FINAL

ENVIRONMENTAL CONDITION OF PROPERTY SUPPLEMENTAL PHASE II SITE INVESTIGATION WORK PLAN FOR

PARCELS 28, 38, 39, 49, 57, 61, AND 69 FOR

REMEDIAL INVESTIGATION / FEASIBILITY STUDY / DECISION DOCUMENTS

FORT MONMOUTH, OCEANPORT, MONMOUTH COUNTY, NEW JERSEY

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LIST OF ACRONYMS

ACRONYM	DEFINITION
°F	degrees Fahrenheit
μg/L	micrograms per liter
AMC	U.S. Fort Monmouth Material Command
amsl	above mean sea level
APP	Accident Prevention Plan
ATSDR	Agency for Toxic Substances and Disease Registry
BEE	Baseline Ecological Evaluation
bgs	below ground surface
BRAC	Base Realignment and Closure
C4ISR	Command and Control Communications, Computers, Intelligence, Sensors and Reconnaissance
CECOM	U.S. Fort Monmouth Communications and Electronics Command
CENAE	U.S. Army Corps of Engineers, New England District
CENAN	U.S. Army Corps of Engineers, New York District
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CSM	conceptual site model
CWA	Charles Wood Area
CWBC	Charles Wood Area Background Concentration
COC	contaminant of concern
COPC	contaminant of potential concern
COPEC	contaminant of potential environmental concern
DAP	Diffuse Anthropogenic Pollution
DD	Decision Documents
DMP	Data Management Plan
DO	dissolved oxygen
DoD	Department of Defense
DQO	data quality objective
EA	Evans Area
ECP	Environmental Condition of Property
EPH	extractable petroleum hydrocarbons
ER-L	Effects Range – Low
ER-M	Effects Range – Medium
EM	electromagnetic
EPH	Extractable Petroleum Hydrocarbons
EPP	Environmental Protection Plan
FMERA	Fort Monmouth Economic Revitalization Authority
FS	Feasibility Study
ft	foot

ACRONYM	DEFINITION
ft/day	feet per day
FTMM	Fort Monmouth
GES	Groundwater & Environmental Services, Inc.
GFP	Government Furnished Property
GIS	geographic information system
gpm	gallons per minute
GPR	ground penetrating radar
GPS	global positioning system
GWQS	Ground Water Quality Standard(s)
Hg	mercury
HTRW	hazardous, toxic, and radiological waste
IDW	investigation-derived waste
IRP	Installation Restoration Program
ITRC	Interstate Technology Regulatory Council
LEL	lowest effect level
LUC	land use controls
MC	munitions constituents
mg/kg	milligrams per kilogram
MP	Main Post
MPBC	Main Post Background Concentration
NA	not applicable
NCP	National Contingency Plan
NCR	nonconformance report
NFA	no further action
N.J.A.C.	New Jersey Administrative Code
NJDEP	New Jersey Department of Environmental Protection
NRDCSCC	Non-Residential Direct Contact Soil Cleanup Criteria
NRDCSRS	Non-Residential Direct Contact Soil Remediation Standard
NPL	National Priorities List
ORP	oxidation-reduction potential
PAH	polycyclic aromatic hydrocarbon
Parsons	Parsons Government Services, Incorporated
PCBs	polychlorinated biphenyls
PCE	tetrachloroethene
PID	photoionization detector
PM	project manager
PMP	Project Management Plan
PWS	Performance Work Statement
QA	quality assurance
QAPP	Quality Assurance Project Plan
QC	quality control

ACRONYM	DEFINITION
QCP	Quality Control Plan
R&D	research and development
RAM	radioactive material
RDCSCC	Residential Direct Contact Soil Cleanup Standard
RDCSRS	Residential Direct Contact Soil Remediation Standard
RI	Remedial Investigation
SAP	Sampling and Analysis Plan
SEL	severe effects level
SI	Site Investigation
SIM	Selective ion monitoring
SHSP	Site Health and Safety Plan
SVOCs	semi-volatile organic compounds
TAL	target analyte list
TBA	tertiary butyl alcohol
TBD	to be determined
TCE	trichloroethene
TCL	target compound list
TICs	tentatively identified compounds
TO	Task Order
TPH	total petroleum hydrocarbons
TRSR	Technical Requirements for Site Remediation
UFP-QAPP	Uniform Federal Policy-Quality Assurance Project Plan
UHOT	unregulated heating oil tank
U.S.	United States
USACE	United States Army Corps of Engineers
USAEHA	United States Army Environmental Hygiene Agency
USAESCH	U.S. Army Engineering and Support Center, Huntsville
USEPA	United States Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
USTs	underground storage tanks
VC	vinyl chloride
VOCs	volatile organic compounds
WERS	Worldwide Environmental Restoration Services

SECTION 1 INTRODUCTION

1.1 PROJECT AUTHORIZATION

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Parsons Government Services, Incorporated (Parsons) is serving as the prime contractor to the United States Army Engineering and Support Center, Huntsville (USAESCH) for the performance of supplemental Site Investigations (SIs) at multiple parcels located at the Fort Monmouth (FTMM) site in Oceanport, Monmouth County, New Jersey. This project is being performed under task order (TO) 0012 issued under the Worldwide Environmental Restoration Services (WERS) contract number W912DY-09-D-0062.

This TO was issued to address a number of environmental sites at FTMM that are in various stages of hazardous, toxic, and radiological waste (HTRW) investigation and remediation. Specific activities that will be performed under this delivery order include: 1) completing supplemental Sis to address New Jersey Department of Environmental Protection (NJDEP) comments on the 2008 SI (United States [U.S.] Army Base Realignment and Closure [BRAC], 2008); 2) performing remedial investigations (RI) and feasibility studies (FS) to achieve acceptance of decision documents (DDs) in compliance with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), the National Contingency Plan (NCP), 40 Code of Federal Regulations (CFR) Part 300 and to the extent possible to meet the requirements of New Jersey Administrative Code (N.J.A.C.) 7:26E Technical Requirements for Site Remediation (TRSR); and 3) supporting the closure of environmental sites to facilitate the efficient transfer of real property to other parties.

This work plan, which describes the supplemental Environmental Condition of Property (ECP) Phase II SI activities to be performed at selected Parcels, is to be executed in accordance with the Performance Work Statement (PWS) dated 30 August 2012 (**Appendix A**, included by reference only). Parsons will coordinate this effort with USAESCH, U.S. Army Corps of Engineers, New York District (CENAN), U.S. Army Corps of Engineers, New England District (CENAE), and FTMM. Project roles and responsibilities are outlined in the Project Management Plan (PMP) (Parsons, 2012). U.S. Army Corps of Engineers (USACE) is defined as USAESCH, CENAN, and CENAE.

1.2 PURPOSE AND SCOPE

The purpose of this document is to describe the tasks that will be completed at FTMM during the implementation of supplemental ECP Phase II SI activities for:

- Parcel 28 (Former Eatontown Laboratory Complex),
- Parcel 38 (Former Outdoor Firing Range),
- Parcel 39 (Building 1150 [Vail Hall]),
- Parcel 49 (Former Squier Laboratory Complex),
- Parcel 57 (Former Coal Storage and Railroad Unloading, 800 Area),
- Parcel 61 (Building 1075 [Patterson Army Health Clinic]), and
- Parcel 69 (Building 900, Former Vehicle Repair/Motor Pool).

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Supporting plans, including the Accident Prevention Plan (APP), which contains the Site Health and Safety Plan (SHSP) and Sampling and Analysis Plan (SAP), have been prepared as stand-alone documents and are included in this work plan by reference only.

NJDEP had requested in their October 28, 2008 letter that additional soil investigation be conducted at three parcels (39, 57, and 61); however, the scope of work for the additional investigations for these parcels reflects Parsons' current evaluation of the existing data from these sites and does not include all of the work outlined by NJDEP at Parcels 39 and 61, as described in Section 1.8.

The work plan is a living document and may be updated via slip pages if warranted. Once this work plan is approved for implementation, a dated summary page listing revised pages will be used to document associated changes and will be included with each revision.

The primary objective of the supplemental ECP Phase II SI is to complete investigations to address NJDEP comments on the 2008 SI (NJDEP, 2008), and to document the results in an ECP Phase II SI Addendum Report. This work plan has been prepared to be responsive to the PWS and NJDEP comments on the 2008 SI. The proposed tasks at each parcel also take into consideration subsequent correspondence between NJDEP and FTMM (NJDEP, 2012b, 2012c, 2012d, 2012e, and 2013). Following completion of the field investigation phase, the report will document the results of the Sis at the seven parcels, and will include maps and tables presenting the data. The objective of the ECP portion of this project will be met when the following tasks have been accomplished:

- A work plan has been prepared in accordance with the PWS that references governing regulations and requirements, identifies appropriate field work for the supplemental Phase II SI, and defines and presents an effective approach to the planning and implementation of field work that will meet the requirements of the supplemental SI; and
- An ECP Phase II SI Addendum Report has been approved by stakeholders and accepted by the NJDEP.

1.3 WORK PLAN ORGANIZATION

This work plan covers the proposed investigation and associated preparatory activities necessary for supplemental SI activities at FTMM. The work plan comprises several sub plans, each discussing a different aspect of the SI and is summarized below. Sections 5, 8, and 9 of WERS-001.01 are not applicable to this project, and therefore are not included in this work plan.

- <u>Introduction</u>: Section 1 details the overall scope and objective of the project, presents the organization of the work plan, and presents an overview of the site and its history, including previous investigations and historical data;
- <u>Technical Management Plan</u>: Section 2 details the organizational structure, lines of authority, and communication of the project team. Given that much of the information in this section is also included in the PMP prepared under separate cover, the PMP is referenced where appropriate to avoid duplication of efforts;
- <u>Field Investigation Plan</u>: Section 3 describes the specific supplemental Phase II SI field activities planned for the sites;

- Quality Control Plan (QCP): Section 4 summarizes Parsons' procedures for controlling and measuring the quality of work performed, including the project organization, responsibilities, and policies. Additional information is included in the Uniform Federal Policy-Quality Assurance Project Plan (UFP-QAPP) prepared as part of the SAP and included by reference as **Appendix E**;
- Environmental Protection Plan (EPP): Section 5 describes the procedures and methods to be implemented to minimize pollution; protect and conserve natural, cultural, archaeological, and water resources; restore damage; and control noise and dust within reasonable limits;
- <u>Property Management Plan</u>: Section 6 describes how Parsons will manage Government Furnished Property (GFP); and
- <u>References</u>: Section 7 includes a list of references used in the preparation of this work plan.

Additional information is attached to this work plan as appendices (some of which are included by reference as indicated below):

- **Appendix A** PWS (included by reference only);
- **Appendix B** Field Forms: Relevant field forms that will be used by the sampling team are provided in the SAP Appendix B (included by reference only);
- **Appendix C** Historical Information: Select historical tables and figures that depict previously-collected site characterization information for the parcels, and other FTMM historical data;
- Appendix D APP (included by reference only); and
- **Appendix E** SAP (included by reference only).

1.4 PROJECT LOCATION

FTMM is located in the central-eastern portion of New Jersey in Monmouth County, approximately 45 miles south of New York City, New York, 70 miles northeast of Philadelphia, Pennsylvania, and 40 miles east of Trenton, New Jersey. The Atlantic Ocean is approximately three miles to the east. The location of FTMM and the seven parcels addressed in this work plan are shown on **Figures 1.1 through 1.3**.

1.5 SITE DESCRIPTION

1.5.1 Site Location

FTMM occupies approximately 1,126 acres and was comprised of three areas: the Main Post (MP), the Charles Wood Area (CWA), and the Evans Area (EA). The EA was closed under BRAC in 1993, and have been transferred from FTMM. On September 15, 2011 the remainder of FTMM was closed under the 2005 BRAC process. FTMM falls within the Boroughs of Eatontown, Oceanport, and Tinton Falls. The MP is in the Eatontown and Oceanport Boroughs. The MP included 637 acres and provided supporting administrative, training, and housing functions, as well as many of the community and industrial facilities for FTMM. The EA was located approximately eight miles to the south of the MP and CWA and was formerly used for administrative, research and development (R&D), and some training. The 489-acre CWA is in

the Eatontown and Tinton Falls Boroughs. The CWA property was transferred to the Fort Monmouth Economic Revitalization Authority (FMERA) in May 2014, with the exception of various environmental site carve-outs. The seven parcels addressed in this document are located as follows:

- Parcel 28, Building 2525, the Former Eatontown Laboratory Complex, is located in the western portion of the CWA (**Figures 1.3 and 1.4**);
- Parcel 38, the Former Outdoor Firing Range, is located in the northwestern portion of the MP, and northwest of Building 200 (**Figures 1.2 and 1.5**);
- Parcel 39, Building 1150 (Vail Hall), is located in the southwestern portion of the MP and encompasses the area between Building 1150 (Vail Hall) and Mill Creek (**Figure 1.2** and 1.6);
- Parcel 49 encompasses the areas associated with the Former Squier Laboratory and other facilities with similar operational histories located in the north-central portion of the MP (Figures 1.2 and 1.7);
- Parcel 57, the Former Coal Storage and Railroad Unloading 800 Area, is located in the south-central portion of the MP in the area of Buildings 800, 801, and 1007 (**Figures 1.2** and 1.8);
- Parcel 61, Building 1075 (Patterson Army Health Clinic), is located in the south-central portion of the MP and encompasses Patterson Army Health Clinic (Building 1075) and the surrounding land (**Figure 1.2 and 1.9**); and
- Parcel 69, Building 900-Former Vehicle Repair/Motor Pool, is located near the eastern boundary of the MP and has been used for general storage for approximately the past 10 years (Figures 1.2 and 1.10).

1.5.2 Physiography, Topography, and Vegetation

Both the MP and CWA are located within New Jersey's Coastal Plains Physiographic Province, which is comprised of sedimentary beds that gently dip to the southeast. The Coastal Plains Physiographic Province sedimentary beds are dissected by meandering rivers that drain to the Raritan or Delaware River. The topography of the installation is relatively flat, and has an elevation of 20 to 25 feet above mean sea level (amsl) (AECOM, 2012).

Major vegetation zones at FTMM consist of landscaped areas, estuarine and fresh water wetlands, riparian areas, upland forests, and old field habitats. Much of the upland areas of the MP and CWA consist of extensive areas of regularly mowed lawns and landscaped areas. The vegetation information summarized in the following paragraphs is from the Baseline Ecological Evaluation (BEE) Report (Shaw, 2012).

Areas of wetlands are present on both the MP and CWA. Estuarine wetlands on the MP are associated with the tidal brackish waters of Parkers and Oceanport Creeks. Where present on the MP, estuarine wetlands are dominated by common reed and phragmites. Fresh water wetlands occur on both the MP and CWA. The most extensive of these are forested wetlands, with areas of emergent wetlands associated with the fresh water portions of the several creeks that traverse the MP and CWA. Forested wetlands in the area are typically dominated by red maple (*Acer rubrum*) and other hardwoods, including sweetgum (*Liquidambar styraciflua*) and black gum

(Nyssa sylvatica). Shrubs/vines include arrowwood (Viburnum dentatum), coastal sweet pepperbush (Clethra alnifolia), and greenbrier (Smilax rotundifolia). Herbaceous species found in these forested wetlands include smartweed (Polygonum sp.), jewelweed (Impatiens capens), violets (Viola sp.), asters, sedges, and ferns. Fresh water emergent vegetation includes cattail (Typha latifolia), water smartweed (Polygonum amphibium), arrowhead (Sagittaria sp.), pondweed (Potamogeton sp.), sedges, and rushes.

In many areas of the MP, steep banks along the creeks limit the extent of the riparian zone and thereby prevent the formation of extensive wetlands. These areas have a narrow riparian zone dominated by marsh elder, also known as high-tide bush.

Although most upland areas of the MP and CWA are developed, patches of upland forest are present in several areas. Dominant tree species include red oak (*Quercus rubra*), chestnut oak (*Quercus prinus*), tuliptree (*Liriodendron tulipifera*), and sweetgum (*Liquidambar styraciflua*). Understory species include sassafras (*Sassafras albidum*), flowering dogwood (*Cornus florida*), and black cherry (*Prunus serotina*).

Old field habitats include formerly mowed areas where the vegetation includes grasses, forbes and often immature trees. Old field habitats at the MP include grasses, many forbes including Queen Ann's lace (*Daucus carota*), pokeweed (*Phytolacca 5luorine5*), goldenrod (*Solidago sp.*), milkweed (*Asclepias syriaca*), and sparse saplings of tree species including eastern red cedar (*Juniperus virginiana*) and winged sumac (*Rhus copallinum*).

1.5.3 Climate

 The climate in the FTMM area is typically humid subtropical and is impacted by continental and oceanic influences. The proximity of the Atlantic Ocean tends to minimize seasonal temperature fluctuations as compared to interior regions of the State. Based on data obtained from the National Weather Service, the temperature at FTMM ranges from 20 degrees Fahrenheit (°F) to 90°F (average of 57°F), and precipitation averages 42 inches per year. Winter is typically cold with occasional Nor'easters, resulting in rain along the coast; springs are mild, with the average temperature in the 50s and common thunderstorms; summers are hot and humid, with rare hurricanes; and autumns are similar to spring in terms of temperature and precipitation, although unpredictable weather is common (AECOM, 2012).

1.5.4 Geology and Hydrogeology

The MP and CWA are situated on coastal plain deposits that thicken to the southeast. The regional geologic and hydrogeologic framework for the New Jersey coastal plain is described by Zapecza (1989), who identified 15 regional hydrogeologic units, including nine aquifers and six confining units. An early regional geologic cross-section for the FTMM vicinity based on the work of Zapecza (1989), and presented in Versar (2005), is provided in **Appendix C**. This cross-section indicates that the depth to crystalline bedrock at FTMM is approximately 1,000 feet. In 2010, the understanding of the unconsolidated geology in the area around FTMM was refined by Sanford and Sugarman of the New Jersey Geological Survey. They describe the lithologic units in the coastal plain as consisting of unconsolidated sand, silt, clay, and glauconitic clay laid down in coastal, nearshore-marine, and continental shelf settings between 95 and 10 million years ago. The sediments are grouped into 19 formations and members.

The Geology of the Long Branch Quadrangle (Stanford and Sugarman, 2010) indicates that the Hornerstown, Vincentown, and Tinton formations are the unconsolidated units that outcrop or occur close to the ground surface in the area of FTMM. There is a relatively thin veneer of surficial deposits that covers most of the unconsolidated material, according to the Surficial Geology of the Long Branch Quadrangle (Stanford, 2000). The 2010 geologic map provides a geologic cross-section (A-A') through FTMM that is more refined than the one developed by Zapecza (1989); this refined cross section is also included in **Appendix C.** Regressive, upward-coarsening deposits are usually aquifers (e.g., Englishtown and Kirkwood Formations and the Cohansey Sand), while the transgressive deposits act as confining units (e.g., the Merchantville, Marshalltown, Navesink, and Hornerstown Formations). The individual thicknesses for these units vary greatly from several tens of feet to a several hundred feet.

The Hornerstown Formation, which underlies much of the MP and the northern portion of the CWA, consists of glauconitic (>50%) clay and silty clay. This unstratified formation is olive, dark green, and black where unweathered and olive-brown with brown to reddish-brown mottles where weathered (Stanford and Sugarman, 2010). The Hornerstown Formation is 25 to 30 feet thick. The Vincentown Formation, which unconformably overlies the Hornerstown Formation, consists of glauconitic (5-20%), silty, medium-to-coarse, quartz sand; some fine-to-medium sand; and some very coarse sand to very fine pebbles. This formation is yellow, reddish-yellow, olive-yellow, or olive-brown in color and has a total thickness of 180 feet.

The Tinton (Sand) Formation unconformably underlies the Hornerstown Formation and conformably overlies the Red Bank Sand and consists of glauconitic (5-30%), silty, medium-to-coarse and fine-to-medium, quartz sand. The color is reddish-brown, reddish-yellow, or yellowish-brown where weathered, and grayish-brown, brown, and olive-brown where unweathered. It is commonly iron-cemented into beds and masses as much as 15 feet thick. The uppermost 4 to 6 feet, just below the contact with the Hornerstown Formation, is a brown to olive-gray, glauconitic, clayey silt to sandy or silty clay (Stanford and Sugarman, 2010).

The water table aquifer in the MP and CWA areas is identified as part of the "Navesink-Hornerstown Confining Units," or minor aquifers. The minor aquifers include the Navesink Formation, Red Bank Sand, Tinton Sand, Hornerstown Sand, Vincentown Formation, Manasquan Formation, Shark River Formation, Piney Point Formation, and the basal clay of the Kirkwood Formation. These geologic formations comprise a "Composite Confining Bed" for the underlying Wenonah Mount Laurel Aquifer (Zapecza, 1989 as reported by Versar, 2005b) (see regional geologic cross-section in **Appendix C**). The Composite Confining Bed is estimated to be approximately 125 feet thick at FTMM (Versar, 2005b). Wells installed in the Red Bank and Tinton Sands produce 2 to 25 gallons per minute (gpm) (Jablonski, 1968). The shallow water table conditions in the Tinton and Red Bank Sands, and the similar composition of these sands within the Kirkwood Formation, suggest that the Tinton-Red Bank-Kirkwood sequence forms a single, laterally continuous aquifer. Regionally, groundwater in this water table aquifer flows east towards the Atlantic Ocean. However, local topography tends to deflect the flow toward local depressions (Versar, 2005b).

Groundwater is typically unconfined and encountered at the MP and in the surrounding areas at shallow depths (2 to 9 feet below ground surface [bgs]); groundwater elevations fluctuate with the tidal action in area creeks (AECOM, 2012). A pumping test performed at FTMM in 1992 yielded a hydraulic conductivity of 32 gallons per day per square foot (4.3 feet

per day [ft/day]) (Groundwater & Environmental Services, Inc. [GES], 1999). The location of the pumping test and the geologic unit tested are not known. Additional hydraulic conductivity information for the MP area is provided in Appendix IV of the *MODFLOW Groundwater Modeling* report prepared by Brinkerhoff Environmental Services, Inc. (Brinkerhoff, 2010). Twenty-one hydraulic conductivity values derived from slug tests performed in monitoring wells installed at various building areas ranged from 0.3 ft/day to 31.7 ft/day with an average value of 5.3 ft/day.

Shallow unconfined groundwater in the MP area is locally influenced by the following factors (GES, 1999):

- Tides (based on proximity to the Atlantic Ocean, rivers, and tributaries);
- Topography;

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- Nature of the fill material within the MP area;
- Presence of clay and silt lenses in the natural overburden deposits; and
- Local groundwater recharge areas (e.g., streams, lakes).

Due to the fluvial nature of the overburden deposits (e.g., sand and clay lenses), GES (1999) concluded that shallow groundwater flow direction is best determined on a case-by-case basis.

N.J.A.C. 7:9C-6, Ground Water Quality Standards (GWQS), establishes groundwater quality criteria for different classes of groundwater. Class II-A, which is defined as groundwater that is not classified as one of the other special classes, is the appropriate class for groundwater at FTMM. The primary designated use for Class II-A groundwater is potable water; secondary uses include agricultural and industrial water.

The chemistry of the groundwater near the surface is variable with low dissolved solids and high iron concentrations. The groundwater chemistry in areas underlain by glauconitic sediments (such as Red Bank and Tinton Sands) is dominated by calcium, magnesium, and iron (Shaw, 2012). Glauconitic soils, such as those present in the Cretaceous Age Red Bank and Tinton Sands of the FTMM area, can exhibit high concentrations of naturally occurring metals such as arsenic, beryllium, and lead (Dooley, 2001), and the upper part of the Tinton Sand is often highly iron-oxide encrusted.

1.5.5 Site Soil

According to the Monmouth County Soil Survey (U.S. Department of Agriculture, 2008), much of the MP is covered by urban, developed land with disturbed soils, whereas the CWA is covered by relatively fewer urban land complexes than the MP is (Shaw, 2012). Surface soil in the vicinity of the MP and CWA generally consist of sandy loams ranging in depth from 9 to 12 inches and are underlain by sandy loam, sandy clay loam, or loam that may grade to loamy sand at a depth of approximately 5 feet bgs. Some areas at the MP and CWA are covered by impermeable surfaces such as roads, parking lots, and buildings (AECOM, 2012).

1.5.6 Hydrology

The northeastern and southeastern portions of the MP are bordered by Parkers Creek and Oceanport Creek, respectively, and the southern portion of the MP is bordered by Husky Brook. The Shrewsbury River is located within one mile to the east of the MP. Wampam Brook is

located to the south of the CWA, and an unnamed brook traverses the CWA from east to west. No other surface water bodies were identified within one mile of the CWA (AECOM, 2012).

Identified surface water bodies ultimately drain into the Shrewsbury Bay, situated adjacent to the eastern edge of the MP. Shrewsbury Bay is separated from the Atlantic Ocean by a barrier island. However, channels through the barrier island ensure hydraulic connection between Shrewsbury Bay and the Atlantic Ocean. As a result, the water in Shrewsbury Bay is tidally-influenced and is brackish to saline. Water in the tributary streams to Shrewsbury Bay is also tidally-influenced, and is fresh water to brackish at low tide and brackish to saline at high tide. Stormwater at FTMM drains to municipal drainage systems via overland flow (AECOM, 2012).

The U.S. Fish and Wildlife Service (USFWS) National Wetland Inventory indicates the presence of wetlands at the MP. Parkers and Oceanport Creeks are classified as estuarine and marine deepwater with estuarine and marine wetland areas. Husky Brook and Lafetra Creek are classified predominantly as fresh water river, emergent wetland, and forested/shrub wetland. Husky Brook Lake is classified as a fresh water pond. Several CWA wetland areas are identified on the USFWS National Wetland Inventory. Most of Shrewsbury Creek and Wampum Brook are classified as fresh water forested/shrub wetland, and the open water in the golf course in the eastern portion of the CWA is classified as a fresh water pond (Shaw, 2012).

Shrewsbury Creek flows across the northern portion and along the western boundary of Parcel 28 (**Figure 1.4**). Parkers Creek (approximately 70 feet) flows across the northern boundary of Parcel 49 (**Figure 1.7**). There are no surface water bodies within the boundaries of Parcels 38, 39, 57, 61, or 69. Lafetra Creek is located approximately 140 feet north of Parcel 38 (**Figure 1.5**), Mill Creek is located along the southern boundary of Parcel 39 (**Figure 1.6**), Oceanport Creek is located approximately 200, 1,000 and 300 feet north of Parcels 57, 61, and 69, respectively (**Figure 1.2**).

1.6 SITE HISTORY

The MP of FTMM was established in 1917 as Camp Little Silver (AECOM, 2012). The name of the Camp was changed after three months to Camp Alfred Vail. The initial mission of the Camp was to train Signal Corps operators for service in World War I. After the war, Camp Alfred Vail was designated as the site of the Signal Corps School. In 1925, the facility became a permanent post, and its name was changed to Fort Monmouth.

Camp Charles Wood was purchased in 1941 and opened in 1942. The eastern half of the property was formerly a golf course, and the western half was residential property and farmland. During World War II, the Camp was used for training Signal Corpsmen (Shaw, 2012). A R&D facility, the Myer Center (Building 2700), was completed in 1954. Laboratories within the Myer Center facility developed state-of-the-art electronic and communications equipment for use by the U.S. Armed Forces.

The primary mission of FTMM was to provide command, administrative, and logistical support for Headquarters, U.S. Fort Monmouth Communications and Electronics Command (CECOM) (Shaw, 2012). CECOM is a major subordinate command of the U.S. Fort Monmouth Material Command (AMC). FTMM was the center for the development of the Fort Monmouth's Command and Control Communications, Computers, Intelligence, Sensors and Reconnaissance (C4ISR) systems, formerly the primary tenants of the Fort. FTMM has a long history of R&D activity, mostly related to communications and electronic equipment. For the completion of these

research activities, FTMM operated a variety of laboratories. Additionally, FTMM has a significant history of training and housing troops. In support of these activities, FTMM has had a full complement of support activities including vehicle maintenance, warehouse, medical and dental services, photo processing, printing, historic solid waste handling methods (e.g., landfills), and facility infrastructure (e.g., underground storage tanks [USTs]). The EA was closed under BRAC in 1993 and have been transferred from FTMM. On September 15, 2011 the remainder of FTMM was closed under the 2005 BRAC process. Many of the historical site activities have resulted in environmental releases that are being addressed within the Installation Restoration Program (IRP) and BRAC ECP processes (Shaw, 2012).

1.6.1 Parcel 28

Parcel 28, the Former Eatontown Laboratory Complex consists of an area of approximately 30 acres that encompasses Buildings 2525, 2535, 2539, 2540, and the land in this area (Shaw, 2012, **Figure 1.4**). Several other parcels located within the boundary of Parcel 28 (Parcels 29, 30, 32, and 33) are not addressed in this work plan. Building 2525 was constructed in 1941 and 1942 and was used as a chemical laboratory consisting of six bays; however, the locations of the bays are unknown. Activities conducted in Building 2525 included crystal growing and processing operations in the early 1950s. The Eatontown Signal Laboratory was renamed Watson Laboratories in 1945 and subsequently moved to Rome, New York in 1951.

FTMM site plans depict three separate septic tanks and leach fields, and one underground transformer vault within the Building 2525 area (U.S. Army BRAC, 2008). The main sanitary sewer line from the building is shown to discharge to a septic tank and leach field east of the building. A review of a historical map and engineering drawings indicated a 2-inch "acid proof drain" leading from Bay 1 to a dry well southeast of the building. Floor drains were shown to discharge to Parkers Creek northwest of the building, and building revitalization plans show floor drains were later connected to the sanitary sewer system. The location of the former septic system tanks are shown on **Figure 1.4**.

On April 28, 2009, a 550-gallon, single-wall, steel UHOT was removed from a field southeast of Building 2525 (Tecom-Vinnell Services, Inc., 2011). A Parcel 28 figure (**Appendix C**, Modified Figure 3.5.1) provided as part of the UHOT report, indicates the locations of the UHOT as well as the three former septic tanks (U.S. Army BRAC, 2012).

The NJDEP requested in a letter dated July 10, 2012 that the three septic systems be further evaluated. Additionally, a letter was sent by the NJDEP to FTMM on April 29, 2013 which requested investigation of an uncategorized area within Parcel 28 (**Appendix C**). The Army provided a response to the NJDEP's correspondence on May 17, 2013 (**Appendix C**) which contained a proposal to perform test pit excavations and sampling at the three septic systems, as well as an investigation of a former gas station, based on a hand-drawn sketch of the CWA dated June 30, 1944. The location of the former gas station is depicted on **Figure 1.4**. The Army's proposal was approved by the NJDEP on June 3, 2013 (**Appendix C**), and the investigations have been performed.

Following the Watson Laboratories move to New York in 1951, the Aviation Research and Development Command Laboratory moved to Building 2525 and occupied the building until 1978. Ozalid reproduction was reportedly conducted in Room 5101 of Building 2525. Building revitalization plans show floor drains connected to the sanitary sewer system; however, no sumps

or floor drains were noted during a 2006 visual site inspection. The use of the building has been administrative since the late 1990s (U.S. Army BRAC, 2008).

Prior to 1997, Building 2525 was used to house electronics laboratories. No chemical usage was reportedly associated with the electronics laboratories. Geothermal well fields used for the heating of facilities within Parcel 28 are present at multiple locations throughout the parcel (U.S. Army BRAC, 2008). (The locations of the geothermal well and other information on the wells are included in **Appendix C**.)

Parcel 28 also contained the CECOM laboratory and radiological testing facility housed in Building 2540. This building contains a gamma irradiator, radiac calibrators, a storage room for low-level radioactive material (RAM) with multiple radioactive sources from the demilitarization of commodities, a nuclear counting laboratory, and several health physics laboratories (U.S. Army BRAC, 2008). The buildings in Parcel 28, including Building 2540, have been unoccupied since BRAC closure in September 2011, and no RAM of any kind remains in the building. (Moore, 2013)

A review of aerial photographs conducted in 1993 noted a fenced, open storage area and possible tank pads in the northern portion of Parcel 28, to the northeast of Building 2525 (U.S. Army BRAC, 2008). The portion of Parcel 28 located north of Corregidor Road received a no further action (NFA) designation from the NJDEP on March 29, 2012 (NJDEP, 2012c) (**Figure 1.4**).

1.6.2 Parcel 38

Parcel 38 consists of the Former Outdoor Firing Range, which was used from approximately 1940 through 1955 (**Figure 1.5**). Former range structures and the backstop berm have been demolished or removed (U.S. Army BRAC, 2008). According to Malcolm Pirnie, Inc. (2006), "It is assumed that the small arms were fired into a backstop berm that has since been removed. The presence of a berm was not identified on historical maps or during the site visit."

The Parcel 38 area is currently occupied by a parking lot associated with Building 200 (formerly used as the Range House) and landscaped areas. Munitions associated with the Former Outdoor Firing Range are assumed to be small arms ammunition only; therefore, no munitions and explosives of concern and limited munitions constituents (MC) are anticipated (U.S. Army BRAC, 2008). The primary MC associated with small arms ranges is lead (U.S. Army BRAC, 2008).

1.6.3 Parcel 39

Parcel 39, Building 1150 (Vail Hall), was most recently utilized for administrative purposes, and is currently vacant (**Figure 1.6**) Within the basement is a large Uninterruptible Power Supply Room, emergency generator, floor drains, and a sump pump strictly for high water table events (discharges to basin behind building and ultimately to Mill Creek). Film developing activities formerly occurred in the basement of the building (U.S. Army BRAC, 2008).

1.6.4 Parcel 49

Parcel 49 encompasses the buildings associated with the Former Squier Laboratory and other facilities with similar operational histories (refer to **Figure 1.7**), and is currently unoccupied. The Squier Laboratory Complex includes existing Buildings 283, 288, 292, 291, and 293 (Shaw, 2012). Parcel 49 also includes former Buildings S-5, S-6, S-6 Annex, S-9, S-10, S-

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11, S-12, and S-1. Building 295, and former Buildings 289, 290, L-3, T-45, X-9, and X-7 have a similar operational history and are included in Parcel 49 along with the Squier Laboratory (U.S. Army BRAC, 2008). Asphalt parking lots and paving cover approximately half the parcel and a relatively small portion of the parcel is landscaped. Parcels 50 and 54 are located within the boundary of Parcel 49 and are not addressed in this work plan.

In 1934, FTMM laboratory operations were consolidated in a new facility, Squier Laboratory, and this facility continued to be the principal laboratory on post until 1954 when the new R&D facility, Myer Center (Building 2700), was opened. The Squier Laboratory Complex supported the Signal Corps Laboratories' research into batteries and electronics coatings. Environmental conditions were identified for some of the laboratory operations based on the size and intensity of historical operations and the timeframe during which the services took place (U.S. Army BRAC, 2007). Environmental concerns associated with Squier Laboratory operations include the use of chemicals, solvents, radioisotopes, and metals when waste handling procedures may not have been sufficiently protective to preclude a release to the environment. The potential for a release to the environment from laboratory operations were identified in the following locations:

- Squier Laboratory in Building 283 which has a long and extensive history of laboratory operations;
- Building 288 was historically used for reproduction and photo-processing;
- Building 291 formerly housed the Crystal Section where crystals were grown;
- Building 292 formerly housed the Climatic Section where testing of electronic equipment at environmental extremes was conducted;
- Former Building 293 housed a battery testing operation. A ground stain was observed in the vicinity of Building 293 in aerial photographs taken in 1969 and 1974. Building 293 was destroyed by a fire and a second Building 293 was constructed. The new building was used for battery testing;
- Building 295 was used for R&D fabrication for reinforced plastics;
- Operations in former Buildings S-5, S-9, S-10, S-11, and S-12 used various laboratory chemicals in hoods for the manufacture and testing of dry cell batteries;
- Former Building L-3 was used for paint experimentation;
- Former Building T-45 was used for the experimental manufacture of storage batteries;
- Former Building X-9 was used for testing gasoline engines; and
- Former Building X-7 was used for mixing acids.

An investigation of the historical use of RAMs was conducted by Cabrera Services, Inc., in 2007. A Special Investigation Report issued in 1951 for the Squier Signal Laboratory Director discussed a wipe test performed on samples of aluminum covered with polonium lacquer (approximately 230 microcuries) to ensure that no hazard was present at Building 283. Building 292 served as storage space for the communications-electronics museum. This storage space contained a Chinese radio and a vacuum tube where radiological commodities were identified

with radiological readings above background levels, and radium-contaminated components were found in a posted radioactive storage locker. This storage space once contained 65 items containing RAM, but numerous non-radioactive items have since been removed (Cabrera Services, Inc., 2007).

1.6.5 Parcel 57

Parcel 57 was identified as a Former Coal Storage Area and fuel unloading area along the former railroad in the vicinity of Buildings 800, 801, and 1007 based on a review of historical site plans, aerial photographs, and information obtained during personnel interviews (refer to **Figure 1.8**) (U.S. Army BRAC, 2008). The dates of operation of the coal storage area are unknown. A geothermal well field is located north of Building 800. Parcels 58 and 59 are located within the boundary of Parcel 57. Information regarding the locations of geothermal well fields at FTMM has been included in **Appendix C**. The parcel is currently occupied by Buildings 800, 801, 1000, 1005, and 1010; asphalt-paved parking areas occupy approximately half the parcel, and a relatively small portion of the parcel consists of landscaped areas. It is not known when the buildings, asphalt pavement, and landscape features were constructed (U.S. Army BRAC, 2008). The site is currently unoccupied.

1.6.6 Parcel 61

Parcel 61 encompasses Patterson Army Health Clinic (Building 1075), asphalt pavement, and landscaped areas (**Figure 1.9**). Building 1075 was constructed in 1961 to house Patterson Army Hospital and was used continuously for that function until it was downgraded to a health clinic in 1995. In the 1960s, 1970s, and 1980s activities in the building included X-ray processing and laboratory operations which extensively used mercury-containing equipment, developing chemicals, and other chemicals/waste associated with medical operations. During a 2006 site inspection, numerous floor drains were observed in the basement that lead to the pneumatic sewage ejector and into the sanitary sewer (U.S. Army BRAC, 2008). Building 1075 has been unoccupied since BRAC closure in September 2011 (personal communication USACE, 2013). The site layout and historical data for Parcel 61 is shown on Figure 3.15-1 located in **Appendix C**.

1.6.7 Parcel 69

Parcel 69, comprised of Building 900, is a former tactical motor pool which has been used for general storage (refer to **Figure 1.10**). A waste oil tank immediately outside the building was connected by a fill pipe originating from inside the building. A storm sewer inlet was observed in the parking lot in close proximity to the building during a 2006 visual site inspection (U.S. Army BRAC, 2008). A boiler was formerly located outside the building. The locations of the tank, storm sewer inlet, and boiler are not shown on available site figures. A trichloroethene (TCE) parts cleaner and a 500-gallon aboveground waste oil tank were located at the building at the time of the 1993 site visit (U.S. Army BRAC, 2008). The tank has been removed from the building. TCE parts cleaners were eliminated from use at the MP and CWA in February 1994 (U.S. Army BRAC, 2008).

Solvents were previously used for cleaning vehicle parts at various locations throughout FTMM. Both the military and the contractors operated solvent parts cleaners (U.S. Army BRAC, 2008). These solvent parts cleaners consisted of a tank and sink with nozzle. The military used Super Agitine for its parts cleaners while the contractor used Siloo Tyme II. Each part cleaner

held about 30 gallons of fluid, which was reused until it needed changing. Fluid changes occurred every four months to every three years depending on location and usage (U.S. Army BRAC, 2008). Additional information regarding the parts cleaners has not been identified.

Review of historical site plans, sanitary plans, and stormwater management plans as well as a site reconnaissance were conducted to evaluate potential discharge locations throughout the parcel (U.S. Army BRAC, 2008). It was determined that stormwater from Building 900 discharges to Oceanport Creek northwest of Building 977 and north of Building 908. Parcel 69 is currently unoccupied.

1.7 BASELINE ECOLOGICAL EVALUATION REPORT

A BEE (Shaw, 2012) was conducted at FTMM to fulfill requirements as set forth in the NJDEP TRSRs (N.J.A.C. 7:26E-3.11). The NJDEP has accepted the 2012 BEE report's recommendations and conclusions and concurs that no further evaluation of ecological risk is required (NJDEP letter dated August 27, 2012). The following is a summary of BEE findings and conclusions that are relevant to this document, and the contaminants of concern (COC) at the parcels.

- Land use in the vicinity of FTMM, as well as general small urban development activities lend to an increase in general anthropogenic inputs in the area (Shaw, 2012);
- Elevated concentrations of many metals are naturally found within the urban coastal plain region in which FTMM is located. Glauconitic soils which are prevalent at FTMM and have been reported in the creek sediments are naturally high in arsenic, beryllium, chromium, nickel, and vanadium as well as other metals;
- Polycyclic aromatic hydrocarbons (PAHs), in particular, though identified as Contaminants of Potential Environmental Concern (COPECs), were found in sediments and surface water at concentrations similar to background sample concentrations or at locations indicative of other sources (e.g., at the upstream extent of the site and downstream of active roads or parking areas);
- Some metals (chromium, copper, lead, mercury, silver, and zinc) were found at a few
 locations above background levels measured during the BEE investigation, but many
 of these are similar to those reported for ambient soil in the region (BEM Systems,
 Inc., 1998) or, in particular, glauconitic soils (Dooley, 2001). Although elevated
 metals in these limited areas may pose some ecological risk due, it is likely that these
 metals are related to natural geology or other diffuse anthropogenic pollution (DAP)
 sources;
- Conservative screening level food chain models indicated estimated exposures to
 wildlife exceeded toxicity values. Based on the overly conservative nature of the food
 chain models (exposure to locations of maximum concentration, conservative model
 parameters, assumptions and toxicity values) and the biased sampling approach used
 in the BEE sediment investigations, it is unlikely that current site conditions present
 any risk to wildlife; and
- Metals that are related to sites evaluated in the BEE may represent a potential ecological risk in limited areas, however, the BEE concluded that constituents at

FTMM are unlikely to have a deleterious effect on sensitive ecological receptors or habitats, and additional ecological assessments at FTMM are not warranted or recommended.

1.8 CURRENT AND PROJECTED LAND USE

The 637-acre MP provided supporting administrative, training, and housing functions, as well as many of the community and industrial facilities for FTMM. These facilities are distributed across the property, with no distinct clustering of functions. A total of 397 buildings and structures are present at the MP. The 489-acre CWA was used primarily for R&D, testing, housing, and recreation. The former CWA research, development, and testing facilities occupy the southwest corner of CWA.

Current land use at Parcel 28 is vehicle parking associated with Building 200. Parcels 38, 39, 49, 57, 61, and 69 are currently unoccupied/not in use (USACE, 2013). **Figure 1.11** presents the current land use at FTMM according to the *Fort Monmouth Reuse and Redevelopment Plan* (EDAW, 2008).

According to the BEE report for FTMM, land use immediately surrounding FTMM is typical of mixed use, small town development in New Jersey. Commercial services and shopping centers in the area populate main roads, interspersed with residential structures, apartments, and office buildings. Business and light industrial parks are located along highways, streams, and railroad tracks. Surrounding properties include National Priorities List (NPL) sites, State Hazardous Waste Sites, Leaking UST Sites, and Voluntary Cleanup Program sites.

1.9 PREVIOUS INVESTIGATIONS AND HISTORICAL DATA

The historical data and identification of COCs at each parcel is based on information provided in *Site Investigation Report Fort Monmouth* (U.S. Army BRAC, 2008).

1.9.1 Parcel 28

Multiple former USTs throughout Parcel 28 have been removed under the FTMM UST Management Program and are summarized within the FTMM Phase I ECP Report (U.S. Army BRAC, 2007). During the 2007 SI (U.S. Army BRAC, 2008), a review of historical site drawings identified several septic tanks, leaching fields, and USTs that once existed within Parcel 28 as well as a former acid proof drain in Building 2525 that discharged to Shrewsbury Creek. Two USTs were identified on historical figures for which no UST removal documentation was identified (U.S. Army BRAC, 2008). Geophysical surveys were conducted to determine the absence/presence of formerly utilized septic tanks, associated leaching fields, and USTs (**Figure 1.4**). The potential for historical releases to the environment were investigated via soil sampling, sediment sampling, groundwater sampling, and test pit soil sampling throughout Parcel 28 (U.S. Army BRAC, 2008). The locations of samples and geophysical survey areas within Parcel 28 are presented in **Appendix C** (Figure 3.5-1). Additional site characterization data collected within Parcel 28 in July 2013 by FTMM were provided to the NJDEP in a Request for No Further Action letter report dated June 4, 2015 (FTMM, 2015, provided in **Appendix C**).

Geophysical Surveys: The geophysical surveys identified a total of 23 target electromagnetic (EM) anomalies. The survey areas and results (locations of suspected USTs, suspected septic tanks, and suspected septic system distribution tanks) are presented in **Appendix C** (Figure 3.5-2). Ground penetrating radar (GPR) scanning identified 23 targets, and

additional GPR scanning was completed within the small roughly square areas labeled A and B on Figure 3.5-2 of **Appendix C**. These areas are thought to contain possible remnant septic system features based on identified anomalies. In Area A, a roughly 4-foot (ft) by 6-ft non-metallic anomaly was delineated and may represent a former septic holding tank reported to have been in place in that area. In Area B, a high-amplitude non-metallic linear anomaly was partially delineated and is suspected to be the former supply pipe to a septic distribution box which was delineated in the EM survey. Follow-up GPR scanning showed a 10-ft by 10-ft high-amplitude flat anomaly characteristic of a box shaped septic tank. No other features of the suspected septic systems in Areas A and B were observed. In summary, no dry well was identified within Parcel 28; however, one possible UST (P28-8), one suspected septic holding tank, and one suspected septic distribution box and associated piping were identified.

The potential for discharges related to previous operations within Parcel 28 was evaluated during the SI in December 2007 (U.S. Army BRAC, 2008). The investigation included collection by Geoprobe® of surface and subsurface soil and groundwater samples, subsurface samples collected from a drainage field test pit, surface soil and sediment samples collected using a hand auger, and groundwater samples from existing monitoring wells. A total of five surface soil samples, 11 subsurface soil samples (including two duplicate samples), four sediment samples, and five groundwater samples (including one duplicate sample) were collected from Parcel 28 (**Appendix C**, Figure 3.5-1). Soil and sediment samples were analyzed for target compound list (TCL [which includes VOCs, SVOCS, Pesticides, and PCBs]) + tentatively identified compounds (TICs) (without pesticides) and target analyte list (TAL) metals. Groundwater samples were analyzed for TCL + TICs (without pesticides or polychlorinated biphenyls [PCBs]), TAL metals, and ammonia, nitrate and nitrite (select wells near drainage fields). Historical analytical results for Parcel 28 are summarized below and presented in **Appendix C** (Tables 3.5-4, 3.5-5, 3.5-6, and 3.5-7).

Geoprobe® Investigation Results: One volatile organic compound (VOC), acetone, and 12 semi-volatile organic compounds (SVOCs) were detected in Parcel 28 surface or subsurface soil samples at concentrations below the then-current NJDEP Non-Residential Direct Contact Soil Cleanup Criteria (NRDCSCC). A total of 17 metals were detected in surface and subsurface soil samples. Of the 17 metals, one (arsenic) was detected at a concentration in excess of the NJDEP NRDCSCC. Arsenic was detected at a concentration of 20.7 milligrams per kilogram (mg/kg) in soil sample (P28-SB3-C) that exceeded the then-current NJDEP NRDCSCC of 20 mg/kg. The arsenic concentration at P28-SB3-C was considered representative of naturally occurring conditions due to site-specific information for this particular area of concern. Sample P28-SB3-C was collected at a depth of 5.0 to 5.5 ft bgs, directly above the water table. The arsenic concentration in surface soil was below the NRDCSCC, and arsenic was not detected in groundwater at this location.

There are several factors both natural and anthropogenic that can have an influence on arsenic levels in the soil at FTMM (U.S. Army BRAC, 2008). The primary natural influence on the chemical concentrations in soil at FTMM is parent material. The parent material at FTMM is glauconitic soil of the Tinton and Red Bank sands and their fluvially and tidally-reworked equivalents (U.S. Army BRAC, 2008). Total arsenic levels in glauconite-bearing soil in New Jersey have been reported to range up to 131 mg/kg, with a median concentration of 30 mg/kg. Anthropogenic influences on arsenic levels in the soil include the use of pesticides and herbicides (U.S. Army BRAC, 2008). Arsenic was a common constituent of herbicides and

pesticides in the past. The specific origin(s) of the elevated background levels of arsenic at FTMM is unknown. As a result of these natural and anthropogenic influences, arsenic is not considered a COC in soil (U.S. Army BRAC, 2008).

Test Pit Investigation Results: One VOC and 12 SVOCs were detected in subsurface soil samples at concentrations below then-current NJDEP NRDCSCC. A total of 17 metals were detected at concentrations below NJDEP NRDCSCC. No COCs were identified in test pit soil (U.S. Army BRAC, 2008).

Groundwater Investigation Results: A total of 13 metals were detected in Parcel 28 groundwater samples. Only two metals (aluminum and manganese) were detected at concentrations above the NJDEP GWQS. Several natural and anthropogenic factors contribute to the wide range in concentrations of metals in soil, which further impact the concentration of metals in groundwater. Soil derived from glauconitic sands contains abundant aluminum, calcium, potassium, iron, magnesium, and manganese (among others), which are likely to be present at elevated concentrations in the groundwater, particularly when sediments are entrained in the collected groundwater samples (U.S. Army BRAC, 2008). As a result of these natural influences, aluminum and manganese are not considered COCs in groundwater (U.S. Army BRAC, 2008). A total of three VOCS, acetone, chloroform, and toluene, were detected at concentrations below the NJDEP GWQS in Parcel 28 groundwater samples. One PAH, bis(2-ethylhexyl)phthalate, was detected at concentrations below the NJDEP GWQS in groundwater samples collected from temporary wells (P28GW-1, P28GW-1-Duplicate, and P28GW-2). No COCs were identified in groundwater at Parcel 28 (U.S. Army BRAC, 2008).

Sediment Investigation Results: Sediment samples were collected from Shrewsbury Creek, which is a non-tidal water body in this portion of the facility; therefore, sediment analytical results were evaluated in relation to the Freshwater Sediment Screening Values-Lowest Effects Level (LEL) and Severe Effects Level (SEL). One VOC, five SVOCs, and 17 metals were detected in Parcel 28 sediment samples. Acetone was detected at concentrations below the LEL in the four samples, and the SVOCs concentrations were below the LEL. Only one metal (chromium) was detected at a concentration greater than the LEL.

Chromium was detected above the LEL of 26 mg/kg in the four sediment samples collected in Parcel 28 at concentrations ranging from 36.8 mg/kg in sample P28SD-2 to 50.6 mg/kg in sample P28SD-2D (**Appendix C**, Table 3.5-7). Three of the four chromium concentrations also exceeded the CWBC of 36.9 mg/kg. No constituents were detected at concentrations greater than the SEL.

One potential source of chromium in sediment may be potentially associated with an upstream chrome plating operation performed at Building 2700. The United States Army Environmental Hygiene Agency (USAEHA, 1976) sampled the effluent from Building 2700 from 1974 to 1975 and identified discharges of the following wastewaters: alkaline cleaning agents, chromium, 93-94 percent sodium hydroxide slugs, sulfuric acid (attributed to a dip solution used to activate a metal surface for plating), copper pickling waste, sodium dichromate as part of a cleaning agent, parabenzoquinone (attributed to photographic processing effluent), ammonium persulfate from the printed circuit manufacturing shop, and acetone (U.S. Army, 2008). At the time of sampling, the chromium was believed to have likely been in the hexavalent state in order to have remained in solution at the measured pH (USAEHA, 1976).

However, there is no evidence that effluent samples were ever specifically analyzed for Cr⁺⁶. Plating operations, which may have included chrome plating operations (operations are describes as gold [and other metals] plating in the SI), were also conducted in Building 2532, and other buildings on the parcel, including Building 2525 had laboratory operations where chromium use can't be ruled out based on currently available information.

Figure 5-7 of the BEE (Shaw, 2012) shows that chromium concentrations in Shrewsbury Creek sediment at and immediately upstream of the western boundary of the CWA, upstream of both Parcel 28 and Building 2700, ranged from 60.7 mg/kg to 97.3 mg/kg; these concentrations are higher than detected in Parcel 28. Therefore, there are other potential upstream sources of chromium, including upstream of the CWA.

The 2008 SI report referred to chromium in sediment as a COC; therefore, this work plan refers to chromium as a COC based on the 2008 report (U.S. Army BRAC, 2008). However in presenting the results of the future evaluation, chemicals which exceed the human health criteria in environmental media will be considered contaminants of potential concern (COPCs), while those that exceed the ecological screening criteria (where appropriate) will be considered COPECs. NJDEP concurred that sediment at Parcel 28 would be evaluated as part of a facility-wide investigation (NJDEP, 2008). The BEE (Shaw, 2012) identified chromium as a COPEC in sediment at Parcel 28. The BEE concluded that constituents at Parcel 28 are unlikely to have a deleterious effect on sensitive ecological receptors or habitats, and additional ecological assessment at Parcel 28 was not recommended (Shaw, 2012). The NJDEP has accepted the 2012 BEE report's recommendations and conclusions and concurs that no further evaluation of ecological risk is required (NJDEP letter dated August 27, 2012).

Septic and Underground Storage Tanks: A figure of Parcel 28, updated from the SI Report (U.S. Army BRAC, 2008) was presented as Attachment F to the *Army's March 2012 Response to NJDEP Correspondence Letter Dated October 2008* (**Appendix C**; modified Figure 3.5-1 [U.S. Army BRAC, 2012]) depicts two former septic tanks from the following locations: 1) northeast of Building 2525, and 2) east of Heliport Drive.

On April 28, 2009, a 550-gallon, single-wall, steel, UHOT was removed from a field southeast of Building 2525. The tank removal document (Tecom-Vinnell Services, Inc., 2011) did not include figures; therefore the actual tank location is unknown but is believed to be the same tank shown on the Figure 3.5-2 provided in **Appendix C**. The document reported that the fill port, vent pipe, and associated piping typically observed during tank removal were not present at the time the tank was excavated. The tank did not contain liquid material, holes were observed in the tank, and no staining or odors were noted in the excavation. Three confirmation soil samples collected from the excavation at depths of 6 to 6.5 ft bgs were analyzed for total petroleum hydrocarbons (TPH), the results were non-detect, and a NFA determination was requested.

Review of available site information and soil and groundwater data does not indicate that a release has occurred from septic tanks, leaching fields, and USTs (U.S. Army BRAC, 2008). The Army provided a proposal to conduct test pit excavations and soil sampling at the former septic tank locations in a letter dated May 17, 2013. The proposal was approved by NJDEP in a letter dated June 3, 2013. Sampling has been performed, and a report was provided to the NJDEP in a Request for No Further Action at Parcel 28 (Parsons, 2015, provided in Appendix C). The NJDEP subsequently approved a NFA for UST 2542-29, UST 2564-32, the former septic system

and septic tank A, the former septic system east of Heliport Drive and South of Radiac Way, and the former septic system at the southeastern corner of Parcel 28 (NJDEP, 2015, provided in 2 Appendix C). The NJDEP did not provide a NFA for the former gas station at former building 3 2541 due to elevated levels of lead detected in the groundwater. The elevated levels of lead may 4 be biased high due to the sample collection method, and the NJDEP required that the location 5 with the highest lead concentration be re-sampled using a methodology that would reduce 6 turbidity. 7

1.9.2 Parcel 38

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The Former Outdoor Firing Range was located in an area currently occupied by a parking lot associated with Building 200 (Range House) and a manicured lawn area east-northeast of Building 1220. In December 2007, a total of 25 surface soil samples (including one duplicate sample) were collected from 24 hand augured borings located in the suspected area of the former firing range berm (**Appendix C**, Figure 3.7-1) to evaluate potential contamination attributable to historical firing range operations. Surface soil samples were analyzed for TAL metals.

Soil Investigation Results: A total of 18 metals were detected at Parcel 38; however, no metals were detected at concentrations above the then-current NJDEP NRDCSCC or Residential Direct Contact Soil Cleanup Standard (RDCSCC), and no COCs were identified in soil at Parcel 38 (U.S. Army BRAC, 2008). Historical analytical data for Parcel 38 is presented in Appendix **C** (Table 3.7-3).

The NJDEP issued a letter on July 10, 2012, Re: March 2012 Army Response to NJDEP Correspondence Letter Dated October 28, 2008 which indicated that surface soil sampling was not adequate due to the possibility that the soils had been reworked, and that groundwater sampling (which has not been previously performed) was also required. Although soil investigation results did not identify COCs, the proposed supplemental SI activities are intended to address the comments from the NJDEP for Parcel 38, and will consist of an investigation to determine if there are impacts of metals to the soil and groundwater due to potential releases from the former firing range. Proposed supplemental SI activities for Parcel 38 are detailed in Section 3.2.1.2.

1.9.3 Parcel 39

In December 2007, surface soil and sediment sampling was conducted to determine the impact of Building 1150 operations on soil and sediment at potential discharge locations along Mill Creek (U.S. Army BRAC, 2008). The investigation included the collection of one surface soil sample and four sediment samples using a hand auger (Appendix C, Figure 3.8-1). Soil and sediment samples were analyzed for TCL + TICs (without pesticides) and TAL metals. Historical analytical data for Parcel 39 is presented in **Appendix C** (Tables 3.8-3 and 3.8-4) and summarized below.

Soil Investigation Results: Four PAHs were detected at concentrations below then-current NJDEP NRDCSCC (U.S. Army BRAC, 2008, Appendix C [Table 3.8-3]). Following completion of the 2008 SI report, New Jersey revised N.J.A.C. 7:26D Remediation Standards, which incorporated new soil remediation standards in place of the old soil cleanup criteria, and PAH concentrations in surface soil are below the new soil cleanup standards, Residential Direct Contact Soil Remediation Standards (RDCSRS), as shown below. A total of 18 metals were detected in surface soil; however, the metals were detected at concentrations below then-current

NJDEP NRDCSCC. A NFA determination was requested for surface soil at Parcel 39 (U.S. Army BRAC, 2008).

PAH Concentrations in Parcel 39 Surface Soil

Contaminant	Non-Residential Direct Contact Soil Remediation Standard (NRDCSRS) ¹ (mg/kg)	RDCSRS ¹ (mg/kg)	Analytical Results ² (mg/kg) P39-SS1
Fluoranthene	24,000	2,300	0.120J
Pyrene	18,000	1,700	0.290J

- 1. Soil Remediation Standards defined in N.J.A.C. 7:26D as amended May 7, 2012
- 2. Analytical results as presented in Final Site Investigation Report, Fort Monmouth, 21 July 2008 (U.S. Army BRAC, 2008).

Sediment Investigation Results: Mill Creek is a non-tidal water body in this portion of the facility; therefore, sediment analytical results were evaluated in relation to the Freshwater Sediment Screening Values-LEL. A total of nine PAHs and 18 metals were detected in Parcel 39 sediment samples. Of the nine PAHs detected, six (benzo[a]anthracene, benzo[a]pyrene, chrysene, fluoranthene, phenanthrene, and pyrene) were detected at concentrations that exceeded Freshwater Sediment Screening Values-LEL, and three (benzo[a]pyrene, chrysene, and phenanthrene) also were detected at concentrations exceeding their respective Main Post Background Concentration (MPBC). No PAHs were detected above the SEL (U.S. Army BRAC, 2008). Of the 18 metals detected, eight (arsenic, cadmium, chromium, copper, lead, mercury, nickel, and zinc) were detected at concentrations that exceeded the LEL, and four (cadmium, chromium, lead, and zinc) exceeded the MPBC.

The three PAHs and four metals are identified as COCs. Chromium was the only compound detected in excess of the Freshwater Sediment Screening Values-SEL. The BEE concluded that 1) constituents in sediment at Parcel 39 are unlikely to have a deleterious effect on sensitive ecological receptors or habitats, 2) the potential for ecological risk is considered low, and 3) additional ecological assessments at Parcel 39 were not warranted (Shaw, 2012).

No additional sampling is proposed at Parcel 39 because the PAH concentrations in soil do not exceed the current NJDEP RDCSRS, ecological risk is considered low based on the concentrations detected in the sediment (Shaw, 2012), and any sediment issue which may have resulted from site operations are to be addressed as part of the facility-wide ecological assessment (NJDEP, 2012). The NJDEP has accepted the 2012 BEE report's recommendations and conclusions and concurs that no further evaluation of ecological risk is required (NJDEP letter dated August 27, 2012). A NFA request for Parcel 39 was submitted to the NJDEP in May 2015, and was subsequently approved in their letter dated September 10, 2015.

1.9.4 Parcel 49

Multiple former USTs throughout Parcel 49 have been removed under the FTMM UST Management Program and are summarized within the FTMM Phase I ECP Report (U.S. Army BRAC, 2007). Building 283 groundwater and soil contamination associated with former USTs that were removed is currently being addressed under the FTMM IRP as site FTMM-61 (U.S. Army BRAC, 2008).

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The potential for discharges related to previous operations within Parcel 49 was evaluated during the SI in December 2007 (U.S. Army BRAC, 2008). The investigation included Geoprobe[®] collection of surface and subsurface soil and groundwater samples, surface soil and sediment samples collected using a hand auger, and groundwater samples from existing monitoring wells. A total of 13 surface soil samples, seven subsurface soil samples (including one duplicate sample), seven sediment samples (including one duplicate sample), and seven groundwater samples (including one duplicate sample) were collected from Parcel 49 (Appendix C. Figure 3.10-1). Soil and sediment samples were analyzed for TCL + TICs (without pesticides), TAL metals, and cyanide. Groundwater samples from the Geoprobe® temporary wells were analyzed for TCL + TICs (without pesticides or PCBs), and tertiary butvl alcohol (TBA). Groundwater samples from the existing monitoring wells were analyzed for TCL + TICs (without pesticides), TBA, TAL metals, and cyanide. Historical analytical data for Parcel 49 obtained during the 2007 SI (U.S. Army BRAC, 2008) is presented in **Appendix C** (Tables 3.10-3, 3.10-4, and 3.10-5) and summarized below. Additional analytical data obtained by the U.S. Army in 2010 is also provided in **Appendix C**, and PCB data for soil obtained by Weston (1995) is summarized below.

Soil Investigation Results (1995 and 2007): During the SI performed by Weston (1995), soil samples for PCB analysis were collected beneath the former locations of pole-mounted transformers. One of the former transformers, designated MP-062, was located in Parcel 49 northwest of the northwest corner of Building 292. No visible oil stain was observed; however, the soil sample collected beneath this former transformer contained a PCB concentration of 0.68 mg/kg, which exceeded the then-current NJDEP cleanup criterion of 0.49 mg/kg. The sample was a composite of soil from three locations immediately below the transformer, each collected from 0 to 6 inches bgs.

Five VOCs, 22 SVOCs, 20 metals, and one PCB (Aroclor 1260) were detected in Parcel 49 soil samples during the 2007 SI (U.S. Army BRAC, 2008). Cyanide was not detected in soil. The VOCs and SVOCs detected were below then-current NJDEP NRDCSCC except for seven PAHs (benzo[a]anthracene, benzo[a]pyrene, benzo[b]fluoranthene, benzo[k]fluoranthene, chrysene, dibenz[a,h]anthracene, and indeno[1,2,3-cd]pyrene). PAHs were detected above the then-current NRDCSCC in five surface soil samples as follows, P49-SB4-A, P49-SS7-A, P49-SS8-A, P49-SS9-A, and P49-SS13-A (Figure 3.10.1 presented in **Appendix C**). Maximum concentrations of these seven PAHS in the same five samples also exceed RDCSRS. Samples collected at P49-SS13-A were collected to investigate a fire which destroyed Building 293, and therefore was considered a potential source of a release of chemicals from Building 293. Only one PAH, benzo(a)pyrene, exceeded the then-current NRDSCC at an estimated (J flagged) concentration of 0.730 mg/kg compared to the then-current NRDSCC of 0.66 mg/kg. The other samples collected for PAHs to investigate this fire (P49-SS10 through -SS12) contained PAHs at similar concentrations to those at P49-SS13A, but did not contain PAHs which exceeded the NRDSCC, and with the low exceedance, shallow sample depth (0-0.5 ft bgs), location in the roadway, and lack of other samples with exceedances for the same fire, the PAH concentration is not attributable to a release from the fire. Therefore, based on this review of soil analytical data the presence of low levels of one PAH in surface soil is not associated with a concentration gradient from a potential discharge or industrial activities, and is considered the result of DAP. Samples collected at P49-SB4-A, P49-SS7-A, P49-SS8-A, and P49-SS9-A were collected in response to

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potential historical discharges from laboratory operations outside of doorways, and may be attributable to either anthropogenic sources or historical discharges.

Of the 20 metals detected, one metal (arsenic) was detected at concentrations that exceeded the then-current NJDEP NRDCSCC. Aroclor 1260, was detected in one surface soil sample (P49-SS8-A) at a concentration of 8.85 mg/kg, which exceeds the then-current NJDEP NRDCSCC of 2 mg/kg. Comments on the 2008 SI from the NJDEP (NJDEP, 2012) require that PCB detections be compared to the current RDCSRS of 0.2 mg/kg. Based on the current RDCSRS, three samples, P49-SS8-A, P49-SS7-A, and P49-SB3-A, exceed the PCB criteria for Aroclor 1260 at concentrations of 8.85, 0.47, and 0.34 mg/kg, respectively. Arsenic was determined to be a result of natural and anthropogenic influences, and is not considered a COC in soil for Parcel 49. According to NJDEP (2012d) "a review of the site operations and the analytical data, including the horizontal and vertical distribution of the arsenic, the lead to arsenic ratio, as well as the presence of glauconitic soils indicate the arsenic encountered in this area is representative of naturally occurring levels". PAHs and PCBs were determined to be COCs in soil at Parcel 49 (U.S. Army BRAC, 2008).

Maximum PAH Concentrations in Parcel 49 Surface Soil

Maximum Concentration (mg/kg)	NRDCSRS ¹ (mg/kg)	RDCSRS ¹ (mg/kg)
80.0	2	0.6
54.0	0.2	0.2
75.0	2	0.6
29.0	23	6
79.0	230	62
2.6	0.2	0.2
18	2	0.6
	80.0 54.0 75.0 29.0 79.0 2.6	Concentration (mg/kg) NRDCSRS¹ (mg/kg) 80.0 2 54.0 0.2 75.0 2 29.0 23 79.0 230 2.6 0.2

The SI report (U.S. Army BRAC, 2008) recommended further delineation of PAHs in shallow soil. However, PAHs detected in shallow soil may be attributable to anthropogenic sources of PAHs rather than historical site activities. The principal sources of PAHs in soil along highways and roads are vehicular exhausts and emissions from wearing of tires and asphalt. Most of the PAHs in soil are believed to result from atmospheric deposition after local and longrange transport. The presence of PAHs in the soil of regions remote from any industrial activity supports this contention (Agency for Toxic Substances and Disease Registry [ATSDR], 1995). NJDEP guidance recognizes that PAHs may be attributable to DAP which means broadly distributed contaminants, often arising from multiple sources, which have been historically generated by human activities. DAP generally arise from atmospheric deposition, but may also contain contributions from random, non-point sources that are not attributed to any discharge at the site. DAP contaminants typically include PAHs and in some cases metals, which may be present above health-based soil remediation standards (NJDEP, 2011). Base material used prior to pouring concrete commonly includes asphalt millings which contain approximately five to seven percent asphalt, which is used as a binder for the quarry materials (stone, rock, sand, and silt) that make up the load-bearing portion of a bituminous concrete surface (NJDEP, 2011). The base material may be difficult to distinguish from surface soil and can be inadvertently sampled. PAHs detected in soil samples collected at Parcel 49 may also be related to surface water runoff

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from asphalt pavement, leaching of PAHs, or analysis of samples with pieces of asphalt or base material inadvertently included in the sample.

Groundwater Investigation Results (2007 and 2010): A total of nine VOCs were detected in groundwater samples collected in Parcel 49 during the 2007 SI (U.S. Army BRAC, 2008). Two VOCs (benzene and bromodichloromethane) were detected at concentrations that exceeded their respective GWQS. Benzene was detected at a concentration that exceeded the NJDEP GWQS of 1 microgram per liter (µg/L) in one groundwater sample (temporary well P49-GW-1) at a concentration of 1.24 µg/L. Bromodichloromethane was detected at a concentration that exceeded the NJDEP GWQS of 1 µg/L in one groundwater sample (temporary well P49-GW-2) at a concentration of 1.35 µg/L. Benzene and bromodichloromethane were determined to be COCs for Parcel 49 groundwater (U.S. Army BRAC, 2008). A total of four SVOCs were detected in Parcel 49 groundwater samples. Only one, bis(2-ethylhexyl)phthalate, was detected at concentrations that exceeded NJDEP GWQS. Because bis(2-ethylhexyl)phthalate is a common laboratory contaminant, it was not considered to be a COC in Parcel 49 groundwater. A total of 18 metals were detected in Parcel 49 groundwater samples collected from monitoring wells. Of the 18 metals detected, six (aluminum, arsenic, beryllium, iron, manganese, and sodium) were detected at concentrations that exceeded NJDEP GWQS. However, the metals were determined to be within background levels and were not considered COCs for Parcel 49 groundwater (U.S. Army BRAC, 2008). Cyanide was not detected in the groundwater samples.

In January 2010, the U.S. Army installed two temporary groundwater monitoring wells (49-TMP-1 and 49-TMP-2) north (downgradient) of Buildings 293 and 295, respectively (**Figure 1.7**). The objective of the temporary wells was to assess benzene and bromodichloromethane concentrations given the slight GWQS exceedances for these two VOCs reported in the 2008 SI report (U.S. Army BRAC, 2008). The two temporary wells were sampled for VOCs on 20 January 2010; samples were analyzed at the FTMM Environmental Testing Laboratory. Neither benzene nor bromodichloromethane were detected in the samples from either well. However, the sample from the westernmost well (49-TMP-1, located immediately north/downgradient of Building 293) contained detectable concentrations of vinyl chloride (VC, 1.11 μ g/L) and cis-1,2-dichloroethene (cis-1,2-DCE, 0.71 μ g/L). The VC concentration slightly exceeds the NJDEP GWQS of 1.0 μ g/L and cis-1,2-DCE was below its GWQS of 70 μ g/L. The sample from 49-TMP-2 did not have detectable concentrations of VOCs. A third groundwater sample, designated TMP-1A (**Figure 1.7**), was collected at Parcel 49 in November 2010 (at the former location of 49-TMP-1 installed in January 2010) and analyzed for VOCs. The only detection was cis-1,2-DCE at a concentration of 0.30 μ g/L; VC was not detected.

Sediment Investigation Results (2007): Parkers Creek is a tidally-influenced water body in this portion of the facility; therefore, sediment analytical results were evaluated in relation to the Marine/Estuarine Sediment Screening Values – Effects Range – Low (ER-L). One VOC, ten SVOCs, and 20 metals were detected in Parcel 49 sediment samples in 2007. The VOC acetone and SVOCs were detected at concentrations below the ER-L. Of the 20 metals, nine (arsenic, cadmium, chromium, copper, lead, mercury, nickel, silver, and zinc) were detected at concentrations that exceeded the ER-L. Two metals, zinc and chromium, were detected above the Effects Range – Medium (ER-M). Mercury and nickel did not exceed local background levels. Arsenic, cadmium, chromium, copper, lead, silver and zinc are COCs for sediment in Parcel 49 (U.S. Army BRAC, 2008). PCBs and cyanide were not detected in Parcel 49 sediment samples. NJDEP concurred that sediment at Parcel 49 would be evaluated as part of a facility-

wide investigation (NJDEP, 2012a). The BEE reported that the potential for significant ecological risk at Parcel 49 is considered minimal, and additional ecological assessment at Parcel 49 is not warranted or recommended (Shaw, 2012). The NJDEP has accepted the 2012 BEE report's recommendations and conclusions and concurs that no further evaluation of ecological risk is required (NJDEP letter dated August 27, 2012).

1.9.5 Parcel 57

In December 2007, soil and groundwater samples were collected in Parcel 57 to determine if contamination exists from previous activities associated with the former coal storage area. A total of 15 surface soil samples and 18 subsurface soil samples (including three duplicate samples) were collected from 15 Geoprobe® borings (**Appendix C**, Figure 3.14-1) on 100-ft centers. Surface soil samples were collected from the 0- to 6-inch bgs interval. However, if the sample location was paved, the surface soil sample was collected from the 0- to 6-inch interval below the pavement sub-base. Subsurface soil samples were collected from the 6-inch interval just above the water table (U.S. Army BRAC, 2008). Surface and subsurface soil samples were analyzed for TCL + TICs (without pesticides) and TAL metals.

A total of six groundwater samples (including one duplicate sample) were collected from five temporary wells installed along the northern boundary of the soil boring grid in a downgradient hydrogeologic direction (**Appendix C**, Figure 3.14-1). Groundwater samples were analyzed for TCL + TICs (without pesticides/PCBs) and TAL metals.

In February-March 2010 and November 2010, the U.S. Army collected additional soil and groundwater samples in Parcel 57 to further delineate potential contamination associated with the former coal storage area. A total of nine soil samples for PAH analysis were collected from seven soil borings advanced at or near two of the locations that previously exhibited elevated PAH concentrations (in the 0- to 6-inch depth interval) during the 2007 SI (U.S. Army BRAC, 2008). Three groundwater samples for metals analysis were collected from temporary monitoring wells installed at three of the locations that exhibited metal concentrations that exceeded GWQC in 2007. Historical analytical data for Parcel 57 obtained during the December 2007 and 2010 sampling events are presented in **Appendix C** and summarized below.

Soil Investigation Results (2007 and 2010): Seven VOCs, 22 SVOCs, and 19 metals were detected in Parcel 57 soil samples in 2007 during the previous SI (U.S. Army BRAC, 2008). Seven VOCs were detected at concentrations below NJDEP NRDCSCC. Four SVOCs including benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, and benzo(k)fluoranthene were detected in three surface soil samples (P57-A1-A, P57-C3-A, and P57-C5-A) collected below the asphalt pavement at concentrations that exceeded the then-current NJDEP NRDCSCC. Maximum concentrations of these four PAHS in the same three samples also exceeded the then-current NJDEP RDCSRS. The SI report (U.S. Army BRAC, 2008) recommended further delineation of PAHs in shallow soil. As discussed above, PAHs detected in shallow soil can be attributed to anthropogenic sources such as asphalt, road base, and DAP versus onsite historical activities. The proposed supplemental SI activities for soil are detailed in Section 3.2.1.4. The 19 metals were detected at concentrations below the then-current NJDEP NRDCSCC. SVOCs are considered COCs in soil at Parcel 57 (U.S. Army BRAC, 2008).

Maximum PAH Concentrations in Parcel 57 Surface Soil

Contaminant	Maximum Concentration (mg/kg)	NRDCSRS (mg/kg) ¹	RDCSRS (mg/kg) ¹	
benzo(a)anthracene	0.9	2.0	0.6	
benzo(a)pyrene	9.9	0.2	0.2	
benzo(b)fluoranthene	9.9	2.0	0.6	
benzo(k)fluoranthene	7.0	23	6.0	
1. Soil Remediation Standards defined in N.J.A.C. 7:26D as amended May 7, 2012				

Five soil samples collected in 2007 contained TICs at elevated concentrations. 1,1-Bis(1-methylethyl)-hydrazine was detected at a concentration of 310 mg/kg in sample P57-A6-A and at a concentration of 330 mg/kg in the duplicate sample collected at P57-A9-C. 4-Hydroxy-4-methyl 2-pentanone was detected at concentrations of 220 mg/kg, 150 mg/kg, and 230 mg/kg in samples P57-A2-A, P57-A2-C, and P57-A4-C, respectively. Multiple SVOCs were identified in each of the five samples; however, no TCL organic constituents were identified at concentrations greater than the NRDCSCC in the five samples in which elevated TIC concentrations were detected. A comparison of PAH concentrations to the current (2012) NRDCSRS and RDCSRS indicates that additional surface soil samples (eight in total) exceed the NJDEP PAH comparison criteria.

The two locations sampled by the Army in February 2010 included P57-A1-A (adjacent to 2007 boring P57-A1) and P57-C5-A (adjacent to 2007 boring P57-A5) (**Figure 1.8**). At each location, soil samples were collected from 1.0-1.5 feet and 1.5-2.0 feet bgs. PAHs in three of the four samples were either non-detect or detected at a concentration less than the RDCSRS; two PAHs in the fourth sample (P57-A1-A, 1.0-1.5') exceeded their RDCSRS and Impact to Groundwater standard, and a third PAH exceeded only the RDCSRS. Due to the detection of PAH concentrations exceeding RDCSRS at a depth of 1.0-1.5 feet bgs at location P57-A1-A, five additional step-out soil borings (P57-A1-A through P57-A1-E) were advanced to the water table in this immediate area in November 2010, and one soil sample from each boring was collected for laboratory analysis from the 6-inch interval immediately above the water table. No PAHs were detected in any of these deeper vertical extent samples.

Groundwater Investigation Results (2007 and 2010): A total of five VOCs (acetone, carbon disulfide, methyl ethyl ketone [2-butanone], TBA, and toluene) and one SVOC (bis[2-ethylhexyl]phthalate) were detected at concentrations below the NJDEP GWQS in Parcel 57 groundwater samples collected in 2007 (U.S. Army BRAC, 2008).

A total of 20 metals were also detected in Parcel 57 groundwater samples in 2007. Of the 20 metals detected, 11 (aluminum, arsenic, beryllium, cadmium, chromium, cobalt, iron, lead, manganese, nickel, and sodium) were detected above the respective GWQS. Several natural and anthropogenic factors contribute to the wide range in concentrations of metals in soil, which further impact the concentration of metals in groundwater. Soil derived from glauconitic sands contains abundant arsenic, aluminum, calcium, potassium, iron, magnesium, manganese, and sodium (among others), which are likely to be present at elevated concentrations in the groundwater, particularly when sediments are entrained in the collected groundwater samples (U.S. Army BRAC, 2008). These native metals included aluminum, barium, calcium, iron, magnesium, manganese, potassium, sodium, and zinc. In addition, sodium concentrations can be

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influenced by saltwater intrusion (U.S. Army BRAC, 2008). The non-native metals detected in groundwater samples collected from the temporary wells in Parcel 57 have been compared to the respective GWQS and MPBCs to determine COCs requiring further evaluation (**Appendix C**, Figure 3.14-1).

Four naturally occurring metal constituents commonly associated with the local soil (aluminum, iron, manganese, and sodium) were detected in Parcel 57 groundwater samples collected from temporary wells in 2007. As a result of these natural influences; aluminum, iron, manganese, and sodium are not considered COCs in groundwater (U.S. Army BRAC, 2008).

