the impounded stretch of the Little River. This has allowed Fuss & O'Neill to identify a preferred sediment management measure and to develop an order of magnitude cost estimate for such activities. These recommendations and assumptions were developed in conjunction with the evaluation of the scour potential of these sediments which was conducted concurrently as part of this feasibility study. The scour potential of these sediments and the approximate volumes of scour-prone sediments were vital to the process of

confirming the most appropriate sediment management measure or combination of measures to be recommended for this project. Based upon the information obtained to date, the following sediment management strategy is recommended:

Dredging of Impacted Materials

Fuss & O'Neill recommends dredging to remove those sediments which may pose a threat to ecological and/or human health if mobilized following dam removal. These sediments specifically consist of those materials located in the vicinity of Transect #2, between Little River Street on the upstream end and Apple Street on the downstream end. The remaining mobile sediment, which generally is located behind the dam, can be released as the levels of metals, PAHs and petroleum hydrocarbons are broadly consistent with urban background conditions and do not pose a unique ecological risk to the receiving waterways. As a result, the overall volume of sediment specifically excavated and handled for offsite upland disposal would be substantially less than the volume proposed for downstream release.

A staging area will be required to store, further characterize, and potentially dewater, materials before shipment to an appropriate disposal facility. Most dam removal projects allow for excavation of sediments in the dry by way of dewatering of the impoundment and conveyance of river flow in a confined temporary channel or conduit. This would be the recommended approach for this project; however, it may still be necessary to accommodate space for dredged material to be dewatered before removal from the site.

The advantage of this recommended alternative is that the hazardous sediments would be removed from the river bottom to the extent possible, therefore eliminating the future risk of impacts on human and/or ecological health and migration downstream and into the Merrimack River once the Little River Dam has been removed. This alternative, if desired results are achieved, would potentially allow for greater access to the Little River for recreational purposes. In addition, while potentially more costly upfront, dredging does not pose a large protracted financial obligation for the City as compared to in-place stabilization of the hazardous sediments.

Management of the Remaining Sediment Materials

Per 314 CMR 9.06, MassDEP provides performance standards related to the discharge of sediment from dredging projects. These performance standards relate to demonstration that the sediment release will not significantly detrimentally affect downstream areas. Additional sediment removal may be required based on MassDEP review of the 401 Water Quality Certification submittal. Based on the current information, the majority of the accumulated sediment in the impoundment does not represent a hazard to humans or the aquatic environment since it is reflective of background conditions within the highly industrialized corridor of the Little River and the Merrimack River. With the approval of permitting agencies, the non-hazardous sediments can be allowed to redistribute naturally downstream. Hydraulic modeling performed in the 2020 feasibility study has shown that these sediments will pass through the downstream flood conduit without issue and ultimately out to the Merrimack River.

Some of this accumulated sediment may also be used for grading of the adjacent pond bottom floodplain area, as well as the channel grading itself. The permitting of sediment management including subsequent grading on the pond bottom could potentially be affected by the ownership of the property

beneath the impoundment. It is currently assumed that the City, once it takes ownership of the dam, is also responsible for the sediments behind the dam and therefore has access and control of the property associated with those sediments. We understand that the City is in the process of confirming that.

Cost Estimate

This most recent sediment quality and quantity data indicates that the potential cost for this project has increased a small amount but has not changed substantially since the opinion of probable construction cost was developed in 2020. Specifically based on the estimated volume of approximately 1,000 cubic yards, or roughly 1,500 dry tons, of hazardous material that will require removal and offsite disposal, and an average unit price $300/ton for the disposal of PCB-impacted sediment, we estimate an overall disposal cost of $400,000 to $500,000. This estimated cost would be in addition to costs associated with the excavation, drying, and upland handling of the material. As previously proposed, another approximately 4,000 cubic yards are proposed to be removed and disposed off-site as regulated waste for reestablishment of the river channel. The balance of the sediment is proposed to be stabilized within the impoundment with vegetation while a certain portion will be allowed to redistribute downstream.

A caveat to the opinion of probable construction cost is that there are however inflationary forces at play that could impact the cost of the project, however it is too early to know specifically to what degree that could occur and if current contingencies will accommodate that.

Next Steps

We recommend that this report be shared with the regulatory agencies for their feedback on the proposed sediment management approach for this potential dam removal project.

Tables

FUSS & O'NEILL

Table 1
Summary of 2020 Sediment Analytical Data

Environmental Site Assessment
Little River Dam Removal
Haverhilll, Massachusetts
November 17, 2020

	Sample Type	Composite			'Sediment Reference Criteria	
	Sample Location	Transect #1	Transect #2	Transect #3		
	Sample Number	1117-02	1117-03	1117-04	Maximum Allowable Contaminant Levels (MACLs)[3]	Consensus-Based PEC[5]
	Sample Depth (fbg)	9-10	3-10	3-10		
	Headspace (ppmv)	0.0	5.2	0.0		
	Sample Date	11/17/2020	11/17/2020	11/17/2020		
Total Metals (USEPA Methods 6010/7471)						
Arsenic	mg/kg	15	6.3	7.9	40	33
Barium	mg/kg	99	32	97	---	---
Cadmium	mg/kg	1.1	0.46	ND<0.71	80	4.98
Chromium	mg/kg	34	17	35	1,000	111
Copper	mg/kg	40	19	13	---	---
Lead	mg/kg	*220*[1]	84	33	2,000	128
Mercury	mg/kg	0.29	0.037	0.068	10	1.06
Nickel	mg/kg	21	10	22	---	48.6
Selenium	mg/kg	ND<7.7	ND<4.5	ND<7.1	---	---
Silver	mg/kg	ND<0.77	ND<0.45	ND<0.71	---	---
Zinc	mf/kg	230	96	77	---	459
Leachable Lead (USEPA Method 1311/6010)	mg/l	0.15[4]	NA	NA	---	---
PCBs (USEPA Method 8082A)						
Aroclor-1260[2C]	mg/kg	ND<0.18	4.2	ND<0.17		
Total PCBs	mg/kg	ND<0.18	*4.2*	ND<0.17	<2.0	0.676
VOCs (USEPA Method 8260C)						
Ethylbenzene	mg/kg	ND<0.16	0.86	ND<0.0033	---	---
Isopropylbenzene (Cumene)	mg/kg	ND<0.16	3.8	ND<0.0033	---	---
p-Isopropyltoluene (p-Cymene)	mg/kg	ND<0.16	0.88	ND<0.0033	---	---
Naphthalene	mg/kg	ND<0.33	56	ND<0.0067	---	---
n-Propylbenzene	mg/kg	ND<0.16	2.6	ND<0.0033	---	---
1,2,4 - Trimethylbenzene	mg/kg	ND<0.16	28	ND<0.0033	---	---
Total VOCs	mg/kg	ND<Various	92.14	ND<Various	10	---
PAHs (USEPA Method 8270D-E)						
Acenaphthene	mg/kg	ND<0.39	0.23	ND<0.37	---	---
Acenaphthylene	mg/kg	ND<0.39	0.43	ND<0.37	---	---
Anthracene	mg/kg	0.49	*0.93*	ND<0.37	---	0.845
Benzo(a)anthracene	mg/kg	1.4	2.6	ND<0.37	---	---
Benzo(a)pyrene	mg/kg	1.6	2.6	ND<0.37	---	---
Benzo(b)fluoranthene	mg/kg	2.1	3.2	0.43	---	---
Benzo(g,h,i)perylene	mg/kg	0.96	1.5	ND<0.37	---	---
Benzo(k)fluoranthene	mg/kg	0.79	1.1	ND<0.37	---	---
Chrysene	mg/kg	1.7	2.8	ND<0.37	---	---
Dibenz(a,h)anthracene	mg/kg	ND<0.39	0.37	ND<0.37	---	---
Fluoranthene	mg/kg	3.8	6.1	0.68	---	---
Fluorene	mg/kg	ND<0.39	*0.59*	ND<0.37	---	0.536
Indeno(1,2,3-cd)pyrene	mg/kg	1.1	1.7	ND<0.37	---	---
Naphthalene	mg/kg	0.39	*0.57*	ND<0.37	---	0.561
Phenanthrene	mg/kg	*2.0*	*4.7*	ND<0.37	---	1.17
Pyrene	mg/kg	*2.8*	*5.2*	0.57	---	1.52
Total PAHs	mg/kg	19.13	*34.62*	1.68	100	23
EPH (MassDEP Method EPH rev 2.1)						
C9-C18 Aliphatics	mg/kg	86	31	95	---	---
C19-C36 Aliphatics	mg/kg	46	580	860	---	---
C11-C12 Aromatics	mg/kg	1,600	300	320	---	---
Acenaphthene	mg/kg	80	0.39	0.39	---	---
Acenaphthylene	mg/kg	28	0.24	ND<0.22	---	---
Anthracene	mg/kg	*16*	0.48	0.49	---	0.845
Benzo(a)anthracene	mg/kg	*12*	*1.1*	*1.5*	---	1.05
Benzo(a)pyrene	mg/kg	*7.0*	1.2	*1.7*	---	1.45
Benzo(b)fluoranthene	mg/kg	8.2	2.4	3.7	---	---
Benzo(g,h,i)perylene	mg/kg	2.7	0.97	1.6	---	---
Benzo(k)fluoranthene	mg/kg	2.7	0.82	1.2	---	---
Chrysene	mg/kg	*11*	*2.8*	*4.2*	---	1.29
Dibenz(a,h)anthracene	mg/kg	0.98	0.24	ND<0.22	---	---
Fluoranthene	mg/kg	*43*	*3.6*	*5.8*	---	2.23
Fluorene	mg/kg	*68*	0.41	0.38	---	0.536
Indeno(1,2,3-cd)pyrene	mg/kg	3.0	1.1	1.5	---	---
2-Methylnaphthalene	mg/kg	270	0.41	0.26	---	---
Naphthalene	mg/kg	*380*	0.55	ND<0.22	---	0.561
Phenathrene	mg/kg	*150*	*2.5*	*3.3*	---	1.17
Pyrene	mg/kg	*48*	*3.6*	*5.7*	---	1.52
Herbicides (USEPA Method 8151A)						
MCPA [1]	mg/kg	ND<29	ND<17	ND<27	---	---
MCPP [1]	mg/kg	ND<29	ND<17	ND<27	---	---
Pesticides (USEPA Method 8081B)						
Various	mg/kg	ND<Various	ND<Various	ND<Various	---	---
Total Organic Carbon (USEPA Method 9060A)	%	6.0	1.1	3.9	---	---

Notes:

Created By: SMD
Checked By: MK

MassDEP: Massachusetts Department of Environmental Protection
USEPA: United States Environmental Protection Agency
T: Transect
EPH: Extractable Petroleum Hydrocarbon
PAH: Polycyclic Aromatic Hydrocarbon
PCB: Polychlorinated Biphenyl
TCLP: Toxic Characteristic Leaching Procedure
VOC: Volatile Organic Compound
SVOC: Semivolatile Organic Compound
ppmv: parts per million by volume
fbg: feet below grade
mg/l: milligrams per liter
mg/kg: milligrams per kilogram
NA: Not analyzed

---: Criteria not defined in applicable regulations
ND<X: Not detected above the lab reporting limits shown.
Shaded and bolded values exceed the levels for sediment reuse at lined landfills
Italicized and bolded values exceed the PEC
Only analytes at concentrations greater than the reporting limits are listed.
[1]: TCLP testing should be performed for metals when the total concentration in sediments are above the theoretical levels at which TCLP criteria may be met or exceeded. Specifically, for lead (Pb) levels greater than 100 mg/kg.
[2]: Parameters required by 314 CMR 9.00 in accordance wuth the approved sampling plan
[3]: Interim Policy COMM-94-007: Dredged Sediment Reuse or Disposal *Table 1*
[4]: USEPA Regulations for Toxicity set a Regulatory Level of 5.0 mg/L TCLP Lead
[5]: PEC = Probably Effect Concentration, MacDonald et. al, 2000, incorporated by reference, MassDEP 2006 Stage 1 Screening Values.

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Table 4
Summary of Sediment Analytical Data and Objectives - Breadth Sampling Program

Suplemental Environmental Site Assessment
Little River Dam Removal
Haverhilll, Massachusetts
November 17, 2021

	Sample Type	Composite						Sediment Reference Criteria	
	Sample Location	Transect #4	Transect #5	Transect #6	Transect #7	Transect #8	Transect #9		
	Sample Number	0907-04	0907-03	0907-02	0907-05	0908-07	0908-08	Maximum Allowable Contaminant Levels (MACLs)[3]	Consensus-Based PEC[5]
	Sample Depth (fbg)	4-14.1	2.5-8.9	3.1-12	5.2-13.4	1.0-5.9	1.0-4.5		
	Headspace (ppmv)	0.2	1.0	34.4	5.2	0	0.7		
	Sample Date	9/7/2021	9/7/2021	9/7/2021	9/7/2021	9/8/2021	9/8/2021		
Total Metals (USEPA Methods 6010/7471)									
Arsenic	mg/kg	5.8	7.5	23	7.4	7.5	ND<4.7	40	33
Cadmium	mg/kg	ND<0.51	0.54	1.4	ND<0.52	ND<0.57	ND<0.47	80	4.98
Chromium	mg/kg	25	27	52	39	24	12	1,000	111
Copper	mg/kg	13	25	63	23	14	5.7	---	---
Lead	mg/kg	32	87	***260***	17	26	11	2,000	128
Mercury	mg/kg	0.072	0.093	0.22	ND<0.043	ND<0.044	ND<0.038	10	1.06
Nickel	mg/kg	15	15	29	25	17	7.2	---	48.6
Zinc	mg/kg	42	93	210	78	60	31	---	459
Leachable Lead (USEPA Method 1311/6010)	mg/l	NA	NA	1.3	NA	NA	NA	5.0	---
PCBs (USEPA Method 8082A)									
Aroclor-1254	mg/kg	ND<0.13	0.13	0.33	ND<0.12	ND<0.14	ND<0.12	---	---
Total PCBs	mg/kg	ND<0.13	0.13	0.33	ND<0.12	ND<0.14	ND<0.12	<2.0	0.676
VOCs (USEPA Method 8260C)									
n-Butylbenzene	mg/kg	ND<0.0023	0.14	1.1	ND<0.0020	ND<0.0026	ND<0.0017		
sec-Butylbenzene	mg/kg	ND<0.0023	ND<0.086	0.46	ND<0.0020	ND<0.0026	ND<0.0017		
Isopropylbenzene (Cumene)	mg/kg	ND<0.0023	0.28	0.38	ND<0.0020	ND<0.0026	ND<0.0017	---	---
p-Isopropyltoluene (p-Cymene)	mg/kg	ND<0.0023	ND<0.086	0.82	ND<0.0020	ND<0.0026	ND<0.0017	---	---
Naphthalene	mg/kg	ND<0.0046	0.93	3.7	ND<0.0040	ND<0.0052	ND<0.0034	---	---
n-Propylbenzene	mg/kg	ND<0.0023	0.089	0.24	ND<0.0020	ND<0.0026	ND<0.0017	---	---
1,2,4 - Trimethylbenzene	mg/kg	ND<0.0023	2.7	4.6	ND<0.0020	ND<0.0026	ND<0.0017	---	---
1,3,5 - Trimethylbenzene	mg/kg	ND<0.0023	0.12	2.2	ND<0.0020	ND<0.0026	ND<0.0017	---	---
m+p Xylene	mg/kg	ND<0.0093	ND<0.17	0.32	ND<0.0080	ND<0.010	ND<0.0068	---	---
Total VOCs	mg/kg	ND<0.0093	4.259	13.82	ND<0.0080	ND<0.010	ND<0.0068	10	---
PAHs (USEPA Method 8270D-E)									
Acenaphthene	mg/kg	ND<0.27	0.31	0.83	ND<0.26	ND<0.30	ND<0.25	---	---
Acenaphthylene	mg/kg	ND<0.27	ND<0.26	0.45	ND<0.26	ND<0.30	ND<0.25	---	---
Anthracene	mg/kg	ND<0.27	***0.85***	***0.96***	***2.3***	ND<0.30	ND<0.25	---	0.845
Benzo(a)anthracene	mg/kg	0.55	2.4	2.9	6.2	ND<0.30	ND<0.25	---	---
Benzo(a)pyrene	mg/kg	0.62	2.3	2.8	2.0	ND<0.30	ND<0.25	---	---
Benzo(b)fluoranthene	mg/kg	0.81	2.7	3.5	4.7	ND<0.30	ND<0.25	---	---
Benzo(g,h,i)perylene	mg/kg	0.50	1.7	2.5	0.80	ND<0.30	ND<0.25	---	---
Benzo(k)fluoranthene	mg/kg	0.30	1.1	1.4	1.9	ND<0.30	ND<0.25	---	---
Chrysene	mg/kg	0.69	2.7	3.5	8.5	ND<0.30	ND<0.25	---	---
Dibenz(a,h)anthracene	mg/kg	ND<0.27	0.43	0.52	ND<0.26	ND<0.30	ND<0.25	---	---
Fluoranthene	mg/kg	1.2	5.3	7.0	49	ND<0.30	ND<0.25	---	---
Fluorene	mg/kg	ND<0.27	***0.55***	***1.4***	***0.64***	ND<0.30	ND<0.25	---	0.536
Indeno(1,2,3-cd)pyrene	mg/kg	0.51	1.7	2.5	1.0	ND<0.30	ND<0.25	---	---
2-Methylnaphthalene	mg/kg	ND<0.27	ND<0.26	5.4	ND<0.26	ND<0.30	ND<0.25	---	---
Naphthalene	mg/kg	ND<0.27	0.33	***3.2***	ND<0.26	ND<0.30	ND<0.25	---	0.561
Phenanthrene	mg/kg	0.82	***4.2***	***6.8***	***25***	ND<0.30	ND<0.25	---	1.17
Pyrene	mg/kg	1.4	***5.8***	***7.7***	***31***	ND<0.30	ND<0.25	---	1.52
Total PAHs	mg/kg	7.4	***32.37***	***53.36***	***133.04***	ND<0.30	ND<0.25	100	23
EPH (MassDEP Method EPH rev 2.1)									
C9-C18 Aliphatics	mg/kg	24	55	630	ND<16	ND<17	ND<14	---	---
C19-C36 Aliphatics	mg/kg	96	260	390	92	31	30	---	---
C11-C12 Aromatics	mg/kg	65	190	1,400	44	33	17	---	---
Acenaphthene	mg/kg	ND<0.16	0.4	4.2	ND<0.16	ND<0.17	ND<0.14	---	---
Acenaphthylene	mg/kg	ND<0.16	0.27	0.87	ND<0.16	ND<0.17	ND<0.14	---	---
Anthracene	mg/kg	0.21	0.76	***3.7***	ND<0.16	ND<0.17	ND<0.14	---	0.845
Benzo(a)anthracene	mg/kg	0.90	***3.2***	***5.1***	***2.2***	***2.8***	0.42	---	1.05
Benzo(a)pyrene	mg/kg	***1.7***	***3.7***	***7.2***	***2.2***	***1.9***	1.1	---	1.45
Benzo(b)fluoranthene	mg/kg	1.2	3.2	6.7	0.42	0.42	ND<0.14	---	---
Benzo(g,h,i)perylene	mg/kg	0.96	1.5	2.9	ND<0.16	ND<0.17	ND<0.14	---	---
Benzo(k)fluoranthene	mg/kg	0.44	1.2	2.5	ND<0.16	ND<0.17	ND<0.14	---	---
Chrysene	mg/kg	***1.9***	***3.0***	***5.8***	***1.4***	***1.7***	0.4	---	1.29
Dibenz(a,h)anthracene	mg/kg	ND<0.16	0.39	0.77	ND<0.16	ND<0.17	ND<0.14	---	---
Fluoranthene	mg/kg	1.8	***5.6***	***13***	0.94	0.66	0.51	---	2.23
Fluorene	mg/kg	ND<0.16	0.49	***6.6***	ND<0.16	ND<0.17	ND<0.14	---	0.536
Indeno(1,2,3-cd)pyrene	mg/kg	0.69	1.2	2.4	ND<0.16	ND<0.17	ND<0.14	---	---
2-Methylnaphthalene	mg/kg	ND<0.16	0.17	8.8	ND<0.16	ND<0.17	ND<0.14	---	---
Naphthalene	mg/kg	0.19	0.44	***11***	ND<0.16	ND<0.17	ND<0.14	---	0.561
Phenathrene	mg/kg	1.1	***3.7***	***15***	0.46	0.34	0.27	---	1.17
Pyrene	mg/kg	***1.8***	***5.6***	***14***	0.84	0.66	0.42	---	1.52
Herbicides (USEPA Method 8151A)									
Various	mg/kg	ND<Various	ND<Various	ND<Various	ND<Various	ND<Various	ND<Various	---	---
Pesticides (USEPA Method 8081B)									
Various	mg/kg	ND<Various	ND<Various	ND<Various	ND<Various	ND<Various	ND<Various	---	---
Total Organic Carbon (USEPA Method 9060A)	mg/kg	14,000	29,000	66,000	43,000	20,000	91,000	---	---

Created By: SMD
Checked By:

Notes:
MassDEP: Massachusetts Department of Environmental Protection
USEPA: United States Environmental Protection Agency
T: Transect
EPH: Extractable Petroleum Hydrocarbon
PAH: Polycyclic Aromatic Hydrocarbon
PCB: Polychlorinated Biphenyl
TCLP: Toxic Characteristic Leaching Procedure
VOC: Volatile Organic Compound
SVOC: Semivolatile Organic Compound
ppmv: parts per million by volume
fbg: feet below grade
mg/l: milligrams per liter
mg/kg: milligrams per kilogram

---: Criteria not defined in applicable regulations
NA: Not analyzed
ND<X: Not detected above the lab reporting limits shown.
Shaded and bolded values exceed the levels for sediment reuse at lined landfills
Italicized and bolded values exceed the PEC
Only analytes at concentrations greater than the reporting limits are listed.
[1]: TCLP testing should be performed for metals when the total concentration in sediments are above the theoretical levels at which TCLP criteria may be met or exceeded. Specifically, for lead (Pb) levels greater than 100 mg/kg.
[2]: Parameters required by 314 CMR 9.00 in accordance wuth the approved sampling plan
[3]: Interim Policy COMM-94-007: Dredged Sediment Reuse or Disposal ***Table 1***
[4]: USEPA Regulations for Toxicity set a Regulatory Level of 5.0 mg/L TCLP Lead
[5]: PEC = Probably Effect Concentration, MacDonald et. al, 2000

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Table 5
Summary of Sediment Analytical Data and Objectives - Detail Phase

Environmental Site Assessment
Little River Dam Removal
Haverhilll, Massachusetts
November 17, 2021

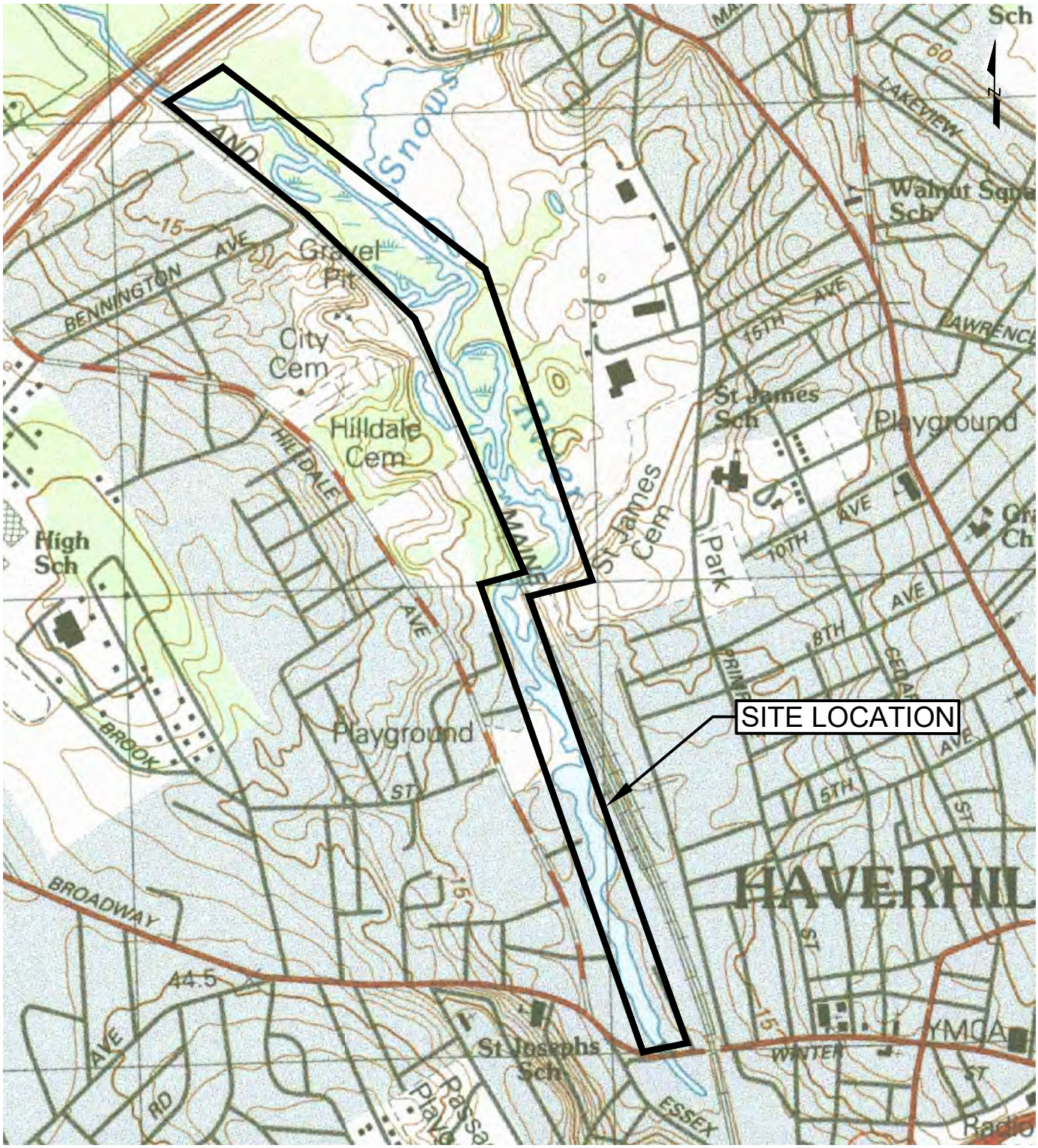
	Sample Type	Composite										Sediment Reference Criteria	
	Sample Location	SED-1	SED-2	SED-3	SED-4	SED-5	SED-6	SED-7	SED-8	SED-9	SED-10		
	Sample Number	0917-01	0917-03	0917-02	0917-05	0917-06	0917-07	0917-04	0917-10	0917-09	0917-08		
	Sample Depth (fbg)	0-2	0-2	0-2.5	0-2	0-2	0-2	0-2	0-1.6	0-1.0	0-0.9	Maximum Allowable Contaminant Levels (MACLs)[3]	Consensus-Based PEC[5]
	Headspace (ppmv)	1.5	0.6	2.5	0.0	0.1	0.2	0.0	0.1	1.0	0.0		
	Sample Date	9/17/2021	9/17/2021	9/17/2021	9/17/2021	9/17/2021	9/17/2021	9/17/2021	9/17/2021	9/17/2021	9/17/2021		
Total Metals (USEPA Methods 6010/7471)													
Arsenic	mg/kg	12	13	*41*	16	ND<4.3	13	14	14	11	12	40	33
Cadmium	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	80	4.98
Chromium	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	1,000	111
Copper	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	---	---
Lead	mg/kg	*150*	*600*	*240*	*320*	3.0	*200*	79	*160*	*160*	*160*	2,000	128
Mercury	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	10	1.06
Nickel	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	---	48.6
Zinc	mf/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	---	459
PCBs (USEPA Method 8082A)													
Aroclor-1254	mg/kg	0.2	0.23	ND<0.19	0.20	ND<0.11	ND<0.14	ND<0.15	ND<0.16	ND<0.14	ND<0.19		
Total PCBs	mg/kg	0.2	0.23	ND<0.19	0.20	ND<0.11	ND<0.14	ND<0.15	ND<0.16	ND<0.14	ND<0.19	<2.0	0.676
PAHs (USEPA Method 8270D-E)													
Acenaphthene	mg/kg	NA	NA	NA	ND<0.41	ND<0.23	ND<0.30	ND<0.32	ND<0.34	0.37	3.2	---	---
Acenaphthylene	mg/kg	NA	NA	NA	ND<0.41	ND<0.23	ND<0.30	ND<0.32	ND<0.34	ND<0.29	ND<0.40	---	---
Anthracene	mg/kg	NA	NA	NA	ND<0.41	ND<0.23	ND<0.30	ND<0.32	ND<0.34	*1.5*	*3.8*	---	0.845
Benzo(a)anthracene	mg/kg	NA	NA	NA	1.2	ND<0.23	1.0	1.0	1.2	2.9	6.5	---	---
Benzo(a)pyrene	mg/kg	NA	NA	NA	1.4	ND<0.23	1.2	1.2	1.2	2.8	5.3	---	---
Benzo(b)fluoranthene	mg/kg	NA	NA	NA	2.0	ND<0.23	1.6	1.5	1.6	3.3	5.8	---	---
Benzo(g,h,i)perylene	mg/kg	NA	NA	NA	0.84	ND<0.23	0.89	0.65	0.57	1.8	3.3	---	---
Benzo(k)fluoranthene	mg/kg	NA	NA	NA	0.77	ND<0.23	0.66	0.58	0.52	1.2	2.2	---	---
Chrysene	mg/kg	NA	NA	NA	1.5	ND<0.23	1.3	1.1	1.3	2.9	7.2	---	---
Dibenz(a,h)anthracene	mg/kg	NA	NA	NA	ND<0.41	ND<0.23	ND<0.30	ND<0.32	ND<0.34	0.43	0.73	---	---
Fluoranthene	mg/kg	NA	NA	NA	2.6	ND<0.23	2.2	2.3	2.4	5.9	12	---	---
Fluorene	mg/kg	NA	NA	NA	ND<0.41	ND<0.23	ND<0.30	ND<0.32	ND<0.34	*0.59*	*2.7*	---	0.536
Indeno(1,2,3-cd)pyrene	mg/kg	NA	NA	NA	0.87	ND<0.23	0.91	0.82	0.71	1.9	3.3	---	---
2-Methylnaphthalene		NA	NA	NA	ND<0.41	ND<0.23	ND<0.30	ND<0.32	ND<0.34	ND<0.29	*1.3*		
Naphthalene	mg/kg	NA	NA	NA	ND<0.41	ND<0.23	ND<0.30	ND<0.32	0.89	ND<0.29	*1.7*	---	0.561
Phenanthrene	mg/kg	NA	NA	NA	*1.4*	ND<0.23	*1.6*	*1.2*	0.95	*5.2*	*21*	---	1.17
Pyrene	mg/kg	NA	NA	NA	*2.4*	ND<0.23	*2.1*	*2.0*	*2.3*	*5.8*	*19*	---	1.52
Total PAHs	mg/kg	NA	NA	NA	14.98	ND<0.23	13.46	12.35	13.64	*36.59*	*99.03*	100	23
EPH Fractions (MassDEP Method EPH rev 2.1)													
C9-C18 Aliphatics	mg/kg	NA	NA	NA	99	ND<14	49	24	29	51	34	---	---
C19-C36 Aliphatics	mg/kg	NA	NA	NA	640	ND<14	190	150	280	190	400	---	---
C11-C12 Aromatics	mg/kg	NA	NA	NA	320	ND<14	150	98	200	100	260	---	---

Created By: SMD
Checked By:

Notes:
MassDEP: Massachusetts Department of Environmental Protection
USEPA: United States Environmental Protection Agency
EPH: Extractable Petroleum Hydrocarbon
PAH: Polycyclic Aromatic Hydrocarbon
PCB: Polychlorinated Biphenyl
SVOC: Semivolatile Organic Compound
ppmv: parts per million by volume
fbg: feet below grade
mg/kg: milligrams per kilogram

---: Criteria not defined in applicable regulations
NA: Not analyzed
ND<X: Not detected above the lab reporting limits shown.
Shaded and bolded values exceed the levels for sediment reuse at lined landfills
Italicized and bolded values exceed the PEC
Only analytes at concentrations greater than the reporting limits are listed.
[1]: Interim Policy COMM-94-007: Dredged Sediment Reuse or Disposal *Table 1*
[2]: PEC = Probably Effect Concentration, MacDonald et. al, 2000

Figures



MAP REFERENCE

THIS MAP WAS PREPARED FROM USGS TOPOGRAPHIC QUADRANGLE IMAGES

SOURCE: OFFICE OF GEOGRAPHIC AND ENVIRONMENTAL INFORMATION (MASSGIS), COMMONWEALTH OF MASSACHUSETTS EXECUTIVE OFFICE OF ENVIRONMENTAL AFFAIRS

SCALE:	
HORZ.:	1" = 1,000'
VERT.:	
DATUM:	
HORZ.:	
VERT.:	

0 500 1,000
GRAPHIC SCALE

FUSS & O'NEILL
1550 MAIN STREET, SUITE 400
SPRINGFIELD, MA 01103
413.452.0445
www.fando.com

CITY OF HAVERHILL

SITE LOCATION MAP

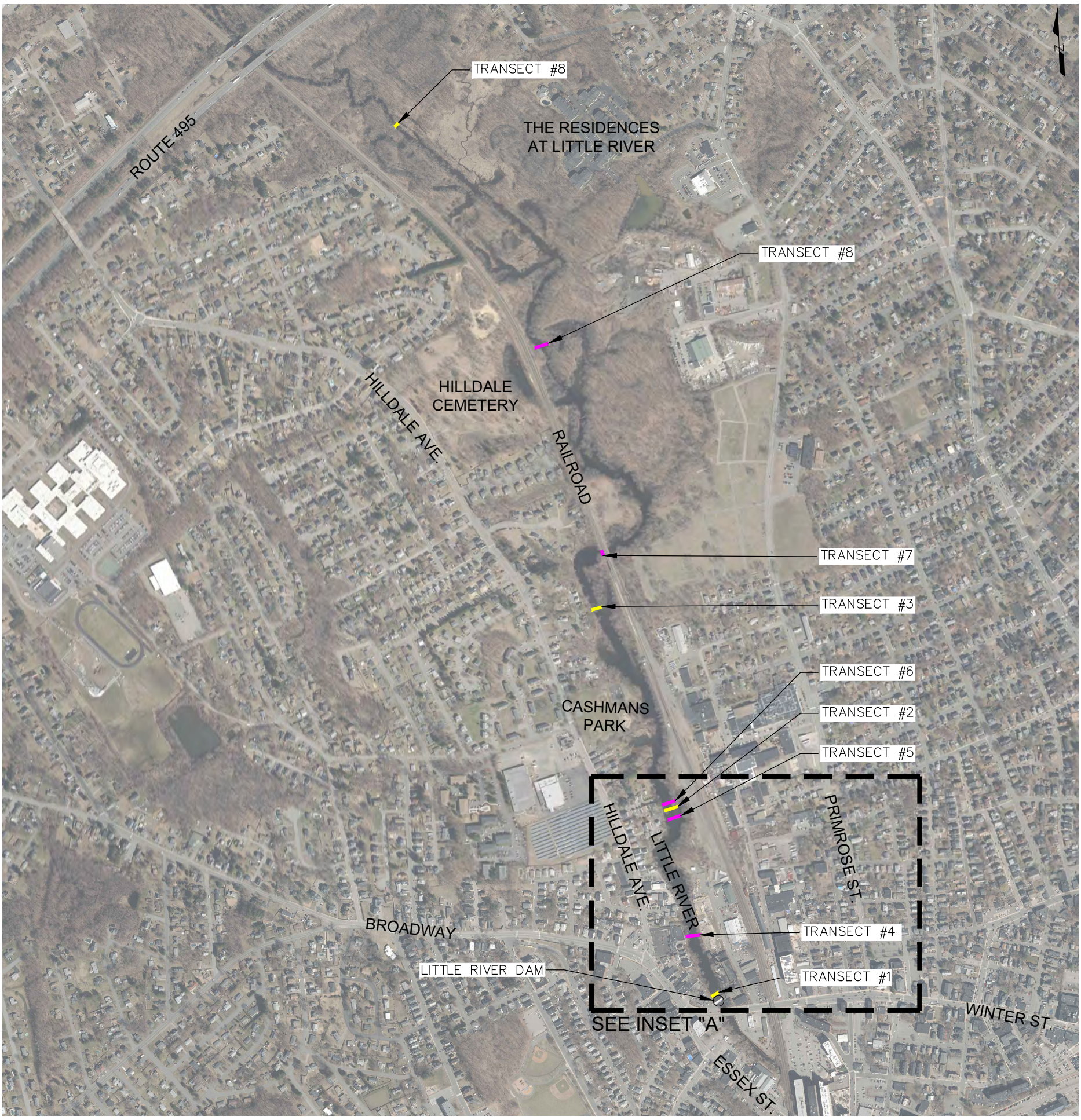
LITTLE RIVER IMPOUNDMENT

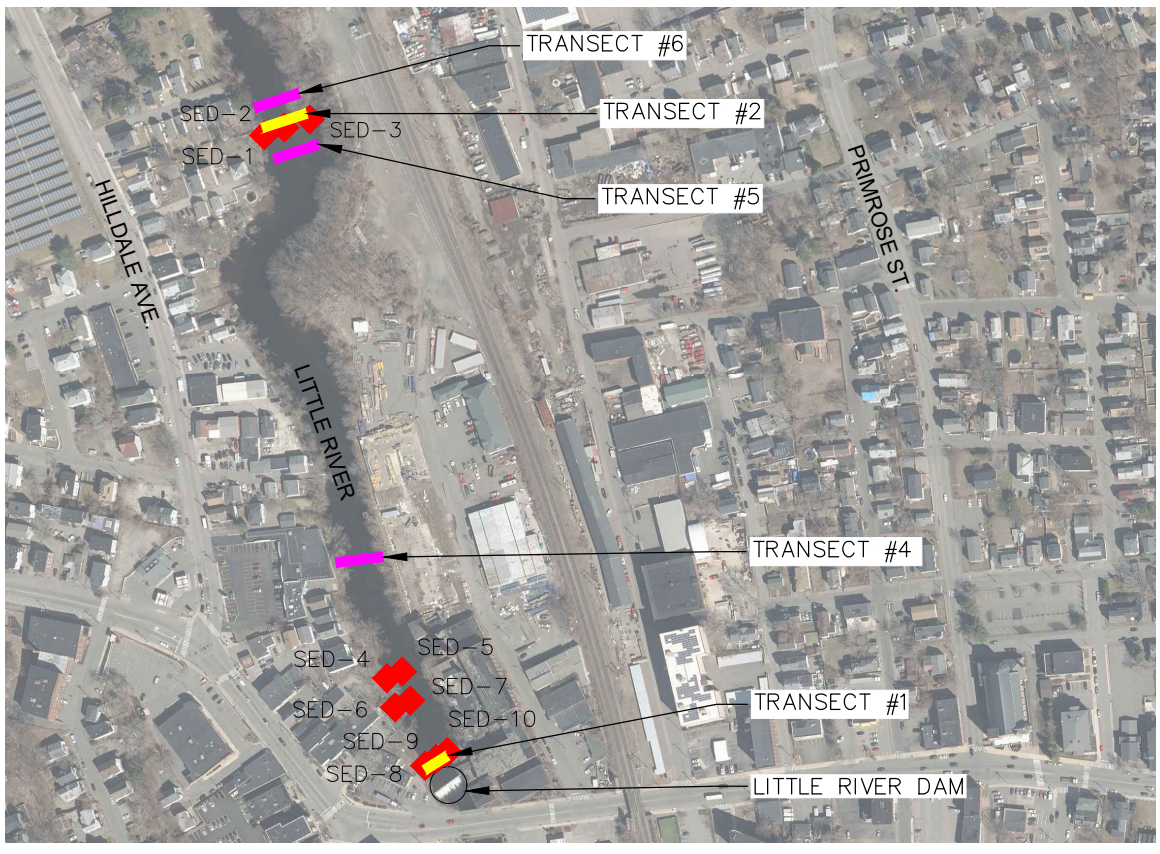
HAVERHILL MASSACHUSETTS

PROJ. No.: 20170390.U30
DATE: SEPTEMBER 2021

FIGURE 1

File Path: J:\DWG\P20170390U30\Environmental\20170390.U30_LOC.dwg Layout: FIGURE 1 Plotted: Wed, November 17, 2021 - 10:46 AM User: sirons
Plotter: DWG TO PDF.PC3 CTB File: FO.STB
LAYER STATE:
MS VIEW:





A INSET
SCALE: 1"= 400'

MAP REFERENCE

THIS MAP WAS PREPARED FROM USGS COLOR ORTHO IMAGERY (2019).

SOURCE: OFFICE OF GEOGRAPHIC AND ENVIRONMENTAL INFORMATION (MASSGIS), COMMONWEALTH OF MASSACHUSETTS EXECUTIVE OFFICE OF ENVIRONMENTAL AFFAIRS.

LEGEND

SED-1 SEDIMENT SAMPLE (SEPT 2021)

TRANSECT (SEPT 2021)

TRANSECT (NOV 2020)

SCALE:
HORZ.: 1"= 800'
VERT.:
DATUM:
HORZ.:
VERT.:
0 400 800
GRAPHIC SCALE

FUSS&O'NEILL
317 IRON HORSE WAY, SUITE 204
PROVIDENCE, RI 02908
401.861.3070
www.fando.com

CITY OF HAVERHILL

SITE PLAN

LITTLE RIVER IMPOUNDMENT

HAVERHILL MASSACHUSETTS

PROJ. No.: 20170390.U30
DATE: NOVEMBER 2021

FIGURE 2

File: J:\DWG\P2017\0390\U30\Environmental\20170390.U30_STP.dwg Layout: FIG 2_OVERALL Plotted: 2021-11-17 12:04 PM Saved: 2021-11-17 12:04 PM User: sirons
MS VIEW: LAYER STATE: PC3: DWG TO PDF.PC3 STB/CTB: FO HALF.STB

Appendix A

Sediment Boring Logs

SOIL BORING SED-1

FUSS & O'NEILL

PROJECT NUMBER 20170390.U30
PROJECT NAME MVP Action Grant FY22/23
LOCATION Haverhill, MA
DRILLING METHOD Slide Hammer
HAMMER WEIGHT/FALL --
ELEVATION (FT)
TOP OF CASING ----
LOGGED BY S. DeVincentis
REMARKS Sample I.D. Prefix: 1543210917-

DATE STARTED 9/17/21
DATE COMPLETED 9/17/21
CASING TYPE/DIAMETER ----
SCREEN TYPE/SLOT/INTERVAL ----
GRAVEL PACK TYPE ----
GROUT TYPE/QUANTITY ----
DEPTH TO WATER (FT) 0.0
GROUND WATER ELEVATION ---

PID (ppm)	BLOW COUNTS	RECOVERY (inches)	SAMPLE ID.	EXTENT	DEPTH (ft. BGL)	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION	WATER DEPTH
								Little River	
					5				
0.0		46.8	-01			ML		Dark brown, ORGANIC SILT, wet, no odor	
1.5						SM		Light brown, fine to coarse SAND, some Silt, wet	
0.3						MLS		Light brown, SILT, some fine Sand, wet	
0.2									
								Bottom of borehole at 9.8 feet.	

LOG A EWNN01 - ESDAT_LOG1.GDT - 10/6/21 10:39 - F:\P2017\0390\U30\DELIVERABLES\SEDIMENT QUALITY ASSESSMENT\BORING LOGS\HAVERHILL_BORING LOGS_ADD SEDIMENT SAMP.GPJ

SOIL BORING SED-10

FUSS & O'NEILL

PROJECT NUMBER 20170390.U30
PROJECT NAME MVP Action Grant FY22/23
LOCATION Haverhill, MA
DRILLING METHOD Slide Hammer
HAMMER WEIGHT/FALL --
ELEVATION (FT)
TOP OF CASING ----
LOGGED BY S. DeVincentis
REMARKS Sample I.D. Prefix: 1543210917-

DATE STARTED 9/17/21
DATE COMPLETED 9/17/21
CASING TYPE/DIAMETER ----
SCREEN TYPE/SLOT/INTERVAL ----
GRAVEL PACK TYPE ----
GROUT TYPE/QUANTITY ----
DEPTH TO WATER (FT) 0.0
GROUND WATER ELEVATION ---

PID (ppm)	BLOW COUNTS	RECOVERY (inches)	SAMPLE ID.	EXTENT	DEPTH (ft. BGL)	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION	WATER DEPTH
								Little River	
					5				
0.0 0.0		10.8	-08			MLS		Dark brown, ORGANIC SILT, wet, petroleum odor Light brown, SILT, some fine Sand, wet Bottom of borehole at 7.6 feet.	

LOG A EWNN01 - ESDAT_LOG1.GDT - 10/6/21 10:39 - F:\P2017\0390\U30\DELIVERABLES\SEDIMENT QUALITY ASSESSMENT\BORING LOGS\HAVERHILL_BORING LOGS_ADD SEDIMENT SAMP.GPJ

SOIL BORING SED-2

FUSS & O'NEILL

PROJECT NUMBER 20170390.U30
PROJECT NAME MVP Action Grant FY22/23
LOCATION Haverhill, MA
DRILLING METHOD Slide Hammer
HAMMER WEIGHT/FALL --
ELEVATION (FT)
TOP OF CASING ----
LOGGED BY S. DeVincentis
REMARKS Sample I.D. Prefix: 1543210917-

DATE STARTED 9/17/21
DATE COMPLETED 9/17/21
CASING TYPE/DIAMETER ----
SCREEN TYPE/SLOT/INTERVAL ----
GRAVEL PACK TYPE ----
GROUT TYPE/QUANTITY ----
DEPTH TO WATER (FT) 0.0
GROUND WATER ELEVATION ---

PID (ppm)	BLOW COUNTS	RECOVERY (inches)	SAMPLE ID.	EXTENT	DEPTH (ft. BGL)	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION	WATER DEPTH
								Little River	
					5				
0.6		37.2	-03			ML		Dark brown, ORGANIC SILT, wet, petroleum odor, sheen observed	
0.5									
0.4						MLS		Light brown, SILT, some fine Sand, wet	
								Bottom of borehole at 9.6 feet.	

LOG A EWNN01 - ESDAT_LOG1.GDT - 10/6/21 10:39 - F:\P2017\0390\U30\DELIVERABLES\SEDIMENT QUALITY ASSESSMENT\BORING LOGS\HAVERHILL_BORING LOGS_ADD SEDIMENT SAMP.GPJ

SOIL BORING SED-3

FUSS & O'NEILL

PROJECT NUMBER 20170390.U30
PROJECT NAME MVP Action Grant FY22/23
LOCATION Haverhill, MA
DRILLING METHOD Slide Hammer
HAMMER WEIGHT/FALL --
ELEVATION (FT)
TOP OF CASING ----
LOGGED BY S. DeVincentis
REMARKS Sample I.D. Prefix: 1543210917-

DATE STARTED 9/17/21
DATE COMPLETED 9/17/21
CASING TYPE/DIAMETER ----
SCREEN TYPE/SLOT/INTERVAL ----
GRAVEL PACK TYPE ----
GROUT TYPE/QUANTITY ----
DEPTH TO WATER (FT) 0.0
GROUND WATER ELEVATION ---

PID (ppm)	BLOW COUNTS	RECOVERY (inches)	SAMPLE ID.	EXTENT	DEPTH (ft. BGL)	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION	WATER DEPTH
								Little River	
0.5 2.5 1.5 0.7		42	-02		5	ML MLS		Dark brown, ORGANIC SILT, wet, petroleum odor Light brown, SILT, some fine Sand, wet Bottom of borehole at 5.5 feet.	

LOG A EWNN01 - ESDAT_LOG1.GDT - 10/6/21 10:39 - F:\P2017\0390\U30\DELIVERABLES\SEDIMENT QUALITY ASSESSMENT\BORING LOGS\HAVERHILL_BORING LOGS_ADD SEDIMENT SAMP.GPJ

SOIL BORING SED-4

FUSS & O'NEILL

PROJECT NUMBER 20170390.U30
PROJECT NAME MVP Action Grant FY22/23
LOCATION Haverhill, MA
DRILLING METHOD Slide Hammer
HAMMER WEIGHT/FALL --
ELEVATION (FT)
TOP OF CASING ----
LOGGED BY S. DeVincentis
REMARKS Sample I.D. Prefix: 1543210917-

DATE STARTED 9/17/21
DATE COMPLETED 9/17/21
CASING TYPE/DIAMETER ----
SCREEN TYPE/SLOT/INTERVAL ----
GRAVEL PACK TYPE ----
GROUT TYPE/QUANTITY ----
DEPTH TO WATER (FT) 0.0
GROUND WATER ELEVATION ---

PID (ppm)	BLOW COUNTS	RECOVERY (inches)	SAMPLE ID.	EXTENT	DEPTH (ft. BGL)	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION	WATER DEPTH
								Little River	
0.0		30	-05		5	ML		Dark brown, ORGANIC SILT, trace Gravel, wet, no odor	
0.0									
0.0					10	MLS		Light brown, SILT, some fine Sand, trace wood, wet	
								Bottom of borehole at 10.5 feet.	

LOG A EWNN01 - ESDAT_LOG1.GDT - 10/6/21 10:39 - F:\P2017\0390\U30\DELIVERABLES\SEDIMENT QUALITY ASSESSMENT\BORING LOGS\HAVERHILL_BORING LOGS_ADD SEDIMENT SAMP.GPJ

SOIL BORING SED-5

FUSS & O'NEILL

PROJECT NUMBER 20170390.U30
PROJECT NAME MVP Action Grant FY22/23
LOCATION Haverhill, MA
DRILLING METHOD Slide Hammer
HAMMER WEIGHT/FALL --
ELEVATION (FT)
TOP OF CASING ----
LOGGED BY S. DeVincentis
REMARKS Sample I.D. Prefix: 1543210917-

DATE STARTED 9/17/21
DATE COMPLETED 9/17/21
CASING TYPE/DIAMETER ----
SCREEN TYPE/SLOT/INTERVAL ----
GRAVEL PACK TYPE ----
GROUT TYPE/QUANTITY ----
DEPTH TO WATER (FT) 0.0
GROUND WATER ELEVATION ---

PID (ppm)	BLOW COUNTS	RECOVERY (inches)	SAMPLE ID.	EXTENT	DEPTH (ft. BGL)	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION	WATER DEPTH
								Little River	
					5				
0.0		27.6	-06			SM		Light brown, fine SAND, some Silt, wet, no odor	
0.1								Bottom of borehole at 9.6 feet.	

LOG A EWNN01 - ESDAT_LOG1.GDT - 10/6/21 10:39 - F:\P2017\0390\U30\DELIVERABLES\SEDIMENT QUALITY ASSESSMENT\BORING LOGS\HAVERHILL_BORING LOGS_ADD SEDIMENT SAMP.GPJ

SOIL BORING SED-6

FUSS & O'NEILL

PROJECT NUMBER 20170390.U30
PROJECT NAME MVP Action Grant FY22/23
LOCATION Haverhill, MA
DRILLING METHOD Slide Hammer
HAMMER WEIGHT/FALL --
ELEVATION (FT)
TOP OF CASING ----
LOGGED BY S. DeVincentis
REMARKS Sample I.D. Prefix: 1543210917-

DATE STARTED 9/17/21
DATE COMPLETED 9/17/21
CASING TYPE/DIAMETER ----
SCREEN TYPE/SLOT/INTERVAL ----
GRAVEL PACK TYPE ----
GROUT TYPE/QUANTITY ----
DEPTH TO WATER (FT) 0.0
GROUND WATER ELEVATION ---

PID (ppm)	BLOW COUNTS	RECOVERY (inches)	SAMPLE ID.	EXTENT	DEPTH (ft. BGL)	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION	WATER DEPTH
								Little River	
					5				
0.2		40.8	-07		10	ML		Dark brown, ORGANIC SILT, wet, no odor	
0.1						SM		Light brown, fine to coarse SAND, some Silt, wet	
0.1						MLS		Light brown, SILT, some fine Sand, wet	
								Bottom of borehole at 12.8 feet.	

LOG A EWNN01 - ESDAT_LOG1.GDT - 10/6/21 10:39 - F:\P2017\0390\U30\DELIVERABLES\SEDIMENT QUALITY ASSESSMENT\BORING LOGS\HAVERHILL_BORING LOGS_ADD SEDIMENT SAMP.GPJ

SOIL BORING SED-7

FUSS & O'NEILL

PROJECT NUMBER 20170390.U30
PROJECT NAME MVP Action Grant FY22/23
LOCATION Haverhill, MA
DRILLING METHOD Slide Hammer
HAMMER WEIGHT/FALL --
ELEVATION (FT)
TOP OF CASING ----
LOGGED BY S. DeVincentis
REMARKS Sample I.D. Prefix: 1543210917-

DATE STARTED 9/17/21
DATE COMPLETED 9/17/21
CASING TYPE/DIAMETER ----
SCREEN TYPE/SLOT/INTERVAL ----
GRAVEL PACK TYPE ----
GROUT TYPE/QUANTITY ----
DEPTH TO WATER (FT) 0.0
GROUND WATER ELEVATION ---

PID (ppm)	BLOW COUNTS	RECOVERY (inches)	SAMPLE ID.	EXTENT	DEPTH (ft. BGL)	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION	WATER DEPTH
								Little River	
					5				
		36				ML		Dark brown, ORGANIC SILT, wet, no odor	
0.0			-04		10	MLS		Light brown, SILT, some fine Sand, wet	
0.0						PT		Light brown, SILT and ORGANICS, some wood fibers, organic odor	
0.0								Bottom of borehole at 12.0 feet.	

LOG A EWNN01 - ESDAT_LOG1.GDT - 10/6/21 10:39 - F:\P2017\0390\U30\DELIVERABLES\SEDIMENT QUALITY ASSESSMENT\BORING LOGS\HAVERHILL_BORING LOGS_ADD SEDIMENT SAMP.GPJ

SOIL BORING SED-8

FUSS & O'NEILL

PROJECT NUMBER 20170390.U30
PROJECT NAME MVP Action Grant FY22/23
LOCATION Haverhill, MA
DRILLING METHOD Slide Hammer
HAMMER WEIGHT/FALL --
ELEVATION (FT)
TOP OF CASING ----
LOGGED BY S. DeVincentis
REMARKS Sample I.D. Prefix: 1543210917-

DATE STARTED 9/17/21
DATE COMPLETED 9/17/21
CASING TYPE/DIAMETER ----
SCREEN TYPE/SLOT/INTERVAL ----
GRAVEL PACK TYPE ----
GROUT TYPE/QUANTITY ----
DEPTH TO WATER (FT) 0.0
GROUND WATER ELEVATION ---

PID (ppm)	BLOW COUNTS	RECOVERY (inches)	SAMPLE ID.	EXTENT	DEPTH (ft. BGL)	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION	WATER DEPTH
								Little River	
					5				
0.1		19.2				ML		Dark brown, ORGANIC SILT, wet, petroleum odor	
0.1			-10			MLS		Light brown, SILT, some fine Sand, wet	
								Bottom of borehole at 8.9 feet.	

LOG A EWNN01 - ESDAT_LOG1.GDT - 10/6/21 10:39 - F:\P2017\0390\U30\DELIVERABLES\SEDIMENT QUALITY ASSESSMENT\BORING LOGS\HAVERHILL_BORING LOGS_ADD SEDIMENT SAMP.GPJ

SOIL BORING SED-9

FUSS & O'NEILL

PROJECT NUMBER 20170390.U30
PROJECT NAME MVP Action Grant FY22/23
LOCATION Haverhill, MA
DRILLING METHOD Slide Hammer
HAMMER WEIGHT/FALL --
ELEVATION (FT)
TOP OF CASING ----
LOGGED BY S. DeVincentis
REMARKS Sample I.D. Prefix: 1543210917-

DATE STARTED 9/17/21
DATE COMPLETED 9/17/21
CASING TYPE/DIAMETER ----
SCREEN TYPE/SLOT/INTERVAL ----
GRAVEL PACK TYPE ----
GROUT TYPE/QUANTITY ----
DEPTH TO WATER (FT) 0.0
GROUND WATER ELEVATION ---

PID (ppm)	BLOW COUNTS	RECOVERY (inches)	SAMPLE ID.	EXTENT	DEPTH (ft. BGL)	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION	WATER DEPTH
								Little River	
					5				
1.0 0.5		12	-09			ML MLS		Dark brown, ORGANIC SILT, wet, petroleum odor Light brown, SILT, some fine Sand, trace Gravel, wet	
								Bottom of borehole at 8.6 feet.	

LOG A EWNN01 - ESDAT_LOG1.GDT - 10/6/21 10:39 - F:\P2017\0390\U30\DELIVERABLES\SEDIMENT QUALITY ASSESSMENT\BORING LOGS\HAVERHILL_BORING LOGS_ADD SEDIMENT SAMP.GPJ

SOIL BORING T4C

FUSS & O'NEILL

PROJECT NUMBER 20170390.U30
PROJECT NAME MVP Action Grant FY22/23
LOCATION Haverhill, MA
DRILLING METHOD Slide Hammer
HAMMER WEIGHT/FALL --
ELEVATION (FT)
TOP OF CASING ----
LOGGED BY S. DeVincentis
REMARKS Sample I.D. Prefix: 1543210907-

DATE STARTED 9/7/21
DATE COMPLETED 9/7/21
CASING TYPE/DIAMETER ----
SCREEN TYPE/SLOT/INTERVAL ----
GRAVEL PACK TYPE ----
GROUT TYPE/QUANTITY ----
DEPTH TO WATER (FT) 0.0
GROUND WATER ELEVATION ---

PID (ppm)	BLOW COUNTS	RECOVERY (inches)	SAMPLE ID.	EXTENT	DEPTH (ft. BGL)	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION	WATER DEPTH
								Little River	
					5				
0.0		58.8	-04		10			Dark brown, ORGANIC SILT, wet, no odor	
0.0						MLS		Light brown, SILT, some fine Sand, wet	
0.0									
0.0						SM		Light brown, fine SAND, some Silt, trace Organics, wet	
0.0								Bottom of borehole at 14.1 feet.	

LOG A EWNN01 - ESDAT_LOG1.GDT - 10/6/21 10:39 - F:\P2017\0390\U30\DELIVERABLES\SEDIMENT QUALITY ASSESSMENT\BORING LOGS\HAVERHILL_BORING LOGS_ADD SEDIMENT SAMP.GPJ

SOIL BORING T4L

FUSS & O'NEILL

PROJECT NUMBER 20170390.U30
PROJECT NAME MVP Action Grant FY22/23
LOCATION Haverhill, MA
DRILLING METHOD Slide Hammer
HAMMER WEIGHT/FALL --
ELEVATION (FT)
TOP OF CASING ----
LOGGED BY S. DeVincentis
REMARKS Sample I.D. Prefix: 1543210907-

DATE STARTED 9/7/21
DATE COMPLETED 9/7/21
CASING TYPE/DIAMETER ----
SCREEN TYPE/SLOT/INTERVAL ----
GRAVEL PACK TYPE ----
GROUT TYPE/QUANTITY ----
DEPTH TO WATER (FT) 0.0
GROUND WATER ELEVATION ---

PID (ppm)	BLOW COUNTS	RECOVERY (inches)	SAMPLE ID.	EXTENT	DEPTH (ft. BGL)	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION	WATER DEPTH
								Little River	
0.0		39.6	-04		10	ML		Dark brown, ORGANIC SILT, wet, no odor	
0.0						MLS		Light brown, SILT, some fine Sand, wet	
0.0									
0.2								Bottom of borehole at 13.2 feet.	

LOG A EWNN01 - ESDAT_LOG1.GDT - 10/6/21 10:39 - F:\P2017\0390\U30\DELIVERABLES\SEDIMENT QUALITY ASSESSMENT\BORING LOGS\HAVERHILL_BORING LOGS_ADD SEDIMENT SAMP.GPJ

SOIL BORING T4R

FUSS & O'NEILL

PROJECT NUMBER 20170390.U30
PROJECT NAME MVP Action Grant FY22/23
LOCATION Haverhill, MA
DRILLING METHOD Slide Hammer
HAMMER WEIGHT/FALL --
ELEVATION (FT)
TOP OF CASING ----
LOGGED BY S. DeVincentis
REMARKS Sample I.D. Prefix: 1543210907-

DATE STARTED 9/7/21
DATE COMPLETED 9/7/21
CASING TYPE/DIAMETER ----
SCREEN TYPE/SLOT/INTERVAL ----
GRAVEL PACK TYPE ----
GROUT TYPE/QUANTITY ----
DEPTH TO WATER (FT) 0.0
GROUND WATER ELEVATION ---

PID (ppm)	BLOW COUNTS	RECOVERY (inches)	SAMPLE ID.	EXTENT	DEPTH (ft. BGL)	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION	WATER DEPTH
								Little River	
		26.4	-04		5	ML		Dark brown, ORGANIC SILT, trace wood, wet, no odor	
0.2						MLS		Light brown, SILT, some fine Sand, wet	
0.0						SM		Light brown, fine SAND, some Silt, wet	
								Bottom of borehole at 6.2 feet.	

LOG A EWNN01 - ESDAT_LOG1.GDT - 10/6/21 10:39 - F:\P2017\0390\U30\DELIVERABLES\SEDIMENT QUALITY ASSESSMENT\BORING LOGS\HAVERHILL_BORING LOGS_ADD SEDIMENT SAMP.GPJ

SOIL BORING T5C

FUSS & O'NEILL

PROJECT NUMBER 20170390.U30
PROJECT NAME MVP Action Grant FY22/23
LOCATION Haverhill, MA
DRILLING METHOD Slide Hammer
HAMMER WEIGHT/FALL --
ELEVATION (FT)
TOP OF CASING ----
LOGGED BY S. DeVincentis
REMARKS Sample I.D. Prefix: 1543210907-

DATE STARTED 9/7/21
DATE COMPLETED 9/7/21
CASING TYPE/DIAMETER ----
SCREEN TYPE/SLOT/INTERVAL ----
GRAVEL PACK TYPE ----
GROUT TYPE/QUANTITY ----
DEPTH TO WATER (FT) 0.0
GROUND WATER ELEVATION ---

PID (ppm)	BLOW COUNTS	RECOVERY (inches)	SAMPLE ID.	EXTENT	DEPTH (ft. BGL)	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION	WATER DEPTH
								Little River	
					5				
0.0 0.2 0.9		37.2	-03			ML MLS		Dark brown, ORGANIC SILT, trace wood, wet, no odor Light brown, SILT, some fine Sand, wet Bottom of borehole at 8.9 feet.	

LOG A EWNN01 - ESDAT_LOG1.GDT - 10/6/21 10:39 - F:\P2017\0390\U30\DELIVERABLES\SEDIMENT QUALITY ASSESSMENT\BORING LOGS\HAVERHILL_BORING LOGS_ADD SEDIMENT SAMP.GPJ

SOIL BORING T5L

FUSS & O'NEILL

PROJECT NUMBER 20170390.U30
PROJECT NAME MVP Action Grant FY22/23
LOCATION Haverhill, MA
DRILLING METHOD Slide Hammer
HAMMER WEIGHT/FALL --
ELEVATION (FT)
TOP OF CASING ----
LOGGED BY S. DeVincentis
REMARKS Sample I.D. Prefix: 1543210907-

DATE STARTED 9/7/21
DATE COMPLETED 9/7/21
CASING TYPE/DIAMETER ----
SCREEN TYPE/SLOT/INTERVAL ----
GRAVEL PACK TYPE ----
GROUT TYPE/QUANTITY ----
DEPTH TO WATER (FT) 0.0
GROUND WATER ELEVATION ---

PID (ppm)	BLOW COUNTS	RECOVERY (inches)	SAMPLE ID.	EXTENT	DEPTH (ft. BGL)	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION	WATER DEPTH
								Little River	
					5				
0.2		28.8	-03			ML		Dark brown, ORGANIC SILT, wet, no odor	
						SM		Light brown to grey, fine to coarse SAND, trace Silt	
1.0						ML		Dark brown, ORGANIC SILT, trace wood, wet	
								Bottom of borehole at 7.9 feet.	

LOG A EWNN01 - ESDAT_LOG1.GDT - 10/6/21 10:39 - F:\P2017\0390\U30\DELIVERABLES\SEDIMENT QUALITY ASSESSMENT\BORING LOGS\HAVERHILL_BORING LOGS_ADD SEDIMENT SAMP.GPJ

SOIL BORING T5R

FUSS & O'NEILL

PROJECT NUMBER 20170390.U30
PROJECT NAME MVP Action Grant FY22/23
LOCATION Haverhill, MA
DRILLING METHOD Slide Hammer
HAMMER WEIGHT/FALL --
ELEVATION (FT)
TOP OF CASING ----
LOGGED BY S. DeVincentis
REMARKS Sample I.D. Prefix: 1543210907-

DATE STARTED 9/7/21
DATE COMPLETED 9/7/21
CASING TYPE/DIAMETER ----
SCREEN TYPE/SLOT/INTERVAL ----
GRAVEL PACK TYPE ----
GROUT TYPE/QUANTITY ----
DEPTH TO WATER (FT) 0.0
GROUND WATER ELEVATION ---

PID (ppm)	BLOW COUNTS	RECOVERY (inches)	SAMPLE ID.	EXTENT	DEPTH (ft. BGL)	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION	WATER DEPTH
								Little River	
0.0		46.8	-03			ML		Dark brown, ORGANIC SILT, trace wood, wet, no odor	
0.0					5	MLS		Light brown, SILT, some fine Sand, wet	
0.0						SM		Light brown, fine SAND, some Silt, wet	
0.0								Bottom of borehole at 6.4 feet.	

LOG A EWNN01 - ESDAT_LOG1.GDT - 10/6/21 10:39 - F:\P2017\0390\U30\DELIVERABLES\SEDIMENT QUALITY ASSESSMENT\BORING LOGS\HAVERHILL_BORING LOGS_ADD SEDIMENT SAMP.GPJ

SOIL BORING T6C

FUSS & O'NEILL

PROJECT NUMBER 20170390.U30
PROJECT NAME MVP Action Grant FY22/23
LOCATION Haverhill, MA
DRILLING METHOD Slide Hammer
HAMMER WEIGHT/FALL --
ELEVATION (FT)
TOP OF CASING ----
LOGGED BY S. DeVincentis
REMARKS Sample I.D. Prefix: 1543210907-

DATE STARTED 9/7/21
DATE COMPLETED 9/7/21
CASING TYPE/DIAMETER ----
SCREEN TYPE/SLOT/INTERVAL ----
GRAVEL PACK TYPE ----
GROUT TYPE/QUANTITY ----
DEPTH TO WATER (FT) 0.0
GROUND WATER ELEVATION ---

PID (ppm)	BLOW COUNTS	RECOVERY (inches)	SAMPLE ID.	EXTENT	DEPTH (ft. BGL)	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION	WATER DEPTH
								Little River	
0.0 2.4 16.9 34.4		48	-02		5 10	ML		Dark brown, ORGANIC SILT, trace wood, wet, petroleum odor Bottom of borehole at 10.2 feet.	

