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The Port Authority of New York and New Jersey

Comprehensive Remedial Investigation Report
Site 2 (VCP Site V00674-2)

HHMT - Port Ivory Facility
April 2008

Volume 2 of 2

40 Western Avenue, Staten Island, New York

2B, in the vicinity of GW-1; the samples were designated with a GW-1 prefix to identify location and not to reference GW-1 as an AOC. Field screening identified the limits of the petroleum impacts at the above listed AOCs through visual, olfactory and field instrumentation. Analytical results confirmed the conclusions rendered through field screening activities performed during the field investigation component of the RI. Thus, the RI implemented at Site 2A/2B has successfully delineated petroleum impacts at Area A, Area B-3, Area B-2, Area OP-1, Area GW-14 and Area FS-1B on Site 2A.

With respect to Area MW-10D located on Site 2B, the RI has successfully delineated the extent of potential petroleum impacts to the north, west and east, however, the RI activities to the south were limited by the presence of an active pipeline. Based on the results of the RI, the Port Authority has reviewed remedial alternatives to address potential petroleum impacts at Site 2A/2B. Given the redevelopment plan (i.e., the contemplated use) for Site 2A/2B, it was determined that the most appropriate remedial alternative to address the petroleum-impacted areas is hot spot excavation with off-site disposal for the majority of the above listed areas. With regard to Area MW-10D further evaluation is being performed based on the presence of the nearby pipeline. A discussion of the selected remedial alternative is presented in Section 12.

In addition, the potential UST Areas were reviewed in conjunction with building/site demolition activities and resulted in the identification of two tanks at the UST7 Area. Tank removal actions are presented in Section 11 of this report.

10.0 EXPOSURE ASSESSMENT

This Exposure Assessment (EA) addresses conditions at Site 2A/2B. As previously stated, this portion of the former industrial site is being redeveloped as the intermodal component of an intermodal/container storage facility. This EA describes the exposure setting, the nature of on-site contaminants, potential exposure points and routes and identifies potential exposure populations.

10.1 Exposure Setting

The HHMT-Port Ivory Facility is situated in an industrial section in the northwestern portion of Staten Island. Generally, the site is bordered by industrial/commercial businesses, roadways, surface water bodies (Arthur Kill and Bridge Creek) and undeveloped/vacant areas. No residential populations are situated immediately adjacent to Site 2A/2B. Site 2A/2B encompasses 22.6 acres and, at the time of Port Authority purchase, was improved by approximately twenty-nine buildings. Site 2A/2B was utilized for offices, boiler buildings, furnace structures, manufacturing and development buildings, locomotive maintenance, security stations, cafeteria, a sewage treatment plant and a reservoir for fire protection. Tanks, both USTs and ASTs, as well as an underground network of piping for drainage control were formerly situated at Site 2A/2B.

The entire HHMT-Port Ivory Facility including Site 2A/2B is serviced by connections to the potable water and sanitary system of New York City. No septic systems or potable water wells are reported to be located or have been located at Site 2A/2B, or elsewhere on the HHMT-Port Ivory Facility. Storm water generated on the site is directed via a sheet flow to on-site catch basins. These catch basins discharge, through the facilities underground stormwater sewer system, to the adjacent waterways, roadways, and marshland. Bridge Creek though not directly located on the site is within the proximity of Site 2A/2B and was therefore included in site investigation activities. This creek is a tidal, saline stream, which has been classified as SD by the NYSDEC. This classification indicates that due to man-made/natural conditions the stream cannot meet primary or secondary criteria. The stream can support fish survival and limited fishing.

In addition, several utility easements and pipelines traverse the subject site. Colonial Pipeline, Exxon (now known as ExxonMobil) and Texas Pipeline (maintained by SOHIO) maintain the easements. Colonial Pipeline maintains a 10-foot pipeline easement that extends in a north/south direction along the western property boundary of Sites 1 and 2A. The easement initiates in the far southwestern corner of Site 2B and extends along the southern and southwestern corner into Site 2A. The easement traverses through the southern portion of Site 2A in a northeasterly direction and enters the southwestern corner of Site 1. The pipeline continues through Site 1 extending across Richmond Terrace and through the western portion of Future Site 4 (Block 1309, Lot 10). The easement terminates at the northern end of Future Site 4 (Block 1309, Lot 10). ExxonMobil maintains an 18-foot easement that is located generally east of the Colonial Pipeline easement. This easement parallels the Colonial Pipeline easement initiates at the western portion of Site 2A, just south of Site 1 and extends through Site 1 to Richmond Terrace where it turns in an easterly direction and extends along the southern boundary of Future Site 4 (Block 1309, Lot 10). Two Texas Pipeline (maintained by SOHIO) easements extend in a east/west direction through Site 2B. In addition, Tidewater Pipe Company LTD formerly operated a pipeline (consisting of approximately 7 pipes) that extend in north/south direction through Site 3. These abandoned pipes extend in an east/west direction through Site 2B, continue in a northerly direction through Site 3, across Richmond

Terrace and extend along the easterly property boundary of Future Site 4. These pipes have been identified as a potential source of LNAPL present at Site 3.

Investigative activities undertaken as part of the previously described SI and RI indicate that the HHMT-Port Ivory Facility consists of non-indigenous fill on top of organic clays and peat or sand deposits. Fill was placed upon tidal salt-marsh or sand deposits to raise the elevation of the land for development. The fill is reported to have included: sand, silt, gravel mixed with debris, cinders generated from on-site coal-fired boilers, calcium carbonate and other carbonate salts generated as a by-product from soap manufacturing processes, spent diatomaceous filter earth from vegetable oil refining operations, and carbonaceous filter material from glycerin recovery operations. Generally, Site 2A/2B is characterized by the presence of urban fill material including cinders. The presence of by-product fill material at Site 2A/2B is generally limited to the northwestern portion of Site 2A along the boundary line between Site 1 and Site 2A.

10.2 Nature of On-Site Contaminants

The SI/RI activities undertaken by HMM included investigation of the soil and groundwater at Site 2A/2B as well as sediment and surface water of Bridge Creek. The SI/RI for soil at Site 2A/2B included the installation of over 50 soil borings and the collection of over 80 soil samples. Groundwater investigations included the installation of 5 monitoring wells, one temporary well, recording water levels from all newly installed wells and four existing wells, reviewing wells for the presence of free phase floating product and the collection and laboratory analysis of 10 groundwater samples.

In soil, only three VOCs, trans-1,3-dichloropropene (0.43 mg/kg), dichloromethane (0.17 mg/kg) and benzene (0.32 mg/kg) were detected in excess of corresponding RSCOs in the SI. No elevated concentrations of VOCs were detected during the RI. In the instances, when the contaminant was detected, it was marginally above the MDL for the compound. The total VOCs concentration was below the NYSDEC guidance criteria of 10 mg/kg for all samples collected from Site 2A/2B. A number of SVOCs were detected in soil samples collected from Sites 2A/2B during the SI and RI. However, the vast majority of these compounds were detected below NYSDEC TAGM RSCOs. The following SVOCs were detected at concentrations above corresponding RSCOs in one or more soil samples from Site 2A/2B: acenaphthaene, anthracene, flouranthene, flourene, pyrene, phenanthrene, naphthalene, benzo(b)fluoranthene, benzo(a)pyrene, benzo(a)anthracene, dibenz[a,h]anthracene, benzo(k)flouranthene, indeno(1,2,3-cd)pyrene, and phenol. The total SVOC concentration was below the NYSDEC guidance criteria for all samples except the surface sample collected from location PG-STAIN-03, situated on Site 2A. The sample also exhibited the presence of a few PAH compounds in excess of 50 mg/kg. No PCBs were detected at concentrations in excess of corresponding RSCOs for surface or subsurface soil, as applicable.

Five pesticides (chlordane, endrin, dieldrin, heptachlor and heptachlor epoxide) were detected in excess of corresponding TAGM RSCOs in only a few samples collected from Site 2A/2B. Specifically, Dieldrin was detected at concentrations in excess of its corresponding RSCO in three samples; chlordane and endrin were both detected in excess of their individual RSCO in two samples; and, heptachlor and heptachlor epoxide were each detected in excess of their RSCO in only a single sample.

The NYSDEC TAGM generally regards site background as an appropriate concentration for the 24 TAL metals and has only established RSCOs for a portion of the targeted metals. Therefore, analytical results from investigative efforts were compared to the upper limit of the Eastern USA Background Range in the absence of a RCSO standard. This application is particularly appropriate in this instance given the presence of fill material and the urban nature of the site and site area. Analytical results revealed exceedances of RSCOs in one or more soil samples for 12 of the 13 of the metals with established guidance criteria; vanadium as not detected in excess of its RSCO in any of the soil samples from Site 2A/and 2B. Lead is reviewed by the NYSDEC on a case-by-case basis with 500 mg/kg established as the upper limit of the Eastern USA Background Range . Levels of lead in samples collected from Site 2A/2B ranged from not detected to 950 mg/kg.

Guidance criteria have not been established for cyanide or total phenolics. The presence of these types of contaminants is reviewed on a case-by-case basis by the NYSDEC. Cyanide was detected in several soil samples collected from Site 2A/2B. In the majority of instances, cyanide was detected at a concentration of less than 1 mg/kg. Total phenolics ranged from not detected to 5.5 mg/kg in 2 samples.

Four samples exhibited concentrations of TPHC in excess of 10,000 mg/kg. All four exhibiting concentrations above 10,000 mg/kg samples were collected from Site 2A. Eight samples exhibited a concentration of oil/grease above 10,000 mg/kg.

Samples collected ranged in pH from 3.8 to 12 with a little less then the majority, approximately 46%, of the values falling between 7.0 and 8.5. It should be noted that all of the samples exhibiting pH concentrations at or above 10 were collected from soil borings installed into the by-product fill material present at the site. SI/RI activities identified three types of fill at Site 2A/2B: urban fill (historic fill) including soil fill, vegetative debris, construction debris (wood, glass, brick, concrete); cinder fill consisting of ash and ash-type materials with some slag; and by-product fill from production activities (calcium carbonate, spent diatomaceous earth, and spent carbonaceous filter material). As previously stated, by-product fill was generally limited to the northwestern portion of Site 2A and was not identified at Site 2B. The majority of fill material encountered of Site 2A/2B consisted of urban fill and cinder fill.

Several petroleum-impacted areas were identified within areas consisting of fill material. Further sampling efforts (i.e., RI phase) performed at these petroleum-impacted areas delineated the extent of "impacted" areas, which may be unrelated to the fill material. Analytical results from endpoint sampling during the RI did not reveal the presence of any VOCs and revealed relatively low levels of PAH compounds.

Overall, very few contaminants were detected in groundwater samples collected from Site 2A/2B. No VOCs, pesticides or PCBs were detected in groundwater samples and only a single SVOC, bis(2-thylhexyl)phthalate, was detected in excess of its corresponding SGV in groundwater samples from Site 2A/2B. Bis(2ethylhexyl) phthalate is frequently identified as a laboratory contaminant and, in fact, this compound was identified as being a laboratory contaminant in other groundwater samples collected with regard to this project.

A number of TAL metals were detected in one or more groundwater samples collected as part of the groundwater investigation of Site 2A/2B. However, only six TAL metals were detected at concentrations in excess of corresponding NYSDEC SGVs: arsenic, barium, iron, magnesium, manganese, and sodium. Barium was detected in one sample whereas arsenic, iron, manganese, magnesium and sodium were detected in several samples at elevated levels. Cyanide was detected below its corresponding SGV and total phenolics were not detected in any groundwater samples. TPHC was not detected in the groundwater samples from Site 2A/2B. In contrast, O/G was detected in six of eleven groundwater samples.

Four sediment and four surface water samples were collected at locations along Bridge Creek generally within the boundary of Site 2A. Analytical results from surface water and sediment samples revealed the presence of several metals at concentrations in excess of NYSDEC screening and guidance criteria. Sediment samples were compared to the Human Health Bioaccumulation criteria as published in the

Guidance Document Technical Guidance for Screening Contaminated Sediments dated January 1999. The Human Health Bioaccumulation criteria were developed as screening criteria; that is, to assist in the preliminary assessment of potential risks to human health and the environment and to determine whether further investigation or remediation is necessary. Four pesticide compounds; chlordane, P,P'-DDD, P,P'-DDT and P,P'-DDE were detected in sediment samples in excess of the Human Health Bioaccumulation criteria during the RI. Total PCB concentrations and concentrations of Arclor-1260 were detected in all sediment samples in excess of the Human Health Bioaccumulation criteria. No contaminant gradient was identified with respect to the detected contaminants indicating that the presence of same is a product of the urban nature of the stream corridor. Cessation of manufacturing activities at the site and the redevelopment of the site by the Port Authority is expected to continue to enhance the quality of Bridge Creek.

Based on the findings of the SI, HMM performed RI activities to delineate the presence of petroleum impacts at certain site locations. The RI successfully delineated the extent of petroleum impacts in soil and, in some instances, provided additional information pertaining to UST areas. The RI did not identify the presence of any VOCs in excess of NYSDEC guidance criteria or any free product conditions at Site 2A/2B. The specifics of the RI and UST evaluation efforts were presented earlier in this Report. Based on the results of the SI and RI, the Port Authority has proposed to address petroleum-impacted soil through source area excavation and removal. The remainder of the contaminants will be addressed as part of site redevelopment through the use of engineering and institutional controls.

10.3 Potential Exposure Points and Routes

The SI/RI revealed elevated concentrations (i.e., concentrations in excess of the NYDEC AGVs, RSCOs, and SGVs) of contaminants have been detected in environmental media at the site. These contaminants however are expected given the sites historical usage and its location in a historically urbanized area. In addition to contaminants that occurred directly as an outcome of historical site activities it can be assumed that contaminants at the site have migrated to the site from various sources found in historically urban areas. Generally the contaminants and levels that were found during the SI are believed to relate to both the sites historical use, location, and the fill reported to have been emplaced at the site as part of site development activities. Generally, the contaminants detected at concentrations in excess of NYSDEC soil guidance criteria included typical historic fill contaminants such as PAH compounds, metals, low levels of PCBs/pesticides, TPHC and O/G. As previously stated, non-fill contaminants such as VOCs were detected at elevated concentrations in only 3 of over 80 soil samples collected from Site 2A/2B.

In groundwater, no VOCs and only one SVOC were detected in excess of NYSDEC groundwater standards. The TAL metals iron, arsenic, barium, magnesium, manganese, and sodium were detected in excess of NYSDEC groundwater standards. In sediment, the several metals, pesticides/PCBs exceeded NYSDEC screening criteria. Analytical results did not reveal the presence of any contaminants at concentrations in excess of NYSDEC guidance criteria in one or more surface water samples.

On most sites, the most likely route of exposure for human receptors would be through ingestion of the contaminated soil, sediment or water or inhalation of airborne dust/particulates created through soil erosion in exposed areas of the site. However, on this site, a low potential exists for human contact, and thus few exposure points exist with regard to contaminants present at the site based on the two following conditions: (1) No human populations are situated in the immediate vicinity of the site. Persons present at the site are limited to Port Authority personnel or contractors retained by the Port Authority; and, (2) The Port Authority has implemented health and safety measures to minimize contact with contaminants by all persons currently performing tasks at the site. In addition, the Port Authority requires that contractors have and implement health and safety plans based on their tasks.

As previously stated, groundwater is not utilized for potable purposes and thus human populations will not contact groundwater. Bridge Creek is situated west of Site 2A. However, the Creek's physical position between the HHMT-Port Ivory Facility and the Howland Hook Marine Terminal does not provide easy access for area persons. Further, a fence is present along Bridge Creek, which further restricts access. Thus, Bridge Creek is considered to have a low potential as a point of exposure for human populations.

Any contamination remaining after the performance of remedial actions will be addressed through redevelopment efforts including engineering and institutional controls. Thus, exposure points will be eliminated in conjunction with site redevelopment.

10.4 Receptor Populations

As previously stated, no human population reside at or in the immediate vicinity of the Site 2A/2B. Further, persons currently present at the site are limited to Port Authority personnel or contractors retained by the Port Authority. To minimize exposure, the Port Authority and its contractors have implemented health and safety measures to minimize contact with contaminants by all persons currently performing tasks at the site. Additional persons will be present on site subsequent to the completion of site redevelopment. As the site will be redeveloped for industrial purposes (intermodal/container storage facility), no resident population will occupy the site. Contamination at the site will have been addressed prior to these future worker populations being present at the site.

10.5 Exposure Assessment Summary

Information gained through the SI /RI has revealed the presence of fill material and a contaminant profile, which is consistent with urban sites located in the New York Metropolitan Region. The presence of contaminants in the soil does not appear to have significantly impacted groundwater quality at the site. Based on delineation efforts, petroleum impacts (identified through assessment and investigation activities) will be addressed through excavation of source areas. Any residual contamination will be addressed through and in conjunction with site redevelopment efforts.

Human receptors have not been identified in the immediate vicinity of the site and health and safety procedures are employed by the Port Authority and its contractors to minimize exposure to persons working at the site during ongoing redevelopment efforts. The intended future redevelopment of the site as an intermodal/container storage facility will further restrict contaminant pathways/routes through the installation of pavement and other semi-impervious material, which will function as an environmental cap throughout the entire site. This action will stabilize contaminants in the soil and fill material by impending infiltration as well as minimize or, in some cases, prevent erosion, as well as forming a barrier to human exposure to impacted soil and groundwater. Redevelopment of the site also is anticipated to continue to reduce any residual contamination in sediment/surface water at Bridge Creek, thus enhancing water quality and virtually eliminating this creek as a pathway of contaminants to human receptors.

The Port Authority will continue to implement appropriate actions to minimize exposure to human populations during remedial efforts and site redevelopment. In addition, the Port Authority will monitor the integrity of any engineering controls employed as part of the overall site remedial and redevelopment strategy. Given the above, no further action is required with regard to exposure assessment for Site 2A/2B.

11.0 UST REMOVAL

During the demolition of the concrete foundation located in the vicinity of Building S-35, in September 2002, the Port Authority identified the presence of an UST. A review of available historical records revealed that the UST encountered during the demolition activities was a former #6 fuel oil tank, which had been closed in place by P&G.

Subsequently, the Port Authority removed surface soil surrounding the UST and identified a second UST situated adjacent to the originally encountered tank. Further evaluation revealed that both tanks were located within concrete vaults and were filled with inert material (bricks, stone and sand). Subsequently, the Port Authority removed the tanks and the surrounding concrete vaults. Indications of petroleum impacts to the surrounding soil were observed during excavation activities. As a result, the Port Authority excavated visually impacted soil immediately adjacent to the vaults. Excavated soil was stockpiled on-site pending off-site disposal at an appropriate recycling/disposal facility. The excavation measured approximately 25 feet in length, 20 feet in width, and approximately 11 feet in depth; groundwater was encountered at approximately 8 feet bgs. The USTs and all connected piping were removed and set aside for off-site recycling with the other recycled materials from the demolition activities. Subsequently, the area was backfilled with existing site soil/crushed concrete. Based on the above described tank removal actions, no further action is proposed with regard to UST7.

12.0 SUMMARY OF REMEDIAL ACTIONS

12.1 Proposed Remedial Actions

The SI of Site 2A/2B revealed a variety of contaminants at a wide-range of concentrations in samples collected from soil, sediment, surface water and groundwater. The presence of these contaminants was not unexpected given the former use and location of the site. Overall, given that the subject site is located in a highly urbanized and historically industrial area, it is reasonable to assume that diffuse anthropogenic pollution has contributed, over many decades, to the contaminants present in site soil, sediment, surface water and groundwater. Diffuse anthropogenic pollution is typically defined as pollution emanating from a variety of sources including automobile exhaust and industrial smokestacks. The primary contaminants of concern associated with these types of sources are lead and PAH compounds, but it is not unusual to encounter other types of contaminants associated with sustained urban activity. Regulatory agencies have indicated that most areas are likely to have been impacted, to some degree, by anthropogenic activity, but recognize that the greatest impacts are to those sites located in urban areas such as the subject site. However, the SI also revealed the presence of two issues (the presence of several potential petroleum-impacted areas and the potential presence of USTs), which required additional investigation or delineation prior to the redevelopment of Site 2A/2B. Subsequently, the RI successfully delineated the extent of potential petroleum issues at all of the identified locations. The RI, in conjunction with other field efforts, has resolved UST related issues at the four potential UST areas (UST1, UST3, UST4 and UST7). As described in Section 11, investigations at UST 7 revealed two tanks, which had been closed in place by P&G. These tanks were removed as part of site redevelopment efforts.

Based on the information gained through the RI and the intended future usage of Site 2A/2B, hot spot excavation was identified as the appropriate remedial action to address petroleum-impacted soil at the following areas: Area B-3/B-2, Area GW-14, Area OP-1, Area A-5 and Area FS-1B. It was proposed to remove "delineated" hot spots of potentially petroleum-impacted soil at these locations in accordance with NYSDEC remedial procedures. Proposed excavation areas are presented in Figure 20. Further, it was proposed to collect samples from resultant excavation limits to confirm the success of the remedial efforts. Samples were to be analyzed for VOCs (8270) and PAH compounds (8260) based on the findings from prior sampling efforts. A summary of the actions undertaken prior to entering the VCP Program are provided in Section 12.2.

With regard to other site contaminants including fill material, the SI/RI activities identified the presence of contaminants at Site 2A/2B, which are typical to urban sites in the New York Metropolitan region. Further, the presence of contaminants in soil does not appear to have adversely impacted groundwater quality at Site 2A/2B. Overall, industrial/commercial usage such as the Port Authority's planned usage of the site as an intermodal facility and container terminal is not inconsistent with the levels of contamination noted to be present in site soil and groundwater. In fact, it is anticipated that the Port Authority's redevelopment of the site will have a positive impact on site environmental quality. In particular, the Port Authority intends to install material such as pavement and other semi-impervious material, which will function as an environmental cap throughout the entire site. This action will tend to stabilize contaminants present in soil and fill material by impeding infiltration, thereby reducing the potential for contaminants in soil to leach from the unsaturated zone to groundwater. In addition, the placement of such materials will safeguard the public by preventing exposure to contaminants in soil and groundwater. Additional information pertaining to development actions is provided in Section 13.

12.2 Completed Remedial Actions

To accommodate site redevelopment efforts, hot spot excavation was performed at locations within Site 2A. No remedial efforts have been proposed or performed at Site 2B. A summary of the excavation and sampling at 2A is presented by AOC in the following Sections. Excavation and sampling were performed

FS1-7

ANALYTE	RES	DEPTH
SVOC		
Benzo[a]anthracene :	1.4	4.5' to 5'
Benzo[a]pyrene :	1	4.5' to 5'
Chrysene :	1.5	4.5' to 5'

FS1-8

ANALYTE	RES	DEPTH
SVOC		
Benzo[a]anthracene :	0.22 J	4.5' to 5'
Benzo[a]pyrene :	0.18 J	4.5' to 5'

A5-5

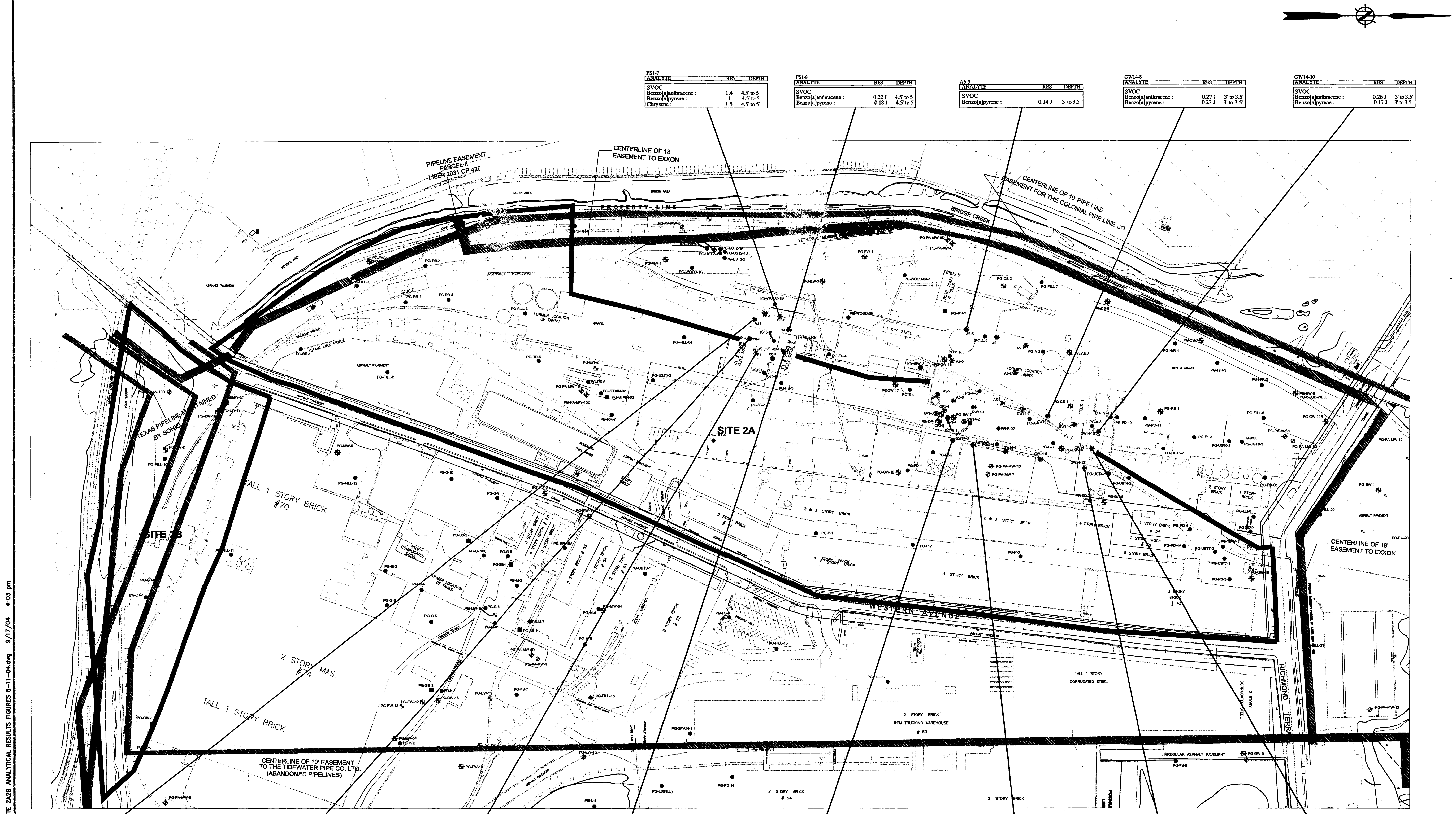
ANALYTE	RES	DEPTH
SVOC		
Benzo[a]pyrene :	0.14 J	3' to 3.5'

GW14-8

ANALYTE	RES	DEPTH
SVOC		
Benzo[a]anthracene :	0.27 J	3' to 3.5'
Benzo[a]pyrene :	0.23 J	3' to 3.5'

GW14-10

ANALYTE	RES	DEPTH
SVOC		
Benzo[a]anthracene :	0.26 J	3' to 3.5'
Benzo[a]pyrene :	0.17 J	3' to 3.5'



FS1-4

ANALYTE	RES	DEPTH
SVOC		
Benzo[a]anthracene :	2.2	4.5' to 5'
Benzo[a]pyrene :	1.7 J	4.5' to 5'
Benzo[b]flouranthene:	2	4.5' to 5'
Chrysene :	2.3	4.5' to 5'

FS1-5

ANALYTE	RES	DEPTH
SVOC		
Benzo[a]pyrene :	0.24 J	4.5' to 5'

FS1-3

ANALYTE	RES	DEPTH
SVOC		
Benzo[a]pyrene :	0.21 J	4.5' to 5'

FS1-1

ANALYTE	RES	DEPTH
SVOC		
Benzo[a]anthracene :	0.27 J	4.5' to 5'
Benzo[a]pyrene :	0.36 J	4.5' to 5'
Chrysene :	0.41 J	4.5' to 5'

GW14-3

ANALYTE	RES	DEPTH
SVOC		
Benzo[a]pyrene :	0.062 J	3' to 3.5'

GW14-4

ANALYTE	RES	DEPTH
SVOC		
Benzo[a]pyrene :	0.11 J	3' to 3.5'

GW14-12

ANALYTE	RES	DEPTH
SVOC		
Benzo[a]anthracene :	0.27 J	3' to 3.5'
Benzo[a]pyrene :	0.24 J	3' to 3.5'

GW14-11

ANALYTE	RES	DEPTH
SVOC		
Benzo[a]pyrene :	0.10 J	3' to 3.5'

100 0 100 200
SCALE IN FEET

RECOMENDED SOIL CLEANUP OBJECTIVES

COMPOUND	RSCO (mg/kg)
SVOC	
Benzo[a]anthracene :	0.224 or MDL
Benzo[a]pyrene :	0.061 or MDL
Benzo[b]flouranthene:	1.1
Chrysene:	0.4

MDL - METHOD DETECTION LIMIT

NOTES:
1. THIS MAP PRESENTS CONCENTRATIONS OF VOCs AND SVOCs AT LEVELS ABOVE CORRESPONDING TAGM RSCOs.

L E G E N D

▨	UTILITY EASEMENT	PG-RS-1 ⊕	PRE-EXISTING P&G MONITORING WELL LOCATION
┼	RAILROAD TRACKS	PG-SB-2 ■	PRE-EXISTING P&G SOIL BORING LOCATION
▬	SITE BOUNDARY	ANALYTE	INDICATES COMPOUND FOR WHICH LABORATORY ANALYSIS WAS CONDUCTED
A5-5	HMM REMEDIAL ACTION POST EXCAVATION/CONFIRMATION SAMPLE LOCATIONS	RES	CONTAMINANT CONCENTRATION IN MG/KG
PG-PA-MW-5 ⊕	YEAR 2000 SITE INVESTIGATION MONITORING WELL LOCATION	J	THE REPORTED VALUE WAS OBTAINED FROM A READING THAT WAS LESS THAN THE CONTRACT REQUIRED DETECTION LIMIT (CRDL), BUT GREATER THAN OR EQUAL TO THE INSTRUMENT DETECTION LIMIT (IDL).
PG-WOOD-3 ●	YEAR 2000 SITE INVESTIGATION SOIL BORING LOCATION	DEPTH	DEPTH IN FEET BELOW GROUND SURFACE

P:\232952wmd\Operable Unit Reports\Operable Unit 2\Mapping\POST VCP Mapping 8-11-04\Drafts\SITE 2A2B ANALYTICAL RESULTS FIGURES 8-11-04.dwg 9/17/04 4:03 pm

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THE PORT AUTHORITY
OF NY & NJ

ENGINEERING PROGRAM MANAGER

No.	Date	Revision	Approved

ENGINEERING DEPARTMENT

Title

(BLOCK 1400, LOT 1 AND BLOCK 1338, LOT 1) HHMT-PORT IVORY FACILITY

SITE 2A/2B HOT SPOT EXCAVATION LIMITS AND CONFIRMATION SAMPLE LOCATIONS, REMEDIAL ACTION

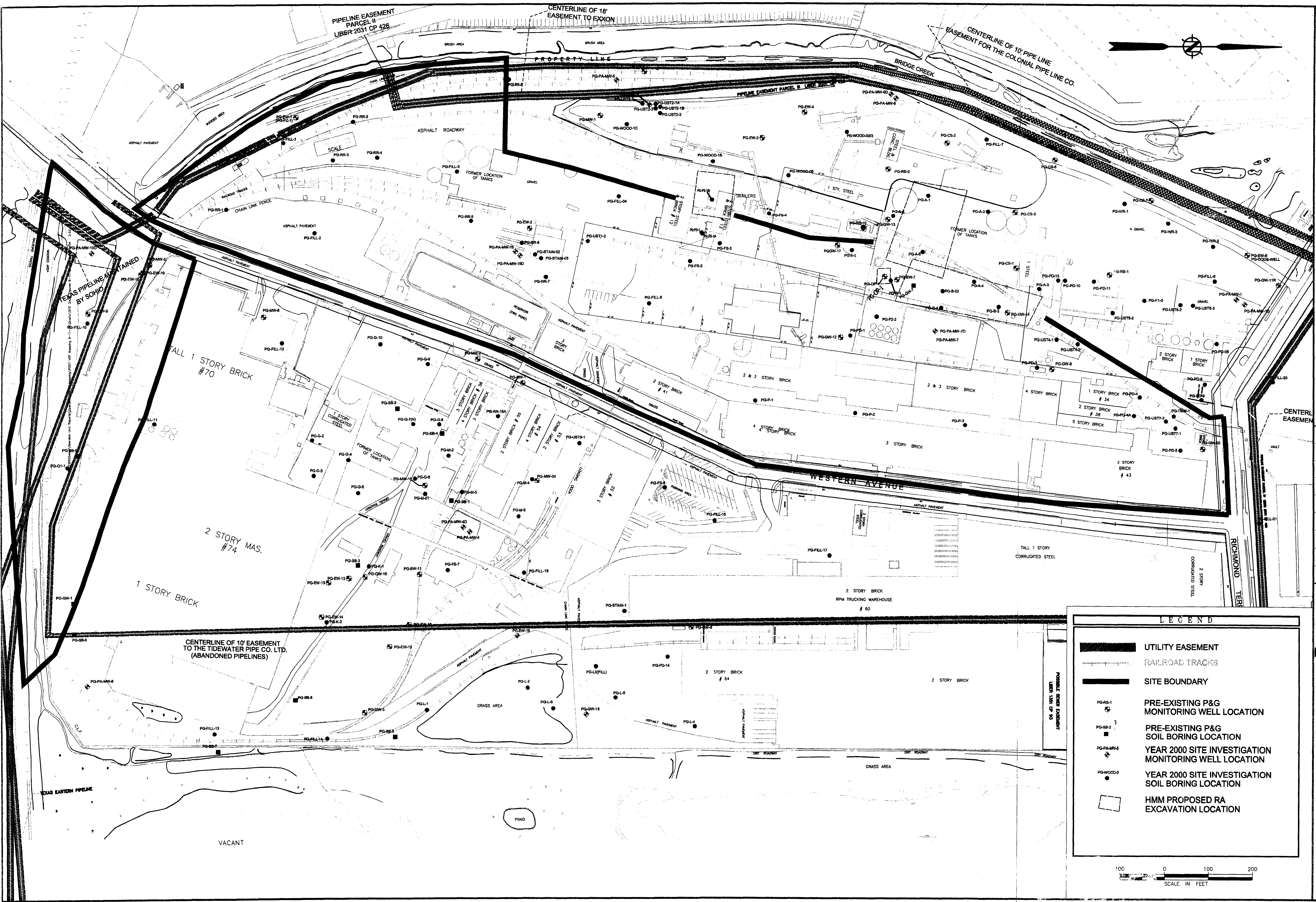
This drawing subject to conditions in contract. All inventions, ideas, designs and methods herein are reserved to Port Authority and may not be used without its written consent.

Designed by Drawn by Checked by

Date

Contract Number

Drawing Number **FIGURE 21**



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THE PORT AUTHORITY OF NY & NJ

ENGINEERING PROGRAM MANAGER

No.	Date	Revision	Approved

ENGINEERING DEPARTMENT

Title

(BLOCK 1400, LOT 1 AND BLOCK 1338, LOT 1) HHMT-PORT IVORY FACILITY

SITE 2A/2B PROPOSED HOT SPOT EXCAVATION AREAS, REMEDIAL ACTION

Designed by Drawn by Checked by

Date

Contract Number

Drawing Number **FIGURE 20**

Table 12
Summary of Remedial Actions and Sampling
Site 2A/2B: HHMT- Port Ivory Facility

Initial SI AOC	SI Soil Boring Location	Description of Issues	Description of Actions and Sampling	Analytical Parameters
Area A	**A-5**	The RI delineated potential petroleum-impacted soil surrounding the borings located in Area A.	The delineated area consisting of Area A was excavated to the groundwater table to address potential petroleum impacted soil. Although not located on Site 1, the excavations for A-2 and A-5 were combined based upon field observations. Soil samples were collected from the 0.0-0.5 foot interval above the groundwater table, approximately 3.0-3.5 feet bgs. The excavation measured approximately 170 feet by 147 feet. Additional excavation, measuring approximately 68 feet by 32 feet, was performed off the northwest corner to address visual signs of potential petroleum impacts. Eight confirmation samples were collected from the A-5 excavation: A5-1, A5-2, A5-3, A5-4, A5-5, A5-6, A5-7, and A5-8. All samples were submitted for laboratory analysis. Excavated soil was stockpiled on site pending off-site disposal. The majority of this excavation is located on Site 1, with only a small area at Site 2A.	VOC 8260; BN 8270
Area B	**B-2, B-3, GW-14**	The RI delineated potential petroleum-impacted soil surrounding the borings located in Area B including sheen noted on groundwater at GW-14.	The delineated area consisting of Area B including B-2 and B-3 and Area GW-14 was excavated to the groundwater table to address potential petroleum impacted soil. Soil samples were collected from the 0.0-0.5 foot interval above the groundwater table. The excavated soil was stockpiled on site pending off-site disposal. The B-2/B-3 excavations joined the GW-14 excavation with resultant sampling utilized the GW-14 designation. The Area GW-14 excavation extended approximately 305 feet in length (north to south) and 110 feet in width (east to west). The excavation was extended to a depth of approximately 3.5 feet; the excavation activities encountered groundwater at some locations. Approximately three-quarters of the excavation	VOC 8260; BN 8270

Table 12
Summary of Remedial Actions and Sampling
Site 2A/2B: HHMT- Port Ivory Facility

Initial SI AOC	SI Soil Boring Location	Description of Issues	Description of Actions and Sampling	Analytical Parameters
			is located on Site 2A, while one-quarter is located in Site 1.	
OP-1	**OP-1**	A sheen was noted on the groundwater surface of OP-1	The Area OP-1 excavation extended approximately 30 feet in length and 30 feet in width and was extended 3.5 feet in depth. No readings above background were recorded on the PID. The Area OP-1 excavation was located to the south of the Area GW-14 excavation, and situated entirely within Site 2A. All visually impacted soils were removed from Area OP-1. No groundwater was encountered during excavation activities. Four soil samples were collected from the sidewalls of the excavation at 3-3.5 feet bgs. Excavated soil was stockpiled onsite pending off-site disposal.	VOC 8260; BN 8270
Former Structures – FS-1B	**FS-1B**	The RI delineated potential petroleum-impacted soil surrounding the FS-1B location.	The delineated area surrounding FS-1B was excavated to the groundwater table to address potential petroleum impacted soil. Soil samples were collected from the 0.0-0.5 foot interval above the groundwater table. The excavation measured 100 feet by 83 feet. Eight confirmation soil samples were collected: FS1-1, FS1-2, FS1-3, FS1-4, FS1-5, FS1-6, FS1-7, and FS1-8. Soil samples were taken at the base of the sidewalls at the 0.0-0.5 foot interval above the groundwater table (approximately 4.5-5' bgs). Excavated soil was stockpiled onsite pending off-site disposal. The majority of this excavation is located on Site 1, with only a small area at Site 2A.	VOC 8260; BN 8270

in accordance with NYSDEC protocols. Continuous field screening, utilizing a photoionization detector (PID) was performed through excavation and sampling efforts. The limits of the hot spot excavation areas and the locations of samples are provided on Figure 21 and a summary of sampling is presented in Table 12.

12.2.1 Area B-3/B-2

The Area B-3/B-2 excavation was extended to address visual indications of petroleum impacts resulting in the joining of the Area B-3/B-2 excavation and the Area GW-14 excavation. As such, the excavation and sampling for Area B-3/B-2 are described in detail under Area GW-14 in Section 12.2.2 below.

12.2.2 Area GW-14

The Area GW-14 excavation extended approximately 305 feet in length (north to south) and 110 feet in width (east to west). The excavation was extended to a depth of approximately 3.5 feet; the excavation activities encountered groundwater at some locations. Approximately three-quarters of the excavation is located on Site 2A, while one-quarter is located in Site 1. Visually impacted soils located from within the limits of the excavation ranged from cinder and ash fill, red clays, silts and sands. PID readings were continuously recorded and ranged from not detected to 1500 parts per million (ppm). No measurable free product was observed to be present or to form on groundwater, where present.

During the removal of soil, piping was noted extending north to south along the eastern portion of the excavation. All piping was removed from the excavation. Based on field observations and historical site maps, it appears that the piping was associated with a former storm sewer line. Additional piping was uncovered in the northern corner of the excavation. The piping was traced and noted to extend to the north. The expansion of the excavation revealed the presence of a UST measuring 4 feet wide by 8 feet long by 6 feet in diameter. Based on historical information, it appeared that the UST was utilized as part of a former oil/water separator system. The UST appeared intact and additional efforts were undertaken to inspect and removed the vessel. Inspection of the tank and the underlying soil did not reveal the presence of residual materials or visually impacted soils. Field screening did not reveal the any readings above background. Due to the presence of the UST, the excavation was expanded in an easterly direction. The extension revealed the presence of three concrete tubs. The tubs were connected with piping and appeared to be part of the oil/water separators system. The system was removed from the excavation for off-site disposal.

Table 13A
Soil Analytical Results
Area GW-14
Volatile Organic Compounds
Site 2A/2B - HHMT-Port Ivory Facility

Location **Sample Date** **Sample Depth (ft)** **Units**	**Recommended Soil Cleanup Objective mg/kg**	**GW14-1** 4/9/2003 3-3.5 mg/kg	**GW14-2** 4/9/2003 3-3.5 mg/kg	**GW14-3** 4/9/2003 3-3.5 mg/kg	**GW14-4** 4/9/2003 3-3.5 mg/kg	**GW14-5** 4/9/2003 3-3.5 mg/kg	**GW14-6** 4/9/2003 3-3.5 mg/kg
1,2,4-trimethylbenzene	3.4	0.0014U	0.0013U	0.0012U	0.0012U	0.0012U	0.0013U
1,3,5-trimethlybenzene	NS	0.0014U	0.0013U	0.0012U	0.0012U	0.0012U	0.0013U
4-isopropyltoluene	NS	0.0014U	0.0013U	0.0012U	0.0012U	0.0012U	0.0024
Benzene	0.06	0.0014U	0.0013U	0.0012U	0.0012U	0.0012U	0.0013U
Ethylbenzene	5.5	0.0014U	0.0013U	0.0012U	0.0012U	0.0012U	0.0013U
Isopropylbenzene	NS	0.0014U	0.0013U	0.0048	0.0012U	0.0012U	0.0013U
M&p-Xylenes	1.2*	0.0028U	0.0026U	0.0024U	0.0025U	0.0024U	0.0025U
Methyl-t-butyl ether	NS	0.0014U	0.0013U	0.0012U	0.0012U	0.0012U	0.0013U
Naphthalene	13	0.0014U	0.0013U	0.0012U	0.0012U	0.0012U	0.0013U
N-butylbenzene	NS	0.0014U	0.0013U	0.0013	0.0012U	0.0012U	0.0013U
N-Propylbenzene	NS	0.0014U	0.0013U	0.0047	0.0012U	0.0012U	0.0013U
O-Xylene	1.2*	0.0014U	0.0013U	0.0012U	0.0012U	0.0012U	0.0013U
Sec-butylbenzene	NS	0.0014U	0.0013U	0.0046	0.0012U	0.0012U	0.0013U
T-butylbenzene	NS	0.0014U	0.0013U	0.0049	0.0012U	0.0012U	0.0013U
Toluene	1.5	0.011	0.0084	0.011	0.0084	0.0076	0.0099
Total VOCs	10	0.011	0.0084	0.0313	0.0084	0.0076	0.0123

U Undetectable Levels
ND Not Detected
NS No Standard
* Total Xylene Recommended Cleanup Standard

Table 13A
Soil Analytical Results
Area GW-14
Volatile Organic Compounds
Site 2A/2B - HHMT-Port Ivory Facility

Location Sample Date Sample Depth (ft) Units	Recommended Soil Cleanup Objective mg/kg	GW14-7 4/9/2003 3-3.5 mg/kg	GW14-8 4/9/2003 3-3.5 mg/kg	GW14-9 4/24/2003 3-3.5 mg/kg	GW14-10 4/24/2003 3-3.5 mg/kg	GW14-11 4/24/2003 3-3.5 mg/kg	GW14-12 4/24/2003 3-3.5 mg/kg
1,2,4-trimethylbenzene	3.4	0.0014U	0.0012U	0.0014U	0.0011U	0.0011U	0.0011U
1,3,5-trimethlybenzene	NS	0.0014U	0.0012U	0.0014U	0.0011U	0.0011U	0.0011U
4-isopropyltoluene	NS	0.0014U	0.0012U	0.0014U	0.0011U	0.0088	0.0086
Benzene	0.06	0.0014U	0.0012U	0.0014U	0.0011U	0.0011U	0.0011U
Ethylbenzene	5.5	0.0014U	0.0012U	0.0014U	0.0011U	0.0011U	0.0011U
Isopropylbenzene	NS	0.0014U	0.0012U	0.0014U	0.0011U	0.0011U	0.0011U
M&p-Xylenes	1.2*	0.0029U	0.0025U	0.0028U	0.0022U	0.0022U	0.0022U
Methyl-t-butyl ether	NS	0.0014U	0.0012U	0.0014U	0.0011U	0.0011U	0.0011U
Naphthalene	13	0.0014U	0.0012U	0.0014U	0.0011U	0.0011U	0.0011U
N-butylbenzene	NS	0.0014U	0.0012U	0.0014U	0.0011U	0.0011U	0.0011U
N-Propylbenzene	NS	0.0014U	0.0012U	0.0014U	0.0011U	0.0011U	0.0011U
O-Xylene	1.2*	0.0014U	0.0012U	0.0014U	0.0011U	0.0011U	0.0011U
Sec-butylbenzene	NS	0.0014U	0.0012U	0.0014U	0.0011U	0.0011U	0.0011U
T-butylbenzene	NS	0.0014U	0.0012U	0.0014U	0.0011U	0.0011U	0.0011U
Toluene	1.5	0.015	0.0054	0.0014U	0.0011U	0.0011U	0.0011U
Total VOCs	10	0.015	0.0054	ND	ND	0.0088	0.0086

U	Undetectable Levels
ND	Not Detected
NS	No Standard
*	Total Xylene Recommended Cleanup Standard

Table 13B
Soil Analytical Results
Area GW-14
PAH Compounds
Site 2A/2B - HHMT-Port Ivory, Facility

Location	Recommended Soil Cleanup Objective mg/kg	GW14-1	GW14-2	GW14-3	GW14-4	GW14-5	GW14-6	GW14-7	GW14-8	GW14-9	GW14-10	GW14-11	GW14-12
Sample Date		4/9/2003	4/9/2003	4/9/2003	4/9/2003	4/9/2003	4/9/2003	4/9/2003	4/9/2003	4/24/2003	4/24/2003	4/24/2003	4/24/2003
Sample Depth (ft)		3-3.5	3-3.5	3-3.5	3-3.5	3-3.5	3-3.5	3-3.5	3-3.5	3-3.5	3-3.5	3-3.5	3-3.5
Units		mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Acenaphthene	41	0.69U	0.64U	0.61U	0.62U	0.60U	0.63U	0.096J	0.14J	0.69U	0.14J	0.088J	0.079J
Anthracene	50	0.69U	0.64U	0.61U	0.11J	0.60U	0.63U	0.71U	0.62U	0.69U	0.15J	0.062J	0.12J
Benzo(a)anthracene	0.224 or MDL	0.69U	0.64U	0.086J	0.16J	0.60U	0.082J	0.084J	**0.27J**	0.69U	**0.26J**	0.13J	**0.27J**
Benzo(a)pyrene	0.061 or MDL	0.69U	0.64U	**0.062J**	**0.11J**	0.60U	0.63U	0.71U	**0.23J**	0.69U	**0.17J**	**0.10J**	**0.24J**
Benzo(b)fluoranthene	1.1	0.69U	0.64U	0.14J	0.16J	0.60U	0.084J	0.18J	0.53J	0.69U	0.36J	0.18J	0.35J
Benzo(g,h,i)perylene	50	0.69U	0.64U	0.61U	0.62U	0.60U	0.63U	0.71U	0.093J	0.69U	0.56U	0.54J	0.081J
Benzo(k)fluoranthene	1.1	0.69U	0.64U	0.61U	0.070J	0.60U	0.63U	0.71U	0.14J	0.69U	0.12J	0.54J	0.12J
Chrysene	0.4	0.69U	0.64U	0.11J	0.18J	0.60U	0.075J	0.12J	0.37J	0.69U	0.31J	0.14J	0.29J
Dibenzo(a,h)Anthracene	0.014 or MDL	0.69U	0.64U	0.61U	0.62U	0.60U	0.63U	0.71U	0.62U	0.69U	0.56U	0.54U	0.56U
Fluoranthene	50	0.69U	0.64U	0.20J	0.35J	0.60U	0.21J	2.4	8.7	0.15J	0.91	0.37J	0.86
Fluorene	50	0.69U	0.64U	0.61U	0.080J	0.60U	0.63U	0.71U	0.62U	0.69U	0.12J	0.071J	0.098J
Indeno(1,2,3-cd)pyrene	3.2	0.69U	0.64U	0.61U	0.62U	0.60U	0.63U	0.71U	0.099J	0.69U	0.56U	0.54U	0.079J
Napthalene	13	0.074J	0.64U	0.61U	0.62U	0.60U	0.63U	0.16J	0.15J	0.095J	0.20J	0.083J	0.089J
Phenanthrene	50	0.69U	0.64U	0.15J	0.19J	0.60U	0.19J	1.5	0.62U	0.16J	0.79	0.24J	0.76
Pyrene	50	0.69U	0.64U	0.18J	0.30J	0.60U	0.17J	0.22J	0.84	0.10J	0.61	0.33J	0.55J
Total PAH Compounds	500	0.074	ND	0.928	1.71	ND	0.811	4.76	11.562	0.505	4.14	2.874	3.986

U Undetectable Levels
ND Not Detected
MDL Method Detection Limit

Table 14A
Soil Analytical Results
Area OP-1
Volatile Organic Compounds
Site 2A/2B - HHMT - Port Ivory Facility

Location	**Recommended**	**OP1-1**	**OP1-2**	**OP1-3**	**OP1-4**
Sample Date	**Soil Cleanup**	4/24/2003	4/24/2003	4/24/2003	4/24/2003
Sample Depth (ft)	**Objective**	3-3.5	3-3.5	3-3.5	3-3.5
Units	**mg/kg**	mg/kg	mg/kg	mg/kg	mg/kg
1,2,4-trimethylbenzene	3.4	0.0013U	0.0011U	0.0012U	0.0011U
1,3,5-trimethlybenzene	NS	0.0013U	0.0011U	0.0012U	0.0011U
4-isopropyltoluene	NS	0.0013U	0.0011U	0.0012U	0.0011U
Benzene	0.06	0.0013U	0.0011U	0.0012U	0.0011U
Ethylbenzene	5.5	0.0013U	0.0011U	0.0012U	0.0011U
Isopropylbenzene	NS	0.0013U	0.0011U	0.0012U	0.0011U
M&p-Xylenes	1.2*	0.0025U	0.0023U	0.0023U	0.0022U
Methyl-t-butyl ether	NS	0.0013U	0.0011U	0.0012U	0.0011U
Naphthalene	13	0.0013U	0.0011U	0.0012U	0.0011U
N-butylbenzene	NS	0.0013U	0.0011U	0.0012U	0.0011U
N-Propylbenzene	NS	0.0013U	0.0011U	0.0012U	0.0011U
O-Xylene	1.2*	0.0013U	0.0011U	0.0012U	0.0011U
Sec-butylbenzene	NS	0.0013U	0.0011U	0.0012U	0.0011U
T-butylbenzene	NS	0.0013U	0.0011U	0.0012U	0.0011U
Toluene	1.5	0.0013U	0.0011U	0.0012U	0.0011U
Total VOCs	10	ND	ND	ND	ND

U Undetectable Levels
NS No Standard
ND Not Detected
* Total Xylene Recommended Cleanup Standard

Table 14B
Soil Analytical Results
Area OP-1
PAH Compounds
Site 2A/2B - HHMT- Port Ivory Facility

Location	**Recommended**	**OP1-1**	**OP1-2**	**OP1-3**	**OP1-4**
Sample Date	**Soil Cleanup**	4/24/2003	4/24/2003	4/24/2003	4/24/2003
Sample Depth (ft)	**Objective**	3-3.5	3-3.5	3-3.5	3-3.5
Units	**mg/kg**	mg/kg	mg/kg	mg/kg	mg/kg
Acenaphthene	41	0.63U	0.57U	0.58U	0.55U
Anthracene	50	0.63U	0.57U	0.58U	0.55U
Benzo(a)anthracene	0.224 or MDL	0.072J	0.57U	0.58U	0.55U
Benzo(a)pyrene	0.061 or MDL	0.63U	0.57U	0.58U	0.55U
Benzo(b)fluoranthene	1.1	0.63U	0.57U	0.58U	0.071J
Benzo(g,h,i)perylene	50	0.63U	0.57U	0.58U	0.55U
Benzo(k)fluoranthene	1.1	0.63U	0.57U	0.58U	0.55U
Chrysene	0.4	0.071J	0.57U	0.58U	0.060J
Dibenzo(a,h)Anthracene	0.014 or MDL	0.63U	0.57U	0.58U	0.55U
Fluoranthene	50	0.12J	0.57U	0.058J	0.18J
Fluorene	50	0.63U	0.57U	0.58U	0.55U
Indeno(1,2,3-cd)pyrene	3.2	0.63U	0.57U	0.58U	0.55U
Napthalene	13	0.064J	0.57U	0.58U	0.55U
Phenanthrene	50	0.088J	0.57U	0.58U	0.11J
Pyrene	50	0.14J	0.57U	0.58U	0.10J
Total PAH Compounds	500	0.555	ND	0.058	0.521

U Undetectable Levels
ND Not Detected
MDL Method Detection Limit

Twelve soil samples were collected from the sidewalls of the excavation at the soil/ground water interface (3-3.5 feet bgs). All soil samples were analyzed for PAH Compounds (8260) and VO Compounds (8270). VOCs were either not detected or were detected at concentrations below corresponding RSCOs. No samples exceeded the RSCO of 10 mg/kg for total VOCs. Only two PAH Compounds, benzo(a)anthracene and benzo(a)pyrene, were detected above corresponding RSCOs. Benzo(a)anthracene was detected at concentrations in excess of its RSCO in three samples ranging from 0.26 mg/kg in sample GW14-10 to 0.27 mg/kg in samples GW14-8 and GW14-12. Benzo(a)pyrene was detected at concentrations in excess of its RSCO in six samples ranging from 0.062 mg/kg in sample GW14-3 to 0.24 mg/kg in sample GW14-12. None of the samples were noted to exceed 50 mg/kg guidance for individual PAH Compounds or the 500 mg/kg guidance criteria for total PAH compounds. Please refer to Tables 13A and 13B for a summary of all analytical results.

12.2.3 Area OP-1

The Area OP-1 excavation extended approximately 30 feet in length and 30 feet in width and was extended 3.5 feet in depth. No readings above background were recorded on the PID. The Area OP-1 excavation was located to the south of the Area GW-14 excavation, and situated entirely within Site 2A. All visually impacted soils were removed from Area OP-1. No groundwater was encountered during excavation activities. Four soil samples were collected from the sidewalls of the excavation at 3-3.5 feet bgs. All samples were analyzed for PAH Compounds (8260) and VOCs (8270).

No VOCs were detected in the four samples collected from the excavation. All PAH compounds were detected at concentrations below corresponding RSCOs and no sample exceeded the 500 mg/kg guidance threshold for total PAH compounds. Please refer to Tables 14A and 14B for a summary of analytical results.

12.2.4 Area A-5

The Area A-5 excavation measured approximately 170 feet in length (east to west) and 150 feet in width (north to south) and extended 3.5 feet in depth. No readings above background were recorded on the PID. The northeastern corner of the Area A-5 excavation overlaps the southwestern excavation of the Area GW-14 (Area B-3/B-2) excavation. Approximately one-quarter of the Area A-5 excavation is situated within the limits of Site 2A, the majority of the excavation is located on Site 1. Access to the underlying soils was possible after the removal of railroad tracks and concrete slabs. Visually impacted soils located from within the limits of the excavation consisted of a mix of cinder, ash, lime sludge/by-product fill, fine black sand and tan sand. The depth of the excavation was limited by the presence of groundwater (3.5 feet bgs) as well as the presence of lime sludge/by-product fill and numerous tree trunks (4 feet to 15 feet bgs).

Eight soil samples were collected from the interface of the sidewalls/ground water table. All samples were analyzed for PAH Compounds (8260) and VOCs (8270). No VOCs were detected at concentrations above corresponding RSCOs and no sample exceeded the total VOC guidance threshold of 10 mg/kg. PAH compounds were either not detected or detected at concentrations below the RSCO in all but one sample. Benzo(a)pyrene was detected at 0.14 mg/kg in Sample A5-5. None of the samples collected exceeded the guidance threshold of 500 mg/kg for total PAH compounds. Please refer to Tables 15A and 15B for a summary of the analytical results.

12.2.5 FS-1B Area

The Area FS-1B measured approximately 100 feet in length (east to west) and 83 feet in width (north to south) and extended approximately 5.0 feet in depth, just above the groundwater table. No readings above background were recorded on the PID. The Area FS-1B excavation is located to the southwest of the Area GW-14 excavation. Approximately one-quarter of the excavation is located on Site 2A, the majority of the excavation is located on Site 1. Visually impacted soils located from within the limits of the excavation consisted of a mix of cinder, ash, lime sludge/by-product fill material, sand, tree timbers and concrete sections.

During the soil removal effort, a concrete structure was encountered at the southeast corner. No visual indications of contaminants were noted and no readings above background were recorded on the PID. The concrete structure was removed from the excavation for off-site disposal along with other concrete demolition debris.

Eight soil samples were collected from the excavation; two from each sidewall and submitted for PAH Compound (8260) and VOC (8270) analyses. VOCs were either not detected or were detected at concentrations below the corresponding RSCO. None of the samples exceeded the guidance threshold of 10 mg/kg for total VOCs. Four PAH compounds were detected at concentrations in excess of corresponding RSCOs in several samples collected from Area FS-1B excavation. Benzo(a)anthracene was detected in excess of its RSCO in three samples with concentrations ranging from 0.27 mg/kg in sample

Table 15A
Soil Analytical Results
Area A-5
Volatile Organic Compounds
Site 2A/2B - HHMT-Port Ivory Facility

Location **Sample Date** **Sample Depth (ft)** **Units**	**Recommended Soil Cleanup Objective mg/kg**	**A5-1** 4/9/2003 3-3.5 mg/kg	**A5-2** 4/9/2003 3-3.5 mg/kg	**A5-3** 4/9/2003 3-3.5 mg/kg	**A5-4** 4/9/2003 3-3.5 mg/kg	**A5-5** 4/9/2003 3-3.5 mg/kg	**A5-6** 4/9/2003 3-3.5 mg/kg	**A5-7** 4/9/2003 3-3.5 mg/kg	**A5-8** 4/9/2003 3-3.5 mg/kg
1,2,4-trimethylbenzene	3.4	0.0015U	0.0014U	0.0013U	0.0014U	0.0012U	0.0013U	0.0014U	0.0012U
1,3,5-trimethlybenzene	NS	0.0015U	0.0014U	0.0013U	0.0014U	0.0012U	0.0013U	0.0014U	0.0012U
4-isopropyltoluene	NS	0.0039	0.0046	0.0035	0.012	0.0084	0.0013U	0.0014U	0.0012U
Benzene	0.06	0.0015U	0.0014U	0.0013U	0.0014U	0.0012U	0.0013U	0.0014U	0.0012U
Ethylbenzene	5.5	0.0015U	0.0014U	0.0013U	0.0014U	0.0012U	0.0013U	0.0014U	0.0012U
Isopropylbenzene	NS	0.0015U	0.0014U	0.0013U	0.0014U	0.0012U	0.0013U	0.0014U	0.0012U
M&P-Xylenes	1.2*	0.0031U	0.0027U	0.0027U	0.0029U	0.0025U	0.0026U	0.0027U	0.0025U
Methyl-t-butyl ether	NS	0.0015U	0.0014U	0.0013U	0.0014U	0.0012U	0.0013U	0.0014U	0.0012U
Naphthalene	13	0.0015U	0.0014U	0.0013U	0.0014U	0.0012U	0.0013U	0.0014U	0.0012U
N-butylbenzene	NS	0.0015U	0.0014U	0.0013U	0.0014U	0.0012U	0.0013U	0.0014U	0.0012U
N-Propylbenzene	NS	0.0015U	0.0014U	0.0013U	0.0014U	0.0012U	0.0013U	0.0014U	0.0012U
O-Xylene	1.2*	0.0015U	0.0014U	0.0013U	0.0014U	0.0012U	0.0013U	0.0014U	0.0012U
Sec-butylbenzene	NS	0.0015U	0.0014U	0.0013U	0.0014U	0.0012U	0.0013U	0.0014U	0.0012U
Toluene	1.5	0.033	0.014	0.012	0.0065	0.021	0.031	0.018	0.02
Total VOCs	10	0.0369	0.0186	0.0155	0.0185	0.0294	0.031	0.018	0.02

U Undetectable Levels

NS No Standard

* Total Xylene Recommended Cleanup Standard

Table 15B
Soil Analytical Results
Area A-5
PAH Compounds
Site 2A/2B - HHMT- Port Ivory Facility

Location	**Recommended Soil Cleanup Objective mg/kg**	**A5-1**	**A5-2**	**A5-3**	**A5-4**	**A5-5**	**A5-6**	**A5-7**	**A5-8**
Sample Date		4/9/2003	4/9/2003	4/9/2003	4/9/2003	4/9/2003	4/9/2003	4/9/2003	4/9/2003
Sample Depth (ft)		3-3.5	3-3.5	3-3.5	3-3.5	3-3.5	3-3.5	3-3.5	3-3.5
Units		mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Acenaphthene	41	0.77U	0.68U	0.67U	0.71U	0.40U	0.66U	0.68U	0.62U
Anthracene	50	0.77U	0.68U	0.67U	0.71U	0.043J	0.66U	0.68U	0.62U
Benzo(a)anthracene	0.224 or MDL	0.77U	0.68U	0.67U	0.076J	0.15J	0.66U	0.68U	0.62U
Benzo(a)pyrene	0.061 or MDL	0.77U	0.68U	0.67U	0.71U	0.14J	0.66U	0.68U	0.62U
Benzo(b)fluoranthene	1.1	0.77U	0.68U	0.67U	0.71U	0.22J	0.66U	0.68U	0.62U
Benzo(g,h,i)perylene	50	0.77U	0.68U	0.67U	0.71U	0.40U	0.66U	0.68U	0.62U
Benzo(k)fluoranthene	1.1	0.77U	0.68U	0.67U	0.71U	0.083J	0.66U	0.68U	0.62U
Chrysene	0.4	0.77U	0.68U	0.67U	0.087J	0.18J	0.075J	0.68U	0.62U
Dibenzo(a,h)Anthracene	0.014 or MDL	0.77U	0.68U	0.67U	0.71U	0.40U	0.66U	0.68U	0.62U
Fluoranthene	50	0.77U	0.68U	0.67U	0.13J	0.26J	0.19J	0.14J	0.13J
Fluorene	50	0.77U	0.68U	0.67U	0.71U	0.40U	0.66U	0.68U	0.62U
Indeno(1,2,3-cd)pyrene	3.2	0.77U	0.68U	0.67U	0.71U	0.40U	0.66U	0.68U	0.62U
Napthalene	13	0.83	0.68U	0.67U	0.091J	0.070J	0.66U	0.68U	0.62U
Phenanthrene	50	0.77U	0.68U	0.67U	0.12J	0.20J	0.14J	0.68U	0.62U
Pyrene	50	0.77U	0.68U	0.67U	0.12J	0.30J	0.14J	0.10J	0.093J
Total PAH Compounds	500	0.83	ND	ND	0.624	1.646	0.545	0.24	0.223

U Undetectable Levels
ND Not Detected
MDL Method Detection Limit

FS1-1 to 2.2 mg/kg in sample FS1-4. Benzo(a)pyrene was detected in excess of its RSCO in six samples ranging in concentrations from 0.18 mg/kg in sample FS1-8 to 1.7 mg/kg in sample FS1-4. Benzo(b)flouranthene was detected in excess of its RSCO in one sample, FS1-4 at 2.0 mg/kg. Chrysene was detected in excess of its RSCO in three samples ranging in concentrations from 0.41 mg/kg in sample FS1-1 to 2.3 mg/kg in sample FS1-4. None of the samples exhibited concentrations in excess of the guidance threshold of 500 mg/kg for total PAH Compounds. Please refer to Tables 16A and 16B for a summary of the analytical results.

13.0 SUMMARY OF PROPOSED SITE DEVELOPMENT ACTIONS

The Port Authority is currently redeveloping Site 2A/2B for use as an intermodal facility, which will function as part of the larger container terminal/intermodal facility including the entire HHMT-Port Ivory Facility. The findings from the assessment/investigation actions have revealed that the Port Authority's planned usage of the site as an intermodal facility and container terminal is not inconsistent with the levels of contamination noted to be present in site soil and groundwater and that contamination can be addressed through site redevelopment.

The Port Authority had developed Preliminary Site Plans for the proposed redevelopment of Sites 1 and 2A/2B. Please refer to Appendix D for information related to site development including a Preliminary Site Plan dated January 2003 and a Preliminary Site Plan with Phasing, also dated January 2003. As shown on these plans, the majority of Site 2A (as well as Site 1) will be dedicated to a railway system which will continue through the southern end of Site 2A and onto Site 2B. Although the elements proposed for Site 2B are not depicted in detail on the Site Plan Figures included in Appendix D, the continuation of the rail system is illustrated on a schematic drawing designated as SK16 and dated October 13, 2003; drawing SK16 is also provided in Appendix D. At this time, it is anticipated that two buildings (Buildings 40 and 41) will remain at Site 2A and will be utilized for security and offices associated with the operation of the facility. To address structural issues presented by the presence of fill material, the Port Authority's development plan includes a process of surcharging portions of Site 1 and Site 2A/2B, with geotechnically suitable clean fill, to achieve a stable base for future construction. Figure SK1, Sequencing of Surcharge Areas along with an associated schedule, is provided in Appendix D.

As part of the geotechnical site preparation work, the Port Authority performed a surcharge pilot study at an area of Site 1 in 2002/2203. The study included the systematic placement of soil/fill over an area measuring approximately 75 feet by 75 feet and the measurement of settlement. As part of the pilot

Table 16A
Soil Analytical Results
Area FS-1B
Volatile Organic Compounds
Site 2A/2B - HHMT- Port Ivory Facility

Location	**Recommended Soil Cleanup Objective mg/kg**	**FS1-1**	**FS1-2**	**FS1-3**	**FS1-4**	**FS1-5**	**FS1-6**	**FS1-7**	**FS1-8**
Sample Date		12/3/2002	12/3/2002	12/3/2002	12/3/2002	12/3/2002	12/3/2002	12/3/2002	12/3/2002
Sample Depth (ft)		4.5-5.0	4.5-5.0	4.5-5.0	4.5-5.0	4.5-5.0	4.5-5.0	4.5-5.0	4.5-5.0
Units		mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
1,2,4-trimethylbenzene	3.4	0.0012U	0.0014U	0.0016U	0.0020U	0.0018U	0.0013U	0.0020U	0.0016U
1,3,5-trimethlybenzene	NS	0.0012U	0.0014U	0.0016U	0.0020U	0.0018U	0.0013U	0.0020U	0.0016U
4-isopropyltoluene	NS	0.0012U	0.0014U	0.0016U	0.0020U	0.0018U	0.0022	0.0020U	0.0016U
Benzene	0.06	0.0012U	0.0014U	0.0016U	0.0020U	0.0018U	0.0013U	0.0020U	0.0016U
Ethylbenzene	5.5	0.0012U	0.0014U	0.0016U	0.0020U	0.0018U	0.0013U	0.0020U	0.0016U
Isopropylbenzene	NS	0.0012U	0.0014U	0.0016U	0.0020U	0.0018U	0.0013U	0.0020U	0.0016U
M&p-Xylenes	1.2*	0.0012U	0.0028U	0.0032U	0.0039U	0.0035U	0.0025U	0.0040U	0.0032U
Methyl-t-butyl ether	NS	0.0012U	0.0014U	0.0016U	0.0020U	0.0018U	0.0013U	0.0020U	0.0016U
Naphthalene	13	0.0012U	0.0014U	0.0016U	0.0020U	0.0018U	0.0013U	0.0020U	0.0016U
N-butylbenzene	NS	0.0012U	0.0014U	0.0016U	0.0020U	0.0018U	0.0013U	0.0020U	0.0016U
N-Propylbenzene	NS	0.0012U	0.0014U	0.0016U	0.0020U	0.0018U	0.0013U	0.0020U	0.0016U
O-Xylene	1.2*	0.0012U	0.0014U	0.0016U	0.0020U	0.0018U	0.0013U	0.0020U	0.0016U
Sec-butylbenzene	NS	0.0012U	0.0014U	0.0016U	0.0020U	0.0018U	0.0013U	0.0020U	0.0016U
T-Butlybenzene	NS	0.0012U	0.0014U	0.0016U	0.0020U	0.0018U	0.0013U	0.0020U	0.0016U
Toluene	1.5	0.0031	0.0037	0.0016U	0.0020U	0.0028	0.0025	0.0023	0.0016U
Total VOCs	10	0.0031	0.0037	ND	ND	0.0028	0.0047	0.0023	ND

U Undetectable Levels
ND Not Detected
NS No Standard
* Total Xylene Recommended Cleanup Standard

Table 16B
Soil Analytical Results
Area FS-1B
PAH Compounds
Site 2A/2B - HHMT-Port Ivory Facility

Location **Sample Date** **Sample Depth (ft)** **Units**	**Recommended Soil Cleanup Objective mg/kg**	**FS1-1** 12/3/2002 4.5-5.0 mg/kg	**FS1-2** 12/3/2002 4.5-5.0 mg/kg	**FS1-3** 12/3/2002 4.5-5.0 mg/kg	**FS1-4** 12/3/2002 4.5-5.0 mg/kg	**FS1-5** 12/3/2002 4.5-5.0 mg/kg	**FS1-6** 12/3/2002 4.5-5.0 mg/kg	**FS1-7** 12/3/2002 4.5-5.0 mg/kg	**FS1-8** 12/3/2002 4.5-5.0 mg/kg
Acenaphthene	41	0.045J	0.47U	0.52U	2.0U	0.58U	0.42U	0.27J	0.54U
Anthracene	50	0.12J	0.47U	0.52U	2.0U	0.58U	0.42U	0.67	0.063J
Benzo(a)anthracene	0.224 or MDL	**0.27J**	0.47U	0.1J	**2.2**	0.19J	0.071J	**1.4**	0.22J
Benzo(a)pyrene	0.061 or MDL	**0.36J**	0.47U	**0.21J**	**1.7J**	**0.24J**	0.059J	**1**	**0.18J**
Benzo(b)fluoranthene	1.1	0.6	0.47U	0.36J	**2**	0.29J	0.10J	0.96	0.31J
Benzo(g,h,i)perylene	50	0.13J	0.47U	0.52U	0.69J	0.58U	0.42U	0.2J	0.54U
Benzo(k)fluoranthene	1.1	0.27J	0.47U	0.087J	0.52J	0.069J	0.42U	0.43J	0.54U
Chrysene	0.4	**0.41J**	0.14J	0.15J	**2.3**	0.35J	0.092J	**1.5**	0.32J
Dibenzo(a,h)Anthracene	0.014 or MDL	0.42U	0.47U	0.52U	2.0U	0.58U	0.42U	0.67U	0.54U
Fluoranthene	50	0.66	0.47U	0.17J	0.82J	0.24J	0.11J	1.9	0.28J
Fluorene	50	0.055J	0.47U	0.52U	2.0U	0.58U	0.42U	0.29J	0.54U
Indeno(1,2,3-cd)pyrene	3.2	0.13J	0.47U	0.52U	0.55J	0.58U	0.42U	0.18J	0.54U
Napthalene	13	0.14J	0.16J	0.082J	0.52J	0.58U	0.045J	2.2	0.19J
Phenanthrene	50	0.54	0.19J	0.16J	0.66J	0.20J	0.089J	3.5	0.35J
Pyrene	50	0.81	0.47U	0.17J	2	0.35J	0.11J	3.3	0.41J
Total PAH Compounds	500	4.54	0.49	1.489	13.96	1.929	1.516	17.8	2.323

U Undetectable Levels
MDL Method Detection Limit

study, the Port Authority reviewed potential environmental impacts to groundwater and Bridge Creek. The environmental review for groundwater included the installation and sampling of nested monitoring well pairs (one shallow and one deep well) at four locations around the pilot study area. The wells were constructed approximately 15 feet from the edge of the surcharge material pile. Groundwater samples were collected from the eight newly installed wells as well as from two additional existing well locations, PG-CS-7 and PG-RS-1. Three rounds of groundwater sampling were performed on the two existing wells with all rounds including phenols and BTEX (benzene, toluene, ethylbenzene and xylenes) and one round including phenols, BTEX, TAL Metals and pH. One round of groundwater sampling was performed for the eight newly installed wells with analysis for TAL Metals and pH. A summary of analytical results is provided in Tables 17A (BTEX), 17B (phenols), and 17C (TAL Metals and pH). The pilot study area and well locations are presented on Figure 22. In addition, exceedences of applicable groundwater SGVs are also presented, by location, on Figure 22. A summary of analytical results is presented in Tables 17A-17C.

With respect to Bridge Creek, the environmental review included the inspection of the eastern bank of Bridge Creek for the presence of seeps, precipitate, bank failure or other evidence of mass movement of subsurface material or liquids. It should be noted that the surface water and sediment sampling undertaken as part of the RI of Site 2A/2B was performed during the surcharge pilot test period. As such, the information generated from that evaluation has been utilized as part of the environmental review for the pilot study. Information related to sampling of Bridge Creek is presented in Sections 8.3 and 9.3 of this Report. In addition, two rounds of surface water sampling were performed as part of the surcharge pilot study. Five samples were collected from representative locations during both rounds and samples were analyzed for TAL Metals and pH. The surface water locations and associated analytical results are presented on Figure 22 and Table 17C. Given the purpose of the study, the surface water samples were compared to applicable groundwater SGVs.

Overall, the environmental evaluation performed as part of the pilot study did not reveal any adverse impacts as a result of the compaction process. Inspection of the eastern bank did not reveal the presence of seeps, additional/increased occurrence of precipitate, bank failure or other evidence of mass movement of subsurface material or liquids. Analytical results from the surface water and the groundwater sampling did not reveal any increased contaminant concentrations over the period of study. It should be noted that m&p xylenes (reported as a combined concentration) was/were detected in the groundwater sample from the third round of sampling of PG-CS-7 but not in the first or second rounds. This is not regarded as

PG-ST-SW-1

DATE SAMPLED	10/21/2002
MATRIX	SURFACE WATER
ANALYTE	RESULTS (ug/L)
METALS	
IRON	610***
MAGNESIUM	600,000
SILVER	4,800,000

PG-ST-SW-2

DATE SAMPLED	10/21/2002
MATRIX	SURFACE WATER
ANALYTE	RESULTS (ug/L)
METALS	
MAGNESIUM	630,000
SODIUM	5,100,000

PG-ST-MW-4D

DATE SAMPLED	11/8/2002
MATRIX	GROUNDWATER
ANALYTE	RESULTS (ug/L)
METALS	
IRON (unfiltered)	22,000***
IRON (filtered)	19,000***
MANGANESE (unfiltered)	5,200***
MANGANESE (filtered)	4,800***
SODIUM (unfiltered)	2,100,000
SODIUM (filtered)	2,000,000

PG-ST-MW-4S

DATE SAMPLED	11/8/2002
MATRIX	GROUNDWATER
ANALYTE	RESULTS (ug/L)
METALS	
ANTIMONY (filtered)	75
ARSENIC (filtered)	69
BERYLLIUM (filtered)	40
IRON (unfiltered)	3,300***
IRON (filtered)	550***
SODIUM (unfiltered)	400,000
SODIUM (filtered)	470,000
THALLIUM (filtered)	42

PG-ST-SW-3

DATE SAMPLED	SURFACE WATER
MATRIX	RESULTS (ug/L)
ANALYTE	
METALS	790***
IRON	130,000
MAGNESIUM	1,300,000
SODIUM	

PG-ST-SW-4

DATE SAMPLED	10/21/2002
MATRIX	SURFACE WATER
ANALYTE	RESULTS (ug/L)
METALS	
MAGNESIUM	610,000
SODIUM	4,900,000

PG-ST-SW-5

DATE SAMPLED	SURFACE WATER
MATRIX	RESULTS (ug/L)
ANALYTE	
METALS	630,000
MAGNESIUM	5,000,000
SODIUM	

PG-CS-7

DATE SAMPLED	10/15/2002
MATRIX	GROUNDWATER
ANALYTE	RESULTS (ug/L)
METALS	
SODIUM (unfiltered)	79,000
SODIUM (filtered)	89,000

DATE SAMPLED	11/8/2002
MATRIX	GROUNDWATER
ANALYTE	RESULTS (ug/L)
METALS	
SODIUM (unfiltered)	130,000
SODIUM (filtered)	130,000

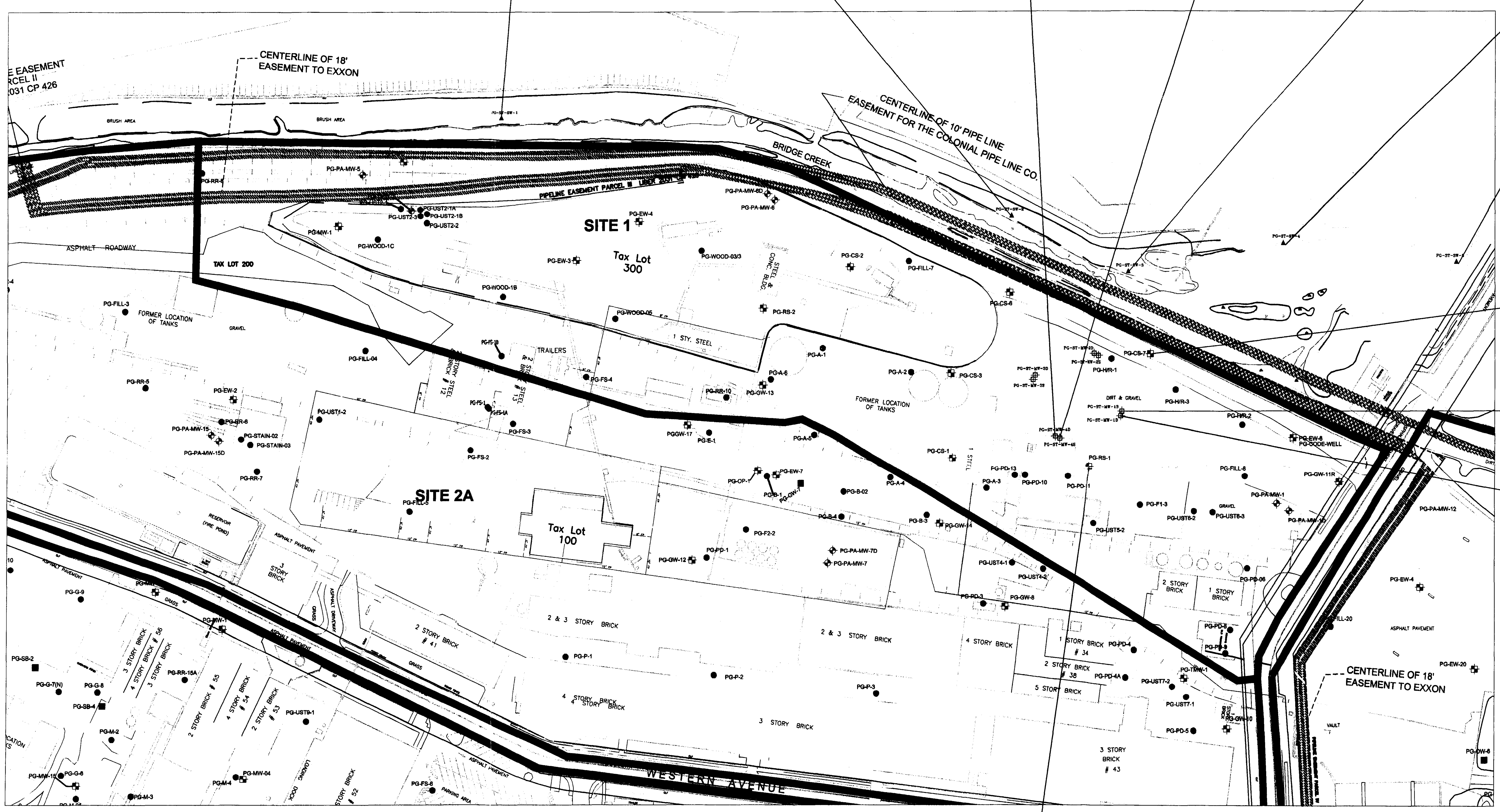
DATE SAMPLED	12/2/2002
MATRIX	GROUNDWATER
ANALYTE	RESULTS (ug/L)
BTEX	
M&P-XYLENES	7

PG-ST-MW-1S

DATE SAMPLED	[illegible]8/2002
MATRIX	GROUNDWATER
ANALYTE	RESULTS (ug/L)
METALS	
ARSENIC (unfiltered)	[illegible]
ARSENIC (filtered)	[illegible]
IRON (unfiltered)	[illegible]
NICKEL (filtered)	110
SODIUM (unfiltered)	1,500,000
SODIUM (filtered)	1,600,000

PG-ST-MW-1D

DATE SAMPLED	11/8/2002
MATRIX	GROUNDWATER
ANALYTE	RESULTS (ug/L)
METALS	
IRON (unfiltered)	5,200***
IRON (filtered)	3,500***
SODIUM (unfiltered)	660,000
SODIUM (filtered)	720,000



PG-RS-1

DATE SAMPLED	10/15/2002
MATRIX	GROUNDWATER
ANALYTE	RESULTS (ug/L)
METALS	
IRON (unfiltered)	20,000***
IRON (filtered)	380***
SODIUM (unfiltered)	29,000
SODIUM (filtered)	28,000
ACID EXTRACTABLES	
TOTAL PHENOLS	1.1

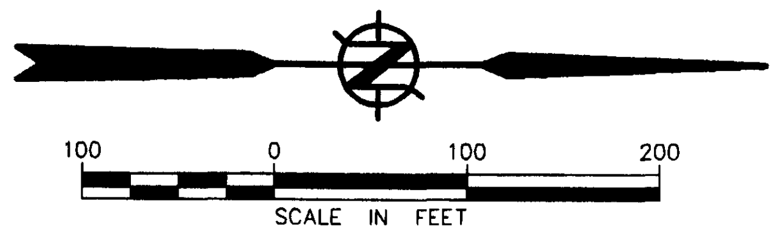
DATE SAMPLED	11/8/2002
MATRIX	GROUNDWATER
ANALYTE	RESULTS (ug/L)
METALS	
IRON (unfiltered)	1,400***
IRON (filtered)	950***
SODIUM (unfiltered)	32,000
SODIUM (filtered)	33,000

DATE SAMPLED	12/2/2002
MATRIX	GROUNDWATER
ANALYTE	RESULTS (ug/L)
ACID EXTRACTABLES	
PHENOL	3
TOTAL PHENOL	6.8

NYSDEC GROUNDWATER
CLEANUP STANDARDS AND CLEANUP
GUIDANCE VALUES

ANALYTE	RCS (ug/l)	RCG (ug/l)
VOCs		
M&P Xylenes:	5&5	NG
ACID EXTRACTABLES		
Phenol:	1	NG
Total Phenol:	1	NG

NG - NO GUIDANCE VALUE



Notes:
1. Site 1, 2A/2B, and 3 descriptions as per July 2004 VCP Agreements.
2. This map presents concentrations of BTEX, Acid Extractables, and Metals at levels above NYSDEC Groundwater Cleanup Standards and Groundwater Cleanup Guidance Values.

L E G E N D

▨	UTILITY EASEMENT
┼┼┼	RAILROAD TRACKS
▬	SITE BOUNDARY
PG-RS-1 ⊕	PRE-EXISTING P&G MONITORING WELL LOCATION
PG-SB-2 ■	PRE-EXISTING P&G SOIL BORING LOCATION
PG-PA-MW-5 ⊕	YEAR 2000 SITE INVESTIGATION MONITORING WELL LOCATION
PG-WOOD-03/3 ●	YEAR 2000 SITE INVESTIGATION SOIL BORING LOCATION
PG-ST-MW-1D ⊕	SURCHARGE MONITORING WELL LOCATIONS
PG-ST-SW-4 ▲	SURCHARGE SURFACE WATER SAMPLE LOCATIONS

Sheet of

THE PORT AUTHORITY
OF NY & NJ

ENGINEERING PROGRAM MANAGER

No.	Date	Revision	Approved

ENGINEERING DEPARTMENT

Title

(BLOCK 1400, LOT 1 AND BLOCK 1338, LOT 1) HHMT-PORT IVORY FACILITY

SURCHARGE MONITORING WELL LOCATIONS MAP AND ANALYTICAL DATA

This drawing subject to conditions in contract. All inventions, ideas, designs and methods herein are reserved to Port Authority and may not be used without its written consent.

Designed by Drawn by Checked by

Date

Contract Number

Drawing Number **FIGURE 22**

Table 17A
Surcharge Pilot Study -Groundwater Results
BTEX
Site 2A/2B: HHMT - Port Ivory Facility

Location	Recommended Groundwater Cleanup Standard UG/L	Recommended Groundwater Cleanup Guidance UG/L	**CS-7**	**RS-1**	**FB-1**	**TB-1**	**CS-7**	**RS-1**	**TB-1**	**FB-1**	**TB-1**	**CS-7**	**RS-1**
Date			10/15/2002	10/15/2002	10/15/2002	10/15/2002	11/6/2002	11/6/2002	11/6/2002	11/6/2002	11/7/2002	12/2/2002	12/2/2002
LAB ID#			AB70453	AB70455	AB70457	AB70459	AB72292	AB72294	AB72304	AB72305	AB72397	AB74079	AB74081
Concentration			UG/L	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L
Benzene	1	NG	0.49U	0.49U	0.49U	0.49U	0.49U	0.49U	0.49U	0.49U	0.49U	0.49U	0.49U
Ethylbenzene	5	NG	0.63U	0.63U	0.63U	0.63U	0.63U	0.63U	0.63U	0.63U	0.63U	2.4	0.63U
m&p-xylenes	5&5	NG	1.1U	1.1U	1.1U	1.1U	1.1U	1.1U	1.1U	1.1U	1.1U	7	1.1U
O-xylenes	5	NG	0.59U	0.59U	0.59U	0.59U	0.59U	0.59U	0.59U	0.59U	0.59U	0.59U	0.59U
Toluene	5	NG	0.79U	0.79U	0.79U	0.79U	0.79U	0.79U	0.79U	0.79U	0.79U	0.79U	0.79U

U	Undetectable Levels
NG	No Guidance

Table 17B
Surcharge Pilot Study - Groundwater Results
Acid Extractables
Site 2A/2B: HHMT Port Ivory Facility

Location Date Lab ID Concentration	Recommended Groundwater Cleanup Standard UG/L	Recommended Groundwater Cleanup Guidance UG/L	**CS-7** 10/15/2002 AB70453 UG/L	**RS-1** 10/15/2002 AB70455 UG/L	**FB-1** 10/15/2002 AB70457 UG/L	**CS-7** 11/6/2002 AB72292 UG/L
2,4,5-trichlorophenol	NS	NG	0.6U	0.6U	0.6U	0.6U
2,4,6-trichlorophenol	NS	NG	0.65U	0.65U	0.65U	0.65U
2,4-dichlorophenol	5	NG	0.57U	0.57U	0.57U	0.57U
2,4-dimethylphenol	NS	50	0.49U	0.49U	0.49U	0.49U
2,4-dinitrophenol	NS	10	3.1U	3.1U	3.1U	3.1U
2-chlorophenol	NS	NG	0.49U	0.49U	0.49U	0.49U
2-methylphenol	NS	NG	0.61U	0.61U	0.61U	0.61U
2-nitrophenol	NS	NG	0.64U	0.64U	0.64U	0.64U
3&4-methylphenol	NS	NG	5.4U	1.1J	5.4U	5.4U
4,6-dinitro-2-methylphenol	NS	NG	0.36U	0.36U	0.36U	0.36U
4-chloro-3-methylphenol	NS	NG	0.38U	0.38U	0.38U	0.38U
4-nitrophenol	NS	NG	0.27U	0.27U	0.27U	0.27U
pentachlorophenol	1 (total phenols)	NG	0.57U	0.57U	0.57U	0.57U
phenol	1 (total phenols)	NG	0.14U	0.14U	0.14U	0.14U
Total phenols	1	NG	ND	**1.1**	ND	ND

U	Undetectable Levels
NS	No Standard
NG	No Guidance
ND	Not Detected

Table 17B
Surcharge Pilot Study - Groundwater Results
Acid Extractables
Site 2A/2B: HHMT Port Ivory Facility

Location Date Lab ID Concentration	Recommended Groundwater Cleanup Standard UG/L	Recommended Groundwater Cleanup Guidance UG/L	**RS-1** 11/6/2002 AB72294 UG/L	**FB-1** 11/6/2002 AB72305 UG/L	**CS-7** 12/2/2002 AB74079 UG/L	**RS-1** 12/2/2002 AB74081 UG/L
2,4,5-trichlorophenol	NS	NG	0.6U	0.6U	0.6U	0.6U
2,4,6-trichlorophenol	NS	NG	0.65U	0.65U	0.65U	0.65U
2,4-dichlorophenol	5	NG	0.57U	0.57U	0.57U	0.57U
2,4-dimethylphenol	NS	50	0.49U	0.49U	0.49U	0.49U
2,4-dinitrophenol	NS	10	3.1U	3.1U	3.1U	3.1U
2-chlorophenol	NS	NG	0.49U	0.49U	0.49U	0.49U
2-methylphenol	NS	NG	0.61U	0.61U	0.61U	0.61U
2-nitrophenol	NS	NG	0.64U	0.64U	0.64U	0.64U
3&4-methylphenol	NS	NG	5.4U	5.4U	5.4U	3.8J
4,6-dinitro-2-methylphenol	NS	NG	0.36U	0.36U	0.36U	0.36U
4-chloro-3-methylphenol	NS	NG	0.38U	0.38U	0.38U	0.38U
4-nitrophenol	NS	NG	0.27U	0.27U	0.27U	0.27U
pentachlorophenol	1 (total phenols)	NG	0.57U	0.57U	0.57U	0.57U
phenol	1 (total phenols)	NG	0.14U	0.14U	0.14U	**3**
Total phenols	1	NG	ND	ND	ND	**6.8**

U Undetectable Levels
NS No Standard
NG No Guidance
ND Not Detected

Table 17C
Surcharge Pilot Study - Groundwater and Surface Water Results
Metals and pH
Site 2A/2B: HHMT - Port Ivory Facility

Location Date Lab ID Concentration Filtered or Unfiltered	Recommended Groundwater Cleanup Standard UG/L	Recommended Groundwater Cleanup Guidance UG/L	ST-SW1 10/21/2002 AB70895 UG/L	ST-SW2 10/21/2002 AB70896 UG/L	ST-SW3 10/21/2002 AB70460 UG/L	ST-SW4 10/21/2002 AB70897 UG/L	ST-SW5 10/21/2002 AB70898 UG/L	CS-7 10/15/2002 AB70453 UG/L unfiltered	CS-7 10/15/2002 AB70454 UG/L filtered	RS-1 10/15/2002 AB70455 UG/L unfiltered
Aluminum	NS	NG	570	400	140	190	330	100U	100U	170
Antimony	3	NG	7.5U	7.5U	7.5U	7.5U	7.5U	7.5U	7.5U	7.5U
Arsenic	25	NG	4.0U	5.4	4.0U	10	4.0U	4.0U	4.0U	4.1
Barium	1000	NG	27	25U	45	25U	25U	25U	25U	59
Beryllium	NS	3	4.0U	4.0U	4.0U	4.0U	4.0U	4.0U	4.0U	4.0U
Cadmium	5	NG	2.5	2.5	2.0U	2.5	2.5	2.0U	2.0U	2.0U
Calcium	NS	NG	150000	160000	93000	170000	160000	110000	120000	130000
Chromium	50	NG	25U	25U	25U	25U	25U	25U	25U	36
Cobalt	NS	NG	10U	10U	10U	10U	10U	10U	10U	10U
Copper	200	NG	25U	25U	25U	25U	25U	25U	25U	25U
Iron	300***	NG	**610*****	**280*****	**790*****	150U	150U	210	150U	**20000*****
Lead	25	NG	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U
Magnesium	NS	35000	**600000**	**630000**	**130000**	**610000**	**630000**	**47000**	**52000**	27000
Manganese	300***	NG	**82*****	**69*****	**260*****	67	61	25U	25U	**180*****
Nickel	100	NG	25U	25U	25U	25U	25U	25U	25U	46
Potassium	NS	NG	250000	260000	58000	250000	260000	13000	15000	5800
Selenium	10	NG	25U	25U	25U	25U	25U	25U	25U	25U
Silver	50	NG	**4800000**	10U	10U	10U	10U	10U	10U	10U
Sodium	20000	NG	50000U	**5100000**	**1300000**	**4900000**	**5000000**	**79000**	**89000**	**29000**
Thallium	NS	0.5	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U
Vanadium	NS	NG	25U	25U	25U	25U	25U	25U	25U	25U
Zinc	NS	2000	47	34	25U	32	31	64	67	440
Mercury	0.7	NG	0.2U	0.2U	0.2U	0.2U	0.2U	0.2U	0.2U	0.2U
pH	NS	NG	7.5	7.6	7.7	7.6	7.6	7	7	7.2

ND	No Data
U	Undetectable Levels
NS	No Standard
NG	No Guidance

*** Total for Iron and Manganese is > 500

Note-1: pH listed is the pH recorded in the field

Note-2: ST-SW1 through ST-SW5 represents samples collected from surface water

Table 11C

Surcharge Pilot Study - Groundwater and Surface Water Results

Metals and pH

Site 2A/2B: HHMT - Port Ivory Facility

Location Date Lab ID Concentration Filtered or Unfiltered	Recommended Groundwater Cleanup Standard UG/L	Recommended Groundwater Cleanup Guidance UG/L	RS-1 10/15/2002 AB70456 UG/L filtered	FB-1 10/15/2002 AB70457 UG/L unfiltered	FB-1 10/15/2002 AB70458 UG/L filtered	ST-SW1 11/7/2002 AB72569 ug/l	ST-SW2 11/7/2002 AB72570 ug/l	ST-SW3 11/7/2002 AB72571 ug/l	ST-SW4 11/7/2002 AB72572 ug/l	ST-SW5 11/7/2002 AB72573 ug/l
Aluminum	NS	NG	100U	100U	100U	430	420	340	550	290
Antimony	3	NG	7.5U	7.5U	7.5U	7.5U	7.5U	7.5U	7.5U	7.5U
Arsenic	25	NG	4.0U	4.0U	4.0U	4.0U	4.0U	4.1	5.4	4.0U
Barium	1000	NG	52	25U	25U	28	25U	37	25U	25U
Beryllium	NS	3	4.0U	4.0U	4.0U	4.0U	4.0U	4.0U	4.0U	4.0U
Cadmium	5	NG	2.0U	2.0U	2.0U	2.6	2.8	2.6	2.8	2.8
Calcium	NS	NG	130000	1000U	1000U	160000	170000	170000	180000	180000
Chromium	50	NG	25U	25U	25U	25U	25U	25U	25U	25U
Cobalt	NS	NG	10U	10U	10U	10U	10U	10U	10U	10U
Copper	200	NG	25U	25U	25U	25U	25U	25U	25U	25U
Iron	300***	NG	**380*** **	150U	150U	**400*** **	290	**360*** **	**460*** **	150U
Lead	25	NG	5.0U	5.0U	5.0U	5U	5U	5U	5U	5U
Magnesium	NS	35000	26000	1000U	1000U	**620000**	**680000**	**610000**	**710000**	**730000**
Manganese	300***	NG	**170*** **	25U	25U	**72*** **	53	**100*** **	**48*** **	36
Nickel	100	NG	25U	25U	25U	25U	25U	25U	25U	25U
Potassium	NS	NG	5500	2500U	2500U	300000	340000	300000	360000	380000
Selenium	10	NG	25U	25U	25U	25U	25U	25U	25U	25U
Silver	50	NG	10U	10U	10U	10U	10U	10U	10U	10U
Sodium	20000	NG	**28000**	25000U	25000U	**5100000**	**5500000**	**5000000**	**5500000**	**5900000**
Thallium	NS	0.5	5.0U	5.0U	5.0U	5U	5U	5U	5U	5U
Vanadium	NS	NG	25U	25U	25U	25U	25U	25U	25U	25U
Zinc	NS	2000	25U	25U	25U	26	25U	28	25U	25U
Mercury	0.7	NG	0.2U	0.2U	0.2U	0.2U	0.2U	0.2U	0.2U	0.2U
pH	NS	NG	7.2	4.2	4.2	7.7	7.6	7.7	7.8	7.8

ND	No Data
U	Undetectable Levels
NS	No Standard
NG	No Guidance

*** Total for Iron and Manganese is > 500

Note-1: pH listed is the pH recorded in the field

Note-2: ST-SW1 through ST-SW5 represents samples collected from surface water

Table 17C

Surcharge Pilot Study - Groundwater and Surface Water Results

Metals and pH

Site 2A/2B: HHMT - Port Ivory Facility

Location Date Lab ID Concentration Filtered or Unfiltered	Recommended Groundwater Cleanup Standard UG/L	Recommended Groundwater Cleanup Guidance UG/L	CS-7 11/6/2002 AB72292 UG/L unfiltered	CS-7 11/6/2002 AB72293 UG/L filtered	RS-1 11/6/2002 AB72294 UG/L unfiltered	RS-1 11/6/2002 AB722945 UG/L filtered	ST-4S 11/6/2002 AB72296 UG/L unfiltered	ST-4S 11/6/2002 AB72297 UG/L filtered	ST-4D 11/6/2002 AB72298 UG/L unfiltered	ST-4D 11/6/2002 AB72299 UG/L filtered
Aluminum	NS	NG	100U	100U	100U	100U	970	2300	140	100U
Antimony	3	NG	7.5U	7.5U	7.5U	7.5U	7.5U	**75**	7.5U	7.5U
Arsenic	25	NG	7.5	5.9	4.1	4.6	15	**69**	8.1	8.3
Barium	1000	NG	25U	25U	78	76	80	130	780	710
Beryllium	NS	3	4U	4U	4U	4U	4U	**40**	4U	4U
Cadmium	5	NG	2U	2U	2U	2U	2U	3.2	2U	2U
Calcium	NS	NG	83000	81000	130000	120000	200000	90000	290000	230000
Chromium	50	NG	25U	25U	25U	25U	25U	46	25U	25U
Cobalt	NS	NG	10U	10U	10U	10U	10U	220	10U	10U
Copper	200	NG	25U	25U	25U	25U	25U	160	25U	25U
Iron	300***	NG	150U	150U	**1400*****	**950*****	**3300*****	**550*****	**22000*****	**19000*****
Lead	25	NG	5U	5U	5U	5U	5U	5U	5U	5U
Magnesium	NS	35000	34000	34000	18000	19000	2000	**52000**	**97000**	**89000**
Manganese	300***	NG	25U	25U	**170****	**170*****	**28*****	**150*****	**5200*****	**4800*****
Nickel	100	NG	25U	25U	25U	25U	25U	49	25U	25U
Potassium	NS	NG	ND	ND	ND	ND	ND	ND	ND	ND
Selenium	10	NG	25U	25U	25U	25U	25U	25U	25U	25U
Silver	50	NG	10U	10U	10U	10U	10U	10U	10U	10U
Sodium	20000	NG	**130000**	**130000**	**32000**	**33000**	**400000**	**470000**	**2100000**	**2000000**
Thallium	NS	0.5	5U	5U	5U	5U	5U	**42**	5U	5U
Vanadium	NS	NG	25U	25U	25U	25U	25U	25U	28	26
Zinc	NS	2000	49	25U	130	34	26	920	25U	25U
Mercury	0.7	NG	0.2U	0.2U	0.2U	0.2U	0.2U	0.2U	0.2U	0.2U
pH	NS	NG	8	8	8	8	11	11	7	7

ND	No Data
U	Undetectable Levels
NS	No Standard
NG	No Guidance

*** Total for Iron and Manganese is > 500

Note-1: pH listed is the pH recorded in the field

Note-2: ST-SW1 through ST-SW5 represents samples collected from surface water

Table [illegible]C
Surcharge Pilot Study - Groundwater and Surface Water Results
Metals and pH
Site 2A/2B: HHMT - Port Ivory Facility

Location Date Lab ID Concentration Filtered or Unfiltered	Recommended Groundwater Cleanup Standard UG/L	Recommended Groundwater Cleanup Guidance UG/L	ST-1S 11/6/2002 AB72300 UG/L unfiltered	ST-1S 11/6/2002 AB72301 UG/L filtered	ST-1D 11/6/2002 AB72302 UG/L unfiltered	ST-1D 11/6/2002 AB72303 UG/L filtered	FB-1 11/6/2002 AB72305 UG/L unfiltered	FB-1 11/6/2002 AB72306 UG/L filtered	FB-1 11/7/2002 AB72395 UG/L unfiltered	FB-1 11/7/2002 AB72396 UG/L filtered
Aluminum	NS	NG	3200	350	910	140	100U	100U	100U	100U
Antimony	3	NG	7.5U	7.5U	7.5U	7.5U	7.5U	7.5U	7.5U	7.5U
Arsenic	25	NG	**90**	**53**	8	6.2	4U	4U	4U	4U
Barium	1000	NG	190	150	84	74	25U	25U	25U	25U
Beryllium	NS	3	4U	4U	4U	4U	4U	4U	4U	4U
Cadmium	5	NG	3.2	2.5	2U	2U	2U	2U	2U	2U
Calcium	NS	NG	690000	350000	74000	74000	1000U	1000U	1000U	1000U
Chromium	50	NG	25U	25U	25U	25U	25U	25U	25U	25U
Cobalt	NS	NG	10U	10U	10U	10U	10U	10U	10U	10U
Copper	200	NG	25U	25U	25U	25U	25U	25U	25U	25U
Iron	300***	NG	**2200*** **	150U	**5200*** **	**3500*** **	150U	150U	150U	150U
Lead	25	NG	5U	5U	5U	5U	5U	5U	5U	5U
Magnesium	NS	35000	12000	1000U	**58000**	**59000**	1000U	1000U	1000U	1000U
Manganese	300***	NG	**54*** **	25U	**120*** **	**110*** **	25U	25U	25U	25U
Nickel	100	NG	92	**110**	25U	25U	25U	25U	25U	25U
Potassium	NS	NG	ND	ND	ND	ND	ND	ND	ND	ND
Selenium	10	NG	25U	25U	25U	25U	25U	25U	25U	25U
Silver	50	NG	10U	10U	10U	10U	10U	10U	10U	10U
Sodium	20000	NG	**1500000**	**1600000**	**660000**	**720000**	2500U	2500U	2500U	2500U
Thallium	NS	0.5	5U	5U	5U	5U	5U	5U	5U	5U
Vanadium	NS	NG	32	25U	25U	26	25U	25U	25U	25U
Zinc	NS	2000	44	25U	25U	25U	25U	25U	25U	25U
Mercury	0.7	NG	0.2U	0.21	0.2U	0.2U	0.2U	0.2U	0.2U	0.2U
pH	NS	NG	13	13	7.3	7.3	6.5	6.5	6.8	6.8

ND No Data
U Undetectable Levels
NS No Standard
NG No Guidance
*** Total for Iron and Manganese is > 500
Note-1: pH listed is the pH recorded in the field
Note-2: ST-SW1 through ST-SW5 represents samples collected from surface water

Table [illegible]

Surcharge Pilot Study - Groundwater and Surface Water Results

Metals and pH

Site 2A/2B: HHMT - Port Ivory Facility

Location Date Lab ID Concentration Filtered or Unfiltered	Recommended Groundwater Cleanup Standard UG/L	Recommended Groundwater Cleanup Guidance UG/L	ST-2S 11/7/2002 AB72398 UG/L unfiltered	ST-2S 11/7/2002 AB72398 UG/L filtered	ST-2D 11/7/2002 AB72400 UG/L unfiltered	ST-2D 11/7/2002 AB72401 UG/L filtered	ST-3D 11/7/2002 AB72402 UG/L unfiltered	ST-3D 11/7/2002 AB72403 UG/L filtered	ST-3S 11/7/2002 AB72404 UG/L unfiltered	ST-3S 11/7/2002 AB72405 UG/L filtered
Aluminum	NS	NG	2400	800	1400	670	680	100U	4400	420
Antimony	3	NG	7.5U	7.5U	7.5U	7.5U	7.5U	7.5U	7.5U	7.5U
Arsenic	25	NG	**28**	23	8.2	6.2	8.2	4U	61	9.7
Barium	1000	NG	160	180	120	110	91	83	510	430
Beryllium	NS	3	4U	4U	4U	4U	4U	4U	4U	4U
Cadmium	5	NG	2U	2U	2U	2U	2U	2U	2.7	2U
Calcium	NS	NG	420000	420000	120000	110000	220000	220000	880000	430000
Chromium	50	NG	25U	25U	25U	25U	25U	25U	25U	25U
Cobalt	NS	NG	10U	10U	10U	10U	10U	10U	10U	10U
Copper	200	NG	25U	25U	25U	25U	25U	25U	25U	25U
Iron	300***	NG	**1100*****	150U	**6600*****	**4900*****	**8500*****	**8200*****	**2100*****	150U
Lead	25	NG	6.7	5U	5U	5U	5U	5U	5U	5U
Magnesium	NS	35000	2400	1000U	**83000**	**82000**	**130000**	**140000**	13000	1000U
Manganese	300***	NG	25U	25U	**430*****	**400*****	**2300*****	**2500*****	**58*****	25U
Nickel	100	NG	39U	37	25U	25U	25U	25U	39	25U
Potassium	NS	NG	52000	57000	23000	32000	72000	74000	250000	2500
Selenium	10	NG	25U	25U	25U	25U	25U	25U	25U	25U
Silver	50	NG	10U	10U	10U	10U	10U	10U	10U	10U
Sodium	20000	NG	**780000**	**850000**	**740000**	**540000**	**2200000**	**2300000**	**2100000**	**25000**
Thallium	NS	0.5	5U	5U	5U	5U	5U	5U	**7.1**	5U
Vanadium	NS	NG	27	25U	25U	25U	55	52	27	25U
Zinc	NS	2000	56	25U	25U	25U	25U	25U	130	25U
Mercury	0.7	NG	0.2U	0.2U	0.2U	0.2U	0.2U	0.2U	**1.7**	0.2U
pH	NS	NG	13	13	7.8	7.8	7.2	7.2	13	13

ND	No Data
U	Undetectable Levels
NS	No Standard
NG	No Guidance

*** Total for Iron and Manganese is > 500

Note-1: pH listed is the pH recorded in the field

Note-2: ST-SW1 through ST-SW5 represents samples collected from surface water

increase in contaminant concentration during the pilot study since xylenes were detected at a higher concentration in the SI sampling round performed in November 2000. As shown on the surcharging phasing study and schedule, surcharging has been completed at the two areas labeled Phase 1A has been completed and has been initiated at the area labeled Phase 1B North. Although the pilot study did not reveal the presence of adverse impacts to groundwater or Bridge Creek, additional monitoring efforts are proposed to confirm the findings of the pilot study. The proposed actions will mimic those performed during the pilot study but will utilize five existing monitoring wells situated in both Site 1 and Site 2A at locations adjacent to Bridge Creek; the proposed locations include EW-1 (Site 2A), MW-5 (Site 1) MW-6/MW-6D (Site 2A) and CS-7 (Site 2A). The proposed monitoring program will also include sampling of two sets of wells (MW-15/MW-15D located on Site 2A and MW-1/MW-1D located at Site 1) to provide additional groundwater information. The samples will be analyzed for TCL VOCs, phenols, TAL Metals and pH. Based on current information, four rounds of sampling will be performed over the next 12 months with collection occurring once per quarter.

The monitoring program will include a review of conditions at Bridge Creek and the sampling of both surface water and sediment/precipitate. The proposed sediment/surface water sampling will be performed in conjunction with the proposed groundwater sampling events and will include samples from five locations. Sediment and surface water samples also will be analyzed for TCL VOCs, phenols, TAL Metals and pH. In addition, monthly inspection will be performed to document conditions along the eastern bank of Bridge Creek. The inspections will be performed during low tide and will note the presence of seeps, precipitate, bank failure or other evidence of mass movement of subsurface material or liquids. All sampling will be performed in accordance with NYSDEC protocol and laboratory analysis will be performed by a NYSDEC certified laboratory. Again, information from the pilot study has not identified any adverse impacts to groundwater or Bridge Creek, however, the Port Authority intends to confirm these findings through the above-described program.

14.0 CONCLUSIONS

This report presents a summary of assessment, investigation, delineation and remedial actions which have been undertaken at Site 2A/2B from 2000 through 2003. By and large, assessment and investigation efforts identified relatively few environmental issues with respect to Site 2A/2B. Generally, the issues involved the presence of fill material, previously closed USTs and the presence of a few petroleum-impacted areas. As described herein, the environmental conditions at this Site 2A/2B as well as Sites 1 and 3 of the HHMT-Port Ivory Facility have been evaluated with respect to the HHMT-Port Ivory

Facility's proposed usage. Further, the Port Authority has undertaken actions to address residual petroleum related contamination through source removal. The actions undertaken at these areas also have included the removal of two previously closed USTs (closed in place by P&G) and an abandoned oil/water separator system from Site 2A. Based on assessment and investigation activities, no remedial actions were warranted with respect to Site 2B. With regard to the presence of fill material, the SI/RI activities identified the presence of contaminants at Site 2A/2B, which are typical to urban sites in the New York Metropolitan region. The presence of the fill material and residual levels of fill-related contaminants in soil does not appear to have adversely impacted groundwater quality at Site 2A/2B or Bridge Creek, situated adjacent to the western property boundary of Site 2A/2B and Site 1.

Overall, industrial/commercial usage such as the Port Authority's planned usage of the site as an intermodal facility and container terminal is not inconsistent with the residual levels of contamination noted to be present in site soil and groundwater. The Port Authority has addressed several petroleum-impacted areas through source removal and will address fill material and residual contamination (associated with the fill material and prior industrial usage of the site by P&G) through site redevelopment including the use of engineering and institutional controls, which will minimize potential impacts to human health and the environment. Specifically, the Port Authority intends to install material such as pavement and other semi-impervious material, which will function as an environmental cap at Site 2A/2B and the entire HHMT-Port Ivory Facility. This action will tend to stabilize contaminants present in soil and fill material by impeding infiltration, thereby reducing the potential for contaminants in soil to leach from the unsaturated zone to groundwater. Further, the placement of such materials will safeguard the public by preventing exposure to contaminants in soil and groundwater.

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HAGER-RICHTER
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PROCTOR & GAMBLE
PORT IVORY FACILITY
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File 00D59
December, 2000

Geophysical Survey
Proctor & Gamble Port Ivory Facility
Staten Island, New York
File 00D59 December, 2000

0. EXECUTIVE SUMMARY

Hager-Richter Geoscience, Inc. conducted a geophysical survey at the Proctor & Gamble Port Ivory Facility located on Staten Island, New York for Killam Associates (Killam)in October and November, 2000. The scope of the project and areas of interest were specified by Killam. The geophysical survey is part of a environmental investigation of the site being conducted by Killam on behalf of the Port Authority of New York and New Jersey.

The site is a large inactive industrial facility located in the northwestern portion of Staten Island. The Site consists of several buildings, gravel and paved parking areas, rail spurs, foundations and slabs of demolished buildings, and open areas. Hager-Richter was contracted by Killam to locate utilities in the vicinity of as many as 210 proposed boring locations and to locate possible USTs that may be present at nine locations identified at the Site by Killam. The locations of utilities detected as part of the boring program were marked on site as specified by Killam, and are not discussed further.

According to information provided by Killam, as many as 19 USTs might be present in nine areas of the site, designated by Killam UST Area 1 through UST Area 9. Four of the nine areas may contain multiple USTs, and five areas may contain a single UST.

The objective of the geophysical survey was to detect possible USTs in each of the nine areas of interest specified by Killam, and if any were detected, to determine the locations of each.

The geophysical survey consisted of time domain electromagnetic induction metal detector (EM61) surveys followed by focused GPR surveys in each of the areas of interest. The EM61 data were acquired at approximately 8-inch intervals along profile lines spaced 5 feet apart across the accessible portions of the areas of interest. In order to aid in the identification of the objects, a focused GPR survey was conducted at the locations of anomalies detected with the EM.

The results of the geophysical survey conducted at the Proctor & Gamble Port Ivory Facility can be summarized as follows:

- Several areas of buried metal were detected in the nine areas of interest at the site on the basis of the EM61 data. None of the identified areas of buried metal could be definitively identified as a UST due to the limited GPR signal penetration and/or surface features such as concrete slabs, metal piping, and rail spurs. Whether the buried metal is a UST is present cannot be determined on the basis of the geophysical data alone.

- Several other EM61 anomalies are interpreted as possible utilities.

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FIGURES

PLATE

APPENDIX

1. INTRODUCTION

Hager-Richter Geoscience, Inc. conducted a geophysical survey at the Proctor & Gamble Port Ivory Facility located on Staten Island, New York for Killam Associates (Killam) October 25 - November 15, 2000. The scope of the project and areas of interest were specified by Killam. The geophysical survey is part of a environmental investigation of the site being conducted by Killam on behalf of the Port Authority of New York and New Jersey.

The site is a large inactive industrial facility located in the northwestern portion of Staten Island. The general location of the Site is shown in Figure 1, and Plate 1 is a site plan. The Site consists of several buildings, gravel and paved parking areas, rail spurs, foundations and slabs of demolished buildings, and open areas. Hager-Richter was contracted by Killam to locate utilities in the vicinity of as many as 210 proposed boring locations and to locate possible USTs that may be present at nine locations identified at the Site by Killam. The locations of utilities detected as part of the boring program were marked on site as specified by Killam, and are not discussed further.

According to information provided by Killam, as many as 19 USTs might be present in nine areas of the site, designated by Killam as UST Area 1 through UST Area 9. Four of the nine areas may contain multiple USTs, and five areas may contain a single UST. The locations of the nine areas specified by Killam are shown as hatched areas on Plate 1.

The objective of the geophysical survey was to detect possible USTs in each of the nine areas of interest specified by Killam, and if any were detected, to determine the locations of each.

The geophysical survey consisted of time domain electromagnetic induction metal detector (EM61) surveys followed by focused GPR surveys in each of the areas of interest. The EM61 survey detects and outlines areas containing buried metal. However, the EM method cannot provide information on the type of objects causing the EM anomaly. In order to aid in the identification of the objects, a focused GPR survey was conducted at the locations of anomalies detected with the EM61.

James Coffman, Jeffrey Reid, P.G., and Jeffrey Sullivan of Hager-Richter conducted the field operations on October 30, November 8, 9, 14, and 15, 2000. The project was coordinated with Ms. Jennifer Kohlsaat of Killam. Mr. Daniel Davis and Mr. Charles Springer, both of Killam, specified the areas of interest for the survey and were present for portions of the field work.

2. EQUIPMENT AND PROCEDURES

2.1 General

The equipment, limitations, and general procedures of EM61 high sensitivity metal detector and GPR surveys are described below. Details specific to this project are given in the Site Specific section below.

2.2 EM61

Equipment. The EM survey was conducted using a Geonics Model EM61 time domain electromagnetic induction metal detector, the industry standard for this type of geophysical survey. The EM61 produces a pulsed primary magnetic field in the earth that induces eddy currents in the ground and in nearby metal objects. The receiver is timed to measure the secondary magnetic field produced by eddy currents after those in the ground have dissipated, i.e., only the current in the metal objects. The data are recorded on a digital data logger. The EM61 is relatively insensitive to nearby cultural interferences such as buildings.

Limitations of the Method. The data from an EM61 survey are affected by surface metal debris in the survey area, and its depth sensitivity is limited to about 15 feet. The instrument is relatively cumbersome, and works best where the 1-meter square transmit and receive coils can be hand pulled in a small trailer.

Detection and identification should be clearly differentiated. Detection is the recognition of the presence of a metal object, and the electromagnetic method is excellent for such purposes. Identification, on the other hand, is determination of the nature of the causative body (i.e., what is the body -- a cache of drums, UST, automobile, white goods, etc.?). Although the EM61 data cannot be used to *identify* all buried metal objects, they provide excellent guides to the identification of some objects. For example, buried metal utilities produce anomalies with lengths many times their widths.

2.3 GPR

Equipment. The GPR survey was conducted using a Geophysical Survey Systems SIR-2 digital GPR system equipped with a survey wheel to trigger recording of data at equal horizontal distances. The GPR system was used with a 500 MHz antenna and a 60 nsec time window. The GPR traverses were spaced approximately 5 feet apart, and were conducted at the locations of EM61 anomalies.

Limitations of the Method. There are limitations of the GPR technique as used to detect and/or locate targets such as those of the subject Site: (1) surface conditions, (2) electrical conductivity of the ground, (3) contrast of the electrical conductivities of the targets and the ground, and (4) spacing between lines. Of these limitations, only the fourth, line spacing, is controlled by the operator.

The condition of the ground surface can affect the quality of the GPR data and the depth of penetration of the GPR signal. Sites covered with high grass, bushes, landscape structures, debris, obstacles, soil mounds, etc. limit the survey access and the coupling of the GPR antenna with the ground. In many cases, the GPR signal will not penetrate below concrete pavement, especially inside of buildings, and a target may not be detectable.

The electrical conductivity of the ground determines the attenuation of the GPR signals, and thereby limits the maximum depth of exploration. The GPR signal does not penetrate clay-rich soils, and targets buried in clay can be missed.

A definite contrast in the electrical conductivities of the ground and the target is required to obtain a reflection of the GPR signal. If the contrast is too small, possibly due to construction details or extremely corroded conditions of metal targets, then the reflection may be too weak to recognize, and the target can be missed.

The spacing between lines is under control of the GPR operator, and the design of the survey is based on the dimensions of the smallest feature of interest. Targets with dimensions smaller than the spacing between GPR survey lines can be missed.

2.4 Site Specific

As noted in the Introduction, Killam specified nine areas of interest for the geophysical survey. A local survey grid was established in each of the UST survey areas and tied to fixed landmarks.

EM61 data were acquired at approximately 8-inch intervals along lines spaced 5 feet apart in the accessible portions of each area. The EM61 was operated with the 1-meter square transmit/receive coils mounted on a hand-drawn trailer with a survey wheel that measures distance and triggers data collection at equal intervals. The EM61 data were recorded digitally and processed in the field using software provided by the manufacturer. A color contour plot of the data was generated using commercially available software (Geosoft).

A focused GPR survey was conducted at the locations of anomalies detected by the EM61 survey to attempt to identify the causative body(ies). GPR traverses were located along the same lines as the EM61 survey and spacing was variable based on the size of the EM anomalies and surface conditions. The GPR antenna was pulled by hand for all traverses.

GPR data were acquired with a 300 MHz antenna and a 60 nsec time window. GPR signal penetration varied significantly at the Site. Based on handbook values of time-to-depth conversions for the GPR signal in average soils, the GPR signal penetration is estimated to have varied from about 1 foot to about 5 feet.

3. RESULTS AND DISCUSSION

3.1 General

The geophysical survey consisted of a time domain electromagnetic induction metal detector (EM61) survey followed by a focused GPR survey where the EM61 survey indicated possible buried metal. Plate 1 is a Site Plan provided by Killam showing the locations of the survey areas.

Interpretation of EM61 data is based on the *relative* response (in millivolts) of the top and bottom instrument coils to local conditions. The differential response, the difference between the top and bottom coils, is typically used as the best indication of the location of buried metal objects, and is shown in the figures for this report. The instrument is not calibrated to provide an absolute measure of a particular property, such as the conductivity of the soil or of buried metal objects. Subsurface metal objects produce sharply defined positive anomalies when the EM61 is positioned directly over them. Such anomalies are colored red and pink on the color plots presented herein. Acquiring data at short intervals along closely spaced lines, as was done at the present site, provides high spatial resolution of the location and footprint of the targets. Thus, buried metal is recognized in contour plots of EM61 data by positive anomalies (red or pink zones) roughly corresponding to the dimensions of the buried metal.

Many surface metal objects and objects containing metal are present in the UST survey areas such as manhole covers, railroad tracks, fences, and reinforced concrete. The locations of such objects are shown on the figures for each of the areas. Because these objects contain metal, they can produce significant EM anomalies. The presence or absence of buried metal in these areas cannot be determined due to the anomalies caused by such surface objects.

In general, GPR signal penetration at the site was limited, with reflections received for less than about 30 nsec. The limited signal penetration is likely due to conductive soils, and in many places, concrete at the surface. Based on handbook time-to-depth conversions for the GPR signal in average soils, the GPR signal penetration is estimated to have been no more than about 2 to 3 feet for most of the areas of interest.

3.2 UST Area 1

UST Area 1 is located on the north side of Building 20, and its location is shown on Plate 1. EM61 data were acquired along survey lines spaced 5 feet apart, and GPR data were acquired at most locations where the EM data indicated the presence of buried metal. Figure 2 is a color contour plot of the EM61 data for UST Area 1, and Figure 3 shows the locations of the GPR traverses and the interpretation of both the EM61 and GPR data. Five areas of possible buried metal were detected within the survey area, and their locations are shown on Figure 3. GPR traverses were conducted in the central portion of the area. GPR signal penetration was limited to less than 2 feet. Therefore, no additional information regarding the causative bodies was determined for this area with the GPR traverse.

Based on the shapes and sizes of the EM anomalies for UST Area 1, we infer that a utility and several other buried objects are present. Whether the objects are USTs cannot be determined on the basis of the geophysical data alone. If any of the buried metal objects is a UST, its capacity is likely 1000 gallons or less.

3.3 UST Area 2

UST Area 2 is located south of a wood shavings stockpile area, and its location is shown on Plate 1. EM61 data were acquired along survey lines spaced 5 feet apart, and GPR data were acquired at most locations where the EM data indicated the presence of buried metal. Figure 4 is a color contour plot of the EM61 data for UST Area 2, and Figure 5 shows the locations of the GPR traverses and the interpretation of both the EM61 and GPR data. One area of possible buried metal was detected within the survey area. The area is located about 35 feet south of a concrete pad. GPR traverses were conducted over the location of the EM anomaly. GPR signal penetration is estimated to have been about 4 to 5 feet for this area, but GPR reflections typical of a UST were not detected in the area included in the GPR survey.

Based on the presence of the EM anomaly in UST Area 2, we infer that a buried metal object is present. Whether the object is a UST cannot be determined on the basis of the geophysical data alone. Because no GPR reflections typical of a UST were observed in the records for the effective depth of penetration of the GPR signal (about 5 feet), and the EM anomaly is small in amplitude, we conclude that if a UST is present, it would likely be located at a depth greater than 5 feet.

3.4 UST Area 3

UST Area 3 is located north of the northeast corner of Building 13, and its location is shown on Plate 1. EM61 data were acquired along survey lines spaced 5 feet apart, and GPR data were acquired at most locations where the EM data indicated the presence of buried metal. Figure 6 is a color contour plot of the EM61 data for UST Area 3, and Figure 7 shows the locations of the GPR traverses and the interpretation of both the EM61 and GPR data. Two areas of possible buried metal were detected within the survey area as well as a possible utility. One buried metal object is located about 25 feet east of a trailer, the other is located about 60 feet east of the trailer, and the locations of both are shown on Figure 7.

GPR signal penetration is estimated to have been about 2 to 3 feet for this area. GPR reflections typical of a UST were not detected in the area included in the GPR survey. GPR reflections typical of a flat structure, such as a concrete pad, are present at the location of the southern end of the EM anomaly closer to the trailer.

Based on the presence of the EM anomalies in UST Area 2, we infer that two buried metal objects are present. The GPR data indicate that at least part of one of the EM anomalies may be related to a flat concrete-like structure. Whether the concrete object is a UST cannot be determined on the basis of the geophysical data alone.

3.5 UST Area 4

UST Area 4 is located west of Buildings 34 and 38 and north of a former floor slab for a demolished building, and its location is shown on Plate 1. EM61 data were acquired along survey lines spaced 5 feet apart, and GPR data were acquired at most locations where the EM data indicated the presence of buried metal. Figure 8 is a color contour plot of the EM61 data for UST Area 4, and Figure 9 shows the locations of the GPR traverses and the interpretation of both the EM61 and GPR data.

The western portion of the survey area is covered by a concrete pad. Three significant EM anomalies are present in this portion of the survey area and one large EM anomaly is present along the southeast edge of the survey area. The areas of the EM anomalies are shown as areas of buried metal on Figure 9. The large EM anomalies may be caused by structures located under the concrete slab. The GPR signal penetration over the concrete slab is limited to less than about 1 foot and GPR reflections typical of USTs were not detected. Whether USTs are located under the slab cannot be determined on the basis of the geophysical data alone. The remaining portion of UST Area 4 is generally free of buried metal.

3.6 UST Area 5

UST Area 5 is located along a rail spur southwest of Building 17, and its location is shown on Plate 1. EM61 data were acquired along survey lines spaced 5 feet apart, and GPR data were acquired at most locations where the EM data indicated the presence of buried metal. Figure 10 is a color contour plot of the EM61 data for UST Area 5, and Figure 11 shows the locations of the GPR traverses and the interpretation of both the EM61 and GPR data. Two rail spurs and a reinforced concrete surface drainage swale are present in the area. High amplitude EM anomalies are present near the concrete drainage swale and low amplitude negative EM anomalies are observed for the rail spurs.

GPR traverses were conducted in the northwest corner of the survey area, but the GPR signal penetration was limited to less than about 1 foot and no GPR reflection typical for a UST were detected.

3.7 UST Area 6

UST Area 6 is located along a rail spur west of Building 17, and its location is shown on Plate 1. EM61 data were acquired along survey lines spaced 5 feet apart, and GPR data were acquired at most locations where the EM data indicated the presence of buried metal. Figure 12 is a color contour plot of the EM61 data for UST Area 6, and Figure 13 shows the locations of the GPR traverses and the interpretation of both the EM61 and GPR data. A rail spur and iron rimmed surface drain are present along the east side of the survey area.

Five EM anomalies not related to the surface features were identified, and their locations are shown on Figure 13. The two large circular anomalies located in the northeast portion of the survey area are likely caused by buried concrete. A small portion of a slab was visible on site and its presence was confirmed with the GPR. The remaining three anomalies are low amplitude and small in extent and are likely too small to be caused by USTs.

3.8 UST Area 7

UST Area 7 is located south of Building S-#35, and its location is shown on Plate 1. EM61 data were acquired along survey lines spaced 5 feet apart, and GPR data were acquired at most locations where the EM data indicated the presence of buried metal. Figure 14 is a color contour plot of the EM61 data for UST Area 7, and Figure 15 shows the locations of the GPR traverses and the interpretation of both the EM61 and GPR data. Surface objects such as a rail spur, a concrete loading dock, a steel plate, transformers, and a tower are present in the survey area. The EM data were adversely affected at such locations.

Four EM anomalies not related to the surface features were identified, and their locations are shown on Figure 15. A large EM anomaly is present in the central portion of the survey area. The GPR data for the area of the large anomaly indicate the presence of a shallow buried reinforced concrete slab or structure at a depth of about 1 foot in the southern part of the anomaly. GPR records for the traverses conducted in the vicinity of the remaining anomalies contain no reflections characteristic of USTs. Such areas are shown as areas of buried metal. Whether the buried metal objects are USTs cannot be determined on the basis of the geophysical data alone.

3.9 UST Area 8

UST Area 8 is located at the northeast corner of Building 55, and its location is shown on Plate 1. EM61 data were acquired along survey lines spaced 5 feet apart, and GPR data were acquired at most locations where the EM data indicated the presence of buried metal. Figure 16 is a color contour plot of the EM61 data for UST Area 8, and Figure 17 shows the locations of the GPR traverses and the interpretation of both the EM61 and GPR data. Surface objects such as a concrete pad and vertical pipes cut at grade are present in the survey area and such objects are shown on Figure 17.

Three anomalies attributed to buried metal objects were identified by the EM survey and their locations are shown on Figure 17. EM anomalies attributed to subsurface utilities were also identified. GPR signal penetration in the areas of the EM anomalies was limited to a depth of about 1 foot and no GPR reflections typical of a UST were detected. Therefore, no information regarding the causative bodies could be determined. Whether the buried metal objects are USTs cannot be determined on the basis of the geophysical data alone.

3.10 UST Area 9

UST Area 9 is located between Buildings 52 and 53, and its location is shown on Plate 1. EM61 data were acquired along survey lines spaced 5 feet apart, and GPR data were acquired at most locations where the EM data indicated the presence of buried metal. Figure 18 is a color contour plot of the EM61 data for UST Area 9, and Figure 19 shows the locations of the GPR traverses and the interpretation of both the EM61 and GPR data.

Several surface metal objects, such as valve box covers, transformers, and overhead pipes are present in the survey area. Four 4-inch pipes, cut at the surface, are present in the southeast corner of the survey area. Significant EM anomalies are present at the locations of the surface features and may mask the presence of buried metal objects, if any, at such locations.

Three anomalies not associated with surface metal were identified by the EM survey. These anomalies have been attributed to buried metal objects. GPR signal penetration in the areas of the EM anomalies was limited to a depth of about 1 foot and no GPR reflections typical of a UST were detected. Therefore, no information regarding the causative bodies could be determined. Whether the buried metal objects are USTs cannot be determined on the basis of the geophysical data alone.

4. CONCLUSIONS

Based on the geophysical survey conducted at the Proctor & Gamble Port Ivory Facility located on Staten Island, New York, we conclude:

- Several areas of buried metal were detected in the nine areas of interest at the site on the basis of the EM61 data. None of the identified areas of buried metal could be definitively identified as a UST due to the limited GPR signal penetration and/or surface features such as concrete slabs, metal piping, and rail spurs. Whether the buried metal is a UST is present cannot be determined on the basis of the geophysical data alone.

- Several other EM61 anomalies are interpreted as possible utilities.

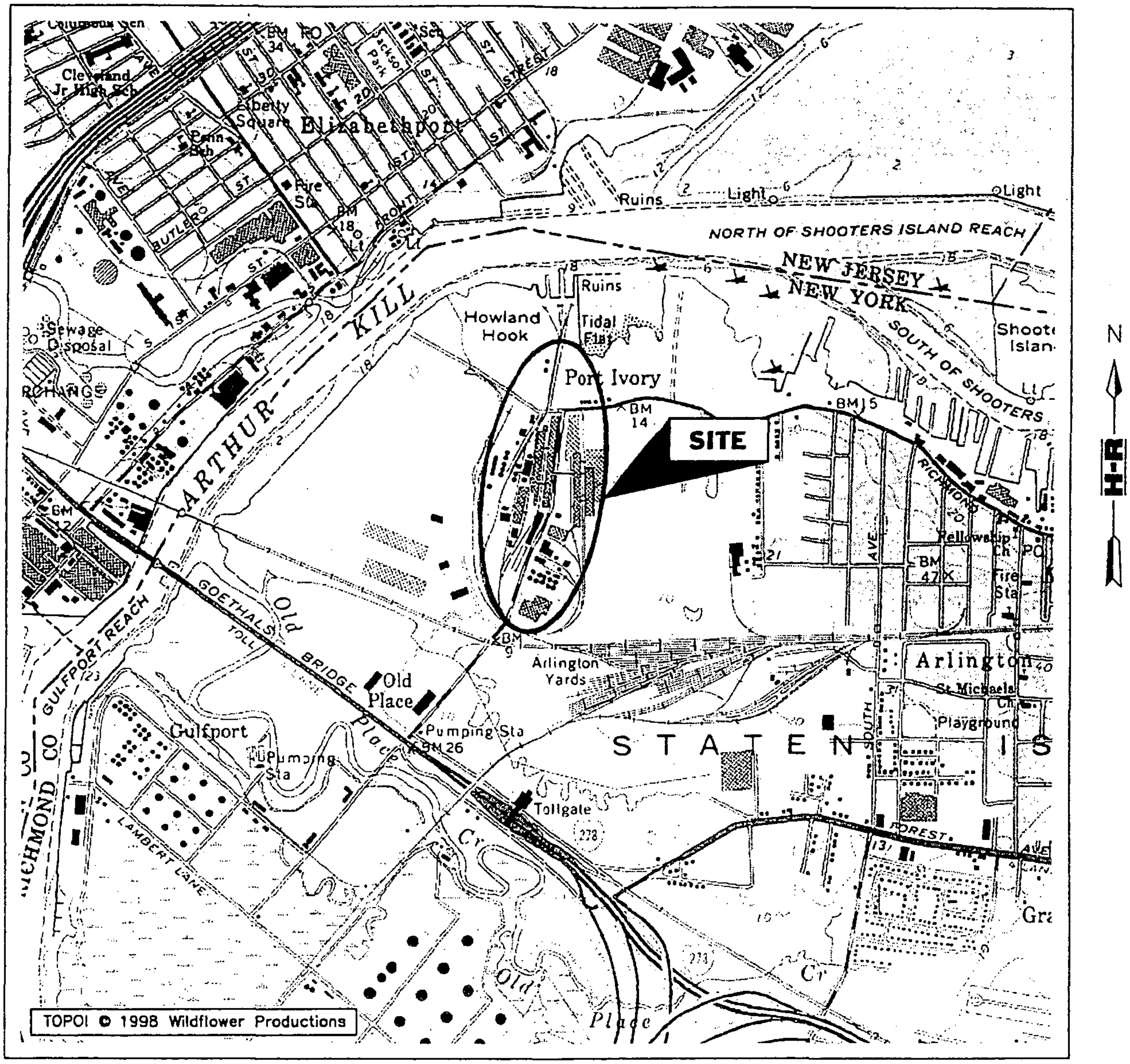
5. LIMITATIONS

This letter report was prepared for the exclusive use of Killam Associates and the Port Authority of New York and New Jersey (Client). No other party shall be entitled to rely on this Report or any information, documents, records, data, interpretations, advice or opinions given to Client by Hager-Richter Geoscience, Inc. (H-R) in the performance of its work. The Report relates solely to the specific project for which H-R has been retained and shall not be used or relied upon by Client or any third party for any variation or extension of this project, any other project or any other purpose without the express written permission of H-R. Any unpermitted use by Client or any third party shall be at Client's or such third party's own risk and without any liability to H-R.

H-R has used reasonable care, skill, competence and judgment in the performance of its services for this project consistent with professional standards for those providing similar services at the same time, in the same locale, and under like circumstances. Unless otherwise stated, the work performed by H-R should be understood to be exploratory and interpretational in character and any results, findings or recommendations contained in this Report or resulting from the work proposed may include decisions which are judgmental in nature and not necessarily based solely on pure science or engineering. It should be noted that our conclusions might be modified if subsurface conditions were better delineated with additional subsurface exploration including, but not limited to, test pits, soil borings with collection of soil and water samples, and laboratory testing.

The detection of subsurface utilities and/or other subsurface objects was not an objective of this portion of the geophysical survey, and the survey was not designed to detect such. However, some utilities and/or other subsurface objects were detected and their locations are provided as a courtesy. Other utilities and/or other subsurface objects may be present and the Client or any third party shall not rely on this report for information on such.

Except as expressly provided in this limitations section, H-R makes no other representation or warranty of any kind whatsoever, oral or written, expressed or implied; and all implied warranties of merchantability and fitness for a particular purpose, are hereby disclaimed.



