Geophysical, Geotechnical and Environmental Investigation
Assunpink Creek Restoration Project
Trenton, New Jersey

Environmental Investigation Report

Prepared for
U.S. Army Corps of Engineers
Philadelphia District

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Project Name
Geophysical/Geotechnical/Environmental Investigation
Assunpink Creek Restoration Project
Trenton, New Jersey

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Prepared by

O'BRIEN & GERE

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Prepared for:
US Army Corps of Engineers

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ACRONYMS AND ABBREVIATIONS

ASTM	American Society for Testing and Materials
DRO	diesel range organics
FSP	Field Sampling Plan
ft bgs	feet below ground surface
GRO	gasoline range organics
IGW	Impact to Groundwater
LNAPL	light non-aqueous phase liquid
MCC	maximum contaminant concentration
mg/kg	milligram per kilogram
mg/l	milligram per liter
MS/MSD	matrix spike/matrix spike duplicate
NA	not analyzed
NJDEP	New Jersey Department of Environmental Protection
N-R DC	Non-Residential Direct Contact
NS	no standard
PCB	polychlorinated biphenyl
PID	photoionization detector
ppm	parts per million
QAPP	Quality Assurance Project Plan
QC	quality control
RCRA	Resource Conservation and Recovery Act
SAP	Sampling and Analysis Plan
SRP	Site Remediation Program
SU	standard units
SVOC	semi-volatile organic compound
TAL	target analyte list
TCLP	toxicity characteristic leaching procedure
TIC	Tentatively Identified Compound
TP	Test Pit
µg/kg	microgram per kilogram
USACE	United States Army Corps of Engineers
VOC	volatile organic compound

1. INTRODUCTION

In accordance with the requirements set forth in the Scope of Work prepared by United States Army Corp of Engineers (USACE) under Contract Number W912BU-10-D-0001, Contract Action Number: 0005, the following Environmental Investigation Report includes a description of the methodology used to complete the environmental investigation portion of the project and includes the results of the environmental investigation performed on September 16-17, 2010.

The Assunpink Creek Restoration Project (Site) is located within the southwestern quadrant of the intersection of E. Lafayette Street and S. Broad Street in Trenton, New Jersey (Figure 1). The following field tasks were completed for the project:

- Geophysical survey and identification of subsurface utilities within the project area
- Survey of soil test pit locations and features identified during geophysical survey, including subsurface utilities
- Excavation of 9 test pits to depths ranging from 9 to 17 feet below the ground surface (ft bgs)
- Collection of disturbed grab soil samples from test pit excavations for engineering evaluation and geotechnical and environmental testing
- Laboratory analysis of environmental soil samples collected during test pit excavation.

The completed scope of work (see Attachment 1) is generally divided into three tasks that involved field work at the site. These tasks include 1) geophysical site investigation, 2) geotechnical investigation, and 3) environmental investigation. The scope of work for environmental investigation portion of the project is described in the Sampling and Analysis Plan (SAP) (O'Brien & Gere, September 2010). The SAP consists of two documents, the Quality Assurance Project Plan (QAPP) and the Field Sampling Plan (FSP). Methodology and results for the environmental investigation are presented in this report.

2. ENVIRONMENTAL INVESTIGATION

The following narrative describes the field activities that were conducted for the environmental investigation task at the Site. The field portion of the environmental investigation was conducted simultaneously with the field portion of the geotechnical investigation; details of the geotechnical investigation are presented under separate cover. A geophysical survey was conducted on September 8, 2010, prior to the environmental/geotechnical investigation. The results of the geophysical survey are also presented under separate cover.

2.1. TEST PIT EXCAVATION

The environmental field investigation was conducted simultaneously with the geotechnical investigation, which included excavation of 9 test pits designated TP-01 through TP-09. Test pit locations were selected by the geotechnical engineer and agreed on by the USACE Project Manager. Test pit locations are shown on Figure 2.

Test pits were excavated with a rubber-tracked CAT 315 excavator. An O'Brien & Gere geologist with 6 years experience in subsurface and environmental investigation directed and observed the excavation of the test pits and prepared detailed test pit logs at the time of excavation. Test pit logs are included as Attachment 2. A tape measure was used to check depths periodically during test pit excavation. The ground surface elevation referenced on the test pit logs is the datum for depth measurements. The test pits were excavated as short, narrow trenches, approximately 3 to 7 ft wide and 10 to 15 ft long. Test pit excavation depths ranged from 9 to 17 ft bgs. Test pit excavations were terminated due to excessive caving of excavation sidewalls or excavator refusal on bedrock, except at TP-01, TP-02 and TP-03. These three excavations were terminated at or near the depth where elevated photoionization detector (PID) readings/petroleum odors were observed. Following discussion of field observations, USACE directed O'Brien & Gere to terminate these test pits at the depth where field indications of impact were observed.

Excavated soils were temporarily stockpiled 4 ft or more from the test pits, and test pits were backfilled completely before leaving the site each day. Soils exhibiting elevated PID readings were not stockpiled, and were kept in the excavator bucket (positioned over the excavation) before being replaced into the test pit as backfill.

2.2. TEST PIT LOGGING AND OBSERVATIONS

An O'Brien & Gere geologist oversaw test pit excavation activities and recorded field observations in a bound field notebook (Attachment 3) and on test pit logs (see Attachment 2).

The following information is included on the test pit logs:

- Test Pit number or designation.
- Excavator operator's name and geologist's name.
- Make, size, and manufacturer's model designation of excavator.
- Test pit dimensions and orientation.
- Dates and time by depths excavation and sampling operations were performed.
- Depths at which samples were collected.
- Classification or description by depth of the materials excavated using the Unified Soil Classification System (American Society for Testing and Materials (ASTM) D-2487). Excavated soils were described in accordance with ASTM D-2488, including moisture conditions, general consistency or relative compactness (as determined by the excavator effort), color, primary constituent and gradation (for example, silt, clay, fine to medium sand, etc.), secondary constituents, presence of foreign debris/deleterious materials, and odor

(when applicable). This classification was made immediately after each sample was retrieved (note: these classifications were confirmed or modified based on geotechnical laboratory analysis).
- PID readings by depth.
- Observations (if any) regarding staining or obvious visual/olfactory impact to excavated materials.
- Depth at which groundwater was initially encountered and when stabilized.
- Depth of primary strata transitions, such as fill/natural soil interface, soil/weathered rock interface, and weathered rock/competent rock interface (where applicable).
- Depth of test pit termination or refusal.

A summary of field observations collected at each test pit follows and includes observations regarding the concrete culvert at the site:

TP-01

- Fill material was encountered from ground surface to the test pit termination depth of 14 ft bgs.
- Groundwater was encountered and stabilized at 14 ft bgs. Sheen was observed on the surface of the groundwater.
- A maximum PID reading of 26.9 part per million (ppm) was recorded on material from 14 ft bgs. This material exhibited a fuel oil odor.

TP-02

- Fill material was encountered from ground surface to the test pit termination depth of 11.5 ft bgs.
- Groundwater was encountered and stabilized at 11 ft bgs. A thin layer of black light non-aqueous phase liquid (LNAPL) was observed floating on the groundwater surface.
- A maximum PID reading of 20.6 ppm was recorded on material from 11 ft bgs. This material exhibited a fuel oil odor.

TP-03

- Fill material was encountered from ground surface to the test pit termination depth of 12 ft bgs.
- Groundwater was encountered and stabilized at 8 ft bgs. Sheen was observed on the surface of the groundwater.
- A maximum PID reading of 1 ppm was recorded on material from 9 to 11 ft bgs. This material exhibited a fuel oil odor.

TP-04

- Fill material was encountered from ground surface to 14 ft bgs. Bedrock was encountered from 14 ft bgs to the test pit termination depth of 15 ft bgs.
- Groundwater was encountered and stabilized at 8 ft bgs.

TP-05

- Fill material was encountered from ground surface to the test pit termination depth of 14 ft bgs. Test pit excavation was terminated at 14 ft bgs due to excavator refusal on probable bedrock.
- Groundwater was encountered and stabilized at 8 ft bgs.

TP-06

- Fill material was encountered from ground surface to the test pit termination depth of 17 ft bgs.
- Groundwater was encountered and stabilized at 14 ft bgs.

TP-07

- Fill material was encountered from ground surface to the test pit termination depth of 13.5 ft bgs. Test pit excavation was terminated at 13.5 ft bgs due to excavator refusal on bedrock.
- Groundwater was encountered and stabilized at 8 ft bgs.
- TP-07 was excavated against the southern wall of the site culvert[1]. The top of the culvert was encountered at 1.5 ft bgs and the culvert footer was encountered at 12 ft bgs. An approximately 4-inch diameter weep hole was observed in the culvert wall at 9.75 ft bgs. After being exposed by the excavation, groundwater was observed flowing into the culvert through the weep hole.

TP-08

- Fill material was encountered from ground surface to 9 ft bgs. Native overburden material was encountered from 9 to 11 ft bgs. The test pit was terminated at 11 ft bgs due to excavator refusal on bedrock.
- Groundwater was encountered and stabilized at 8 ft bgs.

TP-09

- Fill material was encountered from ground surface to 7 ft bgs. Native overburden material was encountered from 7 to 9 ft bgs. The test pit was terminated at 11 ft bgs due excessive sidewall caving.
- Groundwater was encountered and stabilized at 7 ft bgs.

2.3. SOIL SAMPLE COLLECTION AND ANALYSIS

2.3.1. Soil Sample Collection

In addition to samples collected for geotechnical analysis, samples were collected from each test pit for laboratory analysis of environmental parameters. Soil samples were collected from excavated material within the excavator bucket. For each sample, a fresh surface was exposed using a stainless steel spoon immediately prior to sample collection. For composite samples, the sample was composited in a stainless steel bowl using a stainless steel spoon. Sampling equipment was decontaminated before and after each use according to the decontamination protocols described in the FSP.

The Encore sampling method was utilized for soil samples analyzed for volatile organic compounds (VOCs) (except toxicity characteristic leaching procedure [TCLP] VOC analysis). For each VOC sample, three plastic Encore containers were collected as well as sufficient sample for measuring moisture content.

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[1] A concrete culvert is present at the site and extends in a general east-west direction. A stream flows through the culvert towards South Warren Street. From beneath the South Broad Street Bridge and looking west, regularly spaced weep holes (approximately 4-inch diameter) were observed on the northern and southern wall of the culvert. Water appeared to be seeping from the weep holes into the culvert. On the west side of the site a portion of the culvert roof has been removed. In this area, regularly spaced weep holes (approximately 4-inch diameter) were observed on the northern and southern wall of the culvert. Water appeared to be seeping from the weep holes into the culvert.

The number of samples collected from each test pit and the sample depths were agreed upon in the field by the geologist and the on-site USACE representative, or by the USACE representative reached by telephone. A list of samples collected and submitted for laboratory analysis is presented in Table 1. The strategy employed for sample selection was as follows:

- Excavated material was screened for the presence of VOCs with a PID in approximately 1-ft depth intervals. These field screening observations were recorded on the test pit log. Field screening observations included those regarding presence of staining or visual/olfactory impact to excavated material.

- If field observations indicated no impact to excavated material, a grab or composite sample (based on discussion with USACE) was collected from the excavated material. If a composite sample was collected, a separate grab sample was collected for VOC analysis.

  – At test pits TP-04 through TP-09, field observations did not indicate impact to excavated material, and one sample was collected from each of these test pits. Table 1 presents the sample depths and types (grab or composite).

- If field observations indicated impact to excavated material (i.e., elevated PID readings, staining/free product, or obvious visual/olfactory impact of excavated materials was observed), a grab sample was collected from the interval exhibiting the highest level of impact based on field screening observations.

  – At test pits TP-01, TP-02 and TP-03, field observations indicated impact to excavated material at or near the termination depth of the test pits, and a grab sample was collected at this depth. At TP-01 and TP-02, a composite sample (grab sample collected for VOC analysis) was also collected from non-impacted material above the impacted material identified based on field screening results. For TP-03, a soil sample was collected from the impacted subsurface interval (identified based on field screening) and was composited with a soil sample collected from TP-04. This sample was submitted for laboratory analysis of hazardous waste characteristics as discussed below in the next section. Table 1 presents the sample depths and types (grab or composite).

In summary, a total of 24 samples were collected for bulk analysis from the nine test pits. Nineteen of these were grab samples and five were composite samples. A total of 13 samples were collected for hazardous waste characteristics analysis from the nine test pits. Nine of these were grab samples and four were composite samples.

2.3.2. Soil Sample Analysis

The collected soil samples were analyzed by Accutest Laboratories, Inc. (Dayton, New Jersey) for the following parameters, using the analytical methods indicated below. A list of analyses performed for each sample is included in Table 1.

<u>Bulk Analysis</u>

- VOCs– SW 846 8260B/5035
- SVOCs– SW 846 8270C
- Target analyte list (TAL) Metals – SW 846 6010B
- Total Petroleum Hydrocarbons – SW 846 8015M (gasoline range organics [GRO] and diesel range organics [DRO])
- Polychlorinated biphenyls (PCBs) – SW 846 8082A

- Pesticides, Chlorinated – SW 846 8081B
- Herbicides, Chlorinated – SW 846 8151A

Hazardous Waste Characteristics Analysis

- TCLP metals – SW 846 6010B
- TCLP VOCs – SW 846 8260B
- TCLP SVOCs – SW 846 8270C
- TCLP Herbicides/Pesticides – SW 846 8151A/8081A
- Ignitability – SW 846 Chapter 7/ASTM D93
- Reactivity, Sulfide – SW 846 Ch 7.3/9034
- Reactivity, Cyanide – SW 846 Ch 7/9012B
- Corrosivity - SW 846 Chapter 7/9045C,D

As indicated in Table 1, three of the samples submitted for hazardous waste characteristics analysis consisted of soil collected and composited from more than one test pit.

Quality-control (QC) samples were also collected in the field during soil sample collection in accordance with the QAPP, as follows:

- One matrix spike/matrix spike duplicate (MS/MSD) sample was collected and submitted for the bulk analysis parameters listed above.

- Field rinsate blanks were collected at a rate of 10% and were submitted for the bulk analysis parameters listed above.

2.4. TEST PIT BACKFILLING AND SITE RESTORATION

All test pits were backfilled completely before leaving the Site each day. The test pits were backfilled with excavated soil in approximately 18 inch lifts and were tamped thoroughly with the equipment bucket in an effort to prevent further settlement of the backfilled soils. Decontamination fluids were placed with backfilled soils. The test pit areas were rough-graded with the excavator bucket to restore the surface to as near original condition as practical.

3. ENVIRONMENTAL INVESTIGATION RESULTS

The following section discusses the analytical results from the soil samples collected during the environmental investigation.

3.1. SOIL SAMPLE ANALYTICAL RESULTS

Soil sample analytical results are presented in Tables 2 through 7 and Attachment 4. VOC, SVOC, pesticide, herbicide, PCB, and metals results (Tables 2 through 5) are compared to the New Jersey Department of Environmental Protection (NJDEP) Site Remediation Program (SRP) Non-Residential Direct Contact Soil Remediation Standards (N-R DC) and the NJDEP SRP Impact to Groundwater Soil Screening Levels (IGW). Table 6 presents a summary of the results from Tables 2 through 5 that exceed N-R DC standards and/or IGW screening levels. Hazardous waste characteristic results (Table 7) are compared to Resource Conservation and Recovery Act (RCRA) Maximum Contaminant Concentrations (MCC).

3.1.1. VOC Results

VOC soil sample analytical results are presented in Table 2. As indicated in the table, only the sample result for methylene chloride from TP-05 (8 ft bgs) at 0.011 milligram/kilogram (mg/kg) exceeded the IGW screening level. No sample results exceeded the corresponding N-R DC standards.

Tentatively Identified Compounds (TICS) were detected in three samples: TP-01 (14 ft bgs), 12.74 mg/kg; TP-02 (11 ft bgs), 0.3066 mg/kg; and TP-05 (8 ft bgs), 0.0069 mg/kg. The laboratory reported these TICs, which are commonly organic compounds related to the target analytes but not included on the method analyte list, as total values.

3.1.2. SVOC Results

SVOC soil sample analytical results are presented in Table 3. As indicated in the table, the following sample results exceeded N-R DC standards for the indicated compounds:

- Benzo(a)anthracene: TP-01 (0 – 13.5 ft bgs), TP-02 (2 – 10.5 ft bgs) and TP-02 (11 ft bgs)
- Benzo(a)pyrene: TP-01 (0 – 13.5 ft bgs), TP-01 (14 ft bgs), TP-02 (2 – 10.5 ft bgs), TP-02 (11 ft bgs), TP-03 (8 ft bgs), TP-04 (13 ft bgs), TP-05 (0 – 14 ft bgs), TP-06 (7 ft bgs) and TP-07 (0 – 13.5 ft bgs)
- Benzo(b)fluoranthene: TP-01 (0 – 13.5 ft bgs), TP-02 (2 – 10.5 ft bgs), TP-02 (11 ft bgs), TP-03 (8 ft bgs) and TP-04 (13 ft bgs)
- Dibenzo(a,h)anthracene: TP-01 (0 – 13.5 ft bgs), TP-02 (2 – 10.5 ft bgs), TP-02 (11 ft bgs), TP-03 (8 ft bgs), TP-04 (13 ft bgs), TP-05 (0 – 14 ft bgs) and TP-06 (7 ft bgs)

The following sample results exceeded the IGW screening levels for the indicated compounds:

- Benzo(a)anthracene: TP-01 (0 – 13.5 ft bgs), TP-02 (2 – 10.5 ft bgs), TP-02 (11 ft bgs), TP-03 (8 ft bgs), TP-04 (13 ft bgs), TP-05 (0 – 14 ft bgs) and TP-06 (7 ft bgs)
- Benzo(a)pyrene: TP-01 (0 – 13.5 ft bgs), TP-01 (14 ft bgs), TP-02 (2 – 10.5 ft bgs), TP-02 (11 ft bgs), TP-03 (8 ft bgs), TP-04 (13 ft bgs), TP-05 (0 – 14 ft bgs), TP-06 (7 ft bgs) and TP-07 (0 – 13.5 ft bgs)

- Benzo(b)fluoranthene: TP-01 (0 – 13.5 ft bgs), TP-02 (2 – 10.5 ft bgs), TP-02 (11 ft bgs), TP-03 (8 ft bgs) and TP-04 (13 ft bgs)

- Dibenzo(a,h)anthracene: TP-01 (0 – 13.5 ft bgs), TP-02 (2 – 10.5 ft bgs), TP-02 (11 ft bgs) and TP-04 (13 ft bgs)

Tentatively Identified Compounds (TICS) were detected in all samples analyzed for SVOCs except samples TP-08 (4) and TP-09 (7). Total TIC concentrations ranged from 0.17 to 190.7 mg/kg. The laboratory reported these TICs, which are commonly organic compounds related to the target analytes but not included on the method analyte list, as total values.

3.1.3. Total Petroleum Hydrocarbon Results

TPH-GRO (C6-C10) results are presented in Table 2. As indicated, the only sample with a detection was TP-01 (12 ft bgs), with a concentration of 55.4 mg/kg.

TPH-DRO (C10-C28) results are presented in Table 3. As indicated, nine of the eleven samples had a TPH-DRO detection; however, none of the results exceeded the NJDEP N-R DC standard of 54,000 mg/kg.

3.1.4. Pesticide and Herbicide Results

Pesticide and herbicide soil sample analytical results are presented in Table 4. As indicated in the table, no sample results exceeded the N-R DC standards. One sample, TP-04 (13 ft bgs), exceeded the IGW screening level for dieldrin (pesticide).

3.1.5. Polychlorinated biphenyl (PCB) Results

PCB soil sample analytical results are presented in Table 4. As indicated in the table, no sample results exceeded the N-R DC standards. One sample, TP-01 (0 – 13.5 ft bgs), exceeded the IGW screening level for Aroclor 1254 (PCB).

3.1.6. Metals Results

Metals soil sample analytical results are presented in Table 5. As indicated in the table, no sample results exceeded the N-R DC standards. The following sample results exceeded the IGW screening levels for the indicated compounds:

- Aluminum: TP-01 (0 – 13.5 ft bgs), TP-01 (14 ft bgs), TP-02 (2 – 10.5 ft bgs), TP-02 (11 ft bgs), TP-03 (8 ft bgs), TP-04 (13 ft bgs), TP-05 (0 – 14 ft bgs), TP-06 (7 ft bgs), TP-07 (0 – 13.5 ft bgs), TP-08 (4 ft bgs) and TP-09 (7 ft bgs)

- Beryllium: TP-02 (2 – 10.5 ft bgs), TP-02 (11 ft bgs), TP-03 (8 ft bgs), TP-04 (13 ft bgs), TP-05 (0 – 14 ft bgs), TP-07 (0 – 13.5 ft bgs) and TP-08 (4 ft bgs)

- Cadmium: TP-01 (0 – 13.5 ft bgs), TP-02 (2 – 10.5 ft bgs), TP-02 (11 ft bgs) and TP-06 (7 ft bgs)

- Lead: TP-01 (0 – 13.5 ft bgs), TP-01 (14 ft bgs), TP-02 (2 – 10.5 ft bgs), TP-02 (11 ft bgs), TP-03 (8 ft bgs), TP-04 (13 ft bgs), TP-05 (0 – 14 ft bgs), TP-06 (7 ft bgs), TP-07 (0 – 13.5 ft bgs), TP-08 (4 ft bgs) and TP-09 (7 ft bgs)

- Manganese: TP-01 (0 – 13.5 ft bgs), TP-01 (14 ft bgs), TP-02 (2 – 10.5 ft bgs), TP-02 (11 ft bgs), TP-03 (8 ft bgs), TP-04 (13 ft bgs), TP-05 (0 – 14 ft bgs), TP-06 (7 ft bgs), TP-07 (0 – 13.5 ft bgs), TP-08 (4 ft bgs) and TP-09 (7 ft bgs)

- Mercury: TP-01 (0 – 13.5 ft bgs), TP-01 (14 ft bgs), TP-02 (2 – 10.5 ft bgs), TP-02 (11 ft bgs), TP-03 (8 ft bgs), TP-04 (13 ft bgs), TP-05 (0 – 14 ft bgs), TP-06 (7 ft bgs), TP-07 (0 – 13.5 ft bgs), TP-08 (4 ft bgs) and TP-09 (7 ft bgs)

- Nickel: TP-01 (0 – 13.5 ft bgs)

- Silver: TP-08 (4 ft bgs)

3.2. RESULTS SUMMARY

Analyte exceedances were detected in at least one soil sample from each test pit excavated at the Site during this investigation (Table 6). Figure 3 shows a site plan and the analytical results for those samples with constituents exceeding Site criteria. Metals and SVOCs were the most commonly detected constituents with results exceeding site criteria. Test Pits 01, 02, and 03, located in the southwest corner of the Site, exhibit the most evidence of environmental impact, as indicated by the quantitative analytical results and visual/olfactory field observations. Environmental samples from these three test pits generally had slightly higher concentrations of SVOCs than the other test pits.

Among the SVOC exceedances, the results are slightly greater than the NJDEP N-R DC soil remediation standards and exceed the NJ IGW screening levels in all but two test pits (TP-08 and TP-09). The detection of TPH-DRO concentrations, SVOC exceedances, and the visual evidence of fuel oil impact in three of the test pits (TP-01, TP-02, and TP-03) indicate past environmental impact within the general area of the Site.

The detection of five metals (Aluminum, Beryllium, Lead, Manganese, and Mercury) were generally common among all test pits. Elevated metal concentrations are common in urban environments and may also occur naturally in soil.

Because the Site's soil sample results have detections exceeding NJ IGW and NJDEP soil remediation standards, re-use or storage of excavated soils on the Site may not be appropriate. Alternative options for handling and disposing of the Site's impacted soil should be considered.

3.3. HAZARDOUS WASTE CHARACTERISTICS RESULTS

Hazardous waste characteristics soil sample analytical results are presented in Table 7. As indicated in the table, neither the TCLP results nor the other RCRA characteristic tests showed any parameter concentrations or properties that exceeded the applicable criteria.