LOG A EWNN01 - ESDAT_LOG1.GDT - 10/6/21 10:39 - F:\P2017\0390\U30\DELIVERABLES\SEDIMENT QUALITY ASSESSMENT\BORING LOGS\HAVERHILL_BORING LOGS_ADD SEDIMENT SAMP.GPJ

SOIL BORING T6L

FUSS & O'NEILL

PROJECT NUMBER 20170390.U30
PROJECT NAME MVP Action Grant FY22/23
LOCATION Haverhill, MA
DRILLING METHOD Slide Hammer
HAMMER WEIGHT/FALL --
ELEVATION (FT)
TOP OF CASING ----
LOGGED BY S. DeVincentis
REMARKS Sample I.D. Prefix: 1543210907-

DATE STARTED 9/7/21
DATE COMPLETED 9/7/21
CASING TYPE/DIAMETER ----
SCREEN TYPE/SLOT/INTERVAL ----
GRAVEL PACK TYPE ----
GROUT TYPE/QUANTITY ----
DEPTH TO WATER (FT) 0.0
GROUND WATER ELEVATION ---

PID (ppm)	BLOW COUNTS	RECOVERY (inches)	SAMPLE ID.	EXTENT	DEPTH (ft. BGL)	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION	WATER DEPTH
								Little River	
					5				
		48	-02			SP		Light brown, fine to coarse SAND, trace Silt, wet	
0.0					10	ML		Dark brown, ORGANIC SILT, trace wood, wet, petroleum odor	
1.0									
13.6						CH		Grey, high plasticity CLAY, wet	
3.1								Bottom of borehole at 12.0 feet.	

LOG A EWNN01 - ESDAT_LOG1.GDT - 10/6/21 10:39 - F:\P2017\0390\U30\DELIVERABLES\SEDIMENT QUALITY ASSESSMENT\BORING LOGS\HAVERHILL_BORING LOGS_ADD SEDIMENT SAMP.GPJ

SOIL BORING T6R

FUSS & O'NEILL

PROJECT NUMBER 20170390.U30
PROJECT NAME MVP Action Grant FY22/23
LOCATION Haverhill, MA
DRILLING METHOD Slide Hammer
HAMMER WEIGHT/FALL --
ELEVATION (FT)
TOP OF CASING ----
LOGGED BY S. DeVincentis
REMARKS Sample I.D. Prefix: 1543210907-

DATE STARTED 9/7/21
DATE COMPLETED 9/7/21
CASING TYPE/DIAMETER ----
SCREEN TYPE/SLOT/INTERVAL ----
GRAVEL PACK TYPE ----
GROUT TYPE/QUANTITY ----
DEPTH TO WATER (FT) 0.0
GROUND WATER ELEVATION ---

PID (ppm)	BLOW COUNTS	RECOVERY (inches)	SAMPLE ID.	EXTENT	DEPTH (ft. BGL)	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION	WATER DEPTH
								Little River	
0.1 18.7 8.8		45.6 -2			5	ML		Dark brown, ORGANIC SILT, trace wood, wet, petroleum odor	
								Bottom of borehole at 6.9 feet.	

LOG A EWNN01 - ESDAT_LOG1.GDT - 10/6/21 10:39 - F:\P2017\0390\U30\DELIVERABLES\SEDIMENT QUALITY ASSESSMENT\BORING LOGS\HAVERHILL_BORING LOGS_ADD SEDIMENT SAMP.GPJ

SOIL BORING T7C

FUSS & O'NEILL

PROJECT NUMBER 20170390.U30
PROJECT NAME MVP Action Grant FY22/23
LOCATION Haverhill, MA
DRILLING METHOD Slide Hammer
HAMMER WEIGHT/FALL --
ELEVATION (FT)
TOP OF CASING ----
LOGGED BY S. DeVincentis
REMARKS Sample I.D. Prefix: 1543210907-

DATE STARTED 9/7/21
DATE COMPLETED 9/7/21
CASING TYPE/DIAMETER ----
SCREEN TYPE/SLOT/INTERVAL ----
GRAVEL PACK TYPE ----
GROUT TYPE/QUANTITY ----
DEPTH TO WATER (FT) 0.0
GROUND WATER ELEVATION ---

PID (ppm)	BLOW COUNTS	RECOVERY (inches)	SAMPLE ID.	EXTENT	DEPTH (ft. BGL)	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION	WATER DEPTH
								Little River	
					5				
					10				
0.0		14.4	-05			SP		Light brown, fine to coarse SAND, little Silt, wet, no odor	
0.0						MLS		Light brown, SILT, some fine Sand, wet	
								Bottom of borehole at 13.3 feet.	

LOG A EWNN01 - ESDAT_LOG1.GDT - 10/6/21 10:39 - F:\P2017\0390\U30\DELIVERABLES\SEDIMENT QUALITY ASSESSMENT\BORING LOGS\HAVERHILL_BORING LOGS_ADD SEDIMENT SAMP.GPJ

SOIL BORING T7L

FUSS & O'NEILL

PROJECT NUMBER 20170390.U30
PROJECT NAME MVP Action Grant FY22/23
LOCATION Haverhill, MA
DRILLING METHOD Slide Hammer
HAMMER WEIGHT/FALL --
ELEVATION (FT)
TOP OF CASING ----
LOGGED BY S. DeVincentis
REMARKS Sample I.D. Prefix: 1543210907-

DATE STARTED 9/7/21
DATE COMPLETED 9/7/21
CASING TYPE/DIAMETER ----
SCREEN TYPE/SLOT/INTERVAL ----
GRAVEL PACK TYPE ----
GROUT TYPE/QUANTITY ----
DEPTH TO WATER (FT) 0.0
GROUND WATER ELEVATION ---

PID (ppm)	BLOW COUNTS	RECOVERY (inches)	SAMPLE ID.	EXTENT	DEPTH (ft. BGL)	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION	WATER DEPTH
								Little River	
0.0		9.6	-05		5	ML		Dark brown, ORGANIC SILT, wet, no odor	
0.0						SM		Light brown, fine SAND, some Silt, wet	
								Bottom of borehole at 6.0 feet.	

LOG A EWNN01 - ESDAT_LOG1.GDT - 10/6/21 10:39 - F:\P2017\0390\U30\DELIVERABLES\SEDIMENT QUALITY ASSESSMENT\BORING LOGS\HAVERHILL_BORING LOGS_ADD SEDIMENT SAMP.GPJ

SOIL BORING T7R

FUSS & O'NEILL

PROJECT NUMBER 20170390.U30
PROJECT NAME MVP Action Grant FY22/23
LOCATION Haverhill, MA
DRILLING METHOD Slide Hammer
HAMMER WEIGHT/FALL --
ELEVATION (FT)
TOP OF CASING ----
LOGGED BY S. DeVincentis
REMARKS Sample I.D. Prefix: 1543210907-

DATE STARTED 9/7/21
DATE COMPLETED 9/7/21
CASING TYPE/DIAMETER ----
SCREEN TYPE/SLOT/INTERVAL ----
GRAVEL PACK TYPE ----
GROUT TYPE/QUANTITY ----
DEPTH TO WATER (FT) 0.0
GROUND WATER ELEVATION ---

PID (ppm)	BLOW COUNTS	RECOVERY (inches)	SAMPLE ID.	EXTENT	DEPTH (ft. BGL)	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION	WATER DEPTH
					5			Little River	
					10				
0.0		21.6	-05					Dark brown, ORGANIC SILT, trace wood, wet, no odor	
0.0								Bottom of borehole at 13.4 feet.	

LOG A EWNN01 - ESDAT_LOG1.GDT - 10/6/21 10:39 - F:\P2017\0390\U30\DELIVERABLES\SEDIMENT QUALITY ASSESSMENT\BORING LOGS\HAVERHILL_BORING LOGS_ADD SEDIMENT SAMP.GPJ

SOIL BORING T8C

FUSS & O'NEILL

PROJECT NUMBER 20170390.U30
PROJECT NAME MVP Action Grant FY22/23
LOCATION Haverhill, MA
DRILLING METHOD Slide Hammer
HAMMER WEIGHT/FALL --
ELEVATION (FT)
TOP OF CASING ----
LOGGED BY S. DeVincentis
REMARKS Sample I.D. Prefix: 1543210907-

DATE STARTED 9/7/21
DATE COMPLETED 9/7/21
CASING TYPE/DIAMETER ----
SCREEN TYPE/SLOT/INTERVAL ----
GRAVEL PACK TYPE ----
GROUT TYPE/QUANTITY ----
DEPTH TO WATER (FT) 0.0
GROUND WATER ELEVATION ---

PID (ppm)	BLOW COUNTS	RECOVERY (inches)	SAMPLE ID.	EXTENT	DEPTH (ft. BGL)	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION	WATER DEPTH
								Little River	
0.0		18	-07		5	SM		Light brown, fine to coarse SAND, some Silt, wet, no odor	
0.0						SM		Light brown, fine SAND, some Silt, little Organics, wet	
						SM		Light brown, fine to coarse SAND, some Silt, wet	
								Bottom of borehole at 6.2 feet.	

LOG A EWNN01 - ESDAT_LOG1.GDT - 10/6/21 10:39 - F:\P2017\0390\U30\DELIVERABLES\SEDIMENT QUALITY ASSESSMENT\BORING LOGS\HAVERHILL_BORING LOGS_ADD SEDIMENT SAMP.GPJ

SOIL BORING T8L

FUSS & O'NEILL

PROJECT NUMBER 20170390.U30
PROJECT NAME MVP Action Grant FY22/23
LOCATION Haverhill, MA
DRILLING METHOD Slide Hammer
HAMMER WEIGHT/FALL --
ELEVATION (FT)
TOP OF CASING ----
LOGGED BY S. DeVincentis
REMARKS Sample I.D. Prefix: 1543210907-

DATE STARTED 9/7/21
DATE COMPLETED 9/7/21
CASING TYPE/DIAMETER ----
SCREEN TYPE/SLOT/INTERVAL ----
GRAVEL PACK TYPE ----
GROUT TYPE/QUANTITY ----
DEPTH TO WATER (FT) 0.0
GROUND WATER ELEVATION ---

PID (ppm)	BLOW COUNTS	RECOVERY (inches)	SAMPLE ID.	EXTENT	DEPTH (ft. BGL)	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION	WATER DEPTH
								Little River	
0.0		8	-07			SM		Light brown, fine to coarse SAND, some Silt, wet, no odor	
								Bottom of borehole at 1.7 feet.	

LOG A EWNN01 - ESDAT_LOG1.GDT - 10/6/21 10:39 - F:\P2017\0390\U30\DELIVERABLES\SEDIMENT QUALITY ASSESSMENT\BORING LOGS\HAVERHILL_BORING LOGS_ADD SEDIMENT SAMP.GPJ

SOIL BORING T8R

FUSS & O'NEILL

PROJECT NUMBER 20170390.U30
PROJECT NAME MVP Action Grant FY22/23
LOCATION Haverhill, MA
DRILLING METHOD Slide Hammer
HAMMER WEIGHT/FALL --
ELEVATION (FT)
TOP OF CASING ----
LOGGED BY S. DeVincentis
REMARKS Sample I.D. Prefix: 1543210907-

DATE STARTED 9/7/21
DATE COMPLETED 9/7/21
CASING TYPE/DIAMETER ----
SCREEN TYPE/SLOT/INTERVAL ----
GRAVEL PACK TYPE ----
GROUT TYPE/QUANTITY ----
DEPTH TO WATER (FT) 0.0
GROUND WATER ELEVATION ---

PID (ppm)	BLOW COUNTS	RECOVERY (inches)	SAMPLE ID.	EXTENT	DEPTH (ft. BGL)	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION	WATER DEPTH
								Little River	
0.0		0.33	-07			GM		Light brown, fine to coarse SAND and angular GRAVEL, trace Silt, wet, no odor	
								Bottom of borehole at 1.3 feet.	

LOG A EWNN01 - ESDAT_LOG1.GDT - 10/6/21 10:39 - F:\P2017\0390\U30\DELIVERABLES\SEDIMENT QUALITY ASSESSMENT\BORING LOGS\HAVERHILL_BORING LOGS_ADD SEDIMENT SAMP.GPJ

SOIL BORING T9C

FUSS & O'NEILL

PROJECT NUMBER 20170390.U30
PROJECT NAME MVP Action Grant FY22/23
LOCATION Haverhill, MA
DRILLING METHOD Slide Hammer
HAMMER WEIGHT/FALL --
ELEVATION (FT)
TOP OF CASING ----
LOGGED BY S. DeVincentis
REMARKS Sample I.D. Prefix: 1543210907-

DATE STARTED 9/7/21
DATE COMPLETED 9/7/21
CASING TYPE/DIAMETER ----
SCREEN TYPE/SLOT/INTERVAL ----
GRAVEL PACK TYPE ----
GROUT TYPE/QUANTITY ----
DEPTH TO WATER (FT) 0.0
GROUND WATER ELEVATION ---

PID (ppm)	BLOW COUNTS	RECOVERY (inches)	SAMPLE ID.	EXTENT	DEPTH (ft. BGL)	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION	WATER DEPTH
								Little River	
0.0 0.7		16.8	-08			SM		Light brown, fine to coarse SAND, some Silt, trace Organics, wet, no odor	
								Bottom of borehole at 4.5 feet.	

LOG A EWNN01 - ESDAT_LOG1.GDT - 10/6/21 10:39 - F:\P2017\0390\U30\DELIVERABLES\SEDIMENT QUALITY ASSESSMENT\BORING LOGS\HAVERHILL_BORING LOGS_ADD SEDIMENT SAMP.GPJ

SOIL BORING T9L

FUSS & O'NEILL

PROJECT NUMBER 20170390.U30
PROJECT NAME MVP Action Grant FY22/23
LOCATION Haverhill, MA
DRILLING METHOD Slide Hammer
HAMMER WEIGHT/FALL --
ELEVATION (FT)
TOP OF CASING ----
LOGGED BY S. DeVincentis
REMARKS Sample I.D. Prefix: 1543210907-

DATE STARTED 9/7/21
DATE COMPLETED 9/7/21
CASING TYPE/DIAMETER ----
SCREEN TYPE/SLOT/INTERVAL ----
GRAVEL PACK TYPE ----
GROUT TYPE/QUANTITY ----
DEPTH TO WATER (FT) 0.0
GROUND WATER ELEVATION ---

PID (ppm)	BLOW COUNTS	RECOVERY (inches)	SAMPLE ID.	EXTENT	DEPTH (ft. BGL)	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION	WATER DEPTH
								Little River	
0.0		6	-08			SM		Light brown, fine to coarse SAND, some Silt, trace Organics, wet, no odor	
								Bottom of borehole at 1.5 feet.	

LOG A EWNN01 - ESDAT_LOG1.GDT - 10/6/21 10:39 - F:\P2017\0390\U30\DELIVERABLES\SEDIMENT QUALITY ASSESSMENT\BORING LOGS\HAVERHILL_BORING LOGS_ADD SEDIMENT SAMP.GPJ

SOIL BORING T9R

FUSS & O'NEILL

PROJECT NUMBER 20170390.U30
PROJECT NAME MVP Action Grant FY22/23
LOCATION Haverhill, MA
DRILLING METHOD Slide Hammer
HAMMER WEIGHT/FALL --
ELEVATION (FT)
TOP OF CASING ----
LOGGED BY S. DeVincentis
REMARKS Sample I.D. Prefix: 1543210907-

DATE STARTED 9/7/21
DATE COMPLETED 9/7/21
CASING TYPE/DIAMETER ----
SCREEN TYPE/SLOT/INTERVAL ----
GRAVEL PACK TYPE ----
GROUT TYPE/QUANTITY ----
DEPTH TO WATER (FT) 0.0
GROUND WATER ELEVATION ---

PID (ppm)	BLOW COUNTS	RECOVERY (inches)	SAMPLE ID.	EXTENT	DEPTH (ft. BGL)	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION	WATER DEPTH
								Little River	
0.0		12	-08			SM		Light brown, fine to coarse SAND and SILT, trace Organics, wet, no odor	
								Bottom of borehole at 2.0 feet.	

LOG A EWNN01 - ESDAT_LOG1.GDT - 10/6/21 10:39 - F:\P2017\0390\U30\DELIVERABLES\SEDIMENT QUALITY ASSESSMENT\BORING LOGS\HAVERHILL_BORING LOGS_ADD SEDIMENT SAMP.GPJ

Appendix B

Photographic Log



Sediment core at Transect #4, River Right.



Sediment core at Transect #4, River Left.



Sediment core at Transect #5, River Right.



Sediment core at Transect #6, River Left.



Sediment core at Transect #6, River Center.



Sediment coare at Transect #6, River Left.



Sediment core at Transect #7, River Right.



Sediment core at Transect #7, River Center.



Sediment core at Transect #8, River Center.



Sediment core at Transect #9, River Center.



Sediment core at SED-1.



Sediment core at SED-2.



Sediment core at SED-3.



Sediment core at SED-4.



Sediment core at SED-5.



Sediment core at SED-6.



Sediment core at SED-10.

Appendix C

Analytical Laboratory Reports

con-test®
A Pace Analytical® Laboratory

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

October 22, 2021

Matt Kissane
Fuss & O'Neill EnviroScience, LLC - MA
108 Myrtle St,
Quincy, MA 02171

Project Location: Haverhill, MA
Client Job Number:
Project Number: 20170390.U30
Laboratory Work Order Number: 21J0927

Enclosed are results of analyses for samples as received by the laboratory on October 15, 2021. If you have any questions concerning this report, please feel free to contact me.

Sincerely,



Jessica L. Hoffman
Project Manager

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B292761 8

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Chain of Custody/Sample Receipt 11

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

Fuss & O'Neill EnviroScience, LLC - MA
108 Myrtle St,
Quincy, MA 02171
ATTN: Matt Kissane

REPORT DATE: 10/22/2021

PURCHASE ORDER NUMBER:

PROJECT NUMBER: 20170390.U30

ANALYTICAL SUMMARY

WORK ORDER NUMBER: 21J0927

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

PROJECT LOCATION: Haverhill, MA

FIELD SAMPLE #	LAB ID:	MATRIX	SAMPLE DESCRIPTION	TEST	SUB LAB
1543210907-02	21J0927-01	Soil		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.

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: Haverhill, MA | Sample Description: | Work Order: 21J0927

Date Received: 10/15/2021

Field Sample #: 1543210907-02 | Sampled: 9/7/2021 09:41

Sample ID: 21J0927-01

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	47.4		% Wt	1		SM 2540G	9/10/21	9/13/21 9:51	MJH

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

Project Location: Haverhill, MA | Sample Description: | Work Order: 21J0927

Date Received: 10/15/2021

Field Sample #: 1543210907-02 | Sampled: 9/7/2021 09:41

Sample ID: 21J0927-01

Sample Matrix: Soil

TCLP - Metals Analyses

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Lead	1.3	0.10	mg/L	1		SW-846 6010D	10/19/21	10/20/21 12:44	QNW

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

Sample Extraction Data

Prep Method: % Solids **Analytical Method: SM 2540G**

Lab Number [Field ID]	Batch	Date
21J0927-01 [1543210907-02]	B289999	09/10/21

Prep Method: SW-846 3010A **Analytical Method: SW-846 6010D** **Leachates were extracted on 10/18/2021 per SW-846 1311 in Batch B292664**

Lab Number [Field ID]	Batch	Initial [mL]	Final [mL]	Date
21J0927-01 [1543210907-02]	B292761	50.0	50.0	10/19/21

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QUALITY CONTROL

TCLP - Metals Analyses - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B292761 - SW-846 3010A										
Blank (B292761-BLK1)				Prepared: 10/19/21 Analyzed: 10/20/21						
Lead	ND	0.10	mg/L							
LCS (B292761-BS1)				Prepared: 10/19/21 Analyzed: 10/20/21						
Lead	0.503	0.10	mg/L	0.500		101	80-120			
LCS Dup (B292761-BSD1)				Prepared: 10/19/21 Analyzed: 10/20/21						
Lead	0.498	0.10	mg/L	0.500		99.6	80-120	1.02	20	

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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.

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CERTIFICATIONS

Certified Analyses included in this Report

Analyte	Certifications
SW-846 6010D in Water	
Lead	NY,CT,ME,NC,NH,VA

Con-Test, a Pace Environmental Laboratory, operates under the following certifications and accreditations:

Code	Description	Number	Expires
AIHA	AIHA-LAP, LLC - ISO17025:2017	100033	03/1/2022
MA	Massachusetts DEP	M-MA100	06/30/2022
CT	Connecticut Department of Publilc Health	PH-0165	12/31/2022
NY	New York State Department of Health	10899 NELAP	04/1/2022
NH-S	New Hampshire Environmental Lab	2516 NELAP	02/5/2022
RI	Rhode Island Department of Health	LAO00112	12/30/2021
NC	North Carolina Div. of Water Quality	652	12/31/2021
NJ	New Jersey DEP	MA007 NELAP	06/30/2022
FL	Florida Department of Health	E871027 NELAP	06/30/2022
VT	Vermont Department of Health Lead Laboratory	LL720741	07/30/2022
ME	State of Maine	MA00100	06/9/2023
VA	Commonwealth of Virginia	460217	12/14/2021
NH-P	New Hampshire Environmental Lab	2557 NELAP	09/6/2022
VT-DW	Vermont Department of Health Drinking Water	VT-255716	06/12/2022
NC-DW	North Carolina Department of Health	25703	07/31/2022
PA	Commonwealth of Pennsylvania DEP	68-05812	06/30/2022
MI	Dept. of Env, Great Lakes, and Energy	9100	09/6/2022

21J0927

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☐ 146 Hartford Road, Manchester, CT 06040
☐ 56 Quarry Road, Trumbull, CT 06611
☐ 1419 Richland Street, Columbia, SC 29201
☐ 78 Interstate Drive, West Springfield, MA 01089
☒ 108 Myrtle Street, #502, North Quincy, MA 02171
☐ 317 Iron Horse Way, Suite 204, Providence, RI 02908
☐ 80 Washington Street, Suite 301, Poughkeepsie, NY
☐ Other _____

21J0927

CHAIN-OF-CUSTODY RECORD

41951

Turnaround: Due 9/16/21
☐ 24-Hour* ☐ 72-Hour* ☐ Other _____ (days)
☐ 48-Hour* ☐ Standard (____ days) *Surcharge Applies

PROJECT NAME: MVP Grant FY 22/23
PROJECT LOCATION: Haverhill, MA
PROJECT NUMBER: 20170390.U30
LABORATORY: Pace Labs

REPORT TO: Matt Krissake (MKrissane@fando.com)
INVOICE TO:
P.O. No.: 1543 20170390.U30
Sampler's Signature: _____ Date: 9/8/21

Source Codes:
MW=Monitoring Well PW=Potable Water T=Treatment Facility S=Soil B=Sediment
SW=Surface Water ST=Stormwater W=Waste A=Air C=Concrete
X=Other TRIP BLANK

Analysis Request / Containers

Item No.	Transfer Check 1 2 3 4	Sample Number	Source Code	Date Sampled	Time Sampled	Total Metals *	PAH's only	VOC's (8260-E)	EPH's	Pesticides + Herbicides	TCLP *	Total Organic Carbon	Soil VOA Vial, ★methanol	Soil VOA Vial, ☐ water	Glass Soil Container (16) oz ★Na(SO)2	Other 6l 8oz	Other 6l 20z	Water VOA Vial, ☐ As is ☐ HCl	Glass Amber (____) ml, ☐ As is ☐ H2SO4	Plastic - As is, ☐ 250 ml ☐ 500 ☐ 1000 ml	Plastic - H2SO4, ☐ 250 ml ☐ 500 ml	Plastic - HNO3, 250 ml ☐ Filtered ☐ 0.45µ ☐ 10µ	Plastic - NaOH, 250 ml	Comments
1	1 X	1543210907-01	X	9/7/21	0842					X								1	2					
2	2 X	01 -02	B	↓	0941	X	X	X	X	X	X	X	X					1	2	1	1	1		
3	3 X	-03	↓		1057	X	X	X	X	X	X	X	X					1	2	1	1	1		
4	4 X	-04			1125	X	X	X	X	X	X	X	X					1	2	1	1	1		
5	5 X	-05	↓	↓	1305	X	X	X	X	X	X	X	X					1	2	1	1	1		
6	6 X	1543210908-06	X	9/8/21	0954					X								1	2					
7	7 X	-07	B	↓	1027	X	X	X	X	X	X	X	X					1	2	1	1	1		
8	8 X	~~408~~ 08	B	↓	1104	X	X	X	X	X	X	X	X											

Client activated sample for TCLP Lead JLH 10/15/2021

Transfer Number	Relinquished By	Accepted By	Date	Time
1		FED Fridge	9/8/21	
2		Paul Chalkey	9-9-21	1125
3	Paul Chalkey		9-9-21	1455
4		17:15 5.2	9/9/21	1902

Charge Exceptions: ☐ CT Tax Exempt ☐ QA/QC ☐ Other _____ ____ Duplicates ☒ Blanks (Item Nos: 1 + 6)
Reporting and Detection Limit Requirements: ☐ RCP Deliverables ☐ MCP CAM Cert.
Additional Comments: * As, Cd, Cr, Cu, Pb, Hg, Ni, Zn | Hold Samples for TCLP

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I Have Not Confirmed Sample Container Numbers With Lab Staff Before Relinquishing Over Samples_____

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Doc# 277 Rev 5 2017

Login Sample Receipt Checklist - (Rejection Criteria Listing - Using Acceptance Policy) Any False Statement will be brought to the attention of the Client - State True or False

Client Fuss O'Neill

Received By [signature] Date 9/4/21 Time 1900

How were the samples received? In Cooler T No Cooler _____ On Ice T No Ice _____
Direct from Sampling _____ Ambient _____ Melted Ice _____

Were samples within Temperature? 2-6°C T By Gun # 3 Actual Temp - 5.2
By Blank # _____ Actual Temp - _____

Was Custody Seal Intact? n/a Were Samples Tampered with? n/a
Was COC Relinquished ? T Does Chain Agree With Samples? T
Are there broken/leaking/loose caps on any samples? F
Is COC in ink/ Legible? T Were samples received within holding time? _____
Did COC include all pertinent Information? Client T Analysis T Sampler Name _____
Project T ID's T Collection Dates/Times _____
Are Sample labels filled out and legible? T
Are there Lab to Filters? F Who was notified? _____
Are there Rushes? F Who was notified? _____
Are there Short Holds? F Who was notified? _____
Is there enough Volume? T
Is there Headspace where applicable? n/a MS/MSD? F
Proper Media/Containers Used? T Is splitting samples required? F
Were trip blanks received? T On COC? T
Do all samples have the proper pH? Acid n/a Base n/a

Vials	#	Containers:	#		#		#
Unp-		1 Liter Amb.		1 Liter Plastic		16 oz Amb.	6
HCL-		500 mL Amb.		500 mL Plastic		8oz Amb/Clear	6
Meoh-	8	250 mL Amb.		250 mL Plastic		4oz Amb/Clear	
Bisulfate-	16	Flashpoint		Col./Bacteria		2oz Amb/Clear	6
DI-		Other Glass		Other Plastic		Encore	
Thiosulfate-		SOC Kit		Plastic Bag		Frozen:	
Sulfuric-		Perchlorate		Ziplock			

Unused Media

Vials	#	Containers:	#		#		#
Unp-		1 Liter Amb.		1 Liter Plastic		16 oz Amb.	
HCL-		500 mL Amb.		500 mL Plastic		8oz Amb/Clear	
Meoh-		250 mL Amb.		250 mL Plastic		4oz Amb/Clear	
Bisulfate-		Col./Bacteria		Flashpoint		2oz Amb/Clear	
DI-		Other Plastic		Other Glass		Encore	
Thiosulfate-		SOC Kit		Plastic Bag		Frozen:	
Sulfuric-		Perchlorate		Ziplock			

Comments:

MADEP MCP Analytical Method Report Certification Form

Laboratory Name: Con-Test, a Pace Analytical Laboratory	Project #: 21J0927
Project Location: Haverhill, MA	RTN:

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

21J0927-01

Matrices: Soil

CAM Protocol (check all that below)

8260 VOC CAM II A ( )	7470/7471 Hg CAM IIIB ( )	MassDEP VPH 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 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 ( )	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]

<u>Data User Note:</u> 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: 10/22/21

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October 22, 2021

Matt Kissane
Fuss & O'Neill EnviroScience, LLC - MA
108 Myrtle St,
Quincy, MA 02171

Project Location: Haverhill, MA
Client Job Number:
Project Number: 20170390.U30
Laboratory Work Order Number: 21J0931

Enclosed are results of analyses for samples as received by the laboratory on October 15, 2021. If you have any questions concerning this report, please feel free to contact me.

Sincerely,



Jessica L. Hoffman
Project Manager

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Fuss & O'Neill EnviroScience, LLC - MA
108 Myrtle St,
Quincy, MA 02171
ATTN: Matt Kissane

REPORT DATE: 10/22/2021

PURCHASE ORDER NUMBER:

PROJECT NUMBER: 20170390.U30

ANALYTICAL SUMMARY

WORK ORDER NUMBER: 21J0931

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

PROJECT LOCATION: Haverhill, MA

FIELD SAMPLE #	LAB ID:	MATRIX	SAMPLE DESCRIPTION	TEST	SUB LAB
1543210917-01	21J0931-01	Soil		SM 2540G	
				SW-846 6010D	
1543210917-02	21J0931-02	Soil		SM 2540G	
				SW-846 6010D	
1543210917-03	21J0931-03	Soil		SM 2540G	
				SW-846 6010D	
1543210917-05	21J0931-04	Soil		SM 2540G	
				SW-846 6010D	
1543210917-07	21J0931-05	Soil		SM 2540G	
				SW-846 6010D	
1543210917-08	21J0931-06	Soil		SM 2540G	
				SW-846 6010D	
1543210917-09	21J0931-07	Soil		SM 2540G	
				SW-846 6010D	
1543210917-10	21J0931-08	Soil		SM 2540G	
				SW-846 6010D	

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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: Haverhill, MA | Sample Description: | Work Order: 21J0931

Date Received: 10/15/2021

Field Sample #: 1543210917-01 | Sampled: 9/17/2021 08:35

Sample ID: 21J0931-01

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	50.8		% Wt	1		SM 2540G	9/23/21	9/24/21 12:41	MJH

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Project Location: Haverhill, MA
Sample Description:
Work Order: 21J0931

Date Received: 10/15/2021

Field Sample #: 1543210917-01
Sampled: 9/17/2021 08:35

Sample ID: 21J0931-01

Sample Matrix: Soil

TCLP - Metals Analyses

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Lead	0.50	0.10	mg/L	1		SW-846 6010D	10/19/21	10/20/21 12:51	QNW

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Project Location: Haverhill, MA | Sample Description: | Work Order: 21J0931

Date Received: 10/15/2021

Field Sample #: 1543210917-02 | Sampled: 9/17/2021 08:55

Sample ID: 21J0931-02

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	41.2		% Wt	1		SM 2540G	9/23/21	9/24/21 12:41	MJH

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Project Location: Haverhill, MA | Sample Description: | Work Order: 21J0931

Date Received: 10/15/2021

Field Sample #: 1543210917-02 | Sampled: 9/17/2021 08:55

Sample ID: 21J0931-02

Sample Matrix: Soil

TCLP - Metals Analyses

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Lead	0.53	0.10	mg/L	1		SW-846 6010D	10/19/21	10/20/21 12:58	QNW

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Project Location: Haverhill, MA | Sample Description: | Work Order: 21J0931

Date Received: 10/15/2021

Field Sample #: 1543210917-03 | Sampled: 9/17/2021 08:45

Sample ID: 21J0931-03

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	52.0		% Wt	1		SM 2540G	9/23/21	9/24/21 12:41	MJH

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

Project Location: Haverhill, MA | Sample Description: | Work Order: 21J0931

Date Received: 10/15/2021

Field Sample #: 1543210917-03 | Sampled: 9/17/2021 08:45

Sample ID: 21J0931-03

Sample Matrix: Soil

TCLP - Metals Analyses

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Lead	1.4	0.10	mg/L	1		SW-846 6010D	10/19/21	10/20/21 13:05	QNW

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

Project Location: Haverhill, MA | Sample Description: | Work Order: 21J0931

Date Received: 10/15/2021

Field Sample #: 1543210917-05 | Sampled: 9/17/2021 09:15

Sample ID: 21J0931-04

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	41.3		% Wt	1		SM 2540G	9/23/21	9/24/21 12:41	MJH

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Project Location: Haverhill, MA | Sample Description: | Work Order: 21J0931

Date Received: 10/15/2021

Field Sample #: 1543210917-05 | Sampled: 9/17/2021 09:15

Sample ID: 21J0931-04

Sample Matrix: Soil

TCLP - Metals Analyses

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Lead	0.59	0.10	mg/L	1		SW-846 6010D	10/19/21	10/20/21 12:18	QNW

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Project Location: Haverhill, MA | Sample Description: | Work Order: 21J0931

Date Received: 10/15/2021

Field Sample #: 1543210917-07 | Sampled: 9/17/2021 09:35

Sample ID: 21J0931-05

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	56.8		% Wt	1		SM 2540G	9/23/21	9/24/21 12:41	MJH

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Project Location: Haverhill, MA | Sample Description: | Work Order: 21J0931

Date Received: 10/15/2021

Field Sample #: 1543210917-07 | Sampled: 9/17/2021 09:35

Sample ID: 21J0931-05

Sample Matrix: Soil

TCLP - Metals Analyses

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Lead	0.67	0.10	mg/L	1		SW-846 6010D	10/19/21	10/20/21 13:12	QNW

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

Project Location: Haverhill, MA | Sample Description: | Work Order: 21J0931

Date Received: 10/15/2021

Field Sample #: 1543210917-08 | Sampled: 9/17/2021 10:20

Sample ID: 21J0931-06

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	42.9		% Wt	1		SM 2540G	9/23/21	9/24/21 12:41	MJH

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Project Location: Haverhill, MA | Sample Description: | Work Order: 21J0931

Date Received: 10/15/2021

Field Sample #: 1543210917-08 | Sampled: 9/17/2021 10:20

Sample ID: 21J0931-06

Sample Matrix: Soil

TCLP - Metals Analyses

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Lead	0.29	0.10	mg/L	1		SW-846 6010D	10/19/21	10/20/21 13:19	QNW

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Project Location: Haverhill, MA | Sample Description: | Work Order: 21J0931

Date Received: 10/15/2021

Field Sample #: 1543210917-09 | Sampled: 9/17/2021 10:15

Sample ID: 21J0931-07

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	57.6		% Wt	1		SM 2540G	9/23/21	9/24/21 12:41	MJH

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Project Location: Haverhill, MA | Sample Description: | Work Order: 21J0931

Date Received: 10/15/2021

Field Sample #: 1543210917-09 | Sampled: 9/17/2021 10:15

Sample ID: 21J0931-07

Sample Matrix: Soil

TCLP - Metals Analyses

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Lead	0.94	0.10	mg/L	1		SW-846 6010D	10/19/21	10/20/21 13:26	QNW

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Project Location: Haverhill, MA | Sample Description: | Work Order: 21J0931

Date Received: 10/15/2021

Field Sample #: 1543210917-10 | Sampled: 9/17/2021 10:05

Sample ID: 21J0931-08

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	50.1		% Wt	1		SM 2540G	9/23/21	9/24/21 12:41	MJH

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Project Location: Haverhill, MA | Sample Description: | Work Order: 21J0931

Date Received: 10/15/2021

Field Sample #: 1543210917-10 | Sampled: 9/17/2021 10:05

Sample ID: 21J0931-08

Sample Matrix: Soil

TCLP - Metals Analyses

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Lead	0.58	0.10	mg/L	1		SW-846 6010D	10/19/21	10/20/21 13:33	QNW

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Sample Extraction Data

Prep Method: % Solids **Analytical Method: SM 2540G**

Lab Number [Field ID]	Batch	Date
21J0931-01 [1543210917-01]	B290731	09/23/21
21J0931-02 [1543210917-02]	B290731	09/23/21
21J0931-03 [1543210917-03]	B290731	09/23/21
21J0931-04 [1543210917-05]	B290731	09/23/21
21J0931-05 [1543210917-07]	B290731	09/23/21
21J0931-06 [1543210917-08]	B290731	09/23/21
21J0931-07 [1543210917-09]	B290731	09/23/21
21J0931-08 [1543210917-10]	B290731	09/23/21

Prep Method: SW-846 3010A **Analytical Method: SW-846 6010D** **Leachates were extracted on 10/18/2021 per SW-846 1311 in Batch B292664**

Lab Number [Field ID]	Batch	Initial [mL]	Final [mL]	Date
21J0931-01 [1543210917-01]	B292761	50.0	50.0	10/19/21
21J0931-02 [1543210917-02]	B292761	50.0	50.0	10/19/21
21J0931-03 [1543210917-03]	B292761	50.0	50.0	10/19/21
21J0931-04 [1543210917-05]	B292761	50.0	50.0	10/19/21
21J0931-05 [1543210917-07]	B292761	50.0	50.0	10/19/21
21J0931-06 [1543210917-08]	B292761	50.0	50.0	10/19/21
21J0931-07 [1543210917-09]	B292761	50.0	50.0	10/19/21
21J0931-08 [1543210917-10]	B292761	50.0	50.0	10/19/21

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QUALITY CONTROL

TCLP - Metals Analyses - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B292761 - SW-846 3010A										
Blank (B292761-BLK1)				Prepared: 10/19/21 Analyzed: 10/20/21						
Lead	ND	0.10	mg/L							
LCS (B292761-BS1)				Prepared: 10/19/21 Analyzed: 10/20/21						
Lead	0.503	0.10	mg/L	0.500		101	80-120			
LCS Dup (B292761-BSD1)				Prepared: 10/19/21 Analyzed: 10/20/21						
Lead	0.498	0.10	mg/L	0.500		99.6	80-120	1.02	20	
Matrix Spike (B292761-MS1)	**Source: 21J0931-04**			Prepared: 10/19/21 Analyzed: 10/20/21						
Lead	1.07	0.10	mg/L	0.500	0.587	97.4	75-125			

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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.

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CERTIFICATIONS

Certified Analyses included in this Report

Analyte	Certifications
SW-846 6010D in Water	
Lead	NY,CT,ME,NC,NH,VA

Con-Test, a Pace Environmental Laboratory, operates under the following certifications and accreditations:

Code	Description	Number	Expires
AIHA	AIHA-LAP, LLC - ISO17025:2017	100033	03/1/2022
MA	Massachusetts DEP	M-MA100	06/30/2022
CT	Connecticut Department of Publilc Health	PH-0165	12/31/2022
NY	New York State Department of Health	10899 NELAP	04/1/2022
NH-S	New Hampshire Environmental Lab	2516 NELAP	02/5/2022
RI	Rhode Island Department of Health	LAO00112	12/30/2021
NC	North Carolina Div. of Water Quality	652	12/31/2021
NJ	New Jersey DEP	MA007 NELAP	06/30/2022
FL	Florida Department of Health	E871027 NELAP	06/30/2022
VT	Vermont Department of Health Lead Laboratory	LL720741	07/30/2022
ME	State of Maine	MA00100	06/9/2023
VA	Commonwealth of Virginia	460217	12/14/2021
NH-P	New Hampshire Environmental Lab	2557 NELAP	09/6/2022
VT-DW	Vermont Department of Health Drinking Water	VT-255716	06/12/2022
NC-DW	North Carolina Department of Health	25703	07/31/2022
PA	Commonwealth of Pennsylvania DEP	68-05812	06/30/2022
MI	Dept. of Env, Great Lakes, and Energy	9100	09/6/2022

~~21C0497~~

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☐ 56 Quarry Road, Trumbull, CT 06611
☐ 1419 Richland Street, Columbia, SC 29201
☐ 78 Interstate Drive, West Springfield, MA 01089
☒ 108 Myrtle Street, #502, North Quincy, MA 02171
☐ 317 Iron Horse Way, Suite 204, Providence, RI 02908
☐ 80 Washington Street, Suite 301, Poughkeepsie, NY
☐ Other _____

21J0931

CHAIN-OF-CUSTODY RECORD

41957

Turnaround
☐ 24-Hour* ☐ 72-Hour* ☐ Other _____ (days)
☐ 48-Hour* ☒ Standard (5 days) *Surcharge Applies

PROJECT NAME: MVP GRANT FY 22/23
PROJECT LOCATION: HAVERHILL, MA
PROJECT NUMBER: 2017 0390.U30
LABORATORY: PACE LABS

REPORT TO: Matt Kissane (mkissane@fando.com)
INVOICE TO:
P.O. No.: 1543 2017 0390.U30
Sampler's Signature: _____ Date: 9/17/21

Source Codes:
MW=Monitoring Well PW=Potable Water T=Treatment Facility S=Soil B=Sediment
SW=Surface Water ST=Stormwater W=Waste A=Air C=Concrete
X=Other _____

Analysis Request

Containers

Item No.	Transfer Check 1	2	3	4	Sample Number	Source Code	Date Sampled	Time Sampled	PCB	Lead	Hexane	Extr. Ranges ONLY	VPH 8270	Soil VOA Vial, ☐ methanol	Soil VOA Vial, ☐ water	Glass Soil Container (16) oz	Other:	Other:	Water VOA Vial, ☐ As is ☐ HCl	Glass Amber ( ) ml, ☐ As is ☐ H_2SO_4	Plastic - As is, ☐ 250 ml ☐ 500 ml ☐ 1000 ml	Plastic - H_2SO_4, ☐ 250 ml ☐ 500 ml	Plastic - HNO_3, 250 ml ☐ Filtered ☐ 0.45µ ☐ 10µ	Plastic - NaOH, 250 ml
1	X	X			01 1543210917-01	B	9/17/21	0835	X	X	X									1				
2					02 -02			0855	X	X	X									1				
3					03 -03			0845	X	X	X									1				
4					-04			0940	X	X	X	X	X							1				
5					04 -05			0915	X	X	X	X	X							1				
6					-06			0925	X	X	X	X	X							1				
7					05 -07			0935	X	X	X	X	X							1				
8					06 -08			1020	X	X	X	X	X							1				
9					07 -09			1015	X	X	X	X	X							1				
10					08 -10			1005	X	X	X	X	X							1				

Client chose to activate TCLP Lead JLH 10/15/2021

per client they do need the MA MCP form. JLH 9/21/2021

Transfer Number	Relinquished By	Accepted By	Date	Time
1		FedEx	9/17/21	1400
2	Fridge		9/20/21	1145
3		5.4	9/20/21	1709
4				

Charge Exceptions: ☐ CT Tax Exempt ☐ QA/QC ☐ Other _____
____ Duplicates ____ Blanks (Item Nos:)
Reporting and Detection Limit Requirements: ☐ RCP Deliverables ☐ MCP CAM Cert.
Additional Comments:

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I Have Not Confirmed Sample Container Numbers With Lab Staff Before Relinquishing Over Samples_____

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Doc# 277 Rev 5 2017

Login Sample Receipt Checklist - (Rejection Criteria Listing - Using Acceptance Policy) Any False Statement will be brought to the attention of the Client - State True or False

Client Fuss & O'Neill

Received By GR Date 9/20/21 Time 1703

How were the samples received? In Cooler T No Cooler _____ On Ice T No Ice _____

Direct from Sampling _____ Ambient _____ Melted Ice _____

Were samples within Temperature? 2-6°C T By Gun # 2 Actual Temp - 5.4

By Blank # _____ Actual Temp - _____

Was Custody Seal Intact? NA Were Samples Tampered with? NA

Was COC Relinquished ? T Does Chain Agree With Samples? T

Are there broken/leaking/loose caps on any samples? F

Is COC in ink/ Legible? T Were samples received within holding time? T

Did COC include all pertinent Information? Client T Analysis T Sampler Name T

Project T ID's T Collection Dates/Times T

Are Sample labels filled out and legible? T

Are there Lab to Filters? F Who was notified? _____

Are there Rushes? F Who was notified? _____

Are there Short Holds? F Who was notified? _____

Is there enough Volume? T

Is there Headspace where applicable? NA MS/MSD? F

Proper Media/Containers Used? T Is splitting samples required? F

Were trip blanks received? F On COC? F

Do all samples have the proper pH? NA Acid _____ Base _____

Vials	#	Containers:	#		#		#
Unp-		1 Liter Amb.		1 Liter Plastic		16 oz Amb.	10
HCL-		500 mL Amb.		500 mL Plastic		8oz Amb/Clear	
Meoh-		250 mL Amb.		250 mL Plastic		4oz Amb/Clear	
Bisulfate-		Flashpoint		Col./Bacteria		2oz Amb/Clear	
DI-		Other Glass		Other Plastic		Encore	
Thiosulfate-		SOC Kit		Plastic Bag		Frozen:	
Sulfuric-		Perchlorate		Ziplock			

Unused Media

Vials	#	Containers:	#		#		#
Unp-		1 Liter Amb.		1 Liter Plastic		16 oz Amb.	
HCL-		500 mL Amb.		500 mL Plastic		8oz Amb/Clear	
Meoh-		250 mL Amb.		250 mL Plastic		4oz Amb/Clear	
Bisulfate-		Col./Bacteria		Flashpoint		2oz Amb/Clear	
DI-		Other Plastic		Other Glass		Encore	
Thiosulfate-		SOC Kit		Plastic Bag		Frozen:	
Sulfuric-		Perchlorate		Ziplock			

Comments:

MADEP MCP Analytical Method Report Certification Form

Laboratory Name: Con-Test, a Pace Analytical Laboratory	Project #: 21J0931
Project Location: Haverhill, MA	RTN:

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

21J0931-01 thru 21J0931-08

Matrices: Soil

CAM Protocol (check all that below)

8260 VOC CAM II A ( )	7470/7471 Hg CAM IIIB ( )	MassDEP VPH 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 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 ( )	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]

<u>Data User Note:</u> 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: 10/22/21

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September 20, 2021

Matt Kissane
Fuss & O'Neill EnviroScience, LLC - MA
108 Myrtle St,
Quincy, MA 02171

Project Location: Haverhill, MA
Client Job Number:
Project Number: 20170390.U30
Laboratory Work Order Number: 21I0471

Enclosed are results of analyses for samples received by the laboratory on September 9, 2021. If you have any questions concerning this report, please feel free to contact me.

Sincerely,



Jessica L. Hoffman
Project Manager

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Fuss & O'Neill EnviroScience, LLC - MA
108 Myrtle St,
Quincy, MA 02171
ATTN: Matt Kissane

REPORT DATE: 9/20/2021

PURCHASE ORDER NUMBER:

PROJECT NUMBER: 20170390.U30

ANALYTICAL SUMMARY

WORK ORDER NUMBER: 21I0471

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

PROJECT LOCATION: Haverhill, MA

FIELD SAMPLE #	LAB ID:	MATRIX	SAMPLE DESCRIPTION	TEST	SUB LAB
1543210907-01	21I0471-01	Soil		SW-846 8260C-D	
1543210907-02	21I0471-02	Soil		MADEP EPH rev 2.1	
				SM 2540G	
				SW 846 9060A	
				SW-846 6010D	
				SW-846 7471B	
				SW-846 8081B	
				SW-846 8082A	
				SW-846 8151A	
				SW-846 8260C-D	
				SW-846 8270D-E	
1543210907-03	21I0471-03	Soil		MADEP EPH rev 2.1	
				SM 2540G	
				SW 846 9060A	
				SW-846 6010D	
				SW-846 7471B	
				SW-846 8081B	
				SW-846 8082A	
				SW-846 8151A	
				SW-846 8260C-D	
				SW-846 8270D-E	
1543210907-04	21I0471-04	Soil		MADEP EPH rev 2.1	
				SM 2540G	
				SW 846 9060A	
				SW-846 6010D	
				SW-846 7471B	
				SW-846 8081B	
				SW-846 8082A	
				SW-846 8151A	
				SW-846 8260C-D	
				SW-846 8270D-E	
1543210907-05	21I0471-05	Soil		MADEP EPH rev 2.1	
				SM 2540G	
				SW 846 9060A	
				SW-846 6010D	
				SW-846 7471B	
				SW-846 8081B	
				SW-846 8082A	
				SW-846 8151A	
				SW-846 8260C-D	
				SW-846 8270D-E	

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Fuss & O'Neill EnviroScience, LLC - MA
108 Myrtle St,
Quincy, MA 02171
ATTN: Matt Kissane

REPORT DATE: 9/20/2021

PURCHASE ORDER NUMBER:

PROJECT NUMBER: 20170390.U30

ANALYTICAL SUMMARY

WORK ORDER NUMBER: 21I0471

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

PROJECT LOCATION: Haverhill, MA

FIELD SAMPLE #	LAB ID:	MATRIX	SAMPLE DESCRIPTION	TEST	SUB LAB
1543210908-06	21I0471-06	Soil		SW-846 8260C-D	
1543210908-07	21I0471-07	Soil		MADEP EPH rev 2.1	
				SM 2540G	
				SW 846 9060A	
				SW-846 6010D	
				SW-846 7471B	
				SW-846 8081B	
				SW-846 8082A	
				SW-846 8151A	
				SW-846 8260C-D	
				SW-846 8270D-E	
1543210908-08	21I0471-08	Soil		MADEP EPH rev 2.1	
				SM 2540G	
				SW 846 9060A	
				SW-846 6010D	
				SW-846 7471B	
				SW-846 8081B	
				SW-846 8082A	
				SW-846 8151A	
				SW-846 8260C-D	
				SW-846 8270D-E	

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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.

For method 8151 samples were derivatized on 09/14/21.

For method 8151 samples analysis bracketed by LCS to monitor esterification. All recoveries in the bracketing LCS met method criteria.

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SM 2540G

Qualifications:

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:

% Solids
21I0471-02[1543210907-02], 21I0471-07[1543210908-07], B289999-DUP2, B289999-DUP6

SW 846 9060A

Qualifications:

MS-07

Matrix spike recovery is outside of control limits. Analysis is in control based on laboratory fortified blank recovery.Possibility of sample matrix effects that lead to low bias for reported result or non-homogeneous sample aliquot cannot be eliminated.

Analyte & Samples(s) Qualified:

Total Organic Carbon
B290031-MS1

Z-01

Results over calibration curve. Results are estimitated due to method limitations.

Analyte & Samples(s) Qualified:

Total Organic Carbon
21I0471-02[1543210907-02], B290031-DUP1

SW-846 8081B

Qualifications:

DL-03

Elevated reporting limit due to matrix interference.

Analyte & Samples(s) Qualified:

21I0471-02[1543210907-02], 21I0471-03[1543210907-03], 21I0471-04[1543210907-04], 21I0471-05[1543210907-05], 21I0471-07[1543210908-07], 21I0471-08[1543210908-08]

SW-846 8082A

Qualifications:

O-32

A dilution was performed as part of the standard analytical procedure.

Analyte & Samples(s) Qualified:

21I0471-04[1543210907-04], 21I0471-05[1543210907-05], 21I0471-07[1543210908-07], 21I0471-08[1543210908-08]

SW-846 8151A

Qualifications:

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:

2,4,5-T [2C]
B290112-BS1, B290112-BSD1

Dinoseb
B290112-BS1, B290112-BSD1

Dinoseb [2C]
B290112-BS1, B290112-BSD1

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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:

Dalapon

21I0471-02[1543210907-02], 21I0471-03[1543210907-03], 21I0471-04[1543210907-04], 21I0471-05[1543210907-05], 21I0471-07[1543210908-07], 21I0471-08[1543210908-08], B290112-BLK1

Dalapon [2C]

21I0471-02[1543210907-02], 21I0471-03[1543210907-03], 21I0471-04[1543210907-04], 21I0471-05[1543210907-05], 21I0471-07[1543210908-07], 21I0471-08[1543210908-08], B290112-BLK1

SW-846 8260C-D

Qualifications:

RL-07

Elevated reporting limit based on lowest point in calibration.
MA CAM reporting limit not met.

Analyte & Samples(s) Qualified:

Carbon Disulfide

21I0471-02[1543210907-02], 21I0471-03[1543210907-03]

Methylene Chloride

21I0471-02[1543210907-02], 21I0471-03[1543210907-03]

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:

1,2,3-Trichlorobenzene

21I0471-02[1543210907-02], 21I0471-03[1543210907-03], B289949-BLK1, B289949-BS1, B289949-BSD1, S063175-CCV1

Bromoform

21I0471-01[1543210907-01], 21I0471-04[1543210907-04], 21I0471-05[1543210907-05], 21I0471-06[1543210908-06], 21I0471-07[1543210908-07], 21I0471-08[1543210908-08], B289971-BLK1, B289971-BS1, B289971-BSD1, S063160-CCV1

Bromomethane

21I0471-02[1543210907-02], 21I0471-03[1543210907-03], B289949-BLK1, B289949-BS1, B289949-BSD1, S063175-CCV1

Hexachlorobutadiene

21I0471-01[1543210907-01], 21I0471-04[1543210907-04], 21I0471-05[1543210907-05], 21I0471-06[1543210908-06], 21I0471-07[1543210908-07], 21I0471-08[1543210908-08], B289971-BLK1, B289971-BS1, B289971-BSD1, S063160-CCV1

m+p Xylene

21I0471-01[1543210907-01], 21I0471-04[1543210907-04], 21I0471-05[1543210907-05], 21I0471-06[1543210908-06], 21I0471-07[1543210908-07], 21I0471-08[1543210908-08], B289971-BLK1, B289971-BS1, B289971-BSD1, S063160-CCV1

Naphthalene

21I0471-01[1543210907-01], 21I0471-02[1543210907-02], 21I0471-03[1543210907-03], 21I0471-04[1543210907-04], 21I0471-05[1543210907-05], 21I0471-06[1543210908-06], 21I0471-07[1543210908-07], 21I0471-08[1543210908-08], B289949-BLK1, B289949-BS1, B289949-BSD1, B289971-BLK1, B289971-BS1, B289971-BSD1, S063160-CCV1, S063175-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

S063160-CCV1, S063175-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.

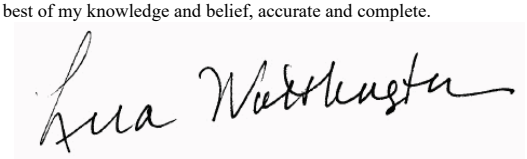
Analyte & Samples(s) Qualified:

Bromomethane

21I0471-01[1543210907-01], 21I0471-04[1543210907-04], 21I0471-05[1543210907-05], 21I0471-06[1543210908-06], 21I0471-07[1543210908-07], 21I0471-08[1543210908-08], B289971-BLK1, B289971-BS1, B289971-BSD1, S063160-CCV1

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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

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

Project Location: Haverhill, MA | Sample Description: | Work Order: 21I0471

Date Received: 9/9/2021

Field Sample #: 1543210907-01 | Sampled: 9/7/2021 08:42

Sample ID: 21I0471-01

Sample Matrix: Soil

Volatile Organic Compounds by GC/MS

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Acetone	ND	0.10	mg/Kg wet	1		SW-846 8260C-D	9/10/21	9/10/21 13:33	MFF
tert-Amyl Methyl Ether (TAME)	ND	0.0010	mg/Kg wet	1		SW-846 8260C-D	9/10/21	9/10/21 13:33	MFF
Benzene	ND	0.0020	mg/Kg wet	1		SW-846 8260C-D	9/10/21	9/10/21 13:33	MFF
Bromobenzene	ND	0.0020	mg/Kg wet	1		SW-846 8260C-D	9/10/21	9/10/21 13:33	MFF
Bromochloromethane	ND	0.0020	mg/Kg wet	1		SW-846 8260C-D	9/10/21	9/10/21 13:33	MFF
Bromodichloromethane	ND	0.0020	mg/Kg wet	1		SW-846 8260C-D	9/10/21	9/10/21 13:33	MFF
Bromoform	ND	0.0020	mg/Kg wet	1	V-05	SW-846 8260C-D	9/10/21	9/10/21 13:33	MFF
Bromomethane	ND	0.010	mg/Kg wet	1	V-34	SW-846 8260C-D	9/10/21	9/10/21 13:33	MFF
2-Butanone (MEK)	ND	0.040	mg/Kg wet	1		SW-846 8260C-D	9/10/21	9/10/21 13:33	MFF
n-Butylbenzene	ND	0.0020	mg/Kg wet	1		SW-846 8260C-D	9/10/21	9/10/21 13:33	MFF
sec-Butylbenzene	ND	0.0020	mg/Kg wet	1		SW-846 8260C-D	9/10/21	9/10/21 13:33	MFF
tert-Butylbenzene	ND	0.0020	mg/Kg wet	1		SW-846 8260C-D	9/10/21	9/10/21 13:33	MFF
tert-Butyl Ethyl Ether (TBEE)	ND	0.0010	mg/Kg wet	1		SW-846 8260C-D	9/10/21	9/10/21 13:33	MFF
Carbon Disulfide	ND	0.0060	mg/Kg wet	1		SW-846 8260C-D	9/10/21	9/10/21 13:33	MFF
Carbon Tetrachloride	ND	0.0020	mg/Kg wet	1		SW-846 8260C-D	9/10/21	9/10/21 13:33	MFF
Chlorobenzene	ND	0.0020	mg/Kg wet	1		SW-846 8260C-D	9/10/21	9/10/21 13:33	MFF
Chlorodibromomethane	ND	0.0010	mg/Kg wet	1		SW-846 8260C-D	9/10/21	9/10/21 13:33	MFF
Chloroethane	ND	0.010	mg/Kg wet	1		SW-846 8260C-D	9/10/21	9/10/21 13:33	MFF
Chloroform	ND	0.0040	mg/Kg wet	1		SW-846 8260C-D	9/10/21	9/10/21 13:33	MFF
Chloromethane	ND	0.010	mg/Kg wet	1		SW-846 8260C-D	9/10/21	9/10/21 13:33	MFF
2-Chlorotoluene	ND	0.0020	mg/Kg wet	1		SW-846 8260C-D	9/10/21	9/10/21 13:33	MFF
4-Chlorotoluene	ND	0.0020	mg/Kg wet	1		SW-846 8260C-D	9/10/21	9/10/21 13:33	MFF
1,2-Dibromo-3-chloropropane (DBCP)	ND	0.0040	mg/Kg wet	1		SW-846 8260C-D	9/10/21	9/10/21 13:33	MFF
1,2-Dibromoethane (EDB)	ND	0.0010	mg/Kg wet	1		SW-846 8260C-D	9/10/21	9/10/21 13:33	MFF
Dibromomethane	ND	0.0020	mg/Kg wet	1		SW-846 8260C-D	9/10/21	9/10/21 13:33	MFF
1,2-Dichlorobenzene	ND	0.0020	mg/Kg wet	1		SW-846 8260C-D	9/10/21	9/10/21 13:33	MFF
1,3-Dichlorobenzene	ND	0.0020	mg/Kg wet	1		SW-846 8260C-D	9/10/21	9/10/21 13:33	MFF
1,4-Dichlorobenzene	ND	0.0020	mg/Kg wet	1		SW-846 8260C-D	9/10/21	9/10/21 13:33	MFF
Dichlorodifluoromethane (Freon 12)	ND	0.010	mg/Kg wet	1		SW-846 8260C-D	9/10/21	9/10/21 13:33	MFF
1,1-Dichloroethane	ND	0.0020	mg/Kg wet	1		SW-846 8260C-D	9/10/21	9/10/21 13:33	MFF
1,2-Dichloroethane	ND	0.0020	mg/Kg wet	1		SW-846 8260C-D	9/10/21	9/10/21 13:33	MFF
1,1-Dichloroethylene	ND	0.0040	mg/Kg wet	1		SW-846 8260C-D	9/10/21	9/10/21 13:33	MFF
cis-1,2-Dichloroethylene	ND	0.0020	mg/Kg wet	1		SW-846 8260C-D	9/10/21	9/10/21 13:33	MFF
trans-1,2-Dichloroethylene	ND	0.0020	mg/Kg wet	1		SW-846 8260C-D	9/10/21	9/10/21 13:33	MFF
1,2-Dichloropropane	ND	0.0020	mg/Kg wet	1		SW-846 8260C-D	9/10/21	9/10/21 13:33	MFF
1,3-Dichloropropane	ND	0.0010	mg/Kg wet	1		SW-846 8260C-D	9/10/21	9/10/21 13:33	MFF
2,2-Dichloropropane	ND	0.0020	mg/Kg wet	1		SW-846 8260C-D	9/10/21	9/10/21 13:33	MFF
1,1-Dichloropropene	ND	0.0020	mg/Kg wet	1		SW-846 8260C-D	9/10/21	9/10/21 13:33	MFF
cis-1,3-Dichloropropene	ND	0.0010	mg/Kg wet	1		SW-846 8260C-D	9/10/21	9/10/21 13:33	MFF
trans-1,3-Dichloropropene	ND	0.0010	mg/Kg wet	1		SW-846 8260C-D	9/10/21	9/10/21 13:33	MFF
Diethyl Ether	ND	0.010	mg/Kg wet	1		SW-846 8260C-D	9/10/21	9/10/21 13:33	MFF
Diisopropyl Ether (DIPE)	ND	0.0010	mg/Kg wet	1		SW-846 8260C-D	9/10/21	9/10/21 13:33	MFF
1,4-Dioxane	ND	0.10	mg/Kg wet	1		SW-846 8260C-D	9/10/21	9/10/21 13:33	MFF
Ethylbenzene	ND	0.0040	mg/Kg wet	1		SW-846 8260C-D	9/10/21	9/10/21 13:33	MFF

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Project Location: Haverhill, MA | Sample Description: | Work Order: 21I0471

Date Received: 9/9/2021

Field Sample #: 1543210907-01 | Sampled: 9/7/2021 08:42

Sample ID: 21I0471-01

Sample Matrix: Soil

Volatile Organic Compounds by GC/MS

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Hexachlorobutadiene	ND	0.0020	mg/Kg wet	1	V-05	SW-846 8260C-D	9/10/21	9/10/21 13:33	MFF
2-Hexanone (MBK)	ND	0.020	mg/Kg wet	1		SW-846 8260C-D	9/10/21	9/10/21 13:33	MFF
Isopropylbenzene (Cumene)	ND	0.0020	mg/Kg wet	1		SW-846 8260C-D	9/10/21	9/10/21 13:33	MFF
p-Isopropyltoluene (p-Cymene)	ND	0.0020	mg/Kg wet	1		SW-846 8260C-D	9/10/21	9/10/21 13:33	MFF
Methyl tert-Butyl Ether (MTBE)	ND	0.0040	mg/Kg wet	1		SW-846 8260C-D	9/10/21	9/10/21 13:33	MFF
Methylene Chloride	ND	0.010	mg/Kg wet	1		SW-846 8260C-D	9/10/21	9/10/21 13:33	MFF
4-Methyl-2-pentanone (MIBK)	ND	0.020	mg/Kg wet	1		SW-846 8260C-D	9/10/21	9/10/21 13:33	MFF
Naphthalene	ND	0.0040	mg/Kg wet	1	V-05	SW-846 8260C-D	9/10/21	9/10/21 13:33	MFF
n-Propylbenzene	ND	0.0020	mg/Kg wet	1		SW-846 8260C-D	9/10/21	9/10/21 13:33	MFF
Styrene	ND	0.0020	mg/Kg wet	1		SW-846 8260C-D	9/10/21	9/10/21 13:33	MFF
1,1,1,2-Tetrachloroethane	ND	0.0020	mg/Kg wet	1		SW-846 8260C-D	9/10/21	9/10/21 13:33	MFF
1,1,2,2-Tetrachloroethane	ND	0.0010	mg/Kg wet	1		SW-846 8260C-D	9/10/21	9/10/21 13:33	MFF
Tetrachloroethylene	ND	0.0020	mg/Kg wet	1		SW-846 8260C-D	9/10/21	9/10/21 13:33	MFF
Tetrahydrofuran	ND	0.010	mg/Kg wet	1		SW-846 8260C-D	9/10/21	9/10/21 13:33	MFF
Toluene	ND	0.0040	mg/Kg wet	1		SW-846 8260C-D	9/10/21	9/10/21 13:33	MFF
1,2,3-Trichlorobenzene	ND	0.0020	mg/Kg wet	1		SW-846 8260C-D	9/10/21	9/10/21 13:33	MFF
1,2,4-Trichlorobenzene	ND	0.0020	mg/Kg wet	1		SW-846 8260C-D	9/10/21	9/10/21 13:33	MFF
1,1,1-Trichloroethane	ND	0.0020	mg/Kg wet	1		SW-846 8260C-D	9/10/21	9/10/21 13:33	MFF
1,1,2-Trichloroethane	ND	0.0020	mg/Kg wet	1		SW-846 8260C-D	9/10/21	9/10/21 13:33	MFF
Trichloroethylene	ND	0.0020	mg/Kg wet	1		SW-846 8260C-D	9/10/21	9/10/21 13:33	MFF
Trichlorofluoromethane (Freon 11)	ND	0.010	mg/Kg wet	1		SW-846 8260C-D	9/10/21	9/10/21 13:33	MFF
1,2,3-Trichloropropane	ND	0.0020	mg/Kg wet	1		SW-846 8260C-D	9/10/21	9/10/21 13:33	MFF
1,2,4-Trimethylbenzene	ND	0.0020	mg/Kg wet	1		SW-846 8260C-D	9/10/21	9/10/21 13:33	MFF
1,3,5-Trimethylbenzene	ND	0.0020	mg/Kg wet	1		SW-846 8260C-D	9/10/21	9/10/21 13:33	MFF
Vinyl Chloride	ND	0.010	mg/Kg wet	1		SW-846 8260C-D	9/10/21	9/10/21 13:33	MFF
m+p Xylene	ND	0.0080	mg/Kg wet	1	V-05	SW-846 8260C-D	9/10/21	9/10/21 13:33	MFF
o-Xylene	ND	0.0040	mg/Kg wet	1		SW-846 8260C-D	9/10/21	9/10/21 13:33	MFF

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
1,2-Dichloroethane-d4	108	70-130		9/10/21 13:33
Toluene-d8	102	70-130		9/10/21 13:33
4-Bromofluorobenzene	94.5	70-130		9/10/21 13:33

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Project Location: Haverhill, MA | Sample Description: | Work Order: 21I0471

