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Soil and Materials Management Plan

Route 6/10 Interchange Reconstruction
Providence, Rhode Island

6/10 Contractors JV

Project number: 60560960

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Prepared by	Checked by	Verified by	Approved by
Patrick Haskell, CHMM Technical Leader	Craig MacPhee Technical Director	Craig MacPhee Technical Director	Richard Prior, P.E. Project Manager

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Prepared for:

Rhode Island Department of Transportation

Prepared by:

Patrick Haskell
Technical Leader

AECOM
10 Orms Street
Suite 400
Providence, RI 02904
aecom.com

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List of Abbreviations

bgs	Below ground surface
BUD	Beneficial use determination
COCs	Contaminants of concern
CY	Cubic yards
DDD	4,4'-Dichlorodiphenyldichloroethane
ELUR	Environmental Land Usage Restriction
GA LC	Leachability Criteria for GA groundwater areas
GB LC	Leachability Criteria for GB groundwater areas
I/C DEC	Industrial Commercial Direct Exposure Criteria
LC	Leachability Criteria
Mg/kg	Milligrams per kilogram (equivalent to parts per million [by weight])
Mg/L	Milligrams per liter (approximately equivalent to parts per million [in water])
MTBE	Methyl tert-butyl ether
PAHs	Polycyclic aromatic hydrocarbons
PCBs	Polychlorinated biphenyls
PDI	Pre-design investigation
PID	Photoionization detector
ppmv	Parts per million by volume (in air)
R DEC	Residential Direct Exposure Criteria
RIDEM	Rhode Island Department of Environmental Management
RIDOT	Rhode Island Department of Transportation
RIRRC	Rhode Island Resource Recovery Corporation
S&E	Sediment and erosion
SMP	Soil and materials management plan
SPLP	Synthetic precipitation leaching procedure
TPH	Total petroleum hydrocarbons

1. Introduction

This soil and materials management plan describes the basis and procedures for management of soil and groundwater that will be encountered during construction activities for the reconstruction of the Route 6/10 Interchange in Providence, Rhode Island.

1.1 Applicable Regulations

The management of soil and groundwater related to this project shall be in accordance with the Rules and Regulations for the Investigation and Remediation of Hazardous Material Releases (Remediation Regulations, Rhode Island Department of Environmental Management [RIDEM], DEM-DSR-01-93, as revised November 2011), when applicable, and the Rules and Regulations for Hazardous Waste Management (RIDEM Hazardous Waste Regulations, DEM OWM-HW 01-14, as amended January 17, 2014), as applicable. Management of soil stockpiles and other construction activities shall be performed in accordance with the Solid Waste Regulation No. 1 – General Requirements, including dust control measures and proper placement and management of temporary soil stockpile areas and guidance provided in the Rhode Island Soil Erosion and Sediment Control Handbook.

The work described herein is being performed by 6/10 Constructors Joint Venture (6/10 JV) on behalf of the Rhode Island Department of Transportation (RIDOT). 6/10 JV will be managing soils in accordance with the applicable regulations identified above and this Soil and Materials Management Plan (SMP). This SMP addresses soil to be managed during the remainder of the project and is intended to supersede the Interim SMP that was submitted to RIDEM on May 1, 2018 and approved on June 29, 2018. This updated SMP presents additional analytical data not available at the time of interim SMP submittal and summarizes data and soil management activities for the construction project as a whole.

1.2 Site Description and Background

The site is identified as the U.S. Route 6 and RI Route 10 Interchange located in Providence, Rhode Island. The site is located approximately one mile southwest of the intersection of Interstate 95 and Huntington Expressway (Routes 6 and 10 in that area) and extends approximately from Atwells Avenue to the north, Union Street to the south along Route 10, and Hartford Avenue to the west along Route 6. The approximate location of the site is illustrated on **Figure 1**.

The site is currently used and, following the completion of the project, will continue to be used as a restricted access highway. It is located in an area where groundwater is classified GB, which indicates that groundwater in this area is not designated for drinking water use. Thus, for purposes of evaluating soil reuse, analyte concentrations in soil will be compared to Rhode Island Residential Direct Exposure Criteria (R DEC) and GB Leachability Criteria (GB LC). However, because the majority of the site is a restricted access highway, the likelihood of public exposure to the soil is low, and it is also appropriate to compare concentrations to the Industrial Commercial Direct Exposure Criteria (I/C DEC) for purposes of assessing reuse.

2. Description of Potentially Contaminated Materials

A pre-design investigation (PDI) was performed in the project area to assess soil and groundwater quality in the areas where subsurface work will necessitate management of those materials. This investigation consisted of the RIDOT preliminary environmental investigation and 6/10 JV's supplemental investigation performed in Spring 2018. The sections below describe the soil quality classification system that will be used to segregate soil types.

2.1 Summary of Overall Environmental Quality Data

Soil and groundwater have been pre-characterized in the project area. The pre-characterization involved the advancement of 65 soil borings and 10 test pits and the collection of 139 soil samples and 9 groundwater samples, in addition to the 25 soil quality borings, 32 soil samples, and 4 groundwater samples collected during RIDOT's preliminary environmental investigation. Analytical data for the majority of these samples were provided in the interim Soil Management Plan submitted in May 2018. Analytical data for the remainder of the samples are provided in **Appendix A**. A summary of soil analytical data from the PDI is provided in **Table 1**, and a summary of groundwater analytical data is provided in **Table 2**. Soil data from RIDOT's preliminary environmental investigation is tabulated in **Appendix B**. The soil boring, monitoring well, and test pit locations are depicted on **Figures 2 and 3**.

Soil boring logs, well construction diagrams, test pit logs, and the remainder of the analytical laboratory reports were provided in the Interim Soil Management Plan, which was submitted to RIDEM on May 1, 2018.

The soil data indicate the presence of PAHs, arsenic, lead, and TPH at concentrations in excess of the R DEC at various locations across the site. The data also indicate the presence of PAHs, arsenic, lead, and TPH at concentrations in excess of the I/C DEC at a subset of these locations. At one location beryllium was detected at concentrations in excess of the R DEC. At another location, benzene was detected at concentrations above the GA LC but below the GB LC. Contrary to the Letter of Responsibility, no other VOCs were detected at concentrations above RI numerical cleanup criteria.

The following provides a summary of results for the investigation:

- Most often, the exceedances of the I/C DEC were based solely on benzo(a)pyrene concentrations. Of the 39 PDI samples for which one or more analytes exceed an I/C DEC, 26 of the exceedances were for benzo(a)pyrene alone and another five were for benzo(a)pyrene and other PAHs. PAH analyses were not performed for the bulk of the borings completed as part of the RIDOT preliminary environmental investigation. Most borings for that investigation were completed in the area to the west of Route 10, where soil quality is generally poorer, as noted below. Benzo(a)pyrene is the only analyte that was detected at a concentration more than 10 times the I/C DEC, and that occurred at only five locations, two of which are in areas where soil is not expected to be excavated as part of the project (i.e., GP-101 and SB-01 at a depth of 30-32 feet below ground surface [bgs]). The other such locations are soil boring SB-36, which is located near the end of Dike Street; GP-107 (11 milligrams per kilogram [mg/kg]), an isolated detection 10 feet deep within the Route 10 Southbound embankment; and RW-13 (8.21 mg/kg). This is indicative of the intermittent, widespread, and generally low concentrations of impacts typical of urban soil on the project site.
- Arsenic was detected at concentrations in excess of the R DEC at 13 soil sampling locations, all of them located west of the Amtrak right-of-way. Arsenic was not detected in excess of the I/C DEC. All of these R DEC exceedances were for soil samples obtained from beneath the Route 6 viaduct with the exception of boring B-36, which was drilled near the end of Dike Street, where one end of a pedestrian bridge will be constructed. No significant excavation is expected in this area.

- Beryllium was detected at concentrations in excess of the R DEC in two soil samples. Both of these samples are located in the area beneath the Route 6 viaduct.
- Lead was detected at concentrations in excess of the R DEC at 29 soil sampling locations and in excess of the I/C DEC at eight locations. The maximum concentration of lead detected was 1,940 mg/kg. Lead concentrations exceeded the GA LC in five samples analyzed via the synthetic precipitation leaching procedure (SPLP). The lowest concentration of total lead associated with such an exceedance was 449 mg/kg. With the exception of one sample, all of the I/C DEC and GA LC exceedances for lead were for soil samples on the western side of the Route 10 corridor, and with the exception of two locations, they were in areas where soil excavation will be limited to that needed for the construction of footings for bridge and ramp piers.
- TPH was detected in two soil samples at concentrations in excess of the I/C DEC and GB LC. Both of these samples were collected west of the Amtrak right-of-way, one beneath the Route 6 viaduct and one near the end of Dike Street. Soils collected from the majority of the project area contained detectable TPH concentrations, and samples from 39 soil sampling locations contained TPH at concentrations in excess of the R DEC and GA LC. These latter samples were scattered across the project site, but represent less than 20% of the soil samples collected, and the vast majority of the samples in which TPH concentrations in excess of the R DEC and GA LC were detected were collected from elevations below the finished grade of the project, and thus excavation in these areas will be limited to that needed to construct pier foundations and retaining walls.
- Concentrations of VOCs were detected in 14 soil sampling locations. All VOC concentrations detected were below the R DEC and GA LC except for one soil sample in which benzene concentrations are above the GA LC, but below the R DEC, I/C DEC, and GB LC. This sample was collected at a depth of over 30 feet below the Tobey Street on-ramp embankment and is not expected to be excavated as part of the project.
- Polychlorinated biphenyls (PCBs) were detected in four soil samples at concentrations below Method 1 Soil Objectives with a maximum concentration of 0.182 mg/kg.
- Two soil samples contained the pesticide 4,4’-Dichlorodiphenyldichloroethane (DDD) with a maximum concentration of 71 micrograms per kilogram (μg/Kg).
- Herbicides were not detected above laboratory reporting limits in any soil samples.
- While one result exceeded the Method 1 GB LC for TPH, no other analytical results exceed Method 1 GB LC, and given the generally immobile nature of the chemicals detected for which Method 1 GB LC do not exist, significant migration of detected chemicals into and through groundwater is not expected to occur.

Figures 2 and 3 illustrate the soil quality data for shallow soil (0 to 4 feet bgs) and deeper soil, respectively. While deeper soil is generally less contaminated, it is not consistently so, and in some places, the most contaminated samples at a boring were collected from deeper soil. This limits the feasibility of vertical segregation of impacted soil as part of the construction project, and therefore, management of soil will largely treat all regulated soils the same with the exception of a few more heavily impacted areas.

Based on the totality of the soil quality data for the project, the contaminants of concern (COCs) are TPH, PAHs, arsenic, beryllium, and lead. Arsenic and beryllium impacts were limited to areas west of the Amtrak right-of-way and are not considered COCs for the bulk of the project area. Thus, the vast majority of regulated soil is affected only by petroleum, PAHs, and lead.

The 2017 groundwater data from the preliminary environmental investigation included detections of metals at concentrations in excess of the Rhode Island GA Groundwater Criteria. However, these samples were collected as grab samples from temporary boreholes and likely had elevated metals due to suspended solids in the groundwater containing metals sorbed to soil particles. A round of groundwater samples were collected in 2018 by AECOM from monitoring wells and from two soil borings at which lowflow sampling techniques were used to help reduce the turbidity of the groundwater samples. Two of these monitoring wells were located in close proximity to the 2017 groundwater sample locations. Metals in the 2018 groundwater samples were below the GA Groundwater Criteria. One VOC, methyl tert-butyl ether (MTBE), was detected in three samples at concentrations above the GA Groundwater Criterion, but below the GB Groundwater Criterion. One SVOC, di-N-butyl phthalate was detected in the six monitoring well samples. This compound is understood to be related to the polyvinyl chloride well material.

TPH was detected in groundwater samples collected from most of the project area with a maximum detected TPH concentration in groundwater of 2 mg/L. There are no groundwater criteria for TPH. A summary of groundwater analytical data is provided in **Table 2**.

2.2 Soil Quality Classification

Soil to be managed at the site is being classified into four categories, based on the current analytical data and field observations and will be managed as described in the Section 3.0. These four categories are discussed below. Soil which does not exceed any RIDEM numerical criteria is considered unregulated soil. All other soil types are considered regulated soil. A summary of estimated quantities of regulated soil is presented in **Table 3**.

2.2.1 Type 1A Soil (Unregulated Soil)

Soil that meets physical requirements for which concentrations are below RDEC and GA LC for the analyzed constituents will be classified as Type 1A soil and may be reused as backfill on-site without further testing. Type 1A soil is unregulated soil and may be shipped off-site for unrestricted use without further testing, except that required by the receiving site.

Based on the analytical data from the PDI, approximately 50,000 cubic yards of Type 1A Soil will be generated during the performance of the construction activities.

2.2.2 Type 1B Soil (Regulated Soil)

Soil in which levels of contaminants are found to be above the R DEC or GA LC but below the I/C DEC and GB LC will be classified as Type 1B soil and may be reused as backfill on site, shipped off-site for reuse at an appropriate site, or shipped off-site for disposal at a permitted facility. Reuse on-site requires placement under a clean soil cover or pavement. Prior to shipment of excess soil off-site, additional sampling and testing may be performed to meet the requirements of the selected disposal facility.

Based on the analytical data from the PDI, approximately 100,000 cubic yards of Type 1B Soil will be generated during the performance of the construction activities.

2.2.3 Type 2 Soil (Regulated Soil)

Soil in which levels of contaminants are found to be above the I/C DEC or GB LC but below levels that would require disposal at a Subtitle C facility will be classified as Type 2 soil. Type 2 soil can be reused on Industrial/Commercial sites under an RIDEM-approved cover provided an Environmental Land Usage Restriction (ELUR) is recorded. Type 2 soil can typically be accepted at one or more local and regional facilities, such as the Coventry Landfill BUD program, out-of-state landfills as cover, at the RI Central Landfill for landfilling without pretreatment, at soil reuse facilities (e.g., W.L. French facility in Dudley, MA), or at asphalt batch recycling facilities (e.g., Ted Ondrick Company in Chicopee, MA). Prior to shipment of excess soil off-site, additional sampling and analytical testing may be performed to meet the requirements of the selected disposal facility.

Based on the analytical data from the PDI, approximately 190,000 cubic yards of Type 2 Soil will be generated during the performance of the construction activities.

2.2.4 Type 3 Soil (Regulated Soil)

Type 3 soil contains levels of contaminants in exceedance of the EPA and/or RIDEM hazardous waste characteristics, necessitating disposal as hazardous waste. Based on the analytical data and field observations from the PDI, this Soil Type has not been encountered on the project and is not expected to be encountered. If field screening indicates that this soil may be encountered (e.g., jar headspace readings greater than 100 parts per millions by volume [ppmv]), the soil may be pre-characterized and live-loaded for off-site disposal or stockpiled separately for sampling and disposal.

2.2.5 Type 1B/Type 2 Soil Exceeding GA LC (Regulated Soil)

Because the bulk of the Type 1B and Type 2 soil is contaminated primarily by PAHs, which are not significantly leachable, there are numerous options for reuse. However, soil containing concentrations of lead and TPH greater than the GA LC may not be suitable for reuse in some off-site locations, as discussed later in this SMP. Therefore, the majority of the soil where sample results exceeded GA LC in the PDI will be segregated from the remainder of the Type 1B and Type 2 soil. The areas where soil is being segregated for off-site disposal are depicted in **Appendix C**.

