

DRAFT

**FINDING OF SUITABILITY TO TRANSFER
(FOST)**

Fort Monmouth, New Jersey

Carve Out Group 8

December 2025

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LIST OF ACRONYMS AND ABBREVIATIONS

ACM	Asbestos-Containing Material
AST	Aboveground Storage Tank
ASTM	American Society of Testing and Materials
BRAC	Base Realignment and Closure
C4ISR	Command and Control, Communications, Computers, Intelligence, Sensors and Reconnaissance
CECOM	Communications-Electronics Command
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CFR	Code of Federal Regulations
DMM	Discarded Military Munitions
DOD	Department of Defense
ECP	Environmental Condition of Property
EPP	Environmental Protection Provision
FIFRA	Federal Insecticide, Fungicide, and Rodenticide Act
FMERA	Fort Monmouth Economic Revitalization Authority
FOST	Finding of Suitability to Transfer
FTMM	Fort Monmouth
IRP	Installation Restoration Program
LBP	Lead-Based Paint
MEC	Munitions and Explosives of Concern
NEPA	National Environmental Policy Act
NFA	No Further Action
NJDEP	New Jersey Department of Environmental Protection
PCB	Polychlorinated Biphenyl
RA	Remedial Action
RDX	Hexahydro-1,3,5-trinitro-1,3,5-triazine
RI	Remedial Investigation
SI	Site Investigation
TNT	2,4,6-Trinitrotoluene
USATHAMA	United States Army Toxic and Hazardous Materials Agency
U.S.C.	United States Code
UST	Underground Storage Tank
UXO	Unexploded Ordnance
VOC	Volatile Organic Compound

**FINDING OF SUITABILITY TO TRANSFER
(FOST)**

**Fort Monmouth, New Jersey
Carve Out Group 8 Parcel**

October 2025

1. PURPOSE

The purpose of this Finding of Suitability to Transfer (FOST) is to document the environmental suitability for transfer of a portion of the “carve outs” located in the Parcel 44 (landfill FTMM-05) as well as Parcel 102D Part 2 of 2, together known as Carve Out Group 8 (the Property) of Fort Monmouth, New Jersey. These carve outs were not transferred with the surrounding property due to unresolved environmental issues. The Property is set to be transferred to the Fort Monmouth Economic Revitalization Authority (FMERA) consistent with Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Section 120(h) and Department of Defense (DOD) policy. In addition, this FOST includes the CERCLA Notice, Covenant, and Access Provisions and other Deed Provisions and the Environmental Protection Provisions (EPPs) necessary to protect human health and the environment after such transfer.

2. PROPERTY DESCRIPTION

Fort Monmouth is located in the central-eastern portion of New Jersey, approximately 45 miles south of New York City, 70 miles northeast of Philadelphia and 40 miles east of Trenton (see Enclosure 1, Figure 1). The Atlantic Ocean is located approximately 2.5 miles to the east. Fort Monmouth consists of the Main Post, Charles Wood Area and Evans Area.

The primary mission of Fort Monmouth was to provide command, administrative and logistical support for the Headquarters, United States Army Communications-Electronics Command (CECOM). CECOM was a major subordinate command of the United States Army Materiel Command and was the host activity. Fort Monmouth served as the center for the development of the Army’s Command and Control, Communications, Computers, Intelligence, Sensors and Reconnaissance (C4ISR) systems. Fort Monmouth activities were realigned under four BRAC Commission recommendations in 1988, 1991, 1993 and 1995 prior to the recommendation for closure in 2005. The installation closed on September 15, 2011.

The Main Post encompasses an area of approximately 637 acres and is bounded by State Highway 35 to the west, Parkers Creek and Lafetra Creek to the north, New Jersey Transit Railroad to the east and residential neighborhoods to the south. The Charles Wood Area is comprised of approximately 489 acres and is located one mile west of the Main Post. The Evans Area consisted of approximately 219 acres and was transferred under the Base Realignment and Closure (BRAC) 1993 Program. The Main Post and Charles Wood Area were included in BRAC 2005 closure. The majority of the Charles Wood Area and Parcel B of the Main Post were transferred to the FMERA as the Phase 1 Parcels in 2012 and 2014. Portions of the Main Post were transferred to the FMERA as the Phase 2 Parcels in 2016. Certain portions of the Main

Post and Charles Wood Area were withheld from transfer as they were not yet suitable for transfer and these areas are identified as “Carve Outs”.

The property to be transferred under this FOST (FTMM-05) is located on the Main Post (see Enclosure 1, Figure 2) as a portion of Parcel 44 and Parcel 102D Part 2 of 2 and is herein referred to as the “Property” (see Enclosure 1, Figure 3). The Property to be transferred to the FMERA under the Economic Development Conveyance authority consists of 4.547 acres of land that is located within the Main Post portion of Fort Monmouth in the Boroughs of Eatontown and Oceanport.

3. ENVIRONMENTAL DOCUMENTATION

A determination of the environmental condition of the Property was made based upon the following:

- FTMM Report. Final Remedial Investigation Report for Site FTMM-05, Fort Monmouth, Oceanport, Monmouth County, New Jersey, Parsons, February 2015
- FTMM Report. Site Investigation Report for Area Upgradient of FTMM-05 Fort Monmouth, Monmouth County, New Jersey, December 2020
- FTMM Report. Remedial Action Report Landfill Capping Landfill, Fort Monmouth, Oceanport, Monmouth County, New Jersey, December 2022.
- FTMM Report. Final Remedial Action Report for FTMM-05 Landfill, November 2025.
- U.S. Army BRAC. 2005 Final Environmental Condition of Property Report, Fort Monmouth, Monmouth County, New Jersey, Finalized January 2007.
- U.S. Army BRAC. Final Environmental Condition of Property Report Update, Fort Monmouth, Monmouth County, NJ. Phase 2 Parcels, March 2016
- U.S. Army BRAC 2025 Carve Out Group 8 Draft Final Environmental Condition of Property Report Update, Fort Monmouth, Monmouth County, NJ
- USACE. Final Record of Decision for Landfill Sites FTMM-03, FTMM-04, FTMM-05, FTMM-12, FTMM-14, FTMM-18 and FTMM-25 at Fort Monmouth, Oceanport, Monmouth County, NJ, June 2017.
- USACE. 2019b. Remedial Action Work Plan Landfill Capping Project Fort Monmouth, Oceanport, Monmouth County, New Jersey. October 2019.

The information provided is a result of a complete search of agency files during the development of these environmental surveys. A complete list of documents providing information on environmental conditions of the Property is attached (Enclosure 2).

4. ENVIRONMENTAL CONDITION OF PROPERTY

The DOD Environmental Condition of Property (ECP) categories for the Parcels covered by this FOST are as follows:

ECP Category 4:

Parcel 44 (Portion of Parcel): This is the area of landfill FTMM-05 owned by the Army that lies within the Boroughs of Eatontown (4.283 acres) and Oceanport (0.109 acre), NJ, encompassing a total area of 4.392 acres (Enclosure 1; Figure 4).

Parcel 102D Part 2 of 2: This is area in the far east by northeastern portion of landfill FTMM-05, owned by the Army that lies within the Borough of Eatontown, NJ encompassing an area of 0.155 acre. This area was originally believed to not contain landfill material but during remediation it was determined that landfill material did exist on Parcel 102D Part 2 of 2. This was addressed with the remediation of landfill FTMM-05 (see Enclosure 1, Figure 4).

A summary map of the ECP categories for the Property is provided (see Enclosure 1, Figure 5) and the ECP category definitions are provided in Table 1 – Description of Property (Enclosure 3).

4.1. ENVIRONMENTAL REMEDIATION SITES

There is one remediation site located on the Property (FTMM-05). A summary of the environmental remediation site on the property is as follows:

Soils.

The surficial soil at landfill FTMM-05 consists of landfill cover material of varying thicknesses. In general, landfill debris observed during test pit investigations included coal, ash, asphalt, concrete, non-putrescible solid waste, and construction and demolition debris (USACE, 2017). A Remedial Investigation (RI) of near surface soil (September 1998 to July 2017) was performed to delineate soil contaminants of concern (COCs) identified VOCs, SVOCs, (PAHs), pesticides and metals above the NJDEP Non-Residential Direct Contact Soil Remediation Standards at multiple locations (USACE, 2017, 2022).

As presented in the ROD, the Army selected the CERCLA presumptive remedy for the Main Post landfills, specifically a 24-inch-thick vegetated soil cap and the establishment of Institutional Controls (ICs) and Engineering Controls (ECs). ECs mitigate potential safety hazards associated with surficial construction/demolition debris. ECs also prevents direct contact with the identified COCs present at concentrations that exceed NJDEP standards in the pre-existing landfill

cover material. The EC for the site also serves as the landfill's final cover system. Institutional Controls (ICs), specifically Deed Notices, will notify future property owners of the soil cover requirement and the prohibition of residential use.

The Army, as the CERCLA lead agency, has determined that it was appropriate to apply the presumptive remedy of capping at FTMM-05 based on the soil and contaminant characteristics found at FTMM, and the guidance provided in the directive, *Presumptive Remedy for CERCLA Municipal Landfill Sites, EPA OSWER Directive No. 9355.0-49FS* (EPA 1993). Further information on the selection of presumptive remedies for landfills at military installations is presented in the directive, *Application of the CERCLA Municipal Landfill Presumptive Remedy to Military Landfills, EPA OSWER Directive No. 9355.0-67FS* (EPA 1996).

The United States Army Corps of Engineers have remediated contaminated soil at the Property, such that soil contamination remains at certain areas of the Property that contains contaminants in concentrations that do not allow for the unrestricted use of the Property. Such soil contamination is described and the existing engineering controls on the site are described in Table 2 – Notification of Hazardous Substance Storage, Release, or Disposal (Encl. 4). As a result, there is a statutory requirement for a Deed Notice in accordance with N.J.S.A. 58:10B-13. Deed notices for the Eatontown and Oceanport Borough portions of landfill FTMM-05 were prepared and provided to NJDEP.

Groundwater.

Previous groundwater investigations identified PCE, TCE, VC, and cis-1,2 DCE at concentrations in groundwater near FTMM-05 exceeding the groundwater water quality standards (GWQSs). Recommendations included continued monitoring under a classification exception area (CEA). Based on a review of groundwater data the Army concluded that chlorinated solvent impacts to groundwater appear to originate from a location upgradient of the landfill FTMM-05. Further investigations related to chlorinated solvent contaminants in groundwater will be undertaken to investigate the source of chlorinated solvent impacts. A CEA encompassing the landfill is in place for the chlorinated solvent impacts to groundwater at the landfill while investigations continue on adjacent property. Once additional delineation is completed, an appropriate remedy will be selected and if necessary, the CEA at FTMM-05 will be amended as needed.

The Property was not remediated to levels suitable for unrestricted use. The deed will include land use restrictions to prevent groundwater and residential use. Deed notices for landfill FTMM-05 were as prepared and provided to NJDEP. NJDEP concurred on the content of the deed notices in a letter dated November 20, 2025. The deed notices will be filed and recorded with deed of transfer as specified the Record of Decision.

4.2. STORAGE, RELEASE, OR DISPOSAL OF HAZARDOUS SUBSTANCES

Hazardous substances were stored for one year or more and released or disposed of on the property in excess of reportable quantities specified in 40 CFR Part 373. All hazardous substance storage operations have been terminated on the property. Hazardous substances were released in excess of the 40 CFR 373 at the following sites:

FTMM-05 Landfill (Portion of Parcel 44 and Parcel 102D Part 2 of 2)

The release or disposal of these hazardous substances was remediated at the time of the release or as part of the Installation Restoration Program (IRP). See Section 4.1 Environmental Remediation Sites for additional information. A summary of the areas in which hazardous substance activities occurred is provided in Table 2 – Notification of Hazardous Substance Storage, Release or Disposal (Enclosure 4). The CERCLA 120(h)(3) Notice, Description, and Covenant is included at Enclosure 5 will be included in the Deed.

4.3. PETROLEUM AND PETROLEUM PRODUCTS

4.3.1. UNDERGROUND AND ABOVEGROUND STORAGE TANKS

Current UST/AST Sites –

There are no underground storage tanks (USTs) or above-ground Storage Tanks (ASTs) currently existing on the Property.

Former UST/AST Sites –

There were no former USTs or ASTs located on the Property.

4.3.2. NON-UST/AST STORAGE, RELEASE, OR DISPOSAL OF PETROLEUM PRODUCTS

There is no evidence that non-UST/AST petroleum products in excess of 55 gallons were stored for one year or more on the property.

4.4. POLYCHLORINATED BIPHENYLS

There is no evidence that PCB-containing equipment is located on the Property nor previously located on the Property.

4.5. ASBESTOS

There are no buildings on the Property and thus Asbestos Containing Material (ACM) is not located on the property.

4.6. LEAD-BASED PAINT

There are no buildings or other structures located on the Property therefore no lead-based paint (LBP) exists on the Property.

4.7. RADIOLOGICAL MATERIALS

There is no evidence that radioactive material or sources were stored or used on the Property.

4.8. RADON

Radon surveys were conducted in 1991 by the Directorate of Engineering and Housing's Environmental Office as part of the Army's Radon Reduction Program. The survey was conducted for all of Fort Monmouth. Radon detectors were deployed in all structures designated as priority one buildings (daycare centers, hospitals, schools and living areas). Radon was not detected above the U.S. Environmental Protection Agency residential action level of 4 picocuries per liter in these buildings.

4.9. MUNITIONS AND EXPLOSIVES OF CONCERN

Based on a review of existing records and available information, there is no evidence that Munitions and Explosives of Concern (MEC) are present on the Property.

The term "MEC" means military munitions that may pose unique explosives safety risks, including: (A) unexploded ordnance (UXO), as defined in 10 United States Code (U.S.C.) §101(f)(5); (B) discarded military munitions (DMM), as defined in 10 U.S.C. §2710(e)(2); or (C) munitions constituents (e.g., 2,4,6-Trinitrotoluene (TNT), Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)), as defined in 10 U.S.C. §2710(e)(3), present in high enough concentrations to pose an explosive hazard.

4.10. OTHER PROPERTY CONDITIONS

There are no other hazardous conditions on the Property that present an unacceptable risk to human health and the environment.

5. ADJACENT PROPERTY CONDITIONS

FTMM-05 landfill is in the western portion of the MP, north of landfill FTMM-04 and south of landfill FTMM-08. FTMM-05 is bounded to the south by Sherrill Drive, to the north by an unpaved road and landfill FTMM-08, to the east by Wilson Avenue, and to the west by Parkers Creek (Enclosure 1, Figure 6).

Landfills FTMM-04 and FTMM-08 have undergone closure with capping and deed notices will be placed associated with those closures. It is not expected that these landfills will pose an unacceptable risk to the Property and use of such property. The landfill caps will be maintained and any disruptions to the caps will be addressed in accordance with deed notices to be filed when those landfills transfer out of Army control.

An update of the Fort Monmouth electronic database search of environmental records for the Property and surrounding area (off installation) was performed for the 2016 ECP Update Report and an update of this search was not necessary because conditions on the Property and in the area surrounding the Property have not changed materially. Surrounding land uses include residential and commercial properties. Activities associated with these land uses are not likely to result in a recognized environmental condition in connection with the property. Additionally,

potential environmental conditions external to the base are not anticipated to have an impact on these areas due to the relative distance to off-base potential sources.

6. ENVIRONMENTAL REMEDIATION AGREEMENTS

There are no environmental remediation agreements specifically applicable to the Property. The deed will include a provision reserving the Army's right to conduct remediation activities, if necessary, in the future (Enclosure 5).

7. REGULATORY/PUBLIC COORDINATION

The NJDEP and the public were notified of the initiation of this FOST. This draft FOST is being made available for review and comment for 10 days. The document was placed in the Fort Monmouth Environmental Restoration Public Information Repository <https://www.ftmonmouthrecords.com/>, and at the following location: Monmouth County Library, Eastern Branch, 1001 Route 35, Shrewsbury, NJ 07702, Phone: (732) 683-8980.

8. NATIONAL ENVIRONMENTAL POLICY ACT (NEPA) COMPLIANCE

The environmental impacts associated with the proposed transfer of the Property have been analyzed in accordance with the National Environmental Policy Act (NEPA). The results of this analysis are documented in the *Final Environmental Assessment of the Implementation of the Base Realignment and Closure at Fort Monmouth, New Jersey, March 2009* and the *Finding of No Significant Impact Environmental Assessment of the Disposal and Reuse of Fort Monmouth, New Jersey, February 2010*. There were no encumbrances or conditions identified in the NEPA analysis as necessary to protect human health or the environment.

9. FINDING OF SUITABILITY TO TRANSFER

Based on the above information, I conclude that all remedial actions necessary to protect human health and the environment have been taken at Parcel 44 (the portion including landfill FTMM-05) and Parcel 102D Part 2 Of 2, and the property is transferable under CERCLA §120(h)(3). In addition, all Department of Defense requirements to reach a finding of suitability to transfer have been met, subject to the terms and conditions set forth in the attached Environmental Protection Provisions that shall be included in the deed for the property. The deed will also include the CERCLA §120(h)(3) Notice, Covenant, and Access Provisions and Other Deed Provisions. Finally, the hazardous substance notification (Table 2) shall be included in the deed as required under the CERCLA §120(h) and DoD FOST Guidance.

Richard C. Ramsdell
BRAC Director
Office of the ASA (IE&E)
DASA ESOH

Date

Enclosures

Encl 1 -- Figures

Encl 2 -- Environmental Documentation

Encl 3 -- Table 1 -- Description of Property

Encl 4 -- Table 2 -- Notification of Hazardous Substance Storage, Release, or Disposal

Encl 5 -- CERCLA Notice, Covenant, and Access Provisions and Other Deed Provisions

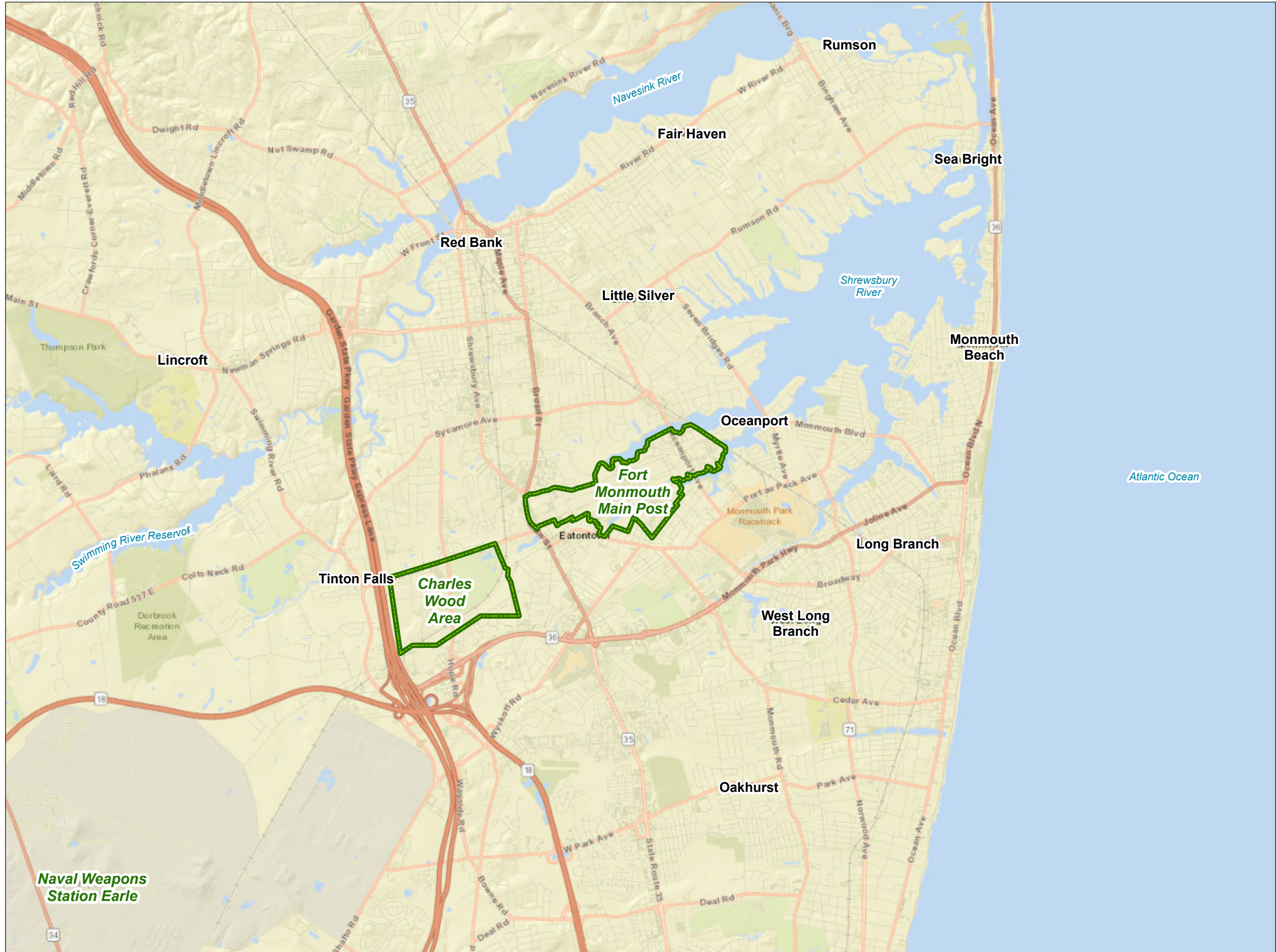
Encl 6 -- Environmental Protection Provisions

Encl 7 -- Regulatory and Public Comments

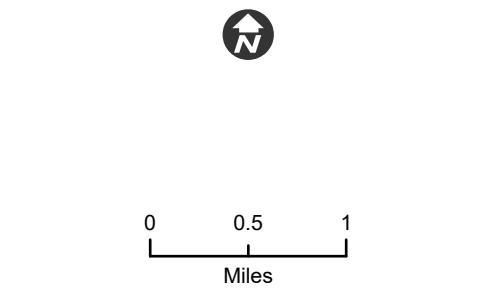
Encl 8 -- Army Responses

ENCLOSURE 1

FIGURES



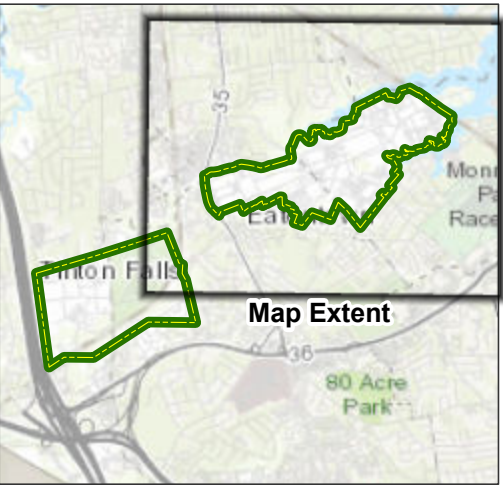
Legend
 Installation Boundary



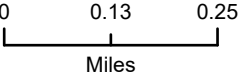
Data Sources: ESRI

Various Landfill Actions
Fort Monmouth, Monmouth County, New Jersey

Fort Monmouth General Location



- Legend**
-  Installation Boundary
 -  Approximate Landfill Boundary



Data Sources: ESRI

Various Landfill Actions
Fort Monmouth, Monmouth County, New Jersey

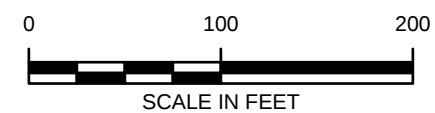
FTMM-05 Landfill Location Figure 2



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- LEGEND
- PROPERTY TO BE TRANSFERRED
 - LANDFILL BOUNDARIES
 - 102D ECP PARCEL NUMBER



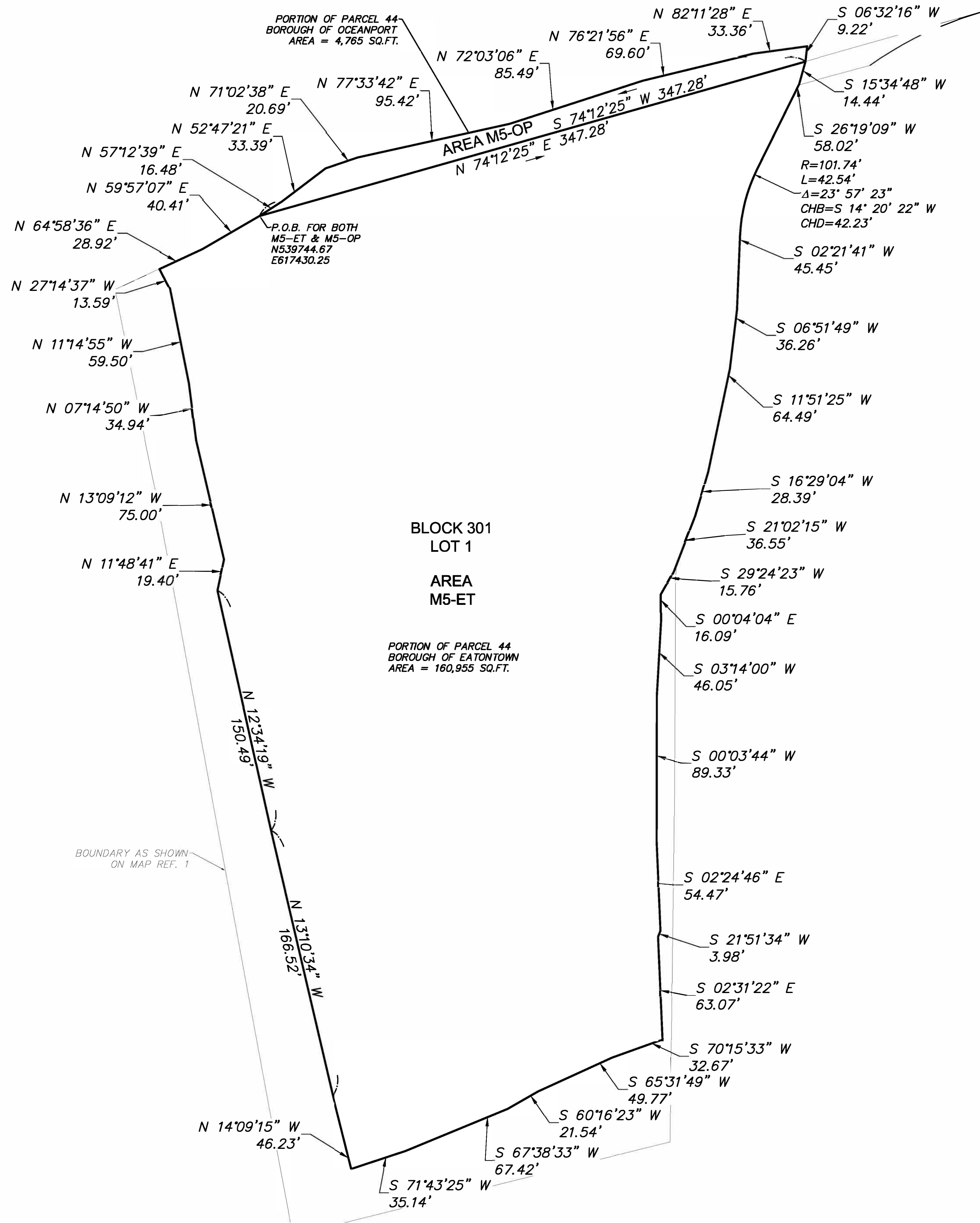
FORT MONMOUTH
OCEANPORT, NEW JERSEY

PROPERTY TRANSFER MAP



FIGURE
3

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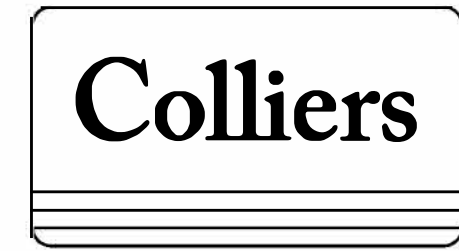
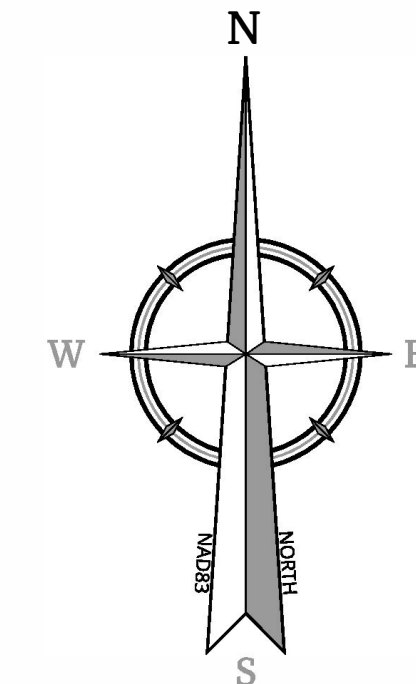
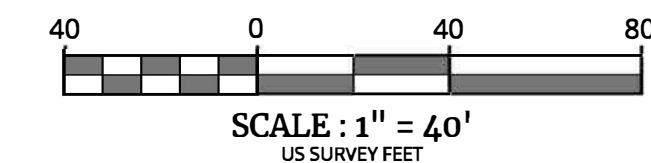


GENERAL NOTES

1. THE SOLE PURPOSE OF THIS PLAN IS TO SHOW THE DEED RESTRICTION AREAS WITHIN LANDFILL FTMM05.
2. BOUNDARIES SHOWN HEREON ARE BASED ON THE REFERENCE MAPS LISTED BELOW
3. HORIZONTAL DATUM IS RELATIVE TO NAD83, VERTICAL DATUM IS RELATIVE TO NAVD88.
4. BOUNDARY AND EXISTING TOPOGRAPHY OUTSIDE OF COLLIERS ENGINEERING & DESIGN FIELD SURVEY LIMITS ARE SHOWN PER MAP REFERENCE 1.

REFERENCES

1. PLANS ENTITLED:
 1. "Fort Monmouth Economic Revitalization Authority, Portion of Lot 1, Block 301 (Borough of Eatontown) and Portion of Lot 4, Block 110 (Borough of Oceanport) Borough of Eatontown and Borough of Oceanport, Monmouth County, New Jersey, Exhibit Map Showing a Portion of Environmental Carveout Parcel 44(M5)", dated July 8, 2025, prepared by T and M
 2. "FTMM05 Encroachment Exhibit, Oceanport & Eatontown Borough, Monmouth County, New Jersey" dated March 23, 2023, prepared by SAM
 3. "Remedial Action Report Landfill Capping at Fort Monmouth, Oceanport, Monmouth County, New Jersey" dated August 2022, prepared by AECOM.



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EA ENGINEERING, SCIENCE & TECHNOLOGY, INC., PBC

REMEDIAL ACTION REPORT LANDFILL CAPPING AT FORT MONMOUTH

OCEANPORT, FORT
MONMOUTH, NJ

R Thomas Hugg
NEW JERSEY LICENSED PROFESSIONAL LAND SURVEYOR
LICENSE NUMBER: G536737
COLLIERS ENGINEERING & DESIGN, INC.
N.J. C.O.A. #: 24GA27986500

EGG HARBOR
500 Scarborough Drive,
Suite 108
Egg Harbor Township, NJ 08234
Phone: 609.910.4068
COLLIERS ENGINEERING & DESIGN, INC.

Colliers
Engineering
& Design

SCALE: AS SHOWN	DRAWN BY: DMS
DESIGNED BY:	REVIEWED BY: RTH
DATE ISSUED: OCT., 2025	PROJECT NUMBER: 24005753A
SHEET NAME:	

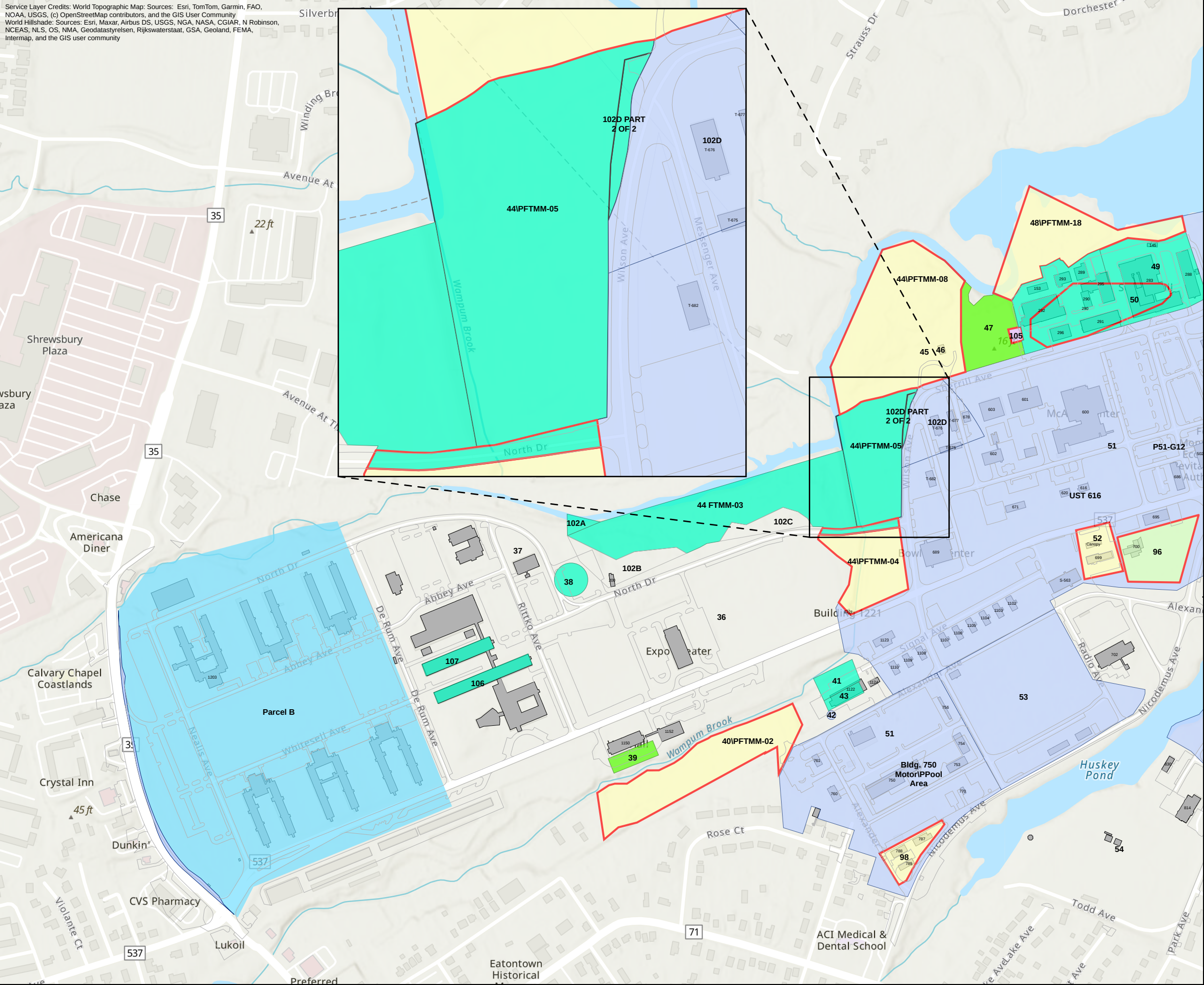
FTMM-05 DEED RESTRICTION EXHIBIT

DRAWING NUMBER:

Figure 4

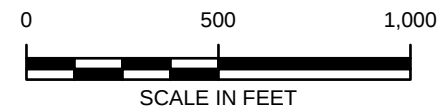
NOTE: DO NOT SCALE DRAWINGS FOR CONSTRUCTION.

Service Layer Credits: World Topographic Map: Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, (c) OpenStreetMap contributors, and the GIS User Community
World Hillshade: Sources: Esri, Maxar, Airbus DS, USGS, NASA, CGIAR, N Robinson, NCEAS, NLS, OS, NMA, Geodatastyrelsen, Rijkswaterstaat, GSA, Geoland, FEMA, Intermap, and the GIS user community



LEGEND:

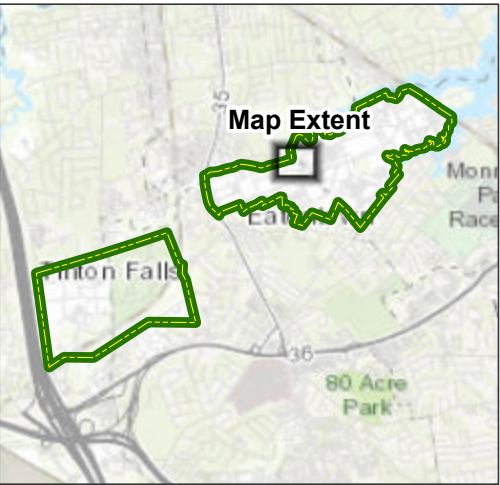
- CATEGORY 1: AREAS WHERE NO RELEASE OR DISPOSAL OF HAZARDOUS SUBSTANCES OR PETROLEUM PRODUCTS HAS OCCURRED (INCLUDING NO MIGRATION OF THESE SUBSTANCES FROM ADJACENT AREAS).
- CATEGORY 2: AREAS WHERE ONLY RELEASE OR DISPOSAL OF PETROLEUM PRODUCTS OR THEIR DERIVATIVES HAS OCCURRED.
- CATEGORY 3: AREAS WHERE RELEASE, DISPOSAL, AND/OR MITIGATION OF HAZARDOUS SUBSTANCES HAS OCCURRED, BUT AT CONCENTRATIONS THAT DO NOT REQUIRE A REMOVAL OR REMEDIAL RESPONSE.
- CATEGORY 4: AREAS WHERE RELEASE, DISPOSAL, AND/OR MITIGATION OF HAZARDOUS SUBSTANCES HAS OCCURRED, AND ALL REMOVAL OR REMEDIAL ACTIONS TO PROTECT HUMAN HEALTH AND THE ENVIRONMENT HAVE BEEN TAKEN.
- CATEGORY 5: AREAS WHERE RELEASE, DISPOSAL, AND/OR MITIGATION OF HAZARDOUS SUBSTANCES HAS OCCURRED, AND REMOVAL OR REMEDIAL ACTIONS ARE UNDERWAY, BUT ALL REQUIRED REMEDIAL ACTIONS HAVE NOT YET BEEN TAKEN.
- CATEGORY 6: AN AREA OR PARCEL OF REAL PROPERTY WHERE RELEASE, DISPOSAL, OR MIGRATION, OR SOME COMBINATION THEREOF, OF HAZARDOUS SUBSTANCES HAS OCCURRED, BUT REQUIRED RESPONSE ACTIONS HAVE NOT YET BEEN INITIATED.
- CATEGORY 7: AREAS THAT ARE NOT EVALUATED OR REQUIRE ADDITIONAL EVALUATIONS.
- TRANSFERRED PROPERTY
- CARVE OUT AREA
- 44 ECP PARCEL NUMBER



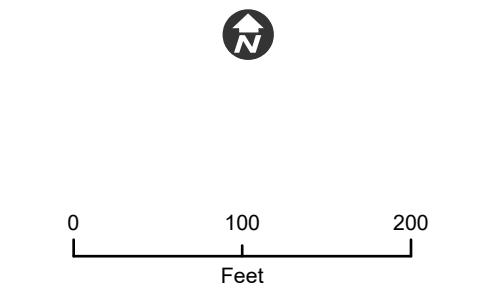
FORT MONMOUTH
OCEANPORT, NEW JERSEY

ECP PROPERTY CATERGORY MAP





- Legend**
- Installation Boundary
 - Approximate Landfill Boundary



Data Sources: ESRI

Various Landfill Actions
Fort Monmouth, Monmouth County, New Jersey

FTMM-05

Figure 6



ENCLOSURE 2

ENVIRONMENTAL DOCUMENTATION

FTMM Report: U.S. Army BRAC 2005 Environmental Condition of Property Report, Fort Monmouth, Monmouth County, New Jersey, January 29, 2007.

FTMM Report: Final Environmental Assessment of the Implementation of Base Realignment and Closure at Fort Monmouth, New Jersey, March 2009.

Finding of No Significant Impact Environmental Assessment of the Disposal and Reuse of Fort Monmouth, New Jersey, February 9, 2010.

FTMM Report: Environmental Condition of Property Update Report, Fort Monmouth, Carve Out Group 2, April 2, 2018.

FTMM Report: Record of Decision for Landfill Sites FTMM-03, FTMM-04, FTMM-05, FTMM-12, FTMM-14, FTMM-18 and FTMM-25 at Fort Monmouth, July 17, 2017.

FTMM Report. Final Remedial Investigation Report for Site FTMM-05, Fort Monmouth, Oceanport, Monmouth County, New Jersey, Parsons, February 2015

FTMM Report. Site Investigation Report for Area Upgradient of FTMM-05 Fort Monmouth, Monmouth County, New Jersey, December 2020

FTMM Report. Remedial Action Report Landfill Capping Landfill, Fort Monmouth, Oceanport, Monmouth County, New Jersey, December 2022.

FTMM Report. Final Remedial Action Report for FTMM-05 Landfill, August 2025.

U.S. Army BRAC. Final Environmental Condition of Property Report Update, Fort Monmouth, Monmouth County, NJ. Phase 2 Parcels, March 2016

USACE. Final Record of Decision for Landfill Sites FTMM-03, FTMM-04, FTMM-05, FTMM-12, FTMM-14, FTMM-18 and FTMM-25 at Fort Monmouth, Oceanport, Monmouth County, NJ, June 2017.

USACE. 2019b. Remedial Action Work Plan Landfill Capping Project Fort Monmouth, Oceanport, Monmouth County, New Jersey. October 2019.

ENCLOSURE 3

TABLE 1 – Description of Property

Building Number and Property Description	ECP Parcel Designation	Condition Category	Remedial Actions
Landfill FTMM-05	Portion of Parcel 44	4	Parcel 44 includes IRP Sites FTMM-03, 04, 05, 06 and 08. Various investigations have been performed at each of the landfills as well as groundwater investigations. The area covered by this FOST, includes landfill FTMM-05. The area was previously a Category 5, but was recategorized to a Category 4 (See ECP Update December 2025), as the landfill remedy has been completed with the placement of a vegetative cap. A deed notice limiting future use will be placed when the property is transferred.
East by Northeast Portion of Landfill FTMM-05	102D Part 2 of 2	4	Parcel 102 Part 2 of 2 is part of landfill FTMM-05 that was planned for remedial action as part of Parcel 44. Parcel 102D Part 2 of 2 is located within the east by northeast portion of Landfill M5. This parcel was originally considered Category 5 but was subsequently re-categorized as Category 4 (see ECP Report Update December 2025), as the landfill remedy has been completed with the placement of a vegetative cap.

ENCLOSURE 4

TABLE 2 – Notification of Hazardous Substances Storage, Release or Disposal

Site Description	Name of Hazardous Substance(s)	Date of Storage, Release, or Disposal	Remedial Actions
Landfill FTMM-05 and Parcel 102D Part 2 of 2	Semi-Volatile Organics (SVOCs) Pesticides PCBs Heavy Metals	1952-1959	<u>SOILS</u> FTMM-05 was in use as a landfill between 1952 and 1959 and was reportedly used for the disposal of domestic and industrial wastes. Landfill FTMM-05 was identified in 1980 in a USATHAMA report as a suspected hazardous waste site at FTMM. As described in the October 2015 Remedial Investigation Report (RIR) for FTMM-05, soil constituents in surficial soil that exceeded the NJDEP Residential Direct Contact Soil Remediation Standards included VOCs, SVOCs, (PAHs), Pesticides and metals. In general, landfill debris observed during test pit investigations included coal, ash, asphalt, concrete, non-putrescible solid waste, and construction and demolition debris (Parsons, 2015). The selected remedy includes the placement of a 2-foot vegetative soil cover “cap” along with the implementation of land use controls (LUCs). The NJDEP concurred on the ROD in correspondence dated 13 June 2017 (NJDEP 2017). The vegetative soil cover remedy was implemented September 2020 (EA Engineering, 2025). <u>GROUNDWATER</u> Groundwater reported concentrations of PCE, TCE, VC and/or cis-1,2 DCE exceeding the New Jersey GWQS. As stated in the ROD for FTMM-05, metals were detected in only a small number of above-background exceedances, and NJDEP agreed that sampling would continue at select wells for VOCs. Specifically, the ROD for FTMM-05 identifies PCE and TCE as compounds requiring continued monitoring and implementation of a CEA (USACE 2022).

The information contained in this notice is required under the authority of regulations promulgated under section 120(h) of the Comprehensive Environmental Response, Liability, and Compensation Act (CERCLA or ‘Superfund’) 42 U.S.C. §9620(h). This table provides information on the storage of hazardous substances for one year or more in quantities greater than or equal to 1,000 kilograms or the hazardous substances’ CERCLA reportable quantity (whichever is greater). In addition, it provides information on the known release of hazardous substances in quantities greater than or equal to the substances CERCLA reportable quantity. See 40 CFR 73.

ENCLOSURE 5

CERCLA NOTICE, COVENANT, AND ACCESS PROVISIONS AND OTHER DEED PROVISIONS

The following CERCLA Covenant and Access Provisions, along with the Other Deed Provisions, will be placed in the deed in a substantially similar form to ensure protection of human health and the environment and to preclude any interference with ongoing or completed remediation activities.

For ECP Category 4 Parcels (Parcel 44 and Parcel 102D Part 2 of 2):

1. Property Covered by Notice, Description, Access Rights, and Covenant Made Pursuant to §120(h)(3)(A) of the Comprehensive Environmental Response Compensation, and Liability Act of 1980 (42 U.S.C. § 9620(h)(3)(A)):

For Part of Parcel 44 and Parcel 102D Part 2 of 2, the Grantor provides the following notice, description, and covenants and retains the following access rights:

A. Notices Pursuant to §120(h)(3)(A)(i)(I) and (II) of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (42 U.S.C. § 9620(h)(3)(A)(i)(I) and (II)):

Pursuant to section 120(h)(3)(A)(i)(I) and (II) of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (42 U.S.C. § 9620(h)(3)(A)(i)(I) and (II)), available information regarding the type, quantity, and location of hazardous substances and the time at which such substances were stored, released, or disposed of, as defined in section 120(h) is provided in Exhibit ____, attached hereto and made a part hereof.

B. Description of Remedial Action Taken, if Any, Pursuant to §120(h)(3)(A)(i)(III) of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (42 U.S.C. § 9620(h)(3)(A)(i)(III)):

Pursuant to section 120(h)(3)(A)(i)(III) of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (42 U.S.C. § 9620(h)(3)(A)(i)(III)), a description of the remedial action taken, if any, on the property is provided in Exhibit ____, attached hereto and made a part hereof.

C. Covenant Pursuant to Sections 120(h)(3)(A)(ii) and (B) of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (42 U.S.C. §§ 9620(h)(3)(A)(ii) and (B)):

Pursuant to sections 120(h)(3)(A)(ii) and (B) of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (42 U.S.C. §§ 9620(h)(3)(A)(ii) and (B)), the United States warrants that –

(1) All remedial action necessary to protect human health and the environment with respect to any hazardous substances identified pursuant to section 120(h)(3)(A)(i)(I) of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 remaining on the Property has been taken before the date of this deed, and

(2) Any additional remedial action found to be necessary after the date of this deed shall be conducted by the United States.

D. Access Rights Pursuant to Section 120(h)(3)(A)(iii) of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (42 U.S.C. § 9620(h)(3)(A)(iii)):

The United States retains and reserves a perpetual and assignable easement and right of access on, over, and through the Property, to enter upon the Property in any case in which a remedial action or corrective action is found to be necessary on the part of the United States, without regard to whether such remedial action or corrective action is on the Property or on adjoining or nearby lands. Such easement and right of access includes, without limitation, the right to perform any environmental investigation, survey, monitoring, sampling, testing, drilling, boring, coring, test-pitting, installing monitoring or pumping wells or other treatment facilities, response action, corrective action, or any other action necessary for the United States to meet its responsibilities under applicable laws and as provided for in this instrument. Such easement and right of access shall be binding on the Grantee and its successors and assigns and shall run with the land.

In exercising such easement and right of access, the United States shall provide the Grantee or its successors or assigns, as the case may be, with reasonable notice of its intent to enter upon the Property and exercise its rights under this clause, which notice may be severely curtailed or even eliminated in emergency situations. The United States shall use reasonable means to avoid and to minimize interference with the Grantee's and the Grantee's successors' and assigns' quiet enjoyment of the Property. At the completion of work, the work site shall be reasonably restored. Such easement and right of access includes the right to obtain and use utility services, including water, gas, electricity, sewer, and communications services available on the Property at a reasonable charge to the United States. Excluding the reasonable charges for such utility services, no fee, charge, or compensation will be due the Grantee, nor its successors and assigns, for the exercise of the easement and right of access hereby retained and reserved by the United States.

In exercising such easement and right of access, neither the Grantee nor its successors and assigns, as the case may be, shall have any claim at law or equity against the United States or any officer or employee of the United States based on actions taken by the United States or its officers, employees, agents, contractors of any tier, or servants pursuant to and in accordance with this clause: Provided, however, that nothing in this paragraph shall be considered a waiver by the Grantee, its successors and assigns, of any remedy available to them under the Federal Tort Claims Act.

2. OTHER DEED PROVISIONS:

A. “AS IS” CONDITION OF PROPERTY

a. The Grantee acknowledges that it has inspected or has had the opportunity to inspect the Property and accepts the condition and state of repair of the Property. The Grantee understands and agrees that the Property is conveyed “AS IS” without any representation, warranty, or guaranty by the Grantor as to the quantity, quality, title, character, condition, size, or kind, or that the same is in a suitable condition or fit to be used for the purpose(s) intended by the Grantee, and no claim for allowance or deduction upon such grounds will be considered.

b. No warranties, either express or implied, are given with regard to the condition of the Property including, without limitation, whether the Property does or does not contain asbestos or lead-based paint. The Grantee shall be deemed to have relied solely on its own judgment in assessing the overall condition of the Property including, without limitation, any asbestos, lead-based paint, or other conditions on the Property. Any failure of the Grantee to inspect or to exercise due diligence to be fully informed as to the condition of the Property will not constitute grounds for any claim or demand against the Grantor.

c. Nothing in this “As Is” provision shall be construed to modify or negate the Grantor’s obligation under the “Covenant Pursuant to §120(h)(3)(A)(ii) and (B) of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (42 U.S.C. § 9260(h)(3)(A)(ii) and (B)) or any other statutory obligations.

