



December 19, 2011

Mr. Martin Judd
New Jersey Transit
One Penn Plaza East
Newark, New Jersey 07105-2246

Re: Environmental Report for Property Acquisition (ERPA)
Union Dry Dock Property – 901 Sinatra Drive, Hoboken, New Jersey

Dear Mr. Judd:

At your request, Roux Associates, Inc. (Roux Associates) completed a Phase I Environmental Site Assessment (Phase I ESA) in accordance with United States Environmental Protection Agency (USEPA) All Appropriate Inquiry (AAI) rule and a Preliminary Assessment Report (PA Report) in accordance with New Jersey Department of Environmental Protection (NJDEP) requirements for the Union Dry Dock & Repair (Union Dry Dock) property, located at 901 Frank Sinatra Drive in Hoboken, New Jersey (hereinafter referred to as Site). A Site Location Map is provided as Figure 1.

The Phase I ESA and PA Report were submitted to New Jersey Transit (NJ Transit) and dated December 2011. Other key documents related to this Site include a PA Report prepared by Dresdner Robin (DR) dated April 2009, and a Site Investigation/Remedial Action Work Plan (SI/RAWP), also prepared by DR and dated April 2009. These key documents, as well as a host of other documents related to the Site, including a 2005 PA Report prepared by TRC Raviv, were reviewed as part of the preparation of the Phase I ESA and PA Report. Additionally, based on the collective findings of these environmental reports, Roux Associates conducted supplemental site investigation activities to further assess subsurface conditions on November 16 through 18, and 30, 2011. Based on the results of the Phase I ESA, PA Report, supplemental site investigation activities, and other key environmental documents, Roux Associates has prepared this Environmental Report for Property Acquisition (ERPA) for the Site. The purpose of this ERPA is to document known environmental conditions and projected remediation costs associated with the upland portion of the Site. It is Roux Associates understanding that NJ Transit is evaluating the future use of the Site as a ferry maintenance facility, and as such, this ERPA contemplates a non-residential future use scenario. A Site description, summary of previous environmental activities, proposed remedial action approach and cost summary are provided below.

Site Description

The Site is currently being operated as the Union Dry Dock & Repair Co., a barge repair and maintenance facility situated along the western shore of the Hudson River. The Site is

shown as Block 259, Lot 1 on the Hoboken Tax Map. The Site is approximately 8.5 acres, and is improved with several buildings and trailers, material storage, three piers, two dry-docks, mooring bells, and a paved parking lot. In 1984, a 2-inch layer of crushed stone was placed over upland areas that are not paved or covered with concrete. A significant portion of the Site (approximately 55%) extends into and encompasses a portion of the Hudson River. The grade at the Site slopes slightly downward to the east towards the Hudson River. The elevation of the Site is approximately 10-15 feet above mean sea level, as shown in the USGS 7.5 Minute Series Passaic Quadrangle Topographic Map (see Figure 1).

The Site is surrounded by a mix of predominantly residential, academic, and public use properties. Specifically, the Site is bounded to the north by a public park and a new residential development (Maxwell House), to the west by Sinatra Drive, Stevens Institute of Technology, and residential row-houses, to the south by a public skate park, public soccer field, and Stevens Institute of Technology Operation Plant, and to the east by the Hudson River.

According to previous investigations conducted by others, and a review of published information, the entire Site is immediately underlain by historic fill to depths ranging from 9 feet below land surface (ft bls) to a maximum depth of 21 ft bls. Historic fill consists of a mix of anthropogenic materials, gravels, cobbles, and sand. Immediately underlying this historic fill is a mix of fluvial sediments consisting of peat, clay, and silt. Serpentine bedrock is likely present beneath unconsolidated sediments at varying depths across the Site. This rock is noted by its distinctive yellowish green color and is known to be naturally asbestos containing. Adjacent to the Site (across Sinatra Drive) is an outcrop of this serpentine rock.

Groundwater occurs beneath the Site at depths of 6 ft bls to 9 ft bls depending on proximity to the Hudson River. Groundwater is assumed to flow in an easterly direction towards the Hudson River with groundwater elevation and flow direction potentially influenced by tidal conditions and the presence of shallow bedrock. In addition, localized groundwater flow direction may also be influenced by utilities and other subsurface variations in geology.

Based on interviews conducted during the Phase I ESA, the buildings that formerly existed while the site was under previous ownership, prior to occupancy by the current owner, were demolished with a majority of the building material debris left in place. Prior to construction of the current facility, Union Dry Dock & Repair Co. imported approximately 1,800 cubic yards of virgin stone to serve as a 2-inch cover across all land portions of the Site in 1984.

Previous Environmental Activities

A summary of key environmental documents related to the site is provided below.

DR PA Report

As discussed above, a PA Report was completed by DR for the Site, dated April 2009. This document was prepared as part of a previous NJDEP Industrial Site Recovery Act (ISRA) filing due to the proposed sale of the Site by Union Dry Dock to Bijou Properties LLC (this property transaction never occurred). The PA Report identified 18 potential areas of concern (AOCs), including above ground storage tanks (ASTs), drum storage areas, the surface water and sediments in the Hudson River, historic fill used to grade the Site, electric transformers, observed stained areas, air compressor vent discharges, and investigation of potential offsite contamination from adjacent properties. DR recommended further investigation at 11 of these 18 potential AOCs.

DR SI/RAWP

Subsequent to identifying the potential AOCs, DR conducted site investigation activities at the 11 AOCs in which further investigation was recommended in the PA Report, and documented the results in an SI/RAWP dated April 2009. As part of this investigation, DR conducted a geophysical survey, and completed 16 soil borings, three piezometers, and 24 sediment cores. Results of the investigation indicated that soils at the Site contained concentrations of metals and polycyclic aromatic hydrocarbons (PAHs) above their respective NJDEP Residential Direct Contact Soil Remediation Standards (RDCSRS), Non-Residential Direct Contact Soil Remediation Standards (NRDCSRS), and/or the Default Impact to Groundwater Soil Screening Guidelines. Additionally, in one location naphthalene was identified in soil above the RDCSRS. The exceedances of metals and PAHs (except naphthalene) in Site soils were attributed to historic fill. The source of the naphthalene exceedance in soil was not determined. The DR SI/RAWP indicated that the extent of the historic fill at the Site has been delineated to depths of 9 up to 21 ft bbls, across the entire Site.

Results of the groundwater investigation concluded that concentrations of various PAHs and Metals were detected above NJDEP Class IIA Groundwater Quality Standards (GWQS). These exceedances were also attributed to historic fill. In addition, one groundwater sample was observed to contain trichloroethene (TCE) at a concentration above GWQS, of which the source was unknown. Note that DR collected groundwater samples from temporary well points as opposed to permanent, properly developed wells. Groundwater samples collected from temporary well points may be prone to elevated turbidity from suspended solids.

Results of the sediment screening from within the Hudson River indicated the presence of metals in near-Site samples at concentrations higher than the concentration of the background samples collected upstream of the Site. Specifically, results identified several metals (including arsenic, cadmium, chromium, copper, lead, mercury, nickel, silver, and zinc) that exceeded NJDEP Marine/Estuary Sediment Screening Guidelines Effects Range. As part of the SI/RAWP, DR conducted a 28-day toxicity test on the river sediments. Based on this toxicity test, DR concluded that near-Site sediment samples are not toxic, despite the elevated concentrations of several elements, therefore, DR recommended no further action related to river sediments.

The DR SI/ RAWP recommended an additional investigation be conducted to delineate the vertical and horizontal extent of the naphthalene exceedance in soil as observed in one sample (boring DR-2) in the area adjacent to the parking lot. Additionally, to confirm the presence of TCE in groundwater, Dresdner Robin concluded that one monitoring well should be installed at the location of former temporary well point PZ-5 (near the hazardous materials storage barge).

Roux Associates Phase I ESA

Roux Associates prepared a Phase I ESA report for the Site dated March 31, 2010. Since this Phase I ESA is greater than one year old, in accordance with ASTM E1527-05, Section 4.6, this Roux Associates prepared a new Phase I ESA dated December 2011. Both Phase I ESAs were conducted in accordance with the USEPA AAI Rule (40 CFR Part 312, Standards and Practices for All Appropriate Inquiries, Final Rule) as defined in ASTM Standards E1527-05 and E2247-08. Both Phase I ESA reports concluded with the identification of the following Recognized Environmental Concerns (RECs):

- The presence of soil and groundwater contamination was documented in Site investigations previously conducted by others. Soil contamination documented onsite includes SVOC and metals contamination attributed by others to historic fill that is distributed throughout the Site, and naphthalene contamination in soil observed in the vicinity of the parking lot. The extent of the naphthalene contamination in soil is unknown. Groundwater contamination onsite includes the presence of TCE observed in the vicinity of the material storage area. The extent and source of the TCE contamination in groundwater is unknown.
- The presence of Hudson River sediment contamination (a portion of the Site is underwater and in connection with the Hudson River) as documented in previously conducted Site investigations. The sediment was analyzed and determined to contain detectable levels of PCBs, and metals. PCBs were historically used in marine paints. Recent stormwater discharge permit modifications suggest that the NJDEP is concerned with the potential for contaminants resulting from Site activities to impact Hudson River sediments.
- The material threat of a release of hazardous substances into the environment due to inadequate storage of hazardous substances including diesel fuel and oils, and poor management of spent blasting grit, and waste potentially containing paint chips. These concerns were evident by staining observed on cracked pavement and soils in areas of hazardous material storage.
- The material threat of contamination posed by previous activities conducted at the Former Pennsylvania Rail Road repair shop that was in operation at the Site from early 1900s to 1976. This repair shop performed repair of barges and other vessels, and included fuel oil storage, a power station, a boiler room, a pitch kettle, paint mixing, material storage/sheds, independent electric shop, and a blacksmith shop. Foundations related to historical structures at the Site were encountered at soil borings completed during previous investigations.

