Proactive by Design

SHORT TERM RESPONSE ACTION PLAN (STRAP): DIKE ACCESS ROAD

642 Allens Avenue
Providence, Rhode Island

June 29, 2016
GZA File No.: 03.0033554.90

PREPARED FOR:
Rhode Island Department of Environmental Management (RIDEM)
Providence, Rhode Island

ON BEHALF OF:
nationalgrid

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June 29, 2016
File No. 03.00033554.90

Via E-Mail and U.S. Mail

Mr. Joseph Martella
Rhode Island Department of Environmental Management (RIDEM)
Office of Waste Management
235 Promenade Street
Providence, Rhode Island 02908

Re: Short Term Response Action Plan (STRAP):
Dike Access Road
642 Allens Avenue
Providence, Rhode Island
RIDEM Case No. 98-004 / Site Remediation File No. SR-28-1152

Dear Mr. Martella:

On behalf of the Narragansett Electric Company d/b/a National Grid (National Grid), GZA GeoEnvironmental, Inc. (GZA) is pleased to present to the Rhode Island Department of Environmental Management (RIDEM) the attached Short Term Response Action Plan (STRAP).

This STRAP describes proposed remedial actions associated with the installation of a new access road at the 642 Allens Avenue Site. The new access road will traverse over an existing containment dike associated with the Liquefied Natural Gas (LNG) facility and the remedial actions consist of installation of an engineered remedial cap designed to address potential human exposure to impacted soils.

Should you have any questions or comments regarding the information presented herein, please do not hesitate to contact the undersigned or Amy Willoughby from National Grid at (401) 258-5410.

Very truly yours,

GZA GEOENVIRONMENTAL, INC.

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MSK/tlb
Attachment: *STRAP Dike Access Road*
cc: Amy Willoughby, National Grid
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TABLES

FIGURES

APPENDICES

1.0 INTRODUCTION

On behalf of The Narragansett Electric Company (TNEC) d/b/a National Grid (National Grid), GZA GeoEnvironmental, Inc. (GZA) is pleased to present to the Rhode Island Department of Environmental Management (RIDEM) this *Short-Term Response Action Plan (STRAP)* for the former 642 Allens Avenue Manufactured Gas Plant (MGP) located in Providence, Rhode Island (herein referred to as the "Site"). A Project Locus Map is presented on Figure 1, *Cover Sheet, Index to Drawings and Locus Plan*.

This *STRAP* has been prepared to address applicable requirements of Section 6.00 – Emergency or Short Term Response, of the RIDEM Rules and Regulations for the Investigation and Remediation of Hazardous Materials Releases (Remediation Regulations).

This *STRAP* is subject to the Limitations included in Appendix A.

1.1 PROJECT OBJECTIVES

National Grid plans on constructing a new containment dike access road for the Liquefied Natural Gas (LNG) facility. The proposed new dike access road will run from Terminal Road, along the southern extent of the existing containment dike, and extend to the southeastern portion of the dike area. This plan has been prepared to address soils in the vicinity of the new dike access road (referred to herein as the "STRAP Area") exhibiting impacts in excess of the RIDEM Method 1 Criteria via installation of an engineered cap. A large portion of the grading elevation cut is into the existing containment dike, which, based on limited explorations through the dike (outside of the STRAP Area), was constructed using engineered import fill material.

As described herein, proposed STRAP activities include installing erosion and sedimentation controls, grading and off-Site disposal of excess materials and installation of an engineered cap. The construction of the engineered cap will also require on-Site infiltration of treated stormwater via an engineered underground treatment/infiltration unit. In addition, the new access road project will also include installation of retaining structures, the installation of new utilities (new water line, new drain line and new underground electrical conduit) and the installation of some new fencing.

Figure 2, *Existing Conditions Plan*, presents the location of existing buildings, roads, landscaped areas and approximate property boundaries based on tax map information for the Site. This plan also shows the approximate 4 acre Limit of Work (LOW) which is located on the southeastern portion of the Site. The STRAP Area (included in the LOW) is approximately 39,000 SF and will consist of a new engineered cap. Figure 4, *Proposed Conditions Plan*, presents the configuration of the new dike road and associated structures and utilities.[1]

2.0 BACKGROUND

The following sections present a summary of relevant background information for the Site, with focus on the LOW, including relevant historical operations, regulatory history and status of the RIDEM-listed Site.

[1] The new dike access road project was designed by Kiewit Engineering and Design Co.

2.1 SITE DESCRIPTION AND HISTORY

The Site is located at 642 Allens Avenue in the southeastern portion of the City of Providence, Rhode Island and is identified as Assessor's Plat (A.P.) 56, Lots 5, 273, 316 and 317, and A.P. 101, Lot 1. The Site consists of approximately 42 acres with frontage on Allens Avenue to the west and bounded to the east by the Providence River. It is adjoined to the northwest by Motiva/Texaco, and to the south by Terminal Road, the former Sun Oil/Providence Port facility, and New England Bituminous Terminal Corporation. Currently, active natural gas regulation and distribution, gas construction storage, a compressed natural gas (CNG) fueling station, (LNG) storage and distribution, and cement storage and distribution activities are conducted at the 642 Allens Avenue property. The LOW consists of approximately 4 acres on the southeastern portion of the Site and is located on A.P. 56 Lots 273 and 316. This area is currently utilized for LNG operations (location of portion of containment dike for the LNG tank) and for storage in the cement distribution facility. The table below presents a summary of the current Site use:

A.P.	Lot	Current Owner	Address	Current Use(s)
101	1	TNEC	642 Allens Avenue 670 Allens Avenue	Natural Gas Construction Storage Natural Gas Regulation and Distribution CNG Fueling Station
56	5	TNEC	642 Allens Avenue	Natural Gas Construction Storage Natural Gas Regulation and Distribution
56	273	TNEC	139 Terminal Road	Cement Storage and Distribution
56	316	TNEC	121 Terminal Road	LNG Facility
56	317	TNEC	121 Terminal Road	Access Road

The Site is generally level with gentle slopes towards the Providence River and is entirely enclosed and secured by chain-link fencing and barbed wire. Based on several rounds of investigations performed at the Site, subsurface conditions generally consists of urban fill underlain by organic silt, glacial outwash and glacial till. The depth to bedrock is more than 100 feet below ground surface (bgs). Groundwater is generally encountered within the fill unit, is classified as GB or not suitable for drinking water use without treatment, and flows towards the tidally influenced Providence River.

A United States Army rifle range operated at the Site in the late 1800s, prior to the use of the Site as a MGP. From 1910 until 1954, a MGP operated at the Site producing coal gas, carbureted water gas, and high-BTU oil gas. MGP by-products were routinely managed through recovery, storage, recycling, reprocessing, and resale. Such by-products included coke, coal tar, ammonia, toluene, and benzene. B.P. Clapp operated an ammonia works at the 642 Allens Avenue property beginning in 1910, and managed the recycling and sale of ammonia by products. The United States Government operated a toluene facility at the Site for a short period of time during 1918. By 1954, coal gasification operations at the Site had ceased. From 1952 until the 1960s, a liquefied petroleum gas distribution plant operated on the Site. Gulf Oil had a facility at the Site to store kerosene from 1957 to 1971. A LNG facility has operated on the eastern and southeastern portions of the Site since 1972. The southeastern portion of the Site has been utilized for cement storage and distribution since 1961. Propane storage and distribution occurred at the Site from the 1960s to the 1980s for peak shaving purposes.

The LOW (including the STRAP Area) is located within the present day existing LNG facility and cement distribution facility. This portion of the Site was utilized as the location of former coke ovens, former tar and ammonia tanks, a former gas tank (unknown whether this was above or below ground), a large building associated with the production of producer gas, a former quenching station, and for coal and bulk material storage associated with the former MGP. As noted above, the MGP was largely decommissioned in 1954 and these structures were likely demolished for the construction of the LNG facility in 1972. Based on explorations in the LOW (as described below), it is likely significant concrete foundations are still present in the subsurface. As described below, certain remedial actions were completed in the late 1990s in the LOW

(including the STRAP Area). As shown on Figure 2, *Existing Conditions Plan*, an engineered cap was installed as part of these remedial actions. Historical features are shown on Figure 3, *Existing Exploration Location Plan*.

The LOW is currently utilized as a containment dike for LNG operations and for storage in the cement distribution facility. The current and foreseeable future use of the property and LOW is unlikely to change.

2.2 REGULATORY HISTORY

RIDEM issued a Letter of Responsibility (LOR) dated February 13th, 1998 to Providence Gas Company. The Site was listed as State Site #98-004 (RIDEM File No. SR-28-1152) following the issuance of the LOR.

The Site is listed with RIDEM due to certain soil and groundwater impacts at concentrations in excess of Method 1 standards as defined in the Remediation Regulations. Investigation activities have been conducted at the Site in several phases since 1994 and have been documented in several reports submitted to RIDEM.

Constituents detected include, total petroleum hydrocarbons (TPH), cyanide, polynuclear aromatic hydrocarbons (PAHs), volatile organic compounds (VOCs) and certain inorganic compounds (primarily arsenic and lead). Sporadic observations of non-aqueous phase liquids (NAPLs) have been made in certain Site monitoring wells. In addition, some residual materials have been observed in former gas processing areas.

A Soil Management Plan (SMP) was established for the Site and submitted to RIDEM on August 31, 2010; a revised SMP was later submitted on September 12, 2012. The SMP was prepared to establish procedures to be followed should construction or maintenance activities require the need to manage soils and/or groundwater. The SMP includes procedures for soil screening/disposal requirements, soil stockpile management and erosion controls, dust controls, capping requirements, decontamination protocols for equipment leaving the Site, requirements for import of soils, basic dewatering guidelines and management of non-soils (such as asphalt or concrete). The SMP is similar to what would be recorded with an Environmental Land Usage Restriction (ELUR) and has been followed at the Site for numerous facility projects.

As discussed during a November 2013 meeting with RIDEM and subsequent project communications with the Department, GZA, on behalf of National Grid, is currently preparing a Site Investigation Report (SIR) Addendum to document results of more recent investigation efforts. The SIR Addendum will also present the preferred remedial approach for the Site and will consist of progressive engineered capping consistent with facility upgrades, groundwater monitoring and institutional controls. The approach presented herein for the STRAP Area is consistent with the overall remedy for the Site which will be described in the SIR Addendum.

2.2.1 Remedial Actions in the LOW (and STRAP Area)

Environmental Science Services, Inc. (ESS) supervised remedial actions on behalf of the Providence Gas Company (PGC) and Algonquin LNG, Inc. beginning in June 1999 in accordance with a RIDEM-issued June 1, 1999 Temporary Remedial Action Permit (TRAP). These remedial actions were documented in a December 2002 *Remedial Action Closure Report* prepared by Vanasse Hangen Brustlin, Inc. (VHB) on behalf of the New England Gas Company (NEGC), included in Appendix B. These activities were of a time-critical nature due to the proposed construction of a vaporizer pad in the southwestern portion of the LNG facility adjacent to the containment dike. Remedial actions were conducted on both the western and eastern side of the containment dike (the LOW (including the STRAP Area) is located east of the containment dike).

During the remedial action, surface and subsurface soils were excavated and disposed off-Site. The excavations were guided by test pit and soil boring data from previously completed investigations and confirmatory soil sampling. Several

structures were excavated, cleaned out and backfilled. All MGP remnant piping was either removed or sealed with hydraulic cement. According to the Closure Report, the former tar tank, as shown on Figure 3, *Existing Exploration Location Plan*, was not able to be excavated or cleaned out because of structural limitations of excavating near the containment dike. According to the Closure Report, the former Tar and Ammonia Pits/Wells (A&B) were excavated and cleaned and reportedly, approximately 50,000 gallons of coal tar was removed from this structure. No information was provided on the condition of the structure. Recovery wells (ESS RW-1 to ESS RW-6) were also installed to for recovery of light non-aqueous phase liquids (LNAPL). Excavated areas were capped with approximately 2 feet of clean fill or were covered by structures (vaporizer pad). ESS RW-1 and ESS RW-2 are located in the LOW. As shown on Figure 2, *Existing Conditions Plan*, an approximate 10,000 square foot (SF) engineered cap is located in the LOW.

A total of approximately 8,746 tons of MGP-impacted material was excavated, transported and disposed off-Site during these remedial activities.

3.0 NATURE AND EXTENT OF OBSERVED IMPACTS IN THE STRAP AREA

Approximately one hundred and sixteen (116) explorations (borings, test pits, monitoring wells and soil samples) have been conducted in the STRAP Area, to depths ranging from approximately 2 to 101 feet bgs. Approximately nineteen (19) borings were conducted for geotechnical purposes, to depths ranging from 52 to 101 feet bgs. Boring and test pit logs are included in Appendix C. Figure 3, *Existing Exploration Location Plan*, presents the location of explorations that have been completed in the STRAP Area.

Please note that sampling depths that are noted in this section are from the original grades in the STRAP Area. As noted above, portions of the STRAP Area have been remediated and capped and relative sampling depths are unknown. The discussion of environmental impacts presented in the following sections pertains to material remaining proximate to the STRAP Area (defined herein as approximately 50 feet in radius from the STRAP Area) following the remedial activities discussed previously based on GZA's review of available information. The following sections present a summary of the nature and extent of observed impacts in the STRAP Area.

3.1 FIELD SCREENING AND OBSERVATIONS OF IMPACTED SOILS

Explorations performed proximate to the STRAP Area indicate the presence of up to approximately 20 feet of fill underlain by outwash deposits and glacial till. A thin layer of organic silt was encountered intermittently beneath the fill (above the outwash deposits), primarily in borings closer to the Providence River. The fill consists of sands and gravels with concrete, coal, asphalt, and brick fragments, cinders, and cinder ash.

Visual and olfactory indicators of petroleum-like impacts were noted in the majority of the explorations conducted in the northern portion of the STRAP Area (downgradient of the Former Producer Gas Plant), generally at the water table and decreasing with depth. Some visual and olfactory indicators of coal tar-like impacts were noted at depth in ETP-4, although this test pit was conducted before remedial actions were conducted in this area. Note, visual indicators of former MGP residuals (i.e., oxide box waste with blue/green/yellow staining) were not observed in explorations performed proximate to the STRAP Area. Total Volatile Organic Compounds (TVOCs) readings, based on PID measurements, ranged from non-detect (ND) to 369 parts per million by volume (ppmv). Generally, TVOC readings were most significant coincident with the water table and decreased with depth. Petroleum-like or coal tar-like impacts were not noted in the area to the southeast of the containment dike (in the cement distribution facility).

Concrete or other obstructions were noted in B-1 (6 feet bgs), B-3 (6 feet bgs), B-4 (10 feet bgs), B-29 (15 feet bgs), ETP-2 (4-5 feet bgs), ETP-4 (8 feet bgs), A39 (refusal at 2 feet bgs), A49 (9-10 feet bgs), A57 (3 feet bgs), and GZ-212 (2-4 feet bgs).

3.2 SOIL ANALYTICAL RESULTS

Over 230 soil samples were collected and analyzed proximate to the STRAP Area for TPH, semi-volatile organic compounds (SVOCs), VOCs, polychlorinated biphenyls (PCBs), pesticides and inorganic compounds. Compounds detected at elevated[2] levels were TPH, arsenic and certain PAHs (benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene dibenzo(a,h)anthracene and indeno(1,2,3-cd)pyrene). Table 1A, *Soil Analytical Data (Under an Engineered Cap)* presents the analytical soil data collected from the previously capped portion of the STRAP Area and Table 1B, *Soil Analytical Data (Currently Uncapped)* presents the analytical soil data collected from areas outside the existing cap.

TPH was the only compound detected in excess of the RIDEM GB Leachability Criteria (four locations - RCA-7 (8-10 feet bgs), A13 (0-2 feet bgs and 8-10 feet bgs), A15 (2-4 feet bgs) and A66 (6-8 feet bgs)) at concentrations ranging from 3,100 mg/kg to 8,130 mg/kg. These explorations are located in the northern portion of the uncapped STRAP Area (downgradient of the Former Producer Gas Plant).

Four (4) borings are located proximate to the area proposed for stormwater infiltration: A60, A61, A63 and A64. The only compound detected at an elevated level was benzo(a)pyrene at A64 at a depth of 4-6 feet bgs. In this sample, benzo(a)pyrene was detected at a concentration of 0.86 mg/kg, slightly above the I/C-DEC of 0.8 mg/kg. No other compounds were detected at elevated levels from other samples collected from these borings.

Overall, the data indicates that materials in the STRAP Area are generally consistent with typical urban fill (arsenic, lead and PAHs), with the exception of the limited TPH exceedances located in the northern portion of the STRAP Area.

3.3 GROUNDWATER AND NAPL MEASUREMENTS

There are four (4) monitoring wells (RCA-29, RCA-33, RCA-38 and VHB-13) and two (2) recovery wells (ESS RW-1 and ESS RW-2) located proximate to the STRAP Area. Three (3) additional monitoring wells (RCA-7, RCA-31 and RCA-37) were located proximate to the STRAP Area that were previously destroyed or decommissioned. RCA-33 and RCA-38 are the closest monitoring wells to the area proposed for stormwater infiltration. Based on elevation data from monitoring wells proximate to the STRAP Area, groundwater is expected to be encountered approximately 4 to 10 feet bgs. Groundwater is expected to be tidally influenced, especially in the monitoring wells closer to the Providence River. A summary of groundwater elevation data from July 2011 to May 2016 for the wells within the STRAP Area is presented in Table 2A, *Summary of Groundwater and NAPL Measurements*.

LNAPL has been detected proximate to the STRAP Area at thicknesses ranging from trace amounts to 0.36 feet. LNAPL has historically been detected in trace amounts to 0.36 feet in RCA-29, located in the former remedial action area (see Section 2.2.1) downgradient of former tar tank. Detected LNAPL has been limited to trace amounts only in ESS RW-1 and ESS RW-2. Dense non-aqueous phase liquid (DNAPL) has not been historically detected proximate to the STRAP Area. LNAPL has not been detected in either RCA-33 or RCA-38, the monitoring wells closest to the area proposed for stormwater

[2] Defined herein as an exceedance of the RIDEM Method 1 Criteria: Industrial/Commercial Direct Exposure Criteria (I/C-DEC), the GB Leachability Criteria or the Upper Concentration Limit (UCL).

infiltration. A summary of historic LNAPL thickness gauging for monitoring wells proximate to the STRAP Area is presented in Table 2B, *Summary of LNAPL Thickness Gauging*.

An effort was made to recover LNAPL and monitor the rate of return (if any) from RCA-29. As indicated on Table 2C, *Summary of LNAPL Recovery*, LNAPL was recovered three times from RCA-29 on July 19, 2012, June 20, 2014 and October 19, 2015. Less than 0.1 gallon was recovered each time. It is also noted that since recovery, detected LNAPL at RCA-29 has been limited to trace to 0.17 feet (Tables 2A and 2B).

3.4 GROUNDWATER ANALYTICAL RESULTS

Thirty-six (36) groundwater samples were collected proximate to the STRAP Area between 1994 and 2016 and analyzed for VOCs, SVOCs, TPH and total cyanide. As indicated in Table 3, *Groundwater Analytical Data,* groundwater data from RCA-29, RCA-33, RCA-38, VHB-13, RCA-7, RCA-31 and RCA-37 indicate low levels of detected constituents with no elevated concentrations or exceedances of RIDEM GB Groundwater Objectives.

3.5 CONCLUSIONS

As presented above, soils proximate to the STRAP Area are generally characterized by RIDEM Method 1 Criteria exceedances of PAHs and arsenic, with the exception of areas of sporadic elevated TPH soil concentrations in the northern portion of the STRAP Area (downgradient of the Former Producer Gas Plant).

Groundwater proximate to the STRAP Area is generally characterized by non-detect to low levels of VOCs, SVOCs and total cyanide, with no compounds detected at concentrations above the GB Groundwater Objective. Measurable LNAPL is currently limited to trace to 0.17 feet in thickness at one well (RCA-29 located downgradient of the former tar tank).

Very little to no evidence of soil or groundwater impacts were detected in the area proposed for stormwater infiltration.

Based on these soil and groundwater conditions, the STRAP activities were designed to mitigate direct exposure to soils above the RIDEM Method 1 Criteria through installation of an engineered soil cap.

4.0 PROPOSED RESPONSE ACTIONS

The proposed STRAP activities include installing erosion and sedimentation controls, grading and off-Site disposal of excess materials and installation of an engineered cap. The construction of the engineered cap will also require on-Site infiltration of treated stormwater via an engineered underground treatment/infiltration unit. In addition, the new access road project will also include installation of retaining structures, the installation of new utilities (new water line, new drain line and new underground electrical conduit) and the installation of some new fencing. A large portion of the grading elevation cut is into the existing containment dike, which, based on limited explorations through the dike (outside of the STRAP Area), was constructed using engineered import fill material.

The following figures were prepared to illustrate the scope of the proposed STRAP:

- Figure 4 – *Proposed Conditions Plan*; and
- Figure 5 – *Erosion and Sedimentation Control Plan*.

4.1 REMEDIAL CAPS

Engineered caps have been designed to mitigate direct exposure to underlying impacted soils across the approximately 39,000 SF STRAP Area. The following is a description of the engineered caps:

- Asphalt Engineered Cap (approximately 16,000 SF): the engineered cap will consist of 8-inches of import aggregate base, 4-inches of base course asphalt overlain with 2-inches of top course; and

- Gravel Engineered Cap (approximately 23,000 SF): the engineered cap will consist of a non-woven geotextile overlain by at least 12-inches of imported granular fill or at least 24-inches of imported granular fill.

The approximate extent of these engineered caps and details showing each cap type is depicted on Figure 4, *Proposed Conditions Plan*.

All new utility excavations will be finished with a gravel engineered cap. The portion of the existing engineered cap that is disturbed during the work will also be restored with a gravel engineered cap.

4.2 STORMWATER MANAGEMENT

The engineered cap has been designed with an integral stormwater management/treatment system. As described in the Rhode Island Stormwater Design and Installation Standards Manual, last amended in March 2015 (*Stormwater Regulations*), the amount of stormwater that must be treated is defined as the Water Quality Volume (WQ_v) and is the portion of runoff likely to contain the primary pollutant load. The WQ_v is equivalent to 1 inch of runoff generated from the first 1.2 inches of rainfall over impervious areas (initial abstraction is assumed to account for the first 0.2 inches of rainfall). By using prescribed methods detailed in the *Stormwater Regulations*, the goal is to reduce 85% of total suspended solids, 60% of pathogens, and 30% of total nitrogen for discharges to saltwater or tidal systems.

Stormwater runoff generated from the proposed Site improvements will be collected utilizing swales and directed to a catchbasin. The catchbasin will drain to an engineered stormwater infiltration unit (presented on Figure 4 as "Cultec Unit"). The WQ_V will be conveyed to the stormwater infiltration unit located between the road and the existing LNG containment and infiltrated. Excess stormwater will overland flow and ultimately discharge to the surrounding surface for infiltration.

Based on the proposed STRAP activities, the redevelopment of the Site is subject to Minimum Standard 6 (Redevelopment) within the *Stormwater Regulations*. As such, the engineered cap has been designed with an integral stormwater management/treatment system. The location and design of the proposed infiltration system (i.e., an engineered stormwater infiltration system) was evaluated in accordance with Section 3.2.8 Subsurface Contamination Guidance of the *Stormwater Regulations*. As shown on the attached Figure 4, *Proposed Conditions Plan*, the proposed infiltration unit will be located in an approximate 450 SF area between the proposed access road and LNG containment. As described in Section 3.0, no significant soil or groundwater impacts were observed in this area based on borings A60, A61, A63 and A64.

4.3 SOIL DISPOSAL

It is currently estimated that approximately 3,865 cubic yards (CY) of existing Site materials will be removed and disposed off-Site to facilitate installation of the engineered cap, new utilities, and the stormwater infiltration system.

All excess soil generated during the STRAP implementation will be disposed off-Site at a licensed disposal/recycling facility approved by National Grid. We currently anticipate excess soils will be shipped to the ESMI in Loudon, New Hampshire for

thermal desorption treatment/recycling. Prior to off-Site disposal, samples will be collected from the stockpiled soil and analyzed based on the frequency and the parameters required by the selected disposal facility.

Copies of all manifest(s) and Bills of Lading (BOLs) documenting the off-Site disposal of these materials will be included in the *Short Term Response Action Closure Report*.

4.4 IMPORT SAMPLING

Samples representative of any imported soil material (collected as composite samples from the source) will be tested for the analyte groups described below. Granular fill and crushed stone aggregate material is expected to be imported to the Site as part of the *STRAP* activities.

Analyte	EPA Test Method
Total Petroleum Hydrocarbons	8100M
Volatile Organic Compounds	8260
Semi-Volatile Organic Compounds	8270
Priority Pollutant Metals (PP-13)	6010 & 7471A

The frequency of sampling and testing will be:

- Full suite of analysis for up to 2,000 cubic yards, with an additional full suite for each subsequent 2,000 cubic yards of material; and

- Arsenic each 500 cubic yards of material.

All imported fill, with the exception of quarry run aggregate materials (i.e., riprap, washed crushed stone) will be sampled prior to delivery and placement, regardless of the source of the material. Prior to the import of quarry run aggregate materials (crushed stone, riprap, etc.) to the Site, the contractor performing the work will be required to provide a certification from the source that the aggregate is from a clean virgin source.

Laboratory samples will be analyzed and compared to RIDEM Method 1 Residential Direct Exposure Criteria (R-DEC). Soils not meeting these criteria will be rejected for use at the Site. The laboratory testing results of the approved soil source(s) will be provided to RIDEM as part of the *Short Term Response Action Closure Report*.

4.5 DEWATERING AND GROUNDWATER MANAGEMENT

We do not anticipate that significant excavation dewatering will be required during performance of this work. Any necessary dewatering will likely be conducted during the installation of new subsurface utilities. We currently anticipate that any resulting groundwater will be containerized into fractionation tanks and disposed off-Site at a licensed disposal/recycling facility approved by National Grid. Copies of all manifest(s) and Bills of Lading (BOLs) documenting the off-Site disposal will be included in the *Short Term Response Action Closure Report*.

4.5.1 Contingency Item – Groundwater Treatment and Discharge

In the unlikely event significant dewatering is required to facilitate construction of the engineered cap, stormwater management system and/or new subsurface utilities, we propose management, treatment and on-Site discharge consistent with a Temporary Groundwater Discharge Approval issued by RIDEM's Office of Waste Management under Rule 13 of the October 2014 Rules for the Discharge of Non-Sanitary Wastewater and Other Fluid to or Below the Ground

Surface. Information related to proposed dewatering, groundwater treatment, and discharge is included in Appendix D, Dewatering and Groundwater Summary Information.

As presented on Figure D-1 in Appendix D, *Dewatering and Groundwater Management Summary Plan*, groundwater removed from the excavations for the purpose of dewatering will be collected and transferred to fractionation tanks. The collected groundwater will be processed through an on-Site treatment system consisting of bag filtration for solids removal followed by activated carbon to remove organic compounds. This treatment system will be similar to the previous treatment systems that have been approved by RIDEM at the Site. It is anticipated that a limited volume of water will be generated and managed/treated in batches (i.e., per fractionation tank or approximately 20,000 gallons). Continuous management, treatment and discharge of groundwater is not anticipated. Figure D-2 in Appendix D, *Process Flow Diagram* shows the treatment components. Based on previous experience at the Site, depths of the planned excavations, and groundwater depths in this area, the system will be designed for a flowrate of up to approximately 100 gallons per minute (gpm). As such, an influent and effluent sample will be collected for analysis on the first day of operation of the treatment system and then one effluent sample per 20,000 gallons of groundwater treated will be collected for analysis (equivalent to one fractionation tank volume). Samples will be submitted for analysis of PCBs via EPA Method 8082A, TPH via EPA Method 8100M, PP13 Metals, VOCs via EPA Method 8260B and SVOCs via EPA Method 8270D. Once processed through the treatment system, which will be assembled and tested on-Site, the treated groundwater will be reintroduced to the ground surface and allowed to infiltrate upgradient of the work area. The proposed infiltration location is shown on the attached Figure D-1. Groundwater will be infiltrated in a non-erosive manner by constructing an infiltration basin using geotextile fabric and haybales or equivalent (see Appendix D for detail).

4.6 AIR EMISSION EVALUATION

Implementation of this *STRAP* will involve earthwork activities that requires certain impacted material excavation, re-grading, management, and temporary stockpiling. GZA performed an evaluation of the potential volatile emissions including a determination related to the applicability of the RIDEM Air Pollution Control Permits (APC) (Regulation No. 9).

The applicability of Regulation No. 9 was evaluated based on potential volatile emissions calculations/modeling performed consistent with published United States Environmental Protection Agency (EPA) guidance. This emissions modeling was developed for the specific earthwork activities to be performed during this effort. As described further herein and in Appendix E, the results of this modeling indicate that STRAP activities **do not** have the potential to increase emissions by greater than the minimum quantities specified in Appendix A of RIDEM APC Regulation No. 9, and, therefore, a minor source permit is not required for this activity.

4.6.1 Emissions Potentials

The emissions potential of a particular analyte was calculated by assuming all of the mass of the analyte volatilizes during the associated earthwork activities. This would represent the maximum amount of mass of the specific analyte in the volume of soil being excavated and managed on-Site. It is based on analyte concentration, soil volume disturbed, and typical bulk density. The predicted modeled emissions, described in the subsequent section, are generally lower than these calculated emissions potentials.

Excavation activities will consist of grading and off-Site disposal of excess materials, installation of retaining structures, installation of new utilities (new water line, new drain line and new underground electrical conduit), installation of an engineered cap, and restoration activities (fencing). It is anticipated that these activities will involve management of

approximately 3,865 CY of soil.[3] To evaluate the excavation emissions potentials and modeled excavation emissions, GZA used data collected in the vicinity and at the depths of expected excavation associated with the *STRAP* work. The data used in the evaluation consisted of 51 soil samples collected by others (as presented in reports submitted to RIDEM) between 1994 and 2000. The data is presented in Table E-1 (in Appendix E). The calculations only utilized soil samples collected and at depths from within areas with planned grade cuts (excavations). Exploration locations in the STRAP Area are presented on Figure 3, *Existing Exploration Location Plan*.

Using both the average and maximum concentrations for the potential calculation, GZA conservatively calculated the total emissions potential (in pounds (lbs)) for all the detected VOCs with minimum quantities included in Appendix A of RIDEM's APC Regulation No. 9. This calculation assumes all the mass of the VOCs in the associated soil is emitted, providing conservative upper bounds to potential excavation emissions. As indicated in Table E-2 (in Appendix E), naphthalene has an excavation emissions potential exceeding the RIDEM annual minimum quantities (3 lbs/year) based on both the average and maximum measured concentrations. Based on these calculations, naphthalene was further evaluated using emissions modeling consistent with published EPA guidance to estimate the predicted emissions that would be generated during the planned *STRAP* implementation activities.

4.6.2 Emissions Modeling

Based on the results of the emissions potentials calculations described above for the earthwork activities, predicted emissions related to naphthalene were calculated based on modeling. The predicted emissions modeling used the average concentration of naphthalene that was detected. Appendix E describes these emission modeling calculations, which were based on the following EPA guidance document:

- Eklund, et al. 1997. Air Emissions from the Treatment of Soils Contaminated with Petroleum Fuels and Other Substances. Prepared for U.S. Environmental Protection Agency Office of Air and Radiation and Office of Research and Development Washington, D.C. EPA-600/R-97-116. October.

The modeling results for the excavation activity are presented in Table E-3 (in Appendix E). GZA assumed that one re-handling event would occur for each of the earthwork activities when the excavated soil was loaded from stockpiles to trucks for subgrade backfilling on-Site or for disposal. Furthermore, GZA assumed that the bulk of the soil excavation activities would be conducted during the calendar year 2016.

Table E-3 (in Appendix E) and the following presents a summary of the modeled predicted total excavation emissions for naphthalene (expressed in pounds) compared to RIDEM's Minimum Quantities (expressed in pounds/year) published in Regulation No. 9, Appendix A.

Analyte	Total Modeled Excavation Emissions (lbs)	RIDEM Annual Minimum Quantity (lbs)
Naphthalene	0.003	3

4.6.3 Estimated Emissions Modeling Conclusions

RIDEM issued a STRAP Approval Letter on May 18, 2016 for the Holder 18/21 Capping Project at the Site. The Holder 18/21 Capping Project is expected to begin construction in mid-July 2016 and will likely be complete by the end of September 2016. The following emissions are expected to be generated as part of the Holder 18/21 Capping Project:

[3] The new dike access road project was designed by Kiewit Engineering and Design Co. Kiewit Engineering and Design Co. estimated that volume of excavation and the expected depths of excavation.

Analyte	Total Modeled Excavation Emissions (lbs)	RIDEM Annual Minimum Quantity (lbs)
Benzene	4.47	10
Naphthalene	0.94	3
Toluene	8.68	9,000
Total Xylenes	4.17	3,000

Therefore, total emissions expected to be generated at the Site during the calendar year 2016 are:

Analyte	Cumulative Modeled Excavation Emissions (lbs) - 2016	RIDEM Annual Minimum Quantity (lbs)
Benzene	4.47	10
Naphthalene	0.943	3
Toluene	8.68	9,000
Total Xylenes	4.17	3,000

The results of this predictive modeling indicate that the Access Road STRAP earthwork activities do **not** have the potential to increase cumulative emissions for calendar year 2016 by greater than the minimum quantities as specified in Appendix A of RIDEM APC Regulation No. 9, and, therefore, a minor source permit is not required for the Access Road STRAP implementation work.

4.7 MONITORING WELLS

All the wells that are currently located in the LOW (RCA-29, RCA-33, RCA-38, VHB-13, ESS RW-1 and ESS RW-2) will be decommissioned to implement the STRAP. Each well will be decommissioned in accordance with Appendix 1 of RIDEM's June 2010 Groundwater Quality Rules. If possible, the PVC riser and screen sections shall be removed and the borehole will be filled with grout. If the PVC riser and screen sections cannot be removed, the PVC riser and screen segments shall be cut off at least 4 feet below the ground surface and the monitoring well will be decommissioned utilizing grout with the tremie method. A GZA field engineer will be on the Site to record well decommissioning activities and a decommissioning log will be prepared for each location. Upon completion of the well decommissioning, a summary letter detailing the well decommissioning effort performed will be submitted to RIDEM and copies of all well decommissioning logs will be included in the *Short Term Response Action Closure Report*.

After the New Access Road project and other facility projects are completed at the Site (currently anticipated to be in 2020, however, the construction window may extend further than the anticipated schedule), select monitoring wells will be replaced/installed and the proposed post-development groundwater monitoring program will be implemented. We currently anticipate that one monitoring well will be replaced (RCA-29R) and two (2) new monitoring wells (GZ-500S and GZ-500D) will be installed at the locations shown on Figure 4, *Proposed Conditions Plan*.

4.8 BEST MANAGEMENT PRACTICES

During implementation, the following Best Management Practices (BMPs) will be employed by the Contractor.

- Dust Control – Dust control measures will be employed to mitigate the potential for release of airborne particulate matter beyond the limits of the Site in accordance with RIDEM *Air Pollution Control Regulation No. 5, Fugitive Dust*. Methods of dust control will consist of sprinkling the ground surface with water, covering of temporary stockpiles, mulching, or similar methods. On-Site and perimeter dust monitoring will be performed during all construction activities. This monitoring will include both visible observations as well as measurements of particulate dust using field

instruments. If excessive dust generation occurs and cannot be reasonably controlled, the job shall be shut down until appropriate engineering control measures are implemented by the Contractor.

- Odor and Organic Vapor Control – Odor and organic vapor control measures will be employed to mitigate the potential for release of odors and organic vapors from the STRAP activities. Methods of control will consist of backfilling excavations, covering stockpiles or excavations with 6-mil polyethylene sheeting or similar methods. On-Site and perimeter total volatile organic compound (TVOCs) monitoring will be performed during all earthwork activities. This monitoring will include both any observations of odors as well as measurements of TVOCs using field instruments. If excessive odors or TVOCs readings occur and cannot be reasonably controlled, the job shall be shut down until appropriate additional engineering control measures (i.e., odor suppressant foam) are implemented by the Contractor.

- Sedimentation and Erosion Controls – Prior to the commencement of any Site work, staked filtrexx siltsoxx, erosion control netting and silt sacks (or other National Grid Environmental-approved equal) will be installed by the Contractor to mitigate the potential migration of Site contaminants with stormwater run-off. The approximate layout of these sedimentation and erosion control devices is shown on Figure 5, *Soil Erosion and Sedimentation Control Plan***.**

- Stockpile Management – Prior to any major earthwork, the Contractor shall construct a central stockpile area that is underlain with at least two layers of 6-mil polyethylene sheeting (or other National Grid Environmental approved equal). To the extent possible during the work day, all impacted excavated materials will be temporarily staged on two layers of minimum 6-mil polyethylene sheeting in working stockpiles. At the end of each work day and to the extent practical during the workdays, working stockpiles will be relocated to a central stockpile area. By the end of the work day, all working stockpiles and the central stockpile area must be covered with a layer of polyethylene sheeting to control the generation of wind-blown dusts and potential migration of soils with stormwater runoff. All stockpile areas (including the central stockpile area) will be equipped with appropriate controls to limit the loss of the cover and protect against storm water erosion. These controls will include the installation of filtrexx siltsoxx (or other National Grid Environmental approved equal) surrounding the perimeter of the stockpiles and weighting the polyethylene cover with sand bags or concrete blocks. Stockpiles will be inspected daily by Site personnel. The Contractor may be allowed to stockpile impacted material directly on the subgrade surface at the discretion of National Grid Environmental, depending on the levels of impacts observed in the soil material (i.e. no NAPL impacted soil material) and/or level of groundwater saturation. Impacted soil material will not be allowed to be stockpiled directly on an already capped area.

4.9 REPORTING

Subsequent to completion of the activities described herein, a *Short Term Response Action Closure Report* will be prepared in accordance with Rule 6.09 of the Remediation Regulations and submitted to RIDEM. The report will summarize field activities and document the completion of the work described herein.

5.0 OTHER PERMITS

All necessary permits will be obtained prior to the start of work. We currently anticipate that a RIDEM Water Quality Certification (WQC), a Coastal Resource Management Council (CRMC) Assent, City of Providence Soil Erosion and Sedimentation Permit and a Rhode Island Pollutant Discharge Elimination System Program (RIPDES) Construction General Permit will be required for the work, as described below:

- The work includes the engineered capping of approximately 39,000 SF and creating approximately 16,000 SF of impervious area. A stormwater management system was designed in accordance with the Rhode Island *Stormwater*

Manual, last revised March 2015 and the RIDEM Water Quality Rules, last revised December 2009. A WQC will be submitted to the CRMC and the RIDEM Office of Water Resources for review and approval. The soil erosion and sedimentation plan prepared as part of this WQC submittal will be submitted to the City of Providence and RIPDES for their review and approval as well.

- As this work will be completed within 200 feet of a coastal feature, a Category A Assent application will be submitted to CRMC for review and approval. This application will be integrated with the WQC submittal to allow for streamlined review by the regulatory agencies.

6.0 PROPOSED SCHEDULE

The schedule for implementation of the remedy described herein will depend on receipt of the *STRAP* Approval from RIDEM and receipt of other necessary permits. The current plan is to perform the work described herein beginning in late July 2016. We anticipate the implementation of the STRAP activities described herein will be completed in six months, by early 2017. We anticipate that the majority of the excavation activities will be complete by the end of 2016.

TABLES

Table 1A
Analytical Soil Data (Under an Engineered Cap)
New Access Road
642 Allens Avenue
Providence, Rhode Island

File No. 03.00033554.00
6/22/2016

	RIDEM GB Leachability Criteria	RIDEM I/C DEC	RIDEM UCL	Units	EPT-4	RCA-29		A1-W131	A1-W132	A1-W133	A1-W134	A1-W135	A1-W136	A1-W137	A1-W138	A1-W139	Al-W140	A1-W141	A1-W142	A1-W143	A1-W144	A1-W145	A1-W146	A1-W147	A1-W148	A1-W149	A1-W150	A1-W151	A1-W152	A1-W153	A1-W154	A1-W155	A1-W156	A1-W158	A1-W159
					7-8 FT	10-12 FT	14-16 FT	0-2 FT	0-2 FT	2-10 FT	0-2 FT	2-10 FT	0-2 FT	2-10 FT	0-2 FT	2-10 FT	0-2 FT	2-10 FT	0-2 FT	2-10 FT	0-2 FT	2-10 FT	0-2 FT	0-2 FT	2-10 FT	0-2 FT	2-10 FT	0-2 FT	0-2 FT	2-10 FT	0-2 FT	2-10 FT	2-10 FT	0-2 FT
					March 1996	March 1996		9/3/99	9/3/99	9/3/99	9/3/99	9/3/99	9/3/99	9/3/99	9/3/99	9/3/99	9/3/99	9/3/99	9/3/99	9/3/99	9/3/99	9/7/99	9/7/99	9/7/99	9/7/99	9/7/99	9/7/99	9/7/99	9/7/99	9/8/99	9/8/99	9/8/99	9/8/99	9/8/99	9/20/99
Volatile Organic Compounds (VOCs)																																		
1,2,4-Trimethylbenzene	NE	NE	10,000	mg/kg	NA	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,3,5-Trimethylbenzene	NE	NE	10,000	mg/kg	NA	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Acetone	NE	10,000	10,000	mg/kg	NA	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzene	4.3	200	10,000	mg/kg	NA	ND	NA	ND	ND	ND	ND	0.746	ND	0.157	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.066	ND	ND	ND
Chloroform	NE	940	10,000	mg/kg	NA	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Ethylbenzene	62	10,000	10,000	mg/kg	NA	ND	NA	ND	ND	0.103	ND	0.262	ND	0.093	ND	MO	ND	ND	0.069	ND	0.077	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.401	ND	ND	ND
Isopropylbenzene	NE	10,000	10,000	mg/kg	NA	0.1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Methylene Chloride	NE	760	10,000	mg/kg	NA	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Naphthalene	NE	10,000	10,000	mg/kg	NA	0.2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
n-Butylbenzene	NE	NE	10,000	mg/kg	NA	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
n-Propylbenzene	NE	NE	10,000	mg/kg	NA	0.4	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
sec-Butylbenzene	NE	NE	10,000	mg/kg	NA	0.3	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Toluene	54	10,000	10,000	mg/kg	NA	ND	NA	ND	ND	ND	ND	0.559	ND	0.121	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.068	ND	ND	ND
Xylenes (Total)	NE	10,000	10,000	mg/kg	NA	ND	NA	ND	ND	ND	ND	0.507	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Total Petroleum Hydrocarbons (TPH)																																		
Hydrocarbon Content	2,500	2,500	30,000	mg/kg	2480	2350	671	156	160	891	64	917	ND	864	85	ND	182	ND	172	ND	1400	ND	ND	741	ND	437	63	568	ND	34	147	ND	103	89	ND
Inorganic Compounds																																		
Total Cyanide	NE	10,000	10,000	mg/kg	NA	NA	NA	0.47	0.62	NA	ND	NA	ND	NA	ND	ND	NA	ND	NA	ND	NA	ND	ND	NA	ND	NA	0.53	NA	0.29	4.1	NA	ND	NA	NA	ND
Antimony	NE	820	10,000	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Arsenic	NE	7	10,000	mg/kg	NA	NA	NA	6.45	**10.7**	NA	5.71	NA	**8.32**	NA	4.49	6.09	NA	6.91	NA	4.23	NA	3.16	4.93	NA	3.85	NA	3.96	NA	5.03	ND	NA	ND	NA	NA	ND
Barium	NE	10,000	10,000	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Beryllium	NE	1.5	10,000	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cadmium	NE	1,000	10,000	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chromium	NE	10,000	10,000	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Copper	NE	10,000	10,000	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Iron	NE	NE	NE	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Lead	NE	500	10,000	mg/kg	NA	NA	NA	49.3	57.9	NA	19.2	NA	12	NA	46.8	10.1	NA	8.2	NA	ND	NA	ND	ND	NA	10.7	NA	42	NA	17.6	15.2	NA	37.8	NA	NA	ND
Mercury	NE	610	10,000	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Nickel	NE	10,000	10,000	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Selenium	NE	10,000	10,000	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Silver	NE	10,000	10,000	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Zinc	NE	10,000	10,000	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Polychlorinated Biphenyls (PCBs) and Pesticides																																		
Endosulfan II	NE	NE	10,000	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Endrin	NE	NE	10,000	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Endrin ketone	NE	NE	10,000	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total PCBs	10	10	10,000	mg/kg	NA	NA	NA	ND	NA	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	ND	NA	NA	ND	NA	ND	NA	NA	ND	NA	NA
Semi-Volatile Organic Compounds (SVOCs)																																		
2-Methylnaphthalene	NE	10,000	10,000	mg/kg	ND	ND	NA	ND	ND	0.79	ND	3.45	ND	0.641	ND	ND	ND	ND	ND	ND	0.552	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Acenaphthene	NE	10,000	10,000	mg/kg	6.2	1.1	NA	ND	ND	ND	ND	2.45	ND	0.537	ND	ND	ND	ND	ND	ND	0.693	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Acenaphthylene	NE	10,000	10,000	mg/kg	ND	ND	NA	ND	ND	0.4	ND	2.85	ND	0.748	ND	ND	ND	ND	ND	ND	0.674	ND	ND	0.366	ND	0.587	ND	ND	ND	ND	ND	ND	ND	ND	140
Anthracene	NE	10,000	10,000	mg/kg	19.4	0.9	NA	0.544	0.503	1.25	ND	6.77	ND	2.37	0.47	ND	0.369	ND	0.353	ND	2.76	ND	ND	0.579	ND	0.64	ND	0.661	ND	ND	ND	ND	ND	ND	ND
Benzo(a)anthracene	NE	7.8	10,000	mg/kg	**14.7**	0.8	NA	2.37	2.99	3.17	0.619	**7.97**	ND	4.33	1.36	ND	1.06	ND	0.831	ND	3.96	ND	ND	1.41	ND	2.01	0.857	1.54	ND	ND	ND	ND	ND	0.874	ND
Benzo(a)pyrene	NE	0.8	10,000	mg/kg	**7.4**	0.5	NA	**2.81**	**3.51**	**3.58**	0.737	**8.92**	ND	**4.33**	**1.36**	ND	**1.36**	ND	**0.875**	ND	**3.15**	ND	ND	**1.34**	ND	**2.13**	**0.986**	**1.45**	ND	ND	ND	ND	ND	**1.07**	ND
Benzo(b)fluoranthene	NE	7.8	10,000	mg/kg	**10.4**	0.6	NA	4.12	5.13	5.39	1	**8.19**	ND	**7.87**	1.87	ND	1.99	ND	1.04	ND	5.07	ND	ND	1.57	ND	2.3	1.01	1.53	ND	ND	0.594	ND	ND	1.83	ND
Benzo(g,h,i)perylene	NE	10,000	10,000	mg/kg	ND	ND	NA	1.34	1.68	1.76	ND	2.84	ND	1.91	ND	ND	ND	ND	0.609	ND	0.685	ND	ND	0.852	ND	0.984	0.555	0.669	ND	ND	ND	ND	ND	ND	ND
Benzo(k)fluoranthene	NE	78	10,000	mg/kg	ND	ND	NA	1.49	1.83	1.81	0.434	2.73	ND	1.88	0.642	ND	0.662	ND	ND	ND	1.86	ND	ND	0.481	ND	0.806	0.433	0.621	ND	ND	ND	ND	ND	0.579	ND
bis(2-Ethylhexyl)phthalate	NE	410	10,000	mg/kg	ND	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Carbazole	NE	NE	10,000	mg/kg	ND	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chrysene	NE	780	10,000	mg/kg	10.6	0.7	NA	2.04	2.41	2.9	0.581	5.15	ND	3.71	1.27	ND	0.978	ND	0.708	ND	3.03	ND	ND	1.24	ND	1.94	0.82	1.37	ND	ND	0.407	ND	ND	0.891	ND
Dibenzo(a,h)Anthracene	NE	0.8	10,000	mg/kg	ND	ND	NA	0.387	0.561	0.523	ND	**0.982**	ND	0.67	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.357	ND	ND	ND	ND	ND	ND	ND	ND	ND
Dibenzofuran	NE	NE	10,000	mg/kg	ND	1.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Fluoranthene	NE	10,000	10,000	mg/kg	27.5	2.4	NA	3.32	3.85	9.24	0.66	17.6	ND	12.9	2.05	ND	1.3	ND	1.16	ND	16.1	ND	ND	2.88	ND	3.37	1.34	2.69	ND	ND	0.641	ND	ND	1.07	ND
Fluorene	NE	10,000	10,000	mg/kg	12.4	1.3	NA	ND	ND	0.842	ND	4.68	ND	1.69	ND	ND	ND	ND	ND	ND	2.42	ND	ND	0.438	ND	0.477	ND	0.792	ND	ND	ND	ND	ND	ND	ND
Indeno(1,2,3-cd)Pyrene	NE	7.8	10,000	mg/kg	ND	ND	NA	1.61	2.1	2.18	ND	3.12	ND	2.36	0.391	ND	0.451	ND	0.758	ND	1.03	ND	ND	1.01	ND	1.26	0.703	0.882	ND	ND	ND	ND	ND	ND	ND
Naphthalene	NE	10,000	10,000	mg/kg	5.8	ND	NA	0.507	0.707	1.88	ND	10.2	ND	1.53	ND	ND	ND	ND	ND	ND	1.08	ND	ND	0.391	ND	0.448	ND	0.642	ND	ND	ND	ND	ND	ND	ND
Phenanthrene	NE	10,000	10,000	mg/kg	39	7.9	NA	2	1.22	2.98	ND	22	ND	10.9	1.68	ND	0.862	ND	0.543	ND	18.96	ND	ND	1.06	ND	1.13	0.924	1.71	ND	ND	0.464	ND	ND	0.467	ND
Pyrene	NE	10,000	10,000	mg/kg	22.7	1	NA	3	4.35	7.04	0.618	17.4	ND	10.5	1.84	ND	1.13	ND	1.24	ND	4.95	ND	ND	2.7	ND	3.57	1.12	2.64	ND	ND	0.678	ND	ND	0.768	ND

Notes:

Data is compared to RIDEM Method 1 Standards. Shaded results represent numerical exceedances of standards.

Table only indicates the compounds that were detected, other compounds were analyzed for, but not detected.

Table only shows explorations located within 50-feet of the New Dike Road

ND - Not Detected NA - Not Analyzed

Sample depths noted here are from original grade. This table presents data that has since been disturbed or regraded. As such, the final grades are unknown and as such the modified sampling depths are unknown.

Table 1A
Analytical Soil Data (Under an Engineered Cap)
New Access Road
642 Allens Avenue
Providence, Rhode Island

	RIDEM GB Leachability Criteria	RIDEM I/C DEC	RIDEM UCL	Units	A1-F52	A1-F53	A1-F54	A1-W164	A1-F55	A1-F56	A1-F57	A1-W157	A1-W169	A1-F58	A1-F59	A1-F60	A1-W170	A1-W171	A1-W172	A1-W173	A1-W174	A1-W175	A1-W176	A1-W177	A1-W178	A1-F61	A1-F62	A1-F63	A1-F64	A1-F65	A1-F66	A1-F67	A1-F68	A1-F69	A1-F70	A1-F71	A1-F72
					2 FT	2 FT	2FT	0-2 FT	2 FT	2 FT	2 FT	0-2 FT	0-2 FT	2 FT	2 FT	2 FT	0-2 FT	0-2 FT	0-2 FT	0-2 FT	0-2 FT	0-2 FT	0-2 FT	0-2 FT	0-2 FT	2 FT	2 FT	2 FT	2 FT	2 FT	2 FT	2 FT	2 FT	2 FT	2 FT	2 FT	2 FT
					9/20/99	9/20/99	9/20/99	9/27/99	9/27/99	9/27/99	9/27/99	10/1/99	10/1/99	10/1/99	10/1/99	10/1/99	10/8/99	10/8/99	10/8/99	10/8/99	10/8/99	10/8/99	10/8/99	10/8/99	10/8/99	10/8/99	10/8/99	10/8/99	10/8/99	10/8/99	10/8/99	10/8/99	10/8/99	10/8/99	10/8/99	10/8/99	10/8/99	10/8/99
Volatile Organic Compounds (VOCs)																																				
1,2,4-Trimethylbenzene	NE	NE	10,000	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,3,5-Trimethylbenzene	NE	NE	10,000	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Acetone	NE	10,000	10,000	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzene	4.3	200	10,000	mg/kg	ND	ND	0.14	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.062	ND	0.047	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloroform	NE	940	10,000	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Ethylbenzene	62	10,000	10,000	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.118	ND	0.056	ND	ND	ND	ND	ND	ND	ND	ND	ND
Isopropylbenzene	NE	10,000	10,000	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Methylene Chloride	NE	760	10,000	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Naphthalene	NE	10,000	10,000	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
n-Butylbenzene	NE	NE	10,000	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
n-Propylbenzene	NE	NE	10,000	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
sec-Butylbenzene	NE	NE	10,000	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Toluene	54	10,000	10,000	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.068	ND	0.072	ND	ND	ND	ND	ND	ND	ND	ND	ND
Xylenes (Total)	NE	10,000	10,000	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.32	ND	ND	ND	ND	ND	ND	ND	ND	ND
Total Petroleum Hydrocarbons (TPH)																																				
Hydrocarbon Content	2,500	2,500	30,000	mg/kg	418	1800	1690	ND	87	105	1770	ND	75	103	83	332	116	140	38	71	ND	72	31	29	ND	72	64	111	41	73	47	79	100	50	38	77	ND
Inorganic Compounds																																				
Total Cyanide	NE	10,000	10,000	mg/kg	NA	NA	NA	0.54	NA	NA	NA	ND	ND	NA	NA	NA	2.2	ND	ND	ND	ND	ND	ND	ND	ND	7.57	ND	0.69	ND	0.64	ND	ND	ND	ND	ND	ND	ND
Antimony	NE	820	10,000	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Arsenic	NE	7	10,000	mg/kg	NA	NA	NA	2.71	NA	NA	NA	3.43	**7.23**	NA	NA	NA	5.22	5.7	4.48	**15.3**	4.43	4.44	5.2	5.52	5.23	4.73	4.22	5.81	3.77	5.83	4.23	4.65	5.92	4.17	4.62	ND	5.1
Barium	NE	10,000	10,000	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Beryllium	NE	1.5	10,000	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cadmium	NE	1,000	10,000	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chromium	NE	10,000	10,000	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Copper	NE	10,000	10,000	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Iron	NE	NE	NE	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Lead	NE	500	10,000	mg/kg	NA	NA	NA	16.3	NA	NA	NA	19.7	52.5	NA	NA	NA	23.2	27.5	17.6	41.3	19.9	31.2	19.5	18.6	14.7	27	34.8	42	30	44.4	36.3	23.3	45.5	44.9	17.9	13.8	10.6
Mercury	NE	610	10,000	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Nickel	NE	10,000	10,000	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Selenium	NE	10,000	10,000	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Silver	NE	10,000	10,000	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Zinc	NE	10,000	10,000	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Polychlorinated Biphenyls (PCBs) and Pesticides																																				
Endosulfan II	NE	NE	10,000	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Endrin	NE	NE	10,000	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Endrin ketone	NE	NE	10,000	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total PCBs	10	10	10,000	mg/kg	NA	NA	0.219	ND	ND	0.38	ND	ND	NA	NA	NA	NA	NA	NA	NA	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Semi-Volatile Organic Compounds (SVOCs)																																				
2-Methylnaphthalene	NE	10,000	10,000	mg/kg	ND	1.21	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Acenaphthene	NE	10,000	10,000	mg/kg	ND	ND	ND	ND	ND	ND	0.389	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Acenaphthylene	NE	10,000	10,000	mg/kg	ND	ND	1.27	ND	ND	ND	0.872	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Anthracene	NE	10,000	10,000	mg/kg	ND	3.94	3.06	ND	ND	0.523	1.09	ND	ND	ND	ND	0.677	ND	0.44	ND	ND	ND	ND	ND	ND	ND	ND	1.11	ND	ND	ND	ND	0.566	ND	ND	ND	ND
Benzo(a)anthracene	NE	7.8	10,000	mg/kg	1.28	5.78	5.81	ND	0.387	1.24	2.74	ND	1.58	0.589	1.64	1.75	ND	1.93	ND	0.893	ND	1.48	0.38	ND	ND	ND	1.1	3.08	0.453	1.04	0.876	1.18	2.11	0.828	0.51	1.45	ND
Benzo(a)pyrene	NE	0.8	10,000	mg/kg	**1.47**	**5.1**	**5.98**	ND	0.472	**1.47**	**3.23**	ND	**1.7**	0.69	**1.72**	**1.72**	ND	**1.76**	ND	**0.835**	ND	**1.29**	0.436	ND	ND	ND	**1**	**2.24**	0.57	**1.02**	**0.823**	**0.999**	**1.89**	0.716	0.481	1.19	ND
Benzo(b)fluoranthene	NE	7.8	10,000	mg/kg	1.65	6.18	7.11	ND	0.475	1.69	4.46	ND	1.85	0.703	1.8	1.86	0.417	1.85	0.362	0.867	ND	1.4	0.51	ND	ND	ND	1.12	2.36	0.535	1.24	0.925	1.04	2.01	0.715	0.515	1.34	ND
Benzo(g,h,i)perylene	NE	10,000	10,000	mg/kg	1.21	2.94	3.79	ND	ND	0.609	0.831	ND	1.07	ND	1	0.84	ND	1.1	ND	0.534	ND	0.729	0.365	ND	ND	ND	0.557	0.636	ND	0.388	ND	0.899	0.543	ND	ND	ND	ND
Benzo(k)fluoranthene	NE	78	10,000	mg/kg	ND	1.58	2.27	ND	ND	0.534	1.05	ND	0.803	ND	0.777	0.721	ND	0.654	ND	ND	ND	0.53	ND	ND	ND	ND	ND	0.622	ND	ND	ND	ND	0.78	ND	ND	0.42	ND
bis(2-Ethylhexyl)phthalate	NE	410	10,000	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Carbazole	NE	NE	10,000	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chrysene	NE	780	10,000	mg/kg	1.41	5.43	6.32	ND	0.378	1.19	1.28	ND	1.6	0.589	1.62	1.6	ND	1.72	ND	0.755	ND	1.21	0.372	ND	ND	ND	0.898	2.42	0.416	0.895	0.777	0.947	1.56	0.668	0.491	1.36	ND
Dibenzo(a,h)Anthracene	NE	0.8	10,000	mg/kg	ND	**1.21**	ND	ND	ND	ND	0.353	ND	ND	ND	ND	ND	ND	0.39	ND	0.143	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Dibenzofuran	NE	NE	10,000	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Fluoranthene	NE	10,000	10,000	mg/kg	1.72	7.99	8.36	ND	0 562	1.74	4.55	ND	2.17	0.884	2.12	2.41	ND	2.27	0.43	1.03	ND	1.61	0.605	ND	ND	ND	1.17	3.35	0.441	1.21	0.986	1.55	2.54	1.05	0.594	1.88	ND
Fluorene	NE	10,000	10,000	mg/kg	ND	2.32	1.22	ND	ND	ND	0.582	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Indeno(1,2,3-cd)Pyrene	NE	7.8	10,000	mg/kg	1.15	2.75	4.32	ND	0.358	0.776	1.04	ND	1.27	0.556	1.22	1.02	ND	1.28	ND	0.618	ND	0.804	0.356	ND	ND	ND	0.707	0.893	0.455	0.512	0.455	0.543	0.829	0.642	ND	0.481	ND
Naphthalene	NE	10,000	10,000	mg/kg	ND	1.43	1.86	ND	ND	ND	0.418	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Phenanthrene	NE	10,000	10,000	mg/kg	1.44	9.31	0.68	ND	ND	1.18	2.12	ND	1.41	0.594	1.21	1.5	ND	1.01	ND	ND	ND	0.754	ND	ND	ND	ND	0.591	2.54	ND	0.532	0.483	0.784	1.35	0.434	ND	0.695	ND
Pyrene	NE	10,000	10,000	mg/kg	2.11	7.99	8.22	ND	0.528	1.6	4.62	ND	2.18	0.875	2.21	2.38	ND	2.58	0 469	1.12	ND	1.7	0.532	ND	ND	0.382	1.35	4.02	0.476	1.28	1.1	1.6	2.15	1.08	0.762	2.11	ND

Notes:

Data is compared to RIDEM Method 1 Standards. Shaded results represent numerical exceedances of standards.

Table only indicates the compounds that were detected, other compounds were analyzed for, but not detected.

Table only shows explorations located within 50-feet of the New Dike R

ND - Not Detected NA - Not Analyzed

Sample depths noted here are from original grade. This table presents data that has since been disturbed or regraded. As such, the final grades are unknown and as such the modified sampling depths are unknown.

Table 1B
Analytical Soil Data (Currently Uncapped)
New Access Road
642 Allens Avenue
Providence, Rhode Island

File No. 03.00033554.00
6/22/2016

	RIDEM GB Leachability Criteria	RIDEM I/C DEC	RIDEM UCL	Units	ETP-1		ETP-2		EPT-8			RCA-7		RCA-R17		RCA-31	RCA-33			RCA-37	RCA-38	A13		A14		A15		A16		A17		A18		A19		A24		A29		A30		A32		A43		A44	
					2-3 FT	7-8 FT	2-3 FT	6-7 FT	2 FT	4 FT	8 FT	4-6 FT	8-10 FT	0-2 FT	6-8 FT	10-12 FT	4-6 FT	14-16 FT	8-10 FT	8-10 FT			0-2 FT	4-6 FT	0-2 FT	2-4 FT	0-2 FT	6-8 FT	0-2 FT	2-4 FT	0-2 FT	4-6 FT	0-2 FT	6-8 FT	0-2 FT	6-8 FT	0-2 FT	6-8 FT	0-2 FT	8-10 FT	0-2 FT	4-6 FT	0-2 FT	4-6 FT	0-2 FT	4-6 FT
					March 1996		March 1996		March 1996			September 1994		November 1994		March 1996	March 1996			May 1996	May 1996	2/3/2000		2/3/2000		2/3/2000		2/3/2000		2/3/2000		2/3/2000		2/4/2000		2/9/2000		2/9/2000		2/9/2000		2/9/2000		2/17/2000		2/17/2000	
Volatile Organic Compounds (VOCs)																																													
1,2,4-Trimethylbenzene	NE	NE	10,000	mg/kg	NA	ND	NA	ND	NA	NA	NA	ND	ND	ND	NA	NA	NA	NA	NA	NA	NA	0.66	0.53	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,3,5-Trimethylbenzene	NE	NE	10,000	mg/kg	NA	ND	NA	ND	NA	NA	NA	ND	ND	ND	NA	NA	NA	NA	NA	NA	NA	ND	0.23	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Acetone	NE	10,000	10,000	mg/kg	NA	ND	NA	ND	NA	NA	NA	ND	0.324	NA	NA	NA	NA	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	4.6	5.8	3.7	5.2	5.7	5.6	5	6.2	0.77	0.58	ND	ND
Benzene	4.3	200	10,000	mg/kg	NA	ND	NA	ND	NA	NA	NA	ND	ND	ND	NA	NA	NA	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloroform	NE	940	10,000	mg/kg	NA	ND	NA	ND	NA	NA	NA	ND	ND	NA	NA	NA	NA	NA	NA	NA	NA	ND	ND	ND	ND	ND	0.16	0.23	0.21	ND	0.21	0.21	0.18	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ethylbenzene	62	10,000	10,000	mg/kg	NA	ND	NA	ND	NA	NA	NA	ND	ND	NA	NA	NA	NA	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Isopropylbenzene	NE	10,000	10,000	mg/kg	NA	ND	NA	ND	NA	NA	NA	ND	ND	ND	NA	NA	NA	NA	NA	NA	NA	ND	ND	ND	ND	ND	0.18	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Methylene Chloride	NE	760	10,000	mg/kg	NA	ND	NA	ND	NA	NA	NA	ND	0.032	ND	NA	NA	NA	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Naphthalene	NE	10,000	10,000	mg/kg	NA	ND	NA	ND	NA	NA	NA	ND	ND	ND	NA	NA	NA	NA	NA	NA	NA	3.1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	7.6	0.46	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
n-Butylbenzene	NE	NE	10,000	mg/kg	NA	ND	NA	ND	NA	NA	NA	ND	ND	ND	NA	NA	NA	NA	NA	NA	NA	0.6	0.77	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
n-Propylbenzene	NE	NE	10,000	mg/kg	NA	ND	NA	ND	NA	NA	NA	ND	ND	ND	NA	NA	NA	NA	NA	NA	NA	0.23	ND	ND	ND	ND	0.18	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
sec-Butylbenzene	NE	NE	10,000	mg/kg	NA	ND	NA	ND	NA	NA	NA	ND	ND	NA	NA	NA	NA	NA	NA	NA	NA	0.29	0.82	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Toluene	54	10,000	10,000	mg/kg	NA	ND	NA	ND	NA	NA	NA	ND	ND	ND	NA	NA	NA	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Xylenes (Total)	NE	10,000	10,000	mg/kg	NA	ND	NA	ND	NA	NA	NA	ND	0.074	ND	NA	NA	NA	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Total Petroleum Hydrocarbons (TPH)																																															
Hydrocarbon Content	2,500	2,500	30,000	mg/kg	1970	227	47	ND	165	216	108	NA	**8130**	281	NA	ND	413	510	ND	302		**3500**	**3100**	ND	ND	ND	**4200**	1000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1600	ND	ND	ND	ND
Inorganic Compounds																																															
Total Cyanide	NE	10,000	10,000	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	ND	NA	NA	NA	NA	NA	NA	NA	NA	0.16	ND	ND	0.28	0.17	0.13	0.13	ND	0.39	0.27	0.095	ND	0.18	ND	0.21	0.19	0.16	0.26	0.95	0.21	0.23	0.61	1.1	0.85	0.38	0.27
Antimony	NE	820	10,000	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	ND	NA	NA	NA	NA	NA	NA	NA	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	0.58	NA	ND	NA	ND	NA	ND	NA	0.31	NA	ND	NA	ND	NA
Arsenic	NE	7	10,000	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	ND	ND	NA	NA	NA	NA	NA	NA	NA	6.7	NA	6.2	NA	6.4	NA	**7.3**	NA	**15.7**	NA	6.7	NA	**13.9**	NA	1.9	NA	3.6	NA	5.2	NA	5.2	NA	**8.2**	NA	**7.7**	NA
Barium	NE	10,000	10,000	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	ND	32	NA	NA	NA	NA	NA	NA	NA	9.1	NA	25.5	NA	20.8	NA	36	NA	56	NA	34.4	NA	34.4	NA	88.5	NA	28.8	NA	31.8	NA	49.5	NA	110	NA	91.6	NA
Beryllium	NE	1.5	10,000	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	ND	NA	NA	NA	NA	NA	NA	NA	NA	0.32	NA	0.77	NA	0.35	NA	0.36	NA	0.47	NA	0.43	NA	0.38	NA	0.54	NA	0.46	NA	0.5	NA	0.4	NA	0.56	NA	0.46	NA
Cadmium	NE	1,000	10,000	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	ND	ND	NA	NA	NA	NA	NA	NA	NA	1.2	NA	1.1	NA	1.1	NA	1.2	NA	2.1	NA	1.2	NA	1.6	NA	1.2	NA	1	NA	1.4	NA	1.6	NA	0.21	NA	0.3	NA
Chromium	NE	10,000	10,000	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	ND	ND	NA	NA	NA	NA	NA	NA	NA	9.6	NA	7.6	NA	9.4	NA	8.7	NA	13	NA	7.2	NA	8.8	NA	12.2	NA	12.1	NA	15.3	NA	17.2	NA	10.1	NA	14.6	NA
Copper	NE	10,000	10,000	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	13.4	NA	13.4	NA	16.9	NA	23.9	NA	13.3	NA	17.8	NA	11.2	NA	9.1	NA	14.4	NA	15.9	NA	23.1	NA	31.8	NA
Iron	NE	NE	NE	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	ND	NA	NA	NA	NA	NA	NA	NA	NA	14400	14300	11300	18900	12900	11700	14000	24900	23100	18400	13400	18800	15900	14900	15100	16800	12800	14200	16500	17700	20000	11000	14600	13800	17100	18500
Lead	NE	500	10,000	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	ND	40	NA	NA	NA	NA	NA	NA	NA	8.8	NA	37.2	NA	13.5	NA	30	NA	57.8	NA	30.6	NA	52.2	NA	5.5	NA	5.3	NA	18.6	NA	7.2	NA	41.1	NA	45.4	NA
Mercury	NE	610	10,000	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	ND	ND	NA	NA	NA	NA	NA	NA	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	0.028	NA	ND	NA	ND	NA	0.015	NA	ND	NA	ND	NA	0.051	NA	0.018	NA
Nickel	NE	10,000	10,000	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	ND	NA	NA	NA	NA	NA	NA	NA	NA	13.1	NA	8.9	NA	11.9	NA	9.8	NA	15.1	NA	9.1	NA	11.8	NA	10	NA	8.9	NA	14.1	NA	16.6	NA	12.8	NA	19.1	NA
Selenium	NE	10,000	10,000	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	ND	ND	NA	NA	NA	NA	NA	NA	NA	0.73	NA	ND	NA	0.34	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA
Silver	NE	10,000	10,000	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	ND	ND	NA	NA	NA	NA	NA	NA	NA	2	NA	1.4	NA	1.8	NA	2.1	NA	3.4	NA	2	NA	2.6	NA	2.3	NA	1.5	NA	2.3	NA	2.6	NA	ND	NA	0.37	NA
Zinc	NE	10,000	10,000	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	ND	NA	NA	NA	NA	NA	NA	NA	NA	34	NA	73.5	NA	36.6	NA	34.4	NA	44.5	NA	46.8	NA	40.8	NA	44.4	NA	38.9	NA	36.9	NA	46.9	NA	66.6	NA	99.3	NA
Polychlorinated Biphenyls (PCBs) and Pesticides																																														
Endosulfan II	NE	NE	10,000	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA
Endrin	NE	NE	10,000	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	ND	NA	ND	NA	ND	NA	ND	NA	0.038	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA
Endrin ketone	NE	NE	10,000	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA
Total PCBs	10	10	10,000	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Semi-Volatile Organic Compounds (SVOCs)																																														
2-Methylnaphthalene	NE	10,000	10,000	mg/kg	3.69	ND	ND	ND	ND	ND	ND	ND	0.48	NA	NA	ND	ND	0.7	NA	0.5	8	21	ND	ND	ND	1.8	ND	0.59	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.1	ND	ND	0.39	ND
Acenaphthene	NE	10,000	10,000	mg/kg	ND	NA	ND	ND	ND	ND	ND	ND	0.389	NA	NA	ND	0.6	0.7	NA	ND	2.1	3.3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Acenaphthylene	NE	10,000	10,000	mg/kg	ND	0.7	ND	ND	0.6	0.4	0.4	ND	ND	NA	NA	ND	2.1	3.1	NA	ND	ND	ND	ND	ND	0.5	0.51	0.44	0.71	ND	0.85	ND	ND	ND	ND	ND	0.85	ND	ND	ND	ND	ND	ND	1.5	ND	ND	1.1	ND
Anthracene	NE	10,000	10,000	mg/kg	ND	2.1	ND	ND	ND	2	ND	ND	ND	1.02	NA	ND	ND	2.5	NA	1.5	1	1.9	ND	ND	1.2	0.88	ND	1.2	ND	1.9	ND	ND	0.51	ND	1.5	0.46	ND	ND	0.64	0.39	ND	3.6	ND	ND	2.2	ND
Benzo(a)anthracene	NE	7.8	10,000	mg/kg	4	1.2	ND	ND	0.5	ND	ND	ND	ND	1.87	NA	ND	ND	0.6	NA	ND	0.72	0.87	ND	ND	1.7	0.82	0.88	1.4	0.61	2.6	0.66	0.46	1.1	ND	3.3	ND	ND	ND	1.1	ND	ND	6.8	0.61	ND	**10**	1
Benzo(a)pyrene	NE	0.8	10,000	mg/kg	ND	**1.7**	ND	ND	0.6	ND	ND	ND	ND	**1.74**	NA	ND	ND	0.4	NA	ND	0.48	0.52	ND	ND	**1.4**	0.63	**1.4**	**1**	0.5	**2.2**	0.54	0.46	**1.2**	ND	2.8	ND	ND	ND	**1**	ND	ND	**6.4**	ND	ND	**9.5**	0.68
Benzo(b)fluoranthene	NE	7.8	10,000	mg/kg	**15.7**	1.7	0.7	ND	0.9	ND	ND	ND	ND	2.99	NA	ND	ND	0.6	NA	ND	0.63	0.65	ND	ND	1.8	0.74	1.4	1.3	0.78	2.7	0.85	0.66	1.5	ND	3.6	ND	ND	ND	1.3	ND	ND	7.6	0.69	ND	**13**	1
Benzo(g,h,i)perylene	NE	10,000	10,000	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.382	NA	ND	ND	ND	NA	ND	ND	ND	ND	ND	0.77	ND	ND	ND	ND	1.1	ND	ND	0.79	ND	1.5	ND	ND	ND	ND	ND	ND	2.9	ND	ND	4.5	ND
Benzo(k)fluoranthene	NE	78	10,000	mg/kg	ND	0.7	ND	ND	ND	ND	ND	ND	ND	0.923	NA	ND	ND	ND	NA	ND	ND	ND	ND	ND	0.63	0.41	0.74	0.54	0.34	1	0.38	0.31	0.5	ND	1.3	ND	ND	ND	0.49	ND	ND	3.1	0.38	ND	5.2	0.5
bis(2-Ethylhexyl)phthalate	NE	410	10,000	mg/kg	NA	NA	NA	NA	ND	ND	ND	ND	ND	NA	NA	NA	ND	ND	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Carbazole	NE	NE	10,000	mg/kg	NA	NA	NA	NA	ND	ND	ND	ND	ND	NA	NA	NA	ND	ND	NA	NA	ND	ND	ND	ND	ND	ND	ND	0.47	ND	0.47	ND	ND	ND	ND	0.44	ND	ND	ND	ND	ND	ND	1.7	ND	ND	0.52	ND
Chrysene	NE	780	10,000	mg/kg	6.9	2.6	ND	ND	0.5	ND	ND	ND	ND	1.72	NA	ND	ND	0.4	NA	ND	0.71	0.74	ND	ND	1.5	0.79	1	1.1	0.54	2.3	0.59	0.52	1	ND	2.8	ND	ND	ND	1	ND	ND	5.7	0.57	ND	9.7	0.88
Dibenzo(a,h)Anthracene	NE	0.8	10,000	mg/kg	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	NA	ND	ND	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	**0.99**	ND	ND	**1.5**	ND
Dibenzofuran	NE	NE	10,000	mg/kg	NA	ND	NA	ND	ND	ND	ND	ND	ND	NA	NA	NA	ND	ND	NA	NA	0.94	2.4	ND	ND	ND	0.69	ND	0.55	ND	0.55	ND	ND	ND	ND	0.44	ND	ND	ND	ND	ND	ND	1.3	ND	ND	0.56	ND
Fluoranthene	NE	10,000	10,000	mg/kg	18.7	1.7	0.6	ND	0.8	0.5	0.5	ND	ND	5.26	NA	ND	0.5	1.3	NA	ND	1.4	1.8	ND	ND	3.4	1.4	0.99	2.6	0.86	6.1	0.89	0.81	1.9	ND	6.6	ND	0.46	ND	2.1	0.38	0.48	12	0.95	ND	18	1.9
Fluorene	NE	10,000	10,000	mg/kg	ND	ND	ND	ND	ND	0.5	ND	ND	0.459	0.378	NA	ND	0.7	0.8	NA	0.6	ND	ND	ND	ND	0.58	ND	ND	0.85	ND	1.2	ND	ND	ND	ND	0.65	ND	ND	ND	ND	ND	ND	1.8	ND	ND	0.82	ND
Indeno(1,2,3-cd)Pyrene	NE	7.8	10,000	mg/kg	5.3	ND	ND	ND	ND	ND	ND	ND	ND	0.39	NA	ND	ND	ND	NA	ND	ND	ND	ND	ND	ND	ND	0.41	ND	ND	1.3	ND	ND	0.82	ND	1.7	ND	ND	ND	0.55	ND	ND	3.6	ND	ND	5.4	ND
Naphthalene	NE	10,000	10,000	mg/kg	5.9	ND	ND	ND	ND	ND	ND	ND	ND	NA	NA	ND	ND	0.7	NA	ND	4.9	ND	ND	ND	ND	1.7	ND	1.4	ND	0.43	ND	ND	ND	ND	0.45	ND	ND	ND	ND	ND	ND	2.7	ND	ND	0.76	ND
Phenanthrene	NE	10,000	10,000	mg/kg	14.4	2.1	0.4	ND	0.4	0.5	ND	ND	1.46	4.15	NA	ND	1.3	1.3	NA	ND	4.5	8	ND	ND	3.5	4.1	ND	3.5	0.63	6.3	0.63	0.74	1.7	ND	5.4	1.9	1.3	1.1	2.2	1.6	1.3	11	0.48	ND	6	1.6
Pyrene	NE	10,000	10,000	mg/kg	15.8	2.1	0.5	ND	0.8	ND	0.4	ND	0.744	2.68	NA	ND	0.5	1.1	NA	ND	1.8	2.6	ND	ND	ND	2.2	5.1	2.2	1.1	4.8	1	0.85	1.7	ND	5.1	ND	0.41	ND	1.7	0.4	0.44	9.5	0.88	ND	17	1.4

Notes:

Data is compared to RIDEM Method 1 Standards. Shaded results represent numerical exceedances of standards.