B. HOLD HARMLESS

a. To the extent authorized by law, the Grantee, for itself, its successors and assigns, covenants and agrees to indemnify and hold harmless the Grantor, its officers, agents, and employees from (1) any and all claims, damages, judgments, losses, and costs, including fines and penalties, arising out of the violation of the covenants, conditions, and restrictions in this deed by the Grantee, its successors and assigns, and (2) any and all claims, damages, judgments, losses, and costs arising out of, or in any manner predicated upon, exposure to asbestos, lead-based paint, mold, pesticide, PCBs or other condition on any portion of the Property after the date of the conveyance herein.

b. The Grantee, for itself, its successors and assigns, covenants and agrees that the Grantor shall not be responsible for any costs associated with modification or termination of the covenants, conditions, and restrictions in this deed including, without limitation, any costs associated with additional investigation or remediation of asbestos, lead-based paint, mold, pesticide, PCBs or other condition on any portion of the Property.

c. Nothing in this “Hold Harmless” provision shall be construed to modify or negate the Grantor’s obligations under the “Covenant Pursuant to §§120(h)(3)(A)(ii) and (B) of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (42 U.S.C. § 9260(h)(3)(A)(ii) and (B))” or any other statutory obligations.

C. POST-TRANSFER DISCOVERY OF CONTAMINATION

a. If an actual or threatened release of a hazardous substance is discovered on the Property after the date of the conveyance herein, the Grantee, its successors or assigns shall be responsible for such release or threatened release of such newly discovered hazardous substance unless the Grantee, its successors or assigns is able to demonstrate that such release or threatened release of a hazardous substance was due to the Grantor's activities, use, or ownership of the Property. If the Grantee, or its successors or assigns believe the newly discovered hazardous substance is due to the Grantor's activities, use, or ownership of the Property, the Grantee, or its successors or assigns shall immediately secure the site and notify the Grantor of the existence of the hazardous substance and the Grantee, or its successors or assigns shall not further disturb or allow the disturbance of such hazardous substance without the prior written permission of the Grantor.

b. The Grantee, for itself, its successors and assigns, as part of the consideration for the conveyance of the Property, hereby releases the Grantor from any liability or responsibility for any claims arising solely out of the release or threatened release of any hazardous substance on the Property occurring after the date of the conveyance herein where such hazardous substance was placed on the Property by the Grantee, or its successors, assigns, employees, invitees, agents, contractors, or any person other than the Grantor after the date of the conveyance herein. This "Post-Transfer Discovery of Contamination" provision shall not affect the Grantor's responsibilities to conduct response actions or corrective actions that are required by applicable laws, rules and regulations, or the Grantor's obligations under the "Covenant Pursuant to Section 120(h)(3)(A)(ii) and (B) of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (42 U.S.C. § 9620(h)(3)(A)(ii) and (B))."

D. ENVIRONMENTAL PROTECTION PROVISIONS

The Environmental Protection Provisions are at Exhibit _____, which is attached hereto and made a part hereof. The Grantee shall neither transfer the property, lease the property, nor grant any interest, privilege, or license whatsoever in connection with the property without the inclusion of the environmental protection provisions contained herein, and shall require the inclusion of the environmental protection provisions in all further deeds, easements, transfers, leases, or grant of any interest, privilege, or license.

ENCLOSURE 6

ENVIRONMENTAL PROTECTION PROVISIONS

The following conditions, restrictions, and notifications will be placed, in a substantially similar form, in the deed and be incorporated therein by reference in order to ensure protection of human health and the environment.

1. LAND USE RESTRICTIONS

A. The United States Department of the Army has undertaken careful environmental study of the Property and concluded that the land use restriction set forth below are required to ensure protection of human health and the environment for Parcel 44 and Parcel 102D Part 2 of 2. The Grantee, its successors or assigns, shall not undertake nor allow any activity on or use of the property that would violate the land use restrictions contained herein.

(1) **Residential Use Restriction.** The Grantee, its successors and assigns, shall not use the Property for residential purposes. For purposes of this provision, residential use includes, but is not limited to, single family or multi-family residences; childcare facilities; and nursing home or assisted living facilities; and any type of educational facility for children/young adults in grades kindergarten through 12.

(2) **Ground Water Restriction.** The Grantee, for itself, its successors and assigns, hereby covenants and agrees not to access or use, or allow access to or use of the ground water underlying the Property for any purpose without the prior written approval of the United States Department of the Army. For the purpose of this restriction, "ground water" shall have the same meaning as in section 101(12) of the CERCLA. Notwithstanding the foregoing, the following activities and impacts shall be permissible and shall not violate the aforesaid restriction if conducted in compliance with all applicable laws and regulations: (i) dewatering solely because of incidental contact with ground water from construction and/or improvements on the Property; (ii) incidental pumping of ground water associated with preventing moisture from entering a sub-grade structure (i.e., sump pump); and (iii) ground water monitoring wells solely for the purpose of performing environmental sampling and/or monitoring.

(3) **Notice of Groundwater Monitoring Wells.** The Grantee is hereby informed and does acknowledge the presence of three groundwater monitoring wells on the Property. The monitoring wells are shown on the attached map Exhibit 1. The wells to be protected include M5MW 09, M5MW20, and M5MW23. The Grantee shall not disturb or permit others to disturb the monitoring wells without prior written approval from the Grantor and the New Jersey Department of Environmental Protection. Upon the Grantor's determination that the wells are no longer necessary, the Grantor will close the wells at the Army's sole cost and expense in accordance with applicable laws, regulations, and ordinances. These wells may be used in supporting the groundwater Classification Exception Area (CEA) established as part of the landfill closure.

(4) **Landfill Restriction.** The Property (Portion of Parcel 44 and Parcel 102D Part 2 of 2 has a landfill). The Grantee, its successors and assigns, shall not conduct or permit others to conduct any excavation activities (i.e. digging, drilling, or any other excavation or disturbance of the land surface or subsurface) or other activities, which may damage the Landfill Parcels soil cover, without prior written approval from the Army and the NJDEP. A site map depicting the location of the landfill is provided as Exhibit 2 (Site Map of Property).

(5) **NJDEP Deed Notice:** These restrictions are further recorded in deed notice(s). The Deed Notices are provided as Exhibit 3 and are included as part of this deed and will be recorded with the deed.

B. Modifying or Terminating the Restrictions. Nothing contained herein shall preclude the Grantee, its successors or assigns from undertaking, in accordance with applicable laws and regulations and without any cost to the Grantor, such action as would be necessary to allow access to or use of the ground water underlying the Property. Prior to any such use of the ground water restricted under the paragraph above, the Grantee shall consult with and obtain the approval of the Grantor. Upon the Grantee's obtaining the approval of the Grantor, the Grantor agrees to prepare and execute an instrument modifying or terminating, as appropriate, the land use restriction set forth herein. The recordation of any such instrument in the land records of Monmouth County, New Jersey shall be the responsibility of the Property owner and shall be accomplished at no additional cost to the Department of the Army.

C. Submissions. The Grantee, its successors and assigns shall submit any requests for modification or termination of the restrictions set forth herein to the Grantor, by first class mail, postage prepaid, addressed as follows:

Grantor:

Headquarters Department of the Army
Office of the Assistant Secretary of the Army
Installations, Energy and Environment
110 Army Pentagon Room 3E464
Washington, D.C. 20310-0110

With a copy to:

U.S. Army Engineer District, New York
26 Federal Plaza, Room 2007 (CENAN-RE-M)
New York, NY 10278

And

New Jersey Department of Environmental Protection
Contaminated Site Remediation & Redevelopment
Bureau of Case Management

401 East State Street, P.O. Bos 420
Mail Code 401-05F
Trenton, N.J. 08625-0402

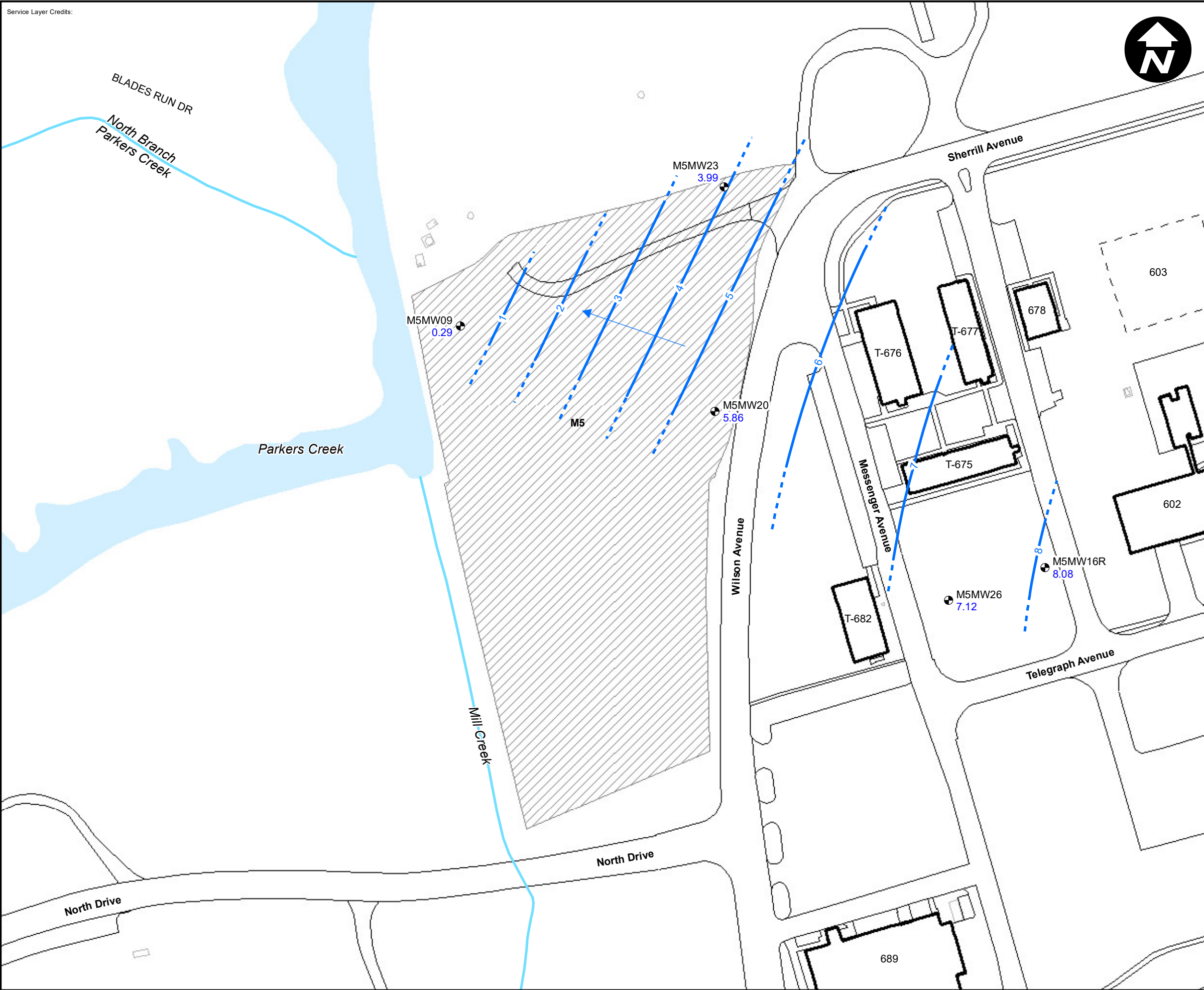
2. NOTICE OF THE PRESENCE OF PESTICIDES AND COVENANT

A. The Grantee is hereby notified and acknowledges that registered pesticides have been applied to the Property conveyed herein and may continue to be present thereon. The Grantor and Grantee know of no use of any registered pesticide in a manner (1) inconsistent with its labeling or with the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) (7 U.S.C. § 136, et seq.) and other applicable laws and regulations, or (2) not in accordance with its intended purpose.

B. The Grantee covenants and agrees for itself, its successors and assigns that if the Grantee takes any action with regard to the Property, including demolition of structures or any disturbance or removal of soil that may expose, or cause a release of, a threatened release of, or an exposure to, any such pesticide, the Grantee assumes all responsibility and liability therefor.

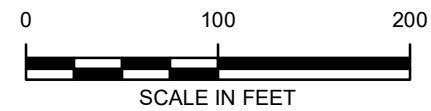
ENVIRONMENTAL PROTECTION PROVISIONS EXHIBIT 1

CITY: NOVI, MI DIV: ENV DB: TRY PIC: PM: TM: TR: PROJECT NUMBER: COORDINATE SYSTEM: NAD 1983 StatePlane New Jersey FIPS 2900 Feet
D:\GIS\Project Files\FortMonmouth\Oceanport\Documents\FTMM5\GaugingEvents\FTMM5_GaugingEvent_2023_qtr4.mxd PLOTTED: 3/1/2024 5:07:45 PM BY: TYarborough



- LEGEND:**
- MONITORING WELL
 - 3.49 GROUNDWATER ELEVATION (FT AMSL)
 - GROUNDWATER FLOW DIRECTION
 - Q4 2023 GROUNDWATER ELEVATION CONTOUR (DASHED WHERE INFERRED)
 - FT FEET
 - AMSL ABOVE MEAN SEA LEVEL

THE WELL LOCATIONS DEPICTED ON THIS FIGURE ARE BASED ON THE INFORMATION DERIVED FROM THE SEPTEMBER 11, 2019 SURVEY TITLED "WELL MASTER LOG (REV SEP 11, 2019)". LOCATIONS NOT CONTAINED IN THIS SURVEY WERE DERIVED FROM THE ORIGINAL PROJECT DATASET TITLED "WATER WELL POINT".



FORT MONMOUTH
OCEANPORT, NEW JERSEY

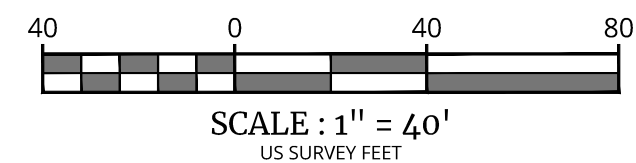
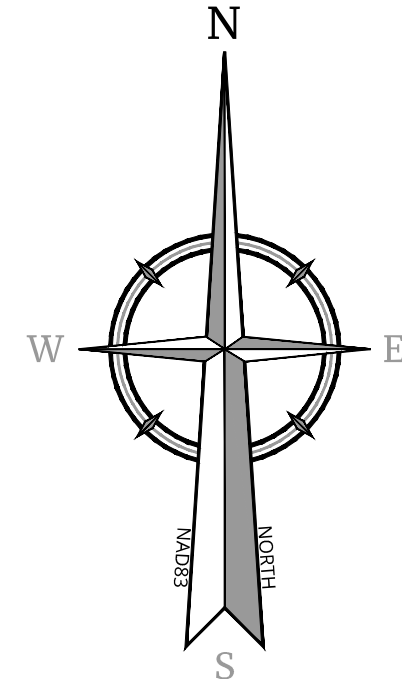
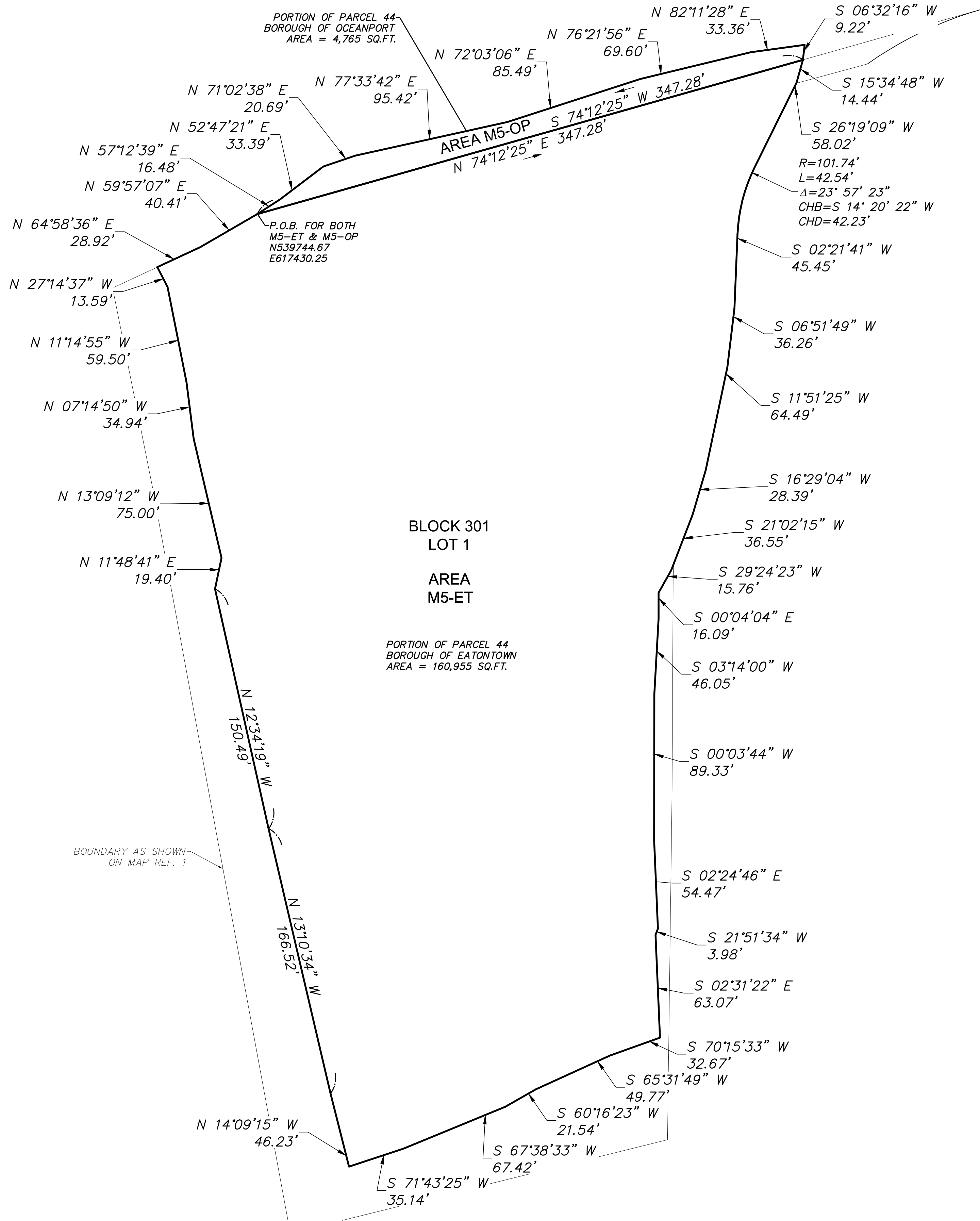
**FTMM-5 SITE GROUNDWATER
ELEVATION - FOURTH QUARTER 2023**



FIGURE
18

ENVIRONMENTAL PROTECTION PROVISIONS EXHIBIT 2

R:\Projects\2024\4005753A\Drawings\CD\DEED RESTRICTION.dwg (10/10/2024 1:45:46 PM) By: T.HUGG on 10/10/2024 1:45:46 PM



GENERAL NOTES

- THE SOLE PURPOSE OF THIS PLAN IS TO SHOW THE DEED RESTRICTION AREAS WITHIN LANDFILL FTMM-05.
- BOUNDARIES SHOWN HEREON ARE BASED ON THE REFERENCE MAPS LISTED BELOW
- HORIZONTAL DATUM IS RELATIVE TO NAD83, VERTICAL DATUM IS RELATIVE TO NAVD88.
- BOUNDARY AND EXISTING TOPOGRAPHY OUTSIDE OF COLLIERS ENGINEERING & DESIGN FIELD SURVEY LIMITS ARE SHOWN PER MAP REFERENCE 1.

REFERENCES

- PLANS ENTITLED:
 - "Fort Monmouth Economic Revitalization Authority, Portion of Lot 1, Block 301 (Borough of Eatontown) and Portion of Lot 4, Block 110 (Borough of Oceanport) Borough of Eatontown and Borough of Oceanport, Monmouth County, New Jersey, Exhibit Map Showing a Portion of Environmental Carveout Parcel 44(M5)", dated July 8, 2025, prepared by T and M
 - "FTMM-05 Encroachment Exhibit, Oceanport & Eatontown Borough, Monmouth County, New Jersey" dated March 23, 2023, prepared by SAM
 - "Remedial Action Report Landfill Capping at Fort Monmouth, Oceanport, Monmouth County, New Jersey" dated August 2022, prepared by AECOM.

Colliers

Engineering
& Design

www.colliersengineering.com

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EA ENGINEERING,
SCIENCE &
TECHNOLOGY, INC., PBC

REMEDIAL ACTION
REPORT LANDFILL
CAPPING AT FORT
MONMOUTH

OCEANPORT, FORT
MONMOUTH, NJ

R Thomas Hugg

NEW JERSEY LICENSED PROFESSIONAL LAND SURVEYOR
LICENSE NUMBER: G536737
COLLIERS ENGINEERING & DESIGN, INC.
N.J. C.O.A. #: 24GA27986500

Colliers

Engineering
& Design

EGG HARBOR

500 Scarborough Drive,
Suite 108
Egg Harbor Township, NJ 08234
Phone: 609.910.4068
COLLIERS ENGINEERING & DESIGN, INC.

SCALE:	DRAWN BY:
AS SHOWN	DMS
DESIGNED BY:	REVIEWED BY:
	RTH
DATE ISSUED:	PROJECT NUMBER:
OCT., 2025	24005753A
SHEET NAME:	

FTMM-05
DEED RESTRICTION
EXHIBIT

DRAWING NUMBER:

01 of 01

NOTE: DO NOT SCALE DRAWINGS FOR CONSTRUCTION.

ENVIRONMENTAL PROTECTION PROVISIONS EXHIBIT 3



DEPARTMENT OF THE ARMY
OFFICE OF THE ASSISTANT SECRETARY OF THE ARMY
INSTALLATIONS, ENERGY AND ENVIRONMENT
110 ARMY PENTAGON
WASHINGTON, DC 20310-0110

November 17, 2025

SUBJECT: Fort Monmouth, NJ. Remedial Action Report. FTMM-05 Landfill Deed Notices
PIG000000032

Mr. Ashish Joshi
New Jersey Department of Environmental Protection
Contaminated Site Remediation and Redevelopment
Division of Remediation Management
410 East State Street
P.O. Box 420 Mail Code 401-05M
Trenton, NJ 08625-0420

Dear Mr. Joshi:

Attached please find two deed notices covering the FTMM-05 Landfill at Fort Monmouth New Jersey. The Remedial Action Completion Report (RACR) for the FTMM-05 landfill was submitted on August 22, 2025 but did not include the draft deed notices (as Appendix E). This submittal provides the information to complete the RACR. One of the deed notices covers the portion of landfill FTMM-05 in Eatontown and one of the deed notices covers the portion of landfill FTMM-05 in Oceanport.

Please contact Steve Cardon at 301-789-7467 or steve.cardon@calibresys.com or me at 703-545-2487 or Thomas.A.Lineer.civ@army.mil if you have any questions or comments.

Sincerely,

LINEER.THOMAS.ALD
EN.1172258375

Digitally signed by
LINEER.THOMAS.ALDEN.1172258375
Date: 2025.11.17 14:15:12 -05'00'

Thomas A. Lineer
Program Manager
Office of the Assistant Secretary of Army (IE&E)
Base Realignment and Closure Office

Enclosure

cc: Joseph Fallon
Steve Cardon, BRAC Environmental Coordinator
FMERA



New Jersey Department of Environmental Protection

Site Remediation Program

Report Certifications for RCRA GPRA 2020, CERCLA, and Federal Facility Sites

These certifications are to be used for reports submitted for RCRA GPRA 2020, CERCLA, and Federal Facility Sites. The Department has developed guidance for report certifications for RCRA GPRA 2020, CERCLA, and Federal Facility Sites under traditional oversight. The "Person Responsible for Conducting the Remediation Information and Certification" is required to be submitted with each report.

Document: Deed Notices for Landfill FTMM-05

Fort Monmouth, New Jersey

Preferred ID: G000000032

PERSON RESPONSIBLE FOR CONDUCTING THE REMEDIATION INFORMATION AND CERTIFICATION

Full Legal Name of the Person Responsible for Conducting the Remediation: Thomas Lineer

Representative First Name: Thomas Representative Last Name: Lineer

Title: BRAC Program Manager

Phone Number: (703) 545-2487 Ext: Fax:

Mailing Address: Pentagon Room 5B112, 600 Army Pentagon

City/Town: Washington State: DC Zip Code: 2310-0600

Email Address: thomas.a.lineer.civ@army.mil

This certification shall be signed by the person responsible for conducting the remediation who is submitting this notification in accordance with Administrative Requirements for the Remediation of Contaminated Sites rule at N.J.A.C. 7:26C-1.5(a).

I certify under penalty of law that I have personally examined and am familiar with the information submitted herein, including all attached documents, and that based on my inquiry of those individuals immediately responsible for obtaining the information, to the best of my knowledge, I believe that the submitted information is true, accurate and complete. I am aware that there are significant civil penalties for knowingly submitting false, inaccurate, or incomplete information and that I am committing a crime of the fourth degree if I make a written false statement which I do not believe to be true. I am also aware that if I knowingly direct or authorize the violation of any statute, I am personally liable for the penalties.

Signature: LINEER.THOMAS.ALDEN.1172258375 Digitally signed by LINEER.THOMAS.ALDEN.1172258375
Date: 2025.11.17 14:11:43 -05'00'

Name/Title: Thomas Lineer, BRAC Program Manager

Date

Return Address:
U.S. Army Base Realignment and Closure (BRAC)
Attn: Thomas Lineer, Program Manager
Pentagon Room 5B112 600 Army Pentagon
Washington, DC 20301

Instrument Number

DEED NOTICE

IN ACCORDANCE WITH N.J.S.A. 58:10B-13, THIS DOCUMENT IS TO BE
RECORDED IN THE SAME MANNER AS ARE DEEDS AND OTHER INTERESTS IN
REAL PROPERTY.

Prepared by: _____
[Signature]

[Print name below signature]

Recorded by: _____
[Signature, Officer of County Recording Office]

[Print name below signature]

DEED NOTICE

This Deed Notice is made as of the ____ day of ____, ____, by the United States of
America (together with his/her/its/their successors and assigns, collectively "Owner").

1. THE PROPERTY. The United States of America, with an address of 26 Federal Plaza,
New York is the owner in fee simple of certain real property designated as Block 301 and a
portion of Lot1 (within Parcel 44) on the tax map of the Borough of Eatontown, Monmouth
County, New Jersey; the New Jersey Department of Environmental Protection Program Interest
Number (Preferred ID) for the contaminated site which includes this property is G000000032;
and the property is more particularly described in Exhibit A, which is attached hereto and made a
part hereof (the "Property").

2. REMEDIATION.

i. The New Jersey Department of Environmental Protection has approved this Deed Notice as an institutional control for the Property, which is part of the remediation of the Property.

ii. The Property was remediated under the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (42 U.S.C. §9601 et. seq.) by the United States Department of the Army. Any future soil remediation activities will be conducted by the then Owner in accordance with N.J.A.C. 7:26C-7 which requires the Owner, among other persons, to obtain a soil remedial action permit for the soil remedial action at the Property.

3. SOIL CONTAMINATION. The United States Army has remediated contaminated soil at the Property, such that soil contamination remains at certain areas of the Property that contains contaminants in concentrations that do not allow for the unrestricted use of the Property. Such soil contamination is described, including the type, concentration and specific location of such contamination, and the existing engineering controls on the site are described, in Exhibit B, which is attached hereto and made a part hereof. As a result, there is a statutory requirement for this Deed Notice and engineering controls in accordance with N.J.S.A. 58:10B-13.

4. CONSIDERATION. In accordance with the remedial action for the site which included the Property, and in consideration of the terms and conditions of that remedial action, and other good and valuable consideration, Owner has agreed to subject the Property to certain statutory and regulatory requirements that impose restrictions upon the use of the Property, to restrict certain uses of the Property, and to provide notice to subsequent owners, lessors, lessees and operators of the Property of the restrictions and the monitoring, maintenance, and biennial certification requirements outlined in this Deed Notice and required by law, as set forth herein.

5A. RESTRICTED AREAS. Due to the presence of contamination remaining at concentrations that do not allow for unrestricted use, the Owner has agreed, as part of the remedial action for the Property, to restrict the use of certain parts of the Property (the "Restricted Areas"); a narrative description of these restrictions is provided in Exhibit C, which is attached hereto and made a part hereof. The Owner has also agreed to maintain a list of these restrictions on site for inspection by governmental officials.

5B. RESTRICTED LAND USES. The following statutory land use restrictions apply to the Restricted Areas:

i. The Brownfield and Contaminated Site Remediation Act, N.J.S.A. 58:10B-12.g(10), prohibits the conversion of a contaminated site, remediated to non-residential soil remediation standards that require the maintenance of engineering or institutional controls, to a child care facility, or public, private, or charter school without the Department's prior written approval, unless a presumptive remedy is implemented; and

ii. The Brownfield and Contaminated Site Remediation Act, N.J.S.A. 58:10B-12.g(12), prohibits the conversion of a landfill, with gas venting systems and or leachate collection systems, to a single family residence or a child care facility.

5C. ENGINEERING CONTROLS. Due to the presence and concentration of these contaminants, the Owner has also agreed, as part of the remedial action for the Property, to the placement of certain engineering controls on the Property; a narrative description of these engineering controls is provided in Exhibit C.

6A. CHANGE IN OWNERSHIP AND REZONING.

i. The Owner and the subsequent owners, lessors, and lessees, shall cause all leases, grants, and other written transfers of an interest in the Restricted Areas to contain a provision expressly requiring all holders thereof to take the Property subject to the restrictions contained herein and to comply with all, and not to violate any of the conditions of this Deed Notice. Nothing contained in this Paragraph shall be construed as limiting any obligation of any person to provide any notice required by any law, regulation, or order of any governmental authority.

ii. The Owner and the subsequent owners shall provide written notice to the Department of Environmental Protection on a form provided by the Department and available at www.nj.gov/srp/forms within 30 calendar days after the effective date of any conveyance, grant, gift, or other transfer, in whole or in part, of the Owner's or subsequent owner's interest in the Restricted Area.

iii. The Owner and the subsequent owners shall provide written notice to the Department, on a form available from the Department at www.nj.gov/srp/forms, within thirty (30) calendar days after the owner's petition for or filing of any document initiating a rezoning of the Property to residential.

6B. SUCCESSORS AND ASSIGNS. This Deed Notice shall be binding upon Owner and upon Owner's successors and assigns, and subsequent owners, lessors, lessees and operators while each is an owner, lessor, lessee, or operator of the Property.

7A. ALTERATIONS, IMPROVEMENTS, AND DISTURBANCES.

i. The Owner and all subsequent owners, lessors, and lessees shall notify any person, including, without limitation, tenants, employees of tenants, and contractors, intending to conduct invasive work or excavate within the Restricted Areas, of the nature and location of contamination in the Restricted Areas, and, of the precautions necessary to minimize potential human exposure to contaminants.

ii. Except as provided in Paragraph 7B, below, no person shall make, or allow to be made, any alteration, improvement, or disturbance in, to, or about the Property which disturbs any engineering control at the Property without first retaining a licensed site remediation professional. Nothing herein shall constitute a waiver of the obligation of any

person to comply with all applicable laws and regulations including, without limitation, the applicable rules of the Occupational Safety and Health Administration.

iii. A soil remedial action permit modification is required for any permanent alteration, improvement, or disturbance and the owner, lessor, lessee or operator shall submit the following within 30 days after the occurrence of the permanent alteration, improvement, or disturbance:

(A) A Remedial Action Workplan or Linear Construction Project notification and Final Report Form, whichever is applicable;

(B) A Remedial Action Report and Termination of Deed Notice Form; and

(C) A revised recorded Deed Notice with revised Exhibits, and Remedial Action Permit or Permit Modification or Remedial Action Permit Termination form and Remedial Action Report.

iv. No owner, lessor, lessee or operator shall be required to obtain a Remedial Action Permit or Permit Modification for any temporary alteration, improvement, or disturbance, provided that the site is restored to the condition described in the Exhibits to this Deed Notice, and the owner, lessee, or operator complies with the following:

(A) Restores any disturbance of an engineering control to pre-disturbance conditions within 60 calendar days after the initiation of the alteration, improvement or disturbance;

(B) Ensures that all applicable worker health and safety laws and regulations are followed during the alteration, improvement, or disturbance, and during the restoration;

(C) Ensures that human exposure to contamination in excess of the remediation standards does not occur; and

(D) Describes, in the next biennial certification the nature of the temporary alteration, improvement, or disturbance, the dates and duration of the temporary alteration, improvement, or disturbance, the name of key individuals and their affiliations conducting the temporary alteration, improvement, or disturbance, the notice the Owner gave to those persons prior to the disturbance.

7B. EMERGENCIES. In the event of an emergency which presents, or may present, an unacceptable risk to the public health and safety, or to the environment, or an immediate environmental concern, see N.J.S.A. 58:10C-2, any person may temporarily breach an engineering control provided that that person complies with each of the following:

i. Immediately notifies the Department of Environmental Protection of the emergency, by calling the DEP Hotline at 1-877-WARNDEP or 1-877-927-6337;

ii. Hires a Licensed Site Remediation Professional (unless the Restricted Areas includes an unregulated heating oil tank) to respond to the emergency;

iii. Limits both the actual disturbance and the time needed for the disturbance to the minimum reasonably necessary to adequately respond to the emergency;

iv. Implements all measures necessary to limit actual or potential, present or future risk of exposure to humans or the environment to the contamination;

v. Notifies the Department of Environmental Protection when the emergency or immediate environmental concern has ended by calling the DEP Hotline at 1-877-WARNDEP or 1-877-927-6337;

vi. Restores the engineering control to the pre-emergency conditions as soon as possible; and

vii. Submits to the Department of Environmental Protection within 60 days after completion of the restoration of the engineering control, a report including: (a) the nature and likely cause of the emergency; (b) the measures that have been taken to mitigate the effects of the emergency on human health and the environment; (c) the measures completed or implemented to restore the engineering control; and (d) any changes to the engineering control or site operation and maintenance plan to prevent reoccurrence of such conditions in the future.

8. TERMINATION OF DEED NOTICE.

i. This Deed Notice may be terminated only upon recording a Department-approved Termination of Deed Notice, available at N.J.A.C. 7:26C Appendix C, with the office of the Office of Records Management, a Division of the Monmouth County Clerk's Office of Monmouth County, New Jersey, expressly terminating this Deed Notice.

ii. Within 30 calendar days after recording a Department-approved Termination of Deed Notice, the owner of the property should apply to the Department for termination of the soil remedial action permit (if present) pursuant to N.J.A.C. 7:26C-7.

9. ACCESS. The Owner, and the subsequent owners, lessors, lessees, and operators agree to allow the Department, its agents and representatives access to the Property to inspect and evaluate the continued protectiveness of the remedial action that includes this Deed Notice and to conduct additional remediation to ensure the protection of the public health and safety and of the environment if the subsequent owners, lessors, lessees, and operators, during their ownership, tenancy, or operation, and the Owner fail to conduct such remediation pursuant to this Deed Notice as required by law. The Owner, and the subsequent owners, lessors, and lessees, shall also cause all leases, subleases, grants, and other written transfers of an interest in the Restricted Areas to contain a provision expressly requiring that all holders thereof provide such access to the Department.

10. ENFORCEMENT OF VIOLATIONS.

i. This Deed Notice itself is not intended to create any interest in real estate in favor of the Department of Environmental Protection, nor to create a lien against the Property, but merely is intended to provide notice of certain conditions and restrictions on the Property and to reflect the regulatory and statutory obligations imposed as a conditional remedial action for this site.

ii. The restrictions provided herein may be enforceable solely by the Department against any person who violates this Deed Notice. To enforce violations of this Deed Notice, the Department may initiate one or more enforcement actions pursuant to N.J.S.A. 58:10-23.11, and N.J.S.A. 58:10C, and require additional remediation and assess damages pursuant to N.J.S.A. 58:10-23.11, and N.J.S.A. 58:10C.

11. SEVERABILITY. If any court of competent jurisdiction determines that any provision of this Deed Notice requires modification, such provision shall be deemed to have been modified automatically to conform to such requirements. If a court of competent jurisdiction determines that any provision of this Deed Notice is invalid or unenforceable and the provision is of such a nature that it cannot be modified, the provision shall be deemed deleted from this instrument as though the provision had never been included herein. In either case, the remaining provisions of this Deed Notice shall remain in full force and effect.

12A. EXHIBIT A. Exhibit A includes the following maps of the Property and the vicinity:

i. Exhibit A-1: Vicinity Map - A map that identifies by name the roads, and other important geographical features in the vicinity of the Property (for example, USGS Quad map, Hagstrom County Maps);

ii. Exhibit A-2: Metes and Bounds Description - A tax map of lots and blocks as wells as metes and bounds description of the Property, including reference to tax lot and block numbers for the Property;

iii. Exhibit A-3: Property Map - A scaled map of the Property, scaled at one inch to 200 feet or less, and if more than one map is submitted, the maps shall be presented as overlays, keyed to a base map; and the Property Map shall include diagrams of major surface topographical features such as buildings, roads, and parking lots.

12B. EXHIBIT B. Exhibit B includes the following descriptions of the Restricted Areas:

i. Exhibit B-1: Restricted Area Map -- A separate map for each restricted area that includes:

(A) As-built diagrams of each engineering control, including caps, fences, slurry walls, (and, if any) ground water monitoring wells, extent of the ground water

classification exception area, pumping and treatment systems that may be required as part of a ground water engineering control in addition to the deed notice;

(B) As-built diagrams of any buildings, roads, parking lots and other structures that function as engineering controls; and

(C) Designation of all soil and all upland sediment sample locations within the restricted areas that exceed any soil standard that are keyed into one of the tables described in the following paragraph.

ii. Exhibit B-2: Restricted Area Data Table - A separate table for each restricted area that includes either (A) or (B) through (F):

(A) Only for historic fill extending over the entire site or a portion of the site and for which analytical data are limited or do not exist, a narrative that states that historic fill is present at the site, a description of the fill material (e.g., ash, cinders, brick, dredge material), and a statement that such material may include, but is not limited to, contaminants such as PAHs and metals;

(B) Sample location designation from Restricted Area map (Exhibit B-1);

(C) Sample elevation based upon mean sea level;

(D) Name and chemical abstract service registry number of each contaminant with a concentration that exceeds the unrestricted use standard;

(E) The restricted and unrestricted use standards for each contaminant in the table; and

(F) The remaining concentration of each contaminant at each sample location at each elevation.

12C. EXHIBIT C. Exhibit C includes narrative descriptions of the institutional controls and engineering controls as follows:

i. Exhibit C-1: Deed Notice as Institutional Control: Exhibit C-1 includes a narrative description of the restriction and obligations of this Deed Notice that are in addition to those described above, as follows:

(A) Description and estimated size in acres of the Restricted Areas as described above;

(B) Description of the restrictions on the Property by operation of this Deed Notice; and

(C) The objective of the restrictions.

ii. Exhibit C-2: Vegetative Landfill Cap: Exhibit C-2 includes a narrative description of the Vegetative Landfill Cap as follows:

- (A) Description of the engineering control;
- (B) The objective of the engineering control; and
- (C) How the engineering control is intended to function.

13. SIGNATURES. IN WITNESS WHEREOF, Owner has executed this Deed Notice as of the date first written above.

[If Owner is an individual]

WITNESS: _____
[Signature]

[Print name below signature]

STATE OF NEW JERSEY SS.:
COUNTY OF MONMOUTH

I certify that on _____, 20__, [Name of Owner] personally came before me, and this person acknowledged under oath, to my satisfaction, that this person [or if more than one person, each person]

- (a) is named in and personally signed this document; and
- (b) signed, sealed and delivered this document as his or her act and deed.

_____, Notary Public
[Print Name and Title]

13. SIGNATURES. IN WITNESS WHEREOF, Owner has executed this Deed Notice as of the date first written above.

[If Owner is a general or limited partnership]
WITNESS: _____
[Name of partnership]

[Signature] By:_____, General Partner
[Signature]

[Print name and title] [Print name]

STATE OF NEW JERSEY SS.:
COUNTY OF MONMOUTH

I certify that on _____, 20____, [Name of person executing document on behalf of owner partnership] personally came before me, and this person acknowledged under oath, to my satisfaction, that this person:

(a) Is a general partner of [Owner], the partnership named in this document;

(b) Signed, sealed and delivered this document as his or her act and deed in his capacity as a general partner of [Owner]; and

(c) This document was signed and delivered by such partnership as its voluntary act, duly authorized.

_____, Notary Public
[Signature]

[Print name]

14. SIGNATURES. IN WITNESS WHEREOF, Owner has executed this Deed Notice as of the date first written above.

[If Owner is a corporation]

ATTEST: [Name of corporation]

By _____

[Print name and title] [Signature]

STATE OF NEW JERSEY SS.:

COUNTY OF MONMOUTH

I certify that on _____, 20____, [Name of person executing document on behalf of Owner] personally came before me, and this person acknowledged under oath, to my satisfaction, that:

(a) this person is the [secretary/assistant secretary] of [Owner], the corporation named in this document;

(b) this person is the attesting witness to the signing of this document by the proper corporate officer who is the [president/vice president] of the corporation;

(c) this document was signed and delivered by the corporation as its voluntary act and was duly authorized;

(d) this person knows the proper seal of the corporation which was affixed to this document; and

(e) this person signed this proof to attest to the truth of these facts.

[Signature]

[Print name and title of attesting witness]

Signed and sworn before me on _____, 20____

_____, Notary Public

[Print name and title]

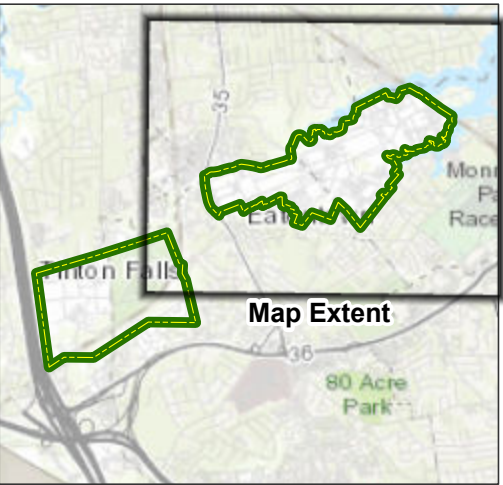
EXHIBIT A

EXHIBIT A

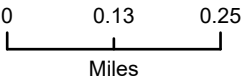
Exhibit A includes the following maps of the subject property and the vicinity, as specified per New Jersey Department of Environmental Protection (NJDEP) in Appendix B of the Administrative Requirements for the Remediation of Contaminated Sites (ARRCS) in N.J.A.C. 7:26C.

- i. Exhibit A-1: Vicinity Map
- ii. Exhibit A-2A: In lieu of a tax map, a parcel status map prepared by the Fort Monmouth Economic Revitalization Authority is provided. Updated tax maps showing the current municipal boundary between Oceanport and Eatontown are pending preparation. The parcel status map shows Block 301, Lot 1 (portion thereof) of Eatontown, within which the Property is located.
- iii. Exhibit A-2B: Metes and bounds descriptions of the Property.
- iv. Exhibit A-2C: Metes and bounds descriptions of the restricted area.
- v. Exhibit A-2D: Survey drawing of the Property and the restricted area.
- vi. Exhibits A-3A and A-3B: Property maps for the subject property with the restricted area's location, adjacent parcels, adjacent roadways, paved areas, buildings, and streams.

Exhibit A-1: Vicinity Map



- Legend**
- Installation Boundary
 - Approximate Landfill Boundary



Data Sources: ESRI

Various Landfill Actions
Fort Monmouth, Monmouth County, New Jersey

Landfill Location



Exhibit A-2A: Parcel Map

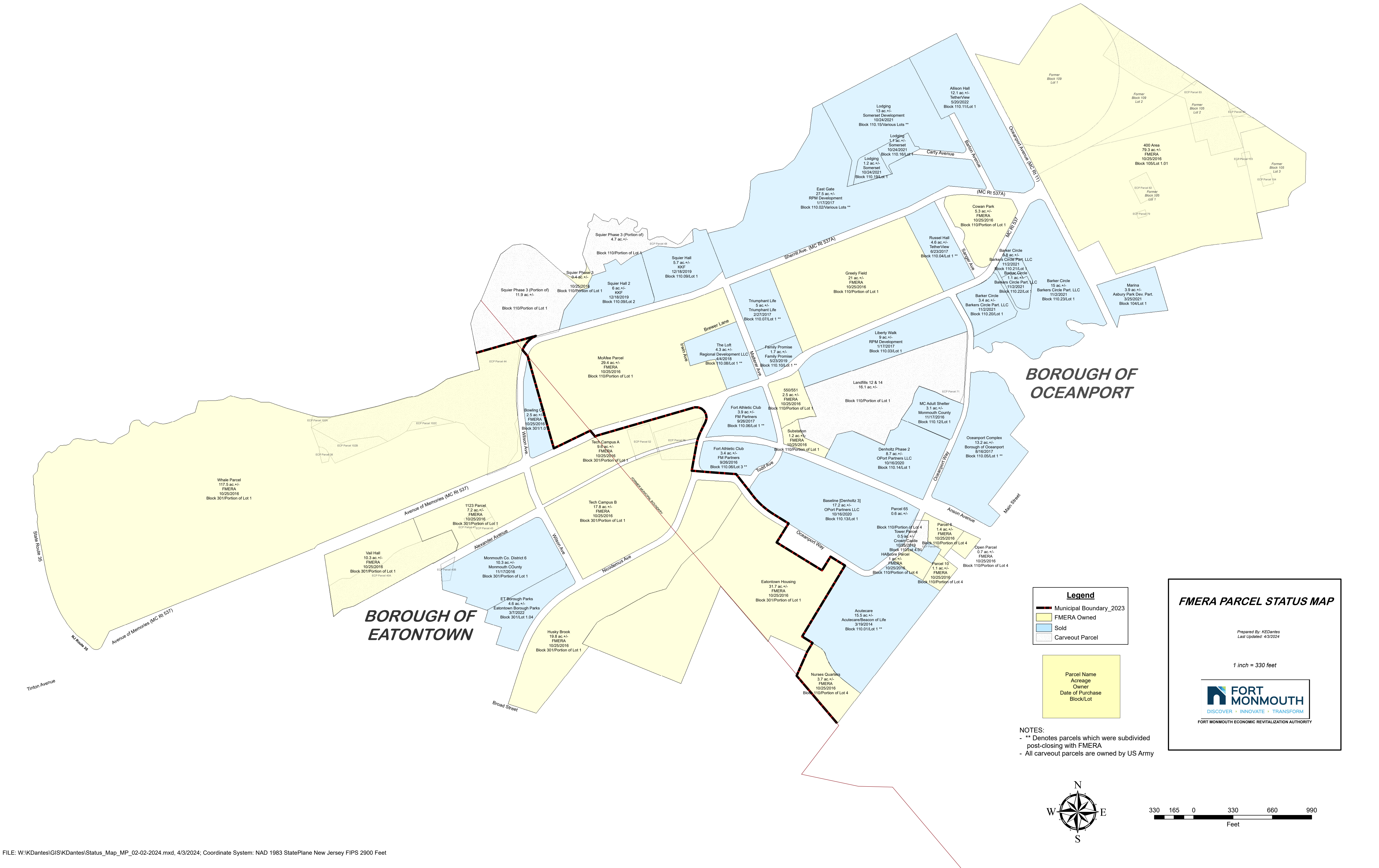


Exhibit A-2B: Property Metes and Bounds

DESCRIPTION OF RESTRICTED AREA (M5-ET) PORTION OF PARCEL 44
BOROUGH OF EATONTOWN
MONMOUTH COUNTY, NEW JERSEY
PROJECT NO. 24005753A
OCTOBER 23, 2025

All that certain lot, tract or parcel of land situate, lying and being in the Borough of Eatontown, in the County of Monmouth and the State of New Jersey, and being a portion of Parcel 44, Lot 1, Block 301, as shown on a map entitled: "Fort Monmouth Economic Revitalization Authority, Portion of Lot 1, Block 301 (Borough of Eatontown) and Portion of Lot 4, Block 110 (Borough of Oceanport) Borough of Eatontown and Borough of Oceanport, Monmouth County, New Jersey, Exhibit Map Showing a Portion of Environmental Carveout Parcel 44(M5), dated July 8, 2025, prepared by T and M. Also including the encroachment area, as shown on a map entitled: "FTMM-05 Encroachment Exhibit, Oceanport & Eatontown Borough, Monmouth County, New Jersey dated March 23, 2023, prepared by SAM. Additionally referencing a map entitled, "Remedial Action Report Landfill Capping at Fort Monmouth, Oceanport, Monmouth County, New Jersey" dated August 2022, prepared by AECOM, and being more particularly bounded and described as follows, to wit:

Beginning at a point in the northerly line of the herein described restricted area, said point being the same point of beginning for area M5-OP, as shown on the above referenced Fort Monmouth plan, and having the following New Jersey State Plane NAD83 coordinates, N 539744.67, E 617430.25, and running, thence –

1. **N 74° 12' 25" E, 347.28 feet**, through a portion of aforementioned Parcel 44, along the aforesaid northerly line of the herein described restricted area, to a point in the easterly line of the same, thence –
2. **S 15° 34' 48" W, 14.44 feet**, still through the same, along the aforesaid easterly line of the herein described restricted area, to a point in the same, thence –
3. **S 26° 19' 09" W, 58.02 feet**, still through the same, still along the aforesaid easterly line of the herein described restricted area, to a point of curvature in the same, thence –
4. **SOUTHWESTWARDLY** on an arc having a radius of **101.74 feet** and curving to the left an arc distance of **42.54 feet**, still through the same, still along the aforesaid easterly line of the herein described restricted area, to a point of tangency in the same, thence –
5. **S 02° 21' 41" W, 45.45 feet**, still through the same, still along the aforesaid easterly line of the herein described restricted area, to a in the same, thence –

6. **S 06° 51' 49" W, 36.26 feet**, still through the same, along the aforesaid easterly line of the herein described restricted area, to a point in the same, thence –
7. **S 11° 51' 25" W, 64.49 feet**, still through the same, along the aforesaid easterly line of the herein described restricted area, to a point in the same, thence –
8. **S 16° 29' 04" W, 28.39 feet**, still through the same, along the aforesaid easterly line of the herein described restricted area, to a point in the same, thence –
9. **S 21° 02' 15" W, 36.55 feet**, still through the same, along the aforesaid easterly line of the herein described restricted area, to a point in the same, thence –
10. **S 29° 24' 23" W, 15.76 feet**, still through the same, along the aforesaid easterly line of the herein described restricted area, to a point in the same, thence –
11. **S 00° 04' 04" E, 16.09 feet**, still through the same, along the aforesaid easterly line of the herein described restricted area, to a point in the same, thence –
12. **S 03° 14' 00" W, 46.05 feet**, still through the same, along the aforesaid easterly line of the herein described restricted area, to a point in the same, thence –
13. **S 00° 03' 44" W, 89.33 feet**, still through the same, along the aforesaid easterly line of the herein described restricted area, to a point in the same, thence –
14. **S 02° 24' 46" W, 54.47 feet**, still through the same, along the aforesaid easterly line of the herein described restricted area, to a point in the same, thence –
15. **S 21° 51' 34" W, 3.98 feet**, still through the same, along the aforesaid easterly line of the herein described restricted area, to a point in the same, thence –
16. **S 02° 31' 22" W, 63.07 feet**, still through the same, along the aforesaid easterly line of the herein described restricted area, to a point in the southerly line of the same, thence –
17. **S 70° 15' 33" W, 32.67 feet**, still through the same, along the aforesaid southerly line of the herein described restricted area, to a point in the same, thence –

18. **S 65° 31' 49" W, 49.77 feet**, still through the same, still along the aforesaid southerly line of the herein described restricted area, to a point in the same, thence –
19. **S 60° 16' 23" W, 21.54 feet**, still through the same, still along the aforesaid southerly line of the herein described restricted area, to a point in the same, thence –
20. **S 67° 38' 33" W, 67.42 feet**, still through the same, still along the aforesaid southerly line of the herein described restricted area, to a point in the same, thence –
21. **S 71° 43' 25" W, 35.14 feet**, still through the same, still along the aforesaid southerly line of the herein described restricted area, to a point in westerly line of the same, thence –
22. **N 14° 09' 15" W, 46.23 feet**, still through the same, along the aforesaid westerly line of the herein described restricted area, to a point in the same, thence –
23. **N 13° 10' 34" W, 166.52 feet**, still through the same, still along the aforesaid westerly line of the herein described restricted area, to a point in the same, thence –
24. **N 12° 34' 19" W, 150.49 feet**, still through the same, still along the aforesaid westerly line of the herein described restricted area, to a point in the same, thence –
25. **N 11° 48' 41" E, 19.40 feet**, still through the same, still along the aforesaid westerly line of the herein described restricted area, to a point in the same, thence –
26. **N 13° 09' 12" W, 75.00 feet**, still through the same, still along the aforesaid westerly line of the herein described restricted area, to a point in the same, thence –
27. **N 07° 14' 50" W, 34.94 feet**, still through the same, still along the aforesaid westerly line of the herein described restricted area, to a point in the same, thence –
28. **N 11° 14' 55" W, 59.50 feet**, still through the same, still along the aforesaid westerly line of the herein described restricted area, to a point in the same, thence –
29. **N 27° 14' 37" W, 13.59 feet**, still through the same, still along the aforesaid westerly line of the herein described restricted area, to a point in the aforesaid northerly line of the same, thence –

30. **N 64° 58' 36" E, 28.92 feet**, still through the same, along the aforesaid northerly line of the herein described restricted area, to a point in the same, thence –
31. **N 59° 57' 07" E, 40.41 feet**, still through the same, still along the aforesaid northerly line of the herein described restricted area, to the Point and Place of **Beginning**.