4. DEVIATIONS FROM SCOPE

4.1. FIELD WORK

Field work for the environmental investigation was conducted according to the approved SAP, with the exception of the following modification:

- Based on field indications of impacted material in TP-01, TP-02 and TP-03, these test pits were not excavated to refusal. Following discussion of field observations, USACE directed O'Brien & Gere to terminate these test pits at the depth where field indications of impact were observed.

- While not a deviation from the scope, Option A was exercised. This option, as described in the scope of work, allowed for the collection of up to 5 additional soil samples for chemical characterization. Only one additional soil sample was collected under the provision of Option A.

4.2. LABORATORY

Laboratory analysis of samples collected during the environmental investigation was conducted according to the SAP, with the exception of the following modifications/deviations:

- The sample collected from TP-06 at 7 ft bgs (Accutest sample JA56494-3) was submitted for laboratory analysis including herbicides and pesticides; however, the laboratory initially did not log the sample in for these analyses. Upon recognizing that these analyses had not been run, O'Brien & Gere notified USACE of the laboratory oversight. At this time, the holding time for herbicide analysis had been exceeded, and USACE advised O'Brien & Gere to direct the laboratory to run the pesticide analysis only. The pesticide analysis was run within the required hold time and the results are included on Table 4.

- The sample collected from TP-03 at 8 ft bgs was submitted for laboratory analysis including TCLP VOC analysis; however, the laboratory did not log in or run the sample for this analysis. Since the sample from TP-03 was also submitted and analyzed for VOC analysis (all of the compounds in the TCLP VOC list are included on the VOC list) and VOCs were not detected above the method detection limit, it is reasonable to assume that they would not have been detected by TCLP VOC analysis.

5. REFERENCES

O'Brien & Gere, Engineers. 2010. Field Sampling Plan - Draft. Assunpink Creek Restoration Project. Trenton, New Jersey. September 2010. Prepared for USACE.

O'Brien & Gere, Engineers. 2010. Quality Assurance Project Plan - Draft. Assunpink Creek Restoration Project. Trenton, New Jersey. September 2010. Prepared for USACE.

Table 1: Summary of Test Pit Samples
USACE Assunpink Creek Restoration Project
Trenton, NJ

Location	Sample Depth (ft bgs)	Accutest Sample Number	Grab/Composite	Bulk Analysis	Note
TP-01	12	JA56673-6	Grab	VOC	
TP-01	0 - 13.5	JA56673-7	Composite	SVOC, TAL metals, GRO, DRO, PCB, Pesticides, Herbicides	
TP-01	14	JA56673-8	Grab	VOC	
TP-01	14	JA56673-8	Grab	SVOC, TAL metals, GRO, DRO, PCB, Pesticides, Herbicides	
TP-02	7	JA56673-3	Grab	VOC	
TP-02	2 - 10.5	JA56673-4	Composite	SVOC, TAL metals, GRO, DRO, PCB, Pesticides, Herbicides	
TP-02	11	JA56673-5	Grab	VOC	
TP-02	11	JA56673-5	Grab	SVOC, TAL metals, GRO, DRO, PCB, Pesticides, Herbicides	
TP-03	8	JA56673-1	Grab	VOC	
TP-03	8	JA56673-1	Grab	SVOC, TAL metals, GRO, DRO, PCB, Pesticides, Herbicides	
TP-04	13	JA56494-6	Grab	VOC	
TP-04	13	JA56494-6	Grab	SVOC, TAL metals, GRO, DRO, PCB, Pesticides, Herbicides	
TP-05	8	JA56494-4	Grab	VOC	
TP-05	0 - 14	JA56494-5	Composite	SVOC, GRO, DRO, PCB, Pesticides, Herbicides	
TP-05	0 - 14	JA56494-5A	Composite	TAL metals	
TP-06	7	JA56494-3	Grab	VOC	
TP-06	7	JA56494-3	Grab	SVOC, GRO, DRO, PCB, Pesticides	
TP-06	7	JA56494-3A	Grab	TAL metals	
TP-07	13.5	JA56494-1	Grab	VOC	
TP-07	0 - 13.5	JA56494-2	Composite	SVOC, TAL metals, GRO, DRO, PCB, Pesticides, Herbicides	
TP-08	4	JA56673-11	Grab	VOC	
TP-08	4	JA56673-11	Grab	SVOC, TAL metals, GRO, DRO, PCB, Pesticides, Herbicides	
TP-09	7	JA56673-10	Grab	VOC	
TP-09	7	JA56673-10	Grab	SVOC, TAL metals, GRO, DRO, PCB, Pesticides, Herbicides	

Location	Sample Depth (ft bgs)	Accutest Sample Number	Grab/Composite	Hazardous Waste Characteristic Analysis	Note
TP-01	14	JA56673-8	Grab	ignitability, corrosivity and reactivity	
TP-01	14	JA56673-8A	Grab	TCLP VOC	
TP-01	14	JA56673-8A	Grab	TCLP SVOC, TCLP pesticides, TCLP herbicides, TCLP metals	
TP-02	11	JA56673-5	Grab	ignitability, corrosivity and reactivity	
TP-02	11	JA56673-5A	Grab	TCLP VOC	
TP-02	11	JA56673-5A	Grab	TCLP SVOC, TCLP pesticides, TCLP herbicides, TCLP metals	
TP-03/04	see note	JA56494-7	Composite	TCLP SVOC, TCLP pesticides, TCLP herbicides, TCLP metals, ignitability, corrosivity and reactivity	Sample composited from TP-03 (8 ft bgs) and TP-04 (13 ft bgs)
TP-05	8	JA56494-4	Grab	TCLP VOC	
TP-05	0 - 14	JA56494-5	Composite	TCLP SVOC, TCLP pesticides, TCLP herbicides, TCLP metals, ignitability, corrosivity and reactivity	
TP-06	7	JA56494-3	Grab	TCLP VOC	
TP-06/07	see note	JA56494-8	Composite	TCLP SVOC, TCLP pesticides, TCLP herbicides, TCLP metals, ignitability, corrosivity and reactivity	Sample composited from TP-06 (7 ft bgs) and TP-07 (0 - 13.5 ft bgs)
TP-08/09	see note	JA56673-12	Composite	TCLP SVOC, TCLP pesticides, TCLP herbicides, TCLP metals, ignitability, corrosivity and reactivity	Sample composited from TP-08 (0 - 11 ft bgs) and TP-09 (0 - 9 ft bgs)
TP-09	7	JA56673-10	Grab	TCLP VOC	

Footnotes:
"A" in sample number is assigned by lab to differntiate between bulk and TCLP analysis of same parameter
ft bgs - feet below ground surface
VOC - volatile organic compound
SVOC - semi-volatile organic compound
TAL - target analyte list
GRO - gasoline ranged organics
DRO - diesel ranged organics
PCB - polychlorinated biphenyl
TCLP - toxicity characteristic leaching procedure

Table 2: VOC Soil Analytical Results
USACE Assunpink Creek Restoration Project
Trenton, NJ

Test Pit ID		NJDEP Non-Residential Direct Contact Soil Remediation Standard (mg/kg)	NJDEP Impact to Groundwater Soil Screening Levels (mg/kg)	TP-01	TP-01	TP-01	TP-02	TP-02	TP-02	TP-03	TP-04	TP-05	TP-05	TP-06	TP-07	TP-07	TP-08	TP-09
Sample Depth Interval (ft bgs)				12	0 - 13.5	14	7	2 - 10.5	11	8	13	8	0 - 14	7	0 - 13.5	13.5	4	7
Client Sample ID:				TP010917201012	TP010917201000013.5	TP010917201014	TP020917201007	TP020917201002 10.5	TP020917201011	TP030916201008	TP040916201013	TP050916201008	TP050916201000014	TP060916201007	TP070916201000013.5	TP070916201013.5	TP080917201004	TP090917201007
Lab Sample ID:				JA56673-6	JA56673-7	JA56673-8	JA56673-3	JA56673-4	JA56673-5	JA56673-1	JA56494-6	JA56494-4	JA56494-5	JA56494-3	JA56494-2	JA56494-1	JA56673-11	JA56673-10
Date Sampled:				9/17/2010	9/17/2010	9/17/2010	9/17/2010	9/17/2010	9/17/2010	9/16/2010	9/16/2010	9/16/2010	9/16/2010	9/16/2010	9/16/2010	9/16/2010	9/17/2010	9/17/2010
Matrix:				Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
Volatile Organic Compounds (VOCs)																		
Acetone	mg/kg	NS	12	0.0025 U	NA	0.0308	0.0027 U	NA	0.0033 U	0.0039 U	0.0293	0.0682	NA	0.0021 U	NA	0.0022 U	0.0024 U	0.0024 U
Allyl chloride	mg/kg	NS	NS	0.00098 U	NA	0.0011 U	0.001 U	NA	0.0013 U	0.0015 U	0.0012 U	0.0011 U	NA	0.00081 U	NA	0.00083 U	0.00092 U	0.00094 U
Benzene	mg/kg	5.0	0.005	0.00039 U	NA	0.00044 U	0.00041 U	NA	0.00051 U	0.00059 U	0.00049 U	0.00043 U	NA	0.00032 U	NA	0.00033 U	0.00037 U	0.00037 U
Bromodichloromethane	mg/kg	3.0	0.005	0.00029 U	NA	0.00034 U	0.00031 U	NA	0.00038 U	0.00045 U	0.00037 U	0.00032 U	NA	0.00024 U	NA	0.00025 U	0.00028 U	0.00028 U
Bromoform	mg/kg	280	0.02	0.00017 U	NA	0.0002 U	0.00018 U	NA	0.00023 U	0.00026 U	0.00022 U	0.00019 U	NA	0.00014 U	NA	0.00015 U	0.00016 U	0.00016 U
Bromomethane	mg/kg	59	0.03	0.00046 U	NA	0.00053 U	0.00049 U	NA	0.0006 U	0.0007 U	0.00058 U	0.00051 U	NA	0.00038 U	NA	0.00039 U	0.00043 U	0.00044 U
2-Butanone (MEK)	mg/kg	44,000	0.6	0.0022 U	NA	0.0026 U	0.0024 U	NA	0.0029 U	0.0034 U	0.0028 U	0.0025 U	NA	0.0018 U	NA	0.0019 U	0.0021 U	0.0021 U
Carbon disulfide	mg/kg	110,000	4.0	0.00035 U	NA	0.0004 U	0.00037 U	NA	0.00045 U	0.00053 U	0.00044 U	0.0018 J	NA	0.00029 U	NA	0.00029 U	0.00033 U	0.00033 U
Carbon tetrachloride	mg/kg	2.0	0.005	0.00063 U	NA	0.00072 U	0.00067 U	NA	0.00083 U	0.00097 U	0.00079 U	0.0007 U	NA	0.00052 U	NA	0.00054 U	0.0006 U	0.0006 U
Chlorobenzene	mg/kg	7,400	0.4	0.00039 U	NA	0.00044 U	0.00041 U	NA	0.00051 U	0.00059 U	0.00048 U	0.00043 U	NA	0.00032 U	NA	0.00033 U	0.00036 U	0.00037 U
Chloroethane	mg/kg	1,100	NS	0.0011 U	NA	0.0013 U	0.0012 U	NA	0.0015 U	0.0017 U	0.0014 U	0.0013 U	NA	0.00094 U	NA	0.00097 U	0.0011 U	0.0011 U
Chloroform	mg/kg	2.0	0.2	0.00036 U	NA	0.00041 U	0.00039 U	NA	0.00047 U	0.00055 U	0.00045 U	0.0004 U	NA	0.0003 U	NA	0.00031 U	0.0005 J	0.00035 U
Chloromethane	mg/kg	12	NS	0.00019 U	NA	0.00022 U	0.0002 U	NA	0.00025 U	0.00029 U	0.00024 U	0.00021 U	NA	0.00015 U	NA	0.00016 U	0.00018 U	0.00018 U
Dibromochloromethane	mg/kg	8.0	0.005	0.00013 U	NA	0.00014 U	0.00013 U	NA	0.00016 U	0.00019 U	0.00016 U	0.00014 U	NA	0.0001 U	NA	0.00011 U	0.00012 U	0.00012 U
1,1-Dichloroethane	mg/kg	24	0.2	0.00016 U	NA	0.00018 U	0.00017 U	NA	0.00021 U	0.00024 U	0.0002 U	0.00017 U	NA	0.00013 U	NA	0.00013 U	0.00015 U	0.00015 U
1,2-Dichloroethane	mg/kg	3.0	0.005	0.00039 U	NA	0.00045 U	0.00042 U	NA	0.00051 U	0.0006 U	0.00049 U	0.00043 U	NA	0.00032 U	NA	0.00033 U	0.00037 U	0.00038 U
1,1-Dichloroethene	mg/kg	150	0.005	0.00075 U	NA	0.00086 U	0.0008 U	NA	0.00099 U	0.0012 U	0.00095 U	0.00083 U	NA	0.00062 U	NA	0.00064 U	0.00071 U	0.00072 U
cis-1,2-Dichloroethene	mg/kg	560	0.2	0.00027 U	NA	0.00031 U	0.00029 U	NA	0.00036 U	0.00042 U	0.00034 U	0.0003 U	NA	0.00022 U	NA	0.00023 U	0.00026 U	0.00026 U
trans-1,2-Dichloroethene	mg/kg	720	0.400	0.00051 U	NA	0.00059 U	0.00054 U	NA	0.00067 U	0.00078 U	0.00064 U	0.00056 U	NA	0.00042 U	NA	0.00043 U	0.00048 U	0.00049 U
1,2-Dichloroethene (total)	mg/kg	NS	NS	0.00027 U	NA	0.00031 U	0.00029 U	NA	0.00036 U	0.00042 U	0.00034 U	0.0003 U	NA	0.00022 U	NA	0.00023 U	0.00026 U	0.00026 U
1,2-Dichloropropane	mg/kg	5.0	0.005	0.00015 U	NA	0.00017 U	0.00016 U	NA	0.00019 U	0.00023 U	0.00019 U	0.00016 U	NA	0.00012 U	NA	0.00013 U	0.00014 U	0.00014 U
cis-1,3-Dichloropropene	mg/kg	7.0	0.005	0.00015 U	NA	0.00017 U	0.00016 U	NA	0.0002 U	0.00023 U	0.00019 U	0.00017 U	NA	0.00012 U	NA	0.00013 U	0.00014 U	0.00014 U
trans-1,3-Dichloropropene	mg/kg	7.0	0.005	0.00011 U	NA	0.00013 U	0.00012 U	NA	0.00014 U	0.00017 U	0.00014 U	0.00012 U	NA	0.00009 U	NA	0.000093 U	0.0001 U	0.0001 U
Epichlorohydrin	mg/kg	NS	NS	0.002 U	NA	0.0023 U	0.0021 U	NA	0.0026 U	0.003 U	0.0025 U	0.0022 U	NA	0.0016 U	NA	0.0017 U	0.0019 U	0.0019 U
Ethylbenzene	mg/kg	110,000	8.0	0.00042 U	NA	0.00048 U	0.00045 U	NA	0.00055 U	0.00065 U	0.00053 U	0.00047 U	NA	0.00035 U	NA	0.00036 U	0.0004 U	0.0004 U
2-Hexanone	mg/kg	NS	NS	0.0011 U	NA	0.0013 U	0.0012 U	NA	0.0014 U	0.0017 U	0.0014 U	0.0012 U	NA	0.0009 U	NA	0.00093 U	0.001 U	0.001 U
4-Methyl-2-pentanone(MIBK)	mg/kg	NS	NS	0.00092 U	NA	0.0011 U	0.00098 U	NA	0.0012 U	0.0014 U	0.0012 U	0.001 U	NA	0.00076 U	NA	0.00078 U	0.00087 U	0.00088 U
Methylene chloride	mg/kg	97	0.007	0.00025 U	NA	0.00029 U	0.00027 U	NA	0.00033 U	0.00039 U	0.00032 U	0.011	NA	0.00021 U	NA	0.0033 J	0.00024 U	0.00024 U
Styrene	mg/kg	260	2.0	0.00012 U	NA	0.00014 U	0.00013 U	NA	0.00016 U	0.00019 U	0.00015 U	0.00013 U	NA	0.0001 U	NA	0.0001 U	0.00011 U	0.00012 U
1,1,2,2-Tetrachloroethane	mg/kg	3.0	0.005	0.00033 U	NA	0.00038 U	0.00036 U	NA	0.00044 U	0.00051 U	0.00042 U	0.00037 U	NA	0.00027 U	NA	0.00028 U	0.00031 U	0.00032 U
Tetrachloroethene	mg/kg	5.0	0.005	0.00017 U	NA	0.0014 J	0.00018 U	NA	0.00022 U	0.00025 U	0.00021 U	0.00018 U	NA	0.00014 U	NA	0.00014 U	0.00024 J	0.00035 J
Toluene	mg/kg	91,000	4.0	0.00033 U	NA	0.00038 U	0.00035 U	NA	0.00044 U	0.00051 U	0.00042 U	0.00037 U	NA	0.00027 U	NA	0.00028 U	0.00031 U	0.00032 U
1,1,1-Trichloroethane	mg/kg	4,200	0.20	0.00015 U	NA	0.00017 U	0.00016 U	NA	0.00019 U	0.00022 U	0.00018 U	0.00016 U	NA	0.00012 U	NA	0.00012 U	0.00014 U	0.00014 U
1,1,2-Trichloroethane	mg/kg	6.0	0.010	0.00021 U	NA	0.00024 U	0.00022 U	NA	0.00028 U	0.00032 U	0.00026 U	0.00023 U	NA	0.00017 U	NA	0.00018 U	0.0002 U	0.0002 U
Trichloroethene	mg/kg	20	0.007	0.0006 U	NA	0.00069 U	0.00064 U	NA	0.00078 U	0.00092 U	0.00075 U	0.00066 U	NA	0.00049 U	NA	0.00051 U	0.00056 U	0.00057 U
Vinyl chloride	mg/kg	2.0	0.005	0.0002 U	NA	0.00023 U	0.00022 U	NA	0.00027 U	0.00031 U	0.00025 U	0.00022 U	NA	0.00017 U	NA	0.00017 U	0.00019 U	0.00019 U
Xylene (total)	mg/kg	170,000	12	0.00053 U	NA	0.00061 U	0.00057 U	NA	0.00085 J	0.00082 U	0.00067 U	0.00059 U	NA	0.00044 U	NA	0.00045 U	0.0005 U	0.00051 U
VOC TENTATIVELY IDENTIFIED COMPOUNDS																		
Total TIC, Volatile	mg/kg	NS	NS	0	NA	12.74	0	NA	0.3066	0	0	0.0069	NA	0	NA	0	0	0
VOCs																		
TPH-GRO (C6-C10)	mg/kg	NS	NS	NA	3.0 U	55.4	NA	3.3 U	4.4 U	3.8 U	4.8 U	NA	4.8 U	3.1 U	3.4 U	NA	3.4 U	3.4 U
General Chemistry																		
Moisture, Percent	%	NS	NS	8.6	8.7	26.3	14.1	14.1	27.1	20.4	31.4	15.4	31.6	11.2	14.8	13.7	15.3	15

Footnotes:
ft bgs - feet below ground surface
U - result < listed method detection limit
Non-detected results are reported to the method detection limit
J - estimated result
NS- No standard NA - Not analyzed
TPH-GRO - total petroleum hydrocarbons - gasoline ranged organics
mg/kg - Milligram per Kilogram
BOLD - Value exceeds NJDEP Non-Residential Direct Contact Soil Remediation Standard (6/08)
Value exceeds NJDEP Impact to Groundwater Soil Screening Level (12/08)

Table 3: SVOC Soil Analytical Results
USACE Assunpink Creek Restoration Project
Trenton, NJ