Arsenic was detected in 2007 at concentrations exceeding the NJDEP GWQS of 3 µg/L in four samples, P57-A3 (5.24 µg/L), P57-A5 (3.94 µg/L), P57-A7 (4.01 µg/L), and P57-A9 (6.73 μg/L). However, these concentrations did not exceed the MPBC of 89.3 μg/L. In addition, arsenic is associated with the native glauconitic sands. The elevated arsenic concentrations in the native soil in turn influence the arsenic levels in groundwater. Thus, arsenic was not considered a COC in groundwater. Beryllium was detected in 2007 at concentrations exceeding the NJDEP GWQS of 1 µg/L in three samples, P57-A5 (2.12 µg/L), P57-A7 (1.98 µg/L), and P57-A9 (10.9 μg/L). Two of the three beryllium concentrations also exceeded the MPBC of 2.1 μg/L. Cadmium was detected at a concentration exceeding the NJDEP GWQS of 4 µg/L and the MPBC of 9.5 µg/L in one sample, P57-A9 (14.3 µg/L). Chromium was detected at a concentration exceeding the NJDEP GWQS of 70 µg/L in one sample, P57-A7 (105 µg/L). The chromium concentration was below the MPBC of 191 µg/L. Cobalt was detected at a concentration exceeding the NJDEP GWQS of 100 µg/L and the MPBC of 18.3 µg/L in one sample, P57-A9 (147 µg/L). Lead was detected at a concentration exceeding the NJDEP GWQS of 5 µg/L and the MPBC of 22.7 µg/L in one sample, P57-A7 (829 µg/L). Nickel was detected at a concentration exceeding the NJDEP GWQS of 100 µg/L and the MPBC of 187 µg/L in one sample P57-A9 (372 µg/L). Five metals (beryllium, cadmium, cobalt, lead, and nickel) were identified as COCs in Parcel 57 groundwater (U.S. Army BRAC, 2008).

In 2010, concentrations of beryllium (2.85 μ g/L) and lead (138 μ g/L) in the unfiltered sample from temporary well P57-TMP-A5 (installed adjacent to 2007 location P57-A5) exceeded their GWQS of 1 μ g/L and 5 μ g/L, respectively. These metals were not detected in the filtered sample, and the field blank contained detectable concentrations of beryllium (8.09 μ g/L) and lead (37.3 μ g/L). Concentrations of beryllium (2.81 μ g/L) and lead (43.2 μ g/L) in the unfiltered sample from 2010 temporary well P57-TMP-A7 (adjacent to 2007 location P57-A7) exceeded their respective GWQS of 1 μ g/L and 5 μ g/L; these metals were not detected in the filtered sample. Concentrations of cadmium (5.43 μ g/L) and lead (6.74 μ g/L) in the unfiltered sample from 2010 temporary well P57-TMP-A9 (adjacent to 2007 location P57-A9) exceeded their respective GWQS of 4 μ g/L and 5 μ g/L, respectively; concentrations in the filtered samples were either non-detect or detected at a level less than the GWQS.

In December 2010 a monitoring well (800MW02) was installed to a depth of 20 feet bgs at P57-A1-A; the screen length was 15 feet. In February 2011 a groundwater sample was collected from this well and analyzed for VOCs+10, BN+15, and TAL metals. All VOCs and BNs were in below the GWQS; arsenic (4.1 μ g/L) was the only metal to exceed its GWQS (3 μ g/L). In addition, existing well 800MW01 was sampled in May 2010, with samples analyzed for VOCs+10 and BN+15; all analytical results were non-detect.

The NJDEP approved the Supplemental SI activities for Parcel 57 which was described in a September 9, 2015 email from the Army because the Army became aware of an opportunity to transfer the parcel due to a prospective buyer interested in purchasing it from FMERA. The Supplemental SI activities (performed) for Parcel 57 are detailed in Section 3.2.1.4.

1.9.6 Parcel 61

In 2007, a site reconnaissance and review of historical site plans, sanitary plans, and stormwater management plans was conducted to evaluate potential discharge locations throughout Parcel 61. It was determined that stormwater from Building 1075 discharges northwest of Building 975 near Oceanport Creek (**Figure 1.2 and Appendix C** [Figure 3.15-1]).

In order to determine if contamination attributable to historical operations conducted at Building 1075, surface soil and sediment sampling were performed in December 2007. A total of four surface soil samples (one hand augured, three Geoprobe® locations) and four sediment samples (hand augured) were collected (**Appendix C**, Figure 3.15-1). Soil samples were analyzed for TCL + TICs (without pesticides) and TAL metals. Sediment samples were analyzed for TCL + TICs (without pesticides), TAL metals, and cyanide. Historical analytical data for Parcel 61 is presented in **Appendix C** (Tables 3.15-3 and 3.15-4) and summarized below.

Soil Investigation Results: Three PAHs (benzo[a]anthracene, benzo[a]pyrene, and benzo[b]fluoranthene) were detected at concentrations exceeding the NJDEP NRDCSCC and MPBC in one surface soil sample, P61-SS1. Maximum concentrations of these four PAHS in the same sample also exceed RDCSRS. The SI report (U.S. Army BRAC, 2008) recommended further delineation of PAHs in shallow soil. However, Parcel 61 has extensive asphalt pavement, and the PAHs detected in shallow soil can be attributed to asphalt, as discussed in Section 1.6.6 Therefore, no further delineation of PAHs in soil is proposed. NJDEP (2012b) is in agreement that PAHs are not reflective of a discharge or operations performed at the site but rather representative of the paving formerly existing in the area, and that no additional action is necessary. NJDEP (2012d) also stated that analyses for PCBs is not required. A NJDEP letter dated August 8, 2012 recategorized the majority of Parcel 61 (excluding the area near Parcel 64) from a Category 7 ("areas that are not evaluated or require additional evaluation") to Category 1 ("areas in which no release of disposal of hazardous substances or petroleum products have occurred, (including no migration of such substances from adjacent areas)" (NJDEP, 2012e).

Maximum PAH Concentrations in Parcel 61 Surface Soil

Contaminant	Maximum Concentration (mg/kg)	NRDCSRS (mg/kg)	RDCSRRS (mg/kg)	
benzo(a)anthracene	4.6	2.0	0.6	
benzo(a)pyrene	3.7	0.2	0.2	
benzo(b)fluoranthene	5.8	2.0	0.6	
1. Soil Remediation Standards defined in N.J.A.C. 7:26D as amended May 7, 2012				

Two metals (copper and lead) and ten PAHs (acenaphthene, anthracene, benzo[a]anthracene, benzo[a]pyrene, chrysene, fluoranthene, 26luorine, naphthalene, phenanthrene, and pyrene) were detected in sediment at concentrations greater than the NJDEP Marine/Estuarine Sediment Screening Guidelines-ER-L and MPBC. The BEE (Shaw, 2012) concluded that there is some potential for ecological risk at Parcel 61 due to elevated PAHs in sediment. The potential

exposure location is limited in area to a small tributary to Husky Brook, may also be related to other anthropogenic sources, the PAH concentrations were well below the ER-M values, and additional ecological assessments were not warranted (Shaw, 2012).

No further investigations are proposed for Parcel 61 including the delineation of PAHs in shallow soil since the PAH concentrations detected in the shallow soil (and concurred by NJDEP) can be attributed to anthropogenic activities that are not associated with historical activities the site. The presence of asphalt paving and buildings over the vast majority of the site currently provides an engineered control that minimizes the potential for direct contact with surface soil at Parcel 61. A NFA request for Parcel 61 was submitted to the NJDEP in May 2015.

1.9.7 Parcel 69

In November 2007, soil and groundwater samples were collected in Parcel 69 to evaluate potential contamination from historical discharges from a former waste oil tank or activities that occurred within Building 900. The Geoprobe® investigation involved collection of surface and subsurface soil and groundwater samples, surface and subsurface sediment samples collected using a hand auger, and groundwater samples from existing monitoring wells. A total of four surface soil samples, five subsurface soil samples (including one duplicate sample), five sediment samples (including one duplicate sample) were collected from Parcel 69 (**Appendix C**, Figure 3.10-1). Soil samples were analyzed for TCL + TICs (without pesticides), TAL metals, and cyanide. Groundwater samples were analyzed for TCL + TICs (without pesticides or PCBs). Sediment samples were analyzed for TCL + TICs (without pesticides) and TAL metals. Historical analytical data for Parcel 69, collected during the previous SI (U.S. Army BRAC, 2008) is presented in **Appendix C** (Tables 3.16-3, 3.16-4, and 3.16-5).

The U.S. Army advanced three soil borings (P69GW-1A, P69GW-2, P69GW-3) to the water table in December 2010 (**Figure 1.10**). Soil samples from P69GW-1A and P69GW-3 were collected from 11.5 to 12.0 feet bgs, just above the water table, and analyzed for tetrachloroethene (PCE) and bis(2-ethylhexyl)phthalate. A soil sample from P69GW-2 was collected from 2.5 to 3.0 feet bgs and analyzed for PAHs and bis(2-ethylhexyl)phthalate. Analysis of soil samples for bis(2-ethylhexyl)phthalate was performed because this SVOC was detected in groundwater during the 2007 SI at concentrations above the GWQS.

In January 2010, the Army installed a temporary 2-inch diameter, PVC monitoring well (P69-TMP-1) screened across the water table adjacent to 2007 location P69GW-1 (**Figure 1.10**). The purpose of the temporary well was to confirm the PCE concentration of $1.02~\mu g/L$ detected in the groundwater in 2007. In January 2010, the temporary well was purged with a peristaltic pump, and a dedicated bailer was used to obtain a sample for VOC analysis.

To further delineate PCE concentrations in groundwater, and to obtain SVOC data, temporary monitoring wells were installed in three soil borings (P69GW-1A, P69GW-2, P69GW-3). The well screens were installed across the water table. Groundwater samples were collected in December 2010 and analyzed for VOCs+10 (all three samples), SVOCs+TICs (P69GW-1A and P69GW-3), and PAHs (P69GW-2). Additional analytical data for soil and groundwater obtained by the U.S. Army in 2010 is provided in **Appendix C**

Soil Investigation Results: Two VOCs, five SVOCs, and 17 metals were detected in Parcel 69 soil during the 2007 SI. The constituents were detected below the NJDEP NRDCSCC. No

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COCs were identified in soil at Parcel 69 as a result of the 2007 SI sampling activities (U.S. Army BRAC, 2008). All target concentrations in the soil samples collected in 2010 were non-detect (i.e., PCE, bis(2-ethylhexyl)phthalate, and PAHs as described above).

Groundwater Investigation Results: Three VOCs and one SVOC were detected in Parcel 69 groundwater during the 2007 SI (U.S. Army BRAC, 2008). One VOC (PCE) was detected in the groundwater samples (the parent sample and a field duplicate) at concentrations (0.97 μ g/L and 1.02 μ g/L, respectively) close to the NJDEP GWQS of 1.0 μ g/L. PCE was not detected in a groundwater sample collected from downgradient temporary well P69GW-4. The SVOC bis(2-ethylhexyl)phthalate was detected at concentrations above the GWQS of 3 μ g/L in sample P69GW-1 (8.54 μ g/L) and the duplicate sample collected at this location P69GW-1DUP (3.08 μ g/L). A commonly used plasticizer, bis(2-ethylhexyl)phthalate, is present in a wide variety of plastic products, is commonly detected in field and laboratory quality control (QC) samples, and was detected in the field blank associated with the Parcel 69 groundwater samples. Therefore, it is not considered a COC in groundwater at Parcel 69. PCE is a COC in groundwater at Parcel 69 (U.S. Army BRAC, 2008).

The groundwater sample collected from temporary well P69-TMP-1 in January 2010 and analyzed for VOCs contained PCE at a concentration of 0.34 $\mu g/L$; no other VOCs were detected. In December 2010, PCE was detected in the groundwater sample from temporary well P69GW-2 at a concentration of 1.18 $\mu g/L$, slightly above the GWQS of 1.0 $\mu g/L$; no other VOCs were detected. There were no detections of SVOCs in the samples from P69GW-1A and P69GW-3, or PAHs in the sample from P69GW-2.

Sediment Investigation Results: Oceanport Creek is an easterly-flowing tidally-influenced water body in this portion of the facility; therefore, sediment analytical results were evaluated in relation to the NJDEP Marine/Estuarine Sediment Screening Guideline-ER-L. Four VOCs, eight SVOCs, and 20 metals were detected in Parcel 69 sediment samples collected upstream of Parcel 69. Six SVOC COCs (acenaphthene, anthracene, chrysene, fluoranthene, phenanthrene, and pyrene) and seven metal COCs (arsenic, cadmium, chromium, copper, lead, silver, and zinc) were detected in sediment at concentrations greater than the NJDEP Marine/Estuarine Sediment Screening Guidelines-ER-L and MPBC. SVOCs and metals have been identified as COCs in sediment at Parcel 69 (U.S. Army BRAC, 2008). The BEE (Shaw, 2012) identified SVOCS and metals as COPECs at Parcel 69, and concluded that there is potential for some ecological risk due to elevated metals, however, these exposures are limited in area and may be relate to anthropogenic inputs based on the proximity of the location to areas of heavy vehicular traffic, and additional ecological assessments at Parcel 69 were not recommended, nor warranted. The NJDEP has accepted the 2012 BEE report's recommendations and conclusions and concurs that no further evaluation of ecological risk is required (NJDEP letter dated August 27, 2012). Therefore, additional sediment investigation at Parcel 69 is not proposed.

The review of the available data indicates that the concentration of one VOC (PCE) detected in two groundwater grab samples slightly exceeded its respective NJDEP GWQS. Proposed supplemental SI activities for Parcel 69 are detailed in Section 3.2.1.5.

SECTION 2 TECHNICAL MANAGEMENT PLAN

2.1 INTRODUCTION

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The purpose of this Technical Management Plan is to provide the approach and procedures that will be used to execute the tasks required to perform a supplemental ECP Phase II SI for Parcels 28, 38, 39, 49, 57, 61, and 69. Information on the project objectives, organization, personnel, communication and reporting, deliverables, schedule, billing, public relations, duties and responsibilities, and the functional relationship between the different organizations is contained in the PMP (Parsons, 2012). The project objectives are provided below.

2.2 PROJECT OBJECTIVE

The overall objective and purpose of this delivery order is to perform a supplemental ECP Phase II SI. Following completion of the field investigation phase, an ECP Phase II SI Addendum Report will be produced that presents the findings of the supplemental ECP Phase II SI. The overall goal of this process is to obtain stakeholder concurrence on the final ECP Phase II SI Addendum Report, and if appropriate, provide sufficient data to recommend additional investigation or NFA. The specific project objectives are also described in subsection 1.2.

SECTION 3 FIELD INVESTIGATION PLAN

This Field Investigation Plan outlines the field activities that Parsons will perform to complete the supplemental ECP Phase II SI for FTMM. The purpose of these field activities is to fill data gaps and address NJDEP comments on five parcels included in the 2008 SI report (U.S. Army BRAC, 2008). The Field Investigation Plan presents the conceptual site models (CSMs) and proposed field data collection activities for Parcels 28, 38, 49, 57, and 69. A CSM and supplemental ECP Phase II SI activities have not been developed for Parcel 39 because the existing data indicates that additional investigation of soil is not warranted, and potential risks to receptors are acceptable because contaminant concentrations are below conservative residential standards. A CSM and supplemental ECP Phase II SI activities have not been developed for Parcel 61 because there is no evidence that PAHs in surface soil are attributable to historical site activities. The BEE (Shaw, 2012) concluded that additional ecological assessments at Parcels 39 and 61 are not warranted. The NJDEP has accepted the 2012 BEE report's recommendations and conclusions and concurs that no further evaluation of ecological risk is required (NJDEP letter dated August 27, 2012).

3.1 CONCEPTUAL SITE MODEL

A CSM is a description of a site and its environment that can be used to depict the nature of potential contamination, its location, and the possible interactions of human and environmental receptors with that contamination. The CSM summarizes which potential receptor exposure pathways for contaminants are (or may be) complete and which are (and are likely to remain) incomplete. An exposure pathway is considered incomplete unless the four following elements are present (United States Environmental Protection Agency [USEPA], 1989): (1) a source of contamination; (2) an environmental transport and/or exposure medium; (3) a point of exposure at which the contaminant can interact with a receptor; and (4) a receptor and a likely route of exposure at the exposure point. If any single factor is not present, the pathway is incomplete. An incomplete exposure pathway indicates that there are no current means by which a receptor (human or ecological) can come into contact with contaminants; therefore, no hazards or risks from exposure to contaminants would be expected. This information can be used to focus the investigation of the site by suggesting which complete or potentially complete exposure pathways need to be evaluated. The CSM is based on existing site knowledge and therefore, can and should be updated throughout the course of the project as more data becomes available.

3.1.1 Parcel 28

For the purposes of this supplemental SI, a preliminary CSM was developed for Parcels 28, 38, 49, 57, and 69 in accordance with Engineering Manual 1110-1-1200. Because the parcels undergoing investigation are in the SI phase, the CSMs have relatively less detail than CSMs developed for other FTMM sites that have proceeded to the RI/FS stage. These CSMs are presented in a summary table (**Table 3.1**) that indicates the known or suspected contamination sources, the potential/suspected locations and distribution of contamination, the related source or exposure media, the current and future receptors, and the potentially complete exposure pathways.

The preliminary CSM for Parcel 28 (Former Eatontown Laboratory) indicates that a release had not occurred from the suspected UST, suspected former septic holding tank, suspected distribution box and associated piping based on soil and groundwater data, and NFA has been recommended for these components (U.S. Army BRAC, 2008). Further test pit investigation, as proposed in a letter to the NJDEP dated May 17, 2013 (Appendix C), has been performed to support this recommendation. The Former Storage Areas/Possible Former Tanks Pads in the northern portion of the parcel received a NFA designation from the NJDEP on March 29, 2012 (NJDEP, 2012b). One metal (chromium) was detected in 2007 in sediment at concentrations above Freshwater Sediment Screening Values - LEL and the CWBC and was identified as a COC, and the SI recommended further evaluation of sediment at Parcel 28. However, the BEE Report (Shaw, 2012) concluded that the potential for ecological effects from contamination at Parcel 28 is judged to be minimal; site related contamination is unlikely to have a deleterious effect on sensitive ecological receptors or habitats, and additional ecological assessments related to Parcel 28 were not warranted. (The NJDEP has accepted the 2012 BEE report's recommendations and conclusions and concurs that no further evaluation of risk was required.) Potentially complete exposure pathways are present at the site that might result in residents, intrusive and non-intrusive site workers, site visitors, and recreational users being exposed to VOCs, SVOCs, or metals from impacted soil, groundwater, or sediment (**Table 3.1**).

3.1.2 Parcel 38

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The preliminary CSM for Parcel 38 (Former Outdoor Firing Range) indicates that no metals have been detected in surface soil at concentrations above NJDEP NRDCSRS or RDCSRS. Potentially complete exposure pathways are present at the site that might result in residents, intrusive and non-intrusive site workers, site visitors, and recreational users being exposed to metals from impacted soil (**Table 3.1**).

3.1.3 Parcel 49

The preliminary CSM for Parcel 49 (Former Squier Laboratory Complex, Museum Storage Facility, and MP Battery Test Facility) indicates that PAHs and PCBs are present in shallow soil; benzene, bromodichloromethane, and VC were present in groundwater; and metals are present in sediment at concentrations that exceed NJDEP criteria. Benzene, bromodichloromethane, and VC have attenuated to below the GWQS. Metals in sediment (and other contaminants in soil and groundwater) were investigated further as part of a facility-wide baseline ecological evaluation, and it was concluded that contaminants at Parcel 49 are unlikely to have a significant deleterious effect on sensitive ecological receptors or habitats and the potential for significant ecological risk is considered minimal (Shaw, 2012). Potentially complete exposure pathways are present at the site that might result in residents, intrusive and non-intrusive site workers, site visitors, and recreational users being exposed to VOCs from incidental contact with groundwater and/or PAHs or PCBs from impacted surface soil (**Table 3.1**). As discussed in Section 1.9.4, DAP may be a significant contributor to low level PAHs on this site. The PAHs and PCBs detected in surface soil in the courtyard of building 283, are believed to be the result of isolated surface releases near the doorways in the courtyard of building 283, as suggested in the SI, and therefore would be bounded on the north, south, and west side of the building by the exterior walls of the building. Detected concentrations in surface soil distal (i.e. east) to the suspected surface releases may be the result of transport via overland flow.

The SI report identified benzene and bromodichloromethane as COCs for groundwater at Parcel 49 (U.S. Army BRAC, 2008). These contaminants were detected in 2007 at concentrations only slightly above GWQS in only one groundwater sample each, and were not detected in additional samples collected in 2010. Therefore, these concentrations decreased to below GWQS following the December 2007 sampling event. VC in groundwater slightly exceeded the GWQS at one location in early 2010, but was not detected at the same location in late 2010.

3.1.4 Parcel 57

The preliminary CSM for Parcel 57 (Former Coal Storage and Railroad Unloading-800 Area) indicates that PAHs have been detected in surface soil at concentrations that exceeded the then-current NJDEP NRDCSCC, and metals in groundwater at concentrations above GWQS. In addition, although analysis has not previously been performed, the former railroad tracks are a potential source area for PCB contamination in surface soils. Potentially complete exposure pathways are present at the site that might result in residents, intrusive and non-intrusive site workers, site visitors, and recreational users being exposed to PAHs in surface soil (**Table 3.1**).

3.1.5 Parcel 69

The preliminary CSM for Parcel 69 (Building 900-Former Vehicle Repair/Motor Pool) indicates that contaminants have been detected in soil at concentrations below the then-current NJDEP NRDCSCC and, and the 2008 SI recommended NFA for soil in this parcel. One compound (PCE) was detected in groundwater at a concentration slightly above the NJDEP GWQS. SVOCs and metals were detected in sediment at concentrations above NJDEP Marine/Estuarine Sediment Screening Guidelines. The BEE Report concluded that although there is a potential for some ecological risk due to elevated metals at Parcel 69, these exposures are limited and may be related to regional anthropogenic inputs based on the proximity of the area to heavy vehicular traffic, and additional ecological assessments of the parcel are not warranted. Potentially complete exposure pathways are present at the site that might result in residents, intrusive and non-intrusive site workers, site visitors, and recreational users being exposed to impacted soil and groundwater (**Table 3.1**).

Table 3.1
Preliminary Conceptual Site Models
Fort Monmouth, New Jersey

SITE DETAILS	Known or Suspected Contamination Source(s)	Location and Extent of Contamination	Source or Exposure Medium: COCs (U.S. Army BRAC, 2008)	Current and Future Receptors	Potentially Complete Exposure Pathways
NAME: PARCEL 28 (FORMER EATONTOWN LABORATORY) HISTORICAL LAND USE: CHEMICAL LABORATORY CURRENT LAND USE: UNOCCUPIED/NOT IN USE FUTURE LAND USE: BUILDING 2525: OFFICE/HIGH TECH INDUSTRY	former gas station	Previous soil sampling detected VOCs, SVOCs, and metals in soil at concentrations below the NJDEP NRDCSCC. Septic tanks and the former gas station have been investigated. NFA has been approved for the septic tank areas, but has not yet been approved for the Former Gas Station where lead, likely attributable to turbidity, was detected in groundwater exceeding the GWQS.	Soil: none Groundwater: none Sediment: Chromium	Residents, intrusive workers, non-intrusive workers, and occasional users (visitors, recreational)	Incidental ingestion of soil, dust inhalation, dermal contact with soil and groundwater by intrusive workers, incidental ingestion and dermal contact with sediment.
NAME: PARCEL 38 (FORMER OUTDOOR FIRING RANGE) HISTORICAL LAND USE: FORMER SMALL ARMS RANGE CURRENT LAND USE: PARKING LOT FUTURE LAND USE: REFORESTATION	Small arms ammunitions	Previous surface soil sampling detected metals at concentrations below NJDEP NRDCSRS and RDCSRS.	Soil: none Groundwater: not sampled	Residents, intrusive workers, non-intrusive workers, and occasional users (visitors, recreational)	Incidental ingestion of soil, dust inhalation, dermal contact with subsurface soil by intrusive workers. Groundwater has not been sampled therefore this pathway cannot be evaluated.

Table 3.1
Preliminary Conceptual Site Models
Fort Monmouth, New Jersey

SITE DETAILS	Known or Suspected Contamination Source(s)	Location and Extent of Contamination	Source or Exposure Medium: COCs (U.S. Army BRAC, 2008)	Current and Future Receptors	Potentially Complete Exposure Pathways
NAME: PARCEL 49 HISTORICAL LAND USE: BUILDINGS ASSOCIATED WITH THE FORMER SQUIER LABORATORY, MUSEUM STORAGE FACILITY, AND MAIN POST BATTERY TEST FACILITY CURRENT LAND USE: UNOCCUPIED/NOT IN USE FUTURE LAND USE: OFFICE/HIGH TECH INDUSTRY, REFORESTATION	Wide variety of research and development activities were historically conducted at the Former Squier Laboratories and nearby facilities. Laboratory operations included the use of chemicals, solvents, radioisotopes, and metals. PAHs in surface soil are likely associated with asphalt pavement or DAP. Bromodichloromethane is a common by-product of disinfection of drinking water. PCBs were detected in surface soil at multiple locations, including beneath a former polemounted transformer.	PAHs and PCBs may be limited to surface soil (five sample locations) but the vertical extent has not been adequately characterized at all locations. Horizontally, detections within the courtyard of building 283 are bounded by the building on the north, south, and west side, and would have limited routes for overland flow to the east. Benzene, bromodichloromethane, and VC exceeded GWQS at one temporary sampling location each but were below GWQS in subsequent samples. Metals contamination in sediment appears to be primarily at the surface with some detections up to 2 ft bgs.	Soil: PAHs, PCBs Groundwater: None Sediment: metals	Residents, intrusive workers, non-intrusive workers, and occasional users (visitors, recreational)	Incidental ingestion of soil, dust inhalation, dermal contact with subsurface soil by intrusive workers, incidental ingestion and dermal contact with sediment.

Table 3.1
Preliminary Conceptual Site Models
Fort Monmouth, New Jersey

SITE DETAILS	Known or Suspected Contamination Source(s)	Location and Extent of Contamination	Source or Exposure Medium: COCs (U.S. Army BRAC, 2008)	Current and Future Receptors	Potentially Complete Exposure Pathways
NAME: PARCEL 57 (FORMER COAL STORAGE AND UNLOADING – 800 AREA) HISTORICAL LAND USE: COAL STORAGE AND FUEL UNLOADING CURRENT LAND USE: UNOCCUPIED/NOT IN USE FUTURE LAND USE: COMMERCIAL/RETAIL AND EDUCATION- MEDICAL CAMPUS, MIXED-INCOME HOUSING, COMMISSARY REUSE	Coal storage, fuel releases, railroad tracks	Four SVOCs (all PAHs) were historically detected in soil samples collected within the parking lots at concentrations above regulatory standards. 11 metals have historically been detected in groundwater samples collected along the northern parcel boundary at concentrations exceeding	Soil: PAHs, PCBs Groundwater: metals	Residents, intrusive workers, non-intrusive workers, and occasional users (visitors, recreational)	Incidental ingestion of soil, dust inhalation, dermal contact with subsurface soil and groundwater by intrusive workers.
NAME: PARCEL 69 (BUILDING 900- FORMER VEHICLE REPAIR/MOTOR POOL) HISTORICAL LAND USE: FORMER TACTICAL MOTOR POOL CURRENT LAND USE: UNOCCUPIED/ NOT IN USE FUTURE LAND USE: FUTURE REDEVELOPMENT	Waste oil tank, parts cleaner, solvent use	NJDEP GWQS. COCs were not detected in soil or sediment at concentrations above regulatory standards during the 2007 SI. PCE was detected in temporary wells installed east of Building 900. Six SVOCs and seven metals were detected at concentrations above NJDEP Marine/Estuarine Sediment Screening Guidelines-ER-L and MPBC. These SVOCs and metals have been identified as COCs at Parcel 69.	Soil: none (preliminary conclusion pending analysis of additional soil samples for EPH and PCBs) Groundwater: PCE Sediment: SVOCs and metals	Residents, intrusive workers, non-intrusive workers, occasional users (visitors, recreational).	Incidental ingestion of soil, dust inhalation, dermal contact with subsurface soil and groundwater by intrusive workers

3.2 GENERAL TECHNICAL APPROACH

This subsection describes the supplemental ECP Phase II SI activities that Parsons will use to complete field operations during this project. The detailed field procedures to be used for the activities described in the following technical approach are described in the SAP (**Appendix E**). The supplemental ECP Phase II SI data will be used to make recommendations regarding a path forward for each parcel.

3.2.1 ECP Phase II SI Sampling Plan

3.2.1.1 Parcel 28

Additional data collected within Parcel 28 in July 2013 by FTMM were provided to the NJDEP in a Request for No Further Action (NFA) letter report dated June 4, 2015. The NJDEP responded in a letter dated September 22, 2015, and granted NFA for the three former septic tanks and two former USTs, as discussed in Section 1.9.1. The NJDEP did not grant an NFA for the Former Gas Station at Former Building 2541, and required additional sampling for lead in groundwater at the location with the highest detection found using a methodology to reduce turbidity. Therefore, the installation of a permanent monitoring well, and low flow sampling is proposed.

A groundwater monitoring well will be installed and developed at the location where the highest detection was found (**Figure 1.4**). The well will be constructed with a 10-foot-long screen placed in the shallow water-bearing zone with at least 2 feet of screen placed above the water table.

Groundwater samples from the new monitoring well will be collected using the NJDEP low-flow purge and sample method (to obtain a low turbidity sample) and analyzed for total and dissolved concentrations of lead (filtered and unfiltered samples) (**Table 3.2**). Two samples will be collected, including one sample with the pump intake positioned at the midpoint of the top 5 feet of saturated screen and one sample with the pump intake positioned at the midpoint of the bottom 5 feet of saturated screen, in accordance with NJDEP's *Field Sampling Procedures Manual* (August 2005). In addition, pH, temperature, electrical conductivity, dissolved oxygen (DO), oxidation reduction potential (ORP), and turbidity will be measured during well purging.

3.2.1.2 Parcel 38

The primary objective of the supplemental Phase II SI field work at Parcel 38 is to determine if soil or groundwater has been impacted by potential releases from the Former Firing Range. In order to meet this objective, a grid consisting of 15 shallow soil borings (**Figure 1.5**) will be installed to delineate soils within the Former Firing Range. Soil samples for visual observation and field screening will be obtained continuously from the ground surface to a depth of 36 inches bgs. In order to obtain vertical profiling data for target analytes, samples from 0 to 6 inches (0 to 0.5 feet), 15 to 21 inches (1.25 to 1.75 feet), and 30 to 36 inches (2.5 to 3.0 feet) beneath the pavement will be submitted to the laboratory for analysis of specific metals associated with small arms firing ranges. Although lead is the primary risk driver, small arms firing ranges may also contain antimony, copper, zinc, and arsenic (Interstate Technology Regulatory Council [ITRC], 2003). Therefore, the soil samples will only be analyzed for lead, antimony, copper, zinc, and arsenic (**Table 3.2**).

Groundwater monitoring wells will be installed and developed at four locations, including downgradient (north), within, crossgradient to downgradient (east), and upgradient (south) of the Former Firing Range (**Figure 1.5**). The downgradient well will be placed in a location near the northern end of the Former Firing Range and upgradient of Lafetra Creek in a location likely to be impact by potential releases from historical site activities. The interior well will be placed in the downgradient portion of the Former Firing Range. The crossgradient to downgradient (depending on whether groundwater flows to the north or northeast) well will help to complete the delineation and provide confirmation of the groundwater flow direction, and the upgradient well will facilitate a site-specific background evaluation for metals in groundwater. The wells will be constructed with a 10-foot-long screen placed in the shallow water-bearing zone immediately below the water table (estimated to be less than 10 feet bgs based on proximity to Lafetra Creek).

Groundwater samples from the new wells will be collected using the NJDEP low-flow purge and sample method (to obtain a low turbidity sample) and analyzed for total and dissolved concentrations of metals associated with small arms firing ranges including lead, antimony, copper, zinc, and arsenic (ITRC, 2003) (**Table 3.2**). Two samples will be collected from each well, including one sample with the pump intake positioned at the midpoint of the top 5 feet of saturated screen and one sample with the pump intake positioned at the midpoint of the bottom 5 feet of saturated screen, in accordance with NJDEP's *Field Sampling Procedures Manual* (August 2005). In addition, pH, temperature, electrical conductivity, dissolved oxygen (DO), oxidation reduction potential (ORP), and turbidity will be measured during well purging.

The elevations and horizontal coordinates of the new shallow soil borings and wells will be surveyed.

3.2.1.3 Parcel 49

 The 2008 SI Report identified benzene and bromodichloromethane as COCs for groundwater (U.S. Army BRAC, 2008). These contaminants were detected at concentrations only slightly above GWQS in only one groundwater sample each. However, based on the information summarized in Section 1.9.4, VOCs in groundwater no longer exceed GWQS, and additional groundwater sampling is not proposed. The primary objective of the supplemental Phase II SI field work at Parcel 49 will be to characterize PAHs and PCBs in surface soil. The specific activities that will be performed to meet these objectives are described in the following paragraphs.

PAHs and PCBs in surface soil that were previously detected in excess of regulatory criteria will be further assessed for the purpose of evaluating future risk.

PAH concentrations from the SI were evaluated individually, as described in Section 1.9.4. As discussed in the CSM, the exceedance at P49-SS13-A (Figure 3.10-1 presented in **Appendix** C) was the result of DAP, and not attributable to a potential discharge. Samples collected at P49-SB4-A, P49-SS7-A, P49-SS8-A, and P49-SS9-A were collected in response to potential historical discharges from laboratory operations outside of doorways, and may be attributable to either anthropogenic sources (possibly from the inadvertent introduction of asphalt or base material into the samples, or as a result of DAP). However, these four samples, as discussed in Section 1.9.4, were initially collected in response to potential releases from laboratory operations, and although the source may be anthropogenic and there is no direct evidence of a

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PAH release, there remains a possibility that the concentrations may be related to laboratory operations.

- At P49-SB4, west of building 283, the low concentration and location in the roadway increase the likelihood that it is the result of DAP or of the introduction of asphalt into the surface soil sample, therefore one boring FTMM-49-SS-02 will be installed to confirm the surface soil sample concentration, and determine if the exceedance extends vertically. The sampling depths for PAH samples are explained in the following paragraph.
- P49-SS9 appears to have been collected at or near a sidewalk outside of a doorway on the western side of building 291, and is less likely to have had asphalt introduced into it. Additionally the concentrations are higher than what might be expected for DAP, but may still be the result of DAP. A confirmation boring, FTMM-49-SS-01 is proposed at this location, with an additional three step-out borings proposed at FTMM-49-SS-06, SS-07, and SS-09.
- P49-SS7 and P49-SS8 are located near doorways to the laboratory in the courtyard building 283. There is a concentration gradient that likely decreases along a pathway from P49-SS7 to P49-SS8, therefore these two concentrations will be confirmed with borings to be installed at FTMM-49-SS-03 and FTMM-49-SS-04. Additionally, three step-out borings are proposed at FTMM-49-SS-12 (to confirm the concentration gradient), and at FTMM-49-SS05 and FTMM-49-SS-11 to determine whether PAHs were contained within the courtyard.

As described above, surface soil samples (0 to 6-inch interval below the asphalt and asphalt base material) will be collected from four of the five locations sampled during the 2008 SI that had PAH exceedances to confirm the original data set, taking care not to introduce asphalt and/or road base into the samples. In addition, soil will be collected from the 3-4 foot interval, and at a depth interval immediately above the water table to evaluate the vertical extent of PAHs. Each sample submitted to the laboratory for analysis will be representative of a 6-inch interval. Therefore, the soil samples from the 3-4 foot interval will be obtained from 3.25 to 3.75 feet below the asphalt and asphalt base material unless visual observation and field screening indicates that a different portion of this 1-foot interval is more appropriate. Step-out borings for PAHs, will follow the same sampling scheme. If PAHs are detected in any of the four primary soil borings, additional samples will be analyzed as follows:

- The surface soil (0-6 inches) samples from nearby "step-out" locations associated with the PAH detection will be analyzed.
- If deeper soil was impacted with PAHs in the primary borings, the corresponding intervals collected at the nearby "step-out" location will be analyzed for PAHs.

A surface soil sample (0 to 6-inch interval below the asphalt and asphalt base material) will be collected from each of three locations sampled during the 2008 SI that had PCB concentrations exceeding the current NJDEP RDCSRS for total PCBs to confirm the original data (**Figure 1.7**). These locations are identified as FTMM-49-SS-03, SS-04, and SS-05. Because PCBs are only slightly soluble and adhere strongly to soil, they are anticipated to be primarily in surface soil, if present. However, in order to obtain vertical profiling data for PCBs,

samples from 12 to 18 inches (1.0 to 1.5 feet) and 24 to 30 inches (2.0 to 2.5 feet) below the asphalt and asphalt base at each of the three locations will also be submitted to the laboratory. Soil samples from the same three depth intervals (0-6 inches, 12-18 inches, 24-30 inches below the asphalt and asphalt base) will also be collected at two "step-out" locations identified as FTMM-49-SS-10 and SS-11 (**Figure 1.7**). Initially, only the three primary surface soil samples (0-6 inches) collected at the 2007 SI locations that had PCB exceedances will be analyzed for PCBs; the other samples will be held at the laboratory pending analysis results. If PCBs are not detected in any of the three primary surface soil samples, then no additional samples will be analyzed. If PCBs are detected in any of the three primary surface soil samples, additional samples will be analyzed as follows:

- The two deeper samples collected at the location of the PCB detection (12-18 inches and 24-30 inches) will be analyzed.
- The surface soil (0-6 inches) samples from each "step-out" location associated with the PCB detection will be analyzed.
- The two deeper samples collected at each "step-out" location will only be analyzed if PCBs are detected in the surface soil sample collected at that "step-out" location.

Samples held at the laboratory pending receipt of analytical results will be extracted as needed to prevent missed holding times. The sample extracts will then be held pending receipt of analytical results as described above. Field screening performed during soil sampling will include collection of headspace reading using a photoionization detector (PID).

In addition to the PCB samples described above, three soil samples for PCB analysis will be collected beneath the former transformer MP-062 that was located northwest of the northwest corner of Building 292. Samples from 0 to 6 inches (0 to 0.5 feet) bgs, 12 to 18 inches (1.0 to 1.5 feet) bgs, and 24 to 30 inches (2.0 to 2.5 feet) bgs will be submitted to the laboratory. The surface soil sample (0-6 inches bgs) will be analyzed first. If PCBs are detected, then the two deeper samples collected beneath the former transformer will also be analyzed. If PCBs are not detected in the surface soil sample, the deeper samples collected at that location will not be analyzed. As described above for PCB samples to be collected elsewhere in Parcel 49, samples held at the laboratory pending receipt of analytical results will be extracted as needed to prevent missed holding times. The sample extracts will then be held pending receipt of analytical results as described above.

3.2.1.4 Parcel 57

As discussed previously, the NJDEP approved the Supplemental SI investigation for Parcel 57 in their September 11, 2015 email correspondence based on the Army's September 9 email describing the proposed investigation. The sampling plan that was implemented at Parcel 57 is provided below.

Additional soil sampling for target PAHs in Parcel 57 was performed during the Supplemental Phase II SI to clarify the influence of the asphalt pavement on PAH concentrations in soil, and to delineate the vertical extent of the target PAH concentrations. The supplemental SI activities for Parcel 57 also included collection of soil samples for PCB analyses along the northern property near the former railroad tracks as these locations may be impacted from adjacent

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railroad operations. Soil samples for laboratory analysis were each representative of a 6-inch increment. These sampling activities are described in greater detail in the following paragraphs.

A primary objective of the Supplemental Phase II SI field work at Parcel 57 was to characterize potential PCB contamination in surface soil attributable to historical site activities. PCBs absorb strongly to soil if present and are most likely to be in surface soil. To meet the objective, eight surface soil (0 to 6-inch interval below the asphalt and asphalt base material) locations along the former railroad tracks were collected and analyzed for PCBs (**Figure 1.8**, **Table 3.2**). Contingent samples from 12 to 18 inches (1.0 to 1.5 feet) and 24 to 30 inches (2.0 to 2.5 feet) below the asphalt and asphalt base material were also collected and submitted to the laboratory for PCB analysis. The surface soil sample (0-6 inches) was analyzed first. If PCBs were detected, then the two deeper samples collected at that location were also analyzed. If PCBs were not detected in the surface soil sample, the deeper samples collected at that location was not be analyzed. Samples held at the laboratory pending receipt of analytical results for the surface soil samples were extracted as needed to prevent missed holding times. The sample extracts were held pending receipt of analytical results as described above.

An additional objective of the supplemental Phase II SI field work at Parcel 57 is to evaluate target PAHs in surface soil in excess of regulatory criteria for the purpose of evaluating future risk. Samples were collected from eight locations from the 2007 SI sampling grid which exceeded the RDCSRS for target PAHs. These eight locations include FTMM-57-SS-09 through FTMM-57-SS-16 (Figure 1.8). A modified sampling procedure (described in detail below) will be followed at FTMM-57-SS-09 and FTMM-57-SS-16 to account for additional PAH data collected at these locations in 2010. To confirm the original data set, surface soil samples at six of the eight locations (all except for FTMM-57-SS-09 and FTMM-57-SS-16) were collected from the 0 to 6-inch interval below the asphalt and asphalt base material, taking care not to introduce asphalt and/or road base into the samples. In addition, subsurface soil locations were collected from the 3-3.5 foot interval below the asphalt and asphalt base material, and at a depth interval immediately above the water table to evaluate the vertical extent of PAHs and potential impact from the surface asphalt. Soil samples for laboratory analysis were each representative of a 6-inch increment. Field screening performed during soil sampling included collection of headspace readings using a PID. Samples from these six locations were submitted to a laboratory for target PAH analysis (target PAH compounds were identified as those that **NJDEP** RDCSRS, specifically benzo(a)anthracene, benzo(b)fluoranthene, and benzo(k)fluoranthene). The sampling procedure for the remaining two locations (FTMM-57-SS-09 and FTMM-57-SS-16) was dependent on the outcome of visual observation and field screening of soil from these borings as described below.

The soil sampling procedure at FTMM-57-SS-09 and FTMM-57-SS-16 (**Figure 1.8**) was modified as described below to account for the PAH data obtained at this location by the U.S. Army in 2010 (Section 1.9.5). While implementing this procedure in the field it is important to remember that the primary objectives are to 1) determine PAH concentrations in surface soil samples from the 0- to 6-inch interval below the asphalt and asphalt base material, taking care not to introduce asphalt and/or road base into the samples, and 2) determine the vertical extent of any PAH contamination in soil.

• The PAH soil sampling location FTMM-57-SS-09, shown on **Figure 1.8**, is located adjacent to the 2007 SI soil sampling location P57-A1, which was resampled by the

Army in 2010 (P57-A1-A). PAHs exceeding the RDCSRS were detected in the 2007 soil sample collected from 0.5-1.0 foot bgs (0-6 inches below base of asphalt and asphalt base material) and in the 2010 soil sample collected from 1.0 to 1.5 feet bgs. No RDCSRS exceedances were detected in the 2010 sample collected from 1.5 to 2.0 feet bgs or in multiple 2010 samples collected in this area from just above the water table. Therefore, vertical extent delineation at this location appears to have been achieved. A soil boring was advanced at this location to a minimum depth of 2.0 feet bgs to 1) determine the thickness of asphalt and asphalt base material and 2) determine whether the soil samples collected in 2007 and 2010 (0.5 to 1.0, 1.0 to 1.5 and 1.5 to 2.0 feet bgs) meet the two Supplemental SI soil sampling objectives described above (sampling of 0-6 inches below the asphalt and asphalt base material and determining vertical extent). All materials encountered were visually examined and described. If visual examination of subsurface materials indicated that the samples collected in 2007 and 2010 met the objectives, then no additional sampling was performed. If not, then soil samples representative of 6-inch increments were collected as required to meet objectives and submitted to the laboratory for analysis of PAHs.

• The PAH soil sampling location FTMM-57-SS-16, shown on **Figure 1.8**, is located adjacent to the 2007 soil sampling location P57-C5, which was resampled by the Army in 2010 (P57-C5-A). One PAH exceeded the NJDEP criterion in the 2007 sample from 0.5 to 1.0 feet bgs (0 – 6 inches below base of asphalt and asphalt base material). No exceedances of RDCSRS for PAHs were detected in the 2010 samples from 1.0 to 1.5 feet and 1.5 to 2.0 feet bgs. A soil boring was advanced at this location to a minimum depth of 2.0 feet bgs to 1) determine the thickness of asphalt and asphalt base material and 2) determine whether the soil samples collected in 2007 and 2010 (0.5 to 1.0, 1.0 to 1.5 and 1.5 to 2.0 feet bgs) met the Supplemental SI soil sampling objectives described above. All materials encountered were visually examined and described. If visual examination of subsurface materials indicated that the samples collected in 2007 and 2010 met the objectives, then no additional sampling was performed. If not, then soil samples representative of 6-inch increments were collected as required to meet objectives and submitted to the laboratory for analysis of PAHs.

In addition to the PAH sampling described above, nine step-out borings (**Figure 1.8**) were advanced to provide horizontal delineation of the target PAHs in surface and shallow subsurface soil. The step out borings were collected at the same time as the borings described above, but were only analyzed if the initial nearby sample exceeded the RDCSRS for a target PAH. The step-out borings were sampled at similar intervals to their related initial borings.

In addition to the soil sampling described above, two new permanent monitoring wells were installed at Parcel 57. One well was installed at the location of former downgradient temporary wells P57-A9 (2007) and 57-TMP-A9 (2010), where concentrations of aluminum, arsenic, beryllium, cadmium, cobalt, manganese, and nickel exceeding then-current GWQC were detected during the 2007 SI (U.S. Army BRAC, 2008), and concentrations of cadmium and lead in an unfiltered temporary well sample exceeded the GWQS in 2010. The maximum concentrations of 7 of the 11 metals detected above their GWQS in 2007 were detected at this location. The second well was installed at the location of former downgradient temporary wells P57-A7 (2007) and TMP-57-A7 (2010), where aluminum, arsenic, beryllium, chromium, lead, and manganese were detected in excess of the then-current GWQC during the 2007 SI and

beryllium and lead in an unfiltered temporary well sample exceeded the GWQS in 2010. Although the highest total lead concentration detected in temporary wells installed in 2010 (138 μ g/L) occurred in temporary well 57-TMP-A5, the total lead concentration detected in 2007 at temporary well P57-A7 was higher (829 μ g/L).

The new wells have 10-foot-long screens installed in the uppermost 10 feet of the saturated zone. Following development, these two wells were sampled for TAL metals (total and dissolved) using low-flow, minimal-drawdown procedures to minimize turbidity. Two samples were collected from each well, including one sample with the pump intake positioned at the midpoint of the top 5 feet of saturated screen and one sample with the pump intake positioned at the midpoint of the bottom 5 feet of saturated screen, in accordance with NJDEP's *Field Sampling Procedures Manual* (August 2005). In addition, pH, temperature, electrical conductivity, dissolved oxygen (DO), oxidation reduction potential (ORP), and turbidity will be measured during well purging.

The elevations and horizontal coordinates of the two new monitoring wells will be surveyed.

Numerous monitoring wells exist in the 800 Area upgradient of Parcel 57; these wells are clustered near Building 812 (site FTMM-64) and Building 866 (site FTMM-66). Twelve wells at FTMM-66 were sampled for TAL metals six to seven times from 2007 to 2011. Eight wells at FTMM-64 were sampled for TAL metals in 2010 and again in 2013 and/or 2014. If metal concentrations exceeding GWQS are detected in unfiltered samples from either of the two newly installed wells at Parcel 57, the existing upgradient metals data will be used to perform an area-specific background evaluation to determine whether metal concentrations in groundwater that exceed GWQS at Parcel 57 are representative of area-specific background conditions or impacts potentially related to the former coal storage areas.

3.2.1.5 Parcel 69

The primary objective of the Supplemental ECP Phase II SI field work at Parcel 69 is to evaluate potential extractable petroleum hydrocarbon (EPH) contamination in soil in response to NJDEP requests to evaluate the potential releases from the former waste oil tank. EPH were not included in the analytical suite during the 2008 SI or during the additional soil sampling performed by the U.S. Army in 2010, and the EPH data will fill a data gap for Parcel 69. In addition, the ECP Phase II SI field work will evaluate groundwater to determine if PCE concentrations exceed GWQS. Temporary well data collected in 2010 indicate that slight exceedances of the GWQS for PCE were present.

To complete the analytical data suite collected for soil in the 2007 SI and during 2010, four surface soil (0- to 6-inch interval) and four subsurface soil (6-inch interval directly above the water table) samples will be collected in the suspected vicinity of the former 500-gallon above ground waste oil tank (**Figure 1.10**). Soil samples will be collected using a Geoprobe[®] rig, and field screening performed during soil sampling will include collection of headspace readings using a PID. The soil samples will be analyzed for EPH, and 25% of those samples containing detectable concentrations of EPH will also be analyzed for PCBs per Table 2-1 of the *Technical Requirements for Site Remediation*. Contingent on the results of the soil sampling, up to four additional soil borings may be installed to further delineate soil quality as necessary.

 Groundwater samples collected in 2007 and 2010 indicate the presence of trace concentrations of PCE ranging from non-detect up to 1.18 μ g/L in shallow groundwater at and near Building 900. One permanent monitoring well (FTMM-69-GW-MW-01) will be installed and developed at the location of the former temporary well P69-GW-1 (east of Building 900) where (**Figure 1.10**.). This location is considered a "worst-case" scenario for potential PCE contamination based on the 2008 SI data which indicated that a temporary downgradient well did not contain detectable levels of PCE. Data collected in 2010 indicated very similar trace-level PCE concentrations at other nearby locations. The well will be constructed with a 10-foot-long screen placed in the uppermost 10 feet of the saturated zone.

Groundwater samples from the new well will be collected using the NJDEP low-flow purge and sample method and analyzed for VOCs+TICs (**Table 3.2**) to determine if PCE concentrations still exceed GWQS. Two samples will be collected from the well, including one sample with the pump intake positioned at the midpoint of the top 5 feet of saturated screen and one sample with the pump intake positioned at the midpoint of the bottom 5 feet of saturated screen, in accordance with NJDEP's *Field Sampling Procedures Manual* (August 2005). In addition, pH, temperature, electrical conductivity, DO, ORP, and turbidity will be measured during well purging. The elevations and horizontal coordinates of the new well will be surveyed. Contingent on the results of the groundwater sampling at FTMM-69-GW-MW-01, up to three additional monitoring wells may be installed to further delineate the results.

Table 3.2 Sampling Summary for Parcels 28, 38, 49, 57, and 69 Fort Monmouth, New Jersey

Parcel	Location	Field Meter Readings ^{a/}	VOCs + TICs by Method 8260C b/ c/	TAL Metals by Method 6010C d/	PCBs by Method 8081B ^{e/}	PAHs by Method 8270 SIM	EPH ^{e/} by NJDEP Method
			Soil Sampling	1			
	15 Surface/Subsurface Soil		Son Samping	45 (Pb, As, Sb,			
38	Locations	45	0	Cu, Zn only)	0	0	0
	4 Confirmation Surface /			•			
	Subsurface Soil Locations (PAHs)	12	0	0	0	12	0
	6 Step-out Surface/Subsurface Soil					18 (estimated	
	Locations (PAHs)	18	0	0	0	maximum)	
	4 Confirmation Surface /						
	Subsurface Soil Locations (PCBs)	12	0	0	12	0	0
	2 Step-out Surface/Subsurface Soil		_	_	8 (estimated	_	_
49	Locations (PCBs)	6	0	0	maximum)	0	0
	8 Surface/Subsurface Soil Locations	2.4	0		2.4		0
	(PCBs)	24	0	0	24	0	0
	6 Surface/Subsurface Locations						
	(PAHs)	18	0	0	0	18 ^{k/}	0
	2 Surface/Subsurface Locations for						
	Field Screening and Contingent	2 (estimated				2 k/ (estimated	
	Laboratory Analysis	maximum)	0	0	0	maximum)	0
	9 Step-Out Surface/Subsurface soil					27 k/ (estimated	
57	Locations	27	0	0	0	maximum)	0
	4 Surface/ Subsurface Soil				25% of samples with		
69	Locations i/	8 i/	0	0	EPH detections ^{i/}	0	$8^{i/}$
			Groundwater Sam	nling		<u> </u>	
			Ground water Sum	4 (Pb only, 2			
	1 New Monitoring Well (filtered			filtered, 2			
28	and unfiltered samples)	1	0	unfiltered)	0	0	0
	4 New Monitoring Wells (filtered			16 (Pb, As, Sb,			
38	and unfiltered samples)	8 j/	0	Cu, Zn only) j/	0	0	0
49	No Sampling Proposed	0	0	0	0	0	0
+9	2 New Monitoring Wells (filtered	0	U	U	U	0	0
57	and unfiltered samples)	4 ^{j/}	0	8 j/	0	0	0
	• ′		-				
69	1 New Monitoring Well ^{i/}	2 ^{i/ j//}	2 ^{i/ j/}	0	0	0	0
		QA/QC s	amples (see SAP for ac	lditional details) f/	T	1	
Field Duplicates (5% Sampling							
Frequency per media)		NA ^{g/}	1	4	3	4	1
		1111	•	,		,	1
Matrix Spike (5% Sampling							
requency per media)		NA	1	4	3	4	1
Matrix Spike Duplicate (5%							
Sampling Frequency per media)		NA	1	4	3	4	1
Trip Blank (1 per cooler of			TD = 1/		_		
OCs per media)		NA	TBD h/	0	0	0	0

QA Split (5% per media)	NA	1	4	3	4	1
Equipment Blank (5% Sampling						
Frequency per media)	NA	1	4	3	4	1
					94 (estimated	
TOTAL	164	7	93	59	maximum)	13

^{a/} Field meter readings include: in soil: PID headspace readings, and in groundwater: PID headspace, pH, temperature, electrical conductivity, DO, ORP, and turbidity.

b/ VOCs = volatile organic compounds.

c/ TICs = tentatively identified compounds.

d Metals analysis for Parcel 38 will be limited to lead, arsenic, antimony, copper, and zinc. Methods for metals in groundwater are 6010C (except Hg) and 7470A (Hg). Methods for metals in soil are: 6010C (except Hg) and 7471B (Hg).

^{e/} PCBs = polychlorinated biphenyls, EPH = extractable petroleum hydrocarbons.

 $^{^{}f/}$ QA/QC = quality assurance/quality control; SAP (**Appendix E**).

g/ NA = not applicable.

h/ TBD = to be determined.

^{i/} Contingent on sampling results at Parcel 69, up to four additional surface and subsurface soil samples, and three additional groundwater samples from new monitoring wells (also contingent on results) may be required.

^j Sample count includes two filtered and unfiltered vertical profile samples to be collected per submerged 10-foot screen in accordance with NJDEP Field Sampling Procedures Manual Section 6.9.2.2.3

^{k/} PAH analysis was limited to target PAH compounds which historically exceeded the NJDEP RDCSRS, specifically benzo(a)anthracene, benzo(b)fluoranthene, and benzo(k)fluoranthene

3.2.2 Data Quality Objectives

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Data Quality Objectives (DQOs) are qualitative and quantitative statements that specify the quality and level of data required to support the decision-making processes for a project. Guidance for DQO development is contained in Section 4 of EM 200-1-2 Technical Project Planning Process (USACE, 1998), Guidance for Performing Site Inspections Under CERCLA (USEPA, 1992), and Guidance on the Data Quality Objectives Process (USEPA, 2006).

The overall project DQOs are to obtain data to evaluate contamination at Parcels 38, 49, 57, and 69, and if required, further delineate potential contamination at Parcel 28 (**Table 3.3**). In addition, analytical measurement performance criteria have been developed for target analyses as presented in the UFP-QAPP in Section 7 of the SAP (**Appendix E**).

3.2.3 Data Incorporation into the ECP Phase II SI Addendum Report

Parsons will prepare and submit an ECP Phase II SI Addendum report that documents the field activities and provides subsequent evaluations and recommendations for parcels addressed in this work plan. This report will describe the site history and the work conducted under this delivery order and present conclusions regarding addressing data gaps and NJDEP comments to the 2008 SI Report for each of the sites. The ECP Phase II SI Addendum Report will be supported as necessary with accompanying maps, charts, tables, and appendices to fully describe and document the work performed and present conclusions and recommendations for each parcel.

3.3 GEOSPATIAL INFORMATION, DIGITAL FIELD DATA COLLECTION, AND ELECTRONIC SUBMITTALS

Parsons will perform activities related to gathering and maintaining geospatial information in accordance with the PWS.

3.3.1 Geospatial Information

Geospatial information will be collected and maintained in accordance with PWS and the Data Management Plan (DMP).

3.3.2 Digital Field Data Collection Methodology

Field documentation including photographs is discussed in the SAP (**Appendix E**).

28 **3.3.3 Electronic Submittals**

Electronic submittals are discussed in the PMP.

30 3.4 WASTE MANAGEMENT PLAN

Investigation-derived wastes (IDW) generated during the field activities will be managed in accordance with the procedures provided in the SAP (**Appendix E**).

3.5 DATA EVALUATION

The validated laboratory data will be used to develop recommendations for each parcel that may include additional investigation or NFA.

Table 3.3
Data Quality Objectives
Fort Monmouth, New Jersey

	INTENDED DATA USE(S)			D A	ATA NEED REQUIRE	EMENTS		SAMPLING AND ANALYT	TICAL METHODS
Site ID	Project Objective(s) Satisfied	Data User	Contaminant or Characteristic of Interest Identified	Media of Interest	Required Sampling Areas or Locations and Depths Identified	Amount of Sampling/ Number of Samples Required	Reference Concentration of Interest or Other Performance Criteria	Sampling Method Identified	Analytical Method Identified
PARCEL 28	Confirm that the lead concentrations in groundwater at the former gas station are related to turbidity	SI	lead	groundwater	A low-flow groundwater sample will be collected from a monitoring well to be installed at the former gas station	Collect two low flow groundwater samples from a well (filtered and unfiltered)	NJDEP GWQS	Collection of groundwater samples from one new permanent monitoring well using low-flow purge and sample methodology.	lead by method 6010C
PARCEL 38	Evaluate potential impacts to groundwater	SI	Metals	Groundwater	Samples from four new shallow monitoring wells to be installed to delineate metals impacts to shallow groundwater in the Former Firing Range	Groundwater samples (filtered and unfiltered) collected from four new monitoring wells.	NJDEP GWQS	Collection of groundwater samples from four new permanent shallow monitoring wells using low-flow purge and sample methodology; one set of samples per 5 feet of saturated screen (two sets per well with 10 foot long screen installed)	Lead, arsenic, antimony, copper, and zinc using USEPA method SW6010C
	Delineate possible lead impacts to soil in the Former Firing Range	SI	Metals	Soil	Sample from surface and subsurface soils in 15-boring sampling grid within Former Firing Range	Collect 45 surface / subsurface samples from the Former Firing Range	NJDEP RDCSRS and NRDCSRS	Collection of discrete surface and subsurface soil samples by hand auger or direct push technology.	Lead, arsenic, antimony, copper, and zinc using USEPA method SW6010C

Table 3.3 Data Quality Objectives Fort Monmouth, New Jersey

	INTENDED DATA USE(S)			D	ATA NEED REQUIRE	SAMPLING AND ANALYTICAL METHODS			
Site ID	Project Objective(s) Satisfied	Data User	Contaminant or Characteristic of Interest Identified	Media of Interest	Required Sampling Areas or Locations and Depths Identified	Amount of Sampling/ Number of Samples Required	Reference Concentration of Interest or Other Performance Criteria	Sampling Method Identified	Analytical Method Identified
PARCEL 49	Evaluate potential PAH and PCB contamination in soil	SI	PAHs and PCBs	Soil	Resample locations with historical exceedances of PAHs that may be related to historical laboratory operations (four locations) and six step-out locations. Resample four locations with historical PCB exceedance and two step-out locations.	Collect soil samples for PAH and PCB analysis.	NJDEP RDCSRS and NRDCSRS	Collection of discrete soil samples using direct push techniques. Three samples will be collected at each of the locations sampled for PAHs and PCBs for vertical profiling of contaminants.	PCBs using Method 8081B PAHs using Method 8270SIM

Table 3.3
Data Quality Objectives
Fort Monmouth, New Jersey

	INTENDED DATA USE(S)			D A	ATA NEED REQUIRE		SAMPLING AND ANALYT	TICAL METHODS	
Site ID	Project Objective(s) Satisfied	Data User	Contaminant or Characteristic of Interest Identified	Media of Interest	Required Sampling Areas or Locations and Depths Identified	Amount of Sampling/ Number of Samples Required	Reference Concentration of Interest or Other Performance Criteria	Sampling Method Identified	Analytical Method Identified
PARCEL 57	Evaluate potential PCB and PAH contamination in soil and metals contamination in groundwater.	SI	PCBs, PAHs, metals	Surface and subsurface soil (PCBs and PAHs) Groundwater (metals)	Resample eight locations which exceed the RDCSRS (surface and subsurface) from 2008 SI for PAHs (two of eight locations may not require sample submission to laboratory following visual examination of soil column—see text). Sample an additional nine stepout locations for PAHs. Sample eight locations along former railroad for PCBs. Resample groundwater at two locations with previous GWQS exceedances for metals.	Minimum of 18 soil samples from minimum of six borings were analyzed for PAHs. Sampling for PAH analysis at two additional borings dependent on visual examination of soil column (see Section 3.2.1.4). Sampling at an additional 9 stepout borings was conducted, and analysis is dependent on the results of the initial samples collected. 24 soil samples from eight borings for PCBs. Groundwater samples (filtered and unfiltered) for TAL metals analysis from two new permanent monitoring wells.	NJDEP RDCSRS, NRDCSRS, and GWQS	Collection of discrete soil samples using direct push techniques. Collection of groundwater samples from new monitoring wells using low-flow sampling methodology; one set of samples per 5 feet of saturated screen (two sets per well with 10 foot long screen installed below water table)	PCBs using Method 8081B PAHs using Method 8270SIM TAL metals using Method SW6010C and SW7470A (mercury)

Table 3.3 Data Quality Objectives Fort Monmouth, New Jersey

	INTENDED DATA USE(S)			D	ATA NEED REQUIRE	SAMPLING AND ANALYT	TICAL METHODS		
Site ID	Project Objective(s) Satisfied	Data User	Contaminant or Characteristic of Interest Identified	Media of Interest	Required Sampling Areas or Locations and Depths Identified	Amount of Sampling/ Number of Samples Required	Reference Concentration of Interest or Other Performance Criteria	Sampling Method Identified	Analytical Method Identified
PARCEL 69	Evaluate potential EPH/PCB contamination in soil. Determine if PCE exceeds GWQS, and VOC concentrations in groundwater.	SI	EPH, PCBs, PCE	Surface and subsurface soil	Vicinity of former waste oil AST	Four soil borings, two samples per boring; up to four additional contingency soil borings depending on results	NJDEP RDCSRS and NRDCSRS	Collection of discrete soil samples using direct push techniques.	EPH using New Jersey Method; 25% of samples with detectable EPH analyzed for PCBs using Method 8081B
				Groundwater	Vicinity of former waste oil AST	One groundwater sample collected from one new permanent monitoring well, up to three additional monitoring wells to be installed and sampled contingent on results	NJDEP GWQS	Collection of groundwater samples from a new monitoring well using low-flow sampling methodology; one sample per 5 feet of saturated screen (two sets per well with 10 foot long screen installed below water table)	VOCs using USEPA method SW8260C

3.6 MOBILIZATION/DEMOBILIZATION

3.6.1 Preparation

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Preparations for mobilization will commence upon approval of this supplemental ECP Phase II SI work plan. Upon receipt of the approval, the field team will be notified and the requisite copies of the applicable documents assembled. The field team will have already reviewed the available site documentation, the work plan, and any additional data obtained during previous site visits.

3.6.2 Equipment Mobilization

Equipment and materials will be sent to the site via commercial carrier, transported to the site by the field team, or obtained locally. Equipment is limited to sampling supplies, documents, first aid kit, fire extinguisher, global positioning system (GPS) unit, digital camera, etc. Appropriate field vehicles will be rented that will accommodate site personnel and equipment. FTMM access and security requirements are detailed in the PMP.

3.6.3 Right-of-Entry

Access to FTMM will be requested in accordance with the procedures outlined in the SAP (**Appendix E**).

3.6.4 Communications

The field team will remain together throughout field activities. There will be a minimum of one operational mobile phone available for emergency use.

3.6.5 Training and Briefing

Training and briefing will be performed in accordance with the APP provided in **Appendix D**.

SECTION 4 QUALITY CONTROL PLAN

4.1 GENERAL

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38 39 The purpose of the QCP is to provide the approach and procedures used to ensure quality throughout the execution of the tasks required by the PWS. The QCP provides organization, responsibilities, policies, and procedures for maintaining the highest possible standards. The QCP applies to work performed by Parsons and its subcontractors. Additional QC information is provided in the UFP-QAPP, which is included as Section 7 in the SAP (**Appendix E**).

4.2 CORPORATE POLICY

Parsons recognizes that the USACE is responsible for QA; however, Parsons also has a QA process at the corporate level with the commitment and involvement of its top management. The process provides a permanent and workable system that allows each employee to understand the job performance expected. The Parsons QA and improvement process ensures that every employee is supported by the actions, procedures, tools, and training required to perform his/her job according to the requirements. By promoting teamwork and by focusing attention on the solutions, the quality of work can be increased and assured throughout the project.

Parsons Corporation Quality Policy

We are committed to providing quality services and products. We will, as a corporation and as individuals, meet the mutually agreed-to requirements the first time and strive for continuous improvement of our work processes.

The Parsons QA Policy is based on the work and concepts of several recognized authorities on quality management in the United States, especially Mr. Philip Crosby, Dr. W.E. Deming, and Dr. J.M. Juran. These three experts each have different methods of addressing and resolving problems. Parsons has taken unique portions of their concepts and tailored them to corporate work processes. As a result, Parsons has placed a greater emphasis on the actual elements pertaining to work processes, project requirements, and lessons learned from past performances. These concepts have been developed into a systematic and practical approach for improving quality.

Generally, the Parsons QA Policy relies on four fundamentals, termed the "absolutes of quality". They answer these questions:

- What is quality? Conformance to Requirements;
- How do we achieve it? Prevention;
- What is our performance standard? Zero Defects; and
- How can we measure quality? Cost of Doing Things Wrong.

4.3 **REQUIREMENTS**

The Parsons QCP for the FTMM project sites has been written to encourage positive communication throughout the Parsons project team. It is also intended to foster clear communication between Parsons, USACE, and FTMM. Honest and effective communication among the project team requires that parties clearly understand the project requirements. QC

reports and documents will be kept onsite and accessible for review upon request. Copies of QC reports and documents will be transmitted to the Parsons Project Manager (PM) for inclusion in the project file.

4.4 QUALITY CONTROL OBJECTIVES

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The QC procedures described in this section will be used for field work performed during the supplemental ECP Phase II SI. These procedures were designed to manage, control, and document performance of work efforts. This section of the QCP will achieve the following objectives:

- Identify QC procedures and responsibilities;
- Ensure USACE, FTMM, and Parsons notifications are performed as required by the PWS;
- Document the quality of work efforts via audits and independent staff reviews of deliverables:
- Ensure data integrity through implementation of data management QC procedures;
- Ensure data precision through implementation of field equipment maintenance and use procedures; and
- Outline an inspection system.

Project quality is the responsibility of the entire project team. The team's comprehension of this QCP is of primary importance for quality objectives to be accomplished; thus, training and indoctrination of key personnel in the quality objectives will be conducted. The project organization is headed by the Parsons PM; the person ultimately responsible for successful accomplishment of the phases of the project. The Parsons PM is given full authority and responsibility for project execution, and the Parsons PM is supported by direct line managers with functions and responsibilities outlined below.

The Parsons PM approves the QCP, implements procedures, and has direct responsibility for day-to-day management of the project. The Parsons PM's responsibilities related to QC include, but are not limited to:

- Implementation of applicable Parsons policies and procedures;
- Timely submission of contract deliverables; and
- Analyzing QC failures with the QC Manager and the appropriate QC person and implementing corrective actions.

The Project QC Manager communicates with the PM on project-related QC matters. The Project QC Manager, as a management representative, has the following authorities and responsibilities:

- Ensuring that the QCP has been established, maintained, and implemented;
- Establishing guidelines to assist in the development of program, project, site, and task-specific QC policies and procedures;
- Initiating, recommending, approving, and providing solutions to the quality problems identified in the QCP during system audits;

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- Conducting periodic audits/inspections of the project and submitting reports to the Parsons Sector Manager with copies to the PM; and
- Reporting the adequacy, status, and effectiveness of ongoing projects to the Parsons Sector Manager.

The Field Team Leader reports to the Project QC Manager on quality matters, is the key QC person onsite, and has responsibility for overall quality of work performed on site. The responsibilities include, but are not limited to:

- Developing QC procedures to implement the QCP;
- Verifying implementation of corrective actions;
- Initiating actions to identify and prevent the occurrence of nonconformance relating to the services and QCP;
- Authorizing the cessation of nonconforming work;
- Ensuring that QC procedures are being followed and are appropriate in demonstrating data validity sufficient to meet DQOs;
- Recommending actions to be taken in the event of QC failures, both to the PM and the Project QC Manager;
- Reporting non-compliance with QC criteria to the PM and Project QC Manager;
- Authorizing suspension of project activities when a condition adverse to quality is identified and notifying the PM and senior personnel responsible for clearance activities when such action is required;
- Conducting daily QC audits and inspections; and
- Conducting weekly and monthly QC Compliance Inspections.

4.5 QUALITY CONTROL FOR INSTRUMENT AND EQUIPMENT TESTING

Instruments and equipment used to gather and generate environmental data will be calibrated in accordance with the procedures outlined in the SAP (**Appendix E**).

4.5.1 Digital Camera Quality Control

The digital camera will be checked each day prior to use during the project. The battery level will be checked and, as needed, the batteries recharged or replaced. Before work begins each morning, team lead will verify that camera functions are working properly, that the date/time setting on the camera is correct, and the available memory space on the camera is sufficient for a complete day of site photography.

4.5.2 Cell Phone Quality Control

The field team will keep at least one cell phone with them for emergency use. The cell phone will be checked each day prior to use during the project. The battery level will be checked and, as needed, the batteries recharged or replaced. In addition, the team will verify that cell phone coverage is adequate at the site. If at any time during the project it is determined that cell phone communication is not available at any portion of the site, an alternative method of emergency communication will be investigated.

4.5.3 Field Measurement Instrumentation Control

Field measurement instrumentation will be performed in accordance with the procedures outlined in the SAP (**Appendix E**).

4.6 INSTRUMENT/EQUIPMENT MAINTENANCE

Maintenance of instruments and equipment will be performed in accordance with the procedures outlined in the SAP (**Appendix E**).

4.7 DATA MANAGEMENT

4.7.1 Data Reduction

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Any raw data from field measurements will be appropriately recorded in field notebooks. Records (field data forms and field note copies) will be maintained onsite in a portable file. Records will be stored such that they can be found using the date they were created, the team who created them and a site identification number. If the data are to be used in the project reports, they will be reduced and summarized, and the reduction method will be documented in the report.

Reduction of the laboratory data from environmental sampling activities is discussed in the SAP (**Appendix E**).

4.7.2 Field Data Storage

Data collected in the field will be stored electronically in the collecting instrument's data logger or recorded manually on hardcopy field forms. Data loggers, if used, will be synchronized with the field computer daily. Upon completion of the project, data will be transferred to the Parsons PM's office for storage and archiving.

22 **4.7.3 Data Validation**

Information in the project database will be validated in accordance with the SAP (**Appendix** E).

4.8 FIELD OPERATIONS DOCUMENTATION

4.8.1 Daily Field Activity Records

Daily field activity records will be prepared in accordance with the procedures outlined in the SAP (**Appendix E**).

4.9 NONCONFORMING ITEMS OR ACTIVITIES AND CORRECTIVE ACTIONS

4.9.1 Identification

Circumstances that prevent a work process from conforming to the contract requirements will be promptly identified, documented, investigated, and corrected appropriately. Project personnel have the responsibility, as part of their normal work duties, to promptly identify and report conditions adverse to quality. The status of nonconformance reports (NCR) will be maintained in a log, and progress of their resolutions will be documented and reviewed monthly to ensure prompt attention to their conclusion.

4.9.2 Resolution, Corrective Action, and Verification

The appropriate level of management is responsible for evaluating the cause of a NCR and will recommend solutions for correcting the deficiency identified. Actions and technical justifications for an action proposed to resolve the corrective action will be reviewed and approved by personnel responsible for the technical aspect of the work. The QC organization will be responsible for verifying implementation of corrective action, monitoring the effectiveness of preventive action, and reporting any findings to the QC Manager.

4.9.3 Material and Item Nonconformance

The QC Manager ensures that:

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- Items that do not conform to prescribed technical and/or quality requirements are tagged or otherwise identified, documented, and reported as nonconforming. The documentation will include the following information:
 - Identification of the nonconforming activity, material, or item;
 - Identification of the technical and quality requirement(s) with which the activity, material, or item is not in compliance;
 - Identification of the current status of the activity, material, or item (i.e. whether the item is on hold or whether its use is conditional);
 - Names and dates of the individuals identifying the nonconformance;
 - Identification of the individual(s) or organization(s) responsible for resolution;
 - Indication of the severity of the nonconformance(s); and
 - Indication regarding the continuance or stoppage of work associated with each nonconforming activity, material, or item.
- Nonconforming materials and items are segregated, when possible, from conforming materials and/or items to the extent necessary to preclude their inadvertent use; and
- The status of nonconforming activities, materials, and items and the progress of their resolution are documented and routinely reviewed to ensure prompt attention to conclusion.

4.9.4 Review and Correction of Nonconformance

The review is conducted by the PM, QC Manager, and Field Team Leader (if applicable) to ensure that:

- The responsibility for review and disposition of nonconformance is defined;
- Nonconforming materials and items are reviewed in accordance with procedures. Nonconformance can be evaluated according to four criteria:
 - Reworked to meet the original requirements;
 - Accepted with or without repair;
 - Regraded for alternative applications;
 - Rejected or scrapped;

- Repaired or reworked materials items are re-inspected; and
- Each document used to identify and correct nonconforming conditions allows for the evaluation and approval of proposed actions by the appropriate authority.

4.9.5 Trend Analysis and Root Cause Analysis

The trend analyses of QC audits, subcontractor/supplier surveillance reports, and identified nonconformance (if any) will include the following information:

- Total number of audit findings and observations, surveillance reports, and NCRs for each area of the QCP;
- A summary of the root cause for the nonconformance consolidated for each area of the QCP; and
- Trends that are developing or that have developed.

The PM will perform the trend analyses once every year. QC will verify the implementation of any preventive actions resulting from the trend analyses. The QC Manager is responsible for evaluating on a semiannual basis NCRs affecting quality and will recommend solutions, as well as steps for verifying their implementation.

4.9.6 Lessons Learned

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Opportunities to share lessons learned with the RI/FS project team include monthly telecoms to discuss issues and concerns, as well as quarterly internal project review meetings. Additionally, Parsons will compile internal lessons learned and provide a forum for dissemination between project team members and distribute to other applicable Parsons project locations.

4.10 AUDITS AND SURVEILLANCES

4.10.1 Audit Planning

The QC Manager, or designee(s), will perform audits of the project activities and, as required, audits of subcontractors/suppliers in the manner specified in Parsons' corporate procedure Q-021, Quality System Audits.

The Lead Auditor will prepare the audit plan. The plan will be reviewed and approved by the QC Manager before execution. The audit plan will include the following information:

- Identification of the organization and work areas to be audited;
- Identification of location, times, and dates of duration of the audit;
- Identification of the documents that specify the criteria against which the work will be measured;
 - Checklists prepared as a guide during the audit;
 - Identification of auditing personnel; and
 - Signatures and dates approving the audit.

The organization to be audited will be notified of the impending audits at least 15 days in advance.

4.10.2 Audit Execution

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A pre-audit briefing and a post-audit briefing will be conducted to inform key management personnel or to confirm results of the audit, including concerns and findings. Daily briefings may be conducted, as needed, to inform the audited organizations of the progress of the audit and potential findings or concerns.

4.10.3 Audit Reporting

The audit results approved by the Lead Auditor will include the following information:

- Reference to audit plan;
- Identification of and justification for any differences that occurred between the audit plan and the actual conduct of the audit;
- Synopsis of the audit results;
- Description of nonconformity (identified as findings and observations); and
- Completed audit checklist and documentation (objective evidence) supporting the discovery of the nonconformity.

Conditions determined to be in nonconformance with the contract, procedure, or other specified requirements, are identified as findings. Conditions not in nonconformance when first identified, but could lead to nonconformance if left uncorrected, are identified as observations. Formal responses are required for findings only. Corrective action is required for both findings and observations.

For internal audits, the Lead Auditor will issue the audit report to the Parsons PM, QC Manager, and the responsible Program Manager. For audits of suppliers or subcontractors, the Lead Auditor will issue the report to the Parsons PM and QC Manager, who will issue the audit report to the audited subcontractors and suppliers.

4.10.4 Review, Approval, and Verification of Recommended Action Response

The recommended corrective action proposed by the management of the organization audited in response to the nonconformity will be reviewed and approved by the QC Manager. Justification for rejection of the response will be documented by the QC Manager and transmitted to the organization providing the response.

Management of the organization being audited will report the implementation of corrective action to close out the audit nonconformity. The Lead Auditor or the QC Manager will verify a closeout action at the time of the next scheduled audit.

Verification of closeout action will be documented to ensure the satisfactory closure of the audit nonconformity and will be reported to the Parsons PM and to the management of the organization audited, when applicable.

4.11 QUALITY CONTROL REPORTS

During the project, the QC Manager, or designee, will prepare at least one QC report to discuss:

• The periodic assessment and measurement of data accuracy, precision, and completeness; and/or

• Significant QA problems and corrective actions taken.

In addition, the Parsons PM will receive periodic updates concerning QC associated with the field activities, laboratory analyses, and the data processing.

4.12 DOCUMENTS AND SUBMITTALS

4.12.1 Process

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Documents and submittals prepared for the supplemental ECP Phase II SI at FTMM will be the result of a collaborative effort by key personnel dedicated to the project. Qualified individuals from each major discipline represented in the deliverable will compose the applicable portion of the document.

4.12.2 Review

Documents and submittals will be reviewed for technical accuracy and editorial merit by qualified peers and/or the appropriate Technical Director(s). The Parsons PM will collect and retain records of these reviews. The QC Manager will audit the project files to ensure that final reports and deliverables have gone through peer review.

4.12.3 Document Distribution and Retrieval

The current revisions of documents that prescribe technical, management, and quality requirements are internally and externally distributed to the applicable project personnel. These personnel are responsible for the document's implementation and its verification for implementation.

The obsolete documents that prescribe obsolete technical and quality requirements are clearly marked and returned to the Parsons PM upon receipt of any revised document. The recipient must also immediately conduct a page change for affected documents by inserting the revised document or slip pages in place of the obsolete. The Parsons PM will maintain a complete list of revisions and will include a summary of the revisions with the document revision submittals.

4.13 PERSONNEL SELECTION

Key personnel will be designated by the PM. Those requiring licenses, certification, or other forms of qualifications necessary to perform their work will be selected and evaluated periodically or on each change of task assignment by program management to ensure that their credentials are current to perform the pre-established job description, meeting the contract requirements.

Project personnel performing functions that affect quality will receive indoctrination and training prior to assuming duty. The job description, indoctrination, training, and certification will be maintained in the project files. To ensure quality and consistency throughout the duration of the supplemental ECP Phase II SI, Parsons will maintain a dedicated group of qualified, trained project personnel to conduct the various tasks associated with this project.

4.14 PERSONNEL QUALIFICATIONS AND TRAINING

Qualifications and training of project personnel will comply with the requirements specified in the PWS and the APP (**Appendix D**).