Bearings sited hereon are based on New Jersey State Plane Datum NAD83

CONTAINING: 160,955 square feet, of land more or less.

The foregoing description was prepared by the undersigned surveyor for the firm of Colliers Engineering & Design based on plan entitled, "Remedial Action Report Landfill Capping at Fort Monmouth, FTMM-05 Deed Restriction Exhibit, dated October 2025, prepared by Colliers Engineering & Design."



10/23/25

R. THOMAS HUGG, PLS
NEW JERSEY PROFESSIONAL LAND SURVEYOR
LICENSE NUMBER GS36737

DATE

Exhibit A-2C: Restricted Area Metes and Bounds

DESCRIPTION OF RESTRICTED AREA (M5-ET) PORTION OF PARCEL 44
BOROUGH OF EATONTOWN
MONMOUTH COUNTY, NEW JERSEY
PROJECT NO. 24005753A
OCTOBER 23, 2025

All that certain lot, tract or parcel of land situate, lying and being in the Borough of Eatontown, in the County of Monmouth and the State of New Jersey, and being a portion of Parcel 44, Lot 1, Block 301, as shown on a map entitled: "Fort Monmouth Economic Revitalization Authority, Portion of Lot 1, Block 301 (Borough of Eatontown) and Portion of Lot 4, Block 110 (Borough of Oceanport) Borough of Eatontown and Borough of Oceanport, Monmouth County, New Jersey, Exhibit Map Showing a Portion of Environmental Carveout Parcel 44(M5), dated July 8, 2025, prepared by T and M. Also including the encroachment area, as shown on a map entitled: "FTMM-05 Encroachment Exhibit, Oceanport & Eatontown Borough, Monmouth County, New Jersey dated March 23, 2023, prepared by SAM. Additionally referencing a map entitled, "Remedial Action Report Landfill Capping at Fort Monmouth, Oceanport, Monmouth County, New Jersey" dated August 2022, prepared by AECOM, and being more particularly bounded and described as follows, to wit:

Beginning at a point in the northerly line of the herein described restricted area, said point being the same point of beginning for area M5-OP, as shown on the above referenced Fort Monmouth plan, and having the following New Jersey State Plane NAD83 coordinates, N 539744.67, E 617430.25, and running, thence –

1. **N 74° 12' 25" E, 347.28 feet**, through a portion of aforementioned Parcel 44, along the aforesaid northerly line of the herein described restricted area, to a point in the easterly line of the same, thence –
2. **S 15° 34' 48" W, 14.44 feet**, still through the same, along the aforesaid easterly line of the herein described restricted area, to a point in the same, thence –
3. **S 26° 19' 09" W, 58.02 feet**, still through the same, still along the aforesaid easterly line of the herein described restricted area, to a point of curvature in the same, thence –
4. **SOUTHWESTWARDLY** on an arc having a radius of **101.74 feet** and curving to the left an arc distance of **42.54 feet**, still through the same, still along the aforesaid easterly line of the herein described restricted area, to a point of tangency in the same, thence –
5. **S 02° 21' 41" W, 45.45 feet**, still through the same, still along the aforesaid easterly line of the herein described restricted area, to a in the same, thence –

6. **S 06° 51' 49" W, 36.26 feet**, still through the same, along the aforesaid easterly line of the herein described restricted area, to a point in the same, thence –
7. **S 11° 51' 25" W, 64.49 feet**, still through the same, along the aforesaid easterly line of the herein described restricted area, to a point in the same, thence –
8. **S 16° 29' 04" W, 28.39 feet**, still through the same, along the aforesaid easterly line of the herein described restricted area, to a point in the same, thence –
9. **S 21° 02' 15" W, 36.55 feet**, still through the same, along the aforesaid easterly line of the herein described restricted area, to a point in the same, thence –
10. **S 29° 24' 23" W, 15.76 feet**, still through the same, along the aforesaid easterly line of the herein described restricted area, to a point in the same, thence –
11. **S 00° 04' 04" E, 16.09 feet**, still through the same, along the aforesaid easterly line of the herein described restricted area, to a point in the same, thence –
12. **S 03° 14' 00" W, 46.05 feet**, still through the same, along the aforesaid easterly line of the herein described restricted area, to a point in the same, thence –
13. **S 00° 03' 44" W, 89.33 feet**, still through the same, along the aforesaid easterly line of the herein described restricted area, to a point in the same, thence –
14. **S 02° 24' 46" W, 54.47 feet**, still through the same, along the aforesaid easterly line of the herein described restricted area, to a point in the same, thence –
15. **S 21° 51' 34" W, 3.98 feet**, still through the same, along the aforesaid easterly line of the herein described restricted area, to a point in the same, thence –
16. **S 02° 31' 22" W, 63.07 feet**, still through the same, along the aforesaid easterly line of the herein described restricted area, to a point in the southerly line of the same, thence –
17. **S 70° 15' 33" W, 32.67 feet**, still through the same, along the aforesaid southerly line of the herein described restricted area, to a point in the same, thence –

18. **S 65° 31' 49" W, 49.77 feet**, still through the same, still along the aforesaid southerly line of the herein described restricted area, to a point in the same, thence –
19. **S 60° 16' 23" W, 21.54 feet**, still through the same, still along the aforesaid southerly line of the herein described restricted area, to a point in the same, thence –
20. **S 67° 38' 33" W, 67.42 feet**, still through the same, still along the aforesaid southerly line of the herein described restricted area, to a point in the same, thence –
21. **S 71° 43' 25" W, 35.14 feet**, still through the same, still along the aforesaid southerly line of the herein described restricted area, to a point in westerly line of the same, thence –
22. **N 14° 09' 15" W, 46.23 feet**, still through the same, along the aforesaid westerly line of the herein described restricted area, to a point in the same, thence –
23. **N 13° 10' 34" W, 166.52 feet**, still through the same, still along the aforesaid westerly line of the herein described restricted area, to a point in the same, thence –
24. **N 12° 34' 19" W, 150.49 feet**, still through the same, still along the aforesaid westerly line of the herein described restricted area, to a point in the same, thence –
25. **N 11° 48' 41" E, 19.40 feet**, still through the same, still along the aforesaid westerly line of the herein described restricted area, to a point in the same, thence –
26. **N 13° 09' 12" W, 75.00 feet**, still through the same, still along the aforesaid westerly line of the herein described restricted area, to a point in the same, thence –
27. **N 07° 14' 50" W, 34.94 feet**, still through the same, still along the aforesaid westerly line of the herein described restricted area, to a point in the same, thence –
28. **N 11° 14' 55" W, 59.50 feet**, still through the same, still along the aforesaid westerly line of the herein described restricted area, to a point in the same, thence –
29. **N 27° 14' 37" W, 13.59 feet**, still through the same, still along the aforesaid westerly line of the herein described restricted area, to a point in the aforesaid northerly line of the same, thence –

30. **N 64° 58' 36" E, 28.92 feet**, still through the same, along the aforesaid northerly line of the herein described restricted area, to a point in the same, thence –
31. **N 59° 57' 07" E, 40.41 feet**, still through the same, still along the aforesaid northerly line of the herein described restricted area, to the Point and Place of **Beginning**.

Bearings sited hereon are based on New Jersey State Plane Datum NAD83

CONTAINING: 160,955 square feet, of land more or less.

The foregoing description was prepared by the undersigned surveyor for the firm of Colliers Engineering & Design based on plan entitled, "Remedial Action Report Landfill Capping at Fort Monmouth, FTMM-05 Deed Restriction Exhibit, dated October 2025, prepared by Colliers Engineering & Design."



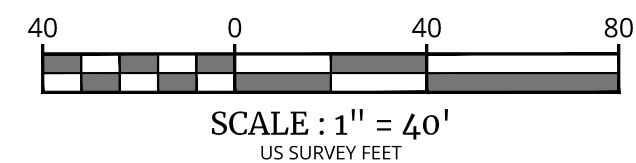
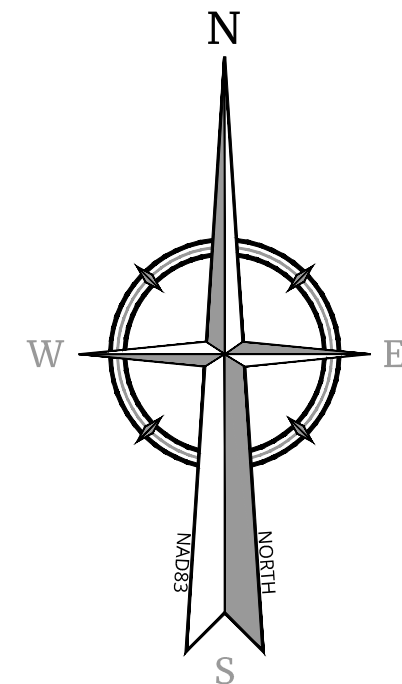
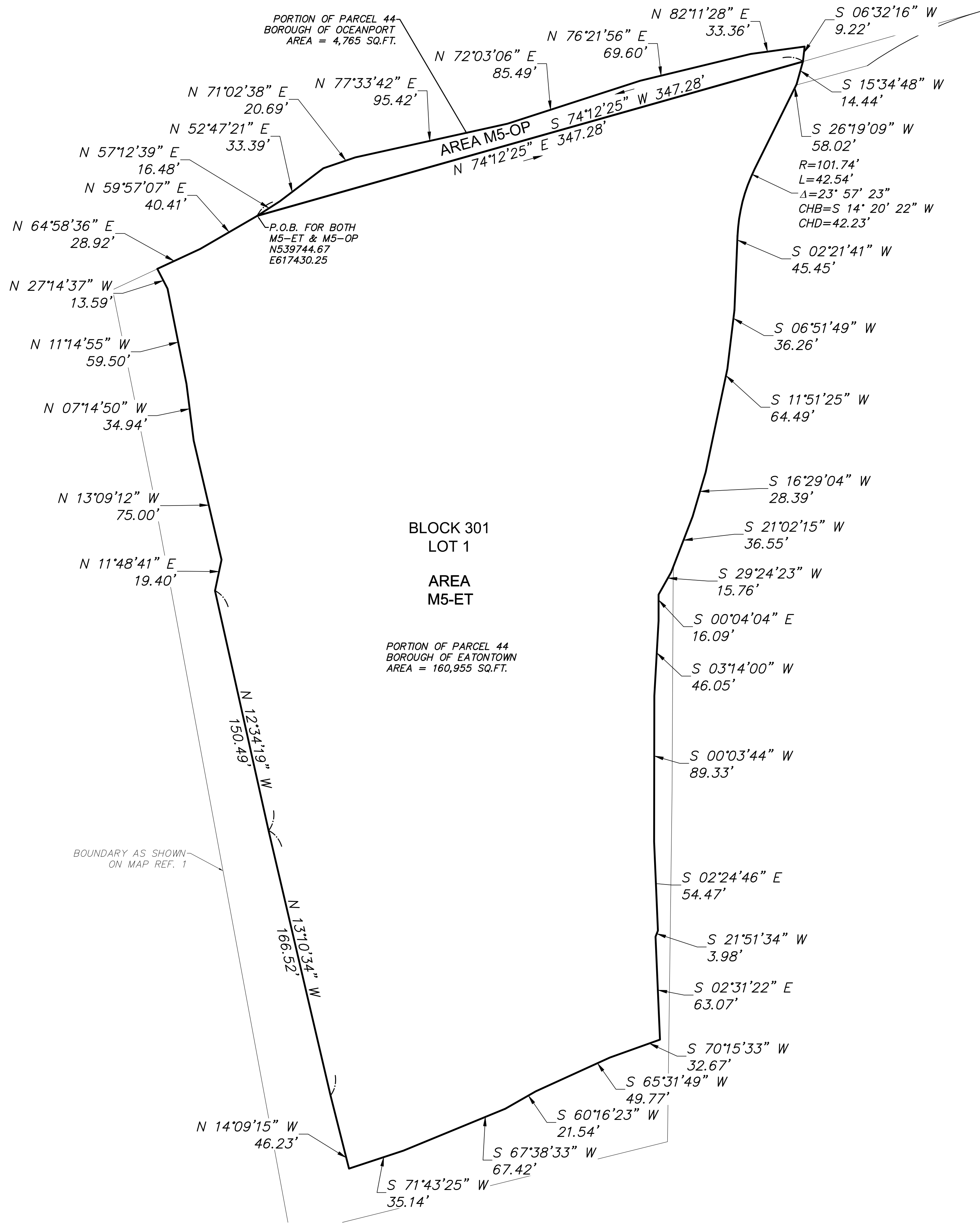
10/23/25

R. THOMAS HUGG, PLS
NEW JERSEY PROFESSIONAL LAND SURVEYOR
LICENSE NUMBER GS36737

DATE

Exhibit A-2D: Survey drawing of the Property and the restricted area.

R:\Projects\2024\4005753A\Drawings\CD\DEED RESTRICTION.dwg (10/01/2025) 1:405 - dls.dgn By: T.HUGG on 10/01/2025 1:405 - dls.dgn



GENERAL NOTES

- THE SOLE PURPOSE OF THIS PLAN IS TO SHOW THE DEED RESTRICTION AREAS WITHIN LANDFILL FTMM-05.
- BOUNDARIES SHOWN HEREON ARE BASED ON THE REFERENCE MAPS LISTED BELOW
- HORIZONTAL DATUM IS RELATIVE TO NAD83, VERTICAL DATUM IS RELATIVE TO NAVD88.
- BOUNDARY AND EXISTING TOPOGRAPHY OUTSIDE OF COLLIERS ENGINEERING & DESIGN FIELD SURVEY LIMITS ARE SHOWN PER MAP REFERENCE 1.

REFERENCES

- PLANS ENTITLED:
 - "Fort Monmouth Economic Revitalization Authority, Portion of Lot 1, Block 301 (Borough of Eatontown) and Portion of Lot 4, Block 110 (Borough of Oceanport) Borough of Eatontown and Borough of Oceanport, Monmouth County, New Jersey, Exhibit Map Showing a Portion of Environmental Carveout Parcel 44(M5)", dated July 8, 2025, prepared by T and M
 - "FTMM-05 Encroachment Exhibit, Oceanport & Eatontown Borough, Monmouth County, New Jersey" dated March 23, 2023, prepared by SAM
 - "Remedial Action Report Landfill Capping at Fort Monmouth, Oceanport, Monmouth County, New Jersey" dated August 2022, prepared by AECOM.

Colliers

Engineering
& Design

www.colliersengineering.com

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EA ENGINEERING,
SCIENCE &
TECHNOLOGY, INC., PBC

REMEDIAL ACTION
REPORT LANDFILL
CAPPING AT FORT
MONMOUTH

OCEANPORT, FORT
MONMOUTH, NJ

R Thomas Hugg

NEW JERSEY LICENSED PROFESSIONAL LAND SURVEYOR
LICENSE NUMBER: G536737
COLLIERS ENGINEERING & DESIGN, INC.
N.J. C.O.A. #: 24GA27986500

Colliers

Engineering
& Design

EGG HARBOR

500 Scarborough Drive,
Suite 108
Egg Harbor Township, NJ 08234
Phone: 609.910.4068
COLLIERS ENGINEERING & DESIGN, INC.

SCALE:	DRAWN BY:
AS SHOWN	DMS
DESIGNED BY:	REVIEWED BY:
	RTH
DATE ISSUED:	PROJECT NUMBER:
OCT., 2025	24005753A
SHEET NAME:	

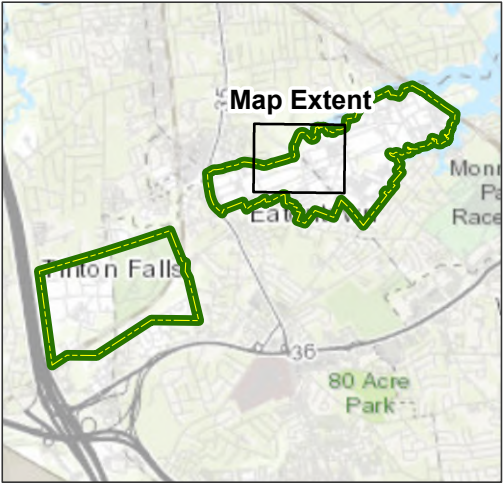
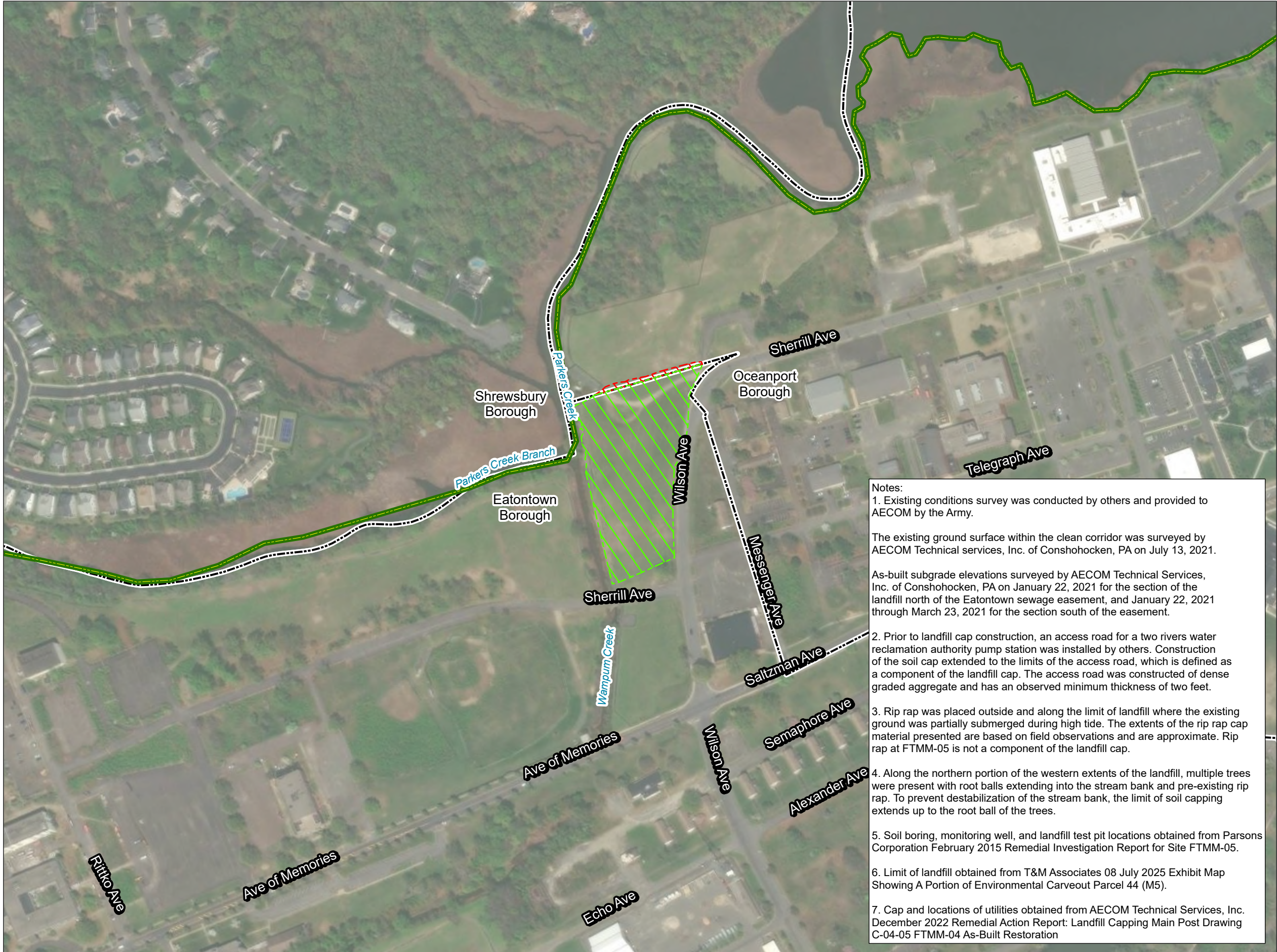
FTMM-05
DEED RESTRICTION
EXHIBIT

DRAWING NUMBER:

01 of 01

NOTE: DO NOT SCALE DRAWINGS FOR CONSTRUCTION.

Exhibit A-3A and Exhibit A-3B: Property Maps



- Legend**
- Limit of As-Built Landfill Cap FTMM-05 within Oceanport
 - Limit of As-Built Landfill Cap FTMM-05 within Eatontown
 - Municipality Boundary
 - Installation Boundary

Notes:

1. Existing conditions survey was conducted by others and provided to AECOM by the Army.

The existing ground surface within the clean corridor was surveyed by AECOM Technical services, Inc. of Conshohocken, PA on July 13, 2021.

As-built subgrade elevations surveyed by AECOM Technical Services, Inc. of Conshohocken, PA on January 22, 2021 for the section of the landfill north of the Eatontown sewage easement, and January 22, 2021 through March 23, 2021 for the section south of the easement.

2. Prior to landfill cap construction, an access road for a two rivers water reclamation authority pump station was installed by others. Construction of the soil cap extended to the limits of the access road, which is defined as a component of the landfill cap. The access road was constructed of dense graded aggregate and has an observed minimum thickness of two feet.

3. Rip rap was placed outside and along the limit of landfill where the existing ground was partially submerged during high tide. The extents of the rip rap cap material presented are based on field observations and are approximate. Rip rap at FTMM-05 is not a component of the landfill cap.

4. Along the northern portion of the western extents of the landfill, multiple trees were present with root balls extending into the stream bank and pre-existing rip rap. To prevent destabilization of the stream bank, the limit of soil capping extends up to the root ball of the trees.

5. Soil boring, monitoring well, and landfill test pit locations obtained from Parsons Corporation February 2015 Remedial Investigation Report for Site FTMM-05.

6. Limit of landfill obtained from T&M Associates 08 July 2025 Exhibit Map Showing A Portion of Environmental Carveout Parcel 44 (M5).

7. Cap and locations of utilities obtained from AECOM Technical Services, Inc. December 2022 Remedial Action Report: Landfill Capping Main Post Drawing C-04-05 FTMM-04 As-Built Restoration



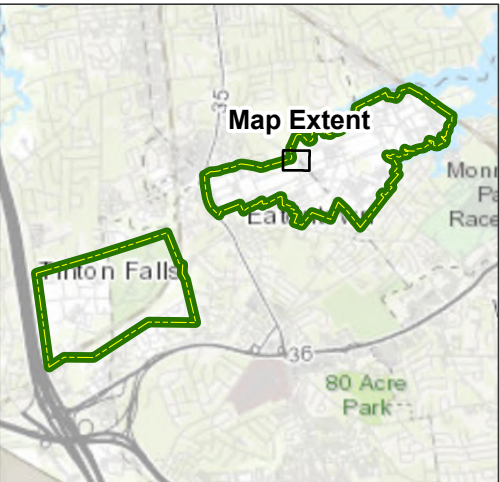
0 150 300
Feet

Data Sources: ESRI, AECOM

Landfill FTMM-05
Eatontown, Monmouth County, New Jersey
PI Number G000000032

Deed Notice - Property Map





- Legend**
- Limit of As-Built Landfill Cap FTMM-05 within Oceanport
 - Limit of As-Built Landfill Cap FTMM-05 within Eatontown
 - Walking Path
 - Previously Installed Access Road
 - Riprap
 - Municipality Boundary
 - Installation Boundary

- Notes:**
- Existing conditions survey was conducted by others and provided to AECOM by the Army.
 - Prior to landfill cap construction, an access road for a two rivers water reclamation authority pump station was installed by others. Construction of the soil cap extended to the limits of the access road, which is defined as a component of the landfill cap. The access road was constructed of dense graded aggregate and has an observed minimum thickness of two feet.
 - Rip rap was placed outside and along the limit of landfill where the existing ground was partially submerged during high tide. The extents of the rip rap cap material presented are based on field observations and are approximate. Rip rap at FTMM-05 is not a component of the landfill cap.
 - Along the northern portion of the western extents of the landfill, multiple trees were present with root balls extending into the stream bank and pre-existing rip rap. To prevent destabilization of the stream bank, the limit of soil capping extends up to the root ball of the trees.
 - Soil boring, monitoring well, and landfill test pit locations obtained from Parsons Corporation February 2015 Remedial Investigation Report for Site FTMM-05.
 - Limit of landfill obtained from T&M Associates 08 July 2025 Exhibit Map Showing A Portion of Environmental Carveout Parcel 44 (M5).
 - Cap and locations of utilities obtained from AECOM Technical Services, Inc. December 2022 Remedial Action Report: Landfill Capping Main Post Drawing C-04-05 FTMM-04 As-Built Restoration

Data Sources: ESRI, AECOM

Landfill FTMM-05
Eatontown, Monmouth County, New Jersey
PI Number G000000032

EXHIBIT B

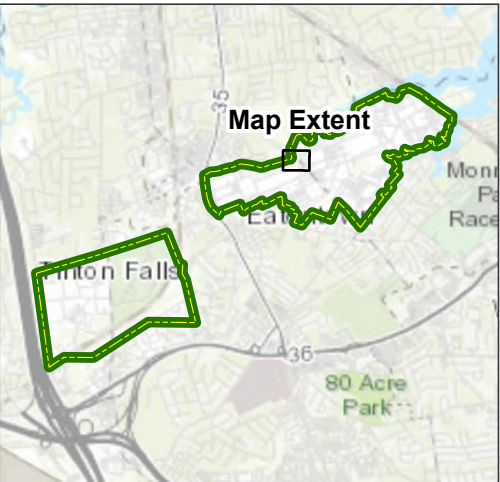
EXHIBIT B

Exhibit B includes the following map and tables for the restricted area, as specified in per New Jersey Department of Environmental Protection (NJDEP) in Appendix B of the Administrative Requirements for the Remediation of Contaminated Sites (ARRCS) in N.J.A.C. 7:26C.

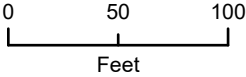
- (A) Exhibit B-1A: Restricted area maps which show the locations of previously observed soil impacts; however, regrading and compaction of the preexisting landfill cover, landfill material, and other soils within the restricted area may have redistributed these impacts within the restricted area's limits.
- (B) Exhibit B-1B: Cap construction details for the restricted area map.
- (C) Exhibit B-2: Restricted Area Data Tables – Table for the restricted area are provided in Exhibit B-2, which includes sample names, sample location designations, chemical abstract service registry number for contaminants, and the concentrations of each contaminant observed. Contaminants are compared to their respective May 2021 NJDEP Soil Remediation Standards (N.J.A.C. 7:26D, last amended May 17, 2021).

The information in Exhibit B-2 provides a comparison of the previously reported results to the 2021 Soil SRS to facilitate remedial action permitting and long-term O&M and prevents the need for an order of magnitude analysis at this time. Previously reported results included the full Target Analyte List/Target Compound List, and sample results were compared to the NJDEP standards and criteria current at the time of the data's publication. Only those analytes exceeding at one or more sample locations the NJDEP standards and criteria current at the time were reported and, therefore, only those analytes are presented in Exhibit B-2.

Exhibit B-1A



- Legend**
- Soil Boring Location
 - Monitoring Well
 - Limit of As-Built Landfill Cap FTMM-05 within Oceanport
 - Limit of As-Built Landfill Cap FTMM-05 within Eatontown
 - Walking Path
 - Previously Installed Access Road
 - Riprap
 - Landfill Test Pit - Debris Not Present
 - Landfill Test Pit - Debris Present
 - Municipality Boundary
 - Installation Boundary



Data Sources: ESRI

Landfill FTMM-05
Eatontown, Monmouth County, New Jersey
PI Number G000000032

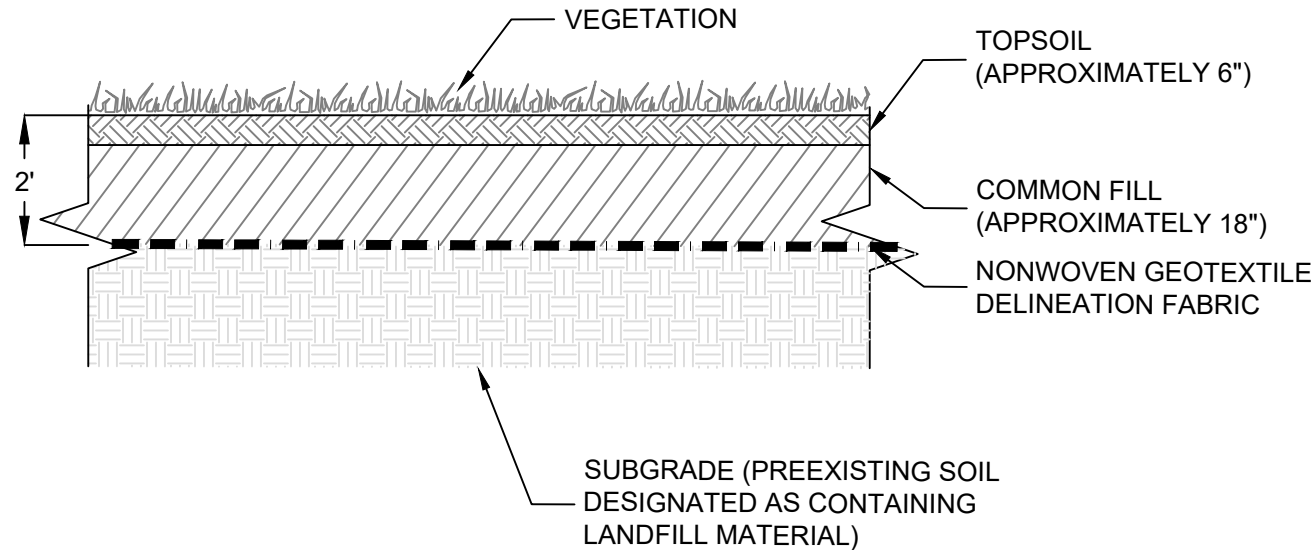
Deed Notice - Locations of Engineering Controls and Soil Sample Locations

- Notes:
- Existing conditions survey and utility survey was conducted by others and provided to AECOM by the Army. Not all utilities are shown, and locations of utilities are for information purposes only.
 - The existing ground surface within the clean corridor was surveyed by AECOM Technical services, Inc. of Conshohocken, PA on July 13, 2021.
 - As-built subgrade elevations surveyed by AECOM Technical Services, Inc. of Conshohocken, PA on January 22, 2021 for the section of the landfill north of the Eatontown sewage easement, and January 22, 2021 through March 23, 2021 for the section south of the easement.
 - Prior to landfill cap construction, an access road for a two rivers water reclamation authority pump station was installed by others. Construction of the soil cap extended to the limits of the access road, which is defined as a component of the landfill cap. The access road was constructed of dense graded aggregate and has an observed minimum thickness of two feet.
 - Rip rap was placed outside and along the limit of landfill where the existing ground was partially submerged during high tide. The extents of the rip rap cap material presented are based on field observations and are approximate. Rip rap at FTMM-05 is not a component of the landfill cap.
 - Along the northern portion of the western extents of the landfill, multiple trees were present with root balls extending into the stream bank and pre-existing rip rap. To prevent destabilization of the stream bank, the limit of soil capping extends up to the root ball of the trees.
 - Soil boring, monitoring well, and landfill test pit locations obtained from Parsons Corporation February 2015 Remedial Investigation Report for Site FTMM-05.
 - Limit of landfill obtained from T&M Associates 08 July 2025 Exhibit Map Showing A Portion of Environmental Carveout Parcel 44 (M5).
 - Cap and locations of utilities obtained from AECOM Technical Services, Inc. December 2022 Remedial Action Report: Landfill Capping Main Post Drawing C-04-05 FTMM-04 As-Built Restoration

Exhibit B-1B

File: C:\AECOM\AECOM\FTM - General\900 CAD\910 CAD\20 Sheets\AS-BUILTS\MP Details.dwg Layout: 01 User: carlsona1 Plotfile: Aug 19, 2022 - 4:59pm AECOM Project Number: 60589072

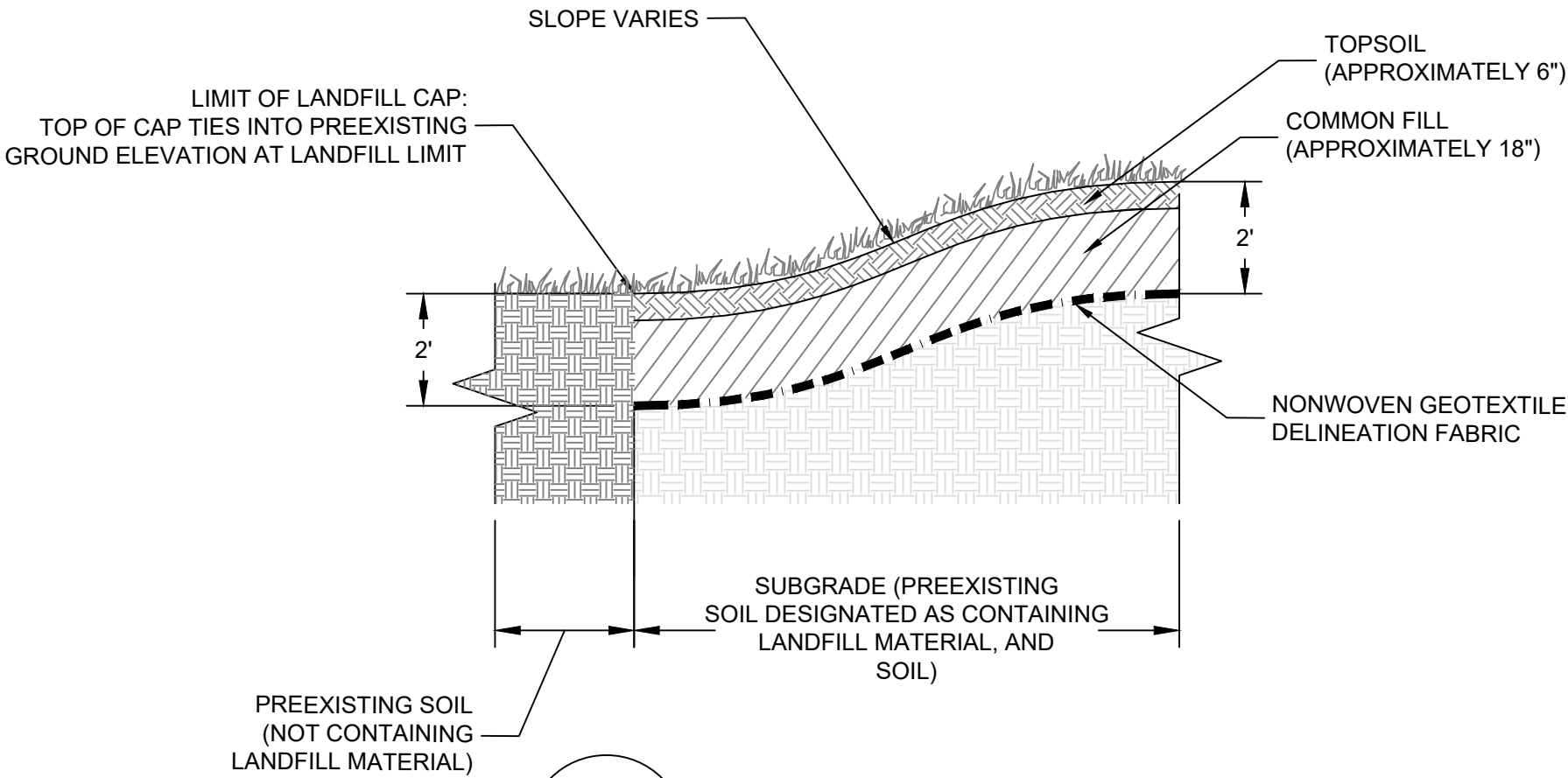
Access Road: Prior to landfill cap construction, an access road for a two rivers water reclamation authority pump station was installed by others. Construction of the soil cap extended to the limits of the access road, which is defined as a component of the landfill cap. The access road was constructed of dense graded aggregate and has an observed minimum thickness of two feet. See Figure B-1A.



1
D-01 **VEGETATIVE CAP**
(TYPICAL, NOT TO SCALE)

NOTES

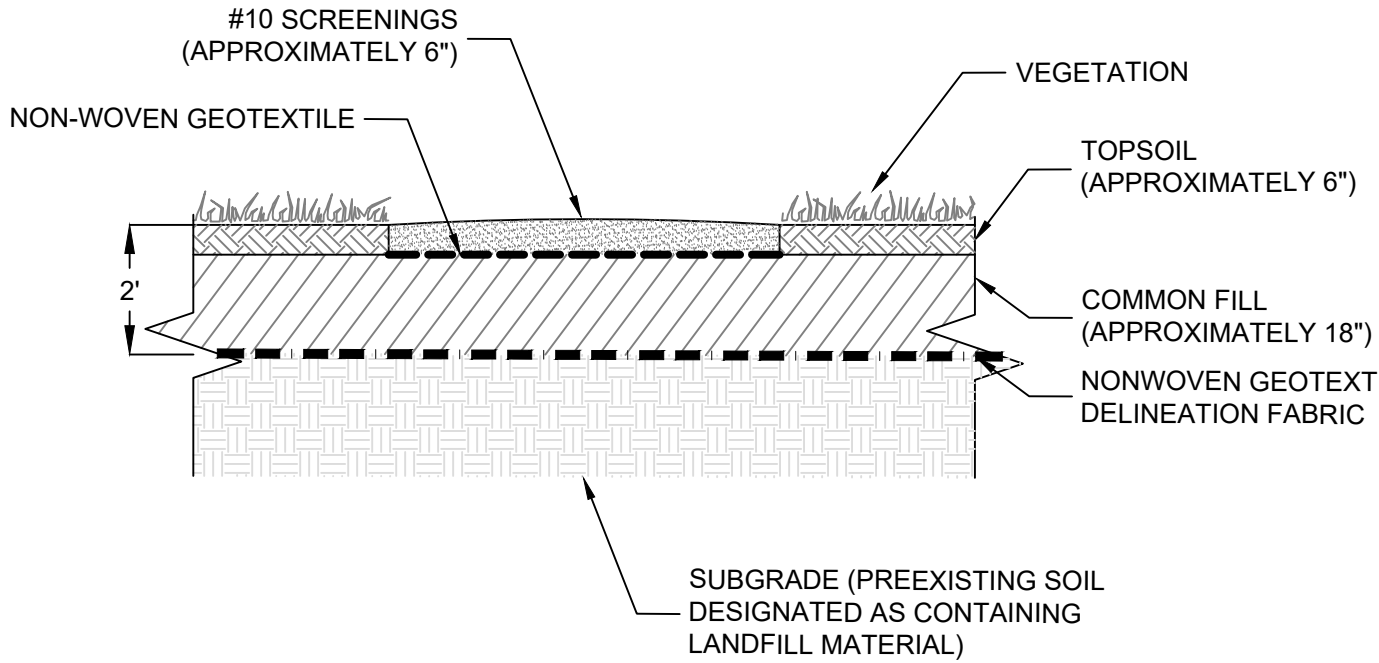
- SUBGRADE IS COMPACTED TO 90 PERCENT STANDARD PROCTOR PRIOR TO PLACEMENT OF NONWOVEN GEOTEXTILE DELINEATION FABRIC, COMMON FILL, AND TOPSOIL.
- COMMON FILL IS PLACED IN THREE LIFTS, EACH COMPACTED TO A THICKNESS OF APPROXIMATELY 6". TOPSOIL IS PLACED IN ONE 6" THICK LIFT.
- CAP IS PLANTED WITH THE SEED MIXES SHOWN IN DRAWING G-03.
- SUBGRADE SLOPE VARIES AND IS AS SHOWN ON THE AS-BUILT SUBGRADE CONTOURS FOR EACH LANDFILL.



2
D-01 **TOE-IN TRENCH**
(TYPICAL, NOT TO SCALE)

NOTES

- SUBGRADE IS COMPACTED TO 90 PERCENT STANDARD PROCTOR PRIOR TO PLACEMENT OF NONWOVEN GEOTEXTILE DELINEATION FABRIC, COMMON FILL, AND TOPSOIL.
- COMMON FILL IS PLACED IN THREE LIFTS, EACH COMPACTED TO A THICKNESS OF APPROXIMATELY 6". TOPSOIL IS PLACED IN ONE 6" THICK LIFT.
- CAP IS PLANTED WITH THE SEED MIXES SHOWN IN DRAWING G-03.
- TO TIE THE VEGETATIVE CAP INTO THE PREEXISTING GROUND SURFACE, A TWO-FOOT DEEP TOE-IN TRENCH WAS EXCAVATED ALONG THE LANDFILL'S LIMIT. MATERIAL EXCAVATED ALONG THE LANDFILL'S LIMIT WAS PULLED BACK INTO THE LANDFILL INTERIOR AND GRADED TO FACILITATE DRAINAGE.



3
D-01 **WALKING PATH**
(TYPICAL, NOT TO SCALE)

NOTES

- SUBGRADE IS COMPACTED TO 90 PERCENT STANDARD PROCTOR PRIOR TO PLACEMENT OF NONWOVEN GEOTEXTILE DELINEATION FABRIC, COMMON FILL, AND TOPSOIL.
- COMMON FILL IS PLACED IN THREE LIFTS, EACH COMPACTED TO A THICKNESS OF APPROXIMATELY 6". TOPSOIL IS PLACED IN ONE 6" THICK LIFT.
- WALKING PATH IS CONSTRUCTED USING #10 SCREENING, WHICH WERE PLACED IN ONE LIFT AND COMPACTED TO A THICKNESS OF APPROXIMATELY 6". THE WALKING PATH IS CROWNED SLIGHTLY TO PREVENT PONDING.