Test Pit ID Sample Depth Interval (ft bgs) Client Sample ID: Lab Sample ID: Date Sampled: Matrix:		NJDEP Non-Residential Direct Contact Soil Remediation Standard (mg/kg)	NJDEP Impact to Groundwater Soil Screening Levels (mg/kg)	TP-01 0 - 13.5 TP010917201000013.5 JA56673-7 9/17/2010 Soil	TP-01 14 TP010917201014 JA56673-8 9/17/2010 Soil	TP-02 2 - 10.5 TP020917201002 10.5 JA56673-4 9/17/2010 Soil	TP-02 11 TP020917201011 JA56673-5 9/17/2010 Soil	TP-03 8 TP030916201008 JA56673-1 9/16/2010 Soil	TP-04 13 TP040916201013 JA56494-6 9/16/2010 Soil	TP-05 0 - 14 TP050916201000014 JA56494-5 9/16/2010 Soil	TP-06 7 TP060916201007 JA56494-3 9/16/2010 Soil	TP-07 0 - 13.5 TP070916201000013.5 JA56494-2 9/16/2010 Soil	TP-08 4 TP080917201004 JA56673-11 9/17/2010 Soil	TP-09 7 TP090917201007 JA56673-10 9/17/2010 Soil
Semi-Volatile Organic Compounds (SVOCs)														
Benzoic acid	mg/kg	NS	NS	0.056 U	0.069 U	0.06 U	0.071 U	0.064 U	0.075 U	0.076 U	0.058 U	0.061 U	0.061 U	0.061 U
2-Chlorophenol	mg/kg	2,200	0.05	0.031 U	0.038 U	0.033 U	0.039 U	0.035 U	0.042 U	0.042 U	0.032 U	0.034 U	0.034 U	0.034 U
4-Chloro-3-methyl phenol	mg/kg	NS	NS	0.031 U	0.038 U	0.033 U	0.039 U	0.035 U	0.041 U	0.042 U	0.032 U	0.034 U	0.034 U	0.033 U
2,4-Dichlorophenol	mg/kg	2,100	0.20	0.05 U	0.061 U	0.053 U	0.063 U	0.056 U	0.066 U	0.067 U	0.051 U	0.054 U	0.054 U	0.054 U
2,4-Dimethylphenol	mg/kg	14,000	0.70	0.052 U	0.063 U	0.055 U	0.065 U	0.059 U	0.069 U	0.07 U	0.053 U	0.056 U	0.056 U	0.056 U
2,4-Dinitrophenol	mg/kg	1,400	0.30	0.038 U	0.046 U	0.04 U	0.047 U	0.043 U	0.05 U	0.051 U	0.039 U	0.041 U	0.041 U	0.041 U
4,6-Dinitro-o-cresol	mg/kg	68	0.30	0.038 U	0.046 U	0.04 U	0.047 U	0.043 U	0.05 U	0.051 U	0.039 U	0.041 U	0.041 U	0.041 U
2-Methylphenol	mg/kg	3,400	NS	0.035 U	0.043 U	0.038 U	0.044 U	0.04 U	0.047 U	0.047 U	0.036 U	0.038 U	0.038 U	0.038 U
3&4-Methylphenol	mg/kg	NS	NS	0.039 U	0.048 U	0.042 U	0.049 U	0.044 U	0.052 U	0.053 U	0.04 U	0.043 U	0.043 U	0.042 U
2-Nitrophenol	mg/kg	NS	NS	0.033 U	0.04 U	0.035 U	0.041 U	0.037 U	0.044 U	0.044 U	0.034 U	0.036 U	0.036 U	0.035 U
4-Nitrophenol	mg/kg	NS	NS	0.052 U	0.064 U	0.056 U	0.066 U	0.059 U	0.07 U	0.07 U	0.053 U	0.057 U	0.057 U	0.056 U
Pentachlorophenol	mg/kg	10	0.30	0.053 U	0.065 U	0.056 U	0.066 U	0.06 U	0.07 U	0.071 U	0.054 U	0.057 U	0.057 U	0.057 U
Phenol	mg/kg	210,000	5.0	0.033 U	0.04 U	0.035 U	0.041 U	0.037 U	0.043 U	0.044 U	0.033 U	0.035 U	0.035 U	0.035 U
2,4,5-Trichlorophenol	mg/kg	68,000	44	0.036 U	0.044 U	0.038 U	0.045 U	0.041 U	0.048 U	0.048 U	0.037 U	0.039 U	0.039 U	0.039 U
2,4,6-Trichlorophenol	mg/kg	74	0.20	0.029 U	0.036 U	0.031 U	0.037 U	0.033 U	0.039 U	0.039 U	0.03 U	0.032 U	0.032 U	0.031 U
Acenaphthene	mg/kg	37,000	74	0.325	0.306	0.143	0.348	0.14	0.134	0.4	0.0717	0.0235 J	0.0097 U	0.0097 U
Acenaphthylene	mg/kg	300,000	NS	0.321	0.012 U	0.361	0.495	0.154	0.326	0.0672	0.136	0.0402	0.011 U	0.0136 J
Anthracene	mg/kg	30,000	1,500	1.25	0.158	0.731	1.21	0.663	0.593	0.962	0.319	0.122	0.012 U	0.012 U
Benzo(a)anthracene	mg/kg	2.00	0.50	**2.67**	0.463	**2.05**	**2.69**	1.58	1.63	1.21	0.805	0.297	0.011 U	0.0249 J
Benzo(a)pyrene	mg/kg	0.20	0.20	**2.08**	**0.449**	**1.74**	**2.3**	**1.36**	**1.5**	**0.974**	**0.767**	**0.32**	0.01 U	0.057
Benzo(b)fluoranthene	mg/kg	2.00	2.0	**4.09**	0.644	**2.12**	**3.04**	**2.24**	**2.04**	1.41	1.06	0.44	0.011 U	0.0851
Benzo(g,h,i)perylene	mg/kg	30,000	NS	1.37	0.308	1.11	1.52	0.822	0.987	0.557	0.515	0.219	0.012 U	0.0475
Benzo(k)fluoranthene	mg/kg	23	16	0.853	0.195	1	1.06	0.36	0.616	0.317	0.397	0.184	0.013 U	0.0219 J
4-Bromophenyl phenyl ether	mg/kg	NS	NS	0.011 U	0.014 U	0.012 U	0.014 U	0.013 U	0.015 U	0.015 U	0.011 U	0.012 U	0.012 U	0.012 U
Butyl benzyl phthalate	mg/kg	14,000	150	0.211	0.022 U	0.019 U	0.0707 J	0.0715	0.124	0.0517 J	0.0539 J	0.0597 J	0.019 U	0.019 U
2-Chloronaphthalene	mg/kg	NS	NS	0.0096 U	0.012 U	0.01 U	0.012 U	0.011 U	0.013 U	0.013 U	0.0098 U	0.01 U	0.01 U	0.01 U
4-Chloroaniline	mg/kg	NS	NS	0.0099 U	0.012 U	0.011 U	0.012 U	0.011 U	0.013 U	0.013 U	0.01 U	0.011 U	0.011 U	0.011 U
Carbazole	mg/kg	96	NS	0.489	0.017 U	0.236	0.511	0.212	0.198	0.308	0.0958	0.0342 J	0.016 U	0.015 U
Chrysene	mg/kg	230	52	2.47	0.497	2.05	2.61	1.57	1.63	1.17	0.846	0.37	0.011 U	0.0486
bis(2-Chloroethoxy)methane	mg/kg	NS	NS	0.013 U	0.015 U	0.013 U	0.016 U	0.014 U	0.017 U	0.017 U	0.013 U	0.014 U	0.014 U	0.013 U
bis(2-Chloroethyl)ether	mg/kg	2.00	0.20	0.0093 U	0.011 U	0.0099 U	0.012 U	0.011 U	0.012 U	0.013 U	0.0095 U	0.01 U	0.01 U	0.01 U
bis(2-Chloroisopropyl)ether	mg/kg	67	3.0	0.0092 U	0.011 U	0.0098 U	0.012 U	0.01 U	0.012 U	0.012 U	0.0094 U	0.01 U	0.01 U	0.0099 U
4-Chlorophenyl phenyl ether	mg/kg	NS	NS	0.0093 U	0.011 U	0.0099 U	0.012 U	0.011 U	0.012 U	0.013 U	0.0095 U	0.01 U	0.01 U	0.01 U
1,2-Dichlorobenzene	mg/kg	59,000	11	0.0089 U	0.011 U	0.0095 U	0.011 U	0.01 U	0.012 U	0.012 U	0.0091 U	0.0097 U	0.0097 U	0.0096 U
1,3-Dichlorobenzene	mg/kg	59,000	12	0.0083 U	0.01 U	0.0088 U	0.01 U	0.0094 U	0.011 U	0.011 U	0.0085 U	0.009 U	0.009 U	0.0089 U
1,4-Dichlorobenzene	mg/kg	13	1.0	0.0069 U	0.0084 U	0.0074 U	0.0087 U	0.0078 U	0.0092 U	0.0093 U	0.0071 U	0.0075 U	0.0075 U	0.0074 U
2,4-Dinitrotoluene	mg/kg	3.00	NS	0.014 U	0.017 U	0.014 U	0.017 U	0.015 U	0.018 U	0.018 U	0.014 U	0.015 U	0.015 U	0.015 U
2,6-Dinitrotoluene	mg/kg	3.00	NS	0.012 U	0.014 U	0.013 U	0.015 U	0.013 U	0.016 U	0.016 U	0.012 U	0.013 U	0.013 U	0.013 U
3,3'-Dichlorobenzidine	mg/kg	4.00	0.20	0.0079 U	0.0096 U	0.0084 U	0.0099 U	0.0089 U	0.01 U	0.011 U	0.008 U	0.0085 U	0.0085 U	0.0085 U
Dibenzo(a,h)anthracene	mg/kg	0.20	0.50	**0.801**	0.161	**0.617**	**0.841**	**0.444**	**0.519**	**0.322**	**0.251**	0.0776	0.011 U	0.011 U
Dibenzofuran	mg/kg	NS	NS	0.253	0.011 U	0.0932	0.212	0.0772	0.073 J	0.291	0.0284 J	0.01 U	0.01 U	0.0099 U
Di-n-butyl phthalate	mg/kg	68,000	620	0.0069 U	0.0084 U	0.0073 U	0.0086 U	0.0078 U	0.0091 U	0.0092 U	0.007 U	0.0074 U	0.0074 U	0.0074 U
Di-n-octyl phthalate	mg/kg	27,000	3,300	0.015 U	0.018 U	0.016 U	0.019 U	0.017 U	0.02 U	0.02 U	0.015 U	0.016 U	0.016 U	0.016 U
Diethyl phthalate	mg/kg	550,000	57	0.011 U	0.013 U	0.011 U	0.013 U	0.012 U	0.014 U	0.014 U	0.011 U	0.011 U	0.011 U	0.011 U
Dimethyl phthalate	mg/kg	NS	NS	0.011 U	0.013 U	0.0672	0.0472 J	0.0444 J	0.014 U	0.015 U	0.011 U	0.012 U	0.012 U	0.0334 J
bis(2-Ethylhexyl)phthalate	mg/kg	140	790	0.161	0.131	0.104	0.132	0.154	2.22	0.15	0.272	0.267	0.03 U	0.029 U
Fluoranthene	mg/kg	24,000	840	7.06	1.02	4.65	5.84	3.41	3.04	2.62	1.64	0.688	0.015 U	0.102
Fluorene	mg/kg	24,000	110	0.443	0.54	0.253	0.538	0.172	0.203	0.38	0.0749	0.0217 J	0.011 U	0.011 U
Hexachlorobenzene	mg/kg	1.0	0.20	0.01 U	0.012 U	0.011 U	0.013 U	0.011 U	0.013 U	0.014 U	0.01 U	0.011 U	0.011 U	0.011 U
Hexachlorobutadiene	mg/kg	25	0.60	0.0086 U	0.011 U	0.0092 U	0.011 U	0.0097 U	0.011 U	0.012 U	0.0088 U	0.0093 U	0.0093 U	0.0093 U
Hexachlorocyclopentadiene	mg/kg	110	210	0.032 U	0.039 U	0.034 U	0.04 U	0.036 U	0.042 U	0.042 U	0.032 U	0.034 U	0.034 U	0.034 U
Hexachloroethane	mg/kg	140	0.20	0.0086 U	0.011 U	0.0092 U	0.011 U	0.0097 U	0.011 U	0.012 U	0.0088 U	0.0093 U	0.0093 U	0.0093 U
Indeno(1,2,3-cd)pyrene	mg/kg	2.0	5.0	1.33	0.302	1.08	1.43	0.822	0.9	0.531	0.467	0.199	0.012 U	0.0415
Isophorone	mg/kg	2,000	0.20	0.0083 U	0.01 U	0.0089 U	0.01 U	0.0094 U	0.011 U	0.011 U	0.0085 U	0.009 U	0.009 U	0.009 U
2-Methylnaphthalene	mg/kg	2,400	5.0	0.115	0.021 U	0.0385 J	0.142	0.0212 J	0.0372 J	0.127	0.018 U	0.019 U	0.019 U	0.019 U
2-Nitroaniline	mg/kg	23,000	NS	0.014 U	0.017 U	0.015 U	0.017 U	0.015 U	0.018 U	0.018 U	0.014 U	0.015 U	0.015 U	0.015 U
3-Nitroaniline	mg/kg	NS	NS	0.012 U	0.015 U	0.013 U	0.016 U	0.014 U	0.016 U	0.017 U	0.013 U	0.013 U	0.013 U	0.013 U
4-Nitroaniline	mg/kg	NS	NS	0.012 U	0.015 U	0.013 U	0.015 U	0.014 U	0.016 U	0.016 U	0.012 U	0.013 U	0.013 U	0.013 U
Naphthalene	mg/kg	17	16	0.228	0.01 U	0.0674	0.259	0.0269 J	0.0685	0.208	0.0197 J	0.0092 U	0.0092 U	0.0091 U
Nitrobenzene	mg/kg	340	0.20	0.009 U	0.011 U	0.0095 U	0.011 U	0.01 U	0.012 U	0.012 U	0.0091 U	0.0097 U	0.0097 U	0.0096 U
N-Nitroso-di-n-propylamine	mg/kg	0.30	0.20	0.0076 U	0.0092 U	0.008 U	0.0095 U	0.0085 U	0.01 U	0.01 U	0.0077 U	0.0082 U	0.0082 U	0.0081 U
N-Nitrosodiphenylamine	mg/kg	390	0.20	0.019 U	0.023 U	0.02 U	0.023 U	0.021 U	0.025 U	0.025 U	0.019 U	0.02 U	0.02 U	0.02 U
Phenanthrene	mg/kg	300,000	NS	4.84	1.24	2.67	3.52	2.19	1.85	2.87	0.889	0.351	0.015 U	0.0479
Pyrene	mg/kg	18,000	550	5.85	1.46	4.1	5.35	3.15	3	2.22	1.53	0.619	0.013 U	0.111
1,2,4-Trichlorobenzene	mg/kg	820	0.40	0.0083 U	0.01 U	0.0088 U	0.01 U	0.0093 U	0.011 U	0.011 U	0.0084 U	0.0089 U	0.0089 U	0.0089 U
SVOC TENTATIVELY IDENTIFIED COMPOUNDS														
Total TIC, Semi-Volatile	mg/kg	NS	NS	10.42	190.7	7.09	12.07	3.98	6.44	10.16	1.43	0.17	0	0
SVOCs														
TPH-DRO (C10-C28)	mg/kg	54,000	NS	89.3	3,530	77.8	159	44.2	147	65.6	83.9	24.2	3.4 U	3.4 U

Footnotes:
ft bgs - feet below ground surface
U - result < listed method detection limit
Non-detected results are reported to the method detection limit
J - estimated result
NS- No standard NA - Not analyzed

TPH-DRO - total petroleum hydrocarbons - diesel ranged organics
mg/kg - Milligram per Kilogram
BOLD - Value exceeds NJDEP Non-Residential Direct Contact Soil Remediation Standard (6/08)
Value exceeds NJDEP Impact to Groundwater Soil Screening Level (12/08)

Table 4: Pesticide, Herbicide, and PCB Soil Analytical Results
USACE Assunpink Creek Restoration Project
Trenton, NJ

Test Pit ID		NJDEP Non-Residential Direct Contact Soil Remediation Standard (mg/kg)	NJDEP Impact to Groundwater Soil Screening Levels (mg/kg)	TP-01	TP-01	TP-02	TP-02	TP-03	TP-04	TP-05	TP-06	TP-07	TP-08	TP-09
Sample Depth Interval (ft bgs)				0 - 13.5	14	2 - 10.5	11	8	13	0 - 14	7	0 - 13.5	4	7
Client Sample ID:				TP01091720100013.5	TP010917201014	TP020917201002 10.5	TP020917201011	TP030916201008	TP040916201013	TP05091620100014	TP060916201007	TP070916201000 13.5	TP080917201004	TP090917201007
Lab Sample ID:				JA56673-7	JA56673-8	JA56673-4	JA56673-5	JA56673-1	JA56494-6	JA56494-5	JA56494-3R	JA56494-2	JA56673-11	JA56673-10
Date Sampled:				9/17/2010	9/17/2010	9/17/2010	9/17/2010	9/16/2010	9/16/2010	9/16/2010	9/16/2010	9/16/2010	9/17/2010	9/17/2010
Matrix:				Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
Pesticides														
Aldrin	mg/kg	0.20	0.10	0.00058 U	0.0007 U	0.00061 U	0.00072 U	0.00065 U	0.00077 U	0.00077 U	0.00059 U	0.00062 U	0.00062 U	0.00062 U
alpha-BHC	mg/kg	0.50	0.002	0.0004 U	0.00048 U	0.00042 U	0.00049 U	0.00045 U	0.00053 U	0.00053 U	0.00041 U	0.00043 U	0.00043 U	0.00043 U
beta-BHC	mg/kg	2.0	0.002	0.00062 U	0.00076 U	0.00066 U	0.00078 U	0.00071 U	0.00083 U	0.00083 U	0.00064 U	0.00067 U	0.00067 U	0.00067 U
delta-BHC	mg/kg	NS	NS	0.00035 U	0.00043 U	0.00037 U	0.00044 U	0.0004 U	0.00047 U	0.00047 U	0.00036 U	0.00038 U	0.00038 U	0.00038 U
gamma-BHC (Lindane)	mg/kg	2.0	0.002	0.0004 U	0.00048 U	0.00042 U	0.00049 U	0.00045 U	0.00053 U	0.00053 U	0.00041 U	0.00043 U	0.00043 U	0.00043 U
alpha-Chlordane	mg/kg	NS	NS	0.00043 U	0.00053 U	0.00046 U	0.00054 U	0.00049 U	0.00058 U	0.00058 U	0.0019	0.00046 U	0.00046 U	0.00047 U
Dieldrin	mg/kg	0.20	0.003	0.00043 U	0.00053 U	0.00046 U	0.00054 U	0.00049 U	0.0034	0.00058 U	0.0019	0.0025	0.00046 U	0.00047 U
4,4'-DDD	mg/kg	13	3.0	0.00055 U	0.00067 U	0.0049	0.0026	0.0017	0.0053	0.0032	0.0021	0.0024	0.00059 U	0.00059 U
4,4'-DDE	mg/kg	9.0	12	0.00045 U	0.00054 U	0.00047 U	0.00056 U	0.00051 U	0.00059 U	0.0006 U	0.0017	0.0022	0.00048 U	0.00048 U
4,4'-DDT	mg/kg	8.0	7.0	0.0192	0.0021	0.0089	0.00067 U	0.00061 U	0.0076	0.0036	0.0128	0.0104	0.00058 U	0.00058 U
Endrin	mg/kg	340	0.6	0.00045 U	0.00054 U	0.00047 U	0.00056 U	0.00051 U	0.00059 U	0.0006 U	0.00046 U	0.00048 U	0.00048 U	0.00048 U
Endosulfan sulfate	mg/kg	6800	1.0	0.00049 U	0.0006 U	0.00052 U	0.00061 U	0.00056 U	0.00065 U	0.0034	0.00051 U	0.00053 U	0.00053 U	0.00053 U
Endrin aldehyde	mg/kg	NS	NS	0.0006 U	0.00073 U	0.00063 U	0.00075 U	0.00068 U	0.0008 U	0.002	0.00062 U	0.00065 U	0.00065 U	0.00065 U
Endosulfan-I	mg/kg	6800	2.0	0.00044 U	0.00054 U	0.00046 U	0.00055 U	0.0005 U	0.00059 U	0.00059 U	0.00045 U	0.00047 U	0.00047 U	0.00047 U
Endosulfan-II	mg/kg	6800	2.0	0.00049 U	0.0006 U	0.00052 U	0.00061 U	0.00056 U	0.00065 U	0.00066 U	0.00051 U	0.00053 U	0.00053 U	0.00053 U
Heptachlor	mg/kg	0.70	0.30	0.00058 U	0.00071 U	0.00061 U	0.00072 U	0.00066 U	0.00077 U	0.00077 U	0.0006 U	0.00062 U	0.00062 U	0.00062 U
Methoxychlor	mg/kg	5700	100	0.00057 U	0.0007 U	0.0006 U	0.00071 U	0.00065 U	0.00076 U	0.00077 U	0.00059 U	0.00062 U	0.00062 U	0.00062 U
Toxaphene	mg/kg	3.0	0.20	0.015 U	0.018 U	0.016 U	0.019 U	0.017 U	0.02 U	0.02 U	0.015 U	0.016 U	0.016 U	0.016 U
Herbicides														
2,4-D	mg/kg	NS	NS	0.005 U	0.0062 U	0.0053 U	0.0062 U	0.0057 U	0.0066 U	0.0067 U	NA	0.0054 U	0.0054 U	0.0054 U
2,4,5-TP (Silvex)	mg/kg	NS	NS	0.0006 U	0.00074 U	0.00063 U	0.00075 U	0.00069 U	0.0008 U	0.0008 U	NA	0.00064 U	0.00065 U	0.00065 U
2,4,5-T	mg/kg	NS	NS	0.0012 U	0.0015 U	0.0013 U	0.0015 U	0.0014 U	0.0016 U	0.0016 U	NA	0.0013 U	0.0013 U	0.0013 U
Dalapon	mg/kg	NS	NS	0.0022 U	0.0027 U	0.0023 U	0.0027 U	0.0025 U	0.0029 U	0.0029 U	NA	0.0023 U	0.0024 U	0.0023 U
Dicamba	mg/kg	NS	NS	0.0016 U	0.002 U	0.0017 U	0.002 U	0.0018 U	0.0021 U	0.0021 U	NA	0.0017 U	0.0017 U	0.0017 U
Dichloroprop	mg/kg	NS	NS	0.0072 U	0.0089 U	0.0076 U	0.009 U	0.0083 U	0.0096 U	0.0096 U	NA	0.0077 U	0.0078 U	0.0078 U
Dinoseb	mg/kg	NS	NS	0.0042 U	0.0052 U	0.0044 U	0.0052 U	0.0048 U	0.0055 U	0.0056 U	NA	0.0045 U	0.0045 U	0.0045 U
MCPA	mg/kg	NS	NS	0.77 U	0.95 U	0.81 U	0.96 U	0.89 U	1 U	1 U	NA	0.83 U	0.83 U	0.83 U
MCPP	mg/kg	NS	NS	0.38 U	0.47 U	0.4 U	0.48 U	0.44 U	0.51 U	0.51 U	NA	0.41 U	0.41 U	0.41 U
Pentachlorophenol	mg/kg	10	0.30	0.0003 U	0.00038 U	0.00032 U	0.00038 U	0.00035 U	0.00041 U	0.00041 U	NA	0.00033 U	0.00033 U	0.00033 U
2,4-DB	mg/kg	NS	NS	0.0068 U	0.0084 U	0.0071 U	0.0085 U	0.0078 U	0.009 U	0.009 U	NA	0.0073 U	0.0073 U	0.0073 U
Polychlorinated biphenyls (PCBs)														
Aroclor 1016	mg/kg	1.0	0.20	0.011 U	0.014 U	0.012 U	0.014 U	0.013 U	0.015 U	0.015 U	NA	0.012 U	0.012 U	0.012 U
Aroclor 1221	mg/kg	1.0	0.20	0.021 U	0.026 U	0.022 U	0.027 U	0.024 U	0.028 U	0.028 U	NA	0.023 U	0.023 U	0.023 U
Aroclor 1232	mg/kg	1.0	0.20	0.01 U	0.013 U	0.011 U	0.013 U	0.012 U	0.014 U	0.014 U	NA	0.011 U	0.011 U	0.011 U
Aroclor 1242	mg/kg	1.0	0.20	0.011 U	0.014 U	0.012 U	0.014 U	0.013 U	0.015 U	0.015 U	NA	0.012 U	0.012 U	0.012 U
Aroclor 1248	mg/kg	1.0	0.20	0.0063 U	0.0078 U	0.0067 U	0.008 U	0.0073 U	0.0085 U	0.0085 U	NA	0.0068 U	0.0068 U	0.0069 U
Aroclor 1254	mg/kg	1.0	0.20	0.287	0.0099 U	0.0085 U	0.01 U	0.0093 U	0.011 U	0.011 U	NA	0.0087 U	0.0087 U	0.0087 U
Aroclor 1260	mg/kg	1.0	0.20	0.0895	0.015 U	0.121	0.016 U	0.014 U	0.118	0.017 U	NA	0.013 U	0.013 U	0.013 U

Footnotes:
ft bgs - feet below ground surface
U - result < listed method detection limit
Non-detected results are reported to the method detection limit
J - estimated result
NS- No standard NA - Not analyzed
ug/kg - Microgram per Kilogram
BOLD - Value exceeds NJDEP Non-Residential Direct Contact Soil Remediation Standard (6/08)
Value exceeds NJDEP Impact to Groundwater Soil Screening Level (12/08)

Table 5: Metal Soil Analytical Results
USACE Assunpink Creek Restoration Project
Trenton, NJ

Test Pit ID Sample Depth Interval (ft bgs) Client Sample ID: Lab Sample ID: Date Sampled: Matrix:		NJDEP Non-Residential Direct Contact Soil Remediation Standard (mg/kg)	NJDEP Impact to Groundwater Soil Screening Levels (mg/kg)	TP-01 0 - 13.5 TP01091720100013.5 JA56673-7 9/17/2010 Soil	TP-01 14 TP010917201014 JA56673-8 9/17/2010 Soil	TP-02 2 - 10.5 TP02091720100210.5 JA56673-4 9/17/2010 Soil	TP-02 11 TP020917201011 JA56673-5 9/17/2010 Soil	TP-03 8 TP030916201008 JA56673-1 9/16/2010 Soil	TP-04 13 TP040916201013 JA56494-6 9/16/2010 Soil	TP-05 0 - 14 TP050916201000014 JA56494-5A 9/16/2010 Soil	TP-06 7 TP060916201007 JA56494-3A 9/16/2010 Soil	TP-07 0 - 13.5 TP070916201000013.5 JA56494-2 9/16/2010 Soil	TP-08 4 TP080917201004 JA56673-11 9/17/2010 Soil	TP-09 7 TP090917201007 JA56673-10 9/17/2010 Soil
Metals														
Aluminum	mg/kg	NS	3,900	9,420	5,090	7,950	7,290	10,700	7,950	8,700	7,890	10,300	12,400	6,660
Antimony	mg/kg	450	6	1.0 B	0.64 B	1.2 B	3.1	2.4 B	4.6	1.5 B	0.75 B	0.55 B	0.41 U	2.6
Arsenic	mg/kg	19	19	7.1	4	8.6	12.9	8.4	9.7	6	5.6	6.7	5.6	6.7
Barium	mg/kg	59,000	1,300	131	62.9	140	205	222	203	105	116	103	164	118
Beryllium	mg/kg	140	0.5	0.49	0.31	0.51	0.6	0.89	0.51	0.53	0.38	0.59	0.69	0.42
Cadmium	mg/kg	78	1	1.3	0.81	1.5	5.8	0.7	0.92	0.41 B	1.3	0.57 B	0.081 B	0.15 B
Calcium	mg/kg	NS	NS	14,800	55,600	6,930	8,220	9,880	2,490	2,680	8,460	4,830	2,060	1,500
Chromium	mg/kg	NS	NS	50.8	9.6	24.8	70.6	31	22.5	18.1	18.4	17.7	16.9	13
Cobalt	mg/kg	590	59	7.9	3.1 B	8	12.4	12.4	11.8	9.8	8.5	9.5	11.5	5.8
Copper	mg/kg	45,000	7,300	148	34.8	107	325	94.8	165	51.1	70.3	42.3	27.1	57.7
Iron	mg/kg	NS	NS	18,000	9,240	18,800	33,700	26,800	28,100	18,000	18,000	22,500	19,600	11,400
Lead	mg/kg	800	59	615	98.2	286	416	303	616	222	244	157	88	286
Magnesium	mg/kg	NS	NS	3,460	7,360	2,380	3,330	6,940	3,060	3,000	4,510	3,180	4,350	1,480
Manganese	mg/kg	5,900	42	309	264	173	254	281	142	196	254	309	516	168
Mercury	mg/kg	65	0.1	0.88	0.22	0.61	1.1	0.56	1.3	1.1	0.6	0.37	0.36	1.4
Nickel	mg/kg	23,000	31	33.2	10.9	12.9	21.2	19.8	22.4	16.4	25.4	16.3	20.5	9.3
Potassium	mg/kg	NS	NS	836 B	570 B	842 B	1490	3980	1,430 B	1180	1,070 B	1580	2050	890 B
Selenium	mg/kg	5,700	7	0.44 B	0.42 U	0.84 B	2.2 B	0.63 B	2.2 B	0.71 B	0.38 B	0.38 U	0.37 U	0.45 B
Silver	mg/kg	5,700	1	0.48 B	0.070 U	0.24 B	0.076 U	0.070 U	0.080 U	0.056 U	0.063 U	0.064 U	3.3	0.28 B
Sodium	mg/kg	NS	NS	103 B	151 B	143 B	311 B	306 B	285 B	180 B	114 B	126 B	130 B	79.0 B
Thallium	mg/kg	79	3	0.26 B	0.22 U	0.20 B	0.24 U	0.61 B	0.25 U	0.18 U	0.20 U	0.20 U	0.44 B	0.35 B
Vanadium	mg/kg	1,100	NS	20.2	11.2	17.6	18.4	26.8	23.7	17.5	15.1	23.5	16.4	15.3
Zinc	mg/kg	110,000	600	478	160	335	518	295	433	215	364	178	72.2	99.1