4.15 CHEMICAL DATA QUALITY MANAGEMENT PLAN

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The QCP procedures for the Chemical Data Quality Management Plan are discussed in the SAP, and Parsons-specific QC procedures will be included in the SAP (**Appendix E**).

SECTION 5 ENVIRONMENTAL PROTECTION PLAN

5.1 INTRODUCTION

 This EPP has been prepared for FTMM project field activities in accordance with the PWS. The purpose of the EPP is to establish general procedures for avoiding, minimizing, and mitigating potential impacts to environmental and cultural resources during field activities.

5.2 SENSITIVE RESOURCES

5.2.1 Threatened and Endangered Species

Except for occasional transient species, no federally listed or proposed threatened or endangered flora or fauna are known to exist on FTMM. There was one observance in 1992 of a New Jersey listed endangered species, the clustered sedge. In addition, no federal or state listed species were observed during the baseline ecological evaluation site visit conducted on the MP and CWA on September 15, 2009 (Shaw, 2012). Due to the developed, urbanized nature of the supplemental Phase II SI parcels and the nature of the work to be performed during the supplemental Phase II SI, no listed threatened and endangered species are anticipated to be encountered or adversely impacted by the supplemental ECP Phase II SI field effort.

5.2.2 Sensitive Environments

Areas of wetlands are present on both the MP and CWA, with both estuarine and fresh water wetlands present on the MP. The USFWS National Wetland Inventory maps have designated wetland areas at the MP and CWA. Areas along Oceanport Creek and Parkers Creek are designated estuarine and marine wetlands or open waters; areas along Mill Creek, Husky Brook, Lafetra and Shrewsbury Creeks are fresh water emergent or forested/shrub wetlands.

Each of the parcels addressed in this document are developed and urbanized. Geographic information system (GIS) digital data available through the NJDEP have identified the following:

- Deciduous scrub/shrub wetlands along Shrewsbury Creek at Parcel 28: The NJDEP Landscape Project Critical Wildlife Habitat database indicates that the wetland area is habitat Rank 1, which is assigned to patches that meet suitability requirements for endangered, threatened, or priority wildlife species but do not have confirmed occurrences of such species (Shaw, 2012). The SI field team will be cautioned to avoid any disturbance or impact to this wetland area during performance of supplemental ECP Phase II SI field activities;
- Parkers Creek on the western portion of Parcel 49: The NJDEP Landscape Project Critical Wildlife Habitat database indicates that the wetland area is habitat Rank 1, which is assigned to patches that meet suitability requirements for endangered, threatened, or priority wildlife species but do not have confirmed occurrences of such species (Shaw, 2012). In addition, Parkers Creek is listed as Conservation Rank 4 as potential bald eagle foraging habitat. However, supplemental ECP Phase II SI sampling of surface water and sediment is not proposed for Parcel 49; and

• Phragmites dominated wetlands along Oceanport Creek at Parcel 69: The NJDEP Landscape Project Critical Wildlife Habitat database indicates that the emergent wetland area is habitat Rank 4, which is assigned to patches with one or more occurrences of a state endangered species, in this case the Least Tern. Oceanport Creek and the adjacent wetlands are also listed as Conservation Rank 4 as potential bald eagle foraging habitat, indicating that open water and adjacent wetlands could be used for foraging by bald eagles. However the presence of bald eagles has not been documented at this site. The supplemental ECP Phase II SI field team will be cautioned to avoid any disturbance or impact to any wetland areas or potentially sensitive areas noted at Parcel 69 or any other parcels during performance of SI field activities.

5.2.3 Cultural and Archaeological Resources

None of the supplemental ECP Phase II SI sites contain any registered or otherwise recognized cultural or archaeological resources. Nevertheless, if an archaeological remnant is discovered or suspected during the supplemental ECP Phase II SI effort, activities in that area will be halted. It is Parsons' policy to note in the field log the location of any archaeologically significant item found by the field team, and to notify USACE and FTMM personnel. Photographs of any archaeological or cultural items found may be included in the ECP Phase II SI Addendum Report.

5.2.4 Water Resources

2.2.

A discussion of water resources at FTMM can be found in subsections 1.5.4 and 1.5.6.

5.2.5 Coastal Zones

None of the supplemental ECP Phase II sites are located within a Coastal Zone Management Area since they are not located on a tidally influenced shoreline. Therefore, the sites are also not within a National Marine Sanctuary, Marine Protected Area, or the National Estuarine Research Reserve System.

5.2.6 Waste Disposal Sites

Based on the history and usage of the supplemental ECP Phase II SI parcels, there are no known munitions storage areas at these locations. No use of chemical warfare material has been reported at the sites.

5.3 MITIGATION PROCEDURES

Various measures will be used to mitigate the environmental impacts of supplemental ECP Phase II SI field activities. The following general measures will be taken during onsite activities:

- Site-specific training will be given on awareness of nearby wetland areas;
- Areas that have been disturbed as a result of field activities will be restored in accordance with the procedures outlined in the SAP (**Appendix E**);
- No burning activities will take place during this project;
- Emissions sources will consist of any motorized equipment used onsite, including crew vehicles, generators, and drilling rigs. Vehicles and equipment will be in good working order and will meet applicable vehicle emissions requirements; and

• Fueling for small equipment, such as generators, will be performed onsite (via small volume fuel containers). If a leak of fuel or other fluid such as hydraulic or transmission fluid occurs in the field, the procedures to follow are outlined in the APP (**Appendix D**).

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SECTION 6 PROPERTY MANAGEMENT PLAN

It is not anticipated that government furnished equipment will be used during the supplemental ECP Phase II SI. Therefore, a property management plan will not be required and this section serves as a placeholder only. If government furnished equipment will be used, then a property management plan will be prepared.

SECTION 7
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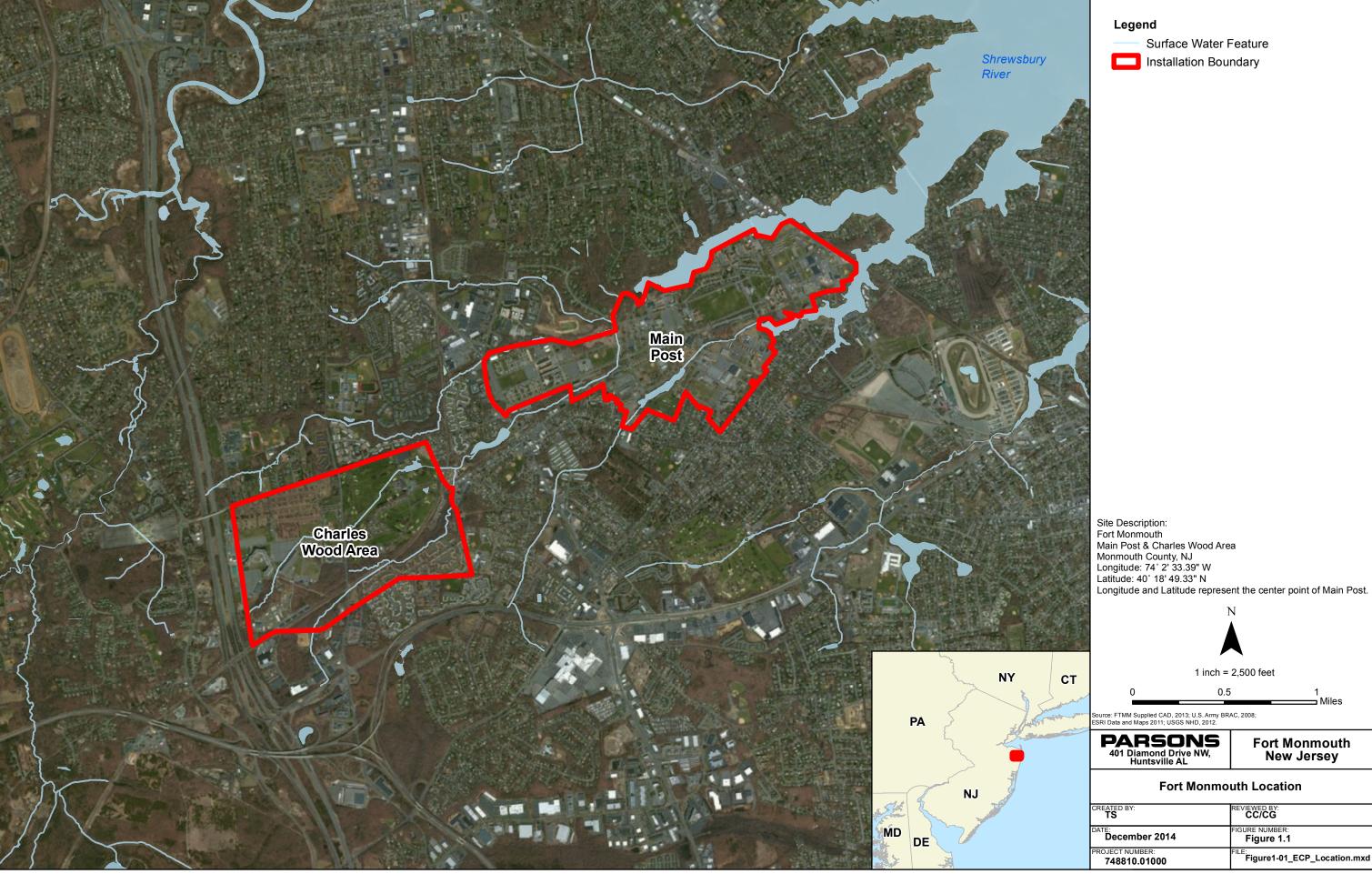
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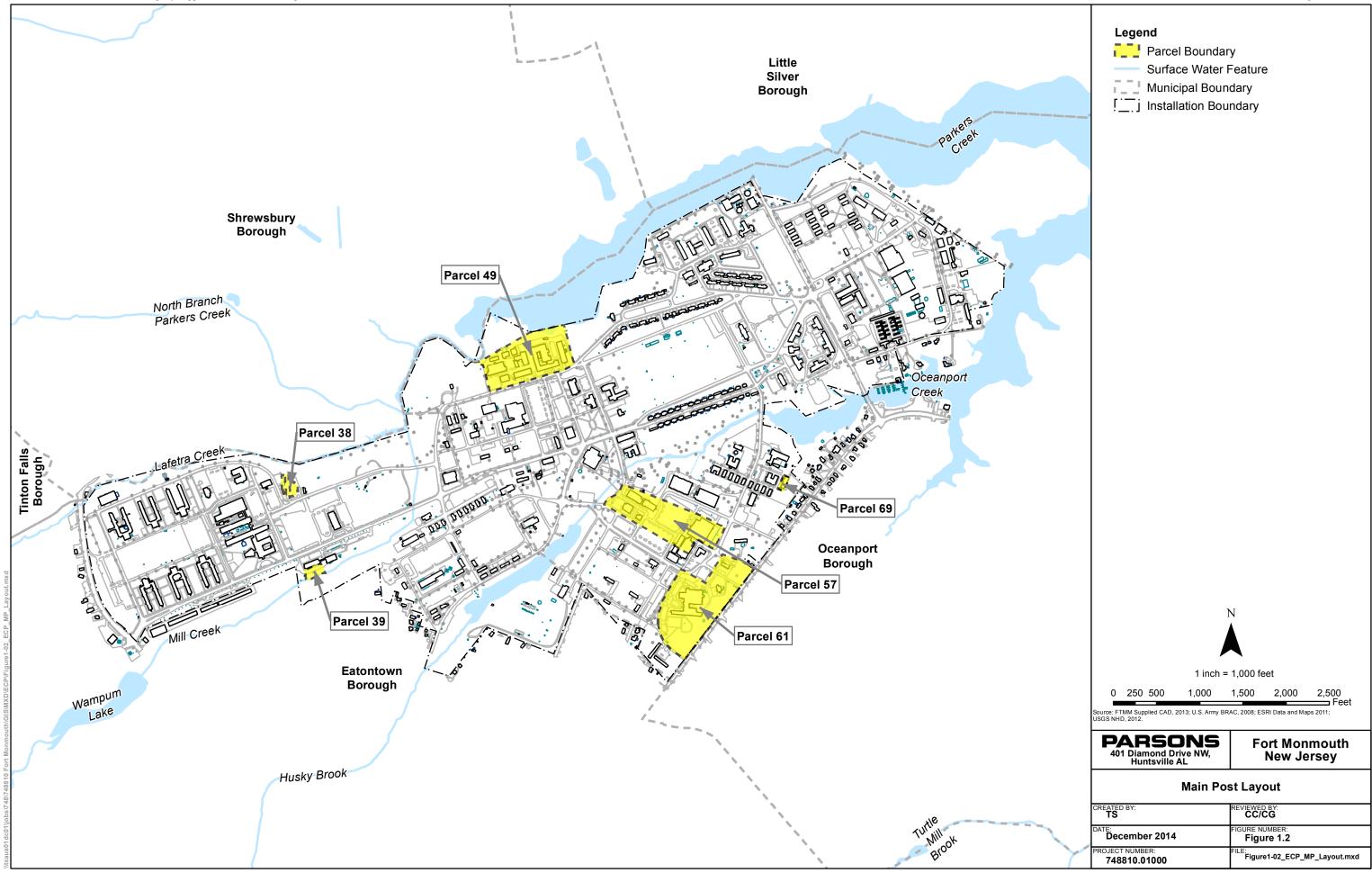
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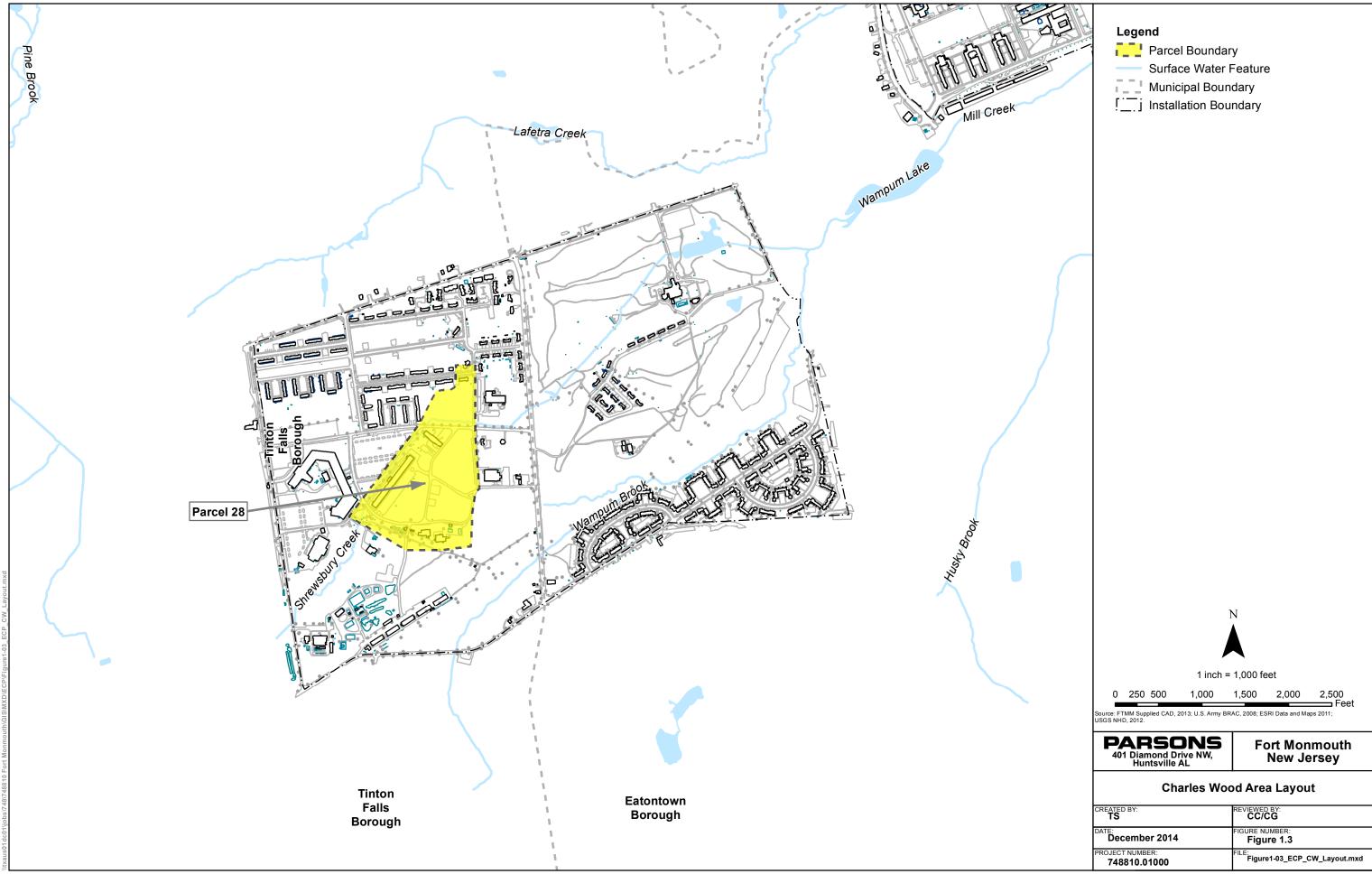
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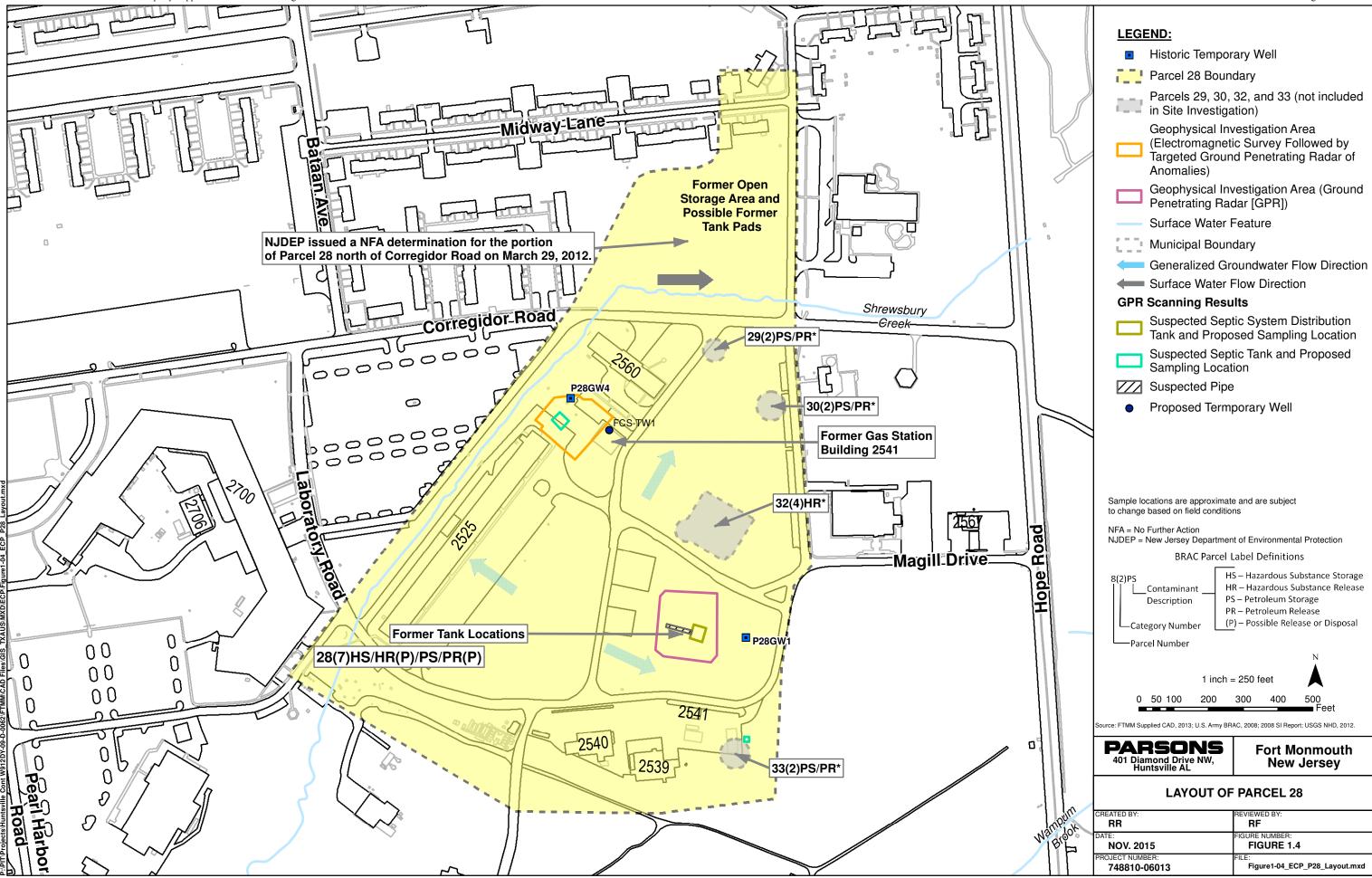
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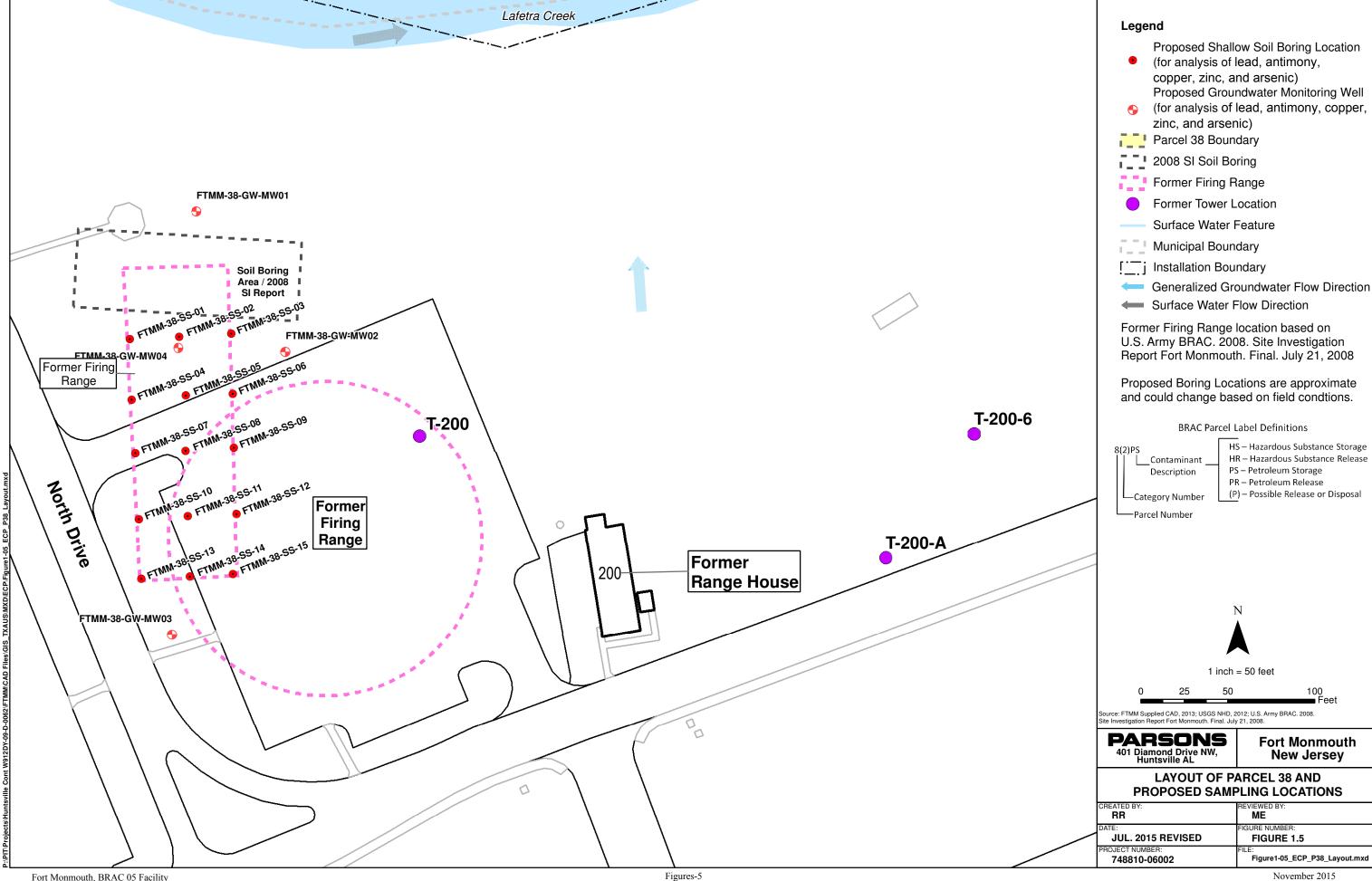
1		FIGURES
2	Figure 1.1	Fort Monmouth Location
3	Figure 1.2	Main Post Layout
4	Figure 1.3	Charles Wood Area Layout
5	Figure 1.4	Layout of Parcel 28
6	Figure 1.5	Layout of Parcel 38 and Proposed Sampling Locations
7	Figure 1.6	Layout of Parcel 39
8	Figure 1.7	Layout of Parcel 49 and Proposed Sampling Locations
9	Figure 1.8	Layout of Parcel 57 and Proposed Sampling Locations
10	Figure 1.9	Layout of Parcel 61
11	Figure 1.10	Layout of Parcel 69 and Proposed Sampling Locations
12	Figure 1.11	Fort Monmouth Land Use in 2008

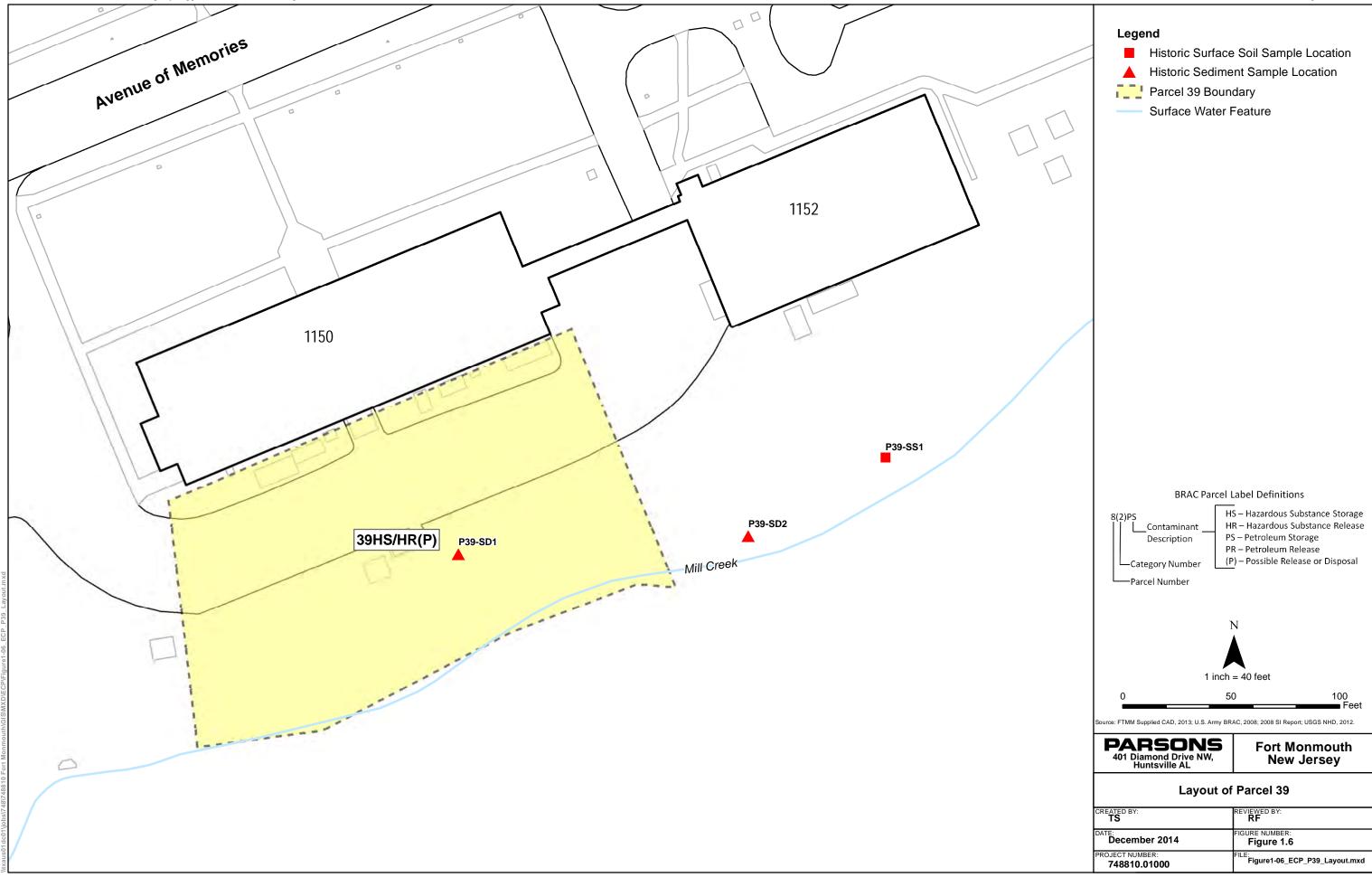


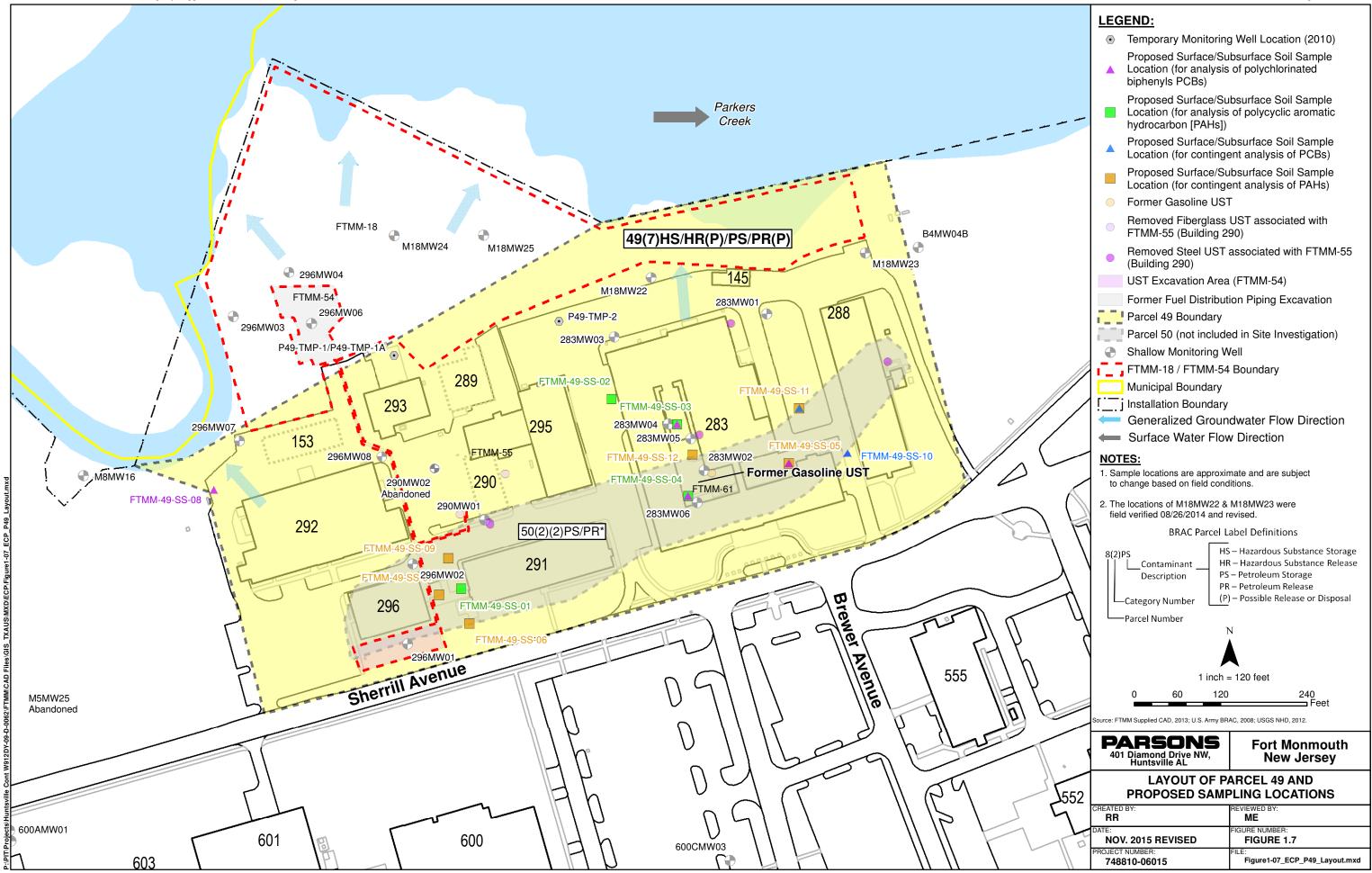


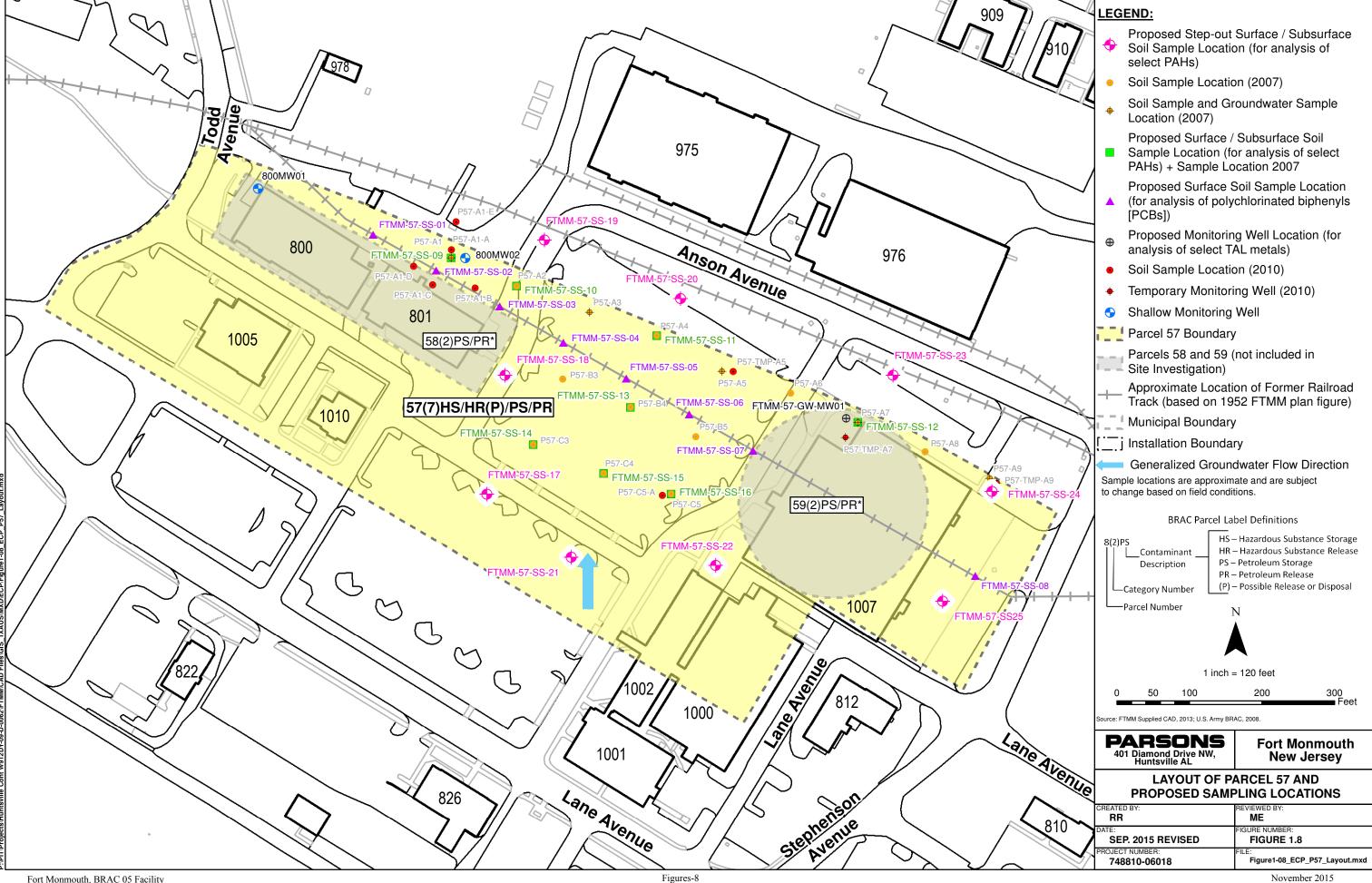


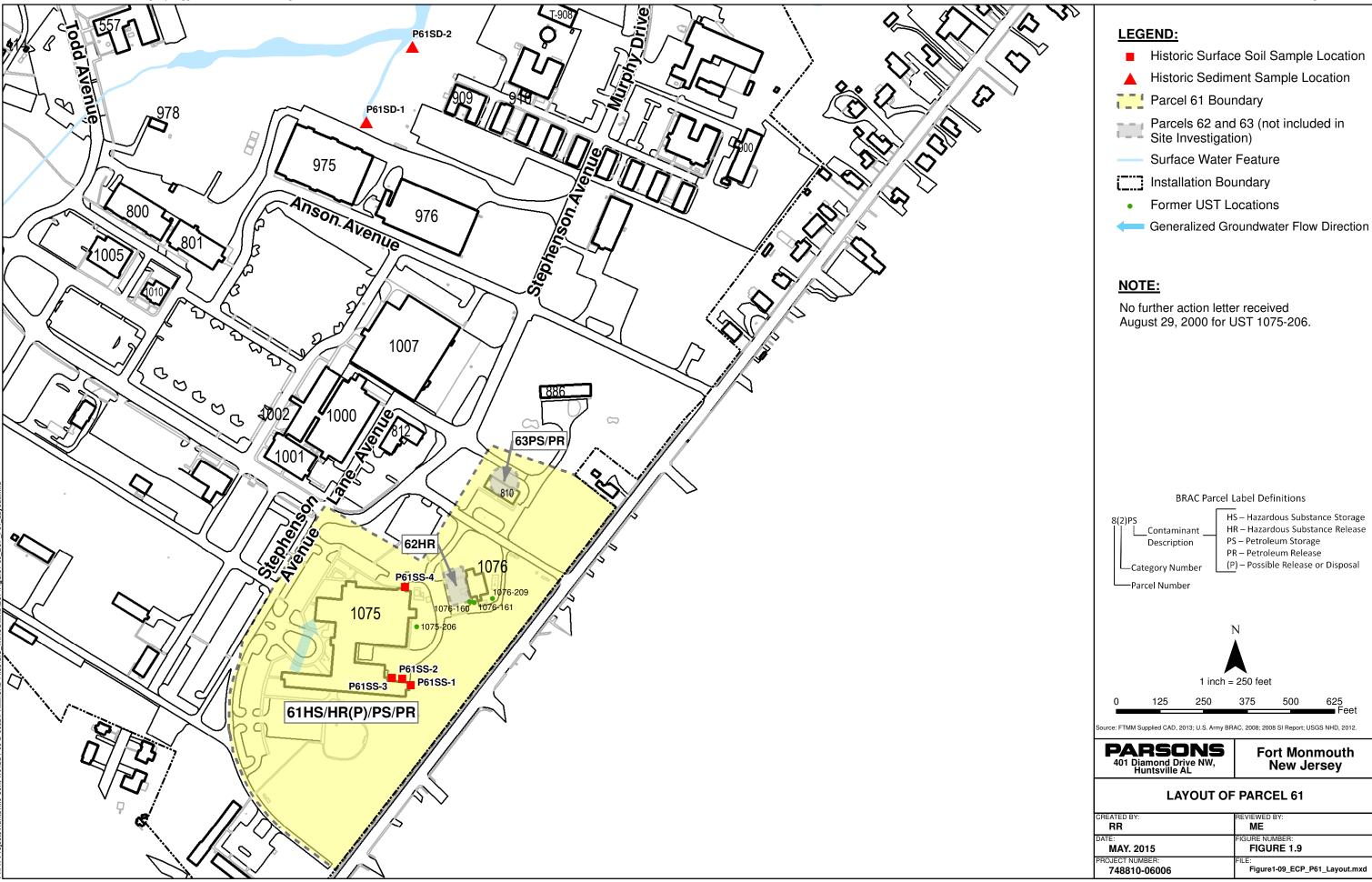


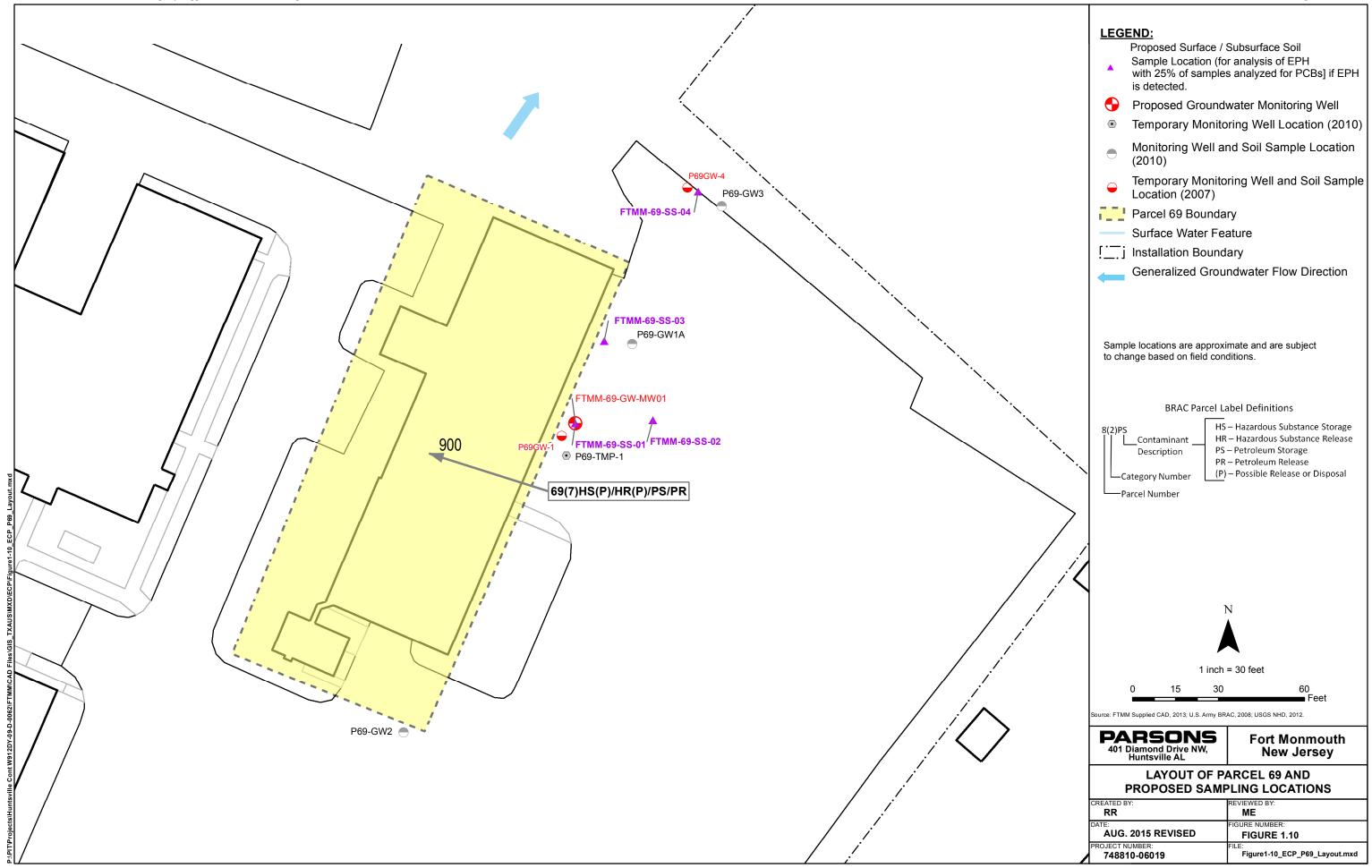


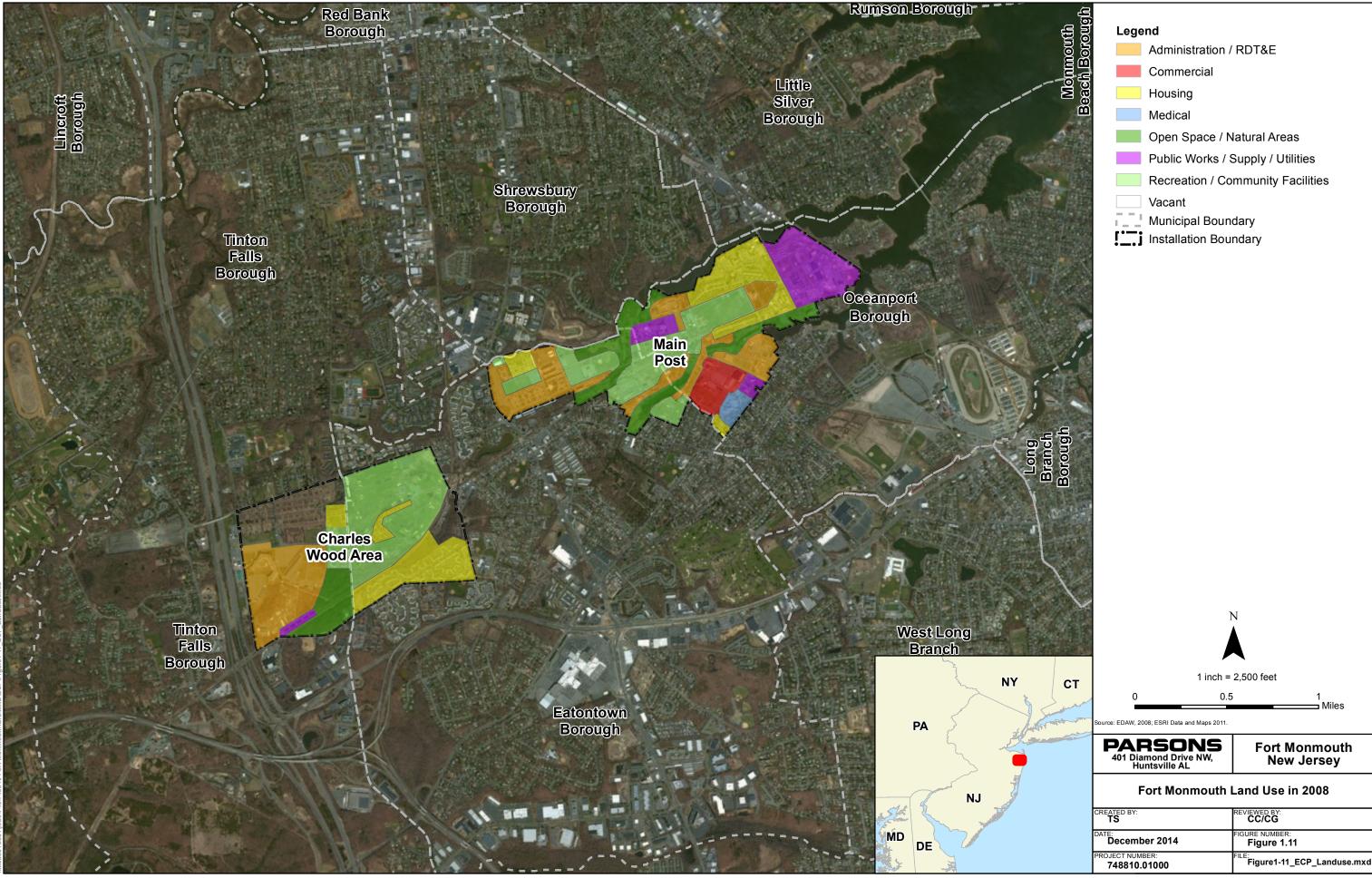












2	Appendix A	Performance Work Statement (included by reference only)
3	Appendix B	Field Forms (included by reference only)
4	Appendix C	Historical Information

APPENDICES

- 5 Appendix D Accident Prevention Plan (included by reference only)
- 6 Appendix E Sampling and Analysis Plan (included by reference only)

1	APPENDIX A
2	PERFORMANCE WORK STATEMENT
3	
4	(This is a placeholder only; included as reference only)

	APPENDIX B
2	FIELD FORMS
3	
ŀ	(This is a placeholder only; field forms are
5	provided in the Sampling and Analysis Plan)

APPENDIX C HISTORICAL INFORMATION

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APPENDIX C

Historical Information for Parcel 28



State of New Jersey

CHRIS CHRISTIE Governor

KIM GUADAGNO Lt. Governor DEPARTMENT OF ENVIRONMENTAL PROTECTION
Bureau of Case Management
401 East State Street
P.O. Box 420/Mail Code 401-05F
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BOB MARTIN Commissioner

September 22, 2015

John Occhipinti
BRAC Environmental Coordinator
OACSIM – U.S. Army Fort Monmouth
PO Box 148
Oceanport, NJ 07757

Re:

Reguest for No Further Action at Parcel 28

Site Investigation Report Addendum

Fort Monmouth

Oceanport, Monmouth County

PI G000000032

Dear Mr. Occhipinti:

The New Jersey Department of Environmental Protection (Department) has completed review of the referenced report, received June 8, 2015, prepared by the Department of the Army's Office of Assistant Chief of Staff for Installation Management as follow up to the July 2008 Site Investigation Report and the Department's letters of July 10, 2012 and February 22, 2013, and to provide information sufficient to allow for designation of No Further Action (NFA) of Parcel 28. The majority of Parcel 28 was previously recategorized as a Category 1 (February 22, 2013), and transferred. Among those areas remaining outstanding were several "carve-outs" - three former septic tanks and/or leach fields, a gasoline station associated with Building 2541. This submittal addresses these carve-outs, as well as specific underground storage tanks.

Underground Storage Tanks

The submittal indicates all but two of the reportedly 16 USTs previously located within Parcel 28 have received a designation of NFA. Attachment B, referenced as a compilation of the 16 USTs formerly located within Parcel 28, does not appear to include all UST/potential UST locations as noted on the figure contained in the *July 2014 Addendum Environmental Condition of Property Report Unregulated Heating Oil Tank Investigation Report*. Two specific USTs not included are:

UST Bldg 2546 / T9 - given a designation of Category 1 on February 22, 2013

UST Bldg 2544 / T7 – for which it was previously determined the NJDEP cannot comment as to the absence or presence of a petroleum discharge as no evaluation has been performed.

As regarding the request for designation of NFA for the following two USTs, as initially indicated via email to Calibre's Joe Pearson on June 19, 2013 at 1349 hours, no further action for the following USTs is required.

UST 2542-29 UST 2564-32

Former Septic System and Septic Tank A

Although the evaluation as proposed was unable to be fully completed due to the presence of the existing geothermal well field, it is agreed the investigation as documented in the referenced submittal, in conjunction with that previously performed and documented in the 2008 Site Investigation, is sufficient. No further action is necessary at this area of concern/carve-out.

Former Septic System East of Heliport Drive and South of Radiac Way

Previous sampling efforts as detailed in the 2008 Site Investigation adequately evaluated the leachfield, and found no contaminants above applicable criteria. The additional characterization sampling as documented in the referenced submittal was performed to complete evaluation of the septic system. Based upon the soil and ground water analytical results, no further action is necessary at this area of concern/carve-out. Although several metals were found in ground water above the Ground Water Quality Standards, N.J.A.C. 7:9-6, it has been determined the levels are present due to naturally occurring background conditions, not as the result of a discharge, and therefore are not subject to remediation pursuant to the Site Remediation Reform Act (N.J.S.A. 58:10C-1 et. seq.).

Former Septic System at Southeastern Corner of Parcel 28

As proposed, one test pit was performed in the location of the former holding tank area and four test pits were located within the former leach field. Based upon the additional sampling activities performed, and the analytical results from these as well as the 2008 Site Investigation activities, it is agreed the septic system has been adequately evaluated, and no further action is necessary at this area of concern/carve-out. Although several metals were found in ground water above the Ground Water Quality Standards, N.J.A.C. 7:9-6, it has been determined the levels are present due to naturally occurring background conditions, not as the result of a discharge, and therefore are not subject to remediation pursuant to the Site Remediation Reform Act (N.J.S.A. 58:10C-1 et. seq.).

Former Gas Station at Former Building 2541

Although not identified in the 2008 Site Investigation, a gasoline station was subsequently identified as previously operating at Former Building 2541. An investigation of the area was performed in July/August 2013, with no exceedances of the applicable Soil Remediation Standards for volatile organics or lead noted.

Several of the ground water samples, however, exhibited elevated levels of lead, and cannot be considered for designation of no further action needed. As indicated in the submittal, the lead results may be biased high due to the sampling method (sample collection using a bailer, with high turbidity likely). Based upon the former use of the site, however, at minimum, the location which exhibited the highest lead concentration must be resampled, using methodology that would reduce turbidity (e.g. low flow), to obtain an analytical result which is below the Ground Water Quality Standards (N.J.A.C.).

Please contact this office if you have any questions.

Sincerely,

Linda S. Range

C: Joe Pearson, Calibre Rich Harrison, FMERA Joe Fallon, FMERA Frank Barricelli, RAB James Moore, USACE

C-4

DEPARTMENT OF THE ARMY



OFFICE OF ASSISTANT CHIEF OF STAFF FOR INSTALLATION MANAGEMENT U.S. ARMY FORT MONMOUTH P.O. 148 OCEANPORT, NEW JERSEY 07757

June 4, 2015

Ms. Linda Range New Jersey Department of Environmental Protection Case Manager Bureau of Southern Field Operations 401 East State Street, 5th Floor PO Box 407 Trenton, NJ 08625

Re: Request for No Further Action at Parcel 28 Site Investigation Report Addendum Fort Monmouth, New Jersey

Attachments:

- A. Figure 1 Parcel 28 Layout and Sample Locations
- B. UHOT Closure Documentation
- C. Table 1 Soil Sampling Results
- D. Table 2 Groundwater Sampling Results
- E. Laboratory Data Reports
- F. CWA Geothermal Well Layout Locations

Previous Correspondence and Reports (not attached):

- 1. NJDEP letter to the U.S. Army dated July 10, 2012, re: *March 2012 Army Response to NJDEP Correspondence Letter Dated October 28*, 2008.
- 2. U.S. Army BRAC, July 2008, US ARMY BRAC 2005 Site Investigation Report, Fort Monmouth
- 3. NJDEP letter to the U.S. Army dated April 29, 2013, re: *Draft Finding of Suitability to Transfer (FOST) dated March 2013*.
- 4. U.S. Army letter to NJDEP dated May 17, 2013, re: *Proposed Test Pit Investigation Plan for Parcel 28 Historical Septic Tank Systems and Gas Station, Charles Wood area, Fort Monmouth, New Jersey.*
- 5. NJDEP letter to the U.S. Army dated June 3, 2013, re: *Proposed Test Pit Investigation Plan for Parcel 28 Historical Septic Tank Systems and Gas Station, Charles Wood area, Fort Monmouth, New Jersey.*

Dear Ms. Range:

In response to the New Jersey Department of Environmental Protection (NJDEP) letter to the U.S. Army (Army) dated July 10, 2012 (Correspondence 1) regarding the information presented in the July 2008 Site Investigation Report (Correspondence 2), the U.S. Army Fort Monmouth (FTMM) and Parsons have reviewed the additional data collected within Environmental Condition of Property (ECP) Parcel 28. The purpose of this letter is to provide support for a No

Further Action (NFA) determination by NJDEP for Parcel 28. This letter report serves as an addendum to the previously submitted 2008 Site Investigation Report.

Parcel 28, the Former Eatontown Laboratory Complex consists of an area of approximately 30 acres that encompasses Buildings 2525, 2560, 2539, 2540, 2541 and the land in this area. Building 2525 was constructed in 1941 and 1942 and was used as a chemical laboratory consisting of six bays; however, the locations of the bays are unknown. Activities conducted in Building 2525 included crystal growing and processing operations in the early 1950s. The Eatontown Signal Laboratory, formerly part of the Eatontown Laboratory Complex, was renamed Watson Laboratories in 1945 and subsequently moved to Rome, New York in 1951.

The NJDEP requested further evaluation of three former septic systems in their letter dated July 10, 2012 (Correspondence 1). Additionally, a letter was sent by the NJDEP to FTMM on April 29, 2013 (Correspondence 3) that requested investigation of an uncategorized area (the location of the former UST 2525A) within Parcel 28. The Army provided a response to the NJDEP's letter on May 17, 2013, (Correspondence 4) indicated that although they believed that the septic system components were removed during the renovation of the buildings associated with the Eatontown Laboratories (Circa 1951), they will perform test pit excavations and sampling at the three former septic system locations, as well as an investigation of a former gas station located northeast of Building 2525 and associated with former Building 2541 (which is based on a hand-drawn sketch of the CWA dated June 30, 1944). The location of the former septic systems and the former gas station is depicted on **Figure 1** provided in **Attachment A**. The Army's proposal was approved by the NJDEP on June 3, 2013 (Correspondence 5).

Correspondence 1 and 3 from the NJDEP requested additional documentation on underground storage tanks (USTs) within Parcel 28, most of which are unregulated heating oil tanks (UHOTs). A compilation of the 16 USTs located within Parcel 28, and documentation of the location and closure status of each, is provided in **Attachment B**. All but two of the USTs have previously been approved for NFA by NJDEP; the closure sample results for the remaining two (2542-29 and 2564-32) were not detected for total petroleum hydrocarbons (TPH), as previously reported to NJDEP in attachments to the draft final (August 2013) *Finding of Suitability to Transfer (FOST)*, *Fort Monmouth, Charles Wood Area* (also known as the Phase 1 FOST). Therefore, we request NJDEP approval of NFA for UHOTs 2542-29 and 2564-32 as part of this current submittal.

The Army further investigated Parcel 28 in July 2013 which focused on: 1) former septic system and septic tank A (identified as SSTA) located northeast of Building 2525; 2) former gas station (identified as FGS) associated with former Building 2541; 3) former septic system (identified as SSEH) located east of Heliport Drive and south of Radiac Way; and 4) former septic system (identified as SSSC) located at the southeastern corner of Parcel 28. The investigation program at the four locations consisted of the excavation of test pits with soil sampling and the collection of groundwater samples collected from temporary monitoring wells installed using direct push methods. The test pits including the soil sampling were completed during the initial mobilization phase of the investigation. As part of a second mobilization in August 2013, groundwater samples were collected from 1-inch diameter 10-slot temporary wells installed within the

backfilled test pit using direct push technology. Three well volumes were removed from each well prior to sampling; and both purging and sampling were completed using a Teflon bailer.

Soil and groundwater samples collected as part of this investigation were analyzed by Accutest Laboratories of Dayton, New Jersey, a NJDEP-accredited laboratory. Soil sample results are presented on **Table 1** (included as **Attachment C**) along with the NJDEP Residential Direct Contact Soil Remediation Standards (RDCSRS), the Non-Residential Direct Contact Soil Remediation Standards (NRDCSRS), and the Impacts to Groundwater Soil Screening Levels (IGWSSL). The groundwater sample results are presented on **Table 2** (included as **Attachment D**) along with the NJDEP Groundwater Quality Standard (GWQS). The laboratory data reports are provided as **Attachment E**. The following text presents the results of the investigations conducted at the four locations within Parcel 28.

Former Septic System and Septic Tank A

To determine the composition of the waste stream that entered the septic holding tank and associated leach field, the Army proposed five test pits (SSTA-A through SSTA-E, as shown in Attachment A) with one test pit located at the septic holding tank and four test pits located within the leach field. Two (SSTA-D and SSTA-E) of the five test pits were excavated since the remaining test pits (SSTA-A, SSTA-B, and SSTA-C) were located in the area of the existing geothermal well field. (The geothermal well field location is provided in Attachment F. The well field supports the Building 2525 closed-loop geothermal heating and cooling system, and therefore must be protected from subsurface disturbances to maintain building operations.) Test pit SSTA-D was terminated at a depth of approximately three feet below ground surface (bgs) when a component of the geothermal system was observed in the test pit and as a result no soil samples were collected from this location. Test pit SSTA-E was excavated to the depth of approximately 8 feet bgs; soils encountered consisted of brown orange sand with no odors or staining observed. A soil sample was collected (since no sludge was observed within the excavation) from a depth of approximately 7.5 to 8 feet bgs in SSTA-E which at the time of collection was within 6-inches from the observed groundwater table. There was no septic tank encountered in the test pits.

The soil sample (Parcel 28-SSTA-E [7.5-8.0]) was analyzed for USEPA Target Compound List plus Tentatively Identified Compounds (TICs)/Target Analyte List (TCL+TICs/TAL), which includes volatile organic compounds (VOC), semivolatile organic compounds (SVOC), metals, pesticides and polychlorinated biphenyls (PCBs). The sample was also analyzed for hexavalent chromium, extractable petroleum hydrocarbons (EPH) and pH. The soil sample results are provided in **Attachment C**. Pesticides, EPH, and PCBs were not detected in the soil sample. Detections of VOCs, SVOCs, and metals were below their respective RDCSRS. One metal, aluminum detected at a concentration of 8,250 mg/kg, exceeded the IGWSSL of 6,000 mg/kg but is below the background value of 15,700 mg/kg established for the Charles Wood Area (CWA) in the 1995 Weston Report Final Site Investigation, Fort Monmouth, New Jersey, Main Post and Charles Wood Area (1995 Weston).

One groundwater sample (Parcel 28-GW-SSTA-E) was collected from a temporary monitoring well installed within test pit SSTA-E. The groundwater sample collected with a bailer was analyzed for TCL+TICs/TAL, EPH, hexavalent chromium and pH. The groundwater sample

results are provided in **Attachment D**. VOCs, pesticides, PCBs, hexavalent chromium, and EPH were not detected in the groundwater sample. SVOC TICs were detected in only one sample and at concentrations significantly below the GWQS of 500 μ g/L. Aluminum (2,960 μ g/L), iron (4,420 μ g/L), and manganese (89.6 μ g/L) were detected above their respective GWQS but below the CWA background values (Weston, 1995). Sodium (176,000 μ g/L) was detected above both the NJDEP GWQS and the CWA background values (Weston, 1995); however, sodium is considered an essential nutrient and therefore not a COPC. In addition, since these samples were collected with a bailer from each temporary well the sample turbidity was likely high, which would cause the metal results to be biased high and, therefore, not representative of actual site conditions.

Evidence of the former septic system tank was not observed during the excavation of the test pits. Furthermore the presence of the geothermal well field indicates that the former septic system and associated components were likely removed to allow for the installation of the geothermal well field system. The soil and groundwater laboratory results from the investigation indicate that the soil and groundwater were not impacted by the former septic system.

Former Gas Station at Former Building 2541

To determine if any remnants of the gas station remain and if a potential release may have occurred from the former station, five test pits (FGS-A through FGS-E as shown in **Attachment A**) were excavated in the area of the former gas station. The test pits were advanced to a depth of approximately 6.5 feet bgs. The soil encountered from 0-3 feet bgs generally consisted of an orange brown sandy fill and from 3-6 feet bgs consisted of green/black glauconitic sand, with the exception of pea stone observed in test pit FGS-A. The soils were visually examined for staining and screened with a photoionization detector (PID). Impacted soil was not observed within the test pits; therefore one soil sample from each test pit was collected at a depth of 6 to 6.5 feet bgs, which at the time of collection was within six inches from the observed groundwater table.

The five soil samples (Parcel 28-FGS-A [6-6.5] through Parcel 28-FGS-E [6-6.5]) were analyzed for VOCs with a library search of the fifteen highest TICs (VOC+15) and lead. The soil results are provided in **Attachment C**. VOCs and lead concentrations detected were significantly below their respective RDCSRS and IGWSSL values. Therefore, no COPCs were identified for soil.

One groundwater sample (Parcel 28-FGS-A-GW through Parcel 28-FGS-E-GW) was collected from the temporary well installed in each of the five test pits. The groundwater samples were collected with bailers and analyzed for VOC+15 and lead. The groundwater samples results are provided in **Attachment D**. VOCs were not detected in the samples. Lead was detected in each sample at concentrations ranging from 4.6 μ g/L to 21.7 μ g/L. At locations FGS-A, FGS-D, and FGS-E, lead was detected above the GWQS of 5 μ g/L and the CWA background value of 7.3 μ g/L; at concentrations of 10.4 μ g/L, 13.7 μ g/L and 21.7 μ g/L respectively. Because these samples were collected with a bailer from the temporary well, the turbidity was likely high, which would cause the lead results to be biased high and, therefore, not representative of actual site conditions. Furthermore, the disturbance of glaucontic sands likely had an impact on the quality of the grab groundwater sample. Additionally lead was not detected above its IGWSSL at this location. For these reasons lead is not considered a COPC.

Remnants of the former gas station were not observed during the excavation of the test pits. The soil and groundwater samples collected during this investigation suggest that the soil and groundwater were not impacted by the former gas station.

Former Septic System East of Heliport Drive and South of Radiac Way

To determine the composition of the waste stream that entered the septic system, one test pit (SSEH-A as shown in **Attachment A**) was advanced in the area of the former distribution box. Test pit SSEH-A was excavated to a depth of approximately 8 feet bgs; soils encountered consisted of brown orange fine sand with no odors or staining observed. A soil sample was collected (since no sludge was observed within the excavation) in the test pit from a depth of approximately 7.5 to 8 feet bgs which at the time of collection was within 6-inches from the observed groundwater table. There was no septic tank or distribution box encountered in the test pit.

The soil sample (Parcel 28-SSEH-A [7.5-8.0] was analyzed for TCL+TICs/TAL, EPH, and hexavalent chromium. The soil sample results are provided in **Attachment C**. SVOCs, EPH, pesticides, and PCBs were not detected in the soil sample. VOCs and metals were detected in the soil sample but below their respective RDCSRS. Beryllium was detected at a concentration of 0.84 mg/kg, slightly above its IGWSSL of 0.7 mg/kg but below the CWA background value of 1.7 mg/kg (Weston, 1995). No COPCs were identified for soil.

One groundwater sample (Parcel 28-GW-SSEH-A) was collected from a temporary well installed in the test pit. The groundwater sample collected using a bailer was analyzed for TCL+TICs/TAL, EPH, hexavalent chromium and pH. The groundwater sample results are provided in Attachment D. VOCs, EPH, pesticides, and PCBs were not detected in the groundwater sample. SVOC TICs were detected in only sample and at a concentration significantly below the GWQS of 500µ g/L. Aluminum, arsenic, beryllium, chromium, iron, lead, and manganese were detected above their respective GWQS. Arsenic, beryllium, and manganese were detected at concentrations below their respective CWA background values and therefore are not COPCs. Iron is considered an essential nutrient and therefore is not a COPC. Aluminum (16,300 μg/L), chromium (213 μg/L) and lead (12.1 μg/L) were detected above both the NJDEP GWQS and the CWA background values. However, because this sample was collected with a bailer from a temporary well, the turbidity was likely high, which would cause the metal concentrations to be biased high and therefore, not representative of actual site conditions. Additionally, the soil sample collected at this location shows that lead and aluminum were detected below their respective IGWSSL. For these reasons, aluminum, chromium and lead are not considered COPCs.

Evidence of the former distribution box was not observed in the test pit, and the soil and groundwater sample collected during this investigation suggest that the soil and groundwater was not impacted by the former septic system.

Former Septic System At Southeastern Corner Of Parcel 28

To determine the composition of the waste stream that entered the septic system holding tank and associated leach field, five test pits (SSSC-A through SSSC-E as shown in **Attachment A**) were excavated with one test pit located at the former holding tank area and four test pits located

within the former leach field. The tests pits were excavated to a depth of approximately 6.5 feet bgs. Soils encountered in the test pits generally consisted of brown medium to fine sands with no odors or staining observed; however, other notable materials observed included abandoned electrical lines in SSSC-A and SSSC-E, concrete chunks in SSSC-B, and pea stone in SSSC-D. A soil sample was collected (since no sludge was observed within the excavation) in each test pit from a depth of approximately 6 to 6.5 feet bgs which at the time of collection was within 6-inches from the observed groundwater table. There was no septic tank encountered in the test pits.

The soil samples (Parcel -28 SSSC-A [6-6.5] through Parcel -28 SSSC-E [6-6.5]) were analyzed for TCL+TICs/TAL, EPH, hexavalent chromium and pH. The soil sample results are provided in **Attachment C**. EPH and PCBs were not detected in the soil samples. VOCs, SVOCs, pesticides, and metals detected in the soil samples are below their respective RDCSRS. Aluminum was detected at concentrations ranging from 7,740 to 11,200 mg/kg in three samples, which exceeds the IGWSSL of 6,000 mg/kg but is below the CWA background value of 15,700 mg/kg. No COPCs were identified for soil.

Groundwater samples (Parcel-28 SSSC-A-GW through Parcel-28 SSSC-E-GW) were collected from the temporary well installed in each test pit. The groundwater samples collected with a bailer were analyzed for TCL+TICs/TAL, EPH, hexavalent chromium and pH. PCBs were not detected in the samples. The groundwater sample results are provided in Attachment D. Only one VOC, chloroform a common laboratory contaminant, was detected in one sample and at a concentration significantly below its GWQS. Bis (2-ethylhexyl) phthalate a common laboratory contaminant, naphthalene and SVOCs TICs were detected in only two samples and at concentrations significantly below their GWQS. Two pesticides (alpha-chlordane and gammachlordane) were detected in only one sample and at concentrations significantly below their GWQS. Although no GWQS is established for EPH, it was detected in two samples, at concentrations less than 0.3 mg/L. Aluminum, arsenic, beryllium, chromium, iron, lead, manganese and sodium were detected above their respective GWQS. Manganese was detected at concentrations below the CWA background values and therefore is not a COPC. Also, iron and sodium are considered an essential nutrients and therefore not COPCs. Aluminum (8,740 µg/L -35,800 μg/L), arsenic (36.3 μg/L), beryllium (2.9 μg/L), chromium (128 μg/L - 408 μg/L) and lead (7.8 µg/L - 36.9 µg/L) were detected above both NJDEP GWQS and the CWA background values. Because these samples were collected with a bailer from a temporary well, the turbidity was likely high which would cause the metal results to be biased high, and therefore not representative of actually groundwater conditions. Additionally, soil samples collected at this location show that arsenic, beryllium and lead were detected below their respective IGWSSL values. For these reasons and considering the soil sampling results above, aluminum, arsenic, beryllium, chromium, and lead are not considered COPCs.

Evidence of the former septic system was not observed in test pits, and soil and groundwater samples collected indicate that the soil and groundwater was not impacted by the former septic system.

In summary, we request No Further Action for Parcel 28. The technical Point of Contact (POC) for this matter is Cris Grill at (617) 449-1583 or by email at cris.grill@parsons.com. Should you

have any questions or require additional information, please contact me by phone (732-383-5104) or by email at john.e.occhipinti.civ@mail.mil.

Sincerely,

Fort Monmouth Site Manager

cc:

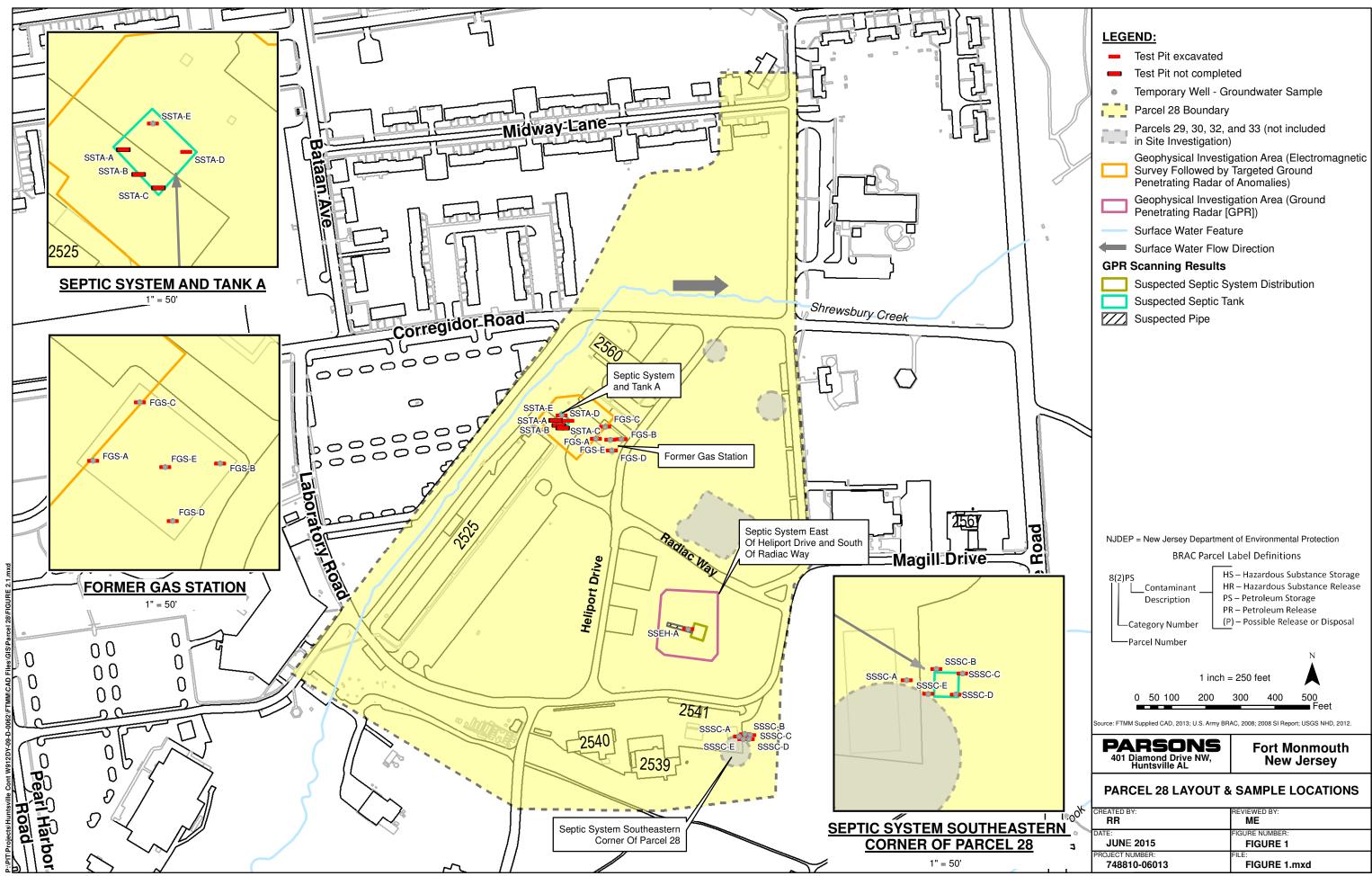
Delight Balducci, HQDA ACSIM

Joseph Pearson, Calibre James Moore, USACE Cris Grill, Parsons

References: Weston. 1995. Final Site Investigation - Main Post and Charles Wood Areas, Fort Monmouth, New Jersey, December

Attachment A

Figure 1 Parcel 28 Layout and Sample Locations

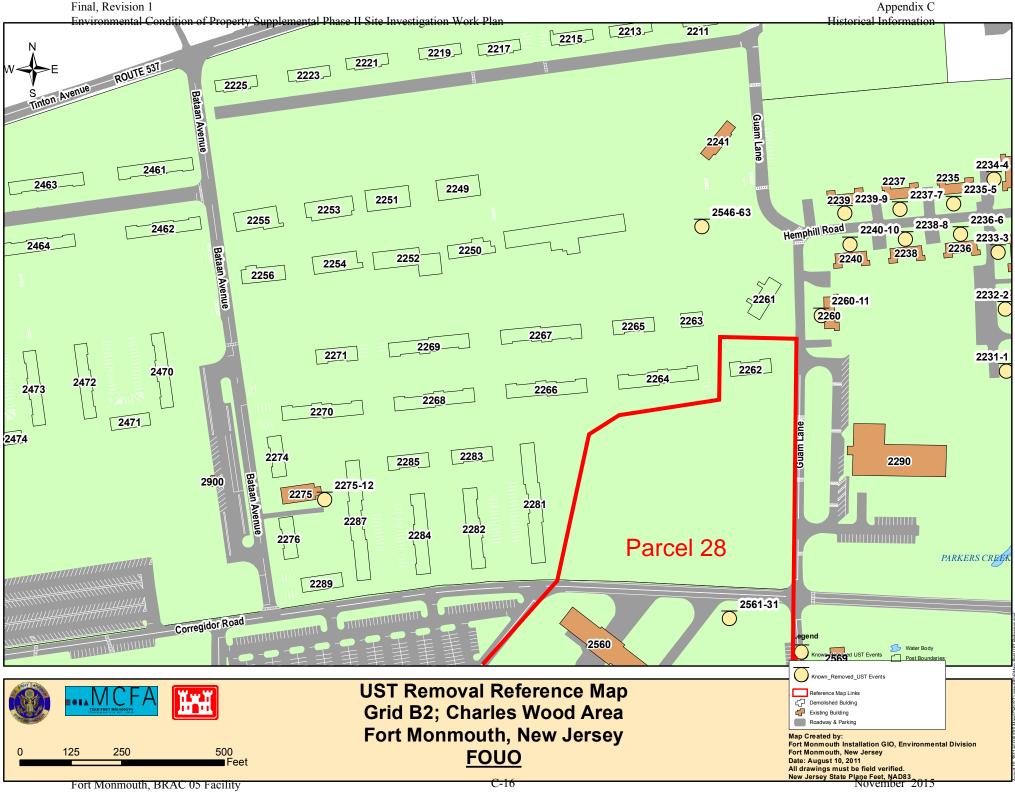


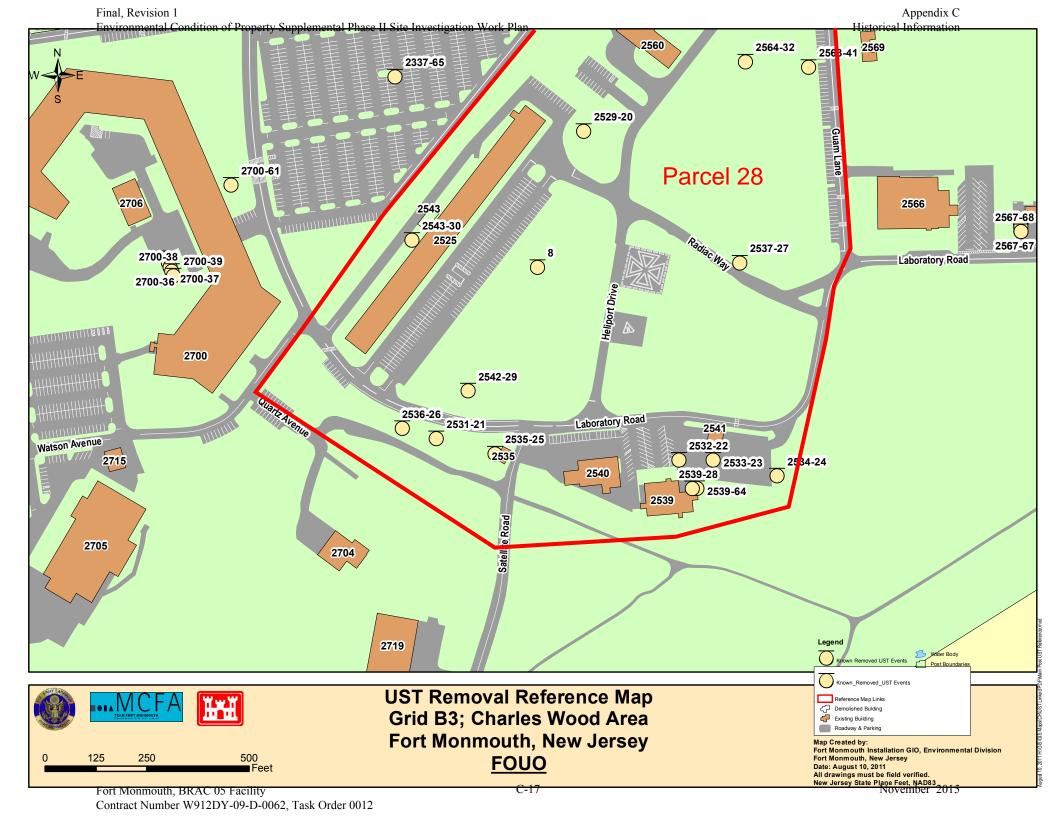
Attachment B

UHOT Closure Documentation

PARCEL 28 UST CLOSURE STATUS

Site Name	RegistrationI D	DICAR	Tank Size and Type	Product	Army Case Status	File Review Comments
2525A /P28-8 /Bldg. 2545	-		550 gal. steel	#2 FUEL OIL	Case Closed	NFA approved per 7/10/2012 NJDEP letter
2529	81515-20		1000 gal. steel	#2 FUEL OIL	Case Closed	NFA approved per 7/10/1998 NJDEP letter
2531	81515-21		1000 gal. steel	#2 FUEL OIL	Case Closed	NFA approved per 8/29/2000 NJDEP letter
2532	81515-22		550 gal. steel	#2 FUEL OIL	Case Closed	NFA approved per 7/10/1998 NJDEP letter
2533	81515-23		1000 gal. fiberglass	#2 FUEL OIL	Case Closed	NFA approved per 7/10/1998 NJDEP letter
2534	81515-24	94-05-24-0945-01	1000 gal. steel	#2 FUEL OIL	Case Closed	NFA approved per 1/10/2003 NJDEP letter
2535	81515-25		1000 gal. steel	#2 FUEL OIL	Case Closed	NFA approved per 8/29/2000 NJDEP letter
2536	81515-26		1000 gal. steel	#2 FUEL OIL	Case Closed	NFA approved per 7/10/1998 NJDEP letter
2537	81515-27	97-05-27-1421-04	1000 gal. steel	#2 FUEL OIL	Case Closed	NFA approved per 8/29/2000 NJDEP letter
2539	81515-64		1000 gal. steel	#2 FUEL OIL	Case Closed	NFA approved per 5/30/2013 NJDEP letter
2539	81515-28		1000 gal. steel	#2 FUEL OIL	Case Closed	NFA approved per 5/30/2013 NJDEP letter
2542	81515-29		1000 gal. steel	#2 FUEL OIL	Case Closed	See the March 2010 TVS closure report appended to the 8/2013 Phase I FOST
2543	81515-30		15000 gal. fiberglass	#2 FUEL OIL	Case Closed	NFA approved per 2/24/2000 NJDEP letter
2561	81515-31	95-9-26-1557-16	550 gal. steel	#2 FUEL OIL	Case Closed	NFA approved per 7/10/1998 NJDEP letter
2562A	81515-41	93-8-16-1243-26	5000 gal. steel	GASOLINE	Case Closed	NFA approved per 1/10/2003 NJDEP letter
2564	81515-32	-	1000 gal. steel	#2 FUEL OIL	Case Closed	See the March 2010 TVS closure report appended to the 8/2013 Phase I FOST







State of New Jersey

Christine Todd Whitman Governor

Department of Environmental Protection

Robert C. Shinn, Jr.