Table only indicates the compounds that were detected, other compounds were analyzed for, but not detected.

Table only shows explorations located within 50-feet of the New Dike Road

ND - Not Detected NA - Not Analyzed

Sample depths noted here are from original grade. This table presents data that has since been disturbed or regraded. As such, the final grades are unknown and as such the modified sampling depths are unknown.

Table 1B
Analytical Soil Data (Currently Uncapped)
New Access Road
642 Allens Avenue
Providence, Rhode Island

	RIDEM GB Leachability Criteria	RIDEM I/C DEC	RIDEM UCL	Units	A49		A50		A51		A57		A58		A59		A60		A61		A63		A64		A65		A66		C65		C66		C67		C68		C69		C70		C71		C72	
					0-2 FT	12-14 FT	0-2 FT	8-10 FT	0-2 FT	6-8 FT	0-2 FT	8-10 FT	0-2 FT	4-6 FT	0-2 FT	4-6 FT	0-2 FT	4-6 FT	0-2 FT	4-6 FT	0-2 FT	2-4 FT	0-2 FT	4-6 FT	0-2 FT	4-6 FT	0-2 FT	6-8 FT	0-2 FT	6-10 FT	0-2 FT	4-6 FT	0-2 FT	4-6 FT	0-2 FT	4-6 FT	0-2 FT	2-4 FT	0-2 FT	4-6 FT	0-2 FT	2-4 FT	0-2 FT	2-4 FT
					2/17/2000		2/23/2000		2/23/2000		2/23/2000		2/29/2000		2/29/2000		2/29/2000		2/29/2000		2/29/2000		2/29/2000		2/29/2000		2/29/2000		2/11/2000		2/11/2000		2/11/2000		2/17/2000		2/11/2000		2/11/2000		2/11/2000		2/11/2000	
Volatile Organic Compounds (VOCs)																																										
1,2,4-Trimethylbenzene	NE	NE	10,000	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,3,5-Trimethylbenzene	NE	NE	10,000	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Acetone	NE	10,000	10,000	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Benzene	4.3	200	10,000	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloroform	NE	940	10,000	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ethylbenzene	62	10,000	10,000	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Isopropylbenzene	NE	10,000	10,000	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Methylene Chloride	NE	760	10,000	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Naphthalene	NE	10,000	10,000	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
n-Butylbenzene	NE	NE	10,000	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
n-Propylbenzene	NE	NE	10,000	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
sec-Butylbenzene	NE	NE	10,000	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Toluene	54	10,000	10,000	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Xylenes (Total)	NE	10,000	10,000	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Total Petroleum Hydrocarbons (TPH)																																										
Hydrocarbon Content	2,500	2,500	30,000	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	**3300**	ND	ND	ND	ND	ND	ND	ND	ND	ND	1300	ND	ND	ND	ND
Inorganic Compounds																																										
Total Cyanide	NE	10,000	10,000	mg/kg	0.14	0.039	0.21	ND	0.083	0.23	0.46	ND	0.22	0.13	ND	0.034	0.12	0.071	ND	ND	0.52	0.4	0.24	0.86	1.4	10.9	ND	ND	ND	25.1	ND	ND	ND	ND	0.51	ND	ND	ND	0.88	6.2	ND	ND	ND	ND
Antimony	NE	820	10,000	mg/kg	ND	NA	0.3	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Arsenic	NE	7	10,000	mg/kg	5.4	NA	4.5	NA	3	NA	5.6	NA	3.1	NA	5.1	NA	4.9	NA	5	NA	6	NA	4	NA	3.9	NA	2.2	NA	5.1	ND	3.2	ND	2.7	ND	6.8	ND	3.3	ND	4.2	ND	3.6	ND	2.1	ND
Barium	NE	10,000	10,000	mg/kg	77.3	NA	67.2	NA	22.2	NA	64.3	NA	19.9	NA	11.4	NA	24.6	NA	17.1	NA	17.5	NA	28.9	NA	18.5	NA	15.2	NA	41.1	ND	25.4	ND	42.2	ND	51.2	ND	52	ND	53.3	ND	49.9	ND	21.4	ND
Beryllium	NE	1.5	10,000	mg/kg	0.71	NA	0.53	NA	0.25	NA	1.1	NA	0.56	NA	ND	NA	0.89	NA	0.23	NA	0.29	NA	0.59	NA	0.31	NA	0.29	NA	ND	ND	ND	ND	ND	ND	0.59	ND	ND	ND	ND	ND	0.57	ND	ND	ND
Cadmium	NE	1,000	10,000	mg/kg	ND	NA	0.29	NA	0.22	NA	0.33	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chromium	NE	10,000	10,000	mg/kg	15.5	NA	11.2	NA	7.8	NA	22.8	NA	7.9	NA	9.1	NA	8.9	NA	9.8	NA	9.3	NA	7.6	NA	7.6	NA	5.4	NA	8.3	ND	6	ND	9.5	ND	9.4	ND	5.4	ND	8.5	ND	11	ND	4.3	ND
Copper	NE	10,000	10,000	mg/kg	67	NA	52.6	NA	9.8	NA	144	NA	16.2	NA	11.1	NA	9.8	NA	9.2	NA	11.6	NA	15.1	NA	9.1	NA	5.5	NA	21.5	ND	9.8	ND	13.8	ND	41.6	ND	14.2	ND	73	ND	36.3	ND	7.7	ND
Iron	NE	NE	NE	mg/kg	16400	134100	12500	20800	7040	14200	17900	16500	9480	8470	17900	10900	15600	8390	18700	20000	15100	15700	12900	22200	11100	17900	8990	26100	11700	16200	8540	13300	10	8690	15000	12900	5710	14000	11600	12300	12600	8780	6660	17600
Lead	NE	500	10,000	mg/kg	45.2	NA	34.9	NA	8.9	NA	85.5	NA	7.4	NA	6.6	NA	17	NA	7.4	NA	24.6	NA	50.5	NA	24.4	NA	8.8	NA	34	ND	11.8	ND	19.8	ND	59.9	ND	33.4	ND	21.2	ND	30.7	ND	5.9	ND
Mercury	NE	610	10,000	mg/kg	0.019	NA	ND	NA	ND	NA	0.029	NA	ND	NA	ND	NA	ND	NA	ND	NA	0.02	NA	0.051	NA	0.033	NA	0.016	NA	0.11	ND	ND	ND	0.051	ND	0.12	ND	ND	ND	0.051	ND	ND	ND	ND	ND
Nickel	NE	10,000	10,000	mg/kg	40.2	NA	24.9	NA	6.6	NA	81.6	NA	11.5	NA	7.9	NA	11.5	NA	11.9	NA	10.2	NA	10.6	NA	8.4	NA	6	NA	10.7	ND	7.6	ND	10.5	ND	14.2	ND	8.5	ND	14.3	ND	11.8	ND	6.6	ND
Selenium	NE	10,000	10,000	mg/kg	ND	NA	0.81	NA	ND	NA	0.4	NA	ND	NA	0.51	NA	ND	NA	ND	NA	ND	NA	ND	NA	0.34	NA	ND	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Silver	NE	10,000	10,000	mg/kg	ND	NA	0.39	NA	0.27	NA	1.1	NA	ND	NA	0.32	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Zinc	NE	10,000	10,000	mg/kg	157	NA	137	NA	31	NA	327	NA	32.6	NA	19	NA	158	NA	33.5	NA	26.5	NA	45.6	NA	31.3	NA	20.2	NA	38.9	ND	25.5	ND	48.3	ND	69.9	ND	27.1	ND	34.5	ND	27.8	ND	16.5	ND
Polychlorinated Biphenyls (PCBs) and Pesticides																																										
Endosulfan II	NE	NE	10,000	mg/kg	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	0.057	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA
Endrin	NE	NE	10,000	mg/kg	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA
Endrin ketone	NE	NE	10,000	mg/kg	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	0.042	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA
Total PCBs	10	10	10,000	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Semi-Volatile Organic Compounds (SVOCs)																																										
2-Methylnaphthalene	NE	10,000	10,000	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.39	ND	ND	ND	ND	ND	0.39	ND	ND	ND	ND	ND	ND	ND	ND	ND
Acenaphthene	NE	10,000	10,000	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Acenaphthylene	NE	10,000	10,000	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.4	ND	0.43	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	14	ND	ND	0.46	ND
Anthracene	NE	10,000	10,000	mg/kg	ND	ND	ND	ND	ND	ND	0.39	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.57	ND	ND	ND	1.3	0.57	1.7	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.38	13	ND	ND	0.43	ND
Benzo(a)anthracene	NE	7.8	10,000	mg/kg	0.66	ND	ND	ND	ND	ND	0.94	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.92	0.38	0.63	ND	ND	1.4	5.6	ND	ND	0.39	ND	0.44	ND	ND	ND	0.72	**61**	ND	ND	1.1	0.69
Benzo(a)pyrene	NE	0.8	10,000	mg/kg	ND	ND	ND	ND	ND	ND	0.77	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	**0.86**	0.45	0.68	ND	ND	**1.3**	**5.2**	ND	ND	ND	ND	ND	ND	ND	ND	0.66	**45**	ND	ND	**1.2**	0.66
Benzo(b)fluoranthene	NE	7.8	10,000	mg/kg	0.86	ND	ND	ND	ND	ND	1.1	ND	ND	ND	ND	ND	ND	ND	ND	0.45	0.41	ND	1.1	0.52	0.94	0.42	ND	1.9	6.8	ND	ND	0.58	ND	ND	ND	ND	ND	1.2	**61**	0.4	ND	2.2	0.91
Benzo(g,h,i)perylene	NE	10,000	10,000	mg/kg	ND	ND	ND	ND	ND	ND	0.43	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.52	ND	ND	0.88	2.8	ND	ND	ND	ND	ND	ND	ND	ND	ND	22	ND	ND	1	0.39
Benzo(k)fluoranthene	NE	78	10,000	mg/kg	0.37	ND	ND	ND	ND	ND	0.5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.4	ND	0.36	ND	ND	0.65	ND	ND	ND	0.26	ND	ND	ND	ND	ND	0.38	**22**	ND	ND	0.53	0.44
bis(2-Ethylhexyl)phthalate	NE	410	10,000	mg/kg	ND	ND	ND	0.52	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Carbazole	NE	NE	10,000	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.97	ND	ND	ND	ND
Chrysene	NE	780	10,000	mg/kg	0.64	ND	ND	ND	ND	ND	0.96	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.97	ND	0.66	ND	ND	1.3	4.8	ND	ND	0.46	ND	0.5	ND	ND	ND	0.99	55	0.52	ND	1.1	0.84
Dibenzo(a,h)Anthracene	NE	0.8	10,000	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	**0.86**	ND	ND	ND	ND	ND	ND	ND	ND	ND	**9.3**	ND	ND	ND	ND
Dibenzofuran	NE	NE	10,000	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Fluoranthene	NE	10,000	10,000	mg/kg	1.5	ND	ND	ND	ND	0.49	1.6	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.6	0.43	0.86	ND	0.6	3	8.6	ND	ND	0.68	ND	0.65	ND	ND	ND	1.3	98	0.4	ND	1.9	0.83
Fluorene	NE	10,000	10,000	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.59	ND	ND	ND	ND	ND	ND	ND	ND	ND	2.4	ND	ND	ND	ND
Indeno(1,2,3-cd)Pyrene	NE	7.8	10,000	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.5	ND	0.49	ND	ND	0.86	3.3	ND	ND	ND	ND	ND	ND	ND	ND	ND	**27**	ND	ND	0.98	ND
Naphthalene	NE	10,000	10,000	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.57	ND	0.48	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.72	ND	ND	ND	ND
Phenanthrene	NE	10,000	10,000	mg/kg	1.3	ND	ND	ND	ND	0.46	1.3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.44	ND	1	ND	ND	ND	7.8	2.2	5.4	0.56	0.52	1.1	0.54	0.78	ND	0.77	0.72	1.5	21	0.57	0.6	1.3	0.92
Pyrene	NE	10,000	10,000	mg/kg	1	ND	ND	ND	ND	0.41	1.3	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.36	0.45	ND	1.8	0.47	1.7	ND	0.64	2.4	7.1	ND	ND	0.6	ND	0.59	ND	0.38	ND	1.3	84	0.5	ND	1.7	ND

Notes:

Data is compared to RIDEM Method 1 Standards. Shaded results represent numerical exceedances of standards.

Table only indicates the compounds that were detected, other compounds were analyzed for, but not detected.

Table only shows explorations located within 50-feet of the New Dike R

ND - Not Detected NA - Not Analyzed

Sample depths noted here are from original grade. This table presents data that has since been disturbed or regraded. As such, the final grades are unknown and as such the modified sampling depths are unknown.

Table 2A
Summary of Groundwater and NAPL Measurements
New Access Road
642 Allens Avenue
Providence, Rhode Island

Site Area	Well ID	Surveyed Elevations			Well Installation Details					Range of LNAPL Observed (feet)	Range of DNAPL Observed (feet)	July 2011								August 2011							
		Top of Casing Elevation (Feet)	Top of PVC Elevation (Feet)	Grade Elevation (Feet)	Type of Well	Well Depth Modifier	Date of Installation	Measured Well Depth (feet bgs)	Screened Interval (feet bgs)			Depth to LNAPL (ft)	Depth to Water (ft)	Depth to DNAPL (ft)	Total Well Depth (ft)	GW Elevation (feet)	LNAPL Thickness (feet)	DNAPL Thickness (feet)	Corrected Groundwater Elevation (feet)	Depth to LNAPL (ft)	Depth to Water (ft)	Depth to DNAPL (ft)	Total Well Depth (ft)	GW Elevation (feet)	LNAPL Thickness (feet)	DNAPL Thickness (feet)	Corrected Groundwater Elevation (feet)
LNG	RCA-29	NS	13.45	NS	Standpipe	Shallow	2/13/1996	12.95	2 - 12	trace - 0.17	NP	10.87	10.95	-	14.79	2.50	0.08	NP	2.57	trace	11.31	-	14.79	2.14	trace	NP	2.14
LNG	RCA-33	NS	9.67	NS	Standpipe	Shallow	2/23/1996	11.32	5 - 15	NP	NP	-	7.44	-	13.12	2.23	NP	NP	2.23	-	7.74	-	13.12	1.93	NP	NP	1.93
LNG	RCA-38	NS	9.36	NS	Standpipe	Shallow	5/2/1996	15.65	5 - 15	NP	NP	-	7.86	-	16.8	1.50	NP	NP	1.50	-	8.19	-	16.8	1.17	NP	NP	1.17
LNG	VHB-13	12.88	12.72	13.34	Roadbox	Shallow	1/16/2002	16.56	7 - 17	NP	NP									-	10.47	-	15.90	2.25	NP	NP	2.25
LNG	ESS RW-1	NS	NS	NS	Recovery Well	Shallow	2002	6.70	Unknown	trace	NP	-	5.11	-	8.46	NS	NP	NP	NS	-	6.71	-	8.46	NS	NP	NP	NS
LNG	ESS RW-2	NS	NS	NS	Recovery Well	Shallow	2002	9.32	Unknown	trace	NP	-	7.62	-	11.07	NS	NP	NP	NS	-	8.24	-	11.07	NS	NP	NP	NS

Notes
Well is located at the LNG Facility
Elevations are relative to NAVD 1988
NP - Indicates No Product observed.
NS - Not Surveyed
Blanks indicate no measurement collected on that particular day.
Potentiometric elevations for wells exhibiting LNAPL include 0.85 correction factor.

Table 2A
Summary of Groundwater and NAPL Measurements
New Access Road
642 Allens Avenue
Providence, Rhode Island

Site Area	Well ID	Surveyed Elevations			Well Installation Details					Range of LNAPL Observed (feet)	Range of DNAPL Observed (feet)	February 2012								July 2012							
		Top of Casing Elevation (Feet)	Top of PVC Elevation (Feet)	Grade Elevation (Feet)	Type of Well	Well Depth Modifier	Date of Installation	Measured Well Depth (feet bgs)	Screened Interval (feet bgs)			Depth to LNAPL (ft)	Depth to Water (ft)	Depth to DNAPL (ft)	Total Well Depth (ft)	GW Elevation (feet)	LNAPL Thickness (feet)	DNAPL Thickness (feet)	Corrected Groundwater Elevation (feet)	Depth to LNAPL (ft)	Depth to Water (ft)	Depth to DNAPL (ft)	Total Well Depth (ft)	GW Elevation (feet)	LNAPL Thickness (feet)	DNAPL Thickness (feet)	Corrected Groundwater Elevation (feet)
LNG	RCA-29	NS	13.45	NS	Standpipe	Shallow	2/13/1996	12.95	2 - 12	trace - 0.17	NP	trace	11.73	-	14.79	1.72	trace	NP	1.72	11.50	11.61	-	14.45	1.84	0.11	NP	1.84
LNG	RCA-33	NS	9.67	NS	Standpipe	Shallow	2/23/1996	11.32	5 - 15	NP	NP	-	8.37	-	13.26	1.30	NP	NP	1.30	-	8.08	-	13.2	1.59	NP	NP	1.59
LNG	RCA-38	NS	9.36	NS	Standpipe	Shallow	5/2/1996	15.65	5 - 15	NP	NP	-	8.78	-	16.64	0.58	NP	NP	0.58	-	8.48	-	16.7	0.88	NP	NP	0.88
LNG	VHB-13	12.88	12.72	13.34	Roadbox	Shallow	1/16/2002	16.56	7 - 17	NP	NP	-	10.73	-	15.86	1.99	NP	NP	1.99	-	10.5	-	15.84	2.22	NP	NP	2.22
LNG	ESS RW-1	NS	NS	NS	Recovery Well	Shallow	2002	6.70	Unknown	trace	NP	-	5.41	-	8.6	NS	NP	NP	NS	-	6.59	-	8.46	NS	NP	NP	NS
LNG	ESS RW-2	NS	NS	NS	Recovery Well	Shallow	2002	9.32	Unknown	trace	NP	-	8.35	-	11.2	NS	NP	NP	NS	-	8.18	-	11.1	NS	NP	NP	NS

Notes
Well is located at the LNG Facility
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Blanks indicate no measurement collected on that particular day.
Potentiometric elevations for wells exhibiting LNAPL include 0.85 correction factor.

Table 2A
Summary of Groundwater and NAPL Measurements
New Access Road
642 Allens Avenue
Providence, Rhode Island

Site Area	Well ID	Surveyed Elevations			Well Installation Details					Range of LNAPL Observed (feet)	Range of DNAPL Observed (feet)	February 2013								November 2013							
		Top of Casing Elevation (Feet)	Top of PVC Elevation (Feet)	Grade Elevation (Feet)	Type of Well	Well Depth Modifier	Date of Installation	Measured Well Depth (feet bgs)	Screened Interval (feet bgs)			Depth to LNAPL (ft)	Depth to Water (ft)	Depth to DNAPL (ft)	Total Well Depth (ft)	GW Elevation (feet)	LNAPL Thickness (feet)	DNAPL Thickness (feet)	Corrected Groundwater Elevation (feet)	Depth to LNAPL (ft)	Depth to Water (ft)	Depth to DNAPL (ft)	Total Well Depth (ft)	GW Elevation (feet)	LNAPL Thickness (feet)	DNAPL Thickness (feet)	Corrected Groundwater Elevation (feet)
LNG	RCA-29	NS	13.45	NS	Standpipe	Shallow	2/13/1996	12.95	2 - 12	trace - 0.17	NP	trace	11.98	-	14.45	1.47	trace	NP	1.47	-	11.79	-	14.35	1.66	NP	NP	1.66
LNG	RCA-33	NS	9.67	NS	Standpipe	Shallow	2/23/1996	11.32	5 - 15	NP	NP	-	8.51	-	13.3	1.16	NP	NP	1.16	-	8.11	-	13.2	1.56	NP	NP	1.56
LNG	RCA-38	NS	9.36	NS	Standpipe	Shallow	5/2/1996	15.65	5 - 15	NP	NP	-	9.05	-	16.7	0.31	NP	NP	0.31	-	9.25	-	16.5	0.11	NP	NP	0.11
LNG	VHB-13	12.88	12.72	13.34	Roadbox	Shallow	1/16/2002	16.56	7 - 17	NP	NP	-	10.71	-	15.85	2.01	NP	NP	2.01	-	10.9	-	15.86	1.82	NP	NP	1.82
LNG	ESS RW-1	NS	NS	NS	Recovery Well	Shallow	2002	6.70	Unknown	trace	NP	-	5.27	-	8.55	NS	NP	NP	NS	-	7.35	-	8.45	NS	NP	NP	NS
LNG	ESS RW-2	NS	NS	NS	Recovery Well	Shallow	2002	9.32	Unknown	trace	NP	-	8.39	-	11.2	NS	NP	NP	NS	-	8.68	-	11.1	NS	NP	NP	NS

Notes
Well is located at the LNG Facility
Elevations are relative to NAVD 1988
NP - Indicates No Product observed.
NS - Not Surveyed
Blanks indicate no measurement collected on that particular day.
Potentiometric elevations for wells exhibiting LNAPL include 0.85 correction factor.

Table 2A
Summary of Groundwater and NAPL Measurements
New Access Road
642 Allens Avenue
Providence, Rhode Island

Site Area	Well ID	Surveyed Elevations			Well Installation Details					Range of LNAPL Observed (feet)	Range of DNAPL Observed (feet)	June 2014								October 2014							
		Top of Casing Elevation (Feet)	Top of PVC Elevation (Feet)	Grade Elevation (Feet)	Type of Well	Well Depth Modifier	Date of Installation	Measured Well Depth (feet bgs)	Screened Interval (feet bgs)			Depth to LNAPL (ft)	Depth to Water (ft)	Depth to DNAPL (ft)	Total Well Depth (ft)	GW Elevation (feet)	LNAPL Thickness (feet)	DNAPL Thickness (feet)	Corrected Groundwater Elevation (feet)	Depth to LNAPL (ft)	Depth to Water (ft)	Depth to DNAPL (ft)	Total Well Depth (ft)	GW Elevation (feet)	LNAPL Thickness (feet)	DNAPL Thickness (feet)	Corrected Groundwater Elevation (feet)
LNG	RCA-29	NS	13.45	NS	Standpipe	Shallow	2/13/1996	12.95	2 - 12	trace - 0.17	NP	11.38	11.55	-	14.95	1.90	0.17	NP	2.04	11.68	11.76	-	14.95	1.69	0.08	NP	1.76
LNG	RCA-33	NS	9.67	NS	Standpipe	Shallow	2/23/1996	11.32	5 - 15	NP	NP	-	7.75	-	13.32	1.92	NP	NP	1.92	-	8.31	-	13.38	1.36	NP	NP	1.36
LNG	RCA-38	NS	9.36	NS	Standpipe	Shallow	5/2/1996	15.65	5 - 15	NP	NP	-	8.7	-	17.65	0.66	NP	NP	0.66	-	9.02	-	16.33	0.34	NP	NP	0.34
LNG	VHB-13	12.88	12.72	13.34	Roadbox	Shallow	1/16/2002	16.56	7 - 17	NP	NP	-	10.45	-	15.95	2.27	NP	NP	2.27	-	10.7	-	15.88	2.02	NP	NP	2.02
LNG	ESS RW-1	NS	NS	NS	Recovery Well	Shallow	2002	6.70	Unknown	trace	NP	-	4.94	-	8.7	NS	NP	NP	NS	-	5.4	-	8.82	NS	NP	NP	NS
LNG	ESS RW-2	NS	NS	NS	Recovery Well	Shallow	2002	9.32	Unknown	trace	NP	-	7.9	-	11.32	NS	NP	NP	NS	Trace	8.19	-	11.3	NS	Trace	NP	NS

Notes
Well is located at the LNG Facility
Elevations are relative to NAVD 1988
NP - Indicates No Product observed.
NS - Not Surveyed
Blanks indicate no measurement collected on that particular day.
Potentiometric elevations for wells exhibiting LNAPL include 0.85 correction factor.

Table 2A
Summary of Groundwater and NAPL Measurements
New Access Road
642 Allens Avenue
Providence, Rhode Island

Site Area	Well ID	Surveyed Elevations			Well Installation Details					Range of LNAPL Observed (feet)	Range of DNAPL Observed (feet)	April 2015								October 2015							
		Top of Casing Elevation (Feet)	Top of PVC Elevation (Feet)	Grade Elevation (Feet)	Type of Well	Well Depth Modifier	Date of Installation	Measured Well Depth (feet bgs)	Screened Interval (feet bgs)			Depth to LNAPL (ft)	Depth to Water (ft)	Depth to DNAPL (ft)	Total Well Depth (ft)	GW Elevation (feet)	LNAPL Thickness (feet)	DNAPL Thickness (feet)	Corrected Groundwater Elevation (feet)	Depth to LNAPL (ft)	Depth to Water (ft)	Depth to DNAPL (ft)	Total Well Depth (ft)	GW Elevation (feet)	LNAPL Thickness (feet)	DNAPL Thickness (feet)	Corrected Groundwater Elevation (feet)
LNG	RCA-29	NS	13.45	NS	Standpipe	Shallow	2/13/1996	12.95	2 - 12	trace - 0.17	NP	11.53	11.55	-	14.8	1.90	0.02	NP	1.92	11.43	11.53	-	12.62	1.92	0.10	NP	2.01
LNG	RCA-33	NS	9.67	NS	Standpipe	Shallow	2/23/1996	11.32	5 - 15	NP	NP	-	10.5	-	15.67	-0.83	NP	NP	-0.83	-	7.76	-	13.49	1.91	NP	NP	1.91
LNG	RCA-38	NS	9.36	NS	Standpipe	Shallow	5/2/1996	15.65	5 - 15	NP	NP	-	8.95	-	16.4	0.41	NP	NP	0.41	-	8.82	-	16.71	0.54	NP	NP	0.54
LNG	VHB-13	12.88	12.72	13.34	Roadbox	Shallow	1/16/2002	16.56	7 - 17	NP	NP	-	10.51	-	15.75	2.21	NP	NP	2.21	-	10.49	-	15.87	2.23	NP	NP	2.23
LNG	ESS RW-1	NS	NS	NS	Recovery Well	Shallow	2002	6.70	Unknown	trace	NP	-	4.05	-	8.45	NS	NP	NP	NS	-	5.99	-	8.27	NS	NP	NP	NS
LNG	ESS RW-2	NS	NS	NS	Recovery Well	Shallow	2002	9.32	Unknown	trace	NP	-	7.9	-	11.1	NS	NP	NP	NS	-	8.23	-	11.34	NS	NP	NP	NS

Notes
Well is located at the LNG Facility
Elevations are relative to NAVD 1988
NP - Indicates No Product observed.
NS - Not Surveyed
Blanks indicate no measurement collected on that particular day.
Potentiometric elevations for wells exhibiting LNAPL include 0.85 correction factor.

Table 2A
Summary of Groundwater and NAPL Measurements
New Access Road
642 Allens Avenue
Providence, Rhode Island

Site Area	Well ID	Surveyed Elevations			Well Installation Details					Range of LNAPL Observed (feet)	Range of DNAPL Observed (feet)	May 2016							
		Top of Casing Elevation (Feet)	Top of PVC Elevation (Feet)	Grade Elevation (Feet)	Type of Well	Well Depth Modifier	Date of Installation	Measured Well Depth (feet bgs)	Screened Interval (feet bgs)			Depth to LNAPL (ft)	Depth to Water (ft)	Depth to DNAPL (ft)	Total Well Depth (ft)	GW Elevation (feet)	LNAPL Thickness (feet)	DNAPL Thickness (feet)	Corrected Groundwater Elevation (feet)
LNG	RCA-29	NS	13.45	NS	Standpipe	Shallow	2/13/1996	12.95	2 - 12	trace - 0.17	NP	11.52	11.53	-	12.31	1.92	0.01	NP	1.93
LNG	RCA-33	NS	9.67	NS	Standpipe	Shallow	2/23/1996	11.32	5 - 15	NP	NP	-	8	-	13.19	1.67	NP	NP	1.67
LNG	RCA-38	NS	9.36	NS	Standpipe	Shallow	5/2/1996	15.65	5 - 15	NP	NP	-	8.95	-	16.5	0.41	NP	NP	0.41
LNG	VHB-13	12.88	12.72	13.34	Roadbox	Shallow	1/16/2002	16.56	7 - 17	NP	NP	-	10.58	-	15.85	2.14	NP	NP	2.14
LNG	ESS RW-1	NS	NS	NS	Recovery Well	Shallow	2002	6.70	Unknown	trace	NP	trace	6.07	-	8.44	NS	trace	NP	NS
LNG	ESS RW-2	NS	NS	NS	Recovery Well	Shallow	2002	9.32	Unknown	trace	NP	trace	8.34	-	11.1	NS	trace	NP	NS

Notes
Well is located at the LNG Facility
Elevations are relative to NAVD 1988
NP - Indicates No Product observed.
NS - Not Surveyed
Blanks indicate no measurement collected on that particular day.
Potentiometric elevations for wells exhibiting LNAPL include 0.85 correction factor.

Table 2B
Summary of LNAPL Thickness Gauging
New Access Road
642 Allens Avenue
Providence, Rhode Island

	LNAPL Thickness (feet)																				
Date	11/12/01	09/12/02	Sept 2003	Sept 2005	Mar 2006	June 2006	July 2006	Oct. 2006	Dec 2006	Mar 2008	July 2011	Aug 2011	Feb 2012	July 2012	Feb 2013	Nov 2013	June 2014	October 2014	April 2015	October 2015	May 2016
LNG Facility																					
RCA-29	0.33	0.01	0.15	trace	ND	0.36	0.15	0.11	0.15	0.3	0.08	trace	trace	0.11	trace	ND	0.17	0.08	0.02	0.10	0.01
ESS RW-1	NI	NI	ND	ND	NG	NG	NG	NG	NG	NG	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	trace
ESS RW-2	NI	NI	ND	ND	NG	NG	NG	NG	NG	NG	ND	ND	ND	ND	ND	ND	ND	trace	ND	ND	trace

Notes:
Well is located at the LNG Facility
NG - Not Gauged
This table presents LNAPL thickness data for monitoring wells that have exhibited LNAPL thicknesses of at least trace amounts since 2001.
Gray shading indicates NAPL thickness of equal to or more than 0.01 feet
ND - Not Detected
NI - Not Installed Yet
Dest - Destroyed
trace - sheen or less than 0.01 feet

Table 2C
Summary of LNAPL Recovery
New Access Road
642 Allens Avenue
Providence, Rhode Island

Well ID	Date	Start Pumping	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Estimated Volume Purged (gallons)	Tide Condition
RCA-29	7/19/2012	9:30	11.50	11.61	0.11	<0.1 gal	Mid
	6/20/2014	13:00	11.38	11.55	0.17	<0.1 gal	Mid to High
	10/19/2015	12:00	11.43	11.53	0.1	<0.1 gal	Mid

Notes: Well is located at the LNG Facility
NR = Not Recovered
Volume purged was noted as a mixture of LNAPL and groundwater

Table 3
Analytical Groundwater Data
New Access Road
642 Allens Avenue
Providence, Rhode Island

	RIDEM		Sample ID:	RCA-7		RCA-29		RCA-31	RCA-33				RCA-37				
	GB GW	GB UCL	Sample Date:	October 1994	March 1996	March 1996	September 2005	March 1996	March 1996	November 2001	September 2003	September 2005	March 1996	November 2001	September 2003	September 2005	March 2008
Volatile Organic Compounds (VOCs)																	
1,3,5-Trimethylbenzene	NE	NE	mg/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Acetone	NE	NE	mg/L	ND	ND	ND	0.0348	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Benzene	0.14	18	mg/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ethylbenzene	1.6	16	mg/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Isopropylbenzene	NE	NE	mg/L	ND	ND	0.017	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Naphthalene	2.67	NE	mg/L	ND	ND	ND	0.002	ND	0.007	ND	ND	ND	ND	ND	ND	ND	ND
n-Butylbenzene	NE	NE	mg/L	ND	ND	0.014	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
n-Propylbenzene	NE	NE	mg/L	ND	ND	0.029	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
sec-Butylbenzene	NE	NE	mg/L	ND	ND	0.012	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
tert-Butylbenzene	NE	NE	mg/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Toluene	1.7	21	mg/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Xylene O	NE	NE	mg/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Xylene P,M	NE	NE	mg/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Xylenes (Total)	NE	NE	mg/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Semi-Volatile Organic Compounds (SVOCs)																	
2-Methylnaphthalene	NE	NE	mg/L	0.047	0.023	ND	NA	ND	0.037	ND	NA	NA	ND	ND	NA	NA	NA
Acenaphthene	NE	NE	mg/L	ND	ND	ND	NA	ND	ND	ND	NA	NA	ND	ND	NA	NA	NA
Acenaphthylene	NE	NE	mg/L	ND	0.024	1.58	NA	ND	0.06	ND	NA	NA	ND	ND	NA	NA	NA
Anthracene	NE	NE	mg/L	ND	ND	1.34	NA	ND	0.023	ND	NA	NA	ND	ND	NA	NA	NA
Benzo [a] Anthracene	NE	NE	mg/L	ND	ND	0.122	NA	ND	ND	ND	NA	NA	ND	ND	NA	NA	NA
Fluoranthene	NE	NE	mg/L	ND	ND	0.496	NA	ND	0.017	ND	NA	NA	ND	ND	NA	NA	NA
Fluorene	NE	NE	mg/L	0.01	ND	ND	NA	ND	ND	ND	NA	NA	ND	ND	NA	NA	NA
Naphthalene	2.67	NE	mg/L	0.083	0.018	0.231	NA	ND	ND	ND	NA	NA	ND	ND	NA	NA	NA
n-Nitrosodiphenylamine	NE	NE	mg/L	0.01	ND	NA	NA	ND	ND	ND	NA	NA	ND	ND	NA	NA	NA
Phenanthrene	NE	NE	mg/L	0.016	ND	0.761	NA	ND	0.018	ND	NA	NA	ND	ND	NA	NA	NA
Pyrene	NE	NE	mg/L	ND	ND	0.346	NA	ND	0.014	ND	NA	NA	ND	ND	NA	NA	NA
Inorganics																	
Total Cyanide	NE	NE	mg/L	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total Petroleum Hydrocarbons																	
TPH	NE	NE	mg/L	12	4.5	370	NA	ND	10	NA	NA	NA	ND	NA	NA	NA	NA

Notes:

Data is compared to RIDEM GB Groundwater Standards. Shaded results represent numerical exceedances of standards.

Table only indicates the compounds that were detected, other compounds were analyzed for, but not detected.

Table only shows monitoring wells or groundwater samples collected within the Limits of Work.

ND - Not Detected
NA - Not Analyzed
NE - Not Established

GB GW - GB Groundwater Objective
GB UCL - GB Upper Concentration Limit

Table 3
Analytical Groundwater Data
New Access Road
642 Allens Avenue
Providence, Rhode Island

	RIDEM		Sample ID:	RCA-38										A18	A39
	GB GW	GB UCL	Sample Date:	March 1996	November 2001	September 2003	September 2005	August 2011	July 2012	November 2013	June 2014	October 2015	May 2016	March 2000	March 2000
Volatile Organic Compounds (VOCs)															
1,3,5-Trimethylbenzene	NE	NE	mg/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	NA
Acetone	NE	NE	mg/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	NA
Benzene	0.14	18	mg/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ethylbenzene	1.6	16	mg/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Isopropylbenzene	NE	NE	mg/L	ND	ND	ND	ND	ND	0.0004	ND	ND	0.0001	0.0001	NA	NA
Naphthalene	2.67	NE	mg/L	0.008	ND	ND	ND	ND	ND	ND	ND	ND	0.0006	ND	ND
n-Butylbenzene	NE	NE	mg/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	NA
n-Propylbenzene	NE	NE	mg/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	NA
sec-Butylbenzene	NE	NE	mg/L	ND	ND	ND	ND	ND	0.0005	ND	ND	ND	ND	NA	NA
tert-Butylbenzene	NE	NE	mg/L	ND	ND	ND	ND	ND	0.0002	ND	ND	ND	ND	NA	NA
Toluene	1.7	21	mg/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Xylene O	NE	NE	mg/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.0001	NA	NA
Xylene P,M	NE	NE	mg/L	ND	ND	ND	ND	NA	ND	ND	ND	ND	ND	NA	NA
Xylenes (Total)	NE	NE	mg/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.0001	ND	ND
Semi-Volatile Organic Compounds (SVOCs)															
2-Methylnaphthalene	NE	NE	mg/L	0.019	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Acenaphthene	NE	NE	mg/L	0.014	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Acenaphthylene	NE	NE	mg/L	0.035	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Anthracene	NE	NE	mg/L	0.019	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo [a] Anthracene	NE	NE	mg/L	ND	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Fluoranthene	NE	NE	mg/L	ND	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Fluorene	NE	NE	mg/L	0.037	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Naphthalene	2.67	NE	mg/L	0.008	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
n-Nitrosodiphenylamine	NE	NE	mg/L	ND	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Phenanthrene	NE	NE	mg/L	0.019	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Pyrene	NE	NE	mg/L	ND	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Inorganics															
Total Cyanide	NE	NE	mg/L	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total Petroleum Hydrocarbons															
TPH	NE	NE	mg/L	1.7	NA	NA	ND	NA	NA	NA	NA	NA	NA	NA	NA

Notes:

Data is compared to RIDEM GB Groundwater Standards. Shaded results represent numerical exceedances of standards.

Table only indicates the compounds that were detected, other compounds were analyzed for, but not detected.

Table only shows monitoring wells or groundwater samples collected within the Limits of Work.

ND - Not Detected
NA - Not Analyzed
NE - Not Established

GB GW - GB Groundwater Objective
GB UCL - GB Upper Concentration Limit

Table 3
Analytical Groundwater Data
New Access Road
642 Allens Avenue
Providence, Rhode Island

	RIDEM		Sample ID:	VHB-13									
	GB GW	GB UCL	Sample Date:	June 2002	September 2003	September 2005	March 2008	August 2011	July 2012	November 2013	June 2014	October 2015	May 2016
Volatile Organic Compounds (VOCs)													
1,3,5-Trimethylbenzene	NE	NE	mg/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.0004
Acetone	NE	NE	mg/L	ND	ND	ND	ND	ND	0.0035	ND	ND	ND	ND
Benzene	0.14	18	mg/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.0468
Ethylbenzene	1.6	16	mg/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.0043
Isopropylbenzene	NE	NE	mg/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.0018
Naphthalene	2.67	NE	mg/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.005
n-Butylbenzene	NE	NE	mg/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
n-Propylbenzene	NE	NE	mg/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.0009
sec-Butylbenzene	NE	NE	mg/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
tert-Butylbenzene	NE	NE	mg/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Toluene	1.7	21	mg/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.0003
Xylene O	NE	NE	mg/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.0024
Xylene P,M	NE	NE	mg/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.0009
Xylenes (Total)	NE	NE	mg/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.0032
Semi-Volatile Organic Compounds (SVOCs)													
2-Methylnaphthalene	NE	NE	mg/L	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA
Acenaphthene	NE	NE	mg/L	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA
Acenaphthylene	NE	NE	mg/L	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA
Anthracene	NE	NE	mg/L	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo [a] Anthracene	NE	NE	mg/L	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA
Fluoranthene	NE	NE	mg/L	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA
Fluorene	NE	NE	mg/L	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA
Naphthalene	2.67	NE	mg/L	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA
n-Nitrosodiphenylamine	NE	NE	mg/L	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA
Phenanthrene	NE	NE	mg/L	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA
Pyrene	NE	NE	mg/L	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA
Inorganics													
Total Cyanide	NE	NE	mg/L	0.041	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total Petroleum Hydrocarbons													
TPH	NE	NE	mg/L	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Notes:

Data is compared to RIDEM GB Groundwater Standards. Shaded results represent numerical exceedances of standards.

Table only indicates the compounds that were detected, other compounds were analyzed for, but not detected.

Table only shows monitoring wells or groundwater samples collected within the Limits of Work.

ND - Not Detected
NA - Not Analyzed
NE - Not Established

GB GW - GB Groundwater Objective
GB UCL - GB Upper Concentration Limit

FIGURES

NATIONAL GRID
SHORT TERM RESPONSE ACTION PLAN: DIKE ACCESS ROAD
642 ALLENS AVENUE PROVIDENCE, RHODE ISLAND

JUNE 2016

PREPARED FOR:

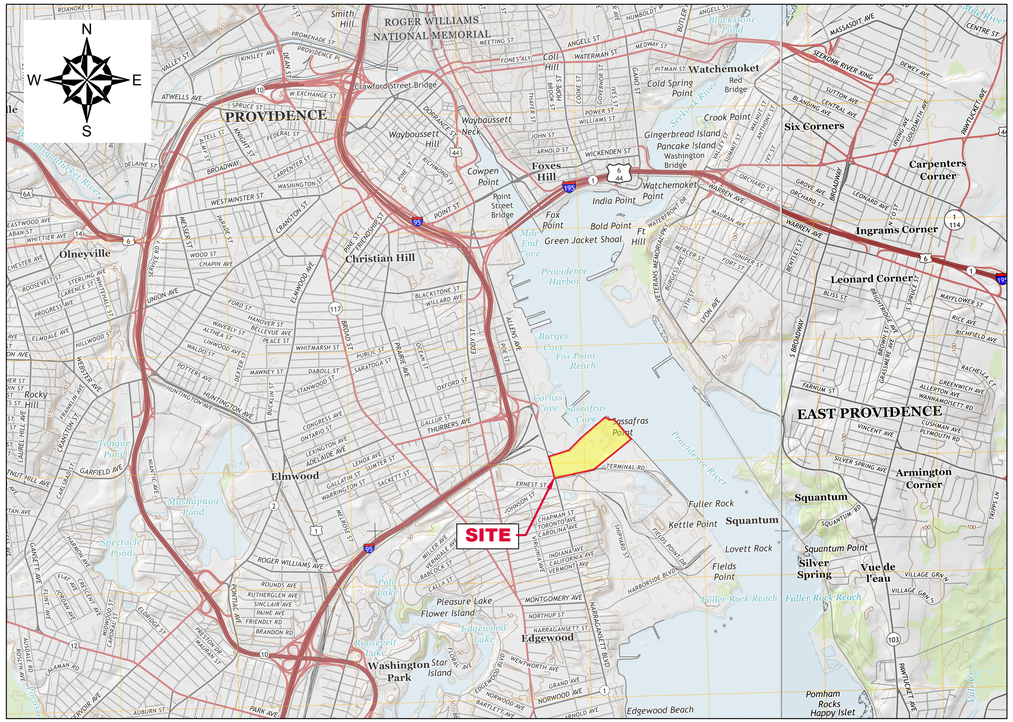
nationalgrid

PREPARED BY:

GZA GEOENVIRONMENTAL, INC.
530 BROADWAY
PROVIDENCE, RHODE ISLAND 02909

ACCESS ROAD DESIGNED BY:

KIEWIT ENGINEERING AND DESIGN CO.
9401 RENNER BOULEVARD
LENEXA, KANSAS 66219



PROJECT LOCUS MAP

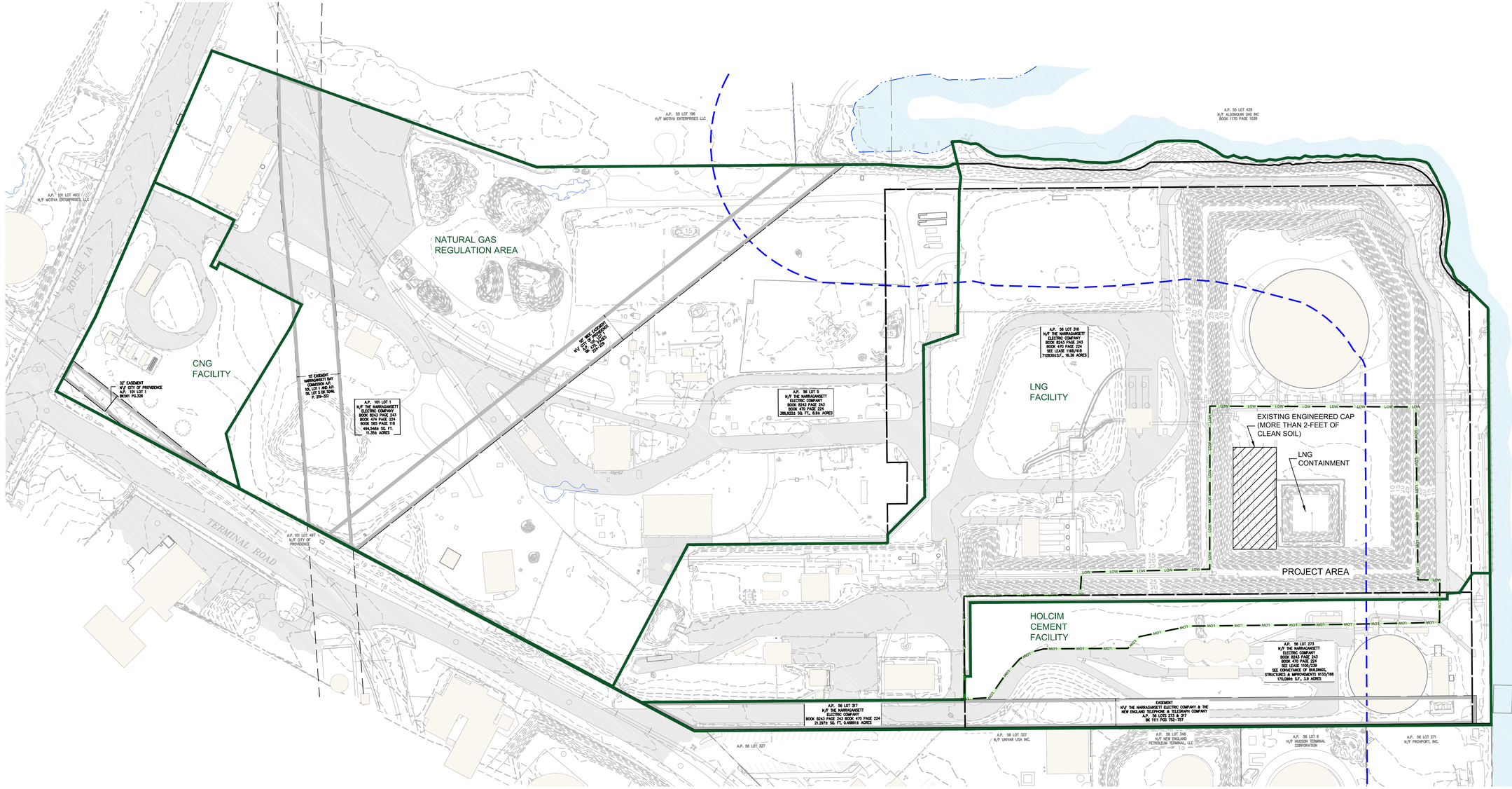
SOURCE: USGSSTORE.GOV

0 1000' 2000' 4000' 6000'

SCALE: 1 INCH = 2000 FEET

INDEX OF DRAWINGS	
Sheet #	Sheet Title
1	TITLE AND LOCUS
2	EXISTING CONDITIONS
3	EXPLORATION LOCATION PLAN
4	PROPOSED CONDITIONS PLAN
5	SOIL EROSION AND SEDIMENT CONTROL PLAN

FOR PERMITTING ONLY



0 40' 80' 160' 240'

SCALE IN FEET 1" = 80'

GENERAL NOTES:

1) BASE MAP DEVELOPED FROM THE FOLLOWING:

- ELECTRONIC CAD FILE "ACAD-7257PL.DWG" PROVIDED BY VANASSE HANGEN BRUSTLIN (VHB) ENTITLED "EXISTING CONDITIONS PLAN," PROJECT TITLE "NATIONAL GRID LNG TERMINAL ROAD LNG FACILITY" DATED MARCH 10, 2014, ORIGINAL SCALE 1" = 50', DRAWING NO. SV-1 THROUGH SV-3 AND AERIAL MAPPING BY WSP TRANSPORTATION AND INFRASTRUCTURE DATED JANUARY 15, 2014 PREPARED FOR NATIONAL GRID LAND SURVEYING DEPARTMENT, WALTHAM, MASSACHUSETTS AND CAD FILE NO. 09303023.052-1.DWG. PLANS PROVIDED BY NATIONAL GRID.
- DESCRIPTIONS PROVIDED IN THE CITY OF PROVIDENCE DEED BOOK (BK) 470 PAGES 224 - 229, BK 561 PAGES 326 - 328, BK 1111 PAGES 752 -756 AND BK 5249 PAGES 219 - 322.
- ELECTRONIC CAD FILE14-152_SU1_REV2.DWG, TITLED "TOPOGRAPHIC SURVEY PLAN, PORTION OF A.P. 56 LOT 5" DATED OCTOBER 27, 2014 AND PROVIDED BY NATIONAL GRID.
- ELECTRONIC CAD FILE 5153_COO.DWG. TITLED "EXISTING CONDITIONS PLAN" PREPARED BY PROCESS PIPELINE SERVICES, DATED DECEMBER 18, 2014 AND PROVIDED BY NATIONAL GRID.

2) HORIZONTAL DATUM IS BASED ON NAD 1983 FROM BASE MAPPING PROVIDED BY VHB.

3) VERTICAL DATUM IS BASED ON NAVD 1988 FROM BASE MAPPING PROVIDED BY VHB.

4) ON-SITE SURVEYS BY GZA PERSONNEL DURING VARIOUS SITE VISITS BETWEEN 2011 AND 2016.

5) PARCEL DATA PROVIDED BY THE CITY OF PROVIDENCE PLANNING AND DEVELOPMENT DEPARTMENT. PARCELS OF REAL ESTATE ASSESSED AS OF DECEMBER 31, 2012. GIS DATA ARE FOR PLANNING PURPOSES ONLY. THESE DATA DO NOT REPRESENT A LEGALLY RECORDED PLAN, DEED, SURVEY OR ENGINEERING SCHEMATIC AND ARE NOT INTENDED TO BE USED AS SUCH.

6) SITE BOUNDARIES ARE APPROXIMATE.

LEGEND:

- EXISTING BUILDING
- EXISTING CONTOUR (MAJOR 5 FOOT INTERVAL)
- EXISTING CONTOUR (MINOR 1 FOOT INTERVAL)
- 200 FOOT CRMC SETBACK
- PAVEMENT
- EASEMENT AREA
- PROPERTY LINE
- INTERIOR PROPERTY LINE
- LIMIT OF WORK
- ABUTTING PROPERTY LINE
- EDGE OF WATER
- EXISTING RAILROAD TRACKS
- EXISTING FENCE
- OPERATIONS BOUNDARY
- EXISTING CONCRETE PAD
- UTILITY POLE
- LIGHT POLE
- HYDRANT

FOR PERMITTING ONLY

SHORT TERM RESPONSE ACTION PLAN: DIKE ACCESS ROAD
642 ALLENS AVENUE
PROVIDENCE, RHODE ISLAND

EXISTING CONDITIONS

PREPARED BY:		PREPARED FOR:	
GZA GeoEnvironmental, Inc. Engineers and Scientists www.gza.com		nationalgrid	
PROJ MGR: MSK	REVIEWED BY: SJH	CHECKED BY: SJH	FIGURE 2
DESIGNED BY: SJH	DRAWN BY: LDT	SCALE: AS NOTED	
DATE: JUNE 2016	PROJECT NO. 33554.60	REVISION NO. 0	SHEET NO. 2 OF 5

EXPLORATION LEGEND:

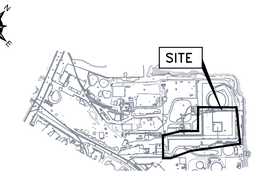
- VHB-7 — ENVIRONMENTAL BORING OBSERVED BY VHB IN 2002 AND 2003
- F47 — ENVIRONMENTAL BORING OBSERVED BY ESS IN 1999 AND 2000
- RCA-40 — ENVIRONMENTAL BORING OBSERVED BY RCA BETWEEN 1994-1996
- ETP-4 — ENVIRONMENTAL TEST PITS OBSERVED BY RCA IN 1995 AND 1996
- ESS-RW-1 — RECOVERY WELL INSTALLED BY ESS IN 1999 AND 2000
- B-211 — GEOTECHNICAL BORING PERFORMED BY GOLDER ASSOCIATES IN 2016
- CPT-3/GZ-6 — GEOTECHNICAL BORING OBSERVED BY GZA IN 2004
- SWBL12 — GEOTECHNICAL BORING OBSERVED BY SWEC IN 1995
- B-207 — GEOTECHNICAL BORING PERFORMED FOR PROVIDENCE GAS COMPANY IN 1973
- B-25 — GEOTECHNICAL BORING OBSERVED BY HALEY & ALDRICH IN 1971 AND 1972
- PGC-8 — GEOTECHNICAL BORING PERFORMED FOR PROVIDENCE GAS COMPANY IN 1912
- W155 — CONFIRMATORY SOIL SAMPLE LOCATION COLLECTED BY ESS IN 1999

LEGEND:

- EXISTING BUILDING
- 10 — EXISTING CONTOUR (MAJOR 5 FOOT INTERVAL)
- 11 — EXISTING CONTOUR (MINOR 1 FOOT INTERVAL)
- 200 FOOT CRMC SETBACK
- 50-FOOT SETBACK
- EXISTING PAVEMENT
- UTILITY POLE
- LIGHT POLE
- HYDRANT
- PROPERTY LINE
- INTERIOR PROPERTY LINE
- HISTORIC STRUCTURE OR FEATURE

GENERAL NOTES:

1) BASE MAP DEVELOPED FROM THE FOLLOWING:
   - ELECTRONIC CAD FILE "ACAD-7257PL.DWG" PROVIDED BY VANASSE HANGEN BRUSTLIN (VHB) ENTITLED "EXISTING CONDITIONS PLAN," PROJECT TITLE "NATIONAL GRID LNG TERMINAL ROAD LNG FACILITY" DATED MARCH 10, 2014, ORIGINAL SCALE 1" = 50', DRAWING NO. SV-1 THROUGH SV-3 AND AERIAL MAPPING BY WSP TRANSPORTATION AND INFRASTRUCTURE DATED JANUARY 15, 2014 PREPARED FOR NATIONAL GRID LAND SURVEYING DEPARTMENT, WALTHAM, MASSACHUSETTS AND CAD FILE NO. 09303023.052-1.DWG. PLANS PROVIDED BY NATIONAL GRID.
   - DESCRIPTIONS PROVIDED IN THE CITY OF PROVIDENCE DEED BOOK (BK) 470 PAGES 224 - 229, BK 561 PAGES 326 - 328, BK 1111 PAGES 752 -756 AND BK 5249 PAGES 219 - 322.
2) HORIZONTAL DATUM IS BASED ON NAD 1983 FROM BASE MAPPING PROVIDED BY VHB.
3) VERTICAL DATUM IS BASED ON NAVD 1988 FROM BASE MAPPING PROVIDED BY VHB.
4) SELECT PRESENTED SITE UTILITIES WERE TAKEN FROM HISTORIC FIGURES PROVIDED BY NATIONAL GRID. ALL UTILITY LOCATIONS ARE APPROXIMATE AND HAVE BEEN ALIGNED AND ADJUSTED FOR THE "BEST FIT" AND THESE DATA SHOULD BE CONSIDERED ACCURATE ONLY TO THE DEGREE IMPLIED BY THE METHOD USED. UTILITIES ARE SHOWN FOR REFERENCE ONLY. **OTHER LOCATIONS MAY EXIST.**
5) ON-SITE SURVEYS BY GZA PERSONNEL DURING VARIOUS SITE VISITS BETWEEN 2011 AND 2016.
6) PARCEL DATA PROVIDED BY THE CITY OF PROVIDENCE PLANNING AND DEVELOPMENT DEPARTMENT. PARCELS OF REAL ESTATE ASSESSED AS OF DECEMBER 31, 2012. GIS DATA ARE FOR PLANNING PURPOSES ONLY. THESE DATA DO NOT REPRESENT A LEGALLY RECORDED PLAN, DEED, SURVEY OR ENGINEERING SCHEMATIC AND ARE NOT INTENDED TO BE USED AS SUCH.
7) SITE BOUNDARIES ARE APPROXIMATE.



KEY PLAN:
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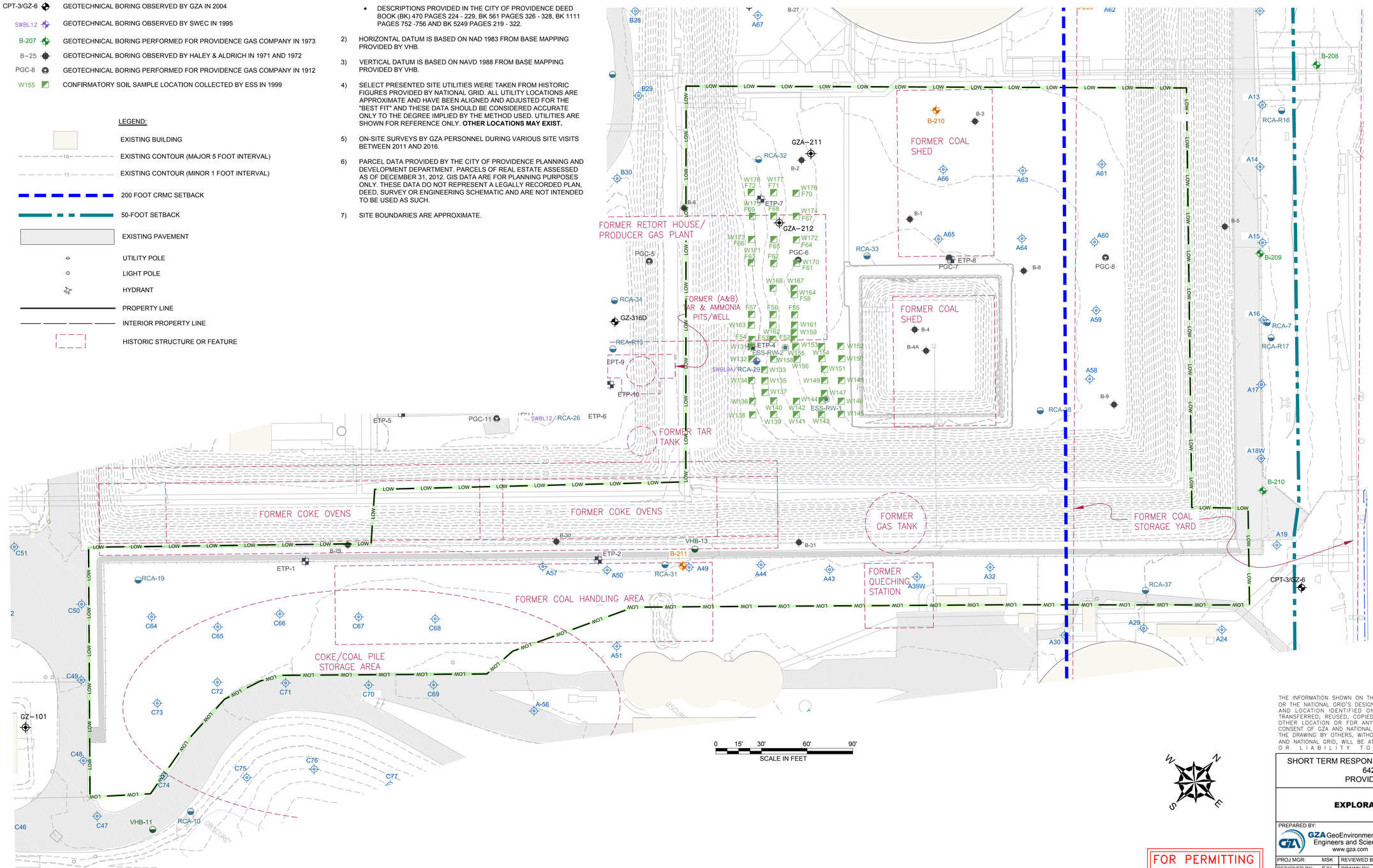


FOR PERMITTING ONLY

SHORT TERM RESPONSE ACTION PLAN: DIKE ACCESS ROAD
642 ALLENS AVENUE
PROVIDENCE, RHODE ISLAND

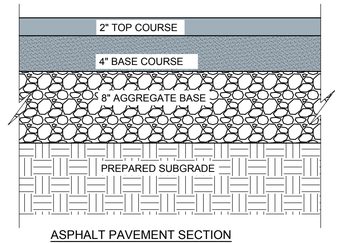
EXPLORATION LOCATION PLAN

PREPARED BY: GZA GeoEnvironmental, Inc. Engineers and Scientists www.gza.com
PREPARED FOR: nationalgrid

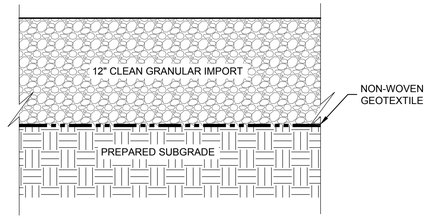
PROJ MGR: MSK	REVIEWED BY: SJH	CHECKED BY: SJH	FIGURE 3
DESIGNED BY: SJH	DRAWN BY: LDT	SCALE: AS NOTED	
DATE: JUNE, 2016	PROJECT NO. 33554.60	REVISION NO. 0	SHEET NO. 3 OF 5

LEGEND:

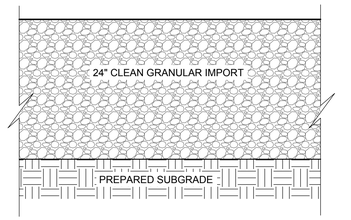
- EXISTING BUILDING
- EXISTING CONTOUR (MAJOR 5 FOOT INTERVAL)
- EXISTING CONTOUR (MINOR 1 FOOT INTERVAL)
- 200-FOOT CRMC SETBACK
- 50-FOOT SETBACK
- EXISTING PAVEMENT
- UTILITY POLE
- LIGHT POLE
- HYDRANT
- PROPOSED CONTOUR (MAJOR 5 FOOT INTERVAL)
- PROPOSED CONTOUR (MINOR 1 FOOT INTERVAL)
- PROPOSED PERMANENT PAVEMENT
- PROPOSED TEMPORARY PAVEMENT
- GRAVEL ENGINEERED CAP
- LIMIT OF WORK
- PROPOSED JERSEY BARRIERS
- GZ-500 S/D — REPLACEMENT MONITORING WELL
- NEW UTILITY POLE WITH LED FLOODLIGHTS INSTALLED BY OTHERS
- NEW HYDRANT
- NEW WATER LINE
- EXISTING WATER LINE
- NEW DRAIN LINE
- EXISTING DRAIN LINE



ASPHALT PAVEMENT SECTION
NOT TO SCALE



GRAVEL SURFACING SECTION (ALT 1)
NOT TO SCALE



GRAVEL SURFACING SECTION (ALT 2)
NOT TO SCALE

KEY PLAN:
SCALE: 1"=800'

0 15' 30' 60' 90'
SCALE IN FEET

GENERAL NOTES:

1) BASE MAP DEVELOPED FROM THE FOLLOWING:
   - ELECTRONIC CAD FILE "ACAD-7257PL.DWG" PROVIDED BY VANASSE HANGEN BRUSTLIN (VHB) ENTITLED "EXISTING CONDITIONS PLAN," PROJECT TITLE "NATIONAL GRID LNG TERMINAL ROAD LNG FACILITY" DATED MARCH 10, 2014, ORIGINAL SCALE 1" = 50', DRAWING NO. SV-1 THROUGH SV-3 AND AERIAL MAPPING BY WSP TRANSPORTATION AND INFRASTRUCTURE DATED JANUARY 15, 2014 PREPARED FOR NATIONAL GRID LAND SURVEYING DEPARTMENT, WALTHAM, MASSACHUSETTS AND CAD FILE NO. 09303023.052-1.DWG. PLANS PROVIDED BY NATIONAL GRID.
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   - ELECTRONIC CAD FILES: 102761-CIV_SITE_ACCESS_ROAD_SURFACING_07.dwg, 102761-CIV_ACCESS_ROAD_PROPOSED_GRADING, 10761-CIV_SITE_ACCESS_ROAD_LAYDOWN_07, PROVIDED BY KIEWIT ENGINEERING AND DESIGN COMPANY TO GZA ON 6-20-2016.
2) HORIZONTAL DATUM IS BASED ON NAD 1983 FROM BASE MAPPING PROVIDED BY VHB.
3) VERTICAL DATUM IS BASED ON NAVD 1988 FROM BASE MAPPING PROVIDED BY VHB.
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FOR PERMITTING ONLY

SHORT TERM RESPONSE ACTION PLAN: DIKE ACCESS ROAD
642 ALLENS AVENUE
PROVIDENCE, RHODE ISLAND

PROPOSED CONDITIONS PLAN

PREPARED BY: GZA GeoEnvironmental, Inc. Engineers and Scientists www.gza.com
PREPARED FOR: nationalgrid

PROJ MGR: MSK	REVIEWED BY: SJH	CHECKED BY: SJH	FIGURE 4
DESIGNED BY: SJH	DRAWN BY: LDT	SCALE: AS NOTED	
DATE: JUNE, 2016	PROJECT NO. 33554.60	REVISION NO. 0	SHEET NO. 4 OF 5

LEGEND:

- EXISTING BUILDING
- EXISTING CONTOUR (MAJOR 5 FOOT INTERVAL)
- EXISTING CONTOUR (MINOR 1 FOOT INTERVAL)
- 200-FOOT CRMC SETBACK
- 50-FOOT SETBACK
- EXISTING PAVEMENT
- UTILITY POLE
- LIGHT POLE
- HYDRANT
- STAKED FILTREXX SOXX OR OTHER NATIONAL GRID ENVIRONMENTAL APPROVED EQUAL
- PROPOSED TEMPORARY PAVEMENT
- WHEEL WASH / CONSTRUCTION ENTRANCE
- LIMIT OF WORK

GENERAL NOTES:

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   - ELECTRONIC CAD FILES: 102761-CIV_SITE_ACCESS_ROAD_LAYDOWN_07.dwg AND 102761-CIV_SITE_ACCESS_ROAD_SURFACING_07.DWG, PREPARED BY KIEWIT ENGINEERING AND DESIGN COMPANY AND PROVIDED TO GZA ON JUNE 20, 2016.
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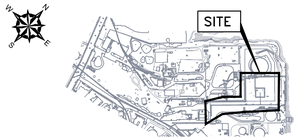

KEY PLAN:
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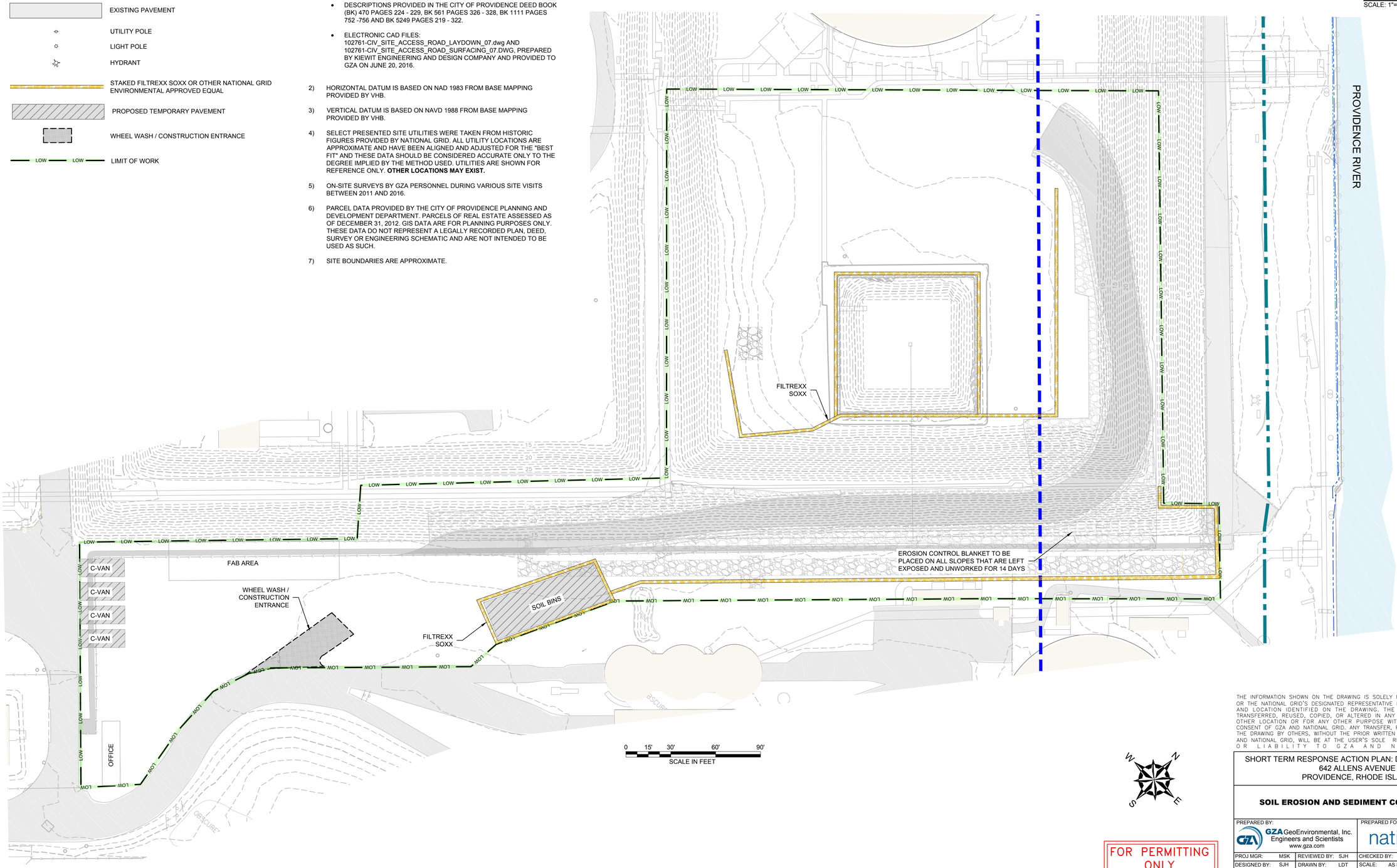

FOR PERMITTING ONLY

SHORT TERM RESPONSE ACTION PLAN: DIKE ACCESS ROAD
642 ALLENS AVENUE
PROVIDENCE, RHODE ISLAND

SOIL EROSION AND SEDIMENT CONTROL PLAN

PREPARED BY:		PREPARED FOR:	
GZA GeoEnvironmental, Inc. Engineers and Scientists www.gza.com		nationalgrid	
PROJ MGR: MSK	REVIEWED BY: SJH	CHECKED BY: SJH	FIGURE 5
DESIGNED BY: SJH	DRAWN BY: LDT	SCALE: AS NOTED	
DATE: JUNE, 2016	PROJECT NO. 33554.60	REVISION NO. 0	SHEET NO. 5 OF 5

APPENDIX A

Limitations

LIMITATIONS

1. This Short Term Response Action Plan (STRAP) has been prepared on behalf of and for the exclusive use of The Narragansett Electric Company d/b/a National Grid (National Grid), solely for use in documenting the work completed as described herein at the 642 Allens Avenue Former MGP ("Site") under the applicable provisions of the State of Rhode Island Department of Environmental Management Rules and Regulations for the Investigation and Remediation of Hazardous Material Releases (Remediation Regulations). This report and the findings contained herein shall not, in whole or in part, be disseminated or conveyed to any other party, nor used by any other party in whole or in part, without the prior written consent of GZA GeoEnvironmental, Inc.(GZA) or National Grid.