Date Received: 9/9/2021

Field Sample #: 1543210907-02 | Sampled: 9/7/2021 09:41

Sample ID: 21I0471-02

Sample Matrix: Soil

Volatile Organic Compounds by GC/MS

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Acetone	ND	7.2	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 16:32	EEH
tert-Amyl Methyl Ether (TAME)	ND	0.072	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 16:32	EEH
Benzene	ND	0.14	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 16:32	EEH
Bromobenzene	ND	0.14	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 16:32	EEH
Bromochloromethane	ND	0.14	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 16:32	EEH
Bromodichloromethane	ND	0.14	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 16:32	EEH
Bromoform	ND	0.14	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 16:32	EEH
Bromomethane	ND	0.29	mg/Kg dry	1	V-05	SW-846 8260C-D	9/10/21	9/10/21 16:32	EEH
2-Butanone (MEK)	ND	2.9	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 16:32	EEH
n-Butylbenzene	1.1	0.14	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 16:32	EEH
sec-Butylbenzene	0.46	0.14	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 16:32	EEH
tert-Butylbenzene	ND	0.14	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 16:32	EEH
tert-Butyl Ethyl Ether (TBEE)	ND	0.072	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 16:32	EEH
Carbon Disulfide	ND	1.4	mg/Kg dry	1	RL-07	SW-846 8260C-D	9/10/21	9/10/21 16:32	EEH
Carbon Tetrachloride	ND	0.14	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 16:32	EEH
Chlorobenzene	ND	0.14	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 16:32	EEH
Chlorodibromomethane	ND	0.072	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 16:32	EEH
Chloroethane	ND	0.29	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 16:32	EEH
Chloroform	ND	0.29	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 16:32	EEH
Chloromethane	ND	0.29	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 16:32	EEH
2-Chlorotoluene	ND	0.14	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 16:32	EEH
4-Chlorotoluene	ND	0.14	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 16:32	EEH
1,2-Dibromo-3-chloropropane (DBCP)	ND	0.57	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 16:32	EEH
1,2-Dibromoethane (EDB)	ND	0.072	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 16:32	EEH
Dibromomethane	ND	0.14	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 16:32	EEH
1,2-Dichlorobenzene	ND	0.14	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 16:32	EEH
1,3-Dichlorobenzene	ND	0.14	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 16:32	EEH
1,4-Dichlorobenzene	ND	0.14	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 16:32	EEH
Dichlorodifluoromethane (Freon 12)	ND	0.29	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 16:32	EEH
1,1-Dichloroethane	ND	0.14	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 16:32	EEH
1,2-Dichloroethane	ND	0.14	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 16:32	EEH
1,1-Dichloroethylene	ND	0.14	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 16:32	EEH
cis-1,2-Dichloroethylene	ND	0.14	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 16:32	EEH
trans-1,2-Dichloroethylene	ND	0.14	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 16:32	EEH
1,2-Dichloropropane	ND	0.14	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 16:32	EEH
1,3-Dichloropropane	ND	0.072	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 16:32	EEH
2,2-Dichloropropane	ND	0.14	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 16:32	EEH
1,1-Dichloropropene	ND	0.29	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 16:32	EEH
cis-1,3-Dichloropropene	ND	0.072	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 16:32	EEH
trans-1,3-Dichloropropene	ND	0.072	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 16:32	EEH
Diethyl Ether	ND	0.29	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 16:32	EEH
Diisopropyl Ether (DIPE)	ND	0.072	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 16:32	EEH
1,4-Dioxane	ND	7.2	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 16:32	EEH
Ethylbenzene	ND	0.14	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 16:32	EEH

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Project Location: Haverhill, MA | Sample Description: | Work Order: 21I0471

Date Received: 9/9/2021

Field Sample #: 1543210907-02 | Sampled: 9/7/2021 09:41

Sample ID: 21I0471-02

Sample Matrix: Soil

Volatile Organic Compounds by GC/MS

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Hexachlorobutadiene	ND	0.14	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 16:32	EEH
2-Hexanone (MBK)	ND	1.4	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 16:32	EEH
Isopropylbenzene (Cumene)	0.38	0.14	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 16:32	EEH
p-Isopropyltoluene (p-Cymene)	0.82	0.14	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 16:32	EEH
Methyl tert-Butyl Ether (MTBE)	ND	0.14	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 16:32	EEH
Methylene Chloride	ND	0.72	mg/Kg dry	1	RL-07	SW-846 8260C-D	9/10/21	9/10/21 16:32	EEH
4-Methyl-2-pentanone (MIBK)	ND	1.4	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 16:32	EEH
Naphthalene	3.7	0.29	mg/Kg dry	1	V-05	SW-846 8260C-D	9/10/21	9/10/21 16:32	EEH
n-Propylbenzene	0.24	0.14	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 16:32	EEH
Styrene	ND	0.14	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 16:32	EEH
1,1,1,2-Tetrachloroethane	ND	0.14	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 16:32	EEH
1,1,2,2-Tetrachloroethane	ND	0.072	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 16:32	EEH
Tetrachloroethylene	ND	0.14	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 16:32	EEH
Tetrahydrofuran	ND	0.57	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 16:32	EEH
Toluene	ND	0.14	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 16:32	EEH
1,2,3-Trichlorobenzene	ND	0.57	mg/Kg dry	1	V-05	SW-846 8260C-D	9/10/21	9/10/21 16:32	EEH
1,2,4-Trichlorobenzene	ND	0.14	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 16:32	EEH
1,1,1-Trichloroethane	ND	0.14	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 16:32	EEH
1,1,2-Trichloroethane	ND	0.14	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 16:32	EEH
Trichloroethylene	ND	0.14	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 16:32	EEH
Trichlorofluoromethane (Freon 11)	ND	0.29	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 16:32	EEH
1,2,3-Trichloropropane	ND	0.29	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 16:32	EEH
1,2,4-Trimethylbenzene	4.6	0.14	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 16:32	EEH
1,3,5-Trimethylbenzene	2.2	0.14	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 16:32	EEH
Vinyl Chloride	ND	0.29	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 16:32	EEH
m+p Xylene	0.32	0.29	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 16:32	EEH
o-Xylene	ND	0.14	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 16:32	EEH

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
1,2-Dichloroethane-d4	114	70-130		9/10/21 16:32
Toluene-d8	112	70-130		9/10/21 16:32
4-Bromofluorobenzene	116	70-130		9/10/21 16:32

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Project Location: Haverhill, MA | Sample Description: | Work Order: 21I0471

Date Received: 9/9/2021

Field Sample #: 1543210907-02 | Sampled: 9/7/2021 09:41

Sample ID: 21I0471-02

Sample Matrix: Soil

Semivolatile Organic Compounds by GC/MS

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Acenaphthene	0.83	0.36	mg/Kg dry	1		SW-846 8270D-E	9/10/21	9/13/21 17:52	IMR
Acenaphthylene	0.45	0.36	mg/Kg dry	1		SW-846 8270D-E	9/10/21	9/13/21 17:52	IMR
Anthracene	0.96	0.36	mg/Kg dry	1		SW-846 8270D-E	9/10/21	9/13/21 17:52	IMR
Benzo(a)anthracene	2.9	0.36	mg/Kg dry	1		SW-846 8270D-E	9/10/21	9/13/21 17:52	IMR
Benzo(a)pyrene	2.8	0.36	mg/Kg dry	1		SW-846 8270D-E	9/10/21	9/13/21 17:52	IMR
Benzo(b)fluoranthene	3.5	0.36	mg/Kg dry	1		SW-846 8270D-E	9/10/21	9/13/21 17:52	IMR
Benzo(g,h,i)perylene	2.5	0.36	mg/Kg dry	1		SW-846 8270D-E	9/10/21	9/13/21 17:52	IMR
Benzo(k)fluoranthene	1.4	0.36	mg/Kg dry	1		SW-846 8270D-E	9/10/21	9/13/21 17:52	IMR
Chrysene	3.5	0.36	mg/Kg dry	1		SW-846 8270D-E	9/10/21	9/13/21 17:52	IMR
Dibenz(a,h)anthracene	0.52	0.36	mg/Kg dry	1		SW-846 8270D-E	9/10/21	9/13/21 17:52	IMR
Fluoranthene	7.0	0.36	mg/Kg dry	1		SW-846 8270D-E	9/10/21	9/13/21 17:52	IMR
Fluorene	1.4	0.36	mg/Kg dry	1		SW-846 8270D-E	9/10/21	9/13/21 17:52	IMR
Indeno(1,2,3-cd)pyrene	2.5	0.36	mg/Kg dry	1		SW-846 8270D-E	9/10/21	9/13/21 17:52	IMR
2-Methylnaphthalene	5.4	0.36	mg/Kg dry	1		SW-846 8270D-E	9/10/21	9/13/21 17:52	IMR
Naphthalene	3.2	0.36	mg/Kg dry	1		SW-846 8270D-E	9/10/21	9/13/21 17:52	IMR
Phenanthrene	6.8	0.36	mg/Kg dry	1		SW-846 8270D-E	9/10/21	9/13/21 17:52	IMR
Pyrene	7.7	0.36	mg/Kg dry	1		SW-846 8270D-E	9/10/21	9/13/21 17:52	IMR

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Nitrobenzene-d5	62.7	30-130		9/13/21 17:52
2-Fluorobiphenyl	59.9	30-130		9/13/21 17:52
p-Terphenyl-d14	89.5	30-130		9/13/21 17:52

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Project Location: Haverhill, MA | Sample Description: | Work Order: 21I0471

Date Received: 9/9/2021

Field Sample #: 1543210907-02 | Sampled: 9/7/2021 09:41

Sample ID: 21I0471-02

Sample Matrix: Soil

Sample Flags: DL-03

Organochloride Pesticides by GC/ECD

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aldrin [1]	ND	0.21	mg/Kg dry	20		SW-846 8081B	9/10/21	9/17/21 10:52	TG
alpha-BHC [1]	ND	0.21	mg/Kg dry	20		SW-846 8081B	9/10/21	9/17/21 10:52	TG
beta-BHC [1]	ND	0.21	mg/Kg dry	20		SW-846 8081B	9/10/21	9/17/21 10:52	TG
delta-BHC [1]	ND	0.21	mg/Kg dry	20		SW-846 8081B	9/10/21	9/17/21 10:52	TG
gamma-BHC (Lindane) [1]	ND	0.084	mg/Kg dry	20		SW-846 8081B	9/10/21	9/17/21 10:52	TG
Chlordane [1]	ND	0.84	mg/Kg dry	20		SW-846 8081B	9/10/21	9/17/21 10:52	TG
4,4'-DDD [1]	ND	0.17	mg/Kg dry	20		SW-846 8081B	9/10/21	9/17/21 10:52	TG
4,4'-DDE [1]	ND	0.17	mg/Kg dry	20		SW-846 8081B	9/10/21	9/17/21 10:52	TG
4,4'-DDT [1]	ND	0.17	mg/Kg dry	20		SW-846 8081B	9/10/21	9/17/21 10:52	TG
Dieldrin [1]	ND	0.17	mg/Kg dry	20		SW-846 8081B	9/10/21	9/17/21 10:52	TG
Endosulfan I [1]	ND	0.21	mg/Kg dry	20		SW-846 8081B	9/10/21	9/17/21 10:52	TG
Endosulfan II [1]	ND	0.34	mg/Kg dry	20		SW-846 8081B	9/10/21	9/17/21 10:52	TG
Endosulfan sulfate [1]	ND	0.34	mg/Kg dry	20		SW-846 8081B	9/10/21	9/17/21 10:52	TG
Endrin [1]	ND	0.34	mg/Kg dry	20		SW-846 8081B	9/10/21	9/17/21 10:52	TG
Endrin ketone [1]	ND	0.34	mg/Kg dry	20		SW-846 8081B	9/10/21	9/17/21 10:52	TG
Heptachlor [1]	ND	0.21	mg/Kg dry	20		SW-846 8081B	9/10/21	9/17/21 10:52	TG
Heptachlor epoxide [1]	ND	0.21	mg/Kg dry	20		SW-846 8081B	9/10/21	9/17/21 10:52	TG
Hexachlorobenzene [1]	ND	0.25	mg/Kg dry	20		SW-846 8081B	9/10/21	9/17/21 10:52	TG
Methoxychlor [1]	ND	2.1	mg/Kg dry	20		SW-846 8081B	9/10/21	9/17/21 10:52	TG

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Decachlorobiphenyl [1]	91.1	30-150		9/17/21 10:52
Decachlorobiphenyl [2]	74.3	30-150		9/17/21 10:52
Tetrachloro-m-xylene [1]	75.9	30-150		9/17/21 10:52
Tetrachloro-m-xylene [2]	77.9	30-150		9/17/21 10:52

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Project Location: Haverhill, MA | Sample Description: | Work Order: 21I0471

Date Received: 9/9/2021

Field Sample #: 1543210907-02 | Sampled: 9/7/2021 09:41

Sample ID: 21I0471-02

Sample Matrix: Soil

Polychlorinated Biphenyls By GC/ECD

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.17	mg/Kg dry	4		SW-846 8082A	9/10/21	9/15/21 21:36	TG
Aroclor-1221 [1]	ND	0.17	mg/Kg dry	4		SW-846 8082A	9/10/21	9/15/21 21:36	TG
Aroclor-1232 [1]	ND	0.17	mg/Kg dry	4		SW-846 8082A	9/10/21	9/15/21 21:36	TG
Aroclor-1242 [1]	ND	0.17	mg/Kg dry	4		SW-846 8082A	9/10/21	9/15/21 21:36	TG
Aroclor-1248 [1]	ND	0.17	mg/Kg dry	4		SW-846 8082A	9/10/21	9/15/21 21:36	TG
Aroclor-1254 [1]	0.33	0.17	mg/Kg dry	4		SW-846 8082A	9/10/21	9/15/21 21:36	TG
Aroclor-1260 [1]	ND	0.17	mg/Kg dry	4		SW-846 8082A	9/10/21	9/15/21 21:36	TG
Aroclor-1262 [1]	ND	0.17	mg/Kg dry	4		SW-846 8082A	9/10/21	9/15/21 21:36	TG
Aroclor-1268 [1]	ND	0.17	mg/Kg dry	4		SW-846 8082A	9/10/21	9/15/21 21:36	TG

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Decachlorobiphenyl [1]	72.2	30-150		9/15/21 21:36
Decachlorobiphenyl [2]	69.0	30-150		9/15/21 21:36
Tetrachloro-m-xylene [1]	64.5	30-150		9/15/21 21:36
Tetrachloro-m-xylene [2]	55.4	30-150		9/15/21 21:36

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Project Location: Haverhill, MA | Sample Description: | Work Order: 21I0471

Date Received: 9/9/2021

Field Sample #: 1543210907-02 | Sampled: 9/7/2021 09:41

Sample ID: 21I0471-02

Sample Matrix: Soil

Herbicides by GC/ECD

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
2,4-D [1]	ND	210	µg/kg dry	4		SW-846 8151A	9/13/21	9/17/21 20:00	JMB
2,4-DB [1]	ND	210	µg/kg dry	4		SW-846 8151A	9/13/21	9/17/21 20:00	JMB
2,4,5-TP (Silvex) [1]	ND	21	µg/kg dry	4		SW-846 8151A	9/13/21	9/17/21 20:00	JMB
2,4,5-T [1]	ND	21	µg/kg dry	4		SW-846 8151A	9/13/21	9/17/21 20:00	JMB
Dalalpon [1]	ND	530	µg/kg dry	4	V-20	SW-846 8151A	9/13/21	9/17/21 20:00	JMB
Dicamba [1]	ND	21	µg/kg dry	4		SW-846 8151A	9/13/21	9/17/21 20:00	JMB
Dichloroprop [1]	ND	210	µg/kg dry	4		SW-846 8151A	9/13/21	9/17/21 20:00	JMB
Dinoseb [1]	ND	110	µg/kg dry	4		SW-846 8151A	9/13/21	9/17/21 20:00	JMB
MCPA [1]	ND	21000	µg/kg dry	4		SW-846 8151A	9/13/21	9/17/21 20:00	JMB
MCPP [1]	ND	21000	µg/kg dry	4		SW-846 8151A	9/13/21	9/17/21 20:00	JMB

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
2,4-Dichlorophenylacetic acid [1]	79.2	30-150		9/17/21 20:00
2,4-Dichlorophenylacetic acid [2]	65.5	30-150		9/17/21 20:00

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Project Location: Haverhill, MA | Sample Description: | Work Order: 21I0471

Date Received: 9/9/2021

Field Sample #: 1543210907-02 | Sampled: 9/7/2021 09:41

Sample ID: 21I0471-02

Sample Matrix: Soil

Petroleum Hydrocarbons Analyses - EPH

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
C9-C18 Aliphatics	630	84	mg/Kg dry	4		MADEP EPH rev 2.1	9/10/21	9/19/21 18:00	AYH
C19-C36 Aliphatics	390	84	mg/Kg dry	4		MADEP EPH rev 2.1	9/10/21	9/19/21 18:00	AYH
Unadjusted C11-C22 Aromatics	1500	84	mg/Kg dry	4		MADEP EPH rev 2.1	9/10/21	9/19/21 18:00	AYH
C11-C22 Aromatics	1400	84	mg/Kg dry	4		MADEP EPH rev 2.1	9/10/21	9/19/21 18:00	AYH
Acenaphthene	4.2	0.21	mg/Kg dry	1		MADEP EPH rev 2.1	9/10/21	9/17/21 21:04	AYH
Acenaphthylene	0.87	0.21	mg/Kg dry	1		MADEP EPH rev 2.1	9/10/21	9/17/21 21:04	AYH
Anthracene	3.7	0.21	mg/Kg dry	1		MADEP EPH rev 2.1	9/10/21	9/17/21 21:04	AYH
Benzo(a)anthracene	5.1	0.21	mg/Kg dry	1		MADEP EPH rev 2.1	9/10/21	9/17/21 21:04	AYH
Benzo(a)pyrene	7.2	0.21	mg/Kg dry	1		MADEP EPH rev 2.1	9/10/21	9/17/21 21:04	AYH
Benzo(b)fluoranthene	6.7	0.21	mg/Kg dry	1		MADEP EPH rev 2.1	9/10/21	9/17/21 21:04	AYH
Benzo(g,h,i)perylene	2.9	0.21	mg/Kg dry	1		MADEP EPH rev 2.1	9/10/21	9/17/21 21:04	AYH
Benzo(k)fluoranthene	2.5	0.21	mg/Kg dry	1		MADEP EPH rev 2.1	9/10/21	9/17/21 21:04	AYH
Chrysene	5.8	0.21	mg/Kg dry	1		MADEP EPH rev 2.1	9/10/21	9/17/21 21:04	AYH
Dibenz(a,h)anthracene	0.77	0.21	mg/Kg dry	1		MADEP EPH rev 2.1	9/10/21	9/17/21 21:04	AYH
Fluoranthene	13	0.21	mg/Kg dry	1		MADEP EPH rev 2.1	9/10/21	9/17/21 21:04	AYH
Fluorene	6.6	0.21	mg/Kg dry	1		MADEP EPH rev 2.1	9/10/21	9/17/21 21:04	AYH
Indeno(1,2,3-cd)pyrene	2.4	0.21	mg/Kg dry	1		MADEP EPH rev 2.1	9/10/21	9/17/21 21:04	AYH
2-Methylnaphthalene	8.8	0.21	mg/Kg dry	1		MADEP EPH rev 2.1	9/10/21	9/17/21 21:04	AYH
Naphthalene	11	0.21	mg/Kg dry	1		MADEP EPH rev 2.1	9/10/21	9/17/21 21:04	AYH
Phenanthrene	15	0.21	mg/Kg dry	1		MADEP EPH rev 2.1	9/10/21	9/17/21 21:04	AYH
Pyrene	14	0.21	mg/Kg dry	1		MADEP EPH rev 2.1	9/10/21	9/17/21 21:04	AYH

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Chlorooctadecane (COD)	62.2	40-140		9/17/21 21:04
o-Terphenyl (OTP)	90.7	40-140		9/17/21 21:04
2-Bromonaphthalene	127	40-140		9/17/21 21:04
2-Fluorobiphenyl	128	40-140		9/17/21 21:04

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Project Location: Haverhill, MA | Sample Description: | Work Order: 21I0471

Date Received: 9/9/2021

Field Sample #: 1543210907-02 | Sampled: 9/7/2021 09:41

Sample ID: 21I0471-02

Sample Matrix: Soil

Metals Analyses (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Arsenic	23	6.7	mg/Kg dry	1		SW-846 6010D	9/15/21	9/15/21 15:54	QNW
Cadmium	1.4	0.67	mg/Kg dry	1		SW-846 6010D	9/15/21	9/15/21 15:54	QNW
Chromium	52	1.3	mg/Kg dry	1		SW-846 6010D	9/15/21	9/15/21 15:54	QNW
Copper	63	1.3	mg/Kg dry	1		SW-846 6010D	9/15/21	9/15/21 15:54	QNW
Lead	260	1.0	mg/Kg dry	1		SW-846 6010D	9/15/21	9/15/21 15:54	QNW
Mercury	0.22	0.054	mg/Kg dry	1		SW-846 7471B	9/10/21	9/13/21 14:05	DRL
Nickel	29	1.3	mg/Kg dry	1		SW-846 6010D	9/15/21	9/15/21 15:54	QNW
Zinc	210	1.3	mg/Kg dry	1		SW-846 6010D	9/15/21	9/15/21 15:54	QNW

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Project Location: Haverhill, MA | Sample Description: | Work Order: 21I0471

Date Received: 9/9/2021

Field Sample #: 1543210907-02 | Sampled: 9/7/2021 09:41

Sample ID: 21I0471-02

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	47.4		% Wt	1	R-02	SM 2540G	9/10/21	9/13/21 9:51	CJV
Total Organic Carbon	66000	100	mg/Kg	1	Z-01	SW 846 9060A	9/13/21	9/13/21 21:18	DJM

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Project Location: Haverhill, MA | Sample Description: | Work Order: 21I0471

Date Received: 9/9/2021

Field Sample #: 1543210907-03 | Sampled: 9/7/2021 10:57

Sample ID: 21I0471-03

Sample Matrix: Soil

Volatile Organic Compounds by GC/MS

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Acetone	ND	4.3	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 16:56	EEH
tert-Amyl Methyl Ether (TAME)	ND	0.043	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 16:56	EEH
Benzene	ND	0.086	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 16:56	EEH
Bromobenzene	ND	0.086	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 16:56	EEH
Bromochloromethane	ND	0.086	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 16:56	EEH
Bromodichloromethane	ND	0.086	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 16:56	EEH
Bromoform	ND	0.086	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 16:56	EEH
Bromomethane	ND	0.17	mg/Kg dry	1	V-05	SW-846 8260C-D	9/10/21	9/10/21 16:56	EEH
2-Butanone (MEK)	ND	1.7	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 16:56	EEH
n-Butylbenzene	0.14	0.086	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 16:56	EEH
sec-Butylbenzene	ND	0.086	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 16:56	EEH
tert-Butylbenzene	ND	0.086	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 16:56	EEH
tert-Butyl Ethyl Ether (TBEE)	ND	0.043	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 16:56	EEH
Carbon Disulfide	ND	0.86	mg/Kg dry	1	RL-07	SW-846 8260C-D	9/10/21	9/10/21 16:56	EEH
Carbon Tetrachloride	ND	0.086	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 16:56	EEH
Chlorobenzene	ND	0.086	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 16:56	EEH
Chlorodibromomethane	ND	0.043	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 16:56	EEH
Chloroethane	ND	0.17	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 16:56	EEH
Chloroform	ND	0.17	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 16:56	EEH
Chloromethane	ND	0.17	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 16:56	EEH
2-Chlorotoluene	ND	0.086	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 16:56	EEH
4-Chlorotoluene	ND	0.086	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 16:56	EEH
1,2-Dibromo-3-chloropropane (DBCP)	ND	0.34	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 16:56	EEH
1,2-Dibromoethane (EDB)	ND	0.043	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 16:56	EEH
Dibromomethane	ND	0.086	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 16:56	EEH
1,2-Dichlorobenzene	ND	0.086	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 16:56	EEH
1,3-Dichlorobenzene	ND	0.086	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 16:56	EEH
1,4-Dichlorobenzene	ND	0.086	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 16:56	EEH
Dichlorodifluoromethane (Freon 12)	ND	0.17	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 16:56	EEH
1,1-Dichloroethane	ND	0.086	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 16:56	EEH
1,2-Dichloroethane	ND	0.086	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 16:56	EEH
1,1-Dichloroethylene	ND	0.086	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 16:56	EEH
cis-1,2-Dichloroethylene	ND	0.086	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 16:56	EEH
trans-1,2-Dichloroethylene	ND	0.086	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 16:56	EEH
1,2-Dichloropropane	ND	0.086	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 16:56	EEH
1,3-Dichloropropane	ND	0.043	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 16:56	EEH
2,2-Dichloropropane	ND	0.086	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 16:56	EEH
1,1-Dichloropropene	ND	0.17	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 16:56	EEH
cis-1,3-Dichloropropene	ND	0.043	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 16:56	EEH
trans-1,3-Dichloropropene	ND	0.043	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 16:56	EEH
Diethyl Ether	ND	0.17	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 16:56	EEH
Diisopropyl Ether (DIPE)	ND	0.043	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 16:56	EEH
1,4-Dioxane	ND	4.3	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 16:56	EEH
Ethylbenzene	ND	0.086	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 16:56	EEH

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Project Location: Haverhill, MA | Sample Description: | Work Order: 21I0471

Date Received: 9/9/2021

Field Sample #: 1543210907-03 | Sampled: 9/7/2021 10:57

Sample ID: 21I0471-03

Sample Matrix: Soil

Volatile Organic Compounds by GC/MS

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Hexachlorobutadiene	ND	0.086	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 16:56	EEH
2-Hexanone (MBK)	ND	0.86	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 16:56	EEH
Isopropylbenzene (Cumene)	0.28	0.086	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 16:56	EEH
p-Isopropyltoluene (p-Cymene)	ND	0.086	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 16:56	EEH
Methyl tert-Butyl Ether (MTBE)	ND	0.086	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 16:56	EEH
Methylene Chloride	ND	0.43	mg/Kg dry	1	RL-07	SW-846 8260C-D	9/10/21	9/10/21 16:56	EEH
4-Methyl-2-pentanone (MIBK)	ND	0.86	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 16:56	EEH
Naphthalene	0.93	0.17	mg/Kg dry	1	V-05	SW-846 8260C-D	9/10/21	9/10/21 16:56	EEH
n-Propylbenzene	0.089	0.086	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 16:56	EEH
Styrene	ND	0.086	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 16:56	EEH
1,1,1,2-Tetrachloroethane	ND	0.086	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 16:56	EEH
1,1,2,2-Tetrachloroethane	ND	0.043	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 16:56	EEH
Tetrachloroethylene	ND	0.086	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 16:56	EEH
Tetrahydrofuran	ND	0.34	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 16:56	EEH
Toluene	ND	0.086	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 16:56	EEH
1,2,3-Trichlorobenzene	ND	0.34	mg/Kg dry	1	V-05	SW-846 8260C-D	9/10/21	9/10/21 16:56	EEH
1,2,4-Trichlorobenzene	ND	0.086	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 16:56	EEH
1,1,1-Trichloroethane	ND	0.086	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 16:56	EEH
1,1,2-Trichloroethane	ND	0.086	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 16:56	EEH
Trichloroethylene	ND	0.086	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 16:56	EEH
Trichlorofluoromethane (Freon 11)	ND	0.17	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 16:56	EEH
1,2,3-Trichloropropane	ND	0.17	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 16:56	EEH
1,2,4-Trimethylbenzene	2.7	0.086	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 16:56	EEH
1,3,5-Trimethylbenzene	0.12	0.086	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 16:56	EEH
Vinyl Chloride	ND	0.17	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 16:56	EEH
m+p Xylene	ND	0.17	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 16:56	EEH
o-Xylene	0.12	0.086	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 16:56	EEH

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
1,2-Dichloroethane-d4	109	70-130		9/10/21 16:56
Toluene-d8	110	70-130		9/10/21 16:56
4-Bromofluorobenzene	113	70-130		9/10/21 16:56

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Project Location: Haverhill, MA | Sample Description: | Work Order: 21I0471

Date Received: 9/9/2021

Field Sample #: 1543210907-03 | Sampled: 9/7/2021 10:57

Sample ID: 21I0471-03

Sample Matrix: Soil

Semivolatile Organic Compounds by GC/MS

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Acenaphthene	0.31	0.26	mg/Kg dry	1		SW-846 8270D-E	9/10/21	9/13/21 18:15	IMR
Acenaphthylene	ND	0.26	mg/Kg dry	1		SW-846 8270D-E	9/10/21	9/13/21 18:15	IMR
Anthracene	0.85	0.26	mg/Kg dry	1		SW-846 8270D-E	9/10/21	9/13/21 18:15	IMR
Benzo(a)anthracene	2.4	0.26	mg/Kg dry	1		SW-846 8270D-E	9/10/21	9/13/21 18:15	IMR
Benzo(a)pyrene	2.3	0.26	mg/Kg dry	1		SW-846 8270D-E	9/10/21	9/13/21 18:15	IMR
Benzo(b)fluoranthene	2.7	0.26	mg/Kg dry	1		SW-846 8270D-E	9/10/21	9/13/21 18:15	IMR
Benzo(g,h,i)perylene	1.7	0.26	mg/Kg dry	1		SW-846 8270D-E	9/10/21	9/13/21 18:15	IMR
Benzo(k)fluoranthene	1.1	0.26	mg/Kg dry	1		SW-846 8270D-E	9/10/21	9/13/21 18:15	IMR
Chrysene	2.7	0.26	mg/Kg dry	1		SW-846 8270D-E	9/10/21	9/13/21 18:15	IMR
Dibenz(a,h)anthracene	0.43	0.26	mg/Kg dry	1		SW-846 8270D-E	9/10/21	9/13/21 18:15	IMR
Fluoranthene	5.3	0.26	mg/Kg dry	1		SW-846 8270D-E	9/10/21	9/13/21 18:15	IMR
Fluorene	0.55	0.26	mg/Kg dry	1		SW-846 8270D-E	9/10/21	9/13/21 18:15	IMR
Indeno(1,2,3-cd)pyrene	1.7	0.26	mg/Kg dry	1		SW-846 8270D-E	9/10/21	9/13/21 18:15	IMR
2-Methylnaphthalene	ND	0.26	mg/Kg dry	1		SW-846 8270D-E	9/10/21	9/13/21 18:15	IMR
Naphthalene	0.33	0.26	mg/Kg dry	1		SW-846 8270D-E	9/10/21	9/13/21 18:15	IMR
Phenanthrene	4.2	0.26	mg/Kg dry	1		SW-846 8270D-E	9/10/21	9/13/21 18:15	IMR
Pyrene	5.8	0.26	mg/Kg dry	1		SW-846 8270D-E	9/10/21	9/13/21 18:15	IMR

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Nitrobenzene-d5	64.5	30-130		9/13/21 18:15
2-Fluorobiphenyl	67.7	30-130		9/13/21 18:15
p-Terphenyl-d14	94.4	30-130		9/13/21 18:15

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Project Location: Haverhill, MA | Sample Description: | Work Order: 21I0471

Date Received: 9/9/2021

Field Sample #: 1543210907-03 | Sampled: 9/7/2021 10:57

Sample ID: 21I0471-03

Sample Matrix: Soil

Sample Flags: DL-03

Organochloride Pesticides by GC/ECD

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aldrin [1]	ND	0.16	mg/Kg dry	20		SW-846 8081B	9/10/21	9/17/21 11:20	TG
alpha-BHC [1]	ND	0.16	mg/Kg dry	20		SW-846 8081B	9/10/21	9/17/21 11:20	TG
beta-BHC [1]	ND	0.16	mg/Kg dry	20		SW-846 8081B	9/10/21	9/17/21 11:20	TG
delta-BHC [1]	ND	0.16	mg/Kg dry	20		SW-846 8081B	9/10/21	9/17/21 11:20	TG
gamma-BHC (Lindane) [1]	ND	0.062	mg/Kg dry	20		SW-846 8081B	9/10/21	9/17/21 11:20	TG
Chlordane [1]	ND	0.62	mg/Kg dry	20		SW-846 8081B	9/10/21	9/17/21 11:20	TG
4,4'-DDD [1]	ND	0.12	mg/Kg dry	20		SW-846 8081B	9/10/21	9/17/21 11:20	TG
4,4'-DDE [1]	ND	0.12	mg/Kg dry	20		SW-846 8081B	9/10/21	9/17/21 11:20	TG
4,4'-DDT [1]	ND	0.12	mg/Kg dry	20		SW-846 8081B	9/10/21	9/17/21 11:20	TG
Dieldrin [1]	ND	0.12	mg/Kg dry	20		SW-846 8081B	9/10/21	9/17/21 11:20	TG
Endosulfan I [1]	ND	0.16	mg/Kg dry	20		SW-846 8081B	9/10/21	9/17/21 11:20	TG
Endosulfan II [1]	ND	0.25	mg/Kg dry	20		SW-846 8081B	9/10/21	9/17/21 11:20	TG
Endosulfan sulfate [1]	ND	0.25	mg/Kg dry	20		SW-846 8081B	9/10/21	9/17/21 11:20	TG
Endrin [1]	ND	0.25	mg/Kg dry	20		SW-846 8081B	9/10/21	9/17/21 11:20	TG
Endrin ketone [1]	ND	0.25	mg/Kg dry	20		SW-846 8081B	9/10/21	9/17/21 11:20	TG
Heptachlor [1]	ND	0.16	mg/Kg dry	20		SW-846 8081B	9/10/21	9/17/21 11:20	TG
Heptachlor epoxide [1]	ND	0.16	mg/Kg dry	20		SW-846 8081B	9/10/21	9/17/21 11:20	TG
Hexachlorobenzene [1]	ND	0.19	mg/Kg dry	20		SW-846 8081B	9/10/21	9/17/21 11:20	TG
Methoxychlor [1]	ND	1.6	mg/Kg dry	20		SW-846 8081B	9/10/21	9/17/21 11:20	TG

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Decachlorobiphenyl [1]	85.4	30-150		9/17/21 11:20
Decachlorobiphenyl [2]	86.8	30-150		9/17/21 11:20
Tetrachloro-m-xylene [1]	67.6	30-150		9/17/21 11:20
Tetrachloro-m-xylene [2]	69.0	30-150		9/17/21 11:20

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Project Location: Haverhill, MA | Sample Description: | Work Order: 21I0471

Date Received: 9/9/2021

Field Sample #: 1543210907-03 | Sampled: 9/7/2021 10:57

Sample ID: 21I0471-03

Sample Matrix: Soil

Polychlorinated Biphenyls By GC/ECD

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.12	mg/Kg dry	4		SW-846 8082A	9/10/21	9/15/21 21:54	TG
Aroclor-1221 [1]	ND	0.12	mg/Kg dry	4		SW-846 8082A	9/10/21	9/15/21 21:54	TG
Aroclor-1232 [1]	ND	0.12	mg/Kg dry	4		SW-846 8082A	9/10/21	9/15/21 21:54	TG
Aroclor-1242 [1]	ND	0.12	mg/Kg dry	4		SW-846 8082A	9/10/21	9/15/21 21:54	TG
Aroclor-1248 [1]	ND	0.12	mg/Kg dry	4		SW-846 8082A	9/10/21	9/15/21 21:54	TG
Aroclor-1254 [2]	0.13	0.12	mg/Kg dry	4		SW-846 8082A	9/10/21	9/15/21 21:54	TG
Aroclor-1260 [1]	ND	0.12	mg/Kg dry	4		SW-846 8082A	9/10/21	9/15/21 21:54	TG
Aroclor-1262 [1]	ND	0.12	mg/Kg dry	4		SW-846 8082A	9/10/21	9/15/21 21:54	TG
Aroclor-1268 [1]	ND	0.12	mg/Kg dry	4		SW-846 8082A	9/10/21	9/15/21 21:54	TG

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Decachlorobiphenyl [1]	76.1	30-150		9/15/21 21:54
Decachlorobiphenyl [2]	77.5	30-150		9/15/21 21:54
Tetrachloro-m-xylene [1]	77.0	30-150		9/15/21 21:54
Tetrachloro-m-xylene [2]	80.1	30-150		9/15/21 21:54

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Project Location: Haverhill, MA | Sample Description: | Work Order: 21I0471

Date Received: 9/9/2021

Field Sample #: 1543210907-03 | Sampled: 9/7/2021 10:57

Sample ID: 21I0471-03

Sample Matrix: Soil

Herbicides by GC/ECD

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
2,4-D [1]	ND	160	µg/kg dry	4		SW-846 8151A	9/13/21	9/17/21 20:40	JMB
2,4-DB [1]	ND	160	µg/kg dry	4		SW-846 8151A	9/13/21	9/17/21 20:40	JMB
2,4,5-TP (Silvex) [1]	ND	16	µg/kg dry	4		SW-846 8151A	9/13/21	9/17/21 20:40	JMB
2,4,5-T [1]	ND	16	µg/kg dry	4		SW-846 8151A	9/13/21	9/17/21 20:40	JMB
Dalalpon [1]	ND	390	µg/kg dry	4	V-20	SW-846 8151A	9/13/21	9/17/21 20:40	JMB
Dicamba [1]	ND	16	µg/kg dry	4		SW-846 8151A	9/13/21	9/17/21 20:40	JMB
Dichloroprop [1]	ND	160	µg/kg dry	4		SW-846 8151A	9/13/21	9/17/21 20:40	JMB
Dinoseb [1]	ND	78	µg/kg dry	4		SW-846 8151A	9/13/21	9/17/21 20:40	JMB
MCPA [1]	ND	16000	µg/kg dry	4		SW-846 8151A	9/13/21	9/17/21 20:40	JMB
MCPP [1]	ND	16000	µg/kg dry	4		SW-846 8151A	9/13/21	9/17/21 20:40	JMB

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
2,4-Dichlorophenylacetic acid [1]	97.5	30-150		9/17/21 20:40
2,4-Dichlorophenylacetic acid [2]	82.6	30-150		9/17/21 20:40

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Project Location: Haverhill, MA | Sample Description: | Work Order: 21I0471

Date Received: 9/9/2021

Field Sample #: 1543210907-03 | Sampled: 9/7/2021 10:57

Sample ID: 21I0471-03

Sample Matrix: Soil

Petroleum Hydrocarbons Analyses - EPH

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
C9-C18 Aliphatics	55	16	mg/Kg dry	1		MADEP EPH rev 2.1	9/10/21	9/17/21 21:24	AYH
C19-C36 Aliphatics	260	31	mg/Kg dry	2		MADEP EPH rev 2.1	9/10/21	9/19/21 17:21	AYH
Unadjusted C11-C22 Aromatics	220	16	mg/Kg dry	1		MADEP EPH rev 2.1	9/10/21	9/17/21 21:24	AYH
C11-C22 Aromatics	190	16	mg/Kg dry	1		MADEP EPH rev 2.1	9/10/21	9/17/21 21:24	AYH
Acenaphthene	0.40	0.16	mg/Kg dry	1		MADEP EPH rev 2.1	9/10/21	9/17/21 21:24	AYH
Acenaphthylene	0.27	0.16	mg/Kg dry	1		MADEP EPH rev 2.1	9/10/21	9/17/21 21:24	AYH
Anthracene	0.76	0.16	mg/Kg dry	1		MADEP EPH rev 2.1	9/10/21	9/17/21 21:24	AYH
Benzo(a)anthracene	3.2	0.16	mg/Kg dry	1		MADEP EPH rev 2.1	9/10/21	9/17/21 21:24	AYH
Benzo(a)pyrene	3.7	0.16	mg/Kg dry	1		MADEP EPH rev 2.1	9/10/21	9/17/21 21:24	AYH
Benzo(b)fluoranthene	3.2	0.16	mg/Kg dry	1		MADEP EPH rev 2.1	9/10/21	9/17/21 21:24	AYH
Benzo(g,h,i)perylene	1.5	0.16	mg/Kg dry	1		MADEP EPH rev 2.1	9/10/21	9/17/21 21:24	AYH
Benzo(k)fluoranthene	1.2	0.16	mg/Kg dry	1		MADEP EPH rev 2.1	9/10/21	9/17/21 21:24	AYH
Chrysene	3.0	0.16	mg/Kg dry	1		MADEP EPH rev 2.1	9/10/21	9/17/21 21:24	AYH
Dibenz(a,h)anthracene	0.39	0.16	mg/Kg dry	1		MADEP EPH rev 2.1	9/10/21	9/17/21 21:24	AYH
Fluoranthene	5.6	0.16	mg/Kg dry	1		MADEP EPH rev 2.1	9/10/21	9/17/21 21:24	AYH
Fluorene	0.49	0.16	mg/Kg dry	1		MADEP EPH rev 2.1	9/10/21	9/17/21 21:24	AYH
Indeno(1,2,3-cd)pyrene	1.2	0.16	mg/Kg dry	1		MADEP EPH rev 2.1	9/10/21	9/17/21 21:24	AYH
2-Methylnaphthalene	0.17	0.16	mg/Kg dry	1		MADEP EPH rev 2.1	9/10/21	9/17/21 21:24	AYH
Naphthalene	0.44	0.16	mg/Kg dry	1		MADEP EPH rev 2.1	9/10/21	9/17/21 21:24	AYH
Phenanthrene	3.7	0.16	mg/Kg dry	1		MADEP EPH rev 2.1	9/10/21	9/17/21 21:24	AYH
Pyrene	5.6	0.16	mg/Kg dry	1		MADEP EPH rev 2.1	9/10/21	9/17/21 21:24	AYH

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Chlorooctadecane (COD)	70.9	40-140		9/17/21 21:24
o-Terphenyl (OTP)	81.3	40-140		9/17/21 21:24
2-Bromonaphthalene	132	40-140		9/17/21 21:24
2-Fluorobiphenyl	125	40-140		9/17/21 21:24

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Project Location: Haverhill, MA | Sample Description: | Work Order: 21I0471

Date Received: 9/9/2021

Field Sample #: 1543210907-03 | Sampled: 9/7/2021 10:57

Sample ID: 21I0471-03

Sample Matrix: Soil

Metals Analyses (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Arsenic	7.5	5.1	mg/Kg dry	1		SW-846 6010D	9/15/21	9/15/21 16:01	QNW
Cadmium	0.54	0.51	mg/Kg dry	1		SW-846 6010D	9/15/21	9/15/21 16:01	QNW
Chromium	27	1.0	mg/Kg dry	1		SW-846 6010D	9/15/21	9/15/21 16:01	QNW
Copper	25	1.0	mg/Kg dry	1		SW-846 6010D	9/15/21	9/15/21 16:01	QNW
Lead	87	0.77	mg/Kg dry	1		SW-846 6010D	9/15/21	9/15/21 16:01	QNW
Mercury	0.093	0.040	mg/Kg dry	1		SW-846 7471B	9/10/21	9/13/21 14:51	DRL
Nickel	15	1.0	mg/Kg dry	1		SW-846 6010D	9/15/21	9/15/21 16:01	QNW
Zinc	93	1.0	mg/Kg dry	1		SW-846 6010D	9/15/21	9/15/21 16:01	QNW

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Project Location: Haverhill, MA | Sample Description: | Work Order: 21I0471

Date Received: 9/9/2021

Field Sample #: 1543210907-03 | Sampled: 9/7/2021 10:57

Sample ID: 21I0471-03

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	64.4		% Wt	1		SM 2540G	9/10/21	9/13/21 9:51	CJV
Total Organic Carbon	29000	100	mg/Kg	1		SW 846 9060A	9/13/21	9/13/21 22:28	DJM

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Project Location: Haverhill, MA | Sample Description: | Work Order: 21I0471

Date Received: 9/9/2021

Field Sample #: 1543210907-04 | Sampled: 9/7/2021 11:23

Sample ID: 21I0471-04

Sample Matrix: Soil

Volatile Organic Compounds by GC/MS

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Acetone	ND	0.12	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 13:58	MFF
tert-Amyl Methyl Ether (TAME)	ND	0.0012	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 13:58	MFF
Benzene	ND	0.0023	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 13:58	MFF
Bromobenzene	ND	0.0023	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 13:58	MFF
Bromochloromethane	ND	0.0023	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 13:58	MFF
Bromodichloromethane	ND	0.0023	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 13:58	MFF
Bromoform	ND	0.0023	mg/Kg dry	1	V-05	SW-846 8260C-D	9/10/21	9/10/21 13:58	MFF
Bromomethane	ND	0.012	mg/Kg dry	1	V-34	SW-846 8260C-D	9/10/21	9/10/21 13:58	MFF
2-Butanone (MEK)	ND	0.046	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 13:58	MFF
n-Butylbenzene	ND	0.0023	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 13:58	MFF
sec-Butylbenzene	ND	0.0023	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 13:58	MFF
tert-Butylbenzene	ND	0.0023	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 13:58	MFF
tert-Butyl Ethyl Ether (TBEE)	ND	0.0012	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 13:58	MFF
Carbon Disulfide	ND	0.0070	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 13:58	MFF
Carbon Tetrachloride	ND	0.0023	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 13:58	MFF
Chlorobenzene	ND	0.0023	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 13:58	MFF
Chlorodibromomethane	ND	0.0012	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 13:58	MFF
Chloroethane	ND	0.012	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 13:58	MFF
Chloroform	ND	0.0046	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 13:58	MFF
Chloromethane	ND	0.012	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 13:58	MFF
2-Chlorotoluene	ND	0.0023	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 13:58	MFF
4-Chlorotoluene	ND	0.0023	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 13:58	MFF
1,2-Dibromo-3-chloropropane (DBCP)	ND	0.0046	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 13:58	MFF
1,2-Dibromoethane (EDB)	ND	0.0012	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 13:58	MFF
Dibromomethane	ND	0.0023	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 13:58	MFF
1,2-Dichlorobenzene	ND	0.0023	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 13:58	MFF
1,3-Dichlorobenzene	ND	0.0023	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 13:58	MFF
1,4-Dichlorobenzene	ND	0.0023	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 13:58	MFF
Dichlorodifluoromethane (Freon 12)	ND	0.012	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 13:58	MFF
1,1-Dichloroethane	ND	0.0023	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 13:58	MFF
1,2-Dichloroethane	ND	0.0023	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 13:58	MFF
1,1-Dichloroethylene	ND	0.0046	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 13:58	MFF
cis-1,2-Dichloroethylene	ND	0.0023	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 13:58	MFF
trans-1,2-Dichloroethylene	ND	0.0023	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 13:58	MFF
1,2-Dichloropropane	ND	0.0023	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 13:58	MFF
1,3-Dichloropropane	ND	0.0012	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 13:58	MFF
2,2-Dichloropropane	ND	0.0023	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 13:58	MFF
1,1-Dichloropropene	ND	0.0023	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 13:58	MFF
cis-1,3-Dichloropropene	ND	0.0012	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 13:58	MFF
trans-1,3-Dichloropropene	ND	0.0012	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 13:58	MFF
Diethyl Ether	ND	0.012	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 13:58	MFF
Diisopropyl Ether (DIPE)	ND	0.0012	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 13:58	MFF
1,4-Dioxane	ND	0.12	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 13:58	MFF
Ethylbenzene	ND	0.0046	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 13:58	MFF

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Project Location: Haverhill, MA | Sample Description: | Work Order: 21I0471

Date Received: 9/9/2021

Field Sample #: 1543210907-04 | Sampled: 9/7/2021 11:23

Sample ID: 21I0471-04

Sample Matrix: Soil

Volatile Organic Compounds by GC/MS

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Hexachlorobutadiene	ND	0.0023	mg/Kg dry	1	V-05	SW-846 8260C-D	9/10/21	9/10/21 13:58	MFF
2-Hexanone (MBK)	ND	0.023	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 13:58	MFF
Isopropylbenzene (Cumene)	ND	0.0023	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 13:58	MFF
p-Isopropyltoluene (p-Cymene)	ND	0.0023	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 13:58	MFF
Methyl tert-Butyl Ether (MTBE)	ND	0.0046	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 13:58	MFF
Methylene Chloride	ND	0.012	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 13:58	MFF
4-Methyl-2-pentanone (MIBK)	ND	0.023	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 13:58	MFF
Naphthalene	ND	0.0046	mg/Kg dry	1	V-05	SW-846 8260C-D	9/10/21	9/10/21 13:58	MFF
n-Propylbenzene	ND	0.0023	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 13:58	MFF
Styrene	ND	0.0023	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 13:58	MFF
1,1,1,2-Tetrachloroethane	ND	0.0023	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 13:58	MFF
1,1,2,2-Tetrachloroethane	ND	0.0012	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 13:58	MFF
Tetrachloroethylene	ND	0.0023	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 13:58	MFF
Tetrahydrofuran	ND	0.012	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 13:58	MFF
Toluene	ND	0.0046	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 13:58	MFF
1,2,3-Trichlorobenzene	ND	0.0023	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 13:58	MFF
1,2,4-Trichlorobenzene	ND	0.0023	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 13:58	MFF
1,1,1-Trichloroethane	ND	0.0023	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 13:58	MFF
1,1,2-Trichloroethane	ND	0.0023	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 13:58	MFF
Trichloroethylene	ND	0.0023	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 13:58	MFF
Trichlorofluoromethane (Freon 11)	ND	0.012	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 13:58	MFF
1,2,3-Trichloropropane	ND	0.0023	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 13:58	MFF
1,2,4-Trimethylbenzene	ND	0.0023	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 13:58	MFF
1,3,5-Trimethylbenzene	ND	0.0023	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 13:58	MFF
Vinyl Chloride	ND	0.012	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 13:58	MFF
m+p Xylene	ND	0.0093	mg/Kg dry	1	V-05	SW-846 8260C-D	9/10/21	9/10/21 13:58	MFF
o-Xylene	ND	0.0046	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 13:58	MFF

Surrogates	% Recovery	Recovery Limits	Flag/Qual		
1,2-Dichloroethane-d4	113	70-130		9/10/21	13:58
Toluene-d8	102	70-130		9/10/21	13:58
4-Bromofluorobenzene	91.5	70-130		9/10/21	13:58

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Project Location: Haverhill, MA | Sample Description: | Work Order: 21I0471

Date Received: 9/9/2021

Field Sample #: 1543210907-04 | Sampled: 9/7/2021 11:23

Sample ID: 21I0471-04

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	0.27	mg/Kg dry	1		SW-846 8270D-E	9/10/21	9/13/21 18:38	IMR
Acenaphthylene	ND	0.27	mg/Kg dry	1		SW-846 8270D-E	9/10/21	9/13/21 18:38	IMR
Anthracene	ND	0.27	mg/Kg dry	1		SW-846 8270D-E	9/10/21	9/13/21 18:38	IMR
Benzo(a)anthracene	0.55	0.27	mg/Kg dry	1		SW-846 8270D-E	9/10/21	9/13/21 18:38	IMR
Benzo(a)pyrene	0.62	0.27	mg/Kg dry	1		SW-846 8270D-E	9/10/21	9/13/21 18:38	IMR
Benzo(b)fluoranthene	0.81	0.27	mg/Kg dry	1		SW-846 8270D-E	9/10/21	9/13/21 18:38	IMR
Benzo(g,h,i)perylene	0.50	0.27	mg/Kg dry	1		SW-846 8270D-E	9/10/21	9/13/21 18:38	IMR
Benzo(k)fluoranthene	0.30	0.27	mg/Kg dry	1		SW-846 8270D-E	9/10/21	9/13/21 18:38	IMR
Chrysene	0.69	0.27	mg/Kg dry	1		SW-846 8270D-E	9/10/21	9/13/21 18:38	IMR
Dibenz(a,h)anthracene	ND	0.27	mg/Kg dry	1		SW-846 8270D-E	9/10/21	9/13/21 18:38	IMR
Fluoranthene	1.2	0.27	mg/Kg dry	1		SW-846 8270D-E	9/10/21	9/13/21 18:38	IMR
Fluorene	ND	0.27	mg/Kg dry	1		SW-846 8270D-E	9/10/21	9/13/21 18:38	IMR
Indeno(1,2,3-cd)pyrene	0.51	0.27	mg/Kg dry	1		SW-846 8270D-E	9/10/21	9/13/21 18:38	IMR
2-Methylnaphthalene	ND	0.27	mg/Kg dry	1		SW-846 8270D-E	9/10/21	9/13/21 18:38	IMR
Naphthalene	ND	0.27	mg/Kg dry	1		SW-846 8270D-E	9/10/21	9/13/21 18:38	IMR
Phenanthrene	0.82	0.27	mg/Kg dry	1		SW-846 8270D-E	9/10/21	9/13/21 18:38	IMR
Pyrene	1.4	0.27	mg/Kg dry	1		SW-846 8270D-E	9/10/21	9/13/21 18:38	IMR

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Nitrobenzene-d5	55.6	30-130		9/13/21 18:38
2-Fluorobiphenyl	59.7	30-130		9/13/21 18:38
p-Terphenyl-d14	81.2	30-130		9/13/21 18:38

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Project Location: Haverhill, MA | Sample Description: | Work Order: 21I0471

Date Received: 9/9/2021

Field Sample #: 1543210907-04 | Sampled: 9/7/2021 11:23

Sample ID: 21I0471-04

Sample Matrix: Soil

Sample Flags: DL-03

Organochloride Pesticides by GC/ECD

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aldrin [1]	ND	0.16	mg/Kg dry	20		SW-846 8081B	9/10/21	9/17/21 11:47	TG
alpha-BHC [1]	ND	0.16	mg/Kg dry	20		SW-846 8081B	9/10/21	9/17/21 11:47	TG
beta-BHC [1]	ND	0.16	mg/Kg dry	20		SW-846 8081B	9/10/21	9/17/21 11:47	TG
delta-BHC [1]	ND	0.16	mg/Kg dry	20		SW-846 8081B	9/10/21	9/17/21 11:47	TG
gamma-BHC (Lindane) [1]	ND	0.063	mg/Kg dry	20		SW-846 8081B	9/10/21	9/17/21 11:47	TG
Chlordane [1]	ND	0.63	mg/Kg dry	20		SW-846 8081B	9/10/21	9/17/21 11:47	TG
4,4'-DDD [1]	ND	0.13	mg/Kg dry	20		SW-846 8081B	9/10/21	9/17/21 11:47	TG
4,4'-DDE [1]	ND	0.13	mg/Kg dry	20		SW-846 8081B	9/10/21	9/17/21 11:47	TG
4,4'-DDT [1]	ND	0.13	mg/Kg dry	20		SW-846 8081B	9/10/21	9/17/21 11:47	TG
Dieldrin [1]	ND	0.13	mg/Kg dry	20		SW-846 8081B	9/10/21	9/17/21 11:47	TG
Endosulfan I [1]	ND	0.16	mg/Kg dry	20		SW-846 8081B	9/10/21	9/17/21 11:47	TG
Endosulfan II [1]	ND	0.25	mg/Kg dry	20		SW-846 8081B	9/10/21	9/17/21 11:47	TG
Endosulfan sulfate [1]	ND	0.25	mg/Kg dry	20		SW-846 8081B	9/10/21	9/17/21 11:47	TG
Endrin [1]	ND	0.25	mg/Kg dry	20		SW-846 8081B	9/10/21	9/17/21 11:47	TG
Endrin ketone [1]	ND	0.25	mg/Kg dry	20		SW-846 8081B	9/10/21	9/17/21 11:47	TG
Heptachlor [1]	ND	0.16	mg/Kg dry	20		SW-846 8081B	9/10/21	9/17/21 11:47	TG
Heptachlor epoxide [1]	ND	0.16	mg/Kg dry	20		SW-846 8081B	9/10/21	9/17/21 11:47	TG
Hexachlorobenzene [1]	ND	0.19	mg/Kg dry	20		SW-846 8081B	9/10/21	9/17/21 11:47	TG
Methoxychlor [1]	ND	1.6	mg/Kg dry	20		SW-846 8081B	9/10/21	9/17/21 11:47	TG

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Decachlorobiphenyl [1]	77.6	30-150		9/17/21 11:47
Decachlorobiphenyl [2]	81.3	30-150		9/17/21 11:47
Tetrachloro-m-xylene [1]	68.0	30-150		9/17/21 11:47
Tetrachloro-m-xylene [2]	71.5	30-150		9/17/21 11:47

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Project Location: Haverhill, MA | Sample Description: | Work Order: 21I0471

Date Received: 9/9/2021

Field Sample #: 1543210907-04 | Sampled: 9/7/2021 11:23

Sample ID: 21I0471-04

Sample Matrix: Soil

Sample Flags: O-32

Polychlorinated Biphenyls By GC/ECD

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.13	mg/Kg dry	4		SW-846 8082A	9/10/21	9/15/21 22:12	TG
Aroclor-1221 [1]	ND	0.13	mg/Kg dry	4		SW-846 8082A	9/10/21	9/15/21 22:12	TG
Aroclor-1232 [1]	ND	0.13	mg/Kg dry	4		SW-846 8082A	9/10/21	9/15/21 22:12	TG
Aroclor-1242 [1]	ND	0.13	mg/Kg dry	4		SW-846 8082A	9/10/21	9/15/21 22:12	TG
Aroclor-1248 [1]	ND	0.13	mg/Kg dry	4		SW-846 8082A	9/10/21	9/15/21 22:12	TG
Aroclor-1254 [2]	ND	0.13	mg/Kg dry	4		SW-846 8082A	9/10/21	9/15/21 22:12	TG
Aroclor-1260 [1]	ND	0.13	mg/Kg dry	4		SW-846 8082A	9/10/21	9/15/21 22:12	TG
Aroclor-1262 [1]	ND	0.13	mg/Kg dry	4		SW-846 8082A	9/10/21	9/15/21 22:12	TG
Aroclor-1268 [1]	ND	0.13	mg/Kg dry	4		SW-846 8082A	9/10/21	9/15/21 22:12	TG

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Decachlorobiphenyl [1]	75.8	30-150		9/15/21 22:12
Decachlorobiphenyl [2]	78.6	30-150		9/15/21 22:12
Tetrachloro-m-xylene [1]	77.6	30-150		9/15/21 22:12
Tetrachloro-m-xylene [2]	80.9	30-150		9/15/21 22:12

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Project Location: Haverhill, MA | Sample Description: | Work Order: 21I0471

Date Received: 9/9/2021

Field Sample #: 1543210907-04 | Sampled: 9/7/2021 11:23

Sample ID: 21I0471-04

Sample Matrix: Soil

Herbicides by GC/ECD

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
2,4-D [1]	ND	160	µg/kg dry	4		SW-846 8151A	9/13/21	9/17/21 21:20	JMB
2,4-DB [1]	ND	160	µg/kg dry	4		SW-846 8151A	9/13/21	9/17/21 21:20	JMB
2,4,5-TP (Silvex) [1]	ND	16	µg/kg dry	4		SW-846 8151A	9/13/21	9/17/21 21:20	JMB
2,4,5-T [1]	ND	16	µg/kg dry	4		SW-846 8151A	9/13/21	9/17/21 21:20	JMB
Dalalpon [1]	ND	390	µg/kg dry	4	V-20	SW-846 8151A	9/13/21	9/17/21 21:20	JMB
Dicamba [1]	ND	16	µg/kg dry	4		SW-846 8151A	9/13/21	9/17/21 21:20	JMB
Dichloroprop [1]	ND	160	µg/kg dry	4		SW-846 8151A	9/13/21	9/17/21 21:20	JMB
Dinoseb [1]	ND	78	µg/kg dry	4		SW-846 8151A	9/13/21	9/17/21 21:20	JMB
MCPA [1]	ND	16000	µg/kg dry	4		SW-846 8151A	9/13/21	9/17/21 21:20	JMB
MCPP [1]	ND	16000	µg/kg dry	4		SW-846 8151A	9/13/21	9/17/21 21:20	JMB

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
2,4-Dichlorophenylacetic acid [1]	103	30-150		9/17/21 21:20
2,4-Dichlorophenylacetic acid [2]	86.7	30-150		9/17/21 21:20

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Project Location: Haverhill, MA | Sample Description: | Work Order: 21I0471

Date Received: 9/9/2021

Field Sample #: 1543210907-04 | Sampled: 9/7/2021 11:23

Sample ID: 21I0471-04

Sample Matrix: Soil

Petroleum Hydrocarbons Analyses - EPH

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
C9-C18 Aliphatics	24	16	mg/Kg dry	1		MADEP EPH rev 2.1	9/10/21	9/17/21 19:47	AYH
C19-C36 Aliphatics	96	16	mg/Kg dry	1		MADEP EPH rev 2.1	9/10/21	9/17/21 19:47	AYH
Unadjusted C11-C22 Aromatics	78	16	mg/Kg dry	1		MADEP EPH rev 2.1	9/10/21	9/17/21 19:47	AYH
C11-C22 Aromatics	65	16	mg/Kg dry	1		MADEP EPH rev 2.1	9/10/21	9/17/21 19:47	AYH
Acenaphthene	ND	0.16	mg/Kg dry	1		MADEP EPH rev 2.1	9/10/21	9/17/21 19:47	AYH
Acenaphthylene	ND	0.16	mg/Kg dry	1		MADEP EPH rev 2.1	9/10/21	9/17/21 19:47	AYH
Anthracene	0.21	0.16	mg/Kg dry	1		MADEP EPH rev 2.1	9/10/21	9/17/21 19:47	AYH
Benzo(a)anthracene	0.90	0.16	mg/Kg dry	1		MADEP EPH rev 2.1	9/10/21	9/17/21 19:47	AYH
Benzo(a)pyrene	1.7	0.16	mg/Kg dry	1		MADEP EPH rev 2.1	9/10/21	9/17/21 19:47	AYH
Benzo(b)fluoranthene	1.2	0.16	mg/Kg dry	1		MADEP EPH rev 2.1	9/10/21	9/17/21 19:47	AYH
Benzo(g,h,i)perylene	0.96	0.16	mg/Kg dry	1		MADEP EPH rev 2.1	9/10/21	9/17/21 19:47	AYH
Benzo(k)fluoranthene	0.44	0.16	mg/Kg dry	1		MADEP EPH rev 2.1	9/10/21	9/17/21 19:47	AYH
Chrysene	1.9	0.16	mg/Kg dry	1		MADEP EPH rev 2.1	9/10/21	9/17/21 19:47	AYH
Dibenz(a,h)anthracene	ND	0.16	mg/Kg dry	1		MADEP EPH rev 2.1	9/10/21	9/17/21 19:47	AYH
Fluoranthene	1.8	0.16	mg/Kg dry	1		MADEP EPH rev 2.1	9/10/21	9/17/21 19:47	AYH
Fluorene	ND	0.16	mg/Kg dry	1		MADEP EPH rev 2.1	9/10/21	9/17/21 19:47	AYH
Indeno(1,2,3-cd)pyrene	0.69	0.16	mg/Kg dry	1		MADEP EPH rev 2.1	9/10/21	9/17/21 19:47	AYH
2-Methylnaphthalene	ND	0.16	mg/Kg dry	1		MADEP EPH rev 2.1	9/10/21	9/17/21 19:47	AYH
Naphthalene	0.19	0.16	mg/Kg dry	1		MADEP EPH rev 2.1	9/10/21	9/17/21 19:47	AYH
Phenanthrene	1.1	0.16	mg/Kg dry	1		MADEP EPH rev 2.1	9/10/21	9/17/21 19:47	AYH
Pyrene	1.8	0.16	mg/Kg dry	1		MADEP EPH rev 2.1	9/10/21	9/17/21 19:47	AYH

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Chlorooctadecane (COD)	66.5	40-140		9/17/21 19:47
o-Terphenyl (OTP)	84.7	40-140		9/17/21 19:47
2-Bromonaphthalene	127	40-140		9/17/21 19:47
2-Fluorobiphenyl	125	40-140		9/17/21 19:47

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Project Location: Haverhill, MA | Sample Description: | Work Order: 21I0471

Date Received: 9/9/2021

Field Sample #: 1543210907-04 | Sampled: 9/7/2021 11:23

Sample ID: 21I0471-04

Sample Matrix: Soil

Metals Analyses (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Arsenic	5.8	5.1	mg/Kg dry	1		SW-846 6010D	9/15/21	9/15/21 16:08	QNW
Cadmium	ND	0.51	mg/Kg dry	1		SW-846 6010D	9/15/21	9/15/21 16:08	QNW
Chromium	25	1.0	mg/Kg dry	1		SW-846 6010D	9/15/21	9/15/21 16:08	QNW
Copper	13	1.0	mg/Kg dry	1		SW-846 6010D	9/15/21	9/15/21 16:08	QNW
Lead	32	0.77	mg/Kg dry	1		SW-846 6010D	9/15/21	9/15/21 16:08	QNW
Mercury	0.072	0.041	mg/Kg dry	1		SW-846 7471B	9/10/21	9/13/21 14:53	DRL
Nickel	15	1.0	mg/Kg dry	1		SW-846 6010D	9/15/21	9/15/21 16:08	QNW
Zinc	42	1.0	mg/Kg dry	1		SW-846 6010D	9/15/21	9/15/21 16:08	QNW

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Project Location: Haverhill, MA | Sample Description: | Work Order: 21I0471

Date Received: 9/9/2021

Field Sample #: 1543210907-04 | Sampled: 9/7/2021 11:23

Sample ID: 21I0471-04

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	63.8		% Wt	1		SM 2540G	9/10/21	9/13/21 9:51	CJV
Total Organic Carbon	14000	100	mg/Kg	1		SW 846 9060A	9/13/21	9/13/21 22:50	DJM

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Project Location: Haverhill, MA | Sample Description: | Work Order: 21I0471