Commissioner

Mr. James Ott Director – Public Works U.S. Army, Fort Monmouth Fort Monmouth, NJ 07703

JUL 1 0 1998

Re:

UST Closure Reports

Fort Monmouth Army Base Tinton Falls, Monmouth County

Dear Mr. Ott:

The NJDEP is in receipt of UST closure reports noted below. These documents have been reviewed by the NJDEP throughout the closure process and the documents submitted were discussed throughout their drafting and in great detail upon submittal. Based on these steps and the final review conducted by me, the NJDEP accepts the closure reports and all of the NFA requests commensurate with these submittals.

NJDEP REG.					DEP
NO.	<u>BUILDING</u>	CONTENTS	CAPACITY	PROPOSAL	APPROVAL
- 90010-10	116C-MP/E	No. 2 Fuel OH	2000	NFA	YES
81533-134	826-MP/W	No. 2 Fuel Oil	550	NFA	YES
81533-144	902-MP/W	No. 2 Fuel Oil	1000	NFA	YES
81515-20	2529-CW	No. 2 Fuel	1000	NFA	YES
81515-22	2532-CW	No. 2 Fuel Oil	550	NFA	YES
81515-23	2533-CW	No. 2 Fuel Oil	1000	NFA	YES
81515-31	2561-CW	No. 2 Fuel Oil	550	NFA	YES
90010-27	410-MP/E	No. 2 Fuel Oil	1080	NEA	YES
81533-206	1075	NOT	SUBMITTED	WITH	PACKAGE
81515-16	2504B-CW	No. 2 Fuel Oil	1000	NFA	YES
81515-18	2507-CW	No. 2 Feel Ori	1080	NFA	YES
81515-26	2536-CW	No. 2 Fuel Oil	1000	NFA	YES
81515-14	2503-CW	No. 2 Fuel Oil	1000	NFA	YES
90010-12	117B-MP/E	No. 2 Fuel Oil	2000	MFA	YES
90010-34	418-MP/E	No. 2 Fuel Oil	1080	NFA	YES
90010-36	420-MP/E	No. 2 Fuel Oil	1080	NFA	YES
90010-38	422-MP/E	No. 2 Fuel Oil	1080	NFA	YES
90010-41	427-MP/E	No.2 Fuel Oil	1080	NFA	YES
90010-44	430A-MP/E	No 2 Fuel Oil	550	NFA	YES
9(#)10-50	453-MP/E •	No. 2 Feel Oil	1080	NFA	YES
90010-51	454-MP/E	No. 2 Fuel Oil	1080	NFA	YES
81533-76	501-MP/W	No. 2 Fuel Oil	1000	NFA	YES
81533-141	900A-MP/W	No. 2 Fuel Oil	1000	NFA	YES
81515-17	2506-CW	No. 2 Fuel Oil	1000	NFA	YES
90010-8	116A-MP/E	No. 2 Fuel Oil	1000	NFA	YES
90010-11	117A-MP/E	No. 2 Fuel Oil	2000	NFA	YES
90010-53	480-MP/E	No 2 Fuel Oil	1000	NFA	YES

81515-19 2508-CW No. 2 Fixel Oil 550 NFA YI	S
81533-228 804B-MP/W No. 2 Fuel Oil 1000 NFA YE	2 S
81533-142 900B-MP/W No. 2 Fuel Oil 1000 NFA YE	is

The efforts made to assure protection of human health and the environment as well as the efforts made to make the entire closure process efficient and consistent with the NJDEP's Technical Requirements for Site Remediation (N.J.A.C. 7:9-6 et seq.) has been exceptional.

If I can be of any assistance, please do not hesitate to contact me should you have any questions or comments.

Sincerely,

Ian R. Curtis, Case Manager Bureau of Federal Case Management ICURTIS@DEP.STATE.NJ.US

cc. Kevin Kratina, BUST

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State of New Hersey

Christine Todd Whitman

Department of Environmental Protection

Robert C. Shinn, Jr. Commissioner

Governor Mr. James Ott C/O: Dinker Desai Director - Public Works U.S. Army, Fort Monmouth Fort Monmouth, NJ 07703

FEB 2 4 2000

Re:

UST Closure Reports - Closure Approvals

Fort Monmouth Army Base

Fort Monmouth, Monmouth County

Dear Mr. Ott:

The NJDEP has reviewed the UST Closure and Site Investigation Reports for the Fort Monmouth underground storage tank sites noted below. Based on the NJDEP review of these documents, your request that the NJDEP approve the closure reports for those tanks listed below.

The following tanks were removed, sampled and analyzed in accordance with State and Federal requirements. Additionally, the reports consistently state the Fort Monmouth Public Works Department policy of removing all soils which are determined to have total petroleum hydrocarbon contamination (TPHC) greater than 1000 ppm. NJDEP criteria requires similar removal for TPHC contamination greater than 10,000 ppm. These activities are conservative and therefore further assure the NJDEP that no further action is necessary at these sites.

NJDEP Req. #	Bldg. #	NJDEP Req. #	Bldg. #
0090016-16	165	0081533-151	913
0090010-69	170D	0081533-155	917
0090010-20	197	0081533-165	1105
0081533-54	270	0081533—169	1109
0081533-60	286	0081533-173	1213A
0081533-65	291	0081533-208	1221
0090010-70	400	00192486-34	2018
0081533-103	671A	00192486-35	2021A
0081533-138	876A	0081515-30	2543
0081533-149	911	0081515-40	2707
0081533-150	912		1

If you should have any questions or comments, please do not hesitate to contact me at (609) 633-7232 or via E-mail.

Ian R. Curtis, Case Manager Bureau of Case Management ICURTIS@DEP.STATE.NJ.US

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State of New Jersey

Christine Todd Whitman Governor

Department of Environmental Protection

Robert C. Shinn, Jr. Commissioner

Mr. Dinkerrai Desai

DEPARTMENT OF THE ARMY

HEADQUARTERS, U.S. ARMY COMMUNICATIONS-ELECTRONIC COMMAND

FORT MONMOUTH, NJ 07703-5000

Re:

UST Closure Approval/NFA Fort Monmouth Main Post Monmouth County

Dear Mr. Desai:

The NJDEP is in receipt of twenty-five (25) UST closure reports dated August 1, 2000. The Army has requested to receive No Further Action approval letters for each of these reports. This letter approves the NFA requests for the following 25 UST located on the Main Post of the Fort Monmouth site:

NJDEP Req. #	Bldg. #	NJDEP Req. #	Bldg. #
0090010-03	64	0081533-80	551
0090010-05	65	0081533-81	552
0090010-05	74	0081533-120	746
0081533-03	205	0081533-122	748
0090010-29	412	0081533-123	749
0090010-30	413	0081533-131	810
0090010-31	414	0081533-132	811
0090010-33	417	0081533-232	906B
0090010-42	428	0081533-159	1006
0090010-47	434	0081533-206	1075
0090010-47	447	0081515-21	2531
0090010-57	485	0019248602	2018
0090010-59	492		

The NJDEP has determined that the Army has performed the remedial actions in a manner consistent or in excess of the regulatory requirements, specifically the Technical Requirements For Site Remediation (N.J.A.C. 7:26E et seq.). Soils with contamination in excess of the NJDEP residential cleanup criteria have been excavated and the Army has taken great care to provide documentation which assures us that all sources of contamination have been remediated.

The NJDEP has one comment in that we request that future reports provide ground water flow direction indications on the well location maps.

If you should have any questions or comments, please do not hesitate to contact me at (609) 633-7232 or via E-mail.

lan R. Curtis, Case Manager Bureau of Case Management ICURTIS@DEP.STATE.NJ.US

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State of New Jersey

Christine Todd Whitman Governor

Department of Environmental Protection

Robert C. Shinn, Jr. Commissioner

AUG 2 9 2000

Mr. Dinkerrai Desai
Department of the Army
Headquarters, U.S. Army Communications-Electronic Command
Fort Monmouth, NJ 07703-5000

Re:

UST Closure Approval/NFA Fort Monmouth Main Post Monmouth County

Dear Mr. Desai:

The NJDEP is in receipt of nine (9) UST closure reports dated July 27, 1998. The Army has requested to receive No Further Action approval letters for each of these reports. This letter approves the NFA requests for the following 9 UST located on the Main Post of the Fort Monmouth site:

NJDEP Reg. #	Bldg. #
1 "	419
0090010—35	
0090010-48	439
0090010-56	484
0081533-77	502
0081533-143	901
0081515-12	2275
0081515-13	2502
0081515-25	2535
0081515-27	2537

The NJDEP has determined that the Army has performed the remedial actions in a manner consistent or in excess of the regulatory requirements, specifically the Technical Requirements For Site Remediation (N.J.A.C. 7:26E et seq.). Soils with contamination in excess of the NJDEP residential cleanup criteria have been excavated and the Army has taken great care to provide documentation which assures us that all sources of contamination have been remediated.

If you should have any questions or comments, please do not hesitate to contact me at (609) 633-7232 or via E-mail.

lah R. Curtis, Case Manager Bureau of Case Management ICURTIS@DEP.STATE.NJ.US

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James E. McGreevey Governor

Department of Environmental Protection

Bradley M. Campbell Commissioner

Mr. Dinkerrai Desai DEPARTMENT OF THE ARMY HEADQUARTERS, U.S. ARMY COMMUNICATIONS-ELECTRONIC COMMAND FORT MONMOUTH, NJ 07703-5000

Re:

UST Closure Approval/NFA Fort Monmouth Main Post Monmouth County JAN 1 0 2003

Dear Mr. Desai:

The NJDEP is in receipt of sixty-eight (68) underground storage tank (UST) closure reports dated between July 17, 2001 and May 15, 2002. The Army has requested to receive No Further Action (NFA) approval letters for each of these reports. This letter approves the NFA requests for the following 68 UST that are located on the Main Post of the Fort Monmouth site:

Submittal Date	Building No.	NJDEP Reg. #	Residential
07/17/2001	104	90010-75	NO
07/17/2001	699A	81533-112	NO
07/17/2001	800A	81533-127	NO
07/17/2001	875	81533-234	NO
07/17/2001	949	81533-203	NO
07/17/2001	1220A	81533-184	NO
07/17/2001	2000B	192486-38	NO
01/02/2002	257	81533-200	NO
01/02/2002	283C	81533-229	NO
01/02/2002	290B	81533-224	NO
01/02/2002	290B	81533-225	NO
01/02/2002	491	90010-71	NO
01/02/2002	605	81533-85	NO
01/02/2002	678	81533-105	NO
01/02/2002	699	81533-236	NO
01/02/2002	699	81533-238	NO
01/02/2002	699	81533-237	NO
01/02/2002	699	81533-235	NO
01/02/2002	801B	81533-129	NO
01/02/2002	804A	81533-130	NO
01/02/2002	2337	81515-65	NO
01/02/2002	2562A	81515-41	NO
01/02/2002	2707	81515-50	NO
01/02/2002	2707	81515-49	NO
01/02/2002	2707	81515-51	NO
01/02/2002	2707	81515-47	NO
01/02/2002	2707	81515-48	NO

Submittal Date	Building No.	NJDEP Reg. #	Residential
02/13/2002	2044	192486-24	NO
02/13/2002	2044	192486-32	NO
02/13/2002	2044	192486-33	NO
02/26/2002	208B	81533-210	YES
03/05/2002	246	N/A	YES
03/05/2002	261B	N/A	YES
05/15/2002	106	90010-74	NO
05/15/2002	164	90010-15	NO
05/15/2002	173	90010-19	NO
05/15/2002	200	81533-2	NO
05/15/2002	208A	81533-6	YES
05/15/2002	233	81533-21	YES
05/15/2002	237	81533-25	YES
05/15/2002	271	81533-55	YES
05/15/2002	277	90010-24	NO
05/15/2002	296B	81533-217	NO
05/15/2002	296B	81533-223	NO
05/15/2002	296B	81533-221	NO
05/15/2002	296B	81533-220	NO
05/15/2002	296B	81533-222	NO
05/15/2002	296B	81533-218	NO
05/15/2002	296B	81533-216	NO
05/15/2002	296B	81533-215	NO
05/15/2002	296B	81533-214	NO
05/15/2002	296B	81533-213	ŃO
05/15/2002	296B	81533-219	NO
05/15/2002	426	90010-40	NO
05/15/2002	482	90010-54	NO
05/15/2002	600 A	81533-83	NO
05/15/2002	600 B	81533-212	NO
05/15/2002	611	81533-87	NO
05/15/2002	615	81533-89	NO
05/15/2002	618	81533-91	NO
05/15/2002	619	81533-92	NO
05/15/2002	621	81533-94	NO
05/15/2002	634	N/A	NO
05/15/2002	638	N/A	NO
05/15/2002	639-2	N/A	NO
05/15/2002	640	N/A	NO
05/15/2002	641	N/A	NO
05/15/2002	644	N/A	NO
05/15/2002	664	. N/A	NO
05/15/2002	666	N/A	NO
05/15/2002	686	81533-107	NO
05/15/2002	697	81533-194	NO
05/15/2002	697	81533-195	NO

Submittal Date	Building No.	NJDEP Reg. #	Residential
05/15/2002	697	81533-196	NO
05/15/2002	876B	81533-139	NO
05/15/2002	886	81533-140	NO
05/15/2002	905	81533-145	NO
05/15/2002	1102	81533-162	NO
05/15/2002	1104	81533-164	NO
05/15/2002	2067	192486-37	NO
05/15/2002	2534	81515-24	NO
05/15/2002	2603	81515-60	NO
05/15/2002	2700 2,6	81515-61	NO

The NJDEP has determined that the Army has performed the remedial actions in a manner consistent with the regulatory requirements, specifically the Technical Requirements For Site Remediation (N.J.A.C. 7:26E et seq.). Soils with contamination in excess of the NJDEP residential cleanup criteria have been excavated and the Army has taken great care to provide documentation that assures us that all sources of contamination have been remediated.

If you should have any questions or comments, please do not hesitate to contact me at (609) 633-7232 or via E-mail.

Sincerely,

Ian R. Curtis, Case Manager Bureau of Case Management ICURTIS@DEP.STATE.NJ.US

FTMMTH116IRC.DOC



State of New Jersey

CHRIS CHRISTIE Governor

KIM GUADAGNO Lt. Governor

DEPARTMENT OF ENVIRONMENTAL PROTECTION Bureau of Case Management 401 East State Street P.O. Box 420/Mail Code 401-05F Trenton, NJ 08625-0028 Phone #: 609-633-1455 Fax #: 609-633-1439

BOB MARTIN Commissioner

July 10, 2012

Wanda Green BRAC Environmental Coordinator OACSIM – U.S. Army Fort Monmouth PO Box 148 Oceanport, NJ 07757

Re:

March 2012 Army Response to NJDEP Correspondence Letter Dated October 28, 2008

Fort Monmouth, NJ PI G000000032

Dear Ms. Green:

A review of the above referenced report, received March 27, 2012 and submitted in response to the Department's comments regarding the Draft Site investigation Report of July 21, 2008 by Shaw Environmental, Inc., has been completed by this office. Many of the parcel comments involved suspected USTs; in addition to that information provided in this submittal and the July 2008 SI, a review and comparison of Appendix G, Appendix O, and Figures 15 and 16 of the January 2007 ECP Report was conducted by this office in an attempt to ascertain the location and status of all tanks located within the parcels. Unless otherwise noted, comments and questions are provided only for each parcel referenced in the submittal and are generally presented by parcel.

Parcel 13 – Former Barracks (Buildings 2004-2016)

Geophysical surveys were performed, and sampling was conducted throughout that area at which USTs were known to or may have been present. No USTs were found; all soils analytical results were below cleanup criteria applicable to the site; no additional action for the parcel is necessary.

Parcel 14 - Former Buildings and Housing Area Northwest Portion of CWA

As indicated in the Department's correspondence of May 30, 2012, the geophysical surveys performed and sampling conducted throughout that area at which USTs were or may have been present were sufficient to adequately characterize the area. No USTs were found; all soils analytical results collected were below cleanup criteria applicable to the site. The parcel was re-categorized from Category 2 to Category 1.

Parcel 15 – Building 2700

Parcel 15 was issued a designation of No Further Action for soils and ground water, *exclusive of CW-1*, on May 9, 2012. Remediation efforts involving CW-1 continue.

Parcel 27 - Southwestern Corner CWA

The single outstanding issue at Parcel 27 was the USTs. As previously indicated, numerous USTs were removed from the parcel, however, additional documentation for same was required.

It is agreed fourteen (14) USTs have been removed and given NJDEP Closure Approval Letters/NFAs. Although it is understood Departmental approval may have been granted for an additional five USTs, as indicated on Page 6 of the referenced submittal and in Appendix G, please be advised this office does not have documentation confirming Closure Approval/NFA for the following USTs.

UST 2506-17	Reported NJDEP UST Closure Approval Date 7/10/98
UST 2624-34	Reported NJDEP UST Closure Approval Date 7/23/93
UST 2624-57	Reported NJDEP UST Closure Approval Date 9/21/95
UST 2624-58	Reported NJDEP UST Closure Approval Date 9/21/95
UST 2624-59	Reported NJDEP UST Closure Approval Date 9/21/95

Additionally, please provide information as to the status of the USTs noted in Appendix O at what appear to be Buildings 2566 and 2505, located just north of Building 2503?

Any sediment issues which may have resulted from parcel operations are to be addressed as part of the ongoing facility wide ecological assessment.

Parcel 28 - Former Eatontown Laboratory

<u>Underground Storage Tanks</u>

Although this office is in agreement with the information submitted in regard to the majority of the USTs as noted on Parcel 28, questions remain on several, which are not considered as given a designation of NFA at this time.

As above, documentation for closure approval or NFA is not available for confirmation on the following USTs.

UST 2539-28	Reported NJDEP UST Closure Approval Date 3/31/93
UST 2539-64	Reported NJDEP UST Closure Approval Date 3/31/93
UST-2531-21	Reported NJDEP UST Closure Approval Date 8/29/00

UST 2542-29 and UST 2564-32 are reported as no release observed. A Standard Reporting Form and/or Site Assessment Compliance Statement were reported sent to us 11/22/91, however, no designation of NFA was granted, nor comments apparently generated.

Appendix O indicates three USTs within that area which underwent a geophysical survey between Building 2525 & Heliport Drive. The center UST appears to correlate to UST P28-8, which, based upon the investigation performed, warrants no further action. Although it is agreed no tanks remain in that area, please provide any record of their removal or indication as to evidence of a discharge upon removal. As previously discussed, a designation of NFA for USTs cannot be granted without sampling.

Septic Tanks & Leachfields

Leachfield East of Heliport Drive, South of Radiac Way – It is agreed the four test pits were adequate for characterization of the leachfield; no additional action is necessary for the leachfield. It does not appear, however, the suspected D-box/entirety of the septic system was investigated. Although they are not designed to hold liquids/sludges (but rather to distribute the liquids after the solids fall out into the holding tank), particularly as the structure apparently remains in place, additional information is required as to whether the structure could have been/functioned as a holding tank (field notes do reference it as a septic tank) which did contain solids or liquids which should have been sampled.

Septic System & Septic Tank A – Located off the northeast corner of Building 2525, a suspected septic tank was located via GPR scanning, as denoted as "A" on Figure 3.5-2 of the ECP Site Investigation. Sampling efforts, however, were performed only at the associated leachfield. What efforts were made to adequately characterize any holding tank contents of the actual septic tank, as required by the Tech Regulations in effect at the time of investigation (NJAC 7:26E-3.9(e)3)? As regarding the associated leachfield, a minimum of 4 samples is required. A single soil and single ground water sample is inadequate.

Septic System at Southeastern Corner of Parcel - For that septic system located in the southeastern corner of the parcel as sampled by P28-SB1, the findings/requirements noted in the above paragraph also apply.

Former Storage Areas/Possible Former Tank Pads – This area received a designation of NFA on March 29, 2012.

Parcel 34 – Building 2567/FTMM 58

Elevated levels of ground water contamination underwent treatment via a Permit-by-Rule approved in October of 2010. The Department most recently responded on March 7, 2012 approving monitoring via two rounds of seasonal high ground water analytical sampling.

As recently discussed, although piping was cleaned at the time of tank removal, it necessary to remove the piping and dispensing equipment/island.

Remaining pages have been omitted for brevity



State of New Jersey

CHRIS CHRISTIE
Governor

KIM GUADAGNO Lt. Governor DEPARTMENT OF ENVIRONMENTAL PROTECTION
Bureau of Case Management
401 East State Street
P.O. Box 420/Mail Code 401-05F
Trenton, NJ 08625-0028
Phone #: 609-633-1455
Fax #: 609-633-1439

BOB MARTIN Commissioner

May 30, 2013

Wanda Green BRAC Environmental Coordinator OACSIM – U.S. Army Fort Monmouth PO Box 148 Oceanport, NJ 07757

Re:

Army's January 31, 2013 Correspondence - Miscellaneous USTs

Main Post & Charles Wood Area Fort Monmouth, New Jersey

PI G00000032

Dear Ms. Green:

The New Jersey Department of Environmental Protection (Department) has completed review of the referenced correspondence (and associated Attachments A through T), submitted to address several of the unresolved underground storage tank (UST) issues noted in this office's letter of July 10, 2012. As indicated in the referenced submittal, additional information regarding the various USTs will be forthcoming. The following comments are offered.

Parcel 28 – Former Eatontown Laboratory

As has been discussed, it is agreed no additional action is necessary for UST 2539-28, UST 2539-64, UST 2531-21, and two of the three USTs previously located between Building 2525 and Heliport Drive. Documentation as to the adequate evaluation of tanks UST 2542-29, UST 2564-32 and the UST at Building 2544 (T-7) has not yet been submitted.

Parcel 49 – Former Squier Laboratory Complex

Upon review of the documentation included in the submittal, it is agreed no further action is necessary for the UST at Building 293-67, or UST 283B-59.

Parcel 51 - 750 Area, 500 Area, 600 Area, 1100 Area - Former Buildings

Upon review of the documentation included in the submittal, it is agreed no further action is necessary for UST 695-111, UST 635, UST 642, UST 643 and 501-76.

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As no sampling was apparently performed at UST 637, this office cannot concur there has been no discharge associated with the UST. As regarding Appendix K, and USTs at Buildings 644 through 654, evidently no sampling was performed; again, without same, this office cannot concur there has been no discharge.

Parcel 76 – 200 Area, 300 Area – Former Barracks

Review of the documentation included in the submittal indicates no additional action is necessary for UST 261 and UST 261B.

Parcel 79 – 400 Area Former Barracks

Review of the documentation included in the submittal, as well as that included in the files, indicates no further action is necessary for UST 411-28, UST 421-37, UST 423-39

As no sampling was evidently performed at UST 401-26 or UST 416-32, this office cannot concur there has been no discharge associated with the USTs.

If you have any questions regarding this matter, please contact this office at (609) 984-6606.

Sincerely,

Linda S. Range

Bureau of Case Management

C: Joe Pearson, Calibre Systems Rich Harrison, FMERA Julie Carver, Matrix

Attachment C

Table 1 Soil Sampling Results

Site Parcel 28 Fort Monmouth, New Jersey rect Cont SRS Screening Level Parcel28-SSTA-E (7.5-8.0) 7/16/2013 latile Organic Compounds (µg/kg) 290,000 4,200,000 300 1,000 3,000 7 NLE NLE NLE 0.57 J 1.3 J 200 11,000 150,000 NLE NLE 73,000 820,000
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Site Parcel 28

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Attachment C **Table 1 Soil Sampling Results** Site Parcel 28 Fort Monmouth, New Jersey

Footnote:

- 1) All historical data collected prior to 2013 are reported as provided by others.
- 2) Number of Analyses is the number of detected and non-detected results excluding rejected results. Sample duplicate pairs have not been averaged.
- 3) NLE = no limit established.
- 4) ND = not detected in any background sample, no background concentration available.

5) Chemical result qualifiers are assigned by the laboratory and is typically evaluated and modified (if necessary) by during data validation.

[blank] = detect, i.e. detected chemical result value. J = estimated (detect or non-detect) value.

B = Compound detected in the sample and its associated blank sample. E (or ER) = Estimated result. R = Rejected, data validation rejected the results. D = Results from dilution of sample.

U = non-detect, i.e. not detected equal to or above this value. J-DL = Elevated sample detection limit due to difficult sample matrix. U-DL = Elevated sample detection limit due to difficult sample matrix. JN = Tentatively identified compound, estimated concentration.

U-ND = Analyte not detected in sample, but no detection or reporting limit provided. NA = Not analyzed

6) Chemical results greater than or equal to the action level (depending on criteria) are highlighted based on the Criteria that are present.

- Cell Shade values represent a result that is above the NJ Residential Direct Contact Soil Remediation Standard.

- Cell Shade values represent a result that is above the NJ Non-Residential Direct Contact Soil Remediation Standard.
- Cell Shade values represent a result that is above the NJ Impact to GW Soil Screening Level
- Cell Style values represent a result that is above the Weston 1995 Background (Charles Wood).

n/a = all concentrations were less than the detection limit, therefore, no location of maximum value identified. Dash (-) = only background concentrations for metals are being used as comparison criteria.

- Cell Shade values represent a result that is above both the NJ Residential, Non-Residential, AND NJ Impact to GW Soil Screening Level Direct

- Cell Shade values represent a result that is above both the NJ Residential and Non-Residential Direct Contact Soil Remediation Standard.



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7) Criteria action level source document and web address.

- The NJ Residential Direct Contact Soil Remediation Standard refers to the NJDEP's May 7, 2012 Remediation Standards http://www.nj.gov/dep/rules/rules/njac7_26d.pdf
- The NJ Non-Residential Direct Contact Soil Remediation Standard refers to the NJDEP's May 7, 2012 Remediation Standards. $http://www.nj.gov/dep/rules/rules/njac7_26d.pdf$
- The NJ Impact to GW Soil Screening Level criteria refers to the Development of Site Specific Impact to Ground Water Soil Remediation Standards Nov 2013 http://www.nj.gov/dep/srp/guidance/rs/partition_equation.pdf
- The Weston 1995 Background (Charles Wood) refers to the FTMM reports.

Attachment D

Table 2 Groundwater Sampling Results

Attachment D Table 2 Groundwater Sampling Results Site Parcel 28 Fort Monmouth, New Jersey

Fort Monmouth, N	ew Jersey	ı					T		T	1	
Loc ID Sample ID	NJ Ground Water Quality Criteria	Weston 1995 Background (Charles Wood)	PARCEL 28-GW-SSTA-E	PARCEL 28-FGS-A-GW PARCEL 28-GW-FGS-A	PARCEL28-FGS-B-GW PARCEL 28-GW-FGS-B	PARCEL28-FGS-C-GW PARCEL 28-GW-FGS-C	PARCEL28-FGS-D-GW PARCEL 28-GW-FGS-D	PARCEL28-FGS-E-GW PARCEL 28-GW-FGS-E	PARCEL28-SSEH-A-GW PARCEL 28-GW-SSEH-A	PARCEL28-SSSC-A-GW PARCEL 28-GW-SSSC-A	PARCEL28-SSSC-B-GW PARCEL 28-GW-SSSC-B
Sample Date Volatile Organic Compounds (µg/l) 1,1,1-Trichloroethane	30	-	8/2/2013 <1	8/2/2013 <1	8/2/2013 <1	8/2/2013 <1	8/2/2013 <1	8/2/2013	7/31/2013	7/17/2013	7/17/2013
1,1,2,2-Tetrachloroethane 1,1,2-Trichloro-1,2,2-Trifluoroethane 1,1,2-Trichloroethane 1,1-Dichloroethane	1 100 3	-	<1 <5 <1 <1	<1 <5 <1	<1 <5 <1 <1	<1 <5 <1 <1	<1 <5 <1 <1	<1 <5 <1	< 0.21 < 0.53 < 0.29	<1 <5 <1 <1	<1 <5 <1
,1-Dichloroetnane ,1-Dichloroethene ,2,3-Trichlorobenzene ,2,4-Trichlorobenzene	50 1 100 9	-	<1 <1 <5 <5	<1 <1 <5 <5	<1 <1 <5 <5	<1 <1 <5 <5	<1 <1 <5 <5	<1 <1 <5 <5	< 0.11 < 0.19 < 0.28 < 0.2	<1 <1 <5 <5	<1 <1 <5 <5
2Dibromo-3-chloropropane 2Dibromoethane 2Dichlorobenzene	0.02 0.03 600	-	<10 <2 <1	<10 <2 <1	<10 <2 <1	<10 <2 <1	<10 <2 <1	<10 <2 <1	< 0.54 < 0.2 < 0.22	<10 <2 <1	<10 <2 <1
2-Dichloroethane 2-Dichloropropane 3-Dichlorobenzene	2 1 600	-	<1 <1 <1	<1 <1 <1	<1 <1 <1	<1 <1 <1	<1 <1 <1 <1	<1 <1 <1	< 0.26 < 0.48 < 0.22	<1 <1 <1	<1 <1 <1
,4-Dichlorobenzene ,4-Dioxane Acetone	75 10 6,000	-	<1 <130 <10	<1 <130 <10	<1 <130 <10	< 1 < 130 < 10	< 1 < 130 < 10	<1 <130 <10	< 0.3 < 75 < 3.3	<1 <130 <10	<1 <130 <10
Benzene Bromochloromethane Bromodichloromethane	1 100 1	-	<1 <5 <1	<1 <5 <1	<1 <5 <1	<1 <5 <1	<1 <5 <1	<1 <5 <1	< 0.24 < 0.3 < 0.21	<1 <5 <1	<1 <5 <1
Bromoform Carbon disulfide Carbon tetrachloride	700 1	-	<4 <2 <1	<4 <2 <1	< 4 < 2 < 1	< 4 < 2 < 1	< 4 < 2 < 1	<4 <2 <1	< 0.21 < 0.19 < 0.22	<4 <2 <1	<4 <2 <1
Chlorobenzene Chlorodibromomethane Chlorocethane	50 1 5	-	<1 <1 <1	<1 <1 <1	<1 <1 <1	<1 <1 <1	<1 <1 <1	<1 <1 <1	< 0.23 < 0.14 < 0.26	<1 <1 <1	<1 <1 <1
Chloroform Cis-1,2-Dichloroethene Cis-1,3-Dichloropropene	70 70 1	-	<1 <1 <1	<1 <1 <1	<1 <1 <1	<1 <1 <1	<1 <1 <1	<1 <1 <1	< 0.2 < 0.19 < 0.21 < 0.35	<1 <1 <1	<1 <1 <1
Cyclohexane Dichlorodifluoromethane Ethyl benzene Isopropylbenzene	100 1,000 700 700	-	<5 <5 <1 <2	<5 <5 <1 <2	<5 <5 <1 <2	<5 <5 <1 <2	<5 <5 <1 <2	<5 <5 <1 <2	< 0.35 < 0.27 < 0.23 < 0.45	<5 <5 <1 <2	<5 <5 <1 <2
sognopyrocinzene Methyl Acetate Methyl Acetate Methyl bromide	1,000 7,000 10	-	<1 <5 <2	<1 <5 <2	<1 <5 <2	<1 <5 <2	<1 <5 <2	<1 <5 <2	< 0.42 < 0.42 < 1.2 < 0.22	<1 <5 <2	<1 <5 <2
Methyl butyl ketone Methyl chloride Methyl cyclohexane	300 100 NLE	-	<5 <1 <5	<5 <1 <5	<5 <1 <5	<5 <1 <5	<5 <1 <5	<5 <1 <5	< 1.1 < 0.21 < 0.26	<5 <1 <5	<5 <1 <5
Methyl ethyl ketone Methyl isobutyl ketone Methyl Tertbutyl Ether	300 100 70	-	<10 <5 <1	<10 <5 <1	<10 <5 <1	<10 <5 <1	<10 <5 <1	<10 <5 <1	< 2.4 < 0.83 < 0.16	<10 <5 <1	<10 <5 <1
Methylene chloride Ortho Xylene Styrene	3 1,000 100	-	<2 <1 <5	<2 <1 <5	<2 <1 <5	<2 <1 <5	<2 <1 <5	<2 <1 <5	< 0.7 < 0.24 < 0.21	<2 <1 <5	<2 <1 <5
Tetrachloroethene Foluene Fotal Xylenes	1 600 1,000	-	<1 <1 <1	<1 <1 <1	<1 <1 <1	<1 <1 <1	<1 <1 <1	<1 <1 <1	< 0.28 < 0.23 < 0.24	<1 <1 <1	<1 <1 <1
Frans-1,2-Dichloroethene Frans-1,3-Dichloropropene Frichloroethene	100 1	-	<1 <1 <1	<1 <1 <1	<1 <1 <1	<1 <1 <1	<1 <1 <1	<1 <1 <1	< 0.21 < 0.19 < 0.22	<1 <1 <1	<1 <1 <1
Trichlorofluoromethane Vinyl chloride FIC VOCs (µg/l)	2,000	-	<5 <1	<5 <1	<5 <1	<5 <1	<5 <1	<5 <1	< 0.27 < 0.21	<5 <1	<5 <1
Fotal Alkanes, VOC Fotal TIC, Volatile Semivolatile Organic Compounds (µg/l)	NLE 500	-	0 U 0 U	0 U 0 U	0 U 0 U	0 U 0 U	0 U 0 U	0 U 0 U	0 U	0 U	0 U 0 U
1,1'-Biphenyl 1,2,4,5-Tetrachlorobenzene 2,3,4,6-Tetrachlorophenol	400 100 200	-	< 1.1 < 2.1 < 5.3	NA NA NA	NA NA NA	NA NA NA	NA NA NA	NA NA NA	< 0.32 < 0.32 < 1	<1 <2 <5	<1 <2 <5
2,4,5-Trichlorophenol 2,4,6-Trichlorophenol 2,4-Dichlorophenol	700 20 20	-	< 5.3 < 5.3 < 5.3	NA NA NA	NA NA NA	NA NA NA	NA NA NA	NA NA NA	<1.7 <1.4 <1.2	<5 <5 <5	<5 <5 <5
2,4-Dimethylphenol 2,4-Dinitrophenol 2,4-Dinitrotoluene	100 40 10	-	<5.3 <21 <2.1	NA NA NA	NA NA NA	NA NA NA	NA NA NA	NA NA NA	<1.6 <18 <0.45	<5 <20 <2	<5 <20 <2
2,6-Dinitrotoluene 2-Chloronaphthalene 2-Chlorophenol	10 600 40	-	< 2.1 < 2.1 < 5.3	NA NA NA	NA NA NA	NA NA NA	NA NA NA	NA NA NA	< 0.49 < 0.32 < 1	<2 <2 <5	<2 <2 <5
2-Methylnaphthalene 2-Methylphenol 2-Nitronaline	30 100 100	-	<1.1 <2.1 <5.3	NA NA NA	NA NA NA	NA NA NA	NA NA NA	NA NA NA	<0.41 <1.1 <1.2	<1 <2 <5	<1 <2 <5
2-Nitrophenol 3&4-Methylphenol 3,3'-Dichlorobenzidine	100 100 30	-	< 5.3 < 2.1 < 5.3	NA NA NA	NA NA NA	NA NA NA	NA NA NA	NA NA NA	< 1.6 < 0.98 < 0.38	<5 <2 <5	<5 <2 <5
3-Nitroaniline 4,6-Dinitro-2-methylphenol 4-Bromophenyl phenyl ether 4-Chloro-3-methylphenol	100 1 100 100	-	<5.3 <21 <2.1 <5.3	NA NA NA NA	NA NA NA NA	NA NA NA NA	NA NA NA NA	NA NA NA NA	<1.3 <1.1 <0.38 <1.9	< 5 < 20 < 2 < 5	<5 <20 <2 <5
4-Chloroaniline 4-Chlorophenyl phenyl ether 4-Nitroaniline	30 100 5	-	< 5.3 < 5.3 < 2.1 < 5.3	NA NA NA NA	NA NA NA NA	NA NA NA	NA NA NA NA	NA NA NA	< 0.56 < 0.33 < 1.8	<5 <5 <2 <5	<5 <2 <5
4-Nitrophenol A-Cenaphthene Acenaphthylene	100 400 100	-	<0.11 <0.11 <0.11	NA NA NA NA	NA NA NA NA	NA NA NA	NA NA NA NA	NA NA NA	< 5.5 < 0.022 < 0.025	< 10 < 0.1 < 0.1	< 10 < 0.1 < 0.1
Acetophenone Anthracene Attrazine	700 2,000 3	-	< 0.11 < 2.1 < 0.11 < 5.3	NA NA NA NA	NA NA NA NA	NA NA NA NA	NA NA NA NA	NA NA NA NA	< 0.025 < 0.3 < 0.022 < 0.52	< 0.1 < 2 < 0.1 < 5	< 0.1 < 2 < 0.1 < 5
Benzaldehyde Benzo(a)anthracene Benzo(a)pyrene	0.1 0.1	-	< 5.3 < 5.3 < 0.11 < 0.11	NA NA NA NA	NA NA NA NA	NA NA NA NA	NA NA NA NA	NA NA NA NA	< 0.32 < 3.5 < 0.012 < 0.013	<5 <0.1 <0.1	< 5 < 0.1 < 0.1
Benzo(b)fluoranthene Benzo(ghi)perylene Benzo(k)fluoranthene	0.2 100 0.5	-	< 0.11 < 0.11 < 0.11	NA NA NA	NA NA NA	NA NA NA	NA NA NA	NA NA NA	< 0.011 < 0.017 < 0.016	< 0.1 < 0.1 < 0.1	< 0.1 < 0.1 < 0.1
Bis(2-Chloroethoxy)methane Bis(2-Chloroethyl)ether Bis(2-Chloroisopropyl)ether	100 7 300	-	< 2.1 < 2.1 < 2.1	NA NA NA	NA NA NA	NA NA NA	NA NA NA	NA NA NA	< 0.33 < 0.33 < 0.48	<2 <2 <2	<2 <2 <2
Bis(2-Ethylhexyl)phthalate Butyl benzyl phthalate Caprolactam	3 100 5,000	-	< 2.1 < 2.1 < 2.1	NA NA NA	NA NA NA	NA NA NA	NA NA NA	NA NA NA	< 0.62 < 0.31 < 0.73	<2 <2 <2	< 2 < 2 < 2
Carbazole Chrysene Dibenz(a,h)anthracene	100 5 0.3	-	< 1.1 < 0.11 < 0.11	NA NA NA	NA NA NA	NA NA NA	NA NA NA	NA NA NA	< 0.38 < 0.013 < 0.018	< 1 < 0.1 < 0.1	< 0.1 < 0.1 < 0.1
Dibenzofuran Diethyl phthalate Dimethyl phthalate	100 6,000 100	-	< 5.3 < 2.1 < 2.1	NA NA NA	NA NA NA	NA NA NA	NA NA NA	NA NA NA	< 0.28 < 0.35 < 0.3	<5 <2 <2	<5 <2 <2
Di-n-butylphthalate Di-n-octylphthalate Fluoranthene	700 100 300	-	< 2.1 < 2.1 < 0.11	NA NA NA	NA NA NA	NA NA NA	NA NA NA	NA NA NA	< 0.59 < 0.33 < 0.014	<2 <2 <0.1	< 2 < 2 < 0.1
Fluorene Hexachlorobenzene Hexachlorobutadiene	300 0.02 1	-	< 0.11 < 0.021 < 1.1	NA NA NA	NA NA NA	NA NA NA	NA NA NA	NA NA NA	< 0.018 < 0.018 < 0.54	< 0.1 < 0.02 < 1	< 0.1 < 0.02 < 1
Hexachlorocyclopentadiene Hexachloroethane Indeno(1,2,3-cd)pyrene	40 7 0.2	-	<11 <2.1 <0.11 <2.1	NA NA NA NA	NA NA NA NA	NA NA NA NA	NA NA NA NA	NA NA NA NA	< 7.6 < 0.59 < 0.015 < 0.29	<10 <2 <0.1 <2	<10 <2 <0.1 <2
Isophorone Naphthalene Nitrobenzene N-Nitroso-di-n-propylamine	40 300 6 10	-	< 2.1 < 0.11 < 2.1 < 2.1	NA NA NA NA	NA NA NA NA	NA NA NA	NA NA NA NA	NA NA NA	< 0.29 < 0.038 < 0.45 < 0.32	< 2 < 0.1 < 2 < 2	< 0.1 < 2 < 2
N-Nitrosodiphenylamine Pentachlorophenol Phenanthrene	10 0.3 100	-	< 5.3 < 0.32 < 0.11	NA NA NA	NA NA NA	NA NA NA	NA NA NA	NA NA NA	< 0.32 < 0.11 < 0.022	< 5 < 0.3 < 0.1	< 5 < 0.3 < 0.1
Phenol Pyrene TTC SVOCs (µg/l)	2,000 200	-	< 2.1 < 0.11	NA NA	NA NA	NA NA	NA NA	NA NA	< 1.4 < 0.016	< 2 < 0.1	< 2 < 0.1
Total Alkanes, SVOC Total TIC, Semi-Volatile Extractable/Volatile Petroleum Hydrocarbons (mg	NLE 500	-	0 U 4.5 J	NA NA	NA NA	NA NA	NA NA	NA NA	0 U 6.5 J	0 U 0 U	0 U 0 U
EPH (>C28-C40) EPH (C9-C28) Total EPH	NLE NLE NLE	-	< 0.053 < 0.053 < 0.053	NA NA NA	NA NA NA	NA NA NA	NA NA NA	NA NA NA	< 0.016 < 0.034 < 0.016	< 0.05 0.29 0.29	< 0.05 < 0.05 < 0.05
Pesticides & PCBs (µg/l) 4,4'-DDD 4,4'-DDE	0.1 0.1	-	< 0.01 < 0.01	NA NA	NA NA	NA NA	NA NA	NA NA	< 0.0025 < 0.0017	< 0.01 < 0.01	< 0.01 < 0.01
4,4'-DDT Aldrin Alpha-BHC	0.1 0.04 0.02	-	< 0.01 < 0.01 < 0.01	NA NA NA	NA NA NA	NA NA NA	NA NA NA	NA NA NA	< 0.0032 < 0.0079 < 0.0023	< 0.01 < 0.01 < 0.01	<0.01 <0.01 <0.01
Alpha-Chlordane Beta-BHC Delta-BHC Dieldrin	0.5 0.04 100	-	< 0.01 < 0.01 < 0.01 < 0.01	NA NA NA NA	NA NA NA NA	NA NA NA NA	NA NA NA NA	NA NA NA NA	< 0.0029 < 0.0023 < 0.0019 < 0.0016	< 0.01 < 0.01 < 0.01 < 0.01	0.13 < 0.01 < 0.01 < 0.01
Dieldrin Endosulfan I Endosulfan II Endosulfan sulfate	0.03 40 40 40	-	< 0.01 < 0.01 < 0.01 < 0.01	NA NA NA NA	NA NA NA NA	NA NA NA NA	NA NA NA NA	NA NA NA NA	< 0.0016 < 0.0028 < 0.002 < 0.0019	< 0.01 < 0.01 < 0.01 < 0.01	< 0.01 < 0.01 < 0.01 < 0.01
endosurran surrate Endrin Endrin aldehyde Endrin ketone	2 100 100	-	< 0.01 < 0.01 < 0.01 < 0.01	NA NA NA NA	NA NA NA NA	NA NA NA NA	NA NA NA NA	NA NA NA NA	< 0.0019 < 0.002 < 0.0037 < 0.0047	< 0.01 < 0.01 < 0.01 < 0.01	< 0.01 < 0.01 < 0.01 < 0.01
Jamma-BHC/Lindane Jamma-Chlordane Heptachlor	0.03 0.5 0.05	-	< 0.01 < 0.01 < 0.01 < 0.01	NA NA NA	NA NA NA	NA NA NA	NA NA NA	NA NA NA	< 0.0017 < 0.0021 < 0.0022	< 0.01 < 0.01 < 0.01 < 0.01	< 0.01 < 0.01 0.12 < 0.01
Heptachlor epoxide Methoxychlor Foxaphene	0.2 40 2	-	< 0.01 < 0.021 < 0.26	NA NA NA	NA NA NA	NA NA NA	NA NA NA	NA NA NA	< 0.0026 < 0.0041 < 0.15	< 0.01 < 0.02 < 0.25	< 0.01 < 0.02 < 0.25
Aroclor-1016 Aroclor-1221 Aroclor-1232	0.5 0.5 0.5	-	< 0.56 < 0.56 < 0.56	NA NA NA	NA NA NA	NA NA NA	NA NA NA	NA NA NA	< 0.13 < 0.27 < 0.39	< 0.5 < 0.5 < 0.5	< 0.5 < 0.5 < 0.5
Aroclor-1242 Aroclor-1248 Aroclor-1254	0.5 0.5 0.5	-	< 0.56 < 0.56 < 0.56	NA NA NA	NA NA NA	NA NA NA	NA NA NA	NA NA NA	< 0.086 < 0.15 < 0.14	< 0.5 < 0.5 < 0.5	< 0.5 < 0.5 < 0.5
aroclor-1260 aroclor-1262 aroclor-1268	0.5 0.5 0.5	-	< 0.56 < 0.56 < 0.56	NA NA NA	NA NA NA	NA NA NA	NA NA NA	NA NA NA	< 0.21 < 0.06 < 0.13	< 0.5 < 0.5 < 0.5	< 0.5 < 0.5 < 0.5
norganics (µg/l) duminum antimony	200	8,210 ND	2,960 < 6	NA NA	NA NA	NA NA	NA NA	NA NA	16,300 < 6	< 200 < 6	35,800 < 6
Arsenic Barium Beryllium	3 6,000 1	25.1 192 2.8	< 3 < 200 < 1	NA NA NA	NA NA NA	NA NA NA	NA NA NA	NA NA NA	15 < 200 1.6	<3 <200 <1	36.3 < 200 2.9
admium alcium hromium	4 NLE 70	3.7 8,700 49.6	25,800 14	NA NA NA	NA NA NA	NA NA NA	NA NA NA	NA NA NA	<3 5,320 213	<3 55,500 <10	< 3 32,200 408
Chromium, Hexavalent Cobalt Copper	NLE 100 1,300	ND 30.6 9.8	< 0.01 < 50 < 10	NA NA NA	NA NA NA	NA NA NA	NA NA NA	NA NA NA	< 0.01 < 50 < 10	< 0.01 < 50 < 10	< 0.01 < 50 12
Syanide ron Lead	0.1 300 5	ND 19,600 7.3	<0.01 4,420 3	NA NA 10.4	NA NA 5	NA NA 4.6	NA NA 13.7	NA NA 21.7	0.016 41,000 12.1	<0.01 177 <3	< 0.01 105,000 36.9
Magnesium Manganese Mercury Vickel	NLE 50 2	7,160 232 ND	8,140 89.6 < 0.2	NA NA NA	NA NA NA	NA NA NA	NA NA NA	NA NA NA	5,280 54.5 < 0.2	< 5000 28.9 < 0.2	12,500 115 < 0.2
	100 NLE	48.3 4,630	< 10 < 10000 < 10	NA NA NA	NA NA	NA NA	NA NA NA	NA NA NA	<10 10,400 <10	< 10 < 10000 < 10	18.6 18,300 < 10
Otassium Selenium	40	3.8 ND			NA NA	NA NA					
otassium		3.8 ND 36,400 ND 28.9	<10 <10 176,000 <2 <50	NA NA NA NA	NA NA NA NA	NA NA NA NA NA	NA NA NA NA	NA NA NA NA	<10 <10000 <10000 <2 111	<10 16,000 <2 <50	<10 132,000 < 4 269

Attachment D Table 2 Groundwater Sampling Results Site Parcel 28 Fort Monmouth, New Jersey

Loc ID	NJ Ground	Weston 1995	PARCEL28-SSSC-C-GW	PARCEL28-SSSC-D-GW	PARCEL28-SSSC-E-GW
Sample ID	Water Quality Criteria	Background (Charles Wood)	PARCEL 28-GW-SSSC-C 7/16/2013	PARCEL 28-GW-SSSC-D 7/16/2013	PARCEL 28-GW-SSSC-E 7/17/2013
Sample Date Volatile Organic Compounds (µg/l) 1,1,1-Trichloroethane	30	-	<1	<1	< 1
1,1,2,2-Tetrachloroethane 1,1,2-Trichloro-1,2,2-Trifluoroethane 1,1,2-Trichloroethane	1 100 3	-	<1 <5 <1	<1 <5 <1	< 1 < 5 < 1
1,1-Dichloroethane 1,1-Dichloroethene 1,2,3-Trichlorobenzene	50 1 100	-	< 1 < 1 < 5	<1 <1 <5	<1 <1 <5
1,2,4-Trichlorobenzene 1,2-Dibromo-3-chloropropane	9 0.02	-	< 5 < 10	< 5 < 10	< 5 < 10
1,2-Dibromoethane 1,2-Dichlorobenzene 1,2-Dichloroethane	0.03 600 2	-	< 2 < 1 < 1	<2 <1 <1	<2 <1 <1
1,2-Dichloropropane 1,3-Dichlorobenzene 1,4-Dichlorobenzene	1 600 75	-	<1 <1 <1	<1 <1 <1	<1 <1 <1
1,4-Dioxane Acetone Benzene	10 6,000 1	-	<130 <10 <1	<130 <10 <1	< 130 < 10 < 1
Bromochloromethane Bromodichloromethane Bromoform	100 1 4	-	< 5 < 1 < 4	< 5 < 1 < 4	<5 <1 <4
Carbon disulfide Carbon tetrachloride	700 1	-	< 2 < 1	< 2 < 1	<2 <1
Chlorobenzene Chlorodibromomethane Chloroethane	50 1 5	-	<1 <1 <1	<1 <1 <1	<1 <1 <1
Chloroform Cis-1,2-Dichloroethene Cis-1,3-Dichloropropene	70 70 1	-	0.29 J < 1 < 1	<1 <1 <1	<1 <1 <1
Cyclohexane Dichlorodifluoromethane Ethyl benzene	100 1,000 700	-	< 5 < 5 < 1	< 5 < 5 < 1	<5 <5 <1
Isopropylbenzene Meta/Para Xylene Methyl Acetate	700 1,000 7,000	-	<2 <1 <5	<2 <1 <5	<2 <1 <5
Methyl bromide Methyl butyl ketone	10 300	-	< 2 < 5 < 1	<2 <5 <1	<2 <5 <1
Methyl chloride Methyl cyclohexane Methyl ethyl ketone	100 NLE 300	-	< 5 < 10	< 5 < 10	< 5 < 10
Methyl isobutyl ketone Methyl Tertbutyl Ether Methylene chloride	70 3	-	<5 <1 <2	<5 <1 <2	<5 <1 <2
Ortho Xylene Styrene Tetrachloroethene	1,000 100 1	-	<1 <5 <1	<1 <5 <1	<1 <5 <1
Toluene Total Xylenes Trans-1,2-Dichloroethene	1,000 100	-	< 1 < 1 < 1	<1 <1 <1	<1 <1 <1
Trans-1,3-Dichloropropene Trichloroethene	1	-	<1 <1	<1 <1	<1 <1
Trichlorofluoromethane Vinyl chloride TIC VOCs (µg/l)	2,000	-	< 5 < 1	<5 <1	<5 <1
Total Alkanes, VOC Total TIC, Volatile Semivolatile Organic Compounds (µg/l)	NLE 500	-	0 U 0 U	0 U	0 U 0 U
1,1'-Biphenyl 1,2,4,5-Tetrachlorobenzene 2,3,4,6-Tetrachlorophenol	400 100 200	-	<1 <2 <5	<1 <2 <5	<1 <2 <5
2.4.5-Trichlorophenol 2.4.6-Trichlorophenol 2.4-Dichlorophenol	700 20 20	-	<5 <5 <5	<5 <5 <5	<5 <5 <5
2,4-Dimethylphenol 2,4-Dinitrophenol	100 40	-	< 5 < 20 < 2	< 5 < 20 < 2	<5 <20 <2
2,4-Dinitrotoluene 2,6-Dinitrotoluene 2-Chloronaphthalene	10 10 600	-	< 2 < 2	< 2 < 2	< 2 < 2
2-Chlorophenol 2-Methylnaphthalene 2-Methylphenol	40 30 100	-	<5 <1 <2	<5 <1 <2	<5 <1 <2
2-Nitroaniline 2-Nitrophenol 3&4-Methylphenol	100 100 100	-	< 5 < 5 < 2	< 5 < 5 < 2	<5 <5 <2
3,3'-Dichlorobenzidine 3-Nitroaniline 4,6-Dinitro-2-methylphenol	30 100	-	< 5 < 5 < 20	< 5 < 5 < 20	< 5 < 5 < 20
4-Bromophenyl phenyl ether 4-Chloro-3-methylphenol	100 100	-	< 2 < 5	< 2 < 5	< 2 < 5
4-Chloroaniline 4-Chlorophenyl phenyl ether 4-Nitroaniline	30 100 5	-	<5 <2 <5	<5 <2 <5	<5 <2 <5
4-Nitrophenol Acenaphthene Acenaphthylene	100 400 100	-	< 10 < 0.1 < 0.1	< 10 < 0.1 < 0.1	< 10 < 0.1 < 0.1
Acetophenone Anthracene Atrazine	700 2,000 3	-	< 2 < 0.1 < 5	<2 <0.1 <5	< 2 < 0.1 < 5
Benzaldehyde Benzo(a)anthracene	100 0.1	-	< 5 < 0.1 < 0.1	< 5 < 0.1 < 0.1	< 5 < 0.1 < 0.1
Benzo(a)pyrene Benzo(b)fluoranthene Benzo(ghi)perylene	0.1 0.2 100	-	< 0.1 < 0.1	< 0.1 < 0.1	< 0.1 < 0.1
Benzo(k)fluoranthene Bis(2-Chloroethoxy)methane Bis(2-Chloroethyl)ether	0.5 100 7	-	< 0.1 < 2 < 2	<0.1 <2 <2	< 0.1 < 2 < 2
Bis(2-Chloroisopropyl)ether Bis(2-Ethylhexyl)phthalate Butyl benzyl phthalate	300 3 100	-	< 2 < 2 < 2 < 2	<2 <2 <2 <2	<2 2.9 <2
Carbazole Chrysene	5,000 100 5	-	< 2 < 1 < 0.1	< 2 < 1 < 0.1	< 2 < 1 < 0.1
Dibenz(a,h)anthracene Dibenzofuran	0.3 100	-	< 0.1 < 5	< 0.1 < 5	< 0.1 < 5
Diethyl phthalate Dimethyl phthalate Di-n-butylphthalate	6,000 100 700	-	< 2 < 2 < 2	< 2 < 2 < 2	<2 <2 <2 <2
Di-n-octylphthalate Fluoranthene Fluorene	100 300 300	-	< 2 < 0.1 < 0.1	< 2 < 0.1 < 0.1	< 2 < 0.1 < 0.1
Hexachlorobenzene Hexachlorobutadiene Hexachlorocyclopentadiene	0.02 1 40	-	< 0.02 < 1 < 10	< 0.02 < 1 < 10	< 0.02 < 1 < 10
Hexachloroethane Indeno(1,2,3-cd)pyrene Isophorone	7 0.2 40	-	< 2 < 0.1 < 2	< 2 < 0.1 < 2	< 2 < 0.1 < 2
Naphthalene Nitrobenzene N-Nitroso-di-n-propylamine	300 6 10	-	0.202 < 2 < 2	< 0.1 < 2 < 2	< 0.1 < 2 < 2
N-Nitrosodiphenylamine Pentachlorophenol	10 0.3	-	< 5 < 0.3	< 5 < 0.3	< 5 < 0.3
Phenanthrene Phenol Pyrene	2,000 200	-	< 0.1 < 2 < 0.1	< 0.1 < 2 < 0.1	< 0.1 < 2 < 0.1
TIC SVOCs (µg/l) Total Alkanes, SVOC Total TIC, Semi-Volatile	NLE 500	-	0 U 19.6 J	0 U 0 U	0 U 0 U
Extractable/Volatile Petroleum Hydrocarbons (mg/ EPH (>C28-C40) EPH (C9-C28)	NLE NLE	-	< 0.05 < 0.05	< 0.05 < 0.05	< 0.05 0.22
Total EPH Pesticides & PCBs (μg/l) 4,4'-DDD	NLE 0.1	-	< 0.05	< 0.05	< 0.01
4,4-DDE 4,4-DDT Aldrin	0.1 0.1 0.04	-	< 0.01 < 0.01 < 0.01 < 0.01	< 0.01 < 0.01 < 0.01 < 0.01	< 0.01 < 0.01 < 0.01 < 0.01
Alpha-BHC Alpha-Chlordane	0.02 0.5	-	< 0.01 < 0.01	< 0.01 < 0.01	< 0.01 < 0.01
Beta-BHC Delta-BHC Dieldrin	0.04 100 0.03	-	< 0.01 < 0.01 < 0.01	< 0.01 < 0.01 < 0.01	< 0.01 < 0.01 < 0.01
Endosulfan I Endosulfan II Endosulfan sulfate	40 40 40	-	< 0.01 < 0.01 < 0.01	< 0.01 < 0.01 < 0.01	< 0.01 < 0.01 < 0.01
Endrin Endrin aldehyde Endrin ketone	2 100 100	-	< 0.01 < 0.01 < 0.01	< 0.01 < 0.01 < 0.01	< 0.01 < 0.01 < 0.01
Gamma-BHC/Lindane Gamma-Chlordane	0.03	-	< 0.01	< 0.01 < 0.01	< 0.01 < 0.01
Heptachlor Heptachlor epoxide Methoxychlor	0.05 0.2 40	-	< 0.01 < 0.01 < 0.02	< 0.01 < 0.01 < 0.02	< 0.01 < 0.01 < 0.02
Toxaphene Aroclor-1016 Aroclor-1221	0.5 0.5	-	< 0.25 < 0.5 < 0.5	< 0.25 < 0.5 < 0.5	< 0.25 < 0.5 < 0.5
Aroclor-1232 Aroclor-1242 Aroclor-1248	0.5 0.5 0.5	-	< 0.5 < 0.5 < 0.5	< 0.5 < 0.5 < 0.5	< 0.5 < 0.5 < 0.5
Aroclor-1254 Aroclor-1260 Aroclor-1262	0.5 0.5 0.5	-	< 0.5 < 0.5 < 0.5	< 0.5 < 0.5 < 0.5	< 0.5 < 0.5 < 0.5
Aroclor-1262 Aroclor-1268 Inorganics (µg/l)	0.5	-	< 0.5	< 0.5	< 0.5
Aluminum Antimony Arsenic	200 6 3	8,210 ND 25.1	8,740 < 6 15.3	4,880 < 6 6.8	< 200 < 6 < 3
Barium Beryllium Cadmium	6,000 1 4	192 2.8 3.7	< 200 < 1 < 3	< 200 < 1 < 3	< 200 < 1 < 3
Calcium Chromium Chromium, Hexavalent	NLE 70 NLE	8,700 49.6 ND	30,600 128 < 0.01	37,900 58.5 < 0.01	57,100 < 10 < 0.01
Cobalt Copper	100 1,300	30.6 9.8	< 50 < 10	< 50 < 10	< 50 < 10 < 0.01
Cyanide Iron Lead	0.1 300 5	ND 19,600 7.3	< 0.01 29,900 23	< 0.01 13,800 7.8	182 < 3
Magnesium Manganese Mercury	NLE 50 2	7,160 232 ND	6,760 25.4 < 0.2	13,400 53.9 < 0.2	< 5000 27.6 < 0.2
Nickel Potassium Selenium	100 NLE 40	48.3 4,630 3.8	< 10 < 10000 < 10	< 10 < 10000 < 10	<10 <10000 <10
Silver Sodium Thallium	40 50,000 2	ND 36,400 ND	< 10 29,900 < 2	<10 51,300 <2	< 10 15,400 < 2
Vanadium Zinc	NLE 2,000	28.9 133	87.8 21.1	< 2 < 50 < 20	< 2 < 50 37.4
Wet Chemistry pH (su)	NLE	-	6.5	6.44	6.02

Attachment D **Table 2 Groundwater Sampling Results** Site Parcel 28 Fort Monmouth, New Jersey

- 1) All historical data collected prior to 2013 are reported as provided by others.
- 2) Number of Analyses is the number of detected and non-detected results excluding rejected results. Sample duplicate pairs have not been averaged.
- 3) NLE = no limit established.
- 4) ND = not detected in any background sample, no background concentration available.
- 5) Chemical result qualifiers are assigned by the laboratory and is typically evaluated and modified (if necessary) by during data validation.

[blank] = detect, i.e. detected chemical result value.

J = estimated (detect or non-detect) value.

 $\boldsymbol{B} = \boldsymbol{Compound}$ detected in the sample and its associated blank sample.

E (or ER) = Estimated result.

R = Rejected, data validation rejected the results.

D = Results from dilution of sample.

U = non-detect, i.e. not detected equal to or above this value.

J-DL = Elevated sample detection limit due to difficult sample matrix.

U-DL = Elevated sample detection limit due to difficult sample matrix.

JN = Tentatively identified compound, estimated concentration.

U-ND = Analyte not detected in sample, but no detection or reporting limit provided.

6) Chemical results greater than or equal to the action level (depending on criteria) are highlighted based on the Criteria that are present.

- Cell Shade values represent a result that is above the NJ Ground Water Quality Criteria

NJDEP Interim Specific GWQC values are presented for the NJ GWQS where there is not a Specific Ground Water Quality Criteria. A full list of compounds is NJDEP Interim Generic GWQC values are presented for the NJ GWQS where there is not a XXXXX or a NJDEP Interim Specific GWQC. Available at

- Cell Style values represent a result that is above the Weston 1995 Background (Charles Wood).

n/a = all concentrations were less than the detection limit, therefore, no location of maximum value identified. Dash (-) = only background concentrations for metals are being used as comparison criteria.

- 7) Criteria action level source document and web address.
- The NJ Ground Water Quality Criteria refers to the NJDEP Groundwater Quality Standards Adopted July 22, 2010 http://www.state.nj.us/dep/wms/bwqsa/docs/njac79C.pdf
- The Weston 1995 Background (Charles Wood) refers to the FTMM reports.

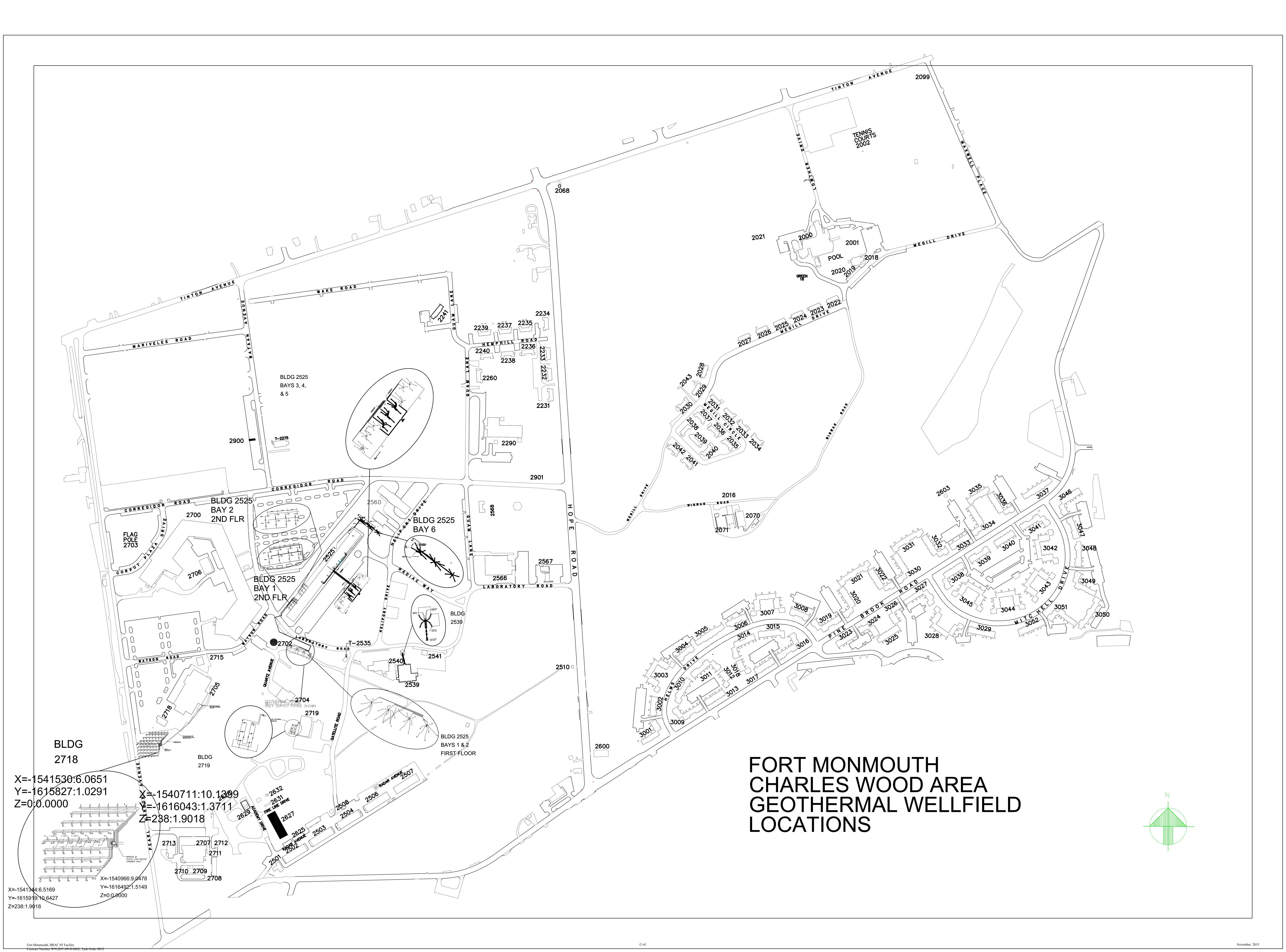
Attachment E

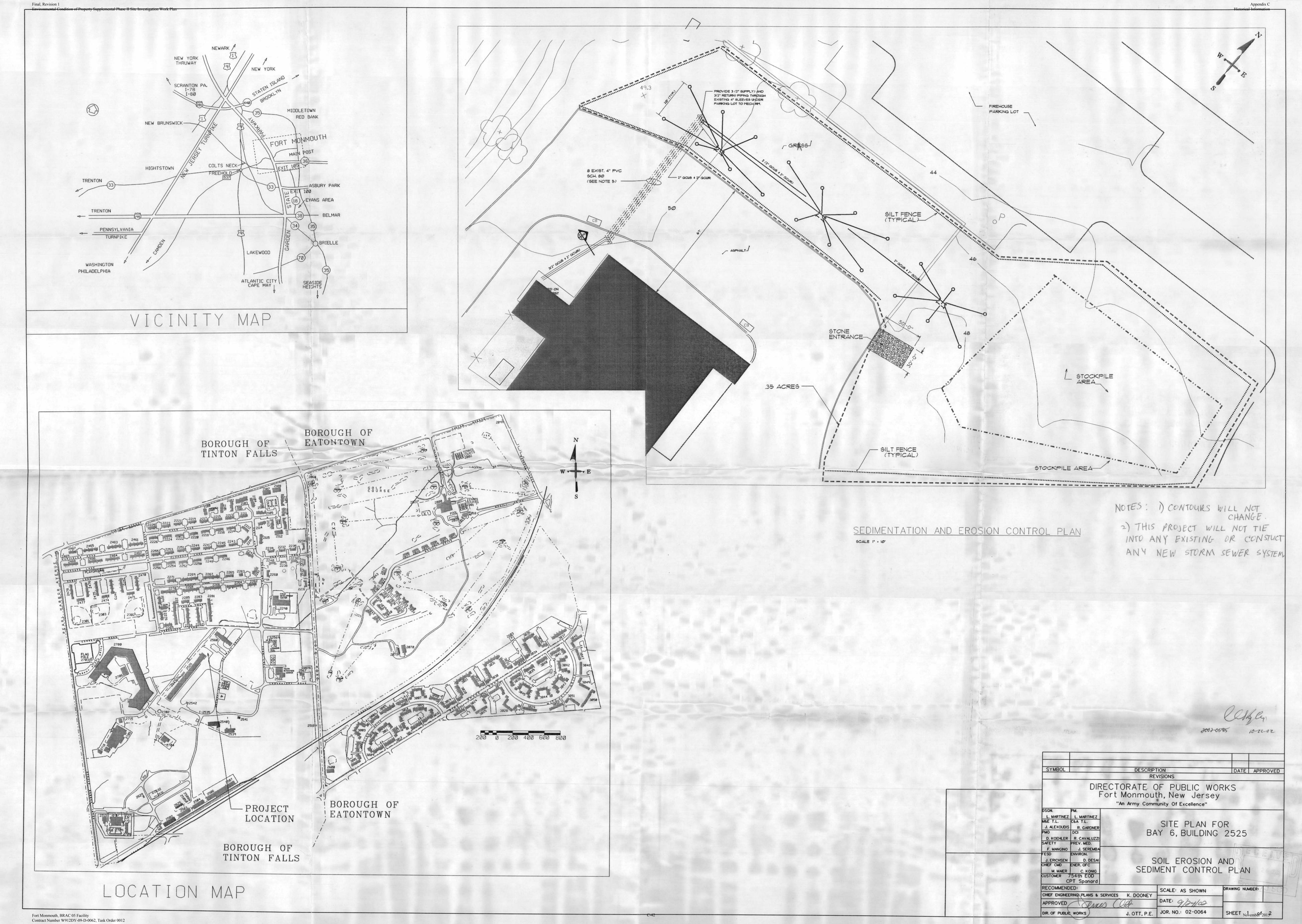
Laboratory Data Reports (included only on the electronic copy of this letter)

Attachment F

CWA Geothermal Well Layout Locations

Final, Revision 1
Environmental Condition of Property Supplemental Phase II Site Investigation Work Plan





Final, Revision 1 Appendix C Historical Information **LEGEND** Geoprobe Soil Sample Location Geoprobe Soil & Groundwater Sample Location Geoprobe Groundwater Sample Location Test Pit Soil Sample Location Surface Soil Sample Location Sediment Sample Location Generalized Groundwater Flow Direction. Direction of Generalized Groundwater Flow derived from qualitative (mg/kg) Storage Area and Possible Former Tank Pads evaluation of surface topography, surface water features, and pre-existing IRP site groundwater P28SD-2D 26/110 potentiometric maps where available. Geophysical Investigation Area (Electromagnetic Survey Followed by Targeted Ground Pentrating Radar of Anomalies) Geophysical Investigation Area - Ground Penetrating Radar (GPR) Building Installation Boundary Value (mg/kg) (mg/kg) **ECP PARCEL CATEGORY DEFINITIONS** Chromium 43.0 26/110 29(2)PS/PR 26/110 Areas that are not evaluated or require additional evaluation. Parcel not included in Site Investigation. Information pertaining to parcels not included in this Site Investigation is presented in the Fort Monmouth Phase I ECP Report (January 2007). 30(2)PS/PR* **BRAC PARCEL LABEL DEFINITIONS** HS - Hazardous Substance Storage HR - Hazardous Substance Release DESCRIPTION PS - Petroleum Storage (P) - Possible Release or Disposal CATEGORY NUMBER PARCEL NUMBER SCALE: 28(7)HS/HR(P)/PS/PR(P) P28-TP3 P28-TP4 Base Realignment and Closure 2005 P28-TP1 Shaw Environmental, Inc. **FIGURE 3.5-1** FORT MONMOUTH ECP SITE INVESTIGATION PARCEL 28 SAMPLE LOCATIONS AND CONSTITUENTS OF CONCERN CHARLES WOOD AREA FORT MONMOUTH NEW JERSEY 2015

Final, Revision 1 Appendix C Environmental Condition of Property Supplemental Phase II Site Investiga Historical Information **LEGEND** Subsurface Metallic Object (Suspected UST) Generalized Groundwater Flow Direction. Direction of Generalized Groundwater Flow derived from qualitative evaluation of surface topography, surface water features, and pre-existing IRP site groundwater potentiometric maps where available. Installation Boundary Geophysical Investigation Area (Electromagnetic Survey Followed by Targeted Ground Pentrating Radar of Anomalies) Geophysical Investigation Area - Ground Penetrating Radar (GPR) **GPR Scanning Results** Suspected Pipe Suspected Septic System Distribution Tank Suspected Septic Tank B SCALE: Base Realignment and Closure 2005 Shaw Environmental, Inc. **FIGURE 3.5-2** FORT MONMOUTH ECP SITE INVESTIGATION PARCEL 28 SUSPECTED UST AND GPR SCANNING RESULTS CHARLES WOOD AREA FORT MONMOUTH NEW JERSEY NEW JERSEY 2015

Contract Number W912DY-09-D-0062, Task Order 0012

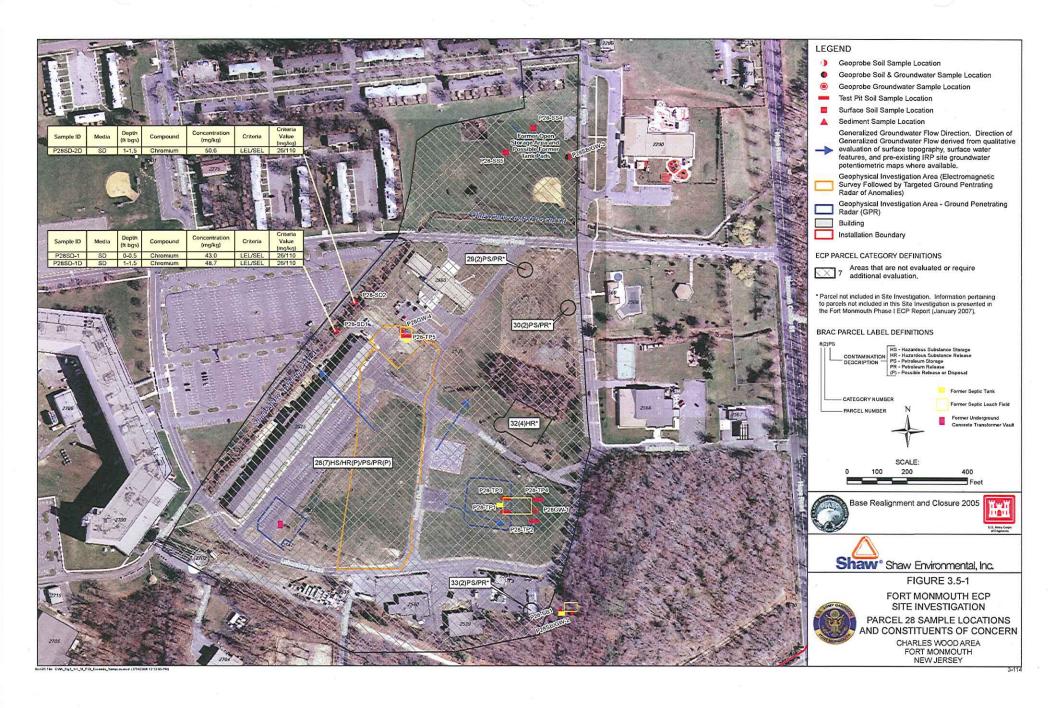


Table 3.5-4
Fort Monmouth Phase II Site Investigation, Parcel 28
Summary of Analytical Parameters in Soil (mg/kg) South of Corregidor Road

			Analytical Results							
		Sample ID:	P28-SB1-A	P28-SB1-B	P28-SB1-C	P28-SB2-A	P28-SB2-B	P28-SB2-C		
		Lab ID:	7051111	7051112	7051113	7051114	7051115	7051116		
		Date Sampled:	12/5/2007	12/5/2007	12/5/2007	12/5/2007	12/5/2007	12/5/2007		
		Depth (ft. bgs):	0.0-0.5'	1.5-2.0'	4.5-5.0	0.0-0.5'	1.5-2.0'	4.5-5.0		
Chemical	NRDCSCC ²	IGWSCC ³	Result	Result	Result	Result	Result	Result		
Volatiles				-	_	_				
Acetone	1000	100	NT	3.100 B	0.690 B	NT	0.650 B	0.360 B		
Semi-Volatiles										
Benzo[b]fluoranthene	4	50	1.100 U	NT	1.200 U	1.000 U	NT	1.100 U		
Indeno[1,2,3-cd]pyrene	4	500	1.100 U	NT	1.200 U	1.000 U	NT	1.100 U		
Benzo[a]anthracene	4	500	1.100 U	NT	1.200 U	1.000 U	NT	1.100 U		
Benzo[a]pyrene	0.66	100	1.100 U	NT	1.200 U	1.000 U	NT	1.100 U		
Benzo[k]fluoranthene	4	500	1.100 U	NT	1.200 U	1.000 U	NT	1.100 U		
bis(2-Ethylhexyl)phthalate	210	100	0.160 J	NT	1.200 U	1.000 U	NT	1.100 U		
Chrysene	40	500	1.100 U	NT	1.200 U	1.000 U	NT	1.100 U		
Di-n-butylphthalate	10000	100	1.100 JB	NT	0.290 JB	0.200 JB	NT	0.630 JB		
Di-n-octyl phthalate	10000	100	1.100 U	NT	1.200 U	1.000 U	NT	1.100 U		
Fluoranthene	10000	100	0.095 J	NT	1.200 U	1.000 U	NT	0.074 J		
Phenanthrene	NLE	NLE	0.069 J	NT	1.200 U	1.000 U	NT	0.081 J		
Pyrene	10000	100	0.120 J	NT	1.200 U	1.000 U	NT	1.100 U		
Metals										
Aluminum	NLE	NLE	7170 B	NT	5580 B	2290 B	NT	7200 B		
Arsenic	20	NLE	7.16	NT	3.29	1.78	NT	4.17		
Barium	47000	NLE	30.1 B	NT	19.2 B	8.30 B	NT	19.8 B		
Beryllium	140	NLE	0.794	NT	0.295	0.154	NT	0.291		
Cadmium	100	NLE	0.338	NT	0.173	0.147	NT	0.233		
Calcium	NLE	NLE	1280 B	NT	491 B	461 B	NT	336 B		
Chromium (Total)	NLE	NLE	58.6	NT	35.9	17.4	NT	38.9		
Cobalt	NLE	NLE	1.15	NT	0.334 U	0.465	NT	0.324 U		
Copper	45000	NLE	9.21 B	NT	4.53 B	5.27 B	NT	5.91 B		
Iron	NLE	NLE	21900	NT	10400	5660	NT	11600		
Lead	800	NLE	28.0	NT	6.79	27.8	NT	10.5		
Magnesium	NLE	NLE	2690 B	NT	822 B	524 B	NT	894 B		
Manganese	NLE	NLE	52.4	NT	35.0	24.1	NT	29.7		
Nickel (Soluble Salts)	2400	NLE	6.55	NT	3.32	2.15	NT	3.19		
Potassium	NLE	NLE	5250	NT	1310	770	NT	1400		
Vanadium	7100	NLE	33.7	NT	30.6	16.6	NT	36.1		
Zinc	1500	NLE	51.9 B	NT	51.4 B	31.1 B	NT	47.9 B		

¹ NJDEP Residential Direct Contact Soil Cleanup Criteria per NJAC 7:26D, 1999. Beryllium, Copper and Lead criteria per NJAC 7:26D, 2008.