2.2.6 Type 1B/Type 2 Soil Not Exceeding GA LC (Regulated Soil)

The remainder of the Type 1B/Type 2 soil is generally less impacted. Under this segregation plan, all but one sample where lead was detected at concentrations greater than the GA LC is designated for off-site disposal. (That one sample was collected from boring GP-114, which is currently beneath the temporary Route 10 Northbound roadway and is not expected to be removed from the site.) Following disposal of the most impacted Type 1B/Type 2 soil, as described in **Section 2.2.5**, some soil with TPH concentrations in excess of the GA LC will remain. However, these TPH results were primarily obtained from samples in areas that will be subjected to limited excavation (i.e., beneath retaining walls or in areas that will only be disturbed for utility installation), and several are beneath the temporary roadway and are likely to remain in place for the duration of the project. The area where the greatest proportion of soil will be removed for the project (i.e., the Route 10 Southbound/Route 6 Westbound embankment) has much lower concentrations of TPH. Therefore, the average concentration of TPH in the remaining combined Type 1B/Type 2 soil is expected to be less than the GA LC, and thus, the combined Type 1B/Type 2 soil designated for reuse is considered appropriate for reuse both on this project and on other RIDOT properties, such as those discussed in **Section 3.5**.

2.3 Groundwater Quality Classification

Groundwater is only expected to be encountered rarely during construction activities. Footings for the bridges and retaining walls are not expected to reach groundwater (aside from piles, for which no groundwater will be generated). In the event that groundwater were to be encountered during the project, several soil borings and monitoring wells were sampled, and groundwater for the project area indicates that all constituents are well below GB Groundwater Criteria.

Stormwater that accumulates in open excavations will generally be allowed to infiltrate naturally to groundwater. However, if it must be managed, it will be filtered to remove dissolved solids.

3. Materials Management

The following sections detail the methods by which environmental media encountered during construction activities will be managed.

3.1 Soil Excavation and Handling

Soil excavated as part of the project will be reused locally, loaded directly into trucks for shipment off-site for beneficial reuse or disposal at an approved site, or segregated into stockpiles, based on location and visual and olfactory observations during excavation pending characterization. Because segregation based on individual samples is neither practical for a project of this scale, nor appropriate for a project area where impacts are largely related to normal, incidental releases of motor oil and gasoline from motor vehicles or from the presence of asphalt pavement residues in soil, segregation will be based on a combination of the project construction sequence and tied to roadway stationing in the construction plan.

The segregation of soil will be based on the data from the PDI and, where applicable, waste pre-characterization sampling. Because there was a discernible pattern of impacts wherein soil tended to display greater impacts in the areas near and west of the Amtrak right-of-way, where industrial activities have historically been more intensive, and tended to display lower impacts to the east, soil segregation reflects this pattern. Soil classification on the western side of the highway right-of-way is generally based on soil data from that side of the right-of way; soil classification on the eastern side of the right-of-way is based on soil data from that side of the right of way; and soil classification in the center is based on soil data from the center of the right-of-way. Within these areas, the analytical data were initially evaluated by the method of Thiessen polygons, wherein the classification of soil was assumed to change half the distance between soil samples of different soil types. Where data were limited, these polygons sometimes crossed between the center of the right-of-way and the eastern or western sides of it. The final polygons were then adjusted slightly to correspond with Stationing from the roadway design such that segregation could be more readily implemented in the field. Vertical segregation is not performed, as it is not practical given the pattern of impacts and the nature of the earthworks necessary for construction (i.e., horizontal cutting into elevated, steeply sloped embankments). The segregation plan is depicted on the construction drawings in **Appendix C**.

6/10 JV's environmental representative will be available while soil is being excavated to aid in screening of soil or to perform testing, as needed. Because the existing analytical data do not suggest the presence of volatile organic compounds at concentrations above RI DEM cleanup criteria, field screening will be performed intermittently, unless material is encountered that displays staining or discernible odors. If petroleum or solvent odors are detected in the soil, if ash or oil is observed, the soil will be stockpiled for analytical testing as presumed Type 2 and potential Type 3 soil, and the environmental representative will be brought on site to assess the situation. Additional details of potential contingency measures to address more heavily impacted soil are summarized in **Section 3.8**.

Soil that is identified as Type 1A soil will be stockpiled on site or sent off-site for unrestricted reuse. Areas of Type 1A soil that can be segregated from more impacted soil are located beneath portions of the Route 10 Southbound embankment and the embankment east of Route 10 Northbound, particularly south of the Route 6 overpass.

Type 3 soil is not anticipated to be encountered. If characterization data indicative of Type 3 soil is obtained or impacts suggestive of Type 3 soil are observed, it will be immediately segregated and temporarily stockpiled as depicted in **Figure 4**, pending disposal arrangements. Procedures for identification and management of Type 3 soil are discussed in **Section 3.8**. If Type 3 soil is determined to be present and an appropriate disposal facility is not immediately available, the soil will be hauled off-site to a licensed temporary storage and disposal facility (e.g., Red Technologies in Portland, Connecticut), pending waste profile generation and disposal. Stockpiles that are identified as Type 3 soil will be sampled at a frequency of one sample per 500 tons for waste characterization parameters prior to shipment off-site.

The most heavily impacted Type 2 soil, which will be generated by excavation of the footings for the Route 6 viaduct, Ramps B, C and D, the Dike Street pedestrian bridge, the Harris Avenue bridge, and the western end of the Tobey Street bridge, will be stockpiled separately or directly loaded into trucks and sent off-site for disposal at a permitted facility. The soil in these areas being segregated from the remainder of the Type 1B and Type 2 soil represents all of the soil with exceedances of the I/C DEC for arsenic and of the I/C DEC and GB LC for TPH, all but two of the samples with exceedances of the GA LC for lead, and approximately half of the exceedances of the GA LC for TPH. It is anticipated that this material will be disposed at the Rhode Island Resource Recovery Corporation (RIRRC) Central Landfill in Johnston, Rhode Island. Stockpiles of this material will be constructed as depicted in **Figure 4** and sampled at a frequency of 1 sample per 1,000 tons and analyzed for the required waste disposal parameters prior to shipment off-site.

Where waste pre-characterization sampling is performed, samples will be collected from soil borings or test pits advanced through the thickness of the area to be excavated. Samples will be composited across the full thickness of the area to be excavated and analyzed for TPH, PAHs, lead and SPLP lead. One boring or test pit will be completed and one sample collected per 1,000 CY to be excavated. Where waste pre-characterization composite sampling identifies soil containing TPH or lead concentrations greater than the GA PMC, it will be managed consistent with the more heavily impacted Type 2 soil described above. This will allow segregation of soil containing concentrations in excess of the GA LC for the primary soil reuse area (see **Section 3.5**), which is a DOT property located in a GA area.

The remainder of the Type 2 soil will be managed along with the Type 1B soil, as the nature of contamination is similar, containing low levels of gasoline, motor oil, and asphalt constituents (i.e., TPH, lead, and PAHs). This soil will be segregated based on physical properties (e.g., soil suitable as structural fill, soil suitable as common borrow) and stockpiled for potential reuse.

It is anticipated that up to half the stockpiled Type 1B/Type 2 soil will be reusable as backfill as part of this construction project. The timing for placement of that fill material will vary, however, over the course of the project. The vast majority of the fill will be generated during three phases of the project:

- In early 2019, as Route 10 Southbound is brought down to the finished grade of the project;
- In late 2020 and early 2021, when the existing Route 6 Southbound embankment is brought down to finished grade;
- In 2021, when the work on Tobey Street/Harris Avenue interchange and the Service Road West is performed; and
- In 2022, when the temporary roadway for Route 10 Northbound is abandoned.

The need for fill, however, will occur throughout the course of the project, as retaining walls and embankments are constructed. Therefore, stockpiles will be generated over relatively short periods of time, but will remain active during much of the project and may therefore be maintained for long-term use.

3.2 Soil Staging Areas

Excess soil will be temporarily stockpiled either adjacent to the excavation from which it came or at the locations selected by 6/10 Constructors JV and approved by RIDOT and RIDEM. The locations discussed in the May 2018 Interim Soil Management Plan are or soon will be under construction, and while they may continue to be used for limited stockpiling in the near term, will not be available over the life of the project. Therefore, soil will primarily be stockpiled on RIDOT property in the infield areas of the Interstate 295/Route 6 Interchange on and off-ramps. Stockpile areas are illustrated on **Figure 5.**

Because this area is both a stockpile area and a soil reuse area, excess soil will be placed in stockpiles atop native soils, and the edges of each stockpile will be surrounded with Jersey barriers to prevent sloughing and bermed to prevent run-on of stormwater from surrounding areas. Sediment and erosion (S&E) controls will also be installed, as needed, around the stockpile areas to prevent managed soils from being eroded into surrounding areas.

Soil stockpiles will be covered when not in use and as needed to control dust on dry days or erosion during rain events. A water mist will also be used sufficient to control dust during active work in the stockpile area without producing runoff. When not in use, stockpile covers will be secured with sandbags, lumber, or concrete to prevent wind from uncovering the stockpile. For inactive long-term stockpiles, cover may consist of topsoil and seeding. All plastic used to manage the stockpile will be considered solid waste and will be properly disposed at the completion of the project.

If soils are saturated by rainwater during construction, then a dewatering basin shall be constructed to dewater soils, and if space is available, a second basin will be created in the native soils and water from the dewatering operations will be directed towards this basin.

3.3 Soil Reuse and Disposal

Excess Type 1A soil will either be reused or shipped off-site for beneficial reuse without restriction. Excess Type 1B/Type 2 soil (i.e., that not reused on-site) will be properly reused or disposed off-site at one of the following sites:

- A permitted waste management facility;
- A similar RIDOT project on a limited access highway using the procedures outlined in this section; or
- At a third-party site with a RIDEM-approved SMP, wherein stockpiles are tested per the requirements of that SMP and results of the composite samples meet the acceptability criteria.

It is anticipated that analytical results of waste disposal parameter characterization sampling for stockpiles containing Type 1B and Type 2 soils will be within the limits allowed by the RIRRC for beneficial reuse at the Central Landfill as daily cover and within the limits allowed under the Coventry Landfill BUD program. Some of these soils may also be appropriate for disposal at an out-of-state facility, such as facilities governed by Massachusetts policies COMM 97-001 or COMM 15-01. It may also prove useful for properties undergoing redevelopment that require fill for regrading.

Type 1B and Type 2 soils that are reused over most of the site will be placed as backfill at a minimum depth of one foot bgs or at any depth beneath asphalt roadway constructed as part of the project. A thickness of one foot is considered adequate as a clean soil cover for the project, because reused soil will be located alongside a restricted access highway where pedestrian access will not be allowed except in the event of a roadside emergency. In such instances, the potential for exposure to soil will be minimal. The area will be maintained as a restricted access highway for the foreseeable future.

Type 1B and Type 2 soils that are reused in the shared use path or other portions of the roadway project that will have regular pedestrian access will be placed as backfill at a minimum depth of two feet bgs or at any depth beneath asphalt portions of the shared use path.

Regulated soil being shipped off-site for reuse or disposal at third-party facilities or sites will be tested at a minimum frequency of 1 sample per 1,000 CY for characterization of COCs that were identified based on the PDI (i.e., TPH, PAHs, and lead). Testing may be performed by composite samples collected in-situ or from stockpiles. Additional sampling may be performed to meet the requirements of the selected receiving site. The need for testing of soils that are to be reused at RIDOT projects will be determined depending on the nature of the receiving site. However, since many such projects have similar conditions to the Route 6/10 Interchange Reconstruction Project, that testing will be limited to assessing compliance with GA LC, where appropriate.

3.4 Soil Transportation and Disposal

Regulated soil that is transported to an approved disposal facility will be shipped using the appropriate documentation (e.g., bill of lading or waste manifest). Each truck will be provided with a copy of the appropriate documentation that will accompany the truck to the receiving facility. Excavated soil that is transported within the project area and along Route 6 between the project site and the reuse area at the Interstate 295 / Route 6 interchange will be tracked in the operating log and transported under a straight bill-of-lading. Trucks used for transporting soil will be lined and covered to prevent water and/or soil from escaping the trucks. The primary licensed waste hauler for transportation of excess Type 1B and Type 2 soil will be J.R. Vinagro Corporation. Additional licensed waste haulers may be retained, as needed, for transportation of excess regulated soil.

All manifests and material shipping record logs will be compiled for incorporation into a closure report that will be submitted in accordance with Section 11.09 of the Remediation Regulations following completion of the construction activities.

Facilities and sites to which regulated soil is anticipated to be shipped include the following:

- RIRRC's Central Landfill in Johnston as daily cover or for disposal;
- Coventry Landfill as cover for their beneficial reuse program;
- On RIDOT property in the infield areas of the Interstate 295 / Route 6 interchange, as depicted in **Figure 5**;
- On RIDOT property as a portion of the embankment being constructed in conjunction with the removal of Bridge No. 736 on Interstate 295, as depicted in **Figure 5**;
- On RIDOT property in the infield area of the Interstate 295 Southbound on-ramp from Route 146 Southbound, as depicted in **Figure 6;**
- On RIDOT property in the infield area of the Route 146 / Twin River Road on/off-ramp, as depicted on **Figure 7;** and
- On RIDOT property at the Interstate 95 Southbound on-ramp from Route 37 Eastbound, as depicted on **Figure 8**.

Additional facilities and sites may be added to this list with approval of RIDEM.

Approximately 20,000 CY of regulated soil is anticipated to be reused by RIDOT for the replacement of Bridge 736 on Interstate 295 with an embankment. Additional regulated soil is expected to be reused as fill within the on and off-ramps at the Interstate 295 / Route 6 interchange, as depicted in **Figure 5**. In addition, approximately 17,000 CY of the Type 1B/Type 2 soil is expected to be reused in the areas depicted on **Figure 6, Figure 7,** and **Figure 8** to fill in depressions that the Rhode Island State Police and RIDOT Safety Section have identified as motor vehicle hazards.

The RIDOT reuse areas are considered appropriate, because like the project site, they are limited access highways in which soil quality is assumed to have been impacted by motor vehicle use, and therefore, has similar constituents of concern. While these areas are in GA-classified groundwater areas, the existing soil data suggest that the average concentration in the soil to be reused in these areas will be below GA LC. Because the infield areas of these interchanges do receive runoff from the highways, additional design for management of stormwater may be required by RIDOT prior to placement of material in these areas.

3.5 Stormwater and Groundwater Management

Based on the PDI findings, groundwater is expected to be encountered at a depth of approximately seven to ten feet below the finished grade of the highway. Construction of the piers and abutments for the

Westminster Street and Broadway bridges and interchange ramps and the temporary retaining walls necessary for the relocation of Route 10 Northbound are not expected to reach this depth. Therefore, dewatering of groundwater will not be required during this phase of the project.

Construction will be performed in such a way as to limit the run-on of stormwater into open excavations. However, if rainwater is encountered during excavation that requires dewatering to complete construction, 6/10 JV will employ localized dewatering methods. It is anticipated that 6/10 JV will pump water from the excavation and will discharge it through filter fabric into a dewatering basin that will be constructed in the native soils to allow natural infiltration of the stormwater. In the unlikely event the water is visually impacted (e.g., contains separate phase oil) or has elevated photoionization detector (PID) readings (i.e., 100 ppmv PID reading in headspace over water in jar), the water will be sampled for laboratory analysis prior to pumping. Presence of separate phase petroleum will be reported to RIDEM, and any petroleum product encountered will be removed for off-site disposal.