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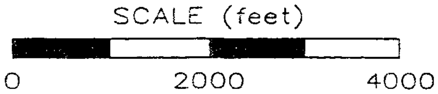

Figure 1
General Site Location
Procter & Gamble Port Ivory Facility
Staten Island, New York

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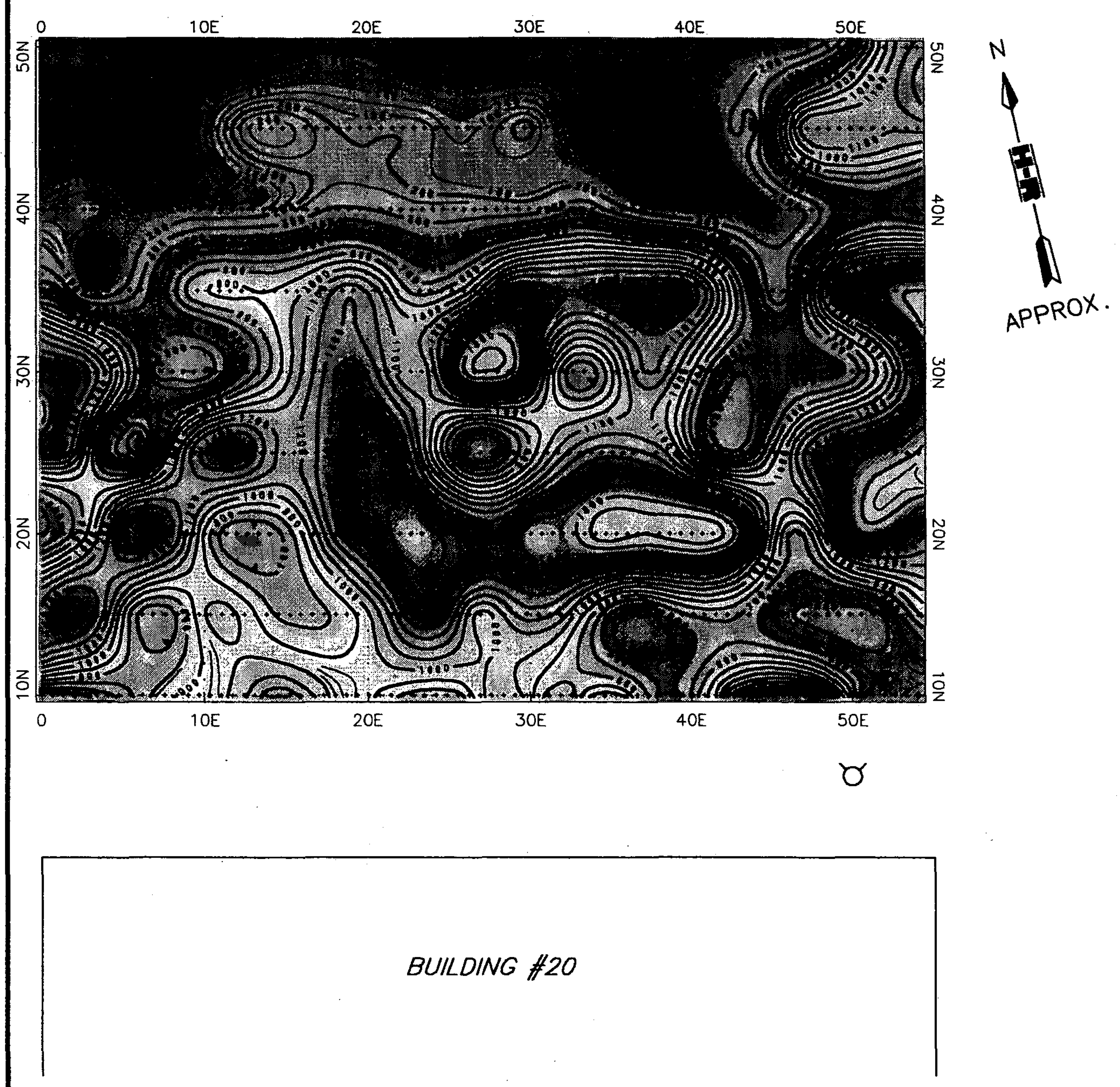
Salem, New Hampshire



NOTES:

1. Site sketch generated from field notes.
2. Contour Interval = 20 mV.

LEGEND

·	EM DATA STATION
ⓥ	WATER VALVE
Ծ	HYDRANT

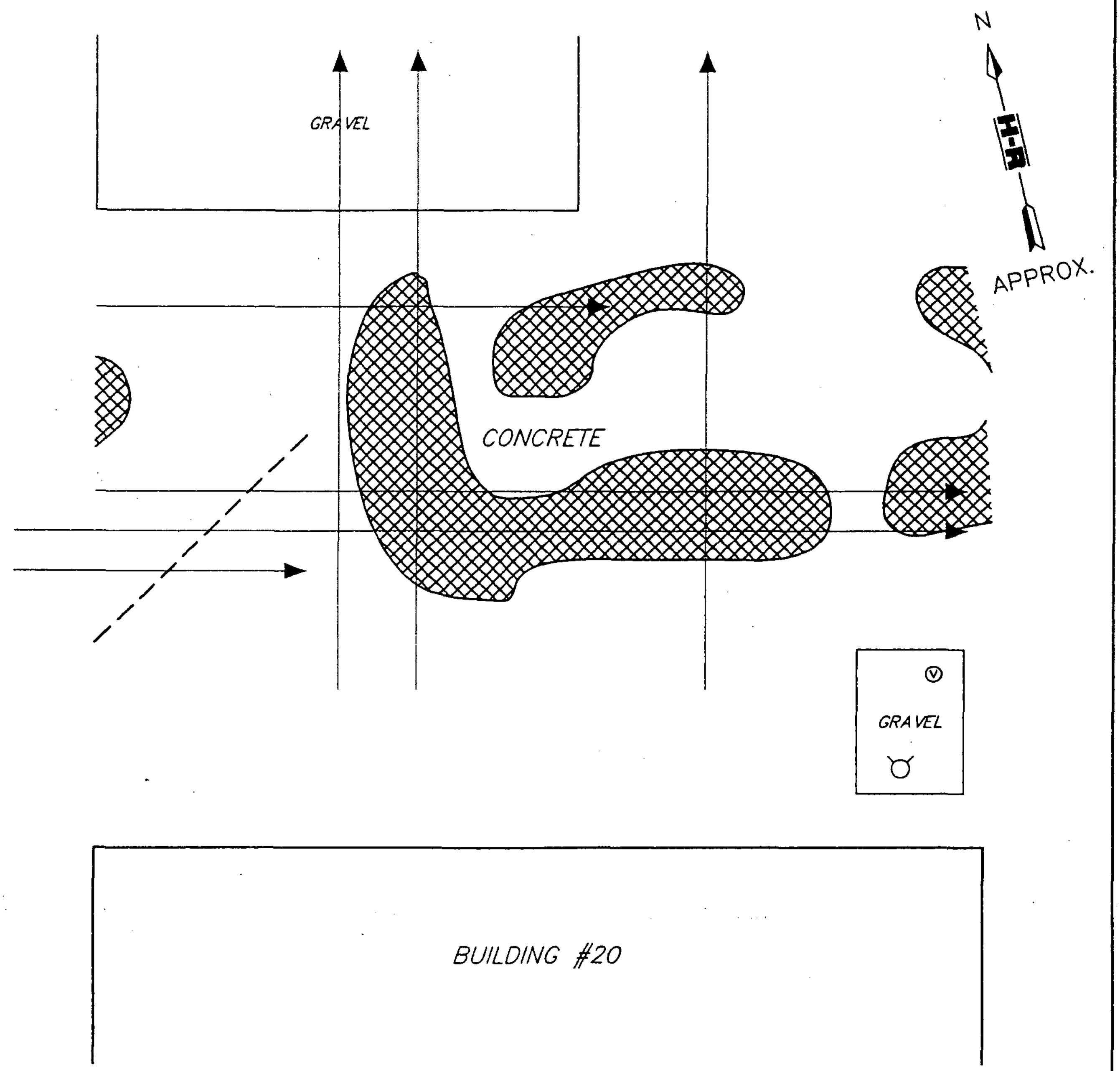
SCALE (feet)

0 10 20

Figure 2
EM61 Survey – UST Area 1
Procter & Gamble Port Ivory Facility
Staten Island, New York

File 00D59	December, 2000

HAGER-RICHTER GEOSCIENCE, INC.
Salem, New Hampshire



LEGEND

→	GPR TRAVERSE
▨	AREA OF POSSIBLE BURIED METAL
- - - -	POSSIBLE UTILITY
Ⓥ	WATER VALVE
♉	HYDRANT

SCALE (feet)

0 10 20

NOTES:

1. Site sketch generated from field notes.
2. Concrete covers survey area except for the areas shown as gravel-covered.

Figure 3
GPR Survey & Integrated
Interpretation – UST Area 1
Procter & Gamble Port Ivory Facility
Staten Island, New York

File 00D59 | December, 2000

HAGER-RICHTER GEOSCIENCE, INC.
Salem, New Hampshire

NOTES:

1. Site sketch generated from field notes.
2. Contour Interval = 20 mV.

LEGEND

·	EM DATA STATION
V	WATER VALVE
⊕	MONITORING WELL

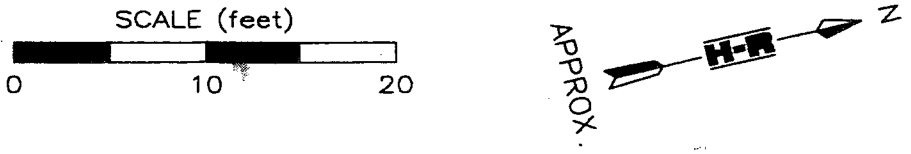


Figure 4
EM61 Survey – UST Area 2
Procter & Gamble Port Ivory Facility
Staten Island, New York

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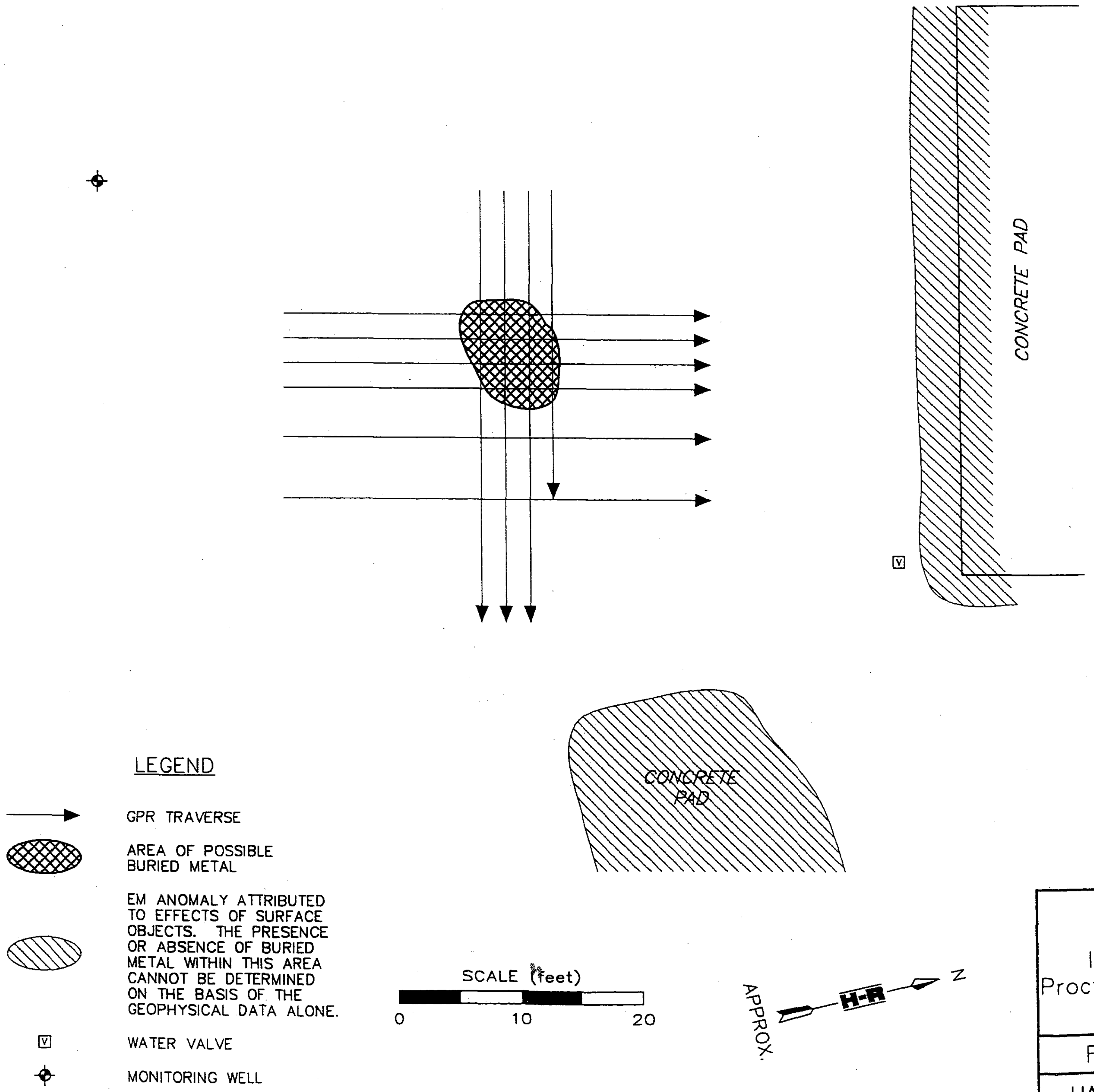
Salem, New Hampshire



NOTE:

Site sketch generated from field notes.

Figure 5
GPR Survey & Integrated
Interpretation – UST Area 2
Procter & Gamble Port Ivory Facility
Staten Island, New York

File 00D59	December, 2000

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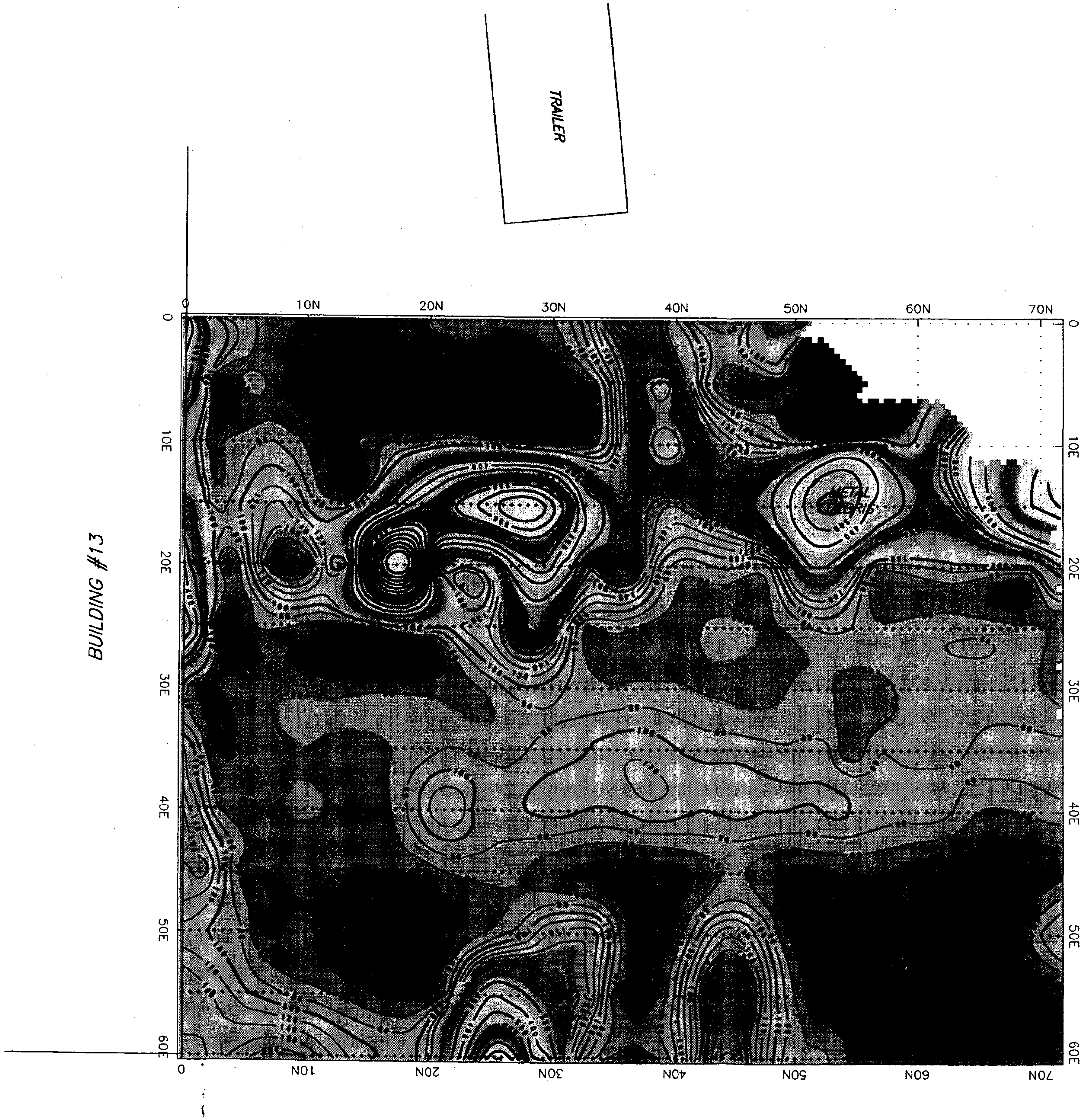


APPROX. N

LEGEND

· EM DATA STATION

SCALE (feet)
0 10 20

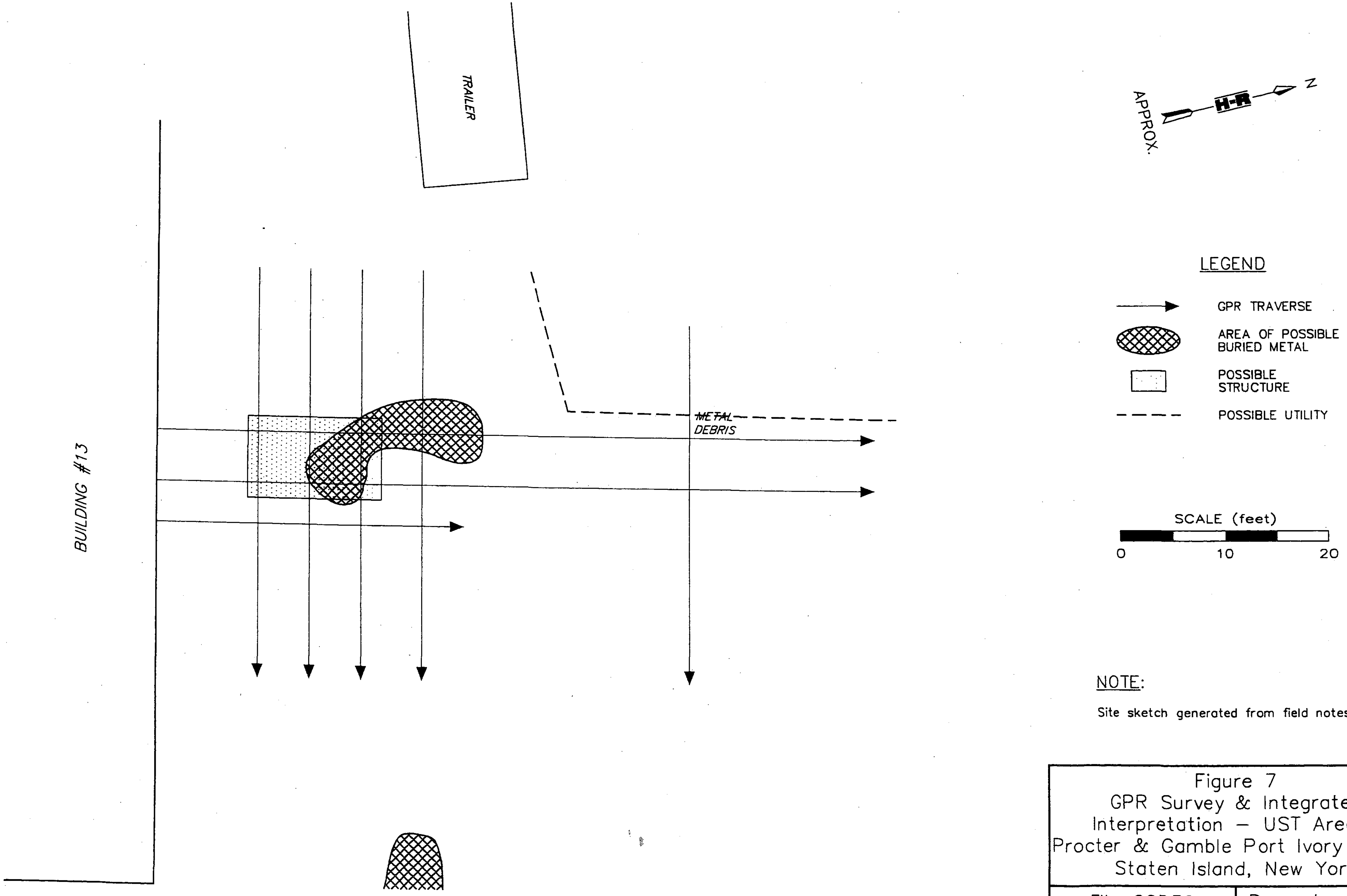
NOTES:

1. Site sketch generated from field notes.
2. Contour interval = 20 mV.

Figure 6
EM61 Survey - UST Area 3
Procter & Gamble Port Ivory Facility
Staten Island, New York

File 00D59	December, 2000

HAGER-RICHTER GEOSCIENCE, INC.
Salem, New Hampshire



NOTE:

Site sketch generated from field notes.

Figure 7
GPR Survey & Integrated
Interpretation – UST Area 3
Procter & Gamble Port Ivory Facility
Staten Island, New York

File 00D59 | December, 2000

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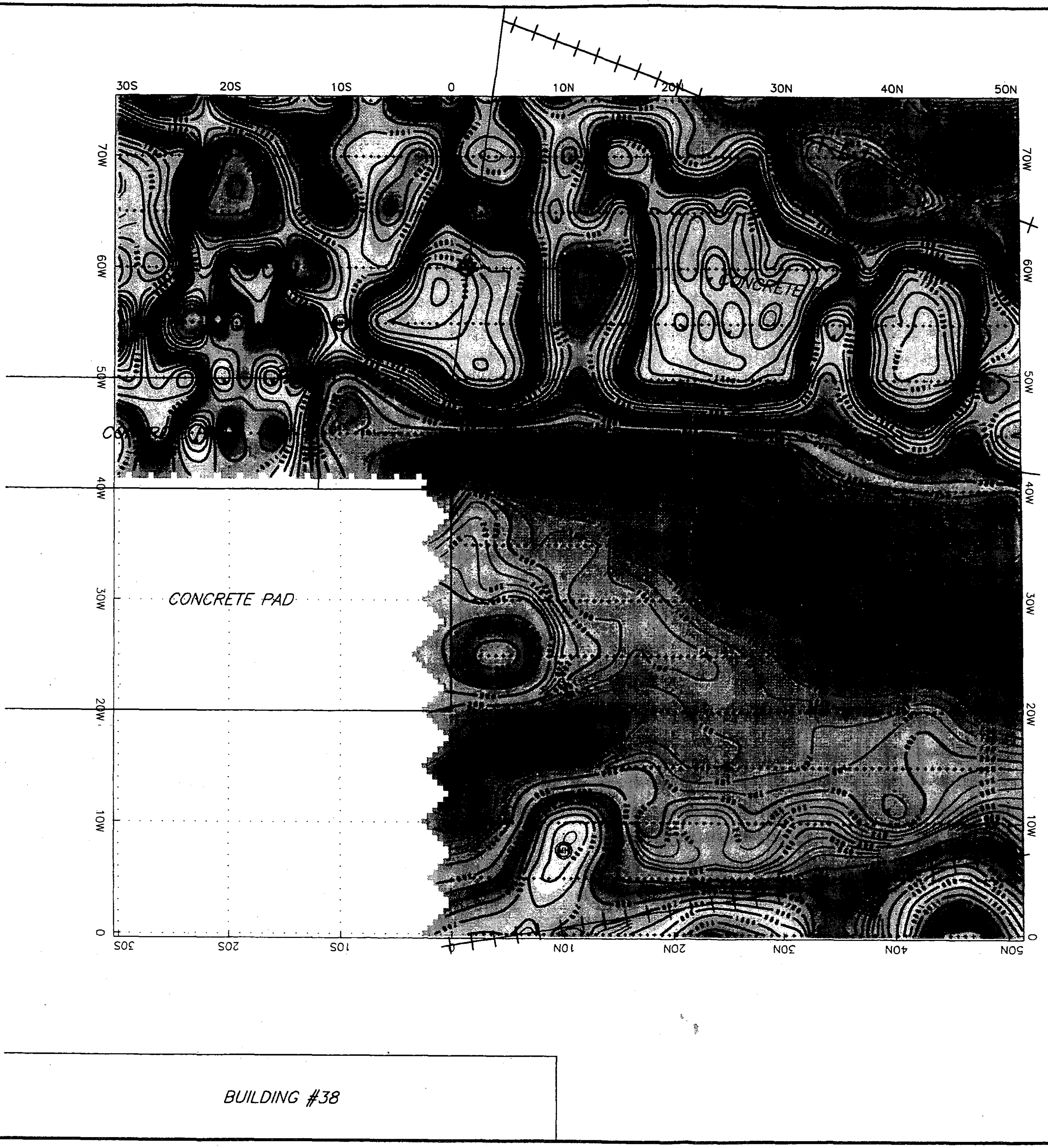

APPROX. N

LEGEND

·	EM DATA STATION
⊛	MANHOLE
┼┼┼	RAILROAD TRACK

SCALE (feet)
0 10 20

NOTES:

1. Site sketch generated from field notes.
2. Contour Interval = 20 mV.

Figure 8
EM61 Survey – UST Area 4
Procter & Gamble Port Ivory Facility
Staten Island, New York

File 00D59 | December, 2000

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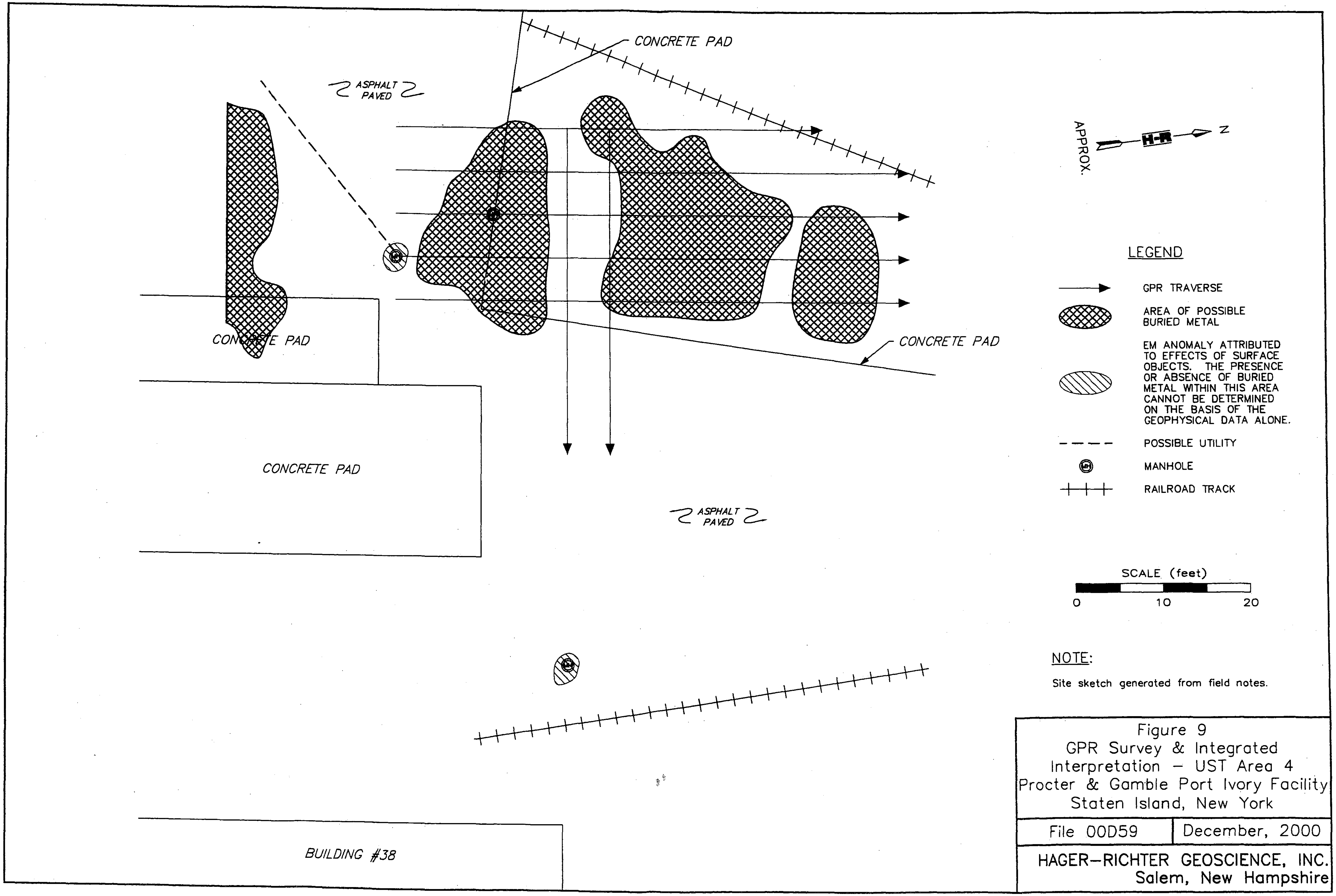
Salem, New Hampshire



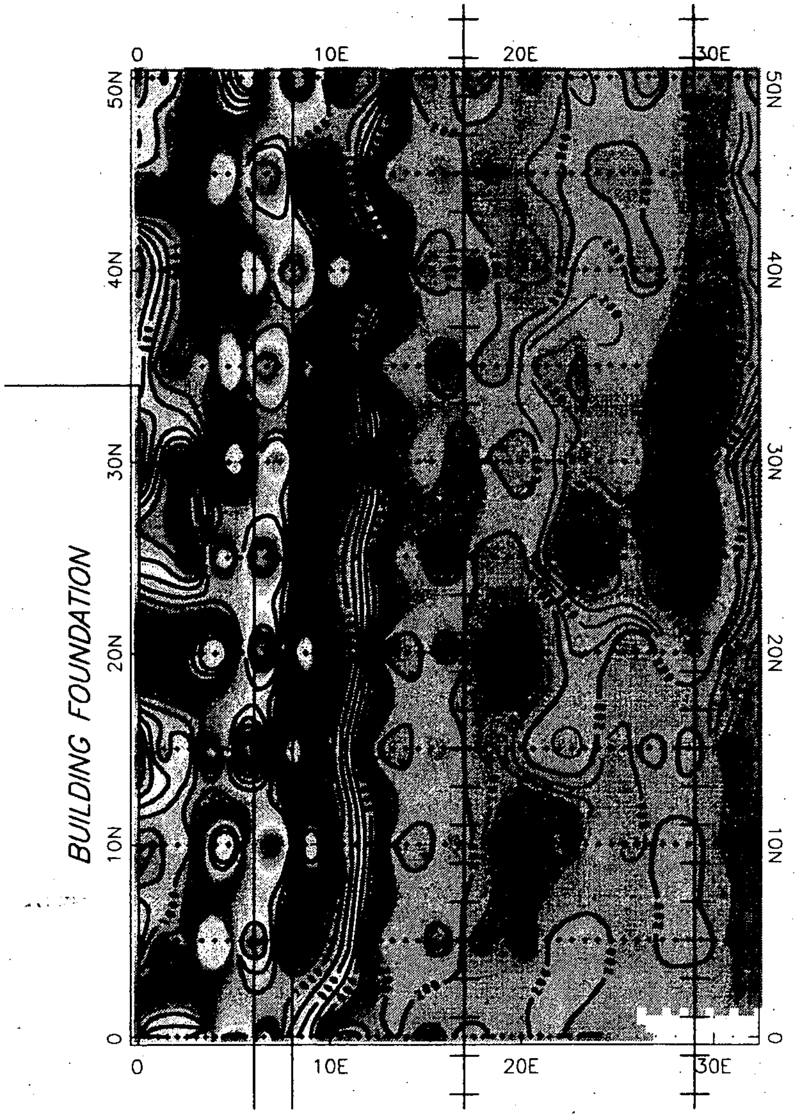
NOTE:

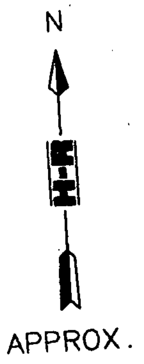
Site sketch generated from field notes.

Figure 9
GPR Survey & Integrated Interpretation – UST Area 4
Procter & Gamble Port Ivory Facility
Staten Island, New York

File 00D59	December, 2000

HAGER–RICHTER GEOSCIENCE, INC.
Salem, New Hampshire





NOTES:

1. Site sketch generated from field notes.
2. Contour Interval = 20 mV.

LEGEND

·	EM DATA STATION
┼─┼─┼	RAILROAD TRACK

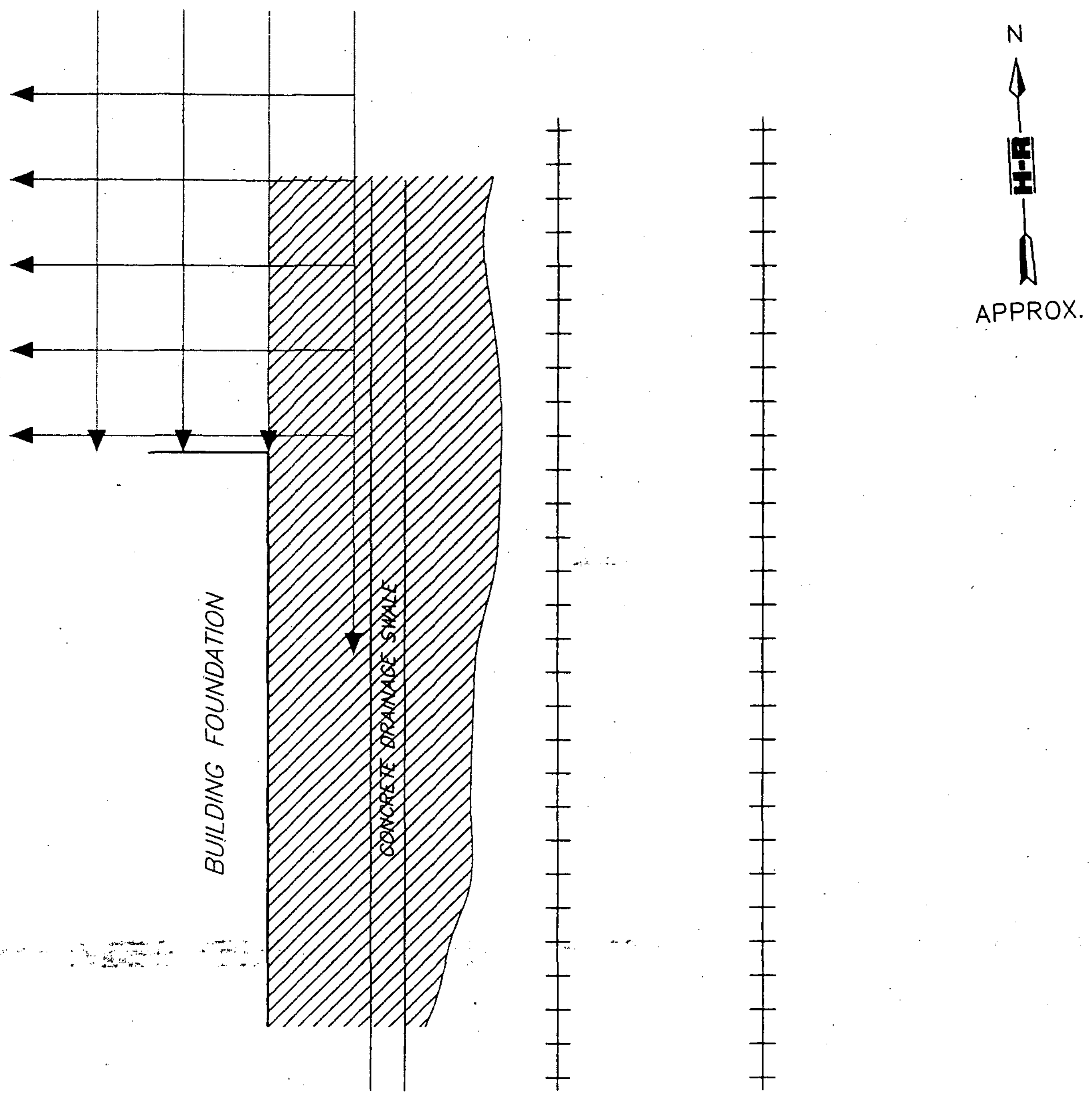
SCALE (feet)

0 10 20

Figure 10
EM61 Survey - UST Area 5
Procter & Gamble Port Ivory Facility
Staten Island, New York

File 00D59 December, 2000

HAGER-RICHTER GEOSCIENCE, INC.
Salem, New Hampshire



LEGEND

→	GPR TRAVERSE
▨	EM ANOMALY ATTRIBUTED TO EFFECTS OF SURFACE OBJECTS. THE PRESENCE OR ABSENCE OF BURIED METAL WITHIN THIS AREA CANNOT BE DETERMINED ON THE BASIS OF THE GEOPHYSICAL DATA ALONE.
┼┼┼	RAILROAD TRACK

SCALE (feet)

0 10 20

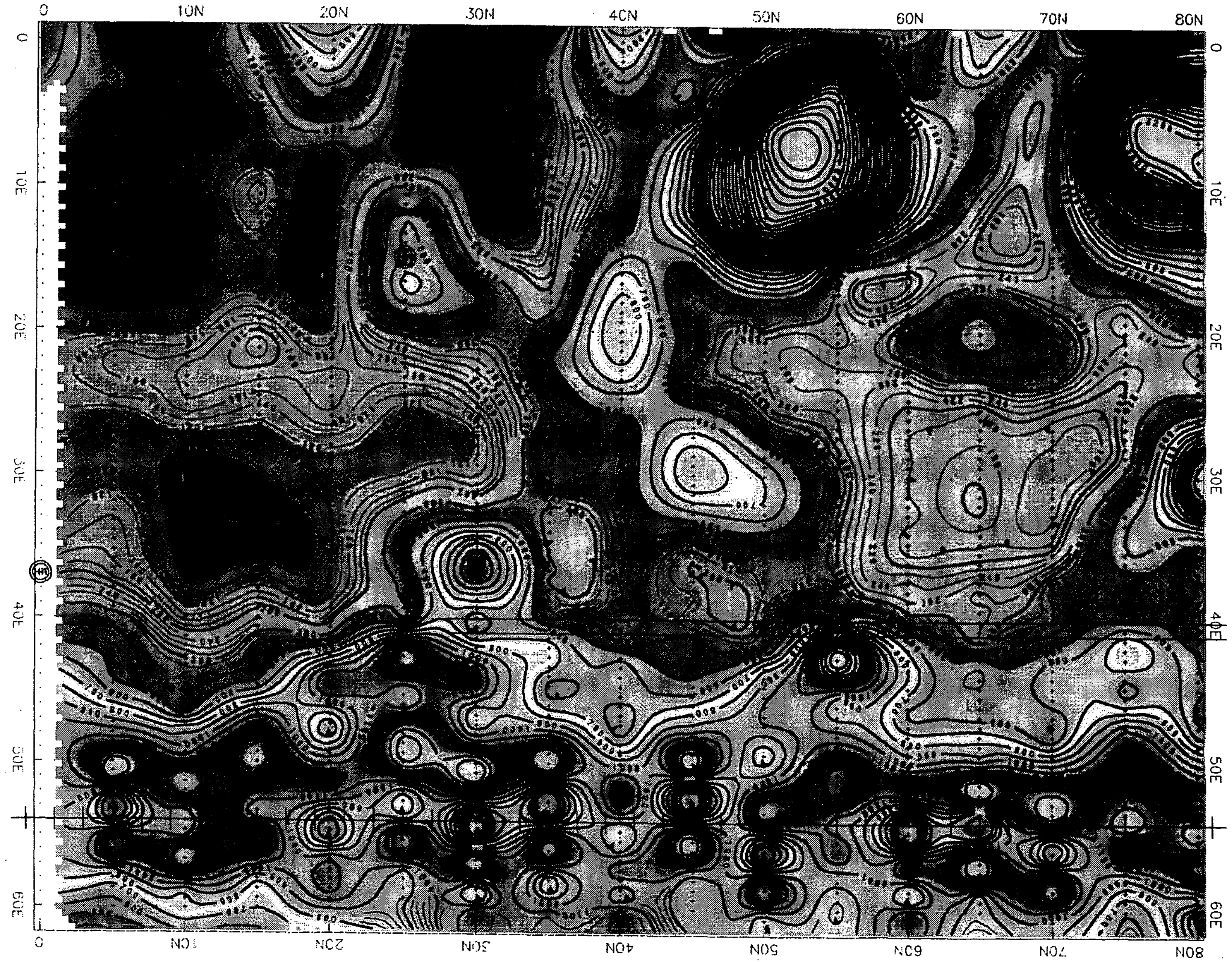
NOTE:

Site sketch generated from field notes.

Figure 11
GPR Survey & Integrated
Interpretation – UST Area 5
Procter & Gamble Port Ivory Facility
Staten Island, New York

File 00D59	December, 2000

HAGER–RICHTER GEOSCIENCE, INC.
Salem, New Hampshire



APPROX.

N

LEGEND

·	EM DATA STATION
(MH)	MANHOLE
(CB)	CATCH BASIN
┼┼┼	RAILROAD TRACK

SCALE (feet)

0 10 20

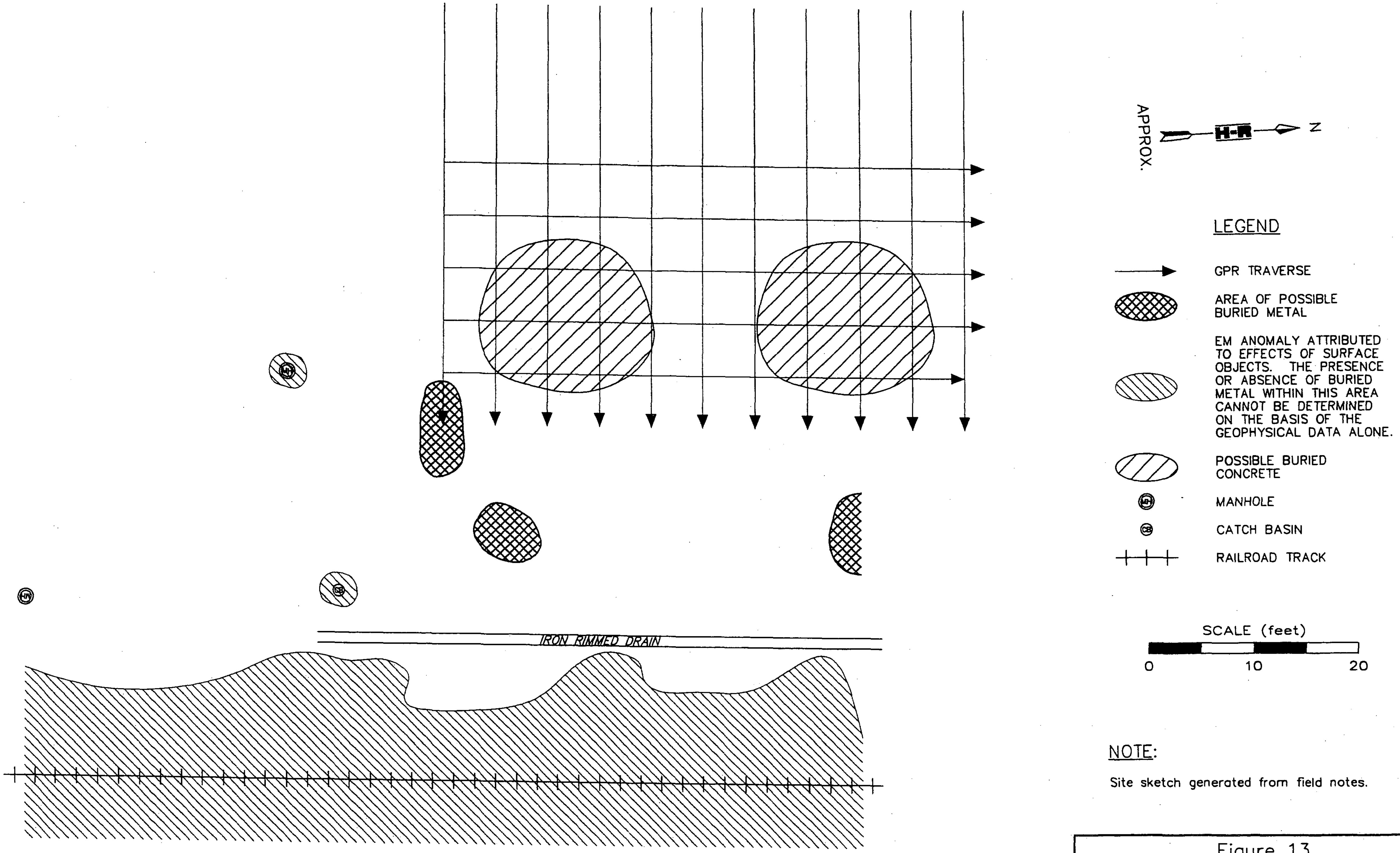
NOTES:

1. Site sketch generated from field notes.
2. Contour Interval = 20 mV.

Figure 12
EM61 Survey – UST Area 6
Procter & Gamble Port Ivory Facility
Staten Island, New York

File 00D59 | December, 2000

HAGER-RICHTER GEOSCIENCE, INC.
Salem, New Hampshire



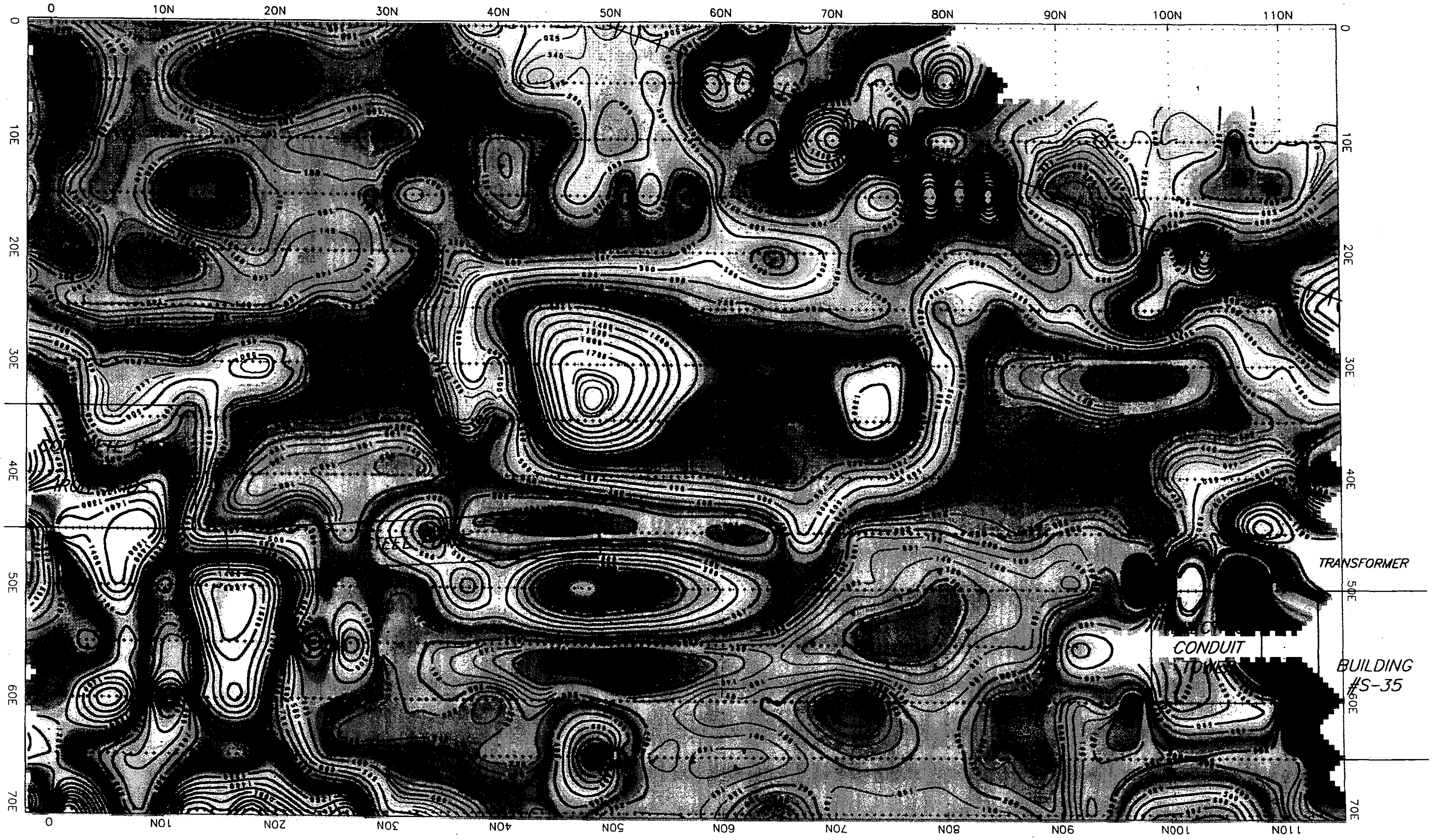
NOTE:

Site sketch generated from field notes.

Figure 13
GPR Survey & Integrated
Interpretation – UST Area 6
Procter & Gamble Port Ivory Facility
Staten Island, New York

File 00D59 | December, 2000

HAGER–RICHTER GEOSCIENCE, INC.
Salem, New Hampshire



LEGEND

·	EM DATA STATION
◉	MANHOLE
♉	HYDRANT
┼┼┼	RAILROAD TRACK

NOTES:

1. Site sketch generated from field notes.
2. Contour Interval = 20 mV.

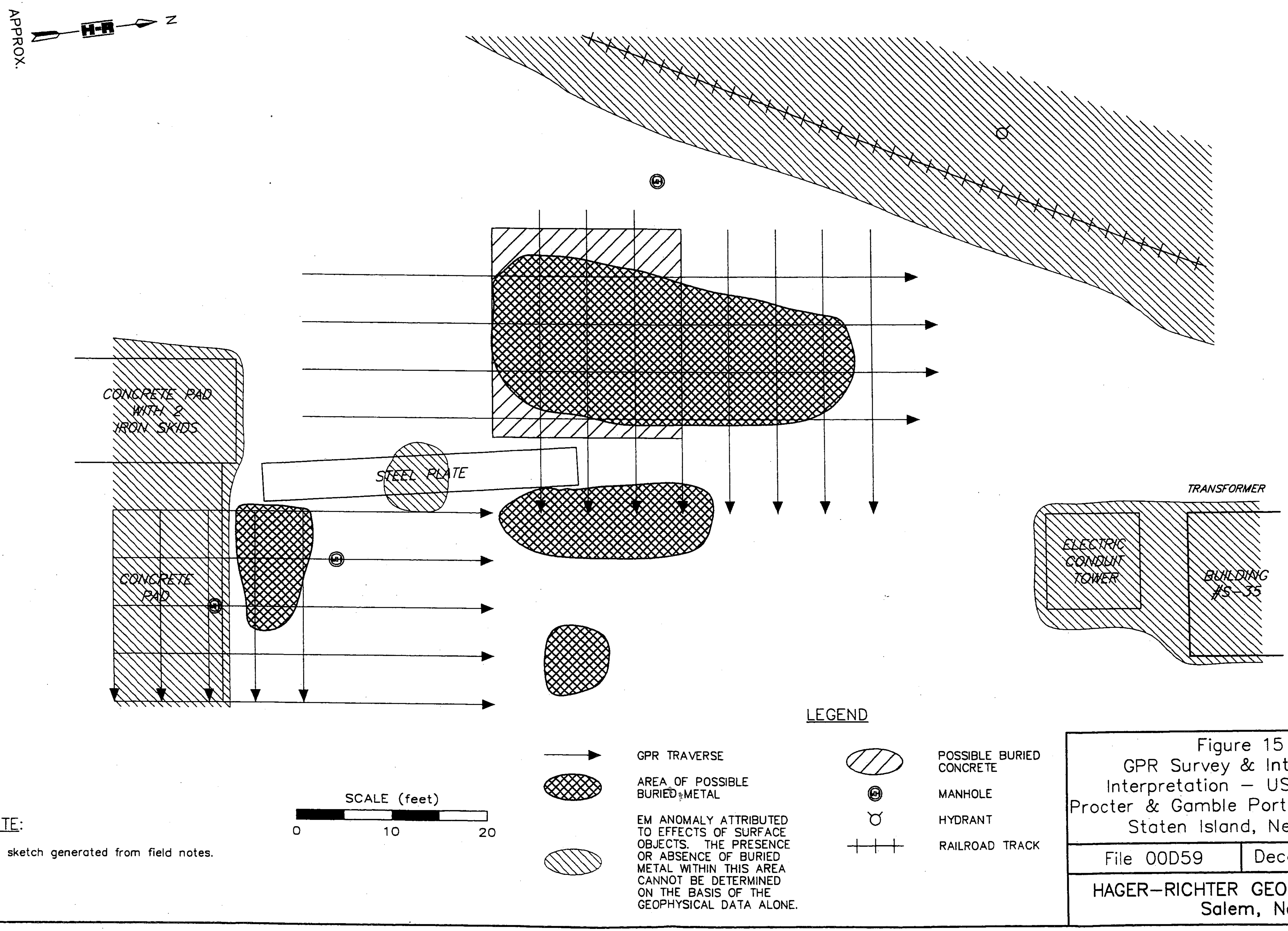
SCALE (feet)
0 10 20

APPROX.
H-R
N

Figure 14
EM61 Survey - UST Area 7
Procter & Gamble Port Ivory Facility
Staten Island, New York

File 00D59 | December, 2000

HAGER-RICHTER GEOSCIENCE, INC.
Salem, New Hampshire



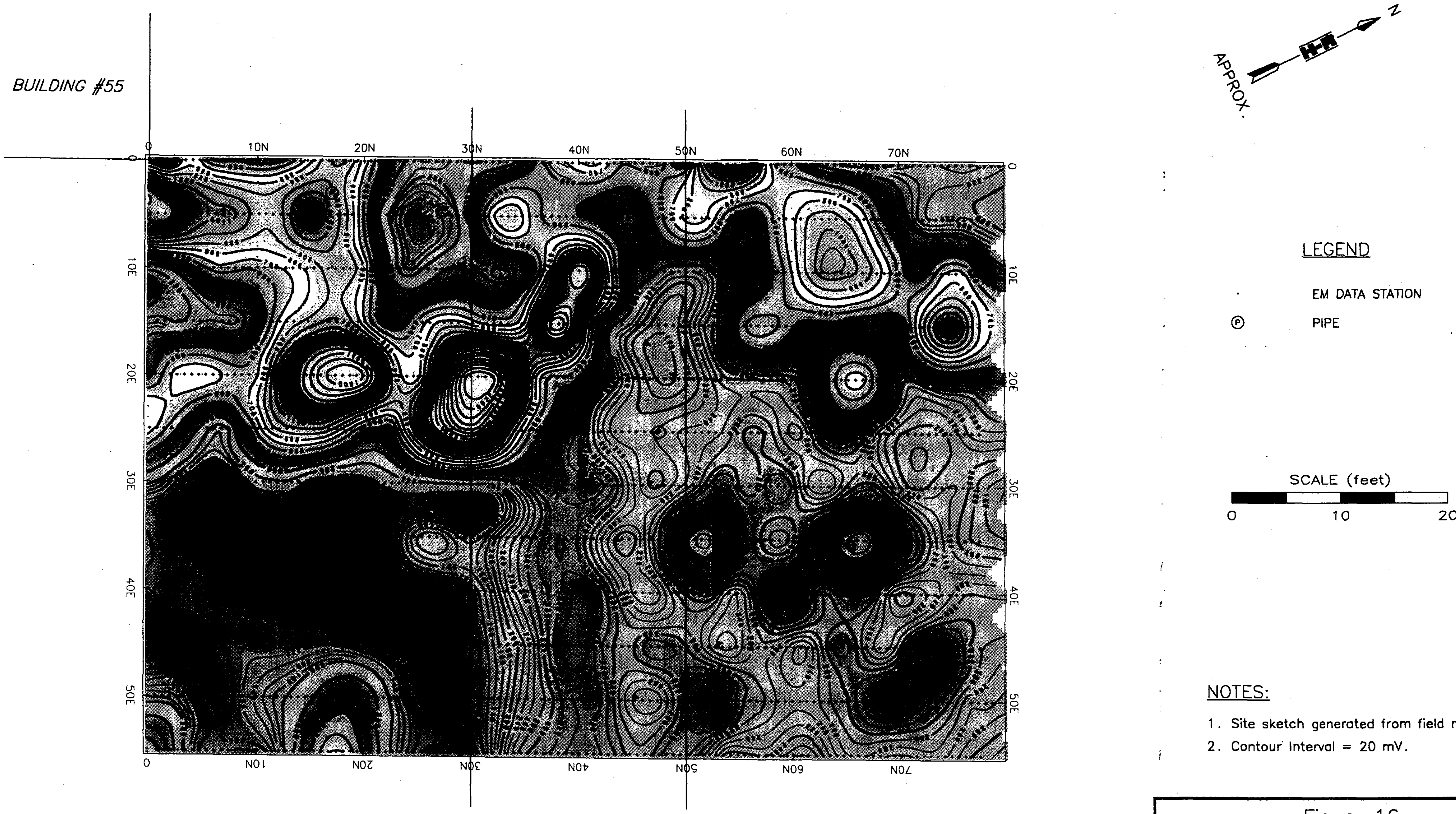
NOTE:

Site sketch generated from field notes.

Figure 15
GPR Survey & Integrated Interpretation – UST Area 7
Procter & Gamble Port Ivory Facility
Staten Island, New York

File 00D59 December, 2000

HAGER–RICHTER GEOSCIENCE, INC.
Salem, New Hampshire



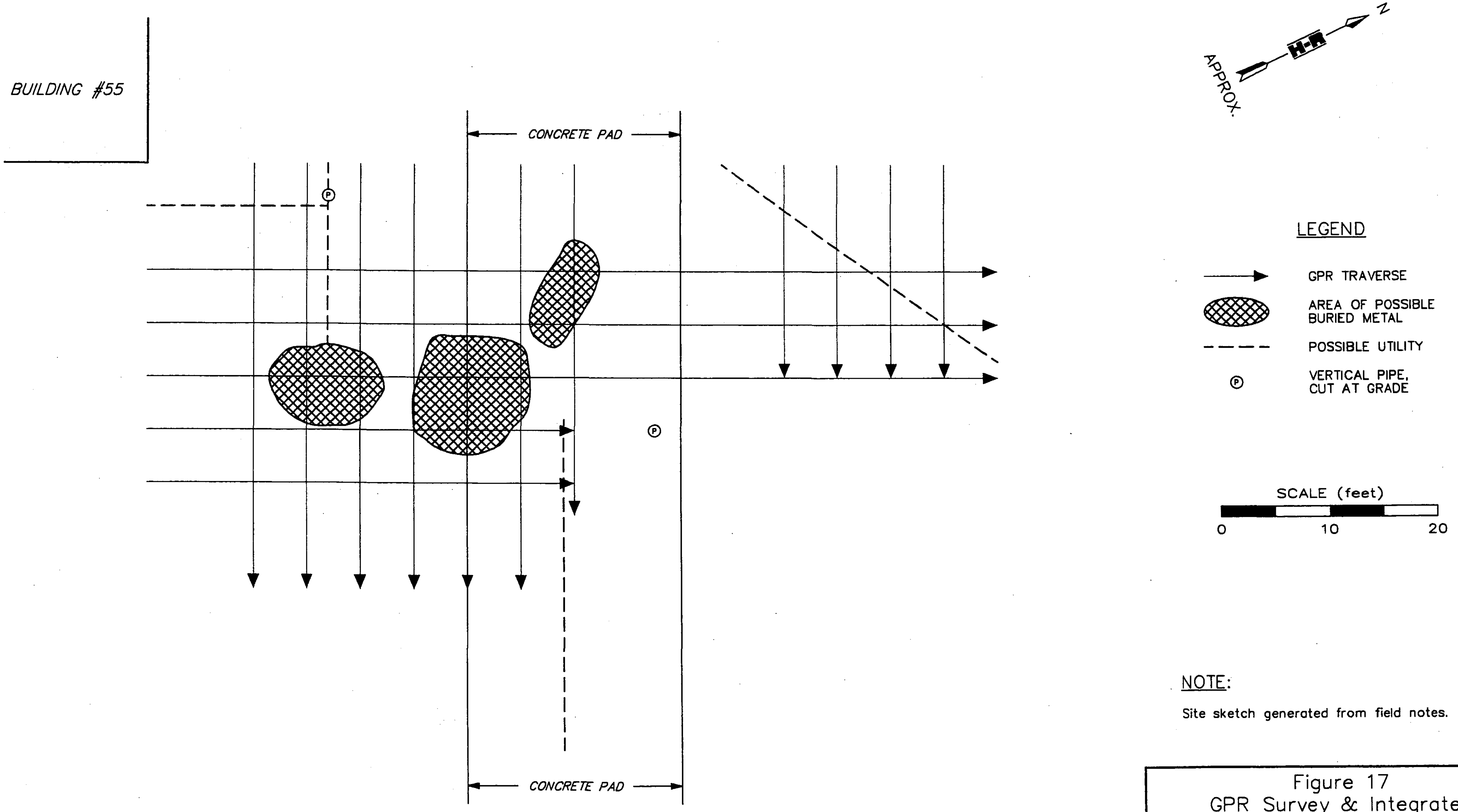
NOTES:

1. Site sketch generated from field notes.
2. Contour Interval = 20 mV.

Figure 16
EM61 Survey - UST Area 8
Procter & Gamble Port Ivory Facility
Staten Island, New York

File 00D59	December, 2000

HAGER-RICHTER GEOSCIENCE, INC.
Salem, New Hampshire



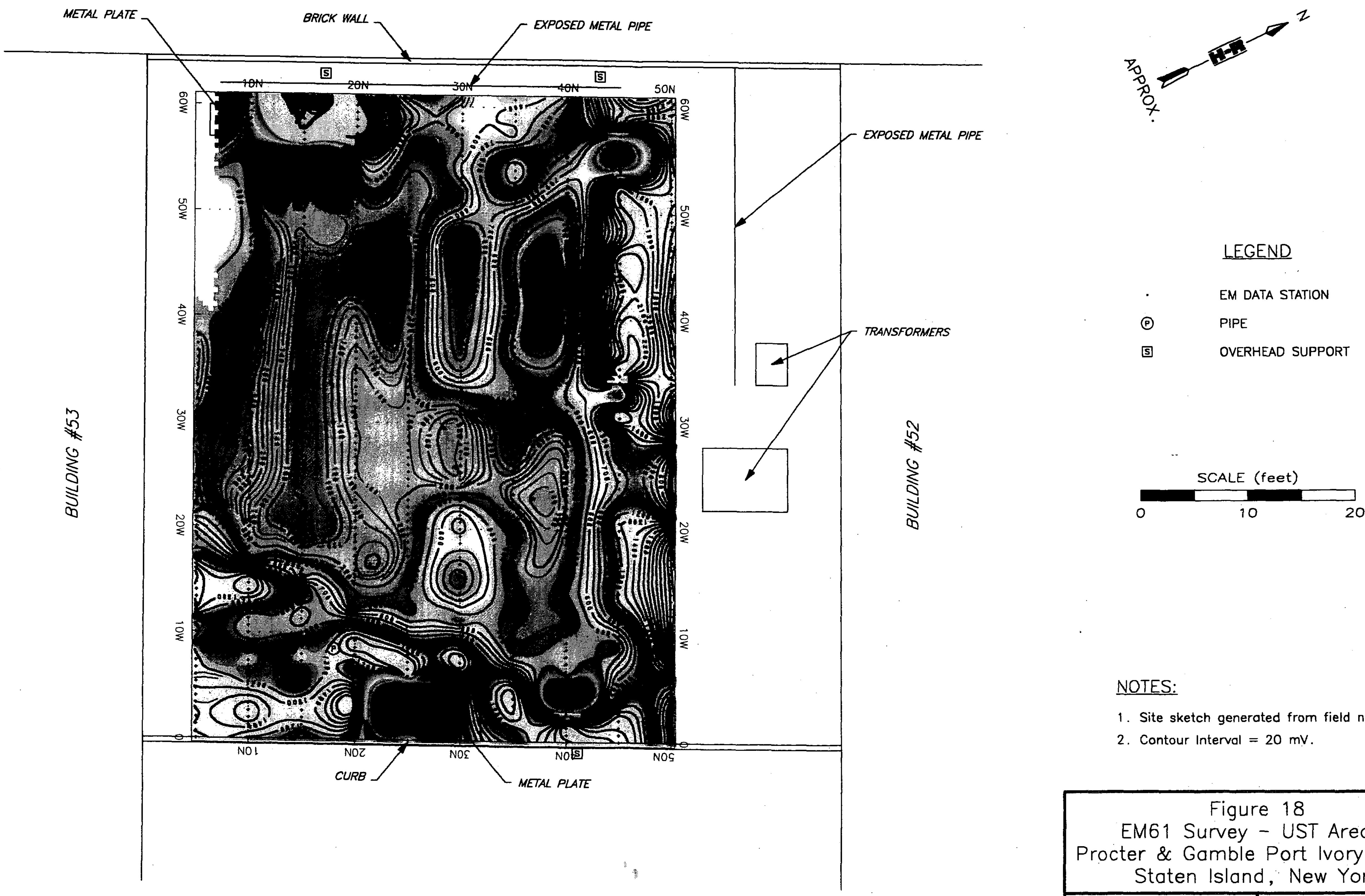
NOTE:

Site sketch generated from field notes.

Figure 17
GPR Survey & Integrated
Interpretation – UST Area 8
Procter & Gamble Port Ivory Facility
Staten Island, New York

File 00D59 | December, 2000

HAGER–RICHTER GEOSCIENCE, INC.
Salem, New Hampshire



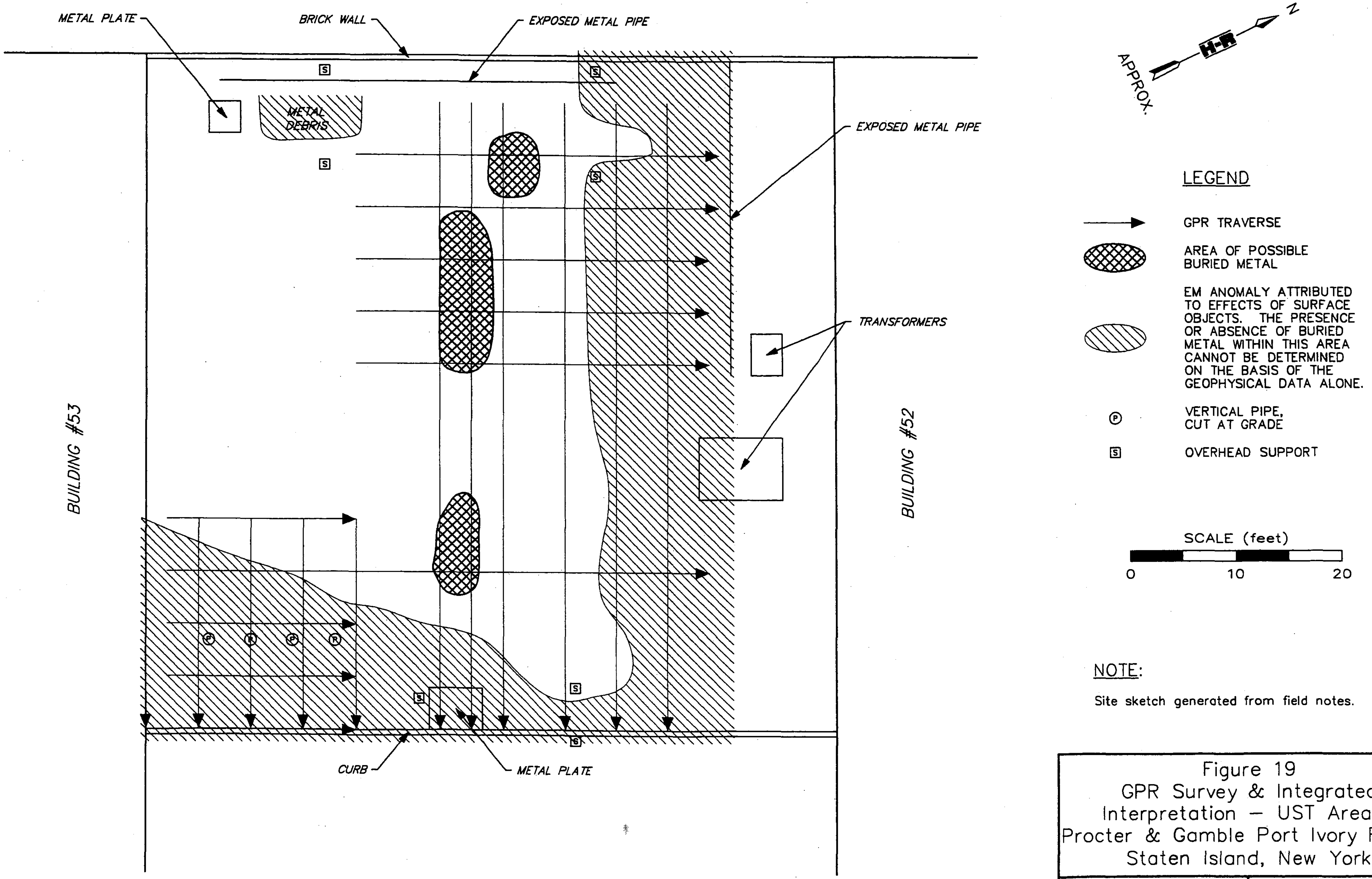
NOTES:

1. Site sketch generated from field notes.
2. Contour Interval = 20 mV.

Figure 18
EM61 Survey - UST Area 9
Procter & Gamble Port Ivory Facility
Staten Island, New York

File 00D59 | December, 2000

HAGER-RICHTER GEOSCIENCE, INC.
Salem, New Hampshire



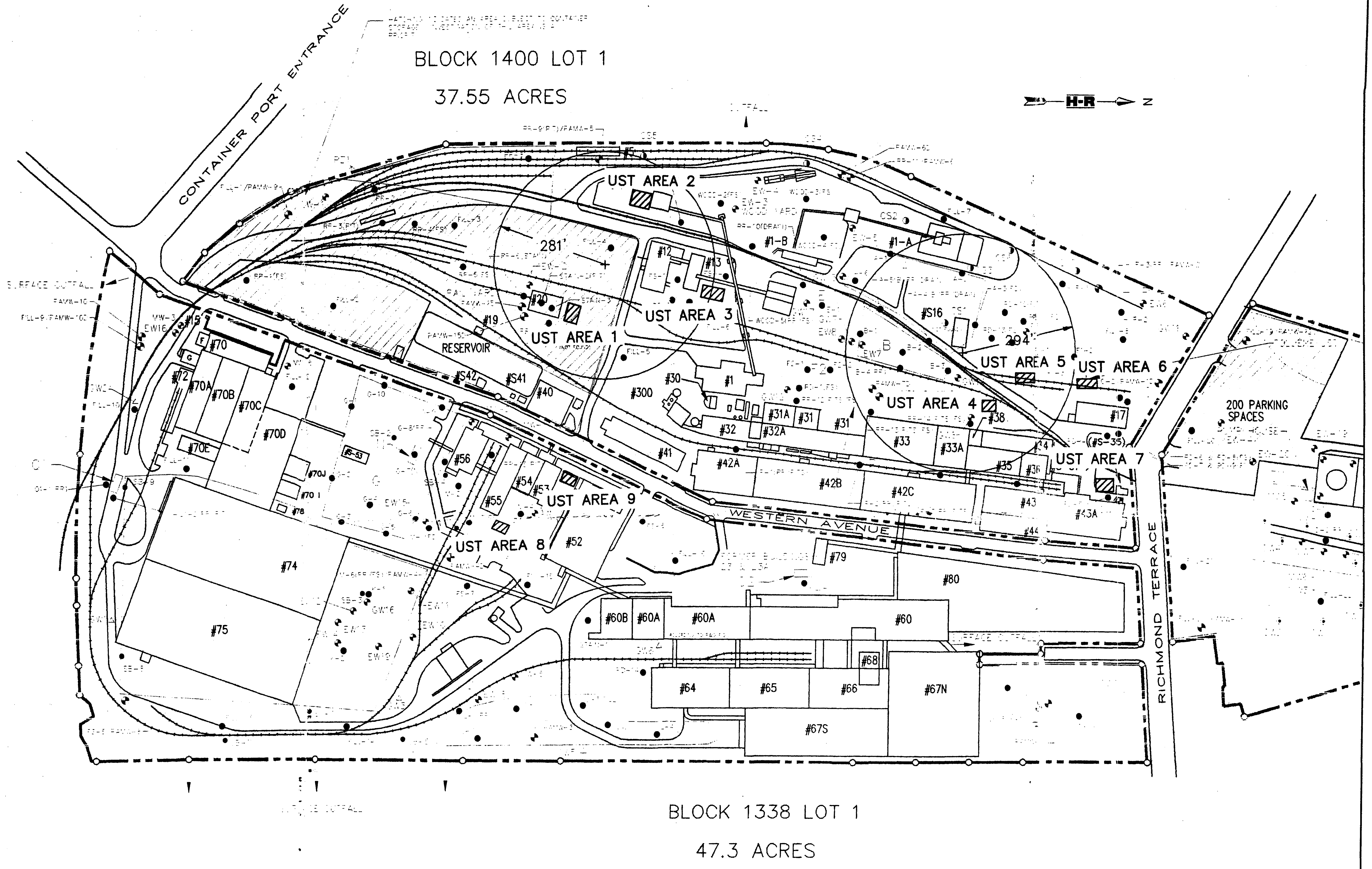
NOTE:

Site sketch generated from field notes.

Figure 19
GPR Survey & Integrated
Interpretation – UST Area 9
Procter & Gamble Port Ivory Facility
Staten Island, New York

File 00D59	December, 2000

HAGER–RICHTER GEOSCIENCE, INC.
Salem, New Hampshire



LEGEND

▨ UST SURVEY AREA

NOT TO SCALE

NOTE:

Modified from site plan provided by Killam Associates

PLATE 1
SITE PLAN
PROCTER & GAMBLE
PORT IVORY FACILITY
STATEN ISLAND, NEW YORK

FILE 00D59	DECEMBER, 2000

HAGER-RICHTER GEOSCIENCE, INC.
SALEM, NEW HAMPSHIRE

APPENDIX
EM61 Metal Detector Surveys

Equipment. The Geonics EM61Metal Detector is a time-domain electromagnetic induction type instrument designed solely for detecting buried metal objects. The manufacturer's specifications are attached. An air-cored 1-meter square transmitter coil generates a pulsed primary magnetic field in the earth, thereby inducing eddy currents in nearby metal objects. The decay of the eddy current produces a secondary magnetic field that is sensed by two receiver coils, one coincident with the transmitter and one positioned 40 cm above the main coil. By measuring the secondary magnetic field after the current in the ground has dissipated but before the current in metal objects has dissipated, the instrument responds only to the secondary magnetic field produced by metal objects. Two channels of secondary response are measured in mV and are recorded on a digital data logger. The system is generally operated by pulling the coils as a trailer with an odometer mounted on the axle to trigger the data logger automatically at 20-cm intervals.

Data Analysis and Interpretation. EM61survey data are most commonly plotted as color contour plots of Channel 2, the lower of the two receiver coils, and the difference between Channel 1 and Channel 2. The differential plot suppresses the effects of surface metal objects.

A buried metal object produces a single, sharply defined, positive peak response when the EM61 is located directly over the object. Thus, the interpretation of the plotted data is relatively straightforward in terms of the presence and location of buried metal objects. The depth of metal objects can be estimated by the width or "footprint" of the peak response.

According to the manufacturer's literature, the EM61 can detect a single 55-gallon drum buried at a depth of 10 feet. The instrument provides excellent lateral location accuracy and discrimination of multiple targets due to the data density (20 cm) possible along each traverse. The EM61 is not as affected by interference from surface metal and electrical objects as other geophysical methods and has the advantage of detecting both ferrous and non-ferrous metal objects.

Limitations of the Method. The EM61 detects metal objects that are present below the 1-meter square coils of the instrument, but it is not very sensitive to the presence of small metal objects located to the sides of the coils. It is possible, then, that metal objects could be missed in an EM61 survey if the survey data are collected at intervals greater than 1 meter.

Detection and identification should be clearly differentiated. Detection in this context is the recognition of the presence of a metal object, and the EM61 is excellent for such purposes. Identification, on the other hand, is determination of the nature of the causative body (i.e., what is the body -- a cache of drums, UST, automobile, white goods, etc.?), and the EM61 cannot identify the buried metal object.

APPENDIX
GROUND PENETRATING RADAR SURVEYS

Field Work. A Geophysical Survey Systems, Inc. Model SIR-2 ground penetrating radar system was used for this survey. The SIR-2 is a fully digital system and includes a color monitor, grey-scale thermal printer, and 10-Gbyte digital tape backup system. The transmit/receive antenna is housed in a box that is moved across the surface. The antenna transmits electromagnetic signals into the subsurface and then detects, amplifies, and displays reflections of the signals in real-time on the color monitor. The result is a radar record of the subsurface.

The maximum depth of penetration of the GPR signal and the resolution of the reflections are controlled in part by the frequency of the antenna used and in part by the electrical properties of the subsurface. Hager-Richter owns antennas with the following center frequencies: 120 MHz, 300 MHz, 500 MHz, and 1000 MHz. The total time during which radar signals are recorded can be varied from a few to 1,000 nanoseconds (nsec). However, there is a trade-off between total time, corresponding to depth range, and resolution. As the total time of recording is increased, the resolution of the GPR records decreases. For a given site, the total time window is set to detect features located somewhat below the maximum expected target depths.

Interpretation. The horizontal axis of a GPR record represents distance across the surface and the vertical axis represents round-trip travel time of the radar signal. The round-trip travel time can be converted to approximate depth by correlating with reflections from targets of known depth or by using handbook values of velocities for materials in the subsurface. For those sites where the subsurface is electrically heterogeneous, the travel times of the radar signal may be different in the various materials, and the vertical scale for the radar records is not necessarily uniform with depth.

The reflections in a GPR record are produced by spatial changes in the physical properties (e.g., type of material, subsurface fluids, porosity, etc.) and related changes in the electrical properties (dielectric constant) of the subsurface materials in the path of the signals. The greater the difference in electrical properties between two materials in the subsurface, the stronger the reflection observed in the GPR record.

The size, shape, and amplitude of the GPR reflections are the characteristics that are considered in the interpretation of the data from any site. Because the electrical properties of metal USTs, utilities, and conduits different significantly from those of the soils in which they are buried, such objects produce GPR reflections with high amplitude and distinctive shapes that permit identification with a high degree of reliability. Most other objects, although readily detectable, require "ground truth" for identification. Only excavations provide positive identification for most objects identified in GPR surveys.

For GPR profiles oriented perpendicular to the long axis of a tank, the signature is similar to a hyperbola, the shape of which is a function of the diameter and depth of burial of the tank. For GPR profiles oriented parallel to the long axis of a tank, the signature is a set of parallel, high amplitude reflections that terminate sharply at the ends of the tank. GPR, then, is useful for determining the exact location and dimensions of USTs.

Limitations of the Method. The maximum depth to which GPR signals can penetrate depends on the electrical properties of the subsurface materials. The higher the electrical conductivity of the subsurface materials, the lower the radar signal penetration. Clay minerals and/or brackish water in the subsurface, for example, attenuate the GPR signal, so reflections are not received from materials at greater depths.

There are limitations of the GPR technique as used to detect and/or locate particular targets: (1) surface conditions, (2) electrical conductivity of the ground, (3) contrast of the electrical conductivities of the targets and the ground, and (4) spacing between lines. Of these limitations, only the fourth, line spacing, is controlled by the operator.

The condition of the ground surface can affect the quality of the GPR data and the depth of penetration of the GPR signal. Sites covered with high grass, bushes, landscape structures, debris, obstacles, soil mounds, etc. limit the survey access and the coupling of the GPR antenna with the ground. In many cases, the GPR signal will not penetrate below concrete pavement, and a target may not be detectable.

The electrical conductivity of the ground determines the attenuation of the GPR signals, and thereby limits the maximum depth of exploration. The GPR signal does not penetrate clay-rich soils, and targets buried in clay can be missed.

A contrast in the electrical conductivities of the ground and the target is required to obtain a reflection of the GPR signal. If the contrast is too small, possibly due to extremely corroded conditions of a metal target, then the reflection may be too weak to recognize, and the target can be missed.

The spacing between lines is under control of the GPR operator, and the design of the survey is based on the dimensions of the smallest target of interest. Targets with dimensions smaller than the spacing between GPR survey lines can be missed.

Accurate determination of the depth to any interface requires calibration of the site specific GPR signal velocity. Where targets of a known depth are not available at a site, the time-to-depth conversion of the GPR signal can be estimated from handbook values, but such depth estimations might contain significant error.

Interpretation of GPR data is subjective. As noted above, "ground truth" through correlation with borings and excavations is required for positive identification of most objects detected on the basis of GPR data.

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THE PORT AUTHORITY OF NY & NJ

Engineering Department
Construction Division
Materials Engineering Section

BORING REPORT

SHEET 1 OF 3

PROJECT Proctor and Gamble	NAME OF CONTRACTOR CRAIG	BORING NO. RR 1	SURFACE ELEV.
LOCATION AS MARKED out in The Field by Killam Assoc.		CONTRACT NO. 426-99-006	DATE 11-3-00

SPOON 3 "O.D. 2 3/8 "I.D.
CASING SIZE H.S. Augers
HOLE TYPE
HAMMER (safety) 140 # FALL 30"
HAMMER # FALL "
DRILLER P. Pennell
INSPECTOR M. Oudeh

GROUND WATER LEVEL

Date	Time	Depth	Remarks
11/3	Am	3.2'	

CASING BLOWS/FT.	DEPTH	SPOON BLOWS/6"	RE-COV'D [1]	SAMP. NO. [2]	[3]SAMPLE DESCRIPTION AND REMARKS ——— LINE LOCATES CHANGE OF PROFILE
					0.0'
H.S	0	Hard	Full	1	Fill - dark brown c-f SAND, some Crushed Rock, little Gravel, trace Silt 1.2'
Augers		Auger		2	Fill - brown c-f SAND, trace Gravel, trace Silt
				3	Fill - dark brown c-f SAND, trace Gravel, trace Silt
	5			4	Fill - SAME
		7-8 11-13	24"	5	Fill - SAME
		4-10 11-15	20"	6	Fill - brown c-f SAND, trace Gravel, trace Silt
	10	5-11 13-10	24"	7	Fill - SAME
		10-12 12-14	24"	8	Fill - SAME
	15	7-9 11-15	21"	9	Fill - brown-grey c-f SAND, trace Gravel, trace Silt
		5-13 20-19	21"	10	Fill - red brown c-f SAND, little Gravel, trace Crushed Rock little Silt
		8-11 14-16	20"	11	Fill - red brown m-f SAND, little Silt, trace Gravel
	20	27-17 16-20	22"	12A	Fill - SAME 21.6'
				B	red-brown SILT 22.0'
					All Samples saved in 2 one pt. JAR & 1 4oz. bottom of boring ↕
					With the following exceptions: S#4 was not
	25				Saved. S#12B was saved in 1 one pt. JAR & 1 4 oz JAR.

NOTES: 1 — Length recovered; 0" — Loss of Sample, T — Trap used
2 — U = undisturbed; A = auger; OER = open end rod; V = vane
3 — Log depth of change in color of wash water, loss of water, artesian water, sand heave in casing, etc.

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THE PORT AUTHORITY OF NY & NJ

Engineering Department
Construction Division
Materials Engineering Section

BORING REPORT

PROJECT Howland Hook, Port Ivory Pd GS, Ro	**NAME OF CONTRACTOR** Craig Drilling	**BORING NO.** RR-2	**SHEET** 1 **OF** 4 **SURFACE ELEV.**
LOCATION ± 10' West of orig Loc		**CONTRACT NO.** 476-99-006	**DATE** 11/4/00

SPOON 3 "O.D. 2 3/8 "I.D. | **CASING SIZE** HW | **HOLE TYPE** 1
HAMMER Safety 140 # FALL 30 " | **HAMMER** # FALL "
DRILLER S Burns
INSPECTOR D Howe

GROUND WATER LEVEL

Date	Time	Depth	Remarks
11/4/00	2 45 pm	2.9	while Hand Augering

CASING BLOWS/FT.	DEPTH	SPOON BLOWS/6"	RE-COV'D[1]	SAMP.[2] NO.	[3]SAMPLE DESCRIPTION AND REMARKS ______ LINE LOCATES CHANGE OF PROFILE 0.0
Hand	0	Hand Augr	Full	1	
Augr					Fill- Cinders
↓		↓	↓	2	
					Same
HW	5	Tapped Spoon	24"	3	
Casing		↓			Same 6.0
		2-2		4	
↓		2-1	12"		Gray organic silty Clay & Brown Peat 0.2 8.0
		WOR		5	
Drill	10	1-8	9"		Black Brown Peat 0.2 10.0
Ahead		3-8		6	
with		10-10	10"		F Gray Sand, Tr Silt 12.0
Mud		5-7		7	
↓		10-13	14"		F Brown Sand, Tr Silt ~~0.2~~
		6-8		8	
	15	8-5	9"		Same ~~0.2~~ 16.0
					Bottom of Boring
					Note S# 6-8 Taken with 2" Spoon
	20				
					Sample #1-5 checked with PID Meter
					S# 1-4 Saved for Enviro Testing
					GeoTech Sample on All
	25				

NOTES: 1 — Length recovered; 0" — Loss of Sample, T — Trap used
2 — U = undisturbed; A = auger; OER = open end rod; V = vane
3 — Log depth of change in color of wash water, loss of water, artesian water, sand heave in casing, etc.

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THE PORT AUTHORITY OF NY & NJ

Engineering Department
Construction Division
Materials Engineering Section

BORING REPORT

SHEET 1 OF 3

PROJECT Proctor & Gamble	NAME OF CONTRACTOR Craig	BORING NO. RR 3	SURFACE ELEV.
LOCATION As marked out in the field by Killian Assoc.		CONTRACT NO. 426-99-506	DATE 11-3-00

SPOON: 3 O.D. 2 3/8 I.D.
CASING SIZE: H.S. Augers
HOLE TYPE:
HAMMER (SAFETY): 140 # FALL 30 "
HAMMER: # FALL "
DRILLER: P. Pennell
INSPECTOR: M. Oudeh

GROUND WATER LEVEL

Date	Time	Depth	Remarks
11/3/00	2:45p	4.5'	In S-#3

CASING BLOWS/FT.	DEPTH	SPOON BLOWS/6"	RE-COV'D[1]	SAMP.[2] NO.	[3]SAMPLE DESCRIPTION AND REMARKS ____ LINE LOCATES CHANGE OF PROFILE
	0				0.0'
		Hand	Full		Crushed Rock 1.5'
		Auger		1	Fill- dark brown c-f SAND, some Gravel, trace Silt 2.0'
				2	Fill- brown c-f SAND, trace Gravel, trace Silt
	5			3	Fill. Same
Augers		12-13 20-22	24"	4	Fill. dark brown c-f SAND, trace Gravel, trace Silt
		5-5 7-19	24"	5	Fill- brown c-f SAND, trace Gravel, trace Silt
	10	6-18 21-20	18"	6	Fill-Brown M-F Sand, tr Silt, tr Gravel.
		10-12 15-15	20"	7	Same
	15	5-9 10-12	17"	8	Same 16.0'
					Bottom of Boring
	20				
					Note: 2-16oz jars & 1 Voa jar was saved from each sample.
	25				

NOTES: 1 — Length recovered; 0" — Loss of Sample, T — Trap used
2 — U = undisturbed; A = auger; OER = open end rod; V = vane
3 — Log depth of change in color of wash water, loss of water, artesian water, sand heave in casing, etc.

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THE PORT AUTHORITY OF NY & NJ

Engineering Department
Construction Division
Materials Engineering Section

BORING REPORT

SHEET 1 OF 3

PROJECT HIt - P&G	NAME OF CONTRACTOR Craig	BORING NO. RR-4	SURFACE ELEV.
LOCATION As laid out by Killam Assoc		CONTRACT NO. 426-99-006	DATE 11/4/00

SPOON 3 "O.D. 2 3/8 "I.D.
CASING SIZE H.S. Auger
HOLE TYPE 1
HAMMER 140 # FALL 30 "
HAMMER # FALL "
DRILLER J. Craig
INSPECTOR T. Ryan

GROUND WATER LEVEL

Date	Time	Depth	Remarks
11/4/00	11:57 Am	4.0'	In S. #4

CASING BLOWS/FT.	DEPTH	SPOON BLOWS/6"	RE-COV'D [1]	SAMP. [2] NO.	[3]SAMPLE DESCRIPTION AND REMARKS ——— LINE LOCATES CHANGE OF PROFILE
	0	Hand	Full		CRASHED STONE 0.5'
		auger	Rec	1	Fill-Br M-F Sand, some Gr, little cinders, some Brick
					Same 3.0'
				2	Fill - Rd Br Clay Silt little Gr, tr Cinders.
	5			3	Misc Fill-Rd Br Clay Silt, some Gr, tr Conc, tr Wood, tr Br.
					6.0'
gers		6-9		4	Gray F Sand, tr Plant fibers
		9-8	11"		
		2-4		5	Br M-F Sand, tr Silt, tr Gravel.
	10	4-5	12"		
		2-4		6	Same
		4-5	10"		
		5-7		7	Same
		11-11	24"		
	15	3-5	10"	8	Same 15.0'

Note: Sample #1-5 were saved for environ testing as per C. Springer (Killam Assoc). All other samples were screened w/ PID & then discarded.

NOTES: 1 — Length recovered; 0" — Loss of Sample, T — Trap used
2 — U = undisturbed; A = auger; OER = open end rod; V = vane.
3 — Log depth of change in color of wash water, loss of water, artesian water, sand heave in casing, etc.

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THE PORT AUTHORITY OF NY & NJ

Engineering Department
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Materials Engineering Section

BORING REPORT

SHEET 1 OF 3

PROJECT: Howland Hook, Port Ivory PA Site
NAME OF CONTRACTOR: Craig Drilling
BORING NO.: RR-5
SURFACE ELEV.:
LOCATION: ± 20' South of Bldg 20 Block 1400 Lot 1
CONTRACT NO.: 426-99-006
DATE: 11/7/00
SPOON: 3" O.D. 2 3/8" I.D.
CASING SIZE: Augers
HOLE TYPE: 1
HAMMER: Safety 140 # FALL 30"
HAMMER: # FALL "
DRILLER: S Burns
INSPECTOR: D Howe

GROUND WATER LEVEL

Date	Time	Depth	Remarks
11/7/00	7 35 A	5.0	while Hand Augering

CASING BLOWS/FT.	DEPTH	SPOON BLOWS/6"	RE-COV'D[1]	SAMP. NO.[2]	[3]SAMPLE DESCRIPTION AND REMARKS ____ LINE LOCATES CHANGE OF PROFILE 0.0
Hand	0	Hand Auger	Full	1	Fill-Cinders 1.0
Auger					Fill- M-F Brown Sand, Tr Cinders, Tr Silt
				2	
					Same 4.0
	5			3	
					M-F Brown Sand, Tr Silt
Hollow		2-2		4	
Stem		3-2	14"		F Brown Sand, Tr Silt
Augers		6-8		5	
	10	10-13	22"		Same
		10-13		6	
		20-24	24"		Same
		10-13		7	
		16-17	24"		Same
	15	5-7		8	
		8-12	24"		16.0
					Bottom of Boring
	20				All Samples Checked with PID Meter
					S# 1-3 Saved for Testing, S# 1&2 To
					Be Tested, Remaining Samples Discarded
	25				

NOTES: 1 — Length recovered; 0" — Loss of Sample, T — Trap used
2 — U = undisturbed; A = auger; OER = open end rod; V = vane
3 — Log depth of change in color of wash water, loss of water, artesian water, sand heave in casing, etc.

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THE PORT AUTHORITY OF NY & NJ

Engineering Department
Construction Division
Materials Engineering Section

BORING REPORT

SHEET 1 OF 3

PROJECT Howland Hook, Port Ivory Pd-G Site	NAME OF CONTRACTOR Craig Drilling	BORING NO. RR-6	SURFACE ELEV.
LOCATION South Side Bldg #70 Block 1400 Lot 1		CONTRACT NO. 426-99-006	DATE 11/6/00

SPOON 3 "O.D. 2 3/8 "I.D.
CASING SIZE Augers
HOLE TYPE 1
HAMMER Safety 140 # FALL 30 "
HAMMER # FALL "
DRILLER S Burns
INSPECTOR D Howe

GROUND WATER LEVEL

Date	Time	Depth	Remarks
11/6/00	3^{05} P	6.0	S# 4

CASING BLOWS/FT.	DEPTH	SPOON BLOWS/6"	RE-COV'D [1]	SAMP. NO. [2]	[3] SAMPLE DESCRIPTION AND REMARKS ____ LINE LOCATES CHANGE OF PROFILE	0.0
Hand	0	Hand Auger	Full	1	Fill- Cinders	1.0
Auger					Fill- M-F Brown Sand, Little Cinders, Tr Silt	
				2		
					Fill- M-F Brown Sand, Tr Cinders, Tr Silt, Tr Gravel	
	5			3		
					Same	6.0
[illegible]		1-0		4		
Stem		0-1	24"		M-F Brown Sand, Tr Silt	
Augers		1-4		5		
	10	3-10	21"		Same	
		10-8		6		
		10-20	23"		M-F Brown Sand, Tr ~~M-F Gray Sand~~, Tr Silt	
		8-14		7		
		24-40	24"		M-F Brown Sand, Tr Silt	
		9-10		8		
	15	16-20	18"			16.0
					Bottom of Boring	
	20				All Samples checked with PID Meter	
					S# 1-3 Saved for Enviro Testing only 1&2 to	
					Be Tested, Remaining Samples Discarded	
	25					

NOTES: 1 — Length recovered; 0" — Loss of Sample, T — Trap used
2 — U = undisturbed; A = auger; OER = open end rod; V = vane
3 — Log depth of change in color of wash water, loss of water, artesian water, sand heave in casing, etc.

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THE PORT AUTHORITY OF NY & NJ

Engineering Department
Construction Division
Materials Engineering Section

BORING REPORT

			SHEET 1 OF 3
PROJECT Howland Hook, Port Ivory PA G Site	NAME OF CONTRACTOR Craig Drilling	BORING NO. RR-7	SURFACE ELEV.
LOCATION As Laid out by Killam Assoc East Side Bldg 20		CONTRACT NO. 426-99-006	DATE 11/6/00

SPOON 3" O.D. 2 3/8" I.D.
CASING SIZE Augers
HOLE TYPE 1
HAMMER 140 # FALL 30" Safety
HAMMER # FALL "
DRILLER S Burns
INSPECTOR D Howe

GROUND WATER LEVEL

Date	Time	Depth	Remarks
11/6/00	1 pm	6.0	S#4

CASING BLOWS/FT.	DEPTH	SPOON BLOWS/6"	RE-COV'D[1]	SAMP.[2] NO.	[3]SAMPLE DESCRIPTION AND REMARKS ______ LINE LOCATES CHANGE OF PROFILE O.V.
Hand	0	Hand Auger	Full	1	
Auger					Fill-M-F Brown Sand, Little Silt, Tr Gravel 0.1
				2	
					Fill-M-F Brown Sand, Little Gravel, Tr Silt, Tr Clay clumps 4.5
	5			3	M-F Brown Sand, Tr Silt, Tr Gravel
[illegible]w		11-10		4	
Stem		8-8	15"		Same 8.0
Augers		6-4		5	
	10	9-13	22"		F Brownish Grey Sand, Some Silt, Tr Gravel 10.0
		2-1		6	
		17-19	20"		F Brown Sand, Tr Silt
		5-17		7	
		25-29	24"		Same
	15	11-17		8	
		18-34	24"		Same 16.0
					Bottom of Boring
	20				All Samples checked with PID Meter
					S# 1-3 Saved for Testing, S#4 To [illegible]
					Remaining Sample Discarded
	25				

NOTES: 1 — Length recovered; 0" — Loss of Sample, T — Trap used
2 — U = undisturbed; A = auger; OER = open end rod; V = vane
3 — Log depth of change in color of wash water, loss of water, artesian water, sand heave in casing, etc.

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BORING REPORT

SHEET 1 OF 3

PROJECT Port Ivory P & G	NAME OF CONTRACTOR Craig drilling	BORING NO. PD-1	SURFACE ELEV.
LOCATION ± 30' W of Bldg 31 Block 1400 Lot 1		CONTRACT NO. 426-99-006	DATE 11-20-00 / 11-21-00

SPOON 3 "O.D. 2 3/8 "I.D.
CASING SIZE Augers
HOLE TYPE 1
HAMMER Autom. 140 # FALL 30 "
HAMMER # FALL "
DRILLER S. Craig / J. Craig
INSPECTOR J. Zarks

GROUND WATER LEVEL

Date	Time	Depth	Remarks
11-20-00	12.20pM	5.5'	SAMple #3

CASING BLOWS/FT.	DEPTH	SPOON BLOWS/6"	RE-COV'D [1]	SAMP. [2] NO.	[3]SAMPLE DESCRIPTION AND [redacted] LINE LOCATES CHANGE OF PROFILE	
Handauger	0	Handauger	Full		. CONCRETE	0.0' 0.7'
				1	Fill brown c-f SAND, little Gravel, tr Silt ·	
				2*	SAME	
	5			3	SAME	
w M AUGERS		2 - 4				
		3 - 3	10"	4	SAME	
		3 - 3				
	10	5 - 4	24"	5	Fill brown c-f SAND, little Gravel, tr Silt	
		2 - 4				
		9 - 9	14"	6 *	Fill greyish-black c-f SAND, tr Gravel, tr Silt	12.0'
		2 - 9				
		13 - 13	24"	7	Reddish-brown Silty Clay.	14.0'
	15					
					Note: 2 samples saved for testing.	
					All other samples screened with	
					PID meter & discarded	Bottom of Boring
	20					

NOTES: 1 — Length recovered; 0" — Loss of Sample, T — Trap used
2 — U = undisturbed; A = auger; OER = open end rod; V = vane
3 — Log depth of change in color of wash water, loss of water, artesian water, sand heave in casing, etc.

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BORING REPORT

SHEET 1 OF 3

PROJECT: Port Ivory P & G

NAME OF CONTRACTOR: Craig drilling

BORING NO.: PD 3

SURFACE ELEV.:

LOCATION: ±25' W of Bldg 33 A Block 1400 Lot 1

CONTRACT NO.: 426-99-006

DATE: 11-28-00/11.29.00

SPOON: 3 " O.D. 2 3/8 " I.D.

CASING SIZE: Augers

HOLE TYPE: 1

HAMMER: 140 # FALL 30 " Safety

HAMMER: # FALL "

DRILLER: A. Kides

INSPECTOR: J. Zarks

GROUND WATER LEVEL

Date	Time	Depth	Remarks
11-28-00	3:27 PM	1.8'	Sample #1

CASING BLOWS/FT.	DEPTH	SPOON BLOWS/6"	RE-COV'D[1]	SAMP.[2] NO.	[3]SAMPLE DESCRIPTION AND REMARKS ____ LINE LOCATES CHANGE OF PROFILE 0.0'
Cutter Head Handauger	0	Cutter Head Handauger	Full Rec		CONCRETE 0.9'
				1	Fill grey c-f SAND & Gravel, Cobbles, tr. SilT
				2	Fill grey & brown c-f SAND some Gravel, little SilT
	5			*	
				3	Reddish brown SilTy ClAY some c-f SAND, tr. Gravel 6.
AUGERS		7-10			
		14-20	12"	4	SAME
		15-19			
	10	21-27	8"	5	SAME
		6-9			
		12-16	24"	6*	SAME
		12-14			
		14-20	24	7	SAME 14.0'
	15				
					Note: 2 samples saved for testing.
					All samples checked with PID meter
					& discarded

Bottom of Boring

NOTES: 1 — Length recovered; 0" — Loss of Sample, T — Trap used
2 — U = undisturbed; A = auger; OER = open end rod; V = vane
3 — Log depth of change in color of wash water, loss of water, artesian water, sand heave in casing, etc.

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BORING REPORT

SHEET 1 OF 3

PROJECT	NAME OF CONTRACTOR	BORING NO.	SURFACE ELEV.
Port Ivory P & G	Craig drilling	PD 4	

LOCATION	CONTRACT NO.	DATE
20' W of BH PD 4 A & 25' N of Bldg 36 (NW corner) Block 1400 lot 1	426-99-006	12-2-00

SPOON 3 "O.D. 2 3/8 "I.D.
CASING SIZE Augers
HOLE TYPE 1
HAMMER Auto 140 # FALL 30"
HAMMER # FALL "
DRILLER A Kides
INSPECTOR J. Zarks

GROUND WATER LEVEL

Date	Time	Depth	Remarks
12-2-00	2:13 PM	6.0'	Top sample #4

CASING BLOWS/FT.	DEPTH	SPOON BLOWS/6"	RE-COV'D[1]	SAMP.[2] NO.	[3]SAMPLE DESCRIPTION AND REMARKS ________ LINE LOCATES CHANGE OF PROFILE
Handauger	0	Handauger	Full Rec		ASPHALT 0.0' 0.4'
					Fill grey c-f SAND & Gravel some Cobbles tr. SILT 1.0'
				1	Red-brown c-f SAND with silty CLAY some Gravel. 20'
				2	Reddish-brown Silty CLAY some c-f SAND & Gravel
	5				
				3	SAME
		1 - 2			
AUGERS		3 - 3	20"	4	SAME
		3 - 2			
	10	2 - 2	24"	5*	SAME 10.0'
		3 - 2			
		4 - 5	22"	6	Reddish-brown CLAYEY SILT.
		3 - 9			
		9 - 16	20"	7	SAME 14.0'
	15				Note: 1 sample saved for testing. All checked w. PID meter
					Remaining samples discarded.
					Bottom of Boring

NOTES: 1 — Length recovered; 0" — Loss of Sample, T — Trap used
2 — U = undisturbed; A = auger; OER = open end rod; V = vane
3 — Log depth of change in color of wash water, loss of water, artesian water, sand heave in casing, etc.

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BORING REPORT

SHEET 1 OF 2

PROJECT Port Ivory P & G

NAME OF CONTRACTOR Craig drilling

BORING NO. PD 4A

SURFACE ELEV.

LOCATION 2' W of BH PD 4B Block 1400 Lot 1

CONTRACT NO. 426-99-006

DATE 12-2-00

SPOON Hand auger "O.D. "I.D.

CASING SIZE Handauger

HOLE TYPE 1

HAMMER # FALL "

HAMMER # FALL "

DRILLER A. Kides

INSPECTOR J. Zarks

GROUND WATER LEVEL

Date	Time	Depth	Remarks

CASING BLOWS/FT.	DEPTH	SPOON BLOWS/6"	RE-COV'D[1]	SAMP.[2] NO.	[3]SAMPLE DESCRIPTION AND REMARKS ——— LINE LOCATES CHANGE OF PROFILE
Cutter Head Handauger	0	Cutter Head HANDAUGER	Full Rec		0.0' ASPHALT 0.[illegible]' Concrete 0.7'
				1	Fill greyish-black c-f SAND, tr Gravel, tr Silt
				2	SAME 3.5'
	5				Note: Obstruction at 3.5' A pipeline i/t BH. Move ± 2' East
					Bottom of Boring

NOTES: 1 — Length recovered; 0" — Loss of Sample, T — Trap used
2 — U = undisturbed; A = auger; OER = open end rod; V = vane
3 — Log depth of change in color of wash water, loss of water, artesian water, sand heave in casing, etc.

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BORING REPORT

SHEET 1 OF 2

PROJECT Port Ivory P & G	NAME OF CONTRACTOR Craig drilling	BORING NO. PD 4 B	SURFACE ELEV.
LOCATION ± 20' N of Bldg 36 (center) Block 1400 lot 1		CONTRACT NO. 426-99-006	DATE 12-2-00

SPOON 3 "O.D. 2 3/8 "I.D.
CASING SIZE Augers
HOLE TYPE 1
HAMMER Autom 140 # FALL 30 "
HAMMER # FALL "
DRILLER A. Kides
INSPECTOR J. Zarks

GROUND WATER LEVEL

Date	Time	Depth	Remarks

CASING BLOWS/FT.	DEPTH	SPOON BLOWS/6"	RE-COV'D[1]	SAMP.[2] NO.	[3]SAMPLE DESCRIPTION AND REMARKS ——— LINE LOCATES CHANGE OF PROFILE
Cutter Head Handauger	0	Cutter Head Handauger	Full		0.0' Asphalt 0.3' Concrete 0.7'
				1	Fill greyish-brown c-f SAND & Gravel, tr. Silt
				2	Reddish-brown c-f SAND & Gravel with Silty ClAY
	5			3	Reddish-brown SIlTy ClAY some Gravel & c-f SAND 6.0'
					CONCRETE SlAB
	10				Refusal Bottom of Boring
	15				

NOTES: 1 — Length recovered; 0" — Loss of Sample, T — Trap used
2 — U = undisturbed; A = auger; OER = open end rod; V = vane
3 — Log depth of change in color of wash water, loss of water, artesian water, sand heave in casing, etc.

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BORING REPORT

SHEET 1 OF 3

PROJECT: Port Ivory P & G
NAME OF CONTRACTOR: Craig drilling
BORING NO.: PD-5
SURFACE ELEV.:
LOCATION: ±10'W of Bldg 43A & ±50'S of NW corner bldg 43 Block 1400 Lot 1
CONTRACT NO.: 426-99-006
DATE: 12-02-00
SPOON: 3 "O.D. 2 3/8 "I.D.
CASING SIZE: Augers
HOLE TYPE: 1
HAMMER: 140 # FALL 30 "
HAMMER: # FALL "
DRILLER: A. Kides
INSPECTOR: J. Zarks

GROUND WATER LEVEL

Date	Time	Depth	Remarks
12-2-00	9:32	7.0'	SAMple # 4

CASING BLOWS/FT.	DEPTH	SPOON BLOWS/6"	RE-COV'D[1]	SAMP. NO.[2]	[3]SAMPLE DESCRIPTION AND REMARKS ——— LINE LOCATES CHANGE OF PROFILE	
Cutter Head Handauger	0	Cutter Head Handauger	Full		CONCRETE	0.0' 0.7'
				1 *	Fill greyish-brown c-f SAND & Gravel, Cobbles tr. Silt	1.5'
					Red-brown Silty CLAY little c-f SAND & Gravel.	
				2 *	Red-brown c-f SAND & Gravel with Silty CLAY	
	5					
				3	SAME	
[illegible] N		5 - 5				
[illegible] EM Augers		10 - 10	14"	4	Reddish-brown Silty CLAY	
		8 - 13				
	10	17 - 19	18"	5	Reddish-brown Silty CLAY	10.0'
					Note: 2 samples saved for testing.	
					All checked w. P.I.D meter.	
					Remaining samples discarded.	Bottom of Boring
	15					

NOTES: 1 — Length recovered; 0" — Loss of Sample, T — Trap used
2 — U = undisturbed; A = auger; OER = open end rod; V = vane
3 — Log depth of change in color of wash water, loss of water, artesian water, sand heave in casing, etc.

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BORING REPORT

SHEET 1 OF 3

PROJECT Port Ivory P & G	NAME OF CONTRACTOR Craig drilling	BORING NO. F2-2	SURFACE ELEV.
LOCATION ±75'W of Bldg 31 Block 1400 lot 1		CONTRACT NO. 426-99-006	DATE 11-20-00

SPOON 3 "O.D. 2 3/8 "I.D.
CASING SIZE Augers
HOLE TYPE 1
HAMMER Safety 140 # FALL 30 "
HAMMER # FALL "
DRILLER J. Craig
INSPECTOR J. Zarks

GROUND WATER LEVEL

Date	Time	Depth	Remarks
11-20-00	10:45	7.0	S #4

CASING BLOWS/FT.	DEPTH	SPOON BLOWS/6"	RE-COV'D[1]	SAMP.[2] NO.	[3]SAMPLE DESCRIPTION AND REMARKS ______ LINE LOCATES CHANGE OF PROFILE	
Cutter Head Handaugr	0	Cutter Head Handauger	Full		Concrete	0.5'
					Fill brown c-f SAND, tr Gravel tr. SilT	
				1	Fill brown c-f SAND, tr Gravel, tr. SilT	
				2*	SAME	
	5			3	SAME	
w EM Augers		4-4 6-7	18"	4	Fill brown & grey c-f SAND, tr. Gravel, tr Silt	
	10	11-11 12-20	24"	5×	Fill grey c-f SAND, tr. Gravel, tr. SilT	
		11-12 20-47	14"	6	SAME	
		8-20 26-30	24"	7A	SAME	
					SAME	14.5
	15	7-8 10-13	24"	8B	Reddish-brown Silty ClAY with tr. Gravel	16.0'
	20					

Note: 2 samples saved for testing & 1 on hold. All other samples screened w. PiD meter & discarded

Bottom of Bo

NOTES: 1 — Length recovered; 0" — Loss of Sample, T — Trap used
2 — U = undisturbed; A = auger; OER = open end rod; V = vane
3 — Log depth of change in color of wash water, loss of water, artesian water, sand heave in casing, etc.

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BORING REPORT

SHEET 1 OF 3

PROJECT: Ivory Pt -- P&G
NAME OF CONTRACTOR: Craig
BORING NO.: STAIN #2
SURFACE ELEV.:
LOCATION: Laid out inside Bldg 20 in Pit (South End) (Block-1400)
CONTRACT NO.: 426-99-006
DATE: 11/11/00
SPOON: 3 " O.D. 2 3/8 " I.D.
CASING SIZE: Augers
HOLE TYPE: 1
HAMMER: Safety 140 # FALL 30 "
HAMMER: # FALL "
DRILLER: D. Oswich
INSPECTOR: D Howe

GROUND WATER LEVEL

Date	Time	Depth	Remarks
11/11/00	1205 P	6.0	While Hand Augering

CASING BLOWS/FT.	DEPTH	SPOON BLOWS/6"	RE-COV'D [1]	SAMP. NO. [2]	[3]SAMPLE DESCRIPTION AND REMARKS ———— LINE LOCATES CHANGE OF PROFILE
					Level of Floor inside Bldg +3.6
					Hole in Inspection PIT Floor
					0.0
	0				Concrete 1.0
nd		Hand Augr	Full	1	Fill- M-F orange Brown Sand, Little Silt 2.0
Auger				2	M-F Black Brown Sand Little Silt, Tr Vegt 3.0
	5			3	F Brown Sand, Tr Silt, Tr Vegt
				4	Same
Augers		13-24			
	10	29-28	24"	5	Same
		16-15		6	
		15-16	19"		Same 12.0
					Bottom of Boring
	15				
					All Samples checked with PID Meter, S# 1-3 Saved, S# 1&2 To BoTest [illegible] Remaining samples Discarded
	20				

NOTES: 1 — Length recovered; 0" — Loss of Sample, T — Trap used
2 — U = undisturbed; A = auger; OER = open end rod; V = vane
3 — Log depth of change in color of wash water, loss of water, artesian water, sand heave in casing, etc.

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BORING REPORT

SHEET 1 OF 3

PROJECT: Ivory Point P & G
NAME OF CONTRACTOR: Craig drilling
BORING NO.: Stain-3
SURFACE ELEV.:
LOCATION: East Bay, Engine House Bldg 20
CONTRACT NO.: 426-99-006
DATE: 11-10-00
SPOON: 3 " O.D. 2 3/8 " I.D.
CASING SIZE: Augers
HOLE TYPE: 1
HAMMER: 140 # FALL 30 "
HAMMER: # FALL "
DRILLER: D. Osuch
INSPECTOR: J. Zarks

GROUND WATER LEVEL

Date	Time	Depth	Remarks

CASING BLOWS/FT.	DEPTH	SPOON BLOWS/6"	RE-COV'D[1]	SAMP.[2] NO.	[3]SAMPLE DESCRIPTION AND REMARKS LINE LOCATES CHANGE OF PROFILE	
						0.0
Handauger	0	Handauger	Full		Crushed Rock - DGABC	0.5
↓		↓	↓		Wooden block	1.3'
					Rubber tire	1.5'
				1	Fill greyish brown c-f SAND, Gravel, tr. Silt & CLAY	
				2	Fill yellowish-grey c-f SAND, some Silty CLAY, tr. Gravel, cinder, wood.	9'
	5					
					Bottom of Boring	
					obstruction, Steel Plate	
	10				All Samples checked with PID	
					Meter, S# 1 & 2 Saved for Testing	

NOTES: 1 — Length recovered; 0" — Loss of Sample, T — Trap used
2 — U = undisturbed; A = auger; OER = open end rod; V = vane
3 — Log depth of change in color of wash water, loss of water, artesian water, sand heave in casing, etc.

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BORING REPORT

SHEET 1 OF 1

PROJECT: Port Ivory P&G Site

NAME OF CONTRACTOR: Craig Drilling

BORING NO.: Stain 3 A

SURFACE ELEV.:

LOCATION: ± 3' SW of Stain 3 East Bay, Bldg 20

CONTRACT NO.: 426-99-000

DATE: 11/11/00

SPOON "O.D. "I.D.

CASING SIZE

HOLE TYPE

HAMMER # FALL "

HAMMER # FALL "

DRILLER: D Osuch

INSPECTOR: D Howe

GROUND WATER LEVEL

Date	Time	Depth	Remarks
11/11		Dry	

CASING BLOWS/FT.	DEPTH	SPOON BLOWS/6"	RE-COV'D[1]	SAMP.[2] NO.	[3]SAMPLE DESCRIPTION AND REMARKS ——— LINE LOCATES CHANGE OF PROFILE
					0.0
Hand	0	Hand Auger	Full		for Strata 0-4' See Log
Auger		↓	↓		for Stain 2
↓				—	No Samples Taken
					4.0
	5				Bottom of Boring
					obstruction, Steel Plate
	10				
	15				
	20				
	25				

NOTES: 1 — Length recovered; 0" — Loss of Sample, T — Trap used
2 — U = undisturbed; A = auger; OER = open end rod; V = vane
3 — Log depth of change in color of wash water, loss of water, artesian water, sand heave in casing, etc.

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BORING REPORT

SHEET 1 OF 3

PROJECT Port Ivory, P&G Site	NAME OF CONTRACTOR Craig Drilling	BORING NO. Stain 3B	SURFACE ELEV.
LOCATION East Bay, Bldg 20 ± 11' South of Stain 3A		CONTRACT NO. 426-99-00	DATE 11/11/00

SPOON 3 "O.D. 2 3/8 "I.D.
CASING SIZE Augers
HOLE TYPE 1
HAMMER 140 # FALL Safety 30 "
HAMMER # FALL "
DRILLER D Osuch
INSPECTOR D Howe

GROUND WATER LEVEL

Date	Time	Depth	Remarks
11/11/00	9¹⁵	5.5'	While Hand Augering

CASING BLOWS/FT.	DEPTH	SPOON BLOWS/6"	RE-COV'D [1]	SAMP. NO. [2]	[3]SAMPLE DESCRIPTION AND REMARKS ____ LINE LOCATES CHANGE OF PROFILE	
						0.0
Hand	0	Hand Auger	Full	1	Misc Fill, Cinders, Sand, Gravel, Etc	1.3
Auger		↓	↓		Fill F Brown Sand, Tr Cinders	2.0
↓				2	|	
					Fill- F Brown Sand	
				3	Same	5.5
	5				F Black Gray Sand, Tr Black Silt	6.2
[illegible]w		6-4		4		
Stem		3-3	16"		F Brown Sand, Little Silt	
Augers		2-4		5		
↓		6-7	18"		Same	
	10	8-12		6		
		8-10	22"		Same	
		6-7		7		
		8-12	24		Same	
		12-12	12"	8	Same	15.0
	15				Bottom of Boring	
	20				All Samples checked with PID Meter S# 1,2 & 4 Saved, S# 1,2 to Be Tested Remaining Samples Discarded	
	25					

NOTES: 1 — Length recovered; 0" — Loss of Sample, T — Trap used
2 — U = undisturbed; A = auger; OER = open end rod; V = vane
3 — Log depth of change in color of wash water, loss of water, artesian water, sand heave in casing, etc.

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BORING REPORT

SHEET 1 OF 2

PROJECT: Port Ivory P&G Site
NAME OF CONTRACTOR: Craig Drilling
BORING NO.: Q1-1
SURFACE ELEV.:
LOCATION: South end of Lot, Next to Truck scale Block 1338 Lot 1
CONTRACT NO.: 426-99-006
DATE: 11/30/00
SPOON: 3 "O.D. 2 3/8 "I.D.
CASING SIZE: Augers
HOLE TYPE: 1
HAMMER: Safety 140 # FALL 30 "
HAMMER: # FALL "
DRILLER: S Burns
INSPECTOR: D Howe

GROUND WATER LEVEL

Date	Time	Depth	Remarks
11/30	10^{16}	1.0	in crushed Stone

CASING BLOWS/FT.	DEPTH 0	SPOON BLOWS/6"	RE-COV'D [1]	SAMP. NO. [2]	[3]SAMPLE DESCRIPTION AND REMARKS ______ LINE LOCATES CHANGE OF PROFILE 0.0
					Concrete 1.0
Hand		Hand Auger	Full		Crushed Stone 2.0
Auger		↓	↓	1	
↓					Fill- M-F Grey Sand, Little Silt, Tr Cinders, Tr Gravel 4.0
Hollow	5	Tapped		2	Tr oil sheen on Sample
Stem		Spoon	18"		F Brown Sand, Little Silt, Tr Black Root, Tr Gravel 6.0
Augers		8-10		3	
		12-15	5"		F Brown Sand, Little Silt, Tr Gravel
		4-3		4	
	10	3-6	19"		F Brown Sand, Tr Silt, Tr Vegt, Tr Gravel
		6-17		5	
		27-27	20"		F Brown Sand, Tr Silt, Tr Gravel
		6-12		6	
↓		19-21	15"		F Brown Sand, Tr F Grey Sand, Tr Silt, Tr Gravel 14.0
		5-12		7	
	15	12-16	18"		F Grey Sand, Tr Silt 16.0
					Bottom of Boring
	20				All Samples checked with PID Meter
					S# 1,2 & 4 Saved for Enviro Testing
					Remaining Samples discarded
	25				

NOTES: 1 — Length recovered; 0" — Loss of Sample, T — Trap used
2 — U = undisturbed; A = auger; OER = open end rod; V = vane
3 — Log depth of change in color of wash water, loss of water, artesian water, sand heave in casing, etc.

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BORING REPORT

SHEET 1 OF 3

PROJECT Port Ivory P & G	NAME OF CONTRACTOR Craig drilling	BORING NO. P 1	SURFACE ELEV.
LOCATION betw. Rail road tracks Between bldg 42A & bldg 32 Block 1400 Lot 1		CONTRACT NO. 426-99-006	DATE 11-22-00

SPOON 3 "O.D. 2 3/8 "I.D.
CASING SIZE Augers
HOLE TYPE 1
HAMMER Autom. 140 # FALL 30 "
HAMMER # FALL "
DRILLER D. Cooke
INSPECTOR J Zark

GROUND WATER LEVEL

Date	Time	Depth	Remarks
11-22-00	1:49 PM	6.0	S# 4

CASING BLOWS/FT.	DEPTH	SPOON BLOWS/6"	RE-COV'D[1]	SAMP. NO.[2]	[3]SAMPLE DESCRIPTION AND REMARKS LINE LOCATES CHANGE OF PROFILE
			Full		0.0' ASPHALT 0.3'
					BALLAST & Crushed Rock
				1	Fill grey c-f SAND & Gravel, tr. SILT
				2*	Fill reddish-brown c-f SAND, tr. Gravel, tr SILT
	5			3	SAME
w M Augers		4-6 5-4	20"	4	Brown c-f SAND, tr. Gravel, tr SILT.
	10	1-2 4-8	24"	5*	Brown c-f SAND, tr. Gravel, tr. CLAY & SILT
		6-2 15-22	24"	6	SAME 12.0'
	15				Note: 2 samples saved for testing All other samples checked w PID meter & discarded
					Bottom of Boring

NOTES: 1 — Length recovered; 0" — Loss of Sample, T — Trap used
2 — U = undisturbed; A = auger; OER = open end rod; V = vane
3 — Log depth of change in color of wash water, loss of water, artesian water, sand heave in casing, etc.

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Construction Division
Materials Engineering Section

BORING REPORT

SHEET 1 OF 3

PROJECT: Port Ivory P&G Site
NAME OF CONTRACTOR: Craig Drilling
BORING NO.: P-2
SURFACE ELEV.:
LOCATION: Between Bldg 32A & 42B Block 1400 Lot 1
CONTRACT NO.: 426-99-006
DATE: 11/30/00
SPOON: 3 "O.D. 2 3/8 "I.D.
CASING SIZE: Augers
HOLE TYPE: 1
HAMMER: Safety 140 # FALL 30 "
HAMMER: # FALL "
DRILLER: S Burns
INSPECTOR: O Howe

GROUND WATER LEVEL

Date	Time	Depth	Remarks
		7.0	While Hand Augering

CASING BLOWS/FT.	DEPTH	SPOON BLOWS/6"	RE-COV'D[1]	SAMP.[2] NO.	[3]SAMPLE DESCRIPTION AND REMARKS LINE LOCATES CHANGE OF PROFILE	
	0					0.0
					Asphalt	0.3
Hand		Hand Auger	Full		Crushed Stone .9ppm	2.0
Auger				1	.1ppm	
					Misc Fill- Sand, Silt, Cinders, Brick, Etc	
	5			2		
					Fill- F Gray, Brown & RB Sand, Tr Silt, Tr Gravel	
				3	Same	8.0
Hollow Stem		6-8				
Augers	10	8-14	14"	4	Red Brown Silty Clay, Tr F Sand, Tr Gravel	
		8-10		5		
		10-2	20"		Same	12.0
					Bottom of Boring	
	15					
					All Samples checked with PID Meter	
					St 1 & 2 Saved for Enviro Testing	
					Remaining Samples discarded	
	20					
	25					

NOTES: 1 — Length recovered; 0" — Loss of Sample, T — Trap used
2 — U = undisturbed; A = auger; OER = open end rod; V = vane
3 — Log depth of change in color of wash water, loss of water, artesian water, sand heave in casing, etc.

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8:20
11:00

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Engineering Department
Construction Division
Materials Engineering Section

BORING REPORT

SHEET 1 OF 3

PROJECT Port Ivory P & G	NAME OF CONTRACTOR Craig drilling	BORING NO. P 3	SURFACE ELEV.
LOCATION Between bldg 42 & bldg 33 A ; 20' W of Bldg 42 Block 1400 Lot 1		CONTRACT NO. 426-99-006	DATE 11-22-00

SPOON 3 " O.D. 2 3/8 " I.D.
CASING SIZE Augers
HOLE TYPE 1
HAMMER Autom. 140 # FALL 30 "
HAMMER # FALL "
DRILLER D. Cooks
INSPECTOR J. Zarks

GROUND WATER LEVEL

Date	Time	Depth	Remarks
11-22-00	9:50	4.5'	Top S# 3

CASING BLOWS/FT.	DEPTH	SPOON BLOWS/6"	RE-COV'D [1]	SAMP. [2] NO.	[3] SAMPLE DESCRIPTION AND REMARKS ———— LINE LOCATES CHANGE OF PROFILE	
	0					0.0'
					ASPHALT	0.2'
Handauger		Handauger	Full Rec		Fill grey c-f SAND AND Gravel, tc SILT	1.0
				1	Reddish-brown c-f SAND and Gravel some Clayey SILT	
				2*	SAME	4.0'
	5			3	Red-brown Silty ClAY with Gravel, boulders, little c-f SAND 6	
[illegible] Augers		27 - 26				
		33 - 38	24"	4*	Red brown c-f SAND and Gravel, boulders some ClAYEY SILT	
		8 - 12				
	10	15 - 23	24"	5	SAME	
		42 - 24				
		20 - 18	24	6	SAME	12.0'
	15				Note: 2 samples saved for testing All other samples checked w PID meter & discarded.	Bottom of Boring
	20					

NOTES: 1 — Length recovered; 0" — Loss of Sample, T — Trap used
2 — U = undisturbed; A = auger; OER = open end rod; V = vane
3 — Log depth of change in color of wash water, loss of water, artesian water, sand heave in casing, etc.

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Engineering Department
Construction Division
Materials Engineering Section

BORING REPORT

SHEET 1 OF 5

PROJECT: PorT Ivory PJG SiTe
NAME OF CONTRACTOR: Craig Drilling
BORING NO.: PAMW-7D
SURFACE ELEV.:
LOCATION: ±20' west of PAMW-7, west of Bldg 37, Block 1400 LoT 1
CONTRACT NO.: 426-99-006
DATE: 11/13/00
SPOON: 2 "O.D. 1 3/8 "I.D.
CASING SIZE: HW
HOLE TYPE: 'D' Monitor
HAMMER: Safety 140 # FALL 30 "
HAMMER: # FALL "
DRILLER: J Finch
INSPECTOR: DHowe

GROUND WATER LEVEL

Date	Time	Depth	Remarks

CASING BLOWS/FT.	DEPTH	SPOON BLOWS/6"	RE-COV'D[1]	SAMP.[2] NO.	[3]SAMPLE DESCRIPTION AND REMARKS ____ LINE LOCATES CHANGE OF PROFILE
	0				0.0
CuTTer					
head					for STraTa 0-16 See log for
Hand Auger		Hand Auger			PAMW-7 No Samples Taken 0-16'
	5				
	6				
Casing					
	15				
					16.0
Drill		11-16		1	
Bhead		23-21	24"		Red Brown Silty Clay, Tr F Sand 18.0'
with		11-16		2	
Rovert	20	16-24	12"		F Dk Brown Sand, Tr Silt
		12-15		3	
		16-18	11"		F Dk Brown Sand, Tr Silt, Tr Gravel
		10-16		4	
		16-21	12"		F Dk Brown Sand, Tr Silt
		9-14		5	Note After S#5 HW advanced from 16' to 24'
	25	16-21	16"		Same 26.0
		23-29		6	
		19-19	17"		F Brown Sand Little Silt
		8-8		7	
	30	13-23	9"		Same

NOTES: 1 — Length recovered; 0" — Loss of Sample, T — Trap used
2 — U = undisturbed; A = auger; OER = open end rod; V = vane
3 — Log depth of change in color of wash water, loss of water, artesian water, sand heave in casing, etc.

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BORING REPORT

SHEET 2 OF 5

PROJECT Port Ivory PDG Site	NAME OF CONTRACTOR Craig Drilling	BORING NO. PAMW-7D	SURFACE ELEV.
LOCATION ±20' West of PAMW-7, West of Bldg 33 Block 1400 Lot 1		CONTRACT NO. 426-99-006	DATE 11/14/00

SPOON 2 "O.D. 1 3/8 "I.D.

CASING SIZE Ravnt

HOLE TYPE "D" Monitor

HAMMER Safety 140 # FALL 30 "

HAMMER # FALL "

DRILLER J Finch

INSPECTOR D Howe

GROUND WATER LEVEL

Date	Time	Depth	Remarks

CASING BLOWS/FT.	DEPTH	SPOON BLOWS/6"	RE-COV'D[1]	SAMP.[2] NO.	[3]SAMPLE DESCRIPTION AND REMARKS ____ LINE LOCATES CHANGE OF PROFILE	
Drill	30	12-22		8		
Ahead		20-32	16"		F Brown Sand, Little Silt	
With		14-16		9		
Ravnt		28-28	12"		Same	
		25-23		10	Note: After S#10 the casing advanced from 24' to 34'	
	35	13-12	10"		F Brown Sand, Tr Silt	36.0'
		5-9		11		
		12-14	15"		F Red Brown Sand, Some clayey Silt	
		20-11		12		
		11-11	22"		F Red Brown Sand Some Silt	
	40	14-15		13		
		14-15	22"		Same	42.0'
		7-6		14		
		5-5	21"		F Red Brown Sand, Some clayey Silt	44.0'
		7-8		15		
	45	11-9	24"		F Red Brown Sand, Little clayey Silt	46.0'
		10-10		16		
		10-12	19"		F Red Brown Sand, Little Silt	
		9-8		17		
		11-11	24"		F Red Brown Sand Some Silt	
	50	11-12		18		
		13-18	24"		Same	
		7-8		19 A	Same	53.5
		11-10	22"	B	F Red Brown Sand, Little clayey Silt, Tr Gravel	
	55	10-19	20"	20	Same	

NOTES: 1 — Length recovered; 0" — Loss of Sample, T — Trap used
2 — U = undisturbed; A = auger; OER = open end rod; V = vane
3 — Log depth of change in color of wash water, loss of water, artesian water, sand heave in casing, etc.

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BORING REPORT

SHEET 2 OF 5

PROJECT: Port Ivory P&G Site
NAME OF CONTRACTOR: Craig Drilling
BORING NO.: PA MW-7D
SURFACE ELEV.:
LOCATION: 120' West of PA MW-7, West of Bldg 33 Block 1400 Lot 1
CONTRACT NO.: 426-99-006
DATE: 11/16/00
SPOON: 2 " O.D. 1 7/8 " I.D.
CASING SIZE: Rowit
HOLE TYPE: "A" Monitor
HAMMER: Safety 140 # FALL 30 "
HAMMER: # FALL "
DRILLER: J Finch
INSPECTOR: D Howe

GROUND WATER LEVEL			
Date	Time	Depth	Remarks

CASING BLOWS/FT.	DEPTH	SPOON BLOWS/6"	RE-COV'D[1]	SAMP.[2] NO.	[3]SAMPLE DESCRIPTION AND REMARKS ____ LINE LOCATES CHANGE OF PROFILE
Drill	55	30-32	22"	20	F Red Brown Sand, Little Clayey SiIT, Tr Gravel
Thread		15-18		21	
with		21-24	11"		Same
Rowit		17-19		22	
	60	27-30	7"		F Red Brown Sand, Some clayey SiIT, Tr Red shale, Tr Gravel
		7-10		23	
		20-61	12"		F Red Brown Sand, Some clayey Silty, Little Gravel, Tr Red Shale
		23-20		24	
		48-37	12"		F Red Brown Sand, Little Gravel, Little clayey SiIT, Tr Red Shale
		44-35		25	
	65	34-48	14"		F Red Brown Sand, Some Gravel, Tr clayey, Tr Red Shale 66.0
		20-29		26	
		87-58	7"		Decomposed Red Shale, Some Gravel, Little F Sand
		27-58		27	
	70	100/5" 4/1" * 26 *	14"		Same 70.0
		24-94		28	Tr clayey SiIT
		96 58	12"		F Red Brown Sand Some Decomposed Red Shale, Little Gravel, 72.0
		54-100/5"-4/1" *	10"	29	Decomposed Red Shale, Little clayey SiIT, Tr F Sand 73.2
		12/2" 50/0"			
		*			Refusal, See Drilling Report
	75				
					78.2
					Bottom of Boring
	80				

NOTES: 1 — Length recovered; 0" — Loss of Sample, T — Trap used
2 — U = undisturbed; A = auger; OER = open end rod; V = vane
3 — Log depth of change in color of wash water, loss of water, artesian water, sand heave in casing, etc.

* 300lb Hammer used

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DRILLING REPORT

PROJECT: Port Ivory PJG Site
NAME OF CONTRACTOR: Craig Drilling
BORING NO.: PA-MW-7D
SHEET 4 OF 5
LOCATION: +20' West of PA-MW-7 West of Bldg 33 Block 1400 Lot 1
CONTRACT NO.: 426-99-006
DATE: 11 / 16 / 00
TYPE OF DRILL RIG.: Mobile B-58
CORE BARREL: SINGLE TUBE [✓ DOUBLE TUBE]
CORE DRILL SIZE: 2" wireline I.D.
CONDITION OF DIAMOND BIT: Good
DEPTH BOTTOM CASING: 34.0'
DEPTH START CORING: 73.2'
DRILLER: J Finch
INSPECTOR: D Horne

TIME [1]		DEPTH	DRILL BEHAVIOR [2]	WASH WATER [3]	[4] ROCK—DESCRIPTION AND REMARKS ____ LINE LOCATED END OF RUN
~~Start~~	~~End~~				
		73.2			73.2
8	Mins/FT		Steady	Losing water	
10					Run# 1 Red Shale, Seamy & Fractured
9				Blocking up	
12				Losing water	
18				Blocking up	78.2
		78.2			
					Bottom of Boring
		83.2			
		88.2			
		93.2			

	RUN NO.	FROM	TO	LENGTH DRILLED	LENGTH RECOVERED	% RECOVERED	NO. PIECES
NOTES ON DRILL RUNS	1	73.2	78.2	5.0	4.5	90 %	17 Pieces & Frags

NOTES:
1 — Record the time to start and end of each foot of drilling
2 — Log drill behavior (i.e., steady, chatter, grinding, etc.)
3 — Log wash water return (i.e., color, loss, blocking, etc.)
4 — Log type, color and condition of rock (i.e., broken, soft, seamy, hard, etc.), log character of wash return solids

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V Installation Report

Sheet 5 of 5

PROJECT Port Ivory, PJG Site				CONTRACT NO. 426-99-006
LOCATION ±20' West of PAMW-7 West of Bldg 33, Block 1400 Lot 1				CONTRACTOR Craig Drilling
WELL NO. PAMW-7D	WELL TYPE 'A' Monitor	INSPECTOR DKo	DRILLER J Finch	DATE 11/16/00

Well Development Report

(NOTE: WATER LEVEL READINGS FROM TOP OF PVC)

DATE	WATER LEVEL BEFORE	WATER LEVEL AFTER	TAKEN ______ MINUTES AFTER

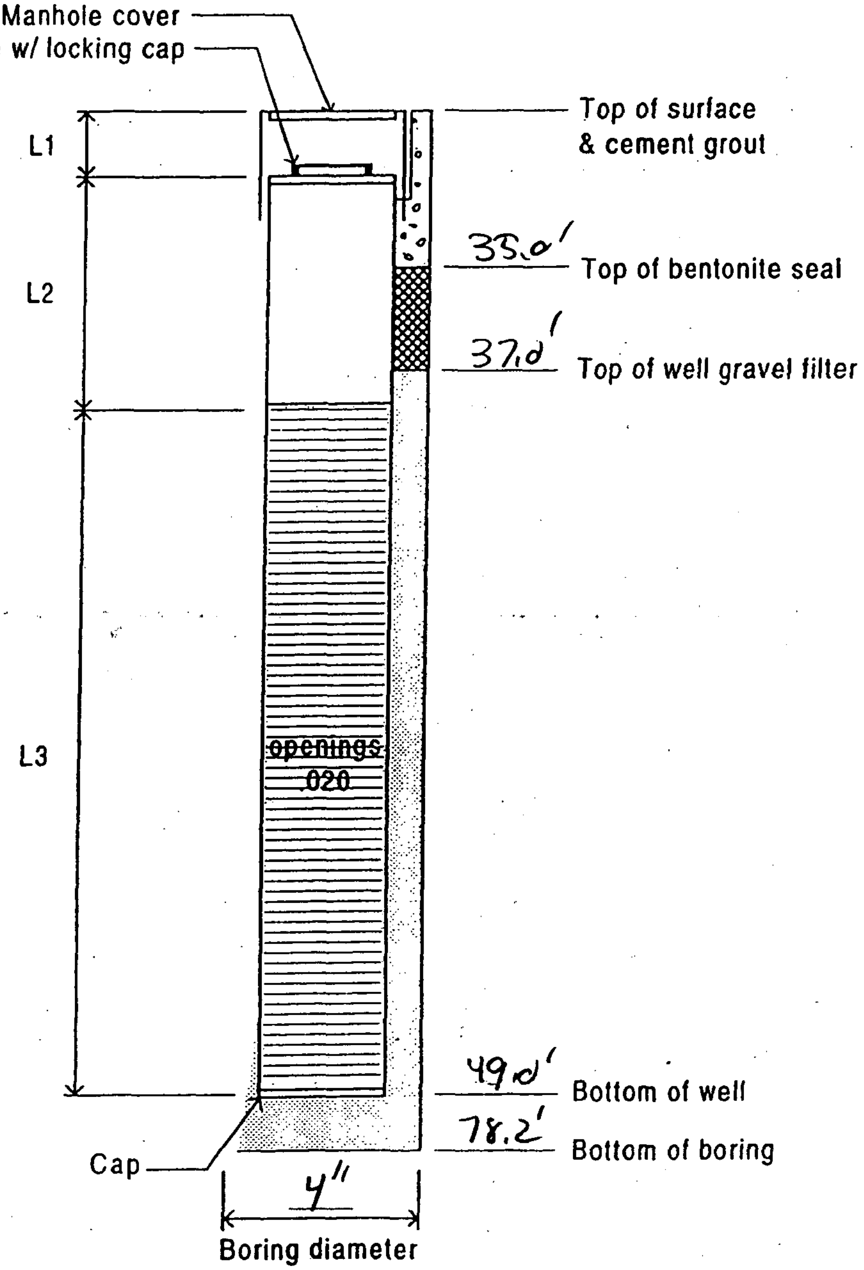
9" dia. Manhole cover

2" dia. PVC pipe w/ locking cap

L1 = 0.3'

L2 = 39.7'

L3 = 10.0'



Top of surface & cement grout

35.0' Top of bentonite seal

37.0' Top of well gravel filter

49.0' Bottom of well

78.2' Bottom of boring

4" Boring diameter

REMARKS:

Hole Backfilled 49.0-55.0 with Well Gravel

″ 55.0-78.2 with Hole Plug

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BORING REPORT

SHEET 1 OF 4

PROJECT Port Ivory P & G	NAME OF CONTRACTOR Craig drilling	BORING NO. PAMW-7	SURFACE ELEV.
LOCATION 3' SW of original location Block 1400 Lot 1		CONTRACT NO. 426-99-006	DATE 11-11-00

SPOON 3" O.D. 2 3/8" I.D.
CASING SIZE Augers
HOLE TYPE "A" MoniTor
HAMMER Safety 140 # FALL 30"
HAMMER # FALL
DRILLER J Finch
INSPECTOR D Howe

GROUND WATER LEVEL

Date	Time	Depth	Remarks
11/13/00	8^{15}	7.0	S #3

CASING BLOWS/FT.	DEPTH	SPOON BLOWS/6"	RE-COV'D[1]	SAMP. NO.[2]	[3]SAMPLE DESCRIPTION AND REMARKS LINE LOCATES CHANGE OF PROFILE
					0.0
Cutter-Head	0	Cutter Head	F...		
					Concrete 2.5'
Hand Auger		Hand Auger	Fill		
				1	Fill- M-F Brown Sand, Tr SilT 4.0'
	5			2	
					Fill -M-F Black Sand, Tr SilT
[illegible]		31-45		3 A	Same 7.0'
Stem		54-82	19"	3 B	Fill - F Dk Gray Sand, Tr SilT
Augers		97-72		4 A	same 8.5
	10	52-60	24"	4 B	Reddish Brown Clayey SilT & Sand, Tr F Black Sand 10.0
		4-8		5	
		14-20	18"		Red Brown SilTy Clay, LiTTle F Sand, Tr Gravel, Tr F Black Sand
		15-17		6	
		24-28	24		Red Brown SilTy Clay, Tr F Sand Tr Gravel
	15	11-15		7	
		25-28	24"		Same 16.0
					Bottom of Boring
	20				All Sample checked with PID MoTor
					S# 1-4 Saved for TesTing + 1-4 to Be TesTed
					Geo Tech Sample on all
	25				

NOTES: 1 — Length recovered; 0" — Loss of Sample, T — Trap used
2 — U = undisturbed; A = auger; OER = open end rod; V = vane
3 — Log depth of change in color of wash water, loss of water, artesian water, sand heave in casing, etc.

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Well Installation Report Sheet 2 of 4

P[illegible]T Port Ivory, PJG Site	CONTRACT NO. 426-99-006
LOCATION ±3' SW of orig loc Block 1400 Lot 1	CONTRACTOR Craig Drilling

WELL NO. PAMW-7	WELL TYPE 'A' Monitor	INSPECTOR D Howe	DRILLER J Finch	DATE 11/13/00

Well Development Report (NOTE: WATER LEVEL READINGS FROM TOP OF PVC)

DATE 11/13/00	WATER LEVEL BEFORE 6.2	WATER LEVEL AFTER 7.5	TAKEN 20 MINUTES AFTER

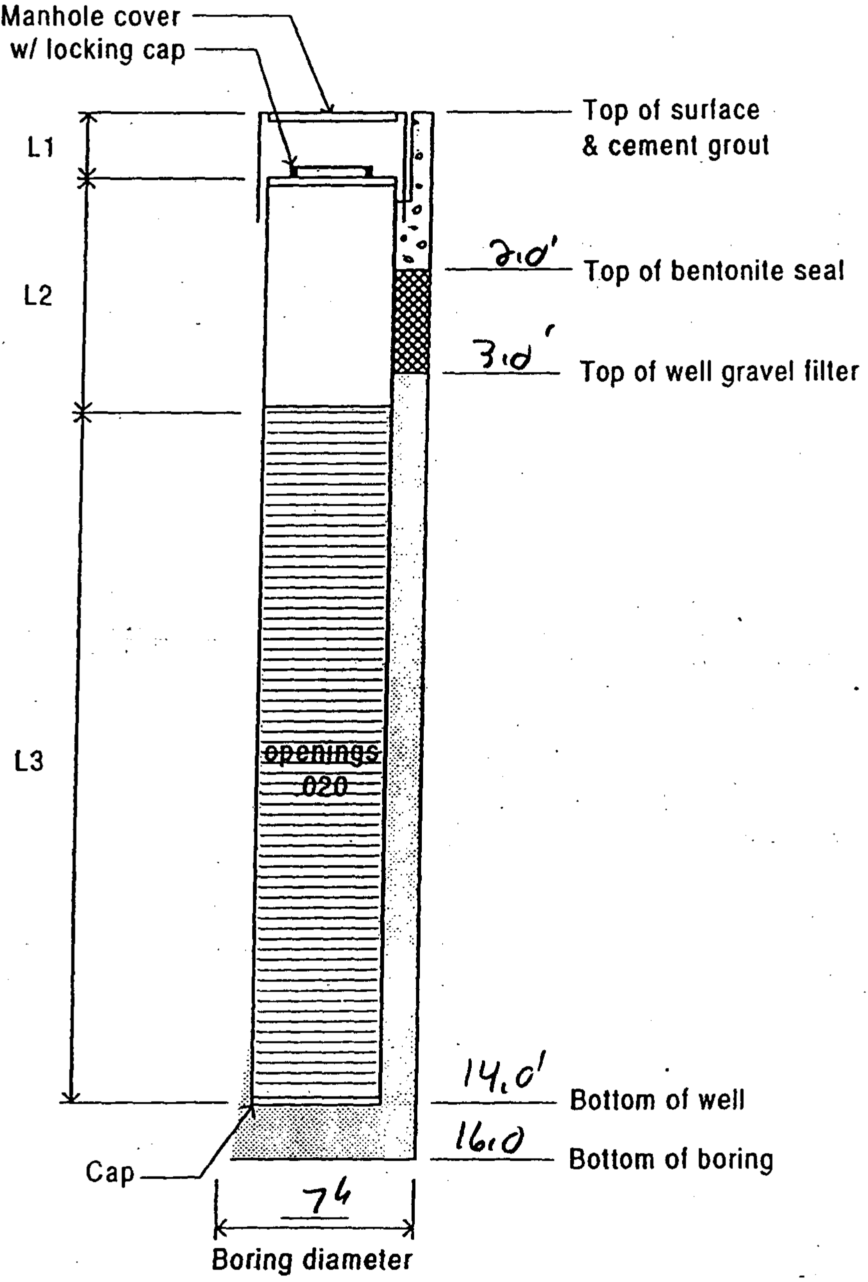
9" dia. Manhole cover

2" dia. PVC pipe w/ locking cap

L1 = 0.3'

L2 = 3.7'

L3 = 10.0'



Top of surface & cement grout

2.0' Top of bentonite seal

3.0' Top of well gravel filter

14.0' Bottom of well

16.0 Bottom of boring

7¼

Boring diameter

[illegible]KS: Hole Back Filled 14-16 with well Gravel

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BORING REPORT

SHEET 1 OF 5

PROJECT Howland Hook, Port Ivory, P&G Site	NAME OF CONTRACTOR Craig Drilling	BORING NO. PA-MW 15D	SURFACE ELEV.
LOCATION As laid out by Killam Assoc		CONTRACT NO. 426-99-006	DATE 11/3/00

SPOON 2 "O.D. 1 3/8 "I.D.	CASING SIZE HW	HOLE TYPE 1
HAMMER Safety 140 # FALL 30 "	HAMMER # FALL "	
DRILLER S Burns		
INSPECTOR D Howe		

GROUND WATER LEVEL

Date	Time	Depth	Remarks

CASING BLOWS/FT.	DEPTH	SPOON BLOWS/6"	RE-COV'D[1]	SAMP.[2] NO.	[3]SAMPLE DESCRIPTION AND REMARKS ——— LINE LOCATES CHANGE OF PROFILE 0.0
HW	0				
Casing					No Samples Taken
					for Strata 0-16 See log
					for PA-MW-15
	5				
	10				
	15				
					16.0
Drill		11-12		1	
Ahead		15-13	14"		F Brown Sand, Tr Silt, Tr Gravel
with		6-8		2	
Rotary	20	11-13	14"		Same
		11-12		3	
		13-13	18"		F Brown Sand, Little Silt, Tr Gravel
		10-12		4	
		18-18	15"		Same
	25	9-10	16"	5	Same

NOTES: 1 — Length recovered; 0" — Loss of Sample, T — Trap used
2 — U = undisturbed; A = auger; OER = open end rod; V = vane
3 — Log depth of change in color of wash water, loss of water, artesian water, sand heave in casing, etc.