DUP = Duplicate Sample.

ft. bgs = Feet below ground surface.

B = The compound was found in the associated method blank as well as in the sample.

D = Sample was diluted.

E = The compound's concentration exceeds the calibration range of the instrument for that specific analysis.

J = Mass spec and retention time data indicate the presence of a compound however the result is less than the MDL but greater than zero.

U = The compound was analyzed for but not detected.

NT = Not tested.

NLE = No limit established.

mg/kg = milligram per kilogram.

Bold = Analyte was detected.

Shaded = Concentration exceeds level of concern.

(Surface soil compared to NRDCSCC. Subsurface soil compared to IGWSCC when available, otherwise compared to NRDCSCC).

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² NJDEP Non-Residential Direct Contact Soil Cleanup Criteria per NJAC 7:26D, 1999. Beryllium, Copper and Lead criteria per NJAC 7:26D, 2008.

³ NJDEP Impact to Groundwater Soil Cleanup Criteria per NJAC 7:26D, 1999.

Table 3.5-4 Fort Monmouth Phase II Site Investigation, Parcel 28 Summary of Analytical Parameters in Soil (mg/kg) South of Corregidor Road

		Sample ID:	P28-TP1	P28-TP2-A	P28-TP2-B	P28-TP3	P28-TP3 DUP	P28-TP4	P28-TP5	P28-TP5 DUP
		Lab ID:	7050603	7050605	7050606	7050604	7050602	7051110	7051117	7051102
		Date Sampled:	12/4/2007	12/4/2007	12/4/2007	12/4/2007	12/4/2007	12/5/2007	12/5/2007	12/5/2007
		Depth (ft. bgs):	6.5-7.0'	4.5-5.0'	5.5-6.0'	6.5-7.0	6.5-7.0	4.5-5.0'	6.0-6.5'	6.0-6.5'
Chemical	NRDCSCC ²	IGWSCC ³	Result	Result	Result	Result	Result	Result	Result	Result
Volatiles										
Acetone	1000	100	0.350	0.430	0.320	0.270 J	0.370	0.520	0.550 B	0.340
Semi-Volatiles										
Benzo[b]fluoranthene	4	50	1.100 U	0.130 J	1.100 U	1.100 U				
Indeno[1,2,3-cd]pyrene	4	500	1.100 U	0.066 J	1.100 U	1.100 U				
Benzo[a]anthracene	4	500	1.100 U	0.120 J	1.100 U	1.100 U				
Benzo[a]pyrene	0.66	100	1.100 U	0.100 J	1.100 U	1.100 U				
Benzo[k]fluoranthene	4	500	1.100 U	0.062 J	1.100 U	1.100 U				
bis(2-Ethylhexyl)phthalate	210	100	1.100 U	1.100 U	1.100 U	0.120 J				
Chrysene	40	500	1.100 U	0.150 J	1.100 U	1.100 U				
Di-n-butylphthalate	10000	100	0.140 JB	0.780 JB	0.130 JB	0.220 JB	0.530 JB	0.860 JB	1.300 B	1.200 B
Di-n-octyl phthalate	10000	100	1.100 U	1.100 U	1.100 U	1.100 U				
Fluoranthene	10000	100	1.100 U	0.270 J	1.100 U	1.100 U				
Phenanthrene	NLE	NLE	1.100 U	0.110 J	1.100 U	1.100 U				
Pyrene	10000	100	1.100 U	0.260 J	1.100 U	1.100 U				
Metals										
Aluminum	NLE	NLE	10800 B	7980 B	6800 B	6460 B	6570 B	3920 B	8980 B	8320 B
Arsenic	20	NLE	5.80	5.29	4.03	5.12	4.62	4.00	4.43	3.97
Barium	47000	NLE	9.95 B	12.0 B	9.73 B	12.0 B	11.8 B	17.5 B	7.62 B	7.08 B
Beryllium	140	NLE	0.848	0.633	0.571	0.745	0.762	0.304	0.811	0.693
Cadmium	100	NLE	0.166	0.110	0.129	0.112	0.117	0.129	0.253	0.234
Calcium	NLE	NLE	327 B	488 B	404 B	171 B	173 B	373 B	685 B	650 B
Chromium	NLE	NLE	109	81.7	73.2	99.1	89.2	28.7	130	115
Cobalt	NLE	NLE	0.373	0.338 U	0.322 U	0.622	1.57	0.320 U	0.342 U	0.398
Copper	45000	NLE	4.93 B	3.64 B	2.91 B	4.38 B	4.63 B	4.80 B	4.62 B	4.60 B
Iron	NLE	NLE	23000	19900	16400	21200	20600	7960	23700	20900
Lead	800	NLE	1.49	0.458	1.12	5.07	4.25	9.74	1.16	1.84
Magnesium	NLE	NLE	2900 B	2040 B	1860 B	2460 B	2420 B	794 B	2460 B	2300 B
Manganese	NLE	NLE	11.6	21.9	14.0	12.3	20.3	22.1	11.6	10.0
Nickel	2400	NLE	4.46	3.48	2.83	3.72	3.67	2.87	3.88	4.09
Potassium	NLE	NLE	5850	4350	4010	5340	5240	1280	5450	4820
Vanadium	7100	NLE	61.7	48.8	40.6	45.0	44.4	24.3	55.1	49.4
Zinc	1500	NLE	41.1 B	27.6 B	22.6 B	32.0 B	38.6 B	22.6 B	51.0 B	46.0 B

¹ NJDEP Residential Direct Contact Soil Cleanup Criteria per NJAC 7:26D, 1999. Beryllium, Copper and Lead criteria per NJAC 7:26D, 2008.

DUP = Duplicate Sample.

ft. bgs = Feet below ground surface.

B = The compound was found in the associated method blank as well as in the sample.

D = Sample was diluted.

E = The compound's concentration exceeds the calibration range of the instrument for that specific analysis.

J = Mass spec and retention time data indicate the presence of a compound however the result is less than the MDL but greater than zero.

U = The compound was analyzed for but not detected.

NT = Not tested.

NLE = No limit established.

mg/kg = milligram per kilogram.

Bold = Analyte was detected.

(Surface soil compared to NRDCSCC. Subsurface soil compared to IGWSCC when available,

otherwise compared to NRDCSCC).

² NJDEP Non-Residential Direct Contact Soil Cleanup Criteria per NJAC 7:26D, 1999. Beryllium, Copper and Lead criteria per NJAC 7:26D, 2008.

³ NJDEP Impact to Groundwater Soil Cleanup Criteria per NJAC 7:26D, 1999.

Table 3.5-5
Fort Monmouth Phase II Site Investigation, Parcel 28
Summary of Analytical Parameters in Soil (mg/kg) North of Corregidor Road

				Analytical Results							
			Sample ID:	P28-SB3-A	P28-SB3-B	P28-SB3-C	P28-SS4-A	P28-SS4-B	P28-SS5-A	P28-SS5-B	
			Lab ID:	7051107	7051108	7051109	7051103	7051104	7051105	7051106	
			Date Sampled:	12/5/2007	12/5/2007	12/5/2007	12/5/2007	12/5/2007	12/5/2007	12/5/2007	
			Depth (ft. bgs):	0.0-0.5'	1.5-2.0'	5.0-5.5'	0.0-0.5'	1.5-2.0'	0.0-0.5'	1.5-2.0'	
Chemical	RDCSCC1	NRDCSCC ²	IGWSCC ³	Result	Result	Result	Result	Result	Result	Result	
Volatiles											
Acetone	1000	1000	100	NT	0.430	0.580	NT	0.430	NT	0.420	
Semi-Volatiles											
Benzo[b]fluoranthene	0.9	4	50	1.200 U	NT	1.200 U	1.200 U	NT	1.200 U	NT	
Indeno[1,2,3-cd]pyrene	0.9	4	500	1.200 U	NT	1.200 U	1.200 U	NT	1.200 U	NT	
Benzo[a]anthracene	0.9	4	500	1.200 U	NT	1.200 U	1.200 U	NT	1.200 U	NT	
Benzo[a]pyrene	0.66	0.66	100	1.200 U	NT	1.200 U	1.200 U	NT	1.200 U	NT	
Benzo[k]fluoranthene	0.9	4	500	1.200 U	NT	1.200 U	1.200 U	NT	1.200 U	NT	
bis(2-Ethylhexyl)phthalate	49	210	100	1.200 U	NT	1.200 U	1.200 U	NT	1.200 U	NT	
Chrysene	9	40	500	1.200 U	NT	1.200 U	1.200 U	NT	1.200 U	NT	
Di-n-butylphthalate	5700	10000	100	0.940 JB	NT	0.950 JB	0.510 JB	NT	0.420 JB	NT	
Di-n-octyl phthalate	1100	10000	100	1.200 U	NT	0.087 J	1.200 U	NT	1.200 U	NT	
Fluoranthene	2300	10000	100	0.074 J	NT	1.200 U	1.200 U	NT	1.200 U	NT	
Phenanthrene	NLE	NLE	NLE	1.200 U	NT	1.200 U	1.200 U	NT	1.200 U	NT	
Pyrene	1700	10000	100	0.073 J	NT	1.200 U	1.200 U	NT	1.200 U	NT	
Metals											
Aluminum	NLE	NLE	NLE	13900 B	NT	17700 B	15100 B	NT	14500 B	NT	
Arsenic	20	20	NLE	14.6	NT	20.7	14.9	NT	19.1	NT	
Barium	700	47000	NLE	37.1 B	NT	36.3 B	59.0 B	NT	48.4 B	NT	
Beryllium	16	140	NLE	1.77	NT	2.11	2.33	NT	2.12	NT	
Cadmium	39	100	NLE	0.602	NT	0.785	0.853	NT	0.824	NT	
Calcium	NLE	NLE	NLE	1090 B	NT	330 B	1650 B	NT	1630 B	NT	
Chromium (Total)	NLE	NLE	NLE	132	NT	194	172	NT	151	NT	
Cobalt	NLE	NLE	NLE	1.98	NT	1.74	2.97	NT	2.16	NT	
Copper	3100	45000	NLE	7.43 B	NT	4.57 B	11.6 B	NT	13.0 B	NT	
Iron	NLE	NLE	NLE	50900	NT	60600	65100	NT	62100	NT	
Lead	400	800	NLE	6.80	NT	0.401 U	28.0	NT	18.8	NT	
Magnesium	NLE	NLE	NLE	6160 B	NT	7910 B	8240 B	NT	7700 B	NT	
Manganese	NLE	NLE	NLE	36.6	NT	26.4	63.4	NT	34.5	NT	
Nickel (Soluble Salts)	250	2400	NLE	9.34	NT	10.8	12.6	NT	10.9	NT	
Potassium	NLE	NLE	NLE	13300	NT	18300	18700	NT	17100	NT	
Vanadium	370	7100	NLE	63.6	NT	91.2	70.8	NT	71.6	NT	
Zinc	1500	1500	NLE	77.6 B	NT	82.0 B	105 B	NT	110 B	NT	

¹ NJDEP Residential Direct Contact Soil Cleanup Criteria per NJAC 7:26D, 1999. Beryllium, Copper and Lead criteria per NJAC 7:26D, 2008.

D = Sample was diluted.

DUP = Duplicate Sample.

ft. bgs = Feet below ground surface.

E = The compound's concentration exceeds the calibration range of the instrument for that specific analysis.

B = The compound was found in the associated method blank as well as in the sample.

mg/kg = milligram per kilogram.

J = Mass spec and retention time data indicate the presence of a compound however the result is less than the MDL but greater than zero.

NT = Not tested.

U = The compound was analyzed for but not detected.

NLE = No limit established.

D. I.I. A. I.I.

Bold = Analyte was detected.

Shaded = Concentration exceeds level of concern.

(Surface soil compared to NRDCSCC. Subsurface soil compared to IGWSCC when available, otherwise compared to NRDCSCC).

C-48

² NJDEP Non-Residential Direct Contact Soil Cleanup Criteria per NJAC 7:26D, 1999. Beryllium, Copper and Lead criteria per NJAC 7:26D, 2008.

³ NJDEP Impact to Groundwater Soil Cleanup Criteria per NJAC 7:26D, 1999.

Table 3.5-6
Fort Monmouth Phase II Site Investigation, Parcel 28
Summary of Analytical Parameters Detected in Groundwater (μg/L)

		Analytical Results						
	Sample ID:	P28GW-1	P28GW-1 DUP	P28GW-2	P28GW-3	P28GW-4		
	Lab ID:	7051404	7051403	7051405	7051406	7051407		
	Date Sampled:	12/06/2007	12/06/2007	12/06/2007	12/06/2007	12/06/2007		
	Screened Interval (ft. bgs):	6-11'	6-11'	2.5-7.5'	3-8'	5-10'		
Chemical	Quality Criteria ¹	Result	Result	Result	Result	Result		
Volatiles								
Acetone	6,000	1.33	0.85 U	0.85 U	1.25	1.43		
Chloroform	70	0.32 U	0.32 U	0.66	0.32 U	0.32 U		
Toluene	600	0.27 U	0.27 U	0.38	0.27 U	0.27 U		
Semi-Volatiles								
bis(2-Ethylhexyl)phthalate	3	2.07 B	1.28 U	1.28 U	0.94 JB	2.30 B		
Metals								
Aluminum	200	198	80.4	75.6	550	973		
Barium	6,000	27.8	24.9	13.9	77.2	92.0		
Beryllium	1	0.100 U	0.100 U	0.100 U	0.507	0.533		
Cadmium	4	0.200 U	0.200 U	0.314 B	0.388 B	0.533 B		
Calcium	NLE	5540	5200	5910	7160	30400		
Chromium (Total)	70	0.200 U	0.200 U	0.200 U	2.34	0.200 U		
Cobalt	100*	0.200 U	0.200 U	0.200 U	6.21	5.99		
Magnesium	NLE	3220	3000	2060	8210	7380		
Manganese	50	56.9	53.3	8.36	50.0	248		
Nickel (Soluble Salts)	100	0.300 U	0.300 U	0.300 U	21.0	5.03		
Potassium	NLE	3270	2980	507	2000	3520		
Sodium	50,000	4670 B	4250 B	48800 B	4850 B	14700 B		
Zinc	2,000	3.58 U	3.58 U	3.58 U	65.0	35.8		
Anions								
Nitrate	10,000	2040	2220	550	NT	NT		
Nitrite	1,000	200 U	200 U	250	NT	NT		

¹ Higher of Practical Quantitation Limits (PQLs) & Groundwater Quality Criterion (GWQC) per NJAC 7:9-6, 2005.

DUP = Duplicate Sample.

ft. bgs = Feet below ground surface.

B = The compound was found in the associated method blank as well as in the sample.

D = Sample was diluted.

E = The compound's concentration exceeds the calibration range of the instrument for that specific analysis.

J = Mass spec and retention time data indicate the presence of a compound however the result is less than the MDL but greater than zero.

U = The compound was analyzed for but not detected.

NT = Not tested.

NLE = No limit established.

Bold = Analyte was detected.

Shaded = Concentration exceeds Quality Criteria.

 μ g/L = micrograms per liter.

November 2015

Table 3.5-7
Fort Monmouth Phase II Site Investigation, Parcel 28
Summary of Analytical Parameters Detected in Sediment (mg/kg)

			Analytical Results						
		Sample ID:	P28SD-1	P28SD-1D	P28SD-2	P28SD-2D			
	Lab ID:		7050607	7050608	7050609	7050610			
	Date Sampled:		12/4/2007	12/4/2007	12/4/2007	12/4/2007			
	Depth (ft. bgs):		0.0-0.5	1.0-1.5'	0.0-0.5	1.0-1.5'			
Chemical	LEL ¹	SEL ²	Result	Result	Result	Result			
Volatiles									
Acetone	NLE	NLE	0.440	0.480	0.390	0.330 J			
Semi-Volatiles									
Benzo[a]anthracene	0.320	1480	1.200 U	1.300 U	0.180 J	1.300 U			
Chrysene	0.340	460	1.200 U	1.300 U	0.270 J	1.300 U			
Di-n-butylphthalate	NLE	NLE	0.190 JB	0.180 JB	0.150 JB	0.220 JB			
Fluoranthene	0.750	1020	1.200 U	1.300 U	0.160 J	1.300 U			
Pyrene	0.490	850	1.200 U	1.300 U	0.370 J	1.300 U			
Metals									
Aluminum	NLE	NLE	4710 B	5620 B	4340 B	5630 B			
Arsenic	6	33	2.32	3.39	2.75	3.20			
Barium	NLE	NLE	28.7 B	40.9 B	31.6 B	34.3 B			
Beryllium	NLE	NLE	0.454	0.485	0.399	0.510			
Cadmium	0.6	10	0.222	0.372	0.449	0.263			
Calcium	NLE	NLE	964 B	1130 B	1080 B	1150 B			
Chromium (Total)	26	110	43.0	48.7	36.8	50.6			
Cobalt	NLE	NLE	0.596	0.826	1.09	0.735			
Copper	16	110	5.92 B	8.61 B	11.5 B	4.40 B			
Iron	NLE	NLE	13200	21500	10600	13100			
Lead	31	250	7.69	7.78	28.0	4.78			
Magnesium	NLE	NLE	1530 B	1590 B	1390 B	1710 B			
Manganese	NLE	NLE	24.2	36.6	31.0	31.5			
Nickel (Soluble Salts)	16	75	5.42	6.17	5.28	5.76			
Potassium	NLE	NLE	3220	3300	2150	3310			
Vanadium	NLE	NLE	23.5	24.8	22.3	32.0			
Zinc	120	820	35.9 B	66.7 B	55.6 B	29.5 B			

¹ NJDEP Freshwater Sediment Screening Values - Lowest Effect Levels, 1998.

For non-polar organics (PAHs, organochlorine pesticides, PCBs), the SEL is caluculated from a site-specific TOC level. To calculate a site-specific SEL, TOC is multiplied by the the table SEL. However, no TOC analysis was performed on the FTMM sediment samples. Generally, TOC values range from 1% (10,000 mg/kg) to 10% (100,000 mg/kg) (USEPA, 1998). Since the table SEL is based on 100% TOC, the calculated site-specific SEL would be lower.

DUP = Duplicate Sample.

ft. bgs = Feet below ground surface.

B = The compound was found in the associated method blank as well as in the sample.

D = Sample was diluted.

E = The compound's concentration exceeds the calibration range of the instrument for that specific analysis.

J = Mass spec and retention time data indicate the presence of a compound however the result is less than the MDL but greater than zero.

U = The compound was analyzed for but not detected.

NT = Not tested.

NLE = No limit established.

mg/kg = milligram per kilogram.

Bold = Analyte detected.

Shaded = Concentration exceeds LEL.

July 2008 3-113

NJDEP Freshwater Sediment Screening Guidelines - Severe Effects Levels, 1998.



State of New Jersey

CHRIS CHRISTIE
Governor

KIM GUADAGNO Lt. Governor DEPARTMENT OF ENVIRONMENTAL PROTECTION
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BOB MARTIN Commissioner

April 29, 2013

Joe Pearson Calibre Systems 1119 Canterbury Dr. Lansdale, PA 19446

Re:

Draft Finding of Suitability to Transfer (FOST) dated March 2013

Charles Wood Area

Fort Monmouth, New Jersey

PI G000000032

Dear Mr. Pearson:

The New Jersey Department of Environmental Protection (Department) has completed review of the referenced document, submitted in support of the suitability for transfer of the bulk of Parcels B, C1, C, F, Howard Commons, and the Golf Course Parcel, the majority of which are contained within the property known as the Charles Wood Area. Parcel B is located on the western portion of the Main Post. The following comments are offered.

Section 2. Property Description

Page 2, paragraph 2, as you indicated on April 22, 2013, the reference to Area 400 is to be removed. Also on page 2, in the midpoint of paragraph 2, it is indicated the southeast corner of CWA was developed for R&D. Shouldn't this read southwest?

Section 4. Environmental Condition of Property

Parcel 28 – The narrative indicates some parts of this parcel remain a Category 7 (which are further explained in Section 5.2), or are not categorized. It does not appear the uncategorized area of Parcel 28 (the location of a former UST) is described anywhere within the document, nor is documentation regarding sampling of this area available; sampling is recommended. Additionally, former USTs 2542-29 and 2564-32, although referenced as no release or no contamination observed, were apparently not evaluated via sampling. Therefore, this office cannot concur with the determination there was no discharge in these areas. The Department recommends sampling in accordance with applicable NJDEP regulations and guidance documents.

Parcel 35 – As indicated in previous (July 23, 2012) correspondence, it was determined Appendix O of the January 2007 ECP Report indicated the presence of a former UST as adjacent to Building 2560. As no evaluation of the UST has apparently been performed in accordance with applicable NJDEP regulations and guidance documents, the Department is unable to concur with the determination there was no discharge in the area of this UST, and is therefore unable to concur with the designation of Category 1 in the area of the UST.

Parcel 36—UST 1203 is listed in Enclosure 5, Table 3, page 6 as being removed on November 1, 2009. Although the Table states "no indication of release", the evaluation report does not appear to have been submitted. Therefore, the Department is unable to concur with the determination there was no discharge or designation of Category 1 in the area of this UST.

Section 4.1.1 Installation Restoration Program

Golf Course PCB Site (CW-7) – FTMM-29 – page 9, third and fourth lines – It is suggested the sentence beginning on line three be reworded to read similar to "A draft deed notice has been submitted to and approved by the NJDEP on January 31, 2013, and is to be filed once the property actually transfers." Regarding the fourth line, the NJDEP has not issued a Conditional NFA letter, but rather an approval of the draft deed notice, which is to be filed upon property transfer (followed by application for Remedial Action Permit).

Section 4.3.1 Underground and Above-Ground Storage Tanks (UST/AST)

Reported Releases from USTs – page 13 – Building 2044 was listed in previous reports as a Pesticide Storage Building, rather than Residential. Building 2067 should be included, as Appendix G indicates results from the tank investigation initially exhibited TPH to 20,800 ppm in the soil, prior to receiving a Closure Approval designation on January 10, 2003.

Section 4.4 Polychlorinated Biphenyls (PCB)

Officer's Club, Building 2000, Page 14 – The 0.049 and 2 milligrams per kilogram (mg/kg) referenced represent the Residential Direct Contact Soil Cleanup Criteria (RDCSCC) and Non-Residential Direct Contact Soil Cleanup Criteria (NRDCSCC). The approved draft Deed Notice will be filed once the property has been transferred.

Section 5.1 Carve Out Areas Needing Further Remediation

Wastewater Treatment Lime Pit (CW-1) – FTMM-22 – page 23, 3rd paragraph, 2nd to last sentence - The document seems to indicate the lime pit has been entirely removed during demolition activities. The base of the pit, however, I believe remains in place at this time.

Enclosure 3, Table 1 – Description of Property

Parcel 28, page 3, Remedial Actions – It is agreed ten former fuel oil USTs received designations of no further action necessary. As indicated in the February 22, 2013, correspondence, however, USTs 2564-32 and 2542-29, although reportedly evidencing no visual

contamination, do not appear to have been sampled; therefore, this office cannot concur with the designation of no discharge, nor concur with a Category 1 designation for the area of these two USTs. The Department believes sampling is necessary. Additionally, no mention is made nor description provided of the non-categorized area within the parcel shown in the Site Map in Enclosure 1; again, sampling is warranted.

AAFES Gasoline Station (FTMM-58)- page 5 — Second to last sentence under the Remedial Actions column — "...are considered non-impacted and are part of this FOST and are considered a Category 1." The Category should read Category 2, rather than Category 1, correct? If this is not accurate, please provide the date of DEP concurrence.

Child Development Center, Teen Center, Pool and Former Sewage Treatment Plant – page 5 – The septic tank in need of investigation, and which is not included in this FOST/transfer (carve-out), is not referenced under the Remedial Actions column, as carve-outs are in the other parcels. As noted, this office cannot concur with the designation of no discharge, nor concur with a Category 1 designation, relative to the area of the UST noted on Appendix O of the January 2007 ECP Report as adjacent to Building 2560, without evaluation in accordance with the applicable NJDEP regulations and guidance documents.

Military Army Prep School and Offices – page 6 – The UST previously located at Building 1203 was reportedly removed on November 1, 2009. Although no evidence of a discharge was apparently evident, unless all tanks, former or current, have been evaluated in accordance with the applicable regulations and guidance documents (including submittal of documentation for review), the NJDEP cannot concur with the designation of no discharge, nor concur with a Category 1 designation for the area of the former UST.

Enclosure 4, Table 2 – Notification of Hazardous Substance Storage, Release or Disposal FTMM-29 (CW-7) – page 1 - Remedial Actions — The fourth and fifth lines reference residential and industrial screening criteria. Please change the phrasing to read cleanup criteria rather than screening criteria.

Building 2700 (ECP Parcel 15) – page 1- does the former PCB transformer area not require inclusion on this table?

2700 Meyer Center (FTMM-22 - CW-1) - page 2 - Remedial Actions - first two words should read "Quality Standards", rather than "Quality Criteria". Line 14 - typo; "area" should read "are".

Enclosure 5, Table 3 – Notification of Petroleum Product Storage, Release, or Disposal Former USTs 2542-29 and 2564-32, on Parcel 28, are listed as no release or contamination observed, however, no sampling was apparently performed. No report of evaluation was submitted for former UST UST-2544 on Parcel 28 (non-characterized area Enclosure 1), nor for UST-2560 on Parcel 35, which are not included on the Table, nor apparently for UST-1203 on Parcel 36. As previously indicated, without same, the Department is unable to concur with the determination that no discharge was associated with these USTs.

Page 2 – Building 2067-37 – Date and Remedial Action - Appendix G of the US Army BRAC 2005 ECP Final Report dated January 27, 2007 (Appendix G) indicates the UST, as well as contaminated soil, were removed on May 16, 1994; the NJDEP Closure Approval is dated January 10, 2003.

Page 2 – Buildings 2231 through 2240 & Building 2260 – These buildings were contained within that portion of Parcel 35 previously transferred.

Enclosure 8 Environmental Protection Provisions

1.A.2) Land Use Restriction – third and fourth lines – change "Soil Remediation Standards" to "Soil Cleanup Criteria", as these were the criteria in effect at the time of remedial activities and approval.

EPP Attachment 1

Site Maps – Land Use Restriction Map – Gibbs Hall Building 2000 – As above, the remediation numbers applicable to the area of concern at the time of remediation were the Residential and Non-Residential Soil Cleanup Criteria, rather than the Soil Remediation Standards. Please change line two of the figure's title (to reflect RDCSCC Limit = 0.49 mg/kg), as well as that within the parenthesis beneath the "Legend" box (to reflect "Area Outside of Proposed Deed Notice Boundary Meets NJDEP RDCSCC").

Please contact this office if you have any questions.

Sincerely,

Linda S. Range

C: Wanda Green, BRAC Environmental Coordinator Rich Harrison, FMERA Julie Carver, Matrix



DEPARTMENT OF THE ARMY

OFFICE OF ASSISTANT CHIEF OF STAFF FOR INSTALLATION MANAGEMENT U.S. ARMY FORT MONMOUTH P.O. 148
OCEANPORT, NEW JERSEY 07757

May 17, 2013

Ms. Linda Range New Jersey Department of Environmental Protection Case Manager Bureau of Southern Field Operations 401 East State Street, 5th Floor PO Box 407 Trenton, NJ 08625

Re: Proposed Test Pit Investigation Plan for Parcel 28 Historical Septic Tank Systems and Gas Station, Charles Wood Area, Fort Monmouth, New Jersey

Attachments:

- A. Correspondence Letter from NJDEP dated July 10, 2012
- B. Figures:

Figure 1 Proposed Test Pit Location Map Figure 2 June 30, 1944 Hand-Drawn Sketch of the Charles Wood Area Figure 3 May 2, 1957 Aerial Photograph

Figure 4 May 13, 1963 Aerial Photograph

Dear Ms. Range:

In response to the NJDEP's July 10, 2012 correspondence letter (provided in Attachment A), the U.S. Army proposes to conduct a test pit investigation at Parcel 28 of the Charles Wood Area of Fort Monmouth. The purpose of the investigation is to evaluate subsurface conditions at three former septic systems (referenced in the July 10, 2012 NJDEP letter) and one former gas station (not referenced in the July 10, 2012 NJDEP letter) at Parcel 28. The test pit investigation will be conducted in accordance with:

- 1) Section 3.6.8 (Waste and Wastewater Treatment Systems) of the August 1, 2012 Technical Guidance for Site Investigation of Soil/Remedial Investigation of Soil/Remedial Action Verification Sampling for Soil
- 2) Sections 7:26E-3.4 and 7:26E-3.5 of the NJDEP's May 7, 2012 Technical Requirements for Site Remediation
- 3) August 2005 Field Sampling and Procedures Manual.

Referenced below is a line by line response in bold print to each NJDEP comment regarding Parcel 28 as stated in the July 10, 2012 correspondence letter:

Septic System and Leach Field East of Heliport Drive, South of Radiac Way

NJDEP Comment

It is agreed the four test pits were adequate for characterization of the leach field; no additional action is necessary for the leach field. It does not appear, however, the suspected distribution box/entirety of the septic system was investigated. Although they are not designed to hold liquids/sludges (but rather to distribute the liquids after the solids fall out into the holding tank), particularly as the structure apparently remains in place, additional information is required as to whether the structure could have been/functioned as a holding tank (field notes do reference it as a septic tank) which did contain solids or liquids which should have been sampled.

Army Response

The Army believes all septic system components were removed from this area during renovation of the buildings associated with the Eatontown Laboratories, circa 1951. In an effort to determine the composition of the waste stream that entered the septic tank and distribution box, the Army proposes to dig a test pit to the depth of the groundwater table in the area where the former septic holding tank and distribution box were located. If sludge is encountered in the excavation, a sludge sample as well as a groundwater sample will be collected and submitted to an NJDEP-certified laboratory for U.S. Environmental Protection Agency (USEPA) Target Compound List (TCL) and Target Analyte List (TAL) analysis. If no sludge is encountered in the excavation, a soil sample within six inches of the groundwater table in addition to a groundwater sample will be collected and submitted to an NJDEP-certified laboratory for USEPA TCL and TAL analysis. A summary report detailing the findings of the test pit investigation, including all photodocumentation, will be submitted to the NJDEP.

Septic System & Septic Tank A

NJDEP Comment

Located off the northeast corner of Building 2525, a suspected septic tank was located via GPR scanning, as denoted as "A" on Figure 3.5-2 of the ECP Site Investigation. Sampling efforts, however, were performed only at the associated leach field. What efforts were made to adequately characterize any holding tank contents of the actual septic tank, as required by the Tech Regulations in effect at the time of investigation [N.J.A.C. 7:26E-3.9(e)3]? As regarding the associated leach field, a minimum of 4 samples are required. A single soil and single groundwater sample is inadequate.

Army Response

The Army believes all septic system components were removed from this area during renovation of the buildings associated with the Eatontown Laboratories, circa 1951. In an effort to determine the composition of the waste stream that entered the septic tank and associated leach field, the Army proposes to dig one test pit in the area where the former septic holding tank was located and four test pits in the area where the former septic system leach field is located. All test pits will be excavated to the depth of the groundwater table. If sludge is encountered in any of the excavations, a sludge sample as well as a groundwater sample will be collected and submitted to an NJDEP-certified laboratory for USEPA TCL and TAL analysis. If no sludge is encountered, a soil sample within six inches of the groundwater table in addition to a

groundwater sample will be collected from each test pit and submitted to an NJDEP-certified laboratory for USEPA TCL and TAL analysis. A summary report detailing the findings of the test pit investigation, including all photodocumentation, will be submitted to the NJDEP.

Septic System at Southeastern Corner of Parcel 28

NJDEP Comment

For that septic system located in the southeastern corner of the parcel as sampled by P28-SB1, the findings/requirements noted in the above paragraph also apply.

Army Response

The Army believes all septic system components were removed from this area during renovation of the buildings associated with the Eatontown Laboratories, circa 1951. In an effort to determine the composition of the waste stream that entered the septic tank and associated leach field, the Army proposes to dig one test pit in the area where the former septic holding tank was located and four test pits in the area where the former septic system leach field is located. All test pits will be excavated to the depth of the groundwater table. If sludge is encountered in any of the excavations, a sludge sample as well as a groundwater sample will be collected and submitted to an NJDEP-certified laboratory for USEPA TCL and TAL analysis. If no sludge is encountered, a soil sample within six inches of the groundwater table in addition to a groundwater sample will be collected from each test pit and submitted to an NJDEP-certified laboratory for USEPA TCL and TAL analysis. A summary report detailing the findings of the test pit investigation, including all photodocumentation, will be submitted to the NJDEP.

Former Storage Areas/Possible Former Tank Pads

NJDEP Comment

This area received a designation of No Further Action on March 29, 2012.

Army Response

The Army acknowledges the NJDEP's NFA designation for this area.

Former Parcel 28 Gas Station (Not Referenced in July 10, 2012 NJDEP Letter)

According to a June 30, 1944 hand-drawn sketch of the Charles Wood Area (**Figure 2**), former building 2541 is depicted as "gas station". The structure depicted as a gas station on the sketch is also present on a May 2, 1957 aerial photograph (**Figure 3**) of the area. In a subsequent May 13, 1963 aerial photograph (**Figure 4**), the "gas station" structure is no longer present. No other records regarding former building 2541 could be found. The Army believes the former Bldg. 2541 gas station depicted on the sketch and aerial photographs was demolished during renovation/reconfiguration of the Charles Wood Area, circa 1957-1963. The building number 2541 has since been reused, and is currently the building number of a warehouse at the Charles Wood Area.

In an effort to determine if any remnants of the gas station remain, including any underground storage tanks, piping, and any historical discharge that may have occurred, the Army proposes to

dig five test pits to the depth of the groundwater table in the area where the former gas station was located. Excavated soil from each test pit will be visually examined and scanned with a photoionization detector. If visually stained soil or soil with field-detectable volatile organic compounds are encountered at a test pit location, three samples will be collected: a soil sample from the impacted area, a soil sample within six inches of the groundwater table, and a groundwater sample. If no impacted soil is encountered, only two samples will be collected: a soil sample within six inches of the groundwater table and a groundwater sample. All samples will be submitted to an NJDEP-certified laboratory and analyzed for volatile organic compounds with a library search of the fifteen highest tentatively identified compounds (VO+15) plus lead. If any underground storage tanks or piping are encountered, these items will be removed from the subsurface with soil and groundwater sampling conducted in accordance with N.J.A.C. 7:26E and the regulations regarding closure of a UST system N.J.A.C. 7:14B). A summary report detailing the findings of the test pit investigation, including all photodocumentation, will be submitted to the NJDEP.

The Army requests that the NJDEP issue a formal approval letter for the proposed test pit investigation plan.

Should you have any questions or require additional information, please contact me at (732) 380-7064 or by email at wanda.s.green2.civ@mail.mil.

Sincerely,

Wanda Green

BRAC Environmental Coordinator

Enclosures

Contract Number W912DY-09-D-0062, Task Order 0012

ATTACHMENT A



State of New Yersey

CHRIS CHRISTIE
Governor

KIM GUADAGNO Lt. Governor DEPARTMENT OF ENVIRONMENTAL PROTECTION
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BOB MARTIN
Commissioner

July 10, 2012

Wanda Green
BRAC Environmental Coordinator
OACSIM – U.S. Army Fort Monmouth
PO Box 148
Oceanport, NJ 07757

Re: March 2012 Army Response to NJDEP Correspondence Letter Dated October 28, 2008

Fort Monmouth, NJ PI G000000032

Dear Ms. Green:

A review of the above referenced report, received March 27, 2012 and submitted in response to the Department's comments regarding the Draft Site investigation Report of July 21, 2008 by Shaw Environmental, Inc., has been completed by this office. Many of the parcel comments involved suspected USTs; in addition to that information provided in this submittal and the July 2008 SI, a review and comparison of Appendix G, Appendix O, and Figures 15 and 16 of the January 2007 ECP Report was conducted by this office in an attempt to ascertain the location and status of all tanks located within the parcels. Unless otherwise noted, comments and questions are provided only for each parcel referenced in the submittal and are generally presented by parcel.

Parcel 13 - Former Barracks (Buildings 2004-2016)

Geophysical surveys were performed, and sampling was conducted throughout that area at which USTs were known to or may have been present. No USTs were found; all soils analytical results were below cleanup criteria applicable to the site; no additional action for the parcel is necessary.

Parcel 14 - Former Buildings and Housing Area Northwest Portion of CWA

As indicated in the Department's correspondence of May 30, 2012, the geophysical surveys performed and sampling conducted throughout that area at which USTs were or may have been present were sufficient to adequately characterize the area. No USTs were found; all soils analytical results collected were below cleanup criteria applicable to the site. The parcel was re-categorized from Category 2 to Category 1.

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Parcel 15 - Building 2700

Parcel 15 was issued a designation of No Further Action for soils and ground water, exclusive of CW-1, on May 9, 2012. Remediation efforts involving CW-1 continue.

Parcel 27 - Southwestern Corner CWA

The single outstanding issue at Parcel 27 was the USTs. As previously indicated, numerous USTs were removed from the parcel, however, additional documentation for same was required.

It is agreed fourteen (14) USTs have been removed and given NJDEP Closure Approval Letters/NFAs. Although it is understood Departmental approval may have been granted for an additional five USTs, as indicated on Page 6 of the referenced submittal and in Appendix G, please be advised this office does not have documentation confirming Closure Approval/NFA for the following USTs.

UST 2506-17	Reported NJDEP UST Closure Approval Date 7/10/98
UST 2624-34	Reported NJDEP UST Closure Approval Date 7/23/93
UST 2624-57	Reported NJDEP UST Closure Approval Date 9/21/95
UST 2624-58	Reported NJDEP UST Closure Approval Date 9/21/95
UST 2624-59	Reported NJDEP UST Closure Approval Date 9/21/95

Additionally, please provide information as to the status of the USTs noted in Appendix O at what appear to be Buildings 2566 and 2505, located just north of Building 2503?

Any sediment issues which may have resulted from parcel operations are to be addressed as part of the ongoing facility wide ecological assessment.

Parcel 28 – Former Eatontown Laboratory

Underground Storage Tanks

Although this office is in agreement with the information submitted in regard to the majority of the USTs as noted on Parcel 28, questions remain on several, which are not considered as given a designation of NFA at this time.

As above, documentation for closure approval or NFA is not available for confirmation on the following USTs.

UST 2539-28	Reported NJDEP UST Closure Approval Date 3/31/93
UST 2539-64	Reported NJDEP UST Closure Approval Date 3/31/93
UST-2531-21	Reported NJDEP UST Closure Approval Date 8/29/00

UST 2542-29 and UST 2564-32 are reported as no release observed. A Standard Reporting Form and/or Site Assessment Compliance Statement were reported sent to us 11/22/91, however, no designation of NFA was granted, nor comments apparently generated.

Appendix O indicates three USTs within that area which underwent a geophysical survey between Building 2525 & Heliport Drive. The center UST appears to correlate to UST P28-8, which, based upon the investigation performed, warrants no further action. Although it is agreed no tanks remain in that area, please provide any record of their removal or indication as to evidence of a discharge upon removal. As previously discussed, a designation of NFA for USTs cannot be granted without sampling.

Septic Tanks & Leachfields

Leachfield East of Heliport Drive, South of Radiac Way — It is agreed the four test pits were adequate for characterization of the leachfield; no additional action is necessary for the leachfield. It does not appear, however, the suspected D-box/entirety of the septic system was investigated. Although they are not designed to hold liquids/sludges (but rather to distribute the liquids after the solids fall out into the holding tank), particularly as the structure apparently remains in place, additional information is required as to whether the structure could have been/functioned as a holding tank (field notes do reference it as a septic tank) which did contain solids or liquids which should have been sampled.

Septic System & Septic Tank A — Located off the northeast corner of Building 2525, a suspected septic tank was located via GPR scanning, as denoted as "A" on Figure 3.5-2 of the ECP Site Investigation. Sampling efforts, however, were performed only at the associated leachfield. What efforts were made to adequately characterize any holding tank contents of the actual septic tank, as required by the Tech Regulations in effect at the time of investigation (NJAC 7:26E-3.9(e)3)? As regarding the associated leachfield, a minimum of 4 samples is required. A single soil and single ground water sample is inadequate.

Septic System at Southeastern Corner of Parcel - For that septic system located in the southeastern corner of the parcel as sampled by P28-SB1, the findings/requirements noted in the above paragraph also apply.

Former Storage Areas/Possible Former Tank Pads — This area received a designation of NFA on March 29, 2012.

Parcel 34 - Building 2567/FTMM 58

Elevated levels of ground water contamination underwent treatment via a Permit-by-Rule approved in October of 2010. The Department most recently responded on March 7, 2012 approving monitoring via two rounds of seasonal high ground water analytical sampling.

As recently discussed, although piping was cleaned at the time of tank removal, it necessary to remove the piping and dispensing equipment/island.

Parcel 38 - Former Outdoor Pistol Range (1940-1955)

Although no exceedences were noted, Departmental comments indicated the surface soil sampling was not adequate due to the possibility the parcel soils had been re-worked; a ground water investigation was therefore required. The Army will be submitting the results of a ground water investigation in a future letter report to this office. If you wish to receive comments on anticipated frequency and locations of the ground water sampling points and methodology (ie low-flow), please submit the sampling plan prior to implementation.

Parcel 39 - Building 1150/Vail Hall

Previous comments indicated the soil exceedences, although permitted to remain in place with institutional controls (Deed Notice), must be compared to and delineated to the RDCSCC. The Army has agreed, in this submittal, to prepare a revised map indicating delineation boundaries to the more stringent criteria, as appropriate. A draft Deed Notice for same is to be submitted to this office for review and comment.

Any sediment issues which may have resulted from operations are to be addressed as part of the ongoing facility wide ecological assessment.

Parcel 43 - Building 1122 (Do-it-Yourself Auto Repair)

No comments based on submittal; Army acknowledges Department's March 18, 2011 comments; remedial efforts are ongoing.

Any sediment issues which may have resulted from parcel operations are to be addressed as part of the ongoing facility wide ecological assessment.

Parcel 49 - Former Squier Laboratory Complex

The Site Investigation indicated five surface soil samples contained base neutrals at concentrations above the NRDCSCC, while one sample contained PCBs above the NRDCSCC. The Department concurred with the recommendation of additional sampling for delineation purposes. The March 2012 submittal, however, specifies no sampling will be performed in regard to the BNs exceedences as they "are commonly detected in soil directly beneath asphalt payement".

Base Neutrals (BNs)

Although it is agreed elevated levels of BN constituents related to asphalt rather than a discharge may be encountered beneath asphalt paving, it is not agreed sufficient information has been provided at this time to document each location at which BN exceedences are noted is unrelated to site operations. The previously approved proposal for additional sampling remains appropriate for each sample location at which exceedences were noted.

PCBs

Regarding PCBs, a re-sample is currently proposed in the location at which PCBs were noted to exceed the NRDCSCC, sample P49-SS8-A. As no Remedial Action Workplan for this parcel was previously approved, the Soil Remediation Standards (0.2 ppm) apply. As such, PCBs exceed the standard at three locations – P49-SB3-A and P49-SS7-A (which also exhibits the highest levels of BN contamination), in addition to SS8-A. Delineation to the most stringent standard is required.

Arsenic

A review of the site operations and the analytical data, including the horizontal and vertical distribution of the arsenic, the lead to arsenic ratio, as well as the presence of glauconitic soils indicate the arsenic encountered in this area is representative of naturally occurring levels.

Volatile Organics

It is agreed further discussion regarding volatile organics in ground water at the M-18 Landfill is to be discussed in a forthcoming Remedial Investigation Report for the landfill.

USTs

As with the above parcels, although many tanks have received a designation of NFA, several tanks do not have sufficient documentation to be designated same. These include:

UST-293-67 – per Appendix G, report submitted 2/26/96; no Departmental response UST-290-193 - per Appendix G, report submitted October 1993, no Departmental response UST 283-59 – per Appendix G, reported Closure Approval 2/24/00; no confirmation available UST 283-58 - per Appendix G, no sampling was performed UST 296-69 – per Appendix G, report submitted 2/26/96; no Departmental response

For those USTs which Appendix G indicates reports were previously submitted and not responded to, unfortunately, this office has no record of same and re-submittal is required for comment.

Parcel 50 - IRP Sites FTMM-54, FTMM-55 & FTMM-61

The Army acknowledges the Department's August 14, 2007 letter, the comments of which are to be addressed via Remedial Investigation Report Addendums for FTMM-54 (Site 296), FTMM-55 (Site 290) and FTMM-61 (Site 283). Submittal dates were not indicated. This office will await submittal of same.

Parcel 51 - 750 Area, 500 Area, 600 Area, 1100 Area - Former Buildings

The geophysical survey and sampling conducted at portions of the parcel were insufficient to allow for determination of NFA for the USTs previously/currently located in the parcel. Further investigation conducted north of Building 750 revealed the presence of USTs UHOT 1123B and 1123C at the two northernmost previously identified anomalies. The USTs were subsequently removed, as was affected soil. Although it is indicated all soils were removed to below 1000 ppm TPH, Table 2 at Attachment D appears to indicate soils at sample 1123B East Wall at 8.5-9' contains TPH at 9832.44 ppm. Clarification is needed.

Although it is understood the additional investigation undertaken in June of 2009 revealed the presence of the two above referenced USTs located above Semaphore Ave, it is unclear what efforts were made to investigate the nine potential USTs/anomalies noted on Figure 3.12-2 south of Echo Avenue? Are they all to be included in the Building 750 submittal?

Additional questions regarding USTs within the parcel remain. As above, documentation for closure approval or NFA is not available for confirmation on the following USTs.

No geophysical surveys, sampling or at least reports appear to have been performed or submitted for the following USTs - UST 68, 635, 637, 642, 643, 645, 647, 648, 649, 650, 651, 652, 653, 654, 656-97, 656-98, 657-90, 658-100, 660, 662, 663, 665, 667, 689-102.

Appendix O indicates USTs which do not appear to be "closed" per Appendix G which were/are also present in areas outside the geophysical survey, including those at Building 676, several along Sherrill Avenue north of Building 600, east of Brewer Ave by Buildings 545 and 554, Building 555, and several by Building 557.

Although Appendix G indicates closure reports were submitted, it also indicates no Departmental response was received for the following USTs - UST-682-106, UST 656-104, UST 659-101, UST 114-1, UST 645-78, UST 789-126.

USTs 750 - report pending

UST 501-76 — Appendix G indicates NFAed July 10, 1998, however confirmation unavailable UST 551-80 — Appendix G indicates NFAed August 29, 2000, however, confirmation unavailable UST 695 — Appendix indicates NFA August 24, 2000, however, confirmation unavailable

Parcel 52 – Building 699 – Army Exchange Services Gas Station
No comments based on submittal; Army acknowledges Department's March 18, 2011
comments; remedial efforts are ongoing.

Parcel 57 - Former Coal Storage & Railroad Unloading - 800 Area

Three surface soil samples contained B/Ns at concentrations above the NRDCSCC. The Department concurred with the general recommendation to conduct additional sampling, and required the submittal of a Remedial Investigation Workplan. The March 2012 submittal, however, states the exceedences were related to the asphalt pavement under which the samples were collected.

As with Parcel 49, it is agreed elevated levels of BN constituents related to asphalt rather than a discharge may be encountered beneath asphalt paving. However, information has not been submitted to document these sample results are not reflective of site operations, particularly given the nature of operations in the area. Delineation is necessary.

PCBs analyses was required due to the proximity of the railroad tracks/unloading area, as indicated in the Department's June 15, 2007 letter, rather than historical operations at Parcel 57.

As PCBs are often associated with rail road tracks and spurs, analysis for same is appropriate and remains a requirement.

Ground Water

Although the previous proposal for delineation of ground water exceedences was approved, the current submittal indicates NFA is warranted due to naturally occurring background conditions. The Department is conducting further review of the information provided.

Parcel 61 - Building 1075 - Patterson Health Clinic

Soil sampling conducted at the parcel indicated elevated levels of three base neutral compounds in a soil sample collected beneath an area of former asphalt paving at the southeastern corner of Building 1075. The Department is in agreement the PAHs are not reflective of a discharge nor of operations performed at the site. No additional action for same is necessary.

As discussed, the analyses for PCBs as indicated in the Department's October 2008 correspondence is not required, based upon a review of areas of concern located within the parcel.

UST 1076-209 — Although Appendix G indicates the closure report was being prepared, recent conversation indicates no submittal of the report is anticipated as the tank was a "clean closure." This would, of course, not allow for comment or designation of NFA for this tank. Additionally, information previously submitted indicates this tank was installed at a location at which a leaking UST was removed and remediated. It does not appear closure information for that UST was submitted.

Parcel 69 - Building 900 - Former Vehicle Repair/Motor Pool

The previous Departmental comments indicated soil sampling was inadequate for designation of NFA as analytical parameters did not include PCBs. Although it is understood your position is that PCBs are not suspected to have been disposed of in the former waste oil AST at Building 900, the Technical Requirements for Site Remediation, both those in effect at the time of sampling, as well as those currently in effect, require the inclusion of PCBs in the analytical parameters for sampling of soil when waste oil is involved.

Regarding analytical parameters for sediment sampling, that will be addressed as part of the ongoing facility wide ecological assessment.

One ground water sample previously indicated an exceedence of PCE. Per this submittal, the Army plans to resample the ground water at the location of temporary well point P69GW-1. Previous Departmental correspondence, however, stated the submittal of a ground water remedial investigation workplan was required for NJDEP review and approval. If resampling of a single location, in anticipation of a "clean" result is performed, rather than several delineation sampling points, please ensure the resultant submittal includes adequate rationale/justification to confirm the area of greatest possible contamination was sufficiently targeted.

Two USTs were previously noted as within the parcel. UST 900-142 was granted Closure Approval Letter/NFA on July 10, 1998, while documentation for closure approval or NFA is not available for confirmation on the following UST:

UST 900-141 Reported NJDEP UST Closure Approval Date 7/10/98

Parcel 70 - Building 551 - Former Photoprocessing

The October 28, 2008 Departmental correspondence concurred with the recommendation for no further action. As a note however, we do not have a copy of the Appendix G referenced 8/29/00 Closure Approval Letter for UST 551-80

Parcel 76 – 200 Area, 300 Area – Former Barracks

A geophysical survey was performed throughout Parcel 76, with suspect USTs noted in the western portion of the parcel. Although sampling conducted within that western portion of the parcel indicated no exceedences of the applicable cleanup criteria, additional investigation was required regarding the possible USTs.

Additional evaluation was documented in the June 2011 Remedial Investigation and Closure Report, which references Incident #s 09-11-04-1553-32, 10-04-28-1333-57, 10-04-13-1710-23, 09-11-19-1710-57 and 10-01-06-1342-44 and the removal of UHOTs 544, 543, 542, 541, 540, 539 and 538. Affected soils were reported removed to below the 1000 ppm contingency analytical threshold; a ground water investigation was performed via the installation of four monitor wells as ground water was encountered in the excavations.

The adequacy of the investigations/remedial actions presented in the report submittal cannot be determined, as insufficient information has been provided. No information was contained in Appendices A through E, nor were any Figures included (this information was missing in many of the Attachment D reports, some of which was obtainable through previous submittals and information, some not). No comparison could be made of UST locations against geophysical anomalies, sample locations, or monitor well locations. A review of Table 2/Summary of Laboratory Analyses as a stand-alone document (without sampling location/result maps, further association between sample ID and tank) is insufficient to allow for documentation of soils removal to below the above stated 1000 ppm contingency analytical threshold, or even the 5100 ppm EPH standard at each tank, or to determine if the ground water investigation (placement of monitor wells) was adequate.

Additionally, although it is agreed no USTs appear to remain in the eastern portion of Parcel 76, no remedial documentation was submitted for those former tank locations as noted on Appendix O and Figure 15 of the January 2007 ECP Report in the eastern portion of Parcel 76, as follows:

UST-261-45 UST-262-46 UST-263-47 UST-264-48 UST-265-49 UST-266-50 UST-267-51 UST-268-52 UST-269-53(contamination per Appendix G)

As previously discussed, a designation of no further action for these USTs cannot be issued without an investigation in accordance with the Technical Requirements for Site Remediation.

Parcel 79 – 400 Area Former Barracks

A geophysical survey was previously performed throughout the parcel, identifying potential USTs in only that portion as noted in Figure 3.19-1. Additional evaluation of the area encountered eight USTs, noted as UHOTs 437, 440, 441, 444, 445, 448 and 450 which were subsequently removed, while contamination was noted at Building 449. A ground water investigation is to be performed based upon the presence of ground water in the excavation. Additional comments regarding same will be forthcoming pending submittal.

As with Parcel 76, above, although it is agreed no USTs appear to remain, no remedial documentation was submitted for many of those former tank locations noted on Appendix O and Figure 15 of the January 2007 ECP Report at other areas of the parcel, and/or insufficient information currently exists to allow for designation of NFA.

North of Fisher Avenue

UST-401-26 - per Appendix G, no samples were collected, no report submitted

UST-411-28 - per Appendix G, report submitted 02/26/96, no Departmental response noted

UST-416-32 - per Appendix G, no samples collected, no report submitted

UST-421-37 - per Appendix G, report submitted 7/22/98, no Departmental response noted

UST-423-39 - per Appendix G, report submitted 2/26/96, no Departmental response noted

South of Fisher Ave, North of Leonard Ave

UST-430-45 – per Appendix G, report submitted 10/23/97, no Departmental response noted UST-447 – Not referenced on Appendix G; located east of grid sampling; sampling status unclear

South of Leonard Avenue

UST-454-51 - Reported Closure Approval date 7/10/98 - no record of same

UST-142-73 - per Appendix G, report submitted 10/23/97, no Departmental response received

UST-142-13 - per Appendix G, report submitted 10/23/97, no Departmental response received

UST-29-1 - per Appendix G, report submitted 11/22/91, no Departmental response noted

UST-490-58 - per Appendix G, no sampling; "site closed by NJDEP"; no record of same

UST-492-59 - Reported Closure Approval date 8/29/00 - no record of same

UST-202-a - "clean closure", no report submitted

UST-202-b - per Appendix G, 30 tons of soil removed, report submittal pending

UST-202-21 - per Appendix G, TPH ND, no report submitted

UST-202-22 - per Appendix G, TPH ND, no report submitted

Please submit documentation in accordance with the Tech Regs for each of the above to allow for comment/designation of NFA. For those which Appendix G indicates reports were previously submitted and not responded to, unfortunately, this office has no record of same and re-submittal is required.

Additionally, with the exception of the above referenced UST-454-51, and UST 475-52 (NFA 10/23/00), no documentation of sampling activities for that area shown on Appendix O extending from Tilly Avenue north to Leonard Avenue, previously shown to include approximately 22 USTs, appears to have been submitted.

Finally, please indicate what investigation, if any, has taken place at the two former and one current ASTs located north of Hazen Drive.

Parcel 80 - Former Buildings 105 & 106 - Photoprocessing

Prior to issuing a determination as to the adequacy of the soil sampling, additional information is required regarding the basis for establishment of the sample locations. Were as-builts or other plans available for the demolished buildings to assist in locating former floor drains, septic systems, discharge points, etc.?

Although the previous proposal for delineation of ground water exceedences was approved, the current submittal indicates NFA is warranted due to naturally occurring background conditions. The Department is conducting further review of the information provided.

Parcel 83 – Former Photoprocessing, Vehicle Maintenance, Coal Storage & Railroad Unloading, Maintenance Shops

The 2008 SI Report, Section 4.1.2, indicates "eight surface soil samples contained B/Ns at concentrations above the NJDEP NRDCSCC. Two surface soil samples contain lead at concentrations above the NJDEP NRDCSCC and MPBC. Further evaluation is recommended."

While the exceedences at P83-SB9C were apparently not included in that statement, nor plotted, several PAH constituents were noted above the residential and non-residential criteria at 4.5-5'. Vertical delineation appears incomplete at this location.

Although this office does not as yet agree the PAH exceedences at this parcel are due to current/former asphalt (particularly at SB9 or B5), re-collection of the samples as proposed to assist in determining same is acceptable. The further evaluation must, of course, include all exceeded contaminant categories if the intent is to prove no discharge.

Trichloroethylene is reported on Table 3.21-4 of the SI Report above criteria at sample location P83-SB9B, at 5.8 ppm, at 1.5-2', with no discussion provided. Please provide same.

Metals exceedences were noted at three locations – SB10A, SB9A and B5A; this office considers location SB-10 to be above criteria for arsenic and lead (residential criteria is 400 ppm).

As regarding arsenic in soils, although it is agreed the site soils are often associated with elevated levels of naturally occurring arsenic, the parcel specific soil analytical results, the lead to arsenic ratio, and the decrease of arsenic with depth at those locations exhibiting an elevated level, do not appear to indicate the exceedences are naturally occurring, and must be included in a remedy.

As with the above parcels, although many tanks have received a designation of NFA, several tanks do not have sufficient documentation to be designated same. These include:

UST-421-37 - Per Appendix G, report submitted 10/23/97; no Departmental response UST-273-65 - Per Appendix G, 6000 gallon gasoline tank still in use UST-273-66 - Per Appendix G, 10000 gallon gasoline tank still in use UST-273-67 - Per Appendix G, 10000 gal gasoline tank still in use UST-117-72 - Per Appendix G, remedial action report completed July '98; status unknown UST-108-7 - Per Appendix G, report submitted 2/26/96; no Departmental response UST-108-60 through 64 - Per Appendix G, remediation efforts ongoing UST-161-68 - Per Appendix G, waste oil tank RAR submitted 2/26/96, no response UST-161-14 - Per Appendix G, RAR submitted 2/26/96, no Departmental response

Appendix O also includes several former USTs on the parcel which appear to have had no documentation of closure or investigation submitted, including those at Buildings 479, 66, 276, 485, 280, 281 and 167.

Electrical Substations

The October 28, 2008 correspondence indicated the need for establishment of a Deed Notice and engineering controls due to elevated levels of PCBs above the RDCSCC of 0.49 ppm. The March 2012 proposal is for resampling of the two locations at which results were above the criteria, with a letter report to follow. This is acceptable, however, please be advised a Deed Notice will be required for any soils left in place within these two areas, which exhibit a result of greater than 0.2 ppm PCBs. No engineering controls are required if all results are below 1 ppm.

Miscellaneous

Attachment E of the submittal references numerous letters from the NJDEP regarding UST closure approvals/NFAs, however, the letters dated July 23, 1993 and September 21, 1995 were not included in the submittal. Submittal of those two letters would be beneficial and appreciated.

Vapor Intrusion Investigation
Submittal of the report is anticipated shortly.

Baseline Ecological Evaluation
Submittal of the amended report is anticipated shortly.

If you have any questions regarding this matter contact this office at (609) 984-6606.

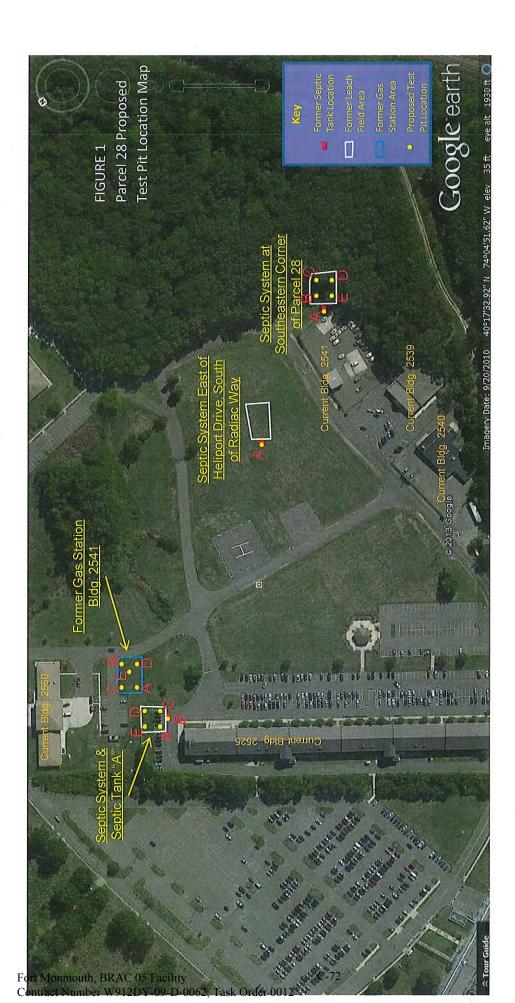
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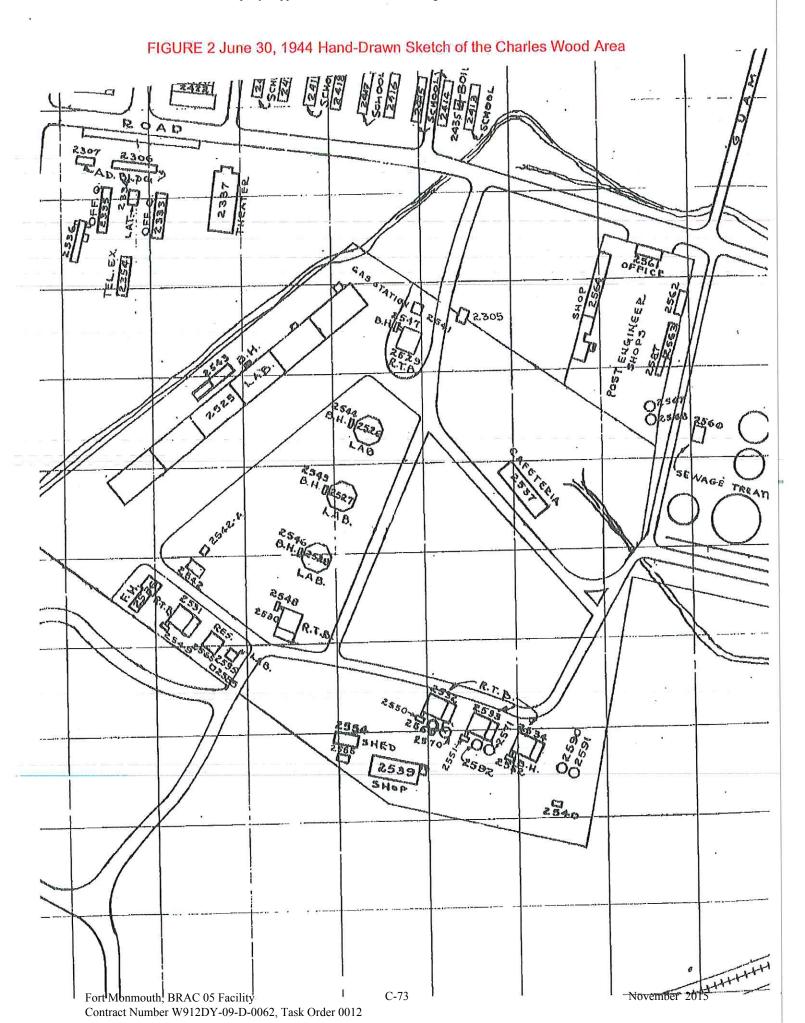
Linda Range

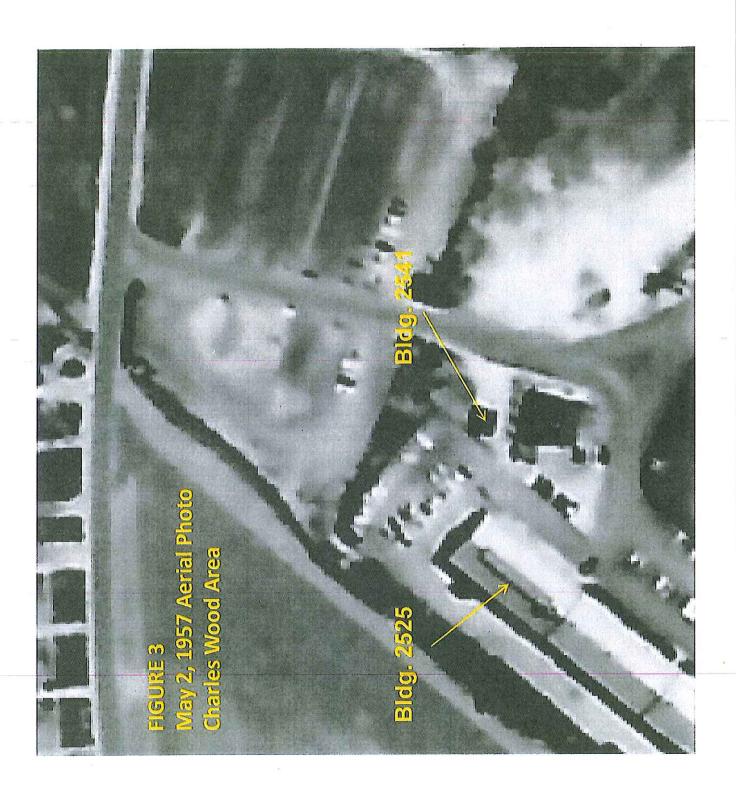
Bureau of Case Management

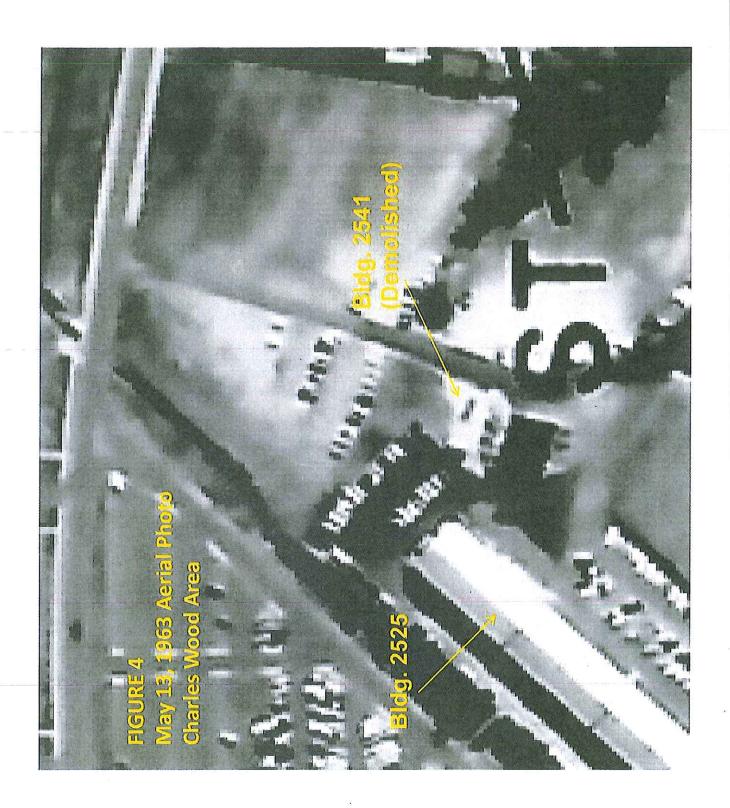
C: Joe Pearson, Calibre Systems Rich Harrison, FMERA Julie Carver, Matrix

ATTACHMENT B











State of New Jersey

CHRIS CHRISTIE
Governor

KIM GUADAGNO Lt. Governor DEPARTMENT OF ENVIRONMENTAL PROTECTION
Bureau of Case Management
401 East State Street
P.O. Box 420/Mail Code 401-05F
Trenton, NJ 08625-0028
Phone #: 609-633-1455
Fax #: 609-633-1439

BOB MARTIN Commissioner

June 3, 2013

Wanda Green
BRAC Environmental Coordinator
OACSIM – U.S. Army Fort Monmouth
PO Box 148
Oceanport, NJ 07757

Re:

Proposed Test Pit Investigation Plan for Parcel 28 Historical Septic Tank Systems &

Gas Station

Charles Wood Area

Fort Monmouth, New Jersey

PI G00000032

Dear Ms. Green:

The New Jersey Department of Environmental Protection (Department) has completed review of the referenced submittal, dated May 17, 2013. The submittal details the additional proposed investigative activities for the three former septic systems located within Parcel 28 (discussed in this office's July 10, 2012 correspondence), as well as the former gas station identified in the 1944 sketch, as previously discussed and included in the referenced submittal.

Sampling frequency and location proposals are acceptable, however, the proposed analytical parameters for all samples collected relative to the septic systems require modification to ensure each of the following is included. In accordance with N.J.A.C. 7:26E-2.1(c)1ii, analytical parameters for all media are to include Target Compound List plus TICs/Target Analyte List (TCL + TICs/TAL), hexavalent chromium, extractable petroleum hydrocarbons (EPH), and pH, as the former wastestream contaminants are unknown or not well documented.

The investigation of the former gas station, as proposed, is acceptable.

If you have any questions regarding this matter, please contact this office at (609) 984-6606.

Sincerely,

Linda S. Range

Bureau of Case Management

C: Joe Pearson, Calibre Systems Rich Harrison, FMERA Julie Carver, Matrix

APPENDIX C

Historical Information for Parcel 38

Final, Revision 1 Appendix C Historical Information of Property Supplemental Phase II Site Investigation Work Plan **LEGEND** Surface Soil Sample Location Former Pistol Range Water Body Building Installation Boundary P38SS-A1 P38SS-A3 P38SS-A4 **BRAC PARCEL LABEL DEFINITIONS** HS - Hazardous Substance Storage HR - Hazardous Substance Release PS - Petroleum Storage PR - Petroleum Release (P) - Possible Release or Disposal P38SS-B7 CATEGORY NUMBER P38SS-C1 P38SS-C8 P38SS-C2 P38SS-B4 P38SS-B5 P38SS-B3 P38SS-B6 P38SS-C7 P38SS-C4 P38SS-C5 P38SS-C6 P38SS-C3 Former Pistol Range 38(7)HR(P)/PS SCALE: 130 Base Realignment and Closure 2005 Shaw Environmental, Inc. FIGURE 3.7-1 FORT MONMOUTH ECP SITE INVESTIGATION PARCEL 38 SAMPLE LOCATIONS MAIN POST FORT MONMOUTH NOVEMBER SIES Contract Number W912DY-09-D-0062, Task Order 0012

Table 3.7-3 Fort Monmouth Phase II Site Investigation, Parcel 38 Summary of Analytical Parameters Detected in Soil (mg/kg)

			Analytical Results												
		Sample ID:	P38SS-A1	P38SS-A2	P38SS-A3	P38SS-A4	P38SS-A5	P38SS-A6	P38SS-A7	P38SS-A8	P38SS-B1	P38SS-B2	P38SS-B3	P38SS-B4	P38SS-B4 DUP
			7055601	7055602	7055603	7055604	7055605	7055606	7055607	7055608	7055609	7055610	7055611	7055612	7055625
		Date Sampled:	12/21/2007	12/21/2007	12/21/2007	12/21/2007	12/21/2007	12/21/2007	12/21/2007	12/21/2007	12/21/2007	12/21/2007	12/21/2007	12/21/2007	12/21/2007
		Depth (ft. bgs):	0.0-0.5	0.0-0.5	0.0-0.5	0.0-0.5	0.0-0.5	0.0-0.5	0.0-0.5	0.0-0.5	0.0-0.5	0.0-0.5	0.0-0.5	0.0-0.5	0.0-0.5
Chemical	NRDCSCC ²	IGWSCC ³	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result
Metals															
Aluminum	NLE	NLE	13100 B	14800 B	14900 B	16300 B	12800 B	13500 B	12400 B	14300 B	19700 B	17900 B	15100 B	15800 B	16700 B
Arsenic	20	NLE	10.0	11.2	9.05	10.8	9.25	12.6	13.0	13.0	15.1	16.0	11.9	9.52	11.8
Barium	47,000	NLE	44.6 B	62.6 B	42.5 B	46.0 B	31.6 B	28.5 B	34.3 B	25.9 B	79.6 B	67.7 B	35.9 B	40.7 B	40.4 B
Beryllium	140	NLE	0.936	1.17	1.77	1.84	1.47	1.30	1.31	1.34	1.75	1.73	2.00	1.92	2.15
Cadmium	100	NLE	0.192	0.220	0.112	0.322	0.120	0.168	0.131	0.169	0.543	0.461	0.367	0.384	0.766
Calcium	NLE	NLE	417 B	602 B	1410 B	805 B	979 B	740 B	742 B	771 B	925 B	668 B	599 B	779 B	873 B
Chromium (Total)	NLE	NLE	80.8	102	141	151	124	108	103	117	175	157	160	154	171 B
Cobalt	NLE	NLE	0.525	1.03	1.24	1.76	1.40	1.58	1.69	1.35	1.83	1.19	1.29	1.32	1.71
Copper	45,000	NLE	18.2 B	23.5 B	13.2 B	12.3 B	9.78 B	8.55 B	12.2 B	12.0 B	34.0 B	23.8 B	11.6 B	12.4 B	13.2 B
Iron	NLE	NLE	31000	38000	52700 E	56500 E	46300 E	43300 E	41400	44200	63200 E	59900 E	64200 E	58200 E	62200 E
Lead	800	NLE	76.3	104	36.2	35.3	26.0	13.0	15.8	23.3	176	96.5	24.9	75.2	104
Magnesium	NLE	NLE	3380	4210	6590	6810	5390	4650	4260	4860	6860	6450	7090	7140	7780 B
Manganese	NLE	NLE	70.7 B	87.5 B	51.2 B	66.2 B	62.8 B	67.8 B	78.7 B	79.6 B	66.1 B	69.1 B	47.1 B	64.0 B	66.9 B
Mercury	270	NLE	0.32	0.62	0.116 U	0.115 U	0.114 U	0.103 U	0.113 U	0.109 U	0.137 U	0.110 U	0.101 U	0.121 U	0.104 U
Nickel (Soluble Salts)	2,400	NLE	11.4	14.8	12.1	10.7	8.67	8.57	8.56	8.17	62.4	22.7	9.97	10.7	12.4
Potassium	NLE	NLE	6170 B	7580 B	14000 B	14200 B	11500 B	9430 B	8420 B	9730 B	13100 B	12600 B	15600 B	15500 B	17200 B
Vanadium	7,100	NLE	102	129	100	98.0	77.5	71.5	69.3	73.8	715	273	109	95.9	107
Zinc	1,500	NLE	73.2 B	98.1 B	106 B	88.0 B	68.2 B	55.1 B	67.2 B	56.2 B	95.2 B	86.3 B	76.5 B	85.9 B	98.4 B

¹ NJDEP Residential Direct Contact Soil Cleanup Criteria per NJAC 7:26D, 1999. Beryllium, Copper and Lead criteria per NJAC 7:26D, 2008.

DUP = Duplicate Sample.

ft. bgs = Feet below ground surface.

B = The compound was found in the associated method blank as well as in the sample.

D = Sample was diluted.

E = The compound's concentration exceeds the calibration range of the instrument for that specific analysis.

J = Mass spec and retention time data indicate the presence of a compound however the result is less than the MDL but greater than zero.

U = The compound was analyzed for but not detected.

NT = Not tested.

NLE = No limit established.

mg/kg = milligram per kilogram.

Bold = Analyte was detected.

Shaded = Concentration exceeds level of concern.

(Surface soil compared to NRDCSCC. Subsurface soil compared to IGWSCC when available, otherwise compared to NRDCSCC).

² NJDEP Non-Residential Direct Contact Soil Cleanup Criteria per NJAC 7:26D, 1999. Beryllium, Copper and Lead criteria per NJAC 7:26D, 2008.

 $^{^{\}rm 3}$ NJDEP Impact to Groundwater Soil Cleanup Criteria per NJAC 7:26D, 1999.