Footnotes:
ft bgs - feet below ground surface
B -Indicates a result ≥ method detection limit and < reporting limit
U - result < listed method detection limit
Non-detected results are reported to the method detection limit
J - estimated result
NS- No standard NA - Not analyzed
ug/kg - Microgram per Kilogram
BOLD - Value exceeds NJDEP Non-Residential Direct Contact Soil Remediation Standard (6/08)
Value exceeds NJDEP Impact to Groundwater Soil Screening Level (12/08)

Table 6 - Exceedance Summary
USACE Assunpink Creek REstoration Project
Trenton, NJ

Test Pit ID Sample Depth Interval (ft bgs) Client Sample ID: Lab Sample ID: Date Sampled: Matrix:		NJDEP Non-Residential Direct Contact Soil Remediation Standard (mg/kg)	NJDEP Impact to Groundwater Soil Screening Levels (mg/kg)	TP-01 0 - 13.5 TP01091720100013.5 JA56673-7 9/17/2010 Soil	TP-01 14 TP010917201014 JA56673-8 9/17/2010 Soil	TP-02 2 - 10.5 TP02091720100210.5 JA56673-4 9/17/2010 Soil	TP-02 11 TP020917201011 JA56673-5 9/17/2010 Soil	TP-03 8 TP030916201008 JA56673-1 9/16/2010 Soil	TP-04 13 TP040916201013 JA56494-6 9/16/2010 Soil	TP-05 8 TP050916201008 JA56494-4 9/16/2010 Soil	TP-05 0 - 14 TP05091620100014 JA56494-5A 9/16/2010 Soil	TP-06 7 TP060916201007 JA56494-3A 9/16/2010 Soil	TP-07 0 - 13.5 TP07091620100013.5 JA56494-2 9/16/2010 Soil	TP-08 4 TP080917201004 JA56673-11 9/17/2010 Soil	TP-09 7 TP090917201007 JA56673-10 9/17/2010 Soil
Volatile Organic Compounds (VOCs)															
Methylene chloride	mg/kg	97	0.007	---	---	---	---	---	---	0.011	---	---	---	---	---
Semi-Volatile Organic Compounds (SVOCs)															
Benzo(a)anthracene	mg/kg	2.00	0.50	**2.67**	---	**2.05**	**2.69**	1.58	1.63	---	1.21	0.805	---	---	---
Benzo(a)pyrene	mg/kg	0.20	0.20	**2.08**	**0.449**	**1.74**	**2.3**	**1.36**	**1.5**	---	**0.974**	**0.767**	**0.32**	---	---
Benzo(b)fluoranthene	mg/kg	2.00	2.0	**4.09**	---	**2.12**	**3.04**	**2.24**	**2.04**	---	---	---	---	---	---
Dibenzo(a,h)anthracene	mg/kg	0.20	0.50	**0.801**	---	**0.617**	**0.841**	**0.444**	**0.519**	---	**0.322**	**0.251**	---	---	---
Pesticides															
Dieldrin	mg/kg	0.20	0.003	---	---	---	---	---	0.0034	---	---	---	---	---	---
Polychlorinated biphenyls (PCBs)															
Aroclor 1254	mg/kg	1.0	0.20	0.287	---	---	---	---	---	---	---	---	---	---	---
Metals															
Aluminum	mg/kg	NS	3,900	9420	5090	7950	7290	10700	7950	---	8700	7890	10300	12400	6660
Beryllium	mg/kg	140	0.5	---	---	0.51	0.6	0.89	0.51	---	0.53	---	0.59	0.69	---
Cadmium	mg/kg	78	1.0	1.3	---	1.5	5.8	---	---	---	---	1.3	---	---	---
Lead	mg/kg	800	59	615	98.2	286	416	303	616	---	222	244	157	88	286
Manganese	mg/kg	5,900	42	309	264	173	254	281	142	---	196	254	309	516	168
Mercury	mg/kg	65	0.1	0.88	0.22	0.61	1.1	0.56	1.3	---	1.1	0.6	0.37	0.36	1.4
Nickel	mg/kg	23,000	31	33.2	---	---	---	---	---	---	---	---	---	---	---
Silver	mg/kg	5,700	1	---	---	---	---	---	---	---	---	---	---	3.3	---

Footnotes:
ft bgs - Feet below ground surface
NS - No standard
mg/kg - Milligram per kilogram
BOLD - Value exceeds NJDEP Non-Residential Direct Contact Soil Remediation Standard (6/08)
Value exceeds NJDEP Impact to Groundwater Soil Screening Level (12/08)
--- indicates the result was not in exceedance of the standard or screening level.
Results presented in this table represent all exceedances to the NJDEP Non-Residential Direct Contact Soil Remediation Standard and/or NJDEP Impact to Groundwater Soil Screening Levels as compiled from Tables 2 through 5.

Table 7: Hazardous Waste Characteristics (General Chemistry and TCLP) Soil Analytical Results
USACE Assunpink Creek Restoration Project
Trenton, NJ

Test Pit ID		RCRA Maximum Contaminant Concentrations	TP-01	TP-02	TP-02	TP-03 / TP-04	TP-05	TP-05	TP-06	TP-06 / TP-07	TP-08 / TP-09	TP-09
Sample Depth Interval (ft bgs)			14	11	11	Composite*	8	0 - 14	7	Composite**	Composite***	7
Client Sample ID:			TP010917201014	TP020917201011	TP020917201011	TP03-0409162010	TP05091620100 8	TP05091620100014	TP060916201007	TP06-0709162010	TP08-0909172010	TP090917201007
Lab Sample ID:			JA56673-8A	JA56673-5	JA56673-5A	JA56494-7	JA56494-4	JA56494-5	JA56494-3	JA56494-8	JA56673-12	JA56673-10
Date Sampled:			9/17/2010	9/17/2010	9/17/2010	9/22/2010	9/16/2010	9/16/2010	9/16/2010	9/22/2010	9/17/2010	9/17/2010
Matrix:			Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
General Chemistry												
Corrosivity as pH	SU	< 2 or > 12	7.82 NC	7.93 NC	NA	8.45 NC	NA	8.11 NC	NA	NA	8.15 NC	NA
Cyanide Reactivity	mg/kg	250	1.9 U	1.9 U	NA	4.4 U	NA	2.0 U	NA	NA	1.6 U	NA
Ignitability (Flashpoint)	Deg. F	< 140	> 200	>200	NA	>200	NA	>200	NA	NA	>200	NA
Sulfide Reactivity	mg/kg	500	42 U	80.0 B	NA	165	NA	53.2 B	NA	NA	43.8 B	NA
TCLP VOCs												
Benzene	mg/l	0.5	0.0012 U	NA	0.0012 U	NA	0.0012 U	NA	0.0012 U	NA	0.0012 U	0.0012 U
2-Butanone (MEK)	mg/l	200	0.0081 U	NA	0.0081 U	NA	0.0081 U	NA	0.0081 U	NA	0.0081 U	0.0081 U
Carbon tetrachloride	mg/l	0.5	0.0013 U	NA	0.0013 U	NA	0.0013 U	NA	0.0013 U	NA	0.0013 U	0.0013 U
Chlorobenzene	mg/l	100	0.0019 U	NA	0.0019 U	NA	0.0019 U	NA	0.0019 U	NA	0.0019 U	0.0019 U
Chloroform	mg/l	6.0	0.0012 U	NA	0.0012 U	NA	0.0012 U	NA	0.0012 U	NA	0.0567	0.0816
1,4-Dichlorobenzene	mg/l	7.5	0.0014 U	NA	0.0014 U	NA	0.0014 U	NA	0.0014 U	NA	0.0014 U	0.0014 U
1,2-Dichloroethane	mg/l	0.5	0.0017 U	NA	0.0017 U	NA	0.0017 U	NA	0.0017 U	NA	0.0017 U	0.0017 U
1,1-Dichloroethene	mg/l	0.7	0.002 U	NA	0.002 U	NA	0.002 U	NA	0.002 U	NA	0.002 U	0.002 U
Tetrachloroethene	mg/l	0.7	0.0013 U	NA	0.0013 U	NA	0.0013 U	NA	0.0013 U	NA	0.0013 U	0.0013 U
Trichloroethene	mg/l	0.5	0.0012 U	NA	0.0012 U	NA	0.0012 U	NA	0.0012 U	NA	0.0012 U	0.0012 U
Vinyl chloride	mg/l	0.2	0.0022 U	NA	0.0022 U	NA	0.0022 U	NA	0.0022 U	NA	0.0022 U	0.0022 U
TCLP SVOCs												
2-Methylphenol	mg/l	200	0.011 U	NA	0.011 U	0.011 U	NA	0.011 U	NA	0.011 U	0.011 U	NA
3&4-Methylphenol	mg/l	200	0.01 U	NA	0.01 U	0.01 U	NA	0.01 U	NA	0.01 U	0.01 U	NA
Pentachlorophenol	mg/l	100	0.008 U	NA	0.008 U	0.008 U	NA	0.008 U	NA	0.008 U	0.008 U	NA
2,4,5-Trichlorophenol	mg/l	400	0.013 U	NA	0.013 U	0.013 U	NA	0.013 U	NA	0.013 U	0.013 U	NA
2,4,6-Trichlorophenol	mg/l	2.0	0.012 U	NA	0.012 U	0.012 U	NA	0.012 U	NA	0.012 U	0.012 U	NA
1,4-Dichlorobenzene	mg/l	7.5	0.0039 U	NA	0.0039 U	0.0039 U	NA	0.0039 U	NA	0.0039 U	0.0039 U	NA
2,4-Dinitrotoluene	mg/l	0.1	0.0022 U	NA	0.0022 U	0.0022 U	NA	0.0022 U	NA	0.0022 U	0.0022 U	NA
Hexachlorobenzene	mg/l	0.1	0.0037 U	NA	0.0037 U	0.0037 U	NA	0.0037 U	NA	0.0037 U	0.0037 U	NA
Hexachlorobutadiene	mg/l	0.5	0.0037 U	NA	0.0037 U	0.0037 U	NA	0.0037 U	NA	0.0037 U	0.0037 U	NA
Hexachloroethane	mg/l	3.0	0.0026 U	NA	0.0026 U	0.0026 U	NA	0.0026 U	NA	0.0026 U	0.0026 U	NA
Nitrobenzene	mg/l	2.0	0.0025 U	NA	0.0025 U	0.0025 U	NA	0.0025 U	NA	0.0025 U	0.0025 U	NA
Pyridine	mg/l	5.0	0.0027 U	NA	0.0027 U	0.0027 U	NA	0.0027 U	NA	0.0027 U	0.0027 U	NA
TCLP Pesticides												
gamma-BHC (Lindane)	mg/l	0.4	0.000011 U	NA	0.000011 U	0.000011 U	NA	0.000011 U	NA	0.000011 U	0.000011 U	NA
Chlordane	mg/l	0.03	0.00079 U	NA	0.00079 U	0.00079 U	NA	0.00079 U	NA	0.00079 U	0.00079 U	NA
Endrin	mg/l	0.02	0.000031 U	NA	0.000031 U	0.000031 U	NA	0.000031 U	NA	0.000031 U	0.000031 U	NA
Heptachlor	mg/l	0.008	0.00002 U	NA	0.00002 U	0.00002 U	NA	0.00002 U	NA	0.00002 U	0.00002 U	NA
Heptachlor epoxide	mg/l	0.008	0.000016 U	NA	0.000016 U	0.000016 U	NA	0.000016 U	NA	0.000016 U	0.000016 U	NA
Methoxychlor	mg/l	10.0	0.000068 U	NA	0.000068 U	0.000068 U	NA	0.000068 U	NA	0.000068 U	0.000068 U	NA
Toxaphene	mg/l	0.5	0.0021 U	NA	0.0021 U	0.0021 U	NA	0.0021 U	NA	0.0021 U	0.0021 U	NA
TCLP Herbicides												
2,4-D	mg/l	10.0	0.0013 U	NA	0.0013 U	0.0013 U	NA	0.0013 U	NA	0.0013 U	0.0013 U	NA
2,4,5-TP (Silvex)	mg/l	1.0	0.00018 U	NA	0.00018 U	0.00018 U	NA	0.00018 U	NA	0.00018 U	0.00018 U	NA
TCLP Metals												
Arsenic	mg/l	5.0	0.0090 B	NA	0.015 B	0.011 B	NA	0.041 B	NA	0.0083 B	0.011 B	NA
Barium	mg/l	100	0.94 B	NA	0.83 B	0.87 B	NA	0.71 B	NA	0.78 B	0.68 B	NA
Cadmium	mg/l	1.0	0.0077	NA	0.029	0.0086	NA	0.0042 B	NA	0.0078	0.0022 B	NA
Chromium	mg/l	5.0	0.00089 B	NA	0.0040 B	0.0034 B	NA	0.0030 B	NA	0.0020 B	0.0020 B	NA
Lead	mg/l	5.0	0.39 B	NA	1.3	3.6	NA	4.4	NA	0.5	0.022 B	NA
Mercury	mg/l	0.2	0.000088 U	NA	0.000088 U	0.00011 B	NA	0.000088 U	NA	0.00017 B	0.000088 U	NA
Selenium	mg/l	1.0	0.017 B	NA	0.012 B	0.014 B	NA	0.014 B	NA	0.015 B	0.015 B	NA
Silver	mg/l	5.0	0.00056 B	NA	0.00052 U	0.00055 B	NA	0.00052 U	NA	0.00052 U	0.00052 U	NA

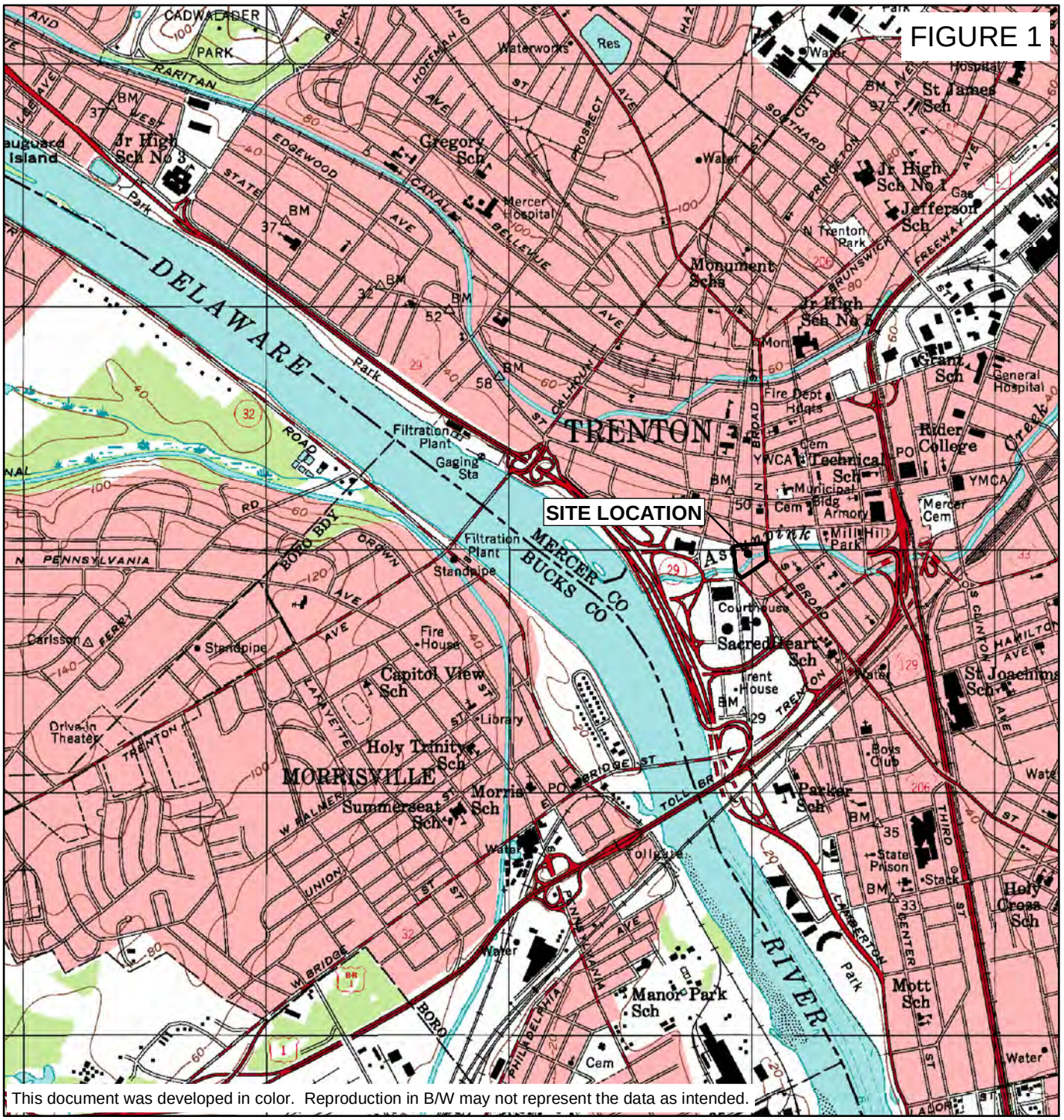
Footnotes:
ft bgs - feet below ground surface
TCLP - Toxicity characteristic leaching procedure
RCRA - Resource Conservation Recovery Act
B -Indicates a result ≥ method detection limit and < reporting limit
U - result < listed method detection limit
Non-detected results are reported to the method detection limit
NS- No standard NA - Not analyzed NC - Non-corrosive
SU - Standard Units
mg/kg - Millgram per Kilogram
mg/l - Milligram per Liter

* - Sample composited from TP-03 (8 ft bg) and TP-04 (13 ft bg)
** - Sample composited from TP-06 (7 ft bg) and TP-07 (0 - 13.5 ft bg)
*** - Sample composited from TP-08 (0 - 11 ft bg) and TP-09 (0 - 9ft bg)

PATH: I:\Us-Acoe-Phila.12124\STDS\GIS\Assunpink\Assunpink_Figure1_SiteLocation.mxd

PLOT DATE: 1/14/2011 KaufmaDR

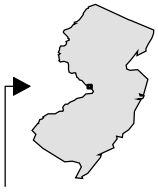
FIGURE 1



This document was developed in color. Reproduction in B/W may not represent the data as intended.

ADAPTED FROM: TRENTON WEST, NEW JERSEY USGS QUADRANGLE

US ARMY CORPS OF ENGINEERS
ASSUNPINK CREEK RESTORATION
TRENTON, NEW JERSEY



MAP LOCATION

N

SITE LOCATION

0 1,000 2,000 4,000 6,000 8,000

Feet

JANUARY 2011
12124/46661

1:24,000

O'BRIEN & GERE

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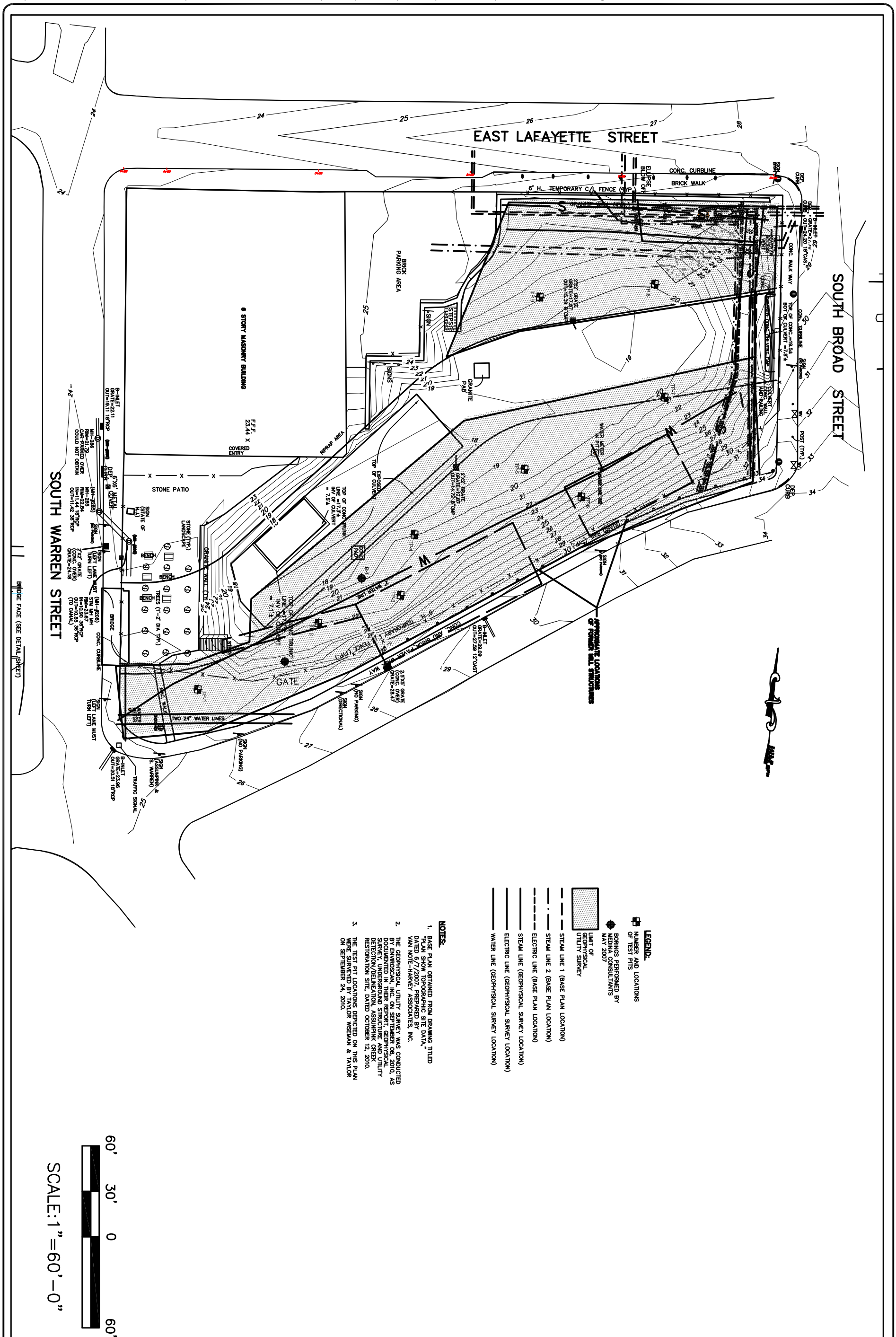


LEGEND:

- NUMBER AND LOCATIONS OF TEST PITS
- BORINGS PERFORMED BY MEDINA CONSULTANTS MAY 2007
- LIMIT OF GEOPHYSICAL UTILITY SURVEY
- STEAM LINE 1 (BASE PLAN LOCATION)
- STEAM LINE 2 (BASE PLAN LOCATION)
- ELECTRIC LINE (BASE PLAN LOCATION)
- STEAM LINE (GEOPHYSICAL SURVEY LOCATION)
- ELECTRIC LINE (GEOPHYSICAL SURVEY LOCATION)
- WATER LINE (GEOPHYSICAL SURVEY LOCATION)

NOTES:

1. BASE PLAN OBTAINED FROM DRAWING TITLED "PLAN SHOW TOPOGRAPHIC SITE DATA," DATED 6/7/2007, PREPARED BY VAN NOTE-HARVEY ASSOCIATES, INC.
2. THE GEOPHYSICAL UTILITY SURVEY WAS CONDUCTED BY ENVIROSCAN, INC. ON SEPTEMBER 06, 2010, AS DOCUMENTED IN THEIR REPORT, GEOPHYSICAL SURVEY, UNDERGROUND STRUCTURE AND UTILITY DETECTION/DELINEATION, ASSUNPINK CREEK RESTORATION SITE, DATED OCTOBER 12, 2010.
3. THE TEST PIT LOCATIONS DEPICTED ON THIS PLAN WERE SURVEYED BY TAYLOR WISEMAN & TAYLOR ON SEPTEMBER 24, 2010.

