October 19, 2007

OPERABLE UNIT 3
REMEDIAL ACTION WORK PLAN

Sunnyside Yard
Queens, New York

Prepared for:

NATIONAL RAILROAD PASSENGER CORPORATION
Washington, D.C. 20002

Remedial Engineering, P.C.
Environmental Engineers

and ROUX ASSOCIATES, INC.

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CERTIFICATIONS

I, Charles J. McGuckin, am currently a registered professional engineer licensed by the State of New York. I have primary direct responsibility for implementation of the remedial program for OU-3 at the Amtrak Sunnyside Yard Site (NYSDEC Site No. 241006).

I certify that the Site description presented in this RAWP is identical to the Site descriptions presented in the Record of Decision for Amtrak Sunnyside Yard – OU-3 and related amendments.

I certify that this plan includes proposed use restrictions, Institutional Controls, Engineering Controls, and plans for all operation and maintenance requirements applicable to the Site and provision for development of an Environmental Easement to be created and recorded pursuant to ECL 71-3605 [if Track 1 is not achieved]. This RAWP requires that all affected local governments, as defined in ECL 71-3603, will be notified that such Easement has been recorded. This RAWP requires that a Site Management Plan must be submitted by Amtrak for the continual and proper operation, maintenance, and monitoring of all Engineering Controls employed at the Site, including the proper maintenance of all remaining monitoring wells, for approval by the Department [if Track 1 is not achieved].

I certify that this RAWP has a plan for transport and disposal of all soil, fill, fluids and other material removed from the property under this Plan, and that all transport and disposal will be performed in accordance with all local, State and Federal laws and requirements. All exported material will be taken to facilities licensed to accept this material in full compliance with all Federal, State, and local laws.

I certify that this RAWP has a plan for import of soils and other material from off-Site and that all activities of this type will be in accordance with all local, State and Federal laws and requirements.

I certify that this RAWP has a plan for nuisance control during the remediation and all invasive development work, including a dust, odor and vector suppression plan and that such plan is sufficient to control dust, odors, and vectors and will prevent nuisances from occurring.

I certify that all information and statements in this certification are true. I understand that a false statement made herein is punishable as a Class "A" misdemeanor, pursuant to Section 210.45 of the Penal Law.

069509	10/18/07	
NYS Professional Engineer #	Date	Signature

It is a violation of Article 130 of New York State Education Law for any p[illegible]ter this document in any way without the express written verification of adoption by any New York State licensed engineer in accordance with Section 7209(2), Article 130, New York State Education Law.

FINAL REMEDIAL ACTION WORK PLAN

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LIST OF ACRONYMS

Acronym	Definition
ASP	Analytical Services Protocol
AMTRAK	National Railroad Passenger Corporation
bls	Below land surface
BTEX	Benzene, toluene, ethylbenzene, and xylenes
C&D	Construction and Demolition
CAMP	Community Air Monitoring Plan
$CaNO_3$	Calcium Nitrate
CFR	Code of Federal Regulations
CFU	Colony Forming Units
COCs	Compounds of Concern
Conrail	Consolidated Rail Corporation
cPAH	Seven specific PAHs that the NYSDEC considers carcinogenic
CQAP	Construction Quality Assurance Plan
CRZ	Contamination Reduction Zone
CY	Cubic Yards
DER	Division of Environmental Remediation
DO	Dissolved Oxygen
DRO	Diesel Range Organics
DSHM	Division of Solid and Hazardous Materials
EC	Engineering Control
EZ	Exclusion Zone
FER	Final Engineering Report
FS	Feasibility Study
GRA	General Response Action
HASP	Health and Safety Plan
HAZWOPER	Hazardous Waste Operation Worker
HDPE	High Density Polyethylene
HRO	Heavy Range Organics
HSTF	High Speed Trainset Facility
IHWDS	Inactive Hazardous Waste Disposal Site
IC	Institutional Control
IRM	Interim remedial measures
LIRR	Long Island Rail Road
mg/kg	Milligrams per kilogram, equal to 1,000 µg/kg
µg/kg	Micrograms per kilogram, equal to 0.001 mg/kg
µg/L	Micrograms per liter
MTA	Metropolitan Transit Authority
NJTC	New Jersey Transit Corporation
NO_3	Nitrate

Acronym	**Definition**
N:P:K	Nitrogen: Phosphorus: Potassium Ratio
NYCDEP	New York City Department of Environmental Protection
NYCRR	New York Code of Rules and Regulations
NYSDEC	New York State Department of Environmental Conservation
NYSDOH	New York State Department of Health
NYSDOT	New York State Department of Transportation
OOC	Order On Consent
OM&M	Operation, Maintenance and Monitoring
ORP	Oxidation Reduction Potential
OSHA	Occupational Safety and Health Administration
OU	Operable Unit
PAHs	Polycyclic aromatic hydrocarbons
PCBs	Polychlorinated biphenyls
PID	Photoionization detector
PPE	Personal protection equipment
ppm	Parts per million, equivalent to mg/kg
PVC	Polyvinyl chloride
QAPP	Quality Assurance Project Plan
RAOs	Remedial Action Objectives
RAWP	Remedial Action Work Plan
RCRA	Resource Conservation and Recovery Act
Redox	Oxidation-reduction
RI	Remedial Investigation
ROD	Record of Decision
RSCOs	Recommended Soil Cleanup Objectives
SCGs	Standards, Criteria and Guidance
SCOs	Soil Cleanup Objective
SF	Square feet
SMP	Site Management Plan
SoMP	Soil Management Plan
SPH	Separate-Phase Petroleum Hydrocarbon
STARS	Spill Technology and Remediation Series
SVOCs	Semivolatile Organic Compounds
SWPPP	Stormwater Pollution Prevention Plan
SZ	Support Zone
TAL	Target Analyte List
TAGM	Technical and Administrative Guidance Memorandum
TCL	Target Compound List
TCLP	Toxicity Characteristic Leaching Procedure
TOC	Total Organic Carbon

Acronym	**Definition**
TPH	Total Petroleum Hydrocarbons
TSCA	Toxic Substance Control Act
USEPA	United States Environmental Protection Agency
USGS	United States Geological Survey
UST	Underground Storage Tank
VOCs	Volatile Organic Compounds
Yard	Sunnyside Yard, Queens, New York

EXECUTIVE SUMMARY

National Railroad Passenger Corporation (Amtrak) and the New Jersey Transit Corporation (NJTC) entered into an Order on Consent (OOC) Index #W2-0081-87-06, with the New York State Department of Environmental Conservation (NYSDEC) in September 1989, to investigate and remediate a 133-acre property located at Sunnyside Yard (Yard), 39-29 Honeywell Street in Queens, New York. Sunnyside Yard is listed as a Class II Site in the NYSDEC's Registry of Inactive Hazardous Waste Disposal Sites. Continued usage as a railroad maintenance and storage facility is proposed for the property.

This Remedial Action Work Plan (RAWP) for Operable Unit 3 (OU-3) summarizes the nature and extent of contamination as determined from data gathered during the Remedial Investigation (RI), performed between October 1990 and December 2003. It provides an evaluation of the remedy selected in the Record of Decision (ROD). The remedy described in this document is consistent with the procedures defined in DER-10 and complies with all applicable standards, criteria and guidance. The remedy described in this document also complies with all applicable Federal, State and local laws, regulations and requirements. The NYSDEC and New York State Department of Health (NYSDOH) have determined that this Site poses a current or potential significant threat to human health and the environment, if not addressed by implementing the response action selected in the Record of Decision. The RI for this Site did not identify fish and wildlife resources.

Site Description/Physical Setting/Site History

The Yard is located in the County of Queens, Sunnyside, New York and is identified as Block 214 and Lots 1 and 68 on the New York City Tax Map. A United States Geological Survey (USGS) topographical quadrangle map (Figure 1) shows the Site location. The Yard is situated on an approximately 133-acre area bounded by the Metropolitan Transportation Authority (MTA)/Long Island Rail Road (LIRR) property to the north, Skillman Avenue to the south, light industrial and commercial properties and 42nd Place to the east, and Thompson Avenue to the west (Figure 2).

The Yard originally operated as a storage and maintenance facility for railroad rolling stock. From April 1, 1976 until shortly after the Engine House was demolished in 1996, Amtrak continued to perform routine train maintenance activities in OU-3. The Yard currently functions as a maintenance facility for electric locomotives and railroad cars for Amtrak and a train layover storage yard for NJTC.

Summary of the Remedial Investigation

The purpose of the RI was to define the nature and extent of any contamination resulting from previous activities in OU-3. The field activities and findings of the investigation are described in the RI report. Analytical results for soil sampling performed in OU-3 for the site-specific compounds of concern (COCs) are shown on Plates 1 through 4.

Soil

In total, 122 PCB samples, 54 cPAH samples, 88 lead samples, and 31 SVOC samples were collected and analyzed during the various investigations in OU-3. The NYSDEC-recommended soil cleanup levels for PCBs, cPAHs, lead, and total SVOCs were used for evaluation of the soil data. Two sample locations exceed the NYSDEC-recommended soil cleanup levels for lead and PCBs and will be addressed in this Remedial Action.

In addition to the soil described above, an area of approximately 0.5 acre of hydrocarbon-impacted surface soil was delineated visually and the impacts were found to be limited to the unsaturated zone. Based on observations from soil borings completed within this 0.5-acre area, the average depth of the hydrocarbon impacts is approximately one foot below land surface (bls).

SPH Plume

The SPH plume has been delineated both horizontally and vertically and is located entirely within the boundaries of OU-3 (Figure 4). The historic outer boundary of the plume (historic zero-foot SPH contour), which is conservatively defined by the absence of a visible sheen on the water table, occupies an area of approximately three acres in the central part of OU-3. Physical evidence of residual petroleum and/or petroleum odor was noted up to 10 feet bls in several borings and deeper in some borings.

The core of the plume consisting of mobile SPH, (i.e., SPH that may migrate vertically or horizontally through the soil) is defined by the 0.5-foot apparent SPH thickness contour. The extent of mobile SPH had been established by NYSDEC to lie within the 0.1-foot SPH thickness contour. The mobile SPH plume currently occupies approximately 0.5 acre (Figure 4). A small portion of the mobile SPH plume exists on the MTA/LIRR property to the north. An estimated 9,400 gallons of recoverable and 85,000 gallons unrecoverable petroleum is present within the historic zero foot plume.

65 samples of SPH were collected from OU-3 monitoring wells and analyzed for PCBs. Plate 6 provides a summary of the PCB concentrations detected in the SPH samples. Analytical results of SPH samples collected in 1994 indicate that the SPH in the plume consists of a slightly degraded No. 2 fuel oil.

Subsurface Structures

The subsurface structures within OU-3 include the former Engine House interior and exterior service pits, the former Metro Shed inspection pit, the Oil House basements, the former UST Areas, the former Fuel Transfer pump vaults, and the former Turntable. Investigation of the interior and exterior Engine House service pits, Fuel Transfer pump vaults, and UST indicate these structures may contain PCB and/or petroleum-impacted material. The Metro Shed inspection pit, the Oil House basements, and the former Turntable do not appear to be continuing sources of contamination.

Qualitative Human Health Exposure Assessment

An Exposure Assessment was conducted to evaluate the potential for exposure to chemicals that remain in soil in OU-3. Exposure Assessments describe the type and magnitude of exposures to chemicals of potential concern present at a site. Workers in OU-3 engaged in routine work involving soil-moving activities are not expected to experience exposure to unacceptable levels of chemicals in soil in OU-3. Secondary exposure to groundwater or the SPH plume was recognized, but the likelihood of any extensive exposure is considered highly unlikely because of the anticipated use of protective clothing (boots and gloves) and the need to pump out any accumulation of liquids in a construction excavation.

Summary of the Remedy

The components of the selected remedy are as follows:

1. A remedial design program to provide the details necessary for the construction, operation, maintenance, and monitoring of the remedial program.

2. Excavation and off-site disposal of visually hydrocarbon-impacted surface soil.

3. Excavation and off-site disposal of all mobile SPH and associated hydrocarbon-impacted soil.

4. Excavation and off-site disposal of soil impacted by PCBs and lead with concentrations in excess of the NYSDEC-recommended site-specific soil cleanup levels for these COCs.

5. Removal of the two exterior Engine House inspection pits, three fuel pump vaults, and nine USTs.

6. In situ application of calcium nitrate to enhance biodegradation of saturated soil areas with measurable residual SPH greater than 0.1 foot (as observed in successive measurements in monitoring wells) located in areas discontinuous of the mobile SPH plume (e.g., MW-77) and all hydrocarbon-impacted soils beneath the mobile SPH excavation to a depth of 10 feet bls. Mobile SPH is defined as free product with apparent thickness of 0.1 foot or greater on the water table. The residual SPH at depths greater than 10 feet will be managed and monitored in place through the Site Management Plan.

7. A Residual SPH Contingency Plan will be developed to address areas of apparent product thickness between 0.1 foot and 0.01 foot on the water table. A monitoring well plan will be developed and subject to approval of the NYSDEC. Residual SPH is defined as petroleum with an apparent thickness of 0.01 foot or greater, but less than 0.1 foot on the water table.

8. Removal of water, SPH, and sludge from the interior Engine House service pits and cleaning and sampling of the service pits. The Engine House structure including original floor slab, interior service pits, and foundation will be removed to a depth of 6 feet bls. Pending USEPA approval, the remainder of the east and west inspection pits and foundations footings extending deeper than 6 feet bls will remain in place and will be backfilled with soil from on-site sources.

9. All excavations will be backfilled with soil/fill from uncontaminated on-site sources except for the top one-foot layer of clean material, which will be imported from offsite sources. These backfill soils meet all site-specific action soil cleanup levels (cPAH, lead, PCB, total SVOC), and exhibit no gross contamination, as determined by screening by visual, olfactory or PID methods, or gross contamination from petroleum constituents. Analytical results from characterization sampling of potential backfill material are provided on Tables 3 through 6.

10. Development of a Site Management Plan to (a) address residual contaminated soils that may be excavated on or off site during future redevelopment. The plan will require soil characterization and, where applicable, disposal/reuse in accordance with NYSDEC

regulations; (b) require the evaluation of the potential for vapor intrusion for any buildings developed on the site, including provision for mitigation of any impacts identified; (c) identify any use restrictions; and (d) provide for the operation and maintenance of the components of the remedy.

11. Imposition of an institutional control in the form of an environmental easement that will (a) require compliance with the approved Site Management Plan; (b) identify areas of residual contamination remaining in OU-3 with chemical concentrations above the recommended soil clean up levels that would be managed in place (residual SPH and subsurface structures); (c) restrict the use of groundwater as a source of potable water, without necessary water quality treatment as determined by NYSDOH; (d) require the property owner to complete and submit to the NYSDEC a periodic certification.

12. Amtrak will provide a periodic certification, prepared and submitted by a professional engineer or such other expert acceptable to the NYSDEC, until the NYSDEC notifies Amtrak in writing that this certification is no longer needed. This submittal will contain certification that the institutional controls and engineering controls are still in place and that nothing has occurred that will impair the ability of the control to protect public health or the environment, or constitute a violation or failure to comply with the Site Management Plan and allow the NYSDEC access to the site.

13. The operation of the components of the remedy will continue until the remedial objectives have been achieved, or until the NYSDEC determines that continued operation is technically impracticable or not feasible.

14. Performance of groundwater monitoring downgradient of the mobile SPH excavation and the residual SPH bioremediation treatment area will be performed. Periodic groundwater monitoring to evaluate post-remedial groundwater concentrations and presence of measurable SPH in residual SPH areas will be performed for two years. This program will allow the effectiveness of the remedy to be monitored and will be a component of the operation, maintenance, and monitoring for OU-3.

1.0 INTRODUCTION

National Railroad Passenger Corporation (Amtrak) and the New Jersey Transit Corporation (NJTC) entered into an Order on Consent (OOC) Index #W2-0081-87-06, with the New York State Department of Environmental Conservation (NYSDEC) in September 1989, to investigate and remediate a 133-acre property located at Sunnyside Yard (Yard), 39-29 Honeywell Street in Queens, New York. Sunnyside Yard is listed as a Class II Site in the NYSDEC's Registry of Inactive Hazardous Waste Disposal Sites. Continued usage as a railroad maintenance and storage facility is expected for the property.

This Remedial Action Work Plan (RAWP) for Operable Unit 3 (OU-3) summarizes the nature and extent of contamination as determined from data gathered during the Remedial Investigation (RI), performed between October 1990 and December 2003. It provides a description of the remedy selected by the NYSDEC in the Record of Decision (ROD). The remedy described in this document is consistent with the procedures defined in DER-10 and complies with all applicable standards, criteria and guidance. The remedy described in this document also complies with all applicable Federal, State and local laws, regulations and requirements. The NYSDEC and New York State Department of Health (NYSDOH) have determined that this Site poses a current or potential significant threat to human health and the environment, if not addressed by implementing the response action selected in the Record of Decision. The RI for this Site did not identify fish and wildlife resources.

A formal Remedial Design document in the form of a construction bid document with plans and specifications will be prepared.

1.1 Site Location and Description

The Yard is located in the County of Queens, Sunnyside, New York and is identified as Block 214 and Lots 1 and 68 on the New York City Tax Map. A United States Geological Survey (USGS) topographical quadrangle map (Figure 1) shows the Site location. The Yard is situated on an approximately 133-acre area bounded by the Metropolitan Transportation Authority (MTA)/Long Island Rail Road (LIRR) property to the north, Skillman Avenue to the south, light industrial and commercial properties and 42nd Place to the east, and Thompson Avenue to the west (Figure 2). The Yard functions as a maintenance facility for electric locomotives and railroad cars for Amtrak and a train layover storage yard for NJTC.

1.2 Contemplated Redevelopment Plan

The Remedial Action to be performed under the RAWP is intended to make the Site protective of human health and the environment consistent with the contemplated end use. The proposed redevelopment plan and end use is described here to provide the basis for this assessment. However, the Remedial Action contemplated under this RAWP may be implemented independent of the proposed redevelopment plan.

As discussed above, continued usage as a railroad maintenance and storage facility is proposed for OU-3. Specific plans for redevelopment of OU-3, aside from replacement of railroad tracks, have not been contemplated at this time.

1.3 Description of Surrounding Property

The land use surrounding the Yard is a combination of commercial, light industrial, and residential areas. The MTA/LIRR currently owns a portion of the original Yard along the northern boundary (including a portion of OU-3) and maintains rights of way through the Yard.

The East River is located approximately one mile to the west while Newtown Creek, which defines the border between Queens and Kings counties, is located less than 0.5 mile south of the western portion of the Yard.

Sensitive receptors, including schools, daycare facilities, and hospitals, are not located on adjoining properties.

2.0 DESCRIPTION OF REMEDIAL INVESTIGATION FINDINGS

The Site was investigated in accordance with the scope of work presented in the NYSDEC-approved Remedial Investigation (RI) Work Plan dated March 14, 1989, revised February 27, 1990 and the following:

- Work Plan for the Phase II Remedial Investigation, August 5, 1992.
- Addendum to the August 5, 1992 Work Plan for the Phase II Remedial Investigation, May 28, 1993, revised August 4, 1993.
- Work Plan for the Operable Unit 3 Remedial Investigation, June 23, 1997, revised January 13, 1999.
- Work Plan for the Delineation and Further Characterization of Soil in the HSTF-Related Work Area Located in OU-3, September 25, 1997.
- Addendum to the June 23, 1997 (Revised January 13, 1999) Work Plan for the OU-3 RI, Sunnyside Yard, Queens, New York, August 1, 2003.

The investigation was conducted between October 1990 and December 2003. The RI was submitted to NYSDEC on May 27, 2005.

2.1 Summary Remedial Investigations Performed

The purpose of the RI was to define the nature and extent of any contamination resulting from previous activities in OU-3. The following activities were conducted during the RI:

- Research of historical operations;
- Installation of 186 soil borings for chemical analysis of soils as well as physical properties of soil;
- Excavation of 4 test pits to further characterize the physical properties of OU-3;
- Installation of 99 observation borings for characterization and delineation of the SPH plume;
- Installation of 20 cone penetrometer ultraviolet induced fluorescence borings to help determine the depth of petroleum hydrocarbon impact;
- Installation of four soil borings for the collection of soil samples for bench scale testing of in situ bioremediation;
- Installation of 54 monitoring wells for analysis of groundwater as well as physical properties of hydrogeologic conditions;

- Collection of 3 discrete groundwater samples using a direct push technique;
- A survey of public and private water supply wells in the area around the site;
- Collection of 65 SPH samples from groundwater monitoring wells; and
- Collection of 10 sewer water samples and 4 sewer sediment samples from sewer manholes within OU-3.

The field activities and findings of the investigation are described in the RI report. Analytical results for soil sampling performed in OU-3 for the site-specific compounds of concern (COCs) are shown on Plates 1 through 4.

2.2 Significant Threat

The NYSDEC and NYSDOH have determined that this Site poses a current or potential significant threat to human health and the environment, if not addressed by implementing the response action selected in the Record of Decision. Notice of that determination has been provided for public review.

2.3 Site History

The Pennsylvania Tunnel and Terminal Company, a subsidiary of the Pennsylvania Railroad, later known as the Penn Central Transportation Company, originally constructed Sunnyside Yard in the early 1900's. The Yard officially opened on November 27, 1910. On April 1, 1976, the Consolidated Rail Corporation (Conrail) acquired the Yard, and the same day conveyed it to Amtrak. The MTA/LIRR currently owns a portion of the Yard along the northern boundary (including a portion of OU-3) and maintains rights of way through the Yard. The Yard originally operated as a storage and maintenance facility for railroad rolling stock. From April 1, 1976 until shortly after the Engine House was demolished in 1996, Amtrak continued to perform routine train maintenance activities in OU-3.

2.4 Geological Conditions

The Yard (including OU-3) is underlain by the following geologic units (in order of increasing depth): fill (including ballast, cinders/ash), wetland deposits, Upper Pleistocene glacial deposits, and crystalline bedrock. Fill activities, which were part of major topographic changes engineered at the Yard, occurred during construction in the early 1900's.

The fill is predominantly comprised of reworked glacial deposits (unstratified sand, silt, clay, and gravel) and railroad ballast, with lesser amounts of ash, cinders, and construction debris. With the exception of paved areas and land occupied by buildings, the railroad ballast is ubiquitous at land surface throughout the Yard. The generalized geology at the water table in OU-3 is shown on Figure 3.

Groundwater beneath the Yard (including OU-3) occurs under water-table (unconfined) conditions in fill deposits, wetlands, or the Upper Pleistocene glacial deposits. The saturated Upper Pleistocene deposits comprise the Upper Glacial aquifer. Beneath the Yard, the saturated fill deposits (excluding ballast, ash/cinders, and construction debris) and the shallow Upper Glacial aquifer were not always distinguishable, and are, therefore, collectively referred to as shallow deposits (that contain the water table). Brackish groundwater is present throughout the southwest half of the Yard, and along the north side of the Yard (in OU-3) where it correlates with a buried channel (i.e., cobble zone) that trends east-west through the Yard, connecting the buried Dutch Kills Creek and saline groundwater lens with the buried northeast wetland. The depth to groundwater across OU-3 varies from one to three feet below ground surface.

Shallow groundwater beneath OU-3 flows predominantly in a west/northwesterly direction (consistent with the regional groundwater flow direction), and apparently is influenced by historical flow patterns of the former Dutch Kills Creek and associated wetlands that were filled in the early 1900s. A shallow groundwater flow map is shown on Plate 5. Based on data obtained from monitoring wells screened deeper in the aquifer, deeper groundwater predominantly flows west across the Yard. The average horizontal flow gradients for the shallow and deeper deposits in the Yard are 0.004 and 0.003 feet/foot, respectively. These values are indicative of a relatively flat water-table surface. Additionally, vertical gradients of -0.0274 and -0.0270 feet/foot were measured in OU-3 indicating upward groundwater flow. Upward groundwater flow reduces or prevents the downward migration of contaminants within the aquifer, if present. Specifically, the upward gradients beneath OU-3 assist in minimizing the impacts of the SPH plume by reducing or preventing the SPH impact on underlying groundwater quality.

2.5 Contamination Conditions

OU-3 encompasses approximately eight acres in the north central portion of the Yard. An Operable Unit (OU) represents a portion of the site remedy that for technical or administrative reasons can be addressed separately to eliminate or mitigate a release, threat of release or exposure pathway resulting from the site contamination. The majority of OU-3 is owned by Amtrak. As mentioned earlier, a portion of OU-3 (approximately 2 acres) includes property owned by the MTA/LIRR.

OU-3 consists of unsaturated and saturated soil and separate phase hydrocarbon (SPH) above the water table. There are nine underground storage tanks (USTs) and subsurface structures located within the OU-3 boundary. The subsurface structures include the former Engine House foundation, exterior and interior Engine House service pits, the former Oil House basement, the former Turntable, the former Metro Shed foundation and inspection pit, and three fuel pump vaults. The partially demolished Oil House is the only aboveground structure currently present in OU-3. The portion of the sewer and groundwater that lies within the OU-3 boundary will be addressed as part of Operable Unit-5 (OU-5) and Operable Unit-6 (OU-6), respectively at a later date.

The remaining operable units for this site are:

- OU-1: Soil above the water table within the footprint of the High Speed Trainset Facility Service and Inspection (HSTF S&I) Building. A ROD was issued for OU-1 in August 1997, and the remedial work was completed in April 1998.
- OU-2: Soil above the water table within the footprint of the HSTF S&I Building ancillary structures. A No Further Action ROD was issued for OU-2 in November 1997.
- OU-4: Soil above the water table (unsaturated zone) in the remainder of the Yard.
- OU-5: Sewer system (water and sediment) beneath the Yard.
- OU-6: Saturated soil and the groundwater beneath the Yard.

2.5.1 Conceptual Model of Site Contamination

OU-3 is contaminated predominantly with petroleum products and polychlorinated biphenyls (PCBs). Petroleum disposal is likely attributable to leaks over time associated with one or more of the nine USTs located in OU-3; leaks over time from underground piping associated with the nine USTs; or surface spills over time associated with fuel transfer or train maintenance activities. Disposal of PCBs in OU-3 is likely attributable to losses from and maintenance of train-mounted transformers over time. With few minor exceptions (as discussed in the Supplement for Phase II Remedial Investigation Report dated May 30, 1996), specific locations, dates, or quantities of petroleum or PCB spillage or onsite disposal are not known.

2.5.2 Identification of Standards, Criteria and Guidance

The NYSDEC identified four COCs for soil in the Yard: PCBs, , seven specific polycyclic aromatic hydrocarbons (PAHs) that the NYSDEC considers carcinogenic (cPAHs), lead, and total SVOCs. The seven cPAHs that were collectively identified as a COC by the NYSDEC are benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, dibenzo(a,h)anthracene, indeno(1,2,3-cd)pyrene; these are the cPAHs discussed in this report. The site –specific recommended soil cleanup levels are:

- PCBs (total) – 25,000 micrograms per kilogram (µg/kg);
- cPAHs (total) – 25,000 µg/kg;
- Lead – 1,000 milligrams per kilogram (mg/kg); and
- Total SVOCS – 500 mg/kg[1].

Additional action-specific standards, criteria, and guidance (SCGs) that were identified in the OU-3 ROD include the following.

- Soil SCGs were based on the NYSDEC's Cleanup Objectives ("Technical and Administrative Guidance Memorandum [TAGM] 4046; Determination of Soil Cleanup Objectives and Cleanup Levels." and 6 NYCRR Subpart 375-6 - Remedial Program Soil Cleanup Objectives).
- SCGs for the contents of the subsurface structures were based on the NYSDEC TAGM 4046; Determination of Soil Cleanup Objectives and Cleanup Levels and Toxic Substance Control Act (TSCA) standards for PCBs in environmental media as provided in 40 CFR 761.
- Part 703.5 Groundwater Standards.

[1] Concentrations discussed in the text are in the units they were provided by the laboratory. Likewise, the table and figures in this report are presented in the units provided by the laboratory for consistency. For reference, 1 mg/kg is equal to 1,000 µg/kg.

2.5.3 Soil/Fill Contamination

A 0.5-acre area of hydrocarbon-impacted surface soil was visually delineated to the north, west, and east of the former Engine House, partly within the bounds of the historic SPH plume and partly within the limits of the mobile SPH plume. Based on observations from soil borings completed during multiple investigations, the average depth of hydrocarbon impacts is one foot below land surface (bls), within the unsaturated zone. Excluding the portion of the visually impacted surface soil that coincides with the extent of mobile SPH, approximately 500 cubic yards (CY) of surface soil are visually impacted. Approximately 0.2 acre of the visual hydrocarbon-impacted surface soil lies within the extent of mobile SPH.

2.5.3.1 Summary of Soil/Fill Data

The NYSDEC-recommended soil cleanup levels for PCBs, cPAHs, and lead were exceeded in soil samples from seven boring locations: PCB in 821-E and CS-76; cPAHs in HST-22A and HST-22B; and lead in HST-28, MW-58, and S-62. The soil at these locations was remediated as part of soil interim remedial measures (IRMs), with the exception of soil near borings CS-76 (PCBs) and S-62 (lead). No samples exceeded the recommended soil cleanup level for SVOCs.

The one remaining exceedance of the site-specific NYSDEC-recommended soil cleanup level for PCBs in OU-3 lies within the mobile SPH limits. PCBs were detected at sample location CS-76 in the 0 to 0.5-foot interval at a concentration of 73,000 µg/kg (Plate 1). This exceedance has been delineated by sample locations TSB-11 through TSB-14 and is limited to approximately 625 square feet (SF).

The one remaining exceedance of the site-specific NYSDEC-recommended soil cleanup level of lead was detected within the extent of visually hydrocarbon-impacted surface soil. Lead was detected in the 0 to 2 foot sampling interval at soil boring location S-62 at a concentration of 1,080 mg/kg (Plate 2).

Plates 1 through 4 are spider maps that show the locations and exceedances of the NYSDEC recommended site–specific soil cleanup levels for all soil/fill.

2.5.4 On-Site and Off-Site Groundwater Contamination

Groundwater in OU-3 is slightly impacted at concentrations above the GA standards and guidance values from the Yard-related activities. Groundwater in OU-3 may be impacted by at least one suspected upgradient source, Standard Motor Products (Site No. 241016, Class 2 Site on NYSDEC Registry of Inactive Hazardous Waste Disposal Sites) by contamination (primarily chlorinated volatile organic compounds [VOCs], benzene, toluene, ethylbenzene, and xylenes [BTEX], and metals) and by saltwater intrusion. Groundwater contamination in OU-3 will be addressed during the OU-6 RI at a later date.

2.5.5 On-Site and Off-Site Soil Vapor Contamination

Since groundwater contamination will be addressed in OU-6 and VOCs have not been identified as a COC in soil, any potential soil vapor impacts will be addressed in OU-6 in accordance with NYSDOH Guidelines.

2.5.6 SPH Plume

The SPH plume has been delineated both horizontally and vertically and is located entirely within the boundaries of OU-3 (Figure 4). The historic outer boundary of the plume (historic zero-foot SPH contour), which is conservatively defined by the absence of a visible sheen on the water table, occupies an area of approximately three acres in the central part of OU-3. Physical evidence of residual petroleum and/or petroleum odor was noted up to 10 feet bls in several borings and deeper in some borings.

The extent of mobile SPH (i.e., SPH that may migrate vertically or horizontally through the soil) has been established by NYSDEC to lie within the 0.1-foot SPH thickness contour. The mobile SPH plume currently occupies approximately 0.5 acres (Figure 4). A small portion of the mobile SPH plume exists on the MTA/LIRR property to the north. An estimated 9,400 gallons of recoverable and 85,000 gallons unrecoverable petroleum is present within the historic zero foot plume.

65 samples of SPH were collected from OU-3 monitoring wells and analyzed for PCBs. Plate 6 provides a summary of the PCB concentrations detected in the SPH samples. Analytical results

of SPH samples collected in 1994 indicate that the SPH in the plume consists of a slightly degraded No. 2 fuel oil.

2.5.7 Subsurface Structures

The subsurface structures within OU-3 include the former Engine House interior and exterior service pits, the former Metro Shed inspection pit, the Oil House basement, the former UST areas, the former Fuel Transfer pump vaults, and the former Turntable. The following sections provide a summary of the contamination that remains within these structures.

2.5.7.1 Former Engine House Pits

Several remedial measures were performed for the interior Engine House inspection pits and drop table pits. The interior Engine House pits were covered with an engineered steel and concrete cover. Sludge and SPH samples collected from the west drop table pit prior to covering with the concrete cover detected PCB concentrations of 512 mg/kg and 517 mg/kg, respectively.

Recent inspection of the Track No. 2 inspection pit during the Pre-Design Study identified SPH at a thickness of 0.01 foot. Based on visual field observations (i.e., comparison of the observed depth to water in nearby monitoring wells and the depth to the observed SPH and minimal SPH thickness), it is apparent that the observed SPH within the interior Engine House pits is not a continuing source to surrounding soil contamination. Rather, the observed SPH is remaining SPH from former maintenance activities prior to closure. It has been assumed that 80 percent of the service pits' available volume is filled with water. Therefore, approximately 87,000 gallons of water is estimated to be present.

2.5.7.2 Oil House Basement

The original Oil House building had two distinct basements separated by a wall (east basement and west basement). Both basements extend 9 feet bls. The PCB-contaminated liquids that were formerly identified in the west basement were removed in 1980. The west basement was steam cleaned and all residues from cleaning activities were removed. The west basement was then backfilled with sand and covered with a 6-inch concrete slab. Recent borings performed during the Pre-Design Study confirmed that the west basement was backfilled with sand. No SPH was observed in the borings and the analysis of the samples collected from Borings OHB-S contained

PCBs well below the site-specific NYSDEC-recommended soil cleanup levels for PCBs. Based on limited visual inspection through basement windows, the east basement was not backfilled with sand and contains groundwater that has infiltrated through cracks in the basement wall.

2.5.7.3 Former UST Areas

Nine USTs with capacities ranging from 8,200 to 17,600 gallons are located north of the former Metro Shed. Recent investigation of the UST areas was performed during the Pre-Design Study to confirm the method of closure for each tank and the potential for these USTs to be acting as a continuing source of SPH contamination to surrounding soil. The western tank area, consisting of Tank Nos. 1, 2 and 3, were filled with sand and water prior to closure. Tank No. 1 had a small discontinuous layer of SPH floating on the water surface in the tank while no SPH was observed in Tank Nos. 2 and 3. In the eastern tank area, four of the six USTs (Tank Nos. 4, 5, 6 and 9) were investigated. UST No. 4 contained only sand; No. 5 contained sand and water; and Nos. 6 and 9 contained only water. SPH was not observed in any of the USTs in the east area. USTs Nos. 7 and 8 were not accessed, however, it is likely that these tanks were filled with water, similar to Tank Nos. 6 and 9. The observations made during investigation of these tanks suggest that the USTs were emptied of product at their time of closure and are not a continuing source of SPH contamination to surrounding soil.

2.5.7.4 Fuel Transfer Pump Vaults

Three fuel pump vaults are located to the northwest of the UST areas. Each of the fuel pump vaults is currently covered with steel grating or plating. Removal of the vault covers and further investigation of the contents and dimensions of the vaults will be required. Two of the pump vaults measure approximately 22 feet in length and 7 feet in width and appear to be filled with soil/fill. The easternmost pump vault measures approximately 7 feet in length and 4 feet in width. It is unknown if equipment still exists within the vaults.

2.5.7.5 Former Metro Shed Service Pit

Soil samples from the Metro Shed inspection pit were collected by United States Testing Company, Inc in August 1989 and found to contain petroleum hydrocarbons and PCBs. In 1997, the Metro Shed inspection pit was cleaned and backfilled with sand. During an investigation in 2001, no SPH was observed in a soil sample collected from a boring completed in the western portion of the Metro Shed inspection pit. Based on the field observations, it does not appear that there is residual impacted material within the Metro Shed inspection pit.

2.5.7.6 Former Turntable

The former Turntable was backfilled with sand in 1991 when drainage of the structure had ceased to function properly. Soil samples were collected from the Turntable fill material in 1998, as requested by the NYSDEC, and submitted for analysis for the COCs. No exceedances of the NYSDEC-recommended site-specific soil cleanup levels were detected in the samples and it is apparent that the Turntable is not a continuing source of SPH contamination to the surrounding soil.

2.6 Environmental and Public Health Assessments

The following sections discuss the human health exposure pathway assessment and fish and wildlife exposure pathway assessment for OU-3.

2.6.1 Qualitative Human Health Exposure Assessment

This section describes the types of human exposures that may present added health risks to persons at or around OU-3. A more detailed discussion of the human exposure pathways can be found in Section 12 of the RI report.

An exposure pathway describes the means by which an individual may be exposed to contaminants originating from a site. An exposure pathway has five elements: [1] a contaminant source, [2] contaminant release and transport mechanisms, [3] a point of exposure, [4] a route of exposure, and [5] a receptor population. An exposure pathway is complete when all five elements of an exposure pathway exist. An exposure pathway is considered a potential pathway when one or more of the elements currently does not exist, but could in the future.

2.6.1.1 Potential Exposure Pathways

Soil

Soil is the primary complete exposure pathway in OU-3. Receptors may come into direct contact with soil within OU-3 while performing routine job-related activities. During the course of contacting the soil on their skin, persons may, under some circumstances, accidentally ingest soil derived from the Site.

Inhalation of vapors from VOCs volatilizing from soils into the ambient air during soil moving activities is not considered a viable exposure pathway because the number of VOCs detected in soil are limited and concentrations are sufficiently low (maximum concentrations below 1 ppm in surface and shallow soil and below 3 ppm in deep soil) that ambient air levels could not rise to a level of concern. There are isolated spots of higher contamination at depth, but these are not within the limits of point of exposure and will be addressed in the Soil Management Plan. While exposure to fugitive dust may occur on a limited basis, the primary exposure routes for on-site receptors to chemicals present in soil is via dermal absorption and incidental ingestion. The Community Air Monitoring Plan (CAMP) to limit exposure to fugitive dust is discussed in Section 4.1.6.

Groundwater

Groundwater is present beneath OU-3 at less than one to three feet bls. Direct contact with groundwater could occur during any intrusive activities such as excavation associated with track maintenance. However, any potential contact with groundwater would likely be limited by the dewatering that would be required to conduct such activities. Furthermore, construction personnel who may work in this area would be required to wear personal protective equipment thus limiting any direct contact with groundwater by the hands. An examination of groundwater data in OU-3 indicates that concentrations of VOCs detected are low (less than 30 ppb), and therefore, any potential casual contact with groundwater would result in minimal exposure. Furthermore, ingestion of groundwater in OU-3 is not considered an exposure pathway since groundwater is not a source of drinking water in OU-3 or anywhere at the Yard.

SPH Plume

The SPH plume occurs at a depth of one to three feet bls. Therefore, direct contact with the SPH plume could occur during any intrusive activities such as excavation associated with track maintenance. However, any potential contact with the SPH plume would likely be limited by the SPH removal that would be required to conduct the planned activity. Furthermore, construction personnel who may work in this area would be required to wear personal protective equipment thus limiting any direct contact with the SPH plume by the hands. Based on samples collected from groundwater monitoring wells, historical PCB concentrations of SPH have ranged from non-detected to 360 ppm (Plate 6). Although higher concentrations of PCBs were found in SPH in other locations, these are not considered representative of the SPH present in the formation because these samples were not collected from monitoring wells. An examination of current data from OU-3 indicates that concentrations of total PCBs in the remaining SPH detected are relatively lower. Any potential casual contact with the SPH plume would likely result in minimal exposure to PCBs. Furthermore, it can be stated that there would be no ingestion of the degraded No. 2 fuel oil containing PCBs (SPH plume) in OU-3. Thus, ingestion would not be considered a complete exposure pathway.

2.6.2 Fish & Wildlife Remedial Impact Analysis

Environmental impacts include existing and potential future exposure pathways to fish and wildlife receptors, as well as damage to natural resources such as aquifers and wetlands. Past releases associated with fueling operations, maintenance activities, train-mounted transformers, and lead-based paint have resulted in the disposal of hazardous wastes including PCBs, SVOCs, cPAHs, lead, and petroleum hydrocarbons. The Site also poses a significant environmental threat associated with the current and potential impacts of contaminants to groundwater from soils impacted with petroleum hydrocarbons, PCBs, and lead. There are no wetlands or other exposure pathways to fish and wildlife receptors in OU-3. Off-site related impacts to groundwater will be addressed as part of OU-6 at a later date.

2.7 Interim Remedial Action

A summary of previous IRM activities was provided in the OU-3 RI report, as well as the OU-3 ROD. The following sections discuss the pre-design bench and field pilot studies of in situ anaerobic biodegradation.

2.7.1 Bench Scale Study

As part of the proposed remedy for the Site, an in situ application of amendments to enhance biodegradation of saturated soil areas with measurable residual SPH greater than 0.1 foot will be performed. A bench-scale treatability study was conducted to determine the viability of biodegradation technologies for treating the residual SPH and associated hydrocarbon-impacted soil. Two bench-scale treatability studies were performed by Adventus Group that included the addition of their proprietary products EHC-O® (a slow-release oxygen source) and Daramend® (a carbon source with reduced metals) mixed with Terramend® (a fertilizer comprised of potassium, phosphorus, and nitrogen in the form of nitrate, ammonium, and urea).

The first phase of the bench-scale treatability study involved the use of Adventus' EHC-O® on soil samples collected from the Site. The results of the first phase indicated that EHC-O® had marginal decreases in PAH and total petroleum hydrocarbon (TPH) concentrations. Based on these results, a second phase of the bench-scale treatability study was performed using Daramend® and Terramend®. In applying these amendments, nitrate would serve as the electron acceptor for any indigenous anaerobic microorganisms.

The Daramend® and Terramend® testing showed that the biogeochemical conditions were suitable for the anaerobic biodegradation of the TPH and that nitrate was serving as the electron acceptor for the indigenous microorganisms. The summary of the bench-scale treatability study was provided in the OU-3 RI report.

2.7.2 Field Pilot Study

On May 7, 2007, a field pilot study was implemented in the area around existing monitoring well MW-77 to test the field application of nitrate for the anaerobic degradation of TPH based on the bench-scale treatability study results. The field pilot study was conducted over a five-month period from May 2007 to October 2007. The field pilot study was conducted in accordance with the April 9, 2007 "In Situ Bioremediation Pilot Study Work Plan" (Roux Associates, 2007b).

Nitrate was introduced into the subsurface through the application of calcium nitrate, a solid agricultural fertilizer with 15% available nitrogen in the form of nitrate (NO_3). The calcium nitrate ($CaNO_3$) was mixed on-Site with potable water to create a 600-gallon readily injectable solution with 6% by weight of calcium nitrate. The 600-gallon $CaNO_3$ solution was injected using a Geoprobe™ unit in 11 temporary injection points upgradient of monitoring well MW-77.

The application of nitrate was followed by consistent groundwater monitoring to determine changes in concentrations of dissolved nitrate. Field parameters of the groundwater including oxidation-reduction potential (ORP), pH and dissolved oxygen (DO) were also monitored as an indicator of anaerobic bacterial activity. To provide additional performance monitoring information, two additional observation wells (OW-1 and OW-2) were installed in the area of the pilot study approximately 10 and 20 feet downgradient from the injection area, respectively.

2.7.2.1 Summary of Performance Monitoring Results

Prior to the nitrate injection event, baseline soil samples were collected at four locations in the pilot study area and analyzed for SVOCs, DROs, ammonia, nitrate, nitrite, nitrogen, ortho-phosphate, total heterotrophic plate count, and total organic carbon (TOC). A total of eight soil samples (two from each location) were collected at depths of 2 to 3 ft bls and 3 to 4 ft bls. Groundwater samples were also collected from existing monitoring wells (MW-74 and MW-77) and the two new observation wells. The groundwater samples were analyzed for ammonia, nitrate, sulfate, iron, and manganese.

Summary of Baseline Soil Samples

The average DRO concentration in the 2 to 3 ft bls samples was 3,150 mg/kg and ranged from 220 to 11,000 mg/kg. Nitrate, nitrite, and phosphorous were non-detect. The average petroleum degrader concentration was 1,040,000 colony forming units (CFUs/gram) and ranged from 590,000 to 1,800,000 CFUs/gram.

The average DRO concentration in the 3 to 4 ft bls samples was 14,550 mg/kg and ranged from 4,000 to 39,000 mg/kg. Nitrate, nitrite and phosphorous were non-detect. The average petroleum degrader concentration was 11,825 CFUs/gram and ranged from non-detect to 25,000 CFUs/gram. The results of the baseline soil samples are provided in Table 1.

Summary of Post-Injection Soil Samples

Post-injection soil samples were collected on June 21, 2007, July 19, 2007, and September 13, 2007, approximately 6, 10, and 12 weeks, respectively, following the nitrate injections at the same locations and depth intervals as the baseline soil samples. The results of the post-injection soil samples are provided in Table 1.

The average DRO on June 21, 2007 in the 2 to 3 ft bls samples was 145 mg/kg and ranged from 49 to 360 mg/kg. The DRO concentrations continued to decrease, as the DRO average on July 19, 2007 was 83 mg/kg and ranged from non-detect to 170 mg/kg (two of the four samples were non-detect). Further decreases in DRO concentrations were observed on September 13, 2007, as the DRO average was 63 mg/kg and ranged from non-detect to 180 mg/kg. As with the July 19, 2007 sampling round, two of the four samples were non-detect for DRO. Nitrate was detected in one soil sample at a concentration of 51 mg/kg on June 21, 2007 and a concentration of 140 mg/kg on July 19, 2007. Nitrate was non-detect on September 13, 2007. Nitrite and phosphorous were non-detect in all of the 2 to 3 ft bls samples for both sampling events. The average petroleum degraders concentration was 532,000 CFUs/gram and ranged from 19,000 to 210,000,000 CFUs/gram on June 21, 2007. The petroleum degraders generally increased especially for one location that went from 590,000 CFUs/gram to 210,000,000 CFUs/gram. The petroleum degraders generally declined on both the July 19, 2007 and September 13, 2007 sampling rounds. However, the samples with very little to non-detect DRO concentrations also had the largest decrease in petroleum degraders. .

The average DRO on June 21, 2007 in the 3 to 4 ft bls samples was 14,040 mg/kg and ranged from 54 to 31,000 mg/kg. The DRO concentrations continued to decrease, as the DRO average on July 19, 2007 was 5,600 mg/kg and ranged from non-detect to 19,000 mg/kg (one of the four samples was non-detect). The DRO concentrations further decreased, as the DRO average on September 13, 2007 was 1,000 mg/kg and ranged from non-detect to 4,000 mg/kg. As with the July 19, 2007 sampling round, one of the four samples was non-detect. Nitrate was detected in one soil sample at a concentration of 180 mg/kg on June 21, 2007. Nitrate was non-detect on July 19, 2007 and September 13, 2007. Nitrite and phosphorous were non-detect in all of the 3 to 4 ft bls samples for all sample dates. The average petroleum degraders concentration was 180,400 CFUs/gram and ranged from 7,600 to 680,000 CFUs/gram on June 21, 2007. The petroleum degraders generally increased (there were no non-detects). The petroleum degraders continued to increase on July 19, 2007 with one sample location going from 3,300 CFUs/gram at baseline, 680,000 CFUs/gram on June 21, 2007 and 1,500,000 CFUs/gram on July 19, 2007. As of September 13, 2007, the petroleum degraders remained about the same or slightly decreased. However, one sample location increased from non-detect on July 19, 2007 to 280,000 CFUs/gram on September 13, 2007.

Summary of Baseline Groundwater Samples

Iron concentrations in the baseline groundwater samples ranged from 6,800 to 120,000 micrograms per liter (μg/L) and manganese concentrations ranged from 1,200 to 7,300 μg/L. Nitrate concentrations were non-detect, and sulfate concentrations ranged from 11 to 73 mg/L.

Ammonia concentrations ranged from 1.1 to 2.5 mg/L. The results of the baseline groundwater samples are provided in Table 2.

<u>Summary of Post-Injection Groundwater Samples</u>

On May 17, 2007, a nitrate sample was collected from MW-77 to confirm that the calcium nitrate solution was distributed within the subsurface. The nitrate concentration at MW-77 was 1,200 mg/L. Additional post-injection groundwater samples were collected on June 7, 2007, July 5, 2007, and September 13, 2007 from all performance monitoring wells. The iron concentrations in the groundwater samples slightly decreased and ranged from 360 to 34,000 µg/L and manganese concentrations ranged from 80 to 11,000 µg/L. Nitrate concentrations were non-detect in the performance monitoring wells except for MW-77. The nitrate concentration in MW-77 was 630 mg/L on June 7, 2007 and on July 5, 2007. The nitrate concentration in MW-77 decreased to 57 mg/L on September 13, 2007. The sulfate concentrations ranged from 5.2 to 290 mg/L. Ammonia concentrations ranged from 0.36 to 19 mg/L. The results of the post-injection groundwater samples are provided in Table 2.