Table 3.7-3 Fort Monmouth Phase II Site Investigation, Parcel 38 Summary of Analytical Parameters Detected in Soil (mg/kg)

								Analytic	cal Results					
		Sample ID:	P38SS-B5	P38SS-B6	P38SS-B7	P38SS-B8	P38SS-C1	P38SS-C2	P38SS-C3	P38SS-C4	P38SS-C5	P38SS-C6	P38SS-C7	P38SS-C8
			7055613	7055614	7055615	7055616	7055617	7055618	7055619	7055620	7055621	7055622	7055623	7055624
		Date Sampled:	12/21/2007	12/21/2007	12/21/2007	12/21/2007	12/21/2007	12/21/2007	12/21/2007	12/21/2007	12/21/2007	12/21/2007	12/21/2007	12/21/2007
		Depth (ft. bgs):	0.0-0.5	0.0-0.5	0.0-0.5	0.0-0.5	0.0-0.5	0.0-0.5	0.0-0.5	0.0-0.5	0.0-0.5	0.0-0.5	0.0-0.5	0.0-0.5
Chemical	NRDCSCC ²	IGWSCC ³	Result	Result	Result	Result	Result	Result						
Metals														
Aluminum	NLE	NLE	13200 B	14800 B	15300 B	14200 B	10800 B	15000 B	15700 B	13100 B	9750 B	11600 B	13900 B	12700 B
Arsenic	20	NLE	10.2	11.0	11.3	12.9	8.65	9.75	9.70	9.53	9.65	8.61	11.9	12.2
Barium	47,000	NLE	32.7 B	42.5 B	52.9 B	46.9 B	42.6 B	36.1 B	48.3 B	35.5 B	24.6 B	42.2 B	30.9 B	31.9 B
Beryllium	140	NLE	1.07	1.18	1.19	1.14	1.45	1.96	2.04	1.65	0.895	0.988	1.35	1.23
Cadmium	100	NLE	0.131	0.141	0.299	0.291	0.524	0.417	0.620	0.479	0.299	0.551	0.410	0.583
Calcium	NLE	NLE	954 B	868 B	1090 B	1030 B	1620 B	422 B	829 B	764 B	899 B	1250 B	950 B	1010 B
Chromium	NLE	NLE	93.7	98.9	91.2	90.8	113 B	159 B	161 B	127 B	75.6 B	72.3 B	112 B	98.3 B
Cobalt	NLE	NLE	1.10	1.16	0.507	1.26	1.76	1.54	1.55	1.43	1.47	1.21	1.71	1.64
Copper	45,000	NLE	11.2 B	9.55 B	14.6 B	13.5 B	15.5 B	11.4 B	14.6 B	13.5 B	9.30 B	19.0 B	11.3 B	10.7 B
Iron	NLE	NLE	35700	38300	36500	36500	41500	57400 E	58100 E	49200 E	28200	29900	41900	37500
Lead	800	NLE	16.7	16.3	37.3	18.4	57.4	21.8	39.9	42.7	25.0	64.9	21.5	19.0
Magnesium	NLE	NLE	3880	4060	4050	3750	5110 B	6950 B	7340 B	6000 B	3050 B	3310 B	4780 B	4240 B
Manganese	NLE	NLE	79.0 B	87.2 B	128 B	85.4 B	63.0 B	49.1 B	59.1 B	58.0 B	64.4 B	114 B	77.4 B	73.5 B
Mercury	270	NLE	0.106 U	0.105 U	0.106 U	0.103 U	0.109 U	0.108 U	0.112 U	0.112 U	0.112 U	0.118 U	0.102 U	0.108 U
Nickel	2,400	NLE	8.53	8.66	9.47	11.6	16.8	9.33	13.5	10.8	7.67	8.62	9.54	9.22
Potassium	NLE	NLE	7980 B	8870 B	8280 B	8150 B	10600 B	15100 B	16000 B	13000 B	5980 B	6470 B	9910 B	8730 B
Vanadium	7,100	NLE	67.2	69.3	68.0	71.2	132	96.0	118	106	56.9	53.1	81.4	69.0
Zinc	1,500	NLE	57.9 B	52.6 B	76.7 B	63.0 B	91.6 B	80.5 B	103 B	75.1 B	51.3 B	93.1 B	68.7 B	72.4 B

¹ NJDEP Residential Direct Contact Soil Cleanup Criteria per NJAC 7:26D, 1999. Beryllium, Copper and Lead criteria per NJAC 7:26D, 2008.

DUP = Duplicate Sample.

ft. bgs = Feet below ground surface.

B = The compound was found in the associated method blank as well as in the sample.

D = Sample was diluted.

E = The compound's concentration exceeds the calibration range of the instrument for that specific analysis.

J = Mass spec and retention time data indicate the presence of a compound however the result is less than the MDL but greater than zero.

U = The compound was analyzed for but not detected.

NT = Not tested.

NLE = No limit established.

mg/kg = milligram per kilogram.

Bold = Analyte was detected.

Shaded = Concentration exceeds level of concern.

(Surface soil compared to NRDCSCC. Subsurface soil compared to IGWSCC when available, otherwise compared to NRDCSCC).

² NJDEP Non-Residential Direct Contact Soil Cleanup Criteria per NJAC 7:26D, 1999. Beryllium, Copper and Lead criteria per NJAC 7:26D, 2008.

³ NJDEP Impact to Groundwater Soil Cleanup Criteria per NJAC 7:26D, 1999.

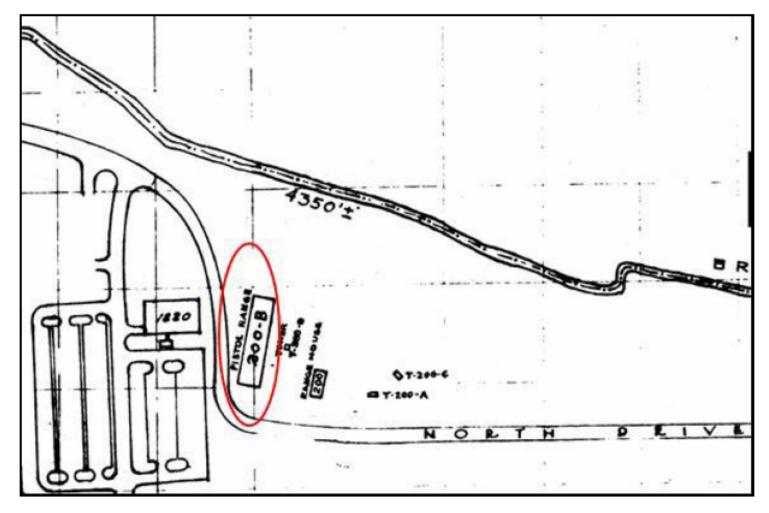


Figure 4-19: Location of the Former Outdoor Firing Range (1940-1955 Pistol Range) (FTMM017)

Source: Malcom Pirnie, Inc. 2006

APPENDIX C

Historical Information for Parcel 39

Final, Revision 1 Appendix C Historical Information Depth (ft Concentration Criteria Value Sample ID Compound (mg/kg) (mg/kg) bgs) **LEGEND** 0.710 J SD 0.0-0.5 0.340/460 P39SD-2 Chrysene SD Surface Soil Sample Location P39SD-2 SD 0.0-0.5 Cadmium 1.85 LEL/SEL 0.6/10 P39SD-2 SD 0.0-0.5 Chromium 131 LEL/SEL 26/110 Sediment Sample Location P39SD-2 SD 0.0-0.5 Zinc 210 B LEL/SEL 120/820 P39SD-2D SD 1.0-1.5 Cadmium 1.49 LEL/SEL 0.6/10 Building SD 89.1 P39SD-2D 26/110 1.0-1.5 Chromium LEL/SEL IRP Site Boundary SD 1.0-1.5 69.0 P39SD-2D Lead LEL/SEL 31/250 SD 1.0-1.5 Zinc LEL/SEL 120/820 Installation Boundary **ECP PARCEL CATEGORY DEFINITIONS** Areas that are not evaluated or require additional evaluation. 1152 **BRAC PARCEL LABEL DEFINITIONS** HS - Hazardous Substance Storage HR - Hazardous Substance Release CONTAMINATION PS - Petroleum Storage PR - Petroleum Release 1150 - CATEGORY NUMBER - PARCEL NUMBER P39-SS 39(7)HS/HR(P) SCALE: 120 Base Realignment and Closure 2005 Shaw Shaw Environmental, Inc. **FIGURE 3.8-1** FORT MONMOUTH ECP SITE INVESTIGATION PARCEL 39 SAMPLE LOCATIONS AND CONSTITUENTS OF CONCERN Depth (ft Concentration Criteria Value Sample ID Media Criteria Compound bgs) (mg/kg) (mg/kg) SD P39SD-1 0.629 LEL/SEL 0.6/10 MAIN POST Cadmium SD 0.370/1440 P39SD-1D 1.0-1.5 1.400 LEL/SEL FORT MONMOUTH SD 1.0-1.5 LEL/SEL 26/110 NEW JERSEY P39SD-1D Chromium

Table 3.8-3
Fort Monmouth Phase II Site Investigation, Parcel 39
Summary of Analytical Parameters Detected in Soil (mg/kg)

			Analytical Results
		Sample ID:	P39-SS1
		Lab ID:	8000805
		Date Sampled:	1/8/2008
		Depth (ft. bgs):	0.0-0.5
Chemical	NRDCSCC ²	IGWSCC ³	Result
Semi-Volatiles			
bis(2-Ethylhexyl)phthalate	210	100	0.570 J
Di-n-butylphthalate	10000	100	0.780 J
Fluoranthene	10000	100	0.120 J
Pyrene	10000	100	0.290 J
Metals			
Aluminum	NLE	NLE	7450 B
Arsenic	20	NLE	3.43
Barium	47000	NLE	50.6 B
Beryllium	140	NLE	1.78
Cadmium	100	NLE	1.56
Calcium	NLE	NLE	1480 B
Chromium (Total)	NLE	NLE	94.0
Cobalt	NLE	NLE	31.9
Copper	45000	NLE	27.7 B
Iron	NLE	NLE	26400
Lead	800	NLE	80.0
Magnesium	NLE	NLE	3000
Manganese	NLE	NLE	15.9
Mercury	270	NLE	0.21
Nickel (Soluble Salts)	2400	NLE	22.1
Potassium	NLE	NLE	7170
Vanadium	7100	NLE	41.8
Zinc	1500	NLE	140 B

¹ NJDEP Residential Direct Contact Soil Cleanup Criteria per NJAC 7:26D, 1999. Beryllium, Copper and Lead criteria per NJAC 7:26D, 2008.

DUP = Duplicate Sample.

ft. bgs = Feet below ground surface.

B = The compound was found in the associated method blank as well as in the sample.

D = Sample was diluted.

E = The compound's concentration exceeds the calibration range of the instrument for that specific analysis.

 $J = Mass\ spec$ and retention time data indicate the presence of a compound however the result is less than the MDL but greater than zero.

U = The compound was analyzed for but not detected.

NT = Not tested.

NLE = No limit established.

mg/kg = milligram per kilogram.

Bold = Analyte was detected.

Shaded = Concentration exceeds level of concern.

(Surface soil compared to NRDCSCC. Subsurface soil compared to IGWSCC when available, otherwise compared to NRDCSCC).

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NJDEP Non-Residential Direct Contact Soil Cleanup Criteria per NJAC 7:26D, 1999. Beryllium, Copper and Lead criteria per NJAC 7:26D, 2008.

³ NJDEP Impact to Groundwater Soil Cleanup Criteria per NJAC 7:26D, 1999.

Table 3.8-4
Fort Monmouth Phase II Site Investigation, Parcel 39
Summary of Analytical Parameters Detected in Sediment (mg/kg)

			Analytical Results				
		Sample ID:	P39-SD1	P39-SD1D	P39-SD2	P39-SD2D	
		Lab ID:	8000801	8000802	8000803	8000804	
	Date Sampled:		01/08/2008	01/08/2008	01/08/2008	01/08/2008	
	Depth (ft. bgs):		0.0-0.5	1.0-1.5	0.0-0.5	1.0-1.5	
Chemical	LEL ¹	SEL ²	Result	Result	Result	Result	
Semi-Volatiles							
Benzo[a]anthracene	0.320	1480	0.260 J	1.300 U	0.540 J	1.600 U	
Benzo[a]pyrene	0.370	1440	1.300 U	1.400	2.100 U	1.600 U	
Benzo[b]fluoranthene	NLE	NLE	1.300 U	1.300 U	1.100 J	1.600 U	
bis(2-Ethylhexyl)phthalate	NLE	NLE	2.100	1.300 U	1.300 J	2.900	
Chrysene	0.340	460	0.370 J	1.300 U	0.710 J	1.600 U	
Di-n-butylphthalate	NLE	NLE	0.950 J	2.100	1.900 J	1.000 J	
Fluoranthene	0.750	1020	0.440 J	0.180 J	0.990 J	0.550 J	
Phenanthrene	0.560	950	0.260 J	0.180 J	0.670 J	0.390 J	
Pyrene	0.490	850	1.000 J	0.380 J	2.000 J	1.200 J	
Metals							
Aluminum	NLE	NLE	4710 B	11900 B	13900 B	9510 B	
Arsenic	6	33	2.28	6.21	8.89	5.56	
Barium	NLE	NLE	26.8 B	40.6 B	96.4 B	73.5 B	
Beryllium	NLE	NLE	0.638	1.58	3.34	2.11	
Cadmium	0.6	10	0.629	0.432	1.85	1.49	
Calcium	NLE	NLE	3150 B	2550 B	2390 B	3600 B	
Chromium (Total)	26	110	44.2	113	131	89.1	
Cobalt	NLE	NLE	3.92	1.86	14.2	11.7	
Copper	16	110	27.7 B	12.5 B	41.0 B	30.9 B	
Iron	NLE	NLE	17200	40200	45600	30000	
Lead	31	250	19.5	7.58	61.7	69.0	
Magnesium	NLE	NLE	2720	5020	3910	3020	
Manganese	NLE	NLE	49.6	61.0	68.4	38.5	
Mercury	0.2	2	0.120 U	0.129 U	0.67	0.59	
Nickel (Soluble Salts)	16	75	11.6	8.16	32.4	23.0	
Potassium	NLE	NLE	3150	10300	7870	3040	
Vanadium	NLE	NLE	31.1	60.0	74.4	53.0	
Zinc	120	820	100 B	66.6 B	210 B	204 B	

¹ NJDEP Freshwater Sediment Screening Values - Lowest Effect Levels, 1998.

For non-polar organics (PAHs, organochlorine pesticides, PCBs), the SEL is caluculated from a site-specific TOC level. To calculate a site-specific SEL, TOC is multiplied by the the table SEL. However, no TOC analysis was performed on the FTMM sediment samples. Generally, TOC values range from 1% (10,000 mg/kg) to 10% (100,000 mg/kg) (USEPA, 1998). Since the table SEL is based on 100% TOC, the calculated site-specific SEL would be lower.

DUP = Duplicate Sample.

ft. bgs = Feet below ground surface.

 $\mbox{\ensuremath{B}}\mbox{=}\mbox{\ensuremath{The}}$ compound was found in the associated method blank as well as in the sample.

D = Sample was diluted.

E = The compound's concentration exceeds the calibration range of the instrument for that specific analysis.

J = Mass spec and retention time data indicate the presence of a compound however the result is less than the MDL but greater than zero.

U = The compound was analyzed for but not detected.

NT = Not tested.

NLE = No limit established.

mg/kg = milligram per kilogram.

Bold = Analyte detected.

Shaded = Concentration exceeds LEL.

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 $^{^{2}\,}$ NJDEP Freshwater Sediment Screening Guidelines - Severe Effects Levels, 1998.

APPENDIX C

Historical Information for Parcel 49

Final, Revision 1 Appendix C Historical Information **LEGEND** Value (mg/kg) (mg/kg) bgs) (mg/kg) ER-L/ER-M 8.2/70 P49-SD1-A SD 0.0-0.5 Geoprobe Soil Sample Location Arsenic ER-L/ER-M 1.2/9. ER-L/ER-N Geoprobe Soil and Groundwater 22.9 4.92 Chromium ER-L/ER-M 81/37 P49-SD1-B SD 1.5-2.0 P49-SD1-B SD 1.5-2.0 16.4 329 ER-L/ER-M 8.2/70 ER-L/ER-M 81/370 Sample Location Arsenic Chromium ER-L/ER-M Surface and Subsurface Soil Sample Location ER-L/ER-M Sediment Sample Location DUP Groundwater Sample Location at ER-L/ER-M Existing Monitoring Well 1.40 1320 B ER-L/ER-M Generalized Groundwater Flow Direction. Direction of ER-L/ER-M Generalized Groundwater Flow derived from qualitative ER-L/ER-M DUP evaluation of surface topography, surface water 16.7 1.41 B 394 (mg/kg) features, and pre-existing IRP site groundwater Cadmium P49-SD3-A SD Arsenic potentiometric maps where available. PARKERS CREEK P49-SD3-A SD 0.0-0.5 Chromium 149 ER-L/ER-M 81/37 P49-SD3-A SD 0.0-0.5 76.5 B ER-L/ER-M 34/27 Building Copper Lead IRP Site Boundary Arsenic P49-SD3-B SD 1.5-2.0 Installation Boundary bgs) **ECP PARCEL CATEGORY DEFINITIONS** P49-GW-2 GW 9-14 Bromodichloromethane Areas that are not evaluated or require additional evaluation. * Parcel not included in Site Investigation. Information pertaining to parcels not included in this Site Investigation is presented in bgs) (ug/L) the Fort Monmouth Phase I ECP Report (January 2007). GW 5-10 1.24 P49-GW-1 **BRAC PARCEL LABEL DEFINITIONS** Criteria Value (mg/kg) (mg/kg) CONTAMINATION
DESCRIPTION

HS - Hazardous Substance Storage HR - Hazardous Substance Release PS - Petroleum Storage 80.000 D Benzo[a]anthracene 0.730 J NRDCSCC 0.66 P49-SS7-A SS 0.0-0.5 Benzo[a]pyrene 54.000 JD PR - Petroleum Release (P) - Possible Release or Disposal NRDCSCC Benzo[k]fluoranthene Chrysene NRDCSCC 79.000 D NRDCSCC Dibenz[a,h]anthracene 0.66 NRDCSCC - CATEGORY NUMBER - PARCEL NUMBER SCALE: 300 Base Realignment and Closure 2005 Value 49(7)HS/HR(P)/PS/PR(P Shaw Environmental, Inc. (mg/kg) P49-SS8-A SS 0.0-0.5 Benzo[a]pyrene 2.600 FIGURE 3.10-1 FORT MONMOUTH ECP SITE INVESTIGATION PARCEL 49 SAMPLE LOCATIONS (mg/kg) AND CONSTITUENTS OF CONCERN Benzo[a]anthracene MAIN POST Value FORT MONMOUTH NRDCSCC 0.66 **NEW JERSEY** P49-SB4-A SB 0.0-0.5 2.200 Benzo[a]pyrene

Table 3.10-3 Fort Monmouth Phase II Site Investigation, Parcel 49 Summary of Analytical Parameters Detected in Soil (mg/kg)

			1											
					1	T	<u> </u>		al Results	T	1	ı	ı	T
		Sample ID:	P49-SB1-A	P49-SB1-B	P49-SB1-C	P49-SB2-A	P49-SB2-B	P49-SB2-C	P49-SB3-A	P49-SB3-B	P49-SB3-C	P49-SB4-A	P49-SB4-B	P49-SB4-C
		Lab ID:	7051517	7051518	7051519	7051603	7051604	7051605	7051609	7051610	7051611	7051606	7051607	7051608
		Date Sampled:	12/06/2007	12/06/2007	12/06/2007	12/07/2007	12/07/2007	12/07/2007	12/07/2007	12/07/2007	12/07/2007	12/07/2007	12/07/2007	12/07/2007
		Depth (ft. bgs):	0.0-0.5	1.5-2.0	5.5-6.0	0.5-1.0	1.5-2.0	9.0-9.5	0.0-0.5	1.5-2.0	3.5-4.0	0.5-1.0	1.5-2.0	8.0-8.5
Chemical	NRDCSCC ²	IGWSCC ³	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result
Volatiles														
Acetone	1000	100	NT	0.390 B	0.420 B	NT	0.230 J	0.300 U	NT	0.260 J	0.370 J	NT	0.280	0.290 J
Carbon disulfide	NLE	NLE	NT	0.028 J	0.330 U	NT	0.260 U	0.300 U	NT	0.320 U	0.380 U	NT	0.270 U	0.320 U
Ethylbenzene	1000	100	NT	0.290 U	0.330 U	NT	0.260 U	0.300 U	NT	0.320 U	0.380 U	NT	0.270 U	0.320 U
Toluene	1000	500	NT	0.290 U	0.330 U	NT	0.260 U	0.300 U	NT	0.320 U	0.380 U	NT	0.270 U	0.320 U
Xylenes (Total)	1000	67	NT	0.870 U	0.990 U	NT	0.780 U	0.900 U	NT	0.960 U	1.150 U	NT	0.810 U	0.970 U
Semi-Volatiles														
Acenaphthene	10000	100	1.100 U	NT	1.300	1.100 U	NT	1.300 U	1.200 U	NT	1.200 U	1.100 U	NT	1.300 U
Acenaphthylene	NLE	NLE	0.056 J	NT	0.210 J	1.100 U	NT	1.300 U	1.200 U	NT	1.200 U	0.920 J	NT	1.300 U
Anthracene	10000	100	1.100 U	NT	0.590 J	1.100 U	NT	1.300 U	0.100 J	NT	0.034 J	0.370 J	NT	1.300 U
Benzo[a]anthracene	4	500	0.091 J	NT	0.730 J	1.100 U	NT	1.300 U	0.550 J	NT	0.110 J	2.500	NT	1.300 U
Benzo[a]pyrene	0.66	100	0.083 J	NT	0.560 J	1.100 U	NT	1.300 U	0.440 J	NT	1.200 U	2.200	NT	1.300 U
Benzo[b]fluoranthene	4	50	0.120 J	NT	0.750 J	1.100 U	NT	1.300 U	0.670 J	NT	0.120 J	2.800	NT	1.300 U
Benzo[g,h,i]perylene	NLE	NLE	1.100 U	NT	1.100 U	1.100 U	NT	1.300 U	1.200 U	NT	1.200 U	0.900 J	NT	1.300 U
Benzo[k]fluoranthene	4	500	0.038 J	NT	0.320 J	1.100 U	NT	1.300 U	0.260 J	NT	0.047 J	0.890 J	NT	1.300 U
bis(2-Ethylhexyl)phthalate	210	100	0.058 J	NT	1.100 U	1.100 U	NT	1.300 U	0.450 J	NT	0.130 J	1.100 U	NT	1.300 U
Butyl benzyl phthalate	10000	100	1.100 U	NT	1.100 U	1.100 U	NT	1.300 U	1.800	NT	0.250 J	1.100 U	NT	1.300 U
Chrysene	40	500	0.120 J	NT	0.810 J	1.100 U	NT	1.300 U	0.610 J	NT	0.130 J	3.500	NT	1.300 U
Dibenz[a,h]anthracene	0.66	100	1.100 U	NT	1.100 U	1.100 U	NT	1.300 U	1.200 U	NT	1.200 U	1.100 U	NT	1.300 U
Dibenzofuran	NLE	NLE	1.100 U	NT	0.440 J	1.100 U	NT	1.300 U	1.200 U	NT	1.200 U	1.100 U	NT	1.300 U
Di-n-butyl phthalate	10000	100	1.500	NT	1.100 B	0.420 JB	NT	1.100 JB	0.810 JB	NT	8.500 B	1.800 B	NT	0.940 JB
Fluoranthene	10000	100	0.110 J	NT	1.600	1.100 U	NT	1.300 U	1.000 J	NT	0.220 J	1.500 B	NT	1.300 U
Fluorene	10000	100	1.100 U	NT	1.100 J	1.100 U	NT	1.300 U	1.200 U	NT	1.200 U	0.130 J	NT	1.300 U
Indeno[1,2,3-cd]pyrene	4	500	1.100 U	NT	0.140 J	1.100 U	NT	1.300 U	0.160 J	NT	1.200 U	0.680 J	NT	1.300 U
2-Methylnaphthalene	NLE	NLE	1.100 U	NT	0.190 J	1.100 U	NT	1.300 U	1.200 U	NT	1.200 U	0.098 J	NT	1.300 U
4-Methylphenol	10000	NLE	1.100 U	NT	1.100 U	1.100 U	NT	1.300 U	1.200 U	NT	1.200 U	1.100 U	NT	1.300 U
Naphthalene	4200	100	1.100 U	NT	0.110 J	1.100 U	NT	1.300 U	1.200 U	NT	1.200 U	0.100 J	NT	1.300 U
Phenanthrene	NLE	NLE	0.038 J	NT	2.300	1.100 U	NT	1.300 U	0.500 J	NT	0.210 J	0.230 J	NT	1.300 U
Pyrene	10000	100	0.170 J	NT	2.000	1.100 U	NT	1.300 U	1.000 J	NT	0.210 J	4.800	NT	1.300 U
PCBs	10000	100	0.1700	141	2.000	1.100 0	141	1.000 0	1.0000	141	0.2.00	4.000	131	1.000 0
Aroclor 1260	2	50	0.0041 U	NT	0.0040 U	0.0042 U	NT	0.0041 U	0.34	NT	0.10	0.0039 U	NT	0.0040 U
Metals		30	0.0041 0	141	0.0040 0	0.0042 0	111	0.0041 0	0.34	INI	0.10	0.0039 0	I NI	0.0040 0
Aluminum	NLE	NLE	12700 B	NT	9810 B	7840 B	NT	27700 B	21600 B	NT	28300 B	13200 B	NT	27600 B
Antimony	340	NLE	0.410 U	NT	1.05	0.426 U	NT	0.514 U	0.470 U	NT	0.511 U	0.389 U	NT	0.549 U
	20	NLE			11.4		NT	24.3		NT			NT	23.4
Arsenic		NLE	6.32	NT NT	73.5 B	4.67 22.0	NT	24.3 51.1	12.8 54.5	NT	17.1 65.0	6.15 65.0	NT	676
Barium	47000 140	NLE NLE	32.3 B 1.34	NT NT	73.5 B 0.903	0.899	NT NT	3.96	54.5	NT NT	65.9 3.09	65.0 1.60	NT NT	3.08
Beryllium Cadmium	140	NLE	1.02	NT NT	0.903 1.54	0.899	NT NT	1.29	2.35 1.81	NT	1.52	0.444	NT	3.08 1.58
Calcium	NLE	NLE	4860 B	NT	1070 B	1700	NT	1110	11300	NT	4630	11600	NT	421
Carcium Chromium (Total)	NLE	NLE	4860 B 104	NT NT	74.2		NT NT			NT NT	400		NT NT	421
	NLE NLE	NLE		NT NT		62.2	NT NT	328 4.57	313			79.5	NT NT	
Copper			3.37		2.05	0.968			3.93	NT NT	0.517	1.85		0.418 U
Copper	45000 NLE	NLE NLE	20.9 B	NT NT	33.8 B	4.63 B	NT NT	13.2 B	36.9 B	NT NT	18.1 B	9.85 B	NT NT	13.6 B
Iron		· ·	42300 B		26100 B	26500	NT NT	106000	75000	NT NT	95900	33800	NT NT	110000
Lead	800 NU E	NLE	11.7	NT	204	5.78	NT NT	0.416 U	91.7	NT	19.6	14.8	NT NT	0.445 U
Magnesium	NLE	NLE	6590 B	NT NT	3140 B	3040	NT NT	17400	12700	NT	14600	5370	NT	16200
Manganese	NLE	NLE	93.1 B	NT	197 B	41.1	NT NT	36.6	53.7	NT	34.1	146	NT	32.0
Mercury	270	NLE	0.91	NT	0.36	0.099 U	NT	0.122 U	1.19	NT	0.33	0.097 U	NT	0.123 U
Nickel (Soluble Salts)	2400	NLE	9.48 B	NT	12.4 B	4.38	NT NT	12.1	10.7	NT	7.95	7.91	NT	6.44
Potassium	NLE	NLE	11400 B	NT	5630 B	4600 B	NT NT	34100 B	22900 B	NT	30400 B	7220 B	NT	32100 B
Sodium	NLE	NLE	35.545 U	NT	38.353 U	36.920 U	NT	44.587 U	40.728 U	NT	44.277 U	33.720 U	NT	47.589 U
Vanadium	7100	NLE	62.4	NT	44.0	40.6	NT	108	114	NT	145	48.1	NT	154
Zinc	1500	NLE	75.1 B	NT	223 B	49.4	NT	124	174	NT	110	74.9	NT	99.0

¹ NJDEP Residential Direct Contact Soil Cleanup Criteria per NJAC 7:26D, 1999. Beryllium, Copper and Lead criteria per NJAC 7:26D, 2008.

ft. bgs = Feet below ground surface.

NT = Not tested.

NLE = No limit established.

mg/kg = milligram per kilogram.

Bold = Analyte was detected.

Shaded = Concentration exceeds level of concern.
(Surface soil compared to NRDCSCC. Subsurface soil compared to IGWSCC when available, otherwise compared to NRDCSCC).

B = The compound was found in the associated method blank as well as in the sample.

D = Sample was diluted.

U = The compound was analyzed for but not detected.

July 2008

² NJDEP Non-Residential Direct Contact Soil Cleanup Criteria per NJAC 7:26D, 1999. Beryllium, Copper and Lead criteria per NJAC 7:26D, 2008.

³ NJDEP Impact to Groundwater Soil Cleanup Criteria per NJAC 7:26D, 1999.

E = The compound's concentration exceeds the calibration range of the instrument for that specific analysis.

J = Mass spec and retention time data indicate the presence of a compound however the result is less than the MDL but greater than zero.

Table 3.10-3 Fort Monmouth Phase II Site Investigation, Parcel 49 Summary of Analytical Parameters Detected in Soil (mg/kg)

			ı			-		A 1 - C	1.0					
		0	D 40 0D 5 A	D 40 005 D	D 40 0D 5 0	D (0.005.0.0)	D 40 0D0 A	· · · · · · · · · · · · · · · · · · ·	al Results	D 40 007 4	D 40 007 D	D 40 000 4	D 40 000 D	D 40 000 4
		Sample ID:	P49-SB5-A	P49-SB5-B	P49-SB5-C	P49-SB5-C DUP	P49-SB6-A	P49-SB6-B	P49-SB6-C	P49-SS7-A	P49-SS7-B	P49-SS8-A	P49-SS8-B	P49-SS9-A
		Lab ID:	7051613	7051614	7051615	7051602	7051616	7051617	7051618	7051515	7051516	7051513	7051514	7051511
		Date Sampled:	12/07/2007	12/07/2007	12/07/2007	12/07/2007	12/07/2007	12/07/2007	12/07/2007	12/06/2007	12/06/2007	12/06/2007	12/06/2007	12/06/2007
		Depth (ft. bgs):	0.0-0.5	1.5-2.0	6.0-6.5	6.0-6.5	0.5-1.0	1.5-2.0	6.5-7.0	0.0-0.5	1.5-2.0	0.0-0.5	1.5-2.0	0.0-0.5
Chemical	NRDCSCC ²	IGWSCC ³	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result
Volatiles			·	T	T				T	T	T	T		T
Acetone	1000	100	NT	0.045 J	0.290 U	0.330	NT	0.250 U	0.330 U	NT	1.000 B	NT	0.680 B	NT
Carbon disulfide	NLE	NLE	NT	0.300 U	0.290 U	0.290 U	NT	0.250 U	0.330 U	NT	0.280 U	NT	0.270 U	NT
Ethylbenzene	1000	100	NT	0.300 U	0.290 U	0.290 U	NT	0.250 U	0.330 U	NT	0.280 U	NT	0.270 U	NT
Toluene	1000	500	NT	0.300 U	0.290 U	0.290 U	NT	0.250 U	0.330 U	NT	0.280 U	NT	0.270 U	NT
Xylenes (Total)	1000	67	NT	0.900 U	0.860 U	0.880 U	NT	0.750 U	0.980 U	NT	0.850 U	NT	0.810 U	NT
Semi-Volatiles	10000	400	4.400.11	I	4 000 11	4,000.11	4.000.11		4.000.11		I		\	1
Acenaphthene	10000	100	1.100 U	NT	1.200 U	1.200 U	1.000 U	NT =	1.200 U	20.000 JD	NT	0.660 J	NT 	0.180 J
Acenaphthylene	NLE	NLE	0.260 J	NT	1.200 U	1.200 U	0.076 J	NT =	1.200 U	0.450 J	NT	0.048 J	NT	0.490 J
Anthracene	10000	100	0.099 J	NT 	1.200 U	1.200 U	1.000 U	NT =	1.200 U	46.000 JD	NT	1.800	NT 	3.000
Benzo[a]anthracene	4	500	0.420 J	NT	1.200 U	1.200 U	1.000 U	NT	1.200 U	80.000 D	NT	3.600	NT	10.000 JD
Benzo[a]pyrene	0.66	100	0.460 J	NT	1.200 U	1.200 U	0.110 J	NT	1.200 U	54.000 JD	NT	2.600	NT	9.600
Benzo[b]fluoranthene	4	50 NU F	0.460 J	NT	1.200 U	1.200 U	0.140 J	NT	1.200 U	75.000 D	NT NT	3.900	NT	9.200 JD
Benzo[g,h,i]perylene	NLE	NLE	0.260 J	NT	1.200 U	1.200 U	1.000 U	NT	1.200 U	16.000 JD	NT NT	0.840 J	NT	3.500
Benzo[k]fluoranthene	4	500 100	0.160 J	NT NT	1.200 U 1.200 U	1.200 U	1.000 U	NT NT	1.200 U	29.000 JD	NT NT	1.500	NT NT	6.200
bis(2-Ethylhexyl)phthalate	210		0.240 J			1.200 U	1.000 U	NT	0.100 J	1.100 U		0.690 J	NT	1.200 U
Butyl benzyl phthalate	10000 40	100 500	1.100 U	NT NT	1.200 U 1.200 U	1.200 U	1.000 U	NT	1.200 U	0.670 J	NT NT	0.520 J	NT NT	1.200 U
Chrysene Dibanzia blanthrocene		100	0.610 J	NT	1.200 U	1.200 U	0.150 J 1.000 U	NT	1.200 U	79.000 D 2.600	NT	3.700 0.340 J	NT	10.000 JD 1.300
Dibenz[a,h]anthracene Dibenzofuran	0.66 NLE	NLE	1.100 U 1.100 U	NT	1.200 U	1.200 U 1.200 U	1.000 U	NT	1.200 U 1.200 U	12.000	NT	0.340 J	NT	0.340 J
	10000	100	1.700 B	NT	1.500 B	0.620 JB	1.000 B	NT	0.760 JB	12.000 1.100 U	NT	0.630 JB	NT	1.200 B
Di-n-butyl phthalate Fluoranthene	10000	100	0.410 J	NT	1.200 U	1.200 U	0.071 J	NT	1.200 U	190.000 D	NT	9.000	NT	23.000 D
Fluorene	10000	100	1.100 U	NT	1.200 U	1.200 U	1.000 U	NT	1.200 U	17.000 JD	NT	0.640 J	NT	1.200 U
Indeno[1,2,3-cd]pyrene	4	500	0.180 J	NT	1.200 U	1.200 U	1.000 U	NT	1.200 U	18.000 JD	NT	0.930 J	NT	3.500
2-Methylnaphthalene	NLE	NLE	1.100 U	NT	1.200 U	1.200 U	1.000 U	NT	1.200 U	4.400	NT	0.130 J	NT	0.240 J
4-Methylphenol	10000	NLE	1.100 U	NT	1.200 U	1.200 U	1.000 U	NT	1.200 U	0.320 J	NT	1.200 U	NT	1.200 U
Naphthalene	4200	100	1.100 U	NT	1.200 U	1.200 U	1.000 U	NT	1.200 U	11.000	NT	0.280 J	NT	0.098 J
Phenanthrene	NLE	NLE	0.380 J	NT	1.200 U	1.200 U	1.000 U	NT	1.200 U	170.000 D	NT	7.100	NT	13.000
Pyrene	10000	100	0.890 J	NT	1.200 U	1.200 U	0.190 J	NT	1.200 U	160.000 D	NT	7.300	NT	20.000 D
PCBs	10000		11000						7.200					
Aroclor 1260	2	50	0.0040 U	NT	0.0041 U	0.0040 U	0.0042 U	NT	0.0039 U	0.47	NT	8.85	NT	0.0041 U
Metals	_		0.000.00											
Aluminum	NLE	NLE	13700 B	NT	31400 B	26900 B	11500 B	NT	15100 B	15100 B	NT	14600 B	NT	17500 B
Antimony	340	NLE	0.421 U	NT	0.457 U	0.445 U	0.438 U	NT	0.491 U	0.432 U	NT	0.434 U	NT	0.456 U
Arsenic	20	NLE	10.5	NT	21.5	21.6	5.10	NT	8.92	10.1	NT	10.6	NT	17.4
Barium	47000	NLE	76.9	NT	77.5	80.6	26.2	NT	41.0	93.6 B	NT	95.5 B	NT	53.8 B
Beryllium	140	NLE	1.06	NT	5.22	4.36	0.422	NT	2.50	1.87	NT	1.61	NT	2.11
Cadmium	100	NLE	0.786	NT	2.90	2.21	0.199	NT	0.875	1.86	NT	3.66	NT	1.31
Calcium	NLE	NLE	13300	NT	2460	2740	758	NT	1340	3750 B	NT	2790 B	NT	2500 B
Chromium	NLE	NLE	92.4	NT	351	312	33.7	NT	167	146	NT	144	NT	135
Cobalt	NLE	NLE	1.47	NT	5.15	4.67	1.56	NT	2.45	1.20	NT	1.55	NT	3.01
Copper	45000	NLE	28.3 B	NT	7.42 B	7.74 B	19.8 B	NT	10.5 B	73.1 B	NT	115 B	NT	27.3 B
Iron	NLE	NLE	29000	NT	146000	125000	20300	NT	57400	47800 B	NT	43000 B	NT	69500 B
Lead	800	NLE	176	NT	0.370 U	0.360 U	9.84	NT	11.7	49.1	NT	109	NT	22.7
Magnesium	NLE	NLE	4320	NT	21100	17500	1200	NT	8430	6220 B	NT	6000 B	NT	6630 B
Manganese	NLE	NLE	104	NT	30.2	28.0	82.6	NT	16.0	68.7 B	NT	120 B	NT	163 B
Mercury	270	NLE	0.16	NT	0.111 U	0.120 U	0.093 U	NT	0.114 U	0.113 U	NT	0.119 U	NT	0.109 U
					I 4	12.1	6.69	NT	9.67	8.80 B	NT	12.1 B	NT	14.7 B
Nickel	2400	NLE	9.88	NT	17.2	12.1	0.09		0.01	0.00 5	INI	12.1.0	INI	1711 0
Nickel Potassium	2400 NLE	NLE NLE	9.88 7010 B	NT NT	17.2 47500 B	38300 B	1940 B	NT	19800 B	13200 B	NT	10700 B	NT	13800 B
Potassium	NLE	NLE	7010 B	NT	47500 B	38300 B	1940 B	NT	19800 B	13200 B	NT	10700 B	NT	13800 B

¹ NJDEP Residential Direct Contact Soil Cleanup Criteria per NJAC 7:26D, 1999. Beryllium, Copper and Lead criteria per NJAC 7:26D, 2008.

ft. bgs = Feet below ground surface.

NT = Not tested.

NLE = No limit established.

mg/kg = milligram per kilogram.

Bold = Analyte was detected.

Shaded = Concentration exceeds level of concern.
(Surface soil compared to NRDCSCC. Subsurface soil compared to IGWSCC when available, otherwise compared to NRDCSCC).

B = The compound was found in the associated method blank as well as in the sample.

D = Sample was diluted.

C-90

² NJDEP Non-Residential Direct Contact Soil Cleanup Criteria per NJAC 7:26D, 1999. Beryllium, Copper and Lead criteria per NJAC 7:26D, 2008.

³ NJDEP Impact to Groundwater Soil Cleanup Criteria per NJAC 7:26D, 1999.

E = The compound's concentration exceeds the calibration range of the instrument for that specific analysis.

J = Mass spec and retention time data indicate the presence of a compound however the result is less than the MDL but greater than zero.

U = The compound was analyzed for but not detected.

Table 3.10-3 Fort Monmouth Phase II Site Investigation, Parcel 49 Summary of Analytical Parameters Detected in Soil (mg/kg)

		1					Analytical Results				
		Sample ID:	P49-SS9-B	P49-SS10-A	P49-SS10-B	P49-SS11-A	P49-SS11-B	P49-SS12-A	P49-SS12-B	P49-SS13-A	P49-SS13-B
		Lab ID:	7051512	7051503	7051504	7051505	7051506	7051507	7051508	7051509	7051510
		Date Sampled:	12/06/2007	12/06/2007	12/06/2007	12/06/2007	12/06/2007	12/06/2007	12/06/2007	12/06/2007	12/06/2007
		Depth (ft. bgs):	1.5-2.0	0.0-0.5	1.5-2.0	0.0-0.5	1.5-2.0	0.0-0.5	1.5-2.0	0.0-0.5	1.5-2.0
Chemical	NRDCSCC ²	IGWSCC ³	Result	Result	Result	Result	Result	Result	Result	Result	Result
Volatiles	NKDC3CC	IGWSCC	rtoodit	rtoodit	rtoduit	rtoodit	rtoodit	rtoouit	rtodat	rtoduit	rtoodit
Acetone	1000	100	0.760 B	NT	0.770 B	NT	0.670 B	NT	0.670	NT	0.780 B
Carbon disulfide	NLE	NLE	0.320 U	NT	0.280 U	NT	0.300 U	NT	0.280 U	NT	0.290 U
Ethylbenzene	1000	100	0.058 J	NT	0.280 U	NT	0.300 U	NT	0.280 U	NT	0.290 U
Toluene	1000	500	0.038 J	NT	0.280 U	NT	0.300 U	NT	0.280 U	NT	0.290 U
Xylenes (Total)	1000	67	0.047 J	NT	0.250 U	NT	0.890 U	NT	0.850 U	NT	0.290 U
Semi-Volatiles	1000	07	0.1193	141	0.030 0	141	0.090 0	INI	0.030 0	101	0.000 0
Acenaphthene	10000	100	NT	1.100 U	NT	1.100 U	NT	1.100 U	NT	1.200 U	NT
Acenaphthylene	NLE	NLE	NT	0.073 J	NT NT	0.059 J	NT	0.130 J	NT	0.097 J	NT
Anthracene	10000	100	NT	0.083 J	NT	0.093 J	NT	0.100 J	NT	0.200 J	NT
	4	500					NT		•••••		NT
Benzo[a]anthracene	0.66	100	NT NT	0.470 J 0.610 J	NT NT	0.350 J 0.310 J	NT	0.380 J 0.360 J	NT NT	0.810 J 0.730 J	NT
Benzo[a]pyrene Benzo[b]fluoranthene	0.66 4	50	NT	0.610 J	NT NT	0.430 J	NT	0.580 J	NT	1.200	NT
	NLE	NLE	NT	1.100 U	NT	1.100 U	NT	1.100 U	NT	1.200 1.200 U	NT
Benzo[g,h,i]perylene Benzo[k]fluoranthene	NLE4	500	NT	0.340 J	NT NT	0.220 J	NT	0.220 J	NT	0.490 J	NT
bis(2-Ethylhexyl)phthalate	210	100	NT	0.340 J 0.160 J	NT NT	0.220 J 0.150 J	NT NT	0.220 J 0.500 J	NT NT	0.490 J 0.220 J	NT
	10000	100	NT	1.100 U	NT	1.100 U	NT	1.100 U	NT	1.200 U	NT
Butyl benzyl phthalate	40	500	NT				NT				NT
Chrysene		·		0.600 J	NT NT	0.440 J		0.480 J	NT NT	0.860 J	
Dibenz[a,h]anthracene	0.66	100	NT	1.100 U	NT NT	1.100 U	NT NT	1.100 U	NT NT	1.200 U	NT
Dibenzofuran	NLE	NLE 400	NT	1.100 U	NT	1.100 U	NT NT	1.100 U	NT	1.200 U	NT
Di-n-butylphthalate	10000	100	NT	1.300 B	NT NT	0.380 JB	NT NT	1.900 B	NT NT	0.800 JB	NT
Fluoranthene Fluorene	10000	100 100	NT NT	0.780 J 1.100 U	NT NT	0.670 J 1.100 U	NT NT	0.690 J 1.100 U	NT NT	1.600 1.200 U	NT NT
	4										NT
Indeno[1,2,3-cd]pyrene	NLE	500 NLE	NT NT	1.100 U	NT NT	1.100 U	NT NT	1.100 U	NT NT	1.200 U 1.200 U	NT
2-Methylnaphthalene	10000	NLE	NT	1.100 U 1.100 U		1.100 U 1.100 U	NT	1.100 U 1.100 U	NT	1.200 U	NT
4-Methylphenol Naphthalene	4200	100	NT	1.100 U	NT NT	1.100 U	NT	1.100 U	NT	1.200 U	NT
Phenanthrene	NLE	NLE NLE	NT	0.270 J	NT	0.370 J	NT	0.380 J	NT	0.750 J	NT
Pyrene	10000	100	NT	1.100 U	NT	0.370 J	NT	1.100 J	NT	2.200	NT
PCBs	10000	100	INI	1.100 0	INI	0.7703	INI	1.100 3	INI	2.200	INI
1	2	50	NT	0.0044.11	NT	0.002011	NT	0.004411	NT	0.0044.11	NT
Aroclor 1260 Metals	2	50	INI	0.0041 U	IN I	0.0039 U	INI	0.0041 U	INI	0.0041 U	NT
1	NI E	NI E	NT	7420 B	NT	7720 B	NT	40500 B	NIT	7240 B	NIT
Aluminum	NLE 240	NLE NI E	NT NT	7420 B	NT NT	7720 B	NT NT	10500 B	NT NT	7310 B	NT NT
Antimony	340	NLE NI E		0.472 U	NT NT	0.451 U	NT NT	0.433 U	NT NT	0.475 U	
Arsenic	20	NLE NLE	NT	6.32	NT NT	7.66	NT NT	10.3	NT NT	5.23	NT
Barium	47000	NLE NLE	NT NT	39.7 B	NT NT	39.4 B	NT NT	55.0 B	NT NT	38.4 B	NT
Beryllium	140	NLE NLE	NT	0.361	NT NT	0.381	NT NT	0.818	NT NT	0.346	NT
Calaium	100	NLE NI E	NT	0.511	NT	0.429	NT NT	0.723	NT NT	0.424	NT
Chromium	NLE	NLE NLE	NT NT	34800 B	NT NT	44700 B	NT NT	23100 B	NT NT	65400 B	NT
Chromium	NLE	NLE NI E	NT	27.1	NT NT	25.6	NT NT	71.7	NT NT	25.9	NT
Cobalt	NLE 45000	NLE	NT	2.19	NT	2.36	NT NT	2.07	NT	2.20	NT
Copper	45000	NLE	NT NT	19.5 B	NT NT	24.3 B	NT NT	36.8 B	NT NT	26.8 B	NT
Iron	NLE	NLE	NT NT	15600 B	NT NT	13600 B	NT NT	25400 B	NT NT	12900 B	NT
Lead	800	NLE	NT	46.0	NT	35.0	NT	101	NT	49.7	NT
Magnesium	NLE	NLE	NT	2830 B	NT	4190 B	NT	4130 B	NT	5610 B	NT
Manganese	NLE	NLE	NT	132 B	NT	115 B	NT	95.9 B	NT	281 B	NT
Mercury	270	NLE	NT	0.113 U	NT	0.106 U	NT	0.108 U	NT NT	0.107 U	NT
Nickel	2400	NLE	NT	8.10 B	NT	15.5 B	NT	9.12 B	NT	8.09 B	NT
Potassium	NLE	NLE	NT	1320 B	NT	1270 B	NT	5470 B	NT	1280 B	NT =
Sodium	NLE	NLE	NT	40.910 U	NT	39.056 U	NT	37.562 U	NT	41.153 U	NT
Vanadium	7100	NLE	NT	32.8	NT	33.1	NT	46.7	NT	32.3	NT
Zinc	1500	NLE	NT	115 B	NT	57.9 B	NT	190 B	NT	64.8 B	NT

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³ NJDEP Impact to Groundwater Soil Cleanup Criteria per NJAC 7:26D, 1999.

Table 3.10-4
Fort Monmouth Phase II Site Investigation, Parcel 49
Summary of Analytical Parameters Detected in Groundwater (µg/L)

					Analytical Results			
	Sample ID:	P49-283-MW1	P49-283-MW1 DUP	P49-283-MW3	P49-296-MW7	P49-B4MWOB4	P49-GW-1	P49-GW-2
	Lab ID:	7051808	7051803	7051807	7051806	7051809	7051804	7051805
	Date Sampled:	12/08/2007	12/08/2007	12/08/2007	12/08/2007	12/08/2007	12/08/2007	12/08/2007
\$	Screened Interval (ft. bgs):	9.8-19.8	9.8-19.8	14.1-24.1	1.8-11.8	7.1-17.1	5-10	9-14
Chemical	Quality Criteria ¹	Result	Result	Result	Result	Result	Result	Result
Volatiles								
Acetone	6000	0.85 U	0.85 U	0.85 U	1.08	0.85 U	14.21	0.85 U
Benzene	1	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U	1.24	0.17 U
Bromodichloromethane	1	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	1.35
Chloroform	70	0.32 U	0.32 U	0.32 U	0.32 U	0.32 U	0.32 U	3.47
Ethylbenzene	700	0.28 U	0.28 U	0.28 U	0.28 U	0.28 U	0.25 J	0.28 U
Methyl ethyl ketone (2-Butanone)	300	0.14 U	0.14 U	0.14 U	0.61	0.14 U	1.35	0.14 U
Toluene	600	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U	1.39	0.27 U
Vinyl Chloride	1	0.30 U	0.30 U	0.30 U	0.30 U	0.30 U	0.27 J	0.30 U
Xylenes (Total)	1000	0.49 U	0.49 U	0.49 U	0.49 U	0.49 U	2.75	0.49 U
Semi-Volatiles								
Benzoic acid	30000	0.86 U	0.86 U	0.86 U	6.47	0.86 U	0.86 U	0.86 U
bis(2-Ethylhexyl)phthalate	3	0.80 J	1.04 J	6.77	3.55	1.28 U	25.94	1.22 J
Diethyl phthalate	6000	0.96 U	0.96 U	0.96 U	0.96 U	0.96 U	7.70	0.96 U
Naphthalene	300	0.76 U	0.76 U	0.76 U	0.76 U	0.76 U	0.64 J	0.76 U
Metals								
Aluminum	200	4900	5110	60.8	112	106	NT	NT
Arsenic	3	2.70 U	2.70 U	3.68	6.17	2.70 U	NT	NT
Barium	6000	123	126	95.6	8.99	40.2	NT	NT
Beryllium	1	1.28	1.33	0.100 U	0.100 U	0.100 U	NT	NT
Cadmium	4	0.550 B	0.592 B	0.273 B	0.297 B	0.626 B	NT	NT
Calcium	NLE	11900	12300	17100	14600	7140	NT	NT
Cobalt	100*	5.58	5.79	0.200 U	0.200 U	0.200 U	NT	NT
Copper	1300	2.78	2.65	0.500 U	0.500 U	0.500 U	NT	NT
Iron	300	323 U	323 U	10200	10600	1220	NT	NT
Magnesium	NLE	22100	22900	3310	3180	2850	NT	NT
Manganese	50	51.6	52.8	49.0	84.9	36.3	NT	NT
Nickel (Soluble Salts)	100	14.4	14.7	7.34	0.300 U	0.300 U	NT	NT
Potassium	NLE	6570	6810	8500	6830	3470	NT	NT
Selenium	40	2.70 U	4.51	2.70 U	2.70 U	3.64	NT	NT
Silver	40	0.881	0.800 U	0.800 U	0.800 U	0.800 U	NT	NT
Sodium	50000	110000 B	114000 B	8610 B	7430 B	11000 B	NT	NT
Vanadium	NLE	0.500 U	0.500 U	0.500 U	0.854	0.500 U	NT	NT
Zinc	2000	103	107	3.58 U	3.58 U	18.3	NT	NT

¹ Higher of Practical Quantitation Limits (PQLs) & Groundwater Quality Criterion (GWQC) per NJAC 7:9-6, 2005 (* Interim GWQC).

 μ g/L = micrograms per liter.

ft. bgs = Feet below ground surface.

B = The compound was found in the associated method blank as well as in the sample.

NT = Not tested.

D = Sample was diluted.

NLE = No limit established.

E = The compound's concentration exceeds the calibration range of the instrument for that specific analysis.

Bold = Analyte was detected.

J = Mass spec and retention time data indicate the presence of a compound however the result is less than the MDL but greater than zero.

Shaded = Concentration exceeds Quality Criteria.

Table 3.10-5
Fort Monmouth Phase II Site Investigation, Parcel 49
Summary of Analytical Parameters Detected in Sediment (mg/kg)

			Analytical Results													
		Sample ID:	P49-SD1-A	P49-SD1-A	P49-SD1-B	P49-SD1-B	P49-SD2-A	P49-SD2-A	P49-SD2-A DUP	P49-SD2-B	P49-SD2-B	P49-SD2-B	P49-SD3-A	P49-SD3-A	P49-SD3-B	P49-SD3-B
		Lab ID:	12/06/2007	12/27/2007	12/06/2007	12/27/2007	12/06/2007	12/27/2007	12/06/2007	12/06/2007	12/27/2007	12/06/2007	12/06/2007	12/27/2007	12/06/2007	12/27/2007
	Da	te Sampled:	7051520	7056801	7051521	7056802	7051522	7056803	7051502	7051523	7056804	7051502	7051524	7056805	7051525	7056806
	De	pth (ft. bgs):	0.0-0.5	0.0-0.5	1.5-2.0	1.5-2.0	0.0-0.5	0.0-0.5	0.0-0.5	1.5-2.0	1.5-2.0	1.5-2.0	0.0-0.5	0.0-0.5	1.5-2.0	1.5-2.0
Chemical	ER-L ¹	ER-M ²	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result
Volatiles																
Acetone	NLE	NLE	NT	0.350 U	0.460 B	NT	NT	0.360 U	NT	0.320 B	NT	1.600 B	NT	0.320 U	0.420 B	NT
Semi-Volatiles																
Benzo[a]anthracene	0.261	1.6	0.920 U	NT	NT	1.300 U	2.100 U	NT	2.500 U	NT	1.400 U	NT	0.200 J	NT	NT	1.400 U
Benzo[a]pyrene	0.430	1.6	0.920 U	NT	NT	1.300 U	2.100 U	NT	2.500 U	NT	1.400 U	NT	0.160 J	NT	NT	1.400 U
Benzo[b]fluoranthene	NLE	NLE	0.920 U	NT	NT	1.300 U	2.100 U	NT	2.500 U	NT	1.400 U	NT	0.240 J	NT	NT	1.400 U
Benzo[k]fluoranthene	0.240	NLE	0.920 U	NT	NT	1.300 U	2.100 U	NT	2.500 U	NT	1.400 U	NT	0.091 J	NT	NT	1.400 U
bis(2-Ethylhexyl)phthalate	NLE	NLE	0.920 U	NT	NT	1.300 U	2.100 U	NT	2.500 U	NT	0.250 J	NT	0.070 J	NT	NT	0.520 J
Chrysene	0.384	2.8	0.920 U	NT	NT	1.300 U	2.100 U	NT	2.500 U	NT	1.400 U	NT	0.230 J	NT	NT	1.400 U
Di-n-butylphthalate	NLE	NLE	0.890 JB	NT	NT	0.100 JB	2.400 B	NT	0.950 JB	NT	0.470 JB	NT	1.500 B	NT	NT	1.400 U
Fluoranthene	0.600	5.1	0.920 U	NT	NT	1.300 U	2.100 U	NT	0.160 J	NT	1.400 U	NT	0.410 J	NT	NT	0.140 J
Phenanthrene	0.240	1.5	0.920 U	NT	NT	1.300 U	2.100 U	NT	2.500 U	NT	1.400 U	NT	0.160 J	NT	NT	1.400 U
Pyrene	0.665	2.6	0.920 U	NT	NT	1.300 U	2.100 U	NT	0.130 J	NT	1.400 U	NT	0.370 J	NT	NT	0.150 J
Metals																
Aluminum	NLE	NLE	29200 B	NT	NT	29400 B	13900 B	NT	18500 B	NT	36300 B	NT	15600 B	NT	NT	19200 B
Arsenic	8.2	70	16.5	NT	NT	16.4	14.8	NT	22.9	NT	16.7	NT	29.7	NT	NT	17.0
Barium	NLE	NLE	96.4 B	NT	NT	39.9 B	65.3 B	NT	79.0 B	NT	110 B	NT	83.7 B	NT	NT	57.2 B
Beryllium	NLE	NLE	4.52	NT	NT	4.08	2.42	NT	3.24	NT	5.13	NT	1.70	NT	NT	2.13
Cadmium	1.2	9.6	1.65	NT	NT	0.971 B	4.92	NT	5.55	NT	1.41 B	NT	1.02	NT	NT	0.844 B
Calcium	NLE	NLE	719 B	NT	NT	430 B	1690 B	NT	2210 B	NT	1700 B	NT	1360 B	NT	NT	804 B
Chromium (Total)	81	370	353	NT	NT	329	176	NT	243	NT	394	NT	149	NT	NT	204
Cobalt	NLE	NLE	4.91	NT	NT	3.22	19.4	NT	29.3	NT	4.18	NT	2.10	NT	NT	0.446 U
Copper	34	270	18.9 B	NT	NT	12.7 B	82.3 B	NT	111 B	NT	21.0 B	NT	76.5 B	NT	NT	18.9 B
Iron	NLE	NLE	120000 B	NT	NT	123000 EB	48900 B	NT	67800 B	NT	160000 EB	NT	49900 B	NT	NT	71100 EB
Lead	47	218	0.432 U	NT	NT	0.413 U	41.8	NT	45.7	NT	4.99	NT	148	NT	NT	23.4
Magnesium	NLE	NLE	20600 B	NT	NT	17400 B	7610 B	NT	10800 B	NT	22400 B	NT	6190 B	NT	NT	8440 B
Manganese	NLE	NLE	44.8 B	NT	NT	19.3	24.2 B	NT	28.3 B	NT	34.9	NT	61.7 B	NT	NT	22.8
Mercury	0.15	0.71	0.124 U	NT	NT	0.119 U	0.49	NT	0.53	NT	0.145 U	NT	0.23	NT	NT	0.134 U
Nickel (Soluble Salts)	21	52	13.1 B	NT	NT	14.6	44.0 B	NT	68.5 B	NT	17.9	NT	11.3 B	NT	NT	11.1
Potassium	NLE	NLE	40800 B	NT	NT	38600	15800 B	NT	22600 B	NT	49200	NT	11800 B	NT	NT	17700
Silver	1.0	3.7	0.203 U	NT	NT	0.195 U	1.40	NT	0.407 U	NT	0.234 U	NT	0.208 U	NT	NT	0.223 U
Sodium	NLE	NLE	219	NT	NT	44.262 U	69.037 U	NT	92.593 U	NT	53.211 U	NT	47.409 U	NT	NT	50.781 U
Vanadium	NLE	NLE	125	NT	NT	146	82.3	NT	118	NT	156	NT	79.3	NT	NT	93.2
Zinc 1 N.IDEP Marine/Estuarine Sedim	150	410	139 B	NT	NT	131	1320 B	NT	2090 B	NT	155	NT	117 B	NT	NT	93.7

¹ NJDEP Marine/Estuarine Sediment Screening Guidelines, Effects Range - Low, 1998.

ft. bgs = Feet below ground surface.

mg/kg = milligram per kilogram.
Bold = Analyte detected.

Shaded = Concentration exceeds ER-L.

NT = Not tested.

NLE = No limit established.

B = The compound was found in the associated method blank as well as in the sample.

D = Sample was diluted.

E = The compound's concentration exceeds the calibration range of the instrument for that specific analysis.

J = Mass spec and retention time data indicate the presence of a compound however the result is less than the MDL but greater than zero.

U = The compound was analyzed for but not detected.

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² NJDEP Marine/Estuarine Sediment Screening Guidelines, Effects Range - Medium, 1998.

PARCEL 49 GROUNDWATER SAMPLING RESULTS FORT MONMOUTH, NEW JERSEY

Loc ID	NJ Ground Water Quality	Weston 1995 Background	P49-TMP-1	P49-TMP-2	P49-TMP-1A
Sample ID	Criteria	(Main Post)	PARCEL 49-GW-P49-TMP-1-0	PARCEL 49-GW-P49-TMP-2-0	PARCEL 49-GW-P49-TMP-1A-0
Sample Date	1		1/20/2010	1/20/2010	11/15/2010
Volatile Organic Compounds (µg/l)					
1,1,1,2-Tetrachloroethane	1	-	< 0.5	< 0.5	< 0.5
1.1.1-Trichloroethane	30	_	< 0.5	< 0.5	< 0.5
1,1,2,2-Tetrachloroethane	1	_	< 0.5	< 0.5	< 0.5
1.1.2-Trichloroethane	3	_	< 0.5	< 0.5	< 0.5
1,1-Dichloroethane	50	-	< 0.5	< 0.5	< 0.5
1,1-Dichloroethene	1	_	< 0.5	< 0.5	< 0.5
1.2-Dichlorobenzene	600	_	< 0.5	< 0.5	< 0.5
1,2-Dichloroethane	2	-	< 0.5	< 0.5	< 0.5
1,2-Dichloropropane	1	-	< 0.5	< 0.5	< 0.5
1.3-Dichlorobenzene	600	_	< 0.5	< 0.5	< 0.5
1,4-Dichlorobenzene	75	-	< 0.5	< 0.5	< 0.5
2-Chloroethylvinylether	NLE	-	<1	<1	<1
Acetone	6,000	-	< 0.5	< 0.5	< 0.5
Acrolein	5	-	< 5	< 5	< 10
Acrylonitrile	2	_	< 5	< 5	< 5
Benzene	1	-	< 0.5	< 0.5	< 0.5
Bromodichloromethane	1	-	< 0.5	< 0.5	< 0.5
Bromoform	4	-	< 0.5	< 0.5	< 0.5
Carbon disulfide	700	-	< 0.5	< 0.5	< 0.5
Carbon tetrachloride	1	-	< 0.5	< 0.5	< 0.5
Chlorobenzene	50	-	< 0.5	< 0.5	< 0.5
Chlorodibromomethane	1	-	< 0.5	< 0.5	< 0.5
Chloroethane	5	-	< 0.5	< 0.5	< 0.5
Chloroform	70		< 0.5	< 0.5	< 0.5
Cis-1.2-Dichloroethene	70	-	0.71	< 0.5	0.3 J
Cis-1,3-Dichloropropene	1	-	< 0.5	< 0.5	< 0.5 < 0.5
Dichlorodifluoromethane	1,000	-	< 0.5	< 0.5	< 0.5
Diisoproply Ether	20,000		< 0.5	< 0.5	< 0.5
1 1 7		-	< 0.5 < 0.5	< 0.5	< 0.5 < 0.5
Ethyl benzene	700	-			
Meta/Para Xylene	1,000	-	< 1	< 1	< 1
Methyl bromide	10	-	< 0.5	< 0.5	< 0.5
Methyl butyl ketone	300	-	< 0.5	< 0.5	< 0.5
Methyl chloride	100	-	< 0.5	< 0.5	< 0.5
Methyl ethyl ketone	300	-	< 0.5	< 0.5	< 0.5
Methyl isobutyl ketone	100	-	< 0.5	< 0.5	< 0.5
Methyl Tertbutyl Ether	70	-	< 0.5	< 0.5	< 0.5
Methylene chloride	3	-	< 0.5	< 0.5	< 0.5
Ortho Xylene	1,000	-	< 0.5	< 0.5	< 0.5
Styrene	100	-	< 0.5	< 0.5	< 0.5
Tert Butyl Alcohol	100	-	< 5	< 5	< 5
Tetrachloroethene	1	-	< 0.5	< 0.5	< 0.5
Toluene	600	-	< 0.5	< 0.5	< 0.5
Trans-1,2-Dichloroethene	100	-	< 0.5	< 0.5	< 0.5
Trans-1,3-Dichloropropene	1	-	< 0.5	< 0.5	< 0.5
Trichloroethene	1	-	< 0.5	< 0.5	< 0.5
Trichlorofluoromethane	2,000	-	< 0.5	< 0.5	< 0.5
Vinyl acetate	7,000	-	< 1	< 1	< 1
Vinyl chloride	1	-	1.11	< 0.5	< 0.5

PARCEL 49 GROUNDWATER SAMPLING RESULTS FORT MONMOUTH, NEW JERSEY

Footnote

- 1) All historical data collected prior to 2013 are reported as provided by others.
- 2) Number of Analyses is the number of detected and non-detected results excluding rejected results. Sample duplicate pairs have not been averaged.
- 3) NLE = no limit established.
- 4) ND = not detected in any background sample, no background concentration available.
- 5) Chemical result qualifiers are assigned by the laboratory and is typically evaluated and modified (if necessary) by during data validation.

[blank] = detect, i.e. detected chemical result value.

J = estimated (detect or non-detect) value.

B = Compound detected in the sample and its associated blank sample.

 $E ext{ (or ER)} = Estimated result.$

R = Rejected, data validation rejected the results.

D = Results from dilution of sample.

U = non-detect, i.e. not detected equal to or above this value.

J-DL = Elevated sample detection limit due to difficult sample matrix.

U-DL = Elevated sample detection limit due to difficult sample matrix.

JN = Tentatively identified compound, estimated concentration.

U-ND = Analyte not detected in sample, but no detection or reporting limit provided.

6) Chemical results greater than or equal to the action level (depending on criteria) are highlighted based on the Criteria that are present.

- Cell Shade values represent a result that is above the NJ Ground Water Quality Criteria

####

NJDEP Interim Specific GWQC values are presented for the NJ GWQS where there is not a Specific Ground Water Quality Criteria. A full list of compounds is available NJDEP Interim Generic GWQC values are presented for the NJ GWQS where there is not a XXXXX or a NJDEP Interim Specific GWQC. Available at

- Cell Style values represent a result that is above the Weston 1995 Background (Main Post).

###

n/a = all concentrations were less than the detection limit, therefore, no location of maximum value identified.

Dash (-) = only background concentrations for metals are being used as comparison criteria.

- 7) Criteria action level source document and web address.
- The NJ Ground Water Quality Criteria refers to the NJDEP Groundwater Quality Standards Adopted July 22, 2010 http://www.state.nj.us/dep/wms/bwqsa/docs/njac79C.pdf
- The Weston 1995 Background (Main Post) refers to the FTMM reports.

NA

APPENDIX C

Historical Information for Parcel 57

Final, Revision 1 Appendix C **LEGEND** Geoprobe Soil Sample Location Geoprobe Soil & Groundwater Sample Location Generalized Groundwater Flow Direction. Direction of Generalized Groundwater Flow derived from qualitative evaluation of surface topography, surface water features, and Depth (f Concentration Criteria Media Compound Criteria Value pre-existing IRP site groundwater (mg/kg) Depth (ft Concentration Media Compound Value (mg/kg) (ug/L) potentiometric maps where available. bgs) (ug/L) NRDCSCC 9.500 JD P57-A1-A SS 0.5-1.0 Benzo[a]anthracene NJ GWQC P57-A-5 GW 4-14 Beryllium Benzo[a]pyrene 9.900 NRDCSCC 0.66 Building PORT CREEK P57-A1-A SS 0.5-1.0 Benzo[b]fluoranthene 9.900 JD NRDCSCC 7.000 Installation Boundary P57-A1-A 0.5-1.0 Benzo[k]fluoranthene NRDCSCC 910 911 912 913 914 915 916 917 **ECP PARCEL CATEGORY DEFINITIONS** Areas that are not evaluated or require additional evaluation. * Parcel not included in Site Investigation. Information pertaining to parcels not included in this Site Investigation is presented in the Fort Monmouth Phase I ECP Report (January 2007). **BRAC PARCEL LABEL DEFINITIONS** HS - Hazardous Substance Storage HR - Hazardous Substance Release PS - Petroleum Storage PR - Petroleum Release CONTAMINATION - CATEGORY NUMBER PARCEL NUMBER 59(2)PS/PR 57(7)HS/HR(P)/PS/PR SCALE: Criteria Depth (ft Concentration Value Compound (mg/kg) (mg/kg) 2.000 NRDCSCC P57-C3-A Benzo[a]pyrene 0.66 Base Realignment and Closure 2005 Criteria Concentration Value (mg/kg) (mg/kg) 0.950 J NRDCSCC P57-C5-A Benzo[a]pyrene 0.66 Shaw Environmental, Inc. FIGURE 3.14-1 Criteria epth (f Concentration Criteria Media Compound Value FORT MONMOUTH ECP (ug/L) (ug/L) Depth (ft Concentration P57-A-7 829 NJ GWQC SITE INVESTIGATION Sample ID Media Compound Criteria Value (ug/L) bgs) P57-A-9 GW Beryllium 10.9 NJ GWQC PARCEL 57 SAMPLE LOCATIONS 8-18 P57-A-9 GW 8-18 Cadmium 14.3 NJ GWQC AND CONSTITUENTS OF CONCERN P57-A-9 GW 8-18 Cobalt 147 NJ GWQC 100 MAIN POST GW Nickel 372 B NJ GWQC FORT MONMOUTH NEW JERSEY 2015 ArcGIS File: MP_Fig3 74-1 St_P57 Exceeds_Samptoc.mxd 7/794/2008 12:54:25 PM)
Contract Number W912DY-09-D-0062, Task Order 0012

Table 3.14-3 Fort Monmouth Phase II Site Investigation, Parcel 57 Summary of Analytical Parameters Detected in Soil (mg/kg)

									Analytical Results						
		Sample ID:	P57-A1-A	P57-A1-B	P57-A1-C	P57-A2-A	P57-A2-B	P57-A2-C	P57-A3-A	P57-A3-B	P57-A3-C	P57-A4-A	P57-A4-B	P57-A4-C	P57-A5-A
		Lab ID:	7052503	7052504	7052505	7051712	7051713	7051714	7052506	7052507	7052508	7052112	7052113	7052114	7052509
		Date Sampled:	12/11/2007	12/11/2007	12/11/2007	12/08/2007	12/08/2007	12/08/2007	12/11/2007	12/11/2007	12/11/2007	12/10/2007	12/10/2007	12/10/2007	12/11/2007
		Depth (ft. bgs):	0.5-1.0	1.5-2.0	7.5-8.0	0.0-0.5	1.5-2.0	5.5-6.0	0.5-1.0	1.5-2.0	4.0-4.5	0.5-1.0	1.5-2.0	6.5-7.0	0.5-1.0
Chemical	NRDCSCC ²	IGWSCC ³	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result
Volatiles	<u> </u>				T		•						•		
Acetone	1000	100	NT	0.260 U	0.400	NT	0.240 U	0.320 U	NT	0.420	0.300	NT	0.043 J	0.450	NT
Benzene	13	1	NT	0.260 U	0.330 U	NT	0.017 J	0.320 U	NT	0.260 U	0.250 U	NT	0.330 U	0.290 U	NT
Ethylbenzene	1000	100	NT	0.260 U	0.330 U	NT	0.023 J	0.320 U	NT	0.260 U	0.250 U	NT	0.330 U	0.290 U	NT
Toluene	1000	500	NT	0.260 U	0.330 U	NT	0.077 J	0.320 U	NT	0.260 U	0.250 U	NT	0.069 J	0.290 U	NT
Trichlorofluoromethane	NLE	NLE	NT	0.260 U	0.330 U	NT	0.240 U	0.320 U	NT	0.260 U	0.250 U	NT	0.330 U	0.290 U	NT
Vinyl Acetate	NLE	NLE	NT	0.260 U	0.330 U	NT	0.240 U	0.320 U	NT	0.260 U	0.250 U	NT	0.330 U	0.290 U	NT
Xylenes (Total)	1000	67	NT	0.780 U	0.990 U	NT	0.350 J	0.950 U	NT	0.780 U	0.750 U	NT	1.000 U	0.870 U	NT
Semi-Volatiles	<u> </u>				T		•						•		
Acenaphthene	10000	100	1.200	NT	1.300 U	1.200 U	NT	1.300 U	1.200 U	NT	1.100 U	1.100 U	NT	1.100 U	0.085 J
Acenaphthylene	NLE	NLE	0.760 J	NT	1.300 U	1.200 U	NT	1.300 U	1.200 U	NT	1.100 U	0.077 J	NT	1.100 U	0.061 J
Anthracene	10000	100	5.600	NT	1.300 U	0.055 J	NT	1.300 U	1.200 U	NT	1.100 U	0.160 J	NT NT	1.100 U	0.180 J
Benzo[a]anthracene	4	500	9.500 JD	NT	1.300 U	0.220 J	NT	1.300 U	0.100 J	NT	1.100 U	0.310 J	NT NT	1.100 U	0.340 J
Benzo[a]pyrene	0.66	100	9.900	NT	1.300 U	0.210 J	NT	1.300 U	1.200 U	NT	1.100 U	0.350 J	NT	1.100 U	1.100 U
Benzo[b]fluoranthene	4	50	9.900 JD	NT	1.300 U	0.330 J	NT	1.300 U	1.200 U	NT	1.100 U	0.470 J	NT NT	1.100 U	0.520 J
Benzo[g,h,i]perylene	NLE	NLE	3.400	NT	1.300 U	1.200 U	NT	1.300 U	1.200 U	NT	1.100 U	1.100 U	NT NT	1.100 U	1.100 U
Benzo[k]fluoranthene	4	500	7.000	NT	1.300 U	0.110 J	NT	1.300 U	1.200 U	NT	1.100 U	0.160 J	NT	1.100 U	0.210 J
bis(2-Ethylhexyl)phthalate	210	100	1.100 U	NT	0.080 J	0.099 J	NT	0.052 J	1.200 U	NT	0.086 J	0.150 J	NT	1.100 U	3.200
Butyl benzyl phthalate	10000	100	1.100 U	NT	1.300 U	1.200 U	NT NT	1.300 U	1.200 U	NT	1.100 U	1.100 U	NT NT	1.100 U	1.100 U
Chrysene	40 NLE	500	10.000 JD 1.800	NT NT	1.300 U	0.270 J 1.200 U	NT NT	1.300 U 1.300 U	0.130 J	NT NT	1.100 U	0.390 J	NT NT	1.100 U	0.430 J
Dibenzofuran	10000	NLE 50	1.100 U	NT	1.300 U 0.059 JB	1.200 U	NT	1.300 U	1.200 U 1.200 U	NT	1.100 U 0.053 JB	0.032 J 0.160 JB	NT	1.100 U 1.100 U	0.061 J 1.100 U
Diethyl phthalate Di-n-butylphthalate	10000	100	0.210 J	NT	0.059 JB 0.990 J	2.700 B	NT	1.800 B	0.820 J	NT	1.500	0.160 JB 0.490 JB	NT	1.400 B	1.300
Di-n-octyl phthalate	10000	100	1.100 U	NT	1.300 U	1.200 U	NT	1.300 U	1.200 U	NT NT	1.100 U	1.100 U	NT	1.100 U	1.100 U
Fluoranthene	10000	100	25.000 D	NT	0.058 J	0.420 J	NT	1.300 U	0.280 J	NT	1.100 U	0.680 J	NT	1.100 U	0.900 J
Fluorene	10000	100	2.200	NT	1.300 U	1.200 U	NT	1.300 U	1.200 U	NT	1.100 U	1.100 U	NT	1.100 U	1.100 U
Indeno[1,2,3-cd]pyrene	4	500	3.200	NT	1.300 U	0.082 J	NT	1.300 U	1.200 U	NT	1.100 U	1.100 U	NT	1.100 U	1.100 U
2-Methylnaphthalene	NLE	NLE	1.400	NT	1.300 U	0.075 J	NT	1.300 U	1.200 U	NT	1.100 U	1.100 U	NT	1.100 U	1.100 U
Naphthalene	4200	100	0.880 J	NT	1.300 U	0.051 J	NT	1.300 U	1.200 U	NT	1.100 U	1.100 U	NT	1.100 U	1.100 U
Phenanthrene	NLE	NLE	19.000 D	NT	1.300 U	0.200 J	NT	1.300 U	0.140 J	NT	1.100 U	0.510 J	NT	0.041 J	0.660 J
Pyrene	10000	100	22.000 D	NT	0.050 J	0.410 J	NT	1.300 U	0.300 J	NT	1.100 U	0.820 J	NT	0.034 J	1.100 J
Metals															
Aluminum	NLE	NLE	7800 B	NT	16500 B	14500 B	NT	35200 B	21700 B	NT	6490 B	14400 B	NT	11500 B	11000 B
Arsenic	20	NLE	17.8	NT	9.11	7.39	NT	11.4	12.4	NT	2.73	6.16	NT	8.12	6.05
Barium	47000	NLE	35.3 B	NT	12.2 B	49.3 B	NT	148 B	50.1 B	NT	11.3 B	42.8 B	NT	17.2 B	49.1 B
Beryllium	140	NLE	0.769	NT	0.926	0.882	NT	1.54	1.35	NT	0.271	0.527	NT	1.61	0.520
Cadmium	100	NLE	0.325	NT	0.221	0.384	NT	0.311	0.426	NT	0.112	0.468	NT	0.497	0.425
Calcium	NLE	NLE	2180 B	NT	216 B	3190 B	NT	468 B	18800 B	NT	466 B	29000 B	NT	778 B	45400 B
Chromium (Total)	NLE	NLE	58.8 B	NT	106 B	53.5 B	NT	217 B	110 B	NT	22.8 B	40.9 B	NT	122 B	31.3 B
Cobalt	NLE	NLE	1.98	NT	0.526	3.48	NT	0.832	1.79	NT	0.338 U	8.52	NT	1.30	4.80
Copper	45000	NLE	28.6 B	NT	9.40 B	17.6 B	NT	26.4 B	12.8 B	NT	3.57 B	33.1 B	NT	7.01 B	25.3 B
Iron	NLE	NLE	27900 B	NT	22800 B	24500 B	NT	35100 B	34600 B	NT	8110 B	21600 B	NT	44000 B	19700 B
Lead	800	NLE	15.9	NT	0.525	22.8	NT	3.88	11.2	NT	3.01	21.0	NT	0.351 U	29.3
Magnesium	NLE	NLE	3240 B	NT	4000 B	3790 B	NT	5900 B	5000 B	NT	832 B	5240 B	NT	5250 B	4970 B
Manganese	NLE	NLE	57.7 B	NT	42.2 B	303 B	NT	54.8 B	85.9 B	NT	19.7 B	174 B	NT	27.9 B	154 B
Mercury	270	NLE	0.100 U	NT	0.119 U	0.110 U	NT	0.122 U	0.116 U	NT	0.099 U	0.105 U	NT	0.109 U	0.113 U
Nickel (Soluble Salts)	2400	NLE	7.56	NT	4.39	10.4	NT	50.3	14.6	NT	2.76	17.6	NT	44.1	11.5
Potassium	NLE	NLE	5200 B	NT	5190 B	4290 B	NT	9540 B	7720 B	NT	1430 B	3420 B	NT	11800 B	2360 B
Sodium	NLE	NLE	42.5	NT	41.667 U	38.480 U	NT	43.926 U	42.214 U	NT	38.483 U	904	NT	37.586 U	434
Vanadium	7100	NLE	45.7	NT	60.5	49.9	NT	86.1	77.6	NT	18.1	60.4	NT	70.2	43.3
Zinc	1500	NLE	39.1	NT	46.9	61.7	NT	72.6	70.2	NT	36.5	65.0	NT	165	74.4

NJDEP Residential Direct Contact Soil Cleanup Criteria per NJAC 7:26D, 1999. Beryllium, Copper and Lead criteria per NJAC 7:26D, 2008.

DUP = Duplicate Sample.

ft. bgs = Feet below ground surface.

J = Mass spec and retention time data indicate the presence of a compound however the result is less than the MDL but greater than zero.

U = The compound was analyzed for but not detected.

NT = Not tested.

NLE = No limit established.

mg/kg = milligram per kilogram.

Bold = Analyte was detected.

Shaded = Concentration exceeds level of concern.

(Surface soil compared to NRDCSCC. Subsurface soil compared to IGWSCC when available, otherwise compared to NRDCSCC).

² NJDEP Non-Residential Direct Contact Soil Cleanup Criteria per NJAC 7:26D, 1999. Beryllium, Copper and Lead criteria per NJAC 7:26D, 2008.

 $^{^{\}rm 3}$ NJDEP Impact to Groundwater Soil Cleanup Criteria per NJAC 7:26D, 1999.

B = The compound was found in the associated method blank as well as in the sample.