Roux Associates PA Report

Roux Associates conducted a PA in accordance with N.J.A.C. 7:26E (The Technical Requirements for Site Remediation). Roux Associates prepared a PA Report dated December 2011, which presented similar conclusions and findings as the Phase I ESAs.

2011 Supplemental Site Investigation Activities

In November 2011, Roux Associates conducted supplemental investigation activities at the Site. Based on review of previous environmental documents, and completion of a Phase I ESA and PA Reports, Roux Associates concluded that the following additional investigation activities were warranted.

1. Based on DR's recommendations in the SI /RAWP, Roux Associates concurred the following investigation activities were warranted:
 - Installation of a permanent monitoring well and collection of a groundwater sample to confirm the presence of TCE, PAHs and metals in groundwater in the location of former temporary well PZ-5.
 - Vertical and horizontal delineation of naphthalene exceedance in soil at boring DR-2.
2. During Roux Associates site visit/reconnaissance conducted on February 5, 2010, staining was observed near cracks in the concrete floor of the Plate Shop. Several 55-gallon drums were also observed to be stored on wooden pallets in this area, without secondary containment. Based on this observation, Roux Associates investigated soil in this area, beneath the floor slab.

Roux Associates conducted these supplemental investigation activities from November 16 through 18, and 30, 2011. A description of our findings is presented below.

Delineation of Naphthalene

Roux Associates completed soil borings SB-1 through SB-5 to complete delineation of naphthalene in soil (see Figure 2 for soil boring locations). Table 1 presents a summary of the naphthalene concentrations detected in soil during this investigation. All soil borings were completed using a Geoprobe direct push drill rig. Prior to drilling, all boring locations were cleared to a depth of 3 ft bls using hand digging methods (i.e., hand auger) to confirm subsurface utilities are not present. Following clearance, soil samples were collected continuously using a five foot Geoprobe macrocore sampler. Each soil core was inspected for evidence of impacts (i.e., staining, odors, etc.) and field screened for VOCs using a photoionization detector (PID).

The first soil boring (designated SB-1) was completed in approximately the same location as DR's soil boring DR-2 (naphthalene was detected in this boring in excess of the RDCSRS in the 7.5 to 8 ft bls interval). Roux Associates collected a soil sample from the 8.5 to 9 ft bls interval (below the interval in which DR detected the exceedance of the RDCSRS). Naphthalene was not detected in sample SB-1/8.5 to 9 ft bls, completing vertical delineation of naphthalene.

Soil borings SB-2 through SB-5 were completed 10 feet on center, radially around SB-1 to the northwest, northeast, southeast, and southwest, respectively (see Figure 2). Soil samples were collected from each boring from the 7.5 to 8 ft bls interval (comparable to the initial naphthalene exceedance in boring DR-2). As presented in Table 1, the highest naphthalene detection was 210 micrograms per kilogram ($\mu\text{g}/\text{kg}$), which was detected in sample SB-4/7.5 to 8 ft bls. All results were significantly below the RDCSRS of 6,000 $\mu\text{g}/\text{kg}$ (i.e., the most stringent SRS); therefore, vertical and horizontal delineation of naphthalene is complete.

Soil Boring Through Plate Shop Slab

On November 16, 2011 Roux Associates completed one soil boring (designated SS-S B-1) through the concrete floor slab of the Plate Shop, in the of the cracks and staining observed during the February 5, 2011 Site reconnaissance. Initially, Roux Associates drilling contractor cored through the concrete floor slab, which is approximately 3-inches in thickness. One soil sample was collected from the 0 to 0.5 ft bls interval and was submitted for laboratory analysis for Priority Pollutant compounds with a library search (PP+40). As presented in Tables 2 and 3, and Tables 5 through 7, this sample did not exceed any SRS for VOCs, SVOCs, PCBs, Pesticides, or phenols. As shown on Table 4, nickel was the only metal identified in excess of a SRS. Specifically, nickel exceeded the NJDEP Default Impact to Groundwater Soil Screening Guidelines of 31 $\mu\text{g}/\text{kg}$ in this sample with a concentration of 550 $\mu\text{g}/\text{kg}$. This concentration is below the RDCSRS of 1,600 $\mu\text{g}/\text{kg}$ for nickel, and is consistent with other detections of nickel found in the historic fill throughout the Site.

Groundwater Quality

On November 16, 2011 Roux Associates installed a permanent monitoring well (designated MW-1) near the former location of DR's temporary well PZ-5 (see Figure 2). This well was constructed of flush threaded 2-inch diameter PVC casing and 20-slot (0.020 inch) PVC screen. The monitoring well was constructed with screen from 4 ft bls to 19 ft bls. From the bottom to top, the annular space between the PVC well screen and casing and the borehole was filled with Morie #1 sand to approximately two feet above the top of the well screen. This was followed by a one foot layer of bentonite pellets. The remainder of the annulus was grouted and the well was completed at the surface with a locking cap and covered with steel manhole cover equipped with watertight steel lid flush with grade. After installation, MW-1 was developed using a submersible pump and surge block. A licensed New Jersey land surveyor then surveyed the position and elevation of the well.

Two weeks after installation, Roux Associates returned to the Site on November 30, 2011 to collect a groundwater sample from MW-1. Initially the water level was gauged using an electronic oil/water interface probe. Groundwater was measured at 6.98 feet below the top of the well casing. Following gauging, the well was purged and sampled. In an effort to reduce turbidity, groundwater purging and sampling activities were completed following low flow groundwater sampling methods, in accordance with the methods described in the NJDEP Low-Flow Purging and Sampling Guidance dated December 2003 and the NJDEP

Field Sampling Procedures Manual dated August 2005. Following purging, a groundwater sample was submitted for laboratory analysis for VOCs+10, SVOCs+25, and PP metals.

The results for the groundwater sample for VOCs, SVOCs, and metals are provided in Tables 8 through 10, respectively. As presented in Table 8, TCE was not detected in this groundwater sample. Further, there were no exceedances of the GW QS for any VOCs or SVOCs. The only metal to exceed its GWQS was nickel, with a concentration of 52 µg/l (the GWQS for nickel is 4 µg/l). This suggests the historic fill may have minimal impacts on groundwater.

Remedial Approach

The remedial selection process is based on an evaluation of the documented environmental concerns identified at the Site, which have been determined to include soil impacts attributed to historic fill. Additionally, groundwater may have minimal impacts attributed to the historic fill. Roux Associates understands that NJ Transit is evaluating the use of the Site as a ferry maintenance facility. Therefore, the remedial approach contemplated in this ERPA is for non-residential future use. Any future remedial activities at the Site would require that the owner enter into the NJDEP's Licensed Site Remediation Professional (LSRP) program.

Roux Associates retained the most cost effective remedial approach to address environmental impacts at the Site, leaving the Site suitable for a non-residential future use scenario. This remedial approach includes the following key components:

- Site Investigation
- Excavation and Off-site Disposal of Soil Impacted with Naphthalene above the NJDEP RDCSRS
- Construction of Engineered Cap to Address Historic Fill Contaminants in Soil
- Implementation of a Deed Notice and Associated Fees, ISRA Costs, other NJDEP Documentation and Fees, and Biennial Deed Notice Certification Reports
- Establishment of Groundwater CEA and Associated Fees, and Biennial CEA Certification Reports (Contingent on Groundwater Investigation)

This ERPA assumes that the existing site improvements, including building slabs, paved areas, and concrete walkways will remain as part of the future use of the Site. Note that asbestos was not evaluated as part of this ERPA, and if present, may need to be addressed as part of site redevelopment.

These remedial approach components are described below.

Site Investigation

This task includes costs associated with the 2011 Site Investigation activities already completed, as described above (i.e., delineation of naphthalene, investigation below Plate Shop slab, and monitoring well installation and groundwater sampling). Also included in

this task are costs anticipated related to future groundwater investigation activities. This includes the installation of three additional monitoring wells at the Site to determine if historic fill has impacted groundwater.