Field parameter monitoring of groundwater for ORP, pH, and DO has also been performed. The ORP and DO values have decreased in the four wells, indicative of reducing groundwater conditions. The DO has been 0.0 mg/L in all four wells and the ORP ranges from 33 mg/L to -169 mg/L. The pH has been measured in the range of 6.0 to 6.83. This is within the acceptable pH range of 6 to 9 for biodegradation.

<u>Summary of Pilot Study Results</u>

The results of the in situ bioremediation pilot study confirmed that anaerobic bioremediation, through the application of an alternate electron acceptor (nitrate) is applicable for treating the residual SPH in the soil at the Site. Based on the baseline soil sample results, there was an absence of microbes or petroleum degraders in the soil. The injection of the calcuium nitrate solution stimulated the growth of the petroleum degraders as evidenced by the increase of petroleum degraders and subsequent reduction in the DRO concentrations. For instance, several of the soil samples collected from the 3 to 4 ft bls zone had petroleum degraders go from non-dectect (less than 3,300 CFUs/gram) up to 680,000 CFUs/gram. The pilot study also demonstrated a successful reduction of DRO concentrations in both the 2 to 3 ft bls and 3 to 4 ft bls samples. Observed reductions of the average DRO concentrations from the two sampling intervals were greater than 90 percent for several sample locations with some locations reaching non-detect.

The in situ bioremediation pilot study also provided information on the spacing of injection points as well as application rates for a full-scale system. The injection points were spaced approximately 10 feet apart. A groundwater sample for nitrate analysis was collected from existing monitoring well MW-77 a week following the injection event. The result showed an increase in nitrate concentration from the baseline sample (non-detect to 1,200 mg/L) following the injection of the calcium nitrate. In addition, the field parameters (e.g., ORP) for MW-77 showed a negative decreasing trend indicative of an anaerobic environment. The injection points were appoximately 10 feet from monitoring well MW-77 thus confirming the influence of the injection points. The influence of the injection points was further confirmed by the soil samples collected within pilot study area (approximately 5 to 10 feet away from the injection points) showing detections of nitrate as well as the reduction of DRO concentrations. Furthermore, the application rate of approximately 50 gallons per injection point using a 6 percent by weight solution was shown to be appropriate for the Site. Therefore, based on the results of the pilot study, the application of in situ bioremediation using calcium nitrate should meet the objectives for addressing residual SPH.

2.8 Remedial Action Objectives

Based on the results of the Remedial Investigation, the following Remedial Action Objectives (RAOs) have been identified for this Site. The remediation goals for OU-3 are to eliminate or reduce to the extent practicable:

- Exposures to persons at or around the site to PCBs, cPAHs, lead, and petroleum hydrocarbons in soil and subsurface structures;
- The release of contaminants from soil into groundwater that may create exceedances of groundwater quality standards;
- NYSDEC-recommended site-specific soil cleanup levels for PCBs (25 ppm), lead (1,000 ppm), cPAHs (25 ppm), and total SVOCs (500 ppm);

- Removal of petroleum present as mobile SPH on the groundwater surface or as visually impacted on the surface soils. Petroleum present at 0.1 foot apparent thickness or greater on the water table is defined as mobile SPH; and

- Reduction of residual SPH mass in the subsurface to the extent technically feasible and practical. Residual SPH encompasses those areas of measurable apparent thickness less than 0.1 foot and within the historic zero foot petroleum thickness contour.

Further, the remediation goals for the Yard include attaining to the extent practicable:

- TAGM 4046 for residual contamination in soil and 6 NYCRR Subpart 375-6 - Remedial Program Soil Cleanup Objectives;
- PCB cleanup requirements in 40 CFR 761.61 (pertaining to PCB remediation waste); and
- Ambient groundwater quality standards.

3.0 DESCRIPTION OF REMEDIAL ACTION PLAN

A detailed evaluation of remedial alternatives and description of the recommended remedy was provided in the OU-3 Feasibility Study (FS), submitted to the NYSDEC on December 6, 2005 (Roux Associates, 2005). A further clarification of the recommended remedy was provided in the OU-3 FS Addendum/Stipulation Letter, submitted to the NYSDEC on February 26, 2007 (Roux Associates, 2007a). Subsequently, the Proposed Remedial Action Plan (PRAP) was developed by the NYSDEC and issued to the public for comment in February 2007 (NYSDEC, 2007a). Upon review of all received comments, the NYSDEC incorporated the comments into a Responsiveness Summary and developed the Record of Decision (ROD) for OU-3 (NYSDEC, 2007b). The ROD presented the selected remedy for OU-3.

Based on the results of the RI/FS for OU-3, the NYSDEC selected excavation and off-site disposal of mobile SPH and associated impacted soil, petroleum-impacted surface soil, and PCBs and lead-impacted soil; in situ application of amendments to enhance biodegradation of petroleum contaminated soils in selected areas; excavation and off-site disposal of structures from the former Engine House exterior inspection pits, three subsurface fuel pump vaults, and nine USTs; removal of water and petroleum hydrocarbons containing sludge from the former Engine House interior service pits; subsequent backfilling of excavated areas with clean soil; and development of a site management plan.

The components of the selected remedy are as follows:

1. A remedial design program to provide the details necessary for the construction, operation, maintenance, and monitoring of the remedial program.

2. Excavation and off-site disposal of visually hydrocarbon-impacted surface soil.

3. Excavation and off-site disposal of all mobile SPH and associated hydrocarbon-impacted soil.

4. Excavation and off-site disposal of soil impacted by PCBs and lead with concentrations in excess of the NYSDEC-recommended site-specific soil cleanup levels for these COCs.

5. Removal of the two exterior Engine House inspection pits, three fuel pump vaults, and nine USTs.

6. In situ application of calcium nitrate to enhance biodegradation of saturated soil areas with measurable residual SPH greater than 0.1 foot (as observed in successive measurements in monitoring wells) located in areas discontinuous of the mobile SPH

plume (e.g., MW-77) and all hydrocarbon-impacted soils beneath the mobile SPH excavation to a depth of 10 feet bls. Mobile SPH is defined as free product with apparent thickness of 0.1 foot or greater on the water table. The residual SPH at depths greater than 10 feet will be managed and monitored in place through the Site Management Plan.

7. A Residual SPH Contingency Plan will be developed to address areas of apparent product thickness between 0.1 foot and 0.01 foot on the water table. A monitoring well plan will be developed and subject to approval of the NYSDEC. Residual SPH is defined as petroleum with an apparent thickness of 0.01 foot or greater, but less than 0.1 foot on the water table.

8. Removal of water, SPH, and sludge from the interior Engine House service pits and cleaning and sampling of the service pits. The Engine House structure including original floor slab, interior service pits, and foundation will be removed to a depth of 6 feet bls. Pending USEPA approval, the remainder of the east and west inspection pits and foundations footings extending deeper than 6 feet bls will remain in place and will be backfilled with soil from on-site sources.

9. All excavations will be backfilled with soil/fill from uncontaminated on-site sources except for the top one-foot layer of clean material, which will be imported from offsite sources. These backfill soils meet all site-specific action soil cleanup levels (cPAH, lead, PCB, total SVOC), and exhibit no gross contamination as determined by screening by visual, olfactory or PID methods or gross contamination from petroleum constituents. Analytical results from characterization sampling of potential backfill material is provided on Tables 3 through 6.

10. Development of a Site Management Plan to (a) address residual contaminated soils that may be excavated on or off site during future redevelopment. The plan will require soil characterization and, where applicable, disposal/reuse in accordance with NYSDEC regulations; (b) require the evaluation of the potential for vapor intrusion for any buildings developed on the site, including provision for mitigation of any impacts identified; (c) identify any use restrictions; and (d) provide for the operation and maintenance of the components of the remedy.

11. Imposition of an institutional control in the form of an environmental easement that will (a) require compliance with the approved Site Management Plan; (b) identify areas of residual contamination remaining in OU-3 with chemical concentrations above the recommended soil clean up levels that would be managed in place (residual SPH and subsurface structures); (c) restrict the use of groundwater as a source of potable water, without necessary water quality treatment as determined by NYSDOH; (d) require the property owner to complete and submit to the NYSDEC a periodic certification.

12. Amtrak will provide a periodic certification, prepared and submitted by a professional engineer or such other expert acceptable to the NYSDEC, until the NYSDEC notifies Amtrak in writing that this certification is no longer needed. This submittal will contain certification that the institutional controls and engineering controls are still in place and that nothing has occurred that will impair the ability of the controls to protect public

health or the environment, or constitute a violation or failure to comply with the Site Management Plan and allow the NYSDEC access to the site.

13. The operation of the components of the remedy will continue until the remedial objectives have been achieved, or until the NYSDEC determines that continued operation is technically impracticable or not feasible.

14. Performance of groundwater monitoring downgradient of the mobile SPH excavation and the residual SPH bioremediation treatment area will be performed. Periodic groundwater monitoring to evaluate post-remedial groundwater concentrations and presence of measurable SPH in residual SPH areas will be performed for two years. This program will allow the effectiveness of the remedy to be monitored and will be a component of the operation, maintenance, and monitoring for OU-3.

Remedial activities will be performed at OU-3 in accordance with this NYSDEC-approved RAWP. All deviations from the RAWP will be promptly reported to NYSDEC for approval and fully explained in the FER.

4.0 REMEDIAL ACTION PROGRAM

The following section provides a summary of each of the governing project plans developed for implementing the selected remedial action, a description of generalized construction information, as well as an explanation of the required site preparation activities.

4.1 Governing Documents

The following project plans are discussed in the sections below:

- Site Specific Health and Safety Plan
- Quality Assurance Project Plan
- Construction Quality Assurance Plan
- Soil/Materials Management Plan
- Stormwater Pollution Prevention Plan
- Community Air Monitoring Plan

4.1.1 Site Specific Health & Safety Plan (HASP)

All remedial work performed under this plan will be in full compliance with governmental requirements, including Site and worker safety requirements mandated by Federal Occupational Safety and Health Administration (OSHA). As defined in the health and safety plan (HASP), all Site workers conducting activities in the exclusion zone will be required to have 40-hour Hazardous Waste Operation Worker (HAZWOPER) training in accordance with the referenced regulations and complete Amtrak's Roadway Worker Protection training.

Amtrak and associated parties preparing the remedial documents submitted to the State and those performing the construction work, are completely responsible for the preparation of an appropriate Health and Safety Plan and for the appropriate performance of work according to that plan and applicable laws. The Site-Specific HASP, provided in Appendix A, will be used to protect all personnel working on the Site, as well as any Site visitors. The HASP shall be readily available at all times. The remedial contractor performing the work will also be responsible for preparing their own Site-specific HASP or adopting the HASP provided in Appendix A as their own. During all phases of work, the remedial contractor shall monitor health and safety conditions and fully enforce all provisions of the Site-specific HASP, as well as Amtrak's Roadway Worker Protection requirements. The remedial contractor shall also be responsible for monitoring general Site conditions and for safety hazards. Specifically, monitoring will be performed to verify that all requirements of 29 CFR 1910 and 1926 are adhered to.

The Health and Safety Plan and requirements defined in this Remedial Action Work Plan pertain to all remedial and invasive work performed at the Site until the issuance of a Certificate of Completion.

As provided in the HASP, Site controls will be established to limit potential exposure to impacted materials. A support zone (SZ), contamination reduction zone (CRZ), and an exclusion zone (EZ) will be established to define specific areas of personal protective equipment (PPE) requirements. Site worker decontamination procedures will be adhered to when leaving the EZ. Personnel decontamination procedures will be conducted within the CRZ. Control zones and PPE requirements are defined in the HASP (Appendix A).

Health and safety monitoring, including both worker and community monitoring, will be performed during all work activities. All monitoring activities will be performed in accordance with the NYSDEC TAGM 4031-Fugitive Dust Suppression and Particulate Monitoring Program at Inactive Hazardous Waste Sites (NYSDEC, 1989), the New York State Department of Health (NYSDOH) protocol for Community Air Monitoring (NYSDEC, 2002), and HASP for the Site.

The Site Safety Coordinator will be identified upon selection of a remedial contractor. A resume will be provided to NYSDEC prior to the start of remedial construction.

Confined space entry will comply with all OSHA requirements to address the potential risk posed by combustible and toxic gasses.

4.1.2 Quality Assurance Project Plan (QAPP)

A Quality Assurance Project Plan (QAPP) provides a detailed description of site specific sampling and analytical methods and sample handling procedures for post-excavation sampling. The elements are provided in Section 5.10.

4.1.3 Construction Quality Assurance Plan (CQAP)

The Construction Quality Assurance Plan (CQAP) for all construction activities provides a detailed description of the observation and testing activities that will be used to monitor construction quality and confirm that remedy construction is in conformance with the remediation objectives and specifications. The CQAP will be prepared by the selected remedial contractor and will include the following.

- Responsibilities and authorities of the organizations and key personnel involved in the design and construction of the remedy.
- Qualifications of the quality assurance personnel that demonstrate that they possess the proper training and experience necessary to fulfill project-specific responsibilities.
- The observations and tests that will be used to monitor construction and the frequency of performance of such activities.
- The sampling activities, sample size, sample locations, frequency of testing, acceptance and rejection criteria, and plans for implementing corrective measures as addressed in the plans and specifications.
- Requirements for project coordination meetings between Amtrak and its representatives, the Construction Manager, Excavation Contractor, remedial or environmental subcontractors, and other involved parties.
- Description of the reporting requirements for quality assurance activities including such items as daily summary reports, schedule of data submissions, inspection data sheets, problem identification and corrective measures reports, evaluation reports, acceptance reports, and final documentation.
- Description of the final documentation retention provisions.

4.1.4 Soil/Materials Management Plan (SoMP)

The Soil/Materials Management Plan (SoMP) includes detailed plans for managing all soils/materials that are disturbed at the Site, including excavation, handling, storage, transport, and disposal. The SoMP also includes all of the controls that will be applied to these efforts to assure effective, nuisance-free performance in compliance with all applicable Federal, State and local laws and regulations. The SoMP is provided in Section 5.12.

4.1.5 Storm-Water Pollution Prevention Plan (SWPPP)

The erosion and sediment controls will be in conformance with requirements presented in the New York State Guidelines for Urban Erosion and Sediment Control. Hay bales and/or silt fence will be placed by the remedial contractor at locations upgradient of excavation areas, within the perimeter plywood fencing, to control storm water runoff and surface water from entering or exiting the excavation. These control measures will be installed prior to initiating the soil excavation. Any collected surface water will be managed as discussed in Section 5.12.7.

4.1.6 Community Air Monitoring Plan (CAMP)

Each of the components of the remedial action will require air monitoring. These activities include concrete structure demolition and handling of petroleum-impacted material (SPH, sand/liquid from the USTs, and liquid contents of the service pits). The air monitoring program will be implemented during all intrusive remedial actions to measure the concentration of particulates in ambient air in the work zone.

The Community Air Monitoring Program (CAMP) was developed in accordance with the NYSDOH Generic Community Air Monitoring Plan contained in Appendix 1A of the draft DER-10 (NYSDEC, 2002). The CAMP includes real-time continuous air monitoring at the Site's downwind perimeter for VOCs and particulates. Implementation and management procedures are specified within the CAMP. During all phases of work, the remedial contractor will be responsible for mitigating any vapor and particulate issues, via suppression techniques defined in the CAMP.

4.1.7 Community Participation Plan

A Community Participation Plan (CPP) has been filed with the NYSDEC. An update to the CPP contact list will be prepared and submitted to the NYSDEC under separate cover.

4.2 General Remedial Construction Information

The following sections discuss general remedial construction information related to the work in OU-3 including project organization, remedial engineer responsibilities, work schedule, and worker requirements and responsibilities.

4.2.1 Project Organization

The remedial contractor has not been selected to date. Once established, a listing of key personnel involved in the Remedial Action will be provided to the NYSDEC.

4.2.2 Remedial Engineer

The Remedial Engineer for this project will be Charles McGuckin. The Remedial Engineer is a registered professional engineer licensed by the State of New York. The Remedial Engineer will have primary direct responsibility for implementation of the remedial program for the Amtrak Sunnyside Yard Site (NYSDEC Site No. 241006). The Remedial Engineer will certify in the Final Engineering Report that the remedial activities were observed by qualified environmental professionals under his supervision and that the remediation requirements set forth in the Remedial Action Work Plan and any other relevant provisions of ECL 27-1419 have been achieved in full conformance with that Plan. Other Remedial Engineer certification requirements are listed later in this RAWP.

The Remedial Engineer will coordinate the work of other contractors and subcontractors involved in all aspects of remedial construction, including soil excavation, stockpiling, characterization, removal and disposal, air monitoring, emergency spill response services, import of backfill material, and management of waste transport and disposal. The Remedial Engineer will be responsible for all appropriate communication with NYSDEC and NYSDOH.

The Remedial Engineer will review all pre-remedial plans submitted by contractors for compliance with this Remedial Action Work Plan and will certify compliance in the Final Engineering Report.

The Remedial Engineer will provide the certifications listed in Section 9.1 in the Final Engineering Report.

4.2.3 Remedial Action Construction Schedule

A preliminary schedule for performance of the remedial work is provided in Figure 5. A revised schedule will be prepared and submitted following development and finalization of work sequencing with the remedial contractor.

4.2.4 Work Hours

A New York City Building Department permit is not required for this work within the Yard. Construction work will occur between 7 a.m. and 7 p.m. from Monday to Friday. Select tasks, including excavation of soil under the North Runner Track, will require work performed on nights and weekends to accommodate necessary movement of trains. NYSDEC will be notified of any variances to the work schedule. Every effort will be made to limit disturbances to the local community to the extent possible.

4.2.5 Site Security

Access is continually monitored by Amtrak personnel at guard booths located at each entrance to the Yard. Access to the OU-3 work area will be limited to authorized and safety trained personnel including Amtrak employees working in OU-3, remedial contractors, Amtrak representatives, and regulatory representatives from the NYSDEC and NYSDOH.

4.2.6 Traffic Control

The truck route for ingress and egress to OU-3 will be 42nd Place to Northern Boulevard. This route was selected based on the existing Yard access roads and an effort to limit transportation of work vehicles through residential areas.

4.2.7 Contingency Plan

A contingency plan describes procedures to be conducted in the event of an emergency, or the remedial work fails to meet any of its objectives or otherwise fails to protect human health or the environment. The remedial contractor will prepare and submit a Contingency Plan prior to commencement of the remedial action.

4.2.8 Worker Training and Monitoring

As discussed in Section 4.1.1, all Site workers conducting activities in the exclusion zone will be required to have 40-hour HAZWOPER training in accordance with the referenced regulations, as well as complete Amtrak's Roadway Worker Protection training.

4.2.9 Agency Approvals

The remedial action will commence following the receipt of approval of this RAWP from the NYSDEC and approval of the selected remedy for the interior Engine House service pits from the USEPA. Additionally, finalization of the MTA/LIRR access agreement will be required prior to starting the remedial action. Amtrak is exempt from certain local permitting requirements. All permits or government approvals required for remedial construction have been, or will be, obtained prior to the start of remedial construction.

The planned end use for the Site is in conformance with the current zoning for the property as determined by New York City Department of Planning.

4.2.10 Pre-Construction Meeting with NYSDEC

A pre-construction meeting will be conducted prior to the start of the remediation activities. This meeting will be attended by Amtrak representatives, the Contractor, the Remedial Engineer, and the NYSDEC. The meeting agenda will include: personnel roles, work hours, schedule, communications, training requirements, site preparation work status, and a discussion of upcoming activities.

4.2.11 Emergency Contact Information

An emergency contact sheet with names and phone numbers is included in the HASP. That document will define the specific project contacts for use by NYSDEC and NYSDOH in the case of a day or night emergency.

4.2.12 Remedial Action Costs

The total estimated cost of the Remedial Action is $4,706,343. An itemized and detailed summary of estimated costs for all remedial activity is attached as Table 7. This will be revised based on actual costs and submitted as an Appendix to the Final Engineering Report.

4.3 Site Preparation

Site preparation activities will include: identification of unmapped utilities, utility relocation (if required); track removal; monitoring well removal; and removal of existing above grade materials/structures (e.g., tracks and walkways). These activities are discussed in more detail below.

Three inactive tracks, Track Nos. 3, 4, and 5, are located to the northeast of the former Engine House and within the extent of the mobile SPH excavation. These tracks, which include rails and ties, will be removed by the remedial contractor prior to the excavation, decontaminated and disposed offsite. Remnants of tracks may exist to the east of the former Engine House (i.e., Track Nos. 1 and 2) and within the extent of the mobile SPH excavation. These tracks will also be removed prior to the excavation. The North Runner Track is an active track and will be removed by Amtrak for only a limited amount of time to allow excavation of the mobile SPH excavation in this area. For this reason, excavation under the North Runner Track will be performed on an expedited basis.

As shown on Technical Drawing C1 (Appendix B), storm drains are located within the mobile SPH excavation limits. These storm drains collect stormwater from this portion of OU-3, transfer the stormwater to the exterior Engine House inspection pits, where the stormwater collects and is discharged to the on-site sewer system. The storm drains and associated piping will require removal and capping, as necessary.

Any construction material or debris, including catenary and other utility poles, walkways, concrete pads, and sheds located within the extent of the excavation will be removed and disposed. Catenary pole foundations extend approximately 8 to 12 feet bls and will be removed within the extent of the excavation to a depth of 6 feet bls. There are three walkways constructed of wood with concrete footings that exist to the east of the Engine House between Track Nos. 3, 4 and 5. These walkways and associated footings will be removed.

Twelve monitoring wells (CTB-19, CTB-20, CTB-21, MW-16, MW-23D, MW-50, MW-71, MW-72, MW-73, MW-75, RW-1, and RW-2) are located at or within the mobile SPH excavation limits. Each of these monitoring wells will be removed in their entirety. Monitoring wells located within the visually impacted surface soil excavation will not require removal.

4.3.1 Mobilization

Site mobilization activities include mobilization of all equipment to the work area, installation of erosion control measures; and set-up of temporary facilities and decontamination facilities. Arrangements for disposal of the waste material will be finalized at this time. Amtrak is exempt from certain local permitting requirements. Applicable access agreements or permits, insurance, and licenses required to complete the work will be obtained.

4.3.2 Erosion and Sedimentation Controls

Soil erosion and sediment control measures for management of storm water will be installed in accordance with the New York Guidelines for Urban Erosion and Sediment Control. Hay bales and/or silt fence will be placed by the remedial contractor at locations upgradient of excavation areas, within the perimeter fencing, to control storm water runoff and surface water from entering or exiting the excavation. These control measures will be installed prior to initiating the soil excavation. Any collected surface water will be managed as discussed in Section 5.12.7.

4.3.3 Stabilized Construction Entrance(s)

Stabilized construction entrances will be installed at all points of vehicle ingress and egress to OU-3.

4.3.4 Utility Marker and Easements Layout

Amtrak and its contractors are solely responsible for the identification of utilities that might be affected by work under the RAWP and implementation of all required, appropriate, or necessary health and safety measures during performance of work under this RAWP. Amtrak and its contractors are solely responsible for safe execution of all invasive and other work performed under this RAWP. Amtrak and its contractors will obtain any applicable local, State or Federal permits or approvals pertinent to such work that may be required to perform work under this RAWP. Approval of this RAWP by NYSDEC does not constitute satisfaction of these requirements.

For safety concerns with regard to the presence of unmarked and unmapped underground utilities, Amtrak typically requires manual excavation to a depth of 5 feet. However, prior to the mobile SPH excavation, Amtrak will identify active underground utilities and either disconnect, permanently or temporarily reroute utilities, as necessary, or support the utility so that it may remain in place. Utilities to remain in place will be identified and mapped and excavation will be performed with caution in these areas.

The presence of utilities and easements on the Site will be investigated by the Remedial Engineer. Following clearance by Amtrak, no risk or impediment to the planned work under this Remedial Action Work Plan will be posed by utilities or easements on the Site.

4.3.5 Sheeting and Shoring

Appropriate management of structural stability of on-Site or off-Site structures during on-Site activities including excavation is the sole responsibility of Amtrak and its contractors. Amtrak and its contractors are solely responsible for safe execution of all invasive and other work performed under this Plan. Amtrak and its contractors will obtain any applicable local, State or Federal permits or approvals that may be required to perform work under this Plan. Further, Amtrak and its contractors are solely responsible for the implementation of all required, appropriate, or necessary health and safety measures during performance of work under the approved Plan.

4.3.6 Equipment and Material Staging

All equipment and work materials will be staged in the Amtrak approved staging areas shown on Technical Drawing C1 (Appendix B).

4.3.7 Decontamination Area

A temporary decontamination pad will be constructed to decontaminate trucks and other vehicles/equipment leaving OU-3. The decontamination pad will be constructed using 60-mil high density polyethylene (HDPE) liner with perimeter berms, sloped to a low-lying sump to contain any liquids. The decontamination pad will be sized to accommodate the largest construction vehicle used and located adjacent to the waste staging area.

4.3.8 Site Fencing

The area surrounding the excavation will remain operational to Amtrak during the excavation activities. An open excavation in a very active portion of the Yard could cause health and safety concerns. Therefore, temporary chain-link fencing will be installed around the perimeter of the mobile SPH excavation. The perimeter fencing will be eight feet in height, with two double access gates to allow ingress and egress of construction vehicles. To comply with Amtrak's safety requirements, the portion of the fencing running parallel to all tracks including the North Runner Track will be installed at a minimum distance of 5 feet from the outside rail. The location of the perimeter fencing is shown on Technical Drawing C1 (Appendix B).

4.3.9 Demobilization

Following the completion of all remedial activities, OU-3 will be restored to pre-construction conditions, with the exception that all above grade structures will be removed. For instance, all temporary structures including trailers, staging areas, and decontamination pads will be removed. Materials used in constructing the waste staging area (e.g., plastic sheeting, haybales) will be removed and disposed. Soil underlying the plastic sheeting in the waste staging area will be inspected for any visual staining or evidence of waste materials. Any impacts to the soil in this area will be removed and disposed as well. All equipment will be decontaminated prior to leaving the Yard.

4.4 Reporting

All daily and monthly reports will be included in the Final Engineering Report. The following sections provide a summary of reports that will be prepared and maintained throughout the remedial action.

4.4.1 Daily Reports

Daily activity reports will be prepared and maintained on site for compilation and record management. Daily reports will be submitted to NYSDEC and NYSDOH Project Managers on a weekly basis and will include:

- Date and weather;
- Listing of personnel and equipment on site;
- A summary of work activities performed;
- A summary of samples collected;
- An update of progress made during the reporting day;
- Locations of work and quantities of material imported and exported from the Site including waste manifest information;
- References to alpha-numeric map for Site activities;
- A summary of any and all complaints with relevant details (names, phone numbers);
- A summary of CAMP findings, including excursions;

- An explanation of notable Site conditions; and
- A summary of future work activities.

Daily reports are not intended to be the mode of communication for notification to the NYSDEC of emergencies (accident, spill), requests for changes to the RAWP or other sensitive or time critical information. However, such conditions shall be included in the daily reports. Emergency conditions and changes to the RAWP will be addressed directly to NYSDEC Project Manager via personal communication.

Daily Reports will include a description of daily activities keyed to an alpha-numeric map for the Site that identifies work areas. These reports will include a summary of air sampling results, odor and dust problems and corrective actions, and all complaints received from the public.

A Site map that shows a predefined alpha-numeric grid for use in identifying locations described in reports submitted to NYSDEC is attached in Figure 6.

The NYSDEC assigned project number will appear on all reports.

4.4.2 Monthly Reports

Monthly reports will be submitted to NYSDEC and NYSDOH Project Managers within one week following the end of the month of the reporting period and will include:

- Activities relative to the Site during the previous reporting period and those anticipated for the next reporting period, including a quantitative presentation of work performed (i.e. tons of material exported and imported, etc.);
- Description of approved activity modifications, including changes of work scope and/or schedule;
- Sampling results received following internal data review and validation, as applicable; and,
- An update of the remedial schedule including the percentage of project completion, unresolved delays encountered or anticipated that may affect the future schedule, and efforts made to mitigate such delays.

4.4.3 Other Reporting

Photographs will be taken of all remedial activities and submitted to NYSDEC in digital (JPEG) format with the monthly reports. Photos will illustrate all remedial program elements and will be of acceptable quality. Representative photos of the Site prior to any Remedial Actions will be provided. Representative photos will be provided of each contaminant source, source area, and Site structures before, during, and after remediation. Photos will be submitted to NYSDEC on CD or other acceptable electronic media and will be sent to NYSDEC's Project Manager (2 copies) and to NYSDOH's Project Manager (1 copy). CDs will have a label and a general file inventory structure that separates photos into directories and sub-directories according to logical Remedial Action components. A photo log keyed to photo file ID numbers will be prepared to provide explanation for all representative photos. For larger and longer projects, photos should be submitted on a monthly basis or another agreed upon time interval.

Job-site record keeping for all remedial work will be appropriately documented. These records will be maintained on-Site at all times during the project and be available for inspection by NYSDEC and NYSDOH staff.

4.4.4 Complaint Management Plan

Any complaints received from the public regarding nuisances or other site conditions will be communicated within 24-hours to NYSDEC and NYSDOH, investigated and remedied, if required.

4.4.5 Deviations from the Remedial Action Work Plan

Any required deviations from this RAWP will be discussed by Amtrak and Amtrak's representatives with the NYSDEC. At that time, the reasons for necessary deviations from the approved RAWP will be explained and the effect of the required deviations on the overall remedy will be evaluated. If the deviation is deemed to be a significant change to the RAWP by the NYSDEC, a description and reasons for the proposed change will be emailed to the NYSDEC Project Manager for review and written approval.

5.0 REMEDIAL ACTION: MATERIAL REMOVAL FROM SITE

The following sections provide an overview of the work elements, health and safety tasks, performance evaluation measures, and decontamination procedures for implementing the selected remedy for OU-3.

5.1 Fuel Pump Vaults Removal

Three fuel pump vaults are located to the northwest of the UST Areas (Figure 6). One of the pump vaults is located within the extent of the mobile SPH excavation and one of the pump vaults is located within the extent of the visually impacted surface soil. The third pump vault is located to the east of both excavations. For estimation purposes, it is assumed that the pump vaults are approximately 6 feet in depth. The two western pump vaults measure approximately 22 feet in length and 7 feet in width and appear to be filled with soil/fill. The easternmost pump vault measures approximately 7 feet in length and 4 feet in width. It is likely that equipment and piping still exists inside the vaults. Based on these assumptions, it is estimated that the three pump vaults are constructed with approximately 20 CY of concrete and the two filled vaults each contain approximately 35 CY of soil (70 CY total).

The contents of the fuel oil pump vaults will be removed and stockpiled for off-site disposal. Any SPH sludge or liquid within the fuel oil pump vaults will be vacuum extracted or mechanically removed with excavation equipment. Any soil/fill within the pump vaults will be removed either manually or mechanically. Removal of the fuel pump contents may require confined space entry precautions. Piping from the pump vaults to the former UST Area will be traced and removed, as necessary. The concrete structures will be dismantled using demolition equipment, including jackhammers and backhoes. All removed concrete will be broken up into manageable pieces, sampled for waste characterization, and transported off-site for proper disposal. The excavation will be backfilled with approved soil from on-site sources as discussed in further detail in Section 5.12.6. A one-foot layer of clean soil, suitable for railroad operations, will be placed over the entire area as discussed in Section 5.12.9.

5.2 Exterior Engine House Service Pit Removal

The exterior inspection pits (trending east/west) are located to the north and exterior of the former Engine House structure (Track Nos. 3 and 4 inspection pits). The pits measure 91 feet in length, 4 feet in width, and 3 feet in depth. The construction of these inspection pits is believed to be similar to the interior inspection pits. Therefore, the thickness of the concrete walls is approximately 2 feet and the floor of the service pit is estimated to be 9 inches in thickness. Given these approximate measurements, it is estimated that the concrete exterior inspection pits are composed of approximately 100 CY of concrete.

One of the exterior inspection pits (southern inspection pit) is covered with wood planking, while the other inspection pit (northern inspection pit) remains uncovered and contains some debris. The presence of water or SPH in the southern inspection pit has not been determined. Any contents discovered after removing the wood planking will be removed either manually or mechanically. Similar to the fuel pump vault removal, the concrete inspection pits will be dismantled using demolition equipment, including jackhammers and backhoes. All above grade structures near the exterior service pits, including concrete and elevated steel work platforms, will be removed during the site preparation task. All removed concrete will be broken up into manageable pieces, sampled for waste characterization, and transported off-site for proper disposal. The excavation will be backfilled with approved soil from on-site sources as discussed in further detail in Section 5.12.6. A one-foot layer of clean soil, suitable for railroad operations, will be placed over the entire area as discussed in Section 5.12.9.

5.3 Interior Engine House Service Pits Cleaning and Partial Demolition

The measurements of the interior inspection and drop table pits are based on the Inspection Building Contract Drawings drafted in August 1909 and the Temporary Containment Cap and Engine House Demolition Drawings prepared in June 1995, as shown on Technical Drawing C4 (Appendix B).

The former Engine House interior service pits consist of four interconnected concrete pits (inspection pits and drop table pits). The east drop table pit intersects the Track No. 2 inspection pit. The west drop table pit intersects both Track Nos. 1 and 2 inspection pits (Technical Drawing C5 [Appendix B]). Based on this configuration and the measurement of water in the Track No. 2 inspection pit, it is assumed that the other pits contain water as well. Due to the presence of the concrete cover, it is not possible to quantify the amount of water present in the inspection pit system. For estimating purposes, it has been assumed that 80 percent of the service pits' available volume is filled with water. Therefore, approximately 87,000 gallons of water is estimated to be present.

According to the Temporary Containment Cap and Engine House Demolition Drawings, concrete caps were constructed over the service pits. These concrete caps were approximately two feet above the original floor slab elevation. Following the building demolition, a steel/concrete cover was constructed over the remaining floor slab area, incorporated with the service pit concrete caps and forming a comprehensive cover over the entire footprint of the Engine House. The Drawings indicate that the steel/concrete cover was constructed on soil/fill that was placed on the original floor slab and between the service pit concrete caps. The Engine House concrete cover is shown on Technical Drawing C4 (Appendix B).

The contents of the former Engine House interior service pits require removal because sludge and SPH samples collected from the inspection pit may potentially be characterized as a NYS B003 listed hazardous waste (i.e., petroleum oil or other liquid containing 500 ppm or greater of PCBs). To enable the removal of the sludge, water, and any debris found within the service pits, the concrete slab constructed over the service pits and original floor slab will be removed in its entirety using mechanical/demolition equipment. Once the service pits are exposed, all water and SPH in the service pits will be removed using a combination of sump pumps and a Guzzler® high-powered vacuum truck, containerized, and sampled for waste characterization purposes for off-site disposal. Debris, including former equipment and machinery, and soil/sludge found within the pits will be removed, sampled for waste characterization purposes, and disposed off-site.

Any surface accumulation of sludge on the walls or bottom of the service pits will be removed using manual scraping tools. The concrete will be cleaned using a high-pressure wash with commercial detergent to remove any remaining residue after scraping. The wash water generated during the pressure washing will be collected using a vacuum truck, containerized for off-site disposal, and sampled for waste characterization purposes.

To facilitate future redevelopment of this portion of OU-3, concrete including foundation footings, original floor slab, and service pits will be removed to a depth of 6 feet bls. It is estimated that the concrete quantity to a depth of 6 feet bls will be approximately 1,000 CY. The remainder of the east and west inspection pits and foundation footings extending deeper than 6 feet bls will remain in place.

Following the cleaning and partial demolition, composite concrete bulk samples will be collected from each of the remaining service pit bottoms and two sidewalls that exhibited petroleum staining/surface accumulation and submitted for PCB analysis. The analytical results will be evaluated and used for development of a risk assessment, which will be submitted to the USEPA and NYSDEC.

The remaining portions of the service pits will be backfilled with soil/fill from on-site sources as further discussed in Section 5.12.6 or the soil/fill present under the steel/concrete cover, if deemed suitable through characterization. A one-foot layer of clean soil, suitable for railroad operations, will be placed over the entire area as discussed in Section 5.12.9.

5.4 Oil House Partial Demolition

The Oil House building originally occupied 3,476 square feet and was situated on a raised platform, approximately 4 feet above surrounding grade elevation. The measurements of the Oil House basement and structure are based on the Oil and Lamp Building Contract Drawings drafted in July 1909 (revised February 1911), as shown on Technical Drawing C7 (Appendix B).

The original building had two distinct basements separated by a wall (east basement and west basement). Both basements extend 9 feet bls. The west basement measures approximately 43 feet by 52 feet. As discussed in Section 2.5.7.2, the west basement was previously cleaned, filled with soil, and a 6-inch concrete cover was installed over the soil-filled basement. The east basement measures approximately 23 feet by 52 feet. Based on limited visual inspection through basement windows, the east basement was not backfilled with soil and contains groundwater that has infiltrated through the basement wall. The wall construction for the basements is 2-foot thick concrete with an exterior course of 4-inch brick.

Remnants of the former Oil House building still exist on the platform over the east basement. Although investigation of the Oil House determined that there is no continuing source of contamination associated with the Oil House, the structure, basements, and adjoining platform will be demolished and removed to a depth of 6 feet below land surface for operational purposes. Excavation to this depth will remove the majority of the Oil House Basement and adjoining platform and ramps. Portions of the basement and foundations extending deeper than 6 feet bls will remain in place.

The building demolition, concrete removal, and soil excavation will be performed using standard mechanical demolition equipment. All removed concrete will be broken up into manageable pieces. The concrete and soil will be sampled for waste characterization, and transported off-site for proper disposal. The excavation will be backfilled with approved soil from on-site sources as discussed in further detail in Section 5.12.6. A one-foot layer of clean soil, suitable for railroad operations, will be placed over the entire area as discussed in Section 5.12.9.

5.5 Underground Storage Tank Removal

The tanks in the west UST area were connected by underground pipelines to the Fuel Transfer Area, located northeast of the former Engine House. The tanks in the east UST area were connected by underground pipelines to a boiler house previously located at the southwestern end of the former Engine House and the Fuel Transfer Area (Technical Drawing C6 [Appendix B]). Due to limited available information regarding the location of the piping associated with the nine USTs, any existing piping will be located by tracing the pipes from the tanks. Once located, the pipes will be drained, cut, and removed, in accordance with 6 NYCRR Part 613.9.

Four of the USTs (Nos. 1, 2, 3 and 5) were filled with sand and water and two of the USTs (Nos. 6 and 9) were filled with water only. It is anticipated that the remaining two USTs (Nos. 7 and 8) are also filled with water. Tank No. 4 was filled with sand only. Prior to removing the tanks, the contents will be pumped from the tanks. All liquid and sand that is removed from the USTs will be sampled for waste characterization purposes and containerized for off-site disposal. If eligible for reuse, the sand will be stockpiled for reuse as backfill. The liquid will be disposed either off-site at a disposal facility or discharged under permit to the onsite sewer.

The steel plates currently covering the manways to the USTs will be removed. Any soil overlying the USTs and surrounding concrete will be removed to access the USTs. Once accessed, the surrounding soil will be removed to allow removal of the tanks. All soil that is removed will be stockpiled and visually inspected for impacts (i.e., staining and odors). To the extent possible, the USTs will be removed and staged on level ground to allow inspection for evidence of cracks or holes. Due to age and Site conditions, intact removal of the USTs may not be feasible. Immediately after inspection, the USTs will be rendered unusable by puncturing and cutting the tanks into sections. Each UST will be cut into manageable pieces and stockpiled for off-site disposal.

It is likely that groundwater will be encountered in the excavation. Following the tank removal, the excavations will be inspected for the presence of measurable SPH on the groundwater to confirm that no continuing source of SPH is present. If measurable SPH is present, the SPH will be vacuum extracted. Post-excavation samples will be collected from the sidewalls of the excavations immediately above the water table at a minimum frequency of one sample per excavation sidewall and submitted for expedited analysis, as discussed further in Section 5.10. Following receipt of the post-excavation soil sampling analysis, the need for additional excavation will be evaluated. Upon excavation completion, the excavations will be backfilled with soil from on-site sources within OU-4 as discussed further in Section 5.12.6. A one-foot layer of clean soil, suitable for railroad operations, will be placed over the entire area as discussed in Section 5.12.9.

5.6 Removal of IRM Trench

The IRM recovery trench consists of two 4-foot diameter pre-cast concrete leaching sumps extending 8 feet bls, 340 linear feet of 12-inch diameter perforated, polyvinyl chloride (PVC) piping between the two sumps, 450 feet of 4-inch PVC product piping between the sumps and the product storage tank, and a 2,000-gallon storage tank. The trench is approximately 2 feet in width and 4.5 feet deep. The 12-inch perforated PVC pipe was installed on non-woven geotextile placed in the trench bottom and covered with gravel material to surrounding grade elevation. Two wooden well houses were constructed at grade at the two recovery sumps. Details of the IRM recovery trench are shown on Technical Drawing C6 (Appendix B).

To decommission the IRM trench, all of the recovery trench components will be removed. All equipment will be removed from the recovery sumps and the well houses will be dismantled.

Using standard mechanical excavation equipment, the gravel will be excavated and stockpiled on polyethylene sheeting until transported for off-site disposal. Any residual product in the 12-inch perforated piping and the recovery sumps' pre-cast concrete rings will be removed and placed in the product storage tank for disposal. The piping and concrete rings will be removed and stockpiled separately until disposed off-site. The product discharge hose and electrical conduit will be traced from the recovery sumps to the product storage tank. The discharge hose will be drained, disconnected from the storage tank connection, and removed. The electrical conduit will also be removed. Following the IRM trench decommissioning, any product in the product storage tank will be removed and disposed offsite and the product storage tank will be thoroughly decontaminated. All excavated areas will be backfilled with soil from on-site sources within OU-4 as discussed further in Section 5.12.6. A one-foot layer of clean soil, suitable for railroad operations, will be placed over the entire area as discussed in Section 5.12.9.

5.7 Visually Hydrocarbon-Impacted Surface Soil Excavation

The extent of visually hydrocarbon-impacted surface soil lies to the north, west, and east of the former Engine House, partly within the bounds of the historic SPH plume and the limits of the mobile SPH plume excavation. This area occupies approximately 0.5-acre and is impacted to an average depth of 1 foot bls. The visually impacted surface soil will be excavated to the limits shown on Technical Drawing C2 (Appendix B) with standard mechanical equipment to a depth of 1 foot bls. Excluding the portion of the visually impacted surface soil that coincides with the mobile SPH excavation, it is estimated that approximately 500 CY of soil will be excavated and disposed off-site.

The one remaining exceedance of the site-specific NYSDEC-recommended soil cleanup level for lead was detected in the 0 to 2 foot sampling interval at soil boring location S-62, within the extent of visually hydrocarbon-impacted surface soil. Deeper excavation (average depth of 3 feet) will be performed at this location to address this exceedance.

All excavated surface soil will be staged on plastic sheeting in approved staging areas and separate from all other waste materials awaiting off-site disposal. A one-foot layer of clean soil, suitable for railroad operations, will be placed over the entire area as discussed in Section 5.12.9.

5.8 Mobile SPH Excavation

Removal of the mobile SPH and associated petroleum-impacted soil will consist of the excavation of soil and SPH in areas with apparent SPH thickness measurements of 0.1-foot or greater, as measured in monitoring wells. The excavation will extend to a depth of one-foot below the water table, tapering to 2.5 feet below the water table within the 3-foot contour. Due to the variable surface grade in this portion of OU-3, the depth to groundwater below land surface varies from approximately 1 foot bls to 3 feet bls. An evaluation of the low water levels collected in OU-3 monitoring wells located near the mobile SPH plume shows the average low water level to be 2.75 feet below land surface. Therefore, the excavation will range from 3.75 feet to 5.25 feet bls. In total, approximately 4,060 CY of soil will be excavated and disposed off-site. Since the excavation below the water table is limited to a shallow depth, the excavation will be performed through the saturated soil layer without dewatering. Grade stakes will be placed on a 25 foot spaced grid to verify specification depths are achieved.

The excavation will begin at the southern portion of the plume, near the Metro Shed foundation, and progress north towards the North Runner Track. The objective of this sequencing is to minimize recontamination of backfill and provide ample notification to Amtrak personnel for suspending service to the North Runner Track. Excavation under the North Runner Track will need to be completed on an expedited schedule and during the weekend, due to regular required usage of this track during the work week. During the excavation, as groundwater is exposed, visible floating (mobile) SPH on the groundwater table will be removed by vacuum truck or pumped to a storage tank. During the course of the excavations, mobile SPH or residual SPH that is disturbed by the excavation that is observed draining into the excavation will be removed. These sidewall areas will then be visually inspected to determine if additional excavation is required.

In addition to removing mobile SPH and associated hydrocarbon-impacted soil, the mobile SPH excavation will remove the remaining PCB exceedance at CS-76. As discussed in Section 2.5.3.1, only this one exceedance of the NYSDEC-recommended soil cleanup levels for PCBs exists within OU-3. PCBs were detected at this location in the 0 to 0.5-foot interval at a concentration of 73,000 µg/kg. This exceedance has been delineated by sample locations

TSB-11 through TSB-14. The soil at this location will require separate handling and disposal and will be classified as PCB-hazardous waste.

Excavated soil will be stockpiled in the staging area designated on Technical Drawing C1 (Appendix B) and kept separate from all other remedial waste generated during other components of the remedy. To the extent possible, the remedial contractor will construct two stockpiled areas. The unsaturated soil at the surface will be stockpiled on polyethylene sheeting in the staging area and sampled for the COCs for potential reuse as backfill. The saturated soil will be stockpiled separately from the unsaturated soil in a bermed area to be constructed by the remedial contractor. The bermed area will be sloped such that water and SPH draining from the stockpile can be collected. Saturated soil will be mixed with kiln dust or similar drying agent to reduce the moisture content of the soil and meet the moisture requirements of the transportation regulations and disposal facilities. All stockpiles will be covered with polyethylene sheeting to prevent contact with precipitation. The staging areas will be inspected routinely and maintained throughout the excavation work by the remedial contractor.

The portion of the mobile SPH excavation extending below the water table will be backfilled with clean imported stone. With the exception of the portion of the mobile SPH excavation extending onto the MTA/LIRR property, soil from on-site sources within OU-4 will be used for backfilling the unsaturated interval of the mobile SPH excavation. The MTA/LIRR owned portion of the mobile SPH excavation will be backfilled with clean stone only. A one-foot layer of clean stone, suitable for railroad operations, will be placed over the entire area. As discussed in Section 5.12.9, the imported stone will be well graded and self-compacting stone.

5.9 Residual SPH Bioremediation

Residual SPH will be addressed by enhancing biodegradation in the subsurface through the injection of calcium nitrate. In situ enhanced bioremediation will be performed in the following areas:

- On the excavation sidewalls at the water table.
- In the soil interval immediately below and within the footprint of the mobile SPH plume
- To address areas of OU-3 with SPH measurements between 0.01 foot and 0.1 foot in monitoring wells, in accordance with the Residual SPH Contingency Plan.

Prior to backfilling, the excavation sidewalls will be treated with a biological amendment to enhance biodegradation. The biological amendment will be a mixture of potable water and calcium nitrate at a 6% solution (by weight). The calcium nitrate solution will be sprayed evenly over the mobile excavation sidewalls. The calcium nitrate loading will be based on the results of the pilot study testing results, as discussed in Section 2.7.2. The objective of adding the calcium nitrate will be to treat any residual SPH at the excavation edge. The application of the calcium nitrate will form a permeable reactive barrier between the residual SPH and the clean backfill. Following backfill activities, calcium nitrate will be injected through the bottom of the excavation (i.e., approximately 10 ft bls or 5 ft below bottom of excavation) through the use of a Geoprobe™.

Application of calcium nitrate to address residual SPH in these areas is further discussed in Section 7.0.

5.10 Remedial Performance Evaluation (Post Excavation End-Point Sampling)

Post-excavation samples will be collected from the sidewalls of the mobile SPH excavation and the UST excavation to confirm the limits of the excavation. Groundwater in both excavations will preclude sampling of the excavation bottom. For this reason, sidewall samples will be collected immediately above the groundwater table in the excavations.