Date Received: 9/9/2021

Field Sample #: 1543210907-05 | Sampled: 9/7/2021 13:05

Sample ID: 21I0471-05

Sample Matrix: Soil

Volatile Organic Compounds by GC/MS

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Acetone	ND	0.10	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 14:23	MFF
tert-Amyl Methyl Ether (TAME)	ND	0.0010	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 14:23	MFF
Benzene	ND	0.0020	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 14:23	MFF
Bromobenzene	ND	0.0020	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 14:23	MFF
Bromochloromethane	ND	0.0020	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 14:23	MFF
Bromodichloromethane	ND	0.0020	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 14:23	MFF
Bromoform	ND	0.0020	mg/Kg dry	1	V-05	SW-846 8260C-D	9/10/21	9/10/21 14:23	MFF
Bromomethane	ND	0.010	mg/Kg dry	1	V-34	SW-846 8260C-D	9/10/21	9/10/21 14:23	MFF
2-Butanone (MEK)	ND	0.040	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 14:23	MFF
n-Butylbenzene	ND	0.0020	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 14:23	MFF
sec-Butylbenzene	ND	0.0020	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 14:23	MFF
tert-Butylbenzene	ND	0.0020	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 14:23	MFF
tert-Butyl Ethyl Ether (TBEE)	ND	0.0010	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 14:23	MFF
Carbon Disulfide	ND	0.0060	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 14:23	MFF
Carbon Tetrachloride	ND	0.0020	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 14:23	MFF
Chlorobenzene	ND	0.0020	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 14:23	MFF
Chlorodibromomethane	ND	0.0010	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 14:23	MFF
Chloroethane	ND	0.010	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 14:23	MFF
Chloroform	ND	0.0040	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 14:23	MFF
Chloromethane	ND	0.010	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 14:23	MFF
2-Chlorotoluene	ND	0.0020	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 14:23	MFF
4-Chlorotoluene	ND	0.0020	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 14:23	MFF
1,2-Dibromo-3-chloropropane (DBCP)	ND	0.0040	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 14:23	MFF
1,2-Dibromoethane (EDB)	ND	0.0010	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 14:23	MFF
Dibromomethane	ND	0.0020	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 14:23	MFF
1,2-Dichlorobenzene	ND	0.0020	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 14:23	MFF
1,3-Dichlorobenzene	ND	0.0020	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 14:23	MFF
1,4-Dichlorobenzene	ND	0.0020	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 14:23	MFF
Dichlorodifluoromethane (Freon 12)	ND	0.010	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 14:23	MFF
1,1-Dichloroethane	ND	0.0020	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 14:23	MFF
1,2-Dichloroethane	ND	0.0020	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 14:23	MFF
1,1-Dichloroethylene	ND	0.0040	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 14:23	MFF
cis-1,2-Dichloroethylene	ND	0.0020	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 14:23	MFF
trans-1,2-Dichloroethylene	ND	0.0020	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 14:23	MFF
1,2-Dichloropropane	ND	0.0020	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 14:23	MFF
1,3-Dichloropropane	ND	0.0010	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 14:23	MFF
2,2-Dichloropropane	ND	0.0020	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 14:23	MFF
1,1-Dichloropropene	ND	0.0020	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 14:23	MFF
cis-1,3-Dichloropropene	ND	0.0010	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 14:23	MFF
trans-1,3-Dichloropropene	ND	0.0010	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 14:23	MFF
Diethyl Ether	ND	0.010	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 14:23	MFF
Diisopropyl Ether (DIPE)	ND	0.0010	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 14:23	MFF
1,4-Dioxane	ND	0.10	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 14:23	MFF
Ethylbenzene	ND	0.0040	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 14:23	MFF

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Project Location: Haverhill, MA | Sample Description: | Work Order: 21I0471

Date Received: 9/9/2021

Field Sample #: 1543210907-05 | Sampled: 9/7/2021 13:05

Sample ID: 21I0471-05

Sample Matrix: Soil

Volatile Organic Compounds by GC/MS

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Hexachlorobutadiene	ND	0.0020	mg/Kg dry	1	V-05	SW-846 8260C-D	9/10/21	9/10/21 14:23	MFF
2-Hexanone (MBK)	ND	0.020	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 14:23	MFF
Isopropylbenzene (Cumene)	ND	0.0020	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 14:23	MFF
p-Isopropyltoluene (p-Cymene)	ND	0.0020	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 14:23	MFF
Methyl tert-Butyl Ether (MTBE)	ND	0.0040	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 14:23	MFF
Methylene Chloride	ND	0.010	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 14:23	MFF
4-Methyl-2-pentanone (MIBK)	ND	0.020	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 14:23	MFF
Naphthalene	ND	0.0040	mg/Kg dry	1	V-05	SW-846 8260C-D	9/10/21	9/10/21 14:23	MFF
n-Propylbenzene	ND	0.0020	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 14:23	MFF
Styrene	ND	0.0020	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 14:23	MFF
1,1,1,2-Tetrachloroethane	ND	0.0020	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 14:23	MFF
1,1,2,2-Tetrachloroethane	ND	0.0010	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 14:23	MFF
Tetrachloroethylene	ND	0.0020	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 14:23	MFF
Tetrahydrofuran	ND	0.010	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 14:23	MFF
Toluene	ND	0.0040	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 14:23	MFF
1,2,3-Trichlorobenzene	ND	0.0020	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 14:23	MFF
1,2,4-Trichlorobenzene	ND	0.0020	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 14:23	MFF
1,1,1-Trichloroethane	ND	0.0020	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 14:23	MFF
1,1,2-Trichloroethane	ND	0.0020	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 14:23	MFF
Trichloroethylene	ND	0.0020	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 14:23	MFF
Trichlorofluoromethane (Freon 11)	ND	0.010	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 14:23	MFF
1,2,3-Trichloropropane	ND	0.0020	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 14:23	MFF
1,2,4-Trimethylbenzene	ND	0.0020	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 14:23	MFF
1,3,5-Trimethylbenzene	ND	0.0020	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 14:23	MFF
Vinyl Chloride	ND	0.010	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 14:23	MFF
m+p Xylene	ND	0.0080	mg/Kg dry	1	V-05	SW-846 8260C-D	9/10/21	9/10/21 14:23	MFF
o-Xylene	ND	0.0040	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 14:23	MFF

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
1,2-Dichloroethane-d4	111	70-130		9/10/21 14:23
Toluene-d8	102	70-130		9/10/21 14:23
4-Bromofluorobenzene	101	70-130		9/10/21 14:23

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Project Location: Haverhill, MA | Sample Description: | Work Order: 21I0471

Date Received: 9/9/2021

Field Sample #: 1543210907-05 | Sampled: 9/7/2021 13:05

Sample ID: 21I0471-05

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	0.26	mg/Kg dry	1		SW-846 8270D-E	9/10/21	9/13/21 19:01	IMR
Acenaphthylene	ND	0.26	mg/Kg dry	1		SW-846 8270D-E	9/10/21	9/13/21 19:01	IMR
Anthracene	2.3	0.26	mg/Kg dry	1		SW-846 8270D-E	9/10/21	9/13/21 19:01	IMR
Benzo(a)anthracene	6.2	0.26	mg/Kg dry	1		SW-846 8270D-E	9/10/21	9/13/21 19:01	IMR
Benzo(a)pyrene	2.0	0.26	mg/Kg dry	1		SW-846 8270D-E	9/10/21	9/13/21 19:01	IMR
Benzo(b)fluoranthene	4.7	0.26	mg/Kg dry	1		SW-846 8270D-E	9/10/21	9/13/21 19:01	IMR
Benzo(g,h,i)perylene	0.80	0.26	mg/Kg dry	1		SW-846 8270D-E	9/10/21	9/13/21 19:01	IMR
Benzo(k)fluoranthene	1.9	0.26	mg/Kg dry	1		SW-846 8270D-E	9/10/21	9/13/21 19:01	IMR
Chrysene	8.5	2.6	mg/Kg dry	10		SW-846 8270D-E	9/10/21	9/14/21 22:09	BGL
Dibenz(a,h)anthracene	ND	0.26	mg/Kg dry	1		SW-846 8270D-E	9/10/21	9/13/21 19:01	IMR
Fluoranthene	49	2.6	mg/Kg dry	10		SW-846 8270D-E	9/10/21	9/14/21 22:09	BGL
Fluorene	0.64	0.26	mg/Kg dry	1		SW-846 8270D-E	9/10/21	9/13/21 19:01	IMR
Indeno(1,2,3-cd)pyrene	1.0	0.26	mg/Kg dry	1		SW-846 8270D-E	9/10/21	9/13/21 19:01	IMR
2-Methylnaphthalene	ND	0.26	mg/Kg dry	1		SW-846 8270D-E	9/10/21	9/13/21 19:01	IMR
Naphthalene	ND	0.26	mg/Kg dry	1		SW-846 8270D-E	9/10/21	9/13/21 19:01	IMR
Phenanthrene	25	2.6	mg/Kg dry	10		SW-846 8270D-E	9/10/21	9/14/21 22:09	BGL
Pyrene	31	2.6	mg/Kg dry	10		SW-846 8270D-E	9/10/21	9/14/21 22:09	BGL

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Nitrobenzene-d5	50.1	30-130		9/13/21 19:01
Nitrobenzene-d5	50.0	30-130		9/14/21 22:09
2-Fluorobiphenyl	56.4	30-130		9/13/21 19:01
2-Fluorobiphenyl	51.4	30-130		9/14/21 22:09
p-Terphenyl-d14	81.8	30-130		9/13/21 19:01
p-Terphenyl-d14	56.7	30-130		9/14/21 22:09

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Project Location: Haverhill, MA | Sample Description: | Work Order: 21I0471

Date Received: 9/9/2021

Field Sample #: 1543210907-05 | Sampled: 9/7/2021 13:05

Sample ID: 21I0471-05

Sample Matrix: Soil

Sample Flags: DL-03

Organochloride Pesticides by GC/ECD

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aldrin [1]	ND	0.078	mg/Kg dry	10		SW-846 8081B	9/10/21	9/17/21 12:15	TG
alpha-BHC [1]	ND	0.078	mg/Kg dry	10		SW-846 8081B	9/10/21	9/17/21 12:15	TG
beta-BHC [1]	ND	0.078	mg/Kg dry	10		SW-846 8081B	9/10/21	9/17/21 12:15	TG
delta-BHC [1]	ND	0.078	mg/Kg dry	10		SW-846 8081B	9/10/21	9/17/21 12:15	TG
gamma-BHC (Lindane) [1]	ND	0.031	mg/Kg dry	10		SW-846 8081B	9/10/21	9/17/21 12:15	TG
Chlordane [1]	ND	0.31	mg/Kg dry	10		SW-846 8081B	9/10/21	9/17/21 12:15	TG
4,4'-DDD [1]	ND	0.062	mg/Kg dry	10		SW-846 8081B	9/10/21	9/17/21 12:15	TG
4,4'-DDE [1]	ND	0.062	mg/Kg dry	10		SW-846 8081B	9/10/21	9/17/21 12:15	TG
4,4'-DDT [1]	ND	0.062	mg/Kg dry	10		SW-846 8081B	9/10/21	9/17/21 12:15	TG
Dieldrin [1]	ND	0.062	mg/Kg dry	10		SW-846 8081B	9/10/21	9/17/21 12:15	TG
Endosulfan I [1]	ND	0.078	mg/Kg dry	10		SW-846 8081B	9/10/21	9/17/21 12:15	TG
Endosulfan II [1]	ND	0.12	mg/Kg dry	10		SW-846 8081B	9/10/21	9/17/21 12:15	TG
Endosulfan sulfate [1]	ND	0.12	mg/Kg dry	10		SW-846 8081B	9/10/21	9/17/21 12:15	TG
Endrin [1]	ND	0.12	mg/Kg dry	10		SW-846 8081B	9/10/21	9/17/21 12:15	TG
Endrin ketone [1]	ND	0.12	mg/Kg dry	10		SW-846 8081B	9/10/21	9/17/21 12:15	TG
Heptachlor [1]	ND	0.078	mg/Kg dry	10		SW-846 8081B	9/10/21	9/17/21 12:15	TG
Heptachlor epoxide [1]	ND	0.078	mg/Kg dry	10		SW-846 8081B	9/10/21	9/17/21 12:15	TG
Hexachlorobenzene [1]	ND	0.093	mg/Kg dry	10		SW-846 8081B	9/10/21	9/17/21 12:15	TG
Methoxychlor [1]	ND	0.78	mg/Kg dry	10		SW-846 8081B	9/10/21	9/17/21 12:15	TG

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Decachlorobiphenyl [1]	69.0	30-150		9/17/21 12:15
Decachlorobiphenyl [2]	77.2	30-150		9/17/21 12:15
Tetrachloro-m-xylene [1]	62.7	30-150		9/17/21 12:15
Tetrachloro-m-xylene [2]	64.5	30-150		9/17/21 12:15

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Project Location: Haverhill, MA | Sample Description: | Work Order: 21I0471

Date Received: 9/9/2021

Field Sample #: 1543210907-05 | Sampled: 9/7/2021 13:05

Sample ID: 21I0471-05

Sample Matrix: Soil

Sample Flags: O-32

Polychlorinated Biphenyls By GC/ECD

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.12	mg/Kg dry	4		SW-846 8082A	9/10/21	9/15/21 22:31	TG
Aroclor-1221 [1]	ND	0.12	mg/Kg dry	4		SW-846 8082A	9/10/21	9/15/21 22:31	TG
Aroclor-1232 [1]	ND	0.12	mg/Kg dry	4		SW-846 8082A	9/10/21	9/15/21 22:31	TG
Aroclor-1242 [1]	ND	0.12	mg/Kg dry	4		SW-846 8082A	9/10/21	9/15/21 22:31	TG
Aroclor-1248 [1]	ND	0.12	mg/Kg dry	4		SW-846 8082A	9/10/21	9/15/21 22:31	TG
Aroclor-1254 [1]	ND	0.12	mg/Kg dry	4		SW-846 8082A	9/10/21	9/15/21 22:31	TG
Aroclor-1260 [1]	ND	0.12	mg/Kg dry	4		SW-846 8082A	9/10/21	9/15/21 22:31	TG
Aroclor-1262 [1]	ND	0.12	mg/Kg dry	4		SW-846 8082A	9/10/21	9/15/21 22:31	TG
Aroclor-1268 [1]	ND	0.12	mg/Kg dry	4		SW-846 8082A	9/10/21	9/15/21 22:31	TG

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Decachlorobiphenyl [1]	76.1	30-150		9/15/21 22:31
Decachlorobiphenyl [2]	79.4	30-150		9/15/21 22:31
Tetrachloro-m-xylene [1]	77.0	30-150		9/15/21 22:31
Tetrachloro-m-xylene [2]	80.8	30-150		9/15/21 22:31

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Project Location: Haverhill, MA | Sample Description: | Work Order: 21I0471

Date Received: 9/9/2021

Field Sample #: 1543210907-05 | Sampled: 9/7/2021 13:05

Sample ID: 21I0471-05

Sample Matrix: Soil

Herbicides by GC/ECD

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
2,4-D [1]	ND	160	µg/kg dry	4		SW-846 8151A	9/13/21	9/17/21 22:00	JMB
2,4-DB [1]	ND	160	µg/kg dry	4		SW-846 8151A	9/13/21	9/17/21 22:00	JMB
2,4,5-TP (Silvex) [1]	ND	16	µg/kg dry	4		SW-846 8151A	9/13/21	9/17/21 22:00	JMB
2,4,5-T [1]	ND	16	µg/kg dry	4		SW-846 8151A	9/13/21	9/17/21 22:00	JMB
Dalalpon [1]	ND	390	µg/kg dry	4	V-20	SW-846 8151A	9/13/21	9/17/21 22:00	JMB
Dicamba [1]	ND	16	µg/kg dry	4		SW-846 8151A	9/13/21	9/17/21 22:00	JMB
Dichloroprop [1]	ND	160	µg/kg dry	4		SW-846 8151A	9/13/21	9/17/21 22:00	JMB
Dinoseb [1]	ND	78	µg/kg dry	4		SW-846 8151A	9/13/21	9/17/21 22:00	JMB
MCPA [1]	ND	16000	µg/kg dry	4		SW-846 8151A	9/13/21	9/17/21 22:00	JMB
MCPP [1]	ND	16000	µg/kg dry	4		SW-846 8151A	9/13/21	9/17/21 22:00	JMB

Surrogates	% Recovery	Recovery Limits	Flag/Qual		
2,4-Dichlorophenylacetic acid [1]	109	30-150			9/17/21 22:00
2,4-Dichlorophenylacetic acid [2]	80.6	30-150			9/17/21 22:00

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Project Location: Haverhill, MA | Sample Description: | Work Order: 21I0471

Date Received: 9/9/2021

Field Sample #: 1543210907-05 | Sampled: 9/7/2021 13:05

Sample ID: 21I0471-05

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	16	mg/Kg dry	1		MADEP EPH rev 2.1	9/10/21	9/17/21 20:06	AYH
C19-C36 Aliphatics	92	16	mg/Kg dry	1		MADEP EPH rev 2.1	9/10/21	9/17/21 20:06	AYH
Unadjusted C11-C22 Aromatics	53	16	mg/Kg dry	1		MADEP EPH rev 2.1	9/10/21	9/17/21 20:06	AYH
C11-C22 Aromatics	44	16	mg/Kg dry	1		MADEP EPH rev 2.1	9/10/21	9/17/21 20:06	AYH
Acenaphthene	ND	0.16	mg/Kg dry	1		MADEP EPH rev 2.1	9/10/21	9/17/21 20:06	AYH
Acenaphthylene	ND	0.16	mg/Kg dry	1		MADEP EPH rev 2.1	9/10/21	9/17/21 20:06	AYH
Anthracene	ND	0.16	mg/Kg dry	1		MADEP EPH rev 2.1	9/10/21	9/17/21 20:06	AYH
Benzo(a)anthracene	2.2	0.16	mg/Kg dry	1		MADEP EPH rev 2.1	9/10/21	9/17/21 20:06	AYH
Benzo(a)pyrene	2.2	0.16	mg/Kg dry	1		MADEP EPH rev 2.1	9/10/21	9/17/21 20:06	AYH
Benzo(b)fluoranthene	0.42	0.16	mg/Kg dry	1		MADEP EPH rev 2.1	9/10/21	9/17/21 20:06	AYH
Benzo(g,h,i)perylene	ND	0.16	mg/Kg dry	1		MADEP EPH rev 2.1	9/10/21	9/17/21 20:06	AYH
Benzo(k)fluoranthene	ND	0.16	mg/Kg dry	1		MADEP EPH rev 2.1	9/10/21	9/17/21 20:06	AYH
Chrysene	1.4	0.16	mg/Kg dry	1		MADEP EPH rev 2.1	9/10/21	9/17/21 20:06	AYH
Dibenz(a,h)anthracene	ND	0.16	mg/Kg dry	1		MADEP EPH rev 2.1	9/10/21	9/17/21 20:06	AYH
Fluoranthene	0.94	0.16	mg/Kg dry	1		MADEP EPH rev 2.1	9/10/21	9/17/21 20:06	AYH
Fluorene	ND	0.16	mg/Kg dry	1		MADEP EPH rev 2.1	9/10/21	9/17/21 20:06	AYH
Indeno(1,2,3-cd)pyrene	ND	0.16	mg/Kg dry	1		MADEP EPH rev 2.1	9/10/21	9/17/21 20:06	AYH
2-Methylnaphthalene	ND	0.16	mg/Kg dry	1		MADEP EPH rev 2.1	9/10/21	9/17/21 20:06	AYH
Naphthalene	ND	0.16	mg/Kg dry	1		MADEP EPH rev 2.1	9/10/21	9/17/21 20:06	AYH
Phenanthrene	0.46	0.16	mg/Kg dry	1		MADEP EPH rev 2.1	9/10/21	9/17/21 20:06	AYH
Pyrene	0.84	0.16	mg/Kg dry	1		MADEP EPH rev 2.1	9/10/21	9/17/21 20:06	AYH

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Chlorooctadecane (COD)	65.3	40-140		9/17/21 20:06
o-Terphenyl (OTP)	80.9	40-140		9/17/21 20:06
2-Bromonaphthalene	131	40-140		9/17/21 20:06
2-Fluorobiphenyl	133	40-140		9/17/21 20:06

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Project Location: Haverhill, MA | Sample Description: | Work Order: 21I0471

Date Received: 9/9/2021

Field Sample #: 1543210907-05 | Sampled: 9/7/2021 13:05

Sample ID: 21I0471-05

Sample Matrix: Soil

Metals Analyses (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Arsenic	7.4	5.2	mg/Kg dry	1		SW-846 6010D	9/15/21	9/15/21 16:15	QNW
Cadmium	ND	0.52	mg/Kg dry	1		SW-846 6010D	9/15/21	9/15/21 16:15	QNW
Chromium	39	1.0	mg/Kg dry	1		SW-846 6010D	9/15/21	9/15/21 16:15	QNW
Copper	23	1.0	mg/Kg dry	1		SW-846 6010D	9/15/21	9/15/21 16:15	QNW
Lead	17	0.77	mg/Kg dry	1		SW-846 6010D	9/15/21	9/15/21 16:15	QNW
Mercury	ND	0.043	mg/Kg dry	1		SW-846 7471B	9/10/21	9/13/21 14:55	DRL
Nickel	25	1.0	mg/Kg dry	1		SW-846 6010D	9/15/21	9/15/21 16:15	QNW
Zinc	78	1.0	mg/Kg dry	1		SW-846 6010D	9/15/21	9/15/21 16:15	QNW

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Project Location: Haverhill, MA | Sample Description: | Work Order: 21I0471

Date Received: 9/9/2021

Field Sample #: 1543210907-05 | Sampled: 9/7/2021 13:05

Sample ID: 21I0471-05

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	64.3		% Wt	1		SM 2540G	9/10/21	9/13/21 9:51	CJV
Total Organic Carbon	4300	100	mg/Kg	1		SW 846 9060A	9/13/21	9/13/21 23:13	DJM

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Project Location: Haverhill, MA | Sample Description: | Work Order: 21I0471

Date Received: 9/9/2021

Field Sample #: 1543210908-06 | Sampled: 9/8/2021 09:50

Sample ID: 21I0471-06

Sample Matrix: Soil

Volatile Organic Compounds by GC/MS

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Acetone	ND	0.10	mg/Kg wet	1		SW-846 8260C-D	9/10/21	9/10/21 14:48	MFF
tert-Amyl Methyl Ether (TAME)	ND	0.0010	mg/Kg wet	1		SW-846 8260C-D	9/10/21	9/10/21 14:48	MFF
Benzene	ND	0.0020	mg/Kg wet	1		SW-846 8260C-D	9/10/21	9/10/21 14:48	MFF
Bromobenzene	ND	0.0020	mg/Kg wet	1		SW-846 8260C-D	9/10/21	9/10/21 14:48	MFF
Bromochloromethane	ND	0.0020	mg/Kg wet	1		SW-846 8260C-D	9/10/21	9/10/21 14:48	MFF
Bromodichloromethane	ND	0.0020	mg/Kg wet	1		SW-846 8260C-D	9/10/21	9/10/21 14:48	MFF
Bromoform	ND	0.0020	mg/Kg wet	1	V-05	SW-846 8260C-D	9/10/21	9/10/21 14:48	MFF
Bromomethane	ND	0.010	mg/Kg wet	1	V-34	SW-846 8260C-D	9/10/21	9/10/21 14:48	MFF
2-Butanone (MEK)	ND	0.040	mg/Kg wet	1		SW-846 8260C-D	9/10/21	9/10/21 14:48	MFF
n-Butylbenzene	ND	0.0020	mg/Kg wet	1		SW-846 8260C-D	9/10/21	9/10/21 14:48	MFF
sec-Butylbenzene	ND	0.0020	mg/Kg wet	1		SW-846 8260C-D	9/10/21	9/10/21 14:48	MFF
tert-Butylbenzene	ND	0.0020	mg/Kg wet	1		SW-846 8260C-D	9/10/21	9/10/21 14:48	MFF
tert-Butyl Ethyl Ether (TBEE)	ND	0.0010	mg/Kg wet	1		SW-846 8260C-D	9/10/21	9/10/21 14:48	MFF
Carbon Disulfide	ND	0.0060	mg/Kg wet	1		SW-846 8260C-D	9/10/21	9/10/21 14:48	MFF
Carbon Tetrachloride	ND	0.0020	mg/Kg wet	1		SW-846 8260C-D	9/10/21	9/10/21 14:48	MFF
Chlorobenzene	ND	0.0020	mg/Kg wet	1		SW-846 8260C-D	9/10/21	9/10/21 14:48	MFF
Chlorodibromomethane	ND	0.0010	mg/Kg wet	1		SW-846 8260C-D	9/10/21	9/10/21 14:48	MFF
Chloroethane	ND	0.010	mg/Kg wet	1		SW-846 8260C-D	9/10/21	9/10/21 14:48	MFF
Chloroform	ND	0.0040	mg/Kg wet	1		SW-846 8260C-D	9/10/21	9/10/21 14:48	MFF
Chloromethane	ND	0.010	mg/Kg wet	1		SW-846 8260C-D	9/10/21	9/10/21 14:48	MFF
2-Chlorotoluene	ND	0.0020	mg/Kg wet	1		SW-846 8260C-D	9/10/21	9/10/21 14:48	MFF
4-Chlorotoluene	ND	0.0020	mg/Kg wet	1		SW-846 8260C-D	9/10/21	9/10/21 14:48	MFF
1,2-Dibromo-3-chloropropane (DBCP)	ND	0.0040	mg/Kg wet	1		SW-846 8260C-D	9/10/21	9/10/21 14:48	MFF
1,2-Dibromoethane (EDB)	ND	0.0010	mg/Kg wet	1		SW-846 8260C-D	9/10/21	9/10/21 14:48	MFF
Dibromomethane	ND	0.0020	mg/Kg wet	1		SW-846 8260C-D	9/10/21	9/10/21 14:48	MFF
1,2-Dichlorobenzene	ND	0.0020	mg/Kg wet	1		SW-846 8260C-D	9/10/21	9/10/21 14:48	MFF
1,3-Dichlorobenzene	ND	0.0020	mg/Kg wet	1		SW-846 8260C-D	9/10/21	9/10/21 14:48	MFF
1,4-Dichlorobenzene	ND	0.0020	mg/Kg wet	1		SW-846 8260C-D	9/10/21	9/10/21 14:48	MFF
Dichlorodifluoromethane (Freon 12)	ND	0.010	mg/Kg wet	1		SW-846 8260C-D	9/10/21	9/10/21 14:48	MFF
1,1-Dichloroethane	ND	0.0020	mg/Kg wet	1		SW-846 8260C-D	9/10/21	9/10/21 14:48	MFF
1,2-Dichloroethane	ND	0.0020	mg/Kg wet	1		SW-846 8260C-D	9/10/21	9/10/21 14:48	MFF
1,1-Dichloroethylene	ND	0.0040	mg/Kg wet	1		SW-846 8260C-D	9/10/21	9/10/21 14:48	MFF
cis-1,2-Dichloroethylene	ND	0.0020	mg/Kg wet	1		SW-846 8260C-D	9/10/21	9/10/21 14:48	MFF
trans-1,2-Dichloroethylene	ND	0.0020	mg/Kg wet	1		SW-846 8260C-D	9/10/21	9/10/21 14:48	MFF
1,2-Dichloropropane	ND	0.0020	mg/Kg wet	1		SW-846 8260C-D	9/10/21	9/10/21 14:48	MFF
1,3-Dichloropropane	ND	0.0010	mg/Kg wet	1		SW-846 8260C-D	9/10/21	9/10/21 14:48	MFF
2,2-Dichloropropane	ND	0.0020	mg/Kg wet	1		SW-846 8260C-D	9/10/21	9/10/21 14:48	MFF
1,1-Dichloropropene	ND	0.0020	mg/Kg wet	1		SW-846 8260C-D	9/10/21	9/10/21 14:48	MFF
cis-1,3-Dichloropropene	ND	0.0010	mg/Kg wet	1		SW-846 8260C-D	9/10/21	9/10/21 14:48	MFF
trans-1,3-Dichloropropene	ND	0.0010	mg/Kg wet	1		SW-846 8260C-D	9/10/21	9/10/21 14:48	MFF
Diethyl Ether	ND	0.010	mg/Kg wet	1		SW-846 8260C-D	9/10/21	9/10/21 14:48	MFF
Diisopropyl Ether (DIPE)	ND	0.0010	mg/Kg wet	1		SW-846 8260C-D	9/10/21	9/10/21 14:48	MFF
1,4-Dioxane	ND	0.10	mg/Kg wet	1		SW-846 8260C-D	9/10/21	9/10/21 14:48	MFF
Ethylbenzene	ND	0.0040	mg/Kg wet	1		SW-846 8260C-D	9/10/21	9/10/21 14:48	MFF

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Project Location: Haverhill, MA | Sample Description: | Work Order: 21I0471

Date Received: 9/9/2021

Field Sample #: 1543210908-06 | Sampled: 9/8/2021 09:50

Sample ID: 21I0471-06

Sample Matrix: Soil

Volatile Organic Compounds by GC/MS

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Hexachlorobutadiene	ND	0.0020	mg/Kg wet	1	V-05	SW-846 8260C-D	9/10/21	9/10/21 14:48	MFF
2-Hexanone (MBK)	ND	0.020	mg/Kg wet	1		SW-846 8260C-D	9/10/21	9/10/21 14:48	MFF
Isopropylbenzene (Cumene)	ND	0.0020	mg/Kg wet	1		SW-846 8260C-D	9/10/21	9/10/21 14:48	MFF
p-Isopropyltoluene (p-Cymene)	ND	0.0020	mg/Kg wet	1		SW-846 8260C-D	9/10/21	9/10/21 14:48	MFF
Methyl tert-Butyl Ether (MTBE)	ND	0.0040	mg/Kg wet	1		SW-846 8260C-D	9/10/21	9/10/21 14:48	MFF
Methylene Chloride	ND	0.010	mg/Kg wet	1		SW-846 8260C-D	9/10/21	9/10/21 14:48	MFF
4-Methyl-2-pentanone (MIBK)	ND	0.020	mg/Kg wet	1		SW-846 8260C-D	9/10/21	9/10/21 14:48	MFF
Naphthalene	ND	0.0040	mg/Kg wet	1	V-05	SW-846 8260C-D	9/10/21	9/10/21 14:48	MFF
n-Propylbenzene	ND	0.0020	mg/Kg wet	1		SW-846 8260C-D	9/10/21	9/10/21 14:48	MFF
Styrene	ND	0.0020	mg/Kg wet	1		SW-846 8260C-D	9/10/21	9/10/21 14:48	MFF
1,1,1,2-Tetrachloroethane	ND	0.0020	mg/Kg wet	1		SW-846 8260C-D	9/10/21	9/10/21 14:48	MFF
1,1,2,2-Tetrachloroethane	ND	0.0010	mg/Kg wet	1		SW-846 8260C-D	9/10/21	9/10/21 14:48	MFF
Tetrachloroethylene	ND	0.0020	mg/Kg wet	1		SW-846 8260C-D	9/10/21	9/10/21 14:48	MFF
Tetrahydrofuran	ND	0.010	mg/Kg wet	1		SW-846 8260C-D	9/10/21	9/10/21 14:48	MFF
Toluene	ND	0.0040	mg/Kg wet	1		SW-846 8260C-D	9/10/21	9/10/21 14:48	MFF
1,2,3-Trichlorobenzene	ND	0.0020	mg/Kg wet	1		SW-846 8260C-D	9/10/21	9/10/21 14:48	MFF
1,2,4-Trichlorobenzene	ND	0.0020	mg/Kg wet	1		SW-846 8260C-D	9/10/21	9/10/21 14:48	MFF
1,1,1-Trichloroethane	ND	0.0020	mg/Kg wet	1		SW-846 8260C-D	9/10/21	9/10/21 14:48	MFF
1,1,2-Trichloroethane	ND	0.0020	mg/Kg wet	1		SW-846 8260C-D	9/10/21	9/10/21 14:48	MFF
Trichloroethylene	ND	0.0020	mg/Kg wet	1		SW-846 8260C-D	9/10/21	9/10/21 14:48	MFF
Trichlorofluoromethane (Freon 11)	ND	0.010	mg/Kg wet	1		SW-846 8260C-D	9/10/21	9/10/21 14:48	MFF
1,2,3-Trichloropropane	ND	0.0020	mg/Kg wet	1		SW-846 8260C-D	9/10/21	9/10/21 14:48	MFF
1,2,4-Trimethylbenzene	ND	0.0020	mg/Kg wet	1		SW-846 8260C-D	9/10/21	9/10/21 14:48	MFF
1,3,5-Trimethylbenzene	ND	0.0020	mg/Kg wet	1		SW-846 8260C-D	9/10/21	9/10/21 14:48	MFF
Vinyl Chloride	ND	0.010	mg/Kg wet	1		SW-846 8260C-D	9/10/21	9/10/21 14:48	MFF
m+p Xylene	ND	0.0080	mg/Kg wet	1	V-05	SW-846 8260C-D	9/10/21	9/10/21 14:48	MFF
o-Xylene	ND	0.0040	mg/Kg wet	1		SW-846 8260C-D	9/10/21	9/10/21 14:48	MFF

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
1,2-Dichloroethane-d4	108	70-130		9/10/21 14:48
Toluene-d8	100	70-130		9/10/21 14:48
4-Bromofluorobenzene	95.4	70-130		9/10/21 14:48

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Project Location: Haverhill, MA | Sample Description: | Work Order: 21I0471

Date Received: 9/9/2021

Field Sample #: 1543210908-07 | Sampled: 9/8/2021 10:27

Sample ID: 21I0471-07

Sample Matrix: Soil

Volatile Organic Compounds by GC/MS

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Acetone	ND	0.13	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 15:12	MFF
tert-Amyl Methyl Ether (TAME)	ND	0.0013	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 15:12	MFF
Benzene	ND	0.0026	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 15:12	MFF
Bromobenzene	ND	0.0026	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 15:12	MFF
Bromochloromethane	ND	0.0026	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 15:12	MFF
Bromodichloromethane	ND	0.0026	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 15:12	MFF
Bromoform	ND	0.0026	mg/Kg dry	1	V-05	SW-846 8260C-D	9/10/21	9/10/21 15:12	MFF
Bromomethane	ND	0.013	mg/Kg dry	1	V-34	SW-846 8260C-D	9/10/21	9/10/21 15:12	MFF
2-Butanone (MEK)	ND	0.052	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 15:12	MFF
n-Butylbenzene	ND	0.0026	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 15:12	MFF
sec-Butylbenzene	ND	0.0026	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 15:12	MFF
tert-Butylbenzene	ND	0.0026	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 15:12	MFF
tert-Butyl Ethyl Ether (TBEE)	ND	0.0013	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 15:12	MFF
Carbon Disulfide	ND	0.0078	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 15:12	MFF
Carbon Tetrachloride	ND	0.0026	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 15:12	MFF
Chlorobenzene	ND	0.0026	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 15:12	MFF
Chlorodibromomethane	ND	0.0013	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 15:12	MFF
Chloroethane	ND	0.013	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 15:12	MFF
Chloroform	ND	0.0052	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 15:12	MFF
Chloromethane	ND	0.013	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 15:12	MFF
2-Chlorotoluene	ND	0.0026	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 15:12	MFF
4-Chlorotoluene	ND	0.0026	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 15:12	MFF
1,2-Dibromo-3-chloropropane (DBCP)	ND	0.0052	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 15:12	MFF
1,2-Dibromoethane (EDB)	ND	0.0013	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 15:12	MFF
Dibromomethane	ND	0.0026	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 15:12	MFF
1,2-Dichlorobenzene	ND	0.0026	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 15:12	MFF
1,3-Dichlorobenzene	ND	0.0026	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 15:12	MFF
1,4-Dichlorobenzene	ND	0.0026	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 15:12	MFF
Dichlorodifluoromethane (Freon 12)	ND	0.013	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 15:12	MFF
1,1-Dichloroethane	ND	0.0026	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 15:12	MFF
1,2-Dichloroethane	ND	0.0026	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 15:12	MFF
1,1-Dichloroethylene	ND	0.0052	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 15:12	MFF
cis-1,2-Dichloroethylene	ND	0.0026	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 15:12	MFF
trans-1,2-Dichloroethylene	ND	0.0026	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 15:12	MFF
1,2-Dichloropropane	ND	0.0026	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 15:12	MFF
1,3-Dichloropropane	ND	0.0013	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 15:12	MFF
2,2-Dichloropropane	ND	0.0026	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 15:12	MFF
1,1-Dichloropropene	ND	0.0026	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 15:12	MFF
cis-1,3-Dichloropropene	ND	0.0013	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 15:12	MFF
trans-1,3-Dichloropropene	ND	0.0013	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 15:12	MFF
Diethyl Ether	ND	0.013	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 15:12	MFF
Diisopropyl Ether (DIPE)	ND	0.0013	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 15:12	MFF
1,4-Dioxane	ND	0.13	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 15:12	MFF
Ethylbenzene	ND	0.0052	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 15:12	MFF

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Project Location: Haverhill, MA | Sample Description: | Work Order: 21I0471

Date Received: 9/9/2021

Field Sample #: 1543210908-07 | Sampled: 9/8/2021 10:27

Sample ID: 21I0471-07

Sample Matrix: Soil

Volatile Organic Compounds by GC/MS

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Hexachlorobutadiene	ND	0.0026	mg/Kg dry	1	V-05	SW-846 8260C-D	9/10/21	9/10/21 15:12	MFF
2-Hexanone (MBK)	ND	0.026	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 15:12	MFF
Isopropylbenzene (Cumene)	ND	0.0026	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 15:12	MFF
p-Isopropyltoluene (p-Cymene)	ND	0.0026	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 15:12	MFF
Methyl tert-Butyl Ether (MTBE)	ND	0.0052	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 15:12	MFF
Methylene Chloride	ND	0.013	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 15:12	MFF
4-Methyl-2-pentanone (MIBK)	ND	0.026	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 15:12	MFF
Naphthalene	ND	0.0052	mg/Kg dry	1	V-05	SW-846 8260C-D	9/10/21	9/10/21 15:12	MFF
n-Propylbenzene	ND	0.0026	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 15:12	MFF
Styrene	ND	0.0026	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 15:12	MFF
1,1,1,2-Tetrachloroethane	ND	0.0026	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 15:12	MFF
1,1,2,2-Tetrachloroethane	ND	0.0013	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 15:12	MFF
Tetrachloroethylene	ND	0.0026	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 15:12	MFF
Tetrahydrofuran	ND	0.013	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 15:12	MFF
Toluene	ND	0.0052	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 15:12	MFF
1,2,3-Trichlorobenzene	ND	0.0026	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 15:12	MFF
1,2,4-Trichlorobenzene	ND	0.0026	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 15:12	MFF
1,1,1-Trichloroethane	ND	0.0026	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 15:12	MFF
1,1,2-Trichloroethane	ND	0.0026	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 15:12	MFF
Trichloroethylene	ND	0.0026	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 15:12	MFF
Trichlorofluoromethane (Freon 11)	ND	0.013	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 15:12	MFF
1,2,3-Trichloropropane	ND	0.0026	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 15:12	MFF
1,2,4-Trimethylbenzene	ND	0.0026	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 15:12	MFF
1,3,5-Trimethylbenzene	ND	0.0026	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 15:12	MFF
Vinyl Chloride	ND	0.013	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 15:12	MFF
m+p Xylene	ND	0.010	mg/Kg dry	1	V-05	SW-846 8260C-D	9/10/21	9/10/21 15:12	MFF
o-Xylene	ND	0.0052	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 15:12	MFF

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
1,2-Dichloroethane-d4	109	70-130		9/10/21 15:12
Toluene-d8	102	70-130		9/10/21 15:12
4-Bromofluorobenzene	95.0	70-130		9/10/21 15:12

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Project Location: Haverhill, MA | Sample Description: | Work Order: 21I0471

Date Received: 9/9/2021

Field Sample #: 1543210908-07 | Sampled: 9/8/2021 10:27

Sample ID: 21I0471-07

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	0.30	mg/Kg dry	1		SW-846 8270D-E	9/10/21	9/13/21 19:24	IMR
Acenaphthylene	ND	0.30	mg/Kg dry	1		SW-846 8270D-E	9/10/21	9/13/21 19:24	IMR
Anthracene	ND	0.30	mg/Kg dry	1		SW-846 8270D-E	9/10/21	9/13/21 19:24	IMR
Benzo(a)anthracene	ND	0.30	mg/Kg dry	1		SW-846 8270D-E	9/10/21	9/13/21 19:24	IMR
Benzo(a)pyrene	ND	0.30	mg/Kg dry	1		SW-846 8270D-E	9/10/21	9/13/21 19:24	IMR
Benzo(b)fluoranthene	ND	0.30	mg/Kg dry	1		SW-846 8270D-E	9/10/21	9/13/21 19:24	IMR
Benzo(g,h,i)perylene	ND	0.30	mg/Kg dry	1		SW-846 8270D-E	9/10/21	9/13/21 19:24	IMR
Benzo(k)fluoranthene	ND	0.30	mg/Kg dry	1		SW-846 8270D-E	9/10/21	9/13/21 19:24	IMR
Chrysene	ND	0.30	mg/Kg dry	1		SW-846 8270D-E	9/10/21	9/13/21 19:24	IMR
Dibenz(a,h)anthracene	ND	0.30	mg/Kg dry	1		SW-846 8270D-E	9/10/21	9/13/21 19:24	IMR
Fluoranthene	ND	0.30	mg/Kg dry	1		SW-846 8270D-E	9/10/21	9/13/21 19:24	IMR
Fluorene	ND	0.30	mg/Kg dry	1		SW-846 8270D-E	9/10/21	9/13/21 19:24	IMR
Indeno(1,2,3-cd)pyrene	ND	0.30	mg/Kg dry	1		SW-846 8270D-E	9/10/21	9/13/21 19:24	IMR
2-Methylnaphthalene	ND	0.30	mg/Kg dry	1		SW-846 8270D-E	9/10/21	9/13/21 19:24	IMR
Naphthalene	ND	0.30	mg/Kg dry	1		SW-846 8270D-E	9/10/21	9/13/21 19:24	IMR
Phenanthrene	ND	0.30	mg/Kg dry	1		SW-846 8270D-E	9/10/21	9/13/21 19:24	IMR
Pyrene	ND	0.30	mg/Kg dry	1		SW-846 8270D-E	9/10/21	9/13/21 19:24	IMR

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Nitrobenzene-d5	64.4	30-130		9/13/21 19:24
2-Fluorobiphenyl	68.6	30-130		9/13/21 19:24
p-Terphenyl-d14	103	30-130		9/13/21 19:24

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Project Location: Haverhill, MA | Sample Description: | Work Order: 21I0471

Date Received: 9/9/2021

Field Sample #: 1543210908-07 | Sampled: 9/8/2021 10:27

Sample ID: 21I0471-07

Sample Matrix: Soil

Sample Flags: DL-03

Organochloride Pesticides by GC/ECD

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aldrin [1]	ND	0.087	mg/Kg dry	10		SW-846 8081B	9/10/21	9/17/21 12:43	TG
alpha-BHC [1]	ND	0.087	mg/Kg dry	10		SW-846 8081B	9/10/21	9/17/21 12:43	TG
beta-BHC [1]	ND	0.087	mg/Kg dry	10		SW-846 8081B	9/10/21	9/17/21 12:43	TG
delta-BHC [1]	ND	0.087	mg/Kg dry	10		SW-846 8081B	9/10/21	9/17/21 12:43	TG
gamma-BHC (Lindane) [1]	ND	0.035	mg/Kg dry	10		SW-846 8081B	9/10/21	9/17/21 12:43	TG
Chlordane [1]	ND	0.35	mg/Kg dry	10		SW-846 8081B	9/10/21	9/17/21 12:43	TG
4,4'-DDD [1]	ND	0.070	mg/Kg dry	10		SW-846 8081B	9/10/21	9/17/21 12:43	TG
4,4'-DDE [1]	ND	0.070	mg/Kg dry	10		SW-846 8081B	9/10/21	9/17/21 12:43	TG
4,4'-DDT [1]	ND	0.070	mg/Kg dry	10		SW-846 8081B	9/10/21	9/17/21 12:43	TG
Dieldrin [1]	ND	0.070	mg/Kg dry	10		SW-846 8081B	9/10/21	9/17/21 12:43	TG
Endosulfan I [1]	ND	0.087	mg/Kg dry	10		SW-846 8081B	9/10/21	9/17/21 12:43	TG
Endosulfan II [1]	ND	0.14	mg/Kg dry	10		SW-846 8081B	9/10/21	9/17/21 12:43	TG
Endosulfan sulfate [1]	ND	0.14	mg/Kg dry	10		SW-846 8081B	9/10/21	9/17/21 12:43	TG
Endrin [1]	ND	0.14	mg/Kg dry	10		SW-846 8081B	9/10/21	9/17/21 12:43	TG
Endrin ketone [1]	ND	0.14	mg/Kg dry	10		SW-846 8081B	9/10/21	9/17/21 12:43	TG
Heptachlor [1]	ND	0.087	mg/Kg dry	10		SW-846 8081B	9/10/21	9/17/21 12:43	TG
Heptachlor epoxide [1]	ND	0.087	mg/Kg dry	10		SW-846 8081B	9/10/21	9/17/21 12:43	TG
Hexachlorobenzene [1]	ND	0.10	mg/Kg dry	10		SW-846 8081B	9/10/21	9/17/21 12:43	TG
Methoxychlor [1]	ND	0.87	mg/Kg dry	10		SW-846 8081B	9/10/21	9/17/21 12:43	TG

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Decachlorobiphenyl [1]	76.5	30-150		9/17/21 12:43
Decachlorobiphenyl [2]	85.3	30-150		9/17/21 12:43
Tetrachloro-m-xylene [1]	72.0	30-150		9/17/21 12:43
Tetrachloro-m-xylene [2]	74.5	30-150		9/17/21 12:43

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Project Location: Haverhill, MA | Sample Description: | Work Order: 21I0471

Date Received: 9/9/2021

Field Sample #: 1543210908-07 | Sampled: 9/8/2021 10:27

Sample ID: 21I0471-07

Sample Matrix: Soil

Sample Flags: O-32

Polychlorinated Biphenyls By GC/ECD

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.14	mg/Kg dry	4		SW-846 8082A	9/10/21	9/15/21 22:49	TG
Aroclor-1221 [1]	ND	0.14	mg/Kg dry	4		SW-846 8082A	9/10/21	9/15/21 22:49	TG
Aroclor-1232 [1]	ND	0.14	mg/Kg dry	4		SW-846 8082A	9/10/21	9/15/21 22:49	TG
Aroclor-1242 [1]	ND	0.14	mg/Kg dry	4		SW-846 8082A	9/10/21	9/15/21 22:49	TG
Aroclor-1248 [1]	ND	0.14	mg/Kg dry	4		SW-846 8082A	9/10/21	9/15/21 22:49	TG
Aroclor-1254 [1]	ND	0.14	mg/Kg dry	4		SW-846 8082A	9/10/21	9/15/21 22:49	TG
Aroclor-1260 [1]	ND	0.14	mg/Kg dry	4		SW-846 8082A	9/10/21	9/15/21 22:49	TG
Aroclor-1262 [1]	ND	0.14	mg/Kg dry	4		SW-846 8082A	9/10/21	9/15/21 22:49	TG
Aroclor-1268 [1]	ND	0.14	mg/Kg dry	4		SW-846 8082A	9/10/21	9/15/21 22:49	TG

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Decachlorobiphenyl [1]	83.1	30-150		9/15/21 22:49
Decachlorobiphenyl [2]	88.8	30-150		9/15/21 22:49
Tetrachloro-m-xylene [1]	83.8	30-150		9/15/21 22:49
Tetrachloro-m-xylene [2]	88.4	30-150		9/15/21 22:49

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Project Location: Haverhill, MA | Sample Description: | Work Order: 21I0471

Date Received: 9/9/2021

Field Sample #: 1543210908-07 | Sampled: 9/8/2021 10:27

Sample ID: 21I0471-07

Sample Matrix: Soil

Herbicides by GC/ECD

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
2,4-D [1]	ND	170	µg/kg dry	4		SW-846 8151A	9/13/21	9/17/21 22:39	JMB
2,4-DB [1]	ND	170	µg/kg dry	4		SW-846 8151A	9/13/21	9/17/21 22:39	JMB
2,4,5-TP (Silvex) [1]	ND	17	µg/kg dry	4		SW-846 8151A	9/13/21	9/17/21 22:39	JMB
2,4,5-T [1]	ND	17	µg/kg dry	4		SW-846 8151A	9/13/21	9/17/21 22:39	JMB
Dalalpon [1]	ND	440	µg/kg dry	4	V-20	SW-846 8151A	9/13/21	9/17/21 22:39	JMB
Dicamba [1]	ND	17	µg/kg dry	4		SW-846 8151A	9/13/21	9/17/21 22:39	JMB
Dichloroprop [1]	ND	170	µg/kg dry	4		SW-846 8151A	9/13/21	9/17/21 22:39	JMB
Dinoseb [1]	ND	87	µg/kg dry	4		SW-846 8151A	9/13/21	9/17/21 22:39	JMB
MCPA [1]	ND	17000	µg/kg dry	4		SW-846 8151A	9/13/21	9/17/21 22:39	JMB
MCPP [1]	ND	17000	µg/kg dry	4		SW-846 8151A	9/13/21	9/17/21 22:39	JMB

Surrogates	% Recovery	Recovery Limits	Flag/Qual		
2,4-Dichlorophenylacetic acid [1]	94.4	30-150			9/17/21 22:39
2,4-Dichlorophenylacetic acid [2]	76.0	30-150			9/17/21 22:39

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Project Location: Haverhill, MA | Sample Description: | Work Order: 21I0471

Date Received: 9/9/2021

Field Sample #: 1543210908-07 | Sampled: 9/8/2021 10:27

Sample ID: 21I0471-07

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	17	mg/Kg dry	1		MADEP EPH rev 2.1	9/10/21	9/17/21 20:26	AYH
C19-C36 Aliphatics	31	17	mg/Kg dry	1		MADEP EPH rev 2.1	9/10/21	9/17/21 20:26	AYH
Unadjusted C11-C22 Aromatics	41	17	mg/Kg dry	1		MADEP EPH rev 2.1	9/10/21	9/17/21 20:26	AYH
C11-C22 Aromatics	33	17	mg/Kg dry	1		MADEP EPH rev 2.1	9/10/21	9/17/21 20:26	AYH
Acenaphthene	ND	0.17	mg/Kg dry	1		MADEP EPH rev 2.1	9/10/21	9/17/21 20:26	AYH
Acenaphthylene	ND	0.17	mg/Kg dry	1		MADEP EPH rev 2.1	9/10/21	9/17/21 20:26	AYH
Anthracene	ND	0.17	mg/Kg dry	1		MADEP EPH rev 2.1	9/10/21	9/17/21 20:26	AYH
Benzo(a)anthracene	2.8	0.17	mg/Kg dry	1		MADEP EPH rev 2.1	9/10/21	9/17/21 20:26	AYH
Benzo(a)pyrene	1.9	0.17	mg/Kg dry	1		MADEP EPH rev 2.1	9/10/21	9/17/21 20:26	AYH
Benzo(b)fluoranthene	0.42	0.17	mg/Kg dry	1		MADEP EPH rev 2.1	9/10/21	9/17/21 20:26	AYH
Benzo(g,h,i)perylene	ND	0.17	mg/Kg dry	1		MADEP EPH rev 2.1	9/10/21	9/17/21 20:26	AYH
Benzo(k)fluoranthene	ND	0.17	mg/Kg dry	1		MADEP EPH rev 2.1	9/10/21	9/17/21 20:26	AYH
Chrysene	1.7	0.17	mg/Kg dry	1		MADEP EPH rev 2.1	9/10/21	9/17/21 20:26	AYH
Dibenz(a,h)anthracene	ND	0.17	mg/Kg dry	1		MADEP EPH rev 2.1	9/10/21	9/17/21 20:26	AYH
Fluoranthene	0.66	0.17	mg/Kg dry	1		MADEP EPH rev 2.1	9/10/21	9/17/21 20:26	AYH
Fluorene	ND	0.17	mg/Kg dry	1		MADEP EPH rev 2.1	9/10/21	9/17/21 20:26	AYH
Indeno(1,2,3-cd)pyrene	ND	0.17	mg/Kg dry	1		MADEP EPH rev 2.1	9/10/21	9/17/21 20:26	AYH
2-Methylnaphthalene	ND	0.17	mg/Kg dry	1		MADEP EPH rev 2.1	9/10/21	9/17/21 20:26	AYH
Naphthalene	ND	0.17	mg/Kg dry	1		MADEP EPH rev 2.1	9/10/21	9/17/21 20:26	AYH
Phenanthrene	0.34	0.17	mg/Kg dry	1		MADEP EPH rev 2.1	9/10/21	9/17/21 20:26	AYH
Pyrene	0.66	0.17	mg/Kg dry	1		MADEP EPH rev 2.1	9/10/21	9/17/21 20:26	AYH

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Chlorooctadecane (COD)	76.6	40-140		9/17/21 20:26
o-Terphenyl (OTP)	93.3	40-140		9/17/21 20:26
2-Bromonaphthalene	125	40-140		9/17/21 20:26
2-Fluorobiphenyl	126	40-140		9/17/21 20:26

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Project Location: Haverhill, MA | Sample Description: | Work Order: 21I0471

Date Received: 9/9/2021

Field Sample #: 1543210908-07 | Sampled: 9/8/2021 10:27

Sample ID: 21I0471-07

Sample Matrix: Soil

Metals Analyses (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Arsenic	7.5	5.7	mg/Kg dry	1		SW-846 6010D	9/15/21	9/15/21 16:21	QNW
Cadmium	ND	0.57	mg/Kg dry	1		SW-846 6010D	9/15/21	9/15/21 16:21	QNW
Chromium	24	1.1	mg/Kg dry	1		SW-846 6010D	9/15/21	9/15/21 16:21	QNW
Copper	14	1.1	mg/Kg dry	1		SW-846 6010D	9/15/21	9/15/21 16:21	QNW
Lead	26	0.86	mg/Kg dry	1		SW-846 6010D	9/15/21	9/15/21 16:21	QNW
Mercury	ND	0.044	mg/Kg dry	1		SW-846 7471B	9/10/21	9/13/21 14:57	DRL
Nickel	17	1.1	mg/Kg dry	1		SW-846 6010D	9/15/21	9/15/21 16:21	QNW
Zinc	60	1.1	mg/Kg dry	1		SW-846 6010D	9/15/21	9/15/21 16:21	QNW

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Project Location: Haverhill, MA | Sample Description: | Work Order: 21I0471

Date Received: 9/9/2021

Field Sample #: 1543210908-07 | Sampled: 9/8/2021 10:27

Sample ID: 21I0471-07

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	57.2		% Wt	1	R-02	SM 2540G	9/10/21	9/13/21 9:51	CJV
Total Organic Carbon	20000	100	mg/Kg	1		SW 846 9060A	9/13/21	9/13/21 23:33	DJM

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Project Location: Haverhill, MA | Sample Description: | Work Order: 21I0471

Date Received: 9/9/2021

Field Sample #: 1543210908-08 | Sampled: 9/8/2021 11:04

Sample ID: 21I0471-08

Sample Matrix: Soil

Volatile Organic Compounds by GC/MS

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Acetone	ND	0.085	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 15:37	MFF
tert-Amyl Methyl Ether (TAME)	ND	0.00085	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 15:37	MFF
Benzene	ND	0.0017	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 15:37	MFF
Bromobenzene	ND	0.0017	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 15:37	MFF
Bromochloromethane	ND	0.0017	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 15:37	MFF
Bromodichloromethane	ND	0.0017	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 15:37	MFF
Bromoform	ND	0.0017	mg/Kg dry	1	V-05	SW-846 8260C-D	9/10/21	9/10/21 15:37	MFF
Bromomethane	ND	0.0085	mg/Kg dry	1	V-34	SW-846 8260C-D	9/10/21	9/10/21 15:37	MFF
2-Butanone (MEK)	ND	0.034	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 15:37	MFF
n-Butylbenzene	ND	0.0017	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 15:37	MFF
sec-Butylbenzene	ND	0.0017	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 15:37	MFF
tert-Butylbenzene	ND	0.0017	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 15:37	MFF
tert-Butyl Ethyl Ether (TBEE)	ND	0.00085	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 15:37	MFF
Carbon Disulfide	ND	0.0051	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 15:37	MFF
Carbon Tetrachloride	ND	0.0017	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 15:37	MFF
Chlorobenzene	ND	0.0017	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 15:37	MFF
Chlorodibromomethane	ND	0.00085	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 15:37	MFF
Chloroethane	ND	0.0085	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 15:37	MFF
Chloroform	ND	0.0034	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 15:37	MFF
Chloromethane	ND	0.0085	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 15:37	MFF
2-Chlorotoluene	ND	0.0017	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 15:37	MFF
4-Chlorotoluene	ND	0.0017	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 15:37	MFF
1,2-Dibromo-3-chloropropane (DBCP)	ND	0.0034	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 15:37	MFF
1,2-Dibromoethane (EDB)	ND	0.00085	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 15:37	MFF
Dibromomethane	ND	0.0017	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 15:37	MFF
1,2-Dichlorobenzene	ND	0.0017	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 15:37	MFF
1,3-Dichlorobenzene	ND	0.0017	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 15:37	MFF
1,4-Dichlorobenzene	ND	0.0017	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 15:37	MFF
Dichlorodifluoromethane (Freon 12)	ND	0.0085	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 15:37	MFF
1,1-Dichloroethane	ND	0.0017	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 15:37	MFF
1,2-Dichloroethane	ND	0.0017	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 15:37	MFF
1,1-Dichloroethylene	ND	0.0034	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 15:37	MFF
cis-1,2-Dichloroethylene	ND	0.0017	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 15:37	MFF
trans-1,2-Dichloroethylene	ND	0.0017	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 15:37	MFF
1,2-Dichloropropane	ND	0.0017	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 15:37	MFF
1,3-Dichloropropane	ND	0.00085	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 15:37	MFF
2,2-Dichloropropane	ND	0.0017	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 15:37	MFF
1,1-Dichloropropene	ND	0.0017	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 15:37	MFF
cis-1,3-Dichloropropene	ND	0.00085	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 15:37	MFF
trans-1,3-Dichloropropene	ND	0.00085	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 15:37	MFF
Diethyl Ether	ND	0.0085	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 15:37	MFF
Diisopropyl Ether (DIPE)	ND	0.00085	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 15:37	MFF
1,4-Dioxane	ND	0.085	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 15:37	MFF
Ethylbenzene	ND	0.0034	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 15:37	MFF

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Project Location: Haverhill, MA | Sample Description: | Work Order: 21I0471

Date Received: 9/9/2021

Field Sample #: 1543210908-08 | Sampled: 9/8/2021 11:04

Sample ID: 21I0471-08

Sample Matrix: Soil

Volatile Organic Compounds by GC/MS

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Hexachlorobutadiene	ND	0.0017	mg/Kg dry	1	V-05	SW-846 8260C-D	9/10/21	9/10/21 15:37	MFF
2-Hexanone (MBK)	ND	0.017	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 15:37	MFF
Isopropylbenzene (Cumene)	ND	0.0017	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 15:37	MFF
p-Isopropyltoluene (p-Cymene)	ND	0.0017	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 15:37	MFF
Methyl tert-Butyl Ether (MTBE)	ND	0.0034	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 15:37	MFF
Methylene Chloride	ND	0.0085	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 15:37	MFF
4-Methyl-2-pentanone (MIBK)	ND	0.017	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 15:37	MFF
Naphthalene	ND	0.0034	mg/Kg dry	1	V-05	SW-846 8260C-D	9/10/21	9/10/21 15:37	MFF
n-Propylbenzene	ND	0.0017	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 15:37	MFF
Styrene	ND	0.0017	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 15:37	MFF
1,1,1,2-Tetrachloroethane	ND	0.0017	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 15:37	MFF
1,1,2,2-Tetrachloroethane	ND	0.00085	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 15:37	MFF
Tetrachloroethylene	ND	0.0017	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 15:37	MFF
Tetrahydrofuran	ND	0.0085	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 15:37	MFF
Toluene	ND	0.0034	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 15:37	MFF
1,2,3-Trichlorobenzene	ND	0.0017	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 15:37	MFF
1,2,4-Trichlorobenzene	ND	0.0017	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 15:37	MFF
1,1,1-Trichloroethane	ND	0.0017	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 15:37	MFF
1,1,2-Trichloroethane	ND	0.0017	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 15:37	MFF
Trichloroethylene	ND	0.0017	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 15:37	MFF
Trichlorofluoromethane (Freon 11)	ND	0.0085	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 15:37	MFF
1,2,3-Trichloropropane	ND	0.0017	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 15:37	MFF
1,2,4-Trimethylbenzene	ND	0.0017	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 15:37	MFF
1,3,5-Trimethylbenzene	ND	0.0017	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 15:37	MFF
Vinyl Chloride	ND	0.0085	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 15:37	MFF
m+p Xylene	ND	0.0068	mg/Kg dry	1	V-05	SW-846 8260C-D	9/10/21	9/10/21 15:37	MFF
o-Xylene	ND	0.0034	mg/Kg dry	1		SW-846 8260C-D	9/10/21	9/10/21 15:37	MFF

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
1,2-Dichloroethane-d4	107	70-130		9/10/21 15:37
Toluene-d8	103	70-130		9/10/21 15:37
4-Bromofluorobenzene	92.6	70-130		9/10/21 15:37

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Project Location: Haverhill, MA | Sample Description: | Work Order: 21I0471

Date Received: 9/9/2021

Field Sample #: 1543210908-08 | Sampled: 9/8/2021 11:04

Sample ID: 21I0471-08

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	0.25	mg/Kg dry	1		SW-846 8270D-E	9/10/21	9/13/21 19:47	IMR
Acenaphthylene	ND	0.25	mg/Kg dry	1		SW-846 8270D-E	9/10/21	9/13/21 19:47	IMR
Anthracene	ND	0.25	mg/Kg dry	1		SW-846 8270D-E	9/10/21	9/13/21 19:47	IMR
Benzo(a)anthracene	ND	0.25	mg/Kg dry	1		SW-846 8270D-E	9/10/21	9/13/21 19:47	IMR
Benzo(a)pyrene	ND	0.25	mg/Kg dry	1		SW-846 8270D-E	9/10/21	9/13/21 19:47	IMR
Benzo(b)fluoranthene	ND	0.25	mg/Kg dry	1		SW-846 8270D-E	9/10/21	9/13/21 19:47	IMR
Benzo(g,h,i)perylene	ND	0.25	mg/Kg dry	1		SW-846 8270D-E	9/10/21	9/13/21 19:47	IMR
Benzo(k)fluoranthene	ND	0.25	mg/Kg dry	1		SW-846 8270D-E	9/10/21	9/13/21 19:47	IMR
Chrysene	ND	0.25	mg/Kg dry	1		SW-846 8270D-E	9/10/21	9/13/21 19:47	IMR
Dibenz(a,h)anthracene	ND	0.25	mg/Kg dry	1		SW-846 8270D-E	9/10/21	9/13/21 19:47	IMR
Fluoranthene	ND	0.25	mg/Kg dry	1		SW-846 8270D-E	9/10/21	9/13/21 19:47	IMR
Fluorene	ND	0.25	mg/Kg dry	1		SW-846 8270D-E	9/10/21	9/13/21 19:47	IMR
Indeno(1,2,3-cd)pyrene	ND	0.25	mg/Kg dry	1		SW-846 8270D-E	9/10/21	9/13/21 19:47	IMR
2-Methylnaphthalene	ND	0.25	mg/Kg dry	1		SW-846 8270D-E	9/10/21	9/13/21 19:47	IMR
Naphthalene	ND	0.25	mg/Kg dry	1		SW-846 8270D-E	9/10/21	9/13/21 19:47	IMR
Phenanthrene	ND	0.25	mg/Kg dry	1		SW-846 8270D-E	9/10/21	9/13/21 19:47	IMR
Pyrene	ND	0.25	mg/Kg dry	1		SW-846 8270D-E	9/10/21	9/13/21 19:47	IMR

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Nitrobenzene-d5	61.2	30-130		9/13/21 19:47
2-Fluorobiphenyl	62.6	30-130		9/13/21 19:47
p-Terphenyl-d14	85.1	30-130		9/13/21 19:47

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Project Location: Haverhill, MA | Sample Description: | Work Order: 21I0471

Date Received: 9/9/2021

Field Sample #: 1543210908-08 | Sampled: 9/8/2021 11:04

Sample ID: 21I0471-08

Sample Matrix: Soil

Sample Flags: DL-03

Organochloride Pesticides by GC/ECD

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aldrin [1]	ND	0.072	mg/Kg dry	10		SW-846 8081B	9/10/21	9/17/21 13:10	TG
alpha-BHC [1]	ND	0.072	mg/Kg dry	10		SW-846 8081B	9/10/21	9/17/21 13:10	TG
beta-BHC [1]	ND	0.072	mg/Kg dry	10		SW-846 8081B	9/10/21	9/17/21 13:10	TG
delta-BHC [1]	ND	0.072	mg/Kg dry	10		SW-846 8081B	9/10/21	9/17/21 13:10	TG
gamma-BHC (Lindane) [1]	ND	0.029	mg/Kg dry	10		SW-846 8081B	9/10/21	9/17/21 13:10	TG
Chlordane [1]	ND	0.29	mg/Kg dry	10		SW-846 8081B	9/10/21	9/17/21 13:10	TG
4,4'-DDD [1]	ND	0.058	mg/Kg dry	10		SW-846 8081B	9/10/21	9/17/21 13:10	TG
4,4'-DDE [1]	ND	0.058	mg/Kg dry	10		SW-846 8081B	9/10/21	9/17/21 13:10	TG
4,4'-DDT [1]	ND	0.058	mg/Kg dry	10		SW-846 8081B	9/10/21	9/17/21 13:10	TG
Dieldrin [1]	ND	0.058	mg/Kg dry	10		SW-846 8081B	9/10/21	9/17/21 13:10	TG
Endosulfan I [1]	ND	0.072	mg/Kg dry	10		SW-846 8081B	9/10/21	9/17/21 13:10	TG
Endosulfan II [1]	ND	0.12	mg/Kg dry	10		SW-846 8081B	9/10/21	9/17/21 13:10	TG
Endosulfan sulfate [1]	ND	0.12	mg/Kg dry	10		SW-846 8081B	9/10/21	9/17/21 13:10	TG
Endrin [1]	ND	0.12	mg/Kg dry	10		SW-846 8081B	9/10/21	9/17/21 13:10	TG
Endrin ketone [1]	ND	0.12	mg/Kg dry	10		SW-846 8081B	9/10/21	9/17/21 13:10	TG
Heptachlor [1]	ND	0.072	mg/Kg dry	10		SW-846 8081B	9/10/21	9/17/21 13:10	TG
Heptachlor epoxide [1]	ND	0.072	mg/Kg dry	10		SW-846 8081B	9/10/21	9/17/21 13:10	TG
Hexachlorobenzene [1]	ND	0.087	mg/Kg dry	10		SW-846 8081B	9/10/21	9/17/21 13:10	TG
Methoxychlor [1]	ND	0.72	mg/Kg dry	10		SW-846 8081B	9/10/21	9/17/21 13:10	TG

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Decachlorobiphenyl [1]	90.5	30-150		9/17/21 13:10
Decachlorobiphenyl [2]	103	30-150		9/17/21 13:10
Tetrachloro-m-xylene [1]	77.1	30-150		9/17/21 13:10
Tetrachloro-m-xylene [2]	78.6	30-150		9/17/21 13:10

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Project Location: Haverhill, MA | Sample Description: | Work Order: 21I0471