2. GZA's work was performed in accordance with generally accepted practices of other consultants undertaking similar studies at the same time and in the same geographical area, and GZA observed that degree of care and skill generally exercised by other consultants under similar circumstances and conditions. GZA's findings and conclusions must be considered not as scientific certainties, but rather as our professional opinion concerning the significance of the limited data gathered during the course of the study. No other warranty, express or implied is made. Specifically, GZA does not and cannot represent that the Site contains no hazardous material, oil, or other latent condition beyond that observed by GZA during the work described herein.

3. The observations described in this report were made under the conditions stated therein. The conclusions presented in the report were based upon services performed and observations made by GZA.

4. In the event that National Grid or others authorized to use this report obtain information on environmental or hazardous waste issues at the Site not contained in this report, such information shall be brought to GZA's attention forthwith. GZA will evaluate such information and, on the basis of this evaluation, may modify the conclusions stated in this report.

5. The conclusions and recommendations contained in this report are based in part upon the data obtained from environmental samples obtained from relatively widely spread subsurface explorations. The nature and extent of variations between these explorations may not become evident until further exploration. If variations or other latent conditions then appear evident, it will be necessary to reevaluate the conclusions and recommendations of this report.

6. The generalized soil profile described in the text is intended to convey trends in subsurface conditions. The boundaries between strata are approximate and idealized and have been developed by interpretations of widely spaced explorations and samples; actual soil transitions are probably more gradual. For specific information, refer to the boring logs.

7. In the event this work included the collection of water level data, these readings have been made in the test pits, borings and/or observation wells at times and under conditions stated on the exploration logs. These data have been reviewed and interpretations have been made in the text of this report. However, it must be noted that fluctuations in the level of the groundwater may occur due to variations in rainfall and other factors different from those prevailing at the time measurements were made.

8. The conclusions contained in this report are based in part upon various types of chemical data and are contingent upon their validity. These data have been reviewed and interpretations made in the report. Moreover, it should be noted that variations in the types and concentrations of contaminants and variations in their flow paths may occur due to seasonal water table fluctuations, past disposal practices, the passage of time, and other factors. Should additional chemical data become available in the future, these data should be reviewed by GZA and the conclusions and recommendations presented herein modified accordingly.

APPENDIX B

December 2002 Remedial Action Closure Report

Remedial Action Closure Report

Former Manufactured Gas Plant
642 Allens Avenue- Area 1

Providence,
Rhode Island

Prepared for: New England Gas Company

Prepared by: ***VHB***/Vanasse Hangen Brustlin, Inc.
Providence, Rhode Island

Project Scientist: Claude M. Masse

Project Manager: Timothy M. O'Connor, P.E.

December 2002

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List of Tables

Executive Summary

On behalf of New England Gas Company (NEGC), a Division of the Southern Union Company, and pursuant to the Rhode Island Department of Environmental Management (RIDEM) Temporary Remedial Action Permit (TRAP) issued to the former Providence Gas Company by the RIDEM Office of Waste Management on June 1, 1999, Environmental Science Services, Inc. (ESS) supervised remedial actions at a portion of a former manufactured gas plant (FMGP) beginning in June 1999. NEGC has requested Vanasse Hangen Brustlin, Inc. (VHB) develop this Closure Report summarizing the work overseen by ESS. Information regarding the remedial activities conducted by ESS was provided by NEGC to VHB. VHB did not observe any of the activities described herein.

The Site is located at 642 Allens Avenue in Providence, RI. The remedial activities described herein were conducted to address a portion (Area 1) of the Site (the Phase 1 Site). Additional remedial activities were conducted in the remaining portions of the Phase 1 Site By Clean Harbors Environmental Services and VHB. These areas are referenced throughout the project file as Areas 2 and 3 of the Phase 1 Site. ESS oversaw the Area 1 remedial actions and ThermoRetec Construction Corporation (TRCC) was retained to conduct field construction activities related to soil and waste excavation in addition to pipe removal. TRCC was retained from May 1999 to July 2000 and was replaced by Tantara in July 2000.

These activities were of a time-critical nature due to the proposed construction of a vaporizer pad in the southwestern portion of the South Algonquin Liquid Natural Gas (SALNG) Area adjacent to the containment dike. To construct the pad, surface soil had to be excavated and subsurface piping which traverses the area had to be removed. A piping removal plan was developed by TRCC and approved by RIDEM in a letter dated June 21, 1999.

During the Area 1 remedial action subsurface soil was excavated and disposed. The excavations were guided by test pit and soil boring data from previously completed Resource Control Associates, Inc. (RCA) investigations. Remedial soil excavations were also conducted within the SALNG containment dike and consisted of surface and subsurface soil removal that were also guided by previous Site investigation results.

Recovery wells and groundwater flow barriers were installed to aid in the recovery of light non-aqueous phase liquid (LNAPL) from the groundwater surface in areas of subsurface soil excavations.

Additional remedial activities consisted of the excavation of some of the contents of Structure 3B (Tar and Ammonia Structure) and the excavation of the surface soil in Area 3. Approximately 50,800 gallons of coal tar was excavated from Structure 3B and shipped to the Norlite Corporation facility in Cohoes, NY for disposal.

A total of approximately 8,746 tons of FMGP-impacted material was excavated, transported and disposed of during remedial activities. Approximately 722 tons was classified as hazardous and approximately 8,024 tons was classified as non-hazardous. According to correspondence from ESS to RIDEM, dated July 19, 2000, surface soil that did not meet the criteria for backfill and subsurface soil that was not classified as hazardous was shipped to Environmental Soil Management, Inc. (ESMI) in Loudon, NH.

Hazardous waste soils were transported to Horizon Environmental Landfill in Grande-Piles, Quebec, Canada. The requirements for the export of hazardous waste, including the Notification of Export to the United States Environmental Protection Agency (USEPA), were met according to a letter dated July 24, 2000 from the USEPA (EPA Notice No. 435/00).

In addition, approximately 9,782 gallons of water and LNAPL was pumped from excavations utilizing vacuum trucks from Cyn Environmental Services. The water and LNAPL was disposed of at Cyn Environmental Service's Stoughton, MA recycling facility.

1 Introduction

On behalf of New England Gas Company (NEGC), a Division of the Southern Union Company, and pursuant to the Rhode Island Department of Environmental Management (RIDEM) Temporary Remedial Action Permit (TRAP) issued to the former Providence Gas Company by the RIDEM Office of Waste Management on June 1, 1999, Environmental Science Services, Inc. (ESS) supervised remedial actions at a portion of a former manufactured gas plant (FMGP) beginning in June 1999. NEGC has requested Vanasse Hangen Brustlin, Inc. (VHB) to develop this Closure Report summarizing the work overseen by ESS. Information regarding the remedial activities conducted by ESS was provided by NEGC to VHB. VHB did not observe any of the activities described herein.

These activities were of a time-critical nature due to the proposed construction of a vaporizer pad in the southwestern portion of the South Algonquin Liquid Natural Gas (SALNG) Area adjacent to the containment dike.

For the purposes of this submittal, the work area for these activities is referenced by the term "Area 1 Site." The term "Site" is used to describe the entire FMGP located at 642 Allens Avenue. The main entrance to the Site is on Allens Avenue, on the west side of the property. Refer to Figure 1 for a Site Location Map.

The Site is currently occupied by an NEGC Operations Center, KeySpan Energy (formerly known as Duke Energy and Algonquin Gas), and the St. Lawrence Cement Company.

From 1994 to 2000, the Site was investigated by Resource Control Associates (RCA) of Pawtucket, RI and Environmental Science Services (ESS) of East Providence, RI on behalf of the Providence Gas Company (PGC).

Three areas of the Site were identified for remedial actions. These areas were the South Algonquin Area (Area 1), the Tar and Ammonia Structure(Area 2), and the North Algonquin Area (Area 3). From April to November 2002, Clean Harbors Environmental Services (CHES) of Weymouth, MA provided construction services for the Area 2 and Area 3 remedial actions, VHB conducted the remedial engineering oversight, and ENSR International (ENSR) of Westford, MA provided independent inspection services on behalf of NEGC. These activities were summarized in a report

prepared by VHB, entitled *Remedial Action Closure Report, Former Manufactured Gas Plant, 642 Allens Avenue, Providence, Rhode Island*, and dated November 2002.

Starting in 1999, remedial activities took place in Area 1. In addition, a portion of the contents of Structure 3B in Area 2 and the surficial soils in Area 3 were also excavated as part of these activities. The remedial activities in Area 1 were conducted coincident with improvement construction projects undertaken by the Algonquin Gas Transmission Company and Algonquin LNG, Inc. ESS oversaw the Area 1 remedial actions and ThermoRetec Construction Corporation (TRCC) was retained to conduct field construction activities related to soil and waste excavation in addition to pipe removal. TRCC was retained from May 1999 to July 2000 and was replaced by Tantara in July 2000.

The Area 1 Site is located on the southeastern portion of the property, south of the KeySpan Energy offload area and is adjacent to the KeySpan Energy containment dike. Portions of the remedial excavations were conducted within the dike, in the southwestern corner. Refer to Figure 2 for a depiction of the work areas.

2

Remedial Actions

In a letter dated June 14, 1999, ESS (on behalf of the former Providence Gas Company) notified RIDEM of its intentions to implement the remedial action as presented in the approved Remedial Action Work Plan (RAWP). At that time, Algonquin was conducting expansion activities that included the construction of a vaporizer pad in the southwestern portion of the SALNG Area adjacent to the dike. To construct the pad, surface soil had to be excavated and subsurface piping which traverses the area had to be removed. The letter also included the piping removal plan that was developed by TRCC and approved by RIDEM in a letter dated June 21, 1999. The piping removal plan is attached as Appendix B.

Surficial soils excavated from Area 1 were either used to construct the Material Handling Area (MHA) (an engineered containment area for the processing and storage of excavated materials), used as subsurface fill (>2 feet below surface grade (BSG)) if the subsurface remedial objectives were met, or was disposed of at a proper facility.

The remedial action consisted of excavation and disposal of impacted material exceeding the RIDEM-approved remedial objectives (ROs) for soil from the ESS RAWP dated December 4, 1998. The ROs were divided into three categories: surface soil objectives (0-2 feet below surface grade (BSG)); subsurface soil objectives (>2 feet BSG) within 100 feet from the shore; and subsurface soil greater than 100 feet from the shore. These ROs were based on the RIDEM Direct exposure criteria (surface soil) and Upper Concentration Limits (UCLs) (subsurface soil) and are presented in Table 1.

Area 1 Excavations

SALNG Area

To facilitate the construction of a vaporizer pad planned by Algonquin, a limited remedial excavation was conducted in Area 1. A trench was excavated to a depth of approximately 7.5 to 9 feet BSG at the east and west limits of the proposed Algonquin construction project. These trenches did not enter the water table and were oriented in a north/south direction. The purpose of the trenching was to identify the number and location of subsurface pipes that traversed under the proposed construction area. A surficial excavation was completed between the trenches and a portion of the excavation

extended into the No Dig Zone and containment dike. This excavation was completed to facilitate the construction of the vaporizer pad.

On June 30, 1999, excavation of the eastern trench exposed an approximately 30-inch cast iron pipe and an approximately 12-inch pipe that were observed to be oriented in an east/west direction (refer to Figure 2). The excavation was advanced to approximately 7.5 to 9 feet BSG and was approximately 13 feet in width. The southern limit of the excavation was defined as the "No Dig Zone" as depicted in the RAWP. A concrete structure was uncovered at a depth of approximately 2.5 feet BSG and limited excavation to the west. This concrete structure was eventually found to be approximately 25 feet in width and extended the entire length of the eastern trench.

Two additional concrete subsurface structures were encountered in the trench and were in an east/west orientation. Both structures were approximately 5 feet wide and were uncovered approximately 2 feet BSG. The northern structure had an approximately 3-foot deep trough running along the center. Sketches of the eastern trench that were developed by ESS personnel are provided in Appendix C.

Based on Site sketches prepared by ESS, the northern portion of the trench (where the two pipes were located) was extended in an easterly direction to the western edge of Structure 10. The 12-inch pipe turned at a 90° angle to the south and the excavation was continued in that direction. The 12-inch pipe continued to the south, under the ten-foot "No Dig Zone" and presumably under the containment dike.

The western trench also appeared to have the pipes and structures and they were similarly oriented as in the eastern trench. The western pipe ends extended beyond the trench, and as such, excavations continued in a westerly direction. The western ends of the pipes were uncovered proximate to the western limits of excavation as presented in the RAWP. Reportedly, the western ends of the pipes were previously cut and sealed with a brick face. While excavating the pipes in a westerly direction, an approximately 12-inch clay pipe was encountered. This pipe was reportedly observed to be filled with a black substance. A sample, identified as "A1-Pipe-2", was collected from the pipe and submitted for laboratory analysis. The laboratory analytical results are presented in Table 2.

A trench was excavated in an east/west orientation to approximately 8 feet BSG to uncover and remove the entire pipe lengths. This excavation connected the northern limits of the western and eastern trenches. It is presumed that the pipe removal was completed per the procedures outlined in the piping removal protocol (see Appendix B). Although there were no descriptions of the conditions of the removed piping, the laboratory analytical results of confirmatory samples collected beneath the pipe runs indicated that there was no release of MGP materials from the pipes.

The area between the east and west trenches, south of the pipe grave excavation, and north of the dike was excavated to approximately 2 feet BSG (refer to Figure 2). The surficial excavation was extended into a portion of the containment dike to facilitate the construction of the vaporizer pad. A cross-sectional diagram of this excavation is included as Appendix D.

The SALNG Area excavation continued in an easterly direction and was guided by data from a test pit previously advanced by RCA. RCA completed a test pit identified as ETP-9 and collected a soil sample from 5 feet BSG. The test pit was completed south of Structure 10 and west of the containment dike. This sample indicated concentrations of several parameters that exceeded the remedial objectives presented in the RAWP. Reportedly, laboratory analytical results indicated TPH concentrations of 163,000 ppm, naphthalene concentrations of 28,700 ppm, phenanthrene concentrations of 20,900 ppm, and fluoranthene concentrations of 11,700 ppm. As such, the RAWP identified this area for subsurface excavation and removal of impacted soils.

The excavation occurred south of Structure 10 (refer to Figure 2) and was advanced 2 feet into the groundwater, where possible. Dewatering and LNAPL recovery was facilitated by the use of a vacuum truck operated by Cyn Environmental, Inc. The "state-regulated waste oily water, Non DOT hazardous Material" was diposed of at the Cyn Oil Corporation facility in Stoughton, MA. The manifests are included in Appendix E. The excavation encountered a subsurface concrete structure at approximately 5 feet BSG. There was also a series of chambers encountered north of the 10-foot No Dig Zone. The area within the chambers was reportedly excavated to 2 feet below the water table.

Two steel pipes extended from beneath the eastern containment dike and were oriented in an east/west direction. The northern pipe was approximately 8-inches in diameter and entered into or beneath the uncovered structure at a 90° angle. The southern pipe was approximately 6 inches in diameter and extended beyond the northern pipe. It continued at an approximately 45° angle and entered into or beneath Structure 10.

■

SALNG Area Within the Containment Dike

RCA previously completed a boring identified as RCA-29 south of Structure 10 and within the containment dike. Laboratory analytical results from a sample collected from 9 to 10 feet indicated a TPH concentration of 72,900 ppm. As such, the RAWP identified this area for subsurface excavation and removal of impacted soils.

The excavation was conducted within the containment dike, in the southwestern corner. The excavation was bordered to the south and west by the containment dike and to the east by the Surface Water Impoundment (SWI). Based on the Site sketch developed by ESS, the excavation sidewalls were sloped and the excavation was advanced between 2 and 3 feet below the groundwater table. Dewatering and LNAPL recovery was accomplished through the use of a vacuum truck operated by Cyn Environmental. The manifests for transportation of this water are included in Appendix E. Surficial excavations were continued in a northerly direction based on exceedances of surficial soil samples. Based on a review of site sketches, continued excavations were completed until analytical results of samples conformed to the surficial soil ROs.

Structure 3B Excavations

ESS excavated a portion of the contents of Structure 3B as part of the remedial activites conducted in 1999-2000. The material was shipped to the Norlite Corporation facility in Cohoes, NY. Copies of the manifests are attached in Appendix E. According to records maintained by NEGC, approximately 50,800 gallons of coal tar was disposed of at this facility.

Confirmatory Soil Samples

Soil confirmation samples were collected from excavations at approximately 15 linear foot intervals and floor samples were collected from 15-foot square grid segment for excavations that did not extend into the water table. Samples were collected from a depth of 0-2 feet for comparison with the Surface Soil ROs and from greater than 2 feet for comparison with the Subsurface Soil ROs.

ESS collected confirmatory soil samples from approximately 173 locations from the excavation conducted in the SALNG area that consisted of sidewall and floor samples and from approximately 66 locations from the excavation conducted within the containment dike (RCA-29 excavation).

Some locations in the excavations required more than one attempt to obtain soils that did not exceed the ROs. If not attained on the first try, additional soil was excavated at the location prior to collecting another confirmatory sample. Following favorable laboratory analytical results of confirmatory soil samples, the excavation was backfilled with material meeting the ROs. Refer to the figures section for site plans depicting the excavation limits and confirmatory sample points.

Recovery Wells

Recovery wells were installed to aid in the recovery of light non-aqueous phase liquid (LNAPL) from the groundwater surface. A letter from ESS to RIDEM dated August 18, 1999 described the relocation of recovery wells due to the presence of concrete subsurface structures in the SALNG Area adjacent to the containment dike. Reportedly, ESS relocated the recovery wells along the edge of Structure 10 and a LNAPL barrier sheet was installed south of the recovery wells. Photographs of the wells and barrier sheets are included in the Photographs section of this report.

Recovery wells were also installed in the SALNG Area within the containment dike. A well was installed in the southeastern corner of the excavation and another recovery well was installed along the edge of Structure 10. LNAPL barrier sheets were installed along the south and east walls of the excavation. The approximate

locations of the recovery wells are depicted in Figure 2. Gaging of these recovery wells on December 30, 2002 did not indicate the presence of any detectable LNAPL.

3

Laboratory Analysis

Confirmatory Laboratory Analysis

ESS collected confirmatory samples and submitted them to ESS Laboratory, of Cranston, RI for laboratory analysis. Samples were analyzed for Total Petroleum Hydrocarbons (TPH) by gas chromatography equipped with a flame ionization detector (GC/FID), volatile organic compounds (VOCs) via EPA Method 8021, polynuclear aromatic hydrocarbons (PAHs) via EPA Method 8270, total arsenic and total lead via EPA Method 6010, and total cyanide via EPA Method 9010. Laboratory analytical results are presented below. Copies of the Laboratory Certificates of Analysis are included as Appendix F.

Laboratory Analytical Results from the SALNG Area

This remedial action began with the excavation of two trenches on the eastern and western portions of the proposed work area to identify the number and location of subsurface pipes that traversed under the proposed construction area. The laboratory analytical results of the confirmatory samples collected from the eastern trench are presented in Table 3.

Sidewall samples collected from this excavation were identified as A1-W1 to A1-W16 and floor samples were identified as A1-F1 to A1-F4. As shown in Table 3, there were several sample locations that exceeded the surficial ROs presented in the RAWP. The compounds exceeding ROs consisted of arsenic, benzo (a) pyrene, benzo (b) fluoranthene, and dibenzo (a,h) anthracene. There were no floor samples that exceeded the subsurface ROs. Sidewall surface soil sample points A1-W2, A1-W5, A1-W8, and A1-W11 exceeded the surficial ROs and, according to an ESS memo dated July 14, 1999, the proposed remedy was further excavations to the east.

The laboratory analytical results of the confirmatory samples collected from the western trench are presented in Table 4. As in the eastern trench, the compounds detected generally consisted of arsenic, benzo (a) pyrene, benzo (b) fluoranthene, and dibenzo (a,h) anthracene that exceed surface soil ROs.

Laboratory analytical results of surficial sample A1-W23 indicated concentrations of benzo (a) anthracene, benzo (b) fluoranthene, and dibenzo (a,h) anthracene that were

approximately 6 times the surficial ROs and benzo (a) pyrene that was approximately 43 times the surficial RO. These soils were removed when the surficial soil excavation was conducted east of the trench. Polychlorinated biphenyls (PCBs) were also detected (10.4 ppm) in this sample at a concentration above the RO of 10 ppm. Excavations in this location were conducted deeperuntil PCB concentrations of confirmatory samples (A1-W62, A1-W63, and A1-W64) were non-detectable. These additional confirmatory samples were only analyzed for PCBs.

For the surficial excavation, confirmatory samples collected from a depth of 0-2 feet could only be collected from the south wall of the excavation. As shown in Table 5, all the surficial confirmatory samples exceeded the RO for benzo (a) pyrene. Two subsurface soil samples (A1-F16 and A1-F24) had PCB concentrations of 10.1 ppm and 11.2 ppm, respectively. The excavation was advanced an additional 2 feet and laboratory analysis of the samples collected at 4 feet BSG indicated that there were no longer PCB exceedances. To accommodate the installation of the vaporizer pad, the excavation was continued into the ten-foot No Dig Zone and approximately 6 feet into the containment dike. Confirmatory soil samples were collected from the southern wall and laboratory analytical results indicated that one of five samples (A1-W130) exceeded the RO for benzo (a) pyrene and TPH.

The laboratory analytical results for the confirmatory soil samples collected from the pipe run excavation, located along the northern portion of the SALNG Area, indicated that there were samples that exceeded the surficial ROs (summarized in Table 6). The compounds that exceeded the ROs consisted of benzo (a) pyrene, benzo (b) fluoranthene, and dibenzo (a,h) anthracene. Sidewall samples collected from the southwestern-most portion of the excavation (south of the pipes and west of the western trench) indicated sample results (A1-W67 and A1-W71) exceeded the ROs for benzo (a) pyrene. Analytical results of the floor samples collected below the pipe runs did not exceed any ROs.

The excavations completed west of Structure 10 were completed as part of the pipe removal and the laboratory analytical results are summarized in Table 7. A surficial sidewall confirmatory sample collected from the north wall indicated concentrations of benzo (a) pyrene in sample A1-W110 that exceeded the ROs. The laboratory analysis of the floor samples collected beneath the pipe runs did not indicate any exceedances of the subsurface ROs.

The excavations completed south of Structure 10 were advanced approximately 2 to 3 feet into the water table, and as such, no floor samples were collected. Due to the presence of concrete structures, there were no surficial confirmatory soil samples collected from the excavation. The analytical results of the subsurface soil samples (summarized in Table 7) did not indicate the presence of compounds that exceed the subsurface ROs.

Laboratory Analytical Results from the SALNG Area within the Containment Dike

This excavation was completed within the containment dike and was bordered to the west and south by the containment dike and to the east by the SWI. Laboratory analytical results of soil samples collected from this excavation are summarized in Table 8. The excavation started in the southwestern portion of the area within the containment dike and was advanced approximately 2 to 3 feet into the water table. Confirmatory samples collected from the excavation did not exceed ROs with the exception of two surficial soil confirmatory samples collected from the northwest corner of the excavation. The excavation of surficial soils only was continued in a northerly direction based on the analytical results of these two samples. Surficial excavations were continued in a northerly direction until confirmatory soil samples did not exceed the surficial soil ROs. There were samples collected from along the western limit of the excavation that indicated surficial exceedances of benzo (a) pyrene, however, these samples were located along the No Dig Zone.

4

Soil Management

A total of approximately 8,746 tons of FMGP-impacted material was excavated, transported and disposed of during remedial activities. Approximately 722 tons was classified as hazardous and approximately 8,024 tons was classified as non-hazardous. According to correspondence from ESS to RIDEM, dated July 19, 2000, surface soil that did not meet the criteria for backfill and subsurface soil that was not classified as hazardous was shipped to Environmental Soil Management, Inc. (ESMI) in Loudon, NH.

Hazardous waste soils were transported to Horizon Environmental Landfill in Grande-Piles, Quebec, Canada. The requirements for the export of hazardous waste, including the Notification of Export to the United States Environmental Protection Agency (USEPA), were met according to a letter dated July 24, 2000 from the USEPA (EPA Notice No. 435/00).

Copies of manifests and/or Bills of Lading are located in Appendix E.

Site Restoration

Upon completion of soil removal activities, subsurface excavations were backfilled with clean sand and a crushed stone finish. Current site-wide soil caps are depicted in Figure 3.

5

Conclusions

Based on the laboratory analytical results of the confirmatory soil samples, it is VHB's opinion that the FMGP-impacted soil has been remediated as well as Site constraints will allow and therefore, no additional soil remedial actions are necessary in Area 1 at the Site.

During these remedial activities the following has been accomplished:

- Approximately 722 tons of hazardous material and 8,024 tons of non-hazardous material have been excavated and disposed of at licensed facilities;
- All FMGP remnant piping has been either removed or plugged with hydraulic cement;
- Surface and subsurface soils exceeding the ROs were excavated to the extent possible;
- Areas that were excavated were capped with approximately 2 feet of clean material or were covered by structures (vaporizer pad); and
- Groundwater recovery wells have been installed to facilitate the removal of LNAPL.

6

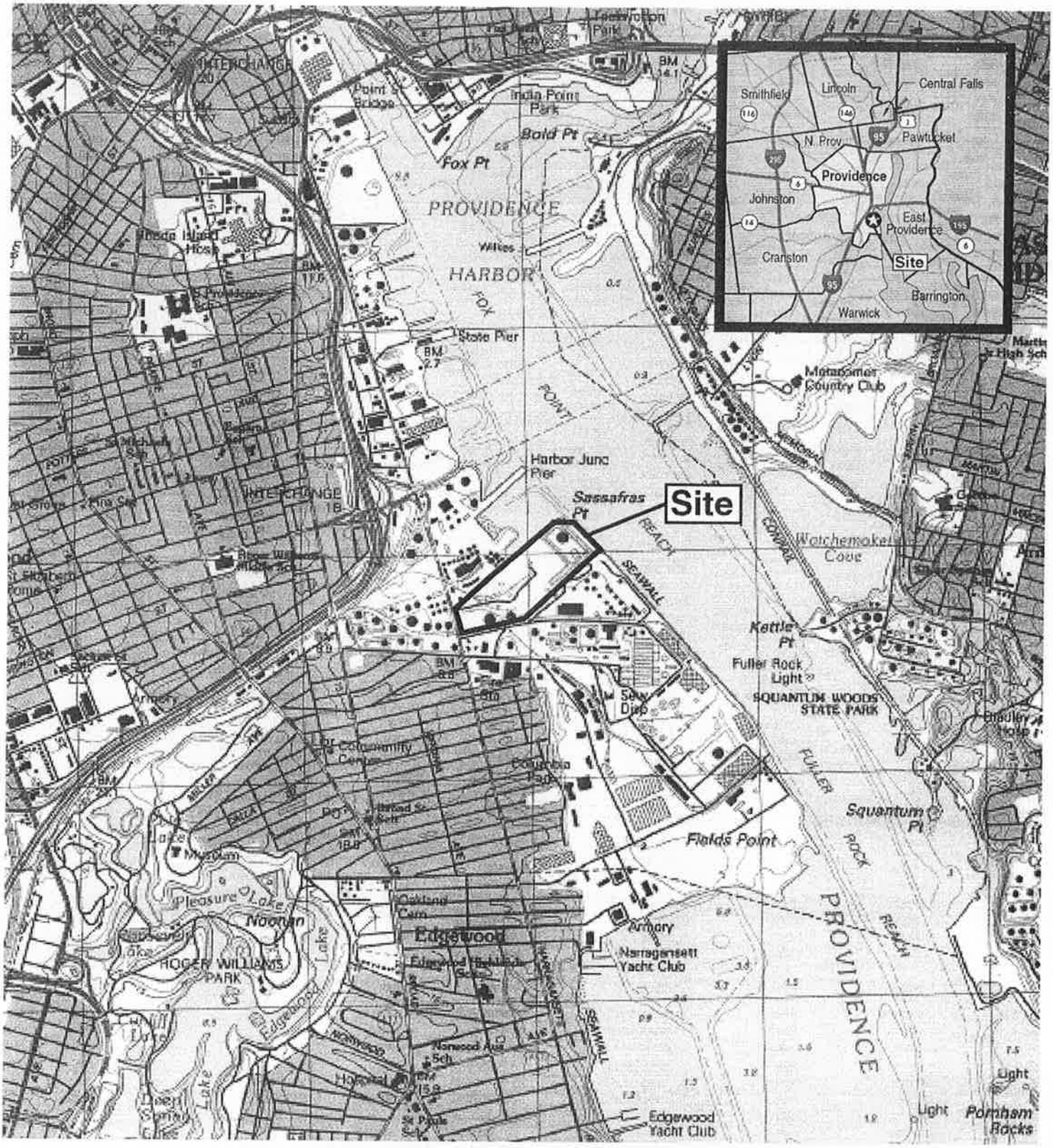
References

Rhode Island Department of Environmental Management, March 1993, as Amended August 1996. *Rules and Regulations for the Investigation and Remediation of Hazardous Material Releases.*

US Geological Survey 7.5 Minute Series Topographic Map Providence Quadrangle 1970.

Rhode Island Department of Environmental Management, October 1998. *Groundwater Classification Map.*

Figures



Source: Providence, RI U.S.G.S. Quadrangle.

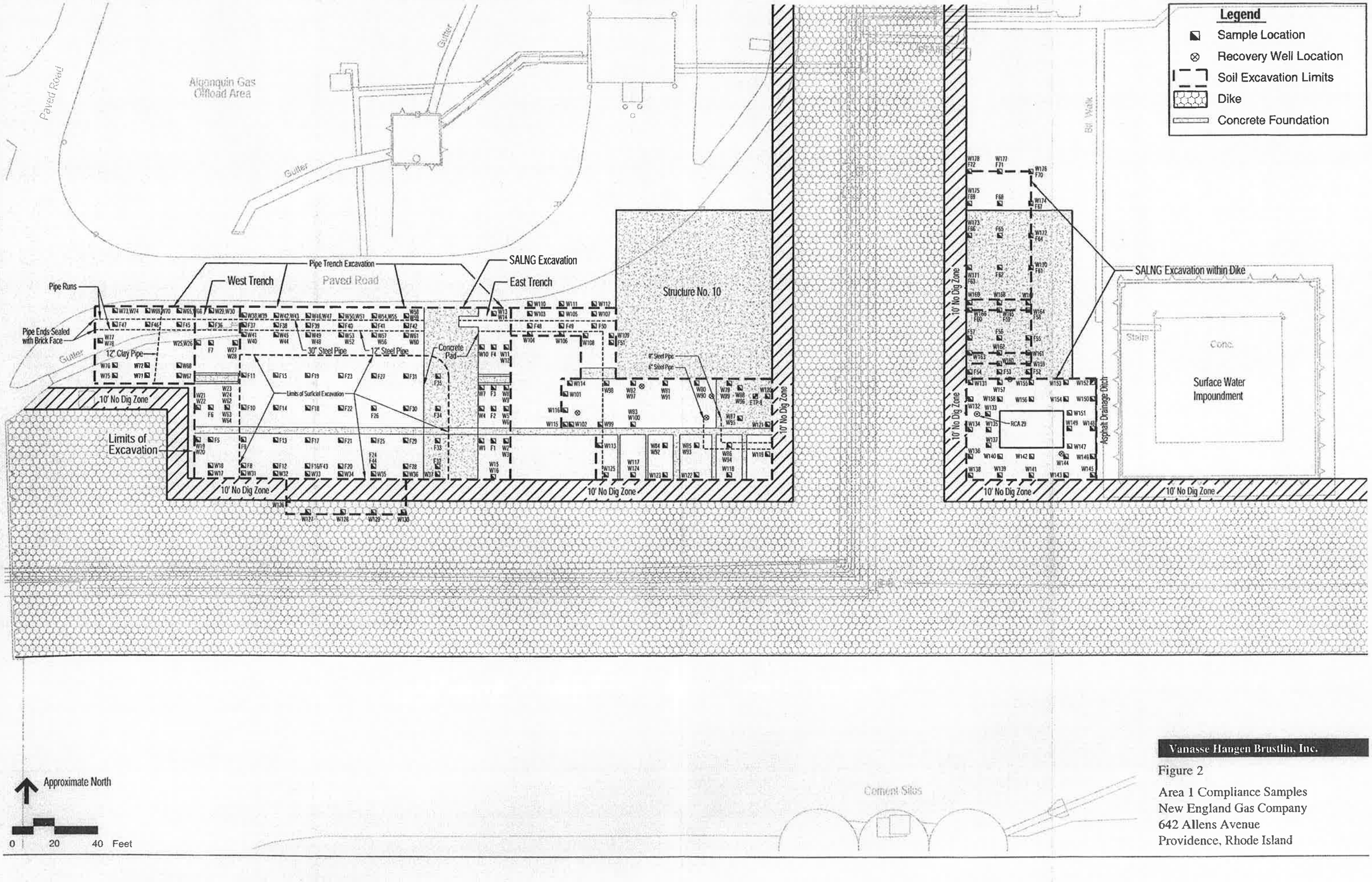
Vanasse Hangen Brustlin, Inc.

0 1000 2000 Feet

Site Location Map
New England Gas Company
642 Allens Avenue
Providence, Rhode Island

Figure 1

71415 Area1 ComplianceSamples.dwg 12-30-02 by dwhite...

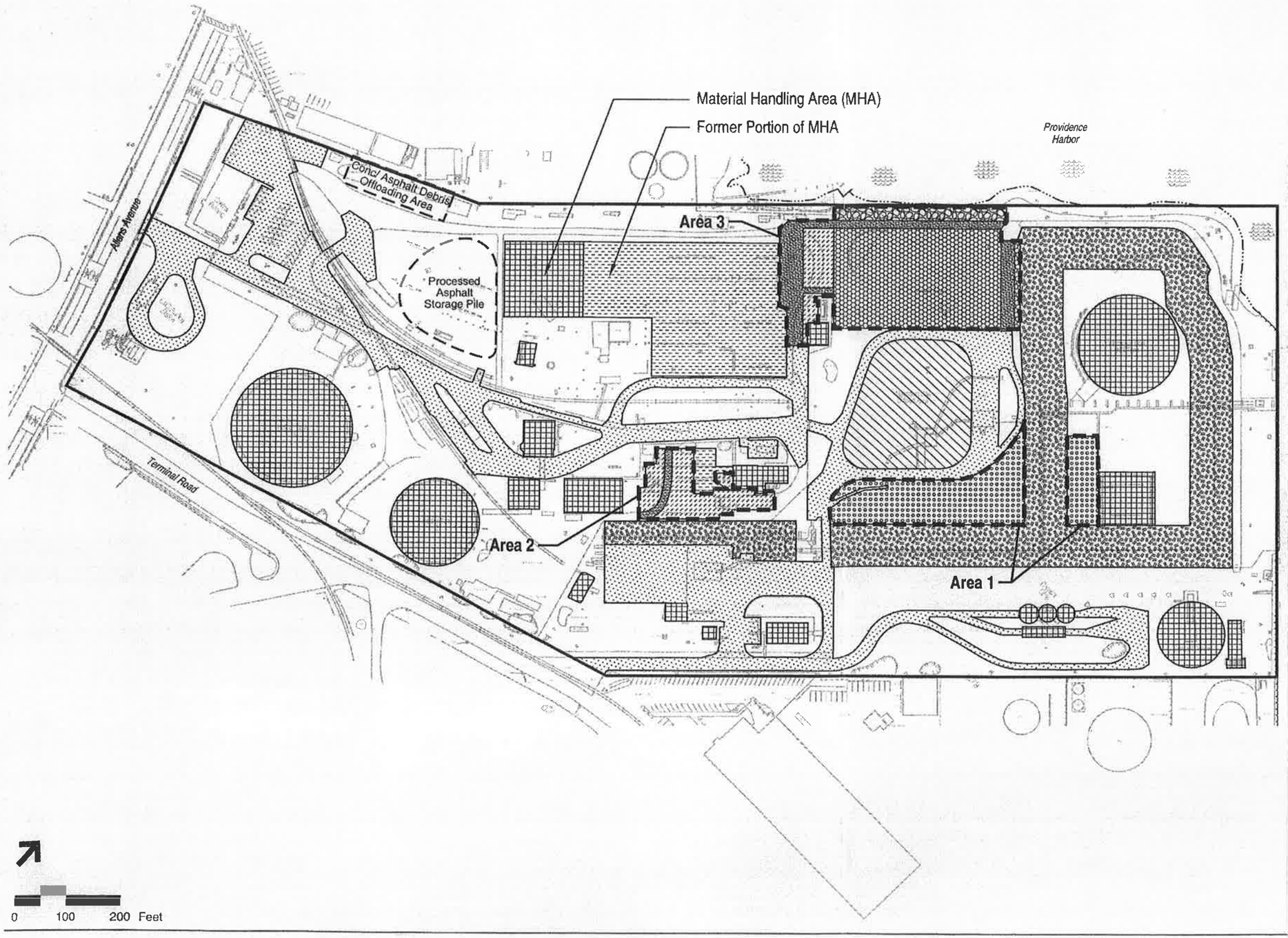


Vanasse Hangen Brustlin, Inc.

Figure 2

Area 1 Compliance Samples
New England Gas Company
642 Allens Avenue
Providence, Rhode Island

71415 Coverings.dwg 11-08-02 by dwhite...



Areas of Remediation

- Areas capped with approximately 18-20 inches of clean sand, approximately 4-6 inches of loam and hydroseeded
- Areas capped with approximately 2 feet of stone dust
- Areas capped with approximately 18-20 inches of clean sand, and approximately 4-6 inches of crushed stone
- Areas remediated by ESS, clean sand and crushed stone cap
- Areas capped with geotextile and approximately 24 inches of rip-rap
- Crushed Stone

Areas Equivalent to an Engineered Cap

- Building/ Structure
- Paved Areas
- Containment Dike

Other Areas

- Approximately 4-6 inches of loam and hydroseed applied to former MHA, not an engineered cap. Additional investigations are planned

Vanasse Hangen Brustlin, Inc.

Figure 3

New England Gas Company
642 Allens Avenue
Providence, Rhode Island

Tables

Table 1
Remedial Objectives for Soil

Constituent	Surface Soil	Subsurface Soil <100 feet from Shore	Subsurface Soil >100 feet from Shore
TPH (mg/Kg)	2,500	15,000	30,000
VOCs (mg/Kg)			
Benzene	200	4.3	43
Ethylbenzene	10,000	62	620
Toluene	10,000	54	540
Xylenes	10,000	540	540
PAHs (mg/Kg)			
Acenaphthene	10,000	10,000	10,000
Acenaphthylene	10,000	10,000	10,000
Anthracene	10,000	10,000	10,000
Benzo(a) Anthracene	7.8	10,000	10,000
Benzo (a) Pyrene	0.8	10,000	10,000
Benzo (b) Fluoranthene	7.8	10,000	10,000
Benzo (g,h,i) perylene	10,000	10,000	10,000
Benzo (k) fluoranthene	78	10,000	10,000
Chrysene	780	10,000	10,000
Dibenzo (a,h) Anthracene	0.8	10,000	10,000
Fluoranthene	10,000	10,000	10,000
Fluorene	10,000	10,000	10,000
Indeno (1,2,3) Pyrene	7.8	10,000	10,000
2-Methylnaphthalene	10,000	10,000	10,000
Naphthalene	10,000	500	5,000
Phenanthrene	10,000	10,000	10,000
Pyrene	10,000	10,000	10,000
2,4-Dimethylphenol	10,000	10,000	10,000
2,6-Dinitrotoluene	10,000	10,000	10,000
Pentachlorophenol	48	10,000	10,000
PCBs (mg/Kg)	10	10,000	10,000
Metals (mg/Kg)			
Arsenic	7	–	–
Lead	500	–	–
Cyanide	10,000	–	–

– No RO established for constituent.

Table 2
Laboratory Analytical Results for Clay Pipe

Analyte/Sample ID Date Collected	A1-Pipe 2 7/22/99
TPH (mg/Kg)	21,100
PAHs (mg/Kg)	
2-Methylnaphthalene	628
Acenaphthene	ND
Acenaphthylene	218
Anthracene	380
Benzo (a) anthracene	379
Benzo (a) pyrene	255
Benzo (b) fluoranthene	297
Benzo (g,h,i) perylene	ND
Benzo (k) fluoranthene	138
Chrysene	320
Dibenzo (a) anthracene	ND
Fluoranthene	929
Fluorene	607
Indeno (1,2,3-cd) pyrene	135
Naphthalene	2,260
Phenanthrene	1,580
Pyrene	658
VOCs (mg/Kg)	
Benzene	ND
Ethylbenzene	ND
Toluene	32.9
Xylenes	174
PCBs (mg/Kg)	ND
Metals (mg/Kg)	
Arsenic	3.22
Lead	ND
Total Cyanide (mg/Kg)	5.26

Table 3
East Trench Confirmatory Results

Sample ID:	Remedial Objectives		A1-W1	A1-W2	A1-W3	A1-W4	A1-W5	A1-W6	A1-W7	A1-W8	A1-W9	A1-W10	A1-W11	A1-W12	A1-W13*	A1-W14	A1-W15*	A1-W16	A1-F1	A1-F2	A1-F3	A1-F4
Date Sampled:	Surface Soil	Subsurface Soil >100 ' of Shore	07/07/99	07/07/99	07/07/99	07/07/99	07/07/99	07/07/99	07/07/99	07/07/99	07/07/99	07/07/99	07/07/99	07/07/99	07/07/99	07/07/99	07/07/99	07/07/99	07/07/99	07/07/99	07/07/99	07/07/99
Depth (ft.):			7.5'	2.0'	5.5'	7.5'	2.0'	5.5'	7.5'	2.0'	5.5'	6.5'	2.0'	5.0'	2.0'	5.0'	2.0'	5.5'	9.0'	9.0'	9.0'	8.0'
Total Cyanide (mg/Kg)	10,000	NE	0.58	1.91	2.04	ND	2.79	0.99	8.06	ND	ND	9.49	ND	ND	ND	0.58	ND	1.64	ND	1.34	18.74	ND
Total Metals (mg/Kg)																						
Asenic	7.0	NE	10.1	12.7	26.6	5.92	8.84	7.47	7.57	12.7	9.64	9.94	11.3	8.01	ND	4.22	3.85	5.12	6.75	13	13	17.6
Lead	500	NE	16.7	36.9	72.2	6.9	51	15.6	12.9	12.4	ND	55.5	9.5	ND	9.0	15	32.6	18	21.5	44.2	344	11
TPH (mg/Kg)	2,500	30,000	ND	155	230	ND	137	ND	913	53	631	ND	41	ND	41	63	44	ND	ND	183	812	106
VOCs (mg/Kg)																						
Benzene	200	43	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ethylbenzene	10,000	620	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Toluene	10,000	540	ND	ND	ND	ND	0.057	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Xylenes	10,000	540	ND	ND	ND	ND	0.058	ND	ND	ND	0.129	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.071	ND
PCBs (mg/Kg)	10	10																				
Arochlor 1060	NE	NE	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Arochlor 1221	NE	NE	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Arochlor 1232	NE	NE	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Arochlor 1242	NE	NE	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Arochlor 1248	NE	NE	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Arochlor 1254	NE	NE	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Arochlor 1260	NE	NE	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
PAHs (mg/Kg)																						
2-Methylnaphthalene	10,000	10,000	ND	ND	ND	ND	ND	ND	ND	ND	23.5	ND	ND	ND	ND	ND	ND	ND	ND	ND	16.6	ND
Acenaphthene	10,000	10,000	ND	ND	ND	ND	ND	ND	ND	ND	2.68	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Acenaphthylene	10,000	10,000	ND	ND	ND	ND	ND	ND	ND	ND	1.97	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Anthracene	10,000	10,000	ND	ND	0.735	ND	0.609	ND	18.0	ND	20.3	ND	ND	ND	ND	ND	ND	ND	ND	0.941	16.8	ND
Benzo(a)anthracene	7.8	10,000	0.657	4.86	8.43	ND	2.7	0.609	87.7	0.855	18.4	0.756	1.14	ND	1.08	1.11	0.819	ND	ND	3.57	20.2	2.02
Benzo(a)pyrene	0.8	10,000	0.979	4.9	7.6	ND	2.9	0.662	72.9	0.833	14.1	0.846	1.35	ND	1.2	1.64	1.04	0.604	ND	3.28	16.6	1.97
Benzo(b)fluoranthene	7.8	10,000	1.53	8.14	23.3	ND	3.99	0.785	106	1.33	20	1.49	1.94	ND	1.91	2.21	1.49	0.937	ND	4.94	27.3	3.13
Benzo(g,h,i)perylene	10,000	10,000	ND	4.07	3.8	ND	1.68	ND	47.2	ND	3.87	ND	ND	ND	1.12	1.91	0.676	ND	ND	3.75	9.8	1.75
Benzo(k)fluoranthene	78	10,000	0.597	2.5	5.78	ND	1.33	ND	19.7	ND	6.01	ND	0.641	ND	0.62	0.835	0.586	ND	ND	1.38	9.9	1.2
Chrysene	780	10,000	0.728	4.65	13.0	ND	2.44	0.66	75.3	0.822	15.4	0.846	1.11	ND	1.22	1.26	0.832	ND	ND	3.16	18.1	1.87
Dibenzo(a,h)anthracene	0.8	10,000	ND	1.1	1.54	ND	ND	ND	23.3	ND	1.74	ND	ND	ND	ND	ND	ND	ND	ND	1.08	ND	ND
Fluoranthene	10,000	10,000	0.549	5.91	6.92	ND	3.01	0.896	1000	1.41	35.1	1.01	1.42	ND	2.1	1.91	1.26	0.637	ND	5.71	35.7	2.72
Fluorene	10,000	10,000	ND	ND	ND	ND	ND	ND	7.87	ND	28	ND	ND	ND	ND	ND	ND	ND	ND	ND	17.3	ND
Indeno(1,2,3-cd)pyrene	7.8	10,000	ND	4.41	4.99	ND	1.95	ND	47.2	ND	4.91	ND	0.559	ND	1.22	1.69	0.691	ND	ND	3.99	11.5	1.78
Naphthalene	10,000	5,000	ND	ND	ND	ND	0.656	ND	ND	1.35	66.4	ND	ND	ND	ND	ND	ND	ND	ND	ND	28.8	ND
Phenanthrene	10,000	10,000	ND	1.32	1.33	ND	1.76	ND	31.60	1.33	65.4	ND	ND	ND	0.894	1.14	0.72	ND	ND	2.21	52.1	0.883
Pyrene	10,000	10,000	0.535	7.53	18.10	ND	2.99	0.86	174	1.06	33.7	0.85	1.40	ND	3.3	2.49	1.39	0.53	ND	8.58	35.5	3.96

Notes: All concentrations are equivilant to parts per million (ppm).
Concentrations depicted as **BOLD** exceed the Surficial Remedial Objectives, Concentrations that are UNDERLINED exceed the Subsurface Remedial Objectives.
ND -- Not detected above method reporting limit, NE – No criteria exists
* Confirmatory sample location at the limits of excavation.

Table 4
West Trench Confirmatory Results

Sample ID:	Remedial Objectives		A1-W17*	A1-W18	A1-W19*	A1-W20	A1-W21*	A1-W22	A1-W23**	A1-W62 (post W-23)	A1-W63	A1-W64	A1-W24	A1-W25**	A1-W26	A1-W27**	A1-W28	A1-W29	A1-W30	A1-F5	A1-F6	A1-F7
Date Sampled:	Surface Soil	Subsurface Soil >100 ' of Shore	7/7/1999	7/7/099	7/7/1999	7/7/1999	7/8/1999	7/8/1999	7/8/1999	7/14/1999	7/14/1999	7/14/1999	7/8/1999	7/8/1999	7/8/1999	7/8/1999	7/8/1999	7/8/1999	7/8/1999	7/8/1999	7/8/1999	7/8/199
Depth (ft.)			2.0'	6.0'	2.0'	6.0'	2.0'	6.0'	2.0'	2.0'	4.0'	4.0'	6.0'	2.0'	6.0'	2.0'	6.0'	2.0'	5.0'	8.0'	9.5'	7.5'
Total Cyanide (mg/Kg)	10,000	NE	4.53	ND	1.87	ND	0.74	ND	ND	NA	NA	NA	ND	ND	ND	1.83	1.18	ND	0.66	ND	ND	1.43
Total Metals (mg/Kg)																						
Asenic	7.0	NE	11	5.53	6.38	6.59	6.01	6.28	5.88	NA	NA	NA	4.98	4.98	ND	7.63	4.47	ND	7.03	6.95	6.67	3.99
Lead	500	NE	30.5	ND	102	ND	54.9	21.6	55.4	NA	NA	NA	ND	34.5	ND	29.4	31.9	ND	9.7	ND	ND	18.1
TPH (mg/Kg)	2,500	30,000	206	ND	358	ND	181	ND	1290	NA	NA	NA	ND	113	ND	144	142	ND	ND	ND	ND	65
VOCs (mg/Kg)																						
Benzene	200	43	ND	ND	ND	ND	ND	ND	ND	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ethylbenzene	10,000	620	0.057	ND	ND	ND	ND	ND	ND	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Toluene	10,000	540	ND	ND	ND	ND	ND	ND	ND	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Xylenes	10,000	540	ND	ND	ND	ND	ND	ND	ND	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
PCBs (mg/Kg)	10	10																				
Arochlor 1060	NE	NE	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Arochlor 1221	NE	NE	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Arochlor 1232	NE	NE	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Arochlor 1242	NE	NE	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Arochlor 1248	NE	NE	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Arochlor 1254	NE	NE	0.228	ND	ND	ND	0.865	ND	10.4	0.605	0.1	ND	ND	0.111	ND	0.238	0.442	ND	ND	ND	ND	0.252
Arochlor 1260	NE	NE	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
PAHs (mg/Kg)																						
2-Methylnaphthalene	10,000	10,000	ND	ND	ND	ND	ND	ND	ND	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Acenaphthene	10,000	10,000	ND	ND	ND	ND	ND	ND	ND	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Acenaphthylene	10,000	10,000	ND	ND	ND	ND	ND	ND	7.18	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Anthracene	10,000	10,000	ND	ND	4.35	ND	ND	ND	17.8	NA	NA	NA	ND	ND	ND	0.961	1.06	ND	ND	ND	ND	ND
Benzo(a)anthracene	7.8	10,000	0.924	ND	4.34	ND	0.944	ND	46.2	NA	NA	NA	ND	2.75	ND	4.09	4.23	ND	ND	ND	ND	1.66
Benzo(a)pyrene	0.8	10,000	0.883	ND	4.82	ND	1.19	ND	34.5	NA	NA	NA	ND	2.56	ND	3.74	3.29	ND	ND	ND	ND	1.45
Benzo(b)fluoranthene	7.8	10,000	1.41	ND	9.38	ND	1.42	ND	48.6	NA	NA	NA	ND	3.26	ND	4.51	4.28	ND	ND	ND	ND	2.0
Benzo(g,h,i)perylene	10,000	10,000	0.57	ND	ND	ND	0.824	ND	11.6	NA	NA	NA	ND	1.45	ND	1.61	1.35	ND	ND	ND	ND	ND
Benzo(k)fluoranthene	78	10,000	ND	ND	ND	ND	ND	ND	13.4	NA	NA	NA	ND	1.01	ND	1.55	1.24	ND	ND	ND	ND	0.759
Chrysene	780	10,000	0.932	ND	4.81	ND	1.09	ND	46.3	NA	NA	NA	ND	2.42	ND	4.09	3.63	ND	ND	ND	ND	1.39
Dibenzo(a,h)anthracene	0.8	10,000	ND	ND	ND	ND	ND	ND	4.94	NA	NA	NA	ND	0.591	ND	0.683	0.636	ND	ND	ND	ND	ND
Fluoranthene	10,000	10,000	1.88	ND	5.54	ND	1.02	ND	104	NA	NA	NA	ND	3.13	ND	5.68	6.04	0.61	ND	ND	ND	2.28
Fluorene	10,000	10,000	ND	ND	ND	ND	ND	ND	10,7	NA	NA	NA	ND	ND	ND	ND	0.58	ND	ND	ND	ND	ND
Indeno(1,2,3-cd)pyrene	7.8	10,000	0.594	ND	3.15	ND	0.858	ND	14.6	NA	NA	NA	ND	1.69	ND	1.96	1.7	ND	ND	ND	ND	0.731
Naphthalene	10,000	5,000	ND	ND	ND	ND	ND	ND	4.65	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Phenanthrene	10,000	10,000	1.02	ND	4.2	ND	ND	ND	91.9	NA	NA	NA	ND	0.9	ND	2.6	3.81	ND	ND	ND	ND	0.617
Pyrene	10,000	10,000	3.08	ND	5.74	ND	1.08	ND	73.30	NA	NA	NA	ND	3.39	ND	5.12	5.22	0.56	ND	ND	ND	2.60

Notes: All concentrations are equivilant to parts per million (ppm).
Concentrations depicted as **BOLD** exceed the Surficial Remedial Objectives, Concentrations that are UNDERLINED exceed the Subsurface Remedial Objectives.
ND --Not detected above method reporting limit, NE - No criteria exists
* Confirmatory sample location at the limits of excavation.
** These confirmatory sample points were excavated, refer to Figure 2.

Table 5
Surficial Soil Excavation Confirmatory Results

Sample ID:	Remedial Objectives		A1-W31*	A1-W32*	A1-W33**	A1-W34**	A1-W35**	A1-W36*	A1-W37*	A1-W126	A1-W127	A1-W128	A1-W129	A1-W130*	A1-F8	A1-F9	A1-F10	A1-F11	A1-F12	A1-F13	A1-F14	A1-F15	A1-F16
Date Sampled:	Surface Soil	Subsurface Soil >100 ' of Shore	7/8/1999	7/8/1999	7/8/1999	7/9/1999	7/7/1999	7/9/1999	7/9/1999	8/20/1999	8/20/1999	8/20/1999	8/20/1999	8/20/1999	7/8/1999	7/8/1999	7/8/1999	7/8/1999	7/8/1999	7/8/1999	7/8/1999	7/8/1999	7/8/1999
Depth (ft.)			1.5'	1.5'	1.5'	1.5'	1.5'	1.5'	1.5'	0-1'	0-1'	0-1'	0-1'	0-1'	2.0'	2.0'	2.0'	2.0'	2.0'	2.0'	2.0'	2.0'	2.0'
Total Cyanide (mg/Kg)	10,000	NE	0.86	1.02	1.06	0.91	1.98	5.3	ND	ND	ND	ND	ND	ND	2.07	ND	1.77	2.76	ND	4.76	1.97	1.02	36
Total Metals (mg/Kg)																							
Asenic	7.0	NE	5.19	4.67	5.68	ND	110	ND	ND	ND	ND	ND	ND	ND	5.39	5.55	ND	6.38	4.91	7.81	6.25	5.96	23.4
Lead	500	NE	19.2	118	36.4	36.1	134	29.5	32.5	ND	ND	ND	ND	29.7	12.7	9.7	19.3	26	ND	63	32.9	17.5	114
TPH (mg/Kg)	2,500	30,000	280	343	302	765	1590	605	564	ND	ND	ND	ND	7920	ND	375	95	211	79	183	119	88	427
VOCs (mg/Kg)																							
Benzene	200	43	ND	ND	ND	ND	ND	0.131	ND	ND	ND	ND	ND	0.201	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ethylbenzene	10,000	620	ND	ND	ND	ND	0.09	ND	ND	ND	ND	ND	ND	0.377	ND	ND	ND	ND	ND	ND	ND	ND	ND
Toluene	10,000	540	ND	ND	ND	ND	0.128	0.19	0.127	ND	ND	ND	ND	0.21	ND	ND	ND	ND	ND	ND	ND	ND	ND
Xylenes	10,000	540	ND	ND	ND	0.141	0.229	0.231	0.225	ND	ND	ND	ND	0.39	ND	ND	ND	ND	ND	ND	ND	ND	ND
PCBs (mg/Kg)	10	10																					
Arochlor 1060	NE	NE	ND	ND	ND	ND	ND	ND	ND	NA	NA	ND	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND
Arochlor 1221	NE	NE	ND	ND	ND	ND	ND	ND	ND	NA	NA	ND	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND
Arochlor 1232	NE	NE	ND	ND	ND	ND	ND	ND	ND	NA	NA	ND	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND
Arochlor 1242	NE	NE	ND	ND	ND	ND	ND	ND	ND	NA	NA	ND	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND
Arochlor 1248	NE	NE	ND	ND	ND	ND	ND	ND	ND	NA	NA	ND	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND
Arochlor 1254	NE	NE	0.262	ND	0.434	0.197	0.781	ND	ND	NA	NA	ND	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND
Arochlor 1260	NE	NE	ND	ND	ND	ND	ND	ND	ND	NA	NA	ND	NA	NA	0.10	0.103	0.422	0.356	0.766	ND	0.640	1.74	10.1
PAHs (mg/Kg)															ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Methylnaphthalene	10,000	10,000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	3.78	ND	ND	ND	ND	ND	ND	ND	ND	ND
Acenaphthene	10,000	10,000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	7.62	ND	ND	ND	ND	ND	ND	ND	ND	ND
Acenaphthylene	10,000	10,000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Anthracene	10,000	10,000	0.574	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	5.12	ND	ND	0.666	1.8	ND	ND	0.688	ND	ND
Benzo(a)anthracene	7.8	10,000	2.14	ND	1.41	ND	ND	ND	ND	ND	ND	ND	ND	4.25	ND	1.09	2.95	9.74	ND	5.42	2.54	2.18	2.49
Benzo(a)pyrene	0.8	10,000	2.59	1.64	2.75	3.63	6.06	4.13	4.32	ND	ND	ND	ND	4.15	ND	1.13	2.77	7.8	ND	5.07	2.67	2.1	2.6
Benzo(b)fluoranthene	7.8	10,000	3.07	2.37	3.24	4.37	6.71	4.37	5.34	ND	ND	ND	ND	4.79	ND	1.96	4.37	11.5	ND	8.82	3.68	3.24	5.91
Benzo(g,h,i)perylene	10,000	10,000	1.39	ND	4.71	ND	3.52	ND	ND	ND	ND	ND	ND	ND	ND	1.49	1.66	2.24	ND	1.99	3.05	1.69	1.5
Benzo(k)fluoranthene	78	10,000	1.19	ND	1.07	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.33	4.57	ND	2.61	1.25	1.3	2.21
Chrysene	780	10,000	2.05	ND	1.4	ND	2.69	ND	ND	ND	ND	ND	ND	ND	ND	1.28	2.55	7.75	ND	4.97	2.65	2.06	2.81
Dibenzo(a,h)anthracene	0.8	10,000	ND	ND	0.874	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.1	ND	0.748	0.539	ND	ND
Fluoranthene	10,000	10,000	3.01	ND	2.33	ND	ND	ND	ND	ND	ND	ND	ND	8.57	ND	1.53	4.22	15.0	ND	7.22	5.02	3.61	3.53
Fluorene	10,000	10,000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	6.92	ND	ND	ND	ND	ND	ND	ND	ND	ND
Indeno(1,2,3-cd)pyrene	7.8	10,000	1.57	1.1	4.38	ND	3.66	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.76	2.84	ND	2.19	3.2	1.83	1.65
Naphthalene	10,000	5,000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	8.75	ND	ND	ND	ND	ND	ND	ND	ND	0.964
Phenanthrene	10,000	10,000	1.92	ND	1.0	ND	ND	ND	ND	ND	ND	ND	ND	19.9	ND	ND	2.68	4.08	ND	2.2	2.69	1.8	2.17
Pyrene	10,000	10,000	2.98	ND	6.46	ND	3.66	3.01	3.14	ND	ND	ND	ND	13.20	ND	6.77	4.59	14.0	ND	7.25	6.29	4.79	2.37

Table 5*
Surficial Soil Excavation Confirmatory Results (Continued)

Sample ID:	Remedial Objectives		post F-16																				
	Surface Soil	Subsurface Soil >100 ' of Shore	(A1-F43)	A1-F17	A1-F18	A1-F19	A1-F20	A1-F21	A1-F22	A1-F23	A1-F24	A1-F44 (post F-24)	A1-F25	A1-F26	A1-F27	A1-F28	A1-F29	A1-F30	A1-F31	A1-F32	A1-F33	A1-F34	A1-F35
Date Sampled:			7/13/1999	7/8/1999	7/8/1999	7/8/1999	7/8/1999	7/8/1999	7/8/1999	7/8/1999	7/8/1999	7/13/1999	7/8/1999	7/8/1999	7/8/1999	7/9/1999	7/9/1999	7/9/1999	7/9/1999	7/9/1999	7/9/1999	7/9/1999	7/9/1999
Depth (ft.)			4.0'	2.0'	2.0'	2.0'	2.0'	2.0'	2.0'	2.0'	2.0'	4.0'	2.0'	2.0'	2.0'	2.0'	2.0'	2.0'	2.0'	2.0'	2.0'	2.0'	2.0'
Total Cyanide (mg/Kg)	10,000	NE	NA	3.15	1.99	1.56	6.09	25	7.63	14.6	38.7	NA	56.4	9.31	5.43	2.27	37.4	2.58	11.1	1450	6.56	1.22	14
Total Metals (mg/Kg)																							
Asenic	7.0	NE	NA	7.09	4.5	7.88	ND	9.37	5.11	9.03	257	NA	124	10.2	6.58	ND	52.1	ND	9.9	77.5	20	ND	6.9
Lead	500	NE	NA	91.4	81.7	36	8.8	72.9	99.7	84.8	1790	NA	392	73.5	29.2	34.9	166	156	197	366	80.2	218	600
TPH (mg/Kg)	2,500	30,000	NA	342	202	198	ND	156	260	304	480	NA	1410	763	1920	514	465	754	668	2880	493	3440	1120
VOCs (mg/Kg)																							
Benzene	200	43	NA	ND	ND	ND	ND	ND	ND	ND	ND	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ethylbenzene	10,000	620	NA	ND	ND	ND	ND	ND	ND	ND	ND	NA	ND	ND	0.079	ND	ND	ND	0.056	ND	ND	ND	0.095
Toluene	10,000	540	NA	0.101	ND	ND	ND	ND	ND	ND	ND	NA	ND	0.075	0.15	0.107	ND	0.108	0.084	ND	ND	ND	0.144
Xylenes	10,000	540	NA	ND	ND	ND	ND	ND	ND	ND	ND	NA	ND	0.141	0.219	0.212	ND	0.25	0.215	ND	ND	0.239	0.379
PCBs (mg/Kg)	10	10																					
Arochlor 1060	NE	NE	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Arochlor 1221	NE	NE	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Arochlor 1232	NE	NE	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Arochlor 1242	NE	NE	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Arochlor 1248	NE	NE	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Arochlor 1254	NE	NE	ND	0.527	ND	0.464	0.628	0.941	0.727	2.02	11.2	ND	6.66	1.64	0.169	0.451	5.0	0.257	0.615	10.0	0.453	ND	0.33
Arochlor 1260	NE	NE	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
PAHs (mg/Kg)																							
2-Methylnaphthalene	10,000	10,000	NA	ND	ND	ND	ND	ND	ND	ND	0.545	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	4.34	ND
Acenaphthene	10,000	10,000	NA	ND	ND	ND	ND	ND	ND	ND	ND	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Acenaphthylene	10,000	10,000	NA	ND	ND	0.535	ND	ND	ND	ND	0.947	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Anthracene	10,000	10,000	NA	ND	ND	0.63	ND	ND	2.06	2.99	0.925	NA	ND	1.31	1.47	4.36	ND	ND	ND	ND	ND	5.56	ND
Benzo(a)anthracene	7.8	10,000	NA	4.51	1.56	2.52	ND	1.97	7.26	6.47	2.46	NA	37.2	4.85	8.0	4.89	3.42	11.2	10.3	5.51	ND	17.4	6.98
Benzo(a)pyrene	0.8	10,000	NA	4.51	1.45	2.56	ND	2.12	6.39	5.39	3.41	NA	24.8	6.83	7.39	7.72	3.8	17.9	12.6	5.48	2.99	22.1	11
Benzo(b)fluoranthene	7.8	10,000	NA	8.03	1.89	3.53	ND	3.8	10.3	8.6	4.78	NA	54.7	10.8	15.3	9.23	6.03	20.5	17.7	15.9	3.97	35.1	16.5
Benzo(g,h,i)perylene	10,000	10,000	NA	1.85	0.561	0.851	ND	0.93	5.68	5.01	1.93	NA	ND	3.11	3.49	3.36	ND	6.81	4.51	3.2	ND	8.42	4.29
Benzo(k)fluoranthene	78	10,000	NA	2.61	0.871	1.91	ND	1.84	3.33	3.1	3.17	NA	18.9	3.8	4.54	2.82	ND	8.06	5.28	5.11	ND	8.59	4.03
Chrysene	780	10,000	NA	4.38	1.37	2.23	ND	2.14	6.66	5.76	2.38	NA	35.3	4.94	7.79	4.38	4.13	10.7	10.3	8.44	ND	14.4	6.98
Dibenzo(a,h)anthracene	0.8	10,000	NA	0.623	ND	ND	ND	ND	1.54	1.32	ND	NA	ND	1.08	1.4	ND	ND	ND	ND	ND	ND	ND	ND
Fluoranthene	10,000	10,000	NA	8.34	1.56	4	ND	2.18	11.5	11.3	3.82	NA	71	6.39	12.1	5.75	5.65	10.5	12	7.29	4.01	20.4	7.11
Fluorene	10,000	10,000	NA	ND	ND	ND	ND	ND	1.57	2.57	ND	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Indeno(1,2,3-cd)pyrene	7.8	10,000	NA	1.97	ND	0.795	ND	0.897	6.17	5.28	1.46	NA	ND	3.49	4.04	3.88	ND	7.95	5.45	3.6	ND	9.67	4.95
Naphthalene	10,000	5,000	NA	ND	ND	ND	ND	ND	ND	ND	0.976	NA	ND	ND	ND	ND	ND	ND	ND	8.2	ND	2.85	4.15
Phenanthrene	10,000	10,000	NA	2.83	0.87	1.89	ND	1.29	8.97	9.89	3.74	NA	54.4	3.54	4.89	7.59	3.43	6.86	9.77	6.27	2.69	13.6	4.65
Pyrene	10,000	10,000	NA	7.20	1.68	3.49	ND	3.09	12.20	12.90	4.73	NA	50.80	5.66	8.66	5.83	5.76	10.1	12.0	5.80	3.74	18.20	7.17

Notes: All concentrations are equivilant to parts per million (ppm).
Concentrations depicted as **BOLD** exceed the Surficial Remedial Objectives, Concentrations that are UNDERLINED exceed the Subsurface Remedial Objectives.
ND – Not detected above method reporting limit, NE – No criteria exists
* Confirmatory sample location at the limits of excavation.
** These confirmatory sample points were excavated, refer to Figure 2.