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BORING REPORT

SHEET 2 OF 5

PROJECT Howland Hook, Port Ivory PdG Site	NAME OF CONTRACTOR Craig Drilling	BORING NO. PA MW 15D	SURFACE ELEV.
LOCATION As Laid out by Killam Assoc		CONTRACT NO. 426-99-006	DATE 11/3/00

SPOON 2 " O.D. 1 3/8 " I.D.
CASING SIZE Revert
HOLE TYPE
HAMMER Safety 140 # FALL 30 "
HAMMER # FALL "
DRILLER S Burns
INSPECTOR D Howe

GROUND WATER LEVEL

Date	Time	Depth	Remarks

CASING BLOWS/FT.	DEPTH	SPOON BLOWS/6"	RE-COV'D [1]	SAMP. [2] NO.	[3] SAMPLE DESCRIPTION AND REMARKS ____ LINE LOCATES CHANGE OF PROFILE
Drill	25	12-12	16"	5	F Brown Sand, Little Silt, tr Gravel
Ahead		13-18		6	
with		24-22	15"		Same
Revert		11-16		7	
	30	12-12	8"		Same 30.0'
		12-11		8	
		13-14	11"		Brown Silt, Little F Sand
		9-11		9	
		13-12	15"		Brown Silt & F Sand 34.0'
	35	10-17		10	
		13-16	18"		F Brown Sand, Some Silt 36.0'
		8-8		11	
		7-6	18"		F Brown Sand, Some Silty Clay
		2-2		12	
	40	3-4	15"		Same
		3-2		13	
		3-4	16"		Same
		4-2		14	
		1-1	19"		Same
	45	3-2		15	
		1-4	24"		Same 460
		5-4		16	
		3-4	22"		F Brown Sand, Little Silt 48.0
		3-4		17	M-F Reddish Brown Sand, Little Silt, Tr Red Shaley
	50	5-6	23"		1/4" Lens of F Gray Sand, 1/2" Layer of Gray clayey Silt

NOTES: 1 — Length recovered; 0" — Loss of Sample, T — Trap used
2 — U = undisturbed; A = auger; OER = open end rod; V = vane
3 — Log depth of change in color of wash water, loss of water, artesian water, sand heave in casing, etc.

Note after S#17 Hole Caved in to 40'

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BORING REPORT

SHEET 3 OF 5

PROJECT Howland Hook, Port Ivory P&G Site	NAME OF CONTRACTOR Craig Drilling	BORING NO. PA MW-15D	SURFACE ELEV.
LOCATION As Laid out by Killam Assoc		CONTRACT NO. 426-99-006	DATE 11/3/00

SPOON 2 " O.D. 1 3/8 " I.D.
CASING SIZE Revert
HOLE TYPE "D" Monitor
HAMMER 140 # FALL 30 " Safety
HAMMER # FALL "
DRILLER S Burns
INSPECTOR D Howe

GROUND WATER LEVEL

Date	Time	Depth	Remarks

CASING BLOWS/FT.	DEPTH	SPOON BLOWS/6"	RE-COV'D[1]	SAMP.[2] NO.	[3]SAMPLE DESCRIPTION AND REMARKS LINE LOCATES CHANGE OF PROFILE 50.0
Drill	50	6-9		18 A	F Brown Sand, Little Silt 51.0
Ahead		21-22	20"	B	M-F Red Brown Sand, Some Clayey Silt, Little Red Shale Gravel 52.0
With		8-3		19	Note: After S# 18 Hole cased from 17' to 51'
Revert		8-10	12"		Red Brown clayey Silt, Little M-F Sand, Little Gravel 54.0
		9-13		20	Red Shale
	55	22-22	18"		Reddish Brown Clayey Silt, Little M-F Sand, Tr Decomposed 56.0
		10-15		21	
		23-30	19"		Red Brown Silt, Tr F Sand 58.0
		8-11		22	
	60	19-43	11"		Red Brown Clayey Silt, Some M-F Sand, Tr Gravel, Tr Red Shale 60.0
		10-26		23	
		22-21	11"		M-F Red Brown Sand, Some Silt, Little Gravel, Little Red Shale 62.0
		7-10	11"	24	Decomposed Red Shale, Little M-F Red Brown Sand 63.0
		100/½" ~~41/5½"~~			
	65	50/0"			Refusal, See Drilling Report
					68.5
	70				Bottom of Boring
	75				

NOTES: 1 — Length recovered; 0" — Loss of Sample, T — Trap used
2 — U = undisturbed; A = auger; OER = open end rod; V = vane
3 — Log depth of change in color of wash water, loss of water, artesian water, sand heave in casing, etc.

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Materials Engineering Section

DRILLING REPORT

PROJECT: Howland Hook, Port Ivory P&G Site
NAME OF CONTRACTOR: Craig Drilling
BORING NO.: PA-MW 150
SHEET 4 OF 5
LOCATION: As Laid out by Killam Assoc
CONTRACT NO.: 426-99-006
DATE: 11 / 4 / 00
TYPE OF DRILL RIG.: Mobile B-58
COE BARREL: SINGLE TUBE [✓ DOUBLE TUBE]
CORE DRILL SIZE: 2" wireline I.D.
CONDITION OF DIAMOND BIT: Good
DEPTH BOTTOM CASING: 51.0
DEPTH START CORING: 63.5
DRILLER: S Burns
INSPECTOR: D Howe

TIME 1		DEPTH	DRILL BEHAVIOR 2	WASH WATER 3	4 ROCK—DESCRIPTION AND REMARKS ______ LINE LOCATED END OF RUN
~~Start~~	~~End~~	63.5			63.5
7	Mins/Ft		Steady	Full Ret	
10					Run #1 Red Shale, Seamy & Fractured
11					
15			chattering	Blocked up	
13			4	losing water	
		68.5			68.5
					Bottom of Boring
		73.5			
		78.5			
		83.5			

NOTES ON DRILL RUNS	RUN NO.	FROM	TO	LENGTH DRILLED	LENGTH RECOVERED	% RECOVERED	NO. PIECES
	1	63.5'	68.5'	5.0'	3.9'	78%	7 Pieces & Frags

NOTES:
1 — Record the time to start and end of each foot of drilling
2 — Log drill behavior (i.e., steady, chatter, grinding, etc.)
3 — Log wash water return (i.e., color, loss, blocking, etc.)
4 — Log type, color and condition of rock (i.e., broken, soft, seamy, hard, etc.), log character of wash return solids

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Well Installation Report

Sheet 5 of X

ECT Howland Hook, Port Ivory PDG Site	CONTRACT NO. 426-99-006
LOCATION As Laid out by Killam Assoc	CONTRACTOR Craig Drilling

WELL NO. PA MW 15D	WELL TYPE "A" Monitor	INSPECTOR D Howe	DRILLER S Burns	DATE 11/4/00

Well Development Report

(NOTE: WATER LEVEL READINGS FROM TOP OF PVC)

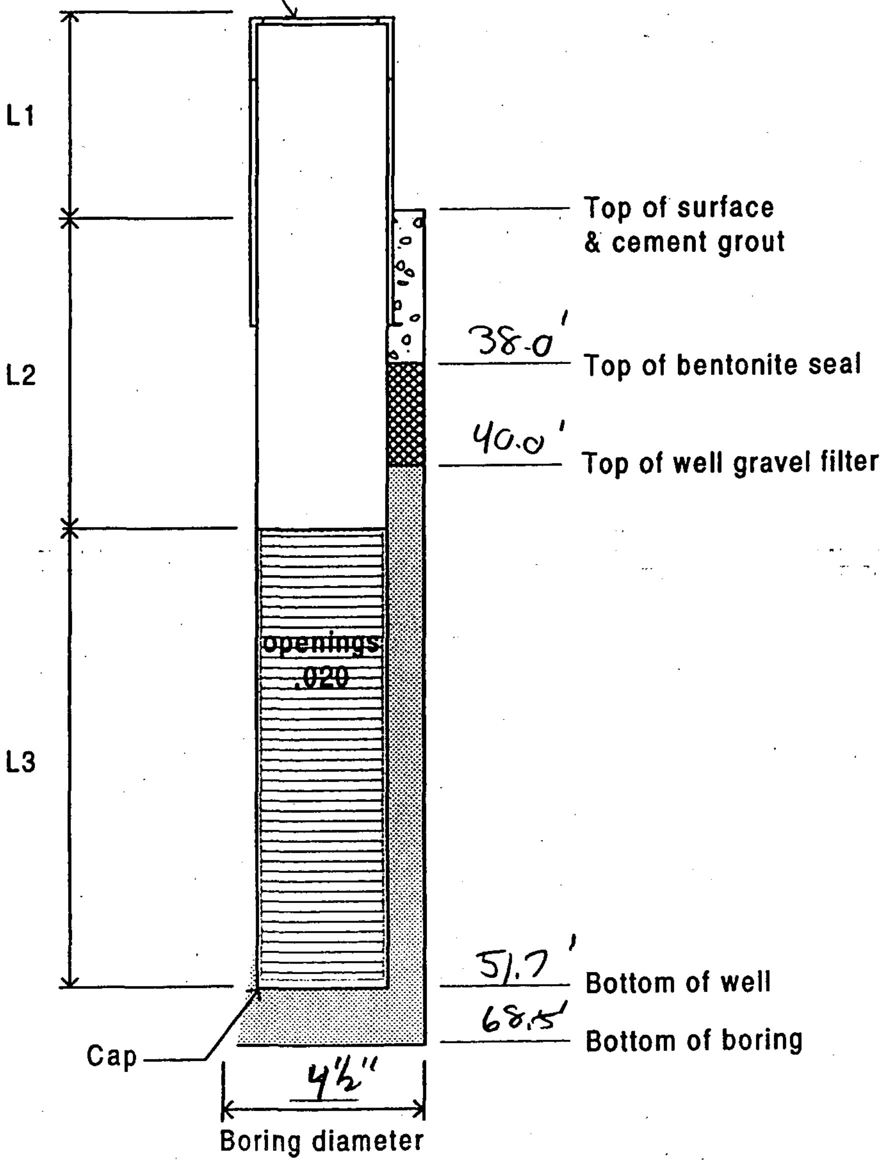
DATE	WATER LEVEL BEFORE	WATER LEVEL AFTER	TAKEN MINUTES AFTER

2" * dia. PVC pipe w/steel locking cap

L1 = 3.3'

L2 = 41.7'

L3 = 10.0'



ARKS:
Hole Back Filled 51.7' – 68.5' with Holo Plug

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BORING REPORT

SHEET 1 OF 4

PROJECT Howland Hook, Port Ivory P&G Site	NAME OF CONTRACTOR Craig Drilling	BORING NO. PA MW-15	SURFACE ELEV.
LOCATION As laid out by Killam Assoc		CONTRACT NO. 426-99-006	DATE 11/3/00

SPOON 3 "O.D. 2 3/8 "I.D.	CASING SIZE Augers	HOLE TYPE
HAMMER Safety 140 # FALL 30 "	HAMMER # FALL "	
DRILLER S Burns		
INSPECTOR D Howe		

GROUND WATER LEVEL

Date	Time	Depth	Remarks
11/3/00	8:00	5.9	while Hand Augering

CASING BLOWS/FT.	DEPTH	SPOON BLOWS/6"	RE-COV'D[1]	SAMP.[2] NO.	[3]SAMPLE DESCRIPTION AND REMARKS ______ LINE LOCATES CHANGE OF PROFILE	
						0.0
Hand	0	Hand Auger	Full	1		
Auger					Misc Fill-Cinders, Ashes, Sand, Gravel, Etc	2.0
				2		
					Fill - M-F Brown Sand, Tr Silt, Tr Gravel	4.0
	5			3		
					Fill - M-F Brown Sand, Little Dk Brown Sand, Tr Silt	6.0
llow		1-0		4		
Stem		1-0	18"		Fill - F Brown Sand, Little Silt, Tr Vegt	8.0
Augers		1-0		5		
	10	1-4	14"		Fill - F Brown Sand, Little Silt, Tr Silty Clay	10.0
		7-8		6		
		5-11	18"		! F Brown Sand, Tr Silt, Tr Gravel	
		10-12		7	No Sample Saved	
		18-28	24"		Same	
	15	4-10		8		
		15-21	20"		Same	16.0
					Bottom of Boring	
	20				All Samples checked with PID Meter	
					S# 1-6 & 8 Saved for Testing	
					Remaining Soil Discarded	
	25					

NOTES: 1 — Length recovered; 0" — Loss of Sample, T — Trap used
2 — U = undisturbed; A = auger; OER = open end rod; V = vane
3 — Log depth of change in color of wash water, loss of water, artesian water, sand heave in casing, etc.

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Well Installation Report

Sheet 2 of 4

ECT Howland Hook, Port Ivory P&G Site	CONTRACT NO. 426-99-006
LOCATION As Laid out by Killam	CONTRACTOR Craig

WELL NO. PA MW-15	WELL TYPE "A" Monitor	INSPECTOR D Howe	DRILLER S Borey	DATE 11/3/00

Well Development Report

(NOTE: WATER LEVEL READINGS FROM TOP OF PVC)

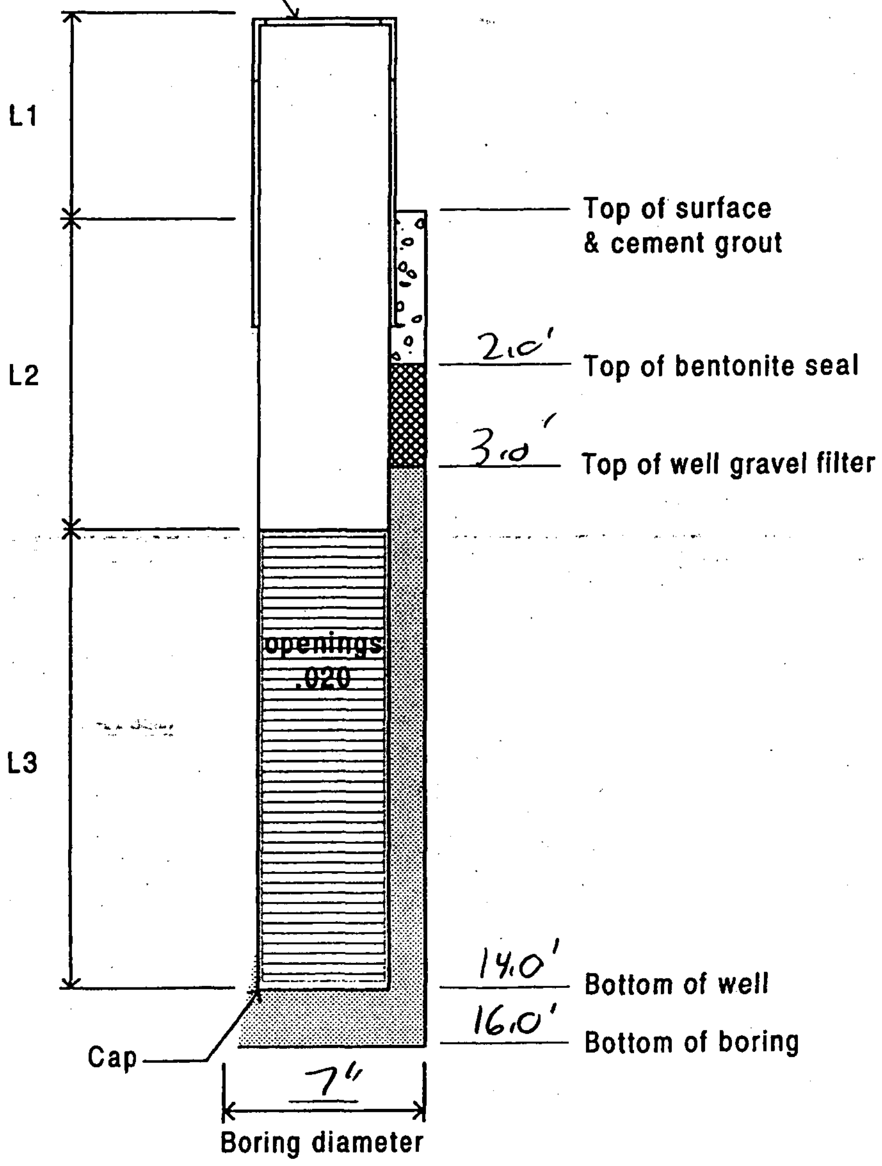
DATE 11/3/00	WATER LEVEL BEFORE 8.0'	WATER LEVEL AFTER 9.7'	TAKEN 60 MINUTES AFTER

2" dia. PVC pipe w/steel locking cap

L1 = 3.0'

L2 = 4.0'

L3 = 10.0'



2.0' Top of bentonite seal

3.0' Top of well gravel filter

14.0' Bottom of well

16.0' Bottom of boring

7" Boring diameter

ARKS:
Hole Back Filled 14-16' with Well Gravel

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BORING REPORT

SHEET 1 OF 3

ROJECT: HOWLAND HOOK, PORT IVORY P+G SITE
NAME OF CONTRACTOR: CRAIG DRILLING
BORING NO.: UST7-1
SURFACE ELEV.:
OCATION: NORTH OF BUILDING S37 - 25' WEST OF UST7-1A
CONTRACT NO.: 426-99-006
DATE: 11/28/00
POON: 3" *O.D. 2 3/8 *I.D.
CASING SIZE: AUGER
HOLE TYPE: 1
AMMER: 140 # FALL SAFETY 130 *
HAMMER: # FALL *
RILLER: J CRAIG
NSPECTOR: DAN DAVIS

GROUND WATER LEVEL

Date	Time	Depth	Remarks
11/28/00	15:30	6 to 7	OBSERVED DURING SPOONING

CASING LOWS/FT.	DEPTH	SPOON BLOWS/6"	RE-COV'D [1]	SAMP. [2] NO.	[3]SAMPLE DESCRIPTION AND REMARKS ______ LINE LOCATES CHANGE OF PROFILE
HAND AUGER		HAND AUGER	FULL	1	ASPHALT AN STONE 0.5' FILL - DARK BROWN AND BLACK FINE TO MEDIUM SAND + GRAVEL
				2	SAME 3.5'
	5			3	FILL - REDDISH/BROWN CLAYEY SILT, LITTLE GRAVEL AND FINE SAND 5.2'
A		2 3 4 4	3"	4	FILL - BLACK-STAINED LAYER (1/16"-THICK), GRADES TO BROWN FINE SAND, SOME SILT, TRACE CLAY 90-100 PPM SAME
	10	4 5 5 8	5"	5	FILL → R/B CLAYEY SILT - SOME SMALL TO LARGE GRAVEL AND FINE SAND, STRONG PETROLEUM ODOR 10'
		10 10 19 34	18"	6	DENSE REDDISH BROWN SILT, TRACE CLAY 12'
					BOTTOM OF BORING

- ALL SAMPLES SCREENED WITH PID METER
- SAMPLES # 5 AND 6 SAVED FOR ENVIRONMENTAL TESTING
- ALL REMAINING SAMPLES DISCARDED

NOTES: 1 — Length recovered; 0" — Loss of Sample, T — Trap used
2 — U = undisturbed; A = auger; OER = open end rod; V = vane
3 — Log depth of change in color of wash water, loss of water, artesian water, sand heave in casing, etc.

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BORING REPORT

SHEET 1 OF 3

ROJECT PORT IVORY P&G SITE	NAME OF CONTRACTOR CRAIG DRILLING	BORING NO. UST 7-1 A	SURFACE ELEV.
OCATION NORTH OF BUILDING S 37		CONTRACT NO. 426-99-006	DATE 11/28/00

POON "O.D. "I.D.	CASING SIZE	HOLE TYPE 1
IAMMER # FALL "	HAMMER # FALL "	
RILLER J CRAIG		
NSPECTOR DAN DAVIS		

GROUND WATER LEVEL

Date	Time	Depth	Remarks

CASING LOWS/FT.	DEPTH	SPOON BLOWS/6"	RE-COV'D[1]	SAMP.[2] NO.	[3]SAMPLE DESCRIPTION AND REMARKS LINE LOCATES CHANGE OF PROFILE
HAND AUGER		HAND AUGER	FULL	1*	FILL DARK BROWN F-M SAND, SOME S GRAVEL
				2	SAME 3.5
					BOTTOM OF BORING (CONCRETE PAD?)
	5				
	10				
	15				- ALL SAMPLES SCREENED WITH PID METER - SAMPLE 1 SAVED FOR ENVIRONMENTAL TESTING - REMAINING SAMPLES DISCARDED
	20				
	25				

NOTES: 1 — Length recovered; 0" — Loss of Sample, T — Trap used
2 — U = undisturbed; A = auger; OER = open end rod; V = vane
3 — Log depth of change in color of wash water, loss of water, artesian water, sand heave in casing, etc.

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BORING REPORT

SHEET 1 OF 3

PROJECT: PORT IVORY P&G SITE

NAME OF CONTRACTOR: CRAIG DRILLING

BORING NO.: UST 7-1 B

SURFACE ELEV.:

LOCATION: NORTH OF BUILDING S 37 → 8' WEST OF UST 7-1 A

CONTRACT NO.: 426-99-006

DATE: 11/28/00

SPOON "O.D. "I.D.

CASING SIZE:

HOLE TYPE: 1

HAMMER # FALL "

HAMMER # FALL "

DRILLER: J CRAIG

INSPECTOR: D DAVIS

GROUND WATER LEVEL

Date	Time	Depth	Remarks

CASING BLOWS/FT.	DEPTH	SPOON BLOWS/6"	RE-COV'D [1]	SAMP. NO. [2]	[3]SAMPLE DESCRIPTION AND REMARKS ______ LINE LOCATES CHANGE OF PROFILE
HAND AUGER		H. AUGER		1	FILL STONE AND WOOD
↓		↓		2	FILL - BLACK STAINED FINE TO MEDIUM SAND - PETROLEUM ODOR
	5				
					- ALL SAMPLES SCREENED WITH PID METER
	10				- SAMPLE 2 SAVED FOR ENVIRONMENTAL TESTING
					- ALL REMAINING SAMPLES DISCARDED
	15				

NOTES: 1 — Length recovered; 0" — Loss of Sample, T — Trap used
2 — U = undisturbed; A = auger; OER = open end rod; V = vane
3 — Log depth of change in color of wash water, loss of water, artesian water, sand heave in casing, etc.

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BORING REPORT

SHEET 1 OF 2

ROJECT: HOWLAND HOOK, P+G SITE
NAME OF CONTRACTOR: CRAIG DRILLING
BORING NO.: UST 7-1 C
SURFACE ELEV.:
OCATION: NORTH OF BUILDING S 37 -> 8' SOUTH OF UST 7-1 A
CONTRACT NO.: 426-99-006
DATE: 11/28/00
POON: "O.D. "I.D.
CASING SIZE:
HOLE TYPE: /
AMMER: # FALL "
HAMMER: # FALL "
RILLER: J CRAIG
NSPECTOR: DAN DAVIS

GROUND WATER LEVEL

Date	Time	Depth	Remarks

CASING LOWS/FT.	DEPTH	SPOON BLOWS/6"	RE-COV'D[1]	SAMP.[2] NO.	[3]SAMPLE DESCRIPTION AND REMARKS ______ LINE LOCATES CHANGE OF PROFILE
HAND AUGER		HAND AUGER	FULL	1	STONE AND DARK BROWN SAND
↓		↓			FILL - LIGHT BROWN FINE TO MEDIUM SAND
				2	FILL - BLACK STAINED FINE TO MEDIUM SAND - PETROLEUM ODOR
					↑ BOTTOM OF BORING (CONCRETE PAD?)
	5				
					- ALL SAMPLES SCREENED WITH PID METER
					- ALL SAMPLES DISCARDED

NOTES: 1 — Length recovered; 0" — Loss of Sample, T — Trap used
2 — U = undisturbed; A = auger; OER = open end rod; V = vane
3 — Log depth of change in color of wash water, loss of water, artesian water, sand heave in casing, etc.

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BORING REPORT

SHEET 1 OF 3

PROJECT Port Ivory P & G	NAME OF CONTRACTOR Craig drilling	BORING NO. UST 7-2	SURFACE ELEV.
LOCATION ±75' North of Bldg 36 & ±15' E of rail road. Block 1400 Lot 1		CONTRACT NO. 426-99-006	DATE 11-21-00

SPOON 3 "O.D. 2 3/8 "I.D.
CASING SIZE Augers
HOLE TYPE 1
HAMMER Autom. 140 # FALL 30 "
HAMMER # FALL "
DRILLER J. Craig
INSPECTOR J. Zarks

GROUND WATER LEVEL

Date	Time	Depth	Remarks
11-21-00	1:30pM	7.0	SAMple # 4

CASING BLOWS/FT.	DEPTH	SPOON BLOWS/6"	RE-COV'D[1]	SAMP.[2] NO.	[3]SAMPLE DESCRIPTION AND REMARKS ——— LINE LOCATES CHANGE OF PROFILE
Cutter Head Handauger	0	Cutter Head Handauger	Full		0.0'
					ASPHALT 0.2'
					CONCRETE 0.8'
					DGABC 1.1'
				1	Fill greyish-black c-f SAND some Gravel, tr SILT 2.7'
					Fill reddish-brown Clayey SILT, little Gravel, some m-f SAND
				2	SAME 4.0'
	5				
				3	Fill reddish-brown Gravel, and c-f SAND some ClAYEY Silt 6
Hollow ST [illegible]		6-6			
		10-10	24'	4	Reddish-brown Silty ClAY and Gravel
		11-9		*	
	10	10-10	24"	5	SAME (oil)
		5-7			
		11-11	24"	6*	SAME (oil)
		5-7			
		8-8	24"	7	SAME (oil)
	15	10-15			
		20-20	24"	8	SAME 16.0'
					Note: 2samples saved for testing All other samples screened with PiD meter & discarded.
	20				Bottom of Boring

NOTES: 1 — Length recovered; 0" — Loss of Sample, T — Trap used
2 — U = undisturbed; A = auger; OER = open end rod; V = vane
3 — Log depth of change in color of wash water, loss of water, artesian water, sand heave in casing, etc.

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BORING REPORT

SHEET 1 OF 3

PROJECT Port Ivory P & G	NAME OF CONTRACTOR Craig drilling	BORING NO. UST 4-1	SURFACE ELEV.
LOCATION ± 80' W of Bldg 80 & 5' E of railroad		CONTRACT NO. 426-99-006	DATE 11-20-00

SPOON 3 "O.D. 2 3/8 "I.D.
CASING SIZE Augers
HOLE TYPE 1
HAMMER 140 # FALL 30 "
HAMMER # FALL "
DRILLER J. Craig
INSPECTOR J. Zarks

GROUND WATER LEVEL

Date	Time	Depth	Remarks
11-20-00	2:30PM	5.0'	Sample # 3

CASING BLOWS/FT.	DEPTH	SPOON BLOWS/6"	RE-COV'D [1]	SAMP. NO. [2]	[3]SAMPLE DESCRIPTION AND REMARKS ____ LINE LOCATES CHANGE OF PROFILE	
Handauger	0	Handauger	Full		ASPHAIT	0.3
				1	Fill black c-f SAND, some Gravel, tr SilT	
				2*	SAME	
	5			3	SAME	
H		3-3				
Augers		3-3	18"	4	Misc. Fill black c-f SAND, little Gravel, tr. Silt, wood, cinders	
		3-2				
	10	8-5	24"	5	SAME (No wood)	
		5-8		* 6A	Fill black c-f SAND & Gravel, tr SilT. Cinders	11.5
		10-11	24"	6B	Reddish brown Silty Clay,	
		4-8			SAME	
		10-17	20"	7	Black c-f SAND, some Gravel, tr. Silt, cinders brick,	
	15	4-2		* 8A	Same.	15.5'
		3-3	20"	8B	Brown Peat w. Silty Clay & fibers	16.0

Note: 3 samples saved for testing
All other samples screened with PID meter
& discarded.

Bottom of Boring

NOTES: 1 — Length recovered; 0" — Loss of Sample, T — Trap used
2 — U = undisturbed; A = auger; OER = open end rod; V = vane
3 — Log depth of change in color of wash water, loss of water, artesian water, sand heave in casing, etc.

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BORING REPORT

SHEET 1 OF 3

ROJECT Port Ivory P & G
NAME OF CONTRACTOR Craig drilling
BORING NO. UST4-2
SURFACE ELEV.
OCATION ±100' W of Bldg 38
CONTRACT NO. 426-99-006
DATE 11-20-00
POON 3 "O.D. 2 3/8 "I.D.
CASING SIZE Augers
HOLE TYPE 1
AMMER 140 # FALL 30 "
HAMMER # FALL "
RILLER J. Craig
NSPECTOR J. Zarks

GROUND WATER LEVEL

Date	Time	Depth	Remarks
11-20-00	1:30pM	5.0'	Sample #3

CASING LOWS/FT.	DEPTH	SPOON BLOWS/6"	RE-COV'D[1]	SAMP. NO.[2]	[3]SAMPLE DESCRIPTION AND REMARKS LINE LOCATES CHANGE OF PROFILE
	0				Asphalt 0.0 [illegible]
landauge		Handauger	Full		
			"	1	Fill black c-f SAND, some Gravel, tr. Silt
				2	SAME
	5			3*	SAME
lollow S[illegible] A[illegible]s		2 - 1			
		8 - 19	10"	4	Fill black c-f SAND, tr. Gravel, tr Silt, cinders, wood
		25 - 6			
	10	6 - 6	8"	5	Misc. Fill black c-f SAND, tr. Gravel, tr Silt, cinders, wood
		66 - 5			
		5 - 4	2"	6	SAME
		2 - 2			
		2 - 2	10"	7*	SAME
	15	6-12			SAME 15.4'
		17-6	10"	8	Brown PEAT & fibers 16.0'
	20				

Note: 2 samples saved for testing
All other samples screened with
PID meter & discarded

Bottom of Boring

NOTES: 1 — Length recovered; 0" — Loss of Sample, T — Trap used
2 — U = undisturbed; A = auger; OER = open end rod; V = vane
3 — Log depth of change in color of wash water, loss of water, artesian water, sand heave in casing, etc.

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BORING REPORT

SHEET 1 OF 1

PROJECT Port Ivory P & G
NAME OF CONTRACTOR Craig drilling
BORING NO. FS-1
SURFACE ELEV.
LOCATION ±15'S of Bldg 12 (Front side) Block 1400 lot 1
CONTRACT NO. 426-99-006
DATE 11-17-00
SPOON "O.D. "I.D.
CASING SIZE
HOLE TYPE
HAMMER # FALL "
HAMMER # FALL "
DRILLER S Burns
INSPECTOR J. Zarks

GROUND WATER LEVEL

Date	Time	Depth	Remarks

CASING BLOWS/FT.	DEPTH	SPOON BLOWS/6"	RE-COV'D[1]	SAMP. NO.[2]	[3]SAMPLE DESCRIPTION AND REMARKS LINE LOCATES CHANGE OF PROFILE
	0				0.[illegible]'
					Asphalt 0.2'
HANDAUGER		HANDAUGER	Full Rec	A	Fill black & dark brown c-f SAND some Gravel, tr. Silt, coal, cinders, bric 1'.
				1 B	Fill reddish.brown Silty CLAY with c-f SAND & Gravel.
				2	SAME
					3.5'
	5				Concrete SlAB - obstruction
					Bottom of Boring

NOTES: 1 — Length recovered; 0" — Loss of Sample, T — Trap used
2 — U = undisturbed; A = auger; OER = open end rod; V = vane
3 — Log depth of change in color of wash water, loss of water, artesian water, sand heave in casing, etc.

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BORING REPORT

SHEET 1 **OF** 1

PROJECT Port Ivory P & G	**NAME OF CONTRACTOR** Craig drilling	**BORING NO.** FS-1 A	**SURFACE ELEV.**
LOCATION ±17'S of Bldg 13 Block 1400 Lot 1		**CONTRACT NO.** 426-99-006	**DATE** 11-17-00

SPOON 3 "O.D. 2 3/8 "I.D.
CASING SIZE Augers
HOLE TYPE 1
HAMMER Safety 140 # FALL 30 "
HAMMER # FALL "
DRILLER S Burns
INSPECTOR J. Zarks

GROUND WATER LEVEL

Date	Time	Depth	Remarks

CASING BLOWS/FT.	DEPTH	SPOON BLOWS/6"	RE-COV'D[1]	SAMP.[2] NO.	[3]SAMPLE DESCRIPTION AND REMARKS ____ LINE LOCATES CHANGE OF PROFILE
	0				ASPHALT 0.0 – 0.2'
Handauger		Handauger	Full Rec		Fill dark brown & black c-f SAND some Gravel, tr. SILT, coal, cinders, brick 1.5'
				1	Fill reddish brown - Silty CLAY with c-f SAND and Gravel
				2	SAME
	5				5.0'
					Concrete SlAb - obstruction
					Bottom of Boring
	10				
	15				
	20				

NOTES: 1 — Length recovered; 0" — Loss of Sample, T — Trap used
2 — U = undisturbed; A = auger; OER = open end rod; V = vane
3 — Log depth of change in color of wash water, loss of water, artesian water, sand heave in casing, etc.

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BORING REPORT

SHEET 1 OF 3

PROJECT Port Ivory P & G	NAME OF CONTRACTOR Craig drilling	BORING NO. FS 1 B	SURFACE ELEV.
LOCATION 40' W of BH-FS 1 betw. Bldg 12 & Bldg 13 Block 1400 Lot 1		CONTRACT NO. 426-99-006	DATE 11-17-00

SPOON 3 "O.D. 2 3/8 "I.D.
CASING SIZE Augers
HOLE TYPE 1
HAMMER Safety # FALL 30 "
HAMMER # FALL "
DRILLER S. Burns
INSPECTOR J. Zarks

GROUND WATER LEVEL

Date	Time	Depth	Remarks
11-17-00	11:20	7.0'	Sample #4

CASING BLOWS/FT.	DEPTH	SPOON BLOWS/6"	RE-COV'D [1]	SAMP. NO. [2]	[3]SAMPLE DESCRIPTION AND REMARKS ____ LINE LOCATES CHANGE OF PROFILE	
	0					0.0'
Handauger		Handauger	Full Rec		ASPHAIT	0.2'
				1	Fill greyish-black c-f SAND, Gravel, tr SILT, Cinders, coal, wood	1.3'
					Fill greyish-yellow c-f SAND AND Silty CLAY, cinders, wood, coal.	
				2	Fill greyish-black Gravel, some c-f SAND, tr SILT, cinders	
	5			3	Fill greyish black Gravel, some c-f SAND, tr SILT, cinders	6.0'
F[illegible] Augers		4-7		* 4 A	Misc Fill yellowish-white dietomaceous, grey c-f SAND, Gravel, cinders, wood	6.5'
		4-3	18"	4 B	Fill greyish-black Gravel, some c-f SAND, tr SILT, cinder	
		1-4				
	10	1-0	24"	5	Fill greyish-White Dietomaceous - with grey c-f SAND & Gravel.	
		Weight of HAMMER	0"	6	(Sample fall into the hole)	
		W.O.Hs.	18"	* A	Fill grey Dietomaceous - with grey c-f SAND & Gravel	13.5'
		18" Bounce	100/0"	7		
	15				Refusal - Bottom of Boring	
					Note: 3 samples saved for testing All samples screened with PID meter, the other samples discarded	
	20					

NOTES: 1 — Length recovered; 0" — Loss of Sample, T — Trap used
2 — U = undisturbed; A = auger; OER = open end rod; V = vane
3 — Log depth of change in color of wash water, loss of water, artesian water, sand heave in casing, etc.

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BORING REPORT

SHEET 1 OF 3

PROJECT: Port Ivory P & G
NAME OF CONTRACTOR: Craig drilling
BORING NO.: FS-2
SURFACE ELEV.:
LOCATION: ± 50' NE of Bldg 12 Block 1400 Lot 1
CONTRACT NO.: 426-99-006
DATE: 11-17-00
SPOON: 3 "O.D. 2 3/8 "I.D.
CASING SIZE: Augers
HOLE TYPE: 1
HAMMER: Safety 140 # FALL 30 "
HAMMER: # FALL "
DRILLER: S. Burns
INSPECTOR: J. ZARKS

GROUND WATER LEVEL

Date	Time	Depth	Remarks
11-17-00	PM	7.0	Sample# 4

CASING BLOWS/FT.	DEPTH	SPOON BLOWS/6"	RE-COV'D [1]	SAMP. [2] NO.	[3] SAMPLE DESCRIPTION AND REMARKS ——— LINE LOCATES CHANGE OF PROFILE	
	0	HANDAUGER	Full Rec		crushed Rock DGABC	0.0 0.5
				1	BALLAST - Crushed Rock	2.0'
				2*	Fill red-brown c-f SAND tr. Gravel, tr. SilT	
					Same.	
	5					
				3	SAME	6.4'
ow EM		3 - 3				
Augers		3 - 4	12"	4	Fill grey c-f SAND, tr. Gravel, tr SilT	
		8 - 9		*		
	10	9 - 10	24"	5	SAME (with wood splinters)	
		5 - 3				
		8 - 25	20"	6	SAME (with wood)	
		40-28				
		38-25	24"	7	Fill grey c-f SAND & Gravel, tr. SilT wood	
	15	20 - 12				
		18 - 27	20"	8	SAME	
		24-38		A	Fill greyish black c-f SAND & Gravel, tr. SilT & wood.	
		68 - 88	24"	*9 B	Greyish-green c-f SAND	
					Note: 3 samples saved for Testing	
	20				All other samples screened with PID meter & discarded	Bottom of Bori

NOTES: 1 — Length recovered; 0" — Loss of Sample, T — Trap used
2 — U = undisturbed; A = auger; OER = open end rod; V = vane
3 — Log depth of change in color of wash water, loss of water, artesian water, sand heave in casing, etc.

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Materials Engineering Section

BORING REPORT

Revision

SHEET 1 OF 3

PROJECT Port Ivory P & G
NAME OF CONTRACTOR Craig drilling
BORING NO. FS-~~2~~ 3
SURFACE ELEV.
LOCATION As laid out in the field
CONTRACT NO. 426-99-006
DATE 11-15-00
SPOON 3 "O.D. 2 3/8 "I.D.
CASING SIZE Augers
HOLE TYPE 1
HAMMER 140 # FALL 30 "
HAMMER # FALL "
DRILLER D. Osuch
INSPECTOR J. Zarks

GROUND WATER LEVEL

Date	Time	Depth	Remarks
11-15-00	11:45	8.5'	Sample # 5

CASING BLOWS/FT.	DEPTH	SPOON BLOWS/6"	RE-COV'D[1]	SAMP.[2] NO.	[3]SAMPLE DESCRIPTION AND REMARKS LINE LOCATES CHANGE OF PROFILE
Handauger	0	Handauger	Full Rec		DGABC 0.0' 0.5'
				1	Misc Fill greyish-black c-f SAND & Gravel, tr. Silt, cinders, wood, coal etc
				2*	Fill brown c-f SAND, tr. Gravel, tr. Silty CLAY, tr. Coal
	5			3	SAME
					6.5'
w 9 AUGERS		4-4 5-5	14"	4*	Fill reddish-brown CLAYEY SILT; little c-f SAND, tr. Gravel
	10	4-4 17-14	2"	5	SAME 10.0'
		4-5 6-5	20"	6	Fill brown c-f SAND AND Red-brown Clayey Silt, little Ga
					SAME 12.8'
		2-2 3-4	24"	7*	Brown PEAT some grey CLAY 14.0'
	15				

Note: Samples 2; 4 & 7 were saved for testing
all samples were screened with PID meters
and the other samples were discarded.

Bottom of Boring

NOTES: 1 — Length recovered; 0" — Loss of Sample, T — Trap used
2 — U = undisturbed; A = auger; OER = open end rod; V = vane
3 — Log depth of change in color of wash water, loss of water, artesian water, sand heave in casing, etc.

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BORING REPORT

SHEET 1 OF 3

PROJECT Port Ivory P & G
NAME OF CONTRACTOR Craig drilling
BORING NO. FS-4
SURFACE ELEV.
LOCATION As laid out in the field
CONTRACT NO. 426-99-006
DATE 11-15-00
SPOON 3 "O.D. 2 3/8 "I.D.
CASING SIZE Augers
HOLE TYPE 1
HAMMER 140 # FALL 30 "
HAMMER # FALL "
DRILLER D. Osuch
INSPECTOR J. Zarks

GROUND WATER LEVEL

Date	Time	Depth	Remarks
11-15-00	1:40 PM	8.0	Sample #5 (top)

CASING BLOWS/FT.	DEPTH	SPOON BLOWS/6"	RE-COV'D[1]	SAMP.[2] NO.	[3]SAMPLE DESCRIPTION AND REMARKS ___ LINE LOCATES CHANGE OF PROFILE
HANDAUGER	0	HAND AUGER	Full Rec		0.0' DGABC 0.5'
				1	Fill grey c-f SAND and Gravel, tr. SILT.
				2	Fill greyish-black c-f SAND some Gravel, tr. SILT, cinders, coal, wood.
	5				
				3	SAME
H		4-5			
A[illegible]ER		5-5	24"	4	SAME
		4-4			
	10	9-9	20"	5	SAME (wood)
		8-12			
		8-6	8"	6	SAME (wood)
		9-9			
		4-4	2"	7	SAME 14.0'
	15	2-2		*	
		2-2	20"	8	Brown Peat, tr. grey Silty CLAY 16.0'
					Note: Samples 1, 2 & 8 saved for testing
					All samples screened with PID meter
	20				and discarded Bottom of Boring

NOTES: 1 — Length recovered; 0" — Loss of Sample, T — Trap used
2 — U = undisturbed; A = auger; OER = open end rod; V = vane
3 — Log depth of change in color of wash water, loss of water, artesian water, sand heave in casing, etc.

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BORING REPORT

SHEET 1 OF 3

PROJECT Port Ivory P+G Site	NAME OF CONTRACTOR Craig Drilling	BORING NO. FS-7	SURFACE ELEV.
LOCATION West of Bld 55		CONTRACT NO. 426-99.00C	DATE 12/1/00

SPOON 3 "O.D. 2 3/8 "I.D.
CASING SIZE Auger
HOLE TYPE 1
HAMMER 140 # FALL Safety 30 "
HAMMER # FALL "
DRILLER Jeff Craig
INSPECTOR Charlie Springer

GROUND WATER LEVEL

Date	Time	Depth	Remarks
12/1/00	0825	5'	HA

CASING BLOWS/FT.	DEPTH	SPOON BLOWS/6"	RE-COV'D[1]	SAMP.[2] NO.	[3]SAMPLE DESCRIPTION AND REMARKS ——— LINE LOCATES CHANGE OF PROFILE
Hand auger		Hand auger	Full	1	Concrete .55'
					~~Gravel Fill w/Sand matrix~~ ~~1.2'~~
				2*	Fine to med Sand Trace SILT/Some Gravel Dark Brown
					4.0
	5			3	
					Fine Sand Trace SILT LT Brown
Auger		8-14	2'	4	
		11-10			Same
		12-14	2'	5*	
	10	16-18			Same
		4-6	2'	6	
		10-7			Same 12.0
					Bottom of Boring
	15				
					- All Samples Screened w/ PID
					- Samples 2+5 Saved For Env. Testing
					- All Remaining Samples Discarded
	20				

NOTES: 1 — Length recovered; 0" — Loss of Sample, T — Trap used
2 — U = undisturbed; A = auger; OER = open end rod; V = vane
3 — *Log depth of change in color of wash water, loss of water, artesian water, sand heave in casing, etc.*

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BORING REPORT

SHEET 1 OF 3

PROJECT: Howland Hook Port Ivory P&G Site

NAME OF CONTRACTOR: Craig Drilling

BORING NO.: All-1

SURFACE ELEV.:

LOCATION: ± 75' Southwest of Truck Scale, Near South Gate, Block 1400 Lot 1

CONTRACT NO.: 426-99-006

DATE: 11/7/00

SPOON: 2 " O.D. 1 3/8 " I.D.

CASING SIZE: Augers

HOLE TYPE: 1

HAMMER: 140 # FALL 30 "

HAMMER: # FALL "

DRILLER: S Burns

INSPECTOR: D Howe

GROUND WATER LEVEL

Date	Time	Depth	Remarks
11/7/00	9 35 A	3.0	While Hand Augering

CASING BLOWS/FT.	DEPTH	SPOON BLOWS/6"	RE-COV'D [1]	SAMP. [2] NO.	[3] SAMPLE DESCRIPTION AND REMARKS ____ LINE LOCATES CHANGE OF PROFILE	
Hand	0	Hand Augr	Full	1	Crushed Stone	0.0 0.5
Auger					Fill M-F Brown Sand, Tr Silt, Tr Crushed Stone	
				2	M-F Brown Sand, Tr Silt	
	5			3	Same	
llow		4-3		4	Same	7.0
Stem		3-3	19"		M-F Grey Sand, Tr Silt	
Augers		3-3		5	Note S# 4- Taken with 2" Spoon	
		6-12	18"		F Brownish Grey Sand, Little Silt	
	10	7-9		6		
		13-11	18"		F Brown Sand, Tr Silt	
		6-11		7		
		11-14	16"		Same	
		4-6		8	Same	15.0
	15	7-9	14"		M-F Grey Sand, Little Silt F Brown Sand, Some Silt	15.5 16.0
					Bottom of Boring	
	20				All Samples checked with PID Meter, S# 1 & 2 Saved for Enviro Testing. Remaining Samples Discarded	
	25					

NOTES: 1 — Length recovered; 0" — Loss of Sample, T — Trap used
2 — U = undisturbed; A = auger; OER = open end rod; V = vane
3 — Log depth of change in color of wash water, loss of water, artesian water, sand heave in casing, etc.

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BORING REPORT

SHEET 1 OF 3

PROJECT Proctor & Gamble	NAME OF CONTRACTOR CRAIG	BORING NO. Fill-2	SURFACE ELEV.
LOCATION AS MARKED OUT IN THE FIELD BY Killian Assoc.		CONTRACT NO. 4/26-99-006	DATE 11-3-00

SPOON 3 "O.D. 2 3/8 "I.D.
CASING SIZE H.S. Augers
HOLE TYPE
HAMMER (safety) 140 # FALL 30"
HAMMER # FALL "
DRILLER R. Pennell
INSPECTOR M. Oudeh

GROUND WATER LEVEL

Date	Time	Depth	Remarks
11-3	Am	4.1'	found in S#3 [redacted]

CASING BLOWS/FT.	DEPTH	SPOON BLOWS/6"	RE-COV'D[1]	SAMP.[2] NO.	[3]SAMPLE DESCRIPTION AND REMARKS ______ LINE LOCATES CHANGE OF PROFILE
H.S.	0				Asphalt Pavement 0.2'
					CRUSHED ROCK 0.7'
Augers		HAND AUGER	Full	1	Fill- dark brown c-f SAND, some Gravel, trace Silt, trace Crushed Rock
				2	Fill- brown c-f SAND, trace Gravel, trace Silt
	5				
		4-4 6-7	20"	3	Fill- SAME
	10	5-6 10-12	20"	4	Fill- SAME
		8-11 14-17	24"	5	Fill- SAME
		10-10 13-15	24"	6	Fill- SAME
	15	9-11 18-22	24"	7	Fill- SAME 16.0'
					Bottom of boring
	20				All samples were saved in 2 one pt. JARS & 1 4 oz JAR.
	25				

NOTES: 1 — Length recovered; 0" — Loss of Sample, T — Trap used
2 — U = undisturbed; A = auger; OER = open end rod; V = vane
3 — Log depth of change in color of wash water, loss of water, artesian water, sand heave in casing, etc.

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SHEET 1 OF 3

PROJECT HH- P&G	NAME OF CONTRACTOR Craig (BLOCK 1400)	BORING NO. Fill #3	SURFACE ELEV.
LOCATION As laid out by Killian Assoc. (±2' east of tank foundation)*		CONTRACT NO. 426-99-006	DATE 11/4/00

SPOON 3 "O.D. 2 3/8 "I.D.
CASING SIZE HS-Augers
HOLE TYPE 1
HAMMER 140 # FALL 30 "
HAMMER # FALL "
DRILLER J. Craig
INSPECTOR T. Ryan

GROUND WATER LEVEL

Date	Time	Depth	Remarks
11/6/00	10:05 A	7.5'	In S #4

CASING BLOWS/FT.	DEPTH	SPOON BLOWS/6"	RE-COV'D[1]	SAMP. NO.[2]	[3]SAMPLE DESCRIPTION AND REMARKS LINE LOCATES CHANGE OF PROFILE	
	0				CRUSHED STONE	0.5'
		Hand	Full	1	Misc Fill- Sand, Cinders, Brick, Conc	
		auger	Rec.			
				2	Same w/ tr metal	
	5			3	[illegible]	5.0'
					[illegible], tr Gravel.	
wo		7-15		[illegible]	Same	
		11-27	17"			
		13-31		5	Same	
	10	54-45	22"			
		7-11		6	Same	
		18-31	20"			
		11-17		7	Same	
		22-28	14"			
	15	4-10	12"	8	Same	15.0'
					Bottom of Boring	

Note: Samples# 1-4 were saved for testing. All other samples were screened w/ PID & then discarded. Sample #4 was saved & placed on Hold.

NOTES: 1 — Length recovered; 0" — Loss of Sample, T — Trap used
2 — U = undisturbed; A = auger; OER = open end rod; V = vane
3 — Log depth of change in color of wash water, loss of water, artesian water, sand heave in casing, etc.

* - Tanks have been removed, foundation only exists.

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SHEET 1 OF 3

PROJECT HH- P&G	NAME OF CONTRACTOR Craig	BORING NO. Fill #4	SURFACE ELEV.
LOCATION As laid out by Killam Assoc (±103' So. of Bldg 12) (BLOCK 1400)		CONTRACT NO. 426-99-006	DATE 11/6/00

SPOON 3 "O.D. 2 3/8 "I.D.

CASING SIZE Augers (HS)

HOLE TYPE 1

HAMMER 140 # FALL 30 "

HAMMER # FALL "

DRILLER P Pennell

INSPECTOR T. Ryan

GROUND WATER LEVEL

Date	Time	Depth	Remarks
11/ /00	1:40 pm	5.9'	In S#3

CASING BLOWS/FT.	DEPTH	SPOON BLOWS/6"	RE-COV'D[1]	SAMP. NO.[2]	[3]SAMPLE DESCRIPTION AND REMARKS ______ LINE LOCATES CHANGE OF PROFILE (Gravel Covered)
	0	Hand	Full	1	Fill-Cinders, Sand, little Br, little Glass
		Auger	Rec		
				2	Same
				3	Same 5.0'
	5				Fill-Br M-F Sand little silt, tr Gravel
ers		2-3		4	Same
		3-6	19"		Br F Sand some Silt, some Plant fibers (org. odor)
		1-1		5	Br M-F Sand, tr Silt, tr Gravel.
	10	2-2	17"		
		1-2		6	Same
		2-2	13"		
		10-15		7	Same
		11-15	24"		
	15	11-14	12"	8	Same 15.0'

Bottom of Boring

Note: Samples #1-5 were saved for environ testing. All other samples were screened w/ PID & then discarded. Sample #5 was saved & placed on hold.

NOTES: 1 — Length recovered; 0" — Loss of Sample, T — Trap used
2 — U = undisturbed; A = auger; OER = open end rod; V = vane
3 — Log depth of change in color of wash water, loss of water, artesian water, sand heave in casing, etc.

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BORING REPORT

SHEET 1 OF 3

PROJECT: Port Ivory P & G
NAME OF CONTRACTOR: Craig drilling
BORING NO.: Fill 5
SURFACE ELEV.:
LOCATION: ±180' E of Bldg 12 - Block 1400 Lot 1
CONTRACT NO.: 426-99-006
DATE: 11-18-00
SPOON: 3 "O.D. 2 3/8 "I.D.
CASING SIZE: Augers
HOLE TYPE: 1
HAMMER: Safety 140 # FALL 30 "
HAMMER: # FALL "
DRILLER: James Finch
INSPECTOR: J. Zarks

GROUND WATER LEVEL

Date	Time	Depth	Remarks
11-18-00	12:30 PM	7.5'	Bottom of Sample # 4

CASING BLOWS/FT.	DEPTH	SPOON BLOWS/6"	RE-COV'D[1]	SAMP.[2] NO.	[3]SAMPLE DESCRIPTION AND REMARKS ____ LINE LOCATES CHANGE OF PROFILE	0.0
Handauger	0	HANDAUGER	Full Rec		Crushed Rock & DGABC	0.5'
				1	Fill greyish-brown c-f SAND, little Gravel, tr. Silt, cinder	
				* 2	Fill reddish-brown c-f SAND, tr. Gravel, tr Silt, wood	
	5					
				3	SAME	
H[illegible]W [illegible]M AUGERS		5 - 5 6 - 6	20"	* 4	Fill brown c-f SAND, tr. Gravel, tr Silt with bl. organic fibers (±2")	
	10	4 - 3 3 - 5	20"	5	SAME	
		3 - 4 7 - 11	18"	6	SAME	
		11 - 13 15 - 21	24"	7	Fill grey & brown c-f SAND, tr Gravel, tr. SilT	
	15	7 - 10 10 - 13	24"	8	Grey c-f SAND, tr. Grabel, tr. SilT	16.0'
					Note: 2 Samples saved for testing All other samples checked w. PID meter & discarded	
	20				Bottom of Boring	

NOTES: 1 — Length recovered; 0" — Loss of Sample, T — Trap used
2 — U = undisturbed; A = auger; OER = open end rod; V = vane
3 — Log depth of change in color of wash water, loss of water, artesian water, sand heave in casing, etc.

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BORING REPORT

SHEET 1 OF 3

PROJECT Port Ivory P&G Site	NAME OF CONTRACTOR Craig Drilling	BORING NO. Fill-7	SURFACE ELEV.
LOCATION West of wood chipper, Block 1400 Lot 1		CONTRACT NO. 426-99-006	DATE 12/4/00

SPOON 3 "O.D. 2 3/8 "I.D. | CASING SIZE Augers | HOLE TYPE 1

HAMMER Safety 140 # FALL 30" | HAMMER # FALL "

DRILLER S Burns

INSPECTOR D Howe

GROUND WATER LEVEL

Date	Time	Depth	Remarks
12/4	9:05	10.0	S#6

CASING BLOWS/FT.	DEPTH	SPOON BLOWS/6"	RE-COV'D [1]	SAMP. NO. [2]	[3]SAMPLE DESCRIPTION AND REMARKS ______ LINE LOCATES CHANGE OF PROFILE	
						0.0
	0				Concrete	0.7
Hand		Hand Auger	Full	1	Misc Fill, Sand, Gravel, Cinders, Wood, Silt, Etc	
Auger						
				2	Same	4.0
	5			3		
					Misc Fill, Cinders, Gravel, Etc	
Hollow		16-11		4		
Stem		16-18	19"		Same	
Augers		17-9		5		
	10	4-3	20"		Same	10.0
		3-2		6		
		1-1	24"		Fill-White Diatomaceous Earth	
		WOH		7		
		WOH	24"		Same	
	15	WOH-1		8		
		2-2	23"		Same	
		2-2		9		
		2-2	24"		Same	
		9-18		10		
	20	25-45	15"		Fill-White Diatomaceous Earth, Little Cinders, Tr Gravel	
		7-3		11		
		2-2	18"		Fill-White & Grey Diatomaceous Earth	
		3-2		12 A	Same	23.0
		1-1	18"	B	Brown Peat	24.0
	25				Bottom of Boring	

NOTES: 1 — Length recovered; 0" — Loss of Sample, T — Trap used
2 — U = undisturbed; A = auger; OER = open end rod; V = vane
3 — Log depth of change in color of wash water, loss of water, artesian water, sand heave in casing, etc.

All Samples checked with PID Meter S# 1,3&6 Saved for Further Testing Remaining Samples Discarded

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BORING REPORT

SHEET 1 OF 3

PROJECT Port Ivory P&C Site	NAME OF CONTRACTOR Craig Drilling	BORING NO. Fill-8	SURFACE ELEV.
LOCATION NW Corner of site, 75' South of PAMW-1 Block 140C Lot 1		CONTRACT NO. 426-99-006	DATE 12/12/00

SPOON 3 "O.D. 2 3/8 "I.D.	CASING SIZE Augers	HOLE TYPE 1
HAMMER Safety 140 # FALL 30 "	HAMMER # FALL "	
DRILLER S Burns		
INSPECTOR D Howe		

GROUND WATER LEVEL

Date	Time	Depth	Remarks
12/12	11 30 A	3.0	while Hand Augering

CASING BLOWS/FT.	DEPTH	SPOON BLOWS/6"	RE-COV'D[1]	SAMP.[2] NO.	[3]SAMPLE DESCRIPTION AND REMARKS ——— LINE LOCATES CHANGE OF PROFILE
Hand	0	Hand Auger	Full	1	0.0
Auger					Misc Fill - Sand, Silt, Brick, Gravel, Metal, Etc
				2	
					4.0
	5			3	
					Fill - Grey Diatomaceous Earth, Little Misc Fill
" .lbco		1-1			
em		1-1	19"	4	Fill - Grey Diatomaceous Earth
Augers		WOH			
	10	WOH	23"	5	Fill - White & Grey Diatomaceous Earth
		WOH			
		WOH	22"	6	Same
		WOH			
		WOH	22"	7	Same
	15	WOH			
		WOH	22"	8	Same
		WOH		9 A	Same 17.5
		WOH-1	24"	9 B	Black Peat 18.0
					Bottom of Boring
	20				
					All Samples checked with PID Meter
					S# 1 & 4 Saved For Envir Testing
					Remaining Samples Discarded
	25				

NOTES: 1 — Length recovered; 0" — Loss of Sample, T — Trap used
2 — U = undisturbed; A = auger; OER = open end rod; V = vane
3 — Log depth of change in color of wash water, loss of water, artesian water, sand heave in casing, etc.

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SHEET 1 OF 3

PROJECT Port Ivory P+G Site	NAME OF CONTRACTOR Craig drilling	BORING NO. FV1-10	SURFACE ELEV.
LOCATION South of BLD 72		CONTRACT NO. 426.99.006	DATE 12/1/00

SPOON 3 " O.D. 2 3/8 " I.D.
CASING SIZE auger
HOLE TYPE 1
HAMMER 140 # FALL Safety 30 "
HAMMER # FALL "
DRILLER Jeff Craig
INSPECTOR Charlie Springer

GROUND WATER LEVEL

Date	Time	Depth	Remarks
12/1/00	1025	5.8'	

CASING BLOWS/FT.	DEPTH	SPOON BLOWS/6"	RE-COV'D[1]	SAMP.[2] NO.	[3]SAMPLE DESCRIPTION AND REMARKS LINE LOCATES CHANGE OF PROFILE
H.A.		H.A.	Full	1	~~Fine Sand some SILT Gravel~~ 0.2
					Fine Sand some SILT Red Brn
				*2 A D	3
					Fine Sand some SILT w/ Gravel Red Brn
	5			3	
					6.4
H.A.		5-8	1.3'	4*	Sand w/ Gravel, cinders, concrete, wood Black
		5-23			Slight Odor 8.2
		4-4	2'	5	Peat
	10	4-4			10.0
					End of Boring 10'
					- All Samples Screened w/ PID
					- Samples 2b + 4 Saved For Env. Testing
	15				- All Remaining Samples Discarded
	20				

NOTES: 1 — Length recovered; 0" — Loss of Sample, T — Trap used
2 — U = undisturbed; A = auger; OER = open end rod; V = vane
3 — Log depth of change in color of wash water, loss of water, artesian water, sand heave in casing, etc.

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BORING REPORT

SHEET 1 OF 3

PROJECT: PORT IVORY P+6 SITE
NAME OF CONTRACTOR: CRAIG DRILLING
BORING NO.: B1
SURFACE ELEV.:
LOCATION: BLOCK 1400, BORING B1 (WEST OF BUILDING # 31) Block 1400
CONTRACT NO.: 426-99-006
DATE: 12/4/00
SPOON: 3 "O.D. 2 3/8 "I.D.
CASING SIZE: AUGER
HOLE TYPE: 1
HAMMER: 140 # FALL SAFETY 30
HAMMER: # FALL
DRILLER: JIM FINCH
INSPECTOR: DAN DAVIS

GROUND WATER LEVEL			
Date	Time	Depth	Remarks
12/4/00	1230	10 to 12	

CASING BLOWS/FT.	DEPTH	SPOON BLOWS/6"	RE-COV'D[1]	SAMP.[2] NO.	[3]SAMPLE DESCRIPTION AND REMARKS ____ LINE LOCATES CHANGE OF PROFILE	0.0
					CONCRETE	
						2.0
HAND AUGER		HAND AUGER	FULL	2*	CINDERS AND SMALL GRAVEL	
					SAME	4.5
	5			3 A B	REDDISH BROWN CLAYEY SILT, LITTLE GRAVEL	
SS		3 4	16"	4*	SAME	
		5 6				
		3 5	15"	5 A	SAME	9.0
	10	7 8		B*	BLACK FINE SAND, TRACE SILT	
		3 4	14"	6	SAME	11.0
		4 6			BROWN FINE TO MEDIUM SAND, TRACE SILT	12.0
		7 8	8"	7	BROWN PEAT	
		9 11				14.0
	15				BOTTOM OF BORING	
	20					

- ALL SAMPLES SCREENED WITH PID METER
- SAMPLES 2, 4 AND 5B SAVED FOR ENVIRONMENTAL TESTING
- ALL REMAINING SAMPLES DISCARDED

NOTES: 1 — Length recovered; 0" — Loss of Sample, T — Trap used
2 — U = undisturbed; A = auger; OER = open end rod; V = vane
3 — Log depth of change in color of wash water, loss of water, artesian water, sand heave in casing, etc.

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SHEET 1 OF 3

PROJECT PorT Ivory P&G SiTe	NAME OF CONTRACTOR Craig Drilling	BORING NO. B-2	SURFACE ELEV.
LOCATION Gravel Area WesT of Bldg 33		CONTRACT NO. 426-95-006	DATE 11/16/00 - 11/16/00

SPOON 3 "O.D. 2 3/8 "I.D.
CASING SIZE Augers
HOLE TYPE 1
HAMMER Safety 140 # FALL 30 "
HAMMER # FALL "
DRILLER S Burns
INSPECTOR D Howe / J. Zarks

GROUND WATER LEVEL

Date	Time	Depth	Remarks
11-16-00	9:08 AM	9.0'	Sample #5
		5.2'	Open hole

CASING BLOWS/FT.	DEPTH	SPOON BLOWS/6"	RE-[1] COV'D	SAMP.[2] NO.	[3]SAMPLE DESCRIPTION AND REMARKS ____ LINE LOCATES CHANGE OF PROFILE 0.0'
Cutter Head	0	Cutter Head	Full Rec		DGABC - CRUSHED Rock 0.2
					Fill brown c-f SAND, tr. Gravel, tr. Silt 0.8
				1	Concrete slab w. ribars 2.0'
HAND AUGER		HAND AUGER			
				2*	Fill greyish-black c-f SAND & Gravel, tr. Silt, Cinders, coal, br
	5			3	SAME
GERS		5 - 5			225.8 ppm
		6 - 6	24'	4*	SAME w/oil
		8 - 12			123.9 ppm
	10	13 - 15	18"	5	SAME w / wood
		100/3"	3"	6	Same 10.3'
					Refusal Bottom of Boring
	15				Note: 2 samples saved for testing All other samples checked with PID meter & discarded
	20				
	25				

NOTES: 1 — Length recovered; 0" — Loss of Sample, T — Trap used
2 — U = undisturbed; A = auger; OER = open end rod; V = vane
3 — Log depth of change in color of wash water, loss of water, artesian water, sand heave in casing, etc.

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Engineering Department
Construction Division
Materials Engineering Section

BORING REPORT

SHEET 1 OF 3

PROJECT: Port Ivory P & G
NAME OF CONTRACTOR: Craig drilling
BORING NO.: B-2 A
SURFACE ELEV.:
LOCATION: 10' S of BH. B-2
CONTRACT NO.: 426-99-006
DATE: 11-16-00
SPOON: 3 " O.D. 2 3/8 " I.D.
CASING SIZE: Augers
HOLE TYPE: 1
HAMMER: Safety 140 # FALL 30 "
HAMMER: # FALL "
DRILLER: G. Mc. Aneny
INSPECTOR: J. Zarks

GROUND WATER LEVEL

Date	Time	Depth	Remarks
11-16-00	10:30	5.1'	sample #3

CASING BLOWS/FT.	DEPTH	SPOON BLOWS/6"	RE-COV'D [1]	SAMP. NO. [2]	[3] SAMPLE DESCRIPTION AND REMARKS ______ LINE LOCATES CHANGE OF PROFILE
Cutter Head	0	Cutter Head	Full		
				1	
HandAUGER		HAND AUGER			For Soil Strata 0.0' - 8.0'
				2	see Boring report BH-2
	5			3	
" " Auger		—	-		
		—	-	4	
		4 - 5		*	66.8ppm
	10	7 - 8	20"	5	Misc Fill black c-f SAND some Gravel tr. Silt, Cinders, Coal, wood
		100/3"		6	10.3'
					SAME 2.7ppm

Note: 1 sample #5 saved for testing. All other samples screened for PID readings & discarded.

Refusal - Bottom of Boring

NOTES: 1 — Length recovered; 0" — Loss of Sample, T — Trap used
2 — U = undisturbed; A = auger; OER = open end rod; V = vane
3 — Log depth of change in color of wash water, loss of water, artesian water, sand heave in casing, etc.

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BORING REPORT

SHEET 1 OF

PROJECT Port Ivory P & G	NAME OF CONTRACTOR Craig drilling	BORING NO. B-3	SURFACE ELEV.
LOCATION 40' S of Bldg 16 & 200' W of Bldg 33A Block 1400 lot 1		CONTRACT NO. 426-99-006	DATE 12-4-00

SPOON 3 "O.D. 2 3/8 "I.D.
CASING SIZE Augers
HOLE TYPE 1
HAMMER 140 # FALL 30 "
HAMMER # FALL "
DRILLER D. Cooke
INSPECTOR J. Zorks

GROUND WATER LEVEL

Date	Time	Depth	Remarks
12-4-00	9:30	3.5'	sample # 2

CASING BLOWS/FT.	DEPTH	SPOON BLOWS/6"	RE-COV'D[1]	SAMP.[2] NO.	[3]SAMPLE DESCRIPTION AND REMARKS LINE LOCATES CHANGE OF PROFILE
Handauger	0	Handauger	Full Rec		Gravel 0.0' 0.2' CONCRETE 0.9
				1	Fill dark grey c-f SAND, tr. Gravel, tr Silt, cinders, coal.
				2*	SAME
	5			3	SAME
H-w 1 ERS		2-3 3-3	20"	4*	Fill c-f SAND, tr Gravel, tr. Silt, cinders, coal
	10	12-18 22-24	24"	5	SAME
		6-6 7-7	24"	6	SAME
		8-12 12-15	20"	7	SAME
	15	3-5 6-7	20"	8	SAME
		4-4 4-4	20"	9	SAME 17.5' Brown Peat 18.0'
	20				Note: 2 samples saved for testing All samples checked w. PID meter remaining samples discarded Bottom of Boring

NOTES: 1 — Length recovered; 0" — Loss of Sample, T — Trap used
2 — U = undisturbed; A = auger; OER = open end rod; V = vane
3 — Log depth of change in color of wash water, loss of water, artesian water, sand heave in casing, etc.

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BORING REPORT

SHEET 1 OF 3

PROJECT: PORT IVORY P+G SITE	NAME OF CONTRACTOR: CRAIG DRILLING	BORING NO.: B4	SURFACE ELEV.:
LOCATION: WEST OF BUILDING #33, BLOCK 1400	Block 1400	CONTRACT NO.: 426-99-006	DATE: 12/4/00

SPOON: 3 "O.D. 2 3/8 "I.D.
CASING SIZE: AUGER
HOLE TYPE: 1
HAMMER: 140 # FALL SAFETY 30 "
HAMMER: # FALL "
DRILLER: JIM FINCH
INSPECTOR: DAN DAVIS

GROUND WATER LEVEL

Date	Time	Depth	Remarks
12/4/00	2:00	4to5	DURING HAND AUGERING

CASING BLOWS/FT.	DEPTH	SPOON BLOWS/6"	RE-COV'D[1]	SAMP.[2] NO.	[3]SAMPLE DESCRIPTION AND REMARKS ____ LINE LOCATES CHANGE OF PROFILE
HAND AUGER		HAND AUGER		1 A	Asphalt AND STONE 1.5
				B	Fill CINDERS AND GRAVEL
				2*	- PETROLEUM ODOR
					250-400 ppm
				3 A	5.0
	5			B*	Fill GRAY FINE SAND TRACE SILT – PETROLEUM ODOR 250-400 6.0
GER		5 6	15"	4 A*	Fill REDDISH BROWN CLAYEY SILT 7.3
		6 5		B	Fill BROWN FINE SAND, TRACE SILT
		3 3	2"	5	SAME
	10	5 8			10.5
		4 4	10"	6	SAME BROWN PEAT 10.9
		7 11			BROWN FINE SAND, TRACE SILT 12.0
					↑ BOTTOM OF BORING
	15				
	20				

- ALL SAMPLES SCREENED WITH PID METER
- SAMPLES #2, 3B AND 4A SAVED FOR ENVIRONMENTAL TESTING
- ALL REMAINING SAMPLES DISCARDED

NOTES: 1 — Length recovered; 0" — Loss of Sample, T — Trap used
2 — U = undisturbed; A = auger; OER = open end rod; V = vane
3 — Log depth of change in color of wash water, loss of water, artesian water, sand heave in casing, etc.

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BORING REPORT

SHEET 1 OF 3

PROJECT Port Ivory P+G	NAME OF CONTRACTOR Craig Drilling	BORING NO. A-1	SURFACE ELEV.
LOCATION N Bld 1-A Block 1400		CONTRACT NO. 426-99-006	DATE 12/2 AND 12/4/00

SPOON 3 " O.D. 2 7/8 " I.D.	CASING SIZE auger	HOLE TYPE 1
HAMMER 140 # FALL 30 " SAFETY	HAMMER # FALL "	
DRILLER JAY		
INSPECTOR Charlie Springer		

GROUND WATER LEVEL

Date	Time	Depth	Remarks
12/4/00	7:45	8.0	DURING SPLIT-SPOONING

CASING BLOWS/FT.	DEPTH	SPOON BLOWS/6"	RE-COV'D[1]	SAMP.[2] NO.	[3]SAMPLE DESCRIPTION AND REMARKS ______ LINE LOCATES CHANGE OF PROFILE
HA		HA	FA	1	
					Gravel w/ Sand SILT matrix
					2.5
				2	Gravel w/Cinders Sand SILT matrix Black 3.5
					diatomaceous Earth white 4.5
	5			3	
					Cinders + Gravel Black
ER		7 8	15"	4	SAME
		12 9			
		9 7	13"	5	SAME
	10	3 3			
		7 6	20"	6	SAME, WITH 4' LAYER DIATOMACEUS EARTH TOP OF
		5 3			SPOON
		3 1	3"	7	SAME
		2 3			14'
	15	2 1	14"	8	BROWN PEAT
		2 2			160
					BOTTOM OF BORING
	20				- ALL SAMPLES SCREENED WITH PID METER
					- SAMPLE #2 SAVED FOR ENVIRONMENTAL TESTING
					- ALL REMAINING SAMPLES DISCARDED

NOTES: 1 — Length recovered; 0" — Loss of Sample, T — Trap used
2 — U = undisturbed; A = auger; OER = open end rod; V = vane
3 — Log depth of change in color of wash water, loss of water, artesian water, sand heave in casing, etc.

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BORING REPORT

SHEET 1 OF 3

PROJECT Port Ivory, P+G site

NAME OF CONTRACTOR Craig Drilling

BORING NO. A-2

SURFACE ELEV.

LOCATION SW of Building 16 (approx. 60 feet)

CONTRACT NO. 42C-99.006

DATE 11/29/2000

SPOON 3 "O.D. 2 3/8 "I.D.

CASING SIZE

HOLE TYPE

HAMMER 140 # FALL Safety 30 "

HAMMER 140 # FALL "

DRILLER David cooks

INSPECTOR M. Patel

GROUND WATER LEVEL

Date	Time	Depth	Remarks
11/29/00	0815	4.0'	

CASING BLOWS/FT.	DEPTH	SPOON BLOWS/6"	RE-COV'D [1]	SAMP. NO. [2]	[3] SAMPLE DESCRIPTION AND REMARKS ______ LINE LOCATES CHANGE OF PROFILE
Hand Auger		Hand Auger	Full	1	Fill. Black and Brownish yellow cmf SAND
					trace Silt, trace mf Gravel, Rock, cinder, etc 2.0'
				2	White Diatomacaceous earth material
				3	White & Gray same
	5				
Hand Auger		W O	24"	4	White Diatamacaceous earth material
		H			
		1 0	24"	5	SAME
		1 0			
	10	1 0	20"	6	SAME
		1,1			
		1,1	16"	7	SAME
		2,2			
		9,15	18"	8	SAME 15.0
	15	20,15			Black cmf GRAVEL, trace cmf SAND Rock, cinder
		5,6	10"	9	SAME
		10,5			
		1,1	18"	10	SAME
		1,1			Brown Organic SILT w decomposed wood (PEAT)
	20				Bottom of Hole at 20.0'
					All soil samples checked for PID meters
					Sample # 1 & 2 saved for Environmental testing
					Remaining samples are discarded.

NOTES: 1 — Length recovered; 0" — Loss of Sample, T — Trap used
2 — U = undisturbed; A = auger; OER = open end rod; V = vane
3 — Log depth of change in color of wash water, loss of water, artesian water, sand heave in casing, etc.

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BORING REPORT

SHEET 1 OF 3

PROJECT: Port Ivory P & G

NAME OF CONTRACTOR: Craig drilling

BORING NO.: A-3

SURFACE ELEV.:

LOCATION: As laid out in the field

CONTRACT NO.: 426-99-006

DATE: 11-16-00

SPOON: 3 " O.D. 2 3/8 " I.D.

CASING SIZE: Augers

HOLE TYPE: 1

HAMMER: Safety 140 # FALL 30 "

HAMMER: # FALL "

DRILLER: G. Mc Aneny

INSPECTOR: J. ZARKS

GROUND WATER LEVEL

Date	Time	Depth	Remarks
11-16-00	2:05 PM	2.0'	SAmple # 2

CASING BLOWS/FT.	DEPTH	SPOON BLOWS/6"	RE-COV'D[1]	SAMP. NO.[2]	[3]SAMPLE DESCRIPTION AND REMARKS LINE LOCATES CHANGE OF PROFILE	
						0.0'
Handauger	0	Cutter Head	Full Re		concrete	0.6
				1	Fill grey c-f SAND and Gravel, tr. SILT	
					SAME	2.4'
				2*	Fill greyish-green Silt, tr. m-f SAND	4.0
	5			3	Fill greyish-black Silt & ClAY	
W M		6 - 6				
AUGERS		8 - 10	24"	4*	Fill black - SilT & ClAY	8.0'
		7 - 8				
	10	9 - 15	24	5	Fill grey c-f SAND, greenish-white Diatomaceous -	
		4 - 5		6*		
		6 - 6	24"		Fill white & grey c-f SAND, Gravel, Diatomaceous	12.0
		2 - 2				
		3 - 4	20"	7	Fill black Silty Clay, some chunks.	
	15	1 - 2				
		1 - 2	24"	8	Fill black Clay SilT	
		2 - 2				
		2 - 2	24"	9	SAME	
		1 - 2				19.0'
	20	2 - 2	24"	10	Brown PEAT	

Note: 3 samples saved for Testing
All other samples screened with
PID meter & discarded

Bottom of Boring

NOTES: 1 — Length recovered; 0" — Loss of Sample, T — Trap used
2 — U = undisturbed; A = auger; OER = open end rod; V = vane
3 — Log depth of change in color of wash water, loss of water, artesian water, sand heave in casing, etc.

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BORING REPORT

SHEET 1 OF 3

PROJECT Port Ivory P & G
NAME OF CONTRACTOR Craig drilling
BORING NO. A-4
SURFACE ELEV.
LOCATION As laid out in the field
CONTRACT NO. 426-99-006
DATE 11-16-00
SPOON 3 "O.D. 2 3/8 "I.D.
CASING SIZE Augers
HOLE TYPE 1
HAMMER SAfety 140 # FALL 30 "
HAMMER # FALL "
DRILLER G. Mc Aneny
INSPECTOR J. Zarks

GROUND WATER LEVEL

Date	Time	Depth	Remarks
11-16-00	11:24 AM	3.0'	SAMPlE #2

CASING BLOWS/FT.	DEPTH	SPOON BLOWS/6"	RE-[1] COV'D	SAMP.[2] NO.	[3]SAMPLE DESCRIPTION AND REMARKS ——— LINE LOCATES CHANGE OF PROFILE	0.0
CutterHead	0	Cutter Head	Full Rec		DGABC	0.5
					CONCRETE	1.1
				1	Misc Fill greyish-black c-f SAND & Gravel, tr Silt, Coal, Cinders, Brick, wood etc	
HANDAUGER		HANDAUGER				
				2	SAME	
	5					
				3	SAME	
[illegible] W		4-4		*		
S[illegible]M		3-3	18"	4	SAME	
Augers		4-3				
	10	3-3	14"	5	SAME	
		4-3				
		3-4	20"	6	SAME	
		4-6				
		6-4	20"	7*	SAME	
	15	2-2			SAME	14.8
		2-2	18"	8	Brown PEAT	16.0

Note: Samples #4 & #7 saved for testing
All other samples screened with PID meter
& discarded

Bottom of Boring

NOTES: 1 — Length recovered; 0" — Loss of Sample, T — Trap used
2 — U = undisturbed; A = auger; OER = open end rod; V = vane
3 — Log depth of change in color of wash water, loss of water, artesian water, sand heave in casing, etc.

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BORING REPORT

SHEET 1 OF 3

PROJECT Port Ivory P & G	NAME OF CONTRACTOR Craig drilling		BORING NO. A-5	SURFACE ELEV.
LOCATION As laid out in the field.			CONTRACT NO. 426-99-006	DATE 11-14-00

SPOON 3 "O.D. 2 3/8 "I.D.
CASING SIZE Augers
HOLE TYPE 1
HAMMER 140 # FALL 30 "
HAMMER # FALL "
DRILLER D. Osuch
INSPECTOR J. Zarks

GROUND WATER LEVEL

Date	Time	Depth	Remarks
11-15-00	7:46	8.0'	Sample #5

CASING BLOWS/FT.	DEPTH	SPOON BLOWS/6"	RE-COV'D [1]	SAMP. NO. [2]	[3]SAMPLE DESCRIPTION AND REMARKS ______ LINE LOCATES CHANGE OF PROFILE	
Handauger	0	Handauger	Full		Fill DGABC	0.0' 0.5'
					Fill dark brown c-f SAND, Gravel, tr SiIT, cinders	
				1	SAME	
				*		
				2	Fill greyish-black c-f SAND, Gravel, tr. Silt, cinders, coal	
	5					
				3	SAME	
W		5-8				
AUGERS		12-17	12"	4	Misc fill greyish black c-f SAND, Gravel, tr. Silt, cinders, wood, coal.	
		7-8				
	10	7-9	20"	5	SAME	
		12-6				
		6-7	24"	6	SAME	
		10-11				
		11-14	12"	7	SAME	
					SAME	14.8'
	15	4-3				
		3-4	24"	8	Brown PEAT, little Silty CLAY	16.0'
					Note: sample #2 saved for testing.	
					All samples were screened with PID meter	
	20				and discarded	Bottom of Boring

NOTES: 1 — Length recovered; 0" — Loss of Sample, T — Trap used
2 — U = undisturbed; A = auger; OER = open end rod; V = vane
3 — Log depth of change in color of wash water, loss of water, artesian water, sand heave in casing, etc.

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BORING REPORT

SHEET 1 OF 3

PROJECT PorT Ivory PJG SiTe	NAME OF CONTRACTOR Craig Drilling	BORING NO. A-6	SURFACE ELEV.
LOCATION EasT of Bldg 1A Block 1400 LoT 1		CONTRACT NO. 426-99-006	DATE 11/10/00 - 11/11

SPOON 3 "O.D. 2 3/8 "I.D.
CASING SIZE
HOLE TYPE 1
HAMMER 140 # FALL 30 "
HAMMER # FALL "
DRILLER S Burns
INSPECTOR D Howe / J. Zarks

GROUND WATER LEVEL

Date	Time	Depth	Remarks
11/10/00	4^15 p	6.0	while Hand Augering
11/11/00	1:05 pm	6.5'	Sample # 4

CASING BLOWS/FT.	DEPTH	SPOON BLOWS/6"	RE-COV'D[1]	SAMP.[2] NO.	[3]SAMPLE DESCRIPTION AND REMARKS ____ LINE LOCATES CHANGE OF PROFILE
Hand	0	Hand Augr	Full		Crushed STone, Little Misc Fill 0.1ppm
Auger				1	
					Misc Fill Cinders Gravel Sand Brick, ETC
				2	
					Same
	5			3	Same
W		4 - 3			
N		3 - 6	20"	4	SAME
Augers		4 - 5			
	10	6 - 6	20"	5	SAME
		6 - 8			
		6 - 11	24"	6	SAME
		18 - 18			
		12 - 3	18"	7	Misc Fill Cinders, black c-f SAND, Gravel etc 14.0
	15	W. O			
		H. 1	24"	8	Brown PEAT, some grey Silty ClAY 16.0
					Bottom of Boring
	20				
					All Samples Checked with PID Meter
					ST 1 & 2 Saved for Testing
					Sample # 8 saved (On hold) for testing
	25				

NOTES:
1 — Length recovered; 0" — Loss of Sample, T — Trap used
2 — U = undisturbed; A = auger; OER = open end rod; V = vane
3 — Log depth of change in color of wash water, loss of water, artesian water, sand heave in casing, etc.

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MATERIALS ENGINEERING DIVISION

[redacted] WELL MONITORING DATA SHEET

PROJECT: HH - PORT IVORY P&G SITE	JOB NO: 501-233-295
WELL DESIGNATION: TW2	DATE: 12-2-00
CHECK BOX FOR LOWFLOW: ☐ RATE (ML):	CASING DIAMETER: 2 Inch
WEATHER CONDITIONS: SUNNY 28°F	STICK-UP DISTANCE: 2.0
STATIC WATER LEVEL GPS COORD'S: LONG:	LAT.:

		DISTANCE FROM TOP OF PIPE TO:	
	TIME	WATER (FEET)	PRODUCT (FEET)
PRE-PURGE:	11:15AM	6.77	—
POST PURGE:	12:20PM	6.85	—

	DEPTH OF WELL	11.05	FEET
	DEPTH TO WATER	6.77	FEET
	DEPTH OF WATER COLUMN	4.28	FEET
	FACTOR *	X 0.618	—
WELL PURGE	VOLUME TO BE REMOVED	2.65	

TIME	pH (SU)	TEMP (C)	CONDUCTIVITY (~~umohs/cm~~) μS	SALINITY (0/00)	TURBIDITY	DISS. O2 (mg/l)
11:21AM	7.18	16.2°	2950	1.5	E2	—
11:30AM	7.28	16.2°	3167	1.7	1,006	—
11:40	7.10	17.1	3138	1.7	735 *	—

SAMPLED BY:

COMMENTS: Sheen visible in purged volumes

* METALS SAMPLED WITH FILTER

Well sampled at 12:00PM

* FACTOR = 0.618 FOR 2 INCH DIAMETER WELL CASING

* F

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MATERIALS ENGINEERING DIVISION

[redacted] WELL MONITORING DATA SHEET

PROJECT: HH - PORT IVORY P&G SITE	JOB NO: S01-233-295
WELL DESIGNATION: MW PZ-1	DATE: 11-24-00
CHECK BOX FOR LOWFLOW: ☐ RATE(ML):	CASING DIAMETER: 2 Inch
WEATHER CONDITIONS: Sunny 34°F	STICK-UP DISTANCE: 2.4
STATIC WATER LEVEL GPS COORD'S: LONG: LAT:	

		DISTANCE FROM TOP OF PIPE TO:	
	TIME	WATER (FEET)	PRODUCT (FEET)
PRE-PURGE:	2:10PM	4.63	—
POST PURGE:	2:49PM	4.98	—

	DEPTH OF WELL	14.13	FEET
	DEPTH TO WATER	4.63	FEET
	DEPTH OF WATER COLUMN	9.5	FEET
WELL PURGE	FACTOR *	X 0.618	
	VOLUME TO BE REMOVED	5.871	

TIME	pH (SU)	TEMP (C)	CONDUCTIVITY (umohs/cm)	SALINITY (0/00)	TURBIDITY	DISS. O2 (mg/l)
:15PM	7.32	13.6°	1245	0.6	95	—
2:21PM	7.20	14.4°	1239	0.6	110	—
2:35PM	7.02	15.6°	1260	0.6	110 *	—

SAMPLED BY: RG. / E.M.

COMMENTS: Well sampled at 2:45PM
* METALS Filtered

* FACTOR = 0.618 FOR 2INCH DIAMETER WELL CASING

* F

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MATERIALS ENGINEERING DIVISION

[redacted] WELL MONITORING DATA SHEET

PROJECT: HH - PORT IVORY P&G SITE	JOB NO: 501-233-295
WELL DESIGNATION: PAMW-15	DATE: 11/20/00
CHECK BOX FOR LOWFLOW: ☐ RATE (ML):	CASING DIAMETER: 2 Inch
WEATHER CONDITIONS: Good	STICK-UP DISTANCE: 3.20'
STATIC WATER LEVEL GPS COORD'S: LONG.:	LAT.:

		DISTANCE FROM TOP OF PIPE TO:	
	TIME	WATER (FEET)	PRODUCT (FEET)
PRE-PURGE:	10:07	9.59	—
POST PURGE:			

DEPTH OF WELL	16.00	FEET
DEPTH TO WATER	9.59	FEET
DEPTH OF WATER COLUMN	6.41	FEET
WELL PURGE FACTOR *	X 0.618	
VOLUME TO BE REMOVED	3.46	

TIME	pH (SU)	TEMP (C)	CONDUCTIVITY (umohs/cm)	SALINITY (0/00)	TURBIDITY	DISS. O2 (mg/l)
10:44	6.48	16.0	379	0.2	05	—
11:00	6.48	15.3	364	0.2	05	—
11:10	6.46	16.4	372	0.2	650	—
11:45	6.56	16.0	391	0.2	220	—
12:15	6.59	16.1	395	0.2	205	—

05 → off scale

SAMPLED BY: A Z & E.M.

COMMENTS: Well goes dry after each volume • Very muddy if bailer or fast Grundfos setting is used
Low flow was used to lower turbidity and
collect sample. Sampling commenced @ 12:16 →
Used 0.45 micron for metals

* FACTOR = 0.618 FOR 2 INCH DIAMETER WELL CASING

* FA

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MATERIALS ENGINEERING DIVISION

WELL MONITORING DATA SHEET

PROJECT: HH - PORT IVORY P&G SITE		JOB NO: 501-233-295	
WELL DESIGNATION: PAMW-15D		DATE: 11/20/00	
CHECK BOX FOR LOWFLOW: ☐	RATE (ML):	CASING DIAMETER: 2"	Inch
WEATHER CONDITIONS:		STICK-UP DISTANCE:	
STATIC WATER LEVEL	GPS COORD'S: LONG:	LAT:	

		DISTANCE FROM TOP OF PIPE TO:	
	TIME	WATER (FEET)	PRODUCT (FEET)
PRE-PURGE:	10:08	9.99	—
POST PURGE:			

	DEPTH OF WELL	52.49	FEET
	DEPTH TO WATER	9.99	FEET
	DEPTH OF WATER COLUMN	42.50	FEET
	FACTOR *	X 0.618	
WELL PURGE	VOLUME TO BE REMOVED	26.27	

TIME	pH (SU)	TEMP (C)	CONDUCTIVITY (umohs/cm)	SALINITY (0/00)	TURBIDITY	DISS. O2 (mg/l)
12:23	6.83	15.7	2132	1.1	0.5	—
13:05	~~14.76~~ 6.90	14.7	2162	1.1	0.5	—
13:48	6.87	15.4	2257	1.2	0.5	—
14:15	6.99	15.6	2264	1.2	0.5	—
14:20	6.99	15.7	2284	1.2	0.5	—
14:35	7.00	15.5	2290	1.2	0.5	—

SAMPLED BY: A2 & EM

COMMENTS: Very muddy Filtered Metals

* FACTOR = 0.618 FOR 2 INCH DIAMETER WELL CASING

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MATERIALS ENGINEERING DIVISION

WELL MONITORING DATA SHEET

PROJECT: HH - PORT IVORY P&G SITE	**JOB NO:** 501-233-295
WELL DESIGNATION: PA MW-15D (Repeat)	**DATE:** 11/30/00
CHECK BOX FOR LOWFLOW: ☐ RATE(ML):	**CASING DIAMETER:** 2" Inch
WEATHER CONDITIONS:	STICK-UP DISTANCE:
STATIC WATER LEVEL GPS COORD'S: LONG:	LAT.:

		DISTANCE FROM TOP OF PIPE TO:	
	TIME	**WATER (FEET)**	**PRODUCT (FEET)**
PRE-PURGE:	8:16	13.23	–
POST PURGE:	9:56	15.53	–

	DEPTH OF WELL	52.49	FEET
	DEPTH TO WATER	13.23	FEET
	DEPTH OF WATER COLUMN	39.26	FEET
WELL PURGE	FACTOR *	X 0.618	
	VOLUME TO BE REMOVED	24.26	

TIME	pH (SU)	TEMP (C)	CONDUCTIVITY (umohs/cm)	SALINITY (0/00)	TURBIDITY	DISS. O2 (mg/l)
8:45	7.53	14.2	2274	1.2	O.R.	–
9:18	7.43	16.4	2337	1.2	O.R.	–
9:33	7.40	18.0	2332	1.2	O.R.	–
					O.R - over range	

SAMPLED BY: AZ 4 EM

COMMENTS: Very muddy - slow recovery, well goes almost dry between volumes
Filtered metals

* FACTOR = 0.618. FOR 2 INCH DIAMETER WELL CASING

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MATERIALS ENGINEERING DIVISION

[redacted] WELL MONITORING DATA SHEET

PROJECT: HH - PORT IVORY P&G SITE	JOB NO: 501-233-295
WELL DESIGNATION: PAMW-10D	DATE: 11/30/00
CHECK BOX FOR LOWFLOW: ☐ RATE(ML):	CASING DIAMETER: 2" Inch
WEATHER CONDITIONS:	STICK-UP DISTANCE:
STATIC WATER LEVEL GPS COORD'S: LONG.:	LAT.:

		DISTANCE FROM TOP OF PIPE TO:	
	TIME	WATER (FEET)	PRODUCT (FEET)
PRE-PURGE:	14:36	7.18	–
POST PURGE:	15:30	7.68	–

	DEPTH OF WELL	33.58	FEET
	DEPTH TO WATER	7.18	FEET
	DEPTH OF WATER COLUMN	26.40	FEET
WELL PURGE	FACTOR *	X 0.618	
	VOLUME TO BE REMOVED	16.32	

TIME	pH (SU)	TEMP (C)	CONDUCTIVITY (umohs/cm)	SALINITY (0/00)	TURBIDITY	DISS. O2 (mg/l)
14:46	6.76	14.8	2742	1.4	32	–
14:56	6.74	15.6	2686	1.4	40	–
15:07	6.76	15.8	2729	1.4	35	–

SAMPLED BY: AZ & E.A

COMMENTS: Good recovery

* FACTOR = 0.618 FOR 2 INCH DIAMETER WELL CASING

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MATERIALS ENGINEERING DIVISION

~~[illegible]~~ WELL MONITORING DATA SHEET

PROJECT: HH - PORT IVORY P&G SITE	JOB NO: 501-233-295
WELL DESIGNATION: PAMW7	DATE: 11/27/00
CHECK BOX FOR LOWFLOW: ☐ RATE(ML):	CASING DIAMETER: Inch
WEATHER CONDITIONS:	STICK-UP DISTANCE:
STATIC WATER LEVEL GPS COORD'S: LONG:	LAT.:

		DISTANCE FROM TOP OF PIPE TO:	
	TIME	WATER (FEET)	PRODUCT (FEET)
PRE-PURGE:	8:10	6.63	
POST PURGE:	10:25	7.08	

	DEPTH OF WELL	13.10	FEET
	DEPTH TO WATER	6.63	FEET
	DEPTH OF WATER COLUMN	6.47	FEET
WELL PURGE	FACTOR * 2"	X 0.618	
	VOLUME TO BE REMOVED	3.99	

TIME	pH (SU)	TEMP (C)	CONDUCTIVITY ~~(umohs/cm)~~ mS	SALINITY (0/00)	TURBIDITY	DISS. O2 (mg/l)
:25 *	7.06	14.9			700	1.06
10:50	7.40	15.6	1.00	0.5	270	
10:55	7.41	15.6	0.96	0.5	120	
11:00	7.42	15.8	0.98	0.5	210	

SAMPLED BY:

COMMENTS: Sample for metals filtered, high turbidity.
* Well pumped continuously till next reading

* FACTOR = 0.618 FOR 2INCH DIAMETER WELL CASING

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MATERIALS ENGINEERING DIVISION

~~[illegible]~~ WELL MONITORING DATA SHEET

PROJECT: HH - PORT IVORY P&G SITE	**JOB NO:** 501-233-295
WELL DESIGNATION: PAMW-7D	**DATE:** 11/30/00
CHECK BOX FOR LOWFLOW: ☐ RATE(ML):	**CASING DIAMETER:** 2" Inch
WEATHER CONDITIONS:	STICK-UP DISTANCE:
STATIC WATER LEVEL GPS COORD'S: LONG.:	LAT.:

		DISTANCE FROM TOP OF PIPE TO:	
	TIME	**WATER (FEET)**	**PRODUCT (FEET)**
PRE-PURGE:	10:08	11.01	—
POST PURGE:	11:25	16.37	—

WELL PURGE

DEPTH OF WELL	46.40	FEET
DEPTH TO WATER	11.01	FEET
DEPTH OF WATER COLUMN	35.39	FEET
FACTOR *	X 0.618	
VOLUME TO BE REMOVED	21.87	

TIME	pH (SU)	TEMP (C)	CONDUCTIVITY (umohs/cm)	SALINITY (0/00)	TURBIDITY	DISS. O2 (mg/l)
10:22	7.78	15.2	3554	1.4	110	—
10:35	7.32	16.8	4486	2.4	950	—
11:00	7.32	17.0	3094	1.6	O.R.	—
11:16	7.31	16.4	3123	1.6	O.R.	—

SAMPLED BY: AZ & E.M.

COMMENTS: Very slow recovery - It runs almost dry

Red muddy water

Filtered metals

* FACTOR = 0.618 FOR 2 INCH DIAMETER WELL CASING

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MATERIALS ENGINEERING DIVISION

~~[illegible]~~ WELL MONITORING DATA SHEET

PROJECT: HH - PORT IVORY P&G SITE	**JOB NO:** 501-233-295
WELL DESIGNATION: MW- GW-7	**DATE:** 11/24/00
CHECK BOX FOR LOWFLOW: ☐ RATE(ML):	**CASING DIAMETER:** 2" Inch
WEATHER CONDITIONS:	STICK-UP DISTANCE:

STATIC WATER LEVEL GPS COORD'S : LONG.: LAT.:

		DISTANCE FROM TOP OF PIPE TO:	
	TIME	**WATER (FEET)**	**PRODUCT (FEET)**
PRE-PURGE:	11:14	8.82	–
POST PURGE:	12:36	9.26	–

DEPTH OF WELL	14.98	FEET
DEPTH TO WATER	8.82	FEET
DEPTH OF WATER COLUMN	6.16	FEET
FACTOR *	X 0.618	
VOLUME TO BE REMOVED	3.81	

WELL PURGE

TIME	pH (SU)	TEMP (C)	CONDUCTIVITY (umohs/cm)	SALINITY (0/00)	TURBIDITY	DISS. O2 (mg/l)
11:36	6.87	~~[illegible]~~ 14.7	707	0.4	60	–
11:39	6.60	16.6	702	0.3	14	–
11:45	6.61	16.7	704	0.3	5.1	–
11:50	6.60	16.7	705	0.3	5.2	–

SAMPLED BY: A2 & DP

COMMENTS:

* FACTOR = 0.618 FOR 2 INCH DIAMETER WELL CASING

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MATERIALS ENGINEERING DIVISION

[redacted] WELL MONITORING DATA SHEET

PROJECT: HH - PORT IVORY P&G SITE	JOB NO: 501-233-295
WELL DESIGNATION: GW-10	DATE: 11-24-00
CHECK BOX FOR LOWFLOW: ☐ RATE(ML):	CASING DIAMETER: 2 Inch
WEATHER CONDITIONS: SUNNY, 34°F	STICK-UP DISTANCE: 0.0
STATIC WATER LEVEL GPS COORD'S : LONG.:	LAT.:

		DISTANCE FROM TOP OF PIPE TO:	
	TIME	WATER (FEET)	PRODUCT (FEET)
PRE-PURGE:	3:26PM	6.98	—
POST PURGE:	4:19PM	7.81	

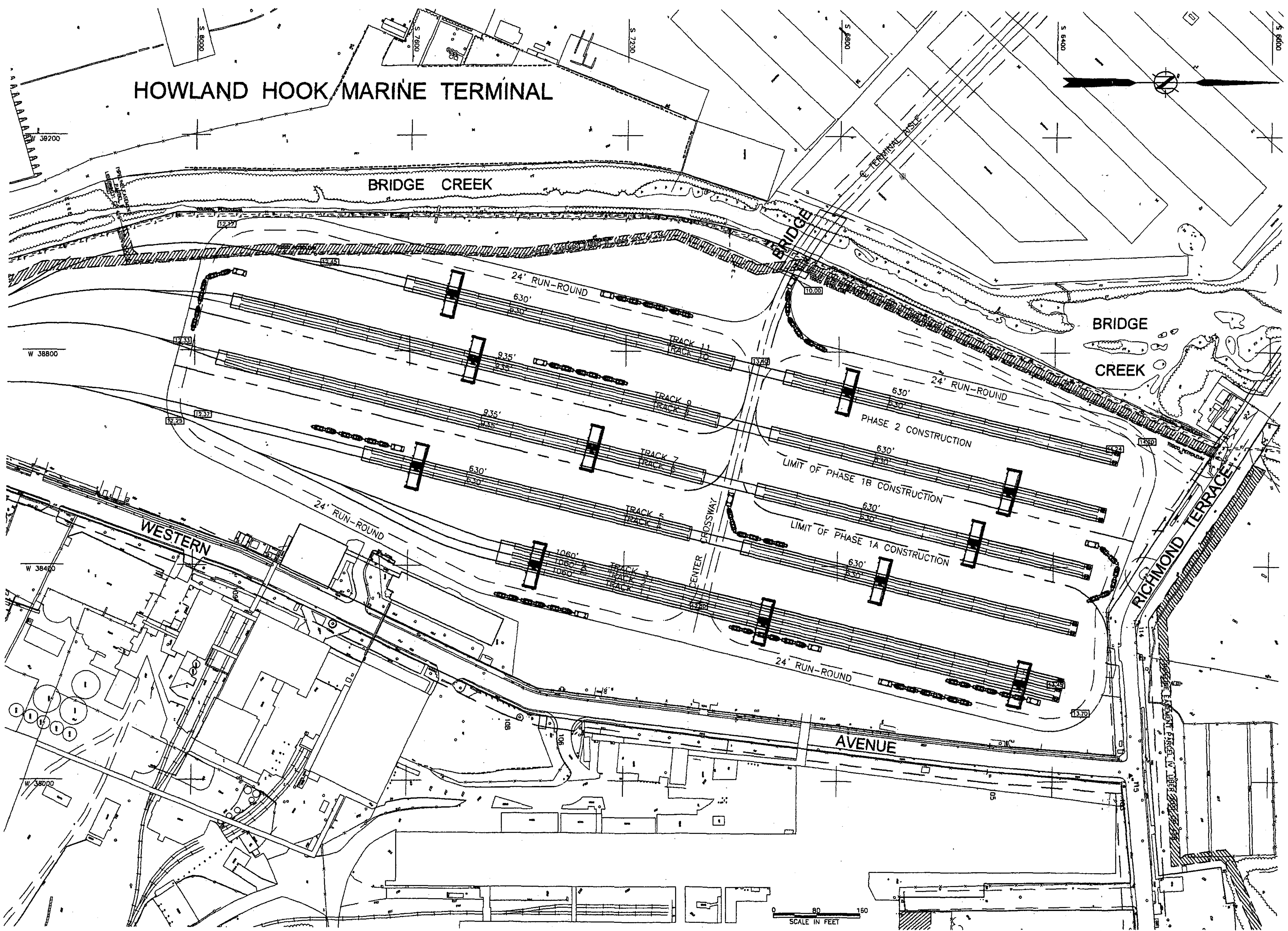
	DEPTH OF WELL	13.42	FEET
	DEPTH TO WATER	6.98	FEET
	DEPTH OF WATER COLUMN	6.44	FEET
WELL PURGE	FACTOR *	X 0.618	
	VOLUME TO BE REMOVED	3.98	

TIME	pH (SU)	TEMP (C)	CONDUCTIVITY (umohs/cm) (uS)	SALINITY (0/00)	TURBIDITY	DISS. O2 (mg/l)
3:30PM	8.13	15.2°	2620	1.4	50	–
3:42PM	8.07	15.1°	2523	1.3	30	–
3:50PM	7.69	15.2°	2718	1.4	25	–
3:59PM	7.72	15.3°	2712	1.4	23	—

SAMPLED BY: RG / EM.

COMMENTS: well sampled @ 4:17PM

* FACTOR = 0.618 FOR 2 INCH DIAMETER WELL CASING



Sheet 1 of 2

THE PORT AUTHORITY OF NY & NJ

DMJM HARRIS
The People Who Get It Done.
AN AECOM COMPANY

No.	Date	Revision	Approved

ENGINEERING DEPARTMENT

HOWLAND HOOK
MARINE TERMINAL
PORT IVORY

CIVIL

Title

PORT IVORY
INTERMODAL FACILITY

PRELIMINARY
SITE
PLAN

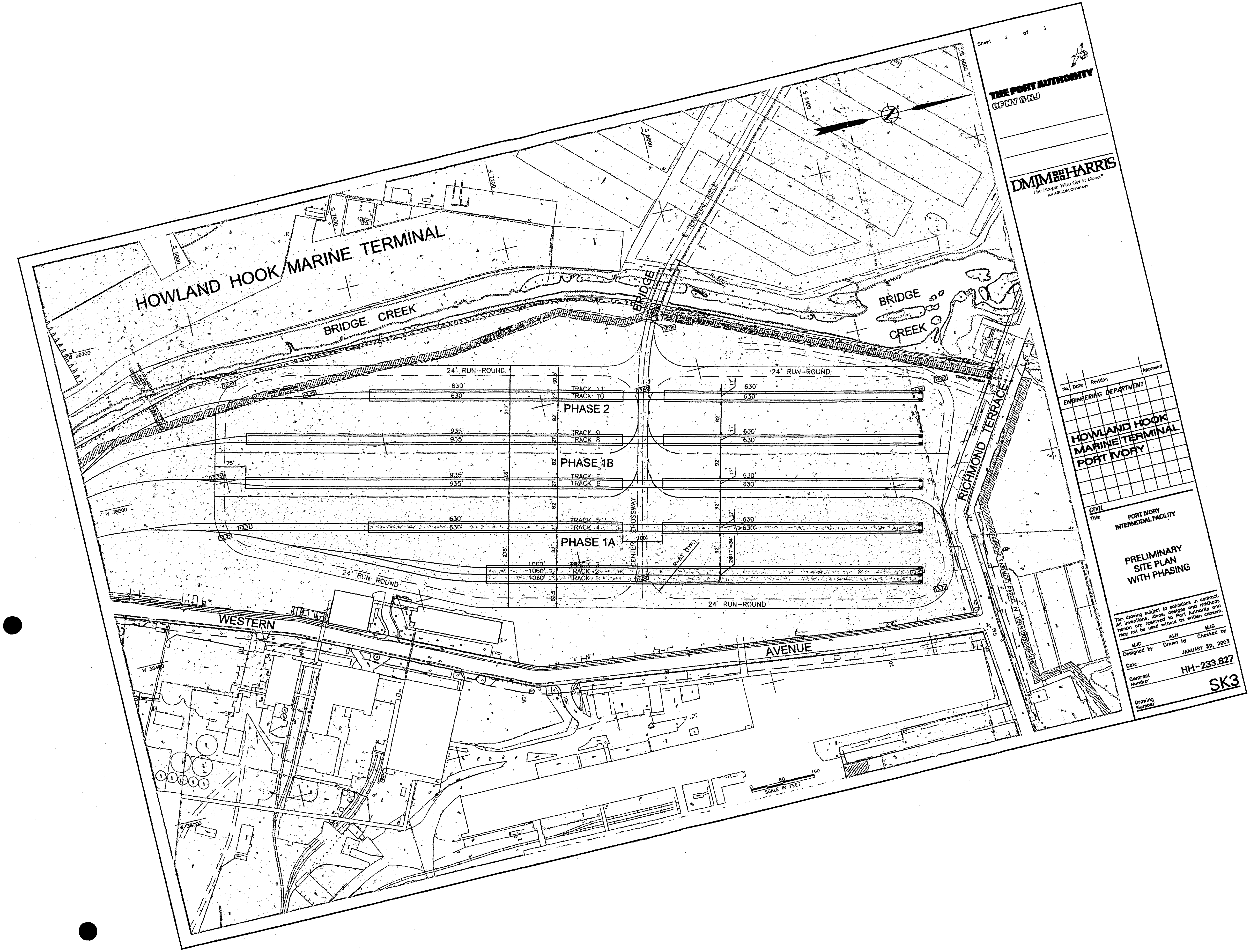
This drawing subject to conditions in contract. All inventions, ideas, designs and methods herein are reserved to Port Authority and may not be used without its written consent.

MJG	ALH	MJG
Designed by	Drawn by	Checked by

Date JANUARY 30, 2003

Contract Number HH-233.827

Drawing Number SK1


Sheet 3 of 3
THE PORT AUTHORITY OF NY & NJ
DMJM HARRIS
The People Who Get It Done.
AN AECOM COMPANY
No. Date Revision Approved
ENGINEERING DEPARTMENT
HOWLAND HOOK MARINE TERMINAL PORT IVORY
CIVIL
Title PORT IVORY INTERMODAL FACILITY
PRELIMINARY SITE PLAN WITH PHASING
This drawing subject to conditions in contract. All inventions, ideas, designs and methods herein are reserved to Port Authority and may not be used without its written consent.
Designed by MJG
Drawn by ALH
Checked by MJG
Date JANUARY 30, 2003
Contract Number HH-233.827
Drawing Number SK3
HOWLAND HOOK MARINE TERMINAL
BRIDGE CREEK
BRIDGE
BRIDGE CREEK
RICHMOND TERRACE
WESTERN AVENUE
24' RUN-ROUND
24' RUN-ROUND
24' RUN ROUND
24' RUN-ROUND
TRACK 11
TRACK 10
TRACK 9
TRACK 8
TRACK 7
TRACK 6
TRACK 5
TRACK 4
TRACK 3
TRACK 2
TRACK 1
630'
935'
1060'
PHASE 2
PHASE 1B
PHASE 1A
CENTER CROSSWAY
100'
R=83' (TYP.)
2@17'=34'
217'
609'
275'
82'
92'
27'
17'
60.5'
75'
SCALE IN FEET 0 80 150
W 38200
W 38800
W 38400
W 38000
S 7200
S 7600
S 8000
S 8600
S 9000
S 8400

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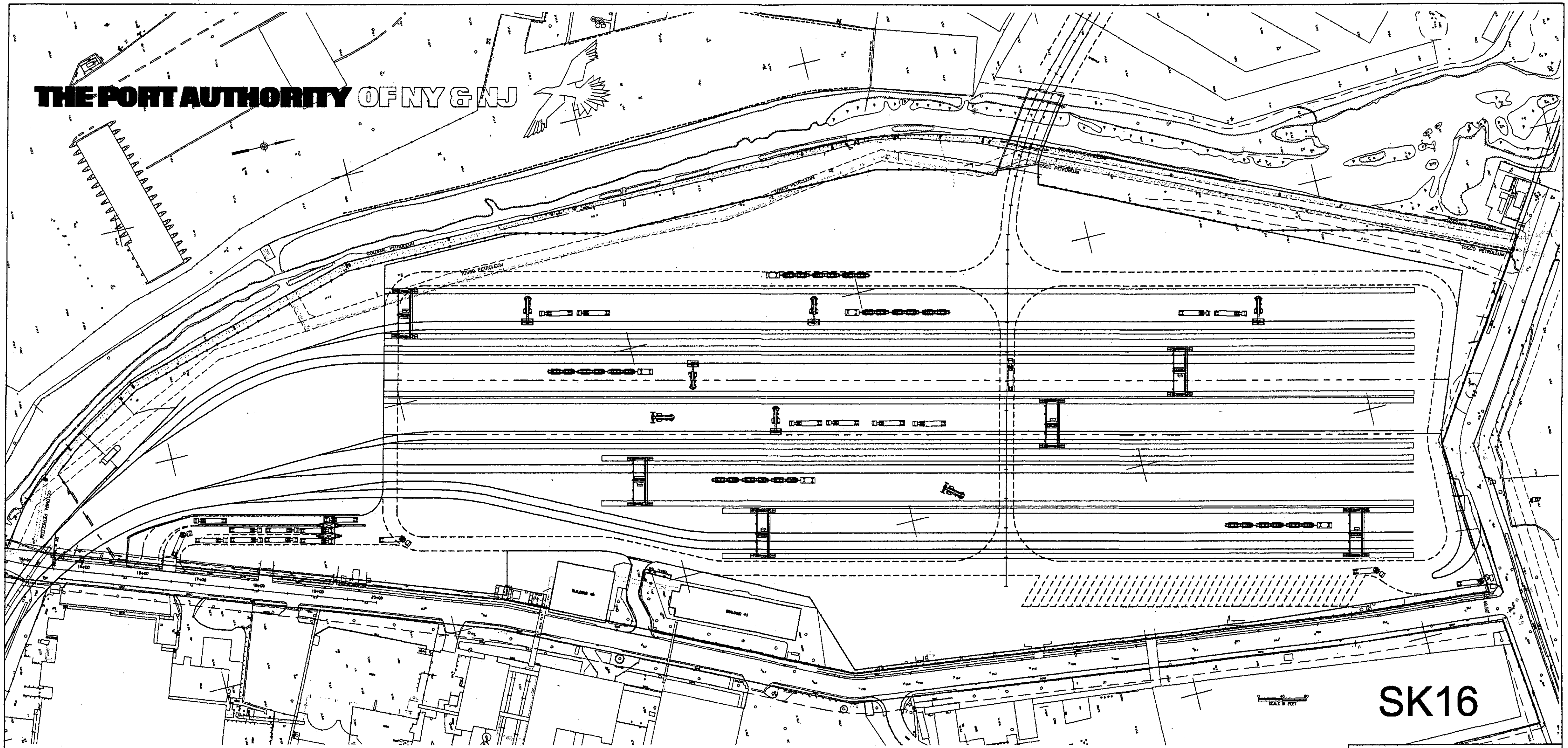


SK16

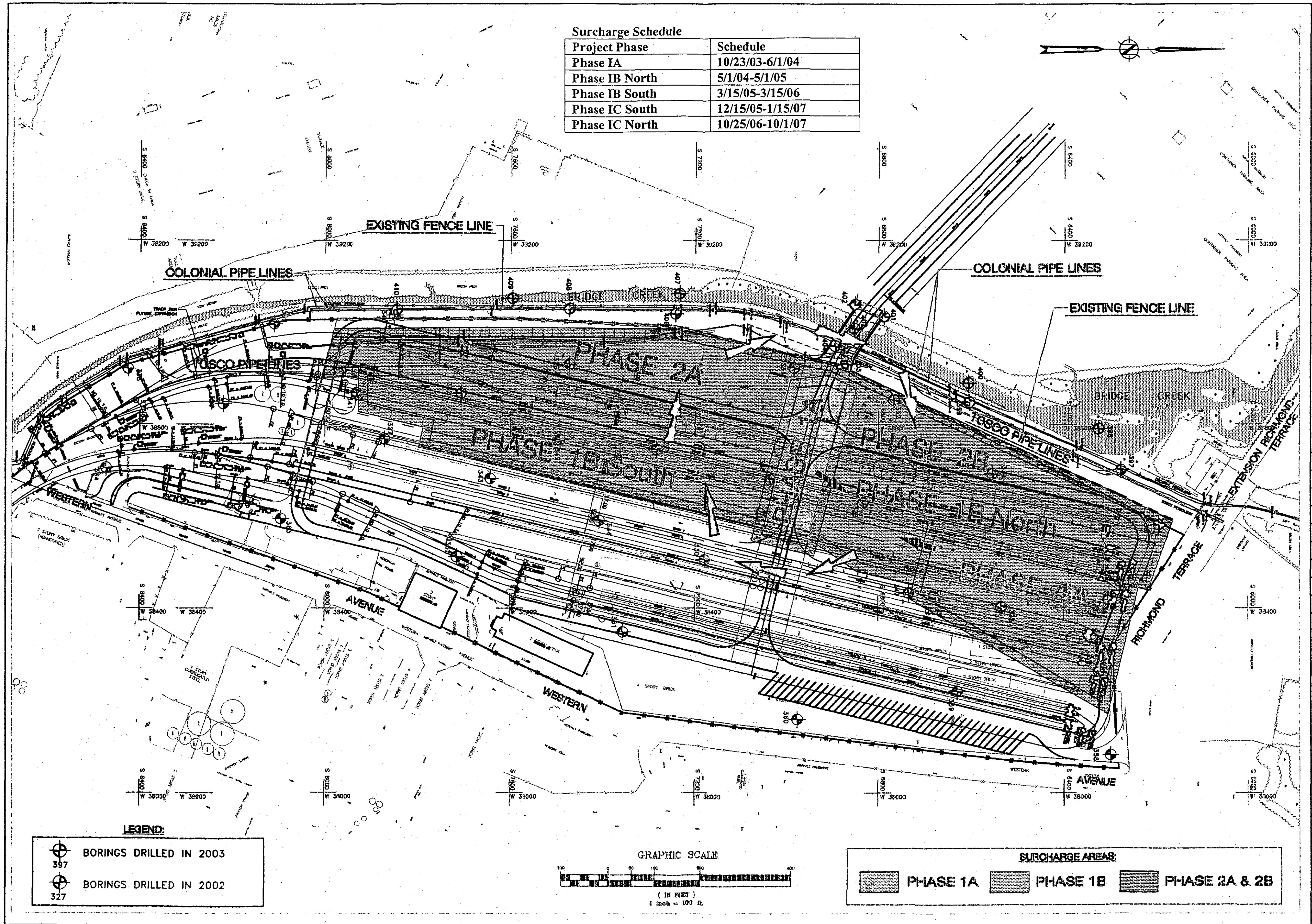
REVISED LAYOUT – OCTOBER 13, 2003

PORT IVORY INTERMODAL FACILITY

DMJM HARRIS
AN AECOM COMPANY

Surcharge Schedule

Project Phase	Schedule
Phase IA	10/23/03-6/1/04
Phase IB North	5/1/04-5/1/05
Phase IB South	3/15/05-3/15/06
Phase IC South	12/15/05-1/15/07
Phase IC North	10/25/06-10/1/07



Sheet 1 of

THE PORT AUTHORITY OF NY & NJ

CHIEF GEOTECHNICAL ENGINEER

No.	Date	Revision	Approved

ENGINEERING DEPARTMENT

HOWLAND HOOK
MARINE TERMINAL

GEOTECHNICAL

Title

PORT IVORY

SEQUENCING
OF
SURCHARGE
AREAS

S. SHETH	G. LAUTENSCHLAGER	S. SHETH
Designed by	Drawn by	Checked by

Date SEPTEMBER 29, 2003

Contract Number

Drawing Number SK1

PA 547
6-90

THE PORT AUTHORITY OF NY & NJ

Engineering Department
Construction Division
Materials Engineering Section

BORING REPORT

SHEET 1 OF 3

PROJECT HHMT - Port Ivory Surcharge Test		**NAME OF CONTRACTOR** Craig Drilling	**BORING NO.** PG-ST-1S	**SURFACE ELEV.**
LOCATION As Located in field as per Drawings North Side			**CONTRACT NO.** 426-99-006	**DATE** 10/23/02

SPOON 2 "O.D. 1 3/8 "I.D. **CASING SIZE** Augers **HOLE TYPE** 'A' Monitor
HAMMER Auto 140 # FALL 30 " **HAMMER** # FALL "
DRILLER D Cooke
INSPECTOR D Howe

GROUND WATER LEVEL

Date	Time	Depth	Remarks
10/21/02	12 45 P	3.7	While Hand Augering

CASING BLOWS/FT.	DEPTH	SPOON BLOWS/6"	RE-COV'D [1]	SAMP. NO. [2]	[3]SAMPLE DESCRIPTION AND REMARKS ______ LINE LOCATES CHANGE OF PROFILE	
	0					0.0
Hand		Hand Auger	Fill			
Auger				1	Fill - RCA - Recycled Concrete Agg	
				2 A	Same	3.0
				B	Fill - Crushed Stone	
	5			3		
					Same	6.0
Hollow		1-WOH				
Stem		WOH	19"	4	Fill White & Gray Limestone Slurry	
Augers		W O				
	10	H	23"	5	Same	
		W O				
		H	24"	6	Same	
		W O				
		H	24"	7	Same	
	15	W O				
		H	24"	8	Same	
		W O				
		H	20"	9	Same	
		W O		10 A	Fill - Green Limestone Slurry	19.0
	20	H	16"	B	Black Peat	20.0
					Bottom of Boring	
					All Samples checked with PID Meter	
	25				No Samples Saved, All Discarded	

NOTES: 1 — Length recovered; 0" — Loss of Sample, T — Trap used
2 — U = undisturbed; A = auger; OER = open end rod; V = vane
3 — Log depth of change in color of wash water, loss of water, artesian water, sand heave in casing, etc.

PORT AUTHORITY OF NY & NJ

Engineering Department - Materials Division

Well Installation Report

Sheet 2 of 3

PROJECT HHMT-Port Ivory Surcharge Test				CONTRACT NO. 426-99-006
LOCATION As Laid out in field as per Drawing North Side				CONTRACTOR Craig Drilling
WELL NO. PG-ST-15	WELL TYPE 'A' Monitor	INSPECTOR D Hoak	DRILLER D Cooke	DATE 10/24/02

Well Development Report

(NOTE: WATER LEVEL READINGS FROM TOP OF PVC)

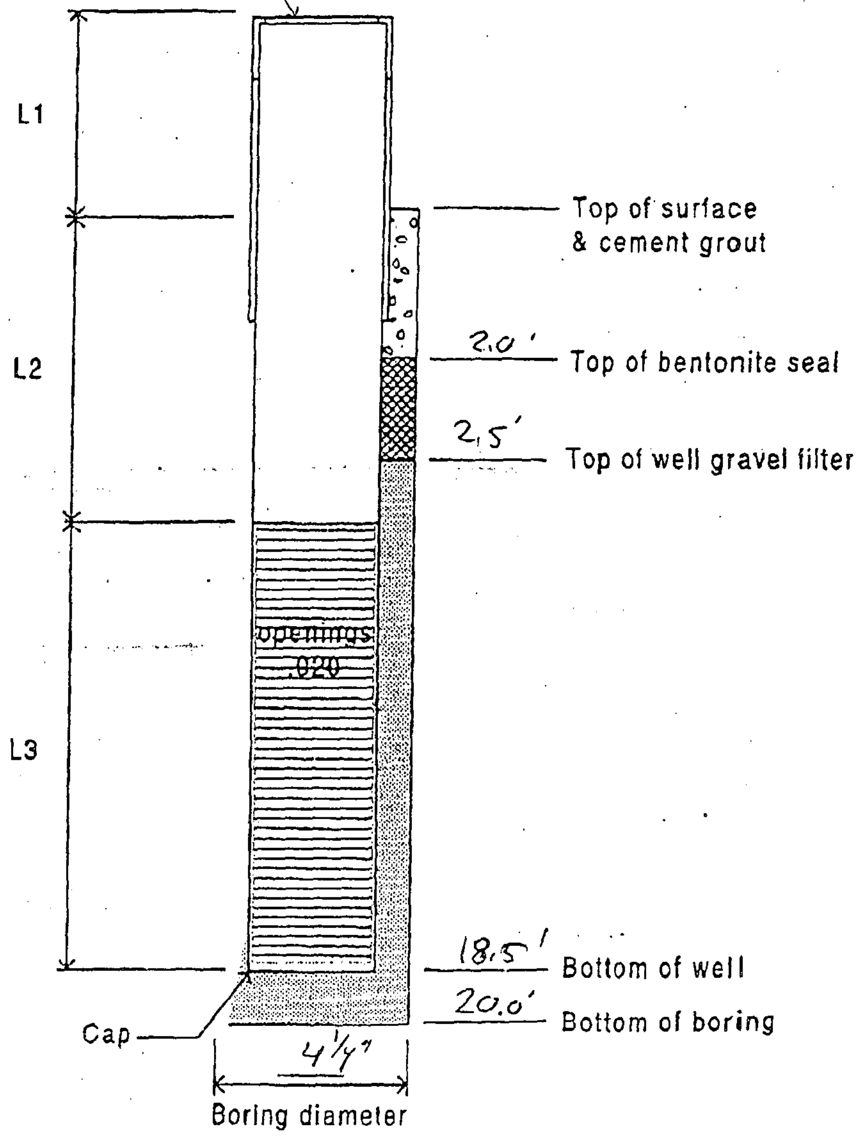
DATE 10/28/02	WATER LEVEL BEFORE 6.0	WATER LEVEL AFTER 6.0	TAKEN 20 MINUTES AFTER

2" " dia. PVC pipe w/steel locking cap

L1 = 30

L2 = 3.0'

L3 = 15.5'



REMARKS:
Hole Backfilled 18.5-20.0' with Bentonite

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ENGINEERING DEPARTMENT

MATERIALS ENGINEERING DIVISION

PID READINGS

Sheet 3 of 3

PROJECT: HH MT- Port Ivory Surcharge Test

BORING No. PG ST 1S

DATE: 10/23/02

FIELD READINGS BY: O'Hara

PID Model: Mini RAE

TIME	SAMPLE No.	IN-SITU Split Spoon Reading	HEAD-Space Reading	BREATHING Zone Reading	REMARKS
AM	1.		0.0		
↓	2A		0.0		
↓	2B		0.0		
PM	3		0.0		
↓	4		0.0		
	5		0.0		
	6		0.0		
	7		0.0		
	8		0.0		
	9		0.0		
	10A		0.0		
↓	10B		0.3		Peat

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THE PORT AUTHORITY OF NY & NJ

Engineering Department
Construction Division
Materials Engineering Section

BORING REPORT

SHEET 1 OF

PROJECT: HHMT- Port Ivory Surcharge Test
NAME OF CONTRACTOR: Craig Drilling
BORING NO.: PG-ST-1D
SURFACE ELEV.:
LOCATION: As Laid out in field as per Drawing North Side
CONTRACT NO.: 426-99-006
DATE: 10/24/02
SPOON: 2 "O.D. 1 3/8 "I.D.
CASING SIZE: HW
HOLE TYPE: "B" Monitor
HAMMER: 140 # FALL 30 "
HAMMER: # FALL "
DRILLER: D Cooke
INSPECTOR: D Howe

GROUND WATER LEVEL

Date	Time	Depth	Remarks
10/24	10^{30}	5.0	While Hand Augering

CASING BLOWS/FT.	DEPTH	SPOON BLOWS/6"	RE-COV'D[1]	SAMP.[2] NO.	[3]SAMPLE DESCRIPTION AND REMARKS ____ LINE LOCATES CHANGE OF PROFILE
					0.0
Hand	0	Hand Auger	Full		
Auger				1	Fill- RCA Recycled Concrete Agg
				2	Same 4.0
	5			3	
	6				Fill- Crushed, Stone, Silt, Sand, ETC
HW					
Casing					For Strata 6-20' See Log For PG-ST-1S
	20				
		1-0			
		1-1	8"	4	Black & Brown Peat
		WOH-1			
		2-2	23"	5	Same
	25	WOH-1			
		2-2	11"	6	Same 26.0
		3-3			
		4-5	12"	7	F Grey Sand, Tr Silt
	30				
		3-5			
		6-7	10"	8	Same
	35				

NOTES: 1 — Length recovered; 0" — Loss of Sample, T — Trap used
2 — U = undisturbed; A = auger; OER = open end rod; V = vane
3 — Log depth of change in color of wash water, loss of water, artesian water, sand heave in casing, etc.

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6-90

THE PORT AUTHORITY OF NY & NJ

Engineering Department
Construction Division
Materials Engineering Section

BORING REPORT

SHEET 2 OF 4

PROJECT HMMT- Port Ivory Surcharge Test
NAME OF CONTRACTOR Craig Drilling
BORING NO. PG-ST- 1D
SURFACE ELEV.
LOCATION As Laid out in field as per Drawing North Side
CONTRACT NO. 426-99-006
DATE 10/24/02
SPOON 2 "O.D. 1 3/8 "I.D.
CASING SIZE HW
HOLE TYPE "B" Mouton
HAMMER Auto 140 # FALL 30 "
HAMMER # FALL "
DRILLER D Cooke
INSPECTOR D Howe

GROUND WATER LEVEL			
Date	Time	Depth	Remarks

CASING BLOWS/FT.	DEPTH	SPOON BLOWS/6"	RE-COV'D[1]	SAMP.[2] NO.	[3]SAMPLE DESCRIPTION AND REMARKS ______ LINE LOCATES CHANGE OF PROFILE	35.0
HW	35	4-4		9		
Casing		5-5	10"		M-F Brown Sand, Tr Silt	37.0
						9
					Bottom of Boring	
	40				All Samples checked with PID Motor	
					No Sample Saved, All Discarded	
	45					
	50					
	55					
	60					

NOTES: 1 — Length recovered; 0" — Loss of Sample, T — Trap used
2 — U = undisturbed; A = auger; OER = open end rod; V = vane
3 — Log depth of change in color of wash water, loss of water, artesian water, sand heave in casing, etc.

PORT AUTHORITY OF NY & NJ

Engineering Department - Materials Division

Well Installation Report

Sheet 2 of 4

PROJECT HHMT- Port Ivory Surcharge Test				CONTRACT NO. 426-99-006
LOCATION As Laid out in field as per Drawings				CONTRACTOR Craig Drilling
WELL NO. PG ST-2D	WELL TYPE 'B' Monitor	INSPECTOR D. Howe	DRILLER D Howe	DATE 10/27/02

Well Development Report

(NOTE: WATER LEVEL READINGS FROM TOP OF PVC)

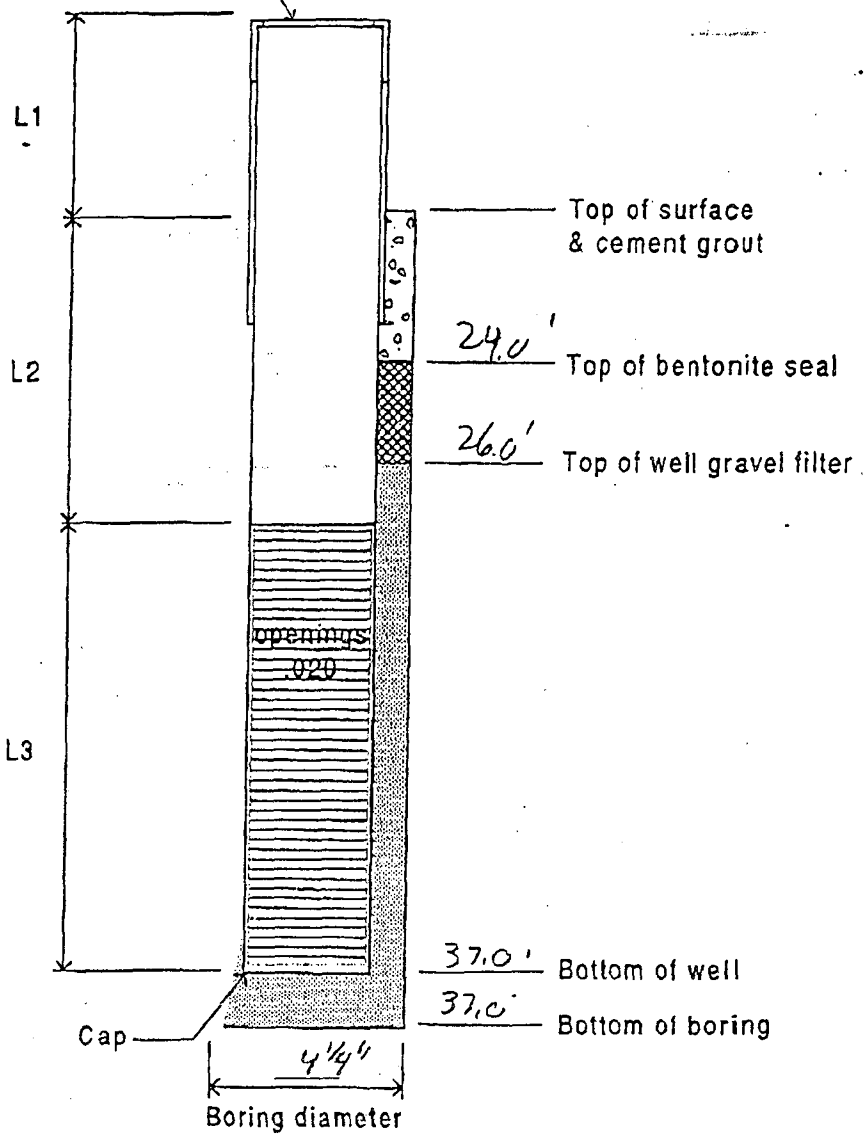
DATE 10/28/02	WATER LEVEL BEFORE 15.1	WATER LEVEL AFTER 15.1	TAKEN 10 MINUTES AFTER

2 " dia. PVC pipe w/steel locking cap

L1 = 3.0'

L2 = 27.0'

L3 = 10.0'



REMARKS:

THE PORT AUTHORITY OF N.Y & N.J.

ENGINEERING DEPARTMENT

MATERIALS ENGINEERING DIVISION

PID READINGS

Sheet 4 of 4

PROJECT: HHMT- Port Ivory Surcharge Test

BORING No. PG-ST-10

DATE: 10/24/02

FIELD READINGS BY: D Howe

PID Model: Mini Rae

TIME	SAMPLE No.	IN-SITU Split Spoon Reading	HEAD-Space Reading	BREATHING Zone Reading	REMARKS
AM	1		0.0		
↓	2		0.0		
↓	3		0.0		
↓	4		0.0		
↓	5		0.0		
PM	6		0.0		
↓	7		0.0		
↓	8		0.0		
↓	9		0.0		

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6-90

THE PORT AUTHORITY OF NY & NJ

Engineering Department
Construction Division
Materials Engineering Section

BORING REPORT

SHEET 1 OF 3

PROJECT HMMT - Port Ivory Surcharge Test	NAME OF CONTRACTOR Craig Drilling	BORING NO. PG ST 25	SURFACE ELEV.
LOCATION As Laid out in field as per drawing west side		CONTRACT NO. 426-99-006	DATE 10/25/02

SPOON 2 " O.D. 1 3/8 " I.D.
CASING SIZE Augers
HOLE TYPE 3" Monitor
HAMMER Auto 140 # FALL 30 "
HAMMER # FALL "
DRILLER D Cooke
INSPECTOR D Howe

GROUND WATER LEVEL

Date	Time	Depth	Remarks
10/25/02	8:45	3.0	While Hand Augering

CASING BLOWS/FT.	DEPTH	SPOON BLOWS/6"	RE-COV'D [1]	SAMP. NO. [2]	[3]SAMPLE DESCRIPTION AND REMARKS ______ LINE LOCATES CHANGE OF PROFILE	
	0					0.0
Hand		Hand Auger	Full	1 A	Fill - Cinders Gravel, Crushed Stone, Concrete, ETC	1.0
Auger				B	Fill - White & Grey Limestone Slurry	
				2	Same	
	5			3	Same	
Hollow		W				
Stem		O H	24"	4	Same	
Augers		W O				
	10	H	24"	5	Same	
		2-2		6		
		1-1	22"		Same Tr wood	
		1-0		7		
		1-1	23"		Same	
		4-2		8		
	15	1-2	5"		Same Tr of wood	
		W O		9		
		H	12"		Same	18.0
		2-1		10		
	20	1-2	22"		Black & Brown Peat	20.0
					Bottom of Boring	
					All Samples Checked with PID Meter	
					No Samples Saved, All Discarded	
	25					

NOTES: 1 — Length recovered; 0" — Loss of Sample, T — Trap used
2 — U = undisturbed; A = auger; OER = open end rod; V = vane
3 — Log depth of change in color of wash water, loss of water, artesian water, sand heave in casing, etc.

PORT AUTHORITY OF NY & NJ

Engineering Department - Materials Division

Well Installation Report

Sheet 2 of 3

PROJECT: HHMT - Port Ivory Surcharge Test

CONTRACT NO.: 426-95-006

LOCATION: As Laid out in field as per Drawing West Side

CONTRACTOR: Craig Drilling

WELL NO.: PG ST 25

WELL TYPE: 'A' Monitor

INSPECTOR: D Howe

DRILLER: D Cooke

DATE: 10/25/02

Well Development Report

(NOTE: WATER LEVEL READINGS FROM TOP OF PVC)

DATE: 10/28/02

WATER LEVEL BEFORE: 5.0'

WATER LEVEL AFTER: 5.0'

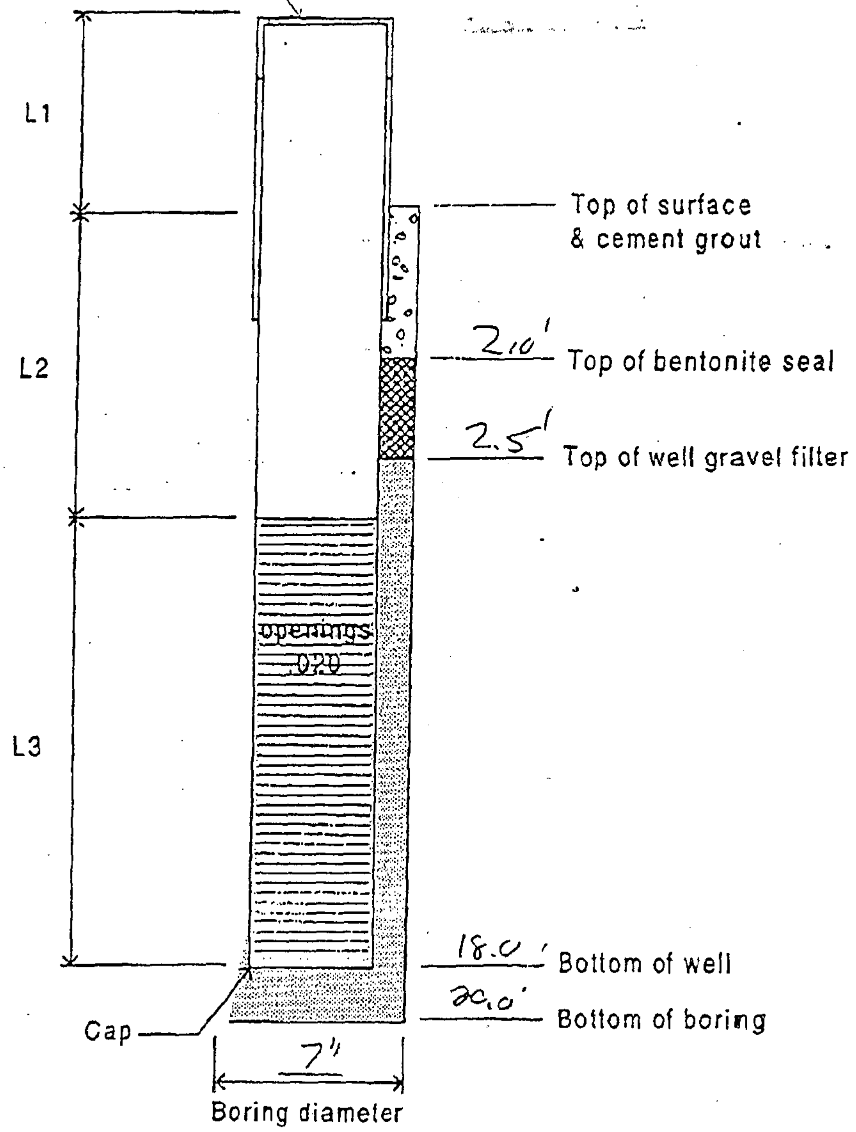
TAKEN: 15 MINUTES AFTER

2" " dia. PVC pipe w/steel locking cap

L1 = 3.0'

L2 = 3.0'

L3 = 15.0'



REMARKS: Hole Back filled 18.0-20.0 with Bentonite

THE PORT AUTHORITY OF N.Y & N.J.