60' 30' 0 60'

SCALE:1"=60'-0"

TEST PIT ANALYSIS RESULTS

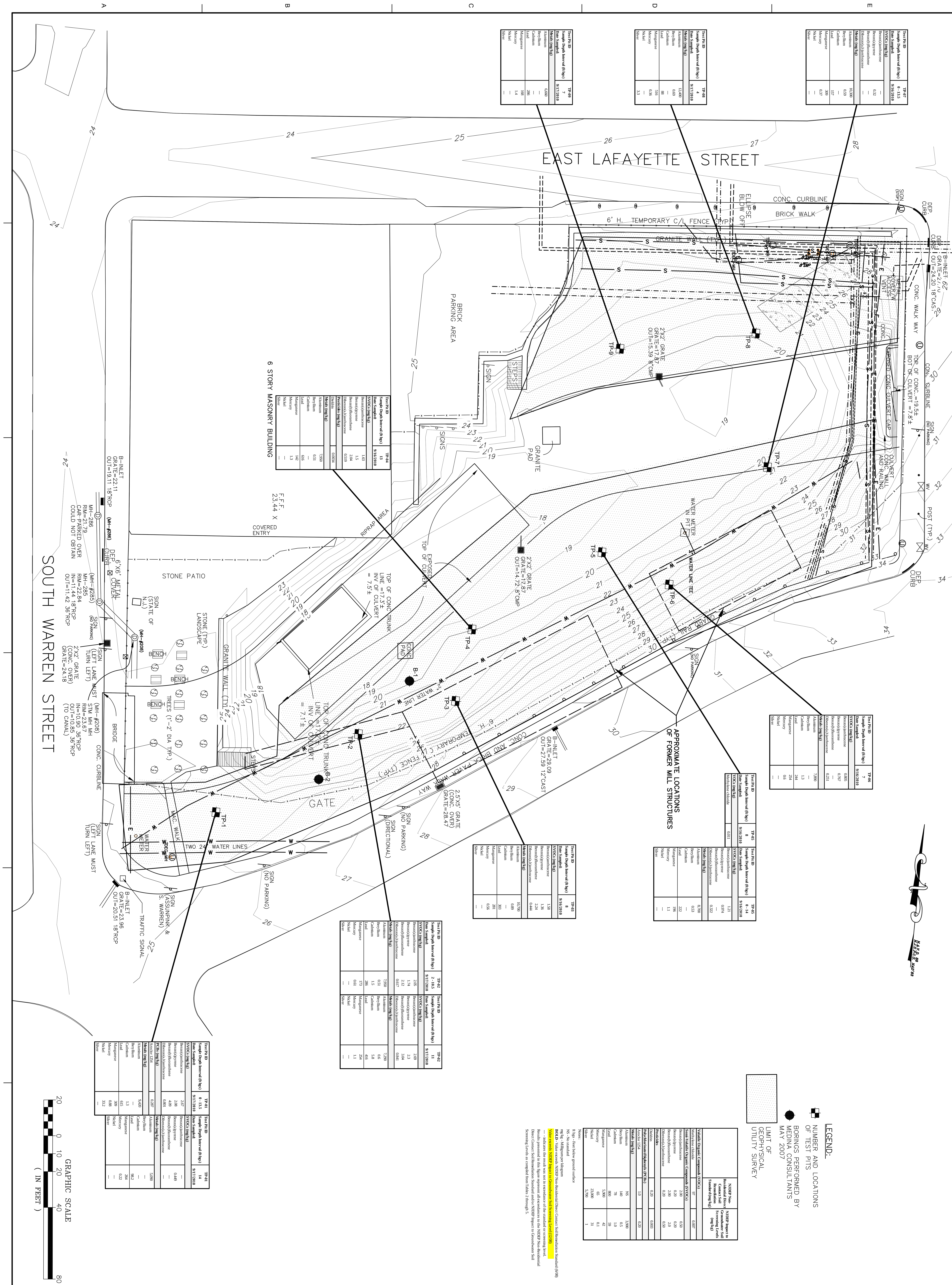
ASSUNPINK CREEK
RESTORATION PROJECT
TRENTON, NEW JERSEY

US Army Corps of Engineers
Philadelphia District

DDW
RGB

JAN. 2011

FIGURE 2



MARK	DESCRIPTION	DATE	APPR.	MARK	DESCRIPTION	DATE	APPR.
1	ISSUED FOR FINAL REPORT	1/14/2011	DDW				

U.S. ARMY CORPS OF ENGINEERS
PHILADELPHIA DISTRICT
PHILADELPHIA, PENNSYLVANIA

O'BRIEN & GERE

DESIGNED BY: D.D.WHETSTONE	DATE: JANUARY 2011
DWN BY: RGB	CKD BY: X
SOLICITATION NO.: X	
SUBMITTED BY: X	CONTRACT NO.: X
PLOT SCALE: 1" = 20'	PLOT DATE: 11/19/2010
FILE NUMBER: X	
SIZE: ANSI F	FILE NAME: 12124/46861-FIG-2.DWG

TEST PIT ANALYSIS RESULTS
ASSUNPINK CREEK
RESTORATION PROJECT
TRENTON, NEW JERSEY

SHEET IDENTIFICATION
FIG-3

US Army Corps of Engineers
Philadelphia District

ATTACHMENT 1

Scope of Work

Architect Engineer Services
Geophysical, Geotechnical and Environmental Site Investigation – Scope of Work
Assunpink Creek Restoration
Trenton, NJ

Date: August 25, 2010

1.0 GENERAL INFORMATION

1.1 Contract Number: W912BU-10-D-0001

1.2 Task Order Number: 0005

1.3 Name and Location of Project:

Assunpink Creek Restoration,
Trenton, NJ.

1.4 Firm Name and Address:

O'Brien & Gere
301 East Germantown Pike/3rd Floor
East Norriton, PA 19401

1.5 Name of Subcontractors and Services to be Performed:

Geophysical Surveyor and Excavator/Operator: TBD
Analytical Laboratory: TBD
Geotechnical Laboratory: TBD

1.6 Point of Contact: USACE: Earl M. Fisher, P.E. (215-656-6700)
O'Brien & Gere: Thomas A. Nowlan, P.E. (484-804-7200)

1.7 Project Overview:

The U.S. Army Corps of Engineers, Philadelphia District (USACE) is presently in the planning phase for the removal of an existing culvert and stream restoration along a section of the Assunpink Creek located in Trenton, NJ. As part of the District's needs, a geotechnical, geo-environmental and a geophysical investigation of the site area will be required. The results of these site investigations will be used as background characterization information for the USACE in the demolition of the existing culvert and the design and construction of the new stream channel.

Philadelphia USACE will require the services of an A/E firm in order to provide support to this design project. The A/E firm will perform the site investigations, which are detailed in this scope of work document.
The project area for this investigation is a 500-foot section of the lower Assunpink Creek in downtown Trenton where the creek is contained within a buried box culvert known as the Broad Street Culvert. The investigation area is situated in an open grassy area adjacent to the State of New Jersey Department of Human Services (DHS) building and is bound by East Lafayette St. to the North, South Warren St. to the West, Factory St. to the South, and South Broad St. to the East.

2.0 SCOPE OF WORK

The purpose of the work specified in this scope document is to identify and delineate subsurface targets and determine their characteristics by means of a geophysical survey, and to determine the type, nature and characteristics of subsurface materials by means of geotechnical and environmental evaluations, and the extent and conditions of the various materials as they exist to the depths and at the locations specified through the performance of a subsurface exploration program.

The work consists of preparing planning documents, and furnishing all plant, labor, materials, supplies, and accessories required to accomplish the investigations and associated laboratory testing, together with all other operations incidental to the work, in strict accordance with these specifications and the applicable proposed exploration and geophysical plans. The work shall be performed on open grass, gravel and pavement covered areas within the area shown in the accompanying figures. Interim and final deliverable products will be required in this task order.

The Contractor shall provide qualified personnel for the following major work items:

- Generate site plans including work plan (WP), site health and safety plan (HASP), and sampling and analysis plan (SAP)
- Perform geophysical survey and identify subsurface utilities within the project area
- Perform survey of soil test pit locations and all features identified during geophysical survey, including subsurface utilities
- Provide an excavator capable of safely advancing test pit excavations to depths up to 18-feet below the ground surface. Collection of disturbed grab samples for engineering evaluation and geotechnical and environmental testing.
- Advance up to 12 test pits to anticipated depths ranging from 15 to 18 feet below the ground surface. If bedrock is encountered above the proposed test pit termination depth, test pits will be advanced up to 2 feet into bedrock or to refusal. Overburden soils are expected to range from 10 to 20 feet below the ground surface The test pit will be terminated at the depth where substantial groundwater intrusion into the test pit is encountered, or where excessive caving of the test pit sidewalls is experienced. Minor discharge of free groundwater mixed with excavated soils is acceptable and no special water handling measures will be required.
- Perform an environmental investigation on samples collected during the geotechnical investigation.

- Prepare reports meeting the geotechnical and environmental requirements as set forth in the attachments. The reports shall describe and document all work performed

In addition to the previously described work items, additional soil sampling for environmental testing may be performed depending on the observed site and environmental conditions encountered in the explorations. The additional sampling is identified as Option A and includes the following:

- Collection of up to 5 additional soil samples for chemical characterization

2.1 Plans and Submittals

2.1.1 Work Plan

The contractor shall develop a work plan (WP), which shall include all planning and on-site work that will be required to complete this task order. The WP will contain descriptions of the work to be performed on-site for each work item in this task order. Vendor literature, specification sheets, and instructions/operating procedures for all tasks will be included in the WP for all supplies and equipment that is procured and used in this task order. A description of how the work will be performed will be included, including sequence of events and project schedule. The WP will also include a description of quality assurance monitoring during sampling and analysis, as well as any other quality assurance issues such as how corrective action will be taken if required. The WP will have descriptions of materials and equipment to be used.

The Contractor shall identify a field supervisor who shall be present during all site work performed by either the Contractor or any subcontractor personnel. Any substitutions for this individual must be approved by USACE in writing. This individual's responsibilities will include acting as supervisor for Contractor and subcontractor personnel, coordinating all field activities needed to perform the task order, acting as H&S specialist in the absence of any other designated personnel, and acting as a contact for USACE. Key Contractor personnel, including key field supervisory personnel, will also be listed along with their responsibilities, as well as any subcontractors and subcontractor key supervisory field personnel and representatives. The WP will also include methods of performing, documenting, and ensuring quality control operations of the contractor and all subcontractors. The final WP will be approved by USACE prior to any field activities.

2.1.2 Site Health and Safety Plan

The contractor shall develop a site-specific health and safety plan (HASP) for field work performed at the site during the geophysical, geotechnical and environmental investigations. If requested, USACE can provide an example HASP that the contractor may utilize as a model of an acceptable HASP. The HASP will be prepared in accordance with USACE publication EM 385-1-1 to cover all on-site work under this task order. The HASP will include emergency contact information, hospital directions, and health and safety requirements based on site-specific conditions. The final HASP will be approved by USACE prior to any field activities.

The HASP shall also identify onsite personnel who shall ensure that all contractor and subcontractor personnel perform all work in accordance with the site HASP. A minimum of one person with this responsibility shall be onsite at all times that field work is ongoing, by either the contractor or any subcontractors.
Additional information pertaining to the site specific HASP can be found in Attachment 1 of this document.

2.1.3 Permits, Certifications, Licenses, and Site Access

The contractor shall comply with all Federal, State and local laws, regulations and ordinances relating to the performance of this work. The contractor shall, at his own expense, procure all required permits, certifications and licenses required of him by Federal, State, and local law for the execution of this work.

The contractor shall be responsible for all damages to property resulting from his negligent operations under this contract. Damage to underground utilities that are not identified by the geophysical survey or by the NJ One-Call system shall not be the Contractor's responsibility. He shall repair any such damage or in lieu thereof, effect an appropriate settlement with the landowner. All obligations under this requirement shall be discharged without cost or obligation to the Government. Contractor work area and access to proposed explorations is limited to the areas adjacent to and at least 5 feet from the edge of the existing culvert structure. Vehicles or construction equipment are **NOT** permitted within 5 feet of and/or above the existing culvert structure.

Following the successful completion of all site activities, the contractor must return all impacted areas of the site to their original condition. This may include surface regrading, filling in tire ruts and holes, repairing or replacing any damaged materials or site features, reseeding, etc. as needed. All site restoration work will be completed by the contractor within 2 weeks following the completion of field work involving heavy equipment such as support trucks, excavators, backhoes, forklifts, etc.

2.2 Geophysical Survey

A geophysical survey will be performed by the contractor, and the results analyzed and interpreted by the contractor, prior to any intrusive activities. The area to be surveyed encompasses approximately 1.5 acres within the study area. The purpose of the geophysical survey is to identify and delineate any subsurface utilities, targets that may be present in the proposed construction area and determine their characteristics by means of a geophysical investigation. This work consists of furnishing all plant, labor, materials, supplies, and accessories required to accomplish the geophysical survey, together with all other operations incidental to the work, in strict accordance with these specifications subject to the terms and conditions of the contract. The work shall be performed on open grass, soil, gravel and pavement covered areas within the areas adjacent to the State building. Important: The contractor shall provide personnel who have a minimum of 5 years of direct experience in performing geophysical surveys and interpreting geophysical survey data.

The geophysical survey will be performed to identify the presence and approximate location of any abandoned and active utilities, pipes, structures, tanks, etc. that may be present beneath the study area and determine if any other anomalous conditions are present.

2.2.1 On-site Geophysical Survey

The geophysical survey shall be performed using optimum geophysical methods to locate and delineate subsurface targets as described herein extending to depths of at least 15 feet below the surface. The Contractor shall recommend, supply and operate the instrumentation and equipment that shall provide the required information. It is anticipated that an initial area wide geophysical survey will be conducted to locate buried features and anomalies, which will be further investigated by more definitive geophysical survey techniques. USACE expects that EM-61 instrumentation and ground penetrating radar will be included in the survey, along with other geophysical instruments that may be required to perform the investigation. USACE expects that the EM-61 and GPR coverage will extend over the complete area within the shaded geophysical survey limits shown on the attached plan, sheet TP-1.

The contractor shall conduct additional GPR survey work over each anomaly identified from the EM-61 survey.

Note: prior to conducting the GPR survey, the contractor shall perform test runs to optimize the equipment set-up of the GPR equipment, including antenna selection. The test runs will at a minimum be performed using different antennas to determine the most effective setup for site conditions.

In addition to performing EM-61 and GPR site survey work, the contractor shall also perform utility mark outs as per guidance in the American Society of Civil Engineers Standard Guidelines for the Collection and Depiction of Existing Subsurface Utility Data (CI/ASCE 38-02). As part of the utility mark out service, induced current utility detection methods shall be utilized to trace out and verify the location of suspected underground utilities, if accessible.

The overburden soils are likely to include sandy, silty and clayey soils with varying quantities of cobbles and gravel, and miscellaneous fill from previous construction activities. It is expected that the targets will have significantly different densities and properties than the surrounding sediments and that the contact should be identifiable using geophysical methods and procedures. Limited overhead and extensive underground utilities (electric, telephone, water, gas, steam, sanitary and storm sewer, cable and other communication lines, etc.) are anticipated to be present at the site, which should be taken into consideration in selection of supplemental geophysical techniques to be utilized. Both metallic and non-metallic targets may be present.

The contractor shall provide all field survey and layout work required to complete the geophysical investigation, and periodically review the data in the field to determine if project objectives are being met. If necessary, survey lines or methods shall be adjusted to obtain better resolution. The geophysical survey shall be performed in accordance with equipment manufacturer recommendations and best field practice.

2.2.2. Feature Location Surveys

The contractor will physically mark out any identified subsurface features or anomalies using paint, flags, etc. and survey these locations to ensure that they are documented accurately. The contractor shall ensure that all physical markings placed during geophysical survey, as well as any markings placed during the utility mark out are properly maintained at least until after the locations of the markings are accurately surveyed. All identified features will be surveyed using GPS assisted by conventional surveying techniques where signal cannot be obtained at the marked locations.

2.2.3 Data Reduction and Evaluation

The data shall be interpreted, presented as both a contour or location map and profile lines, and saved as an AutoCAD file. The contractor shall perform a thorough and detailed analysis of the geophysical survey data to ensure that proper subsurface feature delineation is performed.

For specific questions regarding the geophysical specification contact Earl Fisher of the USACE Geotechnical section at 215-656-6700.

2.2.4 Report Preparation

The contractor shall interpret the data gathered and prepare a report containing at a minimum the following:

1) Detailed descriptions of the investigations conducted
2) Final locations of survey lines, explorations and all subsurface features and utilities.
3) Copies of all data printouts.
4) Summary of all equipment used, including make, model, serial number, and data from most recent calibration.
5) Accuracy of methods and equipment.
6) Data interpretations, including targets located, interpreted nature of the targets, estimated dimensions of the targets, and estimated depths to the targets.
7) Maps showing all target locations and orientations.
8) Figures displaying target depths.
9) Recommendations for future investigations, if required.

The contractor shall submit two bound copies (with tables, graphs, and attachments, if applicable) of the draft geophysical report to USACE within 14 calendar days of completing the geophysical fieldwork (i.e., within 56 calendar days of NTP). USACE will review the draft geophysical report and provide review comments within 7 calendar days (i.e., within 63 calendar days of NTP). The contractor shall submit the final geophysical report to USACE, with all review comments addressed, within 70 calendar days of NTP.

The contractor shall submit 3 bound copies, one unbound copy, a CD ROM PDF of the complete document (including tables, graphs, appendices and attachments), and all electronic files (Word/Excel files, tables, graphs, ACAD figures, etc) of the final geophysical report to USACE.

2.3 Geotechnical Investigation

A detailed scope for geotechnical investigations is included as Attachment 2 of this document. The contractor shall perform all geotechnical work as specified in Attachment 2. For specific questions regarding the geotechnical specifications, contact Earl Fisher of the USACE Geotechnical Section at 215-656-6700.

2.4 Environmental Investigation

Environmental Investigation

A chemical sampling and analytical testing specification providing additional information regarding the environmental work is included in Attachment 3 of this document.

The Contractor shall be responsible for executing the complete environmental sampling and laboratory testing programs as specified in the attachment. For specific questions regarding the environmental specification contact Mike Mohn of the USACE Geotechnical Section at 215-656-6887.

3.0 DELIVERABLES

The contractor shall prepare one project report deliverable to summarize the work performed during this task order. The project report shall contain the following sections:

3.1 Geophysical Survey Report

See Section 2.2 for requirements for this project deliverable.

3.2 Geotechnical Investigation Report

A geotechnical investigation report will be prepared by the contractor as specified in Attachment 2 of this scope of work.

3.3 Environmental Investigation Report

An environmental investigation report will be prepared by the contractor as specified in Attachment 3 of this scope of work.

4.0 PROJECT SCHEDULE

The contractor shall submit a project schedule within 10 days following NTP. The schedule shall contain the NTP date as well as the following target dates:

Planning

- Contractor to submit draft WP, HASP, and SAP within 14 calendar days of NTP
- USACE to review draft plans and provide comments within 21 calendar days of NTP (allows 7 calendar days for USACE review)
- Contractor to submit final WP, HASP, and SAP with comments addressed within 28 calendar days of NTP (allows 7 calendar days for contractor to make document changes)

Field Work

- Contractor to complete geophysical survey within 42 calendar days of NTP (allows 14 calendar days to perform geophysical survey, to begin immediately following submittal of final plans)
- Contractor to complete remainder of topographic survey work, explorations, sampling work, and send all samples to labs for testing within 70 calendar days of NTP (allows 21 days to perform field work, sampling, and remainder of topographic survey work, to begin immediately following submittal of draft geophysical report)

Deliverables

a. Geophysical Survey

- Contractor to submit draft geophysical survey report within 56 calendar days of NTP (allows 14 calendar days to prepare draft report following completion of geophysical survey)
- USACE to review draft geophysical report within 63 calendar days of NTP (allows 7 calendar days for USACE review)
- Contractor to submit final geophysical report with comments addressed within 70 calendar days of NTP (allows 7 calendar days for contractor to make document changes)

b. Survey Work

- Contractor to submit survey deliverable of exploration locations and geophysical and utility survey lines within 70 calendar days of NTP (allows 21 days to prepare location surveying deliverable)

c. Geotechnical Investigation

- Contractor to submit draft typed electronic (digital) test pit logs and locations on an electronic plan view to USACE within 84 calendar days of NTP (allows 14 calendar days to prepare draft typed test pit logs)
- Contractor to submit draft geotechnical investigation report to USACE within 126 calendar days of NTP (allows 28 calendar days from receipt of geotechnical lab results to prepare draft report, assuming 28-day turnaround for Geotechnical lab results specified)
- USACE to review draft geotechnical investigation report and provide review comments within 133 calendar days of NTP (allows 7 calendar days for USACE review)

- Contractor to submit final geotechnical investigation report, with all review comments addressed, within 140 calendar days of NTP (allows 7 calendar days to incorporate review comments)

d. Environmental Investigation

- Contractor to submit analytical lab report to USACE within 100 calendar days of NTP (allows 30 days for laboratories to perform testing assuming standard 30-day turnaround specified)
- Contractor to submit draft analytical summary tables to USACE within 107 calendar days of NTP (allows 7 calendar days to prepare summary tables from lab reports)
- Contractor to submit draft environmental investigation report to USACE within 128 calendar days of NTP (allows 28 calendar days from receipt of analytical lab results to prepare draft report)
- USACE to review draft environmental investigation report and provide review comments within 135 calendar days of NTP (allows 7 calendar days for USACE review)
- Contractor to submit final environmental investigation report, with all review comments addressed, within 142 calendar days of NTP (allows 7 calendar days to incorporate review comments)

  Note: Attachment 3 also contains standard analytical laboratory deliverables required by USACE.

5.0 GOVERNMENT FURNISHED MATERIALS

- Proposed Test Pit and Geophysical Investigation Location Plan, Sheet TP-1

6.0 PERIOD OF PERFORMANCE

The total time in which the Contractor shall complete this Task Order will be 142 calendar days from NTP.

7.0 SITE VISIT

The Contractor is urged and expected to inspect the site where services are to be performed and to satisfy themselves regarding all general and local conditions that may affect the cost of contract performance, to the extent that the information is reasonably obtainable. In no event shall failure to inspect the site constitute grounds for a claim after contract award. For site visits please coordinate with Earl Fisher of the Geotechnical Section at 215-656-6700.

8.0 COMPENSATION TO THE CONTRACTOR

In consideration of the performance of the work under this task order, the contractor shall be paid a total lump sum payment of $ 81,620.00 for the base work effort consisting of geophysical, geotechnical, & environmental site investigation.

Option A: If additional environmental testing is required as described herein, the contractor shall be paid $5,210.00 for the Option A samples, up to 5 additional samples.

This shall constitute complete payment for all services required and expenses incurred in the performance of the work described herein.