Table 6
Pipe Run Excavation Confirmatory Results

Sample ID:	Remedial Objectives		A1-W38	A1-W39	A1-W41	A1-W42*	A1-W43	A1-W45	A1-W46	A1-W47	A1-W49	A1-W50*	A1-W51	A1-W53	A1-W54*	A1-W55	A1-W57	A1-W58	A1-W59	A1-W61	A1-W65*	A1-W66	A1-W67*
Date Sampled:	Surface Soil	Subsurface Soil >100 ' of Shore	7/12/1999	7/12/1999	7/12/1999	7/12/1999	7/12/1999	7/12/1999	7/12/1999	7/12/1999	7/12/1999	7/12/1999	7/12/1999	7/12/1999	7/12/1999	7/12/1999	7/12/1999	7/12/1999	7/12/1999	7/12/1999	7/22/1999	7/22/1999	7/22/1999
Depth (ft.)			2.0'	5.0'	5.0'	2.0'	5.0'	5.0'	2.0'	5.0'	5.0'	2.0'	5.0'	5.0'	2.0'	5.0'	5.0'	2.0'	5.0'	5.0'	1.5'	5.0'	1.5'
Total Cyanide (mg/Kg)	10,000	NE	0.66	NA	NA	35.9	NA	NA	56.5	NA	NA	8.09	NA	NA	2.54	NA	NA	1.67	NA	NA	0.62	NA	1.32
Total Metals (mg/Kg)																							
Asenic	7.0	NE	4.03	NA	NA	NA	NA	NA	3.75	NA	NA	5.61	5.49	NA	5.6	NA	NA	5.51	NA	NA	3.55	NA	5.08
Lead	500	NE	19.9	NA	NA	NA	NA	NA	ND	NA	NA	24.5	23	NA	28.5	NA	NA	18.8	NA	NA	30.2	NA	22.4
TPH (mg/Kg)	2,500	30,000	ND	ND	ND	98	ND	ND	ND	ND	ND	68	142	66	184	ND	96	178	ND	93	173	ND	111
VOCs (mg/Kg)																							
Benzene	200	43	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ethylbenzene	10,000	620	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Toluene	10,000	540	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Xylenes	10,000	540	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
PCBs (mg/Kg)	10	10																					
Arochlor 1060	NE	NE	NA	NA	NA	NA	ND	NA	ND	NA	NA	ND	NA	NA	NA	NA	NA	NA	ND	NA	NA	NA	ND
Arochlor 1221	NE	NE	NA	NA	NA	NA	ND	NA	ND	NA	NA	ND	NA	NA	NA	NA	NA	NA	ND	NA	NA	NA	ND
Arochlor 1232	NE	NE	NA	NA	NA	NA	ND	NA	ND	NA	NA	ND	NA	NA	NA	NA	NA	NA	ND	NA	NA	NA	ND
Arochlor 1242	NE	NE	NA	NA	NA	NA	ND	NA	ND	NA	NA	ND	NA	NA	NA	NA	NA	NA	ND	NA	NA	NA	ND
Arochlor 1248	NE	NE	NA	NA	NA	NA	ND	NA	ND	NA	NA	ND	NA	NA	NA	NA	NA	NA	ND	NA	NA	NA	ND
Arochlor 1254	NE	NE	NA	NA	NA	NA	ND	NA	ND	NA	NA	ND	NA	NA	NA	NA	NA	NA	ND	NA	NA	NA	0.172
Arochlor 1260	NE	NE	NA	NA	NA	NA	ND	NA	ND	NA	NA	ND	NA	NA	NA	NA	NA	NA	ND	NA	NA	NA	ND
PAHs (mg/Kg)																							
2-Methylnaphthalene	10,000	10,000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Acenaphthene	10,000	10,000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Acenaphthylene	10,000	10,000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Anthracene	10,000	10,000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Benzo(a)anthracene	7.8	10,000	ND	ND	ND	1.75	ND	ND	ND	ND	ND	0.753	4.94	1.99	3.61	ND	1.24	ND	ND	2.14	4.65	ND	3.25
Benzo(a)pyrene	0.8	10,000	ND	ND	0.168	1.74	ND	ND	ND	ND	ND	0.969	5.0	1.9	3.8	ND	1.63	0.583	ND	1.9	5.3	ND	2.66
Benzo(b)fluoranthene	7.8	10,000	ND	ND	0.229	2.33	ND	ND	ND	ND	ND	1.15	6.89	2.07	5.24	ND	1.85	0.857	ND	2.73	7.73	ND	3.57
Benzo(g,h,i)perylene	10,000	10,000	0.573	ND	ND	1.24	ND	ND	ND	ND	ND	0.766	1.54	0.933	1.33	ND	0.646	ND	ND	0.88	2.28	ND	1.53
Benzo(k)fluoranthene	78	10,000	ND	ND	ND	0.887	ND	ND	ND	ND	ND	ND	1.89	0.958	1.43	ND	0.846	ND	ND	1.05	2.64	ND	1.13
Chrysene	780	10,000	ND	ND	0.148	1.95	ND	ND	ND	ND	ND	0.812	4.71	1.83	3.44	ND	1.32	ND	ND	2.07	5.92	ND	2.77
Dibenzo(a,h)anthracene	0.8	10,000	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.0	0.782	ND	ND	ND	ND	ND	ND	ND	0.796	ND	0.527
Fluoranthene	10,000	10,000	0.711	ND	ND	3.23	ND	ND	ND	ND	ND	ND	5.53	3.05	5.21	ND	1.6	ND	ND	2.91	7.95	ND	3.87
Fluorene	10,000	10,000	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.841	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Indeno(1,2,3-cd)pyrene	7.8	10,000	ND	ND	0.118	1.46	ND	ND	ND	ND	ND	ND	2.1	1.15	1.73	ND	0.824	0.569	ND	1.12	2.98	ND	1.87
Naphthalene	10,000	5,000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Phenanthrene	10,000	10,000	ND	ND	ND	1.43	ND	ND	ND	ND	ND	ND	0.994	1.24	2.38	ND	0.6	ND	ND	0.969	4.41	ND	0.955
Pyrene	10,000	10,000	0.598	ND	0.14	2.55	ND	ND	ND	ND	ND	0.99	4.55	2.65	3.81	ND	1.29	ND	ND	2.33	9.16	ND	4.75

Table 6
Pipe Run Excavation Confirmatory Results (Continued)

Sample ID:	Remedial Objectives		A1-W68	A1-W69*	A1-W70	A1-W71*	A1-W72	A1-W73	A1-W74	A1-W75	A1-W76	A1-W77	A1-W78	A1-F37	A1-F38	A1-F39	A1-F40	A1-F41	A1-F42	A1-F45	A1-F46	A1-F47
Date Sampled:	Surface Soil	Subsurface Soil >100 ' of Shore	7/22/1999	7/22/1999	7/22/1999	7/22/1999	7/22/1999	7/22/1999	7/22/1999	7/22/1999	7/22/1999	7/22/1999	7/22/1999	7/9/1999	7/9/1999	7/9/1999	7/9/1999	7/9/1999	7/9/1999	7/22/1999	7/22/1999	7/22/1999
Depth (ft.)			5.0'	1.5'	5.0'	1.5'	5.0'	1.5'	5.0'	1.5'	5.0'	1.5'	5.0'	8.0'	8.0'	8.0'	8.0'	8.0'	8.0'	9.0'	9.0'	9.0'
Total Cyanide (mg/Kg)	10,000	NE	NA	2.82	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND	54.6	14.95	1.43	4.04	26.6	NA	NA	NA
Total Metals (mg/Kg)																						
Asenic	7.0	NE	NA	4.6	NA	2.97	NA	5.84	NA	2.63	NA	3.79	NA	ND	ND	7.7	ND	ND	ND	NA	NA	NA
Lead	500	NE	NA	172	NA	17.5	NA	17.9	NA	13	NA	9.5	NA	24.6	69.8	109	24.4	23.5	9.2	NA	NA	NA
TPH (mg/Kg)	2,500	30,000	ND	209	ND	59	ND	ND	ND	ND	ND	ND	ND	ND	57	77	ND	158	702	ND	ND	ND
VOCs (mg/Kg)																						
Benzene	200	43	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ethylbenzene	10,000	620	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Toluene	10,000	540	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Xylenes	10,000	540	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
PCBs (mg/Kg)	10	10																				
Arochlor 1060	NE	NE	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	NA	NA
Arochlor 1221	NE	NE	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	NA	NA
Arochlor 1232	NE	NE	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	NA	NA
Arochlor 1242	NE	NE	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	NA	NA
Arochlor 1248	NE	NE	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	NA	NA
Arochlor 1254	NE	NE	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	NA	NA
Arochlor 1260	NE	NE	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.131	0.61	0.734	0.66	ND	ND	ND	NA	NA
PAHs (mg/Kg)														ND	ND	ND	ND	ND	ND	ND	NA	NA
2-Methylnaphthalene	10,000	10,000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Acenaphthene	10,000	10,000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Acenaphthylene	10,000	10,000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Anthracene	10,000	10,000	ND	1.15	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.663	3.05	ND	3.29	ND	ND	ND
Benzo(a)anthracene	7.8	10,000	0.916	6.93	ND	1.21	ND	ND	ND	0.765	ND	ND	ND	ND	1.75	2.52	8.52	2.52	44.7	ND	ND	ND
Benzo(a)pyrene	0.8	10,000	0.817	8.01	ND	1.09	ND	ND	ND	0.776	ND	ND	ND	ND	1.84	2.32	6.34	2.21	32	ND	ND	ND
Benzo(b)fluoranthene	7.8	10,000	1.01	12.1	ND	1.51	ND	ND	ND	1.15	ND	0.613	ND	ND	2.19	3.03	8.67	2.96	62.1	ND	ND	ND
Benzo(g,h,i)perylene	10,000	10,000	ND	2.35	ND	0.782	ND	ND	ND	ND	ND	ND	ND	ND	1.17	1.51	3.46	1.72	18.5	ND	ND	ND
Benzo(k)fluoranthene	78	10,000	ND	3.69	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.942	1.2	3.62	1.13	13.8	ND	ND	ND
Chrysene	780	10,000	0.907	8.74	ND	1.08	ND	ND	ND	0.972	ND	0.568	ND	ND	1.51	2.61	7.16	2.27	36.4	ND	ND	ND
Dibenzo(a,h)anthracene	0.8	10,000	ND	0.812	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	7.49	ND	ND	ND
Fluoranthene	10,000	10,000	1.43	16.4	ND	1.66	0.659	ND	ND	1.66	0.802	0.995	ND	ND	3.41	4.66	15.5	3.48	52	ND	ND	ND
Fluorene	10,000	10,000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Indeno(1,2,3-cd)pyrene	7.8	10,000	ND	3.24	ND	0.836	ND	ND	ND	0.538	ND	ND	ND	ND	1.25	1.7	4.01	1.98	22.4	ND	ND	ND
Naphthalene	10,000	5,000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Phenanthrene	10,000	10,000	ND	7.32	ND	0.598	0.584	ND	ND	0.703	ND	ND	ND	ND	2.22	3.39	10.3	1.47	66.2	ND	ND	ND
Pyrene	10,000	10,000	1.30	14.80	ND	1.61	ND	ND	ND	1.35	0.62	0.82	ND	ND	2.95	3.78	10.70	3.48	52.5	ND	ND	ND

Notes: All concentrations are equivilant to parts per million (ppm).
All concentrations reported in BOLD exceed the RAWP Surficial Remedial Objectives, Concentrations underlined exceed the RAWP Subsurface Remedial Objectives.
ND -- Not detected above method reporting limit; NA -- Not analyzed; NE – RIDEM criteria does not exist; BIC — By individual constituent.
* Confirmatory sample location at the limits of excavation.

Table 7
East SALNG Area Confirmatory Results

Sample ID:	Remedial Objectives		A1-W79	A1-W80	A1-W81	A1-W82	A1-W83	A1-W84	A1-W85	A1-W86	A1-W87	A1-W88	A1-W90	A1-W91	A1-W92	A1-W93	A1-W94	A1-W95	A1-W96	A1-W97	A1-W98	A1-W99	A1-W100	A1-W101	A1-W102	A1-W103	A1-W104
Date Sampled:	Surface	Subsurface Soil	7/30/1999	7/30/1999	7/30/1999	7/30/1999	7/30/1999	7/30/1999	7/30/1999	7/30/1999	7/30/1999	7/30/1999	8/4/1999	8/4/1999	8/4/1999	8/4/1999	8/4/1999	8/4/1999	8/4/1999	8/9/1999	8/9/1999	8/9/1999	8/9/1999	8/11/1999	8/11/1999	8/11/1999	8/11/1999
Depth (ft.)	Soil	>100 ' of Shore	7-10'	7-10'	7-10'	2-10'	2-10'	2-10'	2-10'	2-10'	2-7'	2-7'	10-12'	10-12'	10-12'	10-12'	10-12'	10-12'	10-12'	10-12'	10-12'	10-12'	10-12'	7-11'	7-11'	2-8'	2-8'
Total Cyanide (mg/Kg)	10,000	NE	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total Metals (mg/Kg)																											
Asenic	7.0	NE	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Lead	500	NE	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TPH (mg/Kg)	2,500	30,000	6550	1060	520	455	176	233	ND	ND	150	1420	15900	3470	7200	ND	2650	263	2070	12900	6960	4020	5320	105	2590	224	77
VOCs (mg/Kg)																											
Benzene	200	43	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ethylbenzene	10,000	620	2	0.173	ND	ND	ND	ND	ND	ND	ND	ND	3.78	ND	ND	ND	ND	1.72	0.755	ND	ND	ND	ND	ND	ND	ND	ND
Toluene	10,000	540	ND	0.079	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Xylenes	10,000	540	5.9	0.529	ND	ND	ND	ND	ND	ND	ND	ND	1.26	0.063	ND	ND	ND	0.517	0.351	0.081	ND	ND	ND	ND	ND	ND	ND	ND
PCBs (mg/Kg)	10	10																									
Arochlor 1060	NE	NE	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	ND	NA	NA	NA	NA	ND	NA	NA	NA	NA	NA	NA
Arochlor 1221	NE	NE	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	ND	NA	NA	NA	NA	ND	NA	NA	NA	NA	NA	NA
Arochlor 1232	NE	NE	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	ND	NA	NA	NA	NA	ND	NA	NA	NA	NA	NA	NA
Arochlor 1242	NE	NE	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	ND	NA	NA	NA	NA	ND	NA	NA	NA	NA	NA	NA
Arochlor 1248	NE	NE	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	ND	NA	NA	NA	NA	ND	NA	NA	NA	NA	NA	NA
Arochlor 1254	NE	NE	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	ND	NA	NA	NA	NA	ND	NA	NA	NA	NA	NA	NA
Arochlor 1260	NE	NE	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	ND	NA	NA	NA	NA	ND	NA	NA	NA	NA	NA	NA
PAHs (mg/Kg)																											
2-Methylnaphthalene	10,000	10,000	35.2	ND	ND	ND	ND	ND	ND	ND	ND	ND	50.1	27.5	ND	ND	ND	2.18	22.5	50.9	12.4	6.16	23.3	ND	ND	ND	ND
Acenaphthene	10,000	10,000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	5.81	ND	ND	ND	ND	ND	ND	2.38	1.18	3.29	ND	ND	ND	ND
Acenaphthylene	10,000	10,000	35.7	ND	ND	ND	0.887	ND	ND	ND	ND	24.3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Anthracene	10,000	10,000	32.1	7.32	ND	3.15	0.565	0.732	ND	ND	0.701	32.8	27.9	6.67	7.88	ND	2.32	0.602	4.42	5.55	3.57	1.13	3.93	ND	0.597	ND	ND
Benzo(a)anthracene	7.8	10,000	79.5	45.8	22	14.8	2.52	3.8	ND	ND	3.35	80.2	63.1	5.62	ND	ND	ND	0.498	ND	4.38	2.33	ND	2.41	0.969	1.12	1.54	0.633
Benzo(a)pyrene	0.8	10,000	63.7	31.2	16.1	12.0	2.21	3.56	ND	ND	3.06	62.4	52.2	ND	ND	ND	ND	0.405	ND	1.87	0.931	ND	1.14	0.742	0.668-	1.27	0.601
Benzo(b)fluoranthene	7.8	10,000	73.4	43.6	20.9	16.7	2.96	4.81	ND	ND	4.12	91.6	60.2	ND	ND	ND	ND	0.522	ND	2.41	1.27	ND	1.24	0.935	0.784	1.58	0.776
Benzo(g,h,i)perylene	10,000	10,000	33.4	12.1	5.15	5.72	1.24	1.24	ND	ND	1.09	41	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.587	ND	0.813	ND
Benzo(k)fluoranthene	78	10,000	30	11.6	6.63	5.62	1.03	1.63	ND	ND	1.44	29.2	21.6	ND	ND	ND	ND	ND	ND	0.946	ND	ND	ND	ND	ND	0.639	ND
Chrysene	780	10,000	62.8	38.6	18.6	13.5	2.45	3.09	ND	ND	3.12	77.2	55.2	4.83	ND	ND	ND	0.431	ND	3.22	1.84	ND	1.76	0.955	0.979	1.61	0.687
Dibenzo(a,h)anthracene	0.8	10,000	12.3	ND	ND	ND	ND	ND	ND	ND	ND	12.7	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Fluoranthene	10,000	10,000	178	61.9	23.9	18.2	4.12	3.2	ND	ND	4.17	195	93.1	14.7	17.8	ND	4.3	1.13	8.82	12.2	4.97	0.684	6.03	1.55	2.34	2.44	0.88
Fluorene	10,000	10,000	36	ND	ND	ND	ND	ND	ND	ND	ND	32.1	28.3	ND	12.1	ND	3.03	ND	6.03	8.65	4.69	2.38	5.58	ND	0.584	ND	ND
Indeno(1,2,3-cd)pyrene	7.8	10,000	40.5	17.5	7.54	7.62	1.62	1.8	ND	ND	1.55	44	23.7	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.663	ND	0.943	0.546
Naphthalene	10,000	5,000	76.1	ND	ND	ND	ND	ND	ND	ND	ND	11.8	48	ND	ND	ND	ND	2.16	17	ND	ND	ND	ND	ND	ND	ND	ND
Phenanthrene	10,000	10,000	85.8	11.7	3.23	13.3	1.83	1.71	ND	ND	2.14	148	72.5	22.8	25.1	ND	6.34	2.05	13.2	23.9	13.7	5.48	15.2	ND	0.648	2.45	0.607
Pyrene	10,000	10,000	144.0	61.1	23.50	18.70	2.13	3.41	ND	ND	4.38	128.0	56.5	10.8	13.2	ND	3.29	0.64	5.87	10.6	6.1	0.85	5.08	1.52	3.72	2.44	0.987

Table 7
East SALNG Area Confirmatory Results (Continued)

Sample ID:	Remedial Objectives		A1-W105	A1-W106	A1-W107	A1-W108	A1-W109	A1-W110*	A1-W111	A1-W112	A1-W113	A1-W114	A-W115	A1-W116	A1-W117	A1-W118	A1-W119	A1-W120	A1-W121	A1-W122	A1-W123	A1-W124	A1-W125	A1-F48	A1-F49	A1-F50	A1-F51
Date Sampled:	Surface Soil	Subsurface Soil >100 ' of Shore	8/11/1999	8/11/1999	8/11/1999	8/11/1999	8/11/1999	8/11/1999	8/11/1999	8/11/1999	8/11/1999	8/11/1999	8/11/1999	8/11/1999	8/18/1999	8/18/1999	8/18/1999	8/18/1999	8/19/1999	8/19/1999	8/19/1999	8/19/1999	8/19/1999	8/11/1999	8/11/1999	8/11/1999	8/11/1999
Depth (ft.):			2-8'	2-8'	2-8'	2-8'	2-8'	0-2'	0-2'	0-2'	7-11'	2-10'	2-10'	12.0'	2-7'	2-12'	2-12'	2-5'	2-5'	2-12'	2-12'	2-3.5'	2-3.5'	8.0'	8.0'	8.0'	8.0'
Total Cyanide (mg/Kg)	10,000	NE	NA	NA	NA	NA	NA	ND	ND	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total Metals (mg/Kg)																											
Asenic	7.0	NE	NA	NA	NA	NA	NA	ND	ND	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Lead	500	NE	NA	NA	NA	NA	NA	ND	ND	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TPH (mg/Kg)	2,500	30,000	ND	ND	148	ND	ND	ND	ND	ND	177	ND	457	1980	ND	144	125	227	175	206	176	138	ND	72	ND	128	163
VOCs (mg/Kg)																											
Benzene	200	43	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.06	ND	ND	0.157	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ethylbenzene	10,000	620	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Toluene	10,000	540	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.069	ND	ND	0.52	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Xylenes	10,000	540	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
PCBs (mg/Kg)	10	10																									
Arochlor 1060	NE	NE	NA	ND	NA	ND	NA	ND	ND	ND	NA	NA	NA	NA	ND	NA	NA	NA	NA	NA	NA	ND	ND	NA	NA	NA	NA
Arochlor 1221	NE	NE	NA	ND	NA	ND	NA	ND	ND	ND	NA	NA	NA	NA	ND	NA	NA	NA	NA	NA	NA	ND	ND	NA	NA	NA	NA
Arochlor 1232	NE	NE	NA	ND	NA	ND	NA	ND	ND	ND	NA	NA	NA	NA	ND	NA	NA	NA	NA	NA	NA	ND	ND	NA	NA	NA	NA
Arochlor 1242	NE	NE	NA	ND	NA	ND	NA	ND	ND	ND	NA	NA	NA	NA	ND	NA	NA	NA	NA	NA	NA	ND	ND	NA	NA	NA	NA
Arochlor 1248	NE	NE	NA	ND	NA	ND	NA	ND	ND	ND	NA	NA	NA	NA	ND	NA	NA	NA	NA	NA	NA	ND	ND	NA	NA	NA	NA
Arochlor 1254	NE	NE	NA	ND	NA	ND	NA	ND	ND	ND	NA	NA	NA	NA	ND	NA	NA	NA	NA	NA	NA	ND	ND	NA	NA	NA	NA
Arochlor 1260	NE	NE	NA	ND	NA	ND	NA	ND	ND	ND	NA	NA	NA	NA	ND	NA	NA	NA	NA	NA	NA	0.076	ND	NA	NA	NA	NA
PAHs (mg/Kg)																						ND	ND	NA	NA	NA	NA
2-Methylnaphthalene	10,000	10,000	ND	ND	0.629	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.387	ND	ND	ND	ND	ND	ND	ND
Acenaphthene	10,000	10,000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Acenaphthylene	10,000	10,000	ND	ND	0.895	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.85	0.732	0.367	0.44	ND	ND	ND	ND	ND	ND
Anthracene	10,000	10,000	ND	ND	1.84	ND	ND	ND	ND	ND	ND	ND	0.637	ND	ND	0.581	0.419	1.19	1.21	0.458	0.852	0.375	ND	ND	ND	0.755	ND
Benzo(a)anthracene	7.8	10,000	0.943	ND	4.84	ND	ND	1.02	ND	ND	ND	ND	2.37	ND	ND	2.28	2.71	5.13	4.5	1.96	4.75	1.69	ND	1.15	ND	3.06	1.21
Benzo(a)pyrene	0.8	10,000	0.873	ND	3.15	ND	ND	1.09	ND	ND	ND	ND	1.74	ND	ND	2.16	2.64	5.29	4.3	2.57	4.0	1.94	ND	1.02	ND	2.12	1.29
Benzo(b)fluoranthene	7.8	10,000	1.0	ND	4.94	ND	ND	1.69	ND	ND	ND	ND	2.76	ND	ND	2.56	2.64	5.72	4.99	3.02	7.51	2.5	ND	1.67	ND	3.24	1.95
Benzo(g,h,i)perylene	10,000	10,000	0.676	ND	1.4	ND	ND	ND	ND	ND	ND	ND	1.25	ND	ND	0.778	3.81	1.05	2.14	1.49	1.44	0.775	ND	ND	ND	0.656	ND
Benzo(k)fluoranthene	78	10,000	ND	ND	1.28	ND	ND	0.725	ND	ND	ND	ND	0.843	ND	ND	0.972	0.732	1.54	1.62	1.08	1.76	0.663	ND	0.685	ND	1.44	0.965
Chrysene	780	10,000	0.978	ND	4.48	ND	ND	1.52	ND	ND	ND	ND	2.19	ND	ND	2.0	2.46	4.88	4.11	2.12	4.92	1.72	ND	1.01	ND	2.57	1.11
Dibenzo(a,h)anthracene	0.8	10,000	ND	ND	0.608	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.362	0.524	0.614	0.539	0.677	ND	ND	ND	ND	ND	ND
Fluoranthene	10,000	10,000	1.57	ND	8.54	ND	ND	1.88	ND	ND	ND	ND	4.49	1.35	ND	2.73	2.76	8.58	8.03	2.63	7.65	2.32	ND	1.19	ND	3.88	1.05
Fluorene	10,000	10,000	ND	ND	1.02	ND	ND	ND	ND	ND	ND	ND	ND	0.708	ND	ND	ND	0.856	0.382	ND	ND	ND	ND	ND	ND	ND	ND
Indeno(1,2,3-cd)pyrene	7.8	10,000	0.768	ND	1.96	ND	ND	ND	ND	ND	ND	ND	1.61	ND	ND	1.01	0.999	1.5	2.66	1.83	1.95	1.01	ND	ND	ND	0.898	0.549
Naphthalene	10,000	5,000	ND	ND	1.31	ND	ND	ND	ND	ND	ND	ND	0.705	ND	ND	ND	ND	0.364	0.731	0.563	0.51	ND	ND	ND	ND	ND	ND
Phenanthrene	10,000	10,000	1.05	ND	8.36	ND	ND	1.58	ND	ND	0.658	ND	2.27	0.928	ND	2.23	1.32	6.58	8.0	1.55	4.35	1.42	ND	1.12	ND	3.27	0.654
Pyrene	10,000	10,000	1.82	ND	9.63	ND	ND	2.42	ND	ND	0.6	ND	4.2	1.4	ND	3.3	3.0	7.06	6.27	2.55	5.57	2.48	ND	1.3	ND	3.3	1.2

Notes: All concentrations are equivilant to parts per million (ppm).
All concentrations reported in BOLD exceed the RIDEM Industrial DEC, Concentrations underlined exceed the ESS Remedial Objectives, Concentrations outlined exceed the RIDEM GB Leachability Criteria.
ND – Not detected above method reporting limit; NA – Not analyzed; NE — RIDEM criteria does not exist; BIC – By individual constituent.
* Confirmatory sample location at the limits of excavation.

Table 8
Confirmatory Results for SALNG Area within Containment Dike

Sample ID:	Remedial Soil Objectives		A1-W131*	A1-W132*	A1-W133	A1-W134	A1-W135	A1-W136*	A1-W137	A1-W138*	A1-W139	A1-W140	A1-W141	A1-W142	A1-W143	A1-W144	A1-W145	A1-W146	A1-W147	A1-W148	A1-W149	A1-W150*	A1-W151	A1-W152	A1-W153	A1-W154	A1-W155	A1-W156	A1-W157**	A1-W158	A1-W159	A1-W160**	A1-F52	A1-F53	A1-F54
Date Sampled:	Surface	Subsurface Soil	9/3/1999	9/3/1999	9/3/1999	9/3/1999	9/3/1999	9/3/1999	9/3/1999	9/3/1999	9/3/1999	9/3/1999	9/3/1999	9/3/1999	9/3/1999	9/3/1999	9/7/1999	9/7/1999	9/7/1999	9/7/1999	9/7/1999	9/7/1999	9/7/1999	9/7/1999	9/8/1999	9/8/1999	9/8/1999	9/8/1999	9/8/1999	9/8/1999	9/8/1999	9/20/1999	9/20/1999	9/20/1999	9/20/199
Depth (ft.):	Soil	>100 ' of Shore	0-2'	0-2'	2-10'	0-2'	2-10'	0-2'	2-10'	0-2'	0-2'	2-10'	0-2'	2-10'	0-2'	2-10'	0-2'	0-2'	2-10'	0-2'	2-10'	0-2'	2-10'	0-2'	0-2'	2-10'	0-2'	2-10'	0-2'	2-10'	0-2'	0-2'	2'	2'	2'
Total Cyanide (mg/Kg)	10,000	NE	0.47	0.62	NA	ND	NA	ND	NA	ND	ND	NA	ND	NA	ND	NA	ND	ND	NA	ND	NA	0.53	NA	0.29	4.1	NA	ND	NA	ND	NA	ND	1.65	NA	NA	NA
Total Metals (mg/Kg)																																			
Asenic	7.0	NE	6.45	10.7	NA	5.71	NA	8.32	NA	4.49	6.09	NA	6.91	NA	4.23	NA	3.16	4.93	NA	3.85	NA	3.96	NA	5.03	ND	NA	ND	NA	7.9	NA	ND	20.3	NA	NA	NA
Lead	500	NE	49.3	57.9	NA	19.2	NA	12	NA	46.8	10.1	NA	8.2	NA	ND	NA	ND	ND	NA	10.7	NA	42	NA	17.6	15.2	NA	37.8	NA	30.3	NA	ND	110	NA	NA	NA
TPH (mg/Kg)	2,500	30,000	156	160	891	64	917	ND	884	85	ND	182	ND	172	ND	1400	ND	ND	741	ND	437	63	568	ND	34	147	ND	103	80	89	ND	425	418	1800	1690
VOCs (mg/Kg)																																			
Benzene	200	43	ND	ND	ND	ND	0.746	ND	0.157	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.066	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ethylbenzene	10,000	620	ND	ND	0.103	ND	0.262	ND	0.093	ND	ND	ND	ND	0.069	ND	0.077	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.401	ND	ND	ND	ND	ND	ND	ND	ND	ND
Toluene	10,000	540	ND	ND	ND	ND	0.559	ND	0.121	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.068	ND	ND	ND	ND	ND	ND	ND	ND	ND
Xylenes	10,000	540	ND	ND	ND	ND	0.507	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NC	ND	ND	ND	ND
PCBs (mg/Kg)	10	10																																	
Arochlor 1060	NE	NE	ND	NA	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	ND	NA	NA	ND	NA	ND	NA	NA	ND	NA	NA	NA	ND	NA	NA	ND
Arochlor 1221	NE	NE	ND	NA	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	ND	NA	NA	ND	NA	ND	NA	NA	ND	NA	NA	NA	ND	NA	NA	ND
Arochlor 1232	NE	NE	ND	NA	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	ND	NA	NA	ND	NA	ND	NA	NA	ND	NA	NA	NA	ND	NA	NA	ND
Arochlor 1242	NE	NE	ND	NA	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	ND	NA	NA	ND	NA	ND	NA	NA	ND	NA	NA	NA	0.119	NA	NA	0.219
Arochlor 1248	NE	NE	ND	NA	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	ND	NA	NA	ND	NA	ND	NA	NA	ND	NA	NA	NA	ND	NA	NA	ND
Arochlor 1254	NE	NE	ND	NA	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	ND	NA	NA	ND	NA	ND	NA	NA	ND	NA	NA	NA	ND	NA	NA	ND
Arochlor 1260	NE	NE	ND	NA	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	ND	NA	NA	ND	NA	ND	NA	NA	ND	NA	NA	NA	NO	NA	NA	ND
PAHs (mg/Kg)																																			
2-Methylnaphthalene	10,000	10,000	ND	ND	0.79	ND	3.45	ND	0.641	ND	ND	ND	ND	ND	ND	0.552	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.21	ND
Acenaphthene	10,000	10,000	ND	ND	ND	ND	2.45	ND	0.537	ND	ND	ND	ND	ND	ND	0.693	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Acenaphthylene	10,000	10,000	ND	ND	0.4	ND	2.85	ND	0.748	ND	ND	ND	ND	ND	ND	0.674	ND	ND	0.366	ND	0.567	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	2.58	ND	ND	1.27
Anthracene	10,000	10,000	0.544	0.503	1.25	ND	6.77	ND	2.37	0.47	ND	0.369	ND	0.353	ND	2.76	ND	ND	0.579	ND	0.64	ND	0.661	ND	ND	ND	ND	ND	ND	ND	ND	1.34	ND	3.94	3.08
Benzo(a)anthracene	7.8	10,000	2.37	2.99	3.17	0.619	7.97	ND	4.6	1.55	ND	1.06	ND	0.831	ND	3.96	ND	ND	1.41	ND	2.01	0.857	1.54	ND	ND	ND	ND	ND	0.837	0.874	ND	8.47	1.28	5.78	5.81
Benzo(a)pyrene	0.8	10,000	2.81	3.51	3.58	0.737	8.92	ND	4.33	1.36	ND	1.36	ND	0.875	ND	3.15	ND	ND	1.34	ND	2.13	0.986	1.45	ND	ND	ND	ND	ND	0.955	1.07	ND	9.39	1.47	5.1	5.98
Benzo(b)fluoranthene	7.8	10,000	4.12	5.13	5.39	1	8.19	ND	7.87	1.87	ND	1.99	ND	1.04	ND	5.07	ND	ND	1.57	ND	2.3	1.01	1.53	ND	ND	0.594	ND	ND	1.33	1.83	ND	9.81	1.65	6.18	7.11
Benzo(g,h,i)perylene	10,000	10,000	1.34	1.68	1.76	ND	2.84	ND	1.91	ND	ND	ND	ND	0.609	ND	0.685	ND	ND	0.852	ND	0.984	0.555	0.669	ND	ND	ND	ND	ND	ND	ND	ND	4.51	1.21	2.94	3.79
Benzo(k)fluoranthene	78	10,000	1.49	1.83	1.81	0.434	2.73	ND	1.88	0.642	ND	0.662	ND	ND	ND	1.86	ND	ND	0.481	ND	0.806	0.433	0.621	ND	ND	ND	ND	ND	0.583	0.579	ND	3.76	ND	1.58	2.27
Chrysene	780	10,000	2.04	2.41	2.9	0.581	5.15	ND	3.71	1.27	ND	0.978	ND	0.706	ND	3.03	ND	ND	1.24	ND	1.94	0.82	1.37	ND	ND	0.407	ND	ND	0.808	0.891	ND	8.09	1.41	5.43	6.32
Dibenzo(a,h)anthracene	0.8	10,000	0.367	0.561	0.523	ND	0.982	ND	0.67	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.357	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.63	ND	1.21	ND
Fluoranthene	10,000	10,000	3.32	3.85	9.24	0.66	17.6	ND	12.9	2.05	ND	1.3	ND	1.16	ND	16.1	ND	ND	2.86	ND	3.37	1.34	2.69	ND	ND	0.641	ND	ND	1.08	1.07	ND	8.3	1.72	7.99	8.36
Fluorene	10,000	10,000	ND	ND	0.842	ND	4.68	ND	1.69	ND	ND	ND	ND	ND	ND	2.42	ND	ND	0.438	ND	0.477	ND	0.792	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	2.32	1.22
Indeno(1,2,3-cd)pyrene	7.8	10,000	1.61	2.1	2.18	ND	3.12	ND	2.36	0.391	ND	0.451	ND	0.758	ND	1.03	ND	ND	1.01	ND	1.28	0.703	0.882	ND	ND	ND	ND	ND	ND	ND	ND	ND	5.77	1.15	2.75	4.32
Naphthalene	10,000	5,000	0.507	0.707	1.88	ND	10.2	ND	1.53	ND	ND	ND	ND	ND	ND	1.08	ND	ND	0.391	ND	0.448	ND	0.642	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.43	1.86
Phenanthrene	10,000	10,000	2.0	1.22	2.98	ND	22	ND	10.9	1.68	ND	0.862	ND	0.543	ND	18.96	ND	ND	1.06	ND	1.13	0.924	1.71	ND	ND	0.464	ND	ND	0.538	0.467	ND	1.75	1.44	9.31	6.68
Pyrene	10,000	10,000	3.0	4.35	7.04	0.618	17.4	ND	10.5	1.84	ND	1.13	ND	1.24	ND	4.95	ND	ND	2.7	ND	3.57	1.12	2.64	ND	ND	0.678	ND	ND	0.865	0.768	ND	9.72	2.11	7.99	8.22

Table 8
Confirmatory Results for SALNG Area within Containment Dike (Continued)

Sample ID:	Remedial Soil Objectives		A1-W164	A1-W165**	A1-W166**	A1-F55	A1-F56	A1-F57	A1-W167	A1-W168**	A1-W169*	A1-F58	A1-F59	A1-F60	A1-W170	A1-W171*	A1-W172	A1-W173*	A1-W174	A1-W175*	A1-W176	A1-W177	A1-W178	A1-F61	A1-F62	A1-F63	A1-F64	A1-F65	A1-F66	A1-F67	A1-F68	A1-F69	A1-F70	A1-F71	A1-F72
Date Sampled:	Surface	Subsurface Soil	9/27/1999	9/27/1999	9/27/1999	9/27/1999	9/27/1999	9/27/1999	10/1/1999	10/1/1999	10/1/1999	10/1/1999	10/1/1999	10/1/1999	10/8/1999	10/8/1999	10/8/1999	10/8/1999	10/8/1999	10/8/1999	10/8/1999	10/8/1999	10/8/1999	10/8/1999	10/8/1999	10/8/1999	10/8/1999	10/8/1999	10/8/1999	10/8/1999	10/8/1999	10/8/1999	10/8/1999	10/8/1999	10/8/1999
Depth (ft.)	Soil	>100' of Shore	0-2'	0-2'	0-2'	0-2'	0-2'	0-2'	0-2'	0-2'	0-2'	2'	2'	2'	0-2'	0-2'	0-2'	0-2'	0-2'	0-2'	0-2'	0-2'	0-2'	2'	2'	2'	2'	2'	2'	2'	2'	2'	2'	2'	2'
Total Cyanide (mg/Kg)	10,000	NE	0.54	ND	1.28	NA	NA	NA	ND	ND	ND	NA	NA	NA	2.2	ND	ND	ND	ND	ND	ND	ND	ND	7.57	ND	0.69	ND	0.64	ND	ND	ND	ND	ND	ND	ND
Total Metals (mg/Kg)																																				
Arsenic	7.0	NE	2.71	6.26	5.74	NA	NA	NA	3.43	4.36	7.23	NA	NA	NA	5.22	5.7	4.48	15.3	4.43	4.44	5.2	5.52	5.23	4.73	4.22	5.81	3.77	5.83	4.23	4.65	5.92	4.17	4.62	ND	5.1
Lead	500	NE	16.3	41.4	65.3	NA	NA	NA	19.7	25.4	52.5	NA	NA	NA	23.2	27.5	17.6	41.3	19.9	31.2	19.5	18.6	14.7	27	34.8	42	30	44.4	36.3	23.3	45.5	44.9	17.9	13.8	10.6
TPH (mg/Kg)	2,500	30,000	ND	152	195	67	105	1770	ND	93	75	103	83	332	118	140	38	71	ND	72	31	29	ND	72	64	117	41	73	47	79	100	50	38	77	ND
VOCs (mg/Kg)																																				
Benzene	200	43	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.062	ND	0.047	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ethylbenzene	10,000	620	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.118	ND	0.056	ND	ND	ND	ND	ND	ND	ND	ND	ND
Toluene	10,000	540	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.068	ND	0.072	ND	ND	ND	ND	ND	ND	ND	ND	ND
Xylenes	10,000	540	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.32	ND	ND	ND	ND	ND	ND	ND	ND	ND
PCBs (mg/Kg)	10	10																																	
Arochlor 1060	NE	NE	ND	ND	ND	ND	ND	ND	ND	NA	NA	NA	NA	NA	NA	NA	NA	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Arochlor 1221	NE	NE	ND	ND	ND	ND	ND	ND	ND	NA	NA	NA	NA	NA	NA	NA	NA	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Arochlor 1232	NE	NE	ND	ND	ND	ND	ND	ND	ND	NA	NA	NA	NA	NA	NA	NA	NA	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Arochlor 1242	NE	NE	ND	ND	ND	ND	ND	ND	ND	NA	NA	NA	NA	NA	NA	NA	NA	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Arochlor 1248	NE	NE	ND	ND	ND	ND	0.38	ND	ND	NA	NA	NA	NA	NA	NA	NA	NA	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Arochlor 1254	NE	NE	ND	ND	ND	ND	ND	ND	ND	NA	NA	NA	NA	NA	NA	NA	NA	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Arochlor 1260	NE	NE	ND	ND	ND	ND	ND	ND	ND	NA	NA	NA	NA	NA	NA	NA	NA	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
PAHs (mg/Kg)																																				
2-Methylnaphthalene	10,000	10,000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Acenaphthene	10,000	10,000	ND	ND	ND	ND	ND	0.389	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Acenaphthylene	10,000	10,000	ND	0.434	ND	ND	ND	0.872	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Anthracene	10,000	10,000	ND	0.808	0.64	ND	0.523	1.09	ND	ND	ND	ND	ND	0.677	ND	0.44	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.11	ND	ND	ND	ND	0.566	ND	ND	ND	ND
Benzo(a)anthracene	7.8	10,000	ND	2.27	1.76	0.387	1.24	2.74	ND	1.64	1.58	0.589	1.64	1.75	ND	1.93	ND	0.893	ND	1.48	0.38	ND	ND	ND	1.1	3.08	0.453	1.04	0.876	1.16	2.11	0.828	0.51	1.45	ND
Benzo(a)pyrene	0.8	10,000	ND	2.1	2.22	0.472	1.47	3.23	ND	1.43	1.7	0.69	1.72	1.72	ND	1.76	ND	0.835	ND	1.29	0.436	ND	ND	ND	1.0	2.24	0.57	1.02	0.823	0.999	1.89	0.716	0.481	1.19	ND
Benzo(b)fluoranthene	7.8	10,000	ND	2.23	2.67	0.475	1.69	4.46	ND	1.54	1.85	0.703	1.8	1.86	0.417	1.85	0.362	0.867	ND	1.4	0.51	ND	ND	ND	1.12	2.36	0.535	1.24	0.925	1.04	2.01	0.715	0.515	1.34	ND
Benzo(g,h,i)perylene	10,000	10,000	ND	1.13	0.587	ND	0.609	0.831	ND	0.86	1.07	ND	1	0.84	ND	1.1	ND	0.534	ND	0.729	0.365	ND	ND	ND	0.557	0.636	ND	0.388	ND	0.399	0.543	ND	ND	ND	ND
Benzo(k)fluoranthene	78	10,000	ND	0.934	0.961	ND	0.534	1.05	ND	0.646	0.803	ND	0.777	0.721	ND	0.654	ND	NO	ND	0.53	ND	ND	ND	ND	ND	0.822	ND	ND	ND	ND	0.78	ND	ND	0.42	ND
Chrysene	780	10,000	ND	1.85	1.64	0.378	1.19	1.28	ND	1.57	1.6	0.589	1.62	1.6	ND	1.72	ND	0.755	ND	1.21	0.372	ND	ND	ND	0.898	2.42	0.416	0.895	0.777	0.947	1.66	0.668	0.491	1.36	ND
Dibenzo(a,h)anthracene	0.8	10,000	ND	0.433	ND	ND	ND	0.353	ND	ND	ND	ND	ND	ND	ND	0.39	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Fluoranthene	10,000	10,000	ND	3.26	1.98	0.562	1.74	4.55	ND	2.02	2.17	0.884	2.12	2.41	ND	2.27	0.43	1.03	ND	1.61	0.605	ND	ND	ND	1.17	3.35	0.441	1.21	0.986	1.55	2.54	1.05	0.694	1.88	ND
Fluorene	10,000	10,000	ND	ND	ND	ND	ND	0.582	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.432	ND	ND	ND	ND	ND	ND	ND	ND	ND
Indeno(1,2,3-cd)pyrene	7.8	10,000	ND	1.37	0.837	0.358	0.776	1.04	ND	1	1.27	0.556	1.22	1.02	ND	1.28	ND	0.618	ND	0.894	0.356	ND	ND	ND	0.707	0.893	0.455	0.512	0.455	0.543	0.829	0.642	ND	0.461	ND
Naphthalene	10,000	5,000	ND	ND	ND	ND	ND	0.418	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Phenanthrene	10,000	10,000	ND	1.85	1.33	ND	1.18	2.12	ND	1.04	1.41	0.594	1.21	1.5	ND	1.01	ND	ND	ND	0.754	ND	ND	ND	ND	0.591	2.54	ND	0.532	0.483	0.784	1.35	0.434	ND	0.695	ND
Pyrene	10,000	10,000	ND	2.58	1.83	0.529	1.5	4.62	ND	2.24	2.18	0.875	2.21	2.38	ND	2.58	0.469	1.12	ND	1.7	0.532	ND	ND	0.382	1.35	4.02	0.476	1.28	1.1	1.6	2.15	1.08	0.762	2.11	ND

Notes: All concentrations are equivilant to parts per million (ppm).
Concentrations shown as bold exceed the RAWP Surface Soil Remedial Objectives. Concentrations that are boxed exceed the RAWP Subsurface Soil Remedial Objectives.
ND – Not detected above method reporting limit; NA – Not analyzed; NE – RIDEM criteria does not exist; BIC – By individual constituent.
* Confirmatory sample location at the limits of excavation.
** These confirmatory sample points were excavated, refer to Figure 2.

Photographs

View of concrete pad looking southeast.

View of pipe trench excavation looking westerly.

View of southeast corner of SALNG excavation.

Backfill operations in SALNG Area looking westerly.

Site Photographs
642 Allens Avenue
Providence, Rhode Island

View of excavations in SALNG Area within the dike.

Backfill operations in SALNG Area within the dike.

Backfill operations and installation of recovery wells in SALNG Area within dike.

Surficial excavation in SALNG Area within the dike.

View of recent conditions of SALNG area looking to the south.

View of recent conditions of SALNG within the containment dike.

Site Photographs
642 Allens Avenue
Providence, Rhode Island

Appendix A – Limitations

New England Gas Company
Providence, RI

- This report has been prepared for the sole and exclusive use of New England Gas Company (Client), and is subject to and issued in connection with the Agreement and the provisions thereof. Any use or reliance upon information provided in this report, without the specific written authorization of Client and VHB, shall be at the User's sole risk.

- In preparing this report, VHB has obtained and relied upon information from multiple sources to form certain conclusions regarding potential environmental issues at and in the vicinity of the subject property. Except as otherwise noted, no attempt has been made to verify the accuracy or completeness of such information.

- No attempt has been made to assess the compliance status of any past or present Owner or Operator of the Site with any federal, state, or local laws or regulations.

- The findings, observations, and conclusions presented in this report are limited by the scope of services outlined in our Agreement, which reflects schedule and budgetary constraints imposed by the Client for the current phase of environmental assessment. Furthermore, the assessment has been performed in accordance with generally accepted engineering practices. No other warranty, expressed or implied, is made.

- The assessment presented in this report is based solely upon information gathered to date. Should further environmental or other relevant information be developed at a later date, Client should bring the information to the attention of VHB as soon as possible. Based upon an evaluation, VHB may modify the report and its conclusions.

Appendix B – Piping Removal Plan

Protocol for purging pipelines suspected of containing flammable and/or volatile materials.

Introduction

The method employed for purging pipelines in preparation for demolition involves a systematic approach of:

1. Isolating the pipeline.
2. Exposing pipe ends sections for removal using hand excavation methods.
3. Cutting the pipe ends using high pressure water to cut steel sections. The high-pressure water has been shown to be effective in safely cutting pipe sections that are suspected of containing gasses or liquids.
4. Purging the pipe sections of all flammable materials and managing the purged materials, if required, and
5. Removing the pipe contents using conventional methods once the purging has been successfully demonstrated.

Objective

Protocol for purging pipelines up to 36" in diameter in preparation for demolition:

Applicability

Method described has been demonstrated on piping systems up to 36" diameter and applies to steel, PE, HDPE cast iron and ductile iron systems.

Prerequisites

1. The piping systems to be purged must be removed from service and isolated from pressure sources by valves, flanges or approved pipe plugs.

2. Expose pipe sections at locations where the demolition is proposed by hand excavation a 8-foot long section of the piping along the circumference of the pipe. Remove all soil within three feet of the circumference of the pipe.

3. Remove with non-sparking devices all insulating and cathodic protection coating in an 18-inch longitudinal section of the exposed piping

4. If the gas to be purged is estimated at greater than 1,000 cubic feet at standard temperature and pressure (STP), than a method for capturing the fugitive gasses must be provided prior to purging the pipeline.

5. If pipe section locations are not completely confirmed, contact the utility locator prior to conducting any excavation on site

Performance of Work

1. Cutting pipe sections exposed shall be accomplished by high pressure water-minimum pressure of 36,000 psi with aggregate. The water utilization is approximately three gallons per minute. It is estimated that to cut the 30 inch diameter cast iron pipe at 1" thick appron, 120 gallons will be generated per cut.

2. Set up blower in excavation around exposed pipe sections and exchange air at a minimum rate of 3 volumes a minute.

3. Using high pressure water or other approved cutting device remove an 5 foot section of piping in the exposed section in each excavation. A minimum of four cuts is required.

4. Plug the section of piping to be left in place with cement grout.

5. Insert a ventiliating blower hose (intrinsically safe) into the pipe end and purge the pipe run. Continuously check the purge gas exiting the opposite end of the line for presence of explosive vapors or gas. Continue to purge until the LEL < 1% or until it is demonstrated that purging is unable to remove all volatile residuals in pipe line.

6. If residuals continue to degas and prompt LEL concerns, the piping must be flushed with a mixture of water and suitable surfactant - collect and manage wastewater. Re-purge after water flush and check for LEL levels.

7. Satisfactory purging will be accomplished when the LEL is $\leq$ 1% or non-detectable.

8. At this point, the piping is acceptable for demolition using conventional methods, such as a gasoline powered cut-off saw, backhoe, cutting torch, etc.

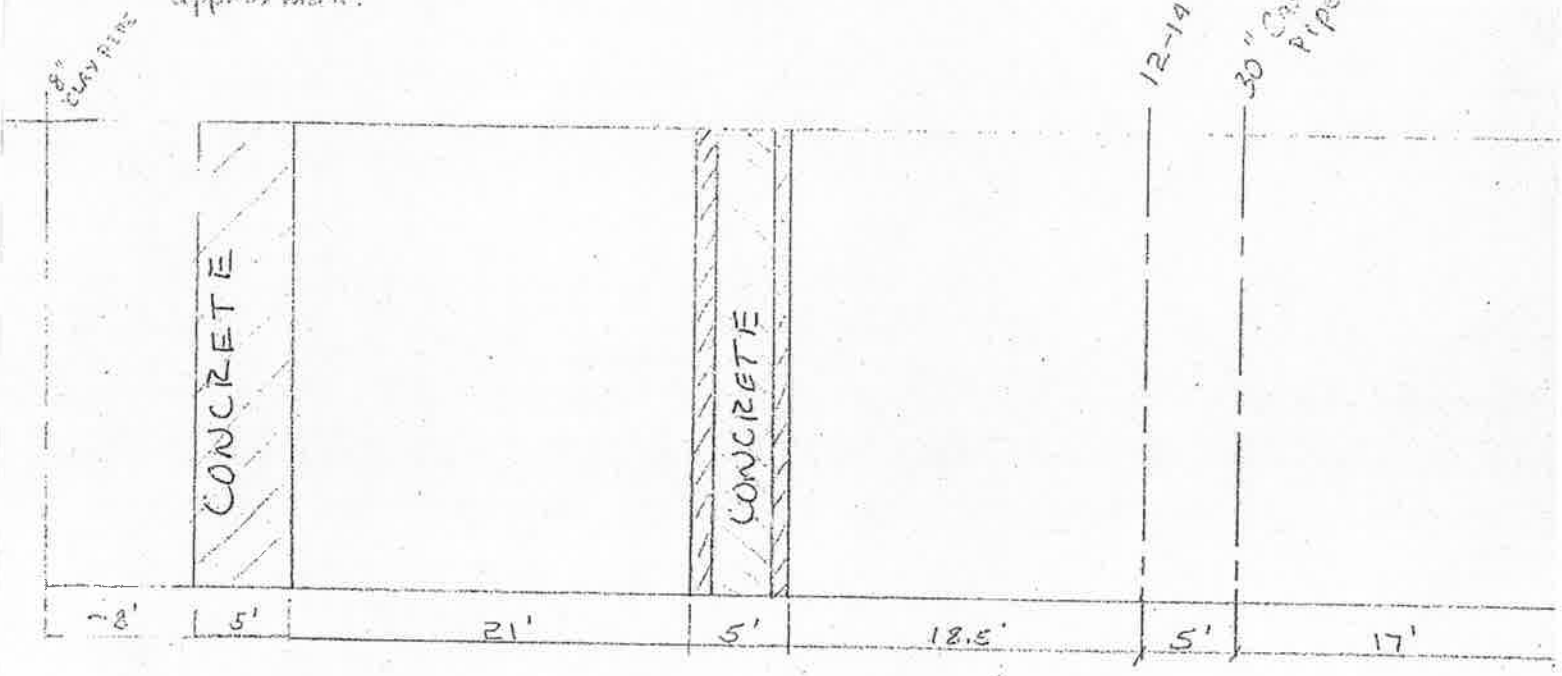
Appendix C – Eastern Trench Sketches

EASTERN TRENCH PLAN VIEW

Scale = 1" = 10'

——— = Pipe ℄

Note: All distances are approximate.



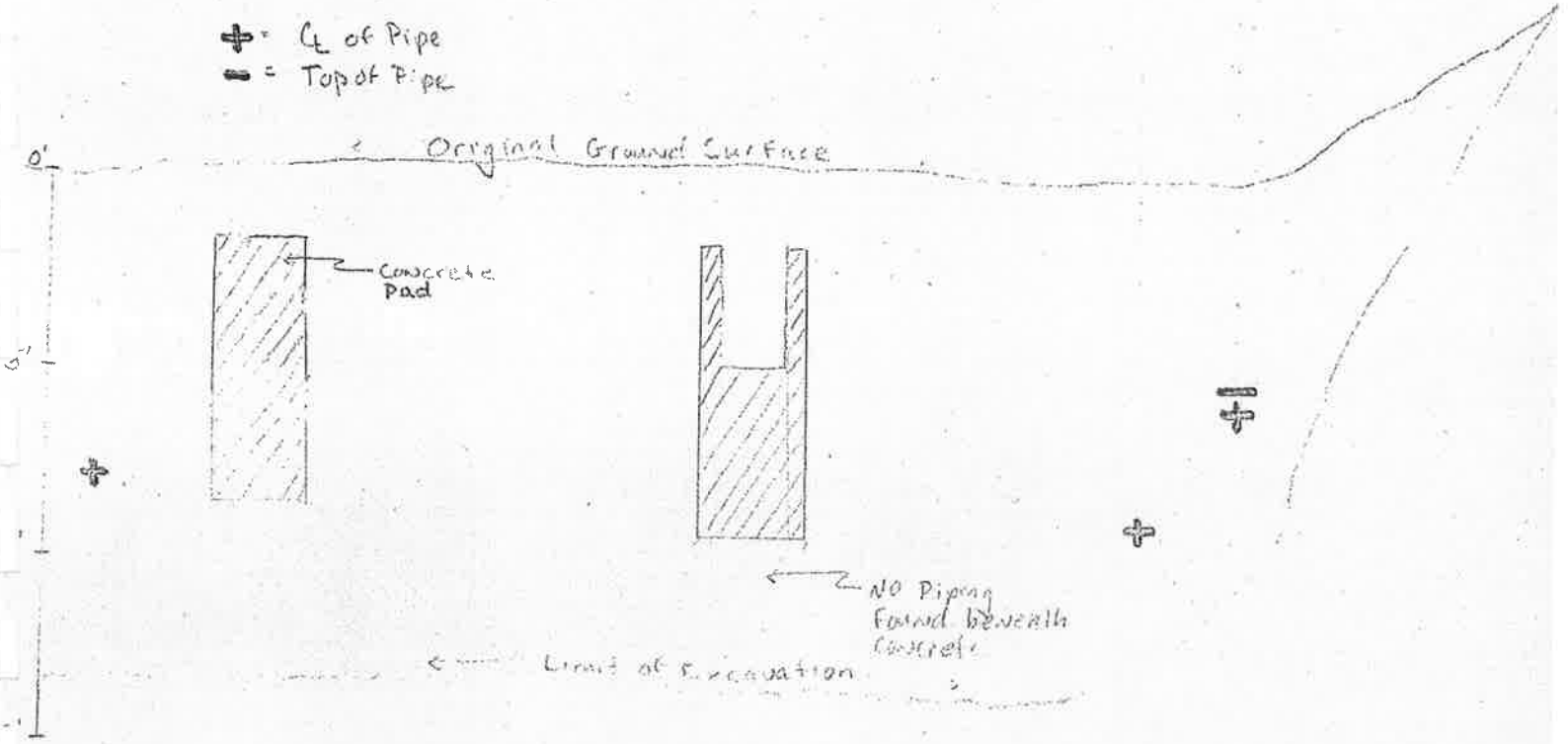
EASTERN TRENCH SECTION VIEW

Horizontal Scale: 1" = 10'

Vertical Scale: 1" = 5'

✚ = ℄ of Pipe

▬ = Top of Pipe



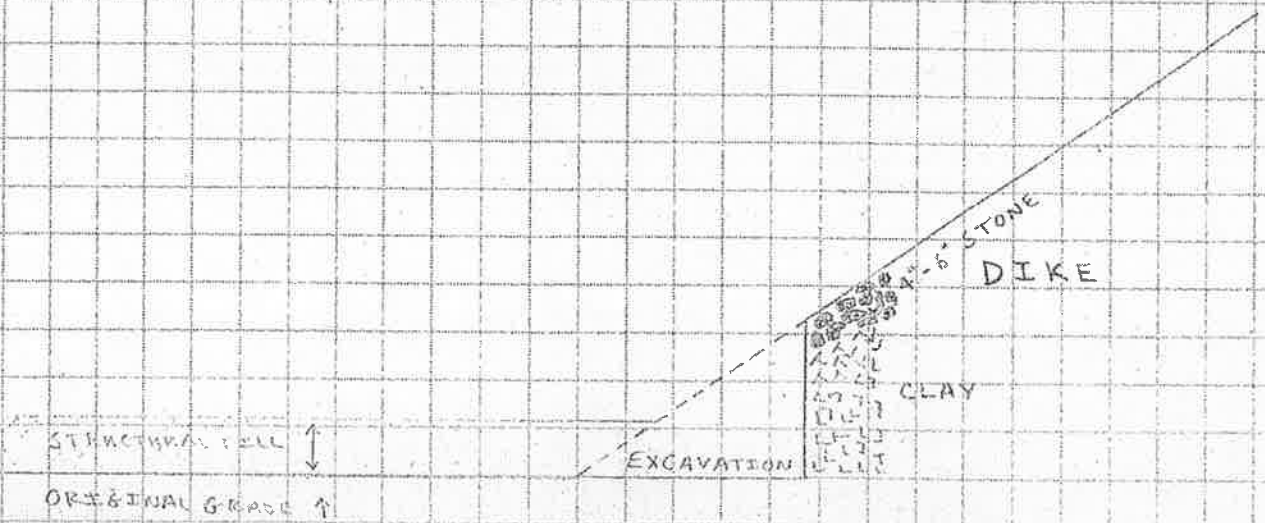
Appendix D – Cross Section of the Containment Dike Excavation

ENVIRONMENTAL SCIENCE SERVICES, INC.
272 West Exchange Street, Suite 101
Providence, Rhode Island 02903
(401) 421-0398

JOB P151 - 000 Providence, RI
SHEET NO. 2 OF 2
CALCULATED BY E. E. L. DATE [illegible] 93
CHECKED BY _____ DATE _____
SCALE 1" = 5'

PROFILE OF EXCAVATION TO 1' BELOW ORIGINAL GRADE

PROFILE OF EXCAVATION TO 0' ELEVATION, ORIGINAL GRADE



ENVIRONMENTAL SCIENCE SERVICES, INC.
272 West Exchange Street, Suite 101
Providence, Rhode Island 02903
(401) 421-0398

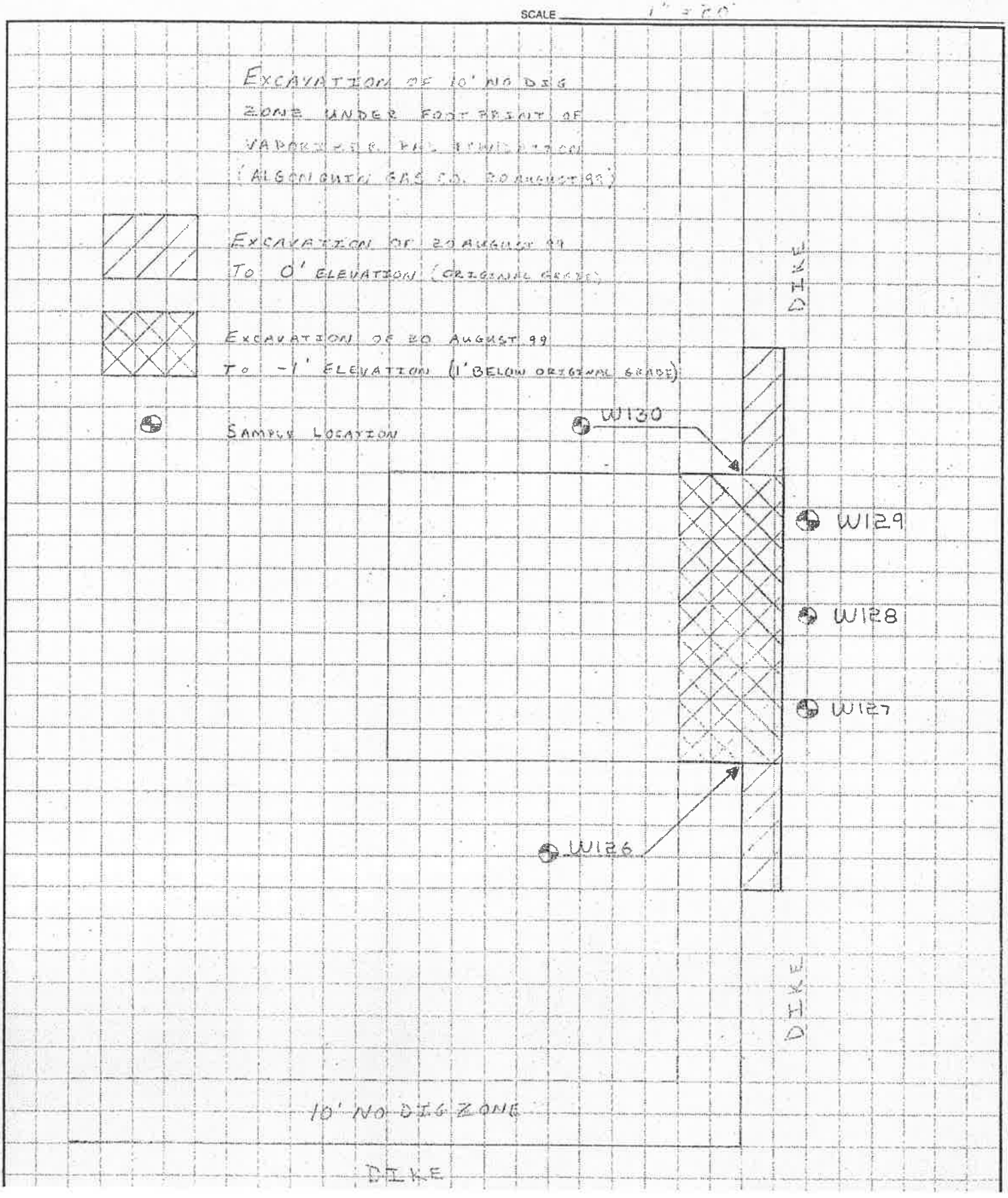
JOB P151.000 Providence Gas

SHEET NO. 1 OF 2

CALCULATED BY E.C.L. DATE 24 August 99

CHECKED BY _____ DATE _____

SCALE 1" = 20'



Appendix E – Disposal Documentation

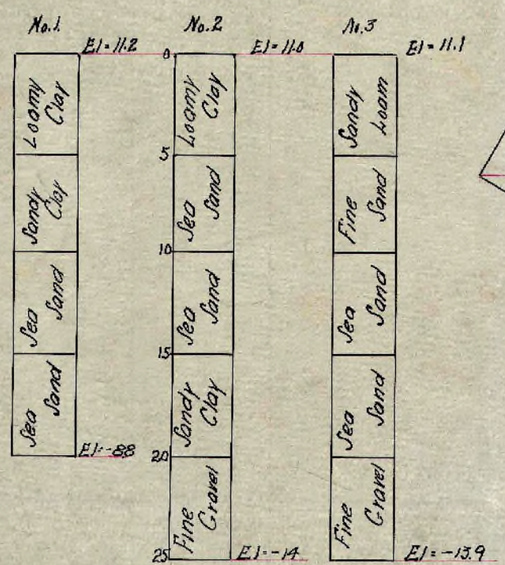
Provided in a Separate Document

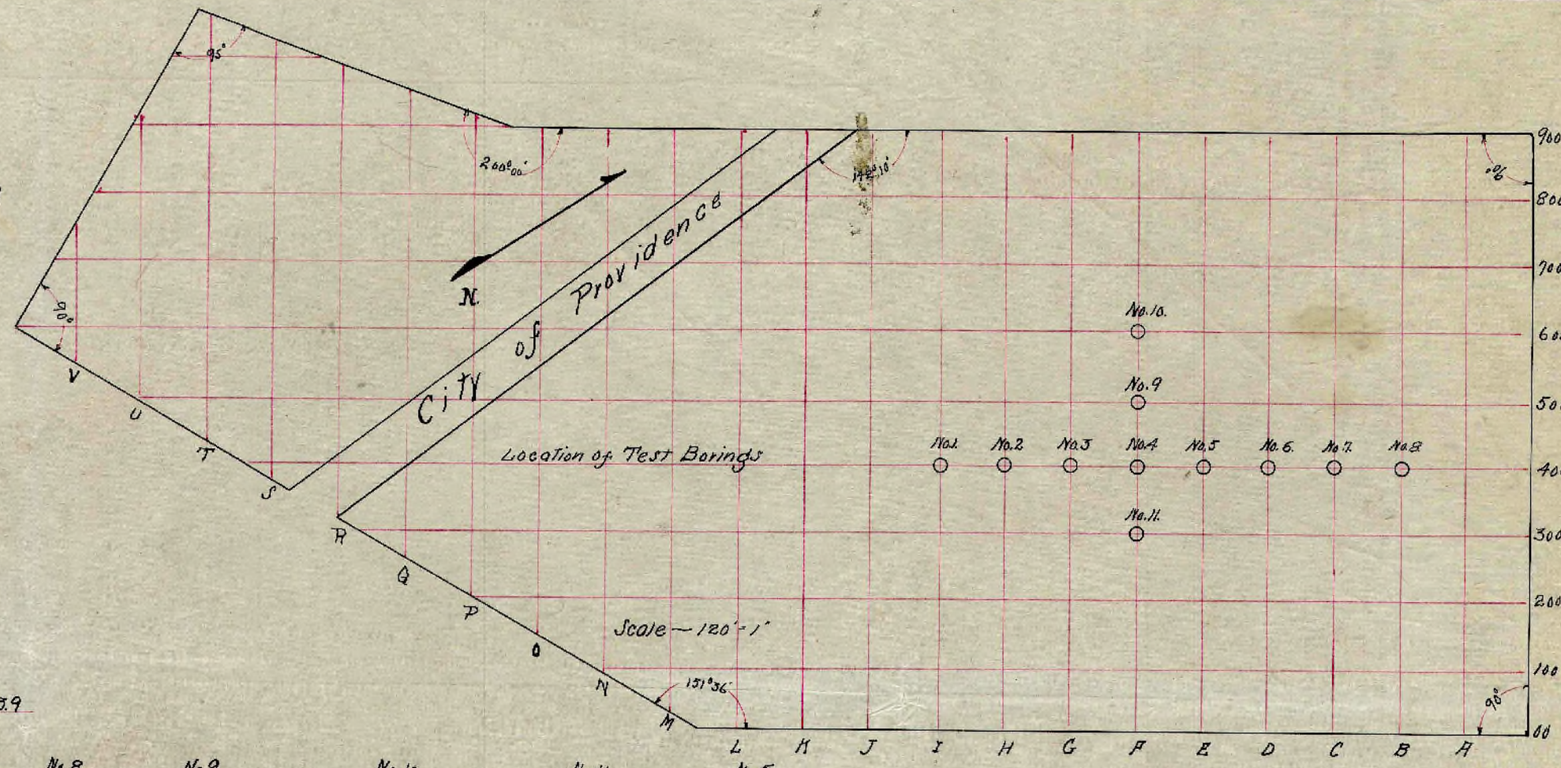
Appendix F – Laboratory Certificates of Analysis

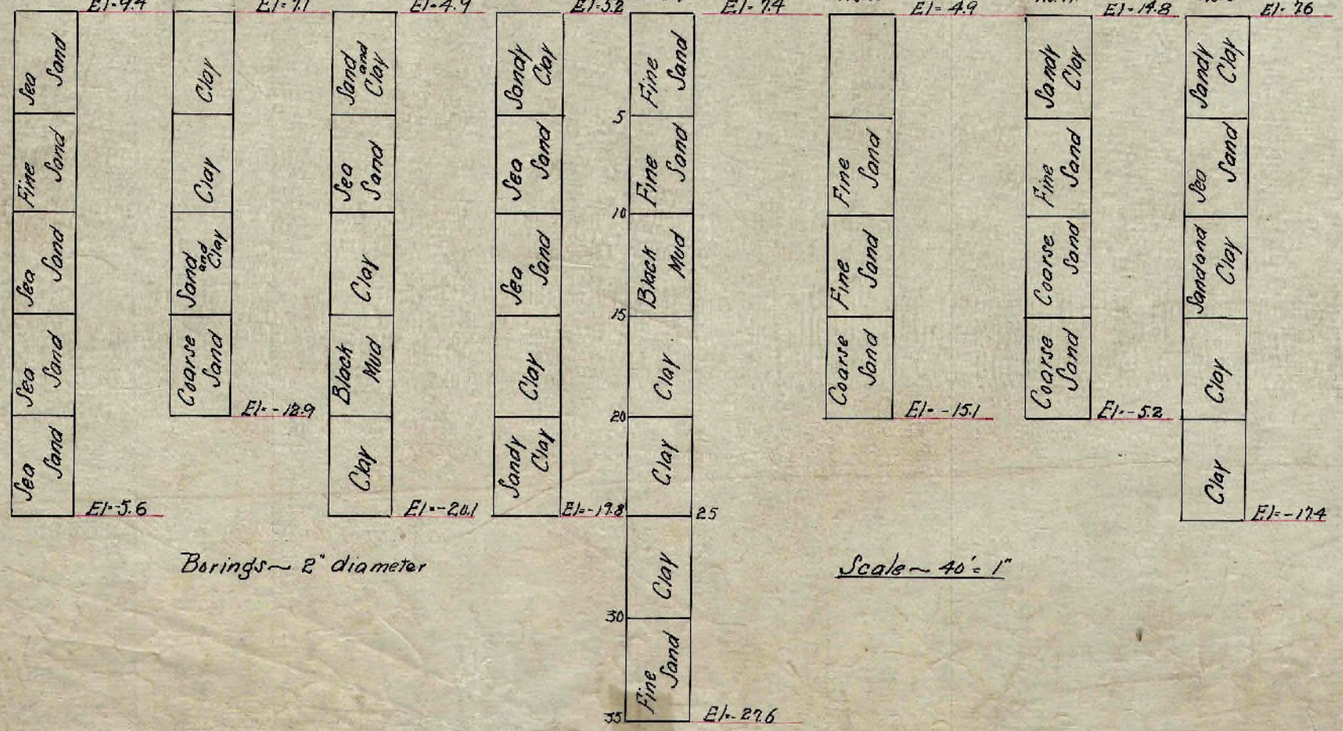
Provided in a Separate Document

APPENDIX C

Boring and Test Pit Logs







Borings ~ 2" diameter

Scale ~ 40'=1"

Providence Gas Company
Sassafras Point
Test Borings under Sassafras Point Plat
Scale ~ 40'+120'=1" June 5, 1912.