ENGINEERING DEPARTMENT

MATERIALS ENGINEERING DIVISION

PID READINGS

Sheet 3 of 3

PROJECT: HH MT · Port Ivory Surcharge Test

BORING No. PG ST 25 **DATE:** 10/25/02

FIELD READINGS BY: D Hom **PID Model:** Mini RAE

TIME	SAMPLE No.	IN-SITU Split Spoon Reading	HEAD-Space Reading	BREATHING Zone Reading	REMARKS
AM	1A		0.0		
	1B		0.0		
	2		0.0		
	3		0.0		
	4		0.0		
	5		0.0		
	6		0.0		
	7		0.0		
	8		0.0		
	9		0.0		
↓	10		0.7		Post

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Construction Division
Materials Engineering Section

BORING REPORT

SHEET 1 OF 3

PROJECT HHMT - Port Ivory Surcharge Test	NAME OF CONTRACTOR Craig Drilling	BORING NO. PG-ST-2D	SURFACE ELEV.
LOCATION As Laid out In field as Per Drawing West Side		CONTRACT NO. 426-9T-006	DATE 10/25/02

SPOON 2 "O.D. 1 3/8 "I.D.	CASING SIZE HW	HOLE TYPE "B" Monitor
HAMMER 140 # FALL Auto 30 "	HAMMER # FALL "	
DRILLER D Cooke		
INSPECTOR D Howe		

GROUND WATER LEVEL

Date	Time	Depth	Remarks
10/25	1 Pm	3.0	while Hand Augering

CASING BLOWS/FT.	DEPTH	SPOON BLOWS/6"	RE-COV'D [1]	SAMP. NO. [2]	[3] SAMPLE DESCRIPTION AND REMARKS ____ LINE LOCATES CHANGE OF PROFILE	
						0.0
Hand	0	Hand Auger	Full	1 A	Fill- Cinders, Gravel, Crushed stone, Sand, ETC	1.0
Auger				B	Fill White & Gray Limestone Slurry	
				2	Same	
	5			3		
	6				Same	
HW						
Casing					For Strata 6-20' See Log for PGST 2D	
	20					
		W o H		4		
		1-1	14"		Black & Brown Peat	
		1-2		5 A	Same	23.0
		2-2	18"	B	M-F Black Sand, Tr Silt	
						25.0
	25	2-2		6		
		3-5	7"		F Gray Sand, Tr Silt	
	30				All Samples checked with PID Meter	
					No Samples Saved, All Discarded	
						32.0
		2-3		7		
		5-4	9"		F Brown Sand, Tr Silt	34.0
	35				Bottom of Boring	

NOTES: 1 — Length recovered; 0" — Loss of Sample, T — Trap used
2 — U = undisturbed; A = auger; OER = open end rod; V = vane
3 — Log depth of change in color of wash water, loss of water, artesian water, sand heave in casing, etc.

PORT AUTHORITY OF NY & NJ

Engineering Department - Materials Division

Well Installation Report

Sheet 2 of 3

PROJECT HHMT-Port Ivory Surcharge Test				CONTRACT NO. 426-99-006
LOCATION As laid out in field as per Drawing West Side				CONTRACTOR Craig Drilling
WELL NO. PG-ST-20	WELL TYPE "B" Monitor	INSPECTOR D Howe	DRILLER D Cooke	DATE 10/28/02

Well Development Report

(NOTE: WATER LEVEL READINGS FROM TOP OF PVC)

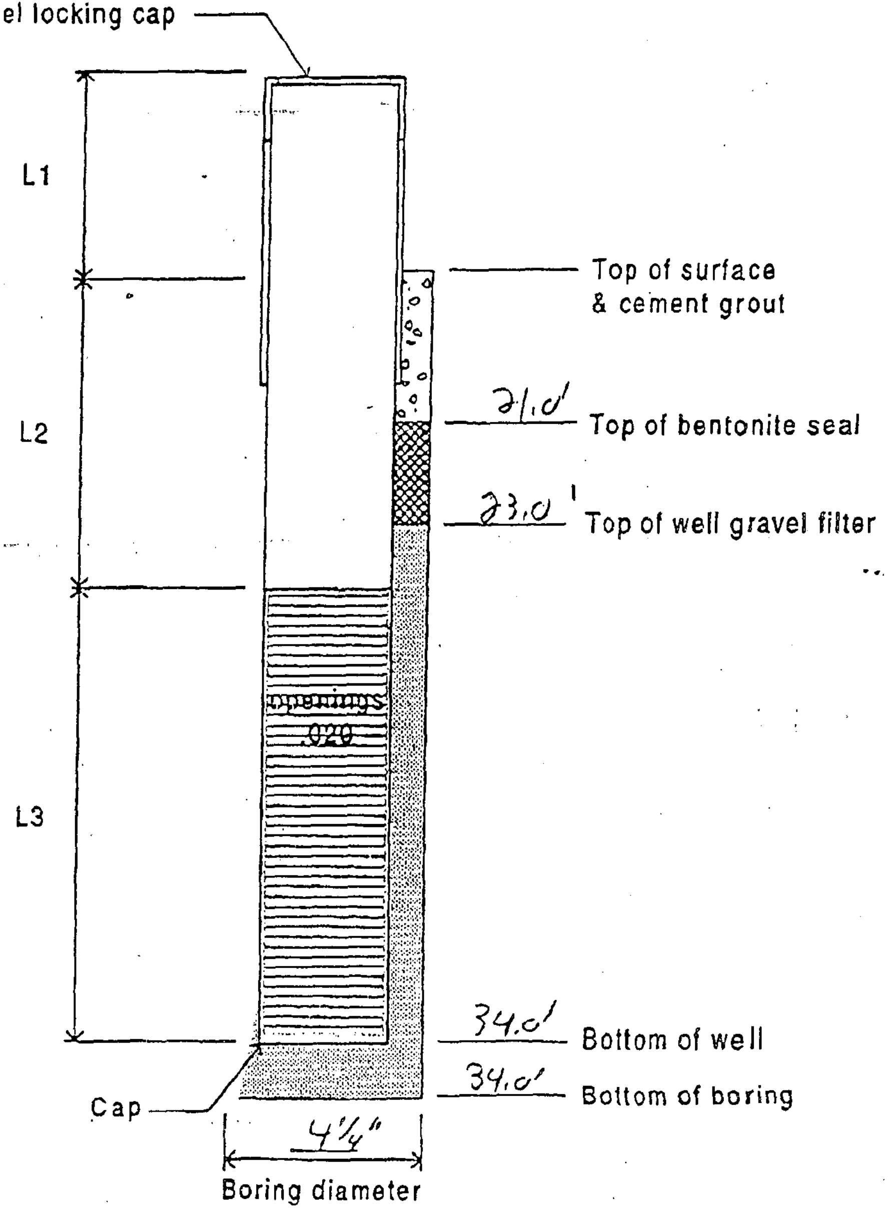
DATE 10/28/01	WATER LEVEL BEFORE 14.0	WATER LEVEL AFTER 14.0	TAKEN 10 MINUTES AFTER

2" " dia. PVC pipe w/steel locking cap

L1 = 3.0'

L2 = 24.0'

L3 = 10.0



REMARKS:

THE PORT AUTHORITY OF N.Y & N.J.

ENGINEERING DEPARTMENT

MATERIALS ENGINEERING DIVISION

PID READINGS

Sheet 3 of 3

PROJECT: HHMT- Port Ivory Surcharge Test

BORING No. PG ST 20

DATE: 10/25/02

FIELD READINGS BY: DHowe

PID Model: Mini RAE

TIME	SAMPLE No.	IN-SITU Split Spoon Reading	HEAD-Space Reading	BREATHING Zone Reading	REMARKS
PM	1A		0.0		
	1B		0.0		
	2		0.0		
	3		0.0		
	4		0.2		Peat
	5A		0.3		"
	5B		0.0		
	6		0.0		
	7		0.0		

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BORING REPORT

SHEET 1 OF 3

PROJECT: HMMT- Port Ivory Surcharge Test
NAME OF CONTRACTOR: Craig Drilling
BORING NO.: PG-ST-35
SURFACE ELEV.:
LOCATION: As Laid out in field as per Drawing South Side
CONTRACT NO.: 426-99-006
DATE: 10/22/02
SPOON: 2 "O.D. 1 3/8 "I.D.
CASING SIZE: Augers
HOLE TYPE: 8" Monitor
HAMMER: 140 Auto # FALL 30 "
HAMMER: # FALL "
DRILLER: D Cooke
INSPECTOR: D Howe

GROUND WATER LEVEL

Date	Time	Depth	Remarks
10/22/02	8:15	2.5	While Hand Augering

CASING BLOWS/FT.	DEPTH	SPOON BLOWS/6"	RE-COV'D[1]	SAMP. NO.[2]	[3]SAMPLE DESCRIPTION AND REMARKS ______ LINE LOCATES CHANGE OF PROFILE	
Hand	0	Hand Auger	Fill	1		0.0
Auger					Fill– Crushed Stone, Silt, Gravel, Cobbles, ETC	2.0
				2	Fill- Grey + White LimeStone Slurry	
	5			3	Same	
Hollow		WOH	24"	4	Same	
Stem						
Augers	10	WOH	24"	5	Same	
		WOH	22"	6	Same	
		WOH 1-1	20"	7	Same	
	15	WOH	12"	8	Same	
		WOH	18"	9A	Same	17.5
				9B	Black Peat	18.0
	20				Bottom of Boring	
					All Samples checked with PID Meter	
					No Samples saved, All Discarded	
	25					

NOTES: 1 — Length recovered; 0" — Loss of Sample, T — Trap used
2 — U = undisturbed; A = auger; OER = open end rod; V = vane
3 — Log depth of change in color of wash water, loss of water, artesian water, sand heave in casing, etc.

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Engineering Department - Materials Division

Well Installation Report

Sheet 2 of 3

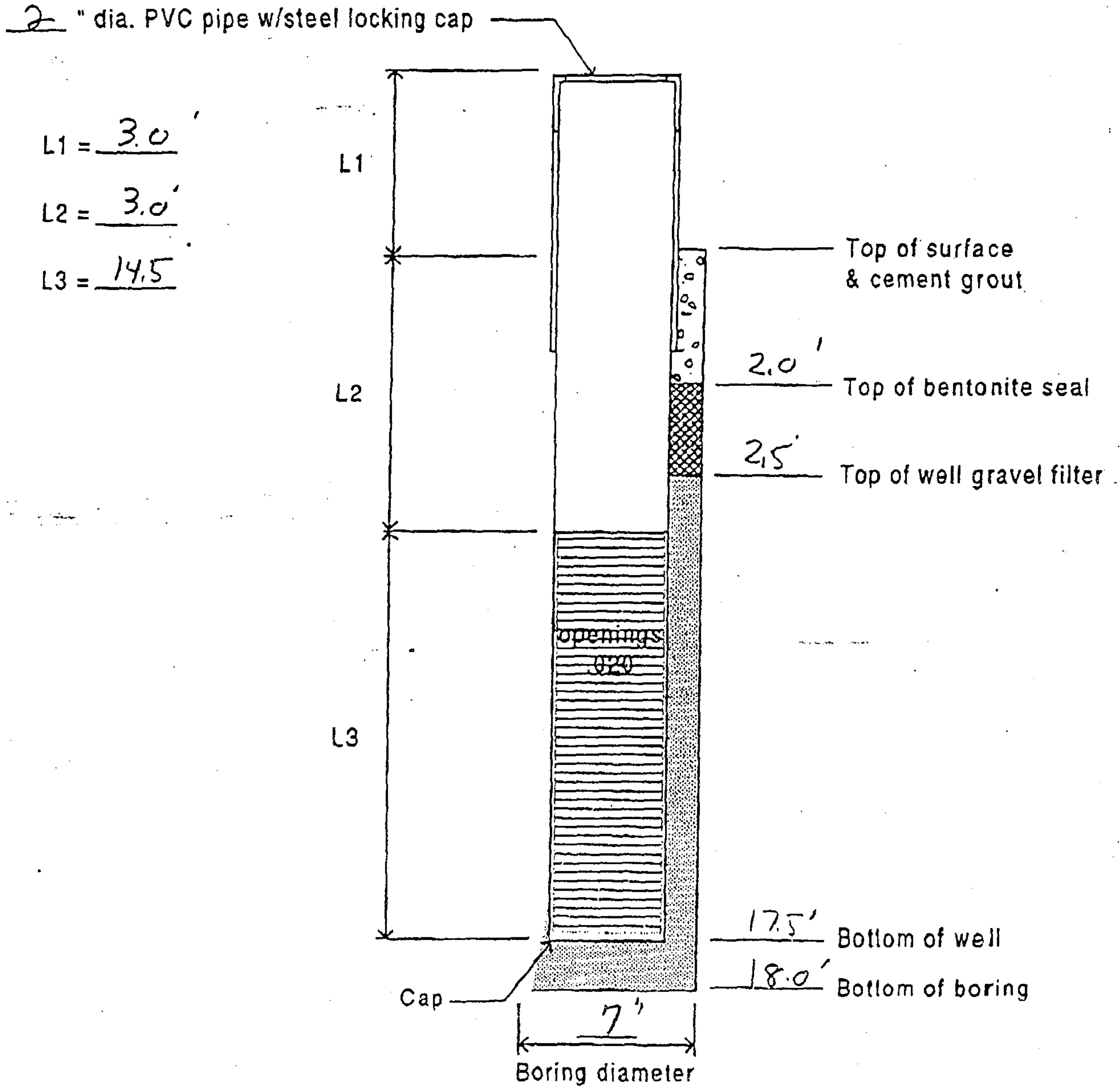
PROJECT HHMT- Port Ivory	CONTRACT NO. 426-99-006
LOCATION As laid out in field as per Drawing South Side	CONTRACTOR Craig Drilling

WELL NO. PG-ST 3S	WELL TYPE "A" Monitor	INSPECTOR D House	DRILLER D Cocks	DATE 10/22/02

Well Development Report

(NOTE: WATER LEVEL READINGS FROM TOP OF PVC)

DATE 10/23/02	WATER LEVEL BEFORE 4.0'	WATER LEVEL AFTER 4.7'	TAKEN 15 MINUTES AFTER



L1 = 3.0'

L2 = 3.0'

L3 = 14.5

REMARKS: Hole Backfilled 17.5-18.0' with Bentonite

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ENGINEERING DEPARTMENT

MATERIALS ENGINEERING DIVISION

PID READINGS

Sheet 3 of 3

PROJECT: HHMT- Port Ivory Surcharge Test

BORING No. PG-ST-35 **DATE:** 10/22/02

FIELD READINGS BY: DHoun **PID Model:** Mini RAE

TIME	SAMPLE No.	IN-SITU Split Spoon Reading	HEAD-Space Reading	BREATHING Zone Reading	REMARKS
AM	1.		0.0		
	2		0.0		
	3		0.0		
	4		0.0		
	5		0.0		
	6		0.0		
	7		0.0		
	8		0.0		
	9A		0.0		
↓	9B		0.2		Peat

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BORING REPORT

SHEET 1 OF 3

PROJECT: HHMT- Port Ivory
NAME OF CONTRACTOR: Craig Drilling
BORING NO.: PG-ST- 30
SURFACE ELEV.:
LOCATION: As laid out in field as per Drawing, South Side
CONTRACT NO.: 426-99-006
DATE: 10/22/02
SPOON: 2" O.D. 1 3/8" I.D.
CASING SIZE: HW
HOLE TYPE: 'B' Mounted
HAMMER: 140 # FALL 30" Auto
HAMMER: # FALL "
DRILLER: D Cooke
INSPECTOR: D Howe

GROUND WATER LEVEL

Date	Time	Depth	Remarks
10/22/02	11a	25	while Hand Augering

CASING BLOWS/FT.	DEPTH	SPOON BLOWS/6"	RE-COV'D [1]	SAMP. NO. [2]	[3]SAMPLE DESCRIPTION AND REMARKS ______ LINE LOCATES CHANGE OF PROFILE	0.0
Hard	0	Hard Auger	Full	1		
Auger					Fill- Crushed stone, Silt, Gravel, Sand, wood, ETC	2.0
				2	Fill - Gray & White Limestone Slurry	
	5			3		
	6				Same	
HW					For strata 6'-18' See log for PG-ST-35	
Casing	18	WO		4		
	20	H	12"		Black & Brown Peat	
		WO		5		
		H	13		Same	
		1-1		6		
		2-3	23		Same Tr of F Black Sand in tip of spoon	24.0
	25	1-1		7		
		2-2	7"		F Brown Gray Sand Tr Silt	
					All Samples checked with PID Meter	
					No Samples saved, All Discarded	
	30	3-5		8		
		8-8	7"		F Grey Sand, Tr Silt	
		2-3		9		
	35	6-7	12"		Same	35.0

Bottom of Boring

NOTES: 1 — Length recovered; 0" — Loss of Sample, T — Trap used
2 — U = undisturbed; A = auger; OER = open end rod; V = vane
3 — Log depth of change in color of wash water, loss of water, artesian water, sand heave in casing, etc.

PORT AUTHORITY OF NY & NJ

Engineering Department - Materials Division

Well Installation Report

Sheet 2 of 3

PROJECT HAMT- Port Ivory Surcharge Test				CONTRACT NO. 426-99-006
LOCATION As Laid out in field as per Drawing South Side				CONTRACTOR Craig Drilling
WELL NO. PG-ST-30	WELL TYPE 'B' Monitor	INSPECTOR D Howe	DRILLER D Cook	DATE 10/23/02

Well Development Report

(NOTE: WATER LEVEL READINGS FROM TOP OF PVC)

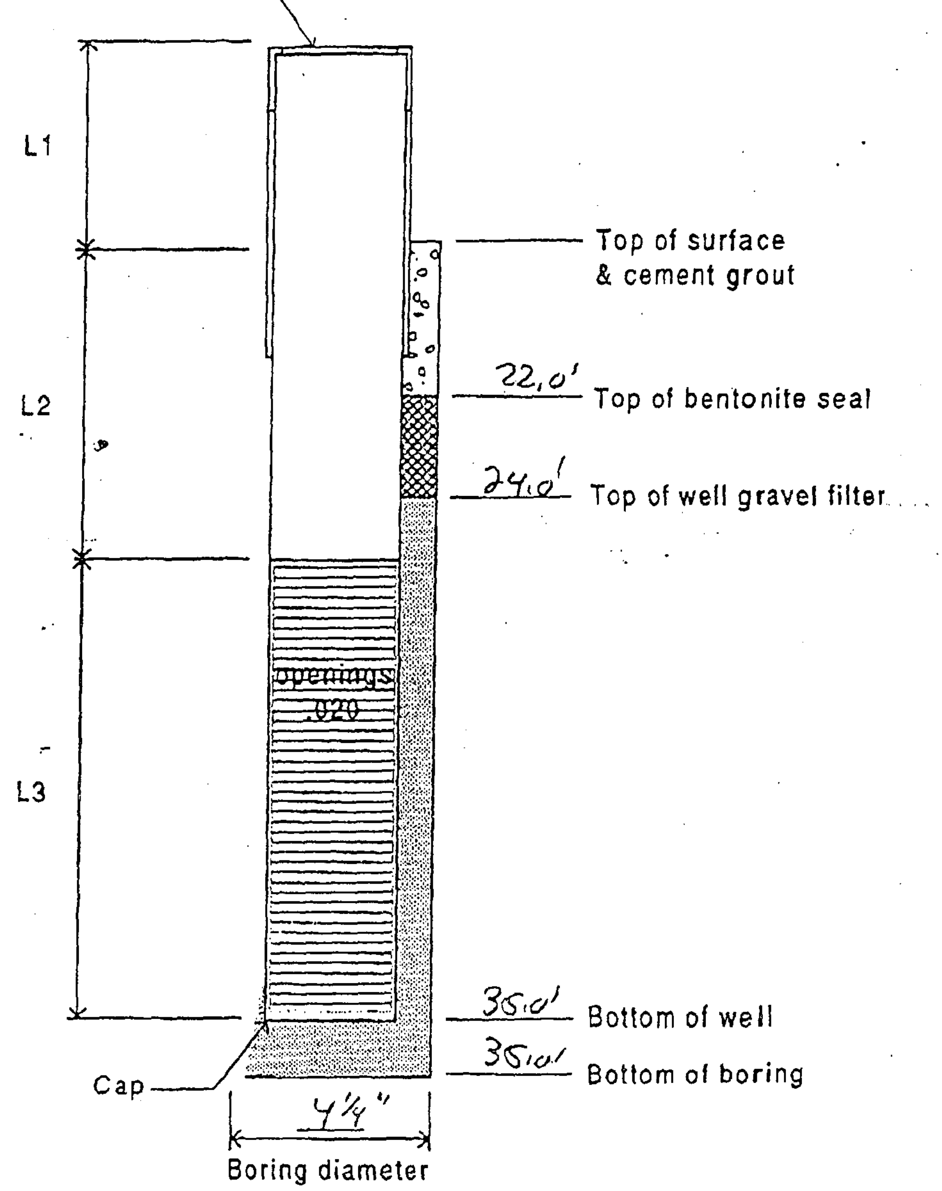
DATE 10/23/02	WATER LEVEL BEFORE 13.5	WATER LEVEL AFTER 13.5	TAKEN 15 MINUTES AFTER

2 " dia. PVC pipe w/steel locking cap

L1 = 3.0'

L2 = 26.0'

L3 = 10.0



REMARKS:

THE PORT AUTHORITY OF N.Y & N.J.

ENGINEERING DEPARTMENT

MATERIALS ENGINEERING DIVISION

PID READINGS

Sheet 3 of 3

PROJECT: HHMT- Port Ivory Surcharge Test

BORING No. PG-ST-30

DATE: 10/22/02

FIELD READINGS BY: D Howe

PID Model: Mini RAE

TIME	SAMPLE No.	IN-SITU Split Spoon Reading	HEAD-Space Reading	BREATHING Zone Reading	REMARKS
AM	1		0.0		
	2		0.0		
	3		0.0		
	4		0.0		
	5		0.0		
PM	6		00		
	7		0.0		
	8		0.0		
	9		0 0		

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Construction Division
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BORING REPORT

SHEET 1 OF 3

PROJECT HMNT-Port Ivory Surcharge Test
NAME OF CONTRACTOR Craig Drilling
BORING NO. PG-ST-45
SURFACE ELEV.
LOCATION As Laid out in field as per Drawing East Side
CONTRACT NO. 426-99-006
DATE 10/18/02
SPOON 2 "O.D. 1 3/8 "I.D.
CASING SIZE Auger
HOLE TYPE "A" Monitor
HAMMER 140 # FALL 30 " Auto
HAMMER # FALL "
DRILLER D Cooke
INSPECTOR D Howe

GROUND WATER LEVEL

Date	Time	Depth	Remarks
10/18	11 30	3.0	While Hand Augering

CASING BLOWS/FT.	DEPTH	SPOON BLOWS/6"	RE-COV'D [1]	SAMP. [2] NO.	[3] SAMPLE DESCRIPTION AND REMARKS ____ LINE LOCATES CHANGE OF PROFILE	0.0
Hand	0	Hand Auger	Fill	1 A	Fill - RCA Recycled concrete Agg	1.0
Auger				B	Fill- Crushed Stone, Silt, Sand, Concrete, ETC	
				2 A	Same	3.0
				B	Fill White & Gray Limestone Slurry	
	5			3	Same	
Hollow		1-1		4		
Stem		WOH	21"		Same	
Augers		WOH	24"	5	Same	
	10	WOH		6		
		1-1	11"		Same	
		WOH	8"	7	Same	
	15	WOH	17"	8	Same	
		WOH	15"	9	Same	
		WOH		10 A	Same	19.0
	20	1-1	20"	B	Black Peat	20.0
					Bottom of Boring	
					All Samples checked with PID Meter	
					No Samples Saved, All Discarded	
	25					

NOTES: 1 — Length recovered; 0" — Loss of Sample, T — Trap used
2 — U = undisturbed; A = auger; OER = open end rod; V = vane
3 — Log depth of change in color of wash water, loss of water, artesian water, sand heave in casing, etc.

PORT AUTHORITY OF NY & NJ

Engineering Department - Materials Division

Well Installation Report

Sheet 2 of 3

PROJECT HHMT- Port Ivory Surcharge Test				CONTRACT NO. 426-95-006
LOCATION As Laid out in field as per Drawing East Side				CONTRACTOR Craig Drilling
WELL NO. PG-ST-45	WELL TYPE "A" Monitor	INSPECTOR D Howe	DRILLER D Cooke	DATE 10/18/02

Well Development Report

(NOTE: WATER LEVEL READINGS FROM TOP OF PVC)

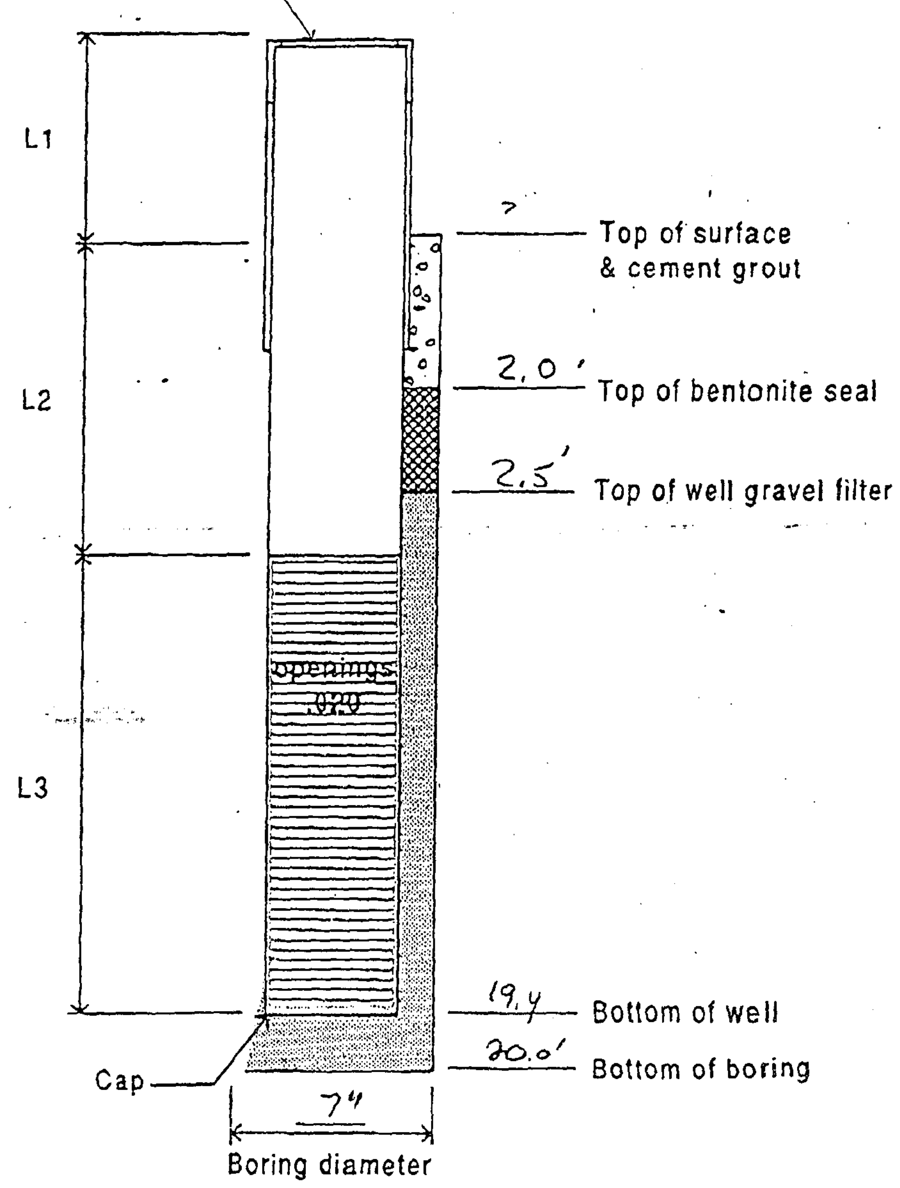
DATE 10/18/02	WATER LEVEL BEFORE 3.7	WATER LEVEL AFTER 3.7	TAKEN 10 MINUTES AFTER

2" " dia. PVC pipe w/steel locking cap

L1 = 2.6'

L2 = 3.4'

L3 = 16.0'



ARKS:

Hole Back filled 19.4-20.0 with Bentonite

THE PORT AUTHORITY OF N.Y & N.J.

ENGINEERING DEPARTMENT

MATERIALS ENGINEERING DIVISION

PID READINGS

Sheet 3 of 3

PROJECT: HHMT– Port Ivory Surcharge Test

BORING No. PG-ST-45

DATE: 10/18/02

FIELD READINGS BY: DHouse

PID Model: Mini RAE

TIME	SAMPLE No.	IN-SITU Split Spoon Reading	HEAD-Space Reading	BREATHING Zone Reading	REMARKS
AM	1A		0.0		
	1B		0.0		
	2A		0.0		
	2B		0.0		
	3		0.0		
	4		0.0		
↓	5		0.0		
PM	6		0.0		
	7		0.0		
	8		0.0		
	9		0.0		
	10A		0.0		
↓	10B		0.0		

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Engineering Department
Construction Division
Materials Engineering Section

BORING REPORT

SHEET 1 OF 3

PROJECT HHMT - Port Ivory Surcharge Test	NAME OF CONTRACTOR Craig Drilling	BORING NO. PG-ST-40	SURFACE ELEV.
LOCATION As Laid out in field as per Drawing East Side		CONTRACT NO. 426 99-006	DATE 10/21/02

SPOON 2 "O.D. 1 3/8 "I.D.
CASING SIZE Hw
HOLE TYPE "B" Mandor
HAMMER Auto 140 # FALL 30 "
HAMMER # FALL "
DRILLER D Cocke
INSPECTOR D Howe

GROUND WATER LEVEL

Date	Time	Depth	Remarks
10/21/02	9~	3.0	while Hand Augering

CASING BLOWS/FT.	DEPTH	SPOON BLOWS/6"	RE-COV'D[1]	SAMP. NO.[2]	[3]SAMPLE DESCRIPTION AND REMARKS ____ LINE LOCATES CHANGE OF PROFILE	
	0					0.0
Hard		Hand Auger	Fill	1 A	Fill - RCA Recycled Concrete Agg	1.0
Auger				B	Fill Crushed Stone	
				2 A	Same	3.0
				B	Fill White & Gray Limestone slurry	
	5			3		
	6				Same	
Hw						
Casing						
					No Sampling 6-20 See Log for	
					PG ST 45 for strata 6'-20'	
	20	WOH				
		1-2	23"	4	Brown & Black Peat	
		1-2		5		
		2-3	22"		Same Tr F Dk Gray Sand in Tip of Spoon	24.0
	25	WOH		6		
		WOH-2	19"		F Dk Gray Sand, Tr Silt	
					All Samples checked with PID Meter	
					No Samples Saved, All Discarded	
	30					30.0
		2-3		7		
		4-3	12"		F Brown Sand, Tr Silt	
	33					
		3-3		8		
	35	8-8	13"		F Brown & Gray Sand, Tr Silt	35.0

Bottom of Boring

NOTES: 1 — Length recovered; 0" — Loss of Sample, T — Trap used
2 — U = undisturbed; A = auger; OER = open end rod; V = vane
3 — Log depth of change in color of wash water, loss of water, artesian water, sand heave in casing, etc.

PORT AUTHORITY OF NY & NJ

Engineering Department - Materials Division

Well Installation Report

Sheet 2 of 3

PROJECT HHMT - Port Ivory Surcharge Test	CONTRACT NO. 426-99-006
LOCATION As Laid out in Field as Per Drawing East Side	CONTRACTOR Craig Drilling

WELL NO.	WELL TYPE	INSPECTOR	DRILLER	DATE
PG ST-40	"B" Monitor	D Howe	D Cooke	10/21/02

Well Development Report

(NOTE: WATER LEVEL READINGS FROM TOP OF PVC)

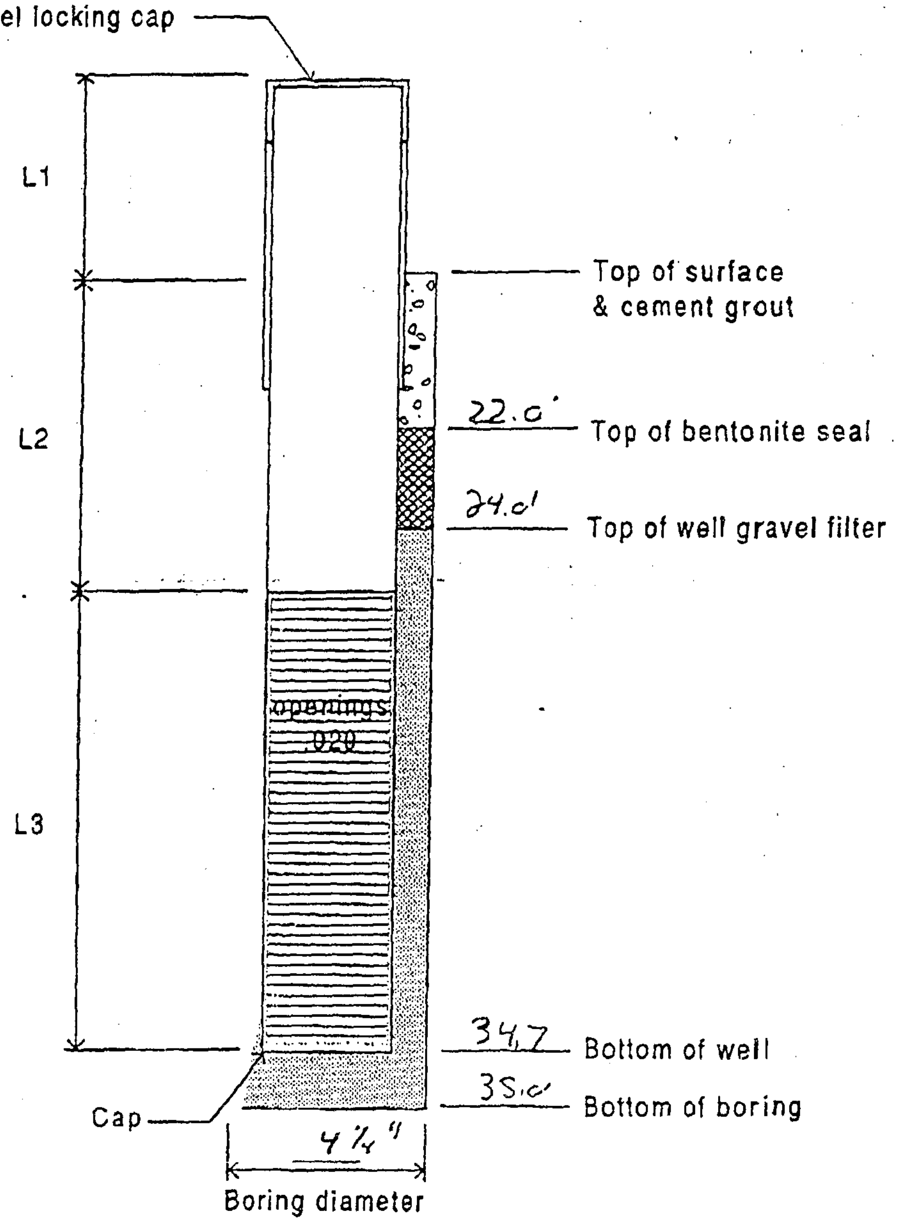
DATE	WATER LEVEL BEFORE	WATER LEVEL AFTER	TAKEN	MINUTES AFTER
10/21/02	13.5	13.5	15	

2" " dia. PVC pipe w/steel locking cap

L1 = 3.3'

L2 = 24.7'

L3 = 10.0'



REMARKS: Hole Back filled 34.7 To 35.0 with well Gravel

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ENGINEERING DEPARTMENT
MATERIALS ENGINEERING DIVISION
PID READINGS

Sheet 3 of 3

PROJECT: HHMT- Port Ivory Surcharge Test

BORING No. PG ST 40 **DATE:** 10/21/02

FIELD READINGS BY: DHa **PID Model:** Min. RAE

TIME	SAMPLE No.	IN-SITU Split Spoon Reading	HEAD-Space Reading	BREATHING Zone Reading	REMARKS
AM	1A		0.0		
	1B		0.0		
	2A		0.0		
	2B		0.0		
	3		0.0		
	4		0.2		PaJ
	5		0.3		PaJ
	6		0.0		
	7		0.0		
	8		0.0		

4.0 SRI REPORT-SITE 2

The Port Authority of New York and New Jersey
Supplemental Remedial Investigation Report
Site 2 (VCP Site 00674-2)
HHMT - Port Ivory Facility
November 2006

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(All figures are provided in text by order of reference)

List of Tables

(All tables are provided in text in order of first reference)

1.0 Executive Summary

The Port Authority of New York and New Jersey (Port Authority) is currently redeveloping the former Proctor & Gamble (P&G) Port Ivory Facility, now known as the Howland Hook Marine Terminal (HHMT) – Port Ivory Facility. The HHMT-Port Ivory Facility is located at 40 Western Avenue in Staten Island, Richmond County, New York and consists of three parcels: Block 1309, Lot 10; Block 1338, Lot 1; and, Block 1400, Lot 1. This report addresses conditions at only the eastern portion of Block 1400, Lot 1 and the southern portion of Block 1338, Lot 1. These portions of the HHMT-Port Ivory facility are also known as Area 2A and Area 2B, respectively; collectively, these portions of the facility are referred to as Site 2.

Prior to conducting the Supplemental Remedial Investigation (SRI), Hatch Mott MacDonald (HMM) conducted various phases of environmental investigation at Site 2 between calendar years 2000 and 2003 on behalf of the Port Authority. The overall goal of these investigations was to determine the appropriate remedial actions, if any, for soil and/or groundwater at Site 2 given the proposed site redevelopment for commercial (intermodal facility) purposes. For the purposes of this document, an intermodal facility is a commercial site where products are received via one mode of transportation and are ultimately distributed via a different mode of transportation. Prior to the SRI, HMM's environmental investigation efforts have included the performance of a Phase I Environmental Site Assessment with an additional file review (Phase I ESA), Site Investigation (SI), and Remedial Investigation (RI). The results of the Phase I ESA, SI, and RI are summarized in the report entitled *Revised – Site Investigation and Conceptual Remedial Action Workplan Site 2A/2B* and dated September 2004, which has been submitted to the NYSDEC.

Although information from previous investigations has been included as necessary for clarity, this report primarily summarizes the findings of the SRI conducted at Site 2 between October 2004 and April 2005. The overall goal of the SRI was to determine whether additional investigative and/or remedial action, of any medium, was necessary at Site 2. In addition, this report summarizes the indoor air quality assessment data required by the New York State Department of Environmental Conservation (NYSDEC) and New York State Department of Health (NYSDOH) at Area 2A and the initial investigation of soil impacted by light, non-aqueous phase liquid (LNAPL-impacted soil) encountered during construction activities in the western portion of Area 2B. An investigation of indoor air quality was not required at Area 2B as no buildings currently exist or are proposed for Area 2B.

In the Phase I ESA, the Port Authority identified Areas of Concern (AOCs) at both Area 2A and at Area 2B. The AOCs were generally grouped into the following categories (the location of the AOCs in each category is provided in parenthesis):

- Underground Storage Tanks (Area 2A);
- Precipitate at Bridge Creek (Area 2A);
- Fill Material (Area 2A and Area 2B);
- Previously Identified Soil and Groundwater Contamination (Area 2A and Area 2B);
- Railroad Tracks and Siding (Area 2A and Area 2B);
- Surface Staining (Area 2A);
- Pits and Drains (Area 2A);
- Former Structures (Area 2A and Area 2B); and,
- Groundwater (Area 2A and Area 2B).

All AOCs identified at Area 2A and Area 2B during the Phase I ESA were investigated during the SI and RI. Based on the results of these investigations, it was determined that no additional investigation and/or remedial actions were warranted at the majority of the AOCs. However, as set forth in the *Site Investigation Workplan Addendum - Sites 1 and 2A/2B* (SIWP) dated March 24, 2005, additional investigation was proposed at four AOCs located at Area 2A and at one AOC located at Area 2B. The four AOCs located at Area 2A were identified as AOC-Stain3, AOC-UST7, AOC-Bldg20, and AOC-Bldg32/32A. The AOC identified as AOC-Stain3 was associated with staining observed on the unpaved (i.e., soil) floor of former Building No. 20. The remaining three AOCs located at Area 2A were associated with former underground storage tanks (USTs), including two AOCs (AOC-Bldg20 and AOC-Bldg32) where USTs were removed by P&G during the 1990s (i.e., prior to the property transfer to the Port Authority) and one area (AOC-UST7) where USTs previously utilized by P&G were identified and removed by the Port Authority.

The AOC that was located at Area 2B and was included in the March 24, 2005 SIWP was AOC-Southern Area, which was referenced as "Southern LNAPL Area" in the SIWP. This AOC was associated with inactive underground pipelines that were previously used to transport petroleum and that are situated within an easement believed to have been owned at one time by the Tidewater Pipeline Co., Ltd. (Tidewater). The investigation of soil along these pipelines was initiated because, during implementation of the SI and RI activities at Site 3, located immediately north of Area 2B, LNAPL-impacted soil was encountered at several locations along the pipelines. Maps provided by the Port Authority indicated that the easement and the pipelines are present in Site 3 and extend into and through Area 2B. Since these pipelines were a potential LNAPL source, the Port Authority investigated soil quality along the pipelines.

The performance of an indoor air quality assessment was required at Area 2A by the NYSDEC and NYSDOH. This investigative effort was required in three Buildings located at Area 2A: Building No. 40, then an unoccupied building; Building No. 41, the primary office building utilized by the Port Authority; and, Building No. 45, a guard shack. Building No. 41 and Building No. 45 are the only remaining buildings at Area 2A. Building No. 40 has since been razed, and two temporary modular offices are currently being constructed in the footprint of former Building No. 40.

The Port Authority voluntarily conducted initial investigative activities at Area 2B when LNAPL-impacted soil was encountered during August 2005 along the sidewalls of an excavation that was not located within any known AOC. The Port Authority encountered the LNAPL-impacted soil while modifying storm water infrastructure in the western portion of Area 2B. As part of the preliminary investigation of this new AOC, identified as AOC-Western Area, the Port Authority implemented a soil and groundwater sampling program.

Summary of SRI Scope and Results - Area 2A

The SRI effort at Area 2A included the investigation of AOC-Stain3, AOC-UST7, AOC-Bldg20, and AOC-Bldg32/32A. The objective for the SRI at Area 2A was to confirm the successful remediation of soil at the previously-investigated AOCs. The scope of work included the drilling of 16 soil borings and the collection of 16 soil samples that were analyzed for Target Compound List (TCL) volatile organic compounds with a 10-compound library search (VOC+10), TCL semivolatile organic compounds with a 15-compound library search (SVOC+15), Target Analyte List (TAL) metals, and total petroleum hydrocarbons (TPHC).

Field observations made during implementation of the SRI at Area 2A indicated limited soil impacts at these AOCs. Discolored soil was observed at AOC-Stain3, AOC-UST7, and AOC-Building32/32A. Isolated "pockets" of LNAPL-impacted soil were encountered at two locations at AOC-UST7. No indications of LNAPL-impacted soil were observed at AOC-Bldg20 and AOC-Bldg32/32A.

Analytical results for soil samples collected during the SRI revealed similarly limited impacts attributable to prior land use and prior P&G operations at these four AOCs. The concentrations of six semivolatile organic compounds (SVOCs) and nine metals exceeded corresponding NYSDEC Recommended Soil Cleanup Objectives (RSCOs). However, with the exception of arsenic detected in soil at AOC-Stain3, these SVOC compounds and metals have been detected at similar concentrations in soil throughout the HHMT-Port Ivory Facility and are attributable to the previous placement of fill materials throughout the property by P&G. The concentration of arsenic in soil at AOC-Stain3 is atypically high relative to the concentrations of arsenic detected in fill materials throughout the property; however, because the environmentally degraded soil is more than five feet above the water table and will be covered by impervious materials, precluding direct contact with the soil and migration of arsenic to groundwater by water percolating through the unsaturated zone, no remedial action is warranted with respect to the soil degraded by arsenic. It is the Port Authority's intent to address soil impacts that remain at Area 2A through completion of the proposed redevelopment of Area 2A and the establishment of an area-wide Environmental Easement to the NYSDEC. No further investigation or remediation is warranted for soil at these AOCs.

Summary of SRI Scope and Results– Area 2B

The SRI at Area 2B included the investigation of the environmental quality of soil and groundwater at AOC-Southern Area. The objectives for this portion of the SRI were as follows: to determine the locations of the underground pipelines in the Tidewater easement; to confirm the presence or absence of LNAPL-impacted soil along the Tidewater pipelines; to delineate areas of LNAPL-impacted soil that were located along the Tidewater pipelines; to quantify the concentrations of regulated compounds in soil along the Tidewater pipelines; and, to determine whether the presence of LNAPL-impacted soil along the Tidewater pipelines has degraded groundwater quality (i.e., is a source area for regulated compounds in groundwater). The scope of work included the completion of geophysical surveys, the drilling of soil borings, the installation of temporary wells, and the collection of soil and groundwater samples.

The Tidewater pipelines were located using geophysical methods, which included ground penetrating radar (GPR) surveys, induced electromagnetic (EM-61) surveys, and line tracing methods. During implementation of the line tracing, a test pit (EXT-1) was excavated to expose the pipelines so that an electric current could be applied directly to the pipelines. Soil borings were drilled at intervals of approximately 50 feet along the previously-located sections of the Tidewater pipelines. LNAPL-impacted soil, identified based on the presence of odor, discolored soil, LNAPL, and/or elevated concentrations of volatile organic vapors, was encountered at test pit location EXT-1 and soil boring locations TW43A, TW-47 and TW-48. Additional soil borings were drilled to delineate the extent of the LNAPL-impacted soil and temporary wells were installed to evaluate groundwater quality at these areas.

The approximate volume of LNAPL-impacted soil is 1,300 cubic feet (48 cubic yards) in the vicinity of test pit location EXT-1, including soil boring location TW-43A and 38,400 cubic feet (1,420 cubic yards) in the vicinity of soil boring locations TW-47 and TW-48. Soil sampling analytical results indicate that higher LNAPL saturation in soil, as determined by field observations, is associated with the presence of tentatively identified volatile organic compounds (VOC TICs) and TPHC. No RSCOs have been established with respect to these compounds. Based on the groundwater sampling analytical results, the presence of the LNAPL-impacted soil does not appear to have degraded groundwater quality with respect to regulated organic compounds.

While the presence of LNAPL in soil is itself an impact, soil and groundwater sampling analytical results indicate that the presence of LNAPL-impacted soil has not degraded the environmental quality of soil or groundwater with respect to regulated metals and organic compounds and relative to the impacts attributable to fill materials placed at the HHMT-Port Ivory Facility by P&G. However,, the Port Authority intends to remove free (i.e., mobile) LNAPL via pumping and limited soil excavation. The LNAPL is most likely to be mobile where it is present at relatively high saturation. Based on the concentration of volatile organic vapors and TPHC in soil, HMM identified four locations in AOC-Southern Area where mobile LNAPL was most likely to be present; this portion of Area 2B was targeted for remediation during the proposed Interim Remedial Measure (IRM). Except for the areas where mobile LNAPL is encountered and removed during the IRM, no further investigation or remediation is warranted at this AOC.

Initial Investigation of AOC-Western Area – Area 2B

As noted above, this investigation was conducted by the Port Authority following the observation of LNAPL-impacted soil in the western portion of Area 2B. A set of five pipelines, identified as the Tidewater pipelines, and a single, inactive 12-inch-diameter pipeline within an easement granted to Texas Eastern were observed within the excavation. Fine-grained, organic meadowmat soil was observed within the excavation at a depth of approximately six feet below ground surface (bgs); soil beneath this meadowmat soil is not anticipated to be degraded with respect to environmental quality.

The investigation of AOC-Western Area involved the collection of five soil samples and one groundwater sample from the excavation. The soil sampling analytical results indicate that, in some soil samples, concentrations of TPHC are above those generally detected throughout the HHMT-Port Ivory Facility. No other soil impacts attributable to the presence of LNAPL-impacted soil are apparent based on the soil sampling analytical data. Groundwater analytical data reveal only low concentrations of two PAH compounds, a subset of SVOCs.

Additional investigation of soil and groundwater quality is warranted in the vicinity of AOC-Western Area. While soil and groundwater quality has been investigated in the vicinity of the Tidewater pipelines, an investigation of soil and groundwater quality is warranted along the Texas Eastern pipeline.

Indoor Air Quality Assessment – Area 2A

As noted above, the NYSDEC and NYSDOH required the Port Authority to complete an indoor air quality assessment at Area 2A. The goal of the assessment was to determine whether the presence of volatile organic compounds in soil gas (if any) has resulted in elevated concentrations of volatile organic vapors within any building scheduled to be occupied following redevelopment of Area 2A. Two buildings, the guard shack (Building No. 45) and the engineers' office building (Building No. 41), are currently scheduled to be occupied following redevelopment. A building adjacent to the guard shack, Building No. 40, has been demolished. Two temporary modular offices are currently under construction in the footprint of Building No. 40, a soil gas sample was collected adjacent to this building. Please note Building No. 40 was razed after performance of the indoor air quality assessment.

Air sampling results revealed concentrations of volatile organic vapors are present within Building No. 41 and Building No. 45. In general, the concentrations of these vapors are below guidance values and standards promulgated by the NYSDOH; in all cases, the concentrations of these vapors are below the Recommended Exposure Limits (RELs) set by the National Institute for Occupational Safety and Health (NIOSH). The sources of these volatile organic vapors include ambient outdoor air, cleaning supplies and other sources within the buildings, and volatile organic vapors in soil gas. The modular offices that will be constructed in the footprint of Building No. 40 will be mounted on piers and elevated above land surface. Therefore, any vapors migrating out of the ground will be vented and/or diluted so that the occupants of the trailers will not be exposed. Based on the results of this investigation, no further action is warranted with respect to indoor air quality at Area 2A.

Summary of Recommendations – Site 2

No further investigative or remedial actions are warranted at any AOC at Area 2A or with respect to indoor air quality at Area 2A. Additional investigative activities are warranted at AOC-Western Area at Area 2B. Remedial actions, which have been proposed as part of an IRM, are warranted for the removal of mobile LNAPL from the subsurface at AOC-Southern Area at Area 2B.

2.0 Introduction

The Port Authority Howland Hook Marine Terminal (HHMT)-Port Ivory Facility is located at 40 Western Avenue in Staten Island, Richmond County, New York, as presented on Figure 1. The HHMT-Port Ivory Facility consists of three parcels: Block 1309, Lot 10; Block 1338, Lot 1; and, Block 1400, Lot 1. The Port Authority of New York and New Jersey (Port Authority) purchased these three parcels from Proctor and Gamble (P&G) in 2000. The HHMT-Port Ivory Facility is bordered by Bridge Creek to the west, the Arthur Kill to the north, wetlands and vacant land to the east, and a railroad to the south. Public roadways separate the three parcels: Western Avenue separates Block 1400, Lot 1 from Block 1338, Lot 1 and Richmond Terrace separates Block 1309, Lot 10 from Block 1338, Lot 1.

The Port Authority is in the process of redeveloping the HHMT-Port Ivory Facility for a commercial end use; specifically, the Port Authority intends to utilize the property as an intermodal facility. For the purpose of this report, an intermodal facility is defined as a facility where cargo transported by ship is transferred to intermediate and final destinations via train or truck. Following redevelopment, the majority of the HHMT-Port Ivory Facility, including Site 2, will be paved or otherwise covered with impermeable or low permeability materials.

As part of the facility redevelopment, the Port Authority entered into the New York State Department of Environmental Conservation (NYSDEC) Voluntary Cleanup Program (VCP) in August 2002. The Port Authority's objective for entering into the VCP program with the NYSDEC was to address the presence of contamination due to prior operations at the facility that were unrelated to the Port Authority. The Port Authority has established different redevelopment schedules for different portions of the facility. To accommodate the Port Authority's redevelopment schedule for Block 1400, Lot 1, in particular the northwest portion of this parcel, the NYSDEC has agreed to expedite the review of information pertaining to certain portions of the facility. Thus, the Port Authority agreed to address the facility as four "Sites" and to present assessment, investigation, and remedial action information/documentation for each individual Site. Please note, the VCP agreements have been executed for only three of the four Sites to date; the fourth Site is referred to as a "Future Site." The Sites have been defined as follows: Site 1 consists of the northwestern portion of Block 1400, Lot 1; Site 2 consists of the eastern and southern portions of Block 1400, Lot 1 (Area 2A) and the southern portion of Block 1338, Lot 1 (Area 2B); Site 3 consists of the central and northern portions of Block 1338, Lot 1; and, Future Site 4/2C consists of Block 1309, Lot 10.

This report includes information associated only withSite 2. Figure 1 presents the location of Site 2 in relation to the locations of Sites 1 and 3 and Future Site 4/2C. Figure 2 depicts the easements located at Area 2A and Area 2B.

2.1 Environmental Investigations at Site 2

On behalf of the Port Authority, Hatch Mott MacDonald (HMM) has completed several phases of investigation at the site, including a Phase I Environmental Site Assessment and Supplemental File Review (Phase I ESA), a Site Investigation (SI), a Remedial Investigation (RI), and a Supplemental Remedial Investigation (SRI). The Phase I ESA and SI were conducted to identify and characterize Areas of Concern (AOCs) at the facility in 2000, prior to the Port Authority's purchase of the facility. The RI and SRI were conducted following the transfer of the property from P&G to the Port Authority. The RI was conducted to further investigate selected AOCs that, based upon the results of the SI, were deemed to warrant additional investigation. Some of the AOCs targeted for investigation during the RI were inaccessible due to their proximity to buildings and other structures; subsequent to the RI, most of these buildings were demolished and these AOCs were therefore accessible during the SRI. In addition, field observations made during the SI and RI indicated that soil impacted by light, non-aqueous phase liquid (LNAPL-impacted soil) was present at certain locations at the facility. The SRI, the subject of this report, was conducted at Area 2A to confirm the success of previous remedial activities conducted at four AOCs by P&G and the Port Authority. In addition, the NYSDEC and NYSDOH required that the Port Authority assess indoor air quality at all buildings that will be occupied following the redevelopment of Area 2A. The SRI was conducted at Area 2B to further evaluate the physical location of the pipelines and potential impacts to environmental media from any petroleum compounds that may have discharged from these pipelines. In addition, LNAPL-impacted soil was observed during modification to the stormwater system in the western portion of Area 2B. The area of LNAPL-impacted soil, identified as AOC-Western Area, was subject to an initial investigative effort, which consisted of the analysis of five soil samples and one groundwater sample. This report summarizes the SRI efforts and results at both Area 2A and Area

2B, the indoor air quality assessment (Area 2A), and the initial investigative effort at AOC-Western Area (Area 2B).

It should be noted that additional investigation was simultaneously performed at Site 1, Site 3, and Future Site 4/2C. These efforts are described in reports prepared for those sites under schedules established by individual VCP agreements. This report addresses those issues associated with Site 2 in an effort to determine whether additional investigative and/or remedial action was necessary at any AOC. This report is submitted pursuant to the VCP Agreement (VCP Site 00674-2), established for Site 2.

2.2 Report Goal and Organization

The overall goal of the SRI was to determine whether additional investigative and/or remedial action, of any medium, was necessary at any AOC atSite 2. The objective of the SRI at Area 2A was to confirm the successful remediation of soil at the four previously-identified AOCs. The objectives of the SRI at Area 2B were to determine the locations of the underground pipelines in the Tidewater easement, to confirm the presence or absence of LNAPL-impacted soil along the Tidewater pipelines, to delineate areas of LNAPL-impacted soil that were located along the Tidewater pipelines, to quantify the concentrations of regulated compounds in soil along the Tidewater pipelines, and to determine whether the presence of LNAPL-impacted soil along the Tidewater pipelines has degraded groundwater quality (i.e., is acting as a source area for regulated compounds in groundwater).

Analytical data and field observations generated during the SRI, and as necessary, from the SI and/or RI, are summarized in tabular form and, as appropriate, in figures. Section 3 provides background information regarding the site history and the regional and local hydrogeologic conditions. Section 4 summarizes the results of previous environmental investigations. Sections 5 through 8 present the goal, scope of work, methods used, findings, and conclusions for the SRI. Section 9 summarizes the scope of work, methods used, findings, and conclusions for the indoor air quality assessment. Section 10 summarizes the results of the initial investigation of AOC-Western Area. Sections 11 and 12 present the Port Authority's conclusions and recommendations with respect to whether additional investigative and/or remedial action is warranted at each open AOC at Area 2A or Area 2B. The scope of work and remedial actions proposed in this report were developed based on a predetermined end-use for Site 2 as an intermodal facility and with recognition of the regional impacts that exist in the vicinity or the HHMT-Port Ivory Facility.

3.0 Background

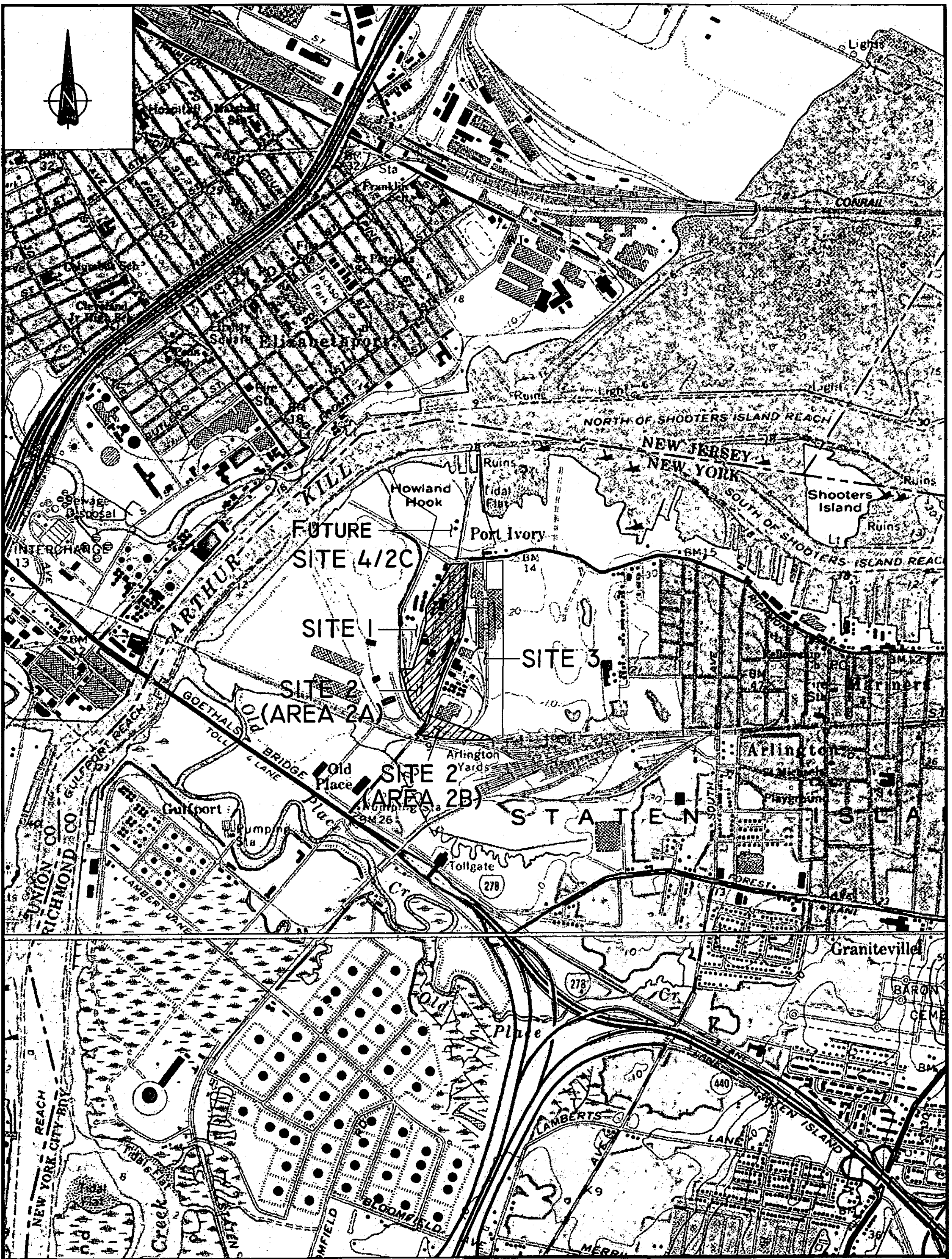
This section includes general information pertaining to the location and operating history of the entire HHMT-Port Ivory facility, specific information on the previous and current land use ofSite 2, and a summary of regional and local hydrogeology. These three topics are discussed in Sections 3.1 through 3.3, respectively. Please note, some of this information was previously submitted to NYSDEC in a report entitled *Revised - Site Investigation and Conceptual Remedial Workplan, Site 2A/2B*; however, this information is repeated as a courtesy to the reader.

3.1 HHMT-Port Ivory Facility – Location and Description

As previously stated, the HHMT-Port Ivory Facility is located at 40 Western Avenue, Staten Island, Richmond County, New York and is comprised of the three following tax blocks/lots: Block 1309, Lot 10, Block 1338, Lot 1 and Block 1400, Lot 1. Together, these three parcels encompass 123.75 acres. The latitude/longitude of the Port Authority facility, as determined from the center of the facility, is 40 degrees 38 minutes 15 seconds North, 74 degrees 10 minutes 50 seconds West. At the time of the Phase I ESA and SI activities, the facility was owned by P&G; the Port Authority purchased the facility from P&G in December 2000 and it is now known as the HHMT-Port Ivory Facility. Subsequent to the purchase of the facility, the Port Authority performed RI and SRI activities.

The HHMT-Port Ivory Facility can be accessed via driveways located along Western Avenue and Richmond Terrace. Western Avenue extends in a north-south direction between Block 1400, Lot 1 (Site 1 and Area 2A) and Block 1338, Lot 1 (Site 3 and Area 2B) and terminates at Richmond Terrace. One of the three parcels, Block 1309, Lot 10 (Future Site 4/2C) is situated north of Richmond Terrace and the two remaining parcels, Block 1400, Lot 1 (Sites 1 and Area 2A) and Block 1338, Lot 1 (Site 3 and Area 2B), are situated south of Richmond Terrace. The relationship of the VCP Sites to one another is presented on Figure 1.

The facility is and has been serviced by connections to the potable water and sanitary sewer system of New York City. No septic systems, potable water wells, or dry wells are reported to be or to have been located on the subject site. Stormwater generated on the site is directed via sheet flow to on-site catch basins. These catch basins discharge to pipes that comprise the facility's underground stormwater sewer system. Ultimately, stormwater discharges to permitted outfalls located along the adjacent waterways, roadways, and marshland areas. Electrical service is supplied to the subject site via connection to the Consolidated Edison system servicing this section of Staten Island. In addition to the utility infrastructure



SOURCE:
UNITED STATES GEOLOGICAL SURVEY
7.5 MINUTE SERIES TOPOGRAPHIC QUADRANGLES
ELIZABETH AND ARTHUR KILL, NY-NJ,
1967, PHOTOREVISED 1981

NOTES:
HHMT – PORT IVORY FACILITY
CONSISTS OF SITES 1 THROUGH 4

2000 0 2000 4000
SCALE IN FEET
1" = 2000'
CONTOUR INTERVAL = 10 FEET

Hatch Mott MacDonald
Certificate No. 24GA28075000

27 Bleeker Street
Millburn, New Jersey 07041

PORT AUTHORITY OF NY AND NJ
40 WESTERN AVENUE, STATEN ISLAND, NY

FIGURE I
SITE LOCATION MAP
HHMT - PORT IVORY FACILITY

Designed	Drawn	Checked	Approved	Date
	BFJ			

P:\232952wmd\REMEDIAL ACTIONS\Remedial Petroleum Issues Block 1338\LNAPL Investigation Res\Site 2A2B Report maintained by the facility, several utility easements traverse the facility. The easements contain pipelines that are underground for most of their length and that were or are utilized to transport natural gas or fuel oil. As indicated on Figure 2, some of the easements are inactive, while others are believed to be active.

In the early 1900s, P&G developed portions of the current facility for use as a consumer goods manufacturing facility. Reportedly, the consumer goods manufactured included soap, detergent and foodstuffs. The specific consumer goods produced at the facility and the operations/activities performed at specific site areas changed based upon corporate requirements. Manufacturing operations ceased in approximately 1991.

According to representatives of P&G and information provided in reports supplied by same, P&G constructed the initial Port Ivory manufacturing facility at this site in 1906-1907. The original 77-acre facility included portions of Site 1 and Area 2A and Future Site 4/2C and was developed on an open, vegetated, marshy area. Over the years, P&G acquired additional acreage (Site 3 and Area 2B) and emplaced fill materials at low-lying areas of Sites 1, 2, 3 and Future Site 4/2C expanding the original facility to include the current site limits that are shown on Figure 1. The fill used by P&G in conjunction with site development is reported to have included the following: sand, silt, gravel mixed with debris, cinders generated from on-site coal-fired boilers, and manufacturing by-products (i.e. calcium carbonate, carbonate salts from soap productions, nickel catalyst, diatomaceous filter earth from vegetable oil refining operations, carbonanaceous filter material from glycerin recovery operations, etc.).

3.2 Site 2 Easements and Historical Land Use

Site 2 includes the eastern portion of Block 1400, Lot 1 (Area 2A) and the southern portion of Block 1338, Lot 1 (Area 2B). Area 2A has an area of 23.94 acres and Area 2B has an area of 4.66 acres. Collectively, Site 2 constitutes 28.6 acres of the 123.75-acre HHMT-Port Ivory Facility.

Area 2A is bordered by Site 1 to the west, Future Site 4/2C to the north, Western Avenue to the east, and a railroad to the south. Vehicular access to the northern portion of Area 2A is provided from the west by a paved access road from Site 1. Vehicular access to the central and southern portions of Area 2A is provided by two paved access roads, one located between Building Nos. 41 and 45 and the second located at the extreme southern portion of Area 2A (see Figure 2 for a map of the current and former conditions of Site 2). At the time of the Phase I ESA and SI, Area 2A was improved by numerous buildings and paved roadways and parking lots. The majority of these improvements have been razed in preparation for site redevelopment. Area 2A is currently improved by three buildings: a structure in the footprint of former Building No. 40, which has bee razed; Building No. 41, and Building No. 45. Please note, and the structure in the footprint of former Building No. 40 consists of two temporary modular offices. A chain-linked fence borders Area 2A to the north, east, and south. Unused railroad spurs, unimproved land where former buildings or other structures were demolished and razed, and paved areas are located to the west of the existing buildings at Area 2A. The railroad tracks extend off the southern portion of Area 2A, cross over Western Avenue, and extend across Area 2B. Area 2A exhibits little relief and is devoid of vegetation. A soil pile is currently located along the western boundary of Area 2A; this soil pile was used for surcharging purposes and will be regraded or transported off site during redevelopment of Area 2A. Please note, Area 2A is currently undergoing redevelopment; railroad spurs and macadam pavement are currently being constructed at Area 2A.

Area 2B is bordered by Western Avenue to the west, Site 3 to the north, marshland to the east, and a railroad and stream to the south. Area 2B exhibits a slight upward grade to the east. The northern boundary of Area 2B extends along the southern building wall of Building Nos. 74/75 such that Area 2B does not include the interior of Building Nos. 74/75 but includes exterior areas to the south of the buildings. Vehicular access to Area 2B is provided from Western Avenue and from Site 3. At the time of the Phase I ESA and SI, Area 2B was improved by (the southern portions of) Building Nos. 70, 70 A/B/C, 70F, 70G and 72. These buildings have been razed, and Area 2B is currently improved only by recently constructed railroad tracks trending in a east to west direction, paved roadways, and an out-of-service truck scale located within one of the roadways. Vegetation is present at most portions of Area 2B that are not paved; the densest vegetation occurs along a small stream located along the southern boundary of Area 2B.

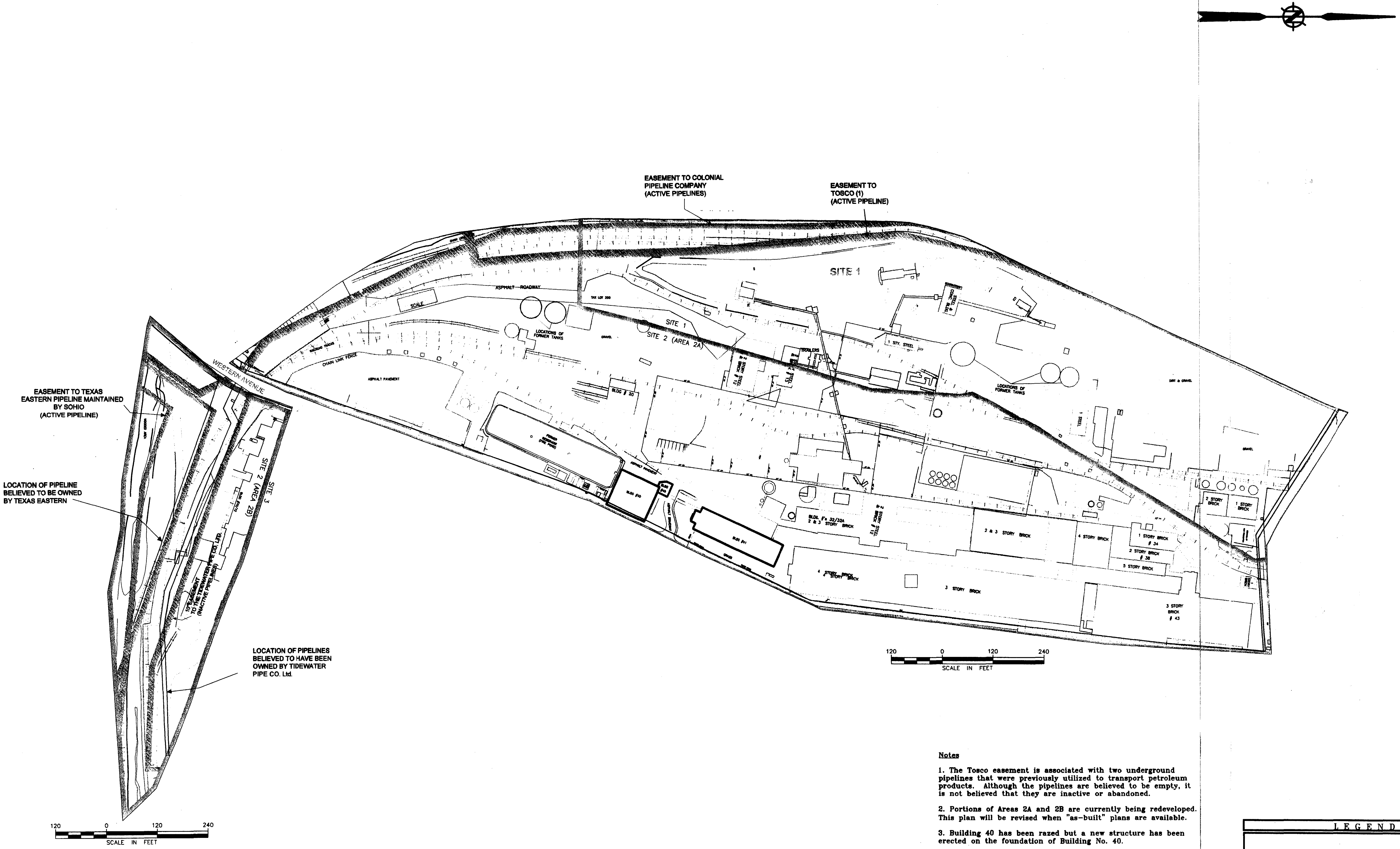
Four utility easements traverse Area 2B; two of the easements, granted to Colonial Pipeline Company (Colonial) and Texas Eastern (maintained by Sohio), are believed to contain active pipelines. A second easement to Texas Eastern contains an inactive pipeline. The fourth easement, reported to have been owned at one time by the Tidewater Pipe Co., Ltd. (Tidewater), contains seven abandoned underground pipelines (Tidewater pipelines) that were formerly utilized to transmit petroleum products. All four easements are between 8 and 15 feet wide. Three of the easements, including the easement to Texas Eastern that contains an active pipeline, trend approximately parallel to Western Avenue in the western portion of Area 2B before turning approximately 90 degrees to the east and trending from west-northwest to east-southeast through most of Area 2B. The remaining active easement, believed to be owned and maintained by Colonial, trends approximately north-south through the western portion of Area 2B before turning approximately 90 degrees and passing under Western Avenue onto Area 2A.

Two utility easements, both associated with underground petroleum pipelines, are located at Area 2A. As noted above, one easement, maintained by Colonial, is present beneath both Area 2A and Area 2B. This easement, associated with one active pipeline, runs along the western side of Area 2A and crosses the Area 2A-Site 1 boundary. The second easement, to Tosco, is associated with two inactive pipelines that cross Bridge Creek in the southern portion of Area 2A and turn north, ultimately crossing the Area 2A-Site 1 boundary. The locations of all known easements on Sites 2A and 2B are presented on Figure 2.

As noted above, P&G constructed the initial Port Ivory manufacturing facility at this site in 1906-1907. The original 77-acre facility included portions of Area 2A but did not include any of Area 2B and was developed on an open, vegetated, marshy area. Additional acreage was gained at Site 2 through the filling of additional marshlands with the following: sand, silt, gravel mixed with debris, cinders generated from on-site coal-fired boilers, and manufacturing by-products. Visual review of subsurface conditions during SI and RI activities indicates that all of the above listed types of fill materials may have been emplaced at Site 2.

Historical aerial photographs and pre- and post-1900 mapping were reviewed for the existence of any structures that were present prior to the Phase I ESA. The review identified the following improvements at Area 2A: a structure referenced as the Kettle House; Building Nos. 10, 10A, 11, 14 (labeled "Lye"), 22, and 23; and, ASTs. Other structures at Area 2A included a sewage treatment facility, fire suppression systems, and a chimney stack. Historical mapping indicates that a network of railroad tracks were also present alongside, and terminating at, former and existing buildings. Historical mapping did not identify the presence of former structures or tanks at Area 2B.

Historical information sources indicate some variability in the operations performed at specific site locations throughout the operation of the facility. However, in general, Sites 1 and 2A (Block 1400, Lot 1) were utilized as a single facility for the production, packaging, and storage of soap, comet, and glycerin manufacturing as well as for utility functions (i.e., boiler houses, wood processing for the boilers, sewage treatment, locomotive maintenance, etc.) from the early 1900's to the cessation of activities. The following materials were reported to have been stored in ASTs present and/or maintained at Area 2A: caustics, various vegetable and fish oils, fuel oil, waste oil, soap, spent acids, spent nickel catalyst, grease,



Sheet of

THE PORT AUTHORITY
OF NY & NJ

ENGINEERING PROGRAM MANAGER

No.	Date	Revision	Approved

ENGINEERING DEPARTMENT

Title

(BLOCK 1400, LOT 1 AND SOUTHERN END OF BLOCK 1338, LOT 1) HHMT-PORT IVORY FACILITY

MAP OF EASEMENTS AND CURRENT AND FORMER CONDITIONS - SITE 2 (AREAS 2A AND 2B)

This drawing subject to conditions in contract. All inventions, ideas, designs and methods herein are reserved to Port Authority and may not be used without its written consent.

Designed by	Drawn by	Checked by
	BFJ	

Date **AUGUST 2006**

Contract Number

Drawing Number **FIGURE 2**

Notes

1. The Tosco easement is associated with two underground pipelines that were previously utilized to transport petroleum products. Although the pipelines are believed to be empty, it is not believed that they are inactive or abandoned.

2. Portions of Areas 2A and 2B are currently being redeveloped. This plan will be revised when "as-built" plans are available.

3. Building 40 has been razed but a new structure has been erected on the foundation of Building No. 40.

4. Only portions of the railroad tracks shown are visible at land surface. Other portions are either buried or have been removed. New railroad lines are proposed and have been constructed. These lines will be shown on an updated map when "as-built" plans are available.

5. The existing conditions shown on this map are current as of August 2006.

6. In addition to those existing features shown on this map, a soil stockpile was located along the Site 1-Area 2A boundary. The stockpile is used for surcharging purposes. Because the soil stockpile was moved in order to surcharge different portions of the HHMT-Port Ivory Facility, the extent of the stockpile is not shown.

LEGEND

▨	UTILITY EASEMENT
┼┼┼	RAILROAD TRACKS
▬	EXISTING SITE BOUNDARY
BLDG #20	FORMER BUILDING
BLDG #45	EXISTING BUILDING

P:\232952wmd\REMEDIAL ACTIONS\Remedial Issues Block 1338\LNAPL Investigation Res\Site 2A2B Report\Figures\Existing Conditions coke, and resin. The storage methods are not identified on the maps. Historical maps also identify the use of "tanks" in at least four areas (referred to as UST1, UST3, UST4 and UST7 in the SI and RI) at Area 2A. Historical information indicates that the tanks at all four areas contained petroleum products. Tanks containing ethanol and enzymes are also reported to have been present at Area 2A; however, none of the remaining AOCs at Area 2A are associated with the tanks containing ethanol or enzymes.

Area 2B included the southern portions of Building Nos. 70, 70 A/B/C/, 70 F, 70 G, and 72 that were utilized for storage and warehousing of finished products and the production and packaging of orange juice. Railroad tracks were and are present at Area 2B.

3.3 Regional and Local Hydrogeologic Setting

The following subsections summarize the geology and hydrogeology of Staten Island and the facility, respectively.

3.3.1 Regional Hydrogeologic Setting

Physiographic provinces within Staten Island include both the Atlantic Coastal Plain and the Triassic lowlands section of the Piedmont physiographic province. The Precambrian-Cretaceous unconformity defines the boundary between these two physiographic provinces extending northeastward from Fresh Kills to north of Stapleton and continuing eastward across Long Island. The northwestern portion of Staten Island is underlain by bedrock of the Piedmont physiographic province, while Coastal Plain sediments are present in the southeastern portion of Staten Island.

Coastal Plain sediments include interlayered clay, silt, sand, and gravel deposits of the Raritan formation that thicken downdip (i.e., to the southeast). The bedrock in the Piedmont physiographic province includes shales, mudstones, and siltstones of the Stockton, Lockatong, and Passaic formations and intrusive diabase dikes. Less frequent sandstones and conglomerates occur in the Passaic formation and occasional limestones occur in the Lockatong formation. Basement rock underlying both the Coastal Plain sediment and bedrock of the Stockton, Lockatong, and Passaic formations is metamorphic rock of the Manhattan Prong.

In the extreme northeast portion of Staten Island, bedrock of the Passaic formation is overlain by glacial outwash deposits in turn overlain by finer-grained tidal marsh deposits. The glacial outwash deposits consist chiefly of stratified fine to coarse sand and gravel. The thickness of the glacial outwash deposits varies from approximately 20 feet to more than 50 feet. The overlying marsh deposits consist of primarily of organic silts and clays with occasional lenses of sand that represent stream channels and/or storm deposits. The marsh deposits are generally thin (i.e., likely no thicker than 15 feet).

Groundwater flow in the Raritan formation is anticipated to be seaward. In places where silts and clays overlie sands, groundwater may exist under confined conditions; otherwise, groundwater is anticipated to be under water table (i.e., unconfined) conditions. Groundwater flow occurs through the interstices between the individual soil grains. Although silts and clays have relatively high porosities, the mobility of groundwater through the pores is limited because the pore spaces are relatively small. Therefore, groundwater flow velocity is faster through the coarser-grained deposits than through the finer-grained deposits and most groundwater flow occurs through the sand layer.

Groundwater flow through the Lockatong, Stockton, and Passaic formations is expected to be seaward and occurs primarily through secondary porosity (e.g., bedding plane partings, fractures, etc.). In sandstone and conglomerate deposits, however, groundwater flow can occur through porosity in the rock itself, particularly if the cement that holds the individual sand and gravel grains together has been weathered and eroded. Water in these formations occurs under unconfined or confined conditions, depending on the frequency of vertical fractures in the interbedded shales, mudstones, siltstones, and coarser-grained deposits. The fractures become less frequent and narrower with depth so that the likelihood of groundwater being under confined conditions also increases with depth. The diabase dikes exhibit very low hydraulic conductivity and therefore tend to act as hydraulic barriers to groundwater flow.

Groundwater in the glacial outwash and marsh deposits that overlie bedrock in the northwestern portion of Staten Island is generally anticipated to flow seaward. However, the groundwater may also be tidally influenced, and surface water may flow into confined aquifers or aquifers that have been subjected to pumping. Groundwater flow is similar to that through the Coastal Plain sediments in that it occurs through interstices between soil grains and occurs more rapidly through deposits of coarser-grained sediments that through deposits of finer-grained sediments. Groundwater in the glacial outwash deposits can be under confined or water table conditions, depending in part upon the thickness and vertical hydraulic characteristics of the overlying deposits. The horizontal flow is estimated to range from less than 0.1 to approximately 1.5 feet/day in glacial deposits comprised of sand and gravel. Where overlying deposits are thick and have low hydraulic conductivities, groundwater in the glacial outwash deposits is more likely to be under confined conditions. Groundwater in the overlying marsh deposits is under water table conditions.

Groundwater is not currently used for public water supply on Staten Island. Estimates of groundwater recharge rates on Staten Island are comparable to Kings and Queens Counties, approximately 0.25 to 0.5 million gallons per day per square mile. Before 1970, the surface water supply from upstate New York was supplemented by pumping a maximum of 5 million gallons per day of groundwater from aquifers beneath Staten Island. Higher pumping rates induced saline groundwater infiltration. Due to saline intrusion of aquifers in the area caused by former groundwater use, future development of aquifers for potable purposes in the general area is unlikely.

3.3.2 Local Hydrogeologic Setting

The Passaic Formation underlies Site 2 and consists of reddish-brown to greyish-red siltstone and shale, with a maximum thickness of 3,600 meters. According to available technical literature, the Passaic Formation in the vicinity of Site 2 strikes approximately north 50 degrees east and dips approximately of 9 to 15 degrees to the northwest. Groundwater flow in the Passaic formation is anticipated to generally conform to that discussed above. According to previous environmental investigations as well as limited information from the SI, tidal fluctuations were not observed in bedrock of the Passaic Formation.

The subsurface unconsolidated deposits at Site 2, as well as at the remainder of the HHMT-Port Ivory facility, include a complex of stratified drift, glacial till, and tidal marsh deposits consisting of glacial outwash, marsh deposits, and anthropogenic fill. In general, the following five soil strata (listed from land surface downwards) have been identified at Site 2: (1) fill consisting of sand, silt, clay, and gravel in a generally loose condition mixed with carbonaceous material and/or vegetative, wood, brick, concrete, and glass debris that covers most of Site 2 with a maximum thickness of about 19.5 feet; (2) organic clays and peats, consisting of soft and highly compressible tidal marsh deposits, in the northern portion of Area 2A (and absent throughout much of Area 2A) and throughout Area 2B with a maximum thickness of at least three feet; (3) loose to medium dense fine sand with varying amounts of silt that represent marine or glacio-fluvial deposits ranging in thickness from four to 19 feet; (4) glacial clay, silt, and sand deposits ranging in thickness from approximately 12 to 22 feet; and, (5) brown gravel, gravel, sand, and silt that represents either fluvial deposits or proximal alluvial fan deposits. Please note, Area 2A is much larger than Area 2B and the scope of the previous investigation at Area 2A was larger than at Area 2B (i.e., more soil borings were drilled to deeper depths and more monitoring wells were installed at Area 2A than at Area 2B. Therefore, more of the strata described above were encountered at Area 2A than at Area 2B.

Essentially, the SI and the RI confirmed that the soil strata of Site 2 was consistent with that documented in the region, although the marsh deposits were absent in much of Area 2A, likely as a result of fluvial erosion. In addition, fill material was placed upon tidal salt-marsh or sand deposits at Site 2 to raise the elevation of the land to allow for development.

Groundwater was encountered in new and previously existing wells at depths ranging from approximately two to eleven feet below ground surface (bgs) at Site 2. The variation in the depth to groundwater was based on the land surface elevation, which is generally higher at Area 2A than at Area 2B, and the presence or absence of impervious materials at land surface. The impervious materials limit groundwater recharge, and groundwater is generally shallower where impervious materials are not present. Generally, groundwater flow velocity through unconsolidated deposits in the site area depends on the gravel, sand, silt, and clay compositions of the glacial outwash and non-indigenous fill. Information from the groundwater investigation component of the SI and RI indicates groundwater conditions are generally consistent with those of the region.

4.0 Summary of Previous Investigative and Remedial Efforts

The previous soil investigation and remediation, consisting of soil removal, that was conducted at each of the AOCs during the SI and RI is summarized below. Groundwater analytical results from the SI and RI are also discussed, as necessary, to demonstrate the effect of the presence of degraded (with respect to environmental quality) and LNAPL-impacted soil on groundwater quality. Please note, the two remaining AOCs (AOC-Southern Area and AOC-Western Area) located at Area 2B were identified subsequent to the SI and RI efforts. Therefore, no information pertaining to these AOCs is presented in this section.

4.1 Stain-3 AOC

Discolored soil was observed on a portion (approximately 50 square feet) of the unpaved floor of Building No. 20 during the Phase I ESA. Four soil samples were collected from the top 2.5 feet of soil at two soil borings, identified as STAIN-3 and STAIN-3B, advanced in this AOC during the SI effort. The soil samples were analyzed for Target Compound List (TCL) volatile organic compounds with a ten-compound library search (VOC+10), TCL Semivolatile Organic Compounds with a 15-compound library search (SVOC+15), Target Analyte List (TAL) metals, pesticides, polychlorinated biphenyls (PCBs), total petroleum hydrocarbons (TPHC), total phenolics, total cyanide, pH, and oil and grease (O&G). Based on the analytical results for the three soil samples, soil in the top 2.5 feet bgs had been degraded (with respect to environmental quality) primarily by various polycyclic aromatic hydrocarbons (PAH compounds), a subset of SVOCs, and metals at concentrations above their respective NYSDEC Recommended Soil Cleanup Objectives (RSCOs). The concentration of total PAH compounds in soil from the 1.7-2.5 foot bgs depth interval at location STAIN-3 was over 2,400 mg/kg. The soil sample collected from the top 2 feet of the soil column at location STAIN-3B contained 13 of the 23 TAL metals at concentrations above their respective RSCOs. The concentrations of arsenic and lead, in particular, in the top 2 feet of the soil column at STAIN-3B were elevated relative to the concentrations of these metals in soil throughout the HHMT-Port Ivory Facility. The deeper soil samples collected from the 2.5-3.5 and 2-4 foot bgs depth intervals at the STAIN-3 and STAIN-3B locations, respectively, exhibited lower concentrations of PAH compounds and metals. In fact, the concentrations of PAH compounds and metals in the deeper soil samples were similar to those detected in the fill previously placed throughout the Port Ivory-HHMT Facility. Vertical delineation was therefore achieved at approximately 2-2.5 feet bgs at AOC-Stain3.

Soil excavation activities were completed by the Port Authority during demolition of Building No. 20. As described in Section 5.1.1, the SRI activities at AOC-Stain3 were conducted to document the success of the Port Authority's soil removal effort and to confirm that additional remedial actions were unnecessary at this AOC.

4.2 AOC-UST7

HMM's review of P&G reports and Sanborn Maps during the Phase I ESA identified the potential presence of a UST in the northern portion of Area 2A. As such, the Port Authority implemented a geophysical survey, consisting of both ground penetrating radar (GPR) and induced electromagnetic (EM-61) investigations, to confirm the presence or absence of a UST in this area. The results of the geophysical investigation were inconclusive; therefore, a subsurface evaluation of AOC-UST7 was initiated during the SI.

The subsurface evaluation consisted of the collection of soil samples at four soil boring locations, the conversion of one soil boring to a temporary well, and the collection of a groundwater sample from the temporary well. Five soil samples were collected at four soil boring locations, identified as UST7-1, UST7-1A, UST7-1B, and UST7-2. The soil samples collected at locations UST7-1 and UST7-2 were collected from between 8 and 12 feet bgs. The soil samples collected at locations UST7-1A and UST7-1B were collected from the top 3.5 feet of the soil column at these locations. All soil samples were analyzed for TCL VOCs, TCL SVOCs, TAL metals, pesticides, PCBs, TPHC, total cyanide, total phenolics, pH, and O&G. Analytical results revealed higher concentrations of TPHC (5,500 and 12,000 mg/kg, respectively) in the soil samples collected at UST7-1A and UST7-1B as compared to the relatively low concentrations of TPHC (ranging from 290 to 1,100 mg/kg), in the three soil samples collected at locations UST7-1 and UST7-2. Although the concentration of at least one individual compound and metal exceeded the applicable RSCO in each of the five soil samples collected at this AOC, the concentrations of these compounds and metals were not elevated relative to concentrations of the same substances detected in fill previously placed throughout the HHMT-Port Ivory Facility.

One groundwater sample was collected at temporary well TMW-01, previously located in AOC-UST7. The groundwater sample was analyzed for TCL VOCs, TCL SVOCs, TAL metals, pesticides, PCBs, TPHC, total cyanide, total phenolics, pH, and O&G. Based on the analytical results, only the SVOC bis(2-ethylhexyl)phthalate and the metals iron, manganese, and lead were detected at concentrations greater than their respective NYSDEC cleanup objectives. The presence of bis(2-ethylhexyl)phthalate, a laboratory solvent, is likely attributable to laboratory contamination of the sample. The listed metals have all been detected at similar concentrations throughout the HHMT-Port Ivory Facility and are attributable to the former placement of fill by P&G.

During demolition of Building No. S-35, located adjacent to AOC-UST7, the Port Authority encountered two USTs, at least one of which was recorded to have contained #6 fuel oil. Both USTs were located within concrete vaults and were filled with inert material (bricks, stone, and sand). The Port Authority removed the USTs, the appurtenant piping, and the surrounding concrete vaults. Indications of petroleum impacts to the surrounding soil were observed during excavation activities. As a result, the Port Authority excavated LNAPL-impacted soil immediately adjacent to the vaults. Excavated soil was stockpiled on-site pending off-site disposal at an appropriate recycling/disposal facility. The excavation measured approximately 25 feet in length, 20 feet in width, and approximately 11 feet in depth; groundwater was encountered at approximately 8 feet bgs. The USTs and all connected piping were removed and set aside for off-site recycling with the other recycled materials from the demolition activities. The excavation area was backfilled with existing site soil/crushed concrete.

As described in Section 5.1.2, the SRI activities were completed at this AOC to document the success of the Port Authority's soil removal effort and to confirm that additional remedial actions were unnecessary at this AOC.

4.3 AOC-Bldg20

The review of historical documents during the Phase I ESA revealed the presence of a former UST adjacent to Building No. 20. The former 8,000-gallon UST was reportedly used to store #6 fuel oil and was located in a concrete vault adjacent to Building No. 20. The UST was reportedly removed by P&G during the 1990s (i.e., prior to the sale of the property to the Port Authority) in accordance with NYSDEC protocols and with NYSDEC oversight. According to information provided by P&G, discolored soil was observed outside of the concrete vault, and approximately 200 tons of LNAPL-impacted soil were removed from the resultant excavation. NYSDEC assigned Case Number 920-3451 to the closure/removal effort. However, due to the proximity of Building No. 20 and associated utilities, limited quantities of LNAPL-impacted soil and a portion of the concrete vault were reportedly left in place to the east of Building No. 20. Following excavation activities, four post-excavation soil samples were collected along the sidewalls from the 0.5-foot depth interval above the water table. Three of these post-excavation soil samples contained PAH compound(s) at concentrations above their respective RSCOs. The concentration of PAH compound(s) detected is within the range attributable to the former placement of fill throughout the HHMT-Port Ivory facility by P&G.

Due to the proximity of this AOC to Building No. 20 and associated utilities, no subsurface investigation activities were proposed or implemented during the SI or RI. The Port Authority completed demolition activities in the vicinity of Building No. 20 subsequent to the RI investigation. Demolition activities included the excavation of the Building No. 20 foundation. As described in Section 5.1.3, the SRI was conducted in this AOC to document the success of the Port Authority's removal of LNAPL-impacted soil adjacent to the eastern side of the foundation for former Building No. 20 and to confirm that additional remedial actions were unnecessary at this AOC.

4.4 AOC-Bldg32/32A

The review of historical documents during the Phase I ESA revealed the presence of a former UST adjacent to Building No. 32 and two USTs adjacent to Building No. 32A. The former 3,000-gallon UST located in a concrete vault adjacent to Building No. 32 was reportedly used to store diesel fuel. This UST was reportedly removed by P&G during the 1990s (i.e., prior to the sale of the property to the Port Authority) in accordance with NYSDEC protocols and with NYSDEC oversight. Discolored soil was observed outside of the concrete vault, and approximately 50 tons of LNAPL-impacted soil was reportedly removed. NYSDEC assigned Case Number 920-3697 to the closure/removal effort. However, due to the presence of Building No. 32 and associated utilities, limited quantities of LNAPL-impacted soil were reportedly left in place to the east of Building 32. Following excavation activities, two post-excavation soil samples were collected from the sidewalls in the 0.5-foot depth interval above the water table. No compounds were detected at concentrations above their respective RSCOs in either of the soil samples.

Each of the former USTs located adjacent to Building No. 32A reportedly had a capacity of 12,500 gallons. One of the former USTs was used to store #6 fuel oil, while the second was used to store #2 fuel oil. These USTs were reportedly removed by P&G during the 1990s (i.e., prior to the sale of the property to the Port Authority) in accordance with NYSDEC protocols and with NYSDEC oversight. According to information provided by P&G, discolored soil was observed outside of the concrete vault, and approximately 50 tons of LNAPL-impacted soil was removed from the resultant excavation. NYSDEC assigned Case Number 920-3697 to the closure/removal effort. However, due to the proximity of Building No. 32, Building No. 32A, and associated utilities, limited quantities of LNAPL-impacted soil were reportedly left in place to the east of Building No. 32 and Building No. 32A: Following excavation activities, two post-excavation soil samples were collected along the sidewalls from the 0.5-foot depth interval above the water table. No compounds were detected at concentrations above their respective RSCOs in either of the soil samples. Due to the proximity of these former USTs to Building No. 32, Building No. 32A, and associated utilities, no subsurface investigation activities were proposed or implemented during the SI or RI. The Port Authority completed demolition activities, including excavation of the foundations, in the vicinity of Building No. 32 and Building No. 32A subsequent to the RI investigation. As described in Section 5.1.4, the SRI was conducted in this AOC to document the success of the Port Authority's removal of LNAPL-impacted soil adjacent to former Building No. 32 and former Building No. 32A and to confirm that additional remedial actions were unnecessary at this AOC.

5.0 SRI Goal and Scope of Work

The overall goal of the SRI was to determine whether additional investigative and/or remedial efforts were required at any AOC located at Area 2A or Area 2B. The proposed scope of work for the SRI was summarized in the NYSDEC-approved document entitled *Site Investigation Workplan Addendum - Sites 1 and 2A/2B* (SIWP) dated March 24, 2005. As previously stated, the results of the indoor air quality assessment at Area 2A and the initial investigation of AOC-Western Area, located at Area 2B, are presented in this report; however, these efforts are not part of the SRI and are summarized separately in Sections 9 and 10, respectively. The locations of the AOCs investigated during as part of the SRI conducted at Site 3 are shown on Figure 3. The SRI soil sampling program is summarized in Table 1.

Objectives for those portions of the SRI conducted at Area 2A were different from those for the SRI conducted at Area 2B. The objective of the SRI at Area 2A was to confirm the successful remediation of soil at the four previously-investigated AOCs: AOC-Stain3, AOC-UST7, AOC-Bldg20, and AOC-Bldg32/32A. All four of these AOCs were identified during the Phase I ESA, are located at Area 2A, and could not be fully evaluated due to the proximity of utilities and/or structures. As part of the Port Authority's redevelopment process, the utilities in this area have been rendered inactive and/or have been removed, and the buildings have been demolished. The SRI conducted at these four AOCs consisted of the drilling of 16 soil borings and the collection of one soil sample at each soil boring location. Soil samples were collected from depths where field observations indicated the presence of LNAPL-impacted soil, or, in the absence of indications of LNAPL-impacted soil, from the six-inch depth interval immediately above the water table. The soil samples were analyzed for the parameters specified in Sections 5.1.1 through 5.1.3, which provide additional detail regarding the scope of work for the four AOCs investigated at Area 2A during the SRI.

The objectives of the SRI at Area 2B were as follows: to determine the locations of the underground pipelines in the Tidewater easement, to confirm the presence or absence of LNAPL-impacted soil along the Tidewater pipelines, to delineate areas of LNAPL-impacted soil that were located along the Tidewater pipelines, to quantify the concentrations of regulated compounds in soil along the Tidewater pipelines, and to determine whether the presence of LNAPL-impacted soil along the Tidewater pipelines has degraded groundwater quality (i.e., is acting as a source area for regulated compounds in groundwater). The Tidewater pipelines were identified as potential sources of LNAPL subsequent to the RI. LNAPL was observed during the RI at two locations in the vicinity of the Tidewater pipelines at Site 3. An LNAPL investigation was initiated for soil along the Tidewater pipelines at Site 3, and the extent of LNAPL and/or LNAPL-impacted soil was significant. Because the Tidewater pipelines are also present at Area 2B, these pipelines were considered to be potential source areas for LNAPL at Area 2B.

TABLE 1
SUMMARY OF FIELD OBSERVATIONS AND SOIL SAMPLING PROGRAM
SITE 2 (AREAS 2A AND 2B)
HHMT-PORT IVORY FACILITY

ite/A OC	Date Collected	Location	Sample Depth (ft bgs)	LNAPL-Impacted Soil Present in Sample Interval? (Yes/No)	Depth Interval where Indications of Soil Impacts Observed (ft bgs)	Maximum PID (ppm)	Depth to Water (ft bgs)	Sampling Rationale
ite 2 (Area 2A)/AOC-UST7								
	3/29/2005	UST7-C1	6.0 to 6.5	No	-	0.0	6.5	Sample collected at the first interval above ground water.
	3/29/2005	UST7-C2	8.0-9.0	Yes	7.0-11.0	13	>9.0	Sample collected at most impacted interval based on PID measurement and free product present.
	3/30/2005	UST7-C3	9.5-10.0	-	-	0.0	10.0	Sample collected at the first interval above ground water
	3/29/2005	UST7-C4	8.0-9.0	Yes	7.0-11.0	9.4	9.0	Sample collected at most impacted interval based on PID measurement.
	3/25/2005	UST7-C5	8.0-9.0	No	-	0.5	7.0	Sample collected at most impacted interval based on PID measurement.
	3/25/2005	UST7-C6	9.0-9.5	No	-	0.0	9.0	Sample collected at the first interval below ground water
ite 2 (Area 2A)/AOC-Bldg20								
	3/23/2005	BLDG20-C1	5.0-6.0	No	-	0.0	6.0	Sample collected at the first interval above ground water
	3/24/2005	BLDG20-C2	3.0-4.0	No	-	0.0	4.0	Sample collected at the first interval above ground water
ite 2 (Area 2A)/AOC-Bldg32/32A								
	3/25/2005	BLDG32-C1	4.0-5.0	No	-	0.0	5.0	Sample collected at the first interval above ground water
	3/25/2005	BLDG32-C2	3.0-4.0	No	-	0.0	4.0	Sample collected at the first interval above ground water
	3/25/2005	BLDG32-C3	5.0-6.0	Note 4	5.0-6.0	0.0	4.5	Sample collected at interval where stained/discolored material was observed.
	3/24/2005	BLDG32-C4	3.0-4.0	No	-	0.0	4.0	Sample collected at the first interval above ground water
	3/24/2005	BLDG32-C5	3.0-4.0	No	-	0.0	4.0	Sample collected at the first interval above ground water
ite 2 (Area 2A)/AOC-Stain3								
	3/24/2005	STAIN03-C1	1.5-2.0	Note 4	1.5-2.0	0.0	>2.0	Sample collected at interval where stained/discolored material was observed.
	3/24/2005	STAIN03-C2	1.0-1.5	Note 4	1.0-2.0	0.0	>2.0	Sample collected at interval where stained/discolored material was observed.
	3/24/2005	STAIN03-C3	1.0-1.5	Note 4	1.5-2.0	0.0	>2.0	Sample collected at interval where stained/discolored material was observed.
ite 2 (Area 2B)/AOC Southern Area								
	12/23/2004	TW-37	6.5-7.0	Note 3	6.0-7.0	0.0	3.5	Sample collected at depth interval where greatest petroleum odor was observed
	12/23/2004	TW-38	8.0-8.5	Note 3	3.0-9.0	0.0	3.0	Sample collected at depth interval where greatest petroleum odor was observed.
	12/9/2004	TW-39	Note 2	No	-	0.0	4.5	Note 2
	12/9/2004	TW-40	Note 1	No	-	0.0	Note 6	Note 1
	12/9/2004	TW-40A	Note 1	No	-	0.0	> 4.3	Note 1
	12/9/2004	TW-40B	5.5-6.0	No	-	0.0	4.0	Sample collected at depth interval where greatest petroleum odor was observed
			8.5-9.0	No	-	0.0	4.0	Sample collected from clean interval below impacted interval.
	12/8/2004	TW-41	Note 2	No	-	0.0	2.0	Note 2
	12/8/2004	TW-42	Note 2	No	-	1.2	2.5	Note 2
	12/8/2004	TW-43	Note 1	No	-	0.0	> 3.5	Note 1
	12/8/2004	TW-43A	7.5-8.0	Yes	5.5-6.0 and 7.5-8.0	8.4	4.5	Sample collected at most impacted interval based on PID measurement.
	12/8/2004	TW-45	4.0-4.5	No	-	0.0	4.5	Sample collected at the first interval above ground water.
	12/28/2004	TW-46	Note 1	No	-	0.0	> 2.0	Note 1
	12/28/2004	TW-46A	Note 1	No	-	0.0	> 2.5	Note 1
	12/28/2004	TW-46B	Note 1	No	-	0.0	> 2.5	Note 1
	12/28/2004	TW-46C	Note 1	No	-	0.0	> 1.1	Note 1
	12/22/2004	TW-47	3.5-4.0	Yes	3.0-5.0	920	4.0	Sample collected at depth interval where greatest petroleum odor was observed.
			8.5-9.0	No	3.0-5.0	920	4.0	Sample collected from clean interval below impacted interval.

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TABL[illegible]
SUMMARY OF FIELD OBSERVATIONS AND SOIL SAMPLING PROGRAM
SITE 2 (AREAS 2A AND 2B)
HHMT-PORT IVORY FACILITY

Site/AOC	Date Collected	Location	Sample Depth (ft bgs)	LNAPL-Impacted Soil Present in Sample Interval? (Yes/No)	Depth Interval where Indications of Soil Impacts Observed (ft bgs)	Maximum PID (ppm)	Depth to Water (ft bgs)	Sampling Rationale
	12/23/2004	TW-48	8.5-9.0	Yes	4.5-9.0	17	3.0	Sample collected at most impacted interval based on PID measurement.
			9.5-10.0	No	4.5-9.0	0.0	3.0	Sample collected from clean interval below impacted interval.
	12/28/2004	TW-49	3.5-4.0	No	-	0.0	4.0	Sample collected at the first interval above ground water.
	12/28/2004	TW-50	3.5-4.0	No	-	0.0	4.0	Sample collected at the first interval above ground water.
	12/29/2004	TW-51	2.5-3.0	No	-	0.0	3.0	Sample collected at the first interval above ground water.
	12/29/2004	TW-52	2.0-2.5	No	-	0.0	2.5	Sample collected at the first interval above ground water.
	3/31/2005	TW-68	2.5-3.0	No	-	0.0	2.5	Sample collected at the first interval below ground water.
	3/31/2005	TW-69	5.5-6.0	No	-	0.0	5.0	Sample collected at depth interval where greatest petroleum odor was observed.
	3/31/2005	TW-70	Note 1	No	-	0.0	Not Encountered	Note 1
	3/31/2005	TW-70A	3.5-4.0	No	-	0.0	4.0	Sample collected at the first interval above ground water.
	3/31/2005	TW-71	Note 1	No	-	7.7	2.5	Note 1
	4/1/2005	TW-71A	5.0-6.0	Yes	4.0-5.0	196	3.0	Sample collected at most impacted interval based on PID measurement.
			7.0-8.0	No	4.0-5.0	32.6	3.0	Sample collected from clean interval below impacted interval.
	4/4/2005	TW-72	3.0-4.0	Yes	2.0-6.0	65.4	2.0	Sample most impacted interval based on PID measurement.
	4/4/2005	TW-73	4.0-5.0	Yes	4.0-6.0	151	2.5	Sample most impacted interval based on PID measurement.
			7.0-8.0	No	4.0-6.0	0.0	2.5	Sample collected from clean interval below impacted interval.
	4/1/2005	TW-74	3.0-3.5	No	-	0.0	3.5	Sample collected at the first interval above ground water.
	4/1/2005	TW-75	2.5-3.0	No	-	0.0	2.0	Sample collected at the first interval below ground water.
	4/5/2005	TW-76	5.0-6.0	No	-	0.0	5.0	Sample collected at the first interval below ground water.
	4/5/2005	TW-77	3.0-4.0	No	-	0.0	3.5	Sample collected at the first interval below ground water.
	4/5/2005	TW-78	2.0-3.0	No	-	0.0	2.5	Sample collected at the first interval below ground water.
	3/30/2005	TWP-13	3.5-4.0	No	-	0.0	4.5	Sample collected at the first interval above ground water.
	4/1/2005	TWP-14	6.0-6.5	Yes	6.0-8.0	1290	2.5	Sample most impacted interval based on PID measurement.
			8.0-8.5	Yes	6.0-8.0	1290	2.5	Sample collected from clean interval below impacted interval.

otes and Abbreviations

Refusal was encountered above the depth interval where LNAPL-impacted soil could potentially be present. No soil sample was collected, and a step-out soil boring was advanced.

No indications of LNAPL-impacted soil was observed, and no sample was collected.

The indications of imapcted soil observed at soil boring locations TW-37 and TW-38 are believed to be attributable to the presence of peat/meadowmat soil in the borehole rather than to petroleum impacts.

Although discolored soil was observed at the soil boring location, no odor or elevated concentration of volatile organic vapors was present. Therefore, although the soil appeared to be impacted, it is not believed to be impacted by petroleum.

Any depth to water that includes a ">" prefix indicates that groundwater was not encountered in the borehole. The value provided is the depth of the borehole.

Groundwater was encountered at 1.5 ft bgs, but was not encountered at 4.3 ft bgs at soil boring location TW-40A and was encountered at 4.0 ft bgs at soil boring location TW-40. Therefore, the groundwater encountered at 1.5 ft bgs is believed to be perched.

OC = Area of Concern
bgs = Feet below ground surface
D = Photoionization detector
ım = Parts per million

B26

The SRI at Area 2B was conducted in two separate mobilizations. During the first mobilization, the location of the Tidewater pipelines was confirmed, and soil borings were drilled at intervals of approximately 50 feet along the pipelines. Based on field observations, one to two soil samples were collected at each soil boring location. LNAPL-impacted soil was observed at two separate locations along the Tidewater pipelines during this mobilization; these locations are referred to collectively as AOC-Southern Area. The second mobilization consisted of the drilling of soil borings, the collection of one to two soil samples per soil boring, the installation of temporary wells, and the collection of one groundwater sample at each temporary well. The soil borings and temporary wells were located at AOC-Southern Area. The soil samples were analyzed for the parameters specified in Section 5.2, which provides additional details regarding the scope of work for the SRI conducted at AOC-Southern Area.

The additional work (i.e., the indoor air quality assessment and the investigation of AOC-Western Area) is not considered to be part of the SRI, despite the inclusion of the resulting data in this report. The additional work was performed to address different objectives than the SRI objectives. The scope of work for the indoor air quality assessment is summarized in Section 9, and that for the investigation of AOC-Western Area is summarized in Section 10.

5.1 Scope of Work – SRI at Area 2A

The scope of work for the SRI at Area 2A included the investigation of the four previously-identified AOCs: AOC-Stain3, AOC-UST7, AOC-Bldg20, and AOC-Bldg32/32A. The sections below summarize the scope of the SRI at each of these AOCs.

5.1.1 Scope of Work – AOC-Stain3

As stated in the September 2004 *Revised Site Investigation and Conceptual Remedial Action Workplan Site 2A/2B*, initial assessment activities performed by HMM identified surface staining at several site locations including an area within Building 20. Analytical results for the soil samples collected from the top 2 to 2.5 feet of the soil column at locations STAIN-3 and STAIN-3B revealed elevated concentrations of total SVOCS and of various metals, respectively. Soil samples collected from depth intervals below 2-2.5 feet bgs at locations STAIN-3 and STAIN-3B revealed significantly lower concentrations of SVOCs and metals. As described in the September 2004 *Revised Site Investigation and Conceptual Remedial Action Workplan Site 2A/2B,* the Port Authority addressed the discolored area during building (Building 20) demolition activities by removing the discolored/degraded (with respect to environmental quality) soil. The investigation performed at AOC-Stain3 during the SRI included the drilling of soil borings and the collection of soil samples from the area surrounding sampling location STAIN-3 and adjacent sampling location STAIN-3B to confirm the success of the soil removal.

Based on previous sampling results and the limited size of the discolored area, three soil samples were collected from the STAIN-3 Area. One soil sample was collected from the 1.5-2 foot bgs depth interval at the (former) STAIN-3 sampling location, and two additional soil samples were collected from the 1-1.5 foot bgs depth interval at locations immediately beyond the previously observed limits of staining. The three soil samples were submitted to STL-Edison, a NYS-certified laboratory (Certification No. 11452) for analysis of TCL VOC+10, TCL SVOC +15, TAL metals, and TPHC.

5.1.2 Scope of Work – AOC-UST7

Initial Phase I ESA efforts revealed the potential for USTs (that were not identified by P&G) to be present at the HHMT-Port Ivory Site, including in an area at the northeastern portion of Area 2A. This area was determined to be an AOC, and was designated AOC-UST7 (see Figure 3 for the location of AOC-UST7). Geophysical surveys performed at AOC-UST7 identified several anomalies and, as a result, soil borings were drilled during the SI to investigate the anomalies. A temporary well, identified as TMW-01, was also installed at AOC-UST7. With the exception of the concentration of TPHC in soil samples collected from the top 3.5 feet of the soil column at AOC-UST7, soil sampling analytical results indicated that the majority of compounds and metals were present at similar concentrations to those in fill placed throughout the HHMT-Port Ivory Facility by P&G. Analytical results for the groundwater sample previously collected at this AOC indicated similarly minimal impacts; only the SVOC bis(2-ethylhexyl)phthalate and the metals iron, manganese, and lead were detected at concentrations greater than their respective NYSDEC Ambient Water Quality Standards and Guidance Values (AWQSGVs). The presence of bis(2-ethylhexyl)phthalate, a laboratory solvent, is likely attributable to laboratory contamination of the sample. The reported concentrations of iron, manganese, and lead were similar to those detected in groundwater throughout the HHMT-Port Ivory Facility and, thus, were considered background conditions.

Much of the shallow soil sampled during the SI was removed from AOC-UST7 during subsequent demolition activities. In addition, two USTs were observed during demolition. The USTs were located within concrete vaults and were filled with inert material (bricks, stone and sand). Upon removing the USTs and the associated concrete vaults, the Port Authority encountered indications of petroleum impacts in the soil surrounding the vaults; the LNAPL-impacted soil was excavated, stockpiled on-site pending off-site disposal, and disposed of at an appropriate recycling/disposal facility. The excavation area was backfilled with existing site soil and crushed concrete. The investigation performed at AOC-UST7 during the SRI included the drilling of soil borings and the collection of soil samples from the vicinity of the former Port Authority excavation to confirm the success of the soil removal.

Based on the size of the excavation footprint (approximately 25 feet southwest-northeast by 20 feet southeast-northwest), six soil samples were collected from the AOC-UST7 Area. Two soil samples were collected from a six-inch depth interval between 9 and 10 feet bgs (i.e., near the bottom of the former excavation), while the remaining four soil samples were collected from the sidewalls of the former excavation. All six soil samples were submitted to STL-Edison, an NYS-certified laboratory, for analysis of TCL VOC+10, TCL SVOC+15, TAL metals, and TPHC.

5.1.3 – Scope of Work - AOC -Bldg 20 and AOC-Bldgs32/32A

P&G removed several USTs during the 1990s; all removal efforts are reported to have been in accordance with NYSDEC protocols and with NYSDEC oversight. However, due to the proximity to structures and/or utilities, limited quantities of LNAPL-impacted soil were reported to remain at the following three locations at Area 2A: east of Building No. 20, east of Building No. 32, and east of Building No. 32A. The general locations of the former UST areas are presented on Figure 3. A brief discussion of each prior removal effort is provided below.

- Building No. 20: P&G removed one concrete-vaulted 8,000-gallon UST containing #6 fuel oil from the area east of Building No. 20. The presence of discolored soil was observed during the tank removal and was addressed through the removal of approximately 200 tons of LNAPL-impacted soil from the tank area. NYSDEC assigned case number 920-3451 to the closure/removal effort. Due to the proximity of the tank to the foundation of Building No. 20, some LNAPL-impacted soil and a portion of the containment vault were left in place.

- Building No. 32: P&G removed one 3,000-gallon concrete vaulted UST containing diesel fuel from the area east of Building No. 32. Approximately 50 tons of LNAPL-impacted soil was removed from the area surrounding the UST based upon visual signs of staining. The closure was assigned case number #920-3697. The excavation was extended to the groundwater table to address LNAPL-impacted soil. However, remedial efforts were limited due to the proximity of underground utilities and building foundations.

- Building No. 32A: P&G removed two 12,500-gallon USTs east of Building No. 32A. One UST was utilized for the storage of #6 oil and the other was utilized to store #2 oil. P&G removed approximately 75 tons of LNAPL-impacted soil from the area surrounding the USTs to LNAPL-impacted soil. The closure was assigned case number #920-4269. The excavation was extended to the groundwater table to address LNAPL-impacted soil. However, remedial efforts were limited due to the presence of building foundations and underground utilities. All accessible LNAPL-impacted soil was reported to have been removed

It should be noted that the Port Authority razed Building Nos. 20, 32, and 32A and concrete foundations and abandoned or removed former utility lines as part of site redevelopment. The demolition activities resulted in the removal of some soil at the former UST areas associated with AOC-Bldg20 and AOC-Bldg32/32A. The SRI performed at AOC-Bldg20 and AOC-Bldgs32/32A included the drilling of soil borings and the collection of soil samples from the areas where LNAPL-impacted soil was reportedly left in place to determine whether additional soil excavation was warranted at these areas.

During the SRI, two soil borings were drilled at AOC-Bldg20 and five soil borings were drilled at AOC-UST32/32A. At each soil boring location, one soil sample was collected from the depth interval exhibiting indications (based on the concentration of volatile organic vapors, as measured using a PID, and on visual and olfactory field observations) of LNAPL-impacted soil or, in the absence of any indications of LNAPL-impacted soil, from the 6-inch depth interval above groundwater. All soil samples were submitted to STL-Edison, a NYS-certified laboratory, for analysis of TCL VOC+10, TCL SVOC+15, TAL metals, and TPHC.

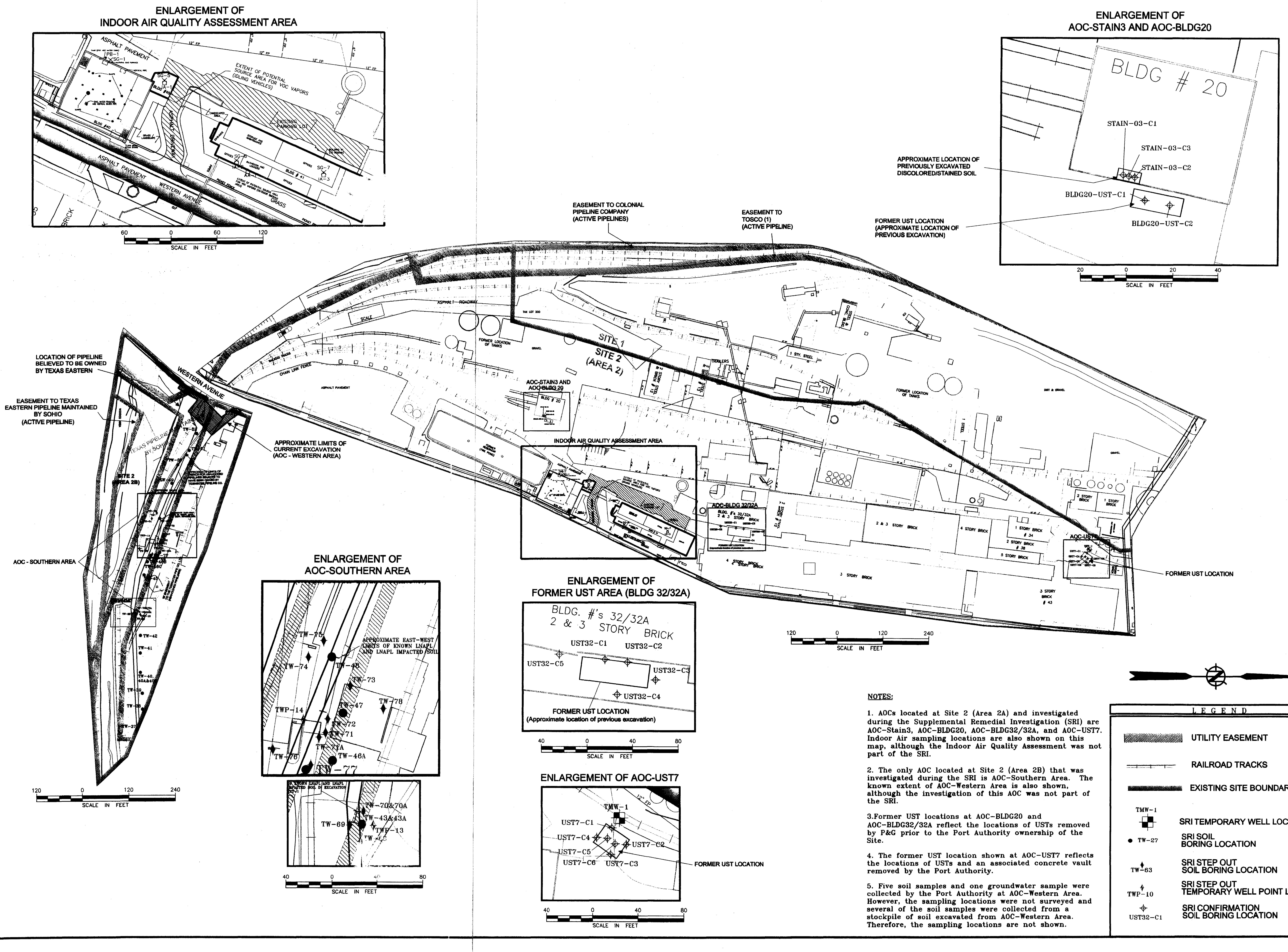
5.2 Scope of Work – SRI at Area 2B

The objectives of the SRI at Area 2B were as follows: to determine the locations of the underground pipelines in the Tidewater easement; to confirm the presence or absence of LNAPL-impacted soil along the Tidewater pipelines; to delineate areas of LNAPL-impacted soil that were located along the Tidewater pipelines; to quantify the concentrations of regulated compounds in soil along the Tidewater pipelines; and, to determine whether the presence of LNAPL-impacted soil along the Tidewater pipelines has degraded groundwater quality (i.e., is acting as a source area for regulated compounds in groundwater). As previously noted, the SRI at Area 2B was completed in two separate mobilizations. The general scope of work for the first mobilization was to locate the inactive underground Tidewater pipelines at Area 2B utilizing geophysical survey techniques, to drill soil borings along the Tidewater pipelines, and to collect soil samples at the soil boring locations. The general scope of work for the second mobilization was to drill soil borings and install temporary wells in the two separate areas where LNAPL-impacted soil was observed during the first mobilization and to collect soil and groundwater samples. Additional details about the scope of work completed during each mobilization of the SRI at Area 2B are provided in sections 5.2.1 and 5.2.2. Figure 3 indicates the soil boring and temporary well locations at Area 2A and Area 2B. Table 1 summarizes the field observations and the soil sampling depth intervals.

5.2.1 Scope of Work – First Mobilization

The geophysical survey included three types of geophysical testing: electromagnetic surveys using EM-61 methods, pipe tracing surveys, and ground penetrating radar (GPR) methods. In order to better utilize pipe tracing techniques, a test pit, identified as EXT-1, was excavated so that electric current could be applied directly to the Tidewater pipelines, rather than being induced from land surface. Once the pipelines were located, soil borings were drilled at an approximate frequency of one soil boring per 50 feet of pipeline. These soil borings were identified as TW-37 through TW-40, TW-40A, TW-40B, TW-41 through TW-43, TW-43A, TW-45, TW-46, TW-46A through TW-46C, and TW-47 through TW-52. Because the geophysical surveys successfully located approximately 650 linear feet of the Tidewater pipelines, soil borings were advanced at 15 locations, not including step-out soil borings. Letter suffixes were applied to step-out soil borings, drilled where refusal was encountered; the first step-out location is identified by an "A" suffix, the second by a "B" suffix, and the third by a "C" suffix. Please note, no soil boring was drilled and no test pit was excavated at proposed location TW-44 because the Tidewater pipelines could not be located in the vicinity of TW-44 using geophysical methods and the risk of breaking a Tidewater pipeline (or other subsurface utility) and potentially releasing additional LNAPL to the subsurface was considered to outweigh the benefits of investigating the relatively short length of the Tidewater pipelines in the vicinity of TW-44. Furthermore, the presence of reinforced concrete, a reinforced-concrete truck scale, and asphalt at ground surface in the vicinity of TW-44 prevented manual drilling of the proposed soil boring.

At each soil boring drilled during the first mobilization, the soil column was inspected for indications (elevated concentrations of volatile organic vapors, as measured using a photoionization detector (PID), and the presence of LNAPL, sheen, discolored soil, or odor) of LNAPL-impacted soil. Except where refusal was encountered, each soil boring was drilled to a depth interval below the smear zone (i.e., a depth interval where the soil appeared clean based on field observations) at locations where field observations indicated the presence of LNAPL-impacted soil or to approximately two feet below the



NOTES:

1. AOCs located at Site 2 (Area 2A) and investigated during the Supplemental Remedial Investigation (SRI) are AOC-Stain3, AOC-BLDG20, AOC-BLDG32/32A, and AOC-UST7. Indoor Air sampling locations are also shown on this map, although the Indoor Air Quality Assessment was not part of the SRI.

2. The only AOC located at Site 2 (Area 2B) that was investigated during the SRI is AOC-Southern Area. The known extent of AOC-Western Area is also shown, although the investigation of this AOC was not part of the SRI.

3.Former UST locations at AOC-BLDG20 and AOC-BLDG32/32A reflect the locations of USTs removed by P&G prior to the Port Authority ownership of the Site.

4. The former UST location shown at AOC-UST7 reflects the locations of USTs and an associated concrete vault removed by the Port Authority.

5. Five soil samples and one groundwater sample were collected by the Port Authority at AOC-Western Area. However, the sampling locations were not surveyed and several of the soil samples were collected from a stockpile of soil excavated from AOC-Western Area. Therefore, the sampling locations are not shown.

LEGEND

▨	UTILITY EASEMENT
┼─┼─┼	RAILROAD TRACKS
▬	EXISTING SITE BOUNDARY
TMW-1 ◩	SRI TEMPORARY WELL LOCATION
● TW-27	SRI SOIL BORING LOCATION
♦ TW-63	SRI STEP OUT SOIL BORING LOCATION
♦ TWP-10	SRI STEP OUT TEMPORARY WELL POINT LOCATION
⊕ UST32-C1	SRI CONFIRMATION SOIL BORING LOCATION

Sheet of

THE PORT AUTHORITY
OF NY & NJ

ENGINEERING PROGRAM MANAGER

No.	Date	Revision	Approved

ENGINEERING DEPARTMENT

Title

(BLOCK 1400, LOT 1 AND
SOUTHERN END OF
BLOCK 1338, LOT 1)
HHMT-PORT IVORY
FACILITY

SITE 2
SAMPLING LOCATION
MAP

This drawing subject to conditions in contract. All inventions, ideas, designs and methods herein are reserved to Port Authority and may not be used without its written consent.

Designed by: BFJ
Drawn by:
Checked by:
Date
Contract Number
Drawing Number **FIGURE 3**

P:\232952wmd\REMEDIAL ACTIONS\Remedial Petroleum Issues Block 1338\LNAPL Investigation Res\Site 2A2B Report\Figures\Site 2A2B Sampling Locations Map water table, at locations where indications of LNAPL-impacted soil were not observed. Based upon field observations, either one or two soil samples were collected from the soil boring and submitted for analysis of TCL VOC+10, TCL SVOC+15, and TAL metals. In general, one soil sample was collected at soil boring locations where indications of LNAPL-impacted soil were not observed; at these locations, the soil sample was collected from the six-inch depth interval above the water table. Two soil samples were collected at locations where LNAPL-impacted soil was observed; the shallower soil sample was collected from the depth interval that exhibited the highest concentrations of VOC vapors or the most significant visual indications of LNAPL-impacted soil, while the deeper sample was collected from a depth interval that appeared to be clean (i.e., where indications of LNAPL-impacted soil were not observed). The only exceptions to the soil sampling procedure were that no soil sample was collected at locations TW-39, TW-40, TW-40A, TW-43, and TW-46 and the step-out locations from TW-46. No soil sample was collected at location TW-39 because indications of LNAPL-impacted soil were not observed and because an extra soil sample was collected at location TW-40B in order to investigate potential impacts at that location. No soil samples were collected at locations TW-40, TW-40A, TW-43, and TW-46 and the step-out locations from TW-46 because refusal was encountered above the smear zone at these soil boring locations.

5.2.2 Scope of Work – Second Mobilization

The second mobilization effort at Area 2B was conducted at each of the two separate areas where LNAPL-impacted soil was encountered during the first mobilization to delineate the extent of LNAPL-impacted soil and to determine whether soil or groundwater quality was degraded based on the presence of the observed LNAPL-impacted soil.

Sixteen soil samples and one duplicate soil sample were collected at 13 soil boring locations (not including step-out locations) during the second mobilization. The soil borings were identified as TW-68, TW-69, TW-70, TW-70A, TW-71, TW-71A, TW-72 through TW-78, TWP-13, and TWP-14. Soil borings TW-68, TW-69, TW-70, TW-70A, and TWP-13 were drilled in the vicinity of one area where LNAPL-impacted soil was observed during the first mobilization (i.e., in the vicinity of test pit location EXT-1), while the remaining soil borings were drilled in the other area where LNAPL-impacted soil was observed (in the vicinity of soil boring locations TW-47 and TW-48). As indicated above, the suffix "A" indicates a step-out soil boring drilled because refusal was encountered at the initial soil boring location. In addition, soil borings TWP-13 and TWP-14 were converted to temporary wells.

The SRI work plan proposed the drilling of soil boring TWP-15, which would be converted to a temporary well; however, location TWP-15 could not be accessed by the drill rig. Following the demolition of Building Nos. 70/72, location TWP-15 was located in a low spot at the site. Water gathered in this area, and the soil was too soft for the rig to drive to and to drill (i.e., the jacks would have pushed into the soil). Therefore, location TWP-15 was offset approximately 30 feet east of TWP-14. Auger and split spoon refusal (caused by concrete or other subsurface obstruction/debris) was encountered at approximately 3 feet bgs at TWP-15. Based on the presence of underground utilities and adjacent roads, any offset of TWP-15 would result in this boring being even closer (within approximately 15 feet of) to TWP-14. It was determined that wells within 15 feet of one another would yield approximately the same information. In addition, the presence of LNAPL at temporary well TWP-14 was well established based on field observations; therefore, groundwater at temporary well TWP-14 would be in contact with the LNAPL and would be expected to be impacted. Since the second offset location for temporary well TWP-15 would also be within the area where LNAPL was encountered, groundwater quality data from this temporary well would not advance the investigation. Therefore, proposed temporary well TWP-15 was not installed.

In general, the soil sampling program was the same as that followed during the first mobilization; the soil column at each soil boring location was inspected for indications of LNAPL-impacted soil, and either one or two soil samples were collected at the soil boring location. The soil sampling depths were as discussed above. The only exception to the sampling protocol was that only one soil sample was collected at location TW-72 because the PID malfunctioned in the field, and it was not learned until later, when the soil could be screened with a functioning PID, that an elevated concentration of volatile organic vapors was present in the soil column. All soil samples were submitted to STL-Edison, an NYS-certified laboratory, for analysis of TCL VOC+10, TCL SVOC+15, and TPHC. TAL metals were not targeted for analysis because, based on the analytical results for soil samples collected during the first mobilization, the metals were determined not to be contaminants of concern (i.e., the LNAPL was not chelating with metals) at this area.

The groundwater sampling program included the collection of one groundwater sample from each of the two temporary wells. Temporary well TWP-13 was installed in the vicinity of test pit location EXT-1, one location where LNAPL-impacted soil was observed during the first mobilization, while temporary well TWP-14 was installed in the vicinity of soil boring locations TW-47 and TW-48, the other location where LNAPL-impacted soil was observed during the first mobilization. Standard (3 to 5-volume purge) methods were utilized in collection of the groundwater samples. All groundwater samples were analyzed for TCL VOC+10 and TCL SVOC+15 by STL-Edison, an NYS-certified analytical laboratory. The library search was conducted for comparison to the AWQSGV for Principal Organic Contaminants (POCs), which are compounds that are not regulated individually (i.e., do not have established AWQSGVs), but that are in one of six classes of organic compounds.

Please note, the SRI work plan proposed the collection and analysis of LNAPL samples from the soil column at selected soil boring locations and from any LNAPL that accumulated within any of the temporary wells. However, LNAPL could not be sampled at any of these locations because it was present in insufficient quantities (i.e., could not be separated from the soil matrix) at all SRI soil boring locations and did not accumulate within either of the two temporary wells installed during the SRI.

6.0 SRI – METHODS

This section describes the methodology utilized during all field activities conducted during the SRI. The following activities were conducted at Area 2A and/or Area 2B during the SRI: the completion of geophysical surveys, the drilling of soil borings, the collection of soil samples, the installation of temporary wells, and the collection of groundwater samples. The sections below provide details on the methodology utilized to complete each of these tasks.

Descriptions of the methods used to complete the SRI activities, including the performance of geophysical surveys, the drilling of soil borings, the collection of soil samples, the installation of temporary wells, and the collection of groundwater samples are provided below in sections 6.1 through 6.5, respectively.

6.1 Geophysical Survey Methods

The geophysical surveys conducted at Area 2B were performed on October 11 and 12, 2004, and December 16, 2004. The purpose of the geophysical surveys was to locate the underground pipelines believed to be present in the Tidewater easement at Area 2B. The geophysical survey included electromagnetic methods (EM-61), line tracing methods, and GPR methods.

Several EM-61 surveys also were utilized to locate the pipelines; each survey was conducted across a different portion of the pipelines. In each survey, parallel transect lines (spaced at approximately 5-foot intervals) were established. The wheel-mounted EM-61 transmitter and receiver were pulled along the transect lines at a uniform rate, and the electric field strength was measured every eight inches along each transect line. The field strength data were contoured using the computer application Surfer. Anomalies were identified based on the contour map, marked on the pavement, and investigated though observation (where above-grade indications of utilities such as manhole covers and catch basins were observed) or through pipe tracing methods as described below.

EM-61 surveys were also used to confirm that the pipe tracing methods had identified the outermost (i.e., the western and eastern) pipelines. In these cases, the transect lines were oriented perpendicular to the pipelines and established so that the pipelines ran through the center of the grid. The data measurement and reduction was performed as described above. The locations of the outermost pipelines were marked on the macadam pavement.

As noted above, the line tracing methods were utilized to confirm that the anomalies detected in the EM-61 surveys were pipelines and that the pipelines were continuous between EM-61 survey areas. Line tracing efforts consisted of inducing a current along the pipeline and tracing the current along the pipeline until the current was no longer detectable. The current was induced from a radio-frequency transmitter that was placed at grade or an electric current applied to the pipeline directly. All line tracing work completed on October 11 and 12, 2004 involved placing the transmitter at grade above the pipeline and oriented in approximately the same direction as the pipeline. In no case was the receiver, the instrument used to detect the current, placed within 50 feet of the transmitter. Prior to conducting the line tracing work on December 16, 2004, a test pit was excavated immediately east of the truck scale in order to allow access to a minimum of one pipeline. Once a pipeline was exposed, an electrode was attached to the pipeline, and an electric current was induced in the pipeline.

At the completion of the line tracing effort, markings were painted on the macadam to indicate the results. If applicable, the results were compared to the EM-61 survey results to confirm that the pipelines detected in the line tracing survey produced anomalies in the EM-61 survey.

GPR surveys were conducted at only two locations where the pipelines were previously identified using pipe tracing techniques. The purpose of the GPR surveys was to confirm the depth of the pipelines. Transect lines were established approximately perpendicular to the pipelines, and the GPR combination transmitter/receiver was pulled along the transect lines at a uniform rate. The GPR data were downloaded into a laptop computer for display and contouring purposes.

6.2 Drilling Methods – Soil Borings

As indicated above, the soil borings at Area 2A were drilled in one mobilization, while the soil borings at Area 2B were drilled in two mobilizations. During the first mobilization, 15 soil borings were drilled at Area 2B between December 7 and 31, 2004. During the second mobilization, 16 soil borings were drilled at Area 2A between March 23 and 29, 2005, 11 delineation soil borings were drilled at Area 2B between March 31 and April 5, 2005, and two soil borings that were subsequently converted to temporary wells were drilled at Area 2B on March 30 and April 1, 2005. The delineation soil borings were drilled to allow collection of subsurface soil samples and to delineate LNAPL-impacted soil away from soil boring location TW-47 and away from the excavation located immediately east of the concrete pad that surrounds the truck scale. Please note, the summary of soil borings presented above does not include eight step-out soil borings drilled at Area 2B because refusal was encountered at proposed soil boring locations.

All soil borings were drilled in accordance with NYSDEC regulations and guidance documents. Soil borings were drilled using manual and/or hollow stem auger drilling methods. As per Port Authority protocols for the protection of existing utilities, soil borings were drilled to a depth of six feet bgs using manual methods except for locations where macadam was present at ground surface. At locations where macadam was present at land surface, augers were used to drill through the macadam and the borehole was advanced below the macadam to a depth of six feet using manual methods. Manual methods included use of post-hole diggers and/or soil augers advanced by hand. These tools were used to advance the borehole and to collect six-inch-long soil cores for inspection.

At depths below six feet below grade, the soil boring was either extended to depth using manual methods or was drilled to depth using hollow stem auger drilling methods. The borehole was drilled to depth using manual methods only if two conditions were met: 1) the borehole was not observed to collapse and 2) soil impacts were not observed. Hollow stem auger drilling included the use of 4 ¼-inch augers, a center rod with a floating plug, and a 3-inch inner diameter split spoon sampler. The floating plug was inserted into the bottom auger, and the augers were advanced to approximately six feet bgs (i.e., to the bottom of the borehole advanced manually). The floating plug was removed, and the split spoon was driven two feet below the bottom of the auger using a 140-pound hammer that was repeatedly dropped approximately 30 inches onto rods connected to the split spoon. The split spoon was retrieved and the soil column was logged. The floating plug was inserted back into the augers, and the augers were advanced an additional two feet. The floating plug was removed, the split spoon was inserted into the augers, and an additional two feet of the soil column were recovered and inspected. This process continued until the soil boring was completed. Completion depths varied, but the soil borings were advanced to the bottom of the impacted soil (for soil borings where LNAPL-impacted soil were encountered) or to at least two feet below the water table (for soil borings where LNAPL-impacted soil was not observed) unless auger refusal was encountered. If auger refusal was encountered, the borehole was abandoned and a new soil boring was drilled adjacent to the abandoned boring location.

The soil column was logged continuously at all soil boring locations for (at a minimum) the following conditions: color; texture; moisture content; and, indications of LNAPL-impacted soil, including elevated concentrations of volatile organic vapors (as measured using a PID), discolored soil, sheen, LNAPL, and odor. Boring logs are included in Appendix A. Soil boring locations are shown on Figure 3.

6.3 Soil Sampling Methods

Forty-four soil borings were drilled at Site 2, including two soil borings that were subsequently converted to temporary wells but not including eight step-out soil borings that were drilled because refusal was encountered at the proposed soil boring location during the SRI. The sampling program included the collection of 14 soil samples from soil borings drilled at Area 2B during the first mobilization (i.e., during December 2004), 16 soil samples and one duplicate soil sample from step-out soil borings and soil borings subsequently converted to temporary wells that were drilled during the second mobilization (i.e., during March and April 2005), and 16 soil samples from soil borings drilled at Area 2A during March 2005. All soil samples were collected in accordance with NYSDEC requirements and guidance documents.

At Area 2A, one soil sample was collected from each soil boring location. Except for soil samples collected from soil borings drilled at AOC-Stain3, soil samples were collected from the depth interval that exhibited the most significant indications of LNAPL-impacted soil; if no indications of LNAPL-impacted soil were observed, the soil sample was collected from a depth interval that was predetermined based on previous field observations. Soil samples collected from soil borings drilled at AOC-Stain3 were collected at predetermined depth intervals based on previous field observations and soil sampling analytical results.

At Area 2B, as many as two soil samples were collected from each soil boring, depending on field observations. If LNAPL-impacted soil was observed, one soil sample was collected from the depth interval that exhibited the most significant indications of LNAPL-impacted soil and a second soil sample was collected from soil that appeared clean and was below the LNAPL-impacted soil. If soil impacts were not observed, a soil sample was either not collected or was collected from soil immediately above the water table. Please note that at least one soil sample was collected from each step-out soil boring drilled during the second mobilization to Area 2B.

Soil samples were collected using a stainless steel sampling device that was decontaminated between samples. Decontamination involved rinsing the device with laboratory-quality DI water, a DI water-alconox solution, and an organic solvent, generally acetone or hexane. Soil was transferred from the sampling device (i.e, the split spoon, hand auger, or post-hole digger) directly into sampling jars. The samples were labeled and placed on ice in a cooler. All soil samples were transported to the analytical laboratory under chain-of-custody documentation.

6.4 Installation of Temporary Wells

Two soil borings drilled at Area 2B during the second mobilization (i.e., during March and April 2005) were converted to temporary wells. The SRI conducted at Area 2A did not include a groundwater investigation component. The temporary wells were installed at Area 2B to allow collection of groundwater samples, to determine the mobility of the LNAPL, and, if possible based on the mobility of the LNAPL, to allow for collection of an LNAPL sample. The groundwater samples were collected to determine whether the LNAPL-impacted soil encountered at locations TW-47 and EXT-1 was a source area for groundwater impacts. Temporary well TWP-13 was constructed of 2-inch diameter PVC screen and riser, while temporary well TWP-14 was constructed of 4-inch diameter PVC screen and riser. Both temporary wells were constructed using 0.010-inch slot size screen that extended from approximately two feet above groundwater to the bottom of the borehole. The sand pack for both wells consisted of number 2 size sand, and was installed to a depth of approximately one to two feet above the top of the screen. Bentonite pellets were installed above the sand pack in both wells to preclude storm water or perched water from entering the sand pack. Well TWP-13 was completed as a flush-mount monitoring well with a road plate because it was located in an access road. Well TWP-14 was completed as a stick-up well because it was located outside the access road.

6.5 Collection of Groundwater Samples

As indicated above, one groundwater sample was collected from each of the two wells installed at Area 2B. Groundwater sampling was performed in accordance with NYSDEC requirements and guidance documents. Standard (3 to 5 volume purge) purging and sampling methods were used.

Prior to groundwater sampling, the presence or absence of LNAPL in the temporary well was confirmed and the depth to water in the well was measured relative to a surveyed reference point using an electronic oil-water interface meter. The volume of water within the well was calculated. The well was purged of three to five times the calculated volume of water using a centrifugal pump. After the water level recovered, a dedicated Teflon bailer was lowered into the well, allowed to fill with water, and was removed from the well. The groundwater sample was transferred from the bailer into laboratory-prepared sampling jars. The samples were labeled and placed on ice in a cooler. All soil samples were transported to the analytical laboratory under chain-of-custody documentation.

7.0 SRI RESULTS

The SRI conducted at Site 2 included the following components: completion of geophysical surveys, drilling of soil borings, collection of soil samples, installation of temporary wells, and collection of groundwater samples. During implementation of each component, field observations and measurements were recorded. In addition, soil and groundwater samples were analyzed for the parameters specified in Section 5. The results of the SRI efforts are presented below. Sections 7.1, 7.2, and 7.3 summarize the results of the geophysical investigations, the field observations pertaining to site hydrogeology and the distribution of LNAPL-impacted soil, and the soil and groundwater sampling analytical results, respectively.

7.1 Geophysical Surveys

Three types of geophysical surveys were utilized to locate the inactive underground pipelines present in the Tidewater easement: an electromagnetic survey (utilizing EM-61), a line tracing survey, and a GPR survey. Initial efforts revealed that the GPR survey was ineffective to detect the pipelines and/or gauge their depths because the penetration depth of the GPR at Area 2B was only a few feet below grade, and the pipelines of interest were situated below this depth.