Date Received: 9/9/2021

Field Sample #: 1543210908-08 | Sampled: 9/8/2021 11:04

Sample ID: 21I0471-08

Sample Matrix: Soil

Sample Flags: O-32

Polychlorinated Biphenyls By GC/ECD

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.12	mg/Kg dry	4		SW-846 8082A	9/10/21	9/15/21 23:07	TG
Aroclor-1221 [1]	ND	0.12	mg/Kg dry	4		SW-846 8082A	9/10/21	9/15/21 23:07	TG
Aroclor-1232 [1]	ND	0.12	mg/Kg dry	4		SW-846 8082A	9/10/21	9/15/21 23:07	TG
Aroclor-1242 [1]	ND	0.12	mg/Kg dry	4		SW-846 8082A	9/10/21	9/15/21 23:07	TG
Aroclor-1248 [1]	ND	0.12	mg/Kg dry	4		SW-846 8082A	9/10/21	9/15/21 23:07	TG
Aroclor-1254 [1]	ND	0.12	mg/Kg dry	4		SW-846 8082A	9/10/21	9/15/21 23:07	TG
Aroclor-1260 [1]	ND	0.12	mg/Kg dry	4		SW-846 8082A	9/10/21	9/15/21 23:07	TG
Aroclor-1262 [1]	ND	0.12	mg/Kg dry	4		SW-846 8082A	9/10/21	9/15/21 23:07	TG
Aroclor-1268 [1]	ND	0.12	mg/Kg dry	4		SW-846 8082A	9/10/21	9/15/21 23:07	TG

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Decachlorobiphenyl [1]	95.8	30-150		9/15/21 23:07
Decachlorobiphenyl [2]	102	30-150		9/15/21 23:07
Tetrachloro-m-xylene [1]	88.8	30-150		9/15/21 23:07
Tetrachloro-m-xylene [2]	93.1	30-150		9/15/21 23:07

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Project Location: Haverhill, MA | Sample Description: | Work Order: 21I0471

Date Received: 9/9/2021

Field Sample #: 1543210908-08 | Sampled: 9/8/2021 11:04

Sample ID: 21I0471-08

Sample Matrix: Soil

Herbicides by GC/ECD

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
2,4-D [1]	ND	140	µg/kg dry	4		SW-846 8151A	9/13/21	9/17/21 23:19	JMB
2,4-DB [1]	ND	140	µg/kg dry	4		SW-846 8151A	9/13/21	9/17/21 23:19	JMB
2,4,5-TP (Silvex) [1]	ND	14	µg/kg dry	4		SW-846 8151A	9/13/21	9/17/21 23:19	JMB
2,4,5-T [1]	ND	14	µg/kg dry	4		SW-846 8151A	9/13/21	9/17/21 23:19	JMB
Dalalpon [1]	ND	360	µg/kg dry	4	V-20	SW-846 8151A	9/13/21	9/17/21 23:19	JMB
Dicamba [1]	ND	14	µg/kg dry	4		SW-846 8151A	9/13/21	9/17/21 23:19	JMB
Dichloroprop [1]	ND	140	µg/kg dry	4		SW-846 8151A	9/13/21	9/17/21 23:19	JMB
Dinoseb [1]	ND	72	µg/kg dry	4		SW-846 8151A	9/13/21	9/17/21 23:19	JMB
MCPA [1]	ND	14000	µg/kg dry	4		SW-846 8151A	9/13/21	9/17/21 23:19	JMB
MCPP [1]	ND	14000	µg/kg dry	4		SW-846 8151A	9/13/21	9/17/21 23:19	JMB

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
2,4-Dichlorophenylacetic acid [1]	84.6	30-150		9/17/21 23:19
2,4-Dichlorophenylacetic acid [2]	68.2	30-150		9/17/21 23:19

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Project Location: Haverhill, MA | Sample Description: | Work Order: 21I0471

Date Received: 9/9/2021

Field Sample #: 1543210908-08 | Sampled: 9/8/2021 11:04

Sample ID: 21I0471-08

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	14	mg/Kg dry	1		MADEP EPH rev 2.1	9/10/21	9/17/21 20:45	AYH
C19-C36 Aliphatics	30	14	mg/Kg dry	1		MADEP EPH rev 2.1	9/10/21	9/17/21 20:45	AYH
Unadjusted C11-C22 Aromatics	20	14	mg/Kg dry	1		MADEP EPH rev 2.1	9/10/21	9/17/21 20:45	AYH
C11-C22 Aromatics	17	14	mg/Kg dry	1		MADEP EPH rev 2.1	9/10/21	9/17/21 20:45	AYH
Acenaphthene	ND	0.14	mg/Kg dry	1		MADEP EPH rev 2.1	9/10/21	9/17/21 20:45	AYH
Acenaphthylene	ND	0.14	mg/Kg dry	1		MADEP EPH rev 2.1	9/10/21	9/17/21 20:45	AYH
Anthracene	ND	0.14	mg/Kg dry	1		MADEP EPH rev 2.1	9/10/21	9/17/21 20:45	AYH
Benzo(a)anthracene	0.42	0.14	mg/Kg dry	1		MADEP EPH rev 2.1	9/10/21	9/17/21 20:45	AYH
Benzo(a)pyrene	1.1	0.14	mg/Kg dry	1		MADEP EPH rev 2.1	9/10/21	9/17/21 20:45	AYH
Benzo(b)fluoranthene	ND	0.14	mg/Kg dry	1		MADEP EPH rev 2.1	9/10/21	9/17/21 20:45	AYH
Benzo(g,h,i)perylene	ND	0.14	mg/Kg dry	1		MADEP EPH rev 2.1	9/10/21	9/17/21 20:45	AYH
Benzo(k)fluoranthene	ND	0.14	mg/Kg dry	1		MADEP EPH rev 2.1	9/10/21	9/17/21 20:45	AYH
Chrysene	0.40	0.14	mg/Kg dry	1		MADEP EPH rev 2.1	9/10/21	9/17/21 20:45	AYH
Dibenz(a,h)anthracene	ND	0.14	mg/Kg dry	1		MADEP EPH rev 2.1	9/10/21	9/17/21 20:45	AYH
Fluoranthene	0.51	0.14	mg/Kg dry	1		MADEP EPH rev 2.1	9/10/21	9/17/21 20:45	AYH
Fluorene	ND	0.14	mg/Kg dry	1		MADEP EPH rev 2.1	9/10/21	9/17/21 20:45	AYH
Indeno(1,2,3-cd)pyrene	ND	0.14	mg/Kg dry	1		MADEP EPH rev 2.1	9/10/21	9/17/21 20:45	AYH
2-Methylnaphthalene	ND	0.14	mg/Kg dry	1		MADEP EPH rev 2.1	9/10/21	9/17/21 20:45	AYH
Naphthalene	ND	0.14	mg/Kg dry	1		MADEP EPH rev 2.1	9/10/21	9/17/21 20:45	AYH
Phenanthrene	0.27	0.14	mg/Kg dry	1		MADEP EPH rev 2.1	9/10/21	9/17/21 20:45	AYH
Pyrene	0.42	0.14	mg/Kg dry	1		MADEP EPH rev 2.1	9/10/21	9/17/21 20:45	AYH

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Chlorooctadecane (COD)	66.3	40-140		9/17/21 20:45
o-Terphenyl (OTP)	77.5	40-140		9/17/21 20:45
2-Bromonaphthalene	117	40-140		9/17/21 20:45
2-Fluorobiphenyl	119	40-140		9/17/21 20:45

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Project Location: Haverhill, MA | Sample Description: | Work Order: 21I0471

Date Received: 9/9/2021

Field Sample #: 1543210908-08 | Sampled: 9/8/2021 11:04

Sample ID: 21I0471-08

Sample Matrix: Soil

Metals Analyses (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Arsenic	ND	4.7	mg/Kg dry	1		SW-846 6010D	9/15/21	9/15/21 16:28	QNW
Cadmium	ND	0.47	mg/Kg dry	1		SW-846 6010D	9/15/21	9/15/21 16:28	QNW
Chromium	12	0.95	mg/Kg dry	1		SW-846 6010D	9/15/21	9/15/21 16:28	QNW
Copper	5.7	0.95	mg/Kg dry	1		SW-846 6010D	9/15/21	9/15/21 16:28	QNW
Lead	11	0.71	mg/Kg dry	1		SW-846 6010D	9/15/21	9/15/21 16:28	QNW
Mercury	ND	0.038	mg/Kg dry	1		SW-846 7471B	9/10/21	9/13/21 14:58	DRL
Nickel	7.2	0.95	mg/Kg dry	1		SW-846 6010D	9/15/21	9/15/21 16:28	QNW
Zinc	31	0.95	mg/Kg dry	1		SW-846 6010D	9/15/21	9/15/21 16:28	QNW

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Project Location: Haverhill, MA | Sample Description: | Work Order: 21I0471

Date Received: 9/9/2021

Field Sample #: 1543210908-08 | Sampled: 9/8/2021 11:04

Sample ID: 21I0471-08

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	69.0		% Wt	1		SM 2540G	9/10/21	9/13/21 9:51	CJV
Total Organic Carbon	9100	100	mg/Kg	1		SW 846 9060A	9/13/21	9/13/21 23:48	DJM

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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
21I0471-02 [1543210907-02]	B289959	20.0	2.00	09/10/21
21I0471-03 [1543210907-03]	B289959	20.0	2.00	09/10/21
21I0471-04 [1543210907-04]	B289959	20.0	2.00	09/10/21
21I0471-05 [1543210907-05]	B289959	20.0	2.00	09/10/21
21I0471-07 [1543210908-07]	B289959	20.0	2.00	09/10/21
21I0471-08 [1543210908-08]	B289959	20.0	2.00	09/10/21

Prep Method: % Solids **Analytical Method: SM 2540G**

Lab Number [Field ID]	Batch	Date
21I0471-02 [1543210907-02]	B289999	09/10/21
21I0471-03 [1543210907-03]	B289999	09/10/21
21I0471-04 [1543210907-04]	B289999	09/10/21
21I0471-05 [1543210907-05]	B289999	09/10/21
21I0471-07 [1543210908-07]	B289999	09/10/21
21I0471-08 [1543210908-08]	B289999	09/10/21

SW 846 9060A

Lab Number [Field ID]	Batch	Initial [g]	Final [mL]	Date
21I0471-02 [1543210907-02]	B290031	1.00	1.00	09/13/21
21I0471-03 [1543210907-03]	B290031	1.00	1.00	09/13/21
21I0471-04 [1543210907-04]	B290031	1.00	1.00	09/13/21
21I0471-05 [1543210907-05]	B290031	1.00	1.00	09/13/21
21I0471-07 [1543210908-07]	B290031	1.00	1.00	09/13/21
21I0471-08 [1543210908-08]	B290031	1.00	1.00	09/13/21

Prep Method: SW-846 3050B **Analytical Method: SW-846 6010D**

Lab Number [Field ID]	Batch	Initial [g]	Final [mL]	Date
21I0471-02 [1543210907-02]	B290223	1.57	50.0	09/15/21
21I0471-03 [1543210907-03]	B290223	1.51	50.0	09/15/21
21I0471-04 [1543210907-04]	B290223	1.53	50.0	09/15/21
21I0471-05 [1543210907-05]	B290223	1.51	50.0	09/15/21
21I0471-07 [1543210908-07]	B290223	1.53	50.0	09/15/21
21I0471-08 [1543210908-08]	B290223	1.52	50.0	09/15/21

Prep Method: SW-846 7471 **Analytical Method: SW-846 7471B**

Lab Number [Field ID]	Batch	Initial [g]	Final [mL]	Date
21I0471-02 [1543210907-02]	B289988	0.584	50.0	09/10/21

Prep Method: SW-846 7471 **Analytical Method: SW-846 7471B**

Lab Number [Field ID]	Batch	Initial [g]	Final [mL]	Date
21I0471-03 [1543210907-03]	B289989	0.578	50.0	09/10/21
21I0471-04 [1543210907-04]	B289989	0.567	50.0	09/10/21
21I0471-05 [1543210907-05]	B289989	0.540	50.0	09/10/21
21I0471-07 [1543210908-07]	B289989	0.600	50.0	09/10/21

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Sample Extraction Data

Prep Method: SW-846 7471 **Analytical Method: SW-846 7471B**

Lab Number [Field ID]	Batch	Initial [g]	Final [mL]	Date
21I0471-08 [1543210908-08]	B289989	0.571	50.0	09/10/21

Prep Method: SW-846 3546 **Analytical Method: SW-846 8081B**

Lab Number [Field ID]	Batch	Initial [g]	Final [mL]	Date
21I0471-02 [1543210907-02]	B289958	10.0	10.0	09/10/21
21I0471-03 [1543210907-03]	B289958	10.0	10.0	09/10/21
21I0471-04 [1543210907-04]	B289958	10.0	10.0	09/10/21
21I0471-05 [1543210907-05]	B289958	10.0	10.0	09/10/21
21I0471-07 [1543210908-07]	B289958	10.0	10.0	09/10/21
21I0471-08 [1543210908-08]	B289958	10.0	10.0	09/10/21

Prep Method: SW-846 3546 **Analytical Method: SW-846 8082A**

Lab Number [Field ID]	Batch	Initial [g]	Final [mL]	Date
21I0471-02 [1543210907-02]	B289957	10.0	10.0	09/10/21
21I0471-03 [1543210907-03]	B289957	10.0	10.0	09/10/21
21I0471-04 [1543210907-04]	B289957	10.0	10.0	09/10/21
21I0471-05 [1543210907-05]	B289957	10.0	10.0	09/10/21
21I0471-07 [1543210908-07]	B289957	10.0	10.0	09/10/21
21I0471-08 [1543210908-08]	B289957	10.0	10.0	09/10/21

Prep Method: SW-846 8151 **Analytical Method: SW-846 8151A**

Lab Number [Field ID]	Batch	Initial [g]	Final [mL]	Date
21I0471-02 [1543210907-02]	B290112	20.0	5.00	09/13/21
21I0471-03 [1543210907-03]	B290112	20.0	5.00	09/13/21
21I0471-04 [1543210907-04]	B290112	20.0	5.00	09/13/21
21I0471-05 [1543210907-05]	B290112	20.0	5.00	09/13/21
21I0471-07 [1543210908-07]	B290112	20.0	5.00	09/13/21
21I0471-08 [1543210908-08]	B290112	20.0	5.00	09/13/21

Prep Method: SW-846 5035 **Analytical Method: SW-846 8260C-D**

Lab Number [Field ID]	Batch	Sample Amount(g)	Methanol Volume(mL)	Methanol Aliquot(mL)	Final Volume(mL)	Date
21I0471-02 [1543210907-02]	B289949	6.01	8.16	1	50	09/10/21
21I0471-03 [1543210907-03]	B289949	6.66	7.37	1	50	09/10/21

Prep Method: SW-846 5035 **Analytical Method: SW-846 8260C-D**

Lab Number [Field ID]	Batch	Initial [g]	Final [mL]	Date
21I0471-01 [1543210907-01]	B289971	5.00	10.0	09/10/21
21I0471-04 [1543210907-04]	B289971	6.75	10.0	09/10/21
21I0471-05 [1543210907-05]	B289971	7.80	10.0	09/10/21
21I0471-06 [1543210908-06]	B289971	5.00	10.0	09/10/21
21I0471-07 [1543210908-07]	B289971	6.70	10.0	09/10/21
21I0471-08 [1543210908-08]	B289971	8.55	10.0	09/10/21

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Sample Extraction Data

Prep Method: SW-846 3546 **Analytical Method: SW-846 8270D-E**

Lab Number [Field ID]	Batch	Initial [g]	Final [mL]	Date
21I0471-02 [1543210907-02]	B289965	30.0	1.00	09/10/21
21I0471-03 [1543210907-03]	B289965	30.0	1.00	09/10/21
21I0471-04 [1543210907-04]	B289965	30.0	1.00	09/10/21
21I0471-05 [1543210907-05]	B289965	30.0	1.00	09/10/21
21I0471-05RE1 [1543210907-05]	B289965	30.0	1.00	09/10/21
21I0471-07 [1543210908-07]	B289965	30.0	1.00	09/10/21
21I0471-08 [1543210908-08]	B289965	30.0	1.00	09/10/21

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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 B289949 - SW-846 5035										
Blank (B289949-BLK1)				Prepared & Analyzed: 09/10/21						
Acetone	ND	2.5	mg/Kg wet							
tert-Amyl Methyl Ether (TAME)	ND	0.025	mg/Kg wet							
Benzene	ND	0.050	mg/Kg wet							
Bromobenzene	ND	0.050	mg/Kg wet							
Bromochloromethane	ND	0.050	mg/Kg wet							
Bromodichloromethane	ND	0.050	mg/Kg wet							
Bromoform	ND	0.050	mg/Kg wet							
Bromomethane	ND	0.10	mg/Kg wet							V-05
2-Butanone (MEK)	ND	1.0	mg/Kg wet							
n-Butylbenzene	ND	0.050	mg/Kg wet							
sec-Butylbenzene	ND	0.050	mg/Kg wet							
tert-Butylbenzene	ND	0.050	mg/Kg wet							
tert-Butyl Ethyl Ether (TBEE)	ND	0.025	mg/Kg wet							
Carbon Disulfide	ND	0.50	mg/Kg wet							
Carbon Tetrachloride	ND	0.050	mg/Kg wet							
Chlorobenzene	ND	0.050	mg/Kg wet							
Chlorodibromomethane	ND	0.025	mg/Kg wet							
Chloroethane	ND	0.10	mg/Kg wet							
Chloroform	ND	0.10	mg/Kg wet							
Chloromethane	ND	0.10	mg/Kg wet							
2-Chlorotoluene	ND	0.050	mg/Kg wet							
4-Chlorotoluene	ND	0.050	mg/Kg wet							
1,2-Dibromo-3-chloropropane (DBCP)	ND	0.20	mg/Kg wet							
1,2-Dibromoethane (EDB)	ND	0.025	mg/Kg wet							
Dibromomethane	ND	0.050	mg/Kg wet							
1,2-Dichlorobenzene	ND	0.050	mg/Kg wet							
1,3-Dichlorobenzene	ND	0.050	mg/Kg wet							
1,4-Dichlorobenzene	ND	0.050	mg/Kg wet							
Dichlorodifluoromethane (Freon 12)	ND	0.10	mg/Kg wet							
1,1-Dichloroethane	ND	0.050	mg/Kg wet							
1,2-Dichloroethane	ND	0.050	mg/Kg wet							
1,1-Dichloroethylene	ND	0.050	mg/Kg wet							
cis-1,2-Dichloroethylene	ND	0.050	mg/Kg wet							
trans-1,2-Dichloroethylene	ND	0.050	mg/Kg wet							
1,2-Dichloropropane	ND	0.050	mg/Kg wet							
1,3-Dichloropropane	ND	0.025	mg/Kg wet							
2,2-Dichloropropane	ND	0.050	mg/Kg wet							
1,1-Dichloropropene	ND	0.10	mg/Kg wet							
cis-1,3-Dichloropropene	ND	0.025	mg/Kg wet							
trans-1,3-Dichloropropene	ND	0.025	mg/Kg wet							
Diethyl Ether	ND	0.10	mg/Kg wet							
Diisopropyl Ether (DIPE)	ND	0.025	mg/Kg wet							
1,4-Dioxane	ND	2.5	mg/Kg wet							
Ethylbenzene	ND	0.050	mg/Kg wet							
Hexachlorobutadiene	ND	0.050	mg/Kg wet							
2-Hexanone (MBK)	ND	0.50	mg/Kg wet							
Isopropylbenzene (Cumene)	ND	0.050	mg/Kg wet							
p-Isopropyltoluene (p-Cymene)	ND	0.050	mg/Kg wet							
Methyl tert-Butyl Ether (MTBE)	ND	0.050	mg/Kg wet							
Methylene Chloride	ND	0.25	mg/Kg wet							
4-Methyl-2-pentanone (MIBK)	ND	0.50	mg/Kg wet							
Naphthalene	ND	0.10	mg/Kg wet							V-05

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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 B289949 - SW-846 5035											
Blank (B289949-BLK1)				Prepared & Analyzed: 09/10/21							
n-Propylbenzene	ND	0.050	mg/Kg wet								
Styrene	ND	0.050	mg/Kg wet								
1,1,1,2-Tetrachloroethane	ND	0.050	mg/Kg wet								
1,1,2,2-Tetrachloroethane	ND	0.025	mg/Kg wet								
Tetrachloroethylene	ND	0.050	mg/Kg wet								
Tetrahydrofuran	ND	0.20	mg/Kg wet								
Toluene	ND	0.050	mg/Kg wet								
1,2,3-Trichlorobenzene	ND	0.20	mg/Kg wet							V-05	
1,2,4-Trichlorobenzene	ND	0.050	mg/Kg wet								
1,1,1-Trichloroethane	ND	0.050	mg/Kg wet								
1,1,2-Trichloroethane	ND	0.050	mg/Kg wet								
Trichloroethylene	ND	0.050	mg/Kg wet								
Trichlorofluoromethane (Freon 11)	ND	0.10	mg/Kg wet								
1,2,3-Trichloropropane	ND	0.10	mg/Kg wet								
1,2,4-Trimethylbenzene	ND	0.050	mg/Kg wet								
1,3,5-Trimethylbenzene	ND	0.050	mg/Kg wet								
Vinyl Chloride	ND	0.10	mg/Kg wet								
m+p Xylene	ND	0.10	mg/Kg wet								
o-Xylene	ND	0.050	mg/Kg wet								
Surrogate: 1,2-Dichloroethane-d4	*0.0268*		mg/Kg wet	0.0250		107	70-130				
Surrogate: Toluene-d8	*0.0276*		mg/Kg wet	0.0250		111	70-130				
Surrogate: 4-Bromofluorobenzene	*0.0270*		mg/Kg wet	0.0250		108	70-130				
LCS (B289949-BS1)				Prepared & Analyzed: 09/10/21							
Acetone	0.103	0.057	mg/Kg wet	0.113		90.8	40-160				†
tert-Amyl Methyl Ether (TAME)	0.0108	0.00057	mg/Kg wet	0.0113		95.4	70-130				
Benzene	0.0108	0.0011	mg/Kg wet	0.0113		95.6	70-130				
Bromobenzene	0.0113	0.0011	mg/Kg wet	0.0113		99.5	70-130				
Bromochloromethane	0.0107	0.0011	mg/Kg wet	0.0113		94.6	70-130				
Bromodichloromethane	0.0119	0.0011	mg/Kg wet	0.0113		105	70-130				
Bromoform	0.0123	0.0011	mg/Kg wet	0.0113		108	70-130				
Bromomethane	0.00957	0.0023	mg/Kg wet	0.0113		84.4	40-160			V-05	†
2-Butanone (MEK)	0.0976	0.023	mg/Kg wet	0.113		86.1	40-160				†
n-Butylbenzene	0.0106	0.0011	mg/Kg wet	0.0113		93.2	70-130				
sec-Butylbenzene	0.0113	0.0011	mg/Kg wet	0.0113		99.4	70-130				
tert-Butylbenzene	0.0117	0.0011	mg/Kg wet	0.0113		104	70-130				
tert-Butyl Ethyl Ether (TBEE)	0.0108	0.00057	mg/Kg wet	0.0113		94.9	70-130				
Carbon Disulfide	0.103	0.011	mg/Kg wet	0.113		91.1	70-130				
Carbon Tetrachloride	0.0122	0.0011	mg/Kg wet	0.0113		108	70-130				
Chlorobenzene	0.0125	0.0011	mg/Kg wet	0.0113		110	70-130				
Chlorodibromomethane	0.0125	0.00057	mg/Kg wet	0.0113		110	70-130				
Chloroethane	0.0115	0.0023	mg/Kg wet	0.0113		102	70-130				
Chloroform	0.0111	0.0023	mg/Kg wet	0.0113		97.7	70-130				
Chloromethane	0.0103	0.0023	mg/Kg wet	0.0113		90.8	40-160				†
2-Chlorotoluene	0.0118	0.0011	mg/Kg wet	0.0113		104	70-130				
4-Chlorotoluene	0.0120	0.0011	mg/Kg wet	0.0113		106	70-130				
1,2-Dibromo-3-chloropropane (DBCP)	0.00991	0.0045	mg/Kg wet	0.0113		87.4	70-130				
1,2-Dibromoethane (EDB)	0.0113	0.00057	mg/Kg wet	0.0113		100	70-130				
Dibromomethane	0.0114	0.0011	mg/Kg wet	0.0113		101	70-130				
1,2-Dichlorobenzene	0.0118	0.0011	mg/Kg wet	0.0113		104	70-130				
1,3-Dichlorobenzene	0.0116	0.0011	mg/Kg wet	0.0113		103	70-130				
1,4-Dichlorobenzene	0.0115	0.0011	mg/Kg wet	0.0113		101	70-130				

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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 B289949 - SW-846 5035											
LCS (B289949-BS1)				Prepared & Analyzed: 09/10/21							
Dichlorodifluoromethane (Freon 12)	0.00995	0.0023	mg/Kg wet	0.0113		87.8	40-160				†
1,1-Dichloroethane	0.0106	0.0011	mg/Kg wet	0.0113		93.4	70-130				
1,2-Dichloroethane	0.0123	0.0011	mg/Kg wet	0.0113		108	70-130				
1,1-Dichloroethylene	0.0106	0.0011	mg/Kg wet	0.0113		93.1	70-130				
cis-1,2-Dichloroethylene	0.0109	0.0011	mg/Kg wet	0.0113		96.2	70-130				
trans-1,2-Dichloroethylene	0.0104	0.0011	mg/Kg wet	0.0113		91.8	70-130				
1,2-Dichloropropane	0.0114	0.0011	mg/Kg wet	0.0113		101	70-130				
1,3-Dichloropropane	0.0114	0.00057	mg/Kg wet	0.0113		100	70-130				
2,2-Dichloropropane	0.0117	0.0011	mg/Kg wet	0.0113		103	70-130				
1,1-Dichloropropene	0.0112	0.0023	mg/Kg wet	0.0113		99.1	70-130				
cis-1,3-Dichloropropene	0.0124	0.00057	mg/Kg wet	0.0113		110	70-130				
trans-1,3-Dichloropropene	0.0122	0.00057	mg/Kg wet	0.0113		108	70-130				
Diethyl Ether	0.0102	0.0023	mg/Kg wet	0.0113		89.9	70-130				
Diisopropyl Ether (DIPE)	0.0100	0.00057	mg/Kg wet	0.0113		88.6	70-130				
1,4-Dioxane	0.118	0.057	mg/Kg wet	0.113		104	40-160				†
Ethylbenzene	0.0120	0.0011	mg/Kg wet	0.0113		106	70-130				
Hexachlorobutadiene	0.0130	0.0011	mg/Kg wet	0.0113		115	70-130				
2-Hexanone (MBK)	0.105	0.011	mg/Kg wet	0.113		92.3	40-160				†
Isopropylbenzene (Cumene)	0.0124	0.0011	mg/Kg wet	0.0113		110	70-130				
p-Isopropyltoluene (p-Cymene)	0.0115	0.0011	mg/Kg wet	0.0113		102	70-130				
Methyl tert-Butyl Ether (MTBE)	0.00997	0.0011	mg/Kg wet	0.0113		88.0	70-130				
Methylene Chloride	0.0102	0.0057	mg/Kg wet	0.0113		90.1	70-130				
4-Methyl-2-pentanone (MIBK)	0.108	0.011	mg/Kg wet	0.113		95.1	40-160				†
Naphthalene	0.00830	0.0023	mg/Kg wet	0.0113		73.2	70-130			V-05	
n-Propylbenzene	0.0118	0.0011	mg/Kg wet	0.0113		104	70-130				
Styrene	0.0128	0.0011	mg/Kg wet	0.0113		113	70-130				
1,1,1,2-Tetrachloroethane	0.0132	0.0011	mg/Kg wet	0.0113		117	70-130				
1,1,2,2-Tetrachloroethane	0.0121	0.00057	mg/Kg wet	0.0113		107	70-130				
Tetrachloroethylene	0.0133	0.0011	mg/Kg wet	0.0113		118	70-130				
Tetrahydrofuran	0.00954	0.0045	mg/Kg wet	0.0113		84.2	70-130				
Toluene	0.0120	0.0011	mg/Kg wet	0.0113		106	70-130				
1,2,3-Trichlorobenzene	0.00878	0.0045	mg/Kg wet	0.0113		77.5	70-130			V-05	
1,2,4-Trichlorobenzene	0.00967	0.0011	mg/Kg wet	0.0113		85.3	70-130				
1,1,1-Trichloroethane	0.0114	0.0011	mg/Kg wet	0.0113		101	70-130				
1,1,2-Trichloroethane	0.0119	0.0011	mg/Kg wet	0.0113		105	70-130				
Trichloroethylene	0.0113	0.0011	mg/Kg wet	0.0113		99.3	70-130				
Trichlorofluoromethane (Freon 11)	0.0112	0.0023	mg/Kg wet	0.0113		98.8	70-130				
1,2,3-Trichloropropane	0.0118	0.0023	mg/Kg wet	0.0113		104	70-130				
1,2,4-Trimethylbenzene	0.0113	0.0011	mg/Kg wet	0.0113		99.3	70-130				
1,3,5-Trimethylbenzene	0.0125	0.0011	mg/Kg wet	0.0113		110	70-130				
Vinyl Chloride	0.0110	0.0023	mg/Kg wet	0.0113		97.0	70-130				
m+p Xylene	0.0251	0.0023	mg/Kg wet	0.0227		111	70-130				
o-Xylene	0.0123	0.0011	mg/Kg wet	0.0113		108	70-130				
Surrogate: 1,2-Dichloroethane-d4	*0.0301*		mg/Kg wet	0.0283		106	70-130				
Surrogate: Toluene-d8	*0.0319*		mg/Kg wet	0.0283		113	70-130				
Surrogate: 4-Bromofluorobenzene	*0.0309*		mg/Kg wet	0.0283		109	70-130				

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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 B289949 - SW-846 5035											
LCS Dup (B289949-BSD1)				Prepared & Analyzed: 09/10/21							
Acetone	0.104	0.057	mg/Kg wet	0.113		91.6	40-160	0.855	20		†
tert-Amyl Methyl Ether (TAME)	0.0107	0.00057	mg/Kg wet	0.0113		94.1	70-130	1.37	20		
Benzene	0.0110	0.0011	mg/Kg wet	0.0113		97.0	70-130	1.45	20		
Bromobenzene	0.0115	0.0011	mg/Kg wet	0.0113		101	70-130	1.79	20		
Bromochloromethane	0.0109	0.0011	mg/Kg wet	0.0113		95.9	70-130	1.36	20		
Bromodichloromethane	0.0117	0.0011	mg/Kg wet	0.0113		104	70-130	1.34	20		
Bromoform	0.0129	0.0011	mg/Kg wet	0.0113		114	70-130	4.60	20		
Bromomethane	0.0104	0.0023	mg/Kg wet	0.0113		91.8	40-160	8.40	20	V-05	†
2-Butanone (MEK)	0.102	0.023	mg/Kg wet	0.113		90.3	40-160	4.73	20		†
n-Butylbenzene	0.0108	0.0011	mg/Kg wet	0.0113		94.9	70-130	1.81	20		
sec-Butylbenzene	0.0115	0.0011	mg/Kg wet	0.0113		102	70-130	2.48	20		
tert-Butylbenzene	0.0121	0.0011	mg/Kg wet	0.0113		107	70-130	2.95	20		
tert-Butyl Ethyl Ether (TBEE)	0.0107	0.00057	mg/Kg wet	0.0113		94.4	70-130	0.528	20		
Carbon Disulfide	0.104	0.011	mg/Kg wet	0.113		91.6	70-130	0.504	20		
Carbon Tetrachloride	0.0123	0.0011	mg/Kg wet	0.0113		109	70-130	1.11	20		
Chlorobenzene	0.0126	0.0011	mg/Kg wet	0.0113		111	70-130	1.08	20		
Chlorodibromomethane	0.0123	0.00057	mg/Kg wet	0.0113		108	70-130	1.83	20		
Chloroethane	0.0118	0.0023	mg/Kg wet	0.0113		104	70-130	2.34	20		
Chloroform	0.0112	0.0023	mg/Kg wet	0.0113		98.4	70-130	0.714	20		
Chloromethane	0.0107	0.0023	mg/Kg wet	0.0113		94.4	40-160	3.89	20		†
2-Chlorotoluene	0.0119	0.0011	mg/Kg wet	0.0113		105	70-130	0.574	20		
4-Chlorotoluene	0.0119	0.0011	mg/Kg wet	0.0113		105	70-130	0.757	20		
1,2-Dibromo-3-chloropropane (DBCP)	0.0109	0.0045	mg/Kg wet	0.0113		96.3	70-130	9.69	20		
1,2-Dibromoethane (EDB)	0.0118	0.00057	mg/Kg wet	0.0113		104	70-130	4.30	20		
Dibromomethane	0.0108	0.0011	mg/Kg wet	0.0113		95.7	70-130	5.39	20		
1,2-Dichlorobenzene	0.0122	0.0011	mg/Kg wet	0.0113		107	70-130	2.74	20		
1,3-Dichlorobenzene	0.0124	0.0011	mg/Kg wet	0.0113		109	70-130	6.04	20		
1,4-Dichlorobenzene	0.0122	0.0011	mg/Kg wet	0.0113		108	70-130	6.32	20		
Dichlorodifluoromethane (Freon 12)	0.0102	0.0023	mg/Kg wet	0.0113		90.4	40-160	2.92	20		†
1,1-Dichloroethane	0.0110	0.0011	mg/Kg wet	0.0113		97.3	70-130	4.09	20		
1,2-Dichloroethane	0.0122	0.0011	mg/Kg wet	0.0113		108	70-130	0.278	20		
1,1-Dichloroethylene	0.0112	0.0011	mg/Kg wet	0.0113		98.6	70-130	5.74	20		
cis-1,2-Dichloroethylene	0.0112	0.0011	mg/Kg wet	0.0113		98.5	70-130	2.36	20		
trans-1,2-Dichloroethylene	0.0100	0.0011	mg/Kg wet	0.0113		88.6	70-130	3.55	20		
1,2-Dichloropropane	0.0114	0.0011	mg/Kg wet	0.0113		101	70-130	0.0994	20		
1,3-Dichloropropane	0.0113	0.00057	mg/Kg wet	0.0113		100	70-130	0.399	20		
2,2-Dichloropropane	0.0121	0.0011	mg/Kg wet	0.0113		107	70-130	4.09	20		
1,1-Dichloropropene	0.0115	0.0023	mg/Kg wet	0.0113		101	70-130	2.10	20		
cis-1,3-Dichloropropene	0.0122	0.00057	mg/Kg wet	0.0113		108	70-130	1.47	20		
trans-1,3-Dichloropropene	0.0119	0.00057	mg/Kg wet	0.0113		105	70-130	2.63	20		
Diethyl Ether	0.0101	0.0023	mg/Kg wet	0.0113		89.2	70-130	0.782	20		
Diisopropyl Ether (DIPE)	0.0105	0.00057	mg/Kg wet	0.0113		92.3	70-130	4.09	20		
1,4-Dioxane	0.120	0.057	mg/Kg wet	0.113		106	40-160	2.20	20		†
Ethylbenzene	0.0122	0.0011	mg/Kg wet	0.0113		107	70-130	1.50	20		
Hexachlorobutadiene	0.0141	0.0011	mg/Kg wet	0.0113		125	70-130	8.36	20		
2-Hexanone (MBK)	0.108	0.011	mg/Kg wet	0.113		95.0	40-160	2.89	20		†
Isopropylbenzene (Cumene)	0.0126	0.0011	mg/Kg wet	0.0113		111	70-130	1.18	20		
p-Isopropyltoluene (p-Cymene)	0.0118	0.0011	mg/Kg wet	0.0113		104	70-130	1.85	20		
Methyl tert-Butyl Ether (MTBE)	0.0103	0.0011	mg/Kg wet	0.0113		91.1	70-130	3.46	20		
Methylene Chloride	0.0100	0.0057	mg/Kg wet	0.0113		88.3	70-130	2.02	20		
4-Methyl-2-pentanone (MIBK)	0.110	0.011	mg/Kg wet	0.113		97.1	40-160	2.02	20		†
Naphthalene	0.00831	0.0023	mg/Kg wet	0.0113		73.3	70-130	0.137	20	V-05	

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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 B289949 - SW-846 5035										
LCS Dup (B289949-BSD1)				Prepared & Analyzed: 09/10/21						
n-Propylbenzene	0.0120	0.0011	mg/Kg wet	0.0113		106	70-130	1.24	20	
Styrene	0.0128	0.0011	mg/Kg wet	0.0113		113	70-130	0.266	20	
1,1,1,2-Tetrachloroethane	0.0131	0.0011	mg/Kg wet	0.0113		116	70-130	0.947	20	
1,1,2,2-Tetrachloroethane	0.0122	0.00057	mg/Kg wet	0.0113		108	70-130	1.12	20	
Tetrachloroethylene	0.0130	0.0011	mg/Kg wet	0.0113		115	70-130	2.59	20	
Tetrahydrofuran	0.00997	0.0045	mg/Kg wet	0.0113		88.0	70-130	4.41	20	
Toluene	0.0119	0.0011	mg/Kg wet	0.0113		105	70-130	0.761	20	
1,2,3-Trichlorobenzene	0.00958	0.0045	mg/Kg wet	0.0113		84.5	70-130	8.64	20	V-05
1,2,4-Trichlorobenzene	0.0102	0.0011	mg/Kg wet	0.0113		89.8	70-130	5.14	20	
1,1,1-Trichloroethane	0.0118	0.0011	mg/Kg wet	0.0113		104	70-130	2.84	20	
1,1,2-Trichloroethane	0.0123	0.0011	mg/Kg wet	0.0113		108	70-130	3.19	20	
Trichloroethylene	0.0121	0.0011	mg/Kg wet	0.0113		107	70-130	7.28	20	
Trichlorofluoromethane (Freon 11)	0.0115	0.0023	mg/Kg wet	0.0113		102	70-130	3.09	20	
1,2,3-Trichloropropane	0.0104	0.0023	mg/Kg wet	0.0113		92.2	70-130	11.7	20	
1,2,4-Trimethylbenzene	0.0119	0.0011	mg/Kg wet	0.0113		105	70-130	5.58	20	
1,3,5-Trimethylbenzene	0.0126	0.0011	mg/Kg wet	0.0113		111	70-130	0.995	20	
Vinyl Chloride	0.0110	0.0023	mg/Kg wet	0.0113		97.3	70-130	0.309	20	
m+p Xylene	0.0252	0.0023	mg/Kg wet	0.0227		111	70-130	0.496	20	
o-Xylene	0.0123	0.0011	mg/Kg wet	0.0113		108	70-130	0.277	20	
Surrogate: 1,2-Dichloroethane-d4	*0.0307*		mg/Kg wet	0.0283		108	70-130			
Surrogate: Toluene-d8	*0.0309*		mg/Kg wet	0.0283		109	70-130			
Surrogate: 4-Bromofluorobenzene	*0.0310*		mg/Kg wet	0.0283		109	70-130			
Batch B289971 - SW-846 5035										
Blank (B289971-BLK1)				Prepared & Analyzed: 09/10/21						
Acetone	ND	0.10	mg/Kg wet							
tert-Amyl Methyl Ether (TAME)	ND	0.0010	mg/Kg wet							
Benzene	ND	0.0020	mg/Kg wet							
Bromobenzene	ND	0.0020	mg/Kg wet							
Bromochloromethane	ND	0.0020	mg/Kg wet							
Bromodichloromethane	ND	0.0020	mg/Kg wet							
Bromoform	ND	0.0020	mg/Kg wet							V-05
Bromomethane	ND	0.010	mg/Kg wet							V-34
2-Butanone (MEK)	ND	0.040	mg/Kg wet							
n-Butylbenzene	ND	0.0020	mg/Kg wet							
sec-Butylbenzene	ND	0.0020	mg/Kg wet							
tert-Butylbenzene	ND	0.0020	mg/Kg wet							
tert-Butyl Ethyl Ether (TBEE)	ND	0.0010	mg/Kg wet							
Carbon Disulfide	ND	0.0060	mg/Kg wet							
Carbon Tetrachloride	ND	0.0020	mg/Kg wet							
Chlorobenzene	ND	0.0020	mg/Kg wet							
Chlorodibromomethane	ND	0.0010	mg/Kg wet							
Chloroethane	ND	0.010	mg/Kg wet							
Chloroform	ND	0.0040	mg/Kg wet							
Chloromethane	ND	0.010	mg/Kg wet							
2-Chlorotoluene	ND	0.0020	mg/Kg wet							
4-Chlorotoluene	ND	0.0020	mg/Kg wet							
1,2-Dibromo-3-chloropropane (DBCP)	ND	0.0020	mg/Kg wet							
1,2-Dibromoethane (EDB)	ND	0.0010	mg/Kg wet							
Dibromomethane	ND	0.0020	mg/Kg wet							
1,2-Dichlorobenzene	ND	0.0020	mg/Kg wet							
1,3-Dichlorobenzene	ND	0.0020	mg/Kg wet							

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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 B289971 - SW-846 5035										
Blank (B289971-BLK1)				Prepared & Analyzed: 09/10/21						
1,4-Dichlorobenzene	ND	0.0020	mg/Kg wet							
Dichlorodifluoromethane (Freon 12)	ND	0.010	mg/Kg wet							
1,1-Dichloroethane	ND	0.0020	mg/Kg wet							
1,2-Dichloroethane	ND	0.0020	mg/Kg wet							
1,1-Dichloroethylene	ND	0.0040	mg/Kg wet							
cis-1,2-Dichloroethylene	ND	0.0020	mg/Kg wet							
trans-1,2-Dichloroethylene	ND	0.0020	mg/Kg wet							
1,2-Dichloropropane	ND	0.0020	mg/Kg wet							
1,3-Dichloropropane	ND	0.0010	mg/Kg wet							
2,2-Dichloropropane	ND	0.0020	mg/Kg wet							
1,1-Dichloropropene	ND	0.0020	mg/Kg wet							
cis-1,3-Dichloropropene	ND	0.0010	mg/Kg wet							
trans-1,3-Dichloropropene	ND	0.0010	mg/Kg wet							
Diethyl Ether	ND	0.010	mg/Kg wet							
Diisopropyl Ether (DIPE)	ND	0.0010	mg/Kg wet							
1,4-Dioxane	ND	0.10	mg/Kg wet							
Ethylbenzene	ND	0.0020	mg/Kg wet							
Hexachlorobutadiene	ND	0.0020	mg/Kg wet							V-05
2-Hexanone (MBK)	ND	0.020	mg/Kg wet							
Isopropylbenzene (Cumene)	ND	0.0020	mg/Kg wet							
p-Isopropyltoluene (p-Cymene)	ND	0.0020	mg/Kg wet							
Methyl tert-Butyl Ether (MTBE)	ND	0.0040	mg/Kg wet							
Methylene Chloride	ND	0.010	mg/Kg wet							
4-Methyl-2-pentanone (MIBK)	ND	0.020	mg/Kg wet							
Naphthalene	ND	0.0040	mg/Kg wet							V-05
n-Propylbenzene	ND	0.0020	mg/Kg wet							
Styrene	ND	0.0020	mg/Kg wet							
1,1,1,2-Tetrachloroethane	ND	0.0020	mg/Kg wet							
1,1,2,2-Tetrachloroethane	ND	0.0010	mg/Kg wet							
Tetrachloroethylene	ND	0.0020	mg/Kg wet							
Tetrahydrofuran	ND	0.010	mg/Kg wet							
Toluene	ND	0.0020	mg/Kg wet							
1,2,3-Trichlorobenzene	ND	0.0020	mg/Kg wet							
1,2,4-Trichlorobenzene	ND	0.0020	mg/Kg wet							
1,1,1-Trichloroethane	ND	0.0020	mg/Kg wet							
1,1,2-Trichloroethane	ND	0.0020	mg/Kg wet							
Trichloroethylene	ND	0.0020	mg/Kg wet							
Trichlorofluoromethane (Freon 11)	ND	0.010	mg/Kg wet							
1,2,3-Trichloropropane	ND	0.0020	mg/Kg wet							
1,2,4-Trimethylbenzene	ND	0.0020	mg/Kg wet							
1,3,5-Trimethylbenzene	ND	0.0020	mg/Kg wet							
Vinyl Chloride	ND	0.010	mg/Kg wet							
m+p Xylene	ND	0.0040	mg/Kg wet							V-05
o-Xylene	ND	0.0020	mg/Kg wet							
Surrogate: 1,2-Dichloroethane-d4	*0.0555*		mg/Kg wet	0.0500		111	70-130			
Surrogate: Toluene-d8	*0.0517*		mg/Kg wet	0.0500		103	70-130			
Surrogate: 4-Bromofluorobenzene	*0.0484*		mg/Kg wet	0.0500		96.9	70-130			

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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 B289971 - SW-846 5035											
LCS (B289971-BS1)				Prepared & Analyzed: 09/10/21							
Acetone	0.206	0.10	mg/Kg wet	0.200		103	40-160				†
tert-Amyl Methyl Ether (TAME)	0.0189	0.0010	mg/Kg wet	0.0200		94.7	70-130				
Benzene	0.0207	0.0020	mg/Kg wet	0.0200		103	70-130				
Bromobenzene	0.0170	0.0020	mg/Kg wet	0.0200		84.9	70-130				
Bromochloromethane	0.0229	0.0020	mg/Kg wet	0.0200		115	70-130				
Bromodichloromethane	0.0182	0.0020	mg/Kg wet	0.0200		91.2	70-130				
Bromoform	0.0159	0.0020	mg/Kg wet	0.0200		79.4	70-130			V-05	
Bromomethane	0.0200	0.010	mg/Kg wet	0.0200		100	40-160			V-34	†
2-Butanone (MEK)	0.239	0.040	mg/Kg wet	0.200		120	40-160				†
n-Butylbenzene	0.0156	0.0020	mg/Kg wet	0.0200		77.9	70-130				
sec-Butylbenzene	0.0155	0.0020	mg/Kg wet	0.0200		77.4	70-130				
tert-Butylbenzene	0.0155	0.0020	mg/Kg wet	0.0200		77.5	70-130				
tert-Butyl Ethyl Ether (TBEE)	0.0201	0.0010	mg/Kg wet	0.0200		100	70-130				
Carbon Disulfide	0.176	0.0060	mg/Kg wet	0.200		87.8	70-130				
Carbon Tetrachloride	0.0192	0.0020	mg/Kg wet	0.0200		96.1	70-130				
Chlorobenzene	0.0166	0.0020	mg/Kg wet	0.0200		82.9	70-130				
Chlorodibromomethane	0.0181	0.0010	mg/Kg wet	0.0200		90.6	70-130				
Chloroethane	0.0185	0.010	mg/Kg wet	0.0200		92.3	70-130				
Chloroform	0.0200	0.0040	mg/Kg wet	0.0200		99.9	70-130				
Chloromethane	0.0216	0.010	mg/Kg wet	0.0200		108	40-160				†
2-Chlorotoluene	0.0165	0.0020	mg/Kg wet	0.0200		82.3	70-130				
4-Chlorotoluene	0.0161	0.0020	mg/Kg wet	0.0200		80.7	70-130				
1,2-Dibromo-3-chloropropane (DBCP)	0.0170	0.0020	mg/Kg wet	0.0200		85.1	70-130				
1,2-Dibromoethane (EDB)	0.0191	0.0010	mg/Kg wet	0.0200		95.6	70-130				
Dibromomethane	0.0190	0.0020	mg/Kg wet	0.0200		95.1	70-130				
1,2-Dichlorobenzene	0.0159	0.0020	mg/Kg wet	0.0200		79.3	70-130				
1,3-Dichlorobenzene	0.0160	0.0020	mg/Kg wet	0.0200		79.9	70-130				
1,4-Dichlorobenzene	0.0164	0.0020	mg/Kg wet	0.0200		81.8	70-130				
Dichlorodifluoromethane (Freon 12)	0.0201	0.010	mg/Kg wet	0.0200		101	40-160				†
1,1-Dichloroethane	0.0212	0.0020	mg/Kg wet	0.0200		106	70-130				
1,2-Dichloroethane	0.0202	0.0020	mg/Kg wet	0.0200		101	70-130				
1,1-Dichloroethylene	0.0195	0.0040	mg/Kg wet	0.0200		97.5	70-130				
cis-1,2-Dichloroethylene	0.0211	0.0020	mg/Kg wet	0.0200		106	70-130				
trans-1,2-Dichloroethylene	0.0212	0.0020	mg/Kg wet	0.0200		106	70-130				
1,2-Dichloropropane	0.0200	0.0020	mg/Kg wet	0.0200		100	70-130				
1,3-Dichloropropane	0.0203	0.0010	mg/Kg wet	0.0200		102	70-130				
2,2-Dichloropropane	0.0193	0.0020	mg/Kg wet	0.0200		96.3	70-130				
1,1-Dichloropropene	0.0198	0.0020	mg/Kg wet	0.0200		99.0	70-130				
cis-1,3-Dichloropropene	0.0182	0.0010	mg/Kg wet	0.0200		91.0	70-130				
trans-1,3-Dichloropropene	0.0178	0.0010	mg/Kg wet	0.0200		89.1	70-130				
Diethyl Ether	0.0200	0.010	mg/Kg wet	0.0200		100	70-130				
Diisopropyl Ether (DIPE)	0.0217	0.0010	mg/Kg wet	0.0200		109	70-130				
1,4-Dioxane	0.200	0.10	mg/Kg wet	0.200		100	40-160				†
Ethylbenzene	0.0166	0.0020	mg/Kg wet	0.0200		82.8	70-130				
Hexachlorobutadiene	0.0151	0.0020	mg/Kg wet	0.0200		75.5	70-130			V-05	
2-Hexanone (MBK)	0.211	0.020	mg/Kg wet	0.200		106	40-160				†
Isopropylbenzene (Cumene)	0.0166	0.0020	mg/Kg wet	0.0200		82.8	70-130				
p-Isopropyltoluene (p-Cymene)	0.0158	0.0020	mg/Kg wet	0.0200		79.2	70-130				
Methyl tert-Butyl Ether (MTBE)	0.0194	0.0040	mg/Kg wet	0.0200		96.8	70-130				
Methylene Chloride	0.0219	0.010	mg/Kg wet	0.0200		110	70-130				
4-Methyl-2-pentanone (MIBK)	0.212	0.020	mg/Kg wet	0.200		106	40-160				†
Naphthalene	0.0150	0.0040	mg/Kg wet	0.0200		74.9	70-130			V-05	

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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 B289971 - SW-846 5035											
LCS (B289971-BS1)				Prepared & Analyzed: 09/10/21							
n-Propylbenzene	0.0163	0.0020	mg/Kg wet	0.0200		81.5	70-130				
Styrene	0.0162	0.0020	mg/Kg wet	0.0200		81.2	70-130				
1,1,1,2-Tetrachloroethane	0.0156	0.0020	mg/Kg wet	0.0200		78.0	70-130				
1,1,2,2-Tetrachloroethane	0.0170	0.0010	mg/Kg wet	0.0200		85.2	70-130				
Tetrachloroethylene	0.0176	0.0020	mg/Kg wet	0.0200		88.0	70-130				
Tetrahydrofuran	0.0222	0.010	mg/Kg wet	0.0200		111	70-130				
Toluene	0.0187	0.0020	mg/Kg wet	0.0200		93.4	70-130				
1,2,3-Trichlorobenzene	0.0156	0.0020	mg/Kg wet	0.0200		78.0	70-130				
1,2,4-Trichlorobenzene	0.0150	0.0020	mg/Kg wet	0.0200		75.0	70-130				
1,1,1-Trichloroethane	0.0189	0.0020	mg/Kg wet	0.0200		94.3	70-130				
1,1,2-Trichloroethane	0.0187	0.0020	mg/Kg wet	0.0200		93.5	70-130				
Trichloroethylene	0.0189	0.0020	mg/Kg wet	0.0200		94.6	70-130				
Trichlorofluoromethane (Freon 11)	0.0205	0.010	mg/Kg wet	0.0200		102	70-130				
1,2,3-Trichloropropane	0.0176	0.0020	mg/Kg wet	0.0200		87.8	70-130				
1,2,4-Trimethylbenzene	0.0156	0.0020	mg/Kg wet	0.0200		78.0	70-130				
1,3,5-Trimethylbenzene	0.0165	0.0020	mg/Kg wet	0.0200		82.6	70-130				
Vinyl Chloride	0.0211	0.010	mg/Kg wet	0.0200		105	70-130				
m+p Xylene	0.0287	0.0040	mg/Kg wet	0.0400		71.8	70-130			V-05	
o-Xylene	0.0160	0.0020	mg/Kg wet	0.0200		79.8	70-130				
Surrogate: 1,2-Dichloroethane-d4	*0.0524*		mg/Kg wet	0.0500		105	70-130				
Surrogate: Toluene-d8	*0.0517*		mg/Kg wet	0.0500		103	70-130				
Surrogate: 4-Bromofluorobenzene	*0.0494*		mg/Kg wet	0.0500		98.8	70-130				
LCS Dup (B289971-BSD1)				Prepared & Analyzed: 09/10/21							
Acetone	0.221	0.10	mg/Kg wet	0.200		110	40-160	7.01	20		†
tert-Amyl Methyl Ether (TAME)	0.0182	0.0010	mg/Kg wet	0.0200		90.8	70-130	4.15	20		
Benzene	0.0195	0.0020	mg/Kg wet	0.0200		97.4	70-130	5.86	20		
Bromobenzene	0.0164	0.0020	mg/Kg wet	0.0200		81.8	70-130	3.70	20		
Bromochloromethane	0.0232	0.0020	mg/Kg wet	0.0200		116	70-130	1.11	20		
Bromodichloromethane	0.0180	0.0020	mg/Kg wet	0.0200		90.0	70-130	1.34	20		
Bromoform	0.0149	0.0020	mg/Kg wet	0.0200		74.5	70-130	6.39	20	V-05	
Bromomethane	0.0202	0.010	mg/Kg wet	0.0200		101	40-160	0.746	20	V-34	†
2-Butanone (MEK)	0.235	0.040	mg/Kg wet	0.200		118	40-160	1.79	20		†
n-Butylbenzene	0.0154	0.0020	mg/Kg wet	0.0200		76.9	70-130	1.30	20		
sec-Butylbenzene	0.0155	0.0020	mg/Kg wet	0.0200		77.6	70-130	0.258	20		
tert-Butylbenzene	0.0154	0.0020	mg/Kg wet	0.0200		76.8	70-130	0.894	20		
tert-Butyl Ethyl Ether (TBEE)	0.0195	0.0010	mg/Kg wet	0.0200		97.4	70-130	3.12	20		
Carbon Disulfide	0.173	0.0060	mg/Kg wet	0.200		86.5	70-130	1.55	20		
Carbon Tetrachloride	0.0189	0.0020	mg/Kg wet	0.0200		94.3	70-130	1.84	20		
Chlorobenzene	0.0165	0.0020	mg/Kg wet	0.0200		82.5	70-130	0.471	20		
Chlorodibromomethane	0.0177	0.0010	mg/Kg wet	0.0200		88.4	70-130	2.41	20		
Chloroethane	0.0191	0.010	mg/Kg wet	0.0200		95.7	70-130	3.61	20		
Chloroform	0.0195	0.0040	mg/Kg wet	0.0200		97.3	70-130	2.66	20		
Chloromethane	0.0210	0.010	mg/Kg wet	0.0200		105	40-160	2.87	20		†
2-Chlorotoluene	0.0159	0.0020	mg/Kg wet	0.0200		79.3	70-130	3.75	20		
4-Chlorotoluene	0.0157	0.0020	mg/Kg wet	0.0200		78.7	70-130	2.50	20		
1,2-Dibromo-3-chloropropane (DBCP)	0.0164	0.0020	mg/Kg wet	0.0200		82.1	70-130	3.66	20		
1,2-Dibromoethane (EDB)	0.0185	0.0010	mg/Kg wet	0.0200		92.7	70-130	3.08	20		
Dibromomethane	0.0182	0.0020	mg/Kg wet	0.0200		91.0	70-130	4.40	20		
1,2-Dichlorobenzene	0.0154	0.0020	mg/Kg wet	0.0200		77.2	70-130	2.71	20		
1,3-Dichlorobenzene	0.0159	0.0020	mg/Kg wet	0.0200		79.7	70-130	0.313	20		
1,4-Dichlorobenzene	0.0154	0.0020	mg/Kg wet	0.0200		76.8	70-130	6.39	20		

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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 B289971 - SW-846 5035											
LCS Dup (B289971-BSD1)				Prepared & Analyzed: 09/10/21							
Dichlorodifluoromethane (Freon 12)	0.0192	0.010	mg/Kg wet	0.0200		96.0	40-160	4.78	20		†
1,1-Dichloroethane	0.0210	0.0020	mg/Kg wet	0.0200		105	70-130	0.692	20		
1,2-Dichloroethane	0.0196	0.0020	mg/Kg wet	0.0200		98.2	70-130	2.68	20		
1,1-Dichloroethylene	0.0193	0.0040	mg/Kg wet	0.0200		96.6	70-130	0.938	20		
cis-1,2-Dichloroethylene	0.0204	0.0020	mg/Kg wet	0.0200		102	70-130	3.62	20		
trans-1,2-Dichloroethylene	0.0206	0.0020	mg/Kg wet	0.0200		103	70-130	3.08	20		
1,2-Dichloropropane	0.0200	0.0020	mg/Kg wet	0.0200		100	70-130	0.100	20		
1,3-Dichloropropane	0.0200	0.0010	mg/Kg wet	0.0200		99.9	70-130	1.66	20		
2,2-Dichloropropane	0.0190	0.0020	mg/Kg wet	0.0200		95.0	70-130	1.36	20		
1,1-Dichloropropene	0.0198	0.0020	mg/Kg wet	0.0200		98.8	70-130	0.192	20		
cis-1,3-Dichloropropene	0.0184	0.0010	mg/Kg wet	0.0200		91.9	70-130	0.908	20		
trans-1,3-Dichloropropene	0.0174	0.0010	mg/Kg wet	0.0200		86.8	70-130	2.66	20		
Diethyl Ether	0.0192	0.010	mg/Kg wet	0.0200		95.8	70-130	4.34	20		
Diisopropyl Ether (DIPE)	0.0216	0.0010	mg/Kg wet	0.0200		108	70-130	0.526	20		
1,4-Dioxane	0.201	0.10	mg/Kg wet	0.200		101	40-160	0.500	20		†
Ethylbenzene	0.0163	0.0020	mg/Kg wet	0.0200		81.3	70-130	1.88	20		
Hexachlorobutadiene	0.0143	0.0020	mg/Kg wet	0.0200		71.3	70-130	5.68	20	V-05	
2-Hexanone (MBK)	0.206	0.020	mg/Kg wet	0.200		103	40-160	2.27	20		†
Isopropylbenzene (Cumene)	0.0159	0.0020	mg/Kg wet	0.0200		79.6	70-130	3.94	20		
p-Isopropyltoluene (p-Cymene)	0.0154	0.0020	mg/Kg wet	0.0200		77.1	70-130	2.66	20		
Methyl tert-Butyl Ether (MTBE)	0.0192	0.0040	mg/Kg wet	0.0200		96.1	70-130	0.716	20		
Methylene Chloride	0.0235	0.010	mg/Kg wet	0.0200		117	70-130	6.91	20		
4-Methyl-2-pentanone (MIBK)	0.207	0.020	mg/Kg wet	0.200		103	40-160	2.73	20		†
Naphthalene	0.0152	0.0040	mg/Kg wet	0.0200		75.9	70-130	1.29	20	V-05	
n-Propylbenzene	0.0158	0.0020	mg/Kg wet	0.0200		79.2	70-130	2.97	20		
Styrene	0.0160	0.0020	mg/Kg wet	0.0200		79.8	70-130	1.68	20		
1,1,1,2-Tetrachloroethane	0.0153	0.0020	mg/Kg wet	0.0200		76.4	70-130	2.01	20		
1,1,2,2-Tetrachloroethane	0.0173	0.0010	mg/Kg wet	0.0200		86.6	70-130	1.73	20		
Tetrachloroethylene	0.0172	0.0020	mg/Kg wet	0.0200		85.8	70-130	2.58	20		
Tetrahydrofuran	0.0193	0.010	mg/Kg wet	0.0200		96.5	70-130	14.2	20		
Toluene	0.0185	0.0020	mg/Kg wet	0.0200		92.5	70-130	0.990	20		
1,2,3-Trichlorobenzene	0.0143	0.0020	mg/Kg wet	0.0200		71.5	70-130	8.68	20		
1,2,4-Trichlorobenzene	0.0142	0.0020	mg/Kg wet	0.0200		70.8	70-130	5.69	20		
1,1,1-Trichloroethane	0.0185	0.0020	mg/Kg wet	0.0200		92.5	70-130	1.93	20		
1,1,2-Trichloroethane	0.0188	0.0020	mg/Kg wet	0.0200		94.2	70-130	0.831	20		
Trichloroethylene	0.0176	0.0020	mg/Kg wet	0.0200		88.0	70-130	7.14	20		
Trichlorofluoromethane (Freon 11)	0.0201	0.010	mg/Kg wet	0.0200		100	70-130	1.91	20		
1,2,3-Trichloropropane	0.0178	0.0020	mg/Kg wet	0.0200		88.9	70-130	1.27	20		
1,2,4-Trimethylbenzene	0.0155	0.0020	mg/Kg wet	0.0200		77.7	70-130	0.424	20		
1,3,5-Trimethylbenzene	0.0158	0.0020	mg/Kg wet	0.0200		78.8	70-130	4.71	20		
Vinyl Chloride	0.0206	0.010	mg/Kg wet	0.0200		103	70-130	2.30	20		
m+p Xylene	0.0287	0.0040	mg/Kg wet	0.0400		71.8	70-130	0.0488	20	V-05	
o-Xylene	0.0157	0.0020	mg/Kg wet	0.0200		78.3	70-130	1.91	20		
Surrogate: 1,2-Dichloroethane-d4	*0.0532*		mg/Kg wet	0.0500		106	70-130				
Surrogate: Toluene-d8	*0.0522*		mg/Kg wet	0.0500		104	70-130				
Surrogate: 4-Bromofluorobenzene	*0.0498*		mg/Kg wet	0.0500		99.6	70-130				

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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 B289965 - SW-846 3546										
Blank (B289965-BLK1)				Prepared: 09/10/21 Analyzed: 09/13/21						
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	*2.77*		mg/Kg wet	3.33		83.2	30-130			
Surrogate: 2-Fluorobiphenyl	*2.73*		mg/Kg wet	3.33		81.9	30-130			
Surrogate: p-Terphenyl-d14	*2.89*		mg/Kg wet	3.33		86.8	30-130			
LCS (B289965-BS1)				Prepared: 09/10/21 Analyzed: 09/13/21						
Acenaphthene	1.17	0.17	mg/Kg wet	1.67		70.2	40-140			
Acenaphthylene	1.17	0.17	mg/Kg wet	1.67		70.3	40-140			
Anthracene	1.23	0.17	mg/Kg wet	1.67		73.6	40-140			
Benzo(a)anthracene	1.17	0.17	mg/Kg wet	1.67		70.3	40-140			
Benzo(a)pyrene	1.28	0.17	mg/Kg wet	1.67		76.9	40-140			
Benzo(b)fluoranthene	1.19	0.17	mg/Kg wet	1.67		71.3	40-140			
Benzo(g,h,i)perylene	1.28	0.17	mg/Kg wet	1.67		77.1	40-140			
Benzo(k)fluoranthene	1.19	0.17	mg/Kg wet	1.67		71.2	40-140			
Chrysene	1.13	0.17	mg/Kg wet	1.67		68.1	40-140			
Dibenz(a,h)anthracene	1.32	0.17	mg/Kg wet	1.67		79.1	40-140			
Fluoranthene	1.19	0.17	mg/Kg wet	1.67		71.6	40-140			
Fluorene	1.23	0.17	mg/Kg wet	1.67		73.8	40-140			
Indeno(1,2,3-cd)pyrene	1.41	0.17	mg/Kg wet	1.67		84.9	40-140			
2-Methylnaphthalene	1.21	0.17	mg/Kg wet	1.67		72.7	40-140			
Naphthalene	1.10	0.17	mg/Kg wet	1.67		66.2	40-140			
Phenanthrene	1.20	0.17	mg/Kg wet	1.67		72.0	40-140			
Pyrene	1.23	0.17	mg/Kg wet	1.67		73.5	40-140			
Surrogate: Nitrobenzene-d5	*2.62*		mg/Kg wet	3.33		78.5	30-130			
Surrogate: 2-Fluorobiphenyl	*2.51*		mg/Kg wet	3.33		75.2	30-130			
Surrogate: p-Terphenyl-d14	*2.60*		mg/Kg wet	3.33		78.1	30-130			

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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 B289965 - SW-846 3546										
LCS Dup (B289965-BSD1)				Prepared: 09/10/21 Analyzed: 09/13/21						
Acenaphthene	1.25	0.17	mg/Kg wet	1.67		75.2	40-140	6.82	30	
Acenaphthylene	1.28	0.17	mg/Kg wet	1.67		77.1	40-140	9.20	30	
Anthracene	1.28	0.17	mg/Kg wet	1.67		76.6	40-140	3.92	30	
Benzo(a)anthracene	1.22	0.17	mg/Kg wet	1.67		73.0	40-140	3.79	30	
Benzo(a)pyrene	1.38	0.17	mg/Kg wet	1.67		82.6	40-140	7.18	30	
Benzo(b)fluoranthene	1.28	0.17	mg/Kg wet	1.67		76.7	40-140	7.33	30	
Benzo(g,h,i)perylene	1.36	0.17	mg/Kg wet	1.67		81.4	40-140	5.43	30	
Benzo(k)fluoranthene	1.26	0.17	mg/Kg wet	1.67		75.7	40-140	6.13	30	
Chrysene	1.21	0.17	mg/Kg wet	1.67		72.7	40-140	6.56	30	
Dibenz(a,h)anthracene	1.40	0.17	mg/Kg wet	1.67		83.7	40-140	5.75	30	
Fluoranthene	1.29	0.17	mg/Kg wet	1.67		77.4	40-140	7.76	30	
Fluorene	1.30	0.17	mg/Kg wet	1.67		78.2	40-140	5.82	30	
Indeno(1,2,3-cd)pyrene	1.51	0.17	mg/Kg wet	1.67		90.9	40-140	6.83	30	
2-Methylnaphthalene	1.24	0.17	mg/Kg wet	1.67		74.7	40-140	2.66	30	
Naphthalene	1.15	0.17	mg/Kg wet	1.67		69.0	40-140	4.14	30	
Phenanthrene	1.27	0.17	mg/Kg wet	1.67		76.1	40-140	5.56	30	
Pyrene	1.28	0.17	mg/Kg wet	1.67		76.8	40-140	4.36	30	
Surrogate: Nitrobenzene-d5	*2.58*		mg/Kg wet	3.33		77.3	30-130			
Surrogate: 2-Fluorobiphenyl	*2.65*		mg/Kg wet	3.33		79.6	30-130			
Surrogate: p-Terphenyl-d14	*2.66*		mg/Kg wet	3.33		79.8	30-130			