American Drilling & Boring Co., Inc.

100 WATER STREET EAST PROVIDENCE, R. I.

SHEET 1 OF 3
DATE
HOLE NO. 1
LINE & STA.
OFFSET
SURF. ELEV.

TO Haley & Aldrich, Inc. | ADDRESS Cambridge, Mass.
PROJECT NAME Gas Tank Installation | LOCATION Providence, R.I.
REPORT SENT TO above | PROJ. NO.
SAMPLES SENT TO " | OUR JOB NO. 71-130

GROUND WATER OBSERVATIONS
At 9.0' after 16 Hours
At 8.5' after ½ Hours

	CASING	SAMPLER	CORE BAR.
Rods-"AW" Type		S/S	
Size I.D.	NX	1 3/8"	
Hammer Wt.	300#	140#	BIT
Hammer Fall	24"	30"	

	Date	Time
START	3/5/71	a.m. p.m.
COMPLETE	3/5/71	a.m. p.m.
TOTAL HRS.		

BORING FOREMAN Peterson
INSPECTOR Debbie Huff
SOILS ENGR.

LOCATION OF BORING:

DEPTH	Casing Blows per foot	Sample Depths From-To	Type of Sample	Blows per 6" on Sampler From 0-6	To 6-12	To 12-18	Moisture Density or Consist.	Strata Change Elev.	SOIL IDENTIFICATION Remarks include color, gradation, Type of soil etc. Rock-color, type, condition, hardness, Drilling time, seams and etc.	SAMPLE No.	Pen	Rec.
	7	0'-1'6"	D	3	2	3	Dry loose	1.0'	Br. F-M SAND, bricks, cinders	1	18"	18"
	6								Layer of fine SAND (FILL)			
	19											
	20							4.0'				
	25						Wet loose					
	25	5'-6'	D	3	4				layer of black CINDERS	2	12"	12"
	23	6'-6'2"	D**	60			V.dense	7'6"	6'-6'2" CONCRETE	2A	2"	2"
	13	6'6"-9'6"	D	3	3	8	Wet		Gray green fine to medium	3	36"	18"
	17			8	8	5	M.dense	9'6"	SAND, lit. silt & F-M gravel			
10	9											
	5	10'-11'6"	D	2	1	1	Wet soft		Gray ORGANIC SILT, some peat trace wood	4	18"	18"
	8											
	10							13'				
	24											
	28						Wet		Gray fine to coarse SAND,			
	10	15'-16'6"	D	13	13	9	medium		some fine to coarse gravel	5	18"	12"
	20						dense		trace silt			
	28											
	55											
10	50											
	24	20'-21'6"	D	17	11	14	"			6	18"	12"
	32											
	50											
	36											
	28							25'				
	23	25'-26'6"	D	24	14	5	"		Yellow brown fine to coarse	7	18"	12"
	23								SAND, some silt, trace			
	30								cobbles			
	30											
10	36						Wet					
	31	30'-31'6"	D	15	23	36	very		at 30' some fine to coarse	8	18"	12"
	72						dense		gravel			
	98											
	85							34'				
	48											
	31	35'-36'6"	D	32	32	32			Pushing COBBLE	-	18"	0"
	38						Wet					
	75	36'6"-38'	D	25	13	17	very		Light gray brown SILT	9	18"	12"
	77						stiff					
10	63											

GROUND SURFACE TO 95' USED NX "CASING: THEN S/S to 97'

Sample Type
D=Dry C=Cored W=Washed
UP=Undisturbed Piston
TP=Test Pit A=Auger V=Vane Test
UT=Undisturbed Thinwall

Proportions Used
trace 0 to 10%
little 10 to 20%
some 20 to 35%
and 35 to 50%

140 lb Wt. x 30" fall on 2" O.D. Sampler

Cohesionless Density		Cohesive Consistency		
0-10	Loose	0-4	Soft	30+ Hard
10-30	Med. Dense	4-8	M/Stiff	
30-50	Dense	8-15	Stiff	
50+	Very Dense	15-30	V-Stiff	

SUMMARY:
Earth Boring 97'
Rock Coring
Samples 22

HOLE NO 1

American Drilling & Boring Co., Inc.

100 WATER STREET EAST PROVIDENCE, R. I.

SHEET 2 OF 3
DATE
HOLE NO. 1
LINE & STA.
OFFSET
SURF. ELEV.

TO Same as #1 | ADDRESS Same as #1
PROJECT NAME | LOCATION
REPORT SENT TO | PROJ. NO.
SAMPLES SENT TO | OUR JOB NO.

GROUND WATER OBSERVATIONS
At Same as #1 after ____ Hours
At ____ after ____ Hours

	CASING	SAMPLER	CORE BAR.
Type		Same as #1	
Size I.D.			
Hammer Wt.			BIT
Hammer Fall			

	Date	Time
START	Same as #1	a.m. p.m.
COMPLETE		a.m. p.m.
TOTAL HRS.		
BORING FOREMAN		
INSPECTOR		
SOILS ENGR.		

LOCATION OF BORING:

DEPTH	Casing Blows per foot	Sample Depths From – To	Type of Sample	Blows per 6" on Sampler From 0-6	To 6-12	To 12-18	Moisture Density or Consist.	Strata Change Elev.	SOIL IDENTIFICATION Remarks include color, gradation, Type of soil etc. Rock-color, type, condition, hardness, Drilling time, seams and etc.	SAMPLE No.	Pen	Rec.
	55	40'-41'6"	D	12	9	10	Wet very stiff		Light gray brown SILT	10	18"	12"
	60											
	100											
	77							44'				
	35						Wet medium dense		Brown fine to coarse SAND, trace silt & fine to medium gravel (running sand)			
	28	45'-47'	D	7	8	8				11	24"	12"
	37			9								
	39											
	48											
50	65							50'				
	52	50'-52'	D	60	40	38	Wet very dense		Brown fine to coarse SAND and gravel, trace silt (cobbles)	12	24"	6"
	90			52				53'				
	76								(Running Sand)			
	100						Wet dense		Gray fine to coarse SAND, some silt & fine to coarse gravel (cobbles)			
	117											
	72	55'-56'6"	D	20	22	23				13	18"	18"
	100											
	100											
	120											
60	95						Wet very dense					
	89	60'-62'	D	32	23	28				14	24"	12"
	109			23				62'				
	74						Wet dense		Blue gray fine to medium SAND, little silt, trace fine to coarse gravel (cobbles)			
	83											
	72											
	73	65'-67'	D	21	16	15				15	24"	6"
	73			19								
	86											
	130											
70	115						Wet very dense					
	60	70'-72'	D	15	20	28				16	24"	6"
	105			36								
	130											
	102											
	80											
	60	75'-76'6"	D	30	22	23	"	76'6"		-	18"	0"
	110	76'6"-77'6"	D	27	49		"			17	12"	6"
	172								Gray fine to coarse SAND, some fine to coarse gravel & silt (cobbles)			
	233											
80	125											

GROUND SURFACE TO ____ USED ____ "CASING: THEN ____

Sample Type
D=Dry C=Cored W=Washed
UP=Undisturbed Piston
TP=Test Pit A=Auger V=Vane Test
UT=Undisturbed Thinwall

Proportions Used
trace 0 to 10%
little 10 to 20%
some 20 to 35%
and 35 to 50%

140 lb Wt. x 30" fall on 2" O.D. Sampler

Cohesionless Density		Cohesive Consistency		
0-10	Loose	0-4	Soft	30 + Hard
10-30	Med. Dense	4-8	M/Stiff	
30-50	Dense	8-15	Stiff	
50 +	Very Dense	15-30	V-Stiff	

SUMMARY:
Earth Boring ____
Rock Coring ____
Samples ____

HOLE NO 1

American Drilling & Boring Co., Inc.

100 WATER STREET EAST PROVIDENCE, R. I.

SHEET 3 OF 3
DATE
HOLE NO. 1
LINE & STA.
OFFSET
SURF. ELEV.

TO Same as #1 | ADDRESS Same as #1
PROJECT NAME | LOCATION
PORT SENT TO | PROJ. NO.
SAMPLES SENT TO | OUR JOB NO.

GROUND WATER OBSERVATIONS
At Same as #1 after ____ Hours
____ after ____ Hours

	CASING	SAMPLER	CORE BAR.
Type		Same as #1	
Size I.D.			
Hammer Wt.			BIT
Hammer Fall			

	Date	Time
START	Same as #1	a.m. p.m.
COMPLETE		a.m. p.m.
TOTAL HRS.		
BORING FOREMAN		
INSPECTOR		
SOILS ENGR.		

LOCATION OF BORING:

DEPTH	Casing Blows per foot	Sample Depths From-To	Type of Sample	Blows per 6" on Sampler From 0-6	To 6-12	To 12-18	Moisture Density or Consist.	Strata Change Elev.	SOIL IDENTIFICATION Remarks include color, gradation, Type of soil etc. Rock-color, type, condition, hardness, Drilling time, seams and etc.	SAMPLE No.	Pen	Rec.
	73	80'-82'6"	D*	73	47	48	Wet		Blue gray TILL - fine to crs	18	30	12"
	103			44	30		V.dense		SAND, some silt & fine to			
	153								coarse gravel, trace cobbles			
	185	82'6"-84'	D	33	27	13	Wet		layers of sand	-	18"	0"
	160						dense					
	105	85'-87'	D	70	48	17	"			19	24"	12"
	154			21								
	148											
	113											
	185						Wet					
	112	90'-92'	D	29	26	26	very			20	24"	12"
	190			35			dense					
	270	92'-95'	D**	17						21	36"	-
	225			17								
	290			17				95'				
		95'-97'	D	20	21	23	Wet		Gray fine to coarse SAND,	22	18"	12"
				29			V.dense	97'	trace silt & F-C gravel			
									Bottom of boring 97'			

D* denotes used
140# wt on open end
A rod sampler

D** denotes used
300# wt on open end
A rod sampler

GROUND SURFACE TO ____ USED ____ "CASING: THEN ____

Sample Type
D=Dry C=Cored W=Washed
UP=Undisturbed Piston
TP=Test Pit A=Auger V=Vane Test
UT=Undisturbed Thinwall

Proportions Used
trace 0 to 10%
little 10 to 20%
some 20 to 35%
and 35 to 50%

140 lb Wt. x 30" fall on 2" O.D. Sampler

Cohesionless Density		Cohesive Consistency	
0-10	Loose	0-4	Soft
10-30	Med. Dense	4-8	M/Stiff
30-50	Dense	8-15	Stiff
50+	Very Dense	15-30	V-Stiff
		30+	Hard

SUMMARY:
Earth Boring ____
Rock Coring ____
Samples ____

HOLE NO. 1

American Drilling & Boring Co., Inc.

100 WATER STREET EAST PROVIDENCE, R. I.

SHEET 1 OF 2
DATE
HOLE NO. 3
LINE & STA.
OFFSET
SURF. ELEV.

TO Haley & Aldrich, Inc. | ADDRESS Cambridge, Mass.
PROJECT NAME Gas Tank Installation | LOCATION Providence, R.I.
PORT SENT TO above | PROJ. NO.
AMPLES SENT TO " | OUR JOB NO. 71-130

GROUND WATER OBSERVATIONS
At 9' after ½ Hours
15' Casing
after Hours

	Rods-"AW"	CASING	SAMPLER	CORE BAR.
Type			S/S	
Size I.D.		HW	1 3/8"	
Hammer Wt.		300#	140#	BIT
Hammer Fall		24"	30"	

	Date	Time
START	3/13/71	a.m. p.m.
COMPLETE	3/15/71	a.m. p.m.
TOTAL HRS.		
BORING FOREMAN	Peterson	
INSPECTOR		
SOILS ENGR.		

LOCATION OF BORING:

DEPTH	Casing Blows per foot	Sample Depths From – To	Type of Sample	Blows per 6" on Sampler From 0-6	To 6-12	To 12-18	Moisture Density or Consist.	Strata Change Elev.	SOIL IDENTIFICATION Remarks include color, gradation, Type of soil etc. Rock-color, type, condition, hardness, Drilling time, seams and etc.	SAMPLE No.	Pen	Rec.
	6	0'-1'6"	D	2	3	3	Dry loose		Brown fine SAND (FILL)	1	18"	12"
	10							2'				
	65						Dry very dense		Black COAL, fine sand some silt			
	85	3'-4'6"	D	35	40	15				2	18"	12"
	30											
	8	5'-6'	D	5	5		loose	6'		3	12"	6"
	120	6'-6'6"	D			100	V.dense	6'6"	CONCRETE	3A	6"	6"
	40											
	25											
	20						Wet loose		Black fine to medium SAND trace coal FILL			
	3	10'-11'6"	D	6	5	3				4	18"	12"
	3							12'				
	6	12'-15'	D	1	per ft		Wet soft		Gray ORGANIC SILT, trace peat	5	36"	24"
	6			2								
	10			3				15'				
	7	15'-16'6"	D	3	5	7	Wet medium dense		Gray fine to coarse SAND & organic silt	6	18"	12"
	9											
	10							18'				
	12											
	10								Gray brown fine to coarse SAND, little fine to coarse gravel, trace silt			
	16	20'-21'6"	D	3	6	10	"			7	18"	12"
	21											
	31							23'				
	41											
	55						Wet very dense		Gray brown fine to coarse SAND, some fine to coarse gravel, trace silt			
	30	25'-26'6"	D	29	21	31				8	18"	12"
	41											
	50											
	55											
	65						Wet medium dense					
	25	30'-32'	D	20	13	12				9	24"	18"
	32			12								
	45											
	60											
	45											
	22	35'-37'	D	8	10	16	Wet dense			10	24"	18"
	30			17								
	40											
	60											
	56											

GROUND SURFACE TO 55' USED HW "CASING: THEN o.e. rod to 56'6"

Sample Type
D=Dry C=Cored W=Washed
UP=Undisturbed Piston
TP=Test Pit A=Auger V=Vane Test
UT=Undisturbed Thinwall

Proportions Used
trace 0 to 10%
little 10 to 20%
some 20 to 35%
and 35 to 50%

140lb Wt. x 30" fall on 2" O.D. Sampler

Cohesionless Density		Cohesive Consistency	
0-10	Loose	0-4	Soft
10-30	Med. Dense	4-8	M/Stiff
30-50	Dense	8-15	Stiff
50+	Very Dense	15-30	V-Stiff
		30+	Hard

SUMMARY:
Earth Boring 56'6"
Rock Coring
Samples 15

HOLE NO 3

American Drilling & Boring Co., Inc.

100 WATER STREET EAST PROVIDENCE, R. I.

SHEET 2 OF 2
DATE
HOLE NO. 3
LINE & STA.
OFFSET
SURF. ELEV.

TO Same as #1 | ADDRESS Same as #1
PROJECT NAME | LOCATION
REPORT SENT TO | PROJ. NO.
SAMPLES SENT TO | OUR JOB NO.

GROUND WATER OBSERVATIONS
At Same as #1 after ____ Hours
____ after ____ Hours

	CASING	SAMPLER	CORE BAR.
Type		Same as #1	
Size I.D.			
Hammer Wt.			BIT
Hammer Fall			

	Date	Time
START	Same as #1	a.m. p.m.
COMPLETE		a.m. p.m.
TOTAL HRS.		

BORING FOREMAN
INSPECTOR
SOILS ENGR.

LOCATION OF BORING:

DEPTH	Casing Blows per foot	Sample Depths From-To	Type of Sample	Blows per 6" on Sampler From 0-6	To 6-12	To 12-18	Moisture Density or Consist.	Strata Change Elev.	SOIL IDENTIFICATION Remarks include color, gradation, Type of soil etc. Rock-color, type, condition, hardness, Drilling time, seams and etc.	SAMPLE No.	Pen	Rec.
	35	40'-42'	D	9	10	10	Wet		Gray brown fine to coarse	11	24"	18"
	47			11			medium		SAND, some fine to coarse			
	47						dense		gravel, trace silt			
	52											
	55											
	25	45'-47'	D	25	17	18	"			12	24"	4"
	55			17								
	46											
	60											
60	65						Wet					
	36	50'-51'6"	D	10	19	18	dense			13	18"	12"
	57											
	55							53'				
	78						Dry		Gray brown fine to coarse			
	90						very		SAND, some fine to medium			
		55'-56'6"	D**	21	27	20	dense	56.5'	gravel & silt TILL	14	18"	12"
									Bottom of boring 56.5'			
70												

D** denotes used
300# wt on open end
A rod sampler

GROUND SURFACE TO ____ USED ____ "CASING: THEN ____

Sample Type
D=Dry C=Cored W=Washed
UP=Undisturbed Piston
TP=Test Pit A=Auger V=Vane Test
UT=Undisturbed Thinwall

Proportions Used
trace 0 to 10%
little 10 to 20%
some 20 to 35%
and 35 to 50%

140 lb Wt. x 30" fall on 2" O.D. Sampler

Cohesionless Density		Cohesive Consistency		
0-10	Loose	0-4	Soft	30+ Hard
10-30	Med. Dense	4-8	M/Stiff	
30-50	Dense	8-15	Stiff	
50+	Very Dense	15-30	V-Stiff	

SUMMARY:
Earth Boring ____
Rock Coring ____
Samples ____

HOLE NO. 3

American Drilling & Boring Co., Inc.

100 WATER STREET EAST PROVIDENCE, R. I.

SHEET 1 OF 2
DATE
HOLE NO. 4
LINE & STA.
OFFSET
SURF. ELEV.

TO Haley & Aldrich, Inc. ADDRESS Cambridge, Mass.
PROJECT NAME Gas Tank Installation LOCATION Providence, R.I.
REPORT SENT TO above PROJ. NO.
SAMPLES SENT TO " OUR JOB NO. 71-130

GROUND WATER OBSERVATIONS
9' after 16 Hours
40' casing
____ after ____ Hours

	CASING	SAMPLER	CORE BAR.
Rods-"AW" Type		S/S	
Size I.D.	BX	1 3/8"	
Hammer Wt.	300#	140#	BIT
Hammer Fall	24"	30"	

	Date	Time
START	3/10/71	a.m. p.m.
COMPLETE	3/11/71	a.m. p.m.
TOTAL HRS.		
BORING FOREMAN	Peterson	
INSPECTOR	Debbie Huff	
SOILS ENGR.		

LOCATION OF BORING:

DEPTH	Casing Blows per foot	Sample Depths From-To	Type of Sample	Blows per 6" on Sampler From 0-6	To 6-12	To 12-18	Moisture Density or Consist.	Strata Change Elev.	SOIL IDENTIFICATION Remarks include color, gradation, Type of soil etc. Rock-color, type, condition, hardness, Drilling time, seams and etc.	SAMPLE No.	Pen	Rec.
	5	0'-2'	D	3	5	5	Dry medium dense		Gray brown fine to medium SAND, little silt & fine	1	18"	12"
	5			5				3'	to medium gravel			
	4											
	3											
	2						Wet loose		Gray brown fine to coarse			
	1	5'-7'	D	1	-	1			SAND, trace fine to medium	2	24"	6"
	1							7'	gravel & silt			
	1	7'-8'	D	7	35		Wet dense		Gray-blue fine to coarse	3	12"	12"
	19							9'	SAND, some F-C gravel Lit. Silt			
	300	9'-10'	D					10'	Wood & concrete	4	12"	-
	14	10'-12'	D	13	9	7	Wet medium dense		Gray fine to coarse SAND,	5	24"	12"
	23			9					some fine to coarse gravel			
	20								trace silt (oil odor noted)			
	25											
	29						Wet					
	15	15'-16'6"	D	15	16	17	dense		layers of dense gravel &	6	18"	12"
	30								cobbles			
	34											
	24											
	27						Wet					
	15	20'-21'6"	D	19	20	34	very dense			7	18"	6"
	30											
	28											
	35							24'				
	20						Wet		Brown SILT (varved), little			
	16	25'-26'6"	D	13	10	12	very stiff		fine sand in layers	8	24"	18"
	17			10								
	25											
	42											
30	60											
	5	30'-32'	D	12	14	18	"			9	24"	-
	6			10								
	7											
	9											
	9											
	7	35'-36'6"	D	6	12	14	"		Blue gray SILT	10	18"	18"
	8							37'6"				
	17											
	31	38'-39'6"	D	36	42	30	Wet V.dense	39'6"	Gray blue TILL - fine to coarse sand & silt	11	18"	4"
40	32								See following page			

GROUND SURFACE TO 50' USED BX "CASING: THEN S/S to 52'

Sample Type
D=Dry C=Cored W=Washed
UP=Undisturbed Piston
TP=Test Pit A=Auger V=Vane Test
UT=Undisturbed Thinwall

Proportions Used
trace 0 to 10%
little 10 to 20%
some 20 to 35%
and 35 to 50%

140lb Wt. x 30" fall on 2" O.D. Sampler

Cohesionless Density		Cohesive Consistency		
0-10	Loose	0-4	Soft	30+ Hard
10-30	Med. Dense	4-8	M/Stiff	
30-50	Dense	8-15	Stiff	
50+	Very Dense	15-30	V-Stiff	

SUMMARY:
Earth Boring 52'
Rock Coring
Samples 17

HOLE NO. 4

American Drilling & Boring Co., Inc.

100 WATER STREET EAST PROVIDENCE, R. I.

SHEET 2 OF 2
DATE
HOLE NO. 4
LINE & STA.
OFFSET
SURF. ELEV.

TO Same as #1 | ADDRESS Same as #1
PROJECT NAME | LOCATION
REPORT SENT TO | PROJ. NO.
SAMPLES SENT TO | OUR JOB NO. 71-130

GROUND WATER OBSERVATIONS
At Same as #1 after ____ Hours
____ after ____ Hours

	CASING	SAMPLER	CORE BAR.
Type		Same as #1	
Size I.D.			
Hammer Wt.			BIT
Hammer Fall			

	Date	Time
START	3/10/71	a.m. p.m.
COMPLETE	3/11/71	a.m. p.m.
TOTAL HRS.		
BORING FOREMAN	Peterson	
INSPECTOR	Dabbie Huff	
SOILS ENGR.		

LOCATION OF BORING:

DEPTH	Casing Blows per foot	Sample Depths From-To	Type of Sample	Blows per 6" on Sampler From 0-6	To 6-12	To 12-18	Moisture Density or Consist.	Strata Change Elev.	SOIL IDENTIFICATION Remarks include color, gradation, Type of soil etc. Rock-color, type, condition, hardness, Drilling time, seams and etc.	SAMPLE No.	Pen	Rec.
	33	40'-41'	D	15	14		Wet V.stiff	41'	Brown SILT & fine to coarse sand, some F-M gravel	12	12"	8"
	65	41'-41'6"	D			30	Wet dense		Brown fine SAND, some silt	12A	6"	4"
	67											
	47											
	46							45'				
	20	45'-46'6"	D	21	36	30	Wet V.Dense	47'	Brown F-C SAND, little F-M gravel & silt (running sand)	13	18"	-
	30											
	60	47'-48'6"	D	33	33	18	"		Dark brown fine to coarse SAND, some fine to coarse	14	18"	18"
	145											
	85	48'6"-50'	D	18	27	28	"		gravel, little silt	15	18"	18"
		50'-52'	D	40	50/20*		"		@ 48'6" becomes gray brown	16	18"	18"
					54	40		52'				
									Bottom of boring 52'			
55												

* indicates used 300# wt

GROUND SURFACE TO 50' USED BX "CASING: THEN S/S to 52'

Sample Type
D=Dry C=Cored W=Washed
UP=Undisturbed Piston
TP=Test Pit A=Auger V=Vane Test
UT=Undisturbed Thinwall

Proportions Used
trace 0 to 10%
little 10 to 20%
some 20 to 35%
and 35 to 50%

140lb Wt. x 30" fall on 2" O.D. Sampler

Cohesionless Density		Cohesive Consistency		
0-10	Loose	0-4	Soft	30+ Hard
10-30	Med. Dense	4-8	M/Stiff	
30-50	Dense	8-15	Stiff	
50+	Very Dense	15-30	V-Stiff	

SUMMARY:
Earth Boring 52'
Rock Coring ____
Samples 16

HOLE NO 4

American Drilling & Boring Co., Inc.

100 WATER STREET EAST PROVIDENCE, R. I.

SHEET 1 OF 1
DATE
HOLE NO. 4A
LINE & STA.
OFFSET
SURF. ELEV.

TO Haley & Aldrich, Inc. ADDRESS Cambridge, Mass.
PROJECT NAME Gas Tank Installation LOCATION Providence, R.I.
REPORT SENT TO above PROJ. NO.
SAMPLES SENT TO " OUR JOB NO. 71-130

GROUND WATER OBSERVATIONS
At 9' after ½ Hours
____ after ____ Hours

	CASING	SAMPLER	CORE BAR.
Rods-"AW" Type		3"Piston Tube	
Size I.D.	H		
Hammer Wt.	300#	300#	BIT
Hammer Fall	24"	6"	

	Date	Time
START	3/18/71	a.m. p.m.
COMPLETE	3/19/71	a.m. p.m.
TOTAL HRS.		

BORING FOREMAN Peterson
INSPECTOR
SOILS ENGR.

LOCATION OF BORING:

DEPTH	Casing Blows per foot	Sample Depths From-To	Type of Sample	Blows per 6" on Sampler From 0-6	To 6-12	To 12-18	Moisture Density or Consist.	Strata Change Elev.	SOIL IDENTIFICATION Remarks include color, gradation, Type of soil etc. Rock-color, type, condition, hardness, Drilling time, seams and etc.	SAMPLE No.	Pen	Rec.
								24'				
		25'-25'4"	PRESS						Yellow brown SILT			
		25'4"-26'6"	UP	20	20					UP1	14"	13"
		29'-30'6"	UP	20	14	16				UP2	18"	14½"
		33'-34'	UP	PRESS			Wet		Blue gray SILT	UP3	12"	10"
		34'-35'6"	D	7	8	10	V-stiff	35'6"		1	18"	12"
									Bottom of boring 35'6"			

GROUND SURFACE TO 24' USED H "CASING: THEN roller bit & S/S to 35'6"

Sample Type
D=Dry C=Cored W=Washed
UP=Undisturbed Piston
TP=Test Pit A=Auger V=Vane Test
UT=Undisturbed Thinwall

Proportions Used
trace 0 to 10%
little 10 to 20%
some 20 to 35%
and 35 to 50%

140 lb Wt. x 30" fall on 2" O.D. Sampler

Cohesionless Density		Cohesive Consistency		
0-10	Loose	0-4	Soft	30+ Hard
10-30	Med. Dense	4-8	M/Stiff	
30-50	Dense	8-15	Stiff	
50+	Very Dense	15-30	V-Stiff	

SUMMARY:
Earth Boring 35'6"
Rock Coring
Samples 1

HOLE NO. 4A

American Drilling & Boring Co., Inc.

100 WATER STREET EAST PROVIDENCE, R. I.

SHEET 1 OF 2

DATE

HOLE NO. 5

LINE & STA.

OFFSET

SURF. ELEV.

TO Haley & Aldrich, Inc. ADDRESS Cambridge, Mass.

PROJECT NAME Gas Tank Installation LOCATION Providence, R.I.

REPORT SENT TO above PROJ. NO.

SAMPLES SENT TO " OUR JOB NO. 71-130

GROUND WATER OBSERVATIONS

At 9'0" after Hours

after Hours

Rods-"AW"	CASING	SAMPLER	CORE BAR.
Type		S/S	
Size I.D.	BX	1 3/8"	
Hammer Wt.	300#	140#	BIT
Hammer Fall	24"	30"	

	Date	Time
START	3/11/71	a.m. p.m.
COMPLETE	3/11/71	a.m. p.m.

TOTAL HRS.

BORING FOREMAN Peterson

INSPECTOR Debbie Huff

SOILS ENGR.

LOCATION OF BORING:

DEPTH	Casing Blows per foot	Sample Depths From-To	Type of Sample	Blows per 6" on Sampler From-To 0-6	6-12	12-18	Moisture Density or Consist.	Strata Change Elev.	SOIL IDENTIFICATION Remarks include color, gradation, Type of soil etc. Rock-color, type, condition, hardness, Drilling time, seams and etc.	SAMPLE No.	Pen	Rec.
	5	0'-1'	D	4	13		wet M.dense	1'	Gray F-M SAND & gravel FILL	1	12"	8"
	10	1'-1'6"	D			23	Dry	1'6"	Black COAL FILL	1A	6"	6"
	21	1'6"-2'	D			24	M.dense		Yellow brown fine to medium SAND, trace fine to coarse gravel & silt FILL	1B	6"	6"
	20											
	20											
	9	5'-7'	D	12	12	12	"			2	24"	22"
	15			12				7.5'				
	18											
	15							9'	Brown fine SAND & gravel FILL			
0	13						Wet					
	3	10'-12'	D	6	6	6	medium		Brown fine to medium SAND, trace fine gravel & silt	3	24"	12"
	8			5			dense	12'				
	8											
	9											
	10											
	4	15'-17'	D	4	3	4	Wet		Brown fine SAND, little silt, trace coarse sand	4	24"	12"
	6			4			loose					
	9											
	9							19'				
0	14						Wet		Gray brown fine to coarse SAND, lit. F-M gravel, T/silt	5	18"	14"
	5	20'-21'6"	D	5	8	9	M.dense	21'6"		5A	6"	3"
	7	21'6"-22'	D	8					Brown fine to coarse SAND some fine to coarse gravel trace silt & cobbles			
	19											
	36											
	55						Wet					
	17	25'-27'	D	13	9	9	medium			6	24"	12"
	16			9			dense					
	20											
	58											
0	42											
	17	30'-32'	D	17	20	23	Wet			7	24"	18"
	40			25			dense					
	75											
	50											
	54											
	31	35'-37'	D	20	22	18	"			8	24"	18"
	41			30				37'				
	110											
	230								Brown SILT W/layers of fine to coarse sand, trace fine gravel			
	100											

GROUND SURFACE TO 50' USED BX "CASING: THEN S/S to 52'

Sample Type
D=Dry C=Cored W=Washed
UP=Undisturbed Piston
TP=Test Pit A=Auger V=Vane Test
UT=Undisturbed Thinwall

Proportions Used
trace 0 to 10%
little 10 to 20%
some 20 to 35%
and 35 to 50%

140lb Wt. x 30" fall on 2" O.D. Sampler

Cohesionless Density		Cohesive Consistency	
0-10	Loose	0-4	Soft
10-30	Med. Dense	4-8	M/Stiff
30-50	Dense	8-15	Stiff
50+	Very Dense	15-30	V. Stiff

30+ Hard

SUMMARY:
Earth Boring 52'
Rock Coring
Samples 15

HOLE NO. 5

American Drilling & Boring Co., Inc.

100 WATER STREET EAST PROVIDENCE, R. I.

SHEET 2 OF 2

TO Same as #1 | ADDRESS Same as #1

PROJECT NAME | LOCATION

PORT SENT TO | PROJ. NO.

SAMPLES SENT TO | OUR JOB NO.

DATE

HOLE NO. 5

LINE & STA.

OFFSET

SURF. ELEV.

GROUND WATER OBSERVATIONS

At Same as #1 after Hours

At after Hours

	CASING	SAMPLER	CORE BAR.
Type	Same as #1		
Size I.D.			
Hammer Wt.			BIT
Hammer Fall			

	Date	Time
START	Same as #1	a.m. p.m.
COMPLETE		a.m. p.m.
TOTAL HRS.		

BORING FOREMAN

INSPECTOR

SOILS ENGR.

LOCATION OF BORING:

DEPTH	Casing Blows per foot	Sample Depths From – To	Type of Sample	Blows per 6" on Sampler From 0-6	To 6-12	To 12-18	Moisture Density or Consist.	Strata Change Elev.	SOIL IDENTIFICATION Remarks include color, gradation, Type of soil etc. Rock-color, type, condition, hardness, Drilling time, seams and etc.	SAMPLE No.	Pen	Rec.
	:56	40'-42.5'	D	48	45	38	Wet V.Hard	42.5'	Brown SILT W/layers of fine to crs. sd. trace fine grave	9	30"	-
	63			40	36							
	159											
	339	43'-45'	D**	110	per ft.		Wet very dense	45'	Blue-gray DECOMPOSED BOULDER TILL	10	24"	-
	130			84								
	74	45'-47'	D	24	41	43			Brown fine to coarse SAND & fine to coarse gravel, some silt, trace cobbles	11	24"	16"
	170			48								
	259											
	243											
50	161											
		50'-52'	D	35	39	43	"			12	24"	12"
				41				52'				
									Bottom of boring 52'			
55												
			D** denotes used 300# wt on open end A rod sampler									

GROUND SURFACE TO USED "CASING: THEN

Sample Type
D=Dry C=Cored W=Washed
UP=Undisturbed Piston
TP=Test Pit A=Auger V=Vane Test
UT=Undisturbed Thinwall

Proportions Used
trace 0 to 10%
little 10 to 20%
some 20 to 35%
and 35 to 50%

140lb Wt. x 30" fall on 2" O.D. Sampler

Cohesionless Density		Cohesive Consistency	
0-10	Loose	0-4	Soft
10-30	Med. Dense	4-8	M/Stiff
30-50	Dense	8-15	Stiff
50+	Very Dense	15-30	V. Stiff
		30+	Hard

SUMMARY:
Earth Boring
Rock Coring
Samples

HOLE NO. 5

American Drilling & Boring Co., Inc.

100 WATER STREET EAST PROVIDENCE, R. I.

SHEET 1 OF 2
DATE
HOLE NO. 8
LINE & STA.
OFFSET
SURF. ELEV.

TO Haley & Aldrich, Inc. ADDRESS Cambridge, Mass.
PROJECT NAME Gas Tank Installation LOCATION Providence, R.I.
REPORT SENT TO above PROJ. NO.
SAMPLES SENT TO " OUR JOB NO. 71-130

GROUND WATER OBSERVATIONS
At 9'6" after ½ Hours
60' Casing
At 8'6" after ½ Hours
No Casing

	CASING	SAMPLER	CORE BAR.
Rods-"AW" Type		S/S	
Size I.D.	HW	1 3/8"	
Hammer Wt.	300#	140#	BIT
Hammer Fall	24"	30"	

	Date	Time
START	3/22/71	a.m. p.m.
COMPLETE	3/23/71	a.m. p.m.
TOTAL HRS.		
BORING FOREMAN	Peterson	
INSPECTOR		
SOILS ENGR.		

LOCATION OF BORING:

DEPTH	Casing Blows per foot	Sample Depths From-To	Type of Sample	Blows per 6" on Sampler From-To 0-6	6-12	12-18	Moisture Density or Consist.	Strata Change Elev.	SOIL IDENTIFICATION Remarks include color, gradation, Type of soil etc. Rock-color, type, condition, hardness, Drilling time, seams and etc.	SAMPLE No.	Pen	Rec.
	5	0'-1'6"	D	3	3	3	Dry loose		Black ashes, coal, bricks concrete, sand & gravel (fill)	1	18"	12"
	3											
	2											
	1											
	2											
	1	5'-6'6"	D	3	2	1	"			2	18"	6"
	-							7'				
	-											
	-											
0	-						Wet loose		Gray brown fine to coarse SAND, some fine to coarse gravel, little silt (oil odor)			
	1	10'-11'6"	D	3	3	4				3	18"	12"
	6											
	13											
	21											
	25						Wet medium dense					
	6	15'-16'6"	D	7	4	9				4	18"	12"
	6											
	29											
	30											
0	15											
	1	20'-22'	D	13	9	8	"		Running up casing 18"	5	24"	6"
	15			10								
	14											
	14											
	14											
	1	25'-27'	D	10	20	10	"			6	24"	6"
	16			10								
	20											
	30											
D	27											
	6	30'-32'	D	10	7	7	"			7	24"	18"
	17			8								
	25							33'				
	36											
	44						Wet very stiff		Gray brown SILT, some fine to coarse sand, trace fine gravel			
	8	35'-37'	D	16	12	10				-	24"	0"
	6			10								
	16	37'-39'	D	9	10	14	"			8	24"	10"
	26			17								
40	39											

GROUND SURFACE TO 60' USED HW "CASING: THEN S/S to 62'

Sample Type
D=Dry C=Cored W=Washed
UP=Undisturbed Piston
TP=Test Pit A=Auger V=Vane Test
UT=Undisturbed Thinwall

Proportions Used
trace 0 to 10%
little 10 to 20%
some 20 to 35%
and 35 to 50%

140 lb Wt. x 30" fall on 2" O.D. Sampler

Cohesionless Density		Cohesive Consistency	
0-10	Loose	0-4	Soft
10-30	Med. Dense	4-8	M/Stiff
30-50	Dense	8-15	Stiff
50+	Very Dense	15-30	V-Stiff
		30+	Hard

SUMMARY:
Earth Boring 62'
Rock Coring
Samples 14

HOLE NO. 8

American Drilling & Boring Co., Inc.

100 WATER STREET EAST PROVIDENCE, R. I.

SHEET 2 OF 2
DATE
HOLE NO. 8
LINE & STA.
OFFSET
SURF. ELEV.

TO Same as #1 | ADDRESS Same as #1
PROJECT NAME | LOCATION
REPORT SENT TO | PROJ. NO.
SAMPLES SENT TO | OUR JOB NO.

GROUND WATER OBSERVATIONS
At Same as #1 after ____ Hours
At ____ after ____ Hours

	CASING	SAMPLER	CORE BAR.
Type		Same as #1	
Size I.D.			
Hammer Wt.			BIT
Hammer Fall			

	Date	Time
START	Same as #1	a.m. p.m.
COMPLETE		a.m. p.m.
TOTAL HRS.		
BORING FOREMAN		
INSPECTOR		
SOILS ENGR.		

LOCATION OF BORING:

DEPTH	Casing Blows per foot	Sample Depths From-To	Type of Sample	Blows per 6" on Sampler From 0-6	To 6-12	To 12-18	Moisture Density or Consist.	Strata Change Elev.	SOIL IDENTIFICATION Remarks include color, gradation, Type of soil etc. Rock-color, type, condition, hardness, Drilling time, seams and etc.	SAMPLE No.	Pen	Rec.
	13	40'-42'	D	18	19	12	Wet		Yellow brown SILT & fine to	9	24"	12"
	16			22			dense		coarse sand, trace gravel			
	36											
	30											
	23						Wet		Running sand 42"			
	7	45'-47'	D	5	7	12	medium		layers of silty sand	-	24"	0"
	10			14			dense					
	12	47'-49'	D	9	per	ft.	Wet			10	24"	24"
	15	(5' spoon)		21			very	49'				
0	14	49'-50'	D	65			dense		Brown F-M silty SAND & fine	11	12"	12"
	20	50'-52'	D	19	21	9	Wet	50'	to crs. gravel (Shale Frags)	12	24"	12"
	21			9			M.dense					
	23											
	37											
	32						Wet		Brown fine to coarse SAND,			
	12	55'-57'	D	19	21	35	very		some fine to coarse gravel	13	24"	18"
	37			35			dense		trace silt			
	47											
	48											
0	48											
		60'-62'	D	31	26	39	"			14	24"	10"
				19				62'				
									Bottom of boring 62'			
65												

GROUND SURFACE TO ____ USED ____ "CASING: THEN ____

Sample Type
D=Dry C=Cored W=Washed
UP=Undisturbed Piston
TP=Test Pit A=Auger V=Vane Test
UT=Undisturbed Thinwall

Proportions Used
trace 0 to 10%
little 10 to 20%
some 20 to 35%
and 35 to 50%

140 lb Wt. x 30" fall on 2" O.D. Sampler

Cohesionless Density		Cohesive Consistency	
0-10	Loose	0-4	Soft
10-30	Med. Dense	4-8	M/Stiff
30-50	Dense	8-15	Stiff
50+	Very Dense	15-30	V-Stiff
		30+	Hard

SUMMARY:
Earth Boring ____
Rock Coring ____
Samples ____

HOLE NO. 8

American Drilling & Boring Co., Inc.

100 WATER STREET EAST PROVIDENCE, R. I.

SHEET 1 OF 2
DATE
HOLE NO. 9
LINE & STA.
OFFSET
SURF. ELEV.

TO Haley & Aldrich, Inc. ADDRESS Cambridge, Mass.
PROJECT NAME Gas Tank Installation LOCATION Providence, R.I.
REPORT SENT TO above
SAMPLES SENT TO " PROJ. NO.
OUR JOB NO. 71-130

GROUND WATER OBSERVATIONS
At 8'0" after 16 Hours
50' casing
At _____ after _____ Hours

	CASING	SAMPLER	CORE BAR.
Type	Rods-"AW"	S/S	
Size I.D.	HW	1 3/8"	
Hammer Wt.	300#	140#	BIT
Hammer Fall	24"	30"	

	Date	Time
START	3/24/71	a.m. p.m.
COMPLETE	3/25/71	a.m. p.m.
TOTAL HRS.		

BORING FOREMAN E. Peterson
INSPECTOR Debbie Huff
SOILS ENGR.

LOCATION OF BORING:

DEPTH	Casing Blows per foot	Sample Depths From-To	Type of Sample	Blows per 6" on Sampler From 0-6	To 6-12	To 12-18	Moisture Density or Consist.	Strata Change Elev.	SOIL IDENTIFICATION Remarks include color, gradation, Type of soil etc. Rock-color, type, condition, hardness, Drilling time, seams and etc.	SAMPLE No.	Pen	Rec.
	2	0'-1'	D	2	9		Dry	1'	Brown F-M SAND & cindersFILL	1	12"	12"
	7	1'-2'	D	13	10		medium dense		Yellow brown fine to coarse SAND, some fine to coarse gravel, trace silt FILL	1A	12"	12"
	27											
	26											
	15											
	18	5'-7'	D	10	6	7	"			2	24"	24"
	26			12								
	32											
	46											
	50						Wet					
	20	10'-12'	D	14	16	13	medium dense			3	24"	18"
	25			12								
	21											
	18							14'				
	14						Wet		Yellow brown fine to medium			
	11	15'-17'	D	5	3	1	loose		SAND, some silt, trace fine gravel (fibers)	4	24"	18"
	13			3								
	17											
	21											
	20							20'				
	12	20'-22'	D	4	4	6	"		Yellow brown fine to medium SAND, trace silt	5	24"	18"
	14			4								
	17											
	20							24'				
	22						Wet					
	19	25'-27'	D	29	19	15	medium dense		Yellow-brown fine to coarse SAND, little fine to coarse gravel, trace silt & cobbles	6	24"	18"
	62			12								
	48											
	50											
	55						Wet					
	20	30'-32'	D	21	22	25	dense			7	24"	18"
	95			23								
	53											
	33							34'				
	27						Wet		Yellow-brown fine to medium			
	13	35'-37'	D	11	9	6	medium dense		SAND, trace silt & mica	8	24"	18"
	20			8								
	33											
	30											
	25											

GROUND SURFACE TO 50' USED HW "CASING: THEN S/S to 52'

Sample Type
D=Dry C=Cored W=Washed
UP=Undisturbed Piston
TP=Test Pit A=Auger V=Vane Test
UT=Undisturbed Thinwall

Proportions Used
trace 0 to 10%
little 10 to 20%
some 20 to 35%
and 35 to 50%

140 lb Wt. x 30" fall on 2" O.D. Sampler

Cohesionless Density		Cohesive Consistency	
0-10	Loose	0-4	Soft
10-30	Med. Dense	4-8	M/Stiff
30-50	Dense	8-15	Stiff
50+	Very Dense	15-30	V-Stiff
		30+	Hard

SUMMARY:
Earth Boring 52'
Rock Coring
Samples 12

HOLE NO 9

American Drilling & Boring Co., Inc.

100 WATER STREET EAST PROVIDENCE, R. I.

SHEET 2 OF 2
DATE
HOLE NO. 9
LINE & STA.
OFFSET
SURF. ELEV.

TO Same as #1
ADDRESS Same as #1
PROJECT NAME
LOCATION
PORT SENT TO
PROJ. NO.
MPLES SENT TO
OUR JOB NO.

GROUND WATER OBSERVATIONS

At Same as #1 after ____ Hours

at ____ after ____ Hours

	CASING	SAMPLER	CORE BAR.
Type		Same as #1	
Size I.D.			
Hammer Wt.			BIT
Hammer Fall			

	Date	Time	
START	Same as #1		a.m. p.m.
COMPLETE			a.m. p.m.
TOTAL HRS.			

BORING FOREMAN
INSPECTOR
SOILS ENGR.

LOCATION OF BORING:

DEPTH	Casing Blows per foot	Sample Depths From – To	Type of Sample	Blows per 6" on Sampler From 0-6	To 6-12	To 12-18	Moisture Density or Consist.	Strata Change Elev.	SOIL IDENTIFICATION Remarks include color, gradation, Type of soil etc. Rock-color, type, condition, hardness, Drilling time, seams and etc.	SAMPLE No.	Pen	Rec.
	30	40'-42'	D	6	8	11	Wet		Yellow-brown fine to medium	9	24"	24"
	33			18			medium	42'	SAND, trace silt			
	80						dense					
	80											
	100						Wet		Yellow-brown fine to coarse			
	26	45'-47'	D	45	32	18	dense		SAND, some fine to coarse	10	24"	24"
	43			15					gravel, trace silt & cobbles			
	39											
	45											
9	52						Wet					
		50'-52'	D	21	25	23	very			11	24"	18"
				31			dense	52'				
									Bottom of boring 52'			
55												

GROUND SURFACE TO ____ USED ____ "CASING: THEN ____

Sample Type
D=Dry C=Cored W=Washed
UP=Undisturbed Piston
TP=Test Pit A=Auger V=Vane Test
UT=Undisturbed Thinwall

Proportions Used
trace 0 to 10%
little 10 to 20%
some 20 to 35%
and 35 to 50%

140 lb Wt. x 30" fall on 2" O.D. Sampler

Cohesionless Density		Cohesive Consistency	
0-10	Loose	0-4	Soft
10-30	Med. Dense	4-8	M/Stiff
30-50	Dense	8-15	Stiff
50+	Very Dense	15-30	V-Stiff
		30+	Hard

SUMMARY:
Earth Boring
Rock Coring
Samples

HOLE NO. 9

American Drilling & Boring Co., Inc.

100 WATER STREET EAST PROVIDENCE, R. I.

SHEET 1 OF 3

DATE

HOLE NO. B-29

LINE & STA.

OFFSET

SUR. ELEV. 11.00

TO Providence Gas Co.-Haley & Aldrich ADDRESS Cambridge, Mass.

PROJECT NAME Tank Site LOCATION Providence, R.I.

REPORT SENT TO above PROJ. NO.

SAMPLES SENT TO " OUR JOB NO. 71-297

GROUND WATER OBSERVATIONS

At 13'4" after ½ Hours

At ____ after ____ Hours

	Rods-"AW"	CASING	SAMPLER	CORE BAR.
Type			S/S	
Size I.D.		DW	1 3/8"	
Hammer Wt.		300#	140#	BIT
Hammer Fall		24"	30"	

	Date	Time
START	7/13/71	a.m. p.m.
COMPLETE	7/15/71	a.m. p.m.

TOTAL HRS.

BORING FOREMAN D. Purcell

INSPECTOR

SOILS ENGR.

LOCATION OF BORING:

DEPTH	Casing Blows per foot	Sample Depths From – To	Type of Sample	Blows per 6" on Sampler From 0-6	To 6-12	To 12-18	Moisture Density or Consist.	Strata Change Elev.	SOIL IDENTIFICATION Remarks include color, gradation, Type of soil etc. Rock-color, type, condition, hardness, Drilling time, seams and etc.	SAMPLE No.	Pen.	Rec.
	2	0'-2'	D	2	7	27	Dry very dense		Gray-brown fine SAND, some fine to medium gravel FILL	1	24"	24
	13			10								
	12											
	15											
	14											
	12	5'-7'	D	17	22	5	Dry loose		Gray-brown fine SAND, some fine to medium gravel - black coal & ash FILL	2	24"	24
	9			3								
	17											
	5											
10	6											
	3						Wet medium dense					
	3											
	5	12'-13'	D	[illegible]	13			13'7"		3	12"	1
								15'1"	Cored CONCRETE - FILL			
	1						Wet very stiff					
	6	15'-16'	D	10	13	10			Brown SILT, some fine sand	4	24"	24
	14			12								
	13											
20	[illegible]						Wet medium dense					
	12	20'-22'	D	15	13	9			Brown fine to medium SAND & silt	5	24"	24
	19			11								
	16											
	23											
	24											
	8	25'-27'	D	7	9	9	"			6	24"	24
	15			10								
	23											
	20							29'				
30	[illegible]						Wet dense		Gray fine to coarse SAND, little fine to medium gravel, little silt	7	24"	24
	15	30'-32'	D	13	22	22						
	22			21								
	28											
	35							34'6"				
	[illegible]						"					
	19	35'-37'	D	15	18	16			Gray medium to coarse SAND, trace fine gravel & silt	8	24"	24
	21			14				37'				
	33								Gray medium SAND, trace fine gravel, trace silt (running)			
	38											
40	42											

GROUND SURFACE TO 97' USED DW "CASING: THEN S/S to 97'

Sample Type
D=Dry C=Cored W=Washed
UP=Undisturbed Piston
TP=Test Pit A=Auger V=Vane Test
UT=Undisturbed Thinwall

Proportions Used
trace 0 to 10%
little 10 to 20%
some 20 to 35%
and 35 to 50%

140 lb Wt. x 30" fall on 2" O.D. Sampler

Cohesionless Density		Cohesive Consistency	
0-10	Loose	0-4	Soft
10-30	Med. Dense	4-8	M/Stiff
30-50	Dense	8-15	Stiff
50+	Very Dense	15-30	V-Stiff
		30+	Hard

SUMMARY:
Earth Boring 97'
Rock Coring
Samples 33

HOLE NO. B-29

TOWN PRESS – EAST PROV.

American Drilling & Boring Co., Inc.

100 WATER STREET EAST PROVIDENCE, R. I.

SHEET 2 OF 3

TO Same as #1 | ADDRESS Same as #1 | DATE

PROJECT NAME | LOCATION | HOLE NO. B-29

REPORT SENT TO | PROJ. NO. | LINE & STA.

SAMPLES SENT TO | OUR JOB NO. | OFFSET

SURF. ELEV.

GROUND WATER OBSERVATIONS	CASING	SAMPLER	CORE BAR	Date	Time
At Same as #1 after ____ Hours	Type)	Same as #1		START Same as #1	a.m. p.m.
At ____ after ____ Hours	Size I.D.			COMPLETE	a.m. p.m.
	Hammer Wt.		BIT	TOTAL HRS.	
	Hammer Fall			BORING FOREMAN	
				INSPECTOR	
				SOILS ENGR.	

LOCATION OF BORING:

DEPTH	Casing Blows per foot	Sample Depths From - To	Type of Sample	Blows per 6" on Sampler From 0-6	To 6-12	To 12-18	Moisture Density or Consist.	Strata Change Elev.	SOIL IDENTIFICATION Remarks include color, gradation, Type of soil etc. Rock-color, type, condition, hardness, Drilling time, seams and etc.	SAMPLE No.	Pen	Rec.
	15	42'-42'	D	15	26	37	Moist very dense	42'	Gray medium SAND, trace fine gravel & silt (running)	D	24"	24"
	26			33								
	50											
	70											
	100											
	29	46'-47'	D	22	37	33	"		Gray fine to coarse SAND & gravel, little silt	10	24"	9"
	47			37								
	53							53'6"				
	69											
50	81											
	37	50'-52'	D	12	24	38	"		Gray fine to coarse running SAND, trace silt	11	24"	24"
	46			32								
	53											
	55											
	65											
	39	55'-57'	D	7	19	34	"			12	24"	24"
	42			46								
	67											
	89											
	94							63'				
60	84	60'-62'	D	9	23	36	"		Gray medium running SAND, trace silt	13	24"	24"
	65			33								
	84											
	107											
	75	65'-67'	D	6	13	27	"			14	24"	24"
	60			33								
	93											
	97											
70	112											
	100	70'-72'	D	2	20	49				15	24"	22"
	84			41								
	86											
	93											
	92											
	56	75'-77'	D	3	15	33	"			16	24"	24"
	71			37								
	89											
	95											
80	117											

GROUND SURFACE TO ____ USED ____ "CASING: THEN ____

Sample Type
D=Dry C=Cored W=Washed
UP=Undisturbed Piston
TP=Test Pit A=Auger V=Vane Test
UT=Undisturbed Thinwall

Proportions Used
trace 0 to 10%
little 10 to 20%
some 20 to 35%
and 35 to 50%

140 lb Wt. x 30" fall on 2" O.D. Sampler

Cohesionless Density		Cohesive Consistency	
0-10	Loose	0-4	Soft
10-30	Med. Dense	4-8	M/Stiff
30-50	Dense	8-15	Stiff
50+	Very Dense	15-30	V-Stiff
		30+	Hard

SUMMARY:
Earth Boring ____
Rock Coring ____
Samples ____

HOLE NO. B-29

TOWN PRESS — EAST PROV.

American Drilling & Boring Co., Inc.

100 WATER STREET EAST PROVIDENCE, R. I.

SHEET 3 OF 3

TO same as #1 | ADDRESS same as #1

PROJECT NAME | LOCATION

REPORT SENT TO | PROJ. NO.

SAMPLES SENT TO | OUR JOB NO.

DATE

HOLE NO. B-29

LINE & STA.

OFFSET

SURF. ELEV.

GROUND WATER OBSERVATIONS

At same as #1 after ____ Hours

At ____ after ____ Hours

	CASING	SAMPLER	CORE BAR.
Type	same as #1		
Size I.D.			
Hammer Wt.			BIT
Hammer Fall			

	Date	Time
START	same as #1	a.m. p.m.
COMPLETE		a.m. p.m.
TOTAL HRS.		
BORING FOREMAN		
INSPECTOR		
SOILS ENGR.		

LOCATION OF BORING:

DEPTH	Casing Blows per foot	Sample Depths From – To	Type of Sample	Blows per 6" on Sampler From 0-6	To 6-12	To 12-18	Moisture Density or Consist.	Strata Change Elev.	SOIL IDENTIFICATION Remarks include color, gradation, Type of soil etc. Rock-color, type, condition, hardness, Drilling time, seams and etc.	SAMPLE No.	Pen	Rec
	50	82'-82'	D	6	21	36	Moist very dense		Gray fine to medium SAND Note: sand running up casing 10' at 90'	17	24"	24
	50			36								
	100											
	100											
	100											
	50	85'-87'	D	21	15	27	"			18	24"	24
	50			42								
	100											
	100											
90	100											
	100											
	100	92'-93'	D	14	12	14	Moist medium dense			19	24"	24
	100			26								
	100											
		93'-97'	D	21	27	36	Moist very dense			20	24"	24
				63				97'				
									Bottom of boring 97'			
100												

GROUND SURFACE TO ____ USED ____ "CASING: THEN ____

Sample Type
D=Dry C=Cored W=Washed
UP=Undisturbed Piston
TP=Test Pit A=Auger V=Vane Test
UT=Undisturbed Thinwall

Proportions Used
trace 0 to 10%
little 10 to 20%
some 20 to 35%
and 35 to 50%

140 lb Wt. x 30" fall on 2" O.D. Sampler

Cohesionless Density		Cohesive Consistency	
0-10	Loose	0-4	Soft
10-30	Med. Dense	4-8	M/Stiff
30-50	Dense	8-15	Stiff
50+	Very Dense	15-30	V-Stiff
		30+	Hard

SUMMARY:
Earth Boring ____
Rock Coring ____
Samples ____

HOLE NO. B-29

TOWN PRESS – EAST PROV.

American Drilling & Boring Co., Inc.

100 WATER STREET EAST PROVIDENCE, R I

SHEET 1 OF 2

TO Providence Gas Co.-Haley &Aldrich ADDRESS Cambridge, Mass.

PROJECT NAME Tank Site LOCATION Providence, R.I.

REPORT SENT TO above PROJ. NO.

SAMPLES SENT TO " OUR JOB NO. 71-297

DATE

HOLE NO. B-30

LINE & STA.

OFFSET

SURF. ELEV. 11.50

GROUND WATER OBSERVATIONS

At 11'10" after 20 ~~min.~~ ~~XXX~~

At _____ after _____ Hours

	CASING	SAMPLER	CORE BAR
Type	Rods-"AW"	S/S	
Size I.D.	2½"	1 3/8"	
Hammer Wt.	300#	140#	BIT
Hammer Fall	24"	30"	

	Date	Time
START	7/16/71	a.m. p.m.
COMPLETE	7/20/71	a.m. p.m.

TOTAL HRS.

BORING FOREMAN C. Lenling

INSPECTOR

SOILS ENGR.

LOCATION OF BORING:

DEPTH	Casing Blows per foot	Sample Depths From – To	Type of Sample	Blows per 6" on Sampler From 0-6	To 6-12	To 12-18	Moisture Density or Consist.	Strata Change Elev.	SOIL IDENTIFICATION Remarks include color, gradation, Type of soil etc. Rock-color, type, condition, hardness, Drilling time, seams and etc.	SAMPLE No.	Pen.	Rec.
	3	0'-2'	D	2	7	12	Moist		6" Brown fine SAND to black	1	24"	15'
	10			15			medium		fine SAND, little silt,			
	16						dense		trace coarse gravel FILL			
	26											
	37							5'				
	17	5'-7'	D	16	15	14	"		Gray-brown fine to coarse	2	24"	12'
	25			16					SAND, trace silt & coarse			
	27								to fine gravel, trace cement			
	24											
10	20							10'				
	11	10'-12'	D	9	13	10	wet		Gray-brown fine to coarse	3	24"	14'
	8			12			medium		SAND, little silt, little			
	26						dense		fine to medium gravel			
	31											
	33							15'				
	15	15'-17'	D	18	24	22	Wet		Brown SILT, little fine	4	24"	12'
	24			24			hard		sand			
	29											
	22											
20	20											
	19	20'-22'	D	12	18	23	Wet		Brown SILT (varved) & fine	5	24"	12'
	25			26			very		sand layers			
	33						dense					
	42											
	47											
	23	25'-27'	D	20	26	31	"			6	24"	13'
	34			37								
	42											
	50											
30	60											
	32	30'-32'	D	10	21	20	"			7	24"	8"
	47			32								
	73											
	85											
	96											
	38	35'-37'	D	12	32	36	"			8	24"	12'
	63			39								
	94											
	127											
40	198											

GROUND SURFACE TO 50' USED 2½ "CASING: THEN S/S to 59'

Sample Type
D=Dry C=Cored W=Washed
UP=Undisturbed Piston
TP=Test Pit A=Auger V=Vane Test
UT=Undisturbed Thinwall

Proportions Used
trace 0 to 10%
little 10 to 20%
some 20 to 35%
and 35 to 50%

140 lb Wt. x 30" fall on 2" O.D. Sampler

Cohesionless Density		Cohesive Consistency	
0-10	Loose	0-4	Soft
10-30	Med. Dense	4-8	M/Stiff
30-50	Dense	8-15	Stiff
50+	Very Dense	15-30	V. Stiff

30+ Hard

SUMMARY:
Earth Boring 59'
Rock Coring
Samples 13

HOLE NO. B-30

TOWN PRESS – EAST PROV.

American Drilling & Boring Co., Inc.

100 WATER STREET EAST PROVIDENCE, R. I.

SHEET 2 OF 2

TO same as #1 | ADDRESS same as #1

PROJECT NAME | LOCATION

REPORT SENT TO | PROJ. NO.

SAMPLES SENT TO | OUR JOB NO.

DATE

HOLE NO. B-30

LINE & STA.

OFFSET

SURF. ELEV. 11.50

GROUND WATER OBSERVATIONS

At same as #1 after ____ Hours

At ____ after ____ Hours

	CASING	SAMPLER	CORE BAR.
Type	same as #1		
Size I.D.			
Hammer Wt.			BIT
Hammer Fall			

	Date	Time
START	Same as #1	a.m. p.m.
COMPLETE		
TOTAL HRS.		
BORING FOREMAN		
INSPECTOR		
SOILS ENGR.		

LOCATION OF BORING:

DEPTH	Casing Blows per foot	Sample Depths From - To	Type of Sample	Blows per 6" on Sampler From 0-6	To 6-12	To 12-18	Moisture Density or Consist.	Strata Change Elev.	SOIL IDENTIFICATION Remarks include color, gradation, Type of soil etc. Rock-color, type, condition, hardness, Drilling time, seams and etc.	SAMPLE No.	Pen	Rec.
	54	40'-42'	D	16	28	36	Moist very dense		Brown SILT, little fine sand layers	9	24"	13"
	99			42								
	167											
	230											
	79											
	48	45'-46'6"	D	10	27	33	"			-	18"	0"
	76											
	130	46'6"-48'6"	D	16	34	51	"			10	24"	15
	226			74								
50	276											
		50'-52'	D	22	42	56	"			11	24"	12
				101								
								54'				
		55'-57'	D	14	51	58	"		Gray-brown fine to coarse SAND, some silt & fine to coarse gravel	12	24"	13
				109								
		57'-59'	D**	62	84	89	"			13	24"	-
				111				59'				
60									Bottom of boring 59'			
			D** denotes used 300# wt on open end AW rod sampler									

GROUND SURFACE TO ____ USED ____ "CASING: THEN ____

Sample Type
D=Dry C=Cored W=Washed
UP=Undisturbed Piston
TP=Test Pit A=Auger V=Vane Test
UT=Undisturbed Thinwall

Proportions Used
trace 0 to 10%
little 10 to 20%
some 20 to 35%
and 35 to 50%

140 lb Wt. x 30" fall on 2" O.D. Sampler

Cohesionless Density		Cohesive Consistency	
0-10	Loose	0-4	Soft
10-30	Med. Dense	4-8	M/Stiff
30-50	Dense	8-15	Stiff
50+	Very Dense	15-30	V-Stiff
		30+	Hard

SUMMARY:
Earth Boring ____
Rock Coring ____
Samples ____

HOLE NO. B-30

TOWN PRESS — EAST PROV.

American Drilling & Boring Co., Inc.

100 WATER STREET EAST PROVIDENCE, R. I.

SHEET 1 OF 3

TO [illegible] ADDRESS [illegible]

PROJECT NAME [illegible] LOCATION [illegible]

REPORT SENT TO [illegible] DATE

SAMPLES SENT TO [illegible] HOLE NO. B-31

PROJ. NO. LINE & STA.

OUR JOB NO. 71-207 OFFSET

SURF. ELEV. [illegible]

GROUND WATER OBSERVATIONS		CASING	SAMPLER	CORE BAR.
At [illegible]	after [illegible] Hours	Type	S/S	
cas. [illegible]		Size I.D.	[illegible]	
At [illegible]	after 3/4 Hours	Hammer Wt.	[illegible]	BIT
cas. [illegible]		Hammer Fall	[illegible]	

	Date	Time
START	[illegible]	[illegible] a.m. p.m.
COMPLETE	[illegible]	[illegible]
TOTAL HRS.		
BORING FOREMAN	[illegible]	
INSPECTOR		
SOILS ENGR.		

LOCATION OF BORING:

DEPTH	Casing Blows per foot	Sample Depths From – To	Type of Sample	Blows per 6" on Sampler From To 0-6	6-12	12-18	Moisture Density or Consist.	Strata Change Elev.	SOIL IDENTIFICATION Remarks include color, gradation, Type of soil etc. Rock-color, type, condition, hardness, Drilling time, seams and etc.	SAMPLE No.	Pen	Rec.
		[illegible]	D	[illegible]				[illegible]	Black COAL - CONCRETE			
							Wet medium dense	[illegible]	Brown fine SAND, concrete gravel, FILL	[illegible]		
		[illegible]	D	[illegible]				[illegible]	Brown fine to coarse SAND, some fine gravel, wood, FILL			
		[illegible]	D	[illegible]				[illegible]	Gray-brown SAND, trace fine sand			
		[illegible]	D	[illegible]				[illegible]	Brown fine to coarse SAND and fine gravel, little silt			
		[illegible]	D	[illegible]				[illegible]	Brown medium SAND, little fine gravel			
		[illegible]	D	[illegible]			Wet dense	[illegible]	Brown medium to coarse running SAND & fine gravel			
		[illegible]	D	[illegible]			Wet medium dense	[illegible]	Brown medium SAND			
		[illegible]	D	[illegible]			Moist dense	[illegible]	Brown fine SAND, some silt			
									Brown fine to medium SAND, [illegible]			

GROUND SURFACE TO [illegible] USED [illegible] "CASING: THEN [illegible]

Sample Type
D=Dry C=Cored W=Washed
UP=Undisturbed Piston
TP=Test Pit A=Auger V=Vane Test
UT=Undisturbed Thinwall

Proportions Used
trace 0 to 10%
little 10 to 20%
some 20 to 35%
and 35 to 50%

140 lb Wt. x 30" fall on 2" O.D. Sampler

Cohesionless Density
0-10 Loose
10-30 Med. Dense
30-50 Dense
50+ Very Dense

Cohesive Consistency
0-4 Soft
4-8 M/Stiff
8-15 Stiff
15-30 V-Stiff
30+ Hard

SUMMARY:
Earth Boring [illegible]
Rock Coring
Samples [illegible]

HOLE NO. B-31

TOWN PRESS – EAST PROV.

American Drilling & Boring Co., Inc.

100 WATER STREET EAST PROVIDENCE, R I

SHEET 2 OF 3
DATE
HOLE NO. B-31
LINE & STA.
OFFSET
SURF. ELEV. 11.0'

TO
PROJECT NAME Same as B1
REPORT SENT TO
SAMPLES SENT TO
ADDRESS
LOCATION Same as B1
PROJ. NO.
OUR JOB NO.

GROUND WATER OBSERVATIONS
At Same as B1 after Hours
At after Hours

	CASING	SAMPLER	CORE BAR.
Type		Same as B1	
Size I.D.			
Hammer Wt.			BIT
Hammer Fall			

	Date	Time
START	Same as B1	a.m. p.m.
COMPLETE		
TOTAL HRS.		
BORING FOREMAN		
INSPECTOR		
SOILS ENGR.		

LOCATION OF BORING:

DEPTH	Casing Blows per foot	Sample Depths From - To	Type of Sample	Blows per 6" on Sampler From 0-6	To 6-12	To 12-18	Moisture Density or Consist.	Strata Change Elev.	SOIL IDENTIFICATION Remarks include color, gradation, Type of soil etc. Rock-color, type, condition, hardness, Drilling time, seams and etc.	SAMPLE No.	Pen.	Rec.
	19	40'-41'6"	D	9	15	33	Wet dense		Brown fine to medium SAND, trace of silt	8	24"	1[illegible]
	22			36				42'0"				
	2[illegible]											
	2[illegible]											
	37											
	15	45'-47'	D	5	23	21	"		Brown fine to coarse SAND, some silt, little fine gravel	9	24"	1[illegible]
	2[illegible]			21				[illegible]				
	3[illegible]											
	3[illegible]											
50	7[illegible]											
	5[illegible]	50'-52'	D	[illegible]	2[illegible]	2[illegible]	Wet very dense		Brown fine to medium SAND some silt, & fine to medium gravel, cemented	[illegible]	[illegible]	[illegible]
	63			32								
	75											
	[illegible]											
	1[illegible]											
	47	55'-57'	D	21	28	22	Wet dense	56'6"		11	24"	1[illegible]
	55			24								
	52											
	55											
60	57						Wet very dense		Brown fine to medium SAND, some fine to medium gravel			
	57	60'-62'	D	7	32	42				12	24"	22
	63			38								
	75											
	67											
	7[illegible]											
	42	65'-67'	D	21	24	44	"		Brown fine to coarse running SAND	13	24"	1[illegible]
	47			24								
	64											
	74											
70									Gray fine to coarse running SAND			
	51	70'-72'	D	12	20	27	"	71'0"		10	24"	1[illegible]
	53			27								
	72											
	77											
	7[illegible]											
	93	75'-77'	D	2[illegible]	38	55	"		Gray fine to coarse SAND, silt, fine gravel, and decomposed shale, TILL	15	24"	2[illegible]
	53			42								
	53											
	51											
80	7[illegible]											

GROUND SURFACE TO USED "CASING: THEN

Sample Type
D=Dry C=Cored W=Washed
UP=Undisturbed Piston
TP=Test Pit A=Auger V=Vane Test
UT=Undisturbed Thinwall

Proportions Used
trace 0 to 10%
little 10 to 20%
some 20 to 35%
and 35 to 50%

140 lb Wt. x 30" fall on 2" O.D. Sampler

Cohesionless Density		Cohesive Consistency	
0-10	Loose	0-4	Soft
10-30	Med. Dense	4-8	M/Stiff
30-50	Dense	8-15	Stiff
50 +	Very Dense	15-30	V-Stiff
		30 +	Hard

SUMMARY:
Earth Boring
Rock Coring
Samples

HOLE NO. B-31

TOWN PRESS — EAST PROV.

American Drilling & Boring Co., Inc.

100 WATER STREET EAST PROVIDENCE, R. I.

SHEET 3 OF 3
DATE
HOLE NO. B-31
LINE & STA.
OFFSET
SURF ELEV. 11.0'

TO [illegible]
PROJECT NAME
REPORT SENT TO
SAMPLES SENT TO
ADDRESS
LOCATION
PROJ. NO.
OUR JOB NO.

GROUND WATER OBSERVATIONS
At _____ after _____ Hours
At _____ after _____ Hours

	CASING	SAMPLER	CORE BAR.
Type		Split Spoon	
Size I.D.			
Hammer Wt.			BIT
Hammer Fall			

	Date	Time	
START			a.m. p.m.
COMPLETE	Split Spoon		a.m. p.m.
TOTAL HRS.			
BORING FOREMAN			
INSPECTOR			
SOILS ENGR.			