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0	MAG	AUGUST 2022	SUBMITTAL TO CLIENT	ALC	AUGUST 2022	PPH	AUGUST 2022
NO	DRWN	DATE	REVISION	CHKD	DATE	APPVD	DATE

Prepared by:
AECOM
30 Knightsbridge Road
Piscataway, NJ 08854

AECOM

Prepared for:
U.S. Army Engineering
& Support Center
Huntsville, Alabama

REMEDIAL ACTION REPORT
LANDFILL CAPPING AT FORT MONMOUTH
OCEANPORT, MONMOUTH COUNTY, NEW JERSEY

PROJECT NUMBER: 60589072

DATE: AUGUST 2022

DETAILS (SHEET 1 OF 4)

DRAWING NUMBER:

D-01

REVISION 0

Exhibit B-2

TABLE 4.1
SOIL SAMPLING SUMMARY RESULTS - COMPARISON TO NJDEP STANDARDS
SITE FTMM-05
FORT MONMOUTH, NEW JERSEY

Field Sample Location	NJDEP Residential Direct Contact Soil Remediation Standard ⁽¹⁾	NJDEP Non- Residential Direct Contact Soil Remediation Standard ⁽¹⁾	NJDEP Impact to Groundwater Screening Level ⁽²⁾	Weston 1995 Background ⁽³⁾	B-1		B-2		B-3		B-4		B-5		B-6		B-7		B-8		B-9		B-10		B-11	
Sample Date					04/08/98		04/08/98		04/08/98		04/09/98		04/09/98		04/09/98		04/09/98		04/10/98		04/10/98		04/10/98		04/11/98	
Volatile Organic Compounds (VOCs, µg/kg)																										
Lab Sample ID (VOCs only collected at approximately 24 in. bgs)					3465.04		3465.08		3465.12		3470.04		3470.08		3470.12		3470.17		3472.04		3472.08		3472.12		3473.04	
Methylene Chloride	34,000	97,000	10	-	<560		<580		<580		<560		<550		<550		<670		<640		<670		<540		<540	
Benzene	2,000	5,000	5	-	<280		<290		<290		<280		<280		<280		<330		<320		<340		<270		<270	
Tetrachloroethene	2,000	5,000	5	-	<280		<290		<290		<280		<280		<280		<330		<320		<340		<270		<270	
Chloroform	600	2,000	400	-	<280		<290		<290		<280		<280		<280		<330		<320		<340		<270		<270	
Ethylbenzene	7,800,000	110,000,000	13,000	-	<560		<580		<580		<560		<550		<550		<670		<640		<670		<540		<540	
TICs	NLE	NLE	NLE	-	ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
Semivolatile Organic Compounds (SVOCs, µg/kg)																										
Lab Sample ID (All analyses except VOCs collected at approximately 6-12 in. bgs)					3465.03		3465.07		3465.11		3470.03		3470.07		3470.11		3470.15		3472.03		3472.07		3472.11		3473.03	
Naphthalene	6,000	17,000	25,000	-	<250		<1300		<280		<270		<270		<520		<580		<310		<300		130	J	<270	
n-Nitrosodiphenylamine	99,000	390,000	400	-	<190		<1000		<210		<200		<200		<390		<440		<240		<220		<200		<200	
2-Methylnaphthalene	230,000	2,400,000	8,000	-	<280		<1500		<310		<300		<310		<590		<650		<350		140	J	150	J	<300	
4-Methylphenol	31,000	340,000	NLE	-	<270		<1500		<300		<290		<300		<570		<640		<340		<330		<290		<290	
Acenaphthylene	NLE	3.00E+08	NLE	-	<190		<1000		<220		<210		<210		<410		<460		<250		<240		<210		<210	
Acenaphthene	3,400,000	37,000,000	110,000	-	<180		<950		<200		<190		<200		<380		<420		<220		<210		<190		<190	
Dibenzofuran	NLE	NLE	NLE	-	<190		<1000		<210		<200		<210		<400		<440		<240		<230		<200		<200	
Diethylphthalate	49,000,000	550,000,000	88,000	-	<210		<1100		<230		<220		<230		<440		<480		<260		<250		<220		<220	
Fluorene	2,300,000	24,000,000	170,000	-	<190		<1000		<220		<210		<210		<410		<460		<250		<230		<210		<210	
Phenanthrene	NLE	300,000,000	NLE	-	160	J	<1100		<220		<210		280		<410		1700		150	J	680		410		<210	
Anthracene	17,000,000	30,000,000	2,400,000	-	<200		<1100		<220		<210		<220		<410		300		<250		<240		<210		<210	
Dimethylphthalate	NLE	NLE	NLE	-	<150		<820		<170		<260		<170		<320		<360		<190		<190		<170		<170	
Di-n-butylphthalate	6,100,000	68,000,000	760,000	-	3900	B	26000	BD	1500	B	2100	B	7900	B	14000	BD	16000	BD	2000	B	5200	B	640	JB	900	JB
Fluoranthene	2,300,000	24,000,000	1,300,000	-	170	J	<1100		<220		<210		310		<420		2100		<250		1100		300		<210	
Pyrene	1,700,000	18,000,000	840,000	-	280		<1200		<260		<250		410		<490		1600		150	J	880		440		<250	
Pyridine	NLE	NLE	NLE	-	<300		<1600		<340		<320		<330		<320		<360		<380		<370		770		<330	
Butylbenzylphthalate	1,200,000	14,000,000	230,000	-	<250		<1400		<280		<270		<280		<540		<600		<320		<310		<280		<270	
Benzo(a)anthracene	600	2,000	800	-	120	J	<1100		<220		<210		180	J	<420		990		360		200	J	180	J	<210	
3,3'-Dichlorobenzidine	1,000	4,000	200	-	<350		<1900		<390		<370		<380		<740		<820		<440		<420		<380		<380	
Chrysene	62,000	230,000	80,000	-	230	J	<1400		<280		<270		370		<540		1500		490		280	J	410		<270	
bis(2-Ethylhexyl)phthalate	35,000	140,000	1,200,000	-	100	JB	730	JBD	110	JB	110	J	<310		170	J	<660		150	JB	<340		180	JB	180	JB
Benzo(b)fluoranthene	600	2,000	2,000	-	<250		<1300		<280		<270		170	J	<530		890		160	J	600		150	J	<270	
Benzo(k)fluoranthene	6,000	23,000	25,000	-	<180		<990		<210		<200		150	J	<390		860		<230		690		150	J	<200	
Benzo(a)pyrene	200	200	200	-	110	J	<1000		<210		<200		170	J	<400		820		140	J	570		140	J	<200	
Indeno(1,2,3-cd)pyrene	600	2,000	7,000	-	<210		<1100		<230		<220		<230		<440		580		<260		390		<220		<220	
Dibenz(a,h)anthracene	200	200	800	-	<240		<1300		<270		<260		<270		<510		240	J	<310		<290		<260		<260	
Benzo(g,h,i)perylene	380,000,000	30,000,000	NLE	-	<240		<1300		<270		<260		<270		<510		420	JD	<310		310		<260		<260	
Total TICs	NLE	NLE	NLE	-	4000		5500		3100		7520		25460		2800		2600		48400		249600		8500		61100	
Pesticides / PCBs (mg/kg)																										
Heptachlor	0.1	0.7	0.5	-	<0.0006		<0.0006		<0.0006		<0.0006		<0.0006		<0.0006		<0.0006		<0.0006		<0.0007		<0.0006		<0.0006	
Heptachlor Epoxide	0.07	0.3	0.01	-	<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0006		<0.0006		<0.0006		<0.0005		<0.0005	
4,4'-DDE	2	9	18	-	<0.0007		0.001		0.001		0.001		<0.0007		<0.0007		<0.0008		0.006		0.021		<0.0008		<0.0007	
Dieldrin	0.04	0.2	0.003	-	<0.0004		<0.0004		<0.0004		<0.0004		<0.0004		<0.0004		<0.0004		<0.0005		<0.0005		<0.0004		<0.0004	
Endrin	23	340	1	-	<0.0006		<0.0006		<0.0007		<0.0006		<0.0006		<0.0006		<0.0007		<0.0007		<0.0007		<0.0007		<0.0006	
4,4'-DDD	3	13	4	-	<0.0014		<0.0014		<0.0015		<0.0014		<0.0014		<0.0014		<0.0015		0.006		<0.0016		0.003		<0.0014	
Endrin Aldehyde	NLE	NLE	NLE	-	<0.0011		<0.0011		<0.0012		<0.0011		<0.0011		<0.0011		<0.0012		<0.0012		<0.0013		<0.0012		<0.0011	
4,4'-DDT	2	8	11	-	<0.0003		<0.0003		<0.0003		<0.0003		<0.0003		<0.0003		<0.0004		0.01		<0.0004		0.006		<0.0003	
Endosulfan I	470	6,800	4	-	<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0006		<0.0006		<0.0006		<0.0005		<0.0005	
Endosulfan II	470	6,800	4	-	0.008		<0.0006		<0.0006</																	

TABLE 4.1
SOIL SAMPLING SUMMARY RESULTS - COMPARISON TO NJDEP STANDARDS
SITE FTMM-05
FORT MONMOUTH, NEW JERSEY

Field Sample Location	NJDEP Residential Direct Contact Soil Remediation Standard ⁽¹⁾	NJDEP Non- Residential Direct Contact Soil Remediation Standard ⁽¹⁾	NJDEP Impact to Groundwater Screening Level ⁽²⁾	Weston 1995 Background ⁽³⁾	B-1		B-2		B-3		B-4		B-5		B-6		B-7		B-8		B-9		B-10		B-11	
Sample Date					04/08/98		04/08/98		04/08/98		04/09/98		04/09/98		04/09/98		04/09/98		04/10/98		04/10/98		04/10/98		04/11/98	
Metals (mg/kg)																										
Aluminum	78,000	NA	6,000	15,200	4632		13450		10970		10250		6368		8343		13830		3691		4474		9667		10420	
Antimony	31	450	6	ND	0.891		2.881		1.599		1.421		1.159		0.71		2.079		0.486		1.098		1.569		2.011	
Arsenic	19	19	19	22.9	4.12		20.13		32.33		10.22		9.054		8.85		11.54		19.98		15.98		11.87		11.44	
Barium	16,000	59,000	2,100	32.3	13.03		32.88		30.43		21.25		40.37		18.58		116.04		31.68		58.82		23.16		23.76	
Beryllium	16	140	0.7	2	0.4862		1.611		1.102		1.015		0.737		0.7328		1.32		0.7184		0.4577		1.055		1.1	
Cadmium	78	78	2	ND	<0.055		0.201		0.1798		0.2656		0.1551		0.0579		0.541		0.2736		0.5314		0.1708		0.1037	
Calcium	NLE	NLE	NLE	921	276		748.3		928.7		707.8		459.9		561.5		3956		1373		1105		453		555.8	
Chromium	NLE	NLE	NLE	269	46.4		152.8		83.07		84.62		42.42		53.53		75.63		13.02		14.93		82.74		104.3	
Cobalt	1,600	590	90	2.5	1.692		5.048		3.708		4.383		1.834		3.863		6.127		4.926		4.535		4.224		5.456	
Copper	3,100	45,000	11,000	8	2.887		5.284		6.87		2.717		30.09		2.421		254.1		43.77		2837		14.52		6.138	
Iron	NLE	NLE	NLE	55,800	18680		59460		41330		44130		22150		30210		29220		10980		9325		40700		44300	
Lead	400	800	90	19.5	14.35		24.96		59.27		8.682		135.1		16.31		370.1		57.95		383.9		17.36		8.172	
Magnesium	NLE	NLE	NLE	7,230	623.7		1468		1548		1250		1222		1051		1571		373.7		423.7		1019		1049	
Manganese	11,000	5,900	65	90.7	47.18		69.84		76.15		83.14		50.43		104.4		146		30.67		484.3		97.99		86.4	
Mercury	23	65	0.1	ND	0.018		0.084		0.949		<0.011		0.228		<0.011		0.687		1.257		0.236		0.091		0.017	
Nickel	1,600	23,000	48	8.4	5.762		18.8		11.78		12.74		6.33		10.08		16.79		1.257		10.39		12.34		17.5	
Potassium	NLE	NLE	NLE	15400	1412		3255		4106		2577		3614		2171		4423		690		1241		2288		2328	
Selenium	390	5,700	11	1.9	<0.330		<0.380		<0.362		<0.330		<0.369		<0.353		<0.363		0.785		1.534		<0.348		<0.352	
Silver	390	5,700	1	1.1	<0.330		<0.380		<0.362		<0.330		<0.369		<0.353		<0.363		<0.412		<0.351		<0.348		<0.352	
Sodium	NLE	NLE	NLE	51.6	39.52		37.37		66.18		95.95		124.8		109		969.8		259.8		227.5		68.42		142.9	
Thallium	5	79	3	ND	<0.330		<0.380		<0.362		<0.330		<0.369		<0.353		<0.363		<0.412		<0.351		<0.348		<0.352	
Vanadium	78	1,100	NLE	94.1	53.06		200.1		103.1		115.4		37.5		76.97		76.13		24		19.41		118.7		141	
Zinc	23,000	110,000	930	81.4	36.18		90.91		71.52		62.01		58.64		44.99		178		22.14		942.9		64.9		65.8	

Notes:

Historically, there have been up to 318 soil boring locations associated with FTMM-05. This analysis looks at only those boring locations that fall within the footprint of FTMM-05.

(1) New Jersey Department of Environmental Protection (NJDEP) Residential Direct Contact Soil Remediation Standards (RDCSRS) and Non-Residential Direct Contact Soil Remediation Standards (NRDCSRS) (N.J.A.C 7:26D; amended May 7, 2012). Available at: <http://www.state.nj.us/dep/srp/regs/rs/>.

(2) NJDEP Impact to Groundwater (NJDEP guidance document; Nov 2013).

(3) Weston, 1995. Final Site Investigation - Main Post and Charles Wood Areas, Fort Monmouth, New Jersey, December.

NJDEP criteria for total xylenes are used for xylene isomers (m+p, o).

NJDEP criteria for endrin is used for endrin aldehyde.

NJDEP criteria for 4,4'-DDD and 4,4'-DDT are for total DDD and total DDT, respectively.

There are no NJDEP soil standards for individual PCB Arcolors; the total PCB NJDEP standards were used for individual Arcolors

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

B = Analyte detected in both sample and associated laboratory blank.

D = Result from dilution of sample.

DUP = field duplicate sample.

E = Estimated value.

J = Analyte detected between MDL and practical quantitation limit (PQL).

NA = not analyzed.

ND = not detected.

NLE = No limit established.

< = analyte not detected above method detection limit (MDL).

µg/kg = micrograms per kilogram.

mg/kg = milligrams per kilogram.

VOCs = volatile organic compounds.

in. = inches.

bgs = below ground surface.

Detections are bolded.

Shaded cells = concentration exceeds NJDEP Impact to Groundwater Criterion.

Shaded cells = concentration exceeds one or both NJDEP Direct Contact Criteria.

Shaded cells = concentration exceeds all NJDEP criteria.

Shaded cells = concentration exceeds Weston (1995) background concentration.

TABLE 4.1
SOIL SAMPLING SUMMARY RESULTS - COMPARISON TO NJDEP STANDARDS
SITE FTMM-05
FORT MONMOUTH, NEW JERSEY

Field Sample Location	NJDEP Residential Direct Contact Soil Remediation Standard ⁽¹⁾	NJDEP Non- Residential Direct Contact Soil Remediation Standard ⁽¹⁾	NJDEP Impact to Groundwater Screening Level ⁽²⁾	Weston 1995 Background ⁽³⁾	B-12		B-13		B-14		B-15		B-16		B-17		B-18		B-19		B-20		B-20 Dup		B-21	
Sample Date					04/11/98		04/11/98		04/11/98		04/11/98		04/13/98		04/13/98		04/13/98		04/13/98		04/14/98		04/14/98		04/14/98	
Volatile Organic Compounds (VOCs, µg/kg)																										
Lab Sample ID (VOCs only collected at approximately 24 in. bgs)					3473.08		3473.12		3473.16		3473.20		3477.04		3477.08		3477.12		3477.16		3479.04		3479.16		3479.08	
Methylene Chloride	34,000	97,000	10	-	<550		<550		<520		<650		<730		<790		<710		<560		<530		<540		<520	
Benzene	2,000	5,000	5	-	<270		<270		<260		<320		<360		<400		<350		<280		<260		<270		<260	
Tetrachloroethene	2,000	5,000	5	-	<270		<270		<260		5000		<360		<400		<350		<280		<260		<270		<260	
Chloroform	600	2,000	400	-	<270		<270		<260		<320		<360		<400		<350		<280		<260		<270		<260	
Ethylbenzene	7,800,000	110,000,000	13,000	-	<550		<550		<520		<650		<730		<790		<710		<560		<530		<540		<520	
TICs	NLE	NLE	NLE	-	ND		ND		ND		ND		19200		2600		5800		ND		ND		2800		ND	
Semivolatile Organic Compounds (SVOCs, µg/kg)																										
Lab Sample ID (All analyses except VOCs collected at approximately 6-12 in. bgs)					3473.07		3473.11		3473.15		3473.19		3477.03		3477.07		3477.11		3477.15		3479.03		3479.15		3479.07	
Naphthalene	6,000	17,000	25,000	-	<280		<260		<280		<1400		<270		300		<270		<260		<300		<280		<260	
n-Nitrosodiphenylamine	99,000	390,000	400	-	<210		<190		<210		<1000		<200		<200		<210		<200		<220		<210		<190	
2-Methylnaphthalene	230,000	2,400,000	8,000	-	<310		<290		<310		<1600		<300		520		<310		<300		<330		<310		<290	
4-Methylphenol	31,000	340,000	NLE	-	<310		<280		<300		<1500		<290		<300		<300		<290		<320		<300		<280	
Acenaphthylene	NLE	3.00E+08	NLE	-	<220		<200		<220		<1100		<210		<210		<220		<210		<230		<220		<200	
Acenaphthene	3,400,000	37,000,000	110,000	-	<200		<180		<200		<1000		<190		<190		<200		<190		<210		<200		<190	
Dibenzofuran	NLE	NLE	NLE	-	<210		<200		<210		<1100		<200		160	J	<210		<200		<230		<210		<200	
Diethylphthalate	49,000,000	550,000,000	88,000	-	<230		<210		<230		<1200		<220		<220		<230		<220		<250		<230		<210	
Fluorene	2,300,000	24,000,000	170,000	-	<220		<200		<220		<1100		<210		<210		<210		<210		<230		<220		<200	
Phenanthrene	NLE	300,000,000	NLE	-	<220		300		<220		<1100		200	J	310		<220		560		<230		<220		<200	
Anthracene	17,000,000	30,000,000	2,400,000	-	<220		290		<220		<1100		<210		<210		<220		<210		<230		<220		<200	
Dimethylphthalate	NLE	NLE	NLE	-	<170		<160		<170		<860		<170		<170		<170		<160		<180		<170		<160	
Di-n-butylphthalate	6,100,000	68,000,000	760,000	-	780	JB	300	JB	330	JB	27000	BD	820	JB	1000	B	590	JB	660	JB	740	JB	590	JB	750	JB
Fluoranthene	2,300,000	24,000,000	1,300,000	-	<220		260		<220		<1100		430		<210		180	J	340		<240		<220		<210	
Pyrene	1,700,000	18,000,000	840,000	-	<260		450		<250		<1300		420		<250		220	J	680		<270		<260		<240	
Pyridine	NLE	NLE	NLE	-	<340		<310		<340		780	JD	<330		<330		<340		<320		<360		<340		<320	
Butylbenzylphthalate	1,200,000	14,000,000	230,000	-	<290		<260		<280		<1400		<270		<280		<280		<270		<300		<280		<270	
Benzo(a)anthracene	600	2,000	800	-	<220		180	J	<220		<1100		270		<220		250		240		<240		<220		<210	
3,3'-Dichlorobenzidine	1,000	4,000	200	-	<390		<360		<390		<2000		<380		<380		<390		<370		<420		<390		<360	
Chrysene	62,000	230,000	80,000	-	<290		350		<280		<1400		460		250	J	410		440		<300		<280		<270	
bis(2-Ethylhexyl)phthalate	35,000	140,000	1,200,000	-	180	JB	160	JB	170	JB	<1600		180	JB	250	JB	190	JB	180	JB	400		130	J	190	JB
Benzo(b)fluoranthene	600	2,000	2,000	-	<280		120	J	<280		<1400		270		<270		410		140	J	<300		<280		<260	
Benzo(k)fluoranthene	6,000	23,000	25,000	-	<210		140	J	<210		<1000		260		<200		310		150	J	<220		<210		<190	
Benzo(a)pyrene	200	200	200	-	<210		150	J	<210		<1100		270		<210		350		170	J	<230		<210		<200	
Indeno(1,2,3-cd)pyrene	600	2,000	7,000	-	<230		<210		<230		<1200		200	J	<230		270		110	J	<250		<230		<220	
Dibenz(a,h)anthracene	200	200	800	-	<270		<250		<270		<1400		<260		<260		<270		<260		<290		<270		<250	
Benzo(g,h,i)perylene	380,000,000	30,000,000	NLE	-	<270		<250		<270		<1400		180	J	<260		220	J	120	J	<290		<270		<250	
Total TICs	NLE	NLE	NLE	-	56100		39300		51500		ND		36700		39950		43300		33800		35800		41850		18900	
Pesticides / PCBs (mg/kg)																										
Heptachlor	0.1	0.7	0.5	-	<0.0006		<0.0006		<0.0006		0		<0.0003		<0.0003		<0.0003		<0.0003		<0.0003		<0.0003		<0.0003	
Heptachlor Epoxide	0.07	0.3	0.01	-	<0.0005		<0.0005		<0.0005		0		<0.0003		<0.0003		<0.0003		<0.0003		<0.0003		<0.0003		<0.0003	
4,4'-DDE	2	9	18	-	<0.0007		<0.0008		<0.0008		0		<0.0004		<0.0004		<0.0004		<0.0004		<0.0004		0.001		0.001	
Dieldrin	0.04	0.2	0.003	-	<0.0004		<0.0004		<0.0004		0		<0.0002		<0.0002		<0.0002		<0.0002		<0.0002		<0.0002		<0.0002	
Endrin	23	340	1	-	<0.0006		<0.0007		<0.0007		0		<0.0003		<0.0003		<0.0004		<0.0003		<0.0003		<0.0003		<0.0003	
4,4'-DDD	3	13	4	-	<0.0014		<0.0015		<0.0015		<0.001		<0.0007		<0.0007		<0.0008		<0.0007		<0.0007		<0.0007		0.001	
Endrin Aldehyde	NLE	NLE	NLE	-	0.01		<0.0012		<0.0012		<0.001		<0.0006		<0.0006		<0.0006		<0.0006		<0.0006		<0.0006		<0.0006	
4,4'-DDT	2	8	11	-	<0.0003		<0.0003		<0.0003		0		0.003		<0.0002		<0.0002		<0.0002		<0.0002		<0.0002		<0.0002	
Endosulfan I	470	6,800	4	-	0.008		<0.0005		<0.0005		0		<0.0003		<0.0003		<0.0003		<0.0003		<0.0003		<0.0003		<0.0003	
Endosulfan II	470	6,800	4	-	0.002		0.009		<0.0006		0		<0.0003		<0.0003		<0.0003									

TABLE 4.1
SOIL SAMPLING SUMMARY RESULTS - COMPARISON TO NJDEP STANDARDS
SITE FTMM-05
FORT MONMOUTH, NEW JERSEY

Field Sample Location	NJDEP Residential Direct Contact Soil Remediation Standard ⁽¹⁾	NJDEP Non- Residential Direct Contact Soil Remediation Standard ⁽¹⁾	NJDEP Impact to Groundwater Screening Level ⁽²⁾	Weston 1995 Background ⁽³⁾	B-12		B-13		B-14		B-15		B-16		B-17		B-18		B-19		B-20		B-20 Dup		B-21	
Sample Date					04/11/98		04/11/98		04/11/98		04/11/98		04/13/98		04/13/98		04/13/98		04/13/98		04/14/98		04/14/98		04/14/98	
Metals (mg/kg)																										
Aluminum	78,000	NA	6,000	15,200	10180		10770		10610		12770		12110		2705		5034		10530		12710		6500		12310	
Antimony	31	450	6	ND	1.568		1.548		2.184		2.339		1.504		2.11		0.716		1.411		1.18		0.811		1.586	
Arsenic	19	19	19	22.9	11.02		13.28		12.94		14.03		12.91		7.747		10.67		1030		14.23		6.743		12.38	
Barium	16,000	59,000	2,100	32.3	22.06		28.75		21.51		29.59		77.62		19.8		57.41		28.22		26.01		18.78		34.1	
Beryllium	16	140	0.7	2	0.9966		1.09		1.376		1.187		1.463		0.3558		0.5955		0.9895		1.228		0.72		1.182	
Cadmium	78	78	2	ND	0.0837		0.0925		0.3648		0.2357		0.3385		0.482		1.934		1.258		1.41		<0.050		<0.059	
Calcium	NLE	NLE	NLE	921	1110		1749		1224		600.2		1370		746.9		1947		533.2		750.3		1079		4851	
Chromium	NLE	NLE	NLE	269	86.63		83.47		117.3		98.72		70.59		5.603		13.86		83.08		106.7		53.19		109.2	
Cobalt	1,600	590	90	2.5	5.389		3.82		5.631		5.412		5.138		3.41		5.639		2.785		3.228		2.142		5.048	
Copper	3,100	45,000	11,000	8	4.719		7.043		4.11		2.605		132.3		191.4		504.4		6.488		4.663		4.971		5.5	
Iron	NLE	NLE	NLE	55,800	39710		39530		56290		47940		33680		4204		8125		33280		38800		19270		44760	
Lead	400	800	90	19.5	9.266		32.8		8.331		8.012		288.8		1793		305.2		10.63		16.25		11.83		9.176	
Magnesium	NLE	NLE	NLE	7,230	1442		2317		1445		1278		1392		184.9		348.8		2199		3160		2083		3428	
Manganese	11,000	5,900	65	90.7	105.6		85.88		115.4		87.25		110.8		24.55		50.34		59.32		76.21		67.71		81.37	
Mercury	23	65	0.1	ND	0.055		0.467		0.024		0.012		0.437		0.0062		0.133		<0.012		0.019		0.011		<0.013	
Nickel	1,600	23,000	48	8.4	14.2		12.04		19.62		15.27		15.51		8.915		15.97		8.234		10.4		5.72		15.46	
Potassium	NLE	NLE	NLE	15400	2392		4990		2466		3631		3944		375.3		907.7		4763		5588		4347		3221	
Selenium	390	5,700	11	1.9	<0.357		<0.314		<0.358		<0.353		<0.301		0.438		0.78		<0.295		<0.360		<0.302		<0.351	
Silver	390	5,700	1	1.1	<0.357		<0.314		<0.358		<0.353		<0.301		<0.361		1.519		<0.295		<0.360		<0.302		<0.351	
Sodium	NLE	NLE	NLE	51.6	66.2		67.71		79.89		83.87		248		152.2		246.7		37.78		48.64		33.37		235.5	
Thallium	5	79	3	ND	<0.357		<0.314		<0.358		<0.353		<0.301		<0.361		<0.397		<0.295		<0.360		<0.302		<0.351	
Vanadium	78	1,100	NLE	94.1	120.3		104.6		166.2		146.2		90.73		10.9		17.17		66.69		67.64		34.59		135.8	
Zinc	23,000	110,000	930	81.4	59.62		66.81		108.8		79.64		120.7		46.07		627.4		42.6		56.35		32.86		74.92	

Notes:

Historically, there have been up to 318 soil boring locations associated with FTMM-05. This analysis looks at only those boring locations that fall within the footprint of FTMM-05.

(1) New Jersey Department of Environmental Protection (NJDEP) Residential Direct Contact Soil Remediation Standards (RDCSRS) and Non-Residential Direct Contact Soil Remediation Standards (NRDCSRS) (N.J.A.C 7:26D; amended May 7, 2012). Available at: <http://www.state.nj.us/dep/srp/regs/rs/>.

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(3) Weston, 1995. Final Site Investigation - Main Post and Charles Wood Areas, Fort Monmouth, New Jersey, December.

NJDEP criteria for total xylenes are used for xylene isomers (m+p, o).

NJDEP criteria for endrin is used for endrin aldehyde.

NJDEP criteria for 4,4'-DDD and 4,4'-DDT are for total DDD and total DDT, respectively.

There are no NJDEP soil standards for individual PCB Arcolors; the total PCB NJDEP standards were used for individual Arcolors

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

B = Analyte detected in both sample and associated laboratory blank.

D = Result from dilution of sample.

DUP = field duplicate sample.

E = Estimated value.

J = Analyte detected between MDL and practical quantitation limit (PQL).

NA = not analyzed.

ND = not detected.

NLE = No limit established.

< = analyte not detected above method detection limit (MDL).

µg/kg = micrograms per kilogram.

mg/kg = milligrams per kilogram.

VOCs = volatile organic compounds.

in. = inches.

bgs = below ground surface.

Detections are bolded.

Shaded cells = concentration exceeds NJDEP Impact to Groundwater Criterion.

Shaded cells = concentration exceeds one or both NJDEP Direct Contact Criteria.

Shaded cells = concentration exceeds all NJDEP criteria.

Shaded cells = concentration exceeds Weston (1995) background concentration.

TABLE 4.1
SOIL SAMPLING SUMMARY RESULTS - COMPARISON TO NJDEP STANDARDS
SITE FTMM-05
FORT MONMOUTH, NEW JERSEY

Field Sample Location	NJDEP Residential Direct Contact Soil Remediation Standard ⁽¹⁾	NJDEP Non- Residential Direct Contact Soil Remediation Standard ⁽¹⁾	NJDEP Impact to Groundwater Screening Level ⁽²⁾	Weston 1995 Background ⁽³⁾	B-22		B-23		B-24		B-25		B-26		B-27		B-28		B-29		B-30		B-31		B-32	
Sample Date					04/14/98	04/15/98	04/15/98	04/15/98	04/15/98	04/20/98	04/20/98	04/20/98	04/20/98	04/21/98	04/21/98											
Volatile Organic Compounds (VOCs, µg/kg)																										
Lab Sample ID (VOCs only collected at approximately 24 in. bgs)					3479.12		3485.04		3485.08		3485.12		3485.16		3498.04		3498.08		3498.12		3498.16		3500.03		3500.07	
Methylene Chloride	34,000	97,000	10	-	<540		<560		<620		<570		<650		<670		<570		<530		<570		<520		<530	
Benzene	2,000	5,000	5	-	<270		<280		<310		<290		<330		<340		<290		<260		<280		<260		<270	
Tetrachloroethene	2,000	5,000	5	-	<270		4800		3200		<290		<330		<340		<290		<260		<280		<260		<270	
Chloroform	600	2,000	400	-	<270		<280		<310		<290		<330		<340		<290		<260		<280		<260		<270	
Ethylbenzene	7,800,000	110,000,000	13,000	-	<540		<560		<620		<570		<650		<670		<570		<530		<570		<520		<530	
TICs	NLE	NLE	NLE	-	2700		ND		ND		ND		ND		3800		ND		ND		ND		ND		ND	
Semivolatile Organic Compounds (SVOCs, µg/kg)																										
Lab Sample ID (All analyses except VOCs collected at approximately 6-12 in. bgs)					3479.11		3485.03		3485.07		3485.11		3485.15		3498.03		3498.07		3498.11		3498.15		3500.02		3500.06	
Naphthalene	6,000	17,000	25,000	-	<250		<270		<250		<280		<280		170	J	130	J	<260		<270		<1300		<270	
n-Nitrosodiphenylamine	99,000	390,000	400	-	<180		<200		<190		<210		<210		<220		<200		<200		<200		<990		<210	
2-Methylnaphthalene	230,000	2,400,000	8,000	-	<270		<300		<280		<310		<310		210	J	160	J	<290		<300		<1500		<310	
4-Methylphenol	31,000	340,000	NLE	-	<270		<300		<280		<300		<300		<320		<290		<290		<290		<1400		<300	
Acenaphthylene	NLE	3.00E+08	NLE	-	<190		<210		<200		<220		<220		<230		<210		<210		<210		<1000		<220	
Acenaphthene	3,400,000	37,000,000	110,000	-	<180		<190		<180		<200		<200		<210		<190		<190		<190		<940		<200	
Dibenzofuran	NLE	NLE	NLE	-	<190		<210		<190		<210		<210		<220		<200		<200		<200		<1000		<210	
Diethylphthalate	49,000,000	550,000,000	88,000	-	<200		<230		<210		<230		<230		200	JB	<220		120	JB	120	JB	150	J	140	J
Fluorene	2,300,000	24,000,000	170,000	-	<190		<210		<200		<220		<220		<230		<210		<200		<210		<1000		<210	
Phenanthrene	NLE	300,000,000	NLE	-	140	J	<210		<200		190	J	390		1300		480		150	J	<210		130	J	170	J
Anthracene	17,000,000	30,000,000	2,400,000	-	140	J	<210		<200		<220		<220		210	J	<210		<210		<210		<1000		<220	
Dimethylphthalate	NLE	NLE	NLE	-	<150		<170		<160		<170		<170		<180		<160		<160		<170		<810		<170	
Di-n-butylphthalate	6,100,000	68,000,000	760,000	-	520	JB	11000	B	1100	B	5700	B	4600	B	6600	B	890	JB	1600	B	1000	B	26000	BD	2500	B
Fluoranthene	2,300,000	24,000,000	1,300,000	-	150	J	<220		<200		330		910		2800		380		140	J	<210		120	J	250	
Pyrene	1,700,000	18,000,000	840,000	-	220	J	<250		<240		310		770		2500		600		240	J	<250		190	J	270	
Pyridine	NLE	NLE	NLE	-	<300		<330		<310		<340		<340		<360		<330		<320		<330		<1600		<340	
Butylbenzylphthalate	1,200,000	14,000,000	230,000	-	<250		<280		<260		<290		120	J	<300		<270		<270		<270		<270		<280	
Benzo(a)anthracene	600	2,000	800	-	<200		<220		<200		250		540		1500		230		<210		<210		<1100		170	J
3,3'-Dichlorobenzidine	1,000	4,000	200	-	<350		<380		<360		<390		<390		<410		<380		<370		<380		<1900		<390	
Chrysene	62,000	230,000	80,000	-	190	J	<280		<260		410		830		2300		530		190	J	<270		150	J	300	
bis(2-Ethylhexyl)phthalate	35,000	140,000	1,200,000	-	640		130	JB	510	B	230	JB	1300	B	290	JB	140	JB	180	JB	170	JB	130	JB	160	JB
Benzo(b)fluoranthene	600	2,000	2,000	-	<250		<270		<260		290		690		1600		190	J	<260		<270		<1300		160	J
Benzo(k)fluoranthene	6,000	23,000	25,000	-	<180		<200		<190		260		560		1400		190	J	<190		<200		<980		150	J
Benzo(a)pyrene	200	200	200	-	<190		<210		<190		250		670		1600		220		<200		<200		<1000		170	J
Indeno(1,2,3-cd)pyrene	600	2,000	7,000	-	<210		<230		<210		190	J	580		1200		150	J	<220		<220		<1100		120	J
Dibenz(a,h)anthracene	200	200	800	-	<240		<270		<250		<270		<270		420		<260		<260		<260		<1300		<270	
Benzo(g,h,i)perylene	380,000,000	30,000,000	NLE	-	<240		<270		<250		170	J	510		950		160	J	<260		<260		<1300		<270	
Total TICs	NLE	NLE	NLE	-	9900		57400		47900		56800		39240		48800		33500		50100		54500		6500		17700	
Pesticides / PCBs (mg/kg)																										
Heptachlor	0.1	0.7	0.5	-	<0.0003		<0.0003		<0.0003		<0.0003		<0.0003		<0.0004		<0.0003		<0.0003		<0.0003		<0.0003		<0.0003	
Heptachlor Epoxide	0.07	0.3	0.01	-	<0.0002		<0.0003		<0.0003		<0.0003		<0.0003		<0.0007		<0.0006		<0.0006		<0.0007		<0.0007		<0.0007	
4,4'-DDE	2	9	18	-	<0.0004		<0.0004		<0.0004		0.007		0.001		0.092		0.016		0.009		0.004		<0.0004		<0.0004	
Dieldrin	0.04	0.2	0.003	-	<0.0002		<0.0002		<0.0002		<0.0002		<0.0002		<0.0006		<0.0005		<0.0005		<0.0005		<0.0006		<0.0005	
Endrin	23	340	1	-	<0.0003		<0.0003		<0.0003		<0.0003		<0.0004		<0.0006		<0.0005		<0.0005		<0.0005		<0.0006		<0.0005	
4,4'-DDD	3	13	4	-	<0.0007		<0.0007		<0.0007		0.002		0.002		0.008		0.001		<0.0006		<0.0007		<0.0007		<0.0007	
Endrin Aldehyde	NLE	NLE	NLE	-	<0.0005		<0.0006		<0.0006		<0.0006		<0.0006		<0.0006		<0.0005		<0.0005		<0.0005		<0.0006		<0.0005	
4,4'-DDT	2	8	11	-	<0.0002		<0.0002		<0.0002		0.015		0.001		0.03		0.004		0.001		<0.0012		<0.0012		<0.0012	
Endosulfan I	470	6,800	4	-	<0.0002		<0.0003		<0.0003		<0.0003		<0.0003		<0.0006		<0.0005		<0.0005		<0.0005		<0.0006		<0.0005	
Endosulfan II	470	6,800	4	-	0.002		<0.0003		<0.0003		0.005															

TABLE 4.1
SOIL SAMPLING SUMMARY RESULTS - COMPARISON TO NJDEP STANDARDS
SITE FTMM-05
FORT MONMOUTH, NEW JERSEY

Field Sample Location	NJDEP Residential Direct Contact Soil Remediation Standard ⁽¹⁾	NJDEP Non- Residential Direct Contact Soil Remediation Standard ⁽¹⁾	NJDEP Impact to Groundwater Screening Level ⁽²⁾	Weston 1995 Background ⁽³⁾	B-22		B-23		B-24		B-25		B-26		B-27		B-28		B-29		B-30		B-31		B-32	
Sample Date					04/14/98		04/15/98		04/15/98		04/15/98		04/15/98		04/20/98		04/20/98		04/20/98		04/20/98		04/21/98		04/21/98	
Metals (mg/kg)																										
Aluminum	78,000	NA	6,000	15,200	6500		10230		8798		5973		3987		4737		10510		3825		11450		9478		9374	
Antimony	31	450	6	ND	0.811		1.933		2.019		0.535		1.402		0.609		2.536		0.562		1.41		1.835		1.035	
Arsenic	19	19	19	22.9	6.743		11.27		11.08		9.377		12.45		14.28		11.12		5.409		10.21		12.89		11.15	
Barium	16,000	59,000	2,100	32.3	18.78		18.63		22.06		54.85		93.31		102.3		27.13		21.8		27.58		26		36.46	
Beryllium	16	140	0.7	2	0.72		1.132		1.003		0.5943		0.5401		0.5059		1.382		0.4842		0.9559		1.034		0.8538	
Cadmium	78	78	2	ND	<0.050		0.2331		0.4323		0.5041		1.011		1.863		0.2193		0.0786		0.1311		0.1635		0.2132	
Calcium	NLE	NLE	NLE	921	1079		672.4		645.4		2380		1670		2181		775.9		715.5		1593		705.5		1054	
Chromium	NLE	NLE	NLE	269	53.19		106.8		92.13		43.8		24.87		25.25		141.4		28.13		78.5		102.1		70.22	
Cobalt	1,600	590	90	2.5	2.142		3.946		4.48		3.881		3.974		3.495		3.636		0.8424		4.455		1.878		3.774	
Copper	3,100	45,000	11,000	8	4.971		37.2		11.34		102.8		484.1		566.7		7.552		7.933		4.673		8.222		32.05	
Iron	NLE	NLE	NLE	55,800	19270		50900		41650		23110		17000		14330		51640		11250		36530		39390		31220	
Lead	400	800	90	19.5	11.83		17.2		10.74		207.2		921.5		708.5		21.74		39.12		10.71		34.73		70.19	
Magnesium	NLE	NLE	NLE	7,230	2083		1176		958.6		1409		378.7		1019		1088		844.5		1847		1751		1360	
Manganese	11,000	5,900	65	90.7	67.71		74.58		86.61		104.8		97.11		73.72		52.63		39.55		87.83		38.07		123.3	
Mercury	23	65	0.1	ND	0.011		<0.012		<0.011		0.201		0.485		0.512		0.064		0.056		0.012		0.184		0.025	
Nickel	1,600	23,000	48	8.4	5.72		13.06		12.94		10.85		13.33		10.33		11.45		3.095		12.99		8.486		12.04	
Potassium	NLE	NLE	NLE	15400	4347		2592		1592		1725		684		1454		2371		1592		2876		4834		3626	
Selenium	390	5,700	11	1.9	<0.302		<0.331		<0.381		<0.305		0.888		0.881		<0.302		<0.372		<0.365		<0.290		<0.299	
Silver	390	5,700	1	1.1	<0.302		<0.331		<0.381		<0.305		1.574		0.419		<0.302		<0.372		<0.365		<0.290		<0.299	
Sodium	NLE	NLE	NLE	51.6	33.37		35.27		58.67		95.4		333.1		159.7		49.69		35.99		77.41		39.97		81.26	
Thallium	5	79	3	ND	<0.302		<0.331		<0.381		<0.305		<0.373		<0.366		<0.302		<0.372		<0.365		<0.290		<0.299	
Vanadium	78	1,100	NLE	94.1	34.59		138.4		126.7		51.98		34.2		28.86		191.7		19.39		109.7		79.23		76.03	
Zinc	23,000	110,000	930	81.4	32.86		86.32		67.07		163.9		303.7		179.4		70.69		55.47		56.71		62.43		82.33	

Notes:

Historically, there have been up to 318 soil boring locations associated with FTMM-05. This analysis looks at only those boring locations that fall within the footprint of FTMM-05.

(1) New Jersey Department of Environmental Protection (NJDEP) Residential Direct Contact Soil Remediation Standards (RDCSRS) and Non-Residential Direct Contact Soil Remediation Standards (NRDCSRS) (N.J.A.C 7:26D; amended May 7, 2012). Available at: <http://www.state.nj.us/dep/srp/regs/rs/>.

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NJDEP criteria for 4,4'-DDD and 4,4'-DDT are for total DDD and total DDT, respectively.

There are no NJDEP soil standards for individual PCB Arcolors; the total PCB NJDEP standards were used for individual Arcolors

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

B = Analyte detected in both sample and associated laboratory blank.

D = Result from dilution of sample.

DUP = field duplicate sample.

E = Estimated value.

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ND = not detected.

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mg/kg = milligrams per kilogram.

VOCs = volatile organic compounds.

in. = inches.

bgs = below ground surface.

Detections are bolded.

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Shaded cells = concentration exceeds all NJDEP criteria.

Shaded cells = concentration exceeds Weston (1995) background concentration.

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SITE FTMM-05
FORT MONMOUTH, NEW JERSEY

Field Sample Location	NJDEP Residential Direct Contact Soil Remediation Standard ⁽¹⁾	NJDEP Non- Residential Direct Contact Soil Remediation Standard ⁽¹⁾	NJDEP Impact to Groundwater Screening Level ⁽²⁾	Weston 1995 Background ⁽³⁾	B-33		B-34		B-35		B-36		B-37		B-38		B-39		B-40		B-41		B-42		B-43	
Sample Date					04/21/98		04/21/98		04/21/98		04/22/98		04/22/98		04/22/98		04/22/98		04/22/98		05/01/98		05/01/98		05/04/98	
Volatile Organic Compounds (VOCs, µg/kg)																										
Lab Sample ID (VOCs only collected at approximately 24 in. bgs)					3500.11		3500.15		3500.19		3501.03		3501.07		3501.11		3501.15		3501.19		3539.03		3539.07		3543.03	
Methylene Chloride	34,000	97,000	10	-	<620		<890		<680		<520		<520		<690		<570		<630		<680		<580		<630	
Benzene	2,000	5,000	5	-	<310		<450		<340		<260		<260		<340		<280		<320		<340		<290		<310	
Tetrachloroethene	2,000	5,000	5	-	<310		<450		<340		<260		<260		410		<280		3100		<340		<290		<310	
Chloroform	600	2,000	400	-	<310		<450		<340		<260		<260		<340		<280		<320		<340		<290		<310	
Ethylbenzene	7,800,000	110,000,000	13,000	-	<620		<890		<680		<520		<520		<690		<570		<630		<680		<580		<630	
TICs	NLE	NLE	NLE	-	ND		ND		ND		ND		ND		ND		ND		ND		22700		ND		ND	
Semivolatile Organic Compounds (SVOCs, µg/kg)																										
Lab Sample ID (All analyses except VOCs collected at approximately 6-12 in. bgs)					3500.10		3500.14		3500.18		3501.02		3501.06		3501.10		3501.14		3501.18		3539.02		3539.06		3543.02	
Naphthalene	6,000	17,000	25,000	-	<270		<280		<260		<250		<250		<270		<1300		<260		180	J	310		<310	
n-Nitrosodiphenylamine	99,000	390,000	400	-	<200		<210		<200		<190		<190		<200		<990		<190		<210		<200		<230	
2-Methylnaphthalene	230,000	2,400,000	8,000	-	110	J	<310		120	J	<280		<280		<310		<1500		<290		260	J	260	J	<350	
4-Methylphenol	31,000	340,000	NLE	-	<290		<300		<290		<280		<270		<300		<1400		<280		<300		<290		<340	
Acenaphthylene	NLE	3.00E+08	NLE	-	<210		<220		<210		<200		<200		<210		<1000		<200		<220		<210		<240	
Acenaphthene	3,400,000	37,000,000	110,000	-	<190		<200		<190		<180		<180		<200		<940		<190		<200		<190		<220	
Dibenzofuran	NLE	NLE	NLE	-	<200		<210		<200		<190		<190		<210		<1000		<200		<210		<200		<240	
Diethylphthalate	49,000,000	550,000,000	88,000	-	300		180	J	<220		<210		<210		<230		<1100		<220		<230		<220		<260	
Fluorene	2,300,000	24,000,000	170,000	-	<210		<220		<200		<200		<200		<210		<1000		<200		<210		<210		<240	
Phenanthrene	NLE	300,000,000	NLE	-	350		280		670		210		<200		<220		<1000		<210		350		640		<250	
Anthracene	17,000,000	30,000,000	2,400,000	-	<210		<220		<210		<200		<200		<220		<1000		<210		<220		<210		<250	
Dimethylphthalate	NLE	NLE	NLE	-	<170		<170		<160		<160		<160		<170		<810		<160		<170		<170		<190	
Di-n-butylphthalate	6,100,000	68,000,000	760,000	-	1000	B	1400	B	6800	B	3300	B	4700	B	6100	B	35000	BD	4200	B	1100	B	800	JB	400	JB
Fluoranthene	2,300,000	24,000,000	1,300,000	-	550		570		1300		220		<200		<220		<1000		<210		340		1300		<250	
Pyrene	1,700,000	18,000,000	840,000	-	520		460		1100		330		<230		<250		<1200		<240		310		960		<290	
Pyridine	NLE	NLE	NLE	-	<330		<340		<320		<310		<310		<330		<1600		<320		<340		<330		<380	
Butylbenzylphthalate	1,200,000	14,000,000	230,000	-	<280		<290		<270		<260		<260		<280		<1400		<270		<280		<280		<320	
Benzo(a)anthracene	600	2,000	800	-	320		350		690		140	J	<200		<220		<1100		<210		150	J	650		<250	
3,3'-Dichlorobenzidine	1,000	4,000	200	-	<380		<390		<370		<350		<350		<380		<1900		<370		<390		<380		<440	
Chrysene	62,000	230,000	80,000	-	600		570		1200		280		<260		<280		<1400		<270		410		980		130	J
bis(2-Ethylhexyl)phthalate	35,000	140,000	1,200,000	-	150	JB	360	B	130	JB	130	JB	130	JB	150	JB	<1500		<290		150	JB	<300		<350	
Benzo(b)fluoranthene	600	2,000	2,000	-	350		420		840		110	J	<250		<270		<1300		<260		250	J	720		<310	
Benzo(k)fluoranthene	6,000	23,000	25,000	-	360		340		700		120	J	<190		<200		<980		<190		180	J	590		<230	
Benzo(a)pyrene	200	200	200	-	370		390		720		120	J	<190		<210		<1000		<200		160	J	670		<240	
Indeno(1,2,3-cd)pyrene	600	2,000	7,000	-	260		300		490		<210		<210		<230		<1100		<220		130	J	580		<260	
Dibenz(a,h)anthracene	200	200	800	-	<260		<270		200	J	<250		<250		<270		<1300		<250		<270		200	J	<300	
Benzo(g,h,i)perylene	380,000,000	30,000,000	NLE	-	230	J	250	J	400		<250		<250		<270		<1300		<250		120	J	500		<300	
Total TICs	NLE	NLE	NLE	-	11560		32020		5920		6000		7100		7300		ND		5800		19190		19310		12400	
Pesticides / PCBs (mg/kg)																										
Heptachlor	0.1	0.7	0.5	-	<0.0003		<0.0003		<0.0003		<0.0003		<0.0003		<0.0003		<0.0003		<0.0003		<0.0003		<0.0003		<0.0004	
Heptachlor Epoxide	0.07	0.3	0.01	-	<0.0007		<0.0007		<0.0006		<0.0006		<0.0006		<0.0006		<0.0007		<0.0007		<0.0006		<0.0007		<0.0007	
4,4'-DDE	2	9	18	-	0.037		0.009		0.153		0.003		<0.0004		0		<0.0005		0.001		0.028		0.007		<0.0005	
Dieldrin	0.04	0.2	0.003	-	<0.0006		<0.0006		<0.0005		<0.0005		<0.0005		<0.0005		<0.0006		<0.0006		<0.0005		<0.0006		<0.0006	
Endrin	23	340	1	-	<0.0006		<0.0006		0.023		<0.0005		<0.0005		<0.0005		<0.0006		<0.0006		<0.0005		<0.0006		<0.0006	
4,4'-DDD	3	13	4	-	0.003		<0.0007		0.02		0.001		<0.0006		<0.0006		<0.0007		0.001		0.003		0.003		<0.0007	
Endrin Aldehyde	NLE	NLE	NLE	-	<0.0006		<0.0006		<0.0005		<0.0005		<0.0005		<0.0005		<0.0006		<0.0006		<0.0005		<0.0006		<0.0006	
4,4'-DDT	2	8	11	-	0.02		0.003		0.051		0.006		<0.0011		<0.0012		<0.0012		0.003		0.044		0.033		<0.0013	
Endosulfan I	470	6,800	4	-	<0.0006		<0.0006		<0.0005		<0.0005		<0.0005		<0.0005		<0.0006		<0.0006		<0.0005		<0.0006		<0.0006	
Endosulfan II	470	6,800	4	-	<0.0004		<0.0004		0.01		<0.0004		<0.0004		<0.0004		<0.0005		<0.0004		<0.0004		0.004			

TABLE 4.1
SOIL SAMPLING SUMMARY RESULTS - COMPARISON TO NJDEP STANDARDS
SITE FTMM-05
FORT MONMOUTH, NEW JERSEY

Field Sample Location	NJDEP Residential Direct Contact Soil Remediation Standard ⁽¹⁾	NJDEP Non- Residential Direct Contact Soil Remediation Standard ⁽¹⁾	NJDEP Impact to Groundwater Screening Level ⁽²⁾	Weston 1995 Background ⁽³⁾	B-33		B-34		B-35		B-36		B-37		B-38		B-39		B-40		B-41		B-42		B-43	
Sample Date					04/21/98		04/21/98		04/21/98		04/22/98		04/22/98		04/22/98		04/22/98		04/22/98		05/01/98		05/01/98		05/04/98	
Metals (mg/kg)																										
Aluminum	78,000	NA	6,000	15,200	5404		6652		12810		8275		10070		9616		9833		7769		6479		3951		6390	
Antimony	31	450	6	ND	1.754		2.403		5.962		0.964		1.965		1.819		1.916		1.55		1.413		1.104		<0.280	
Arsenic	19	19	19	22.9	32.71		13.11		62.27		9.445		10.42		9.688		13.1		10.04		12.52		8.959		4.218	
Barium	16,000	59,000	2,100	32.3	150		203.9		354.6		22.98		24.73		26.09		30.29		20		107.8		181.9		258.9	
Beryllium	16	140	0.7	2	0.6234		0.689		10.89		0.8057		1.032		1.058		1.159		0.8691		0.759		0.4586		0.764	
Cadmium	78	78	2	ND	2.087		1.975		7.431		0.5596		0.1855		0.2547		0.1541		0.1502		0.959		0.489		<0.070	
Calcium	NLE	NLE	NLE	921	4974		3063		2477		635.6		1015		839		612.5		577.6		2137		962.9		1200	
Chromium	NLE	NLE	NLE	269	38.59		44.4		72.25		61.12		96.84		99.42		106.1		83.34		56.36		36.34		21.06	
Cobalt	1,600	590	90	2.5	5.207		5.537		55.97		3.707		4.522		4.232		4.975		4.022		4.604		4.035		5.369	
Copper	3,100	45,000	11,000	8	409.3		428		442.8		8.111		3.796		3.185		3.559		1.854		412.9		207.3		38.4	
Iron	NLE	NLE	NLE	55,800	32440		23380		13500		29820		43400		42240		49440		36490		27420		21350		8584	
Lead	400	800	90	19.5	810.3		1090		2851		16.68		8.622		8.58		10.66		5.945		629.1		502.5		39.9	
Magnesium	NLE	NLE	NLE	7,230	2213		878.7		1112		1019		1311		1022		899.6		789.1		1009		485		331.2	
Manganese	11,000	5,900	65	90.7	179.6		153.2		174.9		76.98		103.8		85.25		110.2		86.79		193.3		102.6		68.44	
Mercury	23	65	0.1	ND	0.979		0.662		1.562		0.059		0.025		0.014		0.037		0.013		0.891		0.754		0.085	
Nickel	1,600	23,000	48	8.4	18.98		22.35		69.97		10.12		14.97		15.78		15.84		10.83		19.73		10.93		13.84	
Potassium	NLE	NLE	NLE	15400	1348		1615		3185		2115		2342		1607		1726		1611		1890		864.1		525.2	
Selenium	390	5,700	11	1.9	0.602		1.104		50.7		0.584		<0.347		<0.341		<0.376		<0.320		0.627		0.859		1.417	
Silver	390	5,700	1	1.1	2.78		3.345		9.425		<0.353		<0.347		<0.341		<0.376		<0.320		0.945		<0.357		2.362	
Sodium	NLE	NLE	NLE	51.6	245.1		186.7		343.3		38.72		40.28		45.41		62.79		32.38		154.9		103.4		216.8	
Thallium	5	79	3	ND	<0.377		<0.380		47.42		<0.353		<0.347		<0.341		<0.376		<0.320		<0.363		<0.357		<0.420	
Vanadium	78	1,100	NLE	94.1	44.85		52.39		84.39		84.38		131.4		139		159.7		103.5		59.51		43.68		20.79	
Zinc	23,000	110,000	930	81.4	743		828		658.1		45.25		64.17		70.04		71.88		58.82		433.1		250.3		48.22	

Notes:

Historically, there have been up to 318 soil boring locations associated with FTMM-05. This analysis looks at only those boring locations that fall within the footprint of FTMM-05.