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QUALITY CONTROL

Organochloride Pesticides by GC/ECD - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B289958 - SW-846 3546										
Blank (B289958-BLK1)				Prepared: 09/10/21 Analyzed: 09/16/21						
Aldrin	ND	0.0010	mg/Kg wet							
Aldrin [2C]	ND	0.0010	mg/Kg wet							
alpha-BHC	ND	0.0010	mg/Kg wet							
alpha-BHC [2C]	ND	0.0010	mg/Kg wet							
beta-BHC	ND	0.0010	mg/Kg wet							
beta-BHC [2C]	ND	0.0010	mg/Kg wet							
delta-BHC	ND	0.0010	mg/Kg wet							
delta-BHC [2C]	ND	0.0010	mg/Kg wet							
gamma-BHC (Lindane)	ND	0.00040	mg/Kg wet							
gamma-BHC (Lindane) [2C]	ND	0.00040	mg/Kg wet							
Chlordane	ND	0.0040	mg/Kg wet							
Chlordane [2C]	ND	0.0040	mg/Kg wet							
4,4'-DDD	ND	0.00080	mg/Kg wet							
4,4'-DDD [2C]	ND	0.00080	mg/Kg wet							
4,4'-DDE	ND	0.00080	mg/Kg wet							
4,4'-DDE [2C]	ND	0.00080	mg/Kg wet							
4,4'-DDT	ND	0.00080	mg/Kg wet							
4,4'-DDT [2C]	ND	0.00080	mg/Kg wet							
Dieldrin	ND	0.00080	mg/Kg wet							
Dieldrin [2C]	ND	0.00080	mg/Kg wet							
Endosulfan I	ND	0.0010	mg/Kg wet							
Endosulfan I [2C]	ND	0.0010	mg/Kg wet							
Endosulfan II	ND	0.0016	mg/Kg wet							
Endosulfan II [2C]	ND	0.0016	mg/Kg wet							
Endosulfan Sulfate	ND	0.0016	mg/Kg wet							
Endosulfan Sulfate [2C]	ND	0.0016	mg/Kg wet							
Endrin	ND	0.0016	mg/Kg wet							
Endrin [2C]	ND	0.0016	mg/Kg wet							
Endrin Aldehyde	ND	0.0016	mg/Kg wet							
Endrin Aldehyde [2C]	ND	0.0016	mg/Kg wet							
Endrin Ketone	ND	0.0016	mg/Kg wet							
Endrin Ketone [2C]	ND	0.0016	mg/Kg wet							
Heptachlor	ND	0.0010	mg/Kg wet							
Heptachlor [2C]	ND	0.0010	mg/Kg wet							
Heptachlor Epoxide	ND	0.0010	mg/Kg wet							
Heptachlor Epoxide [2C]	ND	0.0010	mg/Kg wet							
Hexachlorobenzene	ND	0.0012	mg/Kg wet							
Hexachlorobenzene [2C]	ND	0.0012	mg/Kg wet							
Methoxychlor	ND	0.010	mg/Kg wet							
Methoxychlor [2C]	ND	0.010	mg/Kg wet							
Toxaphene	ND	0.020	mg/Kg wet							
Toxaphene [2C]	ND	0.020	mg/Kg wet							
Surrogate: Decachlorobiphenyl	*0.0344*		mg/Kg wet	0.0400		86.0	30-150			
Surrogate: Decachlorobiphenyl [2C]	*0.0394*		mg/Kg wet	0.0400		98.6	30-150			
Surrogate: Tetrachloro-m-xylene	*0.0284*		mg/Kg wet	0.0400		70.9	30-150			
Surrogate: Tetrachloro-m-xylene [2C]	*0.0287*		mg/Kg wet	0.0400		71.8	30-150			

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QUALITY CONTROL

Organochloride Pesticides by GC/ECD - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B289958 - SW-846 3546										
LCS (B289958-BS1)				Prepared: 09/10/21 Analyzed: 09/16/21						
Aldrin	0.079	0.0050	mg/Kg wet	0.100		78.8	40-140			
Aldrin [2C]	0.085	0.0050	mg/Kg wet	0.100		85.0	40-140			
alpha-BHC	0.061	0.0050	mg/Kg wet	0.100		60.7	40-140			
alpha-BHC [2C]	0.065	0.0050	mg/Kg wet	0.100		65.4	40-140			
beta-BHC	0.070	0.0050	mg/Kg wet	0.100		70.1	40-140			
beta-BHC [2C]	0.077	0.0050	mg/Kg wet	0.100		77.1	40-140			
delta-BHC	0.064	0.0050	mg/Kg wet	0.100		64.2	40-140			
delta-BHC [2C]	0.071	0.0050	mg/Kg wet	0.100		70.9	40-140			
gamma-BHC (Lindane)	0.066	0.0020	mg/Kg wet	0.100		66.4	40-140			
gamma-BHC (Lindane) [2C]	0.070	0.0020	mg/Kg wet	0.100		70.2	40-140			
4,4'-DDD	0.093	0.0040	mg/Kg wet	0.100		93.2	40-140			
4,4'-DDD [2C]	0.10	0.0040	mg/Kg wet	0.100		102	40-140			
4,4'-DDE	0.092	0.0040	mg/Kg wet	0.100		91.9	40-140			
4,4'-DDE [2C]	0.097	0.0040	mg/Kg wet	0.100		97.0	40-140			
4,4'-DDT	0.092	0.0040	mg/Kg wet	0.100		92.3	40-140			
4,4'-DDT [2C]	0.097	0.0040	mg/Kg wet	0.100		96.7	40-140			
Dieldrin	0.086	0.0040	mg/Kg wet	0.100		86.0	40-140			
Dieldrin [2C]	0.094	0.0040	mg/Kg wet	0.100		93.6	40-140			
Endosulfan I	0.080	0.0050	mg/Kg wet	0.100		79.6	40-140			
Endosulfan I [2C]	0.094	0.0050	mg/Kg wet	0.100		93.6	40-140			
Endosulfan II	0.085	0.0080	mg/Kg wet	0.100		84.9	40-140			
Endosulfan II [2C]	0.094	0.0080	mg/Kg wet	0.100		94.3	40-140			
Endosulfan Sulfate	0.079	0.0080	mg/Kg wet	0.100		79.3	40-140			
Endosulfan Sulfate [2C]	0.096	0.0080	mg/Kg wet	0.100		95.5	40-140			
Endrin	0.088	0.0080	mg/Kg wet	0.100		87.6	40-140			
Endrin [2C]	0.097	0.0080	mg/Kg wet	0.100		97.2	40-140			
Endrin Ketone	0.092	0.0080	mg/Kg wet	0.100		91.9	40-140			
Endrin Ketone [2C]	0.098	0.0080	mg/Kg wet	0.100		97.7	40-140			
Heptachlor	0.070	0.0050	mg/Kg wet	0.100		69.6	40-140			
Heptachlor [2C]	0.081	0.0050	mg/Kg wet	0.100		81.2	40-140			
Heptachlor Epoxide	0.080	0.0050	mg/Kg wet	0.100		80.5	40-140			
Heptachlor Epoxide [2C]	0.088	0.0050	mg/Kg wet	0.100		88.0	40-140			
Hexachlorobenzene	0.074	0.0060	mg/Kg wet	0.100		74.0	40-140			
Hexachlorobenzene [2C]	0.079	0.0060	mg/Kg wet	0.100		79.4	40-140			
Methoxychlor	0.092	0.050	mg/Kg wet	0.100		92.0	40-140			
Methoxychlor [2C]	0.098	0.050	mg/Kg wet	0.100		97.6	40-140			
Surrogate: Decachlorobiphenyl	*0.162*		mg/Kg wet	0.200		81.0	30-150			
Surrogate: Decachlorobiphenyl [2C]	*0.185*		mg/Kg wet	0.200		92.4	30-150			
Surrogate: Tetrachloro-m-xylene	*0.136*		mg/Kg wet	0.200		68.0	30-150			
Surrogate: Tetrachloro-m-xylene [2C]	*0.136*		mg/Kg wet	0.200		68.2	30-150			

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QUALITY CONTROL

Polychlorinated Biphenyls By GC/ECD - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B289957 - SW-846 3546										
Blank (B289957-BLK1)				Prepared: 09/10/21 Analyzed: 09/14/21						
Aroclor-1016	ND	0.0040	mg/Kg wet							
Aroclor-1016 [2C]	ND	0.0040	mg/Kg wet							
Aroclor-1221	ND	0.0040	mg/Kg wet							
Aroclor-1221 [2C]	ND	0.0040	mg/Kg wet							
Aroclor-1232	ND	0.0040	mg/Kg wet							
Aroclor-1232 [2C]	ND	0.0040	mg/Kg wet							
Aroclor-1242	ND	0.0040	mg/Kg wet							
Aroclor-1242 [2C]	ND	0.0040	mg/Kg wet							
Aroclor-1248	ND	0.0040	mg/Kg wet							
Aroclor-1248 [2C]	ND	0.0040	mg/Kg wet							
Aroclor-1254	ND	0.0040	mg/Kg wet							
Aroclor-1254 [2C]	ND	0.0040	mg/Kg wet							
Aroclor-1260	ND	0.0040	mg/Kg wet							
Aroclor-1260 [2C]	ND	0.0040	mg/Kg wet							
Aroclor-1262	ND	0.0040	mg/Kg wet							
Aroclor-1262 [2C]	ND	0.0040	mg/Kg wet							
Aroclor-1268	ND	0.0040	mg/Kg wet							
Aroclor-1268 [2C]	ND	0.0040	mg/Kg wet							
Surrogate: Decachlorobiphenyl	*0.0413*		mg/Kg wet	0.0400		103	30-150			
Surrogate: Decachlorobiphenyl [2C]	*0.0423*		mg/Kg wet	0.0400		106	30-150			
Surrogate: Tetrachloro-m-xylene	*0.0356*		mg/Kg wet	0.0400		88.9	30-150			
Surrogate: Tetrachloro-m-xylene [2C]	*0.0352*		mg/Kg wet	0.0400		88.1	30-150			
LCS (B289957-BS1)				Prepared: 09/10/21 Analyzed: 09/14/21						
Aroclor-1016	0.16	0.020	mg/Kg wet	0.200		80.7	40-140			
Aroclor-1016 [2C]	0.16	0.020	mg/Kg wet	0.200		80.7	40-140			
Aroclor-1260	0.15	0.020	mg/Kg wet	0.200		76.8	40-140			
Aroclor-1260 [2C]	0.15	0.020	mg/Kg wet	0.200		75.5	40-140			
Surrogate: Decachlorobiphenyl	*0.171*		mg/Kg wet	0.200		85.4	30-150			
Surrogate: Decachlorobiphenyl [2C]	*0.177*		mg/Kg wet	0.200		88.5	30-150			
Surrogate: Tetrachloro-m-xylene	*0.154*		mg/Kg wet	0.200		77.2	30-150			
Surrogate: Tetrachloro-m-xylene [2C]	*0.158*		mg/Kg wet	0.200		79.0	30-150			
LCS Dup (B289957-BSD1)				Prepared: 09/10/21 Analyzed: 09/14/21						
Aroclor-1016	0.17	0.020	mg/Kg wet	0.200		86.4	40-140	6.82	30	
Aroclor-1016 [2C]	0.17	0.020	mg/Kg wet	0.200		84.7	40-140	4.93	30	
Aroclor-1260	0.16	0.020	mg/Kg wet	0.200		81.7	40-140	6.27	30	
Aroclor-1260 [2C]	0.16	0.020	mg/Kg wet	0.200		79.3	40-140	4.97	30	
Surrogate: Decachlorobiphenyl	*0.185*		mg/Kg wet	0.200		92.6	30-150			
Surrogate: Decachlorobiphenyl [2C]	*0.189*		mg/Kg wet	0.200		94.5	30-150			
Surrogate: Tetrachloro-m-xylene	*0.172*		mg/Kg wet	0.200		86.2	30-150			
Surrogate: Tetrachloro-m-xylene [2C]	*0.173*		mg/Kg wet	0.200		86.6	30-150			

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QUALITY CONTROL

Herbicides by GC/ECD - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B290112 - SW-846 8151										
Blank (B290112-BLK1)				Prepared: 09/13/21 Analyzed: 09/16/21						
2,4-D	ND	24	µg/kg wet							
2,4-D [2C]	ND	24	µg/kg wet							
2,4-DB	ND	24	µg/kg wet							
2,4-DB [2C]	ND	24	µg/kg wet							
2,4,5-TP (Silvex)	ND	2.4	µg/kg wet							
2,4,5-TP (Silvex) [2C]	ND	2.4	µg/kg wet							
2,4,5-T	ND	2.4	µg/kg wet							
2,4,5-T [2C]	ND	2.4	µg/kg wet							
Dalapon	ND	60	µg/kg wet							V-20
Dalapon [2C]	ND	60	µg/kg wet							V-20
Dicamba	ND	2.4	µg/kg wet							
Dicamba [2C]	ND	2.4	µg/kg wet							
Dichloroprop	ND	24	µg/kg wet							
Dichloroprop [2C]	ND	24	µg/kg wet							
Dinoseb	ND	12	µg/kg wet							
Dinoseb [2C]	ND	12	µg/kg wet							
Surrogate: 2,4-Dichlorophenylacetic acid	*63.3*		µg/kg wet	95.2		66.5	30-150			
Surrogate: 2,4-Dichlorophenylacetic acid [2C]	*63.3*		µg/kg wet	95.2		66.5	30-150			
LCS (B290112-BS1)				Prepared: 09/13/21 Analyzed: 09/16/21						
2,4-D	86.1	25	µg/kg wet	125		68.9	40-140			
2,4-D [2C]	91.8	25	µg/kg wet	125		73.4	40-140			
2,4-DB	82.8	25	µg/kg wet	125		66.3	40-140			
2,4-DB [2C]	84.1	25	µg/kg wet	125		67.3	40-140			
2,4,5-TP (Silvex)	8.95	2.5	µg/kg wet	12.5		71.6	40-140			
2,4,5-TP (Silvex) [2C]	9.39	2.5	µg/kg wet	12.5		75.2	40-140			
2,4,5-T	8.56	2.5	µg/kg wet	12.5		68.5	40-140			
2,4,5-T [2C]	9.42	2.5	µg/kg wet	12.5		75.4	40-140			V-06
Dalapon	136	62	µg/kg wet	312		43.6	40-140			
Dalapon [2C]	145	62	µg/kg wet	312		46.5	40-140			
Dicamba	8.67	2.5	µg/kg wet	12.5		69.3	40-140			
Dicamba [2C]	8.94	2.5	µg/kg wet	12.5		71.5	40-140			
Dichloroprop	91.1	25	µg/kg wet	125		72.9	40-140			
Dichloroprop [2C]	94.8	25	µg/kg wet	125		75.9	40-140			
Dinoseb	10.8	12	µg/kg wet	62.5		17.2	2.28-30.2			V-06
Dinoseb [2C]	11.3	12	µg/kg wet	62.5		18.1	2.56-33.2			V-06
Surrogate: 2,4-Dichlorophenylacetic acid	*69.1*		µg/kg wet	100		69.1	30-150			
Surrogate: 2,4-Dichlorophenylacetic acid [2C]	*71.0*		µg/kg wet	100		71.0	30-150			
LCS Dup (B290112-BSD1)				Prepared: 09/13/21 Analyzed: 09/16/21						
2,4-D	87.9	25	µg/kg wet	125		70.3	40-140	2.04	30	
2,4-D [2C]	94.9	25	µg/kg wet	125		75.9	40-140	3.35	30	
2,4-DB	81.8	25	µg/kg wet	125		65.5	40-140	1.20	30	
2,4-DB [2C]	84.3	25	µg/kg wet	125		67.4	40-140	0.256	30	
2,4,5-TP (Silvex)	9.08	2.5	µg/kg wet	12.5		72.6	40-140	1.44	30	
2,4,5-TP (Silvex) [2C]	9.70	2.5	µg/kg wet	12.5		77.6	40-140	3.19	30	
2,4,5-T	8.80	2.5	µg/kg wet	12.5		70.4	40-140	2.75	30	
2,4,5-T [2C]	9.81	2.5	µg/kg wet	12.5		78.5	40-140	4.10	30	V-06
Dalapon	144	62	µg/kg wet	312		46.0	40-140	5.40	30	
Dalapon [2C]	155	62	µg/kg wet	312		49.7	40-140	6.64	30	
Dicamba	8.91	2.5	µg/kg wet	12.5		71.3	40-140	2.80	30	

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QUALITY CONTROL

Herbicides by GC/ECD - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B290112 - SW-846 8151										
LCS Dup (B290112-BSD1)				Prepared: 09/13/21 Analyzed: 09/16/21						
Dicamba [2C]	9.03	2.5	µg/kg wet	12.5		72.2	40-140	0.957	30	
Dichloroprop	93.6	25	µg/kg wet	125		74.9	40-140	2.70	30	
Dichloroprop [2C]	97.4	25	µg/kg wet	125		77.9	40-140	2.72	30	
Dinoseb	9.68	12	µg/kg wet	62.5		15.5	2.28-30.2	10.8	30	V-06
Dinoseb [2C]	10.3	12	µg/kg wet	62.5		16.5	2.56-33.2	9.43	30	V-06
Surrogate: 2,4-Dichlorophenylacetic acid	*69.5*		µg/kg wet	100		69.5	30-150			
Surrogate: 2,4-Dichlorophenylacetic acid [2C]	*71.2*		µg/kg wet	100		71.2	30-150			

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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 B289959 - SW-846 3546										
Blank (B289959-BLK1)				Prepared: 09/10/21 Analyzed: 09/17/21						
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)	*4.06*		mg/Kg wet	5.00		81.3	40-140			
Surrogate: o-Terphenyl (OTP)	*4.14*		mg/Kg wet	5.00		82.8	40-140			
Surrogate: 2-Bromonaphthalene	*5.83*		mg/Kg wet	5.00		117	40-140			
Surrogate: 2-Fluorobiphenyl	*5.91*		mg/Kg wet	5.00		118	40-140			
LCS (B289959-BS1)				Prepared: 09/10/21 Analyzed: 09/17/21						
C9-C18 Aliphatics	23.0	10	mg/Kg wet	30.0		76.8	40-140			
C19-C36 Aliphatics	42.6	10	mg/Kg wet	40.0		107	40-140			
Unadjusted C11-C22 Aromatics	89.8	10	mg/Kg wet	85.0		106	40-140			
Acenaphthene	4.44	0.10	mg/Kg wet	5.00		88.9	40-140			
Acenaphthylene	4.16	0.10	mg/Kg wet	5.00		83.1	40-140			
Anthracene	5.05	0.10	mg/Kg wet	5.00		101	40-140			
Benzo(a)anthracene	5.39	0.10	mg/Kg wet	5.00		108	40-140			
Benzo(a)pyrene	5.08	0.10	mg/Kg wet	5.00		102	40-140			
Benzo(b)fluoranthene	4.86	0.10	mg/Kg wet	5.00		97.2	40-140			
Benzo(g,h,i)perylene	4.54	0.10	mg/Kg wet	5.00		90.8	40-140			
Benzo(k)fluoranthene	4.64	0.10	mg/Kg wet	5.00		92.8	40-140			
Chrysene	4.88	0.10	mg/Kg wet	5.00		97.7	40-140			
Dibenz(a,h)anthracene	4.81	0.10	mg/Kg wet	5.00		96.1	40-140			
Fluoranthene	5.00	0.10	mg/Kg wet	5.00		100	40-140			
Fluorene	4.66	0.10	mg/Kg wet	5.00		93.2	40-140			
Indeno(1,2,3-cd)pyrene	4.54	0.10	mg/Kg wet	5.00		90.9	40-140			
2-Methylnaphthalene	4.01	0.10	mg/Kg wet	5.00		80.2	40-140			
Naphthalene	3.78	0.10	mg/Kg wet	5.00		75.7	40-140			
Phenanthrene	5.11	0.10	mg/Kg wet	5.00		102	40-140			
Pyrene	5.11	0.10	mg/Kg wet	5.00		102	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)	*4.21*		mg/Kg wet	5.00		84.3	40-140			

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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 B289959 - SW-846 3546										
LCS (B289959-BS1)				Prepared: 09/10/21 Analyzed: 09/17/21						
Surrogate: o-Terphenyl (OTP)	*4.55*		mg/Kg wet	5.00		91.1	40-140			
Surrogate: 2-Bromonaphthalene	*6.12*		mg/Kg wet	5.00		122	40-140			
Surrogate: 2-Fluorobiphenyl	*6.04*		mg/Kg wet	5.00		121	40-140			
LCS Dup (B289959-BSD1)				Prepared: 09/10/21 Analyzed: 09/17/21						
C9-C18 Aliphatics	22.3	10	mg/Kg wet	30.0		74.4	40-140	3.18	25	
C19-C36 Aliphatics	40.3	10	mg/Kg wet	40.0		101	40-140	5.48	25	
Unadjusted C11-C22 Aromatics	89.8	10	mg/Kg wet	85.0		106	40-140	0.0181	25	
Acenaphthene	4.45	0.10	mg/Kg wet	5.00		89.0	40-140	0.169	25	
Acenaphthylene	4.14	0.10	mg/Kg wet	5.00		82.8	40-140	0.400	25	
Anthracene	5.14	0.10	mg/Kg wet	5.00		103	40-140	1.77	25	
Benzo(a)anthracene	5.44	0.10	mg/Kg wet	5.00		109	40-140	0.916	25	
Benzo(a)pyrene	5.10	0.10	mg/Kg wet	5.00		102	40-140	0.432	25	
Benzo(b)fluoranthene	4.89	0.10	mg/Kg wet	5.00		97.9	40-140	0.742	25	
Benzo(g,h,i)perylene	4.61	0.10	mg/Kg wet	5.00		92.3	40-140	1.62	25	
Benzo(k)fluoranthene	4.66	0.10	mg/Kg wet	5.00		93.2	40-140	0.351	25	
Chrysene	4.93	0.10	mg/Kg wet	5.00		98.5	40-140	0.870	25	
Dibenz(a,h)anthracene	4.86	0.10	mg/Kg wet	5.00		97.1	40-140	1.05	25	
Fluoranthene	5.08	0.10	mg/Kg wet	5.00		102	40-140	1.53	25	
Fluorene	4.73	0.10	mg/Kg wet	5.00		94.6	40-140	1.59	25	
Indeno(1,2,3-cd)pyrene	4.56	0.10	mg/Kg wet	5.00		91.2	40-140	0.299	25	
2-Methylnaphthalene	3.90	0.10	mg/Kg wet	5.00		77.9	40-140	2.84	25	
Naphthalene	3.64	0.10	mg/Kg wet	5.00		72.8	40-140	3.80	25	
Phenanthrene	5.20	0.10	mg/Kg wet	5.00		104	40-140	1.64	25	
Pyrene	5.18	0.10	mg/Kg wet	5.00		104	40-140	1.23	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)	*4.02*		mg/Kg wet	5.00		80.5	40-140			
Surrogate: o-Terphenyl (OTP)	*4.63*		mg/Kg wet	5.00		92.5	40-140			
Surrogate: 2-Bromonaphthalene	*6.19*		mg/Kg wet	5.00		124	40-140			
Surrogate: 2-Fluorobiphenyl	*6.02*		mg/Kg wet	5.00		120	40-140			

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QUALITY CONTROL

Metals Analyses (Total) - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B289988 - SW-846 7471										
Blank (B289988-BLK1)				Prepared: 09/10/21 Analyzed: 09/13/21						
Mercury	ND	0.025	mg/Kg wet							
LCS (B289988-BS1)				Prepared: 09/10/21 Analyzed: 09/13/21						
Mercury	13.5	0.75	mg/Kg wet	15.6		86.3	59.3-140.4			
LCS Dup (B289988-BSD1)				Prepared: 09/10/21 Analyzed: 09/13/21						
Mercury	13.3	0.74	mg/Kg wet	15.6		85.5	59.3-140.4	0.952	20	
Batch B289989 - SW-846 7471										
Blank (B289989-BLK1)				Prepared: 09/10/21 Analyzed: 09/13/21						
Mercury	ND	0.025	mg/Kg wet							
LCS (B289989-BS1)				Prepared: 09/10/21 Analyzed: 09/13/21						
Mercury	15.8	0.74	mg/Kg wet	15.6		102	59.3-140.4			
LCS Dup (B289989-BSD1)				Prepared: 09/10/21 Analyzed: 09/13/21						
Mercury	14.6	0.75	mg/Kg wet	15.6		93.5	59.3-140.4	8.25	20	
Batch B290223 - SW-846 3050B										
Blank (B290223-BLK1)				Prepared & Analyzed: 09/15/21						
Arsenic	ND	3.3	mg/Kg wet							
Cadmium	ND	0.33	mg/Kg wet							
Chromium	ND	0.67	mg/Kg wet							
Copper	ND	0.67	mg/Kg wet							
Lead	ND	0.50	mg/Kg wet							
Nickel	ND	0.67	mg/Kg wet							
Zinc	ND	0.67	mg/Kg wet							
LCS (B290223-BS1)				Prepared & Analyzed: 09/15/21						
Arsenic	156	9.9	mg/Kg wet	170		91.9	82.9-117.6			
Cadmium	91.9	0.99	mg/Kg wet	89.5		103	82.8-117.3			
Chromium	97.5	2.0	mg/Kg wet	101		96.5	82.1-117.8			
Copper	151	2.0	mg/Kg wet	149		101	83.9-116.1			
Lead	133	1.5	mg/Kg wet	140		94.7	82.9-117.1			
Nickel	69.6	2.0	mg/Kg wet	68.3		102	82.1-117.7			
Zinc	221	2.0	mg/Kg wet	228		96.8	80.7-118.9			
LCS Dup (B290223-BSD1)				Prepared & Analyzed: 09/15/21						
Arsenic	150	9.5	mg/Kg wet	170		88.3	82.9-117.6	4.00	30	
Cadmium	88.0	0.95	mg/Kg wet	89.5		98.3	82.8-117.3	4.40	20	
Chromium	97.2	1.9	mg/Kg wet	101		96.2	82.1-117.8	0.295	30	
Copper	145	1.9	mg/Kg wet	149		97.4	83.9-116.1	3.82	30	
Lead	126	1.4	mg/Kg wet	140		90.1	82.9-117.1	4.92	30	
Nickel	66.7	1.9	mg/Kg wet	68.3		97.6	82.1-117.7	4.36	30	
Zinc	213	1.9	mg/Kg wet	228		93.6	80.7-118.9	3.40	30	

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QUALITY CONTROL

Metals Analyses (Total) - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B290223 - SW-846 3050B										
Reference (B290223-SRM1) MRL Check				Prepared & Analyzed: 09/15/21						
Lead	0.421	0.50	mg/Kg wet	0.501		84.1	80-120			

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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 B289999 - % Solids												
Duplicate (B289999-DUP2)	**Source: 21I0471-02**			Prepared: 09/10/21 Analyzed: 09/13/21								
% Solids	52.0		% Wt		47.4				**9.35**	*	5	R-02
Duplicate (B289999-DUP3)	**Source: 21I0471-03**			Prepared: 09/10/21 Analyzed: 09/13/21								
% Solids	63.5		% Wt		64.4				1.40		5	
Duplicate (B289999-DUP4)	**Source: 21I0471-04**			Prepared: 09/10/21 Analyzed: 09/13/21								
% Solids	62.5		% Wt		63.8				2.10		5	
Duplicate (B289999-DUP5)	**Source: 21I0471-05**			Prepared: 09/10/21 Analyzed: 09/13/21								
% Solids	66.5		% Wt		64.3				3.33		5	
Duplicate (B289999-DUP6)	**Source: 21I0471-07**			Prepared: 09/10/21 Analyzed: 09/13/21								
% Solids	60.5		% Wt		57.2				**5.59**	*	5	R-02
Duplicate (B289999-DUP7)	**Source: 21I0471-08**			Prepared: 09/10/21 Analyzed: 09/13/21								
% Solids	67.0		% Wt		69.0				3.00		5	
Batch B290031 - SW 846 9060A												
Blank (B290031-BLK1)				Prepared & Analyzed: 09/13/21								
Total Organic Carbon	ND	100	mg/Kg									
LCS (B290031-BS1)				Prepared & Analyzed: 09/13/21								
Total Organic Carbon	727	100	mg/Kg	750		96.9		64.9-118				
LCS Dup (B290031-BSD1)				Prepared & Analyzed: 09/13/21								
Total Organic Carbon	763	100	mg/Kg	750		102		64.9-118	4.89		16.9	
Duplicate (B290031-DUP1)	**Source: 21I0471-02**			Prepared & Analyzed: 09/13/21								
Total Organic Carbon	63700	100	mg/Kg		66000				3.64		49.1	Z-01
Matrix Spike (B290031-MS1)	**Source: 21I0471-02**			Prepared & Analyzed: 09/13/21								
Total Organic Carbon	37800	100	mg/Kg	750	66000	**-3760**	*	85-115				MS-07

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BREAKDOWN REPORT

Lab Sample ID:	S063354-PEM1	Analyzed:	09/16/2021

Column Number: 1

Analyte	% Breakdown
4,4'-DDT [1]	1.03
Endrin [1]	1.58

Column Number: 2

Analyte	% Breakdown
4,4'-DDT [2]	1.12
Endrin [2]	2.43

BREAKDOWN REPORT

Lab Sample ID:	S063354-PEM2	Analyzed:	09/16/2021

Column Number: 1

Analyte	% Breakdown
4,4'-DDT [1]	1.65
Endrin [1]	2.73

Column Number: 2

Analyte	% Breakdown
4,4'-DDT [2]	1.77
Endrin [2]	2.49

BREAKDOWN REPORT

Lab Sample ID:	S063354-PEM3	Analyzed:	09/17/2021

Column Number: 1

Analyte	% Breakdown
4,4'-DDT [1]	1.77
Endrin [1]	2.98

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BREAKDOWN REPORT

Lab Sample ID:	S063354-PEM3	Analyzed:	09/17/2021

Column Number: 2

Analyte	% Breakdown
4,4'-DDT [2]	1.90
Endrin [2]	2.68

BREAKDOWN REPORT

Lab Sample ID:	S063354-PEM4	Analyzed:	09/17/2021

Column Number: 1

Analyte	% Breakdown
4,4'-DDT [1]	2.33
Endrin [1]	3.01

Column Number: 2

Analyte	% Breakdown
4,4'-DDT [2]	2.49
Endrin [2]	2.80

BREAKDOWN REPORT

Lab Sample ID:	S063354-PEM5	Analyzed:	09/17/2021

Column Number: 1

Analyte	% Breakdown
4,4'-DDT [1]	3.41
Endrin [1]	3.25

Column Number: 2

Analyte	% Breakdown
4,4'-DDT [2]	3.42
Endrin [2]	3.32

BREAKDOWN REPORT

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BREAKDOWN REPORT

Lab Sample ID:	**S063354-PEM6**	**Analyzed:**	**09/18/2021**

Column Number: **1**

Analyte	% Breakdown
4,4'-DDT [1]	5.86
Endrin [1]	3.75

Column Number: **2**

Analyte	% Breakdown
4,4'-DDT [2]	6.07
Endrin [2]	3.58

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IDENTIFICATION SUMMARY FOR SINGLE COMPONENT ANALYTES

SW-846 8082A

1543210907-02

Lab Sample ID: 21I0471-02 Date(s) Analyzed: 09/15/2021 09/15/2021

Instrument ID (1): ECD1 Instrument ID (2): ECD1

GC Column (1): ID: (mm) GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%RPD
			FROM	TO		
Aroclor-1254	1	0.000	0.000	0.000	0.33	
	2	0.000	0.000	0.000	0.29	12.9

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IDENTIFICATION SUMMARY FOR SINGLE COMPONENT ANALYTES

SW-846 8082A

LCS

Lab Sample ID: B289957-BS1 Date(s) Analyzed: 09/14/2021 09/14/2021

Instrument ID (1): ECD1 Instrument ID (2): ECD1

GC Column (1): ID: (mm) GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%RPD
			FROM	TO		
Aroclor-1016	1	0.000	0.000	0.000	0.16	
	2	0.000	0.000	0.000	0.16	0.0
Aroclor-1260	1	0.000	0.000	0.000	0.15	
	2	0.000	0.000	0.000	0.15	0.0

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IDENTIFICATION SUMMARY FOR SINGLE COMPONENT ANALYTES

SW-846 8082A

LCS Dup

Lab Sample ID: B289957-BSD1 Date(s) Analyzed: 09/14/2021 09/14/2021

Instrument ID (1): ECD1 Instrument ID (2): ECD1

GC Column (1): ID: (mm) GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%RPD
			FROM	TO		
Aroclor-1016	1	0.000	0.000	0.000	0.17	
	2	0.000	0.000	0.000	0.17	0.0
Aroclor-1260	1	0.000	0.000	0.000	0.16	
	2	0.000	0.000	0.000	0.16	0.0

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IDENTIFICATION SUMMARY FOR SINGLE COMPONENT ANALYTES

SW-846 8081B

LCS

Lab Sample ID: B289958-BS1 Date(s) Analyzed: 09/16/2021 09/16/2021

Instrument ID (1): ECD2 Instrument ID (2): ECD2

GC Column (1): ID: (mm) GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%RPD
			FROM	TO		
4,4'-DDD	1	6.638	0.000	0.000	0.093	
	2	6.658	0.000	0.000	0.10	7.3
4,4'-DDE	1	6.231	0.000	0.000	0.092	
	2	6.258	0.000	0.000	0.097	5.3
4,4'-DDT	1	6.836	0.000	0.000	0.092	
	2	6.881	0.000	0.000	0.097	5.3
Aldrin	1	5.621	0.000	0.000	0.079	
	2	5.565	0.000	0.000	0.085	7.3
alpha-BHC	1	5.016	0.000	0.000	0.061	
	2	4.978	0.000	0.000	0.065	6.4
beta-BHC	1	5.236	0.000	0.000	0.070	
	2	5.209	0.000	0.000	0.077	9.5
delta-BHC	1	5.331	0.000	0.000	0.064	
	2	5.363	0.000	0.000	0.071	10.4
Dieldrin	1	6.410	0.000	0.000	0.086	
	2	6.339	0.000	0.000	0.094	8.9
Endosulfan I	1	6.248	0.000	0.000	0.080	
	2	6.157	0.000	0.000	0.094	16.1
Endosulfan II	1	6.723	0.000	0.000	0.085	
	2	6.697	0.000	0.000	0.094	10.1
Endosulfan Sulfate	1	7.348	0.000	0.000	0.079	
	2	7.149	0.000	0.000	0.096	19.4
Endrin	1	6.565	0.000	0.000	0.088	
	2	6.543	0.000	0.000	0.097	9.7
Endrin Ketone	1	7.551	0.000	0.000	0.092	
	2	7.540	0.000	0.000	0.098	6.3
gamma-BHC (Lindane)	1	5.184	0.000	0.000	0.066	
	2	5.158	0.000	0.000	0.070	5.9
Heptachlor	1	5.448	0.000	0.000	0.070	
	2	5.386	0.000	0.000	0.081	14.6
Heptachlor Epoxide	1	5.997	0.000	0.000	0.080	

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IDENTIFICATION SUMMARY FOR SINGLE COMPONENT ANALYTES

SW-846 8081B

LCS

Lab Sample ID: B289958-BS1 Date(s) Analyzed: 09/16/2021 09/16/2021

Instrument ID (1): ECD2 Instrument ID (2): ECD2

GC Column (1): ID: (mm) GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%RPD
			FROM	TO		
	2	5.912	0.000	0.000	0.088	8.3
Hexachlorobenzene	1	4.925	0.000	0.000	0.074	
	2	4.904	0.000	0.000	0.079	6.5
Methoxychlor	1	7.216	0.000	0.000	0.092	
	2	7.422	0.000	0.000	0.098	6.3

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IDENTIFICATION SUMMARY FOR SINGLE COMPONENT ANALYTES

SW-846 8151A

LCS

Lab Sample ID: B290112-BS1 Date(s) Analyzed: 09/16/2021 09/16/2021

Instrument ID (1): ECD 8 Instrument ID (2): ECD 8

GC Column (1): ID: (mm) GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%RPD
			FROM	TO		
2,4,5-T	1	17.129	0.000	0.000	8.56	
	2	17.090	0.000	0.000	9.42	9.1
2,4,5-TP (Silvex)	1	16.870	0.000	0.000	8.95	
	2	16.706	0.000	0.000	9.39	4.2
2,4-D	1	15.163	0.000	0.000	86.1	
	2	14.953	0.000	0.000	91.8	6.5
2,4-DB	1	17.510	0.000	0.000	82.8	
	2	17.443	0.000	0.000	84.1	1.3
Dalapon	1	5.251	0.000	0.000	136	
	2	4.856	0.000	0.000	145	3.5
Dicamba	1	12.928	0.000	0.000	8.67	
	2	12.623	0.000	0.000	8.94	2.7
Dichloroprop	1	14.630	0.000	0.000	91.1	
	2	14.239	0.000	0.000	94.8	4.1
Dinoseb	1	18.054	0.000	0.000	10.8	
	2	17.616	0.000	0.000	11.3	2.7

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IDENTIFICATION SUMMARY FOR SINGLE COMPONENT ANALYTES

SW-846 8151A

LCS Dup

Lab Sample ID: B290112-BSD1 Date(s) Analyzed: 09/16/2021 09/16/2021

Instrument ID (1): ECD 8 Instrument ID (2): ECD 8

GC Column (1): ID: (mm) GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%RPD
			FROM	TO		
2,4,5-T	1	17.130	0.000	0.000	8.80	
	2	17.090	0.000	0.000	9.81	10.9
2,4,5-TP (Silvex)	1	16.870	0.000	0.000	9.08	
	2	16.706	0.000	0.000	9.70	6.4
2,4-D	1	15.164	0.000	0.000	87.9	
	2	14.953	0.000	0.000	94.9	7.6
2,4-DB	1	17.510	0.000	0.000	81.8	
	2	17.443	0.000	0.000	84.3	2.8
Dalapon	1	5.252	0.000	0.000	144	
	2	4.858	0.000	0.000	155	10.2
Dicamba	1	12.927	0.000	0.000	8.91	
	2	12.623	0.000	0.000	9.03	1.5
Dichloroprop	1	14.630	0.000	0.000	93.6	
	2	14.240	0.000	0.000	97.4	3.6
Dinoseb	1	18.053	0.000	0.000	9.68	
	2	17.616	0.000	0.000	10.3	6.0

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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.
DL-03	Elevated reporting limit due to matrix interference.
MS-07	Matrix spike recovery is outside of control limits. Analysis is in control based on laboratory fortified blank recovery.Possibility of sample matrix effects that lead to low bias for reported result or non-homogeneous sample aliquot cannot be eliminated.
O-32	A dilution was performed as part of the standard analytical procedure.
R-02	Duplicate RPD is outside of control limits. Outlier can be attributed to sample non-homogeneity encountered during sample prep.
RL-07	Elevated reporting limit based on lowest point in calibration. MA CAM reporting limit not met.
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.
Z-01	Results over calibration curve. Results are estimitated due to method limitations.

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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
SW 846 9060A in Soil	
Total Organic Carbon	NY,CT,ME,VA,NH
SW-846 6010D in Soil	
Arsenic	CT,NH,NY,ME,VA,NC
Cadmium	CT,NH,NY,ME,VA,NC
Chromium	CT,NH,NY,ME,VA,NC
Copper	CT,NH,NY,ME,VA,NC
Lead	CT,NH,NY,AIHA,ME,VA,NC
Nickel	CT,NH,NY,ME,VA,NC
Zinc	CT,NH,NY,ME,VA,NC
SW-846 7471B in Soil	
Mercury	CT,NH,NY,NC,ME,VA
SW-846 8081B in Soil	
Aldrin	CT,NC,NH,NY,ME,VA
Aldrin [2C]	CT,NC,NH,NY,ME,VA
alpha-BHC	CT,NC,NH,NY,ME,VA
alpha-BHC [2C]	CT,NC,NH,NY,ME,VA
beta-BHC	CT,NC,NH,NY,ME,VA
beta-BHC [2C]	CT,NC,NH,NY,ME,VA
delta-BHC	CT,NC,NH,NY,ME,VA
delta-BHC [2C]	CT,NC,NH,NY,ME,VA
gamma-BHC (Lindane)	CT,NC,NH,NY,ME,VA
gamma-BHC (Lindane) [2C]	CT,NC,NH,NY,ME,VA
Chlordane	CT,NC,NH,NY,ME,VA

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CERTIFICATIONS

Certified Analyses included in this Report

Analyte	Certifications
SW-846 8081B in Soil	
Chlordane [2C]	CT,NC,NH,NY,ME,VA
4,4'-DDD	CT,NC,NH,NY,ME,VA
4,4'-DDD [2C]	CT,NC,NH,NY,ME,VA
4,4'-DDE	CT,NC,NH,NY,ME,VA
4,4'-DDE [2C]	CT,NC,NH,NY,ME,VA
4,4'-DDT	CT,NC,NH,NY,ME,VA
4,4'-DDT [2C]	CT,NC,NH,NY,ME,VA
Dieldrin	CT,NC,NH,NY,ME,VA
Dieldrin [2C]	CT,NC,NH,NY,ME,VA
Endosulfan I	CT,NC,NH,NY,ME,VA
Endosulfan I [2C]	CT,NC,NH,NY,ME,VA
Endosulfan II	CT,NC,NH,NY,ME,VA
Endosulfan II [2C]	CT,NC,NH,NY,ME,VA
Endosulfan Sulfate	CT,NC,NH,NY,ME,VA
Endosulfan Sulfate [2C]	CT,NC,NH,NY,ME,VA
Endrin	CT,NC,NH,NY,ME,VA
Endrin [2C]	CT,NC,NH,NY,ME,VA
Endrin Ketone	NC
Endrin Ketone [2C]	NC
Heptachlor	CT,NC,NH,NY,ME,VA
Heptachlor [2C]	CT,NC,NH,NY,ME,VA
Heptachlor Epoxide	CT,NC,NH,NY,ME,VA
Heptachlor Epoxide [2C]	CT,NC,NH,NY,ME,VA
Hexachlorobenzene	NC
Hexachlorobenzene [2C]	NC
Methoxychlor	CT,NC,NH,NY,ME,VA
Methoxychlor [2C]	CT,NC,NH,NY,ME,VA
SW-846 8081B in Water	
Aldrin	CT,NC,NH,NY,ME,VA
Aldrin [2C]	CT,NC,NH,NY,ME,VA
alpha-BHC	CT,NC,NH,NY,ME,VA
alpha-BHC [2C]	CT,NC,NH,NY,ME,VA
beta-BHC	CT,NC,NH,NY,ME,VA
beta-BHC [2C]	CT,NC,NH,NY,ME,VA
delta-BHC	CT,NC,NH,NY,ME,VA
delta-BHC [2C]	CT,NC,NH,NY,ME,VA
gamma-BHC (Lindane)	CT,NC,NH,NY,ME,VA
gamma-BHC (Lindane) [2C]	CT,NC,NH,NY,ME,VA
Chlordane	CT,NC,NH,NY,ME,VA
Chlordane [2C]	CT,NC,NH,NY,ME,VA
4,4'-DDD	CT,NC,NH,NY,ME,VA
4,4'-DDD [2C]	CT,NC,NH,NY,ME,VA
4,4'-DDE	CT,NC,NH,NY,ME,VA
4,4'-DDE [2C]	CT,NC,NH,NY,ME,VA
4,4'-DDT	CT,NC,NH,NY,ME,VA
4,4'-DDT [2C]	CT,NC,NH,NY,ME,VA

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CERTIFICATIONS

Certified Analyses included in this Report

Analyte	Certifications
SW-846 8081B in Water	
Dieldrin	CT,NC,NH,NY,ME,VA
Dieldrin [2C]	CT,NC,NH,NY,ME,VA
Endosulfan I	CT,NC,NH,NY,ME,VA
Endosulfan I [2C]	CT,NC,NH,NY,ME,VA
Endosulfan II	CT,NC,NH,NY,ME,VA
Endosulfan II [2C]	CT,NC,NH,NY,ME,VA
Endosulfan Sulfate	CT,NC,NH,NY,ME,VA
Endosulfan Sulfate [2C]	CT,NC,NH,NY,ME,VA
Endrin	CT,NC,NH,NY,ME,VA
Endrin [2C]	CT,NC,NH,NY,ME,VA
Endrin Ketone	NC
Endrin Ketone [2C]	NC
Heptachlor	CT,NC,NH,NY,ME,VA
Heptachlor [2C]	CT,NC,NH,NY,ME,VA
Heptachlor Epoxide	CT,NC,NH,NY,ME,VA
Heptachlor Epoxide [2C]	CT,NC,NH,NY,ME,VA
Hexachlorobenzene	NC
Hexachlorobenzene [2C]	NC
Methoxychlor	CT,NC,NH,NY,ME,VA
Methoxychlor [2C]	CT,NC,NH,NY,ME,VA
SW-846 8082A in Soil	
Aroclor-1016	CT,NH,NY,NC,ME,VA,PA
Aroclor-1016 [2C]	CT,NH,NY,NC,ME,VA,PA
Aroclor-1221	CT,NH,NY,NC,ME,VA,PA
Aroclor-1221 [2C]	CT,NH,NY,NC,ME,VA,PA
Aroclor-1232	CT,NH,NY,NC,ME,VA,PA
Aroclor-1232 [2C]	CT,NH,NY,NC,ME,VA,PA
Aroclor-1242	CT,NH,NY,NC,ME,VA,PA
Aroclor-1242 [2C]	CT,NH,NY,NC,ME,VA,PA
Aroclor-1248	CT,NH,NY,NC,ME,VA,PA
Aroclor-1248 [2C]	CT,NH,NY,NC,ME,VA,PA
Aroclor-1254	CT,NH,NY,NC,ME,VA,PA
Aroclor-1254 [2C]	CT,NH,NY,NC,ME,VA,PA
Aroclor-1260	CT,NH,NY,NC,ME,VA,PA
Aroclor-1260 [2C]	CT,NH,NY,NC,ME,VA,PA
Aroclor-1262	NH,NY,NC,ME,VA,PA
Aroclor-1262 [2C]	NH,NY,NC,ME,VA,PA
Aroclor-1268	NH,NY,NC,ME,VA,PA
Aroclor-1268 [2C]	NH,NY,NC,ME,VA,PA
SW-846 8151A in Soil	
2,4-D	NY,ME,NC,NH,VA,CT
2,4-D [2C]	NY,ME,NC,NH,VA,CT
2,4-DB	NY,ME,NC,NH,VA,CT
2,4-DB [2C]	NY,ME,NC,NH,VA,CT
2,4,5-TP (Silvex)	NY,ME,NC,NH,VA,CT
2,4,5-TP (Silvex) [2C]	NY,ME,NC,NH,VA,CT

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CERTIFICATIONS

Certified Analyses included in this Report

Analyte	Certifications
SW-846 8151A in Soil	
2,4,5-T	NY,ME,NC,NH,VA,CT
2,4,5-T [2C]	NY,ME,NC,NH,VA,CT
Dalapon	NY,ME,NC,NH,VA,CT
Dalapon [2C]	NY,ME,NC,NH,VA,CT
Dicamba	NY,ME,NC,NH,VA,CT
Dicamba [2C]	NY,ME,NC,NH,VA,CT
Dichloroprop	NY,ME,NC,NH,VA,CT
Dichloroprop [2C]	NY,ME,NC,NH,VA,CT
Dinoseb	NY,ME,NC,NH,VA,CT
Dinoseb [2C]	NY,ME,NC,NH,VA,CT
MCPA	NY,ME,NC,NH,VA,CT
MCPA [2C]	NY,ME,NC,NH,VA,CT
MCPP	NY,ME,NC,NH,VA,CT
MCPP [2C]	NY,ME,NC,NH,VA,CT
SW-846 8151A in Water	
2,4-D	ME,NC,NH,CT,NY,VA
2,4-D [2C]	ME,NC,NH,CT,NY,VA
2,4-DB	ME,NC,NH,CT,NY,VA
2,4-DB [2C]	ME,NC,NH,CT,NY,VA
2,4,5-TP (Silvex)	ME,NC,NH,CT,NY,VA
2,4,5-TP (Silvex) [2C]	ME,NC,NH,CT,NY,VA
2,4,5-T	ME,NC,NH,CT,NY,VA
2,4,5-T [2C]	ME,NC,NH,CT,NY,VA
Dalapon	ME,NC,NH,CT,NY,VA
Dalapon [2C]	ME,NC,NH,CT,NY,VA
Dicamba	ME,NC,NH,CT,NY,VA
Dicamba [2C]	ME,NC,NH,CT,NY,VA
Dichloroprop	ME,NC,NH,CT,NY,VA
Dichloroprop [2C]	ME,NC,NH,CT,NY,VA
Dinoseb	ME,NC,NH,CT,NY,VA
Dinoseb [2C]	ME,NC,NH,CT,NY,VA
MCPA	NC,CT
MCPA [2C]	NC,CT
MCPP	NC,CT
MCPP [2C]	NC,CT
SW-846 8260C-D in Soil	
Acetone	CT,NH,NY,ME
Acetone	CT,NH,NY,ME
Benzene	CT,NH,NY,ME
Benzene	CT,NH,NY,ME
Bromobenzene	NH,NY,ME
Bromobenzene	NH,NY,ME
Bromochloromethane	NH,NY,ME
Bromochloromethane	NH,NY,ME
Bromodichloromethane	CT,NH,NY,ME
Bromodichloromethane	CT,NH,NY,ME

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CERTIFICATIONS

Certified Analyses included in this Report

Analyte	Certifications
SW-846 8260C-D in Soil	
Bromoform	CT,NH,NY,ME
Bromoform	CT,NH,NY,ME
Bromomethane	CT,NH,NY,ME
Bromomethane	CT,NH,NY,ME
2-Butanone (MEK)	CT,NH,NY,ME
2-Butanone (MEK)	CT,NH,NY,ME
n-Butylbenzene	CT,NH,NY,ME
n-Butylbenzene	CT,NH,NY,ME
sec-Butylbenzene	CT,NH,NY,ME
sec-Butylbenzene	CT,NH,NY,ME
tert-Butylbenzene	CT,NH,NY,ME
tert-Butylbenzene	CT,NH,NY,ME
Carbon Disulfide	CT,NH,NY,ME
Carbon Disulfide	CT,NH,NY,ME
Carbon Tetrachloride	CT,NH,NY,ME
Carbon Tetrachloride	CT,NH,NY,ME
Chlorobenzene	CT,NH,NY,ME
Chlorobenzene	CT,NH,NY,ME
Chlorodibromomethane	CT,NH,NY,ME
Chlorodibromomethane	CT,NH,NY,ME
Chloroethane	CT,NH,NY,ME
Chloroethane	CT,NH,NY,ME
Chloroform	CT,NH,NY,ME
Chloroform	CT,NH,NY,ME
Chloromethane	CT,NH,NY,ME
Chloromethane	CT,NH,NY,ME
2-Chlorotoluene	CT,NH,NY,ME
2-Chlorotoluene	CT,NH,NY,ME
4-Chlorotoluene	CT,NH,NY,ME
4-Chlorotoluene	CT,NH,NY,ME
1,2-Dibromo-3-chloropropane (DBCP)	NY
1,2-Dibromo-3-chloropropane (DBCP)	NY
1,2-Dibromoethane (EDB)	NY
1,2-Dibromoethane (EDB)	NY
Dibromomethane	NH,NY,ME
Dibromomethane	NH,NY,ME
1,2-Dichlorobenzene	CT,NH,NY,ME
1,2-Dichlorobenzene	CT,NH,NY,ME
1,3-Dichlorobenzene	CT,NH,NY,ME
1,3-Dichlorobenzene	CT,NH,NY,ME
1,4-Dichlorobenzene	CT,NH,NY,ME
1,4-Dichlorobenzene	CT,NH,NY,ME
Dichlorodifluoromethane (Freon 12)	NY,ME
Dichlorodifluoromethane (Freon 12)	NY,ME
1,1-Dichloroethane	CT,NH,NY,ME
1,1-Dichloroethane	CT,NH,NY,ME
1,2-Dichloroethane	CT,NH,NY,ME

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CERTIFICATIONS

Certified Analyses included in this Report

Analyte	Certifications
SW-846 8260C-D in Soil	
1,2-Dichloroethane	CT,NH,NY,ME
1,1-Dichloroethylene	CT,NH,NY,ME
1,1-Dichloroethylene	CT,NH,NY,ME
cis-1,2-Dichloroethylene	CT,NH,NY,ME
cis-1,2-Dichloroethylene	CT,NH,NY,ME
trans-1,2-Dichloroethylene	CT,NH,NY,ME
trans-1,2-Dichloroethylene	CT,NH,NY,ME
1,2-Dichloropropane	CT,NH,NY,ME
1,2-Dichloropropane	CT,NH,NY,ME
1,3-Dichloropropane	NH,NY,ME
1,3-Dichloropropane	NH,NY,ME
2,2-Dichloropropane	NH,NY,ME
2,2-Dichloropropane	NH,NY,ME
1,1-Dichloropropene	NH,NY,ME
1,1-Dichloropropene	NH,NY,ME
cis-1,3-Dichloropropene	CT,NH,NY,ME
cis-1,3-Dichloropropene	CT,NH,NY,ME
trans-1,3-Dichloropropene	CT,NH,NY,ME
trans-1,3-Dichloropropene	CT,NH,NY,ME
1,4-Dioxane	NY
Ethylbenzene	CT,NH,NY,ME
Ethylbenzene	CT,NH,NY,ME
Hexachlorobutadiene	NH,NY,ME
Hexachlorobutadiene	NH,NY,ME
2-Hexanone (MBK)	CT,NH,NY,ME
2-Hexanone (MBK)	CT,NH,NY,ME
Isopropylbenzene (Cumene)	CT,NH,NY,ME
Isopropylbenzene (Cumene)	CT,NH,NY,ME
p-Isopropyltoluene (p-Cymene)	NH,NY
p-Isopropyltoluene (p-Cymene)	NH,NY
Methyl tert-Butyl Ether (MTBE)	NH,NY
Methyl tert-Butyl Ether (MTBE)	NY
Methylene Chloride	CT,NH,NY,ME
Methylene Chloride	CT,NH,NY,ME
4-Methyl-2-pentanone (MIBK)	CT,NH,NY
4-Methyl-2-pentanone (MIBK)	CT,NH,NY
Naphthalene	NH,NY,ME
Naphthalene	NH,NY,ME
n-Propylbenzene	NH,NY
n-Propylbenzene	NH,NY
Styrene	CT,NH,NY,ME
Styrene	CT,NH,NY,ME
1,1,1,2-Tetrachloroethane	CT,NH,NY,ME
1,1,1,2-Tetrachloroethane	CT,NH,NY,ME
1,1,2,2-Tetrachloroethane	CT,NH,NY,ME
1,1,2,2-Tetrachloroethane	CT,NH,NY,ME
Tetrachloroethylene	CT,NH,NY,ME

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CERTIFICATIONS

Certified Analyses included in this Report

Analyte	Certifications
SW-846 8260C-D in Soil	
Tetrachloroethylene	CT,NH,NY,ME
Toluene	CT,NH,NY,ME
Toluene	CT,NH,NY,ME
1,2,3-Trichlorobenzene	ME
1,2,3-Trichlorobenzene	NY
1,2,4-Trichlorobenzene	NH,NY,ME
1,2,4-Trichlorobenzene	NH,NY,ME
1,1,1-Trichloroethane	CT,NH,NY,ME
1,1,1-Trichloroethane	CT,NH,NY,ME
1,1,2-Trichloroethane	CT,NH,NY,ME
1,1,2-Trichloroethane	CT,NH,NY,ME
Trichloroethylene	CT,NH,NY,ME
Trichloroethylene	CT,NH,NY,ME
Trichlorofluoromethane (Freon 11)	CT,NH,NY,ME
Trichlorofluoromethane (Freon 11)	CT,NH,NY,ME
1,2,3-Trichloropropane	NH,NY,ME
1,2,3-Trichloropropane	NH,NY,ME
1,2,4-Trimethylbenzene	CT,NH,NY,ME
1,2,4-Trimethylbenzene	CT,NH,NY,ME
1,3,5-Trimethylbenzene	CT,NH,NY,ME
1,3,5-Trimethylbenzene	CT,NH,NY,ME
Vinyl Chloride	CT,NH,NY,ME
Vinyl Chloride	CT,NH,NY,ME
m+p Xylene	CT,NH,NY,ME
m+p Xylene	CT,NH,NY,ME
o-Xylene	CT,NH,NY,ME
o-Xylene	CT,NH,NY,ME
SW-846 8270D-E 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 8270D-E in Water	

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CERTIFICATIONS

Certified Analyses included in this Report

Analyte	Certifications
SW-846 8270D-E 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
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 - ISO17025:2017	100033	03/1/2022
MA	Massachusetts DEP	M-MA100	06/30/2022
CT	Connecticut Department of Publilc Health	PH-0165	12/31/2022
NY	New York State Department of Health	10899 NELAP	04/1/2022
NH-S	New Hampshire Environmental Lab	2516 NELAP	02/5/2022
RI	Rhode Island Department of Health	LAO00112	12/30/2021
NC	North Carolina Div. of Water Quality	652	12/31/2021
NJ	New Jersey DEP	MA007 NELAP	06/30/2022
FL	Florida Department of Health	E871027 NELAP	06/30/2022
VT	Vermont Department of Health Lead Laboratory	LL720741	07/30/2022
ME	State of Maine	MA00100	06/9/2023
VA	Commonwealth of Virginia	460217	12/14/2021
NH-P	New Hampshire Environmental Lab	2557 NELAP	09/6/2022
VT-DW	Vermont Department of Health Drinking Water	VT-255716	06/12/2022
NC-DW	North Carolina Department of Health	25703	07/31/2022
PA	Commonwealth of Pennsylvania DEP	68-05812	06/30/2022
MI	Dept. of Env, Great Lakes, and Energy	9100	09/6/2021

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☐ 146 Hartford Road, Manchester, CT 06040
☐ 56 Quarry Road, Trumbull, CT 06611
☐ 1419 Richland Street, Columbia, SC 29201
☐ 78 Interstate Drive, West Springfield, MA 01089
☒ 108 Myrtle Street, #502, North Quincy, MA 02171
☐ 317 Iron Horse Way, Suite 204, Providence, RI 02908
☐ 80 Washington Street, Suite 301, Poughkeepsie, NY
☐ Other _____

21I0421

CHAIN-OF-CUSTODY RECORD

41951

Turnaround: Due 9/16/21
☐ 24-Hour* ☐ 72-Hour* ☐ Other _____ (days)
☐ 48-Hour* ☐ Standard (____ days) *Surcharge Applies

Project Name	Project Location	Project Number	Laboratory
MVP Grant FY 22/23	Haverhill, MA	20170390.030	Pace Labs

Report To: Matt Krissake (MKrissane@fando.com)
Invoice To:
P.O. No.: 1543 20170390.030
Sampler's Signature: _____ Date: 9/9/21

Source Codes:
MW=Monitoring Well PW=Potable Water T=Treatment Facility S=Soil B=Sediment
SW=Surface Water ST=Stormwater W=Waste A=Air C=Concrete
X=Other TRIP BLANK

Analysis Request / Containers

Item No.	Transfer Check 1 2 3 4	Sample Number	Source Code	Date Sampled	Time Sampled	Total Metals *	PAH-SIM	VOCs (8260-E)	EPH	VOCs	Pesticides + Herbicides	TCLP *	Total Organic Carbon	Soil VOA Vial, ★methanol	Soil VOA Vial, ☐ water	Glass Soil Container (16) oz ★Na(SO)/2	Other 6L 8oz	Other 6L 20z	Water VOA Vial, ☐ As is ☐ HCl	Glass Amber (____) ml ☐ As is ☐ H2SO4	Plastic - As is, ☐ 250 ml ☐ 500 ☐ 1000 ml	Plastic - H2SO4, ☐ 250 ml ☐ 500 ml	Plastic - HNO3, 250 ml ☐ Filtered ☐ 0.45µ ☐ 10µ	Plastic - NaOH, 250 ml	Comments
1	1 X	1543210907-01	X	9/7/21	0842					X				1	2										
2	2 X	-02	B	↓	0941	X	X	X	X	X	X	X	X	1	2	1	1	1							
3	3 X	-03	↓		1057	X	X	X	X	X	X	X	X	1	2	1	1	1							
4	4 X	-04			1125	X	X	X	X	X	X	X	X	1	2	1	1	1							
5	5 X	-05	↓	↓	1305	X	X	X	X	X	X	X	X	1	2	1	1	1							
6	6 X	1543210908-06	X	9/8/21	0954					X				1	2										
7	7 X	-07	B	↓	1027	X	X	X	X	X	X	X	X	1	2	1	1	1							
8	8 X	~~408~~ 08	B	↓	1104	X	X	X	X	X	X	X	X												

Transfer Number	Relinquished By	Accepted By	Date	Time
1		FED Fridge	9/9/21	
2		Paul Chalkley	9-9-21	1125
3	Paul Chalkley		9-9-21	1455
4		17:15 5.2	9/9/21	1902

Charge Exceptions: ☐ CT Tax Exempt ☐ QA/QC ☐ Other _____
____ Duplicates ☒ Blanks (Item Nos: 1 + 6)
Reporting and Detection Limit Requirements: ☐ RCP Deliverables ☐ MCP CAM Cert.
Additional Comments: * As, Cd, Cr, Cu, Pb, Hg, Ni, Zn
Hold Samples for TCLP

Table of Contents

I Have Not Confirmed Sample Container Numbers With Lab Staff Before Relinquishing Over Samples_____

con-test® ANALYTICAL LABORATORY

Doc# 277 Rev 5 2017

Login Sample Receipt Checklist - (Rejection Criteria Listing - Using Acceptance Policy) Any False Statement will be brought to the attention of the Client - State True or False

Client Fuss O'Neill

Received By [signature] Date 9/4/21 Time 1900

How were the samples received? In Cooler T No Cooler _____ On Ice T No Ice _____ Direct from Sampling _____ Ambient _____ Melted Ice _____

Were samples within Temperature? 2-6°C T By Gun # 3 Actual Temp - 5.2 By Blank # _____ Actual Temp - _____

Was Custody Seal Intact? n/a Were Samples Tampered with? n/a

Was COC Relinquished ? T Does Chain Agree With Samples? T

Are there broken/leaking/loose caps on any samples? F

Is COC in ink/ Legible? T Were samples received within holding time? _____

Did COC include all pertinent Information? Client T Analysis T Sampler Name _____ Project T ID's T Collection Dates/Times _____

Are Sample labels filled out and legible? T

Are there Lab to Filters? F Who was notified? _____

Are there Rushes? F Who was notified? _____

Are there Short Holds? F Who was notified? _____

Is there enough Volume? T

Is there Headspace where applicable? n/a MS/MSD? F

Proper Media/Containers Used? T Is splitting samples required? F

Were trip blanks received? T On COC? T

Do all samples have the proper pH? Acid n/a Base n/a

Vials	#	Containers:	#		#		#
Unp-		1 Liter Amb.		1 Liter Plastic		16 oz Amb.	6
HCL-		500 mL Amb.		500 mL Plastic		8oz Amb/Clear	6
Meoh-	8	250 mL Amb.		250 mL Plastic		4oz Amb/Clear	
Bisulfate-	16	Flashpoint		Col./Bacteria		2oz Amb/Clear	6
DI-		Other Glass		Other Plastic		Encore	
Thiosulfate-		SOC Kit		Plastic Bag		Frozen:	
Sulfuric-		Perchlorate		Ziplock			

Unused Media

Vials	#	Containers:	#		#		#
Unp-		1 Liter Amb.		1 Liter Plastic		16 oz Amb.	
HCL-		500 mL Amb.		500 mL Plastic		8oz Amb/Clear	
Meoh-		250 mL Amb.		250 mL Plastic		4oz Amb/Clear	
Bisulfate-		Col./Bacteria		Flashpoint		2oz Amb/Clear	
DI-		Other Plastic		Other Glass		Encore	
Thiosulfate-		SOC Kit		Plastic Bag		Frozen:	
Sulfuric-		Perchlorate		Ziplock			

Comments:

MADEP MCP Analytical Method Report Certification Form

Laboratory Name: Con-Test, a Pace Analytical Laboratory	Project #: 21I0471
Project Location: Haverhill, MA	RTN:

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

21I0471-01 thru 21I0471-08

Matrices: Soil

CAM Protocol (check all that below)

8260 VOC CAM II A (X)	7470/7471 Hg CAM IIIB (X)	MassDEP VPH CAM IV A ( )	8082 PCB CAM V A (X)	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 CAM IV C ( )	8081 Pesticides CAM V B (X)	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 (X)	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]

<u>Data User Note:</u> 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: 09/20/21

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September 27, 2021

Matt Kissane
Fuss & O'Neill EnviroScience, LLC - MA
108 Myrtle St,
Quincy, MA 02171

Project Location: Haverhill, MA
Client Job Number:
Project Number: 20170390.U30
Laboratory Work Order Number: 21I0997

Enclosed are results of analyses for samples received by the laboratory on September 20, 2021. If you have any questions concerning this report, please feel free to contact me.

Sincerely,



Jessica L. Hoffman
Project Manager

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Fuss & O'Neill EnviroScience, LLC - MA
108 Myrtle St,
Quincy, MA 02171
ATTN: Matt Kissane

REPORT DATE: 9/27/2021

PURCHASE ORDER NUMBER:

PROJECT NUMBER: 20170390.U30

ANALYTICAL SUMMARY

WORK ORDER NUMBER: 21I0997

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

PROJECT LOCATION: Haverhill, MA

FIELD SAMPLE #	LAB ID:	MATRIX	SAMPLE DESCRIPTION	TEST	SUB LAB
1543210917-01	21I0997-01	Soil		SM 2540G	
				SW-846 6010D	
				SW-846 8082A	
1543210917-02	21I0997-02	Soil		SM 2540G	
				SW-846 6010D	
				SW-846 8082A	
1543210917-03	21I0997-03	Soil		SM 2540G	
				SW-846 6010D	
				SW-846 8082A	
1543210917-04	21I0997-04	Soil		MADEP EPH rev 2.1	
				SM 2540G	
				SW-846 6010D	
				SW-846 8082A	
				SW-846 8270D-E	
1543210917-05	21I0997-05	Soil		MADEP EPH rev 2.1	
				SM 2540G	
				SW-846 6010D	
				SW-846 8082A	
				SW-846 8270D-E	
1543210917-06	21I0997-06	Soil		MADEP EPH rev 2.1	
				SM 2540G	
				SW-846 6010D	
				SW-846 8082A	
				SW-846 8270D-E	
1543210917-07	21I0997-07	Soil		MADEP EPH rev 2.1	
				SM 2540G	
				SW-846 6010D	
				SW-846 8082A	
				SW-846 8270D-E	
1543210917-08	21I0997-08	Soil		MADEP EPH rev 2.1	
				SM 2540G	
				SW-846 6010D	
				SW-846 8082A	
				SW-846 8270D-E	
1543210917-09	21I0997-09	Soil		MADEP EPH rev 2.1	
				SM 2540G	
				SW-846 6010D	
				SW-846 8082A	
				SW-846 8270D-E	

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Fuss & O'Neill EnviroScience, LLC - MA
108 Myrtle St,
Quincy, MA 02171
ATTN: Matt Kissane

REPORT DATE: 9/27/2021

PURCHASE ORDER NUMBER:

PROJECT NUMBER: 20170390.U30

ANALYTICAL SUMMARY

WORK ORDER NUMBER: 21I0997

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

PROJECT LOCATION: Haverhill, MA

FIELD SAMPLE #	LAB ID:	MATRIX	SAMPLE DESCRIPTION	TEST	SUB LAB
1543210917-10	21I0997-10	Soil		MADEP EPH rev 2.1 SM 2540G SW-846 6010D SW-846 8082A SW-846 8270D-E	

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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.
For method MA EPH, only hydrocarbon ranges were requested and reported.
For Method 6010, only As and Pb were requested and reported.