3.6 Debris Management

Excavated soil shall be evaluated for components such as debris, wood, or large cobbles that might require physical separation from the soil prior to reuse or shipment. Based on the current understanding of the site, it is anticipated that the material will consist of urban fill soils containing mostly sands and gravel with occasional bricks or small debris. If larger debris is encountered, it will be placed in a separate stockpile pending offsite recycling or disposal.

3.7 Contingency Planning

While the existing analytical data and the findings of the PDI suggest that environmental impacts will not present a potential for an imminent hazard, contingency measures are being prepared in the event that an unforeseen situation arises that necessitates focused environmental remediation and waste management activities be performed during construction. Contingency measures will be implemented in the event that any of the following conditions are encountered:

- Intact tanks, vaults, or drums or such things with visible residue on surrounding soil or around which an odor is observed or around which field screening indicate the presence of VOCs;
- Stained soil inconsistent with existing analytical data (e.g., blue-stained soil potentially indicative of manufactured gas plant cyanide box waste or fluorescent yellow-stained soil potentially indicative of chromium plating waste) is observed;
- Field screening of soil using a PID indicates 100 ppmv or greater; or
- Soil or water containing visible non-aqueous phase liquid is encountered.

In the event that such conditions or other potential environmental hazards are encountered, construction work will temporarily halt, RIDEM will be notified and a contractor qualified for hazardous waste operations will be brought on site to manage the material. The material will be sampled in-situ and sent for expedited laboratory analysis. Material may be drummed or stockpiled separately with adequate containment for any free liquids that may be present, pending characterization and disposal. Where necessary, material will be shipped for temporary storage at TSDF facility, as described for Type 3 soil.

3.8 Record Keeping and Reporting

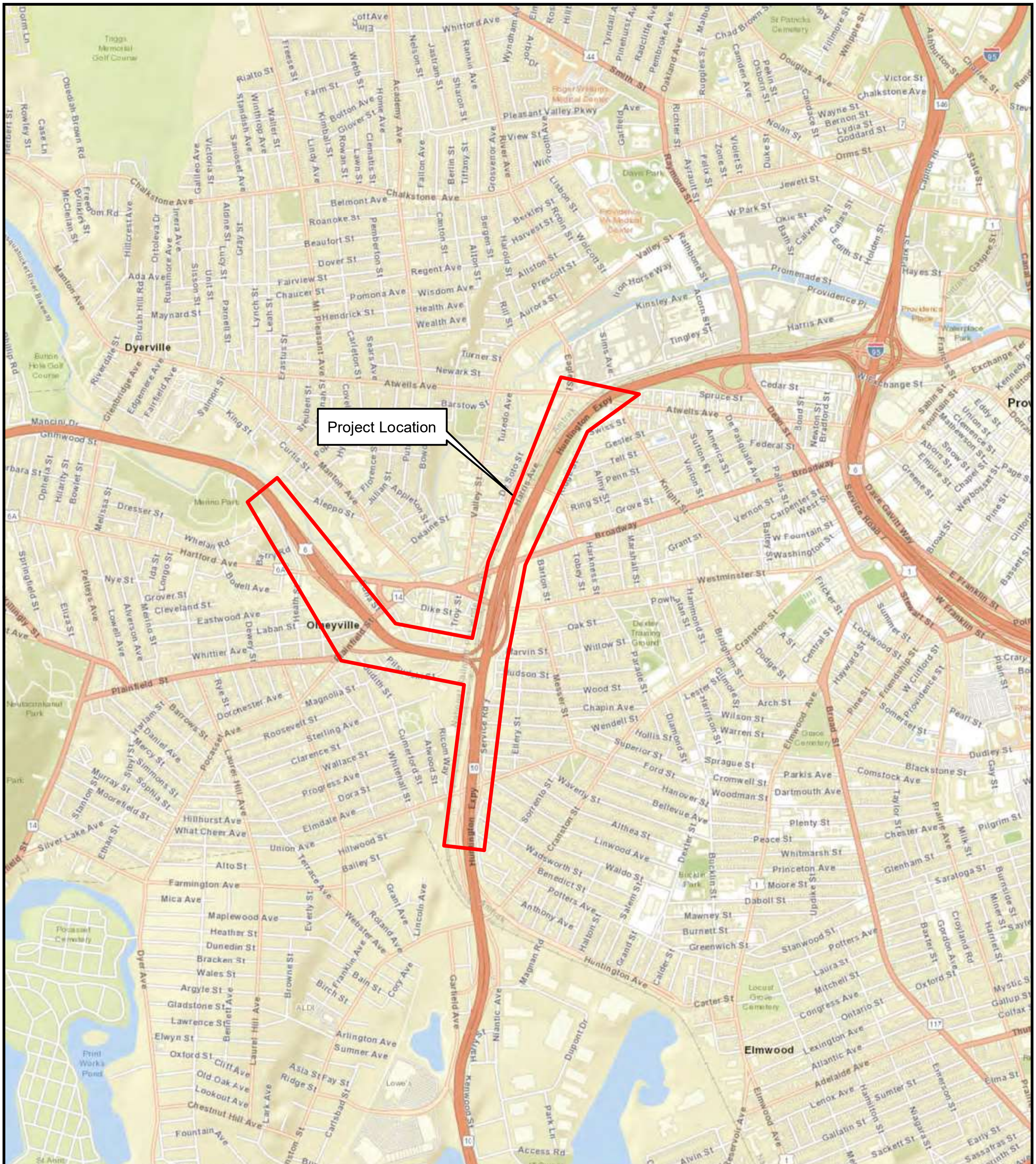
The Operating Log for this project will be maintained in accordance with Section 9.14 of the Remediation Regulations by 6/10 Constructors JV and their environmental representative. The Operating Log will note the dates and locations where regulated soils are generated and where they are reused. The Operating Log will clearly and completely record activities on-site and demonstrate how the soil management complies with Method 1 soil objectives in the Remediation Regulations. The Operating Log will be readily available at the project site during implementation and operation of the project. Examples of forms to be used to compile the Operating Log are provided in **Appendix D**.

A copy of the log will be submitted to RIDEM once per year, along with a progress report that documents the management of regulated soil to date.

3.9 Environmental Land Usage Restriction

At the conclusion of the project, RIDOT will record Environmental Land Use Restrictions to maintain the soil covers through the project corridor and at other RIDOT project locations where regulated soil has been reused.

Figures



Map Location

N

PROJECT LOCATION MAP
RECONSTRUCTION OF ROUTE 6 &
ROUTE 10 INTERCHANGE
PROVIDENCE, RHODE ISLAND

0 500 1,000 2,000 3,000 4,000 5,000 6,000 Feet

0 100 200 400 600 800 1,000 1,200 1,400 1,600 Meters

Map Projection: State Plane, NAD 83, Feet.
Image Source: USGS Topographic Quadrangle: Providence, RI.

Scale: 1:24,000

AECOM

Figure 1

Date: April 2018

Project #: 60560960

Path: L:\Gisprojects\Projects\Route_6_10\Projects\Soil_Stockpile\MXD\Fig_1_Project_Location_Map.mxd

REVISIONS		
NO.	DATE	BY

FIGURE 2

RHODE ISLAND
DEPARTMENT OF TRANSPORTATION

REHABILITATION OF
ROUTE 6 & ROUTE 10
INTERCHANGE
PROVIDENCE, RHODE ISLAND

RT 6/10 HIGHWAY SURFACE
SAMPLING RESULTS
(0 TO 4 FEET BELOW GRADE)

CHECKED BY ________ DATE ________ SCALE ________

FIGURE 3

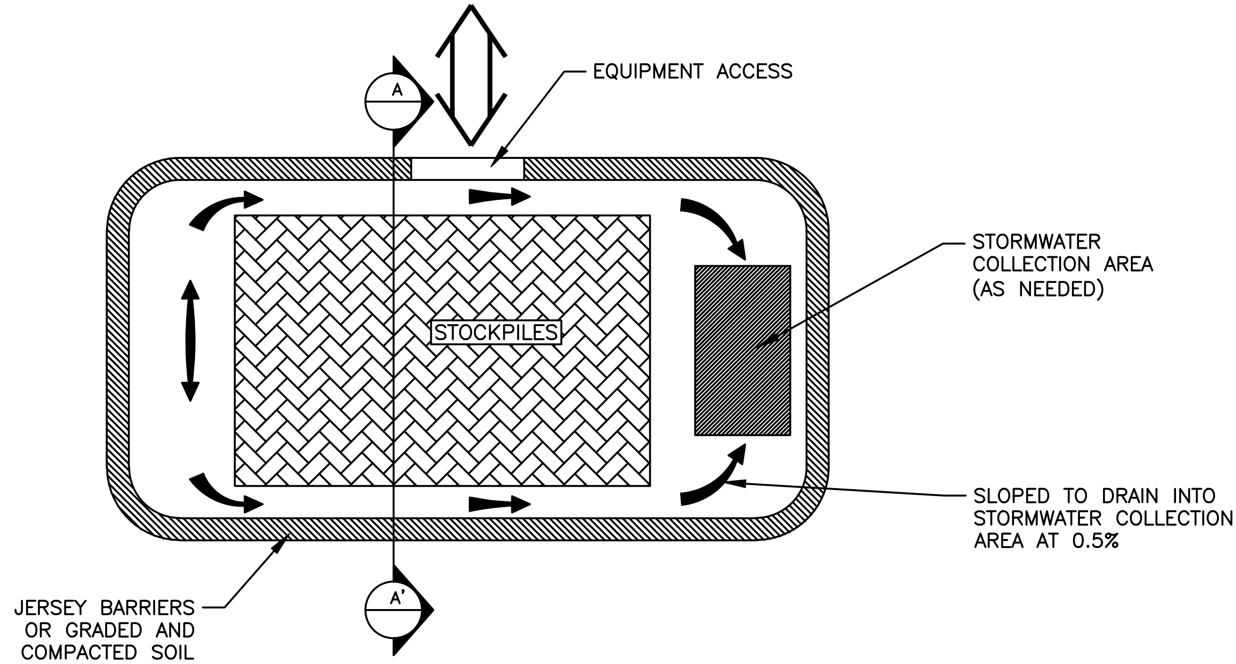
REVISIONS		
NO.	DATE	BY

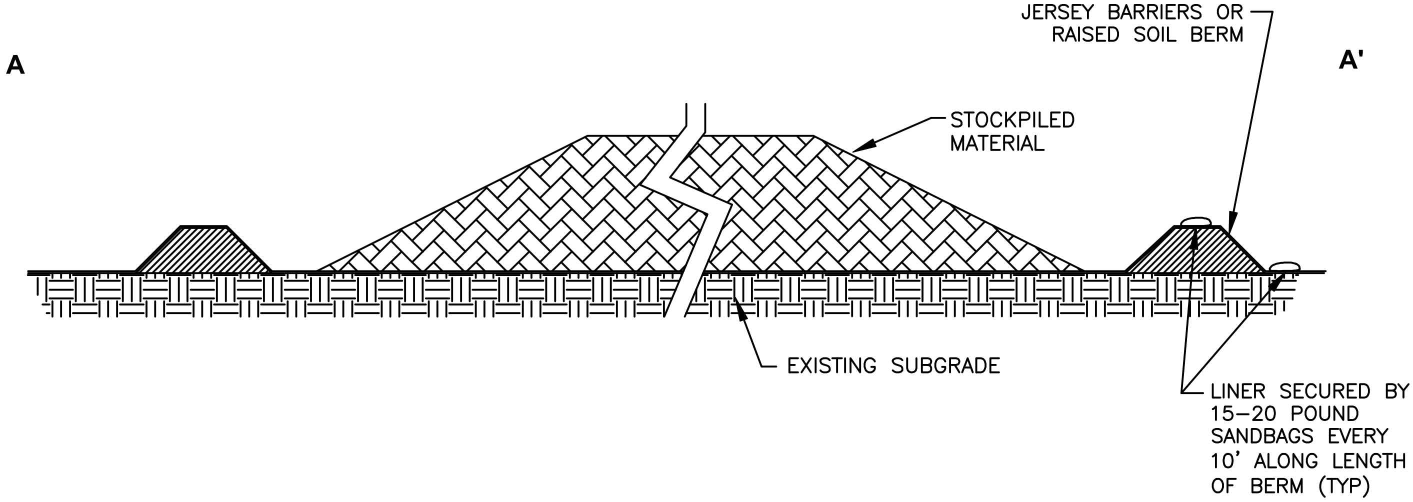
RHODE ISLAND
DEPARTMENT OF TRANSPORTATION

REHABILITATION OF
ROUTE 6 & ROUTE 10
INTERCHANGE
PROVIDENCE, RHODE ISLAND

RT 6/10 HIGHWAY
DEEP SAMPLING RESULTS
(PREDOMINANT RESULT >4 FEET BELOW GRADE)

CHECKED BY ________ DATE ________ SCALE ________





NOTES:

1. STOCKPILE AREA DIMENSIONS AND SHAPE MAY VARY. ACTUAL SIZE WILL BE DETERMINED BASED ON SITE CONDITIONS AND REQUIRED STORAGE AREA. SUBCONTRACTOR SHALL DETERMINE FINAL SIZE OF AREA WITH APPROVAL BY SITE ENGINEER.
2. EXISTING SUBGRADE SHALL BE FREE OF ANGULAR PROTRUSIONS. EXISTING SOIL WILL BE PLACED, GRADED TO DRAIN AND COMPACTED TO A FIRM UNYIELDING SURFACE PRIOR TO PLACEMENT OF LINER.
3. STOCKPILE AREA IS TO BE GRADED TO DRAIN TOWARDS THE STORMWATER COLLECTION AREA.
4. CONTAINMENT BERMS SHALL BE CONSTRUCTED OF IMPORTED CLEAN SOIL. OR JERSEY BARRIERS.
5. INITIAL PLACEMENT OF EXCAVATED SOIL WILL BE CAREFULLY PLACED IN A 12" LIFT SO THAT EQUIPMENT DOES NOT DAMAGE LINER.
6. DAILY INSPECTION AND MAINTENANCE OF THE STOCKPILE IS REQUIRED FOR THE DURATION OF THE PROJECT.
7. WHEN ONE-HALF (1/2) FULL, THE STORMWATER COLLECTION SUMP IS TO BE PUMPED OUT TO WATER TREATMENT SYSTEM.
8. SOLIDS ACCUMULATED IN THE SUMP WILL BE EXCAVATED PERIODICALLY AND PLACED ON THE WASTE MATERIAL STOCKPILE.
9. UPON COMPLETION OF THE WORK, THE STOCKPILE AREA SHALL BE REMOVED, AND THE AREA GRADED.
10. ANY DAMAGE TO STOCKPILE AREA MUST BE REPORTED TO THE SITE ENGINEER IMMEDIATELY.
11. LINER SHALL BE 20 MIL HDPE ONE SOLID SHEET OR SHALL HAVE SEAMS WELDED PER MANUFACTURER'S RECOMMENDATIONS.
12. FLUSHMOUNT WELLS TO BE PROTECTED DURING INSTALLATION AND REMOVAL OF STOCKPILE AREA. LINER TO BE PLACED OVER TOP OF WELL CASINGS.