(1) New Jersey Department of Environmental Protection (NJDEP) Residential Direct Contact Soil Remediation Standards (RDCSRS) and Non-Residential Direct Contact Soil Remediation Standards (NRDCSRS) (N.J.A.C 7:26D; amended May 7, 2012). Available at: <http://www.state.nj.us/dep/srp/regs/rs/>.

(2) NJDEP Impact to Groundwater (NJDEP guidance document; Nov 2013).

(3) Weston, 1995. Final Site Investigation - Main Post and Charles Wood Areas, Fort Monmouth, New Jersey, December.

NJDEP criteria for total xylenes are used for xylene isomers (m+p, o).

NJDEP criteria for endrin is used for endrin aldehyde.

NJDEP criteria for 4,4'-DDD and 4,4'-DDT are for total DDD and total DDT, respectively.

There are no NJDEP soil standards for individual PCB Arcolors; the total PCB NJDEP standards were used for individual Arcolors

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

B = Analyte detected in both sample and associated laboratory blank.

D = Result from dilution of sample.

DUP = field duplicate sample.

E = Estimated value.

J = Analyte detected between MDL and practical quantitation limit (PQL).

NA = not analyzed.

ND = not detected.

NLE = No limit established.

< = analyte not detected above method detection limit (MDL).

µg/kg = micrograms per kilogram.

mg/kg = milligrams per kilogram.

VOCs = volatile organic compounds.

in. = inches.

bgs = below ground surface.

Detections are bolded.

Shaded cells = concentration exceeds NJDEP Impact to Groundwater Criterion.

Shaded cells = concentration exceeds one or both NJDEP Direct Contact Criteria.

Shaded cells = concentration exceeds all NJDEP criteria.

Shaded cells = concentration exceeds Weston (1995) background concentration.

TABLE 4.1
SOIL SAMPLING SUMMARY RESULTS - COMPARISON TO NJDEP STANDARDS
SITE FTMM-05
FORT MONMOUTH, NEW JERSEY

Field Sample Location	NJDEP Residential Direct Contact Soil Remediation Standard ⁽¹⁾	NJDEP Non- Residential Direct Contact Soil Remediation Standard ⁽¹⁾	NJDEP Impact to Groundwater Screening Level ⁽²⁾	Weston 1995 Background ⁽³⁾	B-43 Dup		B-44		B-45		B-46		B-47		B-48		B-49		B-50		B-51		B-52		B-53	
Sample Date					05/04/98		05/04/98		05/04/98		05/04/98		05/05/98		05/05/98		05/05/98		05/05/98		05/05/98		05/05/98		05/06/98	
Volatile Organic Compounds (VOCs, µg/kg)																										
Lab Sample ID (VOCs only collected at approximately 24 in. bgs)					3543.19		3543.07		3543.11		3543.15		3547.03		3547.07		3547.11		3547.15		3547.19		3550.04		3550.08	
Methylene Chloride	34,000	97,000	10	-	<640		<690		<650		<680		<510		<530		<540		<540		<560		<620		<540	
Benzene	2,000	5,000	5	-	<320		<340		<330		<340		<250		<270		<270		<270		<280		<310		<270	
Tetrachloroethene	2,000	5,000	5	-	<320		<340		<330		450		<250		<270		<270		<270		<280		<310		<270	
Chloroform	600	2,000	400	-	<320		<340		<330		<340		<250		<270		<270		<270		<280		<310		<270	
Ethylbenzene	7,800,000	110,000,000	13,000	-	<640		<690		<650		<680		<510		<530		<540		<540		<560		<620		<540	
TICs	NLE	NLE	NLE	-	ND		ND		1800		1500		ND		2300		14500		7600		ND		ND		37700	
Semivolatile Organic Compounds (SVOCs, µg/kg)																										
Lab Sample ID (All analyses except VOCs collected at approximately 6-12 in. bgs)					3543.18		3543.06		3543.10		3543.14		3547.02		3547.06		3547.10		3547.14		3547.18		3550.03		3550.07	
Naphthalene	6,000	17,000	25,000	-	<310		190	J	<250		<260		<240		<260		<270		<260		<260		<260		<250	
n-Nitrosodiphenylamine	99,000	390,000	400	-	<230		<210		<190		<190		<180		<190		<200		<200		<200		<190		<190	
2-Methylnaphthalene	230,000	2,400,000	8,000	-	<350		160	J	<280		<290		<270		<290		<300		<290		<300		<290		<280	
4-Methylphenol	31,000	340,000	NLE	-	<340		<310		<280		160	J	<270		<280		<300		<290		<290		<280		<270	
Acenaphthylene	NLE	3.00E+08	NLE	-	<250		<220		<200		<200		<190		<200		<210		<200		<210		<200		<200	
Acenaphthene	3,400,000	37,000,000	110,000	-	<220		<200		<180		<180		<170		<180		<200		<190		<190		<190		<180	
Dibenzofuran	NLE	NLE	NLE	-	<240		<220		<190		<200		<190		<190		<210		<200		<200		<200		<190	
Diethylphthalate	49,000,000	550,000,000	88,000	-	<260		<240		<210		<210		110	JB	<210		<230		<220		<220		<220		<210	
Fluorene	2,300,000	24,000,000	170,000	-	<240		<220		<200		<200		<190		<200		<210		<200		<210		<200		<190	
Phenanthrene	NLE	300,000,000	NLE	-	140	J	1300		300		320		<190		<200		<220		<210		140	J	110	J	240	
Anthracene	17,000,000	30,000,000	2,400,000	-	<250		190	J	<200		<200		<190		<200		<220		<210		130	J	<200		240	
Dimethylphthalate	NLE	NLE	NLE	-	<190		<180		<160		<160		<150		<160		<170		<160		<160		<160		<150	
Di-n-butylphthalate	6,100,000	68,000,000	760,000	-	870	JB	370	JB	290	JB	1000	B	960	B	630	JB	490	JB	260	JB	910	B	<880		350	JB
Fluoranthene	2,300,000	24,000,000	1,300,000	-	180	J	2800		710		560		<190		120	J	<220		170	J	160	J	<210		260	
Pyrene	1,700,000	18,000,000	840,000	-	140	J	2500		700		530		<230		<240		<250		130	J	230	J	170	J	410	
Pyridine	NLE	NLE	NLE	-	<380		<350		<310		<320		<300		<310		580		<320		<320		<320		<310	
Butylbenzylphthalate	1,200,000	14,000,000	230,000	-	<320		<290		<260		<260		<250		<260		<280		<270		<270		<270		<260	
Benzo(a)anthracene	600	2,000	800	-	<250		1500		440		310		<200		<210		<220		<210		<210		<210		190	J
3,3'-Dichlorobenzidine	1,000	4,000	200	-	<440		<400		<360		<360		<340		<360				<370		<370		<360		<350	
Chrysene	62,000	230,000	80,000	-	130	J	2400		690		510		<250		<260		<280		130	J	180	J	140	J	370	
bis(2-Ethylhexyl)phthalate	35,000	140,000	1,200,000	-	<350		<320		<290		2900	B	<280		<290		140	J	120	J	140	J	<290		<280	
Benzo(b)fluoranthene	600	2,000	2,000	-	<310		1600		480		330		<240		<260		<270		<260		<270		<260		110	J
Benzo(k)fluoranthene	6,000	23,000	25,000	-	<230		1500		470		350		<180		<190		<200		<190		<200		<190		140	J
Benzo(a)pyrene	200	200	200	-	<240		1600		500		360		<190		<200		<210		<200		<200		<200		170	J
Indeno(1,2,3-cd)pyrene	600	2,000	7,000	-	<260		1300		470		310		<200		<210		<230		<220		<220		<220		110	J
Dibenz(a,h)anthracene	200	200	800	-	<310		470		160	J	<250		<240		<250		<270		<260		<260		<250		<240	
Benzo(g,h,i)perylene	380,000,000	30,000,000	NLE	-	<310		1200		420		280		<240		<250		<270		<260		<260		<250		110	J
Total TICs	NLE	NLE	NLE	-	15700		26870		12290		60570		13020		40900		ND		49200		28000		14200		28900	
Pesticides / PCBs (mg/kg)																										
Heptachlor	0.1	0.7	0.5	-	<0.0004		<0.0004		<0.0003		<0.0003		<0.0003		<0.0003		<0.0003		<0.0003		<0.0003		<0.0003		<0.0003	
Heptachlor Epoxide	0.07	0.3	0.01	-	<0.0008		<0.0007		<0.0007		<0.0007		<0.0002		<0.0002		<0.0003		<0.0002		<0.0003		<0.0007		<0.0006	
4,4'-DDE	2	9	18	-	<0.0005		<0.0005		0.084		0.052		0.004		<0.0003		<0.0004		0.004		<0.0004		<0.0004		0.027	
Dieldrin	0.04	0.2	0.003	-	<0.0006		<0.0006		<0.0006		<0.0006		<0.0002		<0.0002		<0.0002		<0.0002		<0.0002		<0.0006		<0.0005	
Endrin	23	340	1	-	<0.0006		<0.0006		<0.0006		<0.0006		<0.0003		<0.0003		<0.0003		<0.0003		<0.0003		<0.0006		<0.0005	
4,4'-DDD	3	13	4	-	<0.0008		<0.0007		0.007		0.008		<0.0007		<0.0007		0.001		0.001		<0.0007		<0.0007		<0.0006	
Endrin Aldehyde	NLE	NLE	NLE	-	<0.0006		<0.0006		<0.0006		<0.0006		<0.0005		<0.0005		<0.0005		<0.0005		<0.0006		<0.0006		<0.0005	
4,4'-DDT	2	8	11	-	<0.0014		<0.0013		0.105		0.075		0.004		<0.0002		<0.0002		0.01		<0.0002		<0.0012		<0.0012	
Endosulfan I	470	6,800	4	-	<0.0006		<0.0006		<0.0006		<0.0006		<0.0002		<0.0002		<0.0003		<0.0002		<0.0003		<0.0006		<0.0005	
Endosulfan II	470	6,800	4	-	<0.0005		<0.0005		<0.0004		<0.0005		<0.0003		<0.0003		<0									

TABLE 4.1
SOIL SAMPLING SUMMARY RESULTS - COMPARISON TO NJDEP STANDARDS
SITE FTMM-05
FORT MONMOUTH, NEW JERSEY

Field Sample Location	NJDEP Residential Direct Contact Soil Remediation Standard ⁽¹⁾	NJDEP Non- Residential Direct Contact Soil Remediation Standard ⁽¹⁾	NJDEP Impact to Groundwater Screening Level ⁽²⁾	Weston 1995 Background ⁽³⁾	B-43 Dup		B-44		B-45		B-46		B-47		B-48		B-49		B-50		B-51		B-52		B-53	
Sample Date					05/04/98		05/04/98		05/04/98		05/04/98		05/05/98		05/05/98		05/05/98		05/05/98		05/05/98		05/06/98		05/06/98	
Metals (mg/kg)																										
Aluminum	78,000	NA	6,000	15,200	4159		8077		1961		4464		1986		3363		4876		3699		8596		8267		4460	
Antimony	31	450	6	ND	0.732		1.203		0.382		0.639		0.388		0.95		0.791		0.497		1.713		1.263		0.547	
Arsenic	19	19	19	22.9	9.162		11.66		2.255		8.122		1.719		8.626		12.79		3.172		27.93		14.36		4.293	
Barium	16,000	59,000	2,100	32.3	105.3		513.9		16.6		69.01		10.23		113.8		76.99		16.51		27.23		29.54		25.47	
Beryllium	16	140	0.7	2	0.565		0.8622		0.166		0.4403		10.23		0.4112		0.6963		0.7032		1.108		0.9403		0.412	
Cadmium	78	78	2	ND	2.775		0.6777		0.4876		0.9829		<0.054		0.2786		0.1114		<0.051		0.1293		<0.068		<0.064	
Calcium	NLE	NLE	NLE	921	1607		2670		10360		2705		277		933.3		1111		476.2		943.5		664.1		452.9	
Chromium	NLE	NLE	NLE	269	11.39		70.59		17.96		36.61		21.36		23.73		52.57		30.82		108.5		87.14		31.37	
Cobalt	1,600	590	90	2.5	3.668		2.42		1.223		2.495		0.3853		2.388		1.731		0.3871		3.129		6.072		1.335	
Copper	3,100	45,000	11,000	8	55.16		346.7		28.23		262.8		2.913		532.4		60.76		4.304		7.103		15.39		17.84	
Iron	NLE	NLE	NLE	55,800	9241		21940		6391		18840		7617		20580		22280		10500		47660		40040		10340	
Lead	400	800	90	19.5	165.5		275.5		228.1		273.5		8.632		845.1		226.7		6.099		40.53		55.83		22.07	
Magnesium	NLE	NLE	NLE	7,230	318.6		2943		5665		928.1		534.1		574.5		1066		602.6		963.9		1089		698.6	
Manganese	11,000	5,900	65	90.7	185.6		84.22		52.05		725.6		10.21		107.1		71.47		20.24		65.67		153.5		74.62	
Mercury	23	65	0.1	ND	0.389		0.164		10.194		5.04		0.039		0.51		5.141		0.074		0.225		0.588		0.037	
Nickel	1,600	23,000	48	8.4	9.258		13.28		4.67		7.3		2.299		7.715		6.521		3.713		12.48		11.51		2.826	
Potassium	NLE	NLE	NLE	15400	379.1		3791		722.3		1955		1048		1422		2485		918.9		2085		2466		1529	
Selenium	390	5,700	11	1.9	0.996		0.473		<0.359		<0.361		0.372		0.4		<0.401		<0.303		<0.397		<0.408		<0.383	
Silver	390	5,700	1	1.1	0.564		0.993		<0.359		0.512		<0.326		1.123		<0.401		<0.303		<0.397		<0.408		<0.383	
Sodium	NLE	NLE	NLE	51.6	870.9		221.4		174.2		312.4		144.3		96.56		71.52		266.9		393.3		52.66		40.01	
Thallium	5	79	3	ND	<0.433		<0.358		<0.359		<0.361		<0.326		<0.314		<0.401		<0.303		<0.397		<0.408		<0.383	
Vanadium	78	1,100	NLE	94.1	15.84		30.96		14.38		33.38		16.22		17.18		39.23		26.17		126.4		79.15		18.81	
Zinc	23,000	110,000	930	81.4	75.11		1598		62.64		1809		46.14		209.5		100.6		49.56		68.26		91.96		35.88	

Notes:

Historically, there have been up to 318 soil boring locations associated with FTMM-05. This analysis looks at only those boring locations that fall within the footprint of FTMM-05.

(1) New Jersey Department of Environmental Protection (NJDEP) Residential Direct Contact Soil Remediation Standards (RDCSRS) and Non-Residential Direct Contact Soil Remediation Standards (NRDCSRS) (N.J.A.C 7:26D; amended May 7, 2012). Available at: <http://www.state.nj.us/dep/srp/regs/rs/>.

(2) NJDEP Impact to Groundwater (NJDEP guidance document; Nov 2013).

(3) Weston, 1995. Final Site Investigation - Main Post and Charles Wood Areas, Fort Monmouth, New Jersey, December.

NJDEP criteria for total xylenes are used for xylene isomers (m+p, o).

NJDEP criteria for endrin is used for endrin aldehyde.

NJDEP criteria for 4,4'-DDD and 4,4'-DDT are for total DDD and total DDT, respectively.

There are no NJDEP soil standards for individual PCB Arcolors; the total PCB NJDEP standards were used for individual Arcolors

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

B = Analyte detected in both sample and associated laboratory blank.

D = Result from dilution of sample.

DUP = field duplicate sample.

E = Estimated value.

J = Analyte detected between MDL and practical quantitation limit (PQL).

NA = not analyzed.

ND = not detected.

NLE = No limit established.

< = analyte not detected above method detection limit (MDL).

µg/kg = micrograms per kilogram.

mg/kg = milligrams per kilogram.

VOCs = volatile organic compounds.

in. = inches.

bgs = below ground surface.

Detections are bolded.

Shaded cells = concentration exceeds NJDEP Impact to Groundwater Criterion.

Shaded cells = concentration exceeds one or both NJDEP Direct Contact Criteria.

Shaded cells = concentration exceeds all NJDEP criteria.

Shaded cells = concentration exceeds Weston (1995) background concentration.

TABLE 4.1
SOIL SAMPLING SUMMARY RESULTS - COMPARISON TO NJDEP STANDARDS
SITE FTMM-05
FORT MONMOUTH, NEW JERSEY

Field Sample Location	NJDEP Residential Direct Contact Soil Remediation Standard ⁽¹⁾	NJDEP Non- Residential Direct Contact Soil Remediation Standard ⁽¹⁾	NJDEP Impact to Groundwater Screening Level ⁽²⁾	Weston 1995 Background ⁽³⁾	B-54		B-55		B-56		B-57		B-58		B-59		B-60		B-60 Dup		B-61		B-62		B-63	
Sample Date					05/06/98		05/06/98		05/11/98		05/11/98		05/11/98		05/11/98		05/14/98		05/14/98		05/14/98		05/14/98		05/14/98	
Volatile Organic Compounds (VOCs, µg/kg)																										
Lab Sample ID (VOCs only collected at approximately 24 in. bgs)					3550.12		3550.16		3561.03		3561.07		3561.11		3561.15		3567.03		3567.24		3567.07		3567.11		3567.15	
Methylene Chloride	34,000	97,000	10	-	<580		<620		<640		<720		<560		<530		<550		<540		<540		<560		<520	
Benzene	2,000	5,000	5	-	<290		<310		<320		<360		<280		<270		<270		<270		<270		<280		<260	
Tetrachloroethene	2,000	5,000	5	-	<290		<310		<320		<360		<280		<270		<270		<270		<270		<280		<260	
Chloroform	600	2,000	400	-	<290		<310		<320		<360		<280		<270		<270		<270		<270		<280		<260	
Ethylbenzene	7,800,000	110,000,000	13,000	-	<580		<620		<640		<720		<560		<530		<550		<540		<540		<560		<520	
TICs	NLE	NLE	NLE	-	ND		ND		ND		ND		ND		ND		1700		9100		ND		ND		ND	
Semivolatile Organic Compounds (SVOCs, µg/kg)																										
Lab Sample ID (All analyses except VOCs collected at approximately 6-12 in. bgs)					3550.11		3550.15		3561.02		3561.06		3561.10		3561.14		3567.02		3567.23		3567.06		3567.10		3567.14	
Naphthalene	6,000	17,000	25,000	-	<260		<280		<280		<270		<260		<270		<280		<260		<270		<270		<260	
n-Nitrosodiphenylamine	99,000	390,000	400	-	<190		<210		<210		<200		<190		<210		<210		<190		<200		<200		<190	
2-Methylnaphthalene	230,000	2,400,000	8,000	-	<290		<310		<310		<300		<290		<310		<310		<290		<300		<300		<290	
4-Methylphenol	31,000	340,000	NLE	-	<280		<300		<300		<290		<280		<300		<300		<280		<300		<300		<280	
Acenaphthylene	NLE	3.00E+08	NLE	-	<200		<220		<220		<210		<200		<220		<220		<200		<210		<210		140	J
Acenaphthene	3,400,000	37,000,000	110,000	-	<190		<200		<200		<190		<180		<200		<200		<180		<190		<190		<180	
Dibenzofuran	NLE	NLE	NLE	-	<200		<210		<210		<210		<200		<210		<210		<200		<210		<210		<200	
Diethylphthalate	49,000,000	550,000,000	88,000	-	<220		<230		<230		<220		<210		<230		<230		<210		<230		<230		<210	
Fluorene	2,300,000	24,000,000	170,000	-	<200		<220		<220		<210		<200		<210		<220		<200		<210		<210		<200	
Phenanthrene	NLE	300,000,000	NLE	-	110	J	<220		NLE		250		<200		<220		440		<200		<210		<210		540	
Anthracene	17,000,000	30,000,000	2,400,000	-	<200		<220		<220		<210		<200		<220		<220		<200		<210		<210		<200	
Dimethylphthalate	NLE	NLE	NLE	-	<160		<170		<170		<170		<160		<170		<170		<160		<170		<170		<160	
Di-n-butylphthalate	6,100,000	68,000,000	760,000	-	1600	B	900	JB	360	JB	570	JB	970	B	430	JB	610	JB	1300	B	880	JB	450	JB	380	JB
Fluoranthene	2,300,000	24,000,000	1,300,000	-	160	J	<220		<220		300		<200		140	J	710		<200		140	J	<220		890	
Pyrene	1,700,000	18,000,000	840,000	-	240		<260		<260		450		<240		120	J	530		<240		150	J	<250		1300	
Pyridine	NLE	NLE	NLE	-	<320		420		<340		<330		<310		<340		<340		<320		<330		<330		<310	
Butylbenzylphthalate	1,200,000	14,000,000	230,000	-	<270		<290		<280		<280		<260		<280		<280		<260		<280		<280		<260	
Benzo(a)anthracene	600	2,000	800	-	170	J	<220		<220		210	J	<210		<220		280		<210		<220		<220		560	
3,3'-Dichlorobenzidine	1,000	4,000	200	-	<360		<390		<390		<380		<360		<390		<390		<360		<380		<380		<360	
Chrysene	62,000	230,000	80,000	-	230	J	<290		<280		290		<260		<280		300		<260		130	J	<280		880	
bis(2-Ethylhexyl)phthalate	35,000	140,000	1,200,000	-	220	J	130	J	<310		140	J	200	J	<310		200	JB	270	JB	220	JB	110	JB	210	JB
Benzo(b)fluoranthene	600	2,000	2,000	-	<260		<280		<280		<270		<260		<280		220	J	<260		<270		<270		410	
Benzo(k)fluoranthene	6,000	23,000	25,000	-	110	J	<210		<210		130	J	<190		<200		240		<190		<200		<200		520	
Benzo(a)pyrene	200	200	200	-	110	J	<210		<210		150	J	<200		<210		260		<200		<210		<210		580	
Indeno(1,2,3-cd)pyrene	600	2,000	7,000	-	<220		<230		<230		<220		<210		<230		180	J	<210		<230		<230		370	
Dibenz(a,h)anthracene	200	200	800	-	<250		<270		<270		<260		<250		<270		<270		<250		<270		<270		<250	
Benzo(g,h,i)perylene	380,000,000	30,000,000	NLE	-	<250		<270		<270		<260		<250		<270		170	J	<250		<270		<270		440	
Total TICs	NLE	NLE	NLE	-	40500		9400		15300		34700		16400		9580		50710		38600		25130		6900		14940	
Pesticides / PCBs (mg/kg)																										
Heptachlor	0.1	0.7	0.5	-	<0.0003		<0.0003		<0.0004		<0.0003		<0.0003		0.014		<0.0003		<0.0003		<0.0003		<0.0003		<0.0003	
Heptachlor Epoxide	0.07	0.3	0.01	-	<0.0006		<0.0006		<0.0007		<0.0006		<0.0006		0.261		<0.0007		<0.0006		<0.0007		<0.0007		<0.0007	
4,4'-DDE	2	9	18	-	0.009		0.006		0.227		0.039		0.004		2.058		0.003		0.002		0.005		0.001		0.007	
Dieldrin	0.04	0.2	0.003	-	<0.0005		<0.0005		<0.0006		<0.0005		<0.0005		<0.0005		<0.0006		<0.0005		<0.0006		<0.0006		<0.0006	
Endrin	23	340	1	-	<0.0005		<0.0005		<0.0006		<0.0005		<0.0005		<0.0005		<0.0006		<0.0005		<0.0006		<0.0006		<0.0006	
4,4'-DDD	3	13	4	-	0.019		0.002		<0.0007		<0.0006		<0.0006		2.68		<0.0007		<0.0006		<0.0007		<0.0007		<0.0007	
Endrin Aldehyde	NLE	NLE	NLE	-	<0.0005		<0.0005		<0.0006		<0.0005		<0.0005		<0.0005		<0.0006		<0.0005		<0.0006		<0.0006		<0.0006	
4,4'-DDT	2	8	11	-	0.092		0.012		0.17		0.06		0.007		11.182		0.002		<0.0012		0.007		<0.0012		0.01	
Endosulfan I	470	6,800	4	-	<0.0005		<0.0005		<0.0006		<0.0005		<0.0005		<0.0005		<0.0006		<0.0005		<0.0006		<0.0006		<0.0006	
Endosulfan II	470	6,800	4	-	<0.0004		<0.0004		<0.0005		<0.0004		<0.0004		<0.0004		<0.0004		<0.00.							

TABLE 4.1
SOIL SAMPLING SUMMARY RESULTS - COMPARISON TO NJDEP STANDARDS
SITE FTMM-05
FORT MONMOUTH, NEW JERSEY

Field Sample Location	NJDEP Residential Direct Contact Soil Remediation Standard ⁽¹⁾	NJDEP Non- Residential Direct Contact Soil Remediation Standard ⁽¹⁾	NJDEP Impact to Groundwater Screening Level ⁽²⁾	Weston 1995 Background ⁽³⁾	B-54	B-55	B-56	B-57	B-58	B-59	B-60	B-60 Dup	B-61	B-62	B-63											
Sample Date					05/06/98	05/06/98	05/11/98	05/11/98	05/11/98	05/11/98	05/14/98	05/14/98	05/14/98	05/14/98	05/14/98											
Metals (mg/kg)																										
Aluminum	78,000	NA	6,000	15,200	6246		7988		11380		10290		1884		2975		13190		3373		9246		5436		7195	
Antimony	31	450	6		1.532		1.149		1.246		1.868		0.326		0.48		1.266		0.739		0.86		0.921		1.01	
Arsenic	19	19	19	22.9	147.5		10.36		16.81		14.94		1.201		7.456		10.76		3.77		7.677		5.493		8.63	
Barium	16,000	59,000	2,100	32.3	14.72		101.2		44.19		88.58		5.948		27.13		34.64		11.22		21.61		18.86		111.8	
Beryllium	16	140	0.7	2	0.7216		0.9041		1.233		0.9952		0.3044		0.3715		1.496		0.4787		1.056		0.6189		0.8207	
Cadmium	78	78	2	ND	<0.063		<0.066		<0.069		0.2176		0.1125		0.2638		<0.062		<0.057		<0.051		0.7023		0.2273	
Calcium	NLE	NLE	NLE	921	440.1		950.6		1662		1169		152.9		400.1		1188		91.75		491.6		181.1		1930	
Chromium	NLE	NLE	NLE	269	81.6		58.97		90.25		78.52		14.29		18.99		100.1		37.19		82.22		49.99		57.85	
Cobalt	1,600	590	90	2.5	0.8229		2.301		2.645		4.073		0.2267		1.23		2.967		0.057		1.778		0.5732		1.54	
Copper	3,100	45,000	11,000	8	6.733		14.76		15.96		83.51		3.742		9.851		5.622		3.553		3.459		20.54		50.68	
Iron	NLE	NLE	NLE	55,800	30770		24580		32850		34590		5510		7582		36290		12740		26710		15460		22510	
Lead	400	800	90	19.5	14.64		45.25		108.8		2379		8.725		71.13		10.39		34.32		9.338		94.89		673.7	
Magnesium	NLE	NLE	NLE	7,230	2093		2144		3720		1506		335.4		664.8		3941		498.5		2704		948.3		1648	
Manganese	11,000	5,900	65	90.7	30.56		147.5		76.07		118.1		5.243		21.19		95.3		9.593		47.43		18.48		144	
Mercury	23	65	0.1	ND	0.036		0.213		0.9		0.459		0.039		17.584		0.671		0.104		0.058		0.161		0.115	
Nickel	1,600	23,000	48	8.4	3.717		7.104		8.858		13.31		1.59		4.389		7.747		2.124		5.302		3.305		8.803	
Potassium	NLE	NLE	NLE	15400	6333		5418		7138		4203		460.3		1084		7084		839.2		5398		2311		3715	
Selenium	390	5,700	11	1.9	0.599		<0.397		<0.411		<0.373		<0.352		<0.371		<0.369		<0.341		<0.307		<0.337		<0.315	
Silver	390	5,700	1	1.1	<0.377		<0.397		<0.411		<0.373		<0.352		<0.371		<0.369		<0.341		<0.307		<0.337		<0.315	
Sodium	NLE	NLE	NLE	51.6	229.7		159.4		71.89		110.9		25.7		57.27		81.7		7.482		49.79		51.48		439.1	
Thallium	5	79	3	ND	<0.377		<0.397		<0.411		<0.373		<0.352		<0.371		<0.369		<0.341		<0.307		<0.337		<0.315	
Vanadium	78	1,100	NLE	94.1	32.76		29.63		42.8		82.13		13.82		18.5		44.53		33.17		37.72		39.39		27.81	
Zinc	23,000	110,000	930	81.4	28.84		58.2		81.92		178.4		26.47		73.37		59.43		20.2		41.41		32.25		338.9	

Notes:

Historically, there have been up to 318 soil boring locations associated with FTMM-05. This analysis looks at only those boring locations that fall within the footprint of FTMM-05.

(1) New Jersey Department of Environmental Protection (NJDEP) Residential Direct Contact Soil Remediation Standards (RDCSRS) and Non-Residential Direct Contact Soil Remediation Standards (NRDCSRS) (N.J.A.C 7:26D; amended May 7, 2012). Available at: <http://www.state.nj.us/dep/srp/regs/rs/>.

(2) NJDEP Impact to Groundwater (NJDEP guidance document; Nov 2013).

(3) Weston, 1995. Final Site Investigation - Main Post and Charles Wood Areas, Fort Monmouth, New Jersey, December.

NJDEP criteria for total xylenes are used for xylene isomers (m+p, o).

NJDEP criteria for endrin is used for endrin aldehyde.

NJDEP criteria for 4,4'-DDD and 4,4'-DDT are for total DDD and total DDT, respectively.

There are no NJDEP soil standards for individual PCB Arcolors; the total PCB NJDEP standards were used for individual Arcolors

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

B = Analyte detected in both sample and associated laboratory blank.

D = Result from dilution of sample.

DUP = field duplicate sample.

E = Estimated value.

J = Analyte detected between MDL and practical quantitation limit (PQL).

NA = not analyzed.

ND = not detected.

NLE = No limit established.

< = analyte not detected above method detection limit (MDL).

µg/kg = micrograms per kilogram.

mg/kg = milligrams per kilogram.

VOCs = volatile organic compounds.

in. = inches.

bgs = below ground surface.

Detections are bolded.

Shaded cells = concentration exceeds NJDEP Impact to Groundwater Criterion.

Shaded cells = concentration exceeds one or both NJDEP Direct Contact Criteria.

Shaded cells = concentration exceeds all NJDEP criteria.

Shaded cells = concentration exceeds Weston (1995) background concentration.

TABLE 4.1
SOIL SAMPLING SUMMARY RESULTS - COMPARISON TO NJDEP STANDARDS
SITE FTMM-05
FORT MONMOUTH, NEW JERSEY

Field Sample Location	NJDEP Residential Direct Contact Soil Remediation Standard ⁽¹⁾	NJDEP Non- Residential Direct Contact Soil Remediation Standard ⁽¹⁾	NJDEP Impact to Groundwater Screening Level ⁽²⁾	Weston 1995 Background ⁽³⁾	B-64		B-65		B-66		B-67		B-68		B-69		B-70		B-71		B-72		B-73		B-74	
Sample Date					05/14/98	05/15/98	05/15/98	05/15/98	05/15/98	05/15/98	05/18/98	05/18/98	05/18/98	05/18/98	05/18/98	05/19/98										
Metals (mg/kg)																										
Aluminum	78,000	NA	6,000	15,200	15670		8058		3044		7248		6761		7952		11120		9388		8881		8643		2868	
Antimony	31	450	6	ND	1.059		0.997		0.443		0.35		1.209		1.305		1.249		0.789		0.724		1.158		0.57	
Arsenic	19	19	19	22.9	14.6		7.83		3.083		7.19		11.44		10.21		10.11		9.62		8.338		7.981		4.511	
Barium	16,000	59,000	2,100	32.3	52.75		28.5		21.9		15.88		44.56		125.5		25.88		51.51		58.95		25.84		12.69	
Beryllium	16	140	0.7	2	1.179		0.8404		0.4444		0.604		0.8332		0.8544		1.128		0.9041		0.6764		0.867		0.4361	
Cadmium	78	78	2	ND	<0.065		<0.055		2		<0.059		ND		<0.057		0.1382		1.154		<0.056		0.1899		<0.056	
Calcium	NLE	NLE	NLE	921	969		744.4		266.5		518.3		1209		1407		586.5		1169		1570		691		327.2	
Chromium	NLE	NLE	NLE	269	81.95		68.44		23.91		42.72		57.83		51.07		114.5		77.94		46.85		85.23		27.92	
Cobalt	1,600	590	90	2.5	4.367		3.136		0.5376		2.701		4.179		5.826		4.8		3.255		3.326		5.769		0.7721	
Copper	3,100	45,000	11,000	8	8.773		5.669		7.449		3.409		42.05		1544		2.028		39.85		46.73		6.715		5.597	
Iron	NLE	NLE	NLE	55,800	34010		29740		8577		25900		27790		27860		47050		33340		17160		34570		10120	
Lead	400	800	90	19.5	20.2		30.1		37.51		9.825		90.71		852.3		11.87		122.6		58.5		75.52		18.46	
Magnesium	NLE	NLE	NLE	7,230	2740		1237		710.2		895.3		730.7		817.3		1074		1435		1940		941		664.5	
Manganese	11,000	5,900	65	90.7	175.4		76.07		29.05		79.87		54.71		195.3		103.5		76.53		89.7		168.8		30.3	
Mercury	23	65	0.1	ND	0.17		0.074		0.088		0.0068		0.268		<0.044		<0.024		0.079		0.115		0.053		0.041	
Nickel	1,600	23,000	48	8.4	13.41		9.24		2.565		7.65		10.39		17.71		16.38		10.52		8.935		11.23		2.749	
Potassium	NLE	NLE	NLE	15400	5202		3399		1602		1460		1202		1922		2684		3817		4607		2201		1340	
Selenium	390	5,700	11	1.9	<0.389		<0.329		<0.356		<0.340		<0.366		<0.328		<0.336		<0.340		<0.335		<0.339		<0.366	
Silver	390	5,700	1	1.1	<0.389		<0.329		<0.356		<0.340		<0.366		1.082		<0.336		<0.340		<0.335		<0.339		<0.366	
Sodium	NLE	NLE	NLE	51.6	287.7		56.68		11.9		43.74		72.72		175.9		92.7		92.75		262.7		62.74		61.08	
Thallium	5	79	3	ND	<0.389		<0.329		<0.356		<0.340		<0.366		<0.328		<0.336		<0.340		<0.335		<0.339		<0.366	
Vanadium	78	1,100	NLE	94.1	74.48		74.42		NLE		14.64		56.21		74.83		52.52		148.9		82.7		34.6		101.9	
Zinc	23,000	110,000	930	81.4	73.04		55.34		43.34		42.07		49.92		455		81.93		117.6		123.4		104.7		25.57	

Notes:

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TABLE 4.1
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SITE FTMM-05
FORT MONMOUTH, NEW JERSEY

Field Sample Location	NJDEP Residential Direct Contact Soil Remediation Standard ⁽¹⁾	NJDEP Non- Residential Direct Contact Soil Remediation Standard ⁽¹⁾	NJDEP Impact to Groundwater Screening Level ⁽²⁾	Weston 1995 Background ⁽³⁾	B-75		B-76		B-77		B-78		B-79		B-80		B-80 Dup		B-81		B-82		B-83		B-84	
Sample Date					05/19/98	05/19/98	05/19/98	05/19/98	05/19/98	05/19/98	05/19/98	05/19/98	05/19/98	05/19/98	05/19/98	05/19/98	05/19/98	05/19/98	05/19/98	05/19/98	05/19/98	05/19/98	05/19/98	05/19/98	05/19/98	05/19/98
Volatile Organic Compounds (VOCs, µg/kg)																										
Lab Sample ID (VOCs only collected at approximately 24 in. bgs)					3580.06		3580.09		3580.12		3580.15		3580.19		3580.23		3580.39		3580.27		3580.31		3580.35		3584.03	
Methylene Chloride	34,000	97,000	10	-	<530		<580		<730		<560		<580		<560		<570		<560		<540		<510		<510	
Benzene	2,000	5,000	5	-	<270		<290		<370		<280		<290		<280		<290		<280		<270		<250		<260	
Tetrachloroethene	2,000	5,000	5	-	<270		770		<370		<280		<290		<280		<290		<280		<270		<250		<260	
Chloroform	600	2,000	400	-	<270		<290		<370		<280		<290		<280		<290		<280		<270		<250		<260	
Ethylbenzene	7,800,000	110,000,000	13,000	-	<530		<580		<730		<560		<580		<570		<560		<560		<540		<510		<510	
TICs	NLE	NLE	NLE	-	ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
Semivolatile Organic Compounds (SVOCs, µg/kg)																										
Lab Sample ID (All analyses except VOCs collected at approximately 6-12 in. bgs)					3580.05		3580.08		3580.11		3580.14		3580.18		3580.22		3580.38		3580.26		3580.30		3580.34		3584.02	
Naphthalene	6,000	17,000	25,000	-	<250		<240		<270		<250		<270		<270		<280		400		<250		<240		2300	
n-Nitrosodiphenylamine	99,000	390,000	400	-	<180		<180		<200		<190		<200		<200		<210		150	J	<180		<180		<190	
2-Methylnaphthalene	230,000	2,400,000	8,000	-	<270		<270		<300		<280		<300		<300		<320		660		<280		<270		4900	
4-Methylphenol	31,000	340,000	NLE	-	<270		<270		<300		<280		<300		<290		<310		<270		<270		<270		<280	
Acenaphthylene	NLE	3.00E+08	NLE	-	<190		<190		<210		<200		<210		<210		<220		110	J	<190		<190		4400	
Acenaphthene	3,400,000	37,000,000	110,000	-	<180		<180		<190		<180		<190		<190		<200		<180		<180		<170		1900	
Dibenzofuran	NLE	NLE	NLE	-	<190		<190		<210		<190		<210		<210		<220		250		<190		<190		540	
Diethylphthalate	49,000,000	550,000,000	88,000	-	<200		<200		<230		<210		<220		<220		<230		170	J	<210		<200		<210	
Fluorene	2,300,000	24,000,000	170,000	-	<190		<190		<210		<200		<210		<210		<220		110	J	<190		<190		5300	
Phenanthrene	NLE	300,000,000	NLE	-	480		720		170	J	130	J	<210		<210		<220		570		<200		<190		29000	E
Anthracene	17,000,000	30,000,000	2,400,000	-	<190		<190		<210		<200		<210		<210		<220		160	J	<200		<190		3200	
Dimethylphthalate	NLE	NLE	NLE	-	<150		<150		<170		<160		<170		<170		<170		120	J	<150		<150		<160	
Di-n-butylphthalate	6,100,000	68,000,000	760,000	-	760	JB	780	JB	380	JB	670	JB	600	JB	270	JB	220	JB	840	JB	170	JB	180	JB	270	JB
Fluoranthene	2,300,000	24,000,000	1,300,000	-	300		500		190	J	<200		<210		<210		<220		400		<200		<190		16000	E
Pyrene	1,700,000	18,000,000	840,000	-	510		820		120	J	120	J	<250		<250		<260		580		<230		<230		30000	E
Pyridine	NLE	NLE	NLE	-	<300		<300		<330		<310		<330		<330		<350		<300		<300		<300		<310	
Butylbenzylphthalate	1,200,000	14,000,000	230,000	-	<250		<250		<280		<260		<280		<280		<280		<260		<250		<250		<260	
Benzo(a)anthracene	600	2,000	800	-	180	J	310		<220		<200		<220		<220		<230		300		<200		<200		13000	E
3,3'-Dichlorobenzidine	1,000	4,000	200	-	<350		<350		<380		<350		<380		<380		<400		<350		<350		<340		1000	
Chrysene	62,000	230,000	80,000	-	300		520		<280		<260		<280		<280		<290		510		<250		<250		21000	E
bis(2-Ethylhexyl)phthalate	35,000	140,000	1,200,000	-	280	J	100	J	<310		<290		<310		<310		<320		<280		<280		<280		120	J
Benzo(b)fluoranthene	600	2,000	2,000	-	110	J	200	J	<270		<250		<270		<270		<280		180	J	<250		<240		9200	
Benzo(k)fluoranthene	6,000	23,000	25,000	-	130	J	220		<200		<190		<200		<200		<210		220		<180		<180		8800	
Benzo(a)pyrene	200	200	200	-	130	J	290		<210		<190		<210		<210		<220		240		<190		<190		11000	
Indeno(1,2,3-cd)pyrene	600	2,000	7,000	-	<200		160	J	<230		<210		<230		<220		<240		150	J	<210		<200		4900	
Dibenz(a,h)anthracene	200	200	800	-	<240		<240		<260		<250		<260		<260		<280		<240		<240		<240		2900	
Benzo(g,h,i)perylene	380,000,000	30,000,000	NLE	-	<240		190	J	<260		<250		<260		<260		<280		190	J	<240		<240		5800	
Total TICs	NLE	NLE	NLE	-	10100		9860		5400		9600		10400		7400		1400		9820		1900		2500		72000	
Pesticides / PCBs (mg/kg)																										
Heptachlor	0.1	0.7	0.5	-	<0.0003		<0.0003		<0.0003		<0.0003		<0.0003		<0.0003		<0.0003		<0.0003		<0.0003		<0.0003		<0.0003	
Heptachlor Epoxide	0.07	0.3	0.01	-	<0.0006		<0.0006		<0.0007		<0.0006		<0.0007		<0.0006		<0.0007		<0.0006		<0.0006		<0.0006		<0.0006	
4,4'-DDE	2	9	18	-	<0.0004		<0.0004	18	<0.0005		<0.0004		0.002		0.005		0.002		<0.0004		0.001		0.018		0.208	
Dieldrin	0.04	0.2	0.003	-	<0.0005		<0.0005		<0.0006		<0.0005		<0.0005		<0.0005		<0.0006		<0.0005		<0.0005		<0.0005		<0.0005	
Endrin	23	340	1	-	<0.0005		<0.0005	1	<0.0006		<0.0005		<0.0005		<0.0005		<0.0006		<0.0005		<0.0005		<0.0005		<0.0005	
4,4'-DDD	3	13	4	-	<0.0006		<0.0006		<0.0007		<0.0006		<0.0007		<0.0006		<0.0007		<0.0006		<0.0006		<0.0006		<0.0006	
Endrin Aldehyde	NLE	NLE	NLE	-	<0.0005		<0.0005		<0.0006		<0.0005		<0.0005		<											

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SITE FTMM-05
FORT MONMOUTH, NEW JERSEY

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Sample Date					05/19/98		05/19/98		05/19/98		05/19/98		05/19/98		05/19/98		05/19/98		05/19/98		05/19/98		05/19/98		05/19/98		05/20/98	
Metals (mg/kg)																												
Aluminum	78,000	NA	6,000	15,200	1781		6780		8537		10590		10590		10450		10910		2577		2449		1275		9216			
Antimony	31	450	6	ND	<0.219		0.686		1.309		1.531		1.531		1.642		1.6		0.308		0.356		0.255		1.288			
Arsenic	19	19	19	22.9	1.452		6.874		8.003		10.88		10.88		10.26		11.24		5.594		1.387		0.858		11.23			
Barium	16,000	59,000	2,100	32.3	5.525		26.72		24.35		24.94		24.94		24.91		21.68		36.08		15.13		4.896		29.34			
Beryllium	16	140	0.7	2	0.2615		0.6806		0.9024		1.19		1.19		1.143		1.322		0.2973		0.3248		0.1492		0.634			
Cadmium	78	78	2	ND	<0.055		2		<0.055		<0.058		<0.058		<0.054		<0.064		0.0968		<0.056		<0.052		<0.061			
Calcium	NLE	NLE	NLE	921	117.9		510		440.1		809.2		908.2		611.8		297		865.2		316.7		134.9		817.1			
Chromium	NLE	NLE	NLE	269	18.67		61.92		97.55		96.08		96.08		112.3		149.7		11.66		19.27		12.27		62.61			
Cobalt	1,600	590	90	2.5	0.4013		2.925		2.623		5.587		5.587		5.818		4.822		1.554		0.4012		0.2038		1.854			
Copper	3,100	45,000	11,000	8	2.002		8.638		3.266		27.74		27.74		4.975		<0.386		17.64		1.524		1.995		43.09			
Iron	NLE	NLE	NLE	55,800	6671		28090		36430		56400		56400		47360		65860		6221		6563		4284		24830			
Lead	400	800	90	19.5	5.525		48.57		16.89		33.19		33.19		65.52		8.234		36.85		4.79		6.115		126.8			
Magnesium	NLE	NLE	NLE	7,230	334.2		887.6		863.8		1385		1385		1003		848.1		318.6		568.3		317.3		1392			
Manganese	11,000	5,900	65	90.7	13.35		67.87		62.27		160.5		160.5		141.4		68.32		17.63		12.37		8.873		40			
Mercury	23	65	0.1	ND	<0.023		0.028		0.029		<0.021		<0.021		<0.023		<0.022		0.061		<0.022		<0.020		0.123			
Nickel	1,600	23,000	48	8.4	1.679		8.334		10.82		13.68		13.68		15.43		17.24		4.848		1.503		0.8202		7.483			
Potassium	NLE	NLE	NLE	15400	614.6		1966		2023		3911		3911		2351		1996		648.6		1045		490		4076			
Selenium	390	5,700	11	1.9	<0.329		<0.331		<0.331		<0.350		<0.350		<0.325		<0.386		0.385		<0.338		<0.315		<0.365			
Silver	390	5,700	1	1.1	<0.329		<0.331		<0.331		<0.350		<0.350		<0.325		<0.386		<0.345		<0.338		<0.315		<0.365			
Sodium	NLE	NLE	NLE	51.6	27.75		32.16		31.08		150.5		150.5		27.11		90.62		138.3		13.7		23.19		61.43			
Thallium	5	79	3	ND	<0.329		<0.331		<0.331		<0.350		<0.350		<0.325		<0.386		<0.345		<0.338		<0.315		<0.365			
Vanadium	78	1,100	NLE	94.1	16.56		73.25		103		123		123		154.8		183.2		18.03		13.74		9.388		58.91			
Zinc	23,000	110,000	930	81.4	12.77		53.92		58.91		72.31		72.31		70.89		74.82		29.27		12.57		7.018		46.59			

Notes:

Historically, there have been up to 318 soil boring locations associated with FTMM-05. This analysis looks at only those boring locations that fall within the footprint of FTMM-05.

(1) New Jersey Department of Environmental Protection (NJDEP) Residential Direct Contact Soil Remediation Standards (RDCSRS) and Non-Residential Direct Contact Soil Remediation Standards (NRDCSRS) (N.J.A.C 7:26D; amended May 7, 2012). Available at: <http://www.state.nj.us/dep/srp/regs/rs/>.

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NJDEP criteria for total xylenes are used for xylene isomers (m+p, o).

NJDEP criteria for endrin is used for endrin aldehyde.

NJDEP criteria for 4,4'-DDD and 4,4'-DDT are for total DDD and total DDT, respectively.

There are no NJDEP soil standards for individual PCB Arcolors; the total PCB NJDEP standards were used for individual Arcolors

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

B = Analyte detected in both sample and associated laboratory blank.

D = Result from dilution of sample.

DUP = field duplicate sample.

E = Estimated value.

J = Analyte detected between MDL and practical quantitation limit (PQL).

NA = not analyzed.

ND = not detected.

NLE = No limit established.

< = analyte not detected above method detection limit (MDL).

µg/kg = micrograms per kilogram.

mg/kg = milligrams per kilogram.

VOCs = volatile organic compounds.

in. = inches.

bgs = below ground surface.

Detections are bolded.

Shaded cells = concentration exceeds NJDEP Impact to Groundwater Criterion.

Shaded cells = concentration exceeds one or both NJDEP Direct Contact Criteria.

Shaded cells = concentration exceeds all NJDEP criteria.

Shaded cells = concentration exceeds Weston (1995) background concentration.