8/27/10

Contractor's Representative Date

_____

Earl M. Fisher, P.E. Date
Geotechnical Engineer

_____

Paul D. Bacani Date
A/E Negotiator

Attachment 1
Description/Specifications – Preparation of Site Specific Health and Safety Plan
Geotechnical and Geophysical Site Investigation – Scope of Work
Assunpink Creek Restoration
Trenton, NJ
August 6, 2010

The Philadelphia District, U.S. Army Corps of Engineers is presently in the design phase for the removal of a box culvert in conjunction with the restoration of a portion of the Assunpink Creek. As part of the District's needs, several investigations must be conducted.

The Contractor shall prepare a site specific health and safety plan (HASP) to encompass a subsurface investigation, as well as a geophysical survey and a topographic survey. The subsurface investigation will consist of a geotechnical investigation for soil classification within the project area. The plan shall meet the requirements of OSHA 29 CFR 1926 and the US Army Corps of Engineers Safety and Health Requirements Manual, EM 385-1-1 (as amended) with particular emphasis on the following aspects:

- Section 1, Program Management
- Section 5, Personal Protective and Safety Equipment
- Section 6, Hazardous Substances, Agents, and Environments
- Section 25 Excavations and Trenching
- Section 28 Hazardous, Toxic and Radioactive Waste (HTRW) and Underground Storage (UST) Tank Activities

Activity Hazard Analyses (AHAs) for all major work activities shall be prepared in compliance with EM 385-1-1 requirements. These shall be included in the HASP and will be modified as necessary as the work proceeds.

The HASP shall be prepared by a Certified Industrial Hygienist (CIH), or an Environmental Engineer experienced in the preparation of HASP documents, and submitted to the Philadelphia District for review and comment. The HASP shall detail all potential hazards to be encountered during subsurface investigation to ensure compliance with applicable governmental laws and regulations relating to health, safety and the environment. The plan shall document specific requirements and procedures for the protection of field personnel while performing subsurface investigations in the study areas. This will include initial and upgraded personal protective equipment requirements, air monitoring requirements, and standard and emergency operating procedures.

The HASP deliverable submittal schedule shall be as described in Section 2.1.2 of the Scope of Work.

Attachment 2
Description/Specifications - Geotechnical Investigation
Assunpink Creek Restoration
Trenton, NJ
August 6, 2010

PART 1 GENERAL

1.1 SCOPE OVERVIEW

The purpose of the work specified herein is to determine the type, nature, and characteristics of subsurface materials and the extent and conditions of the various materials as they exist to the depths and at the locations specified. This is to be accomplished by means of test pit excavations. The work consists of furnishing all plant, labor, materials, supplies, and accessories required to accomplish the investigations, together with all other operations incidental to the work, in strict accordance with these specifications and the applicable test pit plan and subject to the terms and conditions of the contract. All work shall be performed on land.

All equipment and supplies as specified herein are subject to approval by the Contracting Officer's Representative (USACE). No portion of this contract may be subcontracted without prior approval from the USACE. On site personnel shall have a copy of these specifications and each subcontractor shall be familiar with the applicable provisions of the specifications governing the contract work.

1.2 MAJOR ITEMS OF WORK

The major items of work to be performed under this Attachment, include, but are not limited to, the following:

a. Layout the proposed test pit explorations as shown on the exploration location plan (Sheet TP-1). Field adjust proposed locations as necessary to avoid existing utilities, buildings, buried foundations, and any other obstructions based on the results of the geophysical survey.

b. Mobilization/demobilization of all equipment necessary to conduct the field investigations.

c. Provide geotechnical inspection of all test pit excavations and sampling to obtain the required subsurface soil and groundwater characterization.

d. All test pits shall be advanced to bedrock until refusal with the excavator, or up to 3 feet below top of bedrock. Bedrock is anticipated approximately 12-18 feet below the ground surface.

e. All explorations shall be screened for VOCs in the field using a photo ionizing detector (PID) and recorded on the test pit log.

f. Surveying of completed explorations.

g. Submission of draft typed electronic (digital) test pit logs and approximate test pit locations.

h. Laboratory testing of disturbed soil samples.

i. Preparation of a Geotechnical Investigation report.

1.3 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM D 653	Terminology Related to Soil, Rock and Contained Fluids
ASTM D 2487	(2000) Classification of Soils for Engineering Purposes (Unified Soil Classification System)
ASTM D 2488	(2000) Description and Identification of Soils (Visual-Manual Procedure)

U.S. ARMY CORPS OF ENGINEERS (USACE)

EM 385-1-1	(Latest Rev.) US Army Corps of Engineers Safety and Health Requirements Manual

1.4 DEFINITIONS

1.4.1 Test Pit

A test pit is an excavation made through unconsolidated or partly consolidated sediments or decomposed rock by means of an excavator. The purpose of these test pits is to obtain knowledge of the composition, the thickness, the depth, the sequence, the structure, and the pertinent physical properties of the in-place materials.

1.5 SUBMITTALS

The following shall be submitted as specified:

1.5.1 Permits, Certifications, Licenses, and Site Access.

The Contractor shall provide copies of all such documents as specified in the main body of this Scope of Work (SOW).

1.5.2 Work Plan of Geotechnical Investigations.

Prior to starting work, the Contractor shall submit a brief plan for test pit excavation, sampling, and laboratory testing. The plan shall include, but not be limited to, the proposed method of excavating and sampling, including a description of the equipment and sampling tools that will be used, the proposed method for backfilling explorations, a listing of any subcontractors to include a description of how the subcontractors will be used and a description of all methods and procedures that will be utilized to insure a safe operation and to protect the environment. This submittal shall also include a statement of the prior experience, in the type of work described in these specifications, of the person or persons designated to perform the work specified herein. No work shall be performed until this plan has been approved and no deviation from the approved plan will be permitted without prior approval by the USACE.

The Work Plan shall also include a description of the planned field sample handling, identification and screening operations, and procedures to be followed in selecting samples for testing.

1.5.3 Test Pit Log.

The Contractor shall submit complete, legible copies of DRILLING LOG, ENG FORM 1836 and 1836A (or approved equal) and records to the USACE upon completion of the work or at such other time or times as he may be directed.

1.5.4 Draft Test Pit Logs and As-Built Plan

The Contractor shall submit all test pit logs in typed/digital "draft" form within 2 weeks of completing the last test pit. A digital "draft" as-built plan shall also be submitted with all test pits plotted. If the as-built survey results are not available within this 2 week period, then the test pits shall be plotted in their approximate location, but as-built survey coordinates shall not be presented on the logs until the final report submission.

1.5.5 Geotechnical Investigations Report

Results of the geotechnical investigations shall be submitted in report form as specified in PART 3, paragraph GEOTECHNICAL REPORT.

1.6 PROJECT/SITE CONDITIONS

1.6.1 Environmental Requirements

In order to prevent and to provide for abatement and control of any environmental pollution arising from Contractor activities in the performance of this contract, the Contractor and his subcontractors shall comply with all applicable Federal, State, and local laws, regulations, and ordinances concerning environmental pollution control and abatement.

a. The Contractor shall be responsible for keeping informed of all updates and changes in all applicable laws, regulations, and ordinances.

b. The Contractor shall not pollute wetlands, lakes, ditches, rivers, springs, canals, waterways, groundwater, or reservoirs with drill fluids, fuels, oils, bitumen, calcium chloride, insecticides, herbicides, or other materials that may be harmful to the environment or a detriment to outdoor recreation.

1.6.2 Test Pit Locations

The proposed locations of the test pits are shown on the test pit location plan (Sheet No. TP-1). The actual locations will be located by the Contractor and adjusted in the field as necessary utilizing the results of the utility mark-out and results of the geophysical investigation. The elevations shall be in NAVD 88 and the locations shall be in New Jersey State Plane Grid, NAD 83.

The Contractor is required to determine site access for all intrusive operations and shall be responsible for damages to utilities and property resulting from his negligent operations under this contract. The Contractor shall not be held responsible for damages to utilities that are not identified by the geophysical survey or the NJ One-Call utility locator service. The Government will obtain the legal right-of-entry and assist the Contractor in gaining site access, however, the Contractor is responsible to repair any such damage or in lieu thereof, effect an appropriate settlement with the landowner. All obligations under this requirement shall be discharged without cost or obligation to the Government.

1.7 SEQUENCING AND SCHEDULING

1.7.1 Schedule of Excavation and Sampling

All test pits shall be excavated up to 18 feet below the ground surface, as subsurface conditions permit, or to refusal atop bedrock. The test pit will be terminated at the depth where substantial groundwater intrusion into the test pit is encountered, or where excessive caving of the test pit sidewalls is experienced. Minor discharge of free groundwater mixed with excavated soils is acceptable and no special water handling measures will be required. Grab samples shall be obtained at regular intervals to adequately characterize the subsurface materials and perform geotechnical and environmental laboratory testing.

1.7.2 Order of Work

The order in which the work is to be accomplished shall be determined in the field by the Contractor as approved by the USACE.

a. The Contractor shall provide a qualified geologist or geotechnical engineer experienced in subsurface exploration to oversee all excavation and sampling operations. This individual shall be responsible for the preparation of a separate log and/or report for each test pit. This individual shall also be responsible for the preparation of all soil samples for delivery to the designated point, as well as ensuring that all contractor and subcontractor personnel perform all work in accordance with the site HASP, Work Plan, and SAP.

b. The presence of a Government representative or the keeping of separate exploration records by the USACE shall not relieve the Contractor of the responsibility for the work specified in this specification.

1.8 CONTRACTOR FURNISHED EQUIPMENT

The Contractor shall furnish all equipment necessary to complete the work specified herein. In addition, the Contractor's representative shall be equipped with a portable cellular telephone at the contract work site at all times during the life of the contract such that USACE may contact him directly, as required.

1.9 GOVERNMENT FURNISHED EQUIPMENT

The Government will furnish no equipment for this contract.

1.10 INSPECTION

The work will be conducted under the general direction of the Contractor and shall be subject to inspection by his appointed inspectors to ensure strict compliance with the terms of the contract, but the presence of the inspector shall not relieve the sub-contractor of responsibility for the proper execution of the work in accordance with the specifications. As a minimum, the Contractor shall provide an experienced geologist or geotechnical engineer proficient in geotechnical and environmental sampling operations to coordinate the subsurface exploration operation and log the test pits as discussed in other sections of this document. Inspection and acceptance of work will be made at the place of performance by the USACE.

1.11 CARE AND DELIVERY OF SAMPLES

1.11.1 General

The Contractor shall be solely responsible for preserving all samples in good condition. Samples shall be kept from freezing and from undue exposure to the weather, and shall keep all descriptive labels and designations on sample jars and boxes clean and legible until final delivery of samples to, and acceptance by, the USACE. Except as otherwise specified, the Contractor shall deliver all untested samples to the Fort Mifflin Project Office, situated on Fort Mifflin Road adjacent to the Philadelphia International Airport, Philadelphia, Pa. Contact Earl Fisher at (215) 656-6700 to coordinate sample delivery to the Fort Mifflin office.

PART 2 PRODUCTS

2.1 CONTAINERS/SHIPPING BOXES

The Contractor shall furnish jars, tubes, boxes, and crates that meet the following requirements. All such containers will become the property of the Government and the cost thereof shall be included in the contract price for the applicable item for which payment is provided.

2.1.1 Sample Jars

Sample jars shall be 1-pint capacity, wide-mouth (at least 2-1/4 inches in diameter) glass jars with moisture-tight screw tops.

2.1.3 Shipping Boxes

2.1.3.1 Boxes for Sample Jars

Boxes for shipping sample jars shall be corrugated cardboard boxes that have the capacity to hold no more than 12 sample jars and the strength to contain and protect the jars and their contents under ordinary handling and environmental conditions.

2.2. LABELS

2.2.1 Sample Jar Labels

A printed or type-written, fade resistant and waterproof label shall be affixed to the outside of each jar and shall contain the following information:

a. PROJECT:
b. HOLE NO.:
c. SAMPLE NO.:
d. DEPTH OF SAMPLE:

2.2.2 Shipping Box Labels

Each box of jar samples shall be identified with weatherproof and wear-proof labels indicating the following:

a. PROJECT:
b. DATE EXCAVATED
c. JAR SAMPLES FROM HOLE OR HOLES:

PART 3 EXECUTION

3.1 MOBILIZATION AND DEMOBILIZATION

3.1.1 Mobilization

Mobilization shall consist of the delivery to the site of all plant, equipment, materials and supplies to be furnished by the Contractor, the complete assembly in satisfactory working order of all such plant and equipment at the jobsite and the satisfactory storage at the site of all such materials and supplies.

3.1.2 Demobilization

Demobilization shall consist of the removal from the site of all plant, equipment, materials and supplies after completion of the work and also includes, at the direction of the USACE, the cleanup and removal of all scrap, waste backfill material, soil contaminated with engine/hydraulic oil resulting from the work performed for this contract, backfilling all excavations resulting from the operations and, in general, returning the site as close to its original condition as possible.

3.2 EQUIPMENT AND SUPPLIES

3.2.1 Test Pit Excavation

Equipment to be furnished by the Contractor for advancing test pit excavations shall be in good working order and capable of excavating a minimum of 18-feet below the ground surface.

3.3 IDENTIFYING SAMPLES

Sample jars, shipping boxes, and labels shall comply with PART 2, paragraphs SAMPLE JARS, SHIPPING BOXES, and LABELS, respectively. In addition, this information shall be written using a waterproof pen or scribed on the jar lid. The Contractor shall take all precautions required to insure that the shipping boxes are not subjected to rough handling or damaging environmental conditions, and complies with paragraph CARE AND DELIVERY OF SAMPLES.

3.4 TEST PIT SAMPLING

Grab samples of the various soil types encountered in the test pits should be obtained from the excavations to be accurately identified and subjected to geotechnical and environmental screening to evaluate their geotechnical characteristics and environmental integrity. Representative samples should be retained in sample jars so that the samples can be reexamined in the geotechnical laboratory to confirm the field classification and subject selected samples to laboratory testing to augment the visual classification and physical property evaluation of the materials encountered in the test pits. In addition, a sample shall be selected from each test pit and subjected to chemical analysis to evaluate the environmental integrity of the material, using the criteria required in Attachment 3.

The samples shall be placed in sample jars as soon as possible after they are taken from the hole and, when possible, the volume of the sample shall be large enough to completely fill the sample jar in order that the natural moisture content of the material may be retained to the fullest extent possible. All samples shall be labeled in accordance with paragraph IDENTIFYING SAMPLES.

3.5 BACKFILLING

Unless otherwise noted in these specifications or directed by the Contracting Officer, all holes shall be backfilled and abandoned in accordance with all Federal, State, and local laws, regulations and ordinances. All backfilling operations shall be performed in the presence of the Contractor and, if required by regulation, Federal, State, and local officials. Test pit excavations shall be backfilled to the adjacent ground surface and raked or graded such that no depressions or mounded soil exists. The holes shall be nominally compacted in maximum 18 inch loose lifts with the excavator bucket to the degree necessary to prevent settlement of the holes. No separate payment will be made for backfilling test pit excavations. The cost of this work shall be included in the costs. Contractor will be responsible to return to the site and backfill excavations that settle after completion of the work, if necessary. No additional payment will be made to return to the site and fill in holes created by the work herein if settlement of the ground surface occurs after the initial backfilling operations.

3.6 RECORDS

The Contractor shall keep accurate logs (DRILLING LOG, ENG FORM 1836, and 1836-A, or approved equivalent) and records of all work accomplished under this contract and shall deliver complete, legible copies of these logs and records to the Contracting Officer upon completion of the work or at such other time or times as he may be directed. All such records shall be recorded during the actual performance of the work and shall be preserved in good condition and order by the Contractor until they are delivered and accepted. The Contracting Officer shall have the right to examine and review all such records at any time prior to their delivery to him and shall have the right to request changes to the record keeping procedure. The following information shall be included on the logs or in the records for each hole:

a. Hole number or designation and elevation of top of hole with datum referenced.

b. Excavator’s name and Inspector's name.

c. Make, size, and manufacturer's model designation of excavation equipment.

d. Type of sampling operation by depth.

e. Excavation dimensions

f. Dates and time by depths when excavation and sampling operations were performed.

g. Action of excavation equipment, and any other unusual and non-ordinary experience which could indicate the subsurface conditions encountered.

h. Depths at which samples were recovered.

i. Classification or description by depths of the materials sampled, cored, or penetrated using the Unified Soil Classification System (ASTM D 2487). Descriptive information for soil shall be in accordance with ASTM D 2488 and shall at least include the following: moisture conditions, consistency, degree of compactness or stiffness, color, primary constituent and gradation (e.g., SILT, CLAY, fine to medium SAND, etc.), secondary constituents, and odor (as applicable). This classification or description shall be made immediately after the samples or cores are retrieved.

j. Depth at which groundwater is encountered initially and when stabilized.

k. Depth of bottom of hole.

l. Final electronic test pit logs shall include survey x, y, and z information as well as an indication of whether the Unified Soil Classification System designation shown on the log is based on laboratory testing results or visual inspection.

3.7 GEOTECHNICAL LABORATORY TESTING

3.7.1 General

The Contractor shall perform geotechnical laboratory testing on the disturbed samples collected from the test pit locations. Testing shall be performed by an approved, USACE-validated, commercial testing laboratory having a current validation. Go to the following internet link to get the most current list of validated labs: http://www.wes.army.mil/SL/MTC/ValStatesTbl.htm. The Contractor shall be responsible for developing and executing a coherent and complete geotechnical laboratory testing program for the collected soil samples. All testing shall be completed in accordance with the American Society for Testing and Materials (ASTM) approved methods, except as modified herein, the "Estimated Laboratory Testing Schedule" (shown below), and the Contractor's approved laboratory testing schedule. The Contractor's proposed testing schedule shall be submitted weekly following collection of the field samples. Please do **not** dispose of any soil samples before or after testing. Additional samples may be requested by the Government pending the results of the testing specified herein. All required health and safety precautions shall be taken when testing materials that may be potentially contaminated.

The Contractor is required to determine the appropriate materials to be tested in conjunction with the recommendations of the USACE geotechnical representative. The testing is performed to augment and verify the visual classification of the soil materials obtained from the borings and obtain information on the index and physical properties of the materials sampled.

3.7.2 Applicable Testing Standards (latest editions)

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM D 421	Dry Preparation of Soil Samples for Particle-Size Analysis of Soils and Determination of Soil Constants
ASTM D 422	Particle-Size Analysis of Soils
ASTM D 2166	Unconfined Compressive Strength of Cohesive Soil
ASTM D 2216	Laboratory Determination of Water (Moisture) Content of Soil and Rock by Mass
ASTM D 2487	Classification of Soils for Engineering Purposes (Unified Soil Classification System).
ASTM D 3080	Direct Shear Test of Soils Under Consolidated Drained Conditions
ASTM D 4318	Liquid Limit, Plastic Limit, and Plasticity Index of Soils

3.8 CLASSIFICATION, AND CLASSIFICATION TESTING

All recovered soil samples shall be reexamined by an experienced geologist or geotechnical engineer to verify the field classification, or modify them accordingly. Selected samples shall then be forwarded to a USACE validated geotechnical laboratory to confirm the field classification by the performance of geotechnical laboratory classification, index and physical property testing.

Below are recommended tests/quantities to be incorporated into the Contractor's proposed testing schedule, and to be used as a guide when estimating quantities for bidding purposes. The actual final selection of samples to be tested and the testing to be performed will be determined by the Contractor in conjunction with the USACE geotechnical representative.

Suggested/Recommended Geotechnical Laboratory Testing

Geotechnical Tests - Soil	Estimated Number of Tests (Estimated)
Moisture Content	25
Sieve Analysis (w/o hydrometer)	25
Atterberg Limits	25
Direct Shear	2

3.9 CORRECTED TEST PIT LOGS

The field test pit logs shall be reviewed by a senior geologist or geotechnical engineer and revised based on this review, supplemented with the results of the laboratory examination and testing. The logs shall be accurate and shall incorporate the results of the geotechnical laboratory analysis. Detailed on the logs shall be the sample designation, the exact sample location, the approximate location from which sieve samples were taken, corrected depth of water at the time of excavation and soil classifications as per ASTM D 2487.

The test pit logs shall be prepared on ENG Form 1836, or approved equal. Final logs shall also be provided in AutoCAD 2005 format, or more recent version.

3.10 GEOTECHNICAL REPORT

3.10.1 General Requirements

The contractor shall interpret the geotechnical data gathered and prepare a geotechnical report for incorporation into the final Geotechnical and Environmental Report to be submitted. All field data, including the results of the sample examination, laboratory testing, etc. shall be included in the report.

The geotechnical report shall include a thorough description of the geotechnical investigation performed, the results of the investigation and testing program, a discussion and evaluation of the subsurface soil and groundwater conditions, and provide geotechnical recommendations for the proposed construction operations for the culvert removal and stream restoration.

The report shall include design recommendations for the required geotechnical operations for the stream restoration including but not limited to slope stability analyses, retaining wall design parameters, reusability of the on-site soils as structural fill or regrading of the site, an indication of problems or other construction (or environmental) concerns that may be involved in the project.

The report should include any appropriate text, figures, tables, and appendices. The reports shall be prepared in Microsoft Word format. Any spreadsheets shall be prepared in Microsoft Excel format and any drawings shall be prepared in AutoCAD 2007 format or newer. All figures, besides those prepared utilizing AutoCAD, shall be provided in *.tif, *.jpg, or *.pdf format for the final submission. These figures would include any testing results, grain size curves, digital photographs, etc. Test pit logs shall be digitally prepared using gINT software, unless otherwise approved by the Government, and inserted into AutoCAD format.

3.10.2 Draft Test pit Logs and Approximate Test pit Locations

Contractor to submit draft typed electronic (digital) test pit logs and approximate test pit locations on an electronic plan view to USACE within 84 calendar days of NTP (allows 14 calendar days to prepare draft typed test pit logs).

3.10.3 Draft Geotechnical Report

The Contractor shall submit two bound copies (with tables, graphs, and attachments, if applicable) of the draft geotechnical report to USACE within 126 calendar days of NTP. USACE personnel will review the draft geotechnical report and provide review comments within 7 calendar days.

3.10.4 Final Geotechnical Report

The Contractor shall submit the final geotechnical report to USACE, with all review comments addressed, within 140 calendar days of NTP. The Contractor shall submit 2 bound copies and one unbound copy of the complete document (including tables, graphs, appendices and attachments), and all electronic files of the final geotechnical report to USACE. The electronic files shall be sent on a CD(s) in the formats specified above. An additional digital final copy of the report (all text, tables, photos, and figures) shall be submitted as a single Adobe *.pdf file.

Attachment 3
Description/Specifications - Environmental Investigation
Assunpink Creek Restoration
Trenton, NJ
August 6, 2010

1.0 GENERAL

This attachment, which contains a description and specifications for collection, analysis, and reporting of environmental samples, is included by reference in the Scope of Work, Geotechnical and Environmental Investigation for the Assunpink Creek restoration project located in Trenton, NJ.

1.1 Scope of Work

The purpose of the work specified herein is to obtain data on the chemical characteristics of shallow subsurface soil conditions in the proposed development areas in which excavation or other earthwork work may potentially be performed as part of the construction activities. In the event that soils in these work areas do not meet appropriate geotechnical specifications, they would require removal from the construction area. Depending on the level of contamination, if any, the soils could require off-site disposal as hazardous material. Chemical characterization of soils in work areas is also required to ensure that proper precautions are taken to minimize worker exposure to contamination during earthwork and construction operations.

1.2 Submittals

1.2.1 Permits, Certifications, and Licenses

The Contractor shall comply with all Federal, State and local laws, regulations and ordinances relating to the performance of this work. The Contractor shall, at his own expense, procure all required permits, certifications and licenses required of him by Federal, State, and local law for the execution of this work. The Contractor will also be responsible for contacting NJ One Call to arrange for a markout of any existing utilities or other subsurface features.

Copies of all such documents shall be furnished to USACE prior to starting work. Final plans must be approved by USACE prior to starting field work.