SCALE: NTS

AECOM

RHODE ISLAND
DEPARTMENT OF TRANSPORTATION

RECONSTRUCTION OF ROUTE 6 & ROUTE 10 INTERCHANGE
PROVIDENCE, RHODE ISLAND

TYPICAL SOIL STOCKPILE DETAIL

DRAWN BY:	CHECKED BY:	PROJECT No:	DATE:	FIGURE No:
JB	TDD	60560960	04/17/2018	4

AECOM

ROUTE 6/10 INTERCHANGE RECONSTRUCTION
PROVIDENCE, RHODE ISLAND

DATE: 11/02/2018 | DRWN: JB

FIGURE 5
I-295 / U.S. ROUTE 6 SOIL STOCKPILE AND REUSE LOCATION

AECOM

ROUTE 6/10 INTERCHANGE RECONSTRUCTION
PROVIDENCE, RHODE ISLAND

DATE: 11/02/2018 | DRWN: JB

FIGURE 6
I-295 / U.S. ROUTE 146 SOIL REUSE LOCATION

AECOM

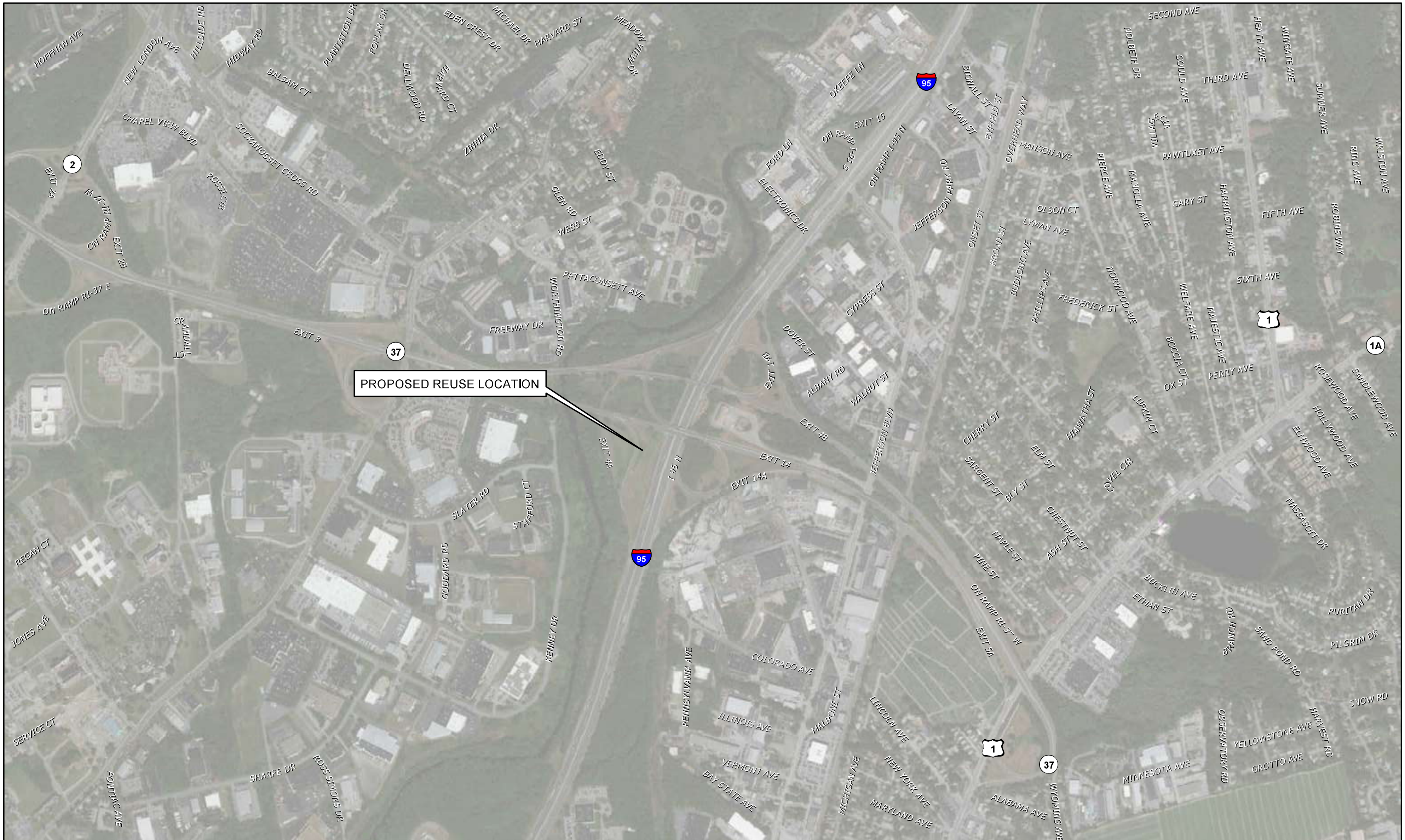
0 400 800 Feet

N

ROUTE 6/10 INTERCHANGE RECONSTRUCTION
PROVIDENCE, RHODE ISLAND

DATE: 11/02/2018 DRWN: JB

FIGURE 7
ROUTE 146/TWIN RIVER ROAD
SOIL REUSE LOCATION



0 400 800 Feet

N

AECOM

ROUTE 6/10 INTERCHANGE RECONSTRUCTION
PROVIDENCE, RHODE ISLAND

DATE: 11/02/2018 | DRWN: JB

FIGURE 8
I-95/ROUTE 37
SOIL REUSE LOCATION

Tables

Table 1
2018 Soil Pre-Charcterization Data
6/10 Highway Interchange Reconstruction
Providence, Rhode Island

Location / Sample ID / Sampling Date / Lab Report Number / Estimated Volume (tons)	GA Leachability Criteria	GB Leachability Criteria	Residential Direct Exposure Criteria (DEC)	Industrial Comercial DEC	Sample ID, Date, and Lab Deliverable ID																	
					B-6-SS1 (1-3)	B-6-SS3 (9-11)	B7-SS1(0-2)	B7-SS3(6-8)	B7-SS4(9-11)	B-10-SS3 (4.5)	B-10-COMP (0-8)	B-11-SS2(3)	B-11/19-COMP(0-8)	B-12-SS1(0-2)	B-14-SS4(6-7)	B-8/14-COMP(0-8)	B-15-SS4(7)	B-15-COMP(0-8)	B-17-SS-3(5)	B-17-COMP(0-8)	B-20-SS4 (7)	B-20/21-COMP-(0-8
					4/10/2018	4/10/2018	3/21/2018	3/21/2018	3/21/2018	2/7/2018	2/7/2018	2/19/2018	2/19/2018	3/19/2018	3/6/2018	3/6/2018	2/5/2018	2/5/2018	2/1/2018	2/1/2018	2/16/2018	2/16/2018
					SC45587		SC45086			SC43845		SC44148		SC44948	SC44632		SC43758		SC43677		SS44063	
TPH (mg/kg)																						
TPH	500	2500	500	2500	343	ND	791	48.4	45.6	NA	315	NA	1000	1460	NA	325	NA	310	NA	301	NA	1470
VOCs (mg/kg)																						
2-Butanone (MEK)	NE	NE	NE	NE										0.0261								
Acetone	NE	NE	7,800	10,000										0.0787								
Ethanol	NE	NE	NE	NE																		
Naphthalene	NE	NE	54	10000													0.166				0.162	
Tetrachloroethene	0.1	4.2	12	110						0.00949												
Trichloroethene	0.2	20	13	520																		
Trichlorofluoromethane	NE	NE	NE	NE																		
Vinyl Chloride	0.3	NE	0.02	3																		
Total Chlorinated VOCs	NE	NE	NE	NE						0.00949											0	
Total VOCs	NE	NE	NE	NE	ND	ND	ND	ND	ND	0.00949	NA	ND	NA	ND	ND	NA	0.166	NA	ND	NA	0.162	NA
PAHs (mg/kg)																						
1-Methylnaphthalene	NE	NE									ND			ND		0.193		ND				0.582
2-Methylnaphthalene	NE	NE	123	10,000							ND			ND		0.421		ND		ND		1
Acenaphthene	NE	NE	43	10,000			0.107				ND			ND		0.147		ND		ND		1.05
Acenaphthylene	NE	NE	23	10,000							ND			ND		0.583		0.075		ND		
Anthracene	NE	NE	35	10,000			0.199				ND		1.09	ND		0.922		ND		ND		3.17
Benzo(a)anthracene	NE	NE	0.9	7.8			0.597				ND		2.06	ND		1.29		0.457		0.955		3.67
Benzo(a)pyrene	240	NE	0.4	0.8			0.556				0.524		2.11	ND		1.31		0.593		0.666		3.81
Benzo(b)fluoranthene	NE	NE	0.9	7.8			0.549				0.693		1.95	ND		1.27		0.812		0.662		3.93
Benzo(g,h,i)perylene	NE	NE	0.8	10,000			0.341				ND		1.26	ND		0.725		0.266		0.417		1.48
Benzo(k)fluoranthene	NE	NE	0.9	78			0.423				0.532		1.51	ND		0.724		0.484		0.666		2.58
Chrysene	NE	NE	0.4	780			0.584				ND		1.67	ND		1.12		0.431		0.917		2.9
Dibenzo(a,h)anthracene	NE	NE	0.4	0.8			0.087				ND		ND	ND		0.163		0.0837		ND		0.439
Fluoranthene	NE	NE	20	10,000			1.43				0.654		4.69	2.13		4.29		0.762		1.66		8.43
Fluorene	NE	NE	28	10,000			0.0895				ND		ND	ND		0.649		ND		ND		1.6
Indeno(1,2,3-cd)pyrene	NE	NE	0.9	7.8			0.357				ND		1.35	ND		0.816		0.348		0.472		1.73
Naphthalene	0.8	NE	54	10,000			0.0964				ND		ND	ND		0.862		ND		ND		0.976
Phenanthrene	NE	NE	40	10,000			1.21				ND		4.57	ND		4.68		0.313		0.742		9.35
Pyrene	NE	NE	13	10,000			1.18				0.603		4.23	1.56		2.8		0.669		1.51		6.9
Carbazole	NE	NE	NE	NE	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA		NA	NA	NA	NA	ND	NA	NA
Dibenzofuran	NE	NE	NE	NE	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA		NA	NA	NA	NA	ND	NA	NA
Total PAHs	NE	NE	NE	NE	ND	ND		ND	ND	NA	3.006	NA	26.49	3.69	NA	22.965	NA	5.2937	NA	8.667	NA	53.597
PAHs-SPLP (ug/L)																						
Phenanthrene	NE	NE	NE	NE																		
Metals (mg/kg)																						
Arsenic	NE	NE	7	820	ND	ND	2.17	ND	ND		2.96		6.58	ND		2.52		7.78				3.59
Barium	NE	NE	5,500	10,000	23.3	11.7	20.8	6.03	18.7		50.2		59.9	63.9		66.6		91.4				29.0
Beryllium	NE	NE	1.5	1.5	NA	NA	NA	NA	NA		NA		NA	ND		NA		NA				NA
Cadmium	NE	NE	39	1,000	0.692	ND	ND	ND	ND		0.612		0.684	ND		NA		ND				ND
Chromium	NE	NE	1,400	10,000	12.4	3.78	4.94	3.09	5.77		7.53		52.4	17.4		9.19		10.0				164
Copper	NE	NE	3,100	10,000	6.39	3.08	6.56	2.89	7.19		14.7		47.9	30.8		11.9		19.6				78.2
Lead	NE	NE	150	500	3.78	3.12	40	ND	2.4		116		338	42.5		47.7		246				60.5
Mercury	NE	NE	23	610	ND	ND	0.175	ND	ND		0.0444		0.889	0.0461		0.146		0.101				0.222
Nickel	NE	NE	1,000	10,000	3.34	3.01	3.78	1.87	4.01		5.10		9.42	9.75		6.61		5.45				7.32
Zinc	NE	NE	6,000	10,000	21.2	14.9	22.8	8.08	13.7		52.7		123	105		49.9		159				73.0
Metals-SPLP (ug/L)																						
Arsenic	NE	NE	NE	NE																		
Chromium	1100	NE	NE	NE																		
Copper	NE	NE	NE	NE									11.5									
Lead	40	NE	NE	NE									25.5									
Mercury	20	NE	NE	NE																		
Zinc	NE	NE	NE	NE									22.6									
Cyanide (mg/kg)																						
Total Cyanide (mg/kg)					NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
PCBs (mg/kg)																						
Aroclor-1254	NE	NE	NE	NE																		
Aroclor-1260	NE	NE	NE	NE																		
Total PCBs	10	10	10	10	ND	ND	ND	ND	ND	NA	ND	NA	ND	ND	NA	ND	NA	ND	NA	ND	NA	ND
Pesticides (ug/kg)																						
4,4-DDD	NE	NE	NE	NE																		
4,4-DDE	NE	NE	NE	NE																		
4,4-DDT	NE	NE	NE	NE																		
Total DDT Isomers	NE	NE	NE	NE	ND	NA	ND	NA	NA	NA	NA	NA	NA	ND	NA	ND	NA	NA	NA	NA	NA	NA
Herbicides (ug/kg)																						
Total Herbicides					ND	NA	ND	NA	NA	NA	NA	NA	NA	ND	NA	ND	NA	NA	NA	NA	NA	NA

Notes:

This is a summary table. Only those analytes that are detected are shown.

Exceedances of Direct Exposure Criteria indicated by shading.

Exceedances of Leachability Criteria indicated by colored text.

NA = Sample not analyzed for given parameter.

ND = Analyte not detected for this analysis.