TABLE 4.1
SOIL SAMPLING SUMMARY RESULTS - COMPARISON TO NJDEP STANDARDS
SITE FTMM-05
FORT MONMOUTH, NEW JERSEY

Field Sample Location	NJDEP Residential Direct Contact Soil Remediation Standard ⁽¹⁾	NJDEP Non- Residential Direct Contact Soil Remediation Standard ⁽¹⁾	NJDEP Impact to Groundwater Screening Level ⁽²⁾	Weston 1995 Background ⁽³⁾	B-85		B-86		B-87		B-88		B-89	B-90		B-91		B-92		B-93		B-94		B-95	B-96	
Sample Date					05/20/98		05/20/98		05/20/98		05/20/98		05/20/98	05/20/98		05/20/98		05/20/98		05/21/98		05/21/98		05/21/98	05/21/98	
Volatile Organic Compounds (VOCs, µg/kg)																										
Lab Sample ID (VOCs only collected at approximately 24 in. bgs)					3584.07		3584.11		3584.15		3584.19		3584.23	3584.27		3584.31		3584.35		3588.03		3588.07		3588.11	3588.15	
Methylene Chloride	34,000	97,000	10	-	<510		<560		<580		<630		<620	<610		<500		<540		<570		<570		<550	<610	
Benzene	2,000	5,000	5	-	<260		<280		<290		<310		<310	<300		<250		<270		<280		<280		<270	<300	
Tetrachloroethene	2,000	5,000	5	-	<260		<280		<290		<310		<310	<300		<250		<270		<280		<280		<270	<300	
Chloroform	600	2,000	400	-	<260		<280		<290		<310		<310	<300		<250		<270		<280		<280		<270	<300	
Ethylbenzene	7,800,000	110,000,000	13,000	-	<510		<560		<580		<630		<620	<610		<500		<540		<570		<570		<550	<610	
TICs	NLE	NLE	NLE	-	ND		ND		ND		ND		ND	ND		ND		ND		ND		ND		ND	ND	
Semivolatile Organic Compounds (SVOCs, µg/kg)																										
Lab Sample ID (All analyses except VOCs collected at approximately 6-12 in. bgs)					3584.06		3584.10		3584.14		3584.18		3584.22	3584.26		3584.30		3584.34		3588.02		3588.06		3588.10	3588.14	
Naphthalene	6,000	17,000	25,000	-	<240		<260		<240		<270		<280	130	J	<240		<250		<260		<250		<250	<260	
n-Nitrosodiphenylamine	99,000	390,000	400	-	<180		<190		<180		<210		<210	<200		<180		<190		<200		<190		<190	<190	
2-Methylnaphthalene	230,000	2,400,000	8,000	-	<270		<290		<270		<310		<320	170	J	<270		<280		<290		<280		<280	<290	
4-Methylphenol	31,000	340,000	NLE	-	<270		<280		<270		<300		<310	<290		<270		<280		<280		<270		<280	<280	
Acenaphthylene	NLE	3.00E+08	NLE	-	<190		<200		<190		<220		<220	<210		<190		<200		<200		<190		<200	<200	
Acenaphthene	3,400,000	37,000,000	110,000	-	<180		<190		<180		<200		<200	<190		<170		590		<190		<180		<180	<180	
Dibenzofuran	NLE	NLE	NLE	-	<190		<200		<190		<210		<220	<200		<180		640		<200		<190		<190	<200	
Diethylphthalate	49,000,000	550,000,000	88,000	-	<200		<220		<200		<230		<240	<220		<200		<210		<220		<210		<210	<210	
Fluorene	2,300,000	24,000,000	170,000	-	<190		<200		<190		<210		<220	<210		<190		1100		<200		<190		<200	<200	
Phenanthrene	NLE	300,000,000	NLE	-	<190		<200		<190		<220		<220	480		<190		<200		<210		<200		<200	<200	
Anthracene	17,000,000	30,000,000	2,400,000	-	<190		<200		<190		<220		<220	<210		<190		3300		<210		<200		<200	<200	
Dimethylphthalate	NLE	NLE	NLE	-	<150		<160		<150		<170		<180	<160		<150		<160		<160		<150		<160	<160	
Di-n-butylphthalate	6,100,000	68,000,000	760,000	-	640	JB	870	JB	660	JB	290	JB	<970	510	JB	320	JB	280	JB	470	JB	270	JB	<860	430	JB
Fluoranthene	2,300,000	24,000,000	1,300,000	-	<190		<210		<190		<220		<230	480		<190		<200		<210		<200		<200	<200	
Pyrene	1,700,000	18,000,000	840,000	-	140	J	<240		<230		<250		<260	840		<220		11000		<240		<230		<230	<240	
Pyridine	NLE	NLE	NLE	-	<300		<320		<300		<340		<350	<320		<300		<310		<320		<300		<310	<320	
Butylbenzylphthalate	1,200,000	14,000,000	230,000	-	<250		<270		<250		<280		<290	<270		<250		<260		<270		<250		<260	<270	
Benzo(a)anthracene	600	2,000	800	-	<200		<210		<200		<220		<230	360		<190		7200		<210		<200		<200	<210	
3,3'-Dichlorobenzidine	1,000	4,000	200	-	<340		<370		<340		<390		<400	<370		<340		<360		<370		<350		<360	<360	
Chrysene	62,000	230,000	80,000	-	120	J	<270		<250		<280		<290	590		<250		9700		<270		<250		<260	<270	
bis(2-Ethylhexyl)phthalate	35,000	140,000	1,200,000	-	110	J	150	J	160	J	<310		<320	120	J	110	J	<290		<300		<280		<290	<290	
Benzo(b)fluoranthene	600	2,000	2,000	-	<250		<260		<250		<270		<290	250	J	<240		5600		<260		<250		<250	<260	
Benzo(k)fluoranthene	6,000	23,000	25,000	-	<180		<190		<180		<200		<210	340		<180		3900		<190		<180		<190	<190	
Benzo(a)pyrene	200	200	200	-	<190		<200		<190		<210		<220	410		<190		5300		<200		<190		<190	<200	
Indeno(1,2,3-cd)pyrene	600	2,000	7,000	-	<200		<220		<200		<230		<240	200	J	<200		3000		<220		<210		<210	<220	
Dibenz(a,h)anthracene	200	200	800	-	<240		<250		<240		<270		<280	<260		<240		640		<250		<240		<250	<250	
Benzo(g,h,i)perylene	380,000,000	30,000,000	NLE	-	<240		<250		<240		<270		<280	230	J	<240		2800		<250		<240		<250	<250	
Total TICs	NLE	NLE	NLE	-	17900		9900		11650		16700		8600	1100		8400		47930		9080		9500		223800	8700	
Pesticides / PCBs (mg/kg)																										
Heptachlor	0.1	0.7	0.5	-	<0.0003		<0.0003		<0.0003		<0.0003		<0.0003	<0.0003		<0.0003		<0.0003		<0.0003		<0.0003		<0.0003	<0.0003	
Heptachlor Epoxide	0.07	0.3	0.01	-	<0.0006		<0.0006		<0.0006		<0.0007		<0.0007	<0.0006		<0.0006		<0.0006		<0.0006		<0.0006		<0.0006	<0.0006	
4,4'-DDE	2	9	18	-	<0.0004		0.002		0.007		<0.0005		0.006	0.001		0.002		<0.0004		0.008		0.002		<0.0004	0.003	
Dieldrin	0.04	0.2	0.003	-	<0.0005		<0.0005		<0.0005		<0.0006		<0.0006	<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005	<0.0005	
Endrin	23	340	1	-	<0.0005		<0.0005		<0.0005		<0.0006		<0.0006	<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005	<0.0005	
4,4'-DDD	3	13	4	-	<0.0006		<0.0006		<0.0006		<0.0007		<0.0007	<0.0006		<0.0006		<0.0006		0.004		<0.0006		<0.0006	<0.0006	
Endrin Aldehyde	NLE	NLE	NLE	-	<0.0005		<0.0005		<0.0005		<0.0006		<0.0006	<0.0005												

TABLE 4.1
SOIL SAMPLING SUMMARY RESULTS - COMPARISON TO NJDEP STANDARDS
SITE FTMM-05
FORT MONMOUTH, NEW JERSEY

Field Sample Location	NJDEP Residential Direct Contact Soil Remediation Standard ⁽¹⁾	NJDEP Non-Residential Direct Contact Soil Remediation Standard ⁽¹⁾	NJDEP Impact to Groundwater Screening Level ⁽²⁾	Weston 1995 Background ⁽³⁾	B-85		B-86		B-87		B-88		B-89		B-90		B-91		B-92		B-93		B-94		B-95		B-96	
Sample Date					05/20/98		05/20/98		05/20/98		05/20/98		05/20/98		05/20/98		05/20/98		05/20/98		05/21/98		05/21/98		05/21/98		05/21/98	
Metals (mg/kg)																												
Aluminum	78,000	NA	6,000	15,200	6650		7711		7796		5870		4347	4758		2982		2424		6587		7273		6776	1231			
Antimony	31	450	6	ND	0.52		1.219		0.834	ND	0.834		0.237	0.945		0.542		0.305		0.864		0.705		0.293	1.11			
Arsenic	19	19	19	22.9	4.61		8.103		10.68		12.43		2.981	15.53		4.745		1.092		9.735		9.53		7.075	12.33			
Barium	16,000	59,000	2,100	32.3	14.66		14.57		29.97		192.3		25.61	8.797		21.03		12.71		18.68		21.47		50.99	96.83			
Beryllium	16	140	0.7	2	0.3893		0.9604		0.9373		4.787		0.3072	0.4409		0.3972		0.3802		0.49		0.7067		0.591	0.1224			
Cadmium	78	78	2	ND	<0.060		<0.059		<0.060	ND	0.674		<0.067	<0.053		<0.055		<0.053		<0.060		<0.058		<0.061	<0.061			
Calcium	NLE	NLE	NLE	921	590.2		646.2		1477		1547		1663	181.2		987.9		168.5		393.2		502.8		1605	383.6			
Chromium	NLE	NLE	NLE	269	37.09		91.08		88.9		54.19		7.984	58.29		27.55		16.35		56.44		57.07		28.21	11.51			
Cobalt	1,600	590	90	2.5	2.493		2.845		3.717		7.393		3.526	0.5178		0.9371		0.4263		1.026		3.164		4.892	1.152			
Copper	3,100	45,000	11,000	8	3.002		0.413		4.648		2314		46.74	139.2		10.16		2.46		11.74		2.615		19.37	26.15			
Iron	NLE	NLE	NLE	55,800	13010		41350		41280		12220		5168	15660		12860		6114		21140		28210		10070	7920			
Lead	400	800	90	19.5	6.786		7.797		90.95		1267		15.43	19.27		50.74		5.981		30.17		131.3		18.73	78.99			
Magnesium	NLE	NLE	NLE	7,230	974.8		780.5		1019		614.5		359.5	1090		748		517.9		879		895		1135	286			
Manganese	11,000	5,900	65	90.7	85.56		49.43		101.9		175.7		97.42	9.783		28.45		22.4		16.42		67.3		32.46	15.55			
Mercury	23	65	0.1	ND	0.024		<0.023		0.034		0.044		0.039	0.044		0.053		0.036		0.051		0.024		0.05	0.184			
Nickel	1,600	23,000	48	8.4	3.728		12.44		14.15		22.36		10.93	2.453		3.39		1.526		4.015		8.536		14.98	4.765			
Potassium	NLE	NLE	NLE	15400	1656		1321		1580		1654		633.6	3985		1988		1086		2804		2075		2495	472.2			
Selenium	390	5,700	11	1.9	<0.363		<0.355		<0.359		1.379		<0.405	1.146		<0.329		<0.318		<0.363		<0.349		0.627	3.91			
Silver	390	5,700	1	1.1	<0.363		<0.355		<0.359		3.472		<0.405	<0.319		<0.329		<0.318		<0.363		<0.349		<0.364	<0.367			
Sodium	NLE	NLE	NLE	51.6	38.89		40.52		116.5		335.1		440.7	186.3		128.8		22.98		91.43		37.29		216.6	58.66			
Thallium	5	79	3	ND	<0.363		<0.355		<0.359		<0.381		<0.405	<0.319		<0.329		<0.318		<0.363		<0.349		<0.364	<0.367			
Vanadium	78	1,100	NLE	94.1	32.18		108.4		113.1		18.83		9.574	11.28		11.94		9.943		51.64		75.4		25.26	9.353			
Zinc	23,000	110,000	930	81.4	20.41		57.83		79.89		500.7		26.7	35.88		76.22		14.81		27.7		41.81		27.54	13.94			

Notes:

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(1) New Jersey Department of Environmental Protection (NJDEP) Residential Direct Contact Soil Remediation Standards (RDCSRS) and Non-Residential Direct Contact Soil Remediation Standards (NRDCSRS) (N.J.A.C 7:26D; amended May 7, 2012). Available at: <http://www.state.nj.us/dep/srp/regs/rs/>.

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There are no NJDEP soil standards for individual PCB Arcolors; the total PCB NJDEP standards were used for individual Arcolors

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

B = Analyte detected in both sample and associated laboratory blank.

D = Result from dilution of sample.

DUP = field duplicate sample.

E = Estimated value.

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µg/kg = micrograms per kilogram.

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VOCs = volatile organic compounds.

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Detections are bolded.

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SITE FTMM-05
FORT MONMOUTH, NEW JERSEY

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Sample Date					05/21/98		05/21/98		05/26/98		06/17/98		06/17/98		06/17/98		06/17/98		06/17/98		06/26/98		06/26/98		06/26/98		
Volatile Organic Compounds (VOCs, µg/kg)																											
Lab Sample ID (VOCs only collected at approximately 24 in. bgs)					3588.19		3588.22		3593.03		3665.13		3665.17		3665.20		3665.26		3665.23		3686.05		3686.08		3686.11		3688.03
Methylene Chloride	34,000	97,000	10	-	<580		<660		<610	<560		<570		<560		<550		<570		<630		<650		<530		<620	
Benzene	2,000	5,000	5	-	<290		<330		<300	<280		<290		<280		<280		<280		<310		<330		<270		<310	
Tetrachloroethene	2,000	5,000	5	-	<290		<330		<300	<280		<290		<280		<280		<280		<310		<330		<270		<310	
Chloroform	600	2,000	400	-	<290		<330		<300	<280		<290		<280		<280		<280		<310		<330		<270		<310	
Ethylbenzene	7,800,000	110,000,000	13,000	-	<580		<660		<610	<560		<570		<560		<550		<570		<630		<650		<530		<620	
TICs	NLE	NLE	NLE	-	ND		ND		ND	ND		ND		ND		ND		ND		1400		ND		ND		ND	
Semivolatile Organic Compounds (SVOCs, µg/kg)																											
Lab Sample ID (All analyses except VOCs collected at approximately 6-12 in. bgs)					3588.18		3588.22		3593.02		3665.12		3665.16		3665.19		3665.25		3665.22		3686.04		3686.07		3686.10		
Naphthalene	6,000	17,000	25,000	-	<230		<290		<2600	<240		<270		<260		<270		<250		<310		<270		<260			
n-Nitrosodiphenylamine	99,000	390,000	400	-	<170		<220		<1900	<180		<210		<190		<200		<190		<230		<200		<190			
2-Methylnaphthalene	230,000	2,400,000	8,000	-	<260		<320		<2900	<270		<310		<290		<300		<280		<340		<300		<290			
4-Methylphenol	31,000	340,000	NLE	-	<250		<320		<2800	<260		<300		<280		<290		<280		<330		<300		<280			
Acenaphthylene	NLE	3.00E+08	NLE	-	<180		<230		<2000	<190		<220		<200		<210		<200		<240		<210		<200			
Acenaphthene	3,400,000	37,000,000	110,000	-	<170		<210		<1800	<170		<200		<180		<190		<180		<220		<190		<180			
Dibenzofuran	NLE	NLE	NLE	-	<180		<220		<2000	<180		<210		<200		<210		<190		<230		<210		<190			
Diethylphthalate	49,000,000	550,000,000	88,000	-	<190		<240		<2100	<200		<230		<210		<220		<210		<250		<220		<210			
Fluorene	2,300,000	24,000,000	170,000	-	<180		<230		<2000	<190		<210		<200		<210		<200		<240		<210		<200			
Phenanthrene	NLE	300,000,000	NLE	-	<180		160	J	<2000	<190		<220		<200		<210		<200		<240		230		<200			
Anthracene	17,000,000	30,000,000	2,400,000	-	<180		<230		<2000	<190		<220		<200		<210		<200		<240		<210		<200			
Dimethylphthalate	NLE	NLE	NLE	-	<140		<180		<1600	<150		<170		<160		<170		<160		<190		<170		<160			
Di-n-butylphthalate	6,100,000	68,000,000	760,000	-	730	JB	500	JB	<8800	230	JB	210	JB	900	B	490	JB	180	JB	460	JB	1100	B	380	JB		
Fluoranthene	2,300,000	24,000,000	1,300,000	-	240		210	J	<2000	<190		<220		300		150	J	<200		<240		830		<200			
Pyrene	1,700,000	18,000,000	840,000	-	160	J	200	J	<2400	<220		<250		400		170	J	<230		<280		1100		<240			
Pyridine	NLE	NLE	NLE	-	<280		<350		<3100	<290		<340		<310		<330		<310		<370		<330		<310			
Butylbenzylphthalate	1,200,000	14,000,000	230,000	-	<2409		<300		<2600	<250		<280		<260		<280		<260		<310		<280		<260			
Benzo(a)anthracene	600	2,000	800	-	120	J	140	J	<2100	<190		<220		150	J	<220		<200		<250		590		<210			
3,3'-Dichlorobenzidine	1,000	4,000	200	-	<330		<410		<3600	<340		<390		<360		<380		<360		<430		<380		<360			
Chrysene	62,000	230,000	80,000	-	170	J	290	J	<2600	<250		<280		340		180	J	<260		<310		1100		<260			
bis(2-Ethylhexyl)phthalate	35,000	140,000	1,200,000	-	100	J	<330		<2900	<270		<310		<290		<310		<290		<350		13000		<290			
Benzo(b)fluoranthene	600	2,000	2,000	-	110	J	160	J	<2600	<240		<270		140	J	<270		<250		<310		610		<260			
Benzo(k)fluoranthene	6,000	23,000	25,000	-	<170		<220		<1900	<180		<200		130	J	<200		<190		<230		630		<190			
Benzo(a)pyrene	200	200	200	-	110	J	<220		<2000	<180		<210		130	J	<210		<190		<230		530		<200			
Indeno(1,2,3-cd)pyrene	600	2,000	7,000	-	<190		<240		<2100	<200		<230		<210		<220		<210		<260		290		<210			
Dibenz(a,h)anthracene	200	200	800	-	<230		<280		<2500	<230		<270		<250		<260		<250		<300		<260		<250			
Benzo(g,h,i)perylene	380,000,000	30,000,000	NLE	-	<230		<280		<2500	<230		<270		<250		<260		<250		<300		310		<250			
Total TICs	NLE	NLE	NLE	-	10620		8500		105300	1700		1600		1200		ND		ND		ND		18520		940			
Pesticides / PCBs (mg/kg)																											
Heptachlor	0.1	0.7	0.5	-	<0.0003		<0.0003		<0.0003	<0.0003		<0.0003		0.003		<0.0003		<0.0003		<0.0004		<0.0003		<0.0003			
Heptachlor Epoxide	0.07	0.3	0.01	-	0.001		<0.0007		<0.0006	<0.0006		<0.0006		<0.0006		<0.0006		<0.0006		<0.0007		<0.0007		<0.0006			
4,4'-DDE	2	9	18	-	0.008		0.166		0.008	<0.0004		0.003		0.011		0.011		<0.0004		<0.0005		<0.0005		<0.0004			
Dieldrin	0.04	0.2	0.003	-	<0.0005		<0.0006		<0.0005	<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0006		<0.0006		<0.0005			
Endrin	23	340	1	-	<0.0005		<0.0006		<0.0005	<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0006		<0.0006		<0.0005			
4,4'-DDD	3	13	4	-	0.003		0.02		<0.0006	<0.0006		<0.0006		<0.0006		<0.0006		<0.0006		<0.0007		<0.0007		<0.0006			
Endrin Aldehyde	NLE	NLE	NLE	-	<0.0005		<0.0006		<0.0005	<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0006		<0.0006		<0.0005			
4,4'-DDT	2	8	11	-	0.014		0.077		0.008	<0.0011		0.003		0.019		0.017		<0.0011		<0.0014		<0.0013		<0.0012			
Endosulfan I																											

TABLE 4.1
SOIL SAMPLING SUMMARY RESULTS - COMPARISON TO NJDEP STANDARDS
SITE FTMM-05
FORT MONMOUTH, NEW JERSEY

Field Sample Location	NJDEP Residential Direct Contact Soil Remediation Standard ⁽¹⁾	NJDEP Non-Residential Direct Contact Soil Remediation Standard ⁽¹⁾	NJDEP Impact to Groundwater Screening Level ⁽²⁾	Weston 1995 Background ⁽³⁾	B-97		B-98		B-99	B-158		B-159		B-160		B-160 Dup		B-161		B-162		B-163		B-164		B-164		
Sample Date					05/21/98	05/21/98	05/26/98	06/17/98	06/17/98	06/17/98	06/17/98	06/17/98	06/17/98	06/26/98	06/26/98	06/26/98	06/26/98	06/26/98	06/26/98	06/26/98	06/26/98	06/26/98	06/26/98	06/26/98	06/26/98	06/26/98	06/26/98	06/26/98
Metals (mg/kg)																												
Aluminum	78,000	NA	6,000	15,200	8665		2673		3319	2715		6285				6418		5319		2685		7000		1807				
Antimony	31	450	6	ND	0.813		0.397		1.522	0.349		0.487				0.678		0.579		0.337		4.693		0.31				
Arsenic	19	19	19	22.9	9.33		7.349		4.823	1.328		8.398				8.753		4.368		5.292		67.77		0.977				
Barium	16,000	59,000	2,100	32.3	35.87		108.4		25.33	15.24		16.27				18.2		11.72		35.73		180.7		8.533				
Beryllium	16	140	0.7	2	0.6407		0.2846		0.2113	0.401		0.5945				0.7039		0.4884		0.2658		0.562		0.3014				
Cadmium	78	78	2	ND	<0.060		0.415		8.552	0.1991		<0.062				<0.061		<0.053		0.4376		<0.065		0.4001				
Calcium	NLE	NLE	NLE	921	1533		1042		1011	230.8		705.6				604.4		395		1154		9589		211.4				
Chromium	NLE	NLE	NLE	269	41.47		11.65		20.07	20.65		48.92				53.4		41.48		13.87		65.41		14.53				
Cobalt	1,600	590	90	2.5	3.802		2.666		2.289	0.3999		2.458				2.825		1.602		2.082		14.15		0.2978				
Copper	3,100	45,000	11,000	8	14.07		48.11		1168	1.01		7.446				5.783		1.858		23.12		433		1.341				
Iron	NLE	NLE	NLE	55,800	21290		4878		7295	7173		25200				28760		13430		5905		131900		5494				
Lead	400	800	90	19.5	46.73		69.52		4549	3.345		22.86				17.83		4.473		46.83		98.63		2.754				
Magnesium	NLE	NLE	NLE	7,230	1372		342.3		783.4	712.5		914.9				859.9		1036		494.8		1008		363.8				
Manganese	11,000	5,900	65	90.7	78.04		59.09		2581	20.15		50.78				63.65		36.64		24.99		623.9		17.74				
Mercury	23	65	0.1	ND	0.099		0.34		4.465	<0.022		<0.025				<0.024		<0.021		0.031		0.067		<0.022				
Nickel	1,600	23,000	48	8.4	11.81		8.137		6.487	1.697		6.746				7.369		2.982		5.629		67.18		1.4				
Potassium	NLE	NLE	NLE	15400	3002		456		1426	1740		1640				1671		2860		716.6		1579		587.3				
Selenium	390	5,700	11	1.9	<0.358		1.474		0.504	<0.288		<0.369				<0.365		<0.317		<0.430		<0.389		<0.333				
Silver	390	5,700	1	1.1	<0.358		0.421		37.83	<0.288		<0.369				<0.365		<0.317		<0.430		<0.389		<0.333				
Sodium	NLE	NLE	NLE	51.6	183.9		177.3		235.1	61.53		62.96				34.22		<2.112		134.2		953.4		4.653				
Thallium	5	79	3	ND	<0.358		<0.380		<0.363	<0.288		<0.369				<0.365		<0.317		<0.430		<0.389		<0.333				
Vanadium	78	1,100	NLE	94.1	50.3		10.97		16.76	11.98		58.35				66.43		30.25		17.05		15.28		10.23				
Zinc	23,000	110,000	930	81.4	43.54		73.52		9772	15.95		39.62				41.11		17.6		29.63		457.1		13.81				

Notes:

Historically, there have been up to 318 soil boring locations associated with FTMM-05. This analysis looks at only those boring locations that fall within the footprint of FTMM-05.

(1) New Jersey Department of Environmental Protection (NJDEP) Residential Direct Contact Soil Remediation Standards (RDCSRS) and Non-Residential Direct Contact Soil Remediation Standards (NRDCSRS) (N.J.A.C 7:26D; amended May 7, 2012). Available at: <http://www.state.nj.us/dep/srp/regs/rs/>.

(2) NJDEP Impact to Groundwater (NJDEP guidance document; Nov 2013).

(3) Weston, 1995. Final Site Investigation - Main Post and Charles Wood Areas, Fort Monmouth, New Jersey, December.

NJDEP criteria for total xylenes are used for xylene isomers (m+p, o).

NJDEP criteria for endrin is used for endrin aldehyde.

NJDEP criteria for 4,4'-DDD and 4,4'-DDT are for total DDD and total DDT, respectively.

There are no NJDEP soil standards for individual PCB Arcolors; the total PCB NJDEP standards were used for individual Arcolors

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

B = Analyte detected in both sample and associated laboratory blank.

D = Result from dilution of sample.

DUP = field duplicate sample.

E = Estimated value.

J = Analyte detected between MDL and practical quantitation limit (PQL).

NA = not analyzed.

ND = not detected.

NLE = No limit established.

< = analyte not detected above method detection limit (MDL).

µg/kg = micrograms per kilogram.

mg/kg = milligrams per kilogram.

VOCs = volatile organic compounds.

in. = inches.

bgs = below ground surface.

Detections are bolded.

Shaded cells = concentration exceeds NJDEP Impact to Groundwater Criterion.

Shaded cells = concentration exceeds one or both NJDEP Direct Contact Criteria.

Shaded cells = concentration exceeds all NJDEP criteria.

Shaded cells = concentration exceeds Weston (1995) background concentration.

TABLE 4.1
SOIL SAMPLING SUMMARY RESULTS - COMPARISON TO NJDEP STANDARDS
SITE FTMM-05
FORT MONMOUTH, NEW JERSEY

Field Sample Location	NJDEP Residential Direct Contact Soil Remediation Standard ⁽¹⁾	NJDEP Non- Residential Direct Contact Soil Remediation Standard ⁽¹⁾	NJDEP Impact to Groundwater Screening Level ⁽²⁾	Weston 1995 Background ⁽³⁾	B-165		B-166		B-167		B-168		B-169		B-178		B-179		B-180		B-180 Dup		B-181		B-197
Sample Date					06/29/98	06/29/98	06/29/98	06/29/98	06/29/98	07/13/98	07/13/98	07/13/98	07/13/98	07/13/98	07/13/98	07/13/98	08/12/98								
Volatile Organic Compounds (VOCs, µg/kg)																									
Lab Sample ID (VOCs only collected at approximately 24 in. bgs)					3688.07		3688.10		3688.13				3688.16		3722.13		3722.16		3722.19		3722.25		3722.22		3805.03
Methylene Chloride	34,000	97,000	10	-	<560		<670		<660		NA		<670		<520		<540		<520		<540		<560		<600
Benzene	2,000	5,000	5	-	<280		<340		<330		NA		<340		<260		<270		<260		<270		<280		<300
Tetrachloroethene	2,000	5,000	5	-	<280		3200		<330		NA		<340		<260		<270		<260		<270		<280		<300
Chloroform	600	2,000	400	-	<280		<340		<330		NA		<340		<260		<270		<260		<270		<280		<300
Ethylbenzene	7,800,000	110,000,000	13,000	-	<560		<670		<660		NA		<670		<520		<540		<520		<540		<560		<600
TICs	NLE	NLE	NLE	-	ND		ND		ND		NA		ND		ND		ND		ND		ND		ND		ND
Semivolatile Organic Compounds (SVOCs, µg/kg)																									
Lab Sample ID (All analyses except VOCs collected at approximately 6-12 in. bgs)					3688.02		3688.06		3688.09		3688.12		3688.15		3722.12		3722.15		3722.18		3722.24		3722.21		3805.02
Naphthalene	6,000	17,000	25,000	-	<270		<260		<260		<280		<320		<260		<240		<250		<240		<280		<260
n-Nitrosodiphenylamine	99,000	390,000	400	-	<200		<190		<200		<210		<240		<190		<180		<190		<180		<210		<200
2-Methylnaphthalene	230,000	2,400,000	8,000	-	<300		<290		<290		<310		<360		<290		<270		<280		<270		<310		<290
4-Methylphenol	31,000	340,000	NLE	-	<290		<280		<290		<310		<350		<280		<270		<270		<260		<300		<290
Acenaphthylene	NLE	3.00E+08	NLE	-	<210		<200		<210		<220		<250		<200		<190		<200		<190		<220		<210
Acenaphthene	3,400,000	37,000,000	110,000	-	<190		<190		<190		<200		<230		<180		<170		<180		<170		<200		<190
Dibenzofuran	NLE	NLE	NLE	-	<200		<200		<200		<210		<240		<190		<180		<190		<180		<210		<200
Diethylphthalate	49,000,000	550,000,000	88,000	-	<220		<210		<220		<230		<270		<210		<200		<210		<200		<230		<220
Fluorene	2,300,000	24,000,000	170,000	-	<210		<200		<210		<220		<250		<200		<190		<190		<190		<220		<210
Phenanthrene	NLE	300,000,000	NLE	-	<210		<200		740		<220		<250		<200		<190		250		330		<220		<210
Anthracene	17,000,000	30,000,000	2,400,000	-	<210		<200		<210		<220		<250		<200		<190		<200		<190		<220		<210
Dimethylphthalate	NLE	NLE	NLE	-	<170		<160		<160		<170		<200		<160		<150		<150		<150		<170		<160
Di-n-butylphthalate	6,100,000	68,000,000	760,000	-	240	JB	290	JB	120	JB	480	JB	190	JB	580	JB	310	JB	610	JB	520	JB	760	JB	<900
Fluoranthene	2,300,000	24,000,000	1,300,000	-	<210		<210		470		<220		<260		<200		<190		230		360		<220		<210
Pyrene	1,700,000	18,000,000	840,000	-	110	J	<240		920		<260		<300		<240		<220		370		580		<260		<240
Pyridine	NLE	NLE	NLE	-	<330		<320		<320		<340		<390		<310		<300		<300		<300		<340		<320
Butylbenzylphthalate	1,200,000	14,000,000	230,000	-	<280		<270		<270		<290		<330		<260		<250		<260		<260		<280		<270
Benzo(a)anthracene	600	2,000	800	-	<220		<210		280		<230		<260		<210		<190		140	J	190		<220		<210
3,3'-Dichlorobenzidine	1,000	4,000	200	-	<380		<360		<370		<400		<450		<360		<340		<350		<350		<390		<370
Chrysene	62,000	230,000	80,000	-	<280		160	J	580		<290		<330		<260		<250		390		600		<280		<270
bis(2-Ethylhexyl)phthalate	35,000	140,000	1,200,000	-	<310		<290		<300		<320		<360		<290		110	J	<280		100	J	<310		<300
Benzo(b)fluoranthene	600	2,000	2,000	-	<270		170	J	200	J	<280		<320		<260		<240		110	J	130	J	<280		<260
Benzo(k)fluoranthene	6,000	23,000	25,000	-	<200		140	J	220		<210		<240		<190		<180		<190		190		<210		<200
Benzo(a)pyrene	200	200	200	-	<210		<200		210		<210		<250		<200		<190		<190		220		<210		<200
Indeno(1,2,3-cd)pyrene	600	2,000	7,000	-	<220		120	J	120	J	<230		<270		<210		<200		<210		<200		<230		<220
Dibenz(a,h)anthracene	200	200	800	-	<260		<250		<260		<270		<310		<250		<240		<240		<240		<270		<260
Benzo(g,h,i)perylene	380,000,000	30,000,000	NLE	-	<260		<250		140	J	<270		<310		<250		<240		<240		<240		<270		<260
Total TICs	NLE	NLE	NLE	-	2990		2500		3000		3100		ND		15500		14830		16310		18820		18450		12130
Pesticides / PCBs (mg/kg)																									
Heptachlor	0.1	0.7	0.5	-	<0.0003		<0.0003		<0.0003		<0.0003		<0.0004		<0.0003		<0.0003		<0.0003		<0.0003		<0.0003		<0.0003
Heptachlor Epoxide	0.07	0.3	0.01	-	<0.0006		<0.0006		<0.0006		<0.0007		<0.0008		<0.0006		<0.0006		<0.0006		<0.0006		<0.0007		<0.0007
4,4'-DDE	2	9	18	-	0.011		0.003		0.067		0.003		<0.0005		<0.0004		0.002		0.006		0.008		<0.0004		0.033
Dieldrin	0.04	0.2	0.003	-	<0.0005		<0.0005		<0.0005		<0.0006		<0.0007		<0.0005		<0.0005		<0.0005		<0.0005		<0.0006		<0.0005
Endrin	23	340	1	-	<0.0005		<0.0005		<0.0005		<0.0006		<0.0007		<0.0005		<0.0005		<0.0005		<0.0005		<0.0006		<0.0005
4,4'-DDD	3	13	4	-	<0.0006		<0.0006		0.016		<0.0007		<0.0008		<0.0006		<0.0006		<0.0006		<0.0006		<0.0007		0.001
Endrin Aldehyde	NLE	NLE	NLE	-	<0.0005		<0.0005		<0.0005		<0.0006		<0.0007		<0.0005		<0.0005		<0.0005		<0.0005		<0.0006		<0.0005
4,4'-DDT	2	8	11	-	0.01		0.01		0.091		0.002		<0.0014		<0.0011		0.002		0.009		0.009		<0.0012		0.015
Endosulfan I	470	6,800	4	-	<0.0005		<0.0005		<0.0005		<0.0006		<0.0007		<0.0005		<0.0005		<0.0005		<0.0005		<0.0006		<0.0005
Endosulfan II	470	6,800	4	-	<0.0004		<0.0004		<0.0004		<0.0005		<0.0005		<0.0004		<0.0004		<0.0004		<0.0004		<0.0004		<0.0004
Endosulfan-Sulfate	470	6,800	2	-	<0.0004		<0.0004		<0.0004		<0.0005		<0.0005		<0.0004		<0.0004		<0.0004		<0.0004		<0.0004		<0.0004
gamma-Chlordane	0.2	1	0.05	-	<0.0005		<0.0005																		

TABLE 4.1
SOIL SAMPLING SUMMARY RESULTS - COMPARISON TO NJDEP STANDARDS
SITE FTMM-05
FORT MONMOUTH, NEW JERSEY

Field Sample Location	NJDEP Residential Direct Contact Soil Remediation Standard ⁽¹⁾	NJDEP Non- Residential Direct Contact Soil Remediation Standard ⁽¹⁾	NJDEP Impact to Groundwater Screening Level ⁽²⁾	Weston 1995 Background ⁽³⁾	B-165		B-166		B-167		B-168		B-169		B-178		B-179		B-180		B-180 Dup		B-181		B-197	
Sample Date					06/29/98	06/29/98	06/29/98	06/29/98	06/29/98	06/29/98	06/29/98	06/29/98	06/29/98	07/13/98	07/13/98	07/13/98	07/13/98	07/13/98	07/13/98	07/13/98	07/13/98	07/13/98	07/13/98	07/13/98	07/13/98	07/13/98
Metals (mg/kg)																										
Aluminum	78,000	NA	6,000	15,200	5053		9267		6171		3375		1764		5330		1710		10000		3330		12500		5970	
Antimony	31	450	6	ND	0.822		1.298		0.638		<0.261		0.368		0.54		0.391		0.537		<0.226		1.16		0.253	
Arsenic	19	19	19	22.9	6.525		17.45		9.463		4.215		3.946		6.39		1.55		9.99		3.72		11.6		4.98	
Barium	16,000	59,000	2,100	32.3	15.48		14.34		54.63		31.47		45.13		21.4		5.27		42.8		21.7		14.2		47.1	
Beryllium	16	140	0.7	2	0.4805		0.5758		0.5529		0.3019		0.1749		0.728		0.255		1.35		0.492		1.8		0.53	
Cadmium	78	78	2	ND	0.2383		<0.061		0.3187		0.3736		0.3013		<4.182		<0.057		<0.050		<0.057		<0.062		<0.058	
Calcium	NLE	NLE	NLE	921	665		441.5		1435		1273		624.1		851		127		1240		668		86.4		1720	
Chromium	NLE	NLE	NLE	269	55.07		72.9		47.49		10.58		3.82		58.8		19.6		110		34.5		139		17.1	
Cobalt	1,600	590	90	2.5	0.9522		0.8807		2.798		4.252		1.702		1.22		0.247		1.97		1.34		1.1		5.69	
Copper	3,100	45,000	11,000	8	12.07		7.172		38.89		20.07		14.28		4.95		1		7.44		9.92		<0.374		37.8	
Iron	NLE	NLE	NLE	55,800	18160		30120		21260		4301		2469		19400		7740		35100		12100		48800		7220	
Lead	400	800	90	19.5	42.83		14.31		94.14		20.43		18.74		7.58		7.32		14.6		13.5		6.18		40	
Magnesium	NLE	NLE	NLE	7,230	983.2		902.7		1306		468.3		159.2		1620		436		4220		975		1660		791	
Manganese	11,000	5,900	65	90.7	30.92		12.46		59.92		34.87		17.16		38.7		4.3		45.3		44.3		17.6		47.8	
Mercury	23	65	0.1	ND	0.051		0.064		0.101		0.025		<0.026		1.68		0.013		0.042		0.019		0.028		0.063	
Nickel	1,600	23,000	48	8.4	3.563		4.461		8.902		11.23		4.544		3.57		1.14		5.91		3.9		6.24		14.9	
Potassium	NLE	NLE	NLE	15400	2960		2850		3105		598.3		193.8		3980		774		9010		2050		3210		1300	
Selenium	390	5,700	11	1.9	<0.339		0.371		0.342		<0.392		<0.399		<25.092		<0.343		<0.300		<0.340		<0.374		<0.348	
Silver	390	5,700	1	1.1	<0.339		<0.365		<0.333		<0.392		<0.399		<25.092		<0.343		<0.300		<0.340		<0.374		<0.348	
Sodium	NLE	NLE	NLE	51.6	46.52		7.854		690		226.4		147.4		84.8		42.6		109		59.2		56.6		290	
Thallium	5	79	3	ND	<0.339		<0.365		<0.333		<0.392		<0.399		<25.092		<0.343		<0.300		<0.340		<0.374		<0.348	
Vanadium	78	1,100	NLE	94.1	43.13		62.26		41.98		14.73		9.161		18.3		17		40.3		21.7		92.1		23.2	
Zinc	23,000	110,000	930	81.4	37.72		32.28		61.39		28.85		11.74		48.4		10.5		51.5		34.8		44.9		31.9	

Notes:

Historically, there have been up to 318 soil boring locations associated with FTMM-05. This analysis looks at only those boring locations that fall within the footprint of FTMM-05.

(1) New Jersey Department of Environmental Protection (NJDEP) Residential Direct Contact Soil Remediation Standards (RDCSRS) and Non-Residential Direct Contact Soil Remediation Standards (NRDCSRS) (N.J.A.C 7:26D; amended May 7, 2012). Available at: <http://www.state.nj.us/dep/srp/regs/rs/>.

(2) NJDEP Impact to Groundwater (NJDEP guidance document; Nov 2013).

(3) Weston, 1995. Final Site Investigation - Main Post and Charles Wood Areas, Fort Monmouth, New Jersey, December.

NJDEP criteria for total xylenes are used for xylene isomers (m+p, o).

NJDEP criteria for endrin is used for endrin aldehyde.

NJDEP criteria for 4,4'-DDD and 4,4'-DDT are for total DDD and total DDT, respectively.

There are no NJDEP soil standards for individual PCB Arcolors; the total PCB NJDEP standards were used for individual Arcolors

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

B = Analyte detected in both sample and associated laboratory blank.

D = Result from dilution of sample.

DUP = field duplicate sample.

E = Estimated value.

J = Analyte detected between MDL and practical quantitation limit (PQL).

NA = not analyzed.

ND = not detected.

NLE = No limit established.

< = analyte not detected above method detection limit (MDL).

µg/kg = micrograms per kilogram.

mg/kg = milligrams per kilogram.

VOCs = volatile organic compounds.

in. = inches.

bgs = below ground surface.

Detections are bolded.

Shaded cells = concentration exceeds NJDEP Impact to Groundwater Criterion.

Shaded cells = concentration exceeds one or both NJDEP Direct Contact Criteria.

Shaded cells = concentration exceeds all NJDEP criteria.

Shaded cells = concentration exceeds Weston (1995) background concentration.

TABLE 4.1
SOIL SAMPLING SUMMARY RESULTS - COMPARISON TO NJDEP STANDARDS
SITE FTMM-05
FORT MONMOUTH, NEW JERSEY

Field Sample Location	NJDEP Residential Direct Contact Soil Remediation Standard ⁽¹⁾	NJDEP Non- Residential Direct Contact Soil Remediation Standard ⁽¹⁾	NJDEP Impact to Groundwater Screening Level ⁽²⁾	Weston 1995 Background ⁽³⁾	B-198		B-199		B-200		B-200 Dup	B-201	B-202		B-203		B-204		B-205		B-206		B-207	B-208	
Sample Date					08/12/98		08/12/98		08/12/98		08/12/98	08/12/98	08/12/98		08/12/98		08/12/98		08/12/98		08/12/98		08/12/98	08/12/98	
Volatile Organic Compounds (VOCs, µg/kg)																									
Lab Sample ID (VOCs only collected at approximately 24 in. bgs)					3805.05		3805.07		3805.09		3805.33	3805.11	3805.13		3805.15		3805.17		3805.19		3805.21		3805.23	3805.25	
Methylene Chloride	34,000	97,000	10	-	<910		<600		<740		<920	<660	<590		<560		<680		<640		<580		<630	<650	
Benzene	2,000	5,000	5	-	<460		<300		<370		<460	<330	<290		<280		<340		<320		<290		<310	<320	
Tetrachloroethene	2,000	5,000	5	-	<460		<300		<370		<460	<330	<290		780		<340		<320		<290		<310	<320	
Chloroform	600	2,000	400	-	<460		<300		<370		760	<330	<290		<280		<340		<320		<290		<310	<320	
Ethylbenzene	7,800,000	110,000,000	13,000	-	<910		<600		<740		<920	<660	<590		<560		<680		<640		<580		<630	<650	
TICs	NLE	NLE	NLE	-	ND		ND		ND		ND	ND	ND		ND		ND		ND		ND		ND	ND	
Semivolatile Organic Compounds (SVOCs, µg/kg)																									
Lab Sample ID (All analyses except VOCs collected at approximately 6-12 in. bgs)					3805.04		3805.06		3805.08		3805.32	3805.10	3805.12		3805.14		3805.16		3805.18		3805.20		3805.22	3805.24	
Naphthalene	6,000	17,000	25,000	-	<260		<300		<250		<260	<280	130	J	<240		<270		<270		<280		<270	<290	
n-Nitrosodiphenylamine	99,000	390,000	400	-	<190		<220		<190		<200	<210	<180		<180		<210		<200		<210		<200	<220	
2-Methylnaphthalene	230,000	2,400,000	8,000	-	<290		<330		<290		<290	<320	<270		<270		<310		<300		<310		<300	<320	
4-Methylphenol	31,000	340,000	NLE	-	<280		<330		<280		<290	<310	<260		<260		<300		<300		<310		<300	<320	
Acenaphthylene	NLE	3.00E+08	NLE	-	<200		78	J	<200		<210	<220	530		<190		<220		<210		<220		<210	<230	
Acenaphthene	3,400,000	37,000,000	110,000	-	<180		<210		<180		<190	<200	<170		<170		<200		<190		<200		<190	<210	
Dibenzofuran	NLE	NLE	NLE	-	<190		<230		<190		<200	<220	<180		<180		<210		<210		<210		<210	<220	
Diethylphthalate	49,000,000	550,000,000	88,000	-	<210		<250		<210		<220	<240	<200		<200		<230		<220		<230		<220	<240	
Fluorene	2,300,000	24,000,000	170,000	-	<200		<230		<200		<210	<220	<190		<190		<210		<210		<220		<210	<230	
Phenanthrene	NLE	300,000,000	NLE	-	<200		260		<200		<210	1000	2100		380		<220		<210		<220		<210	<230	
Anthracene	17,000,000	30,000,000	2,400,000	-	<200		<240		<200		<210	280	390		<190		<220		<210		<220		<210	<230	
Dimethylphthalate	NLE	NLE	NLE	-	<160		<190		<160		<160	<170	<150		<150		<170		<170		<170		<170	<180	
Di-n-butylphthalate	6,100,000	68,000,000	760,000	-	720	J	700	J	630	J	1100	1200	570	J	210	J	210	J	270	J	240	J	<920	250	J
Fluoranthene	2,300,000	24,000,000	1,300,000	-	<200		400		170	J	<210	1100	4500		510		140	J	<210		<220		<210	<230	
Pyrene	1,700,000	18,000,000	840,000	-	<240		560		260		<240	950	5100		740		260		<250		<260		<250	<270	
Pyridine	NLE	NLE	NLE	-	<310		<370		<310		<320	<350	<290		<290		<340		<330		<340		<330	<350	
Butylbenzylphthalate	1,200,000	14,000,000	230,000	-	<260		<310		<260		<260	<290	<250		<250		<280		<280		<290		<280	<300	
Benzo(a)anthracene	600	2,000	800	-	<210		230	J	130	J	<210	470	2700		260		120	J	<220		<230		<220	<230	
3,3'-Dichlorobenzidine	1,000	4,000	200	-	<360		<420		<360		<360	<400	<340		<340		<390		<380		<400		<380	<410	
Chrysene	62,000	230,000	80,000	-	<260		460		290		<270	670	4900		490		240	J	<280		<290		<280	<300	
bis(2-Ethylhexyl)phthalate	35,000	140,000	1,200,000	-	<290		<340		<290		<300	<320	<270		<270		<310		<310		<320		<310	<330	
Benzo(b)fluoranthene	600	2,000	2,000	-	<260		220	J	160	J	<260	360	3100		230	J	<280		<270		<280		<270	<290	
Benzo(k)fluoranthene	6,000	23,000	25,000	-	<190		230		170	J	<200	360	2800		250		<200		<200		<210		<200	<220	
Benzo(a)pyrene	200	200	200	-	<200		240		130	J	<200	390	2900		260		<210		<210		<210		<210	<220	
Indeno(1,2,3-cd)pyrene	600	2,000	7,000	-	<210		<250		<210		<220	<240	2100		150	J	<230		<230		<230		<230	<240	
Dibenz(a,h)anthracene	200	200	800	-	<250		<290		<250		<260	<280	1500		<240		<270		<260		<270		<260	<280	
Benzo(g,h,i)perylene	380,000,000	30,000,000	NLE	-	<250		<290		<250		<260	<280	2200		140	J	<270		<260		<270		<260	<280	
Total TICs	NLE	NLE	NLE	-	9880		8800		ND		8200	16400	15260		4600		2500		2780		10400		ND	2200	
Pesticides / PCBs (mg/kg)																									
Heptachlor	0.1	0.7	0.5	-	<0.0003		<0.0004		<0.0003		<0.0003	<0.0003	<0.0003		<0.0003		<0.0003		<0.0003		<0.0004		<0.0003	<0.0004	
Heptachlor Epoxide	0.07	0.3	0.01	-	<0.0006		<0.0007		<0.0007		<0.0006	<0.0007	<0.0006		<0.0006		<0.0007		<0.0006		<0.0007		<0.0007	<0.0008	
4,4'-DDE	2	9	18	-	0.017		0.26		0.01		<0.0004	0.047	0.016		0.102		0.024		<0.0004		0.004		<0.0005	0.005	
Dieldrin	0.04	0.2	0.003	-	<0.0005		<0.0006		<0.0005		<0.0005	<0.0006	<0.0005		<0.0005		<0.0006		<0.0005		<0.0006		<0.0006	<0.0006	
Endrin	23	340	1	-	<0.0005		<0.0006		<0.0005		<0.0005	<0.0006	<0.0005		<0.0005		<0.0006		<0.0005		<0.0006		<0.0006	<0.0006	
4,4'-DDD	3	13	4	-	0.001		0.116		<0.0007		<0.0006	<0.0007	<0.0006		0.031		0.004		<0.0006		0.003		<0.0007	<0.0008	
Endrin Aldehyde	NLE	NLE	NLE	-	<0.0005		<0.0006		<0.0005		<0.0005	<0.0006	<0.0005		<0.0005		<0.0006		<0.0005		<0.0006		<0.0006	<0.0006	
4,4'-DDT	2	8	11	-	0.019		1.321		0.01		<0.0011	<0.0013	0.054		0.34		0.019		<0.0011		0.003		<0.0013	0.006	
Endosulfan I	470	6,800	4	-	<0.0005		<0.0006		<0.0005		<0.0005	<0.0006	<0.0005		<0.0005		<0.0006		<0.0005		<0.0006		<0.0006	<0.0006	
Endosulfan II	470	6,800	4	-	<0.0004		<0.0005		<0.0004																

TABLE 4.1
SOIL SAMPLING SUMMARY RESULTS - COMPARISON TO NJDEP STANDARDS
SITE FTMM-05
FORT MONMOUTH, NEW JERSEY

Field Sample Location	NJDEP Residential Direct Contact Soil Remediation Standard ⁽¹⁾	NJDEP Non- Residential Direct Contact Soil Remediation Standard ⁽¹⁾	NJDEP Impact to Groundwater Screening Level ⁽²⁾	Weston 1995 Background ⁽³⁾	B-198		B-199		B-200		B-200 Dup	B-201	B-202		B-203		B-204		B-205		B-206		B-207	B-208	
Sample Date					08/12/98		08/12/98		08/12/98		08/12/98	08/12/98	08/12/98		08/12/98	08/12/98		08/12/98		08/12/98		08/12/98		08/12/98	08/12/98
Metals (mg/kg)																									
Aluminum	78,000	NA	6,000	15,200	4720		9820		10500		2490	5920	5990		6500		3940		4920		12300		3020	3420	
Antimony	31	450	6	ND	1.48		6.56		0.35		<0.245	0.617	0.751		0.359		<0.250		<0.245		<0.255		0.411	0.737	
Arsenic	19	19	19	22.9	59.1		11.5		8.59		4.96	5.5	7.11		6.34		5.27		7.61		8.46		6.07	10.7	
Barium	16,000	59,000	2,100	32.3	68.6		363		147		50.1	84.6	113		25.5		35.5		61.6		99.6		22.3	71.1	
Beryllium	16	140	0.7	2	0.548		0.9		0.743		0.266	0.92	0.58		0.428		0.389		0.354		0.985		0.288	0.525	
Cadmium	78	78	2	ND	<0.051		<0.057		0.543		823	0.929	<0.059		<0.059		<0.062		<0.061		<0.064		<0.057	<0.070	
Calcium	NLE	NLE	NLE	921	918		537		1390		823	1500	455		2470		1100		1010		1270		670	714	
Chromium	NLE	NLE	NLE	269	19.5		77.4		25.8		5.31	37.8	49.8		36		19.8		12.9		26.4		18.4	32	
Cobalt	1,600	590	90	2.5	11.4		5.14		7.57		1.77	5.81	1.98		4.27		4.61		4.8		9.39		3.91	2.42	
Copper	3,100	45,000	11,000	8	92.6		122		38.6		23.6	47.3	77.4		36.4		35		18.1		110		31.8	58	
Iron	NLE	NLE	NLE	55,800	38400		33400		15300		4580	12600	23300		14600		8620		5100		10200		15100	14800	
Lead	400	800	90	19.5	119		494		37.6		11.2	62.8	268		23.8		35		28.6		39.9		12.6	135	
Magnesium	NLE	NLE	NLE	7,230	491		1700		900		256	1430	1680		2450		630		342		540		329	995	
Manganese	11,000	5,900	65	90.7	121		143		126		19.3	332	39.1		83.9		61.8		21.1		63.2		65.6	36.2	
Mercury	23	65	0.1	ND	0.029		0.153		0.044		0	0.391	0.115		0.602		0.064		<0.035		<0.034		0.047	0.075	
Nickel	1,600	23,000	48	8.4	18.2		23.6		19.6		5.28	10.5	5.95		11		8.78		14.5		24.5		11.9	7.99	
Potassium	NLE	NLE	NLE	15400	1330		4160		3580		488	3670	3720		3560		1470		989		2280		852	3150	
Selenium	390	5,700	11	1.9	<0.303		<0.345		<0.327		<0.367	<0.386	<0.352		<0.352		<0.375		1.24		<0.382		0.606	<0.419	
Silver	390	5,700	1	1.1	<0.303		<0.345		<0.327		<0.367	<0.386	<0.352		<0.352		<0.375		<0.368		<0.382		<0.340	<0.419	
Sodium	NLE	NLE	NLE	51.6	393		535		485		278	526	566		411		207		339		460		252	404	
Thallium	5	79	3	ND	<0.303		<0.345		<0.327		0.513	<0.386	0.498		<0.352		<0.375		<0.368		<0.382		<0.340	0.505	
Vanadium	78	1,100	NLE	94.1	17.5		43.5		30.9		11.8	25.3	31.2		36.7		22.9		23.7		31.5		17.1	21.1	
Zinc	23,000	110,000	930	81.4	114		116		80.2		34.2	514	38.1		39.2		29.2		27.2		31.8		165	48.9	

Notes:

Historically, there have been up to 318 soil boring locations associated with FTMM-05. This analysis looks at only those boring locations that fall within the footprint of FTMM-05.