Post-excavation samples will also be collected from the excavation sidewalls and bottoms at the locations of exceedance of the NYSDEC recommended soil cleanup levels (S-62 [lead]). A sample from the excavation bottom will be collected from the PCB exceedance excavation (CS-76 [PCBs]).

The following sections provide additional detail on the post-excavation sampling.

5.10.1 End-Point Sampling Frequency

Sidewall samples will be collected at a rate of one sample every 100 linear feet at the mobile SPH excavation and the UST excavation or a minimum of one each sidewall.

Post-excavation samples collected from the two locations of exceedance of the NYSDEC recommended soil cleanup levels (S-62 [lead] and CS-76 [PCBs]) are situated within the larger excavation limits of the visual hydrocarbon impacted surface soil and the mobile SPH excavations, respectively, and extend to the depth of the larger excavation, or deeper (S-62 extends 1 feet deeper than surrounding excavation). Therefore, sidewall samples will not be available at the PCB exceedance excavation at CS-76. Sidewall samples will be collected from the lead exceedance excavation at S-62 near the groundwater table (expected to be 2 feet bls in this area). Post-excavation samples will be collected from the bottom of the excavation in these respective locations, to verify that the excavation of these exceedances has been completed. If necessary, based on the analytical results, the excavation will continue until additional post-excavation sampling indicates that the soil with PCB and lead concentrations above the respective NYSDEC-recommended soil cleanup levels has been removed.

5.10.2 Methodology

Each sample will be inspected for visual evidence of contamination (i.e., staining, presence of petroleum or odors) and field screened for VOCs using a portable photoionization detector (PID). Soil samples to be submitted for analysis will be homogenized, placed in a laboratory sample jar, and transported to the laboratory in an iced container. Samples will be submitted for analysis for PCBs, lead, cPAHs, and total SVOCs. Laboratory analysis will be performed by a NYSDEC-approved laboratory using USEPA SW846 Method 8082 for PCBs, USEPA SW846 Method 8270 for cPAHs and total SVOCs, and USEPA SW846 Method 6010 for lead.

5.10.3 Reporting of Results

The laboratory will report analytical results in Analytical Services Protocol (ASP) Category B deliverable packages. An electronic data deliverable (EDD) will also be provided by the laboratory.

All post-excavation sample data generated for the Remedial Action will be logged in a database and organized to facilitate data review and evaluation. The electronic dataset will include the data flags provided in accordance with USEPA Laboratory Data Validation Functional Guidelines for Evaluating Organic Analysis and Inorganic Analyses, as well as additional comments of the data review for ASP/CLP analyses. The data flags include such items as: 1) concentration below required detection limit, 2) estimated concentration due to poor recovery below required detection limit, 3) estimated concentration due to poor spike recovery, and 4) concentration of chemical also found in laboratory blank.

5.10.4 QA/QC

Quality control (QC) samples serve as checks on both the sampling and measurements systems and assist in determining the overall data quality with regard to representation, accuracy, and precision. Field duplicates and matrix spike samples are analyzed to assess the quality of the data resulting from the field sampling. Field duplicate samples are individual portions of the same field sample. These samples can be used to estimate the overall precision of the data collection activity. Sampling error can be estimated by the comparison of field sample result and duplicated sample result. During post-excavation sampling, one field duplicate sample will be collected for each 20 grab samples collected. Matrix spike and matrix spike duplicates are used to evaluate analytical accuracy and precision, respectively. MS/MSDs will be analyzed by the laboratory at a frequency of one per preparation batch.

5.10.5 DUSR

The usability of laboratory-generated data may be performed by conducting a systematic review of the data for compliance with the established QC criteria based on the results provided by the laboratory. It is anticipated that all laboratory data will be validated (e.g., complete transcription checks, calculation checks) by the laboratory. The data reviewer will identify any out-of-control data points and data omissions and interact with the laboratory to correct data deficiencies. Decisions to repeat sample collection and analyses may be made by Amtrak’s representative based on the extent of deficiencies and their importance in the overall context of the project.

5.10.6 Reporting of Post-Excavation Data in FER

Chemical labs used for all post-excavation sample results and contingency sampling will be NYSDOH ELAP certified. The FER will provide a tabular and map summary of all post-excavation sample results and exceedances of NYSDEC-recommended site-specific soil cleanup levels.

5.11 Estimated Material Removal Quantities

Remediation-derived waste will include:

- Petroleum-impacted soil from mobile SPH and surface soil excavations and IRM trench removal;
- Petroleum-impacted liquid waste from mobile SPH excavation and stockpiles
- PCB-impacted soil;
- Liquid waste and sludge removed from the former interior Engine House service pits;
- Wash water generated from pressure washing the former Engine House service pits;
- Sand and liquid removed from USTs;
- Metal debris from UST removal;
- Debris removed from the interior Engine House service pits;
- Bulk concrete from the interior Engine House service pits removal;
- Bulk concrete from fuel pump vaults, exterior Engine House inspection pits, and IRM trench removal; and
- Soil/sludge and equipment debris removed from the fuel pump vaults, exterior Engine House inspection pits, and IRM trench.

All excavated materials will be staged in approved stockpile areas while awaiting off-site disposal. Segregation of each of the remediation-derived wastes will be performed based on media (e.g., concrete, debris) with the exception of the liquid wastes. Liquid waste from the mobile SPH excavation and interior Engine House service pits will be vacuum extracted and therefore directly contained in the transport vehicle. Further, concrete and debris will be staged separately from excavated soil. A separate staging area has been constructed for the on-site soil to be used for backfill. All materials will be staged on plastic sheeting to prevent run-off and covered daily with a layer of plastic sheeting to control run-on during storm events. The stockpiles will be inspected weekly and after/during storm events by the remedial contractor and Remedial Engineer to detect any damage to the plastic sheeting or erosion of stockpiled materials.

Soil

Approximately 4,060 CY of soil will be generated from the mobile SPH excavation. The soil within the mobile SPH excavation known to exceed the site-specific NYSDEC-recommended soil cleanup level for PCBs is located within the mobile SPH excavation and is estimated to be approximately 100 CY. Based on a review of current SPH analytical results, it was assumed that the waste characterization sampling of soils excavated from the mobile SPH plume may classify the soil as PCB-hazardous waste due to the PCB concentrations in the mobile SPH. Therefore, it is assumed that approximately 5 percent of the total soil volume excavated from the mobile SPH plume (4,060 CY) will be classified as PCB-hazardous waste. The total anticipated PCB-hazardous waste is approximately 205 CY.

Approximately 500 CY of soil will be generated from the visually impacted surface soil excavation. The one remaining exceedance of the site-specific NYSDEC-recommended soil cleanup level for lead in OU-3 is located within the surface soil excavation. Based on previous sampling data, it is not anticipated that the lead-impacted soil will receive separate classification or require separate handling and disposal.

The quantity of sand within the tanks is difficult to quantify due to limited tank records. It is estimated that approximately 400 CY of sand exists within the USTs. Waste characterization samples would be collected to classify the sand and determine if disposal is required. The sand is not anticipated to be impacted and may be eligible for onsite reuse.

Liquid

Based on limited data from the SPH and sludge within the former Engine House service pits, there is a potential that the sludge and SPH will contain PCBs and may be classified as a NYS B003 hazardous waste and TSCA waste. The presence of the concrete cover has prevented a complete investigation of the interior service pit contents. It is anticipated that 80 percent of the service pits volume is filled with liquids and therefore, approximately 87,000 gallons of liquids are present. Waste characterization samples will be collected to confirm waste classifications. Extracted liquid is expected to be disposed as non-hazardous waste or discharge under permit to the on-site sewer.

Similarly, the wash water from cleaning the service pits may contain PCBs and will require separate handling and disposal. The quantity of wash water is not quantifiable because the surface area of service pits that require cleaning will not be known until the service pits are accessed. The wash water will be collected and containerized, sampled for waste characterization purposes, and disposed offsite.

The SPH/water that is vacuum-extracted during the mobile SPH excavation has the potential to be classified as a NYS B003 hazardous waste and TSCA waste. The SPH will be extracted and containerized with a dedicated vacuum truck. Use of the dedicated vacuum truck will preclude commingling of the SPH with other liquid waste. It is assumed that approximately 25 percent of the mobile SPH volume (2,400 gallons) will seep from the soil during excavation and will be recovered through vacuum extraction. The extracted water will be sampled for waste characterization purposes and disposed offsite.

The water within the tanks is difficult to quantify because of limited records regarding the capacities of the tanks and proportion of the tanks that are filled with water. The water within the USTs is estimated to be approximately 45,000 gallons. Waste characterization samples will be collected to confirm waste classifications. The water from the UST removal activities is expected to be disposed as non-hazardous waste or discharged under permit to the on-site sewer.

All liquids that are not directly containerized and disposed offsite in vacuum trucks will be stored in temporary on-site tanks to await disposal.

Debris

Based on limited information, the type of debris that may be encountered in the former Engine House service pits is unknown. It is expected that the debris will consist primarily of wood, scrap metal debris, and possibly some equipment and machinery. The debris will be decontaminated, if necessary, and disposed offsite.

Concrete

The concrete bulk waste from removing the concrete cover to the former Engine House will not be in contact with contaminants and is expected to be classified as construction and demolition

(C&D) waste. Concrete generated from the partial removal of the interior Engine House service pits is expected to be classified as non-hazardous petroleum impacted waste. Concrete will be transported to a State-approved solid waste landfill facility. An average density of 1.5 tons per cubic yard is assumed for concrete. Based on this density assumption, it is estimated that approximately 1440 tons of concrete will be generated from removal of the Engine House concrete cover and Engine House foundation and 480 tons of concrete will be generated from the partial removal of the interior service pits.

Due to existing covers on the fuel pump vaults and one of the exterior Engine House inspection pits, the presence of hydrocarbon impacts cannot be determined. For this reason, it is assumed that approximately 20 percent of the bulk concrete from the removal of these structures will be disposed as non-hazardous petroleum-impacted concrete. The remaining 80 percent will be disposed as C&D waste.

All remedial waste will be sampled for waste characterization purposes prior to transportation for offsite disposal. It is estimated that one waste characterization sample will be collected for every 1,000 cubic yards of soil and concrete for disposal and one waste characterization sample will be collected for every 10,000 gallons of liquid waste. Waste characterization samples will be submitted for analysis for the disposal facility requirements, which may include PCBs, total lead, TCLP VOCs, TCLP SVOCs, TCLP metals, and RCRA characteristics (e.g., reactivity and corrosivity). Dedicated sampling equipment will be used for collection of each waste characterization sample.

Any metal debris produced from demolition of the Engine House structure, the Oil House structure, UST removal, and track removal for site preparation activities will be decontaminated and transported offsite for disposal or to a scrap metal recycler.

All construction equipment used in handling impacted materials will be decontaminated prior to reuse or leaving the work area. Construction equipment includes hand tools, excavation buckets, and disposal vehicles. All equipment will be inspected after decontamination and prior to leaving the Yard to ensure all residual contamination has been removed. A designated decontamination area (i.e., decontamination pad) will be established adjacent to the work area on an impermeable material. This decontamination area will be constructed with bermed edges to contain all decontamination solids/liquids. Wastewater will be managed as described below in Section 5.12.7.

5.12 Soil/Materials Management Plan

The following sections provide the Soil Management Plan to be implemented during the Remedial Action.

5.12.1 Soil Screening Methods

Visual, olfactory and PID soil screening and assessment will be performed by a qualified environmental professional during all remedial excavations into known or potentially contaminated material (Residual Contamination Zone). Soil screening will be performed regardless of when the invasive work is done and will include all excavation and invasive work performed during the remedy and during the development phase, such as excavations for foundations and utility work, prior to issuance of the COC.

All primary contaminant sources (including but not limited to tanks and hotspots) identified during Site Characterization, Remedial Investigation, and Remedial Action will be surveyed by a surveyor licensed to practice in the State of New York. This information will be provided on maps in the Final Engineering Report.

Screening will be performed by qualified environmental professionals. Resumes will be provided for all personnel responsible for field screening (i.e. those representing the Remedial Engineer) of invasive work for unknown contaminant sources during remediation and development work.

5.12.2 Stockpile Methods

Stockpiles will be inspected at a minimum once each week and after every storm event. Results of inspections will be recorded in a logbook and maintained at the Site and available for inspection by NYSDEC.

Stockpiles will be kept covered at all times with appropriately anchored tarps. Stockpiles will be routinely inspected and damaged tarp covers will be promptly replaced.

Soil stockpiles will be continuously encircled with silt fences. Hay bales will be used as needed near catch basins, surface waters and other discharge points.

A dedicated water truck equipped with a water cannon will be available on-Site for dust control.

5.12.3 Materials Excavation and Load Out

The Remediation Engineer or a qualified environmental professional under his/her supervision will oversee all invasive work and the excavation and load-out of all excavated material.

Amtrak and its contractors are solely responsible for safe execution of all invasive and other work performed under this Plan.

The presence of utilities and easements on the Site will be investigated by the Remedial Engineer. Following clearance by Amtrak, no risk or impediment to the planned work under this Remedial Action Work Plan will be posed by utilities or easements on the Site.

Loaded vehicles leaving the Site will be appropriately lined, tarped, securely covered, manifested, and placarded in accordance with appropriate Federal, State, local, and New York State Department of Transportation (NYSDOT) requirements (and all other applicable transportation requirements).

A truck wash will be operated on-Site. The Remediation Engineer will be responsible for ensuring that all outbound trucks are inspected and will be brushed or washed, as required to remove loose soils at the truck wash before leaving the Site until the remedial construction is complete.

Locations where vehicles enter or exit the Site shall be inspected daily for evidence of off-Site sediment tracking.

The Remediation Engineer will be responsible for ensuring that all egress points for truck and equipment transport from the Site will be clean of dirt and other materials derived from the Site during Site remediation and development. Cleaning of the adjacent streets will be performed as needed to maintain a clean condition with respect to Site -derived materials.

Amtrak and associated parties preparing the remedial documents submitted to the State, and parties performing this work, are completely responsible for the safe performance of all invasive work, the structural integrity of excavations, and for structures that may be affected by excavations (such as building foundations and bridge footings).

Each hotspot and structure to be remediated (USTs, vaults and associated piping, etc.) will be removed and end-point remedial performance sampling completed before excavations related to Site development commence proximal to the hotspot or structure.

5.12.4 Materials Transport Off-Site

All transport of materials will be performed by licensed haulers in accordance with appropriate local, State, and Federal regulations, including 6 NYCRR Part 364. Haulers will be appropriately licensed and trucks properly placarded.

The proposed in-bound and out-bound truck route to the Site is via 42nd Place to Northern Boulevard. This is the most appropriate route and takes into account: (a) limiting transport through residential areas and past sensitive sites; (b) use of city mapped truck routes; (c) prohibiting off-Site queuing of trucks entering the facility; (d) limiting total distance to major highways; (e) promoting safety in access to highways; and (f) overall safety in transport.

Trucks will be prohibited from stopping and idling in the neighborhood outside the project Site. Queuing of trucks will be performed on-Site in order to minimize off-Site disturbance. Off-Site queuing will be prohibited.

5.12.5 Materials Disposal Off-Site

Disposal location will be established at a later date and will be reported to the NYSDEC Project Manager. The total quantity of material expected to be disposed off-Site was discussed in Section 5.11.

All soil/fill/solid waste excavated and removed from the Site will be treated as contaminated and regulated material and will be disposed in accordance with all local, State (including 6 NYCRR Part 360) and Federal regulations. If disposal of soil/fill from this Site is proposed for unregulated disposal (i.e. clean soil removed for development purposes), a formal request with an associated plan will be made to NYSDEC's Project Manager. Unregulated off-Site management of materials from this Site is prohibited without formal NYSDEC approval.

Material that does not meet Track 1 unrestricted SCOs is prohibited from being taken to a New York State recycling facility (6 NYCRR Part 360-16 Registration Facility).

The following documentation will be obtained and reported by the Remedial Engineer for each disposal location used in this project to fully demonstrate and document that the disposal of material derived from the Site conforms with all applicable laws: (1) a letter from the Remedial Engineer or Amtrak to the receiving facility describing the material to be disposed and requesting formal written acceptance of the material. This letter will state that material to be disposed is contaminated material generated at an environmental remediation Site in New York State. The letter will provide the project identity and the name and phone number of the Remedial Engineer. The letter will include as an attachment a summary of all chemical data for the material being transported (including Site Characterization data); and (2) a letter from all receiving facilities stating it is in receipt of the correspondence (above) and is approved to accept the material. These documents will be included in the FER.

Non-hazardous historic fill and contaminated soils taken off-Site will be handled, at minimum, as a Municipal Solid Waste per 6 NYCRR Part 360-1.2.

Historic fill and contaminated soils from the Site are prohibited from being disposed at Part 360-16 Registration Facilities (also known as Soil Recycling Facilities).

Soils that are contaminated but non-hazardous and are being removed from the Site are considered by the Division of Solid & Hazardous Materials (DSHM) in NYSDEC to be Construction and Demolition (C&D) materials with contamination not typical of virgin soils. These soils may be sent to a permitted Part 360 landfill. They may be sent to a permitted C&D processing facility without permit modifications only upon prior notification of NYSDEC Region 2 DSHM. This material is prohibited from being sent or redirected to a Part 360-16 Registration Facility. In this case, as dictated by DSHM, special procedures will include, at a minimum, a letter to the C&D facility that provides a detailed explanation that the material is derived from a DER remediation Site, that the soil material is contaminated, and that it must not be redirected to on-Site or off-Site Soil Recycling Facilities. The letter will provide the project identity and the name and phone number of the Remedial Engineer. The letter will include as an attachment a summary of all chemical data for the material being transported.

The Final Engineering Report will include an accounting of the destination of all material removed from the Site during this Remedial Action, including excavated soil, contaminated soil, historic fill, solid waste, and hazardous waste, non-regulated material, and fluids. Documentation associated with disposal of all material must also include records and approvals for receipt of the material. This information will also be presented in a tabular form in the FER.

Bill of Lading system or equivalent will be used for off-Site movement of non-hazardous wastes and contaminated soils. This information will be reported in the Final Engineering Report.

Hazardous wastes derived from on-Site will be stored, transported, and disposed in full compliance with applicable local, State, and Federal regulations.

Appropriately licensed haulers will be used for material removed from this Site and will be in full compliance with all applicable local, State and Federal regulations.

Waste characterization will be performed for off-Site disposal in a manner suitable to the receiving facility and in conformance with applicable permits. Sampling and analytical methods, sampling frequency, analytical results, and QA/QC will be reported in the FER. All data available for soil/material to be disposed at a given facility must be submitted to the disposal facility with suitable explanation prior to shipment and receipt.

5.12.6 Materials Reuse On-Site

All excavations will be backfilled with approved on-site soil from sources within the Yard. Only screened soil that meets the NYSDEC-recommended soil cleanup levels for the COCs and SVOCs will be used as backfill.

The on-site OU-4 soil to be used for backfill is currently stockpiled in the area of the former Metro Shed and the former REA building platform, as shown on Technical Drawing C2 (Appendix B). Soil that is stockpiled on the former Metro Shed foundation is immediately adjacent to the mobile SPH excavation and readily accessible for reuse. The soil that is stockpiled for reuse on the former REA building platform will require transportation from the platform to the OU-3 work area. Due to the presence of active railroad tracks, transportation of the soil on the REA platform will require loading onto transport vehicles that will leave the Yard through the 39th Street ramp and re-enter the Yard through the 42nd Place entrance.

The backfill was previously sampled and analyzed for Target Compound List (TCL) VOCs, TCL SVOCs, pesticides, PCBs, Toxicity Characteristic Leaching Procedure (TCLP) RCRA metals and VOCs, RCRA characteristics, gasoline and diesel range TPH, percent moisture, and paint filter. The analytical results for all soil samples are below the NYSDEC-recommended site-specific soil cleanup criteria for the COCs and SVOCs and are provided in Tables 3 through 6. The Remedial Engineer will ensure that procedures defined for materials reuse in this RAWP are followed and that unacceptable material will not remain on-Site.

Acceptable demolition material proposed for reuse on-Site, if any, will be sampled for asbestos.

Organic matter (wood, roots, stumps, etc.) or other solid waste derived from clearing and grubbing of the Site is prohibited for reuse on-Site.

Approved backfill will be placed in the excavated areas to the original grade, at a minimum, and compacted. Additional backfill may be required for grading purposes and restoration of drainage. A one-foot layer of clean soil, suitable for railroad operations, will be imported on site and placed on the compacted backfill material.

Contaminated on-Site material, including historic fill and contaminated soil, removed for grading or other purposes will not be reused within a cover soil layer, within landscaping berms, or as backfill for subsurface utility lines. This will be expressed in the final Site Management Plan.

5.12.7 Fluids Management

Construction wastewater will be generated from personnel/equipment decontamination and run-off/run-on in bermed soil stockpile and excavation areas. Construction wastewater will be collected and stored on-site in leak-tight drums or temporary storage tanks. The wastewater will be sampled and submitted for analysis for disposal/discharge characterization. Based on the laboratory analytical results, the construction wastewater will be disposed off-site at a permitted disposal/recycling facility or discharged to the on-site sewer system, if approved by the New York City Department of Environmental Protection (NYCDEP). The remedial contractor will acquire any required permits.

As discussed in Section 5.11, liquid extracted from the Engine House service pits, as well as wash water from cleaning the service pits will require separate handling and disposal. The SPH/water that is vacuum-extracted during the mobile SPH excavation has the potential to be classified as a NYS B003 hazardous waste and TSCA waste. The SPH will be extracted and containerized with a dedicated vacuum truck. Use of the dedicated vacuum truck will preclude commingling of the SPH with other liquid waste. Waste characterization samples will be collected to confirm waste classifications and determine appropriate means of disposal.

All liquids that are not directly containerized and disposed offsite in vacuum trucks will be stored in temporary on-site tanks to await disposal. Containers used for storing construction wastewater will conform to both federal and state requirements. All storage tanks or containers will be decontaminated following disposal/discharge of wastewater.

All liquids to be removed from the Site, including dewatering fluids, will be handled, transported and disposed in accordance with applicable local, State, and Federal regulations. Liquids discharged into the New York City sewer system will be addressed through approval by NYCDEP.

Dewatered fluids will not be recharged back to the land surface or subsurface of the Site. Dewatering fluids will be managed off-Site.

5.12.8 Demarcation

After the completion of soil removal and any other invasive remedial activities and prior to backfilling, a land survey will be performed by a New York State licensed surveyor. The survey will define the top elevation of residual contaminated soils. A physical demarcation layer will not be feasible for the mobile SPH excavation since the excavation will extend below the water table. The survey will measure the grade before the placement of cover soils, pavement and sub-soils, structures, or other materials. This survey on this grade surface will constitute the physical and written record of the upper surface of the 'Residuals Management Zone' in the Site Management Plan. A map showing the survey results will be included in the Final Remediation Report and the Site Management Plan.

5.12.9 Backfill from Off-Site Sources

Clean fill, suitable for railroad operations, will be imported onto the Site and used in the following areas:

- All excavations extending below the water table;
- Visually impacted surface soil excavation;
- The portion of the mobile SPH excavation located on the MTA/LIRR portion of OU-3; and
- As a one-foot clean fill cover over all excavation and subsurface structure removal areas.

The clean fill to be used will be ¾-inch, well graded, self-compacting stone (e.g., blue stone). This stone will be placed in the mobile SPH excavation, the UST excavation, and subsurface structure excavations that extend deeper than the water table and as a one-foot layer of clean cover. Stone will also be used to backfill the saturated and unsaturated portions of the mobile excavation on the MTA/LIRR property. Similarly, the entire extent of the visually impacted surface soil excavation will be backfilled with stone.

All materials proposed for import onto the Site will be approved by the Remedial Engineer and will be in compliance with provisions in this RAWP prior to receipt at the Site.

Material from industrial sites, spill sites, other environmental remediation sites, or other potentially contaminated sites will not be imported to the Site.

The Final Engineering Report will include the following certification by the Remedial Engineer: "I certify that all import of soils from off-Site, including source evaluation, approval and sampling, has been performed in a manner that is consistent with the methodology defined in the Remedial Action Work Plan".

All imported soils will meet NYSDEC approved backfill or cover soil quality objectives for this Site. Non-compliant soils will not be imported onto the Site without prior approval by NYSDEC. Nothing in the approved Remedial Action Work Plan or its approval by NYSDEC should be construed as an approval for this purpose.

Soils that meet 'exempt' fill requirements under 6 NYCRR Part 360, but do not meet backfill or cover soil objectives for this Site, will not be imported onto the Site without prior approval by NYSDEC. Nothing in this Remedial Action Work Plan should be construed as an approval for this purpose.

Solid waste will not be imported onto the Site.

Trucks entering the Site with imported soils will be securely covered with tight fitting covers.

5.12.10 Stormwater Pollution Prevention

Barriers and hay bale checks will be installed and inspected once a week and after every storm event. Results of inspections will be recorded in a logbook and maintained at the Site and available for inspection by NYSDEC. All necessary repairs shall be made immediately.

Accumulated sediments will be removed as required to keep the barrier and hay bale check functional. All undercutting or erosion of the silt fence toe anchor shall be repaired immediately with appropriate backfill materials. Manufacturer's recommendations will be followed for replacing silt fencing damaged due to weathering.

Erosion and sediment control measures identified in the RAWP shall be observed to ensure that they are operating correctly. Where discharge locations or points are accessible, they shall be inspected to ascertain whether erosion control measures are effective in preventing significant impacts to receiving waters

Silt fencing or hay bales will be installed around stockpile areas, around sewer inlets, and the downgradient perimeter of construction area.

5.12.11 Contingency Plan

If underground tanks or other previously unidentified contaminant sources are found during on-Site remedial excavation or development related construction, sampling will be performed on product, sediment and surrounding soils, etc. Chemical analytical work will be for full scan parameters (TAL metals; TCL volatiles and semi-volatiles, TCL pesticides and PCBs). These analyses will not be limited to Spill Technology and Remediation Series (STARS) parameters where tanks are identified without prior approval by NYSDEC. Analyses will not be otherwise limited without NYSDEC approval.

Identification of unknown or unexpected contaminated media identified by screening during invasive Site work will be promptly communicated by phone to NYSDEC’s Project Manager. These findings will be also included in daily and periodic electronic media reports.

5.12.12 Community Air Monitoring Plan

Each of the components of the Remedial Action will require air monitoring. These activities include saw cutting of concrete and handling of petroleum-impacted material (soil, SPH, sand/liquid from the USTs, and liquid contents of the service pits). The air monitoring program will be implemented during all intrusive remedial actions to measure the concentration of particulates in ambient air in the work zone.

A CAMP will be developed in accordance with the NYSDOH Generic Community Air Monitoring Plan contained in Appendix 1A of the draft DER-10 (NYSDEC, 2002). The CAMP will include real-time continuous air monitoring at the Site's downwind perimeter for VOCs and particulates. Implementation and management procedures will be specified within the CAMP. During all phases of work, the remedial contractor will be responsible for mitigating any vapor and particulate issues, via suppression techniques defined in the CAMP.

A map showing the location of fixed and mobile sampling stations will be shown in the CAMP.

Exceedances observed in the CAMP will be reported to NYSDEC and NYSDOH Project Managers and included in the Daily Report.

5.12.13 Odor, Dust and Nuisance Control Plan

Dust will be controlled by spraying a water mist over the work area if perimeter action levels established in the CAMP are exceeded. The water mist will be generated by connecting a misting device to a hose, which will be connected to any potable water source. The degree to which these measures will be used will depend on particulate levels in ambient air at the perimeter of the Yard as determined through implementation of the CAMP.

As necessary, a foam unit to suppress vapors and odors that are generated during the soil excavations will be employed. The foam unit, such as a Rusmar PFU-400, includes a self-contained 400-gallon tank for mixing foam concentrate. Foam will be applied to stockpiled soil and excavation sidewalls in an effort to maintain work zone and perimeter air monitoring criteria established in the HASP and CAMP. Tarps will also be employed to suppress vapor and odors from stockpiled soil in the staging area.

The Final Engineering Report will include the following certification by the Remedial Engineer: "I certify that all invasive work during the remediation and all invasive development work were conducted in accordance with dust and odor suppression methodology defined in the Remedial Action Work Plan."

5.12.13.1 Odor Control Plan

This odor control plan is capable of controlling emissions of nuisance odors off-Site and on-Site. Specific odor control methods to be used on a routine basis will include assigning a dedicated air monitoring technician to monitor odors, active removal of SPH within excavations when encountered, backfilling excavations in a timely manner, and maintaining covers over stockpiled impacted soils. If nuisance odors are identified, work in that particular work area will be halted at that particular work area and the source of odors will be identified and corrected. Work will not resume in this area until all nuisance odors have been abated. NYSDEC and NYSDOH will be notified of all odor events and of all other complaints about the project. Implementation of all odor controls, including the halt of work, will be the responsibility of the Applicant's Remediation Engineer, who is responsible for certifying the Final Engineering Report.

All necessary means will be employed to prevent on- and off-Site nuisances. At a minimum, procedures will include: (a) limiting the area of open excavations; and (b) using foams to cover exposed odorous soils. If odors develop and cannot be otherwise controlled, additional means to eliminate odor nuisances will include: (a) direct load-out of soils to trucks for off-Site disposal; (b) use of chemical odorants in spray or misting systems; and, (f) use of staff to monitor odors in surrounding neighborhoods.

Where odor nuisances have developed during remedial work and cannot be corrected, or where the release of nuisance odors cannot otherwise be avoided due to on-Site conditions or close proximity to sensitive receptors, odor control will be achieved by sheltering excavation and handling areas under tented containment structures equipped with appropriate air venting/filtering systems.

5.12.13.2 Dust Control Plan

A dust suppression plan that addresses dust management during invasive on-Site work will include, at a minimum, the items listed below:

- Dust suppression will be achieved through the use of a dedicated on-Site water truck for road wetting. The truck will be equipped with a water cannon capable of spraying water directly onto off-road areas including excavations and stockpiles.
- Gravel will be used on roadways to provide a clean and dust-free road surface.

- On-Site roads will be limited in total area to minimize the area required for water truck sprinkling.

5.12.13.3 Other Nuisances

A plan for rodent control will be developed and utilized by the contractor prior to and during Site clearing and Site grubbing, and during all remedial work.

A plan will be developed and utilized by the contractor for all remedial work and will conform, at a minimum, to NYCDEP noise control standards.

6.0 RESIDUAL CONTAMINATION TO REMAIN ON-SITE

Since residual contaminated soil [and groundwater/soil vapor] will exist beneath the Site after the remedy is complete, Engineering and Institutional Controls (ECs and ICs) are required to protect human health and the environment. These ECs and ICs are described hereafter. Long-term management of EC/ICs and of residual contamination will be executed under a Site-specific Site Management Plan (SMP) that will be developed and included in the FER.

ECs and monitoring will be implemented to protect public health and the environment by appropriately managing residual contamination. The Controlled Property (the Site) will have two EC systems. These are: 1) controlled Yard access with security gates at each entrance; and 2) one-foot of clean cover material placed at all excavation locations. Monitoring will be performed through: 1) performance groundwater monitoring at locations downgradient of the mobile SPH excavation; and 2) groundwater monitoring in areas of residual SPH in accordance with the Residual SPH Contingency Plan.

The FER will report residual contamination on the Site in tabular and map form.

6.1 Residual SPH Contingency Plan

The Residual SPH Contingency Plan will address areas within OU-3 with apparent SPH thickness measurements between 0.1 foot and 0.01 foot. The Residual SPH Contingency Plan includes:

- Quarterly gauging of monitoring wells within the area of residual SPH for two years (i.e., MW-20, MW-35, MW-49, MW-52, MW-74, MW-76, MW-77, TA-2, CTB-1, CTB-19, CTB-20, CTB-21, and one well to be installed south of the Metro Shed).
- Absorbent socks will be used to remove product thicknesses greater than 0.01 foot that is identified in two quarterly events. The absorbent socks will remain in the monitoring wells until one week prior to the next scheduled quarterly gauging event.
- Any measurement of SPH thickness greater the 0.1 foot will trigger immediate evaluation of the occurrence and the implementation of remedial action including the use of absorbent socks, product recovery, or bioremediation.
- Monitoring well gauging measurements and application of any remedial action will be documented in quarterly reports.

6.2 Performance Monitoring

Groundwater monitoring will be performed to monitor the performance of the mobile SPH excavation and remedial efforts at the subsurface structures. The groundwater monitoring will gauge the apparent SPH thickness measurements in monitoring wells located downgradient from the mobile SPH excavation, the Engine House, the Metro Shed, and the Oil House.

The Performance Monitoring program will consist of the installation of five monitoring wells at the following locations:

- Two monitoring wells - in the center of the mobile SPH excavation, subsequent to the excavation and backfill. These monitoring wells will observe any SPH that mobilizes into the backfilled area.
- One monitoring well - northwest of the Metro Shed
- One monitoring well - northwest of the Oil House basement
- One monitoring well - downgradient of the former Engine House

Existing monitoring well MW-70 is also located downgradient of the former Engine House and will be monitored. The proposed locations of the monitoring wells are provided on Figure 6.

Quarterly groundwater monitoring of the six monitoring wells will be conducted for 2 years and will consist of documentation of groundwater and SPH measurements, if any, and the collection of groundwater samples for COCs, STARS list of analytes for fuel oil, and chlorinated solvents. The Performance Monitoring Plan will be managed under the Site Management Plan.

7.0 ENGINEERING CONTROLS: TREATMENT SYSTEMS

As part of the Remedial Action, calcium nitrate will be applied along the mobile SPH excavation sidewalls and through the use of a Geoprobe™ by injecting through the bottom of the mobile SPH excavation (i.e., approximately 10 ft bls or 5 ft below bottom of excavation). Calcium nitrate will be delivered to the Site as dry granular in 50-pound bags or bulk containers. The calcium nitrate to be used is commercially available (fertilizer grade). The calcium nitrate will be stored on-site and covered to protect the material from the elements prior to use. Field personnel will set-up a temporary mixing system proximate to the excavation area to produce a solution of calcium nitrate by mixing the calcium nitrate with potable water. The temporary mixing system will consist of a holding tank for potable water and one more holding tank for the calcium nitrate solution. Based on the results of the field pilot study (as discussed in Section 2.7.2), the solution will be 6 percent (by weight) of calcium nitrate.

The estimated amount of calcium nitrate required to address any residual SPH in the excavation sidewall will be approximately 1,250 pounds. The calcium nitrate will be applied over the perimeter length of the excavated area. Approximately 200 gallons of the calcium nitrate solution will be applied for every 50 lineal feet of excavation sidewall.

The field personnel will take the calcium nitrate solution from the holding tank and deliver it to the sidewalls. The temporary delivery system will consist of a transfer pump, distribution hoses, and fittings. The calcium nitrate solution will be applied at the sidewalls of the open excavations created during the removal of impacted soil as discussed in Section 5.9. The calcium nitrate will be distributed and mixed, using the excavator bucket, to mix the calcium nitrate solution throughout the groundwater in the excavation sidewall area. The excavation will be backfilled following the calcium nitrate applications in order to minimize exposure of air to the calcium nitrate.

For the interior portions of the excavated area (following backfilling activities), approximately 25 pounds of calcium nitrate (e.g., 50 gallons of 6% by weight calcium nitrate solution) will be injected per injection point to address the residual SPH at a depth of approximately 10 ft bls. A Geoprobe™ unit will be used to inject the calcium nitrate in temporary injection points spaced approximately 10 feet on center within the footprint of the backfilled excavation. The amount of calcium nitrate, injection volume and the calcium nitrate solution concentration may be adjusted depending on the size of the excavation, field conditions, depth to groundwater, etc.

In addition to applying the calcium nitrate within the excavation area, calcium nitrate will also be used to address areas of residual SPH outside of the excavation area as part of the Residual SPH Contingency Plan, as discussed in Section 6.1. The calcium nitrate will be injected using a Geoprobe™ unit and associated mixing tank, pumps, piping, etc. The volume and application rates will be the same as discussed above for the temporary injection points within the mobile SPH excavated area.

All as-built drawings, diagrams, calculations and manufacturer documentation for treatment systems will be presented in the FER.

8.0 INSTITUTIONAL CONTROLS

After the remedy is complete, the Site will have residual contamination remaining in place. Engineering Controls (ECs) for the residual contamination have been incorporated into the remedy to render the overall Site remedy protective of public health and the environment. Two elements have been designed to ensure continual and proper management of residual contamination in perpetuity: an Environmental Easement and a Site Management Plan. These elements are described in this Section.

A Site-specific Environmental Easement will be recorded with Queens County to provide an enforceable means of ensuring the continual and proper management of residual contamination and protection of public health and the environment in perpetuity or until released in writing by NYSDEC. It requires that the grantor of the Environmental Easement and the grantor's successors and assigns adhere to all Engineering and Institutional Controls (ECs/ICs) placed on this Site by this NYSDEC-approved remedy. ICs provide restrictions on Site usage and mandate operation, maintenance, monitoring, and reporting measures for all ECs and ICs.

The Site Management Plan (SMP) describes appropriate methods and procedures to ensure compliance with all ECs and ICs that are required by the Environmental Easement. Once the SMP has been approved by the NYSDEC, compliance with the SMP is required by the grantor of the Environmental Easement and grantor's successors and assigns.

8.1 Environmental Easement

An Environmental Easement, as defined in Article 71 Title 36 of the Environmental Conservation Law, is required when residual contamination is left on-Site after the Remedial Action is complete. If the Site will have residual contamination after completion of all Remedial Actions then an Environmental Easement is required. As part of this remedy, an Environmental Easement approved by NYSDEC will be filed and recorded with the Queens County Clerk. The Environmental Easement will be submitted as part of the Final Engineering Report.

The Environmental Easement renders the Site a Controlled Property. The Environmental Easement must be recorded with the Queens County Clerk before the Certificate of Completion can be issued by NYSDEC. A series of Institutional Controls are required under this remedy to implement, maintain and monitor these Engineering Control systems, prevent future exposure to residual contamination by controlling disturbances of the subsurface soil and restricting the use of the Site to railroad use(s) only. These Institutional Controls are requirements or restrictions placed on the Site that are listed in, and required by, the Environmental Easement. Institutional Controls can, generally, be subdivided between controls that support Engineering Controls, and those that place general restrictions on Site usage or other requirements. Institutional Controls in both of these groups are closely integrated with the Site Management Plan, which provides all of the methods and procedures to be followed to comply with this remedy.

The Institutional Controls that support Engineering Controls are:

- Compliance with the Environmental Easement by the Grantee and the Grantee's successors and adherence of all elements of the SMP is required;
- All Engineering Controls must be maintained as specified in this SMP;
- All Engineering Controls on the Controlled Property must be inspected and certified at a frequency and in a manner defined in the SMP;
- Groundwater and other environmental or public health monitoring must be performed as defined in the SMP;
- Data and information pertinent to Site Management for the Controlled Property must be reported at the frequency and in a manner defined in the SMP;
- On-Site environmental monitoring devices, including but not limited to, groundwater monitor wells, must be protected and replaced as necessary to ensure proper functioning in the manner specified in the SMP;
- Engineering Controls may not be discontinued without an amendment or extinguishment of the Environmental Easement.

Adherence to these Institutional Controls for the Site is mandated by the Environmental Easement and will be implemented under the Site Management Plan (discussed in the next section). The Controlled Property (OU-3) will also have a series of Institutional Controls in the form of Site restrictions and requirements. The Site restrictions that apply to the Controlled Property are:

- Vegetable gardens and farming on the Controlled Property are prohibited;
- Use of groundwater underlying the Controlled Property is prohibited without treatment rendering it safe for intended purpose;
- All future activities on the Controlled Property that will disturb residual contaminated material are prohibited unless they are conducted in accordance with the soil management provisions in the Site Management Plan;

- The Controlled Property may be used for railroad related use only, provided the long-term Engineering and Institutional Controls included in the Site Management Plan are employed;
- The Controlled Property may not be used for a higher level of use, such as restricted residential use without an amendment or extinguishment of this Environmental Easement;
- Grantor agrees to submit to NYSDEC a written statement that certifies, under penalty of perjury, that: (1) controls employed at the Controlled Property are unchanged from the previous certification or that any changes to the controls were approved by the NYSDEC; and, (2) nothing has occurred that impairs the ability of the controls to protect public health and environment or that constitute a violation or failure to comply with the SMP. NYSDEC retains the right to access such Controlled Property at any time in order to evaluate the continued maintenance of any and all controls. This certification shall be submitted annually, or an alternate period of time that NYSDEC may allow. This statement must be certified by an expert that the NYSDEC finds acceptable.

8.2 Site Management Plan

Site Management is the last phase of remediation and begins with the approval of the Final Engineering Report and issuance of the Certificate of Completion for the Remedial Action. The Site Management Plan is submitted as part of the FER but will be written in a manner that allows its removal and use as a complete and independent document. Site Management continues in perpetuity or until released in writing by NYSDEC. The property owner is responsible to ensure that all Site Management responsibilities defined in the Environmental Easement and the Site Management Plan are performed.

The SMP is intended to provide a detailed description of the procedures required to manage residual contamination left in place at the Site following completion of the Remedial Action. This includes: (1) development, implementation, and management of all Engineering and Institutional Controls; (2) development and implementation of monitoring systems and a Monitoring Plan; (3) development of a plan to operate and maintain any treatment, collection, containment, or recovery systems (including, where appropriate, preparation of an Operation and Maintenance Manual); (4) submittal of Site Management Reports, performance of inspections and certification of results, and demonstration of proper communication of Site information to NYSDEC; and (5) defining criteria for termination of treatment system operation.

To address these needs, this SMP will include four plans: (1) an Engineering and Institutional Control Plan for implementation and management of EC/ICs; (2) a Monitoring Plan for implementation of Site Monitoring; (3) an Operation and Maintenance Plan for implementation of remedial collection, containment, treatment, and recovery systems; and (4) a Site Management Reporting Plan for submittal of data, information, recommendations, and certifications to NYSDEC. The SMP will be prepared in accordance with the requirements in NYSDEC Draft DER-10 Technical Guidance for Site Investigation and Remediation, dated December 2002, and the guidelines provided by NYSDEC.

Site management activities, reporting, and EC/IC certification will be scheduled on a certification period basis. The certification period will be annually. The Site Management Plan will be based on a calendar year and will be due for submission to NYSDEC by March 1 of the year following the reporting period.

The Site Management Plan in the Final Engineering Report will include a monitoring plan for groundwater at the down-gradient Site perimeter to evaluate Site-wide performance of the remedy. No exclusions for handling of residual contaminated soils will be provided in the Site Management Plan (SMP). All handling of residual contaminated material will be subject to provisions contained in the SMP.

9.0 FINAL ENGINEERING REPORT

A Final Engineering Report (FER) and Certificate of Completion will be submitted to NYSDEC following implementation of the Remedial Action defined in this RAWP. The FER provides the documentation that the remedial work required under this RAWP has been completed and has been performed in compliance with this plan. The FER will provide a comprehensive account of the locations and characteristics of all material removed from the Site including the surveyed map(s) of all sources. The Final Engineering Report will include as-built drawings for all constructed elements, certifications, manifests, bills of lading as well as the complete Site Management Plan (formerly the Operation and Maintenance Plan). The FER will provide a description of the changes in the Remedial Action from the elements provided in the RAWP and associated design documents. The FER will provide a tabular summary of all performance evaluation sampling results and all material characterization results and other sampling and chemical analysis performed as part of the Remedial Action. The FER will provide test results demonstrating that all mitigation and remedial systems are functioning properly. The FER will be prepared in conformance with DER-10.

The Final Remediation Report will include written and photographic documentation of all remedial work performed under this remedy.

The FER will include an itemized tabular description of actual costs incurred during all aspects of the Remedial Action.

The FER will provide a thorough summary of all residual contamination left on the Site after the remedy is complete. Residual contamination includes all contamination that exceeds the Track 1 Unrestricted Use SCO in 6NYCRR Part 375-6. A table that shows exceedances from Track 1 Unrestricted SCOs for all soil/fill remaining at the Site after the Remedial Action and a map that shows the location and summarizes exceedances from Track 1 Unrestricted SCOs for all soil/fill remaining at the Site after the Remedial Action will be included in the FER.

The FER will provide a thorough summary of all residual contamination that exceeds the SCOs defined for the Site in the RAWP and must provide an explanation for why the material was not removed as part of the Remedial Action. A table that shows residual contamination in excess of

Site SCOs and a map that shows residual contamination in excess of Site SCOs will be included in the FER.

The Final Engineering Report will include an accounting of the destination of all material removed from the Site, including excavated contaminated soil, historic fill, solid waste, hazardous waste, non-regulated material, and fluids. Documentation associated with disposal of all material must also include records and approvals for receipt of the material. It will provide an accounting of the origin and chemical quality of all material imported onto the Site.

Before approval of a FER and issuance of a Certificate of Completion, all project reports must be submitted in digital form on electronic media (PDF).

9.1 Certifications

The following certification will appear in front of the Executive Summary of the Final Engineering Report. The certification will be signed by the Remedial Engineer, Charles McGuckin, who is a Professional Engineer registered in New York State This certification will be appropriately signed and stamped. The certification will include the following statements:

I, Charles McGuckin, am currently a registered professional engineer licensed by the State of New York. I had primary direct responsibility for implementation of the remedial program for OU-3 at the Amtrak Sunnyside Yard Site (NYSDEC Site No. 241006).

I certify that the Site description presented in this FER is identical to the Site descriptions presented in the Environmental Easement, the Site Management Plan, and the Record of Decision for Amtrak Sunnyside Yard - OU-3 and related amendments.

I certify that the Remedial Action Work Plan dated August 2007 and Stipulations [if any] in a letter dated [month day year] and approved by the NYSDEC were implemented and that all requirements in those documents have been substantively complied with.

I certify that the remedial activities were observed by qualified environmental professionals under my supervision and that the remediation requirements set forth in the Remedial Action Work Plan and any other relevant provisions of ECL 27-1419 have been achieved.

I certify that all use restrictions, Institutional Controls, Engineering Controls, and all operation and maintenance requirements applicable to the Site are contained in an Environmental Easement created and recorded pursuant ECL 71-3605 and that all affected local governments, as defined in ECL 71-3603, have been notified that such easement has been recorded. A Site

Management Plan has been submitted by the Applicant for the continual and proper operation, maintenance, and monitoring of all Engineering Controls employed at the Site, including the proper maintenance of all remaining monitoring wells, and that such plan has been approved by the NYSDEC.

I certify that the export of all contaminated soil, fill, water or other material from the property was performed in accordance with the Remedial Action Work Plan, and were taken to facilities licensed to accept this material in full compliance with all Federal, State and local laws.

I certify that all import of soils from off-Site, including source approval and sampling, has been performed in a manner that is consistent with the methodology defined in the Remedial Action Work Plan.

I certify that all invasive work during the remediation and all invasive development work were conducted in accordance with dust and odor suppression methodology and soil screening methodology defined in the Remedial Action Work Plan.

I certify that all information and statements in this certification are true. I understand that a false statement made herein is punishable as Class "A" misdemeanor, pursuant to Section 210.45 of the Penal Law.

It is a violation of Article 130 of New York State Education Law for any person to alter this document in any way without the express written verification of adoption by any New York State licensed engineer in accordance with Section 7209(2), Article 130, New York State Education Law.

10.0 SCHEDULE

A project schedule that depicts the anticipated sequencing of the Remedial Action work elements and dates for performance of the work is provided as Figure 5.

Respectfully submitted,

ROUX ASSOCIATES, INC.

Jennifer Parisi

Jennifer Parisi
Senior Engineer

REMEDIAL ENGINEERING, P.C.

Charles J. McGuckin

Charles J. McGuckin, P.E.
Principal Engineer

11.0 REFERENCES

NYSDEC, 1989, NYSDEC TAGM 4031 – Fugitive Dust Suppression and Particulate Monitoring Program at Inactive Hazardous Waste Sites.

NYSDEC, 2002. Draft DER-10 Technical Guidance for Site Investigation and Remediation, Appendix 1A, NYSDOH Generic Community Air Monitoring Plan, December 25, 2002.

NYSDEC, 2007a. Proposed Remedial Action Plan, Amtrak Sunnyside Yard, Operable Unit 3, Long Island City, Queens County, New York, Site No. 241006, February 2007.

NYSDEC, 2007b. Record of Decision, Amtrak Sunnyside Yard Site, Operable Unit No. 3, Long Island City, Queens County, New York, Site Number 241006, March 2007.