1.2.2 Sampling and Analysis Plan

The Contractor shall develop a sampling and analysis plan (SAP) to be approved by USACE. The SAP will include a Field Sampling Plan (FSP) and a project specific Quality Assurance Project Plan (QAPP). The SAP will be prepared in accordance with USACE publication EM 200-1-3. The SAP should include the following items:

- Data quality objectives

- Sampling design/procedures
- Equipment to be used during sampling
- Equipment decontamination procedure
- Samples to be collected
- Summary tables of samples and analyses to be performed
- Analyses to be performed and methods used
- Analytical laboratory selected
- List of reporting limits and detection limits for analytical parameters
- Data deliverable format and type of deliverables from laboratory and contractor
- Waste disposal

1.3 Sampling Protocol

1.3.1 Soil Samples

Soil samples will be collected at each of the test pit locations, from various intervals throughout the depth of the excavation. The Contractor must ensure that sufficient soil sample is collected to fulfill the needs of all geotechnical and environmental test requirements. The soil exposed in the test pits will be visually examined for staining or other indications of contamination, and screened for the presence of VOCs using a PID or other monitoring instrument capable of detecting the VOC analytes. Screening results will be documented in field notes.

Chemical characterization samples will be collected primarily at the depth at which the proposed construction operations will impact the subsurface conditions and where excavation and other earthwork activity would most likely occur (likely from 0 to 15 feet below ground surface). If any alternate location in a test pit is suspected to contain elevated levels of contamination, based on the field screening operation, a soil sample should be taken from this location. Following PID screening, soil samples will be collected from the samples exhibiting the highest level of suspected contamination, if detected, otherwise representative samples, that will be defined in advance of the excavation operations by USACE, will be selected for testing.

It is likely that the soil samples will be collected by the contractor from large piles of excavated soil, equipment buckets, or else excavation sidewalls (maximum depth 4 feet bgs).

If no suspected contamination appears to be present, one sample shall be collected from various levels from each test pit, and tested for chemical contamination. A second sample should be obtained and tested from the test pits, only if very high levels of contamination are suspected at another level in the test pits. This additional testing should be approved by USACE prior to testing, and may consist of a composite type sample collected from multiple locations within the test pit. Samples exhibiting the highest levels of contamination should be selected for testing. If no contamination is suspected, the only sample that needs to be tested will be the designated samples that will be obtained from the intervals that are anticipated to be disturbed by the proposed culvert removal and stream restoration project. Note: depending on field conditions, the soil samples to be collected may consist of either grab or composite samples. This will be determined by USACE personnel.

Soil samples collected will be analyzed for the following:

- VOC (6) – SW 846 8260B/5035
- SVOC – SW 846 8270D
- TAL Metals – SW 846 6010B
- Total Petroleum Hydrocarbons – SW 846 8015M (GRO and DRO)
- PCB – SW 846 8082A
- Pesticides, Chlorinated – SW 846 8081B
- Herbicides, Chlorinated – SW 846 8151A
- TCLP metals (1) – SW 846 6010B
- TCLP VOC (2,3) – SW 846 8260B
- TCLP SVOC (4) – SW 846 8270D
- TCLP Herbicides/Pesticides (5) – SW 846 8151A/8081A
- Ignitability – SW 846 Chapter 7/1010A
- Reactivity, Sulfide - SW 846 Ch 7.3/9034
- Reactivity, Cyanide – SW 846 Ch 7.3/ 9010C/9014
- Corrosivity SW 846 Chapter 7/9045D

Notes:

(1) TCLP metals to include As, Ba, Cd, Cr, Pb, Hg, Se, Ag
(2) TCLP VOC to include benzene, carbon tetrachloride, chlorobenzene, chloroform, 1, 2-dichloroethane, 1, 1-dichloroethene, methyl ethyl ketone, tetrachloroethene, vinyl chloride
(3) TCLP VOC analysis to be done using zero head space extraction method. All other TCLP tests to be done using standard extraction method.
(4) TCLP SVOC to include total cresols, 2, 4-dinitrotoluene, hexachloro-1, 3-butadiene, hexachlorobenzene, nitrobenzene, pentachlorophenol, 2, 4, 5-trichlorophenol, 2, 4, 6-trichlorophenol, pyridine, 1, 4-dichlorobenzene
(5) TCLP herbicides/pesticides to include 2, 4-D, 2, 4, 5-TP, chlordane, endrin, heptachlor/heptachlor epoxide, lindane, methoxychlor, toxaphene
(6) The Encore sampling method will be employed for all soil samples analyzed for VOCs. For each sample, three plastic Encore containers must be collected as well as sufficient sample for determining moisture content. This may require the use of an additional vial or jar to collect sufficient soil sample.

1.3.2 Option A

Option A consists of collecting up to 5 additional soil samples during test pitting operations, and submitting them to an analytical laboratory for chemical characterization. The chemical parameters above are to be analyzed. The contractor shall provide unit costs for the analytical lab services so that from 1 to 5 samples may be collected.

1.3.3 Groundwater Samples

There is no requirement for collecting groundwater samples in this task order.

1.4 Inspection

The work will be conducted under the general direction of the Contractor and shall be subject to his inspection by his appointed inspectors to ensure strict compliance with the terms of the contract, but the presence of the inspector shall not relieve the sub-contractor of responsibility for the proper execution of the working accordance with the specifications.

1.4.1 QA/QC Parameters

MS/MSD samples will be collected at a rate of five percent for all analytical parameters, with the exception of the TCLP and RCRA parameters.

Rinsate blanks shall be collected at a rate of ten percent, and analyzed for the same chemical parameters as the primary samples, with the exception of the TCLP and RCRA parameters. Rinsate blanks will be collected from decontaminated soil collecting equipment such as split spoons. USACE will randomly select sample locations and decontaminated equipment to collect rinsate samples from.

No VOC trip blanks are needed for soil samples.

Laboratory QA/QC shall include at a minimum: documentation of ongoing instrument calibration, method blanks (one with every batch of 1-20 samples, control spikes, duplicate matrix spikes and percent recoveries for internal quantitation standards and surrogate standards. No additional cost shall be associated with the laboratory and method QA/QC samples.

1.4.2 Sample Preservation, Shipping and Holding Times

Sample preservation and holding times shall be in accordance with their applicable method. It is required that samples be hand delivered or shipped via overnight carrier to the USACE-approved primary laboratory the same day of sample collection, or picked up by the lab carrier on the same day they were collected. Each day that samples are received at the laboratory, a copy of the COC and sample receipt form shall be faxed to the USACE project manager. If samples are collected on a Friday, the Contractor shall ensure that the receiving laboratory can process the samples such that no prep or analysis holding times are exceeded, and that no temperature problems occur with the samples. All soil and water samples will be tested using a turnaround time of 2 weeks.

1.5 Environmental Considerations

1.5.1 Equipment Decontamination

All dedicated equipment used in the sample collection activities must be decontaminated prior to use at each sample location according to a USACE-approved procedure. This includes sampling

equipment, and monitoring instruments.

Field monitoring equipment that comes into contact with soil or groundwater will be decontaminated prior to use at another sampling location. Sampling equipment (trowels, etc) will be cleaned using potable water, detergent such as Alconox, and distilled/deionized water. Decontamination fluids and any water generated from other site activities must be drummed and stored on site at a location to be determined by USACE. Both soil and water IDW will be analyzed prior to disposal. Unless otherwise directed, the Contractor will provide containers (55-gallon drums) and any equipment needed to transport and store them at the proper storage area.

1.6 Summary of Anticipated Sample Testing

Based upon the anticipated scope of work, the following sample testing will be required. If elevated levels of contamination are suspected to be present, additional testing may be required pending USACE pre-approval

Sample	Number
Test Pit Samples (soil)	9
Option A Samples (soil)	up to 5
Total samples to be collected (max)	14

1.4 Investigation Derived Waste

USACE does not expect that significant quantities of IDW will be generated. Any IDW soil will be placed with excavated soils either in piles or replaced in excavations. Decontamination fluids will also be placed with excavated soils. Since it is likely that no significant contamination will be encountered, any trash generated at the site will be removed by the contractor for placement in "clean" trash receptacles.

1.6 Site Restoration

Following the successful completion of all site activities, the Contractor must return all impacted areas of the site to their original condition. This may include regrading, filling in tire ruts and holes, repairing or replacing any damaged materials or site features, reseeding, etc. as needed. All site restoration work will be completed by the Contractor within 2 weeks following the completion of field work involving heavy equipment such as excavators, support trucks, backhoes, etc.

1.7 Laboratory Selection

- The laboratory must be approved by the USACE Philadelphia District prior to performing any analytical work under this SOW.
- The laboratory must provide reporting and detection limits for all parameters listed in this scope. These reporting limits must be approved by USACE prior to initiation of work.

- Reporting limits must be able to meet the site regulatory criteria discussed in the scope of work document;
- The laboratory must provide a Quality Assurance Manual for approval;
- The laboratory must be certified by the state of New Jersey for the parameters to be analyzed at the time the contract is awarded;
- Laboratory must participate in ISO Guide 25 requirements;
- The laboratory must produce, as part of this task order, an electronic data deliverable (EDD) as specified in Section 1.7.1 (below).
- The laboratory must be capable of performing 90% of the analyses "in-house". A subcontract laboratory must be approved by USACE in writing prior to initiation of any work and also be capable of meeting the requirements set forth in this SOW.
- The laboratory must comply with the most recent version of the DoD Quality Systems Manual.

1.7.1 Laboratory Reporting Requirements

As part of the deliverable provided by the A/E firm, USACE will require the following electronic and hard copy products directly (i.e., without modification) from the analytical laboratory:

- CD-ROM containing Adobe Acrobat or pdf file (i.e., electronic hard copy) of laboratory report of analytical results.
- Hard copy laboratory report of analytical results.
- Electronic data deliverable (EDD) containing the information listed below.

The EDD will be in an approved USACE software format such as Excel that is suitable for incorporation into the USACE electronic database. Note: an EDD consisting of a pdf will not be suitable for this application. The EDD format will contain the below list of fields, at a minimum, and shall be approved by the USACE.

- Sample delivery group
- Analytical Laboratory
- Client sample ID
- Lab sample ID
- Date sampled
- Date received
- Date prepped/extracted
- Date analyzed
- CAS number
- Parameter
- Result
- Qualifiers
- Units
- Matrix
- Reporting limit
- Detection limit (MDL)

- Prep method
- Analysis method
- Dilution factor
- Moisture content
- Project specific criteria

The analytical laboratory reporting package will contain the following items:

(1) Cover Sheet. The cover sheet shall specify the following information:
- Name, location and certification numbers of laboratory
- Name, location and certification numbers of any subcontractor laboratory used
- Contract number
- Client name and address
- Project name and site location
- Statement of data authenticity and official signature of person authorizing report release

(2) Table of Contents. Laboratory data packages shall be organized in a format that allows for easy identification and retrieval of information. An index and/or table of contents shall be included for this purpose.

(3) Case Narrative. A case narrative shall be included in each report, outlining any problems with analysis. The case narrative shall also list all methods used. The case narrative shall contain a table correlating field sample numbers and laboratory sample numbers, and indicate which analytical test methods were performed and by which laboratories. Samples that were received but not analyzed shall also be identified. Extractions or analyses that are performed out of holding times shall be appropriately noted. The case narrative shall define all data qualifiers or flags. Deviations of QC sample results from laboratory acceptance limits shall be noted and associated corrective actions taken by the laboratory shall be addressed. Any other factors that could affect the sample results are to be discussed.

(4) Analytical Results. The results for each sample shall contain the following information at a minimum: NOTE: "NDs" are not acceptable for reporting results.

- Project name and unique ID number
- Field sample ID number as written on custody form
- Laboratory name and location (city and state)
- Laboratory sample ID number
- Preparation and analysis batch numbers
- Date sample collected
- Date sample received
- Date sample extracted or prepared
- Date sample analyzed
- Analysis time when holding time limit is less than forty-eight hours
- Method numbers for all preparation and cleanup procedures
- Analysis procedure including method numbers
- Analyte or parameter

- Detection limits (DL) - Estimated sample detection limits based on method detection limits adjusted for sample-specific factors (e.g., aliquot size, dilution or concentration factors, moisture content of a soil or sediment)
- Quantitation Limits (QL)
- Analytical results with correct number of significant figures (Results for solid matrices should be reported on a dry weight basis)
- Concentration units
- Dilution factor: All reported data shall reflect any dilutions and/or concentrations. The dilution factor, if applicable, should be noted on the analytical report. If dilution is required for organic analytes, data from both runs should be recorded and reported.
- Matrix (soil, water, oil, etc.)
- Percent moisture or percent solids
- Chromatograms and other raw data
- Sample aliquot analyzed
- Final extract volume
- Sample preservation

(5) Lower Limit Reporting. The laboratory may use a reporting limit (RL) expressed in terms of detection limit, quantitation limit, regulatory action level, or project-specific threshold limit, however the laboratory's use of these terms must be well defined. In addition, if the non-detect "ND", "U", "<", or other lower limit reporting convention is used, then these terms must also be defined. "ND" is not an acceptable reporting format for Contractor summary tables.

(6) Sample Documentation. Original Chain of Custody (COC) records, shipping documents, and Sample Cooler Receipt Forms shall be attached to each data package.

(7) QC/QA Information. The minimum data package must include internal laboratory QC/QA data with their respective acceptance criteria. The data package shall also include the laboratory's method detection limits for project-specific parameters. The data package shall correlate the method QC data with the corresponding environmental samples on a per batch basis. Method QC data include all spike recoveries, including surrogate spike recoveries; all measures of precision, including relative percent difference (RPD); and all control limits for accuracy and precision. This would include laboratory performance information such as results for method blanks (MBs), recoveries for Laboratory Control Standard (LCS) and Laboratory Control Standard Duplicate (LCSD), RPD for LCS/LCSD pairs, and recoveries for QC sample surrogates; and matrix-specific information such as sample duplicate RPDs, MS and MSD recoveries, MS/MSD RPDs, and field sample surrogate recoveries, serial dilutions, and post-digestion spikes. At a minimum, internal QC samples shall be analyzed and reported at rates specified in the specific methods or as specified in the contract, whichever is greater. Any deviations from the control limits shall be noted. For example, the data package should document the matrix spike (MS) and duplicate spike level, the MS and duplicate spike sample result, the percent recovery of the MS and duplicate, the respective RPD, and the acceptance criteria for spike recovery and RPD. The data reporting package will contain sufficient information to allow complete reconstruction of the analyses that were performed.

2.0 DELIVERABLES

The Contractor shall submit to USACE a draft report of the field sampling activities and analytical results for the chemical characterization work performed. The report will be prepared in Microsoft Word. Figures shall be prepared in AutoCAD for Windows and tables shall be prepared in Microsoft Excel.

The draft report shall be submitted to USACE within 30 calendar days of completion of the test pits and field sampling work. USACE will review the draft chemical characterization report and provide comments within 7 calendar days of receipt of the draft report. The contractor will submit the final chemical characterization report, with all comments addressed, to USACE within 7 calendar days of receipt of the review comments.

The report shall clearly summarize the sampling and analysis work performed, equipment and supplies used, and contain the analytical results from the soil and groundwater samples. It shall describe all methodologies used in the field and laboratory, and present the analytical results and data in tabular form. A section describing any project-related problems or deviations from the work plan and SAP will be included. Summary tables will be prepared to compare data to applicable standards. RCRA and New Jersey Department of Environmental Protection (NJDEP) standards will be used to classify soil results as hazardous or non-hazardous. Exceedances will be bolded in the tables. A discussion will be provided which summarizes the results in the comparison tables. A figure containing the sampling locations as well as posted data will be included in the report. All field notes and data will be included in appropriate appendices. Note: the draft summary tables, with comparison columns containing the appropriate regulatory criteria (RCRA hazardous waste criteria and NJDEP criteria), and with exceedances bolded, are required as a deliverable. See Section 4 of the scope document for required deliverables.

Three bound copies and one unbound copy of the draft report will be submitted to USACE within 30 calendar days of receipt of the final analytical results by the Contractor. USACE will provide review comments on the draft report and will return these comments to the Contractor within 7 calendar days. Within 7 calendar days following receipt of USACE comments, the Contractor shall address all comments and submit the final report to USACE.
A CD Rom pdf of the complete document (including tables, graphs, appendices, and attachments) and all electronic files making up the report will also be submitted to USACE.

The recommended content and format of the report deliverable prepared by the Contractor to summarize and discuss the analytical results should be structured as follows:

(1) TITLE PAGE – will include the appropriate title, date, author, and contract number.
(2) EXECUTIVE SUMMARY – will contain a brief description of the study's purpose, findings, and conclusions.0
(3) TABLE OF CONTENTS – will include a list of all figures and tables presented in the report.
(4) INTRODUCTION – will state the purpose of the study with background information on the project and area.
(5) METHODOLOGY – describes all field work and procedures related to the performance of each task in this scope of work; describes the sampling and analysis equipment and all

methodologies used in the field and laboratory.
(6) RESULTS – will present the collected data in tabular form, including columns containing appropriate regulatory standards. The data shall be compared to the regulatory standards and exceedances will be bolded. A summary table containing only sample results that exceed their respective regulatory standards will also be generated. A base map illustrating the project area, borehole/sampling locations, and posted data shall be included. A discussion of the results will be presented in the report, along with appropriate conclusions regarding the analytical results.
(7) A LIST OF REFERENCES – will include literature cited and agencies or individuals consulted. The bibliography must be in a format used by professional scientific journals.
(8) APPENDICES – will contain a copy of this scope of work, raw data sheets, record logs, field notes, the laboratory analytical report, and other pertinent information.

ATTACHMENT 2

Test Pit Logs

O'BRIEN & GERE

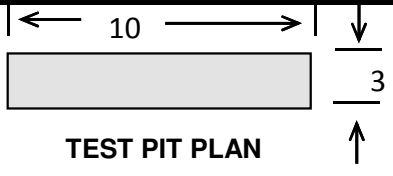
TEST PIT LOG

TEST PIT NO. 01

PROJECT:	Assunpink Creek Restoration Project	JOB NO.:	46661
CLIENT:	USACE North Atlantic Division; Philadelphia District	GROUND ELEV.:	24.939 ft
CONTRACTOR:	O'Brien & Gere Operations, LLC	Location:	N 504226.315 E 417974.036
EQUIPMENT:	Cat 315 Trackhoe	DATUM:	NAVD 88 / NAD 83
OPERATOR:	Drew Baldwin	GROUND WATER DEPTH:	14'
INSPECTOR:	Stephen Scott	TIME STARTED: 1045	DATE STARTED: 9/17/10
No. of Disturbed Samples:	7	TIME FINISHED: 1145	DATE FINISHED: 9/17/10

Depth Ft.	Geotech Sample #	PID Readings (ppm)	GEOLOGIC DESCRIPTION	REMARKS
		0.0	FILL: SILTY SAND (SM): m. brown, moist, dense, Silty SAND, some f-c gravel; Contains few cobbles, trace brick and concrete fragments	
	S-1	0.0	FILL: SILTY SAND with GRAVEL (SM): orange/brown, moist, m. dense f-c SAND with few f- gravel and some silt fines; Contains cobbles, brick and concrete fragments, occasional boulders	
	S-2	0.0	FILL: SILTY GRAVEL with SAND (GM): m. brown, moist, m. dense, f-c GRAVEL with some f-c sand, little silt fines; Contains cobbles, brick, and concrete. 1.5' x 1.5' x 1' sized concrete pieces with 1/2" diameter rebar; several 10' long, 1/2" to 1" diameter rebar	
5		0.0		
		0.0		
		0.0	Rebar absent below 8'	
	S-3	0.0		
10	S-4	0.0	FILL: SILTY SAND (SM): brown, moist, m. dense, Silty SAND with gravel; Contains brick and concrete fragments, cobbles and angular boulders	Sample collected at 12' for environmental analysis. Composite sample collected from 0-13.5' for environmental analysis. ▼Groundwater entering test pit at 14'.
		0.0		
		0.0		
		0.0		
15		26.9	Test Pit terminated at 14' due to fuel oil odor, sheen on groundwater, and 26.9 ppm reading on PID at 14'	Sample collected at 14' for environmental analysis.

TEST PIT LOCATION AND NOTES:



TEST PIT PLAN

NORTH

TEST PIT LOG

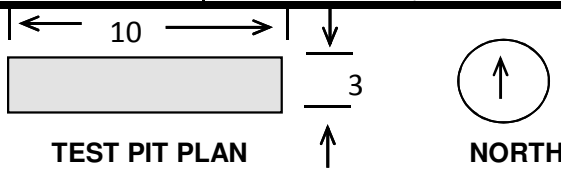
TEST PIT NO. 02

PROJECT:	Assunpink Creek Restoration Project	JOB NO.:	46661
CLIENT:	USACE North Atlantic Division; Philadelphia District	GROUND ELEV.:	22.176 ft
CONTRACTOR:	O'Brien & Gere Operations, LLC	Location:	N 504277.564 E 418048.884
EQUIPMENT:	Cat 315 Trackhoe	DATUM:	NAVD 88 / NAD 83
OPERATOR:	Drew Baldwin	GROUND WATER DEPTH:	11'
INSPECTOR:	Stephen Scott	TIME STARTED: 845	DATE STARTED: 9/17/10
No. of Disturbed Samples:	6	TIME FINISHED: 930	DATE FINISHED: 9/17/10

Depth Ft.	Geotech Sample #	PID Readings (ppm)	GEOLOGIC DESCRIPTION	REMARKS
		0.0	FILL: SILTY GRAVEL with SAND (GM): gray, moist, dense graded aggregate	
2	S-1	0.0	FILL: SILTY SAND with GRAVEL (SM): dark brown, moist, m. dense Silty SAND with some f-c gravel	
		0.0		
4	S-2	0.0	FILL: SILTY SAND with GRAVEL (SM): grayish brown, moist, dense, Silty SAND with little f-c gravel; Contains cobbles, brick fragments, ceramic fragments	
		0.0		
6		0.0		
		0.0		
	S-3		FILL: Poorly-graded GRAVEL with SILT and SAND (GP-GM): brown, moist, m. dense, poorly-graded GRAVEL with few silt and some sand; Contains cobbles, occasional boulders, brick fragments, and ceramics	Sample collected at 7' for environmental analysis.
8				Sidewalls caving below 8.5'
10				Composite sample collected from 2-10.5' for environmental analysis
		20.6	Test Pit terminated at 11.5' due to fuel oil odor, floating product on groundwater, and a 20.6 ppm PID reading	▼Groundwater entering test pit at 11' ; Sample collected at 11' for environmental analysis.
12		18.9		

TEST PIT LOCATION AND NOTES:

Thin layer of black LNAPL observed on groundwater. Product is not continuous layer on the surface of groundwater, but rather sporadic globs. The LNAPL has a viscosity greater than water.



TEST PIT LOG

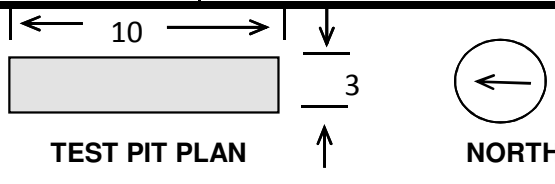
TEST PIT NO. 03

PROJECT:	Assunpink Creek Restoration Project	JOB NO.:	46661
CLIENT:	USACE North Atlantic Division; Philadelphia District	GROUND ELEV.:	21.248 ft
CONTRACTOR:	O'Brien & Gere Operations, LLC	Location:	N 504301.228 E 418101.025
EQUIPMENT:	Cat 315 Trackhoe	DATUM:	NAVD 88 / NAD 83
OPERATOR:	Drew Baldwin	GROUND WATER DEPTH:	8'
INSPECTOR:	Dreher Whetstone	TIME STARTED: 1630	DATE STARTED: 9/16/10
No. of Disturbed Samples:	3	TIME FINISHED: 1700	DATE FINISHED: 9/16/10

Depth Ft.	Geotech Sample #	PID Readings (ppm)	GEOLOGIC DESCRIPTION	REMARKS
		0.0	FILL: SILTY GRAVEL with SAND (GM): gray, dry, dense graded aggregate	
2	S-1	0.0		
		0.0	FILL: SILTY SAND (SM): dark brown, moist, m. dense, f-c SAND, some silt, trace gravel	
4		0.0	FILL: SILTY SAND with GRAVEL (SM): tan/orange, moist, dense, f-c SAND, little silt, some f-c gravel; Contains brick fragments, little wood, few cobbles	
		0.0	FILL: SILTY SAND with GRAVEL (SM): brown, gray, moist, dense, f-c SAND with some gravel, little silt; Contains some cobbles, few small boulders some brick fragments	
6		0.0		
	S-2	0.0		
8		0.0		▼Groundwater entering test pit at 8'. Trapped water below 8', filling hole; Sidewalls caving below 8' depth. Sample collected at 8' for environmental analysis.
		1.0	FILL: Cobbles and Boulders with wet Silty SAND matrix; Contains brick and small tree trunks. Sheen on groundwater and fuel oil odor.	
10		1.0		
		1.0		
12		0.0		
			Test Pit terminated at 12'.	