TPH = Total petroleum hydrocarbons

VOCs = Volatile organic compounds

SVOCs = Semi-volatile organic compounds

Table 1
2018 Soil Pre-Charcterization Data
6/10 Highway Interchange Reconstruction
Providence, Rhode Island

Location / Sample ID / Sampling Date / Lab Report Number / Estimated Volume (tons)	GA Leachability Criteria	GB Leachability Criteria	Residential Direct Exposure Criteria (DEC)	Industrial Comercial DEC	B-23-SS-3(5)	B-23/16-COMP(0-8)	B-24-SS4(7)	B-24-COMP(0-8)	B-25-SS4(8)	B-25-COMP(0-8)	B-27-SS1(0-2)	B-27-SS2(5-7)
Sampling Date					2/1/2018	2/5/2018	3/1/2018	3/1/2018	2/28/2018	2/28/2018	3/28/2018	3/28/2018
Lab Report Number					SC43677	SC43758	SC44468		SC44468		SC45295	
TPH (mg/kg)												
TPH	500	2500	500	2500	NA	513	NA	1090	NA	472	87.8	59.3
VOCs (mg/kg)												
2-Butanone (MEK)	NE	NE	NE	NE								
Acetone	NE	NE	7,800	10,000								
Ethanol	NE	NE	NE	NE								
Naphthalene	NE	NE	54	10000								
Tetrachloroethene	0.1	4.2	12	110								
Trichloroethene	0.2	20	13	520								
Trichlorofluoromethane	NE	NE	NE	NE								
Vinyl Chloride	0.3	NE	0.02	3								
Total Chlorinated VOCs	NE	NE	NE	NE								
Total VOCs	NE	NE	NE	NE	ND		ND	NA	ND	NA	ND	ND
PAHs (mg/kg)												
1-Methylnaphthalene	NE	NE			NA	ND		ND		ND		
2-Methylnaphthalene	NE	NE	123	10,000	NA	ND		ND		ND		
Acenaphthene	NE	NE	43	10,000	NA	ND		ND		ND		
Acenaphthylene	NE	NE	23	10,000	NA	ND		ND		ND		
Anthracene	NE	NE	35	10,000	NA	ND		ND		0.846		
Benzo(a)anthracene	NE	NE	0.9	7.8	NA	0.924		1.1		1.93	0.447	
Benzo(a)pyrene	240	NE	0.4	0.8	NA	0.711		1.26		2.0	0.563	
Benzo(b)fluoranthene	NE	NE	0.9	7.8	NA	0.592		1.61		2.11	0.556	
Benzo(g,h,i)perylene	NE	NE	0.8	10,000	NA	0.384		0.793		0.957	0.265	
Benzo(k)fluoranthene	NE	NE	0.9	78	NA	0.779		0.891		1.51	0.449	
Chrysene	NE	NE	0.4	780	NA	0.835		1.15		1.69	0.425	
Dibenzo(a,h)anthracene	NE	NE	0.4	0.8	NA	ND		ND		ND		
Fluoranthene	NE	NE	20	10,000	NA	1.76		2.51		5.05	0.83	
Fluorene	NE	NE	28	10,000	NA	ND		ND		ND		
Indeno(1,2,3-cd)pyrene	NE	NE	0.9	7.8	NA	0.447		0.807		1.05	0.274	
Naphthalene	0.8	NE	54	10,000	NA	ND		ND		ND		
Phenanthrene	NE	NE	40	10,000	NA	0.915		1.27		3.86	0.276	
Pyrene	NE	NE	13	10,000	NA	1.49		2.09		3.83	0.811	
Carbazole	NE	NE	NE	NE	NA	ND	NA	NA	NA	ND	NA	NA
Dibenzofuran	NE	NE	NE	NE	NA	ND	NA	NA	NA	ND	NA	NA
Total PAHs	NE	NE	NE	NE		8.837	NA	13.481	NA	24.833	4.896	ND
PAHs-SPLP (ug/L)												
Phenanthrene	NE	NE	NE	NE								
Metals (mg/kg)												
Arsenic	NE	NE	7	820				6.26		4.24	2.53	1.56
Barium	NE	NE	5,500	10,000				196		66.4	37.8	14.9
Beryllium	NE	NE	1.5	1.5				NA		NA	NA	NA
Cadmium	NE	NE	39	1,000				0.778		ND	0.762	0.539
Chromium	NE	NE	1,400	10,000				12.2		11.4	5.98	8.42
Copper	NE	NE	3,100	10,000				51.1		22.7	13.1	10.4
Lead	NE	NE	150	500				1640		176	84.4	4.94
Mercury	NE	NE	23	610				0.226		0.498	0.142	ND
Nickel	NE	NE	1,000	10,000				8.53		7.46	5.16	4.62
Zinc	NE	NE	6,000	10,000				225		87.8	62.6	16
Metals-SPLP (ug/L)												
Arsenic	NE	NE	NE	NE				NA				
Chromium	1100	NE	NE	NE				NA				
Copper	NE	NE	NE	NE				21.9				
Lead	40	NE	NE	NE				232				
Mercury	20	NE	NE	NE				NA				
Zinc	NE	NE	NE	NE				42.6				
Cyanide (mg/kg)												
Total Cyanide (mg/kg)					NA	NA	NA	NA	NA	NA	NA	NA
PCBs (mg/kg)												
Aroclor-1254	NE	NE	NE	NE				0.091				
Aroclor-1260	NE	NE	NE	NE				0.0912		0.0625		
Total PCBs	10	10	10	10	NA	ND	NA	0.1822	NA	0.0625	ND	ND
Pesticides (ug/kg)												
4,4-DDD	NE	NE	NE	NE				71		59.8		
4,4-DDE	NE	NE	NE	NE								
4,4-DDT	NE	NE	NE	NE								
Total DDT Isomers	NE	NE	NE	NE	NA	NA	NA	71	NA	59.8	ND	NA
Herbicides (ug/kg)												
Total Herbicides					NA	NA	NA	ND	NA	ND	ND	NA

Sample ID, Date, and Lab Deliverable ID	B-30-SS4(7)	B-30/31-COMP(0-8)	B-33 (4)	B-33 (0-5)	B-35 (3)	B-35 (0-5)	B-36-SS1(0-2)	B-36-SS2(4-6)	B-38 (4)	B-38-COMP(0-4)	B-39-SS-1(0-2)
Sampling Date	2/28/2018	2/28/2018	4/12/2018	4/12/2018	4/12/2018	4/12/2018	4/18/2018	4/18/2018	3/7/2018	3/7/2018	3/9/2018
Lab Report Number	SC44468		SC45848		SC45741		SC45909		SC44661		SC4
TPH (mg/kg)											
TPH	NA	151	NA	681	NA	4180	1370	538	NA	797	564
VOCs (mg/kg)											
2-Butanone (MEK)											
Acetone											
Ethanol											
Naphthalene											
Tetrachloroethene											
Trichloroethene											
Trichlorofluoromethane											
Vinyl Chloride											
Total Chlorinated VOCs											
Total VOCs	ND	NA	ND		ND	NA			ND		ND
PAHs (mg/kg)											
1-Methylnaphthalene								1.19			ND
2-Methylnaphthalene								2.63			ND
Acenaphthene								3.41			ND
Acenaphthylene											ND
Anthracene		0.211					3.3	6.3			1.25
Benzo(a)anthracene		0.622		0.799			11.6	10.9		2.12	4.56
Benzo(a)pyrene		0.657		0.862			16.1	10.1		2.44	4.41
Benzo(b)fluoranthene		0.659		0.828			17.9	10.4		2.28	3.95
Benzo(g,h,i)perylene		0.336		0.571			10.8	4.5		1.71	3.01
Benzo(k)fluoranthene		0.49		0.768			13.7	6.64		1.7	3.89
Chrysene		0.537		0.759			12	9.89		1.78	3.95
Dibenzo(a,h)anthracene							2.54	1.68		ND	0.89
Fluoranthene		1.47		1.7		1.5	29.3	30.1		3.86	10.8
Fluorene								3.37		ND	ND
Indeno(1,2,3-cd)pyrene		0.363		0.551			11.2	5.67		1.76	3.14
Naphthalene								5.36		ND	ND
Phenanthrene		0.992		0.944			18.4	36.4		1.1	5.93
Pyrene		1.14		1.31			24.9	21.2		3.03	8.28
Carbazole	NA	NA		ND			ND	3.46		NA	NA
Dibenzofuran	NA	NA		ND			ND	4.48		NA	NA
Total PAHs	NA	7.477	NA		NA				NA	21.78	54.06
PAHs-SPLP (ug/L)											
Phenanthrene											
Metals (mg/kg)											
Arsenic		2.94		6.73		4.07	9.02	4.84		1.93	2.46
Barium		38.9		45.2		123	193	81.9		22.5	24.6
Beryllium		NA		NA		NA	NA	NA		ND	ND
Cadmium		ND		1.17		1.16	1.92	1.44		ND	ND
Chromium		6.22		8.42		12.4	23.1	28.7		6.58	7.31
Copper		11.1		27.6		19.1	60.2	27.5		14.3	11.1
Lead		78.3		81.2		217	1200	979		147	89.8
Mercury		0.128		0.38		15.6	0.585	2.45		0.163	0.068
Nickel		4.56		5.65		9.96	24.2	13		4.02	5.17
Zinc		54.5		58.8		105	1400	573		59.4	40.2
Metals-SPLP (ug/L)											
Arsenic											
Chromium											
Copper											
Lead											
Mercury											
Zinc											
Cyanide (mg/kg)											
Total Cyanide (mg/kg)	NA	NA	NA	ND	NA	ND	ND	ND	NA	NA	NA
PCBs (mg/kg)											
Aroclor-1254											
Aroclor-1260											
Total PCBs	NA	ND	NA	ND	NA	ND	ND	ND	NA	ND	ND
Pesticides (ug/kg)											
4,4-DDD											
4,4-DDE											
4,4-DDT											
Total DDT Isomers	NA	ND	NA	ND	NA	ND	ND	NA	NA	ND	ND
Herbicides (ug/kg)											
Total Herbicides	NA	ND	NA	ND	NA	ND	ND	NA	NA	ND	ND

Notes:
This is a summary table. Only those analytes that are detected are shown.
Exceedances of Direct Exposure Criteria indicated by shading.
Exceedances of Leachability Criteria indicated by colored text.
NA = Sample not analyzed for given parameter.
ND = Analyte not detected for this analysis.
TPH = Total petroleum hydrocarbons
VOCs = Volatile organic compounds
SVOCs = Semi-volatile organic compounds

Table 1
2018 Soil Pre-Charcterization Data
6/10 Highway Interchange Reconstruction
Providence, Rhode Island

Location Sample ID Sampling Date Lab Report Number Estimated Volume (tons)	GA Leachability Criteria	GB Leachability Criteria	Residential Direct Exposure Criteria (DEC)	Industrial Comercial DEC	B-39-SS-2(4-6)	B-40-SS1 (7)	B-40-SS3 (11)	B-40-COMP-(8-15)	B-44-SS2 (9)	B-44-COMP-(0-9)	B-44-SS5 (15)	B-44-COMP-(10-18)
					3/9/2018	2/14/2018	2/14/2018	2/14/2018	2/15/2018	2/15/2018	2/15/2018	2/15/2018
					4661	SC44063			SS44063			
TPH (mg/kg)												
TPH	500	2500	500	2500	NA	NA	NA	247	NA	50.5	NA	ND
VOCs (mg/kg)												
2-Butanone (MEK)	NE	NE	NE	NE								
Acetone	NE	NE	7,800	10,000								
Ethanol	NE	NE	NE	NE								
Naphthalene	NE	NE	54	10000								
Tetrachloroethene	0.1	4.2	12	110	0.0188							
Trichloroethene	0.2	20	13	520								
Trichlorofluoromethane	NE	NE	NE	NE								
Vinyl Chloride	0.3	NE	0.02	3								
Total Chlorinated VOCs	NE	NE	NE	NE								
Total VOCs	NE	NE	NE	NE	0.0188	ND	ND	NA	ND	NA	ND	NA
PAHs (mg/kg)												
1-Methylnaphthalene	NE	NE			ND							
2-Methylnaphthalene	NE	NE	123	10,000	ND							
Acenaphthene	NE	NE	43	10,000	ND							
Acenaphthylene	NE	NE	23	10,000	ND							
Anthracene	NE	NE	35	10,000	ND							
Benzo(a)anthracene	NE	NE	0.9	7.8	0.199							
Benzo(a)pyrene	240	NE	0.4	0.8	0.237							
Benzo(b)fluoranthene	NE	NE	0.9	7.8	0.185							
Benzo(g,h,i)perylene	NE	NE	0.8	10,000	0.152							
Benzo(k)fluoranthene	NE	NE	0.9	78	0.241							
Chrysene	NE	NE	0.4	780	0.198							
Dibenzo(a,h)anthracene	NE	NE	0.4	0.8	ND							
Fluoranthene	NE	NE	20	10,000	0.427							
Fluorene	NE	NE	28	10,000	ND							
Indeno(1,2,3-cd)pyrene	NE	NE	0.9	7.8	0.161							
Naphthalene	0.8	NE	54	10,000	ND							
Phenanthrene	NE	NE	40	10,000	0.172							
Pyrene	NE	NE	13	10,000	0.354							
Carbazole	NE	NE	NE	NE	NA			NA		NA		NA
Dibenzofuran	NE	NE	NE	NE	NA			NA		NA		NA
Total PAHs	NE	NE	NE	NE	2.326	NA	NA	ND	NA	ND	NA	ND
PAHs-SPLP (ug/L)												
Phenanthrene	NE	NE	NE	NE								
Metals (mg/kg)												
Arsenic	NE	NE	7	820	2.83			ND		ND		ND
Barium	NE	NE	5,500	10,000	16.7			27.0		10.7		12.5
Beryllium	NE	NE	1.5	1.5	ND			NA		NA		NA
Cadmium	NE	NE	39	1,000	ND			ND		ND		ND
Chromium	NE	NE	1,400	10,000	5.98			3.08		6.01		4.33
Copper	NE	NE	3,100	10,000	5.89			4.55		4.52		3.94
Lead	NE	NE	150	500	31.0			18.6		6.29		3.15
Mercury	NE	NE	23	610	0.0525			0.055		ND		ND
Nickel	NE	NE	1,000	10,000	3.91			2.34		2.95		3.17
Zinc	NE	NE	6,000	10,000	22.6			17.3		14.5		11.2
Metals-SPLP (ug/L)												
Arsenic	NE	NE	NE	NE								
Chromium	1100	NE	NE	NE								
Copper	NE	NE	NE	NE								
Lead	40	NE	NE	NE								
Mercury	20	NE	NE	NE								
Zinc	NE	NE	NE	NE								
Cyanide (mg/kg)												
Total Cyanide (mg/kg)					NA	NA	NA	NA	NA	NA	NA	NA
PCBs (mg/kg)												
Aroclor-1254	NE	NE	NE	NE								
Aroclor-1260	NE	NE	NE	NE								
Total PCBs	10	10	10	10	ND	NA	NA	ND	NA	ND	NA	ND
Pesticides (ug/kg)												
4,4-DDD	NE	NE	NE	NE								
4,4-DDE	NE	NE	NE	NE								
4,4-DDT	NE	NE	NE	NE								
Total DDT Isomers	NE	NE	NE	NE	NA	NA	NA	NA	NA	NA	NA	NA
Herbicides (ug/kg)												
Total Herbicides					NA	NA	NA	NA	NA	NA	NA	NA