SW-846 8082A

Qualifications:

O-32

A dilution was performed as part of the standard analytical procedure.

Analyte & Samples(s) Qualified:

21I0997-02[1543210917-02], 21I0997-04[1543210917-04], 21I0997-06[1543210917-06], 21I0997-07[1543210917-07], 21I0997-08[1543210917-08], 21I0997-09[1543210917-09], 21I0997-10[1543210917-10]

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.



Tod E. Kopyscinski
Laboratory Director

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Project Location: Haverhill, MA | Sample Description: | Work Order: 21I0997

Date Received: 9/20/2021

Field Sample #: 1543210917-01 | Sampled: 9/17/2021 08:35

Sample ID: 21I0997-01

Sample Matrix: Soil

Polychlorinated Biphenyls By GC/ECD

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.16	mg/Kg dry	4		SW-846 8082A	9/21/21	9/23/21 11:34	SFM
Aroclor-1221 [1]	ND	0.16	mg/Kg dry	4		SW-846 8082A	9/21/21	9/23/21 11:34	SFM
Aroclor-1232 [1]	ND	0.16	mg/Kg dry	4		SW-846 8082A	9/21/21	9/23/21 11:34	SFM
Aroclor-1242 [1]	ND	0.16	mg/Kg dry	4		SW-846 8082A	9/21/21	9/23/21 11:34	SFM
Aroclor-1248 [1]	ND	0.16	mg/Kg dry	4		SW-846 8082A	9/21/21	9/23/21 11:34	SFM
Aroclor-1254 [2]	0.20	0.16	mg/Kg dry	4		SW-846 8082A	9/21/21	9/23/21 11:34	SFM
Aroclor-1260 [1]	ND	0.16	mg/Kg dry	4		SW-846 8082A	9/21/21	9/23/21 11:34	SFM
Aroclor-1262 [1]	ND	0.16	mg/Kg dry	4		SW-846 8082A	9/21/21	9/23/21 11:34	SFM
Aroclor-1268 [1]	ND	0.16	mg/Kg dry	4		SW-846 8082A	9/21/21	9/23/21 11:34	SFM

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Decachlorobiphenyl [1]	79.6	30-150		9/23/21 11:34
Decachlorobiphenyl [2]	82.0	30-150		9/23/21 11:34
Tetrachloro-m-xylene [1]	74.7	30-150		9/23/21 11:34
Tetrachloro-m-xylene [2]	68.6	30-150		9/23/21 11:34

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Project Location: Haverhill, MA | Sample Description: | Work Order: 21I0997

Date Received: 9/20/2021

Field Sample #: 1543210917-01 | Sampled: 9/17/2021 08:35

Sample ID: 21I0997-01

Sample Matrix: Soil

Metals Analyses (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Arsenic	12	6.2	mg/Kg dry	1		SW-846 6010D	9/24/21	9/26/21 23:37	JLC
Lead	150	0.92	mg/Kg dry	1		SW-846 6010D	9/24/21	9/26/21 23:37	JLC

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Project Location: Haverhill, MA | Sample Description: | Work Order: 21I0997

Date Received: 9/20/2021

Field Sample #: 1543210917-01 | Sampled: 9/17/2021 08:35

Sample ID: 21I0997-01

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	50.8		% Wt	1		SM 2540G	9/23/21	9/24/21 12:41	BMB

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Project Location: Haverhill, MA | Sample Description: | Work Order: 21I0997

Date Received: 9/20/2021

Field Sample #: 1543210917-02 | Sampled: 9/17/2021 08:55

Sample ID: 21I0997-02

Sample Matrix: Soil

Sample Flags: O-32

Polychlorinated Biphenyls By GC/ECD

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.19	mg/Kg dry	4		SW-846 8082A	9/21/21	9/23/21 11:52	SFM
Aroclor-1221 [1]	ND	0.19	mg/Kg dry	4		SW-846 8082A	9/21/21	9/23/21 11:52	SFM
Aroclor-1232 [1]	ND	0.19	mg/Kg dry	4		SW-846 8082A	9/21/21	9/23/21 11:52	SFM
Aroclor-1242 [1]	ND	0.19	mg/Kg dry	4		SW-846 8082A	9/21/21	9/23/21 11:52	SFM
Aroclor-1248 [1]	ND	0.19	mg/Kg dry	4		SW-846 8082A	9/21/21	9/23/21 11:52	SFM
Aroclor-1254 [1]	ND	0.19	mg/Kg dry	4		SW-846 8082A	9/21/21	9/23/21 11:52	SFM
Aroclor-1260 [1]	ND	0.19	mg/Kg dry	4		SW-846 8082A	9/21/21	9/23/21 11:52	SFM
Aroclor-1262 [1]	ND	0.19	mg/Kg dry	4		SW-846 8082A	9/21/21	9/23/21 11:52	SFM
Aroclor-1268 [1]	ND	0.19	mg/Kg dry	4		SW-846 8082A	9/21/21	9/23/21 11:52	SFM

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Decachlorobiphenyl [1]	67.3	30-150		9/23/21 11:52
Decachlorobiphenyl [2]	69.5	30-150		9/23/21 11:52
Tetrachloro-m-xylene [1]	64.8	30-150		9/23/21 11:52
Tetrachloro-m-xylene [2]	58.9	30-150		9/23/21 11:52

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Project Location: Haverhill, MA | Sample Description: | Work Order: 21I0997

Date Received: 9/20/2021

Field Sample #: 1543210917-02 | Sampled: 9/17/2021 08:55

Sample ID: 21I0997-02

Sample Matrix: Soil

Metals Analyses (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Arsenic	41	7.7	mg/Kg dry	1		SW-846 6010D	9/24/21	9/26/21 23:44	JLC
Lead	240	1.2	mg/Kg dry	1		SW-846 6010D	9/24/21	9/26/21 23:44	JLC

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Project Location: Haverhill, MA | Sample Description: | Work Order: 21I0997

Date Received: 9/20/2021

Field Sample #: 1543210917-02 | Sampled: 9/17/2021 08:55

Sample ID: 21I0997-02

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	41.2		% Wt	1		SM 2540G	9/23/21	9/24/21 12:41	BMB

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Project Location: Haverhill, MA | Sample Description: | Work Order: 21I0997

Date Received: 9/20/2021

Field Sample #: 1543210917-03 | Sampled: 9/17/2021 08:45

Sample ID: 21I0997-03

Sample Matrix: Soil

Polychlorinated Biphenyls By GC/ECD

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.15	mg/Kg dry	4		SW-846 8082A	9/21/21	9/23/21 12:10	SFM
Aroclor-1221 [1]	ND	0.15	mg/Kg dry	4		SW-846 8082A	9/21/21	9/23/21 12:10	SFM
Aroclor-1232 [1]	ND	0.15	mg/Kg dry	4		SW-846 8082A	9/21/21	9/23/21 12:10	SFM
Aroclor-1242 [1]	ND	0.15	mg/Kg dry	4		SW-846 8082A	9/21/21	9/23/21 12:10	SFM
Aroclor-1248 [1]	ND	0.15	mg/Kg dry	4		SW-846 8082A	9/21/21	9/23/21 12:10	SFM
Aroclor-1254 [1]	0.23	0.15	mg/Kg dry	4		SW-846 8082A	9/21/21	9/23/21 12:10	SFM
Aroclor-1260 [1]	ND	0.15	mg/Kg dry	4		SW-846 8082A	9/21/21	9/23/21 12:10	SFM
Aroclor-1262 [1]	ND	0.15	mg/Kg dry	4		SW-846 8082A	9/21/21	9/23/21 12:10	SFM
Aroclor-1268 [1]	ND	0.15	mg/Kg dry	4		SW-846 8082A	9/21/21	9/23/21 12:10	SFM

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Decachlorobiphenyl [1]	72.2	30-150		9/23/21 12:10
Decachlorobiphenyl [2]	74.3	30-150		9/23/21 12:10
Tetrachloro-m-xylene [1]	68.3	30-150		9/23/21 12:10
Tetrachloro-m-xylene [2]	61.3	30-150		9/23/21 12:10

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Project Location: Haverhill, MA | Sample Description: | Work Order: 21I0997

Date Received: 9/20/2021

Field Sample #: 1543210917-03 | Sampled: 9/17/2021 08:45

Sample ID: 21I0997-03

Sample Matrix: Soil

Metals Analyses (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Arsenic	13	6.0	mg/Kg dry	1		SW-846 6010D	9/24/21	9/26/21 23:51	JLC
Lead	600	0.91	mg/Kg dry	1		SW-846 6010D	9/24/21	9/26/21 23:51	JLC

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Project Location: Haverhill, MA | Sample Description: | Work Order: 21I0997

Date Received: 9/20/2021

Field Sample #: 1543210917-03 | Sampled: 9/17/2021 08:45

Sample ID: 21I0997-03

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	52.0		% Wt	1		SM 2540G	9/23/21	9/24/21 12:41	BMB

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Project Location: Haverhill, MA | Sample Description: | Work Order: 21I0997

Date Received: 9/20/2021

Field Sample #: 1543210917-04 | Sampled: 9/17/2021 09:40

Sample ID: 21I0997-04

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	0.32	mg/Kg dry	1		SW-846 8270D-E	9/21/21	9/24/21 14:30	BGL
Acenaphthylene	ND	0.32	mg/Kg dry	1		SW-846 8270D-E	9/21/21	9/24/21 14:30	BGL
Anthracene	ND	0.32	mg/Kg dry	1		SW-846 8270D-E	9/21/21	9/24/21 14:30	BGL
Benzo(a)anthracene	1.0	0.32	mg/Kg dry	1		SW-846 8270D-E	9/21/21	9/24/21 14:30	BGL
Benzo(a)pyrene	1.2	0.32	mg/Kg dry	1		SW-846 8270D-E	9/21/21	9/24/21 14:30	BGL
Benzo(b)fluoranthene	1.5	0.32	mg/Kg dry	1		SW-846 8270D-E	9/21/21	9/24/21 14:30	BGL
Benzo(g,h,i)perylene	0.65	0.32	mg/Kg dry	1		SW-846 8270D-E	9/21/21	9/24/21 14:30	BGL
Benzo(k)fluoranthene	0.58	0.32	mg/Kg dry	1		SW-846 8270D-E	9/21/21	9/24/21 14:30	BGL
Chrysene	1.1	0.32	mg/Kg dry	1		SW-846 8270D-E	9/21/21	9/24/21 14:30	BGL
Dibenz(a,h)anthracene	ND	0.32	mg/Kg dry	1		SW-846 8270D-E	9/21/21	9/24/21 14:30	BGL
Fluoranthene	2.3	0.32	mg/Kg dry	1		SW-846 8270D-E	9/21/21	9/24/21 14:30	BGL
Fluorene	ND	0.32	mg/Kg dry	1		SW-846 8270D-E	9/21/21	9/24/21 14:30	BGL
Indeno(1,2,3-cd)pyrene	0.82	0.32	mg/Kg dry	1		SW-846 8270D-E	9/21/21	9/24/21 14:30	BGL
2-Methylnaphthalene	ND	0.32	mg/Kg dry	1		SW-846 8270D-E	9/21/21	9/24/21 14:30	BGL
Naphthalene	ND	0.32	mg/Kg dry	1		SW-846 8270D-E	9/21/21	9/24/21 14:30	BGL
Phenanthrene	1.2	0.32	mg/Kg dry	1		SW-846 8270D-E	9/21/21	9/24/21 14:30	BGL
Pyrene	2.0	0.32	mg/Kg dry	1		SW-846 8270D-E	9/21/21	9/24/21 14:30	BGL

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Nitrobenzene-d5	63.3	30-130		9/24/21 14:30
2-Fluorobiphenyl	74.3	30-130		9/24/21 14:30
p-Terphenyl-d14	92.5	30-130		9/24/21 14:30

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Project Location: Haverhill, MA | Sample Description: | Work Order: 21I0997

Date Received: 9/20/2021

Field Sample #: 1543210917-04 | Sampled: 9/17/2021 09:40

Sample ID: 21I0997-04

Sample Matrix: Soil

Sample Flags: O-32

Polychlorinated Biphenyls By GC/ECD

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.15	mg/Kg dry	4		SW-846 8082A	9/21/21	9/23/21 12:27	SFM
Aroclor-1221 [1]	ND	0.15	mg/Kg dry	4		SW-846 8082A	9/21/21	9/23/21 12:27	SFM
Aroclor-1232 [1]	ND	0.15	mg/Kg dry	4		SW-846 8082A	9/21/21	9/23/21 12:27	SFM
Aroclor-1242 [1]	ND	0.15	mg/Kg dry	4		SW-846 8082A	9/21/21	9/23/21 12:27	SFM
Aroclor-1248 [1]	ND	0.15	mg/Kg dry	4		SW-846 8082A	9/21/21	9/23/21 12:27	SFM
Aroclor-1254 [1]	ND	0.15	mg/Kg dry	4		SW-846 8082A	9/21/21	9/23/21 12:27	SFM
Aroclor-1260 [1]	ND	0.15	mg/Kg dry	4		SW-846 8082A	9/21/21	9/23/21 12:27	SFM
Aroclor-1262 [1]	ND	0.15	mg/Kg dry	4		SW-846 8082A	9/21/21	9/23/21 12:27	SFM
Aroclor-1268 [1]	ND	0.15	mg/Kg dry	4		SW-846 8082A	9/21/21	9/23/21 12:27	SFM

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Decachlorobiphenyl [1]	68.4	30-150		9/23/21 12:27
Decachlorobiphenyl [2]	66.2	30-150		9/23/21 12:27
Tetrachloro-m-xylene [1]	66.6	30-150		9/23/21 12:27
Tetrachloro-m-xylene [2]	62.5	30-150		9/23/21 12:27

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Project Location: Haverhill, MA | Sample Description: | Work Order: 21I0997

Date Received: 9/20/2021

Field Sample #: 1543210917-04 | Sampled: 9/17/2021 09:40

Sample ID: 21I0997-04

Sample Matrix: Soil

Petroleum Hydrocarbons Analyses - EPH

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
C9-C18 Aliphatics	24	19	mg/Kg dry	1		MADEP EPH rev 2.1	9/21/21	9/24/21 4:29	AYH
C19-C36 Aliphatics	150	19	mg/Kg dry	1		MADEP EPH rev 2.1	9/21/21	9/24/21 4:29	AYH
Unadjusted C11-C22 Aromatics	110	19	mg/Kg dry	1		MADEP EPH rev 2.1	9/21/21	9/24/21 4:29	AYH
C11-C22 Aromatics	98	19	mg/Kg dry	1		MADEP EPH rev 2.1	9/21/21	9/24/21 4:29	AYH

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Chlorooctadecane (COD)	70.0	40-140		9/24/21 4:29
o-Terphenyl (OTP)	74.2	40-140		9/24/21 4:29
2-Bromonaphthalene	85.1	40-140		9/24/21 4:29
2-Fluorobiphenyl	85.4	40-140		9/24/21 4:29

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Project Location: Haverhill, MA | Sample Description: | Work Order: 21I0997

Date Received: 9/20/2021

Field Sample #: 1543210917-04 | Sampled: 9/17/2021 09:40

Sample ID: 21I0997-04

Sample Matrix: Soil

Metals Analyses (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Arsenic	14	6.1	mg/Kg dry	1		SW-846 6010D	9/24/21	9/26/21 23:58	JLC
Lead	79	0.91	mg/Kg dry	1		SW-846 6010D	9/24/21	9/26/21 23:58	JLC

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Project Location: Haverhill, MA | Sample Description: | Work Order: 21I0997

Date Received: 9/20/2021

Field Sample #: 1543210917-04 | Sampled: 9/17/2021 09:40

Sample ID: 21I0997-04

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	53.8		% Wt	1		SM 2540G	9/23/21	9/24/21 12:41	BMB

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Project Location: Haverhill, MA | Sample Description: | Work Order: 21I0997

Date Received: 9/20/2021

Field Sample #: 1543210917-05 | Sampled: 9/17/2021 09:15

Sample ID: 21I0997-05

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	0.41	mg/Kg dry	1		SW-846 8270D-E	9/21/21	9/22/21 17:06	IMR
Acenaphthylene	ND	0.41	mg/Kg dry	1		SW-846 8270D-E	9/21/21	9/22/21 17:06	IMR
Anthracene	ND	0.41	mg/Kg dry	1		SW-846 8270D-E	9/21/21	9/22/21 17:06	IMR
Benzo(a)anthracene	1.2	0.41	mg/Kg dry	1		SW-846 8270D-E	9/21/21	9/22/21 17:06	IMR
Benzo(a)pyrene	1.4	0.41	mg/Kg dry	1		SW-846 8270D-E	9/21/21	9/22/21 17:06	IMR
Benzo(b)fluoranthene	2.0	0.41	mg/Kg dry	1		SW-846 8270D-E	9/21/21	9/22/21 17:06	IMR
Benzo(g,h,i)perylene	0.84	0.41	mg/Kg dry	1		SW-846 8270D-E	9/21/21	9/22/21 17:06	IMR
Benzo(k)fluoranthene	0.77	0.41	mg/Kg dry	1		SW-846 8270D-E	9/21/21	9/22/21 17:06	IMR
Chrysene	1.5	0.41	mg/Kg dry	1		SW-846 8270D-E	9/21/21	9/22/21 17:06	IMR
Dibenz(a,h)anthracene	ND	0.41	mg/Kg dry	1		SW-846 8270D-E	9/21/21	9/22/21 17:06	IMR
Fluoranthene	2.6	0.41	mg/Kg dry	1		SW-846 8270D-E	9/21/21	9/22/21 17:06	IMR
Fluorene	ND	0.41	mg/Kg dry	1		SW-846 8270D-E	9/21/21	9/22/21 17:06	IMR
Indeno(1,2,3-cd)pyrene	0.87	0.41	mg/Kg dry	1		SW-846 8270D-E	9/21/21	9/22/21 17:06	IMR
2-Methylnaphthalene	ND	0.41	mg/Kg dry	1		SW-846 8270D-E	9/21/21	9/22/21 17:06	IMR
Naphthalene	ND	0.41	mg/Kg dry	1		SW-846 8270D-E	9/21/21	9/22/21 17:06	IMR
Phenanthrene	1.4	0.41	mg/Kg dry	1		SW-846 8270D-E	9/21/21	9/22/21 17:06	IMR
Pyrene	2.4	0.41	mg/Kg dry	1		SW-846 8270D-E	9/21/21	9/22/21 17:06	IMR

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Nitrobenzene-d5	52.5	30-130		9/22/21 17:06
2-Fluorobiphenyl	55.7	30-130		9/22/21 17:06
p-Terphenyl-d14	55.4	30-130		9/22/21 17:06

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Project Location: Haverhill, MA | Sample Description: | Work Order: 21I0997

Date Received: 9/20/2021

Field Sample #: 1543210917-05 | Sampled: 9/17/2021 09:15

Sample ID: 21I0997-05

Sample Matrix: Soil

Polychlorinated Biphenyls By GC/ECD

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.19	mg/Kg dry	4		SW-846 8082A	9/21/21	9/23/21 12:45	SFM
Aroclor-1221 [1]	ND	0.19	mg/Kg dry	4		SW-846 8082A	9/21/21	9/23/21 12:45	SFM
Aroclor-1232 [1]	ND	0.19	mg/Kg dry	4		SW-846 8082A	9/21/21	9/23/21 12:45	SFM
Aroclor-1242 [1]	ND	0.19	mg/Kg dry	4		SW-846 8082A	9/21/21	9/23/21 12:45	SFM
Aroclor-1248 [1]	ND	0.19	mg/Kg dry	4		SW-846 8082A	9/21/21	9/23/21 12:45	SFM
Aroclor-1254 [2]	0.20	0.19	mg/Kg dry	4		SW-846 8082A	9/21/21	9/23/21 12:45	SFM
Aroclor-1260 [1]	ND	0.19	mg/Kg dry	4		SW-846 8082A	9/21/21	9/23/21 12:45	SFM
Aroclor-1262 [1]	ND	0.19	mg/Kg dry	4		SW-846 8082A	9/21/21	9/23/21 12:45	SFM
Aroclor-1268 [1]	ND	0.19	mg/Kg dry	4		SW-846 8082A	9/21/21	9/23/21 12:45	SFM

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Decachlorobiphenyl [1]	54.6	30-150		9/23/21 12:45
Decachlorobiphenyl [2]	54.8	30-150		9/23/21 12:45
Tetrachloro-m-xylene [1]	43.9	30-150		9/23/21 12:45
Tetrachloro-m-xylene [2]	40.4	30-150		9/23/21 12:45

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Project Location: Haverhill, MA | Sample Description: | Work Order: 21I0997

Date Received: 9/20/2021

Field Sample #: 1543210917-05 | Sampled: 9/17/2021 09:15

Sample ID: 21I0997-05

Sample Matrix: Soil

Petroleum Hydrocarbons Analyses - EPH

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
C9-C18 Aliphatics	99	24	mg/Kg dry	1		MADEP EPH rev 2.1	9/21/21	9/24/21 5:10	AYH
C19-C36 Aliphatics	640	48	mg/Kg dry	2		MADEP EPH rev 2.1	9/21/21	9/24/21 14:35	AYH
Unadjusted C11-C22 Aromatics	360	24	mg/Kg dry	1		MADEP EPH rev 2.1	9/21/21	9/24/21 5:10	AYH
C11-C22 Aromatics	320	24	mg/Kg dry	1		MADEP EPH rev 2.1	9/21/21	9/24/21 5:10	AYH

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Chlorooctadecane (COD)	48.1	40-140		9/24/21 5:10
Chlorooctadecane (COD)	60.0	40-140		9/24/21 14:35
o-Terphenyl (OTP)	56.5	40-140		9/24/21 5:10
2-Bromonaphthalene	82.4	40-140		9/24/21 5:10
2-Fluorobiphenyl	76.8	40-140		9/24/21 5:10

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Project Location: Haverhill, MA | Sample Description: | Work Order: 21I0997

Date Received: 9/20/2021

Field Sample #: 1543210917-05 | Sampled: 9/17/2021 09:15

Sample ID: 21I0997-05

Sample Matrix: Soil

Metals Analyses (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Arsenic	16	8.1	mg/Kg dry	1		SW-846 6010D	9/24/21	9/27/21 0:05	JLC
Lead	320	1.2	mg/Kg dry	1		SW-846 6010D	9/24/21	9/27/21 0:05	JLC

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Project Location: Haverhill, MA
Sample Description:
Work Order: 21I0997

Date Received: 9/20/2021

Field Sample #: 1543210917-05
Sampled: 9/17/2021 09:15

Sample ID: 21I0997-05

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	41.3		% Wt	1		SM 2540G	9/23/21	9/24/21 12:41	BMB

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Project Location: Haverhill, MA | Sample Description: | Work Order: 21I0997

Date Received: 9/20/2021

Field Sample #: 1543210917-06 | Sampled: 9/17/2021 09:25

Sample ID: 21I0997-06

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	0.23	mg/Kg dry	1		SW-846 8270D-E	9/21/21	9/22/21 17:29	IMR
Acenaphthylene	ND	0.23	mg/Kg dry	1		SW-846 8270D-E	9/21/21	9/22/21 17:29	IMR
Anthracene	ND	0.23	mg/Kg dry	1		SW-846 8270D-E	9/21/21	9/22/21 17:29	IMR
Benzo(a)anthracene	ND	0.23	mg/Kg dry	1		SW-846 8270D-E	9/21/21	9/22/21 17:29	IMR
Benzo(a)pyrene	ND	0.23	mg/Kg dry	1		SW-846 8270D-E	9/21/21	9/22/21 17:29	IMR
Benzo(b)fluoranthene	ND	0.23	mg/Kg dry	1		SW-846 8270D-E	9/21/21	9/22/21 17:29	IMR
Benzo(g,h,i)perylene	ND	0.23	mg/Kg dry	1		SW-846 8270D-E	9/21/21	9/22/21 17:29	IMR
Benzo(k)fluoranthene	ND	0.23	mg/Kg dry	1		SW-846 8270D-E	9/21/21	9/22/21 17:29	IMR
Chrysene	ND	0.23	mg/Kg dry	1		SW-846 8270D-E	9/21/21	9/22/21 17:29	IMR
Dibenz(a,h)anthracene	ND	0.23	mg/Kg dry	1		SW-846 8270D-E	9/21/21	9/22/21 17:29	IMR
Fluoranthene	ND	0.23	mg/Kg dry	1		SW-846 8270D-E	9/21/21	9/22/21 17:29	IMR
Fluorene	ND	0.23	mg/Kg dry	1		SW-846 8270D-E	9/21/21	9/22/21 17:29	IMR
Indeno(1,2,3-cd)pyrene	ND	0.23	mg/Kg dry	1		SW-846 8270D-E	9/21/21	9/22/21 17:29	IMR
2-Methylnaphthalene	ND	0.23	mg/Kg dry	1		SW-846 8270D-E	9/21/21	9/22/21 17:29	IMR
Naphthalene	ND	0.23	mg/Kg dry	1		SW-846 8270D-E	9/21/21	9/22/21 17:29	IMR
Phenanthrene	ND	0.23	mg/Kg dry	1		SW-846 8270D-E	9/21/21	9/22/21 17:29	IMR
Pyrene	ND	0.23	mg/Kg dry	1		SW-846 8270D-E	9/21/21	9/22/21 17:29	IMR

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Nitrobenzene-d5	65.7	30-130		9/22/21 17:29
2-Fluorobiphenyl	56.8	30-130		9/22/21 17:29
p-Terphenyl-d14	63.8	30-130		9/22/21 17:29

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Project Location: Haverhill, MA | Sample Description: | Work Order: 21I0997

Date Received: 9/20/2021

Field Sample #: 1543210917-06 | Sampled: 9/17/2021 09:25

Sample ID: 21I0997-06

Sample Matrix: Soil

Sample Flags: O-32

Polychlorinated Biphenyls By GC/ECD

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.11	mg/Kg dry	4		SW-846 8082A	9/21/21	9/23/21 13:02	SFM
Aroclor-1221 [1]	ND	0.11	mg/Kg dry	4		SW-846 8082A	9/21/21	9/23/21 13:02	SFM
Aroclor-1232 [1]	ND	0.11	mg/Kg dry	4		SW-846 8082A	9/21/21	9/23/21 13:02	SFM
Aroclor-1242 [1]	ND	0.11	mg/Kg dry	4		SW-846 8082A	9/21/21	9/23/21 13:02	SFM
Aroclor-1248 [1]	ND	0.11	mg/Kg dry	4		SW-846 8082A	9/21/21	9/23/21 13:02	SFM
Aroclor-1254 [1]	ND	0.11	mg/Kg dry	4		SW-846 8082A	9/21/21	9/23/21 13:02	SFM
Aroclor-1260 [1]	ND	0.11	mg/Kg dry	4		SW-846 8082A	9/21/21	9/23/21 13:02	SFM
Aroclor-1262 [1]	ND	0.11	mg/Kg dry	4		SW-846 8082A	9/21/21	9/23/21 13:02	SFM
Aroclor-1268 [1]	ND	0.11	mg/Kg dry	4		SW-846 8082A	9/21/21	9/23/21 13:02	SFM

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Decachlorobiphenyl [1]	87.8	30-150		9/23/21 13:02
Decachlorobiphenyl [2]	85.9	30-150		9/23/21 13:02
Tetrachloro-m-xylene [1]	75.9	30-150		9/23/21 13:02
Tetrachloro-m-xylene [2]	71.9	30-150		9/23/21 13:02

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Project Location: Haverhill, MA | Sample Description: | Work Order: 21I0997

Date Received: 9/20/2021

Field Sample #: 1543210917-06 | Sampled: 9/17/2021 09:25

Sample ID: 21I0997-06

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	14	mg/Kg dry	1		MADEP EPH rev 2.1	9/21/21	9/24/21 1:23	AYH
C19-C36 Aliphatics	ND	14	mg/Kg dry	1		MADEP EPH rev 2.1	9/21/21	9/24/21 1:23	AYH
Unadjusted C11-C22 Aromatics	ND	14	mg/Kg dry	1		MADEP EPH rev 2.1	9/21/21	9/24/21 1:23	AYH
C11-C22 Aromatics	ND	14	mg/Kg dry	1		MADEP EPH rev 2.1	9/21/21	9/24/21 1:23	AYH

Surrogates	% Recovery	Recovery Limits	Flag/Qual		
Chlorooctadecane (COD)	56.8	40-140		9/24/21 1:23	
o-Terphenyl (OTP)	63.8	40-140		9/24/21 1:23	
2-Bromonaphthalene	72.4	40-140		9/24/21 1:23	
2-Fluorobiphenyl	72.0	40-140		9/24/21 1:23	

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Project Location: Haverhill, MA | Sample Description: | Work Order: 21I0997

Date Received: 9/20/2021

Field Sample #: 1543210917-06 | Sampled: 9/17/2021 09:25

Sample ID: 21I0997-06

Sample Matrix: Soil

Metals Analyses (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Arsenic	ND	4.3	mg/Kg dry	1		SW-846 6010D	9/24/21	9/27/21 0:24	JLC
Lead	3.0	0.64	mg/Kg dry	1		SW-846 6010D	9/24/21	9/27/21 0:24	JLC

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Project Location: Haverhill, MA | Sample Description: | Work Order: 21I0997

Date Received: 9/20/2021

Field Sample #: 1543210917-06 | Sampled: 9/17/2021 09:25

Sample ID: 21I0997-06

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	73.9		% Wt	1		SM 2540G	9/23/21	9/24/21 12:41	BMB

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Project Location: Haverhill, MA | Sample Description: | Work Order: 21I0997

Date Received: 9/20/2021

Field Sample #: 1543210917-07 | Sampled: 9/17/2021 09:35

Sample ID: 21I0997-07

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	0.30	mg/Kg dry	1		SW-846 8270D-E	9/21/21	9/22/21 17:52	IMR
Acenaphthylene	ND	0.30	mg/Kg dry	1		SW-846 8270D-E	9/21/21	9/22/21 17:52	IMR
Anthracene	ND	0.30	mg/Kg dry	1		SW-846 8270D-E	9/21/21	9/22/21 17:52	IMR
Benzo(a)anthracene	1.0	0.30	mg/Kg dry	1		SW-846 8270D-E	9/21/21	9/22/21 17:52	IMR
Benzo(a)pyrene	1.2	0.30	mg/Kg dry	1		SW-846 8270D-E	9/21/21	9/22/21 17:52	IMR
Benzo(b)fluoranthene	1.6	0.30	mg/Kg dry	1		SW-846 8270D-E	9/21/21	9/22/21 17:52	IMR
Benzo(g,h,i)perylene	0.89	0.30	mg/Kg dry	1		SW-846 8270D-E	9/21/21	9/22/21 17:52	IMR
Benzo(k)fluoranthene	0.66	0.30	mg/Kg dry	1		SW-846 8270D-E	9/21/21	9/22/21 17:52	IMR
Chrysene	1.3	0.30	mg/Kg dry	1		SW-846 8270D-E	9/21/21	9/22/21 17:52	IMR
Dibenz(a,h)anthracene	ND	0.30	mg/Kg dry	1		SW-846 8270D-E	9/21/21	9/22/21 17:52	IMR
Fluoranthene	2.2	0.30	mg/Kg dry	1		SW-846 8270D-E	9/21/21	9/22/21 17:52	IMR
Fluorene	ND	0.30	mg/Kg dry	1		SW-846 8270D-E	9/21/21	9/22/21 17:52	IMR
Indeno(1,2,3-cd)pyrene	0.91	0.30	mg/Kg dry	1		SW-846 8270D-E	9/21/21	9/22/21 17:52	IMR
2-Methylnaphthalene	ND	0.30	mg/Kg dry	1		SW-846 8270D-E	9/21/21	9/22/21 17:52	IMR
Naphthalene	ND	0.30	mg/Kg dry	1		SW-846 8270D-E	9/21/21	9/22/21 17:52	IMR
Phenanthrene	1.6	0.30	mg/Kg dry	1		SW-846 8270D-E	9/21/21	9/22/21 17:52	IMR
Pyrene	2.1	0.30	mg/Kg dry	1		SW-846 8270D-E	9/21/21	9/22/21 17:52	IMR

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Nitrobenzene-d5	62.2	30-130		9/22/21 17:52
2-Fluorobiphenyl	68.5	30-130		9/22/21 17:52
p-Terphenyl-d14	69.4	30-130		9/22/21 17:52

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Project Location: Haverhill, MA | Sample Description: | Work Order: 21I0997

Date Received: 9/20/2021

Field Sample #: 1543210917-07 | Sampled: 9/17/2021 09:35

Sample ID: 21I0997-07

Sample Matrix: Soil

Sample Flags: O-32

Polychlorinated Biphenyls By GC/ECD

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.14	mg/Kg dry	4		SW-846 8082A	9/21/21	9/23/21 13:20	SFM
Aroclor-1221 [1]	ND	0.14	mg/Kg dry	4		SW-846 8082A	9/21/21	9/23/21 13:20	SFM
Aroclor-1232 [1]	ND	0.14	mg/Kg dry	4		SW-846 8082A	9/21/21	9/23/21 13:20	SFM
Aroclor-1242 [1]	ND	0.14	mg/Kg dry	4		SW-846 8082A	9/21/21	9/23/21 13:20	SFM
Aroclor-1248 [1]	ND	0.14	mg/Kg dry	4		SW-846 8082A	9/21/21	9/23/21 13:20	SFM
Aroclor-1254 [1]	ND	0.14	mg/Kg dry	4		SW-846 8082A	9/21/21	9/23/21 13:20	SFM
Aroclor-1260 [1]	ND	0.14	mg/Kg dry	4		SW-846 8082A	9/21/21	9/23/21 13:20	SFM
Aroclor-1262 [1]	ND	0.14	mg/Kg dry	4		SW-846 8082A	9/21/21	9/23/21 13:20	SFM
Aroclor-1268 [1]	ND	0.14	mg/Kg dry	4		SW-846 8082A	9/21/21	9/23/21 13:20	SFM

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Decachlorobiphenyl [1]	78.2	30-150		9/23/21 13:20
Decachlorobiphenyl [2]	78.7	30-150		9/23/21 13:20
Tetrachloro-m-xylene [1]	74.8	30-150		9/23/21 13:20
Tetrachloro-m-xylene [2]	69.0	30-150		9/23/21 13:20

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Project Location: Haverhill, MA | Sample Description: | Work Order: 21I0997

Date Received: 9/20/2021

Field Sample #: 1543210917-07 | Sampled: 9/17/2021 09:35

Sample ID: 21I0997-07

Sample Matrix: Soil

Petroleum Hydrocarbons Analyses - EPH

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
C9-C18 Aliphatics	49	18	mg/Kg dry	1		MADEP EPH rev 2.1	9/21/21	9/24/21 4:50	AYH
C19-C36 Aliphatics	190	18	mg/Kg dry	1		MADEP EPH rev 2.1	9/21/21	9/24/21 4:50	AYH
Unadjusted C11-C22 Aromatics	180	18	mg/Kg dry	1		MADEP EPH rev 2.1	9/21/21	9/24/21 4:50	AYH
C11-C22 Aromatics	150	18	mg/Kg dry	1		MADEP EPH rev 2.1	9/21/21	9/24/21 4:50	AYH

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Chlorooctadecane (COD)	67.4	40-140		9/24/21 4:50
o-Terphenyl (OTP)	60.8	40-140		9/24/21 4:50
2-Bromonaphthalene	71.0	40-140		9/24/21 4:50
2-Fluorobiphenyl	68.3	40-140		9/24/21 4:50

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Project Location: Haverhill, MA | Sample Description: | Work Order: 21I0997

Date Received: 9/20/2021

Field Sample #: 1543210917-07 | Sampled: 9/17/2021 09:35

Sample ID: 21I0997-07

Sample Matrix: Soil

Metals Analyses (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Arsenic	13	5.7	mg/Kg dry	1		SW-846 6010D	9/24/21	9/27/21 0:31	JLC
Lead	200	0.86	mg/Kg dry	1		SW-846 6010D	9/24/21	9/27/21 0:31	JLC

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Project Location: Haverhill, MA | Sample Description: | Work Order: 21I0997

Date Received: 9/20/2021

Field Sample #: 1543210917-07 | Sampled: 9/17/2021 09:35

Sample ID: 21I0997-07

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	56.8		% Wt	1		SM 2540G	9/23/21	9/24/21 12:42	BMB

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Project Location: Haverhill, MA | Sample Description: | Work Order: 21I0997

Date Received: 9/20/2021

Field Sample #: 1543210917-08 | Sampled: 9/17/2021 10:20

Sample ID: 21I0997-08

Sample Matrix: Soil

Semivolatile Organic Compounds by GC/MS

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Acenaphthene	3.2	0.40	mg/Kg dry	1		SW-846 8270D-E	9/21/21	9/22/21 18:16	IMR
Acenaphthylene	ND	0.40	mg/Kg dry	1		SW-846 8270D-E	9/21/21	9/22/21 18:16	IMR
Anthracene	3.8	0.40	mg/Kg dry	1		SW-846 8270D-E	9/21/21	9/22/21 18:16	IMR
Benzo(a)anthracene	6.5	0.40	mg/Kg dry	1		SW-846 8270D-E	9/21/21	9/22/21 18:16	IMR
Benzo(a)pyrene	5.3	0.40	mg/Kg dry	1		SW-846 8270D-E	9/21/21	9/22/21 18:16	IMR
Benzo(b)fluoranthene	5.8	0.40	mg/Kg dry	1		SW-846 8270D-E	9/21/21	9/22/21 18:16	IMR
Benzo(g,h,i)perylene	3.3	0.40	mg/Kg dry	1		SW-846 8270D-E	9/21/21	9/22/21 18:16	IMR
Benzo(k)fluoranthene	2.2	0.40	mg/Kg dry	1		SW-846 8270D-E	9/21/21	9/22/21 18:16	IMR
Chrysene	7.2	0.40	mg/Kg dry	1		SW-846 8270D-E	9/21/21	9/22/21 18:16	IMR
Dibenz(a,h)anthracene	0.73	0.40	mg/Kg dry	1		SW-846 8270D-E	9/21/21	9/22/21 18:16	IMR
Fluoranthene	12	2.0	mg/Kg dry	5		SW-846 8270D-E	9/21/21	9/23/21 18:45	IMR
Fluorene	2.7	0.40	mg/Kg dry	1		SW-846 8270D-E	9/21/21	9/22/21 18:16	IMR
Indeno(1,2,3-cd)pyrene	3.3	0.40	mg/Kg dry	1		SW-846 8270D-E	9/21/21	9/22/21 18:16	IMR
2-Methylnaphthalene	1.3	0.40	mg/Kg dry	1		SW-846 8270D-E	9/21/21	9/22/21 18:16	IMR
Naphthalene	1.7	0.40	mg/Kg dry	1		SW-846 8270D-E	9/21/21	9/22/21 18:16	IMR
Phenanthrene	21	2.0	mg/Kg dry	5		SW-846 8270D-E	9/21/21	9/23/21 18:45	IMR
Pyrene	19	2.0	mg/Kg dry	5		SW-846 8270D-E	9/21/21	9/23/21 18:45	IMR

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Nitrobenzene-d5	60.6	30-130		9/22/21 18:16
Nitrobenzene-d5	64.7	30-130		9/23/21 18:45
2-Fluorobiphenyl	62.8	30-130		9/22/21 18:16
2-Fluorobiphenyl	70.0	30-130		9/23/21 18:45
p-Terphenyl-d14	64.6	30-130		9/22/21 18:16
p-Terphenyl-d14	76.2	30-130		9/23/21 18:45

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Project Location: Haverhill, MA | Sample Description: | Work Order: 21I0997

Date Received: 9/20/2021

Field Sample #: 1543210917-08 | Sampled: 9/17/2021 10:20

Sample ID: 21I0997-08

Sample Matrix: Soil

Sample Flags: O-32

Polychlorinated Biphenyls By GC/ECD

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.19	mg/Kg dry	4		SW-846 8082A	9/21/21	9/23/21 13:37	SFM
Aroclor-1221 [1]	ND	0.19	mg/Kg dry	4		SW-846 8082A	9/21/21	9/23/21 13:37	SFM
Aroclor-1232 [1]	ND	0.19	mg/Kg dry	4		SW-846 8082A	9/21/21	9/23/21 13:37	SFM
Aroclor-1242 [1]	ND	0.19	mg/Kg dry	4		SW-846 8082A	9/21/21	9/23/21 13:37	SFM
Aroclor-1248 [1]	ND	0.19	mg/Kg dry	4		SW-846 8082A	9/21/21	9/23/21 13:37	SFM
Aroclor-1254 [1]	ND	0.19	mg/Kg dry	4		SW-846 8082A	9/21/21	9/23/21 13:37	SFM
Aroclor-1260 [1]	ND	0.19	mg/Kg dry	4		SW-846 8082A	9/21/21	9/23/21 13:37	SFM
Aroclor-1262 [1]	ND	0.19	mg/Kg dry	4		SW-846 8082A	9/21/21	9/23/21 13:37	SFM
Aroclor-1268 [1]	ND	0.19	mg/Kg dry	4		SW-846 8082A	9/21/21	9/23/21 13:37	SFM

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Decachlorobiphenyl [1]	67.4	30-150		9/23/21 13:37
Decachlorobiphenyl [2]	67.6	30-150		9/23/21 13:37
Tetrachloro-m-xylene [1]	69.9	30-150		9/23/21 13:37
Tetrachloro-m-xylene [2]	63.8	30-150		9/23/21 13:37

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Project Location: Haverhill, MA | Sample Description: | Work Order: 21I0997

Date Received: 9/20/2021

Field Sample #: 1543210917-08 | Sampled: 9/17/2021 10:20

Sample ID: 21I0997-08

Sample Matrix: Soil

Petroleum Hydrocarbons Analyses - EPH

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
C9-C18 Aliphatics	34	23	mg/Kg dry	1		MADEP EPH rev 2.1	9/21/21	9/24/21 4:09	AYH
C19-C36 Aliphatics	400	47	mg/Kg dry	2		MADEP EPH rev 2.1	9/21/21	9/24/21 14:55	AYH
Unadjusted C11-C22 Aromatics	300	23	mg/Kg dry	1		MADEP EPH rev 2.1	9/21/21	9/24/21 4:09	AYH
C11-C22 Aromatics	260	23	mg/Kg dry	1		MADEP EPH rev 2.1	9/21/21	9/24/21 4:09	AYH

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Chlorooctadecane (COD)	56.5	40-140		9/24/21 4:09
Chlorooctadecane (COD)	55.0	40-140		9/24/21 14:55
o-Terphenyl (OTP)	59.9	40-140		9/24/21 4:09
2-Bromonaphthalene	76.2	40-140		9/24/21 4:09
2-Fluorobiphenyl	76.1	40-140		9/24/21 4:09

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Project Location: Haverhill, MA | Sample Description: | Work Order: 21I0997

Date Received: 9/20/2021

Field Sample #: 1543210917-08 | Sampled: 9/17/2021 10:20

Sample ID: 21I0997-08

Sample Matrix: Soil

Metals Analyses (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Arsenic	12	7.6	mg/Kg dry	1		SW-846 6010D	9/24/21	9/27/21 0:38	JLC
Lead	160	1.1	mg/Kg dry	1		SW-846 6010D	9/24/21	9/27/21 0:38	JLC

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Project Location: Haverhill, MA | Sample Description: | Work Order: 21I0997

Date Received: 9/20/2021

Field Sample #: 1543210917-08 | Sampled: 9/17/2021 10:20

Sample ID: 21I0997-08

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	42.9		% Wt	1		SM 2540G	9/23/21	9/24/21 12:42	BMB

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Project Location: Haverhill, MA | Sample Description: | Work Order: 21I0997

Date Received: 9/20/2021

Field Sample #: 1543210917-09 | Sampled: 9/17/2021 10:15

Sample ID: 21I0997-09

Sample Matrix: Soil

Semivolatile Organic Compounds by GC/MS

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Acenaphthene	0.37	0.29	mg/Kg dry	1		SW-846 8270D-E	9/21/21	9/22/21 18:39	IMR
Acenaphthylene	ND	0.29	mg/Kg dry	1		SW-846 8270D-E	9/21/21	9/22/21 18:39	IMR
Anthracene	1.5	0.29	mg/Kg dry	1		SW-846 8270D-E	9/21/21	9/22/21 18:39	IMR
Benzo(a)anthracene	2.9	0.29	mg/Kg dry	1		SW-846 8270D-E	9/21/21	9/22/21 18:39	IMR
Benzo(a)pyrene	2.8	0.29	mg/Kg dry	1		SW-846 8270D-E	9/21/21	9/22/21 18:39	IMR
Benzo(b)fluoranthene	3.3	0.29	mg/Kg dry	1		SW-846 8270D-E	9/21/21	9/22/21 18:39	IMR
Benzo(g,h,i)perylene	1.8	0.29	mg/Kg dry	1		SW-846 8270D-E	9/21/21	9/22/21 18:39	IMR
Benzo(k)fluoranthene	1.2	0.29	mg/Kg dry	1		SW-846 8270D-E	9/21/21	9/22/21 18:39	IMR
Chrysene	2.9	0.29	mg/Kg dry	1		SW-846 8270D-E	9/21/21	9/22/21 18:39	IMR
Dibenz(a,h)anthracene	0.43	0.29	mg/Kg dry	1		SW-846 8270D-E	9/21/21	9/22/21 18:39	IMR
Fluoranthene	5.9	0.29	mg/Kg dry	1		SW-846 8270D-E	9/21/21	9/22/21 18:39	IMR
Fluorene	0.59	0.29	mg/Kg dry	1		SW-846 8270D-E	9/21/21	9/22/21 18:39	IMR
Indeno(1,2,3-cd)pyrene	1.9	0.29	mg/Kg dry	1		SW-846 8270D-E	9/21/21	9/22/21 18:39	IMR
2-Methylnaphthalene	ND	0.29	mg/Kg dry	1		SW-846 8270D-E	9/21/21	9/22/21 18:39	IMR
Naphthalene	ND	0.29	mg/Kg dry	1		SW-846 8270D-E	9/21/21	9/22/21 18:39	IMR
Phenanthrene	5.2	0.29	mg/Kg dry	1		SW-846 8270D-E	9/21/21	9/22/21 18:39	IMR
Pyrene	5.8	0.29	mg/Kg dry	1		SW-846 8270D-E	9/21/21	9/22/21 18:39	IMR

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Nitrobenzene-d5	62.7	30-130		9/22/21 18:39
2-Fluorobiphenyl	61.7	30-130		9/22/21 18:39
p-Terphenyl-d14	61.4	30-130		9/22/21 18:39

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Project Location: Haverhill, MA | Sample Description: | Work Order: 21I0997

Date Received: 9/20/2021

Field Sample #: 1543210917-09 | Sampled: 9/17/2021 10:15

Sample ID: 21I0997-09

Sample Matrix: Soil

Sample Flags: O-32

Polychlorinated Biphenyls By GC/ECD

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.14	mg/Kg dry	4		SW-846 8082A	9/21/21	9/23/21 13:55	SFM
Aroclor-1221 [1]	ND	0.14	mg/Kg dry	4		SW-846 8082A	9/21/21	9/23/21 13:55	SFM
Aroclor-1232 [1]	ND	0.14	mg/Kg dry	4		SW-846 8082A	9/21/21	9/23/21 13:55	SFM
Aroclor-1242 [1]	ND	0.14	mg/Kg dry	4		SW-846 8082A	9/21/21	9/23/21 13:55	SFM
Aroclor-1248 [1]	ND	0.14	mg/Kg dry	4		SW-846 8082A	9/21/21	9/23/21 13:55	SFM
Aroclor-1254 [1]	ND	0.14	mg/Kg dry	4		SW-846 8082A	9/21/21	9/23/21 13:55	SFM
Aroclor-1260 [1]	ND	0.14	mg/Kg dry	4		SW-846 8082A	9/21/21	9/23/21 13:55	SFM
Aroclor-1262 [1]	ND	0.14	mg/Kg dry	4		SW-846 8082A	9/21/21	9/23/21 13:55	SFM
Aroclor-1268 [1]	ND	0.14	mg/Kg dry	4		SW-846 8082A	9/21/21	9/23/21 13:55	SFM

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Decachlorobiphenyl [1]	90.5	30-150		9/23/21 13:55
Decachlorobiphenyl [2]	89.4	30-150		9/23/21 13:55
Tetrachloro-m-xylene [1]	83.6	30-150		9/23/21 13:55
Tetrachloro-m-xylene [2]	76.6	30-150		9/23/21 13:55

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Project Location: Haverhill, MA | Sample Description: | Work Order: 21I0997

Date Received: 9/20/2021

Field Sample #: 1543210917-09 | Sampled: 9/17/2021 10:15

Sample ID: 21I0997-09

Sample Matrix: Soil

Petroleum Hydrocarbons Analyses - EPH

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
C9-C18 Aliphatics	51	17	mg/Kg dry	1		MADEP EPH rev 2.1	9/21/21	9/24/21 13:56	AYH
C19-C36 Aliphatics	190	35	mg/Kg dry	2		MADEP EPH rev 2.1	9/21/21	9/24/21 16:51	AYH
Unadjusted C11-C22 Aromatics	110	17	mg/Kg dry	1		MADEP EPH rev 2.1	9/21/21	9/24/21 13:56	AYH
C11-C22 Aromatics	100	17	mg/Kg dry	1		MADEP EPH rev 2.1	9/21/21	9/24/21 13:56	AYH

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Chlorooctadecane (COD)	70.8	40-140		9/24/21 13:56
Chlorooctadecane (COD)	50.8	40-140		9/24/21 16:51
o-Terphenyl (OTP)	66.7	40-140		9/24/21 13:56
2-Bromonaphthalene	75.2	40-140		9/24/21 13:56
2-Fluorobiphenyl	74.0	40-140		9/24/21 13:56

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Project Location: Haverhill, MA | Sample Description: | Work Order: 21I0997

Date Received: 9/20/2021

Field Sample #: 1543210917-09 | Sampled: 9/17/2021 10:15

Sample ID: 21I0997-09

Sample Matrix: Soil

Metals Analyses (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Arsenic	11	5.8	mg/Kg dry	1		SW-846 6010D	9/24/21	9/27/21 0:45	JLC
Lead	160	0.87	mg/Kg dry	1		SW-846 6010D	9/24/21	9/27/21 0:45	JLC

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Project Location: Haverhill, MA | Sample Description: | Work Order: 21I0997

Date Received: 9/20/2021

Field Sample #: 1543210917-09 | Sampled: 9/17/2021 10:15

Sample ID: 21I0997-09

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	57.6		% Wt	1		SM 2540G	9/23/21	9/24/21 12:42	BMB

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Project Location: Haverhill, MA | Sample Description: | Work Order: 21I0997

Date Received: 9/20/2021

Field Sample #: 1543210917-10 | Sampled: 9/17/2021 10:05

Sample ID: 21I0997-10

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	0.34	mg/Kg dry	1		SW-846 8270D-E	9/21/21	9/24/21 9:44	IMR
Acenaphthylene	ND	0.34	mg/Kg dry	1		SW-846 8270D-E	9/21/21	9/24/21 9:44	IMR
Anthracene	ND	0.34	mg/Kg dry	1		SW-846 8270D-E	9/21/21	9/24/21 9:44	IMR
Benzo(a)anthracene	1.2	0.34	mg/Kg dry	1		SW-846 8270D-E	9/21/21	9/24/21 9:44	IMR
Benzo(a)pyrene	1.2	0.34	mg/Kg dry	1		SW-846 8270D-E	9/21/21	9/24/21 9:44	IMR
Benzo(b)fluoranthene	1.6	0.34	mg/Kg dry	1		SW-846 8270D-E	9/21/21	9/24/21 9:44	IMR
Benzo(g,h,i)perylene	0.57	0.34	mg/Kg dry	1		SW-846 8270D-E	9/21/21	9/24/21 9:44	IMR
Benzo(k)fluoranthene	0.52	0.34	mg/Kg dry	1		SW-846 8270D-E	9/21/21	9/24/21 9:44	IMR
Chrysene	1.3	0.34	mg/Kg dry	1		SW-846 8270D-E	9/21/21	9/24/21 9:44	IMR
Dibenz(a,h)anthracene	ND	0.34	mg/Kg dry	1		SW-846 8270D-E	9/21/21	9/24/21 9:44	IMR
Fluoranthene	2.4	0.34	mg/Kg dry	1		SW-846 8270D-E	9/21/21	9/24/21 9:44	IMR
Fluorene	ND	0.34	mg/Kg dry	1		SW-846 8270D-E	9/21/21	9/24/21 9:44	IMR
Indeno(1,2,3-cd)pyrene	0.71	0.34	mg/Kg dry	1		SW-846 8270D-E	9/21/21	9/24/21 9:44	IMR
2-Methylnaphthalene	ND	0.34	mg/Kg dry	1		SW-846 8270D-E	9/21/21	9/24/21 9:44	IMR
Naphthalene	0.89	0.34	mg/Kg dry	1		SW-846 8270D-E	9/21/21	9/24/21 9:44	IMR
Phenanthrene	0.95	0.34	mg/Kg dry	1		SW-846 8270D-E	9/21/21	9/24/21 9:44	IMR
Pyrene	2.3	0.34	mg/Kg dry	1		SW-846 8270D-E	9/21/21	9/24/21 9:44	IMR

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Nitrobenzene-d5	77.2	30-130		9/24/21 9:44
2-Fluorobiphenyl	83.0	30-130		9/24/21 9:44
p-Terphenyl-d14	84.0	30-130		9/24/21 9:44

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Project Location: Haverhill, MA | Sample Description: | Work Order: 21I0997

Date Received: 9/20/2021

Field Sample #: 1543210917-10 | Sampled: 9/17/2021 10:05

Sample ID: 21I0997-10

Sample Matrix: Soil

Sample Flags: O-32

Polychlorinated Biphenyls By GC/ECD

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.16	mg/Kg dry	4		SW-846 8082A	9/21/21	9/23/21 14:13	SFM
Aroclor-1221 [1]	ND	0.16	mg/Kg dry	4		SW-846 8082A	9/21/21	9/23/21 14:13	SFM
Aroclor-1232 [1]	ND	0.16	mg/Kg dry	4		SW-846 8082A	9/21/21	9/23/21 14:13	SFM
Aroclor-1242 [1]	ND	0.16	mg/Kg dry	4		SW-846 8082A	9/21/21	9/23/21 14:13	SFM
Aroclor-1248 [1]	ND	0.16	mg/Kg dry	4		SW-846 8082A	9/21/21	9/23/21 14:13	SFM
Aroclor-1254 [1]	ND	0.16	mg/Kg dry	4		SW-846 8082A	9/21/21	9/23/21 14:13	SFM
Aroclor-1260 [1]	ND	0.16	mg/Kg dry	4		SW-846 8082A	9/21/21	9/23/21 14:13	SFM
Aroclor-1262 [1]	ND	0.16	mg/Kg dry	4		SW-846 8082A	9/21/21	9/23/21 14:13	SFM
Aroclor-1268 [1]	ND	0.16	mg/Kg dry	4		SW-846 8082A	9/21/21	9/23/21 14:13	SFM

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Decachlorobiphenyl [1]	74.2	30-150		9/23/21 14:13
Decachlorobiphenyl [2]	73.4	30-150		9/23/21 14:13
Tetrachloro-m-xylene [1]	74.1	30-150		9/23/21 14:13
Tetrachloro-m-xylene [2]	69.0	30-150		9/23/21 14:13

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Project Location: Haverhill, MA | Sample Description: | Work Order: 21I0997

Date Received: 9/20/2021

Field Sample #: 1543210917-10 | Sampled: 9/17/2021 10:05

Sample ID: 21I0997-10

Sample Matrix: Soil

Petroleum Hydrocarbons Analyses - EPH

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
C9-C18 Aliphatics	29	20	mg/Kg dry	1		MADEP EPH rev 2.1	9/21/21	9/24/21 3:48	AYH
C19-C36 Aliphatics	280	40	mg/Kg dry	2		MADEP EPH rev 2.1	9/21/21	9/24/21 15:16	AYH
Unadjusted C11-C22 Aromatics	220	20	mg/Kg dry	1		MADEP EPH rev 2.1	9/21/21	9/24/21 3:48	AYH
C11-C22 Aromatics	200	20	mg/Kg dry	1		MADEP EPH rev 2.1	9/21/21	9/24/21 3:48	AYH

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Chlorooctadecane (COD)	57.5	40-140		9/24/21 3:48
Chlorooctadecane (COD)	48.7	40-140		9/24/21 15:16
o-Terphenyl (OTP)	74.6	40-140		9/24/21 3:48
2-Bromonaphthalene	96.7	40-140		9/24/21 3:48
2-Fluorobiphenyl	100	40-140		9/24/21 3:48

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Project Location: Haverhill, MA | Sample Description: | Work Order: 21I0997

Date Received: 9/20/2021

Field Sample #: 1543210917-10 | Sampled: 9/17/2021 10:05

Sample ID: 21I0997-10

Sample Matrix: Soil

Metals Analyses (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Arsenic	14	6.4	mg/Kg dry	1		SW-846 6010D	9/24/21	9/27/21 0:51	JLC
Lead	160	0.96	mg/Kg dry	1		SW-846 6010D	9/24/21	9/27/21 0:51	JLC

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Project Location: Haverhill, MA | Sample Description: | Work Order: 21I0997

Date Received: 9/20/2021

Field Sample #: 1543210917-10 | Sampled: 9/17/2021 10:05

Sample ID: 21I0997-10

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	50.1		% Wt	1		SM 2540G	9/23/21	9/24/21 12:42	BMB

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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
21I0997-04 [1543210917-04]	B290670	20.0	2.00	09/21/21
21I0997-05 [1543210917-05]	B290670	20.0	2.00	09/21/21
21I0997-05RE1 [1543210917-05]	B290670	20.0	2.00	09/21/21
21I0997-06 [1543210917-06]	B290670	20.0	2.00	09/21/21
21I0997-07 [1543210917-07]	B290670	20.0	2.00	09/21/21
21I0997-08 [1543210917-08]	B290670	20.0	2.00	09/21/21
21I0997-08RE1 [1543210917-08]	B290670	20.0	2.00	09/21/21
21I0997-09 [1543210917-09]	B290670	20.0	2.00	09/21/21
21I0997-09RE1 [1543210917-09]	B290670	20.0	2.00	09/21/21
21I0997-10 [1543210917-10]	B290670	20.0	2.00	09/21/21
21I0997-10RE1 [1543210917-10]	B290670	20.0	2.00	09/21/21

Prep Method: % Solids **Analytical Method: SM 2540G**

Lab Number [Field ID]	Batch	Date
21I0997-01 [1543210917-01]	B290731	09/23/21
21I0997-02 [1543210917-02]	B290731	09/23/21
21I0997-03 [1543210917-03]	B290731	09/23/21
21I0997-04 [1543210917-04]	B290731	09/23/21
21I0997-05 [1543210917-05]	B290731	09/23/21
21I0997-06 [1543210917-06]	B290731	09/23/21
21I0997-07 [1543210917-07]	B290731	09/23/21
21I0997-08 [1543210917-08]	B290731	09/23/21
21I0997-09 [1543210917-09]	B290731	09/23/21
21I0997-10 [1543210917-10]	B290731	09/23/21

Prep Method: SW-846 3050B **Analytical Method: SW-846 6010D**

Lab Number [Field ID]	Batch	Initial [g]	Final [mL]	Date
21I0997-01 [1543210917-01]	B290882	1.60	50.0	09/24/21
21I0997-02 [1543210917-02]	B290882	1.58	50.0	09/24/21
21I0997-03 [1543210917-03]	B290882	1.59	50.0	09/24/21
21I0997-04 [1543210917-04]	B290882	1.53	50.0	09/24/21
21I0997-05 [1543210917-05]	B290882	1.50	50.0	09/24/21
21I0997-06 [1543210917-06]	B290882	1.58	50.0	09/24/21
21I0997-07 [1543210917-07]	B290882	1.54	50.0	09/24/21
21I0997-08 [1543210917-08]	B290882	1.54	50.0	09/24/21
21I0997-09 [1543210917-09]	B290882	1.50	50.0	09/24/21
21I0997-10 [1543210917-10]	B290882	1.56	50.0	09/24/21

Prep Method: SW-846 3546 **Analytical Method: SW-846 8082A**

Lab Number [Field ID]	Batch	Initial [g]	Final [mL]	Date
21I0997-01 [1543210917-01]	B290669	10.0	10.0	09/21/21
21I0997-02 [1543210917-02]	B290669	10.0	10.0	09/21/21
21I0997-03 [1543210917-03]	B290669	10.0	10.0	09/21/21
21I0997-04 [1543210917-04]	B290669	10.0	10.0	09/21/21
21I0997-05 [1543210917-05]	B290669	10.0	10.0	09/21/21
21I0997-06 [1543210917-06]	B290669	10.0	10.0	09/21/21
21I0997-07 [1543210917-07]	B290669	10.0	10.0	09/21/21
21I0997-08 [1543210917-08]	B290669	10.0	10.0	09/21/21

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Sample Extraction Data

Prep Method: SW-846 3546 **Analytical Method: SW-846 8082A**

Lab Number [Field ID]	Batch	Initial [g]	Final [mL]	Date
21I0997-09 [1543210917-09]	B290669	10.0	10.0	09/21/21
21I0997-10 [1543210917-10]	B290669	10.0	10.0	09/21/21

Prep Method: SW-846 3546 **Analytical Method: SW-846 8270D-E**

Lab Number [Field ID]	Batch	Initial [g]	Final [mL]	Date
21I0997-05 [1543210917-05]	B290653	30.0	1.00	09/21/21
21I0997-06 [1543210917-06]	B290653	30.0	1.00	09/21/21
21I0997-07 [1543210917-07]	B290653	30.0	1.00	09/21/21
21I0997-08 [1543210917-08]	B290653	30.0	1.00	09/21/21
21I0997-08RE1 [1543210917-08]	B290653	30.0	1.00	09/21/21
21I0997-09 [1543210917-09]	B290653	30.0	1.00	09/21/21
21I0997-10 [1543210917-10]	B290653	30.0	1.00	09/21/21

Prep Method: SW-846 3546 **Analytical Method: SW-846 8270D-E**

Lab Number [Field ID]	Batch	Initial [g]	Final [mL]	Date
21I0997-04 [1543210917-04]	B290671	30.0	1.00	09/21/21

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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 B290653 - SW-846 3546										
Blank (B290653-BLK1)				Prepared: 09/21/21 Analyzed: 09/22/21						
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	*1.96*		mg/Kg wet	3.33		58.9	30-130			
Surrogate: 2-Fluorobiphenyl	*2.14*		mg/Kg wet	3.33		64.1	30-130			
Surrogate: p-Terphenyl-d14	*2.43*		mg/Kg wet	3.33		73.0	30-130			
LCS (B290653-BS1)				Prepared: 09/21/21 Analyzed: 09/22/21						
Acenaphthene	1.10	0.17	mg/Kg wet	1.67		66.3	40-140			
Acenaphthylene	1.08	0.17	mg/Kg wet	1.67		65.1	40-140			
Anthracene	1.16	0.17	mg/Kg wet	1.67		69.5	40-140			
Benzo(a)anthracene	1.10	0.17	mg/Kg wet	1.67		65.8	40-140			
Benzo(a)pyrene	1.21	0.17	mg/Kg wet	1.67		72.5	40-140			
Benzo(b)fluoranthene	1.14	0.17	mg/Kg wet	1.67		68.3	40-140			
Benzo(g,h,i)perylene	1.03	0.17	mg/Kg wet	1.67		62.0	40-140			
Benzo(k)fluoranthene	1.18	0.17	mg/Kg wet	1.67		70.7	40-140			
Chrysene	1.15	0.17	mg/Kg wet	1.67		68.8	40-140			
Dibenz(a,h)anthracene	1.06	0.17	mg/Kg wet	1.67		63.8	40-140			
Fluoranthene	1.13	0.17	mg/Kg wet	1.67		67.6	40-140			
Fluorene	1.13	0.17	mg/Kg wet	1.67		67.6	40-140			
Indeno(1,2,3-cd)pyrene	1.06	0.17	mg/Kg wet	1.67		63.9	40-140			
2-Methylnaphthalene	1.16	0.17	mg/Kg wet	1.67		69.3	40-140			
Naphthalene	1.04	0.17	mg/Kg wet	1.67		62.3	40-140			
Phenanthrene	1.16	0.17	mg/Kg wet	1.67		69.3	40-140			
Pyrene	1.14	0.17	mg/Kg wet	1.67		68.2	40-140			
Surrogate: Nitrobenzene-d5	*2.27*		mg/Kg wet	3.33		68.1	30-130			
Surrogate: 2-Fluorobiphenyl	*2.33*		mg/Kg wet	3.33		69.9	30-130			
Surrogate: p-Terphenyl-d14	*2.46*		mg/Kg wet	3.33		73.8	30-130			