LOCATION OF BORING

DEPTH	Casing Blows per foot	Sample Depths From – To	Type of Sample	Blows per 6" on Sampler From 0-6	To 6-12	To 12-18	Moisture Density or Consist.	Strata Change Elev.	SOIL IDENTIFICATION Remarks include color, gradation, Type of soil etc. Rock-color, type, condition, hardness, Drilling time, seams and etc.	SAMPLE No	Pen	Rec.
		22'-23'	D	22	22	22	Wet		Clay F to Co. Sand, silt, Cinders	12		12
				22			Very dense	62'0"	gravel & coarse Sand, Wet			
									Bottom of boring 62'0"			
23												

GROUND SURFACE TO _____ USED _____ "CASING: THEN _____

Sample Type
D=Dry C=Cored W=Washed
UP=Undisturbed Piston
TP=Test Pit A=Auger V=Vane Test
UT=Undisturbed Thinwall

Proportions Used	
trace	0 to 10%
little	10 to 20%
some	20 to 35%
and	35 to 50%

140 lb Wt. x 30" fall on 2" O.D. Sampler

Cohesionless Density		Cohesive Consistency	
0-10	Loose	0-4	Soft
10-30	Med. Dense	4-8	M/Stiff
30-50	Dense	8-15	Stiff
50+	Very Dense	15-30	V-Stiff

30+ Hard

SUMMARY:
Earth Boring _____
Rock Coring _____
Samples _____

HOLE NO. B-31

TOWN PRESS – EAST PROV.

RESOURCE CONTROLS TEST PIT LOG

RESOURCE CONTROL ASSOCIATES, INC.

Project:	Location:	Test Pit No.	
Providence Gas Company	642 Allens Avenue, Providence, Rhode Island	ETP-1	
Test pit dimensions: 4' x 12' x 8' (D)	Face of Test Pit logged: Composite	Date excavated: 2/13/96	Project No.: A2000 / Sheet No.: 1 of 2
Depth to water: 7' to 7.5'	Excavated by: JP (Zecco, Inc.)	Logged by: SC	
Surface elevation: 12.38'	Surface conditions: frost		

DEPTH (feet)	Sample No.	Description	Elevation (feet)	PID Readings (ppm)
0-2		med. to fine SAND, fill, some breeze		12.0
2-3	S-1	fine SAND and breeze, dry		
	@	found rebar at 3 to 3.5' deep		
3-4		black, damp, med. to fine SAND (breeze)		14.0
4-5	S-2	black, damp, med. to fine SAND (breeze)		
5-6		black, damp, med. to fine SAND (breeze)		
6-7		damp, black, med. to fine SAND		
	GW	groundwater encountered at 7 to 7.5' deep		14.9
7-8	S-3	saturated, black, med. SAND		
	@	at 4'deep, a brown/tan color 2 to 4" pipe runs parallel to the		
		fence. This pipe is approximately 5-6' south from the fence.		
		Samples from 4-5' west from initial samples:		11.0
0-2		fill, wood fragments, some breeze		
4-5	S-4	black, damp, course to med. SAND		
	@	overall soils in the test pit seem to be homogenous		

Summary	
Depth:	8'
No. of Samples:	4 soil samples
Test Pit No.	ETP-1

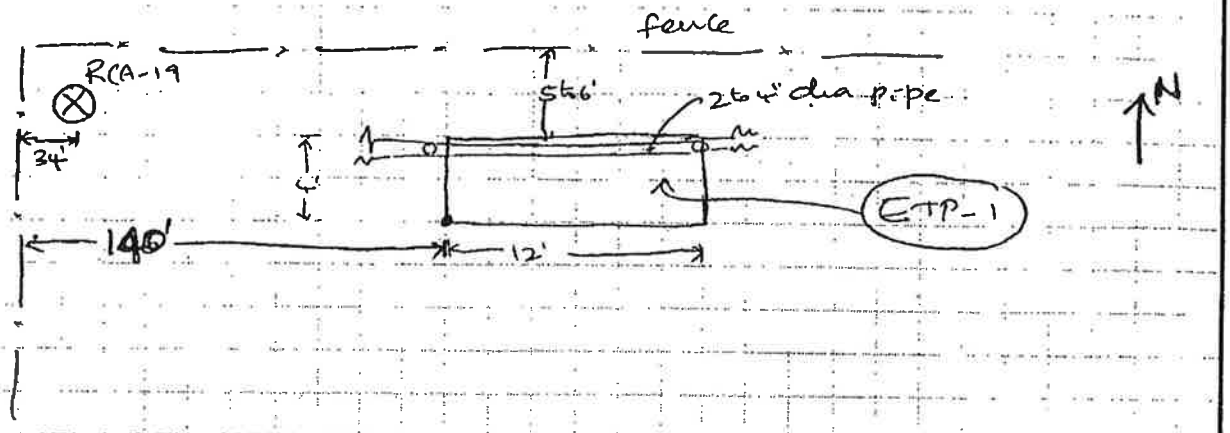
EOIPROV0004144

RESOURCE CONTROL ASSOCIATES, INC.
Environmental Assm., Engineering & Remediation
474 Broadway
PAWTUCKET, RHODE ISLAND 02860
(401) 728-6860

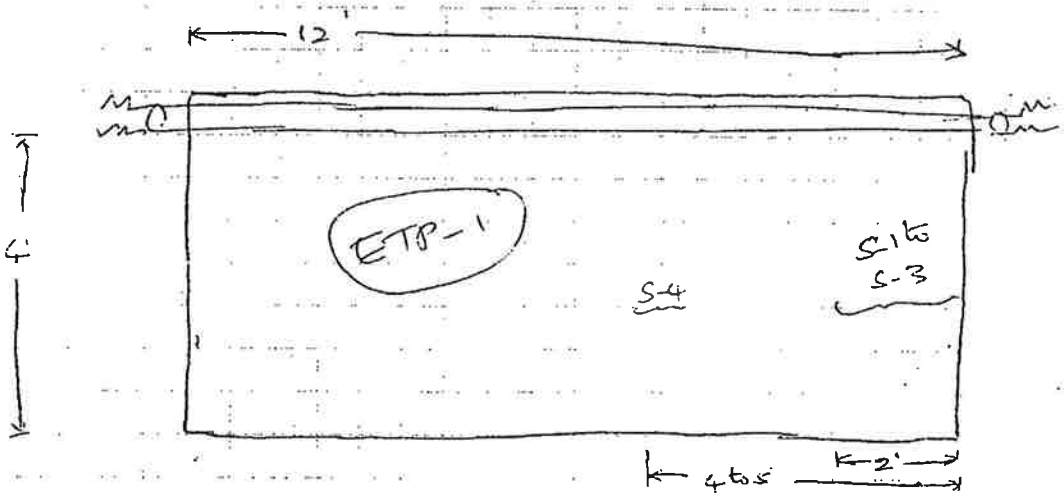
ETP-1

JOB A2003 ETP - 1
SHEET NO. 2 OF 2
CALCULATED BY _____ DATE _____
CHECKED BY _____ DATE 2/13/96
SCALE _____

(I)



(II)



RESOURCE CONTROLS TEST PIT LOG

RESOURCE CONTROL ASSOCIATES, INC.

	Project: Providence Gas Company	Location: 642 Allens Avenue, Providence, Rhode Island		Test Pit No. ETP-2
Test pit dimensions: 4' x 6' x 10' (D)	Face of Test Pit logged: Composite	Date excavated: 2/13/96	Project No.: A2000	Sheet No.: 1 of 2
Depth to water: Not encountered		Excavated by: JP (Zecco, Inc.)		Logged by: SC
Surface elevation: 13.68'	Surface conditions: frost			

DEPTH (feet)	Sample No.	Description	Elevation (feet)	PID Readings (ppm)
0-2		dry, brown/tan, coarse to med. SAND (fill)		
2-3	S-1	dry, brown/tan, coarse to med. SAND, some cobbles		7.1
4-5	S-2	dry, brown/tan, coarse to med. SAND, some cobbles		14.5
	@	at 4' deep, approximately 6 to 8" dia. ductiline pipe runs at an angle		14.3
		at approximately 120 degrees with the fence line. No info about this pipe.		
5-6	S-3	dry, brown/tan, coarse to med. SAND, some cobbles		15.7
6-7	S-4	damp, brown, med. to fine SAND		16.0
	@	at 4 to 5' deep, 1 to 1.5' thick concrete foundation is encountered		
		at 4 to 5' west from Initial sample collection. The width of this		
		foundation is unknown (we could not continue west side due to		
		frost conditions). Right underneath this foundation, found 8" to 10"		
		dia. broken pipe. No liquids inside.		
8-9	S-5	(at 8 to 8.5') damp, brown, med. SAND, trace fine sand		14.5
	S-6	(at 10' deep), damp, brown, med. SAND, fine sand		16.5
	@	Groundwater is not encountered at 10' deep (Maybe inside a structure?)		

Summary	
Depth:	10'
No. of Samples:	6 soil samples
Test Pit No.	ETP-2

RESOURCE CONTROL ASSOCIATES, INC.
Environmental Assm., Engineering & Remediation
474 Broadway
PAWTUCKET, RHODE ISLAND 02860
(401) 728-6860

ETP-2

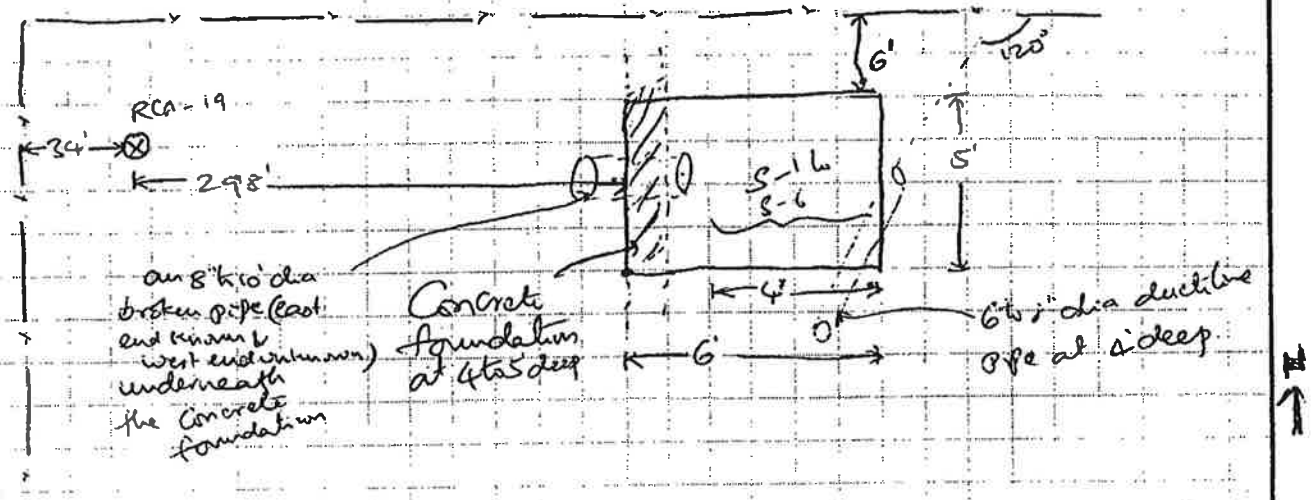
JOB A2000

SHEET NO. 2 OF 2

CALCULATED BY _____ DATE 2/13/96

CHECKED BY _____ DATE _____

SCALE _____



EOIPROV0004147

RESOURCE CONTROLS TEST PIT LOG

RESOURCE CONTROL ASSOCIATES, INC.

Project: Providence Gas Company	Location: 642 Allens Avenue, Providence, Rhode Island		Test Pit No. ETP-4
Test pit dimensions: 5.5' x 10' x 8' (D)	Face of Test Pit logged: Composite	Date excavated: 2/14/96	Project No.: A2000 / Sheet No.: 1 of 2
Depth to water: Not encountered	Excavated by: JP (Zecco, Inc.)		Logged by: SC
Surface elevation: 10.51'	Surface conditions: frost		

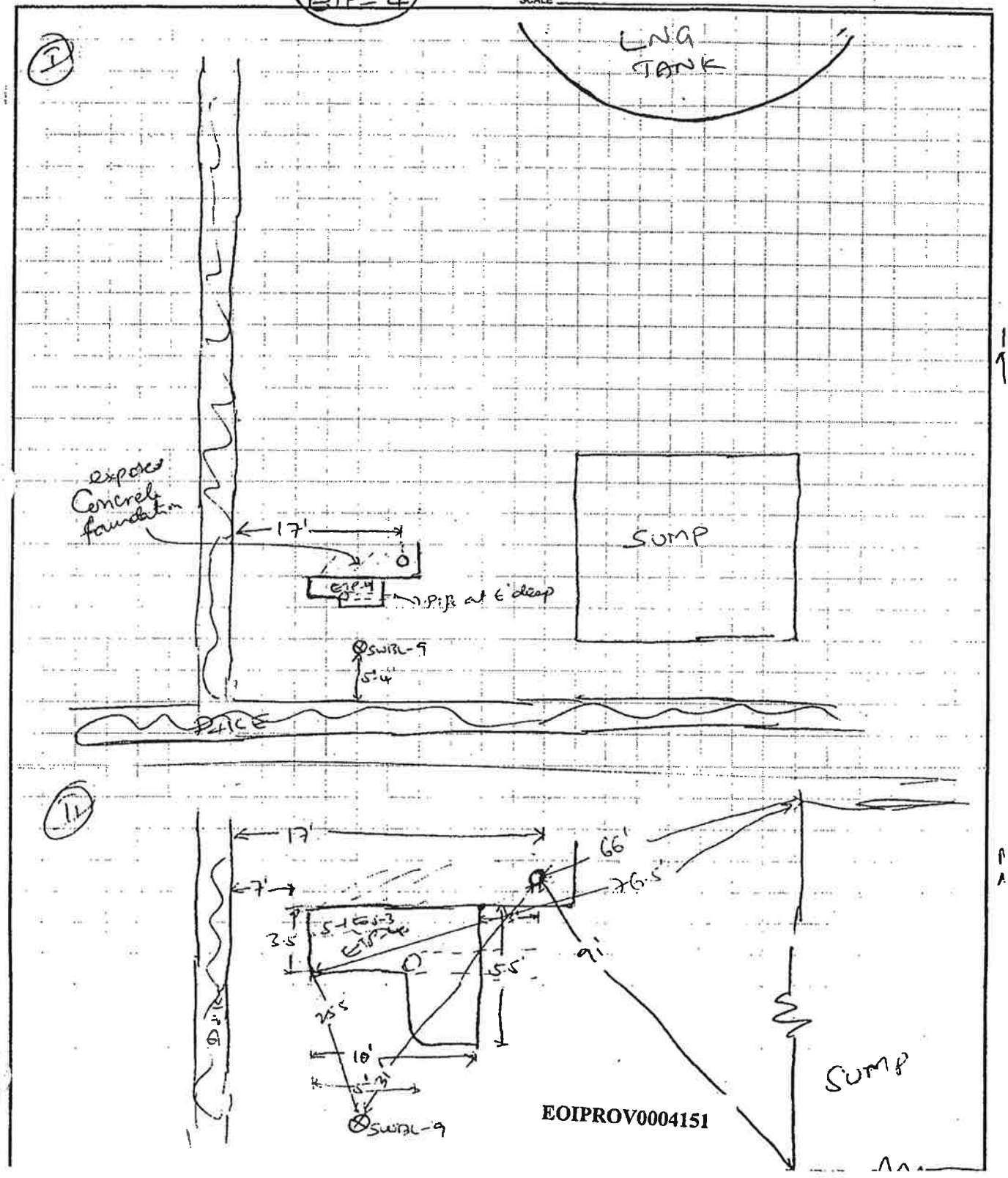
DEPTH (feet)	Sample No.	Description	Elevation (feet)	PID Readings (ppm)
	@	excavation is started along the south edge of the exposed concrete foundation (probably south edge of the Retort House [#10]) inside the dike		
0-2	S-1	(at 2' deep) cobbles, brick, and some rebar, coarse SAND (fill)		
2-3		damp, black/tan, coarse to med. SAND, rebar protruding from the foundation edge, bricks and stones		13.9
3-4		damp, black, med. to fine SAND, bricks and stones		
6-7	S-2	damp (like paste), black, homogenous fine SAND and silt, smells like coal tar		19.6
7-8	S-3	damp (like paste), black, homogenous fine SAND and silt, smells like coal tar		14.7
	@	at 6' deep, found a small pipe of less than 6' dia., dripping liquid. However could not figure out what type of liquid and the test pit caved in.		
	@	at 8' deep found a concrete floor/base and groundwater was not encountered.		
	Note: @	During this test pit excavation, it is heavily snowing. The concrete foundation is more than 8' deep.		

Summary	
Depth:	8'
No of Samples:	3 soil samples
Test Pit No.	ETP-4

RESOURCE CONTROLS
Environmental Assm., Engineering & Remediation
474 Broadway
PAWTUCKET, RHODE ISLAND 02860
(401) 728-6860

JOB A2000-
SHEET NO: 2 OF 2
CALCULATED BY DATE 2/16/94
CHECKED BY DATE
SCALE

ETP-4



EOIPROV0004151

RESOURCE CONTROLS TEST PIT LOG

RESOURCE CONTROL ASSOCIATES, INC.

Project: Providence Gas Company	Location: 642 Allens Avenue, Providence, Rhode Island			Test Pit No. ETP-8
Test pit dimensions: 4' x 10' x 8' (D)	Face of Test Pit logged: Composite	Date excavated: 2/15/96	Project No.: A2000	Sheet No.: 1 of 2
Depth to water: 7.5' to 8'	Excavated by: JP (Zecco, Inc.)			Logged by: SC
Surface elevation: 6.24'	Surface conditions:			

DEPTH (feet)	Sample No.	Description	Elevation (feet)	PID Readings (ppm)
2	S-1	brown/tan, damp, coarse SAND		21.6
4	S-2	brown/tan, damp, coarse to med. SAND, slight petroleum odor.		98.0
7	S-3	tan, damp, coarse to med. SAND, petroleum odor		70.0
8	S-4	tan, wet, coarse to med. SAND, petroleum odor		40.0
	@	groundwater is encountered at 7.5' to 8' deep and no sheen or product is observed. However slight petroleum odor is noted.		

Summary	
Depth:	8
No. of Samples:	4 soil samples
Test Pit No.	ETP-8

EOIPROV0004158

RESOURCE CONTROLS
Environmental Assm., Engineering & Remediation
474 Broadway
PAWTUCKET, RHODE ISLAND 02860
(401) 728-6860

JOB _____

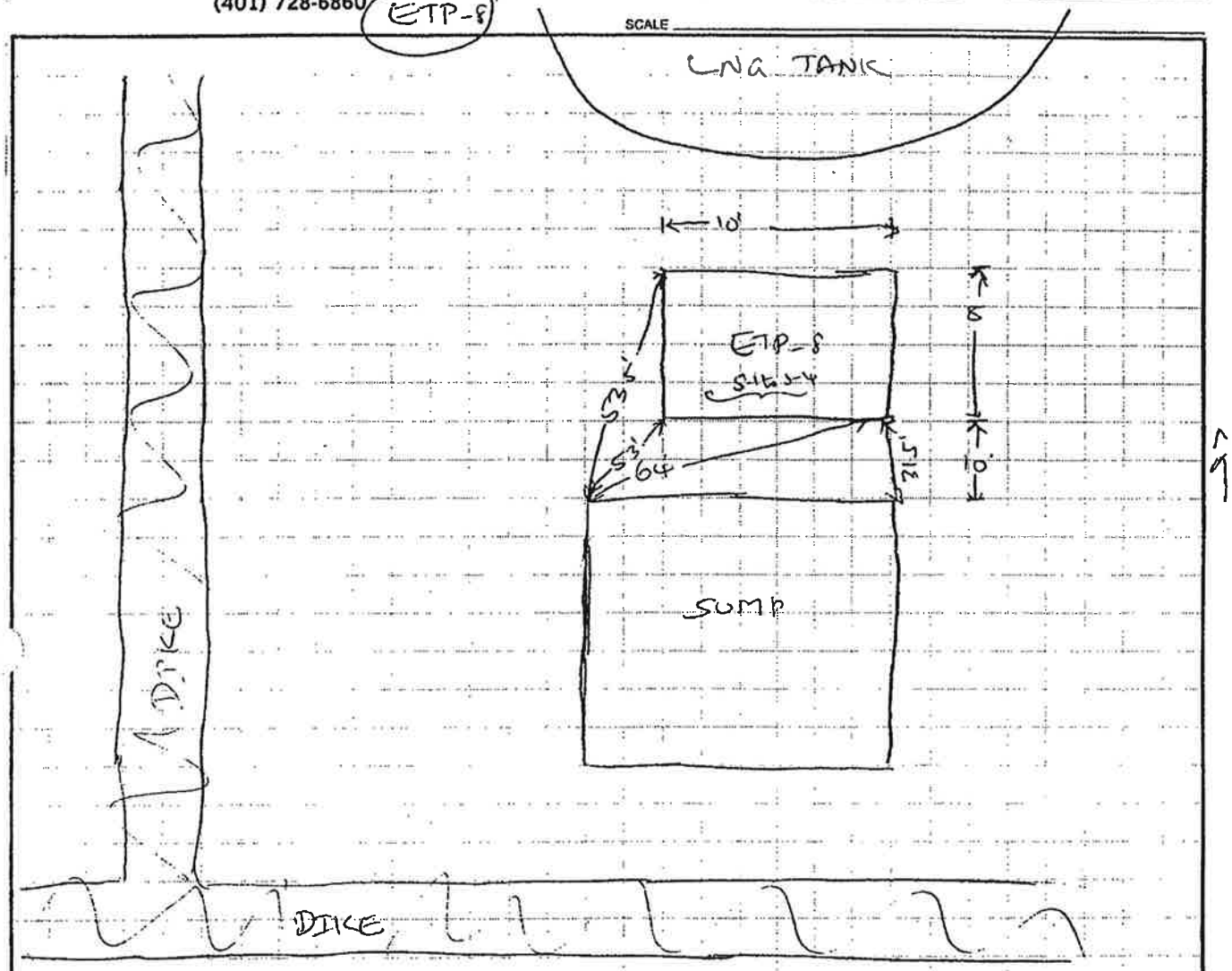
SHEET NO. 2 OF 2

CALCULATED BY _____ DATE 2/15/96

CHECKED BY _____ DATE _____

SCALE _____

ETP-8



EOIPROV0004159

Stone & Webster Engineering Corporation	BORING LOG	Boring SWBL-9A J.O. 05885.20 Sheet 1 of 2

Site: Fields Point, Providence, RI
Client: Algonquin LNG, Inc.
Coordinates: N 327.65 W 397.92
Groundwater Depth:
Contractor: American Drilling

Depth to Bedrock:
Driller: R. Leger

Logged by: A.C. Smith
Date Start - Finish: 11/06/95 - 11/06/95
Ground Elevation: 10.251 ft
Total Depth Drilled: 62 ft
Rig Type: CME-75

Methods:
Casing Used: None
Drilling Soil: 4.25" hollow-stem augers
Sampling Soil: Standard split-spoon sampler driven using a CME automatic SPT hammer
Drilling Rock: None

Comments: Groundwater depth as noted during sampling.

Elev (ft)	Depth (ft)	Sample Type	Sample No.	Blows or Recovery / RQD	SPT N Value	USC Symbol	Sample Description
10.3	0						
5	5						
0	10	S	4	3-3-6-7 (11.0")	9	GP-GM	S-4: Sandy gravel, subrounded, fine, 30-40% coarse to fine sand, 5-15% slightly plastic fines, loose, gray-brown, strong hydrocarbon odor.
		S	5	12-14-7-8 (5.0")	21	GP-GM	S-5: Similar to S-4, except medium dense.
-5	15	S	6	2-2-7-9 (12.0")	9	GP-GM	S-6: Similar to S-4.
		S	7	7-8-13-20 (12.0")	21	GP-GM	S-7: Similar to S-4, except medium dense.
		S	8	8-7-9-11 (16.0")	16	GM ML-GP	S-8A (Top 2"): Similar to S-4. S-8B (Bot. 14"): Silt, nonplastic, 15-25% fine sand, medium dense, brown; one slightly plastic layer 2" thick.
-10	20	S	9	6-5-6-8 (16.0")	11	SP-SM ML	S-9A (Top 10"): Sand, medium to fine, 5-10% nonplastic fines, medium dense, brown. S-9B (Bot. 6"): Silt, nonplastic, 15-25% fine sand, medium dense, brown.

Legend/Notes

- Datum is NGVD 1929.
- ▽ indicates groundwater level.
- ▌ indicates location of samples.
- Blows = number of blows required to drive 2" O.D. sample spoon 6" or distance shown using 140 pound hammer falling 30".
- ( ) = inches of sample recovery.
- Recovery = % rock core recovery.
- RQD = Rock Quality Designation.
- SPT N = Standard Penetration Test resistance to driving, blows/ft.
- USC = Unified Soil Classification system.
- * indicates use of 300 pound hammer.
- Sample Type:
  S = Standard split-spoon

Approved	Date
DRB	04/05/96

Stone & Webster Engineering Corporation	BORING LOG	Boring SWBL-9A J.O. 05885.20 Sheet 2 of 2

Site: **Fields Point, Providence, RI** Logged by: **A.C. Smith**

Elev (ft)	depth (ft)	Sample Type	Sample No.	Blows or Recovery / RQD	SPT N Value	USC Symbol	Sample Description
-15	25	S	10	5-7-7-7 (16.0")	14	ML	S-10: Silt, nonplastic, 15-25% fine sand, medium dense, brown.
-20	30	S	11	5-6-6-9 (18.0")	12	ML	S-11: Similar to S-10.
-25	35	S	12	20-16-14-12 (11.0")	30	SP-SM	S-12A (Top 1"): Similar to S-10. S-12B (Bot. 15"): Gravelly sand, widely graded, 15-25% fine gravel, 5-15% nonplastic fines, medium dense, gray.
-30	40	S	13	7-10-13-19 (11.0")	23	SP	S-13: Sand, medium to fine, <10% nonplastic fines, medium dense, gray.
-35	45	S	14	19-14-23-25 (14.0")	37	SM SW-SM	S-14A (Top 10"): Silty sand, fine, 10-20% nonplastic fines, dense, brown. S-14B (Bot. 4"): Gravelly sand, widely graded, 35-45% fine gravel, 5-15% nonplastic fines, dense, gray. Note: Very gravelly while augering from 47 to 50 feet.
-40	50	S	15	28-32-36-42 (20.0")	68	SW	S-15: Gravelly sand, widely graded, 35-45% fine gravel, <10% nonplastic fines, very dense, gray.
-45	55	S	16	37-38-44-45 (17.0")	82	SW	S-16: Similar to S-15.
-50	60	S	17	28-17-14-22	31	SW	S-17: Similar to S-15.

BOTTOM OF BORING AT 62 FEET

Note: See Sheet 1 for Boring Summary and Legend Information

Approved DRB

Date 04/05/96

NOT MENTIONED IN THE SIR

RESOURCE CONTROLS

TEST BORING LOG

PROJECT: Providence Gas Company
PROJECT NO.: A2000
LOCATION: 642 Allens Avenue, Providence, R.I.
DRILLING CO.: American Drilling, Inc.
DRILLED BY: Jim Campbell
INSPECTED BY: Daniel Lanier

BORING NO. RCA-7
PAGE 1 OF 1
DATE STARTED: 9/9/94
DATE FINISHED: 9/9/94
SURFACE ELEVATION:

GROUNDWATER OBSERVATIONS

DEPTH	STABILIZATION TIME

	CASING	SAMPLER
TYPE:		Split Spoon
SIZE I.D.:		1-3/8"
HAMMER WT.:		140 lbs.
HAMMER FALL:		30 in.

DEPTH (FT.)	SAMPLING DEPTH (FT.) FROM - TO	SAMPLE DATA ID	PERCENT RECOV.	BLOWS PER 6 INCHES	WELL DATA	STRATA CHANGE (FT.)	LITHOLOGY (DESCRIPTION OF MATERIALS) GRAVEL	FIELD TEST DATA PID - 10.2 eV (ppm)
	2	S-1		GRAB			damp, brown, coarse to medium SAND, little fine sand (fill)	
5'	4-6	SS-1	65%	6-7-7-10			damp, olive-brown, medium to fine SAND, trace coarse sand	60.9
	6-8	SS2	50%	16-24-38-26			SAME, trace gravel	92.4
10'	8-10	SS-3	10%	4-5-3-8			SAME, with fine brick,petroleum odor	58.3
	10-12	SS-4	40%	3-1-2-3			saturated, olive, coarse to medium SAND, some silt, oily	369
	12-14	SS-5	70%	5-3-2-2		13.5	olive silt, trace clay	359
15'	14-16	SS-6	90%	2-1-2-3			saturated, olive, fine SAND, and SILT, trace coarse sand	60.1
	16-18	SS-7	100%	3-5-5-7		17.5	brown, medium SAND, petroleum odor	23.2
20'								318
							Bottom of exploration at 18'	
25'								
30'								

GENERAL REMARKS:
10' 0.020"-slot EPG screen
8-1/2" borehole
HSA/ boring
#2 silica sand pack
2'-10" standpipe

EOIPROV0003862

LN6

RESOURCE CONTROL ASSOCIATES, INC.

DRILLING LOG

PROJECT:	Providence Gas
PROJECT NO.:	A2000
LOCATION:	642 Allens Avenue Providence, RI
DRILLING CO.:	American Drilling
DRILLED BY:	Rick Leger
INSPECTED BY:	Brian Koch

BORING NO.	RCA-29/SWBL-9
PAGE 1 OF	2
DATE STARTED:	2/13/96
DATE FINISHED:	2/13/96
SURFACE ELEVATION:	Unknown

SWBL-9 (BORING) DRILLED 11/6/95 WITHIN 10' DISTANCE

GROUNDWATER OBSERVATIONS

DEPTH	STABILIZATION TIME

	CASING	SAMPLER
TYPE:	HSA	Split Spoon
SIZE I.D.:	3-3/4"	1-1/4"
HAMMER WT.:		140 lbs.
HAMMER FALL:		30 in.

DEPTH (FT.)	SAMPLING DEPTH (FT.) FROM - TO	SAMPLE DATA ID	PERCENT RECOV.	BLOWS PER 6 INCHES	WELL DATA	STRATA CHANGE (FT.)	LITHOLOGY (DESCRIPTION OF MATERIALS)	FIELD TEST DATA PID - 10.2 eV (ppm)
5'	5'-7'	SS-1		32-31-12-14			Dry, dark brown, fine SAND	33.0
10'	10'-12'	SS-2		10-12-14-12			Wet, olive, med.-coarse SAND and gravel, trace silt	90.0
	12'-14'	SS-5	20%	12-14-7-8			SAME	47.7
15'	14'-16'	SS-6	40%	2-2-7-9			Wet, dark olive, GRAVEL and COARSE SAND, trace silt, petroleoum	92.5
	16'-18'	SS-7	50%	13-20-8-7			Wet, dark olive, coarse to medium SAND, little gravel	26.7
20'	18'-20'	SS-8	70%	8-7-9-11			Wet, olive SILT	13.1
	20'-22'	SS-9	75%	6-5-6-8			Wet, olive, fine SAND, little medium sand Wet, olive fine SAND and SILT	14.5
25'								
	25'-27'	SS-10	65%	5-7-7-7			Wet, olive fine SAND and SILT	10.9
30'								
	30'-32'	SS-11	80%	5-6-6-9			Wet, olive SILT, little fine sand medium sand lens @ 31' (1.5")	11.9
35'								
	35'-37'	SS-12	70%	20-16-14-12			Wet, olive-grey/black, coarse to medium SAND some fine sand and silt (till-like)	11.8
40'								

GENERAL REMARKS:

Note:
Cuttings at approx. 4', appeared moist and had petrol odor. Took spoon at 5'-7'

Stratigraphy from 12' to 62' obtained from adjacent boring SWBL-9 (SS-5 to SS-17)

EOIPROV0003890

RESOURCE CONTROL ASSOCIATES, INC.

DRILLING LOG

PROJECT:	Providence Gas	BORING NO.	RCA-29/SWBL-9
PROJECT NO.:	A2000	PAGE 2 OF	2
LOCATION:	642 Alleas Avenue Providence, RI	DATE STARTED:	2/13/96
		DATE FINISHED:	2/13/96
DRILLING CO.:	American Drilling	SURFACE ELEVATION:	Unknown
DRILLED BY:	Rick Leger	SWBL-9 (BORING) DRILLED	11/6/95
INSPECTED BY:	Brian Koch	WITHIN 10' DISTANCE	

GROUNDWATER OBSERVATIONS

DEPTH	STABILIZATION TIME

	CASING	SAMPLER
TYPE:	HSA	Split Spoon
SIZE I.D.:	3-3/4"	1-1/4"
HAMMER WT.:		140 lbs.
HAMMER FALL:		30 in.

DEPTH (FT.)	SAMPLING DEPTH (FT.) FROM - TO	SAMPLE DATA ID	PERCENT RECOV.	BLOWS PER 6 INCHES	WELL DATA	STRATA CHANGE (FT.)	LITHOLOGY (DESCRIPTION OF MATERIALS)	FIELD TEST DATA PID - 10.2 eV (ppm)
45'	40'-42'	SS-13	35%	7-10-13-19			Wet, olive-gray, med. SAND, trace silt	13.4
50'	45'-47'	SS-14	65%	19-14-23-25		46.5	Wet, olive, medium to fine SAND, trace coarse sand GRAVEL	11.5
55'	50'-52'	SS-15	80%	28-32-36-42			Wet, olive-grey, coarse to medium SAND, some gravel, fine sand silt (till-like)	15.9
60'	55'-57'	SS-16	80%	37-38-44-45			SAME	36.7
65'	60'-62'	SS-17	80%	28-17-14-22			Wet, olive, medium to fine SAND, little coarse sand, gravel	21.3
70'							Bottom of exploration at 62' grouted to surface Well Construction: 2" diameter SCH 80 High Density Polyethylene (HDP) 0.010" Slot Screen Screen - 12'-2' Top of sand - 1.5' Top of Bentonite seal - 0.5'	
75'								
80'								

GENERAL REMARKS:

Note:
Cuttings at approx. 4', appeared moist and had petrol odor. Took spoon at 5'-7'

Stratigraphy from 12' to 62' obtained from adjacent boring SWBL-9 (SS-5 to SS-17)

EOIPROV0003891

NOT MENTIONED IN HB SIR

RESOURCE CONTROL ASSOCIATES, INC.

DRILLING LOG

PROJECT:	Providence Gas
PROJECT NO.:	A2000
LOCATION:	642 Allens Avenue Providence, RI
DRILLING CO.:	American Drilling
DRILLED BY:	Rick Leger
INSPECTED BY:	Brian Koch

BORING NO.	RCA-31
PAGE 1 OF	1
DATE STARTED:	2/23/96
DATE FINISHED:	2/23/96
SURFACE ELEVATION:	Unknown

GROUNDWATER OBSERVATIONS

DEPTH	STABILIZATION TIME
10'	

	CASING	SAMPLER
TYPE:	HSA	Split Spoon
SIZE I.D.:	3-3/4"	1-1/4"
HAMMER WT.:		140 lbs.
HAMMER FALL:		30 in.

DEPTH (FT.)	SAMPLING DEPTH (FT.) FROM - TO	SAMPLE DATA ID	PERCENT RECOV.	BLOWS PER 6 INCHES	WELL DATA	STRATA CHANGE (FT.)	LITHOLOGY (DESCRIPTION OF MATERIALS)	FIELD TEST DATA PID - 10.2 eV (ppm)
	0'-2'	SS-1	50%	33-12-18-24			Dry, brown-olive fine SAND, little gravel, trace silt	1.7
	2'-4'	SS-2	20%	12-12-18-4			Dry, olive, drk. brown gravel and fine-med. SAND, trace silt	2.0
5'	4'-6'	SS-3	45%	4-3-4-4			4'-5' - Dry, black fine SAND, some gravel, trace silt	2.4
	6'-8'	SS-4	8%	5-6-2-2			5'-6' - Dry, olive fine SAND, some gravel, trace silt	2.2
	8'-10'	SS-5	60%	5-4-8-13			Dry, olive fine SAND and gravel	2.6
10'							Moist olive fine SAND, trace gravel	
	10'-12'	SS-6	12%	8-10-9-6		▽	Wet, olive SILT and fine sand	2.8
	12'-14'	SS-7	10%	1-2-2-2			Wet, olive fine-coarse SAND, some gravel	2.6
15'	14'-16'	SS-8	15%	4-4-6-3			Wet, olive fine-coarse SAND, little gravel, trace silt	3.4
20'							Bottom of exploration at 16'	
25'							Well Construction: 2" diameter SCH 80 High Density Polyethylene (HDP) 0.010" Slot Screen	
30'							Screen - 15'-5' Sand - 4' Bentonite - 2' Sand - 1' Concrete to grade	
35'								
40'								

GENERAL REMARKS:

EOIPROV0003893

LN6

RESOURCE CONTROL ASSOCIATES, INC.

DRILLING LOG

PROJECT:	Providence Gas	BORING NO.	RCA-33
PROJECT NO.:	A2000	PAGE 1 OF	1
LOCATION:	642 Allens Avenue Providence, RI	DATE STARTED:	2/23/96
		DATE FINISHED:	2/23/96
DRILLING CO.:	American Drilling	SURFACE ELEVATION:	Unknown
DRILLED BY:	Rick Leger		
INSPECTED BY:	Brian Koch		

GROUNDWATER OBSERVATIONS

DEPTH	STABILIZATION TIME
4.5'	

	CASING	SAMPLER
TYPE:	HSA	Split Spoon
SIZE I.D.:	3-3/4"	1-1/4"
HAMMER WT.:		140 lbs.
HAMMER FALL:		30 in.

DEPTH (FT.)	SAMPLING DEPTH (FT.) FROM - TO	SAMPLE DATA ID	PERCENT RECOV.	BLOWS PER 6 INCHES	WELL DATA	STRATA CHANGE (FT.)	LITHOLOGY (DESCRIPTION OF MATERIALS)	FIELD TEST DATA PID - 10.2 eV (ppm)
	0'-2'	SS-1	50%	5-5-13-15			Dry, brown coarse GRAVEL and fine-coarse sand	16.6
	2'-4'	SS-2	50%	12-13-19-23			Dry, drk gray-olive coarse GRAVEL and fine-coarse sand	48.7
5'	4'-6'	SS-3	80%	9-13-23-28		6	Moist, olive-gray fine-med. SAND, coarse gravel	61.4
	6'-8'	SS-4	70%	18-19-33-38			Moist olive GRAVEL, little silt, fine-med. sand (stiff till)	40.0
10'	8'-10'	SS-5	85%	4-14-16-14			Same as SS-4	50.0
	10'-12'	SS-6	95%	16-19-43-100		11		42.5
15'							Moist, gray-olive fine-med. SAND and gravel, trace silt (hard till)	
	14'-16'	SS-7	80%	3-4-5-6			Wet, black, med.-coarse SAND, little gravel, petrol odor	54.8
	16'-18'	SS-8	100%	74-15-4-2			Wet, gray, fine-coarse SAND, little gravel, petrol odor	21.8
20'							Bottom of exploration at 18'	
25'							Well Construction: 2" diameter SCH 80 High Density Polyethylene (HDP) 0.010" Slot Screen	
30'							Screen - 15.5'-3.5' Sand - 2.5 Bentonite - 1.5' 2.5' Standpipe Stickup	
35'								
40'								

GENERAL REMARKS:

EOIPROV0003895

CEMENT

RESOURCE CONTROL ASSOCIATES, INC.

DRILLING LOG

PROJECT:	Providence Gas	BORING NO.	RCA-37
PROJECT NO.:	A2000	PAGE 1 OF	1
LOCATION:	642 Allens Avenue Providence, RI	DATE STARTED:	5/2/96
		DATE FINISHED:	5/2/96
DRILLING CO.:	American Drilling	SURFACE ELEVATION:	Unknown
DRILLED BY:	Chris Stamos		
INSPECTED BY:	Brian Koch		

GROUNDWATER OBSERVATIONS

DEPTH	STABILIZATION TIME
11'	

	CASING	SAMPLER
TYPE:	HSA	Split Spoon
SIZE I.D.:	3-3/4"	1-1/4"
HAMMER WT.:		140 lbs.
HAMMER FALL:		30 in.

DEPTH (FT.)	SAMPLING DEPTH (FT.) FROM - TO	SAMPLE DATA ID	PERCENT RECOV.	BLOWS PER 6 INCHES	WELL DATA	STRATA CHANGE (FT.)	LITHOLOGY (DESCRIPTION OF MATERIALS)	FIELD TEST DATA PID - 10.2 eV (ppm)
5'	4'-6'	SS-1	85%	4-6-6-5			Dry, brown, fine SAND, trace silt and gravel	3.4
	6'-8'	SS-2	100%	8-10-14-12			Moist, brown, fine SAND, some silt, trace gravel	3.0
10'	8'-10'	SS-3	2%	3-3-4-5			Wet, brown, same as SS-3	2.8
	10'-12'	SS-4	75%	3-5-5-4		10'	Wet, brown, fine SAND, some silt,trace gravel	2.1
	12'-14'	SS-5	60%	8-12-14-21			Wet, brown, fine SAND and silt	2.7
15'	14'-16'	SS-6	85%	2-2-2-2			Wet, black, medium-coarse SAND, some gravel	3.1
							Wet, black, fine -coarse SAND	3.0
20'							Wet, black, organic SILT, trace clay	3.7
							Bottom of exploration at 17'	
25'								
30'							Well Construction: 2" diameter SCH 80 High Density Polyethylene (HDP) 0.020" Slot Screen Screen - 17'-7' # 1 Sand Pack - 17'-5' Bentonite - 5'-3' # 1 Sand Pack - 3'-0.5' Concrete to grade	
35'								
40'								

GENERAL REMARKS:

EOIPROV0003899

LN 6

RESOURCE CONTROL ASSOCIATES, INC.

DRILLING LOG

PROJECT:	Providence Gas	BORING NO.	RCA-38
PROJECT NO.:	A2000	PAGE 1 OF	1
LOCATION:	642 Allens Avenue Providence, RI	DATE STARTED:	5/2/96
		DATE FINISHED:	5/2/96
DRILLING CO.:	American Drilling	SURFACE ELEVATION:	Unknown
DRILLED BY:	Chris Stamos		
INSPECTED BY:	Daniel M. Lanier		

GROUNDWATER OBSERVATIONS

DEPTH	STABILIZATION TIME
6'	

	CASING	SAMPLER
TYPE:	HSA	Split Spoon
SIZE I.D.:	3-3/4"	1-1/4"
HAMMER WT.:		140 lbs.
HAMMER FALL:		30 in.

DEPTH (FT.)	SAMPLING DEPTH (FT.) FROM - TO	SAMPLE DATA ID	PERCENT RECOV.	BLOWS PER 6 INCHES	WELL DATA	STRATA CHANGE (FT.)	LITHOLOGY (DESCRIPTION OF MATERIALS)	FIELD TEST DATA PID - 10.2 eV (ppm)
							GRAVEL	
							(SANDY FILL)	
5'	4'-6'	SS-1	50%	11-11-18-17			Damp, gray, coarse-medium, SAND, little gravel (fill)	132.0
	6'-8'	SS-2	95%	24-20-15-16			Moist, same as SS-1	67.5
10'	8'-10'	SS-3	85%	11-11-13-12			Moist, dark olive, medium, SAND, some coarse sand, little gravel	132.0
	10'-12'	SS-4	75%	8-6-9-10		11'	Saturated, olive, medium, SAND, little coarse sand	50.5
15'								
20'							Bottom of exploration at 14.5'	
25'							Well Construction: 2" diameter SCH 80 High Density Polyethylene (HDP) 0.020" Slot Screen Screen - 14.5'-4.5' # 1 Sand Pack - 14.5'-3.5' Bentonite - 3.5'-2.5' # 1 Sand Pack - 1'-0.5' HDPE riser - 4.5'-2.5' Concrete to grade	
30'								
35'								
40'								

GENERAL REMARKS:

EOIPROV0003900

TEST BORING LOG

ESS
2 West Exchange Street, Suite 101
Providence, Rhode Island 02903
(401) 421-0398 Fax (401) 421-5731

Site: Providence Gas Company 642 Allens Avenue, Providence, RI	Boring No.: A13
ESS Job No: P151-002	Date: 3/3/00
Driller.: Environmental Drilling, Inc.	Within 100' of Water: Yes
Well Diameter: N/A	Instrument: Thermo Environmental Instruments, Inc., Model 580B OVM
Drilling Method: Geoprobe	Boring Depth: 10.0'
Sample Method: 4' Acetate Sampler	Depth to Water: 9.0'
	Logged By: Daryll Issa

Depth (intervals)	Sample Depth (feet)	Recovery/ Penetration (in.)	Sample Time	PID (ppm)	Materials Description (size, grade, color, moisture)
A	0-2	22/24	1130	0.0	(2-20") F/M brown sand with LI gravel and LI small/large black cinders with TR cinder ash; dry; light odor of petroleum odor (0-24") F/M gray stained sand with LI gravel; dry; light petroleum odor.
B	2-4	45/48		0.0	(27-51") F/M brown/gray stained sand; dry; heavy odor unknown origin. (51-60") F/dense black cinder ash with SO small/large black cinders; dry; no odor. (60-72") F/M brown sand and silt with LI gravel; dry; no odor.
C	4-6			7.6	
D	6-8	40/48		0.0	(80-84") F brown/gray sand and cinder ash with TR gravel; dry; no odor. (84-102") F/M brown sand and gravel; dry; no odor. (102-120") F black/gray stained silt with SO gravel and SO F sand; saturated with water at 108"; heavy petroleum odor.
E	8-10		1150	27.2	
F	10-12				
G	12-14				

Comments:

PROPORTIONS USED		ABBREVIATIONS	Well Construction	DEPTH INTERVALS	
		F = FINE	N/A	A = 0-24 in.	G = 144-168 in.
TRACE (TR)	0-10%	M = MEDIUM		B = 24-48 in.	H = 168-192 in.
LITTLE (LI)	10-20%	C = COARSE		C = 48-72 in.	I = 192-216 in.
SOME (SO)	20-35%	F/M = FINE TO MEDIUM		D = 72-96 in.	J = 216-240 in.
AND	35-50%	F/C = FINE TO COARSE		E = 96-120 in..	K = 240-264 in.
		M/C = MEDIUM TO COARSE		F = 120-144 in.	L = 264-288 in.

TEST BORING LOG

ESS
272 West Exchange Street, Suite 101
Providence, Rhode Island 02903
(401) 421-0398 Fax (401) 421-5731

Site: Providence Gas Company 642 Allens Avenue, Providence, RI	Boring No.: **A14**
ESS Job No: P151-002	Date: 2/3/00
Driller.: Environmental Drilling, Inc.	Within 100' of Water: Yes
	Instrument: Thermo Environmental Instruments, Inc., Model 580B OVM
Well Diameter: N/A	Boring Depth: 10.0'
Drilling Method: Geoprobe	Depth to Water: 9.0'
Sample Method: 4' Acetate Sampler	Logged By: Jason Wiggin

Depth (intervals)	Sample Depth (feet)	Recovery/ Penetration (in.)	Sample Time	PID (ppm)	Materials Description (size, grade, color, moisture)
A	0-2	24/24	1115	0.0	(0-12") F/M brown sand with SO gravel and TR organic M/C sand at 3-5", TR silt. (12-24") F brown sand with SO silt and TR gravel and TR coal and ash throughout interval; dry except wet from 14-17".
B	2-4	46/48		0.0	(26-30") F reddish brown sand and silt; dry. (30-34") F/M gray sand with LI gravel and TR silt; dry. (34-38") F light tan, silty sand with black staining; dry. (38-45") F dark gray/brown sand and silt, black stained; dry; coal ash at 43-45". (45-55") yellow/green sandy silt, black staining; dry. (55-72") F green/gray sand and silt; dry. Petroleum odor.
C	4-6		1125	0.0	
D	6-8	34/48		1.7	(86-88") F green/gray coal ash; dry. (88-105") F yellow/brown silty sand; (105-120") F black stained sand and silt with LI gravel, mostly at 117-120", petroleum odor, sheen observed. Wet at 108"
E	8-10			4.7	
F	10-12				
G	12-14				

Comments:

PROPORTIONS USED		ABBREVIATIONS	Well Construction	DEPTH INTERVALS	
		F = FINE	N/A	A = 0-24 in.	G = 144-168 in.
TRACE (TR)	0-10%	M = MEDIUM		B = 24-48 in.	H = 168-192 in.
LITTLE (LI)	10-20%	C = COARSE		C = 48-72 in.	I = 192-216 in.
SOME (SO)	20-35%	F/M = FINE TO MEDIUM		D = 72-96 in.	J = 216-240 in.
AND	35-50%	F/C = FINE TO COARSE		E = 96-120 in..	K = 240-264 in.
		M/C = MEDIUM TO COARSE		F = 120-144 in.	L = 264-288 in.

TEST BORING LOG

ESS
2 West Exchange Street, Suite 101
Providence, Rhode Island 02903
(401) 421-0398 Fax (401) 421-5731

Site: Providence Gas Company 642 Allens Avenue, Providence, RI	Boring No.: A15
ESS Job No: P151-002	Date: 2/3/00
Driller.: Environmental Drilling, Inc.	Within 100' of Water: Yes
Well Diameter: N/A	Instrument: Thermo Environmental Instruments, Inc., Model 580B OVM
Drilling Method: Geoprobe	Boring Depth: 6.0'
Sample Method: 4' Acetate Sampler	Depth to Water: 5.5'
	Logged By: Jason Wiggin

Depth (intervals)	Sample Depth (feet)	Recovery/ Penetration (in.)	Sample Time	PID (ppm)	Materials Description (size, grade, color, moisture)
A	0-2	24/24	1150	9.5	(0-24") F/C brown sand, LI gravel, TR gray/green ash/dust at 6 and 17", TR coal ash/coal at 8" and 22".
B	2-4	48/48	1210	14.9	(24-50") F/M brown sand, TR gravel, TR silt; petroleum odor; dry. (50-72") F gray/brown silty sand; wet at 68".
C	4-6			17.6	
D	6-8				
E	8-10				
F	10-12				
G	12-14				

Comments:

PROPORTIONS USED		ABBREVIATIONS	Well Construction	DEPTH INTERVALS	
		F = FINE	N/A	A = 0-24 in.	G = 144-168 in.
TRACE (TR)	0-10%	M = MEDIUM		B = 24-48 in.	H = 168-192 in.
LITTLE (LI)	10-20%	C = COARSE		C = 48-72 in.	I = 192-216 in.
SOME (SO)	20-35%	F/M = FINE TO MEDIUM		D = 72-96 in.	J = 216-240 in.
AND	35-50%	F/C = FINE TO COARSE		E = 96-120 in..	K = 240-264 in.
		M/C = MEDIUM TO COARSE		F = 120-144 in.	L = 264-288 in.

TEST BORING LOG

ESS

272 West Exchange Street, Suite 101

Providence, Rhode Island 02903
(401) 421-0398 Fax (401) 421-5731

Site: Providence Gas Company 642 Allens Avenue, Providence, RI	Boring No.: A16
ESS Job No: P151-002	Date: 2/3/00
Driller.: Environmental Drilling, Inc.	Within 100' of Water: Yes
	Instrument: Thermo Environmen Instruments, Inc., Model 580B OVI
Well Diameter: N/A	Boring Depth: 10.0'
Drilling Method: Geoprobe	Depth to Water: 9.5'
Sample Method: 4' Acetate Sampler	Logged By: Jason Wiggin

Depth (intervals)	Sample Depth (feet)	Recovery/ Penetration (in.)	Sample Time	PID (ppm)	Materials Description (size, grade, color, moisture)
A	0-2	24/24	1350	6.8	(0-24") F/M brown sand with LI gravel and LI silt and TR coal ash throughout sample; damp.
B	2-4	40/48		0.0	(27-72") F/M brown sand with LI F/C gravel and LI silt with TR coal ash, TR yellow ash and sand at 44".
C	4-6			0.0	
D	6-8	45/48	1400	0.0	(80-91") F/M brown sand with TR silt and TR coal ash; damp. (91-101") F/C yellow/brown sand with TR silt and TR gravel. (101-105") F/C green/gray sand and TR silt. (105-120") F black coal ash with SO gravel. Wet at 114".
E	8-10			0.0	
F	10-12				
G	12-14				

Comments:

PROPORTIONS USED		ABBREVIATIONS	Well Construction	DEPTH INTERVALS	
		F = FINE	N/A	A = 0-24 in.	G = 144-168 in.
TRACE (TR)	0-10%	M = MEDIUM		B = 24-48 in.	H = 168-192 in.
LITTLE (LI)	10-20%	C = COARSE		C = 48-72 in.	I = 192-216 in.
SOME (SO)	20-35%	F/M = FINE TO MEDIUM		D = 72-96 in.	J = 216-240 in.
AND	35-50%	F/C = FINE TO COARSE		E = 96-120 in..	K = 240-264 in.
		M/C = MEDIUM TO COARSE		F = 120-144 in.	L = 264-288 in.

TEST BORING LOG

ESS
2 West Exchange Street, Suite 101
Providence, Rhode Island 02903
(401) 421-0398 Fax (401) 421-5731

Site: Providence Gas Company 642 Allens Avenue, Providence, RI	Boring No.: A17
ESS Job No: P151-002	Date: 2/3/00
Driller.: Environmental Drilling, Inc.	Within 100' of Water: Yes
Well Diameter: N/A	Instrument: Thermo Environmental Instruments, Inc., Model 580B OVM
Drilling Method: Geoprobe	Boring Depth: 6.0'
Sample Method: 4' Acetate Sampler	Depth to Water: 5.7'
	Logged By: Jason Wiggin

Depth (intervals)	Sample Depth (feet)	Recovery/ Penetration (in.)	Sample Time	PID (ppm)	Materials Description (size, grade, color, moisture)
A	0-2	24/24	1415	4.0	(0-13") F/M brown sand with LI gravel and TR silt; TR powder (white) at 7"; dry. (13-24") F/C gray dark black sand with SO coal ash and TR silt; dry.
B	2-4	37/48	1425	0.0	(35-46") F black sand and coal ash with TR silt; moist. (46-72") F/M brown sand with TR gravel and TR silt, TR coal ash, and black staining throughout. Wet at 66".
C	4-6			0.0	
D	6-8				
E	8-10				
	10-12				
G	12-14				

Comments:

PROPORTIONS USED	
TRACE (TR)	0-10%
LITTLE (LI)	10-20%
SOME (SO)	20-35%
AND	35-50%

ABBREVIATIONS	Well Construction
F = FINE	N/A
M = MEDIUM	
C = COARSE	
F/M = FINE TO MEDIUM	
F/C = FINE TO COARSE	
M/C = MEDIUM TO COARSE	

DEPTH INTERVALS	
A = 0-24 in.	G = 144-168 in.
B = 24-48 in.	H = 168-192 in.
C = 48-72 in.	I = 192-216 in.
D = 72-96 in.	J = 216-240 in.
E = 96-120 in..	K = 240-264 in.
F = 120-144 in.	L = 264-288 in.

TEST BORING LOG

ESS
272 West Exchange Street, Suite 101
Providence, Rhode Island 02903
(401) 421-0398 Fax (401) 421-5731

Site: Providence Gas Company 642 Allens Avenue, Providence, RI	Boring No.: A18
ESS Job No: P151-002	Date: 2/3/00
Driller.: Environmental Drilling, Inc.	Within 100' of Water: Yes
Well Diameter: N/A	Instrument: Thermo Environmental Instruments, Inc., Model 580B OVM
Drilling Method: Geoprobe	Boring Depth: 10.0'
Sample Method: 4' Acetate Sampler	Depth to Water: 7.0'
	Logged By: Jason Wiggin

Depth (intervals)	Sample Depth (feet)	Recovery/ Penetration (in.)	Sample Time	PID (ppm)	Materials Description (size, grade, color, moisture)
A	0-2	24/24	1450	0.0	(0-24") F/C brown sand with SO F gravel, LI coal and coal ash, TR silt; dry.
B	2-4	43/48		0.0	(29-62") F brown sand, LI F/C gravel, TR silt, TR coal ash; damp. (62-72") F brown sand and silt; moist.
C	4-6		1500	0.0	
D	6-8	48/48		0.0	(80-84") F brown sand and silt; moist. (84-103") F gray/brown sand, TR silt, TR F/C gravel, black staining and slight petroleum odor; wet. (103-110") F/C brown sand with TR F gravel; wet. (110-120") F brown sand, LI silt, wet.
E	8-10			0.0	
F	10-12				
G	12-14				

Comments:
Refusal of stone at 14'

PROPORTIONS USED		ABBREVIATIONS	Well Construction	DEPTH INTERVALS	
		F = FINE	(+1.5-4.0') PVC Solid Riser (4.0-9.0') PVC Screen One inch sump at 9.0'	A = 0-24 in.	G = 144-168 in.
TRACE (TR)	0-10%	M = MEDIUM		B = 24-48 in.	H = 168-192 in.
LITTLE (LI)	10-20%	C = COARSE		C = 48-72 in.	I = 192-216 in.
SOME (SO)	20-35%	F/M = FINE TO MEDIUM		D = 72-96 in.	J = 216-240 in.
AND	35-50%	F/C = FINE TO COARSE		E = 96-120 in..	K = 240-264 in.
		M/C = MEDIUM TO COARSE		F = 120-144 in.	L = 264-288 in.

TEST BORING LOG

ESS
2 West Exchange Street, Suite 101
Providence, Rhode Island 02903
(401) 421-0398 Fax (401) 421-5731

Site: Providence Gas Company 642 Allens Avenue, Providence, RI	Boring No.: A19
ESS Job No: P151-002	Date: 2/4/00
Driller.: Environmental Drilling, Inc.	Within 100' of Water: Yes
Well Diameter: N/A	Instrument: Thermo Environmental Instruments, Inc., Model 580B OVM
Drilling Method: Geoprobe	Boring Depth: 10.0'
Sample Method: 4' Acetate Sampler	Depth to Water: 7.5'
	Logged By: Daryll Issa

Depth (intervals)	Sample Depth (feet)	Recovery/ Penetration (in.)	Sample Time	PID (ppm)	Materials Description (size, grade, color, moisture)
A	0-2	24/24	1330	0.0	(0-6") F/C brown sand and gravel; dry; no odor. (6-24") F/M brown sand and gravel with SO M shiny black cinders; dry; no odor.
B	2-4	46/48		0.0	(26-34") F/M black/dark brown sand and gravel with TR cinder ash; dry; no odor. (34-41") F/M black/orange stained sand with SO M orange/black cinders; dry; no odor. (41-72") F brown sand with TR gravel; dry; no odor.
C	4-6			0.0	
D	6-8	48/48	1345	0.0	(72-84") F brown sand with TR gravel and black cinder ash; dry; no odor. (84-120") F brown sand with TR silt; saturated with water at 90";dry; no odor.
E	8-10			0.0	
	10-12				
G	12-14				

Comments:

PROPORTIONS USED		ABBREVIATIONS	Well Construction	DEPTH INTERVALS	
		F = FINE	N/A	A = 0-24 in.	G = 144-168 in.
TRACE (TR)	0-10%	M = MEDIUM		B = 24-48 in.	H = 168-192 in.
LITTLE (LI)	10-20%	C = COARSE		C = 48-72 in.	I = 192-216 in.
SOME (SO)	20-35%	F/M = FINE TO MEDIUM		D = 72-96 in.	J = 216-240 in.
AND	35-50%	F/C = FINE TO COARSE		E = 96-120 in..	K = 240-264 in.
		M/C = MEDIUM TO COARSE		F = 120-144 in.	L = 264-288 in.

TEST BORING LOG

ESS

272 West Exchange Street, Suite 101

Providence, Rhode Island 02903
(401) 421-0398 Fax (401) 421-5731

Site: Providence Gas Company 642 Allens Avenue, Providence, RI	Boring No.: A24
	Date: 2/9/00
ESS Job No: P151-002	Within 100' of Water: Yes
Driller.: Environmental Drilling, Inc.	Instrument: Thermo Environment. Instruments, Inc., Model 580B OVI
Well Diameter: N/A	Boring Depth: 10.0'
Drilling Method: Geoprobe	Depth to Water: 7.5'
Sample Method: 4' Acetate Sampler	Logged By: Daryll Issa

Depth (intervals)	Sample Depth (feet)	Recovery/ Penetration (in.)	Sample Time	PID (ppm)	Materials Description (size, grade, color, moisture)
A	0-2	24/24	0915	0.0	(0-14") F/M brown sand with SO gravel; dry; no odor. (14-18") pulverized stone/concrete. (18-24") F/M brown sand and gravel; dry; no odor.
B	2-4	43/48		0.0	(29-36") black/orange/yellow, cinder ash with SO small/M dull black cinders; dry; no odor. (36-72") F light brown sand with TR gravel; dry; no odor.
C	4-6			0.0	
D	6-8	44/48	0940	0.0	(76-92") F brown sand with TR gravel; damp; no odor. (92-120") F brown sand with SO silt; saturated with water at 91"; no odor;
E	8-10			0.0	
F	10-12				
G	12-14				

Comments:

PROPORTIONS USED		ABBREVIATIONS	Well Construction	DEPTH INTERVALS	
		F = FINE	N/A	A = 0-24 in.	G = 144-168 in.
TRACE (TR)	0-10%	M = MEDIUM		B = 24-48 in.	H = 168-192 in.
LITTLE (LI)	10-20%	C = COARSE		C = 48-72 in.	I = 192-216 in.
SOME (SO)	20-35%	F/M = FINE TO MEDIUM		D = 72-96 in.	J = 216-240 in.
AND	35-50%	F/C = FINE TO COARSE		E = 96-120 in..	K = 240-264 in.
		M/C = MEDIUM TO COARSE		F = 120-144 in.	L = 264-288 in.

TEST BORING LOG

ESS
2 West Exchange Street, Suite 101
Providence, Rhode Island 02903
(401) 421-0398 Fax (401) 421-5731

Site: Providence Gas Company 642 Allens Avenue, Providence, RI	Boring No.: A29
	Date: 2/9/00
ESS Job No: P151-002	Within 100' of Water: No
Driller.: Environmental Drilling, Inc.	Instrument: Thermo Environmental Instruments, Inc., Model 580B OVM
Well Diameter: N/A	Boring Depth: 10.0'
Drilling Method: Geoprobe	Depth to Water: 9.0'
Sample Method: 4' Acetate Sampler	Logged By: Jason Wiggin

Depth (intervals)	Sample Depth (feet)	Recovery/ Penetration (in.)	Sample Time	PID (ppm)	Materials Description (size, grade, color, moisture)
A	0-2	24/24	0850	0.0	(0-24") F/M light brown sand, SO gravel, TR white ash, TR silt; dry; no odor.
B	2-4	44/48		0.0	(28-34") F/M brown/gray sand, TR silt; damp. (34-72") F/M brown/light brown sand, LI gravel, LI F/M black coal/ash/cinders, TR silt; dry; no odor.
C	4-6			0.0	
D	6-8	43/48	0900	0.0	(77-85") F brown/gray sand, TR silt; damp. (85-112") F light brown sand, TR silt; damp. (112-120") F/M light brown sand, TR silt; wet; no odor;
E	8-10			0.0	
F	10-12				
G	12-14				

Comments:

PROPORTIONS USED	
TRACE (TR)	0-10%
LITTLE (LI)	10-20%
SOME (SO)	20-35%
AND	35-50%

ABBREVIATIONS	Well Construction
F = FINE	N/A
M = MEDIUM	
C = COARSE	
F/M = FINE TO MEDIUM	
F/C = FINE TO COARSE	
M/C = MEDIUM TO COARSE	

DEPTH INTERVALS	
A = 0-24 in.	G = 144-168 in.
B = 24-48 in.	H = 168-192 in.
C = 48-72 in.	I = 192-216 in.
D = 72-96 in.	J = 216-240 in.
E = 96-120 in..	K = 240-264 in.
F = 120-144 in.	L = 264-288 in.

TEST BORING LOG

ESS

272 West Exchange Street, Suite 101

Providence, Rhode Island 02903
(401) 421-0398 Fax (401) 421-5731

Site: Providence Gas Company 642 Allens Avenue, Providence, RI	Boring No.: A30
ESS Job No: P151-002	Date: 2/9/00
Driller.: Environmental Drilling, Inc.	Within 100' of Water: No
	Instrument: Thermo Environment. Instruments, Inc., Model 580B OVM
Well Diameter: N/A	Boring Depth: 10.0'
Drilling Method: Geoprobe	Depth to Water: 9.5'
Sample Method: 4' Acetate Sampler	Logged By: Daryll Issa

Depth (intervals)	Sample Depth (feet)	Recovery/ Penetration (in.)	Sample Time	PID (ppm)	Materials Description (size, grade, color, moisture)
A	0-2	24/24	0845	0.0	(0-11") crush stone with SO F/M brown sand and SO gravel; dry; no odor. (11-24") F/M sand and gravel with SO black cinder ash and black cinders in interval; dry; no odor.
B	2-4	40/48		0.0	(32-34") F/C brown sand with SO gravel; dry; no odor. (34-48") F black stained orange/brown sand with SO cinder ash and SO small shiny cinders; dry; no odor. (48-72") F brown/light brown sand with TR gravel; dry; no odor.
C	4-6			0.0	
D	6-8	28/48		0.0	(92-98") F/M brown sand with SO loose black cinder ash; dry; no odor. (98-109") F brown sand with SO gravel; dry; no odor. (109-112") pulverized stone; wet. (112-120") F sand and silt with TR gravel; saturated with water; no odor.
E	8-10		0900	0.0	
F	10-12				
G	12-14				

Comments:

PROPORTIONS USED	
TRACE (TR)	0-10%
LITTLE (LI)	10-20%
SOME (SO)	20-35%
AND	35-50%

ABBREVIATIONS	Well Construction
F = FINE	N/A
M = MEDIUM	
C = COARSE	
F/M = FINE TO MEDIUM	
F/C = FINE TO COARSE	
M/C = MEDIUM TO COARSE	

DEPTH INTERVALS	
A = 0-24 in.	G = 144-168 in.
B = 24-48 in.	H = 168-192 in.
C = 48-72 in.	I = 192-216 in.
D = 72-96 in.	J = 216-240 in.
E = 96-120 in..	K = 240-264 in.
F = 120-144 in.	L = 264-288 in.

TEST BORING LOG

ESS
272 West Exchange Street, Suite 101
Providence, Rhode Island 02903
(401) 421-0398 Fax (401) 421-5731

Site: Providence Gas Company 642 Allens Avenue, Providence, RI	Boring No.: A32
	Date: 2/9/00
ESS Job No: P151-002	Within 100' of Water: No
Driller.: Environmental Drilling, Inc.	Instrument: Thermo Environment Instruments, Inc., Model 580B OVM
Well Diameter: N/A	Boring Depth: 10.0'
Drilling Method: Geoprobe	Depth to Water: 9.8'
Sample Method: 4' Acetate Sampler	Logged By: Jason Wiggin

Depth (intervals)	Sample Depth (feet)	Recovery/ Penetration (in.)	Sample Time	PID (ppm)	Materials Description (size, grade, color, moisture)
A	0-2	24/24	0950	0.0	(0-5") F/M dark gray sand, TR silt, damp, red staining. (5-11") F/C tan/light brown sand, TR silt, orange (O2) apparent at 7"; dry; black staining at 13-16" and at approximately 24". (11-24") F/C brown sand, LI F/M gravel, TR silt, TR coal ash at 13"; dry; no odor.
B	2-4	46/48		0.0	(26-40")F/M brown sand, LI F gravel; LI black ash/coal, staining, TR silt; no odor; TR light gray dust/ash; dry. (40-60") light brown/gray sand and F gravel or broken concrete, LI gray ash; dry. (60-72") F/M brown sand, LI C gravel, TR silt; dry; no odor.
C	4-6			0.0	
D	6-8	45/48		0.0	(75-81") F brown sand, LI silt, black staining, TR black coal/ash. (81-92") light gray, broken concrete with dark specks. (92-100") F/C light brown/gray sand, LI broken concrete, TR silt, TR black ash/coal bits. (100-110") light gray broken concrete with dark specks. (110-120") F/M brown sand, SO black stained sand with ash/coal; wet; no odor; water table at 117".
E	8-10		1000	0.0	
F	10-12				
G	12-14				

Comments:

PROPORTIONS USED	
TRACE (TR)	0-10%
LITTLE (LI)	10-20%
SOME (SO)	20-35%
AND	35-50%

ABBREVIATIONS	Well Construction
F = FINE	N/A
M = MEDIUM	
C = COARSE	
F/M = FINE TO MEDIUM	
F/C = FINE TO COARSE	
M/C = MEDIUM TO COARSE	

DEPTH INTERVALS	
A = 0-24 in.	G = 144-168 in.
B = 24-48 in.	H = 168-192 in.
C = 48-72 in.	I = 192-216 in.
D = 72-96 in.	J = 216-240 in.
E = 96-120 in..	K = 240-264 in.
F = 120-144 in.	L = 264-288 in.

TEST BORING LOG

ESS
2 West Exchange Street, Suite 101
Providence, Rhode Island 02903
(401) 421-0398 Fax (401) 421-5731

Site: Providence Gas Company 642 Allens Avenue, Providence, RI	Boring No.: A39
ESS Job No: P151-002	Date: 2/17/00
Driller.: Environmental Drilling, Inc.	Within 100' of Water:
Well Diameter: N/A	Instrument: Thermo Environmental Instruments, Inc., Model 580B OVM
Drilling Method: Geoprobe	Boring Depth:
Sample Method: 4' Acetate Sampler	Depth to Water:
	Logged By: Daryll Issa

Depth (intervals)	Sample Depth (feet)	Recovery/ Penetration (in.)	Sample Time	PID (ppm)	Materials Description (size, grade, color, moisture)
A	0-2				Refusal. No samples recovered.
B	2-4				
C	4-6				
D	6-8				
E	8-10				
F	10-12				
G	12-14				

Comments:

PROPORTIONS USED		ABBREVIATIONS	Well Construction	DEPTH INTERVALS	
		F = FINE	(+1.0-3.0') PVC Solid Riser (3.0-8.0') PVC Screen One inch sump at 8.0'	A = 0-24 in.	G = 144-168 in.
TRACE (TR)	0-10%	M = MEDIUM		B = 24-48 in.	H = 168-192 in.
LITTLE (LI)	10-20%	C = COARSE		C = 48-72 in.	I = 192-216 in.
SOME (SO)	20-35%	F/M = FINE TO MEDIUM		D = 72-96 in.	J = 216-240 in.
AND	35-50%	F/C = FINE TO COARSE		E = 96-120 in..	K = 240-264 in.
		M/C = MEDIUM TO COARSE		F = 120-144 in.	L = 264-288 in.

TEST BORING LOG

ESS
272 West Exchange Street, Suite 101
Providence, Rhode Island 02903
(401) 421-0398 Fax (401) 421-5731

Site: Providence Gas Company 642 Allens Avenue, Providence, RI	Boring No.: A43
ESS Job No: P151-002	Date: 2/17/00
Driller.: Environmental Drilling, Inc.	Within 100' of Water: No
	Instrument: Thermo Environment Instruments, Inc., Model 580B OVM
Well Diameter: N/A	Boring Depth: 10.0'
Drilling Method: Geoprobe	Depth to Water: 8.0'
Sample Method: 4' Acetate Sampler	Logged By: Daryll Issa

Depth (intervals)	Sample Depth (feet)	Recovery/ Penetration (in.)	Sample Time	PID (ppm)	Materials Description (size, grade, color, moisture)
A	0-2	24/24	1420	0.0	(0-6") pulverized stone/gravel/wet topsoil. (6-24") F/M dark brown/brown sand with SO gravel; dry; no odor.
B	2-4	31/48		0.0	(41-56") F/M dark brown sand with SO gravel; dry; no odor. (56-72") F/M brown sand and gravel; dry; no odor.
C	4-6		1440	0.0	
D	6-8	48/48		0.0	(105-120") F/M sand and silt with LI gravel; wet; no odor.
E	8-10			0.0	
F	10-12				
G	12-14				

Comments:

PROPORTIONS USED	
TRACE (TR)	0-10%
LITTLE (LI)	10-20%
SOME (SO)	20-35%
AND	35-50%

ABBREVIATIONS	Well Construction
F = FINE	N/A
M = MEDIUM	
C = COARSE	
F/M = FINE TO MEDIUM	
F/C = FINE TO COARSE	
M/C = MEDIUM TO COARSE	

DEPTH INTERVALS	
A = 0-24 in.	G = 144-168 in.
B = 24-48 in.	H = 168-192 in.
C = 48-72 in.	I = 192-216 in.
D = 72-96 in.	J = 216-240 in.
E = 96-120 in..	K = 240-264 in.
F = 120-144 in.	L = 264-288 in.