The EM-61 methods successfully utilized the pipelines from the eastern edge of the concrete pad that surrounds the truck scale to a point approximately 50 feet east of the concrete pad. The pipelines were not traceable to the east of these locations due to interference from railroad tracks and other near-surface metal debris at this portion of Area 2B. Similarly, the lines could not be traced to the west due to interference from a metal frame in the truck scale and rebar in the concrete pad that surrounded the truck scale. EM-61 methods were utilized to the west of the concrete pad surrounding the truck scale. However, the presence of metal at the surface (the fence lines and rebar in the Jersey barriers, for example) and the relatively high density of subsurface utilities precluded a positive identification of the pipelines at this area.

As such, line tracing methods were utilized since the signal induced on a pipeline can be traced even in the vicinity of near-surface metal debris. Using the line tracing methods, the pipelines were located from the eastern edge of the concrete pad surrounding the truck scale to approximately 150 feet east of the concrete pad. Beyond this distance, the current induced in the pipelines was too weak to detect. Thus, the pipelines could not be traced beneath the concrete pad surrounding the truck scale because the current was induced not only in the pipelines, but also in the rebar present in the concrete pad surrounding the truck scale. Again, the current was too weak to detect on the west side of the concrete pad surrounding the truck scale.

In order to trace the pipelines further, a test pit, identified as EXT-1 (see Figure 3), was excavated immediately to the east of the concrete pad surrounding the truck scale; this location was chosen because it was the westernmost area of the known pipeline location. A pipeline was exposed at a depth of approximately 5.5 feet bgs, and an electrode was taped to the pipeline. Utilizing the line tracing technique, the pipeline was traced an additional 500 feet to the west. The trend of the pipeline was marked on the macadam using spray paint and was mapped relative to existing, mapped features such as a nearby fence line.

Once one pipeline was traced over this distance, EM-61 methods were utilized to confirm the locations of the outermost pipeline of the seven pipelines within the easement. EM-61 transect lines were established approximately perpendicular to the trend of the pipeline as determined by the line tracing results. The EM-61 results confirmed that all seven pipelines were within approximately ten to fifteen feet of one-another. Figure 2 indicates the location of the pipelines determined using the methods described above.

7.2 Field Observations

The following summary of field observations includes a summary of hydrogeologic conditions and a description of the extent of LNAPL-impacted or potentially degraded (with respect to environmental quality) soil. The summary of hydrogeologic conditions at Site 2 in Section 7.2.1 is based upon field observations made in the SRI and includes information regarding the depth to groundwater, the thickness of the fill materials, and the consistency of the fill materials and native soils encountered during the field effort. Because the soil borings advanced during the SRI were drilled to depths of less than fifteen feet bgs, but some soil borings drilled during the SI and RI were drilled to deeper depths, some information that is included in Section 3.2.2 of this report was not verified during the SRI and is not included in Section 7.2.1.

The summary of the extent of potential soil impacts, as identified visually (i.e., the presence of LNAPL, discolored soil, sheen, etc.) and through field screening methods (i.e., the use of a PID to measure the concentration of volatile organic compounds in the soil column) is provided in Section 7.2.2. As noted above, the objective of the SRI at Area 2A was to confirm the successful remediation of soil at the four previously identified AOCs. Section 7.2.2 includes only field observations; the soil sampling analytical data are summarized below in Section 7.3.

The objectives of the SRI at Area 2B were to determine the locations of the underground pipelines in the Tidewater easement, to confirm the presence or absence of LNAPL-impacted soil along the Tidewater pipelines, to delineate areas of LNAPL-impacted soil that were located along the Tidewater pipelines, to quantify the concentrations of regulated compounds in soil along the Tidewater pipelines, and to determine whether the presence of LNAPL-impacted soil along the Tidewater pipelines has degraded groundwater quality (i.e., is acting as a source area for regulated compounds in groundwater). The results of the geophysical investigation, conducted to locate the underground pipelines, were summarized in Section 7.1. Section 7.2.2 identifies the locations where LNAPL-impacted soil was observed and the extent of the LNAPL-impacted soil. Field observations pertaining to the magnitude and extent of the impacts are also provided. Soil and groundwater sampling analytical results are summarized in Section 7.3 and 7.4, respectively.

7.2.1 Summary of Hydrogeology

Field observations pertaining to the hydrogeology are summarized below.

Area 2A

Sixteen soil borings, identified as BLDG20-C1 and C2; STAIN03-C1, C2, and C3; UST32-C1 through C5; and, UST7-C1 through C6, were drilled at Area 2A, and the location of each soil boring was surveyed by the Port Authority and mapped by HMM (see Figure 3). The completion depth varied from approximately two to 11 feet bgs, depending on the AOC being investigated. Soil boring logs are included in Appendix A, and a summary of field observations is included in Table 1.

Soils encountered at Area 2A consisted primarily of fine to medium grained sand with varying amounts of gravel, silt, clay, and cinder fill material. Construction and demolition debris such as concrete, brick, wood, and metal were observed at or near the ground surface at all sixteen soil boring locations. Native soil, encountered at depths of approximately 7.5 to 9 feet bgs, consisted of red-brown silty clay that contained layers of fine angular gravel. Neither organic clays nor peat was encountered at Area 2A at any soil boring location drilled during the SRI.

Groundwater was encountered at depths of between approximately 4 to 4.5 feet bgs in the central portion of Area 2A (in the vicinity of soil boring PG-Bldg32-C3) and depths of approximately 7 to 10 feet bgs in the northern portion of Area 2A (in the vicinity of soil boring PG-UST7-C4). The SRI for Area 2A did not include the installation of monitoring wells. However, as stated in the previously submitted *Revised – Site Investigation and Conceptual Remedial Action Workplan Area 2A/2B* dated September 2004, shallow groundwater is anticipated to flow towards and ultimately discharge into Bridge Creek.

Area 2B

Twenty-six soil borings (identified as TW-37 through TW-43, TW-45 through TW-52, and TW-68 through TW-78) were drilled, one test pit (identified as EXT-1) was excavated, and two temporary wells (identified as TWP-13 and TWP-14) were installed at Area 2B during the SRI. The location of each soil boring, test pit, and well point was surveyed by the Port Authority and mapped by HMM (see Figure 3). The elevation of the land surface adjacent to each location was also surveyed by the Port Authority. The completion depth varied from approximately four to 11 feet bgs, depending on the vertical extent of the LNAPL-impacted soil or the depth to groundwater. As noted above, the soil borings at Area 2B were advanced to at least two feet below the water table (where no LNAPL-impacted soil was observed) or to below the depth of the LNAPL-impacted soil (where LNAPL-impacted soil was observed). Soil boring logs are included in Appendix A, and a summary of field observations is included in Table 1.

Most of the soil borings, the test pit, and the temporary wells were advanced through macadam or concrete that was present at land surface. Soils encountered at Area 2B consisted primarily of fine to medium grained sand with varying amounts of cobbles, gravel, silt, clay, construction and demolition debris (for example, glass, brick, and wood fragments), and cinder fill material. As compared to the fill at Area 2A, cinders were more common and construction and demolition debris were less common. Native soil, encountered at depths of approximately six to ten feet bgs, consisted of organic clays and silts with plant fragments (i.e., meadowmat) or, at some soil boring locations, gray or brown soils that consisted of clay, silt, and sand.

Groundwater was encountered at varying depths across Area 2B. Beneath paved areas, the depth to groundwater ranged from approximately 1.0 to 5.0 feet bgs. Beneath unpaved areas, the depth to water ranged from approximately 0.5 (following a rain storm) to 3.0 feet bgs. As only two temporary wells were installed at Area 2B, it was not possible to determine the direction of groundwater flow. However, shallow groundwater is anticipated to flow towards and ultimately discharge into the small stream at the southern boundary of Area 2B, to Bridge Creek (located to the west of Area 2B), and/or to the marshlands located to the east of Area 2B. Based on prior depth to groundwater measurements at the HHMT-Port Ivory Facility, a groundwater flow divide is likely present at Area 2B, with some groundwater discharging to each of the three areas identified above.

7.2.2 Field Observations

Field observations pertaining to LNAPL-impacted soil and potentially degraded (with respect to environmental quality) soil are summarized below.

Area 2A

As noted above, 16 soil borings were drilled at Area 2A during the SRI. Indications of LNAPL-impacted and/or potentially degraded (with respect to environmental quality) soil were observed at six of these soil boring locations. Discolored soils were observed at four locations at Area 2A. At AOC-Stain3, gray discoloration was observed at approximately 1.5 to 2.0 feet bgs at locations STAIN03-C1 and C3 while the same discoloration was observed from 1.7 to 2.0 feet bgs in location STAIN03-C2. A similar gray discoloration was observed in the 5-6 foot bgs depth interval at location PG-BLDG32-C3, located in

AOC-BLDG32. Except as noted below, no discolored soils were observed at other soil boring locations in AOC-BLDG32 or at any soil boring location in AOC-Bldg7 or AOC-UST7. At all four locations where discolored soil was observed, the discoloration was gray and, because no odor was present in the soil, no sheen was observed, and the PID readings for this depth interval were not greater than background, the discoloration did not appear to be related to petroleum.

LNAPL-impacted soil was observed at discrete depth intervals at locations PG-UST7-C2 and PG-UST7-C4, which were both located in AOC-UST7. No indications of LNAPL-impacted soil were observed at any other locations at Area 2A during the SRI. The LNAPL-impacted soil was encountered in the 7-7.5 and 9-11 foot bgs depth intervals at PG-UST7-C2 and the 8-11 foot bgs depth interval at PG-UST7-C4. PID readings for the soils in these depth intervals and at these locations ranged from 3.2 to 13 parts per million (ppm) greater than background. Discolored soil with a dark gray hue was encountered between nine and 11 feet bgs at PG-UST7-C2 and between eight and 11 feet bgs at PG-UST7-C4. Discrete ganglia of residual LNAPL were present in split spoon samples collected from eight feet to nine feet bgs at PG-UST7-C2. LNAPL-impacted soil was not encountered at any other soil boring location at Area 2A. Please note, locations PG-UST7-C2 and PG-UST7-C4 were not adjacent and that the LNAPL appears to be present in residual saturation at isolated depths and locations in AOC-UST7.

Area 2B – Tidewater Pipelines

For the purposes of this section, no distinction will be made between the field observations recorded during the first mobilization in December 2004 and those recorded during the second mobilization in March 2005. Twenty-six soil borings were advanced during the SRI, inclusive of both the first and second mobilizations. Port Authority surveyors surveyed the locations of all 26 soil borings (see Figure 3 for the soil boring locations). As noted above, manual methods were used to advance the borehole to a depth of six feet bgs at all locations. Hollow stem auger drilling methods were used to advance the borehole to the completion depth at most soil borings advanced to depths of more than six feet bgs; at other locations, primarily those inaccessible to the drill rig, the soil boring was advanced to the completion depth using manual drilling methods. Soil boring logs are included in Appendix A.

Indications of LNAPL-impacted and/or degraded (with respect to environmental quality) soil were observed at three separate locations along the pipelines: in the vicinity of soil boring locations TW-37 and TW-38; in the vicinity of soil boring location TW-43A and EXT-1, the test pit excavated as part of the geophysical investigation; and, in the vicinity of soil boring locations TW-47 and TW-48. Soil impacts encountered at locations TW-37 and TW-38 included odor and elevated concentrations of volatile organic vapors (PID readings of 9.4 to 62.1 ppm) in the six to seven foot bgs depth interval at location TW-37 and sheen, odor, and discolored soil in the one to nine foot bgs depth interval at location TW-38. Because LNAPL was not encountered at either location, and because elevated concentrations of volatile organic vapors were not measured at location TW-38, the soil impacts do not appear to be related to petroleum. Rather, at least some of the field observations (the elevated concentrations of volatile organic compounds, e.g.) may be attributable to the presence of peat/meadowmat soils at soil boring locations TW-37 and TW-38. As a result, soil samples were collected in the vicinity of TW-37 and TW-38, but no delineation activities were performed at these locations.

Discolored soil, odor, and elevated concentrations of volatile organic vapors (as high as 45 ppm) were observed at location EXT-1. Neither LNAPL nor sheen was observed to flow into the test pit. However, based on the field observations, LNAPL-impacted soil was present at location EXT-1 and soil boring location TW-43A. Except for the presence of odor in the five to six foot bgs depth interval at location TW-69, no indications of LNAPL-impacted soil were observed at step-out soil boring locations TW-68 through TW-70A or at temporary well location TWP-13.

Indications of LNAPL-impacted soil were also observed in the vicinity of locations TW-47 and TW-48. As indicated on Figure 3, several step-out soil borings were drilled to delineate the LNAPL-impacted soil observed at TW-47 and TW-48. Therefore, this summary of field observations indicates where LNAPL-impacted soil was observed, where LNAPL-impacted soil was not observed, and the field observations made in this portion of Area 2B in general rather than the field observation at each individual location. LNAPL-impacted soil was observed at soil boring locations TW-47, TW-48, TW-71A, TW-72, and TW-73 and at temporary well location TWP-14 while the borehole for this temporary well was being drilled. Indications of LNAPL-impacted soil included the presence of odor, sheen, discolored soil, and elevated concentrations of volatile organic compounds (as great as 1,290 ppm at temporary well location TWP-14). Indications of LNAPL-impacted soil were not observed at locations TW-74, TW-75, TW-76, TW-77, and TW-78.

7.3 Analytical Results

To meet the above-mentioned objectives, the SRI included the collection of soil samples at Area 2A and the collection of both soil and groundwater samples at Area 2B. Section 7.3.1 and Section 7.3.2

summarize the analytical results for soil samples collected from Area 2A and Area 2B, respectively. Section 7.3.3 summarizes the analytical results for groundwater samples collected from Area 2B.

7.3.1 Soil Sampling Results – Area 2A

The soil sampling component of the SRI at Area 2A was conducted to confirm the presence or absence of LNAPL-impacted soil and/or degraded (with respect to environmental quality) soil at the four previously identified AOCs. Soil is considered to be degraded if it contains metals or compounds at concentrations above NYSDEC objectives and above those detected throughout the HHMT-Port Ivory Facility that are be attributable to fill materials that were formerly placed at the facility by P&G. For the purposes of this summary, the soil sampling results have been compared to the RSCOs set forth in the January 1994 NYSDEC Division of Technical and Administrative Guidance Memorandum (TAGM) 4046. Please note, the reference to these cleanup objectives in this report does not represent any agreement or concurrence that the same are appropriate for usage at this site.

The NYSDEC TAGM 4046 generally regards site background as an appropriate concentration for metals and provides RSCOs for only some metals. RSCOs are provided for the following metals: arsenic, barium, beryllium, cadmium, chromium, cobalt, copper, iron, mercury, nickel, selenium, vanadium and zinc. Based on TAGM 4046, the RSCOs for all other metals are the background concentrations of the metals in site soils. However, given the presence of fill material and the urban nature of the site, it is difficult to establish a site background concentration for metals. As such, in accordance with TAGM 4046, the upper limit of the Eastern USA Background Range was utilized as the background concentration for aluminum, calcium, lead, magnesium, manganese, potassium, and sodium. It is important to recognize that the presence of a metal above an established background concentration does not constitute an exceedance of a regulatory standard. As the NYSDEC TAGM 4046 does not provide RSCOs for antimony, silver, or thallium and the background concentrations of these metals in the Eastern USA has not been established, the concentrations of these metals in soil samples collected at Area 2A were not compared to any cleanup objectives.

In accordance with the sampling program described above, one soil sample was collected from each of 16 soil borings drilled at Area 2A between March 23 and 29, 2005. The date of sample collection, the depth interval sampled, and the rationale for selecting the depth interval are provided in Table 1. The soil samples were collected to confirm the environmental quality of soil at four AOCs located at Area 2A:

AOC-Stain3, AOC-Bldg20, AOC-Bldg32/32A, and AOC-UST7. Soil boring locations are shown on Figure 3. Soil sampling results are summarized in Table 2A-D and on Figure 4.

AOC-Stain3 Area Soil Sampling Results

The sampling program for AOC-Stain3 included the collection of one soil sample from the top two feet of the soil column at each of three soil boring locations. One soil sample was collected at the former sampling location identified as STAIN03, and two soil samples were collected from locations adjacent to previous sampling location STAIN03. The samples were all analyzed for TCL SVOC and TAL metals.

No VOCs were detected at concentrations greater than their respective RSCOs in any of the three soil samples collected from AOC-Stain3. In fact, the only VOCs detected in at least one of the soil samples were methylene chloride and acetone. Methylene chloride and acetone, common laboratory solvents, were also detected in method blanks prepared and analyzed by the laboratory. The concentrations of these two compounds in the soil samples are therefore attributable to laboratory contamination. In no case was the concentration of tentatively identified compounds (TICs) estimated to be greater than or equal to one mg/kg.

The following SVOCs were detected at concentrations that exceeded their respective RSCOs in at least one of the three soil samples collected in this AOC: phenol, benzo(a)anthracene, benzo(b)fluoranthene, benzo(k)fluoranthene, benzo(a)pyrene, chrysene, and dibenz(a,h)anthracene. All these compounds except for phenol are PAH compounds, a subset of SVOCs that have been detected in fill throughout the HHMT-Port Ivory Facility. Phenol was detected only in sample STAIN03-C2. The concentration of phenol in that sample was below the detection limit, and was estimated to be 0.08 mg/kg.

Several metals (arsenic, beryllium, chromium, copper, iron, mercury, nickel, and zinc) were detected at concentrations that exceeded their respective RSCOs in at least one of the three soil samples collected in this AOC. Magnesium was also detected at concentrations greater than its maximum background concentration for magnesium in the Eastern US. For the most part, these metals have been detected at similar concentrations in fill throughout the HHMT-Port Ivory Facility. However, soil samples STAIN03-C1 and STAIN03-C2 both contained elevated concentrations of arsenic (1100 and 983 mg/kg). These concentrations are greater than concentrations detected in other soil samples collected at Area 2A or Area 2B during the SRI and than the concentrations of arsenic generally associated with the prior placement of fill materials at the HHMT-Port Ivory Facility.

Location	UST7-C5
Lab Sample #	618771
Sampling Date	03/25/05
Matrix	SOLID
SVOCs	**Conc**
Benzo(a)anthracene	**0.42**
Benzo(a)pyrene	**0.45**
Chrysene	**0.6**
METALS	
Arsenic	**48.9**
Barium	**2960**
Beryllium	**0.68**
Calcium	**51200**
Chromium	**44.9**
Copper	**119**
Iron	**19000**
Magnesium	**27800**
Mercury	**0.31**
Nickel	**47.1**
Zinc	**371**

Location	UST7-C1
Lab Sample #	620681
Sampling Date	03/29/05
Matrix	SOLID
SVOCs	**Conc**
Dibenz(a,h)anthracene	**0.015**
METALS	
Chromium	**11.5**
Iron	**7160**
Nickel	**43.0**
Zinc	**22.9**

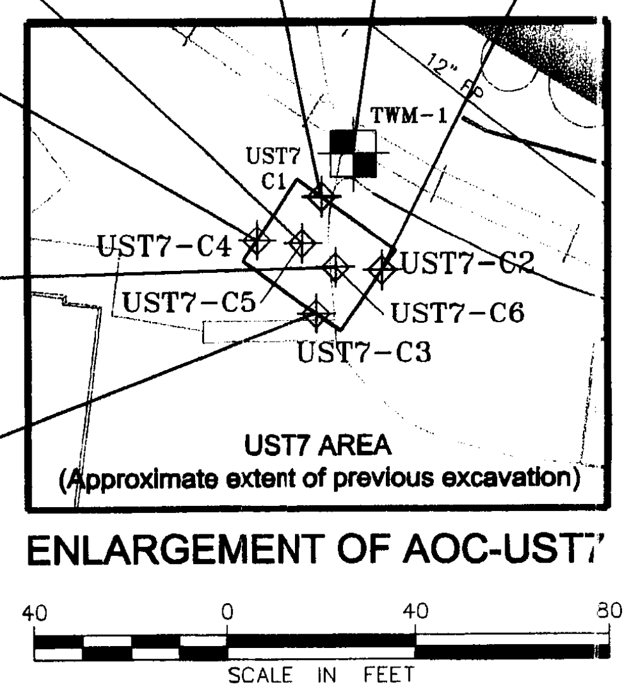
Location	**PG-TMW-01**
Sample Date	11/29/2000
Matrix	Aqueous
SVOCs	**Conc**
Bis(2-ethylhexyl)phthalate	**9.2**
METALS	
Iron	**3100**
Manganese	**2400**
Sodium	**22000**

Location	UST7-C2
Lab Sample #	620682
Sampling Date	03/29/05
Matrix	SOLID
SVOCs	**Conc**
Benzo(a)anthracene	**0.29**
Benzo(a)pyrene	**0.2**
Chrysene	**0.65**
METALS	
Beryllium	**1.1**
Chromium	**43.9**
Iron	**50200**
Magnesium	**10300**
Nickel	**51.1**
Zinc	**113**

Location	UST7-C4
Lab Sample #	620683
Sampling Date	03/29/05
Matrix	SOLID
SVOCs	**Conc**
Benzo(a)anthracene	**0.32**
Benzo(a)pyrene	**0.34**
Chrysene	**0.51**
Dibenz(a,h)anthracene	**0.019**
METALS	
Beryllium	**0.63**
Chromium	**22.0**
Iron	**24200**
Nickel	**25.1**
Zinc	**55.2**

Location	UST7-C6
Lab Sample #	618772
Sampling Date	03/25/05
Matrix	SOLID
METALS	**Conc**
Beryllium	**0.63**
Chromium	**26.5**
Iron	**30700**
Nickel	**31.3**
Zinc	**69.9**

Location	UST7-C3
Lab Sample #	620684
Sampling Date	03/30/05
Matrix	SOLID
SVOCs	**Conc**
Benzo(a)anthracene	**0.52**
Benzo(a)pyrene	**0.53**
Chrysene	**0.8**
Dibenz(a,h)anthracene	**0.12**
METALS	
Arsenic	**96.9**
Beryllium	**0.57**
Chromium	**25.6**
Copper	**110**
Iron	**22900**
Magnesium	**17900**
Mercury	**0.33**
Nickel	**67.0**
Zinc	**292**



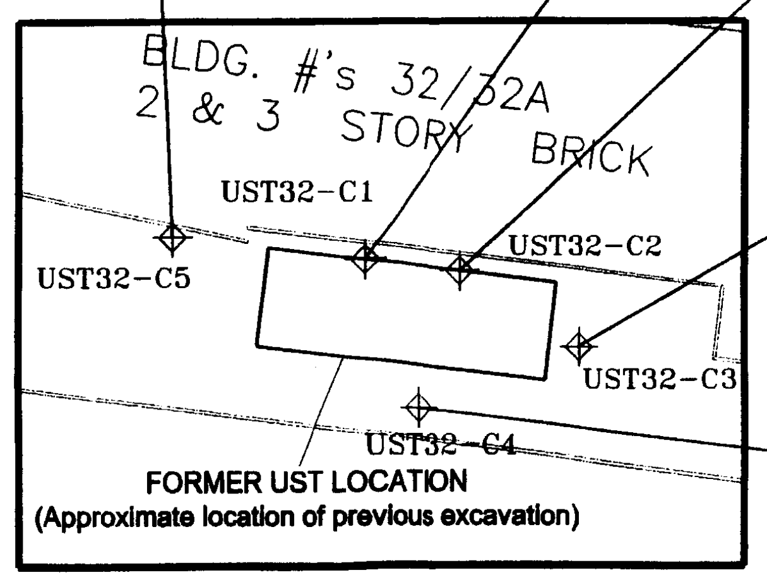
ENLARGEMENT OF AOC-UST7

Location	BLDG32-C5
Lab Sample #	618550
Sampling Date	03/24/05
Matrix	SOLID
SVOCs	**Conc**
Benzo(a)anthracene	**0.27**
Benzo(a)pyrene	**0.24**
Dibenz(a,h)anthracene	**0.044**
METALS	
Beryllium	**0.23**
Chromium	**14.9**
Copper	**64.8**
Iron	**13600**
Magnesium	**10400**
Nickel	**21.0**
Zinc	**103**

Location	BLDG32-C1
Lab Sample #	618773
Sampling Date	03/25/05
Matrix	SOLID
SVOCs	**Conc**
Benzo(a)pyrene	**0.19**
METALS	
Chromium	**11.8**
Copper	**25.4**
Iron	**12600**
Magnesium	**11700**
Zinc	**34.1**

Location	BLDG32-C2
Lab Sample #	618774
Sampling Date	03/25/05
Matrix	SOLID
SVOCs	**Conc**
Benzo(a)pyrene	**0.085**
METALS	
Iron	**9640**
Magnesium	**12500**
Zinc	**33.9**

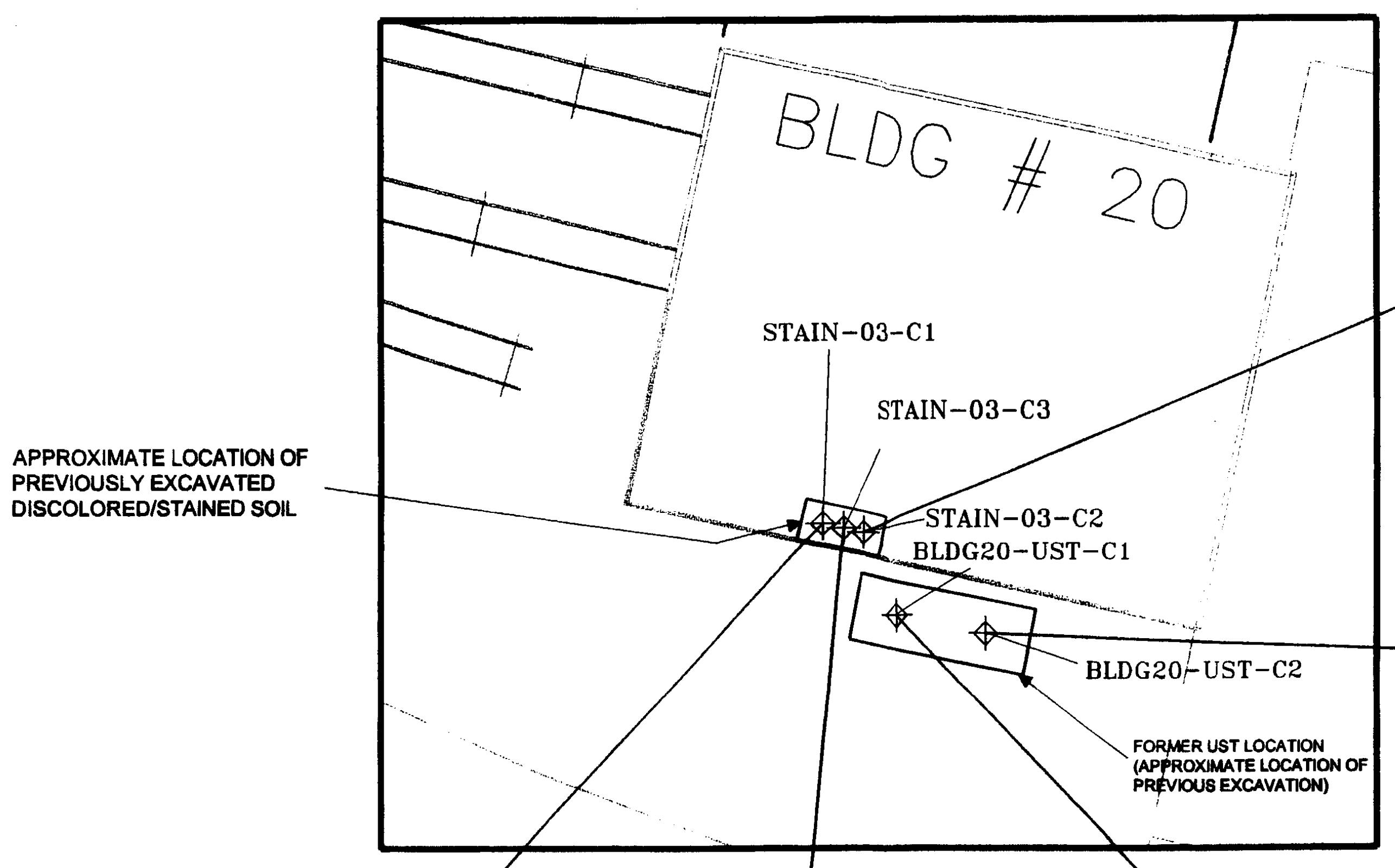
Location	BLDG32-C3
Lab Sample #	618775
Sampling Date	03/25/05
Matrix	SOLID
SVOCs	**Conc**
Benzo(a)pyrene	**0.21**
METALS	
Beryllium	**0.44**
Chromium	**15.5**
Copper	**42.2**
Iron	**16000**
Magnesium	**5400**
Mercury	**0.65**
Nickel	**31.4**
Zinc	**124**



ENLARGEMENT OF AOC-BLDG 32/32A

Location	BLDG32-C4
Lab Sample #	618549
Sampling Date	03/24/05
Matrix	SOLID
SVOCs	**Conc**
Benzo(a)pyrene	**0.066**
METALS	
Arsenic	**10.6**
Beryllium	**0.25**
Chromium	**13.8**
Copper	**35.1**
Iron	**13200**
Magnesium	**6950**
Mercury	**0.60**
Nickel	**14.6**
Zinc	**66.9**

ENLARGEMENT OF AOC-STAIN3 AND AOC-BLDG 20



Location	STAIN03-C3
Lab Sample #	618553
Sampling Date	03/24/05
Matrix	SOLID
SVOCs	**Conc**
Benzo(a)anthracene	**0.28**
Benzo(a)pyrene	**0.24**
Chrysene	**0.51**
Dibenz(a,h)anthracene	**0.076**
METALS	
Arsenic	**95.6**
Copper	**28.2**
Iron	**52200**
Mercury	**0.62**
Zinc	**23.9**

Location	BLDG20-C2
Lab Sample #	618548
Sampling Date	03/24/05
Matrix	SOLID
SVOCs	**Conc**
Benzo(a)pyrene	**0.1**
METALS	
Arsenic	**25.1**
Beryllium	**0.29**
Chromium	**13.1**
Copper	**58.5**
Iron	**12400**
Zinc	**286**

Location	STAIN03-C1
Lab Sample #	618551
Sampling Date	03/24/05
Matrix	SOLID
SVOCs	**Conc**
Benzo(a)anthracene	**1.3**
Benzo(a)pyrene	**1.4**
Benzo(b)fluoranthene	**1.5**
Benzo(k)fluoranthene	**1.6**
METALS	
Arsenic	**1100**
Beryllium	**0.54**
Chromium	**42.9**
Copper	**97.5**
Iron	**37000**
Mercury	**0.31**
Nickel	**17.8**
Zinc	**74.8**

Location	STAIN03-C2
Lab Sample #	618552
Sampling Date	03/24/05
Matrix	SOLID
SVOCs	**Conc**
Phenol	**0.08**
METALS	
Arsenic	**983**
Beryllium	**0.34**
Chromium	**52.4**
Copper	**174**
Iron	**28800**
Lead	**587**
Magnesium	**5950**
Mercury	**0.24**
Nickel	**35.6**
Zinc	**178**

Location	BLDG20-C1
Lab Sample #	618546
Sampling Date	03/23/05
Matrix	SOLID
METALS	**Conc**
Arsenic	**13.3**
Beryllium	**0.22**
Copper	**76.8**
Iron	**8500**
Zinc	**23.0**

Location Field Sample ID Lab Sample Number Sampling Date Matrix	New York TAGM Recommended Soil Cleanup Objective (mg/kg)
SVOCs	
Benzo(a)anthracene	0.224
Benzo(a)pyrene	0.061
Benzo(b)fluoranthene	1.1
Benzo(k)fluoranthene	1.1
Chrysene	0.4
Dibenz(a,h)anthracene	0.014
Phenol	0.03
METALS	
Arsenic	7.5 or SB
Barium	300 or SB
Beryllium	0.16 (HEAST) or SB
Calcium	35,000*
Chromium	10 or SB
Copper	25 or SB
Iron	2,000 or SB
Magnesium	5,000*
Mercury	0.1
Nickel	13 or SB
Zinc	20 or SB

Location **Sample Date** ***Matrix***	**Ambient Water Quality Standard *or Guidance* Value (ug/L)**
SVOCs	
Bis(2-ethylhexyl)phthalate	**5**
METALS	
Iron	**30**
Manganese	**300**
Sodium	**20000**

Notes:

1. Please refer to Figure 3, Site 2 Sampling Location Map, for the locations of the enlargement windows.

2. Only compounds and metals that exceed the New York TAGM 4046 Recommended Soil Cleanup Objectives (for soil samples) or the New York Ambient Water Quality Standards and Guidance Values are shown on the map.

3. All soil sampling analytical results are provided in units of milligrams per kilogram (mg/Kg).

4. All groundwater sampling analytical results are provided in units of micrograms per liter (ug/L).

5. Site background concentrations have not been established for any compound or metal.

6. Former UST locations at AOC-BLDG20 and AOC-BLDG32/32A reflect the locations of USTs removed by P&G prior to the Port Authority ownership of the Site.

7. The former UST location shown at AOC-UST7 reflects the locations of USTs and an associated concrete vault removed by the Port Authority.

Conc – concentration
mg/Kg – milligrams per kilogram
ug/L – micrograms per liter
SVOCs – Semivolatile Organic Compounds
SB – Site background
* – Background concentration in US Eastern Soils (As per TAGM 4046)
TAGM – Technical and Administrative Guidance Memorandum

LEGEND

▨	UTILITY EASEMENT
—+—	RAILROAD TRACKS
▨	EXISTING SITE BOUNDARY
TMW-1 ▚	PRE-SRI TEMPORARY WELL LOCATION
UST7-C3 ⌖	SRI CONFIRMATION SOIL SAMPLING LOCATION

Sheet of

THE PORT AUTHORITY
OF NY & NJ

ENGINEERING PROGRAM MANAGER

No.	Date	Revision	Approved

ENGINEERING DEPARTMENT

Title

(BLOCK 1400, LOT 1 AND SOUTHERN END OF BLOCK 1338, LOT 1) HHMT-PORT IVORY FACILITY

SITE 2 (AREA 2A) GROUNDWATER AND SOIL SAMPLING ANALYTICAL RESULTS MAP

BFJ
Designed by Drawn by Checked by
Date
Contract Number
Drawing Number **FIGURE 4**

P:\232952wmd\REMEDIAL ACTIONS\Remedial Issues Block 1338\LNAPL Investigation Res\Site2A2B Report\Figures\Analytical Results Site 2A

The concentrations of TPHC detected in the soil samples collected at this AOC ranged from 311 mg/kg (at soil boring STAIN03-C3) to 2,140 mg/kg (at soil boring STAIN03-C2). No RSCO has been established for TPHC in soil. TPHC has been detected at similar concentrations throughout the HHMT-Port Ivory Facility.

AOC-UST7

The sampling program for AOC-UST7 included the collection of one soil sample from each of six soil borings drilled to depths of approximately 11 feet bgs. Four soil samples were collected from the sidewalls of the previous excavation area and two soil samples were collected from near the bottom of the former excavation. The sampling depths were based upon field observations. The samples were analyzed for TCL VOC, TCL SVOC, and TAL metals.

No VOCs were detected at concentrations greater than their respective RSCOs in any of the six soil samples collected from AOC-UST7. In fact, the only VOCs detected in at least one of the soil samples were methylene chloride, acetone, carbon disulfide, and 2-butanone. Methylene chloride and acetone, common laboratory solvents, were also detected in method blanks prepared and analyzed by the laboratory. The concentrations of these two compounds in the soil samples are therefore attributable to laboratory contamination. In no case was the concentration of tentatively identified compounds (TICs) estimated to be greater than or equal to one mg/kg.

The following SVOCs were detected at concentrations that exceeded their respective RSCOs in at least one of the six soil samples collected in this AOC: benzo(a)anthracene, benzo(a)pyrene, chrysene, and dibenz(a,h)anthracene. All these compounds are PAH compounds, a subset of SVOCs that have been detected at similar concentrations in fill throughout the HHMT-Port Ivory Facility.

Several metals (arsenic, barium, beryllium, chromium, copper, iron, mercury, nickel, and zinc) were detected at concentrations that exceeded their respective RSCOs in at least one of the six soil samples collected in this AOC. Calcium and magnesium were also detected at concentrations greater than the maximum background concentrations for these metals in the Eastern US. These metals have been detected at similar concentrations in fill throughout the HHMT-Port Ivory Facility.

The concentrations of TPHC detected in the soil samples collected at this AOC ranged from 149 mg/kg (at UST7-C3) to 3,810 mg/kg (at UST7-C2). No RSCO has been established for TPHC in soil. TPHC has been detected at similar concentrations throughout the HHMT-Port Ivory Facility.

AOC-Bldg20

The sampling program for AOC-Bldg20 included the collection of one soil sample from each of two soil borings drilled to depths of approximately eight feet bgs. The sampling depths were based upon field observations. The samples were analyzed for TCL VOC, TCL SVOC, and TAL metals.

No VOCs were detected at concentrations greater than their respective RSCOs in either of the two soil samples collected from AOC-Bldg20. In fact, the only VOCs detected in at least one of the soil samples were methylene chloride and acetone, common laboratory solvents that were also detected in method blanks prepared and analyzed by the laboratory. The concentrations of these two compounds in the soil samples are therefore attributable to laboratory contamination. In no case was the concentration of tentatively identified compounds (TICs) estimated to be greater than or equal to one mg/kg.

Benzo(a)pyrene was the only SVOC that was detected at a concentration exceeding its respective RSCO in sample Bldg20-C2. No SVOCs were detected at concentrations greater than their respective RSCOs in sample Bldg20-C1. Benzo(a)pyrene is classified as a PAH compound. PAH compounds are a subset of SVOCs, and several PAH compounds, including benzo(a)pyrene, have been detected at similar concentrations in fill throughout the HHMT-Port Ivory Facility.

Several metals (arsenic, beryllium, chromium, copper, iron, and zinc) were detected at concentrations that exceeded their respective RSCOs in at least one of the two soil samples collected in this AOC. These metals have been detected at similar concentrations in fill throughout the HHMT-Port Ivory Facility.

The concentrations of TPHC detected in the soil samples collected at this AOC were 25 mg/kg at Bldg20-C1 and 275 mg/kg at Bldg20-C2. No RSCO has been established for TPHC in soil. TPHC has been detected at similar (and higher) concentrations throughout the HHMT-Port Ivory Facility.

AOC-Bldg32/32A

The sampling program for AOC-UST32/32A included the collection of one soil sample from each of five soil borings drilled to depths of approximately eight feet bgs. The sampling depths were based upon field observations. The samples were analyzed for TCL VOC, TCL SVOC, and TAL metals.

No VOCs were detected at concentrations greater than their respective RSCOs in any of the five soil samples collected from AOC-Bldg32/32A. In fact, the only VOCs detected in at least one of the soil samples were methylene chloride, acetone, and carbon disulfide. Methylene chloride and acetone, common laboratory solvents, were also detected in method blanks prepared and analyzed by the laboratory. The concentrations of these two compounds in the soil samples are therefore attributable to laboratory contamination. The concentration of carbon disulfide, detected only in only the sample collected at location BLDG32-C3, was estimated to be 0.0022 mg/kg, more than three orders of magnitude below the RSCO for carbon disulfide (2.7 mg/kg). In no case was the concentration of tentatively identified compounds (TICs) estimated to be greater than or equal to one mg/kg.

Three SVOCs were detected at concentrations that exceeded their respective RSCOs in at least one of the five soil samples collected in this AOC: benzo(a)anthracene, benzo(a)pyrene, and dibenz(a,h)anthracene. All these compounds are PAH compounds, a subset of SVOCs, that have been detected at similar concentrations in fill throughout the HHMT-Port Ivory Facility.

Several metals (arsenic, beryllium, chromium, copper, iron, magnesium, mercury, nickel, and zinc) were detected at concentrations above their respective RSCOs in at least one soil sample collected in AOC-Bldg32/32A. The concentrations of these metals in soil at AOC-Bldg32/32A were consistent with those in fill materials previously placed at the HHMT-Port Ivory Facility by P&G.

The concentrations of TPHC detected in the soil samples collected at this AOC ranged from 543 mg/kg (at Bldg32-C4) to 1,510 mg/kg (at Bldg32-C5). No RSCO has been established for TPHC in soil. TPHC has been detected at similar concentrations throughout the HHMT-Port Ivory Facility.

Quality Assurance/Quality Control – Area 2A

To monitor the effectiveness of field decontamination procedures, field blanks were collected. The Port Authority prepared four field blanks and analyzed the blanks for VOCs. No VOCs were identified any of the four field blanks. Because no VOCs were detected in the field blanks, it can be concluded that field decontamination procedures were effective. No duplicate sample was collected at Area 2A.

7.3.2 Soil Sampling Results – Area 2B

The majority of the soil sampling component of the SRI at Area 2B was conducted to quantify the concentrations of regulated compounds in soil along the Tidewater pipelines, including in areas where LNAPL-impacted soil was observed.

In accordance with the sampling program described above, 31 soil samples, including a duplicate sample, were collected from 36 soil borings, including 8 step-out soil borings, drilled at Area 2B between December 7 and 31, 2004 (first mobilization) and March 31 to April 5, 2005 (second mobilization). The date of sample collection, depth interval sampled, and the rationale for selecting the depth interval are provided in Table 1. During the first mobilization, soil samples were collected to characterize soil quality along the Tidewater pipelines. During the second mobilization, soil samples were collected to confirm the extents of LNAPL-impacted soil in the two areas (the vicinity of soil boring locations TW-47 and TW-48 and the vicinity of test pit location EXT-1) along the Tidewater pipelines where LNAPL-impacted soil was previously encountered. The summary below includes the soil sampling results from both mobilizations. Soil boring locations are shown on Figure 3. Soil sampling results are summarized in Tables 2A-2D and on Figure 5.

Please note, the VOC and SVOC minimum detection limits reported for all but two of the soil samples (those collected at soil boring locations TW-50 and TW-51) collected during the first mobilization were revised by the analytical laboratory. The detection limits were revised to show the actual detection limit of the instrument rather than the method reporting limit required for each compound. The actual soil analytical results were unaffected by this revision. The original detection limits supplied by the analytical laboratory are indicated on Tables 2A and 2B as "reporting limits," while the revised limits are indicated as "minimum detection limits."

For discussion purposes, the soil sampling results have been compared to current NYSDEC regulatory objectives. The objectives utilized are the RSCOs as set forth in the January 1994 NYSDEC TAGM 4046. Please note, the reference to these objectives in this report does not represent any agreement or concurrence that the same are appropriate for usage at this site.

The NYSDEC TAGM 4046 generally regards site background as an appropriate concentration for metals and provides RSCOs for only some metals. RSCOs are provided for the following metals: arsenic, barium, beryllium, cadmium, chromium, cobalt, copper, iron, mercury, nickel, selenium, vanadium and

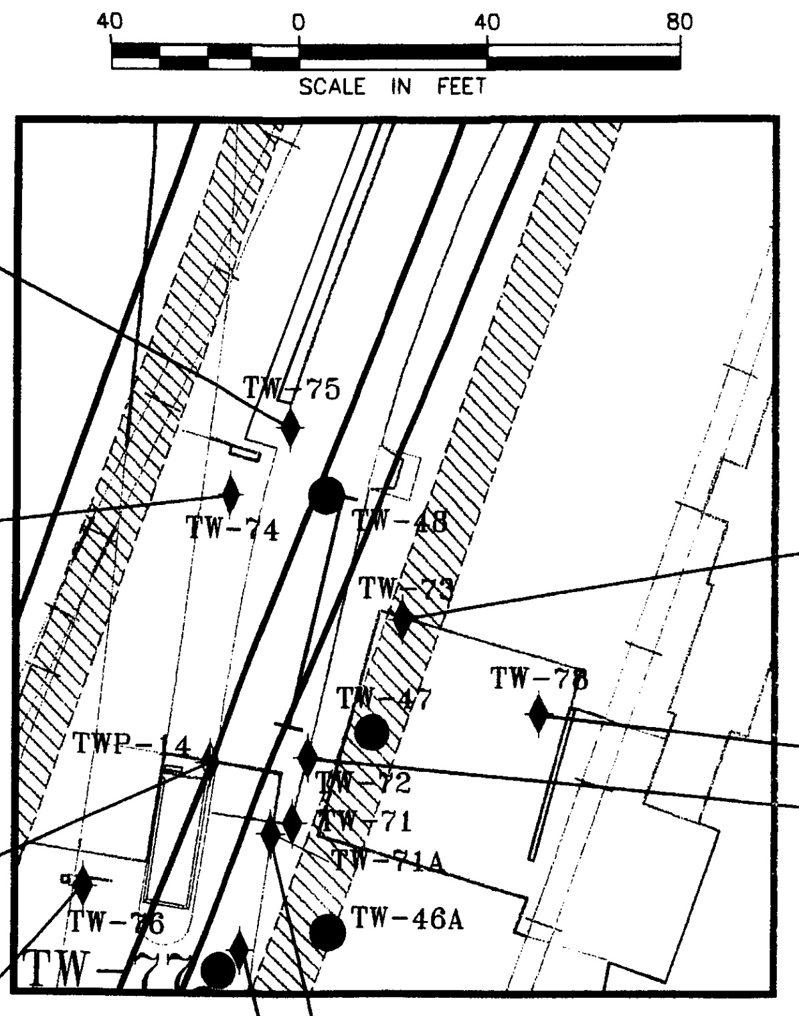
Location	TW-75
Lab Sample #	620940
Sampling Date	04/01/05
Matrix	SOLID
SVOCs	**Conc**
Benzo(a)anthracene	**8.4**
Benzo(a)pyrene	**9.7**
Benzo(b)fluoranthene	**7.6**
Benzo(k)fluoranthene	**11**
Chrysene	**12**
Dibenz(a,h)anthracene	**1.5**
Indeno(1,2,3-cd)pyrene	**3.7**
METALS	
Arsenic	**15.2**
Iron	**12000**
Mercury	**0.23**
Nickel	**7.6**
Zinc	**35.0**

Location	TW-74
Lab Sample #	620939
Sampling Date	04/01/05
Matrix	SOLID
METALS	**Conc**
Beryllium	**0.34**
Iron	**12200**
Nickel	**6.1**
Zinc	**24.8**

Location	TWP-14
Lab Sample #	620941
Sampling Date	04/01/05
Matrix	SOLID
METALS	**Conc**
Beryllium	**0.30**
Copper	**172**
Iron	**8380**
Nickel	**6.3**
Zinc	**32.3**

Location	TWP-14
Lab Sample #	620942
Sampling Date	04/01/05
Matrix	SOLID
METALS	**Conc**
Beryllium	**0.23**
Iron	**11400**
Nickel	**5.0**
Zinc	**22.9**

ENLARGEMENT OF AOC-SOUTHERN AREA



Location	TW-76
Lab Sample #	621716
Sampling Date	04/05/05
Matrix	SOLID
METALS	**Conc**
Beryllium	**0.34**
Iron	**10500**
Nickel	**7.9**
Zinc	**28.3**

Location	TW-77
Lab Sample #	621717
Sampling Date	04/05/05
Matrix	SOLID
SVOCs	**Conc**
Benzo(a)pyrene	**0.072**
METALS	
Arsenic	**8.7**
Beryllium	**0.51**
Chromium	**12.0**
Copper	**37.5**
Iron	**14200**
Mercury	**1.1**
Nickel	**18.6**
Zinc	**80.3**

Location	TW-73
Lab Sample #	621713
Sampling Date	04/04/05
Matrix	SOLID
SVOCs	**Conc**
Benzo(a)anthracene	**0.89**
Benzo(a)pyrene	**0.48**
Chrysene	**1.3**
METALS	
Arsenic	**14.9**
Beryllium	**0.52**
Chromium	**14.4**
Copper	**49.9**
Iron	**17600**
Mercury	**0.32**
Nickel	**45.6**
Zinc	**128**

Location	TW-73
Lab Sample #	621714
Sampling Date	04/04/05
Matrix	SOLID
SVOCs	**Conc**
Benzo(a)pyrene	**0.084**
METALS	
Beryllium	**0.36**
Iron	**11900**
Nickel	**7.9**
Zinc	**25.4**

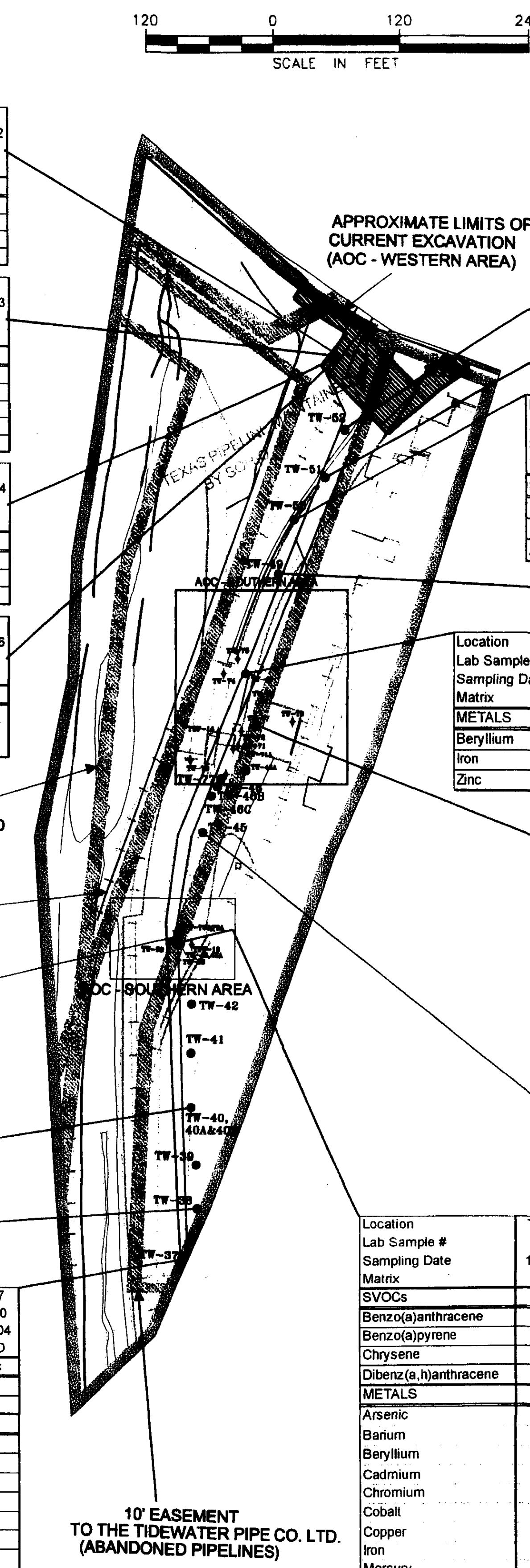
Location	TW-78
Lab Sample #	621718
Sampling Date	04/05/05
Matrix	SOLID
METALS	**Conc**
Arsenic	**9.2**
Beryllium	**0.36**
Chromium	**22.7**
Copper	**66.6**
Iron	**16500**
Mercury	**0.28**
Nickel	**24.9**
Zinc	**65.5**

Location	TW-72
Lab Sample #	621712
Sampling Date	04/04/05
Matrix	SOLID
SVOCs	**Conc**
Benzo(a)anthracene	**0.98**
Benzo(a)pyrene	**0.86**
Chrysene	**1.5**
METALS	
Arsenic	**29.7**
Beryllium	**0.52**
Chromium	**16.4**
Copper	**83.2**
Iron	**23800**
Nickel	**72.4**
Zinc	**171**

Location	TW-71A
Lab Sample #	620937
Sampling Date	04/01/05
Matrix	SOLID
METALS	**Conc**
Beryllium	**0.43**
Chromium	**12.3**
Iron	**14900**
Nickel	**9.5**
Zinc	**32.9**

Location	TW-71A
Lab Sample #	620938
Sampling Date	04/01/05
Matrix	SOLID
METALS	**Conc**
Beryllium	**0.33**
Iron	**11200**
Nickel	**6.0**
Zinc	**23.1**

AOC-SOUTHERN AREA AND AOC-WESTERN AREA



EASEMENT TO TEXAS EASTERN PIPELINE MAINTAINED BY SOHIO (ACTIVE PIPELINE)

LOCATION OF PIPELINE BELIEVED TO BE OWNED BY TEXAS EASTERN

APPROXIMATE EAST WEST LIMITS OF KNOWN LNAPL AND LNAPL IMPACTED SOIL IN EXCAVATION EXT-1

Location	HHPI-1A
Lab Sample #	AC19113-002
Sampling Date	8/16/05
Matrix	SOLID
SVOCs	**Conc**
Benzo(a)anthracene	**0.55**
Benzo(a)pyrene	**0.45**
Chrysene	**0.62**
Dibenz(a,h)anthracene	**0.22**

Location	HHPI-1B
Lab Sample #	AC19113-003
Sampling Date	8/16/05
Matrix	SOLID
SVOCs	**Conc**
Benzo(a)anthracene	**1.5**
Benzo(a)pyrene	**1.3**
Benzo(b)fluoranthene	**1.70**
Chrysene	**1.6**
Dibenz(a,h)anthracene	**0.37**

Location	HHPI-2
Lab Sample #	AC19113-004
Sampling Date	8/16/05
Matrix	SOLID
SVOCs	**Conc**
Benzo(a)anthracene	**0.26**
Benzo(a)pyrene	**0.22**
Dibenz(a,h)anthracene	**0.20**

Location	HHPI-4
Lab Sample #	AC19113-006
Sampling Date	8/16/05
Matrix	SOLID
SVOCs	**Conc**
Benzo(a)anthracene	**0.28**
Benzo(a)pyrene	**0.23**
Dibenz(a,h)anthracene	**0.065**

Location	TW-50
Lab Sample #	596818
Sampling Date	12/28/04
Matrix	SOLID
METALS	**Conc**
Beryllium	**0.29**
Iron	**9670**
Zinc	**20.4**

Location	TW-51
Lab Sample #	596857
Sampling Date	12/29/04
Matrix	SOLID
SVOCs	**Conc**
Benzo(a)anthracene	**0.87**
Benzo(a)pyrene	**0.65**
Chrysene	**1.3**
Dibenz(a,h)anthracene	**0.17**
METALS	
Arsenic	**39.8**
Beryllium	**0.3**
Chromium	**11.7**
Copper	**59.8**
Iron	**15000**
Mercury	**0.21**
Nickel	**39.8**
Zinc	**96.9**

Location	TW-52
Lab Sample #	596856
Sampling Date	12/29/04
Matrix	SOLID
SVOCs	**Conc**
Benzo(a)anthracene	**0.85**
Benzo(a)pyrene	**0.64**
Chrysene	**1**
Dibenz(a,h)anthracene	**0.058**
METALS	
Arsenic	**99.3**
Barium	**151**
Beryllium	**0.32**
Chromium	**16.1**
Copper	**56.3**
Iron	**18700**
Mercury	**0.45**
Nickel	**33.5**
Zinc	**269**

Location	TW-48
Lab Sample #	596212
Sampling Date	12/23/04
Matrix	SOLID
METALS	**Conc**
Beryllium	**0.31**
Iron	**8330**
Zinc	**22.2**

Location	TW-48
Lab Sample #	**596213**
Sampling Date	**12/23/04**
Matrix	**SOLID**
METALS	**Conc**
Beryllium	**0.29**
Iron	[illegible]
Zinc	[illegible]

Location	TW-49
Lab Sample #	596817
Sampling Date	12/28/04
Matrix	SOLID
SVOCs	**Conc**
Benzo(a)pyrene	**0.26**
Dibenz(a,h)anthracene	**0.1**
METALS	
Arsenic	**7.6**
Beryllium	**0.36**
Copper	**32.2**
Iron	**15000**
Mercury	**0.12**
Nickel	**16.4**
Zinc	**127**

Location	TW-47
Lab Sample #	596206
Sampling Date	38343
Matrix	SOLID
METALS	**Conc**
Arsenic	**8.5**
Beryllium	**0.49**
Chromium	**12.4**
Iron	**15500**
Nickel	**13.7**
Zinc	**43**

Location	TW-47
Lab Sample #	596207
Sampling Date	**12/22/04**
Matrix	**SOLID**
METALS	**Conc**
Beryllium	**0.49**
Chromium	**11.7**
Iron	**18600**
Zinc	**34.6**

Location	TW-43A
Lab Sample #	592638
Sampling Date	12/08/04
Matrix	SOLID
SVOCs	**Conc**
Benzo(a)anthracene	**0.26**
Benzo(a)pyrene	**0.15**
Chrysene	**0.65**
Dibenz(a,h)anthracene	**0.031**
METALS	
Arsenic	**50.2**
Barium	**550**
Beryllium	**4.9**
Cadmium	**3.1**
Chromium	**51.7**
Cobalt	**55.1**
Copper	**218**
Iron	**134500**
Mercury	**0.52**
Nickel	**338**
Selenium	**6.5**
Zinc	**996**

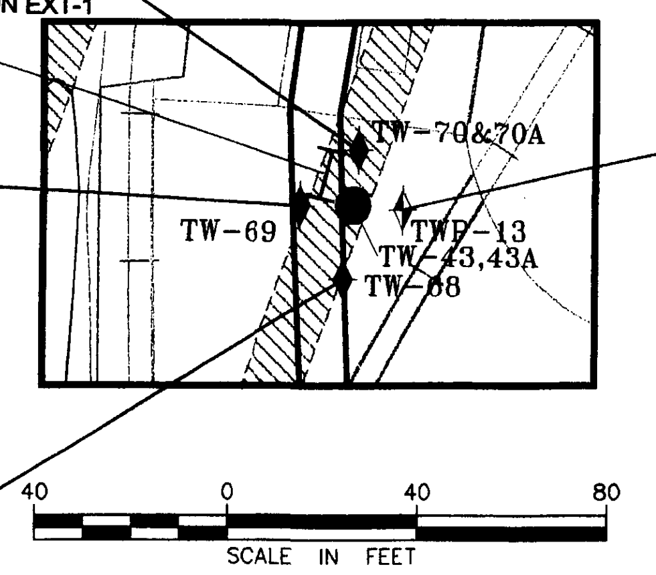
Location	TW-45
Lab Sample #	596205
Sampling Date	12/22/04
Matrix	SOLID
SVOCs	**Conc**
Benzo(a)anthracene	**0.37**
Benzo(a)pyrene	**0.35**
Chrysene	**0.46**
Dibenz(a,h)anthracene	**0.065**
METALS	
Arsenic	**21.2**
Beryllium	**0.38**
Chromium	**12.5**
Copper	**42**
Iron	**15600**
Mercury	**0.22**
Zinc	**99.4**

Location	TW-70A
Lab Sample #	620688
Sampling Date	03/31/05
Matrix	SOLID
SVOCs	**Conc**
Benzo(a)anthracene	**0.65**
Benzo(a)pyrene	**0.48**
Chrysene	**0.78**
Dibenz(a,h)anthracene	**0.08**
METALS	
Arsenic	**23.1**
Beryllium	**0.29**
Chromium	**16.0**
Copper	**88.0**
Iron	**18600**
Mercury	**0.30**
Nickel	**22.6**
Zinc	**109**

APPROXIMATE EAST WEST LIMITS OF KNOWN LNAPL AND LNAPL IMPACTED SOIL IN EXCAVATION EXT-1

Location	TW-69
Lab Sample #	620687
Sampling Date	03/31/05
Matrix	SOLID
SVOCs	**Conc**
Benzo(a)anthracene	**1.1**
Benzo(a)pyrene	**1**
Benzo(k)fluoranthene	**1.3**
Chrysene	**1.5**
Dibenz(a,h)anthracene	**0.18**
METALS	
Arsenic	**31.1**
Barium	**409**
Beryllium	**0.91**
Cadmium	**3.6**
Chromium	**69.2**
Copper	**347**
Iron	**36800**
Mercury	**2.7**
Nickel	**84.1**
Selenium	**3.2**
Zinc	**901**

Location	TW-68
Lab Sample #	620686
Sampling Date	03/31/05
Matrix	SOLID
SVOCs	**Conc**
Benzo(a)anthracene	**1.3**
Benzo(a)pyrene	**1.2**
Benzo(k)fluoranthene	**1.3**
Chrysene	**1.8**
Dibenz(a,h)anthracene	**0.23**
METALS	
Arsenic	**24.0**
Barium	**313**
Beryllium	**0.76**
Cadmium	**1.4**
Chromium	**28.3**
Copper	**307**
Iron	**41600**
Mercury	**1.4**
Nickel	**38.6**
Zinc	**720**



ENLARGEMENT OF AOC-SOUTHERN AREA

Location	TW-40B**
Lab Sample #	592644
Sampling Date	12/09/04
Matrix	SOLID
SVOCs	**Conc**
Benzo(a)anthracene	**0.32**
Benzo(a)pyrene	**0.16**
Chrysene	**0.56**
Dibenz(a,h)anthracene	**0.049**
METALS	
Arsenic	**19.6**
Beryllium	**0.38**
Cadmium	**1.6**
Chromium	**28.5**
Copper	**115**
Iron	**13900**
Lead	**282**
Magnesium	**2190**
Mercury	**1.1**
Nickel	**32.2**
Potassium	**750**
Vanadium	**121**
Zinc	**241**

Location	TW-40B**
Lab Sample #	592645
Sampling Date	12/09/04
Matrix	SOLID
SVOCs	**Conc**
Benzo(a)pyrene	**0.08**
METALS	
Arsenic	**85.5**
Barium	**618**
Beryllium	**10.9**
Cadmium	**19.4**
Chromium	**298**
Copper	**775**
Iron	**45200**
Magnesium	**8180**
Mercury	**0.67**
Nickel	**872**
Vanadium	**578**
Zinc	**2470**

Location	TW-40B
Lab Sample #	592646
Sampling Date	12/09/04
Matrix	SOLID
SVOCs	**Conc**
Benzo(a)anthracene	**0.39**
Benzo(a)pyrene	**0.71**
Chrysene	**0.55**
METALS	
Arsenic	**25.3**
Beryllium	**1.4**
Cadmium	**2.7**
Chromium	**22**
Copper	**165**
Iron	**69500**
Mercury	**0.43**
Nickel	**56.4**
Zinc	**989**

Location	TWP-13
Lab Sample #	620685
Sampling Date	03/30/05
Matrix	SOLID
SVOCs	**Conc**
Benzo(a)anthracene	**0.52**
Benzo(a)pyrene	**0.49**
Chrysene	**0.63**
Dibenz(a,h)anthracene	**0.084**
METALS	
Beryllium	**0.35**
Chromium	**13.2**
Iron	**14900**
Nickel	**9.6**
Zinc	**38.3**

Location	TW-38
Lab Sample #	596211
Sampling Date	12/23/04
Matrix	SOLID
SVOCs	**Conc**
Benzo(a)pyrene	**0.15**
Dibenz(a,h)anthracene	**0.029**
METALS	
Aluminum	**6670**
Arsenic	**10.7**
Beryllium	**1.1**
Calcium	**17700**
Chromium	**16.2**
Copper	**65.3**
Iron	**20600**
Lead	**103**
Magnesium	**2560**
Mercury	**0.23**
Nickel	**87.3**
Vanadium	**32.6**
Zinc	**250**

Location	TW-37
Lab Sample #	596210
Sampling Date	12/23/04
Matrix	SOLID
SVOCs	**Conc**
Benzo(a)pyrene	**0.31**
Dibenz(a,h)anthracene	**0.5**
METALS	
Arsenic	**21.5**
Barium	**372**
Beryllium	**1.6**
Cadmium	**2**
Chromium	**15**
Cobalt	16.3
Copper	**101**
Iron	**20900**
Mercury	**0.2**
Nickel	**99.5**
Zinc	**615**

Location Field Sample ID Lab Sample Number Sampling Date Matrix	New York TAGM 4046 Recommended Soil Cleanup Objective (mg/kg)
SVOCs	
Benzo(a)anthracene	0.224
Benzo(a)pyrene	0.061
Benzo(b)fluoranthene	1.1
Benzo(k)fluoranthene	1.1
Chrysene	0.4
Dibenz(a,h)anthracene	0.014
Indeno(1,2,3-cd)pyrene	3.2
METALS	
Arsenic	7.5 or SB
Barium	300 or SB
Beryllium	0.16 (HEAST) or SB
Cadmium	1 or SB
Chromium	10 or SB
Cobalt	30 or SB
Copper	25 or SB
Iron	2,000 or SB
Lead	500*
Magnesium	5,000*
Mercury	0.1
Nickel	13 or SB
Potassium	43,000*
Selenium	2 or SB
Vanadium	150 or SB
Zinc	20 or SB

Notes:

1. Please refer to Figure 3, Sampling Location Map, for the locations of the enlargement windows.

2. Only compounds that were detected at concentrations above the New York TAGM 4046 Recommended Soil Cleanup Objective are shown on the map.

3. All soil sampling analytical results are provided in units of milligrams per kilogram (mg/Kg).

4. Excavation EXT-1 was part of the geophysical investigation conducted to locate the buried pipelines previously owned by Tidewater Pipe Co. Ltd. Although LNAPL impacted soil was observed at this location, resulting in the advancement of SRI step-out soil boring locations TW-68, TW-69, and TW-70 and 70A, no soil sample was collected at excavation EXT-1.

5. Soil borings were advanced at SRI step-out soil boring locations TW-71 and 71A, and TW-72 to TW-78 to delineate LNAPL-impacted soil away from locations TW-47 and TW-48.

6. Soil borings were collected at SRI temporary well locations TWP-13 and TWP-14 prior to the installment of the PVC temporary wells.

7. Soil samples were not collected at SRI boring locations TW-39, TW-41, TW-42, TW-46, and TW-46A to 46C.

8. Analytical results for soil samples collected at SRI step-out soil boring locations are shown only in enlargements. Results for soil samples collected at the initial soil boring locations (i.e., at soil borings TW-37 through TW-52) are shown in the Site 2 (Area 2B) view.

Abbreviations:

Conc – concentration
mg/Kg – milligrams per kilogram
SVOCs – Semivolatile Organic Compounds
SB – Site background
* – Background concentration in Eastern US soils (as per TAGM 4046)
** – Field duplicate samples
TAGM – Technical and Administrative Guidance Memorandum

LEGEND

▨ UTILITY EASEMENT
┼ RAILROAD TRACKS
▨ SITE BOUNDARY
● TW-27 SRI SOIL BORING LOCATION
◆ TW-63 SRI STEP-OUT SOIL BORING LOCATION
◆ TWP-10 SRI STEP-OUT TEMPORARY WELL POINT LOCATION

Sheet of

THE PORT AUTHORITY
OF NY & NJ

ENGINEERING PROGRAM MANAGER

No.	Date	Revision	Approved

ENGINEERING DEPARTMENT

Title

(BLOCK 1400, LOT 1 AND SOUTHERN END OF BLOCK 1338, LOT 1) HHMT-PORT IVORY FACILITY

SITE 2 (AREA 2B) SOIL SAMPLING ANALYTICAL RESULTS MAP

Designed by
Drawn by BFJ
Checked by
Date
Contract Number
Drawing Number **FIGURE 5**

P:\232952wmd\REMEDIAL ACTIONS\Remedial petroleum Issues Block 1338\LNAPL Investigation Res\Site2A2B Report\Figures\Analytical ResultsSite 2B zinc. Based on TAGM 4046, the RSCOs for all other metals are the background concentrations of the metals in site soils. However, given the presence of fill material and the urban nature of the site, it is difficult to establish a site background concentration for metals. As such, in accordance with TAGM 4046, the upper limit of the Eastern USA Background Range was utilized as the background concentration for aluminum, calcium, lead, magnesium, manganese, potassium, and sodium. It is important to recognize that the presence of a metal above an established background concentration does not constitute an exceedance of a regulatory standard. As the NYSDEC TAGM 4046 does not provide RSCOs for antimony, silver, or thallium and the background concentrations of these metals in the Eastern USA has not been established, the concentrations of these metals in soil samples collected at Future Site 4/2C were not compared to any cleanup objectives.

Methylene chloride, acetone, 2-butanone, trichloroethene, and carbon disulfide were the only VOCs detected in any soil sample collected at Area 2B during the SRI. All five of these VOCs were detected at concentrations below their respective RSCOs. In addition, because methylene chloride, a common laboratory solvent, was also detected in at least one method blank prepared and analyzed by the laboratory, the concentration of methylene chloride in the soil samples is considered to be attributable to laboratory contamination. The concentration of tentatively identified volatile organic compounds (VOC TICs) was estimated to be less than five mg/kg in all soil samples except those collected from the depth intervals that exhibited the most significant indications of LNAPL-impacted soil at soil boring locations TW-71A, TW-72, and TW-73; the concentrations of VOC TICs at these locations were 202, 83.5, and 68.7 mg/kg, respectively.

The following SVOCs were detected at concentrations that exceeded their respective RSCOs in at least one of the 31 soil samples collected in this AOC: benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, dibenz(a,h)anthracene, and indeno(1,2,3-c,d)pyrene. All these compounds are PAH compounds, a subset of SVOCs that have been detected at similar concentrations in fill throughout the HHMT-Port Ivory Facility.

The soil samples collected and analyzed during the first mobilization were analyzed for metals in addition to VOCs and SVOCs, but were not analyzed for TPHC. The metals arsenic, barium, beryllium, cadmium, chromium, copper, iron, mercury, nickel, selenium, and zinc were detected at concentrations that exceeded their respective RSCOs in at least one of the 31 soil samples collected in this AOC. Magnesium and lead were also detected at concentrations greater than their maximum background concentrations in the Eastern US. These metals have been detected at similar concentrations at locations throughout the HHMT-Port Ivory Facility.

The soil samples collected and analyzed during the second mobilization were analyzed for TPHC in addition to VOCs and SVOCs, but were not analyzed for metals. The concentrations of TPHC detected in these soil samples ranged from 25 mg/kg (in the deeper samples collected at soil boring location TW-76 and temporary well location TWP-14) to 13,000 mg/kg (at soil boring location TW-72). No RSCO has been established for TPHC in soil. For the most part, the concentrations of TPHC in soil samples collected at Area 2B during the SRI are similar to those in soil samples collected throughout the HHMT-Port Ivory Facility during other investigations.

Quality Assurance/Quality Control – Area 2B

To monitor the effectiveness of the field decontamination procedures and laboratory consistency, quality assurance and quality control (QA/QC) samples were collected. The Port Authority collected six field blanks and one duplicate sample for analysis at Area 2B. No VOCs were identified in the six field blanks. It can therefore be inferred that the field decontamination procedures were effective. Analytical results for field blanks are summarized in Table 2A-D.

A duplicate sample was collected from the 5.5-6 foot bgs depth interval at soil boring location TW-40B. Analytical results for compounds with confident concentrations (i.e., the reported concentrations for targeted compounds that do not have a "J" qualifier) were compared in the sample and the duplicate sample to assess laboratory consistency. Results for VOCs, SVOCs, and metals were reasonably consistent. All the reported results were within an order of magnitude of one another (see Table 2A-D for a summary of the analytical data).

7.3.3 Groundwater Sampling Results

The groundwater sampling component of the SRI at Area 2B was conducted to determine whether LNAPL-impacted soil is a source area for regulated compounds in groundwater. In accordance with the sampling program described above, one groundwater sample was collected from each of two temporary wells, identified as TWP-13 and TWP-14, which were installed at Area 2B on March 30 and April 2, 2005, respectively. Specifically, temporary well TWP-13 was installed and sampled to determine whether the LNAPL-impacted soil encountered at test pit location EXT-1 had degraded groundwater quality, and temporary well TWP-14 was installed and sampled to determine whether LNAPL-impacted

TABL[illegible]A
SUMMARY OF SOIL SAMPLNIG ANALYTICAL RESULTS - VOCs
SITE 2
HHMT-PORT IVORY FACILITY

Location Field Sample ID Lab Sample Number Sampling Date Matrix	New York TAGM Recommended Soil Cleanup Objective (mg/kg)	BLDG20-C1 B20C1-032305S003 618546 03/23/05 SOLID			BLDG20-C2 B20C2-032405S002 618548 03/24/05 SOLID			BLDG32-C1 C1032505S003 618773 03/25/05 SOLID			BLDG32-C2 032505S002 618774 03/25/05 SOLID			BLDG32-C3 032505S003 618775 03/25/05 SOLID		
Volatile Organic Compounds (VOCs)		Conc	MDL	Qual	Conc	MDL	Qual	Conc	MDL	Qual	Conc	MDL	Qual	Conc	MDL	Qual
Chloromethane	NS	ND	0.0062		ND	0.0054		ND	0.0055		ND	0.0052		ND	0.0056	
Bromomethane	NS	ND	0.0062		ND	0.0054		ND	0.0055		ND	0.0052		ND	0.0056	
VinylChloride	0.2	ND	0.0062		ND	0.0054		ND	0.0055		ND	0.0052		ND	0.0056	
Chloroethane	1.9	ND	0.0062		ND	0.0054		ND	0.0055		ND	0.0052		ND	0.0056	
MethyleneChloride	0.1	0.026		B	0.022		B	ND	0.0033		ND	0.0031		ND	0.0034	
Acetone	0.2	0.13		B	0.1		B	0.012		B	ND	0.0052		0.049		B
CarbonDisulfide	2.7	ND	0.0062		ND	0.0054		ND	0.0055		ND	0.0052		0.0022		J
1,1-Dichloroethene	0.4	ND	0.0025		ND	0.0022		ND	0.0022		ND	0.0021		ND	0.0022	
1,1-Dichloroethane	0.2	ND	0.0062		ND	0.0054		ND	0.0055		ND	0.0052		ND	0.0056	
trans-1,2-Dichloroethene	0.3	ND	0.0062		ND	0.0054		ND	0.0055		ND	0.0052		ND	0.0056	
cis-1,2-Dichloroethene	NS	ND	0.0062		ND	0.0054		ND	0.0055		ND	0.0052		ND	0.0056	
Chloroform	0.3	ND	0.0062		ND	0.0054		ND	0.0055		ND	0.0052		ND	0.0056	
1,2-Dichloroethane	0.1	ND	0.0025		ND	0.0022		ND	0.0022		ND	0.0021		ND	0.0022	
2-Butanone	0.3	ND	0.0062		ND	0.0054		ND	0.0055		ND	0.0052		ND	0.0056	
1,1,1-Trichloroethane	0.8	ND	0.0062		ND	0.0054		ND	0.0055		ND	0.0052		ND	0.0056	
CarbonTetrachloride	0.6	ND	0.0025		ND	0.0022		ND	0.0022		ND	0.0021		ND	0.0022	
Bromodichloromethane	NS	ND	0.0012		ND	0.0011		ND	0.0011		ND	0.001		ND	0.0011	
1,2-Dichloropropane	NS	ND	0.0012		ND	0.0011		ND	0.0011		ND	0.001		ND	0.0011	
cis-1,3-Dichloropropene	NS	ND	0.0062		ND	0.0054		ND	0.0055		ND	0.0052		ND	0.0056	
Trichloroethene	0.7	ND	0.0012		ND	0.0011		ND	0.0011		ND	0.001		ND	0.0011	
Dibromochloromethane	NS	ND	0.0062		ND	0.0054		ND	0.0055		ND	0.0052		ND	0.0056	
1,1,2-Trichloroethane	NS	ND	0.0037		ND	0.0032		ND	0.0033		ND	0.0031		ND	0.0034	
Benzene	0.06	ND	0.0012		ND	0.0011		ND	0.0011		ND	0.001		ND	0.0011	
trans-1,3-Dichloropropene	NS	ND	0.0062		ND	0.0054		ND	0.0055		ND	0.0052		ND	0.0056	
Bromoform	NS	ND	0.005		ND	0.0043		ND	0.0044		ND	0.0041		ND	0.0045	
4-Methyl-2-Pentanone	1	ND	0.0062		ND	0.0054		ND	0.0055		ND	0.0052		ND	0.0056	
2-Hexanone	NS	ND	0.0062		ND	0.0054		ND	0.0055		ND	0.0052		ND	0.0056	
Tetrachloroethene	1.4	ND	0.0012		ND	0.0011		ND	0.0011		ND	0.001		ND	0.0011	
1,1,2,2-Tetrachloroethane	0.6	ND	0.0012		ND	0.0011		ND	0.0011		ND	0.001		ND	0.0011	
Toluene	1.5	ND	0.0062		ND	0.0054		ND	0.0055		ND	0.0052		ND	0.0056	
Chlorobenzene	1.7	ND	0.0062		ND	0.0054		ND	0.0055		ND	0.0052		ND	0.0056	
Ethylbenzene	5.5	ND	0.005		ND	0.0043		ND	0.0044		ND	0.0041		ND	0.0045	
Styrene	NS	ND	0.0062		ND	0.0054		ND	0.0055		ND	0.0052		ND	0.0056	
Xylene(Total)	1.2	ND	0.0062		ND	0.0054		ND	0.0055		ND	0.0052		ND	0.0056	
Total VOC Concentration	10	0.156			0.122			0.012			0			0.0512		
Total VOC TICs Concentration	NS	0			0			0.014		J	0			0		

Notes and Abbreviations

1) Bold concentrations in shaded cells exceed the New York TAGM Recommended Soil Cleanup Objective.

2) All results provided in units of mg/kg.

3) The analytical laboratory initally provided the Reporting Limit (RL) for most samples collected form soil borings TW-37 through TW-52, but subsequently provided the Method Detection Limits (MDLs). Both the RL and MDL are reported for these samples. For all other samples, only the MDL is reported.

* = Field duplicate samples
= The compound was detected at a concentration below the MDL and is estimated
VOC TICs = Tentatively identified volatile organic compounds
B = The compound was detected in an associated method blank
ND = The compound was not detected
Conc = Concentration
Qual = Laboratory Data Qualifier
MDL = Method Detection Limit
NS = No standard
mg/kg = Milligrams per kilograms

B 57

TAB[illegible]A
SUMMARY OF SOIL SAMPLNIG ANALYTICAL RESULTS - VOCs
SITE 2
HHMT-PORT IVORY FACILITY

Location Field Sample ID Lab Sample Number Sampling Date Matrix	New York TAGM Recommended Soil Cleanup Objective (mg/kg)	BLDG32-C4 B32C4-032405S002 618549 03/24/05 SOLID			BLDG32-C5 B32C5-032405S002 618550 03/24/05 SOLID			STAIN03-C1 STA03C1-032405S3 618551 03/24/05 SOLID			STAIN03-C2 STA03C2-032405S2 618552 03/24/05 SOLID			STAIN03-C3 STA03C3-032405S3 618553 03/24/05 SOLID		
Volatile Organic Compounds (VOCs)		Conc	MDL	Qual	Conc	MDL	Qual	Conc	MDL	Qual	Conc	MDL	Qual	Conc	MDL	Qual
Chloromethane	NS	ND	0.0056		ND	0.0054		ND	0.0053		ND	0.0063		ND	0.006	
Bromomethane	NS	ND	0.0056		ND	0.0054		ND	0.0053		ND	0.0063		ND	0.006	
VinylChloride	0.2	ND	0.0056		ND	0.0054		ND	0.0053		ND	0.0063		ND	0.006	
Chloroethane	1.9	ND	0.0056		ND	0.0054		ND	0.0053		ND	0.0063		ND	0.006	
MethyleneChloride	0.1	0.017		B	0.024		B	0.011		B	0.0019		JB	0.0019		JB
Acetone	0.2	0.12		B	0.088		B	0.11		B	0.0067		B	0.0069		B
CarbonDisulfide	2.7	ND	0.0056		ND	0.0054		ND	0.0053		ND	0.0063		ND	0.006	
1,1-Dichloroethene	0.4	ND	0.0022		ND	0.0022		ND	0.0021		ND	0.0025		ND	0.0024	
1,1-Dichloroethane	0.2	ND	0.0056		ND	0.0054		ND	0.0053		ND	0.0063		ND	0.006	
trans-1,2-Dichloroethene	0.3	ND	0.0056		ND	0.0054		ND	0.0053		ND	0.0063		ND	0.006	
cis-1,2-Dichloroethene	NS	ND	0.0056		ND	0.0054		ND	0.0053		ND	0.0063		ND	0.006	
Chloroform	0.3	ND	0.0056		ND	0.0054		ND	0.0053		ND	0.0063		ND	0.006	
1,2-Dichloroethane	0.1	ND	0.0022		ND	0.0022		ND	0.0021		ND	0.0025		ND	0.0024	
2-Butanone	0.3	ND	0.0056		ND	0.0054		ND	0.0053		ND	0.0063		ND	0.006	
1,1,1-Trichloroethane	0.8	ND	0.0056		ND	0.0054		ND	0.0053		ND	0.0063		ND	0.006	
CarbonTetrachloride	0.6	ND	0.0022		ND	0.0022		ND	0.0021		ND	0.0025		ND	0.0024	
Bromodichloromethane	NS	ND	0.0011		ND	0.0011		ND	0.0011		ND	0.0013		ND	0.0012	
1,2-Dichloropropane	NS	ND	0.0011		ND	0.0011		ND	0.0011		ND	0.0013		ND	0.0012	
cis-1,3-Dichloropropene	NS	ND	0.0056		ND	0.0054		ND	0.0053		ND	0.0063		ND	0.006	
Trichloroethene	0.7	ND	0.0011		ND	0.0011		ND	0.0011		ND	0.0013		ND	0.0012	
Dibromochloromethane	NS	ND	0.0056		ND	0.0054		ND	0.0053		ND	0.0063		ND	0.006	
1,1,2-Trichloroethane	NS	ND	0.0034		ND	0.0032		ND	0.0032		ND	0.0038		ND	0.0036	
Benzene	0.06	ND	0.0011		ND	0.0011		ND	0.0011		ND	0.0013		ND	0.0012	
trans-1,3-Dichloropropene	NS	ND	0.0056		ND	0.0054		ND	0.0053		ND	0.0063		ND	0.006	
Bromoform	NS	ND	0.0045		ND	0.0043		ND	0.0042		ND	0.0051		ND	0.0048	
4-Methyl-2-Pentanone	1	ND	0.0056		ND	0.0054		ND	0.0053		ND	0.0063		ND	0.006	
2-Hexanone	NS	ND	0.0056		ND	0.0054		ND	0.0053		ND	0.0063		ND	0.006	
Tetrachloroethene	1.4	ND	0.0011		ND	0.0011		ND	0.0011		ND	0.0013		ND	0.0012	
1,1,2,2-Tetrachloroethane	0.6	ND	0.0011		ND	0.0011		ND	0.0011		ND	0.0013		ND	0.0012	
Toluene	1.5	ND	0.0056		ND	0.0054		ND	0.0053		ND	0.0063		ND	0.006	
Chlorobenzene	1.7	ND	0.0056		ND	0.0054		ND	0.0053		ND	0.0063		ND	0.006	
Ethylbenzene	5.5	ND	0.0045		ND	0.0043		ND	0.0042		ND	0.0051		ND	0.0048	
Styrene	NS	ND	0.0056		ND	0.0054		ND	0.0053		ND	0.0063		ND	0.006	
Xylene(Total)	1.2	ND	0.0056		ND	0.0054		ND	0.0053		ND	0.0063		ND	0.006	
Total VOC Concentration	10	0.137			0.112			0.121			0.0086			0.0088		
Total VOC TICs Concentration	NS	0			0			0			0.0077		J	0.058		J

Notes and Abbreviations

1) Bold concentrations in shaded cells exceed the New York TAGM Recommended Soil Cleanup Objective.
2) All results provided in units of mg/kg.
3) The analytical laboratory initally provided the Reporting Limit (RL) for most samples collected form soil borings TW-37 through TW-52, but subsequently provided the Method Detection Limits (MDLs). Both the RL and MDL are reported for these samples. For all other samples, only the MDL is reporte

* = Field duplicate samples
I = The compound was detected at a concentration below the MDL and is estimated
/OC TICs = Tentatively identified volatile organic compounds
3 = The compound was detected in an associated method blank
ID = The compound was not detected
:onc = Concentration
Jual = Laboratory Data Qualifier
ADL = Method Detection Limit
IS = No standard
ng/kg = Milligrams per kilograms

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TAB[illegible]A
SUMMARY OF SOIL SAMPLNIG ANALYTICAL RESULTS - VOCs
SITE 2
HHMT-PORT IVORY FACILITY

Location Field Sample ID Lab Sample Number Sampling Date Matrix	New York TAGM Recommended Soil Cleanup Objective (mg/kg)	UST7-C1 032905S004 620681 03/29/05 SOLID			UST7-C2 032905S006 620682 03/29/05 SOLID			UST7-C3 033005S006 620684 03/30/05 SOLID			UST7-C4 032905S005 620683 03/29/05 SOLID			UST7-C5 032505S006 618771 03/25/05 SOLID		
Volatile Organic Compounds (VOCs)		**Conc**	**MDL**	**Qual**	**Conc**	**MDL**	**Qual**	**Conc**	**MDL**	**Qual**	**Conc**	**MDL**	**Qual**	**Conc**	**MDL**	**Qual**
Chloromethane	NS	ND	0.0055		ND	0.01		ND	0.0053		ND	0.0056		ND	0.0055	
Bromomethane	NS	ND	0.0055		ND	0.01		ND	0.0053		ND	0.0056		ND	0.0055	
VinylChloride	0.2	ND	0.0055		ND	0.01		ND	0.0053		ND	0.0056		ND	0.0055	
Chloroethane	1.9	ND	0.0055		ND	0.01		ND	0.0053		ND	0.0056		ND	0.0055	
MethyleneChloride	0.1	0.0009		JB	ND	0.0061		ND	0.0032		ND	0.0033		0.002		JB
Acetone	0.2	0.011		B	0.062		B	0.014		B	0.028		B	0.083		B
CarbonDisulfide	2.7	ND	0.0055		0.0023		J	ND	0.0053		0.0017		J	ND	0.0055	
1,1-Dichloroethene	0.4	ND	0.0022		ND	0.0041		ND	0.0021		ND	0.0022		ND	0.0022	
1,1-Dichloroethane	0.2	ND	0.0055		ND	0.01		ND	0.0053		ND	0.0056		ND	0.0055	
trans-1,2-Dichloroethene	0.3	ND	0.0055		ND	0.01		ND	0.0053		ND	0.0056		ND	0.0055	
cis-1,2-Dichloroethene	NS	ND	0.0055		ND	0.01		ND	0.0053		ND	0.0056		ND	0.0055	
Chloroform	0.3	ND	0.0055		ND	0.01		ND	0.0053		ND	0.0056		ND	0.0055	
1,2-Dichloroethane	0.1	ND	0.0022		ND	0.0041		ND	0.0021		ND	0.0022		ND	0.0022	
2-Butanone	0.3	ND	0.0055		0.018			ND	0.0053		ND	0.0056		ND	0.0055	
1,1,1-Trichloroethane	0.8	ND	0.0055		ND	0.01		ND	0.0053		ND	0.0056		ND	0.0055	
CarbonTetrachloride	0.6	ND	0.0022		ND	0.0041		ND	0.0021		ND	0.0022		ND	0.0022	
Bromodichloromethane	NS	ND	0.0011		ND	0.002		ND	0.0011		ND	0.0011		ND	0.0011	
1,2-Dichloropropane	NS	ND	0.0011		ND	0.002		ND	0.0011		ND	0.0011		ND	0.0011	
cis-1,3-Dichloropropene	NS	ND	0.0055		ND	0.01		ND	0.0053		ND	0.0056		ND	0.0055	
Trichloroethene	0.7	ND	0.0011		ND	0.002		ND	0.0011		ND	0.0011		ND	0.0011	
Dibromochloromethane	NS	ND	0.0055		ND	0.01		ND	0.0053		ND	0.0056		ND	0.0055	
1,1,2-Trichloroethane	NS	ND	0.0033		ND	0.0061		ND	0.0032		ND	0.0033		ND	0.0033	
Benzene	0.06	ND	0.0011		ND	0.002		ND	0.0011		ND	0.0011		ND	0.0011	
trans-1,3-Dichloropropene	NS	ND	0.0055		ND	0.01		ND	0.0053		ND	0.0056		ND	0.0055	
Bromoform	NS	ND	0.0044		ND	0.0082		ND	0.0042		ND	0.0045		ND	0.0044	
4-Methyl-2-Pentanone	1	ND	0.0055		ND	0.01		ND	0.0053		ND	0.0056		ND	0.0055	
2-Hexanone	NS	ND	0.0055		ND	0.01		ND	0.0053		ND	0.0056		ND	0.0055	
Tetrachloroethene	1.4	ND	0.0011		ND	0.002		ND	0.0011		ND	0.0011		ND	0.0011	
1,1,2,2-Tetrachloroethane	0.6	ND	0.0011		ND	0.002		ND	0.0011		ND	0.0011		ND	0.0011	
Toluene	1.5	ND	0.0055		ND	0.01		ND	0.0053		ND	0.0056		ND	0.0055	
Chlorobenzene	1.7	ND	0.0055		ND	0.01		ND	0.0053		ND	0.0056		ND	0.0055	
Ethylbenzene	5.5	ND	0.0044		ND	0.0082		ND	0.0042		ND	0.0045		ND	0.0044	
Styrene	NS	ND	0.0055		ND	0.01		ND	0.0053		ND	0.0056		ND	0.0055	
Xylene(Total)	1.2	ND	0.0055		ND	0.01		ND	0.0053		ND	0.0056		ND	0.0055	
Total VOC Concentration	10	0.0119			0.0823			0.014			0.0297			0.085		
Total VOC TICs Concentration	NS	0			0.805		J	0			0.34		J	0		

Notes and Abbreviations

1) Bold concentrations in shaded cells exceed the New York TAGM Recommended Soil Cleanup Objective.

2) All results provided in units of mg/kg.

3) The analytical laboratory initally provided the Reporting Limit (RL) for most samples collected form soil borings TW-37 through TW-52, but subsequently provided the Method Detection Limits (MDLs). Both the RL and MDL are reported for these samples. For all other samples, only the MDL is reporte

* = Field duplicate samples
J = The compound was detected at a concentration below the MDL and is estimated
VOC TICs = Tentatively identified volatile organic compounds
B = The compound was detected in an associated method blank
ND = The compound was not detected
Conc = Concentration
Qual = Laboratory Data Qualifier
MDL = Method Detection Limit
NS = No standard
mg/kg = Milligrams per kilograms

TAB[illegible]A
SUMMARY OF SOIL SAMPLNIG ANALYTICAL RESULTS - VOCs
SITE 2
HHMT-PORT IVORY FACILITY

Location Field Sample ID Lab Sample Number Sampling Date Matrix	New York TAGM Recommended Soil Cleanup Objective (mg/kg)	UST7-C6 032505S005 618772 03/25/05 SOLID			TW-37 TW-37-122304S012 596210 12/23/04 SOLID				TW-38 TW-38-122304S011 596211 12/23/04 SOLID				TW-40B** TP40B-120904SO06 592644 12/09/04 SOLID			
Volatile Organic Compounds (VOCs)		Conc	MDL	Qual	Conc	RL	Qual	MDL	Conc	RL	Qual	MDL	Conc	RL	Qual	MDL
Chloromethane	NS	ND	0.0056		ND	0.0089		0.00059	ND	0.0089		0.00059	ND	0.0062		0.00041
Bromomethane	NS	ND	0:0056		ND	0.0089		0.00064	ND	0.0089		0.00064	ND	0.0062		0.00045
VinylChloride	0.2	ND	0.0056		ND	0.0089		0.00041	ND	0.0089		0.00041	ND	0.0062		0.00028
Chloroethane	1.9	ND	0.0056		ND	0.0089		0.00062	ND	0.0089		0.00062	ND	0.0062		0.00043
MethyleneChloride	0.1	0.0096		B	ND	0.0054		0.00041	ND	0.0054		0.00041	ND	0.0037		0.00028
Acetone	0.2	0.11		B	0.035		B	0.0043	0.046		B	0.0043	0.12		B	0.003
CarbonDisulfide	2.7	0.0015		J	0.0015		J	0.00053	0.0066		J	0.00053	0.026			0.00037
1,1-Dichloroethene	0.4	ND	0.0022		ND	0.0036		0.00058	ND	0.0036		0.00058	ND	0.0025		0.0004
1,1-Dichloroethane	0.2	ND	0.0056		ND	0.0089		0.00043	ND	0.0089		0.00043	ND	0.0062		0.0003
trans-1,2-Dichloroethene	0.3	ND	0.0056		ND	0.0089		0.00053	ND	0.0089		0.00053	ND	0.0062		0.00037
cis-1,2-Dichloroethene	NS	ND	0.0056		ND	0.0089		0.00053	ND	0.0089		0.00053	ND	0.0062		0.00037
Chloroform	0.3	ND	0.0056		ND	0.0089		0.00041	ND	0.0089		0.00041	ND	0.0062		0.00028
1,2-Dichloroethane	0.1	ND	0.0022		ND	0.0036		0.00029	ND	0.0036		0.00029	ND	0.0025		0.0002
2-Butanone	0.3	ND	0.0056		ND	0.0089		0.0018	ND	0.0089		0.0018	0.037			0.0012
1,1,1-Trichloroethane	0.8	ND	0.0056		ND	0.0089		0.0005	ND	0.0089		0.0005	ND	0.0062		0.00035
CarbonTetrachloride	0.6	ND	0.0022		ND	0.0036		0.00038	ND	0.0036		0.00038	ND	0.0025		0.00026
Bromodichloromethane	NS	ND	0.0011		ND	0.0018		0.00043	ND	0.0018		0.00043	ND	0.0012		0.00029
1,2-Dichloropropane	NS	ND	0.0011		ND	0.0018		0.00052	ND	0.0018		0.00052	ND	0.0012		0.00035
cis-1,3-Dichloropropene	NS	ND	0.0056		ND	0.0089		0.00053	ND	0.0089		0.00053	ND	0.0062		0.00037
Trichloroethene	0.7	ND	0.0011		ND	0.0018		0.00049	ND	0.0018		0.00049	ND	0.0012		0.00032
Dibromochloromethane	NS	ND	0.0056		ND	0.0089		0.00028	ND	0.0089		0.00028	ND	0.0062		0.0002
1,1,2-Trichloroethane	NS	ND	0.0033		ND	0.0054		0.00047	ND	0.0054		0.00047	ND	0.0037		0.00032
Benzene	0.06	ND	0.0011		ND	0.0018		0.00041	ND	0.0018		0.00041	ND	0.0012		0.00028
trans-1,3-Dichloropropene	NS	ND	0.0056		ND	0.0089		0.00021	ND	0.0089		0.00021	ND	0.0062		0.00015
Bromoform	NS	ND	0.0044		ND	0.0072		0.00049	ND	0.0071		0.00048	ND	0.005		0.00092
4-Methyl-2-Pentanone	1	ND	0.0056		ND	0.0089		0.0013	ND	0.0089		0.0013	ND	0.0062		0.00095
2-Hexanone	NS	ND	0.0056		ND	0.0089		0.0014	ND	0.0089		0.0014	ND	0.0062		0
Tetrachloroethene	1.4	ND	0.0011		ND	0.0018		0.0003	ND	0.0018		0.0003	ND	0.0012		0.0002
1,1,2,2-Tetrachloroethane	0.6	ND	0.0011		ND	0.0018		0.00059	ND	0.0018		0.00059	ND	0.0012		0.0004
Toluene	1.5	ND	0.0056		ND	0.0089		0.00036	0.0022		J	0.00036	ND	0.0062		0.00025
Chlorobenzene	1.7	ND	0.0056		ND	0.0089		0.00027	ND	0.0089		0.00027	ND	0.0062		0.00019
Ethylbenzene	5.5	ND	0.0044		ND	0.0072		0.00036	0.0015		J	0.00035	ND	0.005		0.00025
Styrene	NS	ND	0.0056		ND	0.0089		0.00021	ND	0.0089		0.00021	ND	0.0062		0.00015
Xylene(Total)	1.2	ND	0.0056		ND	0.0089		0.00085	0.0072		J	0.00085	ND	0.0062		0.0006
Total VOC Concentration	10	0.1211			0.0365				0.0635				0.183			
Total VOC TICs Concentration	NS	0.395		J	0.0498			J	1.97			J	NA			

Notes and Abbreviations

1) Bold concentrations in shaded cells exceed the New York TAGM Recommended Soil Cleanup Objective.
2) All results provided in units of mg/kg.
3) The analytical laboratory initally provided the Reporting Limit (RL) for most samples collected form soil borings TW-37 through TW-52, but subsequently provided the Method Detection Limits (MDLs). Both the RL and MDL are reported for these samples. For all other samples, only the MDL is reporte

** = Field duplicate samples
J = The compound was detected at a concentration below the MDL and is estimated
VOC TICs = Tentatively identified volatile organic compounds
B = The compound was detected in an associated method blank
ND = The compound was not detected
Conc = Concentration
Qual = Laboratory Data Qualifier
MDL = Method Detection Limit
NS = No standard
mg/kg = Milligrams per kilograms

B 60

TABLE 2A
SUMMARY OF SOIL SAMPLNIG ANALYTICAL RESULTS - VOCs
SITE 2
HHMT-PORT IVORY FACILITY

Location Field Sample ID Lab Sample Number Sampling Date Matrix	New York TAGM Recommended Soil Cleanup Objective (mg/kg)	TW-40B** 40B-120904SO06D 592645 12/09/04 SOLID				TW-40B 120904SO12 592646 12/09/04 SOLID				TW-43A TW43A-120804SO10 592638 12/08/04 SOLID				TW-45 TW-45-122204S003 596205 12/22/04 SOLID			
Volatile Organic Compounds (VOCs)		Conc	RL	Qual	MDL	Conc	RL	Qual	MDL	Conc	RL	Qual	MDL	Conc	RL	Qual	MDL
Chloromethane	NS	ND	0.029		0.0019	ND	0.0099		0.00065	ND	0.015		0.00099	ND	0.0055		0.00036
Bromomethane	NS	ND	0.029		0.0021	ND	0.0099		0.00071	ND	0.015		0.0011	ND	0.0055		0.0004
VinylChloride	0.2	ND	0.029		0.0013	ND	0.0099		0.00046	ND	0.015		0.00069	ND	0.0055		0.00025
Chloroethane	1.9	ND	0.029		0.002	ND	0.0099		0.00069	ND	0.015		0.001	ND	0.0055		0.00038
MethyleneChloride	0.1	ND	0.018		0.0014	0.0048		JB	0.00045	ND	0.009		0.00069	0.0008		JB	0.00025
Acetone	0.2	0.6		B	0.014	0.39		B	0.0048	0.38		B	0.0073	0.043		B	0.0027
CarbonDisulfide	2.7	0.17			0.0017	0.028			0.00059	0.022			0.0009	0.0012		J	0.00033
1,1-Dichloroethene	0.4	ND	0.012		0.0019	ND	0.004		0.00064	ND	0.006		0.00096	ND	0.0022		0.00035
1,1-Dichloroethane	0.2	ND	0.029		0.0014	ND	0.0099		0.00048	ND	0.015		0.00072	ND	0.0055		0.00026
trans-1,2-Dichloroethene	0.3	ND	0.029		0.0017	ND	0.0099		0.00059	ND	0.015		0.0009	ND	0.0055		0.00033
cis-1,2-Dichloroethene	NS	ND	0.029		0.0017	ND	0.0099		0.00059	ND	0.015		0.0009	ND	0.0055		0.00033
Chloroform	0.3	ND	0.029		0.0013	ND	0.0099		0.00046	ND	0.015		0.00069	ND	0.0055		0.00025
1,2-Dichloroethane	0.1	ND	0.012		0.00096	ND	0.004		0.00032	ND	0.006		0.00048	ND	0.0022		0.00018
2-Butanone	0.3	0.12			0.0057	0.12			0.002	0.092			0.003	ND	0.0055		0.0011
1,1,1-Trichloroethane	0.8	ND	0.029		0.0016	ND	0.0099		0.00055	ND	0.015		0.00084	ND	0.0055		0.00031
CarbonTetrachloride	0.6	ND	0.012		0.0012	ND	0.004		0.00042	ND	0.006		0.00063	ND	0.0022		0.00023
Bromodichloromethane	NS	ND	0.0058		0.0014	ND	0.002		0.00048	ND	0.003		0.00072	ND	0.0011		0.00026
1,2-Dichloropropane	NS	ND	0.0058		0.0017	ND	0.002		0.00058	ND	0.003		0.00087	ND	0.0011		0.00032
cis-1,3-Dichloropropene	NS	ND	0.029		0.0017	ND	0.0099		0.00059	ND	0.015		0.0009	ND	0.0055		0.00033
Trichloroethene	0.7	ND	0.0058		0.0016	ND	0.002		0.00054	ND	0.003		0.00081	ND	0.0011		0.0003
Dibromochloromethane	NS	ND	0.029		0.00093	ND	0.0099		0.00032	ND	0.015		0.00048	ND	0.0055		0.00018
1,1,2-Trichloroethane	NS	ND	0.018		0.0016	ND	0.0059		0.00051	ND	0.009		0.00078	ND	0.0033		0.00028
Benzene	0.06	ND	0.0058		0.0013	ND	0.002		0.00046	ND	0.003		0.00069	ND	0.0011		0.00025
trans-1,3-Dichloropropene	NS	ND	0.029		0.0007	ND	0.0099		0.00024	ND	0.015		0.00036	ND	0.0055		0.00013
Bromoform	NS	ND	0.023		0.0016	ND	0.0079		0.00053	ND	0.012		0.00081	ND	0.0044		0.0003
4-Methyl-2-Pentanone	1	ND	0.029		0.0043	ND	0.0099		0.0015	ND	0.015		0.0022	ND	0.0055		0.00081
2-Hexanone	NS	ND	0.029		0.0045	ND	0.0099		0.0015	ND	0.015		0.0023	ND	0.0055		0.00085
Tetrachloroethene	1.4	ND	0.0058		0.00099	ND	0.002		0.00034	ND	0.003		0.00051	ND	0.0011		0.00019
1,1,2,2-Tetrachloroethane	0.6	ND	0.0058		0.0019	ND	0.002		0.00066	ND	0.003		0.00099	ND	0.0011		0.00036
Toluene	1.5	ND	0.029		0.0012	ND	0.0099		0.0004	ND	0.015		0.0006	ND	0.0055		0.00023
Chlorobenzene	1.7	ND	0.029		0.00087	ND	0.0099		0.0003	ND	0.015		0.00045	ND	0.0055		0.00016
Ethylbenzene	5.5	ND	0.023		0.0011	ND	0.0079		0.0004	ND	0.012		0.0006	ND	0.0044		0.00022
Styrene	NS	ND	0.029		0.0007	ND	0.0099		0.00024	ND	0.015		0.00036	ND	0.0055		0.00013
Xylene(Total)	1.2	ND	0.029		0.0028	ND	0.0099		0.00095	ND	0.015		0.0014	ND	0.0055		0.00053
Total VOC Concentration	10	0.89				0.5428				0.494				0.045			
Total VOC TICs Concentration	NS	NA				NA				NA				0			

Notes and Abbreviations

1) Bold concentrations in shaded cells exceed the New York TAGM Recommended Soil Cleanup Objective.
2) All results provided in units of mg/kg.
3) The analytical laboratory initally provided the Reporting Limit (RL) for most samples collected form soil borings TW-37 through TW-52, but subsequently provided the Method Detection Limits (MDLs). Both the RL and MDL are reported for these samples. For all other samples, only the MDL is reporte

** = Field duplicate samples
J = The compound was detected at a concentration below the MDL and is estimated
VOC TICs = Tentatively identified volatile organic compounds
B = The compound was detected in an associated method blank
ND = The compound was not detected
Conc = Concentration
Qual = Laboratory Data Qualifier
MDL = Method Detection Limit
NS = No standard
mg/kg = Milligrams per kilograms

TABLE 2A
SUMMARY OF SOIL SAMPLNIG ANALYTICAL RESULTS - VOCs
SITE 2
HHMT-PORT IVORY FACILITY

Location Field Sample ID Lab Sample Number Sampling Date Matrix	New York TAGM Recommended Soil Cleanup Objective (mg/kg)	TW-47 TW-47-122204S007 596206 12/22/04 SOLID				TW-47 TW-47-122204S017 596207 12/22/04 SOLID				TW-48 TW-48-122304S016 596212 12/23/04 SOLID				TW-48 TW-48-122304S018 596213 12/23/04 SOLID			
Volatile Organic Compounds (VOCs)		Conc	RL	Qual	MDL	Conc	RL	Qual	MDL	Conc	RL	Qual	MDL	Conc	RL	Qual	MDL
Chloromethane	NS	ND	0.0073		0.00079	ND	0.0059		0.00039	ND	0.0058		0.00038	ND	0.006		0.0004
Bromomethane	NS	ND	0.0073		0.00047	ND	0.0059		0.00042	ND	0.0058		0.00042	ND	0.006		0.00043
VinylChloride	0.2	ND	0.0073		0.00055	ND	0.0059		0.00027	ND	0.0058		0.00027	ND	0.006		0.00028
Chloroethane	1.9	ND	0.0073		0.00068	ND	0.0059		0.00041	ND	0.0058		0.0004	ND	0.006		0.00042
MethyleneChloride	0.1	ND	0.0044		0.00019	ND	0.0035		0.00027	ND	0.0034		0.00026	ND	0.0036		0.00028
Acetone	0.2	0.038		B	0.0028	0.015		B	0.0028	0.014		B	0.0028	0.021		B	0.0029
CarbonDisulfide	2.7	ND	0.0073		0.00038	ND	0.0059		0.00035	ND	0.0058		0.00035	0.0012		J	0.00036
1,1-Dichloroethene	0.4	ND	0.0029		0.00035	ND	0.0024		0.00038	ND	0.0023		0.00037	ND	0.0024		0.00038
1,1-Dichloroethane	0.2	ND	0.0073		0.00036	ND	0.0059		0.00028	ND	0.0058		0.00028	ND	0.006		0.00029
trans-1,2-Dichloroethene	0.3	ND	0.0073		0.0003	ND	0.0059		0.00035	ND	0.0058		0.00035	ND	0.006		0.00036
cis-1,2-Dichloroethene	NS	ND	0.0073		0.00032	ND	0.0059		0.00035	ND	0.0058		0.00035	ND	0.006		0.00036
Chloroform	0.3	ND	0.0073		0.00025	ND	0.0059		0.00027	ND	0.0058		0.00027	ND	0.006		0.00028
1,2-Dichloroethane	0.1	ND	0.0029		0.00016	ND	0.0024		0.00019	ND	0.0023		0.00018	ND	0.0024		0.00019
2-Butanone	0.3	ND	0.0073		0.0029	ND	0.0059		0.0012	ND	0.0058		0.0011	ND	0.006		0.0012
1,1,1-Trichloroethane	0.8	ND	0.0073		0.00054	ND	0.0059		0.00033	ND	0.0058		0.00032	ND	0.006		0.00034
CarbonTetrachloride	0.6	ND	0.0029		0.00056	ND	0.0024		0.00025	ND	0.0023		0.00024	ND	0.0024		0.00025
Bromodichloromethane	NS	ND	0.0014		0.00011	ND	0.0012		0.00029	ND	0.0012		0.00029	ND	0.0012		0.00029
1,2-Dichloropropane	NS	ND	0.0014		0.00024	ND	0.0012		0.00035	ND	0.0012		0.00035	ND	0.0012		0.00035
cis-1,3-Dichloropropene	NS	ND	0.0073		0.00033	ND	0.0059		0.00035	ND	0.0058		0.00035	ND	0.006		0.00036
Trichloroethene	0.7	ND	0.0014		0.00035	0.0015			0.00032	0.0009		J	0.00032	ND	0.0012		0.00032
Dibromochloromethane	NS	ND	0.0073		0.00025	ND	0.0059		0.00019	ND	0.0058		0.00018	ND	0.006		0.00019
1,1,2-Trichloroethane	NS	ND	0.0044		0.00025	ND	0.0035		0.0003	ND	0.0034		0.00029	ND	0.0036		0.00031
Benzene	0.06	ND	0.0014		0.00029	ND	0.0012		0.00028	ND	0.0012		0.00028	ND	0.0012		0.00028
trans-1,3-Dichloropropene	NS	ND	0.0073		0.00013	ND	0.0059		0.00014	ND	0.0058		0.00014	ND	0.006		0.00014
Bromoform	NS	ND	0.0058		0.00035	ND	0.0047		0.00032	ND	0.0046		0.00031	ND	0.0048		0.00032
4-Methyl-2-Pentanone	1	ND	0.0073		0.0016	ND	0.0059		0.00087	ND	0.0058		0.00086	ND	0.006		0.00089
2-Hexanone	NS	ND	0.0073		0.0016	ND	0.0059		0.00091	ND	0.0058		0.00089	ND	0.006		0.00092
Tetrachloroethene	1.4	ND	0.0014		0.00047	ND	0.0012		0.0002	ND	0.0012		0.0002	ND	0.0012		0.0002
1,1,2,2-Tetrachloroethane	0.6	ND	0.0014		0.0003	ND	0.0012		0.0004	ND	0.0012		0.0004	ND	0.0012		0.0004
Toluene	1.5	ND	0.0073		0.00025	ND	0.0059		0.00024	ND	0.0058		0.00023	ND	0.006		0.00024
Chlorobenzene	1.7	ND	0.0073		0.00012	ND	0.0059		0.00018	ND	0.0058		0.00017	ND	0.006		0.00018
Ethylbenzene	5.5	ND	0.0058		0.00025	ND	0.0047		0.00023	ND	0.0046		0.00023	ND	0.0048		0.00024
Styrene	NS	ND	0.0073		0.00024	ND	0.0059		0.00014	ND	0.0058		0.00014	ND	0.006		0.00014
Xylene(Total)	1.2	ND	0.0073		0.00034	ND	0.0059		0.00057	ND	0.0058		0.00056	ND	0.006		0.00058
Total VOC Concentration	10	0.038				0.0165				0.0149				0.0222			
Total VOC TICs Concentration	NS	4.91			J	0.054			J	0				0.0879			J

Notes and Abbreviations

1) Bold concentrations in shaded cells exceed the New York TAGM Recommended Soil Cleanup Objective.
2) All results provided in units of mg/kg.
3) The analytical laboratory initally provided the Reporting Limit (RL) for most samples collected form soil borings TW-37 through TW-52, but subsequently provided the Method Detection Limits (MDLs). Both the RL and MDL are reported for these samples. For all other samples, only the MDL is reporte

* = Field duplicate samples
= The compound was detected at a concentration below the MDL and is estimated
VOC TICs = Tentatively identified volatile organic compounds
B = The compound was detected in an associated method blank
ND = The compound was not detected
Conc = Concentration
Qual = Laboratory Data Qualifier
MDL = Method Detection Limit
NS = No standard
mg/kg = Milligrams per kilograms

TAB[illegible]A
SUMMARY OF SOIL SAMPLNIG ANALYTICAL RESULTS - VOCs
SITE 2
HHMT-PORT IVORY FACILITY

Location Field Sample ID Lab Sample Number Sampling Date Matrix	New York TAGM Recommended Soil Cleanup Objective (mg/kg)	TW-49 TW-49-122804S002 596817 12/28/04 SOLID			TW-50 TW-50-122804S002 596818 12/28/04 SOLID			TW-51 TW-51-122904S002 596857 12/29/04 SOLID				TW-52 TW-52-122904S002 596856 12/29/04 SOLID			
Volatile Organic Compounds (VOCs)		Conc	MDL	Qual	Conc	MDL	Qual	Conc	RL	Qual	MDL	Conc	RL	Qual	MDL
Chloromethane	NS	ND	0.0058		ND	0.0058		ND	0.0062		0.00041	ND	0.0059		0.00039
Bromomethane	NS	ND	0.0058		ND	0.0058		ND	0.0062		0.00045	ND	0.0059		0.00042
VinylChloride	0.2	ND	0.0058		ND	0.0058		ND	0.0062		0.00028	ND	0.0059		0.00027
Chloroethane	1.9	ND	0.0058		ND	0.0058		ND	0.0062		0.00043	ND	0.0059		0.00041
MethyleneChloride	0.1	0.0056		B	0.0046		B	0.001		J	0.00028	ND	0.0035		0.00027
Acetone	0.2	0.034		B	0.052		B	0.075			0.003	0.084			0.0028
CarbonDisulfide	2.7	ND	0.0058		ND	0.0058		0.0013		J	0.00037	0.0027		J	0.00035
1,1-Dichloroethene	0.4	ND	0.0023		ND	0.0023		ND	0.0025		0.0004	ND	0.0024		0.00038
1,1-Dichloroethane	0.2	ND	0.0058		ND	0.0058		ND	0.0062		0.0003	ND	0.0059		0.00028
trans-1,2-Dichloroethene	0.3	ND	0.0058		ND	0.0058		ND	0.0062		0.00037	ND	0.0059		0.00035
cis-1,2-Dichloroethene	NS	ND	0.0058		ND	0.0058		ND	0.0062		0.00037	ND	0.0059		0.00035
Chloroform	0.3	ND	0.0058		ND	0.0058		ND	0.0062		0.00028	ND	0.0059		0.00027
1,2-Dichloroethane	0.1	ND	0.0023		ND	0.0023		ND	0.0025		0.0002	ND	0.0024		0.00019
2-Butanone	0.3	ND	0.0058		ND	0.0058		ND	0.0062		0.0012	ND	0.0059		0.0012
1,1,1-Trichloroethane	0.8	ND	0.0058		ND	0.0058		ND	0.0062		0.00035	ND	0.0059		0.00033
CarbonTetrachloride	0.6	ND	0.0023		ND	0.0023		ND	0.0025		0.00026	ND	0.0024		0.00025
Bromodichloromethane	NS	ND	0.0012		ND	0.0012		ND	0.0012		0.00029	ND	0.0012		0.00029
1,2-Dichloropropane	NS	ND	0.0012		ND	0.0012		ND	0.0012		0.00035	ND	0.0012		0.00035
cis-1,3-Dichloropropene	NS	ND	0.0058		ND	0.0058		ND	0.0062		0.00037	ND	0.0059		0.00035
Trichloroethene	0.7	ND	0.0012		ND	0.0012		ND	0.0012		0.00032	ND	0.0012		0.00032
Dibromochloromethane	NS	ND	0.0058		ND	0.0058		ND	0.0062		0.0002	ND	0.0059		0.00019
1,1,2-Trichloroethane	NS	ND	0.0034		ND	0.0035		ND	0.0037		0.00032	ND	0.0035		0.0003
Benzene	0.06	ND	0.0012		ND	0.0012		ND	0.0012		0.00028	ND	0.0012		0.00028
trans-1,3-Dichloropropene	NS	ND	0.0058		ND	0.0058		ND	0.0062		0.00015	ND	0.0059		0.00014
Bromoform	NS	ND	0.0046		ND	0.0046		ND	0.005		0.00034	ND	0.0047		0.00032
4-Methyl-2-Pentanone	1	ND	0.0058		ND	0.0058		ND	0.0062		0.00092	ND	0.0059		0.00087
2-Hexanone	NS	ND	0.0058		ND	0.0058		ND	0.0062		0.00095	ND	0.0059		0.00091
Tetrachloroethene	1.4	ND	0.0012		ND	0.0012		ND	0.0012		0.0002	ND	0.0012		0.0002
1,1,2,2-Tetrachloroethane	0.6	ND	0.0012		ND	0.0012		ND	0.0012		0.0004	ND	0.0012		0.0004
Toluene	1.5	ND	0.0058		ND	0.0058		ND	0.0062		0.00025	ND	0.0059		0.00024
Chlorobenzene	1.7	ND	0.0058		ND	0.0058		ND	0.0062		0.00019	ND	0.0059		0.00018
Ethylbenzene	5.5	ND	0.0046		ND	0.0046		ND	0.005		0.00025	ND	0.0047		0.00023
Styrene	NS	ND	0.0058		ND	0.0058		ND	0.0062		0.00015	ND	0.0059		0.00014
Xylene(Total)	1.2	ND	0.0058		ND	0.0058		ND	0.0062		0.0006	ND	0.0059		0.00057
Total VOC Concentration	10	0.0396			0.0566			0.0773				0.0867			
Total VOC TICs Concentration	NS	0			0			0				0			

Notes and Abbreviations

1) Bold concentrations in shaded cells exceed the New York TAGM Recommended Soil Cleanup Objective.

2) All results provided in units of mg/kg.

3) The analytical laboratory initally provided the Reporting Limit (RL) for most samples collected form soil borings TW-37 through TW-52, but subsequently provided the Method Detection Limits (MDLs). Both the RL and MDL are reported for these samples. For all other samples, only the MDL is reporte

** = Field duplicate samples
J = The compound was detected at a concentration below the MDL and is estimated
VOC TICs = Tentatively identified volatile organic compounds
B = The compound was detected in an associated method blank
ND = The compound was not detected
Conc = Concentration
Qual = Laboratory Data Qualifier
MDL = Method Detection Limit
NS = No standard
mg/kg = Milligrams per kilograms

TAB[illegible]A
SUMMARY OF SOIL SAMPLNIG ANALYTICAL RESULTS - VOCs
SITE 2
HHMT-PORT IVORY FACILITY

Location Field Sample ID Lab Sample Number Sampling Date Matrix	New York TAGM Recommended Soil Cleanup Objective (mg/kg)	TW-68 033105S001 620686 03/31/05 SOLID			TW-69 033105S004 620687 03/31/05 SOLID			TW-70A 033105S002 620688 03/31/05 SOLID			TW-71A 040105S005 620937 04/01/05 SOLID			TW-71A 040105S007 620938 04/01/05 SOLID		
Volatile Organic Compounds (VOCs)		Conc	MDL	Qual	Conc	MDL	Qual	Conc	MDL	Qual	Conc	MDL	Qual	Conc	MDL	Qual
Chloromethane	NS	ND	0.0079		ND	0.009		ND	0.0054		ND	0.6		ND	0.0057	
Bromomethane	NS	ND	0.0079		ND	0.009		ND	0.0054		ND	0.6		ND	0.0057	
VinylChloride	0.2	ND	0.0079		ND	0.009		ND	0.0054		ND	0.6		ND	0.0057	
Chloroethane	1.9	ND	0.0079		ND	0.009		ND	0.0054		ND	0.6		ND	0.0057	
MethyleneChloride	0.1	ND	0.0047		0.0013		JB	ND	0.0032		ND	0.36		0.0013		JB
Acetone	0.2	0.059		B	0.029		B	0.02		B	ND	0.6		0.028		B
CarbonDisulfide	2.7	ND	0.0079		0.003		J	ND	0.0054		ND	0.6		0.0023		J
1,1-Dichloroethene	0.4	ND	0.0031		ND	0.0036		ND	0.0022		ND	0.24		ND	0.0023	
1,1-Dichloroethane	0.2	ND	0.0079		ND	0.009		ND	0.0054		ND	0.6		ND	0.0057	
trans-1,2-Dichloroethene	0.3	ND	0.0079		ND	0.009		ND	0.0054		ND	0.6		ND	0.0057	
cis-1,2-Dichloroethene	NS	ND	0.0079		ND	0.009		ND	0.0054		ND	0.6		ND	0.0057	
Chloroform	0.3	ND	0.0079		ND	0.009		ND	0.0054		ND	0.6		ND	0.0057	
1,2-Dichloroethane	0.1	ND	0.0031		ND	0.0036		ND	0.0022		ND	0.24		ND	0.0023	
2-Butanone	0.3	ND	0.0079		ND	0.009		ND	0.0054		ND	0.6		ND	0.0057	
1,1,1-Trichloroethane	0.8	ND	0.0079		ND	0.009		ND	0.0054		ND	0.6		ND	0.0057	
CarbonTetrachloride	0.6	ND	0.0031		ND	0.0036		ND	0.0022		ND	0.24		ND	0.0023	
Bromodichloromethane	NS	ND	0.0016		ND	0.0018		ND	0.0011		ND	0.12		ND	0.0011	
1,2-Dichloropropane	NS	ND	0.0016		ND	0.0018		ND	0.0011		ND	0.12		ND	0.0011	
cis-1,3-Dichloropropene	NS	ND	0.0079		ND	0.009		ND	0.0054		ND	0.6		ND	0.0057	
Trichloroethene	0.7	ND	0.0016		ND	0.0018		ND	0.0011		ND	0.12		ND	0.0011	
Dibromochloromethane	NS	ND	0.0079		ND	0.009		ND	0.0054		ND	0.6		ND	0.0057	
1,1,2-Trichloroethane	NS	ND	0.0047		ND	0.0054		ND	0.0032		ND	0.36		ND	0.0034	
Benzene	0.06	ND	0.0016		ND	0.0018		ND	0.0011		ND	0.12		ND	0.0011	
trans-1,3-Dichloropropene	NS	ND	0.0079		ND	0.009		ND	0.0054		ND	0.6		ND	0.0057	
Bromoform	NS	ND	0.0063		ND	0.0072		ND	0.0043		ND	0.48		ND	0.0046	
4-Methyl-2-Pentanone	1	ND	0.0079		ND	0.009		ND	0.0054		ND	0.6		ND	0.0057	
2-Hexanone	NS	ND	0.0079		ND	0.009		ND	0.0054		ND	0.6		ND	0.0057	
Tetrachloroethene	1.4	ND	0.0016		ND	0.0018		ND	0.0011		ND	0.12		ND	0.0011	
1,1,2,2-Tetrachloroethane	0.6	ND	0.0016		ND	0.0018		ND	0.0011		ND	0.12		ND	0.0011	
Toluene	1.5	ND	0.0079		ND	0.009		ND	0.0054		ND	0.6		ND	0.0057	
Chlorobenzene	1.7	ND	0.0079		ND	0.009		ND	0.0054		ND	0.6		ND	0.0057	
Ethylbenzene	5.5	ND	0.0063		ND	0.0072		ND	0.0043		ND	0.48		ND	0.0046	
Styrene	NS	ND	0.0079		ND	0.009		ND	0.0054		ND	0.6		ND	0.0057	
Xylene(Total)	1.2	ND	0.0079		ND	0.009		ND	0.0054		ND	0.6		ND	0.0057	
Total VOC Concentration	10	0.059			0.0333			0.02			0			0.0316		
Total VOC TICs Concentration	NS	0			0			0			202		J	0.248		J

Notes and Abbreviations

1) Bold concentrations in shaded cells exceed the New York TAGM Recommended Soil Cleanup Objective.
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** = Field duplicate samples
J = The compound was detected at a concentration below the MDL and is estimated
VOC TICs = Tentatively identified volatile organic compounds
B = The compound was detected in an associated method blank
ND = The compound was not detected
Conc = Concentration
Qual = Laboratory Data Qualifier
MDL = Method Detection Limit
NS = No standard
mg/kg = Milligrams per kilograms

B64

TAB[illegible]2A
SUMMARY OF SOIL SAMPLNIG ANALYTICAL RESULTS - VOCs
SITE 2
HHMT-PORT IVORY FACILITY

Location Field Sample ID Lab Sample Number Sampling Date Matrix	New York TAGM Recommended Soil Cleanup Objective (mg/kg)	TW-72 TW-72-040405S004 621712 04/04/05 SOLID			TW-73 TW-73-040405S005 621713 04/04/05 SOLID			TW-73 TW-73-040405S008 621714 04/04/05 SOLID			TW-74 4-040105S005 620939 04/01/05 SOLID			TW-75 040105S006 620940 04/01/05 SOLID		
Volatile Organic Compounds (VOCs)		Conc	MDL	Qual	Conc	MDL	Qual	Conc	MDL	Qual	Conc	MDL	Qual	Conc	MDL	Qual
Chloromethane	NS	ND	0.63		ND	0.63		ND	0.0059		ND	0.0056		ND	0.0069	
Bromomethane	NS	ND	0.63		ND	0.63		ND	0.0059		ND	0.0056		ND	0.0069	
VinylChloride	0.2	ND	0.63		ND	0.63		ND	0.0059		ND	0.0056		ND	0.0069	
Chloroethane	1.9	ND	0.63		ND	0.63		ND	0.0059		ND	0.0056		ND	0.0069	
MethyleneChloride	0.1	ND	0.38		ND	0.38		ND	0.0035		ND	0.0033		ND	0.0041	
Acetone	0.2	ND	0.63		ND	0.63		0.1		B	ND	0.0056		ND	0.0069	
CarbonDisulfide	2.7	ND	0.63		ND	0.63		ND	0.0059		ND	0.0056		ND	0.0069	
1,1-Dichloroethene	0.4	ND	0.25		ND	0.25		ND	0.0024		ND	0.0022		ND	0.0028	
1,1-Dichloroethane	0.2	ND	0.63		ND	0.63		ND	0.0059		ND	0.0056		ND	0.0069	
trans-1,2-Dichloroethene	0.3	ND	0.63		ND	0.63		ND	0.0059		ND	0.0056		ND	0.0069	
cis-1,2-Dichloroethene	NS	ND	0.63		ND	0.63		ND	0.0059		ND	0.0056		ND	0.0069	
Chloroform	0.3	ND	0.63		ND	0.63		ND	0.0059		ND	0.0056		ND	0.0069	
1,2-Dichloroethane	0.1	ND	0.25		ND	0.25		ND	0.0024		ND	0.0022		ND	0.0028	
2-Butanone	0.3	ND	0.63		ND	0.63		ND	0.0059		ND	0.0056		ND	0.0069	
1,1,1-Trichloroethane	0.8	ND	0.63		ND	0.63		ND	0.0059		ND	0.0056		ND	0.0069	
CarbonTetrachloride	0.6	ND	0.25		ND	0.25		ND	0.0024		ND	0.0022		ND	0.0028	
Bromodichloromethane	NS	ND	0.13		ND	0.13		ND	0.0012		ND	0.0011		ND	0.0014	
1,2-Dichloropropane	NS	ND	0.13		ND	0.13		ND	0.0012		ND	0.0011		ND	0.0014	
cis-1,3-Dichloropropene	NS	ND	0.63		ND	0.63		ND	0.0059		ND	0.0056		ND	0.0069	
Trichloroethene	0.7	ND	0.13		ND	0.13		ND	0.0012		ND	0.0011		ND	0.0014	
Dibromochloromethane	NS	ND	0.63		ND	0.63		ND	0.0059		ND	0.0056		ND	0.0069	
1,1,2-Trichloroethane	NS	ND	0.38		ND	0.38		ND	0.0035		ND	0.0033		ND	0.0041	
Benzene	0.06	ND	0.13		ND	0.13		ND	0.0012		ND	0.0011		ND	0.0014	
trans-1,3-Dichloropropene	NS	ND	0.63		ND	0.63		ND	0.0059		ND	0.0056		ND	0.0069	
Bromoform	NS	ND	0.51		ND	0.5		ND	0.0047		ND	0.0045		ND	0.0055	
4-Methyl-2-Pentanone	1	ND	0.63		ND	0.63		ND	0.0059		ND	0.0056		ND	0.0069	
2-Hexanone	NS	ND	0.63		ND	0.63		ND	0.0059		ND	0.0056		ND	0.0069	
Tetrachloroethene	1.4	ND	0.13		ND	0.13		ND	0.0012		ND	0.0011		ND	0.0014	
1,1,2,2-Tetrachloroethane	0.6	ND	0.13		ND	0.13		ND	0.0012		ND	0.0011		ND	0.0014	
Toluene	1.5	ND	0.63		ND	0.63		ND	0.0059		ND	0.0056		ND	0.0069	
Chlorobenzene	1.7	ND	0.63		ND	0.63		ND	0.0059		ND	0.0056		ND	0.0069	
Ethylbenzene	5.5	ND	0.51		ND	0.5		ND	0.0047		ND	0.0045		ND	0.0055	
Styrene	NS	ND	0.63		ND	0.63		ND	0.0059		ND	0.0056		ND	0.0069	
Xylene(Total)	1.2	ND	0.63		ND	0.63		ND	0.0059		ND	0.0056		ND	0.0069	
Total VOC Concentration	10	0			0			0.1			0			0		
Total VOC TICs Concentration	NS	83.5		J	68.7		J	0.011		J	0			0		

Notes and Abbreviations

1) Bold concentrations in shaded cells exceed the New York TAGM Recommended Soil Cleanup Objective.
2) All results provided in units of mg/kg.
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'* = Field duplicate samples
I = The compound was detected at a concentration below the MDL and is estimated
/OC TICs = Tentatively identified volatile organic compounds
3 = The compound was detected in an associated method blank
ID = The compound was not detected
)onc = Concentration
)ual = Laboratory Data Qualifier
/IDL = Method Detection Limit
IS = No standard
ng/kg = Milligrams per kilograms

TABLE 2A
SUMMARY OF SOIL SAMPLNIG ANALYTICAL RESULTS - VOCs
SITE 2
HHMT-PORT IVORY FACILITY

Location Field Sample ID Lab Sample Number Sampling Date Matrix	New York TAGM Recommended Soil Cleanup Objective (mg/kg)	TW-76 TW-76-040505S006 621716 04/05/05 SOLID			TW-77 TW-77-040505S004 621717 04/05/05 SOLID			TW-78 TW-78-040505S003 621718 04/05/05 SOLID			TWP-13 033005S002 620685 03/30/05 SOLID			TWP-14 4040105S007 620941 04/01/05 SOLID		
Volatile Organic Compounds (VOCs)		Conc	MDL	Qual	Conc	MDL	Qual	Conc	MDL	Qual	Conc	MDL	Qual	Conc	MDL	Qual
Chloromethane	NS	ND	0.0057		ND	0.006		ND	0.0062		ND	0.0058		ND	0.0062	
Bromomethane	NS	ND	0.0057		ND	0.006		ND	0.0062		ND	0.0058		ND	0.0062	
VinylChloride	0.2	ND	0.0057		ND	0.006		ND	0.0062		ND	0.0058		ND	0.0062	
Chloroethane	1.9	ND	0.0057		ND	0.006		ND	0.0062		ND	0.0058		ND	0.0062	
MethyleneChloride	0.1	ND	0.0034		ND	0.0036		ND	0.0037		0.0005		JB	ND	0.0037	
Acetone	0.2	0.064		B	0.077		B	0.06		B	0.0094		B	0.032		B
CarbonDisulfide	2.7	ND	0.0057		ND	0.006		ND	0.0062		ND	0.0058		0.0035		J
1,1-Dichloroethene	0.4	ND	0.0023		ND	0.0024		ND	0.0025		ND	0.0023		ND	0.0025	
1,1-Dichloroethane	0.2	ND	0.0057		ND	0.006		ND	0.0062		ND	0.0058		ND	0.0062	
trans-1,2-Dichloroethene	0.3	ND	0.0057		ND	0.006		ND	0.0062		ND	0.0058		ND	0.0062	
cis-1,2-Dichloroethene	NS	ND	0.0057		ND	0.006		ND	0.0062		ND	0.0058		ND	0.0062	
Chloroform	0.3	ND	0.0057		ND	0.006		ND	0.0062		ND	0.0058		ND	0.0062	
1,2-Dichloroethane	0.1	ND	0.0023		ND	0.0024		ND	0.0025		ND	0.0023		ND	0.0025	
2-Butanone	0.3	ND	0.0057		ND	0.006		ND	0.0062		ND	0.0058		ND	0.0062	
1,1,1-Trichloroethane	0.8	ND	0.0057		ND	0.006		ND	0.0062		ND	0.0058		ND	0.0062	
CarbonTetrachloride	0.6	ND	0.0023		ND	0.0024		ND	0.0025		ND	0.0023		ND	0.0025	
Bromodichloromethane	NS	ND	0.0011		ND	0.0012		ND	0.0012		ND	0.0012		ND	0.0012	
1,2-Dichloropropane	NS	ND	0.0011		ND	0.0012		ND	0.0012		ND	0.0012		ND	0.0012	
cis-1,3-Dichloropropene	NS	ND	0.0057		ND	0.006		ND	0.0062		ND	0.0058		ND	0.0062	
Trichloroethene	0.7	ND	0.0011		ND	0.0012		ND	0.0012		ND	0.0012		ND	0.0012	
Dibromochloromethane	NS	ND	0.0057		ND	0.006		ND	0.0062		ND	0.0058		ND	0.0062	
1,1,2-Trichloroethane	NS	ND	0.0034		ND	0.0036		ND	0.0037		ND	0.0035		ND	0.0037	
Benzene	0.06	ND	0.0011		ND	0.0012		ND	0.0012		ND	0.0012		ND	0.0012	
trans-1,3-Dichloropropene	NS	ND	0.0057		ND	0.006		ND	0.0062		ND	0.0058		ND	0.0062	
Bromoform	NS	ND	0.0046		ND	0.0048		ND	0.0049		ND	0.0046		ND	0.005	
4-Methyl-2-Pentanone	1	ND	0.0057		ND	0.006		ND	0.0062		ND	0.0058		ND	0.0062	
2-Hexanone	NS	ND	0.0057		ND	0.006		ND	0.0062		ND	0.0058		ND	0.0062	
Tetrachloroethene	1.4	ND	0.0011		ND	0.0012		ND	0.0012		ND	0.0012		ND	0.0012	
1,1,2,2-Tetrachloroethane	0.6	ND	0.0011		ND	0.0012		ND	0.0012		ND	0.0012		ND	0.0012	
Toluene	1.5	ND	0.0057		ND	0.006		ND	0.0062		ND	0.0058		ND	0.0062	
Chlorobenzene	1.7	ND	0.0057		ND	0.006		ND	0.0062		ND	0.0058		ND	0.0062	
Ethylbenzene	5.5	ND	0.0046		ND	0.0048		ND	0.0049		ND	0.0046		ND	0.005	
Styrene	NS	ND	0.0057		ND	0.006		ND	0.0062		ND	0.0058		ND	0.0062	
Xylene(Total)	1.2	ND	0.0057		ND	0.006		ND	0.0062		ND	0.0058		ND	0.0062	
Total VOC Concentration	10	0.064			0.077			0.06			0.0099			0.0355		
Total VOC TICs Concentration	NS	0.023		J	0			0.01		J	0			0.57		J

Notes and Abbreviations

1) Bold concentrations in shaded cells exceed the New York TAGM Recommended Soil Cleanup Objective.

2) All results provided in units of mg/kg.