Roux Associates, 2005. Operable Unit 3 Final Feasibility Study, Sunnyside Yard, Queens, New York, December 6, 2005.

Roux Associates, 2007a. OU-3 Final Feasibility Study Addendum – Stipulation List, DEC #241006, Amtrak Sunnyside Yard, Queens, New York, February 26, 2007.

Roux Associates, 2007b. In Situ Bioremediation Pilot Study Work Plan, Sunnyside Yard, Queens, New York, April 9, 2007.

Table 1. Summary of Soil Sample Results, OU-3 Bioremediation Pilot Study, Sunnyside Yard, Queens, New York

Parameter	Units	Sample Designation: / Sample Date: / Sample Depth (ft bls):	BPSB-1 05/07/07 2-3	BPSB-1 05/07/07 3-4	BPSB-1B 06/21/07 2-3	BPSB-1B 06/21/07 3-4	BPSB-1C 07/19/07 2-3	BPSB-1C 07/19/07 3-4
pH	PH		NA	NA	7.4	8	7.8	6.7
Nitrate as N (NO3-N)	MG/KG		33 U	32 U	51	33 U	140	32 U
Nitrite as N (NO2-N)	MG/KG		96 U	95 U	95 U	99 U	99 U	94 U
Nitrogen Total Kjeldahl as N (TKN)	MG/KG		1,160	139	510	117	133	180
Ammonia (NH3) as N	MG/KG		11	26	12	16	10	12
Phosphorus,Total	MG/KG		160 U	150 U	150 U	160 U	160 U	150 U
Total Organic Carbon	MG/KG		71,000	3,500	47,000	3,900	310 U	6,400
Petroleum Degrading Microbes	CFU/GRAM		940,000	3,000 U	890,000	21,000	3,000 U	3,000 U
Diesel Range Organics (DRO)	UG/KG		11,000,000	39,000,000	360,000	31,000,000	74,000 U	19,000,000
TPH	UG/KG		NA	NA	3,500,000	45,000,000	42,000 U	23,000,000
SVOCs (µg/kg)								
2-Methylnaphthalene			3,500 J	6,200	400 U	820 U	410 U	7,800 U
Acenaphthene			1,900 J	8,400	69 J	820 U	410 U	7,800 U
Acenaphthylene			4,000 U	6,000 U	86 J	820 U	410 U	7,800 U
Anthracene			4,000 U	2,100 J	160 J	2,400	410 U	7,800 U
Benzo(a)anthracene			4,000 U	6,000 U	560	160 J	410 U	7,800 U
Benzo(a)pyrene			4,000 U	6,000 U	390 J	820 U	410 U	7,800 U
Benzo(b)fluoranthene			4,000 U	6,000 U	580	820 U	410 U	7,800 U
Benzo(g,h,i)perylene			4,000 U	6,000 U	340 J	820 U	410 U	7,800 U
Benzo(k)fluoranthene			4,000 U	6,000 U	180 J	820 U	410 U	7,800 U
Bis(2-ethylhexyl)phthalate			4,000 U	6,000 U	44 J	820 U	410 U	980 J
Carbazole			4,000 U	6,000 U	42 J	820 U	410 U	7,800 U
Chrysene			430 J	6,000 U	620	300 J	410 U	7,800 U
Dibenzo(a h)anthracene			4,000 U	6,000 U	96 J	820 U	410 U	7,800 U
Dibenzofuran			4,000 U	6,000 U	400 U	820 U	410 U	7,800 U
Di-n-butyl phthalate			4,000 U	6,000 U	400 U	820 U	57 J	7,800 U
Fluoranthene			4,000 U	6,000 U	740	200 J	410 U	7,800 U
Fluorene			2,100 J	9,600	63 J	820 U	410 U	7,800 U
Indeno(1,2,3-cd)pyrene			4,000 U	6,000 U	260 J	820 U	410 U	7,800 U
Naphthalene			4,000 U	6,000 U	120 J	820 U	410 U	7,800 U
Phenanthrene			2,200 J	13,000	890	15,000	410 U	1,200 J
Pyrene			2,100 J	4,600 J	1,400	7,000	410 U	2,800 J

µg/kg - Micrograms per kilogram
mg/kg - Milligrams per kilogram
cfu/gram - Colony forming unit per gram
U - Not detected
J - Estimated value
NA - Not analyzed
ft bls - Feet below land surface
TPH - Total Petroleum Hydrocarbons

Table 1. Summary of Soil Sample Results, OU-3 Bioremediation Pilot Study, Sunnyside Yard, Queens, New York

Parameter	Units	Sample Designation:	BPSB-1D	BPSB-1D	BPSB-2	BPSB-2	BPSB-2B	BPSB-2B
		Sample Date:	9/13/2007	9/13/2007	05/07/07	05/07/07	06/21/07	06/21/07
		Sample Depth (ft bls):	2-3	3-4	2-3	3-4	2-3	3-4
pH	PH		7.7	7.8	NA	NA	8	6.9
Nitrate as N (NO3-N)	MG/KG		33 U	34	31 U	30 U	30 U	180
Nitrite as N (NO2-N)	MG/KG		98 U	95 U	91 U	89 U	89 U	99 U
Nitrogen Total Kjeldahl as N (TKN)	MG/KG		1,000	494	967	106	118	147
Ammonia (NH3) as N	MG/KG		8.3	11	8.2	27	12	8.6
Phosphorus,Total	MG/KG		160 U	150 U	150 U	140 U	140 U	160 U
Total Organic Carbon	MG/KG		19,000	22,000	20,000	600	2,900	2,000
Petroleum Degrading Microbes	CFU/GRAM		1,900 J	280,000	590,000	3,300	210,000,000	680,000
Diesel Range Organics (DRO)	UG/KG		73,000 U	4,000,000	460,000	5,200,000	49,000	5,100,000
TPH	UG/KG		74	11,000	NA	NA	110,000	1,600,000
SVOCs (µg/kg)								
2-Methylnaphthalene			410 U	1,200 U	380 U	4,900	370 U	410 U
Acenaphthene			410 U	1,200 U	380 U	1,300 J	360 J	410 U
Acenaphthylene			410 U	1,200 U	130 J	3,700 U	210 J	210 J
Anthracene			410 U	270 J	230 J	600 J	840	270 J
Benzo(a)anthracene			410 U	340 J	410	3,700 U	1,400	1,700
Benzo(a)pyrene			410 U	240 J	300 J	3,700 U	890	930
Benzo(b)fluoranthene			410 U	390 J	960	3,700 U	1,900	3,100
Benzo(g,h,i)perylene			410 U	320 J	400	3,700 U	890	1,100
Benzo(k)fluoranthene			410 U	150 J	300 J	3,700 U	630	760
Bis(2-ethylhexyl)phthalate			410 U	1,200 U	110 J	3,700 U	370 U	410 U
Carbazole			410 U	1,200 U	88 J	3,700 U	49 J	410 U
Chrysene			410 U	380 J	630	3,700 U	1,600	2,300
Dibenzo(a h)anthracene			410 U	1,200 U	160 J	3,700 U	320 J	370 J
Dibenzofuran			410 U	1,200 U	380 U	3,700 U	180 J	410 U
Di-n-butyl phthalate			410 U	1,200 U	150 J	3,700 U	370 U	73 J
Fluoranthene			410 U	510 J	710	3,700 U	2,400	880
Fluorene			410 U	1,200 U	43 J	2,200 J	340 J	410 U
Indeno(1,2,3-cd)pyrene			410 U	260 J	390	3,700 U	800	980
Naphthalene			410 U	210 J	120 J	3,700 U	41 J	45 J
Phenanthrene			50 J	880 J	420	3,300 J	2,600	190 J
Pyrene			410 U	1,100 J	710	530 J	3,400	2,200

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J - Estimated value
NA - Not analyzed
ft bls - Feet below land surface
TPH - Total Petroleum Hydrocarbons

Table 1. Summary of Soil Sample Results, OU-3 Bioremediation Pilot Study, Sunnyside Yard, Queens, New York

Parameter	Units	Sample Designation:	BPSB-2C	BPSB-2C	BPSB-2D	BPSB-2D	BPSB-3	BPSB-3
		Sample Date:	07/19/07	07/19/07	9/13/2007	9/13/2007	05/07/07	05/07/07
		Sample Depth (ft bls):	2-3	3-4	2-3	3-4	2-3	3-4
pH	PH		6.4	6.6	6.8	7.7	NA	NA
Nitrate as N (NO3-N)	MG/KG		34 U	35 U	31 U	35 U	30 U	31 U
Nitrite as N (NO2-N)	MG/KG		100 U	100 U	93 U	100 U	89 U	91 U
Nitrogen Total Kjeldahl as N (TKN)	MG/KG		86.1	182	1,120	57	491	216
Ammonia (NH3) as N	MG/KG		45	18	9.6	9.1	57	13
Phosphorus,Total	MG/KG		160 U	170 U	150 U	170 U	140 U	150 U
Total Organic Carbon	MG/KG		860	3,500	4,200	320 U	25,000	570
Petroleum Degrading Microbes	CFU/GRAM		7,300	1,500,000	13,000	9,300	1,800,000	25,000
Diesel Range Organics (DRO)	UG/KG		76000 U	3,500,000	70,000 U	17,000 U	220,000	4,000,000
TPH	UG/KG		43000 U	7,000,000	110	44 U	NA	NA
SVOCs (µg/kg)								
2-Methylnaphthalene			420 U	1,300 U	390 U	430 U	370 U	470
Acenaphthene			420 U	1,300 U	390 U	430 U	370 U	380 U
Acenaphthylene			420 U	1,300 U	390 U	430 U	79 J	380 U
Anthracene			420 U	1,300 U	390 U	430 U	120 J	420
Benzo(a)anthracene			420 U	1,300 U	120 J	430 U	330 J	150 J
Benzo(a)pyrene			420 U	1,300 U	110 J	430 U	210 J	130 J
Benzo(b)fluoranthene			420 U	1,300 U	240 J	70 J	460	300 J
Benzo(g,h,i)perylene			420 U	1,300 U	140 J	430 U	260 J	130 J
Benzo(k)fluoranthene			420 U	1,300 U	71 J	430 U	290 J	100 J
Bis(2-ethylhexyl)phthalate			420 U	1,300 U	390 U	430 U	43 J	380 U
Carbazole			420 U	1,300 U	390 U	430 U	45 J	380 U
Chrysene			420 U	1,300 U	160 J	66 J	460	250 J
Dibenzo(a h)anthracene			420 U	1,300 U	55 J	430 U	100 J	51 J
Dibenzofuran			420 U	1,300 U	390 U	430 U	370 U	380 U
Di-n-butyl phthalate			420 U	1,300 U	390 U	430 U	42 J	380 U
Fluoranthene			420 U	1,300 U	160 J	75 J	490	220 J
Fluorene			420 U	1,300 U	390 U	430 U	370 U	380 U
Indeno(1,2,3-cd)pyrene			420 U	1,300 U	120 J	430 U	230 J	130 J
Naphthalene			420 U	1,300 U	390 U	430 U	97 J	380 U
Phenanthrene			420 U	1,300 U	110 J	430 U	210 J	610
Pyrene			420 U	470 J	200 J	83 J	640	380 J

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ft bls - Feet below land surface
TPH - Total Petroleum Hydrocarbons

Table 1. Summary of Soil Sample Results, OU-3 Bioremediation Pilot Study, Sunnyside Yard, Queens, New York

Parameter	Units	Sample Designation:	BPSB-3B	BPSB-3B	BPSB-3C	BPSB-3C	BPSB-3D	BPSB-3D
		Sample Date:	06/21/07	06/21/07	07/19/07	07/19/07	9/13/2007	9/13/2007
		Sample Depth (ft bls):	2-3	3-4	2-3	3-4	2-3	3-4
pH	PH		6.3	6.6	6.1	6.6	5.6	6
Nitrate as N (NO3-N)	MG/KG		30 U	31 U	34 U	33 U	33 U	32 U
Nitrite as N (NO2-N)	MG/KG		89 U	91 U	100 U	99 U	96 U	94 U
Nitrogen Total Kjeldahl as N (TKN)	MG/KG		844	416	942	2,180	1,100	590
Ammonia (NH3) as N	MG/KG		8	7	19	15	23	22
Phosphorus,Total	MG/KG		140 U	150 U	160 U	160 U	160 U	150 U
Total Organic Carbon	MG/KG		19,000	4,800	4,000	310 U	20,000	12,000
Petroleum Degrading Microbes	CFU/GRAM		19,000	13,000	910,000	340,000	20,000	2,200 J
Diesel Range Organics (DRO)	UG/KG		62,000	54,000	160,000	74,000 U	180,000	39,000
TPH	UG/KG		160,000	120,000	100,000	42,000 U	260	90
SVOCs (µg/kg)								
2-Methylnaphthalene			370 U	380 U	3,600	410 U	400 U	390 U
Acenaphthene			370 U	380 U	7,400	410 U	400 U	390 U
Acenaphthylene			49 J	58 J	640	410 U	120 J	45 J
Anthracene			61 J	88 J	7,800	410 U	140 J	87 J
Benzo(a)anthracene			200 J	200 J	4,800	91 J	300 J	240 J
Benzo(a)pyrene			170 J	160 J	2,000	70 J	190 J	190 J
Benzo(b)fluoranthene			460	500	3,700	140 J	750	470
Benzo(g,h,i)perylene			220 J	230 J	1,200	120 J	340 J	190 J
Benzo(k)fluoranthene			130 J	140 J	1,400	68 J	200 J	160 J
Bis(2-ethylhexyl)phthalate			46 J	61 J	420 U	42 J	130 J	390 U
Carbazole			370 U	380 U	1,000	410 U	57 J	390 U
Chrysene			320 J	330 J	4,500	110 J	430	360 J
Dibenzo(a h)anthracene			65 J	89 J	480	410 U	140 J	56 J
Dibenzofuran			370 U	380 U	3,900	410 U	400 U	390 U
Di-n-butyl phthalate			52 J	380 U	170 J	65 J	92 J	390 U
Fluoranthene			230 J	250 J	9,300	63 J	400 J	360 J
Fluorene			370 U	380 U	5,700	410 U	400 U	390 U
Indeno(1,2,3-cd)pyrene			170 J	210 J	1,000	100 J	380 J	160 J
Naphthalene			370 U	380 U	2,400	410 U	60 J	390 U
Phenanthrene			130 J	120 J	20,000	42 J	210 J	190 J
Pyrene			370	360 J	15,000	140 J	480	540

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Table 1. Summary of Soil Sample Results, OU-3 Bioremediation Pilot Study, Sunnyside Yard, Queens, New York

Parameter	Units	Sample Designation:	BPSB-4	BPSB-4	BPSB-4B	BPSB-4B	BPSB-4C	BPSB-4C
		Sample Date:	05/07/07	05/07/07	06/21/07	06/21/07	07/19/07	07/19/07
		Sample Depth (ft bls):	2-3	3-4	2-3	3-4	2-3	3-4
pH	PH		NA	NA	6.7	7.9	6.1	6.7
Nitrate as N (NO3-N)	MG/KG		32 U	31 U	32 U	33 U	33 U	46
Nitrite as N (NO2-N)	MG/KG		95 U	93 U	95 U	96 U	99 U	99 U
Nitrogen Total Kjeldahl as N (TKN)	MG/KG		2,030	228	1,400	169	713	223
Ammonia (NH3) as N	MG/KG		11	13	13	13	11	10
Phosphorus,Total	MG/KG		150 U	150 U	150 U	160 U	160 U	160 U
Total Organic Carbon	MG/KG		99,000	11,000	17,000	4,900	12,000	5,000
Petroleum Degrading Microbes	CFU/GRAM		830,000	19,000	1,800,000	7,600	600,000	18,000
Diesel Range Organics (DRO)	UG/KG		860,000	10,000,000	100,000	20,000,000	170,000	97,000
TPH	UG/KG		NA	NA	300,000	27,000,000	42,000 U	42,000 U
SVOCs (µg/kg)								
2-Methylnaphthalene			390 J	1,900 U	400 U	8,000 U	410 U	410 U
Acenaphthene			400 U	1,900 U	400 U	8,000 U	410 U	410 U
Acenaphthylene			400 U	1,900 U	64 J	8,000 U	53 J	410 U
Anthracene			400 U	1,900 U	96 J	3300 J	47 J	410 U
Benzo(a)anthracene			130 J	220 J	270 J	8,000 U	130 J	410 U
Benzo(a)pyrene			110 J	1,900 U	230 J	8,000 U	100 J	410 U
Benzo(b)fluoranthene			170 J	1,900 U	450	8,000 U	180 J	410 U
Benzo(g,h,i)perylene			92 J	1,900 U	200 J	8,000 U	120 J	410 U
Benzo(k)fluoranthene			56 J	1,900 U	140 J	8,000 U	47 J	410 U
Bis(2-ethylhexyl)phthalate			400 U	1,900 U	400 U	8,000 U	410 U	410 U
Carbazole			400 U	1,900 U	400 U	8,000 U	410 U	410 U
Chrysene			220 J	280 J	450	8,000 U	200 J	410 U
Dibenzo(a h)anthracene			53 J	1,900 U	66 J	8,000 U	44 J	410 U
Dibenzofuran			400 U	1,900 U	400 U	8,000 U	410 U	410 U
Di-n-butyl phthalate			400 U	1,900 U	400 U	8,000 U	410 U	410 U
Fluoranthene			130 J	1,900 U	470	8,000 U	190 J	410 U
Fluorene			400 U	1,900 U	400 U	8,000 U	410 U	410 U
Indeno(1,2,3-cd)pyrene			65 J	1,900 U	170 J	8,000 U	77 J	410 U
Naphthalene			240 J	1,900 U	72 J	8,000 U	84 J	410 U
Phenanthrene			400	880 J	410	4,200 J	260 J	65 J
Pyrene			170 J	1,500 J	610	4,400 J	240 J	63 J

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Table 1. Summary of Soil Sample Results, OU-3 Bioremediation Pilot Study, Sunnyside Yard, Queens, New York

Parameter	Units	Sample Designation:	BPSB-4D	BPSB-4D
		Sample Date:	9/13/2007	9/13/2007
		Sample Depth (ft bls):	2-3	3-4
pH	PH		7	7.2
Nitrate as N (NO3-N)	MG/KG		33 U	31 U
Nitrite as N (NO2-N)	MG/KG		96 U	92 U
Nitrogen Total Kjeldahl as N (TKN)	MG/KG		1,130	844
Ammonia (NH3) as N	MG/KG		11	9.8
Phosphorus,Total	MG/KG		160 U	150 U
Total Organic Carbon	MG/KG		18,000	14,000
Petroleum Degrading Microbes	CFU/GRAM		11,000	3,800
Diesel Range Organics (DRO)	UG/KG		71,000	65,000
TPH	UG/KG		110	100
SVOCs (µg/kg)				
2-Methylnaphthalene			400 U	380 U
Acenaphthene			400 U	380 U
Acenaphthylene			400 U	48 J
Anthracene			400 U	52 J
Benzo(a)anthracene			47 J	110 J
Benzo(a)pyrene			400 U	110 J
Benzo(b)fluoranthene			53 J	200 J
Benzo(g,h,i)perylene			400 U	110 J
Benzo(k)fluoranthene			400 U	87 J
Bis(2-ethylhexyl)phthalate			400 U	380 U
Carbazole			400 U	380 U
Chrysene			67 J	200 J
Dibenzo(a h)anthracene			400 U	380 U
Dibenzofuran			400 U	380 U
Di-n-butyl phthalate			400 U	58 J
Fluoranthene			41 J	150 J
Fluorene			400 U	380 U
Indeno(1,2,3-cd)pyrene			400 U	74 J
Naphthalene			81 J	170 J
Phenanthrene			120 J	340 J
Pyrene			55 J	180 J

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J - Estimated value
NA - Not analyzed
ft bls - Feet below land surface
TPH - Total Petroleum Hydrocarbons

Table 2. Summary of Groundwater Sample Results, OU-3 Bioremediation Pilot Study, Sunnyside Yard, Queens, New York

Parameter	Units	**Sample Designation:**	MW-74	MW-74	MW-74	MW-74	MW-74	MW-77
		Sample Date:	05/08/07	06/07/07	07/05/07	8/2/2007	9/13/2007	05/08/07
		Sample Depth (ft bls):						
Iron	UG/L		19,000	2,000	280 U	11,000	1,800	16,000
Manganese	UG/L		200	120	40 U	200	80	1200
Nitrate as N (NO3-N)	MG/L		0.27 U	0.61	1.4	0.27 U	0.98	0.27 U
Sulfate	MG/L		29	14	7.4	6.6	28	28
Ammonia (NH3) as N	MG/L		0.73	0.49	0.26	1.6	0.36	1.1

µg/L - Micrograms per liter
mg/L - Milligrams per liter
U - Not detected
NA - Not analyzed

Table 2. Summary of Groundwater Sample Results, OU-3 Bioremediation Pilot Study, Sunnyside Yard, Queens, New York

Parameter	Units	**Sample Designation:** **Sample Date:** **Sample Depth (ft bls):**	MW-77 05/17/07	MW-77 05/31/07	MW-77 06/07/07	MW-77 07/05/07	MW-77 8/2/2007	MW-77 9/13/2007
Iron	UG/L		NA	NA	8,000	440	280 U	360
Manganese	UG/L		NA	NA	3,500	3,300	2,100	1,800
Nitrate as N (NO3-N)	MG/L		1,200	1,200	630	630	170	57
Sulfate	MG/L		NA	NA	79	300	310 D	290 D
Ammonia (NH3) as N	MG/L		NA	NA	19	18	8.5 D	6.8 D

µg/L - Micrograms per liter
mg/L - Milligrams per liter
U - Not detected
NA - Not analyzed

Table 2. Summary of Groundwater Sample Results, OU-3 Bioremediation Pilot Study, Sunnyside Yard, Queens, New York

Parameter	Units	**Sample Designation:** **Sample Date:** **Sample Depth (ft bls):**	OW-1 05/08/07	OW-1 05/31/07	OW-1 06/07/07	OW-1 07/05/07	OW-1 8/2/2007	OW-1 9/13/2007
Iron	UG/L		6,800	NA	12,000	18,000	18,000	18,000
Manganese	UG/L		1,200	NA	1,500	1,700	1,500	1,400
Nitrate as N (NO3-N)	MG/L		0.27 U	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U
Sulfate	MG/L		11	NA	42	2.9	2.9	2.3 U
Ammonia (NH3) as N	MG/L		1.1	NA	1.3	0.87	1.1	1

μg/L - Micrograms per liter
mg/L - Milligrams per liter
U - Not detected
NA - Not analyzed

Table 2. Summary of Groundwater Sample Results, OU-3 Bioremediation Pilot Study, Sunnyside Yard, Queens, New York

Parameter	Units	**Sample Designation:**	OW-2	OW-2	OW-2	OW-2	OW-2	OW-2
		Sample Date:	05/08/07	05/31/07	06/07/07	07/05/07	8/2/2007	9/13/2007
		Sample Depth (ft bls):						
Iron	UG/L		12,000	NA	40,000	36,000	37,000	34,000
Manganese	UG/L		7,300	NA	15,000	12,000	13,000	11,000
Nitrate as N (NO3-N)	MG/L		0.27 U	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U
Sulfate	MG/L		73	NA	5.2	2.3 U	2.3 U	2.3 U
Ammonia (NH3) as N	MG/L		2.5	NA	3.3	3.5	3.2 D	2.9

µg/L - Micrograms per liter
mg/L - Milligrams per liter
U - Not detected
NA - Not analyzed

Table 3. Summary of PCBs in On-Site Soil Proposed for Backfill in OU-3, Amtrak Sunnyside Yard, Queens, New York

	Sample Designation:	SS-0007A	SS-0007B	SS-0007C	SS-0007D	SS-0025A	SS-0025B	SS-0025C	SS-0025D	SS-0025E
	Sample Date:	8/7/2006	8/7/2006	8/7/2006	8/7/2006	10/27/2006	10/27/2006	10/27/2006	10/27/2006	10/27/2006
	Sample Depth (ft bls):									
Parameter (Concentrations in ug/kg)	NYSDEC Recommended Cleanup Level									
Aroclor-1016		140 U	140 U	140 U	140 U	28 U	28 U	27 U	27 U	27 U
Aroclor-1221		140 U	140 U	140 U	140 U	28 U	28 U	27 U	27 U	27 U
Aroclor-1232		140 U	140 U	140 U	140 U	28 U	28 U	27 U	27 U	27 U
Aroclor-1242		140 U	140 U	140 U	140 U	28 U	28 U	27 U	27 U	27 U
Aroclor-1248		140 U	140 U	140 U	140 U	28 U	28 U	27 U	27 U	27 U
Aroclor-1254		140 U	140 U	140 U	140 U	28 U	28 U	27 U	27 U	27 U
Aroclor-1260		2900	3200	4700	2600	3600 D	990	830	1300	1100
Aroclor-1262		NA	NA	NA	NA	NA	NA	NA	NA	NA
Total PCBs	25,000	2,900	3,200	4,700	2,600	3,600	990	830	1,300	1,100

PCBs - Polychlorinated Biphenyls
ug/kg - micrograms per kilogram
J - Estimated value
U - Compound was analyzed for but not detected
NYSDEC - New York State Department of Environmental Conservation
NA - Not analyzed
D - Dilution
Bold text indicates the exceedance of the NYSDEC site-specific cleanup level for PCBs

Table 3. Summary of PCBs in On-Site Soil Proposed for Backfill in OU-3, Amtrak Sunnyside Yard, Queens, New York

Parameter (Concentrations in ug/kg)	NYSDEC Recommended Cleanup Level	SS-0026A	SS-0026B	SS-0026C	SS-0026D	SS-0026E	SS-0026F	SS-0027A	SS-0027B	SS-0027C
Sample Date:		11/3/2006	11/3/2006	11/3/2006	11/3/2006	11/3/2006	11/3/2006	11/10/2006	11/10/2006	11/10/2006
Sample Depth (ft bls):										
Aroclor-1016		27 U	27 U	28 U	27 U	28 U	28 U	28 U	28 U	28 U
Aroclor-1221		27 U	27 U	28 U	27 U	28 U	28 U	28 U	28 U	28 U
Aroclor-1232		27 U	27 U	28 U	27 U	28 U	28 U	28 U	28 U	28 U
Aroclor-1242		27 U	27 U	28 U	27 U	28 U	28 U	28 U	28 U	28 U
Aroclor-1248		27 U	27 U	28 U	27 U	28 U	28 U	28 U	28 U	28 U
Aroclor-1254		27 U	27 U	28 U	27 U	28 U	28 U	28 U	28 U	28 U
Aroclor-1260		1600	1800	2000	2700	3000	12000	4600 D	1700	760
Aroclor-1262		27 U	27 U	28 U	27 U	28 U	28 U	28 U	28 U	28 U
Total PCBs	25,000	1,600	1,800	2,000	2,700	3,000	12,000	2,600	1,700	760

PCBs - Polychlorinated Biphenyls
ug/kg - micrograms per kilogram
J - Estimated value
U - Compound was analyzed for but not detected
NYSDEC - New York State Department of Environmental Conservation
NA - Not analyzed
D - Dilution
Bold text indicates the exceedance of the NYSDEC site-specific cleanup level for PCBs

Table 3. Summary of PCBs in On-Site Soil Proposed for Backfill in OU-3, Amtrak Sunnyside Yard, Queens, New York

Parameter (Concentrations in ug/kg)	**Sample Designation:** **Sample Date:** **Sample Depth (ft bls):** NYSDEC Recommended Cleanup Level	SS-0027D 11/10/2006	SS-0027E 11/10/2006	SS-0027F 11/10/2006
Aroclor-1016		27 U	27 U	29 U
Aroclor-1221		27 U	27 U	29 U
Aroclor-1232		27 U	27 U	29 U
Aroclor-1242		27 U	27 U	29 U
Aroclor-1248		27 U	27 U	29 U
Aroclor-1254		27 U	27 U	29 U
Aroclor-1260		4100 D	3900 D	3300 D
Aroclor-1262		27 U	27 U	29 U
Total PCBs	25,000	4,100	3,900	3,300

PCBs - Polychlorinated Biphenyls
ug/kg - micrograms per kilogram
J - Estimated value
U - Compound was analyzed for but not detected
NYSDEC - New York State Department of Environmental Conservation
NA - Not analyzed
D - Dilution
Bold text indicates the exceedance of the NYSDEC site-specific cleanup level for PCBs

Table 4. Summary of Lead in On-Site Soil Proposed for Backfill in OU-3, Amtrak Sunnyside Yard, Queens, New York

	Sample Designation:	SS-0007A	SS-0007B	SS-0007C	SS-0007D	SS-0025A	SS-0025B	SS-0025C	SS-0025D	SS-0025E
	Sample Date:	8/7/2006	8/7/2006	8/7/2006	8/7/2006	10/27/2006	10/27/2006	10/27/2006	10/27/2006	10/27/2006
	Sample Depth (ft bls):									
Parameter (Concentrations in mg/kg)	NYSDEC Recommended Cleanup Level									
Lead	1000	55	82	150	110	250	340	190	210	170

ug/kg - micrograms per kilogram
J - Estimated value
U - Compound was analyzed for but not detected
NYSDEC - New York State Department of Environmental Conservation
Bold text indicates the exceedance of the NYSDEC site-specific cleanup level for Lead

Table 4. Summary of Lead in On-Site Soil Proposed for Backfill in OU-3, Amtrak Sunnyside Yard, Queens, New York

	Sample Designation:	SS-0026A	SS-0026B	SS-0026C	SS-0026E	SS-0026F	SS-0027A	SS0027B	SS0027C	SS0027D
	Sample Date:	11/3/2006	11/3/2006	11/3/2006	11/3/2006	11/3/2006	11/10/2006	11/10/2006	11/10/2006	11/10/2006
	Sample Depth (ft bls):									
Parameter (Concentrations in mg/kg)	NYSDEC Recommended Cleanup Level									
Lead	1000	110	130	300	150	240	180	140	100	170

ug/kg - micrograms per kilogram
J - Estimated value
U - Compound was analyzed for but not detected
NYSDEC - New York State Department of Environmental Conservation
Bold text indicates the exceedance of the NYSDEC site-specific cleanup level for Lead

Table 4. Summary of Lead in On-Site Soil Proposed for Backfill in OU-3, Amtrak Sunnyside Yard, Queens, New York

Parameter (Concentrations in mg/kg)	NYSDEC Recommended Cleanup Level		
	Sample Designation:	SS0027E	SS0027F
	Sample Date:	11/10/2006	11/10/2006
	Sample Depth (ft bls):		
Lead	1000	160	190

ug/kg - micrograms per kilogram
J - Estimated value
U - Compound was analyzed for but not detected
NYSDEC - New York State Department of Environmental Conservation
Bold text indicates the exceedance of the NYSDEC site-specific cleanup level for Lead

Table 5. Summary of cPAHs in On-Site Soil Proposed for Backfill in OU-3, Amtrak Sunnyside Yard, Queens, New York

Parameter (Concentrations in ug/kg)	**Sample Designation:** / **Sample Date:** / **Sample Depth (ft bls):** NYSDEC Recommended Cleanup Level	SS-0007A	SS-0007B	SS-0007C	SS-0007D	SS-0025A	SS-0025B	SS-0025C	SS-0025D	SS-0025E
Sample Date		8/7/2006	8/7/2006	8/7/2006	8/7/2006	10/27/2006	10/27/2006	10/27/2006	10/27/2006	10/27/2006
Benzo(a)anthracene		960	930	1,100	740	1,600	1,600	1,300	1,900	1,400
Benzo(a)pyrene		890	810	1,000	600	1,700	1,600	1,300	1,900	1,400
Benzo(b)fluoranthene		1,700	1,500	2,200	1,200	3,600	3,000	2,500	3,700	2,900
Benzo(k)fluoranthene		550	530	530	400	1,200	980	700	1,100	700
Chrysene		950	950	1,200	790	2,200	1,800	1,500	2,300	1,700
Dibenzo(a h)anthracene		230 J	220 J	290 J	160 J	500	430	330 J	480	370
Indeno(1,2,3-cd)pyrene		770	730	1,000	610	1,600	1,600	1,200	1,600	1,200
Total cPAHs	25,000	6,050	5,670	7,320	4,500	12,400	11,010	8,830	12,980	9,670

ug/kg - micrograms per kilogram
J - Estimated value
U - Compound was analyzed for but not detected
NYSDEC - New York State Department of Environmental Conservation
NA - Not analyzed
Bold text indicates the exceedance of the NYSDEC site-specific cleanup level for cPAHs

Table 5. Summary of cPAHs in On-Site Soil Proposed for Backfill in OU-3, Amtrak Sunnyside Yard, Queens, New York

	Sample Designation:	SS-0026A	SS-0026B	SS-0026C	SS-0026D	SS-0026E	SS-0026F	SS-0027A	SS-0027B	SS-0027C
	Sample Date:	11/3/2006	11/3/2006	11/3/2006	11/3/2006	11/3/2006	11/3/2006	11/10/2006	11/10/2006	11/10/2006
	Sample Depth (ft bls):									
Parameter (Concentrations in ug/kg)	NYSDEC Recommended Cleanup Level									
Benzo(a)anthracene		870	950	1,300	1,100	1,000	830	2,200	850	500
Benzo(a)pyrene		790	820	1,200	1,000	940	8,800	1,700	740	430
Benzo(b)fluoranthene		1,400	1,600	2,200	1,700	1,800	1,500	2,800	1,400	770
Benzo(k)fluoranthene		510	450	650	430	600	780	1,000	500	380 J
Chrysene		1,100	1,100	1,500	1,300	1,200	910	2,100	900	510
Dibenzo(a h)anthracene		190 J	230 J	310 J	250 J	260 J	140 J	340 J	240 J	84 J
Indeno(1,2,3-cd)pyrene		640	700	990	640	800	630	1,000	530	240 J
Total cPAHs	25,000	5,500	5,850	8,150	6,420	6,600	13,590	11,140	5,160	2,914

ug/kg - micrograms per kilogram
J - Estimated value
U - Compound was analyzed for but not detected
NYSDEC - New York State Department of Environmental Conservation
NA - Not analyzed
Bold text indicates the exceedance of the NYSDEC site-specific cleanup level for cPAHs

Table 5. Summary of cPAHs in On-Site Soil Proposed for Backfill in OU-3, Amtrak Sunnyside Yard, Queens, New York

	Sample Designation:	SS-0027D	SS-0027E	SS-0027F
	Sample Date:	11/10/2006	11/10/2006	11/10/2006
	Sample Depth (ft bls):			
Parameter (Concentrations in ug/kg)	NYSDEC Recommended Cleanup Level			
Benzo(a)anthracene		1,100	750	1,100
Benzo(a)pyrene		1,000	710	910
Benzo(b)fluoranthene		2,100	1,500	2,100
Benzo(k)fluoranthene		570	590	530
Chrysene		1,200	990	1,400
Dibenzo(a h)anthracene		270 J	140 J	280 J
Indeno(1,2,3-cd)pyrene		790	460	730
Total cPAHs	25,000	7,030	5,140	7,050

ug/kg - micrograms per kilogram
J - Estimated value
U - Compound was analyzed for but not detected
NYSDEC - New York State Department of Environmental Conservation
NA - Not analyzed
Bold text indicates the exceedance of the NYSDEC site-specific cleanup level for cPAHs

Table 6. Summary of SVOCs in On-Site Soil Proposed for Backfill in OU-3, Amtrak Sunnyside Yard, Queens, New York

Parameter (Concentrations in ug/kg)	NYSDEC Recommended Cleanup Level	SS-0007A	SS-0007B	SS-0007C	SS-0007D	SS-0025A	SS-0025B	SS-0025C	SS-0025D	SS-0025E
Sample Date:		8/7/2006	8/7/2006	8/7/2006	8/7/2006	10/27/2006	10/27/2006	10/27/2006	10/27/2006	10/27/2006
1,2,4-Trichlorobenzene		370 U	370 U	370 U	370 U	370 U	370 U	370 U	370 U	360 U
1,2-Dichlorobenzene		370 U	370 U	370 U	370 U	370 U	370 U	370 U	370 U	360 U
1,3-Dichlorobenzene		370 U	370 U	370 U	370 U	370 U	370 U	370 U	370 U	360 U
1,4-Dichlorobenzene		370 U	370 U	370 U	370 U	370 U	370 U	370 U	370 U	360 U
2,2-oxybis (1-chloropropane)		370 U	370 U	370 U	370 U	370 U	370 U	370 U	370 U	360 U
2,4,5-Trichlorophenol		370 U	370 U	370 U	370 U	370 U	370 U	370 U	370 U	360 U
2,4,6-Trichlorophenol		370 U	370 U	370 U	370 U	370 U	370 U	370 U	370 U	360 U
2,4-Dichlorophenol		370 U	370 U	370 U	370 U	370 U	370 U	370 U	370 U	360 U
2,4-Dimethylphenol		370 U	370 U	370 U	370 U	370 U	370 U	370 U	370 U	360 U
2,4-Dinitrophenol		920 U	920 U	930 U	920 U	940 U	930 U	920 U	920 U	910 U
2,4-Dinitrotoluene		920 U	920 U	930 U	920 U	370 U	370 U	370 U	370 U	360 U
2,6-Dinitrotoluene		370 U	370 U	370 U	370 U	370 U	370 U	370 U	370 U	360 U
2-Chloronaphthalene		370 U	370 U	370 U	370 U	370 U	370 U	370 U	370 U	360 U
2-Chlorophenol		370 U	370 U	370 U	370 U	370 U	370 U	370 U	370 U	360 U
2-Methylnaphthalene		140 J	71 J	100 J	54 J	370 U	370 U	370 U	370 U	360 U
2-Methylphenol		370 U	370 U	370 U	370 U	370 U	370 U	370 U	370 U	360 U
2-Nitroaniline		370 U	370 U	370 U	370 U	370 U	370 U	370 U	370 U	360 U
2-Nitrophenol		370 U	370 U	370 U	370 U	370 U	370 U	370 U	370 U	360 U
3,3-Dichlorobenzidine		370 U	370 U	370 U	370 U	370 U	370 U	370 U	370 U	360 U
3-Nitroaniline		370 U	370 U	370 U	370 U	370 U	370 U	370 U	370 U	360 U
4,6-Dinitro-2-methylphenol		1800 U	1800 U	1900 U	1800 U	370 U	370 U	370 U	370 U	360 U
4-Bromophenyl phenyl ether		370 U	370 U	370 U	370 U	370 U	370 U	370 U	370 U	360 U
4-Chloro-3-methylphenol		370 U	370 U	370 U	370 U	370 U	370 U	370 U	370 U	360 U
4-Chloroaniline		370 U	370 U	370 U	370 U	370 U	370 U	370 U	370 U	360 U
4-Chlorophenyl phenyl ether		370 U	370 U	370 U	370 U	370 U	370 U	370 U	370 U	360 U
4-Methylphenol		370 U	370 U	370 U	370 U	370 U	370 U	370 U	370 U	360 U
4-Nitroaniline		370 U	370 U	370 U	370 U	370 U	370 U	370 U	370 U	360 U
4-Nitrophenol		370 U	370 U	370 U	370 U	370 U	370 U	370 U	370 U	360 U
Acenaphthene		45 J	66 J	40 J	370 U	62 J	87 J	77 J	79 J	93 J
Acenaphthylene		210 J	190 J	280 J	150 J	540	410	310 J	410	330 J
Anthracene		350 J	300 J	390	220 J	600	600	480	600	560
Benzo(a)anthracene		960	930	1100	740	1600	1600	1300	1900	1400

Table 6. Summary of SVOCs in On-Site Soil Proposed for Backfill in OU-3, Amtrak Sunnyside Yard, Queens, New York

Parameter (Concentrations in ug/kg)	NYSDEC Recommended Cleanup Level	SS-0007A	SS-0007B	SS-0007C	SS-0007D	SS-0025A	SS-0025B	SS-0025C	SS-0025D	SS-0025E
Sample Designation:		SS-0007A	SS-0007B	SS-0007C	SS-0007D	SS-0025A	SS-0025B	SS-0025C	SS-0025D	SS-0025E
Sample Date:		8/7/2006	8/7/2006	8/7/2006	8/7/2006	10/27/2006	10/27/2006	10/27/2006	10/27/2006	10/27/2006
Benzo(a)pyrene		890	810	1000	600	1700	1600	1300	1900	1400
Benzo(b)fluoranthene		1700	1500	2200	1200	3600	3000	2500	3700	2900
Benzo(g,h,i)perylene		760	720	1000	600	1700	1700	1300	1700	1300
Benzo(k)fluoranthene		550	530	530	400	1200	980	700	1100	700
Benzoic acid		920 U	920 U	930 U	920 U	370 U	370 U	370 U	370 U	360 U
Benzyl alcohol		370 U	370 U	370 U	370 U	370 U	370 U	370 U	370 U	360 U
Bis(2-chloroethoxy)methane		370 U	370 U	370 U	370 U	370 U	370 U	370 U	370 U	360 U
Bis(2-chloroethyl)ether		370 U	370 U	370 U	370 U	370 U	370 U	370 U	370 U	360 U
Bis(2-ethylhexyl)phthalate		130 J	190 J	220 J	84 J	390	440	370	550	310 J
Butylbenzyl phthalate		370 U	370 U	370 U	370 U	370 U	370 U	370 U	370 U	360 U
Carbazole		110 J	120 J	160 J	92 J	280 J	290 J	210 J	240 J	270 J
Chrysene		950	950	1200	790	2200	1800	1500	2300	1700
Dibenzo(a h)anthracene		230 J	220 J	290 J	160 J	500	430	330 J	480	370
Dibenzofuran		70 J	70 J	87 J	55 J	110 J	100 J	76 J	81 J	86 J
Diethyl phthalate		370 U	370 U	370 U	370 U	370 U	370 U	370 U	370 U	360 U
Dimethyl phthalate		370 U	370 U	370 U	370 U	370 U	370 U	370 U	370 U	360 U
Di-n-butyl phthalate		100 J	120 J	84 J	41 J	130 J	87 J	64 J	58 J	71 J
Di-n-octyl phthalate		370 U	370 U	370 U	370 U	370 U	370 U	370 U	370 U	360 U
Fluoranthene		1700	1400	1700	1100	2300	2200	1800	2600	2000
Fluorene		58 J	59 J	51 J	40 J	78 J	93 J	88 J	95 J	110 J
Hexachlorobenzene		370 U	370 U	370 U	370 U	370 U	370 U	370 U	370 U	360 U
Hexachlorobutadiene		370 U	370 U	370 U	370 U	370 U	370 U	370 U	370 U	360 U
Hexachlorocyclopentadiene		920 U	920 U	930 U	920 U	370 U	370 U	370 U	370 U	360 U
Hexachloroethane		370 U	370 U	370 U	370 U	370 U	370 U	370 U	370 U	360 U
Indeno(1,2,3-cd)pyrene		770	730	1000	610	1600	1600	1200	1600	1200
Isophorone		370 U	370 U	370 U	370 U	370 U	370 U	370 U	370 U	360 U
Naphthalene		120 J	68 J	110 J	70 J	110 J	91 J	67 J	72 J	85 J
Nitrobenzene		370 U	370 U	370 U	370 U	370 U	370 U	370 U	370 U	360 U
n-Nitroso-di-n-propylamine		370 U	370 U	370 U	370 U	370 U	370 U	370 U	370 U	360 U
n-Nitrosodiphenylamine		370 U	370 U	370 U	370 U	370 U	370 U	370 U	370 U	360 U
Pentachlorophenol		920 U	920 U	930 U	920 U	370 U	370 U	370 U	370 U	360 U
Phenanthrene		510	580	490	400	710	910	860	930	890

Table 6. Summary of SVOCs in On-Site Soil Proposed for Backfill in OU-3, Amtrak Sunnyside Yard, Queens, New York

Parameter (Concentrations in ug/kg)	NYSDEC Recommended Cleanup Level	SS-0007A	SS-0007B	SS-0007C	SS-0007D	SS-0025A	SS-0025B	SS-0025C	SS-0025D	SS-0025E
Sample Date:		8/7/2006	8/7/2006	8/7/2006	8/7/2006	10/27/2006	10/27/2006	10/27/2006	10/27/2006	10/27/2006
Phenol		370 U	370 U	370 U	370 U	370 U	370 U	370 U	370 U	360 U
Pyrene		1500	1400	1600	1200	2600	2500	2100	3300	2300
Total SVOCs	500,000	11,853	11,024	13,632	8,606	22,010	20,518	16,632	23,695	18,075

SVOCs - Semivolatile Organic Compounds
ug/kg - micrograms per kilogram
J - Estimated value
U - Compound was analyzed for but not detected
NYSDEC - New York State Department of Environmental Conservation
NA - Not analyzed
Bold text indicates the exceedance of the NYSDEC site-specific cleanup level for SVOCs

Table 6. Summary of SVOCs in On-Site Soil Proposed for Backfill in OU-3, Amtrak Sunnyside Yard, Queens, New York

Parameter (Concentrations in ug/kg)	NYSDEC Recommended Cleanup Level	SS-0026A	SS-0026B	SS-0026C	SS-0026D	SS-0026E	SS-0026F	SS-0027A	SS-0027B	SS-0027C
Sample Date:		11/3/2006	11/3/2006	11/3/2006	11/3/2006	11/3/2006	11/3/2006	11/10/2006	11/10/2006	11/10/2006
1,2,4-Trichlorobenzene		360 U	360 U	370 U	360 U	370 U	130 J	380 U	370 U	380 U
1,2-Dichlorobenzene		360 U	360 U	370 U	360 U	370 U	370 U	380 U	370 U	380 U
1,3-Dichlorobenzene		360 U	360 U	370 U	360 U	370 U	370 U	380 U	370 U	380 U
1,4-Dichlorobenzene		360 U	360 U	370 U	360 U	370 U	370 U	380 U	370 U	380 U
2,2-oxybis (1-chloropropane)		360 U	360 U	370 U	360 U	370 U	370 U	380 U	370 U	380 U
2,4,5-Trichlorophenol		360 U	360 U	370 U	360 U	370 U	370 U	380 U	370 U	380 U
2,4,6-Trichlorophenol		360 U	360 U	370 U	360 U	370 U	370 U	380 U	370 U	380 U
2,4-Dichlorophenol		360 U	360 U	370 U	360 U	370 U	370 U	380 U	370 U	380 U
2,4-Dimethylphenol		360 U	360 U	370 U	360 U	370 U	370 U	380 U	370 U	380 U
2,4-Dinitrophenol		910 U	910 U	930 U	1800 U	930 U	930 U	1900 U	1900 U	950 U
2,4-Dinitrotoluene		360 U	360 U	370 U	360 U	370 U	370 U	380 U	370 U	380 U
2,6-Dinitrotoluene		360 U	360 U	370 U	360 U	370 U	370 U	380 U	370 U	380 U
2-Chloronaphthalene		360 U	360 U	370 U	360 U	370 U	370 U	380 U	370 U	380 U
2-Chlorophenol		360 U	360 U	370 U	360 U	370 U	370 U	380 U	370 U	380 U
2-Methylnaphthalene		360 U	360 U	370 U	360 U	370 U	150 J	160 J	370 U	380 U
2-Methylphenol		360 U	360 U	370 U	360 U	370 U	370 U	380 U	370 U	380 U
2-Nitroaniline		360 U	360 U	370 U	360 U	370 U	370 U	380 U	370 U	380 U
2-Nitrophenol		360 U	360 U	370 U	360 U	370 U	370 U	380 U	370 U	380 U
3,3-Dichlorobenzidine		360 U	360 U	370 U	360 U	370 U	930 U	380 U	370 U	950 U
3-Nitroaniline		360 U	360 U	370 U	360 U	370 U	370 U	380 U	370 U	380 U
4,6-Dinitro-2-methylphenol		910 U	910 U	930 U	360 U	930 U	930 U	380 U	370 U	950 U
4-Bromophenyl phenyl ether		360 U	360 U	370 U	360 U	370 U	370 U	380 U	370 U	380 U
4-Chloro-3-methylphenol		360 U	360 U	370 U	360 U	370 U	370 U	380 U	370 U	380 U
4-Chloroaniline		360 U	360 U	370 U	360 U	370 U	370 U	380 U	370 U	380 U
4-Chlorophenyl phenyl ether		360 U	360 U	370 U	360 U	370 U	370 U	380 U	370 U	380 U
4-Methylphenol		360 U	360 U	370 U	360 U	370 U	370 U	380 U	370 U	380 U
4-Nitroaniline		360 U	360 U	370 U	360 U	370 U	370 U	380 U	370 U	380 U
4-Nitrophenol		360 U	360 U	370 U	360 U	370 U	370 U	380 U	370 U	380 U
Acenaphthene		74 J	95 J	83 J	110 J	62 J	370 U	350 J	47 J	380 U
Acenaphthylene		160 J	200 J	220 J	150 J	210 J	84 J	180 J	150 J	47 J
Anthracene		300 J	350 J	380	370	340 J	160 J	1000	250 J	120 J
Benzo(a)anthracene		870	950	1300	1100	1000	830	2200	850	500