Excavation of Soil Impacted with Naphthalene above the NJDEP RDCSRS

As described above, soils impacted with naphthalene (initially identified in DR's boring designated DR-2) have been delineated both in the vertical and horizontal directions. Soil containing naphthalene above the RDCSRS is limited to a 400 square feet (sf) area, and to a depth of 8.5 feet bls. As described below, an Engineered Cap would be constructed as part of this remedial approach. As such, the naphthalene hot spot could remain at the Site, however this would trigger additional NJDEP fees associated with the Engineered Cap. If naphthalene were removed, the cap would be purely to address historic fill, and NJDEP fees associated with the cap would not apply. Therefore, this naphthalene hot spot (approximately 125 cubic yards in volume) would be excavated and disposed off site. Following soil excavation activities, post-excavation samples would be collected in accordance with the Technical Requirements for Site Remediation (7:26E et seq. "Tech Regs") to confirm clean excavation endpoints were obtained. Once clean endpoints are confirmed, the excavation would be backfilled.

Engineered Cap

The construction of an Engineered Cap over the upland portion of the Site would be required to address the historical fill impacts identified in soil. Since Site improvements such as building slabs, paved areas, and concrete walkways will remain, these would be incorporated in the design of the Engineered Cap. Note that when calculating estimated costs for the Engineered Cap as part of this remedial approach, only permanent structures such as buildings, parking lots, etc. were considered viable components of the cap (i.e., office trailers and locker room trailers that can be relocated were not considered to be included as part of the cap design). Further, the 2-inches of stone placed by the Union Dry Dock & Repair Co. in 1984 does not qualify as a sufficient cap, so all of these areas are included in the design of this cap.

A barrier consisting of a minimum of 1 foot of clean fill will be placed over all areas of the Site that are not covered with buildings, pavement or concrete. A geotextile fabric demarcation layer will be placed under this cap. Inspections of this cap would be completed on a semi-annual basis, and reported on a biennial basis.

Implementation of a Deed Notice and Associated Fees, ISRA Costs, other NJDEP Documentation and Fees, and Biennial Deed Notice Certification Reports

In accordance with the Technical Requirements for Site Remediation (7:26E et seq. "Tech Regs"), a property owner is required to submit a Deed Notice to NJDEP when the proposed remedial action for the property includes contamination remaining above the RDCSRS. Since there are soil exceedances of the RDCSRS associated with historic fill that will remain on-site, a Deed Notice would be required to document the extent of the remaining contamination and the engineering control (i.e., Engineered Cap). Upon issuance of a Deed Notice for the property, the NJDEP requires biennial reporting which includes: an inspection of the property to document the condition of the institutional

controls and overall site conditions; inspection of the County records to confirm that the Deed Notice for the property is on file, the determination of the current or proposed zoning for the property; and completion of a NJDEP biennial report checklist. Additionally, NJDEP fees associated with establishing the Deed Notice, semi-annual inspection/monitoring of the cap (engineering control), and biennial reporting is also included in this task.

This task also includes the preparation of a Remedial Action Report, as well as the submission of required LSRP applications, forms and fees. This task assumes ISRA will be triggered as part of the property transfer; therefore estimated costs associated with ISRA are included herein.

Preparation of Groundwater CEA and Associated Fees, and Biennial CEA Certification Reports

In accordance with the Technical Requirements for Site Remediation (7:26E et seq. "Tech Regs"), a property owner is required to establish a CEA for groundwater when the proposed remedial action for the property includes groundwater impacts remaining above the GWQS. Currently, nickel is the only compound identified in groundwater above the GWQS. Additional groundwater investigation is proposed (as described above) to further investigate this exceedance of nickel. The groundwater investigation described above also includes the installation of additional monitoring wells to determine if groundwater beneath other portions of the Site has been impacted by historic fill.

This task includes the establishment of a groundwater CEA and associated biennial CEA certification reporting. To be cost effective, it is assumed that the biennial CEA certification reporting will be done concurrently with the biennial Deed Notice certification reporting. This task is contingent on future groundwater investigation activities.

Cost Summary

The cost estimate for this remedial approach, as described above, is summarized below. Additionally, Attachment 1 (Tables A-1, A-2, and A-3) provide a detailed summary of this cost estimate. The costs identified for the remediation of the Site presented herein represents costs that NJ Transit would likely incur for occupancy and use of the Site for a proposed ferry maintenance terminal.

Since it is not certain at this point if a groundwater CEA will be required, two remedial cost estimates are provided. The first (Option A) assumes all components of the remedial cost estimate will be required (including the groundwater CEA). The second remedial cost estimate (Option B) assumes the groundwater CEA (and associated biennial reporting) will not be required (all other components to the remedial approach described above are included).

Below is a summary of the estimated remedial costs.

OPTION 1: Remedial Cost Estimate – Assuming Groundwater CEA is Required

Task Description	Estimated Cost
Site Investigation	\$ [REDACTED]
Naphthalene Soil Excavation	\$ [REDACTED]
Construction of Engineered Cap	\$ [REDACTED]
Preparation of Deed Notice, ISRA Costs, and other NJDEP Documentation and Fees	\$ [REDACTED]
Preparation of Groundwater CEA (Contingent on Groundwater Investigation Results)	\$ [REDACTED]
Biennial Deed Notice Certifications and Cap Inspection Monitoring Reports (every two years for 30 years) – Total Net Present Value	\$ [REDACTED]
Biennial Groundwater CEA Certifications (every two years for 30 years) – Total Net Present Value	\$ [REDACTED]
Indirect Costs (Project Management, Remedial Design, Const. Management and Contingency)	\$ [REDACTED]
Total Cost Estimate (Net Present Value)	\$ [REDACTED]

OPTION 2: Remedial Cost Estimate – Assuming Groundwater CEA is Not Required

Task Description	Estimated Cost
Site Investigation	\$ [REDACTED]
Naphthalene Soil Excavation	\$ [REDACTED]
Construction of Engineered Cap	\$ [REDACTED]
Preparation of Deed Notice, ISRA Costs, and other NJDEP Documentation and Fees	\$ [REDACTED]
Biennial Deed Notice Certifications and Cap Inspection Monitoring Reports (every two years for 30 years) – Total Net Present Value	\$ [REDACTED]
Indirect Costs (Project Management, Remedial Design, Const. Management and Contingency)	\$ [REDACTED]
Total Cost Estimate (Net Present Value)	\$ [REDACTED]

Should you have any questions regarding the findings of this ERPA, do not hesitate to contact either of the undersigned at (631) 232-2600.

Sincerely,

ROUX ASSOCIATES, INC.



Robert Kovacs
Project Manager/
Senior Environmental Scientist



Joseph D. Duminuco
Principal Hydrogeologist/
Vice President

Attachments

Table 1. Summary of Naphthalene Soil Delineation Results, Union Dry Dock, Hoboken, New Jersey

Parameter (Concentrations in µg/kg)	NJDEP Non-Residential	NJDEP Residential	NJDEP	Sample Designation:	SB-1	SB-2	SB-3
	Direct Contact Soil Remediation Standards	Direct Contact Soil Remediation Standards	Default Impact to Groundwater	Sample Date:	11/17/2011	11/17/2011	11/17/2011
				Sample Depth (ft bls):	8.5-9	7.5-8	7.5-8
Naphthalene	17000	6000	16000		69 U	150	81

U - Indicates that the compound was analyzed for but not detected

µg/kg - Micrograms per kilogram

ft bls - Feet below land surface

NJDEP - New Jersey Department of Environmental Protection

Table 1. Summary of Naphthalene Soil Delineation Results, Union Dry Dock, Hoboken, New Jersey

Parameter (Concentrations in µg/kg)	NJDEP Non-Residential Direct Contact Soil Remediation Standards	NJDEP Residential Direct Contact Soil Remediation Standards	NJDEP Default Impact to Groundwater	Sample Designation: Sample Date: Sample Depth (ft bls):	SB-4 11/17/2011 7.5-8	SB-5 11/17/2011 7.5-8
Naphthalene	17000	6000	16000		210	59 U

U - Indicates that the compound was analyzed for but not detected

µg/kg - Micrograms per kilogram

ft bls - Feet below land surface

NJDEP - New Jersey Department of Environmental Protection

Table 2. Summary of Volatile Organic Compounds in Soil, Union Dry Dock, Hoboken, New Jersey