Sample ID, Date, and Lab Deliverable ID	B-46-SS-1(1-3)	B-47-SS-1(1.5-2)	B-47-SS-3(7-8)	B-48-SS-1(0-2)	B-48-SS-4(8-10)	BS-1-SS1(0-2)	BS-1-SS2(4-6)	BS-9-SS1(1-3)	BS-9-SS2(4-6)	RW-1-SS1 (0-2)	RW-2-SS1(0-2)	RW-3-SS1(0-2)
	3/12/2018	3/12/2018	3/12/2018	3/14/2018	3/14/2018	4/27/2018	4/27/2018	4/23/2018	4/23/2018	4/6/2018	4/4/2018	4/5/2018
	SC44813	SC44813		SC44813		SC13054		SC46116		SC45587	SC45473	SC45473
TPH (mg/kg)												
TPH	197	129	ND	427	286	1530	78.1	274	83.1	785	358	1840
VOCs (mg/kg)												
2-Butanone (MEK)												
Acetone												
Ethanol												
Naphthalene												
Tetrachloroethene												
Trichloroethene												
Trichlorofluoromethane												
Vinyl Chloride												
Total Chlorinated VOCs												
Total VOCs	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
PAHs (mg/kg)												
1-Methylnaphthalene												
2-Methylnaphthalene												
Acenaphthene								0.221				
Acenaphthylene			0.223									
Anthracene			0.293		0.309						0.207	
Benzo(a)anthracene	1.38	0.436	1.32		1.24	0.754		0.507			1.12	
Benzo(a)pyrene	1.43	0.479	1.34		1.27	0.805		0.618			1.41	
Benzo(b)fluoranthene	1.4	0.424	1.28		1.37			0.575			1.65	
Benzo(g,h,i)perylene	0.845	0.315	0.752		0.646			0.39			0.777	
Benzo(k)fluoranthene	0.805	0.337	0.928		0.818			0.292			0.815	
Chrysene	1.3	0.418	1.25		1.24			0.414			1.06	
Dibenzo(a,h)anthracene			0.328		0.307						0.194	
Fluoranthene	2.86	0.917	2.48		2.56	1.21		0.703	0.0948		2.32	
Fluorene	ND	ND	ND									
Indeno(1,2,3-cd)pyrene	1.01	0.348	0.922		0.817			0.284			0.835	
Naphthalene			ND									
Phenanthrene	0.96	0.397	1.28		1.44			0.16			1.03	
Pyrene	2.65	0.772	1.97		2.16	1.19		0.828	0.0765		1.97	
Carbazole	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dibenzofuran	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total PAHs	14.64	4.843	14.366	ND	14.177		ND			ND	13.388	ND
PAHs-SPLP (ug/L)												
Phenanthrene												
Metals (mg/kg)												
Arsenic	1.88	ND	6.16	1.84	6.68	ND	ND	1.63	ND	3.66	2.78	2.11
Barium	15.5	67.4	144	26.6	523	16.5	18.7	17.5	17.3	30.2	38.2	59.7
Beryllium	ND	1.14	ND	ND	ND	NA	NA	NA	NA	NA	NA	NA
Cadmium	ND	ND	ND	ND	1.24	ND	ND	ND	ND	1.26	1.18	1.83
Chromium	8.07	5.72	13.6	4.96	17.8	6.42	8.16	5.71	3.43	18.5	6.94	57.1
Copper	16.8	4.94	89.1	8.18	190	9.27	9.38	7.78	7.92	23.3	34.4	95.9
Lead	68.7	12.2	937	43.5	826	19.1	8.15	41.2	9.49	49.4	141	288
Mercury	0.113	0.0288	1.6	0.0693	0.363	ND	ND	0.08	ND	0.0881	0.382	0.171
Nickel	4.13	2.96	7.73	2.58	13.2	4.37	5.66	3.15	2.55	9.86	6.27	15.6
Zinc	39	22.5	181	30.0	450	33.9	18.2	38.5	18.6	53.4	97.1	94.9
Metals-SPLP (ug/L)												
Arsenic			8.1									
Chromium			32.8		17.8							
Copper					46.2							
Lead			167		152							
Mercury			0.25									
Zinc					144							
Cyanide (mg/kg)												
Total Cyanide (mg/kg)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
PCBs (mg/kg)												
Aroclor-1254												
Aroclor-1260					0.128							0.0436
Total PCBs	ND	ND	ND	ND	0.128	ND	ND	ND	ND	ND	ND	0.0436
Pesticides (ug/kg)												
4,4-DDD												
4,4-DDE												
4,4-DDT												
Total DDT Isomers	ND	ND	NA	ND	NA	ND	NA	ND	NA	ND	ND	ND
Herbicides (ug/kg)												
Total Herbicides	ND	ND	NA	ND	NA	ND	NA	ND	NA	ND	ND	ND

Notes:
This is a summary table. Only those analytes that are detected are shown.
Exceedances of Direct Exposure Criteria indicated by shading.
Exceedances of Leachability Criteria indicated by colored text.
NA = Sample not analyzed for given parameter.
ND = Analyte not detected for this analysis.
TPH = Total petroleum hydrocarbons
VOCs = Volatile organic compounds
SVOCs = Semi-volatile organic compounds

Table 1
2018 Soil Pre-Charcterization Data
6/10 Highway Interchange Reconstruction
Providence, Rhode Island

Location	GA Leachability Criteria	GB Leachability Criteria	Residential Direct Exposure Criteria (DEC)	Industrial Comercial DEC	Sample ID, Date, and Lab Deliverable ID																			
Sample ID					RW-5-SS1(0-3)	RW07-SS2(4-5)	RW-8-SS1 (1-3)	RW-8-SS4 (14-16)	RW-13-SS1(1-3)	RW-13-SS3(6-8)	RW-15-SS1(1-5)	RW-16-SS1(1-3)	RW-16-SS2(4-6)	RW-17-SS1(1-3)	RW-18-SS1(1-3)	RW-19-SS1(1-3)	RW-21-SS1(1-3)	RW-21-SS2(4-6)	RW-22-SS1(1-3)	RW-22-SS2(4-6)	RW-30-SS1(1-3)	RW-31-SS1(1-3)	RW-31-SS2(4-6)	RW-32-SS1(1-3)
Sampling Date					3/28/2018	3/23/2018	4/9/2018	4/9/2018	3/27/2018	3/27/2018	4/3/2018	4/3/2018	4/3/2018	3/22/2018	3/22/2018	3/22/2018	4/4/2018	4/4/2018	4/4/2018	4/4/2018	3/23/2018	3/30/2018	3/30/2018	3/30/2018
Lab Report Number					SC45295	SC45086	SC45587		SC45295		SC45473	SC45473		SC45086	SC45086	SC45086	SC45473		SC45473		SC45086	SC45367		SC4
Estimated Volume (tons)																								
TPH (mg/kg)																								
TPH	500	2500	500	2500	1830	NA	2020	79.4	129	2460	525	2050	70	734	1140	1150	1340	701	167	56	370	1220	98.6	1460
VOCs (mg/kg)																								
2-Butanone (MEK)	NE	NE	NE	NE																				
Acetone	NE	NE	7,800	10,000																				
Ethanol	NE	NE	NE	NE																				
Naphthalene	NE	NE	54	10000						0.275		0.00629												
Tetrachloroethene	0.1	4.2	12	110																				
Trichloroethene	0.2	20	13	520																				
Trichlorofluoromethane	NE	NE	NE	NE																				
Vinyl Chloride	0.3	NE	0.02	3																				
Total Chlorinated VOCs	NE	NE	NE	NE																				
Total VOCs	NE	NE	NE	NE	ND	ND	ND	ND	ND	0.275	ND	0.00629	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
PAHs (mg/kg)																								
1-Methylnaphthalene	NE	NE																						
2-Methylnaphthalene	NE	NE	123	10,000						0.846		0.424												
Acenaphthene	NE	NE	43	10,000																				
Acenaphthylene	NE	NE	23	10,000						2.6		1.19					0.415							
Anthracene	NE	NE	35	10,000				0.0784		5.89	0.211	1.77					1.61							
Benzo(a)anthracene	NE	NE	0.9	7.8	3.22			0.278		9.88	1.06	3.67		1.71			4.3	2.13	0.662	0.087				
Benzo(a)pyrene	240	NE	0.4	0.8	3.78			0.344		8.21	1.43	3.84		1.53			3.53	2.24	0.724	0.0983				
Benzo(b)fluoranthene	NE	NE	0.9	7.8	4.02			0.299		7.57	1.37	3.21		1.57			5.32	1.93	0.573	0.0753				
Benzo(g,h,i)perylene	NE	NE	0.8	10,000	2.1			0.177		3.64	0.799	2.37		0.887			2.34	1.09	0.403					
Benzo(k)fluoranthene	NE	NE	0.9	78	2.54			0.298		5.77	0.966	2.96		1.11			2.79	1.94	0.675	0.0928				
Chrysene	NE	NE	0.4	780	3.04			0.295		7.76	0.963	2.97		1.61			3.42	1.9	0.568	0.0812				
Dibenzo(a,h)anthracene	NE	NE	0.4	0.8						1.35	0.207	0.514					0.801							
Fluoranthene	NE	NE	20	10,000	6.55			0.591		21.7	1.94	9.46		2.81	0.553		8.99	4.25	1.19	0.178	2.08			
Fluorene	NE	NE	28	10,000						2.36		0.957					0.503							
Indeno(1,2,3-cd)pyrene	NE	NE	0.9	7.8	2.21			0.192		4.29	0.831	2.51		0.904			2.48	1.24	0.439					
Naphthalene	0.8	NE	54	10,000						0.765		0.454												
Phenanthrene	NE	NE	40	10,000	3.4			0.421		22.7	0.784	9.39					7.38	1.82	0.366	0.11				
Pyrene	NE	NE	13	10,000	5.75			0.525		16.1	1.81	7.61		2.63	0.53		6.82	3.49	1.04	0.156	1.76			
Carbazole	NE	NE	NE	NE	NA	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dibenzofuran	NE	NE	NE	NE	NA	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total PAHs	NE	NE	NE	NE	36.61	ND	ND		ND	121.431	12.371	53.299	ND	14.761	1.083	ND	50.699	22.03	6.64	0.8786	3.84	ND	ND	ND
PAHs-SPLP (ug/L)																								
Phenanthrene	NE	NE	NE	NE		ND				5.14														
Metals (mg/kg)																								
Arsenic	NE	NE	7	820	5.89		2.76	4.37	2.73	2.58	ND	2.86	ND	ND	1.69	ND	1.82	4.88	2.75	ND	ND	2.08	2.08	1.69
Barium	NE	NE	5,500	10,000	175		31.5	20.1	21.6	30.2	11.3	110	18.8	12.2	14.6	15.2	22.2	152	37.7	13.5	7.7	23.8	11.2	14
Beryllium	NE	NE	1.5	1.5	NA		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cadmium	NE	NE	39	1,000	1.53		1.12	0.734	0.747	1.44	ND	0.752	ND	ND	ND	ND	0.564	1.07	1.82	ND	ND	ND	ND	ND
Chromium	NE	NE	1,400	10,000	10.5		10.9	5.57	15	5.7	4.24	6.63	4.01	4.19	3.82	4.3	6.46	11.5	7.9	4.52	3	12	2.99	4.58
Copper	NE	NE	3,100	10,000	51.1		14.2	8.6	10.3	7.06	6.7	23.2	4.27	5.36	6.62	4.91	9.73	41.6	18.6	4.54	3.94	6.67	2.98	5.3
Lead	NE	NE	150	500	449		23.8	42.3	33.5	11.4	29.8	242	7.76	32.3	32.5	19.2	72.7	387	101	16.9	16.4	30.9	2.83	22.5
Mercury	NE	NE	23	610	0.554		0.0743	0.231	0.0431	ND	0.0433	0.106	ND	0.0401	0.0516	ND	0.196	1.04	0.184	0.0307	ND	0.0358	ND	ND
Nickel	NE	NE	1,000	10,000	9.73		7.55	3.53	9.95	4.79	3.31	4.56	2.93	2.58	3.17	3.34	4.3	8.47	7.27	2.03	3.05	5.73	3.19	3.86
Zinc	NE	NE	6,000	10,000	305		38	29.1	29	17.3	18.4	72.7	15.9	22.1	24.5	22.4	37.5	182	788	17	21.5	28.9	10.9	26
Metals-SPLP (ug/L)																								
Arsenic	NE	NE	NE	NE																				
Chromium	1100	NE	NE	NE																				
Copper	NE	NE	NE	NE																				
Lead	40	NE	NE	NE	83.6																			
Mercury	20	NE	NE	NE																				
Zinc	NE	NE	NE	NE																				
Cyanide (mg/kg)																								
Total Cyanide (mg/kg)					NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
PCBs (mg/kg)																								
Aroclor-1254	NE	NE	NE	NE																				
Aroclor-1260	NE	NE	NE	NE																				
Total PCBs	10	10	10	10	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Pesticides (ug/kg)																								
4,4-DDD	NE	NE	NE	NE																				
4,4-DDE	NE	NE	NE	NE																				
4,4-DDT	NE	NE	NE	NE																				
Total DDT Isomers	NE	NE	NE	NE	ND	NA	ND	NA	ND	NA	ND	ND	NA	ND	ND	ND	ND	NA	ND	NA	ND	ND	NA	ND
Herbicides (ug/kg)																								
Total Herbicides					ND	NA	ND	NA	ND	NA	ND	ND	NA	ND	ND	ND	ND	NA	ND	NA	ND	ND	NA	ND

Notes:
This is a summary table. Only those analytes that are detected are shown.
Exceedances of Direct Exposure Criteria indicated by shading.
Exceedances of Leachability Criteria indicated by colored text.
NA = Sample not analyzed for given parameter.
ND = Analyte not detected for this analysis.
TPH = Total petroleum hydrocarbons
VOCs = Volatile organic compounds
SVOCs = Semi-volatile organic compounds

Table 1
2018 Soil Pre-Charcterization Data
6/10 Highway Interchange Reconstruction
Providence, Rhode Island