Parameter (Concentrations in ug/kg)	NYSDEC Recommended Cleanup Level	Sample Designation: SS-0026A	SS-0026B	SS-0026C	SS-0026D	SS-0026E	SS-0026F	SS-0027A	SS-0027B	SS-0027C
	Sample Date:	11/3/2006	11/3/2006	11/3/2006	11/3/2006	11/3/2006	11/3/2006	11/10/2006	11/10/2006	11/10/2006
Benzo(a)pyrene		790	820	1200	1000	940	880	1700	740	430
Benzo(b)fluoranthene		1400	1600	2200	1700	1800	1500	2800	1400	770
Benzo(g,h,i)perylene		670	730	1100	710	830	670	1100	580	240 J
Benzo(k)fluoranthene		510	450	650	430	600	780	1000	500	380 J
Benzoic acid		1800 U	1800 U	1900 U	1800 U	1900 U	930 U	1900 U	1900 U	950 U
Benzyl alcohol		360 U	360 U	370 U	360 U	370 U	370 U	380 U	370 U	380 U
Bis(2-chloroethoxy)methane		360 U	360 U	370 U	360 U	370 U	370 U	380 U	370 U	380 U
Bis(2-chloroethyl)ether		360 U	360 U	370 U	360 U	370 U	370 U	380 U	370 U	380 U
Bis(2-ethylhexyl)phthalate		250 J	290 J	210 J	230 J	720	260 J	170 J	190 J	160 J
Butylbenzyl phthalate		360 U	360 U	370 U	710	370 U	370 U	380 U	370 U	380 U
Carbazole		120 J	140 J	150 J	95 J	120 J	54 J	270 J	87 J	380 U
Chrysene		1100	1100	1500	1300	1200	910	2100	900	510
Dibenzo(a h)anthracene		190 J	230 J	310 J	250 J	260 J	140 J	340 J	240 J	84 J
Dibenzofuran		78 J	92 J	130 J	360 U	95 J	370 U	290 J	370 U	380 U
Diethyl phthalate		360 U	360 U	370 U	360 U	370 U	370 U	380 U	370 U	380 U
Dimethyl phthalate		360 U	360 U	370 U	360 U	370 U	370 U	380 U	370 U	380 U
Di-n-butyl phthalate		120 JB	140 JB	83 JB	72 J	150 JB	100 JB	84 JB	86 JB	150 JB
Di-n-octyl phthalate		360 U	360 U	370 U	900 U	370 U	370 U	950 U	930 U	380 U
Fluoranthene		1300	1500	1700	1800	1400	860	4600	1400	1500
Fluorene		76 J	100 J	110 J	150 J	84 J	370 U	400	54 J	39 J
Hexachlorobenzene		360 U	360 U	370 U	360 U	370 U	370 U	380 U	370 U	380 U
Hexachlorobutadiene		360 U	360 U	370 U	360 U	370 U	370 U	380 U	370 U	380 U
Hexachlorocyclopentadiene		360 U	360 U	370 U	900 U	370 U	370 U	950 U	930 U	380 U
Hexachloroethane		360 U	360 U	370 U	360 U	370 U	370 U	380 U	370 U	380 U
Indeno(1,2,3-cd)pyrene		640	700	990	640	800	630	1000	530	240 J
Isophorone		360 U	360 U	370 U	360 U	370 U	370 U	380 U	370 U	380 U
Naphthalene		95 J	110 J	150 J	77 J	110 J	84 J	180 J	96 J	39 J
Nitrobenzene		360 U	360 U	370 U	360 U	370 U	370 U	380 U	370 U	380 U
n-Nitroso-di-n-propylamine		360 U	360 U	370 U	360 U	370 U	370 U	380 U	370 U	380 U
n-Nitrosodiphenylamine		360 U	360 U	370 U	360 U	370 U	370 U	380 U	370 U	380 U
Pentachlorophenol		910 U	910 U	930 U	1800 U	930 U	370 U	1900 U	1900 U	380 U
Phenanthrene		590	720	850	1100	570	380	3400	490	360 J

Table 6. Summary of SVOCs in On-Site Soil Proposed for Backfill in OU-3, Amtrak Sunnyside Yard, Queens, New York

Parameter (Concentrations in ug/kg)	NYSDEC Recommended Cleanup Level	SS-0026A	SS-0026B	SS-0026C	SS-0026D	SS-0026E	SS-0026F	SS-0027A	SS-0027B	SS-0027C
Sample Date:		11/3/2006	11/3/2006	11/3/2006	11/3/2006	11/3/2006	11/3/2006	11/10/2006	11/10/2006	11/10/2006
Phenol		360 U	360 U	370 U	360 U	370 U	370 U	380 U	370 U	380 U
Pyrene		1400	1500	2400	2300	1700	1600	4300	1500	830
Total SVOCs	500,000	10,733	11,817	15,716	14,294	12,991	10,202	27,624	10,090	6,399

SVOCs - Semivolatile Organic Compounds
ug/kg - micrograms per kilogram
J - Estimated value
U - Compound was analyzed for but not detected
NYSDEC - New York State Department of Environmental Conservation
NA - Not analyzed
Bold text indicates the exceedance of the NYSDEC site-specific cleanup level for SVOCs

Table 6. Summary of SVOCs in On-Site Soil Proposed for Backfill in OU-3, Amtrak Sunnyside Yard, Queens, New York

Parameter (Concentrations in ug/kg)	NYSDEC Recommended Cleanup Level	Sample Designation: SS-0027D Sample Date: 11/10/2006	SS-0027E 11/10/2006	SS-0027F 11/10/2006
1,2,4-Trichlorobenzene		370 U	370 U	390 U
1,2-Dichlorobenzene		370 U	370 U	390 U
1,3-Dichlorobenzene		370 U	370 U	390 U
1,4-Dichlorobenzene		370 U	370 U	390 U
2,2-oxybis (1-chloropropane)		370 U	370 U	390 U
2,4,5-Trichlorophenol		370 U	370 U	390 U
2,4,6-Trichlorophenol		370 U	370 U	390 U
2,4-Dichlorophenol		370 U	370 U	390 U
2,4-Dimethylphenol		370 U	370 U	390 U
2,4-Dinitrophenol		1800 U	920 U	1900 U
2,4-Dinitrotoluene		370 U	370 U	390 U
2,6-Dinitrotoluene		370 U	370 U	390 U
2-Chloronaphthalene		370 U	370 U	390 U
2-Chlorophenol		370 U	370 U	390 U
2-Methylnaphthalene		370 U	1100	160 J
2-Methylphenol		370 U	370 U	390 U
2-Nitroaniline		370 U	370 U	390 U
2-Nitrophenol		370 U	370 U	390 U
3,3-Dichlorobenzidine		370 U	920 U	390 U
3-Nitroaniline		370 U	370 U	390 U
4,6-Dinitro-2-methylphenol		370 U	920 U	390 U
4-Bromophenyl phenyl ether		370 U	370 U	390 U
4-Chloro-3-methylphenol		370 U	370 U	390 U
4-Chloroaniline		370 U	370 U	390 U
4-Chlorophenyl phenyl ether		370 U	370 U	390 U
4-Methylphenol		370 U	370 U	390 U
4-Nitroaniline		370 U	370 U	390 U
4-Nitrophenol		370 U	370 U	390 U
Acenaphthene		58 J	1200	110 J
Acenaphthylene		230 J	110 J	240 J
Anthracene		330 J	720	470
Benzo(a)anthracene		1100	750	1100

Table 6. Summary of SVOCs in On-Site Soil Proposed for Backfill in OU-3, Amtrak Sunnyside Yard, Queens, New York

Parameter (Concentrations in ug/kg)	NYSDEC Recommended Cleanup Level	Sample Designation: SS-0027D Sample Date: 11/10/2006	SS-0027E 11/10/2006	SS-0027F 11/10/2006
Benzo(a)pyrene		1000	710	910
Benzo(b)fluoranthene		2100	1500	2100
Benzo(g,h,i)perylene		860	460	780
Benzo(k)fluoranthene		570	590	530
Benzoic acid		1800 U	920 U	1900 U
Benzyl alcohol		370 U	370 U	390 U
Bis(2-chloroethoxy)methane		370 U	370 U	390 U
Bis(2-chloroethyl)ether		370 U	370 U	390 U
Bis(2-ethylhexyl)phthalate		210 J	230 J	270 J
Butylbenzyl phthalate		370 U	370 U	390 U
Carbazole		120 J	590	170 J
Chrysene		1200	990	1400
Dibenzo(a h)anthracene		270 J	140 J	280 J
Dibenzofuran		110 J	630	150 J
Diethyl phthalate		370 U	370 U	390 U
Dimethyl phthalate		370 U	370 U	390 U
Di-n-butyl phthalate		100 JB	120 JB	68 JB
Di-n-octyl phthalate		920 U	370 U	970 U
Fluoranthene		1600	2000	1900
Fluorene		74 J	740	140 J
Hexachlorobenzene		370 U	370 U	390 U
Hexachlorobutadiene		370 U	370 U	390 U
Hexachlorocyclopentadiene		920 U	370 U	970 U
Hexachloroethane		370 U	370 U	390 U
Indeno(1,2,3-cd)pyrene		790	460	730
Isophorone		370 U	370 U	390 U
Naphthalene		150 J	540	170 J
Nitrobenzene		370 U	370 U	390 U
n-Nitroso-di-n-propylamine		370 U	370 U	390 U
n-Nitrosodiphenylamine		370 U	370 U	390 U
Pentachlorophenol		1800 U	370 U	1900 U
Phenanthrene		570	3000	900

Table 6. Summary of SVOCs in On-Site Soil Proposed for Backfill in OU-3, Amtrak Sunnyside Yard, Queens, New York

Parameter (Concentrations in ug/kg)	NYSDEC Recommended Cleanup Level	SS-0027D	SS-0027E	SS-0027F
Sample Designation:		SS-0027D	SS-0027E	SS-0027F
Sample Date:		11/10/2006	11/10/2006	11/10/2006
Phenol		370 U	370 U	390 U
Pyrene		1700	2600	2000
Total SVOCs	500,000	13,142	19,180	14,578

SVOCs - Semivolatile Organic Compounds
ug/kg - micrograms per kilogram
J - Estimated value
U - Compound was analyzed for but not detected
NYSDEC - New York State Department of Environmental Conservation
NA - Not analyzed
Bold text indicates the exceedance of the NYSDEC site-specific cleanup level for SVOCs

Table 7. OU-3 Remedial Action Cost Estimate, OU-3 Remedial Action Work Plan
Amtrak Sunnyside Yard, Queens, New York

Description	Quantity	Unit	Unit Cost	Total Cost	Notes
REMEDIAL ALTERNATIVE II: CAPITAL COSTS					
SITE PREPARATION					
Perimeter Plywood Barrier Installation	760	LF	$19.80	$15,048	(29)
Access Road Relocation			Completed by Amtrak		(30)
Underground Utility Clearance			Completed by Amtrak		(2)
Active Utility Relocation/Replacement			Completed by Amtrak		(2)
Clearance of Surface Features (Rails, RR Cars, etc.)			Completed by Amtrak		(1)
Sewer/Catch Basin Relocation	1	LS	$30,000	$30,000	
Temporary Drainage & Runoff Control	1	LS	$15,000	$15,000	
Subtotal				**$60,048**	
MOBILE SPH PLUME AND PETROLEUM IMPACTED SOIL EXCAVATION					
Removal of North Runner Track	1	LS	$45,000	$45,000	
Excavate and Stockpile Soil	3,700	CY	$21.75	$80,475	(31,32)
Excavate and Stockpile Soil (under North Runner Track)	360	CY	$33.00	$11,880	(57)
Product Skimming within Excavation	41	Day	$800	$32,800	(33)
Initial Trenching in South and East Portions of Excavation	340	LF	$7.14	$2,428	(34)
Segregate/Stockpile Wood Railroad Ties and Large Debris	60	CY	$10.00	$600	(21,27)
Soil Stabilization for Transport	4,060	CY	$35.00	$142,100	(35)
T&D Non-Hazardous Petroleum-Impacted Soil	6,653	Tons	$58.00	$385,893	(36, 37)
T&D Hazardous PCB-impacted Soil	350	Tons	$185.00	$64,750	(38,39)
T&D of Skimmed Product (Non-Hazardous)	11,000	Gal	$0.85	$9,350	(40)
T&D Non-Hazardous Wood (Rail Road Ties)	72	Tons	$100.00	$7,200	(41)
Post-Excavation Sampling	15	Sample	$183.00	$2,745	(42)
Waste Characterization Sampling	9	Sample	$1,000	$9,000	(43)
Loading/Placement of Backfill from OU-4 to OU-3	2,842	CY	$15.00	$42,630	(45)
Loading/Placement of Backfill from OU-4 to OU-3 (under North Runner Track)	291	CY	$22.50	$6,548	(57)
Placement of Backfill - LIRR Property with Clean Fill Material	431	CY	$23.00	$9,913	(44)
Placement of Shallow OU-3 Soil Reused as Backfill	675	CY	$8.00	$5,400	(46)
Placement of Clean Surface Fill Material	393	CY	$23.00	$9,039	(45)
Placement of Clean Surface Fill Material (under North Runner Track)	37	CY	$34.50	$1,277	(45, 57)
Track Preparation Compaction, QA/QC	1	LS	$5,000	$5,000	
Recovery Trench Decommissioning	1	LS	$10,000	$10,000	
Dust/Odor Control	1	LS	$65,000	$65,000	(47)
Subtotal				**$949,026**	
RESIDUAL SPH IN SITU BIODEGRADATION - SATURATED SOIL BENEATH MOBILE SPH PLUME					
Pre-Design Pilot Study	1	LS	$30,000	$30,000	(9)
Baseline Soil Sampling	1	LS	$8,200	$8,200	(4)
Injection of Ammonium Nitrate	1	LS	$84,000	$84,000	(7)
Confirmatory Soil Sampling	1	LS	$6,400	$6,400	(8)
Subtotal				**$128,600**	

Table 7. OU-3 Remedial Action Cost Estimate, OU-3 Remedial Action Work Plan
Amtrak Sunnyside Yard, Queens, New York

Description		Quantity	Unit	Unit Cost	Total Cost	Notes
SURFACE SOIL EXCAVATION						
Excavate and Stockpile Surface Soil (0-1 foot)		450	CY	$21.75	$9,788	(31,48)
Excavate Known Lead Exceedance (Sample S-62)		30	CY	$21.75	$653	(31,49)
Segregate/Stockpile Wood Railroad Ties and Large Debris		90	CY	$10.00	$900	(27)
Soil Stabilization for Transport		480	CY	$35.00	$16,800	(35)
T&D Non-Hazardous Petroleum-Impacted Soil		828	Tons	$58.00	$48,024	(36)
T&D Non-Hazardous Wood (Rail Road Ties)		108	Tons	$100.00	$10,800	(41)
Loading/Placement of Backfill from OU-4 to OU-3		552	CY	$15.00	$8,280	(45)
Lead Confirmatory Soil Samples (Near Sample S-62)		5	Samples	$12.00	$60	(50)
Waste Characterization Sampling		2	Samples	$1,000	$2,000	(43)
	Subtotal				**$97,304**	
INTERIOR ENGINE HOUSE SERVICE PIT CLEANING						
Concrete Cover Removed by Sawcutting		3,000	SF	$15.00	$45,000	
Water and SPH Removal in Service Pits		87,000	Gallons	$2.00	$174,000	(20)
Removal of Debris and Equipment/Machinery in Service Pits		350	Tons	$50.00	$17,500	(21,55)
Manual Removal of Surface Accumulation of SPH/Sludge		1	LS	$20,000	$20,000	
Pressure Washing Service Pits		1	LS	$10,000	$10,000	(11)
Collection of Wash Water		10,000	Gallons	$2.00	$20,000	
Confirmatory Concrete Sampling		40	Samples	$100.00	$4,000	(10)
Loading/Placement of Backfill from OU-4 to OU-3		850	CY	$15.00	$12,750	(12, 45)
Placement of Clean Surface Fill Material		70	CY	$23.00	$1,610	(45)
T&D of Bulk Concrete - Engine House Service Pit Cap Removal		315	Tons	$45.00	$14,175	(18)
T&D of PCB-hazardous Liquid Waste - Engine House Service Pits		21,750	Gallons	$5.00	$108,750	(19, 20)
T&D of Non-hazardous Liquid Waste - Engine House Service Pits		65,250	Gallons	$0.85	$55,463	(19, 20)
T&D of Debris Removed - Former Engine House Service Pits		350	Tons	$79.35	$27,773	(21,55)
T&D of Wash Water - Pressure Washing the Engine House Service Pits		10,000	Gallons	$0.85	$8,500	(22)
Waste Characterization Sampling - Liquid Waste		10	Samples	$1,000	$10,000	(25)
Waste Characterization Sampling - Concrete		14	Samples	$1,000	$14,000	(24)
	Subtotal				**$543,520**	
EXTERIOR ENGINE HOUSE INSPECTION PIT REMOVAL						
Removal of Concrete Structures		1	LS	$40,000	$40,000	
T & D of Non-Hazardous Petroleum Impacted Concrete		30	Tons	$110.00	$3,300	(51)
T & D of Non-Impacted Concrete		120	Tons	$45.00	$5,400	(51)
Loading/Placement of Backfill from OU-4 to OU-3		175	CY	$15.00	$2,625	(45)
Placement of Clean Surface Fill Material		25	CY	$23.00	$575	(45)
Waste Characterization Sampling		7	Sample	$1,000	$7,000	(24)
	Subtotal				**$58,900**	

Table 7. OU-3 Remedial Action Cost Estimate, OU-3 Remedial Action Work Plan
Amtrak Sunnyside Yard, Queens, New York

Description		Quantity	Unit	Unit Cost	Total Cost	Notes
FUEL PUMP VAULTS REMOVAL						
Removal of Residual Product (Non-Hazardous)		1,000	Gal	$0.85	$850	(26)
Removal of Former Fuel Pump Piping		1	LS	$4,000	$4,000	(13)
Removal of Soil/Fill		40	CY	$21.75	$870	(31)
Removal of Concrete Structures		1	LS	$60,000	$60,000	
T & D Non-Hazardous Petroleum-Impacted Soil		60	Tons	$58.00	$3,480	(36)
T & D of Non-Hazardous Petroleum Impacted Concrete		50	Tons	$110.00	$5,500	
T & D of Non-Impacted Concrete		50	Tons	$45.00	$2,250	
Loading/Placement of Backfill from OU-4 to OU-3		64	CY	$15.00	$960	(45)
Placement of Clean Surface Fill Material		5	CY	$23.00	$115	(45)
Waste Characterization Sampling		1	Sample	$1,000	$1,000	(24)
	Subtotal				**$79,025**	
UST REMOVAL						
UST Handling and Disposal Costs		9	EA	$30,000	$270,000	(14,56)
T&D of Water Removed from UST Closure		45,000	Gallons	$1.00	$45,000	(23)
Waste Characterization Sampling - Liquid Waste		5	Samples	$1,000	$4,500	(25)
	Subtotal				**$319,500**	
COMMUNITY AIR MONITORING PLAN						
CAMP Oversight		8	Months	$13,000	$104,000	(15, 27)
CAMP Meters		8	Months	$5,000	$40,000	(16)
CAMP Data Reporting to the NYSDOH and NYSDEC		8	Months	$1,270	$10,160	(27)
Dust Control Using Water Mist over the Work Area		1	LS	$10,000	$10,000	(17)
	Subtotal				**$164,160**	
GROUNDWATER PERFORMANCE MONITORING						
Monitoring Well Installation, Development, and Survey		1	LS	$11,470	$11,470	
Remove 8 Monitoring Wells Located within Excavation Area		1	LS	$8,930	$8,930	
	Subtotal				**$20,400**	
RESIDUAL SPH CONTINGENCY PLAN						
Monitoring Well Replacement, Development, and Survey		1	LS	$53,510	$53,510	
	Subtotal				**$53,510**	
SITE MANAGEMENT PLAN						
Preparation and Implementation of Site Management Plan		1	LS	$15,000	$15,000	
	Subtotal				**$15,000**	
ENVIRONMENTAL EASEMENTS						
Environmental Easements		1	LS	$25,000	$25,000	
	Subtotal				**$25,000**	
				Subtotal Direct Costs	$2,513,993	
				Contingency (30%)	$754,198	
				TOTAL DIRECT COSTS	***$3,268,191***	
				Mobilization/Demobilization (5%)	$163,410	(28)
				Amtrak Site Preparation (10%)	$326,819	(1,2, 3)
				Project Management (6%)	$196,091	
				Remedial Design (12%)	$392,183	
				Construction Management (8%)	$261,455	
				TOTAL INDIRECT COSTS	***$1,339,959***	
				TOTAL CAPITAL COSTS	**$4,608,150**	

Table 7. OU-3 Remedial Action Cost Estimate, OU-3 Remedial Action Work Plan
Amtrak Sunnyside Yard, Queens, New York

Description	Quantity	Unit	Unit Cost	Total Cost	Notes
REMEDIAL ALTERNATIVE II: FUTURE COSTS					
Groundwater Performance Monitoring					
Quarterly Groundwater Sampling/Analysis for 2 years ($36,560/Year)	1	LS	$37,980	$37,980	
Residual SPH Contingency Plan Gauging					
Quarterly Groundwater Gauging for 2 years ($12,000/Year)	1	LS	$22,313	$22,313	
Annual Inspection					
Annual Inspection ($2,000/year, Future Value = $60,000)	1	LS	$37,900	$37,900	
Subtotal Net Present Worth of OM&M Costs				$98,193	
TOTAL PRESENT WORTH OF OM&M COSTS				**$98,193**	
TOTAL OU-3 FS COSTS				**$4,706,343**	

1. All surface features, including debris, rails, railroad cars, etc., would require relocation by Amtrak prior to mobilization.
2. All active aboveground and underground electrical, communication, and signal lines within the excavation areas would be deactivated and/or temporarily rerouted by Amtrak prior to mobilization.
3. Amtrak Railroad Protection would be required during all construction activities. Flagmen would be required for the entire working day during work performed near active tracks.
4. Soil samples would be collected from the 2-foot interval spanning the oil/water interface. Soil samples would be submitted for analysis to characterize the physical, chemical, and biological properties of the soil to be treated including such parameters as SVOCs (PAHs), DRO and HRO (collectively TPH), ammonia, nitrate, nitrite, nitrogen, phosphorus, total heterotrophic plate count, and TOC.
5. Monitoring of soil pH, nutrient balance, oxygen content, and moisture content would be performed weekly for the treatment duration (estimated 8 months) to ensure that soil conditions are favorable for biodegradation.
6. Field parameters include pH, dissolved oxygen, temperature, and oxidation-reduction (redox) potential. Gauging includes water levels and apparent SPH thickness measurements. Field parameter monitoring would be performed weekly for treatment duration (estimated 8 months). Cost includes data management and reporting.
7. Ammonia nitrate would be injected into the subsurface using a Geoprobe direct push injection method. Cost includes Geoprobe costs for 5 days, ammonia nitrate product costs and pH adjustment.
8. Soil samples collected throughout the treatment, submitted for DRO, HRO, and PAH analysis, and compared to the baseline sampling data. Cost includes data management and reporting.
9. A pre-design field study will be performed to determine final remedial design parameters including nutrient loading, injection rates and spacing, and the anticipated radius of influence
10. Two samples collected along each of the service pit sidewalls with two sample collected from each service pit bottom.
11. Concrete cleaned using high-pressure washer with commercial detergent to remove any remaining residue.
12. Service pits backfilled with soil/fill from on-site sources within OU-4 or from off-site certified sources. Backfill would be placed to grade of the undisturbed surrounding concrete cover.
13. Pipelines located by tracing pipes from the tanks to the Fuel Transfer Area/Boiler House.
14. UST removal requires pumping the water in the USTs out of the tanks and containerizing.
15. Air monitoring required during the sawcutting of concrete and handling of impacted materials (soil near the USTs and liquid contents of the service pits) to measure the concentration of particulates in ambient air in the work zone and in the perimeter of the Yard.
16. As required by the NYSDOH, CAMP monitoring would include monitoring for VOCs using PIDs, particulate levels using particulate meters, and meteorological monitoring using a weather station to obtain real-time continuous data.
17. If perimeter action levels established in the CAMP are exceeded, a water mist would be sprayed over the work area by connecting a misting device to a hose, which would be connected to a potable water source.
18. Assumes an average density of 1.5 tons per cubic yard for concrete. Also assumes that the concrete bulk waste would be classified as construction and demolition (C&D) waste. Cost provided by Clean Harbors for similar project.

19. This liquid would be segregated from other liquid waste since it is expected to contain PCBs. It is assumed that 25 percent would be classified as hazardous liquid waste and 75 percent would be classified as non-hazardous liquid waste.

20. It is not possible to quantify the amount of water present in the inspection pit system due to the presence of the concrete cover. For estimating purposes, it is anticipated that 80 percent of the service pits volume is filled with water and therefore, approximately 87,000 gallons of water are present.

21. It is expected that the debris would consist primarily of wood, scrap metal debris, and possibly some equipment and machinery. Cost provided by Clean Harbors for similar project.

22. Quantity of wash water was estimated because the surface area of service pits that require cleaning would not be known until the service pits are accessed and the concrete structures are sampled.

23. Assumes disposal as non-hazardous waste. Water within the tanks is estimated because of limited records regarding the capacities of the tanks and proportions of the tanks that are filled with water.

24. Assumes that waste characterization samples would be collected at a rate of 1 sample for every 22-ton truckload of concrete for disposal. Samples would be submitted for analysis based on disposal facility requirements, which may include PCBs, total lead, TCLP VOCs, TCLP SVOCs, TCLP metals, and RCRA characteristics.

25. Assumes that waste characterization samples would be collected at a rate of 1 sample for every 10,000 gallons of liquid waste. Samples would be submitted for analysis based on disposal facility requirements, which may include PCBs, total lead, TCLP VOCs, TCLP SVOCs, TCLP metals, and RCRA characteristics.

26. One monitoring well would be installed on the south side of the North Runner Track and one monitoring well would be installed in the center of the mobile SPH excavation subsequent to backfill.

27. This cost was generated by Roux Associates based on previous engineering experience.

28. The mobilization/demobilization cost includes mobilization of equipment to the Yard; obtaining required permitting; set up of temporary services/utilities; construction of decontamination pads and staging areas for equipment, disposal container storage, soil/fill, etc.; and removal of equipment, temporary services/utilities, and decontamination pads from the Yard.

29. The temporary barrier would be constructed out of plywood, and would be 8-feet high. The temporary barrier would extend around the perimeter of the mobile SPH Plume excavation only. The unit cost was derived by R.S. Means Heavy Construction Cost Data, 2003, P.17

30. The existing access road transects OU-3 and the SPH plume excavation. This access road is the primary accessway for Amtrak personnel within the northern portion of the Yard. This road would require relocation to the south prior to excavation activities.

31. The cost for soil excavation and loading was based on a cost provided by Clean Earth Environmental Services, Inc. on April 9, 2004. The cost provided by Clean Earth was increased by a factor of 50% to account for the affects to productivity associated with completing this work in an active rail yard (e.g., presence of unmapped utilities, railroad protection near active tracks).

32. The volume of soil to be excavated is based on the volume of soil within the 0.1-foot apparent SPH thickness contour to a depth of 1-foot below the water table. This volume estimate includes any visually hydrocarbon-impacted soil that lies within the SPH plume excavation limits.

33. Free floating SPH would be skimmed from the open excavation during soil removal. The duration of product skimming is based upon the time to excavate. It is assumed that approximately 100 CY of soil would be excavated each day (approximately 41 days of excavating).

34. The trenching located in the southern and eastern portion of the SPH excavation would be approximately 2 feet wide, and 4 feet deep. The unit cost was derived by R.S. Means Heavy Construction Cost Data, 2003, P.332.

35. Visual hydrocarbon-impacted surface soil and soil in contact with SPH plume would be water and oil-saturated and would require stabilization prior to transport. It is assumed that stabilization would increase the soil volume by 15 percent.

36. Non-hazardous petroleum impacted soil transportation and disposal cost was provided by Clean Earth Environmental Services, Inc. on April 9, 2004. Soil would be disposed at Clean Earth of Philadelphia, Inc. Average density of material was assumed to be 1.5 tons/cy.

37. Approximately 95 percent of the total quantity of SPH plume associated soil is assumed to be classified as non-hazardous petroleum-impacted soil. Quantity = (stabilized soil volume, CY)(0.95)(1.5 ton/cy)

38. Approximately 5 percent of the total quantity of SPH plume associated soil is assumed to be classified as hazardous PCB-impacted soil. Quantity = (stabilized soil volume, CY)(0.05)(1.5 ton/cy)

39. Hazardous PCB-impacted soil transportation and disposal cost was provided by Clean Harbors. Material would be disposed at Model City. Average density of material was assumed to be 1.5 tons/cy.

40. 11,000 gallons is an estimate of the product/water skimming recovery total and decon/storage area runoff collection. The non-hazardous disposal rate of $0.85/gallon was provided by a Roux Associates' Subcontractor for a similar project.

41. The quantity of wood for disposal was based on an approximate estimate of railroad ties per length of track (1 tie per 3 lf) to be removed to facilitate the excavation. An average volume for railroad ties of 0.3 cy was estimated and density of 1.2 tons/cy). Approximately 885 lf of track requires removal for the surface soil excavation and 600 lf of track require removal for the SPH plume excavation.

42. The limits of the SPH excavation would be confirmed by collecting post-excavation samples every 2500 sf (40 ft grid) on the excavation bottom and every 100 lf along the bottom of the excavation sidewalls. The post-excavation samples would be submitted for analysis for the COCs. Costs for analyses were provided by Veritech Laboratories.

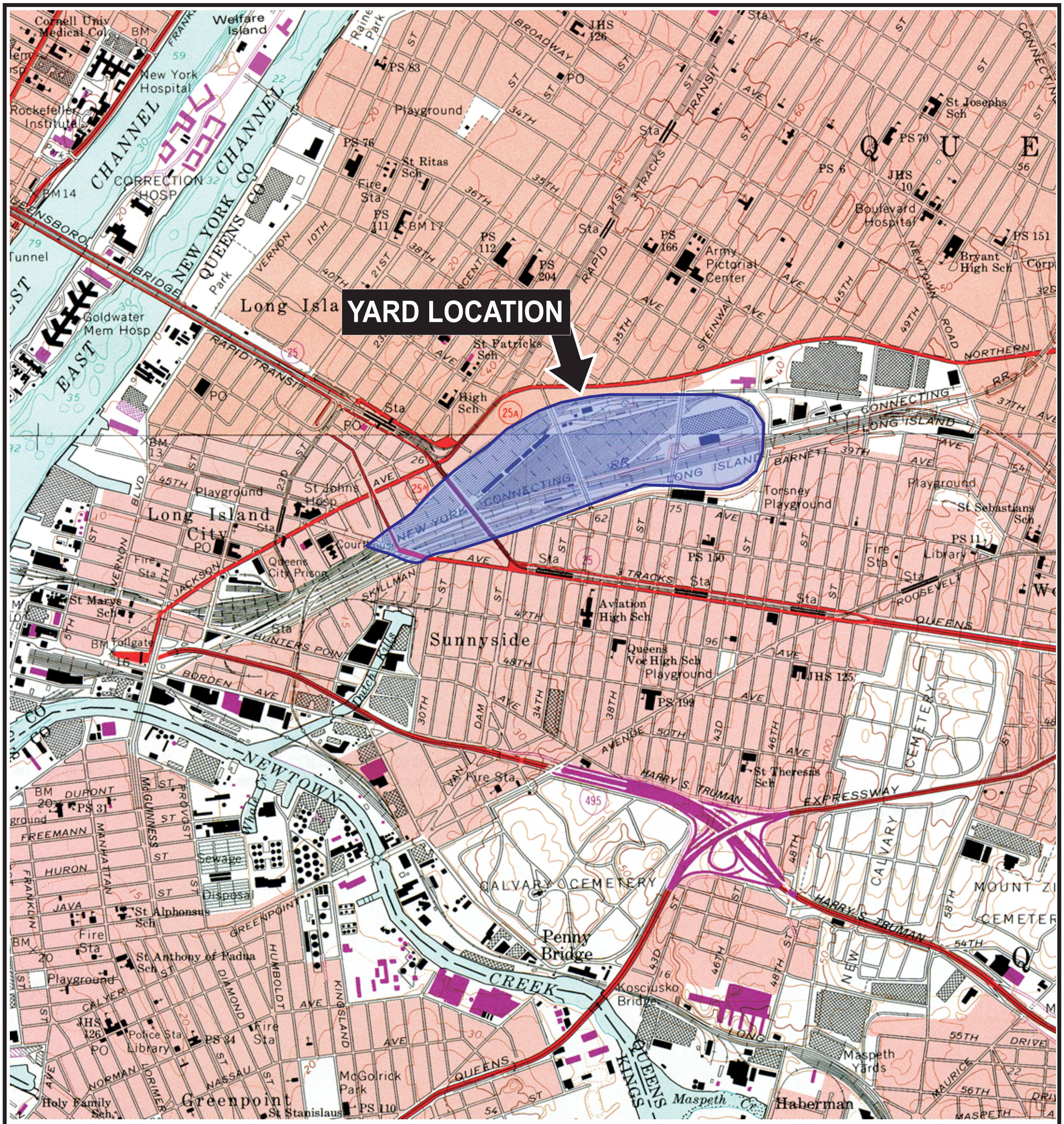
43. Assumed that waste characterization samples would be collected at a rate of 1 sample for every 500 CY of mobile SPH excavated soil. Samples would be submitted for analyses based on disposal facility requirements. Assumed cost $1,000.00/sample.

44. Soil/fill from certified offsite sources will be used to backfill the portion of the excavation on MTA property.

45. This cost includes loading backfill from OU-4, transporting it to OU-3, and placing it in the open excavation. A layer of clean fill material would be placed over all backfilled areas.

46. It is estimated that approximately 675 CY of soil removed from the SPH excavation would be able to be re-used as backfill. This soil is comprised of the upper 2 feet of the soil located in the southern portion of the SPH excavation.

47. The cost for dust/odor control is based on the application of a spray-on foam. This cost includes the product cost, rental of foam applicator unit, and daily application of the foam during excavation activities. Costs were provided by Rusmar Foam Technology.



SOURCE:
CENTRAL PARK AND BROOKLYN, NEW YORK
QUADRANGLE 7.5 MINUTE SERIES (TOPOGRAPHIC)

QUADRANGLE
LOCATION

N

0 2000'

Title:

LOCATION OF SITE

OU-3 REMEDIAL ACTION WORK PLAN
SUNNYSIDE YARD, QUEENS, NEW YORK

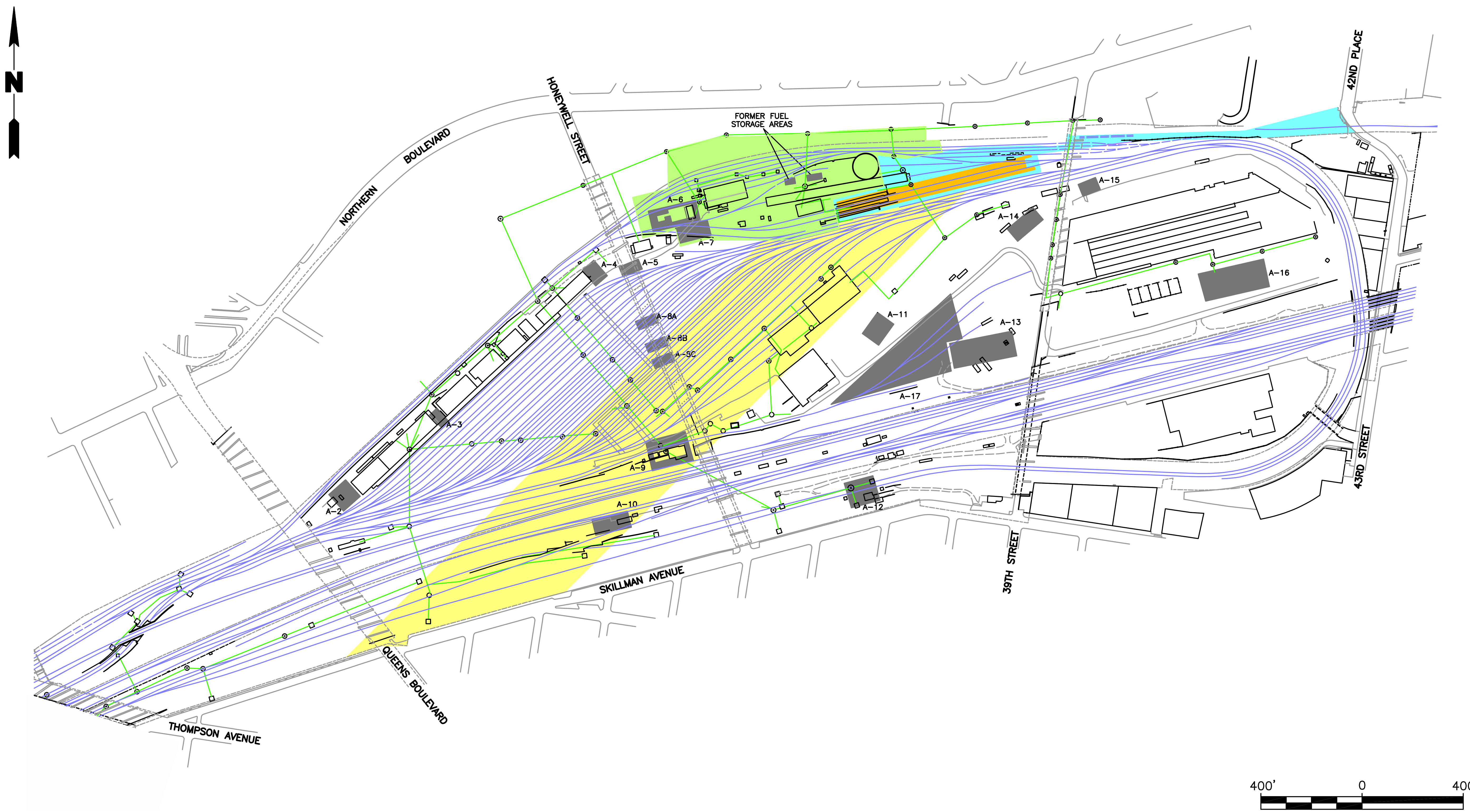
Prepared for:

AMTRAK

ROUX
ROUX ASSOCIATES, INC.
Environmental Consulting & Management

Compiled by: J.P.	Date: 01AUG07	FIGURE
Prepared by: G.M.	Scale: 1"=2000'	1
Project Mgr.: H.G.	Office: NY	
File No.: AM4522309.CDR	Project No.: 05545Y12	

N:\PROJECTS\AM055Y\AM45Y223\AM4522309.CDR



LEGEND

LOCATION OF RAILROAD TRACK

APPROXIMATE LOCATION OF SEWER

GRATE COVER CATCH BASIN LOCATION

SOLID COVER MANHOLE LOCATION

GRATE COVER MANHOLE LOCATION

A-2 LOCATION AND DESIGNATION OF PREVIOUSLY DETERMINED AREA OF CONCERN

APPROXIMATE PROPERTY BOUNDARY

OU-1

OU-2

OU-3

OU-4

OU-5

NOTES:

1. LOCATIONS OF SEWER COMPONENTS BASED UPON A REVIEW OF AMTRAK-SUPPLIED ENGINEERING DIAGRAMS AND LIMITED FIELD SURVEY.
2. OU-6, GROUND WATER BENEATH THE YARD, IS NOT SHOWN.
3. RI – REMEDIAL INVESTIGATION
4. LIRR – LONG ISLAND RAIL ROAD

Title:

AMTRAK SUNNYSIDE YARD LAYOUT

OU-3 REMEDIAL ACTION WORK PLAN
SUNNYSIDE YARD, QUEENS, NEW YORK

Prepared For:
AMTRAK

ROUX
ROUX ASSOCIATES, INC.
Environmental Consulting & Management

Compiled by: J.P.	Date: 01AUG07	FIGURE
Prepared by: G.M.	Scale: AS SHOWN	2
Project Mgr: H.G.	Office: NY	
File No: AM4522308	Project: 05545Y12	

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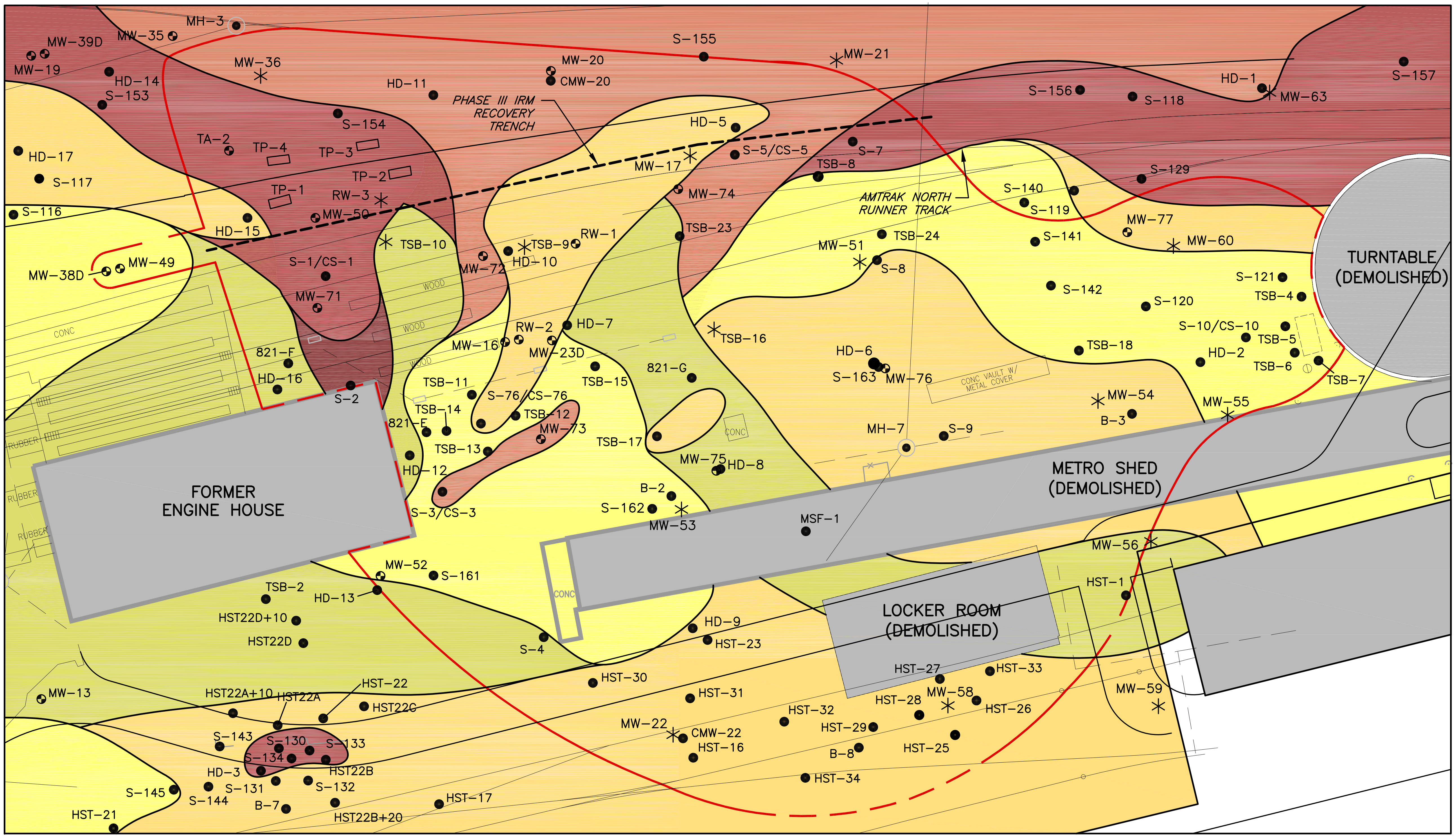


LEGEND

HD-15 ●	LOCATION AND DESIGNATION OF OU-3 SOIL BORING
MW-50 ⊗	LOCATION AND DESIGNATION OF EXISTING OU-3 MONITORING WELL
MW-17 ✳	LOCATION AND DESIGNATION OF FORMER ROUX MONITORING WELL IN OU-3
TP-4 ▭	LOCATION AND DESIGNATION OF TEST PIT NEAR FORMER HUMP TRACK
— — —	LOCATION OF PHASE III IRM RECOVERY TRENCH
▭	FOOTPRINT OF EXISTING OR FORMER BUILDING STRUCTURE

NOTES:

1. GEOLOGIC CONTACTS ARE INFERRED FROM SOIL BORING LOGS.
2. GEOLOGIC DATA IS FROM THE DEPTH OF THE WATER TABLE, AT THE TIME EACH BORING WAS COMPLETED. GEOLOGIC DATA ON THIS FIGURE IS NOT FROM A UNIFORM VERTICAL DATUM.
3. SEPARATE-PHASE HYDROCARBON ACCUMULATION CONTOURS REPRESENT MONITORING DATA COLLECTED ON MAY 20, 2004.
4. IRM – INTERIM REMEDIAL MEASURE
5. OU-3 – OPERABLE UNIT 3
6. SPH – SEPARATE-PHASE HYDROCARBON

GEOLOGIC UNITS

- SAND
- GRAVELLY SAND
- GRAVELLY/SILTY SAND
- SILTY SAND
- CLAYEY/SILTY SAND
- SANDY CLAY

Title:

GENERALIZED GEOLOGY AT THE WATER TABLE IN THE VICINITY OF OU-3 SPH PLUME

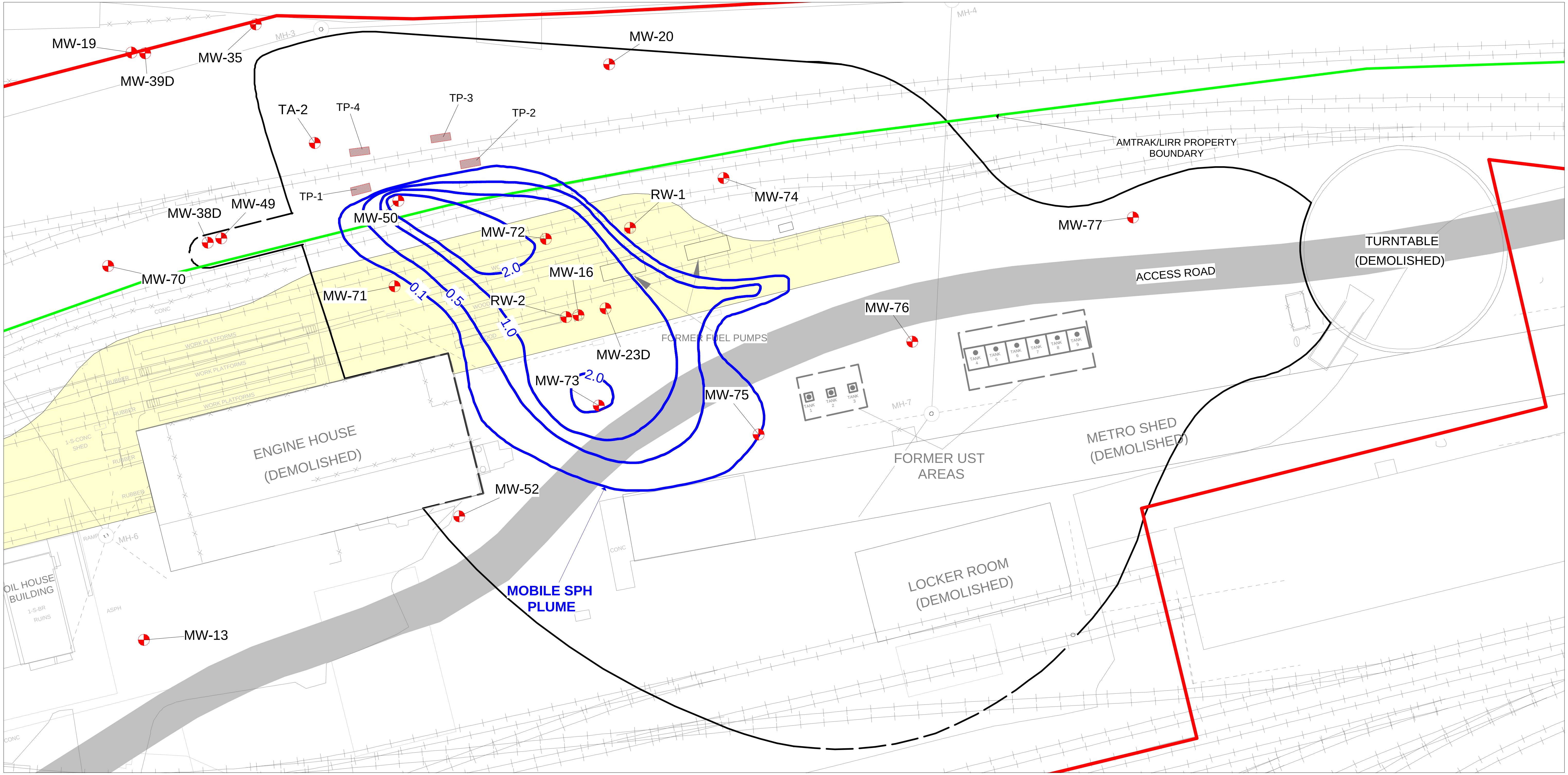
OU3 REMEDIAL ACTION WORK PLAN
SUNNYSIDE YARD, QUEENS, NEW YORK

Prepared For:

AMTRAK

ROUX ASSOCIATES, INC.
Environmental Consulting & Management

Compiled by: R.K.	Date: 01JUL07	FIGURE
Prepared by: G.M.	Scale: 1" = 50'	3
Project Mgr: J.D.	Office: NY	
File No: AM4522307	Project: 05545Y12	



MW-16 — LOCATION AND DESIGNATION OF MONITORING WELL

TP-1 — LOCATION AND DESIGNATION OF TEST PIT NEAR FORMER HUMP TRACK

OU-3 BOUNDARY

2 — CURRENT LINE OF EQUAL APPARENT SEPARATE-PHASE HYDROCARBON THICKNESS (MOBILE SPH PLUME)

APPROXIMATE BOUNDARY OF HISTORIC SPH PLUME (ZERO CONTOUR)

APPROXIMATE EXTENT OF VISUAL HYDROCARBON-IMPACTED SURFACE SOIL

NOTES

APPARENT SEPARATE-PHASE HYDROCARBON THICKNESS CONTOURS REPRESENT MONITORING DATA COLLECTED ON JUNE 8, 2005

SPH - SEPARATE-PHASE HYDROCARBON

OU-3 - OPERABLE UNIT 3

LIRR - LONG ISLAND RAIL ROAD

RI - REMEDIAL INVESTIGATION

N

50' 0 50'

Title:

CONFIGURATION OF MOBILE SPH PLUME

OU-3 REMEDIAL ACTION WORK PLAN
SUNNYSIDE YARD, QUEENS, NEW YORK

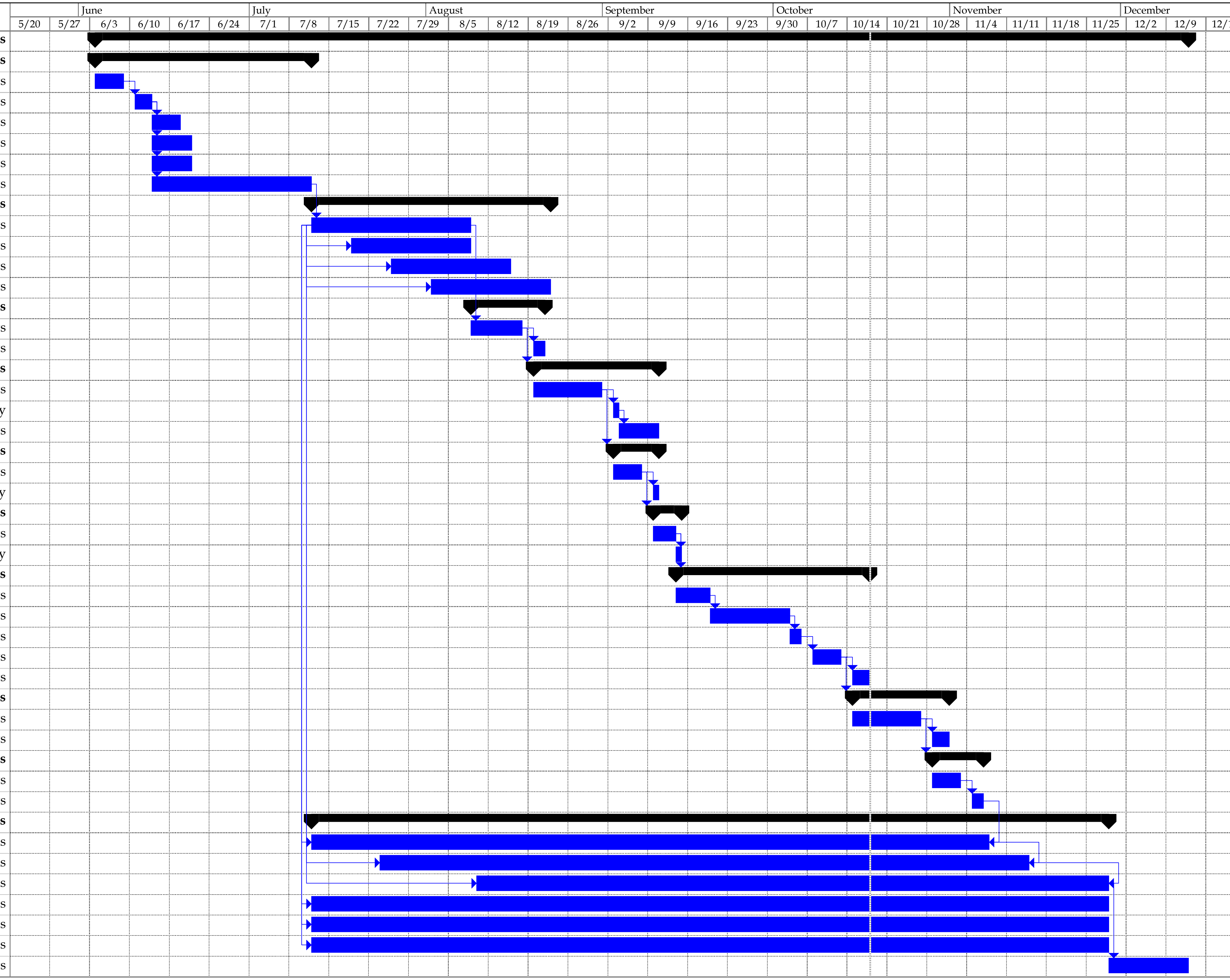
Prepared For: AMTRAK

ROUX ASSOCIATES INC
Environmental Consulting & Management

Compiled by: RSK	Date: 8/1/2007	FIGURE
Prepared by: RSK	Scale: SHOWN	4
Project Mgr: HG	Office: NY	
File No: AM4522311.WOR	Project: 05545Y12	

Operable Unit 3 Remedial Action
Preliminary Project Schedule

ID	Task Name	Duration
1	**OU-3 REMEDIAL ACTION**	**138 days**
2	**Site Preparation**	**28 days**
3	Mobilization	5 days
4	Perimeter Chainlink Fencing Installation	3 days
5	Setup Decontamination Facilities	3 days
6	Set up Temporary Facilities	5 days
7	Installation of Erosion Control Measures	5 days
8	Removal of Existing Above Grade Structures, Sand Tower, Oil House	20 days
9	**Excavation of Soil and Removal of Mobile SPH**	**30 days**
10	Mobile SPH Excavation	20 days
11	Post-Excavation Sampling	15 days
12	Application of Bioremediation Amendments	15 days
13	Backfill, Grading, and Compaction	15 days
14	**Excavation of Visually Hydrocarbon-Impacted Surface Soil**	**9 days**
15	Excavation of Surface Soil	7 days
16	Backfill, Grading, and Compaction	2 days
17	**Removal of USTs**	**16 days**
18	Removal of USTs	10 days
19	Post-Excavation Sampling	1 day
20	Backfill, Grading, and Compaction	5 days
21	**Removal of Former Fuel Pump Structures**	**6 days**
22	Removal of Structures	5 days
23	Backfill, Grading, and Compaction	1 day
24	**Removal of Former Engine House Exterior Service Pits**	**5 days**
25	Removal of Structures	4 days
26	Backfill, Grading, and Compaction	1 day
27	**Partial Demolition/Cleaning of Engine House**	**24 days**
28	Removal of Concrete Cover	4 days
29	Cleaning of Interior Service Pits	10 days
30	Sampling of Interior Service Pits	2 days
31	Demolition to 6 ft bls	5 days
32	Backfill, Grading, and Compaction	3 days
33	**Removal of Oil House Foundations**	**13 days**
34	Foundation Removal to 6 ft bls	10 days
35	Backfill, Grading, and Compaction	3 days
36	**Removal of Sand Tower Foundation**	**7 days**
37	Foundation Removal to 6 ft bls	5 days
38	Backfill, Grading, and Compaction	2 days
39	**Disposal of Staged Excavated Material**	**100 days**
40	Segregation and Stockpiling	4.25 mons
41	Sampling and Analysis	4.1 mons
42	Loading for Offsite Transportation and Disposal	3.95 mons
43	**CAMP Implementation**	100 days
44	**Fugitive Dust Emission and Odor Control**	100 days
45	**Management of Construction Wastewater**	100 days
46	**Site Restoration/Demobilization**	10 days



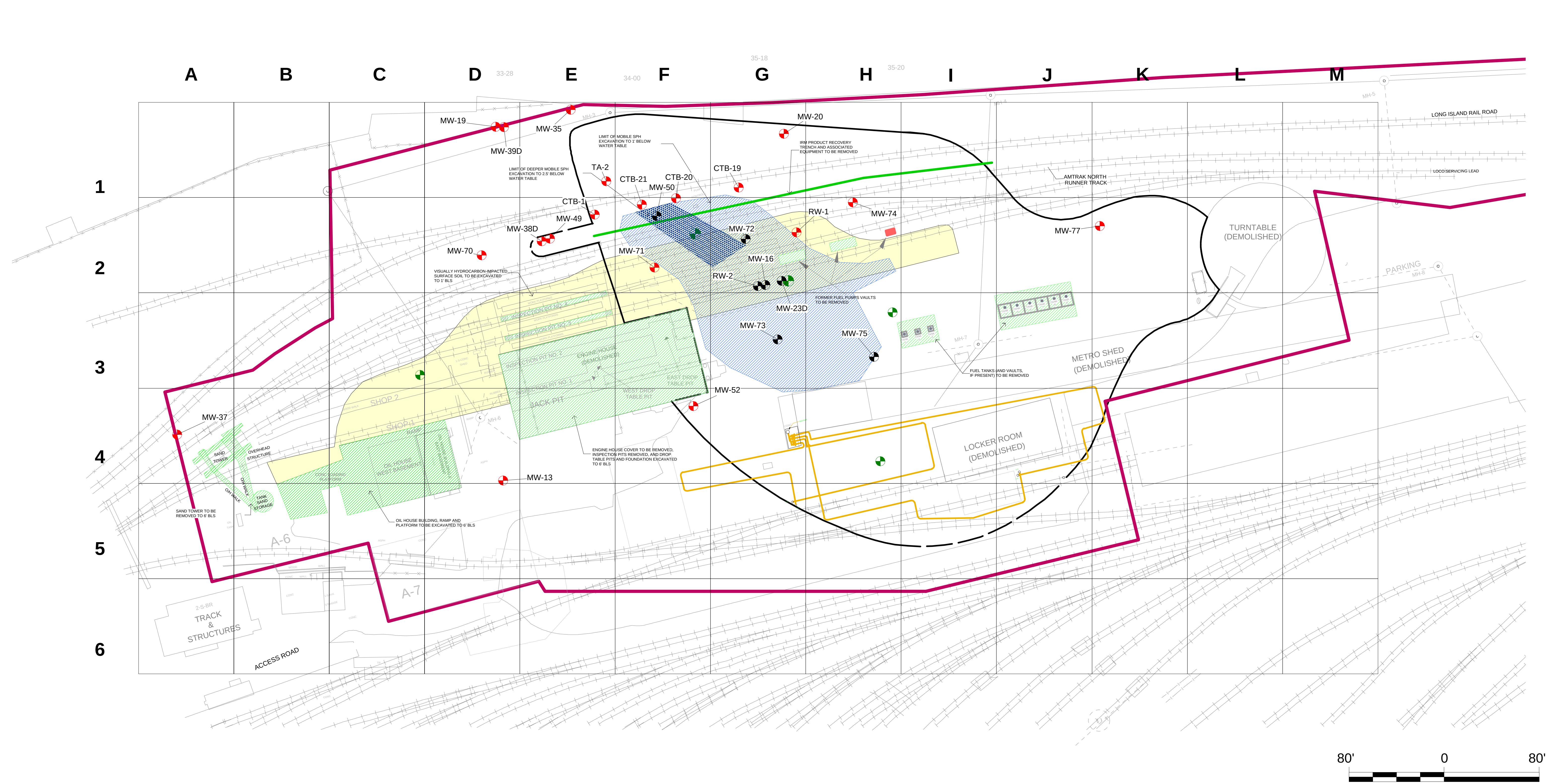
Project No: 05545Y12
File No. : AM4522312.MPP
Compiled by: JEP
Date: 08/01/2007

Task
Summary

Notes:
1. Task durations are estimated. Dates and sequencing of Work are subject to change. This schedule will be revised after preparation of the Contractor Work Plan.

FIGURE 5

ROUX ASSOCIATES, INC.
Environmental Consulting & Management



MW-76 LOCATION AND DESIGNATION OF MONITORING WELL

LOCATION OF PROPOSED MONITORING WELL

MW-16 LOCATION AND DESIGNATION OF MONITORING WELL TO BE REMOVED BY EXCAVATION

LIMIT OF MOBILE SPH EXCAVATION TO 1 FT BELOW WATER TABLE/ ENHANCED BIODEGRADATION OF SOIL UNDERLYING THE EXCAVATION

LIMIT OF DEEPER MOBILE SPH EXCAVATION TO 2.5 FT BELOW WATER TABLE (5.25 FT BLS)

STRUCTURES TO BE REMOVED

LIMIT OF VISUALLY HYDROCARBON IMPACTED SURFACE SOIL EXCAVATION

APPROXIMATE BOUNDARY OF HISTORIC SPH PLUME (ZERO CONTOUR)

OU-3 BOUNDARY

BIOINFILTRATION PIPING

IRM PRODUCT RECOVERY TRENCH

NOTES

SPH - SEPARATE-PHASE HYDROCARBON

OU-3 - OPERABLE UNIT 3

N

Title:

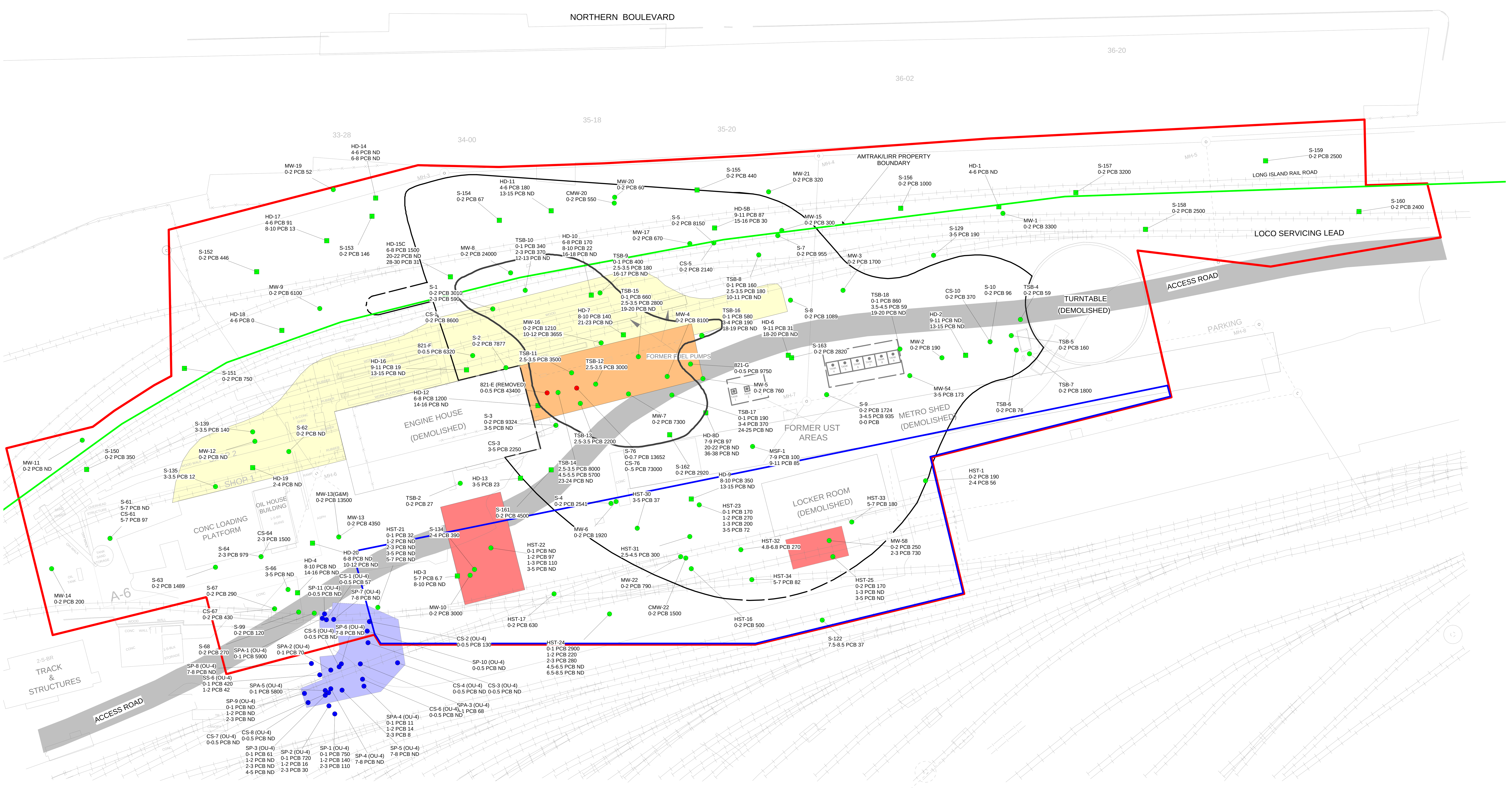
REMEDIAL ACTION PLAN

OU-3 REMEDIAL ACTION WORK PLAN
SUNNYSIDE YARD, QUEENS, NEW YORK

Prepared For: AMTRAK

ROUX
ROUX ASSOCIATES INC
Environmental Consulting & Management

Compiled by: JEP	Date: 8/6/2007	FIGURE
Prepared by: JEP	Scale: SHOWN	6
Project Mgr: HG	Office: NY	
File No: AM4522319.WOR	Project: 05545Y12	



SOIL SAMPLE EXPLANATION

DESIGNATION

HD-10	
6-8	PCB 170
8-10	PCB 22
16-18	PCB 0

SAMPLE DEPTH (FT BLS)

TOTAL PCB CONCENTRATION IN SOIL (UG/KG)

HD-1 LOCATION AND DESIGNATION OF SUPPLEMENTAL RI SOIL BORING WITH ALL COLLECTED SAMPLE INTERVALS LESS THAN THE NYSDEC APPROVED SOIL CLEANUP LEVEL FOR PCBs

S-61 LOCATION AND DESIGNATION OF PREVIOUS SOIL BORING WITH ALL COLLECTED SAMPLE INTERVALS LESS THAN THE NYSDEC APPROVED SOIL CLEANUP LEVEL FOR PCBs

821-E LOCATION AND DESIGNATION OF PREVIOUS SOIL BORING WITH ONE SAMPLE INTERVAL EXCEEDING THE NYSDEC APPROVED SOIL CLEANUP LEVEL FOR PCBs

SP-1 (OU-4) LOCATION AND DESIGNATION OF PREVIOUS SOIL BORING COLLECTED IN ASSOCIATION WITH THE AREA 7 SOIL EXCAVATION WITH ALL SAMPLE INTERVALS LESS THAN THE NYSDEC APPROVED SOIL CLEANUP LEVEL FOR PCBs

EXPLANATION

APPROXIMATE BOUNDARY OF HISTORIC SPH PLUME (ZERO CONTOUR)

AREA REMEDIATED TO 0.5 FT BELOW HISTORIC GRADE (1985-1986)

AREA REMEDIATED TO 2 FT BELOW HISTORIC GRADE (1998)

AREA REMEDIATED TO BETWEEN 3 AND 8 FT BELOW HISTORIC GRADE (1999)

EXTENT OF MOBILE SPH PLUME

OU-3 BOUNDARY

LIMIT OF AREA PREVIOUSLY ADDRESSED DURING HST CONSTRUCTION

MH-4 SEWER LINE (DASHED WHERE INFERRED), WITH MANHOLE DESIGNATION

APPROXIMATE EXTENT OF VISUAL HYDROCARBON-IMPACTED SURFACE SOIL

NOTES

SOIL NEAR SAMPLE 821-E WAS REMOVED AS PART OF 1985-1986 SOIL IRM

NYSDEC RECOMMENDED CLEANUP LEVEL FOR PCBs - 25,000 UG/KG

NYSDEC - NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

SPH - SEPARATE-PHASE HYDROCARBON

OU-3 - OPERABLE UNIT 3

PCB - POLYCHLORINATED BIPHENYL
UG/KG - MICROGRAM PER KILOGRAM
FT BLS - FEET BELOW LAND SURFACE
RI - REMEDIAL INVESTIGATION
LIRR - LONG ISLAND RAIL ROAD
ND - NOT DETECTED

N

40' 0 40'

Title:

TOTAL PCB CONCENTRATIONS IN SOIL

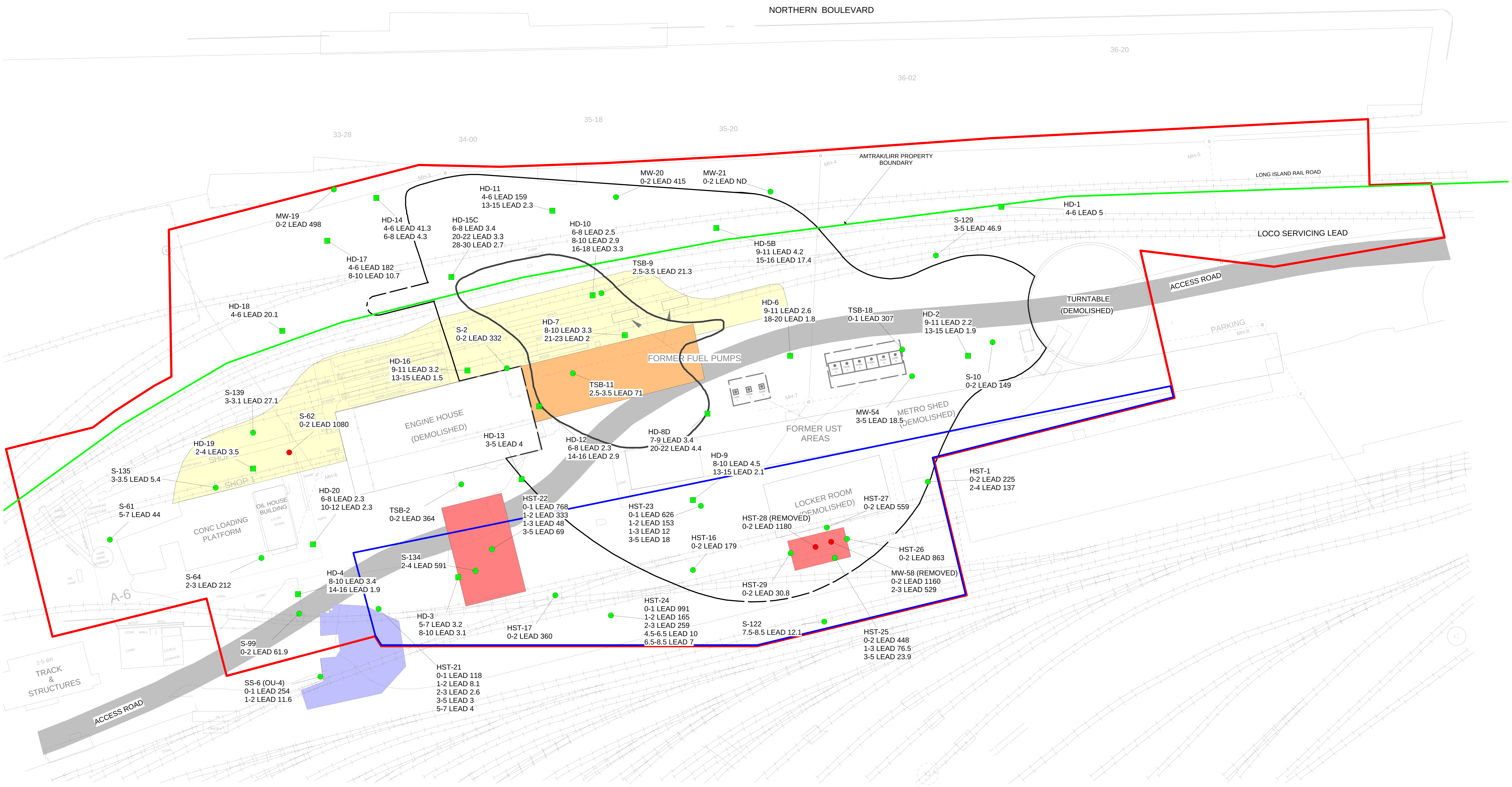
OU-3 REMEDIAL ACTION WORK PLAN
SUNNYSIDE YARD, QUEENS, NEW YORK

Prepared For: AMTRAK

ROUX ASSOCIATES INC
Environmental Consulting & Management

Compiled by: RSK | Date: 8/1/2007
Prepared by: RSK | Scale: AS SHOWN
Project Mgr: HG | Office: NY
File No: AM45223J13.MXD | Project: 0554SY12

PLATE 1



SOIL SAMPLE EXPLANATION

DESIGNATION

HD-10	
6-8	LEAD 2.5
8-10	LEAD 2.9
16-18	LEAD 3.3

SAMPLE DEPTH (FT BLS)

LEAD CONCENTRATION IN SOIL (MG/KG)

HD-1 LOCATION AND DESIGNATION OF SUPPLEMENTAL RI SOIL BORING WITH ALL COLLECTED SAMPLE INTERVALS LESS THAN THE NYSDEC APPROVED SOIL CLEANUP LEVEL FOR LEAD

S-61 LOCATION AND DESIGNATION OF PREVIOUS SOIL BORING WITH ALL COLLECTED SAMPLE INTERVALS LESS THAN THE NYSDEC APPROVED SOIL CLEANUP LEVEL FOR LEAD

HST-28 LOCATION AND DESIGNATION OF PREVIOUS SOIL BORING WITH ONE SAMPLE INTERVAL EXCEEDING THE NYSDEC APPROVED SOIL CLEANUP LEVEL FOR LEAD

EXPLANATION

APPROXIMATE BOUNDARY OF HISTORIC SPH PLUME (ZERO CONTOUR)

AREA REMEDIATED TO 0.5 FT BELOW HISTORIC GRADE (1985-1986)

AREA REMEDIATED TO 2 FT BELOW HISTORIC GRADE (1998)

AREA REMEDIATED TO BETWEEN 3 AND 8 FT BELOW HISTORIC GRADE (1999)

EXTENT OF MOBILE SPH PLUME

OU-3 BOUNDARY

LIMIT OF AREA PREVIOUSLY ADDRESSED DURING HST CONSTRUCTION

MH-4 SEWER LINE (DASHED WHERE INFERRED), WITH MANHOLE DESIGNATION

APPROXIMATE EXTENT OF VISUAL HYDROCARBON-IMPACTED SURFACE SOIL

NOTES

SOIL NEAR MW-58 AND HST-28 WAS REMOVED AS PART OF THE 1998 SOIL IRM

NYSDEC RECOMMENDED CLEANUP LEVEL FOR LEAD - 1,000 MG/KG

NYSDEC - NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

OU-3 - OPERABLE UNIT 3

MG/KG - MICROGRAM PER KILOGRAM

FT BLS - FEET BELOW LAND SURFACE

SPH - SEPARATE-PHASE HYDROCARBON

RI - REMEDIAL INVESTIGATION

LIRR - LONG ISLAND RAIL ROAD

ND - NOT DETECTED

40' 0 40'

N

Title:

TOTAL LEAD CONCENTRATIONS IN SOIL

OU-3 REMEDIAL ACTION WORK PLAN
SUNNYSIDE YARD, QUEENS, NEW YORK

Prepared For: AMTRAK

ROUX ASSOCIATES INC
Environmental Consulting & Management

Compiled by: RSK	Date: 8/1/2007	PLATE
Prepared by: RSK	Scale: AS SHOWN	2
Project Mgr: HG	Office: NY	
File No: AM4522314.WOR	Project: 05545Y12	

SOIL SAMPLE EXPLANATION

DESIGNATION

HD-10	
6-8	CPAH ND
8-10	CPAH ND
16-18	CPAH ND

TOTAL CPAH CONCENTRATION IN SOIL (UG/KG)

SAMPLE DEPTH (FT BLS)

HD-1 — LOCATION AND DESIGNATION OF SUPPLEMENTAL RI SOIL BORING WITH ALL COLLECTED SAMPLE INTERVALS LESS THAN THE NYSDEC APPROVED SOIL CLEANUP LEVEL FOR CPAHs

S-61 — LOCATION AND DESIGNATION OF PREVIOUS SOIL BORING WITH ALL COLLECTED SAMPLE INTERVALS LESS THAN THE NYSDEC APPROVED SOIL CLEANUP LEVEL FOR CPAHs

HST-22A — LOCATION AND DESIGNATION OF PREVIOUS SOIL BORING WITH ONE SAMPLE INTERVAL EXCEEDING THE NYSDEC APPROVED SOIL CLEANUP LEVEL FOR CPAHs

EXPLANATION

APPROXIMATE BOUNDARY OF HISTORIC SPH PLUME (ZERO CONTOUR)

AREA REMEDIATED TO 0.5 FT BELOW HISTORIC GRADE (1985-1986)

AREA REMEDIATED TO 2 FT BELOW HISTORIC GRADE (1998)

AREA REMEDIATED TO BETWEEN 3 AND 8 FT BELOW HISTORIC GRADE (1999)

EXTENT OF MOBILE SPH PLUME

OU-3 BOUNDARY

LIMIT OF AREA PREVIOUSLY ADDRESSED DURING HST CONSTRUCTION

MH-4 — SEWER LINE (DASHED WHERE INFERRED), WITH MANHOLE DESIGNATION

APPROXIMATE EXTENT OF VISUAL HYDROCARBON-IMPACTED SURFACE SOIL

NOTES

SOIL NEAR HST-22A AND HST-22B WAS REMOVED AS PART OF THE 1998 SOIL IRM

NYSDEC RECOMMENDED CLEANUP LEVEL FOR CPAHs - 25,000 UG/KG

NYSDEC - NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

CPAH - SEVEN SPECIFIC POLYCYCLIC AROMATIC HYDROCARBONS CONSIDERED BY THE NYSDEC TO BE CARCINOGENIC

OU-3 - OPERABLE UNIT 3

SPH - SEPARATE-PHASE HYDROCARBON

UG/KG - MICROGRAM PER KILOGRAM

FT BLS - FEET BELOW LAND SURFACE

RI - REMEDIAL INVESTIGATION

ND - NOT DETECTED

N

40' 0 40'

Title:

TOTAL CPAH CONCENTRATIONS IN SOIL

OU-3 REMEDIAL ACTION WORK PLAN
SUNNYSIDE YARD, QUEENS, NEW YORK

Prepared For:

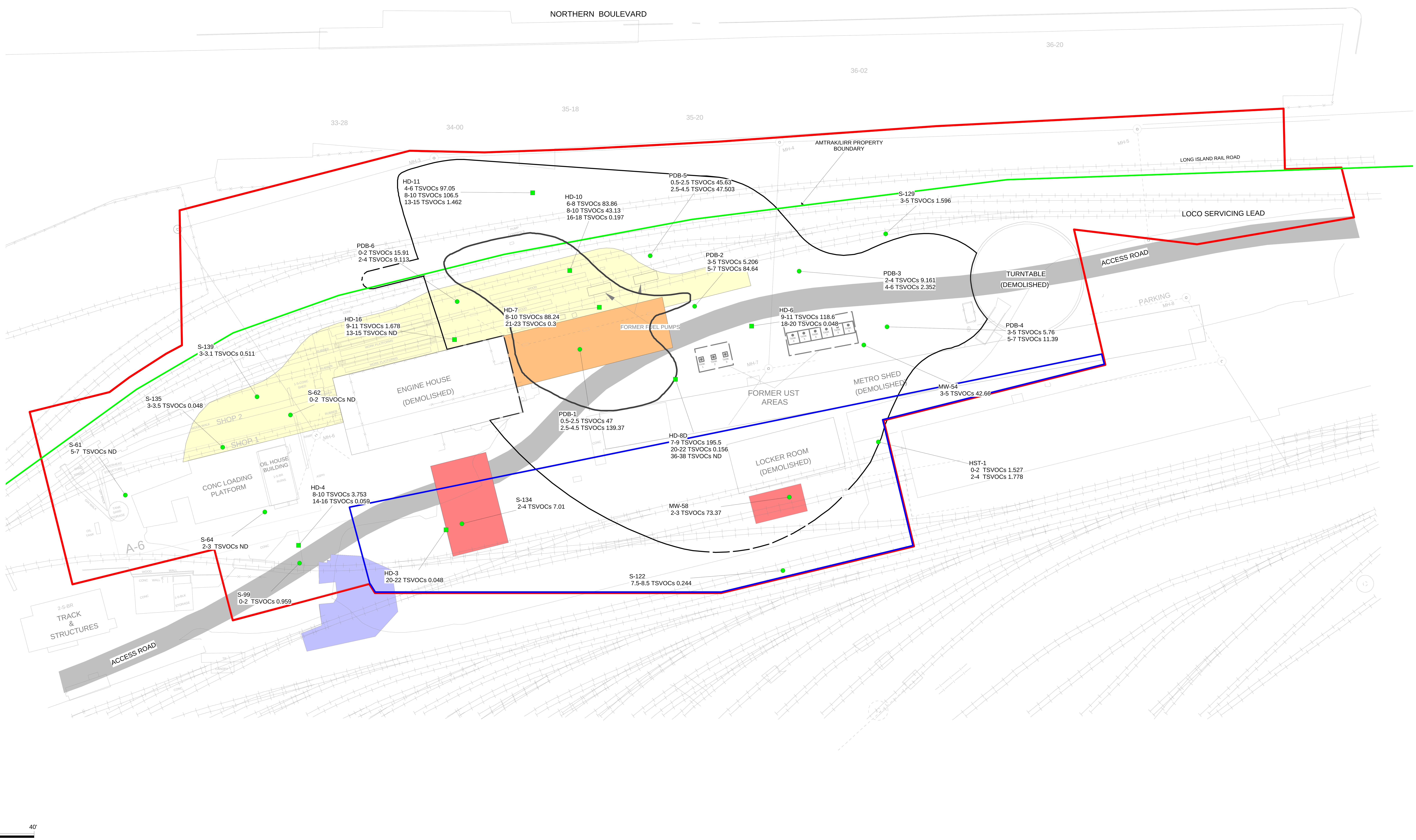
AMTRAK

ROUX

ROUX ASSOCIATES INC
Environmental Consulting & Management

Compiled by: RSK
Prepared by: RSK
Project Mgr: HG
File No: AM48221S.WOR
Date: 8/1/2007
Scale: AS SHOWN
Office: NY
Project: 05545Y12

PLATE
3



SOIL SAMPLE EXPLANATION

DESIGNATION

HD-8D	
7-9	TSVOCs 195.5
20-22	TSVOCs 0.156
36-38	TSVOCs ND

TOTAL SVOC CONCENTRATION IN SOIL (MG/KG)

SAMPLE DEPTH (FT BLS)

HD-3 LOCATION AND DESIGNATION OF SUPPLEMENTAL RI SOIL BORING WITH SOIL SAMPLE(S) COLLECTED AND SUBMITTED FOR TSVOC ANALYSIS

S-61 LOCATION AND DESIGNATION OF PREVIOUS SOIL BORING WITH SOIL SAMPLE(S) COLLECTED AND SUBMITTED FOR TSVOC ANALYSIS

EXPLANATION

APPROXIMATE BOUNDARY OF HISTORIC SPH PLUME (ZERO CONTOUR)

AREA REMEDIATED TO 0.5 FT BELOW HISTORIC GRADE (1985-1986)

AREA REMEDIATED TO 2 FT BELOW HISTORIC GRADE (1998)

AREA REMEDIATED TO BETWEEN 3 AND 8 FT BELOW HISTORIC GRADE (1999)

EXTENT OF MOBILE SPH PLUME

OU-3 BOUNDARY

LIMIT OF AREA PREVIOUSLY ADDRESSED DURING HST CONSTRUCTION

MH-4 SEWER LINE (DASHED WHERE INFERRED), WITH MANHOLE DESIGNATION

APPROXIMATE EXTENT OF VISUAL HYDROCARBON-IMPACTED SURFACE SOIL

NOTES

NYSDEC - NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

SPH - SEPARATE-PHASE HYDROCARBON

OU-3 - OPERABLE UNIT 3

TSVOC - TOTAL SEMIVOLATILE ORGANIC COMPOUND

THE TSVOC CONCENTRATION PRESENTED ON THIS FIGURE FOR EACH SAMPLE IS THE SUM OF ALL SVOCs DETECTED AS PART OF THE SVOC TARGET COMPOUND LIST (TCL) OF ANALYTES

FT BLS - FEET BELOW LAND SURFACE

RI - REMEDIAL INVESTIGATION

LIRR - LONG ISLAND RAIL ROAD

HST - HIGH SPEED TRAINSET

ND - NOT DETECTED

MG/KG - MILLIGRAM PER KILOGRAM

N

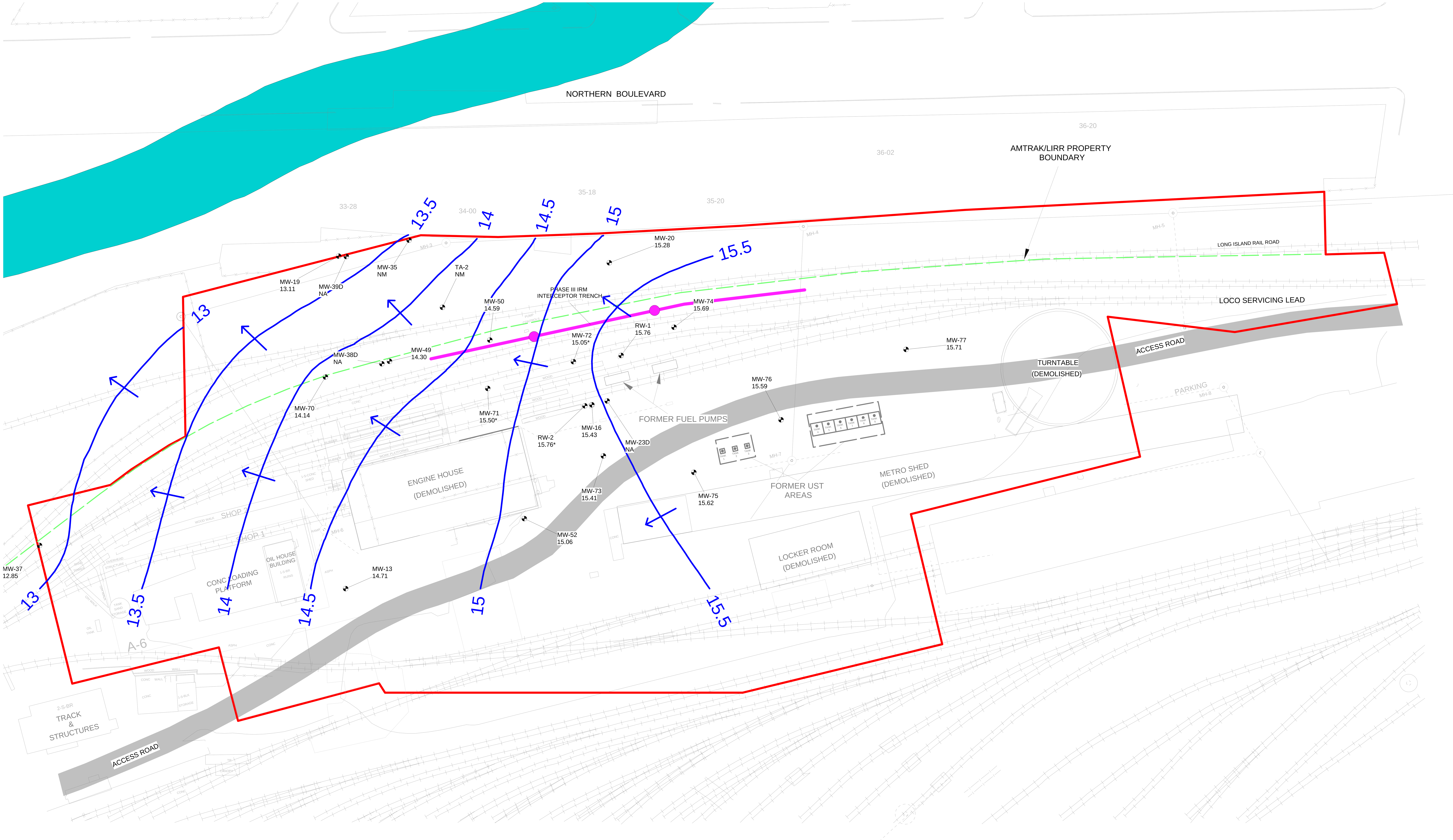
TOTAL SVOC CONCENTRATIONS IN SOIL

OU-3 REMEDIAL ACTION WORK PLAN
SUNNYSIDE YARD, QUEENS, NEW YORK

AMTRAK

ROUX ASSOCIATES INC

PLATE 4



MW-16 15.43 — LOCATION AND DESIGNATION OF MONITORING WELL; GROUNDWATER ELEVATION IN FEET RELATIVE TO MEAN SEA LEVEL

15.5 — CONTOUR OF EQUAL GROUNDWATER ELEVATION IN FEET RELATIVE TO MEAN SEA LEVEL

INFERRED DIRECTION OF GROUNDWATER FLOW

APPROXIMATE 1890 FLOW PATH OF DUTCH KILLS CREEK

OU-3 BOUNDARY

LOCATION OF PHASE III IRM INTERCEPTOR TRENCH

NOTES:

WATER LEVEL MEASUREMENTS WERE COLLECTED ON AUGUST 5, 2004

IF APPLICABLE, GROUNDWATER ELEVATIONS WERE CORRECTED FOR THE PRESENCE OF SEPARATE PHASE HYDROCARBON

* - INDICATES WATER LEVEL WAS NOT USED IN THE CONSTRUCTION OF CONTOURS DUE TO ANOMOLOUS READING

NA - INDICATES WATER LEVEL WAS NOT USED IN THE CONSTRUCTION OF CONTOURS BECAUSE WELL SCREEN IS SET IN THE DEEP ZONE

NM - NOT MEASURED

OU-3 - OPERABLE UNIT 3

RI - REMEDIAL INVESTIGATION

LIRR - LONG ISLAND RAIL ROAD

SPH - SEPARATE-PHASE HYDROCARBON

40' 0 40'

N

Title:

GROUNDWATER ELEVATIONS IN THE SHALLOW ZONE (AUGUST 5, 2004)

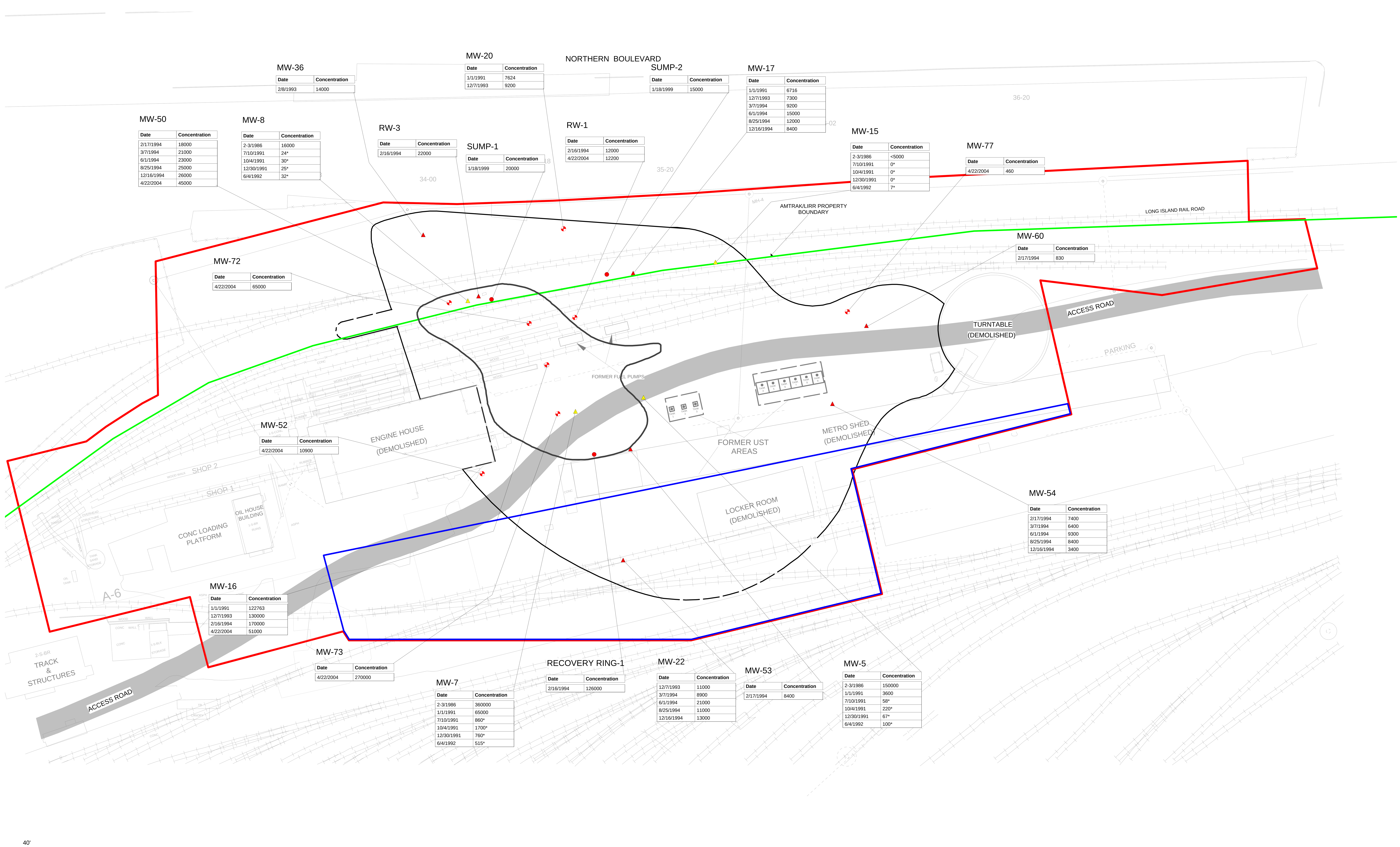
OU-3 REMEDIAL ACTION WORK PLAN
SUNNYSIDE YARD, QUEENS, NEW YORK

Prepared For:

AMTRAK

ROUX ASSOCIATES INC
Environmental Consulting & Management

Compiled by: RSK	Date: 8/1/2007	PLATE
Prepared by: RSK	Scale: AS SHOWN	5
Project Mgr: HG	Office: NY	
File No: AM4522317.WOR	Project: 05545Y12	



MW-36

Date	Concentration
2/8/1993	14000

MW-20

Date	Concentration
1/1/1991	7624
12/7/1993	9200

SUMP-2

Date	Concentration
1/18/1999	15000

MW-17

Date	Concentration
1/1/1991	6716
12/7/1993	7300
3/7/1994	9200
6/1/1994	15000
8/25/1994	12000
12/16/1994	8400

MW-50

Date	Concentration
2/17/1994	18000
3/7/1994	21000
6/1/1994	23000
8/25/1994	25000
12/16/1994	26000
4/22/2004	45000

MW-8

Date	Concentration
2-3/1986	16000
7/10/1991	24*
10/4/1991	30*
12/30/1991	25*
6/4/1992	32*

RW-3

Date	Concentration
2/16/1994	22000

SUMP-1

Date	Concentration
1/18/1999	20000

RW-1

Date	Concentration
2/16/1994	12000
4/22/2004	12200

MW-15

Date	Concentration
2-3/1986	<5000
7/10/1991	0*
10/4/1991	0*
12/30/1991	0*
6/4/1992	7*

MW-77

Date	Concentration
4/22/2004	460

MW-60

Date	Concentration
2/17/1994	830

MW-72

Date	Concentration
4/22/2004	65000

MW-52

Date	Concentration
4/22/2004	10900

MW-54

Date	Concentration
2/17/1994	7400
3/7/1994	6400
6/1/1994	9300
8/25/1994	8400
12/16/1994	3400

MW-16

Date	Concentration
1/1/1991	122763
12/7/1993	130000
2/16/1994	170000
4/22/2004	51000

MW-73

Date	Concentration
4/22/2004	270000

MW-7

Date	Concentration
2-3/1986	360000
1/1/1991	65000
7/10/1991	860*
10/4/1991	1700*
12/30/1991	760*
6/4/1992	515*

RECOVERY RING-1

Date	Concentration
2/16/1994	126000

MW-22

Date	Concentration
12/7/1993	11000
3/7/1994	8900
6/1/1994	21000
8/25/1994	11000
12/16/1994	13000

MW-53

Date	Concentration
2/17/1994	8400

MW-5

Date	Concentration
2-3/1986	150000
1/1/1991	3600
7/10/1991	58*
10/4/1991	220*
12/30/1991	67*
6/4/1992	100*

LOCATION OF EXISTING MONITORING WELL WHERE SPH SAMPLE WAS COLLECTED FOR PCB ANALYSIS

LOCATION OF SUMP ASSOCIATED WITH EITHER A FORMER OR EXISTING IRM SYSTEM WHERE SPH SAMPLE WAS COLLECTED FOR PCB ANALYSIS

LOCATION OF FORMER ROUX MONITORING WELL WHERE SPH SAMPLE WAS COLLECTED FOR PCB ANALYSIS

LOCATION OF FORMER GERAGHTY & MILLER MONITORING WELL WHERE SPH SAMPLE WAS COLLECTED FOR PCB ANALYSIS

SPH SAMPLE EXPLANATION

SPH SAMPLE DESIGNATION — MW-73

Date	Concentration
4/22/2004	270000

DATE OF SAMPLE COLLECTION

SAMPLE CONCENTRATION IN UG/KG UNLESS NOTED WITH AN " * " (SEE NOTE)

APPROXIMATE BOUNDARY OF HISTORIC SPH PLUME (ZERO CONTOUR)

EXTENT OF MOBILE SPH PLUME

OPERABLE UNIT 3 BOUNDARY

LIMIT OF AREA PREVIOUSLY ADDRESSED DURING HST CONSTRUCTION

SEWER LINE (DASHED WHERE INFERRED), WITH MANHOLE DESIGNATION (OU-5)

NOTES

ALL CONCENTRATIONS ARE REPORTED IN UG/KG, UNLESS MARKED WITH AN " * ", WHICH INDICATES SAMPLE RESULT WAS REPORTED IN UG/L

FOR REFERENCE, 1 UG/KG = 1 PART PER BILLION (PPB)

UG/KG - MICROGRAMS PER KILOGRAM

UG/L - MICROGRAMS PER LITER

SPH - SEPARATE-PHASE HYDROCARBON

N

Title:

TOTAL PCBs IN SPH

OU-3 REMEDIAL ACTION WORK PLAN
SUNNYSIDE YARD, QUEENS, NEW YORK

Prepared For: AMTRAK

ROUX ASSOCIATES INC
Environmental Consulting & Management

Compiled by: RSK	Date: 8/1/2007	PLATE
Prepared by: RSK	Scale: AS SHOWN	6
Project Mgr: HG	Office: NY	
File No: AM4522318.WOR	Project: 05545Y12	

APPENDIX A

Health and Safety Plan

(To be submitted under separate cover)

APPENDIX B

Technical Specifications and Drawings

(Specifications to be submitted under separate cover)

NOTES

1. EVERY EFFORT HAS BEEN MADE TO IDENTIFY SURFACE FEATURES AND KNOWN SUBSURFACE OBSTRUCTIONS IN THE WORK AREA. CONTRACTOR SHALL BE RESPONSIBLE FOR REMOVAL OF ALL OBSTRUCTIONS WITHIN THE MOBILE SPH EXCAVATION LIMITS (SHOWN), TO A MAXIMUM DEPTH OF 6 FT BELOW LAND SURFACE, TO ACCOMODATE THE EXCAVATION. SEE SECTION 02110.