TEST BORING LOG

ESS
72 West Exchange Street, Suite 101
Providence, Rhode Island 02903
(401) 421-0398 Fax (401) 421-5731

Site: Providence Gas Company 642 Allens Avenue, Providence, RI	Boring No.: A44
ESS Job No: P151-002	Date: 2/17/00
Driller.: Environmental Drilling, Inc.	Within 100' of Water: No
Well Diameter: N/A	Instrument: Thermo Environmental Instruments, Inc., Model 580B OVM
Drilling Method: Geoprobe	Boring Depth: 14.0'
Sample Method: 4' Acetate Sampler	Depth to Water: 12.0'
	Logged By: Nicole Murry

Depth (intervals)	Sample Depth (feet)	Recovery/ Penetration (in.)	Sample Time	PID (ppm)	Materials Description (size, grade, color, moisture)
A	0-2	24/24	1330	0.0	(0-4") M/C brown sand. (4-8") black cinder ash with black cinder ash stone. (8-24") poorly sorted F/C brown sand with M/large gray gravel, coal bits, cinder ash and brick throughout the interval.
B	2-4	36/48		0.0	(36-40") poorly sorted F/C brown sand with M/large gray gravel, coal bits, cinder ash and brick throughout. (40-41") stone with orange M sand. (41-48") poorly sorted dark brown sand with black cinder ash and small/M gravel. (48-56") very C orange/brown sand. (56-72") poorly sorted orange/brown sand with small/M gravel, cinder ash; (56-62") gravel sand at 66-68.
C	4-6		1350	0.0	
D	6-8	36/48		0.0	(84-120") very C brown/orange sand, loose LI stone at 116".
E	8-10			0.0	
F	10-12	38/48		0.0	(130-168") poorly sorted, very C orange/brown sand; saturated at 144".
G	12-14	38/48		0.0	

Comments:

PROPORTIONS USED	
TRACE (TR)	0-10%
LITTLE (LI)	10-20%
SOME (SO)	20-35%
AND	35-50%

ABBREVIATIONS	Well Construction
F = FINE	N/A
M = MEDIUM	
C = COARSE	
F/M = FINE TO MEDIUM	
F/C = FINE TO COARSE	
M/C = MEDIUM TO COARSE	

DEPTH INTERVALS	
A = 0-24 in.	G = 144-168 in.
B = 24-48 in.	H = 168-192 in.
C = 48-72 in.	I = 192-216 in.
D = 72-96 in.	J = 216-240 in.
E = 96-120 in..	K = 240-264 in.
F = 120-144 in.	L = 264-288 in.

TEST BORING LOG

ESS
272 West Exchange Street, Suite 101
Providence, Rhode Island 02903
(401) 421-0398 Fax (401) 421-5731

Site: Providence Gas Company 642 Allens Avenue, Providence, RI	Boring No.: A49
ESS Job No: P151-002	Date: 2/17/00
Driller.: Environmental Drilling, Inc.	Within 100' of Water: No
Well Diameter: N/A	Instrument: Thermo Environmental Instruments, Inc., Model 580B OVM
Drilling Method: Geoprobe	Boring Depth: 14.0'
Sample Method: 4' Acetate Sampler	Depth to Water: 13.5'
	Logged By: Nicole Murry

Depth (intervals)	Sample Depth (feet)	Recovery/ Penetration (in.)	Sample Time	PID (ppm)	Materials Description (size, grade, color, moisture)
A	0-2	24/24	1250	0.0	(0-24") poorly sorted F/M brown sand mixed with small/large rounded gravel, black cinder ash, cinder ash stone, brick, glass throughout.
B	2-4	30/48		0.0	(44-70") poorly sorted M/C brown sand mixed with small/large rounded gravel, large cinders, coal bits throughout 56-70". (70-72") large white stone/concrete bits.
C	4-6			0.0	
D	6-8	28/48		0.0	(92-96") M brown sand with M gravel. (96-110") poorly sorted M/C brown sand with small/large gravel. (110-120") concrete, concrete powder mixed with stone, gray gravel and SO M brown sand.
E	8-10			0.0	
F	10-12	36/48		0.0	(132-150") poorly sorted brown/gray M/C sand mixed with M/large gravel, SO coal, SO cinder. (150-164") loose C stone 164-168" poorly sorted brown/red sand with M/large gravel; saturated at 164".
G	12-14	36/48	1305	0.0	

Comments:

PROPORTIONS USED	
TRACE (TR)	0-10%
LITTLE (LI)	10-20%
SOME (SO)	20-35%
AND	35-50%

ABBREVIATIONS	Well Construction
F = FINE	N/A
M = MEDIUM	
C = COARSE	
F/M = FINE TO MEDIUM	
F/C = FINE TO COARSE	
M/C = MEDIUM TO COARSE	

DEPTH INTERVALS	
A = 0-24 in.	G = 144-168 in.
B = 24-48 in.	H = 168-192 in.
C = 48-72 in.	I = 192-216 in.
D = 72-96 in.	J = 216-240 in.
E = 96-120 in..	K = 240-264 in.
F = 120-144 in.	L = 264-288 in.

TEST BORING LOG

ESS
2 West Exchange Street, Suite 101
Providence, Rhode Island 02903
(401) 421-0398 Fax (401) 421-5731

Site: Providence Gas Company 642 Allens Avenue, Providence, RI	Boring No.: A50
ESS Job No: P151-002	Date: 2/23/00
Driller.: Environmental Drilling, Inc.	Within 100' of Water: No
Well Diameter: N/A	Instrument: Thermo Environmental Instruments, Inc., Model 580B OVM
Drilling Method: Geoprobe	Boring Depth: 14.0'
Sample Method: 4' Acetate Sampler	Depth to Water: 12.0'
	Logged By: Nicole Murry

Depth (intervals)	Sample Depth (feet)	Recovery/ Penetration (in.)	Sample Time	PID (ppm)	Materials Description (size, grade, color, moisture)
A	0-2	24/24	1435	0.0	(0-5") M brown sand with small/M rounded gravel. (5-7") brown sand with F black cinder ash. (7-20") very F brown silty sand. (20-24") brown sand with black cinder ash; stone at 24".
B	2-4	12/48		0.0	(60-64") M/C brown sand, large stone at 62". (64-66") white large gravel. (66-72") M/C brown sand with small/large rounded gravel.
C	4-6			0.0	
D	6-8	24/48		0.0	(96-100") M/C brown sand with small/M C gravel. (100-102") light green sand with M brown sand. (102-110") poorly sorted M/C light brown sand with small/M rounded stone, coal bits. (110-112") C large stone. (112-120") poorly sorted M/C light brown sand with small/M rounded stone, coal bits, 102-110 coal bits.
E	8-10		1445	0.0	
F	10-12	40/48		0.0	(128-146") poorly sorted brown sand with small/large rounded gravel; wet at 144".
G	12-14	40/48		0.0	

Comments:

PROPORTIONS USED	
TRACE (TR)	0-10%
LITTLE (LI)	10-20%
SOME (SO)	20-35%
AND	35-50%

ABBREVIATIONS	Well Construction
F = FINE	N/A
M = MEDIUM	
C = COARSE	
F/M = FINE TO MEDIUM	
F/C = FINE TO COARSE	
M/C = MEDIUM TO COARSE	

DEPTH INTERVALS	
A = 0-24 in.	G = 144-168 in.
B = 24-48 in.	H = 168-192 in.
C = 48-72 in.	I = 192-216 in.
D = 72-96 in.	J = 216-240 in.
E = 96-120 in..	K = 240-264 in.
F = 120-144 in.	L = 264-288 in.

TEST BORING LOG

ESS
272 West Exchange Street, Suite 101
Providence, Rhode Island 02903
(401) 421-0398 Fax (401) 421-5731

Site: Providence Gas Company 642 Allens Avenue, Providence, RI	Boring No.: A51
ESS Job No: P151-002	Date: 2/23/00
Driller.: Environmental Drilling, Inc.	Within 100' of Water: No
Well Diameter: N/A	Instrument: Thermo Environmental Instruments, Inc., Model 580B OVM
Drilling Method: Geoprobe	Boring Depth: 10.0'
Sample Method: 4' Acetate Sampler	Depth to Water: 9.0'
	Logged By: Nicole Murry

Depth (intervals)	Sample Depth (feet)	Recovery/ Penetration (in.)	Sample Time	PID (ppm)	Materials Description (size, grade, color, moisture)
A	0-2	24/24	1505	0.0	(0-10") M dark brown sand, large cinder ash, stone at 3", large gray gravel throughout. (10-24") F light brown silty sand.
B	2-4	24/48		0.0	(48-60") F light brown silty sand, (60-72") dense brown silty sand, large gravel 66-72".
C	4-6			0.0	
D	6-8	30/48	1515	0.0	(90-120") F/M brown sand with small/M rounded stone throughout, SO black cinder ash at 106"; wet at 108".
E	8-10			0.0	
F	10-12				
G	12-14				

Comments:

PROPORTIONS USED		ABBREVIATIONS	Well Construction	DEPTH INTERVALS	
		F = FINE	N/A	A = 0-24 in.	G = 144-168 in.
TRACE (TR)	0-10%	M = MEDIUM		B = 24-48 in.	H = 168-192 in.
LITTLE (LI)	10-20%	C = COARSE		C = 48-72 in.	I = 192-216 in.
SOME (SO)	20-35%	F/M = FINE TO MEDIUM		D = 72-96 in.	J = 216-240 in.
AND	35-50%	F/C = FINE TO COARSE		E = 96-120 in..	K = 240-264 in.
		M/C = MEDIUM TO COARSE		F = 120-144 in.	L = 264-288 in.

TEST BORING LOG

ESS
272 West Exchange Street, Suite 101
Providence, Rhode Island 02903
(401) 421-0398 Fax (401) 421-5731

Site: Providence Gas Company 642 Allens Avenue, Providence, RI	Boring No.: A57
ESS Job No: P151-002	Date: 2/23/00
Driller.: Environmental Drilling, Inc.	Within 100' of Water: No
Well Diameter: N/A	Instrument: Thermo Environment Instruments, Inc., Model 580B OVM
Drilling Method: Geoprobe	Boring Depth: 14.0'
Sample Method: 4' Acetate Sampler	Depth to Water: 11.0'
	Logged By: Nicole Murry

Depth (intervals)	Sample Depth (feet)	Recovery/ Penetration (in.)	Sample Time	PID (ppm)	Materials Description (size, grade, color, moisture)
A	0-2	24/24	1350	0.0	(0-20") M brown silty sand with small/M rounded stones throughout. (20-24") C gray sand, concrete bits and concrete powder.
B	2-4	36/48		0.0	(36-38") concrete and concrete powder. (38-42") M brown sand with SO black cinder ash and M/large rounded gravel. (42-50") large gray gravel with F dense black cinder ash. (50-56") concrete and concrete powder. (56-72") poorly sorted M/large gravel, brown sand, SO black cinder 56-60".
C	4-6			0.0	
D	6-8	36/48		0.0	(96-102") M brown sand wit SO black cinder. (102-120") poorly sorted M/C brown sand with M/large gravel at 104", 106", and 110", black specks (LI), 102-110" M/large gravel.
E	8-10		1410	0.0	
F	10-12	48/48		0.0	(120-130") M/C brown sand with SO M gravel, saturated at 130". (130-144") very F light brown silty sand. (144-168") M/C brown sand.
G	12-14	48/48		0.0	

Comments:

PROPORTIONS USED	
TRACE (TR)	0-10%
LITTLE (LI)	10-20%
SOME (SO)	20-35%
AND	35-50%

ABBREVIATIONS	Well Construction
F = FINE	N/A
M = MEDIUM	
C = COARSE	
F/M = FINE TO MEDIUM	
F/C = FINE TO COARSE	
M/C = MEDIUM TO COARSE	

DEPTH INTERVALS	
A = 0-24 in.	G = 144-168 in.
B = 24-48 in.	H = 168-192 in.
C = 48-72 in.	I = 192-216 in.
D = 72-96 in.	J = 216-240 In.
E = 96-120 in..	K = 240-264 in.
F = 120-144 in.	L = 264-288 in.

TEST BORING LOG

ESS
2 West Exchange Street, Suite 101
Providence, Rhode Island 02903
(401) 421-0398 Fax (401) 421-5731

Site: Providence Gas Company 642 Allens Avenue, Providence, RI	Boring No.: A58
	Date: 2/29/00
ESS Job No: P151-002	Within 100' of Water: No
Driller.: Environmental Drilling, Inc.	Instrument: Thermo Environmental Instruments, Inc., Model 580B OVM
Well Diameter: N/A	Boring Depth: 6.0'
Drilling Method: Geoprobe	Depth to Water: 5.0'
Sample Method: 4' Acetate Sampler	Logged By: Daryll Issa

Depth (intervals)	Sample Depth (feet)	Recovery/ Penetration (in.)	Sample Time	PID (ppm)	Materials Description (size, grade, color, moisture)
A	0-2	24/24	0845	0.0	(0-4") wet topsoil with SO F/M brown sand and SO gravel. (4-24") F/M brown sand with SO gravel; dry; no odor; a LI oxidation at 22-24".
B	2-4	48/48		0.0	(24-60") F/M brown sand with SO gravel and SO red staining (30-48"); dry; no odor. (60-72") F/M brown sand with SO gravel and SO red staining; wet; no odor.
C	4-6		0915	0.0	
D	6-8				
E	8-10				
F	10-12				
G	12-14				

Comments:

PROPORTIONS USED

TRACE (TR)	0-10%
LITTLE (LI)	10-20%
SOME (SO)	20-35%
AND	35-50%

ABBREVIATIONS

F = FINE
M = MEDIUM
C = COARSE
F/M = FINE TO MEDIUM
F/C = FINE TO COARSE
M/C = MEDIUM TO COARSE

Well Construction

N/A

DEPTH INTERVALS

A = 0-24 in.	G = 144-168 in.
B = 24-48 in.	H = 168-192 in.
C = 48-72 in.	I = 192-216 in.
D = 72-96 in.	J = 216-240 in.
E = 96-120 in..	K = 240-264 in.
F = 120-144 in.	L = 264-288 in.

TEST BORING LOG

ESS
272 West Exchange Street, Suite 101
Providence, Rhode Island 02903
(401) 421-0398 Fax (401) 421-5731

Site: Providence Gas Company 642 Allens Avenue, Providence, RI	Boring No.: **A59**
ESS Job No: P151-002	Date: 2/29/00
Driller.: Environmental Drilling, Inc.	Within 100' of Water: No
Well Diameter: N/A	Instrument: Thermo Environment. Instruments, Inc., Model 580B OVM
Drilling Method: Geoprobe	Boring Depth: 10.0'
Sample Method: 4' Acetate Sampler	Depth to Water: 4.8'
	Logged By: Daryll Issa

Depth (intervals)	Sample Depth (feet)	Recovery/ Penetration (in.)	Sample Time	PID (ppm)	Materials Description (size, grade, color, molsture)
A	0-2	24/24	0930	0.0	(0-6") F/M dark brown sand and topsoil with SO gravel; wet TR surface rain; no odor. (6-24") F/M brown/red stained sand with SO gravel concrete red stained from (20-24"); dry; no odor.
B	2-4	48/48		0.0	(24-42") F/M red stained sand and gravel; dry; no odor. (42-44") F/M brown sand and pulverized stone; damp; no odor. (44-72") F/M brown sand and gravel; wet; no odor.
C	4-6		0950	0.0	
D	6-8	48/48		0.0	(72-76") F/M brown sand with TR gravel; damp; no odor. (76-120") F/M brown/gray/dark brown sand with TR silt; saturated; no odor.
E	8-10			0.0	
F	10-12				
G	12-14				

Comments:

PROPORTIONS USED	
TRACE (TR)	0-10%
LITTLE (LI)	10-20%
SOME (SO)	20-35%
AND	35-50%

ABBREVIATIONS	Well Construction
F = FINE	N/A
M = MEDIUM	
C = COARSE	
F/M = FINE TO MEDIUM	
F/C = FINE TO COARSE	
M/C = MEDIUM TO COARSE	

DEPTH INTERVALS	
A = 0-24 in.	G = 144-168 in.
B = 24-48 in.	H = 168-192 in.
C = 48-72 in.	I = 192-216 in.
D = 72-96 in.	J = 216-240 in.
E = 96-120 in..	K = 240-264 in.
F = 120-144 in.	L = 264-288 in.

TEST BORING LOG

ESS
2 West Exchange Street, Suite 101
Providence, Rhode Island 02903
(401) 421-0398 Fax (401) 421-5731

Site: Providence Gas Company 642 Allens Avenue, Providence, RI	Boring No.: A60
ESS Job No: P151-002	Date: 2/29/00
Driller.: Environmental Drilling, Inc.	Within 100' of Water: No
Well Diameter: N/A	Instrument: Thermo Environmental Instruments, Inc., Model 580B OVM
Drilling Method: Geoprobe	Boring Depth: 10.0'
Sample Method: 4' Acetate Sampler	Depth to Water: 5.5'
	Logged By: Daryll Issa

Depth (intervals)	Sample Depth (feet)	Recovery/ Penetration (in.)	Sample Time	PID (ppm)	Materials Description (size, grade, color, moisture)
A	0-2	24/24	1000	0.0	(0-5") F/M brown topsoil with SO gravel; wet from surficial water; no odor. (5-19") F brown sand with SO silt and So gravel; dry; no odor. (19-24") F brown/red stained sand with SO gravel; dry; no odor.
B	2-4	38/48		0.0	(34-57") F brown/red stained sand with TR gravel; dry; no odor. (57-62") F brown/red/black stained sand with TR gravel; damp; no odor. (62-72") F/M brown sand and TR silt; saturated with water; no odor.
C	4-6		1015	0.0	
D	6-8	28/48		0.0	(92-120") F/M gray stained brown sand with SO silt and SO gravel; wet; petroleum odor.
E	8-10			0.0	
F	10-12				
G	12-14				

Comments:

PROPORTIONS USED	
TRACE (TR)	0-10%
LITTLE (LI)	10-20%
SOME (SO)	20-35%
AND	35-50%

ABBREVIATIONS	Well Construction
F = FINE	N/A
M = MEDIUM	
C = COARSE	
F/M = FINE TO MEDIUM	
F/C = FINE TO COARSE	
M/C = MEDIUM TO COARSE	

DEPTH INTERVALS	
A = 0-24 in.	G = 144-168 in.
B = 24-48 in.	H = 168-192 in.
C = 48-72 in.	I = 192-216 in.
D = 72-96 in.	J = 216-240 in.
E = 96-120 in..	K = 240-264 in.
F = 120-144 in.	L = 264-288 in.

TEST BORING LOG

ESS
272 West Exchange Street, Suite 101
Providence, Rhode Island 02903
(401) 421-0398 Fax (401) 421-5731

Site: Providence Gas Company 642 Allens Avenue, Providence, RI	Boring No.: A61
ESS Job No: P151-002	Date: 2/29/00
Driller.: Environmental Drilling, Inc.	Within 100' of Water: No
Well Diameter: N/A	Instrument: Thermo Environmental Instruments, Inc., Model 580B OVM
Drilling Method: Geoprobe	Boring Depth: 6.0'
Sample Method: 4' Acetate Sampler	Depth to Water: 5.0'
	Logged By: Daryll Issa

Depth (intervals)	Sample Depth (feet)	Recovery/ Penetration (in.)	Sample Time	PID (ppm)	Materials Description (size, grade, color, moisture)
A	0-2	24/24	1030	0.0	(0-4") F/M brown sand and gravel; damp; no odor. (4-18") F brown sand with TR gravel and LI silt; dry; no odor. (18-24") F/M red stained sand with SO gravel; dry; no odor.
B	2-4	40/48		0.0	(32-44") F/M red/brown stained sand with SO gravel; dry; no odor. (44-51") F/M brown/gray sand with SO gravel; dry; no odor. (51-58") F/M brown sand with LI red stained sand, SO gravel; damp; no odor. (58-61") pulverized stone. (61-72") F/M brown/gray sand with SO gravel; saturated with water; no odor.
C	4-6		1050	0.0	
D	6-8				
E	8-10				
F	10-12				
G	12-14				

Comments:

PROPORTIONS USED		ABBREVIATIONS	Well Construction	DEPTH INTERVALS	
		F = FINE	N/A	A = 0-24 in.	G = 144-168 in.
TRACE (TR)	0-10%	M = MEDIUM		B = 24-48 in.	H = 168-192 in.
LITTLE (LI)	10-20%	C = COARSE		C = 48-72 in.	I = 192-216 in.
SOME (SO)	20-35%	F/M = FINE TO MEDIUM		D = 72-96 in.	J = 216-240 in.
AND	35-50%	F/C = FINE TO COARSE		E = 96-120 in..	K = 240-264 in.
		M/C = MEDIUM TO COARSE		F = 120-144 in.	L = 264-288 in.

TEST BORING LOG

ESS
272 West Exchange Street, Suite 101
Providence, Rhode Island 02903
(401) 421-0398 Fax (401) 421-5731

Site: Providence Gas Company 642 Allens Avenue, Providence, RI	Boring No.: A63
ESS Job No: P151-002	Date: 2/29/00
Driller.: Environmental Drilling, Inc.	Within 100' of Water: No
	Instrument: Thermo Environmen. Instruments, Inc., Model 580B OVM
Well Diameter: N/A	Boring Depth: 10.0'
Drilling Method: Geoprobe	Depth to Water: 4.0'
Sample Method: 4' Acetate Sampler	Logged By: Daryll Issa

Depth (intervals)	Sample Depth (feet)	Recovery/ Penetration (in.)	Sample Time	PID (ppm)	Materials Description (size, grade, color, moisture)
A	0-2	24/24	1115	0.0	(0-19") F/M brown/dark brown sand with SO gravel and SO TR small black cinders; dry; no odor. (19-24") F/ loose black cinder ash with SO small/M black cinders.
B	2-4	35/48	1130	0.0	(37-49") F/ loose black cinder ash with pulverized stone at 42-44" with LI gravel and SO coal chips; dry; no odor. (49-60") F gray/brown sand with SO silt and TR gravel; saturated with water; no odor. (60-63") F/M brown/gray sand with TR silt; saturated with water with SO lime green staining; no odor. (63-72") pulverized stone/concrete; saturated with water; no odor.
C	4-6			0.0	
D	6-8	34/48		0.0	(86-90") F/M gray stained sand and black cinder ash; saturated with water; light sweet odor. (90-120") F/M gray/black stained sand with LI gravel, saturated with water/some sheen observed; heavy odor.
E	8-10			0.0	
F	10-12				
G	12-14				

Comments:

PROPORTIONS USED		ABBREVIATIONS	Well Construction	DEPTH INTERVALS	
		F = FINE	N/A		
TRACE (TR)	0-10%	M = MEDIUM		A = 0-24 in.	G = 144-168 in.
LITTLE (LI)	10-20%	C = COARSE		B = 24-48 in.	H = 168-192 in.
SOME (SO)	20-35%	F/M = FINE TO MEDIUM		C = 48-72 in.	I = 192-216 in.
AND	35-50%	F/C = FINE TO COARSE		D = 72-96 in.	J = 216-240 in.
		M/C = MEDIUM TO COARSE		E = 96-120 in..	K = 240-264 in.
				F = 120-144 in.	L = 264-288 in.

TEST BORING LOG

ESS
2 West Exchange Street, Suite 101
Providence, Rhode Island 02903
(401) 421-0398 Fax (401) 421-5731

Site: Providence Gas Company 642 Allens Avenue, Providence, RI	Boring No.: A64
	Date: 2/29/00
ESS Job No: P151-002	Within 100' of Water: No
Driller.: Environmental Drilling, Inc.	Instrument: Thermo Environmental Instruments, Inc., Model 580B OVM
Well Diameter: N/A	Boring Depth: 6.0'
Drilling Method: Geoprobe	Depth to Water: 4.8'
Sample Method: 4' Acetate Sampler	Logged By: Daryll Issa

Depth (intervals)	Sample Depth (feet)	Recovery/ Penetration (in.)	Sample Time	PID (ppm)	Materials Description (size, grade, color, moisture)
A	0-2	24/24	1330	0.0	(0-18") F/M brown sand with SO gravel; dry; no odor. (18-24") F/M dark brown sand with SO black cinder ash and SO M/large black cinders with LI gravel; dry; no odor.
B	2-4	36/48		0.0	(36-55") F/M brown sand with SO gravel and SO black cinder ash and SO small/M black cinders; dry; no odor. (55-72") F/M gray stained sand and silt with SO gravel; saturated with water; heavy petroleum odor.
C	4-6		1345	0.0	
D	6-8				
E	8-10				
F	10-12				
G	12-14				

Comments:

PROPORTIONS USED	
TRACE (TR)	0-10%
LITTLE (LI)	10-20%
SOME (SO)	20-35%
AND	35-50%

ABBREVIATIONS	Well Construction
F = FINE	N/A
M = MEDIUM	
C = COARSE	
F/M = FINE TO MEDIUM	
F/C = FINE TO COARSE	
M/C = MEDIUM TO COARSE	

DEPTH INTERVALS	
A = 0-24 in.	G = 144-168 in.
B = 24-48 in.	H = 168-192 in.
C = 48-72 in.	I = 192-216 in.
D = 72-96 in.	J = 216-240 in.
E = 96-120 in..	K = 240-264 in.
F = 120-144 in.	L = 264-288 in.

TEST BORING LOG

ESS
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Providence, Rhode Island 02903
(401) 421-0398 Fax (401) 421-5731

Site: Providence Gas Company 642 Allens Avenue, Providence, RI	Boring No.: A65
ESS Job No: P151-002	Date: 2/29/00
Driller.: Environmental Drilling, Inc.	Within 100' of Water: No
Well Diameter: N/A	Instrument: Thermo Environment Instruments, Inc., Model 580B OVM
Drilling Method: Geoprobe	Boring Depth: 6.0'
Sample Method: 4' Acetate Sampler	Depth to Water: 4.0'
	Logged By: Daryll Issa

Depth (intervals)	Sample Depth (feet)	Recovery/ Penetration (in.)	Sample Time	PID (ppm)	Materials Description (size, grade, color, moisture)
A	0-2	24/24	1300	0.0	(0-17") F/M brown sand with SO gravel and SO small/large black cinders; dry; no odor. (17-20") concrete/pulverized stone (gray-weathered/soft). (20-24") F/M brown sand with LI gravel and LI small black cinders; dry; no odor.
B	2-4	38/48		0.0	(34-42") F/M brown/dark brown sand with LI gravel; damp; no odor. (42-55") F/M brown/dark brown sand with SO silt and SO gravel, SO red staining; saturated at 48". (55-60") F/C brown/dark brown/red stained sand with SO gravel; saturated; no odor with LI clay and SO dark cinder ash. (60-72") F/M gray stained sand and gravel; saturated with water; heavy petroleum odor.
C	4-6		1320	0.0	
D	6-8				
E	8-10				
F	10-12				
G	12-14				

Comments:

PROPORTIONS USED		ABBREVIATIONS	Well Construction	DEPTH INTERVALS	
		F = FINE	N/A	A = 0-24 in.	G = 144-168 in.
TRACE (TR)	0-10%	M = MEDIUM		B = 24-48 in.	H = 168-192 in.
LITTLE (LI)	10-20%	C = COARSE		C = 48-72 in.	I = 192-216 in.
SOME (SO)	20-35%	F/M = FINE TO MEDIUM		D = 72-96 in.	J = 216-240 in.
AND	35-50%	F/C = FINE TO COARSE		E = 96-120 in..	K = 240-264 in.
		M/C = MEDIUM TO COARSE		F = 120-144 in.	L = 264-288 in.

TEST BORING LOG

ESS
2 West Exchange Street, Suite 101
Providence, Rhode Island 02903
(401) 421-0398 Fax (401) 421-5731

Site: Providence Gas Company 642 Allens Avenue, Providence, RI	Boring No.: A66
	Date: 2/29/00
ESS Job No: P151-002	Within 100' of Water: No
Driller.: Environmental Drilling, Inc.	Instrument: Thermo Environmental Instruments, Inc., Model 580B OVM
Well Diameter: N/A	Boring Depth: 10.0'
Drilling Method: Geoprobe	Depth to Water: 5.0'
Sample Method: 4' Acetate Sampler	Logged By: Daryll Issa

Depth (intervals)	Sample Depth (feet)	Recovery/ Penetration (in.)	Sample Time	PID (ppm)	Materials Description (size, grade, color, moisture)
A	0-2	24/24	1200	0.0	(0-1") topsoil/gravel. (1-6") F/light red/light brown sand with LI gravel; dry; no odor. (6-24") F/M brown/light brown sand with SO gravel; dry; no odor.
B	2-4	36/48		0.0	(36-47") F/M brown sand with SO gravel; damp; no odor. (47-51") F/M brown sand and gravel with TR red staining (oxidation); damp; no odor. (51-53") F/M tan sand with SO gravel; damp; no odor. (53-56") F/dark brown sand with SO gravel; damp; no odor. (56-72") F/M brown sand with TR gravel; wet; no odor.
C	4-6			0.0	
D	6-8	46/48	1218	0.0	(74-86") F/M brown/black/light brown sand with SO gravel; wet; no odor. (86-92") F/dark brown/ stained sand with SO silt and TR gravel and TR red staining at 91"; wet; no odor. (92-110") M/large black cinders with SO gray stained sand silt and SO gravel and SO black cinder ash; saturated with water; no odor. (119-120") F/M gray/light blue/gray sand with SO gravel and LI black cinders; saturated with water; petroleum odor.
E	8-10			0.0	
F	10-12				
G	12-14				

Comments:

PROPORTIONS USED	
TRACE (TR)	0-10%
LITTLE (LI)	10-20%
SOME (SO)	20-35%
AND	35-50%

ABBREVIATIONS	Well Construction
F = FINE	N/A
M = MEDIUM	
C = COARSE	
F/M = FINE TO MEDIUM	
F/C = FINE TO COARSE	
M/C = MEDIUM TO COARSE	

DEPTH INTERVALS	
A = 0-24 in.	G = 144-168 in.
B = 24-48 in.	H = 168-192 in.
C = 48-72 in.	I = 192-216 in.
D = 72-96 in.	J = 216-240 in.
E = 96-120 in..	K = 240-264 in.
F = 120-144 in.	L = 264-288 in.

TEST BORING LOG

ESS

272 West Exchange Street, Suite 101

Providence, Rhode Island 02903
(401) 421-0398 Fax (401) 421-5731

Site: Providence Gas Company 642 Allens Avenue, Providence, RI	Boring No.: C65
	Date: 2/11/00
ESS Job No: P151-002	Within 100' of Water: No
Driller.: Environmental Drilling, Inc.	Instrument: Thermo Environmen Instruments, Inc., Model 580B OVM
Well Diameter: N/A	Boring Depth: 10.0'
Drilling Method: Geoprobe	Depth to Water: 8.0'
Sample Method: 4' Acetate Sampler	Logged By: Daryll Issa

Depth (intervals)	Sample Depth (feet)	Recovery/ Penetration (in.)	Sample Time	PID (ppm)	Materials Description (size, grade, color, moisture)
A	0-2	24/24	1105	0.0	(0-10") F/M brown sand and gravel; wet from melting snow; no odor. (10-14") F light brown sand with LI gravel and TR black cinders; dry; no odor. (22-24") F/M black cinder ash and small/large black cinders; dry; no odor.
B	2-4	47/48	1120	0.0	(25-30") black cinder ash and F brown/dark brown sand with TR gravel; TR black cinders; dry; no odor. (30-36") F/M black cinder ash with SO gravel and SO black small/large cinders; dry; no odor. (36-42") F/M black/light purple/brown sand with SO gravel and SO dull black M/large cinders; dry; no odor. (42-50") black cinders and cinder ash with SO gravel; dry; no odor. (50-72") F brown sand with TR gravel; damp; no odor.
C	4-6			0.0	
D	6-8	33/48		0.0	(87-92") F/M brown sand and black cinder ash; dry; no odor. (92-97") F/M brown sand with TR cinder ash; dry; no odor. (97-115") F brown sand and silt; saturated; no odor. (115-120") F/C brown sand; wet; no odor.
E	8-10			0.0	
F	10-12				
G	12-14				

Comments:

PROPORTIONS USED		ABBREVIATIONS	Well Construction	DEPTH INTERVALS	
		F = FINE	N/A	A = 0-24 in.	G = 144-168 in.
TRACE (TR)	0-10%	M = MEDIUM		B = 24-48 in.	H = 168-192 in.
LITTLE (LI)	10-20%	C = COARSE		C = 48-72 in.	I = 192-216 in.
SOME (SO)	20-35%	F/M = FINE TO MEDIUM		D = 72-96 in.	J = 216-240 in.
AND	35-50%	F/C = FINE TO COARSE		E = 96-120 in..	K = 240-264 in.
		M/C = MEDIUM TO COARSE		F = 120-144 in.	L = 264-288 in.

TEST BORING LOG

ESS
2 West Exchange Street, Suite 101
Providence, Rhode Island 02903
(401) 421-0398 Fax (401) 421-5731

Site: Providence Gas Company 642 Allens Avenue, Providence, RI	Boring No.: C66
ESS Job No: P151-002	Date: 2/11/00
Driller.: Environmental Drilling, Inc.	Within 100' of Water: No
Well Diameter: N/A	Instrument: Thermo Environmental Instruments, Inc., Model 580B OVM
Drilling Method: Geoprobe	Boring Depth: 6.0'
Sample Method: 4' Acetate Sampler	Depth to Water: 5.5'
	Logged By: Daryll Issa

Depth (intervals)	Sample Depth (feet)	Recovery/ Penetration (in.)	Sample Time	PID (ppm)	Materials Description (size, grade, color, moisture)
A	0-2	24/24	1315	0.0	(0-8") F/M brown sand and gravel; dry; no odor. (8-14") F yellow sand with TR gravel; dry; no odor. (14-18") F light brown sand; dry; no odor. (18-24") F/M dark brown sand with SO gravel; dry; no odor.
B	2-4	48/48		0.0	(24-26") F light brown sand; dry; no odor. (26-30") F black/dark brown sand with SO small black cinders; dry; no odor. (30-36") F/M brown sand and gravel; dry; no odor. (36-50") F brown sand with TR gravel; dry; no odor. (50-72") F/M brown sand with SO gravel; TR silt; saturated at 66"; no odor.
C	4-6		1330	0.0	
D	6-8				
E	8-10				
F	10-12				
G	12-14				

Comments:

PROPORTIONS USED		ABBREVIATIONS	Well Construction	DEPTH INTERVALS	
		F = FINE	N/A	A = 0-24 in.	G = 144-168 in.
TRACE (TR)	0-10%	M = MEDIUM		B = 24-48 in.	H = 168-192 in.
LITTLE (LI)	10-20%	C = COARSE		C = 48-72 in.	I = 192-216 in.
SOME (SO)	20-35%	F/M = FINE TO MEDIUM		D = 72-96 in.	J = 216-240 in.
AND	35-50%	F/C = FINE TO COARSE		E = 96-120 in..	K = 240-264 in.
		M/C = MEDIUM TO COARSE		F = 120-144 in.	L = 264-288 in.

TEST BORING LOG

ESS
272 West Exchange Street, Suite 101
Providence, Rhode Island 02903
(401) 421-0398 Fax (401) 421-5731

Site: Providence Gas Company 642 Allens Avenue, Providence, RI	Boring No.: C67
ESS Job No: P151-002	Date: 2/11/00
Driller.: Environmental Drilling, Inc.	Within 100' of Water: No
	Instrument: Thermo Environmen... Instruments, Inc., Model 580B OVM
Well Diameter: N/A	Boring Depth: 10.0'
Drilling Method: Geoprobe	Depth to Water: 7.5'
Sample Method: 4' Acetate Sampler	Logged By: Daryll Issa

Depth (intervals)	Sample Depth (feet)	Recovery/ Penetration (in.)	Sample Time	PID (ppm)	Materials Description (size, grade, color, moisture)
A	0-2	18/24	1345	0.0	(6-10") topsoil/brown sand and gravel. (10-14") F/M brown sand with SO gravel; dry; no odor. (14-20") F/M dark brown sand with TR silt and SO gravel; dry; no odor. (20-24") F loose black cinder ash with LI small black cinders; dry; no odor.
B	2-4	44/48		0.0	(28-36") F/M dark brown sand and gravel with SO black cinders and SO gravel; dry; no odor. (36-38") F brown/tan sand; damp; no odor. (38-72") F brown sand with TR silt; damp; no odor.
C	4-6		1355	0.0	
D	6-8	35/48		0.0	(85-89") F brown sand with TR gravel; dry; no odor. (89-93") F black stained sand; wet; no odor. (93-96") F light brown sand; wet; no odor. (96-101") F/C brown sand and gravel; wet; no odor. (101-120") F brown sand with LI silt and SO gravel; saturated with water at 91"; no odor.
E	8-10			0.0	
F	10-12				
G	12-14				

Comments:

PROPORTIONS USED		ABBREVIATIONS	Well Construction	DEPTH INTERVALS	
		F = FINE	N/A		
TRACE (TR)	0-10%	M = MEDIUM		A = 0-24 in.	G = 144-168 in.
LITTLE (LI)	10-20%	C = COARSE		B = 24-48 in.	H = 168-192 in.
SOME (SO)	20-35%	F/M = FINE TO MEDIUM		C = 48-72 in.	I = 192-216 in.
AND	35-50%	F/C = FINE TO COARSE		D = 72-96 in.	J = 216-240 in.
		M/C = MEDIUM TO COARSE		E = 96-120 in..	K = 240-264 in.
				F = 120-144 in.	L = 264-288 in.

TEST BORING LOG

ESS
2 West Exchange Street, Suite 101
Providence, Rhode Island 02903
(401) 421-0398 Fax (401) 421-5731

Site: Providence Gas Company 642 Allens Avenue, Providence, RI	Boring No.: C68
	Date: 2/17/00
ESS Job No: P151-002	Within 100' of Water: No
Driller.: Environmental Drilling, Inc.	Instrument: Thermo Environmental Instruments, Inc., Model 580B OVM
Well Diameter: N/A	Boring Depth: 10.0'
Drilling Method: Geoprobe	Depth to Water: 6.5'
Sample Method: 4' Acetate Sampler	Logged By: Nicole Murry

Depth (intervals)	Sample Depth (feet)	Recovery/ Penetration (in.)	Sample Time	PID (ppm)	Materials Description (size, grade, color, moisture)
A	0-2	24/24	0910	0.0	(0-8") F/M light brown sand mixed with SO M gravel. (8-11") F black cinder ash with cinder ash stone and orange wood fibers. (11-13") white gravel; concrete. (13-24") very F black cinder ash mixed with coal bits and small/M gravel.
B	2-4	38/48		0.0	(36-56") M light brown sand with small/M white jagged gravel. (56-72") very F to F light brown sand; moist.
C	4-6		0924	0.0	
D	6-8	38/48		0.0	(82-90") very F to F light brown sand; moist. (90-120") very F saturated, dense, light brown silty sand.
E	8-10			0.0	
F	10-12				
G	12-14				

Comments:

PROPORTIONS USED	
TRACE (TR)	0-10%
LITTLE (LI)	10-20%
SOME (SO)	20-35%
AND	35-50%

ABBREVIATIONS	Well Construction
F = FINE	N/A
M = MEDIUM	
C = COARSE	
F/M = FINE TO MEDIUM	
F/C = FINE TO COARSE	
M/C = MEDIUM TO COARSE	

DEPTH INTERVALS	
A = 0-24 in.	G = 144-168 in.
B = 24-48 in.	H = 168-192 in.
C = 48-72 in.	I = 192-216 in.
D = 72-96 in.	J = 216-240 in.
E = 96-120 in..	K = 240-264 in.
F = 120-144 in.	L = 264-288 in.

TEST BORING LOG

ESS
272 West Exchange Street, Suite 101
Providence, Rhode Island 02903
(401) 421-0398 Fax (401) 421-5731

Site: Providence Gas Company 642 Allens Avenue, Providence, RI	Boring No.: C69
ESS Job No: P151-002	Date: 2/11/00
Driller.: Environmental Drilling, Inc.	Within 100' of Water: No
	Instrument: Thermo Environmer Instruments, Inc., Model 580B OVM
Well Diameter: N/A	Boring Depth: 10.0'
Drilling Method: Geoprobe	Depth to Water: 7.0'
Sample Method: 4' Acetate Sampler	Logged By: Daryll Issa

Depth (intervals)	Sample Depth (feet)	Recovery/ Penetration (in.)	Sample Time	PID (ppm)	Materials Description (size, grade, color, moisture)
A	0-2	24/24	1450	0.0	(0-5") brown topsoil; wet; no odor. (5-8") F/M brown sand and SO gravel; dry; no odor. (8-17") dense cinder ash with SO small/large black cinders; dry; no odor. (17-24") F tan/brown sand with SO red staining; dry; no odor.
B	2-4	48/48	1505	0.0	(24-36") F brown/black stained sand with TR small black cinders; dry; no odor. (36-51") F brown sand with LI gravel; dry; no odor. (51-72") F/M brown sand; dry; no odor.
C	4-6			0.0	
D	6-8	41/48		0.0	(79-83") F brown sand with TR gravel; dry; no odor. (83-87") F black stained sand and gravel; wet; no odor. (87-120") F/M brown sand with TR gravel; saturated with water; no odor.
E	8-10			0.0	
F	10-12				
G	12-14				

Comments:

PROPORTIONS USED		ABBREVIATIONS	Well Construction	DEPTH INTERVALS	
		F = FINE	N/A	A = 0-24 in.	G = 144-168 in.
TRACE (TR)	0-10%	M = MEDIUM		B = 24-48 in.	H = 168-192 in.
LITTLE (LI)	10-20%	C = COARSE		C = 48-72 in.	I = 192-216 in.
SOME (SO)	20-35%	F/M = FINE TO MEDIUM		D = 72-96 in.	J = 216-240 in.
AND	35-50%	F/C = FINE TO COARSE		E = 96-120 in..	K = 240-264 in.
		M/C = MEDIUM TO COARSE		F = 120-144 in.	L = 264-288 in.

TEST BORING LOG

ESS
2 West Exchange Street, Suite 101
Providence, Rhode Island 02903
(401) 421-0398 Fax (401) 421-5731

Site: Providence Gas Company 642 Allens Avenue, Providence, RI	Boring No.: **C70**
	Date: 2/11/00
ESS Job No: P151-002	Within 100' of Water: No
Driller.: Environmental Drilling, Inc.	Instrument: Thermo Environmental Instruments, Inc., Model 580B OVM
Well Diameter: N/A	Boring Depth: 10.0'
Drilling Method: Geoprobe	Depth to Water: 8.0'
Sample Method: 4' Acetate Sampler	Logged By: Daryll Issa

Depth (intervals)	Sample Depth (feet)	Recovery/ Penetration (in.)	Sample Time	PID (ppm)	Materials Description (size, grade, color, moisture)
A	0-2	24/24	1425	0.0	(0-6") F/M dark brown sand and gravel; wet from snow; no odor. (6-13") F/M brown sand and gravel; dry; no odor. (13-24") loose black cinder ash with SO M/large black cinders; dry; no odor.
B	2-4	43/48		0.0	(29-58") F/M brown/dark brown/black/yellow stained sand with SO cinder ash and SO black cinders; dry; no odor. (56-60") black cinders and cinder ash; dry; no odor. (60-65") pulverized stone. (65-72") F brown sand with LI gravel; dry; no odor.
C	4-6		1440	0.0	
D	6-8	32/48		0.0	(82-87") F/M brown sand and gravel; dry; no odor. (87-95") F brown sand with LI gravel; damp; no odor. (96-120") F/C brown sand with LI gravel; saturated with water; no odor.
E	8-10			0.0	
F	10-12				
G	12-14				

Comments:

PROPORTIONS USED		ABBREVIATIONS	Well Construction	DEPTH INTERVALS	
		F = FINE	N/A	A = 0-24 in.	G = 144-168 in.
TRACE (TR)	0-10%	M = MEDIUM		B = 24-48 in.	H = 168-192 in.
LITTLE (LI)	10-20%	C = COARSE		C = 48-72 in.	I = 192-216 in.
SOME (SO)	20-35%	F/M = FINE TO MEDIUM		D = 72-96 in.	J = 216-240 in.
AND	35-50%	F/C = FINE TO COARSE		E = 96-120 in..	K = 240-264 in.
		M/C = MEDIUM TO COARSE		F = 120-144 in.	L = 264-288 in.

TEST BORING LOG

ESS
272 West Exchange Street, Suite 101
Providence, Rhode Island 02903
(401) 421-0398 Fax (401) 421-5731

Site: Providence Gas Company 642 Allens Avenue, Providence, RI	Boring No.: C71
ESS Job No: P151-002	Date: 2/11/00
Driller.: Environmental Drilling, Inc.	Within 100' of Water: No
	Instrument: Thermo Environmen Instruments, Inc., Model 580B OV
Well Diameter: N/A	Boring Depth: 10.0'
Drilling Method: Geoprobe	Depth to Water: 4.0'
Sample Method: 4' Acetate Sampler	Logged By: Daryll Issa

Depth (intervals)	Sample Depth (feet)	Recovery/ Penetration (in.)	Sample Time	PID (ppm)	Materials Description (size, grade, color, moisture)
A	0-2	24/24	1220	0.0	(0-4") F/M brown sand with SO gravel; dry; no odor. (4-8") F/M light brown sand with SO gravel; dry; no odor. (8-15") loose black cinder ash with SO small/M black cinders; dry; no odor. (15-24") F/M brown sand and black cinder ash; dry; no odor.
B	2-4	46/48	1230	0.0	(26-39") F/M brown sand and black F stained sand with SO gravel and SO M/large black cinders; dry; no odor. (39-43") black cinder ash and shiny/dull M/large black cinders; damp; no odor. (43-46") F brown sand and gravel (pulverized stone) damp; no odor. (46-70") F brown sand with TR silt and LI small black cinders; wet; no odor. (70-72") F/C brown sand with TR gravel; saturated with water; no odor.
C	4-6			0.0	
D	6-8	39/48		0.0	(81-83") F dark brown sand; damp; no odor. (83-89") F/M black stained/dark brown sand with SO small black cinders; damp; no odor. (89-120") F/C light brown sand; wet; no odor.
E	8-10			0.0	
F	10-12				
G	12-14				

Comments:

PROPORTIONS USED		ABBREVIATIONS	Well Construction	DEPTH INTERVALS	
		F = FINE	N/A		
TRACE (TR)	0-10%	M = MEDIUM		A = 0-24 in.	G = 144-168 in.
LITTLE (LI)	10-20%	C = COARSE		B = 24-48 in.	H = 168-192 in.
SOME (SO)	20-35%	F/M = FINE TO MEDIUM		C = 48-72 in.	I = 192-216 in.
AND	35-50%	F/C = FINE TO COARSE		D = 72-96 in.	J = 216-240 in.
		M/C = MEDIUM TO COARSE		E = 96-120 in..	K = 240-264 in.
				F = 120-144 in.	L = 264-288 in.

TEST BORING LOG

ESS
2 West Exchange Street, Suite 101
Providence, Rhode Island 02903
(401) 421-0398 Fax (401) 421-5731

Site: Providence Gas Company 642 Allens Avenue, Providence, RI	Boring No.: C72
	Date: 2/11/00
ESS Job No: P151-002	Within 100' of Water: No
Driller.: Environmental Drilling, Inc.	Instrument: Thermo Environmental Instruments, Inc., Model 580B OVM
Well Diameter: N/A	Boring Depth: 10.0'
Drilling Method: Geoprobe	Depth to Water: 7.5'
Sample Method: 4' Acetate Sampler	Logged By: Daryll Issa

Depth (intervals)	Sample Depth (feet)	Recovery/ Penetration (in.)	Sample Time	PID (ppm)	Materials Description (size, grade, color, moisture)
A	0-2	24/24	1135	0.0	(0-16") F/M brown sand and gravel with LI gray/green stained sand; dry ; no odor. (16-24") F light brown sand with LI gravel; dry; no odor.
B	2-4	48/48	1200	0.0	(24-28") dense black cinder ash with SO small/M dull black cinders and SO dark brown sand; dry; no odor. (28-32") dense black cinder ash and dark brown sand with SO small/M dull black cinders; dry; no odor. (32-36") black cinders and black cinder ash with LI gravel and LI brown sand; dry; no odor. (36-42") F/M brown sand and black cinder ash with TR cinders; dry; no odor. (42-49") F/M brown sand and black cinders; dry; no odor. (49-72") F/M brown sand and gravel; damp; no odor.
C	4-6				
D	6-8	32/48		0.0	(88-91") F brown sand with TR gravel; dry; no odor. (91-100") dense black cinder ash with SO small/M black cinders and SO gravel; wet; no odor. (100-120") F/C light brown sand; wet; no odor.
E	8-10			0.0	
F	10-12				
G	12-14				

Comments:

PROPORTIONS USED	
TRACE (TR)	0-10%
LITTLE (LI)	10-20%
SOME (SO)	20-35%
AND	35-50%

ABBREVIATIONS	Well Construction
F = FINE	N/A
M = MEDIUM	
C = COARSE	
F/M = FINE TO MEDIUM	
F/C = FINE TO COARSE	
M/C = MEDIUM TO COARSE	

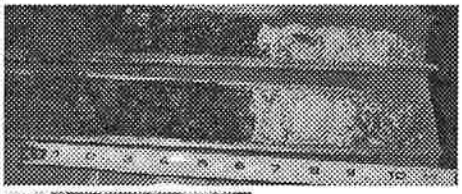
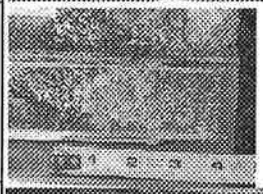
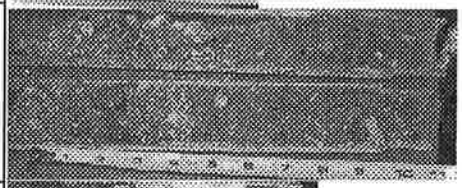
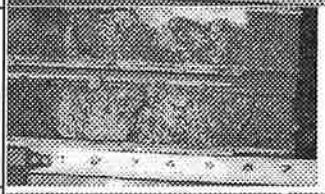
DEPTH INTERVALS	
A = 0-24 in.	G = 144-168 in.
B = 24-48 in.	H = 168-192 in.
C = 48-72 in.	I = 192-216 in.
D = 72-96 in.	J = 216-240 in.
E = 96-120 in..	K = 240-264 in.
F = 120-144 in.	L = 264-288 in.

Soil Boring Report

PROJECT	Report of Boring No.	VHB-13
New England Gas Company 642 Allens Avenue Providence, Rhode Island	Well ID:	VHB-13
	Job Number: 71274	Sheet 1 of 1

Drilling Company:	Subsurface Drilling and Remediation	Boring Location:	Cement plant, by cement silos		
Driller:	Jim Goldthwaite / Josh Downing	Elevation:	NA	Datum:	NA
Inspector:	Keith Sullivan / Adam Rosenblatt	Start Date:	1/16/2002	End Date:	1/16/2002

The borings were drilled by hollow-stem auger. Unless otherwise noted, the soil samples were collected using a 2' split-spoon driven with a 140-lb. hammer falling 30".

Depth (ft)	PID Reading	Sample No.	Pen/Rec	Blows/6"	SAMPLE DESCRIPTION	Boring Photo
0 - 2	ND	S1	NA	NA	Post hole digger to 3', look for water line. 3' to 4' - dark brown, sand, silt and gravel , moist no sheen or odors. 4' to 5' Gray to black, dense rotten rock and coal slag, dry, no sheen or odors.	
2 - 4	ND	S2	NA	NA	Post hole digger to 3', look for water line. 3' to 4' - dark brown, sand, silt and gravel , moist no sheen or odors. 4' to 5' Gray to black, dense rotten rock and coal slag, dry, no sheen or odors.	
4 - 6	ND	S3	24 / 11	2 - 6 9 - 13	Gray, medium dense ROCK FRAGMENTS, some silt, dry, no sheen or odor.	
6 - 8	ND	S4	24 / 4	10 - 10 10 - 13	Brown to gray, medium dense, SAND, some silt, little gravel, trace coal slag, dry, no sheen or odors.	
8 - 10	ND	S5	24 / 11	8 - 6 4 - 7	Brown to gray, loose, SAND and silt, little gravel, trace coal slag, wet at 12', no sheen or odors.	
10 - 12	ND	S6	24 / 7	7 - 6 11 - 10	Brown to gray, medium dense, SILT, some sand, trace gravel, wet, no sheen or odors.	
12 - 14	ND	S7	24 / 10	11 - 8 12 - 16	Brown to gray, medium dense, SILT, some sand, trace gravel, wet, no sheen or odors.	 Bottom of exploration 14' below grade.

GRANULAR SOILS BLOWS/FT	DENSITY
0 - 4	V. Loose
4 - 10	Loose
10 - 30	M. Dense
30 - 50	Dense
>50	V. Dense

COHESIVE SOILS BLOWS/FT	DENSITY
<2	V. Soft
2 - 4	Soft
4 - 8	M. Stiff
8 - 15	Stiff
15 - 30	V. Stiff
>30	Hard

PROPORTIONS	
Trace	0 - 10%
Little	10 - 20%
Some	20 - 35%
And	35 - 50%

Notes

1) Soil stratification lines represent a graphical depiction of changes in soil type and grainsize. Actual changes may be gradual.
2) Bedrock was not encountered.
3) Water levels may fluctuate due to ocean tides, season, and precipitation rates.
4) All soil samples were screened in the field for VOCs using a ThermoEnvironmental Instruments model 580B 10.eV photoionization detector (PID).

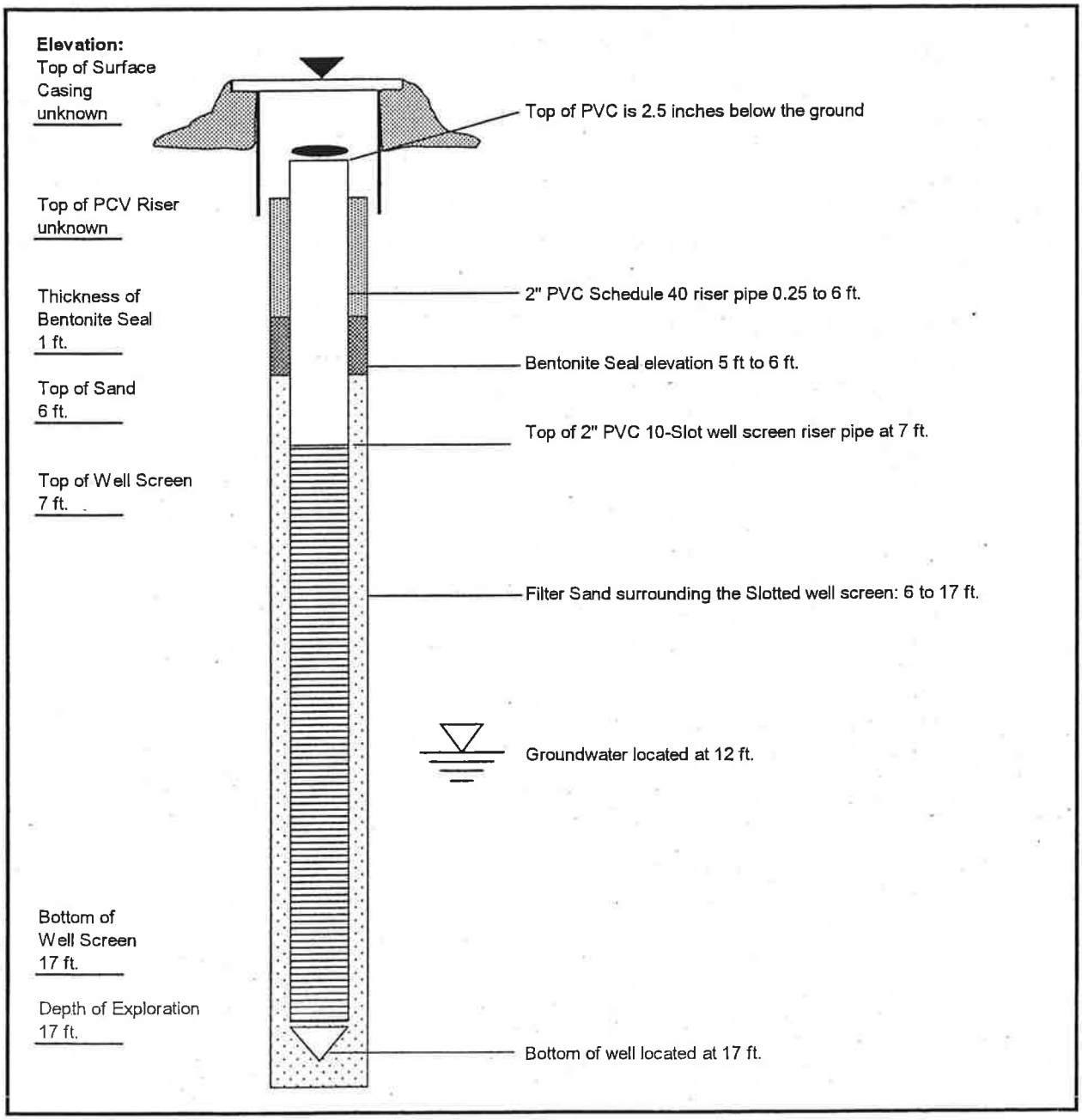
CEMENT

VHB Monitoring Well Diagram

Project Name: New England Gas
Location: 642 Allens Ave
Providence, RI

Project No. 71274
Contractor: Subsurface Drilling
Scientist: K. Sullivan / A. Rosenblatt

Date: 16-Jan-02
Well No. VHB-13
GW Depth: Approx. 6 Feet



ZA GEOENVIRONMENTAL INC.	PROJECT	REPORT OF BORING NO.	GZ-212
40 BROADWAY, PROVIDENCE, RHODE ISLAND	Keyspan LNG Facility	SHEET	1 of 3
GEOTECH/GEOHYDROLOGICAL CONSULTANTS	Providence, Rhode Island	FILE NO.	32784.01
GEOTECHNICAL BORING LOG		CHKD BY	AH

ORING CO. New Hampshire Boring
OREMAN Charlie O'Donnel
GZA ENG. Joanne Kissinger

BORING LOCATION See Exploration Location Plan
GROUND SURFACE ELEV. 11 ft DATUM MLLW
DATE START 05/04/05 DATE END 05/05/05

AMPLER: UNLESS OTHERWISE NOTED, SAMPLER CONSISTS OF 2" SPLIT SPOON DRIVEN USING A 140 lb. HAMMER FALLING 30 IN

CASING: UNLESS OTHERWISE NOTED, CASING DRIVEN USING A 300 lb HAMMER FALLING 24 IN.

ASING SIZE: 5" / 4" / 3" OTHER:

GROUNDWATER READINGS

DATE	TIME	WATER	CASING	STABILIZATION TIME

DEPTH	CASING BLOWS	SAMPLE NO	SAMPLE PEN/./REC	SAMPLE DEPTH (FT)	SAMPLE BLOWS/6"	SAMPLE DESCRIPTION BURMISTER CLASSIFICATION	R K	STRATUM DESCRIPTION
	P	S-1	12/6"	0-1	7-120/6"	Very Dense, light brown, fine to medium SAND, trace Silt	1	±1' FILL
	5							
	WOC	C-1	24/8	2-4	9 min/ft	CORED THROUGH CONCRETE	2	±3' CONCRETE
	WOC				1 min/ft			
	2	S-2	24/4	4-6	1-1	Very loose, light brown, fine to medium SAND, trace Silt	3	
	4				1-2			
	5	S-3	24/5	6-8	2-1	Very loose, gray (oil-type staln), fine to medium SAND, trace	4	FILL
	4				1-2	Silt		
	14	S-4	24/1	8-10	8-6	Loose, gray (oil-type stain), fine GRAVEL, some fine to medium	5	
10	17				1-2	Sand, trace Silt		
	11	S-5	24/5	10-12	11-4	Loose, gray (oil-type stain), fine to medium SAND, little Silt,	6	
	27				3-5	trace Wood Chips		
	17	S-6	24/12	12-14	10-9	Medium dense, gray (oil-type stain), fine to medium SAND, little	7	
	19				17-10	fine Gravel, little Silt		
15	11	S-7	24/8	14-16	2-1	Medium dense, gray, fine to coarse SAND, little Silt	8	
	21				9-16			
	35	S-8	24/10	16-18	15-32	Dense, gray, fine to coarse SAND, little Silt, trace fine Gravel	9	
	29				12-8			
	15	S-9	24/8	18-20	8-8	Medium dense, gray, fine to coarse SAND, little Silt, trace	10	
0	16				6-3	fine Gravel, trace Organics in tip of Spoon		±20'
	12	S-10A	24/13	20-22	2-3	S-10A: (Top 8"): Loose, grayish-brown, fine to medium SAND,	11	SAND
	12	S-10B			3-7	trace Organics, trace Silt		±21.5' (TRACE ORGANICS)
	13	S-11	24/12	22-24	7-5	S-10B: (Bottom 5"): Loose, grayish-brown, fine to medium SAND,	12	
	15				7-5	trace Silt		
25	23	S-12	24/9	24-26	6-6	S-11: Medium dense, grayish-brown, fine to medium SAND,	13	SAND
	43				7-7	trace Silt		
	36					S-12: Medium dense, brown, fine to coarse SAND, trace		
	35					fine Gravel, trace Silt		
	43							
0	46	S-13	24/12	29-31	14-12	Medium dense, brown, fine to coarse SAND, little fine Gravel,		
	40				12-12	little Silt		
	52							
	65							
	46							±34.2'
	39							

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

REMARKS:
1. "P" Push Casing. "S" Spin Casing. "WOC" Weight of Casing
2. Obstruction encountered possible concrete foundation or boulder. Sample S-1 collected then casing installed to ±17' and washed out. Rollerbit to ±2' then core C-1. Cored 2-4', broke through obstruction at ±3'.
3. Rollerbit to 4', installed casing to 4'. Collect samples S-2 and S-3. Installed casing to 8' and washed out.
4. Petro odor sample S-3.
5. Spoon bouncing, possible piece of wood. Oil type odor S-4.
6. Casing installed to 10' and washed out.
7. Petro odor (S-5) installed casing to 12' & wash-out.
8. Petro odor (S-6) installed casing to 14' & wash-out.
9. Installed casing to 18' & wash-out.

OTES:
1) STRATIFICATION LINES REPRESENT APPROXIMATE BOUNDARY BETWEEN SOIL TYPES, TRANSITIONS MAY BE GRADUAL.
2) WATER LEVEL READINGS HAVE BEEN MADE AT TIMES AND UNDER CONDITIONS STATED, FLUCTUATIONS OF GROUNDWATER MAY OCCUR DUE TO OTHER FACTORS THAN THOSE PRESENT AT THE TIME MEASUREMENTS WERE MADE

GZA GEOENVIRONMENTAL INC.	PROJECT	REPORT OF BORING NO.	GZ-212
40 BROADWAY, PROVIDENCE, RHODE ISLAND	Keyspan LNG Facility	SHEET	2 of 3
	Providence, Rhode Island	FILE NO.	32784.01
GEOTECH/GEOHYDROLOGICAL CONSULTANTS		CHKD BY	AH

DEPTH	CASING BLOWS	SAMPLE NO	SAMPLE PEN/./REC	SAMPLE DEPTH (FT)	SAMPLE BLOWS/6"	SAMPLE DESCRIPTION BURMISTER CLASSIFICATION	R K	STRATUM DESCRIPTION
35	39	S-14	24/7	34-36	14-14	(Top 2"): Dense, gray, fine to coarse SAND, little Silt	14	
	33				18-14	(Bottom 5"): Dense, brown, fine to medium SAND,		
	51					some Silt, trace fine Gravel		SAND
	60							
	47							
)	48	S-15	24/12	39-41	20-23	Very dense, grayish-brown, fine to coarse (-) SAND, some Silt	15	
	87				36-22			
	69							
	62							
	62							
45	35	S-16	24/12	44-46	12-8	(Top 6"): Medium dense, grayish-brown, fine to coarse (-) SAND,	16	
	44				10-12	some Silt		
	31					(Bottom 6"): Medium dense, grayish-brown, fine to medium SAND,		
	79					trace Silt		
	58							
50		S-17	24/7	49-51	8-8	Medium dense, grayish-brown, fine to medium SAND, trace	17	
					19-18	Silt (1" Layer of gray, fine to medium Sand, some Silt)		
	S							
	S							
5	S	S-18	24/12	54-56	42-21	Very dense, grayish-brown, fine to coarse SAND, some Silt,	18	
	S				40-30	trace fine Gravel (2" Layer of grayish-brown, fine to medium		
	S					Sand, trace Silt)		
	S							
	S							
60	S	S-19	24/10	59-61	19-15	(Top 4"): Medium dense, grayish-brown, fine to coarse SAND,	19	
	S				9-13	little Silt, trace fine Gravel		
	S					(Bottom 6"): Medium dense, graylsh-brown, fine to medium SAND,		SAND
	S					trace Silt		
	S							
65	S	S-20	24/12	64-66	22-18	Dense, brownish-gray, fine to medium SAND, little fine Gravel,	20	
	S				13-19	little Silt		
	S							
	S							
	S							
)	S	S-21	24/12	69-71	34-35	Very dense, brownish-gray, fine to medium SAND, trace Silt	21	
	S				57-42	(1" Layers of fine to coarse (-) Sand, little fine Gravel, little	22	
	S					Silt)		
	S							
	S							
75	S							

GRANULAR SOILS BLOWS/FT	DENSITY
0-4	VERY LOOSE
4-10	LOOSE
0-30	MEDIUM DENSE
0-50	DENSE
>50	VERY DENSE

COHESIVE SOILS BLOWS/FT	DENSITY
<2	VERY SOFT
2-4	SOFT
4-8	M. STIFF
8-15	STIFF
15-30	V. STIFF
>30	HARD

REMARKS:

10. Took sample S-9, installed casing to 20' & wash-out.
11. Took sample S-11, installed casing to 24'.
12. Washed to 24' ,collected Sample S-12 (Bag Sample)
13. Installed casing to 29' & washed out, collected sample S-13 (Bag Sample)
14. Installed casing to 34' & washed out, collected sample S-14 (No Bag Sample)
15. Installed casing to 39' & wash-out. Collected sample S-15 (Bag Sample)
16. Installed casing to 44' & washed out. Collected sample S-16 (No Bag Sample)

OTES:

1) STRATIFICATION LINES REPRESENT APPROXIMATE BOUNDARY BETWEEN SOIL TYPES, TRANSITIONS MAY BE GRADUAL.
2) WATER LEVEL READINGS HAVE BEEN MADE AT TIMES AND UNDER CONDITIONS STATED, FLUCTUATIONS OF GROUNDWATER MAY OCCUR DUE TO OTHER FACTORS THAN THOSE PRESENT AT THE TIME MEASUREMENTS WERE MADE

GZA GEOENVIRONMENTAL INC.	PROJECT	REPORT OF BORING NO.	GZ-212
40 BROADWAY, PROVIDENCE, RHODE ISLAND	Keyspan LNG Facility	SHEET	3 of 3
	Providence, Rhode Island	FILE NO.	32784.01
GEOTECH/GEOHYDROLOGICAL CONSULTANTS		CHKD BY	AH

DEPTH	CASING BLOWS	SAMPLE NO	SAMPLE PEN./REC	SAMPLE DEPTH (FT)	SAMPLE BLOWS/6"	SAMPLE DESCRIPTION BURMISTER CLASSIFICATION	R K	STRATUM DESCRIPTION
75	S	S-22	24/8	74-76	27-28	Very dense, dark gray, fine to coarse SAND, little Silt, trace	23	
	S				33-27	fine Gravel		
	S							
	S							
	S							
0	S	S-23	24/12	79-81	37-51	Very dense, dark gray, fine to coarse SAND< some fine	24	
	S				38-40	Gravel, little Silt		
	S							
	S							
	S							
85	S	S-24	24/7	84-86	30-31	Very dense, dark gray, fine to coarse SAND, some fine Gravel,	25	
	S				28-24	little Silt		
	S							
	S							
	S							
90	S	S-25	24/4	89-91	39-27	Very dense, dark gray, fine to coarse SAND, some fine Gravel,	26	
	S				31-42	little Silt		
	S							
	S							
	S							±94'
5	S	S-26	24/6	94-96	22-24	Very dense, brownish-gray, fine to medium SAND, trace fine	27	
	S				35-27	Gravel, trace Silt		SAND
	S							
	S							
	S							±99'
100	S	S-27	24/8	99-101	31-43	Very dense, gray, fine to coarse SAND, some Silt,	28	
	S				44-37	little fine Gravel,		GLACIAL TILL
						End of Exploration at ±101'		
						17. Casing installed to 49' & washed out. Collect sample S-17 (No		
105						Bag Sample)		
						18. Open hole with mud to S-3 (Bag Sample) due to sands. Gravel		
						encountered, 3" casing spun to 54', Collect Sample S-18		
						(Bag Sample)		
						19. Rollerbit to 59', possible cobbles encountered, spin casing to 59'		
110						& washed out. Collect Sample S-19 (No Bag Sample).		
						20. Rollerbit ahead to 64', spin casing to 64' & washed out. Rig		
						shaking and grinding, possible cobbles encountered. Collected		
						Sample S-20. (Bag Sample)		
						21. Rollerbit ahead to 69'. Spin casing to 69'.		
115						22. Washed out & collected sample S-214 (Bag Sample).		

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

REMARKS:

23. Rollerbit ahead to 74'. Rollerbit grinding, rig shaking. Casing to 74', washed out. Collected sample S-22 (Bag Sample).
24. Rollerbit ahead to 79', installed casing to 79' and washed out. Collected sample S-23, rollerbit grinding and rig shaking.
25. Rollerbit ahead to 84'. Rollerbit grinding, rig shaking, installed casing to 84' of wash-out. Collected sample S-24
2' blow-out into casing when spoon pulled out
26. Rollerbit ahead to 89'. Installed casing to 89' & washed out. Collected sample S-25 (No Bag Sample).
27. Rollerbit ahead to 94', installed casing to 94' & washed out. Collected sample S-26 (No Bag Sample).
28. Rollerbit ahead to 99'. Rollerbit grinding. Installed casing to 99' & washed out. Collected sample S-27 (Bag Sample).