Parameter (Concentrations in µg/kg)	NJDEP Non-Residential Direct Contact Soil Remediation Standards	NJDEP Residential Direct Contact Soil Remediation Standards	NJDEP Default Impact to Groundwater	Sample Designation: Sample Date: Sample Depth (ft bls):	SS-SB1 11/17/2011 0.0-0.5
1,1,1-Trichloroethane	4200000	290000	200		2 U
1,1,2,2-Tetrachloroethane	3000	1000	5		2 U
1,1,2-Trichloroethane	6000	2000	10		2 U
1,1-Dichloroethane	24000	8000	200		2 U
1,1-Dichloroethene	150000	11000	5		2 U
1,2,3-Trichlorobenzene	--	--	--		2 U
1,2,4-Trichlorobenzene	820000	73000	400		2 U
1,2-Dibromoethane	40	8	5		1 U
1,2-Dichlorobenzene	59000000	5300000	11000		2 U
1,2-Dichloroethane	3000	900	5		2 U
1,2-Dichloropropane	5000	2000	5		2 U
1,3-Dichlorobenzene	59000000	5300000	12000		2 U
1,4-Dichlorobenzene	13000	5000	1000		2 U
1,4-Dioxane	--	--	--		100 U
2-Butanone (MEK)	44000000	3100000	600		2 U
2-Hexanone	--	--	--		2 U
4-Methyl-2-pentanone (MIBK)	--	--	--		2 U
Acetone	--	70000000	12000		10 U
Acrolein	1000	500	500		10 U
Acrylonitrile	3000	900	500		2 U
Benzene	5000	2000	5		1 U
Bromochloromethane	--	--	--		2 U
Bromodichloromethane	3000	1000	5		2 U
Bromoform	280000	81000	20		2 U
Bromomethane	59000	25000	30		2 U
Carbon disulfide	110000000	7800000	4000		2 U
Carbon tetrachloride	2000	600	5		2 U
Chlorobenzene	7400000	510000	400		2 U
Chloroethane	1100000	220000	NA		2 U
Chloroform	2000	600	200		2 U
Chloromethane	12000	4000	NA		2 U
cis-1,2-Dichloroethene	560000	230000	200		2 U
cis-1,3-Dichloropropene	7000	--	--		2 U
Cyclohexane	--	--	--		2 U
Dibromochloromethane	8000	3000	5		2 U
Dibromochloropropane	200	--	5		2 U

Table 2. Summary of Volatile Organic Compounds in Soil, Union Dry Dock, Hoboken, New Jersey

Parameter (Concentrations in µg/kg)	NJDEP Non-Residential Direct Contact Soil Remediation Standards	NJDEP Residential Direct Contact Soil Remediation Standards	NJDEP Default Impact to Groundwater	Sample Designation: Sample Date: Sample Depth (ft bls):	SS-SB1 11/17/2011 0.0-0.5
Dichlorodifluoromethane	230000000	490000	25000		2 U
Ethylbenzene	110000000	7800000	8000		1 U
Freon 113	--	--	--		2 U
Isopropylbenzene	--	--	--		1 U
m+p-Xylene	--	--	--		1 U
Methyl acetate	--	78000000	14000		2 U
Methylcyclohexane	--	--	--		2 U
Methylene chloride	97000	34000	7		2 U
MTBE	320000	110000	200		1 U
o-Xylene	--	--	--		1 U
Styrene	260000	90000	2000		2 U
t-Butyl Alcohol	11000000	1400000	200		10 U
Tetrachloroethene	5000	2000	5		2 U
Toluene	91000000	6300000	4000		1 U
trans-1,2-Dichloroethene	720000	300000	400		2 U
trans-1,3-Dichloropropene	7000	--	--		2 U
Trichloroethene	20000	7000	7		2 U
Trichlorofluoromethane	340000000	23000000	22000		2 U
Vinyl chloride	2000	700	5		2 U
Xylenes (total)	170000000	12000000	12000		1 U

J - Estimated value

U - Indicates that the compound was analyzed for but not detected

DUP - Duplicate sample

µg/kg - Micrograms per kilogram

ft bls - Feet below land surface

NJDEP - New Jersey Department of Environmental Protection

-- No NJDEP Soil Remediation Standards available

Table 3. Summary of Semivolatile Organic Compounds in Soil, Union Dry Dock, Hoboken, New Jersey

Parameter (Concentrations in µg/kg)	NJDEP Non-Residential Direct Contact Soil Remediation Standards	NJDEP Residential Direct Contact Soil Remediation Standards	NJDEP Default Impact to Groundwater	Sample Designation: Sample Date: Sample Depth (ft bls):	SS-SB1 11/16/2011 0.0-0.5
1,1'-Biphenyl	34000000	3100000	90000		38 U
1,2,4,5-Tetrachlorobenzene	--	--	--		38 U
1,2,4-Trichlorobenzene	820000	73000	400		38 U
1,2-Diphenylhydrazine	2000	700	700		38 U
2,2'-oxybis (1-chloropropane)	67000	23000	3000		38 U
2,3,4,6-Tetrachlorophenol	--	--	--		38 U
2,4,5-Trichlorophenol	68000000	6100000	44000		38 U
2,4,6-Trichlorophenol	74000	19000	200		38 U
2,4-Dichlorophenol	2100000	180000	200		9.5 U
2,4-Dimethylphenol	14000000	1200000	700		38 U
2,4-Dinitrophenol	1400000	120000	300		190 U
2,4-Dinitrotoluene	3000	700	NA		38 U
2,6-Dinitrotoluene	3000	700	NA		38 U
2-Chloronaphthalene	--	--	--		38 U
2-Chlorophenol	2200000	310000	500		38 U
2-Methylnaphthalene	2400000	230000	5000		38 U
2-Methylphenol	3400000	310000	NA		9.5 U
2-Nitroaniline	23000000	39000	NA		38 U
2-Nitrophenol	--	--	--		38 U
3,3'-Dichlorobenzidine	4000	1000	200		38 U
3-Nitroaniline	--	--	--		38 U
4,6-Dinitro-2-methylphenol	68000	6000	300		38 U
4-Bromophenyl phenyl ether	--	--	--		38 U
4-Chloro-3-methylphenol	--	--	--		38 U
4-Chloroaniline	--	--	--		18 U
4-Chlorophenyl phenyl ether	--	--	--		38 U
4-Methylphenol	340000	31000	NA		9.5 U
4-Nitroaniline	--	--	--		38 U
4-Nitrophenol	--	--	--		38 U
Acenaphthene	37000000	3400000	74000		38 U
Acenaphthylene	300000000	--	NA		38 U
Acetophenone	5000	2000	2000		38 U
Anthracene	30000000	17000000	1500000		38 U

Table 3. Summary of Semivolatile Organic Compounds in Soil, Union Dry Dock, Hoboken, New Jersey

Parameter (Concentrations in µg/kg)	NJDEP Non-Residential Direct Contact Soil Remediation Standards	NJDEP Residential Direct Contact Soil Remediation Standards	NJDEP Default Impact to Groundwater	Sample Designation: Sample Date: Sample Depth (ft bls):	SS-SB1 11/16/2011 0.0-0.5
Atrazine	2400000	210000	200		38 U
Benzaldehyde	68000000	6100000	NA		38 U
Benzidine	700	700	700		38 U
Benzo[a]anthracene	2000	600	500		38 U
Benzo[a]pyrene	200	200	200		38 U
Benzo[b]fluoranthene	2000	600	2000		38 U
Benzo[g,h,i]perylene	30000000	38000000	NA		38 U
Benzo[k]fluoranthene	23000	6000	16000		38 U
Bis(2-chloroethoxy)methane	--	--	--		38 U
Bis(2-chloroethyl) ether	2000	400	200		9.5 U
Bis(2-ethylhexyl) phthalate	140000	35000	790000		42
Butylbenzyl phthalate	14000000	1200000	150000		38 U
Caprolactam	340000000	31000000	8000		38 U
Carbazole	96000	24000	NA		38 U
Chrysene	230000	62000	52000		38 U
Dibenzo[a,h]anthracene	200	200	500		38 U
Dibenzofuran	--	--	--		9.5 U
Diethyl phthalate	550000000	49000000	57000		38 U
Dimethyl phthalate	--	--	--		38 U
Di-n-butyl phthalate	68000000	6100000	620000		19 U
Di-n-octyl phthalate	27000000	2400000	3300000		38 U
Fluoranthene	24000000	2300000	840000		38 U
Fluorene	24000000	2300000	110000		38 U
Hexachlorobenzene	1000	300	200		38 U
Hexachlorobutadiene	25000	6000	600		38 U
Hexachlorocyclopentadiene	110000	45000	210000		38 U
Hexachloroethane	140000	35000	200		38 U
Indeno[1,2,3-cd]pyrene	2000	600	5000		38 U
Isophorone	2000000	510000	200		38 U
Naphthalene	17000	6000	16000		9.5 U
Nitrobenzene	340000	31000	200		38 U
n-Nitrosodimethylamine	700	700	700		38 U
n-Nitrosodi-n-propylamine	300	200	200		9.5 U

Table 3. Summary of Semivolatile Organic Compounds in Soil, Union Dry Dock, Hoboken, New Jersey

Parameter (Concentrations in µg/kg)	NJDEP Non-Residential Direct Contact Soil Remediation Standards	NJDEP Residential Direct Contact Soil Remediation Standards	NJDEP Default Impact to Groundwater	Sample Designation: Sample Date: Sample Depth (ft bls):	SS-SB1 11/16/2011 0.0-0.5
n-Nitrosodiphenylamine	390000	99000	200		38 U
Pentachlorophenol	10000	3000	300		190 U
Phenanthrene	300000000	--	NA		38 U
Phenol	210000000	18000000	5000		38 U
Pyrene	18000000	1700000	550000		38 U