2. CATENARY POLE FOUNDATIONS EXTEND BETWEEN 8 AND 12 FT BLS AND SHALL BE REMOVED TO A DEPTH OF 6 FT BLS.

3. CONTRACTOR SHALL PROVIDE OWNER WITH ADVANCE NOTICE (MINIMUM 2 WEEKS) FOR TAKING NORTH RUNNER TRACK OUT OF SERVICE. ONCE DE-ENERGIZED AND TAKEN OUT OF SERVICE BY OWNER, AMTRAK WILL REMOVE REQUIRED LENGTH OF TRACK TO ACCOMODATE EXCAVATION. ALL WORK RELATED TO THE NORTH RUNNER TRACK WILL BE PERFORMED DURING A SCHEDULED WEEKEND. SEE SECTION 02200.

LEGEND

MW-19 LOCATION AND DESIGNATION OF EXISTING MONITORING WELL
STRUCTURES TO BE REMOVED
OPERABLE UNIT 3 BOUNDARY
EXISTING RAILROAD TRACK
EXISTING RAILROAD TRACK TO BE REMOVED
LOCATION OF EXISTING CATENARY POLES
LOCATION OF EXISTING MISCELLANEOUS UTILITY POLES
LOCATION OF EXISTING MISCELLANEOUS UTILITY POLES TO BE REMOVED
FENCING TO BE INSTALLED
LOCATION OF SIGN
LOCATION OF LIGHT POLE
LOCATION OF FIRE HYDRANT
LOCATION OF MANHOLE
LOCATION OF POST
LOCATION OF TRANSFORMER
LOCATION OF RAILROAD SWITCH
LOCATION OF UTILITY BOX

N

30' 0 30'

Date: 15OCT07 File Name: N:\PROJECTS\AM055Y\AM45Y\223\AM4522301.DWG Plot Scale: 1:1

NO.	DATE	REVISION DESCRIPTION	INT.

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PROJECT ENGINEER: J.P.
DESIGNED BY: J.P.
DRAWN BY: B.H.C./G.M.
CHECKED BY: C.M.

PROJECT NO. 05545Y12
FILE NO. AM4522301.DWG
SCALE: 1"=30'
DATE: OCTOBER 2007

REMEDIAL ENGINEERING, P.C.
209 Shafter Street
Islandia, New York 11749 (631) 232-2600

PROJECT NAME:
REMEDIAL ACTION WORK PLAN
OU-3

PROJECT FOR:
AMTRAK SUNNYSIDE YARD
QUEENS, NEW YORK

TITLE:
SITE PREPARATION PLAN

DRAWING NO.
C-1
DRAWING
1 OF 8

LEGEND

- OPERABLE UNIT 3 BOUNDARY
- EXISTING RAILROAD TRACK
- LOCATION OF EXISTING CATENARY POLES
- LOCATION OF EXISTING MISCELLANEOUS POLES/SUPPORTS
- VISUALLY HYDROCARBON-IMPACTED SURFACE SOIL TO BE EXCAVATED TO 1 FT. BLS
- LIMIT OF MOBILE SPH EXCAVATION
- STRUCTURES TO BE REMOVED
- A A' LOCATION OF CROSS SECTION
- LOCATION OF SIGN
- LOCATION OF LIGHT POLE
- LOCATION OF FIRE HYDRANT
- LOCATION OF MANHOLE
- LOCATION OF POST
- LOCATION OF TRANSFORMER
- LOCATION OF RAILROAD SWITCH
- LOCATION OF UTILITY BOX

NOTE

THE HORIZONTAL LIMIT OF EXCAVATION IS SHOWN. THE VERTICAL LIMIT OF EXCAVATION EXTENDS 1 FT BELOW THE WATER TABLE (AVG. 3.75 FT BLS) AT THE EDGES OF THE PLUME AND TAPERS TO A MAXIMUM OF 2.5 FT BELOW THE WATER TABLE (AVG. 5.25 FT BLS).

30' 0 30'

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DESIGNED BY: J.P.
DRAWN BY: K.T./G.M.
CHECKED BY: C.M.

PROJECT NO. 05545Y12
FILE NO. AM4522301
SCALE: 1"=30'
DATE: AUGUST 2007

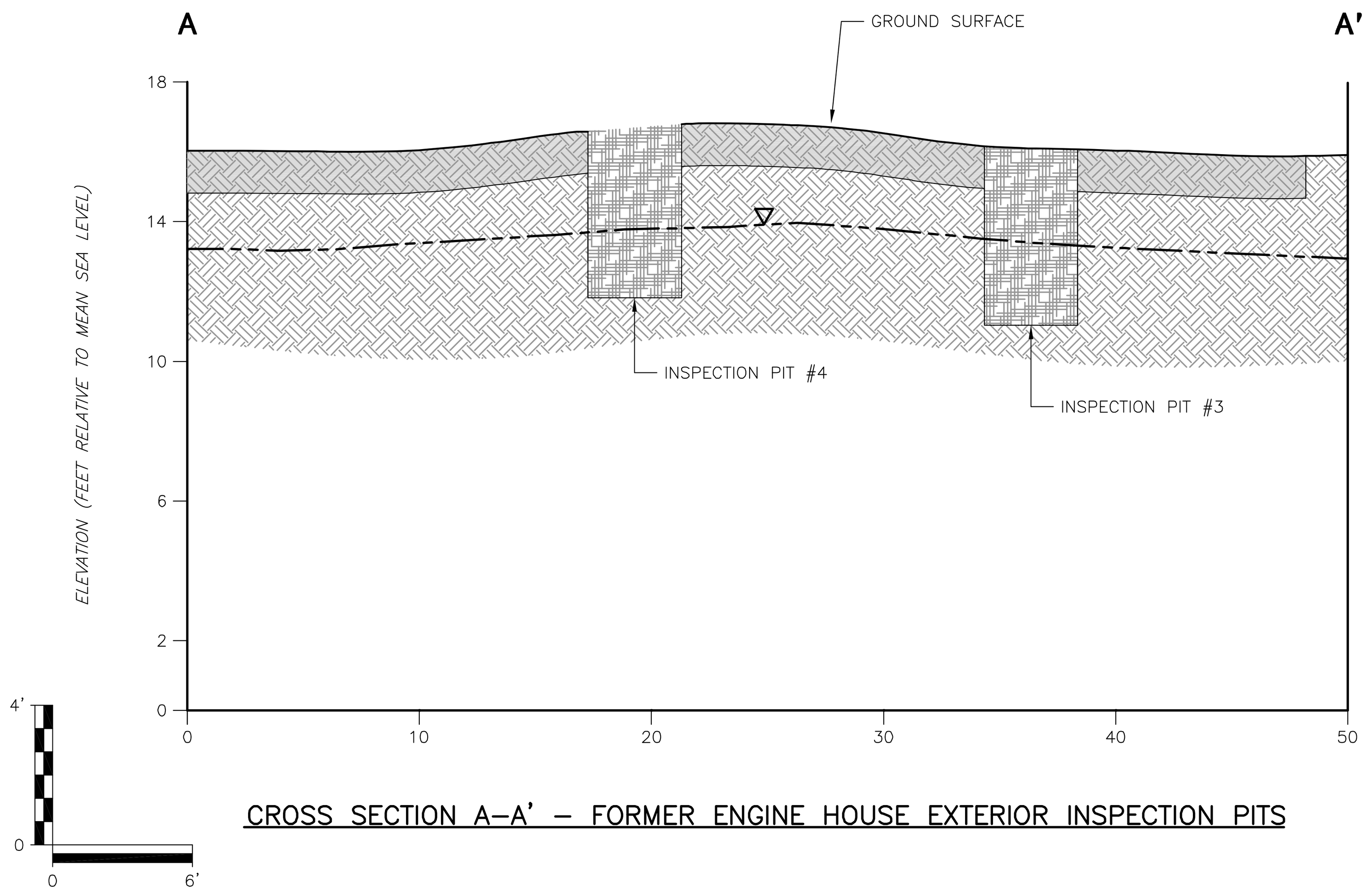
REMEDIAL ENGINEERING, P.C.
209 Shafter Street
Islandia, New York 11749 (631) 232-2600

PROJECT NAME: REMEDIAL ACTION WORK PLAN OU-3
PROJECT FOR: AMTRAK SUNNYSIDE YARD QUEENS, NEW YORK

TITLE: SITE REMEDIATION AND STRUCTURAL REMOVAL PLAN

DRAWING NO. C-2
DRAWING 2 OF 8

Plot Scale: 1:1 Date: 26JUN07 File Name: N:\PROJECTS\AM05Y\AM45\223\AM4522301.DWG



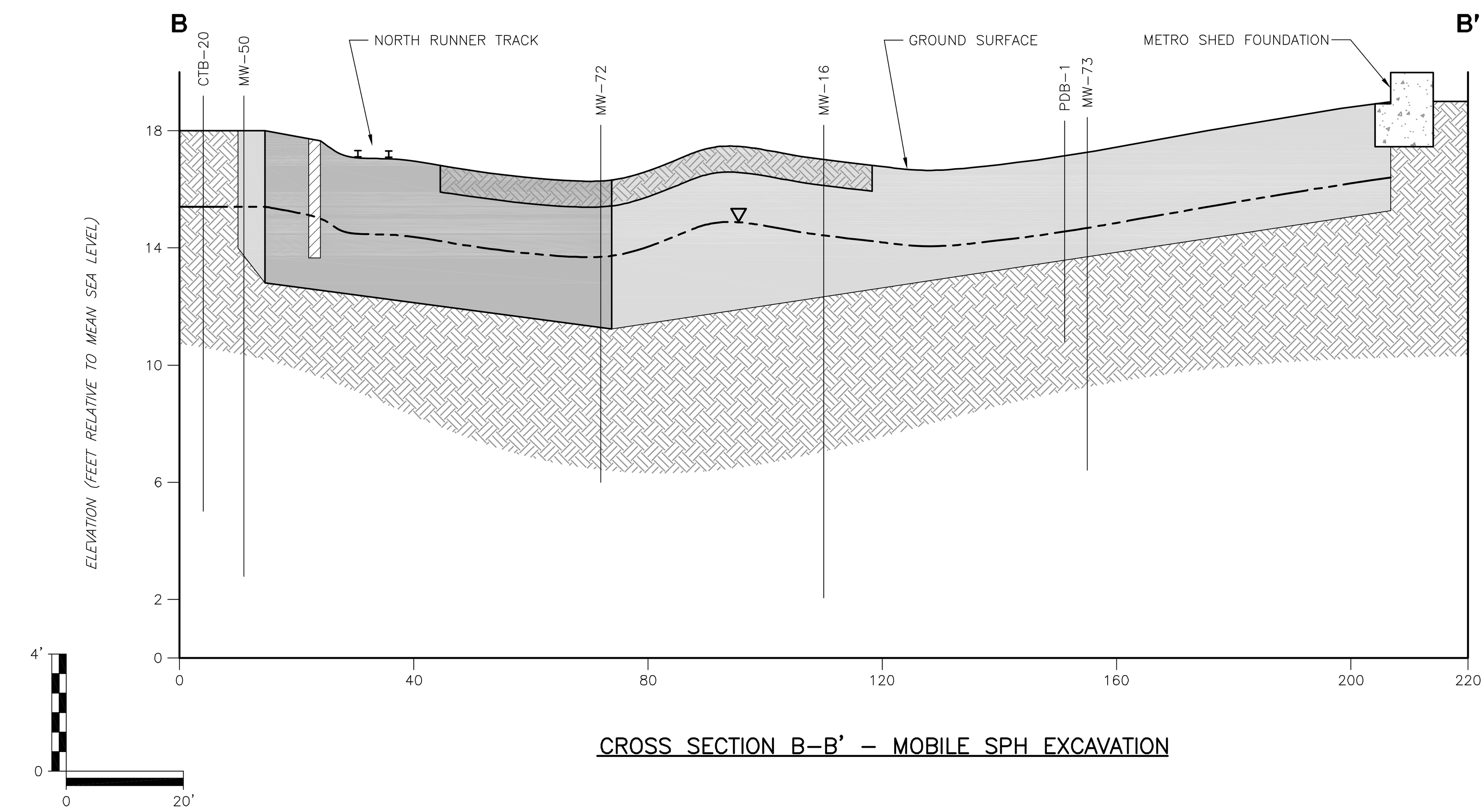
CROSS SECTION A–A' – FORMER ENGINE HOUSE EXTERIOR INSPECTION PITS

LEGEND

- VISUALLY HYDROCARBON–IMPACTED SURFACE SOIL TO BE EXCAVATED
- SUBSURFACE SOIL TO REMAIN IN PLACE
- FORMER ENGINE HOUSE EXTERIOR INSPECTION PIT TO BE REMOVED
- AVERAGE GROUNDWATER ELEVATION (2.75 FT BLS)

SECTION A–A' NOTES

1. GROUND SURFACE ELEVATION EXTRAPOLATED FROM EXISTING AERIAL CONTOUR MAP FROM SPRING 2004.
2. GROUNDWATER ELEVATION EXTRAPOLATED FROM AVERAGE SEASONAL FLUCTUATIONS OF MONITORING WELLS MW–38D, MW–49, MW–70, MW–50, MW–37, MW–71, MW–52 AND MW–13.
3. BOTH INSPECTION PITS EXTEND 4 FEET BELOW LAND SURFACE (ASSUMES 8–INCH CONCRETE BOTTOM OF PIT, ASSUME EXCAVATION DEPTH IS 5 FEET BELOW LAND SURFACE).
4. WORK PLATFORM EXCAVATIONS ASSUME 4 INCHES OF CONCRETE.



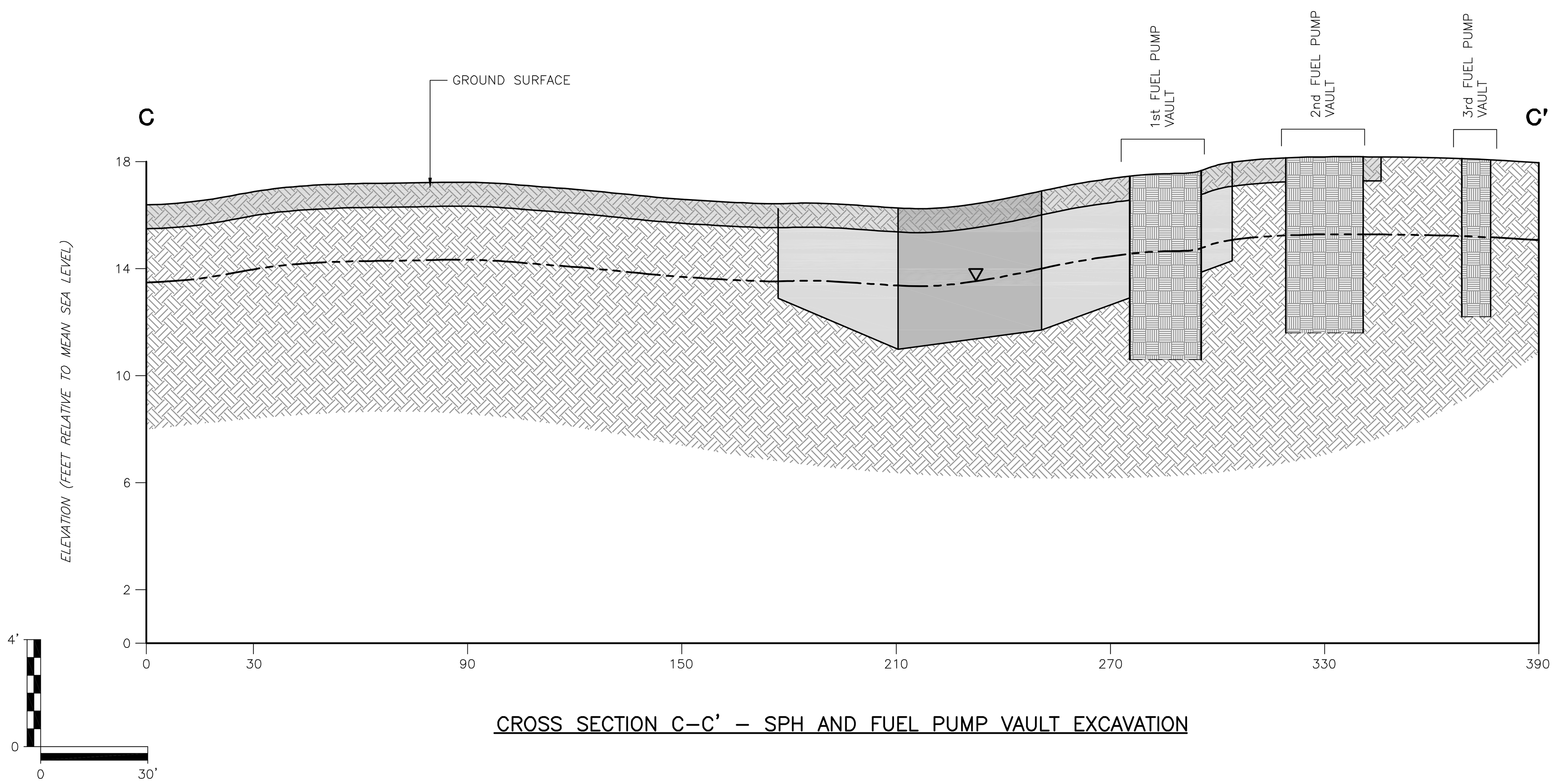
CROSS SECTION B–B' – MOBILE SPH EXCAVATION

LEGEND

- VISUALLY HYDROCARBON–IMPACTED SURFACE SOIL TO BE EXCAVATED
- MOBILE SPH EXCAVATION TO A MINIMUM OF 1 FT BELOW WATER TABLE
- MOBILE SPH EXCAVATION TO 2.5 FT BELOW WATER TABLE
- SUBSURFACE SOIL TO REMAIN IN PLACE
- PRODUCT RECOVERY TRENCH
- METRO SHED FOUNDATION
- AVERAGE GROUNDWATER ELEVATION (2.75 FT BLS)

SECTION B–B' NOTES

1. GROUND SURFACE ELEVATION EXTRAPOLATED FROM EXISTING AERIAL CONTOUR MAP FROM SPRING 2004.
2. GROUNDWATER ELEVATION EXTRAPOLATED FROM AVERAGE SEASONAL FLUCTUATIONS OF MONITORING WELLS TA–2, MW–50, MW–71, MW–72, RW–2, MW–16, MW–23D, MW–73, MW–52 AND MW–75.
3. THE NORTH RUNNER TRACK IS APPROXIMATELY 9 FEET WIDE.



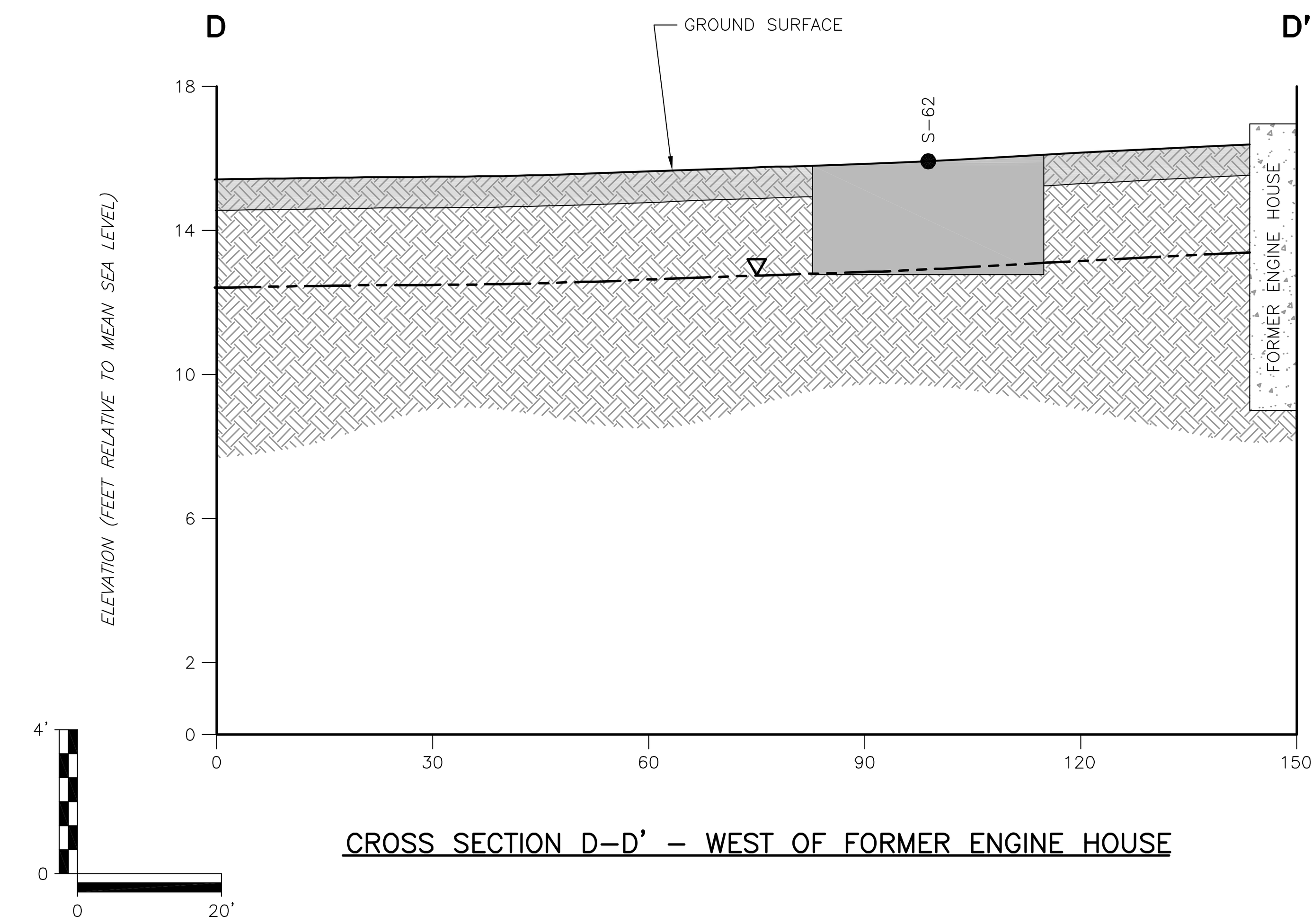
CROSS SECTION C–C' – SPH AND FUEL PUMP VAULT EXCAVATION

LEGEND

- VISUALLY HYDROCARBON–IMPACTED SURFACE SOIL TO BE EXCAVATED
- MOBILE SPH EXCAVATION TO A MINIMUM OF 1 FT BELOW WATER TABLE
- MOBILE SPH EXCAVATION TO 2.5 FT BELOW WATER TABLE
- SUBSURFACE SOIL TO REMAIN IN PLACE
- FORMER FUEL PUMP VAULT
- AVERAGE GROUNDWATER ELEVATION (2.75 FT BLS)
- DEPTH TO BE CONFIRMED DURING PRE–DESIGN INVESTIGATIONS

SECTION C–C' NOTES

1. GROUND SURFACE ELEVATION EXTRAPOLATED FROM EXISTING AERIAL CONTOUR MAP FROM SPRING 2004.
2. GROUNDWATER ELEVATION EXTRAPOLATED FROM AVERAGE SEASONAL FLUCTUATIONS OF MONITORING WELLS MW–37, MW–13, MW–70, MW–38D, MW–49, TA–2, MW–50, MW–71, MW–52, MW–73, MW–72, RW–2, MW–16, MW–23D, RW–1, MW–75, MW–74 AND MW–76.
3. DEPTH OF FORMER FUEL PUMP VAULTS PLUS AN ADDITIONAL 8 INCHES OF CONCRETE, ASSUME THE EXCAVATION DEPTH IS 6 FEET BELOW LAND SURFACE. ACTUAL DEPTH WILL BE CONFIRMED DURING PRE–DESIGN INVESTIGATIONS.



CROSS SECTION D–D' – WEST OF FORMER ENGINE HOUSE

LEGEND

- VISUALLY HYDROCARBON–IMPACTED SURFACE SOIL TO BE EXCAVATED
- EXCAVATION TO 3 FEET BELOW LAND SURFACE IN AREA OF LEAD EXCEEDANCE (S–62)
- SUBSURFACE SOIL TO REMAIN IN PLACE
- FORMER ENGINE HOUSE
- AVERAGE GROUNDWATER ELEVATION (2.75 FT BLS)

SECTION D–D' NOTES

1. GROUND SURFACE ELEVATION EXTRAPOLATED FROM EXISTING AERIAL CONTOUR MAP FROM SPRING 2004.
2. GROUNDWATER ELEVATION EXTRAPOLATED FROM AVERAGE SEASONAL FLUCTUATIONS OF MONITORING WELLS MW–37, MW–13 AND MW–70.
3. EXCAVATION FOR LEAD EXCEEDANCE WILL EXTEND 15 FEET RADIALLY FROM S–62.

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DESIGNED BY:	J.P.	FILE NO.	AM4522302
DRAWN BY:	K.T./G.M.	SCALE:	AS SHOWN
CHECKED BY:	C.M.	DATE:	05545Y12

REMEDIAL ENGINEERING, P.C.
209 Shafter Street
Islandia, New York 11749 (631) 232–2600

PROJECT NAME:
REMEDIAL ACTION WORK PLAN OU–3

PROJECT FOR:
AMTRAK SUNNYSIDE YARD QUEENS, NEW YORK

TITLE:
CROSS SECTIONS

DRAWING NO.
C–3
DRAWING 3 OF 8

Plot Scale: 1:1
Date: 02AUG07
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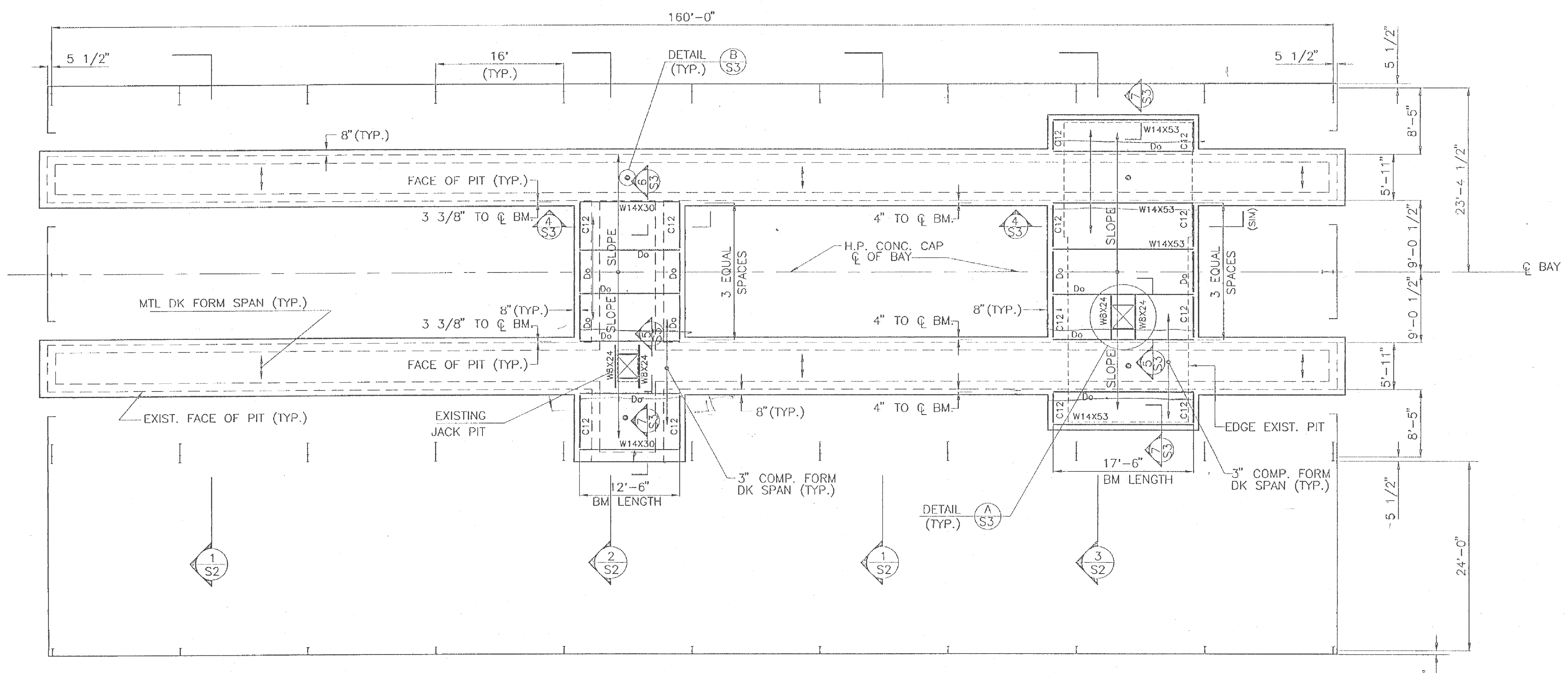
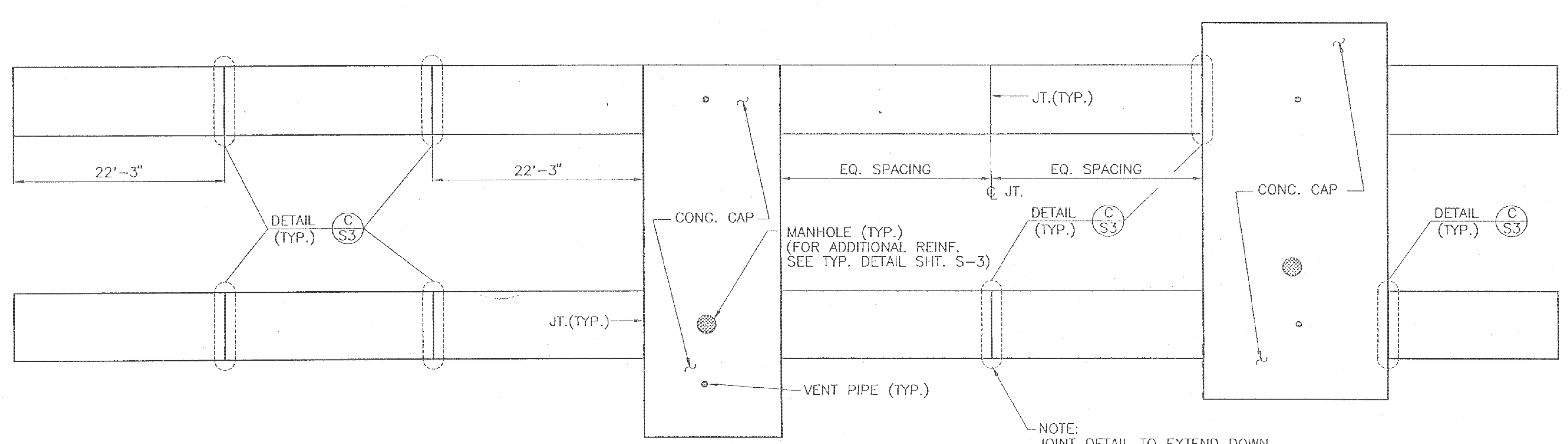


CONTAINMENT CAP FRAMING PLAN

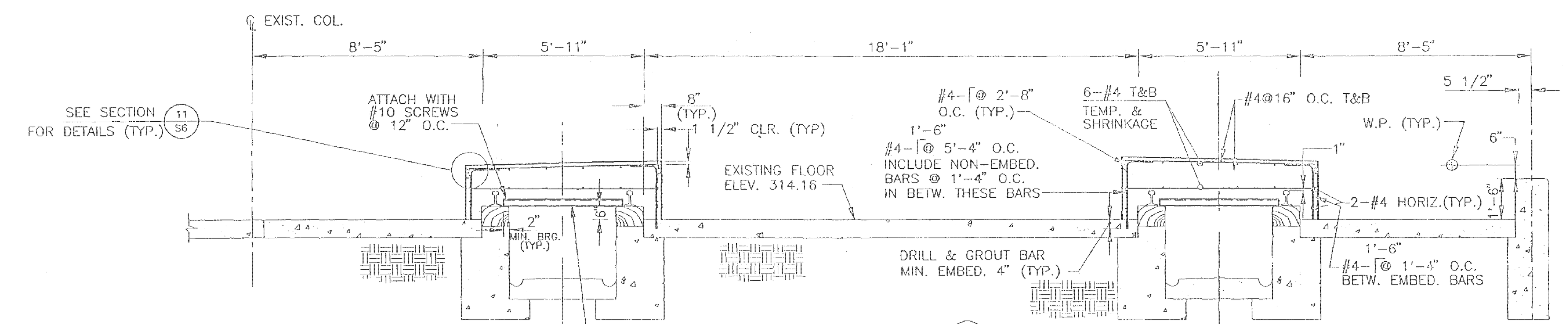
PHASE 1 (PRE-BUILDING DEMOLITION)

NOT TO SCALE



CONCRETE CAP JOINT LAYOUT

NOTES:
1. DESIGN LIVE LOAD – 150 LBS/FT²
2. EXISTING FLOOR SLAB ELEVATION TYPICALLY 314.16.



SECTION 1 S1
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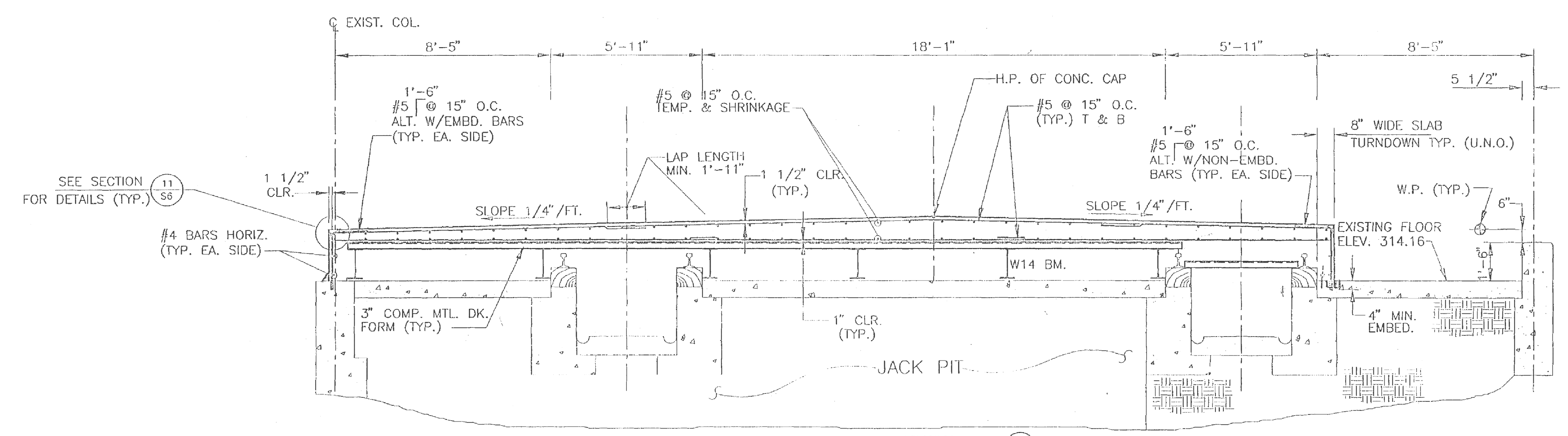

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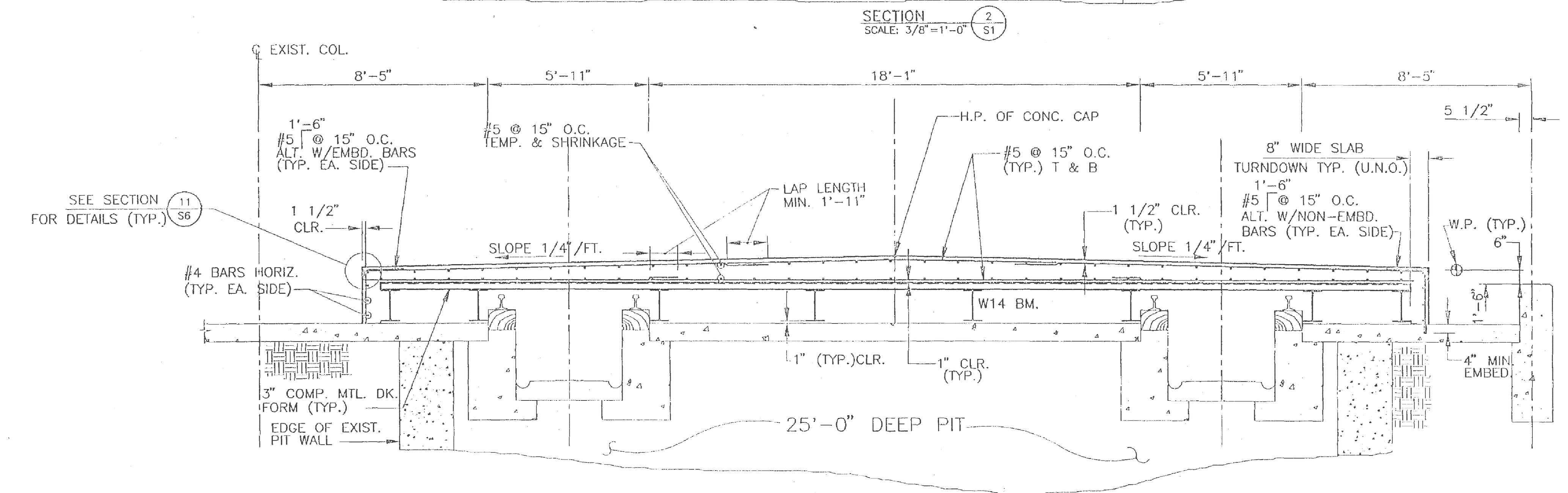

SECTION 3 S1
SCALE: 3/8"=1'-0"

SOURCE

THE ABOVE DETAILS ARE FROM THE "TEMPORARY CONTAINMENT CAP AND ENGINE HOUSE DEMOLITION, SUNNYSIDE YARD, NEW YORK, NEW YORK" DRAWINGS, PREPARED BY AMTRAK, OFFICE OF ENGINEERING AND DATED JUNE 30, 1995.