(1) New Jersey Department of Environmental Protection (NJDEP) Residential Direct Contact Soil Remediation Standards (RDCSRS) and Non-Residential Direct Contact Soil Remediation Standards (NRDCSRS) (N.J.A.C 7:26D; amended May 7, 2012). Available at: <http://www.state.nj.us/dep/srp/regs/rs/>.

(2) NJDEP Impact to Groundwater (NJDEP guidance document; Nov 2013).

(3) Weston, 1995. Final Site Investigation - Main Post and Charles Wood Areas, Fort Monmouth, New Jersey, December.

NJDEP criteria for total xylenes are used for xylene isomers (m+p, o).

NJDEP criteria for endrin is used for endrin aldehyde.

NJDEP criteria for 4,4'-DDD and 4,4'-DDT are for total DDD and total DDT, respectively.

There are no NJDEP soil standards for individual PCB Arcolors; the total PCB NJDEP standards were used for individual Arcolors

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

B = Analyte detected in both sample and associated laboratory blank.

D = Result from dilution of sample.

DUP = field duplicate sample.

E = Estimated value.

J = Analyte detected between MDL and practical quantitation limit (PQL).

NA = not analyzed.

ND = not detected.

NLE = No limit established.

< = analyte not detected above method detection limit (MDL).

µg/kg = micrograms per kilogram.

mg/kg = milligrams per kilogram.

VOCs = volatile organic compounds.

in. = inches.

bgs = below ground surface.

Detections are bolded.

Shaded cells = concentration exceeds NJDEP Impact to Groundwater Criterion.

Shaded cells = concentration exceeds one or both NJDEP Direct Contact Criteria.

Shaded cells = concentration exceeds all NJDEP criteria.

Shaded cells = concentration exceeds Weston (1995) background concentration.

TABLE 4.1
SOIL SAMPLING SUMMARY RESULTS - COMPARISON TO NJDEP STANDARDS
SITE FTMM-05
FORT MONMOUTH, NEW JERSEY

Field Sample Location	NJDEP Residential Direct Contact Soil Remediation Standard ⁽¹⁾	NJDEP Non-Residential Direct Contact Soil Remediation Standard ⁽¹⁾	NJDEP Impact to Groundwater Screening Level ⁽²⁾	Weston 1995 Background ⁽³⁾	B-209		B-210		B-211		B-212		B-213		B-214		B-215		B-216		B-217		B-218		B-219	
Sample Date					08/12/98		08/12/98		08/12/98		08/13/98		08/13/98		08/13/98		08/13/98		08/13/98		08/13/98		08/13/98		08/13/98	
Volatile Organic Compounds (VOCs, µg/kg)																										
Lab Sample ID (VOCs only collected at approximately 24 in. bgs)					3805.27		3805.29		3805.31		3809.03		3809.05		3809.07		3809.09		3809.11		3809.13		3809.15		3809.17	
Methylene Chloride	34,000	97,000	10	-	<510		<580		<660		<710		<770		<580		<560		<560		<550		<640		<650	
Benzene	2,000	5,000	5	-	<250		<290		<330		<350		<390		<290		<280		<280		<270		<320		<320	
Tetrachloroethene	2,000	5,000	5	-	<250		<290		<330		<350		<390		<290		<280		<280		<270		<320		<320	
Chloroform	600	2,000	400	-	450		490		550		460		520		410		430		390		460		440		440	
Ethylbenzene	7,800,000	110,000,000	13,000	-	<510		<580		<660		<710		<770		<580		<560		<560		<550		<640		<650	
TICs	NLE	NLE	NLE	-	ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
Semivolatile Organic Compounds (SVOCs, µg/kg)																										
Lab Sample ID (All analyses except VOCs collected at approximately 6-12 in. bgs)					3805.26		3805.28		3805.30		3809.02		3809.04		3809.06		3809.08		3809.10		3809.12		3809.14		3809.16	
Naphthalene	6,000	17,000	25,000	-	120	J	<240		<250		<1200		<1200		<1100		<970		<980		<1000		<1100		<1100	
n-Nitrosodiphenylamine	99,000	390,000	400	-	<180		60	J	<190		<1200		<1200		<1100		<970		<980		<1000		<1100		<1100	
2-Methylnaphthalene	230,000	2,400,000	8,000	-	120	J	<270		<280		<1200		<1200		<1100		<970		<980		<1000		<1100		<1100	
4-Methylphenol	31,000	340,000	NLE	-	<260		<260		<280		<1200		<1200		<1100		<970		<980		<1000		<1100		<1100	
Acenaphthylene	NLE	3.00E+08	NLE	-	260		<190		<200		<1200		<1200		<1100		<970		<980		<1000		480	J	<1100	
Acenaphthene	3,400,000	37,000,000	110,000	-	<170		<170		<180		<1200		<1200		<1100		<970		<980		<1000		<1100		<1100	
Dibenzofuran	NLE	NLE	NLE	-	<180		<180		<190		<1200		<1200		<1100		<970		<980		<1000		<1100		<1100	
Diethylphthalate	49,000,000	550,000,000	88,000	-	<200		<200		<210		<1200		<1200		<1100		<970		<980		<1000		<1100		<1100	
Fluorene	2,300,000	24,000,000	170,000	-	<190		<190		<200		<1200		<1200		<1100		<970		<980		<1000		<1100		<1100	
Phenanthrene	NLE	300,000,000	NLE	-	760		<190		150	J	140	J	280	J	190	J	160	J	<980		140	J	1300		110	J
Anthracene	17,000,000	30,000,000	2,400,000	-	200		<190		<200		<1200		<1200		<1100		<970		<980		<1000		250	J	<1100	
Dimethylphthalate	NLE	NLE	NLE	-	<150		<150		<160		<1200		<1200		<1100		<970		<980		<1000		<1100		<1100	
Di-n-butylphthalate	6,100,000	68,000,000	760,000	-	540	J	840		580	J	330	JB	670	JB	260	JB	660	JB	250	JB	190	JB	650	JB	380	JB
Fluoranthene	2,300,000	24,000,000	1,300,000	-	1400		190	J	160	J	370	J	370	J	220	J	160	J	280	J	190	J	2900		220	J
Pyrene	1,700,000	18,000,000	840,000	-	1100		260		270		400	J	560	J	310	J	270	J	340	J	180	J	3500		280	J
Pyridine	NLE	NLE	NLE	-	<290		<290		<310		<1200		<1200		<1100		<970		<980		<1000		<1100		<1100	
Butylbenzylphthalate	1,200,000	14,000,000	230,000	-	<250		<250		<260		<1200		<1200		<1100		<970		<980		<1000		<1100		<1100	
Benzo(a)anthracene	600	2,000	800	-	<190		110	J	<200		230	J	200	J	120	J	<970		140	J	<1000		1000	J	110	J
3,3'-Dichlorobenzidine	1,000	4,000	200	-	<340		<340		<350		<1200		<1200		<1100		<970		<980		<1000		<1100		<1100	
Chrysene	62,000	230,000	80,000	-	<250		240	J	<260		360	J	460	J	240	J	<970		280	J	<1000		2500		280	J
bis(2-Ethylhexyl)phthalate	35,000	140,000	1,200,000	-	<270		<270		<290		<1200		<1200		<1100		<970		<980		<1000		<1100		120	J
Benzo(b)fluoranthene	600	2,000	2,000	-	530		<240		<250		180	J	190	J	<1100		<970		<980		<1000		1100		170	J
Benzo(k)fluoranthene	6,000	23,000	25,000	-	<180		<180		<190		220	J	240	J	<1100		<970		<980		<1000		1200		<1100	
Benzo(a)pyrene	200	200	200	-	400		<180		<190		200	J	240	J	<1100		<970		<980		<1000		1000	J	<1100	
Indeno(1,2,3-cd)pyrene	600	2,000	7,000	-	190	J	<200		<210		120	J	140	J	<1100		<970		<980		<1000		550	J	<1100	
Dibenz(a,h)anthracene	200	200	800	-	170	J	<230		<250		<1200		<1200		<1100		<970		<980		<1000		<1100		<1100	
Benzo(g,h,i)perylene	380,000,000	30,000,000	NLE	-	190	J	<230		<250		210	J	<1200		<1100		<970		<980		<1000		490	J	<1100	
Total TICs	NLE	NLE	NLE	-	ND		3400		3400		1200		11700		25710		1200		1200		2300		11430		880	
Pesticides / PCBs (mg/kg)																										
Heptachlor	0.1	0.7	0.5	-	<0.0003		<0.0003		<0.0003		<0.0004		<0.0035		<0.0034		<0.0003		<0.0003		0.004		<0.0030		<0.0030	
Heptachlor Epoxide	0.07	0.3	0.01	-	<0.0006		<0.0006		<0.0006		<0.0007		<0.0070		<0.0067		<0.0006		<0.0006		<0.0006		<0.0059		<0.0060	
4,4'-DDE	2	9	18	-	0.028		0.057		0.057		<0.0005		0.473		0.313		0.013		0.088		0.013		0.315		0.233	
Dieldrin	0.04	0.2	0.003	-	<0.0005		<0.0005		<0.0005		<0.0006		<0.0058		<0.0056		<0.0005		<0.0005		0.004		<0.0049		<0.0050	
Endrin	23	340	1	-	<0.0005		<0.0005		<0.0005		<0.0006		<0.0058		<0.0056		<0.0005		<0.0005		<0.0005		<0.0049		<0.0050	
4,4'-DDD	3	13	4	-	0.025		0.014		0.008		<0.0007		0.814		0.214		0.004		0.008		0.012		0.17		0.082	
Endrin Aldehyde	NLE	NLE	NLE	-	<0.0005		<0.0005		<0.0005		<0.0006		<0.0058		<0.0056		<0.0005		<0.0005		<0.0005		<0.0049		<0.0050	
4,4'-DDT	2	8	11	-	0.167		0.025		0.014		<0.0013		1.042		0.463		0.015		0.106		0.039		0.444		0.472	
Endosulfan I	470	6,800	4	-	<0.0005		<0.0005		<0.0005		<0.0006		<0.0058		<0.0056		<0.0005		<0.0005		<0.0005		<0.0049		<0.0050	
Endosulfan II	470	6,800	4	-	<0.0004		<0.0004		<0.0																	

TABLE 4.1
SOIL SAMPLING SUMMARY RESULTS - COMPARISON TO NJDEP STANDARDS
SITE FTMM-05
FORT MONMOUTH, NEW JERSEY

Field Sample Location	NJDEP Residential Direct Contact Soil Remediation Standard ⁽¹⁾	NJDEP Non- Residential Direct Contact Soil Remediation Standard ⁽¹⁾	NJDEP Impact to Groundwater Screening Level ⁽²⁾	Weston 1995 Background ⁽³⁾	B-209		B-210		B-211		B-212		B-213		B-214		B-215		B-216		B-217		B-218		B-219			
Sample Date					08/12/98		08/12/98		08/12/98		08/13/98		08/13/98		08/13/98		08/13/98		08/13/98		08/13/98		08/13/98		08/13/98		08/13/98	
Metals (mg/kg)																												
Aluminum	78,000	NA	6,000	15,200	6840		5330		958		3050		3690		6270		7680		10900		8370		2150		3880			
Antimony	31	450	6	ND	0.87		0.665		<0.229	ND	<0.249		0.466		1.24		0.827		1.7		<0.229		<0.189		0.285			
Arsenic	19	19	19	22.9	8.17		9.51		1.23		9		10.5		10.9		6.37		18.5		5.26		5.78		7.42			
Barium	16,000	59,000	2,100	32.3	59.7		43.6		129		55.3		70.3		42.5		28.8		9.95		25		24.4		98.9			
Beryllium	16	140	0.7	2	0.671		0.525		0.0934		0.423		0.492		0.591		0.885		1.27		0.422		0.227		0.804			
Cadmium	78	78	2	ND	<0.047		<0.055		<0.057	ND	<0.062		<0.069		<0.057		<0.057		<0.052		<0.057		<0.047		0.115			
Calcium	NLE	NLE	NLE	921	1740		2000		405		1440		777		320		747		511		774		901		1700			
Chromium	NLE	NLE	NLE	269	43.7		36.8		2.75		5.38		26.1		67.3		78.2		122		28.8		12.9		21.4			
Cobalt	1,600	590	90	2.5	3.08		2.66		1.56		2.47		2.82		0.937		1.07		0.799		1.68		1.77		2.73			
Copper	3,100	45,000	11,000	8	36.6		26.3		12.1		14.6		33.1		7.75		4.39		3.87		4.41		24.9		30.3			
Iron	NLE	NLE	NLE	55,800	18600		15500		2220		5180		16000		36000		24600		36400		11900		6370		10700			
Lead	400	800	90	19.5	289		73.8		7.32		25.3		146		20.2		11.8		12.6		23.4		54.3		117			
Magnesium	NLE	NLE	NLE	7,230	1800		1850		136		316		918		2080		2350		3600		1120		443		2390			
Manganese	11,000	5,900	65	90.7	72.7		73.2		25.5		23.1		105		13		31.9		26.6		48.9		30		103			
Mercury	23	65	0.1	ND	0.072		0.036		<0.020		0.041		0.645		0.244		0.061		0.042		0.095		0.159		0.236			
Nickel	1,600	23,000	48	8.4	10.4		7.49		3.63		5.3		11		4.41		4.35		4.77		4.55		4.61		6.11			
Potassium	NLE	NLE	NLE	15400	2920		3840		248		369		2690		4850		4890		6900		3200		882		2270			
Selenium	390	5,700	11	1.9	<0.282		<0.331		<0.343		<0.373		0.618		<0.331		<0.342		<0.312		<0.343		0.582		<0.359			
Silver	390	5,700	1	1.1	<0.282		<0.331		<0.343		<0.373		<0.411		<0.331		<0.342		<0.312		<0.343		<0.284		<0.359			
Sodium	NLE	NLE	NLE	51.6	294		327		159		349		412		650		132		101		95.2		142		491			
Thallium	5	79	3	ND	<0.282		<0.331		0.422		0.437		<0.411		0.564		0.531		0.738		<0.343		0.348		<0.359			
Vanadium	78	1,100	NLE	94.1	38.1		32.7		5.82		11.2		21.5		38.4		48.5		45.5		24.2		16		20.5			
Zinc	23,000	110,000	930	81.4	197		48		11.7		22.3		178		27.8		43.1		34		28.6		30.6		67.3			

Notes:

Historically, there have been up to 318 soil boring locations associated with FTMM-05. This analysis looks at only those boring locations that fall within the footprint of FTMM-05.

(1) New Jersey Department of Environmental Protection (NJDEP) Residential Direct Contact Soil Remediation Standards (RDCSRS) and Non-Residential Direct Contact Soil Remediation Standards (NRDCSRS) (N.J.A.C 7:26D; amended May 7, 2012). Available at: <http://www.state.nj.us/dep/srp/regs/rs/>.

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NJDEP criteria for total xylenes are used for xylene isomers (m+p, o).

NJDEP criteria for endrin is used for endrin aldehyde.

NJDEP criteria for 4,4'-DDD and 4,4'-DDT are for total DDD and total DDT, respectively.

There are no NJDEP soil standards for individual PCB Arcolors; the total PCB NJDEP standards were used for individual Arcolors

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

B = Analyte detected in both sample and associated laboratory blank.

D = Result from dilution of sample.

DUP = field duplicate sample.

E = Estimated value.

J = Analyte detected between MDL and practical quantitation limit (PQL).

NA = not analyzed.

ND = not detected.

NLE = No limit established.

< = analyte not detected above method detection limit (MDL).

µg/kg = micrograms per kilogram.

mg/kg = milligrams per kilogram.

VOCs = volatile organic compounds.

in. = inches.

bgs = below ground surface.

Detections are bolded.

Shaded cells = concentration exceeds NJDEP Impact to Groundwater Criterion.

Shaded cells = concentration exceeds one or both NJDEP Direct Contact Criteria.

Shaded cells = concentration exceeds all NJDEP criteria.

Shaded cells = concentration exceeds Weston (1995) background concentration.

TABLE 4.1
SOIL SAMPLING SUMMARY RESULTS - COMPARISON TO NJDEP STANDARDS
SITE FTMM-05
FORT MONMOUTH, NEW JERSEY

Field Sample Location	NJDEP Residential Direct Contact Soil Remediation Standard ⁽¹⁾	NJDEP Non- Residential Direct Contact Soil Remediation Standard ⁽¹⁾	NJDEP Impact to Groundwater Screening Level ⁽²⁾	Weston 1995 Background ⁽³⁾	B-220		B-220 Dup		B-221		B-222		B-223		B-224		B-225		B-226		B-227		B-228		B-229	
Sample Date					08/13/98	08/13/98	08/13/98	08/13/98	08/14/98	08/14/98	08/14/98	08/14/98	08/14/98	08/14/98	08/14/98	08/14/98	08/14/98	08/14/98	08/14/98							
Volatile Organic Compounds (VOCs, µg/kg)																										
Lab Sample ID (VOCs only collected at approximately 24 in. bgs)					3809.19		3809.25		3809.21		3809.23		3812.03		3812.05		3812.07		3812.09		3812.11		3812.13		3812.15	
Methylene Chloride	34,000	97,000	10	-	<1100		<700		<690		<840		<530		<470		<500		<490		<600		<510		<540	
Benzene	2,000	5,000	5	-	<540		<350		<340		<420		<260		<240		<250		<240		<300		<260		<270	
Tetrachloroethene	2,000	5,000	5	-	<540		<350		<340		<420		<260		<240		<250		<240		<300		<260		<270	
Chloroform	600	2,000	400	-	<540		410		400		480		<260		<240		<250		<240		<300		<260		<270	
Ethylbenzene	7,800,000	110,000,000	13,000	-	<1100		56	J	<690		<840		<530		<470		<500		<490		<600		<510		<540	
TICs	NLE	NLE	NLE	-	ND		ND		ND		2700		ND		ND		ND		ND		ND		ND		ND	
Semivolatile Organic Compounds (SVOCs, µg/kg)																										
Lab Sample ID (All analyses except VOCs collected at approximately 6-12 in. bgs)					3809.18		3809.24		3809.20		3809.22		3812.02		3812.04		3812.06		3812.08		3812.10		3812.12		3812.14	
Naphthalene	6,000	17,000	25,000	-	4000	JD	<1000		<1100		<1100		<1100		<950		<1000		<1000		<1200		<1000		<1100	
n-Nitrosodiphenylamine	99,000	390,000	400	-	<9800		<1000		<1100		<1100		<1100		<950		<1000		<1000		<1200		<1000		<1100	
2-Methylnaphthalene	230,000	2,400,000	8,000	-	7600	JD	<1000		<1100		<1100		<1100		<950		<1000		<1000		<1200		<1000		<1100	
4-Methylphenol	31,000	340,000	NLE	-	<9800		<1000		<1100		<1100		<1100		<950		<1000		<1000		<1200		<1000		<1100	
Acenaphthylene	NLE	3.00E+08	NLE	-	6100	JD	170	J	120	J	<1100		260	J	<950		120	J	110	J	<1200		<1000		<1100	
Acenaphthene	3,400,000	37,000,000	110,000	-	<9800		<1000		<1100		<1100		<1100		<950		<1000		<1000		<1200		<1000		<1100	
Dibenzofuran	NLE	NLE	NLE	-	<9800		<1000		<1100		<1100		<1100		<950		<1000		<1000		<1200		<1000		<1100	
Diethylphthalate	49,000,000	550,000,000	88,000	-	<9800		<1000		<1100		<1100		<1100		<950		<1000		<1000		<1200		<1000		<1100	
Fluorene	2,300,000	24,000,000	170,000	-	<9800		<1000		<1100		<1100		<1100		<950		<1000		<1000		<1200		<1000		<1100	
Phenanthrene	NLE	300,000,000	NLE	-	55000	D	490	J	560	J	220	J	1000	J	<950		420	J	360	J	<1200		170	J	280	J
Anthracene	17,000,000	30,000,000	2,400,000	-	6700	JD	<1000		<1100		<1100		150	J	<950		<1000		<1000		<1200		<1000		<1100	
Dimethylphthalate	NLE	NLE	NLE	-	<9800		<1000		<1100		<1100		<1100		<950		<1000		<1000		<1200		<1000		<1100	
Di-n-butylphthalate	6,100,000	68,000,000	760,000	-	<9800		580	JB	220	JB	1000	JB	310	JB	490	JB	210	JB	530	JB	210	JB	670	JB	710	JB
Fluoranthene	2,300,000	24,000,000	1,300,000	-	23000	D	620	J	640	J	270	J	1300		95	J	710	J	500	J	<1200		160	J	290	J
Pyrene	1,700,000	18,000,000	840,000	-	44000	D	990	J	900	J	370	J	1900		110	J	890	J	700	J	140	J	270	J	430	J
Pyridine	NLE	NLE	NLE	-	<9800		<1000		<1100		<1100		<1100		<950		<1000		<1000		<1200		<1000		<1100	
Butylbenzylphthalate	1,200,000	14,000,000	230,000	-	<9800		<1000		<1100		<1100		<1100		<950		<1000		<1000		<1200		<1000		<1100	
Benzo(a)anthracene	600	2,000	800	-	14000	D	350	J	320	J	160	J	700	J	<950		240	J	280	J	<1200		<1000		160	J
3,3'-Dichlorobenzidine	1,000	4,000	200	-	<9800		<1000		<1100		<1100		<1100		<950		<1000		<1000		<1200		<1000		<1100	
Chrysene	62,000	230,000	80,000	-	25000	D	850	J	680	J	290	J	1500		<950		720	J	610	J	<1200		200	J	340	J
bis(2-Ethylhexyl)phthalate	35,000	140,000	1,200,000	-	<9800		<1000		<1100		<1100		<1100		<950		<1000		<1000		<1200		<1000		<1100	
Benzo(b)fluoranthene	600	2,000	2,000	-	4700	JD	380	J	330	J	140	J	670	J	<950		320	J	310	J	<1200		<1000		130	J
Benzo(k)fluoranthene	6,000	23,000	25,000	-	9000	JD	400	J	430	J	180	J	720	J	<950		380	J	360	J	<1200		<1000		200	J
Benzo(a)pyrene	200	200	200	-	8900	JD	380	J	360	J	130	J	770	J	<950		280	J	320	J	<1200		<1000		150	J
Indeno(1,2,3-cd)pyrene	600	2,000	7,000	-	19000	D	<1000		<1100		<1100		550	J	<950		200	J	200	J	<1200		<1000		<1100	
Dibenz(a,h)anthracene	200	200	800	-	25000	D	<1000		<1100		<1100		<1100		<950		<1000		<1000		<1200		<1000		<1100	
Benzo(g,h,i)perylene	380,000,000	30,000,000	NLE	-	22000	D	<1000		<1100		<1100		490	J	<950		210	J	190	J	<1200		<1000		<1100	
Total TICs	NLE	NLE	NLE	-	87910		32430		32510		41840		24000		8810		13740		25150		ND		6050		15710	
Pesticides / PCBs (mg/kg)																										
Heptachlor	0.1	0.7	0.5	-	<0.0003		<0.0003		<0.0003		<0.0003		<0.0003		<0.0003		<0.0003		<0.0003		<0.0037		<0.0033		<0.0032	
Heptachlor Epoxide	0.07	0.3	0.01	-	<0.0006		<0.0006		<0.0007		<0.0007		<0.0006		0.01		<0.0006		<0.0006		<0.0074		<0.0066		<0.0064	
4,4'-DDE	2	9	18	-	0.104		0.457		0.433		0.068		0.644		0.024		0.422		0.612		0.241		0.262		0.169	
Dieldrin	0.04	0.2	0.003	-	<0.0005		<0.0005		<0.0006		<0.0006		<0.0005		0.003		<0.0005		<0.0005		<0.0062		<0.0055		<0.0053	
Endrin	23	340	1	-	<0.0005		<0.0005		<0.0006		<0.0006		<0.0005		<0.0005		<0.0005		<0.0005		<0.0062		<0.0055		<0.0053	
4,4'-DDD	3	13	4	-	0.021		0.069		2.225		0.03		<0.0006		0.004		0.048		0.164		0.276		0.419		0.179	
Endrin Aldehyde	NLE	NLE	NLE	-	<0.0005		<0.0005		<0.0006		<0.0006		0.061		<0.0005		<0.0005		<0.0005		<0.0062		<0.0055		<0.0053	
4,4'-DDT	2	8	11	-	0.15		0.491		5.604		0.427		1.237		0.05		1		0.973		0.859		<0.0121		1.07	
Endosulfan I	470	6,800	4	-	<0.0005		<0.0005	</																		

TABLE 4.1
SOIL SAMPLING SUMMARY RESULTS - COMPARISON TO NJDEP STANDARDS
SITE FTMM-05
FORT MONMOUTH, NEW JERSEY

Field Sample Location	NJDEP Residential Direct Contact Soil Remediation Standard ⁽¹⁾	NJDEP Non- Residential Direct Contact Soil Remediation Standard ⁽¹⁾	NJDEP Impact to Groundwater Screening Level ⁽²⁾	Weston 1995 Background ⁽³⁾	B-220		B-220 Dup		B-221		B-222		B-223		B-224		B-225		B-226		B-227		B-228		B-229			
Sample Date					08/13/98		08/13/98		08/13/98		08/13/98		08/14/98		08/14/98		08/14/98		08/14/98		08/14/98		08/14/98		08/14/98		08/14/98	
Metals (mg/kg)																												
Aluminum	78,000	NA	6,000	15,200	4400		4200		7220		6310		8000		8920		3360		5370		6730		8520		4570			
Antimony	31	450	6	ND	0.763		0.382		1.38		0.483		0.759		<0.200		0.444		0.648		<0.220		1.17		1.06			
Arsenic	19	19	19	22.9	10		7.26		9.59		10.2		8.04		4.76		6.16		7.7		6.64		8.79		11			
Barium	16,000	59,000	2,100	32.3	70.6		36		55.2		26		40.3		25.7		28.3		47.9		38.5		39.9		31.5			
Beryllium	16	140	0.7	2	0.534		0.449		1.1		0.446		0.764		0.399		0.336		0.719		0.916		1.43		0.514			
Cadmium	78	78	2	ND	<0.053		<0.054		<0.060		<0.059		<0.056		<0.050		<0.054		<0.059		<0.055		<0.056		<0.057			
Calcium	NLE	NLE	NLE	921	983		779		654		314		1210		606		631		1020		519		395		344			
Chromium	NLE	NLE	NLE	269	37.5		25.5		74.3		69		60.4		27.1		22.4		44.1		73.2		92.1		51.5			
Cobalt	1,600	590	90	2.5	2.52		2.24		1.09		1.08		2.47		1.6		1.47		2.1		0.94		1.42		0.718			
Copper	3,100	45,000	11,000	8	29.8		30		32.9		4.04		22		3.7		23.1		32.9		8.81		5.93		17.7			
Iron	NLE	NLE	NLE	55,800	19400		14500		28900		17800		21500		11300		10800		18800		25700		30100		30800			
Lead	400	800	90	19.5	122		162		137		12.9		67.7		15.3		81.2		111		21.4		23.9		18.8			
Magnesium	NLE	NLE	NLE	7,230	1440		839		2280		1680		2160		1040		748		1470		2690		2940		1530			
Manganese	11,000	5,900	65	90.7	49.5		43.7		20.7		12.9		69.5		46.6		29.2		40		11.5		26.8		10.5			
Mercury	23	65	0.1	ND	2.341		31.452		0.392		0.197		0.096		0.351		0.301		0.283		0.198		0.212		0.182			
Nickel	1,600	23,000	48	8.4	6.6		6.3		5.86		4.76		8.15		4.31		5.43		7.43		4.49		5.39		3.49			
Potassium	NLE	NLE	NLE	15400	4340		2170		4950		5820		4300		3180		1920		4750		5430		6580		3610			
Selenium	390	5,700	11	1.9	<0.315		<0.327		<0.360		0.353		<0.335		<0.300		<0.325		<0.355		<0.329		<0.336		<0.344			
Silver	390	5,700	1	1.1	<0.315		<0.327		<0.360		<0.352		<0.335		<0.300		<0.325		<0.355		<0.329		<0.336		<0.344			
Sodium	NLE	NLE	NLE	51.6	386		218		723		572		168		94.2		262		448		483		315		565			
Thallium	5	79	3	ND	0.54		<0.327		<0.360		0.527		<0.335		<0.300		0.457		0.457		0.898		0.567		0.69			
Vanadium	78	1,100	NLE	94.1	28.3		25.1		34.4		38.7		41.8		23.5		23.1		28.9		24.8		32.1		34			
Zinc	23,000	110,000	930	81.4	57.2		31.1		62		25.8		79.5		23.5		48		50.3		34.3		50.8		43.5			

Notes:

Historically, there have been up to 318 soil boring locations associated with FTMM-05. This analysis looks at only those boring locations that fall within the footprint of FTMM-05.

(1) New Jersey Department of Environmental Protection (NJDEP) Residential Direct Contact Soil Remediation Standards (RDCSRS) and Non-Residential Direct Contact Soil Remediation Standards (NRDCSRS) (N.J.A.C 7:26D; amended May 7, 2012). Available at: <http://www.state.nj.us/dep/srp/regs/rs/>.

(2) NJDEP Impact to Groundwater (NJDEP guidance document; Nov 2013).

(3) Weston, 1995. Final Site Investigation - Main Post and Charles Wood Areas, Fort Monmouth, New Jersey, December.

NJDEP criteria for total xylenes are used for xylene isomers (m+p, o).

NJDEP criteria for endrin is used for endrin aldehyde.

NJDEP criteria for 4,4'-DDD and 4,4'-DDT are for total DDD and total DDT, respectively.

There are no NJDEP soil standards for individual PCB Arcolors; the total PCB NJDEP standards were used for individual Arcolors

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

B = Analyte detected in both sample and associated laboratory blank.

D = Result from dilution of sample.

DUP = field duplicate sample.

E = Estimated value.

J = Analyte detected between MDL and practical quantitation limit (PQL).

NA = not analyzed.

ND = not detected.

NLE = No limit established.

< = analyte not detected above method detection limit (MDL).

µg/kg = micrograms per kilogram.

mg/kg = milligrams per kilogram.

VOCs = volatile organic compounds.

in. = inches.

bgs = below ground surface.

Detections are bolded.

Shaded cells = concentration exceeds NJDEP Impact to Groundwater Criterion.

Shaded cells = concentration exceeds one or both NJDEP Direct Contact Criteria.

Shaded cells = concentration exceeds all NJDEP criteria.

Shaded cells = concentration exceeds Weston (1995) background concentration.

TABLE 4.1
SOIL SAMPLING SUMMARY RESULTS - COMPARISON TO NJDEP STANDARDS
SITE FTMM-05
FORT MONMOUTH, NEW JERSEY

Field Sample Location	NJDEP Residential Direct Contact Soil Remediation Standard ⁽¹⁾	NJDEP Non- Residential Direct Contact Soil Remediation Standard ⁽¹⁾	NJDEP Impact to Groundwater Screening Level ⁽²⁾	Weston 1995 Background ⁽³⁾	B-230		B-231		B-232		B-233		B-234		B-235		B-236		B-237		B-238		B-239		B-240	
Sample Date					08/14/98	08/14/98	08/25/98	08/25/98	08/25/98	08/25/98	08/25/98	08/25/98	08/25/98	08/25/98	08/25/98	08/25/98	08/25/98	08/25/98	08/25/98	08/25/98	08/25/98	08/25/98	08/25/98	08/25/98	08/25/98	08/25/98
Volatile Organic Compounds (VOCs, µg/kg)																										
Lab Sample ID (VOCs only collected at approximately 24 in. bgs)					3812.17		3812.19		3827.03		3827.05		3827.07		3827.09		3827.11		3836.03		3836.05		3836.07		3836.09	
Methylene Chloride	34,000	97,000	10	-	<480		<480		<510		<530		<580		<520		<550		<550		<610		<840		<760	
Benzene	2,000	5,000	5	-	<240		<240		<250		<260		<290		<260		340		<270		<300		<420		<380	
Tetrachloroethene	2,000	5,000	5	-	<240		<240		<250		<260		<290		<260		<280		<270		<300		<420		<380	
Chloroform	600	2,000	400	-	<240		<240		<250		<260		<290		<260		<280		<270		<300		<420		<380	
Ethylbenzene	7,800,000	110,000,000	13,000	-	<480		<480		<510		<530		<580		<520		<550		<550		<610		<840		<760	
TICs	NLE	NLE	NLE	-	ND		ND		ND		1600		1900		ND		ND		ND		ND		ND		ND	
Semivolatile Organic Compounds (SVOCs, µg/kg)																										
Lab Sample ID (All analyses except VOCs collected at approximately 6-12 in. bgs)					3812.16		3812.18		3827.02		3827.04		3827.06		3827.08		3827.10		3836.02		3836.04		3836.06		3836.08	
Naphthalene	6,000	17,000	25,000	-	<960		<970		<1000		<1100		<1200		<1000		<1100		<1100		<1000		<1100		<1000	
n-Nitrosodiphenylamine	99,000	390,000	400	-	<960		<970		<1000		<1100		<1200		<1000		<1100		<1100		<1000		<1100		<1000	
2-Methylnaphthalene	230,000	2,400,000	8,000	-	<960		<970		<1000		<1100		<1200		<1000		<1100		<1100		<1000		<1100		<1000	
4-Methylphenol	31,000	340,000	NLE	-	<960		<970		<1000		<1100		<1200		<1000		<1100		<1100		<1000		<1100		<1000	
Acenaphthylene	NLE	3.00E+08	NLE	-	<960		<970		<1000		230	J	<1200		<1000		200	J	<1100		<1000		340	J	260	J
Acenaphthene	3,400,000	37,000,000	110,000	-	<960		<970		<1000		<1100		210	J	<1000		<1100		<1100		<1000		<1100		<1000	
Dibenzofuran	NLE	NLE	NLE	-	<960		<970		<1000		<1100		<1200		<1000		<1100		<1100		<1000		<1100		<1000	
Diethylphthalate	49,000,000	550,000,000	88,000	-	<960		<970		<1000		<1100		<1200		<1000		<1100		<1100		<1000		<1100		<1000	
Fluorene	2,300,000	24,000,000	170,000	-	<960		<970		<1000		<1100		260	J	<1000		<1100		<1100		<1000		<1100		<1000	
Phenanthrene	NLE	300,000,000	NLE	-	310	J	<970		<1000		590	J	3200		370	J	670	J	300	J	440	J	1000	J	990	J
Anthracene	17,000,000	30,000,000	2,400,000	-	<960		<970		<1000		170	J	750	J	<1000		120	J	<1100		<1000		<1100		<1000	
Dimethylphthalate	NLE	NLE	NLE	-	<960		<970		<1000		<1100		<1200		<1000		<1100		<1100		<1000		<1100		<1000	
Di-n-butylphthalate	6,100,000	68,000,000	760,000	-	470	JB	160	JB	420	J	450	J	580	J	410	J	280	J	320	J	<1000		190	J	440	J
Fluoranthene	2,300,000	24,000,000	1,300,000	-	360	J	250	J	130	J	950	J	5100		410	J	700	J	310	J	350	J	950	J	850	J
Pyrene	1,700,000	18,000,000	840,000	-	550	J	380	J	200	J	1200		4700		570	J	1100		610	J	580	J	1800		1600	
Pyridine	NLE	NLE	NLE	-	<960		<970		<1000		<1100		<1200		<1000		<1100		<1100		<1000		<1100		<1000	
Butylbenzylphthalate	1,200,000	14,000,000	230,000	-	<960		<970		<1000		<1100		<1200		<1000		<1100		<1100		<1000		<1100		<1000	
Benzo(a)anthracene	600	2,000	800	-	190	J	130	J	<1000		570	J	2100		220	J	380	J	220	J	200	J	550	J	510	J
3,3'-Dichlorobenzidine	1,000	4,000	200	-	<960		<970		<1000		<1100		<1200		<1000		<1100		<1100		<1000		<1100		<1000	
Chrysene	62,000	230,000	80,000	-	450	J	350	J	<1000		1000	J	3100		450	J	860	J	490	J	410	J	1300		1100	
bis(2-Ethylhexyl)phthalate	35,000	140,000	1,200,000	-	<960		<970		<1000		<1100		130	J	<1000		<1100		<1100		<1000		<1100		<1000	
Benzo(b)fluoranthene	600	2,000	2,000	-	180	J	140	J	<1000		450	J	1600		200	J	340	J	<1100		<1000		500	J	410	J
Benzo(k)fluoranthene	6,000	23,000	25,000	-	210	J	160	J	<1000		620	J	1500		240	J	420	J	<1100		<1000		520	J	470	J
Benzo(a)pyrene	200	200	200	-	210	J	150	J	<1000		570	J	1600		210	J	400	J	<1100		<1000		560	J	510	J
Indeno(1,2,3-cd)pyrene	600	2,000	7,000	-	120	J	<970		<1000		330	J	880	J	<1000		180	J	<1100		<1000		240	J	210	J
Dibenz(a,h)anthracene	200	200	800	-	<960		<970		<1000		<1100		<1200		<1000		<1100		<1100		<1000		<1100		<1000	
Benzo(g,h,i)perylene	380,000,000	30,000,000	NLE	-	130	J	<970		<1000		290	J	650	J	120	J	190	J	<1100		<1000		230	J	220	J
Total TICs	NLE	NLE	NLE	-	22080		3400		7200		5400		16500		20710		15570		4500		4950		ND		44620	
Pesticides / PCBs (mg/kg)																										
Heptachlor	0.1	0.7	0.5	-	<0.0015		<0.0015		<0.0032		<0.0007		<0.0017		<0.0016		<0.0033		<0.0003		<0.0003		<0.0003		<0.0003	
Heptachlor Epoxide	0.07	0.3	0.01	-	<0.0031		<0.0031		<0.0064		<0.0013		<0.0034		<0.0032		<0.0066		<0.0006		<0.0006		<0.0006		<0.0007	
4,4'-DDE	2	9	18	-	0.483		0.366		<0.0043		0.104		0.08		0.204		0.272		0.275		0.412		0.592		0.445	
Dieldrin	0.04	0.2	0.003	-	<0.0026		<0.0025		<0.0053		<0.0011		<0.0028		<0.0026		<0.0055		<0.0005		<0.0005		0.049		<0.0006	
Endrin	23	340	1	-	<0.0026		<0.0025		<0.0053		<0.0011		<0.0028		<0.0026		<0.0055		<0.0005		<0.0005		<0.0005		<0.0006	
4,4'-DDD	3	13	4	-	0.127		0.089		0.181		0.068		0.143		0.209		0.158		0.021		0.033		0.779		0.287	
Endrin Aldehyde	NLE	NLE	NLE	-	<0.0026		<0.0025		<0.0053		<0.0011		<0.0028		<0.0026		<0.0055		<0.0005		<0.0005		<0.0005		<0.0006	
4,4'-DDT	2	8	11	-	0.833		0.626		1.344		0.345		1.143		1.028		1.28		0.65		1.438		2.914		1.636	
Endosulfan I	470	6,800	4	-	<0.0026		<0.0025		<0.0053		<0.0011</															

TABLE 4.1
SOIL SAMPLING SUMMARY RESULTS - COMPARISON TO NJDEP STANDARDS
SITE FTMM-05
FORT MONMOUTH, NEW JERSEY

Field Sample Location	NJDEP Residential Direct Contact Soil Remediation Standard ⁽¹⁾	NJDEP Non- Residential Direct Contact Soil Remediation Standard ⁽¹⁾	NJDEP Impact to Groundwater Screening Level ⁽²⁾	Weston 1995 Background ⁽³⁾	B-230		B-231		B-232		B-233		B-234		B-235		B-236		B-237		B-238		B-239		B-240			
Sample Date					08/14/98		08/14/98		08/25/98		08/25/98		08/25/98		08/25/98		08/25/98		08/26/98		08/26/98		08/26/98		08/26/98			
Metals (mg/kg)																												
Aluminum	78,000	NA	6,000	15,200	6620		7420		7250		3370		4870		5200		10200		4020		6180		5840		7580			
Antimony	31	450	6	ND	0.918		1.12		1.28		0.374		0.9		1.04		1.67		0.604		0.948		0.721		1.16			
Arsenic	19	19	19	22.9	9.13		7.76		9.52		6.66		6.23		7.87		9.48		5.11		8.95		9.08		12.6			
Barium	16,000	59,000	2,100	32.3	19		31		45.3		35.5		25.8		36.4		36.3		16.8		20.1		49.4		48.1			
Beryllium	16	140	0.7	2	0.723		0.786		0.958		0.5		0.861		0.887		1.39		0.479		0.733		0.799		0.949			
Cadmium	78	78	2	ND	<0.048		<0.053		<0.060		ND		<0.061		<0.065		<0.057		<0.063		<0.050		<0.054		<0.060		<0.058	
Calcium	NLE	NLE	NLE	921	420		786		862		708		199		442		583		595		290		371		421			
Chromium	NLE	NLE	NLE	269	62.7		59.1		74.3		20.6		55.4		57.3		112		40.3		59.8		61.8		71.4			
Cobalt	1,600	590	90	2.5	1.55		2.61		1.36		3.37		0.88		0.948		1.67		1.79		2.79		1.01		1.26			
Copper	3,100	45,000	11,000	8	11.6		12.9		14.2		11.9		2.95		10.5		5.84		8.44		1.78		17.6		18.4			
Iron	NLE	NLE	NLE	55,800	20200		26600		29600		12200		19900		22900		41300		17300		31700		24100		28500			
Lead	400	800	90	19.5	36.3		47.5		55.9		25.5		14.4		30.7		21.9		26		13.4		50.6		55.8			
Magnesium	NLE	NLE	NLE	7,230	1890		1430		2260		684		1640		1690		4380		928		872		1690		2060			
Manganese	11,000	5,900	65	90.7	45.2		45.2		21.2		61.6		14.7		14.1		15.7		53.3		60.2		13.9		16.9			
Mercury	23	65	0.1	ND	0.067		0.078		0.278		0.22		0.213		0.288		0.217		0.037		0.015		0.38		0.391			
Nickel	1,600	23,000	48	8.4	5.19		9.07		6.07		6.49		3.35		4.77		6.44		5.85		7.59		4.97		6.16			
Potassium	NLE	NLE	NLE	15400	3780		5360		4740		1950		6550		3720		10200		2360		2490		6150		4130			
Selenium	390	5,700	11	1.9	<0.289		<0.317		<0.359		<0.365		<0.390		<0.341		<0.378		<0.298		<0.321		<0.359		<0.345			
Silver	390	5,700	1	1.1	<0.289		<0.317		<0.359		<0.365		<0.390		<0.341		<0.378		<0.298		<0.321		<0.359		<0.345			
Sodium	NLE	NLE	NLE	51.6	135		241		360		297		194		431		582		104		97		320		374			
Thallium	5	79	3	ND	<0.289		0.429		0.725		0.456		0.68		0.475		0.589		0.402		0.57		0.606		1.06			
Vanadium	78	1,100	NLE	94.1	42.3		60.8		40.3		15.7		17.6		22.7		51.8		39.8		74.9		28.9		40.4			
Zinc	23,000	110,000	930	81.4	32.1		36.3		43.4		59.6		28.8		43.8		43.6		39.1		46.3		39.6		43.7			

Notes:

Historically, there have been up to 318 soil boring locations associated with FTMM-05. This analysis looks at only those boring locations that fall within the footprint of FTMM-05.

(1) New Jersey Department of Environmental Protection (NJDEP) Residential Direct Contact Soil Remediation Standards (RDCSRS) and Non-Residential Direct Contact Soil Remediation Standards (NRDCSRS) (N.J.A.C 7:26D; amended May 7, 2012). Available at: <http://www.state.nj.us/dep/srp/regs/rs/>.

(2) NJDEP Impact to Groundwater (NJDEP guidance document; Nov 2013).

(3) Weston, 1995. Final Site Investigation - Main Post and Charles Wood Areas, Fort Monmouth, New Jersey, December.

NJDEP criteria for total xylenes are used for xylene isomers (m+p, o).

NJDEP criteria for endrin is used for endrin aldehyde.

NJDEP criteria for 4,4'-DDD and 4,4'-DDT are for total DDD and total DDT, respectively.

There are no NJDEP soil standards for individual PCB Arcolors; the total PCB NJDEP standards were used for individual Arcolors

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

B = Analyte detected in both sample and associated laboratory blank.

D = Result from dilution of sample.

DUP = field duplicate sample.

E = Estimated value.

J = Analyte detected between MDL and practical quantitation limit (PQL).

NA = not analyzed.

ND = not detected.

NLE = No limit established.

< = analyte not detected above method detection limit (MDL).

µg/kg = micrograms per kilogram.

mg/kg = milligrams per kilogram.

VOCs = volatile organic compounds.

in. = inches.

bgs = below ground surface.

Detections are bolded.

Shaded cells = concentration exceeds NJDEP Impact to Groundwater Criterion.

Shaded cells = concentration exceeds one or both NJDEP Direct Contact Criteria.

Shaded cells = concentration exceeds all NJDEP criteria.

Shaded cells = concentration exceeds Weston (1995) background concentration.