OTES:
1) STRATIFICATION LINES REPRESENT APPROXIMATE BOUNDARY BETWEEN SOIL TYPES, TRANSITIONS MAY BE GRADUAL.
2) WATER LEVEL READINGS HAVE BEEN MADE AT TIMES AND UNDER CONDITIONS STATED, FLUCTUATIONS OF GROUNDWATER MAY OCCUR DUE TO OTHER FACTORS THAN THOSE PRESENT AT THE TIME MEASUREMENTS WERE MADE

RECORD OF BOREHOLE B-210 (PL-4)

PROJECT: CHI LNG Bund Highwall
PROJECT NUMBER: 154-6055
DRILLED DEPTH: 101.0 ft
LOCATION: Southeast Tank Area

DRILL METHOD: 4 inch Drive and Wash
HAMMER TYPE: Auto
DATE STARTED: 2/17/16
DATE COMPLETED: 2/19/16

COORDS: N: 260,915.04 E: 357,394.32
GS ELEVATION: 7.9 ft
WEATHER: Partly Cloudy
TEMPERATURE: 24-48 deg F

INCLINATION: 90
DEPTH W.L.: 8.8 ft
ELEVATION W.L.: -0.9 ft
DATE W.L.: 2/19/2016
TIME W.L.: 1130

SOIL PROFILE					SAMPLE INFORMATION						
DEPTH ft	ELEVATION ft	LITHOLOGY DESCRIPTION	USCS	GRAPHIC LOG	SAMPLE DEPTH	NUMBER	SAMPLE TYPE	BLOWS per 6 in	N	REC / ATT	Sample Description
0.0		0.0 - 19.0ft Brown to black, fine to coarse SAND, some gravel to fine to coarse sandy GRAVEL, some to little silt, (FILL).	SM		0.0	S1	SS	2-12-16-15	28	1.3 / 2.0	Brown, damp, medium dense, fine to coarse SAND, some gravel, little silt, (SM). PID = 0.0 ppm
	5										
5.0					4.0	S2	SS	12-8-9-10	17	1.2 / 2.0	Black, wet, medium dense, fine to coarse SAND, some gravel, some silt, (SM). PID = 6.2 ppm
	0										
▽					9.0	S3	SS	10-15-17-25	32	1.3 / 2.0	Black, wet, dense, fine to coarse sandy GRAVEL, little silt, (GM). Strong hydrocarbon odor. PID = 31.6 ppm
10.0											
	-5										
15.0					14.0	S4	SS	18-38-16-17	54	1.5 / 2.0	Dark gray, wet, very dense, fine to coarse sandy GRAVEL, some silt, (GM). Strong hydrocarbon odor. PID = 41.3 ppm
	-10										
20.0		19.0 - 49.6ft Brown, sandy GRAVEL, some to trace silt, (Outwash).	GM		19.0	S5	SS	7-11-15-16	26	1.1 / 2.0	Dark gray, wet, medium dense, silty fine to coarse SAND, some gravel, (SM). Strong hydrocarbon odor. PID = 16.2 ppm
	-15										
25.0					24.0	S6	SS	10-10-7-8	17	0.0 / 2.0	NO RECOVERY.

Log continued on next page

Fill (made ground) | USCS Silty Gravel | USCS Silt (ML) | USCS Silty Sand (SM)

D+W: Drive and Wash SH: Shelby Tube SSA: Solid Stem Auger AUG: Auger Cuttings PP: Pocket Penetrometer TV: Torvane

DRILLING COMPANY: Geologic Earth Exploration Inc.
DRILLER: C. O'Donnel
DRILL RIG: CME - 45

LOGGED BY: CEM
CHECKED BY: JDL
DATE: 3/3/16

Golder Associates

RECORD OF BOREHOLE B-210 (PL-4)

PROJECT: CHI LNG Bund Highwall
PROJECT NUMBER: 154-6055
DRILLED DEPTH: 101.0 ft
LOCATION: Southeast Tank Area

DRILL METHOD: 4 inch Drive and Wash
HAMMER TYPE: Auto
DATE STARTED: 2/17/16
DATE COMPLETED: 2/19/16

COORDS: N: 260,915.04 E: 357,394.32
GS ELEVATION: 7.9 ft
WEATHER: Partly Cloudy
TEMPERATURE: 24-48 deg F

INCLINATION: 90
DEPTH W.L.: 8.8 ft
ELEVATION W.L.: -0.9 ft
DATE W.L.: 2/19/2016
TIME W.L.: 1130

SOIL PROFILE					SAMPLE INFORMATION						
DEPTH ft	ELEVATION ft	LITHOLOGY DESCRIPTION	USCS	GRAPHIC LOG	SAMPLE DEPTH	NUMBER	SAMPLE TYPE	BLOWS per 6 in	N	REC / ATT	Sample Description
25.0						S6	SS	10-10-7-8	17	0.0 / 2.0	25.0 ft: Driller notes gravels while washing out the casing
	-20										
					29.0	S7	SS	7-5-10-10	15	0.4 / 2.0	Grayish brown, wet, medium dense, fine to coarse sandy GRAVEL, some silt, (GM). Strong hydrocarbon odor. PID = 33.3 ppm
30.0											
	-25										
					34.0	S8	SS	17-19-15-17	34	0.7 / 2.0	Brown, wet, dense, fine to coarse sandy GRAVEL, some silt, (GM). Strong hydrocarbon odor. PID = 25.8 ppm
35.0			GM								
	-30										
					39.0	S9	SS	15-15-20-17	35	1.4 / 2.0	Brown, wet, dense, GRAVEL, some fine to coarse sand, trace silt, (GW-GM). PID = 3.2 ppm
40.0											
	-35										
					44.0	S10	SS	19-15-17-16	32	1.2 / 2.0	Brown, wet, dense, fine to coarse SAND, some gravel, some silt, (SM). PID = 0.2 ppm
45.0											
	-40										
					49.0	S11	SS	21-13-12-11	25	1.0 / 2.0	Top 7": Brown, wet, medium dense, fine to coarse sandy GRAVEL, little silt, (GM). Bottom 5": Brown, moist, very stiff, SILT, little fine sand, (ML). PID = 0.3
50.0			ML								

Log continued on next page

Fill (made ground) | USCS Silty Gravel | USCS Silt (ML) | USCS Silty Sand (SM)

D+W: Drive and Wash SH: Shelby Tube SSA: Solid Stem Auger AUG: Auger Cuttings PP: Pocket Penetrometer TV: Torvane

DRILLING COMPANY: Geologic Earth Exploration Inc.
DRILLER: C. O'Donnel
DRILL RIG: CME - 45

LOGGED BY: CEM
CHECKED BY: JDL
DATE: 3/3/16

Golder Associates

RECORD OF BOREHOLE B-210 (PL-4)

PROJECT: CHI LNG Bund Highwall
PROJECT NUMBER: 154-6055
DRILLED DEPTH: 101.0 ft
LOCATION: Southeast Tank Area

DRILL METHOD: 4 inch Drive and Wash
HAMMER TYPE: Auto
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DATE W.L.: 2/19/2016
TIME W.L.: 1130

SOIL PROFILE					SAMPLE INFORMATION						
DEPTH ft	ELEVATION ft	LITHOLOGY DESCRIPTION	USCS	GRAPHIC LOG	SAMPLE DEPTH	NUMBER	SAMPLE TYPE	BLOWS per 6 in	N	REC / ATT	Sample Description
50.0		49.6 - 74.0ft Gray, SILT, trace fine sand, trace clay, (Outwash).				S11	SS	21-13-12-11	25	1.0 / 2.0	ppm
	-45										
					54.0	S12	SS	13-13-15-13	28	0.4 / 2.0	Gray, wet, very stiff, SILT, trace gravel, trace fine sand, trace clay, (ML). Tv = 300 psf. PID = 0.0 ppm
55.0											
	-50										
					59.0	S13	SS	10-10-10-13	20	1.3 / 2.0	Gray, wet, very stiff, SILT, trace fine sand, (ML). Tv = 500 psf. PID = 0.0 ppm
60.0											
	-55		ML								
					64.0	S14	SS	13-11-13-15	24	1.1 / 2.0	Grayish brown, wet, very stiff, SILT, trace fine sand, trace clay, (ML). Pp = 3,000 psf. PID = 0.0 ppm
65.0											
	-60										
					69.0	S15	SS	8-9-11-9	20	1.1 / 2.0	Gray, wet, very stiff, SILT, some clay, trace fine sand, (CL-ML). Pp = 2,500 psf. PID = 0.0 ppm
70.0											
	-65										
			SM		74.0	S16	SS	14-14-13-13	27	1.3 / 2.0	Grayish brown, wet, medium dense, fine sandy SILT, (ML). PID = 0.0 ppm
75.0											

Log continued on next page

Fill (made ground) | USCS Silty Gravel | USCS Silt (ML) | USCS Silty Sand (SM)

D+W: Drive and Wash SH: Shelby Tube SSA: Solid Stem Auger AUG: Auger Cuttings PP: Pocket Penetrometer TV: Torvane

DRILLING COMPANY: Geologic Earth Exploration Inc.
DRILLER: C. O'Donnel
DRILL RIG: CME - 45

LOGGED BY: CEM
CHECKED BY: JDL
DATE: 3/3/16

Golder Associates

RECORD OF BOREHOLE B-210 (PL-4)

PROJECT: CHI LNG Bund Highwall
PROJECT NUMBER: 154-6055
DRILLED DEPTH: 101.0 ft
LOCATION: Southeast Tank Area

DRILL METHOD: 4 inch Drive and Wash
HAMMER TYPE: Auto
DATE STARTED: 2/17/16
DATE COMPLETED: 2/19/16

COORDS: N: 260,915.04 E: 357,394.32
GS ELEVATION: 7.9 ft
WEATHER: Partly Cloudy
TEMPERATURE: 24-48 deg F

INCLINATION: 90
DEPTH W.L.: 8.8 ft
ELEVATION W.L.: -0.9 ft
DATE W.L.: 2/19/2016
TIME W.L.: 1130

SOIL PROFILE					SAMPLE INFORMATION						
DEPTH ft	ELEVATION ft	LITHOLOGY DESCRIPTION	USCS	GRAPHIC LOG	SAMPLE DEPTH	NUMBER	SAMPLE TYPE	BLOWS per 6 in	N	REC / ATT	Sample Description
75.0		74.0 - 101.0ft Gray to grayish brown, silty fine to coarse SAND to fine coarse SAND, little silt, trace to some gravel, (Outwash).	SM			S16	SS	14-14-13-13	27	1.3 / 2.0	
	-70										
					79.0	S17	SS	9-11-11-14	22	0.9 / 2.0	Brown, wet, medium dense, fine to coarse SAND, little silt, trace gravel, (SM). Gravel lense at 6". PID = 0.0 ppm
80.0											
	-75										
					84.0	S18	SS	24-15-13-17	28	0.7 / 2.0	Grayish brown, wet, medium dense, medium to coarse sandy GRAVEL, little silt, (GM). PID = 0.3 ppm
85.0											
	-80										
					89.0	S19	SS	21-11-11-11	22	0.5 / 2.0	Gray, wet, medium dense, silty fine to coarse SAND, little gravel, (SM). PID = 0.6 ppm
90.0											
	-85										
					94.0	S20	SS	19-17-13-10	30	0.2 / 2.0	Gray, wet, dense, silty fine to coarse SAND, some gravel, (SM). 1" piece of gravel at 1" blocking the split spoon. PID = 1.1 ppm
95.0											
	-90										
					99.0	S21	SS	9-7-8-10	15	0.8 / 2.0	Grayish brown, wet, medium dense, fine to coarse SAND, some gravel, trace silt, (SP-SM). PID = 0.0 ppm
100.0											

Log continued on next page

Fill (made ground) | USCS Silty Gravel | USCS Silt (ML) | USCS Silty Sand (SM)

D+W: Drive and Wash SH: Shelby Tube SSA: Solid Stem Auger AUG: Auger Cuttings PP: Pocket Penetrometer TV: Torvane

DRILLING COMPANY: Geologic Earth Exploration Inc.
DRILLER: C. O'Donnel
DRILL RIG: CME - 45

LOGGED BY: CEM
CHECKED BY: JDL
DATE: 3/3/16

Golder Associates

RECORD OF BOREHOLE B-210 (PL-4)

PROJECT: CHI LNG Bund Highwall
PROJECT NUMBER: 154-6055
DRILLED DEPTH: 101.0 ft
LOCATION: Southeast Tank Area

DRILL METHOD: 4 inch Drive and Wash
HAMMER TYPE: Auto
DATE STARTED: 2/17/16
DATE COMPLETED: 2/19/16

COORDS: N: 260,915.04 E: 357,394.32
GS ELEVATION: 7.9 ft
WEATHER: Partly Cloudy
TEMPERATURE: 24-48 deg F

INCLINATION: 90
DEPTH W.L.: 8.8 ft
ELEVATION W.L.: -0.9 ft
DATE W.L.: 2/19/2016
TIME W.L.: 1130

SOIL PROFILE					SAMPLE INFORMATION						
DEPTH ft	ELEVATION ft	LITHOLOGY DESCRIPTION	USCS	GRAPHIC LOG	SAMPLE DEPTH	NUMBER	SAMPLE TYPE	BLOWS per 6 in	N	REC / ATT	Sample Description
100.0			SM			S21	SS	9-7-8-10	15	0.8 / 2.0	

Boring completed at 101.0 ft

Notes:
1. Borehole backfilled with cuttings to ground surface.
2. Seismograph geophone was anchored to the LNG Tank foundation 42' away from the borehole. No vibrations detected.
3. 4" casing to 40' bgs - 3" casing to 95' bgs - open hole below

Fill (made ground) | USCS Silty Gravel | USCS Silt (ML) | USCS Silty Sand (SM)

D+W: Drive and Wash SH: Shelby Tube SSA: Solid Stem Auger AUG: Auger Cuttings PP: Pocket Penetrometer TV: Torvane

DRILLING COMPANY: Geologic Earth Exploration Inc.
DRILLER: C. O'Donnel
DRILL RIG: CME - 45

LOGGED BY: CEM
CHECKED BY: JDL
DATE: 3/3/16

Golder Associates

RECORD OF BOREHOLE B-211 (CHI-6)

PROJECT: CHI LNG Bund Highwall
PROJECT NUMBER: 154-6055
DRILLED DEPTH: 51.0 ft
LOCATION: Next to Cement Plant

DRILL METHOD: 4 inch Drive and Wash
HAMMER TYPE: Auto
DATE STARTED: 2/24/16
DATE COMPLETED: 2/24/16

COORDS: N: 260,581.01 E: 357,470.96
GS ELEVATION: 12.9 ft
WEATHER: Rain
TEMPERATURE: 46 deg F

INCLINATION: 90
DEPTH W.L.: 11.1 ft
ELEVATION W.L.: 1.8 ft
DATE W.L.: 2/24/2016
TIME W.L.: 1300

SOIL PROFILE					SAMPLE INFORMATION						
DEPTH ft	ELEVATION ft	LITHOLOGY DESCRIPTION	USCS	GRAPHIC LOG	SAMPLE DEPTH	NUMBER	SAMPLE TYPE	BLOWS per 6 in	N	REC / ATT	Sample Description
0.0		0.0 - 19.0ft Grayish brown to brown, fine to coarse SAND, some to trace gravel, some to little silt, (FILL).	SM		0.0	S1	SS	6-10-11-6	21	0.7 / 2.0	Grayish brown, moist to wet, medium dense, fine to coarse SAND, little gravel, some silt, (SM). PID = 0.7 ppm
	10										
					4.0	S2	SS	6-7-2-1	9	0.5 / 2.0	Grayish brown, wet to saturated, loose, fine to coarse sandy GRAVEL, little silt, trace brick fragments, (GM). PID = 0.0 ppm 5.0 ft: Some difficulty advancing casing to 5' bgs
5.0											
	5										
					9.0	S3	SS	50/5"	R	0.4 / 2.0	Brown and dark gray with trace oxidized spotting, saturated from 0" - 4.5", dry from 4.5" - 5", very dense, silty fine to coarse SAND, trace gravel, (SM). From 3.5" - 4.5": wood. From 4.5" - 5": concrete. PID = 0.0 ppm 9.4-11.0 ft: Concrete
10.0											
▽											12.0 ft: Drill rig chatter to 14' bgs
	0										
					14.0	S4	SS	12-11-19-30	30	1.1 / 2.0	Top 5.5": Grayish brown, wet, medium dense, fine to coarse SAND, little silt, (SP). Most likely wash. Bottom 7.5": Reddish brown, wet, medium dense, fine to coarse SAND, some gravel, (SP). From 5.5" - 8": weathered/fractured gravel. PID = 17.3 ppm (rig exhaust)
15.0											
	-5										
		19.0 - 51.0ft Brown to gray, fine to coarse SAND, some to trace silt, trace gravel, (Outwash).			19.0	S5	SS	9-10-11-11	21	1.5 / 2.0	Brown, wet to saturated, medium dense, fine to coarse SAND, (SP). PID = 0.0 ppm
20.0			SM								
	-10										
					24.0	S6	SS	22-20-21-20	41	0.8 / 2.0	Brown, wet, dense, fine to coarse SAND, some gravel, some silt, trace clay, (SM). Some of the gravel is greenish-yellow in color. Some clayey till-like bonding around the gravel. PID = 0.0 ppm
25.0											

Log continued on next page

Fill (made ground) USCS Silty Sand (SM)

D+W: Drive and Wash SH: Shelby Tube SSA: Solid Stem Auger AUG: Auger Cuttings PP: Pocket Penetrometer TV: Torvane

DRILLING COMPANY: Geologic Earth Exploration Inc.
DRILLER: C. O'Donnel
DRILL RIG: CME - 45

LOGGED BY: CJS
CHECKED BY: JDL
DATE: 3/3/16

Golder Associates

RECORD OF BOREHOLE B-211 (CHI-6)

PROJECT: CHI LNG Bund Highwall
PROJECT NUMBER: 154-6055
DRILLED DEPTH: 51.0 ft
LOCATION: Next to Cement Plant

DRILL METHOD: 4 inch Drive and Wash
HAMMER TYPE: Auto
DATE STARTED: 2/24/16
DATE COMPLETED: 2/24/16

COORDS: N: 260,581.01 E: 357,470.96
GS ELEVATION: 12.9 ft
WEATHER: Rain
TEMPERATURE: 46 deg F

INCLINATION: 90
DEPTH W.L.: 11.1 ft
ELEVATION W.L.: 1.8 ft
DATE W.L.: 2/24/2016
TIME W.L.: 1300

SOIL PROFILE					SAMPLE INFORMATION						
DEPTH ft	ELEVATION ft	LITHOLOGY DESCRIPTION	USCS	GRAPHIC LOG	SAMPLE DEPTH	NUMBER	SAMPLE TYPE	BLOWS per 6 in	N	REC / ATT	Sample Description
25.0						S6	SS	22-20-21-20	41	0.8 / 2.0	
	-15										
					29.0	S7	SS	16-20-24-20	44	0.8 / 2.0	Brown, wet to saturated, dense, fine to coarse SAND, trace gravel, little silt, trace clay, (SM). Some clayey till-like bonding around gravel with some orange and red oxidation coloring in this bond zone. PID = 0.0 ppm
30.0											
	-20										
					34.0	S8	SS	11-11-16-18	27	1.6 / 2.0	Brown, wet to saturated, medium dense, fine to coarse SAND, grading to fine sand at 11", (SP). PID = 0.0 ppm
35.0											
	-25		SM								
					39.0	S9	SS	15-20-23-28	43	1.7 / 2.0	Gray, wet, dense, fine to medium sandy SILT, (ML). Medium sand is in brown bands. At 5.5" and 17.5": oxidized bands. PID = 0.0 ppm
40.0											
	-30										
					44.0	S10	SS	18-30-35-37	65	1.0 / 2.0	Gray, wet, dense, fine to medium sandy SILT, (ML). Oxidized banding throughout. PID = 0.0 ppm
45.0											
	-35										
					49.0	S11	SS	28-31-32-35	63	2.0 / 2.0	Brown, wet, very dense, fine to medium SAND, little silt, trace gravel, (SM). PID = 0.0 ppm
50.0											

Log continued on next page

Fill (made ground) USCS Silty Sand (SM)

D+W: Drive and Wash SH: Shelby Tube SSA: Solid Stem Auger AUG: Auger Cuttings PP: Pocket Penetrometer TV: Torvane

DRILLING COMPANY: Geologic Earth Exploration Inc.
DRILLER: C. O'Donnel
DRILL RIG: CME - 45

LOGGED BY: CJS
CHECKED BY: JDL
DATE: 3/3/16

Golder Associates

RECORD OF BOREHOLE B-211 (CHI-6)

PROJECT: CHI LNG Bund Highwall
PROJECT NUMBER: 154-6055
DRILLED DEPTH: 51.0 ft
LOCATION: Next to Cement Plant

DRILL METHOD: 4 inch Drive and Wash
HAMMER TYPE: Auto
DATE STARTED: 2/24/16
DATE COMPLETED: 2/24/16

COORDS: N: 260,581.01 E: 357,470.96
GS ELEVATION: 12.9 ft
WEATHER: Rain
TEMPERATURE: 46 deg F

INCLINATION: 90
DEPTH W.L.: 11.1 ft
ELEVATION W.L.: 1.8 ft
DATE W.L.: 2/24/2016
TIME W.L.: 1300

SOIL PROFILE					SAMPLE INFORMATION						
DEPTH ft	ELEVATION ft	LITHOLOGY DESCRIPTION	USCS	GRAPHIC LOG	SAMPLE DEPTH	NUMBER	SAMPLE TYPE	BLOWS per 6 in	N	REC / ATT	Sample Description
50.0			SM			S11	SS	28-31-32-35	63	2.0 / 2.0	

Boring completed at 51.0 ft

Notes:
1. Borehole backfilled with cuttings to ground surface.
2. 4" casing to 9' bgs - 3" casing to 24' bgs - open hole below

Fill (made ground) USCS Silty Sand (SM)

D+W: Drive and Wash SH: Shelby Tube SSA: Solid Stem Auger AUG: Auger Cuttings PP: Pocket Penetrometer TV: Torvane

DRILLING COMPANY: Geologic Earth Exploration Inc.
DRILLER: C. O'Donnel
DRILL RIG: CME - 45

LOGGED BY: CJS
CHECKED BY: JDL
DATE: 3/3/16

Golder Associates

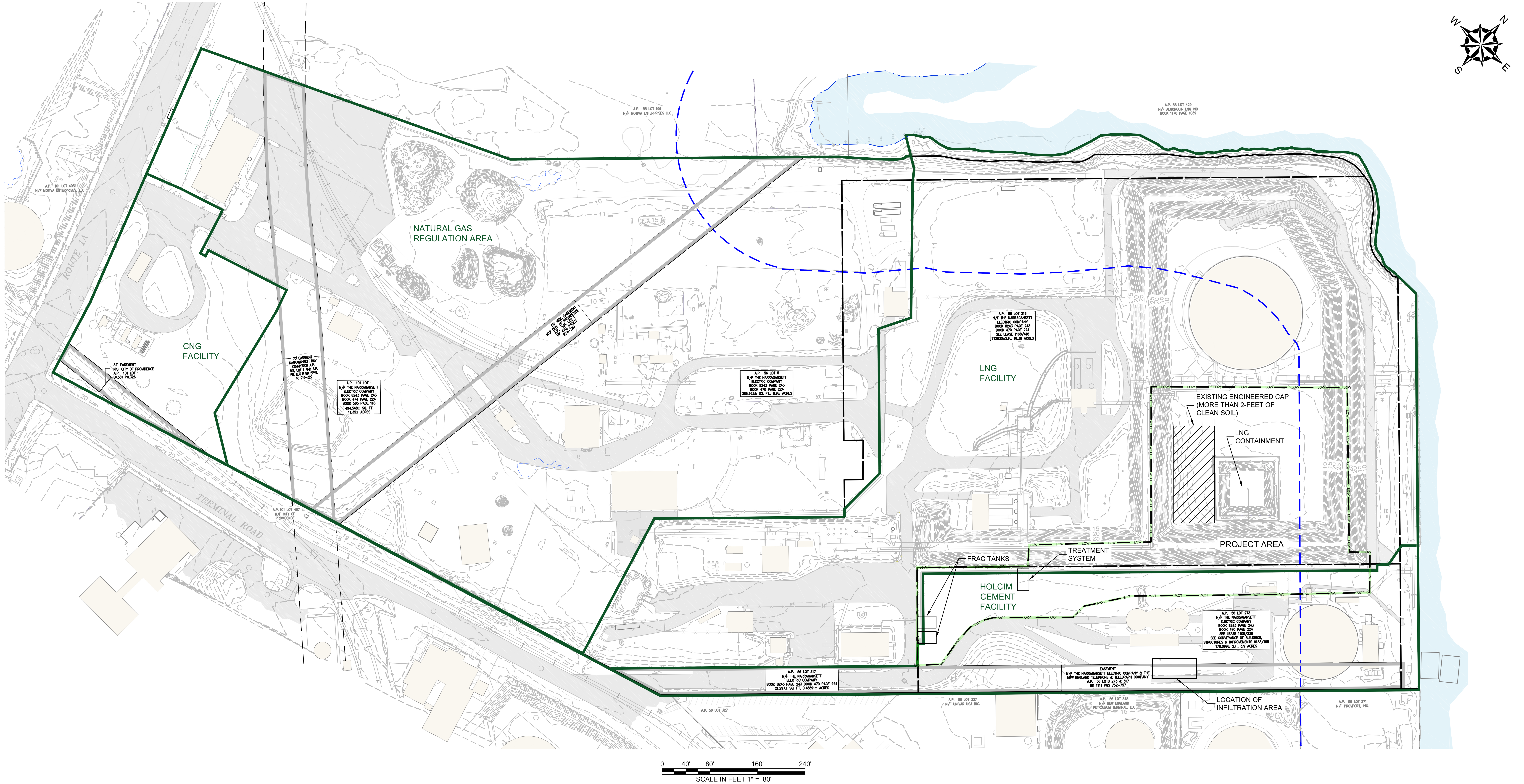
APPENDIX D

Dewatering and Groundwater

Management Information

APPENDIX D

Figures



GENERAL NOTES:

1) BASE MAP DEVELOPED FROM THE FOLLOWING:

- ELECTRONIC CAD FILE "ACAD-7257PL.DWG" PROVIDED BY VANASSE HANGEN BRUSTLIN (VHB) ENTITLED "EXISTING CONDITIONS PLAN," PROJECT TITLE "NATIONAL GRID LNG TERMINAL ROAD LNG FACILITY" DATED MARCH 10, 2014, ORIGINAL SCALE 1" = 50', DRAWING NO. SV-1 THROUGH SV-3 AND AERIAL MAPPING BY WSP TRANSPORTATION AND INFRASTRUCTURE DATED JANUARY 15, 2014 PREPARED FOR NATIONAL GRID LAND SURVEYING DEPARTMENT, WALTHAM, MASSACHUSETTS AND CAD FILE NO. 09303023.052-1.DWG. PLANS PROVIDED BY NATIONAL GRID.
- DESCRIPTIONS PROVIDED IN THE CITY OF PROVIDENCE DEED BOOK (BK) 470 PAGES 224 - 229, BK 561 PAGES 326 - 328, BK 1111 PAGES 752 -756 AND BK 5249 PAGES 219 - 322.
- ELECTRONIC CAD FILE14-152_SU1_REV2.DWG, TITLED "TOPOGRAPHIC SURVEY PLAN, PORTION OF A.P. 56 LOT 5" DATED OCTOBER 27, 2014 AND PROVIDED BY NATIONAL GRID.
- ELECTRONIC CAD FILE 5153_COO.DWG. TITLED "EXISTING CONDITIONS PLAN" PREPARED BY PROCESS PIPELINE SERVICES, DATED DECEMBER 18, 2014 AND PROVIDED BY NATIONAL GRID.

2) HORIZONTAL DATUM IS BASED ON NAD 1983 FROM BASE MAPPING PROVIDED BY VHB.

3) VERTICAL DATUM IS BASED ON NAVD 1988 FROM BASE MAPPING PROVIDED BY VHB.

4) ON-SITE SURVEYS BY GZA PERSONNEL DURING VARIOUS SITE VISITS BETWEEN 2011 AND 2016.

5) PARCEL DATA PROVIDED BY THE CITY OF PROVIDENCE PLANNING AND DEVELOPMENT DEPARTMENT. PARCELS OF REAL ESTATE ASSESSED AS OF DECEMBER 31, 2012. GIS DATA ARE FOR PLANNING PURPOSES ONLY. THESE DATA DO NOT REPRESENT A LEGALLY RECORDED PLAN, DEED, SURVEY OR ENGINEERING SCHEMATIC AND ARE NOT INTENDED TO BE USED AS SUCH.

6) SITE BOUNDARIES ARE APPROXIMATE.

LEGEND:

- EXISTING BUILDING
- EXISTING CONTOUR (MAJOR 5 FOOT INTERVAL)
- EXISTING CONTOUR (MINOR 1 FOOT INTERVAL)
- 200 FOOT CRMC SETBACK
- PAVEMENT
- EASEMENT AREA
- PROPERTY LINE
- INTERIOR PROPERTY LINE
- LIMIT OF WORK
- ABUTTING PROPERTY LINE
- EDGE OF WATER
- EXISTING RAILROAD TRACKS
- EXISTING FENCE
- OPERATIONS BOUNDARY
- EXISTING CONCRETE PAD
- UTILITY POLE
- LIGHT POLE
- HYDRANT

FOR PERMITTING ONLY

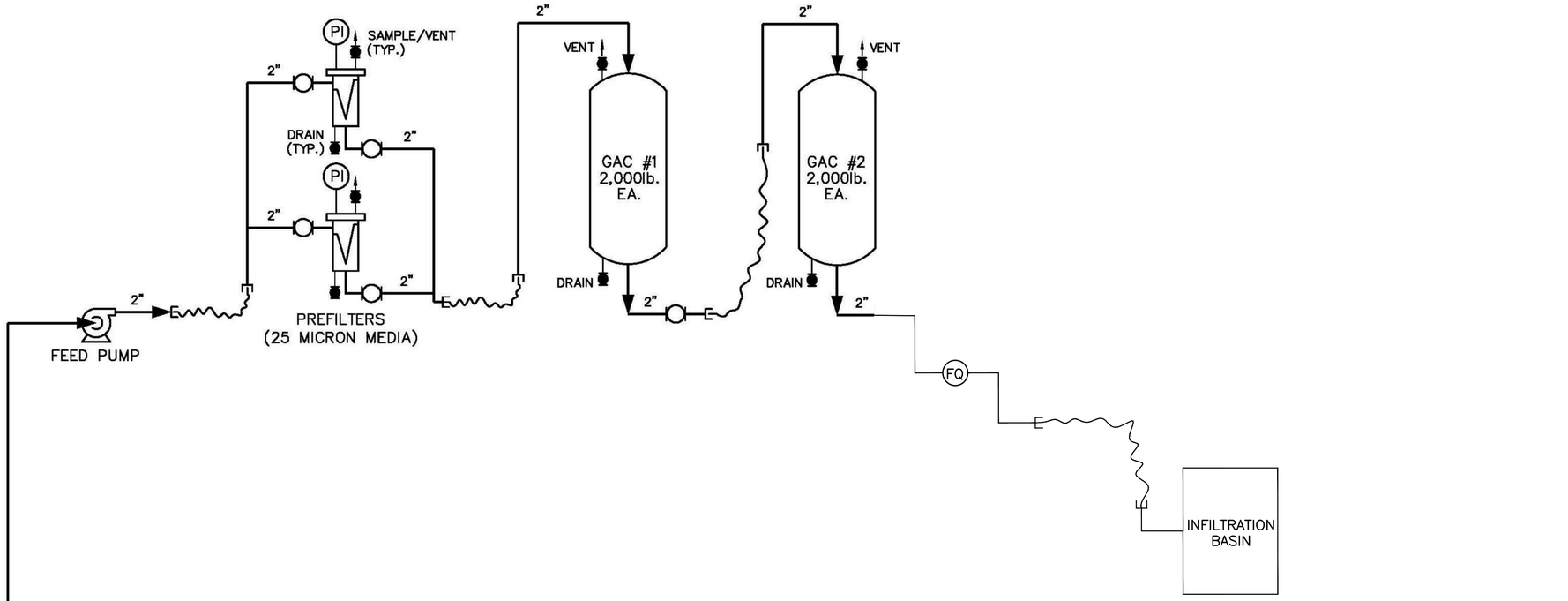
SHORT TERM RESPONSE ACTION PLAN: DIKE ACCESS ROAD
642 ALLENS AVENUE
PROVIDENCE, RHODE ISLAND

DEWATERING AND GROUNDWATER MANAGEMENT SUMMARY PLAN

PREPARED BY: GZA GeoEnvironmental, Inc. Engineers and Scientists www.gza.com

PREPARED FOR: nationalgrid

PROJ MGR: MSK	REVIEWED BY: SJH	CHECKED BY: SJH	FIGURE
DESIGNED BY: SJH	DRAWN BY: LDT	SCALE: AS NOTED	D-1
DATE: JUNE 2016	PROJECT NO. 33554.60	REVISION NO. 0	SHEET NO. 1 OF 3



LEGEND

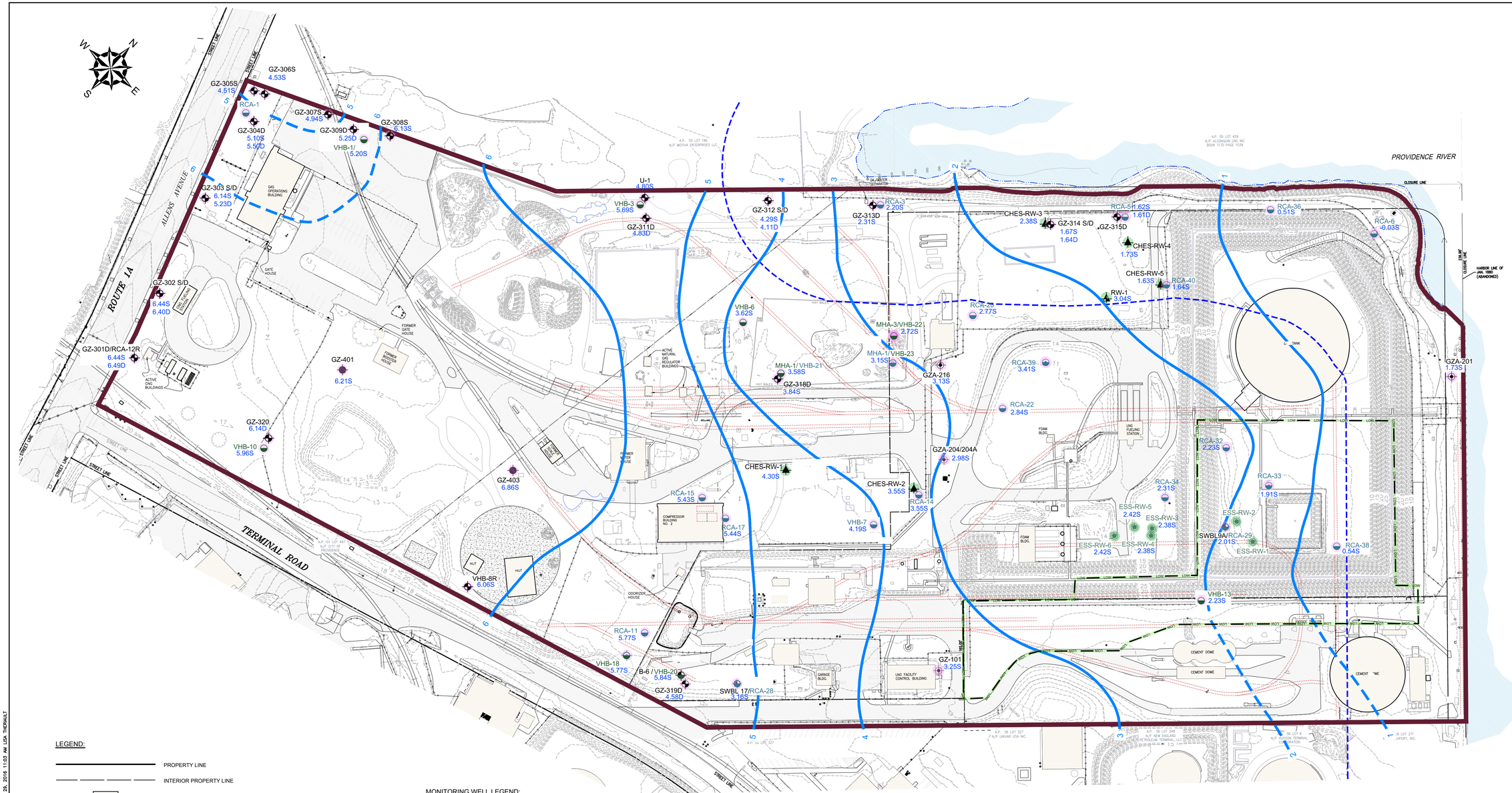
- BALL VALVE (NORMALLY CLOSED)
- BALL VALVE (NORMALLY OPEN)
- FQI — FLOW TOTALIZER
- PI — PRESSURE INDICATOR
- PRIMARY FLOW
- SECONDARY FLOW
- FLEXIBLE HOSE

FOR PERMITTING ONLY

NATIONAL GRID
SHORT TERM RESPONSE ACTION PLAN: DIKE ACCESS ROAD
642 ALLENS AVENUE, PROVIDENCE, RHODE ISLAND

PROCESS FLOW DIAGRAM

PREPARED BY:		PREPARED FOR:	
GZA GeoEnvironmental, Inc. Engineers and Scientists www.gza.com		nationalgrid	
PROJ MGR: MSK	REVIEWED BY: SDN	CHECKED BY: SDN	FIGURE D-2
DESIGNED BY: SDN	DRAWN BY: CB/LDT	SCALE: AS NOTED	
DATE: JUNE 2016	PROJECT NO. 33554.60	REVISION NO. 0	SHEET NO. 2 OF 3



LEGEND:

- PROPERTY LINE
- INTERIOR PROPERTY LINE
- EXISTING BUILDING
- STEEL POST
- PILING
- EDGE OF WATER
- FENCE
- RAILROAD TRACKS
- EXISTING CONTOUR (MAJOR 5 FOOT INTERVAL)
- EXISTING CONTOUR (MINOR 1 FOOT INTERVAL)
- PAVEMENT
- CONCRETE PAD
- LIMIT OF WORK
- SITE BOUNDARY

MONITORING WELL LEGEND:

GZ-401	MONITORING WELL INSTALLED BY GZA IN 2015
GZ-314 S/D	MONITORING WELL INSTALLED BY GZA IN 2014
GZA-206	MONITORING WELL INSTALLED BY GZA IN 2005
VHB-7	MONITORING WELL INSTALLED BY VHB IN 2002 AND 2003
F47	TEMPORARY WELL POINT INSTALLED BY ESS IN 1999 AND 2000
1	TEMPORARY WELL POINT INSTALLED BY ESS IN 1999
RCA-40	MONITORING WELL INSTALLED BY ESS IN 1996
RW-1	RECOVERY WELL INSTALLED BY CHES OBSERVED BY GZA IN 2014
CHES-RW-1	RECOVERY WELL INSTALLED BY CHES OBSERVED BY VHB IN 2002
ESS-RW-1	RECOVERY WELL INSTALLED BY ESS IN 1999 AND 2000
2.93S 2.56D	GROUNDWATER ELEVATION OBSERVED ON OCTOBER 30, 2014 (IN FEET RELATIVE TO NAVD 1988 MSL)
S	INDICATES THE MONITORING WELL SCREEN IS SHALLOW
D	INDICATES THE MONITORING WELL SCREEN IS DEEP

MONITORING WELL LEGEND CONTINUED:

- ACTIVE MONITORING WELLS
- RECOVERY WELLS
- 5 — SHALLOW GROUNDWATER ELEVATION CONTOUR (NAVD 1988 MSL) ON OCTOBER 14, 2015
- 4 — INFERRED SHALLOW GROUNDWATER ELEVATION CONTOUR (NAVD 1988 MSL) ON OCTOBER 14, 2015

GROUNDWATER CONTOUR NOTES:

1. SHALLOW GROUNDWATER CONTOURS (NAVD 1988 MSL) ARE BASED ON DATA FROM WIDELY SPACED EXPLORATIONS AND MAY NOT REFLECT ACTUAL SUBSURFACE CONDITIONS. WATER LEVEL READINGS WERE ON OCTOBER 14, 2015, WITH THE EXCEPTION OF GZ-401 AND GZ-402 WHICH WERE GAUGED ON NOVEMBER 3, 2015.
2. WATER LEVEL READINGS HAVE BEEN MADE IN THE MONITORING WELLS AT THE TIMES AND UNDER THE CONDITIONS STATED IN THE TEXT OF THIS REPORT. THESE DATA HAVE BEEN REVIEWED AND INTERPRETATIONS MADE IN THE TEXT OF THIS REPORT. HOWEVER, FLUCTUATIONS IN THE LEVEL OF THE GROUNDWATER MAY OCCUR DUE TO VARIATIONS IN RAINFALL, TEMPERATURE AND OTHER FACTORS.

0 40 80 160 240
SCALE IN FEET 1" = 80'

NATIONAL GRID
SHORT TERM RESPONSE ACTION PLAN: DIKE ACCESS ROAD
642 ALLENS AVENUE, PROVIDENCE, RHODE ISLAND

GROUNDWATER CONTOURS

FOR PERMITTING ONLY

PREPARED BY: GZA GeoEnvironmental, Inc. Engineers and Scientists www.gza.com		PREPARED FOR: nationalgrid	
PROJ MGR: MSK	REVIEWED BY: SDN	CHECKED BY: SDN	FIGURE D-3
DESIGNED BY: SDN	DRAWN BY: CB/LDT	SCALE: AS NOTED	
DATE: JUNE 2016	PROJECT NO. 33554.60	REVISION NO. 0	SHEET NO. 3 OF 3

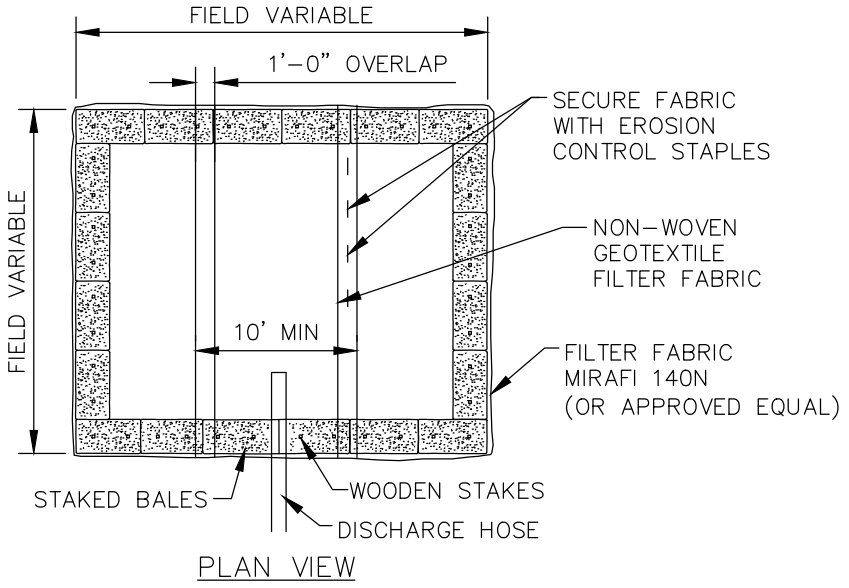
2016- GZA GeoEnvironmental, Inc. G:\ENV\33554.48\FIGURES\[VAD\]DWG\03.33554.05_BASE_V1.DWG D-3 JUNE 29, 2016 11:03 AM LISA THERRIAULT

APPENDIX D

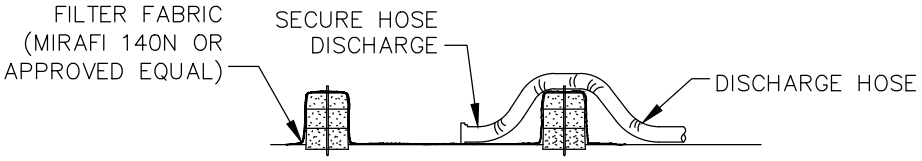
Infiltration Details

BMP DETAIL

SCALE: NONE



PLAN VIEW



CROSS–SECTION

NOTES:

1. NUMBER OF BALES MAY VARY DEPENDING ON SITE CONDITIONS,
2. THE BASIN TO BE SIZED TO PREVENT DISCHARGE WATER FROM OVERTOPPING BASIN.
3. KEEP AS FAR FROM WETLANDS AS PRACTICAL.
4. CLEAN AND REMOVE AS SOON AS DEWATERING IS COMPLETE.

BMP PICTURE

BMP # 31
DEWATERING BASIN (SMALL SCALE)

File: Dewat_Bas_Small.dwg

BMP PICTURE

NOTE:

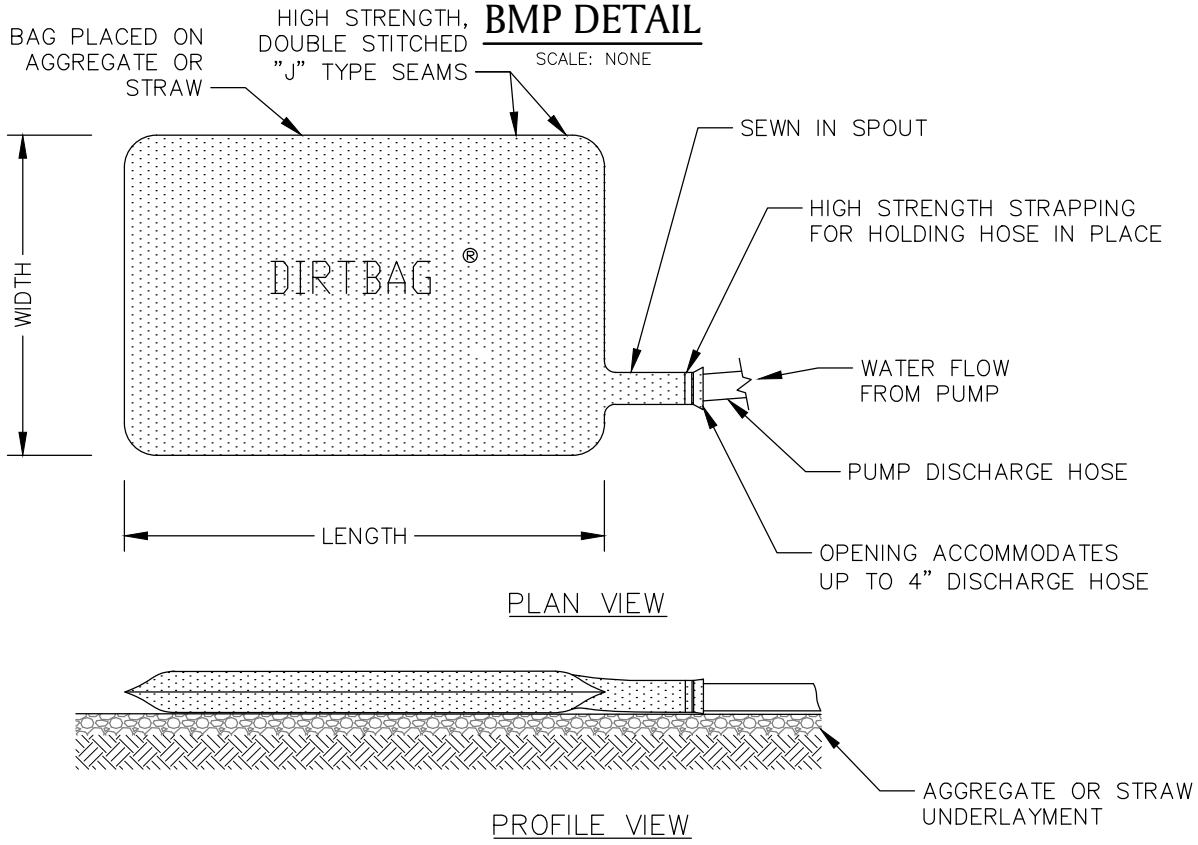
1. EXACT SIZE, LOCATION AND DESIGN IS DEPENDANT ON SITE CONDITIONS, AND LOCAL AND STATE REGULATIONS. COORDINATE THIS BMP WITH NATIONAL GRID ENVIRONMENTAL SCIENTIST PRIOR TO CONSTRUCTION.

BMP # 32
DEWATERING BASIN -
LARGE SCALE

File: Dewat_Bas_Large.dwg

BMP DETAIL

SCALE: NONE



BMP PICTURE

* PICTURE AND DETAIL PROVIDED BY ACF ENVIRONMENTAL

APPROVED BY: VICE PRESIDENT, ENVIRONMENTAL SERVICES

BMP # 33
DIRTBAG *

File: Dirtbag.dwg

APPENDIX D

Design Calculations

CARBON DESIGN CALCULATIONS
642 Allens Avenue
Providence, Rhode Island

ORGANIC DESCRIPTION	CONC. (ppb)	lbs OF ORGANIC PER DAY	MOL. WT.	REFRACTIVE INDEX	GAC USE* (lb/1000gal)
TPHg	50700	60.82	108	na	4.28
1,3,5-TRIMETHYLBENZENE	2.4	0.00	120	1.4994	0.00
2-BUTANONE	44	0.05	78	1.3807	0.07
ETHYLBENZENE	1.1	0.00	106	1.4983	0.00
NAPHTHALENE	1.2	0.00	128	1.5823	0.00
TOLUENE	36.2	0.04	92	1.4969	0.02
XYLENE	4.3	0.01	106	1.4972	0.00
TOTAL:	50789.2	60.92			4.37

Note:

Calculations provided by Carbon Filtration Systems, Inc. of Johnston, RI.

APPENDIX E

Air Emissions Evaluation

APPENDIX E

Tables

Table E-1 Analytical Soil Data

New Access Road
642 Allens Avenue
Providence, Rhode Island

	RIDEM GB Leachability Criteria	RIDEM I/C DEC	RIDEM UCL	Units	Average	Maximum	ETP-2		EPT-4	RCA-19	RCA-38	A19		A24		A29		A30		A32		A43		A44		A49		A50		A57		A58		A59	
							2-3 FT	6-7 FT	7-8 FT	0-2 FT	8-10 FT	0-2 FT	6-8 FT	0-2 FT	6-8 FT	0-2 FT	6-8 FT	0-2 FT	8-10 FT	0-2 FT	8-10 FT	0-2 FT	4-6 FT	0-2 FT	4-6 FT	0-2 FT	12-14 FT	0-2 FT	8-10 FT	0-2 FT	8-10 FT	0-2 FT	4-6 FT	0-2 FT	4-6 FT
							March 1996		March 1996	October 1995	May 1996	2/4/2000		2/9/2000		2/9/2000		2/9/2000		2/9/2000		2/17/2000		2/17/2000		2/17/2000		2/23/2000		2/23/2000		2/29/2000		2/29/2000	
Volatile Organic Compounds (VOCs)																																	
Acetone	NE	10,000	10,000	mg/kg	1.75	6.2	NA	NA	NA	ND	NA	0.6	0.7	4.6	5.8	3.7	5.2	5.7	5.6	5	6.2	0.77	0.58	0.9	0.5	0.6	0.55	0.44	0.375	0.475	0.46	0.49	0.4	0.48	0.55
Benzene	4.3	200	10,000	mg/kg	0.35	0.9	NA	ND	NA	ND	NA	0.6	0.7	0.55	0.7	0.42	0.65	0.65	0.7	0.55	0.65	0.55	0.445	0.9	0.5	0.6	0.55	0.44	0.375	0.475	0.46	0.49	0.4	0.48	0.55
Chloroform	NE	940	10,000	mg/kg	0.54	0.9	NA	NA	NA	ND	NA	0.6	0.7	0.55	0.7	0.42	0.65	0.65	0.7	0.55	0.65	0.55	0.445	0.9	0.5	0.6	0.55	0.44	0.375	0.475	0.46	0.49	0.4	0.48	0.55
Ethylbenzene	62	10,000	10,000	mg/kg	0.36	0.9	NA	NA	NA	ND	NA	0.6	0.7	0.55	0.7	0.42	0.65	0.65	0.7	0.55	0.65	0.55	0.445	0.9	0.5	0.6	0.55	0.44	0.375	0.475	0.46	0.49	0.4	0.48	0.55
Isopropylbenzene	NE	10,000	10,000	mg/kg	0.53	0.9	NA	ND	NA	ND	NA	0.6	0.7	0.55	0.7	0.42	0.65	0.65	0.7	0.55	0.65	0.55	0.445	0.9	0.5	0.6	0.55	0.44	0.375	0.475	0.46	0.49	0.4	0.48	0.55
Methylene Chloride	NE	760	10,000	mg/kg	0.53	0.9	NA	ND	NA	ND	NA	0.6	0.7	0.55	0.7	0.42	0.65	0.65	0.7	0.55	0.65	0.55	0.445	0.9	0.5	0.6	0.55	0.44	0.375	0.475	0.46	0.49	0.4	0.48	0.55
Naphthalene	NE	10,000	10,000	mg/kg	1.05	9.9	NA	ND	NA	9.9	NA	0.6	7.6	0.46	0.7	0.42	0.65	0.65	0.7	0.55	0.65	0.55	0.445	0.9	0.5	0.6	0.55	0.44	0.375	0.475	0.46	0.49	0.4	0.48	0.55
Toluene	54	10,000	10,000	mg/kg	0.35	0.9	NA	ND	NA	ND	NA	0.6	0.7	0.55	0.7	0.42	0.65	0.65	0.7	0.55	0.65	0.55	0.445	0.9	0.5	0.6	0.55	0.44	0.375	0.475	0.46	0.49	0.4	0.48	0.55
Xylenes (Total)	NE	10,000	10,000	mg/kg	0.35	0.9	NA	ND	NA	ND	NA	0.6	0.7	0.55	0.7	0.42	0.65	0.65	0.7	0.55	0.65	0.55	0.445	0.9	0.5	0.6	0.55	0.44	0.375	0.475	0.46	0.49	0.4	0.48	0.55
Semi-Volatile Organic Compounds (SVOCs)																																	
Naphthalene	NE	10,000	10,000	mg/kg	1.65	21	ND	ND	5.8	21	ND	1.8	1.85	0.45	1.9	1.75	1.9	1.7	1.75	1.9	2.7	1.8	1.75	0.76	1.75	1.85	1.7	1.9	1.7	1.6	1.75	1.6	1.75	1.8	1.8

Notes:

Data is compared to RIDEM Method 1 Standards. Shaded results represent numerical exceedances of standards.

Table only indicates the compounds that were detected and have a RIDEM Minimum Quantity, other compounds were analyzed for, but not detected.

Table only shows explorations within the Limits of Work

ND - Not Detected NA - Not Analyzed NE - Not Established

Sample depths noted here are from original grade. This table presents data that has since been disturbed or regraded. As such, the final grades are unknown and as such the modified sampling depths are unknown.

Blue shading indicates compound was not detected - value shown is half the detection limit.

Table only shows explorations within a cut area of the Limits of Work

Averages presented in the table include half the detection limit (if reported)

Table E-1 Analytical Soil Data

New Access Road
642 Allens Avenue
Providence, Rhode Island

	RIDEM GB Leachability Criteria	RIDEM I/C DEC	RIDEM UCL	Units	Average	Maximum	A60		A61		A63		A1-W131	A1-W132	A1-W133	A1-W153	A1-W155	A1-W156	A1-W158	A1-W159	A1-F52	A1-F53	A1-F54	A1-W164	A1-F55	A1-F56	A1-F57	A1-W157
							0-2 FT	4-6 FT	0-2 FT	4-6 FT	0-2 FT	2-4 FT	0-2 FT	0-2 FT	2-10 FT	0-2 FT	0-2 FT	2-10 FT	2-10 FT	0-2 FT	2 FT	2 FT	2FT	0-2 FT	2 FT	2 FT	2 FT	0-2 FT
							2/29/2000		2/29/2000		2/29/2000		9/3/99	9/3/99	9/3/99	9/8/99	9/8/99	9/8/99	9/8/99	9/20/99	9/20/99	9/20/99	9/20/99	9/27/99	9/27/99	9/27/99	9/27/99	10/1/99
Volatile Organic Compounds (VOCs)																												
Acetone	NE	10,000	10,000	mg/kg	1.75	6.2	0.65	0.65	0.6	0.385	0.6	0.6	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzene	4.3	200	10,000	mg/kg	0.35	0.9	0.65	0.65	0.6	0.385	0.6	0.6	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.14	ND	ND	ND	ND	ND
Chloroform	NE	940	10,000	mg/kg	0.54	0.9	0.65	0.65	0.6	0.385	0.6	0.6	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Ethylbenzene	62	10,000	10,000	mg/kg	0.36	0.9	0.65	0.65	0.6	0.385	0.6	0.6	ND	ND	0.103	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Isopropylbenzene	NE	10,000	10,000	mg/kg	0.53	0.9	0.65	0.65	0.6	0.385	0.6	0.6	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Methylene Chloride	NE	760	10,000	mg/kg	0.53	0.9	0.65	0.65	0.6	0.385	0.6	0.6	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Naphthalene	NE	10,000	10,000	mg/kg	1.05	9.9	0.65	0.65	0.6	0.385	0.6	0.6	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Toluene	54	10,000	10,000	mg/kg	0.35	0.9	0.65	0.65	0.6	0.385	0.6	0.6	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Xylenes (Total)	NE	10,000	10,000	mg/kg	0.35	0.9	0.65	0.65	0.6	0.385	0.6	0.6	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Semi-Volatile Organic Compounds (SVOCs)																												
Naphthalene	NE	10,000	10,000	mg/kg	1.65	21	1.8	1.7	1.85	1.8	1.8	0.57	0.507	0.707	1.88	ND	ND	ND	ND	ND	ND	1.43	1.86	ND	ND	ND	0.418	ND

Notes:

Data is compared to RIDEM Method 1 Standards. Shaded results represent numerical exceedances of standards.

Table only indicates the compounds that were detected and have a RIDEM Minimum Quantity, other compounds were analyzed for, but not detected.

Table only shows explorations within the Limits of Work

ND - Not Detected NA - Not Analyzed NE - Not Established

Sample depths noted here are from original grade. This table presents data that has since been disturbed or regraded. As such, the final grades are unknown and as such the modified sampling depths are unknown.

Blue shading indicates compound was not detected - value shown is half the detection limit.

Table only shows explorations within a cut area of the Limits of Work

Averages presented in the table include half the detection limit (if reported)

Table E-2 Excavation Emissions Potential

New Access Road
642 Allens Avenue
Providence, Rhode Island

Site-Specific		
Volume of Soil - Excavation	3,855	(cy)
Volume of Soil Moved	3,855	(cy)
Volume of Soil Moved	2,897	(m^3)

Constants			
Typical Bulk Density	1.5	(g/cm^3)	Eklund 1997 Default

Conversion Factors	
ft/m	3.3
ft^3/cy	27
g/lb	454
g/kg	1000

Analyte	Average Measured Concentration in Soil (µg/g)	Maximum Measured Concentration in Soil (µg/g)	Total Excavation Emissions Potential[1] (lb)	Total Excavation Emissions Potential[2] (lb)	RIDEM Annual Minimum Quantity (lb)
Acetone	1.75	6.2	1.68E+01	5.93E+01	2.00E+04
Benzene	0.35	0.9	3.35E+00	8.61E+00	1.00E+01
Chloroform	0.54	0.9	5.17E+00	8.61E+00	2.00E+01
Ethylbenzene	0.36	0.9	3.45E+00	8.61E+00	9.00E+03
Isopropylbenzene	0.53	0.9	5.07E+00	8.61E+00	1.00E+03
Methylene Chloride	0.53	0.9	5.07E+00	8.61E+00	2.00E+02
Naphthalene	1.77	21	1.69E+01	2.01E+02	3.00E+00
Toluene	0.35	0.9	3.35E+00	8.61E+00	1.00E+03
Xylenes (Total)	0.35	0.9	3.35E+00	8.61E+00	3.00E+03

Notes:
1. Total Excavation Emissions Potential based on Average Measured Concentration in Soil.
2. Total Excavation Emissions Potential based on Maximum Measured Concentration in Soil.
3. Only detected analytes with Rhode Island Department of Environmental Management (RIDEM) minimum quanitity values are shown.
4. Naphthalene concentrations presented in this model are the maximum of napthalene analyzed as a VOC or as a PAH
5. cm = centimeter; m = meter; g = gram; µg = microgram; ft = feet, lb = pound; kg = kilogram; cy = cubic yard.
6. Yellow Highlighting indicates model inputs.
7. Orange Highlighting indicates the calculated Total Excavation Emissions Potential exceeds the RIDEM Minimum Quantity.

Table E-3 Predicted Excavation Emissions

New Access Road
642 Allens Avenue
Providence, Rhode Island

GZA Job 03.0033554.00
6/23/2016

Assumptions		
Assumed Average MW of NAPL	250	(g/mol)
Assumed NAPL Temperature	15	(°C)

Initial Estimate		
Average Regrading Surface Area	20,817	(ft^2)
Average Excavation Average Depth	5.0	(ft)
Excavation Surface Area	2,177	(m^2)
Pile Surface Area	2,177	(m^2)
Emitting Surface Area	4,353	(m^2)
Volume of Soil Moved	3,855	(cy)
Volume of Soil Moved	2,896	(m^3)

Constants			
Typical Bulk Density	1.5	(g/cm^3)	Eklund 1997 Default
R	8.21E-05	(m^3*atm/K/mol)	
R	8.31E-03	(kJ/K/mol)	
R	62,361	(mm Hg*cm^3/mol/K)	
Soil Gas to Atmosphere Exchange Constant (Dry, uncompacted Soils)	0.33	(%/100)	Eklund 1997 Default
Air-Filled Porosity (Dry, uncompacted Soils)	0.55		Eklund 1997 Default
Total Porosity (Uncompacted Soils)	0.55		Eklund 1997 Default
Gas-Phase Mass Transfer Coefficient	0.15	cm/s	Eklund 1997 Default
Time since Start of Excavation of Soil of Interest	60	s	Eklund 1997 Default
Time Period Excavated Soil are Emitting Contaminants	0.1	(hr)	Eklund 1997 Default
TOC of Soil	0.002	(g OC/g soil)	USEPA 1996 Default

Analyte	Average Measured Concentration in Soil (ug/g)	Partial Pressure[1] (atm)	Equilibrium Coefficient	Effective Diffusivity in Air (cm^2/s)	Total Excavation Emissions Potential[2] (lb)	Total Excavation Emissions (lb)	RIDEM Annual Minimum Quantity (lb)
Naphthalene	1.77	9.59E-08	1.08E-04	2.66E-02	1.70E+01	0.003	3

Notes:
1. The Partial Pressure was calculated using Raoult's Law.
2. If the calculated Total Excavation Emissions exceeds the Total Excavation Emissions Potential, the Total Excavation Emissions Potential was used as the Total Excavation Emissions.
3. All constants for total xylenes are the average of the individual constants for m-xylene, o-xylene, and p-xylene.
4. Only detected analytes with RIDEM minimum quanitity values are shown with Total Excavation Emissions Potentials above RIDEM minimum quantities.
5. Concentration units are in ug/g, which is equal to ppm.
6. MW = molecular weight; atm = atmosphere; kJ = kilojoules; mol = moles; NAPL = non-aqueous phase liquid; ppm = parts per million; mm Hg = millimeter mercury; cm = centimeter; m = meter; g = gram; ug = microgram; ft = feet, lb = pound; s = second; yr = year; hr = hour; < = less than the reporting limit; TOC = total organic carbon.
7. Yellow Highlighting indicates model inputs.
8. Purple Highlighting indicates the Total Excavation Emissions exceeds the Rhode Island Department of Environmental Management (RIDEM) Minimum Quantity.

APPENDIX E

Excavation Emission Calculations

APPENDIX E
EXCAVATION EMISSIONS CALCULATIONS
New Access Road
642 Allens Avenue
Providence, Rhode Island

To estimate potential volatile emissions associated with planned remediation activities at the 642 Allens Avenue Property ("the Site"), GZA GeoEnvironmental, Inc. (GZA) used the following modified versions of the equations given in Appendix D of "Air Emissions from the Treatment of Soils Contaminated with Petroleum Fuels and Other Substances" (Eklund 1997):

First, the total excavation emissions potential is calculated as a benchmark:

Total Excavation Emissions Potential:

$$E_{Potential} = C_{i,Soil} \times S_v \times \beta$$

Where,
$E_{Potential}$ = Total Mass of Component i in a given volume of soil in grams (g);
$C_{i,Soil}$ = Concentration of Component i in the Soil in micrograms of Component i per gram of Soil (ug/g);
β = Typical Bulk Density in grams per cubic centimeter (g/cm^3) (assumed to be 1.5 g/cm^3 – Eklund 1997); and
S_v = Total Volume of Soil Moved in cubic meters (m^3).

Average Total Emissions (detailed model):
If the Average Total Emissions calculated by this detailed model (Eklund 1997) exceeds the calculated Total Excavation Emissions Potential, the Total Excavation Emissions Potential will be used.

$$E = E_{PS} + E_{DIFF}$$

$$E_{PS} = \frac{P_i \, MW \, 10^6 \, E_a \, S_v \, ExC}{R \, T}$$

$$E_{DIFF} = \frac{(C)(10{,}000)(SA)(t_v)}{\left(\frac{E_a}{K_{eq} k_g}\right) + \left(\frac{\pi t}{D_e K_{eq}}\right)^{1/2}}$$

Where,
E = Total Emissions from Excavation of Soil in g;
E_{PS}= Total Emissions due to Soil Pore Space Gas in g;
E_{DIFF} = Total Emissions due to Diffusion in g;
P_i = Partial Pressure of Component i in millimeters of mercury (mm Hg)[1];
MW = Molecular Weight in grams per mole (g/mol);

[1] Note that because the impacts at the Site are primarily not separate phase, we have used the partial pressure as opposed to the vapor pressure of the pure component.

10^6 = Conversion Factor of cm^3/m^3;
E_a= Air-Filled Porosity (0.35 for wet, or compacted soil; 0.55 for dry, uncompacted soil – Eklund (1997));
S_v = Total Volume of Soil Moved in m^3;
ExC = Soil-Gas to Atmosphere Exchange Constant (0.10 for wet or high-clay content soils; 0.33 for dry, sandy soils from Eklund - 1997);
R = Universal Gas Constant in mm-Hg*cm^3/mol/K (62,361 mm-Hg*cm^3/mol/K);
T = Temperatures in K (assumed to be 15°C);
C = Mass Loading of Component i in soil in g/cm^3;
$10{,}000$ = Conversion Factor of square centimeters per square meter (cm^2/m^2); and
SA = Total Emitting Surface Area in square meters (m^2). GZA assumed the Total Emitting Surface Area to be the sides and bottom of the excavation and the sides and top of the stockpile.
D_e = Effective Diffusivity in Air in square centimeter per second (cm^2/s);
K_{eq} = Equilibrium Coefficient;
t_v = Time the Volume of Soil Moved is emitting in seconds (s) (360 s – Eklund (1997));
k_g = Gas-Phase Mass Transfer Coefficient in centimeter per second (cm/s) (Default of 0.15 cm/s – Eklund (1997)); and
t = Time that the Instantaneous Emission Rate approximates the Average Emission Rate over the 360 second period that Emissions from Freshly Excavated Soil are assumed to be Significant in s (60 s – Eklund (1997)).

P_i is calculated by:

For this scenario, the partial pressure was estimated using Raoult's Law assuming the constituents are in a mixture with the other organic matter in the soil.

Raoult's Law:

$$P_i = P_i^* x_i$$

Where,
P_i = Partial Pressure of the Component i in the Mixture;
P_i^* = Vapor Pressure of the pure Component i; and
x_i = Mole Fraction of the Component i in the Mixture (moles component/total moles).

$$x_i = \frac{10^{-6}\, C_{i,Mixture}\, MW_{Mixture}}{MW_i}$$

Where,
10^{-6} = Conversion Factor of kilogram per milligram (kg/mg);
$MW_{Mixture}$ = Molecular Weight of Mixture in g/mol (assumed to be 250 g/mol);
MW_i = Molecular Weight of Component i in g/mol; and
$C_{i,Mixture}$ = Concentration of Component i in the Mixture in milligrams of Component i per kilogram of Mixture (mg/kg).

$$C_{i,Mixture} = \frac{C_{i,Soil}}{TOC}$$

Where,
$C_{i,Mixture}$ = Concentration of Component i in the Mixture in milligrams of Component i per kilogram of Mixture (mg/kg);

$C_{i,Soil}$ = Concentration of Component i in the Soil in micrograms of Component i per gram of Soil (ug/g); and TOC = Fraction of Total Organic Carbon in the Soil (g/g). Because Site-specific TOC data was not available, the default value of 0.002 from the USEPA's Soil Screening Guidance: User's Guide (1996) was used to be conservative.

We've assumed a soil temperature of 15°C in our calculations. We have therefore utilized the Clausius-Clapeyron equation to calculate vapor pressures at 15°C from those in the literature (typically 25°C):
Clausius-Clapeyron Equation:

$$\ln\left(\frac{P_1}{P_2}\right) = \left(\frac{\Delta H_{vap}}{R}\right)\left(\frac{1}{T_2} - \frac{1}{T_1}\right)$$

Where,
P_1 = Vapor Pressure at a Known Point;
P_2 = Vapor Pressure at a Given Point;
T_1 = Temperature at a Known Point in Kelvin (K);
T_2 = Temperature at a Given Point in K;
ΔH_{vap} = Enthalpy of Vaporization of Component i in kilojoules per mole (kJ/mol); and
R = Universal Gas Constant in kilojoules per Kelvin per mole (8.314E-03 kJ/K/mol).

C (Mass Loading of Component i in soil in g/cm^3) is calculated by:

$$C = 10^{-6}\, C_{i,Soil}\, \beta$$

Where,
10^{-6} = Conversion Factor of gram per microgram (g/ug);
$C_{i,Soil}$ = Concentration of Component i in the Soil in micrograms of Component i per gram of Soil (ug/g); and
β = Typical Bulk Density in g/m^3; (assumed to be 1.5 g/m^3 – Eklund (1997)).

K_{eq} is calculated by:

$$K_{eq} = \frac{P_i\, MW_i\, E_a}{R\, T\, C}$$

Where,
P_i = Partial Pressure of the Component i in the Mixture in mm Hg;
MW_i = Molecular Weight of Component i in g/mol;
E_a= Air-Filled Porosity (0.35 for wet, or compacted soil; 0.55 for dry, uncompacted soil – Eklund (1997));
R = Universal Gas Constant in mm-Hg*cm^3/mol/K (62,361 mm-Hg*cm^3/mol/K);
T = Temperatures in K (assumed to be 15°C);
C = Mass Loading of Component i in soil in g/cm^3;

D_e is calculated by:

$$D_e = \frac{D_a\, (E_a)^{3.33}}{(E_T)^2}$$

Where,
D_a = Diffusivity in Air of Component i in cm^2/s (Default of 0.1 was used when chemical-specific values could not be found.);

E_a = Air-Filled Porosity (0.35 for wet, or compacted soil; 0.55 for dry, uncompacted soil – Eklund (1997)); and
E_T = Total Porosity (0.35 for compacted soil; 0.55 for uncompacted soil – Eklund (1997)).

For impacted soils to be managed on-Site (e.g., if it is not directly loaded into a truck but is first stockpiled), an additional Total Emissions due to Soil Pore Space Gas factor will be included in the Average Total Emissions to account for the additional emissions during soil handling and stockpiling. As a conservative measure, for losses during management of materials, GZA will utilize the Total Emissions due to Soil Pore Space Gas that was calculated above for losses during excavation. This is conservative since the concentrations in the re-handled soil will be lower than in the soil during excavation.

References:

Eklund, et al. 1997. Air Emissions from the Treatment of Soils Contaminated with Petroleum Fuels and Other Substances. Prepared for U.S. Environmental Protection Agency Office of Air and Radiation and Office of Research and Development Washington, D.C. EPA-600/R-97-116. October.

RIDEM. 2009. Air Pollution Control Regulation No. 9: Air Pollution Control Permits. December.

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