3) The analytical laboratory initally provided the Reporting Limit (RL) for most samples collected form soil borings TW-37 through TW-52, but subsequently provided the Method Detection Limits (MDLs). Both the RL and MDL are reported for these samples. For all other samples, only the MDL is reporte

* = Field duplicate samples
I = The compound was detected at a concentration below the MDL and is estimated
/OC TICs = Tentatively identified volatile organic compounds
3 = The compound was detected in an associated method blank
ID = The compound was not detected
:onc = Concentration
Jual = Laboratory Data Qualifier
ADL = Method Detection Limit
IS = No standard
ng/kg = Milligrams per kilograms

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TABLE 2A
SUMMARY OF SOIL SAMPLNIG ANALYTICAL RESULTS - VOCs
SITE 2
HHMT-PORT IVORY FACILITY

Location Field Sample ID Lab Sample Number Sampling Date Matrix	New York TAGM Recommended Soil Cleanup Objective (mg/kg)	TWP-14 040105S009 620942 04/01/05 SOLID			Field Blank FB01-032305WQ01 618547 03/23/05 WATER			Field Blank FB01-032405WQ01 618554 03/24/05 WATER			Field Blank 032505WQ01 618776 03/25/05 WATER			Field Blank 032905WQ01 620689 03/29/05 WATER		
Volatile Organic Compounds (VOCs)		Conc	MDL	Qual	Conc	MDL	Qual	Conc	MDL	Qual	Conc	MDL	Qual	Conc	MDL	Qual
Chloromethane	NS	ND	0.0073		ND	5.0		ND	5.0		ND	5.0		ND	0.4	
Bromomethane	NS	ND	0.0073		ND	5.0		ND	5.0		ND	5.0		ND	0.3	
VinylChloride	0.2	ND	0.0073		ND	5.0		ND	5.0		ND	5.0		ND	0.4	
Chloroethane	1.9	ND	0.0073		ND	5.0		ND	5.0		ND	5.0		ND	0.4	
MethyleneChloride	0.1	ND	0.0044		ND	3.0		ND	3.0		ND	3.0		ND	0.9	
Acetone	0.2	ND	0.0073		ND	5.0		ND	5.0		ND	5.0		ND	1.0	
CarbonDisulfide	2.7	ND	0.0073		ND	5.0		ND	5.0		ND	5.0		ND	0.2	
1,1-Dichloroethene	0.4	ND	0.0029		ND	2.0		ND	2.0		ND	2.0		ND	0.3	
1,1-Dichloroethane	0.2	ND	0.0073		ND	5.0		ND	5.0		ND	5.0		ND	0.4	
trans-1,2-Dichloroethene	0.3	ND	0.0073		ND	5.0		ND	5.0		ND	5.0		ND	0.3	
cis-1,2-Dichloroethene	NS	ND	0.0073		ND	5.0		ND	5.0		ND	5.0		ND	0.4	
Chloroform	0.3	ND	0.0073		ND	5.0		ND	5.0		ND	5.0		ND	0.3	
1,2-Dichloroethane	0.1	ND	0.0029		ND	2.0		ND	2.0		ND	2.0		ND	0.4	
2-Butanone	0.3	ND	0.0073		ND	5.0		ND	5.0		ND	5.0		ND	0.9	
1,1,1-Trichloroethane	0.8	ND	0.0073		ND	5.0		ND	5.0		ND	5.0		ND	0.3	
CarbonTetrachloride	0.6	ND	0.0029		ND	2.0		ND	2.0		ND	2.0		ND	0.3	
Bromodichloromethane	NS	ND	0.0014		ND	1.0		ND	1.0		ND	1.0		ND	0.3	
1,2-Dichloropropane	NS	ND	0.0014		ND	1.0		ND	1.0		ND	1.0		ND	0.4	
cis-1,3-Dichloropropene	NS	ND	0.0073		ND	5.0		ND	5.0		ND	5.0		ND	0.3	
Trichloroethene	0.7	ND	0.0014		ND	1.0		ND	1.0		ND	1.0		ND	0.4	
Dibromochloromethane	NS	ND	0.0073		ND	5.0		ND	5.0		ND	5.0		ND	0.2	
1,1,2-Trichloroethane	NS	ND	0.0044		ND	3.0		ND	3.0		ND	3.0		ND	0.3	
Benzene	0.06	ND	0.0014		ND	1.0		ND	1.0		ND	1.0		ND	0.3	
trans-1,3-Dichloropropene	NS	ND	0.0073		ND	5.0		ND	5.0		ND	5.0		ND	0.4	
Bromoform	NS	ND	0.0058		ND	4.0		ND	4.0		ND	4.0		ND	0.3	
4-Methyl-2-Pentanone	1	ND	0.0073		ND	5.0		ND	5.0		ND	5.0		ND	0.4	
2-Hexanone	NS	ND	0.0073		ND	5.0		ND	5.0		ND	5.0		ND	0.9	
Tetrachloroethene	1.4	ND	0.0014		ND	1.0		ND	1.0		ND	1.0		ND	0.4	
1,1,2,2-Tetrachloroethane	0.6	ND	0.0014		ND	1.0		ND	1.0		ND	1.0		ND	0.5	
Toluene	1.5	ND	0.0073		ND	5.0		ND	5.0		ND	5.0		ND	0.3	
Chlorobenzene	1.7	ND	0.0073		ND	5.0		ND	5.0		ND	5.0		ND	0.3	
Ethylbenzene	5.5	ND	0.0058		ND	4.0		ND	4.0		ND	4.0		ND	0.3	
Styrene	NS	ND	0.0073		ND	5.0		ND	5.0		ND	5.0		ND	0.3	
Xylene(Total)	1.2	ND	0.0073		ND	5.0		ND	5.0		ND	5.0		ND	0.2	
Total VOC Concentration	10	0			0			0			0			0		
Total VOC TICs Concentration	NS	0			0			0			0			0		

Notes and Abbreviations

1) Bold concentrations in shaded cells exceed the New York TAGM Recommended Soil Cleanup Objective.
2) All results provided in units of mg/kg.
3) The analytical laboratory initally provided the Reporting Limit (RL) for most samples collected form soil borings TW-37 through TW-52, but subsequently provided the Method Detection Limits (MDLs). Both the RL and MDL are reported for these samples. For all other samples, only the MDL is reporte

'* = Field duplicate samples
J = The compound was detected at a concentration below the MDL and is estimated
VOC TICs = Tentatively identified volatile organic compounds
B = The compound was detected in an associated method blank
ND = The compound was not detected
Conc = Concentration
Qual = Laboratory Data Qualifier
MDL = Method Detection Limit
NS = No standard
mg/kg = Milligrams per kilograms

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TABLE 2A
SUMMARY OF SOIL SAMPLNIG ANALYTICAL RESULTS - VOCs
SITE 2
HHMT-PORT IVORY FACILITY

Location Field Sample ID Lab Sample Number Sampling Date Matrix	New York TAGM Recommended Soil Cleanup Objective (mg/kg)	Field Blank 033005WQ01 620690 03/30/05 WATER		
Volatile Organic Compounds (VOCs)		Conc	MDL	Qual
Chloromethane	NS	ND	0.4	
Bromomethane	NS	ND	0.3	
VinylChloride	0.2	ND	0.4	
Chloroethane	1.9	ND	0.4	
MethyleneChloride	0.1	ND	0.9	
Acetone	0.2	ND	1.0	
CarbonDisulfide	2.7	ND	0.2	
1,1-Dichloroethene	0.4	ND	0.3	
1,1-Dichloroethane	0.2	ND	0.4	
trans-1,2-Dichloroethene	0.3	ND	0.3	
cis-1,2-Dichloroethene	NS	ND	0.4	
Chloroform	0.3	ND	0.3	
1,2-Dichloroethane	0.1	ND	0.4	
2-Butanone	0.3	ND	0.9	
1,1,1-Trichloroethane	0.8	ND	0.3	
CarbonTetrachloride	0.6	ND	0.3	
Bromodichloromethane	NS	ND	0.3	
1,2-Dichloropropane	NS	ND	0.4	
cis-1,3-Dichloropropene	NS	ND	0.3	
Trichloroethene	0.7	ND	0.4	
Dibromochloromethane	NS	ND	0.2	
1,1,2-Trichloroethane	NS	ND	0.3	
Benzene	0.06	ND	0.3	
trans-1,3-Dichloropropene	NS	ND	0.4	
Bromoform	NS	ND	0.3	
4-Methyl-2-Pentanone	1	ND	0.4	
2-Hexanone	NS	ND	0.9	
Tetrachloroethene	1.4	ND	0.4	
1,1,2,2-Tetrachloroethane	0.6	ND	0.5	
Toluene	1.5	ND	0.3	
Chlorobenzene	1.7	ND	0.3	
Ethylbenzene	5.5	ND	0.3	
Styrene	NS	ND	0.3	
Xylene(Total)	1.2	ND	0.2	
Total VOC Concentration	10	0		
Total VOC TICs Concentration	NS	0		

Notes and Abbreviations

1) Bold concentrations in shaded cells exceed the New York TAGM Recommended Soil Cleanup Objective.
2) All results provided in units of mg/kg.
3) The analytical laboratory initally provided the Reporting Limit (RL) for most samples collected form soil borings TW-37 through TW-52, but subsequently provided the Method Detection Limits (MDLs). Both the RL and MDL are reported for these samples. For all other samples, only the MDL is reporte

* = Field duplicate samples
I = The compound was detected at a concentration below the MDL and is estimated
/OC TICs = Tentatively identified volatile organic compounds
3 = The compound was detected in an associated method blank
ID = The compound was not detected
onc = Concentration
ual = Laboratory Data Qualifier
IDL = Method Detection Limit
IS = No standard
ng/kg = Milligrams per kilograms

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SUMMARY OF SOIL SAMPLING ANALYTICAL RESULTS - SVOCs
SITE 2
HHMT-PORT IVORY FACILITY

Location Field Sample ID Lab Sample Number Sampling Date Matrix	New York TAGM Recommended Soil Cleanup Objective (mg/kg)	BLDG20-C1 B20C1-032305S003 618546 03/23/05 SOLID			BLDG20-C2 B20C2-032405S002 618548 03/24/05 SOLID			BLDG32-C1 C1032505S003 618773 03/25/05 SOLID			BLDG32-C2 032505S002 618774 03/25/05 SOLID			BLDG32-C3 032505S003 618775 03/25/05 SOLID			BLDG32-C4 B32C4-032405S002 618549 03/24/05 SOLID			BLDG32-C5 B32C5-032405S002 618550 03/24/05 SOLID		
Semivolatile Organic Compounds (SVOCs)		Conc	MDL	Qual	Conc	MDL	Qual	Conc	MDL	Qual	Conc	MDL	Qual	Conc	MDL	Qual	Conc	MDL	Qual	Conc	MDL	Qual
1,2,4-Trichlorobenzene	3.4	ND	0.042		ND	0.073		ND	0.036		ND	0.036		ND	0.2		ND	0.037		ND	0.072	
1,2-Dichlorobenzene	7.9	ND	0.42		ND	0.73		ND	0.36		ND	0.36		ND	2		ND	0.37		ND	0.72	
1,3-Dichlorobenzene	1.6	ND	0.42		ND	0.73		ND	0.36		ND	0.36		ND	2		ND	0.37		ND	0.72	
1,4-Dichlorobenzene	8.5	ND	0.42		ND	0.73		ND	0.36		ND	0.36		ND	2		ND	0.37		ND	0.72	
2,4,5-Trichlorophenol	0.1	ND	0.42		ND	0.73		ND	0.36		ND	0.36		ND	2		ND	0.37		ND	0.72	
2,4,6-Trichlorophenol	NA	ND	0.42		ND	0.73		ND	0.36		ND	0.36		ND	2		ND	0.37		ND	0.72	
2,4-Dichlorophenol	0.4	ND	0.42		ND	0.73		ND	0.36		ND	0.36		ND	2		ND	0.37		ND	0.72	
2,4-Dimethylphenol	NA	ND	0.42		ND	0.73		ND	0.36		ND	0.36		ND	2		ND	0.37		ND	0.72	
2,4-Dinitrophenol	0.2	ND	1.7		ND	2.9		ND	1.4		ND	1.4		ND	8		ND	1.5		ND	2.9	
2,4-Dinitrotoluene	NA	ND	0.083		ND	0.15		ND	0.073		ND	0.072		ND	0.4		ND	0.075		ND	0.14	
2,6-Dinitrotoluene	1	ND	0.083		ND	0.15		ND	0.073		ND	0.072		ND	0.4		ND	0.075		ND	0.14	
2-Chloronaphthalene	NA	ND	0.42		ND	0.73		ND	0.36		ND	0.36		ND	2		ND	0.37		ND	0.72	
2-Chlorophenol	0.8	ND	0.42		ND	0.73		ND	0.36		ND	0.36		ND	2		ND	0.37		ND	0.72	
2-Methylnaphthalene	36.4	ND	0.42		0.063		J	0.028		J	ND	0.36		0.14		J	0.075		J	ND	0.72	
2-Methylphenol	0.1	ND	0.42		ND	0.73		ND	0.36		ND	0.36		ND	2		ND	0.37		ND	0.72	
2-Nitroaniline	0.43	ND	0.83		ND	1.5		ND	0.73		ND	0.72		ND	4		ND	0.75		ND	1.4	
2-Nitrophenol	0.33	ND	0.42		ND	0.73		ND	0.36		ND	0.36		ND	2		ND	0.37		ND	0.72	
3,3'-Dichlorobenzidine	NA	ND	0.83		ND	1.5		ND	0.73		ND	0.72		ND	4		ND	0.75		ND	1.4	
3-Nitroaniline	0.5	ND	0.83		ND	1.5		ND	0.73		ND	0.72		ND	4		ND	0.75		ND	1.4	
4,6-Dinitro-2-methylphenol	NA	ND	1.7		ND	2.9		ND	1.4		ND	1.4		ND	8		ND	1.5		ND	2.9	
4-Bromophenyl-phenylether	NA	ND	0.42		ND	0.73		ND	0.36		ND	0.36		ND	2		ND	0.37		ND	0.72	
4-Chloro-3-methylphenol	0.24	ND	0.42		ND	0.73		ND	0.36		ND	0.36		ND	2		ND	0.37		ND	0.72	
4-Chloroaniline	0.22	ND	0.42		ND	0.73		ND	0.36		ND	0.36		0.15		J	ND	0.37		ND	0.72	
4-Chlorophenyl-phenylether	NA	ND	0.42		ND	0.73		ND	0.36		ND	0.36		ND	2		ND	0.37		ND	0.72	
4-Methylphenol	0.9	ND	0.42		ND	0.73		ND	0.36		ND	0.36		0.2		J	ND	0.37		ND	0.72	
4-Nitroaniline	NA	ND	0.83		ND	1.5		ND	0.73		ND	0.72		ND	4		ND	0.75		ND	1.4	
4-Nitrophenol	0.1	ND	1.7		ND	2.9		ND	1.4		ND	1.4		ND	8		ND	1.5		ND	2.9	
Acenaphthene	50	ND	0.42		ND	0.73		0.18		J	ND	0.36		0.049		J	0.015		J	0.097		J
Acenaphthylene	41	ND	0.42		0.079		J	0.031		J	ND	0.36		ND	2		0.02		J	0.044		J
Anthracene	50	ND	0.42		0.078		J	0.14		J	0.02		J	0.096		J	0.029		J	0.12		J
Benzo(a)anthracene	0.224	0.0085		J	0.089			0.21			0.059			0.21			0.066			**0.27**		
Benzo(a)pyrene	0.061	0.0093		J	**0.1**			**0.19**			**0.085**			**0.21**			**0.066**			**0.24**		
Benzo(b)fluoranthene	1.1	0.013		J	0.12			0.24			0.1			0.28			0.078			0.27		
Benzo(g,h,i)perylene	50	0.011		J	0.15		J	ND	0.36		ND	0.36		ND	2		0.045		J	0.1		J
Benzo(k)fluoranthene	1.1	0.01		J	0.12			0.26			0.12			0.29			0.08			0.31		
bis(2-Chloroethoxy)methane	NA	ND	0.42		ND	0.73		ND	0.36		ND	0.36		ND	2		ND	0.37		ND	0.72	
bis(2-Chloroethyl)ether	NA	ND	0.042		ND	0.073		ND	0.036		ND	0.036		ND	0.2		ND	0.037		ND	0.072	
bis(2-chloroisopropyl)ether	NA	ND	0.42		ND	0.73		ND	0.36		ND	0.36		ND	2		ND	0.37		ND	0.72	
bis(2-Ethylhexyl)phthalate	50	ND	0.42		ND	0.73		0.19		J	0.084		J	ND	2		0.083		J	0.15		J
Butylbenzylphthalate	50	ND	0.42		ND	0.73		ND	0.36		ND	0.36		ND	2		ND	0.37		ND	0.72	
Carbazole	NA	ND	0.42		0.023		J	0.048		J	ND	0.36		ND	2		0.0081		J	0.035		J
Chrysene	0.4	0.013		J	0.14		J	0.26		J	0.086		J	0.33		J	0.1		J	0.35		J
Dibenz(a,h)anthracene	0.014	ND	0.042		ND	0.073		ND	0.036		ND	0.036		ND	0.2		ND	0.037		**0.044**		J
Dibenzofuran	6.2	ND	0.42		ND	0.73		0.1		J	ND	0.36		0.061		J	0.02		J	0.038		J
Diethylphthalate	7.1	ND	0.42		ND	0.73		ND	0.36		ND	0.36		ND	2		ND	0.37		ND	0.72	
Dimethylphthalate	2	ND	0.42		ND	0.73		ND	0.36		ND	0.36		ND	2		ND	0.37		ND	0.72	
Di-n-butylphthalate	8.1	ND	0.42		ND	0.73		ND	0.36		ND	0.36		ND	2		ND	0.37		ND	0.72	
Di-n-octylphthalate	50	ND	0.42		ND	0.73		ND	0.36		ND	0.36		ND	2		ND	0.37		ND	0.72	
Fluoranthene	50	0.017		J	0.12		J	0.54			0.07		J	0.31		J	0.12		J	0.61		J
Fluorene	50	ND	0.42		ND	0.73		0.14		J	ND	0.36		ND	2		0.017		J	0.036		J
Hexachlorobenzene	0.41	ND	0.042		ND	0.073		ND	0.036		ND	0.036		ND	0.2		ND	0.037		ND	0.072	
Hexachlorobutadiene	NA	ND	0.083		ND	0.15		ND	0.073		ND	0.072		ND	0.4		ND	0.075		ND	0.14	
Hexachlorocyclopentadiene	NA	ND	0.42		ND	0.73		ND	0.36		ND	0.36		ND	2		ND	0.37		ND	0.72	
Hexachloroethane	NA	ND	0.042		ND	0.073		ND	0.036		ND	0.036		ND	0.2		ND	0.037		ND	0.072	
Indeno(1,2,3-cd)pyrene	3.2	ND	0.042		0.067		J	ND	0.036		ND	0.036		ND	0.2		0.039			0.096		
Isophorone	4.4	ND	0.42		ND	0.73		ND	0.36		ND	0.36		ND	2		ND	0.37		ND	0.72	
Naphthalene	13	ND	0.42		0.042		J	0.023		J	ND	0.36		0.13		J	0.045		J	ND	0.72	
Nitrobenzene	0.2	ND	0.042		ND	0.073		ND	0.036		ND	0.036		ND	0.2		ND	0.037		ND	0.072	
N-Nitroso-di-n-propylamine	NA	ND	0.042		ND	0.073		ND	0.036		ND	0.036		ND	0.2		ND	0.037		ND	0.072	
N-Nitrosodiphenylamine	NA	ND	0.42		ND	0.73		ND	0.36		ND	0.36		ND	2		ND	0.37		ND	0.72	
Pentachlorophenol	1	ND	1.7		ND	2.9		ND	1.4		ND	1.4		ND	8		ND	1.5		ND	2.9	
Phenanthrene	50	ND	0.42		0.072		J	0.49			0.024		J	0.27		J	0.088		J	0.28		J
Phenol	0.03	ND	0.42		ND	0.73		ND	0.36		ND	0.36		ND	2		ND	0.37		ND	0.72	
Pyrene	50	0.018		J	0.19		J	1.1			0.16		J	0.41		J	0.13		J	0.78		
Total SVOC Concentration	500	0.0998			1.453			4.17			0.808			3.136			1.1241			3.87		
Total SVOC TICs Concentration	NS	5.76		J	0.043		J	5.41		J	3.29		J	281.4		J	1.54		J	2.66		J

Notes and Abbreviations

1) Bold concentrations in shaded cells exceed the New York TAGM Recommended Soil Cleanup Objective.

2) All results provided in units of mg/kg.

3) The analytical laboratory initially provided the Reporting Limit (RL) for most samples collected form soil borings TW-37 through TW-52, but subsequently provided the Method Detection Limits (MDLs). Both the RL and MDL are reported for these samples. For all other samples, only the MDL is reported.

J - The compound was detected at a concentration below the MDL and is estimated
** = Field duplicate samples
SVOC TICs = Tentatively identified semivolatile organic compounds
ND = The compound was not detected
Conc = Concentration
Qual = Laboratory Data Qualifier
MDL = Method Detection Limit
NS = No standard
mg/kg = Milligrams per kilograms

TA[illegible]
SUMMARY OF SOIL SAMPLIN[illegible]LYTICAL RESULTS - SVOCs
SITE 2
HHMT-PORT IVORY FACILITY

Location Field Sample ID Lab Sample Number Sampling Date Matrix	New York TAGM Recommended Soil Cleanup Objective (mg/kg)	STAIN03-C1 STA03C1-032405S3 618551 03/24/05 SOLID			STAIN03-C2 STA03C2-032405S2 618552 03/24/05 SOLID			STAIN03-C3 STA03C3-032405S3 618553 03/24/05 SOLID			UST7-C1 032905S004 620681 03/29/05 SOLID			UST7-C2 032905S006 620682 03/29/05 SOLID			UST7-C3 033005S006 620684 03/30/05 SOLID			UST7-C4 032905S005 620683 03/29/05 SOLID			UST7-C5 032505S006 618771 03/25/05 SOLID		
Semivolatile Organic Compounds (SVOCs)		Conc	MDL	Qual	Conc	MDL	Qual	Conc	MDL	Qual	Conc	MDL	Qual	Conc	MDL	Qual	Conc	MDL	Qual	Conc	MDL	Qual	Conc	MDL	Qual
1,2,4-Trichlorobenzene	3.4	ND	0.075		ND	0.072		ND	0.038		ND	0.037		ND	0.14		ND	0.038		ND	0.079		ND	0.038	
1,2-Dichlorobenzene	7.9	ND	0.75		ND	0.72		ND	0.38		ND	0.37		ND	1.4		ND	0.38		ND	0.79		ND	0.38	
1,3-Dichlorobenzene	1.6	ND	0.75		ND	0.72		ND	0.38		ND	0.37		ND	1.4		ND	0.38		ND	0.79		ND	0.38	
1,4-Dichlorobenzene	8.5	ND	0.75		ND	0.72		ND	0.38		ND	0.37		ND	1.4		ND	0.38		ND	0.79		ND	0.38	
2,4,5-Trichlorophenol	0.1	ND	0.75		ND	0.72		ND	0.38		ND	0.37		ND	1.4		ND	0.38		ND	0.79		ND	0.38	
2,4,6-Trichlorophenol	NA	ND	0.75		ND	0.72		ND	0.38		ND	0.37		ND	1.4		ND	0.38		ND	0.79		ND	0.38	
2,4-Dichlorophenol	0.4	ND	0.75		ND	0.72		ND	0.38		ND	0.37		ND	1.4		ND	0.38		ND	0.79		ND	0.38	
2,4-Dimethylphenol	NA	ND	0.75		ND	0.72		ND	0.38		ND	0.37		ND	1.4		ND	0.38		ND	0.79		ND	0.38	
2,4-Dinitrophenol	0.2	ND	3		ND	2.9		ND	1.5		ND	1.5		ND	5.6		ND	1.5		ND	3.2		ND	1.5	
2,4-Dinitrotoluene	NA	ND	0.15		ND	0.14		ND	0.077		ND	0.075		ND	0.28		ND	0.076		ND	0.16		ND	0.075	
2,6-Dinitrotoluene	1	ND	0.15		ND	0.14		ND	0.077		ND	0.075		ND	0.28		ND	0.076		ND	0.16		ND	0.075	
2-Chloronaphthalene	NA	ND	0.75		ND	0.72		ND	0.38		ND	0.37		ND	1.4		ND	0.38		ND	0.79		ND	0.38	
2-Chlorophenol	0.8	ND	0.75		ND	0.72		ND	0.38		ND	0.37		ND	1.4		ND	0.38		ND	0.79		ND	0.38	
2-Methylnaphthalene	36.4	0.14		J	0.36		J	0.14		J	0.022		J	ND	1.4		0.45			7.4			0.22		J
2-Methylphenol	0.1	ND	0.75		0.02		J	ND	0.38		ND	0.37		ND	1.4		ND	0.38		ND	0.79		ND	0.38	
2-Nitroaniline	0.43	ND	1.5		ND	1.4		ND	0.77		ND	0.75		ND	2.8		ND	0.76		ND	1.6		ND	0.75	
2-Nitrophenol	0.33	ND	0.75		ND	0.72		ND	0.38		ND	0.37		ND	1.4		ND	0.38		ND	0.79		ND	0.38	
3,3'-Dichlorobenzidine	NA	ND	1.5		ND	1.4		ND	0.77		ND	0.75		ND	2.8		ND	0.76		ND	1.6		ND	0.75	
3-Nitroaniline	0.5	ND	1.5		ND	1.4		ND	0.77		ND	0.75		ND	2.8		ND	0.76		ND	1.6		ND	0.75	
4,6-Dinitro-2-methylphenol	NA	ND	3		ND	2.9		ND	1.5		ND	1.5		ND	5.6		ND	1.5		ND	3.2		ND	1.5	
4-Bromophenyl-phenylether	NA	ND	0.75		ND	0.72		ND	0.38		ND	0.37		ND	1.4		ND	0.38		ND	0.79		ND	0.38	
4-Chloro-3-methylphenol	0.24	ND	0.75		ND	0.72		ND	0.38		ND	0.37		ND	1.4		ND	0.38		ND	0.79		ND	0.38	
4-Chloroaniline	0.22	ND	0.75		ND	0.72		ND	0.38		ND	0.37		ND	1.4		0.029		J	ND	0.79		ND	0.38	
4-Chlorophenyl-phenylether	NA	ND	0.75		ND	0.72		ND	0.38		ND	0.37		ND	1.4		ND	0.38		ND	0.79		ND	0.38	
4-Methylphenol	0.9	ND	0.75		0.045		J	0.049		J	ND	0.37		ND	1.4		0.014		J	ND	0.79		0.0077		J
4-Nitroaniline	NA	ND	1.5		ND	1.4		ND	0.77		ND	0.75		ND	2.8		ND	0.76		ND	1.6		ND	0.75	
4-Nitrophenol	0.1	ND	3		ND	2.9		ND	1.5		ND	1.5		ND	5.6		ND	1.5		ND	3.2		ND	1.5	
Acenaphthene	50	0.046		J	0.051		J	0.011		J	0.02		J	0.52		J	0.21		J	0.5		J	0.11		J
Acenaphthylene	41	0.51		J	0.36		J	0.1		J	0.012		J	ND	1.4		0.22		J	ND	0.79		0.12		J
Anthracene	50	0.58		J	0.32		J	0.14		J	0.023		J	0.91		J	0.48			1.1			0.33		J
Benzo(a)anthracene	0.224	**1.3**			**0.68**			**0.28**			0.052			**0.29**			**0.52**			**0.32**			**0.42**		
Benzo(a)pyrene	0.061	**1.4**			**0.66**			**0.24**			0.044			**0.2**			**0.53**			**0.34**			**0.45**		
Benzo(b)fluoranthene	1.1	**1.5**			0.94			0.31			0.046			0.08		J	0.67			ND	0.079		0.65		
Benzo(g,h,i)perylene	50	0.57		J	0.29		J	0.16		J	0.039		J	0.22		J	0.38			0.21		J	0.13		J
Benzo(k)fluoranthene	1.1	**1.8**			0.9			0.33			0.047			0.061		J	0.64			ND	0.079		0.62		
bis(2-Chloroethoxy)methane	NA	ND	0.75		ND	0.72		ND	0.38		ND	0.37		ND	1.4		ND	0.38		ND	0.79		ND	0.38	
bis(2-Chloroethyl)ether	NA	ND	0.075		ND	0.072		ND	0.038		ND	0.037		ND	0.14		ND	0.038		ND	0.079		ND	0.038	
bis(2-chloroisopropyl)ether	NA	ND	0.75		ND	0.72		ND	0.38		ND	0.37		ND	1.4		ND	0.38		ND	0.79		ND	0.38	
bis(2-Ethylhexyl)phthalate	50	ND	0.75		ND	0.72		ND	0.38		0.2		J	ND	1.4		0.11		J	ND	0.79		0.15		J
Butylbenzylphthalate	50	ND	0.75		ND	0.72		ND	0.38		ND	0.37		ND	1.4		ND	0.38		ND	0.79		ND	0.38	
Carbazole	NA	0.077		J	0.086		J	0.027		J	0.013		J	ND	1.4		0.13		J	ND	0.79		0.04		J
Chrysene	0.4	**2**			**0.81**			**0.51**			0.074		J	**0.65**		J	**0.8**			**0.51**		J	**0.8**		
Dibenz(a,h)anthracene	0.014	**0.23**			**0.098**			**0.076**			**0.015**		J	ND	0.14		**0.12**			**0.019**		J	ND	0.038	
Dibenzofuran	6.2	0.068		J	0.12		J	0.051		J	0.016		J	ND	1.4		0.26		J	ND	0.79		0.079		J
Diethylphthalate	7.1	ND	0.75		ND	0.72		ND	0.38		ND	0.37		ND	1.4		ND	0.38		ND	0.79		ND	0.38	
Dimethylphthalate	2	ND	0.75		ND	0.72		ND	0.38		ND	0.37		ND	1.4		ND	0.38		ND	0.79		ND	0.38	
Di-n-butylphthalate	8.1	ND	0.75		ND	0.72		ND	0.38		ND	0.37		ND	1.4		ND	0.38		ND	0.79		ND	0.38	
Di-n-octylphthalate	50	ND	0.75		ND	0.72		ND	0.38		ND	0.37		ND	1.4		ND	0.38		ND	0.79		0.2		J
Fluoranthene	50	1.4			1.4			0.41			0.11		J	0.54		J	1			0.53		J	0.62		
Fluorene	50	0.041		J	0.05		J	0.018		J	0.02		J	1.2		J	0.2		J	1.3			0.2		J
Hexachlorobenzene	0.41	ND	0.075		ND	0.072		ND	0.038		ND	0.037		ND	0.14		ND	0.038		ND	0.079		ND	0.038	
Hexachlorobutadiene	NA	ND	0.15		ND	0.14		ND	0.077		ND	0.075		ND	0.28		ND	0.076		ND	0.16		ND	0.075	
Hexachlorocyclopentadiene	NA	ND	0.75		ND	0.72		ND	0.38		ND	0.37		ND	1.4		ND	0.38		ND	0.79		ND	0.38	
Hexachloroethane	NA	ND	0.075		ND	0.072		ND	0.038		ND	0.037		ND	0.14		ND	0.038		ND	0.079		ND	0.038	
Indeno(1,2,3-cd)pyrene	3.2	0.55			0.2			0.16			0.029		J	0.067		J	0.32			0.063		J	0.12		
Isophorone	4.4	ND	0.75		ND	0.72		ND	0.38		ND	0.37		ND	1.4		ND	0.38		ND	0.79		ND	0.38	
Naphthalene	13	0.27		J	0.72		J	0.34		J	0.05		J	ND	1.4		0.38			0.38		J	0.17		J
Nitrobenzene	0.2	ND	0.075		ND	0.072		ND	0.038		ND	0.037		ND	0.14		ND	0.038		ND	0.079		ND	0.038	
N-Nitroso-di-n-propylamine	NA	ND	0.075		ND	0.072		ND	0.038		ND	0.037		ND	0.14		ND	0.038		ND	0.079		ND	0.038	
N-Nitrosodiphenylamine	NA	ND	0.75		ND	0.72		ND	0.38		ND	0.37		ND	1.4		ND	0.38		ND	0.79		ND	0.38	
Pentachlorophenol	1	ND	3		ND	2.9		ND	1.5		ND	1.5		ND	5.6		ND	1.5		ND	3.2		ND	1.5	
Phenanthrene	50	0.3		J	0.4		J	0.33		J	0.076		J	1.5			0.95			4.6			0.43		
Phenol	0.03	ND	0.75		**0.08**		J	ND	0.38		ND	0.37		ND	1.4		ND	0.38		ND	0.79		ND	0.38	
Pyrene	50	1.9			1.2			0.38		J	0.11		J	2.5			1.2			3			2		
Total SVOC Concentration	500	14.482			9.79			4.062			1.018			8.738			9.613			20.272			7.6667		
Total SVOC TICs Concentration	NS	4.44		J	8.28		J	12.72			4.12			156			8.68		J	101.6		J	34.26		J

Notes and Abbreviations

1) Bold concentrations in shaded cells exceed the New York TAGM Recommended Soil Cleanup Objective.
2) All results provided in units of mg/kg.
3) The analytical laboratory initally provided the Reporting Limit (RL) for most samples collected form soil borings TW-37 through TW-52, but subsequently provided the Method Detection Limits (MDLs). Both the RL and MDL are reported for these samples. For all other samples, only the MDL is repor

J - The compound was detected at a concentration below the MDL and is estimated
** = Field duplicate samples
SVOC TICs = Tentatively identified semivolatile organic compoun
ND = The compound was not detected
Conc = Concentration
Qual = Laboratory Data Qualifier
MDL = Method Detection Limit
NS = No standard
mg/kg = Milligrams per kilograms

TA[illegible]

SUMMARY OF SOIL SAMPLING A[illegible]YTICAL RESULTS - SVOCs

SITE 2

HHMT-PORT IVORY FACILITY

Location	New York TAGM Recommended Soil Cleanup Objective (mg/kg)	UST7-C6			TW-37				TW-38				TW-40B**				TW-40B**				TW-40B			
Field Sample ID		032505S005			TW-37-122304S012				TW-38-122304S011				TP40B-120904SO06				40B-120904SO06D				TP40B120904SO12			
Lab Sample Number		618772			596210				596211				592644				592645				592646			
Sampling Date		03/25/05			12/23/04				12/23/04				12/09/04				12/09/04				12/09/04			
Matrix		SOLID			SOLID				SOLID				SOLID				SOLID				SOLID			
Semivolatile Organic Compounds (SVOCs)		Conc	MDL	Qual	Conc	RL	Qual	MDL Rev	Conc	RL	Qual	MDL Rev	Conc	RL	Qual	MDL Rev	Conc	RL	Qual	MDL Rev	Conc	RL	Qual	MDL Rev
1,2,4-Trichlorobenzene	3.4	ND	0.079		ND	0.3		0.22	ND	0.054		0.04	ND	0.086		0.063	ND	0.2		0.15	ND	0.068		0.05
1,2-Dichlorobenzene	7.9	ND	0.79		ND	3		0.35	ND	0.54		0.063	ND	0.86		0.1	ND	2		0.23	ND	0.68		0.079
1,3-Dichlorobenzene	1.6	ND	0.79		ND	3		0.38	ND	0.54		0.069	ND	0.86		0.11	ND	2		0.26	ND	0.68		0.087
1,4-Dichlorobenzene	8.5	ND	0.79		ND	3		0.32	ND	0.54		0.057	ND	0.86		0.091	ND	2		0.21	ND	0.68		0.072
2,4,5-Trichlorophenol	0.1	ND	0.79		ND	3		0.57	ND	0.54		0.1	ND	0.86		0.16	ND	2		0.38	ND	0.68		0.13
2,4,6-Trichlorophenol	NA	ND	0.79		ND	3		0.15	ND	0.54		0.025	ND	0.86		0.042	ND	2		0.098	ND	0.68		0.033
2,4-Dichlorophenol	0.4	ND	0.79		ND	3		0.39	ND	0.54		0.071	ND	0.86		0.11	ND	2		0.26	ND	0.68		0.089
2,4-Dimethylphenol	NA	ND	0.79		ND	3		0.28	ND	0.54		0.05	ND	0.86		0.079	ND	2		0.18	ND	0.68		0.063
2,4-Dinitrophenol	0.2	ND	3.1		ND	12		0.41	ND	2.2		0.075	ND	3.4		0.12	ND	8.1		0.28	ND	2.7		0.092
2,4-Dinitrotoluene	NA	ND	0.16		ND	0.6		0.12	ND	0.11		0.022	ND	0.17		0.035	ND	0.4		0.082	ND	0.14		0.029
2,6-Dinitrotoluene	1	ND	0.16		ND	0.6		0.12	ND	0.11		0.022	ND	0.17		0.033	ND	0.4		0.078	ND	0.14		0.027
2-Chloronaphthalene	NA	ND	0.79		ND	3		0.44	ND	0.54		0.079	ND	0.86		0.12	ND	2		0.29	ND	0.68		0.099
2-Chlorophenol	0.8	ND	0.79		ND	3		0.37	ND	0.54		0.067	ND	0.86		0.11	ND	2		0.25	ND	0.68		0.084
2-Methylnaphthalene	36.4	ND	0.79		ND	3		0.14	1.1			0.025	0.098		J	0.04	0.051		J	0.094	0.16		J	0.032
2-Methylphenol	0.1	ND	0.79		ND	3		0.27	ND	0.54		0.049	ND	0.86		0.078	ND	2		0.18	ND	0.68		0.062
2-Nitroaniline	0.43	ND	1.6		ND	6		0.21	ND	1.1		0.039	ND	1.7		0.061	ND	4		0.14	ND	1.4		0.05
2-Nitrophenol	0.33	ND	0.79		ND	3		0.3	ND	0.54		0.055	ND	0.86		0.087	ND	2		0.2	ND	0.68		0.069
3,3'-Dichlorobenzidine	NA	ND	1.6		ND	6		1.2	ND	1.1		0.22	ND	1.7		0.34	ND	4		0.81	ND	1.4		0.28
3-Nitroaniline	0.5	ND	1.6		ND	6		0.18	ND	1.1		0.032	ND	1.7		0.05	ND	4		0.12	ND	1.4		0.041
4,6-Dinitro-2-methylphenol	NA	ND	3.1		ND	12		0.43	ND	2.2		0.078	ND	3.4		0.12	ND	8.1		0.29	ND	2.7		0.096
4-Bromophenyl-phenylether	NA	ND	0.79		ND	3		0.16	ND	0.54		0.029	ND	0.86		0.047	ND	2		0.11	ND	0.68		0.037
4-Chloro-3-methylphenol	0.24	ND	0.79		ND	3		0.26	ND	0.54		0.047	ND	0.86		0.074	ND	2		0.17	ND	0.68		0.059
4-Chloroaniline	0.22	ND	0.79		ND	3		0.36	ND	0.54		0.064	ND	0.86		0.1	ND	2		0.24	ND	0.68		0.081
4-Chlorophenyl-phenylether	NA	ND	0.79		ND	3		0.17	ND	0.54		0.03	ND	0.86		0.048	ND	2		0.11	ND	0.68		0.038
4-Methylphenol	0.9	ND	0.79		ND	3		0.3	ND	0.54		0.054	0.054		J	0.085	ND	2		0.2	0.05		J	0.068
4-Nitroaniline	NA	ND	1.6		ND	6		0.14	ND	1.1		0.026	ND	1.7		0.041	ND	4		0.096	ND	1.4		0.034
4-Nitrophenol	0.1	ND	3.1		ND	12		0.091	ND	2.2		0.017	ND	3.4		0.026	ND	8.1		0.062	ND	2.7		0.02
Acenaphthene	50	0.15		J	ND	3		0.025	1.1			0.0046	ND	0.86		0.0073	ND	2		0.017	0.049		J	0.0058
Acenaphthylene	41	ND	0.79		ND	3		0.025	0.059		J	0.0046	0.069		J	0.0073	ND	2		0.017	ND	0.68		0.0058
Anthracene	50	0.23		J	ND	3		0.023	0.31		J	0.0042	0.16		J	0.0066	0.066		J	0.015	0.074		J	0.0062
Benzo(a)anthracene	0.224	0.048		J	0.18		J	0.082	0.21			0.015	**0.32**			0.024	0.1		J	0.055	**0.39**			0.018
Benzo(a)pyrene	0.061	0.037		J	**0.31**			0.022	**0.15**			0.004	**0.16**			0.0064	**0.08**		J	0.015	**0.71**			0.005
Benzo(b)fluoranthene	1.1	ND	0.079		0.26		J	0.023	0.15			0.0042	0.34			0.0066	0.09		J	0.015	0.28			0.0052
Benzo(g,h,i)perylene	50	ND	0.79		0.75		J	0.032	0.11		J	0.0058	0.13		J	0.0092	0.065		J	0.021	0.31		J	0.0073
Benzo(k)fluoranthene	1.1	ND	0.079		0.34			0.031	0.16			0.0056	0.33			0.009	0.1		J	0.021	0.38			0.0071
bis(2-Chloroethoxy)methane	NA	ND	0.79		ND	3		0.21	ND	0.54		0.039	ND	0.86		0.062	ND	2		0.14	ND	0.68		0.049
bis(2-Chloroethyl)ether	NA	ND	0.079		ND	0.3		0.24	ND	0.054		0.044	ND	0.086		0.069	ND	0.2		0.16	ND	0.068		0.055
bis(2-chloroisopropyl)ether	NA	ND	0.79		ND	3		0.19	ND	0.54		0.035	ND	0.86		0.055	ND	2		0.13	ND	0.68		0.044
bis(2-Ethylhexyl)phthalate	50	ND	0.79		ND	3		0.18	0.17		J	0.033	1.9			0.052	0.48		J	0.12	0.17		J	0.041
Butylbenzylphthalate	50	ND	0.79		ND	3		0.12	ND	0.54		0.022	ND	0.86		0.035	ND	2		0.081	ND	0.68		0.028
Carbazole	NA	ND	0.79		ND	3		0.022	0.21		J	0.004	ND	0.86		0.0063	ND	2		0.015	0.02		J	0.005
Chrysene	0.4	0.11		J	0.23		J	0.037	0.33		J	0.0067	**0.58**		J	0.011	0.2		J	0.025	**0.55**		J	0.0084
Dibenz(a,h)anthracene	0.014	ND	0.079		**0.5**			0.02	**0.029**		J	0.0036	**0.049**		J	0.0057	ND	0.2		0.013	ND	0.068		0.0045
Dibenzofuran	6.2	ND	0.79		ND	3		0.15	0.66			0.028	0.055		J	0.044	ND	2		0.1	0.046		J	0.035
Diethylphthalate	7.1	ND	0.79		ND	3		0.081	ND	0.54		0.014	ND	0.86		0.023	ND	2		0.054	ND	0.68		0.018
Dimethylphthalate	2	ND	0.79		ND	3		0.13	ND	0.54		0.023	0.53		J	0.037	ND	2		0.086	ND	0.68		0.029
Di-n-butylphthalate	8.1	ND	0.79		ND	3		0.087	ND	0.54		0.016	ND	0.86		0.025	ND	2		0.058	ND	0.68		0.02
Di-n-octylphthalate	50	ND	0.79		ND	3		0.13	ND	0.54		0.024	ND	0.86		0.038	ND	2		0.09	ND	0.68		0.03
Fluoranthene	50	0.067		J	0.13		J	0.0097	0.81			0.0018	0.54		J	0.0028	0.39		J	0.0065	0.38		J	0.0022
Fluorene	50	0.28		J	ND	3		0.021	0.77			0.0037	0.12		J	0.0059	0.16		J	0.014	0.044		J	0.0047
Hexachlorobenzene	0.41	ND	0.079		ND	0.3		0.11	ND	0.054		0.02	ND	0.086		0.032	ND	0.2		0.074	ND	0.068		0.025
Hexachlorobutadiene	NA	ND	0.16		ND	0.6		0.28	ND	0.11		0.051	ND	0.17		0.079	ND	0.4		0.19	ND	0.14		0.065
Hexachlorocyclopentadiene	NA	ND	0.79		ND	3		0.19	ND	0.54		0.034	ND	0.86		0.054	ND	2		0.13	ND	0.68		0.043
Hexachloroethane	NA	ND	0.079		ND	0.3		0.11	ND	0.054		0.019	ND	0.086		0.031	ND	0.2		0.072	ND	0.068		0.024
Indeno(1,2,3-cd)pyrene	3.2	ND	0.079		0.61			0.02	0.073			0.0035	0.083		J	0.0056	ND	0.2		0.013	0.13			0.0044
Isophorone	4.4	ND	0.79		ND	3		0.23	ND	0.54		0.041	ND	0.86		0.065	ND	2		0.15	ND	0.68		0.052
Naphthalene	13	ND	0.79		ND	3		0.026	0.17		J	0.0048	0.098		J	0.0076	0.083		J	0.018	0.21		J	0.006
Nitrobenzene	0.2	ND	0.079		ND	0.3		0.17	ND	0.054		0.031	ND	0.086		0.049	ND	0.2		0.11	ND	0.068		0.038
N-Nitroso-di-n-propylamine	NA	ND	0.079		ND	0.3		0.11	ND	0.054		0.02	ND	0.086		0.032	ND	0.2		0.075	ND	0.068		0.026
N-Nitrosodiphenylamine	NA	ND	0.79		ND	3		0.14	ND	0.54		0.025	ND	0.86		0.04	ND	2		0.092	ND	0.68		0.031
Pentachlorophenol	1	ND	3.1		ND	12		0.55	ND	2.2		0.1	ND	3.4		0.16	ND	8.1		0.37	ND	2.7		0.12
Phenanthrene	50	0.2		J	0.13		J	0.028	1.4			0.005	0.29		J	0.0079	0.16		J	0.018	0.16		J	0.0063
Phenol	0.03	ND	0.79		ND	3		0.4	ND	0.54		0.072	ND	0.86		0.12	ND	2		0.27	ND	0.68		0.091
Pyrene	50	0.34		J	0.15		J	0.021	0.74			0.0038	0.8		J	0.0061	0.38		J	0.014	1.7			0.0048
Total SVOC Concentration	500	1.462			3.59				8.711				6.686				2.405				5.813			
Total SVOC TICs Concentration	NS	68.7		J	255.6			J	24.37			J	NA				NA				NA			

Notes and Abbreviations

1) Bold concentrations in shaded cells exceed the New York TAGM Recommended Soil Cleanup Objective.

2) All results provided in units of mg/kg

3) The analytical laboratory initally provided the Reporting Limit (RL) for most samples collected form soil borings TW-37 through TW-52, but subsequently provided the Method Detection Limits (MDLs). Both the RL and MDL are reported for these samples. For all other samples, only the MDL is repor

J - The compound was detected at a concentration below the MDL and is estimated

** = Field duplicate samples

SVOC TICs = Tentatively identified semivolatile organic compoun

ND = The compound was not detected

Conc = Concentration

Qual = Laboratory Data Qualifier

MDL = Method Detection Limit

NS = No standard

mg/kg = Milligrams per kilograms

TABLE

SUMMARY OF SOIL SAMPLING ANALYTICAL RESULTS - SVOCs
SITE 2
HHMT-PORT IVORY FACILITY

Location Field Sample ID Lab Sample Number Sampling Date Matrix	New York TAGM Recommended Soil Cleanup Objective (mg/kg)	TW-43A TW43A-120804SO10 592638 12/08/04 SOLID				TW-45 TW-45-122204S003 596205 12/22/04 SOLID				TW-47 TW-47-122204S007 596206 12/22/04 SOLID				TW-47 TW-47-122204S017 596207 12/22/04 SOLID				TW-48 TW-48-122304S016 596212 12/23/04 SOLID			
Semivolatile Organic Compounds (SVOCs)		Conc	RL	Qual	MDL Rev	Conc	RL	Qual	MDL Rev	Conc	RL	Qual	MDL Rev	Conc	RL	Qual	MDL Rev	Conc	RL	Qual	MDL Rev
1,2,4-Trichlorobenzene	3.4	ND	0.1		0.073	ND	0.038		0.028	ND	0.08		0.059	ND	0.04		0.029	ND	0.039		0.029
1,2-Dichlorobenzene	7.9	ND	1		0.12	ND	0.38		0.044	ND	0.8		0.093	ND	0.4		0.046	ND	0.39		0.045
1,3-Dichlorobenzene	1.6	ND	1		0.13	ND	0.38		0.048	ND	0.8		0.1	ND	0.4		0.051	ND	0.39		0.05
1,4-Dichlorobenzene	8.5	ND	1		0.1	ND	0.38		0.04	ND	0.8		0.085	ND	0.4		0.042	ND	0.39		0.041
2,4,5-Trichlorophenol	0.1	ND	1		0.19	ND	0.38		0.072	ND	0.8		0.15	ND	0.4		0.076	ND	0.39		0.074
2,4,6-Trichlorophenol	NA	ND	1		0.049	ND	0.38		0.018	ND	0.8		0.039	ND	0.4		0.02	ND	0.39		0.019
2,4-Dichlorophenol	0.4	ND	1		0.13	ND	0.38		0.05	ND	0.8		0.1	ND	0.4		0.052	ND	0.39		0.051
2,4-Dimethylphenol	NA	ND	1		0.092	ND	0.38		0.035	ND	0.8		0.074	ND	0.4		0.037	ND	0.39		0.036
2,4-Dinitrophenol	0.2	ND	4.1		0.14	ND	1.5		0.051	ND	3.2		0.11	ND	1.6		0.054	ND	1.6		0.054
2,4-Dinitrotoluene	NA	ND	0.2		0.041	ND	0.077		0.016	ND	0.16		0.033	ND	0.079		0.016	ND	0.079		0.016
2,6-Dinitrotoluene	1	ND	0.2		0.039	ND	0.077		0.015	ND	0.16		0.031	ND	0.079		0.015	ND	0.079		0.015
2-Chloronaphthalene	NA	ND	1		0.14	ND	0.38		0.055	ND	0.8		0.12	ND	0.4		0.058	ND	0.39		0.057
2-Chlorophenol	0.8	ND	1		0.12	ND	0.38		0.047	ND	0.8		0.099	ND	0.4		0.05	ND	0.39		0.048
2-Methylnaphthalene	36.4	0.078		J	0.047	0.083		J	0.018	1.2			0.038	ND	0.4		0.019	ND	0.39		0.018
2-Methylphenol	0.1	ND	1		0.091	ND	0.38		0.034	ND	0.8		0.073	ND	0.4		0.036	ND	0.39		0.035
2-Nitroaniline	0.43	ND	2		0.072	ND	0.77		0.028	ND	1.6		0.057	ND	0.79		0.028	ND	0.79		0.028
2-Nitrophenol	0.33	ND	1		0.1	ND	0.38		0.038	ND	0.8		0.081	ND	0.4		0.04	ND	0.39		0.039
3,3'-Dichlorobenzdine	NA	ND	2		0.4	ND	0.77		0.16	ND	1.6		0.32	ND	0.79		0.16	ND	0.79		0.16
3-Nitroaniline	0.5	ND	2		0.059	ND	0.77		0.023	ND	1.6		0.047	ND	0.79		0.023	ND	0.79		0.023
4,6-Dinitro-2-methylphenol	NA	ND	4.1		0.14	ND	1.5		0.053	ND	3.2		0.11	ND	1.6		0.057	ND	1.6		0.057
4-Bromophenyl-phenylether	NA	ND	1		0.054	ND	0.38		0.021	ND	0.8		0.044	ND	0.4		0.022	ND	0.39		0.021
4-Chloro-3-methylphenol	0.24	ND	1		0.087	ND	0.38		0.033	ND	0.8		0.069	ND	0.4		0.035	ND	0.39		0.034
4-Chloroaniline	0.22	ND	1		0.12	ND	0.38		0.045	ND	0.8		0.096	ND	0.4		0.048	ND	0.39		0.046
4-Chlorophenyl-phenylether	NA	ND	1		0.056	ND	0.38		0.021	ND	0.8		0.045	ND	0.4		0.022	ND	0.39		0.022
4-Methylphenol	0.9	ND	1		0.099	ND	0.38		0.038	ND	0.8		0.079	ND	0.4		0.04	ND	0.39		0.039
4-Nitroaniline	NA	ND	2		0.048	ND	0.77		0.018	ND	1.6		0.038	ND	0.79		0.019	ND	0.79		0.019
4-Nitrophenol	0.1	ND	4.1		0.031	ND	1.5		0.011	ND	3.2		0.024	ND	1.6		0.012	ND	1.6		0.012
Acenaphthene	50	0.11		J	0.0085	0.085		J	0.0032	0.25		J	0.0068	ND	0.4		0.0034	ND	0.39		0.0033
Acenaphthylene	41	0.039		J	0.0085	0.097		J	0.0032	ND	0.8		0.0068	ND	0.4		0.0034	ND	0.39		0.0033
Anthracene	50	0.24		J	0.0077	0.2		J	0.0029	0.13		J	0.0062	ND	0.4		0.0031	ND	0.39		0.003
Benzo(a)anthracene	0.224	**0.28**			0.027	**0.37**			0.01	0.069		J	0.022	ND	0.04		0.011	ND	0.039		0.011
Benzo(a)pyrene	0.061	**0.15**			0.0074	**0.35**			0.0028	0.059		J	0.0059	ND	0.04		0.003	ND	0.039		0.0029
Benzo(b)fluoranthene	1.1	0.39			0.0077	0.38			0.0029	0.035		J	0.0062	ND	0.04		0.0031	ND	0.039		0.003
Benzo(g,h,i)perylene	50	0.11		J	0.011	0.18		J	0.0041	0.058		J	0.0086	ND	0.4		0.0043	ND	0.39		0.0042
Benzo(k)fluoranthene	1.1	0.34			0.01	0.47			0.004	0.023		J	0.0083	ND	0.04		0.0042	ND	0.039		0.0041
bis(2-Chloroethoxy)methane	NA	ND	1		0.072	ND	0.38		0.027	ND	0.8		0.057	ND	0.4		0.029	ND	0.39		0.028
bis(2-Chloroethyl)ether	NA	ND	0.1		0.081	ND	0.038		0.031	ND	0.08		0.064	ND	0.04		0.032	ND	0.039		0.031
bis(2-chloroisopropyl)ether	NA	ND	1		0.064	ND	0.38		0.024	ND	0.8		0.051	ND	0.4		0.026	ND	0.39		0.025
bis(2-Ethylhexyl)phthalate	50	0.28		J	0.061	ND	0.38		0.023	ND	0.8		0.048	0.18		J	0.024	ND	0.39		0.024
Butylbenzylphthalate	50	ND	1		0.041	ND	0.38		0.015	ND	0.8		0.032	ND	0.4		0.016	ND	0.39		0.016
Carbazole	NA	ND	1		0.0074	0.033		J	0.0028	ND	0.8		0.0059	ND	0.4		0.0029	ND	0.39		0.0029
Chrysene	0.4	**0.65**		J	0.012	**0.48**			0.0047	0.1		J	0.0099	ND	0.4		0.005	ND	0.39		0.0048
Dibenz(a,h)anthracene	0.014	**0.031**		J	0.0066	**0.065**			0.0025	ND	0.08		0.0053	ND	0.04		0.0026	ND	0.039		0.0026
Dibenzofuran	6.2	0.09		J	0.052	0.08		J	0.02	0.36		J	0.041	ND	0.4		0.021	ND	0.39		0.02
Diethylphthalate	7.1	ND	1		0.027	ND	0.38		0.01	ND	0.8		0.022	ND	0.4		0.011	ND	0.39		0.01
Dimethylphthalate	2	ND	1		0.043	ND	0.38		0.016	ND	0.8		0.034	ND	0.4		0.017	ND	0.39		0.017
Di-n-butylphthalate	8.1	ND	1		0.029	ND	0.38		0.011	ND	0.8		0.023	ND	0.4		0.012	ND	0.39		0.011
Di-n-octylphthalate	50	ND	1		0.045	ND	0.38		0.017	ND	0.8		0.036	ND	0.4		0.018	ND	0.39		0.017
Fluoranthene	50	1.8			0.0032	0.77			0.0012	0.1		J	0.0026	ND	0.4		0.0013	ND	0.39		0.0013
Fluorene	50	0.13		J	0.0069	0.089		J	0.0026	0.39		J	0.0055	ND	0.4		0.0028	ND	0.39		0.0027
Hexachlorobenzene	0.41	ND	0.1		0.037	ND	0.038		0.014	ND	0.08		0.03	ND	0.04		0.015	ND	0.039		0.014
Hexachlorobutadiene	NA	ND	0.2		0.093	ND	0.077		0.036	ND	0.16		0.074	ND	0.079		0.037	ND	0.079		0.037
Hexachlorocyclopentadiene	NA	ND	1		0.063	ND	0.38		0.024	ND	0.8		0.051	ND	0.4		0.025	ND	0.39		0.025
Hexachloroethane	NA	ND	0.1		0.036	ND	0.038		0.014	ND	0.08		0.029	ND	0.04		0.014	ND	0.039		0.014
Indeno(1,2,3-cd)pyrene	3.2	0.1		J	0.0065	0.17			0.0025	ND	0.08		0.0052	ND	0.04		0.0026	ND	0.039		0.0025
Isophorone	4.4	ND	1		0.076	ND	0.38		0.029	ND	0.8		0.061	ND	0.4		0.03	ND	0.39		0.03
Naphthalene	13	0.067		J	0.0088	0.079		J	0.0034	ND	0.8		0.0071	ND	0.4		0.0035	ND	0.39		0.0034
Nitrobenzene	0.2	ND	0.1		0.057	ND	0.038		0.022	ND	0.08		0.045	ND	0.04		0.023	ND	0.039		0.022
N-Nitroso-di-n-propylamine	NA	ND	0.1		0.038	ND	0.038		0.014	ND	0.08		0.03	ND	0.04		0.015	ND	0.039		0.015
N-Nitrosodiphenylamine	NA	ND	1		0.046	ND	0.38		0.018	ND	0.8		0.037	ND	0.4		0.018	ND	0.39		0.018
Pentachlorophenol	1	ND	4.1		0.19	ND	1.5		0.069	ND	3.2		0.15	ND	1.6		0.073	ND	1.6		0.073
Phenanthrene	50	0.99		J	0.0092	0.32		J	0.0035	0.78		J	0.0074	ND	0.4		0.0037	ND	0.39		0.0036
Phenol	0.03	ND	1		0.13	ND	0.38		0.051	ND	0.8		0.11	ND	0.4		0.054	ND	0.39		0.052
Pyrene	50	1.3			0.0071	0.77			0.0027	0.21		J	0.0056	ND	0.4		0.0028	ND	0.39		0.0028
Total SVOC Concentration	500	7.155				5.051				3.764				0.18				0			
Total SVOC TICs Concentration	NS	NA				1.7			J	165.6			J	0.33			J	0			

Notes and Abbreviations

1) Bold concentrations in shaded cells exceed the New York TAGM Recommended Soil Cleanup Objective.
2) All results provided in units of mg/kg.
3) The analytical laboratory initially provided the Reporting Limit (RL) for most samples collected form soil borings TW-37 through TW-52, but subsequently provided the Method Detection Limits (MDLs). Both the RL and MDL are reported for these samples. For all other samples, only the MDL is reporte

J - The compound was detected at a concentration below the MDL and is estimated
** = Field duplicate samples
SVOC TICs = Tentatively identified semivolatile organic compounds
ND = The compound was not detected
Conc = Concentration
Qual = Laboratory Data Qualifier
MDL = Method Detection Limit
NS = No standard
mg/kg = Milligrams per kilograms

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SUMMARY OF SOIL SAMPLING LYTICAL RESULTS - SVOCs
SITE 2
HHMT-PORT IVORY FACILITY

Location Field Sample ID Lab Sample Number Sampling Date Matrix	New York TAGM Recommended Soil Cleanup Objective (mg/kg)	TW-48 TW-48-122304S018 596213 12/23/04 SOLID				TW-49 TW-49-122804S002 596817 12/28/04 SOLID			TW-50 TW-50-122804S002 596818 12/28/04 SOLID			TW-51 TW-51-122904S002 596857 12/29/04 SOLID				TW-52 TW-52-122904S002 596856 12/29/04 SOLID				TW-58 033105S001 620686 03/31/05 SOLID		
Semivolatile Organic Compounds (SVOCs)		Conc	RL	Qual	MDL Rev	Conc	MDL	Qual	Conc	MDL	Qual	Conc	RL	Qual	MDL Rev	Conc	RL	Qual	MDL Rev	Conc	MDL	Qual
1,2,4-Trichlorobenzene	3.4	ND	0.041		0.03	ND	0.039		ND	0.04		ND	0.043		0.032	ND	0.04		0.029	ND	0.054	
1,2-Dichlorobenzene	7.9	ND	0.41		0.048	ND	0.39		ND	0.4		ND	0.43		0.05	ND	0.4		0.046	ND	0.54	
1,3-Dichlorobenzene	1.6	ND	0.41		0.052	ND	0.39		ND	0.4		ND	0.43		0.055	ND	0.4		0.051	ND	0.54	
1,4-Dichlorobenzene	8.5	ND	0.41		0.043	ND	0.39		ND	0.4		ND	0.43		0.045	ND	0.4		0.042	ND	0.54	
2,4,5-Trichlorophenol	0.1	ND	0.41		0.078	ND	0.39		ND	0.4		ND	0.43		0.082	ND	0.4		0.076	ND	0.54	
2,4,6-Trichlorophenol	NA	ND	0.41		0.02	ND	0.39		ND	0.4		ND	0.43		0.021	ND	0.4		0.02	ND	0.54	
2,4-Dichlorophenol	0.4	ND	0.41		0.054	ND	0.39		ND	0.4		ND	0.43		0.056	ND	0.4		0.052	ND	0.54	
2,4-Dimethylphenol	NA	ND	0.41		0.038	ND	0.39		ND	0.4		ND	0.43		0.04	ND	0.4		0.037	ND	0.54	
2,4-Dinitrophenol	0.2	ND	1.6		0.054	ND	1.6		ND	1.6		ND	1.7		0.058	ND	1.6		0.054	ND	2.1	
2,4-Dinitrotoluene	NA	ND	0.082		0.017	ND	0.079		ND	0.08		ND	0.086		0.018	ND	0.079		0.016	ND	0.11	
2,6-Dinitrotoluene	1	ND	0.082		0.016	ND	0.079		ND	0.08		ND	0.086		0.017	ND	0.079		0.015	ND	0.11	
2-Chloronaphthalene	NA	ND	0.41		0.06	ND	0.39		ND	0.4		ND	0.43		0.063	ND	0.4		0.058	ND	0.54	
2-Chlorophenol	0.8	ND	0.41		0.051	ND	0.39		ND	0.4		ND	0.43		0.053	ND	0.4		0.05	ND	0.54	
2-Methylnaphthalene	36.4	ND	0.41		0.019	0.052		J	ND	0.4		0.26		J	0.02	0.18		J	0.019	0.78		
2-Methylphenol	0.1	ND	0.41		0.037	ND	0.39		ND	0.4		ND	0.43		0.039	ND	0.4		0.036	0.011		J
2-Nitroaniline	0.43	ND	0.82		0.029	ND	0.79		ND	0.8		ND	0.86		0.031	ND	0.79		0.028	ND	1.1	
2-Nitrophenol	0.33	ND	0.41		0.041	ND	0.39		ND	0.4		ND	0.43		0.044	ND	0.4		0.04	ND	0.54	
3,3'-Dichlorobenzidine	NA	ND	0.82		0.16	ND	0.79		ND	0.8		ND	0.86		0.17	ND	0.79		0.16	ND	1.1	
3-Nitroaniline	0.5	ND	0.82		0.024	ND	0.79		ND	0.8		ND	0.86		0.025	ND	0.79		0.023	ND	1.1	
4,6-Dinitro-2-methylphenol	NA	ND	1.6		0.057	ND	1.6		ND	1.6		ND	1.7		0.06	ND	1.6		0.057	ND	2.1	
4-Bromophenyl-phenylether	NA	ND	0.41		0.022	ND	0.39		ND	0.4		ND	0.43		0.023	ND	0.4		0.022	ND	0.54	
4-Chloro-3-methylphenol	0.24	ND	0.41		0.036	ND	0.39		ND	0.4		ND	0.43		0.037	ND	0.4		0.035	ND	0.54	
4-Chloroaniline	0.22	ND	0.41		0.049	ND	0.39		ND	0.4		ND	0.43		0.051	ND	0.4		0.048	ND	0.54	
4-Chlorophenyl-phenylether	NA	ND	0.41		0.023	ND	0.39		ND	0.4		ND	0.43		0.024	ND	0.4		0.022	ND	0.54	
4-Methylphenol	0.9	ND	0.41		0.041	ND	0.39		ND	0.4		0.045		J	0.043	ND	0.4		0.04	0.022		J
4-Nitroaniline	NA	ND	0.82		0.02	ND	0.79		ND	0.8		ND	0.86		0.021	ND	0.79		0.019	ND	1.1	
4-Nitrophenol	0.1	ND	1.6		0.012	ND	1.6		ND	1.6		ND	1.7		0.013	ND	1.6		0.012	ND	2.1	
Acenaphthene	50	ND	0.41		0.0035	0.034		J	ND	0.4		0.12		J	0.0036	0.082		J	0.0034	0.36		J
Acenaphthylene	41	ND	0.41		0.0035	0.26		J	ND	0.4		0.55			0.0036	0.056		J	0.0034	0.25		J
Anthracene	50	ND	0.41		0.0032	0.074		J	ND	0.4		0.37		J	0.0033	0.27		J	0.0031	0.72		
Benzo(a)anthracene	0.224	ND	0.041		0.011	0.18			ND	0.04		**0.87**			0.012	**0.85**			0.011	**1.3**		
Benzo(a)pyrene	0.061	ND	0.041		0.003	**0.26**			ND	0.04		**0.65**			0.0032	**0.64**			0.003	**1.2**		
Benzo(b)fluoranthene	1.1	ND	0.041		0.0032	0.22			ND	0.04		0.68			0.0033	0.67			0.0031	1.1		
Benzo(g,h,i)perylene	50	ND	0.41		0.0044	0.22		J	ND	0.4		0.46			0.0046	0.23		J	0.0043	0.74		
Benzo(k)fluoranthene	1.1	ND	0.041		0.0043	0.42			ND	0.04		1			0.0045	1			0.0042	**1.3**		
bis(2-Chloroethoxy)methane	NA	ND	0.41		0.029	ND	0.39		ND	0.4		ND	0.43		0.031	ND	0.4		0.029	ND	0.54	
bis(2-Chloroethyl)ether	NA	ND	0.041		0.033	ND	0.039		ND	0.04		ND	0.043		0.035	ND	0.04		0.032	ND	0.054	
bis(2-chloroisopropyl)ether	NA	ND	0.41		0.026	ND	0.39		ND	0.4		ND	0.43		0.028	ND	0.4		0.026	ND	0.54	
bis(2-Ethylhexyl)phthalate	50	ND	0.41		0.025	ND	0.39		ND	0.4		0.088		J	0.026	0.088		J	0.024	0.26		J
Butylbenzylphthalate	50	ND	0.41		0.017	ND	0.39		ND	0.4		ND	0.43		0.017	ND	0.4		0.016	ND	0.54	
Carbazole	NA	ND	0.41		0.003	0.0092		J	ND	0.4		0.05		J	0.0032	0.037		J	0.0029	0.14		J
Chrysene	0.4	ND	0.41		0.0051	0.29		J	ND	0.4		**1.3**			0.0053	**1**			0.005	**1.8**		
Dibenz(a,h)anthracene	0.014	ND	0.041		0.0027	**0.1**			ND	0.04		**0.17**			0.0028	**0.058**			0.0026	**0.23**		
Dibenzofuran	6.2	ND	0.41		0.021	ND	0.39		ND	0.4		0.16		J	0.022	0.14		J	0.021	0.43		J
Diethylphthalate	7.1	ND	0.41		0.011	ND	0.39		ND	0.4		ND	0.43		0.012	ND	0.4		0.011	ND	0.54	
Dimethylphthalate	2	ND	0.41		0.018	ND	0.39		ND	0.4		ND	0.43		0.018	ND	0.4		0.017	ND	0.54	
Di-n-butylphthalate	8.1	ND	0.41		0.012	ND	0.39		ND	0.4		ND	0.43		0.012	ND	0.4		0.012	ND	0.54	
Di-n-octylphthalate	50	ND	0.41		0.018	ND	0.39		ND	0.4		ND	0.43		0.019	ND	0.4		0.018	ND	0.54	
Fluoranthene	50	ND	0.41		0.0013	0.11		J	ND	0.4		1.4			0.0014	1.7			0.0013	2.9		
Fluorene	50	ND	0.41		0.0028	0.025		J	ND	0.4		0.19		J	0.003	0.16		J	0.0028	0.44		J
Hexachlorobenzene	0.41	ND	0.041		0.015	ND	0.039		ND	0.04		ND	0.043		0.016	ND	0.04		0.015	ND	0.054	
Hexachlorobutadiene	NA	ND	0.082		0.038	ND	0.079		ND	0.08		ND	0.086		0.04	ND	0.079		0.037	ND	0.11	
Hexachlorocyclopentadiene	NA	ND	0.41		0.026	ND	0.39		ND	0.4		ND	0.43		0.027	ND	0.4		0.025	ND	0.54	
Hexachloroethane	NA	ND	0.041		0.015	ND	0.039		ND	0.04		ND	0.043		0.016	ND	0.04		0.014	ND	0.054	
Indeno(1,2,3-cd)pyrene	3.2	ND	0.041		0.0027	0.19			ND	0.04		0.44			0.0028	0.22			0.0026	0.6		
Isophorone	4.4	ND	0.41		0.031	ND	0.39		ND	0.4		ND	0.43		0.033	ND	0.4		0.03	ND	0.54	
Naphthalene	13	ND	0.41		0.0036	ND	0.04	J	ND	0.4		0.2		J	0.0038	0.11		J	0.0035	0.88		
Nitrobenzene	0.2	ND	0.041		0.023	ND	0.039		ND	0.04		ND	0.043		0.024	ND	0.04		0.023	ND	0.054	
N-Nitroso-di-n-propylamine	NA	ND	0.041		0.015	ND	0.039		ND	0.04		ND	0.043		0.016	ND	0.04		0.015	ND	0.054	
N-Nitrosodiphenylamine	NA	ND	0.41		0.019	ND	0.39		ND	0.4		ND	0.43		0.02	ND	0.4		0.018	ND	0.54	
Pentachlorophenol	1	ND	1.6		0.073	ND	1.6		ND	1.6		ND	1.7		0.078	ND	1.6		0.073	ND	2.1	
Phenanthrene	50	ND	0.41		0.0038	0.14		J	ND	0.4		0.96			0.004	0.7			0.0037	2.4		
Phenol	0.03	ND	0.41		0.055	ND	0.39		ND	0.4		ND	0.43		0.058	ND	0.4		0.054	ND	0.54	
Pyrene	50	ND	0.41		0.0029	0.27		J	ND	0.4		1.8			0.003	1.8			0.0028	2.5		
Total SVOC Concentration	500	0				2.8542			0			11.763				9.991				20.363		
Total SVOC TICs Concentration	NS	0				8.61		J	0			27.85			J	8.59			J	14.82		J

Notes and Abbreviations

1) Bold concentrations in shaded cells exceed the New York TAGM Recommended Soil Cleanup Objective.
2) All results provided in units of mg/kg.
3) The analytical laboratory initally provided the Reporting Limit (RL) for most samples collected form soil borings TW-37 through TW-52, but subsequently provided the Method Detection Limits (MDLs). Both the RL and MDL are reported for these samples. For all other samples, only the MDL is repor

J - The compound was detected at a concentration below the MDL and is estimated
** = Field duplicate samples
SVOC TICs = Tentatively identified semivolatile organic compoun
ND = The compound was not detected
Conc = Concentration
Qual = Laboratory Data Qualifier
MDL = Method Detection Limit
NS = No standard
mg/kg = Milligrams per kilograms

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SUMMARY OF SOIL SAMPLING ANALYTICAL RESULTS - SVOCs
SITE 2
HHMT-PORT IVORY FACILITY

Location Field Sample ID Lab Sample Number Sampling Date Matrix	New York TAGM Recommended Soil Cleanup Objective (mg/kg)	TW-69 033105S004 620687 03/31/05 SOLID			TW-70A 033105S002 620688 03/31/05 SOLID			TW-71A 040105S005 620937 04/01/05 SOLID			TW-71A 040105S007 620938 04/01/05 SOLID			TW-72 TW-72-040405S004 621712 04/04/05 SOLID			TW-73 TW-73-040405S005 621713 04/04/05 SOLID			TW-73 TW-73-040405S008 621714 04/04/05 SOLID		
Semivolatile Organic Compounds (SVOCs)		Conc	MDL	Qual	Conc	MDL	Qual	Conc	MDL	Qual	Conc	MDL	Qual	Conc	MDL	Qual	Conc	MDL	Qual	Conc	MDL	Qual
1,2,4-Trichlorobenzene	3.4	ND	0.06		ND	0.037		ND	0.2		ND	0.04		ND	0.44		ND	0.21		ND	0.039	
1,2-Dichlorobenzene	7.9	ND	0.6		ND	0.37		ND	2		ND	0.4		ND	4.4		ND	2.1		ND	0.39	
1,3-Dichlorobenzene	1.6	ND	0.6		ND	0.37		ND	2		ND	0.4		ND	4.4		ND	2.1		ND	0.39	
1,4-Dichlorobenzene	8.5	ND	0.6		ND	0.37		ND	2		ND	0.4		ND	4.4		ND	2.1		ND	0.39	
2,4,5-Trichlorophenol	0.1	ND	0.6		ND	0.37		ND	2		ND	0.4		ND	4.4		ND	2.1		ND	0.39	
2,4,6-Trichlorophenol	NA	ND	0.6		ND	0.37		ND	2		ND	0.4		ND	4.4		ND	2.1		ND	0.39	
2,4-Dichlorophenol	0.4	ND	0.6		ND	0.37		ND	2		ND	0.4		ND	4.4		ND	2.1		ND	0.39	
2,4-Dimethylphenol	NA	ND	0.6		ND	0.37		ND	2		ND	0.4		ND	4.4		ND	2.1		ND	0.39	
2,4-Dinitrophenol	0.2	ND	2.4		ND	1.5		ND	8.1		ND	1.6		ND	18		ND	8.5		ND	1.6	
2,4-Dinitrotoluene	NA	ND	0.12		ND	0.075		ND	0.41		ND	0.08		ND	0.89		ND	0.42		ND	0.079	
2,6-Dinitrotoluene	1	ND	0.12		ND	0.075		ND	0.41		ND	0.08		ND	0.89		ND	0.42		ND	0.079	
2-Chloronaphthalene	NA	ND	0.6		ND	0.37		ND	2		ND	0.4		ND	4.4		ND	2.1		ND	0.39	
2-Chlorophenol	0.8	ND	0.6		ND	0.37		ND	2		ND	0.4		ND	4.4		ND	2.1		ND	0.39	
2-Methylnaphthalene	36.4	0.63			0.22		J	0.57		J	ND	0.4		ND	4.4		0.46		J	0.015		J
2-Methylphenol	0.1	ND	0.6		ND	0.37		ND	2		ND	0.4		ND	4.4		ND	2.1		ND	0.39	
2-Nitroaniline	0.43	ND	1.2		ND	0.75		ND	4.1		ND	0.8		ND	8.9		ND	4.2		ND	0.79	
2-Nitrophenol	0.33	ND	0.6		ND	0.37		ND	2		ND	0.4		ND	4.4		ND	2.1		ND	0.39	
3,3'-Dichlorobenzidine	NA	ND	1.2		ND	0.75		ND	4.1		ND	0.8		ND	8.9		ND	4.2		ND	0.79	
3-Nitroaniline	0.5	ND	1.2		ND	0.75		ND	4.1		ND	0.8		ND	8.9		ND	4.2		ND	0.79	
4,6-Dinitro-2-methylphenol	NA	ND	2.4		ND	1.5		ND	8.1		ND	1.6		ND	18		ND	8.5		ND	1.6	
4-Bromophenyl-phenylether	NA	ND	0.6		ND	0.37		ND	2		ND	0.4		ND	4.4		ND	2.1		ND	0.39	
4-Chloro-3-methylphenol	0.24	ND	0.6		ND	0.37		ND	2		ND	0.4		ND	4.4		ND	2.1		ND	0.39	
4-Chloroaniline	0.22	ND	0.6		ND	0.37		ND	2		ND	0.4		ND	4.4		ND	2.1		ND	0.39	
4-Chlorophenyl-phenylether	NA	ND	0.6		ND	0.37		ND	2		ND	0.4		ND	4.4		ND	2.1		ND	0.39	
4-Methylphenol	0.9	0.064		J	0.01		J	ND	2		ND	0.4		ND	4.4		ND	2.1		ND	0.39	
4-Nitroaniline	NA	ND	1.2		ND	0.75		ND	4.1		ND	0.8		ND	8.9		ND	4.2		ND	0.79	
4-Nitrophenol	0.1	ND	2.4		ND	1.5		ND	8.1		ND	1.6		ND	18		ND	8.5		ND	1.6	
Acenaphthene	50	0.28		J	0.18		J	0.5		J	ND	0.4		1.2		J	2.4			0.1		J
Acenaphthylene	41	0.2		J	0.11		J	ND	2		ND	0.4		ND	4.4		ND	2.1		ND	0.39	
Anthracene	50	0.58		J	0.59			0.29		J	ND	0.4		0.92		J	1.9		J	0.32		J
Benzo(a)anthracene	0.224	**1.1**			**0.65**			ND	0.2		ND	0.04		**0.98**			**0.89**			0.16		
Benzo(a)pyrene	0.061	**1**			**0.48**			ND	0.2		ND	0.04		**0.86**			**0.48**			**0.084**		
Benzo(b)fluoranthene	1.1	1			0.52			ND	0.2		ND	0.04		0.8			0.45			0.063		
Benzo(g,h,i)perylene	50	0.56		J	0.23		J	ND	2		ND	0.4		ND	4.4		ND	2.1		0.027		J
Benzo(k)fluoranthene	1.1	**1.3**			0.53			ND	0.2		ND	0.04		1			0.47			0.09		
bis(2-Chloroethoxy)methane	NA	ND	0.6		ND	0.37		ND	2		ND	0.4		ND	4.4		ND	2.1		ND	0.39	
bis(2-Chloroethyl)ether	NA	ND	0.06		ND	0.037		ND	0.2		ND	0.04		ND	0.44		ND	0.21		ND	0.039	
bis(2-chloroisopropyl)ether	NA	ND	0.6		ND	0.37		ND	2		ND	0.4		ND	4.4		ND	2.1		ND	0.39	
bis(2-Ethylhexyl)phthalate	50	0.29		J	0.15		J	ND	2		0.12		J	ND	4.4		ND	2.1		ND	0.39	
Butylbenzylphthalate	50	ND	0.6		ND	0.37		ND	2		ND	0.4		ND	4.4		ND	2.1		ND	0.39	
Carbazole	NA	0.13		J	0.16		J	ND	2		ND	0.4		ND	4.4		1.7		J	0.14		J
Chrysene	0.4	**1.5**			**0.78**			0.26		J	ND	0.4		**1.5**		J	**1.3**		J	0.12		J
Dibenz(a,h)anthracene	0.014	**0.18**			**0.08**			ND	0.2		ND	0.04		ND	0.44		ND	0.21		ND	0.039	
Dibenzofuran	6.2	0.34		J	0.22		J	ND	2		ND	0.4		ND	4.4		0.86		J	0.052		J
Diethylphthalate	7.1	ND	0.6		ND	0.37		ND	2		ND	0.4		ND	4.4		ND	2.1		ND	0.39	
Dimethylphthalate	2	ND	0.6		ND	0.37		ND	2		ND	0.4		ND	4.4		ND	2.1		ND	0.39	
Di-n-butylphthalate	8.1	ND	0.6		ND	0.37		ND	2		ND	0.4		ND	4.4		ND	2.1		ND	0.39	
Di-n-octylphthalate	50	ND	0.6		ND	0.37		ND	2		ND	0.4		ND	4.4		ND	2.1		ND	0.39	
Fluoranthene	50	2.6			1.8			0.11		J	ND	0.4		2.1		J	4.2			0.57		
Fluorene	50	0.35		J	0.21		J	1		J	0.018		J	0.62		J	1.8		J	0.11		J
Hexachlorobenzene	0.41	ND	0.06		ND	0.037		ND	0.2		ND	0.04		ND	0.44		ND	0.21		ND	0.039	
Hexachlorobutadiene	NA	ND	0.12		ND	0.075		ND	0.41		ND	0.08		ND	0.89		ND	0.42		ND	0.079	
Hexachlorocyclopentadiene	NA	ND	0.6		ND	0.37		ND	2		ND	0.4		ND	4.4		ND	2.1		ND	0.39	
Hexachloroethane	NA	ND	0.06		ND	0.037		ND	0.2		ND	0.04		ND	0.44		ND	0.21		ND	0.039	
Indeno(1,2,3-cd)pyrene	3.2	0.5			0.22			ND	0.2		ND	0.04		ND	0.44		ND	0.21		0.033		J
Isophorone	4.4	ND	0.6		ND	0.37		ND	2		ND	0.4		ND	4.4		ND	2.1		ND	0.39	
Naphthalene	13	0.74			0.18		J	ND	2		ND	0.4		ND	4.4		0.41		J	ND	0.39	
Nitrobenzene	0.2	ND	0.06		ND	0.037		ND	0.2		ND	0.04		ND	0.44		ND	0.21		ND	0.039	
N-Nitroso-di-n-propylamine	NA	ND	0.06		ND	0.037		ND	0.2		ND	0.04		ND	0.44		ND	0.21		ND	0.039	
N-Nitrosodiphenylamine	NA	ND	0.6		ND	0.37		ND	2		ND	0.4		ND	4.4		ND	2.1		ND	0.39	
Pentachlorophenol	1	ND	2.4		ND	1.5		ND	8.1		ND	1.6		ND	18		ND	8.5		ND	1.6	
Phenanthrene	50	1.8			1.5			2.4			0.044		J	1.2		J	8.4			0.72		
Phenol	0.03	ND	0.6		ND	0.37		ND	2		ND	0.4		ND	4.4		ND	2.1		ND	0.39	
Pyrene	50	2.3			1.5			0.18		J	ND	0.4		2.1		J	3.2			0.46		
Total SVOC Concentration	500	17.444			10.32			5.31			0.182			13.28			28.92			3.064		
Total SVOC TICs Concentration	NS	85.1		J	2.44		J	265.2		J	7.41		J	312.1		J	105.5		J	0		

Notes and Abbreviations

1) Bold concentrations in shaded cells exceed the New York TAGM Recommended Soil Cleanup Objective.
2) All results provided in units of mg/kg.
3) The analytical laboratory initally provided the Reporting Limit (RL) for most samples collected form soil borings TW-37 through TW-52, but subsequently provided the Method Detection Limits (MDLs). Both the RL and MDL are reported for these samples. For all other samples, only the MDL is repor

J - The compound was detected at a concentration below the MDL and is estimated
** = Field duplicate samples
SVOC TICs = Tentatively identified semivolatile organic compoun
ND = The compound was not detected
Conc = Concentration
Qual = Laboratory Data Qualifier
MDL = Method Detection Limit
NS = No standard
mg/kg = Milligrams per kilograms

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TAB

SUMMARY OF SOIL SAMPLING TICAL RESULTS - SVOCs
SITE 2
HHMT-PORT IVORY FACILITY

Location Field Sample ID Lab Sample Number Sampling Date Matrix	New York TAGM Recommended Soil Cleanup Objective (mg/kg)	TW-74 4-040105S005 620939 04/01/05 SOLID			TW-75 040105S006 620940 04/01/05 SOLID			TW-76 TW-76-040505S006 621716 04/05/05 SOLID			TW-77 TW-77-040505S004 621717 04/05/05 SOLID			TW-78 TW-78-040505S003 621718 04/05/05 SOLID			TWP-13 033005S002 620685 03/30/05 SOLID			TWP-14 4040105S007 620941 04/01/05 SOLID			TWP-14 040105S009 620942 04/01/05 SOLID		
Semivolatile Organic Compounds (SVOCs)		Conc	MDL	Qual	Conc	MDL	Qual	Conc	MDL	Qual	Conc	MDL	Qual	Conc	MDL	Qual	Conc	MDL	Qual	Conc	MDL	Qual	Conc	MDL	Qual
1,2,4-Trichlorobenzene	3.4	ND	0.039		ND	0.24		ND	0.039		ND	0.041		ND	0.042		ND	0.038		ND	0.044		ND	0.039	
1,2-Dichlorobenzene	7.9	ND	0.39		ND	2.4		ND	0.39		ND	0.41		ND	0.42		ND	0.38		ND	0.44		ND	0.39	
1,3-Dichlorobenzene	1.6	ND	0.39		ND	2.4		ND	0.39		ND	0.41		ND	0.42		ND	0.38		ND	0.44		ND	0.39	
1,4-Dichlorobenzene	8.5	ND	0.39		ND	2.4		ND	0.39		ND	0.41		ND	0.42		ND	0.38		ND	0.44		ND	0.39	
2,4,5-Trichlorophenol	0.1	ND	0.39		ND	2.4		ND	0.39		ND	0.41		ND	0.42		ND	0.38		ND	0.44		ND	0.39	
2,4,6-Trichlorophenol	NA	ND	0.39		ND	2.4		ND	0.39		ND	0.41		ND	0.42		ND	0.38		ND	0.44		ND	0.39	
2,4-Dichlorophenol	0.4	ND	0.39		ND	2.4		ND	0.39		ND	0.41		ND	0.42		ND	0.38		ND	0.44		ND	0.39	
2,4-Dimethylphenol	NA	ND	0.39		0.16		J	ND	0.39		ND	0.41		ND	0.42		ND	0.38		ND	0.44		ND	0.39	
2,4-Dinitrophenol	0.2	ND	1.6		ND	9.4		ND	1.6		ND	1.6		ND	1.7		ND	1.5		ND	1.8		ND	1.6	
2,4-Dinitrotoluene	NA	ND	0.079		ND	0.47		ND	0.078		ND	0.082		ND	0.084		ND	0.076		ND	0.088		ND	0.078	
2,6-Dinitrotoluene	1	ND	0.079		ND	0.47		ND	0.078		ND	0.082		ND	0.084		ND	0.076		ND	0.088		ND	0.078	
2-Chloronaphthalene	NA	ND	0.39		ND	2.4		ND	0.39		ND	0.41		ND	0.42		ND	0.38		ND	0.44		ND	0.39	
2-Chlorophenol	0.8	ND	0.39		ND	2.4		ND	0.39		ND	0.41		ND	0.42		ND	0.38		ND	0.44		ND	0.39	
2-Methylnaphthalene	36.4	ND	0.39		1.7		J	ND	0.39		0.042		J	0.045		J	0.15		J	0.014		J	ND	0.39	
2-Methylphenol	0.1	ND	0.39		0.098		J	ND	0.39		ND	0.41		ND	0.42		ND	0.38		ND	0.44		ND	0.39	
2-Nitroaniline	0.43	ND	0.79		ND	4.7		ND	0.78		ND	0.82		ND	0.84		ND	0.76		ND	0.88		ND	0.78	
2-Nitrophenol	0.33	ND	0.39		ND	2.4		ND	0.39		ND	0.41		ND	0.42		ND	0.38		ND	0.44		ND	0.39	
3,3'-Dichlorobenzidine	NA	ND	0.79		ND	4.7		ND	0.78		ND	0.82		ND	0.84		ND	0.76		ND	0.88		ND	0.78	
3-Nitroaniline	0.5	ND	0.79		ND	4.7		ND	0.78		ND	0.82		ND	0.84		ND	0.76		ND	0.88		ND	0.78	
4,6-Dinitro-2-methylphenol	NA	ND	1.6		ND	9.4		ND	1.6		ND	1.6		ND	1.7		ND	1.5		ND	1.8		ND	1.6	
4-Bromophenyl-phenylether	NA	ND	0.39		ND	2.4		ND	0.39		ND	0.41		ND	0.42		ND	0.38		ND	0.44		ND	0.39	
4-Chloro-3-methylphenol	0.24	ND	0.39		ND	2.4		ND	0.39		ND	0.41		ND	0.42		ND	0.38		ND	0.44		ND	0.39	
4-Chloroaniline	0.22	ND	0.39		ND	2.4		ND	0.39		ND	0.41		ND	0.42		ND	0.38		ND	0.44		ND	0.39	
4-Chlorophenyl-phenylether	NA	ND	0.39		ND	2.4		ND	0.39		ND	0.41		ND	0.42		ND	0.38		ND	0.44		ND	0.39	
4-Methylphenol	0.9	ND	0.39		0.2		J	ND	0.39		ND	0.41		ND	0.42		ND	0.38		ND	0.44		ND	0.39	
4-Nitroaniline	NA	ND	0.79		ND	4.7		ND	0.78		ND	0.82		ND	0.84		ND	0.76		ND	0.88		ND	0.78	
4-Nitrophenol	0.1	ND	1.6		ND	9.4		ND	1.6		ND	1.6		ND	1.7		ND	1.5		ND	1.8		ND	1.6	
Acenaphthene	50	ND	0.39		1.5		J	ND	0.39		ND	0.41		ND	0.42		0.067		J	ND	0.44		ND	0.39	
Acenaphthylene	41	ND	0.39		5.3			ND	0.39		ND	0.41		ND	0.42		0.1		J	ND	0.44		ND	0.39	
Anthracene	50	ND	0.39		2.7			ND	0.39		0.016		J	0.018		J	0.33		J	ND	0.44		ND	0.39	
Benzo(a)anthracene	0.224	ND	0.039		**8.4**			ND	0.039		0.065			0.045			**0.52**			0.028		J	ND	0.039	
Benzo(a)pyrene	0.061	ND	0.039		**8.7**			ND	0.039		**0.072**			ND	0.042		**0.49**			0.02		J	ND	0.039	
Benzo(b)fluoranthene	1.1	ND	0.039		**7.4**			ND	0.039		0.084			ND	0.042		0.3			0.02		J	ND	0.039	
Benzo(g,h,i)perylene	50	ND	0.39		4.1			ND	0.39		ND	0.41		ND	0.42		0.34		J	0.02		J	ND	0.39	
Benzo(k)fluoranthene	1.1	ND	0.039		**11**			ND	0.039		0.08			ND	0.042		0.38			0.02		J	ND	0.039	
bis(2-Chloroethoxy)methane	NA	ND	0.39		ND	2.4		ND	0.39		ND	0.41		ND	0.42		ND	0.38		ND	0.44		ND	0.39	
bis(2-Chloroethyl)ether	NA	ND	0.039		ND	0.24		ND	0.039		ND	0.041		ND	0.042		ND	0.038		ND	0.044		ND	0.039	
bis(2-chloroisopropyl)ether	NA	ND	0.39		ND	2.4		ND	0.39		ND	0.41		ND	0.42		ND	0.38		ND	0.44		ND	0.39	
bis(2-Ethylhexyl)phthalate	50	0.091		J	ND	2.4		ND	0.39		ND	0.41		ND	0.42		ND	0.38		0.21		J	0.16		J
Butylbenzylphthalate	50	ND	0.39		ND	2.4		ND	0.39		ND	0.41		ND	0.42		ND	0.38		ND	0.44		ND	0.39	
Carbazole	NA	ND	0.39		0.068		J	ND	0.39		ND	0.41		ND	0.42		0.019		J	ND	0.44		ND	0.39	
Chrysene	0.4	ND	0.39		**12**			ND	0.39		0.091		J	0.057		J	**0.63**			0.036		J	ND	0.39	
Dibenz(a,h)anthracene	0.014	ND	0.039		**1.5**			ND	0.039		ND	0.041		ND	0.042		**0.084**			ND	0.044		ND	0.039	
Dibenzofuran	6.2	ND	0.39		ND	2.4		ND	0.39		0.015		J	0.014		J	0.042		J	ND	0.44		ND	0.39	
Diethylphthalate	7.1	ND	0.39		ND	2.4		ND	0.39		ND	0.41		ND	0.42		ND	0.38		ND	0.44		ND	0.39	
Dimethylphthalate	2	ND	0.39		ND	2.4		ND	0.39		ND	0.41		ND	0.42		ND	0.38		ND	0.44		ND	0.39	
Di-n-butylphthalate	8.1	ND	0.39		ND	2.4		ND	0.39		ND	0.41		ND	0.42		ND	0.38		ND	0.44		ND	0.39	
Di-n-octylphthalate	50	ND	0.39		ND	2.4		ND	0.39		ND	0.41		ND	0.42		ND	0.38		ND	0.44		ND	0.39	
Fluoranthene	50	ND	0.39		4.7			ND	0.39		0.11		J	0.07		J	1.1			0.042		J	ND	0.39	
Fluorene	50	ND	0.39		0.59		J	ND	0.39		ND	0.41		ND	0.42		0.22		J	0.0096		J	ND	0.39	
Hexachlorobenzene	0.41	ND	0.039		ND	0.24		ND	0.039		ND	0.041		ND	0.042		ND	0.038		ND	0.044		ND	0.039	
Hexachlorobutadiene	NA	ND	0.079		ND	0.47		ND	0.078		ND	0.082		ND	0.084		ND	0.076		ND	0.088		ND	0.078	
Hexachlorocyclopentadiene	NA	ND	0.39		ND	2.4		ND	0.39		ND	0.41		ND	0.42		ND	0.38		ND	0.44		ND	0.39	
Hexachloroethane	NA	ND	0.039		ND	0.24		ND	0.039		ND	0.041		ND	0.042		ND	0.038		ND	0.044		ND	0.039	
Indeno(1,2,3-cd)pyrene	3.2	ND	0.039		**3.7**			ND	0.039		ND	0.041		ND	0.042		0.23			0.019		J	ND	0.039	
Isophorone	4.4	ND	0.39		ND	2.4		ND	0.39		ND	0.41		ND	0.42		ND	0.38		ND	0.44		ND	0.39	
Naphthalene	13	ND	0.39		1.3		J	ND	0.39		0.074		J	0.35		J	0.19		J	0.018		J	ND	0.39	
Nitrobenzene	0.2	ND	0.039		ND	0.24		ND	0.039		ND	0.041		ND	0.042		ND	0.038		ND	0.044		ND	0.039	
N-Nitroso-di-n-propylamine	NA	ND	0.039		ND	0.24		ND	0.039		ND	0.041		ND	0.042		ND	0.038		ND	0.044		ND	0.039	
N-Nitrosodiphenylamine	NA	ND	0.39		ND	2.4		ND	0.39		ND	0.41		ND	0.42		ND	0.38		ND	0.44		ND	0.39	
Pentachlorophenol	1	ND	1.6		ND	9.4		ND	1.6		ND	1.6		ND	1.7		ND	1.5		ND	1.8		ND	1.6	
Phenanthrene	50	ND	0.39		7.1			ND	0.39		0.079		J	0.07		J	1.7			0.027		J	ND	0.39	
Phenol	0.03	ND	0.39		ND	2.4		ND	0.39		ND	0.41		ND	0.42		ND	0.38		ND	0.44		ND	0.39	
Pyrene	50	ND	0.39		13			ND	0.39		0.16		J	0.11		J	1.5			0.044		J	ND	0.39	
Total SVOC Concentration	500	0.091			96.416			0			0.888			0.779			8.392			0.5276			0.16		
Total SVOC TICs Concentration	NS	0			204.3		J	1.75		J	2.34		J	7.28		J	7.55		J	24		J	0		

Notes and Abbreviations

1) Bold concentrations in shaded cells exceed the New York TAGM Recommended Soil Cleanup Objective.
2) All results provided in units of mg/kg.
3) The analytical laboratory initally provided the Reporting Limit (RL) for most samples collected form soil borings TW-37 through TW-52, but subsequently provided the Method Detection Limits (MDLs). Both the RL and MDL are reported for these samples. For all other samples, only the MDL is reporte

J - The compound was detected at a concentration below the MDL and is estimated
** = Field duplicate samples
SVOC TICs = Tentatively identified semivolatile organic compounds
ND = The compound was not detected
Conc = Concentration
Qual = Laboratory Data Qualifier
MDL = Method Detection Limit
NS = No standard
mg/kg = Milligrams per kilograms

TABLE 2C
SUMMARY OF SOIL SAMPLING ANALYTICAL RESULTS - METALS
SITE 2
HHMT-PORT IVORY FACILITY

Location	New York TAGM Recommended Soil Cleanup Objective (mg/kg)	BLDG20-C1			BLDG20-C2			BLDG32-C1			BLDG32-C2			BLDG32-C3			BLDG32-C4		
Field Sample ID		B20C1-032305S003			B20C2-032405S002			C1032505S003			032505S002			032505S003			B32C4-032405S002		
Lab Sample Numb		618546			618548			618773			618774			618775			618549		
Sampling Date		03/23/05			03/24/05			03/25/05			03/25/05			03/25/05			03/24/05		
Matrix		SOLID			SOLID			SOLID			SOLID			SOLID			SOLID		
METALS		**Conc**	**MDL**	**Qual**	**Conc**	**MDL**	**Qual**	**Conc**	**MDL**	**Qual**	**Conc**	**MDL**	**Qual**	**Conc**	**MDL**	**Qual**	**Conc**	**MDL**	**Qual**
Aluminum	33,000*	3870			1760			3600			2990			5820			4260		
Antimony	SB	ND	0.97		ND	0.86		ND	0.85		ND	0.85		ND	0.93		ND	0.87	
Arsenic	7.5 or SB	**13.3**			**25.1**			1.9			1.5			5.0			**10.6**		
Barium	300 or SB	24.3		J	170			25.7		J	14.6		J	75.1			69.5		
Beryllium	0.16 (HEAST) or SB	**0.22**		J	**0.29**		J	0.15		J	0.14		J	**0.44**		J	**0.25**		J
Cadmium	1 or SB	ND	0.100		0.10		J	ND	0.088		ND	0.087		ND	0.096		ND	0.090	
Calcium	35,000*	843		J	7030			20,100			21800			13700			32400		
Chromium	10 or SB	6.8			**13.1**			**11.8**			8.5			**15.5**			**13.8**		
Cobalt	30 or SB	1.5		J	4.3		J	4.7		J	3.9		J	5.7		J	3.6		J
Copper	25 or SB	**76.8**			**58.5**			**25.4**			12.9			**42.2**			**35.1**		
Iron	2,000 or SB	**8500**			**12400**			**12600**			**9640**			**16000**			**13200**		
Lead	500*	34.0			103			10.4			8.4			43.4			35.5		
Magnesium	5,000*	520		J	2860			**11700**			**12500**			**5400**			**6950**		
Manganese	5,000*	23.2			81.5			120			94.9			188			127		
Mercury	0.1	0.06			0.04			0.04			0.04			**0.65**			**0.60**		
Nickel	13 or SB	4.9		J	10.9			13.0			12.8			**31.4**			**14.6**		
Potassium	43,000*	185		J	388		J	519		J	377		J	856		J	494		J
Selenium	2 or SB	ND	1.2		ND	1.0		ND	1.0		ND	1.0		ND	1.1		ND	1.1	
Silver	SB	ND	0.20		ND	0.18		ND	0.18		ND	0.17		ND	0.19		ND	0.18	
Sodium	8,000*	ND	89.9		118		J	374		J	168		J	373		J	236		J
Thallium	SB	ND	1.1		ND	0.97		ND	0.96		ND	0.96		ND	1.1		ND	0.99	
Vanadium	150 or SB	11.3		J	18.0			16.8			15.0			59.7			46.0		
Zinc	20 or SB	**23.0**			**286**			**34.1**			**33.9**			**124**			**68.9**		

Notes and Abbreviations

1) Bold concentrations in shaded cells exceed the New York TAGM Recommended Soil Cleanup Objective or Eastern US background concentration.

* = No Recommended Cleanup Objective has been established. The value provided is the background concentration value from TAGM 4046.
** = Field Duplicate Samples
J = Reported value is less than the reporting limit but greater than the instrument detection limit
ND = The compound was not detected
Conc = Concentration
Qual = Laboratory Data Qualifier
MDL = Method Detection Limit
SB = Site Background Concentration
mg/kg = Milligrams per kilograms

TABLE 2C
SUMMARY OF SOIL SAMPLING ANALYTICAL RESULTS - METALS
SITE 2
HHMT-PORT IVORY FACILITY

Location Field Sample ID Lab Sample Numb Sampling Date Matrix	New York TAGM Recommended Soil Cleanup Objective (mg/kg)	BLDG32-C5 B32C5-032405S002 618550 03/24/05 SOLID			STAIN03-C1 STA03C1-032405S3 618551 03/24/05 SOLID			STAIN03-C2 STA03C2-032405S2 618552 03/24/05 SOLID			STAIN03-C3 STA03C3-032405S3 618553 03/24/05 SOLID			UST7-C1 032905S004 620681 03/29/05 SOLID			UST7-C2 032905S006 620682 03/29/05 SOLID		
METALS		Conc	MDL	Qual	Conc	MDL	Qual	Conc	MDL	Qual	Conc	MDL	Qual	Conc	MDL	Qual	Conc	MDL	Qual
Aluminum	33,000*	3700			3080			3060			1220			1940			21600		
Antimony	SB	1.1		J	2.9			6.7			ND	0.90		ND	1.3		ND	2.4	
Arsenic	7.5 or SB	3.6			**1100**			**983**			**95.6**			1.5			ND	1.3	
Barium	300 or SB	22.9		J	87.6			149			74.3			17.8		J	90.5		
Beryllium	0.16 (HEAST) or SB	**0.23**		J	**0.54**			**0.34**		J	0.08		J	0.10		J	**1.1**		
Cadmium	1 or SB	0.15		J	ND	0.090		0.39		J	ND	0.092		ND	0.090		ND	0.17	
Calcium	35,000*	19700			10600			18600			6220			6800			2310		
Chromium	10 or SB	**14.9**			**42.9**			**52.4**			9.8			**11.5**			**43.9**		
Cobalt	30 or SB	5.7		J	3.9		J	4.7		J	1.6		J	4		J	26.7		
Copper	25 or SB	**64.8**			**97.5**			**174**			**28.2**			9.3			16.0		
Iron	2,000 or SB	**13600**			**37000**			**28800**			**52200**			**7160**			**50200**		
Lead	500*	29.0			262			**587**			80.8			9.8			25.2		
Magnesium	5,000*	**10400**			2440			**5950**			847		J	1810			**10300**		
Manganese	5,000*	120			84.8			241			42.3			41.9			880		
Mercury	0.1	0.04			**0.31**			**0.24**			**0.62**			0.09			ND	0.035	
Nickel	13 or SB	**21.0**			**17.8**			**35.6**			7.4		J	**43.0**			**51.1**		
Potassium	43,000*	401		J	736		J	513		J	1180			235		J	3590		
Selenium	2 or SB	ND	1.0		ND	2.6		ND	1.0		ND	5.4		ND	0.94		ND	1.8	
Silver	SB	ND	0.17		ND	0.18		ND	0.17		ND	0.18		ND	0.31		ND	0.59	
Sodium	8,000*	488		J	1220			365		J	2340			177		J	928		J
Thallium	SB	ND	0.95		ND	0.99		ND	0.96		ND	1.5		ND	1.1		ND	2.0	
Vanadium	150 or SB	20.3			38.8			21.1			23.6			17.8			46.0		
Zinc	20 or SB	**103**			**74.8**			**178**			**23.9**			**22.9**			**113**		

Notes and Abbreviations

1) Bold concentrations in shaded cells exceed the New York TAGM Recommended Soil Cleanup Objective or Eastern US background concentratio

* = No Recommended Cleanup Objective has been established. The value provided is the backgroun concentration value from TAGM 4046.

** = Field Duplicate Samples

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Conc = Concentration

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MDL = Method Detection Limit

SB = Site Background Concentration

mg/kg = Milligrams per kilograms

TABLE 2C
SUMMARY OF SOIL SAMPLING ANALYTICAL RESULTS - METALS
SITE 2
HHMT-PORT IVORY FACILITY

Location Field Sample ID Lab Sample Numb Sampling Date Matrix	New York TAGM Recommended Soil Cleanup Objective (mg/kg)	UST7-C3 033005S006 620684 03/30/05 SOLID			UST7-C4 032905S005 620683 03/29/05 SOLID			UST7-C5 032505S006 618771 03/25/05 SOLID			UST7-C6 032505S005 618772 03/25/05 SOLID			TW-37 TW-37-122304S012 596210 12/23/04 SOLID			TW-38 TW-38-122304S011 596211 12/23/04 SOLID		
METALS		Conc	MDL	Qual	Conc	MDL	Qual	Conc	MDL	Qual	Conc	MDL	Qual	Conc	MDL	Qual	Conc	MDL	Qual
Aluminum	33,000*	6410			11800			7550			14400			5370			6670		
Antimony	SB	ND	1.3		ND	1.2		4.4			ND	0.92		ND	2.1		ND	1.9	
Arsenic	7.5 or SB	**86.9**			1.7			**48.9**			ND	0.83		**21.5**			**10.7**		
Barium	300 or SB	207			55.9			**2960**			42.2		J	**372**			176		
Beryllium	0.16 (HEAST) or SB	**0.57**			**0.63**			**0.68**			**0.63**			**1.6**			**1.1**		
Cadmium	1 or SB	0.38		J	ND	0.086		0.14		J	ND	0.094		**2**			0.84		J
Calcium	35,000*	33900			1200			**51200**			761		J	12400			17700		
Chromium	10 or SB	**25.6**			**22.0**			**44.9**			**26.5**			**15**			**16.2**		
Cobalt	30 or SB	10.0		J	11.0		J	15.3			15.1			16.3		J	9.3		J
Copper	25 or SB	**110**			13.4			**119**			12.6			**101**			**65.3**		
Iron	2,000 or SB	**22900**			**24200**			**19000**			**30700**			**20900**			**20600**		
Lead	500*	178			12.4			190			14.2			102			103		
Magnesium	5,000*	**17900**			4920			**27800**			6460			1810			2560		
Manganese	5,000*	284			403			370			570			282			212		
Mercury	0.1	**0.33**			ND	0.017		**0.31**			ND	0.020		**0.2**			**0.23**		
Nickel	13 or SB	**67.0**			**25.1**			**47.1**			**31.3**			**99.5**			**87.3**		
Potassium	43,000*	558		J	1510			1650			2250			652		J	573		J
Selenium	2 or SB	ND	0.96		ND	0.90		ND	1.1		ND	1.1		2			ND	1.4	
Silver	SB	ND	0.32		ND	0.30		ND	0.18		0.51		J	ND	0.5		ND	0.45	
Sodium	8,000*	626		J	380		J	1100		J	589		J	1020		J	719		J
Thallium	SB	ND	1.1		ND	1.0		ND	0.99		ND	1.0		ND	1.7		ND	1.5	
Vanadium	150 or SB	31.4			25.1			27.1			26.7			22.4			32.6		
Zinc	20 or SB	**292**			**55.2**			**371**			**69.9**			**615**			**250**		

Notes and Abbreviations

1) Bold concentrations in shaded cells exceed the New York TAGM Recommended Soil Cleanup Objective or Eastern US background concentratioı

* = No Recommended Cleanup Objective has been established. The value provided is the backgroun concentration value from TAGM 4046.
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MDL = Method Detection Limit
SB = Site Background Concentration
mg/kg = Milligrams per kilograms

TABLE 2C
SUMMARY OF SOIL SAMPLING ANALYTICAL RESULTS - METALS
SITE 2
HHMT-PORT IVORY FACILITY

Location Field Sample ID Lab Sample Numb Sampling Date Matrix	New York TAGM Recommended Soil Cleanup Objective (mg/kg)	TW-40B** TP40B-120904SO06 592644 12/09/04 SOLID			TW-40B** 40B-120904SO06D 592645 12/09/04 SOLID			TW-40B TP40B120904SO12 592646 12/09/04 SOLID			TW-43A TW43A-120804SO10 592638 12/08/04 SOLID			TW-45 TW-45-122204S003 596205 12/22/04 SOLID			TW-47 TW-47-122204S007 596206 12/22/04 SOLID		
METALS		Conc	MDL	Qual	Conc	MDL	Qual	Conc	MDL	Qual	Conc	MDL	Qual	Conc	MDL	Qual	Conc	MDL	Qual
Aluminum	33,000*	4780			30800			10100			18000			4840			10100		
Antimony	SB	2.7			ND	4.7		ND	1.6		ND	2.4		ND	1.2		ND	1.4	
Arsenic	7.5 or SB	**19.6**			**85.5**			**25.3**			**50.2**			**21.2**			**8.5**		
Barium	300 or SB	211			**618**			263			**550**			75.3			33.8		J
Beryllium	0.16 (HEAST) or SB	**0.38**		J	**10.9**			**1.4**			**4.9**			**0.38**		J	**0.49**		
Cadmium	1 or SB	**1.6**			**19.4**			**2.7**			**3.1**			0.51		J	0.25		J
Calcium	35,000*	4770			17300			12300			14100			3210			1790		
Chromium	10 or SB	**28.5**			**298**			**22**			**51.7**			**12.5**			**12.4**		
Cobalt	30 or SB	4.8		J	94.5			17.1		J	**55.1**			4.5		J	4.2		J
Copper	25 or SB	**115**			**775**			**165**			**218**			**42**			15.5		
Iron	2,000 or SB	**13900**			**45200**			**69500**			**134500**			**15600**			**15500**		
Lead	500*	282			303			139			261			69.4			15.4		
Magnesium	5,000*	2190			**8180**			1970		J	2450		J	1240			1860		
Manganese	5,000*	158			386			399			443			151			76.3		
Mercury	0.1	**1.1**			**0.67**			**0.43**			**0.52**			**0.22**			0.06		
Nickel	13 or SB	**32.2**			**872**			**56.4**			**338**			11.8			**13.7**		
Potassium	43,000*	750		J	2160		J	364		J	741		J	579		J	459		J
Selenium	2 or SB	1.9			ND	5.7		3.1			**6.5**			ND	0.88		ND	1	
Silver	SB	0.93		J	1.7		J	ND	0.33		ND	0.49		ND	0.29		ND	0.33	
Sodium	8,000*	255		J	1760		J	598		J	1940		J	143		J	118		J
Thallium	SB	ND	1.1		ND	5.3		ND	1.8		ND	2.7		ND	0.99		ND	1.1	
Vanadium	150 or SB	121			**578**			27.2			69.8			24.5			17.7		
Zinc	20 or SB	**241**			**2470**			**989**			**996**			**89.4**			**43**		

Notes and Abbreviations

1) Bold concentrations in shaded cells exceed the New York TAGM Recommended Soil Cleanup Objective or Eastern US background concentratio

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TABLE 2C
SUMMARY OF SOIL SAMPLING ANALYTICAL RESULTS - METALS
SITE 2
HHMT-PORT IVORY FACILITY

Location Field Sample ID Lab Sample Numb Sampling Date Matrix	New York TAGM Recommended Soil Cleanup Objective (mg/kg)	'TW-47 TW-47-122204S017 596207 12/22/04 SOLID			'TW-48 TW-48-122304S016 596212 12/23/04 SOLID			'TW-48 TW-48-122304S018 596213 12/23/04 SOLID			TW-49 TW-49-122804S002 596817 12/28/04 SOLID			'TW-50 TW-50-122804S002 596818 12/28/04 SOLID			'TW-51 TW-51-122904S002 596857 12/29/04 SOLID		
METALS		Conc	MDL	Qual	Conc	MDL	Qual	Conc	MDL	Qual	Conc	MDL	Qual	Conc	MDL	Qual	Conc	MDL	Qual
Aluminum	33,000*	6740			4530			2700			2780			3200			3480		
Antimony	SB	ND	1.4		ND	1.4		ND	1.4		ND	1.4		ND	1.4		ND	1.5	
Arsenic	7.5 or SB	6.1			5.9			4			**7.6**			5.9			**39.8**		
Barium	300 or SB	13.4		J	25.6		J	6.7		J	55.3			11.5		J	108		
Beryllium	0.16 (HEAST) or SB	**0.49**			**0.31**		J	**0.29**		J	**0.36**		J	**0.29**		J	**0.3**		J
Cadmium	1 or SB	0.32		J	0.11		J	ND	0.098		ND	0.095		ND	0.096		ND	0.1	
Calcium	35,000*	429		J	281		J	213		J	1620			329		J	2190		
Chromium	10 or SB	**11.7**			8.2			6.6			9.4			7.2			**11.7**		
Cobalt	30 or SB	7.4		J	7.6		J	2.3		J	3.3		J	2.4		J	5.3		J
Copper	25 or SB	8.3			5.5		J	4.3		J	**32.2**			12.7			**59.8**		
Iron	2,000 or SB	**18600**			**8330**			**10200**			**15000**			**9670**			**15000**		
Lead	500*	5.5			4.1			3.2			51.1			4.7			86.9		
Magnesium	5,000*	1450			860		J	482		J	1160			549		J	797		J
Manganese	5,000*	103			29.6			29.1			103			31.8			146		
Mercury	0.1	ND	0.02		ND	0.02		ND	0.02		**0.12**			ND	0.02		**0.21**		
Nickel	13 or SB	8.8		J	6.3		J	3.4		J	**16.4**			4.1		J	**39.8**		
Potassium	43,000*	724		J	462		J	411		J	368		J	311		J	343		J
Selenium	2 or SB	ND	1		ND	1		ND	1		1.8			ND	1		1.2		J
Silver	SB	ND	0.33		ND	0.33		ND	0.34		ND	0.33		ND	0.33		ND	0.36	
Sodium	8,000*	136		J	107		J	111		J	90.2		J	ND	94.6		ND	103	
Thallium	SB	ND	1.1		ND	1.1		ND	1.2		ND	1.1		ND	1.1		ND	1.2	
Vanadium	150 or SB	20			13.4			12.9			17.3			12.9			26.5		
Zinc	20 or SB	**34.6**			**22.2**			**20.1**			**127**			**20.4**			**96.9**		

Notes and Abbreviations

1) Bold concentrations in shaded cells exceed the New York TAGM Recommended Soil Cleanup Objective or Eastern US background concentratio

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mg/kg = Milligrams per kilograms

TABLE 2C
SUMMARY OF SOIL SAMPLING ANALYTICAL RESULTS - METALS
SITE 2
HHMT-PORT IVORY FACILITY

Location Field Sample ID Lab Sample Numb Sampling Date Matrix	New York TAGM Recommended Soil Cleanup Objective (mg/kg)	'TW-52 TW-52-122904S002 596856 12/29/04 SOLID			TW-68 033105S001 620686 03/31/05 SOLID			TW-69 033105S004 620687 03/31/05 SOLID			TW-70A 033105S002 620688 03/31/05 SOLID			TW-71A 040105S005 620937 04/01/05 SOLID			TW-71A 040105S007 620938 04/01/05 SOLID		
METALS		Conc	MDL	Qual	Conc	MDL	Qual	Conc	MDL	Qual	Conc	MDL	Qual	Conc	MDL	Qual	Conc	MDL	Qual
Aluminum	33,000*	5000			8020			8320			5650			9990			4620		
Antimony	SB	ND	1.4		5.1			4.7			ND	1.2		ND	0.95		ND	0.93	
Arsenic	7.5 or SB	**99.3**			**24.0**			**31.1**			**23.1**			3.4			4.2		
Barium	300 or SB	151			**313**			**409**			91.1			12.8		J	7.6		J
Beryllium	0.16 (HEAST) or SB	**0.32**		J	**0.76**			**0.91**			**0.29**		J	**0.43**		J	**0.33**		J
Cadmium	1 or SB	ND	0.095		**1.4**		J	**3.6**			ND	0.082		ND	0.098		ND	0.096	
Calcium	35,000*	10900			21200			17500			17700			537		J	335		J
Chromium	10 or SB	**16.1**			**28.3**			**59.2**			**16.0**			**12.3**			8.1		
Cobalt	30 or SB	5.1		J	9.8		J	10.9		J	7.5		J	4.0		J	4.0		J
Copper	25 or SB	**56.3**			**307**			**347**			**88.0**			10.8			6.6		
Iron	2,000 or SB	**18700**			**41600**			**35800**			**18600**			**14900**			**11200**		
Lead	500*	65.7			541			660			80.7			6.5			3.8		
Magnesium	5,000*	3890			3780			3560			9030			1690			814		J
Manganese	5,000*	111			631			293			218			61.2			36.1		
Mercury	0.1	**0.45**			**1.4**			**2.7**			**0.30**			ND	0.020		ND	0.020	
Nickel	13 or SB	**33.5**			**38.6**			**84.1**			**22.6**			**9.5**			**6.0**		J
Potassium	43,000*	352		J	1080		J	887		J	476		J	484		J	493		J
Selenium	2 or SB	1.3			1.9			**3.2**			1.1			ND	1.1		ND	1.1	
Silver	SB	ND	0.33		0.79		J	1.3		J	ND	0.29		ND	0.20		ND	0.19	
Sodium	8,000*	ND	93.8		270		J	354		J	275		J	106		J	ND	86.5	
Thallium	SB	ND	1.1		ND	1.5		ND	1.5		ND	0.96		ND	1.1		ND	1.1	
Vanadium	150 or SB	73.7			62.2			80.9			30.8			17.6			14.3		
Zinc	20 or SB	**269**			**720**			**901**			**109**			**32.9**			**23.1**		

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TABLE 2C
SUMMARY OF SOIL SAMPLING ANALYTICAL RESULTS - METALS
SITE 2
HHMT-PORT IVORY FACILITY

Location Field Sample ID Lab Sample Numb Sampling Date Matrix	New York TAGM Recommended Soil Cleanup Objective (mg/kg)	TW-72 TW-72-040405S004 621712 04/04/05 SOLID			TW-73 TW-73-040405S005 621713 04/04/05 SOLID			TW-73 TW-73-040405S008 621714 04/04/05 SOLID			TW-74 4-040105S005 620939 04/01/05 SOLID			TW-75 040105S006 620940 04/01/05 SOLID			TW-76 TW-76-040505S006 621716 04/05/05 SOLID		
METALS		**Conc**	**MDL**	**Qual**	**Conc**	**MDL**	**Qual**	**Conc**	**MDL**	**Qual**	**Conc**	**MDL**	**Qual**	**Conc**	**MDL**	**Qual**	**Conc**	**MDL**	**Qual**
Aluminum	33,000*	5820			6950			7040			4650			1610			5800		
Antimony	SB	ND	0.94		ND	1.00		ND	0.92		ND	0.92		ND	1.1		ND	0.92	
Arsenic	7.5 or SB	**29.7**			**14.9**			4.5			7.4			**15.2**			2.7		
Barium	300 or SB	173			107			11.5		J	12.9		J	45.4		J	10.7		J
Beryllium	0.16 (HEAST) or SB	**0.52**			**0.52**			**0.36**		J	**0.34**		J	0.16		J	**0.34**		J
Cadmium	1 or SB	ND	0.097		ND	0.10		ND	0.095		ND	0.094		ND	0.11		ND	0.094	
Calcium	35,000*	7340			3900			376		J	584		J	1190		J	484		J
Chromium	10 or SB	**16.4**			**14.4**			10.0			8.1			5.5			8.7		
Cobalt	30 or SB	7.9		J	6.1		J	5.3		J	3.4		J	2.5		J	2.6		J
Copper	25 or SB	**83.2**			**49.9**			9.6			22.4			20.5			7.7		
Iron	2,000 or SB	**23800**			**17600**			**11900**			**12200**			**12000**			**10500**		
Lead	500*	138			77.1			5.3			6.5			62.3			4.6		
Magnesium	5,000*	2810			1970			1280			828		J	373		J	937		J
Manganese	5,000*	163			109			47.5			74.9			122			40.9		
Mercury	0.1	0.59			**0.32**			ND	0.020		ND	0.020		**0.23**			ND	0.020	
Nickel	13 or SB	**72.4**			**45.6**			**7.9**		J	**6.1**		J	**7.6**		J	**7.9**		J
Potassium	43,000*	515		J	569		J	546		J	391		J	418		J	374		J
Selenium	2 or SB	ND	2.3		ND	1.2		ND	1.1		1.3			ND	6.6		ND	1.1	
Silver	SB	ND	0.19		ND	0.20		ND	0.19		ND	0.19		ND	0.23		ND	0.19	
Sodium	8,000*	ND	87.4		101		J	ND	85.4		ND	85.2		ND	102		371		J
Thallium	SB	ND	1.1		ND	1.1		ND	1.0		ND	1.0		ND	1.9		ND	1.0	
Vanadium	150 or SB	25.4			22.9			15.3			14.3			13.4		J	13.5		
Zinc	20 or SB	**171**			**128**			**25.4**			**24.8**			**35.0**			**28.3**		

Notes and Abbreviations

1) Bold concentrations in shaded cells exceed the New York TAGM Recommended Soil Cleanup Objective or Eastern US background concentratioı

* = No Recommended Cleanup Objective has been established. The value provided is the backgroun concentration value from TAGM 4046.

** = Field Duplicate Samples

J = Reported value is less than the reporting limit but greater than the instrument detection limit

ND = The compound was not detected

Conc = Concentration

Qual = Laboratory Data Qualifier

MDL = Method Detection Limit

SB = Site Background Concentration

mg/kg = Milligrams per kilograms

TABLE 2C
SUMMARY OF SOIL SAMPLING ANALYTICAL RESULTS - METALS
SITE 2
HHMT-PORT IVORY FACILITY

Location	New York TAGM	TW-77			TW-78			TWP-13			TWP-14			TWP-14		
Field Sample ID	Recommended Soil	TW-77-040505S004			TW-78-040505S003			033005S002			4040105S007			040105S009		
Lab Sample Numb	Cleanup Objective	621717			621718			620685			620941			620942		
Sampling Date	(mg/kg)	04/05/05			04/05/05			03/30/05			04/01/05			04/01/05		
Matrix		SOLID			SOLID			SOLID			SOLID			SOLID		
METALS		Conc	MDL	Qual	Conc	MDL	Qual	Conc	MDL	Qual	Conc	MDL	Qual	Conc	MDL	Qual
Aluminum	33,000*	4460			5350			5830			5690			4180		
Antimony	SB	ND	0.97		ND	0.98		ND	1.3		ND	1.0		ND	0.91	
Arsenic	7.5 or SB	**8.7**			**9.2**			3.8			5.4			3.3		
Barium	300 or SB	69.2			122			44.3			24.2		J	6.9		J
Beryllium	0.16 (HEAST) or SB	**0.51**			**0.36**		J	**0.35**		J	**0.30**		J	**0.23**		J
Cadmium	1 or SB	ND	0.099		ND	0.10		ND	0.091		ND	0.11		ND	0.093	
Calcium	35,000*	1440			8940			2160			1060		J	263		J
Chromium	10 or SB	**12.0**			**22.7**			**13.2**			8.8			9.0		
Cobalt	30 or SB	4.7		J	2.5		J	4		J	2.2		J	3.0		J
Copper	25 or SB	**37.5**			**66.8**			19.9			**172**			5.8		
Iron	2,000 or SB	**14200**			**16500**			**14900**			**8380**			**11400**		
Lead	500*	52.6			53.5			19.4			45.5			3.5		
Magnesium	5,000*	716		J	2310			1830			758		J	958		J
Manganese	5,000*	84.2			82.2			197			37.8			52.2		
Mercury	0.1	**1.1**			**0.28**			0.06			0.05			ND	0.019	
Nickel	13 or SB	**18.6**			**24.9**			**9.6**			**6.3**		J	**5.0**		J
Potassium	43,000*	404		J	415		J	566		J	386		J	491		J
Selenium	2 or SB	ND	2.3		ND	1.2		ND	0.96		ND	1.2		ND	1.1	
Silver	SB	ND	0.20		ND	0.20		ND	0.32		ND	0.21		ND	0.19	
Sodium	8,000*	148		J	144		J	100		J	99.9		J	ND	84.1	
Thallium	SB	ND	1.1		ND	1.1		ND	1.1		ND	1.7		ND	1.0	
Vanadium	150 or SB	17.1			18.0			27.1			13.7			14.6		
Zinc	20 or SB	**80.3**			**65.5**			**38.3**			**32.3**			**22.9**		

Notes and Abbreviations

1) Bold concentrations in shaded cells exceed the New York TAGM Recommended Soil Cleanup Objective or Eastern US background concentratioi

* = No Recommended Cleanup Objective has been established. The value provided is the backgroun concentration value from TAGM 4046.

** = Field Duplicate Samples

J = Reported value is less than the reporting limit but greater than the instrument detection limit

ND = The compound was not detected

Conc = Concentration

Qual = Laboratory Data Qualifier

MDL = Method Detection Limit

SB = Site Background Concentration

mg/kg = Milligrams per kilograms

TABLE 2D
SUMMARY OF SOIL SAMPLING ANALYTICAL RESULTS - TPHC
SITE 2
HHMT-PORT IVORY FACILITY

Location	Field Sample ID	Lab Sample Number	Sampling Date	Matrix	TPHC Concentration (mg/kg)
BLDG20-C1	B20C1-032305S003	618546	03/23/05	SOLID	25.0
BLDG20-C2	B20C2-032405S002	618548	03/24/05	SOLID	275
BLDG32-C1	C1032505S003	618773	03/25/05	SOLID	1490
BLDG32-C2	032505S002	618774	03/25/05	SOLID	1060
BLDG32-C3	032505S003	618775	03/25/05	SOLID	544
BLDG32-C4	B32C4-032405S002	618549	03/24/05	SOLID	543
BLDG32-C5	B32C5-032405S002	618550	03/24/05	SOLID	1510
STAIN03-C1	STA03C1-032405S3	618551	03/24/05	SOLID	535
STAIN03-C2	STA03C2-032405S2	618552	03/24/05	SOLID	2140
STAIN03-C3	STA03C3-032405S3	618553	03/24/05	SOLID	311
UST7-C1	032905S004	620681	03/29/05	SOLID	347
UST7-C2	032905S006	620682	03/29/05	SOLID	3810
UST7-C3	033005S006	620684	03/30/05	SOLID	149
UST7-C4	032905S005	620683	03/29/05	SOLID	825
UST7-C5	032505S006	618771	03/25/05	SOLID	947
UST7-C6	032505S005	618772	03/25/05	SOLID	1140
TW-68	033105S001	620686	03/31/05	SOLID	691
TW-69	033105S004	620687	03/31/05	SOLID	294
TW-70A	033105S002	620688	03/31/05	SOLID	87.5
TW-71A	040105S005	620937	04/01/05	SOLID	4980
TW-71A	040105S007	620938	04/01/05	SOLID	183
TW-72	TW-72-040405S004	621712	04/04/05	SOLID	13000
TW-73	TW-73-040405S005	621713	04/04/05	SOLID	4030
TW-73	TW-73-040405S008	621714	04/04/05	SOLID	29.6
TW-74	4-040105S005	620939	04/01/05	SOLID	25.0
TW-75	040105S006	620940	04/01/05	SOLID	83.9
TW-76	TW-76-040505S006	621716	04/05/05	SOLID	25.0
TW-77	TW-77-040505S004	621717	04/05/05	SOLID	152
TW-78	TW-78-040505S003	621718	04/05/05	SOLID	132
TWP-13	033005S002	620685	03/30/05	SOLID	52
TW-14	4040105S007	620941	04/01/05	SOLID	310
TWP-14	040105S009	620942	04/01/05	SOLID	25.0

Notes and Abbreviations

1) No New York TAGM Recommended Soil Cleanup Objective has been established for TPHC.

mg/kg = Milligrams per kilograms
TPHC = Total petroleum hydrocarbons

soil encountered in the vicinity of soil boring location TW-47 had degraded groundwater quality. Both groundwater samples were analyzed for TCL VOCs and TCL SVOCs. Groundwater sampling results are summarized in Table 3A-B and on Figure 6. Temporary well locations are shown on Figure 3.

For the purposes of this summary of analytical results, the results have been compared to current NYSDEC AWQSGVs. The NYSDEC AWQSGVs assume that groundwater is classified as GA, a potential drinking water source. Given the location of the site and the potential for the groundwater to be saline, the published AWQSGVs are not appropriate for use at this site. However, at this time, these represent the only guidance available for ambient groundwater. Please note, the reference of these cleanup objectives in this report does not represent any agreement or concurrence that same are appropriate for usage at this site. A discussion of the analytical results from the groundwater component of the investigation is provided below.

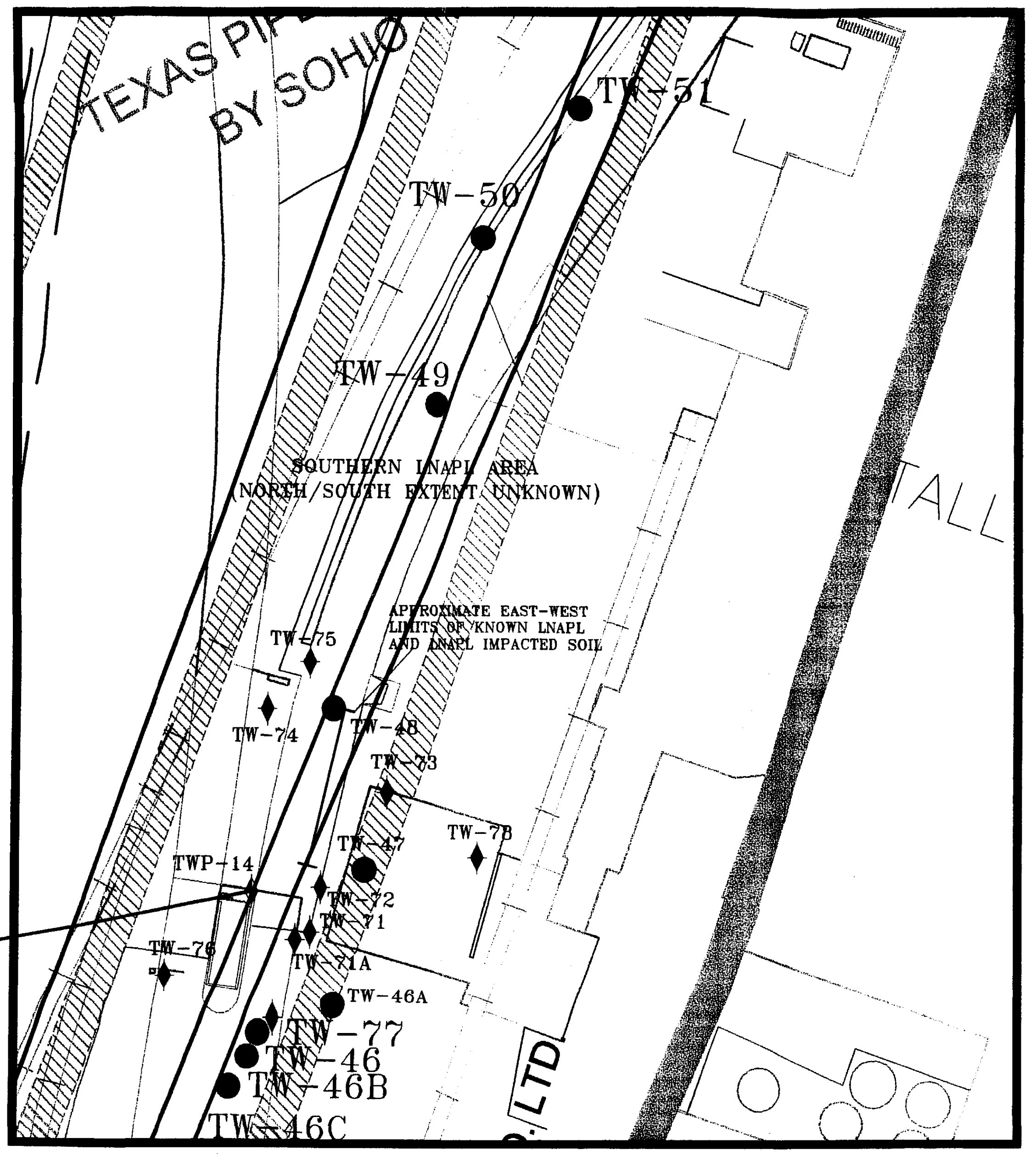
Acetone, a common laboratory solvent, was the only compound detected at a concentration greater than its AWQSGV. The total concentration of VOC TICs detected in the groundwater sample collected at location TWP-13 was 190 ug/L. No VOC TICs were detected in the groundwater sample collected at location TWP-14.

Neither targeted SVOCs nor SVOC TICs were detected in the groundwater samples collected at temporary well locations TWP-13 and TWP-14.

Quality Assurance/Quality Control – Groundwater Samples

To monitor the effectiveness of the field decontamination procedures and the degree to which the laboratory may have contaminated the groundwater samples, QA/QC samples were collected. The Port Authority collected one field blank and one trip blank. The field blank was analyzed for TCL SVOCs and was prepared by running laboratory-grade DI water over the sampling equipment. The trip blank was prepared by the analytical laboratory and was shipped with the groundwater sampling jars from the laboratory and transported to the laboratory with the groundwater samples. The field blank was analyzed for TCL VOC and TCL SVOC, while the trip blank was analyzed for VOCs only.

No targeted VOCs, VOC TICs, targeted SVOCs, or SVOC TICs were detected in the field blank (see Table 3A-B for a summary of the QA/QC results). It can therefore be inferred that the field decontamination procedures were effective.



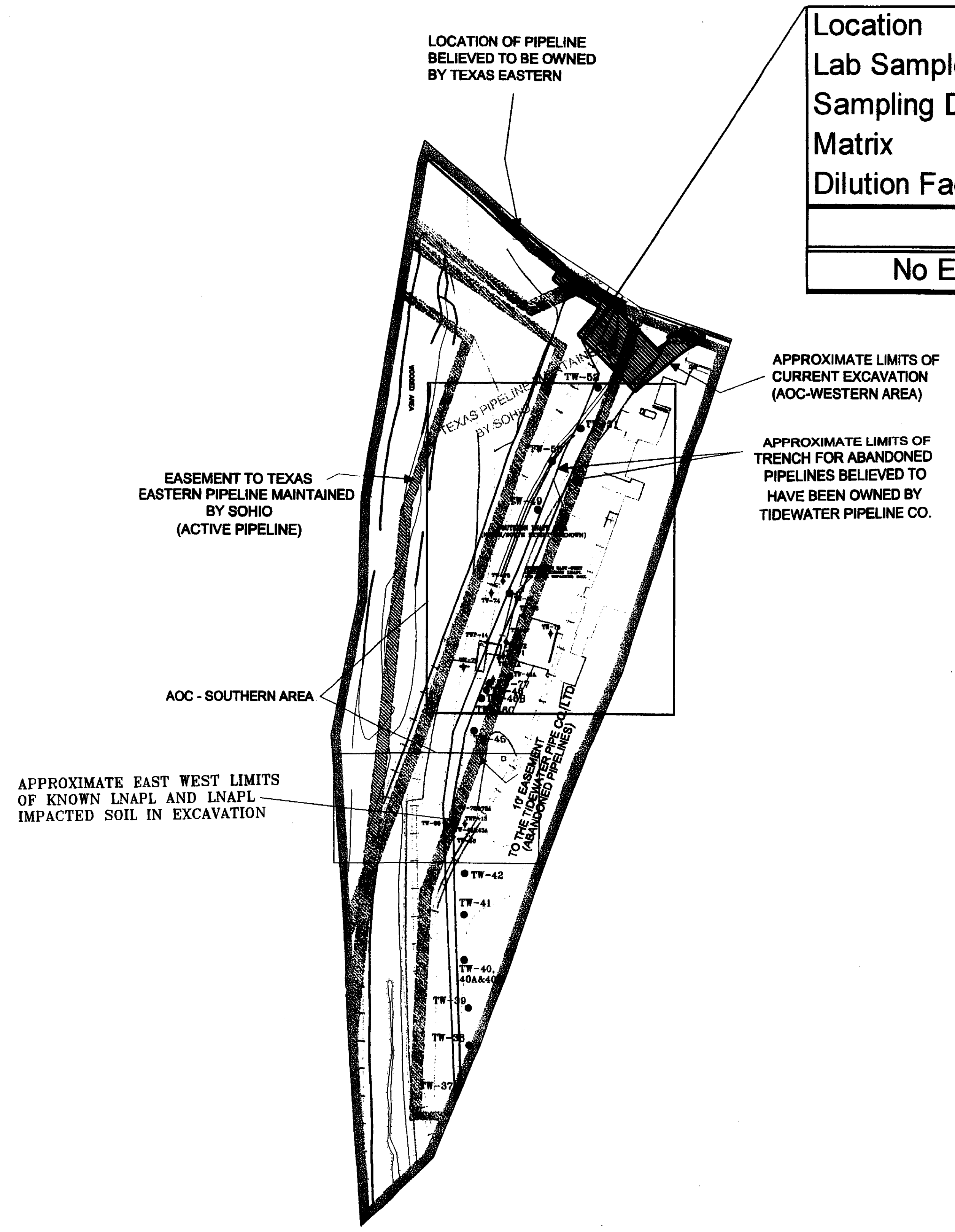
Location	TWP-14
Lab Sample #	623615
Sampling Date	04/12/05
Matrix	WATER
Dilution Factor	1
No Exceedence	

ENLARGEMENT OF AOC-SOUTHERN AREA

40 0 40 80
SCALE IN FEET

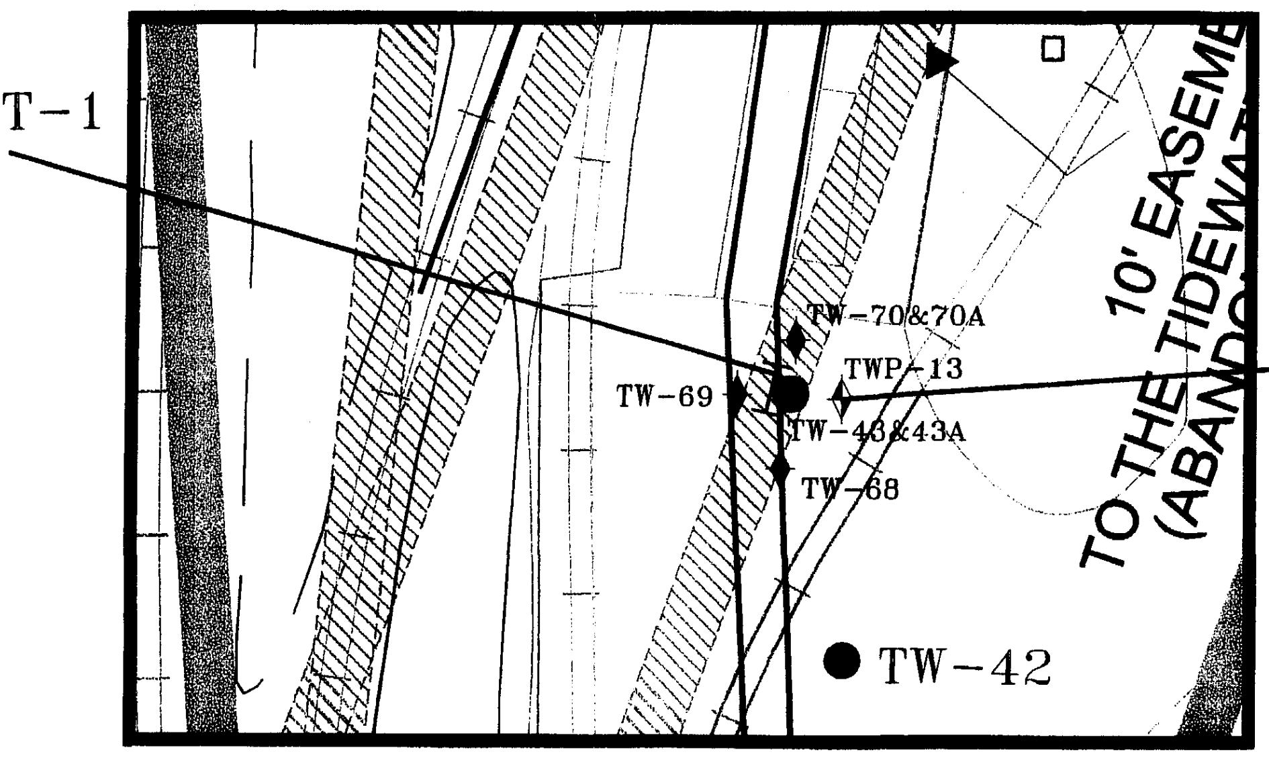
AOC-SOUTHERN AREA
AND AOC-WESTERN AREA

120 0 120 240
SCALE IN FEET



Location	HHPI-PIT
Lab Sample #	81605
Sampling Date	8/16/05
Matrix	WATER
Dilution Factor	
No Exceedence	

APPROXIMATE EAST WEST LIMITS
OF KNOWN LNAPL AND LNAPL
IMPACTED SOIL IN EXCAVATION EXT-1



Location	TWP-13
Lab Sample #	623614
Sampling Date	04/12/05
Matrix	Aqueous
Dilution Factor	2
VOCs	Conc
Acetone	**190**

40 0 40 80
SCALE IN FEET

ENLARGEMENT OF AOC - SOUTHERN AREA

Notes:

1. Please refer to Figure 3, Site 2 Sampling Location Map, for the location of the enlargement windows.

2. Only compounds that exceed the New York State Ambient Water Quality Standards and Guidance Values are shown on the map.

3. All groundwater sampling concentrations are provided in units of micrograms per liter (ug/L).

Conc – concentration
ug/L – milligrams per liter
VOCs – Volatile Organic Compounds

Location Field Sample ID Lab Sample Number Sampling Date Matrix Dilution Factor	New York State Ambient Water Quality Standards and Guidance Values (ug/L)
VOCs	
Acetone	50

L E G E N D

▨	UTILITY EASEMENT
─┼─┼─	RAILROAD TRACKS
▬	SITE BOUNDARY
● TW-27	SRI SOIL BORING LOCATION
◆ TW-63	SRI STEP OUT SOIL BORING LOCATION
◇ TWP-10	SRI STEP OUT TEMPORARY WELL POINT LOCATION

Sheet of

**THE PORT AUTHORITY
OF NY & NJ**

ENGINEERING PROGRAM MANAGER

No.	Date	Revision	Approved

ENGINEERING DEPARTMENT

Title
(BLOCK 1400, LOT 1 AND
SOUTHERN END OF
BLOCK 1338, LOT 1)
HHMT-PORT IVORY
FACILITY

SITE 2 (AREA 2B)
GROUNDWATER
SAMPLING ANALYTICAL
RESULTS
MAP

This drawing subject to conditions in contract. All inventions, ideas, designs and methods herein are reserved to Port Authority and may not be used without its written consent.

BFJ
Designed by Drawn by Checked by

Date

Contract
Number

Drawing
Number **FIGURE 6**

P:\232952wmd\REMEDIAL ACTIONS\Remedial Petroleum Issues Block 1338\LNAPL Investigation Res\Site2A2B Report\Figures\Analytical Results Site 2B GW

TABLE 3A
SUMMARY OF GROUNDWATER ANALYTICAL RESUTLS - VOCs
SITE 2
HHMT-PORT IVORY FACILITY

Location Field Sample ID Lab Sample Number Sampling Date Matrix Dilution Factor	New York State Ambient Water Quality Standards and Guidance Values (ug/L)	TWP-13 13-041205WG01 623614 04/12/05 WATER 2			TWP-14 14-041205WG01 623615 04/12/05 WATER 1			Field Blank FB-01-041205WQ01 623616 04/12/05 WATER 1			Trip Blank TB-01-041205WQ01 623617 04/12/05 WATER 1		
Volatile Organic Compounds (VOCs)		Conc	MDL	Qual	Conc	MDL	Qual	Conc	MDL	Qual	Conc	MDL	Qual
1,1,1-Trichloroethane	5	ND	10		ND	5.0		ND	5.0		ND	5.0	
1,1,2,2-Tetrachloroethane	5	ND	2.0		ND	1.0		ND	1.0		ND	1.0	
1,1,2-Trichloroethane	1	ND	6.0		ND	3.0		ND	3.0		ND	3.0	
1,1-Dichloroethane	5	ND	10		ND	5.0		ND	5.0		ND	5.0	
1,1-Dichloroethene	5	ND	4.0		ND	2.0		ND	2.0		ND	2.0	
1,2-Dichloroethane	0.6	ND	4.0		ND	2.0		ND	2.0		ND	2.0	
1,2-Dichloropropane	1	ND	2.0		ND	1.0		ND	1.0		ND	1.0	
2-Butanone	50	2.7		J	ND	5.0		ND	5.0		ND	5.0	
2-Hexanone	50	ND	10		ND	5.0		ND	5.0		ND	5.0	
4-Methyl-2-Pentanone	NS	ND	10		ND	5.0		ND	5.0		ND	5.0	
Acetone	50	**190**			ND	5.0		ND	5.0		ND	5.0	
Benzene	1	ND	2.0		ND	1.0		ND	1.0		ND	1.0	
Bromodichloromethane	50	ND	2.0		ND	1.0		ND	1.0		ND	1.0	
Bromoform	50	ND	8.0		ND	4.0		ND	4.0		ND	4.0	
Bromomethane	5	ND	10		ND	5.0		ND	5.0		ND	5.0	
CarbonDisulfide	NS	ND	10		ND	5.0		ND	5.0		ND	5.0	
CarbonTetrachloride	5	ND	4.0		ND	2.0		ND	2.0		ND	2.0	
Chlorobenzene	5	ND	10		ND	5.0		ND	5.0		ND	5.0	
Chloroethane	5	ND	10		ND	5.0		ND	5.0		ND	5.0	
Chloroform	7	ND	10		0.3		J	ND	5.0		ND	5.0	
Chloromethane	5	ND	10		ND	5.0		ND	5.0		ND	5.0	
cis-1,2-Dichloroethene	5	ND	10		ND	5.0		ND	5.0		ND	5.0	
cis-1,3-Dichloropropene	*0.4	ND	10		ND	5.0		ND	5.0		ND	5.0	
Dibromochloromethane	50	ND	10		ND	5.0		ND	5.0		ND	5.0	
Ethylbenzene	5	ND	8.0		ND	4.0		ND	4.0		ND	4.0	
MethyleneChloride	5	ND	6.0		ND	3.0		ND	3.0		ND	3.0	
Styrene	5	ND	10		ND	5.0		ND	5.0		ND	5.0	
Tetrachloroethene	5	ND	2.0		ND	1.0		ND	1.0		ND	1.0	
Toluene	5	ND	10		ND	5.0		ND	5.0		ND	5.0	
trans-1,2-Dichloroethene	5	ND	10		ND	5.0		ND	5.0		ND	5.0	
trans-1,3-Dichloropropene	*0.4	ND	10		ND	5.0		ND	5.0		ND	5.0	
Trichloroethene	5	ND	2.0		ND	1.0		ND	1.0		ND	1.0	
VinylChloride	2	ND	10		ND	5.0		ND	5.0		ND	5.0	
Xylene(Total)	5	ND	10		ND	5.0		ND	5.0		ND	5.0	
Total VOC Concentration	NS	192.7			0.3			0			0		
Total VOC TICs Concentration	NS	190		J	0			0			0		

Notes and Abbreviations

1) All results provided in units of micrograms per liter (ug/L).
2) Bold font in a shaded box indicates an exceedance of the standard or guidance value for the compound.