Location Sample ID Sampling Date Lab Report Number Estimated Volume (tons)	GA Leachability Criteria	GB Leachability Criteria	Residential Direct Exposure Criteria (DEC)	Industrial Comercial DEC	Sample ID, Date, and Lab Deliverable ID																			
Sample ID					RW-32-SS2(4-6)	RW-33-SS1(1-3)	RW-33-SS2(4-6)	RW-35-SS1(1-3)	RW-35-SS2(5-7)	RW-42-SS1(2-4)	RW-43-SS1(0-2)	RW-52-SS1(0-2)	RW-52-SS2(4-6)	GP-101 (1-3)-1	GP-101 (16-18)-1	GP-102 (1-3)-1	GP-102 (6-8)-1	GP-103(1-3)-1	GP-103(8-10)-1	GP-105(1-3)-1	GP-105(10-12)-1	GP-105(18-20)-1	GP-106(1-3)-1	GP-106(8-10)-1
Sampling Date					3/30/2018	3/29/2018	3/29/2018	3/23/2018	3/23/2018	4/2/2018	3/21/2018	3/15/2018	3/15/2018	3/19/2018	3/19/2018	3/19/2018	3/19/2018	3/20/2018	3/20/2018	3/20/2018	3/20/2018	3/20/2018	3/20/2018	3/20/2018
Lab Report Number					5367	SC45295		SC45086		SC45367	SC44977	SC44879		SC44949		SC44949		SC44983		SC44983				SC44983
TPH (mg/kg)																								
TPH	500	2500	500	2500	226	491	40.6	1150	1130	117	107	1060	467	692	115	643	104	208	102	255	83.7	59.2	259	112
VOCs (mg/kg)																								
2-Butanone (MEK)	NE	NE	NE	NE																				
Acetone	NE	NE	7,800	10,000																				
Ethanol	NE	NE	NE	NE																				
Naphthalene	NE	NE	54	10000																				
Tetrachloroethene	0.1	4.2	12	110								0.0396	0.00466											
Trichloroethene	0.2	20	13	520								0.0111												
Trichlorofluoromethane	NE	NE	NE	NE																				
Vinyl Chloride	0.3	NE	0.02	3																				
Total Chlorinated VOCs	NE	NE	NE	NE																				
Total VOCs	NE	NE	NE	NE	ND	ND	ND	ND	ND	ND	ND	0.0507	0.00466	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
PAHs (mg/kg)																								
1-Methylnaphthalene	NE	NE										ND	ND	ND	ND	ND	ND							
2-Methylnaphthalene	NE	NE	123	10,000								ND	ND	0.758	ND	ND	ND							
Acenaphthene	NE	NE	43	10,000								ND	ND	ND	ND	ND	ND							
Acenaphthylene	NE	NE	23	10,000		0.797					0.0874	ND	ND	3.03	ND	ND	ND	0.101		0.286			0.136	
Anthracene	NE	NE	35	10,000		1.15		0.897	0.831			ND	0.659	6.8	ND	1.336	ND		0.104	0.207	0.16		0.109	0.133
Benzo(a)anthracene	NE	NE	0.9	7.8	0.351	3.86		2.78	2.17	0.262	0.418	0.467	1.69	13.8	ND	3.38	ND	0.346	0.287	0.973	0.297		0.521	0.369
Benzo(a)pyrene	240	NE	0.4	0.8	0.52	4.62		2.31	1.78	0.433	0.46	0.544	1.71	13.7	ND	3.49	ND	0.36	0.274	0.959	0.26		0.533	0.324
Benzo(b)fluoranthene	NE	NE	0.9	7.8	0.419	3.24		2.31	1.6	0.354	0.274	0.52	1.25	10.6	ND	2.08	ND	0.27	0.171	0.927	0.197		0.438	0.265
Benzo(g,h,i)perylene	NE	NE	0.8	10,000	0.274	2.72		1.1	0.814	0.217	0.233	0.356	0.92	6.51	ND	1.53	ND	0.211	0.152	0.515	0.129		0.272	0.147
Benzo(k)fluoranthene	NE	NE	0.9	78	0.433	4.1		1.7	1.44	0.287	0.447	ND	1.38	9.15	ND	3.59	ND	0.279	0.263	0.533	0.198		0.391	0.246
Chrysene	NE	NE	0.4	780	0.389	3.42		2.65	2.05	0.292	0.429	0.439	1.57	12.3	ND	3.21	ND	0.342	0.3	0.933	0.284		0.525	0.358
Dibenzo(a,h)anthracene	NE	NE	0.4	0.8							0.0729	ND	ND	2.05	ND	ND	ND			0.123			0.0777	
Fluoranthene	NE	NE	20	10,000	0.681	9.76		6.46	5.01	0.554	0.8	0.943	3.51	33.3	ND	7.19	ND	0.527	0.649	1.87	0.716		0.822	0.842
Fluorene	NE	NE	28	10,000								ND	ND	1.97	ND	ND	ND							
Indeno(1,2,3-cd)pyrene	NE	NE	0.9	7.8	0.294	2.85		1.19	0.908	0.246	0.273	ND	0.966	8.14	ND	1.81	ND	0.207	0.142	0.564	0.14		0.297	0.161
Naphthalene	0.8	NE	54	10,000					0.82			ND	ND	1.15	ND	ND	ND							
Phenanthrene	NE	NE	40	10,000	0.225	4.29		4.06	4.05	0.139		0.449	2.63	27.8	ND	4.02	ND	0.12	0.408	0.622	0.551		0.23	0.518
Pyrene	NE	NE	13	10,000	0.621	8.32		5.73	4.19	0.52	0.736	0.879	3.15	29.3	ND	6.19	ND	0.521	0.504	1.72	0.548		0.756	0.678
Carbazole	NE	NE	NE	NE	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dibenzofuran	NE	NE	NE	NE	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total PAHs	NE	NE	NE	NE	4.207	49.127	ND	31.187	25.663	3.304	4.2303	4.597	19.435	180.358	ND	37.826	ND	3.284	3.254	10.232	3.48	ND	5.1077	4.041
PAHs-SPLP (ug/L)																								
Phenanthrene	NE	NE	NE	NE																				
Metals (mg/kg)																								
Arsenic	NE	NE	7	820	1.87	1.71	ND	3.59	3.02	2.15	1.9	1.91	2.41	2.3	ND	2.56	ND	2.16	2.79	1.77	1.7	1.9	2.04	2.31
Barium	NE	NE	5,500	10,000	22.9	13.4	13.2	36.1	33.3	43.2	19	24.9	64.1	26.0	13.1	56.6	9.14	11.6	14.7	11.7	11.1	8.69	13.2	18.3
Beryllium	NE	NE	1.5	1.5	NA	NA	NA	NA	NA	NA	ND	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Cadmium	NE	NE	39	1,000	ND	0.594	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chromium	NE	NE	1,400	10,000	6.42	5.23	5.31	6.15	5.82	6.93	4.05	4.10	6.83	16.2	4.14	6.34	2.69	3.43	6.08	3.66	7.03	4.54	4.48	4.36
Copper	NE	NE	3,100	10,000	8.46	5.58	4.05	14	15.2	9.21	7.43	10.2	18.4	50.5	3.2	12.2	2.42	4.19	8.12	3.86	6.68	2.83	5.41	6.93
Lead	NE	NE	150	500	28.2	12.5	4.45	143	112	78.7	19.9	48.9	176	42.3	3.28	143	3.33	18.3	172	9.73	6.33	4.87	23.7	26.6
Mercury	NE	NE	23	610	ND	ND	ND	8.05	0.875	0.108	ND	0.121	0.466	0.0843	ND	0.344	ND	ND	0.0352	ND	ND	ND	0.0487	0.0376
Nickel	NE	NE	1,000	10,000	5.35	5.11	3.76	4.03	4.16	4.62	3.71	3.00	5.31	12.7	2.74	6.26	1.84	3.4	5.15	3.13	5.86	2.9	3.72	4.56
Zinc	NE	NE	6,000	10,000	27.4	18.8	15.8	40.7	54.4	47.3	27.9	30.6	79.8	29.9	30.5	70	9.20	19.3	26.5	22.9	13.1	12	24.3	23.1
Metals-SPLP (ug/L)																								
Arsenic	NE	NE	NE	NE																				
Chromium	1100	NE	NE	NE																				
Copper	NE	NE	NE	NE																				
Lead	40	NE	NE	NE																				
Mercury	20	NE	NE	NE				0.0009																
Zinc	NE	NE	NE	NE																				
Cyanide (mg/kg)																								
Total Cyanide (mg/kg)					NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
PCBs (mg/kg)																								
Aroclor-1254	NE	NE	NE	NE																				
Aroclor-1260	NE	NE	NE	NE																				
Total PCBs	10	10	10	10	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Pesticides (ug/kg)																								
4,4-DDD	NE	NE	NE	NE																				
4,4-DDE	NE	NE	NE	NE																				
4,4-DDT	NE	NE	NE	NE																				
Total DDT Isomers	NE	NE	NE	NE	NA	ND	NA	ND	NA	ND	ND	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	NA	ND	NA
Herbicides (ug/kg)																								
Total Herbicides					NA	ND	NA	ND	NA	ND	ND	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	NA	ND	NA

Notes:
This is a summary table. Only those analytes that are detected are shown.
Exceedances of Direct Exposure Criteria indicated by shading.
Exceedances of Leachability Criteria indicated by colored text.
NA = Sample not analyzed for given parameter.
ND = Analyte not detected for this analysis.
TPH = Total petroleum hydrocarbons
VOCs = Volatile organic compounds
SVOCs = Semi-volatile organic compounds

Table 1
2018 Soil Pre-Charcterization Data
6/10 Highway Interchange Reconstruction
Providence, Rhode Island

Location / Sample ID / Sampling Date / Lab Report Number / Estimated Volume (tons)	GA Leachability Criteria	GB Leachability Criteria	Residential Direct Exposure Criteria (DEC)	Industrial Comercial DEC	Sample ID, Date, and Lab Deliverable ID									
					GP-106(16-18)-1	GP-107 (1-3)-1	GP-107 (10-12)-1	GP-107 (20-22)-1	GP-108(2-4)-1	GP-108(10-12)-1	GP-108(18-20)-1	GP-110 (1-3)-1	GP-110 (10-12)-1	GP-110 (18-20)-1
					3/20/2018	3/19/2018	3/19/2018	3/19/2018	3/20/2018	3/20/2018	3/20/2018	3/19/2018	3/19/2018	3/19/2018
						SC44949			SC44983			SC44949		
TPH (mg/kg)														
TPH	500	2500	500	2500	104	ND	745	382	81.2	82.1	1190	215	111	196
VOCs (mg/kg)														
2-Butanone (MEK)	NE	NE	NE	NE										
Acetone	NE	NE	7,800	10,000										
Ethanol	NE	NE	NE	NE										
Naphthalene	NE	NE	54	10000										
Tetrachloroethene	0.1	4.2	12	110										
Trichloroethene	0.2	20	13	520										
Trichlorofluoromethane	NE	NE	NE	NE										
Vinyl Chloride	0.3	NE	0.02	3										
Total Chlorinated VOCs	NE	NE	NE	NE										
Total VOCs	NE	NE	NE	NE	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
PAHs (mg/kg)														
1-Methylnaphthalene	NE	NE				ND	ND	ND				ND	ND	ND
2-Methylnaphthalene	NE	NE	123	10,000		ND	ND	ND				ND	ND	ND
Acenaphthene	NE	NE	43	10,000		ND	ND	ND			0.52	0.0811	ND	ND
Acenaphthylene	NE	NE	23	10,000		ND	ND	ND		0.0958		0.0784	ND	ND
Anthracene	NE	NE	35	10,000		ND	7.71	ND		0.105	1.06	0.334	ND	ND
Benzo(a)anthracene	NE	NE	0.9	7.8	0.195	ND	13.2	0.109	0.0758	0.666	1.51	0.757	0.0831	ND
Benzo(a)pyrene	240	NE	0.4	0.8	0.147	ND	11	0.105	0.0726	0.499	0.983	0.844	0.097	0.0705
Benzo(b)fluoranthene	NE	NE	0.9	7.8	0.113	ND	8.72	0.0741		0.476	0.849	0.637	ND	ND
Benzo(g,h,i)perylene	NE	NE	0.8	10,000	0.086	ND	5.97	0.0697		0.283	0.442	0.434	ND	ND
Benzo(k)fluoranthene	NE	NE	0.9	78	0.128	ND	7.55	0.0901		0.344	0.865	0.5	0.089	ND
Chrysene	NE	NE	0.4	780	0.177	ND	11.3	0.108		0.598	1.35	0.826	0.0893	ND
Dibenzo(a,h)anthracene	NE	NE	0.4	0.8		ND	1.9	ND		0.0811		0.135	ND	ND
Fluoranthene	NE	NE	20	10,000	0.403	ND	32	0.255	0.161	1.36	4.29	1.9	0.145	0.106
Fluorene	NE	NE	28	10,000		ND	2.56	ND			0.472	0.076	ND	ND
Indeno(1,2,3-cd)pyrene	NE	NE	0.9	7.8	0.0914	ND	7.01	ND		0.304	0.516	0.506	ND	ND
Naphthalene	0.8	NE	54	10,000		ND	ND	ND			0.389	ND	ND	ND
Phenanthrene	NE	NE	40	10,000	0.216	ND	22	0.17	0.118	0.407	4.67	1.26	ND	ND
Pyrene	NE	NE	13	10,000	0.318	ND	24.4	0.207	0.131	1.07	3.19	1.5	0.128	0.0902
Carbazole	NE	NE	NE	NE	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dibenzofuran	NE	NE	NE	NE	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total PAHs	NE	NE	NE	NE	1.8744	ND	155.32	1.1879	0.5584	6.2889	21.106	9.8685	0.6314	0.2667
PAHs-SPLP (ug/L)														
Phenanthrene	NE	NE	NE	NE										
Metals (mg/kg)														
Arsenic	NE	NE	7	820	2.98	ND	2.1	1.67	1.9	1.9	1.8	1.74	1.55	4.22
Barium	NE	NE	5,500	10,000	18.7	12.2	35.6	23.4	12.5	11.2	15.4	25.2	15.2	28.6
Beryllium	NE	NE	1.5	1.5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Cadmium	NE	NE	39	1,000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chromium	NE	NE	1,400	10,000	7.99	2.26	6.06	5.88	7.33	3.44	3.34	6.02	3.26	3.89
Copper	NE	NE	3,100	10,000	9.52	2.95	6.87	5.06	4.52	4.78	5.07	7.76	4.75	5.03
Lead	NE	NE	150	500	9.42	6.17	64.4	29	18.8	12	47.7	11.1	7.18	73
Mercury	NE	NE	23	610	ND	ND	0.0777	0.0519	0.0321	ND	0.185	ND	0.146	ND
Nickel	NE	NE	1,000	10,000	8.41	1.77	3.4	3.37	4.2	3.44	2.72	6.18	2.86	3.94
Zinc	NE	NE	6,000	10,000	20.7	11.7	44.6	23.3	17.3	17.4	31	24.5	13.0	39
Metals-SPLP (ug/L)														
Arsenic	NE	NE	NE	NE										
Chromium	1100	NE	NE	NE										
Copper	NE	NE	NE	NE										
Lead	40	NE	NE	NE										
Mercury	20	NE	NE	NE										
Zinc	NE	NE	NE	NE										
Cyanide (mg/kg)														
Total Cyanide (mg/kg)					NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
PCBs (mg/kg)														
Aroclor-1254	NE	NE	NE	NE										
Aroclor-1260	NE	NE	NE	NE										
Total PCBs	10	10	10	10	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Pesticides (ug/kg)														
4,4-DDD	NE	NE	NE	NE										
4,4-DDE	NE	NE	NE	NE										
4,4-DDT	NE	NE	NE	NE										
Total DDT Isomers	NE	NE	NE	NE	NA	ND	NA	NA	ND	NA	NA	ND	NA	NA
Herbicides (ug/kg)														
Total Herbicides					NA	ND	NA	NA	ND	NA	NA	ND	NA	NA

Location / Sample ID / Sampling Date / Lab Report Number / Estimated Volume (tons)	GP-111(2-4)-1	GP-111(6-8)-1	GP-113 (0-2)-1	GP-113 (0-2)-2	GP-113 (4-6)-1	GP-114 (0-2)-1	GP-114 (10-12)-1	GP-116(0-2)-1	GP-116(0-2)-2	GP-116(17-19)-1
	3/20/2018	3/20/2018	3/19/2018	3/19/2018	3/19/2018	3/19/2018	3/19/2018	3/20/2018	3/20/2018	3/20/2018
	SC44983		SC44949			SC44949		SC44983		
TPH (mg/kg)										
TPH	328	317	610	567	152	475	ND	1780	2130	53.7
VOCs (mg/kg)										
2-Butanone (MEK)										
Acetone										
Ethanol				4.04						
Naphthalene										
Tetrachloroethene										
Trichloroethene										
Trichlorofluoromethane										
Vinyl Chloride										
Total Chlorinated VOCs										
Total VOCs	ND	ND	ND	4.04	ND	ND	ND	ND	ND	ND
PAHs (mg/kg)										
1-Methylnaphthalene			ND	ND	ND	ND	ND			
2-Methylnaphthalene			ND	ND	ND	ND	ND			
Acenaphthene			ND	ND	ND	ND	ND			
Acenaphthylene			ND	ND	ND	ND	ND			
Anthracene	0.0809	0.74	0.636	0.451	ND	ND	ND			
Benzo(a)anthracene	0.333	2.03	1.59	1.16	0.268	ND	ND	0.59	0.461	
Benzo(a)pyrene	0.279	1.4	1.51	1.11	0.271	ND	ND	0.502		
Benzo(b)fluoranthene	0.287	1.31	1.35	0.92	0.208	ND	ND	0.522		
Benzo(g,h,i)perylene	0.137	0.741	0.839	0.669	0.154	ND	ND	0.295		
Benzo(k)fluoranthene	0.176	1.08	0.932	0.825	0.233	ND	ND	0.382		
Chrysene	0.291	1.69	1.55	1.15	0.263	ND	ND	0.57	0.473	
Dibenzo(a,h)anthracene			ND	ND	ND	ND	ND			
Fluoranthene	0.726	4.5	3.68	2.73	0.551	ND	ND	1.21	0.954	
Fluorene			ND	ND	ND	ND	ND			
Indeno(1,2,3-cd)pyrene	0.158	0.891	0.891	0.695	0.178	ND	ND	0.307		
Naphthalene			ND	ND	ND	ND	ND			
Phenanthrene	0.285	3.41	2.33	1.57	0.215	ND	ND	0.485	0.411	
Pyrene	0.562	3.37	2.95	2.17	0.448	ND	ND	0.943	0.806	
Carbazole	NA	NA	NA	NA	NA	NA	NA	NA	NA	
Dibenzofuran	NA	NA	NA	NA	NA	NA	NA	NA	NA	
Total PAHs	3.3149	21.162	18.258	13.45	2.789	ND	ND	5.806	3.105	ND
PAHs-SPLP (ug/L)										
Phenanthrene										
Metals (mg/kg)										
Arsenic	2.02	2.18	4.92	4.93	3.3	5.4	ND	1.97	2.06	1.72
Barium	8.95	12.5	56.8	70.5	43.8	550	15.7	17.5	18.3	9.85
Beryllium	ND	ND	ND	0.606	ND	ND	ND	ND	ND	ND
Cadmium	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chromium	3.64	3.49	9.25	8.64	5.97	13.1	6.73	4.83	4.64	6.58
Copper	2.84	4.29	23.6	24	12.2	17.3	7.29	14	5.9	4.77
Lead	11.3	25.7	195	198	92.9	1940	10.7	20.1	16.5	2.26
Mercury	ND	0.0716	0.249	0.207	0.166	0.182	ND	0.0312	0.293	ND
Nickel	2.29	3.18	5.91	5.91	4.06	4.9	3.39	5.53	3.41	5.21
Zinc	11.4	20.7	94.6	94.4	74.1	419	18.7	32	27.5	11
Metals-SPLP (ug/L)										
Arsenic										
Chromium										
Copper										
Lead						231				
Mercury										
Zinc						87.6				
Cyanide (mg/kg)										
Total Cyanide (mg/kg)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
PCBs (mg/kg)										
Aroclor-1254										
Aroclor-1260										
Total PCBs	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Pesticides (ug/kg)										
4,4-DDD										
4,4-DDE										
4,4-DDT										
Total DDT Isomers	ND	NA	ND	ND	NA	ND	NA	ND	NA	NA
Herbicides (ug/kg)										
Total Herbicides	ND	NA	ND	ND	NA	ND	NA	ND	NA	NA