D = Sample was diluted.

E = The compound's concentration exceeds the calibration range of the instrument for that specific analysis.

Table 3.14-3 Fort Monmouth Phase II Site Investigation, Parcel 57 Summary of Analytical Parameters Detected in Soil (mg/kg)

		1							Analytical Results						
		Sample ID:	P57-A5-B	P57-A5-C	P57-A6-A	P57-A6-B	P57-A6-C	P57-A7-A	P57-A7-B	P57-A7-C	P57-A8-A	P57-A8-B	P57-A8-C	P57-A9-A	P57-A9-B
		Lab ID:	7052510	7052511	7052115	7052116	7052117	7052512	7052513	7052514	7052118	7052119	7052120	7052515	7052516
		Date Sampled:	12/11/2007	12/11/2007	12/10/2007	12/10/2007	12/10/2007	12/11/2007	12/11/2007	12/11/2007	12/10/2007	12/10/2007	12/10/2007	12/11/2007	12/11/2007
		Depth (ft. bgs):	1.5-2.0	7.5-8.0	0.5-1.0	1.5-2.0	7.0-7.5	0.0-0.5	1.5-2.0	5.5-6.0	0.5-1.0	1.5-2.0	6.0-6.5	0.0-0.5	1.5-2.0
Chemical	NRDCSCC ²	IGWSCC ³	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result
Volatiles															
Acetone	1000	100	0.340	0.420	NT	0.400	0.380	NT	0.610	0.340	NT	0.390	0.560	NT	0.510
Benzene	13	1	0.250 U	0.280 U	NT	0.270 U	0.260 U	NT	0.270 U	0.280 U	NT	0.260 U	0.270 U	NT	0.260 U
Ethylbenzene	1000	100	0.250 U	0.280 U	NT	0.270 U	0.260 U	NT	0.270 U	0.280 U	NT	0.260 U	0.270 U	NT	0.260 U
Toluene	1000	500	0.250 U	0.280 U	NT	0.270 U	0.260 U	NT	0.270 U	0.024 J	NT	0.260 U	0.270 U	NT	0.260 U
Trichlorofluoromethane	NLE	NLE	0.069 J	0.280 U	NT	0.270 U	0.260 U	NT	0.270 U	0.280 U	NT	0.260 U	0.270 U	NT	0.260 U
Vinyl Acetate	NLE	NLE	0.250 U	0.280 U	NT	0.270 U	0.260 U	NT	0.270 U	0.280 U	NT	0.210 J	0.270 U	NT	0.260 U
Xylenes (Total)	1000	67	0.760 U	0.840 U	NT	0.810 U	0.780 U	NT	0.820 U	0.021 J	NT	0.770 U	0.810 U	NT	0.790 U
Semi-Volatiles															
Acenaphthene	10000	100	NT	1.200 U	0.070 J	NT	1.100 U	1.100 U	NT	1.100 U	4.400 U	NT	1.100 U	1.200 U	NT
Acenaphthylene	NLE	NLE	NT	1.200 U	0.059 J	NT	1.100 U	1.100 U	NT	0.069 J	0.170 J	NT	1.100 U	1.200 U	NT
Anthracene	10000	100	NT	1.200 U	0.150 J	NT	0.030 J	0.058 J	NT	0.039 J	0.520 J	NT	1.100 U	1.200 U	NT
Benzo[a]anthracene	4	500	NT	1.200 U	0.350 J	NT	0.054 J	0.240 J	NT	0.100 J	1.100 J	NT	1.100 U	0.089 J	NT
Benzo[a]pyrene	0.66	100	NT	1.200 U	1.100 U	NT	1.100 U	0.240 J	NT	0.088 J	4.400 U	NT	1.100 U	0.080 J	NT
Benzo[b]fluoranthene	4	50	NT	1.200 U	1.100 U	NT	0.069 J	0.430 J	NT	0.072 J	4.400 U	NT	1.100 U	0.130 J	NT
Benzo[g,h,i]perylene	NLE	NLE	NT	1.200 U	1.100 U	NT	1.100 U	1.100 U	NT	1.100 U	4.400 U	NT	1.100 U	1.200 U	NT
Benzo[k]fluoranthene	4	500	NT	1.200 U	1.100 U	NT	0.039 J	0.100 J	NT	0.077 J	4.400 U	NT	1.100 U	1.200 U	NT
bis(2-Ethylhexyl)phthalate	210	100	NT	0.067 J	1.100 U	NT	0.044 J	1.900	NT	0.730 J	1.200 J	NT	0.110 J	0.180 J	NT
Butyl benzyl phthalate	10000	100	NT	1.200 U	1.100 U	NT	1.100 U	1.100 U	NT	1.100 U	4.400 U	NT	1.100 U	1.200 U	NT
Chrysene	40	500	NT	1.200 U	0.470 J	NT	0.077 J	0.320 J	NT	0.140 J	1.500 J	NT	1.100 U	0.120 J	NT
Dibenzofuran	NLE	NLE	NT	1.200 U	1.100 U	NT	1.100 U	1.100 U	NT	1.100 U	0.170 J	NT	1.100 U	1.200 U	NT
Diethyl phthalate	10000	50	NT	1.200 U	0.080 JB	NT	1.100 U	0.065 JB	NT	0.054 JB	0.250 JB	NT	1.100 U	0.046 JB	NT
Di-n-butylphthalate	10000	100	NT	0.300 J	1.100 JB	NT	0.380 JB	1.500	NT	0.810 J	2.300 JB	NT	3.800 B	0.340 J	NT
Di-n-octyl phthalate	10000	100	NT	1.200 U	1.100 U	NT	1.100 U	1.100 U	NT	1.100 U	4.400 U	NT	0.035 JB	1.200 U	NT
Fluoranthene	10000	100	NT	0.077 J	0.850 J	NT	0.130 J	0.580 J	NT	0.140 J	2.400 J	NT	0.055 J	0.170 J	NT
Fluorene	10000	100	NT	1.200 U	0.073 J	NT	1.100 U	1.100 U	NT	1.100 U	0.280 J	NT	1.100 U	1.200 U	NT
Indeno[1,2,3-cd]pyrene	4	500	NT	1.200 U	1.100 U	NT	1.100 U	1.100 U	NT	1.100 U	4.400 U	NT	1.100 U	1.200 U	NT
2-Methylnaphthalene	NLE	NLE	NT	1.200 U	0.091 J	NT	1.100 U	1.100 U	NT	1.100 U	4.400 U	NT	1.100 U	1.200 U	NT
Naphthalene	4200	100	NT	1.200 U	0.043 J	NT	1.100 U	1.100 U	NT	1.100 U	0.160 J	NT	1.100 U	1.200 U	NT
Phenanthrene	NLE	NLE	NT	0.057 J	0.670 J	NT NT	0.100 J	0.270 J	NT	0.050 J	2.100 J	NT	0.031 J	0.100 J	NT
Pyrene	10000	100	NT	0.074 J	1.300	NT	0.150 J	0.550 J	NT	0.210 J	4.000 J	NT	0.051 J	0.200 J	NT
Metals	T					·	· · · · · · · ·		T	· · · · · ·	ı		ı		
Aluminum	NLE	NLE	NT	11000 B	10600 B	NT	14300 B	10300 B	NT	6810 B	7970 B	NT	6370 B	12500 B	NT
Arsenic	20	NLE	NT	6.04	4.58	NT	13.2	8.01	NT	4.58	2.84	NT	8.05	10.3	NT NT
Barium	47000	NLE	NT	45.9 B	35.5 B	NT	38.6 B	34.5 B	NT	14.6 B	19.0 B	NT	5.38 B	36.2 B	NT
Beryllium	140	NLE	NT	1.02	0.346	NT NT	1.23	0.529	NT	0.524	0.259	NT NT	0.556	0.933	NT
Cadmium	100 NLE	NLE	NT	0.203	0.435	NT NT	0.359	0.329	NT NT	0.185	0.247	NT NT	0.0843	0.306	NT NT
Chromium	NLE NLE	NLE NLE	NT NT	1140 B 61.5 B	25000 B	NT NT	2040 B	9430 B 33.3 B	NT NT	762 B 41.0 B	14300 B	NT NT	439 B	1720 B	NT NT
Chromium Cobalt	NLE NLE	NLE NLE	NT NT	0.347 U	22.9 B 5.53	NT NT	108 B 1.70	33.3 B 1.32	NT NT	41.0 B 0.876	17.1 B 6.60	NT NT	72.2 B 0.337 U	58.9 B 1.42	NT NT
Copper	45000	NLE	NT NT	3.02 B	26.8 B	NT NT	11.1 B	1.32 13.0 B	NT NT	7.19 B	33.3 B	NT NT	2.90 B	1.42 16.2 B	NT
Iron	45000 NLE	NLE NLE	NT NT	3.02 B 23100 B	26.8 B 16500 B	NT NT	11.1 B 33200 B	13.0 B 17800 B	NT NT	7.19 B 15600 B	33.3 B 14300 B	NT NT	2.90 B 14100 B	16.2 B 27200 B	NT NT
Lead	800	NLE	NT	3.05	15.7	NT	7.57	29.5	NT	7.00	9.78	NT	1.65	28.9	NT
Magnesium	NLE	NLE	NT	2670 B	3790 B	NT	4330 B	29.5 2280 B	NT	7.00 1780 B	3720 B	NT	1180 B	2850 B	NT
Manganese	NLE	NLE	NT	97.6 B	118 B	NT	73.1 B	95.7 B	NT	55.9 B	140 B	NT	9.25 B	110 B	NT
Mercury	270	NLE	NT	0.101 U	0.099 U	NT	0.108 U	0.106 U	NT	0.101 U	0.104 U	NT	0.109 U	0.10B	NT
Nickel	2400	NLE	NT	5.57	20.0	NT	10.3	6.45	NT	4.43	14.5	NT	2.27	6.97	NT
Potassium	NLE	NLE	NT	4170 B	1920 B	NT	7580 B	1970 B	NT	3110 B	1010 B	NT	2750 B	5150 B	NT
Sodium	NLE	NLE	NT	39.424 U	539	NT	41.362 U	36.479 U	NT	38.989 U	429	NT	38.358 U	38.584 U	NT
Vanadium	7100	NLE	NT	40.9	46.8	NT	63.9	37.5	NT	29.7	70.6	NT	40.6	47.0	NT
Zinc	1500	NLE	NT	80.4	70.4	NT	58.2	76.4	NT	35.8	50.4	NT	14.4	57.8	NT
NIDER Residential Direct Contact Soil Cleanus Criteria po	NIAC 7:26D 1000 P	\$I				<u> </u>				. 55.5		. '''	17.7	00	

NJDEP Residential Direct Contact Soil Cleanup Criteria per NJAC 7:26D, 1999. Beryllium, Copper and Lead criteria per NJAC 7:26D, 2008.

DUP = Duplicate Sample.

ft. bgs = Feet below ground surface.

B = The compound was found in the associated method blank as well as in the sample.

J = Mass spec and retention time data indicate the presence of a compound however the result is less than the MDL but greater than zero.

U = The compound was analyzed for but not detected.

NT = Not tested.

NLE = No limit established.

mg/kg = milligram per kilogram.

Bold = Analyte was detected.

Shaded = Concentration exceeds level of concern.

(Surface soil compared to NRDCSCC. Subsurface soil compared to IGWSCC when available, otherwise compared to NRDCSCC).

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² NJDEP Non-Residential Direct Contact Soil Cleanup Criteria per NJAC 7:26D, 1999. Beryllium, Copper and Lead criteria per NJAC 7:26D, 2008.

 $^{^{\}rm 3}$ NJDEP Impact to Groundwater Soil Cleanup Criteria per NJAC 7:26D, 1999.

D = Sample was diluted.

E = The compound's concentration exceeds the calibration range of the instrument for that specific analysis.

Table 3.14-3 Fort Monmouth Phase II Site Investigation, Parcel 57 Summary of Analytical Parameters Detected in Soil (mg/kg)

									Analytical Results						
		Sample ID:	P57-A9-C	P57-A9-C DUP	P57-B3-A	P57-B3-B	P57-B3-C	P57-B4-A	P57-B4-B	P57-B4-C	P57-B5-A	P57-B5-B	P57-B5-C	P57-B5-C DUP	P57-C3-A
		Lab ID:	7052517	7052502	7051703	7051704	7051705	7051706	7051707	7051708	7052109	7052110	7052111	7052102	7051709
		Date Sampled:	12/11/2007	12/11/2007	12/08/2007	12/08/2007	12/08/2007	12/08/2007	12/08/2007	12/08/2007	12/10/2007	12/10/2007	12/10/2007	12/10/2007	12/08/2007
	_	Depth (ft. bgs):	7.5-8.0	7.5-8.0	0.5-1.0	1.5-2.0	7.0-7.5	0.5-1.0	1.5-2.0	6.5-7.0	0.5-1.0	1.5-2.0	6.5-7.0	6.5-7.0	0.5-1.0
Chemical	NRDCSCC ²	IGWSCC ³	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result
Volatiles	T			 		·	ı		•	ı	ı	•	ı	<u> </u>	
Acetone	1000	100	0.490	0.730	NT	0.260 U	0.330 U	NT	0.260 U	0.280 U	NT	0.270 U	0.350 U	0.280 J	NT
Benzene	13	1	0.250 U	0.290 U	NT	0.260 U	0.330 U	NT	0.260 U	0.280 U	NT	0.270 U	0.350 U	0.300 U	NT
Ethylbenzene	1000	100	0.250 U	0.290 U	NT	0.260 U	0.330 U	NT	0.260 U	0.280 U	NT	0.270 U	0.350 U	0.300 U	NT
Toluene	1000	500	0.250 U	0.290 U	NT	0.260 U	0.330 U	NT	0.260 U	0.280 U	NT	0.270 U	0.350 U	0.300 U	NT
Trichlorofluoromethane	NLE	NLE	0.250 U	0.290 U	NT	0.260 U	0.330 U	NT	0.260 U	0.280 U	NT	0.270 U	0.350 U	0.300 U	NT
Vinyl Acetate	NLE	NLE	0.250 U	0.240 J	NT	0.260 U	0.330 U	NT	0.260 U	0.280 U	NT	0.270 U	0.350 U	0.300 U	NT
Xylenes (Total)	1000	67	0.750 U	0.870 U	NT	0.790 U	0.980 U	NT	0.790 U	0.840 U	NT	0.810 U	1.060 U	0.900 U	NT
Semi-Volatiles	T			 		·	ı		•	ı	ı	•	ı	<u> </u>	
Acenaphthene	10000	100	1.100 U	1.200 U	1.100 U	NT	1.200 U	0.041 J	NT	1.100 U	0.066 J	NT	1.200 U	1.200 U	0.540 J
Acenaphthylene	NLE	NLE	1.100 U	1.200 U	1.100 U	NT	1.200 U	0.071 J	NT	1.100 U	0.039 J	NT	1.200 U	1.200 U	0.097 J
Anthracene	10000	100	1.100 U	0.110 J	0.049 J	NT	1.200 U	0.200 J	NT	1.100 U	0.200 J	NT 	1.200 U	1.200 U	1.200
Benzo[a]anthracene	4	500	1.100 U	0.230 J	0.210 J	NT	1.200 U	0.600 J	NT	1.100 U	0.460 J	NT N T	1.200 U	1.200 U	2.900
Benzo[a]pyrene	0.66	100	1.100 U	0.150 J	1.100 U	NT NT	1.200 U	0.480 J	NT	1.100 U	1.100 U	NT	1.200 U	1.200 U	2.000
Benzo[b]fluoranthene	4	50	1.100 U	0.220 J	1.100 U	NT NT	1.200 U	0.790 J	NT NT	1.100 U	0.520 J	NT	1.200 U	1.200 U	3.100
Benzo[g,h,i]perylene	NLE 4	NLE	1.100 U	0.100 J	1.100 U	NT NT	1.200 U	1.100 U	NT NT	1.100 U	1.100 U	NT	1.200 U	1.200 U	0.730 J
Benzo[k]fluoranthene	4	500	1.100 U	0.093 J	1.100 U	NT	1.200 U	0.360 J	NT	1.100 U	0.350 J	NT	1.200 U	1.200 U	1.900
bis(2-Ethylhexyl)phthalate	210 10000	100 100	0.100 J 1.100 U	0.062 J	0.150 J 1.100 U	NT NT	1.200 U 1.200 U	0.130 J 1.100 U	NT NT	1.100 U 1.100 U	0.300 J 0.130 J	NT NT	1.200 U	0.087 J	0.220 J
Butyl benzyl phthalate	40	500	1.100 U	1.200 U 0.250 J	0.250 J	NT NT	1.200 U	0.690 J	NT	1.100 U	0.130 J 0.510 J	NT	1.200 U	1.200 U	1.100 U 3.000
Chrysene Dibenzofuran	NLE	NLE	1.100 U	1.200 U	1.100 U	NT	1.200 U	0.064 J	NT	1.100 U	0.510 J 0.057 J	NT	1.200 U 1.200 U	1.200 U 1.200 U	0.260 J
Diethyl phthalate	10000	50	1.100 U	0.048 JB	0.043 JB	NT	1.200 U	1.100 U	NT	1.100 U	1.100 U	NT	1.200 U	0.034 JB	1.100 U
Di-n-butylphthalate	10000	100	1.100 J	1.000 J	1.600 B	NT	0.630 JB	1.700 B	NT	0.610 JB	0.760 JB	NT	0.910 JB	2.700 B	2.000 B
Di-n-octyl phthalate	10000	100	1.100 U	1.200 U	1.100 U	NT	1.200 U	1.100 U	NT	1.100 U	0.380 JB	NT	1.200 U	0.060 JB	1.100 U
Fluoranthene	10000	100	1.100 U	0.680 J	0.320 J	NT	1.200 U	1.400	NT	1.100 U	0.990 J	NT	1.200 U	1.200 U	7.500
Fluorene	10000	100	1.100 U	1.200 U	1.100 U	NT	1.200 U	0.038 J	NT	1.100 U	1.100 U	NT	1.200 U	1.200 U	0.380 J
Indeno[1,2,3-cd]pyrene	4	500	1.100 U	1.200 U	1.100 U	NT	1.200 U	0.150 J	NT	1.100 U	1.100 U	NT	1.200 U	1.200 U	0.690 J
2-Methylnaphthalene	NLE	NLE	1.100 U	1.200 U	1.100 U	NT	1.200 U	0.080 J	NT	1.100 U	1.100 U	NT	1.200 U	1.200 U	0.075 J
Naphthalene	4200	100	1.100 U	1.200 U	1.100 U	NT	1.200 U	0.065 J	NT	1.100 U	1.100 U	NT	1.200 U	1.200 U	0.120 J
Phenanthrene	NLE	NLE	1.100 U	0.510 J	0.180 J	NT	1.200 U	0.750 J	NT	1.100 U	1.000 J	NT	1.200 U	1.200 U	4.700
Pyrene	10000	100	1.100 U	0.580 J	0.500 J	NT	1.200 U	1.600	NT	1.100 U	1.600	NT	1.200 U	1.200 U	9.400
Metals															
Aluminum	NLE	NLE	5540 B	5180 B	8850 B	NT	18800 B	10600 B	NT	8020 B	9520 B	NT	19400 B	20300 B	10400 B
Arsenic	20	NLE	2.42	1.70	7.58	NT	11.0	5.89	NT	6.21	5.03	NT	7.71	9.35	2.36
Barium	47000	NLE	19.9 B	17.0 B	20.6 B	NT	33.8 B	43.6 B	NT	39.3 B	32.9 B	NT	30.5 B	32.0 B	20.9 B
Beryllium	140	NLE	0.462	0.475	1.25	NT	0.917	0.517	NT	0.516	0.540	NT	1.06	1.18	0.494
Cadmium	100	NLE	0.135	0.126	0.193	NT	0.261	0.318	NT	0.414	0.289	NT	0.317	0.534	0.163
Calcium	NLE	NLE	677 B	605 B	18300 B	NT	467 B	42600 B	NT	34300 B	34400 B	NT	607 B	598 B	292 B
Chromium	NLE	NLE	28.0 B	28.3 B	92.2 B	NT	63.6 B	39.9 B	NT	35.6 B	58.4 B	NT	127 B	135 B	46.4 B
Cobalt	NLE	NLE	0.332 U	0.333 U	1.94	NT	2.47	2.82	NT	2.93	5.07	NT	1.64	1.58	0.756
Copper	45000	NLE	2.91 B	4.17 B	8.00 B	NT	12.2 B	14.4 B	NT	29.9 B	21.0 B	NT	5.56 B	6.99 B	4.84 B
Iron	NLE	NLE	13300 B	13300 B	36000 B	NT	15300 B	15800 B	NT	17400 B	18500 B	NT	37400 B	47400 B	8230 B
Lead	800	NLE	40.7	38.0	7.69	NT	7.04	20.3	NT	51.4	15.0	NT	3.03	2.82	4.81
Magnesium	NLE	NLE	1380 B	1460 B	4560 B	NT	2600 B	3970 B	NT	4980 B	4530 B	NT	5090 B	5330 B	1500 B
Manganese	NLE	NLE	36.2 B	26.9 B	58.4 B	NT	67.6 B	120 B	NT	118 B	102 B	NT	55.2 B	54.6 B	34.8 B
Mercury	270	NLE	0.106 U	0.114 U	0.110 U	NT	0.116 U	0.102 U	NT	0.102 U	0.107 U	NT	0.114 U	0.110 U	0.160
Nickel	2400	NLE	2.35	2.49	6.29	NT	11.0	8.92	NT	8.99	9.44	NT	8.71	8.98	5.59
Potassium	NLE	NLE	2500 B	2640 B	8710 B	NT	2780 B	2710 B	NT	2560 B	3170 B	NT	8330 B	8900 B	1940 B
Sodium	NLE	NLE	37.822 U	37.867 U	37.752 U	NT	43.828 U	36.969 U	NT	39.984 U	48.6	NT	42.72 U	39.581 U	40.694 U
Vanadium	7100	NLE	19.4	18.2	51.2	NT	62.7	40.8	NT	40.0	59.1	NT 	85.3	91.4	30.9
Zinc	1500	NLE	29.4	28.8	72.5	NT	57.9	50.5	NT	84.8	46.2	NT	62.6	67.0	25.2

NJDEP Residential Direct Contact Soil Cleanup Criteria per NJAC 7:26D, 1999. Beryllium, Copper and Lead criteria per NJAC 7:26D, 2008.

DUP = Duplicate Sample.

ft. bgs = Feet below ground surface.

B = The compound was found in the associated method blank as well as in the sample.

J = Mass spec and retention time data indicate the presence of a compound however the result is less than the MDL but greater than zero.

 $\ensuremath{\mathsf{U}}$ = The compound was analyzed for but not detected.

NT = Not tested.

NLE = No limit established.

mg/kg = milligram per kilogram.

Bold = Analyte was detected.

Shaded = Concentration exceeds level of concern.

(Surface soil compared to NRDCSCC. Subsurface soil compared to IGWSCC when available, otherwise compared to NRDCSCC).

² NJDEP Non-Residential Direct Contact Soil Cleanup Criteria per NJAC 7:26D, 1999. Beryllium, Copper and Lead criteria per NJAC 7:26D, 2008.

 $^{^{\}rm 3}$ NJDEP Impact to Groundwater Soil Cleanup Criteria per NJAC 7:26D, 1999.

D = Sample was diluted.

E = The compound's concentration exceeds the calibration range of the instrument for that specific analysis.

Table 3.14-3
Fort Monmouth Phase II Site Investigation, Parcel 57
Summary of Analytical Parameters Detected in Soil (mg/kg)

							Analytical Results				
		Sample ID:	P57-C3-B	P57-C3-C	P57-C3-C DUP	P57-C4-A	P57-C4-B	P57-C4-C	P57-C5-A	P57-C5-B	P57-C5-C
		Lab ID:	7051710	7051711	7051702	7052106	7052107	7052108	7052103	7052104	7052105
		Date Sampled:	12/08/2007	12/08/2007	12/08/2007	12/10/2007	12/10/2007	12/10/2007	12/10/2007	12/10/2007	12/10/2007
		Depth (ft. bgs):	1.5-2.0	6.5-7.0	6.5-7.0	0.5-1.0	1.5-2.0	6.5-7.0	0.5-1.0	1.5-2.0	7.0-7.5
Chemical	NRDCSCC ²	IGWSCC ³	Result	Result	Result	Result	Result	Result	Result	Result	Result
Volatiles											
Acetone	1000	100	0.270 U	0.260 U	0.260 U	NT	0.310 U	0.270 U	NT	0.280 J	0.320 U
Benzene	13	1	0.270 U	0.260 U	0.260 U	NT	0.310 U	0.270 U	NT	0.300 U	0.320 U
Ethylbenzene	1000	100	0.011 J	0.260 U	0.260 U	NT	0.310 U	0.270 U	NT	0.300 U	0.320 U
Toluene	1000	500	0.270 U	0.260 U	0.260 U	NT	0.310 U	0.270 U	NT	0.300 U	0.320 U
Trichlorofluoromethane	NLE	NLE	0.270 U	0.260 U	0.260 U	NT	0.310 U	0.270 U	NT	0.300 U	0.320 U
Vinyl Acetate	NLE	NLE	0.270 U	0.260 U	0.260 U	NT	0.310 U	0.270 U	NT	0.300 U	0.320 U
Xylenes (Total)	1000	67	0.810 U	0.780 U	0.780 U	NT	0.920 U	0.810 U	NT	0.990 U	0.960 U
Semi-Volatiles					•					<u> </u>	
Acenaphthene	10000	100	NT	1.100 U	1.100 U	1.000 U	NT	1.100 U	0.078 J	NT	1.100 U
Acenaphthylene	NLE	NLE	NT	1.100 U	1.100 U	0.190 J	NT	1.100 U	0.100 J	NT	1.100 U
Anthracene	10000	100	NT	1.100 U	1.100 U	0.130 J	NT	1.100 U	0.430 J	NT	1.100 U
Benzo[a]anthracene	4	500	NT	0.100 J	1.100 U	0.420 J	NT	1.100 U	1.200	NT	1.100 U
Benzo[a]pyrene	0.66	100	NT	0.081 J	1.100 U	0.470 J	NT	1.100 U	0.950 J	NT	1.100 U
Benzo[b]fluoranthene	4	50	NT	0.110 J	1.100 U	0.650 J	NT	1.100 U	1.500	NT	1.100 U
Benzo[g,h,i]perylene	NLE	NLE	NT	1.100 U	1.100 U	1.000 U	NT	1.100 U	1.100 U	NT	1.100 U
Benzo[k]fluoranthene	4	500	NT	0.059 J	1.100 U	0.290 J	NT	1.100 U	0.480 J	NT	1.100 U
bis(2-Ethylhexyl)phthalate	210	100	NT	0.092 J	0.090 J	0.200 J	NT	1.100 U	1.100	NT	1.100 U
Butyl benzyl phthalate	10000	100	NT	1.100 U	1.100 U	1.000 U	NT	1.100 U	1.100 U	NT	1.100 U
Chrysene	40	500	NT	0.120 J	1.100 U	0.520 J	NT	1.100 U	1.300	NT	1.100 U
Dibenzofuran	NLE	NLE	NT	1.100 U	1.100 U	1.000 U	NT	1.100 U	0.058 J	NT	1.100 U
Diethyl phthalate	10000	50	NT	1.100 U	1.100 U	1.000 U	NT	1.100 U	1.100 U	NT	1.100 U
Di-n-butylphthalate	10000	100	NT	2.400 B	0.410 JB	0.770 JB	NT	0.570 JB	0.640 JB	NT	0.580 JB
Di-n-octyl phthalate	10000	100	NT	1.100 U	1.100 U	1.000 U	NT	1.100 U	1.100 U	NT	1.100 U
Fluoranthene	10000	100	NT	0.120 J	0.041 J	0.640 J	NT	1.100 U	2.600	NT	1.100 U
Fluorene	10000	100	NT	1.100 U	1.100 U	1.000 U	NT	1.100 U	0.110 J	NT	1.100 U
Indeno[1,2,3-cd]pyrene	4	500	NT	1.100 U	1.100 U	1.000 U	NT	1.100 U	0.330 J	NT	1.100 U
2-Methylnaphthalene	NLE	NLE	NT	1.100 U	1.100 U	1.000 U	NT	1.100 U	1.100 U	NT	1.100 U
Naphthalene	4200	100	NT	1.100 U	1.100 U	1.000 U	NT	1.100 U	1.100 U	NT	1.100 U
Phenanthrene	NLE	NLE	NT	0.033 J	1.100 U	0.260 J	NT	1.100 U	1.400	NT	1.100 U
Pyrene	10000	100	NT	0.160 J	0.041 J	1.200	NT	1.100 U	3.600	NT	1.100 U
Metals											
Aluminum	NLE	NLE	NT	11000 B	7000 B	13100 B	NT	11000 B	8990 B	NT	3580 B
Arsenic	20	NLE	NT	4.98	3.65	5.40	NT	11.4	4.64	NT	2.04
Barium	47000	NLE	NT	20.6 B	13.4 B	40.7 B	NT	15.9 B	32.7 B	NT	6.15 B
Beryllium	140	NLE	NT	0.637	0.508	0.590	NT	1.33	0.615	NT	0.326
Cadmium	100	NLE	NT	0.194	0.0962	0.362	NT	0.196	0.319	NT	0.0535
Calcium	NLE	NLE	NT	1660 B	1400 B	21100 B	NT	693 B	24100 B	NT	280 B
Chromium	NLE	NLE	NT	57.7 B	42.9 B	43.5 B	NT	96.4 B	54.5 B	NT	30.8 B
Cobalt	NLE	NLE	NT	1.11	1.43	8.68	NT	1.42	3.13	NT	0.326 U
Copper	45000	NLE	NT	8.57 B	7.79 B	29.3 B	NT	5.09 B	20.0 B	NT	3.28 B
Iron	NLE	NLE	NT	18400 B	16200 B	20100 B	NT	39500 B	19800 B	NT	8350 B
Lead	800	NLE	NT	5.10	4.66	30.1	NT	1.20	51.6	NT	1.40
Magnesium	NLE	NLE	NT	1940 B	1330 B	4740 B	NT	4300 B	3400 B	NT	871 B
Manganese	NLE	NLE	NT	52.7 B	96.2 B	127 B	NT	39.4 B	93.3 B	NT	15.3 B
Mercury	270	NLE	NT	0.100 U	0.101 U	0.098 U	NT	0.096 U	0.099 U	NT	0.099 U
Nickel	2400	NLE	NT	5.79	7.16	14.1	NT	5.97	9.05	NT	3.63
Potassium	NLE	NLE	NT	3070 B	1860 B	2760 B	NT	9520 B	2540 B	NT	1960 B
Sodium	NLE	NLE	NT	35.244 U	37.691 U	688	NT	36.431 U	40.061 U	NT	37.124 U
Vanadium	7100	NLE	NT	46.7	36.6	65.3	NT	60.0	65.3	NT	24.5
Zinc	1500	NLE	NT	39.8	43.6	53.6	NT	61.5	58.2	NT	28.0

¹ NJDEP Residential Direct Contact Soil Cleanup Criteria per NJAC 7:26D, 1999. Beryllium, Copper and Lead criteria per NJAC 7:26D, 2008.

ft. bgs = Feet below ground surface.

B = The compound was found in the associated method blank as well as in the sample.

D = Sample was diluted.

E = The compound's concentration exceeds the calibration range of the instrument for that specific analysis.

J = Mass spec and retention time data indicate the presence of a compound however the result is less than the MDL but greater than zero.

U = The compound was analyzed for but not detected.

NT = Not tested.

NLE = No limit established.

mg/kg = milligram per kilogram.

Bold = Analyte was detected.

Shaded = Concentration exceeds level of concern.

(Surface soil compared to NRDCSCC. Subsurface soil compared to IGWSCC when available, otherwise compared to NRDCSCC).

² NJDEP Non-Residential Direct Contact Soil Cleanup Criteria per NJAC 7:26D, 1999. Beryllium, Copper and Lead criteria per NJAC 7:26D, 2008.

 $^{^{\}rm 3}$ NJDEP Impact to Groundwater Soil Cleanup Criteria per NJAC 7:26D, 1999.

Table 3.14-4
Fort Monmouth Phase II Site Investigation, Parcel 57
Summary of Analytical Parameters Detected in Groundwater (µg/L)

				Analytica	al Results		
	Sample ID:	P57-A-1	P57-A-3	P57-A-3 DUP	P57-A-5	P57-A-7	P57-A-9
	Lab ID:	7053104	7053105	7053103	7053106	7053107	7053108
	Date Sampled:	12/11/2007	12/11/2007	12/11/2007	12/11/2007	12/11/2007	12/11/2007
	Screened Interval (ft. bgs):	7-12	4-9	4-9	4-14	4-14	8-18
Chemical	Quality Criteria ¹	Result	Result	Result	Result	Result	Result
Volatiles							
Acetone	6000	0.85 U	0.85 U	0.85 U	0.85 U	31.13 B	0.85 U
Carbon disulfide	700	0.44 U	0.44 U	0.44 U	0.44 U	0.28 J	0.10 J
Methyl ethyl ketone (2-Butanone)	300	0.14 U	0.14 U	0.14 U	0.14 U	4.14	0.14 U
Tertiary butyl alcohol	100	1.82 U	10.49	1.82 U	1.82 U	1.82 U	1.82 U
Toluene	600	0.23 J	0.27 U	0.27 U	1.02	0.77	0.21 J
Semi-Volatiles							
bis(2-Ethylhexyl)phthalate	3	1.28 U	1.94	1.28 U	1.28 U	1.28 U	1.28 U
Metals							
Aluminum	200	592 B	16100 B	266 B	13400 B	11000 B	43400 B
Antimony	6	0.70 U	0.70 U	0.70 U	0.70 U	1.13	0.70 U
Arsenic	3	2.70 U	5.24	2.70 U	3.94	4.01	6.73
Barium	6000	66.2	189	165	225	224	26.8
Beryllium	1	0.454	0.249	0.100 U	2.12	1.98	10.9
Cadmium	4	0.274	1.46	1.15	0.284	0.917	14.3
Calcium	NLE	3300 B	290000 B	284000 B	33200 B	63400 B	73300 B
Chromium (Total)	70	0.692 B	45.5 B	0.640 B	69.8 B	105 B	3.57 B
Cobalt	100*	3.79	1.75	0.755	9.62	10.5	147
Copper	1300	1.72	27.7	6.58	10.7	137	43.4
Iron	300	323 U	17100	323 U	138000	25200	17700
Lead	5	0.700 U	3.31	0.700 U	0.700 U	829	3.07
Magnesium	NLE	5370	14000	12900	22000	6600	37500
Manganese	50	46.4 B	62.7 B	43.5 B	502 B	765 B	2710 B
Nickel (Soluble Salts)	100	7.38 B	7.18 B	0.300 U	16.6 B	24.0 B	372 B
Potassium	NLE	2850 B	72600 B	68500 B	6720 B	2500 B	5480 B
Selenium	40	4.89 B	2.70 U	2.70 U	2.70 U	2.70 U	2.70 U
Sodium	50000	20900	3070000 E	3110000 E	156000	6790	26000
Vanadium	NLE	0.500 U	95.3	17.6	56.9	68.8	3.07
Zinc	2000	23.6	62.7	20.0	171	145	1580

¹ Higher of Practical Quantitation Limits (PQLs) & Groundwater Quality Criterion (GWQC) per NJAC 7:9-6, 2005 (*Interim GWQC).

DUP = Duplicate Sample. B = The compound was found in the associated method blank as well as in the sample.

ft. bgs = Feet below ground surface. D = Sample was diluted.

Bold = Analyte was detected. E = The compound's concentration exceeds the calibration range of the instrument for that specific analysis.

Shaded = Concentration exceeds Quality Criteria.

µg/L = micrograms per liter. J = Mass spec and retention time data indicate the presence of a compound however the result is less than the MDL but greater than zero.

NLE = No limit established. U = The compound was analyzed for but not detected.

PARCEL 57 GROUNDWATER SAMPLING RESULTS FORT MONMOUTH, NEW JERSEY

Loc ID			D57 T	MP-A5	D57 T	MP-A7	P57-T1	MP AQ	80	0MW02
Loc ID	NJ Ground	Weston 1995	F3/-1	MIT-A3	F3/-1	MF-A/	F3/-11	VIT-A9	80	OM W 02
Sample ID	Water Quality	Background	PARCEL 57-GW-P57-TMP-A5-Filtered	PARCEL 57-GW-P57-TMP-A5-Unfiltered	PARCEL 57-GW-P57-TMP-A7-Filtered	PARCEL 57-GW-P57-TMP-A7-Unfiltered	PARCEL 57-GW-P57-TMP-A9-Filtered	PARCEL 57-GW-P57-TMP-A9-Unfiltered	PARCEL 57-GW-800MW02	PARCEL 57-GW-800MW02-Dup
Sample Date	Criteria	(Main Post)	4/2/2010	4/2/2010	3/11/2010	3/11/2010	3/10/2010	3/10/2010	2/4/2011	2/4/2011
QA/QC			SA	SA	SA	SA	SA	SA	SA	DU
Filtered			Dissolved	Total	Dissolved	Total	Dissolved	Total	Total	Total
Volatile Organic Compounds (µg/l)										
1,1,1,2-Tetrachloroethane	1	-	NA	NA	NA	NA	NA	NA	< 0.5	< 0.5
1,1,1-Trichloroethane	30	-	NA	NA	NA	NA	NA	NA	< 0.5	< 0.5
1.1.2.2-Tetrachloroethane	1	-	NA	NA	NA	NA	NA	NA	< 0.5	< 0.5
1,1,2-Trichloroethane	3	-	NA	NA	NA	NA	NA	NA	< 0.5	< 0.5
1,1-Dichloroethane	50	-	NA	NA	NA	NA	NA	NA	< 0.5	< 0.5
1,1-Dichloroethene	1	-	NA	NA	NA	NA	NA	NA	< 0.5	< 0.5
1,2-Dichlorobenzene	600	-	NA	NA	NA	NA	NA	NA	< 0.5	< 0.5
1,2-Dichloroethane	2	-	NA	NA	NA	NA	NA	NA	< 0.5	< 0.5
1,2-Dichloropropane	1	-	NA	NA	NA	NA	NA	NA	< 0.5	< 0.5
1,3-Dichlorobenzene	600	-	NA	NA	NA	NA	NA	NA	< 0.5	< 0.5
1,4-Dichlorobenzene	75	-	NA	NA	NA	NA	NA	NA	< 0.5	< 0.5
2-Chloroethylvinylether	NLE	-	NA	NA	NA	NA	NA	NA	< 0.5	< 0.5
Acetone	6,000	-	NA	NA	NA	NA	NA	NA	< 0.5	< 0.5
Acrolein	5	-	NA	NA	NA	NA	NA	NA	< 5	< 5
Acrylonitrile	2	-	NA	NA	NA	NA	NA	NA	< 5	< 5
Benzene	1	-	NA	NA	NA	NA	NA	NA	< 0.5	< 0.5
Bromodichloromethane	1	-	NA	NA	NA	NA	NA	NA	< 0.5	< 0.5
Bromoform	4	-	NA	NA	NA	NA	NA	NA	< 0.5	< 0.5
Carbon disulfide	700	-	NA	NA	NA	NA	NA	NA	< 0.5	< 0.5
Carbon tetrachloride	1	-	NA	NA	NA	NA	NA	NA	< 0.5	< 0.5
Chlorobenzene	50	-	NA	NA	NA	NA	NA	NA	< 0.5	< 0.5
Chlorodibromomethane	1	-	NA	NA	NA	NA	NA	NA	< 0.5	< 0.5
Chloroethane	5	-	NA	NA	NA	NA	NA	NA	< 0.5	< 0.5
Chloroform	70	-	NA	NA	NA	NA	NA	NA	< 0.5	< 0.5
Cis-1,2-Dichloroethene	70	-	NA	NA	NA	NA	NA	NA	< 0.5	< 0.5
Cis-1,3-Dichloropropene	1	-	NA	NA	NA	NA	NA	NA	< 0.5	< 0.5
Dichlorodifluoromethane	1,000	-	NA	NA	NA	NA	NA	NA	< 0.5	< 0.5
Diisoproply Ether	20,000	-	NA	NA	NA	NA	NA	NA	< 0.5	< 0.5
Ethyl benzene	700	-	NA	NA	NA	NA	NA	NA	< 0.5	< 0.5
Meta/Para Xylene	1,000	-	NA	NA	NA	NA	NA	NA	<1	< 1
Methyl bromide	10	-	NA	NA	NA	NA	NA	NA	< 0.5	< 0.5
Methyl butyl ketone	300	-	NA	NA	NA	NA	NA	NA	< 0.5	< 0.5
Methyl chloride	100	-	NA	NA	NA	NA	NA	NA	< 0.5	< 0.5
Methyl ethyl ketone	300	-	NA NA	NA NA	NA NA	NA NA	NA	NA	< 0.5	< 0.5
Methyl isobutyl ketone	100	-	NA NA	NA NA	NA NA	NA NA	NA NA	NA	< 0.5	< 0.5
Methyl Tertbutyl Ether	70	-	NA NA	NA NA	NA NA	NA NA	NA NA	NA NA	< 0.5	< 0.5 < 0.5
Methylene chloride Ortho Xylene	1,000	-	NA NA	NA NA	NA NA	NA NA	NA NA	NA NA	< 0.5 < 0.5	< 0.5 < 0.5
Ortho Xylene Styrene	1,000	-	NA NA	NA NA	NA NA	NA NA	NA NA	NA NA	< 0.5 < 0.5	< 0.5 < 0.5
Tert Butyl Alcohol	100		NA NA	NA NA	NA NA	NA NA	NA NA	NA NA	< 0.5 < 5	< 0.5 < 5
Tetrachloroethene	100	-	NA NA	NA NA	NA NA	NA NA	NA NA	NA NA	< 0.5	< 0.5
Toluene	600	-	NA NA	NA NA	NA NA	NA NA	NA NA	NA NA	< 0.5	< 0.5
Trans-1.2-Dichloroethene	100	-	NA NA	NA NA	NA NA	NA NA	NA NA	NA NA	< 0.5	< 0.5
Trans-1,3-Dichloropropene	100	-	NA NA	NA NA	NA NA	NA NA	NA NA	NA NA	< 0.5	< 0.5
Trichloroethene	1	-	NA NA	NA NA	NA NA	NA NA	NA NA	NA NA	< 0.5	< 0.5
Trichlorofluoromethane	2,000	-	NA NA	NA NA	NA NA	NA NA	NA NA	NA NA	< 0.5	< 0.5
Vinyl acetate	7,000	-	NA NA	NA NA	NA NA	NA NA	NA NA	NA NA	< 0.5	< 0.5
Vinyl chloride	1	-	NA NA	NA NA	NA NA	NA NA	NA NA	NA NA	< 0.5	< 0.5
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PARCEL 57 GROUNDWATER SAMPLING RESULTS FORT MONMOUTH, NEW JERSEY

Loc ID			P57-T.	MP-A5	P57-T	MP-A7	P57-T	MP-A9	86	00MW02
Sample ID	NJ Ground Water Quality	Weston 1995 Background	PARCEL 57-GW-P57-TMP-A5-Filtered	PARCEL 57-GW-P57-TMP-A5-Unfiltered	PARCEL 57-GW-P57-TMP-A7-Filtered	PARCEL 57-GW-P57-TMP-A7-Unfiltered	PARCEL 57-GW-P57-TMP-A9-Filtered	PARCEL 57-GW-P57-TMP-A9-Unfiltered	PARCEL 57-GW-800MW02	PARCEL 57-GW-800MW02-Dup
Sample Date	Criteria	(Main Post)	4/2/2010	4/2/2010	3/11/2010	3/11/2010	3/10/2010	3/10/2010	2/4/2011	2/4/2011
QA/QC Filtered		-	SA Dissolved	SA Total	SA Dissolved	SA Total	SA Dissolved	SA Total	SA Total	DU Total
Semivolatile Organic Compounds (µg/l)			Dissolved	Total	Dissolved	10141	Dissolved	Total	Total	Total
1,1'-Biphenyl	400	-	NA	NA	NA	NA	NA	NA	<1	< 1
2,4-Dinitrotoluene	10	-	NA NA	NA NA	NA	NA NA	NA NA	NA	<2	< 2
2,6-Dinitrotoluene 2-Chloronaphthalene	10 600	-	NA NA	NA NA	NA NA	NA NA	NA NA	NA NA	< 2 < 2	< 2 < 2
2-Methylnaphthalene	30	-	NA	NA	NA	NA	NA	NA	<1	< 1
2-Nitroaniline 3.3'-Dichlorobenzidine	100 30	-	NA NA	NA NA	NA NA	NA NA	NA NA	NA NA	< 5 < 5	< 5 < 5
3-Nitroaniline	100	-	NA NA	NA NA	NA NA	NA NA	NA NA	NA NA	<5	< 5
4-Bromophenyl phenyl ether	100	-	NA	NA	NA	NA	NA	NA	< 2	< 2
4-Chloroaniline 4-Chlorophenyl phenyl ether	30 100	-	NA NA	NA NA	NA NA	NA NA	NA NA	NA NA	< 5 < 2	< 5 < 2
4-Nitroaniline	5	-	NA	NA NA	NA	NA NA	NA NA	NA NA	<5	< 5
Acenaphthene	400	-	NA NA	NA NA	NA	NA NA	NA NA	NA	< 0.1	< 0.1
Acenaphthylene Acetophenone	100 700	-	NA NA	NA NA	NA NA	NA NA	NA NA	NA NA	< 0.1 < 2	< 0.1 < 2
Anthracene	2,000	-	NA	NA	NA	NA	NA	NA	< 0.1	< 0.1
Atrazine Benzaldehyde	3 100	-	NA NA	NA NA	NA NA	NA NA	NA NA	NA NA	< 5 < 5	< 5 < 5
Benzaldehyde Benzo(a)anthracene	0.1	-	NA NA	NA NA	NA NA	NA NA	NA NA	NA NA	< 0.1	< 5 < 0.1
Benzo(a)pyrene	0.1	-	NA	NA	NA	NA	NA	NA	< 0.1	< 0.1
Benzo(b)fluoranthene Benzo(ghi)perylene	0.2 100	-	NA NA	NA NA	NA NA	NA NA	NA NA	NA NA	< 0.1 < 0.1	< 0.1 < 0.1
Benzo(k)fluoranthene	0.5	-	NA NA	NA NA	NA NA	NA NA	NA NA	NA NA	< 0.1	< 0.1
Bis(2-Chloroethoxy)methane	100	-	NA NA	NA NA	NA NA	NA NA	NA NA	NA NA	< 2	<2
Bis(2-Chloroethyl)ether Bis(2-Chloroisopropyl)ether	7 300	-	NA NA	NA NA	NA NA	NA NA	NA NA	NA NA	< 2 < 2	< 2 < 2
Bis(2-Ethylhexyl)phthalate	3	-	NA	NA	NA	NA	NA	NA	< 2	< 2
Butyl benzyl phthalate	100	-	NA NA	NA NA	NA NA	NA NA	NA NA	NA NA	<2	< 2
Caprolactam Carbazole	5,000 100	-	NA NA	NA NA	NA NA	NA NA	NA NA	NA NA	< 2 < 1	< 2 < 1
Chrysene	5	-	NA	NA	NA	NA	NA	NA	< 0.1	< 0.1
Dibenz(a,h)anthracene Dibenzofuran	0.3 100	-	NA NA	NA NA	NA NA	NA NA	NA NA	NA NA	< 0.1 < 5	< 0.1 < 5
Diethyl phthalate	6,000	-	NA NA	NA NA	NA NA	NA NA	NA NA	NA NA	<2	< 2
Dimethyl phthalate	100	-	NA	NA	NA	NA	NA	NA	< 2	< 2
Di-n-butylphthalate Di-n-octylphthalate	700 100	-	NA NA	NA NA	NA NA	NA NA	NA NA	NA NA	< 2 < 2	< 2 < 2
Fluoranthene	300	-	NA	NA	NA	NA	NA	NA	< 0.1	< 0.1
Fluorene	300 0.02	-	NA NA	NA NA	NA NA	NA NA	NA NA	NA NA	< 0.1 < 0.02	< 0.1 < 0.02
Hexachlorobenzene Hexachlorobutadiene	0.02	-	NA NA	NA NA	NA NA	NA NA	NA NA	NA NA	< 0.02	< 0.02 < 1
Hexachlorocyclopentadiene	40	-	NA	NA	NA	NA	NA	NA	< 20	< 20
Hexachloroethane Indeno(1,2,3-cd)pyrene	7 0.2	-	NA NA	NA NA	NA NA	NA NA	NA NA	NA NA	< 2 < 0.1	< 2 < 0.1
Isophorone	40	-	NA NA	NA NA	NA	NA NA	NA NA	NA NA	< 2	< 2
Naphthalene	300	-	NA	NA NA	NA	NA NA	NA NA	NA	0.15	0.151
Nitrobenzene N-Nitroso-di-n-propylamine	6 10	-	NA NA	NA NA	NA NA	NA NA	NA NA	NA NA	< 2 < 2	< 2 < 2
N-Nitrosodiphenylamine	10	-	NA	NA	NA	NA	NA	NA	< 5	< 5
Phenanthrene Pyrene	100 200	-	NA NA	NA NA	NA NA	NA NA	NA NA	NA NA	0.136 < 0.1	0.14 < 0.1
Inorganics (µg/l)	200		NA.	ING.	NA.	ind	ind.	na na	V.1	
Aluminum	200	121,000	NA NA	NA NA	NA NA	NA NA	NA NA	NA NA	290	300
Antimony Arsenic	6	20.7 89.3	NA NA	NA NA	NA NA	NA NA	NA NA	NA NA	< 6 4.1	< 6 4.1
Barium	6,000	699	NA	NA	NA	NA	NA	NA .	< 200	< 200
Beryllium Cadmium	4	2.1 9.5	< 0.5 NA	2.85 NA	< 0.5 NA	2.81 NA	< 0.5 3.97	0.459 5.43	<1 <3	<1 <3
Calcium	NLE	45,400	NA	NA	NA	NA	NA	NA	13,300	13,800
Chromium	70	191	NA NA	NA NA	NA NA	NA NA	< 5	54.7	< 10	< 10
Cobalt Copper	100 1,300	18.3 65.6	NA NA	NA NA	NA NA	NA NA	51.2 NA	53.8 NA	< 50 < 10	< 50 < 10
Iron	300	431,000	NA	NA	NA	NA	NA	NA	8,220	8,710
Lead	5 NLE	22.7 62,700	< 5 NA	138 NA	< 5 NA	43.2 NA	2.81 NA	6.74 NA	3.5 5,190	3.7 5,570
Magnesium Manganese	50	331	NA NA	NA NA	NA NA	NA NA	NA NA	NA NA	5,190 172	180
Mercury	2	0.26	NA	NA	NA	NA	NA	NA	< 0.2	< 0.2
Nickel Potassium	100 NLE	187 137,000	NA NA	NA NA	NA NA	NA NA	NA NA	NA NA	16 < 10000	16.9 < 10000
Selenium	40	29.6	NA NA	NA NA	NA NA	NA NA	NA NA	NA NA	< 10000	< 10000
Silver	40	ND	NA	NA	NA	NA	NA	NA	< 10	< 10
Sodium Thallium	50,000	21,500 5.5	NA NA	NA NA	NA NA	NA NA	NA NA	NA NA	35,600 < 2	35,500 < 2
Vanadium	NLE	108	NA	NA	NA	NA	NA	NA	< 50	< 50
Zinc	2,000	233	NA	NA	NA	NA	NA	NA	125	130

PARCEL 57 GROUNDWATER SAMPLING RESULTS FORT MONMOUTH, NEW JERSEY

- 1) All historical data collected prior to 2013 are reported as provided by others.
- 2) Number of Analyses is the number of detected and non-detected results excluding rejected results. Sample duplicate pairs have not been averaged.
- 3) NLE = no limit established.
- 4) ND = not detected in any background sample, no background concentration available.
- 5) Chemical result qualifiers are assigned by the laboratory and is typically evaluated and modified (if necessary) by during data validation.

[blank] = detect, i.e. detected chemical result value.

J = estimated (detect or non-detect) value.

B = Compound detected in the sample and its associated blank sample.

E (or ER) = Estimated result.

R = Rejected, data validation rejected the results.

D = Results from dilution of sample.

U = non-detect, i.e. not detected equal to or above this value.

J-DL = Elevated sample detection limit due to difficult sample

U-DL = Elevated sample detection limit due to difficult sample matrix.

JN = Tentatively identified compound, estimated concentration

U-ND = Analyte not detected in sample, but no detection or reporting limit provided.

- 6) Chemical results greater than or equal to the action level (depending on criteria) are highlighted based on the Criteria that are present.
- Cell Shade values represent a result that is above the NJ Ground Water Quality Criteria

NJDEP Interim Specific GWQC values are presented for the NJ GWQS where there is not a Specific Ground Water Quality Criteria. A full list of compounds is NJDEP Interim Generic GWQC values are presented for the NJ GWQS where there is not a XXXXX or a NJDEP Interim Specific GWQC. Available at

- Cell Style values represent a result that is above the Weston 1995 Background (Main Post).

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n/a = all concentrations were less than the detection limit, therefore, no location of maximum value identified. Dash (-) = only background concentrations for metals are being used as comparison criteria.

- 7) Criteria action level source document and web address.
- The NJ Ground Water Quality Criteria refers to the NJDEP Groundwater Quality Standards Adopted July 22, 2010 http://www.state.nj.us/dep/wms/bwqsa/docs/njac79C.pdf
- The Weston 1995 Background (Main Post) refers to the FTMM reports.

PARCEL 57 SOIL SAMPLING RESULTS FORT MONMOUTH, NEW JERSEY

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Loc ID	NJ Non- Residential	NJ Residential Direct Contact	NJ Impact to GW Soil	Weston 1995 Background	P57-	-A1-A	P57-	-C5-A	P57-A1-A	P57-A1-B	P57-A1-C	P57-A1-D	P57-A1-E
Sample ID	Direct Contact	SRS	Screening	(Main Post)	P57-SS-P57-A1-A-1.0-1.5	P57-SS-P57-A1-A-1.5-2.0	P57-SS-P57-C5-A-1.0-1.5	P57-SS-P57-C5-A-1.5-2.0	P57-SS-A1-A-6.5-7.0	P57-SS-A1-B-6.5-7.0	P57-SS-A1-C-8.0-8.5	P57-SS-A1-D-6.0-6.5	P57-SS-A1-E-5.5-6.0
Sample Date	SRS		Level		2/1/2010	2/1/2010	2/1/2010	2/1/2010	11/22/2010	11/22/2010	11/22/2010	11/22/2010	11/22/2010
Semivolatile Organic Compounds (mg/kg)		•											
1,2,4-Trichlorobenzene	820	73	0.7	-	NA	NA	NA	NA	< 0.62	< 0.62	< 0.65	< 0.63	< 0.65
1,2-Dichlorobenzene	59,000	5,300	17	-	NA	NA	NA	NA	< 0.62	< 0.62	< 0.65	< 0.63	< 0.65
1,3-Dichlorobenzene	59,000	5,300	19	-	NA	NA	NA	NA	< 0.62	< 0.62	< 0.65	< 0.63	< 0.65
1,4-Dichlorobenzene	13	5	2	-	NA	NA	NA	NA	< 0.62	< 0.62	< 0.65	< 0.63	< 0.65
2,4-Dinitrotoluene	3	0.7	NLE	-	NA	NA	NA	NA	< 0.62	< 0.62	< 0.65	< 0.63	< 0.65
2,6-Dinitrotoluene	3	0.7	NLE	-	NA	NA	NA	NA	< 0.62	< 0.62	< 0.65	< 0.63	< 0.65
2-Chloronaphthalene	NLE	NLE	NLE	-	NA	NA	NA	NA	< 0.62	< 0.62	< 0.65	< 0.63	< 0.65
2-Methylnaphthalene	2,400	230	8	-	1.45	< 0.54	< 0.57	< 0.54	< 0.62	< 0.62	< 0.65	< 0.63	< 0.65
2-Nitroaniline	23,000	39	NLE	-	NA	NA	NA	NA	< 0.62	< 0.62	< 0.65	< 0.63	< 0.65
3,3'-Dichlorobenzidine	4	1	0.2	-	NA	NA	NA	NA	< 0.62	< 0.62	< 0.65	< 0.63	< 0.65
3-Nitroaniline	NLE	NLE	NLE	-	NA	NA	NA	NA	< 1.24	< 1.24	< 1.31	< 1.25	< 1.30
4-Bromophenyl phenyl ether	NLE	NLE	NLE	-	NA	NA	NA	NA	< 0.62	< 0.62	< 0.65	< 0.63	< 0.65
4-Chloroaniline	NLE	NLE	NLE	-	NA	NA	NA	NA	< 0.62	< 0.62	< 0.65	< 0.63	< 0.65
4-Chlorophenyl phenyl ether	NLE	NLE	NLE	-	NA	NA	NA	NA	< 0.62	< 0.62	< 0.65	< 0.63	< 0.65
4-Nitroaniline	NLE	NLE	NLE	-	NA	NA	NA 0.55	NA	< 0.62	< 0.62	< 0.65	< 0.63	< 0.65
Acenaphthene	37,000	3,400	110	-	< 0.55	< 0.54	< 0.57	< 0.54	< 0.62	< 0.62	< 0.65	< 0.63	< 0.65
Acenaphthylene	300,000	NLE	NLE	-	< 0.55	< 0.54	< 0.57	< 0.54	< 0.62	< 0.62	< 0.65	< 0.63	< 0.65
Aniline	NLE	NLE	NLE 2.400	-	NA 10.55	NA 10.54	NA . 0.57	NA O 5 4	< 0.62	< 0.62	< 0.65	< 0.63	< 0.65
Anthracene	30,000	17,000	2,400	-	< 0.55	< 0.54	< 0.57	< 0.54	< 0.62	< 0.62	< 0.65	< 0.63	< 0.65
Azobenzene Benzidine	NLE 0.7	NLE	NLE	-	NA NA	NA NA	NA NA	NA NA	< 0.62	< 0.62	< 0.65	< 0.63 < 1.25	< 0.65
	0.7	0.7	0.7	-	0.72	< 0.54	NA < 0.57	NA < 0.54	< 1.24 < 0.62	< 1.24 < 0.62	< 1.31 < 0.65	< 0.63	< 1.30 < 0.65
Benzo(a)anthracene Benzo(a)pyrene	0.2	0.6	0.8	-	0.72	< 0.54	< 0.57	< 0.54	< 0.62	< 0.62	< 0.65	< 0.63	< 0.65
Benzo(b)fluoranthene	2	0.2	2.	-	1.54	< 0.54	< 0.57	< 0.54	< 0.62	< 0.62	< 0.65	< 0.63	< 0.65
Benzo(ghi)perylene	30.000	380.000	NLE	-	NA J	< 0.54	< 0.57	< 0.54	< 0.62	< 0.62	< 0.65	< 0.63	< 0.65
Benzo(k)fluoranthene	23	6	25	-	NA J	< 0.54	< 0.57	< 0.54	< 0.62	< 0.62	< 0.65	< 0.63	< 0.65
Benzyl alcohol	NLE	NLE	NLE	-	NA	NA	NA	NA	< 0.62	< 0.62	< 0.65	< 0.63	< 0.65
Bis(2-Chloroethoxy)methane	NLE	NLE	NLE	_	NA	NA	NA	NA	< 0.62	< 0.62	< 0.65	< 0.63	< 0.65
Bis(2-Chloroethyl)ether	2	0.4	0.2	-	NA	NA	NA	NA	< 0.62	< 0.62	< 0.65	< 0.63	< 0.65
Bis(2-Chloroisopropyl)ether	67	23	5	-	NA	NA	NA	NA	< 0.62	< 0.62	< 0.65	< 0.63	< 0.65
Bis(2-Ethylhexyl)phthalate	140	35	1,200	-	NA	NA	NA	NA	< 0.62	< 0.62	< 0.65	< 0.63	< 0.65
Butyl benzyl phthalate	14,000	1,200	230	-	NA	NA	NA	NA	< 0.62	< 0.62	< 0.65	< 0.63	< 0.65
Chrysene	230	62	80	-	0.95	< 0.54	< 0.57	< 0.54	< 0.62	< 0.62	< 0.65	< 0.63	< 0.65
Dibenz(a,h)anthracene	0.2	0.2	0.8	-	< 0.55	< 0.54	< 0.57	< 0.54	< 0.62	< 0.62	< 0.65	< 0.63	< 0.65
Dibenzofuran	NLE	NLE	NLE	-	NA	NA	NA	NA	< 0.62	< 0.62	< 0.65	< 0.63	< 0.65
Diethyl phthalate	550,000	49,000	88	-	NA	NA	NA	NA	< 0.62	< 0.62	< 0.65	< 0.63	< 0.65
Dimethyl phthalate	NLE	NLE	NLE	-	NA	NA	NA	NA	< 0.62	< 0.62	< 0.65	< 0.63	< 0.65
Di-n-butylphthalate	68,000	6,100	760	-	NA	NA	NA	NA	< 0.62	< 0.62	< 0.65	< 0.63	< 0.65
Di-n-octylphthalate	27,000	2,400	3,300	-	NA 116	NA . 0.54	NA	NA . o. s. a	< 0.62	< 0.62	< 0.65	< 0.63	< 0.65
Fluoranthene	24,000	2,300	1,300	-	1.16	< 0.54	< 0.57	< 0.54	< 0.62	< 0.62	< 0.65	< 0.63	< 0.65
Fluorene	24,000	2,300 0.3	170	-	0.55	< 0.54 NA	< 0.57	< 0.54 NA	< 0.62	< 0.62 < 0.62	< 0.65 < 0.65	< 0.63 < 0.63	< 0.65 < 0.65
Hexachlorobenzene Hexachlorobutadiene	25	6.5	0.2	-	NA NA	NA NA	NA NA	NA NA	< 0.62 < 0.62	< 0.62	< 0.65	< 0.63	< 0.65
	110	45	320	-	NA NA	NA NA	NA NA	NA NA	< 0.62	< 0.62	< 0.65	< 0.63	< 0.65
Hexachlorocyclopentadiene Hexachloroethane	140	35	0.2	-	NA NA	NA NA	NA NA	NA NA	< 0.62	< 0.62	< 0.65	< 0.63	< 0.65
Indeno(1,2,3-cd)pyrene	2	0.6	7	-	NA J	< 0.54	< 0.57	< 0.54	< 0.62	< 0.62	< 0.65	< 0.63	< 0.65
Isophorone	2,000	510	0.2	-	NA NA	NA	NA	NA	< 0.62	< 0.62	< 0.65	< 0.63	< 0.65
Naphthalene	17	6	25	-	0.99	< 0.54	< 0.57	< 0.54	< 0.62	< 0.62	< 0.65	< 0.63	< 0.65
Nitrobenzene	340	31	0.2	-	NA	NA	NA	NA	< 0.62	< 0.62	< 0.65	< 0.63	< 0.65
N-Nitrosodimethylamine	0.7	0.7	0.7	-	NA	NA	NA	NA NA	< 0.62	< 0.62	< 0.65	< 0.63	< 0.65
N-Nitroso-di-n-propylamine	0.3	0.2	0.2	-	NA	NA	NA	NA	< 0.62	< 0.62	< 0.65	< 0.63	< 0.65
N-Nitrosodiphenylamine	390	99	0.4	-	NA	NA	NA	NA	< 0.62	< 0.62	< 0.65	< 0.63	< 0.65
Phenanthrene	300,000	NLE	NLE	-	0.9	< 0.54	< 0.57	0.49 J	< 0.62	< 0.62	< 0.65	< 0.63	< 0.65
Pyrene	18,000	1,700	840	-	1.37	< 0.54	< 0.57	0.83	< 0.62	< 0.62	< 0.65	< 0.63	< 0.65
TIC SVOCs (mg/kg)													
Total TIC, Semi-Volatile	NLE	NLE	NLE	-	83.6 J	59.77 J	41.69 J	116.7 J	97.4 J	114 J	91 J	110 J	99 J
•	•	•	•		·			•			•		

PARCEL 57 SOIL SAMPLING RESULTS FORT MONMOUTH, NEW JERSEY

Footnote:

- 1) All historical data collected prior to 2013 are reported as provided by others.
- 2) Number of Analyses is the number of detected and non-detected results excluding rejected results. Sample duplicate pairs have not been averaged.
- 3) NLE = no limit established.
- 4) ND = not detected in any background sample, no background concentration available.
- 5) Chemical result qualifiers are assigned by the laboratory and is typically evaluated and modified (if necessary) by during data validation.

[blank] = detect, i.e. detected chemical result value.

J = estimated (detect or non-detect) value.

B = Compound detected in the sample and its associated blank sample.

 $E ext{ (or ER)} = Estimated result.$

R = Rejected, data validation rejected the results.

D = Results from dilution of sample.

U = non-detect, i.e. not detected equal to or above this value.

J-DL = Elevated sample detection limit due to difficult sample

U-DL = Elevated sample detection limit due to difficult sample matrix.

JN = Tentatively identified compound, estimated concentration

U-ND = Analyte not detected in sample, but no detection or reporting limit provided.

- 6) Chemical results greater than or equal to the action level (depending on criteria) are highlighted based on the Criteria that are present.
- Cell Shade values represent a result that is above the NJ Non-Residential Direct Contact Soil Remediation Standard.
- Cell Shade values represent a result that is above the NJ Residential Direct Contact Soil Remediation Standard.
- Cell Shade values represent a result that is above the NJ Impact to GW Soil Screening Level
- Cell Style values represent a result that is above the Weston 1995 Background (Main Post).
 n/a = all concentrations were less than the detection limit, therefore, no location of maximum value identified.
 Dash (-) = only background concentrations for metals are being used as comparison criteria.
- Cell Shade values represent a result that is above both the NJ Residential, Non-Residential, AND NJ Impact to GW Soil Screening Level Direct
- Cell Shade values represent a result that is above both the NJ Residential and Non-Residential Direct Contact Soil Remediation Standard.



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7) Criteria action level source document and web address.

- The NJ Non-Residential Direct Contact Soil Remediation Standard refers to the NJDEP's May 7, 2012 Remediation Standards. http://www.nj.gov/dep/rules/njac7_26d.pdf
- The NJ Residential Direct Contact Soil Remediation Standard refers to the NJDEP's May 7, 2012 Remediation Standards http://www.nj.gov/dep/rules/njac7_26d.pdf
- The NJ Impact to GW Soil Screening Level criteria refers to the Development of Site Specific Impact to Ground Water Soil Remediation Standards Nov 2013 http://www.nj.gov/dep/srp/guidance/rs/partition_equation.pdf
- The Weston 1995 Background (Main Post) refers to the FTMM reports.

NA

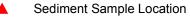
APPENDIX C

Historical Information for Parcel 61

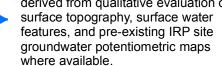


LEGEND

Surface Soil Sample Location



Generalized Groundwater Flow Direction. Direction of Generalized Groundwater Flow derived from qualitative evaluation of





Installation Boundary

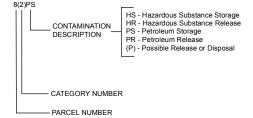
ECP PARCEL CATEGORY DEFINITIONS



Areas that are not evaluated or require additional evaluation.

* Parcel not included in Site Investigation. Information pertaining to parcels not included in this Site Investigation is presented in the Fort Monmouth Phase I ECP Report (January 2007).

BRAC PARCEL LABEL DEFINITIONS



** Depth is from surface of paved area; soil collected from below subbase.





Base Realignment and Closure 2005





Shaw Environmental, Inc.

FIGURE 3.15-1

FORT MONMOUTH ECP SITE INVESTIGATION

PARCEL 61 SAMPLE LOCATIONS AND CONSTITUENTS OF CONCERN

> MAIN POST FORT MONMOUTH **NEW JERSEY**

gs 15.1 Si 1961 Exceeds Samples mxd (7/14/2008 12:55:24 PM)
Contract Number W912DY-09-D-0062, Task Order 0012

Table 3.15-3 Fort Monmouth Phase II Site Investigation, Parcel 61 Summary of Analytical Parameters Detected in Soil (mg/kg)

				Analytica	al Results	
		Sample ID:	P61-SS1	P61-SS2	P61-SS3	P61-SS4
		Lab ID:	7055205	7055206	7055207	7055208
		Date Sampled:	12/20/2007	12/20/2007	12/20/2007	12/20/2007
		Depth (ft. bgs):	1.5-2.0	1.5-2.0	1.5-2.0	1.5-2.0
Chemical	NRDCSCC ²	IGWSCC ³	Result	Result	Result	Result
Semi-Volatiles						
Acenaphthene	10000	100	2.300	1.100 U	1.100 U	1.200 U
Anthracene	10000	100	2.500	1.100 U	1.100 U	1.200 U
Benzo[a]anthracene	4	500	4.600	1.100 U	1.100 U	1.200 U
Benzo[a]pyrene	0.66	100	3.700	1.100 U	1.100 U	1.200 U
Benzo[b]fluoranthene	4	50	5.800	1.100 U	1.100 U	1.200 U
Benzo[g,h,i]perylene	NLE	NLE	1.100 J	1.100 U	1.100 U	1.200 U
Benzo[k]fluoranthene	4	500	2.200	1.100 U	1.100 U	1.200 U
Butyl benzyl phthalate	10000	100	1.100 U	1.100 U	1.100 U	0.300 J
Chrysene	40	500	5.000	1.100 U	1.100 U	1.200 U
Dibenzofuran	NLE	NLE	1.200	1.100 U	1.100 U	1.200 U
Di-n-butylphthalate	10000	100	0.082 JB	0.093 JB	0.110 JB	0.250 JB
bis(2-Ethylhexyl)phthalate	210	100	0.270 J	1.100 U	0.130 J	1.300
Fluoranthene	10000	100	13.000	1.100 U	1.100 U	0.085 J
Fluorene	10000	100	1.600	1.100 U	1.100 U	1.200 U
Indeno[1,2,3-cd]pyrene	4	500	1.100 J	1.100 U	1.100 U	1.200 U
2-Methylnaphthalene	NLE	NLE	0.540 J	1.100 U	1.100 U	1.200 U
Naphthalene	4200	100	1.200	1.100 U	1.100 U	1.200 U
Phenanthrene	NLE	NLE	14.000 E	1.100 U	1.100 U	1.200 U
Pyrene	10000	100	12.000	1.100 U	1.100 U	0.094 J
Metals						
Aluminum	NLE	NLE	10100 B	10400 B	9320 B	10700 B
Arsenic	20	NLE	7.40	5.31	4.24	15.8
Barium	47000	NLE	26.7 B	20.2 B	23.2 B	148 B
Beryllium	140	NLE	0.972	0.558	0.574	0.849
Cadmium	100	NLE	0.546	0.237	0.0446	0.900
Calcium	NLE	NLE	1410 B	4290 B	550 B	2850 B
Chromium (Total)	NLE	NLE	73.6 B	54.2 B	84.7 B	73.3 B
Cobalt	NLE	NLE	2.45	3.15	1.07	0.755
Copper	45000	NLE	32.4 B	22.5 B	5.96 B	81.8 B
Iron	NLE	NLE	29300 B	28800 B	18000 B	36200 B
Lead	800	NLE	33.3	3.75	1.90	14.6
Magnesium	NLE	NLE	3110	3220	1450	2980
Manganese	NLE	NLE	84.5 B	112 B	55.6 B	118 B
Mercury	270	NLE	0.61	0.103 U	0.104 U	0.20
Nickel (Soluble Salts)	2400	NLE	6.50	10.7	4.01	6.47
Potassium	NLE	NLE	6140 B	2910 B	3270 B	4660 B
Vanadium	7100	NLE	52.6	76.2	78.3	61.7
Zinc	1500	NLE	74.7 B	44.4 B	25.4 B	290 B

¹ NJDEP Residential Direct Contact Soil Cleanup Criteria per NJAC 7:26D, 1999. Beryllium, Copper and Lead criteria per NJAC 7:26D, 2008.

DUP = Duplicate Sample.

ft. bgs = Feet below ground surface.

B = The compound was found in the associated method blank as well as in the sample.

D = Sample was diluted.

E = The compound's concentration exceeds the calibration range of the instrument for that specific analysis.

J = Mass spec and retention time data indicate the presence of a compound however the result is less than the MDL but greater than zero.

U = The compound was analyzed for but not detected.

NT = Not tested.

NLE = No limit established.

mg/kg = milligram per kilogram.

Bold = Analyte was detected.

Shaded = Concentration exceeds level of concern.

(Surface soil compared to NRDCSCC. Subsurface soil compared to IGWSCC when available, otherwise compared to NRDCSCC).

² NJDEP Non-Residential Direct Contact Soil Cleanup Criteria per NJAC 7:26D, 1999. Beryllium, Copper and Lead criteria per NJAC 7:26D, 2008.

 $^{^{\}rm 3}$ NJDEP Impact to Groundwater Soil Cleanup Criteria per NJAC 7:26D, 1999.

Table 3.15-4 Fort Monmouth Phase II Site Investigation, Parcel 61 Summary of Analytical Parameters Detected in Sediment (mg/kg)

			Analytical Results						
		Sample ID:	P61-SD1	P61-SD1D	P61-SD2	P61-SD2D			
		Lab ID:	7055201	7055202	7055203	7055204			
	Dat	e Sampled:	12/20/2007	12/20/2007	12/20/2007	12/20/2007			
		oth (ft. bgs):	0.0-0.5	1.0-1.5	0.0-0.5	1.0-1.5			
Chemical	ER-L ¹	ER-M ²	Result	Result	Result	Result			
Volatiles									
Toluene	NLE	NLE	0.290 U	0.095 J	0.340 U	0.340 U			
Semi-Volatiles									
Acenaphthene	0.016	0.500	1.200 U	0.210 J	1.600	7.600			
Anthracene	0.085	1.1	0.160 J	0.800 J	0.290 J	0.340 J			
Benzo[a]anthracene	0.261	1.6	0.490 J	2.000	0.740 J	0.660 J			
Benzo[a]pyrene	0.430	1.6	0.430 J	1.800	0.650 J	0.580 J			
Benzo[b]fluoranthene	NLE	NLE	0.990 J	3.000	1.000 J	0.880 J			
Benzo[k]fluoranthene	0.240	NLE	1.200 U	1.300 U	0.380 J	0.310 J			
bis(2-Ethylhexyl)phthalate	NLE	NLE	0.380 J	1.300 U	0.460 J	0.370 J			
Chrysene	0.384	2.8	0.710 J	2.600	0.920 J	0.790 J			
Dibenzofuran	NLE	NLE	1.200 U	1.300 U	1.400 U	0.420 J			
Di-n-butylphthalate	NLE	NLE	0.280 JB	1.300 U	0.320 JB	1.400 U			
Fluoranthene	0.600	5.1	1.300	4.500	1.700	1.700			
Fluorene	0.019	0.54	1.200 U	0.560 J	0.140 J	0.200 J			
4-Methylphenol	NLE	NLE	1.200 U	1.300	1.400 U	1.400 U			
Naphthalene	0.16	2.1	1.200 U	0.280 J	1.400 U	1.400 U			
Phenanthrene	0.240	1.5	0.680 J	1.500	1.200 J	1.100 J			
Pyrene	0.665	2.6	1.500	7.200	2.200	1.800			
Metals									
Aluminum	NLE	NLE	4390 B	9740 B	10000 B	3400 B			
Arsenic	8.2	70	1.77	14.1	13.3	3.03			
Barium	NLE	NLE	27.2 B	55.3 B	17.2 B	11.0 B			
Beryllium	NLE	NLE	0.662	1.11	1.19	0.498			
Cadmium	1.2	9.6	0.221	0.847	0.274	0.133			
Calcium	NLE	NLE	553 B	938 B	1180 B	1170 B			
Chromium (Total)	81	370	39.9 B	54.6 B	86.0 B	27.6 B			
Cobalt	NLE	NLE	0.903	4.97	1.98	1.35			
Copper	34	270	12.0 B	48.7 B	13.0 B	31.6 B			
Iron	NLE	NLE	13000 B	20400 B	32300 B	13000 B			
Lead	47	218	33.0	114	12.4	17.6			
Magnesium	NLE	NLE	1820	2140	3910	1190			
Manganese	NLE	NLE	13.0 B	29.8 B	62.6 B	40.9 B			
Mercury	0.15	0.71	0.118 U	0.13	0.130 U	0.134 U			
Nickel (Soluble Salts)	21	52	3.59	14.4	9.41	4.73			
Potassium	NLE	NLE	4050 B	3980 B	6470 B	1970 B			
Vanadium	NLE	NLE	24.8	41.7	49.9	20.7			
Zinc	150	410	58.4 B	127 B	63.4 B	63.6 B			

¹ NJDEP Marine/Estuarine Sediment Screening Guidelines, Effects Range - Low, 1998.

DUP = Duplicate Sample.

ft. bgs = Feet below ground surface.

B = The compound was found in the associated method blank as well as in the sample.

D = Sample was diluted.

NT = Not tested.

NLE = No limit established.

Bold = Analyte detected.

mg/kg = milligram per kilogram.

Shaded = Concentration exceeds LEL.

 $^{^{2}\,}$ NJDEP Marine/Estuarine Sediment Screening Guidelines, Effects Range - Medium, 1998.

E = The compound's concentration exceeds the calibration range of the instrument for that specific analysis.

J = Mass spec and retention time data indicate the presence of a compound however the result is less than the MDL but greater than zero.

U = The compound was analyzed for but not detected.