* = The standards are for total 1,3-Dichloropropene isomers
VOC TICs = Tentatively identified volatile organic compounds
ND = Not detected
J = The compound was detected at a concentration below the method detection limit (MDL). The concentration provided is an estimate.
NS = No standard or guidance value is available
Conc = Concentration
MDL = Method detection limit
Qual = Laboratory data qualifier

B 87

TABLE 3B
SUMMARY OF GROUNDWATER ANALYTICAL RESUTLS - SVOCs
SITE 2
HHMT-PORT IVORY FACILITY

Location Field Sample ID Lab Sample Number Sampling Date Matrix Dilution Factor	New York State Ambient Water Quality Standards and Guidance Values (ug/L)	TWP-13 13-041205WG01 623614 04/12/05 WATER 2			TWP-14 14-041205WG01 623615 04/12/05 WATER 1			Field Blank FB-01-041205WQ01 623616 04/12/05 WATER 1			Trip Blank TB-01-041205WQ01 623617 04/12/05 WATER 1		
Semivolatile Organic Compounds (SVOCs)		Conc	MDL	Qual	Conc	MDL	Qual	Conc	MDL	Qual	Conc	MDL	Qual
1,2,4-Trichlorobenzene	10	ND	1.0		ND	1.1		ND	1.1		NR		
1,2-Dichlorobenzene	3	ND	10		ND	11		ND	11		NR		
1,3-Dichlorobenzene	3	ND	10		ND	11		ND	11		NR		
1,4-Dichlorobenzene	3	ND	10		ND	11		ND	11		NR		
2,4,5-Trichlorophenol	**1	ND	10		ND	11		ND	11		NR		
2,4,6-Trichlorophenol	**1	ND	10		ND	11		ND	11		NR		
2,4-Dichlorophenol	**1	ND	10		ND	11		ND	11		NR		
2,4-Dimethylphenol	**1	ND	10		ND	11		ND	11		NR		
2,4-Dinitrophenol	**1	ND	40		ND	44		ND	42		NR		
2,4-Dinitrotoluene	5	ND	2.0		ND	2.2		ND	2.1		NR		
2,6-Dinitrotoluene	5	ND	2.0		ND	2.2		ND	2.1		NR		
2-Chloronaphthalene	10	ND	10		ND	11		ND	11		NR		
2-Chlorophenol	**1	ND	10		ND	11		ND	11		NR		
2-Methylnaphthalene	NS	ND	10		ND	11		ND	11		NR		
2-Methylphenol	**1	ND	10		ND	11		ND	11		NR		
2-Nitroaniline	5	ND	20		ND	22		ND	21		NR		
2-Nitrophenol	**1	ND	10		ND	11		ND	11		NR		
3,3'-Dichlorobenzidine	5	ND	20		ND	22		ND	21		NR		
3-Nitroaniline	5	ND	20		ND	22		ND	21		NR		
4,6-Dinitro-2-methylphenol	**1	ND	40		ND	44		ND	42		NR		
4-Bromophenyl-phenylether	**1	ND	10		ND	11		ND	11		NR		
4-Chloro-3-methylphenol	**1	ND	10		ND	11		ND	11		NR		
4-Chloroaniline	5	ND	10		ND	11		ND	11		NR		
4-Chlorophenyl-phenylether	NS	ND	10		ND	11		ND	11		NR		
4-Methylphenol	**1	ND	10		ND	11		ND	11		NR		
4-Nitroaniline	5	ND	20		ND	22		ND	21		NR		
4-Nitrophenol	**1	ND	40		ND	44		ND	42		NR		
Acenaphthene	20	ND	10		ND	11		ND	11		NR		
Acenaphthylene	NS	ND	10		ND	11		ND	11		NR		
Anthracene	50	ND	10		ND	11		ND	11		NR		
Benzo(a)anthracene	0.002	ND	1.0		ND	1.1		ND	1.1		NR		
Benzo(a)pyrene	MDL	ND	1.0		ND	1.1		ND	1.1		NR		
Benzo(b)fluoranthene	0.002	ND	1.0		ND	1.1		ND	1.1		NR		
Benzo(g,h,i)perylene	NS	ND	10		ND	11		ND	11		NR		
Benzo(k)fluoranthene	0.002	ND	1.0		ND	1.1		ND	1.1		NR		
bis(2-Chloroethoxy)methane	5	ND	10		ND	11		ND	11		NR		
bis(2-Chloroethyl)ether	1	ND	1.0		ND	1.1		ND	1.1		NR		
bis(2-chloroisopropyl)ether	5	ND	10		ND	11		ND	11		NR		
bis(2-Ethylhexyl)phthalate	5	ND	10		ND	11		ND	11		NR		
Butylbenzylphthalate	50	ND	10		ND	11		ND	11		NR		
Carbazole	NS	ND	10		ND	11		ND	11		NR		
Chrysene	0.002	ND	10		ND	11		ND	11		NR		
Dibenz(a,h)anthracene	NS	ND	1.0		ND	1.1		ND	1.1		NR		
Dibenzofuran	NS	ND	10		ND	11		ND	11		NR		
Diethylphthalate	50	ND	10		ND	11		ND	11		NR		
Dimethylphthalate	50	ND	10		ND	11		ND	11		NR		
Di-n-butylphthalate	50	ND	10		ND	11		ND	11		NR		
Di-n-octylphthalate	50	ND	10		ND	11		ND	11		NR		
Fluoranthene	50	ND	10		ND	11		ND	11		NR		
Fluorene	50	ND	10		ND	11		ND	11		NR		
Hexachlorobenzene	0.04	ND	1.0		ND	1.1		ND	1.1		NR		
Hexachlorobutadiene	0.5	ND	2.0		ND	2.2		ND	2.1		NR		
Hexachlorocyclopentadiene	5	ND	10		ND	11		ND	11		NR		
Hexachloroethane	5	ND	1.0		ND	1.1		ND	1.1		NR		
Indeno(1,2,3-cd)pyrene	0.002	ND	1.0		ND	1.1		ND	1.1		NR		
Isophorone	50	ND	10		ND	11		ND	11		NR		
Naphthalene	10	ND	10		ND	11		ND	11		NR		
Nitrobenzene	5	ND	1.0		ND	1.1		ND	1.1		NR		
N-Nitroso-di-n-propylamine	50	ND	1.0		ND	1.1		ND	1.1		NR		
N-Nitrosodiphenylamine	50	ND	10		ND	11		ND	11		NR		
Pentachlorophenol	**1	ND	40		ND	44		ND	42		NR		
Phenanthrene	50	ND	10		ND	11		ND	11		NR		
Phenol	**1	ND	10		ND	11		ND	11		NR		
Pyrene	50	ND	10		ND	11		ND	11		NR		
Total SVOC Concentration	NS	0			0			0			NR		
Total SVOC TICs Concentration	NS	0			0			0			NR		

Notes and Abbreviations

1) All results provided in units of micrograms per liter (ug/L).

** = The standards are for total chlorinated and non-chlorinated isomers
SVOC TICs = Tentatively identified semivolatile organic compound
ND = Not detected
NS = No standard or guidance value is available
Conc = Concentration
MDL = Method detection limit
Qual = Laboratory data qualifier
NR = Not analyzed

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Neither targeted VOCs nor VOC TICs were detected in the trip blank. This is one indication that the analytical laboratory may not have contaminated the groundwater samples, although other QA/QC sample results must also be analyzed as required by the method in order to confirm this conclusion.

8.0 DISCUSSION/CONCLUSIONS

The overall goal of these investigations was to determine whether further investigative and/or remedial efforts are warranted for media at Site 2 given the proposed site redevelopment for commercial (intermodal facility) purposes. To meet the previously stated objectives, the SRI included the collection of soil samples at Area 2A and the collection of both soil and groundwater samples at Area 2B.

While the presence of LNAPL in soil is itself an impact, the field component of the SRI indicated that the majority of soil at Area 2A and soil and groundwater at Area 2B have not been degraded with respect to regulated metals and organic compounds and relative to the impacts attributable to fill materials placed at the HHMT-Port Ivory Facility by P&G. In general, the concentrations of metals and organic compounds detected in the soil samples collected at Area 2A during the SRI are similar to those detected in soil throughout the HHMT-Port Ivory Facility and are attributable to the former placement of fill by P&G. Soil in areas of concern AOC-Bldg20 and AOC-Bldg32/32A did not suggest the presence of LNAPL-impacted soil and did not contain any metal or compound that was targeted for analysis at a concentration above its respective RSCO. However, LNAPL-impacted soil was encountered at locations within AOC-UST7 and arsenic was detected in soil at locations within AOC Stain 3 at concentrations in excess of those detected throughout the HHMT-Port Ivory Facility (i.e., in excess of the arsenic concentrations believed to be attributable to the former placement of fill by P&G).

In general, the concentrations of metals and compounds detected in soil at Area 2B were similar to those detected throughout the HHMT-Port Ivory Facility and are attributable to the former placement of fill by P&G. Soil at three soil boring locations (TW-71A, TW-72, and TW-73) contained TPHC and VOC TICs at concentrations that were greater than those typically encountered in fill materials placed by P&G. LNAPL-impacted soil was encountered at two separate locations along the Tidewater pipelines. Based on the analytical data for groundwater samples collected at temporary well locations TWP-13 and TWP-14, both installed where LNAPL-impacted soil was present, LNAPL-impacted soil at Area 2B is not a source of groundwater impacts.

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The following is a discussion of the data, including field observations, geophysical data, analytical data, and data generated prior to this SRI (as necessary). The discussion is organized based on the different objectives for the SRI. The data obtained during implementation of the SRI at Area 2A are discussed in Section 8.1. The data obtained during implementation of the SRI at Area 2B are discussed in Sections 8.2.1 through 8.2.6, each of which addresses one of the objectives of the SRI at Area 2B.

8.1 Soil Analytical Results and Field Observations – Area 2A

The following sections discuss the analytical results and the field observations associated with each of the four AOCs investigated at Area 2A during the SRI: AOC-Stain3, AOC-UST7, AOC-Bldg20, and AOC-Bldg32/32A.

AOC-Stain3

AOC-Stain3 was investigated to confirm that the Port Authority's previous removal of discolored soil from the unfinished floor of Building No. 20 had successfully remediated soil at this portion of the facility. One soil sample was collected from the top two feet of each of three soil borings advanced at AOC-Stain3. Discolored soil was observed at all three soil boring locations. However, based on field observations (i.e., the lack of odor, the lack of elevated PID readings, and the light gray color of the soil), the discoloration is not associated with petroleum impacts.

The analytical results for the soil samples collected at AOC-Stain3 indicate that, although the SVOC phenol, various PAH compounds, and various metals were detected at concentrations above their respective RSCOs, the presence of these compounds and metals is generally attributable to the former placement of fill at the HHMT-Port Ivory Facility by P&G. However, the concentrations of arsenic detected in the soil samples collected at locations STAIN03-C1 and STAIN03-C2 was greater than those typically detected in the fill materials placed by P&G. The concentration of arsenic detected in the soil sample collected at STAIN03-C3 exceeded the RSCO for arsenic but is consistent with arsenic concentrations detected in fill placed at HHMT-Port Ivory by P&G.

A comparison between the analytical data generated for soil in this AOC during the SI and SRI indicates that soil impcated by PAH compounds has been successfully remediated through soil removal efforts completed after the SI but before the SRI. The sample collected at AOC-Stain3 prior to removal of the soil (i.e., during the SI), identified as soil sample STAIN03, contained a concentration of total PAH compounds of more than 2,300 mg/kg. In addition, the concentrations of individual PAH compounds were as great as 540 mg/kg. In the three soil samples collected at AOC-Stain3 during the SRI, the concentrations of total PAH compounds ranged from approximately 3.9 to 14.3 mg/kg and the greatest concentration of any individual PAH compound was 2 mg/kg.

A comparison of the soil analytical data from the SI to that generated during the SRI indicates a general decline in the concentrations of TAL metals detected in soil. Of the eight TAL metals (arsenic, beryllium, chromium, copper, iron, mercury, nickel, and zinc) detected at concentrations above their respective RSCOs in the soil samples collected during the SRI, six were detected at greater concentrations in the SI sample STAIN-3B. Therefore, with exception of the metals arsenic and nickel, the soil that was removed from AOC-Stain3 (by the Port Authority) appears to have contained metals at higher concentrations than the soil currently present in that AOC. In addition, the concentration of nickel in soil at this AOC has increased only slightly, from a maximum concentration of 34 mg/kg in soil sampled during the SI to a maximum concentration of 35.6 mg/kg in samples of soil that remains at AOC-Stain3. The overall reduction in the concentration of total metals, which was as great as almost 117,000 mg/kg, currently ranges up to approximately 64,400 mg/kg (i.e., a 45% reduction). This reduction further demonstrates that the soil removal efforts by Port Authority resulted in a significant decrease in the concentration of contaminants present at AOC-Stain 3. Aluminum, calcium, iron, magnesium, potassium, and sodium together constitute, by mass, approximately 96% to 99.5% of the metals that were detected in soil at this AOC. The listed metals are not considered to pose a significant threat to human health, and consequently are not listed in the US Environmental Protection Agency's Integrated Risk Information System (IRIS) database except when they form compounds with hazardous materials (e.g., calcium cyanide is listed, but calcium itself is not).

Based on the SRI soil sampling analytical data, samples collected from soil currently at AOC-Stain3 generally contain lower concentrations of PAH compounds and metals than samples collected during the SI. The soil sampled during the SI was removed by the Port Authority. Although soil degraded (with respect to environmental quality) by arsenic remains at location AOC-Stain3, the construction of impervious cover over this soil will prevent both direct contact with the soil and migration of the arsenic to groundwater. Therefore, no further investigative or remedial actions are warranted with respect to soil at AOC-Stain3.

AOC-UST7

AOC-UST7 was investigated to confirm that the Port Authority's removal of two USTs that were closed in place by P&G (i.e., were filled with inert materials) and the associated soil removal effort had successfully remediated LNAPL-impacted soil at this portion of the facility. One soil sample was collected from each of six soil borings drilled at AOC-UST7.

Indications of LNAPL-impacted soil were observed at only two soil boring locations, UST7-C2 and UST7-C4. The indications of potentially LNAPL-impacted soil were encountered at depths of between 7 and 11 feet bgs and included one or more of the following: discolored soil, elevated concentrations of volatile organic vapors in the soil (as measured using a PID), and odors. In addition, discrete ganglia of LNAPL were encountered between 8 and 9 feet bgs at soil boring location UST7-C2. The LNAPL did not appear to be present as a saturating fluid, and therefore is not expected to be mobile.

The analytical results for the soil samples collected at AOC-UST7 exhibited similarly minimal impacts. Four PAH compounds were detected at concentrations above their respective RSCOs. These PAH compounds have been detected at similar concentrations in many soil samples collected at the facility during the SI and the RI and are attributable to fill placed by P&G.

Nine metals (arsenic, barium, beryllium, chromium, copper, iron, mercury, nickel, and zinc) were identified at AOC-UST7 at concentrations above their respective RSCOs. These metals are not associated with the petroleum products that were formerly stored in USTs at this AOC; therefore, the presence of these metals in soil at this AOC is likely due to the fill placed in this location by P&G. In addition, these metals have been detected in many soil samples collected at the facility during the SI and the RI and are believed to be attributable to the former placement of fill at the facility.

No other compounds were detected at concentrations greater than their RSCOs in any soil sample collected at AOC-UST7. The concentration (3,810 mg/kg) of TPHC detected in the soil sample collected from the depth interval where ganglia of LNAPL were observed in the soil was the greatest concentration of TPHC detected in any soil sample collected at AOC-UST7 during the SRI. The concentration of TPHC in this sample was close to the maximum typically detected in fill materials placed by P&G; however, as indicated below, this concentration is not indicative of free (i.e., mobile) LNAPL. The following is an estimation of the LNAPL saturation in the sample collected from a silty clay soil at location UST7-C2. By definition, the LNAPL saturation in the soil is the volume of LNAPL per cubic centimeter divided by the volume of pore space per cubic centimeter. Assuming that the soil has a bulk density of 1.6 tons per cubic yard (approximately 1.9 grams per cubic centimeter) and based on the analytical data showing that the LNAPL constitutes 3.81 parts per thousand of the dry soil-LNAPL mix, there are approximately 0.0072 grams of LNAPL per cubic centimeter of soil and void. Assuming that the LNAPL has a specific gravity of about 1, the volume of LNAPL per cubic centimeter of soil and void is 0.0072 cubic centimeters. For the purposes of this analysis, the porosity of the soil is assumed to be between 10% and 50%, a wide range that likely includes the actual porosity. A porosity of 10% constitutes 0.1 cubic centimeters of void space per cubic centimeter of soil and void space, while a porosity of 50% corresponds to 0.5 centimeters of void space per cubic centimeter of soil and void space. Therefore, the saturation of LNAPL in the soil ranges from approximately 1.4% to 7.2% and the LNAPL is almost certainly in a residual (i.e., immobile state). The remaining 92.8% to 98.6% of the porosity is filled with water, effectively isolating the LNAPL. In addition, according to Physical and Chemical Hydrogeology (Domenico and Schwartz, 1998), the residual saturation for LNAPL in the saturated zone is between 10% and 50%. This analysis confirms the field observation that the LNAPL was present in discrete "ganglia" within the silty clay soil.

Because the concentrations of PAH compounds and metals in the soil are attributable to the former placement of fill at the HHMT-Port Ivory Facility by P&G, neither additional investigative nor remedial activities are warranted with respect to the concentrations of these substances in soil at AOC-UST7. LNAPL-impacted soil appears to be present in residual quantities at two locations at AOC-UST7. The fact that these locations are not adjacent suggests that the majority of LNAPL-impacted soil was removed successfully by P&G, but that limited quantities of LNAPL-impacted soil were left in place at the edges of the excavation. Groundwater samples collected during the SI at temporary well location TMW-01 did not indicate that groundwater was degraded by these limited quantities of LNAPL-impacted soil. Therefore, no further investigative or remedial actions are required with respect to AOC-UST7.

AOC-Bldg20

AOC-Bldg20 was investigated to confirm that P&G's closure of a UST containing #6 fuel oil and its associated soil removal effort had successfully remediated LNAPL-impacted soil at this portion of the facility. One soil sample was collected from each of two soil borings at AOC-Bldg20. No indications of LNAPL-impacted soil were observed at either soil boring location.

Benzo(a)pyrene was detected at a concentration slightly greater than its RSCO. This PAH compound has been detected at similar concentrations in many soil samples collected at the facility during the SI and the RI and is believed to be attributable to fill placed by P&G.

Six metals (arsenic, beryllium, chromium, copper, iron, and zinc) were identified at AOC-Bldg20 at concentrations above their respective RSCOs. These metals are not associated with the petroleum products that were formerly stored in USTs at this AOC; therefore, the presence of these metals in soil at this AOC is likely due to the former placement of fill at this location by P&G. In addition, these metals have been detected at similar concentrations in many soil samples collected at the facility during the SI and the RI and are believed to be attributable to fill placed by P&G.

No other compound was detected at a concentration greater than its RSCO in either soil sample collected at AOC-Bldg20. The concentrations of TPHC in the soil samples collected at this AOC were low relative to what may be expected for soil impacted by petroleum, but are consistent with TPHC concentrations attributable to fill placed by P&G.

Based on the relatively low concentrations of TPHC and the absence of indications of LNAPL impacts, soil at this AOC does not appear to be impacted by fuel oil/petroleum. Analytical results confirm that soil impacts in this AOC are relatively minor and are attributable to fill placed by P&G. The soil at this AOC is unlikely to be a source area for groundwater contamination. Therefore, neither additional investigative nor remedial actions are warranted at this AOC.

AOC-Bldg32/32A

AOC-Bldg32/32A was investigated to confirm that P&G's closure of three USTs containing #6 and #2 fuel oils and diesel fuel and its associated soil removal effort had successfully remediated LNAPL-impacted soil at this portion of the facility. One soil sample was collected from each of five soil borings at AOC-Bldg32/32A.

Indications of potentially degraded (with respect to environmental quality) soil were observed at only one soil boring location, Bldg32-C3, that was drilled in this AOC. Discolored soil was observed in the five to six foot bgs depth interval. Because neither odor nor sheen were observed and because the concentration of volatile organic vapors (as measured using a PID) in soil was not elevated above background in this depth interval, the discoloration is not believed to be attributable to petroleum.

Three PAH compounds, Benzo(a)anthracene, Benzo(a)pyrene, and Dibenz(a,h)anthracene, were detected at concentrations greater than their respective RSCOs in at least one soil sample collected at this AOC during the SRI. These PAH compounds have been detected at similar concentrations in many soil samples collected at the facility during the SI and the RI and are believed to be attributable to fill placed by P&G.

Eight metals (arsenic, beryllium, chromium, copper, iron, mercury, nickel, and zinc) were identified at AOC-Bldg32/32A at concentrations above their respective RSCOs. These metals are not associated with the petroleum products that were formerly stored in USTs at this AOC; therefore, the presence of these metals in soil at this AOC is likely due to the former placement of fill at this location by P&G. In addition, these metals have been detected at similar concentrations in many soil samples collected at the facility during the SI and the RI and are believed to be attributable to fill placed by P&G.

No other compound was detected at a concentration greater than its RSCO in either soil sample collected at AOC-Bldg32/32A. The concentrations of TPHC in the soil samples collected at this AOC were low relative to what may be expected for soil impacted by fuel oil, but were consistent with those attributable to fill placed by P&G.

Based on the relatively low concentrations of TPHC and the absence of indications of LNAPL impacts, soil at this AOC does not appear to be impacted by fuel oil. The analytical results confirm that soil impacts in this AOC are relatively minor and are attributable to the former placement of fill at the facility. The soil at this AOC is unlikely to be a source area for groundwater contamination. Therefore, neither additional investigative efforts nor additional remedial efforts are warranted at this AOC.

8.2 SRI Results – Area 2B

The following sections discuss the data generated during the SRI with respect to the objectives for that portion of the SRI conducted at Area 2B. As stated above, the objectives were to determine the locations of the underground pipelines in the Tidewater easement, to confirm the presence or absence of LNAPL-impacted soil along the Tidewater pipelines, to delineate areas of LNAPL-impacted soil that were located along the Tidewater pipelines, to quantify the concentrations of regulated compounds in soil along the Tidewater pipelines, and to determine whether the presence of LNAPL-impacted soil along the Tidewater pipelines has degraded groundwater quality (i.e., is acting as a source area for regulated compounds in groundwater). These objectives are discussed in Sections 8.2.1 through 8.2.5, respectively.

8.2.1 Results of the Geophysical Surveys

The geophysical surveys were conducted to locate the inactive underground pipelines in the Tidewater easement. Approximately 650 linear feet of the pipelines were identified (see Figure 2). Based on field observations made at test pit location EXT-1, the pipelines are buried at approximately 5.5 feet bgs.

Please note that, based upon the results of the geophysical investigations conducted at Site 3, located immediately to the north of Area 2B, seven pipelines are present within the easement. These pipelines are not parallel within the utility trench. However, the large-scale trend of the utility trench is linear.

8.2.2 Presence/Absence of LNAPL-Impacted Soil Along the Tidewater Pipelines

The confirmation of the presence or absence of LNAPL-impacted soil along the Tidewater Pipeline was accomplished primarily by field observations, although analytical results were used to determine the likelihood of free (i.e., mobile) LNAPL being present.

LNAPL was not observed along the Tidewater pipelines, but LNAPL-impacted soil was observed along the Tidewater pipelines at two separate areas, collectively referred to as AOC-Southern Area. The locations where LNAPL-impacted soil was observed were test pit location EXT-1 and soil boring locations TW-43A, TW-47 and TW-48. The odor and elevated concentrations of volatile organic compounds (as measured using a PID) suggest that the impacted soil is associated with petroleum LNAPL rather than vegetable oil LNAPL, a type of LNAPL that has been observed at other locations at the HHMT-Port Ivory Facility.

Indications of LNAPL-impacted soil, including elevated concentrations of volatile organic vapors (up to 50 ppm) and the presence of discolored soil, were observed in the test pit excavated at location EXT-1. Please note that the test pit excavated at location EXT-1 was excavated as part of the geophysical survey work, and as such, no soil samples were collected at this location. Indications of LNAPL-impacted soil and sheen were observed at soil boring location TW-43A. The LNAPL-impacted soil at TW-43A was present between depths of 5.5 and 6 feet bgs, slightly below groundwater.

Indications of LNAPL-impacted soil at locations TW-47 and TW-48 included elevated PID measurements (up to 920 ppm) and the presence of odor, discolored soil, and sheen. The LNAPL-impacted soil was present between depths of 3 and 9 feet bgs.

Please note, potentially impacted soil was also encountered in the vicinity of soil borings TW-37 and TW-38, located to the east of test pit location EXT-1. An elevated concentration of volatile organic vapors (62.1 ppm) was measured in the 6.5-7 foot bgs depth interval at TW-37. The vapors were within the top few inches of a peat/meadowmat layer, and are likely related to the decay of organic matter rather than to the presence of petroleum. The maximum concentration of volatile organic vapors measured at soil boring location TW-38 was 0.5 ppm, and was also associated with a peat layer. However, discolored soils, odor, and/or sheen were present in the 3-9 foot bgs depth interval at location TW-38. Because these indications of impacted soil were not associated with elevated PID measurements (0-0.5 ppm), it is unlikely that LNAPL-impacted soil was present at this location. Please note, two soil samples were collected at TW-37 and TW-38 from the depth intervals where the soil impacts were observed. Neither of these two soil samples contained any organic compounds or metals at concentrations greater than those attributable to fill placed throughout the facility by P&G.

The SRI identified LNAPL-impacted soil, but not separate phase LNAPL, along the Tidewater pipelines; however, the potential exists for separate phase LNAPL to be present in the vicinity of soil borings drilled through LNAPL-impacted soil. Depending upon its saturation, LNAPL can be free (i.e., mobile) or residual (i.e., immobile). LNAPL that is present at low saturation (i.e., is discontinuous within the soil matrix) is immobile. LNAPL that is present at high saturation (i.e., as a continuous mass) may be mobile, depending on properties of the soil and the LNAPL. Any LNAPL that is observed to flow into a soil boring or a test pit, or that accumulates within a well or temporary well is considered to be free LNAPL. Please note that LNAPL was not observed to flow into test pit EXT-1 and that LNAPL had not accumulated within either well as of April 12, 2005, twelve days after the installation and development of well TWP-13 and eight days after the installation and development of well TWP-14. However, not observing evidence of free/mobile LNAPL does not conclusively indicate the absence of free/mobile LNAPL. Therefore, the Port Authority will investigate and/or remediate soil that is most likely to contain free LNAPL based on field observations and soil sampling analytical results. Field observations, such as the concentration of volatile organic vapors in the soil column, and analytical results, such as the concentration of TPHC, are likely indicators of LNAPL saturation. That is, soil that exhibits high concentrations of volatile organic vapors and/or TPHC is more likely to contain LNAPL at relatively high saturation (i.e., is more likely to contain free LNAPL) than soil that exhibits lower concentrations of volatile organic vapors and/or TPHC.

Concentrations of volatile organic vapors and TPHC were noted to be higher at a few locations as compared to all other locations along the Tidewater pipelines. At all locations except for soil boring location TW-47 and temporary well location TWP-14, the concentration of volatile organic vapors was below 50 ppm. However, the concentrations of volatile organic vapors at TW-47 and TWP-14 were 935 and 1,290 ppm, respectively. Likewise, except for the TPHC concentrations detected at soil boring locations TW-71A, TW-72, and TW-73, the concentration of TPHC was below 691 mg/kg (detected at location TW-68). While the TPHC concentration of 691 mg/kg and the volatile organic vapor concentration of 50 ppm do not have any particular regulatory meaning, the above analysis is intended to show the large difference between the concentrations of TPHC/volatile organic vapors detected at locations TW-71A, TW-72, and TW-73 and the concentrations detected at all other locations at Area 2B. The concentrations of TPHC at locations TW-71A, TW-72, and TW-73 were 4980, 13000, and 4030 mg/kg, respectively. Based on these results, free LNAPL is most likely to be present in the vicinity of locations TWP-14, TW-47, TW-71A, TW-72, and TW-73. Since locations TWP-14, TW-47, TW-71A, and TW-72 are located within close proximity of one another, soil in these locations will be addressed through implementation of an Interim Remedial Measure (IRM). If, during implementation, LNAPL-impacted soil in the vicinity of locations TWP-14, TW-47, TW-71A, and TW-72 is determined to contain free LNAPL, the presence of free LNAPL in the vicinity of location TW-73 also will be investigated. Please note although elevated concentrations of volatile organic compounds were measured using a PID and elevated concentrations of TPHC were detected along the Tidewater pipelines, the concentrations appear similar to those detected at other locations at the HHMT-Port Ivory facility as part of other investigations unrelated to the SRI.

8.2.3 Limits of LNAPL-impacted soil along the Tidewater pipelines

The extent of LNAPL-impacted soil at each of two locations along the Tidewater pipelines was determined primarily by field observations made during the SRI. As noted above, the first mobilization to Area 2B included the drilling of soil borings at intervals of approximately 50 feet along those portions of the Tidewater pipelines located during the geophysical investigation. In addition, a test pit (EXT-1) was excavated as part of the geophysical investigation. LNAPL-impacted soil was observed at soil boring locations TW-43A, TW-47, and TW-48 and at the test pit location EXT-1.

Based on the identification of LNAPL-impacted soil at these locations, additional soil borings were drilled and temporary wells were installed during the second mobilization. The purpose of the investigative work conducted during the second mobilization was to delineate the lateral and vertical extents of LNAPL-impacted soil away from locations TW-47, TW-48, TW-43A, and EXT-1.

Based on the field observations made during the second mobilization, the lateral extent of LNAPL-impacted soil in the vicinity of test pit location EXT-1, including TW-43A has been delineated at soil boring locations TW-68 (to the east of EXT-1), TW-69 (to the south of EXT-1), and TW-70A (to the west of EXT-1) and by temporary well location TWP-13 (to the north of EXT-1). Please note, discolored soil and odor were present in the 5.5-6 foot bgs depth interval at location TW-69; however, the extent of LNAPL-impacted soil was limited and the concentration of TPHC at this location was 294 mg/kg, which is within the range attributable to the former placement of fill throughout the HHMT-Port Ivory facility by P&G. The vertical extent of LNAPL-impacted soil in the vicinity of EXT-1 is approximately six feet bgs, as determined by field observations at EXT-1. The upper two feet of soil encountered during the excavation at test pit location EXT-1 appeared to be clean. Based on these field observations, the maximum extent of LNAPL-impacted soil in the vicinity of test pit location EXT-1, including soil boring location TW-43A is approximately 1,300 cubic feet, equivalent to approximately 48 cubic yards.

Based on the field observations made during the second mobilization, the lateral extent of LNAPL-impacted soil in the vicinity of soil boring locations TW-47 and TW-48 has been delineated at soil boring locations TW-74 (to the south of TW-48), TW-75 (to the southwest of TW-48), TW-78 (to the northeast of TW-48 and the northwest of TW-47), TW-77 (to the east-northeast of TW-47), and TW-76 (to the southeast of TW-47). The maximum vertical extent of LNAPL-impacted soil is nine feet bgs, as determined by field observations made at location TW-48. The depth to the top of the LNAPL-impacted soil varies throughout this area, being relatively shallow in areas where the water table is shallow (i.e., at location TW-72, where pavement is not present) and deeper at locations such as TW-48, where the water table is deeper (i.e., pavement is present at land surface). The minimum depth to the LNAPL-impacted soil was two feet bgs at location TW-72. Based on these field observations, the maximum volume of LNAPL-impacted soil in the vicinity of locations TW-47 and TW-48 is approximately 38,400 cubic feet, approximately 1,420 cubic yards.

As indicated above, two soil samples were collected at locations where LNAPL-impacted soil was observed. The shallower sample was collected from the depth interval that exhibited the most significant indications of LNAPL impacts, as determined primarily by the concentration of volatile organic vapors and secondarily by other field observations. The deeper soil sample was collected from a depth interval where the soil appeared to be clean (i.e., where indications of LNAPL-impacted soil were not observed). At locations where the entire soil column appeared to be clean, one soil sample was collected from the six-inch depth interval above the water table. Therefore, although field observations were the primary basis for determining the extents of LNAPL-impacted soil, the soil sampling analytical results were reviewed to confirm the limits of the LNAPL-impacted and degraded (with respect to regulated metals or compounds) soil. Analytical results for soil samples that were collected at soil boring locations that appeared to be clean or from depth intervals in the soil column below LNAPL-impacted soil did not indicate concentrations of any metal or compound at greater than those attributable to fill placed by P&G. Therefore, the analytical results confirm the maximum volumes of LNAPL-impacted soil (as based on field observations) identified above.

8.2.4 Concentrations of Regulated Compounds and Metals in Soil

This discussion of the concentrations of regulated compounds and metals in soil along the Tidewater pipelines is based on the soil sampling analytical results summarized in Table 2A-D. As indicated above, two soil samples were collected at locations where LNAPL-impacted soil was observed. The shallower sample was collected from the depth interval where the most significant indications of LNAPL-impacted soil were observed, as determined primarily by the concentration of volatile organic vapors and secondarily by other field observations. The deeper soil sample was collected from a depth interval where the soil appeared to be clean (i.e., indications of LNAPL-impacted soil were not observed). At locations where the entire soil column appeared to be clean, one soil sample was collected from the six-inch depth interval above the water table. During the first mobilization, the soil samples were analyzed for VOCs, SVOCs, and TAL metals. Once it became apparent that the presence of organic compounds was not affecting the concentrations of metals (i.e., between the first and second mobilizations), the soil samples were analyzed for VOCs, SVOCs, and TPHC.

As noted above, for the purposes of this discussion, the soil sampling analytical results were compared to the RSCOs published in NYSDEC TAGM 4046. TAGM 4046 generally regards site background as an appropriate concentration for metals and provides RSCOs for only some metals. RSCOs are provided for the following metals: arsenic, barium, beryllium, cadmium, chromium, cobalt, copper, iron, mercury, nickel, selenium, vanadium and zinc. Based on TAGM 4046, the RSCOs for all other metals are the background concentrations of the metals in site soils. However, given the presence of fill material and the urban nature of the site, it is difficult to establish a site background concentration for metals. As such, in accordance with TAGM 4046, the upper limit of the Eastern USA Background Range was utilized as the background concentration for aluminum, calcium, lead, magnesium, manganese, potassium, and sodium. It is important to recognize that the presence of a metal above an established background concentration does not constitute an exceedance of a regulatory standard. As the NYSDEC TAGM 4046 does not provide RSCOs for antimony, silver, or thallium and the background concentrations of these metals in the Eastern USA has not been established, the concentrations of these metals in soil samples collected at Area 2B were not compared to any cleanup objectives.

In general, the concentrations of compounds and metals in soil were similar to those detected at other portions of the HHMT-Port Ivory Facility. The presence of these metals and compounds in the soil is believed to be attributable to the former placement of fill at the HHMT-Port Ivory Facility by P&G. The following summarizes the analytical results by compound class.

No targeted VOCs were detected at concentrations that were typical for the fill placed at the HHMT-Port Ivory Facility by P&G. Please note, however, that the total concentration of VOC TICs detected at locations TW-71A, TW-72, and TW-73, all locations where LNAPL-impacted soil was observed, ranged from 68.7 to 202 mg/kg, which was more than an order of magnitude greater than the concentrations of VOC TICs in soil samples at locations where the soil appeared to be clean.

The SVOCs detected were generally PAH compounds, a subset of SVOCs. No SVOCs, including PAH compounds, were detected at concentrations that were atypical for the fill. Although the concentrations of individual PAH compounds were frequently above their respective RSCOs, the concentration of total PAH compounds ranged from 0 to 90.5 mg/kg, which is below the RSCO for total SVOCs. In addition, the concentration of total PAH compounds does not appear to be correlated with the presence of LNAPL-impacted soil or the concentration of TPHC. The greatest concentration of PAH compounds was detected in the soil sample collected at location TW-75, where LNAPL-impacted soil was not observed. LNAPL-impacted soil was observed at locations TW-47, TW-48, TW-71A, TW-72, and TW-73, but the concentrations of total PAH compounds in three of the four soil samples collected at these locations were lower than those collected at locations TW-51 and TW-70A, where the soil appeared to be clean. Likewise, the soil sample containing the greatest concentration of total PAH compounds (i.e., the soil sample collected at location TW-75) contained only 83.9 mg/kg TPHC, while the soil sample that contained the greatest concentration of TPHC (the soil sample collected at location TW-72) was only in the 70th percentile for the concentration of total PAH compounds. The concentration of total PAH compounds has been detected at similar concentrations at soil sampling locations throughout the facility. Therefore, the presence of PAH compounds in the soil along the Tidewater pipelines at Area 2B is not believed to be attributable to the presence of LNAPL-impacted soil, but rather to the fill placed by P&G.

No metals were detected at concentrations that were atypical for the fill placed at the HHMT-Port Ivory Facility by P&G. Please note, however, that only those soil samples collected during the first mobilization were analyzed for metals.

TPHC was detected at concentrations that are atypical for the fill at two SRI soil sampling locations (TW-71A and TW-72). In addition, the concentration of TPHC was at the upper limit that is typical of the fill at one sampling location (TW-73). The TPHC concentrations for soil samples collected at soil boring locations TW-71A, TW-72, and TW-73 from the depth intervals that exhibited the most significant indications of LNAPL-impacted soil were 4980 mg/kg, 13000, and 4030 mg/kg, respectively. All three soil samples were collected at locations where LNAPL-impacted soil was observed during drilling.

8.2.5 Groundwater Analytical Results

The objective of the groundwater sampling effort conducted at Area 2B during the SRI was to determine whether LNAPL-impacted soil along the Tidewater pipelines was a source area for regulated compounds in groundwater. As noted above, LNAPL-impacted soil was observed at two separate locations, the vicinity of test pit location EXT-1, including soil boring location TW-43A and the vicinity of soil boring locations TW-47 and TW-48) along the Tidewater pipelines. One temporary well was installed at each of these two locations to determine whether the presence of LNAPL-impacted soil had degraded groundwater quality. One groundwater sample was collected at each temporary well location, and both groundwater samples were analyzed for VOCs and SVOCs.

The analytical results for the groundwater sample collected at temporary well location TWP-13, installed in the vicinity of EXT-1, indicate that the presence of LNAPL-impacted soil has not resulted in groundwater impacts. The only VOCs detected in the groundwater sample collected at TWP-13 were acetone, a common laboratory solvent, and 2-butanone. Based upon previous analytical results, the acetone, which was the only VOC detected at a concentration above its AWQSGV, is not associated with the LNAPL encountered at Area 2B or other portions of the HHMT-Port Ivory Facility. It is likely that the presence of acetone in this groundwater sample is attributable to laboratory or field contamination of the groundwater sample. The VOC 2-butanone was detected at an estimated concentration of 2.7 ug/L, more than an order of magnitude below its AWQSGV of 50 ug/L. The only VOC TIC identified in this groundwater sample was 2-propanol, present at a concentration of 190 ug/L. No AWQSGV has been established for 2-propanol, nor is this compound included in the six classes of compounds that are defined as Principal Organic Contaminants (POCs): halogenated alkanes; halogenated ethers; halobenzenes and substituted halobenzenes; benzenes and alkyl- or nitrogen-substituted benzenes; substituted, unsaturated hydrocarbons; and, halogenated non-aromatic cyclic hydrocarbons. Neither targeted SVOCs nor SVOC TICs were detected in the groundwater sample collected at temporary well TWP-13.

The analytical results for the groundwater sample collected at temporary well location TWP-14, installed in the vicinity of soil boring locations TW-47 and TW-48, where LNAPL-impacted soil was observed, indicate that the presence of LNAPL-impacted soil has not resulted in groundwater impacts. The only VOC detected in the groundwater sample collected at TWP-14 was chloroform, detected at an estimated concentration of 0.3 ug/L. This concentration is more than an order of magnitude lower than the AWQSGV for chloroform, 7 ug/L. No VOC TICs were detected in this groundwater sample. Neither targeted SVOCs nor SVOC TICs were detected in the groundwater sample collected at temporary well TWP-14.

As discussed in section 8.2.4, the environmental quality of the soil has not been significantly impacted by the presence of LNAPL; however, VOC TICs do appear to be present at greater concentrations at locations and depths where LNAPL-impacted soil was encountered. Based on the soil analytical data, the presence of LNAPL-impacted soil also appears to be associated with elevated TPHC concentrations. However, no targeted SVOCs or SVOC TICs, surrogates for the TPHC in groundwater, were detected in either of the two groundwater samples collected at Area 2B during the SRI. Since the VOC TICs and the TPHC were the only soil impacts that appear to be associated with the presence of LNAPL-impacted soil at Area 2B and the groundwater in the vicinity of the LNAPL-impacted soil has not been significantly impacted by any compounds, including VOC TICs and TPHC (as determined by the SVOC analytical data), the LNAPL-impacted soil along the Tidewater pipeline is not a source area for groundwater impacts.

Please note, the results of investigations at Site 3, located immediately north of Area 2B, indicate that the LNAPL may be almost two decades old. It is likely that the soluble compounds have previously leached out of the LNAPL and the surrounding soil. Other compounds that are subject to biodegradation and/or volatilization, for example benzene, may have been depleted via these processes.

9.0 INDOOR AIR QUALITY ASSESSMENT

The NYSDEC and NYSDOH required the Port Authority to conduct an indoor air quality assessment at Area 2A. Substructure soil gas, ambient air, and indoor air were sampled to determine whether volatile organic compounds in soil and/or groundwater have impacted or could potentially impact air quality in buildings scheduled to remain following the redevelopment of Area 2A. Results of prior sampling efforts, including results from the SRI, have detected minimal concentrations of VOCs in both soil and groundwater; in most instances, VOCs were detected at concentrations below applicable NYSDEC cleanup objectives. The VOCs that have been detected in soil at Site 2 are as follows: benzene, chloroform, dichloromethane, ethylbenzene, 4-isopropyl toluene, toluene, trans-1,3-dichloropropene, trichloroethene, and various isomers of xylene. The VOCs that have been detected in groundwater at Site 2 are toluene and vinyl chloride. Other VOCs detected in soil and/or groundwater samples, for example acetone, are believed to be attributable to laboratory contamination of the sample, and these VOCs are not listed above.

The Port Authority intends to redevelop Site 2 for use as an intermodal facility. Following redevelopment, only two existing buildings (Building No. 41, the office building, and Building No. 45, known as the guard shack) will remain and two modular offices (under construction) will be installed within the footprint of Building No. 40, which has been demolished. No other permanent structures will be present at Area 2A subsequent to the redevelopment of that Site, although modular offices will be staged in the footprint of Building No. 40 and will be used byfacility personnel. All three buildings identified above are located at Area 2A. No buildings are currently located at Area 2B, nor are occupied buildings anticipated at Area 2B following facility redevelopment.

The scope of work for the indoor air quality assessment conducted at Area 2A was summarized in the NYSDEC-approved document entitled *Revised Substructure Soil Gas and Ambient and Indoor Air Sampling Plan* and dated March 2005. The sampling effort was conducted in accordance with applicable NYSDEC and NYSDOH guidance documents. Section 9.1 discusses the methods and results of the pre-sampling indoor inventory. Sections 9.2 through 9.5 summarize the methods and results of the substructure soil gas sampling program, indoor air sampling program, and ambient air sampling program, respectively. Section 9.6 discusses the results of the Quality Assurance/Quality Control (QA/QC) program. Section 9.7 presents conclusions. All sampling locations are depicted on Figure 3 and a summary of the sampling results is provided in Table 4.

9.1 Pre-Sampling Inventory

In accordance with NYSDOH protocol, an Indoor Air Quality Questionnaire and Building Inventory was completed one week prior to initiating air quality sampling activities. The purpose of the inventory was to identify any potential interferences with the proposed air quality sampling program. As part of the inventory, the type, quantity, method of storage, and location of such items as utilities, cleaning supplies, paint, etc. were recorded. In addition, the atmosphere in the vicinity of the above listed areas/items was screened using a VRae multigas meter that includes a photoionization detector (PID) equipped with a 10.6 electron-volt ionization potential lamp.

Potential interferences that were observed included the following: paint remover, spray paint, and cleaning supplies (see Table 5 for a listing of the potential interferences listed by building). In Building No. 45, the cleaning supplies were stored in the one room guard shack, albeit at a level above the soil gas and indoor air sampling locations. In Building No. 41, all supplies were stored in a closet accessible only from the receptionist's office/copy room. No such potential sources for VOCs were observed in Building No. 40, which was vacant. No PID readings greater than background were measured in the Building No. 41 supply closet or any other portion of any of the three buildings. It was reported to HMM personnel that the following activities did not occur in the same room as the sampling locations within 24 hours prior to the indoor air sampling: smoking, use of portable heating devices such as a kerosene heater, storage of fuel, use of petroleum-based cleaning fluids, use of air fresheners, or application of pesticides.

9.2 Substructure Soil Gas Sampling Methods and Results

Substructure soil gas sampling was conducted to determine the concentration of VOC vapors in the soil below existing concrete foundations for slab-on-grade buildings (Building Nos. 41 and 45) as well as VOC vapors in soil adjacent to Building No. 40. The concentration of VOC vapors in soil gas below the concrete slabs of Building Nos. 41 and 45 represents the worst-case potential exposure for personnel inside these buildings. Because Building No. 40 was demolished and temporary construction trailers will be staged in or adjacent to the footprint of this building, the concentration of VOC vapors below grade in the vicinity of Building No. 40 represents the worst-case potential exposure for personnel inside the proposed trailers.

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SUMMARY OF SOIL GAS AND INDOOR AND AMBIENT AIR ANALYTICAL RESULTS
SITE 2 (AREA 2A)
HHMT - PORT IVORY FACILITY

Location	US EPA BASE Data, Offices 1994-1998	NYSDOH Air Guideline Values mcg/m3	AA-1			SG-5			IA-1			AA-1			SG-6		
Sample Date			03/14/2005			03/14/2005			03/14/2005			03/14/2005			03/14/2005		
Laboratory Sample ID			611634			611639			611640			611634			611637		
Sample Type (Note 1)			Ambient Air			Soil Gas			Indoor Air			Ambient Air			Soil Gas		
Dilution			0.50			1.00*			0.50			0.50			1.00		
Units			ug/m^3			ug/m^3			ug/m^3			ug/m^3			ug/m^3		
Volatile Organic Compound			conc	qual	pql	conc	qual	pql	conc	qual	pql	conc	qual	pql	conc	qual	pql
Dichlorodifluoromethane	NB	NG	2.6			ND	U	2.5	2.3			2.6			3		
1,2-Dichlorotetrafluoroethane	NB	NG	ND	U	0.7	ND	U	1.4	ND	U	0.7	ND	U	0 7	ND	U	1.4
Chloromethane	2.1-3.1	NG	1			ND	U	1	0.99			1			ND	U	1
Vinyl Chloride	<0.9	NG	ND	U	0.26	ND	U	0.51	ND	U	0.26	ND	U	0.26	ND	U	0.51
1,3-Butadiene	NB	NG	ND	U	0.22	ND	U	0.44	ND	U	0.22	ND	U	0.22	24		
Bromomethane	<0.9	NG	ND	U	0.39	ND	U	0.78	ND	U	0.39	ND	U	0.39	ND	U	0.78
Chloroethane	NB	NG	ND	U	0.26	ND	U	0.53	ND	U	0.26	ND	U	0.26	ND	U	0.53
Bromoethene	NB	NG	ND	U	0.44	ND	U	0.87	ND	U	0.44	ND	U	0.44	ND	U	0.87
Trichlorofluoromethane	NB	NG	1.2			1.3			1.2			1.2			1.2		
Freon TF	NB	NG	ND	U	0.77	ND	U	1.5	ND	U	0.77	ND	U	0.77	ND	U	1.5
1,1-Dichloroethene	<1.1	NG	ND	U	0.4	ND	U	0.79	ND	U	0.4	ND	U	0.4	ND	U	0.79
Acetone	32-60	NG	ND	U	5.9	**110**	D		8.8			ND	U	5.9	**81**		
Carbon Disulfide	NB	NG	ND	U	0.78	ND	U	1.6	ND	U	0.78	ND	U	0.78	ND	U	1.6
3-Chloropropene	NB	NG	ND	U	0.31	ND	U	0.63	ND	U	0.31	ND	U	0.31	ND	U	0.63
Methylene Chloride	<1.7-5.0	60	ND	U	0.87	ND	U	1.7	ND	U	0.87	ND	U	0.87	ND	U	1.7
tert-Butyl Alcohol	NB	NG	ND	U	7.6	ND	U	15	ND	U	7.6	ND	U	7.6	16		
Methyl tert-Butyl Ether	<1.7-12	NG	ND	U	0.9	2			ND	U	0.9	ND	U	0.9	3.6		
trans-1,2-Dichloroethene	NB	NG	ND	U	0.4	ND	U	0.79	ND	U	0.4	ND	U	0.4	ND	U	0.79
n-Hexane	1.6-6.4	NG	ND	U	0.35	2.4			ND	U	0.35	ND	U	0.35	6.3		
1,1-Dichloroethane	<0.5	NG	ND	U	0.4	ND	U	0.81	ND	U	0.4	ND	U	0.4	ND	U	0.81
Methyl Ethyl Ketone	NB	NG	ND	U	0.74	1.8			ND	U	0.74	ND	U	0.74	8.8		
cis-1,2-Dichloroethene	<1.0	NG	ND	U	0.4	ND	U	0.79	ND	U	0.4	ND	U	0.4	ND	U	0.79
Chloroform	<0.5	NG	ND	U	0.49	ND	U	0.98	ND	U	0.49	ND	U	0.49	ND	U	0.98
1,1,1-Trichloroethane	2.6-11	NG	ND	U	0.55	ND	U	1.1	ND	U	0.55	ND	U	0.55	1.6		
Cyclohexane	NB	NG	ND	U	0.34	ND	U	0.69	ND	U	0.34	ND	U	0.34	0.89		
Carbon Tetrachloride	<3.1	NG	ND	U	0.63	ND	U	1.3	ND	U	0.63	ND	U	0.63	ND	U	1.3
2,2,4-Trimethylpentane	NB	NG	ND	U	0.47	ND	U	0.93	ND	U	0.47	ND	U	0.47	ND	U	0.93
Benzene	2.1-5.1	NG	0.54			1.1			0.54			0.54			**38**		
1,2-Dichloroethane	<0.6	NG	ND	U	0.4	ND	U	0.81	ND	U	0.4	ND	U	0.4	ND	U	0.81
n-Heptane	NB	NG	ND	U	0.41	ND	U	0.82	9.4			ND	U	0.41	8.2		
Trichloroethene	<1.2-1.2	5	ND	U	0.54	ND	U	1.1	ND	U	0.54	ND	U	0.54	ND	U	1.1
1,2-Dichloropropane	<1.4	NG	ND	U	0.46	ND	U	0.92	ND	U	0.46	ND	U	0.46	ND	U	0.92
Bromodichloromethane	NA	NG	ND	U	0.67	ND	U	1.3	ND	U	0.67	ND	U	0.67	ND	U	1.3
cis-1,3-Dichloropropene	NB	NG	ND	U	0.45	ND	U	0.91	ND	U	0.45	ND	U	0.45	ND	U	0.91
Methyl Isobutyl Ketone	NB	NG	ND	U	1	ND	U	2	6.6			ND	U	1	2.2		
Toluene	10.7-26	NG	0.75			5.7			2.5			0.75			**45**		
trans-1,3-Dichloropropene	NB	NG	ND	U	0.45	ND	U	0.91	ND	U	0.45	ND	U	0.45	ND	U	0.91
1,1,2-Trichloroethane	<1.3	NG	ND	U	0.55	ND	U	1.1	ND	U	0.55	ND	U	0.55	ND	U	1.1
Tetrachloroethene	<1.9-5.9	100	ND	U	0.68	ND	U	1.4	ND	U	0.68	ND	U	0.68	1.9		
Dibromochloromethane	NA	NG	ND	U	0.85	ND	U	1.7	ND	U	0.85	ND	U	0.85	ND	U	1.7
1,2-Dibromoethane	<1.3	NG	ND	U	0.77	ND	U	1.5	ND	U	0.77	ND	U	0.77	ND	U	1.5
Chlorobenzene	<0.7	NG	ND	U	0.46	ND	U	0.92	ND	U	0.46	ND	U	0.46	ND	U	0.92
Ethylbenzene	<1.6-3.4	NG	ND	U	0.43	0.91			ND	U	0.43	ND	U	0.43	**36**		

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SUMMARY OF SOIL GAS AND INDOOR AND AMBIENT AIR ANALYTICAL RESULTS
SITE 2 (AREA 2A)
HHMT - PORT IVORY FACILITY

Location	US EPA BASE Data, Offices 1994-1998	NYSDOH Air Guideline Values mcg/m3	**AA-1**			**SG-5**			**IA-1**			**AA-1**			**SG-6**		
Sample Date			03/14/2005			03/14/2005			03/14/2005			03/14/2005			03/14/2005		
Laboratory Sample ID			611634			611639			611640			611634			611637		
Sample Type (Note 1)			Ambient Air			Soil Gas			Indoor Air			Ambient Air			Soil Gas		
Dilution			0.50			1.00*			0.50			0.50			1.00		
Units			ug/m^3			ug/m^3			ug/m^3			ug/m^3			ug/m^3		
Volatile Organic Compound			conc	qual	pql	conc	qual	pql	conc	qual	pql	conc	qual	pql	conc	qual	pql
Xylene (m,p)	4.1-12	NG	ND	U	0.43	2.8			0.48			ND	U	0.43	**120**		
Xylene (o)	<2.4-4.4	NG	ND	U	0.43	0.87			ND	U	0.43	ND	U	0.43	**35**		
Styrene	<1.8	NG	ND	U	0.43	ND	U	0.85	ND	U	0.43	ND	U	0.43	ND	U	0.85
Bromoform	NB	NG	ND	U	1	ND	U	2.1	ND	U	1	ND	U	1	ND	U	2.1
1,1,2,2-Tetrachloroethane	NB	NG	ND	U	0.69	ND	U	1.4	ND	U	0.69	ND	U	0.69	ND	U	1.4
4-Ethyltoluene	NB	NG	ND	U	0.49	ND	U	0.98	ND	U	0.49	ND	U	0.49	3.1		
1,3,5-Trimethylbenzene	<0.25-0.44	NG	ND	U	0.49	ND	U	0.98	ND	U	0.49	ND	U	0.49	1.2		
2-Chlorotoluene	NB	NG	ND	U	0.52	ND	U	1	ND	U	0.52	ND	U	0.52	ND	U	1
1,2,4-Trimethylbenzene	1.7-5.1	NG	ND	U	0.49	ND	U	0.98	ND	U	0.49	ND	U	0.49	4.3		
1,3-Dichlorobenzene	<0.8	NG	ND	U	0.6	ND	U	1.2	ND	U	0.6	ND	U	0.6	ND	U	1.2
1,4-Dichlorobenzene	NB	NG	ND	U	0.6	ND	U	1.2	ND	U	0.6	ND	U	0.6	4.3		
1,2-Dichlorobenzene	<0.9	NG	ND	U	0.6	ND	U	1.2	ND	U	0.6	ND	U	0.6	ND	U	1.2
1,2,4-Trichlorobenzene	NB	NG	ND	U	1.9	ND	U	3.7	ND	U	1.9	ND	U	1.9	ND	U	3.7
Hexachlorobutadiene	NB	NG	ND	U	1.1	ND	U	2.1	ND	U	1.1	ND	U	1.1	ND	U	2.1
Naphthalene	<2.5	NG	ND	U	1.3	ND	U	2.6	ND	U	1.3	ND	U	1.3	**3.3**		

Notes and Abbreviations:

1) Soil gas samples were collected from below land surface, indoor air samples were collected from the lowest floor of the building, the ambient air sample was collected from a location immediately east of Building No. 41, and the laboratory blank was prepared at the analytical laboratory.
2) The laboratory blank was prepared on the same day that the samples were analyzed.
3) Bold values in highlighted cells exceed the greater of the New York State Department of Health (NYSDOH) Air Guideline Values and the United States Environmental Protection Agency (US EPA) BASE data.
4) The samples are grouped based on potential sources for the indoor air sampling results. For example, the source for compounds detected in indoor air sample IA-1 could be ambient air (sample AA-1) or soil gas (SG-5) collected from below the concrete slab at a location adjacent to IA-1.
5) The samples ABLKW2 and ABLKW4 are associated laboratory blanks.

ug/m3 = Micrograms per cubic meter
conc = Concentration
qual = Laboratory data qualifier
pql = Practical quantitation limit
ND = The targeted compound was not detected (laboratory data qualifier "U") at a concentration greater than the practical quantitation limit.
AA = Ambient Air Sample
SG = Soil Gas Sample
IA = Indoor Air Sample
NB = No BASE data were available for the compound
NG = No guideline value has been published for the compound

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SUMMARY OF SOIL GAS AND INDOOR AND AMBIENT AIR ANALYTICAL RESULTS
SITE 2 (AREA 2A)
HHMT - PORT IVORY FACILITY

Location	US EPA BASE Data, Offices 1994-1998	NYSDOH Air Guideline Values mcg/m3	IA-2			AA-1			SG-7			IA-3			AA-1			SG-1		
Sample Date			03/14/2005			03/14/2005			03/14/2005			03/14/2005			03/14/2005			03/14/2005		
Laboratory Sample ID			611638			611634			611635			611636			611634			611641		
Sample Type (Note 1)			Indoor Air			Ambient Air			Soil Gas			Indoor Air			Ambient Air			Soil Gas		
Dilution			0.50			0.50			1.00			0.50			0.50			5.00*		
Units			ug/m^3			ug/m^3			ug/m^3			ug/m^3			ug/m^3			ug/m^3		
Volatile Organic Compound			conc	qual	pql	conc	qual	pql	conc	qual	pql	conc	qual	pql	conc	qual	pql	conc	qual	pql
Dichlorodifluoromethane	NB	NG	2.2			2.6			2.5			3.2			2.6			ND	U	12
1,2-Dichlorotetrafluoroethane	NB	NG	ND	U	0.7	ND	U	0.7	ND	U	1.4	ND	U	0.7	ND	U	0.7	ND	U	7
Chloromethane	2.1-3.1	NG	1.3			1			ND	U	1	1.3			1			ND	U	5.2
Vinyl Chloride	<0.9	NG	ND	U	0.26	ND	U	0.26	ND	U	0.51	ND	U	0.26	ND	U	0.26	ND	U	2.6
1,3-Butadiene	NB	NG	ND	U	0.22	ND	U	0.22	ND	U	0.44	0.31			ND	U	0.22	ND	U	2.2
Bromomethane	<0.9	NG	ND	U	0.39	ND	U	0.39	ND	U	0.78	ND	U	0.39	ND	U	0.39	ND	U	3.9
Chloroethane	NB	NG	ND	U	0.26	ND	U	0.26	ND	U	0.53	ND	U	0.26	ND	U	0.26	ND	U	2.6
Bromoethene	NB	NG	ND	U	0.44	ND	U	0.44	ND	U	0.87	ND	U	0.44	ND	U	0.44	ND	U	4.4
Trichlorofluoromethane	NB	NG	1.1			1.2			1.4			1.2			1.2			11		
Freon TF	NB	NG	ND	U	0.77	ND	U	0.77	ND	U	1.5	ND	U	0.77	ND	U	0.77	ND	U	7.7
1,1-Dichloroethene	<1.1	NG	ND	U	0.4	ND	U	0.4	ND	U	0.79	ND	U	0.4	ND	U	0.4	ND	U	4
Acetone	32-60	NG	11			ND	U	5.9	**90**			26			ND	U	5.9	**170**		
Carbon Disulfide	NB	NG	ND	U	0.78	ND	U	0.78	ND	U	1.6	ND	U	0.78	ND	U	0.78	ND	U	7.8
3-Chloropropene	NB	NG	ND	U	0.31	ND	U	0.31	ND	U	0.63	ND	U	0.31	ND	U	0.31	ND	U	3.1
Methylene Chloride	<1.7-5.0	60	ND	U	0.87	ND	U	0.87	ND	U	1.7	1.4			ND	U	0.87	ND	U	8.7
tert-Butyl Alcohol	NB	NG	ND	U	7.6	ND	U	7.6	45			ND	U	7.6	ND	U	7.6	ND	U	76
Methyl tert-Butyl Ether	<1.7-12	NG	1.3			ND	U	0.9	ND	U	1.8	1.7			ND	U	0.9	ND	U	9
trans-1,2-Dichloroethene	NB	NG	ND	U	0.4	ND	U	0.4	ND	U	0.79	ND	U	0.4	ND	U	0.4	ND	U	4
n-Hexane	1.6-6.4	NG	5.6			ND	U	0.35	4.6			**9.2**			ND	U	0.35	ND	U	3.5
1,1-Dichloroethane	<0.5	NG	ND	U	0.4	ND	U	0.4	ND	U	0.81	ND	U	0.4	ND	U	0.4	ND	U	4
Methyl Ethyl Ketone	NB	NG	5			ND	U	0.74	7.1			6.8			ND	U	0.74	29		
cis-1,2-Dichloroethene	<1.0	NG	ND	U	0.4	ND	U	0.4	ND	U	0.79	ND	U	0.4	ND	U	0.4	**5.9**		
Chloroform	<0.5	NG	ND	U	0.49	ND	U	0.49	**14**			ND	U	0.49	ND	U	0.49	**180**		
1,1,1-Trichloroethane	2.6-11	NG	1.8			ND	U	0.55	**13**			3.4			ND	U	0.55	ND	U	5.5
Cyclohexane	NB	NG	2.5			ND	U	0.34	ND	U	0.69	2			ND	U	0.34	ND	U	3.4
Carbon Tetrachloride	<3.1	NG	ND	U	0.63	ND	U	0.63	ND	U	1.3	ND	U	0.63	ND	U	0.63	**28**		
2,2,4-Trimethylpentane	NB	NG	1.5			ND	U	0.47	ND	U	0.93	2			ND	U	0.47	ND	U	4.7
Benzene	2.1-5.1	NG	2.5			0.54			0.67			3.5			0.54			3.8		
1,2-Dichloroethane	<0.6	NG	ND	U	0.4	ND	U	0.4	ND	U	0.81	ND	U	0.4	ND	U	0.4	ND	U	4
n-Heptane	NB	NG	11			ND	U	0.41	1.5			3.5			ND	U	0.41	ND	U	4.1
Trichloroethene	<1.2-1.2	5	0.64			ND	U	0.54	4.7			1.1			ND	U	0.54	**910**		
1,2-Dichloropropane	<1.4	NG	ND	U	0.46	ND	U	0.46	ND	U	0.92	ND	U	0.46	ND	U	0.46	ND	U	4.6
Bromodichloromethane	NA	NG	ND	U	0.67	ND	U	0.67	ND	U	1.3	ND	U	0.67	ND	U	0.67	ND	U	6.7
cis-1,3-Dichloropropene	NB	NG	ND	U	0.45	ND	U	0.45	ND	U	0.91	ND	U	0.45	ND	U	0.45	ND	U	4.5
Methyl Isobutyl Ketone	NB	NG	ND	U	1	ND	U	1	5.7			ND	U	1	ND	U	1	ND	U	10
Toluene	10.7-26	NG	**28**			0.75			11			**57**			0.75			6		
trans-1,3-Dichloropropene	NB	NG	ND	U	0.45	ND	U	0.45	ND	U	0.91	ND	U	0.45	ND	U	0.45	ND	U	4.5
1,1,2-Trichloroethane	<1.3	NG	ND	U	0.55	ND	U	0.55	ND	U	1.1	ND	U	0.55	ND	U	0.55	ND	U	5.5
Tetrachloroethene	<1.9-5.9	100	ND	U	0.68	ND	U	0.68	ND	U	1.4	ND	U	0.68	ND	U	0.68	ND	U	6.8
Dibromochloromethane	NA	NG	ND	U	0.85	ND	U	0.85	ND	U	1.7	ND	U	0.85	ND	U	0.85	ND	U	8.5
1,2-Dibromoethane	<1.3	NG	ND	U	0.77	ND	U	0.77	ND	U	1.5	ND	U	0.77	ND	U	0.77	ND	U	7.7
Chlorobenzene	<0.7	NG	ND	U	0.46	ND	U	0.46	ND	U	0.92	ND	U	0.46	ND	U	0.46	ND	U	4.6
Ethylbenzene	<1.6-3.4	NG	2.8			ND	U	0.43	3			**4.3**			ND	U	0.43	ND	U	4.3

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SUMMARY OF SOIL GAS AND INDOOR AND AMBIENT AIR ANALYTICAL RESULTS
SITE 2 (AREA 2A)
HHMT - PORT IVORY FACILITY

Location	US EPA	NYSDOH	**IA-2**			**AA-1**			**SG-7**			**IA-3**			**AA-1**			**SG-1**		
Sample Date	BASE	Air	03/14/2005			03/14/2005			03/14/2005			03/14/2005			03/14/2005			03/14/2005		
Laboratory Sample ID	Data, Offices	Guideline	611638			611634			611635			611636			611634			611641		
Sample Type (Note 1)	1994-1998	Values	Indoor Air			Ambient Air			Soil Gas			Indoor Air			Ambient Air			Soil Gas		
Dilution		mcg/m3	0.50			0.50			1.00			0.50			0.50			5.00*		
Units			ug/m^3			ug/m^3			ug/m^3			ug/m^3			ug/m^3			ug/m^3		
Volatile Organic Compound			conc	qual	pql	conc	qual	pql	conc	qual	pql	conc	qual	pql	conc	qual	pql	conc	qual	pql
Xylene (m,p)	4.1-12	NG	9.1			ND	U	0.43	9.6			**15**			ND	U	0.43	4.8		
Xylene (o)	<2.4-4.4	NG	2.8			ND	U	0.43	2.5			4.3			ND	U	0.43	ND	U	4.3
Styrene	<1.8	NG	ND	U	0.43	ND	U	0.43	ND	U	0.85	ND	U	0.43	ND	U	0.43	**6.4**		
Bromoform	NB	NG	ND	U	1	ND	U	1	ND	U	2.1	ND	U	1	ND	U	1	ND	U	10
1,1,2,2-Tetrachloroethane	NB	NG	ND	U	0.69	ND	U	0.69	ND	U	1.4	ND	U	0.69	ND	U	0.69	ND	U	6.9
4-Ethyltoluene	NB	NG	2.5			ND	U	0.49	ND	U	0.98	4.2			ND	U	0.49	ND	U	4.9
1,3,5-Trimethylbenzene	<0.25-0.44	NG	0.69			ND	U	0.49	ND	U	0.98	1.2			ND	U	0.49	ND	U	4.9
2-Chlorotoluene	NB	NG	ND	U	0.52	ND	U	0.52	ND	U	1	ND	U	0.52	ND	U	0.52	ND	U	5.2
1,2,4-Trimethylbenzene	1.7-5.1	NG	2.8			ND	U	0.49	1.2			4.7			ND	U	0.49	**8.4**		
1,3-Dichlorobenzene	<0.8	NG	ND	U	0.6	ND	U	0.6	ND	U	1.2	ND	U	0.6	ND	U	0.6	ND	U	6
1,4-Dichlorobenzene	NB	NG	5.8			ND	U	0.6	ND	U	1.2	14			ND	U	0.6	ND	U	6
1,2-Dichlorobenzene	<0.9	NG	ND	U	0.6	ND	U	0.6	ND	U	1.2	ND	U	0.6	ND	U	0.6	ND	U	6
1,2,4-Trichlorobenzene	NB	NG	ND	U	1.9	ND	U	1.9	ND	U	3.7	ND	U	1.9	ND	U	1.9	ND	U	19
Hexachlorobutadiene	NB	NG	ND	U	1.1	ND	U	1.1	ND	U	2.1	ND	U	1.1	ND	U	1.1	ND	U	11
Naphthalene	<2.5	NG	ND	U	1.3	ND	U	1.3	ND	U	2.6	ND	U	1.3	ND	U	1.3	**1000**	D	

Notes and Abbreviations:

1) Soil gas samples were collected from below land surface, indoor air samples were collected from the lowest floor of the building, the ambient air sample was collected from a location immediately east of Building No. 41, and the laboratory blank was prepared at the analytical laboratory.
2) The laboratory blank was prepared on the same day that the samples were analyzed.
3) Bold values in highlighted cells exceed the greater of the New York State Department of Health (NYSDOH) Air Guideline Values and the United States Environmental Protection Agency (US EPA) BASE data.
4) The samples are grouped based on potential sources for the indoor air sampling results. For example, the source for compounds detected in indoor air sample IA-1 could be ambient air (sample AA-1) or soil gas (SG-5) collected from below the concrete slab at a location adjacent to IA-1.
5) The samples ABLKW2 and ABLKW4 are associated laboratory blanks.

ug/m3 = Micrograms per cubic meter
conc = Concentration
qual = Laboratory data qualifier
pql = Practical quantitation limit
ND = The targeted compound was not detected (laboratory data qualifier "U") at a concentration greater than the practical quantitation limit.
AA = Ambient Air Sample
SG = Soil Gas Sample
IA = Indoor Air Sample
NB = No BASE data were available for the compound
NG = No guideline value has been published for the compound

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SUMMARY OF SOIL GAS AND INDOOR AND AMBIENT AIR ANALYTICAL RESULTS
SITE 2 (AREA 2A)
HHMT - PORT IVORY FACILITY

Location	US EPA	NYSDOH	ABLKW2			ABLKW4		
Sample Date	BASE	Air	(Note 2)			(Note 2)		
Laboratory Sample ID	Data, Offices	Guideline	ABLKW2			ABLKW4		
Sample Type (Note 1)	1994-1998	Values	Laboratory Blank			Laboratory Blank		
Dilution		mcg/m3	0.50			0.50		
Units			ug/m^3			ug/m^3		
Volatile Organic Compound			conc	qual	pql	conc	qual	pql
Dichlorodifluoromethane	NB	NG	ND	U	1.2	ND	U	1.2
1,2-Dichlorotetrafluoroethane	NB	NG	ND	U	0.7	ND	U	0.7
Chloromethane	2.1-3.1	NG	ND	U	0.52	ND	U	0.52
Vinyl Chloride	<0.9	NG	ND	U	0.26	ND	U	0.26
1,3-Butadiene	NB	NG	ND	U	0.22	ND	U	0.22
Bromomethane	<0.9	NG	ND	U	0.39	ND	U	0.39
Chloroethane	NB	NG	ND	U	0.26	ND	U	0.26
Bromoethene	NB	NG	ND	U	0.44	ND	U	0.44
Trichlorofluoromethane	NB	NG	ND	U	0.56	ND	U	0.56
Freon TF	NB	NG	ND	U	0.77	ND	U	0.77
1,1-Dichloroethene	<1.1	NG	ND	U	0.4	ND	U	0.4
Acetone	32-60	NG	ND	U	5.9	ND	U	5.9
Carbon Disulfide	NB	NG	ND	U	0.78	ND	U	0.78
3-Chloropropene	NB	NG	ND	U	0.31	ND	U	0.31
Methylene Chloride	<1.7-5.0	60	ND	U	0.87	ND	U	0.87
tert-Butyl Alcohol	NB	NG	ND	U	7.6	ND	U	7.6
Methyl tert-Butyl Ether	<1.7-12	NG	ND	U	0.9	ND	U	0.9
trans-1,2-Dichloroethene	NB	NG	ND	U	0.4	ND	U	0.4
n-Hexane	1.6-6.4	NG	ND	U	0.35	ND	U	0.35
1,1-Dichloroethane	<0.5	NG	ND	U	0.4	ND	U	0.4
Methyl Ethyl Ketone	NB	NG	ND	U	0.74	ND	U	0.74
cis-1,2-Dichloroethene	<1.0	NG	ND	U	0.4	ND	U	0.4
Chloroform	<0.5	NG	ND	U	0.49	ND	U	0.49
1,1,1-Trichloroethane	2.6-11	NG	ND	U	0.55	ND	U	0.55
Cyclohexane	NB	NG	ND	U	0.34	ND	U	0.34
Carbon Tetrachloride	<3.1	NG	ND	U	0.63	ND	U	0.63
2,2,4-Trimethylpentane	NB	NG	ND	U	0.47	ND	U	0.47
Benzene	2.1-5.1	NG	ND	U	0.32	ND	U	0.32
1,2-Dichloroethane	<0.6	NG	ND	U	0.4	ND	U	0.4
n-Heptane	NB	NG	ND	U	0.41	ND	U	0.41
Trichloroethene	<1.2-1.2	5	ND	U	0.54	ND	U	0.54
1,2-Dichloropropane	<1.4	NG	ND	U	0.46	ND	U	0.46
Bromodichloromethane	NA	NG	ND	U	0.67	ND	U	0.67
cis-1,3-Dichloropropene	NB	NG	ND	U	0.45	ND	U	0.45
Methyl Isobutyl Ketone	NB	NG	ND	U	1	ND	U	1
Toluene	10.7-26	NG	ND	U	0.38	ND	U	0.38
trans-1,3-Dichloropropene	NB	NG	ND	U	0.45	ND	U	0.45
1,1,2-Trichloroethane	<1.3	NG	ND	U	0.55	ND	U	0.55
Tetrachloroethene	<1.9-5.9	100	ND	U	0.68	ND	U	0.68
Dibromochloromethane	NA	NG	ND	U	0.85	ND	U	0.85
1,2-Dibromoethane	<1.3	NG	ND	U	0.77	ND	U	0.77
Chlorobenzene	<0.7	NG	ND	U	0.46	ND	U	0.46
Ethylbenzene	<1.6-3.4	NG	ND	U	0.43	ND	U	0.43

TA 4
SUMMARY OF SOIL GAS AND INDOOR AND AMBIENT AIR ANALYTICAL RESULTS
SITE 2 (AREA 2A)
HHMT - PORT IVORY FACILITY

Location	US EPA	NYSDOH	**ABLKW2**			**ABLKW4**		
Sample Date	BASE	Air	(Note 2)			(Note 2)		
Laboratory Sample ID	Data, Offices	Guideline	ABLKW2			ABLKW4		
Sample Type (Note 1)	1994-1998	Values	Laboratory Blank			Laboratory Blank		
Dilution		mcg/m3	0.50			0.50		
Units			ug/m^3			ug/m^3		
Volatile Organic Compound			conc	qual	pql	conc	qual	pql
Xylene (m,p)	4.1-12	NG	ND	U	0.43	ND	U	0.43
Xylene (o)	<2.4-4.4	NG	ND	U	0.43	ND	U	0.43
Styrene	<1.8	NG	ND	U	0.43	ND	U	0.43
Bromoform	NB	NG	ND	U	1	ND	U	1
1,1,2,2-Tetrachloroethane	NB	NG	ND	U	0.69	ND	U	0.69
4-Ethyltoluene	NB	NG	ND	U	0.49	ND	U	0.49
1,3,5-Trimethylbenzene	<0.25-0.44	NG	ND	U	0.49	ND	U	0.49
2-Chlorotoluene	NB	NG	ND	U	0.52	ND	U	0.52
1,2,4-Trimethylbenzene	1.7-5.1	NG	ND	U	0.49	ND	U	0.49
1,3-Dichlorobenzene	<0.8	NG	ND	U	0.6	ND	U	0.6
1,4-Dichlorobenzene	NB	NG	ND	U	0.6	ND	U	0.6
1,2-Dichlorobenzene	<0.9	NG	ND	U	0.6	ND	U	0.6
1,2,4-Trichlorobenzene	NB	NG	ND	U	1.9	ND	U	1.9
Hexachlorobutadiene	NB	NG	ND	U	1.1	ND	U	1.1
Naphthalene	<2.5	NG	ND	U	1.3	ND	U	1.3

Notes and Abbreviations:

1) Soil gas samples were collected from below land surface, indoor air samples were collected from the lowest floor of the building, the ambient air sample was collected from a location immediately east of Building No. 41, and the laboratory blank was prepared at the analytical laboratory.
2) The laboratory blank was prepared on the same day that the samples were analyzed.
3) Bold values in highlighted cells exceed the greater of the New York State Department of Health (NYSDOH) Air Guideline Values and the United States Environmental Protection Agency (US EPA) BASE data.
4) The samples are grouped based on potential sources for the indoor air sampling results. For example, the source for compounds detected in indoor air sample IA-1 could be ambient air (sample AA-1) or soil gas (SG-5) collected from below the concrete slab at a location adjacent to IA-1.
5) The samples ABLKW2 and ABLKW4 are associated laboratory blanks.

ug/m3 = Micrograms per cubic meter
conc = Concentration
qual = Laboratory data qualifier
pql = Practical quantitation limit
ND = The targeted compound was not detected (laboratory data qualifier "U") at a concentration greater than the practical quantitation limit.
AA = Ambient Air Sample
SG = Soil Gas Sample
IA = Indoor Air Sample
NB = No BASE data were available for the compound
NG = No guideline value has been published for the compound

TABLE 5
SUMMARY OF RESULTS OF THE PRE-SAMPLING INVENTORY
SITE 2 (AREA 2A)
HHMT-PORT IVORY FACILITY

Building	Description of Item/Product	Nearest Indoor Air Sampling Location
Building No. 40	Note 1	Note 1
Building No. 41	Spray Paint (Mostly unopened) in storage closet	IA-3
	Air freshener in storage closet	IA-3
Building No. 45	Limpiador Cleaner/Sanitizer beneath desk	IA-1

Notes and Abbreviations

1) Because Building No. 40 was scheduled for demolition, no indoor air samples were collected and no pre-sampling invesntory was conducted.
2) No elevated concentration of volatile organic vapors was measured (using a photoionization detector, or PID) in Building No. 41 or Building No. 45, including in the vicinity of the listed item/product.
3) Other items were observed in the storage closet in Building No. 41, but only those items/products that contained volatile organic compounds are listed.

Two methods (Method I and Method II) were used to collect subsurface soil gas samples. In Method I, utilized beneath the concrete floors of Building Nos. 41 and 45 at sampling locations SG-5 through SG-7 (see Figure 3), soil gas samples were collected from immediately below the concrete slab because these buildings are slab-on-grade construction. As specified by the NYSDOH during a December 9, 2004 conference call, two soil gas samples was collected from below Building No. 41, and one sample was collected from below Building No. 45. Because the bottom floor of Building No. 40 was a basement constructed below the water table, Method II was utilized for sample collection adjacent to this building. The depth to water immediately west of Building No. 40 was measured at a temporary well, identified as PB-1. Because the water table was measured to be above the bottom of the basement of Building No. 40, it was not possible to collect a soil gas sample from beneath the concrete floor in the basement. Therefore, as per the NYSDOH, one soil gas sample was collected the soil column within 18 inches of the water table at a location, identified as SG-1 (see Figure 3), to the north of PB-1 and immediately west of Building No. 40.

9.2.1 Substructure Soil Gas Sampling Method I

Soil gas samples SG-5 through SG-7 were collected using Method I equipment and techniques. The sampling locations were selected to characterize the concentrations of VOC vapors in soil beneath the concrete slabs of Building Nos. 41 and 45 in frequently-occupied portions of the buildings. Sample location SG-5 was located in a one-room guard shack that was, at that time, occupied 24 hours per day, seven days per week. The guard shack has no walls or other partitions that may limit air movement. Sample locations SG-6 and SG-7 were collected from Building No. 41, an office building that is usually occupied for approximately ten hours per day, six days per week. Soil gas sample SG-6 was collected from within offices located near the southeast corner of Building No. 41, while sample SG-7 was collected from within offices to the north and west of the center of Building No. 41.

As noted above, the ground floors of Building Nos. 41 and 45 were inspected on March 4, 2005 for features where soil gas could potentially migrate from below the concrete slab into the building. The concrete slab that formed the floor was covered in both Building No. 41 and Building No. 45. In Building No. 41, the concrete slab was covered by tile. In Building No. 45, the floor was covered by thin rubber matting. Therefore, no cracks were observed in the concrete slab that forms the floors of these buildings. No floor drains, support columns, or subsided areas were present within ten feet of any of the three indoor sampling locations.

A temporary sampling port was constructed at each subsurface soil gas sampling location on March 10, 2005. The borehole for each sampling port was advanced through the bottom of the concrete slab using a 3/8-inch drill bit. Based on field observations made during drilling, the thickness of the concrete slab in Building No. 41 ranged from approximately 1.4 (at sampling location SG-7) to 2.0 feet (at sampling location SG-6). The thickness of the concrete slab in Building No. 45 was approximately 0.8 feet, as determined by field observations made during drilling at sampling location SG-5.

Each sampling port consisted of a ¼-inch nipple, Teflon threaded compression fitting, rubber tube, and a seal that was placed around the rubber tube to preclude indoor air from being drawn into the subsurface soil gas sample. The compression fitting was pushed through the rubber tube so that the bottom of the compression fitting was below the bottom of the rubber tube. The compression fitting was tightened so that the rubber tube was forced against the sides of the borehole. The seal consisted of beeswax and a 1-inch diameter laboratory-grade rubber stopper, with a 3/8-inch diameter center hole. The tubing was pushed through the rubber stopper, and the tubing and stopper were inserted into the hole that was drilled through the concrete slab. The beeswax was melted and used to form a seal around the rubber stopper. After the wax hardened, soil gas was purged through the tubing using the VRae multigas meter. The PID reading and oxygen content of the soil gas were recorded and are provided in Table 6. The multigas meter was removed, and the tube was immediately plugged using a laboratory-grade rubber stopper.

All subsurface soil gas samples were collected using 1-liter SUMMA canisters. All SUMMA canisters were equipped with particulate filters and were calibrated by STL-Edison, an NYSDEC-certified laboratory (Certification No.11452), to allow soil vapors into the canister throughout an eight-hour sampling period at a rate of less than 0.2 liters per minute. All canisters had an initial vacuum reading of at least 25 inches of mercury. Sample collection was initiated as close as possible to 9:00 A.M. on March 14, 2005. The time, pressure reading, and SUMMA canister serial number were recorded (see Table 6). At the end of the eight-hour sampling period (i.e., at approximately 5:00 P.M.), all canisters were closed.

Each SUMMA canister was transported to the analytical laboratory under full Chain of Custody documentation for analysis of VOCs in accordance with United States Environmental Protection Agency (USEPA) Method TO-15 using selective ion monitoring (SIM). The method detection limits achieved by the analytical laboratory are summarized with the analytical results in Table 4.

9.2.2 Substructure Soil Gas Sampling Method II

In the second type of subsurface soil gas sampling, a soil gas sample was collected from within 18 inches of the water table from a location outside of Building No. 40 because the water table was measured to be above the basement floor of Building No. 40. A pilot boring, identified as PB-1 on Figure 3, was drilled on March 10, 2005 to confirm the depth of the water table, which was measured at 5.5 feet bgs using an electronic water level meter. Hollow rods equipped with a disposable drive point were advanced through macadam to a depth of 4.5 feet bgs and were retracted to approximately 4.0 feet bgs, allowing soil gas in the 4-4.5 foot bgs depth interval (i.e., within 18 inches of the water table) to be sampled. A nipple was attached to the top of the hollow rods, which were equipped with threads and Teflon tape, in order to allow the SUMMA canisters and VRae multigas meter to be attached. Beeswax was melted and used to form a seal around the rods.

After the wax hardened, soil gas was purged through the tubing using the VRae multigas meter. The PID reading and oxygen content of the soil gas were recorded and are provided in Table 6.. The multigas meter was removed, and the tube was immediately plugged using a laboratory-grade rubber stopper.

The subsurface soil gas sample was collected using a 1-liter SUMMA canister. The SUMMA canister was equipped with a particulate filter and was calibrated by STL-Edison, an NYSDEC-certified laboratory, to allow soil vapors into the canister throughout an eight-hour sampling period at a rate of less than 0.2 liters per minute. The SUMMA canister had an initial vacuum reading of 30 inches of mercury, greater than the required 25 inches of mercury. Sample collection was initiated as close as possible to 9:00 A.M. on March 14, 2005. The time, pressure reading, and SUMMA canister serial number were recorded (see Table 6). At the end of the eight-hour sampling period (i.e., at approximately 5:00 P.M.), the SUMMA canister was closed.

The SUMMA canister was transported to the analytical laboratory under full Chain of Custody documentation for analysis of VOCs in accordance with USEPA Method TO-15 using SIM. The MDLs achieved by the analytical laboratory are summarized with the analytical results in Table 4.

9.3 Indoor Air Sampling Program

Indoor air sampling was conducted to determine the concentration of VOC vapors in the breathing zone inside the two buildings that are scheduled to remain following redevelopment (Buildings No. 41 and No.

TABLE 6
SUMMARY OF SOIL GAS MEASUREMENTS AND SUMMA CANISTER DATA
SITE 2 (AREA 2A)
HHMT-PORT IVOERY FACILITY

Location ID	Sample Type	Pre-purge Soil Gas Measurements		SUMMA Canister No.	Initial Pressure (in Hg)	Time Opened	Time Closed	Final Pressure (in Hg)
		PID Reading (ppm)	Oxygen (%)					
AA-1	Ambient Air	Note 1	Note 1	854	-28	8:54 A.M.	4:56 P.M.	-2.5
IA-1	Indoor Air	Note 1	Note 1	7048	-30	8:59 A.M.	4:59 P.M.	-10
IA-2	Indoor Air	Note 1	Note 1	7012	-30	8:57 A.M.	4:53 P.M.	-4
IA-3	Indoor Air	Note 1	Note 1	6481	-30	8:56 A.M.	4:55 P.M.	-9
SG-1	Soil Gas	5.6	17.4	7033	-30	9:03 A.M.	4:57 P.M.	-8
SG-5	Soil Gas	0.0	20.9	7058	-30	8:59 A.M.	4:59 P.M.	-9
SG-6	Soil Gas	0.3	20.4	6776	-29	8:57 A.M.	4:53 P.M.	-4
SG-7	Soil Gas	0.0	20.9	6462	-30	8:56 A.M.	4:55 P.M.	-2.5

Notes and Abbreviations

1) Purging was conducted only at soil gas sampling locations in order to purge the sampling apparatus of any indoor air that may have been trapped beneath the apparatus.
2) Pressures are negative because the Summa canisters must be operated under vacuum.
3) The PID reading is the concentration of volatile organic compounds, as measured using a PID.
4) The Location ID is as per Figure 3.

PID = Photoionization detector
ppm = parts per million
in Hg = Inches of mercury

45). Because the buildings will be utilized only by facility personnel and not by children, the breathing zone was considered to be approximately 4.5-5 feet above the floor.

All indoor air samples will be collected using SUMMA canisters. STL-Edison equipped each SUMMA canister with a particulate filter and calibrated the SUMMA canisters to allow air in throughout an eight-hour sampling period and at a rate of less than 0.2 liters per minute. The metering valve was opened and immediately closed to ensure that the vacuum within the canister was at least 25 inches of mercury. The SUMMA canister valve was opened to initiate sample collection as close as possible to 9:00 A.M. on March 14, 2005 (i.e., at approximately the same time as the valve on the adjacent subsurface soil gas SUMMA canister, if any, was opened). The time, pressure reading, and SUMMA canister serial number were recorded and are provided in Table 6. At the end of the eight-hour sampling period (i.e., at approximately 5:00 P.M.), the SUMMA canister valve was closed.

The SUMMA canisters were transported to the analytical laboratory under full Chain of Custody documentation for analysis of VOCs in accordance with United States Environmental Protection Agency (USEPA) Method TO-15 using selective ion monitoring (SIM). The method detection limits (MDLs) achieved by the analytical laboratory are summarized with the analytical results in Table 4.

9.4 Ambient Air Sampling Program

Ambient air sampling was conducted to determine whether the results of the indoor air sampling were potentially affected by the concentration of VOC vapors in ambient air outside the building. The Port Authority facility is located in Staten Island, immediately across the Hudson River from Elizabeth and Linden, New Jersey. Due to the heavily industrialized and populated character of this area, HMM anticipated that VOC vapors may be present in the ambient atmosphere.

Because the indoor air samples were collected from two buildings, Building Nos. 41 and 45, separated by only approximately 75 feet, the ambient air outside Building No. 41 was expected to be of the same quality as the ambient air outside Building No. 45. Therefore, only one ambient air sample was collected. The ambient air sampling location (see Figure 3) was selected based upon the potential for positive bias in the results (i.e., for point sources to contribute to the ambient air vapor concentrations). To the extent possible, HMM did not locate the ambient air sample at a location adjacent to such a potential point source. Figure 3 indicates the potential point sources of VOC vapors that were identified by HMM.

The ambient air sample was collected using a SUMMA canister with an intake in the breathing zone (i.e., approximately 4.5-5 feet above the ground surface) set up immediately east of Building No. 41. STL-Edison equipped each SUMMA canister with a particulate filter and calibrated the SUMMA canisters to allow air in throughout an eight-hour sampling period and at a rate of less than 0.2 liters per minute. The metering valve was opened and immediately closed to ensure that the vacuum within the canister was at least 25 inches of mercury. The SUMMA canister valve was opened to initiate sample collection as close as possible to 9:00 A.M. on March 14, 2005 (i.e., at approximately the same time as the valve on the adjacent subsurface soil gas SUMMA canister, if any, was opened). The time, pressure reading, and SUMMA canister serial number were recorded and are provided in Table 6. At the end of the eight-hour sampling period (i.e., at approximately 5:00 P.M.), the SUMMA canister valve was closed.

The SUMMA canister was transported to the analytical laboratory under full Chain of Custody documentation for analysis of VOCs in accordance with USEPA Method TO-15 using SIM. The MDLs achieved by the analytical laboratory are summarized with the analytical results in Table 4.

9.5 Quality Assurance/Quality Control (QA/QC) Program

The QA/QC Program consisted of procedural protocols and laboratory sampling. Procedural protocols included confirming that the metering valve was working properly by checking vacuum pressure within the SUMMA canister. Vacuum readings for all SUMMA canisters were monitored periodically to ensure proper functioning of the valve. In addition, the final vacuum in the SUMMA canister, as measured using the gauge, was checked to confirm a vacuum of at least 2 inches of mercury. Final gauge readings are provided in Table 6.

Laboratory QA/QC samples were prepared and analyzed at a frequency dictated by the TO-15 method. The results for the associated method blanks are provided in Table 4.

9.6 Analytical Results

As noted above, all soil gas, indoor air, and ambient air samples were analyzed for VOCs. Sampling locations are shown on Figure 3. The analytical results for all samples are summarized below and in Table 4. As per the NYSDOH document entitled "Draft Guidance for Evaluating Soil Vapor Intrusion in New York" and dated February 2005, the analytical data were compared to the NYSDOH Air Guideline Values (AGV), when available, or the USEPA BASE data set if no AGV had been established for a compound. AGVs have been established for the following VOCs only: methylene chloride, tetrachloroethene, and trichloroethene. Concentrations in the BASE data set represent concentrations of VOCs in indoor air samples collected at industrial and commercial facilities by the US EPA. The levels provided in the referenced guidance document are the 25th and 75th percentile concentrations in the BASE data set; the analytical results for the samples collected at the HHMT-Port Ivory Facility were compared to the 75th percentile concentrations. Please note, neither the NYSDEC nor the NYSDOH regulates the concentrations of VOC compounds in soil gas. In addition, the BASE data set concentrations are background data only and have no significance with regards to exposure assessments or health hazards. The comparison of analytical results for soil gas samples to AGVs and BASE data and the comparison of analytical results for indoor and ambient air to the BASE data does not indicate acceptance that these are appropriate objectives.

9.6.1 Soil Gas Sampling Results

Four soil gas samples, identified as SG-1, SG-5, SG-6, and SG-7, were collected from four different locations on March 14, 2005. The sampling locations are shown on Figure 3. Soil gas samples SG-5, SG-6, and SG-7 were collected using Method I (see Section 8.2.1), and soil gas sample SG-1 was collected using Method II (see Section 8.2.2). Soil gas sampling analytical results are summarized in Table 4.

No VOCs were detected at concentrations greater than their corresponding NYSDOH AGVs, except for the concentration of trichloroethene (TCE) in the soil gas sample collected at location SG-1. TCE was detected at a concentration of 910 micrograms per cubic meter (ug/m^3), and the AGV for TCE is 5 ug/m^3.

Fourteen VOCs, including two isomers of xylene, were detected at concentrations greater than the concentration listed in the US EPA BASE data set. These VOCs included compounds associated with petroleum hydrocarbons (benzene, ethylbenzene, naphthalene, n-hexane, styrene, toluene, 1,2,4-Trimethylbenzene, and isomers of xylene), with non-chlorinated solvents (acetone), and with chlorinated solvents (carbon tetrachloride, chloroform, cis-1,2-Dichloroethene, 1,1,1-trichloroethane, and trichloroethene).

Please note, most of the VOCs detected at concentrations greater than the concentrations in the BASE data set were detected in soil gas samples SG-1 and SG-6. The only VOCs detected in samples SG-5 and/or SG-7 at concentrations greater than the concentrations in the BASE data set were acetone (in both SG-5 and SG-7) and chloroform and 1,1,1-Trichloroethane (in SG-7 only).

9.6.2 Indoor Air Sampling Results

Three indoor air samples, identified as IA-1, IA-2, and IA-3, were collected from three different locations on March 14, 2005. The sampling locations are shown on Figure 3. Soil gas sampling analytical results are summarized in Table 4.

No VOCs were detected at concentrations greater than their corresponding NYSDOH AGVs in any of the indoor air samples. In addition, no VOCs were detected at concentrations greater than the concentrations in the BASE data set in sample IA-1. Toluene was the only VOC detected in sample IA-2 at a concentration (28 ug/m^3) slightly greater than the concentration (26 ug/m^3) in the BASE data set. The concentrations of the following compounds were detected in sample IA-3 at a concentration greater than the concentration in the BASE data set: ethylbenzene, n-hexane, toluene, and the m/p isomer(s) of xylene.

9.6.3 Ambient Air Sampling Results

One ambient air sample, identified as AA-1, was collected from a location to the east of Building No. 41 (see Figure 3) on March 14, 2005. Ambient air sampling analytical results are summarized in Table 4.

The only VOCs detected in the ambient air sample were benzene, chloromethane, dichlorodifluoromethane, toluene, and trichlorofluoromethane. The NYSDOH has not established AGVs for these VOCs. Of the five VOCs detected in sample AA-1, only benzene, chloromethane, and toluene are included in the BASE data set; none of these three compounds were detected at concentrations greater than the concentration in the BASE data set.

9.6.4 QA/QC Sampling Results

As noted above, the samples analyzed for QA/QC purposes were two laboratory blanks, identified as ABLKW2 and ABLKW4. No VOCs were detected in either blank.

9.7 Soil Gas and Indoor and Ambient Air Sampling – Discussion

The following discussion of the analytical data is organized similarly to Table 4 (i.e., by soil gas sampling location). Soil gas sampling location SG-1 was collected from within 18 inches of the water table to determine whether soil gas vapors could potentially migrate into two trailers that will be anchored within the footprint of Building No. 40 subsequent to the demolition of this building. The trailers will be anchored onto concrete or stone foundations so that there is a space between the bottom of the trailer and ground surface.

Please note, this discussion is for completeness only, as the NYSDEC and NYSDOH have concluded that no further investigation or remediation is warranted at Area 2A with respect to indoor air quality.

9.7.1 Soil Gas Sample SG-1

The concentrations of VOCs detected in sample SG-1 are greater than the concentrations of the same VOCs detected in ambient air. Therefore, the VOCs detected in soil gas sample SG-1 are either not attributable to ambient air quality or are only partially attributable to ambient air quality. Regardless of the concentration of VOCs in the soil gas, however, any VOCs that migrate into the atmosphere at land surface are expected to be diluted/vented immediately and will not pose a health hazard to workers within the trailers. Therefore, no additional monitoring or remedial actions are necessary with respect to (anticipated) indoor air quality in the trailers that will be anchored in the footprint of Building No. 40.

9.7.2 Soil Gas Sample SG-5

Soil gas sample SG-5 was collected below the concrete slab in Building No. 45 and adjacent to indoor air sample IA-1. The concentrations of VOCs in the ambient air sample AA-1 were lower then the concentrations of the same VOCs in soil gas sample SG-5 and indoor air sample IA-1. Therefore, the VOCs detected in the soil gas sample SG-1 and the indoor air sample IA-1 are either not attributable to ambient air quality or are only partially attributable to ambient air quality.

The concentrations of VOCs in SG-5 were generally greater than those in IA-1; therefore, soil gas may be a source for VOCs detected in indoor air sample IA-1. Acetone was the only compound detected in sample SG-5 at a concentration greater than the 75th percentile concentration in the BASE data set (indoor air quality baseline). No VOCs were detected in sample IA-1 at concentrations greater than the indoor air quality baseline. Based on the data, acetone is the only VOC in soil gas that could potentially migrate into Building No. 45 at a concentration greater than the applicable indoor air quality baseline, 60 micrograms per cubic meter (ug/m^3). Acetone is not a highly toxic compound; it is not a carcinogen and has a NIOSH REL (590 milligrams per cubic meter, or mg/m^3, equivalent to 590,000 ug/m^3) more than 5,000 times as high as the concentration detected in SG-5. In addition, assuming that all acetone in the indoor air sample was from soil gas migrating into the building, the attenuation factor for acetone was

12.5. Therefore, in order for the indoor air to contain acetone at a concentration above 60 ug/m^3, the indoor air quality baseline for acetone, the soil gas would need to contain acetone at a concentration of at least 750 ug/L, approximately seven times as high as the detected concentration. No additional monitoring or remedial actions are necessary with respect to indoor air quality in Building No. 45.

9.7.3 Soil Gas Sample SG-6

Soil gas sample SG-6 was collected below the concrete slab in an office area in Building No. 41 and immediately adjacent to indoor air sample IA-2. The concentrations of VOCs in the ambient air sample AA-1 were lower then the concentrations of the same VOCs in soil gas sample SG-6 and indoor air sample IA-2. Therefore, the VOCs detected in the soil gas sample SG-6 and the indoor air sample IA-2 are either not attributable to ambient air quality or are only partially attributable to ambient air quality.

The concentrations of VOCs in SG-6 were frequently greater than those in IA-2; therefore, soil gas may be a source for VOCs detected in indoor air sample IA-2. Acetone, benzene, ethylbenzene, naphthalene, toluene, and two isomers of xylene were the only compounds detected in sample SG-6 at concentrations greater than indoor air quality baseline. Based on the data, these compounds are the only VOCs that could potentially migrate from the soil gas into the southeast portion of Building No. 41 at a concentration greater than the applicable indoor air quality baseline. All of these VOCs except benzene have NIOSH REL values of at least 1,000 times greater than the concentration of benzene in sample SG-6. In addition, benzene is the only carcinogen in the VOCs listed above. Benzene was detected in soil gas at a concentration (38 ug/m^3) more than eight times below the NIOSH REL for benzene. Assuming that all the benzene detected in the indoor air sample attributable to the migration of benzene from soil gas into the building, the attenuation factor for benzene was 15.2. Therefore, in order for the indoor air to contain benzene at a concentration above 5.1 ug/m^3, the soil gas would need to contain acetone at a concentration of at least 77.5 ug/m^3, approximately twice as high as the detected concentration.

Toluene was the only VOC detected in indoor air sample IA-2 at a concentration greater than the indoor air baseline. Toluene is not a highly toxic compound; it is not a carcinogen and has a NIOSH REL (375 milligrams per cubic meter) more than 13,000 times as high as the concentration detected in sample IA-2. In addition, toluene is a common constituent in aerosol cans (air fresheners, e.g.). No additional monitoring or remedial actions are necessary with respect to toluene in indoor air in the southeast portion of Building No. 41.

9.7.4 Soil Gas Sample SG-7

Soil gas sample SG-7 was collected below the concrete slab in an office area in Building No. 41 and immediately adjacent to indoor air sample IA-3. The concentrations of VOCs in the ambient air sample AA-1 were lower then the concentrations of the same VOCs in soil gas sample SG-7 and indoor air sample IA-3. Therefore, the VOCs detected in the soil gas sample SG-7 and the indoor air sample IA-3 are either not attributable to ambient air quality or are only partially attributable to ambient air quality.

A total of 24 VOCs were detected in soil gas sample SG-7 and/or indoor air sample IA-3. Sixteen of the VOCs were detected at greater concentrations in the indoor air sample than in the soil gas sample, while only eight VOCs were detected at greater concentrations in the soil gas sample than in the indoor air sample. Soil gas may potentially be a source for only the eight VOCs detected at greater concentrations in the soil gas sample than in the indoor air sample. These eight compounds were acetone; trichlorofluoromethane; tertiary butyl alcohol; methyl ethyl ketone; chloroform; 1,1,1-trichloroethane; trichloroethene; and,methyl isobutyl ketone. Of these compounds, only acetone, chloroform, and 1,1,1-trichloroethane were detected at concentrations above the indoor air quality baseline. Acetone, chloroform, and 1,1,1-trichloroethane were detected at concentrations greater than the indoor air quality baseline in soil gas sample SG-7, but not in indoor air sample IA-3. The NIOSH RELs for acetone, chloroform, and 1,1,1-Trichloroethane are, respectively, more than 6500, 690, and 145,000 times as great as the concentrations of these VOCs detected in soil gas sample SG-7. Chloroform is the only carcinogen in the VOCs listed above.

Assuming that all the acetone detected in the indoor air sample was from soil gas, the attenuation factor for acetone was 3.5. Therefore, in order for the indoor air to contain acetone at a concentration above 60 ug/m^3, the indoor air quality baseline for acetone, the soil gas would need to contain acetone at a concentration of at least 210 ug/m^3, more than twice as high as the detected concentration. Chloroform was not detected in the indoor air sample, so an attenuation factor cannot be calculated, and analysis similar to that above cannot be performed. Assuming that all the 1,1,1-trichloroethane detected in the indoor air sample was from soil gas, the attenuation factor for 1,1,1-trichloroethane was 3.8. Therefore, in order for the concentration of 1,1,1-trichloroethane in indoor air to exceed 11 ug/m3, the indoor air quality baseline, the concentration of 1,1,1-trichloroethane in soil gas would have to be at least 41.8 ug/m^3, more than three times as high as the detected concentration.

No additional monitoring or remedial actions are necessary with respect to indoor air quality in Building No. 41.

9.8 Soil Gas and Indoor and Ambient Air Sampling – Conclusions

As a result of the soil gas and indoor and ambient air sampling results, HMM has drawn the following conclusions. Please note, in all cases, HMM concurs with the NYSDEC and NYSDOH that neither additional monitoring nor remediation are necessary with regard to indoor air quality at Area 2A.

- Although the soil gas at location SG-1 contained several VOCs at concentrations above the indoor air quality baseline, the trailers will be elevated above land surface. Any vapors that migrate from the subsurface to land surface beneath the trailers will therefore be diluted and vented. Indoor air quality within the trailers is not anticipated to be impacted.
- No VOCs were detected in indoor air in Building No. 45 at concentrations greater than the indoor air quality baseline. Therefore, indoor air quality has not been significantly impacted by the presence of VOC vapors in soil gas beneath Building No. 45.
- Based on the analytical data for soil gas sample SG-5, acetone is the only VOC that could potentially migrate into Building No. 45 at a concentration above the applicable indoor air quality baseline; to do so, the concentration of acetone in the soil gas would need to increase by a factor of at least seven. Therefore, indoor air quality in building No. 45 is not expected to be impacted by the presence of VOC vapors in soil gas beneath the building.
- The VOCs ethylbenzene, n-hexane, toluene, and two indistinguishable isomers (meta- and para-) of xylene were detected at concentrations above the indoor air quality baseline in the indoor air samples (IA-2 and IA-3) collected in Building No. 41. Toluene is not toxic (its NIOSH REL is more than 6,500 times as great as the concentration detected in indoor air sample IA-2 and more than 13,000 times as great as that detected in sample IA-3). Since the concentrations of the other VOC vapors were greater in the indoor air sample than in the corresponding soil gas sample, the presence of these VOCs is not attributable to the migration of VOC vapors in soil gas into Building No. 41. Therefore, indoor air quality has not been significantly impacted by the presence of VOC vapors in soil gas beneath Building No. 41.
- Based on the analytical data for soil gas samples SG-6 and SG-7, the soil gas samples collected from beneath Building No. 41, the only VOCs that have the potential to migrate from soil gas into Building No. 41 at concentrations above the applicable indoor air quality baseline are acetone, benzene, chloroform, ethylbenzene, naphthalene, toluene, 1,1,1-trichloroethane, and xylene (all

three isomers). With the exception of benzene and chloroform, which are considered to be carcinogens, none of these compounds are highly toxic. In order for benzene to migrate from the soil gas into Building No. 41 at a concentration greater than the indoor air quality baseline, the concentration of benzene beneath Building N. 41 would have to increase by a factor of between two (based on the analytical data for sample SG-6) and 116 (based on the analytical data for sample SG-7). The NIOSH REL for chloroform is more than 690 times higher than the concentration of chloroform in soil gas sample SG-7. Please note, chloroform was not detected in soil gas sample SG-6. Therefore, indoor air quality in building No. 45 is not expected to be impacted by the presence of VOC vapors in soil gas beneath the building.

- Neither additional investigation nor any remediation is warranted with respect to indoor air quality at Area 2A.

10.0 Initial Investigation of AOC-Western Area

During modification to the stormwater system in the southwestern portion of Area 2B on August 16, 2005, the Port Authority encountered one 12-inch-diameter pipeline, five pipelines with diameters that varied from four to eight inches, and, LNAPL-impacted soil. This AOC was identified as AOC-Western Area. As part of the construction effort at this AOC, LNAPL-impacted soil was excavated, stockpiled, and disposed of off-site to the Middlesex County Landfill, an NJDEP-permitted landfill operated by the Middlesex County Utilities Authority. The following summarizes the field observations made during excavation activities at this AOC and analytical results for soil and groundwater samples collected directly from the excavation.

10.1 Field Observations

The Area 2B excavation was inspected on two occasions: August 16 and September 14, 2005. LNAPL-impacted soil was first encountered in the excavation in August 2005. Indications of LNAPL-impacted soil included the elevated concentrations of volatile organic vapors, the presence of sheen, odor, and discolored (gray) soil. LNAPL was not observed to be floating on the water surface during either inspection. However, sheen was observed on August 16, 2005. For the most part, the sheen appeared to be thick and solid and was unrelated to petroleum. However, near the eastern extents of the excavation, thinner, iridescent sheen was observed. Therefore, the LNAPL-impacted soil was likely to be more significant to the east of the excavation. This observation agreed with the apparent impacts to soil exposed along the sidewalls. Please note, meadowmat was encountered at the bottom of the excavation at a depth of approximately 5-6 feet bgs.

The excavation was expanded to the north in late August and early September 2005. HMM inspected the newly exposed sidewalls. The inspection effort included screening soil along the sidewalls for volatile organic vapors using a PID. The concentration of volatile organic vapors was low (maximum PID reading less than 10 ppm) in all instances, but was greatest in the southern and eastern portions of the excavation. LNAPL was not observed to be floating on the water in the excavation or seeping out of the excavation sidewalls. Indications of LNAPL-impacted soil included the elevated concentrations of volatile organic vapors, the presence of sheen, odor, and discolored (gray) soil.

10.2 Analytical Results

The initial investigation of soil and groundwater quality at AOC-Western Area was not presented in any NYSDEC-approved work plan because the Port Authority needed to respond rapidly to this emergent issue that resulted from construction activities unrelated to actions being undertaken pursuant to the VCP Agreement. As a preliminary investigation to determine the effect of the LNAPL-impacted soil on the environmental quality of soil and groundwater in AOC-Western Area, five soil samples and one groundwater sample were collected in AOC-Western Area. Because the excavation extended below the water table, the Port Authority collected all five soil samples, identified as HHPI-1-A, HHPI-1-B, and HHPI-2 through HHPI-4, from the excavation sidewalls and from stockpiled soil that had been excavated previously. The groundwater sample, identified as HHPI-PIT, was collected from water that had accumulated within the excavation. All soil and groundwater samples collected at this AOC were analyzed for PP VOC + 10 and xylene, PP SVOC, and TPHC. Soil and groundwater analytical results are summarized in Tables 7A-C and 8A-B, respectively.

The only VOCs detected in the soil samples were acetone, carbon disulfide, methylene chloride, and toluene. Acetone and methylene chloride are common laboratory solvents, and methylene chloride was detected in an associated method blank. The occurrence of acetone and methylene chloride in these soil samples is likely due to laboratory contamination of the samples. Carbon disulfide was detected at an estimated concentration of 0.0023 mg/kg in the soil sample collected at location HHPI-2, but was not detected in any other sample. Toluene was detected at a concentration of 0.0019 mg/kg in the sample collected at location HHPI-1B, but was not detected in any other sample. None of these VOCs were detected at concentrations above their respective RSCOs in any soil samples.

TABLE 7A
SUMMARY OF SOIL SAMPLNIG ANALYTICAL RESULTS - VOCs, AOC-WESTERN AREA
SITE 2 (AREA 2B)
HHMT-PORT IVORY FACILITY

Location Field Sample ID Lab Sample Number Sampling Date Matrix	New York TAGM Recommended Soil Cleanup Objective (mg/kg)	HHPI-1A HHPI-1-A-081605-S001 AC19113-002 8/16/05 SOLID			HHPI-1B HHPI-1-B-081605-S001 AC19113-003 8/16/05 SOLID			HHPI-2 HHPI-2-081605-S001 AC19113-004 8/16/05 SOLID			HHPI-3 HHPI-3-081605-S001 AC19113-005 8/16/05 SOLID			HHPI-4 HHPI-4-081605-S001 AC19113-006 8/16/05 SOLID		
Volatile Organic Compounds (VOCs)		Conc	MDL	Qual	Conc	MDL	Qual	Conc	MDL	Qual	Conc	MDL	Qual	Conc	MDL	Qual
1,1,1,2-Tetrachloroethane	NS	ND	0.0072		ND	0.0086		ND	0.01		ND	0.0065		ND	0.0062	
1,1,1-Trichloroethane	0.8	ND	0.0072		ND	0.0086		ND	0.01		ND	0.0065		ND	0.0062	
1,1,2,2-Tetrachloroethane	0.6	ND	0.0072		ND	0.0086		ND	0.01		ND	0.0065		ND	0.0062	
1,1,2-Trichloroethane	NS	ND	0.0072		ND	0.0086		ND	0.01		ND	0.0065		ND	0.0062	
1,1-Dichloroethane	0.2	ND	0.0072		ND	0.0086		ND	0.01		ND	0.0065		ND	0.0062	
1,1-Dichloroethene	0.4	ND	0.0072		ND	0.0086		ND	0.01		ND	0.0065		ND	0.0062	
1,2-Dichloroethane	0.1	ND	0.0072		ND	0.0086		ND	0.01		ND	0.0065		ND	0.0062	
1,2-Dichloropropane	NS	ND	0.0072		ND	0.0086		ND	0.01		ND	0.0065		ND	0.0062	
2-Butanone	0.3	ND	0.0072		ND	0.0086		ND	0.01		ND	0.0065		ND	0.0062	
2-Chloroethylvinylether	NS	ND	0.0072		ND	0.0086		ND	0.01		ND	0.0065		ND	0.0062	
2-Hexanone	NS	ND	0.0072		ND	0.0086		ND	0.01		ND	0.0065		ND	0.0062	
4-Methyl-2-Pentanone	1	ND	0.0072		ND	0.0086		ND	0.01		ND	0.0065		ND	0.0062	
Acetone	0.2	0.12			0.064			0.069			0.034			0.046		
Acrolein	NS	ND	0.036		ND	0.043		ND	0.051		ND	0.032		ND	0.031	
Acrylonitrile	NS	ND	0.0072		ND	0.0086		ND	0.01		ND	0.0065		ND	0.0062	
Benzene	0.06	ND	0.0014		ND	0.0017		ND	0.002		ND	0.0013		ND	0.0012	
Bromodichloromethane	NS	ND	0.0072		ND	0.0086		ND	0.01		ND	0.0065		ND	0.0062	
Bromoform	NS	ND	0.0072		ND	0.0086		ND	0.01		ND	0.0065		ND	0.0062	
Bromomethane	NS	ND	0.0072		ND	0.0086		ND	0.01		ND	0.0065		ND	0.0062	
CarbonDisulfide	2.7	ND	0.0072		ND	0.0086		0.0023		J	ND	0.0065		ND	0.0062	
CarbonTetrachloride	0.6	ND	0.0072		ND	0.0086		ND	0.01		ND	0.0065		ND	0.0062	
Chlorobenzene	1.7	ND	0.0072		ND	0.0086		ND	0.01		ND	0.0065		ND	0.0062	
Chloroethane	1.9	ND	0.0072		ND	0.0086		ND	0.01		ND	0.0065		ND	0.0062	
Chloroform	0.3	ND	0.0072		ND	0.0086		ND	0.01		ND	0.0065		ND	0.0062	
Chloromethane	NS	ND	0.0072		ND	0.0086		ND	0.01		ND	0.0065		ND	0.0062	
cis-1,2-Dichloroethene	NS	ND	0.0072		ND	0.0086		ND	0.01		ND	0.0065		ND	0.0062	
cis-1,3-Dichloropropene	NS	ND	0.0072		ND	0.0086		ND	0.01		ND	0.0065		ND	0.0062	
Dibromochloromethane	NS	ND	0.0072		ND	0.0086		ND	0.01		ND	0.0065		ND	0.0062	
Ethylbenzene	5.5	ND	0.0014		ND	0.0017		ND	0.002		ND	0.0013		ND	0.0012	
m&p-Xylene (Total)	1.2	ND	0.0029		ND	0.0034		ND	0.0041		ND	0.0026		ND	0.0025	
MethyleneChloride	0.1	0.0059		B	0.019		B	0.024		B	0.02		B	0.011		B
o-Xylene	1.2	ND	0.0014		ND	0.0017		ND	0.002		ND	0.0013		ND	0.0012	
Styrene	NS	ND	0.0072		ND	0.0086		ND	0.01		ND	0.0065		ND	0.0062	
Tetrachloroethene	1.4	ND	0.0072		ND	0.0086		ND	0.01		ND	0.0065		ND	0.0062	
Toluene	1.5	ND	0.0014		0.0019			ND	0.002		ND	0.0013		ND	0.0012	
trans-1,2-Dichloroethene	0.3	ND	0.0072		ND	0.0086		ND	0.01		ND	0.0065		ND	0.0062	
trans-1,3-Dichloropropene	NS	ND	0.0072		ND	0.0086		ND	0.01		ND	0.0065		ND	0.0062	
Trichloroethene	0.7	ND	0.0072		ND	0.0086		ND	0.01		ND	0.0065		ND	0.0062	
VinylChloride	0.2	ND	0.0072		ND	0.0086		ND	0.01		ND	0.0065		ND	0.0062	
Total VOC Concentration	10	0.1259			0.0849			0.0953			0.054			0.057		
Total VOC TICs Concentration	NS	0.945		J	2.99		J	2.18		J	2.76		J	0.1515		J

Notes and Abbreviations

1) All results provided in units of mg/kg.

** = Field duplicate samples
J = The compound was detected at a concentration below the MDL and is estimated
VOC TICs = Tentatively identified volatile organic compounds
B = The compound was detected in an associated method blank
ND = The compound was not detected
Conc = Concentration
Qual = Laboratory Data Qualifier
MDL = Method Detection Limit
NS = No standard
mg/kg = Milligrams per kilograms

TA B
SUMMARY OF SOIL SAMPLING ANALYTICAL RESULTS - SVOCs, AOC-WESTERN AREA
SITE 2 (AREA 2B)
HHMT-PORT IVORY FACILITY

Location Field Sample ID Lab Sample Number Sampling Date Matrix	New York TAGM Recommended Soil Cleanup Objective (mg/kg)	HHPI-1A HHPI-1-A-081605-S001 AC19113-002 8/16/05 SOLID			HHPI-1B HHPI-1-B-081605-S001 AC19113-003 8/16/05 SOLID			HHPI-2 HHPI-2-081605-S001 AC19113-004 8/16/05 SOLID			HHPI-3 HHPI-3-081605-S001 AC19113-005 8/16/05 SOLID			HHPI-4 HHPI-4-081605-S001 AC19113-006 8/16/05 SOLID		
Semivolatile Organic Compounds (SVOCs)		Conc	MDL	Qual	Conc	MDL	Qual	Conc	MDL	Qual	Conc	MDL	Qual	Conc	MDL	Qual
1,2,4-Trichlorobenzene	3.4	ND	0.48		ND	0.57		ND	0.48		ND	0.43		ND	0.41	
1,2-Dichlorobenzene	7.9	ND	1.2		ND	1.4		ND	1.7		ND	0.43		ND	0.41	
1,2-Diphenylhydrazine	NS	ND	0.48		ND	0.57		ND	0.48		ND	0.43		ND	0.41	
1,3-Dichlorobenzene	1.6	ND	0.48		ND	0.57		ND	0.48		ND	0.43		ND	0.41	
1,4-Dichlorobenzene	8.5	ND	0.48		ND	0.57		ND	0.48		ND	0.43		ND	0.41	
2,4-Dinitrotoluene	NS	ND	0.48		ND	0.57		ND	0.48		ND	0.43		ND	0.41	
2,6-Dinitrotoluene	1	ND	0.48		ND	0.57		ND	0.48		ND	0.43		ND	0.41	
2-Chloronaphthalene	NS	ND	0.48		ND	0.57		ND	0.48		ND	0.43		ND	0.41	
2-Methylnaphthalene	36.4	0.25		J	0.32		J	0.17		J	ND	0.43		0.32		J
2-Nitroaniline	0.43	ND	0.48		ND	0.57		ND	0.48		ND	0.43		ND	0.41	
3,3'-Dichlorobenzidine	NS	ND	0.48		ND	0.57		ND	0.48		ND	0.43		ND	0.41	
3-Nitroaniline	0.5	ND	0.48		ND	0.57		ND	0.48		ND	0.43		ND	0.41	
4-Bromophenyl-phenylether	NS	ND	0.48		ND	0.57		ND	0.48		ND	0.43		ND	0.41	
4-Chloroaniline	0.22	ND	0.48		ND	0.57		ND	0.48		ND	0.43		ND	0.41	
4-Chlorophenyl-phenylether	NS	ND	0.48		ND	0.57		ND	0.48		ND	0.43		ND	0.41	
4-Nitroaniline	NS	ND	0.48		ND	0.57		ND	0.48		ND	0.43		ND	0.41	
Acenaphthene	50	0.50			0.97			ND	0.68		0.12		J	0.14		J
Acenaphthylene	41	ND	0.48		ND	0.57		ND	0.48		ND	0.43		0.047		J
Anthracene	50	0.29		J	0.59		J	ND	1.7		ND	0.43		0.13		J
Benzidene	NS	ND	0.48		ND	0.57		ND	0.48		ND	0.43		ND	0.41	
Benzo(a)anthracene	0.224	**0.55**			**1.5**			**0.26**		J	ND	0.43		**0.28**		J
Benzo(a)pyrene	0.061	**0.45**		J	**1.3**		J	**0.22**		J	ND	0.43		**0.23**		J
Benzo(b)fluoranthene	1.1	0.70			**1.70**			0.38		J	ND	0.43		0.43		
Benzo(g,h,i)perylene	50	0.55			1.2			0.56		J	ND	0.43		0.21		J
Benzo(k)fluoranthene	1.1	0.27		J	0.54		J	0.21		J	ND	0.43		0.15		J
Benzyl Alcohol	NS	ND	0.48		ND	0.57		ND	0.48		ND	0.43		ND	0.41	
bis(2-Chloroethoxy)methane	NS	ND	0.48		ND	0.57		ND	0.48		ND	0.43		ND	0.41	
bis(2-Chloroethyl)ether	NS	ND	0.48		ND	0.57		ND	0.48		ND	0.43		ND	0.41	
bis(2-chloroisopropyl)ether	NS	ND	0.48		ND	0.57		ND	0.48		ND	0.43		ND	0.41	
bis(2-Ethylhexyl)phthalate	50	0.18		J	0.11		J	0.18		J	ND	0.43		ND	0.41	
Butylbenzylphthalate	50	ND	0.48		ND	0.57		ND	0.48		ND	0.43		ND	0.41	
Carbazole	NS	ND	0.48		ND	0.57		ND	0.48		ND	0.43		0.044		J
Chrysene	0.4	**0.62**			**1.6**			0.40		J	0.10		J	0.39		J
Dibenz(a,h)anthracene	0.014	**0.22**		J	**0.37**		J	**0.20**		J	ND	0.43		**0.065**		J
Dibenzofuran	6.2	0.22		J	0.37		J	ND	0.68		ND	0.43		0.15		J
Diethylphthalate	7.1	ND	0.48		ND	0.57		ND	0.48		ND	0.43		ND	0.41	
Dimethylphthalate	2	ND	0.48		ND	0.57		ND	0.48		ND	0.43		ND	0.41	
Di-n-butylphthalate	8.1	ND	0.48		ND	0.57		ND	0.48		ND	0.43		ND	0.41	
Di-n-octylphthalate	50	ND	0.48		ND	0.57		ND	0.48		ND	0.43		ND	0.41	
Fluoranthene	50	0.90			2.10			0.33		J	0.061		J	0.79		
Fluorene	50	0.31		J	0.65			ND	0.68		ND	0.43		0.17		J
Hexachlorobenzene	0.41	ND	0.48		ND	0.57		ND	0.48		ND	0.43		ND	0.41	
Hexachlorobutadiene	NS	ND	0.48		ND	0.57		ND	0.48		ND	0.43		ND	0.41	
Hexachlorocyclopentadiene	NS	ND	0.48		ND	0.57		ND	0.48		ND	0.43		ND	0.41	
Hexachloroethane	NS	ND	0.48		ND	0.57		ND	0.48		ND	0.43		ND	0.41	
Indeno(1,2,3-cd)pyrene	3.2	0.44		J	1.0			0.37		J	ND	0.43		0.17		J
Isophorone	4.4	ND	0.48		ND	0.57		ND	0.48		ND	0.43		ND	0.41	
Naphthalene	13	0.23		J	0.33		J	0.15		J	ND	0.43		0.21	0.41	J
Nitrobenzene	0.2	ND	0.48		ND	0.57		ND	0.48		ND	0.43		ND	0.41	

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SUMMARY OF SOIL SAMPLING ANALYTICAL RESULTS - SVOCs, AOC-WESTERN AREA
SITE 2 (AREA 2B)
HHMT-PORT IVORY FACILITY

Location	New York TAGM Recommended Soil Cleanup Objective (mg/kg)	HHPI-1A			HHPI-1B			HHPI-2			HHPI-3			HHPI-4		
Field Sample ID		HHPI-1-A-081605-S001			HHPI-1-B-081605-S001			HHPI-2-081605-S001			HHPI-3-081605-S001			HHPI-4-081605-S001		
Lab Sample Number		AC19113-002			AC19113-003			AC19113-004			AC19113-005			AC19113-006		
Sampling Date		8/16/05			8/16/05			8/16/05			8/16/05			8/16/05		
Matrix		SOLID			SOLID			SOLID			SOLID			SOLID		
Semivolatile Organic Compounds (SVOCs)		**Conc**	**MDL**	**Qual**	**Conc**	**MDL**	**Qual**	**Conc**	**MDL**	**Qual**	**Conc**	**MDL**	**Qual**	**Conc**	**MDL**	**Qual**
N-Nitrosodi-methylamine	NS	ND	0.48		ND	0.57		ND	0.48		ND	0.43		ND	0.41	
N-Nitroso-di-n-propylamine	NS	ND	0.48		ND	0.57		ND	0.48		ND	0.43		ND	0.41	
N-Nitrosodiphenylamine	NS	ND	0.48		ND	0.57		ND	0.48		ND	0.43		ND	0.41	
Phenanthrene	50	0.74		J	2.0			0.26		J	ND	0.43		0.63		
Pyrene	50	1			2.3			0.37		J	0.16		J	0.66		
Total SVOC Concentration	500	8.42			18.95			4.06			0.441			5.216		
Total SVOC TICs Concentration	NS	23.36		J	24.3		J	42.4		J	24.4		J	18.62		J

Notes and Abbreviations

1) Bold concentrations in shaded cells exceed the New York TAGM Recommended Soil Cleanup Objective.
2) All results provided in units of mg/kg.

J - The compound was detected at a concentration below the MDL and is estimated
SVOC TICs = Tentatively identified semivolatile organic compounds
ND = The compound was not detected
Conc = Concentration
Qual = Laboratory Data Qualifier
MDL = Method Detection Limit
NS = No standard
mg/kg = Milligrams per kilograms

TABLE 7C
SUMMARY OF SOIL SAMPLING ANALYTICAL RESULTS - TPHC, AOC-WESTERN AREA
SITE 2 (AREA 2B)
HHMT-PORT IVORY FACILITY

Location	Field Sample ID	Lab Sample Number	Sampling Date	Matrix	TPHC Concentration (mg/kg)
HHPI-1A	HHPI-1-A-081605-S001	AC19113-002	8/16/05	SOLID	4500
HHPI-1B	HHPI-1-B-081605-S001	AC19113-003	8/16/05	SOLID	6300
HHPI-2	HHPI-2-081605-S001	AC19113-004	8/16/05	SOLID	6300
HHPI-3	HHPI-3-081605-S001	AC19113-005	8/16/05	SOLID	4300
HHPI-4	HHPI-4-081605-S001	AC19113-006	8/16/05	SOLID	1800

Notes and Abbreviations

1) No New York TAGM Recommended Soil Cleanup Objective has been established for TPHC.

mg/Kg = Milligrams per kilograms
TPHC = Total petroleum hydrocarbons

TABLE 8A
SUMMARY OF GROUNDWATER ANALYTICAL RESUTLS - VOCs, AOC-Western Area
SITE 2 (AREA 2B)
HHMT-PORT IVORY FACILITY

Location	New York State Ambient Water Quality Standards and Guidance Values (ug/L)	HHPI-GW01		
Field Sample ID		HHPI-PIT-081605-GW01		
Lab Sample Number		AC19113-001		
Sampling Date		8/16/05		
Matrix		WATER		
Dilution Factor		1		
Volatile Organic Compounds (VOCs)		Conc	MDL	Qual
1,1,1-Trichloroethane	5	ND	0.45	
1,1,1,2-Tetrachloroethane	5	ND	0.40	
1,1,2,2-Tetrachloroethane	5	ND	0.28	
1,1,2-Trichloroethane	1	ND	0.40	
1,1-Dichloroethane	5	ND	0.29	
1,1-Dichloroethene	5	ND	0.48	
1,2-Dichloroethane	0.6	ND	0.22	
1,2-Dichloropropane	1	ND	0.37	
2-Hexanone	50	ND	0.39	
4-Methyl-2-Pentanone	NS	ND	0.53	
Acetone	50	ND	4.0	
Acrolein	5	ND	5.4	
Acrylonitrile	5	ND	5.6	
Benzene	1	ND	0.43	
Bromodichloromethane	50	ND	0.46	
Bromoform	50	ND	0.47	
Bromomethane	5	ND	0.76	
CarbonDisulfide	NS	ND	0.51	
CarbonTetrachloride	5	ND	0.54	
Chlorobenzene	5	ND	0.20	
Chloroethane	5	ND	0.53	
Chloroform	7	ND	0.38	
Chloromethane	5	ND	0.32	
cis-1,2-Dichloroethene	5	ND	0.50	
cis-1,3-Dichloropropene	*0.4	ND	0.18	
Dibromochloromethane	50	ND	0.56	
Ethylbenzene	5	ND	0.49	
MethyleneChloride	5	ND	0.87	
Styrene	5	ND	0.29	
Tetrachloroethene	5	ND	0.31	
Toluene	5	ND	0.31	
trans-1,2-Dichloroethene	5	ND	0.50	
trans-1,3-Dichloropropene	*0.4	ND	0.40	
Trichloroethene	5	ND	0.36	
VinylChloride	2	ND	0.54	
Xylene(Total)	5	ND	1.41	
Total VOC Concentration	NS	0		
Total VOC TICs Concentration	NS	0		

Notes and Abbreviations

1) All results provided in units of micrograms per liter (ug/L).

2) Bold font in a shaded box indicates an exceedance of the standard or guidance value for the compound.

* = The standards are for total 1,3-Dichloropropene isomers
VOC TICs = Tentatively identified volatile organic compounds
ND = Not detected
J = The compound was detected at a concentration below the method detection limit (MDL). The concentration provided is an estimate.
NS = No standard or guidance value is available
Conc = Concentration
MDL = Method detection limit
Qual = Laboratory data qualifier

TABLE 8B
SUMMARY OF GROUNDWATER ANALYTICAL RESUTLS - SVOCs, AOC-WESTERN AREA
SITE 2 (AREA 2B)
HHMT-PORT IVORY FACILITY

Location	New York State	HHPI-GW01		
Field Sample ID	Ambient Water Quality	HHPI-PIT-081605-GW01		
Lab Sample Number	Standards and Guidance	AC19113-001		
Sampling Date	Values (ug/L)	8/16/05		
Matrix		WATER		
Dilution Factor		1		
Semivolatile Organic Compounds (SVOCs)		Conc	MDL	Qual
1,2,4-Trichlorobenzene	10	ND	0.17	
1,2-Dichlorobenzene	3	ND	0.40	
1,2-Diphenylhydrazine	MDL	ND	0.33	
1,3-Dichlorobenzene	3	ND	0.28	
1,4-Dichlorobenzene	3	ND	0.18	
2,4-Dinitrotoluene	5	ND	0.36	
2,6-Dinitrotoluene	5	ND	0.45	
2-Chloronaphthalene	10	ND	0.11	
2-Methylnaphthalene	NS	ND	1.7	
2-Nitroaniline	5	ND	1.3	
3,3'-Dichlorobenzidine	5	ND	1.8	
3-Nitroaniline	5	ND	2.5	
4-Bromophenyl-phenylether	**1	ND	0.41	
4-Chloroaniline	5	ND	6.8	
4-Chlorophenyl-phenylether	NS	ND	0.28	
4-Nitroaniline	5	ND	1.5	
Acenaphthene	20	2.5		
Acenaphthylene	NS	ND	0.15	
Anthracene	50	ND	0.20	
Benzidine	5	ND	10	
Benzo(a)anthracene	0.002	ND	0.14	
Benzo(a)pyrene	MDL	ND	0.17	
Benzo(b)fluoranthene	0.002	ND	0.28	
Benzo(g,h,i)perylene	NS	ND	0.14	
Benzo(k)fluoranthene	0.002	ND	0.35	
bis(2-Chloroethoxy)methane	5	ND	0.23	
bis(2-Chloroethyl)ether	1	ND	0.44	
bis(2-chloroisopropyl)ether	5	ND	0.21	
bis(2-Ethylhexyl)phthalate	5	ND	0.63	
Butylbenzylphthalate	50	ND	0.27	
Carbazole	NS	ND	0.19	
Chrysene	0.002	ND	0.28	
Dibenz(a,h)anthracene	NS	ND	0.18	
Dibenzofuran	NS	ND	1.3	
Diethylphthalate	50	ND	0.24	
Dimethylphthalate	50	ND	0.17	
Di-n-butylphthalate	50	ND	0.20	
Di-n-octylphthalate	50	ND	0.34	
Fluoranthene	50	ND	0.16	
Fluorene	50	ND	0.24	
Hexachlorobenzene	0.04	ND	0.41	
Hexachlorobutadiene	0.5	ND	0.25	
Hexachlorocyclopentadiene	5	ND	2.7	
Hexachloroethane	5	ND	0.35	
Indeno(1,2,3-cd)pyrene	0.002	ND	0.17	
Isophorone	50	ND	5.3	
Naphthalene	10	ND	0.097	
Nitrobenzene	5	ND	0.28	
N-Nitrosodimethylamine	NS	ND	11	
N-Nitroso-di-n-propylamine	50	ND	0.32	
N-Nitrosodiphenylamine	50	ND	0.27	
Phenanthrene	50	1.2		
Pyrene	50	ND	0.23	
Total SVOC Concentration	NS	3.7		
Total SVOC TICs Concentration	NS	29		J
Total Petroleum Hydrocarbons	NS	3,300		

Notes and Abbreviations

1) All results provided in units of micrograms per liter (ug/L).

** = The standards are for total chlorinated and non-chlorinated isomers
SVOC TICs = Tentatively identified semivolatile organic compound
ND = Not detected
NS = No standard or guidance value is available
Conc = Concentration
MDL = Method detection limit
Qual = Laboratory data qualifier
NR = Not analyzed
J = The compound was detected at a concentration below the MDL. The value provided is estimated.

Several SVOCs, primarily PAH compounds, were detected in each of the five soil samples. The concentration of total PAH compounds in the soil samples ranged from 0.38 mg/kg to nearly 19 mg/kg. These concentrations of total PAH compounds are similar to those that have been detected throughout the HHMT-Port Ivory Facility and that are attributable to fill placed by P&G.

The concentration of TPHC detected in the soil samples ranged from 1,800 (in the soil sample collected at location HHPI-4) to 6,300 mg/kg (in the soil samples collected at locations HHPI-1B and HHPI-2). The lowest TPHC concentration, 1,800 mg/kg, is similar to those that have been detected throughout the HHMT-Port Ivory Facility and that are attributable to fill placed by P&G. The greatest concentration, 6.300 mg/kg, is slightly higher than the concentration of TPHC that has typically been detected in the fill placed by P&G.

The groundwater sample collected from the excavation at AOC-Western Area was collected to determine whether the LNAPL-impacted soil encountered in this AOC had degraded groundwater quality. The sample was analyzed for PP VOC+15 and xylene, PP SVOC+15, and TPHC. No VOCs or VOC TICs were detected in the groundwater sample collected from the excavation at AOC-Western Area. The PAH compounds acenaphthene and phenanthrene were detected in the groundwater sample collected from this excavation; however, neither of these compounds was detected at a concentration above its AWQSGV. SVOC TICs were detected in the groundwater sample collected from the excavation. Only one SVOC TIC, 3,3,4-trimethyl-Decane, was identified. This TIC is not a POC, and no AWQSGV has been established for the compound. The concentration of TPHC detected in the groundwater sample collected from the excavation was 3.3 milligrams per liter (mg/L).

10.3 Discussion of Results – Initial Investigation of AOC-Western Area

Based on the fact that inactive pipelines that formerly contained petroleum products were encountered within the excavation, at least one of these pipelines is likely to be the source of the LNAPL-impacted soil encountered at this AOC. Based on the field observations, soil impacts are more significant near the single, 12-inch-diameter Texas Eastern pipeline than near the Tidewater pipelines. . No indications of free (i.e., mobile) LNAPL were made during the field inspections. Initial soil and groundwater samples collected directly from the excavations indicate little impact to soil and groundwater quality. While soil and groundwater quality along the Tidewater pipelines has been investigated in Area 2B, no investigation of soil or groundwater quality along the Texas Eastern pipeline has been conducted to date. Continued investigation of soil and groundwater quality is warranted in the vicinity of AOC-Western Area and along the Texas Eastern pipeline.

11.0 SRI Summary and Conclusions

Based on the data generated during the SRI, during the Indoor Air Quality Assessment, and the investigation of AOC-Western Area, HMM has drawn the following conclusions:

- The Port Authority's previous soil removal efforts at AOC-Stain3, located at Area 2A, were largely successful with regards to PAH compounds and metals, the contaminants of concern for this AOC. Although arsenic remains at elevated concentrations in soil at this AOC, the degraded (with respect to environmental quality) soil is more than five feet above the water table. The soil in this AOC will be covered by impervious materials, which will preclude direct contact with the soil and migration of arsenic to the water table in water percolating downwards through the unsaturated zone, following completion of the proposed redevelopment at Area 2A. Therefore, no further investigative or remedial actions are warranted at this AOC.

- The Port Authority's previous soil removal efforts at AOC-UST7, located at Area 2A, were largely successful, except for residual LNAPL in soil encountered at discrete depth intervals at two (non-adjacent) soil boring locations. While the presence of LNAPL in soil is itself an impact, soil sampling analytical results from the SRI at AOC-UST7 and groundwater sampling analytical results from the SI indicate that the presence of the LNAPL-impacted soil has not degraded the environmental quality of soil or groundwater with respect to regulated metals and organic compounds and relative to the impacts attributable to fill materials placed at the HHMT-Port Ivory Facility by P&G. Therefore, no further investigative or remedial actions are warranted at this AOC.

- The Port Authority's previous soil removal efforts at AOC-Bldg20, located at Area 2A, were entirely successful with respect to the removal of all LNAPL-impacted soil at this AOC. No indications of LNAPL-impacted soil were observed during the SRI. Based on the soil sampling analytical data, the environmental quality of soil in this AOC has not been degraded with respect to regulated metals and organic compounds and relative to the impacts attributable to fill materials placed at the HHMT-Port Ivory Facility by P&G. Therefore, no further investigative or remedial actions are warranted at this AOC.

- The Port Authority's previous soil removal efforts at AOC-Bldg32/32A, located at Area 2A, were entirely successful with respect to the removal of all LNAPL-impacted soil at this AOC. Based on the soil sampling analytical data, the environmental quality of soil in this AOC has not been degraded with respect to regulated metals and organic compounds and relative to the impacts attributable to fill materials placed at the HHMT-Port Ivory Facility by P&G.. The minimal soil impacts detected in AOC-Bldg32/32A are attributable to fill placed by P&G. Therefore, no further investigative or remedial actions are warranted at this AOC.

- LNAPL-impacted soil is present in AOC-Southern Area, an AOC that includes two separate areas along the Tidewater pipelines. This bullet item addresses LNAPL-impacted soil at one of these areas, which is located in the vicinity of soil boring locations TW-47, TW-71A, TW-72, and TW-73 and temporary well TWP-14. The next bullet item addresses LNAPL-impacted soil encountered at the other area, which is located in the vicinity of locations EXT-1 and TW-43A. The presence of LNAPL-impacted soil at locations TW-47, TW-71A, TW-72, TW-73, and TWP-14 is itself an impact, and the presence of free LNAPL is suspected in this portion of Area 2B. The presence of LNAPL-impacted soil at this location along the Tidewater pipelines has degraded the environmental quality of the soil with respect to VOC TICs and TPHC. No specific RSCOs have been established for VOC TICs or TPHC. The Port Authority has proposed the removal of free LNAPL in the vicinity of locations TW-47, TW-71A, TW-72, TW-73, and TWP-14 as part of an Interim Remedial Measure (IRM). It is not anticipated that additional (i.e., subsequent to completion of the IRM) investigative or remedial actions are warranted in the vicinity of locations TW-47, TW-71A, TW-72, TW-73, and TWP-13.

- The other area within AOC-Southern Area where LNAPL-impacted soil was encountered during the SRI was the area in the vicinity of test pit location EXT-1 and soil boring location TW-43A. During excavation of test pit EXT-1, neither LNAPL nor sheen was observed to flow into the test pit. Based on this observation and other field observations and soil sampling analytical results, free (i.e., mobile) LNAPL is not likely to be present in the vicinity of EXT-1. Therefore, no further investigative or remedial actions are warranted at EXT-1 and TW-43A, at this portion of AOC-Southern Area.

- Soil gas sampling results indicate that VOC vapors in the soil gas have not to this point, and/or are not anticipated to, impact indoor air quality in Building No. 41 of Building No. 45 or the trailers proposed in the footprint of Building No. 40. Investigation of indoor air quality is not warranted at Area 2B because occupied structures are neither currently present nor proposed at Area 2B. Therefore, no further investigative and remedial activities are warranted with respect to indoor air quality at Site 2.

- LNAPL-impacted soil was initially observed in AOC-Western Area during construction activities. While the presence of LNAPL in soil at AOC-Western Area is itself an impact, soil and groundwater sampling analytical results from the initial investigation of AOC-Western Area indicate that the presence of LNAPL-impacted soil at this AOC has not degraded the environmental quality of soil or groundwater with respect to regulated metals and organic compounds and relative to the impacts attributable to fill materials placed at the HHMT-Port Ivory Facility by P&G. LNAPL-impacted soil excavated at AOC-Western Area has been disposed of properly off site. However, additional investigation of soil and groundwater quality along a pipeline present in an easement to Texas Eastern is necessary. Additional investigation of soil and groundwater quality is also warranted in the vicinity of AOC-Western Area, particularly to the east and south of this AOC. Based on the results of these additional investigations, remedial efforts beyond the soil removal already completed may or may not be warranted.