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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 B290653 - SW-846 3546										
LCS Dup (B290653-BSD1)				Prepared: 09/21/21 Analyzed: 09/22/21						
Acenaphthene	0.986	0.17	mg/Kg wet	1.67		59.1	40-140	11.4	30	
Acenaphthylene	0.954	0.17	mg/Kg wet	1.67		57.2	40-140	12.8	30	
Anthracene	1.01	0.17	mg/Kg wet	1.67		60.7	40-140	13.6	30	
Benzo(a)anthracene	0.973	0.17	mg/Kg wet	1.67		58.4	40-140	11.9	30	
Benzo(a)pyrene	1.06	0.17	mg/Kg wet	1.67		63.7	40-140	12.8	30	
Benzo(b)fluoranthene	0.996	0.17	mg/Kg wet	1.67		59.7	40-140	13.4	30	
Benzo(g,h,i)perylene	0.882	0.17	mg/Kg wet	1.67		52.9	40-140	15.8	30	
Benzo(k)fluoranthene	1.05	0.17	mg/Kg wet	1.67		63.0	40-140	11.5	30	
Chrysene	1.02	0.17	mg/Kg wet	1.67		61.1	40-140	11.8	30	
Dibenz(a,h)anthracene	0.920	0.17	mg/Kg wet	1.67		55.2	40-140	14.6	30	
Fluoranthene	1.00	0.17	mg/Kg wet	1.67		60.1	40-140	11.8	30	
Fluorene	1.00	0.17	mg/Kg wet	1.67		60.0	40-140	12.0	30	
Indeno(1,2,3-cd)pyrene	0.920	0.17	mg/Kg wet	1.67		55.2	40-140	14.6	30	
2-Methylnaphthalene	1.04	0.17	mg/Kg wet	1.67		62.3	40-140	10.6	30	
Naphthalene	0.954	0.17	mg/Kg wet	1.67		57.3	40-140	8.43	30	
Phenanthrene	1.00	0.17	mg/Kg wet	1.67		60.1	40-140	14.2	30	
Pyrene	0.994	0.17	mg/Kg wet	1.67		59.6	40-140	13.4	30	
Surrogate: Nitrobenzene-d5	*2.03*		mg/Kg wet	3.33		60.9	30-130			
Surrogate: 2-Fluorobiphenyl	*2.08*		mg/Kg wet	3.33		62.3	30-130			
Surrogate: p-Terphenyl-d14	*2.10*		mg/Kg wet	3.33		63.0	30-130			
Batch B290671 - SW-846 3546										
Blank (B290671-BLK1)				Prepared: 09/21/21 Analyzed: 09/24/21						
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	*1.75*		mg/Kg wet	3.33		52.5	30-130			
Surrogate: 2-Fluorobiphenyl	*1.98*		mg/Kg wet	3.33		59.5	30-130			
Surrogate: p-Terphenyl-d14	*2.96*		mg/Kg wet	3.33		88.7	30-130			

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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 B290671 - SW-846 3546										
LCS (B290671-BS1)				Prepared: 09/21/21 Analyzed: 09/24/21						
Acenaphthene	0.973	0.17	mg/Kg wet	1.67		58.4	40-140			
Acenaphthylene	0.996	0.17	mg/Kg wet	1.67		59.8	40-140			
Anthracene	1.07	0.17	mg/Kg wet	1.67		64.1	40-140			
Benzo(a)anthracene	1.04	0.17	mg/Kg wet	1.67		62.2	40-140			
Benzo(a)pyrene	1.15	0.17	mg/Kg wet	1.67		68.8	40-140			
Benzo(b)fluoranthene	1.08	0.17	mg/Kg wet	1.67		64.8	40-140			
Benzo(g,h,i)perylene	1.04	0.17	mg/Kg wet	1.67		62.2	40-140			
Benzo(k)fluoranthene	1.15	0.17	mg/Kg wet	1.67		69.2	40-140			
Chrysene	1.09	0.17	mg/Kg wet	1.67		65.2	40-140			
Dibenz(a,h)anthracene	1.06	0.17	mg/Kg wet	1.67		63.9	40-140			
Fluoranthene	0.994	0.17	mg/Kg wet	1.67		59.6	40-140			
Fluorene	1.05	0.17	mg/Kg wet	1.67		62.8	40-140			
Indeno(1,2,3-cd)pyrene	1.10	0.17	mg/Kg wet	1.67		66.2	40-140			
2-Methylnaphthalene	1.08	0.17	mg/Kg wet	1.67		64.8	40-140			
Naphthalene	0.977	0.17	mg/Kg wet	1.67		58.6	40-140			
Phenanthrene	1.07	0.17	mg/Kg wet	1.67		64.5	40-140			
Pyrene	1.11	0.17	mg/Kg wet	1.67		66.6	40-140			
Surrogate: Nitrobenzene-d5	*2.16*		mg/Kg wet	3.33		64.7	30-130			
Surrogate: 2-Fluorobiphenyl	*2.23*		mg/Kg wet	3.33		67.0	30-130			
Surrogate: p-Terphenyl-d14	*2.45*		mg/Kg wet	3.33		73.4	30-130			
LCS Dup (B290671-BSD1)				Prepared: 09/21/21 Analyzed: 09/24/21						
Acenaphthene	1.07	0.17	mg/Kg wet	1.67		64.0	40-140	9.22	30	
Acenaphthylene	1.09	0.17	mg/Kg wet	1.67		65.5	40-140	9.16	30	
Anthracene	1.19	0.17	mg/Kg wet	1.67		71.4	40-140	10.8	30	
Benzo(a)anthracene	1.16	0.17	mg/Kg wet	1.67		69.5	40-140	11.1	30	
Benzo(a)pyrene	1.27	0.17	mg/Kg wet	1.67		76.3	40-140	10.3	30	
Benzo(b)fluoranthene	1.20	0.17	mg/Kg wet	1.67		72.0	40-140	10.6	30	
Benzo(g,h,i)perylene	1.20	0.17	mg/Kg wet	1.67		72.0	40-140	14.5	30	
Benzo(k)fluoranthene	1.25	0.17	mg/Kg wet	1.67		75.2	40-140	8.31	30	
Chrysene	1.21	0.17	mg/Kg wet	1.67		72.4	40-140	10.3	30	
Dibenz(a,h)anthracene	1.20	0.17	mg/Kg wet	1.67		72.0	40-140	12.0	30	
Fluoranthene	1.11	0.17	mg/Kg wet	1.67		66.8	40-140	11.4	30	
Fluorene	1.18	0.17	mg/Kg wet	1.67		70.5	40-140	11.6	30	
Indeno(1,2,3-cd)pyrene	1.22	0.17	mg/Kg wet	1.67		73.1	40-140	9.97	30	
2-Methylnaphthalene	1.15	0.17	mg/Kg wet	1.67		68.8	40-140	5.99	30	
Naphthalene	1.02	0.17	mg/Kg wet	1.67		61.1	40-140	4.14	30	
Phenanthrene	1.19	0.17	mg/Kg wet	1.67		71.4	40-140	10.2	30	
Pyrene	1.23	0.17	mg/Kg wet	1.67		74.0	40-140	10.6	30	
Surrogate: Nitrobenzene-d5	*2.23*		mg/Kg wet	3.33		67.0	30-130			
Surrogate: 2-Fluorobiphenyl	*2.35*		mg/Kg wet	3.33		70.5	30-130			
Surrogate: p-Terphenyl-d14	*2.66*		mg/Kg wet	3.33		79.8	30-130			

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QUALITY CONTROL

Polychlorinated Biphenyls By GC/ECD - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B290669 - SW-846 3546										
Blank (B290669-BLK1)				Prepared: 09/21/21 Analyzed: 09/23/21						
Aroclor-1016	ND	0.020	mg/Kg wet							
Aroclor-1016 [2C]	ND	0.020	mg/Kg wet							
Aroclor-1221	ND	0.020	mg/Kg wet							
Aroclor-1221 [2C]	ND	0.020	mg/Kg wet							
Aroclor-1232	ND	0.020	mg/Kg wet							
Aroclor-1232 [2C]	ND	0.020	mg/Kg wet							
Aroclor-1242	ND	0.020	mg/Kg wet							
Aroclor-1242 [2C]	ND	0.020	mg/Kg wet							
Aroclor-1248	ND	0.020	mg/Kg wet							
Aroclor-1248 [2C]	ND	0.020	mg/Kg wet							
Aroclor-1254	ND	0.020	mg/Kg wet							
Aroclor-1254 [2C]	ND	0.020	mg/Kg wet							
Aroclor-1260	ND	0.020	mg/Kg wet							
Aroclor-1260 [2C]	ND	0.020	mg/Kg wet							
Aroclor-1262	ND	0.020	mg/Kg wet							
Aroclor-1262 [2C]	ND	0.020	mg/Kg wet							
Aroclor-1268	ND	0.020	mg/Kg wet							
Aroclor-1268 [2C]	ND	0.020	mg/Kg wet							
Surrogate: Decachlorobiphenyl	*0.202*		mg/Kg wet	0.200		101	30-150			
Surrogate: Decachlorobiphenyl [2C]	*0.179*		mg/Kg wet	0.200		89.7	30-150			
Surrogate: Tetrachloro-m-xylene	*0.174*		mg/Kg wet	0.200		87.2	30-150			
Surrogate: Tetrachloro-m-xylene [2C]	*0.143*		mg/Kg wet	0.200		71.3	30-150			
LCS (B290669-BS1)				Prepared: 09/21/21 Analyzed: 09/23/21						
Aroclor-1016	0.17	0.020	mg/Kg wet	0.200		85.6	40-140			
Aroclor-1016 [2C]	0.15	0.020	mg/Kg wet	0.200		74.2	40-140			
Aroclor-1260	0.18	0.020	mg/Kg wet	0.200		87.8	40-140			
Aroclor-1260 [2C]	0.16	0.020	mg/Kg wet	0.200		82.3	40-140			
Surrogate: Decachlorobiphenyl	*0.228*		mg/Kg wet	0.200		114	30-150			
Surrogate: Decachlorobiphenyl [2C]	*0.186*		mg/Kg wet	0.200		93.2	30-150			
Surrogate: Tetrachloro-m-xylene	*0.192*		mg/Kg wet	0.200		96.0	30-150			
Surrogate: Tetrachloro-m-xylene [2C]	*0.150*		mg/Kg wet	0.200		74.9	30-150			
LCS Dup (B290669-BSD1)				Prepared: 09/21/21 Analyzed: 09/23/21						
Aroclor-1016	0.16	0.020	mg/Kg wet	0.200		80.3	40-140	6.43	30	
Aroclor-1016 [2C]	0.14	0.020	mg/Kg wet	0.200		70.5	40-140	5.06	30	
Aroclor-1260	0.16	0.020	mg/Kg wet	0.200		80.5	40-140	8.70	30	
Aroclor-1260 [2C]	0.15	0.020	mg/Kg wet	0.200		74.7	40-140	9.67	30	
Surrogate: Decachlorobiphenyl	*0.204*		mg/Kg wet	0.200		102	30-150			
Surrogate: Decachlorobiphenyl [2C]	*0.182*		mg/Kg wet	0.200		90.9	30-150			
Surrogate: Tetrachloro-m-xylene	*0.175*		mg/Kg wet	0.200		87.6	30-150			
Surrogate: Tetrachloro-m-xylene [2C]	*0.144*		mg/Kg wet	0.200		71.8	30-150			

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QUALITY CONTROL

Polychlorinated Biphenyls By GC/ECD - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B290669 - SW-846 3546										
Matrix Spike (B290669-MS1)	**Source: 21I0997-01**			Prepared: 09/21/21 Analyzed: 09/23/21						
Aroclor-1016	0.30	0.16	mg/Kg dry	0.393	ND	75.4	40-140			
Aroclor-1016 [2C]	0.25	0.16	mg/Kg dry	0.393	ND	63.0	40-140			
Aroclor-1260	0.33	0.16	mg/Kg dry	0.393	ND	82.7	40-140			
Aroclor-1260 [2C]	0.28	0.16	mg/Kg dry	0.393	ND	70.4	40-140			
Surrogate: Decachlorobiphenyl	*0.304*		mg/Kg dry	0.393		77.2	30-150			
Surrogate: Decachlorobiphenyl [2C]	*0.306*		mg/Kg dry	0.393		77.7	30-150			
Surrogate: Tetrachloro-m-xylene	*0.285*		mg/Kg dry	0.393		72.5	30-150			
Surrogate: Tetrachloro-m-xylene [2C]	*0.254*		mg/Kg dry	0.393		64.5	30-150			
Matrix Spike Dup (B290669-MSD1)	**Source: 21I0997-01**			Prepared: 09/21/21 Analyzed: 09/23/21						
Aroclor-1016	0.30	0.16	mg/Kg dry	0.393	ND	75.5	40-140	0.196	30	
Aroclor-1016 [2C]	0.26	0.16	mg/Kg dry	0.393	ND	65.8	40-140	4.44	30	
Aroclor-1260	0.31	0.16	mg/Kg dry	0.393	ND	78.8	40-140	4.81	30	
Aroclor-1260 [2C]	0.27	0.16	mg/Kg dry	0.393	ND	69.1	40-140	1.87	30	
Surrogate: Decachlorobiphenyl	*0.288*		mg/Kg dry	0.393		73.1	30-150			
Surrogate: Decachlorobiphenyl [2C]	*0.290*		mg/Kg dry	0.393		73.8	30-150			
Surrogate: Tetrachloro-m-xylene	*0.283*		mg/Kg dry	0.393		71.8	30-150			
Surrogate: Tetrachloro-m-xylene [2C]	*0.253*		mg/Kg dry	0.393		64.2	30-150			

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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 B290670 - SW-846 3546										
Blank (B290670-BLK1)				Prepared: 09/21/21 Analyzed: 09/23/21						
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)	*2.90*		mg/Kg wet	5.00		58.0	40-140			
Surrogate: o-Terphenyl (OTP)	*3.54*		mg/Kg wet	5.00		70.7	40-140			
Surrogate: 2-Bromonaphthalene	*4.37*		mg/Kg wet	5.00		87.4	40-140			
Surrogate: 2-Fluorobiphenyl	*4.34*		mg/Kg wet	5.00		86.7	40-140			
LCS (B290670-BS1)				Prepared: 09/21/21 Analyzed: 09/23/21						
C9-C18 Aliphatics	21.5	10	mg/Kg wet	30.0		71.8	40-140			
C19-C36 Aliphatics	30.3	10	mg/Kg wet	40.0		75.7	40-140			
Unadjusted C11-C22 Aromatics	66.0	10	mg/Kg wet	85.0		77.7	40-140			
Acenaphthene	3.09	0.10	mg/Kg wet	5.00		61.8	40-140			
Acenaphthylene	2.92	0.10	mg/Kg wet	5.00		58.3	40-140			
Anthracene	3.34	0.10	mg/Kg wet	5.00		66.9	40-140			
Benzo(a)anthracene	4.16	0.10	mg/Kg wet	5.00		83.2	40-140			
Benzo(a)pyrene	4.24	0.10	mg/Kg wet	5.00		84.8	40-140			
Benzo(b)fluoranthene	4.64	0.10	mg/Kg wet	5.00		92.8	40-140			
Benzo(g,h,i)perylene	3.92	0.10	mg/Kg wet	5.00		78.4	40-140			
Benzo(k)fluoranthene	3.51	0.10	mg/Kg wet	5.00		70.2	40-140			
Chrysene	4.07	0.10	mg/Kg wet	5.00		81.4	40-140			
Dibenz(a,h)anthracene	4.17	0.10	mg/Kg wet	5.00		83.4	40-140			
Fluoranthene	3.65	0.10	mg/Kg wet	5.00		72.9	40-140			
Fluorene	3.03	0.10	mg/Kg wet	5.00		60.5	40-140			
Indeno(1,2,3-cd)pyrene	3.96	0.10	mg/Kg wet	5.00		79.2	40-140			
2-Methylnaphthalene	2.86	0.10	mg/Kg wet	5.00		57.1	40-140			
Naphthalene	2.70	0.10	mg/Kg wet	5.00		54.1	40-140			
Phenanthrene	3.44	0.10	mg/Kg wet	5.00		68.7	40-140			
Pyrene	3.78	0.10	mg/Kg wet	5.00		75.6	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)	*3.18*		mg/Kg wet	5.00		63.7	40-140			

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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 B290670 - SW-846 3546										
LCS (B290670-BS1)				Prepared: 09/21/21 Analyzed: 09/23/21						
Surrogate: o-Terphenyl (OTP)	*3.31*		mg/Kg wet	5.00		66.1	40-140			
Surrogate: 2-Bromonaphthalene	*3.51*		mg/Kg wet	5.00		70.2	40-140			
Surrogate: 2-Fluorobiphenyl	*3.47*		mg/Kg wet	5.00		69.4	40-140			
LCS Dup (B290670-BSD1)				Prepared: 09/21/21 Analyzed: 09/23/21						
C9-C18 Aliphatics	22.3	10	mg/Kg wet	30.0		74.3	40-140	3.46	25	
C19-C36 Aliphatics	30.9	10	mg/Kg wet	40.0		77.2	40-140	1.97	25	
Unadjusted C11-C22 Aromatics	70.1	10	mg/Kg wet	85.0		82.5	40-140	5.98	25	
Acenaphthene	3.46	0.10	mg/Kg wet	5.00		69.2	40-140	11.4	25	
Acenaphthylene	3.26	0.10	mg/Kg wet	5.00		65.2	40-140	11.1	25	
Anthracene	3.67	0.10	mg/Kg wet	5.00		73.4	40-140	9.22	25	
Benzo(a)anthracene	4.41	0.10	mg/Kg wet	5.00		88.2	40-140	5.86	25	
Benzo(a)pyrene	4.39	0.10	mg/Kg wet	5.00		87.7	40-140	3.36	25	
Benzo(b)fluoranthene	4.84	0.10	mg/Kg wet	5.00		96.7	40-140	4.16	25	
Benzo(g,h,i)perylene	4.00	0.10	mg/Kg wet	5.00		80.0	40-140	2.00	25	
Benzo(k)fluoranthene	3.65	0.10	mg/Kg wet	5.00		73.0	40-140	3.86	25	
Chrysene	4.28	0.10	mg/Kg wet	5.00		85.6	40-140	4.99	25	
Dibenz(a,h)anthracene	4.28	0.10	mg/Kg wet	5.00		85.6	40-140	2.55	25	
Fluoranthene	3.95	0.10	mg/Kg wet	5.00		79.0	40-140	7.96	25	
Fluorene	3.55	0.10	mg/Kg wet	5.00		71.0	40-140	15.9	25	
Indeno(1,2,3-cd)pyrene	4.05	0.10	mg/Kg wet	5.00		81.1	40-140	2.32	25	
2-Methylnaphthalene	3.22	0.10	mg/Kg wet	5.00		64.3	40-140	11.9	25	
Naphthalene	3.03	0.10	mg/Kg wet	5.00		60.6	40-140	11.3	25	
Phenanthrene	3.79	0.10	mg/Kg wet	5.00		75.8	40-140	9.77	25	
Pyrene	4.07	0.10	mg/Kg wet	5.00		81.5	40-140	7.40	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)	*3.24*		mg/Kg wet	5.00		64.7	40-140			
Surrogate: o-Terphenyl (OTP)	*3.68*		mg/Kg wet	5.00		73.6	40-140			
Surrogate: 2-Bromonaphthalene	*3.99*		mg/Kg wet	5.00		79.8	40-140			
Surrogate: 2-Fluorobiphenyl	*3.93*		mg/Kg wet	5.00		78.7	40-140			

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QUALITY CONTROL

Metals Analyses (Total) - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B290882 - SW-846 3050B										
Blank (B290882-BLK1)				Prepared: 09/24/21 Analyzed: 09/26/21						
Arsenic	ND	3.3	mg/Kg wet							
Lead	ND	0.50	mg/Kg wet							
LCS (B290882-BS1)				Prepared: 09/24/21 Analyzed: 09/26/21						
Arsenic	143	9.9	mg/Kg wet	170		84.3	82.9-117.6			
Lead	123	1.5	mg/Kg wet	140		88.1	82.9-117.1			
LCS Dup (B290882-BSD1)				Prepared: 09/24/21 Analyzed: 09/26/21						
Arsenic	144	9.4	mg/Kg wet	170		84.4	82.9-117.6	0.134	30	
Lead	125	1.4	mg/Kg wet	140		89.0	82.9-117.1	0.987	30	
Reference (B290882-SRM1) MRL Check				Prepared: 09/24/21 Analyzed: 09/26/21						
Lead	0.402	0.47	mg/Kg wet	0.474		84.7	80-120			

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IDENTIFICATION SUMMARY FOR SINGLE COMPONENT ANALYTES

SW-846 8082A

1543210917-01

Lab Sample ID: 21I0997-01 Date(s) Analyzed: 09/23/2021 09/23/2021

Instrument ID (1): GCFID4 Instrument ID (2): GCFID4

GC Column (1): ID: (mm) GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%RPD
			FROM	TO		
Aroclor-1254	1	0.000	0.000	0.000	0.16	
	2	0.000	0.000	0.000	0.20	22.2

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IDENTIFICATION SUMMARY FOR SINGLE COMPONENT ANALYTES

SW-846 8082A

1543210917-03

Lab Sample ID: 21I0997-03 Date(s) Analyzed: 09/23/2021 09/23/2021

Instrument ID (1): GCFID4 Instrument ID (2): GCFID4

GC Column (1): ID: (mm) GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%RPD
			FROM	TO		
Aroclor-1254	1	0.000	0.000	0.000	0.23	
	2	0.000	0.000	0.000	0.22	4.4

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IDENTIFICATION SUMMARY FOR SINGLE COMPONENT ANALYTES

SW-846 8082A

LCS

Lab Sample ID: B290669-BS1 Date(s) Analyzed: 09/23/2021 09/23/2021

Instrument ID (1): GCFID4 Instrument ID (2): GCFID4

GC Column (1): ID: (mm) GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%RPD
			FROM	TO		
Aroclor-1016	1	0.000	0.000	0.000	0.17	
	2	0.000	0.000	0.000	0.15	12.5
Aroclor-1260	1	0.000	0.000	0.000	0.18	
	2	0.000	0.000	0.000	0.16	11.8

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IDENTIFICATION SUMMARY FOR SINGLE COMPONENT ANALYTES

SW-846 8082A

LCS Dup

Lab Sample ID: B290669-BSD1 Date(s) Analyzed: 09/23/2021 09/23/2021

Instrument ID (1): GCFID4 Instrument ID (2): GCFID4

GC Column (1): ID: (mm) GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%RPD
			FROM	TO		
Aroclor-1016	1	0.000	0.000	0.000	0.16	
	2	0.000	0.000	0.000	0.14	13.3
Aroclor-1260	1	0.000	0.000	0.000	0.16	
	2	0.000	0.000	0.000	0.15	6.5

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IDENTIFICATION SUMMARY FOR SINGLE COMPONENT ANALYTES

SW-846 8082A

Matrix Spike

Lab Sample ID: B290669-MS1 Date(s) Analyzed: 09/23/2021 09/23/2021

Instrument ID (1): GCFID4 Instrument ID (2): GCFID4

GC Column (1): ID: (mm) GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%RPD
			FROM	TO		
Aroclor-1016	1	0.000	0.000	0.000	0.30	
	2	0.000	0.000	0.000	0.25	18.2
Aroclor-1260	1	0.000	0.000	0.000	0.33	
	2	0.000	0.000	0.000	0.28	16.4

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IDENTIFICATION SUMMARY FOR SINGLE COMPONENT ANALYTES

SW-846 8082A

Matrix Spike Dup

Lab Sample ID: B290669-MSD1 Date(s) Analyzed: 09/23/2021 09/23/2021

Instrument ID (1): GCFID4 Instrument ID (2): GCFID4

GC Column (1): ID: (mm) GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%RPD
			FROM	TO		
Aroclor-1016	1	0.000	0.000	0.000	0.30	
	2	0.000	0.000	0.000	0.26	14.3
Aroclor-1260	1	0.000	0.000	0.000	0.31	
	2	0.000	0.000	0.000	0.27	13.8

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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.
O-32	A dilution was performed as part of the standard analytical procedure.

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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,ME
Naphthalene	CT,NC,ME,NH-P
Phenanthrene	CT,NC,ME,NH-P
Pyrene	CT,NC,ME,NH-P
SW-846 6010D in Soil	
Arsenic	CT,NH,NY,ME,VA,NC
Lead	CT,NH,NY,AIHA,ME,VA,NC
SW-846 8082A in Soil	
Aroclor-1016	CT,NH,NY,NC,ME,VA,PA
Aroclor-1016 [2C]	CT,NH,NY,NC,ME,VA,PA
Aroclor-1221	CT,NH,NY,NC,ME,VA,PA
Aroclor-1221 [2C]	CT,NH,NY,NC,ME,VA,PA
Aroclor-1232	CT,NH,NY,NC,ME,VA,PA
Aroclor-1232 [2C]	CT,NH,NY,NC,ME,VA,PA
Aroclor-1242	CT,NH,NY,NC,ME,VA,PA
Aroclor-1242 [2C]	CT,NH,NY,NC,ME,VA,PA
Aroclor-1248	CT,NH,NY,NC,ME,VA,PA
Aroclor-1248 [2C]	CT,NH,NY,NC,ME,VA,PA
Aroclor-1254	CT,NH,NY,NC,ME,VA,PA
Aroclor-1254 [2C]	CT,NH,NY,NC,ME,VA,PA
Aroclor-1260	CT,NH,NY,NC,ME,VA,PA
Aroclor-1260 [2C]	CT,NH,NY,NC,ME,VA,PA
Aroclor-1262	NH,NY,NC,ME,VA,PA
Aroclor-1262 [2C]	NH,NY,NC,ME,VA,PA
Aroclor-1268	NH,NY,NC,ME,VA,PA
Aroclor-1268 [2C]	NH,NY,NC,ME,VA,PA
SW-846 8270D-E in Soil	
Acenaphthene	CT,NY,NH,ME,NC,VA
Acenaphthylene	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 8270D-E in Soil	
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 8270D-E 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
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

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

Con-Test, a Pace Environmental Laboratory, operates under the following certifications and accreditations:

Code	Description	Number	Expires
AIHA	AIHA-LAP, LLC - ISO17025:2017	100033	03/1/2022
MA	Massachusetts DEP	M-MA100	06/30/2022
CT	Connecticut Department of Publilc Health	PH-0165	12/31/2022
NY	New York State Department of Health	10899 NELAP	04/1/2022
NH-S	New Hampshire Environmental Lab	2516 NELAP	02/5/2022
RI	Rhode Island Department of Health	LAO00112	12/30/2021
NC	North Carolina Div. of Water Quality	652	12/31/2021
NJ	New Jersey DEP	MA007 NELAP	06/30/2022
FL	Florida Department of Health	E871027 NELAP	06/30/2022
VT	Vermont Department of Health Lead Laboratory	LL720741	07/30/2022
ME	State of Maine	MA00100	06/9/2023
VA	Commonwealth of Virginia	460217	12/14/2021
NH-P	New Hampshire Environmental Lab	2557 NELAP	09/6/2022
VT-DW	Vermont Department of Health Drinking Water	VT-255716	06/12/2022
NC-DW	North Carolina Department of Health	25703	07/31/2022
PA	Commonwealth of Pennsylvania DEP	68-05812	06/30/2022
MI	Dept. of Env, Great Lakes, and Energy	9100	09/6/2022

21T0497

FUSS & O'NEILL
(860) 646-2469 • www.FandO.com

☐ 146 Hartford Road, Manchester, CT 06040
☐ 56 Quarry Road, Trumbull, CT 06611
☐ 1419 Richland Street, Columbia, SC 29201
☐ 78 Interstate Drive, West Springfield, MA 01089
☒ 108 Myrtle Street, #502, North Quincy, MA 02171
☐ 317 Iron Horse Way, Suite 204, Providence, RI 02908
☐ 80 Washington Street, Suite 301, Poughkeepsie, NY
☐ Other _____

CHAIN-OF-CUSTODY RECORD 41957

Turnaround
☐ 24-Hour* ☐ 72-Hour* ☐ Other _____ (days)
☐ 48-Hour* ☒ Standard (5 days) *Surcharge Applies

PROJECT NAME: MVP GRANT FY22/23
PROJECT LOCATION: HAVERHILL, MA
PROJECT NUMBER: 20170390.U30
LABORATORY: PACE LABS
REPORT TO: Matt Kissane (mkissane@fando.com)
INVOICE TO:
P.O. No.: 1543 20170390.U30
Sampler's Signature: [signature] Date: 9/17/21

Source Codes:
MW=Monitoring Well PW=Potable Water T=Treatment Facility S=Soil B=Sediment
SW=Surface Water ST=Stormwater W=Waste A=Air C=Concrete
X=Other _____

Analysis Request: PCB, Lead, Hexane, EPH Ranges only, VPH 8270

Containers: Soil VOA Vial, ☐ methanol; Soil VOA Vial, ☐ water; Glass Soil Container (16) oz; Other; Other; Water VOA Vial, ☐ As is ☐ HCl; Glass Amber ( ) ml, ☐ As is ☐ H_2SO_4; Plastic - As is, ☐ 250 ml ☐ 500 ml ☐ 1000 ml; Plastic - H_2SO_4, ☐ 250 ml ☐ 500 ml; Plastic - HNO_3, 250 ml ☐ Filtered ☐ 0.45µ ☐ 10µ; Comments

Item No.	Transfer Check 1	2	3	4	Sample Number	Source Code	Date Sampled	Time Sampled	PCB	Lead	Hexane	EPH Ranges only	VPH 8270	Soil VOA Vial, ☐ methanol	Soil VOA Vial, ☐ water	Glass Soil Container (16) oz	Other:	Other:	Water VOA Vial, ☐ As is ☐ HCl	Glass Amber ( ) ml, ☐ As is ☐ H_2SO_4	Plastic - As is, ☐ 250 ml ☐ 500 ml ☐ 1000 ml	Plastic - H_2SO_4, ☐ 250 ml ☐ 500 ml	Plastic - HNO_3, 250 ml ☐ Filtered ☐ 0.45µ ☐ 10µ	Plastic - NaOH, 250 ml	Comments
1	X	X			1543210917-01	B	9/17/21	0835	X	X	X										1				
2					-02			0855	X	X	X										1				
3					-03			0845	X	X	X										1				
4					-04			0940	X	X	X	X	X								1				
5					-05			0915	X	X	X	X	X								1				
6					-06			0925	X	X	X	X	X								1				
7					-07			0935	X	X	X	X	X								1				
8					-08			1020	X	X	X	X	X								1				
9					-09			1015	X	X	X	X	X								1				
10					-10			1005	X	X	X	X	X								1				

per client they do need the MA MCP form. JLH 9/21/2021

Transfer Number	Relinquished By	Accepted By	Date	Time
1	[signature]	FedEx [illegible]	9/17/21	1400
2	Fridge	[signature]	9/20/21	1145
3	[signature]	[signature] 5.4	9/20/21	1709
4				

Charge Exceptions: ☐ CT Tax Exempt ☐ QA/QC ☐ Other _____
____ Duplicates ____ Blanks (Item Nos:)
Reporting and Detection Limit Requirements: ☐ RCP Deliverables ☐ MCP CAM Cert.
Additional Comments:

Table of Contents

I Have Not Confirmed Sample Container Numbers With Lab Staff Before Relinquishing Over Samples_____

con-test® ANALYTICAL LABORATORY

Doc# 277 Rev 5 2017

Login Sample Receipt Checklist - (Rejection Criteria Listing - Using Acceptance Policy) Any False Statement will be brought to the attention of the Client - State True or False

Client Fuss & O'Neill

Received By GR Date 9/20/21 Time 1703

How were the samples received? In Cooler T No Cooler _____ On Ice T No Ice _____

Direct from Sampling _____ Ambient _____ Melted Ice _____

Were samples within Temperature? 2-6°C T By Gun # 2 Actual Temp - 5.4

By Blank # _____ Actual Temp - _____

Was Custody Seal Intact? NA Were Samples Tampered with? NA

Was COC Relinquished ? T Does Chain Agree With Samples? T

Are there broken/leaking/loose caps on any samples? F

Is COC in ink/ Legible? T Were samples received within holding time? T

Did COC include all pertinent Information? Client T Analysis T Sampler Name T

Project T ID's T Collection Dates/Times T

Are Sample labels filled out and legible? T

Are there Lab to Filters? F Who was notified? _____

Are there Rushes? F Who was notified? _____

Are there Short Holds? F Who was notified? _____

Is there enough Volume? T

Is there Headspace where applicable? NA MS/MSD? F

Proper Media/Containers Used? T Is splitting samples required? F

Were trip blanks received? F On COC? F

Do all samples have the proper pH? NA Acid _____ Base _____

Vials	#	Containers:	#		#		#
Unp-		1 Liter Amb.		1 Liter Plastic		16 oz Amb.	10
HCL-		500 mL Amb.		500 mL Plastic		8oz Amb/Clear	
Meoh-		250 mL Amb.		250 mL Plastic		4oz Amb/Clear	
Bisulfate-		Flashpoint		Col./Bacteria		2oz Amb/Clear	
DI-		Other Glass		Other Plastic		Encore	
Thiosulfate-		SOC Kit		Plastic Bag		Frozen:	
Sulfuric-		Perchlorate		Ziplock			

Unused Media

Vials	#	Containers:	#		#		#
Unp-		1 Liter Amb.		1 Liter Plastic		16 oz Amb.	
HCL-		500 mL Amb.		500 mL Plastic		8oz Amb/Clear	
Meoh-		250 mL Amb.		250 mL Plastic		4oz Amb/Clear	
Bisulfate-		Col./Bacteria		Flashpoint		2oz Amb/Clear	
DI-		Other Plastic		Other Glass		Encore	
Thiosulfate-		SOC Kit		Plastic Bag		Frozen:	
Sulfuric-		Perchlorate		Ziplock			

Comments:

MADEP MCP Analytical Method Report Certification Form

Laboratory Name: Con-Test, a Pace Analytical Laboratory	Project #: 21I0997
Project Location: Haverhill, MA	RTN:

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

21I0997-01 thru 21I0997-10

Matrices: Soil

CAM Protocol (check all that below)

8260 VOC CAM II A ( )	7470/7471 Hg CAM IIIB ( )	MassDEP VPH CAM IV A ( )	8082 PCB CAM V A (X)	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 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

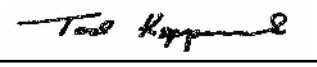
G	Were the reporting limits at or below all CAM reporting limits specified in the selected CAM protocol(s)?	☑ Yes	☐ No[1]

***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:  Position: Laboratory Director

Printed Name: Tod E. Kopyscinski Date: 09/27/21

THIELSCH ENGINEERING

195 Frances Avenue
Cranston RI, 02910
Phone: (401)-467-6454
Fax: (401)-467-2398
thielsch.com
Let's Build a Solid Foundation

Client Information:
Fuss & O'Neill
North Quincy, MA
PM: Matt Kissane
Assigned By: Matt Kissane
Collected By: Client

Project Information:
MUP Grant FY 22/23
Haverhill, MA
F&O Project Number: 20170390.U30
Summary Page: 1 of 1
Report Date: 09.15.21

LABORATORY TESTING DATA SHEET, Report No.: 7421-J-B004

Source Code	Sample No.	Depth (Ft)	Laboratory No.	Identification Tests								Proctor / CBR / Permeability Tests								Laboratory Log and Soil Description
				As Received Water Content %	LL %	PL %	Gravel %	Sand %	Fines %	Org. %	G_s	Dry unit wt. pcf	Test Water Content %	γ_d MAX (pcf) W_{opt} (%)	γ_d MAX (pcf) W_{opt} (%) (Corr.)	Target Test Setup as % of Proctor	CBR @ 0.1"	CBR @ 0.2"	Permeability cm/sec	
				D2216	D4318		D6913			D2974	D854			D1557						
B	1543210907-02	N/A	21-S-B201	75.2			0.5	55.4	44.1											Grey clayey sand (SC)
B	1543210907-03	N/A	21-S-B202	50.4			1.6	68.2	30.2											Grey clayey sand (SC)
B	1543210907-04	N/A	21-S-B203	67.1			0.1	45.6	54.3											Grey clay (CL)
B	1543210907-05	N/A	21-S-B204	50.9			0.9	63.9	35.2											Grey clayey sand (SC)
B	1543210908-07	N/A	21-S-B205	36.3			3.8	73.4	22.8											Grey clayey sand (SC)
B	1543210908-08	N/A	21-S-B206	23.3			0.6	76.3	23.1											Grey clayey sand (SC)

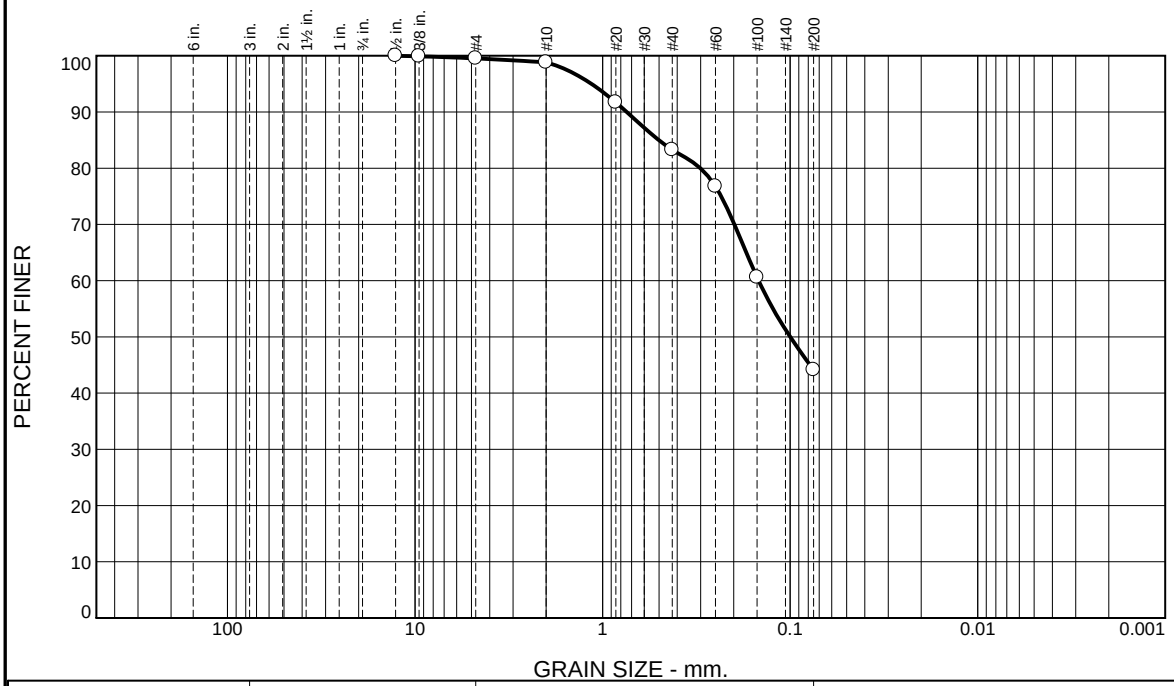
Date Received: *09.08.21*

Reviewed By: Christine M Colburn

Date Reviewed: *09.15.21*

This report only relates to items inspect and/or tested. No warranty, expressed or implied, is made.
This report shall not be reproduced, except in full, without prior written approval from the Agency, as defined in ASTM E329.

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.5	0.7	15.5	39.2	44.1	

Test Results (D6913 & ASTM D 1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
1/2"	100.0		
3/8"	99.9		
#4	99.5		
#10	98.8		
#20	91.7		
#40	83.3		
#60	76.8		
#100	60.6		
#200	44.1		

* (no specification provided)

Material Description

Grey clayey sand (SC)

Atterberg Limits (ASTM D 4318)

PL= **LL=** **PI=**

Classification

USCS (D 2487)= **AASHTO (M 145)=**

Coefficients

D_{90}= 0.7438 D_{85}= 0.5015 D_{60}= 0.1472
D_{50}= 0.0999 D_{30}= D_{15}=
D_{10}= C_u= C_c=

Remarks

Sample visually classified as plastic. Sample rolled to 1/8".

Date Received: 9/8/21 **Date Tested:** 9/14/21

Tested By: CC

Checked By: Christina Colman

Title: Laboratory Coordinator

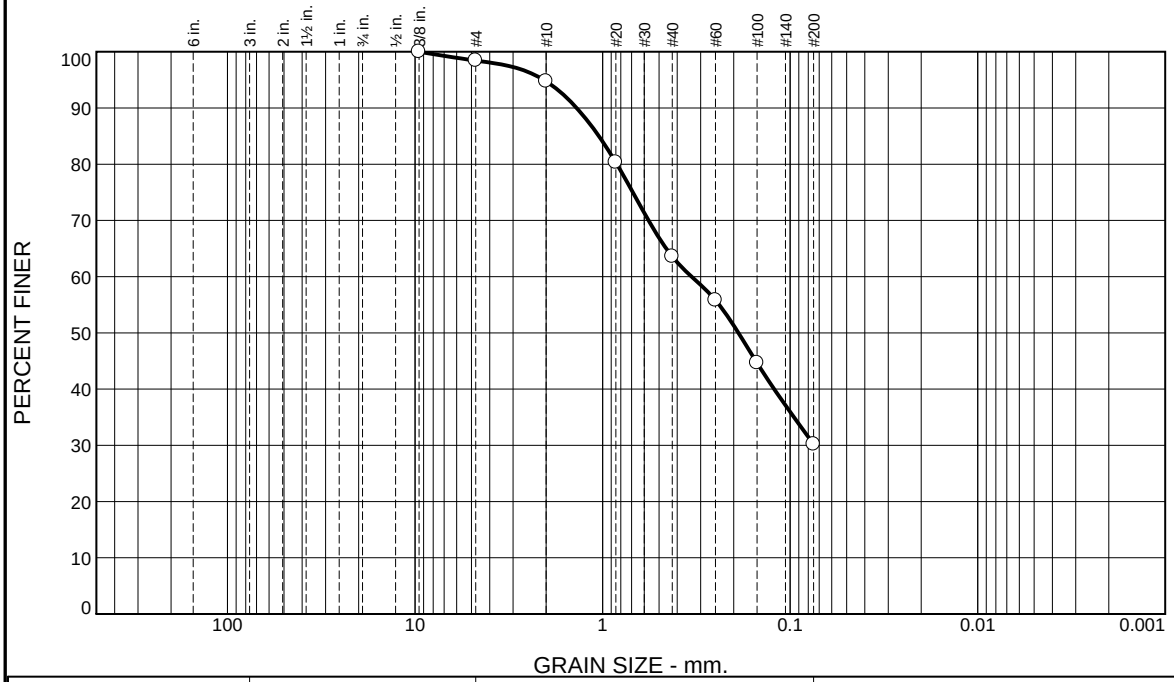
Source of Sample: B **Depth:** Unknown **Date Sampled:** 9/7/21
Sample Number: 1543210907-02

Thielsch Engineering Inc.

Cranston, RI

Client: Fuss & O'Neill
Project: MUP Grant FY 22/23
Haverhill, MA
Project No: 20170390.U30 **Figure** 21-S-B201

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	1.6	3.6	31.2	33.4	30.2	

Test Results (D6913 & ASTM D 1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
3/8"	100.0		
#4	98.4		
#10	94.8		
#20	80.3		
#40	63.6		
#60	55.8		
#100	44.6		
#200	30.2		

* (no specification provided)

Material Description

Grey clayey sand (SC)

Atterberg Limits (ASTM D 4318)

PL= **LL=** **PI=**

Classification

USCS (D 2487)= **AASHTO (M 145)=**

Coefficients

D_{90}= 1.3742 D_{85}= 1.0467 D_{60}= 0.3350
D_{50}= 0.1887 D_{30}= D_{15}=
D_{10}= C_u= C_c=

Remarks

Sample visually classified as plastic. Sample rolled to 1/8".

Date Received: 9/8/21 **Date Tested:** 9/14/21

Tested By: CC

Checked By: Christina Colman

Title: Laboratory Coordinator

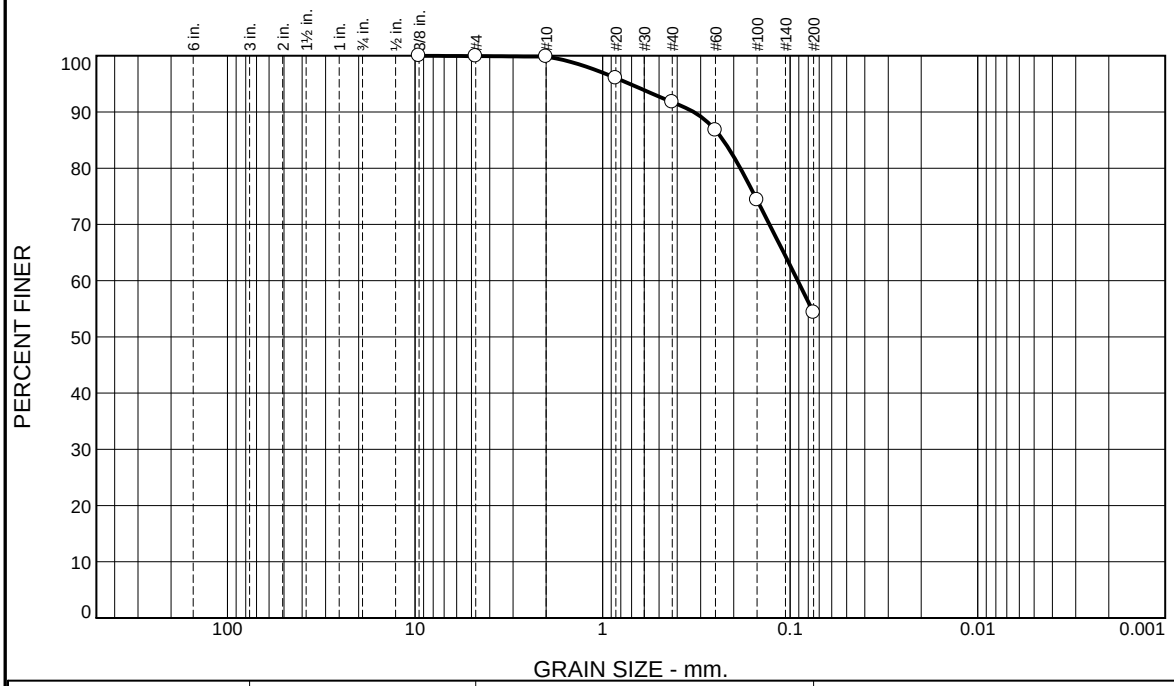
Source of Sample: B **Depth:** Unknown **Date Sampled:** 9/7/21
Sample Number: 1543210907-03

Thielsch Engineering Inc.

Cranston, RI

Client: Fuss & O'Neill
Project: MUP Grant FY 22/23
Haverhill, MA
Project No: 20170390.U30 **Figure** 21-S-B202

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.1	0.1	8.0	37.5	54.3	

Test Results (D6913 & ASTM D 1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
3/8"	100.0		
#4	99.9		
#10	99.8		
#20	96.0		
#40	91.8		
#60	86.8		
#100	74.3		
#200	54.3		

* (no specification provided)

Material Description

Grey clay (CL)

Atterberg Limits (ASTM D 4318)

PL= **LL=** **PI=**

Classification

USCS (D 2487)= **AASHTO (M 145)=**

Coefficients

D_{90}= 0.3267 D_{85}= 0.2276 D_{60}= 0.0911
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Remarks

Sample visually classified as plastic. Sample rolled to 1/8".

Date Received: 9/8/21 **Date Tested:** 9/14/21

Tested By: CC

Checked By: Christina Colman

Title: Laboratory Coordinator

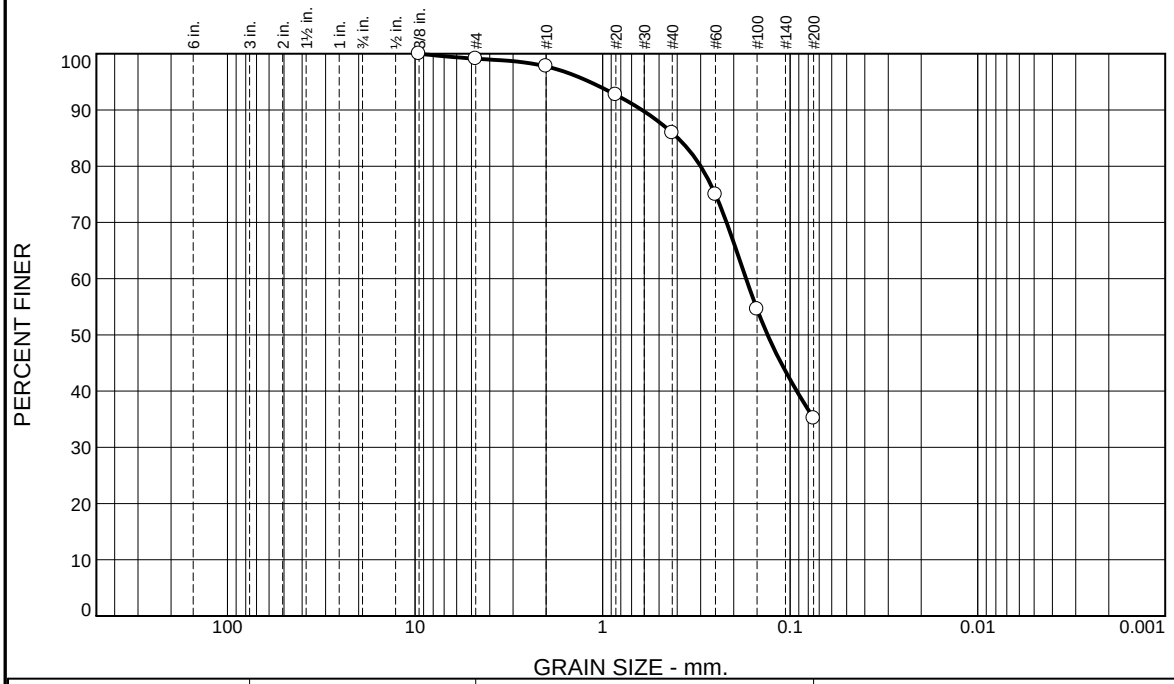
Source of Sample: B **Depth:** Unknown **Date Sampled:** 9/7/21
Sample Number: 1543210907-04

Thielsch Engineering Inc.

Cranston, RI

Client: Fuss & O'Neill
Project: MUP Grant FY 22/23
Haverhill, MA
Project No: 20170390.U30 **Figure** 21-S-B203

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.9	1.3	11.9	50.7	35.2	

Test Results (D6913 & ASTM D 1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
3/8"	100.0		
#4	99.1		
#10	97.8		
#20	92.7		
#40	85.9		
#60	75.0		
#100	54.6		
#200	35.2		

* (no specification provided)

Material Description

Grey clayey sand (SC)

Atterberg Limits (ASTM D 4318)

PL= **LL=** **PI=**

Classification

USCS (D 2487)= **AASHTO (M 145)=**

Coefficients

D_{90}= 0.6164 D_{85}= 0.3966 D_{60}= 0.1717
D_{50}= 0.1318 D_{30}= D_{15}=
D_{10}= C_u= C_c=

Remarks

Sample visually classified as plastic. Sample rolled to 1/8".

Date Received: 9/8/21 **Date Tested:** 9/14/21

Tested By: CC

Checked By: Christina Colman

Title: Laboratory Coordinator

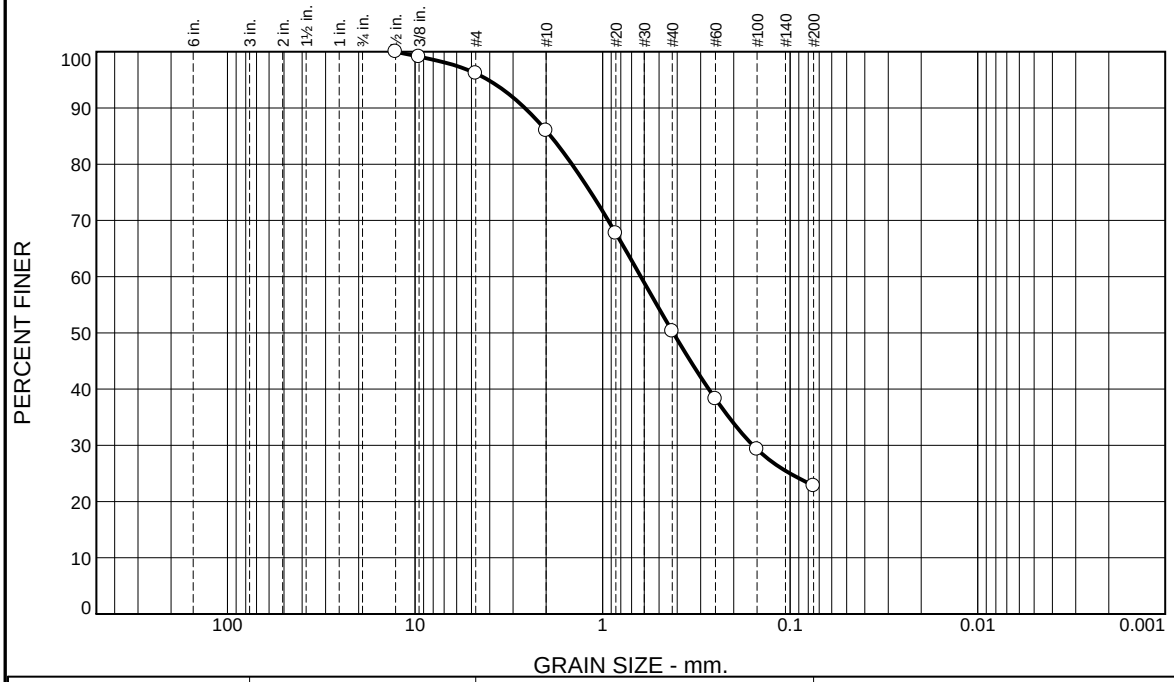
Source of Sample: B **Depth:** Unknown **Date Sampled:** 9/7/21
Sample Number: 1543210907-05

Thielsch Engineering Inc.

Cranston, RI

Client: Fuss & O'Neill
Project: MUP Grant FY 22/23
Haverhill, MA
Project No: 20170390.U30 **Figure** 21-S-B204

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	3.8	10.2	35.7	27.5	22.8	

Test Results (D6913 & ASTM D 1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
1/2"	100.0		
3/8"	99.1		
#4	96.2		
#10	86.0		
#20	67.7		
#40	50.3		
#60	38.3		
#100	29.3		
#200	22.8		

* (no specification provided)

Material Description

Grey clayey sand (SC)

Atterberg Limits (ASTM D 4318)

PL= **LL=** **PI=**

Classification

USCS (D 2487)= **AASHTO (M 145)=**

Coefficients

D_{90}= 2.5966 D_{85}= 1.8897 D_{60}= 0.6255
D_{50}= 0.4199 D_{30}= 0.1577 D_{15}=
D_{10}= C_u= C_c=

Remarks

Sample visually classified as plastic. Sample rolled to 1/8".

Date Received: 9/8/21 **Date Tested:** 9/14/21

Tested By: CC

Checked By: Christina Colman

Title: Laboratory Coordinator

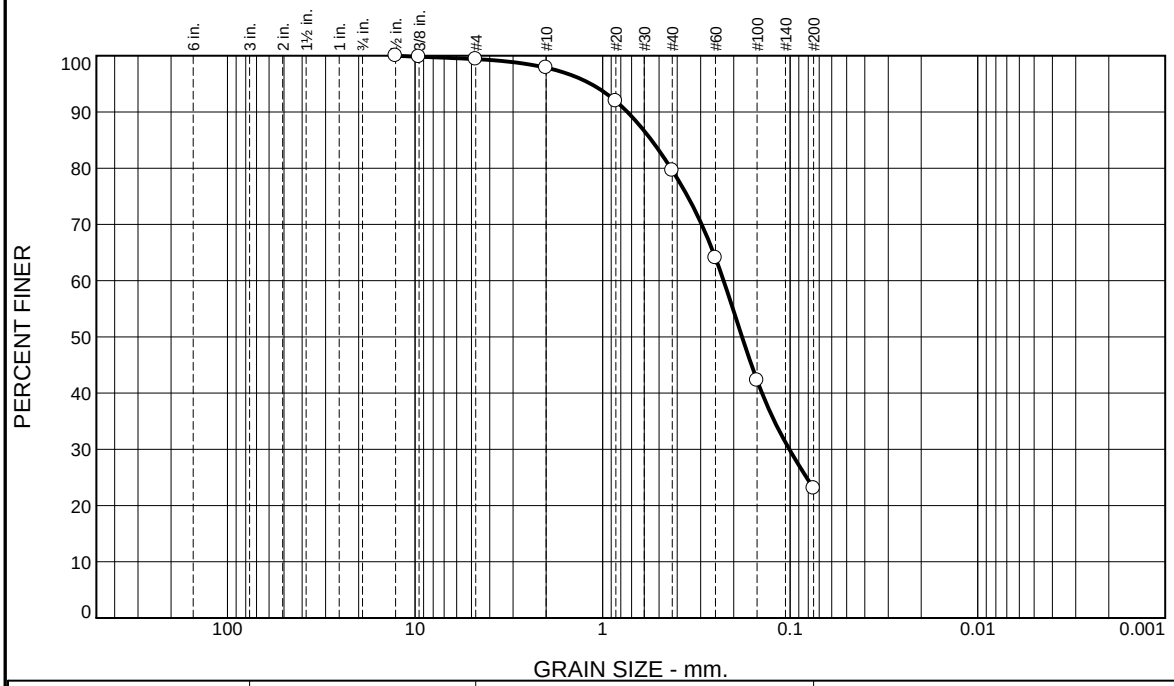
Source of Sample: B **Depth:** Unknown **Date Sampled:** 9/8/21
Sample Number: 1543210908-07

Thielsch Engineering Inc.

Cranston, RI

Client: Fuss & O'Neill
Project: MUP Grant FY 22/23
Haverhill, MA
Project No: 20170390.U30 **Figure** 21-S-B205

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.6	1.5	18.3	56.5	23.1	

Test Results (D6913 & ASTM D 1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
1/2"	100.0		
3/8"	99.8		
#4	99.4		
#10	97.9		
#20	91.9		
#40	79.6		
#60	64.1		
#100	42.3		
#200	23.1		

* (no specification provided)

Material Description

Grey clayey sand (SC)

Atterberg Limits (ASTM D 4318)

PL= **LL=** **PI=**

Classification

USCS (D 2487)= **AASHTO (M 145)=**

Coefficients

D_{90}= 0.7371 D_{85}= 0.5491 D_{60}= 0.2263
D_{50}= 0.1804 D_{30}= 0.1011 D_{15}=
D_{10}= C_u= C_c=

Remarks

Sample visually classified as plastic. Sample rolled to 1/8".

Date Received: 9/8/21 **Date Tested:** 9/14/21

Tested By: CC

Checked By: Christina Colman

Title: Laboratory Coordinator

Source of Sample: B **Depth:** Unknown **Date Sampled:** 9/8/21
Sample Number: 1543210908-08

Thielsch Engineering Inc.

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Haverhill, MA
Project No: 20170390.U30 **Figure** 21-S-B206

THIELSCH ENGINEERING

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Let's Build a Solid Foundation

Client Information:
Fuss & O'Neill
North Quincy, MA
PM: Matt Kissane
Assigned By: Matt Kissane
Collected By: Client

Project Information:
MUP Grant FY 22/23
Haverhill, MA
F&O Project Number: 20170390.U30
Summary Page: 1 of 1
Report Date: 09.29.21

LABORATORY TESTING DATA SHEET, Report No.: 7421-J-B008

Source Code	Sample No.	Depth (Ft)	Laboratory No.	Identification Tests								Proctor / CBR / Permeability Tests								Laboratory Log and Soil Description
				As Received Water Content %	LL %	PL %	Gravel %	Sand %	Fines %	Org. %	G_s	Dry unit wt. pcf	Test Water Content %	γ_d MAX (pcf) W_{opt} (%)	γ_d MAX (pcf) W_{opt} (%) (Corr.)	Target Test Setup as % of Proctor	CBR @ 0.1"	CBR @ 0.2"	Permeability cm/sec	
				D2216	D4318		D6913			D2974	D854			D1557						
B	1543210917-06	N/A	21-S-B240	28.7			0.0	65.8	34.2											Dark Brown clayey sand (SC)
B	1543210917-07	N/A	21-S-B241	56.0			0.0	22.0	78.0											Dark Brown clay (CL)

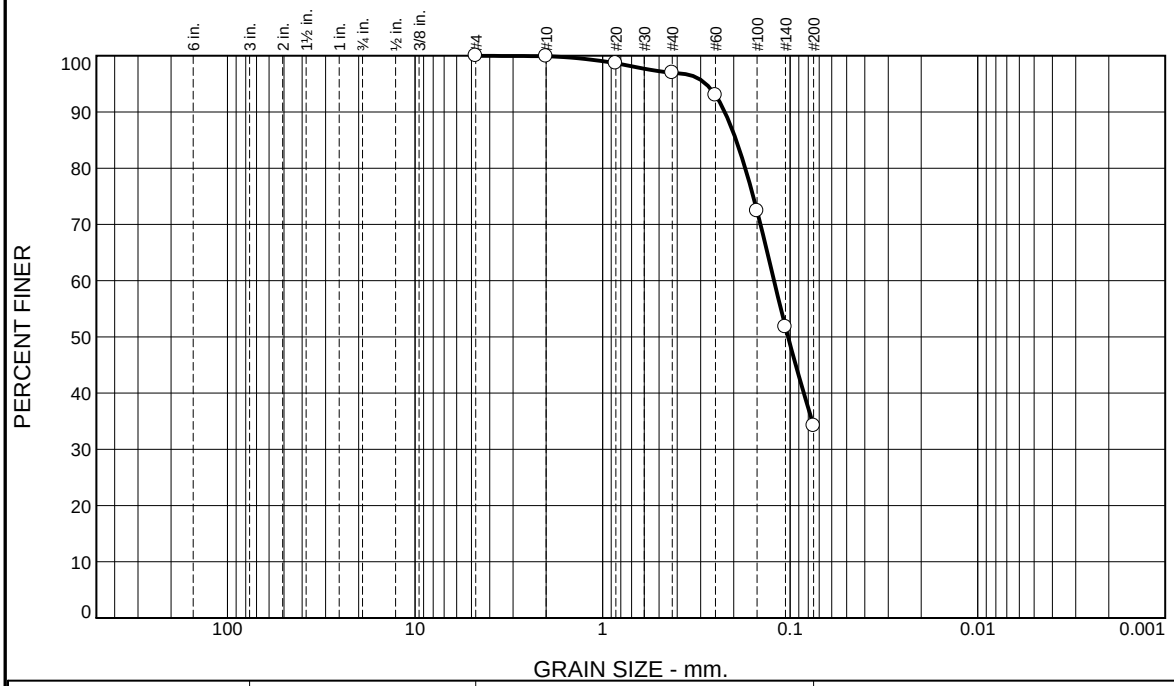
Date Received: ***09.21.21***

Reviewed By: Christine M Cahoon

Date Reviewed: ***09.29.21***

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Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.1	2.9	62.8	34.2	

Test Results (D6913 & ASTM D 1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#4	100.0		
#10	99.9		
#20	98.7		
#40	97.0		
#60	93.0		
#100	72.4		
#140	51.8		
#200	34.2		

* (no specification provided)

Material Description

Dark Brown clayey sand (SC)

Atterberg Limits (ASTM D 4318)

PL= **LL=** **PI=**

Classification

USCS (D 2487)= **AASHTO (M 145)=**

Coefficients

D_{90}= 0.2230 D_{85}= 0.1940 D_{60}= 0.1218
D_{50}= 0.1027 D_{30}= D_{15}=
D_{10}= C_u= C_c=

Remarks

Sample visually classified as plastic. Sample rolled to 1/8".

Date Received: 9/20/21 **Date Tested:** 9/27/21

Tested By: DN / CC

Checked By: Christina Colman

Title: Laboratory Coordinator

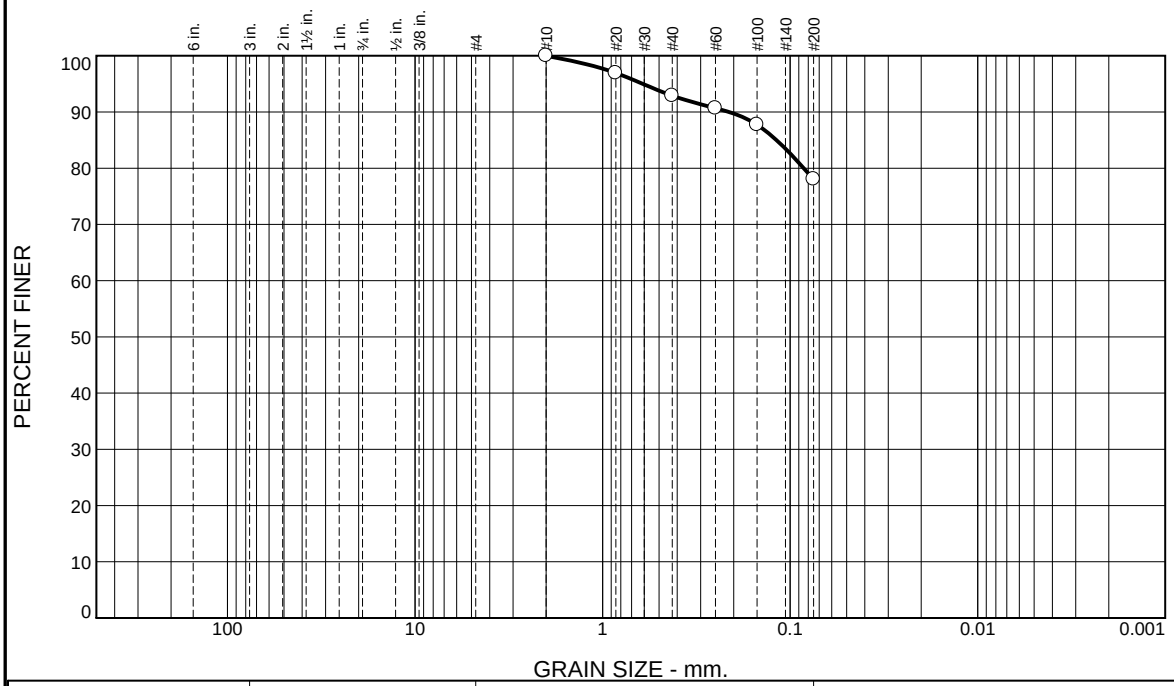
Source of Sample: B **Depth:** Unknown **Date Sampled:** 9/17/21
Sample Number: 1543210917-06

Thielsch Engineering Inc.

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Project No: 20170390.U30 **Figure** 21-S-B240

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	7.1	14.9	78.0	

Test Results (D6913 & ASTM D 1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#10	100.0		
#20	96.9		
#40	92.9		
#60	90.7		
#100	87.7		
#200	78.0		

* (no specification provided)

Material Description

Dark Brown clay (CL)

Atterberg Limits (ASTM D 4318)

PL= **LL=** **PI=**

Classification

USCS (D 2487)= **AASHTO (M 145)=**

Coefficients

D_{90}= 0.2119 D_{85}= 0.1182 D_{60}=
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Remarks

Sample visually classified as plastic. Sample rolled to 1/16".

Date Received: 9/20/21 **Date Tested:** 9/27/21

Tested By: DN / CC

Checked By: Christina Colman

Title: Laboratory Coordinator

Source of Sample: B **Depth:** Unknown **Date Sampled:** 9/17/21
Sample Number: 1543210917-07

Thielsch Engineering Inc.

Cranston, RI

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Project: MUP Grant FY 22/23
Haverhill, MA
Project No: 20170390.U30 **Figure** 21-S-B241