TEST PIT LOCATION AND NOTES:

A portion of TP-03 (8') and TP-04 (13') were composited for environmental analysis.



O'BRIEN & GERE

TEST PIT LOG

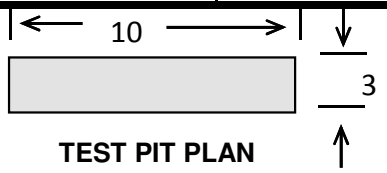
TEST PIT NO. 04

PROJECT:	Assunpink Creek Restoration Project	JOB NO.:	46661
CLIENT:	USACE North Atlantic Division; Philadelphia District	GROUND ELEV.:	20.489 ft
CONTRACTOR:	O'Brien & Gere Operations, LLC	Location:	N 504341.941 E 418106.224
EQUIPMENT:	Cat 315 Trackhoe	DATUM:	NAVD 88 / NAD 83
OPERATOR:	Drew Baldwin	GROUND WATER DEPTH:	8'
INSPECTOR:	Dreher Whetstone	TIME STARTED: NR	DATE STARTED: 9/16/10
No. of Disturbed Samples:	4	TIME FINISHED: NR	DATE FINISHED: 9/16/10

Depth Ft.	Geotech Sample #	PID Readings (ppm)	GEOLOGIC DESCRIPTION	REMARKS
	S-1	0.0	FILL: SILTY SAND (SM): tan, orange, moist, dense, f- SAND, little silt, few f-c gravel and cobbles	Sidewalls relatively stable to 10'
		0.0		
		0.0		
	S-2		FILL: SILTY GRAVEL with SAND (GM): dark gray, brown, moist, m. dense, f-c GRAVEL with some f-c sand, few silt fines; Contains cobbles and moderate concentration of bricks	
5		0.0		
		0.0		
		0.0		
	S-3	0.0	FILL: SILTY SAND with GRAVEL (SM): dark brown, moist, f-c SAND, some f-c gravel, little silt fines	▼Groundwater entering test pit at 8'.
10		0.0	FILL: SILTY SAND (SM): black, wet, loose, Silty SAND with organics and roots	
		0.0	ROCK FILL: brown, black, wet, loose, mostly COBBLES with Silty SAND; Contains wood debris and brick fragments	
		0.0		Sample collected at 13' for environmental analysis.
		0.0		
15		0.0	BEDROCK Test Pit terminated at 15'.	

TEST PIT LOCATION AND NOTES:

A portion of TP-03 (8') and TP-04 (13') were composited for environmental analysis.



TEST PIT PLAN

NORTH

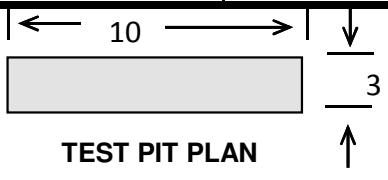
TEST PIT LOG

TEST PIT NO. 05

PROJECT:	Assunpink Creek Restoration Project	JOB NO.:	46661
CLIENT:	USACE North Atlantic Division; Philadelphia District	GROUND ELEV.:	19.64 ft
CONTRACTOR:	O'Brien & Gere Operations, LLC	Location:	N 504391.867 E 418174.210
EQUIPMENT:	Cat 315 Trackhoe	DATUM:	NAVD 88 / NAD 83
OPERATOR:	Drew Baldwin	GROUND WATER DEPTH:	8'
INSPECTOR:	Dreher Whetstone	TIME STARTED: 1345	DATE STARTED: 9/16/10
No. of Disturbed Samples:	5	TIME FINISHED: 1430	DATE FINISHED: 9/16/10

Depth Ft.	Geotech Sample #	PID Readings (ppm)	GEOLOGIC DESCRIPTION	REMARKS
	S-1	0.0	FILL: SILTY SAND (SM): tan, moist, dense f-c SAND, some silt fines, few, f-c gravel; Contains cobbles, boulders (12-24") at 2-3', and brick fragments	
		0.0		
		0.0	FILL: SILTY SAND with GRAVEL (SM): dark gray, moist, f-c SAND ittle f-c gravel, little silt fines; Contains some brick fragments, cobbles, occasional boulders, and trace wood debris	
	S-2			
5		0.0		
	S-3	0.0	FILL: SILTY SAND with GRAVEL (SM): dark gray to black, moist f-c SAND, some f-c gravel, little silt fines, and organic fibers; Contains few tree limbs, brick fragments, and cobbles; Becoming wet at 8'	▼Groundwater entering test pit at 8'. Water trapped in rock fill. Sample collected at 8' for environmental analysis.
		0.0		
		0.0		
		0.0	ROCK FILL: black, wet, loose, cobbles and boulders with Silty SAND; Fill contains cobbles (6-8"), small boulders, brick fragments, and 4-6" diameter tree trunks. High concentrations of buried wood debris (trees) at 10-12'.	
10		0.0		
		0.0		
		0.0		
		0.0		Rock appeared to be highly fractured; excavated in large pieces.
15		0.0	Test Pit terminated at 14' on probable bedrock.	Composite sample collected from 0-14' for environmental analysis.

TEST PIT LOCATION AND NOTES:



TEST PIT PLAN

NORTH

TEST PIT LOG

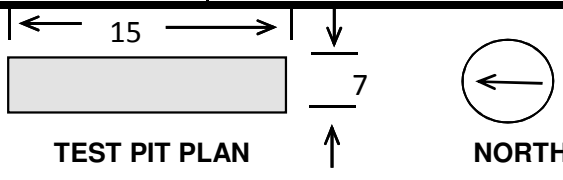
TEST PIT NO. 06

PROJECT:	Assunpink Creek Restoration Project	JOB NO.:	46661
CLIENT:	USACE North Atlantic Division; Philadelphia District	GROUND ELEV.:	25.869 ft
CONTRACTOR:	O'Brien & Gere Operations, LLC	Location:	N 504377.549 E 418213.284
EQUIPMENT:	Cat 315 Trackhoe	DATUM:	NAVD 88 / NAD 83
OPERATOR:	Drew Baldwin	GROUND WATER DEPTH:	14'
INSPECTOR:	Dreher Whetstone	TIME STARTED: 1130	DATE STARTED: 9/16/10
No. of Disturbed Samples:	5	TIME FINISHED: 1220	DATE FINISHED: 9/16/10

Depth Ft.	Geotech Sample #	PID Readings (ppm)	GEOLOGIC DESCRIPTION	REMARKS
	S-1	0.0	FILL: SILTY SAND with GRAVEL (SM): brown, orange, gray, moist, f-c SAND with little f-gravel and trace cobbles; Contains trace concrete and brick fragments	Datum for depth measurements is at ground surface elevation referenced above, at upper end of test pit.
3		0.0		
	S-2	0.0	FILL: Poorly-graded SAND with SILT (SP-SM): orange, moist, poorly-graded f-c SAND with few silt fines and trace f-gravel	
6		0.0		
	S-3	0.0	FILL: SILTY SAND with GRAVEL (SM): brown, gray, moist, f-c SAND with few f- gravel, little silt fines; Contains bricks, cobbles, and trace glass; Occasional boulders	Sample collected at 7' for environmental analysis.
9		0.0		
	S-4	0.0	ROCK FILL: wet, cobbles and boulders with Silty SAND with GRAVEL; Contains block stones of variable sizes	4" x 4" wood timber at north end of test pit.
12		0.0		
	S-5	0.0	ROCK FILL: wet, cobbles and boulders with Silty SAND with GRAVEL	▼Groundwater entering test pit at 14'. Water trapped in rock fill.
15		0.0		
		0.0		
18		0.0	Test Pit terminated at 17'	

TEST PIT LOCATION AND NOTES:

A portion of TP-06 (7') and TP-07 (0-13.5') were composited for environmental analysis.



TEST PIT PLAN

NORTH

O'BRIEN & GERE — TEST PIT LOG

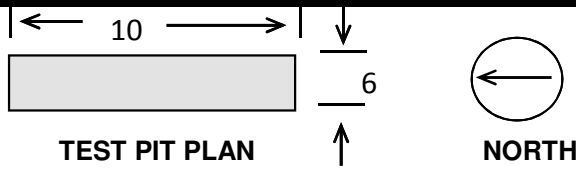
TEST PIT NO. 07

PROJECT:	Assunpink Creek Restoration Project	JOB NO.:	46661
CLIENT:	USACE North Atlantic Division; Philadelphia District	GROUND ELEV.:	19.804 ft
CONTRACTOR:	O'Brien & Gere Operations, LLC	Location:	N 504448.14 E 418261.479
EQUIPMENT:	Cat 315 Trackhoe	DATUM:	NAVD 88 / NAD 83
OPERATOR:	Drew Baldwin	GROUND WATER DEPTH:	8'
INSPECTOR:	Stephen Scott	TIME STARTED: 915	DATE STARTED: 9/16/10
No. of Disturbed Samples:	6	TIME FINISHED: 1055	DATE FINISHED: 9/16/10

Depth Ft.	Geotech Sample #	PID Readings (ppm)	GEOLOGIC DESCRIPTION	REMARKS
	S-1	0.0	FILL: SILTY SAND with GRAVEL (SM): brown, light tan, moist, f-c SAND with little f- gravel, some silt fines, few 4-6" cobbles; Contains brick fragments and sub-rounded gravel	Top of culvert wall at 18" below surface.
		0.0	… With few 12-16" boulders	
			… 2" cast iron/steel pipe found at 3.5' (abandoned or debris)	
	S-2	0.0	FILL: SILTY SAND with GRAVEL (SM): reddish orange, moist, f-c SAND with some rounded f-gravel, little silt fines; Contains trace brick fragments and few 4-6" rounded cobbles	
5		0.0		
	S-3	0.0	Large 24" boulder observed at 6-8'	
		0.0	Same as above, except wet	
	S-4	0.0	Nest of cobbles and boulders observed at 9-10'	▼Groundwater entering test pit at 8'. Water trapped in rock fill. Heavy groundwater flow from nest of boulders or old pipe.
10		0.0	FILL: SILTY GRAVEL (GM): brown, wet, f-c GRAVEL with some sand and cobbles, few boulders, little silt	
		0.0	Concrete culvert footing (18" wide) observed at 12'	4" core hole in wall of culvert (weep hole)
		0.0		
		0.0	BEDROCK: Bedrock encountered at 13.5'	Sample collected at 13.5' for environmental analysis.
			Test Pit terminated at 13.5' at bedrock	Composite sample collected from 0-13.5' for environmental analysis.
15		0.0		

TEST PIT LOCATION AND NOTES:

A portion of TP-06 (7') and TP-07 (0-13.5') were composited for environmental analysis.



TEST PIT PLAN **NORTH**

TEST PIT LOG

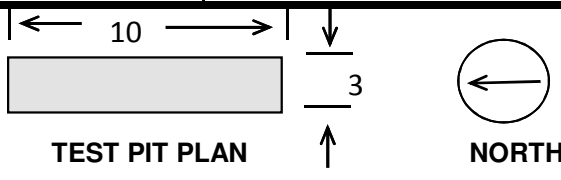
TEST PIT NO. 08

PROJECT:	Assunpink Creek Restoration Project	JOB NO.:	46661
CLIENT:	USACE North Atlantic Division; Philadelphia District	GROUND ELEV.:	19.909 ft
CONTRACTOR:	O'Brien & Gere Operations, LLC	Location:	N 504521.807 E 418247.684
EQUIPMENT:	Cat 315 Trackhoe	DATUM:	NAVD 88 / NAD 83
OPERATOR:	Drew Baldwin	GROUND WATER DEPTH:	8'
INSPECTOR:	Stephen Scott	TIME STARTED: 1415	DATE STARTED: 9/17/10
No. of Disturbed Samples:	5	TIME FINISHED: 1500	DATE FINISHED: 9/17/10

Depth Ft.	Geotech Sample #	PID Readings (ppm)	GEOLOGIC DESCRIPTION	REMARKS
		0.0	FILL: SILTY SAND with GRAVEL (SM): light brown, dry, m. dense, Silty SAND with gravel	
2		0.0		
	S-1	0.0	FILL: SILTY SAND with GRAVEL (SM): medium brown, moist, m. dense, f-c SAND with some silt, few f-gravel, and cobbles; Contains concrete, bricks, and occasional boulder	
4		0.0		Sample collected at 4' for environmental analysis.
		0.0		
6		0.0		Sidewalls collapsing below 6'.
		0.0	SILTY SAND with GRAVEL (SM): brown, moist, m. dense to loose, Silty f-c SAND with f-c gravel; Contains rounded cobbles, boulders, appears native	
8		0.0		▼Groundwater entering test pit at 8'.
	S-3	0.0	Poorly-graded GRAVEL with SAND (GP): dark brown, moist, poorly-graded GRAVEL with sand.	
10		0.0		
	S-2	0.0	Well-graded GRAVEL with SAND (GW): brown, moist, well-graded GRAVEL with SAND	Composite sample collected from 0-11' for environmental analysis.
12		0.0	Test Pit terminated at 11'; Bedrock refusal	

TEST PIT LOCATION AND NOTES:

A portion of TP-08 (0-11') and TP-09 (0-9') were composited for environmental analysis.



TEST PIT LOG

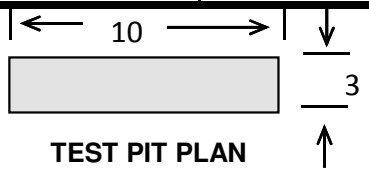
TEST PIT NO. 09

PROJECT:	Assunpink Creek Restoration Project	JOB NO.:	46661
CLIENT:	USACE North Atlantic Division; Philadelphia District	GROUND ELEV.:	21.556 ft
CONTRACTOR:	O'Brien & Gere Operations, LLC	Location:	N 504505.524 E 418173.118
EQUIPMENT:	Cat 315 Trackhoe	DATUM:	NAVD 88 / NAD 83
OPERATOR:	Drew Baldwin	GROUND WATER DEPTH:	8'
INSPECTOR:	Stephen Scott	TIME STARTED: 1320	DATE STARTED: 9/17/10
No. of Disturbed Samples:	4	TIME FINISHED: 1355	DATE FINISHED: 9/17/10

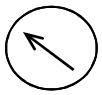
Depth Ft.	Geotech Sample #	PID Readings (ppm)	GEOLOGIC DESCRIPTION	REMARKS
		0.0	FILL: SILTY SAND with GRAVEL (SM): light brown, dry, m. dense, Silty SAND with gravel	
2	S-1	0.0		
		0.0	FILL: SILTY SAND with GRAVEL (SM): medium brown, moist, m. dense, f-c SAND with little f-gravel, cobbles, and little silt fines; Contains concrete, bricks, and occasional boulders	
4	S-2	0.0		
		0.0	FILL: SILTY SAND (SM): dark brown, moist, f-c SAND, some silt fines, trace gravel	
6		0.0		
		0.0		Sample collected at 7' for environmental analysis; Sidewalls collapsing below 7'
8		0.0	SILTY SAND with GRAVEL (SM): brown, moist, m. dense to loose, Silty f-c SAND with f-c gravel; Contains rounded cobbles, boulders, appears native	▼Groundwater entering test pit at 8'.
		0.0		
10		0.0	Test Pit terminated at 9'. Sidewalls continuously collapsing, cannot achieve greater depth.	Composite sample collected from 0-9' for environmental analysis.
		0.0		
12		0.0		

TEST PIT LOCATION AND NOTES:

A portion of TP-08 (0-11') and TP-09 (0-9') were composited for environmental analysis.



TEST PIT PLAN



NORTH

ATTACHMENT 3

Field Notes

CONTENTS

PAGE	REFERENCE	DATE

Location Trenton, NJ Date 9/16/10

Project / Client Assunpink Test Pits.

WEATHER: 80°F clear

0730 OBG (OB, SC, DW, SRS) onsite for geotech/Env. investigation V.G test pit digging. Utilities marked by NJ one call & private utility mailer. SRS calibrates MiniRae 2000 PID unit calibrates & is functioning properly.

0815 VSAGE Onsite: Earl, Corey and Mike Mohn Tracknoe delivered to Site this morning. Accutest labs drops off Coolerware. SRS will screen excavated material w/ PID. Excavated material will be classified using Unified Soil classification System. Geologic Samples will be collected at approx 2ft intervals and env. samples (at least one per test pit) will be collected.

IDEO TP-07 refusal on bedrock @ 3.5 bgs (see locator details)

~~TP070910ED3.5 collected by SRS for VOCs (3 encores), TCL+TICs/moisture~~ SRS collected

Location _____ Date 9/16/10

Project / Client _____

1115 TP07 091620100013.5 collected by SRS for additional parameters (will be defined in later entry). This is a composite sample collected from test pit material 0-13.5' bgs. VOC samples (ie. collected at 1100) will be discrete grab intervals (i.e. in the case of the 1100 sample, from 13.5' bgs.

1130 Begin TP-6

1150 TP06 091620100 07 collected by SRS for VOC, TCLP VOC, mois & addit params. This is a grab sample collected from 7' bgs.

1245 TP06 terminated @ 17': sidewall continuous cave-in.

1345 Begin TP-05.

1355 TP05 091620100 08, MS, MSD collected by SRS for VOC, TCLP VOC & mois.

1445 TP05 091620100014 MS, MSD collected by SRS for addit. params. End TP-05 on refusal/bedrock @ 14' bgs.

1545 TP04 091620101 3 collected by SRS for VOC, TCLP VOC, moisture and addit. params. ~ SRS 9/16/10

Location _____ Date 9/16/10

Project / Client _____

1600 TP-04 terminated/refusal on bedrock @ 15' bgs. Sample collected to denote Additional params are: SVOC, TAL Metals, PCB, Pest, Herb, DRO, GRO, TCLP (metals, SVOC, Pest, Herb, VOC) Ignitability, Corrosivity, Reactivity, Cyanide & Sulfides. Only if samples MS/MSD will be duplicated for TCLP, Ignit, Corros & Reactivity. The rest will be placed on AOC D. All sampling, work, decon, H&S is being conducted in accordance with the FSP, QAPP, HASP & WP.

1630 Begin TP-3

1700 TP03 091620100 18 collected by SRS for VOC, TCLP VOC, mois and addit. params. Fuel oil odor & sheen on groundwater from 8-12' bgs. PID 1.0 ppm. Boring terminated @ 12' bgs due to lightning storm.

1745 All hands offsite. USACE offsite @ 1200. End of Entry. 9/16/10

Location Trenton, NJ Date 09/17/10

Project / Client Assunpink Test Pits

WEATHER: 75°F Clear/sunny

0700 SRS/MH onsite: prep for sampling

0730 Dan Baldwin (DBS) onsite.

SRS calls M. Mount/USACE w/ status report of yesterday's activities

0835 Begin TP-07 @ 0830

Note: TP0209172010 RB collected (by SRS/MH) for VOC, SVOC, TAL metals, Pest/PCB, DRO/GRO. This is a field rinsate blank sample collected by pouring lab supplied DI water over decontaminated stainless steel sampling spoon into the appropriate lab supplied containers.

0915 TP0709172010 07 collected by SRS for VOC, TCLP VOC & Moisture

097 TP0709172010 07 10-5 collected by SRS for addit. params. This is a composite from 2-10.5' @ TP-07. 0-2' is aggregate used for driveway and is not included in sample. -SRS 9/17/10

Location Date 9/17/10 7

Project / Client

0930 Groundwater in TP-07 @ 11' soil is reading 20.6 ppm w/PID, faint oil odor, free product/blade sheen on GW, thickness is less than 0.01'.

0935 TP0709172011 collected by SRS for VOC, TCLP VOC, moist & addit. params. Discussion w/ MJC & MM/USACE. Test pit will be reconstructed @ 11.5' bgs due to fuel oil/ floating product impact.

0940 End TP-07, all material replaced in Test pit, impacted material was kept in excavator bucket, & replaced.

1030 Prep to move to TP-1

No visual/odor indications of fuel oil on excavator bucket. SRS stays w/ PID=0.0 ppm.

1045 Begin TP-1

1125 TP0709172012 collected by SRS for VOC, TCLP VOC & moisture.

SRS 9/17/10

Location _____ Date 9/7/10

Project / Client _____

1130 TP01091720100135 collected by SRS for addit. Params.
1140 TP01091720101 4 collected by SRS for VOC, TCLP VOC, Mois and addit. Params. Ground water entering TP-01 at 14' bgs fuel oil odor, sheen on groundwater soil PID at 14' is 26.9 ppm. Test pit terminated at 14' due to impurities based on field observations.
1145 Test pit complete will backfill then monitor excavator bucket w/ PID as per TP-02. If bucket is not impacted (per field observations) will mobilize to TP-08 or TP-09.
1320 Begin TP-09
Note: 1305 TP01091720101RB collected by SRS/MH for same params and using same methodology as 0930 9/7/10 rinsate blank
1345 TP09091720100 7 collected by SRS for VOC, TCLP VOC & mois.

SRS.

Location _____ Date 9/7/10

Project / Client _____

1345 (cont.) this q also collected for SVOC, PCB, Pest/Herb, TAL metals, DRO & GRO.
1355 End TP-09 @ 9' due to constant sidewall collapse.
1415 Begin TP-08
1430 TP08091720100 4 collected by SRS for VOC, TCLP VOC, mois, SVOC, PCB, Pest/Herb, TAL metals, DRO & GRO.
1500 End TP-08, Refusal on bedrock @ 11'. Attempted to dig through bedrock from 1440-1500, could not penetrate.
Note 1445 TP08-09091720100 collected by SRS for TCLP metals, TCLP SVOC, TCLP Pest/Herb, Ignitability, Corrosivity & Reactivity (sulfide & CN). This is a sample collected (as per USACE direction) of the TP-09 (0-9') & TP-08 (0-11') material. All sch. activities complete.

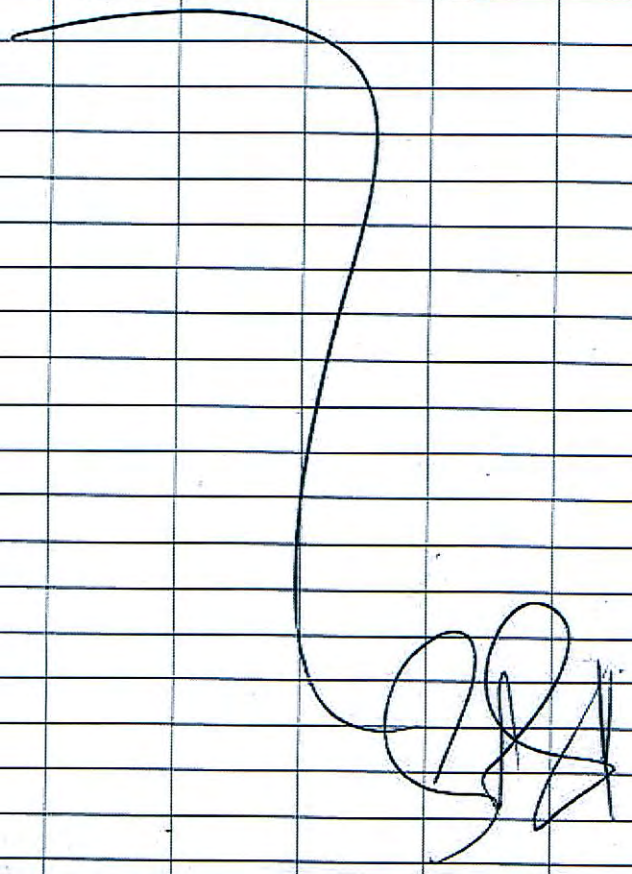
SRS 9/7/10

10

Location _____ Date 9/17/10

Project / Client _____

1620 SRS CO finishes sampling to couriers. Decon fluids poured into test pit area. All hands offsite End of Entry.



11

Location _____ Date _____

Project / Client _____

ATTACHMENT 4

Laboratory Data (CD)