J - Estimated value

U - Indicates that the compound was analyzed for but not detected

DUP - Duplicate sample

µg/kg - Micrograms per kilogram

ft bls - Feet below land surface

NJDEP - New Jersey Department of Environmental Protection

-- No NJDEP Soil Remediation Standards available

Table 4. Summary of Metals in Soil, Union Dry Dock, Hoboken, New Jersey

Parameter (Concentrations in µg/kg)	NJDEP Non-Residential Direct Contact Soil Remediation Standards	NJDEP Residential Direct Contact Soil Remediation Standards	NJDEP Default Impact to Groundwater	Sample Designation: Sample Date: Sample Depth (ft bls):	SS-SB1 11/16/2011 0.0-0.5
Antimony	450	31	6		2.3 U
Arsenic	19	19	19		3.7
Barium	59000	16000	1300		36
Beryllium	140	16	0.5		0.34
Cadmium	78	78	1		0.68 U
Chromium	--	--	--		27
Copper	45000	3100	7300		12
Cyanide, Free	23000	1600	13		0.27 U
Lead	800	400	59		21
Mercury	65	23	0.1		0.095 U
Nickel	23000	1600	31		550
Selenium	5700	390	7		2 U
Silver	5700	390	1		0.23 U
Thallium	79	5	3		1.4 U
Zinc	110000	23000	600		38

J - Estimated value

U - Indicates that the compound was analyzed for but not detected

DUP - Duplicate sample

µg/kg - Micrograms per kilogram

ft bls - Feet below land surface

NJDEP - New Jersey Department of Environmental Protection

-- No NJDEP Soil Remediation Standards available

Bold data indicates that parameter was detected above the NJDEP Residential Soil Remediation Standards

Shaded data indicates that parameter was detected above the NJDEP Non-Residential Soil Remediation Standards

Italized data indicates that parameter was detected above the NJDEP Default Impact to Groundwater Standards

Table 5. Summary of Polychlorinated Biphenyls in Soil, Union Dry Dock, Hoboken, New Jersey

Parameter (Concentrations in µg/kg)	NJDEP Non-Residential Direct Contact Soil Remediation Standards	NJDEP Residential Direct Contact Soil Remediation Standards	NJDEP Default Impact to Groundwater	Sample Designation: Sample Date: Sample Depth (ft bls):	SS-SB1 11/16/2011 0.0-0.5
Aroclor-1016	--	--	--		28 U
Aroclor-1221	--	--	--		28 U
Aroclor-1232	--	--	--		28 U
Aroclor-1242	--	--	--		28 U
Aroclor-1248	--	--	--		28 U
Aroclor-1254	--	--	--		28 U
Aroclor-1260	--	--	--		28 U
Aroclor-1262	--	--	--		28 U
Aroclor-1268	--	--	--		28 U
Aroclor (Total)	1000	200	200		28 U

J - Estimated value

U - Indicates that the compound was analyzed for but not detected

DUP - Duplicate sample

µg/kg - Micrograms per kilogram

ft bls - Feet below land surface

NJDEP - New Jersey Department of Environmental Protection

-- No NJDEP Soil Remediation Standards available

Table 6. Summary of Pesticides in Soil, Union Dry Dock, Hoboken, New Jersey

Parameter (Concentrations in µg/kg)	NJDEP Non-Residential Direct Contact Soil Remediation Standards	NJDEP Residential Direct Contact Soil Remediation Standards	NJDEP Impact to Groundwater	Sample Designation: Sample Date: Sample Depth (ft bls):	SS-SB1 11/16/2011 0.0-0.5
4,4'-DDD	13000	3000	3000		2.8 U
4,4'-DDE	9000	2000	12000		2.8 U
4,4'-DDT	8000	2000	7000		2.8 U
Aldrin	200	40	100		5.7 U
alpha-BHC	500	100	2		1.1 U
beta-BHC	2000	400	2		1.1 U
Chlordane	--	200	30		28 U
delta-BHC	--	--	--		5.7 U
Dieldrin	200	40	3		1.1 U
Endosulfan I	6800000	--	2000		5.7 U
Endosulfan II	6800000	--	2000		5.7 U
Endosulfan sulfate	6800000	470000	1000		5.7 U
Endrin aldehyde	--	--	--		5.7 U
Endrin ketone	--	--	--		5.7 U
Endrin	340000	23000	600		5.7 U
gamma-BHC (Lindane)	2000	400	2		1.1 U
Heptachlor epoxide	300	70	9		5.7 U
Heptachlor	700	100	300		5.7 U
Methoxychlor	5700000	390000	100000		5.7 U
Toxaphene	3000	600	200		28 U

J - Estimated value

U - Indicates that the compound was analyzed for but not detected

DUP - Duplicate sample

µg/kg - Micrograms per kilogram

ft bls - Feet below land surface

NJDEP - New Jersey Department of Environmental Protection

-- No NJDEP Soil Remediation Standards available

Table 7. Summary of General Chemistry in Soil, Union Dry Dock, Hoboken, New Jersey

Parameter	Units	Sample Designation:	SB-1	SB-2	SB-3	SB-4	SB-5	SS-SB1	SS-SB-1	SS-SB1	SS-SB1
		Sample Date:	11/17/2011	11/17/2011	11/17/2011	11/17/2011	11/17/2011	11/16/2011	11/16/2011	11/17/2011	11/17/2011
		Sample Depth (ft bls):	8.5-9	7.5-8	7.5-8	7.5-8	7.5-8	0.0-0.5	1.5-2.0	0.0-0.5	1.5-2.0
Percent Solids	PERCENT		72	87	87	81	85	88	93	94	87
Phenols (Total)	MG/KG		NA	NA	NA	NA	NA	1.4 U	NA	NA	NA

J - Estimated value

U - Indicates that the compound was analyzed for but not detected

DUP - Duplicate sample

mg/kg - Milligrams per kilogram

ft bls - Feet below land surface

NJDEP - New Jersey Department of Environmental Protection

-- No NJDEP Soil Remediation Standards available

Table 8. Summary of Volatile Organic Compounds in Groundwater, Union Dry Dock, Hoboken, New Jersey

Parameter (Concentrations in µg/L)	NJDEP Groundwater Quality Standards (µg/L)	Sample Designation:		
		MW-1 Sample Date: 11/30/2011	TRIP BLANK 11/29/2011	FB-113011 11/30/2011
1,1,1-Trichloroethane	1	1 U	1 U	1 U
1,1,2,2-Tetrachloroethane	1	1 U	1 U	1 U
1,1,2-Trichloroethane	2	1 U	1 U	1 U
1,1-Dichloroethane	1	1 U	1 U	1 U
1,1-Dichloroethene	1	1 U	1 U	1 U
1,2,3-Trichlorobenzene	--	1 U	1 U	1 U
1,2,4-Trichlorobenzene	1	1 U	1 U	1 U
1,2-Dibromoethane	0.03	0.02 U	0.02 U	0.02 U
1,2-Dichlorobenzene	5	1 U	1 U	1 U
1,2-Dichloroethane	2	0.5 U	0.5 U	0.5 U
1,2-Dichloropropane	1	1 U	1 U	1 U
1,3-Dichlorobenzene	5	1 U	1 U	1 U
1,4-Dichlorobenzene	5	1 U	1 U	1 U
1,4-Dioxane	10	1 U	1 U	1 U
2-Butanone (MEK)	2	1 U	1 U	1 U
2-Hexanone	1	1 U	1 U	1 U
4-Methyl-2-pentanone (MIBK)	--	1 U	1 U	1 U
Acetone	10	10 U	10 U	10 U
Acrolein	5	5 U	5 U	5 U
Acrylonitrile	2	2 U	2 U	2 U
Benzene	1	0.5 U	0.5 U	0.5 U
Bromochloromethane	--	1 U	1 U	1 U
Bromodichloromethane	1	1 U	1 U	1 U
Bromoform	0.8	1 U	1 U	1 U
Bromomethane	1	1 U	1 U	1 U
Carbon disulfide	1	1 U	1 U	1 U
Carbon tetrachloride	1	1 U	1 U	1 U
Chlorobenzene	1	1 U	1 U	1 U
Chloroethane	0.5	1 U	1 U	1 U
Chloroform	1	1 U	1 U	1 U
Chloromethane	--	1 U	1 U	1 U
cis-1,2-Dichloroethene	1	1 U	1 U	1 U
cis-1,3-Dichloropropene	--	1 U	1 U	1 U
Cyclohexane	--	1 U	1 U	1 U

Table 8. Summary of Volatile Organic Compounds in Groundwater, Union Dry Dock, Hoboken, New Jersey