APPENDIX C

Historical Information for Parcel 69

Final, Revision 1 Appendix C Historical Information **LEGEND** Concentratio Criteria Value Compound Criteria Geoprobe Soil Sample Location bgs) (mg/kg) (mg/kg) Geoprobe Soil & Groundwater Sample Location Acenaphthene 1.200 . ER-L/ER-M P69SD-2A SD 0.0-0.5 Fluoranthene 2.800 J ER-L/ER-M 0.600/5.1 Sediment Sample Location ER-L/ER-M P69SD-2A SD 0.0-0.5 Pyrene 3.100 J 0.665/2.6 Direction of Generalized Groundwater Flow ER-L/ER-M P69SD-2A SD 0.0-0.5 Arsenic 36.2 8.2/70 derived from qualitative evaluation of surface P69SD-2A SD Cadmium 14.1 1.2/9.6 topography, surface water features, and pre-existing IRP site groundwater 345 P69SD-2A SD 0.0-0.5 Chromium ER-L/ER-M 81/370 203 B P69SD-2A SD 0.0-0.5 Copper ER-L/ER-M 34/270 potentiometric maps where available. SD Lead 410 B ER-L/ER-M 47/218 Silver 9 99 FR-I /FR-M 1/3.7 Building SD 515 B ER-L/ER-M 150/410 P69SD-2B SD Zinc 176 B ER-L/ER-M 150/410 IRP Site Boundary Installation Boundary P69SD-2 OCEANPORT CREEK **ECP PARCEL CATEGORY DEFINITIONS** Areas that are not evaluated or require additional evaluation. **BRAC PARCEL LABEL DEFINITIONS** HS - Hazardous Substance Storage CONTAMINATION HR - Hazardous Substance Release PS - Petroleum Storage PR - Petroleum Release (P) - Possible Release or Disposal DESCRIPTION - CATEGORY NUMBER Criteria Valu Depth (ft Concentration Sample ID Criteria Compound PARCEL NUMBER bgs) (mg/kg) (mg/kg) 0.500 J ER-L/ER-M 0.016/.0500 P69SD-1A SD 0.0-0.5 Acenaphthene SD Phenanthrene 0.650 J 0.240/1.5 P69SD-1B 0.190 J 0.085/1.1 Anthracene 977 SD 1.5-2.0 ER-L/ER-M P69SD-1B 1.000 J 0.384/2.8 Chrysene SD 1.5-2.0 ER-L/ER-M P69SD-1B Phenanthrene 0.730 J 0.240/1.5 SD 1.5-2.0 ER-L/ER-M P69SD-1B 2.200 J 0.665/2.6 Pyrene ER-L/ER-M SCALE: 69(7)HS(P)/HR(P)/PS/PR 150 300 Base Realignment and Closure 2005 P69SS/SB/GW-4 Shaw Shaw Environmental, Inc. FIGURE 3.16-1 FORT MONMOUTH ECP SITE INVESTIGATION PARCEL 69 SAMPLE LOCATIONS AND CONSTITUENTS OF CONCERN Concentration Criteria Value Media Criteria Sample ID Compound (ug/L) (ug/L) bgs) MAIN POST P69GW-

FORT MONMOUTH

NEW JERSEY

Contract Number W912DY-09-D-0062, Task Order 0012

NJ GWQC

PCE

DUP

DUP

DUP

DUP

DUP

Table 3.16-3
Fort Monmouth Phase II Site Investigation, Parcel 69
Summary of Analytical Parameters Detected in Soil (mg/kg)

								Analytic	cal Results					
		Sample ID:	P69SB-1A	P69SB-1B	P69SB-1C	P69SB-1C	P69SB-2A	P69SB-2B	P69SB-2C	P69SB-2C	P69SB-3A	P69SB-3B	P69SB-3C	P69SB-3C
		Lab ID:	7048003	7053903	7048005	7053904	7048006	7053905	7048008	7053906	7048009	7053907	7048011	7053908
		Date Sampled:	11/20/2007	12/17/2007	11/20/2007	12/17/2007	11/20/2007	12/17/2007	11/20/2007	12/17/2007	11/20/2007	12/17/2007	11/20/2007	12/17/2007
		Depth (ft. bgs):	0.5-1.0	1.5-2.0	7.0-7.5	7.0-7.5	0.5-1.0	1.5-2.0	7.0-7.5	7.0-7.5	0.5-1.0	1.5-2.0	3.5-4.0	3.5-4.0
Chemical	NRDCSCC ²	IGWSCC ³	Result	Result	Result		Result	Result	Result		Result	Result	Result	Result
Volatiles														
Acetone	1000	100	NT	0.410 B	NT	0.380	NT	0.590	NT	0.830	NT	0.860	NT	0.870
Methylene Chloride	210	1	NT	0.250 U	NT	0.270 U	NT	0.250 U	NT	0.260 U	NT	0.250 U	NT	0.250 U
Semi-Volatiles														
Diethyl phthalate	10000	50	1.000 U	NT	0.039 JB	NT	1.100 U	NT	1.100 U	NT	1.000 U	NT	1.100 U	NT
Di-n-butylphthalate	10000	100	1.100 B	NT	0.670 JB	NT	1.000 JB	NT	0.750 JB	NT	0.420 JB	NT	1.800 B	NT
Fluoranthene	10000	100	1.000 U	NT	1.100 U	NT	1.100 U	NT	1.100 U	NT	0.094 J	NT	1.100 U	NT
Phenanthrene	NLE	NLE	1.000 U	NT	1.100 U	NT	1.100 U	NT	1.100 U	NT	0.080 J	NT	1.100 U	NT
Pyrene	10000	100	1.000 U	NT	1.100 U	NT	1.100 U	NT	1.100 U	NT	0.170 J	NT	1.100 U	NT
Metals														
Aluminum	NLE	NLE	6760 B	NT	7300 B	NT	7890 B	NT	9440 B	NT	7880 B	NT	7170 B	NT
Arsenic	20	NLE	2.09	NT	0.586 U	NT	2.49	NT	1.98	NT	2.14	NT	1.09	NT
Barium	47000	NLE	23.0 B	NT	11.9 B	NT	21.5 B	NT	14.1 B	NT	28.0 B	NT	20.4 B	NT
Beryllium	2	NLE	0.768	NT	0.520	NT	0.827	NT	0.448	NT	0.885	NT	0.846	NT
Calcium	NLE	NLE	1230	NT	287	NT	1070	NT	247	NT	1420	NT	805	NT
Chromium (Total)	NLE	NLE	46.9	NT	55.8	NT	56.5	NT	44.1	NT	60.0	NT	56.2	NT
Cobalt	NLE	NLE	0.497	NT	0.536	NT	0.919	NT	0.352 U	NT	0.947	NT	0.690	NT
Copper	600	NLE	6.49 B	NT	7.33 B	NT	15.4 B	NT	6.41 B	NT	11.6 B	NT	7.12 B	NT
Iron	NLE	NLE	18600	NT	16500	NT	24700	NT	17600	NT	25100	NT	23600	NT
Lead	600	NLE	8.98 B	NT	5.58 B	NT	9.68 B	NT	4.20 B	NT	21.8 B	NT	11.1 B	NT
Magnesium	NLE	NLE	2200	NT	1910	NT	2960	NT	1650	NT	2960	NT	2580	NT
Manganese	NLE	NLE	36.7	NT	22.2	NT	43.8	NT	32.9	NT	46.2	NT	30.7	NT
Mercury	270	NLE	0.107 U	NT	0.102 U	NT	0.095 U	NT	0.107 U	NT	0.103 U	NT	0.096 U	NT
Nickel (Soluble Salts)	2400	NLE	4.50	NT	5.27	NT	4.96	NT	4.21	NT	5.16	NT	4.13	NT
Potassium	NLE	NLE	3320	NT	3660	NT	4780	NT	2620	NT	5400	NT	4800	NT
Vanadium	7100	NLE	31.3	NT	37.9	NT	37.1	NT	37.0	NT	37.8	NT	37.6	NT
Zinc	1500	NLE	45.3 B	NT	42.8 B	NT	42.5 B	NT	34.5 B	NT	74.9 B	NT	43.7 B	NT

¹ NJDEP Residential Direct Contact Soil Cleanup Criteria per NJAC 7:26D.

ft. bgs = Feet below ground surface.

B = The compound was found in the associated method blank as well as in the sample.

D = Sample was diluted.

E = The compound's concentration exceeds the calibration range of the instrument for that specific analysis.

J = Mass spec and retention time data indicate the presence of a compound however the result is less than the MDL but greater than zero.

U = The compound was analyzed for but not detected.

NT = Not tested.

NLE = No limit established.

mg/kg = milligram per kilogram.

Bold = Analyte was detected.

Shaded = Concentration exceeds level of concern. (Surface soil compared to NRDCSCC. Subsurface soil compared to IGWSCC when available, otherwise compared to NRDCSCC).

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 $^{^{2}\,}$ NJDEP Non-Residential Direct Contact Soil Cleanup Criteria per NJAC 7:26D.

³ NJDEP Impact to Groundwater Soil Cleanup Criteria per NJAC 7:26D.

Table 3.16-3
Fort Monmouth Phase II Site Investigation, Parcel 69
Summary of Analytical Parameters Detected in Soil (mg/kg)

					Analyitica	al Results		
		Sample ID:	P69SB-4A	P69SB-4B	P69SB-4C	P69SB-4C	P69SB-4C DUP	P69SB-4C DUP
		Lab ID:	7048012	7053909	7048014	7053910	7048002	7053902
		Date Sampled:	11/20/2007	12/17/2007	11/20/2007	12/17/2007	11/20/2007	12/17/2007
		Depth (ft. bgs):	0.5-1.0	1.5-2.0	8.5-9.0	8.5-9.0	8.5-9.0	8.5-9.0
Chemical	NRDCSCC ²	IGWSCC ³	Result	Result	Result	Result	Result	Result
Volatiles								
Acetone	1000	100	NT	2.300 B	NT	2.800 B	NT	0.300 B
Methylene Chloride	210	1	NT	0.082 JB	NT	0.110 JB	NT	0.280 U
Semi-Volatiles								
Diethyl phthalate	10000	50	1.100 U	NT	1.200 U	NT	1.200 U	NT
Di-n-butylphthalate	10000	100	0.730 JB	NT	0.360 JB	NT	0.750 JB	NT
Fluoranthene	10000	100	1.100 U	NT	1.200 U	NT	1.200 U	NT
Phenanthrene	NLE	NLE	1.100 U	NT	1.200 U	NT	1.200 U	NT
Pyrene	10000	100	1.100 U	NT	1.200 U	NT	1.200 U	NT
Metals								
Aluminum	NLE	NLE	9190 B	NT	21600 B	NT	16700 B	NT
Arsenic	20	NLE	4.09	NT	5.17	NT	5.25	NT
Barium	47000	NLE	30.6 B	NT	51.3 B	NT	35.1 B	NT
Beryllium	140	NLE	0.796	NT	0.714	NT	0.608	NT
Calcium	NLE	NLE	1300	NT	795	NT	473	NT
Chromium	NLE	NLE	46.8	NT	59.4	NT	53.5	NT
Cobalt	NLE	NLE	0.837	NT	0.718	NT	0.882	NT
Copper	45000	NLE	46.8 B	NT	10.0 B	NT	10.2 B	NT
Iron	NLE	NLE	18100	NT	17800	NT	18300	NT
Lead	800	NLE	23.0 B	NT	6.69 B	NT	6.69 B	NT
Magnesium	NLE	NLE	2490	NT	2750	NT	2470	NT
Manganese	NLE	NLE	69.5	NT	88.2	NT	60.5	NT
Mercury	270	NLE	0.51	NT	0.115 U	NT	0.106 U	NT
Nickel	2400	NLE	5.52	NT	9.62	NT	9.46	NT
Potassium	NLE	NLE	3300	NT	3440	NT	2420	NT
Vanadium	7100	NLE	32.0	NT	50.0	NT	46.7	NT
Zinc	1500	NLE	55.9 B	NT	45.2 B	NT	45.9 B	NT

¹ NJDEP Residential Direct Contact Soil Cleanup Criteria per NJAC 7:26D, 1999. Beryllium, Copper and Lead criteria per NJAC 7:26D, 2008.

ft. bgs = Feet below ground surface.

B = The compound was found in the associated method blank as well as in the sample.

D = Sample was diluted.

E = The compound's concentration exceeds the calibration range of the instrument for that specific analysis.

J = Mass spec and retention time data indicate the presence of a compound however the result is less than the MDL but greater than zero.

U = The compound was analyzed for but not detected.

NT = Not tested.

NLE = No limit established.

mg/kg = milligram per kilogram.

Bold = Analyte was detected.

Shaded = Concentration exceeds level of concern. (Surface soil compared to NRDCSCC). Subsurface soil compared to IGWSCC when available, otherwise compared to NRDCSCC).

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² NJDEP Non-Residential Direct Contact Soil Cleanup Criteria per NJAC 7:26D, 1999. Beryllium, Copper and Lead criteria per NJAC 7:26D, 2008.

³ NJDEP Impact to Groundwater Soil Cleanup Criteria per NJAC 7:26D, 1999.

Table 3.16-4 Fort Monmouth Phase II Site Investigation, Parcel 69 Summary of Analytical Parameters Detected in Groundwater (μg/L)

			Analytical Results	
	Sample ID:	P69GW-1	P69GW-1 DUP	P69GW-4
	Lab ID:	7048104	7048103	7048105
	Date Sampled:	11/21/2007	11/21/2007	11/21/2007
	Screened Interval (ft. bgs):	7-12'	7-12'	10-15'
Chemical	Quality Criteria ¹	Result	Result	Result
Volatiles				
Acetone	6000	0.85 U	0.85 U	1.09 B
Tetrachloroethylene	1	0.97	1.02	0.34 U
Toluene	600	0.27 U	0.27 U	0.14 J
Semi-Volatiles	_	_	_	
bis(2-Ethylhexyl)phthalate	3	8.54	3.08	1.28 U

¹ Higher of Practical Quantitation Limits (PQLs) & Groundwater Quality Criterion (GWQC) per NJAC 7:9-6, 2005.

DUP = Duplicate Sample.

ft. bgs = Feet below ground surface.

B = The compound was found in the associated method blank as well as in the sample.

D = Sample was diluted.

E = The compound's concentration exceeds the calibration range of the instrument for that specific analysis.

J = Mass spec and retention time data indicate the presence of a compound however the result is less than the MDL but greater than zero.

U = The compound was analyzed for but not detected.

NT = Not tested.

NLE = No limit established.

Bold = Analyte was detected.

Shaded = Concentration exceeds Quality Criteria.

 μ g/L = micrograms per liter.

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Table 3.16-5 Fort Monmouth Phase II Site Investigation, Parcel 69 Summary of Analytical Parameters Detected in Sediment (mg/kg)

				Analytical Results									
		Sample ID:	P69SD-1A	P69SD-1A	P69SD-1B	P69SD-1B	P69SD-1B DUP	P69SD-1B DUP	P69SD-2A	P69SD-2A	P69SD-2B	P69SD-2B	
		Lab ID:	7048017	7053911	7048018	7053912	7048016	7053915	7048019	7053913	7048020	7053914	
	D	ate Sampled:	11/20/2007	12/17/2007	11/20/2007	12/17/2007	11/20/2007	12/17/2007	11/20/2007	12/17/2007	11/20/2007	12/17/2007	
	D	epth (ft. bgs):	0.0-0.5	0.0-0.5	1.5-2.0	1.5-2.0	1.5-2.0	1.5-2.0	0.0-0.5	0.0-0.5	1.5-2.0	1.5-2.0	
Chemical	ER-L ¹	ER-M ²	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	
Volatiles													
Acetone	NLE	NLE	NT	4.000 B	NT	3.100 B	NT	3.400 B	NT	5.300 B	NT	5.600 B	
Carbon disulfide	NLE	NLE	NT	0.130 J	NT	0.074 J	NT	0.069 J	NT	0.069 J	NT	0.071 J	
Methylene Chloride	NLE	NLE	NT	0.160 JB	NT	0.130 JB	NT	0.110 JB	NT	0.190 JB	NT	0.210 JB	
Toluene	NLE	NLE	NT	0.440 U	NT	0.023 J	NT	0.320 U	NT	0.510 U	NT	0.590 U	
Semi-Volatiles													
Acenaphthene	0.016	0.500	0.500 J	NT	3.100 U	NT	3.100 U	NT	1.200 J	NT	4.600 U	NT	
Anthracene	0.085	1.1	2.800 U	NT	3.100 U	NT	0.190 J	NT	6.500 U	NT	4.600 U	NT	
Benzo[a]anthracene	0.261	1.6	2.800 U	NT	3.100 U	NT	0.560 J	NT	6.500 U	NT	4.600 U	NT	
Chrysene	0.384	2.8	2.800 U	NT	3.100 U	NT	1.000 J	NT	6.500 U	NT	4.600 U	NT	
Di-n-butylphthalate	NLE	NLE	4.800 B	NT	7.600 B	NT	4.100 B	NT	1.200 JB	NT	9.400 B	NT	
Fluoranthene	0.600	5.1	0.790 J	NT	0.850 J	NT	1.200 J	NT	2.800 J	NT	4.600 U	NT	
Phenanthrene	0.240	1.5	0.250 J	NT	0.650 J	NT	0.730 J	NT	6.500 U	NT	4.600 U	NT	
Pyrene	0.665	2.6	1.100 J	NT	1.900 J	NT	2.200 J	NT	3.100 J	NT	4.600 U	NT	
Metals													
Aluminum	NLE	NLE	7790 B	NT	8720 B	NT	7890 B	NT	41300 B	NT	12100 B	NT	
Arsenic	8.2	70	2.59	NT	2.27	NT	1.85	NT	36.2	NT	6.12	NT	
Barium	NLE	NLE	14.8 B	NT	23.5 B	NT	17.3 B	NT	89.6 B	NT	21.6 B	NT	
Beryllium	NLE	NLE	0.876	NT	1.19	NT	1.14	NT	3.90	NT	1.36	NT	
Cadmium	1.2	9.6	0.063 U		0.061 U	NT	0.064 U	NT	14.1	NT	0.087 U	NT	
Calcium	NLE	NLE	1460	NT	2060	NT	1210	NT	3850	NT	1470	NT	
Chromium (Total)	81	370	74.5	NT	87.6	NT	83.3	NT	345	NT	80.1	NT	
Cobalt	NLE	NLE	2.05	NT	1.84	NT	2.07	NT	20.3	NT	4.61	NT	
Copper	34	270	30.5 B	NT	37.3 B	NT	38.6 B	NT	203 B	NT	23.9 B	NT	
Iron	NLE	NLE	23700	NT	26600	NT	26700	NT	92500	NT	33200	NT	
Lead	47	218	35.9 B	NT	44.4 B	NT	53.7 B	NT	410 B	NT	44.8 B	NT	
Magnesium	NLE	NLE	3550	NT	3660	NT	3480	NT	11300	NT	4130	NT	
Manganese	NLE	NLE	55.4	NT	45.5	NT	39.6	NT	339	NT	93.1	NT	
Mercury	0.15	0.71	0.143 U	NT	0.158 U	NT	0.148 U	NT	0.83	NT	0.217 U	NT	
Nickel (Soluble Salts)	21	52	9.32	NT	8.56	NT	8.49	NT	53.1	NT	18.4	NT	
Potassium	NLE	NLE	4880	NT	5900	NT	5610	NT	13900	NT	5090	NT	
Silver	1.0	3.7	0.252 U	NT	0.243 U	NT	0.255 U	NT	9.99	NT	0.347 U	NT	
Sodium	NLE	NLE	57.316 U	NT	55.365 U	NT	57.923 U	NT	9690	NT	5230	NT	
Vanadium	NLE	NLE	45.6	NT	47.8	NT	47.1	NT	185	NT	49.6	NT	
Zinc	150	410	126 B	NT	134 B	NT	140 B	NT	515 B	NT	176 B	NT	

¹ NJDEP Marine/Estuarine Sediment Screening Guidelines, Effects Range - Low, 1998.

Bold = Analyte detected.

Shaded = Concentration exceeds ER-L.

DUP = Duplicate Sample.

ft. bgs = Feet below ground surface.

NT = Not tested. NLE = No limit established.

mg/kg = milligram per kilogram.

 $^{^{2}\,}$ NJDEP Marine/Estuarine Sediment Screening Guidelines, Effects Range - Medium, 1998.

B = The compound was found in the associated method blank as well as in the sample.

D = Sample was diluted.

E = The compound's concentration exceeds the calibration range of the instrument for that specific analysis.

J = Mass spec and retention time data indicate the presence of a compound however the result is less than the MDL but greater than zero.

U = The compound was analyzed for but not detected.

PARCEL 69 GROUNDWATER SAMPLING RESULTS FORT MONMOUTH, NEW JERSEY

Loc ID	NJ Ground Water Quality	Weston 1995 Background	P69-TMP-1	P69-GW-1A	P69-GW-2	P69-GW-3
Sample ID	Criteria	(Main Post)	PARCEL 69-GW-P69-TMP-1	PARCEL 69-GW-P69-GW-1A	PARCEL 69-GW-P69-GW-2	PARCEL 69-GW-P69-GW-3
Sample Date			1/20/2010	12/6/2010	12/13/2010	12/6/2010
Volatile Organic Compounds (µg/l)						
1,1,1,2-Tetrachloroethane	1	-	< 0.5	< 0.5	< 0.5	< 0.5
1,1,1-Trichloroethane	30	-	< 0.5	< 0.5	< 0.5	< 0.5
1,1,2,2-Tetrachloroethane	1	-	< 0.5	< 0.5	< 0.5	< 0.5
1,1,2-Trichloroethane	3	-	< 0.5	< 0.5	< 0.5	< 0.5
,1-Dichloroethane	50	-	< 0.5	< 0.5	< 0.5	< 0.5
1,1-Dichloroethene	1	-	< 0.5	< 0.5	< 0.5	< 0.5
1,2-Dichlorobenzene	600	-	< 0.5	< 0.5	< 0.5	< 0.5
,2-Dichloroethane	2	-	< 0.5	< 0.5	< 0.5	< 0.5
,2-Dichloropropane	1	-	< 0.5	< 0.5	< 0.5	< 0.5
,3-Dichlorobenzene	600	-	< 0.5	< 0.5	< 0.5	< 0.5
,4-Dichlorobenzene	75	-	< 0.5	< 0.5	< 0.5	< 0.5
2-Chloroethylvinylether	NLE	-	< 1	< 0.5	< 0.5	< 0.5
Acetone	6,000	-	< 0.5	< 0.5	< 0.5	< 0.5
Acrolein	5	-	< 5	< 5	< 5	< 5
Acrylonitrile	2	-	< 5	< 5	< 5	< 5
Benzene	1	-	< 0.5	< 0.5	< 0.5	< 0.5
Bromodichloromethane	1	-	< 0.5	< 0.5	< 0.5	< 0.5
Bromoform	4	-	< 0.5	< 0.5	< 0.5	< 0.5
Carbon disulfide	700	-	< 0.5	< 0.5	< 0.5	< 0.5
Carbon tetrachloride	1	-	< 0.5	< 0.5	< 0.5	< 0.5
Chlorobenzene	50	-	< 0.5	< 0.5	< 0.5	< 0.5
Chlorodibromomethane	1	-	< 0.5	< 0.5	< 0.5	< 0.5
Chloroethane	5	-	< 0.5	< 0.5	< 0.5	< 0.5
Chloroform	70	-	< 0.5	< 0.5	< 0.5	< 0.5
Cis-1,2-Dichloroethene	70	-	< 0.5	< 0.5	< 0.5	< 0.5
Cis-1,3-Dichloropropene	1	-	< 0.5	< 0.5	< 0.5	< 0.5
Dichlorodifluoromethane	1,000	-	< 0.5	< 0.5	< 0.5	< 0.5
Diisoproply Ether	20,000	-	< 0.5	< 0.5	< 0.5	< 0.5
Ethyl benzene	700	-	< 0.5	< 0.5	< 0.5	< 0.5
Meta/Para Xylene	1,000	-	< 1	< 1	< 1	< 1
Methyl bromide	10	-	< 0.5	< 0.5	< 0.5	< 0.5
Methyl butyl ketone	300	-	< 0.5	< 0.5	< 0.5	< 0.5
Methyl chloride	100	-	< 0.5	< 0.5	< 0.5	< 0.5
Methyl ethyl ketone	300	-	< 0.5	< 0.5	< 0.5	< 0.5
Methyl isobutyl ketone	100	-	< 0.5	< 0.5	< 0.5	< 0.5
Methyl Tertbutyl Ether	70	-	< 0.5	< 0.5	< 0.5	< 0.5
Methylene chloride	3	-	< 0.5	< 0.5	< 0.5	< 0.5
Ortho Xylene	1,000	-	< 0.5	< 0.5	< 0.5	< 0.5
styrene	100	-	< 0.5	< 0.5	< 0.5	< 0.5
Tert Butyl Alcohol	100	-	< 5	< 5	< 5	< 5
Tetrachloroethene	1	-	0.34 J	< 0.5	1.18	< 0.5
Coluene	600	-	< 0.5	< 0.5	< 0.5	< 0.5
Trans-1,2-Dichloroethene	100	-	< 0.5	< 0.5	< 0.5	< 0.5
Frans-1,3-Dichloropropene	1	-	< 0.5	< 0.5	< 0.5	< 0.5
richloroethene	1	-	< 0.5	< 0.5	< 0.5	< 0.5
Trichlorofluoromethane	2,000	-	< 0.5	< 0.5	< 0.5	< 0.5
/inyl acetate	7,000	-	< 1	< 0.5	< 0.5	< 0.5
Vinyl chloride	1 1	<u> </u>	< 0.5	< 0.5	< 0.5	< 0.5
ΓIC VOCs (μg/l)						

PARCEL 69 GROUNDWATER SAMPLING RESULTS FORT MONMOUTH, NEW JERSEY

Loc ID	NJ Ground Water Quality	Weston 1995 Background	P69-TMP-1	P69-GW-1A	P69-GW-2	P69-GW-3
Sample ID	Criteria	(Main Post)	PARCEL 69-GW-P69-TMP-1	PARCEL 69-GW-P69-GW-1A	PARCEL 69-GW-P69-GW-2	PARCEL 69-GW-P69-GW-3
Sample Date	1		1/20/2010	12/6/2010	12/13/2010	12/6/2010
Semivolatile Organic Compounds (µg/l)	-					
1,1'-Biphenyl	400	_	NA	< 1	NA	< 1.2
2,4-Dinitrotoluene	10	_	NA	< 2	NA	< 2.4
2,6-Dinitrotoluene	10	_	NA	< 2	NA	< 2.4
2-Chloronaphthalene	600	_	NA	< 2	NA	< 2.4
2-Methylnaphthalene	30	_	NA	< 1	NA	< 1.2
2-Nitroaniline	100	_	NA	< 5	NA	< 5.9
3,3'-Dichlorobenzidine	30	_	NA	< 5	NA	< 5.9
3-Nitroaniline	100	_	NA	< 5	NA	< 5.9
4-Bromophenyl phenyl ether	100	_	NA	< 2	NA	< 2.4
4-Chloroaniline	30	_	NA	< 5	NA	< 5.9
4-Chlorophenyl phenyl ether	100	-	NA	< 2	NA	< 2.4
4-Nitroaniline	5	_	NA NA	< 5	NA NA	< 5.9
Acenaphthene	400	_	NA NA	< 0.1	< 0.1	< 0.12
Acenaphthylene	100	-	NA NA	< 0.1	< 0.1	< 0.12
Acetophenone	700		NA NA	<2	NA	< 2.4
Anthracene	2,000	_	NA NA	< 0.1	< 0.1	< 0.12
Atrazine	3	_	NA	<5	NA	< 5.9
Benzaldehyde	100	_	NA NA	<5	NA NA	< 5.9
Benzo(a)anthracene	0.1	_	NA	< 0.1	< 0.1	< 0.12
Benzo(a)pyrene	0.1	_	NA NA	< 0.1	< 0.1	< 0.12
Benzo(b)fluoranthene	0.2	_	NA	< 0.1	< 0.1	< 0.12
Benzo(ghi)perylene	100	_	NA	< 0.1	< 0.1	< 0.12
Benzo(k)fluoranthene	0.5		NA	< 0.1	< 0.1	< 0.12
Bis(2-Chloroethoxy)methane	100	_	NA	< 2	NA	< 2.4
Bis(2-Chloroethyl)ether	7	-	NA	< 2	NA	< 2.4
Bis(2-Chloroisopropyl)ether	300	_	NA	< 2	NA	< 2.4
Bis(2-Ethylhexyl)phthalate	3	_	NA	< 2	< 2	< 2.4
Butyl benzyl phthalate	100	_	NA	< 2	NA	< 2.4
Caprolactam	5,000	-	NA	< 2	NA	< 2.4
Carbazole	100	_	NA	< 1	NA	< 1.2
Chrysene	5	-	NA	< 0.1	< 0.1	< 0.12
Dibenz(a,h)anthracene	0.3	_	NA	< 0.1	< 0.1	< 0.12
Dibenzofuran	100	-	NA	< 5	NA	< 5.9
Diethyl phthalate	6,000	_	NA	< 2	NA	< 2.4
Dimethyl phthalate	100	_	NA	< 2	NA	< 2.4
Di-n-butylphthalate	700	-	NA	< 2	NA	< 2.4
Di-n-octylphthalate	100	-	NA	< 2	NA	< 2.4
Fluoranthene	300	-	NA	< 0.1	< 0.1	< 0.12
Fluorene	300	-	NA	< 0.1	< 0.1	< 0.12
Hexachlorobenzene	0.02	-	NA	< 0.02	< 0.02	< 0.024
Hexachlorobutadiene	1	-	NA	< 1	NA	< 1.2
Hexachlorocyclopentadiene	40	-	NA	< 20	NA	< 24
Hexachloroethane	7	-	NA	< 2	NA	< 2.4
Indeno(1,2,3-cd)pyrene	0.2	-	NA	< 0.1	< 0.1	< 0.12
Isophorone	40	-	NA	< 2	NA	< 2.4
Naphthalene	300	-	NA	< 0.1	< 0.1	< 0.12
Nitrobenzene	6	-	NA	< 2	NA	< 2.4
N-Nitroso-di-n-propylamine	10	-	NA	< 2	NA	< 2.4
N-Nitrosodiphenylamine	10	-	NA	< 5	NA	< 5.9
Phenanthrene	100	-	NA	< 0.1	< 0.1	< 0.12
Pyrene	200	-	NA	< 0.1	< 0.1	< 0.12
TIC SVOCs (µg/l)						
Total TIC, Semi-Volatile	500	-	NA	0 U	0 U	7.1 J

PARCEL 69 GROUNDWATER SAMPLING RESULTS FORT MONMOUTH, NEW JERSEY

Footnote:

- 1) All historical data collected prior to 2013 are reported as provided by others.
- 2) Number of Analyses is the number of detected and non-detected results excluding rejected results. Sample duplicate pairs have not been averaged.
- 3) NLE = no limit established.
- 4) ND = not detected in any background sample, no background concentration available.
- 5) Chemical result qualifiers are assigned by the laboratory and is typically evaluated and modified (if necessary) by during data validation.

[blank] = detect, i.e. detected chemical result value.

J = estimated (detect or non-detect) value.

B = Compound detected in the sample and its associated blank sample.

E (or ER) = Estimated result.

R = Rejected, data validation rejected the results.

D = Results from dilution of sample.

U = non-detect, i.e. not detected equal to or above this value.

J-DL = Elevated sample detection limit due to difficult sample matrix.

U-DL = Elevated sample detection limit due to difficult sample matrix.

JN = Tentatively identified compound, estimated concentration.

U-ND = Analyte not detected in sample, but no detection or reporting limit provided.

- 6) Chemical results greater than or equal to the action level (depending on criteria) are highlighted based on the Criteria that are present.
- Cell Shade values represent a result that is above the NJ Ground Water Quality Criteria

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NJDEP Interim Specific GWQC values are presented for the NJ GWQS where there is not a Specific Ground Water Quality Criteria. A full list of compounds is available at NJDEP Interim Generic GWQC values are presented for the NJ GWQS where there is not a XXXXX or a NJDEP Interim Specific GWQC. Available at

- Cell Style values represent a result that is above the Weston 1995 Background (Main Post).

n/a = all concentrations were less than the detection limit, therefore, no location of maximum value identified.

Dash (-) = only background concentrations for metals are being used as comparison criteria.

7) Criteria action level source document and web address.

- The NJ Ground Water Quality Criteria refers to the NJDEP Groundwater Quality Standards Adopted July 22, 2010 http://www.state.nj.us/dep/wms/bwqsa/docs/njac79C.pdf
- The Weston 1995 Background (Main Post) refers to the FTMM reports.

NA

PARCEL 69 SOIL SAMPLING RESULTS FORT MONMOUTH, NEW JERSEY

Loc ID Sample ID	NJ Non- Residential Direct Contact SRS	NJ Residential Direct Contact SRS	NJ Impact to GW Soil Screening Level	Weston 1995 Background (Main Post)	P69GW1A P69-SS-P69GW1A-11.5-12.0	P69GW2 P69-SS-P69GW2-2.5-3.0	P69GW3 P69-SS-P69GW3-11.5-12.0
Sample Date	BKB		Ecver		12/6/2010	12/13/2010	12/6/2010
Volatile Organic Compounds (mg/kg)				-			
Tetrachloroethene	5	2	0.005	-	< 0.129	NA	< 0.113
Semivolatile Organic Compounds (µg/kg)							
Acenaphthene	37,000,000	3,400,000	110,000	-	NA	< 3.2	NA
Acenaphthylene	300,000,000	NLE	NLE	-	NA	< 3.2	NA
Anthracene	30,000,000	17,000,000	2,400,000	-	NA	< 3.2	NA
Benzo(a)anthracene	2,000	600	800	-	NA	< 3.2	NA
Benzo(a)pyrene	200	200	200	-	NA	< 3.2	NA
Benzo(b)fluoranthene	2,000	600	2,000	-	NA	< 3.2	NA
Benzo(ghi)perylene	30,000,000	380,000,000	NLE	-	NA	< 3.2	NA
Benzo(k)fluoranthene	23,000	6,000	25,000	-	NA	< 3.2	NA
Bis(2-Ethylhexyl)phthalate	140	35	1,200	-	< 0.59	< 0.064	< 0.58
Chrysene	230,000	62,000	80,000	-	NA	< 3.2	NA
Dibenz(a,h)anthracene	200	200	800	-	NA	< 3.2	NA
Fluoranthene	24,000,000	2,300,000	1,300,000	-	NA	< 3.2	NA
Fluorene	24,000,000	2,300,000	170,000	-	NA	< 3.2	NA
Hexachlorobenzene	1,000	300	200	-	NA	< 3.2	NA
Indeno(1,2,3-cd)pyrene	2,000	600	7,000	-	NA	< 3.2	NA
Naphthalene	17,000	6,000	25,000	-	NA	< 3.2	NA
Phenanthrene	300,000,000	NLE	NLE	-	NA	< 3.2	NA
Pyrene	18,000,000	1,700,000	840,000	-	NA	< 3.2	NA

PARCEL 69 SOIL SAMPLING RESULTS FORT MONMOUTH, NEW JERSEY

Footnote

- 1) All historical data collected prior to 2013 are reported as provided by others.
- 2) Number of Analyses is the number of detected and non-detected results excluding rejected results. Sample duplicate pairs have not been averaged.
- 3) NLE = no limit established.
- 4) ND = not detected in any background sample, no background concentration available.
- 5) Chemical result qualifiers are assigned by the laboratory and is typically evaluated and modified (if necessary) by during data validation.

[blank] = detect, i.e. detected chemical result value.

J = estimated (detect or non-detect) value.

B = Compound detected in the sample and its associated blank sample.

 $E ext{ (or ER)} = Estimated result.$

R = Rejected, data validation rejected the results.

D = Results from dilution of sample.

U = non-detect, i.e. not detected equal to or above this value.

 $\label{eq:J-DL} \textbf{J-DL} = \textbf{Elevated sample detection limit due to difficult sample}$

 $\label{eq:U-DL} \mbox{$U$-DL$ = Elevated sample detection limit due to difficult sample matrix.}$

JN = Tentatively identified compound, estimated concentration

U-ND = Analyte not detected in sample, but no detection or reporting limit provided.

- 6) Chemical results greater than or equal to the action level (depending on criteria) are highlighted based on the Criteria that are present.
- Cell Shade values represent a result that is above the NJ Non-Residential Direct Contact Soil Remediation Standard.
- Cell Shade values represent a result that is above the NJ Residential Direct Contact Soil Remediation Standard.
- Cell Shade values represent a result that is above the NJ Impact to GW Soil Screening Level
- Cell Style values represent a result that is above the Weston 1995 Background (Main Post).
 n/a = all concentrations were less than the detection limit, therefore, no location of maximum value identified.
 Dash (-) = only background concentrations for metals are being used as comparison criteria.
- Cell Shade values represent a result that is above both the NJ Residential, Non-Residential, AND NJ Impact to GW Soil Screening Level Direct
- Cell Shade values represent a result that is above both the NJ Residential and Non-Residential Direct Contact Soil Remediation Standard.



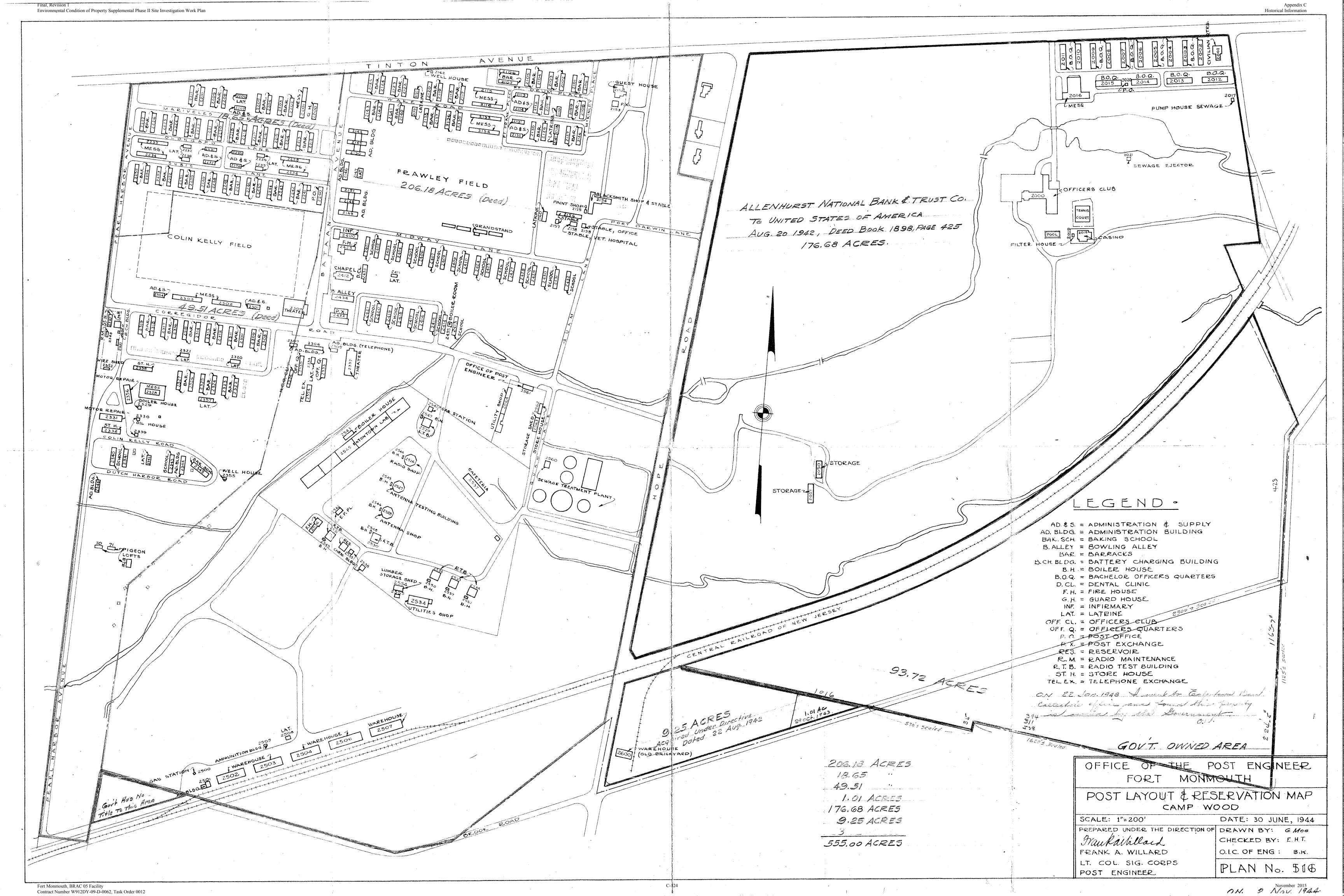
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7) Criteria action level source document and web address.

- The NJ Non-Residential Direct Contact Soil Remediation Standard refers to the NJDEP's May 7, 2012 Remediation Standards. http://www.nj.gov/dep/rules/njac7_26d.pdf
- The NJ Residential Direct Contact Soil Remediation Standard refers to the NJDEP's May 7, 2012 Remediation Standards http://www.nj.gov/dep/rules/njac7_26d.pdf
- The NJ Impact to GW Soil Screening Level criteria refers to the Development of Site Specific Impact to Ground Water Soil Remediation Standards Nov 2013 http://www.nj.gov/dep/srp/guidance/rs/partition_equation.pdf
- The Weston 1995 Background (Main Post) refers to the FTMM reports.

Post Layout & Reservation Map, Camp Wood, June 30, 1944



Main Post Additional Facilities (FY 1952) Part 1, Site Location Plan, March 13, 1952

CORPS OF ENGINEERS, U.S. ARMY WAR DEPARTMENT VICINITY MAP

SCALE IN MILES

0 5 10 15 20 CONTRACT DA-30-075-ENG-5297 RECORD DRAWING 2 IOMAYSE ADDITIONAL RECORD WORK-AS-BUILT OF WORK - AS - BUILT DESCRIPTION CORPS OF ENGINEERS, U.S. ARMY
OFFICE OF THE DISTRICT ENGINEER
NEW YORK DISTRICT
NEW YORK 13. N.Y. ZIEGLER, CHILDS & PAULSEN Contracting Officer ARCHITECT - ENGINEER 18 AM 1824
DESIGN SERVICE CO.
ARCHITECT - ENGINEER
NEW YORK, R.Y. JERSEY CITY - NEW JERSEY FORT MONMOUTH ADDITIONAL FACILITIES (FY 1952) PART 1 SITE LOCATION PLAN THIS SHEET IS A REPRODUCTION OF POST PLAN DATED 13 AUG. 1945 REVISED TO INDICATE LOCATION **NEW JERSEY** OF WORK UNDER CONTRACT. CHIEF, ENGINEERING DIVISION Drawle P. Hacudel SCALE AS SHOWN DRAWING NUMBER REVIEWED BY SAFETY BRANCH Q.C. DATE: 13 MARCH 1952 SHEET OF FILE NO. 75294000.01

Fort Monmouth, BRAC 05 Facility

Contract Number W912DY-09-D-0062, Task Order 0012

C-126

November 2015

Road Jurisdiction Map, Fort Monmouth, April 19, 1962

Fort Monmouth, BRAC 05 Facility

Contract Number W912DY-09-D-0062, Task Order 0012

General Site Map, Charles Wood Area, November 1, 1985

Environmental Condition of Property Supplemental Phase II Site Investigation Work Plan CORPS OF ENGINEERS TO FORT MAIN. ACCESS FROM FORT MONMOUTH LAGOON BASEBALL 2302 R & D LAB -L E G E N D S- 2480 BUILDING, SEMI-PERMANENT Y-2500 BUILDING, TEMPORARY FORT MONMOUTH - CHARLES WOOD AREA RED BANK, NEW JERSEY ==== TRAIL OR EARTH ROAD CORPS OF ENGINEERS - U.S. ARMY
OFFICE OF THE DISTRICT ENGINEER
NEW YORK DISTRICT - NEW YORK, NEW YORK × FENCE HARLAND BARTHOLOMEN & ASSOCIATES, INC. PLANNING-ENGINEERING-LANDSCAPE ARCHITECTURE MEMPHIS, TENNESSEE MARSH AREA MASTER PLAN BASIC INFORMATION MAPS GENERAL SITE MAP RECOMMENDED BY THE INSTALLATION PLANNING BOARD FOR APPROVAL DATE
REVIEWED & COMMENTED ON BY MAJOR COMMANDER
& FORWARDED TO THE CHIEF OF ENGINEERS 01 NOV 85 18 - 02 - 01 SHEET NO. FILE NO. 7529 **- 3863** , r (1)

C-130

November 2015

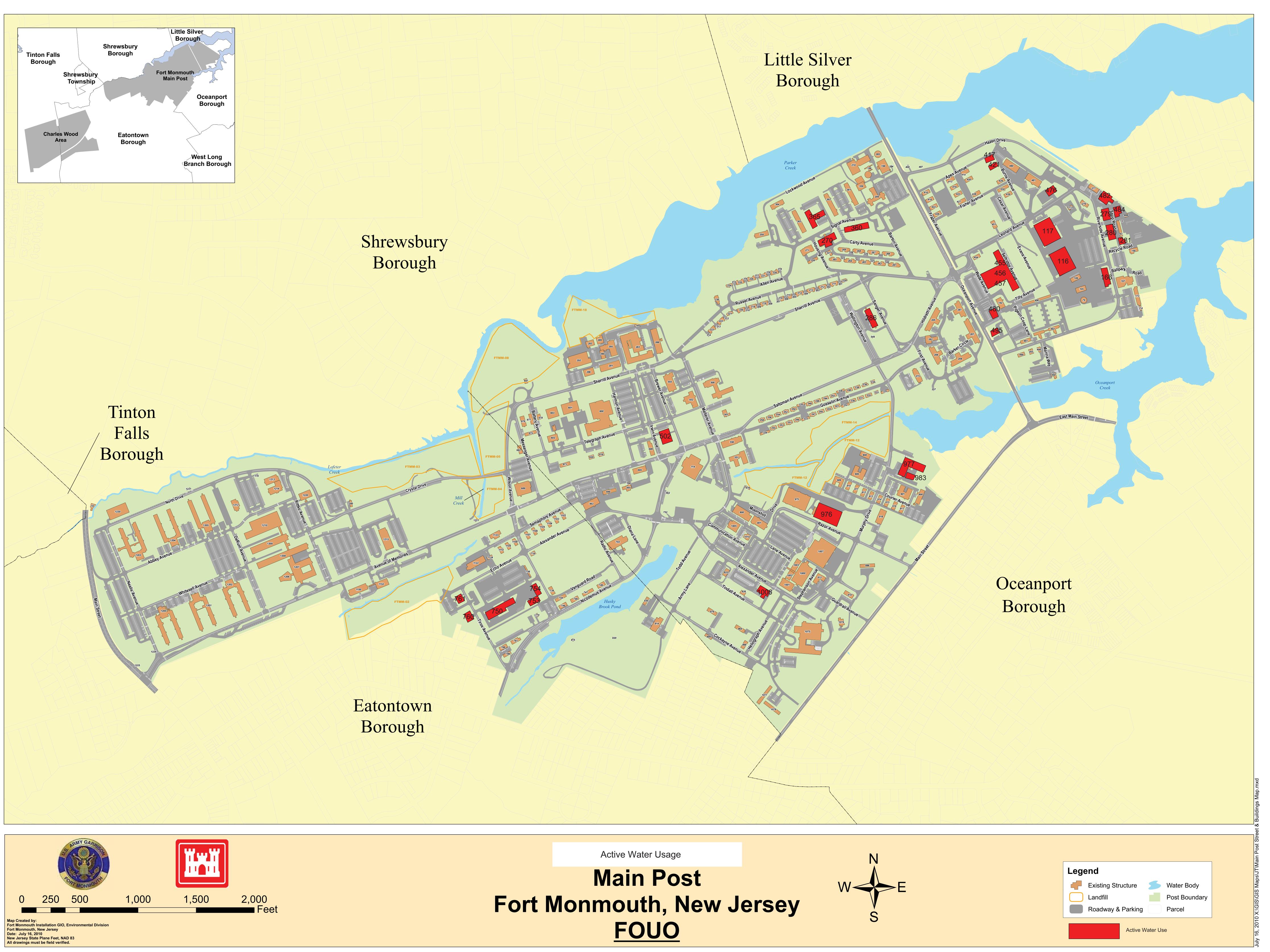
Fort Monmouth, BRAC 05 Facility
Contract Number W912DY-09-D-0062, Task Order 0012

Active Water Usage, Main Post, July 16, 2010

Final, Revision 1

Environmental Condition of Property Supplemental Phase II Site Investigation Work Plan

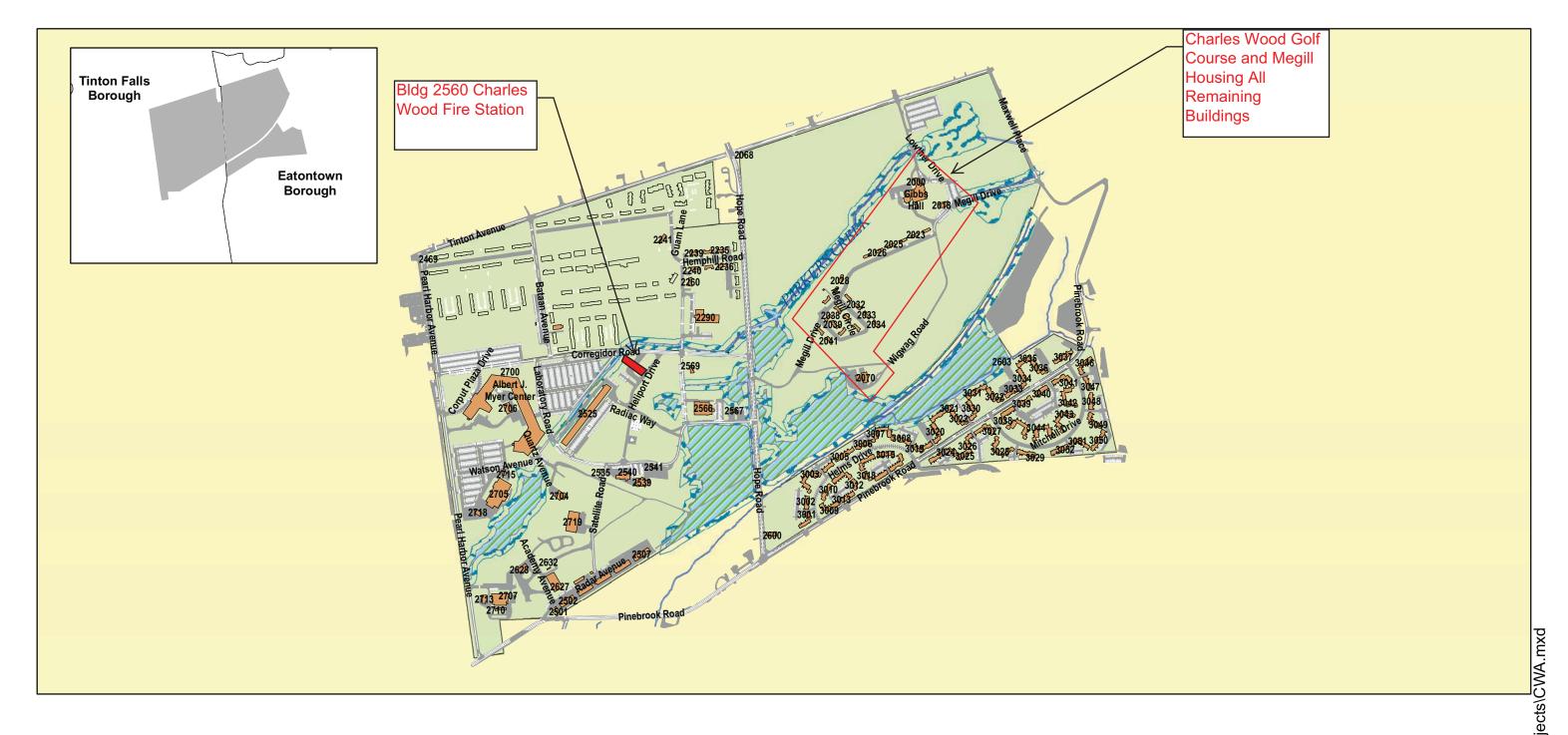
Historical Information

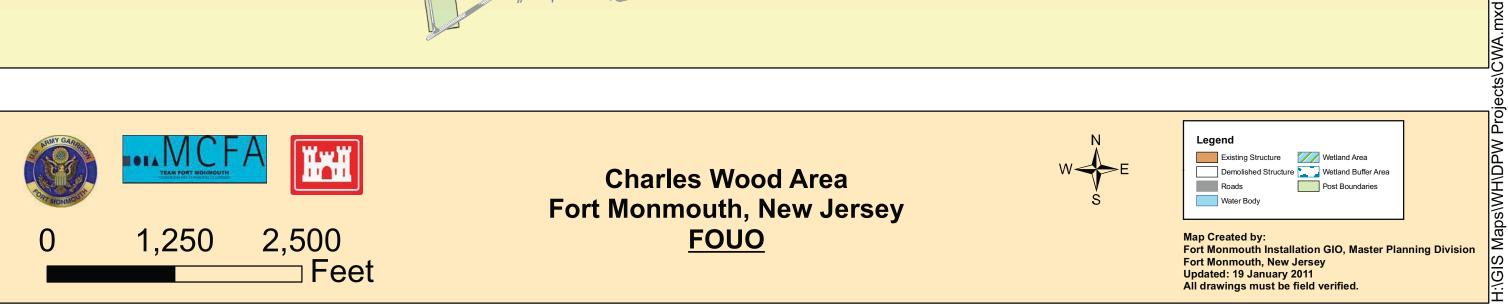


Fort Monmouth, BRAC 05 Facility Contract Number W912DY-09-D-0062, Task Order 0012 C-132

November 2015

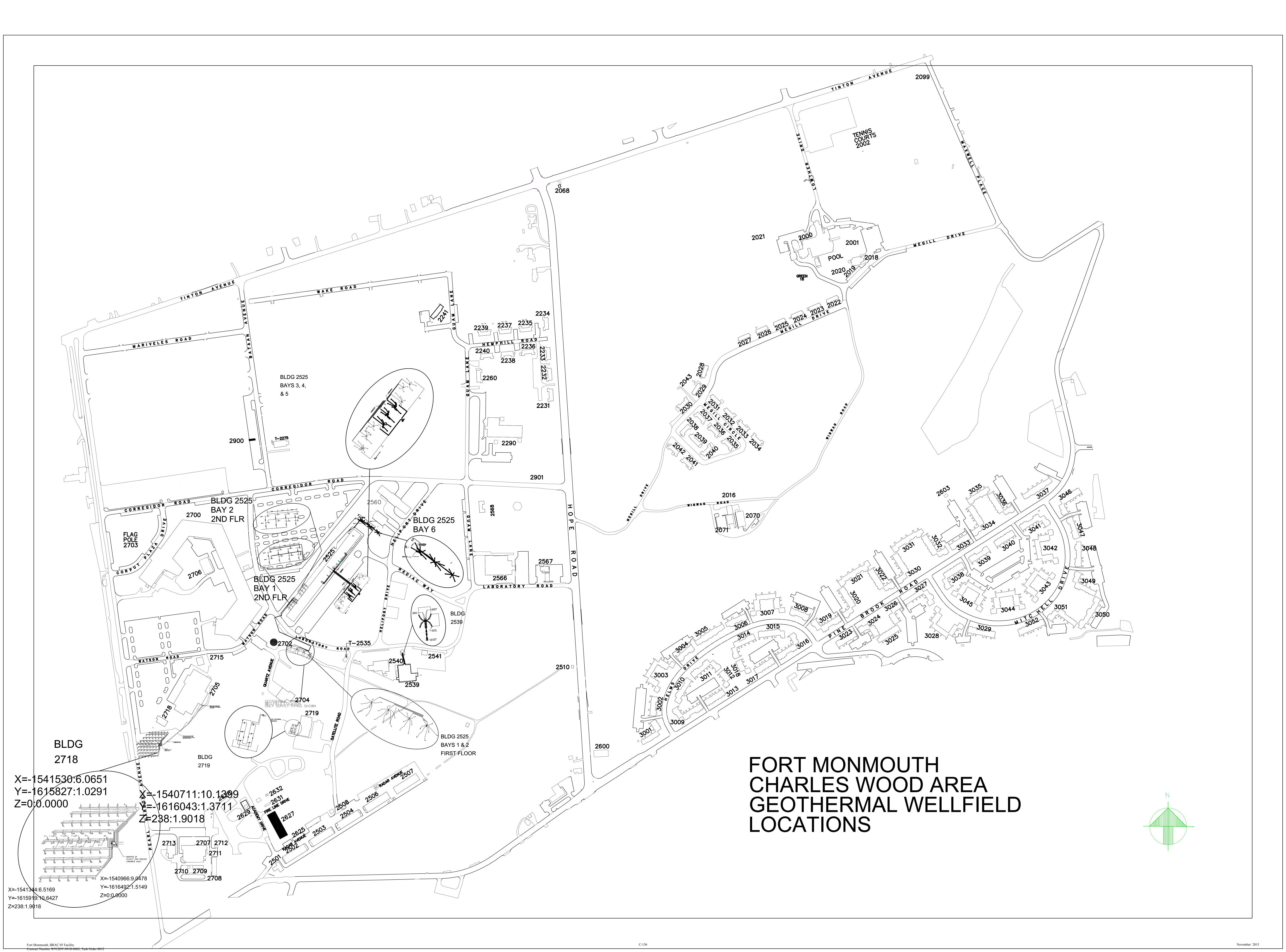
Active Water Usage, Charles Wood Area, July 19, 2011





Fort Monmouth, Charles Wood Area, Geothermal Wellfield Locations, undated

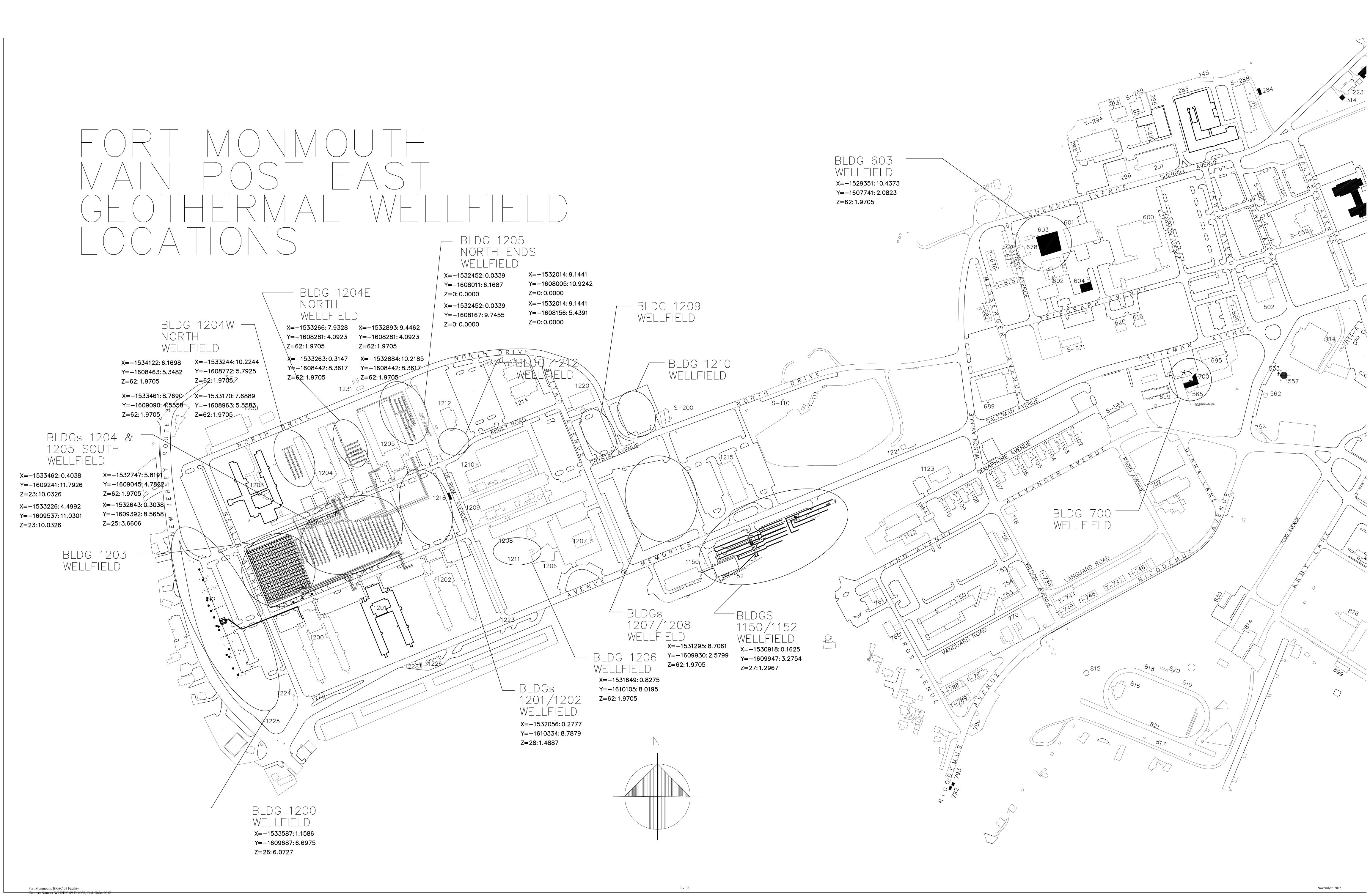
Final, Revision 1
Environmental Condition of Property Supplemental Phase II Site Investigation Work Plan



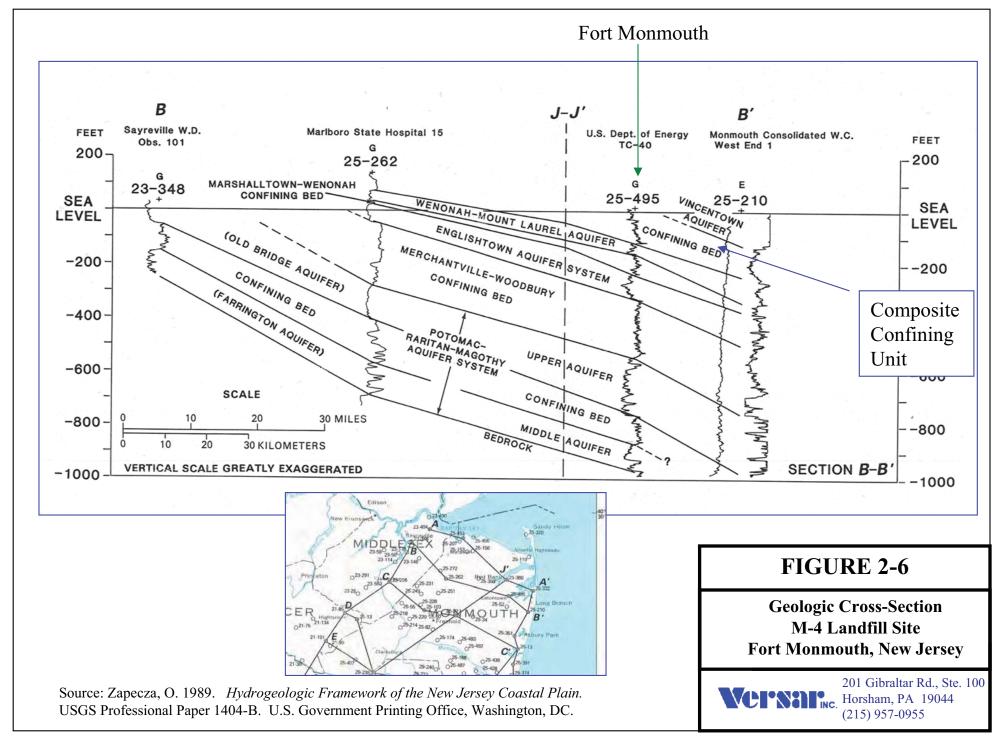
Fort Monmouth, Main Post East, Geothermal Wellfield Locations, undated

Environmental Condition of Property Supplemental Phase II Site Investigation Work Plan

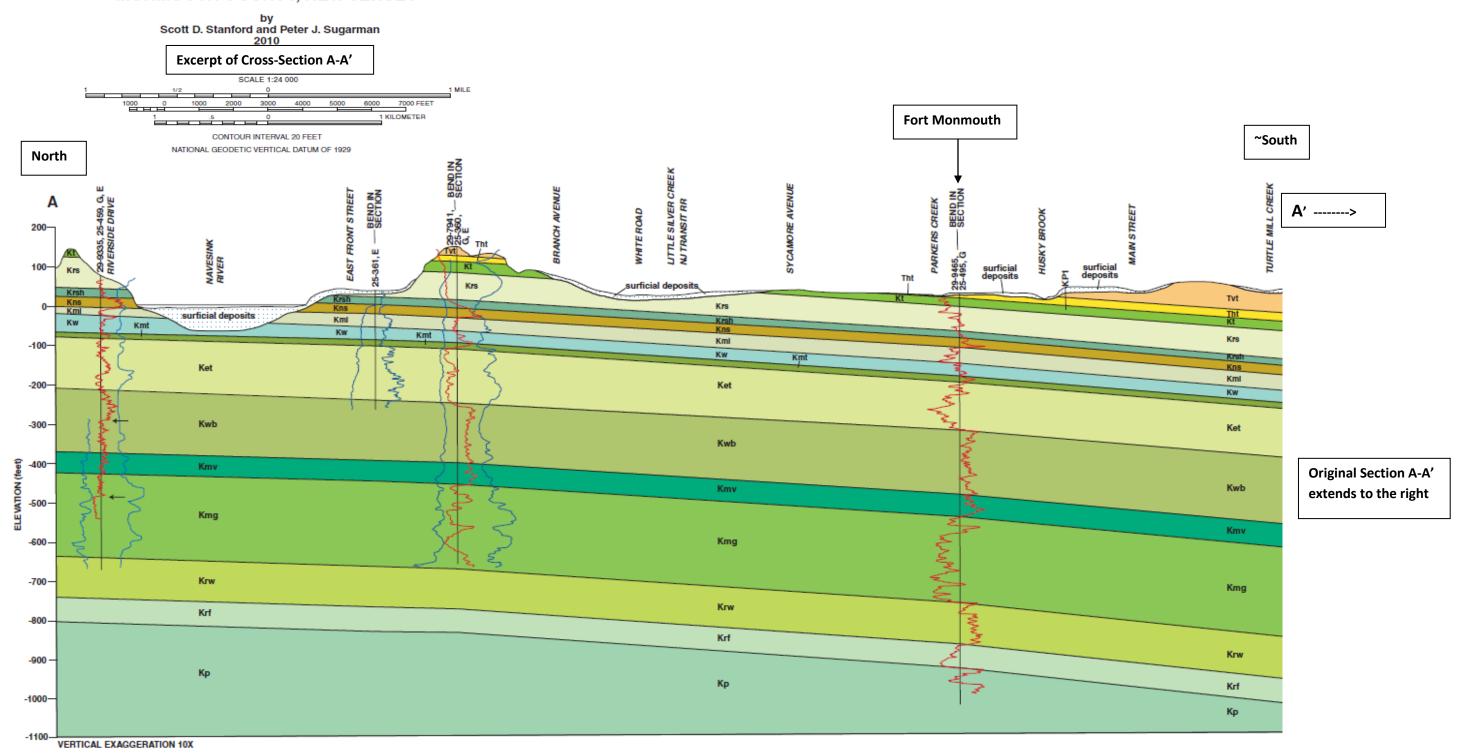
Historical Information



Fort Monmouth, Geologic Cross-Sections



BEDROCK GEOLOGY OF THE LONG BRANCH QUADRANGLE MONMOUTH COUNTY, NEW JERSEY



VINCENTOWN FORMATION—Glauconitic (5-20%) silty medium-to-coarse quartz sand, some fine-to-medium sand, some very coarse sand to very fine pebbles; yellow, reddish-yellow, olive-yellow, olive-brown; unstratified to weakly horizontally stratified. Coarse sands are locally iron-cemented into beds and masses as much as 10 feet thick. Lowermost 10-20 feet of the formation is silty fine-to-medium sand, with more glauconite than upsection. Total thickness of formation is 180 feet. Late Paleocene in age, based on foraminifera (Olsson and Wise, 1987; Miller and others, 2006) and calcareous nannofossils (Sugarman and others, 1991). Unconformably overlies the Hornerstown Formation.

Description of Geologic Units Shown on Cross-Section A-A'

- HORNERSTOWN FORMATION—Glauconite (>50%) clay and silty clay; olive, dark green, black where unweathered, olive-brown with brown to reddish-brown mottles where weathered; unstratified. Glauconite occurs primarily in soft grains of fine-to-medium sand size. Thickness is 25 to 30 feet. Early Paleocene in age, based on foraminifera (Olsson and others, 1997; Landman and others, 2004; Miller and others, 2006) and calcareous nannofossils (Sugarman and others, 1991; Miller and others, 2006). Unconformably overlies the Tinton Formation.
- TINTON FORMATION—Glauconitic (5-30%) silty medium-to-coarse and fine-to-medium quartz sand; reddish-brown, reddish-yellow, yellowish-brown where weathered, grayish-brown, brown, olive-brown where unweathered; unstratified to weakly horizontally stratified. Commonly iron-cemented into beds and masses as much as 15 feet thick. Uppermost 4-6 feet, just below contact with Hornerstown Formation, is a brown to olive-gray glauconitic clayey-silty fine sand to fine-sandy silt-clay ("New Egypt Formation" of Landman and others, 2004). Total thickness of Tinton is 30 to 40 feet. Late Cretaceous (late Maestrichtian) in age based on foraminifera, nannofossils, and ammonites (Landman and others, 2004) and strontium-isotope ratios (Sugarman and others, 1995). Overlies the Shrewsbury Member of the Red Bank Formation. Contact with Shrewsbury is not exposed in the Long Branch quadrangle. It is gradational over several feet in the Sandy Hook quadrangle, north of the Long Branch quadrangle (Minard, 1969), but may be unconformable in the Marlboro quadrangle, west of the Long Branch quadrangle (Sugarman and Owens, 1996).
- RED BANK FORMATION, SHREWSBURY MEMBER—Fine-to-medium quartz sand, minor medium-to-coarse sand, slightly silty, glauconitic (<5%), and micaceous; reddishyellow, yellow where weathered, light gray and gray where unweathered; unstratified to weakly horizontally bedded; locally iron-cemented. As much as 100 feet thick. Late Cretaceous (late Maestrichtian) in age based on fossils in the underlying Sandy Hook Member; the Shrewsbury Member is unfossiliferous. Grades downward within 2-3 feet to the Red Bank Formation, Sandy Hook Member. On geophysical well logs, transition to Sandy Hook Member is marked by increased gamma-ray intensity and decreased resistance.
- RED BANK FORMATION, SANDY HOOK MEMBER—Fine-sandy clayey silt, micaceous, slightly glauconitic (<5%); brown to yellowish-brown where weathered, dark gray, olive-gray where unweathered; unstratified. Calcareous brachiopod, pelecypod, and gastropod fossils are common. As much as 20 feet thick. Late Cretaceous (late Maestrichtian) in age based on calcareous nannofossils (Sugarman and Owens, 1996), foraminifera (Olsson, 1964; Olsson and Wise, 1987; Owens and others, 1977), and strontium-isotope ratios (Sugarman and others, 1995). Grades downward within 2-3 feet into the Navesink Formation. On geophysical well logs, transition to Navesink is marked by increased gamma-ray intensity and slightly decreased resistance.
- NAVESINK FORMATION—Glauconitic (20-50%) clayey-silty fine-to-medium quartz sand to fine-sandy clayey silt; dark gray, gray, grayish-brown, olive-gray where unweathered, brown to yellowish-brown where weathered; unstratified. Glauconite occurs chiefly in soft grains of fine-to-medium sand size. Calcareous brachiopod, pelecypod, and gastropod fossils are common. Late Cretaceous (late Maestrichtian) in age based on calcareous nannofossils and foraminifera (Olsson, 1964; Miller and others, 2006), macrofossils (Sohl, 1977), and strontium-isotope ratios (Sugarman and others, 1995). Unconformably overlies the Mount Laurel Formation. Contact with Mount Laurel is commonly marked by a sharp peak in gamma-ray intensity on geophysical well logs, with reduced intensity in the Mount Laurel.

Kml

MOUNT LAUREL FORMATION—Glauconitic (3-15%) fine-to-medium quartz sand, minor medium-to-coarse sand, with thin interbeds of clay and silt; yellowish-brown where weathered, olive-gray to olive-brown where unweathered. Sand is unstratified to horizontally bedded to cross-bedded. As much as 50 feet thick in the southern part of the quadrangle; thins to 20 feet to the north. In subsurface only, covered by surficial deposits in the Navesink River estuary and by overlying Coastal Plain formations elsewhere. Late Cretaceous (late Campanian) in age, based on calcareous nannofossils and strontium-isotope ratios (Sugarman and others, 1991; Miller and others, 2006). Grades downward into the Wenonah Formation. On geophysical well logs, transition to Wenonah is generally marked by slightly decreased resistance and increased gamma-ray intensity.

Description of Geologic Units Shown on Cross-Section A-A' (cont.)

Kw

WENONAH FORMATION—Silty fine-to-very-fine quartz sand to fine-sandy clayey silt, micaceous, slightly glauconitic (<5%); yellow, very pale brown where weathered, gray to pale-olive where unweathered; unstratified. As much as 40 feet thick. In subsurface only, covered by surficial deposits in the Navesink River estuary and by overlying Coastal Plain formations elsewhere. Late Cretaceous (late Campanian) in age based on pollen (Wolfe, 1976) and ammonites (Kennedy and Cobban, 1994). Grades downward into the Marshalltown Formation. On geophysical well logs, transition to Marshalltown is marked by increased gamma-ray intensity.

Kmt

MARSHALLTOWN FORMATION—Glauconitic (20-50%), slightly micaceous, silty-clayey fine-to-medium quartz sand, to fine-sandy clayey silt; olive-gray to olive-brown; unstratified. Thickness is 15 to 20 feet. In subsurface only. Late Cretaceous (middle Campanian) in age based on calcareous nannofossils, foraminifera, mollusks, and strontium-isotope ratios (Sugarman and others, 1995). Unconformably overlies the Englishtown Formation. On geophysical well logs, contact with Englishtown is marked by decreased gamma-ray intensity and slightly increased resistance.

Ket

ENGLISHTOWN FORMATION-Fine-to-medium quartz sand, minor medium-tocoarse sand, with thin interbeds of clay and silt; micaceous and lignitic, with a trace (<1%) of glauconite; white and light gray where weathered, dark gray where unweathered. Sand is unstratified to horizontally bedded to cross-bedded. In subsurface only. As much as 140 feet thick in the eastern part of the quadrangle, thins to 110 feet thick in the west. In the Asbury Park quadrangle to the south of the Long Branch quadrangle, and farther southwest in northern Ocean County, the Englishtown is divided into an upper and lower member based on the presence of a clay-silt facies in the middle of the formation that is distinctive on gamma-ray logs (Nichols, 1977; Sugarman and Owens, 1994; Miller and others, 2006). This facies is not well marked on gamma-ray logs in the Long Branch quadrangle (wells 29-9335, 29-7941, 29-9465, 29-6173, 29-23948, and 29-48307) and so the members are not mapped here. Late Cretaceous (middle to late Campanian) in age, based on pollen (Wolfe, 1976), ostracodes (Gohn, 1992), calcareous nannofossils, and strontium-isotope ratios (Miller and others, 2006). Grades downward into the Woodbury Formation. On geophysical well logs, transition to Woodbury is marked by increased gamma-ray intensity and decreased resistance.

Kwb

WOODBURY FORMATION—Clay, silty clay, with minor thin beds of very fine quartz sand, slightly micaceous and lignitic; dark gray and black where unweathered, yellowish-brown to brown where weathered; unstratified. In subsurface only. As much as 240 feet thick in the eastern part of the quadrangle, thins to 160 feet thick in the central and western parts of the quadrangle. Late Cretaceous (early to middle Campanian) based on pollen (Wolfe, 1976), ostracodes (Gohn, 1992), and calcareous nannofossils (Miller and others, 2006). Grades downward into the Merchantville Formation. On geophysical well logs, transition to the Merchantville is marked by slightly increased gamma-ray intensity.



MERCHANTVILLE FORMATION—Glauconitic (20-50%) clayey silt to sandy clayey silt, slightly micaceous; olive, dark gray, black where unweathered, olive-brown to yellowish-brown where weathered; unstratified. Thickness is 40 to 60 feet. In subsurface only. Late Cretaceous (early Campanian to Santonian) in age based on ammonites (Owens and others, 1977) and calcareous nannofossils (Miller and others, 2006). The Cheesequake Formation, a glauconitic clayey silt underlying the Merchantville, is mapped in outcrop in northern Monmouth and eastern Middlesex counties (Sugarman and Owens, 1996; Sugarman and others, 2005; Stanford and Sugarman, 2008) and in the subsurface both west and south of the Long Branch quadrangle (Sugarman and Owens, 1994, 1996). Because it is lithically similar to the Merchantville and cannot be easily distinguished from it on geophysical logs, it is not mapped separately here. If present, it is included here within the Merchantville, or uppermost Magothy Formation.

Description of Geologic Units Shown on Cross-Section A-A' (cont.)

Kmg

MAGOTHY FORMATION—Fine-to-medium quartz sand, some very-fine-to-fine sand and minor medium-to-coarse sand, micaceous, lignitic, and pyrite-bearing in places, with thin interbeds of silt and clay; white to yellow where weathered, light gray to gray where unweathered. Sand is cross-bedded to laminated. As much as 220 feet thick. In subsurface only. Late Cretaceous (Turonian-Santonian) in age, based on pollen (Christopher, 1979, 1982; Miller and others, 2006). Unconformably overlies the Raritan Formation, Woodbridge Clay member. On geophysical well logs, contact with the Woodbridge is marked by increased gamma-ray intensity.

In its outcrop area in eastern Middlesex County the Magothy is divided into 5 members. From bottom to top they include: South Amboy Fire Clay, Old Bridge Sand, Amboy Stoneware Clay, Morgan beds, and Cliffwood beds (Sugarman and others, 2005). The Old Bridge is a thick sand, the other members are interbedded clay-silt and fine sand. These members may extend downdip in the subsurface (Miller and others, 2006). Geophysical well logs in the Long Branch quadrangle (wells 29-21612, 29-23948, 29-21510, 29-9335, 29-7941, 29-9465, and 29-6173) show generally higher gamma-ray intensity and lower resistivity in the uppermost 50 feet of the formation, and again in the lowermost 30-40 feet, than in the middle 100-120 feet. The upper fine-grained beds may correspond to the Amboy Stoneware Clay and Morgan and Cliffwood beds, and the lower fine-grained beds may correspond to the South Amboy Fire Clay. The middle sand may correspond to the Old Bridge Sand.

Krw

RARITAN FORMATION, WOODBRIDGE CLAY MEMBER—Clay and silt, micaceous, lignitic, and pyrite-bearing; gray and black where unweathered, white to brown where weathered; with minor thin interbeds and laminas of white, yellow, and light gray very-fine-to-fine quartz sand. As much as 110 feet thick. In subsurface only, penetrated by wells 29-9465 and 29-1921. The driller's log for well 29-2366 in Eatontown reports "weathered bedrock", with no further information, beneath the Magothy Formation, at a depth of 875-891 feet. This depth is anomalously shallow for the basement surface, suggesting that the material may be weathered clay of either the Woodbridge or South Amboy Fire Clay member of the Magothy. The Woodbridge is Late Cretaceous (late Cenomanian) in age based on pollen (Christopher, 1979) and ammonites (Cobban and Kennedy, 1990). Grades downward into the Raritan Formation, Farrington Sand member. Transition to the Farrington is marked by decreased gammaray intensity on geophysical well logs.

Krf

RARITAN FORMATION, FARRINGTON SAND MEMBER—Fine-to-coarse quartz sand, some coarse-to-very-coarse sand, minor beds of clay and silt; white and yellow where weathered, gray where unweathered. Sands are horizontally bedded to cross-bedded. As much as 60 feet thick. In subsurface only, penetrated in well 29-9465. Late Cretaceous (Cenomanian) in age based on pollen (Christopher, 1979). Unconformably overlies the Potomac Formation. Contact with Potomac is marked by increased gammaray intensity on geophysical well logs.



POTOMAC FORMATION—Fine-to-medium quartz sand, some coarse-to-very-coarse sand, with beds of clay and silt; white, red, yellow where weathered, gray where unweathered. Sands are horizontally bedded to cross-bedded, clays are in beds as much as 8 feet thick. More than 90 feet thick, full thickness not penetrated in the Long Branch quadrangle. In subsurface only, partially penetrated in well 29-9465. Late Cretaceous (Albian-Cenomanian) based on pollen (Sugarman and Owens, 1996; Miller and others, 2006), which indicates that the Potomac in this area corresponds to the Potomac Formation, unit 3, of Doyle and Robbins (1977).

Description of Geologic Units Shown on Cross-Section A-A' (cont.)

1	APPENDIX D
2	ACCIDENT PREVENTION PLAN
3	
4	(This is a placeholder only; the Accident
5	Prevention Plan was prepared under separate cover)

l	APPENDIX E
2	SAMPLING AND ANALYSIS PLAN
3	
1	(This is a placeholder only; the Sampling and
5	Analysis Plan was prepared under separate cover)