12.0 Recommendations

Based on the conclusions presented in Section 11, the Port Authority recommends the following:

- Implementation of the proposed IRM to remove recoverable free product at Site 2B;

- Subsequent to completion of the proposed IRM at Area 2B, preparation of a Remedial Action Workplan (RAW) for Site 2, indicating that no additional remediation is warranted beyond the completion of the proposed redevelopment of Site 2 and the granting of an Environmental Easement to the State of New York;

- Investigation of the extent of LNAPL-impacted soil and the environmental quality of soil and groundwater in the vicinity of AOC-Western Area; and,

- Investigation of the presence of LNAPL-impacted soil and the environmental quality of soil along an underground pipeline in an easement to Texas Eastern. Please note, based on the results of this investigation, groundwater quality will be investigated at any area(s) where LNAPL-impacted soil is encountered along the underground pipeline in the easement to Texas Eastern.

13.0 Reporting Schedule

Below is a schedule for submitting documents associated with additional investigations planned at Site 2. The results of these activities and previously collected data will be summarized in a final comprehensive Remedial Investigation (RI) Report that will address the nature and extent of contamination for investigative work completed to date. The final RI Report will include an on-site/off-site exposure assessment, meeting the Citizen Participation Program requirements, and submitting a data usability summary report.

Report	Date of Draft Submittal	Date of Final Submittal
Remedial Action Workplan (RAWP) Site 2	September 2006	December 2006
Interim Remedial Measure (IRM) Workplan Area 2B*	August 2005	June 2006
Investigation Workplan AOC-Western Area (Area 2B)**	October 2006	December 2006
Investigation Workplan Texas Eastern Pipeline (Area 2B)**	October 2006	December 2006
Final Comprehensive Remedial Investigation Report	December 2006	-

*Please note the IRM Workplan includes Site 3 as well.

**These documents were combined into one Workplan.

5.0 2007 SURFACE WATER SAMPLING

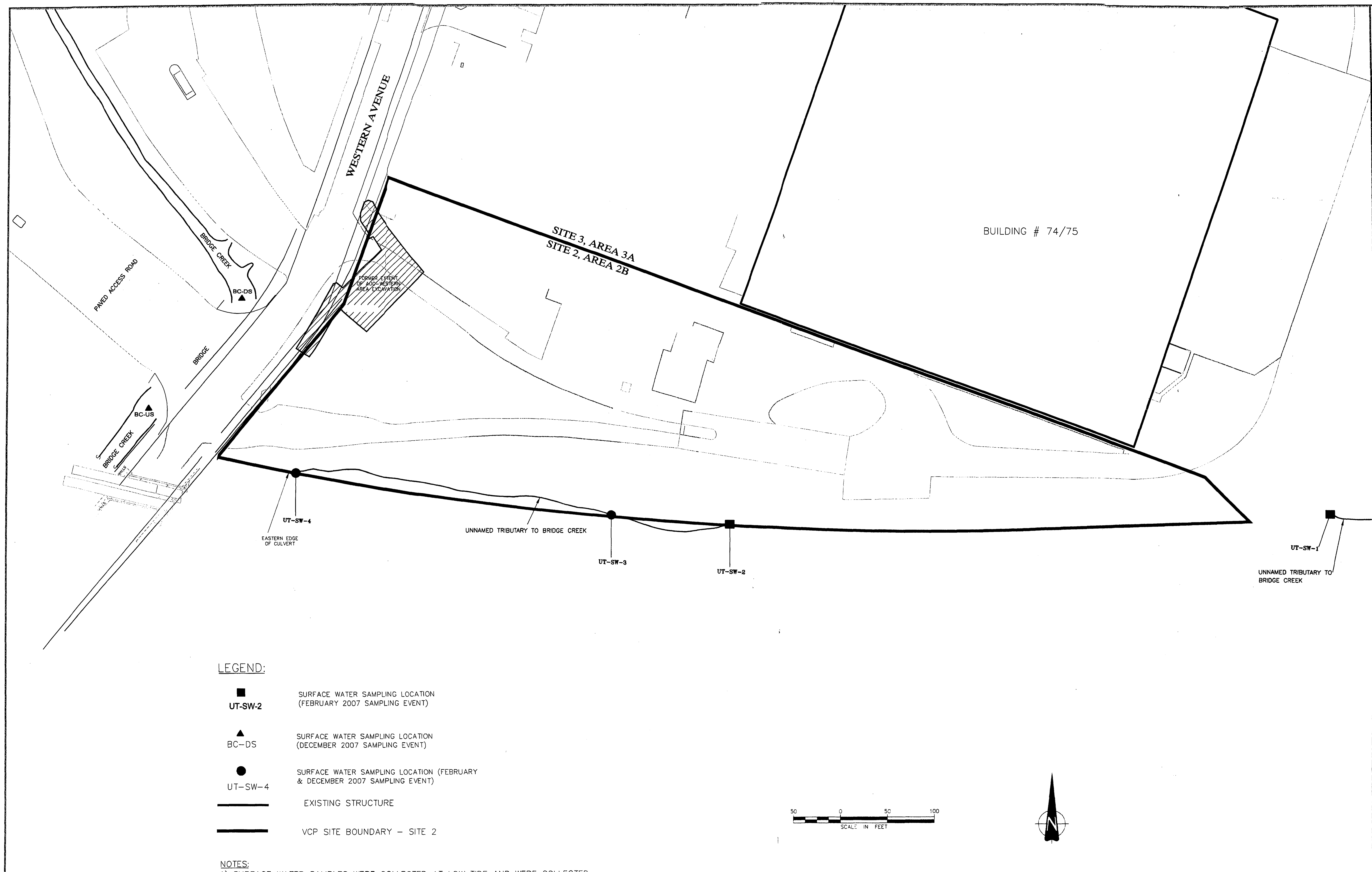
Surface water samples were collected from two locations along Bridge Creek and four locations along an unnamed tributary stream to Bridge Creek in 2007 (See Figure 3). Maps provided by P&G showed the unnamed stream located to the south of Site 2. Subsequent surveying and mapping efforts, however, have confirmed that portions of this stream are present within the boundaries of VCP Site 2 (Area 2B). Therefore, investigation of surface water quality within this stream was required to confirm that soil and/or groundwater impacts at Area 2B have not impacted surface water quality.

Two surface water sampling events were conducted in 2007, the first in February and the second in December. During both events, samples were collected as close to low tide as possible so that groundwater seeps would be visible and so that surface water would be flowing towards Bridge Creek. The samples were collected from downstream to upstream (e.g., in February 2007, UT-SW-4 was collected first, followed by UT-SW-3, etc.) so as to minimize disturbances to downstream sampling locations. At each sampling location, the surface water was examined for the presence of sheen or other indications of potential impacts.

Surface water samples were collected using a decontaminated stainless steel pond sampler. The sample was transferred directly from the pond sampler to laboratory-prepared sampling jars, which were labeled and placed in a cooler with ice. The samples were transported to Veritech Laboratories, a New York-certified analytical laboratory, under full Chain-of-Custody documentation.

February 2007 Surface Water Sampling

During the February effort, four surface water samples were collected at the following locations along the unnamed tributary stream to Bridge Creek: at the eastern edge of a culvert that conveys the stream under Western Avenue (sample UT-SW-4); near the central portion of Area 2B (sample UT-SW-3); at the western end of a culvert that conveys the stream under existing railroad tracks at Area 2B (sample UT-SW-2); and, at a location immediately to the east of Area 2B (designated as UT-SW-1). All four surface water samples collected were analyzed for Priority Pollutant (PP) VOCs with a 15-compound library search (VOCs+15), PP SVOCs with a 25-compound library search (SVOCs+25), and PP Metals. This list was selected because VOCs and metals have been detected in groundwater at Area 2B at concentrations above their AWQSGVs and VOCs, SVOCs, and metals have been detected in soil at Area 2B at concentrations above their RSCOs. No other organic compound classes (e.g., pesticides) have been



LEGEND:

■ UT-SW-2	SURFACE WATER SAMPLING LOCATION (FEBRUARY 2007 SAMPLING EVENT)
▲ BC-DS	SURFACE WATER SAMPLING LOCATION (DECEMBER 2007 SAMPLING EVENT)
● UT-SW-4	SURFACE WATER SAMPLING LOCATION (FEBRUARY & DECEMBER 2007 SAMPLING EVENT)
———	EXISTING STRUCTURE
━━━	VCP SITE BOUNDARY - SITE 2

NOTES:

1) SURFACE WATER SAMPLES WERE COLLECTED AT LOW TIDE AND WERE COLLECTED FROM DOWNSTREAM TO UPSTREAM.

2) THE CONFLUENCE OF THE UNNAMED TRIBUTARY OF BRIDGE CREEK AND BRIDGE CREEK ITSELF (NOT SHOWN) IS LOCATED BENEATH THE BRIDGE ADJACENT TO WESTERN AVENUE.

3) VCP = VOLUNTARY CLEANUP PROGRAM

P:\232952wmd\Remedial Actions\Outstanding Issues RAW Sites 1&2\SW Sampling AOC-Western Ave Sampling.doc\surface water sampling Nov. 2007.dwg

Sheet 1 of 1

THE PORT AUTHORITY
OF NY & NJ

ENGINEERING PROGRAM MANAGER

No.	Date	Revision	Approved

HOWLAND HOOK
MARINE TERMINAL -
PORT IVORY FACILITY

Title

SURFACE WATER
SAMPLING LOCATIONS-
SITE 2

This drawing subject to conditions in contract. All inventions, ideas, designs and methods herein are reserved to Port Authority and may not be used without its written consent.

Designed by: RMT
Drawn by: GKC
Checked by:
Date: 12/18/2007

Contract Number

Drawing Number: 3

detected in soil or groundwater at Area 2B at concentrations above their respective RSCOs or AWQSGVs.

Field observations were recorded before and during sample collection. Neither sheen nor other indications of petroleum impacts were observed at any of the four surface water sample locations. Field parameters, including pH, conductivity, turbidity, dissolved oxygen, temperature, and oxygen reduction potential, were recorded at each sampling location and reported on the field sampling log included as Appendix A. Surface water analytical results are summarized in Tables 2A-2C, respectively. The laboratory analytical results are included in Appendix B.

To monitor the effectiveness of the field decontamination procedures, The Port Authority prepared a field blank by running laboratory-grade DI water over the sampling equipment. A duplicate surface water sample was collected at location UT-SW-4. The field blank and duplicate samples were analyzed for the same parameters as the surface water samples collected. A trip blank sample accompanied the sampling jars during transport from the laboratory and the samples during transport to the laboratory. The trip blank was analyzed for PP VOCs+15.

The surface water sampling analytical results were compared to the AWQSGVs for Class SD surface water. The NYSDEC has classified Bridge Creek and its tributaries as SD, which indicates that the stream cannot meet primary or secondary criteria due to man-made/natural conditions. The best use of surface water within the stream is for fish survival and limited fishing.

The targeted organic compounds and metals were either not detected or were detected at concentrations below their respective AWQSGV in all samples, except the duplicate sample. The duplicate sample contained copper and zinc at concentrations of 43 micrograms per liter (ug/L) and 110 ug/L, respectively. These concentrations slightly exceed the AWQSGV for copper (4.8 ug/L) and zinc (95 ug/L). HMM conducted additional sampling in December to further investigate these apparent impacts.

December 2007 Surface Water Sampling

Because the concentrations of copper and zinc exceeded their respective AWQSGV in one of two samples collected at location UT-SW-4 in February 2007, a third sample was collected to confirm the presence or absence of metal impacts at this location. In addition, surface water samples were collected at UT-SW-3 and at two locations (BC-US and BC-DS) in Bridge Creek, in the event delineation was

TABLE 2A
SUMMARY OF SURF ATER ANALYTICAL RESULTS-VOCs
ITE 2 (AREA 2B)
HHMT-PORT IVORY FACILITY

Sample ID Lab ID Date Collected Material Units	New York State AWQSGV (Surface Water*) ug/L	UT-SW-1 AC28390-001 02/01/07 Water ug/L			UT-SW-2 AC28390-002 02/01/07 Water ug/L			UT-SW-3 AC28390-003 02/01/07 Water ug/L			UT-SW-4 AC28390-004 02/01/07 Water ug/L			UT-SW-4** AC28390-005 02/01/07 Water ug/L		
Volatile Organic Compounds (VOCs)		Conc	Qual	MDL	Conc	Qual	MDL	Conc	Qual	MDL	Conc	Qual	MDL	Conc	Qual	MDL
1,1,1,2-Tetrachloroethane	NS	ND		0.46	ND		0.46	ND		0.46	ND		0.46	ND		0.46
1,1,1-Trichloroethane	NS	ND		0.33	ND		0.33	ND		0.33	ND		0.33	ND		0.33
1,1,2,2-Tetrachloroethane	NS	ND		0.21	ND		0.21	ND		0.21	ND		0.21	ND		0.21
1,1,2-Trichloroethane	NS	ND		0.25	ND		0.25	ND		0.25	ND		0.25	ND		0.25
1,1-Dichloroethane	NS	ND		0.34	ND		0.34	ND		0.34	ND		0.34	ND		0.34
1,1-Dichloroethene	NS	ND		0.53	ND		0.53	ND		0.53	ND		0.53	ND		0.53
1,2-Dichloroethane	NS	ND		0.21	ND		0.21	ND		0.21	ND		0.21	ND		0.21
1,2-Dichloropropane	NS	ND		0.46	ND		0.46	ND		0.46	ND		0.46	ND		0.46
2-Butanone	NS	ND		0.38	ND		0.38	ND		0.38	ND		0.38	ND		0.38
2-Chloroethylvinylether	NS	ND		0.26	ND		0.26	ND		0.26	ND		0.26	ND		0.26
2-Hexanone	NS	ND		0.36	ND		0.36	ND		0.36	ND		0.36	ND		0.36
4-Methyl-2-Pentanone	NS	ND		0.17	ND		0.17	ND		0.17	ND		0.17	ND		0.17
Acetone	NS	ND		2.7	ND		2.7	ND		2.7	ND		2.7	ND		2.7
Acrolein	NS	ND		1.5	ND		1.5	ND		1.5	ND		1.5	ND		1.5
Acrylonitrile	NS	ND		0.54	ND		0.54	ND		0.54	ND		0.54	ND		0.54
Benzene	10	ND		0.25	ND		0.25	ND		0.25	ND		0.25	ND		0.25
Bromodichloromethane	NS	ND		0.33	ND		0.33	ND		0.33	ND		0.33	ND		0.33
Bromoform	NS	ND		0.29	ND		0.29	ND		0.29	ND		0.29	ND		0.29
Bromomethane	NS	ND		0.23	ND		0.23	ND		0.23	ND		0.23	ND		0.23
Carbon disulfide	NS	ND		0.23	ND		0.23	ND		0.23	ND		0.23	ND		0.23
Carbon tetrachloride	NS	ND		0.44	ND		0.44	ND		0.44	ND		0.44	ND		0.44
Chlorobenzene	400	ND		0.21	ND		0.21	ND		0.21	ND		0.21	ND		0.21
Chloroethane	NS	ND		0.22	ND		0.22	ND		0.22	ND		0.22	ND		0.22
Chloroform	NS	ND		0.42	ND		0.42	ND		0.42	ND		0.42	ND		0.42
Chloromethane	NS	ND		0.51	ND		0.51	ND		0.51	ND		0.51	ND		0.51
Cis-1,2-Dichloroethene	5	ND		0.31	ND		0.31	ND		0.31	ND		0.31	ND		0.31
Cis-1,3-Dichloropropene	NS	ND		0.2	ND		0.2	ND		0.2	ND		0.2	ND		0.2
Dibromochloromethane	NS	ND		0.2	ND		0.2	ND		0.2	ND		0.2	ND		0.2
Ethylbenzene	NS	ND		0.4	ND		0.4	ND		0.4	ND		0.4	ND		0.4
M&p-Xylenes	170 (total)	ND		0.36	ND		0.36	ND		0.36	ND		0.36	ND		0.36
Methylene chloride	NS	ND		0.47	ND		0.47	ND		0.47	ND		0.47	ND		0.47
O-Xylene	170 (total)	ND		0.16	ND		0.16	ND		0.16	ND		0.16	ND		0.16
Styrene	NS	ND		0.18	ND		0.18	ND		0.18	ND		0.18	ND		0.18
Tetrachloroethene	1	ND		0.24	ND		0.24	ND		0.24	ND		0.24	ND		0.24
Toluene	430	ND		0.18	ND		0.18	ND		0.18	ND		0.18	ND		0.18
Trans-1,2-Dichloroethene	5	ND		0.4	ND		0.4	ND		0.4	ND		0.4	ND		0.4
Trans-1,3-Dichloropropene	NS	ND		0.15	ND		0.15	ND		0.15	ND		0.15	ND		0.15
Trichloroethene	40	ND		0.28	ND		0.28	ND		0.28	ND		0.28	ND		0.28
Vinyl chloride	NS	ND		0.65	ND		0.65	ND		0.65	ND		0.65	ND		0.65
Total VOC TICs	NS	ND			ND			ND			ND			ND		

Notes and Abbreviations:

AWQSGV = Ambient Groundwater Standards and Guidance Values as published in the Division of Water Technical and Operational Guidance Series (1.1.1), dated June 1998.

* Using SD water classification with protection for human consumption of fish (saline water).

** Field duplicate sample

UG/L = Micrograms per Liter

TICs= Tentatively identified compounds

ND = Not Detected

NS = No Standard

Qual = Laboratory Qualifer

Conc = Concentration

MDL = Method Detection Limit

TABLE 2B
SUMMARY OF SURFACE WATER ANALYTICAL RESULTS- SVOCs
SITE 2 (AREA 2B)
HHMT-PORT IVORY FACILITY

Sample ID Lab ID Date Collected Material Units	New York State AWQSGV (Surface Water*) ug/L	UT-SW-1 AC28390-001 02/01/07 Water ug/L			UT-SW-2 AC28390-002 02/01/07 Water ug/L			UT-SW-3 AC28390-003 02/01/07 Water ug/L			UT-SW-4 AC28390-004 02/01/07 Water ug/L			UT-SW-4** AC28390-005 02/01/07 Water ug/L		
SemiVolatile Organic Compounds		Conc	Qual	MDL	Conc	Qual	MDL	Conc	Qual	MDL	Conc	Qual	MDL	Conc	Qual	MDL
1,2,4-Trichlorobenzene	50	ND		0.51	ND		0.48	ND		0.48	ND		0.48	ND		0.48
1,2-Dichlorobenzene	50	ND		0.6	ND		0.57	ND		0.57	ND		0.57	ND		0.57
1,2-Diphenylhydrazine	NS	ND		0.14	ND		0.14	ND		0.14	ND		0.14	ND		0.14
1,3-Dichlorobenzene	50	ND		0.74	ND		0.7	ND		0.7	ND		0.7	ND		0.7
1,4-Dichlorobenzene	50	ND		0.79	ND		0.75	ND		0.75	ND		0.75	ND		0.75
2,4,5-Trichlorophenol	NS	ND		2	ND		1.9	ND		1.9	ND		1.9	ND		1.9
2,4,6-Trichlorophenol	NS	ND		0.92	ND		0.88	ND		0.88	ND		0.88	ND		0.88
2,4-Dichlorophenol	NS	ND		1.3	ND		1.3	ND		1.3	ND		1.3	ND		1.3
2,4-Dimethylphenol	1000	ND		2.1	ND		2	ND		2	ND		2	ND		2
2,4-Dinitrophenol	400	ND		0.67	ND		0.63	ND		0.63	ND		0.63	ND		0.63
2,4-Dinitrotoluene	NS	ND		0.38	ND		0.36	ND		0.36	ND		0.36	ND		0.36
2,6-Dinitrotoluene	NS	ND		0.35	ND		0.33	ND		0.33	ND		0.33	ND		0.33
2-Chloronaphthalene	NS	ND		0.43	ND		0.41	ND		0.41	ND		0.41	ND		0.41
2-Chlorophenol	NS	ND		1.5	ND		1.5	ND		1.5	ND		1.5	ND		1.5
2-Methylnaphthalene	NS	ND		3.7	ND		3.5	ND		3.5	ND		3.5	ND		3.5
2-Methylphenol	NS	ND		4.1	ND		3.9	ND		3.9	ND		3.9	ND		3.9
2-Nitroaniline	NS	ND		1.7	ND		1.7	ND		1.7	ND		1.7	ND		1.7
2-Nitrophenol	NS	ND		0.85	ND		0.81	ND		0.81	ND		0.81	ND		0.81
3&4-Methylphenol	NS	ND		4.3	ND		4.1	ND		4.1	ND		4.1	ND		4.1
3,3'-Dichlorobenzidine	NS	ND		0.84	ND		0.8	ND		0.8	ND		0.8	ND		0.8
3-Nitroaniline	NS	ND		2.7	ND		2.6	ND		2.6	ND		2.6	ND		2.6
4,6-Dinitro-2-methylphenol	NS	ND		0.85	ND		0.81	ND		0.81	ND		0.81	ND		0.81
4-Bromophenyl-phenylether	NS	ND		0.55	ND		0.53	ND		0.53	ND		0.53	ND		0.53
4-Chloro-3-methylphenol	NS	ND		1.2	ND		1.1	ND		1.1	ND		1.1	ND		1.1
4-Chloroaniline	NS	ND		3.2	ND		3	ND		3	ND		3	ND		3
4-Chlorophenyl-phenylether	NS	ND		0.4	ND		0.38	ND		0.38	ND		0.38	ND		0.38
4-Nitroaniline	NS	ND		1.6	ND		1.6	ND		1.6	ND		1.6	ND		1.6
4-Nitrophenol	NS	ND		1.1	ND		1.1	ND		1.1	ND		1.1	ND		1.1
Acenaphthene	60	ND		0.27	ND		0.25	ND		0.25	ND		0.25	ND		0.25
Acenaphthylene	20	ND		0.28	ND		0.24	ND		0.24	ND		0.24	ND		0.24
Anthracene	50	ND		0.19	ND		0.19	ND		0.19	ND		0.19	ND		0.19
Benzidine	5	ND		9.1	ND		8.6	ND		8.6	ND		8.6	ND		8.6
Benzo[a]anthracene	0.002	ND		0.24	ND		0.22	ND		0.22	ND		0.22	ND		0.22
Benzo[a]pyrene	Detection Limit	ND		0.17	ND		0.16	ND		0.16	ND		0.16	ND		0.16
Benzo[b]fluoranthene	0.002	ND		0.22	ND		0.21	ND		0.21	ND		0.21	ND		0.21
Benzo[g,h,i]perylene	5	ND		0.3	ND		0.29	ND		0.29	ND		0.29	ND		0.29
Benzo[k]fluoranthene	0.002	ND		0.33	ND		0.31	ND		0.31	ND		0.31	ND		0.31
Bis(2-Chloroethoxy)methane	5	ND		0.2	ND		0.19	ND		0.19	ND		0.19	ND		0.19
Bis(2-Chloroethyl)Ether	1	ND		0.45	ND		0.43	ND		0.43	ND		0.43	ND		0.43
Bis(2-Chloroisopropyl)ether	NS	ND		0.24	ND		0.23	ND		0.23	ND		0.23	ND		0.23
Bis(2-Ethylhexyl)phthalate	NS	ND		0.39	ND		0.37	ND		0.37	ND		0.37	ND		0.37
Butylbenzylphthalate	NS	ND		0.24	ND		0.23	ND		0.23	ND		0.23	ND		0.23
Carbazole	NS	ND		0.17	ND		0.16	ND		0.16	ND		0.16	ND		0.16
Chrysene	NS	ND		0.2	ND		0.19	ND		0.19	ND		0.19	ND		0.19
Dibenzo[a,h]Anthracene	NS	ND		0.26	ND		0.25	ND		0.32	ND		0.25	ND		0.25
Dibenzofuran	NS	ND		1.7	ND		1.6	ND		0.19	ND		1.6	ND		1.6
Diethylphthalate	NS	ND		0.3	ND		0.28	ND		0.25	ND		0.28	ND		0.28
Dimethylphthalate	NS	ND		0.18	ND		0.18	ND		1.6	ND		0.18	ND		0.18
Di-n-butylphthalate	NS	ND		0.34	ND		0.32	ND		0.28	ND		0.32	ND		0.32
Di-n-octylphthalate	NS	ND		0.2	ND		0.19	ND		0.18	ND		0.19	ND		0.19
Fluoranthene	NS	ND		0.16	ND		0.15	ND		0.15	ND		0.15	ND		0.15
Fluorene	23	ND		0.16	ND		0.15	ND		0.15	ND		0.15	ND		0.15
Hexachlorobenzene	0.00003	ND		0.29	ND		0.27	ND		0.27	ND		0.27	ND		0.27
Hexachlorobutadiene	0.01	ND		0.66	ND		0.62	ND		0.62	ND		0.62	ND		0.62
Hexachlorocyclopentadiene	0.7	ND		4.9	ND		4.6	ND		4.6	ND		4.6	ND		4.6
Hexachloroethane	0.6	ND		0.72	ND		0.68	ND		0.68	ND		0.68	ND		0.68
Indeno[1,2,3-cd]pyrene	NS	ND		0.19	ND		0.18	ND		0.18	ND		0.18	ND		0.18
Isophorone	NS	ND		0.15	ND		0.14	ND		0.14	ND		0.14	ND		0.14
Naphthalene	140	ND		0.47	ND		0.44	ND		0.26	ND		0.44	ND		0.44
Nitrobenzene	0.4	ND		0.25	ND		0.24	ND		8.8	ND		0.24	ND		0.24
N-Nitrosodimethylamine	NS	ND		9.2	ND		8.8	ND		0.15	ND		8.8	ND		8.8
N-Nitroso-Di-N-Propylamine	NS	ND		0.27	ND		0.26	ND		0.44	ND		0.26	ND		0.26
N-Nitrosodiphenylamine	NS	ND		0.16	ND		0.15	ND		0.24	ND		0.15	ND		0.15
Pentachlorophenol	NS	ND		0.8	ND		0.76	ND		0.76	ND		0.76	ND		0.76
Phenanthrene	14	ND		0.24	ND		0.23	ND		0.23	ND		0.23	ND		0.23
Phenol	NS	ND		1.5	ND		1.5	ND		1.5	ND		1.5	ND		1.5
Pyrene	NS	ND		0.15	ND		0.15	ND		0.15	ND		0.15	ND		0.15
Total TICs	NS	ND			ND			ND			ND			6.1	J	

Notes and Abbreviations:

AWQSGV = Ambient Water Quality Standards and Guidance Values as published in the Division of Water Technical and Operational Guidance Series (1.1.1), dated June 1998.
* Using SD water classification with protection for human consumption of fish (saline water).
** Field duplicate sample
UG/L = Micrograms per Liter
ND = Not Detected
NS=No Standard
TICs = Tentatively Identified Compounds
Qual = Laboratory Qualifier
Conc = Concentration
MDL = Method Detection Limit
J= estimated value below the calibration range

[illegible]ABLE 2C
SUMMARY OF SURFACE [illegible]ER ANALYTICAL RESULTS- METALS
SITE 2 (AREA 2B)
HHMT-PORT IVORY FACILITY

Sample ID Lab ID Date Collected Material Units	New York State AWQSGV (Surface Water*) ug/L	UT-SW-1 AC28390-001 02/01/07 Water ug/L			UT-SW-2 AC28390-002 02/01/07 Water ug/L			UT-SW-3 AC28390-003 02/01/07 Water ug/L			UT-SW-4 AC28390-004 02/01/07 Water ug/L			UT-SW-4** AC28390-004 02/01/07 Water ug/L		
Priority Pollutant Metals		Conc	Qual	MDL	Conc	Qual	MDL	Conc	Qual	MDL	Conc	Qual	MDL	Conc	Qual	MDL
Antimony	NS	ND		7.5	ND		7.5	ND		7.5	ND		7.5	ND		7.5
Arsenic	120	ND		4	ND		4	4.1		4	5.9		4	13		4
Barium	NS	100		25	97		25	95		25	99		25	170		25
Beryllium	NS	ND		4	ND		4	ND		4	ND		4	ND		4
Cadmium	21	ND		2	ND		2	ND		2	ND		2	ND		2
Chromium	NS	ND		25	ND		25	ND		25	ND		25	ND		25
Copper	4.8	ND		25	ND		25	ND		25	ND		25	**43**		25
Lead	204	ND		5	ND		5	ND		5	8		5	27		5
Mercury	0.0026	ND		0.2	ND		0.2	ND		0.2	ND		0.2	ND		0.2
Nickel	74	ND		10	ND		10	ND		2.1	ND		10	10		10
Selenium	NS	ND		25	ND		25	ND		0.67	ND		25	ND		25
Silver	2.3	ND		10	ND		10	ND		0.38	ND		10	ND		10
Thallium	NS	ND		5	ND		5	ND		0.35	ND		5	ND		5
Zinc	95	ND		25	34		25	ND		0.43	51		25	**110**		25

Notes and Abbreviations:

AWQSGV = Ambient Water Quality Standards and Guidance Values as published in the Division of Water Technical and Operational Guidance Series (1.1.1), dated June 1998
* Using SD water classification with protection for human consumption of fish
UG/L = Micrograms per Liter
** Field duplicate sample
ND = Not Detected
NS = No standard or guidance value
Qual = Laboratory Qualifier
Conc = Concentration
MDL = Method Detection Limit
NA= Not analyzed
Bold concentrations in shaded cells exceed the AWQSGVs.

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required. All four samples were analyzed for copper and zinc. Quality assurance/quality control (QA/QC) samples were not collected in December 2007 because the February data confirm that the impacts are not due to laboratory or field contamination.

Field observations were recorded before and during sample collection. Neither sheen nor other indications of petroleum impacts were observed at any of the four surface water sample locations. Field parameters, including pH, conductivity, turbidity, dissolved oxygen, temperature, and oxygen reduction potential, were recorded at each sampling located and reported on the field sampling log included as Appendix A. Surface water analytical results are summarized in Table 3. The laboratory analytical results are included in Appendix B.

Copper was not detected in any of the four surface water samples collected. Zinc concentrations ranged from 26 to 39 ug/L, below its AWGSGV of 95 ug/L for class SD surface water. In addition, the concentration of zinc was slightly greater in Bridge Creek than in the unnamed tributary to Bridge Creek.

5.1 Discussion of Surface Water Sampling

The field observations and analytical results confirm that surface water in the unnamed tributary to Bridge Creek is not impacted by organic compounds. In addition, only one (12.5%) of the eight samples collected in February and December 2007 contained any metal at a concentration above its AWQSGV. The duplicate sample collected at UT-SW-4 in February 2007 contained slight exceeedances of copper and zinc. Copper was not detected in any other surface water sample, indicating that this result was anomalous and possibly the result of the suspension of fine-grained sediments during sampling. On the contrary, zinc was detected in the majority (75%) of the eight surface water samples, suggesting that dissolved zinc is likely present in Bridge Creek and its unnamed tributary.

However, the weight of evidence indicates that dissolved zinc is not generally present in surface water at concentrations above its AWQSGV. The sample collected at UT-SW-4 in December 2007 did not contain either metal at a concentration above its AWQSGV. Therefore, only one of three surface water samples collected at this location contained zinc at a concentration above its AWQSGV. In addition, the average concentration of zinc in samples collected to date at UST-SW-4 is 62.3 ug/L, below the AWQSGV for zinc (95 ug/L).

TABLE 3
SUMMARY OF SURFACE WATER ANALYTICAL RESULTS (DECEMBER 2007)
SITE 2
HHMT-PORT IVORY FACILITY

Sample ID Lab ID Date Collected Material Units	New York State AWQSGV (Surface Water*) ug/L	UT-SW-3 AC34641-001 12/04/07 Water ug/L			UT-SW-4 AC34641-002 12/04/07 Water ug/L			BC-US AC34641-003 12/04/07 Water ug/L			BC-DS AC34641-005 12/04/07 Water ug/L		
Priority Pollutant Metals		Conc	Qual	MDL	Conc	Qual	MDL	Conc	Qual	MDL	Conc	Qual	MDL
Antimony	NS	NA			NA			NA			NA		
Arsenic	120	NA			NA			NA			NA		
Barium	NS	NA			NA			NA			NA		
Beryllium	NS	NA			NA			NA			NA		
Cadmium	21	NA			NA			NA			NA		
Chromium	NS	NA			NA			NA			NA		
Copper	4.8	ND		0.5	ND		0.5	ND		0.5	ND		0.5
Lead	204	NA			NA			NA			NA		
Mercury	0.0026	NA			NA			NA			NA		
Nickel	74	NA			NA			NA			NA		
Selenium	NS	NA			NA			NA			NA		
Silver	2.3	NA			NA			NA			NA		
Thallium	NS	NA			NA			NA			NA		
Zinc	95	ND		0.5	26		0.5	37		0.5	39		0.5

Notes and Abbreviations:

AWQSGV = Ambient Water Quality Standards and Guidance Values as published in the Division of Water Technical and Operational Guidance Series (1.1.1), dated June 1998

* Using SD water classification with protection for human consumption of fish

UG/L = Micrograms per Liter

ND = Not Detected

NS = No standard or guidance value

Qual = Laboratory Qualifier

Conc = Concentration

MDL = Method Detection Limit

NA= Not analyzed

Based on the information above, surface water in Bridge Creek and its tributary is not believed to be impacted by any targeted organic compounds or metals.

6.0 EXPOSURE ASSESSMENT

The Port Authority completed an exposure assessment to determine if the potential exists for human and ecological receptors to be exposed to known contaminants at the HHMT-Port Ivory Facility. The exposure assessment is described in Sections 6.1 through 6.4.

6.1 Nature of Contaminants at Site 2

The following summarizes the impacts to all environmental media characterized to date. The following environmental media have been investigated at and immediately adjacent to Site 2: soil, groundwater, surface water in Bridge Creek and its unnamed tributary, sediments along the eastern bank/bed of Bridge Creek, and indoor air in remaining structures at Area 2A. The western bank of Bridge Creek is located to the west of the HHMT-Port Ivory Facility. The sections below document metals and classes of organic compounds that have been identified at concentrations greater than applicable NYSDEC Standards, Criteria, and Guidance (SCGs) in environmental media investigated. The specific metals and organic compounds detected at concentrations in excess of the applicable NYSDEC guidance values, including those believed to be attributable to laboratory contamination of the sample or to background conditions, are listed in Table 4.

6.1.1 Soil

The analytical results for soil indicate that three VOCs, various SVOCs, various metals, and four pesticides are present in soils at Site 2 at concentrations greater than their respective RSCOs the selected soil SCG. The contaminants are present primarily in the historic fill. As previously indicated, the elevated concentration of TPHC at AOC-Western Area (Area 2B) and AOC-Area 2A Southeast will be investigated during subsequent investigations currently underway. An investigation is underway at an Area 2B AOC (AOC-TE Pipeline) to characterize the soil quality along underground pipelines formerly and currently used to transport petroleum.

6.1.2 Groundwater

For this project, the groundwater analytical results have been compared to current NYSDEC AWQSGVs, the selected groundwater SCG, for class GA groundwater. Given the location of the Site and the high potential for water to be saline, the class GA groundwater AWQSGVs are not appropriate for use at this Site. However, at this time, these represent the only guidance available for groundwater. Please note, reference to these standards in this report does not represent any agreement or concurrence that the same

[illegible]ble 4
Metals and Compounds Detected at Concentrations above NYSDEC Standards, Criteria, and Guidance (SCGs)
Howland Hook Marine Terminal-Port Ivory Facility- Site 2
40 Western Avenue
Staten Island, New York

SOIL				
VOCs	**SVOCs**	**Pest &PCBs**	**Metals**	**TPHC; O&G; pH; CN; Tot Ph**
DICHLOROMETHANE	4-CHLORO-3-METHYLPHENOL	DIELDRIN	ALUMINUM	Petroleum Hydrocarbons (NYSDEC has
BENZENE	4-NITROPHENOL	ENDRIN	ARSENIC	not established a RSCO for TPH;
TRANS-1,3DICHLOROPROPENE	BENZO[A]ANTHRACENE	HEPTACHLOR EPOXIDE	BARIUM	however, TPH concentrations were above
	BENZO[A]PYRENE	CHLORDANE	BERYLLIUM	500 mg/kg, the total SVOCs allowed by
	BENZO[B]FLOURANTHENE		CADMIUM	NYSDEC.)
	DIBENZO[A,H]ANTHRACENE		CALCIUM METAL	Note:RSCO=Recommended soil cleanup
	PHENOL		CHROMIUM	objective
	CHRYSENE		COBALT	
	ANTHRACENE		COPPER	
	BENZO[K]FLOURANTHENE		IRON	
	FLUORANTHENE		LEAD	
	INDENO[1,2,3-CD]PYRENE		MAGNESIUM	
	PHENANTHRENE		MERCURY	
	PYRENE		NICKEL	
	PHENOL		POTASSIUM	
	FLUORENE		SELENIUM	
	NAPHTHALENE		SODIUM	
	ACENAPHTYLENE		ZINC	
GROUNDWATER				
VOCs	**SVOCs**	**Pest &PCBs**	**Metals**	**TPHC; O&G; pH; CN; Tot Ph**
ACETONE	BIS(2-ETHYLHEXYL)PHTHALATE	NONE	ARSENIC	NONE
			BARIUM	
			IRON	
			LEAD	
			MAGNESIUM	
			MANGANESE	
			SODIUM	
SEDIMENT				
VOCs	**SVOCs**	**Pest &PCBs**	**Metals**	**TPHC; O&G; pH; CN; Tot Ph**
NONE	NONE	P,P'-DDD	ANTIMONY	NONE
		P,P'-DDE	ARSENIC	
		P,P'-DDT	CADMIUM	
		TOTAL PCBS	CHROMIUM	
		CHLORDANE	LEAD	
			MERCURY	
			NICKEL	
			ZINC	

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Metals and Compounds Detected at Concentrations above NYSDEC Standards, Criteria, and Guidance (SCGs)

Howland Hook Marine Terminal-Port Ivory Facility- Site 2

40 Western Avenue
Staten Island, New York

SURFACE WATER				
VOCs	**SVOCs**	**Pest &PCBs**	**Metals**	**TPHC; O&G; pH; CN; Tot Ph**
NONE	NONE	NONE	NONE	NONE
Indoor Air				
VOCs	**SVOCs**	**Pest &PCBs**	**Metals**	**TPHC; O&G; pH; CN; Tot Ph**
TRICHLOROETHENE	NONE	NONE	NONE	NONE
Notes:				
VOCs= Volatile organic compounds				
SVOCs= Semi-volatile organic compounds				
Pest= Pesticides				
PCBs= Polychlorinated biphenyls				
TPHC= Total Petroleum Hydrocarbons				
O&G= Oil and Grease				
CN= Cyanide				
Tot Ph= Total Phenols				
This list of SCGs is required by the NYSDEC *Draft DER-10 Technical Guidance for Site Investigation and Remediation*, dated 2002.				
1: This table lists the metals and organic compounds by medium tested.				
2: Samples were collected and analyzed from the following media: soil, groundwater, sediment and surface water.				
3: None= None detected above SCGs.				

are appropriate for use at Site 2 or the HHMT-Port Ivory Facility. The analytical results for groundwater indicate that the following metals are present in groundwater at concentrations greater than their respective AWQSGVs: arsenic, barium, iron, lead, magnesium, manganese, and sodium. The groundwater analytical results for groundwater samples collected show the presence of one VOC (acetone), and one SVOC (bis2-ethylhexylphthalate) above their respective AWQSGV. Acetone and bis(2-ethylhexyl)phthalate are common laboratory contaminants, and in fact, the compounds were identified as being laboratory contaminants in groundwater samples collected at the same time from (at a minimum) adjacent VCP Site 3. Therefore, groundwater at Site 2 is impacted by only the seven metals listed above.

6.1.3 Surface Water

The quality of surface water in Bridge Creek and its unnamed tributary were investigated because Bridge Creek is located adjacent to Area 2A and portions of its unnamed tributary are situated within the boundaries of Area 2B. Bridge Creek and its tributaries are tidal, saline streams, which have been classified as SD by the NYSDEC. This classification indicates that due to man-made/natural conditions the stream(s) cannot meet primary or secondary criteria. The best possible use of surface water in these stream(s) is fish survival and limited fishing.

Surface water samples collected from Bridge Creek did not contain metals or organic compounds above the NYSDEC AWQSGVs for Class SD surface water, the selected SCG for surface water. As indicated in Section 5.0, surface water quality in the tributary stream is not impacted by targeted organic compounds or metals.

6.1.4 Sediment

Sediment samples collected from Bridge Creek contained eight metals at concentrations greater than their respective NYSDEC Lower Effects Level (LEL) or the Severe Effects Level (SEL): antimony, arsenic, cadmium, chromium, lead, mercury, nickel and zinc. The LEL and SEL are the appropriate SCGs for metals in sediment.

Four pesticide compounds (P,P'-DDD, P,P'-DDE, P,P'-DDT and chlordane), and total PCBs were detected at concentrations above the Human Health Bioaccumulation criteria, the appropriate SCG for pesticides and PCBs.

The potential sources for these sediment impacts include not only the HHMT-Port Ivory Facility, but also the following: facilities on the western side of Bridge Creek; stormwater runoff from Western Avenue, which passes over Bridge Creek in two locations that are upgradient of the HHMT-Port Ivory Facility; and, impacted sediments at upstream (during low tide) portions of Bridge Creek. In particular, sediment quality upgradient of the HHMT-Port Ivory Facility is known to be degraded with respect to metals and pesticides/PCBs.

The NYSDEC completed a wetlands restoration effort along Bridge Creek upstream (during low tide) of the HHMT-Port Ivory Facility. As part of their restoration effort, the NYSDEC collected soil/sediment samples in and adjacent to Bridge Creek and analyzed the samples for, among other parameters, pesticides and PCBs and the metals arsenic, barium, cadmium, chromium, lead, mercury, selenium, and silver. The analytical results indicate that pesticides/PCBs and the following metals are present at concentrations above their respective SCGs in soil/sediment upstream (during low tide) of the HHMT-Port Ivory Facility: arsenic, cadmium, chromium, lead, mercury, and silver. Pesticides/PCBs and all the metals except for silver have also been detected at concentrations above their respective SCGs in sediment samples collected along Bridge Creek adjacent to the HHMT-Port Ivory Facility. Therefore, the presence of these impacts cannot be conclusively attributed to former land uses at Area 2A.

In accordance with the *Revised Focused SRI Work Plan- Area 2B*, dated December 12, 2006, sediment quality was not evaluated in the unnamed tributary of Bridge Creek because surface water is not impacted in this stream.

6.1.5 Indoor Air

The performance of an indoor air quality assessment was required at Area 2A by the NYSDEC and NYSDOH. This investigative effort was required in three buildings located at Area 2A: Building No. 40, then an unoccupied (since demolished) building; Building No. 41, the primary office building utilized by The Port Authority; and, Building No. 45, a guard shack. Building No. 41 and Building No. 45 are the only remaining permanent structures at Area 2A. Modular construction trailers have been installed on elevated piers in the footprint of former Building No. 40; although skirts have been constructed below the trailers for aesthetic purposes, the skirts are not airtight, and vapors are not anticipated to accumulate below the trailers.

Air sampling results indicate that low concentrations of volatile organic vapors are present within Building No. 41 and Building No. 45. Indoor air samples were not collected at Building No. 40 because that building was scheduled for demolition. Instead, a soil gas sample was collected at a location adjacent to Building No. 40 in accordance with an NYSDOH approved sampling plan.

The sources of the volatile organic vapors detected in Building No. 41 and Building No. 45 include ambient outdoor air, cleaning supplies and other sources within the buildings, and volatile organic vapors in soil gas. None of the indoor air sampling results exceeded the NYSDOH guidance values that have been established for specific halogenated organic compounds. In addition, the concentrations of the volatile organic vapors inside these buildings are significantly lower than the guidance values promulgated by the National Institute for Occupational Safety and Health. Therefore, indoor air quality is not considered to be an issue for Building No. 41 and Building No. 45.

The source for the volatile organic vapors detected in the subsurface adjacent to Building No. 40 may potentially be organic compounds in soil or groundwater. Indoor air samples were not collected at Building No. 40 because that building was scheduled for demolition. Trichloroethene was the only compound detected at a concentration above its NYSDOH guidance value in the soil vapor sample collected adjacent to Building No. 40. However, any vapors, including trichloroethene, migrating from the subsurface to the area beneath the trailers are anticipated to be diluted and/or vented. Although indoor air is not considered to be a concern, the NYSDOH has requested that a venting system be installed beneath the trailers situated within the footprint of Building No. 40. This system will be constructed to prevent vapors that could potentially accumulate beneath these structures from migrating into the trailers. The venting system will consist of louvered vents with a minimum of one vent per side of the trailers, which will be installed during implementation of the RAWP. Periodic inspection, maintenance, and repair of this passive venting system will be specified in the Remedial Action Report.

6.2 Potential Receptors

Two types of potential receptors have been identified at and adjacent to Site 2: human and ecological/environmental receptors. There are no residential properties adjacent to Site 2; in fact, except for one residential property located along Richmond Terrace adjacent to Site 3 and northeast of Area 2A, no residential populations are situated in the immediate vicinity of the HHMT-Port Ivory Facility. Therefore, the occupants of the residential property are considered the only potential off-site human receptors in the vicinity of the HHMT- Port Ivory Facility. Persons present at the site are limited to personnel, tenants, or contractors retained by The Port Authority. The Port Authority has implemented health and safety measures to minimize contact with contaminants by all persons currently performing tasks at the facility and the one residential property located in the site vicinity. Notwithstanding this, personnel at the Facility and residents at the referenced property are considered to be potential human receptors.

The potential ecological/environmental receptors adjacent to Site 2 are an unnamed tributary of Bridge Creek and Bridge Creek itself. Where not culverted, the unnamed tributary of Bridge Creek meanders on and off Area 2B along the southern property boundary of the HHMT Port Ivory Facility. The Arthur Kill tidally influences Bridge Creek. During low tide, surface water in Bridge Creek and the unnamed tributary of Bridge Creek flows towards and discharges into the Arthur Kill, but during high tide, the direction of surface water flow is from the Arthur Kill and up Bridge Creek and its unnamed tributary.

The majority of the surface drainage from Site 2 appears to be collected by storm drains, which discharge into Bridge Creek or its unnamed tributary identified above. The unnamed tributary of Bridge Creek collects minor surface drainage via overland flow. Site 2 is serviced by connections to the potable water and sanitary system of New York. No septic systems or potable water wells are located on or near the site.

6.3 Migration Pathways

The section presents an evaluation of potential migration pathways from impacted media at the site to potential receptors, which have been determined to be Bridge Creek, the unnamed tributary to Bridge Creek, and personnel working at the facility are evaluated in this section. Migration pathways are considered under both pre-redevelopment conditions and post-redevelopment conditions. Redevelopment, which will be completed for economic purposes, will improve environmental conditions at the site through the construction of an environmental cap. The cap will reduce the mobility of contaminants to receptors. In each of the subsections below, the identification and discussion of the potential migration pathways is organized according to medium and contaminant class.

6.3.1 Pre-Redevelopment Pathways

Soil samples collected at Site 2 exhibited varying concentrations of VOCs, SVOCs, metals, pesticides, PCBs, and TPHC, including some metals and organic compounds at concentrations above their respective NYSDEC RSCOs. Area 2A is relatively flat, but does slope gently to the east and south toward Bridge

Creek. Area 2B is also relatively flat, but exhibits a slight slope to the south (i.e., toward the unnamed tributary of Bridge Creek). Therefore, surface soil may be eroded from Site 2 via wind or water transport, and the potential exists that the adsorbed metals and compounds could migrate into Bridge Creek or the unnamed tributary of Bridge Creek. The Port Authority has not established the prevailing wind direction. To be conservative, The Port Authority assumes that metals and organic compounds adsorbed to surface soil have the potential to migrate toward the unnamed tributary of Bridge Creek and to Bridge Creek itself and that personnel working at the facility may also be exposed to these metals and compounds via inhalation. As noted previously, The Port Authority and its subcontractors implement health and safety measures to lessen the likelihood of exposure.

Metals and organic compounds in surface or subsurface soil have the potential to migrate to potential ecological/environmental receptors (unnamed tributary of Bridge Creek and Bridge Creek itself) if impacted soil is disturbed during intrusive activities. Personnel may be exposed to metals and organic compounds (likely SVOCs since VOCs would likely volatilize during the soil disturbance) through the inhalation or ingestion of airborne particulate matter or through dermal contact with soil. Personnel may be exposed, via inhalation, to volatile organic vapors released from the subsurface while the intrusive activity is being conducted. As noted previously, The Port Authority and its tenants or subcontractors will implement health and safety measures to lessen the likelihood of exposure.

Metals and organic compounds may also be mobilized by desorbing from soil and dissolving in rainwater that ultimately recharges groundwater (i.e., may leach). Alternatively, VOCs and SVOCs may desorb from the soil and dissolve in the soil vapor (i.e., may volatilize), and may subsequently dissolve in rainwater that ultimately recharges groundwater. Because both pathways result in metals or organic compounds in groundwater, these migration pathways are considered to be identical to the groundwater pathway discussed below.

Groundwater at Site 2 is not utilized for any potable or non-potable purpose. Therefore, the only potential receptors for groundwater are the unnamed tributary of Bridge Creek and Bridge Creek. Groundwater impacts at Site 2 are limited to the metals arsenic, barium, iron, lead, magnesium, manganese and sodium. Groundwater and any metals dissolved in the groundwater are anticipated to flow towards and discharge into the unnamed tributary of Bridge Creek or into Bridge Creek itself. Of course, the mass loading of metals into Bridge Creek and its unnamed tributary is low relative to the flow of water within Bridge

Creek. Therefore, metals that may be transported via the groundwater migration pathway are diluted upon entering either surface water body.

Potential human receptors (i.e., personnel at the HHMT-Port Ivory Facility) are unlikely to be exposed to the groundwater impacts detected at Site 2. Groundwater at the HHMT-Port Ivory Facility is not used as a source of potable water; therefore, exposure to dissolved contaminants is possible only when intrusive activities are conducted below the water table. When such intrusive work is being conducted, personnel could potentially be exposed to metals via dermal contact. However, as noted above, groundwater impacts at Site 2 are minimal, and The Port Authority and its subcontractors implement health and safety measures to lessen the likelihood of exposure.

Based on the sampling and analytical investigations conducted to date, there is no conclusive evidence that the soil and groundwater impacts detected at Area 2A have impacted surface water or sediment quality in the portion of Bridge Creek adjacent to Area 2A. In fact, surface water sampling results show that the environmental quality of surface water in this portion of Bridge Creek is not impacted. In addition, the sediment impacts detected in the portion of Bridge Creek adjacent to Area 2A may be attributable to non-point sources or, based on offsite NYSDEC sampling results, to the presence of impacted soil/sediment at upstream (during low tide) portions of Bridge Creek or to other non-point source impacts.

Additionally, surface water sampling results show that the environmental quality of surface water in the unnamed tributary of Bridge Creek, part of which is situated within Site 2 (Area 2A), is not impacted.

6.3.2 Post-Redevelopment Pathways

The following is an assessment of the potential migration pathways for metals and organic compounds adsorbed to surface and/or subsurface soil subsequent to redevelopment. As additional potential pathways will not be created during redevelopment, only the potential migration pathways identified in Section 6.3.1 (Pre-Redevelopment Pathways) are assessed below.

Following redevelopment with impervious surfaces or the placement of clean fill, erosion of impacted surface soil is not considered to be a significant migration pathway. Furthermore, the integrity of the impervious cover (i.e., cap) will be inspected on an annual basis, and repairs will be made as necessary.

Following redevelopment, the impervious surfaces will decrease the mass of metals and organic compounds that may leach from soil into groundwater. Therefore, infiltration is considered to be a less significant migration pathway subsequent to redevelopment.

Once the impervious cover has been constructed and the clean fill has been placed, the potential for personnel working at the facility to have direct contact with impacted soil will be reduced. However, this pathway cannot be completely eliminated given that impacted soil may be disturbed in the future (to accommodate utility upgrades, repairs, etc.). Therefore, direct contact with soil and groundwater is considered a potential migration pathway following redevelopment.

Groundwater is not utilized for any potable or non-potable purpose. Therefore, except for direct contact with impacted groundwater by workers (during construction), the only potential receptors for groundwater are Bridge Creek and its unnamed tributary. Groundwater and any metals or organic compounds dissolved in the groundwater are anticipated to flow towards and discharge into one of these surface water bodies. However, the mass loading of these metals and organic compounds to groundwater will decrease subsequent to redevelopment; likewise, mass loading of these substances to Bridge Creek and its tributary will also be reduced.

6.4 Exposure Assessment Summary

As the redevelopment of Site 2 is considered to be part of the remedial action for the site, this Exposure Assessment Summary evaluates post-redevelopment conditions at the site. The presence of metals and organic compounds in soil, and metals in groundwater, at concentrations above their respective criteria is not anticipated to be a concern for residents of the property located along Richmond Terrace.

As noted above, the impacted soil and groundwater that will remain following implementation of the Site 2 RAWP, including the redevelopment of Site 2, is a concern to facility personnel only in the event that subsurface activities are being conducted and the humidity is low. The pathway cannot be completely eliminated given that impacted soil may be disturbed in the future (to accommodate utility upgrades, repairs etc.). Therefore, direct contact with soil and groundwater is considered a potential migration pathway following redevelopment. The concern to personnel is not considered to be significant given the low concentrations of organic compounds and metals in the soil.

Except for direct contact with impacted groundwater by workers (during construction), the only potential receptors for groundwater are Bridge Creek and its unnamed tributary. Groundwater and any dissolved constituents are anticipated to flow towards and discharge into one of these surface water bodies. Following redevelopment, groundwater at Site 2 and surface water in Bridge Creek and its unnamed tributary will be monitored to confirm that contaminant concentrations in groundwater decrease or remain constant and that the remaining impacts do not degrade Bridge Creek or its unnamed tributary.

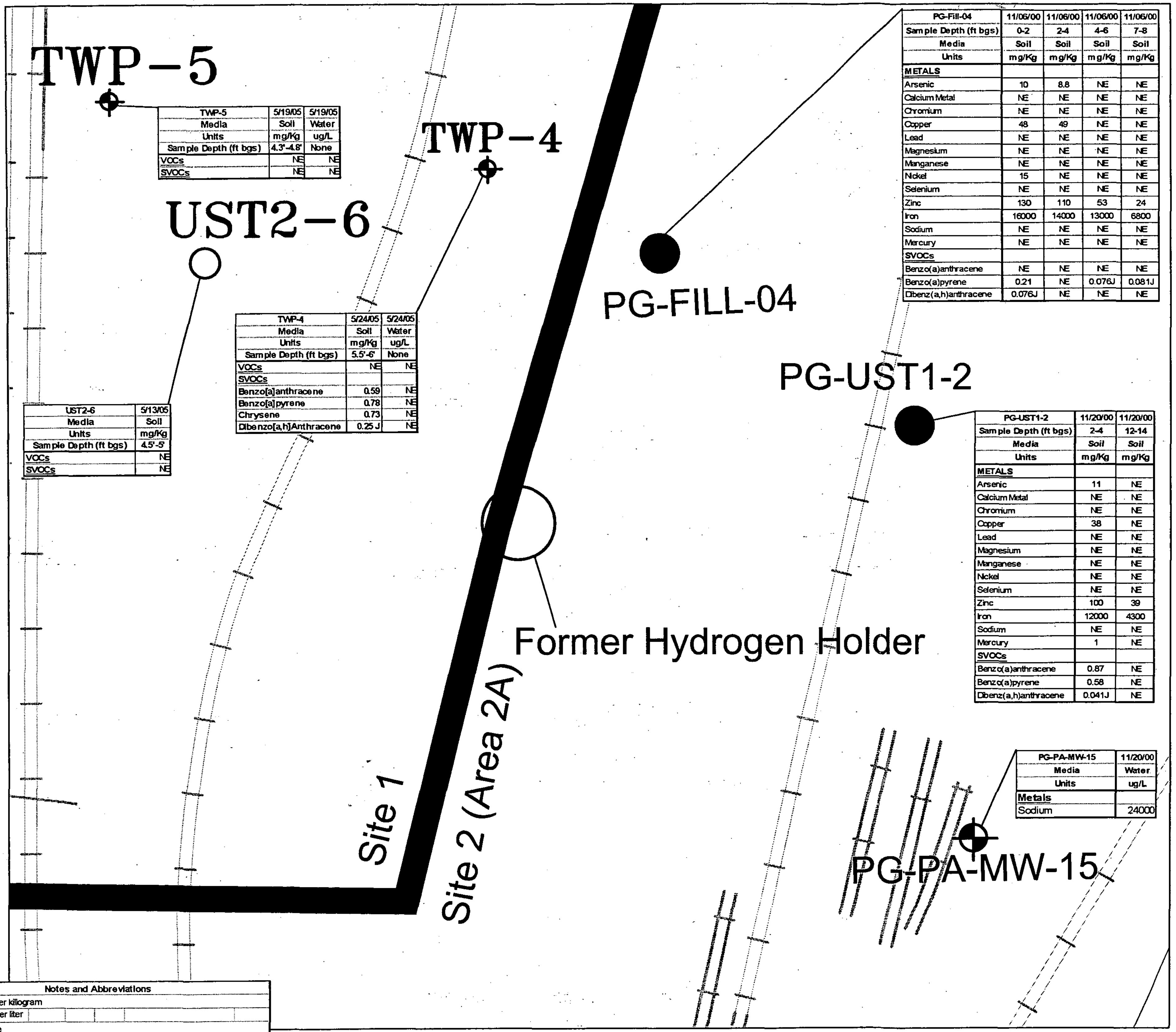
7.0 HYDROGEN HOLDER INVESTIGATION

The Revised SICRAWP identified former hydrogen holder(s) at Area 2A, but did not provide further information regarding these structures. In its December 20, 2004 comment letter, the NYSDEC requested confirmation of former hydrogen holder(s) at Site 2 (Area 2A). The NYSDEC further required documentation of its/their location(s) and any associated analytical results. The information related to the presence of hydrogen holder(s) at Area 2A is included below.

Based on a review of Sanborn Maps, a hydrogen holder (HH) was located approximately 50 feet north of a former silicate warehouse, on the southern portion of Area 2A, adjacent to the eastern Site 1 border. No other hydrogen holders were identified on the site. As part of the CRI, HMM reviewed analytical data for groundwater and soil samples collected in the vicinity of the former HH. The soil sampling locations located within 200 feet of the former hydrogen holder (as referenced on Sanborn maps) are PG-Fill-04, PG-UST1-2 and PG-PA-MW-15, TWP-4, TWP-5, and UST2-6. Please note, sampling locations TWP-4, TWP-5, and UST2-6 are located at Site 1. Together these sampling locations were used to evaluate soil and groundwater quality in the vicinity of the HH. The sampling locations in proximity to the HH are shown on Figure 4.

The concern regarding the hydrogen holders is not that the holders themselves could have discharged regulated substances to soil and/or groundwater, but rather that appurtenant equipment (air compressors, e.g.) could have discharged these substances. Nine soil samples were collected from PG-Fill-04, PG-UST1-2, UST2-6, TWP-4, and TWP-5; no soil samples were collected at PG-PA-MW-15. PG-UST1-2 and PG-Fill-04 were analyzed for PP VOCs, PP SVOCs, PP pesticides and PCBs, TAL metals, total cyanide, total phenolics, O&G, TPHC, and pH. UST2-6, TWP-4, and TWP-5 were analyzed for PP VOCs, PP SVOCs, and TPHC. Groundwater samples were collected at PG-PA-MW-15, TWP-4, and TWP-5. PG-PA-MW-15 was analyzed for PP VOCs, PP SVOCs, PP pesticides and PCBs, TAL metals, total cyanide, total phenolics, O&G, TPHC, and pH. TWP-4 and TWP-5 were analyzed for PP VOCs and PP SVOCs. The soil and groundwater sampling analytical results are included on Figure 4.

The soil sampling analytical results indicate that soil impacts above the RSCOs in the vicinity of the former HH are limited to the PAH compounds benzo(a)anthracene, benzo(a)pyrene, dibenzo(a,h)anthracene, chrysene, and the metals arsenic, copper, iron, mercury, nickel, and zinc. The four PAH compounds detected are the only compounds or metals that are listed above and that could be related to the presence of the former HH and appurtenant equipment (if any). However, the



TWP-5	5/19/05	5/19/05
Media	Soil	Water
Units	mg/Kg	ug/L
Sample Depth (ft bgs)	4.3'-4.8'	None
VOCs	NE	NE
SVOCs	NE	NE

TWP-4	5/24/05	5/24/05
Media	Soil	Water
Units	mg/Kg	ug/L
Sample Depth (ft bgs)	5.5'-6'	None
VOCs	NE	NE
SVOCs		
Benzo[a]anthracene	0.59	NE
Benzo[a]pyrene	0.78	NE
Chrysene	0.73	NE
Dibenzo[a,h]Anthracene	0.25 J	NE

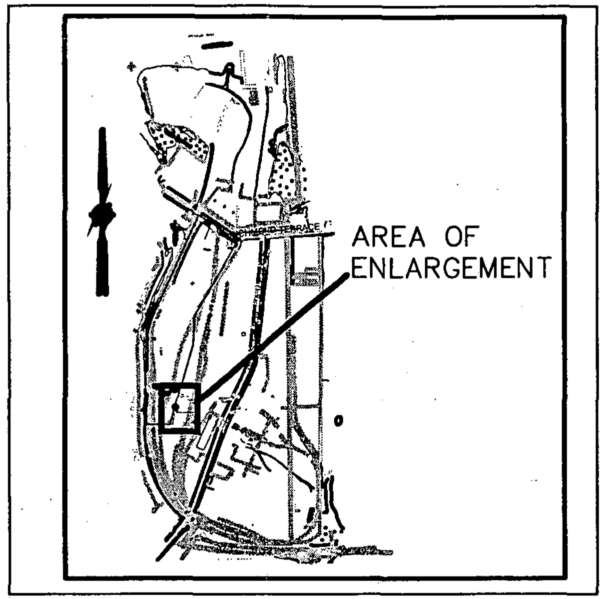
UST2-6	5/13/05
Media	Soil
Units	mg/Kg
Sample Depth (ft bgs)	4.5'-5'
VOCs	NE
SVOCs	NE

PG-Fill-04	11/06/00	11/06/00	11/06/00	11/06/00
Sample Depth (ft bgs)	0-2	2-4	4-6	7-8
Media	Soil	Soil	Soil	Soil
Units	mg/Kg	mg/Kg	mg/Kg	mg/Kg
METALS				
Arsenic	10	8.8	NE	NE
Calcium Metal	NE	NE	NE	NE
Chromium	NE	NE	NE	NE
Copper	48	49	NE	NE
Lead	NE	NE	NE	NE
Magnesium	NE	NE	NE	NE
Manganese	NE	NE	NE	NE
Nickel	15	NE	NE	NE
Selenium	NE	NE	NE	NE
Zinc	130	110	53	24
Iron	16000	14000	13000	6800
Sodium	NE	NE	NE	NE
Mercury	NE	NE	NE	NE
SVOCs				
Benzo(a)anthracene	NE	NE	NE	NE
Benzo(a)pyrene	0.21	NE	0.076J	0.081J
Dibenz(a,h)anthracene	0.076J	NE	NE	NE

PG-UST1-2	11/20/00	11/20/00
Sample Depth (ft bgs)	2-4	12-14
Media	Soil	Soil
Units	mg/Kg	mg/Kg
METALS		
Arsenic	11	NE
Calcium Metal	NE	NE
Chromium	NE	NE
Copper	38	NE
Lead	NE	NE
Magnesium	NE	NE
Manganese	NE	NE
Nickel	NE	NE
Selenium	NE	NE
Zinc	100	39
Iron	12000	4300
Sodium	NE	NE
Mercury	1	NE
SVOCs		
Benzo(a)anthracene	0.87	NE
Benzo(a)pyrene	0.58	NE
Dibenz(a,h)anthracene	0.041J	NE

PG-PA-MW-15	11/20/00
Media	Water
Units	ug/L
Metals	
Sodium	24000

Notes and Abbreviations			
mg/Kg: milligrams per kilogram			
ug/L: micrograms per liter			
NE No exceedence			
VOCs: Volatile Organic Compounds			
SVOCs: Semi-Volatile Organic Compounds			
J: The estimated concentration was below the method detection limit, but above the laboratory reporting limit.			
Recommended Soil Cleanup Objectives (RSCOs), mg/Kg		Ambient Water Quality Standards and Guidance Values (AWQSGVs), ug/L	
SVOCs	Value	Metals	Value
Benzo[a]anthracene	0.224	Sodium	20000
Benzo[a]pyrene	0.061		
Chrysene	0.4		
Dibenzo[a,h]Anthracene	0.014		



LEGEND:

○ UST2-6	SITE 1 SUPPLEMENTAL RI SOIL BORING LOCATION
⌖ TWP-4	SUPPLEMENTAL RI TEMPORARY WELL LOCATION
╪	RAILROAD TRACKS
● PG-UST1-2	SI SOIL BORING LOCATION
⌖ PG-PA-MW-15	SI WELL LOCATION

NOTES:

1) ONLY THE SOIL BORINGS AND WELLS LOCATED WITHIN 200 FEET OF THE HYDROGEN HOLDER ARE SHOWN ON MAP.

2) ONLY THE SOIL ANALYTICAL RESULTS ABOVE THE RSCOs AND GROUNDWATER ANALYTICAL RESULTS ABOVE THE AWQSGVs ARE SHOWN ON MAP.

50' 0' 50' 100'

SCALE IN FEET

Sheet of

THE PORT AUTHORITY OF NY & NJ

ENGINEERING PROGRAM MANAGER

No.	Date	Revision	Approved

ENGINEERING DEPARTMENT

HOWLAND HOOK MARINE TERMINAL (HHMT)-PORT IVORY FACILITY (BLOCK 1400, LOT 1) SITE 1 AND SITE 2 (AREA 2A)

Title

SOIL AND GROUNDWATER INVESTIGATION - HYDROGEN HOLDER AREA

Designed by	Drawn by	Checked by
	RMT	GKC

Date 8/6/2008

Contract Number

Drawing Number FIGURE 4

concentrations of these PAH compounds were similar to those detected in soil throughout the Facility and are attributable to the former placement of historic fill at the Facility by P&G. No remedial action is warranted with respect to the soil in the vicinity of the former HH.

Groundwater monitoring wells were installed and sampled at locations PG-PA-MW15, TWP-4, and TWP-5 listed above. Sodium was the only regulated organic compound or metal detected above the AWQSGVs in groundwater upgradient of the HH, at PG-PA-MW-15. Sodium is not related to the presence of hydrogen holders rather from historic industrial site uses. Groundwater downgradient (i.e., at well TWP-4 and TWP-5) of the location of the former HH is not impacted by VOCs and SVOCs. As such, it does not appear that the presence of the HH has impacted groundwater quality. No further action is recommended with respect to the former presence of the HH at Site 2.

8.0 CONCLUSIONS AND RECOMMENDATIONS

All 19 AOCs identified during the Phase I ESA were investigated during the SI, RI, and SRI as necessary. Each subsequent phase of environmental investigation resulted in the additional characterization of soil, groundwater, surface water, and/or sediment at or adjacent to the HHMT-Port Ivory Facility. Five AOCs were identified subsequent to the Phase I ESA. Currently, only 3 of the 24 AOCs (i.e., 13%) identified at Site 2 are considered to warrant further investigative and/or remedial efforts. These AOCs are AOC-Western Area, AOC-TE Pipeline, and AOC-Area 2A Southeast. The findings of additional investigations at these AOCs will be summarized in subsequent reports.

Based on the investigative activities completed to date, no further investigative or remedial actions are warranted with respect to the following AOCs:

- **AOC-UST 1**
- **AOC-UST 3**
- **AOC-UST 4**
- **AOC-Precipitate at Bridge Creek**
- **AOC-Area E (S&S Tank Field, Super Fat Trap/Block 1400)**
- **AOC-Area F2 (Waste Oil Drum Storage Area/Block 1400)**
- **AOC-Area P (Former Product Unloading Pit/Block 1400)**
- **AOC-Area Q1 (Existing Scale Pit/Block 1338)**
- **AOC-Railroad Tracks and Siding**
- **AOC-Pits and Drains**
- **AOC-Groundwater**: Groundwater impacts at GW-14 were addressed by the excavation of soil at Area B (see Area GW-14 below). Groundwater impacts at OP-1 were addressed by the excavation of soil (see Area OP-1 below). Although sheen was encountered on groundwater at MW-10D, and soil in the vicinity of this well is impacted by benzene (See AOC-Area MW-10D below), the groundwater is not impacted by any organic compounds. This AOC excludes potential groundwater impacts at AOCs where investigation is underway.
- **AOC-Area MW-10D (soil)**: Delineation completed in 2007 (4,800 square feet). Benzene impacts in soil have not impacted groundwater and are of no concern relative to human health.
- **AOC-Hydrogen Holder**

Remedial actions were conducted at the following AOCs. Based on the results of field observations and post excavation soil sample analytical results, no further investigative activities are warranted with respect to these AOCs:

- **AOC-UST-7**: Approximately 204 cubic yards of LNAPL-impacted soil was removed.
- **AOC-Bldg. 20**: Approximately 200 tons of LNAPL-impacted soil was removed.
- **AOC-Bldg 32/32A**: Approximately 50 tons of LNAPL-impacted soil was removed.
- **AOC-Area A West Tank Field Southwest of Building 16)/Block 1400**: Approximately 3,306 cubic yards of LNAPL-impacted soil was removed.
- **AOC-Area B Former Raw Product and By-product AST Areas/Block 1400**: Approximately 4,349 cubic yards of LNAPL-impacted soil was removed.
- **AOC-Staining**: AOC-Stain 3; unknown quantity of soil removed.
- **AOC-Former Structures**: Approximately 1,537 cubic yards of LNAPL-impacted soil was removed.
- **AOC-Area GW-14**: Groundwater impacts were addressed by the removal of approximately 4,349 cubic yards of LNAPL-impacted soil with AOC-Area B.
- **AOC-Area OP-1**: Groundwater impacts were addressed by the removal of approximately 117 cubic yards of LNAPL-impacted soil in the vicinity of OP-1..
- **AOC-Southern Area**: Approximately 200 cubic yards of LNAPL/LNAPL-impacted soil was removed at one location during the IRM. All mobile (i.e., free) LNAPL appears to have been removed at this location.

The following AOCs were identified subsequent to the performance of the Phase I ESA, SI and RI and require additional investigation and/or remedial actions.

- **AOC-Western Area**: LNAPL-impacted soil was initially observed in AOC-Western Area during construction activities. While the presence of LNAPL in soil at AOC-Western Area is itself an impact, soil and groundwater sampling analytical results from the initial investigation of AOC-Western Area indicate that the presence of LNAPL-impacted soil at this AOC has not degraded the environmental quality of soil or groundwater with respect to regulated metals and organic compounds and relative to the impacts attributable to fill materials placed at the HHMT-Port Ivory Facility by P&G. Additional investigation of soil and groundwater quality is warranted in the vicinity of AOC-Western Area, particularly to the east and south. Based on the results of these additional investigations, remedial efforts beyond the soil removal already completed may or may not be warranted.

- **AOC-TE Pipeline**: LNAPL-impacted soil was encountered during an investigation of soil and groundwater along the Tidewater pipelines in AOC-Southern Area; however, the investigation of soil and groundwater quality along a pipeline in an easement to Texas Eastern is ongoing. Additionally, soil and groundwater quality along a second pipeline previously owned by Texas Eastern and currently owned by IMTT located southeast of AOC-Western Area near the unnamed tributary of Bridge Creek is ongoing. Due to their close proximity, both pipelines were identified as AOC-TE Pipeline. Therefore, the investigation of soil and groundwater quality along both pipelines is being conducted simultaneously.

- **AOC-Area 2A Southeast**: While performing storm water drainage improvements along Western Avenue subsequent to the SRI, LNAPL-impacted soil was encountered in an excavation located immediately adjacent to the west of Western Avenue (Area 2A). The excavation was determined to be located approximately three feet from the Tidewater pipelines. Initial soil sample results indicated TPHC concentrations ranged from 1,200 mg/kg to 14,000 mg/kg in the analyzed soil samples. The concentration of TPHC in two samples exceeded 5,000 mg/kg, the site-specific threshold at which the potential presence of free LNAPL must be investigated. Further investigative activities are ongoing at AOC-Area 2A Southeast.

The following AOC warrants additional remedial actions for soil, but not groundwater, quality. Should AOC-Western Area, AOC-TE Pipeline, and AOC-Area 2A Southeast warrant remedial actions, these areas will be remediated as specified in the approved Site 2 RAWP. Although the environmental quality of groundwater at Site 2 is not believed to warrant remedial action, groundwater quality will be monitored during post-redevelopment monitoring. All remedial actions and post-remedial monitoring will be implemented as per the approved Site 2 RAWP.

- **Historic Fill Material**: An impervious cap will be constructed throughout approximately 50-90% of Site 2. Any areas at the site that will remain uncapped following redevelopment will be covered with a minimum of one foot of clean cover material with a demarcation barrier (i.e., geo-textile, plastic liner, or equivalent) between the original land surface and the cover.

APPENDIX A

SURFACE WATER SAMPLING LOGS

THE PORT AUTHORITY OF NY & NJ

MATERIALS ENGINEERING DIVISION
WATER QUALITY DATA SHEET

PROJECT: **HHMT - PORT IVORY**	CHARGE CODE: **CP11634502**
Surface Water from Bridge Creek & Unnamed Tributary	DATE: **12 / 04 / 2007**
WEATHER CONDITIONS: Cloudy and Snowing - 32°F	

SAMPLE ID	SAMPLE TIME	ANALYSIS TIME	pH (SU)	COND (ms/m)	DO (mg/L)	TEMP (°C)	ORP (mV)	TURB (NTU)
UT-SW-4	10:03	10:04	8.24	127.0	11.05	1.86	65	2.04
UT-SW-3	10:11	10:13	8.07	53.9	9.29	2.79	13	2.78
UT-SW-2								
UT-SW-1								
BC-US	9:52	9:53	6.81	992.0	9.79	0.37	124	38.80
BC-DS	9:45	9:47	5.74	673.0	11.22	2.10	186	26.10
	:							
	:							
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	:							
	:							
	:							
	:							
	:							
	:							
	:							

SAMPLED BY: T. Gard / S. Byrne

COMMENTS:

BC-US: ice layer on surface of water.

THE PORT AUTHORITY OF NY & NJ

MATERIALS ENGINEERING DIVISION
WATER QUALITY DATA SHEET

PROJECT: **PORT IVORY**	CHARGE CODE: **CP11-233-295**
Surface Water from Unnamed Tributary	DATE: 02 / 01 / 07
WEATHER CONDITIONS: cloudy, 34°F	

SAMPLE ID	TIME	pH (SU)	COND (ms/m)	TURB (NTU)	DO (mg/L)	TEMP (oC)	SALINITY (%)	TDS (g/L)	SPG	ORP (mV)	
UT-SW-4	14:48	7.51	101.0	55.0	9.27	4.2				2	
UT-SW-3	15:02	7.50	70.4	61.0	9.49	2.8				-3	
UT-SW-2	15:15	7.58	67.0	56.3	9.87	2.4				15	
UT-SW-1	15:31	7.51	77.1	52.3	9.86	2.1				36	
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SAMPLED BY: T. Gard / B. Swofford

COMMENTS:

APPENDIX B

SURFACE WATER SAMPLING ANALYTICAL RESULTS

CT #: PH-0671
MA #: NJ386
NJ #: 14622

NY #: 11408
PA #: 68-463

Report Of Analysis

veritech laboratories

To: PORT AUTHORITY OF NY & NJ
MATERIALS ENGINEERING DIV.
241 ERIE ST.
ROOM 234
JERSEY CITY NJ 07310-1397

Attention: D.Bailey/A.Zafirelis
Project: Port Ivory

Date Collected: 2/1/2007
Date Submitted: 2/2/2007
Date Reported: 2/12/2007

Lab#: AC28390-001 **SampleID: PIT-UT-SW-1-020107SW1**

TestGroup	Analyte	DF	Units	MDL/PQL/RL	DRAFT RESULT
AC28390-001	**PIT-UT-SW-1-020107SW1**				
Mercury (Water) 245.1					
	Mercury	1	ug/L	0.20	ND
PP Metals (Water) 200.7					
	Antimony	0.5	ug/L	7.5	ND
	Arsenic	0.5	ug/L	4.0	ND
	Barium	0.5	ug/L	25	100
	Beryllium	0.5	ug/L	4.0	ND
	Cadmium	0.5	ug/L	2.0	ND
	Chromium	0.5	ug/L	25	ND
	Copper	0.5	ug/L	25	ND
	Lead	0.5	ug/L	5.0	ND
	Nickel	0.5	ug/L	10	ND
	Selenium	0.5	ug/L	25	ND
	Silver	0.5	ug/L	10	ND
	Thallium	0.5	ug/L	5.0	ND
	Zinc	0.5	ug/L	25	ND

ND = Not Detected

Lab#: AC28390-001 **SampleID: PIT-UT-SW-1-020107SW1**

DRAFT

TestGroup	Analyte	DF	Units	MDL/PQL/RL	RESULT
Semivolatile Organics + 25 (625)					
LIBRARY SEARCH:	:No Unknown Compounds Detected	1	ug/L	0(r.t.)	ND
LIBRARY SEARCH:	:TotalSemiVolatileTic	1	ug/L	NA(r.t.)	ND
	1,2,4-Trichlorobenzene	1	ug/L	0.51	ND
	1,2-Dichlorobenzene	1	ug/L	0.60	ND
	1,2-Diphenylhydrazine	1	ug/L	0.14	ND
	1,3-Dichlorobenzene	1	ug/L	0.74	ND
	1,4-Dichlorobenzene	1	ug/L	0.79	ND
	2,4,5-Trichlorophenol	1	ug/L	2.0	ND
	2,4,6-Trichlorophenol	1	ug/L	0.92	ND
	2,4-Dichlorophenol	1	ug/L	1.3	ND
	2,4-Dimethylphenol	1	ug/L	2.1	ND
	2,4-Dinitrophenol	1	ug/L	0.67	ND
	2,4-Dinitrotoluene	1	ug/L	0.38	ND
	2,6-Dinitrotoluene	1	ug/L	0.35	ND
	2-Chloronaphthalene	1	ug/L	0.43	ND
	2-Chlorophenol	1	ug/L	1.5	ND
	2-Methylnaphthalene	1	ug/L	3.7	ND
	2-Methylphenol	1	ug/L	4.1	ND
	2-Nitroaniline	1	ug/L	1.7	ND
	2-Nitrophenol	1	ug/L	0.85	ND
	3&4-Methylphenol	1	ug/L	4.3	ND
	3,3'-Dichlorobenzidine	1	ug/L	0.84	ND
	3-Nitroaniline	1	ug/L	2.7	ND
	4,6-Dinitro-2-methylphenol	1	ug/L	0.85	ND
	4-Bromophenyl-phenylether	1	ug/L	0.55	ND
	4-Chloro-3-methylphenol	1	ug/L	1.2	ND
	4-Chloroaniline	1	ug/L	3.2	ND
	4-Chlorophenyl-phenylether	1	ug/L	0.40	ND
	4-Nitroaniline	1	ug/L	1.6	ND
	4-Nitrophenol	1	ug/L	1.1	ND
	Acenaphthene	1	ug/L	0.27	ND
	Acenaphthylene	1	ug/L	0.26	ND
	Anthracene	1	ug/L	0.19	ND
	Benzidine	1	ug/L	9.1	ND
	Benzo[a]anthracene	1	ug/L	0.24	ND
	Benzo[a]pyrene	1	ug/L	0.17	ND
	Benzo[b]fluoranthene	1	ug/L	0.22	ND
	Benzo[g,h,i]perylene	1	ug/L	0.30	ND
	Benzo[k]fluoranthene	1	ug/L	0.33	ND
	Bis(2-Chloroethoxy)methane	1	ug/L	0.20	ND
	Bis(2-Chloroethyl)ether	1	ug/L	0.45	ND
	Bis(2-Chloroisopropyl)ether	1	ug/L	0.24	ND
	Bis(2-Ethylhexyl)phthalate	1	ug/L	0.39	ND
	Butylbenzylphthalate	1	ug/L	0.24	ND
	Carbazole	1	ug/L	0.17	ND
	Chrysene	1	ug/L	0.20	ND
	Dibenzo[a,h]anthracene	1	ug/L	0.26	ND
	Dibenzofuran	1	ug/L	1.7	ND
	Diethylphthalate	1	ug/L	0.30	ND
	Dimethylphthalate	1	ug/L	0.18	ND
	Di-n-butylphthalate	1	ug/L	0.34	ND
	Di-n-octylphthalate	1	ug/L	0.20	ND
	Fluoranthene	1	ug/L	0.16	ND
	Fluorene	1	ug/L	0.16	ND
	Hexachlorobenzene	1	ug/L	0.29	ND

ND = Not Detected

Lab#: **AC28390-001** **SampleID:** **PIT-UT-SW-1-020107SW1**

TestGroup	Analyte	DF	Units	MDL/PQL/RL	DRAFT RESULT
	Hexachlorobutadiene	1	ug/L	0.66	ND
	Hexachlorocyclopentadiene	1	ug/L	4.9	ND
	Hexachloroethane	1	ug/L	0.72	ND
	Indeno[1,2,3-cd]pyrene	1	ug/L	0.19	ND
	Isophorone	1	ug/L	0.15	ND
	Naphthalene	1	ug/L	0.47	ND
	Nitrobenzene	1	ug/L	0.25	ND
	N-Nitrosodimethylamine	1	ug/L	9.2	ND
	N-Nitroso-di-n-propylamine	1	ug/L	0.27	ND
	N-Nitrosodiphenylamine	1	ug/L	0.16	ND
	Pentachlorophenol	1	ug/L	0.80	ND
	Phenanthrene	1	ug/L	0.24	ND
	Phenol	1	ug/L	1.5	ND
	Pyrene	1	ug/L	0.15	ND
Volatile Organics + 15 (624)					
LIBRARY SEARCH:	:No Unknown Compounds Detected	1	ug/L	0(r.t.)	ND
LIBRARY SEARCH:	:TotalVolatileTic	1	ug/L	NA(r.t.)	ND
	1,1,1,2-Tetrachloroethane	1	ug/L	0.46	ND
	1,1,1-Trichloroethane	1	ug/L	0.33	ND
	1,1,2,2-Tetrachloroethane	1	ug/L	0.21	ND
	1,1,2-Trichloroethane	1	ug/L	0.25	ND
	1,1-Dichloroethane	1	ug/L	0.34	ND
	1,1-Dichloroethene	1	ug/L	0.53	ND
	1,2-Dichloroethane	1	ug/L	0.21	ND
	1,2-Dichloropropane	1	ug/L	0.46	ND
	2-Butanone	1	ug/L	0.38	ND
	2-Chloroethylvinylether	1	ug/L	0.26	ND
	2-Hexanone	1	ug/L	0.36	ND
	4-Methyl-2-Pentanone	1	ug/L	0.17	ND
	Acetone	1	ug/L	2.7	ND
	Acrolein	1	ug/L	1.5	ND
	Acrylonitrile	1	ug/L	0.54	ND
	Benzene	1	ug/L	0.25	ND
	Bromodichloromethane	1	ug/L	0.33	ND
	Bromoform	1	ug/L	0.29	ND
	Bromomethane	1	ug/L	0.23	ND
	Carbon disulfide	1	ug/L	0.23	ND
	Carbon tetrachloride	1	ug/L	0.44	ND
	Chlorobenzene	1	ug/L	0.21	ND
	Chloroethane	1	ug/L	0.22	ND
	Chloroform	1	ug/L	0.42	ND
	Chloromethane	1	ug/L	0.51	ND
	cis-1,2-Dichloroethene	1	ug/L	0.31	ND
	cis-1,3-Dichloropropene	1	ug/L	0.20	ND
	Dibromochloromethane	1	ug/L	0.20	ND
	Ethylbenzene	1	ug/L	0.40	ND
	m&p-Xylenes	1	ug/L	0.36	ND
	Methylene chloride	1	ug/L	0.47	ND
	o-Xylene	1	ug/L	0.16	ND
	Styrene	1	ug/L	0.18	ND
	Tetrachloroethene	1	ug/L	0.24	ND
	Toluene	1	ug/L	0.18	ND
	trans-1,2-Dichloroethene	1	ug/L	0.40	ND
	trans-1,3-dichloropropene	1	ug/L	0.15	ND
	Trichloroethene	1	ug/L	0.28	ND
	Vinyl chloride	1	ug/L	0.65	ND

ND = Not Detected

Lab#: AC28390-002 **SampleID: PIT-UT-SW-2-020107SW1**

DRAFT

TestGroup	Analyte	DF	Units	MDL/PQL/RL	RESULT
AC28390-002	**PIT-UT-SW-2-020107SW1**				
Mercury (Water) 245.1					
	Mercury	1	ug/L	0.20	ND
PP Metals (Water) 200.7					
	Antimony	0.5	ug/L	7.5	ND
	Arsenic	0.5	ug/L	4.0	ND
	Barium	0.5	ug/L	25	97
	Beryllium	0.5	ug/L	4.0	ND
	Cadmium	0.5	ug/L	2.0	ND
	Chromium	0.5	ug/L	25	ND
	Copper	0.5	ug/L	25	ND
	Lead	0.5	ug/L	5.0	ND
	Nickel	0.5	ug/L	10	ND
	Selenium	0.5	ug/L	25	ND
	Silver	0.5	ug/L	10	ND
	Thallium	0.5	ug/L	5.0	ND
	Zinc	0.5	ug/L	25	34

ND = Not Detected

Lab#: AC28390-002 **SampleID:** PIT-UT-SW-2-020107SW1

DRAFT

TestGroup	Analyte	DF	Units	MDL/PQL/RL	RESULT
Semivolatile Organics + 25 (625)					
LIBRARY SEARCH:	:No Unknown Compounds Detected	1	ug/L	0(r.t.)	ND
LIBRARY SEARCH:	:TotalSemiVolatileTic	1	ug/L	NA(r.t.)	ND
	1,2,4-Trichlorobenzene	1	ug/L	0.48	ND
	1,2-Dichlorobenzene	1	ug/L	0.57	ND
	1,2-Diphenylhydrazine	1	ug/L	0.14	ND
	1,3-Dichlorobenzene	1	ug/L	0.70	ND
	1,4-Dichlorobenzene	1	ug/L	0.75	ND
	2,4,5-Trichlorophenol	1	ug/L	1.9	ND
	2,4,6-Trichlorophenol	1	ug/L	0.88	ND
	2,4-Dichlorophenol	1	ug/L	1.3	ND
	2,4-Dimethylphenol	1	ug/L	2.0	ND
	2,4-Dinitrophenol	1	ug/L	0.63	ND
	2,4-Dinitrotoluene	1	ug/L	0.36	ND
	2,6-Dinitrotoluene	1	ug/L	0.33	ND
	2-Chloronaphthalene	1	ug/L	0.41	ND
	2-Chlorophenol	1	ug/L	1.5	ND
	2-Methylnaphthalene	1	ug/L	3.5	ND
	2-Methylphenol	1	ug/L	3.9	ND
	2-Nitroaniline	1	ug/L	1.7	ND
	2-Nitrophenol	1	ug/L	0.81	ND
	3&4-Methylphenol	1	ug/L	4.1	ND
	3,3'-Dichlorobenzidine	1	ug/L	0.80	ND
	3-Nitroaniline	1	ug/L	2.6	ND
	4,6-Dinitro-2-methylphenol	1	ug/L	0.81	ND
	4-Bromophenyl-phenylether	1	ug/L	0.53	ND
	4-Chloro-3-methylphenol	1	ug/L	1.1	ND
	4-Chloroaniline	1	ug/L	3.0	ND
	4-Chlorophenyl-phenylether	1	ug/L	0.38	ND
	4-Nitroaniline	1	ug/L	1.6	ND
	4-Nitrophenol	1	ug/L	1.1	ND
	Acenaphthene	1	ug/L	0.25	ND
	Acenaphthylene	1	ug/L	0.24	ND
	Anthracene	1	ug/L	0.19	ND
	Benzidine	1	ug/L	8.6	ND
	Benzo[a]anthracene	1	ug/L	0.22	ND
	Benzo[a]pyrene	1	ug/L	0.16	ND
	Benzo[b]fluoranthene	1	ug/L	0.21	ND
	Benzo[g,h,i]perylene	1	ug/L	0.29	ND
	Benzo[k]fluoranthene	1	ug/L	0.31	ND
	Bis(2-Chloroethoxy)methane	1	ug/L	0.19	ND
	Bis(2-Chloroethyl)ether	1	ug/L	0.43	ND
	Bis(2-Chloroisopropyl)ether	1	ug/L	0.23	ND
	Bis(2-Ethylhexyl)phthalate	1	ug/L	0.37	ND
	Butylbenzylphthalate	1	ug/L	0.23	ND
	Carbazole	1	ug/L	0.16	ND
	Chrysene	1	ug/L	0.19	ND
	Dibenzo[a,h]anthracene	1	ug/L	0.25	ND
	Dibenzofuran	1	ug/L	1.6	ND
	Diethylphthalate	1	ug/L	0.28	ND
	Dimethylphthalate	1	ug/L	0.18	ND
	Di-n-butylphthalate	1	ug/L	0.32	ND
	Di-n-octylphthalate	1	ug/L	0.19	ND
	Fluoranthene	1	ug/L	0.15	ND
	Fluorene	1	ug/L	0.15	ND
	Hexachlorobenzene	1	ug/L	0.27	ND

ND = Not Detected

Lab#: AC28390-002 **SampleID: PIT-UT-SW-2-020107SW1** **DRAFT**

TestGroup	Analyte	DF	Units	MDL/PQL/RL	RESULT
	Hexachlorobutadiene	1	ug/L	0.62	ND
	Hexachlorocyclopentadiene	1	ug/L	4.6	ND
	Hexachloroethane	1	ug/L	0.68	ND
	Indeno[1,2,3-cd]pyrene	1	ug/L	0.18	ND
	Isophorone	1	ug/L	0.14	ND
	Naphthalene	1	ug/L	0.44	ND
	Nitrobenzene	1	ug/L	0.24	ND
	N-Nitrosodimethylamine	1	ug/L	8.8	ND
	N-Nitroso-di-n-propylamine	1	ug/L	0.26	ND
	N-Nitrosodiphenylamine	1	ug/L	0.15	ND
	Pentachlorophenol	1	ug/L	0.76	ND
	Phenanthrene	1	ug/L	0.23	ND
	Phenol	1	ug/L	1.5	ND
	Pyrene	1	ug/L	0.15	ND
Volatile Organics + 15 (624)					
LIBRARY SEARCH:	:No Unknown Compounds Detected	1	ug/L	0(r.t.)	ND
LIBRARY SEARCH:	:TotalVolatileTic	1	ug/L	NA(r.t.)	ND
	1,1,1,2-Tetrachloroethane	1	ug/L	0.46	ND
	1,1,1-Trichloroethane	1	ug/L	0.33	ND
	1,1,2,2-Tetrachloroethane	1	ug/L	0.21	ND
	1,1,2-Trichloroethane	1	ug/L	0.25	ND
	1,1-Dichloroethane	1	ug/L	0.34	ND
	1,1-Dichloroethene	1	ug/L	0.53	ND
	1,2-Dichloroethane	1	ug/L	0.21	ND
	1,2-Dichloropropane	1	ug/L	0.46	ND
	2-Butanone	1	ug/L	0.38	ND
	2-Chloroethylvinylether	1	ug/L	0.26	ND
	2-Hexanone	1	ug/L	0.36	ND
	4-Methyl-2-Pentanone	1	ug/L	0.17	ND
	Acetone	1	ug/L	2.7	ND
	Acrolein	1	ug/L	1.5	ND
	Acrylonitrile	1	ug/L	0.54	ND
	Benzene	1	ug/L	0.25	ND
	Bromodichloromethane	1	ug/L	0.33	ND
	Bromoform	1	ug/L	0.29	ND
	Bromomethane	1	ug/L	0.23	ND
	Carbon disulfide	1	ug/L	0.23	ND
	Carbon tetrachloride	1	ug/L	0.44	ND
	Chlorobenzene	1	ug/L	0.21	ND
	Chloroethane	1	ug/L	0.22	ND
	Chloroform	1	ug/L	0.42	ND
	Chloromethane	1	ug/L	0.51	ND
	cis-1,2-Dichloroethene	1	ug/L	0.31	ND
	cis-1,3-Dichloropropene	1	ug/L	0.20	ND
	Dibromochloromethane	1	ug/L	0.20	ND
	Ethylbenzene	1	ug/L	0.40	ND
	m&p-Xylenes	1	ug/L	0.36	ND
	Methylene chloride	1	ug/L	0.47	ND
	o-Xylene	1	ug/L	0.16	ND
	Styrene	1	ug/L	0.18	ND
	Tetrachloroethene	1	ug/L	0.24	ND
	Toluene	1	ug/L	0.18	ND
	trans-1,2-Dichloroethene	1	ug/L	0.40	ND
	trans-1,3-dichloropropene	1	ug/L	0.15	ND
	Trichloroethene	1	ug/L	0.28	ND
	Vinyl chloride	1	ug/L	0.65	ND

ND = Not Detected

TestGroup	Analyte	DF	Units	MDL/PQL/RL	RESULT
AC28390-003	**PIT-UT-SW-3-020107SW1**				
Mercury (Water) 245.1					
	Mercury	1	ug/L	0.20	ND
PP Metals (Water) 200.7					
	Antimony	0.5	ug/L	7.5	ND
	Arsenic	0.5	ug/L	4.0	4.1
	Barium	0.5	ug/L	25	95
	Beryllium	0.5	ug/L	4.0	ND
	Cadmium	0.5	ug/L	2.0	ND
	Chromium	0.5	ug/L	25	ND
	Copper	0.5	ug/L	25	ND
	Lead	0.5	ug/L	5.0	ND
	Nickel	0.5	ug/L	10	ND
	Selenium	0.5	ug/L	25	ND
	Silver	0.5	ug/L	10	ND
	Thallium	0.5	ug/L	5.0	ND
	Zinc	0.5	ug/L	25	ND

ND = Not Detected

Lab#: AC28390-003 **SampleID: PIT-UT-SW-3-020107SW1**

TestGroup	Analyte	DF	Units	MDL/PQL/RL	DRAFT RESULT
Semivolatile Organics + 25 (625)					
LIBRARY SEARCH:	:No Unknown Compounds Detected	1	ug/L	0(r.t.)	ND
LIBRARY SEARCH:	:TotalSemiVolatileTic	1	ug/L	NA(r.t.)	ND
	1,2,4-Trichlorobenzene	1	ug/L	0.48	ND
	1,2-Dichlorobenzene	1	ug/L	0.57	ND
	1,2-Diphenylhydrazine	1	ug/L	0.14	ND
	1,3-Dichlorobenzene	1	ug/L	0.70	ND
	1,4-Dichlorobenzene	1	ug/L	0.75	ND
	2,4,5-Trichlorophenol	1	ug/L	1.9	ND
	2,4,6-Trichlorophenol	1	ug/L	0.88	ND
	2,4-Dichlorophenol	1	ug/L	1.3	ND
	2,4-Dimethylphenol	1	ug/L	2.0	ND
	2,4-Dinitrophenol	1	ug/L	0.63	ND
	2,4-Dinitrotoluene	1	ug/L	0.36	ND
	2,6-Dinitrotoluene	1	ug/L	0.33	ND
	2-Chloronaphthalene	1	ug/L	0.41	ND
	2-Chlorophenol	1	ug/L	1.5	ND
	2-Methylnaphthalene	1	ug/L	3.5	ND
	2-Methylphenol	1	ug/L	3.9	ND
	2-Nitroaniline	1	ug/L	1.7	ND
	2-Nitrophenol	1	ug/L	0.81	ND
	3&4-Methylphenol	1	ug/L	4.1	ND
	3,3'-Dichlorobenzidine	1	ug/L	0.80	ND
	3-Nitroaniline	1	ug/L	2.6	ND
	4,6-Dinitro-2-methylphenol	1	ug/L	0.81	ND
	4-Bromophenyl-phenylether	1	ug/L	0.53	ND
	4-Chloro-3-methylphenol	1	ug/L	1.1	ND
	4-Chloroaniline	1	ug/L	3.0	ND
	4-Chlorophenyl-phenylether	1	ug/L	0.38	ND
	4-Nitroaniline	1	ug/L	1.6	ND
	4-Nitrophenol	1	ug/L	1.1	ND
	Acenaphthene	1	ug/L	0.25	ND
	Acenaphthylene	1	ug/L	0.24	ND
	Anthracene	1	ug/L	0.19	ND
	Benzidine	1	ug/L	8.6	ND
	Benzo[a]anthracene	1	ug/L	0.22	ND
	Benzo[a]pyrene	1	ug/L	0.16	ND
	Benzo[b]fluoranthene	1	ug/L	0.21	ND
	Benzo[g,h,i]perylene	1	ug/L	0.29	ND
	Benzo[k]fluoranthene	1	ug/L	0.31	ND
	Bis(2-Chloroethoxy)methane	1	ug/L	0.19	ND
	Bis(2-Chloroethyl)ether	1	ug/L	0.43	ND
	Bis(2-Chloroisopropyl)ether	1	ug/L	0.23	ND
	Bis(2-Ethylhexyl)phthalate	1	ug/L	0.37	ND
	Butylbenzylphthalate	1	ug/L	0.23	ND
	Carbazole	1	ug/L	0.16	ND
	Chrysene	1	ug/L	0.19	ND
	Dibenzo[a,h]anthracene	1	ug/L	0.25	ND
	Dibenzofuran	1	ug/L	1.6	ND
	Diethylphthalate	1	ug/L	0.28	ND
	Dimethylphthalate	1	ug/L	0.18	ND
	Di-n-butylphthalate	1	ug/L	0.32	ND
	Di-n-octylphthalate	1	ug/L	0.19	ND
	Fluoranthene	1	ug/L	0.15	ND
	Fluorene	1	ug/L	0.15	ND
	Hexachlorobenzene	1	ug/L	0.27	ND

ND = Not Detected

Lab#: AC28390-003 **SampleID: PIT-UT-SW-3-020107SW1**

TestGroup	Analyte	DF	Units	MDL/PQL/RL	DRAFT RESULT
	Hexachlorobutadiene	1	ug/L	0.62	ND
	Hexachlorocyclopentadiene	1	ug/L	4.6	ND
	Hexachloroethane	1	ug/L	0.68	ND
	Indeno[1,2,3-cd]pyrene	1	ug/L	0.18	ND
	Isophorone	1	ug/L	0.14	ND
	Naphthalene	1	ug/L	0.44	ND
	Nitrobenzene	1	ug/L	0.24	ND
	N-Nitrosodimethylamine	1	ug/L	8.8	ND
	N-Nitroso-di-n-propylamine	1	ug/L	0.26	ND
	N-Nitrosodiphenylamine	1	ug/L	0.15	ND
	Pentachlorophenol	1	ug/L	0.76	ND
	Phenanthrene	1	ug/L	0.23	ND
	Phenol	1	ug/L	1.5	ND
	Pyrene	1	ug/L	0.15	ND
Volatile Organics + 15 (624)					
LIBRARY SEARCH:	:No Unknown Compounds Detected	1	ug/L	0(r.t.)	ND
LIBRARY SEARCH:	:TotalVolatileTic	1	ug/L	NA(r.t.)	ND
	1,1,1,2-Tetrachloroethane	1	ug/L	0.46	ND
	1,1,1-Trichloroethane	1	ug/L	0.33	ND
	1,1,2,2-Tetrachloroethane	1	ug/L	0.21	ND
	1,1,2-Trichloroethane	1	ug/L	0.25	ND
	1,1-Dichloroethane	1	ug/L	0.34	ND
	1,1-Dichloroethene	1	ug/L	0.53	ND
	1,2-Dichloroethane	1	ug/L	0.21	ND
	1,2-Dichloropropane	1	ug/L	0.46	ND
	2-Butanone	1	ug/L	0.38	ND
	2-Chloroethylvinylether	1	ug/L	0.26	ND
	2-Hexanone	1	ug/L	0.36	ND
	4-Methyl-2-Pentanone	1	ug/L	0.17	ND
	Acetone	1	ug/L	2.7	ND
	Acrolein	1	ug/L	1.5	ND
	Acrylonitrile	1	ug/L	0.54	ND
	Benzene	1	ug/L	0.25	ND
	Bromodichloromethane	1	ug/L	0.33	ND
	Bromoform	1	ug/L	0.29	ND
	Bromomethane	1	ug/L	0.23	ND
	Carbon disulfide	1	ug/L	0.23	ND
	Carbon tetrachloride	1	ug/L	0.44	ND
	Chlorobenzene	1	ug/L	0.21	ND
	Chloroethane	1	ug/L	0.22	ND
	Chloroform	1	ug/L	0.42	ND
	Chloromethane	1	ug/L	0.51	ND
	cis-1,2-Dichloroethene	1	ug/L	0.31	ND
	cis-1,3-Dichloropropene	1	ug/L	0.20	ND
	Dibromochloromethane	1	ug/L	0.20	ND
	Ethylbenzene	1	ug/L	0.40	ND
	m&p-Xylenes	1	ug/L	0.36	ND
	Methylene chloride	1	ug/L	0.47	ND
	o-Xylene	1	ug/L	0.16	ND
	Styrene	1	ug/L	0.18	ND
	Tetrachloroethene	1	ug/L	0.24	ND
	Toluene	1	ug/L	0.18	ND
	trans-1,2-Dichloroethene	1	ug/L	0.40	ND
	trans-1,3-dichloropropene	1	ug/L	0.15	ND
	Trichloroethene	1	ug/L	0.28	ND
	Vinyl chloride	1	ug/L	0.65	ND

ND = Not Detected

Lab#: **AC28390-004** **SampleID:** **PIT-UT-SW-4-020107SW1**

DRAFT

TestGroup	Analyte	DF	Units	MDL/PQL/RL	RESULT
AC28390-004	**PIT-UT-SW-4-020107SW1**				
Mercury (Water) 245.1					
	Mercury	1	ug/L	0.20	ND
PP Metals (Water) 200.7					
	Antimony	0.5	ug/L	7.5	ND
	Arsenic	0.5	ug/L	4.0	5.9
	Barium	0.5	ug/L	25	99
	Beryllium	0.5	ug/L	4.0	ND
	Cadmium	0.5	ug/L	2.0	ND
	Chromium	0.5	ug/L	25	ND
	Copper	0.5	ug/L	25	ND
	Lead	0.5	ug/L	5.0	8.0
	Nickel	0.5	ug/L	10	ND
	Selenium	0.5	ug/L	25	ND
	Silver	0.5	ug/L	10	ND
	Thallium	0.5	ug/L	5.0	ND
	Zinc	0.5	ug/L	25	51

ND = Not Detected

Lab#: AC28390-004 **SampleID:** PIT-UT-SW-4-020107SW1

DRAFT

TestGroup	Analyte	DF	Units	MDL/PQL/RL	RESULT
Semivolatile Organics + 25 (625)					
LIBRARY SEARCH:	:No Unknown Compounds Detected	1	ug/L	0(r.t.)	ND
LIBRARY SEARCH:	:TotalSemiVolatileTic	1	ug/L	NA(r.t.)	ND
	1,2,4-Trichlorobenzene	1	ug/L	0.48	ND
	1,2-Dichlorobenzene	1	ug/L	0.57	ND
	1,2-Diphenylhydrazine	1	ug/L	0.14	ND
	1,3-Dichlorobenzene	1	ug/L	0.70	ND
	1,4-Dichlorobenzene	1	ug/L	0.75	ND
	2,4,5-Trichlorophenol	1	ug/L	1.9	ND
	2,4,6-Trichlorophenol	1	ug/L	0.88	ND
	2,4-Dichlorophenol	1	ug/L	1.3	ND
	2,4-Dimethylphenol	1	ug/L	2.0	ND
	2,4-Dinitrophenol	1	ug/L	0.63	ND
	2,4-Dinitrotoluene	1	ug/L	0.36	ND
	2,6-Dinitrotoluene	1	ug/L	0.33	ND
	2-Chloronaphthalene	1	ug/L	0.41	ND
	2-Chlorophenol	1	ug/L	1.5	ND
	2-Methylnaphthalene	1	ug/L	3.5	ND
	2-Methylphenol	1	ug/L	3.9	ND
	2-Nitroaniline	1	ug/L	1.7	ND
	2-Nitrophenol	1	ug/L	0.81	ND
	3&4-Methylphenol	1	ug/L	4.1	ND
	3,3'-Dichlorobenzidine	1	ug/L	0.80	ND
	3-Nitroaniline	1	ug/L	2.6	ND
	4,6-Dinitro-2-methylphenol	1	ug/L	0.81	ND
	4-Bromophenyl-phenylether	1	ug/L	0.53	ND
	4-Chloro-3-methylphenol	1	ug/L	1.1	ND
	4-Chloroaniline	1	ug/L	3.0	ND
	4-Chlorophenyl-phenylether	1	ug/L	0.38	ND
	4-Nitroaniline	1	ug/L	1.6	ND
	4-Nitrophenol	1	ug/L	1.1	ND
	Acenaphthene	1	ug/L	0.25	ND
	Acenaphthylene	1	ug/L	0.24	ND
	Anthracene	1	ug/L	0.19	ND
	Benzidine	1	ug/L	8.6	ND
	Benzo[a]anthracene	1	ug/L	0.22	ND
	Benzo[a]pyrene	1	ug/L	0.16	ND
	Benzo[b]fluoranthene	1	ug/L	0.21	ND
	Benzo[g,h,i]perylene	1	ug/L	0.29	ND
	Benzo[k]fluoranthene	1	ug/L	0.31	ND
	Bis(2-Chloroethoxy)methane	1	ug/L	0.19	ND
	Bis(2-Chloroethyl)ether	1	ug/L	0.43	ND
	Bis(2-Chloroisopropyl)ether	1	ug/L	0.23	ND
	Bis(2-Ethylhexyl)phthalate	1	ug/L	0.37	ND
	Butylbenzylphthalate	1	ug/L	0.23	ND
	Carbazole	1	ug/L	0.16	ND
	Chrysene	1	ug/L	0.19	ND
	Dibenzo[a,h]anthracene	1	ug/L	0.25	ND
	Dibenzofuran	1	ug/L	1.6	ND
	Diethylphthalate	1	ug/L	0.28	ND
	Dimethylphthalate	1	ug/L	0.18	ND
	Di-n-butylphthalate	1	ug/L	0.32	ND
	Di-n-octylphthalate	1	ug/L	0.19	ND
	Fluoranthene	1	ug/L	0.15	ND
	Fluorene	1	ug/L	0.15	ND
	Hexachlorobenzene	1	ug/L	0.27	ND

ND = Not Detected

Lab#: **AC28390-004** **SampleID:** **PIT-UT-SW-4-020107SW1** **DRAFT**

TestGroup	Analyte	DF	Units	MDL/PQL/RL	RESULT
	Hexachlorobutadiene	1	ug/L	0.62	ND
	Hexachlorocyclopentadiene	1	ug/L	4.6	ND
	Hexachloroethane	1	ug/L	0.68	ND
	Indeno[1,2,3-cd]pyrene	1	ug/L	0.18	ND
	Isophorone	1	ug/L	0.14	ND
	Naphthalene	1	ug/L	0.44	ND
	Nitrobenzene	1	ug/L	0.24	ND
	N-Nitrosodimethylamine	1	ug/L	8.8	ND
	N-Nitroso-di-n-propylamine	1	ug/L	0.26	ND
	N-Nitrosodiphenylamine	1	ug/L	0.15	ND
	Pentachlorophenol	1	ug/L	0.76	ND
	Phenanthrene	1	ug/L	0.23	ND
	Phenol	1	ug/L	1.5	ND
	Pyrene	1	ug/L	0.15	ND
Volatile Organics + 15 (624)					
LIBRARY SEARCH:	:No Unknown Compounds Detected	1	ug/L	0(r.t.)	ND
LIBRARY SEARCH:	:TotalVolatileTic	1	ug/L	NA(r.t.)	ND
	1,1,1,2-Tetrachloroethane	1	ug/L	0.46	ND
	1,1,1-Trichloroethane	1	ug/L	0.33	ND
	1,1,2,2-Tetrachloroethane	1	ug/L	0.21	ND
	1,1,2-Trichloroethane	1	ug/L	0.25	ND
	1,1-Dichloroethane	1	ug/L	0.34	ND
	1,1-Dichloroethene	1	ug/L	0.53	ND
	1,2-Dichloroethane	1	ug/L	0.21	ND
	1,2-Dichloropropane	1	ug/L	0.46	ND
	2-Butanone	1	ug/L	0.38	ND
	2-Chloroethylvinylether	1	ug/L	0.26	ND
	2-Hexanone	1	ug/L	0.36	ND
	4-Methyl-2-Pentanone	1	ug/L	0.17	ND
	Acetone	1	ug/L	2.7	ND
	Acrolein	1	ug/L	1.5	ND
	Acrylonitrile	1	ug/L	0.54	ND
	Benzene	1	ug/L	0.25	ND
	Bromodichloromethane	1	ug/L	0.33	ND
	Bromoform	1	ug/L	0.29	ND
	Bromomethane	1	ug/L	0.23	ND
	Carbon disulfide	1	ug/L	0.23	ND
	Carbon tetrachloride	1	ug/L	0.44	ND
	Chlorobenzene	1	ug/L	0.21	ND
	Chloroethane	1	ug/L	0.22	ND
	Chloroform	1	ug/L	0.42	ND
	Chloromethane	1	ug/L	0.51	ND
	cis-1,2-Dichloroethene	1	ug/L	0.31	ND
	cis-1,3-Dichloropropene	1	ug/L	0.20	ND
	Dibromochloromethane	1	ug/L	0.20	ND
	Ethylbenzene	1	ug/L	0.40	ND
	m&p-Xylenes	1	ug/L	0.36	ND
	Methylene chloride	1	ug/L	0.47	ND
	o-Xylene	1	ug/L	0.16	ND
	Styrene	1	ug/L	0.18	ND
	Tetrachloroethene	1	ug/L	0.24	ND
	Toluene	1	ug/L	0.18	ND
	trans-1,2-Dichloroethene	1	ug/L	0.40	ND
	trans-1,3-dichloropropene	1	ug/L	0.15	ND
	Trichloroethene	1	ug/L	0.28	ND
	Vinyl chloride	1	ug/L	0.65	ND

ND = Not Detected

TestGroup	Analyte	DF	Units	MDL/PQL/RL	RESULT
AC28390-005	**PIT-UT-SWDUP-020107SW1**				
Mercury (Water) 245.1					
	Mercury	1	ug/L	0.20	ND
PP Metals (Water) 200.7					
	Antimony	0.5	ug/L	7.5	ND
	Arsenic	0.5	ug/L	4.0	13
	Barium	0.5	ug/L	25	170
	Beryllium	0.5	ug/L	4.0	ND
	Cadmium	0.5	ug/L	2.0	ND
	Chromium	0.5	ug/L	25	ND
	Copper	0.5	ug/L	25	43
	Lead	0.5	ug/L	5.0	27
	Nickel	0.5	ug/L	10	10
	Selenium	0.5	ug/L	25	ND
	Silver	0.5	ug/L	10	ND
	Thallium	0.5	ug/L	5.0	ND
	Zinc	0.5	ug/L	25	110

ND = Not Detected

Lab#: **AC28390-005** **SampleID:** **PIT-UT-SWDUP-020107SW1** **DRAFT**

TestGroup	Analyte	DF	Units	MDL/PQL/RL	RESULT
Semivolatile Organics + 25 (625)					
LIBRARY SEARCH:	:TotalSemiVolatileTic	1	ug/L	NA(r.t.)	6.1J
LIBRARY SEARCH:	:unknown	1	ug/L	11.5(r.t.)	6.1J
	1,2,4-Trichlorobenzene	1	ug/L	0.48	ND
	1,2-Dichlorobenzene	1	ug/L	0.57	ND
	1,2-Diphenylhydrazine	1	ug/L	0.14	ND
	1,3-Dichlorobenzene	1	ug/L	0.70	ND
	1,4-Dichlorobenzene	1	ug/L	0.75	ND
	2,4,5-Trichlorophenol	1	ug/L	1.9	ND
	2,4,6-Trichlorophenol	1	ug/L	0.88	ND
	2,4-Dichlorophenol	1	ug/L	1.3	ND
	2,4-Dimethylphenol	1	ug/L	2.0	ND
	2,4-Dinitrophenol	1	ug/L	0.63	ND
	2,4-Dinitrotoluene	1	ug/L	0.36	ND
	2,6-Dinitrotoluene	1	ug/L	0.33	ND
	2-Chloronaphthalene	1	ug/L	0.41	ND
	2-Chlorophenol	1	ug/L	1.5	ND
	2-Methylnaphthalene	1	ug/L	3.5	ND
	2-Methylphenol	1	ug/L	3.9	ND
	2-Nitroaniline	1	ug/L	1.7	ND
	2-Nitrophenol	1	ug/L	0.81	ND
	3&4-Methylphenol	1	ug/L	4.1	ND
	3,3'-Dichlorobenzidine	1	ug/L	0.80	ND
	3-Nitroaniline	1	ug/L	2.6	ND
	4,6-Dinitro-2-methylphenol	1	ug/L	0.81	ND
	4-Bromophenyl-phenylether	1	ug/L	0.53	ND
	4-Chloro-3-methylphenol	1	ug/L	1.1	ND
	4-Chloroaniline	1	ug/L	3.0	ND
	4-Chlorophenyl-phenylether	1	ug/L	0.38	ND
	4-Nitroaniline	1	ug/L	1.6	ND
	4-Nitrophenol	1	ug/L	1.1	ND
	Acenaphthene	1	ug/L	0.25	ND
	Acenaphthylene	1	ug/L	0.24	ND
	Anthracene	1	ug/L	0.19	ND
	Benzidine	1	ug/L	8.6	ND
	Benzo[a]anthracene	1	ug/L	0.22	ND
	Benzo[a]pyrene	1	ug/L	0.16	ND
	Benzo[b]fluoranthene	1	ug/L	0.21	ND
	Benzo[g,h,i]perylene	1	ug/L	0.29	ND
	Benzo[k]fluoranthene	1	ug/L	0.31	ND
	Bis(2-Chloroethoxy)methane	1	ug/L	0.19	ND
	Bis(2-Chloroethyl)ether	1	ug/L	0.43	ND
	Bis(2-Chloroisopropyl)ether	1	ug/L	0.23	ND
	Bis(2-Ethylhexyl)phthalate	1	ug/L	0.37	ND
	Butylbenzylphthalate	1	ug/L	0.23	ND
	Carbazole	1	ug/L	0.16	ND
	Chrysene	1	ug/L	0.19	ND
	Dibenzo[a,h]anthracene	1	ug/L	0.25	ND
	Dibenzofuran	1	ug/L	1.6	ND
	Diethylphthalate	1	ug/L	0.28	ND
	Dimethylphthalate	1	ug/L	0.18	ND
	Di-n-butylphthalate	1	ug/L	0.32	ND
	Di-n-octylphthalate	1	ug/L	0.19	ND
	Fluoranthene	1	ug/L	0.15	ND
	Fluorene	1	ug/L	0.15	ND
	Hexachlorobenzene	1	ug/L	0.27	ND

ND = Not Detected

Lab#: AC28390-005 **SampleID: PIT-UT-SWDUP-020107SW1**

DRAFT

TestGroup	Analyte	DF	Units	MDL/PQL/RL	RESULT
	Hexachlorobutadiene	1	ug/L	0.62	ND
	Hexachlorocyclopentadiene	1	ug/L	4.6	ND
	Hexachloroethane	1	ug/L	0.68	ND
	Indeno[1,2,3-cd]pyrene	1	ug/L	0.18	ND
	Isophorone	1	ug/L	0.14	ND
	Naphthalene	1	ug/L	0.44	ND
	Nitrobenzene	1	ug/L	0.24	ND
	N-Nitrosodimethylamine	1	ug/L	8.8	ND
	N-Nitroso-di-n-propylamine	1	ug/L	0.26	ND
	N-Nitrosodiphenylamine	1	ug/L	0.15	ND
	Pentachlorophenol	1	ug/L	0.76	ND
	Phenanthrene	1	ug/L	0.23	ND
	Phenol	1	ug/L	1.5	ND
	Pyrene	1	ug/L	0.15	ND
Volatile Organics + 15 (624)					
LIBRARY SEARCH:	:No Unknown Compounds Detected	1	ug/L	0(r.t.)	ND
LIBRARY SEARCH:	:TotalVolatileTic	1	ug/L	NA(r.t.)	ND
	1,1,1,2-Tetrachloroethane	1	ug/L	0.46	ND
	1,1,1-Trichloroethane	1	ug/L	0.33	ND
	1,1,2,2-Tetrachloroethane	1	ug/L	0.21	ND
	1,1,2-Trichloroethane	1	ug/L	0.25	ND
	1,1-Dichloroethane	1	ug/L	0.34	ND
	1,1-Dichloroethene	1	ug/L	0.53	ND
	1,2-Dichloroethane	1	ug/L	0.21	ND
	1,2-Dichloropropane	1	ug/L	0.46	ND
	2-Butanone	1	ug/L	0.38	ND
	2-Chloroethylvinylether	1	ug/L	0.26	ND
	2-Hexanone	1	ug/L	0.36	ND
	4-Methyl-2-Pentanone	1	ug/L	0.17	ND
	Acetone	1	ug/L	2.7	ND
	Acrolein	1	ug/L	1.5	ND
	Acrylonitrile	1	ug/L	0.54	ND
	Benzene	1	ug/L	0.25	ND
	Bromodichloromethane	1	ug/L	0.33	ND
	Bromoform	1	ug/L	0.29	ND
	Bromomethane	1	ug/L	0.23	ND
	Carbon disulfide	1	ug/L	0.23	ND
	Carbon tetrachloride	1	ug/L	0.44	ND
	Chlorobenzene	1	ug/L	0.21	ND
	Chloroethane	1	ug/L	0.22	ND
	Chloroform	1	ug/L	0.42	ND
	Chloromethane	1	ug/L	0.51	ND
	cis-1,2-Dichloroethene	1	ug/L	0.31	ND
	cis-1,3-Dichloropropene	1	ug/L	0.20	ND
	Dibromochloromethane	1	ug/L	0.20	ND
	Ethylbenzene	1	ug/L	0.40	ND
	m&p-Xylenes	1	ug/L	0.36	ND
	Methylene chloride	1	ug/L	0.47	ND
	o-Xylene	1	ug/L	0.16	ND
	Styrene	1	ug/L	0.18	ND
	Tetrachloroethene	1	ug/L	0.24	ND
	Toluene	1	ug/L	0.18	ND
	trans-1,2-Dichloroethene	1	ug/L	0.40	ND
	trans-1,3-dichloropropene	1	ug/L	0.15	ND
	Trichloroethene	1	ug/L	0.28	ND
	Vinyl chloride	1	ug/L	0.65	ND

ND = Not Detected

Lab#: **AC28390-006** **SampleID:** **PIT-UT-SWFB-020107SW1**

DRAFT

TestGroup	Analyte	DF	Units	MDL/PQL/RL	RESULT
AC28390-006	**PIT-UT-SWFB-020107SW1**				
Mercury (Water) 245.1					
	Mercury	1	ug/L	0.20	ND
PP Metals (Water) 200.7					
	Antimony	0.5	ug/L	7.5	ND
	Arsenic	0.5	ug/L	4.0	ND
	Barium	0.5	ug/L	25	ND
	Beryllium	0.5	ug/L	4.0	ND
	Cadmium	0.5	ug/L	2.0	ND
	Chromium	0.5	ug/L	25	ND
	Copper	0.5	ug/L	25	ND
	Lead	0.5	ug/L	5.0	ND
	Nickel	0.5	ug/L	10	ND
	Selenium	0.5	ug/L	25	ND
	Silver	0.5	ug/L	10	ND
	Thallium	0.5	ug/L	5.0	ND
	Zinc	0.5	ug/L	25	ND

ND = Not Detected

Lab#:	AC28390-006	SampleID:	PIT-UT-SWFB-020107SW1		DRAFT
TestGroup	Analyte	DF	Units	MDL/PQL/RL	RESULT
Semivolatile Organics + 25 (625)					
LIBRARY SEARCH:	:No Unknown Compounds Detected	1	ug/L	0(r.t.)	ND
LIBRARY SEARCH:	:TotalSemiVolatileTic	1	ug/L	NA(r.t.)	ND
	1,2,4-Trichlorobenzene	1	ug/L	0.49	ND
	1,2-Dichlorobenzene	1	ug/L	0.59	ND
	1,2-Diphenylhydrazine	1	ug/L	0.14	ND
	1,3-Dichlorobenzene	1	ug/L	0.72	ND
	1,4-Dichlorobenzene	1	ug/L	0.77	ND
	2,4,5-Trichlorophenol	1	ug/L	2.0	ND
	2,4,6-Trichlorophenol	1	ug/L	0.90	ND
	2,4-Dichlorophenol	1	ug/L	1.3	ND
	2,4-Dimethylphenol	1	ug/L	2.0	ND
	2,4-Dinitrophenol	1	ug/L	0.65	ND
	2,4-Dinitrotoluene	1	ug/L	0.37	ND
	2,6-Dinitrotoluene	1	ug/L	0.34	ND
	2-Chloronaphthalene	1	ug/L	0.42	ND
	2-Chlorophenol	1	ug/L	1.5	ND
	2-Methylnaphthalene	1	ug/L	3.6	ND
	2-Methylphenol	1	ug/L	4.0	ND
	2-Nitroaniline	1	ug/L	1.7	ND
	2-Nitrophenol	1	ug/L	0.83	ND
	3&4-Methylphenol	1	ug/L	4.2	ND
	3,3'-Dichlorobenzidine	1	ug/L	0.82	ND
	3-Nitroaniline	1	ug/L	2.7	ND
	4,6-Dinitro-2-methylphenol	1	ug/L	0.83	ND
	4-Bromophenyl-phenylether	1	ug/L	0.54	ND
	4-Chloro-3-methylphenol	1	ug/L	1.1	ND
	4-Chloroaniline	1	ug/L	3.1	ND
	4-Chlorophenyl-phenylether	1	ug/L	0.39	ND
	4-Nitroaniline	1	ug/L	1.6	ND
	4-Nitrophenol	1	ug/L	1.1	ND
	Acenaphthene	1	ug/L	0.26	ND
	Acenaphthylene	1	ug/L	0.25	ND
	Anthracene	1	ug/L	0.19	ND
	Benzidine	1	ug/L	8.8	ND
	Benzo[a]anthracene	1	ug/L	0.23	ND
	Benzo[a]pyrene	1	ug/L	0.17	ND
	Benzo[b]fluoranthene	1	ug/L	0.22	ND
	Benzo[g,h,i]perylene	1	ug/L	0.29	ND
	Benzo[k]fluoranthene	1	ug/L	0.32	ND
	Bis(2-Chloroethoxy)methane	1	ug/L	0.19	ND
	Bis(2-Chloroethyl)ether	1	ug/L	0.44	ND
	Bis(2-Chloroisopropyl)ether	1	ug/L	0.23	ND
	Bis(2-Ethylhexyl)phthalate	1	ug/L	0.38	ND
	Butylbenzylphthalate	1	ug/L	0.24	ND
	Carbazole	1	ug/L	0.17	ND
	Chrysene	1	ug/L	0.19	ND
	Dibenzo[a,h]anthracene	1	ug/L	0.25	ND
	Dibenzofuran	1	ug/L	1.6	ND
	Diethylphthalate	1	ug/L	0.29	ND
	Dimethylphthalate	1	ug/L	0.18	ND
	Di-n-butylphthalate	1	ug/L	0.33	ND
	Di-n-octylphthalate	1	ug/L	0.19	ND
	Fluoranthene	1	ug/L	0.16	ND
	Fluorene	1	ug/L	0.15	ND
	Hexachlorobenzene	1	ug/L	0.28	ND

ND = Not Detected

Lab#: **AC28390-006** **SampleID:** **PIT-UT-SWFB-020107SW1**

TestGroup	Analyte	DF	Units	MDL/PQL/RL	DRAFT RESULT
	Hexachlorobutadiene	1	ug/L	0.64	ND
	Hexachlorocyclopentadiene	1	ug/L	4.7	ND
	Hexachloroethane	1	ug/L	0.70	ND
	Indeno[1,2,3-cd]pyrene	1	ug/L	0.18	ND
	Isophorone	1	ug/L	0.14	ND
	Naphthalene	1	ug/L	0.45	ND
	Nitrobenzene	1	ug/L	0.24	ND
	N-Nitrosodimethylamine	1	ug/L	9.0	ND
	N-Nitroso-di-n-propylamine	1	ug/L	0.26	ND
	N-Nitrosodiphenylamine	1	ug/L	0.16	ND
	Pentachlorophenol	1	ug/L	0.78	ND
	Phenanthrene	1	ug/L	0.24	ND
	Phenol	1	ug/L	1.5	ND
	Pyrene	1	ug/L	0.15	ND
Volatile Organics + 15 (624)					
LIBRARY SEARCH:	:No Unknown Compounds Detected	1	ug/L	0(r.t.)	ND
LIBRARY SEARCH:	:TotalVolatileTic	1	ug/L	NA(r.t.)	ND
	1,1,1,2-Tetrachloroethane	1	ug/L	0.46	ND
	1,1,1-Trichloroethane	1	ug/L	0.33	ND
	1,1,2,2-Tetrachloroethane	1	ug/L	0.21	ND
	1,1,2-Trichloroethane	1	ug/L	0.25	ND
	1,1-Dichloroethane	1	ug/L	0.34	ND
	1,1-Dichloroethene	1	ug/L	0.53	ND
	1,2-Dichloroethane	1	ug/L	0.21	ND
	1,2-Dichloropropane	1	ug/L	0.46	ND
	2-Butanone	1	ug/L	0.38	ND
	2-Chloroethylvinylether	1	ug/L	0.26	ND
	2-Hexanone	1	ug/L	0.36	ND
	4-Methyl-2-Pentanone	1	ug/L	0.17	ND
	Acetone	1	ug/L	2.7	ND
	Acrolein	1	ug/L	1.5	ND
	Acrylonitrile	1	ug/L	0.54	ND
	Benzene	1	ug/L	0.25	ND
	Bromodichloromethane	1	ug/L	0.33	ND
	Bromoform	1	ug/L	0.29	ND
	Bromomethane	1	ug/L	0.23	ND
	Carbon disulfide	1	ug/L	0.23	ND
	Carbon tetrachloride	1	ug/L	0.44	ND
	Chlorobenzene	1	ug/L	0.21	ND
	Chloroethane	1	ug/L	0.22	ND
	Chloroform	1	ug/L	0.42	ND
	Chloromethane	1	ug/L	0.51	ND
	cis-1,2-Dichloroethene	1	ug/L	0.31	ND
	cis-1,3-Dichloropropene	1	ug/L	0.20	ND
	Dibromochloromethane	1	ug/L	0.20	ND
	Ethylbenzene	1	ug/L	0.40	ND
	m&p-Xylenes	1	ug/L	0.36	ND
	Methylene chloride	1	ug/L	0.47	2.0B
	o-Xylene	1	ug/L	0.16	ND
	Styrene	1	ug/L	0.18	ND
	Tetrachloroethene	1	ug/L	0.24	ND
	Toluene	1	ug/L	0.18	ND
	trans-1,2-Dichloroethene	1	ug/L	0.40	ND
	trans-1,3-dichloropropene	1	ug/L	0.15	ND
	Trichloroethene	1	ug/L	0.28	ND
	Vinyl chloride	1	ug/L	0.65	ND

ND = Not Detected

TestGroup	Analyte	DF	Units	MDL/PQL/RL	RESULT
AC28390-007	**PIT-UT-SWTB-020107SW1**				
Volatile Organics + 15 (624)					
LIBRARY SEARCH:	:No Unknown Compounds Detected	1	ug/L	0(r.t.)	ND
LIBRARY SEARCH:	:TotalVolatileTic	1	ug/L	NA(r.t.)	ND
	1,1,1,2-Tetrachloroethane	1	ug/L	0.46	ND
	1,1,1-Trichloroethane	1	ug/L	0.33	ND
	1,1,2,2-Tetrachloroethane	1	ug/L	0.21	ND
	1,1,2-Trichloroethane	1	ug/L	0.25	ND
	1,1-Dichloroethane	1	ug/L	0.34	ND
	1,1-Dichloroethene	1	ug/L	0.53	ND
	1,2-Dichloroethane	1	ug/L	0.21	ND
	1,2-Dichloropropane	1	ug/L	0.46	ND
	2-Butanone	1	ug/L	0.38	ND
	2-Chloroethylvinylether	1	ug/L	0.26	ND
	2-Hexanone	1	ug/L	0.36	ND
	4-Methyl-2-Pentanone	1	ug/L	0.17	ND
	Acetone	1	ug/L	2.7	ND
	Acrolein	1	ug/L	1.5	ND
	Acrylonitrile	1	ug/L	0.54	ND
	Benzene	1	ug/L	0.25	ND
	Bromodichloromethane	1	ug/L	0.33	ND
	Bromoform	1	ug/L	0.29	ND
	Bromomethane	1	ug/L	0.23	ND
	Carbon disulfide	1	ug/L	0.23	ND
	Carbon tetrachloride	1	ug/L	0.44	ND
	Chlorobenzene	1	ug/L	0.21	ND
	Chloroethane	1	ug/L	0.22	ND
	Chloroform	1	ug/L	0.42	ND
	Chloromethane	1	ug/L	0.51	ND
	cis-1,2-Dichloroethene	1	ug/L	0.31	ND
	cis-1,3-Dichloropropene	1	ug/L	0.20	ND
	Dibromochloromethane	1	ug/L	0.20	ND
	Ethylbenzene	1	ug/L	0.40	ND
	m&p-Xylenes	1	ug/L	0.36	ND
	Methylene chloride	1	ug/L	0.47	ND
	o-Xylene	1	ug/L	0.16	ND
	Styrene	1	ug/L	0.18	ND
	Tetrachloroethene	1	ug/L	0.24	ND
	Toluene	1	ug/L	0.18	ND
	trans-1,2-Dichloroethene	1	ug/L	0.40	ND
	trans-1,3-dichloropropene	1	ug/L	0.15	ND
	Trichloroethene	1	ug/L	0.28	ND
	Vinyl chloride	1	ug/L	0.65	ND

ND = Not Detected

Lab#: **AC28390-007** **SampleID:** **PIT-UT-SWTB-020107SW1** [illegible] **DRAFT**

TestGroup Analyte DF Units MDL/PQL/RL RESULT

RL Definitions: SW846 Organics reported to PQL
SW846 Inorganics reported to PQL

Clean Water Act Organics reported to MDL
Clean Water Act Inorganics reported to PQL

CLP Organics reported to CRDL
CLP Inorganics reported to CRDL

This report is a true report of results obtained from our tests of this material. In lieu of a formal contract document, the total aggregate liability of Veritech to all parties shall not exceed Veritech's total fee for analytical services rendered.

Or

Jeri Rossi - Quality Assurance Director

Stanley Gilewicz - Laboratory Director

ND = Not Detected

THE PORT AUTHORITY OF NY & NJ

Materials Engineering Division - 241 Erie Street, Room 234
Jersey City, NJ 07310

Chain-of-Custody

PAGE _1_OF_2_ PA PROJECT SDG NO_ _

7020216

Facility	Port Ivory
Project Info.	Port Ivory
Charge Code #	CP11-233-295

Contact Name	Dorian Bailey / Angelos Zafirelis		
Contact Phone No.	201-216-2963 / 201-216-2960		
Contact Fax No.	201-216-2158		
Contact Email	dbailey@PANYNJ.gov / azafirel@PANYNJ.gov		
Destination Laboratory:	HCV	Lab Case/SDG:	

EQuIS Sys_Sample_Code	Contract Lab Sample ID AC28390	Date of Collection Year_2007	Time of Collection	Geotech Cross ID	# of Containers	Preservative Code (MeOH No.)	Grab or Composite	PP VOAS+15+xylenes	PP BNA+25	PP Metals (13)				EQUIS / PDF
PI-UT-SW-1-020107SW1	-001	2/1/2007	15:30		5	1, 2, 3	GRAB	X	X	X				X
								Field ph: 7.51 @ 2.1C @ 15:31						
PI-UT-SW-2-020107SW1	-002	2/1/2007	15:14		5	1, 2, 3	GRAB	X	X	X				X
								Field ph: 7.58 @ 2.4C @ 15:15						
PI-UT-SW-3-020107SW1	-003	2/1/2007	15:01		5	1, 2, 3	GRAB	X	X	X				X
								Field ph: 7.50 @ 2.8C @ 15:02						
PI-UT-SW-4-020107SW1	-004	2/1/2007	14:47		5	1, 2, 3	GRAB	X	X	X				X
								Field ph: 7.51 @ 4.2C @ 14:48						
PI-UT-SWDUP020107SW1	-005	2/1/2007			5	1, 2, 3	GRAB	X	X	X				X
PI-UT-SWFB-020107SW1	-006	2/1/2007	15:40		5	1, 2, 3	GRAB	X	X	X				X

Sampled By: _____*TG/BS*_____
Sampling Method: SS Pond Dipper

Preservatives:
1. Ice 2. HCl 3. HNO3
4. NaOH 5. MeOH 6. H2SO4

TAT: STD
OTHER______________

3-7

Deliverables: NY ASP B, EXCEL
OTHER____________

Relinquished By: __________ Date: 2-2-07 Received By: Rich [illegible] HCV Date: 2-02-07 11:45

Relinquished By: Rich [illegible] HCV Date: 2-02-07 1340 Received By: C Arena Date: 2/2/07 1340

Relinquished By: __________ Date: __________ ived By: __________ Date: ______

THE PORT AUTHORITY OF NY & NJ

Materials Engineering Division - 241 Erie Street, Room 234
Jersey City, NJ 07310

Chain-of-Custody

PAGE _2_OF_2_ PA PROJECT SDG NO__

Facility	Port Ivory
Project Info.	Port Ivory
Charge Code #	CP11-233-295

Contact Name	Dorian Bailey / Angelos Zafirelis		
Contact Phone No.	201-216-2963 / 201-216-2960		
Contact Fax No.	201-216-2158		
Contact Email	dbailey@PANYNJ.gov / azafirel@PANYNJ.gov		
Destination Laboratory:	HCV	**Lab Case/SDG:**	

EQuIS Sys_Sample_Code	Contract Lab Sample ID AC28390	Date of Collection Year_2007	Time of Collection	Geotech Cross ID	# of Containers	Preservative Code (MeOH No.)	Grab or Composite		PP VOAS+15+xylenes	PP BNA+25	PP Metals (13)				EQUIS / PDF
PI-UT-SWTB-020107SW1	-007	2/1/2007			2	1	GRAB		X						X

Sampled By: ____TG/BS____
Sampling Method: *SS Pond Dipper*

Preservatives:
1. Ice 2. HCl 3. HNO3
4. NaOH 5. MeOH 6. H2SO4

TAT: STD
OTHER________________

3.7

Deliverables: NY ASP B, EXCEL
OTHER____________

Relinquished By: ________ Date: 2-2-07 Received By: ________ HCV Date: 2-02-07 11:45
Relinquished By: ________ HCV Date: 2-02-07 1340 Received By: C Arena Date: 2/2/07 1340
Relinquished By: ________ Date: ________ eived By: ________ Date: ______

CT #: PH-0671
MA #: NJ386
NJ #: 14622

NY #: 11408
PA #: 68-463

Report Of Analysis

veritech laboratories

[illegible]: PORT AUTHORITY OF NY & NJ
MATERIALS ENGINEERING DIV.
241 ERIE ST.
ROOM 234
JERSEY CITY NJ 07310-1397

Attention: D.Bailey/A.Zafirelis
Project: HHMT-Port Ivory

Date Collected: 12/4/2007
Date Submitted: 12/5/2007
Date Reported: 12/10/2007

Lab#: AC34641-001 **SampleID: PI-UT-SW-4-120407SW1**

TestGroup	Analyte	DF	Units	MDL/PQL/RL	DRAFT RESULT
AC34641-001	**PI-UT-SW-4-120407SW1**				
Metals Pair 200.7/8					
	Copper	0.5	ug/L	25	ND
	Zinc	0.5	ug/L	25	26
AC34641-002	**PI-UT-SW-3-120407SW1**				
Metals Pair 200.7/8					
	Copper	0.5	ug/L	25	ND
	Zinc	0.5	ug/L	25	ND
AC34641-003	**PI-BC-US-120407SW001**				
Metals Pair 200.7/8					
	Copper	0.5	ug/L	25	ND
	Zinc	0.5	ug/L	25	37
AC34641-004	**PI-BC-DS-120407SW001**				
Metals Pair 200.7/8					
	Copper	0.5	ug/L	25	ND
	Zinc	0.5	ug/L	25	39
[illegible]C34641-005	**PI-UT-SWFB-120407SW1**				
Metals Pair 200.7/8					
	Copper	0.5	ug/L	25	ND
	Zinc	0.5	ug/L	25	ND

RL Definitions: **SW846 Organics reported to PQL**
SW846 Inorganics reported to PQL

Clean Water Act Organics reported to MDL
Clean Water Act Inorganics reported to PQL

CLP Organics reported to CRDL
CLP Inorganics reported to CRDL

This report is a true report of results obtained from our tests of this material. In lieu of a formal contract document, the total aggregate liability of Veritech to all parties shall not exceed Veritech's total fee for analytical services rendered.

________________________ Or ________________________

Jeri Rossi - Quality Assurance Director **Stanley Gilewicz - Laboratory Director**

ND = Not Detected

THE PORT AUTHORITY OF NY & NJ

Materials Engineering Division - 241 Erie Street, Room 234
Jersey City, NJ 07310

Chain-of-Custody

PAGE _1_OF_1_ PA PROJECT SDG NO__

7120518

Facility	HHMT - Port Ivory
Project Info.	Port Ivory Surface Water
Charge Code #	CP11-634.502

Contact Name	Dorian Bailey / Angelos Zafirelis		
Contact Phone No.	201-216-2963 / 201-216-2960		
Contact Fax No.	201-216-2158		
Contact Email	dbailey@PANYNJ.gov / azafirel@PANYNJ.gov		
Destination Laboratory:	HCV	**Lab Case/SDG:**	

EQuIS Sys_Sample_Code	Contract Lab Sample ID AC34641	Date of Collection	Time of Collection	Geotech Cross ID	# of Containers	Preservative Code (MeOH No.)	Grab or Composite		Copper & Zinc						EQUIS / PDF
PI-UT-SW-4-120407SW1	-001	12/4/2007	10:03		1	1, 3	GRAB		X						X
									Field ph: 8.24 @ 1.86°C @ 10:04						
PI-UT-SW-3-120407SW1	-002	12/4/2007	10:11		1	1, 3	GRAB		X						X
									Field ph: 8.07 @ 2.79°C @ 10:11						
PI-BC-US-120407SW001	-003	12/4/2007	9:52		1	1, 3	GRAB		X						X
									Field ph: 6.81 @ 0.37°C @ 09:53						
PI-BC-DS-120407SW001	-004	12/4/2007	9:45		1	1, 3	GRAB		X						X
									Field ph: 6.74 @ 2.10°C @ 09:47						
PI-UT-SWFB-120407SW1	-005	12/4/2007	10:20		1	1, 3	GRAB		X						X

Sampled By: ____TG/SB____
Sampling Method: SS Pond Dipper

Preservatives:
1. Ice 2. HCl 3. HNO3
4. NaOH 5. MeOH 6. H2SO4

TAT: 72 ms 12/6/07 ~~48~~-HOUR

Deliverables: NY ASP B

Relinquished By: ____________ Date: 12/5/07
Received By: Jesse Edwards Date: 12/5/07 1420
Relinquished By: Jesse Edwards Date: 12/5/07 1500
Received By: ____________ HCV Date: 12/6/07 1600
Relinquished By: ____________ Date: ____________
Received By: ____________ Date: ____________

3.