Parameter (Concentrations in µg/L)	NJDEP Groundwater Quality Standards (µg/L)	Sample Designation:	MW-1	TRIP BLANK	FB-113011
		Sample Date:	11/30/2011	11/29/2011	11/30/2011
Dibromochloromethane	1		1 U	1 U	1 U
Dibromochloropropane	--		0.02 U	0.02 U	0.02 U
Dichlorodifluoromethane	--		1 U	1 U	1 U
Ethylbenzene	2		1 U	1 U	1 U
Freon 113	--		5 U	5 U	5 U
Isopropylbenzene	1		1 U	1 U	1 U
m+p-Xylene	--		1 U	1 U	1 U
Methyl acetate	--		1 U	1 U	1 U
Methylcyclohexane	--		1 U	1 U	1 U
Methylene chloride	1		1 U	1 U	1 U
MTBE	1		0.5 U	0.5 U	0.5 U
o-Xylene	--		1 U	1 U	1 U
Styrene	2		1 U	1 U	1 U
t-Butyl Alcohol	2		5 U	5 U	5 U
Tetrachloroethene	1		1 U	1 U	1 U
Toluene	1		1 U	1 U	1 U
trans-1,2-Dichloroethene	1		1 U	1 U	1 U
trans-1,3-Dichloropropene	--		1 U	1 U	1 U
Trichloroethene	1		1 U	1 U	1 U
Trichlorofluoromethane	1		1 U	1 U	1 U
Vinyl chloride	1		1 U	1 U	1 U
Xylenes (total)	2		1 U	1 U	1 U

NJDEP - New Jersey Department of Environmental Protection

Groundwater Quality Standards reflect the higher of PQL and

Groundwater Quality Standards

PQL - Practical Quantitation Level as defined in N.J.A.C. 7:9C-1.4

µg/L -Micrograms per liter

J - Estimated Value

U - Compound was analyzed for but not detected

-- No NJDEP Groundwater Quality Standards available

Table 9. Summary of Semivolatile Organic Compounds in Groundwater, Union Dry Dock, Hoboken, New Jersey

Parameter (Concentrations in µg/L)	NJDEP Groundwater Quality Standards (µg/L)	Sample Designation:	
		MW-1 Sample Date: 11/30/2011	FB-113011 11/30/2011
1,1'-Biphenyl	--	2 U	2 U
1,2,4,5-Tetrachlorobenzene	--	2 U	2 U
1,2,4-Trichlorobenzene	1	2 U	2 U
1,2-Diphenylhydrazine	20	2 U	2 U
2,2'-oxybis (1-chloropropane)	10	2 U	2 U
2,3,4,6-Tetrachlorophenol	--	2 U	2 U
2,4,5-Trichlorophenol	10	2 U	2 U
2,4,6-Trichlorophenol	20	2 U	2 U
2,4-Dichlorophenol	10	2 U	2 U
2,4-Dimethylphenol	20	2 U	2 U
2,4-Dinitrophenol	40	10 U	10 U
2,4-Dinitrotoluene	--	2 U	2 U
2,6-Dinitrotoluene	--	2 U	2 U
2-Chloronaphthalene	10	2 U	2 U
2-Chlorophenol	20	2 U	2 U
2-Methylnaphthalene	10	2 U	2 U
2-Methylphenol	--	0.5 U	0.5 U
2-Nitroaniline	--	2 U	2 U
2-Nitrophenol	--	2 U	2 U
3,3'-Dichlorobenzidine	30	2 U	2 U
3-Nitroaniline	--	2 U	2 U
4,6-Dinitro-2-methylphenol	1	0.2 U	0.2 U
4-Bromophenyl phenyl ether	--	2 U	2 U
4-Chloro-3-methylphenol	--	2 U	2 U
4-Chloroaniline	10	0.5 U	0.5 U
4-Chlorophenyl phenyl ether	--	2 U	2 U
4-Methylphenol	--	0.5 U	0.5 U
4-Nitroaniline	--	2 U	2 U
4-Nitrophenol	--	2 U	2 U
Acenaphthene	10	2 U	2 U
Acenaphthylene	--	2 U	2 U
Acetophenone	10	2 U	2 U
Anthracene	10	2 U	2 U
Atrazine	0.1	2 U	2 U

Table 9. Summary of Semivolatile Organic Compounds in Groundwater, Union Dry Dock, Hoboken, New Jersey

Parameter (Concentrations in µg/L)	NJDEP Groundwater Quality Standards (µg/L)	Sample Designation:	
		MW-1 Sample Date: 11/30/2011	FB-113011 11/30/2011
Benzaldehyde	--	2 U	2 U
Benzidine	20	10 U	10 U
Benzo[a]anthracene	0.1	0.02 U	0.02 U
Benzo[a]pyrene	0.1	0.02 U	0.02 U
Benzo[b]fluoranthene	0.2	0.02 U	0.02 U
Benzo[g,h,i]perylene	--	2 U	2 U
Benzo[k]fluoranthene	0.3	0.02 U	0.02 U
Bis(2-chloroethoxy)methane	--	2 U	2 U
Bis(2-chloroethyl) ether	7	0.5 U	0.5 U
Bis(2-ethylhexyl) phthalate	3	2 U	2 U
Butylbenzyl phthalate	1	2 U	2 U
Caprolactam	5000	2 U	2 U
Carbazole	--	2 U	2 U
Chrysene	0.2	2 U	2 U
Dibenzo[a,h]anthracene	0.3	0.02 U	0.02 U
Dibenzofuran	--	0.5 U	0.5 U
Diethyl phthalate	1	2 U	2 U
Dimethyl phthalate	--	2 U	2 U
Di-n-butyl phthalate	1	0.5 U	0.5 U
Di-n-octyl phthalate	10	2 U	2 U
Fluoranthene	10	2 U	2 U
Fluorene	1	2 U	2 U
Hexachlorobenzene	0.02	0.02 U	0.02 U
Hexachlorobutadiene	1	0.02 U	0.02 U
Hexachlorocyclopentadiene	0.5	2 U	2 U
Hexachloroethane	7	0.02 U	0.02 U
Indeno[1,2,3-cd]pyrene	0.2	0.02 U	0.02 U
Isophorone	10	2 U	2 U
Naphthalene	2	0.5 U	0.5 U
Nitrobenzene	6	2 U	2 U
n-Nitrosodimethylamine	0.8	2 U	2 U
n-Nitrosodi-n-propylamine	10	0.5 U	0.5 U
n-Nitrosodiphenylamine	10	2 U	2 U
Pentachlorophenol	0.1	0.2 U	0.2 U

Table 9. Summary of Semivolatile Organic Compounds in Groundwater, Union Dry Dock, Hoboken, New Jersey

Parameter (Concentrations in µg/L)	NJDEP Groundwater Quality Standards (µg/L)	Sample Designation:	
		MW-1	FB-113011
		Sample Date:	
		11/30/2011	11/30/2011
Phenanthrene	--	2 U	2 U
Phenol	10	2 U	2 U
Pyrene	0.1	2 U	2 U

NJDEP - New Jersey Department of Environmental Protection
 Groundwater Quality Standards reflect the higher of PQL and
 Groundwater Quality Standards
 PQL - Practical Quantitation Level as defined in N.J.A.C. 7:9C-1.4
 µg/L -Micrograms per liter
 J - Estimated Value
 U - Compound was analyzed for but not detected
 - - No NJDEP Groundwater Quality Standards available

Table 10. Summary of Metals in Groundwater, Union Dry Dock, Hoboken, New Jersey

Parameter (Concentrations in µg/L)	NJDEP Groundwater Quality Standards (µg/L)	Sample Designation: Sample Date:	MW-1 11/30/2011	FB-113011 11/30/2011
Antimony	3		2.5 U	2.5 U
Arsenic	3		1.7	1 U
Barium	200		36	25 U
Beryllium	1		0.75 U	0.75 U
Cadmium	0.5		2 U	2 U
Chromium	1		25 U	25 U
Copper	4		25 U	25 U
Lead	5		5 U	5 U
Mercury	0.05		0.2 U	0.2 U
Nickel	4		52	10 U
Selenium	4		25 U	25 U
Silver	1		10 U	10 U
Thallium	2		1.5 U	1.5 U
Zinc	10		25 U	25 U

NJDEP - New Jersey Department of Environmental Protection
Groundwater Quality Standards reflect the higher of PQL and
Groundwater Quality Standards