Notes:
This is a summary table. Only those analytes that are detected are shown.
Exceedances of Direct Exposure Criteria indicated by shading.
Exceedances of Leachability Criteria indicated by colored text.
NA = Sample not analyzed for given parameter.
ND = Analyte not detected for this analysis.
TPH = Total petroleum hydrocarbons
VOCs = Volatile organic compounds
SVOCs = Semi-volatile organic compounds

Table 1
2018 Soil Pre-Charcterization Data
6/10 Highway Interchange Reconstruction
Providence, Rhode Island

Location	GA Leachability Criteria	GB Leachability Criteria	Residential Direct Exposure Criteria (DEC)	Industrial Comercial DEC	Sample ID, Date, and Lab Deliverable ID																					
Sample ID					TP-1 (3)	TP-1 (2-8)	TP-2 (3)	TP-2 (0-9)	TP-5 (3)	TP-5 (1-8)	TP12(1-8)	TP12(3)	TP13(1-7)	TP13(4)	TP19 (3)	TP19 (2-8)	TP20 (4)	TP20 (3-9)	TP21(0-8)	TP21(3)	TP23(1-8)	TP23(2)	TP24(1-10)	TP24(3)	Mound	Mound
Sampling Date					4/11/2018	4/11/2018	4/11/2018	4/11/2018	4/11/2018	4/11/2018	4/12/2018	4/12/2018	4/12/2018	4/12/2018	4/11/2018	4/11/2018	4/11/2018	4/11/2018	4/12/2018	4/12/2018	4/12/2018	4/12/2018	4/12/2018	4/12/2018	4/12/2018	4/12/2018
Lab Report Number					SC45699		SC45699		SC45699		SC45741		SC45741		SC45699		SC45699		SC45741		SC45741		SC45741		SC45741	
Estimated Volume (tons)																										
TPH (mg/kg)																										
TPH	500	2500	500	2500	NA	71.2	NA	62.6	NA	442	92.9	NA	113	NA	NA	519	NA	391	2490	NA	72.6	NA	90.7	NA	NA	456
VOCs (mg/kg)																										
2-Butanone (MEK)	NE	NE	NE	NE																						
Acetone	NE	NE	7,800	10,000																						
Ethanol	NE	NE	NE	NE																						
Naphthalene	NE	NE	54	10000																						
Tetrachloroethene	0.1	4.2	12	110																						
Trichloroethene	0.2	20	13	520																						
Trichlorofluoromethane	NE	NE	NE	NE																						
Vinyl Chloride	0.3	NE	0.02	3																						
Total Chlorinated VOCs	NE	NE	NE	NE																						
Total VOCs	NE	NE	NE	NE	ND	NA	ND	NA	ND	NA	NA	ND		ND	ND	NA	ND	NA	NA	ND	NA	ND	NA	ND	ND	NA
PAHs (mg/kg)																										
1-Methylnaphthalene	NE	NE									0.298															
2-Methylnaphthalene	NE	NE	123	10,000							0.469															
Acenaphthene	NE	NE	43	10,000							0.207															
Acenaphthylene	NE	NE	23	10,000							0.79															
Anthracene	NE	NE	35	10,000							0.915		0.0791										0.191			
Benzo(a)anthracene	NE	NE	0.9	7.8		0.0719				0.432	2.41		0.272								0.103		0.518			
Benzo(a)pyrene	240	NE	0.4	0.8		0.0882				0.525	2.5		0.298								0.11		0.514			
Benzo(b)fluoranthene	NE	NE	0.9	7.8						0.518	2.85		0.29								0.111		0.554			
Benzo(g,h,i)perylene	NE	NE	0.8	10,000						0.293	0.98		0.17										0.256			
Benzo(k)fluoranthene	NE	NE	0.9	78		0.0783				0.315	1.4		0.203								0.0915		0.324			
Chrysene	NE	NE	0.4	780						0.375	2.17		0.249								0.107		0.55			
Dibenzo(a,h)anthracene	NE	NE	0.4	0.8							0.295															
Fluoranthene	NE	NE	20	10,000		0.128				0.847	6.87		0.602			0.969		0.567	0.735		0.226		1.1			0.596
Fluorene	NE	NE	28	10,000							0.688															
Indeno(1,2,3-cd)pyrene	NE	NE	0.9	7.8						0.293	1.18		0.181										0.283			
Naphthalene	0.8	NE	54	10,000							1.08												0.173			
Phenanthrene	NE	NE	40	10,000						0.452	6.83		0.298								0.145		0.968			
Pyrene	NE	NE	13	10,000		0.11				0.737	5.11		0.477			0.835		0.47			0.19		0.878			0.558
Carbazole	NE	NE	NE	NE		ND		ND		ND	0.647		ND			ND		ND			NA		NA			ND
Dibenzofuran	NE	NE	NE	NE		ND		ND		ND	0.671		ND			ND		ND			NA		NA			ND
Total PAHs	NE	NE	NE	NE	NA		NA	ND	NA			NA		NA	NA		NA			NA		NA		NA	NA	
PAHs-SPLP (ug/L)																										
Phenanthrene	NE	NE	NE	NE																						
Metals (mg/kg)																										
Arsenic	NE	NE	7	820		2.56		ND		2.2	2.82		2.05			2.26		2.01	2.76		4.86		5.75			2.95
Barium	NE	NE	5,500	10,000		17.1		17.7		53.7	15.2		13			17.7		17.6	16		22.6		34.9			20.6
Beryllium	NE	NE	1.5	1.5		NA		NA		NA	NA		NA			NA		NA]	NA		NA		NA			NA
Cadmium	NE	NE	39	1,000		ND		ND		ND	ND		ND			ND		ND	0.708		1.01		1.02			0.877
Chromium	NE	NE	1,400	10,000		6.48		5.27		4.99	3.44		2.96			8.14		7.81	7.77		8		14.4			8.07
Copper	NE	NE	3,100	10,000		6.45		5.34		14.3	10.6		7.39			11.4		10.1	10.2		20		28.7			11.2
Lead	NE	NE	150	500		15.8		31.1		137	47.3		24.4			18.5		16.5	17.7		31.9		52.9			25
Mercury	NE	NE	23	610		0.0449		0.0656		0.163	0.192		0.0432			ND		ND	0.0916		0.0724		0.11			0.0416
Nickel	NE	NE	1,000	10,000		4.03		3.47		3.96	3.57		3.14			6.59		6.03	5.75		7.39		9.85			6.29
Zinc	NE	NE	6,000	10,000		19.3		17.9		77.9	29.9		23.2			24.9		25.5	22.8		32.9		25.8			32.5
Metals-SPLP (ug/L)																										
Arsenic	NE	NE	NE	NE																						
Chromium	1100	NE	NE	NE																						
Copper	NE	NE	NE	NE																						
Lead	40	NE	NE	NE																						
Mercury	20	NE	NE	NE																						
Zinc	NE	NE	NE	NE																						
Cyanide (mg/kg)																										
Total Cyanide (mg/kg)					NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
PCBs (mg/kg)																										
Aroclor-1254	NE	NE	NE	NE																						
Aroclor-1260	NE	NE	NE	NE																						
Total PCBs	10	10	10	10	NA	ND	NA	ND	NA	ND	ND	NA	ND	NA	NA	ND	NA	ND	ND	NA	ND	NA	ND	NA	NA	ND
Pesticides (ug/kg)																										
4,4-DDD	NE	NE	NE	NE																						
4,4-DDE	NE	NE	NE	NE																						
4,4-DDT	NE	NE	NE	NE																						
Total DDT Isomers	NE	NE	NE	NE	NA	ND	NA	ND	NA	ND	ND	NA	ND	NA	NA	ND	NA	ND	ND	NA	ND	NA	ND	NA	NA	ND
Herbicides (ug/kg)																										
Total Herbicides					NA	ND	NA	ND	NA	ND	ND	NA	ND	NA	NA	ND	NA	ND	ND	NA	ND	NA	ND	NA	NA	ND

Notes:
This is a summary table. Only those analytes that are detected are shown.
Exceedances of Direct Exposure Criteria indicated by shading.
Exceedances of Leachability Criteria indicated by colored text.
NA = Sample not analyzed for given parameter.
ND = Analyte not detected for this analysis.
TPH = Total petroleum hydrocarbons
VOCs = Volatile organic compounds
SVOCs = Semi-volatile organic compounds

Table 2
Summary of Groundwater Analytical Data
Highway 6/10 Interchange Reconstruction
Providence, Rhode Island

	GA Groundwater Criteria	GB Groundwater Criteria	Sampling Location, Sampling Date, Laboratory SDG, and Analytical Results								
Sample Location			GP-101 (GW)-1	GP-116(GW)-1	MW-B39W	MW-B41W	MW-B41W (dupe)	MW-B30W	MW-B49W	MW-B23W	MW-B21W
Sampling Date			3/19/2018	3/20/2018	4/4/2018	4/4/2018	4/4/2018	4/4/2018	4/4/2018	4/4/2018	4/4/2018
Lab Report Number			SC44948	SC44983	SC45467						
TPH (mg/L)											
TPH	NE	NE	< 0.2	1.8	0.8	1	0.8	0.9	0.9	1	0.8
VOCs (mg/L)											
Chloroform	NE	NE	< 1.00	< 1.00	0.0012	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00
Methyl tert-butyl ether (MTBE)	0.04	5	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	0.837
Tert-amyl methyl ether	NE	NE	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	0.0619
Tert-Butanol / butyl alcohol	NE	NE	< 10.0	< 10.0	< 10.0	< 10.0	< 10.0	< 10.0	< 1.00	< 10.0	0.0507
Tetrachloroethene	0.005	0.15	< 1.00	0.00228	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00
Trichloroethene	0.005	0.54	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	0.00173
SVOCs (mg/l)											
Di-n-butylphthalate	NE	NE	NA	NA	0.00866	0.00757	0.0149	0.011	0.00875	0.00842	0.00981
Metals (mg/l)											
Barium	2	NE	0.186	0.5	0.122	0.229	0.258	1.03	0.776	0.182	0.132
Barium (dissolved)	2	NE	NA	0.509	NA	NA	NA	NA	NA	NA	NA
Chromium	0.1	NE	< 0.0100	0.0246	< 0.0050	0.0188	0.0054	< 0.0050	< 0.0050	< 0.0050	0.0064
Chromium (dissolved)	0.1	NE	NA	0.0109	NA	NA	NA	NA	NA	NA	NA
Copper	NE	NE	< 0.0100	0.0111	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	0.0055
Copper (dissolved)	NE	NE	NA	< 0.0100	NA	NA	NA	NA	NA	NA	NA
Lead	0.015	NE	< 0.0150	0.0097	< 0.0075	< 0.0075	< 0.0075	< 0.0075	< 0.0075	< 0.0075	< 0.0375
Lead (dissolved)	NE	NE	NA	< 0.0150	NA	NA	NA	NA	NA	NA	NA
Mercury	0.002	NE	< 0.00020	< 0.00020	< 0.00020	< 0.00020	< 0.00020	< 0.00020	< 0.00020	< 0.00020	< 0.00020
Nickel	0.1	NE	< 0.0100	0.0144	< 0.0050	0.0139	0.0055	< 0.0050	0.0053	< 0.0050	< 0.0050
Nickel (dissolved)	0.1	NE	NA	< 0.0100	NA	NA	NA	NA	NA	NA	NA
Selenium	0.05	NE	< 0.0300	0.0188	< 0.0150	< 0.0150	< 0.0150	< 0.0150	< 0.0150	< 0.0150	< 0.0150
Selenium (dissolved)	0.05	NE	NA	< 0.0300	NA	NA	NA	NA	NA	NA	NA
Zinc	NE	NE	0.0151	0.0402	< 0.0100	< 0.0100	< 0.0100	< 0.0100	0.011	< 0.0100	0.0408
Zinc (dissolved	NE	NE	NA	< 0.0100	NA	NA	NA	NA	NA	NA	NA

Note:

This is a summary table. Only detected analytes are presented.

NE = No established criterion

NA = Not analyzed for this parameter.

Green highlighted results indicate exceedance of GA Groundwater Criteria.

Table 3
Summary of Soil Quality Classifications
Route 6/10 Interchange Reconstruction
Providence, Rhode Island

Soil Type	RIDEM Criteria	Approximate Quantity of Soil to be Generated (CY)	Management Options	Testing Frequency
Type 1A	< all criteria	50,000	Reuse on site with no further testing Reuse off site with no further testing	NA
Type 1B*	> R DEC or > GA LC	100,000	Reuse on site with no further testing Reuse on another RIDOT property with testing for GA LC compliance Reuse on 3rd party property with testing per their approved SMP Disposal off site with additional testing as requried by facility permit	1 sample/ 1,000 CY or per 3rd party SMP/facility permit
Type 2*	> I/C DEC or > GB LC	190,000	Reuse on site with no further testing Reuse on another RIDOT property with testing for GA LC compliance Reuse on 3rd party property with testing per their approved SMP Disposal off site with additional testing as requried by facility permit	1 sample/ 1,000 CY or per 3rd party SMP/facility permit
Type 3	Hazardous Waste or free product	0	Disposal off-site with additional testing as required by facility permit	Varies

Notes:
* Specific areas of Type 1B and Type 2 soil are identified for off-site disposal, as described in Section 3.2 and Appendix C.
CY = Cubic yards
R DEC = Residential Direct Exposure Criteria
I/C DEC = Industrial Commercial Direct Exposure Criteria
LC = Leachability criteria
SMP = Soil management plan

Appendix A
Supplemental Analytical Data Lab Reports