File Name: N:\PROJECTS\AM055\AM45Y\223\AM4522319.DWG Date: 26JUN07 Plot Scale: 1:1

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DESIGNED BY: J.P.	FILE NO. AM4522319		
DRAWN BY: G.M.	SCALE: AS SHOWN		
CHECKED BY: C.M.	DATE: AUGUST 2007		

REMEDIAL ENGINEERING, P.C.
209 Shafter Street
Islandia, New York 11749 (631) 232-2600

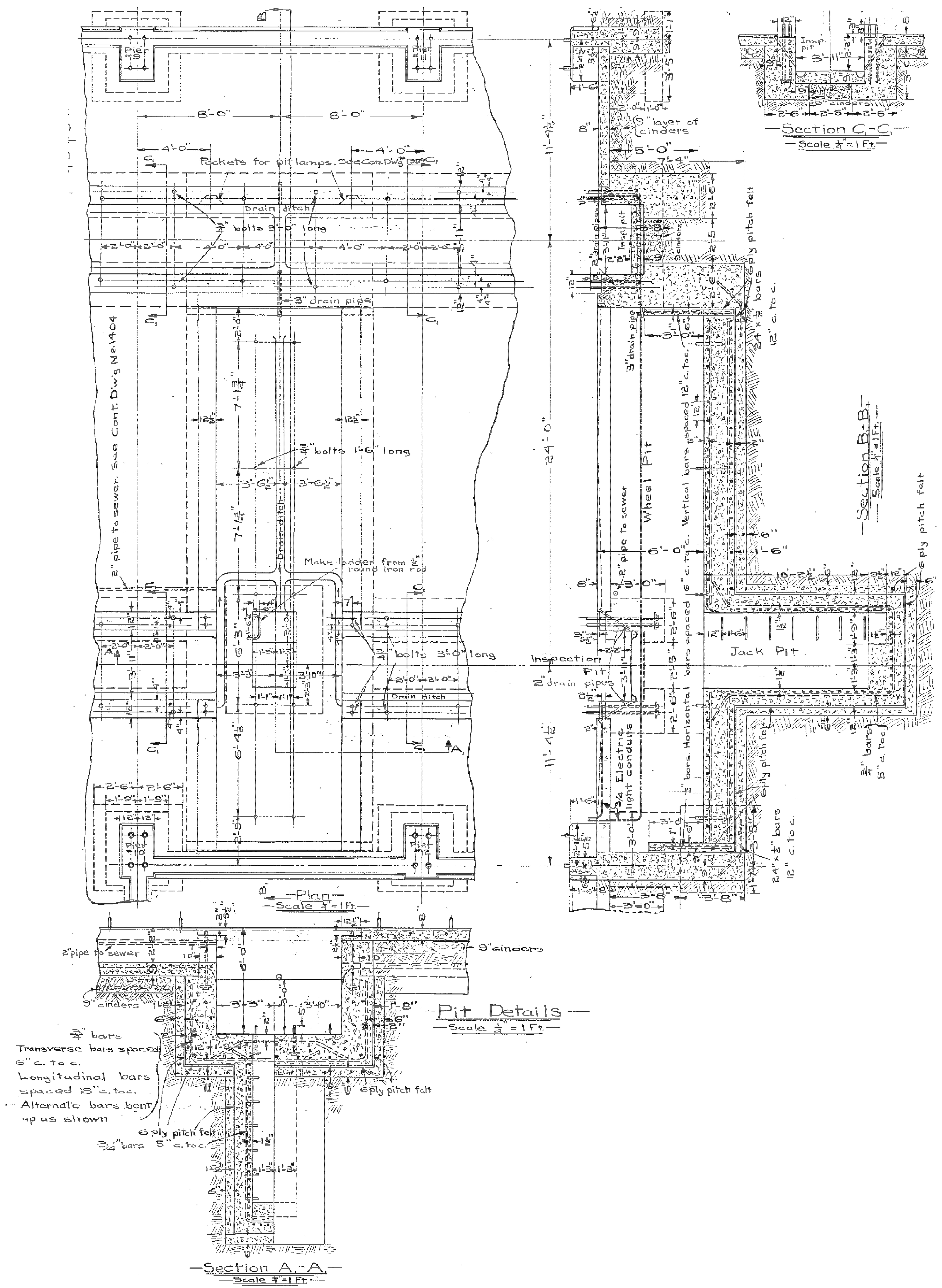
PROJECT NAME: OU-3 REMEDIAL ACTION WORK PLAN

PROJECT FOR: AMTRAK SUNNYSIDE YARD QUEENS, NEW YORK

TITLE: DETAILS – ENGINE HOUSE CONCRETE COVER

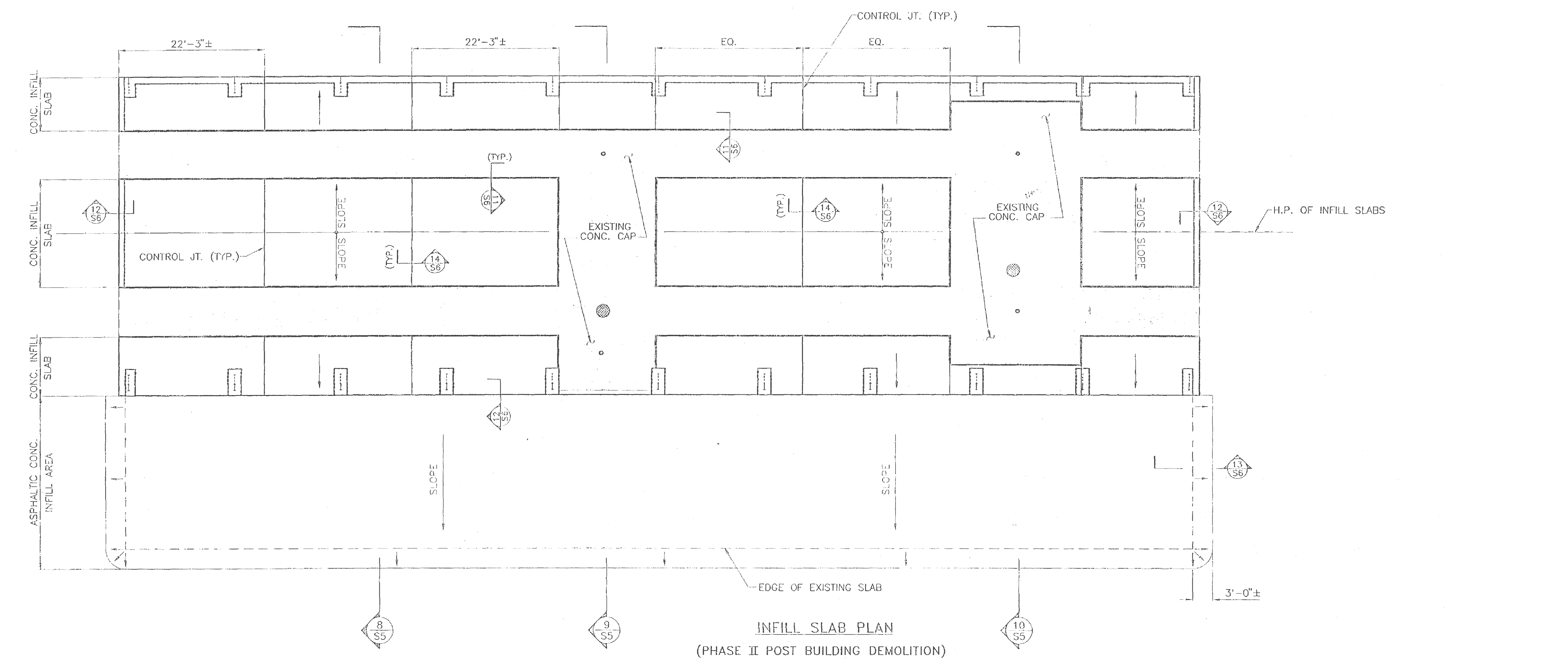
DRAWING NO. C-4

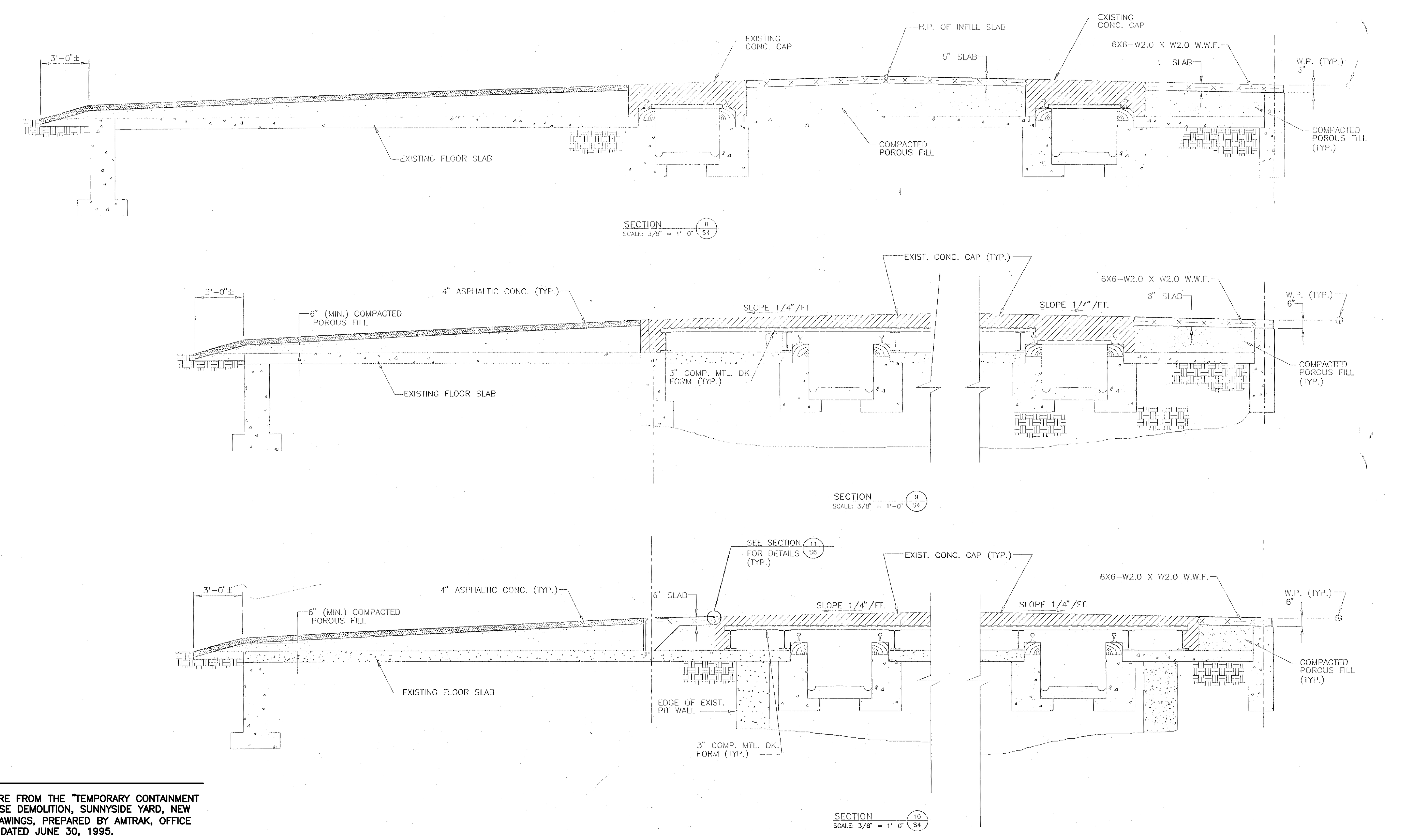
DRAWING 4 OF 8



SOURCE

THE ABOVE DETAILS ARE FROM "INSPECTION BUILDING, SUNNYSIDE YARD, FOUNDATION & PIT DETAILS, CONTRACT DRAWING, NO. 1390", PREPARED BY PENNSYLVANIA TUNNEL & TERMINAL RAILROAD COMPANY, EAST RIVER DIVISION AND DATED AUGUST 16, 1909.





SOURCE

THE ABOVE DETAILS ARE FROM THE "TEMPORARY CONTAINMENT CAP AND ENGINE HOUSE DEMOLITION, SUNNYSIDE YARD, NEW YORK, NEW YORK" DRAWINGS, PREPARED BY AMTRAK, OFFICE OF ENGINEERING AND DATED JUNE 30, 1995.

NO.	DATE	REVISION DESCRIPTION	INT.

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PROJECT ENGINEER: H.G.	PROJECT NO. 05545Y12
DESIGNED BY: J.P.	FILE NO. AM4522304
DRAWN BY: G.M.	SCALE: AS SHOWN
CHECKED BY: C.M.	DATE: AUGUST 2007

REMEDIAL ENGINEERING, P.C.
209 Shafter Street
Islandia, New York 11749 (631) 232-2600

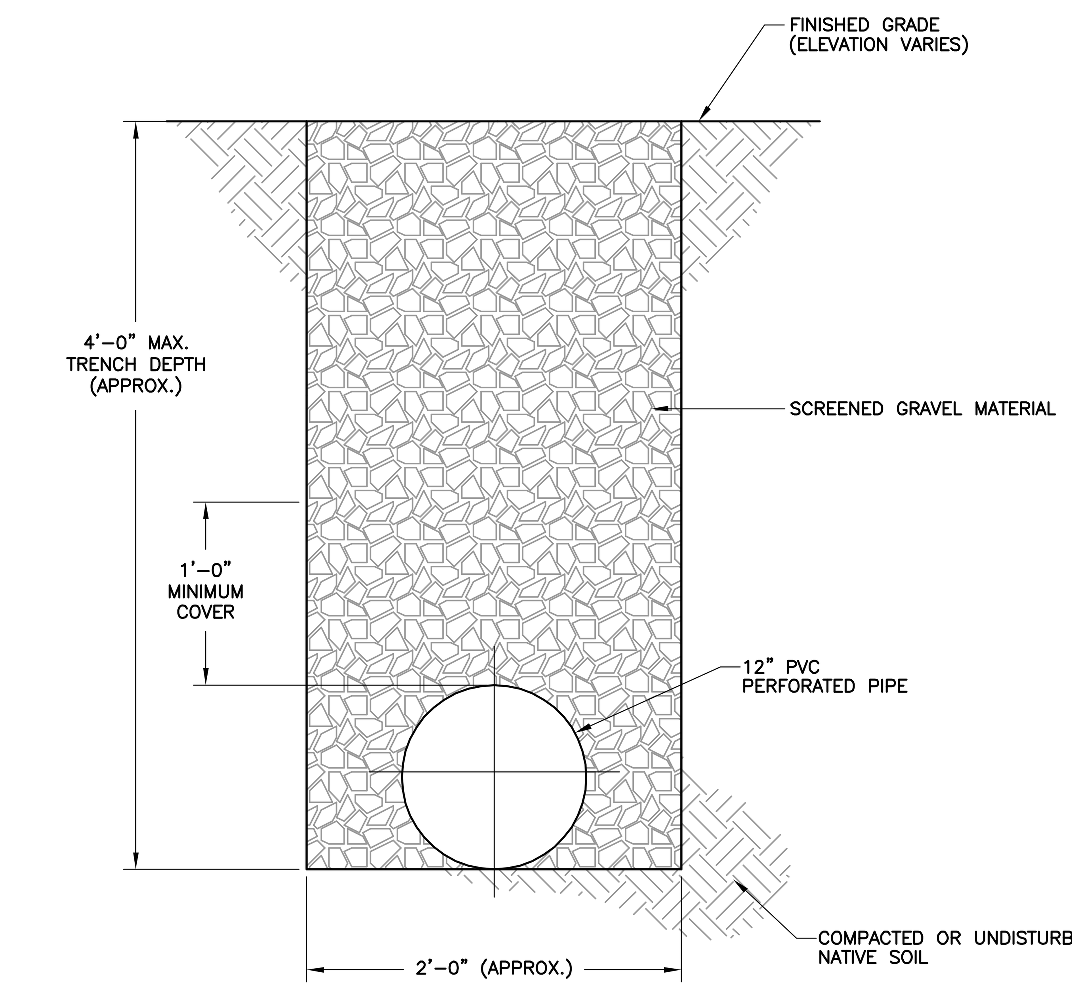
PROJECT NAME:
OU-3 REMEDIAL ACTION WORK PLAN

PROJECT FOR:
AMTRAK SUNNYSIDE YARD
QUEENS, NEW YORK

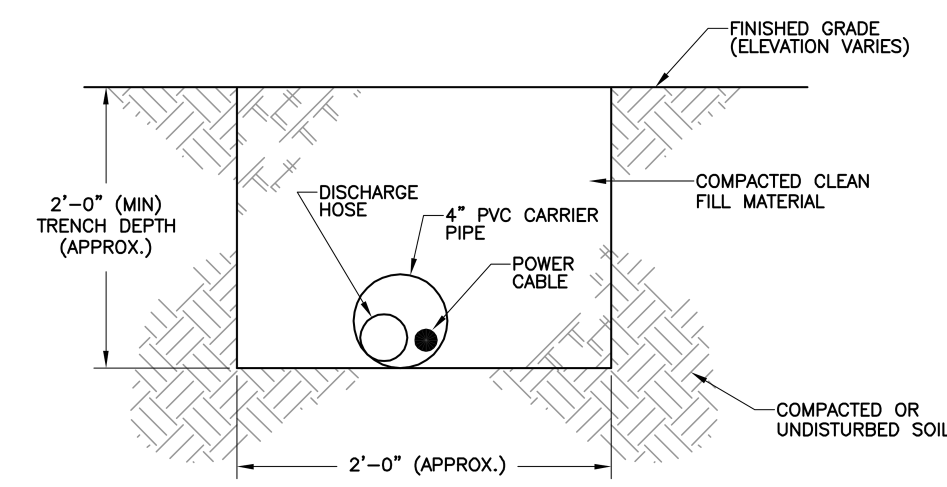
TITLE:
DETAILS – ENGINE HOUSE INTERIOR SERVICE PITS

DRAWING NO.
C-5
DRAWING 1 OF 1

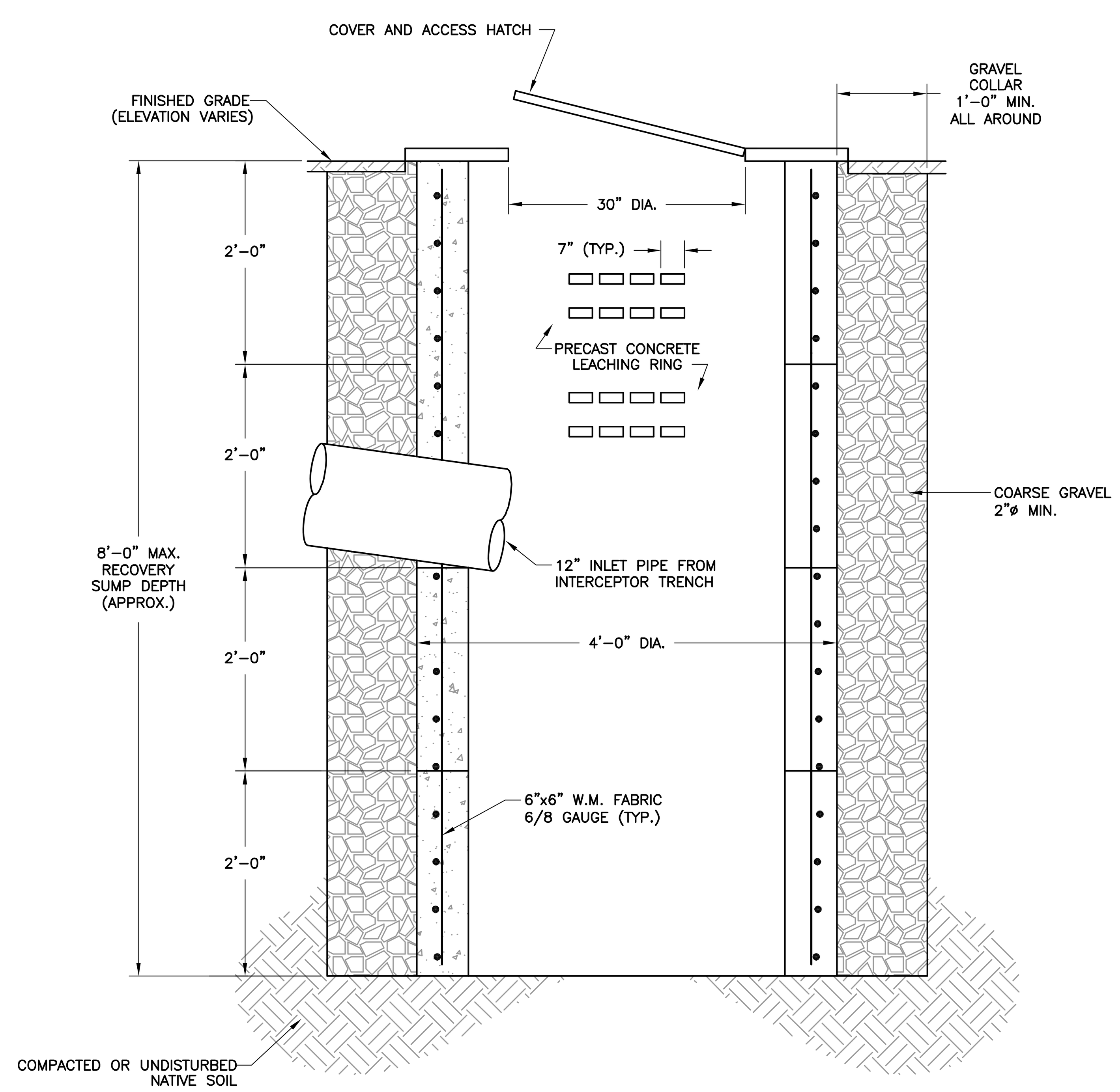
File Name: N:\PROJECTS\AM055Y\AM45Y\223\AM4522304.DWG Date: 26JUN07 Plot Scale: 1:1



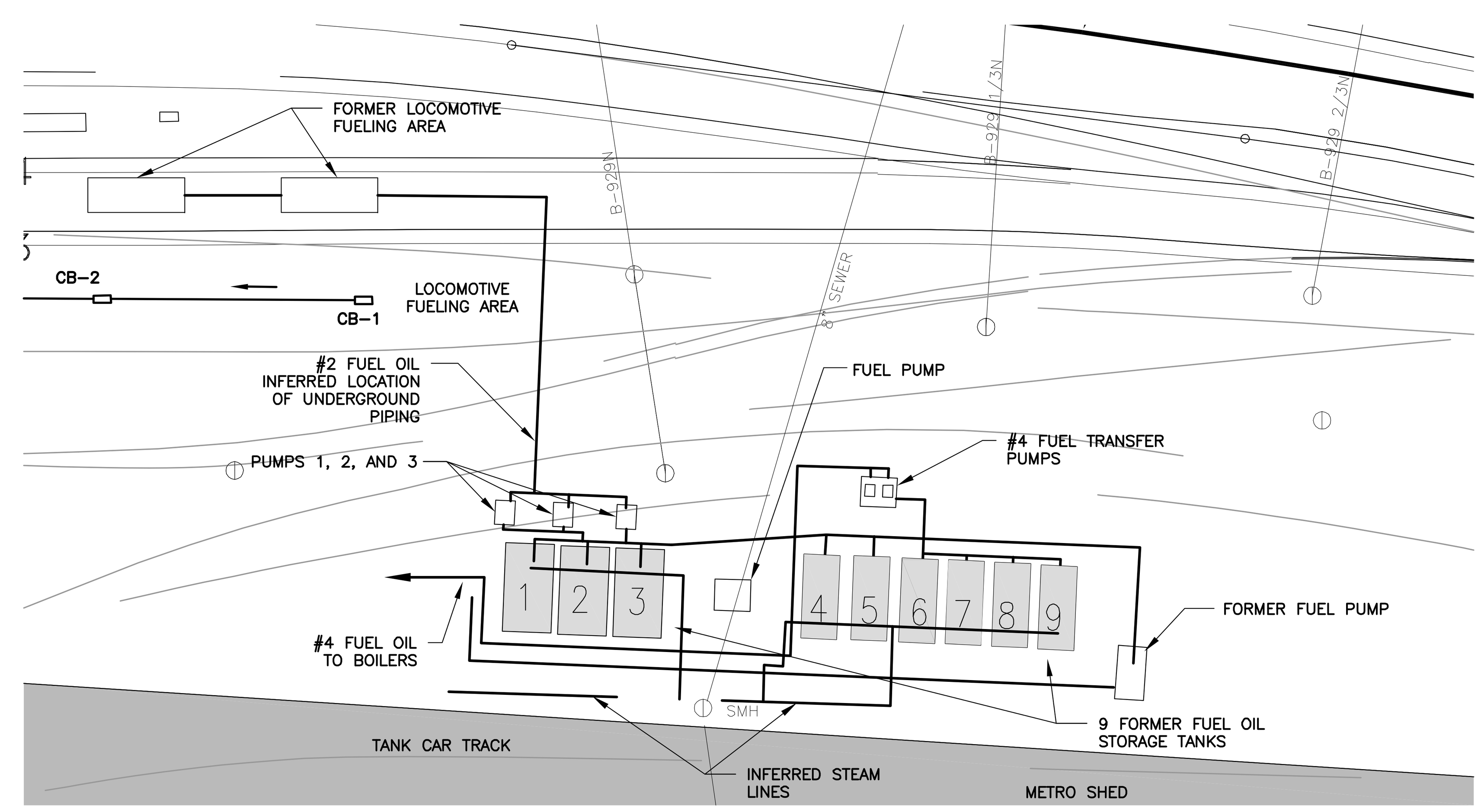
1 PHASE III IRM SYSTEM INTERCEPTOR TRENCH DETAIL
SCALE: NOT TO SCALE



3 PHASE III IRM SYSTEM DISCHARGE PIPING TRENCH DETAIL
SCALE: NOT TO SCALE



2 PHASE III IRM SYSTEM RECOVERY SUMP DETAIL
SCALE: NOT TO SCALE



4 USTs AND PIPING SCHEMATIC
SCALE: 1" = 30'

TANK NO.	TANK SIZE (GAL)	CONTENTS
1	12,000	SAND+WATER+0.1' FLOATING SPH
2	12,000	SAND+WATER
3	12,000	SAND+WATER
4	10,600	SAND
5	10,600	SAND+WATER
6	8,300	WATER
7	11,000	WATER
8	17,600	WATER
9	8,200	WATER

NOTES

1. THE LOCATION AND ORIENTATION OF FUEL OIL PIPING ASSOCIATED WITH THE NINE USTs IS INFERRED. THE PRESENCE OF SUBSURFACE PIPING AND ADJACENT PUMP STRUCTURES HAS NOT BEEN CONFIRMED.
2. ALL PIPING SHALL BE TRACED AND REMOVED AS SPECIFIED IN SECTION 15607.
3. UST CAPACITIES AND CONTENTS BASED ON "FUEL OIL FACILITIES & SCHEMATIC PIPING DIAGRAM", DATED NOVEMBER 25, 1958.

NO.	DATE	REVISION DESCRIPTION	INT.
*	*	*	*

PROJECT ENGINEER: J.P.
DESIGNED BY: J.P.
DRAWN BY: G.M.
CHECKED BY: C.M.

PROJECT NO. 05545Y12
FILE NO. AM4522306
SCALE: AS SHOWN
DATE: AUGUST 2007

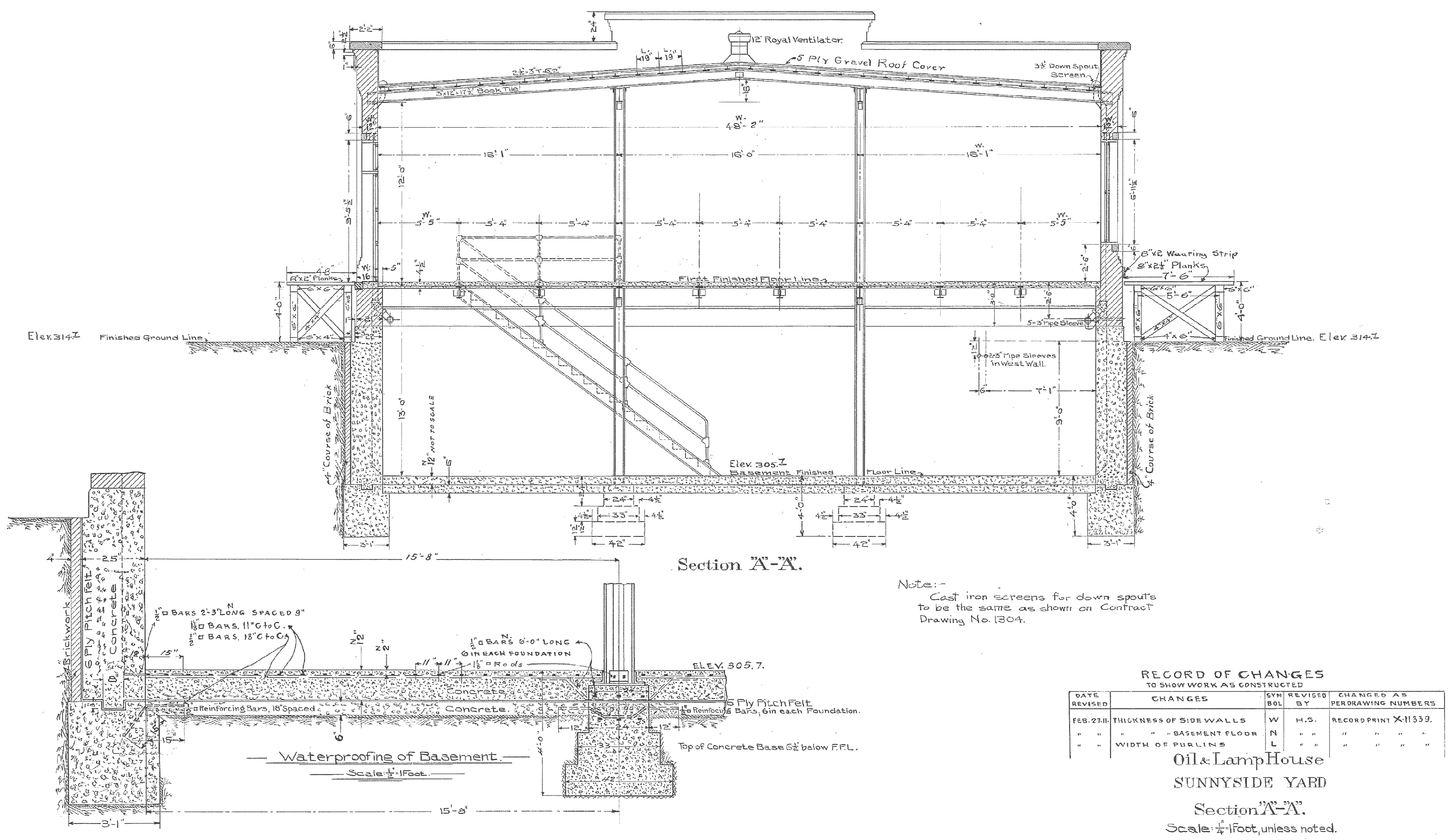
REMEDIAL ENGINEERING, P.C.
209 Shafter Street
Islandia, New York 11749 (631) 232-2600

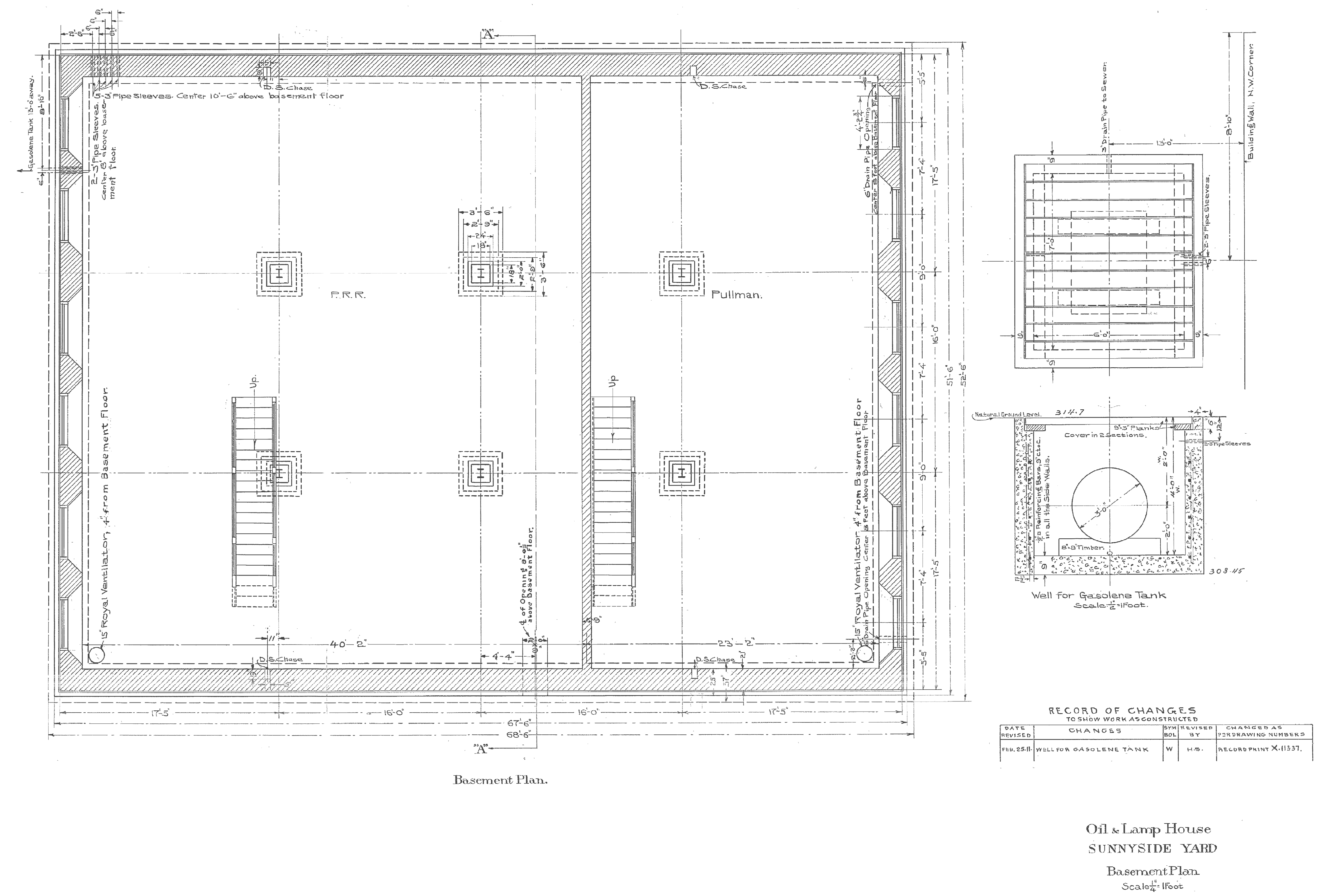
PROJECT NAME: OU-3 REMEDIAL ACTION WORK PLAN
PROJECT FOR: AMTRAK SUNNYSIDE YARD QUEENS, NEW YORK

TITLE: DETAILS – USTs AND IRM PRODUCT RECOVERY TRENCH

DRAWING NO. C-6
DRAWING 6 OF 8

Plot Scale: 1:1 Date: 26JUN07 File Name: N:\PROJECTS\AM055Y\AM45Y\223\AM4522305.DWG





SOURCE

THE ABOVE PLAN VIEW AND SECTION ARE FROM CONTRACT DRAWING, NO. 1337 AND 1339 RESPECTIVELY, PREPARED BY PENNSYLVANIA TUNNEL & TERMINAL RAILROAD COMPANY AND DATED JULY 1, 1909.

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PROJECT ENGINEER: J.P.
DESIGNED BY: J.P.
DRAWN BY: G.M.
CHECKED BY: C.M.

PROJECT NO. 05545Y12
FILE NO. AM4522305
SCALE: AS SHOWN
DATE: JUNE 2007

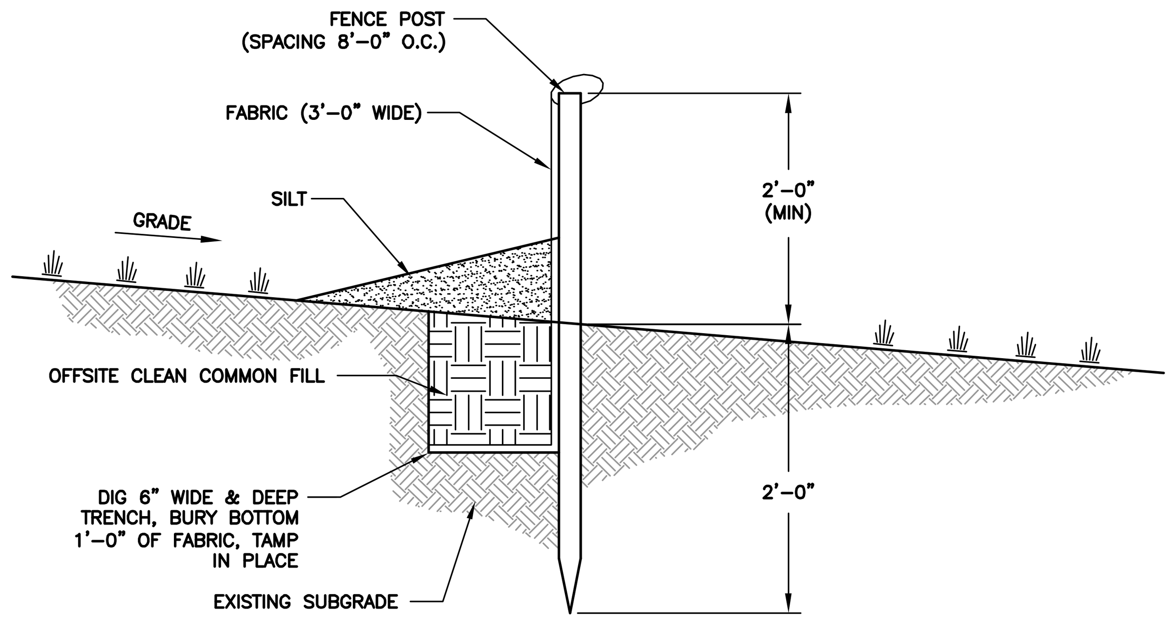
REMEDIAL ENGINEERING, P.C.
209 Shafter Street
Islandia, New York 11749 (631) 232-2600

PROJECT NAME: OU-3 REMEDIAL ACTION WORK PLAN

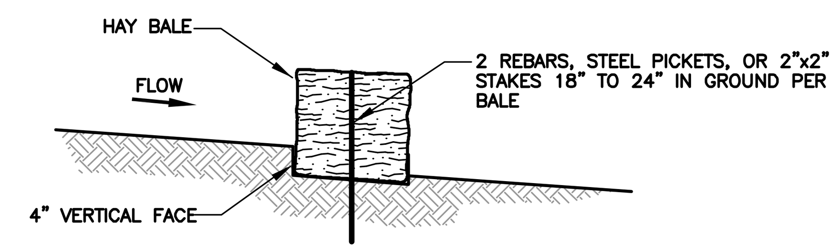
PROJECT FOR: AMTRAK SUNNYSIDE YARD
QUEENS, NEW YORK

TITLE: DETAILS - OIL HOUSE BUILDING AND BASEMENTS

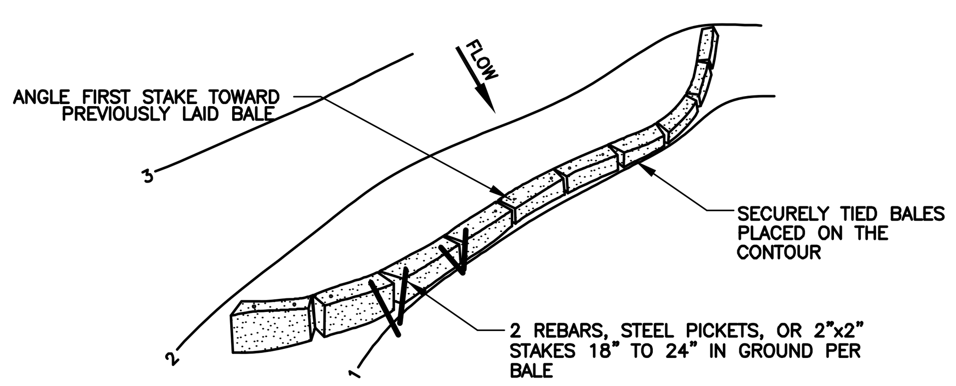
DRAWING NO. **C-7**
DRAWING 7 OF 8



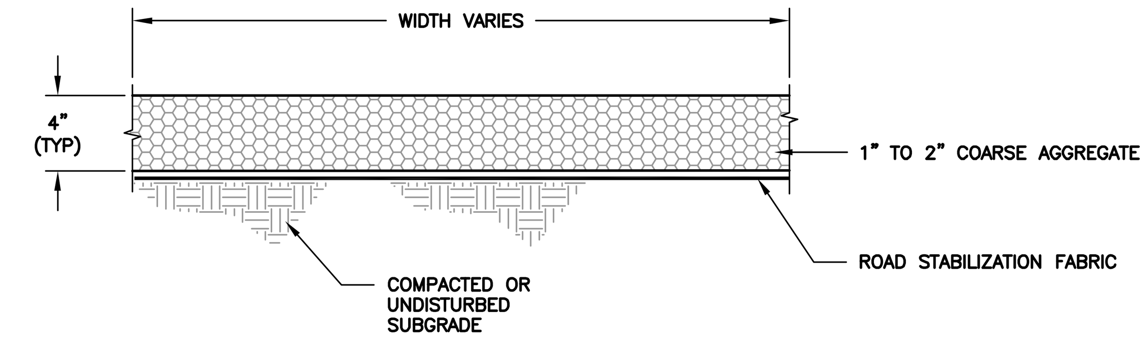
1 TYPICAL SILT FENCE DETAIL
SCALE: NOT TO SCALE



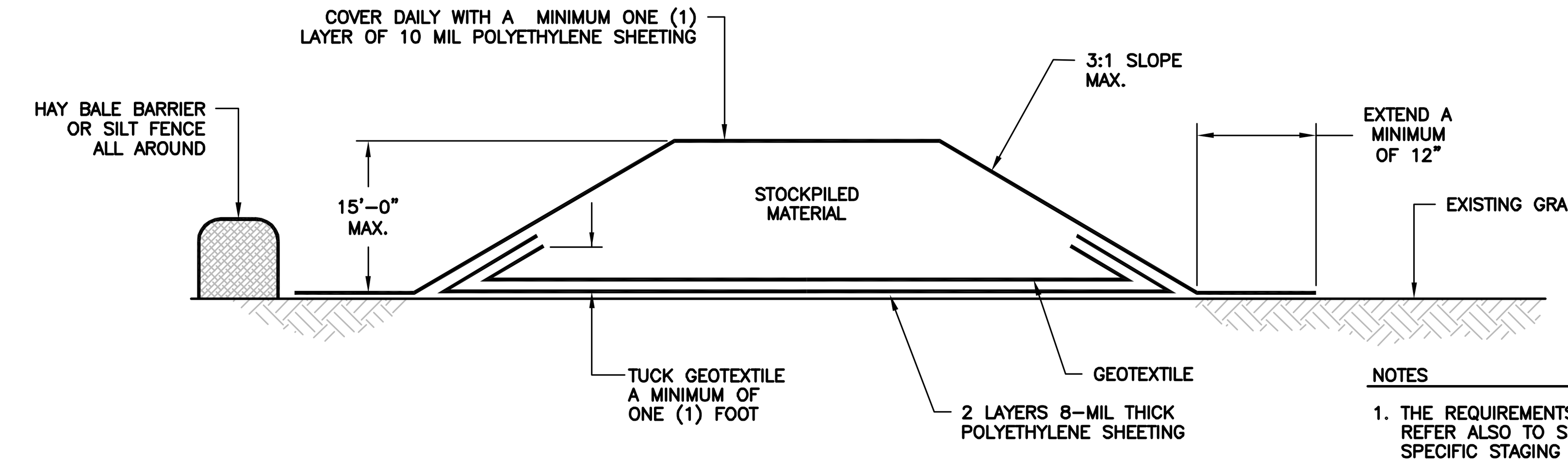
EMBEDDING DETAIL



2 HAY BALE SEDIMENT BARRIER PLACEMENT AND ANCHORING DETAIL
SCALE: NOT TO SCALE



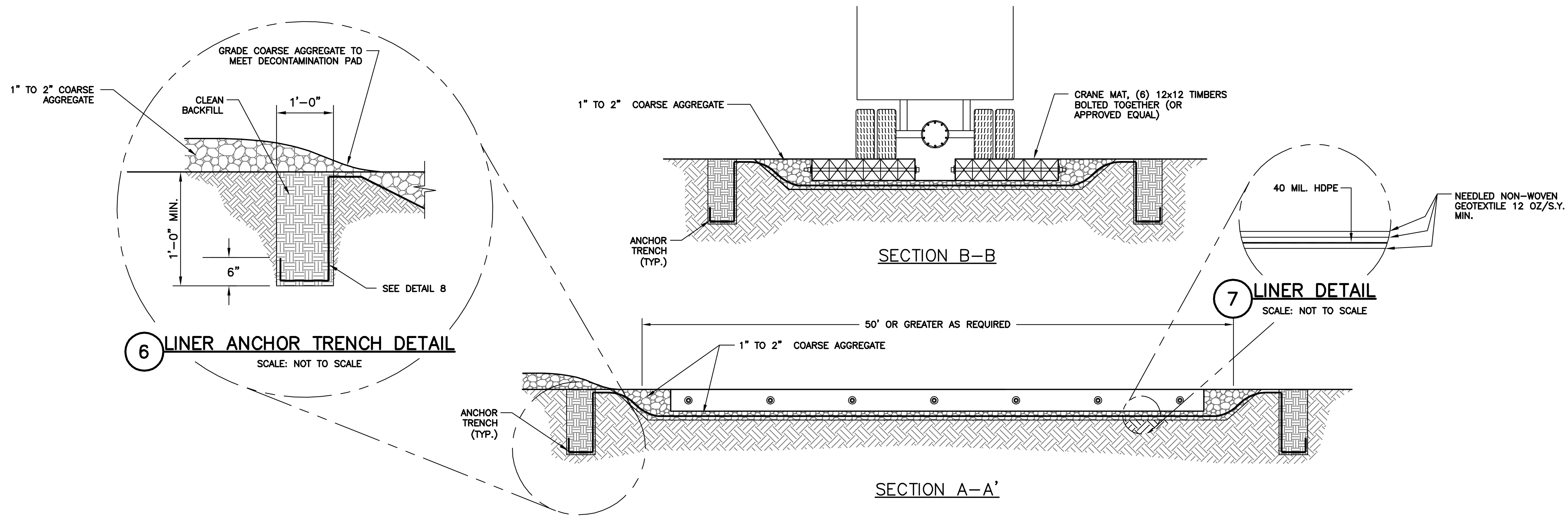
3 TEMPORARY ROAD DETAIL
SCALE: NOT TO SCALE



4 CONTAMINATED MATERIAL STOCKPILE DETAIL
SCALE: NOT TO SCALE

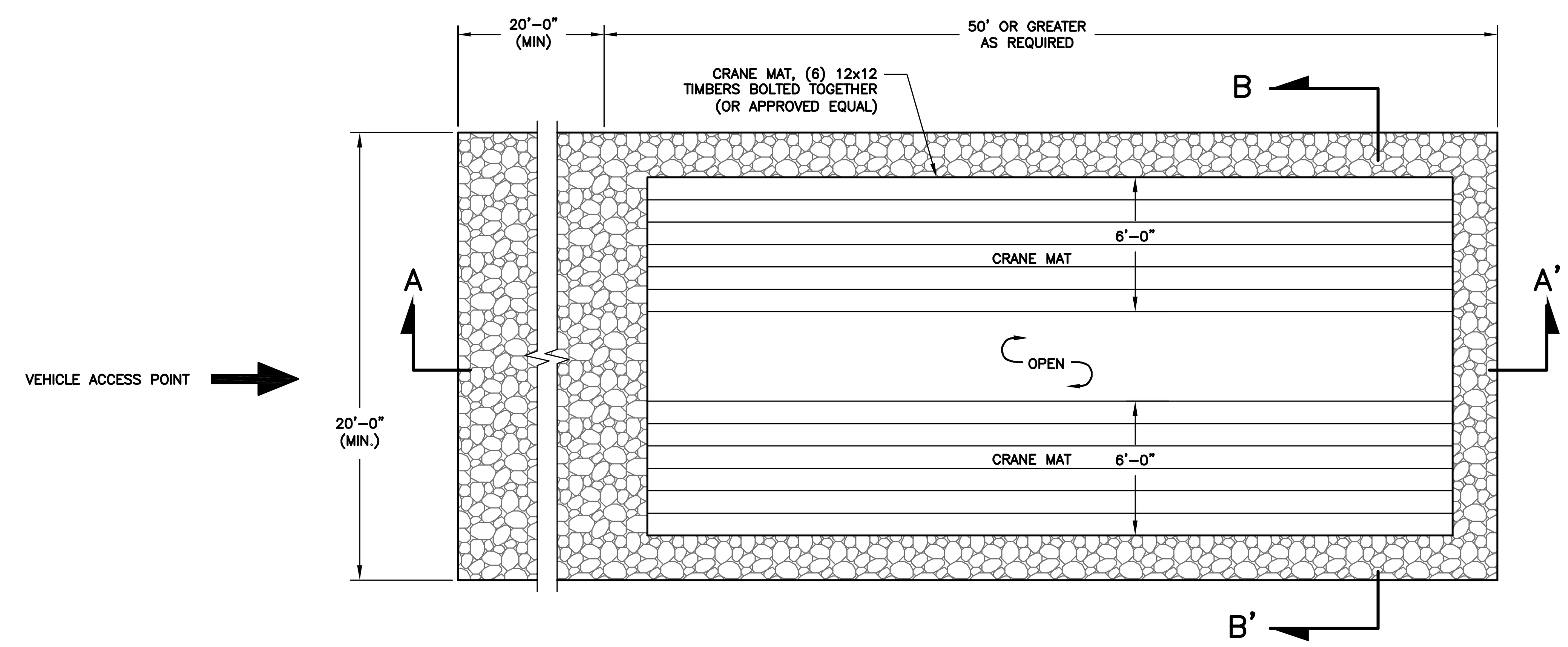
NOTES

1. THE REQUIREMENTS SHOWN ARE MINIMUM REQUIREMENTS. REFER ALSO TO SPECIFICATION SECTION 02210 FOR SPECIFIC STAGING REQUIREMENTS.
2. POLY SHEETING SHALL OVERLAP BY A MINIMUM OF TWELVE (12) INCHES AND SHALL BE ANCHORED, USING SAND BAGS OR EQUIVALENT WEIGHTS, AT 5 TO 10 FOOT CENTERS. USE ADDITIONAL WEIGHTS, AS NECESSARY, TO PROPERLY ANCHOR SHEETING DURING WINDY CONDITIONS
3. ALL STOCKPILES SHALL BE LABELED WITH SIGNS INDICATING THE STOCKPILE CONTENTS.



6 LINER ANCHOR TRENCH DETAIL
SCALE: NOT TO SCALE

7 LINER DETAIL
SCALE: NOT TO SCALE



PLAN VIEW

5 DECONTAMINATION PAD/STABILIZED CONSTRUCTION ENTRANCE DETAIL
SCALE: NOT TO SCALE

NOTES:

1. CONTRACTOR SHALL INSTALL DECONTAMINATION PAD/STABILIZED CONSTRUCTION ENTRANCE AT EACH CONSTRUCTION VEHICLE ACCESS POINT TO THE SITE OR NECESSARY FOR THE WORK.
2. STONE SIZE SHALL BE COARSE AGGREGATE (STONE SIZE 1" TO 2").
3. NON-WOVEN GEOTEXTILE – PLACE OVER ENTIRE AREA PRIOR TO PLACING OF STONE.
4. MAINTENANCE – THE ENTRANCE SHALL BE MAINTAINED IN A CONDITION WHICH WILL PREVENT TRACKING OR FLOWING OF SOIL ONTO PUBLIC RIGHTS-OF-WAY. THIS MAY REQUIRE PERIODIC TOP DRESSING WITH ADDITIONAL STONE AS CONDITIONS DEMAND AND REPAIR AND/OR CLEANOUT OF ANY MEASURES USED TO TRAP SOIL. ALL SOIL SPILLED, DROPPED, WASHED OR TRACKED ONTO PUBLIC RIGHTS-OF-WAY MUST BE REMOVED IMMEDIATELY.
5. WASHING – WHEELS SHALL BE CLEANED TO REMOVE SOIL PRIOR TO ENTRANCE ONTO PUBLIC RIGHTS-OF-WAY. WHEN WASHING IS REQUIRED, IT SHALL BE DONE ON AN AREA STABILIZED WITH STONE.
6. PERIODIC INSPECTION AND NEEDED MAINTENANCE SHALL BE PROVIDED AFTER EACH RAIN EVENT.
7. DECONTAMINATION PAD SHALL BE COVERED WITH 6 MIL POLYETHYLENE WHEN NOT IN USE.

Date: 06AUG07 File Name: N:\PROJECTS\AM055Y\AM45Y\223\AM4522309.DWG Plot Scale: 1:1

NO.	DATE	REVISION DESCRIPTION	INT.
0	7/09/07	EMBAYMENT AREA BID SET	N.C.

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PROJECT ENGINEER: J.P.	PROJECT NO. 05545Y
DESIGNED BY: J.P.	FILE NO. AM4522309
DRAWN BY: G.M.	SCALE: AS SHOWN
CHECKED BY: D.M.H.	DATE: AUGUST 2007

REMEDIAL ENGINEERING, P.C.
209 Shafter Street
Islandia, New York 11749 (631) 232-2600

PROJECT NAME:
REMEDIAL ACTION WORK PLAN
OU-3
PROJECT FOR:
AMTRAK SUNNYSIDE YARD
QUEENS, NEW YORK

TITLE:
DETAILS

DRAWING NO.
C-8
DRAWING 8 OF 8