PQL - Practical Quantitation Level as defined in N.J.A.C. 7:9C-1.4

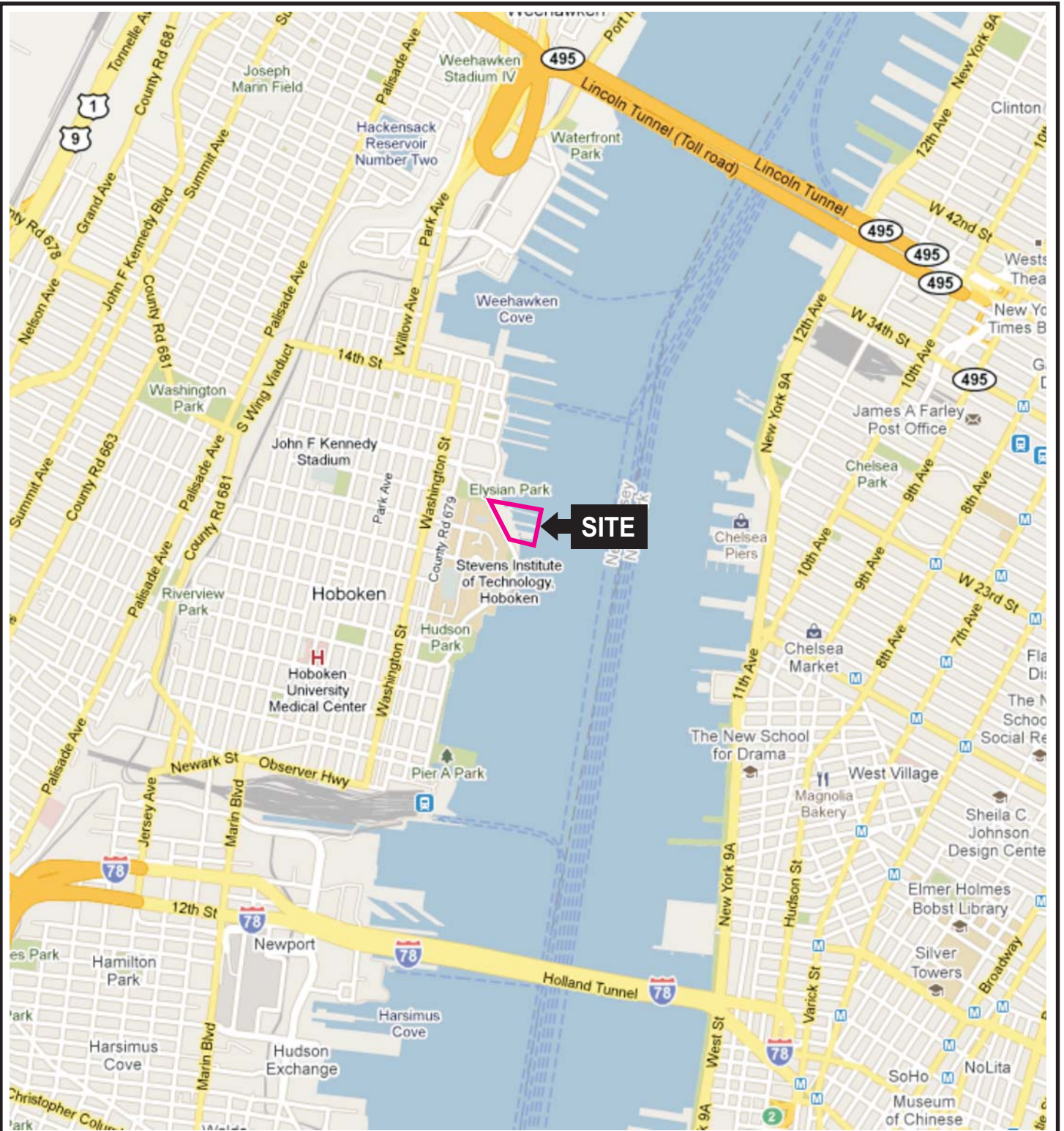
µg/L -Micrograms per liter

J - Estimated Value

U - Compound was analyzed for but not detected

- - No NJDEP Groundwater Quality Standards available

Bold data indicates that parameter was detected above the NJDEP
Groundwater Quality Standards



SITE



Title:

SITE LOCATION MAP

UNION DRY DOCK & REPAIR CO.
HOBOKEN, NEW JERSEY

Prepared for:

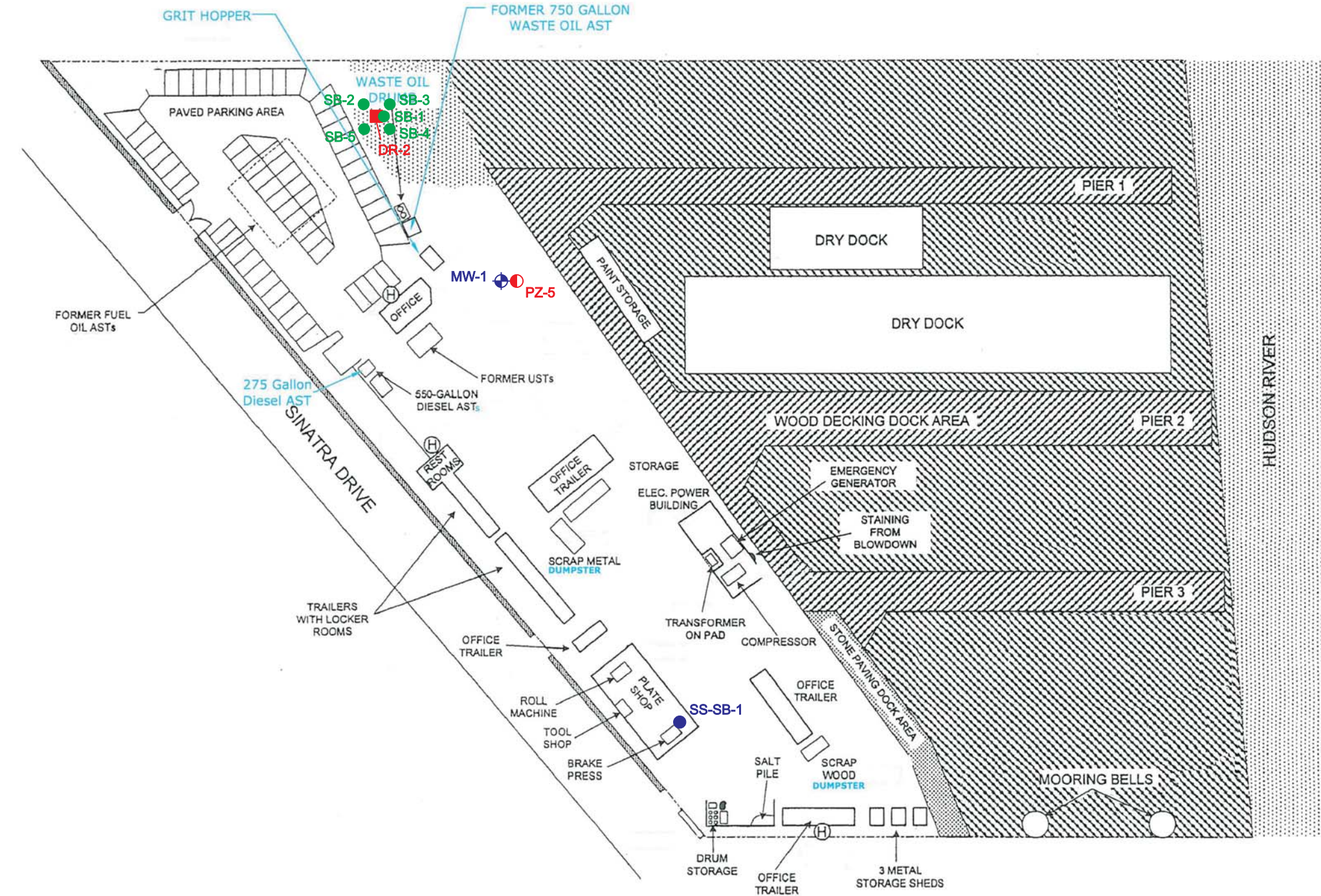
NEW JERSEY TRANSIT

ROUX
ROUX ASSOCIATES, INC.
Environmental Consulting
& Management

Compiled by: C.R.	Date: 14DEC11
Prepared by: J.A.D.	Scale: AS SHOWN
Project Mgr.: R.S.K.	Project No.: 0532.0079Y000
File: 0532.0079Y108.01.CDR	

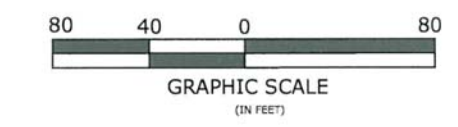
FIGURE
1

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- LEGEND**
- **DR-2** SOIL BORING WITH NAPHTHALENE EXCEEDANCE (COMPLETED BY DRESDNER ROBIN)
 - **SB-1** SOIL BORING TO DELINEATE NAPHTHALENE (COMPLETED BY ROUX ASSOCIATES)
 - ⊙ **PZ-5** FORMER TEMPORARY PIEZOMETER LOCATION WITH TCE IN GROUNDWATER (COMPLETED BY DRESDNER ROBIN)
 - ⊕ **MW-1** PERMANENT MONITORING WELL INSTALLED BY ROUX ASSOCIATES
 - **SS-SB-1** SOIL BORING THROUGH PLATE SHOP FLOOR SLAB (COMPLETED BY ROUX ASSOCIATES)

- NOTES**
1. BASE MAP AND HISTORIC DATA ADAPTED FROM INFORMATION SUPPLIED BY DRESDNER ROBIN.
 2. TCE – TRICHLOROETHENE



Title:

SAMPLE LOCATIONS 2011 SUPPLEMENTAL SITE INVESTIGATION ACTIVITIES

UNION DRY DOCK & REPAIR CO.
HOBOKEN, NEW JERSEY

Prepared for:

NEW JERSEY TRANSIT

ROUX ROUX ASSOCIATES, INC. <small>Environmental Consulting & Management</small>	Compiled by: R.S.K.	Date: 15DEC11	FIGURE 2
	Prepared by: J.A.D.	Scale: AS SHOWN	
	Project Mgr.: R.S.K.	Project No.: 0532.0079Y000	
	File: 0532.0079Y108.01.CDR		

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Remedial Cost Estimates

Table A1. Option 1 Remedial Cost Estimate
 Union Dry Dock, Hoboken, New Jersey

OPTION 1 REMEDIAL COST ESTIMATE- INCLUDES GROUNDWATER CEA

Description	Quantity	Unit	Unit Cost	Total Cost
Site Investigation				
<i>Includes 2011 Site Investigation (Completed) and Anticipated Groundwater Investigation</i>				
2011 Site Investigation (Completed)	1	LS	█	█
Future Groundwater Investigation	1	LS	█	█
Subtotal				█
Naphthalene Soil Excavation				
<i>Removal of naphthalene soil hot spot (i.e., naphthalene over RDCSRS)</i>				
Contractor Mobilization	1	LS	█	█
Excavate and Stockpile Soil	125	CY	█	█
Backfill and Compaction	125	CY	█	█
Disposal of Non-Hazardous Soil	188	Tons	█	█
Transportation of Non-Hazardous Soil	188	Tons	█	█
Waste Characterization Sampling	1	Each	█	█
H&S Dust Monitoring and Control	1	LS	█	█
Subtotal				█
Construction of Engineered Cap				
<i>Construction of 1 ft Engineered Cap over all upland areas of the Site not currently paved, covered with permanent building slabs or with concrete sidewalks.</i>				
Site Modification/Preparation for Cap	1	LS	█	█
Construction of 1-ft Clean Fill Engineered Cap	3400	CY	█	█
Geotextile subsurface demarcation layer	91800	SF	█	█
Subtotal				█
Preparation of Deed Notice, ISRA Costs, and other NJDEP Documentation and Fees				
<i>Preparation of Deed Notice (and Associated NJDEP Fees), ISRA Costs, Remedial Action Report, LSRP Application and Forms, Including Public Outreach and Notification and Receptor Evaluation</i>				
Preparation of Deed Notice (Includes NJDEP Fee)	1	LS	█	█
Preparation of Remedial Action Report	1	LS	█	█
LSRP Documentation	1	LS	█	█
ISRA Costs	1	LS	█	█
NJDEP Annual Remediation Fee (assume for 1 year prior to issuance of Deed Notice and CEA)	1	LS	█	█
Subtotal				█
Preparation of Groundwater CEA (Contingent on Groundwater Investigation Results)				
<i>Preparation of Groundwater CEA and Associated Fees (May be Required Due To Historic Fill Impacts to Groundwater - Contingent on further Groundwater Investigation)</i>				
Preparation of Groundwater CEA (Includes NJDEP Fee)	1	LS	█	█
Subtotal				█
			<i>Subtotal Direct Costs</i>	█
			<i>Contingency (20%)</i>	█
			Total Direct Costs	█
			<i>Project Management (6%)</i>	█
			<i>Remedial Design (10%)</i>	█
			<i>Construction Management (8%)</i>	█
			Total Indirect Costs	█
			Total Estimated Capital Cost	█

Table A1. Option 1 Remedial Cost Estimate
 Union Dry Dock, Hoboken, New Jersey

FUTURE COSTS				
Deed Notice Future Costs				
<i>Preparation and Submittal of Biennial Certification of Deed Notice every two years for period of 30 years (15 submissions). Also includes submission of Engineered Cap inspection monitoring reports every two years for period of 30 years (15 submissions)</i>				
Biennial Certification of Deed Notice (\$4,000 every two years for 30 years)	1	LS	\$ [REDACTED]	\$ [REDACTED]
Total Future Costs				\$ [REDACTED]
Total Net Present Value of Future Costs				\$ [REDACTED]
Groundwater CEA Future Costs (Contingent on Groundwater Investigation Results)				
<i>Preparation and Submittal of Biennial Certification of Groundwater CEA every two years for period of 30 years (15 submissions).</i>				
Biennial Certification of Groundwater CEA (\$2,000 every two years for 30 years)	1	LS	\$ [REDACTED]	\$ [REDACTED]
Total Future Costs				\$ [REDACTED]
Total Net Present Value of Future Costs				\$ [REDACTED]
OPTION 1 REMEDIATION COST ESTIMATE (INCLUDED GROUNDWATER CEA)				
TOTAL ESTIMATED REMEDIAL COST (No adjustment for Net Present Value)				\$ [REDACTED]
TOTAL ESTIMATED PRESENT VALUE REMEDIAL COST				\$ [REDACTED]

Table A2. Option 2 Remedial Cost Estimate
 Union Dry Dock, Hoboken, New Jersey

OPTION 2 REMEDIAL COST ESTIMATE- EXCLUDES GROUNDWATER CEA

Description	Quantity	Unit	Unit Cost	Total Cost
Site Investigation				
<i>Includes 2011 Site Investigation (Completed) and Anticipated Groundwater Investigation</i>				
2011 Site Investigation (Completed)	1	LS	█	█
Future Groundwater Investigation	1	LS	█	█
Subtotal				█
Naphthalene Soil Excavation				
<i>Removal of naphthalene soil hot spot (i.e., naphthalene over RDCSRS)</i>				
Contractor Mobilization	1	LS	█	█
Excavate and Stockpile Soil	125	CY	█	█
Backfill and Compaction	125	CY	█	█
Disposal of Non-Hazardous Soil	188	Tons	█	█
Transportation of Non-Hazardous Soil	188	Tons	█	█
Waste Characterization Sampling	1	Each	█	█
H&S Dust Monitoring and Control	1	LS	█	█
Subtotal				█
Construction of Engineered Cap				
<i>Construction of 1 ft Engineered Cap over all upland areas of the Site not currently paved, covered with permanent building slabs or with concrete sidewalks.</i>				
Site Modification/Preparation for Cap	1	LS	█	█
Construction of 1-ft Clean Fill Engineered Cap	3400	CY	█	█
Geotextile subsurface demarcation layer	91800	SF	█	█
Subtotal				█
Preparation of Deed Notice, ISRA Costs, and other NJDEP Documentation and Fees				
<i>Preparation of Deed Notice (and Associated NJDEP Fees), ISRA Costs, Remedial Action Report, LSRP Application and Forms, Including Public Outreach and Notification and Receptor Evaluation</i>				
Preparation of Deed Notice (Includes NJDEP Fee)	1	LS	█	█
Preparation of Remedial Action Report	1	LS	█	█
LSRP Documentation	1	LS	█	█
ISRA Costs	1	LS	█	█
NJDEP Annual Remediation Fee (assume for 1 year prior to issuance of Deed Notice)	1	LS	█	█
Subtotal				█
Subtotal Direct Costs				█
Contingency (20%)				█
Total Direct Costs				█
Project Management (6%)				█
Remedial Design (10%)				█
Construction Management (8%)				█
Total Indirect Costs				█
Total Estimated Capital Cost				█

Table A2. Option 2 Remedial Cost Estimate
 Union Dry Dock, Hoboken, New Jersey

FUTURE COSTS				
Deed Notice Future Costs				
<i>Preparation and Submittal of Biennial Certification of Deed Notice every two years for period of 30 years (15 submissions). Also includes submission of Engineered Cap inspection monitoring reports every two years for period of 30 years (15 submissions)</i>				
Biennial Certification of Deed Notice (\$4,000 every two years for 30 years)	1	LS	\$ [REDACTED]	\$ [REDACTED]
Total Future Costs				\$ [REDACTED]
Total Net Present Value of Future Costs				\$ [REDACTED]
OPTION 2 REMEDIATION COST ESTIMATE (EXCLUDES GROUNDWATER CEA)				
TOTAL ESTIMATED REMEDIAL COST (No adjustment for Net Present Value)				\$ [REDACTED]
TOTAL ESTIMATED PRESENT VALUE REMEDIAL COST				\$ [REDACTED]

**Table A-3. Net Present Value Calculation for Estimated Remedial Costs,
Union Dry Dock, Hoboken, New Jersey**

Year	Biennial Certification of Deed Notice	Biennial Certification of Groundwater CEA
1	██████████	██████████
2	██████████	██████████
3	██████████	██████████
4	██████████	██████████
5	██████████	██████████
6	██████████	██████████
7	██████████	██████████
8	██████████	██████████
9	██████████	██████████
10	██████████	██████████
11	██████████	██████████
12	██████████	██████████
13	██████████	██████████
14	██████████	██████████
15	██████████	██████████
16	██████████	██████████
17	██████████	██████████
18	██████████	██████████
19	██████████	██████████
20	██████████	██████████
21	██████████	██████████
22	██████████	██████████
23	██████████	██████████
24	██████████	██████████
25	██████████	██████████
26	██████████	██████████
27	██████████	██████████
28	██████████	██████████
29	██████████	██████████
30	██████████	██████████
Non-NPV Subtotal NPV for Future Costs	██████████	██████████