TABLE 4.1
SOIL SAMPLING SUMMARY RESULTS - COMPARISON TO NJDEP STANDARDS
SITE FTMM-05
FORT MONMOUTH, NEW JERSEY

Field Sample Location	NJDEP Residential Direct Contact Soil Remediation Standard ⁽¹⁾	NJDEP Non- Residential Direct Contact Soil Remediation Standard ⁽¹⁾	NJDEP Impact to Groundwater Screening Level ⁽²⁾	Weston 1995 Background ⁽³⁾	B-240 Dup		B-241		B-242		B-243		B-244		B-245		B-246		B-247		B-248		B-249		B-250	
Sample Date					08/26/98		08/26/98		08/26/98		08/26/98		08/26/98		08/26/98		08/26/98		08/26/98		08/26/98		08/26/98		08/26/98	
Volatile Organic Compounds (VOCs, µg/kg)																										
Lab Sample ID (VOCs only collected at approximately 24 in. bgs)					3836.39		3836.11		3836.13		3836.15		3836.17		3836.19		3836.21		3836.23		3836.25		3836.27		3836.29	
Methylene Chloride	34,000	97,000	10	-	6400		<1000		<670		<670		<570		<620		<940		<620		<630		<780		<640	
Benzene	2,000	5,000	5	-	<350		<500		<330		<340		<290		<310		<470		<310		<310		<390		<320	
Tetrachloroethene	2,000	5,000	5	-	<350		<500		<330		<340		<290		<310		<470		<310		<310		<390		<320	
Chloroform	600	2,000	400	-	<350		<500		<330		<340		<290		<310		<470		<310		<310		<390		<320	
Ethylbenzene	7,800,000	110,000,000	13,000	-	<700		<1000		<670		<670		<570		<620		<940		<620		<630		<780		<640	
TICs	NLE	NLE	NLE	-	ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
Semivolatile Organic Compounds (SVOCs, µg/kg)																										
Lab Sample ID (All analyses except VOCs collected at approximately 6-12 in. bgs)					3836.38		3836.10		3836.12		3836.14		3836.16		3836.18		3836.20		3836.22		3836.24		3836.26		3836.28	
Naphthalene	6,000	17,000	25,000	-	<1100		<1000		<990		<1400		<1100		<1100		<1100		<1000		<1000		<1000		<1100	
n-Nitrosodiphenylamine	99,000	390,000	400	-	<1100		<1000		<990		<1400		<1100		<1100		<1100		<1000		<1000		<1000		<1100	
2-Methylnaphthalene	230,000	2,400,000	8,000	-	<1100		<1000		<990		<1400		<1100		<1100		<1100		<1000		<1000		<1000		<1100	
4-Methylphenol	31,000	340,000	NLE	-	<1100		<1000		<990		<1400		<1100		<1100		<1100		<1000		<1000		<1000		<1100	
Acenaphthylene	NLE	3.00E+08	NLE	-	280	J	<1000		<990		<1400		210	J	<1100		<1100		<1000		<1000		<1000		<1100	
Acenaphthene	3,400,000	37,000,000	110,000	-	<1100		<1000		<990		<1400		<1100		<1100		<1100		<1000		<1000		<1000		<1100	
Dibenzofuran	NLE	NLE	NLE	-	<1100		<1000		<990		<1400		<1100		<1100		<1100		<1000		<1000		<1000		<1100	
Diethylphthalate	49,000,000	550,000,000	88,000	-	<1100		<1000		<990		<1400		<1100		<1100		<1100		<1000		<1000		<1000		<1100	
Fluorene	2,300,000	24,000,000	170,000	-	<1100		<1000		<990		<1400		<1100		<1100		<1100		<1000		<1000		<1000		<1100	
Phenanthrene	NLE	300,000,000	NLE	-	2800		210	J	<990		<1400		1100		440	J	360	J	<1000		<1000		<1000		400	J
Anthracene	17,000,000	30,000,000	2,400,000	-	440	J	<1000		<990		<1400		<1100		<1100		<1100		<1000		<1000		<1000		<1100	
Dimethylphthalate	NLE	NLE	NLE	-	<1100		<1000		<990		<1400		<1100		<1100		<1100		<1000		<1000		<1000		<1100	
Di-n-butylphthalate	6,100,000	68,000,000	760,000	-	<1100		420	J	<990		290	J	960	J	460	J	960	J	440	J	440	J	350	J	780	J
Fluoranthene	2,300,000	24,000,000	1,300,000	-	2900		250	J	180	J	<1400		720	J	420	J	360	J	190	J	190	J	<1000		310	J
Pyrene	1,700,000	18,000,000	840,000	-	3600		390	J	310	J	<1400		1400		680	J	570	J	310	J	300	J	<1000		560	J
Pyridine	NLE	NLE	NLE	-	<1100		<1000		<990		<1400		<1100		<1100		<1100		<1000		<1000		<1000		<1100	
Butylbenzylphthalate	1,200,000	14,000,000	230,000	-	<1100		<1000		<990		<1400		<1100		<1100		<1100		<1000		<1000		<1000		<1100	
Benzo(a)anthracene	600	2,000	800	-	1200		<1000		<990		<1400		410	J	220	J	<1100		<1000		<1000		<1000		<1100	
3,3'-Dichlorobenzidine	1,000	4,000	200	-	<1100		<1000		<990		<1400		<1100		<1100		<1100		<1000		<1000		<1000		<1100	
Chrysene	62,000	230,000	80,000	-	2100		<1000		<990		<1400		880	J	460	J	<1100		<1000		<1000		<1000		<1100	
bis(2-Ethylhexyl)phthalate	35,000	140,000	1,200,000	-	<1100		<1000		<990		<1400		<1100		<1100		<1100		<1000		<1000		<1000		<1100	
Benzo(b)fluoranthene	600	2,000	2,000	-	1100	J	<1000		<990		<1400		<1100		<1100		<1100		<1000		<1000		<1000		<1100	
Benzo(k)fluoranthene	6,000	23,000	25,000	-	1000	J	<1000		<990		<1400		<1100		<1100		<1100		<1000		<1000		<1000		<1100	
Benzo(a)pyrene	200	200	200	-	1100	J	<1000		<990		<1400		<1100		<1100		<1100		<1000		<1000		<1000		<1100	
Indeno(1,2,3-cd)pyrene	600	2,000	7,000	-	590	J	<1000		<990		<1400		<1100		<1100		<1100		<1000		<1000		<1000		<1100	
Dibenz(a,h)anthracene	200	200	800	-	<1100		<1000		<990		<1400		<1100		<1100		<1100		<1000		<1000		<1000		<1100	
Benzo(g,h,i)perylene	380,000,000	30,000,000	NLE	-	540	J	<1000		<990		<1400		<1100		<1100		<1100		<1000		<1000		<1000		<1100	
Total TICs	NLE	NLE	NLE	-	20300		12700		7250		23700		32940		15450		20700		10500		11300		4500		17500	
Pesticides / PCBs (mg/kg)																										
Heptachlor	0.1	0.7	0.5	-	<0.0003		<0.0003		<0.0003		<0.0004		<0.0003		<0.0003		<0.0003		<0.0003		<0.0003		<0.0003		<0.0003	
Heptachlor Epoxide	0.07	0.3	0.01	-	<0.0007		<0.0006		<0.0006		<0.0008		<0.0007		<0.0007		<0.0006		<0.0006		<0.0006		<0.0006		<0.0007	
4,4'-DDE	2	9	18	-	0.34		0.195		0.036		0.135		1.003		0.164		0.33		0.408		0.083		0.903		3.33	
Dieldrin	0.04	0.2	0.003	-	<0.0006		<0.0005		<0.0005		<0.0007		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0006	
Endrin	23	340	1	-	<0.0006		<0.0005		<0.0005		<0.0007		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0006	
4,4'-DDD	3	13	4	-	0.109		0.077		0.056		0.037		0.178		0.08		0.171		0.145		0.045		0.378		0.729	
Endrin Aldehyde	NLE	NLE	NLE	-	<0.0006		<0.0005		<0.0005		<0.0007		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0006	
4,4'-DDT	2	8	11	-	0.822		0.599		0.07		0.62		2.781		0.789		2.226		1.918		0.525		13.949		23.629	
Endosulfan I	470	6,800	4	-	<0.0006		<0.0005		<0.0005		<0.0007		<0.0005		<0.0006		<0.0005		<0.0005		<0.0005		&			

TABLE 4.1
SOIL SAMPLING SUMMARY RESULTS - COMPARISON TO NJDEP STANDARDS
SITE FTMM-05
FORT MONMOUTH, NEW JERSEY

Field Sample Location	NJDEP Residential Direct Contact Soil Remediation Standard ⁽¹⁾	NJDEP Non- Residential Direct Contact Soil Remediation Standard ⁽¹⁾	NJDEP Impact to Groundwater Screening Level ⁽²⁾	Weston 1995 Background ⁽³⁾	B-240 Dup		B-241		B-242		B-243		B-244		B-245		B-246		B-247		B-248		B-249		B-250	
Sample Date					08/26/98		08/26/98		08/26/98		08/26/98		08/26/98		08/26/98		08/26/98		08/26/98		08/26/98		08/26/98		08/26/98	
Metals (mg/kg)																										
Aluminum	78,000	NA	6,000	15,200	6210		5080		5800		7380		3900		8730		5890		5890		6970		3390		8150	
Antimony	31	450	6	ND	0.999		0.821		0.593		1.15		0.495		1.28		0.94		0.931		1.14		0.654		1.43	
Arsenic	19	19	19	22.9	9.78		7.6		6.45		10		6.62		9.43		8.91		8.61		9.13		5.72		7.84	
Barium	16,000	59,000	2,100	32.3	45.3		46.5		24.5		51		34.5		53.7		53.3		40.9		34.6		25.1		31.1	
Beryllium	16	140	0.7	2	0.775		1.15		0.736		0.927		0.45		1.25		0.811		1.02		0.945		0.538		1.02	
Cadmium	78	78	2	ND	<0.059		<0.059		45.8		<0.079		<0.059		<0.064		<0.059		<0.059		<0.049		<0.058		<0.047	
Calcium	NLE	NLE	NLE	921	508		332		575		427		929		396		306		787		1140		278		389	
Chromium	NLE	NLE	NLE	269	61.9		52.1		45.8		72		31.3		88.1		63.2		60.5		72.5		39.3		90.1	
Cobalt	1,600	590	90	2.5	1.07		1.11		0.951		2.04		1.85		1.68		0.96		0.998		1.55		0.926		1.02	
Copper	3,100	45,000	11,000	8	13.4		6.5		7.62		12.3		27		45.3		22.5		18		10.1		5.01		5.52	
Iron	NLE	NLE	NLE	55,800	25000		21100		17000		33900		13200		33700		28200		24400		30600		17500		32800	
Lead	400	800	90	19.5	43.4		28.5		19.4		17		94.5		50.5		53.2		47.4		21.6		23.1		20.2	
Magnesium	NLE	NLE	NLE	7,230	1810		1470		1420		1930		1090		2980		1660		1830		2730		1160		3380	
Manganese	11,000	5,900	65	90.7	15.2		13		28.1		24.9		53.9		18.8		15		19		33.2		8.41		12.4	
Mercury	23	65	0.1	ND	0.393		0.332		0.19		0.255		0.228		0.355		0.385		0.371		0.229		0.267		0.163	
Nickel	1,600	23,000	48	8.4	5.16		5		431		8.64		5.75		7.73		4.64		4.52		6.14		2.99		4.74	
Potassium	NLE	NLE	NLE	15400	6560		5540		4830		7840		3120		7070		3650		3760		5980		4390		8120	
Selenium	390	5,700	11	1.9	<0.357		<0.355		<0.335		<0.477		<0.354		<0.386		<0.356		<0.351		<0.296		<0.346		<0.282	
Silver	390	5,700	1	1.1	<0.357		<0.355		<0.335		<0.477		<0.354		<0.386		<0.356		<0.351		<0.296		<0.346		<0.282	
Sodium	NLE	NLE	NLE	51.6	463		304		362		898		262		303		310		349		360		336		342	
Thallium	5	79	3	ND	0.945		1.03		0.426		0.71		0.389		0.969		0.665		0.863		0.563		0.681		0.6	
Vanadium	78	1,100	NLE	94.1	34.5		21.3		19.8		59.3		27.8		45.4		28.6		27.3		33		15.9		40	
Zinc	23,000	110,000	930	81.4	38.5		43.8		53.5		35.8		65.6		47.6		181		43.6		69.5		27.2		39.4	

Notes:

Historically, there have been up to 318 soil boring locations associated with FTMM-05. This analysis looks at only those boring locations that fall within the footprint of FTMM-05.

(1) New Jersey Department of Environmental Protection (NJDEP) Residential Direct Contact Soil Remediation Standards (RDCSRS) and Non-Residential Direct Contact Soil Remediation Standards (NRDCSRS) (N.J.A.C 7:26D; amended May 7, 2012). Available at: <http://www.state.nj.us/dep/srp/regs/rs/>.

(2) NJDEP Impact to Groundwater (NJDEP guidance document; Nov 2013).

(3) Weston, 1995. Final Site Investigation - Main Post and Charles Wood Areas, Fort Monmouth, New Jersey, December.

NJDEP criteria for total xylenes are used for xylene isomers (m+p, o).

NJDEP criteria for endrin is used for endrin aldehyde.

NJDEP criteria for 4,4'-DDD and 4,4'-DDT are for total DDD and total DDT, respectively.

There are no NJDEP soil standards for individual PCB Arcolors; the total PCB NJDEP standards were used for individual Arcolors

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

B = Analyte detected in both sample and associated laboratory blank.

D = Result from dilution of sample.

DUP = field duplicate sample.

E = Estimated value.

J = Analyte detected between MDL and practical quantitation limit (PQL).

NA = not analyzed.

ND = not detected.

NLE = No limit established.

< = analyte not detected above method detection limit (MDL).

µg/kg = micrograms per kilogram.

mg/kg = milligrams per kilogram.

VOCs = volatile organic compounds.

in. = inches.

bgs = below ground surface.

Detections are bolded.

Shaded cells = concentration exceeds NJDEP Impact to Groundwater Criterion.

Shaded cells = concentration exceeds one or both NJDEP Direct Contact Criteria.

Shaded cells = concentration exceeds all NJDEP criteria.

Shaded cells = concentration exceeds Weston (1995) background concentration.

TABLE 4.1
SOIL SAMPLING SUMMARY RESULTS - COMPARISON TO NJDEP STANDARDS
SITE FTMM-05
FORT MONMOUTH, NEW JERSEY

Field Sample Location	NJDEP Residential Direct Contact Soil Remediation Standard ⁽¹⁾	NJDEP Non- Residential Direct Contact Soil Remediation Standard ⁽¹⁾	NJDEP Impact to Groundwater Screening Level ⁽²⁾	Weston 1995 Background ⁽³⁾	B-251		B-252		B-253	B-254	
Sample Date					08/26/98		08/26/98		08/26/98	08/26/98	
Volatile Organic Compounds (VOCs, µg/kg)											
Lab Sample ID (VOCs only collected at approximately 24 in. bgs)					3836.31		3836.33		3836.35	3836.37	
Methylene Chloride	34,000	97,000	10	-	<510		<620		<600	<550	
Benzene	2,000	5,000	5	-	<250		<310		<300	340	
Tetrachloroethene	2,000	5,000	5	-	<250		<310		<300	<280	
Chloroform	600	2,000	400	-	<250		<310		<300	<280	
Ethylbenzene	7,800,000	110,000,000	13,000	-	<510		<620		<600	<550	
TICs	NLE	NLE	NLE	-	ND		ND		ND	ND	
Semivolatile Organic Compounds (SVOCs, µg/kg)											
Lab Sample ID (All analyses except VOCs collected at approximately 6-12 in. bgs)					3836.30		3836.32		3836.34	3836.36	
Naphthalene	6,000	17,000	25,000	-	<1100		<1000		<1000	<990	
n-Nitrosodiphenylamine	99,000	390,000	400	-	<1100		<1000		<1000	<990	
2-Methylnaphthalene	230,000	2,400,000	8,000	-	<1100		<1000		<1000	<990	
4-Methylphenol	31,000	340,000	NLE	-	<1100		<1000		<1000	<990	
Acenaphthylene	NLE	3.00E+08	NLE	-	<1100		<1000		<1000	250	J
Acenaphthene	3,400,000	37,000,000	110,000	-	<1100		<1000		<1000	<990	
Dibenzofuran	NLE	NLE	NLE	-	<1100		<1000		<1000	<990	
Diethylphthalate	49,000,000	550,000,000	88,000	-	<1100		<1000		<1000	<990	
Fluorene	2,300,000	24,000,000	170,000	-	<1100		<1000		<1000	<990	
Phenanthrene	NLE	300,000,000	NLE	-	300	J	240	J	<1000	1800	
Anthracene	17,000,000	30,000,000	2,400,000	-	<1100		<1000		<1000	<990	
Dimethylphthalate	NLE	NLE	NLE	-	<1100		<1000		<1000	<990	
Di-n-butylphthalate	6,100,000	68,000,000	760,000	-	390	J	370	J	<1000	<990	
Fluoranthene	2,300,000	24,000,000	1,300,000	-	290	J	300	J	<1000	1300	
Pyrene	1,700,000	18,000,000	840,000	-	450	J	570	J	<1000	2400	
Pyridine	NLE	NLE	NLE	-	<1100		<1000		<1000	<990	
Butylbenzylphthalate	1,200,000	14,000,000	230,000	-	<1100		<1000		<1000	<990	
Benzo(a)anthracene	600	2,000	800	-	<1100		220	J	<1000	690	J
3,3'-Dichlorobenzidine	1,000	4,000	200	-	<1100		<1000		<1000	<990	
Chrysene	62,000	230,000	80,000	-	<1100		430	J	<1000	1400	
bis(2-Ethylhexyl)phthalate	35,000	140,000	1,200,000	-	<1100		<1000		<1000	<990	
Benzo(b)fluoranthene	600	2,000	2,000	-	<1100		<1000		<1000	480	J
Benzo(k)fluoranthene	6,000	23,000	25,000	-	<1100		<1000		<1000	510	J
Benzo(a)pyrene	200	200	200	-	<1100		<1000		<1000	520	J
Indeno(1,2,3-cd)pyrene	600	2,000	7,000	-	<1100		<1000		<1000	310	J
Dibenz(a,h)anthracene	200	200	800	-	<1100		<1000		<1000	<990	
Benzo(g,h,i)perylene	380,000,000	30,000,000	NLE	-	<1100		<1000		<1000	320	J
Total TICs	NLE	NLE	NLE	-	18050		5100		8840	83770	
Pesticides / PCBs (mg/kg)											
Heptachlor	0.1	0.7	0.5	-	<0.0003		<0.0003		<0.0003	<0.0003	
Heptachlor Epoxide	0.07	0.3	0.01	-	<0.0006		<0.0006		<0.0006	<0.0006	
4,4'-DDE	2	9	18	-	0.742		1.104		0.23	4.185	
Dieldrin	0.04	0.2	0.003	-	<0.0005		<0.0005		<0.0005	<0.0005	
Endrin	23	340	1	-	<0.0005		<0.0005		<0.0005	<0.0005	
4,4'-DDD	3	13	4	-	0.046		0.041		0.043	3.787	
Endrin Aldehyde	NLE	NLE	NLE	-	<0.0005		<0.0005		<0.0005	<0.0005	
4,4'-DDT	2	8	11	-	2.094		1.746		0.856	56.446	
Endosulfan I	470	6,800	4	-	<0.0005		<0.0005		<0.0005	<0.0005	
Endosulfan II	470	6,800	4	-	<0.0004		<0.0004		<0.0004	<0.0004	
Endosulfan-Sulfate	470	6,800	2	-	<0.0004		<0.0004		<0.0004	<0.0004	
gamma-Chlordane	0.2	1	0.05	-	<0.0005		<0.0005		<0.0005	0.021	
alpha-Chlordane	0.2	1	0.05	-	<0.0005		<0.0005		<0.0005	0.026	
Aroclor 1254	0.2	1	0.2	-	<0.0041		<0.0040		<0.0040	<0.0042	

TABLE 4.1
SOIL SAMPLING SUMMARY RESULTS - COMPARISON TO NJDEP STANDARDS
SITE FTMM-05
FORT MONMOUTH, NEW JERSEY

Field Sample Location	NJDEP Residential Direct Contact Soil Remediation Standard ⁽¹⁾	NJDEP Non- Residential Direct Contact Soil Remediation Standard ⁽¹⁾	NJDEP Impact to Groundwater Screening Level ⁽²⁾	Weston 1995 Background ⁽³⁾	B-251		B-252		B-253	B-254	
Sample Date					08/26/98		08/26/98		08/26/98	08/26/98	
Metals (mg/kg)											
Aluminum	78,000	NA	6,000	15,200	6430		5560		4350	6740	
Antimony	31	450	6	ND	1.31		0.774		0.688	0.916	
Arsenic	19	19	19	22.9	11.3		9.19		5.88	10.1	
Barium	16,000	59,000	2,100	32.3	69.6		32.2		17	48.4	
Beryllium	16	140	0.7	2	0.824		0.736		0.84	2.05	
Cadmium	78	78	2	ND	<0.056		<0.053		<0.045	<0.053	
Calcium	NLE	NLE	NLE	921	828		1100		563	143	
Chromium	NLE	NLE	NLE	269	72.6		56.7		46.7	52.8	
Cobalt	1,600	590	90	2.5	1.36		1.43		1.21	2.76	
Copper	3,100	45,000	11,000	8	110		15.8		11.9	10.1	
Iron	NLE	NLE	NLE	55,800	31400		21200		16400	27700	
Lead	400	800	90	19.5	163		69.8		12.4	40.3	
Magnesium	NLE	NLE	NLE	7,230	2210		1920		1330	1130	
Manganese	11,000	5,900	65	90.7	38.5		49.7		15.4	38	
Mercury	23	65	0.1	ND	0.275		0.361		0.069	0.706	
Nickel	1,600	23,000	48	8.4	5.81		5.24		3.33	6.57	
Potassium	NLE	NLE	NLE	15400	4900		3860		5380	4170	
Selenium	390	5,700	11	1.9	<0.336		<0.321		<0.267	<0.316	
Silver	390	5,700	1	1.1	<0.336		<0.321		<0.267	0.413	
Sodium	NLE	NLE	NLE	51.6	388		147		84.6	99.8	
Thallium	5	79	3	ND	0.709		0.535		0.332	0.691	
Vanadium	78	1,100	NLE	94.1	35.1		25.7		13.5	26.8	
Zinc	23,000	110,000	930	81.4	123		115		32.1	51.5	

Notes:

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(1) New Jersey Department of Environmental Protection (NJDEP) Residential Direct Contact Soil Remediation Standards (RDCSRS) and Non-Residential Direct Contact Soil Remediation Standards (NRDCSRS) (N.J.A.C 7:26D; amended May 7, 2012). Available at: <http://www.state.nj.us/dep/srp/regs/rs/>.

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EXHIBIT C

EXHIBIT C

Exhibit C includes the narrative descriptions of the institutional controls and engineering controls for the subject property, as specified in Appendix B of the Administrative Requirements for the Remediation of Contaminated Sites (ARRCS) in N.J.A.C. 7:26C. All current and subsequent owners, operators and lessees will be advised of the conditions and provided copies of the Deed Notice.

- i. Exhibit C-1: Deed Notice as Institutional Control: Exhibit C-1 includes a narrative description of the restriction and obligations of this Deed Notice as follows:

- (A) General Description of this Deed Notice:

This Deed Notice is being established as an institutional control for landfill FTMM-05. The landfill is a 4.227-acre area where landfill material was identified, as well as concentrations of volatile organic compounds, semivolatile organic compounds, polychlorinated biphenyls, and metals exceeding their May 2021 NJDEP Soil Remediation Standards. This Deed Notice is specific to a 160,955-square foot section of the landfill falling within Army owned property in Eatontown (Parcel 44 of the Phase 2 Parcel Survey Section A and Parcel 102D part 2 of 2) but within Phase 2 Parcel Survey Section A) and within Eatontown.

The engineering control for the entire landfill is a combination of a 24-inch-thick vegetated soil cap, soil and stone screening cap (walking path) and a cap comprised of dense grade aggregate fill (an existing access road) to restrict exposure.

By operation of this Deed Notice the restricted area at the subject property is restricted to non-residential uses that will maintain the current engineering and institutional controls established. For purposes of this deed notice, residential use includes, but is not limited to, single family or multi-family residences; child care facilities; and nursing home or assisted living facilities; and any type of educational facility for children/young adults in grades kindergarten through 12. The objective of these restrictions is to prevent potential exposure to- and/or migration of- landfill material or soil that contains contaminants at concentrations exceeding the NJDEP Soil Remediation Standards.

- (B) Monitoring of Deed Notice and Engineering Controls:

Monitoring of the institutional and engineering control will consist of an annual inspection of the Restricted Areas, at a minimum, and an evaluation of the engineered cap acting as an engineering control. The annual monitoring will be conducted by the Army or its contractor at the subject property to determine whether:

- 1) Any disturbances (including erosion) of the soil in the Restricted Areas resulted in the loss or reduction in protectiveness of the engineering control or an unacceptable exposure to the underlying landfill material or soil;

- 2) There have been any land use changes subsequent to the filing of this Deed Notice or the most recent biennial certification, whichever is more recent;
- 3) The current land use on the property is consistent with the restrictions in this Deed Notice;
- 4) Any newly promulgated or modified requirements of applicable regulations or laws apply to the site; and
- 5) Any new standards, regulations, or laws apply to the site that might necessitate additional sampling in order to evaluate the protectiveness of the remedial action which includes this Deed Notice, so that additional sampling can be conducted, if necessary.

Annual inspections will be documented and maintained at the site, at the primary office location of the owner, the Person Responsible for the Remediation (U.S. Army), and/or the Person with Primary Responsibility for Permit Compliance.

(C) Description of Biennial Certification:

Annual monitoring for compliance and effectiveness of the institutional and engineering control(s) pursuant to (A) and (B), above, shall be documented in support of a biennial certification of the protectiveness of the remedial action that includes the Deed Notice.

The Biennial Certification shall be submitted by the U.S. Army or its contractor to the Department every two years in the format required by the regulations and guidance in effect at the time of submittal.

The Biennial Certification report will include:

- 1) Certification of the protectiveness of the remedial action and Deed Notice;
- 2) Description of how the institutional and engineering controls are being maintained;
- 3) Determination whether the remedial action and deed notice continues to be protective of public health and safety and the environment; and
- 4) Assessment if Land Use at the property remains consistent with the restrictions in the Deed Notice;

ii. Exhibit C-2 – Vegetative Landfill Cap:

(A) Description of engineering controls:

Landfill material and contaminated soil was regraded to facilitate drainage and compacted prior to installation of the vegetated soil cap. The engineered cap consists of the following, as indicated on Exhibit B-1A:

1. Non-woven 8 oz/yd² geotextile filtration fabric placed on top of compacted soil;
2. 18 inches of common borrow soil to provide a vegetative support layer;

3. 6 inches of topsoil; and
4. Vegetation.

(B) Objective of the engineering controls:

The objective of the cap as an engineering control is to limit the potential for exposure and migration of underlying contaminants present in soil at concentrations in excess of the NJDEP Soil Remediation Standards.

(C) How the engineering control is intended to function:

The engineered soil cap is intended to be a physical barrier that would limit the potential for human direct contact to the underlying landfill material and soils that exceed the NJDEP Soil Remediation Standards. In addition, the physical barrier will prevent wind or rain-based erosion forces that could result in migration of contaminants in the underlying soil. The following describes recommended monitoring and maintenance activities that would facilitate long term effectiveness of the engineering control.

- 1) Vegetation should be maintained to prevent succession and establishment of deep-rooted vegetation that could compromise the integrity of the soil cap and/or geotextile delineation fabric. Recommended maintenance is an annual mowing of vegetation at the end of each growing season (November / December).
- 2) The party responsible for remediation (U.S. Army) will conduct annual monitoring of the soil capped areas consisting of inspection and evaluation of the cap to determine its integrity, operability, and effectiveness. The capped area shall be evaluated and maintained on a yearly basis. Areas that show signs of disturbance that reduce the protectiveness of the engineering controls within the Restricted Areas shall be repaired. Inspections and maintenance activities will be logged and photo documented.
- 3) Alterations, excavations, or other disturbance of the engineering controls cap will be conducted in accordance with the Deed Notice and NJDEP regulations in effect at the time of disturbance. Disturbance activities will occur under a Remedial Action Workplan prepared in accordance with N.J.A.C. 7:26E-5.5 and applicable regulations and guidance in effect at the time of disturbance. Disturbance activities will be conducted in a timely manner and shall not result in the unacceptable exposure to contamination present in the underlying soil. Planned disturbances shall be coordinated with the party with Primary Responsibility for Permit Compliance.
- 4) The results of inspections, maintenance, and repair activities of the engineering controls shall be documented in a logbook, which will be made available onsite¹ to the NJDEP upon request. The logbook shall contain dates of activities, name of

¹ If there are no occupants onsite, inspections will be documented and maintained at the primary office location of the owner, the Person Responsible for the Remediation, or the Person with Primary Responsibility for Permit Compliance.

the personnel conducting activities, and the results of activities including documentation of the condition of the cap with photo-documentation as appropriate.

During the biennial certification process, a regulatory review will be conducted to determine if newly promulgated or modified requirements exist in relation to the maintenance of this Engineering Control

iii. Exhibit C-3 – Existing Access Road Cap:

(A) Description of engineering controls:

Landfill material and contaminated soil was regraded to facilitate drainage and compacted prior to installation of the vegetated soil cap. The existing access road cap consists of 24 inches of dense grade aggregate.

(B) Objective of the engineering controls:

The objective of the cap as an engineering control is to limit the potential for exposure and migration of underlying contaminants present in soil at concentrations in excess of the NJDEP Soil Remediation Standards.

(C) How the engineering control is intended to function:

The engineered soil cap is intended to be a physical barrier that would limit the potential for human direct contact to the underlying landfill material and soils that exceed the NJDEP Soil Remediation Standards. In addition, the physical barrier will prevent wind or rain-based erosion forces that could result in migration of contaminants in the underlying soil. The following describes recommended monitoring and maintenance activities that would facilitate long term effectiveness of the engineering control.

- 1) The party responsible for remediation (the Army) will conduct annual monitoring of the access road consisting of inspection and evaluation of the access road cap to determine its integrity, operability, and effectiveness. The capped area shall be evaluated and maintained on a yearly basis. Areas that show signs of disturbance that reduce the protectiveness of the engineering controls within the Restricted Areas shall be repaired. Inspections and maintenance activities will be logged and photo documented.
- 2) Alterations, excavations, or other disturbance of the engineering controls cap will be conducted in accordance with the Deed Notice and NJDEP regulations in effect at the time of disturbance. Disturbance activities will occur under a Remedial Action Workplan prepared in accordance with N.J.A.C. 7:26E-5.5 and applicable regulations and guidance in effect at the time of disturbance. Disturbance activities will be conducted in a timely manner and shall not result in the unacceptable exposure to contamination present in the underlying soil. Planned disturbances

shall be coordinated with the party with Primary Responsibility for Permit Compliance.

- 3) The results of inspections, maintenance, and repair activities of the engineering controls shall be documented in a logbook, which will be made available onsite² to the NJDEP upon request. The logbook shall contain dates of activities, name of the personnel conducting activities, and the results of activities including documentation of the condition of the cap with photo-documentation as appropriate.
- 4) The results of inspections, maintenance, and repair activities of the engineering controls shall be documented in a logbook, which will be made available onsite to the NJDEP upon request. The logbook shall contain dates of activities, name of the personnel conducting activities, and the results of activities including documentation of the condition of the cap with photo-documentation as appropriate.
- 5) During the biennial certification process, a regulatory review will be conducted to determine if newly promulgated or modified requirements exist in relation to the maintenance of this Engineering Control.

iv. Exhibit C-4 – Soil and Stone Screenings Cap (Walking Path, Exhibit B-1B Detail 2):

(A) Description of engineering controls:

Landfill material and contaminated soil was regraded to facilitate drainage and compacted prior to installation of the engineered cap. The engineered cap consists of the following, where indicated on Exhibit B-1A:

1. Non-woven 8 oz/yd² geotextile filtration fabric placed on top of compacted soil;
2. 18 inches of common borrow soil;
3. A second layer of non-woven 8 oz/yd² geotextile filtration fabric; and
4. 6 inches of #10 stone screenings.

(B) Objective of the engineering controls:

The objective of the cap as an engineering control is to limit the potential for exposure and migration of underlying contaminants present in soil at concentrations in excess of the NJDEP Soil Remediation Standards.

(C) How the engineering control is intended to function:

The engineered cap is intended to be a physical barrier that would limit the potential for human direct contact to the underlying landfill material and soils that exceed the NJDEP Soil Remediation Standards. In addition, the physical barrier will prevent wind or rain-based erosion forces that could result in migration of contaminants in the underlying soil.

² If there are no occupants onsite, inspections will be documented and maintained at the primary office location of the owner, the Person Responsible for the Remediation, or the Person with Primary Responsibility for Permit Compliance.

The following describes recommended monitoring and maintenance activities that would facilitate long term effectiveness of the engineering control.

- 1) The party responsible for remediation (the Army) will conduct annual monitoring of the soil capped areas consisting of inspection and evaluation of the cap to determine its integrity, operability, and effectiveness. The capped area shall be evaluated and maintained on a yearly basis. Areas that show signs of disturbance that reduce the protectiveness of the engineering controls within the Restricted Areas shall be repaired. Inspections and maintenance activities will be logged and photo documented.
- 2) Alterations, excavations, or other disturbance of the engineering controls cap will be conducted in accordance with the Deed Notice and NJDEP regulations in effect at the time of disturbance. Disturbance activities will occur under a Remedial Action Workplan prepared in accordance with N.J.A.C. 7:26E-5.5 and applicable regulations and guidance in effect at the time of disturbance. Disturbance activities will be conducted in a timely manner and shall not result in the unacceptable exposure to contamination present in the underlying soil. Planned disturbances shall be coordinated with the party with Primary Responsibility for Permit Compliance.
- 3) The results of inspections, maintenance, and repair activities of the engineering controls shall be documented in a logbook, which will be made available onsite to the NJDEP upon request. The logbook shall contain dates of activities, name of the personnel conducting activities, and the results of activities including documentation of the condition of the cap with photo-documentation as appropriate.
- 4) The results of inspections, maintenance, and repair activities of the engineering controls shall be documented in a logbook, which will be made available onsite to the NJDEP upon request. The logbook shall contain dates of activities, name of the personnel conducting activities, and the results of activities including documentation of the condition of the cap with photo-documentation as appropriate.
- 5) During the biennial certification process, a regulatory review will be conducted to determine if newly promulgated or modified requirements exist in relation to the maintenance of this Engineering Control.

Return Address:
U.S. Army Base Realignment and Closure (BRAC)
Attn: Thomas Lineer, Program Manager
Pentagon Room 5B112 600 Army Pentagon
Washington, DC 20301

Instrument Number

DEED NOTICE

IN ACCORDANCE WITH N.J.S.A. 58:10B-13, THIS DOCUMENT IS TO BE
RECORDED IN THE SAME MANNER AS ARE DEEDS AND OTHER INTERESTS IN
REAL PROPERTY.

Prepared by: _____
[Signature]

[Print name below signature]

Recorded by: _____
[Signature, Officer of County Recording Office]

[Print name below signature]

DEED NOTICE

This Deed Notice is made as of the ____ day of ____, ____, by United States of America
(together with his/her/its/their successors and assigns, collectively "Owner").

1. THE PROPERTY. The United States of America, with an address of 26 Federal Plaza,
New York is the owner in fee simple of certain real property designated as Block 110 and a
portion of Lot1 (within Parcel 44) on the tax map of the Borough of Oceanport, Monmouth
County, New Jersey; the New Jersey Department of Environmental Protection Program Interest
Number (Preferred ID) for the contaminated site which includes this property is G000000032;
and the property is more particularly described in Exhibit A, which is attached hereto and made a
part hereof (the "Property").

2. REMEDIATION.

i. The New Jersey Department of Environmental Protection has approved this Deed
Notice as an institutional control for the Property, which is part of the remediation of the
Property.

ii. The Property was remediated under the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (42 U.S.C. §9601 et. seq.) by the United States Department of the Army. Any future soil remediation activities will be conducted by the then Owner in accordance with N.J.A.C. 7:26C-7 which requires the Owner, among other persons, to obtain a soil remedial action permit for the soil remedial action at the Property.

3. SOIL CONTAMINATION. The United States Army has remediated contaminated soil at the Property, such that soil contamination remains at certain areas of the Property that contains contaminants in concentrations that do not allow for the unrestricted use of the Property. Such soil contamination is described, including the type, concentration and specific location of such contamination, and the existing engineering controls on the site are described, in Exhibit B, which is attached hereto and made a part hereof. As a result, there is a statutory requirement for this Deed Notice and engineering controls in accordance with N.J.S.A. 58:10B-13.

4. CONSIDERATION. In accordance with the remedial action for the site which included the Property, and in consideration of the terms and conditions of that remedial action, and other good and valuable consideration, Owner has agreed to subject the Property to certain statutory and regulatory requirements that impose restrictions upon the use of the Property, to restrict certain uses of the Property, and to provide notice to subsequent owners, lessors, lessees and operators of the Property of the restrictions and the monitoring, maintenance, and biennial certification requirements outlined in this Deed Notice and required by law, as set forth herein.

5A. RESTRICTED AREAS. Due to the presence of contamination remaining at concentrations that do not allow for unrestricted use, the Owner has agreed, as part of the remedial action for the Property, to restrict the use of certain parts of the Property (the "Restricted Areas"); a narrative description of these restrictions is provided in Exhibit C, which is attached hereto and made a part hereof. The Owner has also agreed to maintain a list of these restrictions on site for inspection by governmental officials.

5B. RESTRICTED LAND USES. The following statutory land use restrictions apply to the Restricted Areas:

i. The Brownfield and Contaminated Site Remediation Act, N.J.S.A. 58:10B-12.g(10), prohibits the conversion of a contaminated site, remediated to non-residential soil remediation standards that require the maintenance of engineering or institutional controls, to a child care facility, or public, private, or charter school without the Department's prior written approval, unless a presumptive remedy is implemented; and

ii. The Brownfield and Contaminated Site Remediation Act, N.J.S.A. 58:10B-12.g(12), prohibits the conversion of a landfill, with gas venting systems and or leachate collection systems, to a single family residence or a child care facility.

5C. ENGINEERING CONTROLS. Due to the presence and concentration of these contaminants, the Owner has also agreed, as part of the remedial action for the Property, to the placement of certain engineering controls on the Property; a narrative description of these engineering controls is provided in Exhibit C.

6A. CHANGE IN OWNERSHIP AND REZONING.

i. The Owner and the subsequent owners, lessors, and lessees, shall cause all leases, grants, and other written transfers of an interest in the Restricted Areas to contain a provision expressly requiring all holders thereof to take the Property subject to the restrictions contained herein and to comply with all, and not to violate any of the conditions of this Deed Notice. Nothing contained in this Paragraph shall be construed as limiting any obligation of any person to provide any notice required by any law, regulation, or order of any governmental authority.

ii. The Owner and the subsequent owners shall provide written notice to the Department of Environmental Protection on a form provided by the Department and available at www.nj.gov/srp/forms within 30 calendar days after the effective date of any conveyance, grant, gift, or other transfer, in whole or in part, of the Owner's or subsequent owner's interest in the Restricted Area.

iii. The Owner and the subsequent owners shall provide written notice to the Department, on a form available from the Department at www.nj.gov/srp/forms, within thirty (30) calendar days after the owner's petition for or filing of any document initiating a rezoning of the Property to residential.

6B. SUCCESSORS AND ASSIGNS. This Deed Notice shall be binding upon Owner and upon Owner's successors and assigns, and subsequent owners, lessors, lessees and operators while each is an owner, lessor, lessee, or operator of the Property.

7A. ALTERATIONS, IMPROVEMENTS, AND DISTURBANCES.

i. The Owner and all subsequent owners, lessors, and lessees shall notify any person, including, without limitation, tenants, employees of tenants, and contractors, intending to conduct invasive work or excavate within the Restricted Areas, of the nature and location of contamination in the Restricted Areas, and, of the precautions necessary to minimize potential human exposure to contaminants.

ii. Except as provided in Paragraph 7B, below, no person shall make, or allow to be made, any alteration, improvement, or disturbance in, to, or about the Property which disturbs any engineering control at the Property without first retaining a licensed site remediation professional. Nothing herein shall constitute a waiver of the obligation of any person to comply with all applicable laws and regulations including, without limitation, the applicable rules of the Occupational Safety and Health Administration.

iii. A soil remedial action permit modification is required for any permanent alteration, improvement, or disturbance and the owner, lessor, lessee or operator shall submit the following within 30 days after the occurrence of the permanent alteration, improvement, or disturbance:

(A) A Remedial Action Workplan or Linear Construction Project notification and Final Report Form, whichever is applicable;

(B) A Remedial Action Report and Termination of Deed Notice Form; and

(C) A revised recorded Deed Notice with revised Exhibits, and Remedial Action Permit or Permit Modification or Remedial Action Permit Termination form and Remedial Action Report.

iv. No owner, lessor, lessee or operator shall be required to obtain a Remedial Action Permit or Permit Modification for any temporary alteration, improvement, or disturbance, provided that the site is restored to the condition described in the Exhibits to this Deed Notice, and the owner, lessee, or operator complies with the following:

(A) Restores any disturbance of an engineering control to pre-disturbance conditions within 60 calendar days after the initiation of the alteration, improvement or disturbance;

(B) Ensures that all applicable worker health and safety laws and regulations are followed during the alteration, improvement, or disturbance, and during the restoration;

(C) Ensures that human exposure to contamination in excess of the remediation standards does not occur; and

(D) Describes, in the next biennial certification the nature of the temporary alteration, improvement, or disturbance, the dates and duration of the temporary alteration, improvement, or disturbance, the name of key individuals and their affiliations conducting the temporary alteration, improvement, or disturbance, the notice the Owner gave to those persons prior to the disturbance.

7B. EMERGENCIES. In the event of an emergency which presents, or may present, an unacceptable risk to the public health and safety, or to the environment, or an immediate environmental concern, see N.J.S.A. 58:10C-2, any person may temporarily breach an engineering control provided that that person complies with each of the following:

i. Immediately notifies the Department of Environmental Protection of the emergency, by calling the DEP Hotline at 1-877-WARNDEP or 1-877-927-6337;

ii. Hires a Licensed Site Remediation Professional (unless the Restricted Areas includes an unregulated heating oil tank) to respond to the emergency;

iii. Limits both the actual disturbance and the time needed for the disturbance to the minimum reasonably necessary to adequately respond to the emergency;

iv. Implements all measures necessary to limit actual or potential, present or future risk of exposure to humans or the environment to the contamination;

v. Notifies the Department of Environmental Protection when the emergency or immediate environmental concern has ended by calling the DEP Hotline at 1-877-WARNDEP or 1-877-927-6337;

vi. Restores the engineering control to the pre-emergency conditions as soon as possible; and

vii. Submits to the Department of Environmental Protection within 60 days after completion of the restoration of the engineering control, a report including: (a) the nature and likely cause of the emergency; (b) the measures that have been taken to mitigate the effects of the emergency on human health and the environment; (c) the measures completed or implemented to restore the engineering control; and (d) any changes to the engineering control or site operation and maintenance plan to prevent reoccurrence of such conditions in the future.

8. TERMINATION OF DEED NOTICE.

i. This Deed Notice may be terminated only upon recording a Department-approved Termination of Deed Notice, available at N.J.A.C. 7:26C Appendix C, with the office of the Office of Records Management, a Division of the Monmouth County Clerk's Office of Monmouth County, New Jersey, expressly terminating this Deed Notice.

ii. Within 30 calendar days after recording a Department-approved Termination of Deed Notice, the owner of the property should apply to the Department for termination of the soil remedial action permit (if present) pursuant to N.J.A.C. 7:26C-7.

9. ACCESS. The Owner, and the subsequent owners, lessors, lessees, and operators agree to allow the Department, its agents and representatives access to the Property to inspect and evaluate the continued protectiveness of the remedial action that includes this Deed Notice and to conduct additional remediation to ensure the protection of the public health and safety and of the environment if the subsequent owners, lessors, lessees, and operators, during their ownership, tenancy, or operation, and the Owner fail to conduct such remediation pursuant to this Deed Notice as required by law. The Owner, and the subsequent owners, lessors, and lessees, shall also cause all leases, subleases, grants, and other written transfers of an interest in the Restricted Areas to contain a provision expressly requiring that all holders thereof provide such access to the Department.

10. ENFORCEMENT OF VIOLATIONS.

i. This Deed Notice itself is not intended to create any interest in real estate in favor of the Department of Environmental Protection, nor to create a lien against the Property, but merely is intended to provide notice of certain conditions and restrictions on the Property and to reflect the regulatory and statutory obligations imposed as a conditional remedial action for this site.

ii. The restrictions provided herein may be enforceable solely by the Department against any person who violates this Deed Notice. To enforce violations of this Deed Notice, the Department may initiate one or more enforcement actions pursuant to N.J.S.A. 58:10-23.11, and N.J.S.A. 58:10C, and require additional remediation and assess damages pursuant to N.J.S.A. 58:10-23.11, and N.J.S.A. 58:10C.

11. SEVERABILITY. If any court of competent jurisdiction determines that any provision of this Deed Notice requires modification, such provision shall be deemed to have been modified automatically to conform to such requirements. If a court of competent jurisdiction determines that any provision of this Deed Notice is invalid or unenforceable and the provision is of such a nature that it cannot be modified, the provision shall be deemed deleted from this instrument as though the provision had never been included herein. In either case, the remaining provisions of this Deed Notice shall remain in full force and effect.

12A. EXHIBIT A. Exhibit A includes the following maps of the Property and the vicinity:

i. Exhibit A-1: Vicinity Map - A map that identifies by name the roads, and other important geographical features in the vicinity of the Property (for example, USGS Quad map, Hagstrom County Maps);

ii. Exhibit A-2: Metes and Bounds Description - A tax map of lots and blocks as wells as metes and bounds description of the Property, including reference to tax lot and block numbers for the Property;

iii. Exhibit A-3: Property Map - A scaled map of the Property, scaled at one inch to 200 feet or less, and if more than one map is submitted, the maps shall be presented as overlays, keyed to a base map; and the Property Map shall include diagrams of major surface topographical features such as buildings, roads, and parking lots.

12B. EXHIBIT B. Exhibit B includes the following descriptions of the Restricted Areas:

i. Exhibit B-1: Restricted Area Map -- A separate map for each restricted area that includes:

(A) As-built diagrams of each engineering control, including caps, fences, slurry walls, (and, if any) ground water monitoring wells, extent of the ground water classification exception area, pumping and treatment systems that may be required as part of a ground water engineering control in addition to the deed notice;

(B) As-built diagrams of any buildings, roads, parking lots and other structures that function as engineering controls; and

(C) Designation of all soil and all upland sediment sample locations within the restricted areas that exceed any soil standard that are keyed into one of the tables described in the following paragraph.

ii. Exhibit B-2: Restricted Area Data Table - A separate table for each restricted area that includes either (A) or (B) through (F):

(A) Only for historic fill extending over the entire site or a portion of the site and for which analytical data are limited or do not exist, a narrative that states that historic fill is present at the site, a description of the fill material (e.g., ash, cinders, brick, dredge material), and a statement that such material may include, but is not limited to, contaminants such as PAHs and metals;

(B) Sample location designation from Restricted Area map (Exhibit B-1);

(C) Sample elevation based upon mean sea level;

(D) Name and chemical abstract service registry number of each contaminant with a concentration that exceeds the unrestricted use standard;

(E) The restricted and unrestricted use standards for each contaminant in the table;
and

(F) The remaining concentration of each contaminant at each sample location at each elevation.

12C. EXHIBIT C. Exhibit C includes narrative descriptions of the institutional controls and engineering controls as follows:

i. Exhibit C-1: Deed Notice as Institutional Control: Exhibit C-1 includes a narrative description of the restriction and obligations of this Deed Notice that are in addition to those described above, as follows:

(A) Description and estimated size in acres of the Restricted Areas as described above;

(B) Description of the restrictions on the Property by operation of this Deed Notice;
and

(C) The objective of the restrictions.

ii. Exhibit C-2: Vegetative Landfill Cap: Exhibit C-2 includes a narrative description of the Vegetative Landfill Cap as follows:

(A) Description of the engineering control;

(B) The objective of the engineering control; and

(C) How the engineering control is intended to function.

13. SIGNATURES. IN WITNESS WHEREOF, Owner has executed this Deed Notice as of the date first written above.

[If Owner is an individual]

WITNESS: _____
[Signature]

[Print name below signature]

STATE OF NEW JERSEY SS.:
COUNTY OF MONMOUTH

I certify that on _____, 20__, [Name of Owner] personally came before me, and this person acknowledged under oath, to my satisfaction, that this person [or if more than one person, each person]

(a) is named in and personally signed this document; and

(b) signed, sealed and delivered this document as his or her act and deed.

_____, Notary Public
[Print Name and Title]

13. SIGNATURES. IN WITNESS WHEREOF, Owner has executed this Deed Notice as of the date first written above.

[If Owner is a general or limited partnership]
WITNESS: _____
[Name of partnership]

[Signature] By: _____, General Partner
[Signature]

[Print name and title] _____
[Print name]

STATE OF NEW JERSEY SS.:
COUNTY OF MONMOUTH

I certify that on _____, 20____, [*Name of person executing document on behalf of owner partnership*] personally came before me, and this person acknowledged under oath, to my satisfaction, that this person:

(a) Is a general partner of [*Owner*], the partnership named in this document;

(b) Signed, sealed and delivered this document as his or her act and deed in his capacity as a general partner of [*Owner*]; and

(c) This document was signed and delivered by such partnership as its voluntary act, duly authorized.

_____, Notary Public
[*Signature*]

[*Print name*]

14. SIGNATURES. IN WITNESS WHEREOF, Owner has executed this Deed Notice as of the date first written above.

[If Owner is a corporation]

ATTEST: [Name of corporation]

_____ By_____

[Print name and title] [Signature]

STATE OF NEW JERSEY SS.:
COUNTY OF MONMOUTH

I certify that on _____, 20____, [*Name of person executing document on behalf of Owner*] personally came before me, and this person acknowledged under oath, to my satisfaction, that:

(a) this person is the [secretary/assistant secretary] of [*Owner*], the corporation named in this document;

(b) this person is the attesting witness to the signing of this document by the proper corporate officer who is the [president/vice president] of the corporation;

(c) this document was signed and delivered by the corporation as its voluntary act and was duly authorized;

(d) this person knows the proper seal of the corporation which was affixed to this document;
and

(e) this person signed this proof to attest to the truth of these facts.

[Signature]

[Print name and title of attesting witness]

Signed and sworn before me on _____, 20__

_____, Notary Public

[Print name and title]

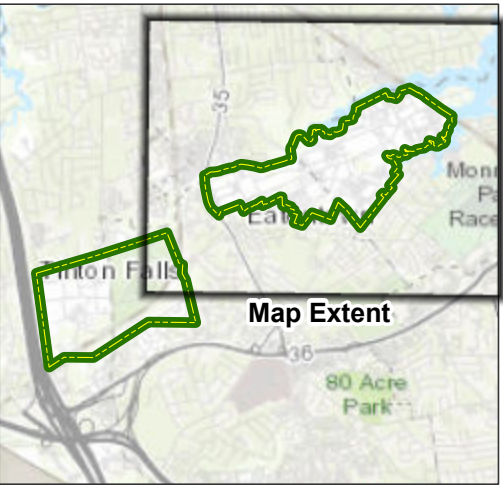
EXHIBIT A

EXHIBIT A

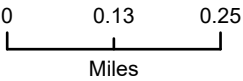
Exhibit A includes the following maps of the subject property and the vicinity, as specified per New Jersey Department of Environmental Protection (NJDEP) in Appendix B of the Administrative Requirements for the Remediation of Contaminated Sites (ARRCS) in N.J.A.C. 7:26C.

- i. Exhibit A-1: Vicinity Map
- ii. Exhibits A-2A: In lieu of a tax map, a parcel status map prepared by the Fort Monmouth Economic Revitalization Authority is provided. Updated tax maps showing the current municipal boundary between Oceanport and Eatontown are pending preparation. The parcel status map shows Block 110, Lot 1 of Oceanport, within which the Property falls.
- iii. Exhibit A-2B: Metes and bounds descriptions of the Property.
- iv. Exhibit A-2C: Metes and bounds descriptions of the restricted area.
- v. Exhibit A-2D: Survey drawing of the Property and the restricted area.
- vi. Exhibits A-3A and A-3B: Property maps for the subject property with the restricted area's location, adjacent parcels, adjacent roadways, paved areas, buildings, and streams.

Exhibit A-1: Vicinity Map



- Legend**
- Installation Boundary
 - Approximate Landfill Boundary



Data Sources: ESRI

Various Landfill Actions
Fort Monmouth, Monmouth County, New Jersey

Landfill Location



Exhibit A-2A: Parcel Map

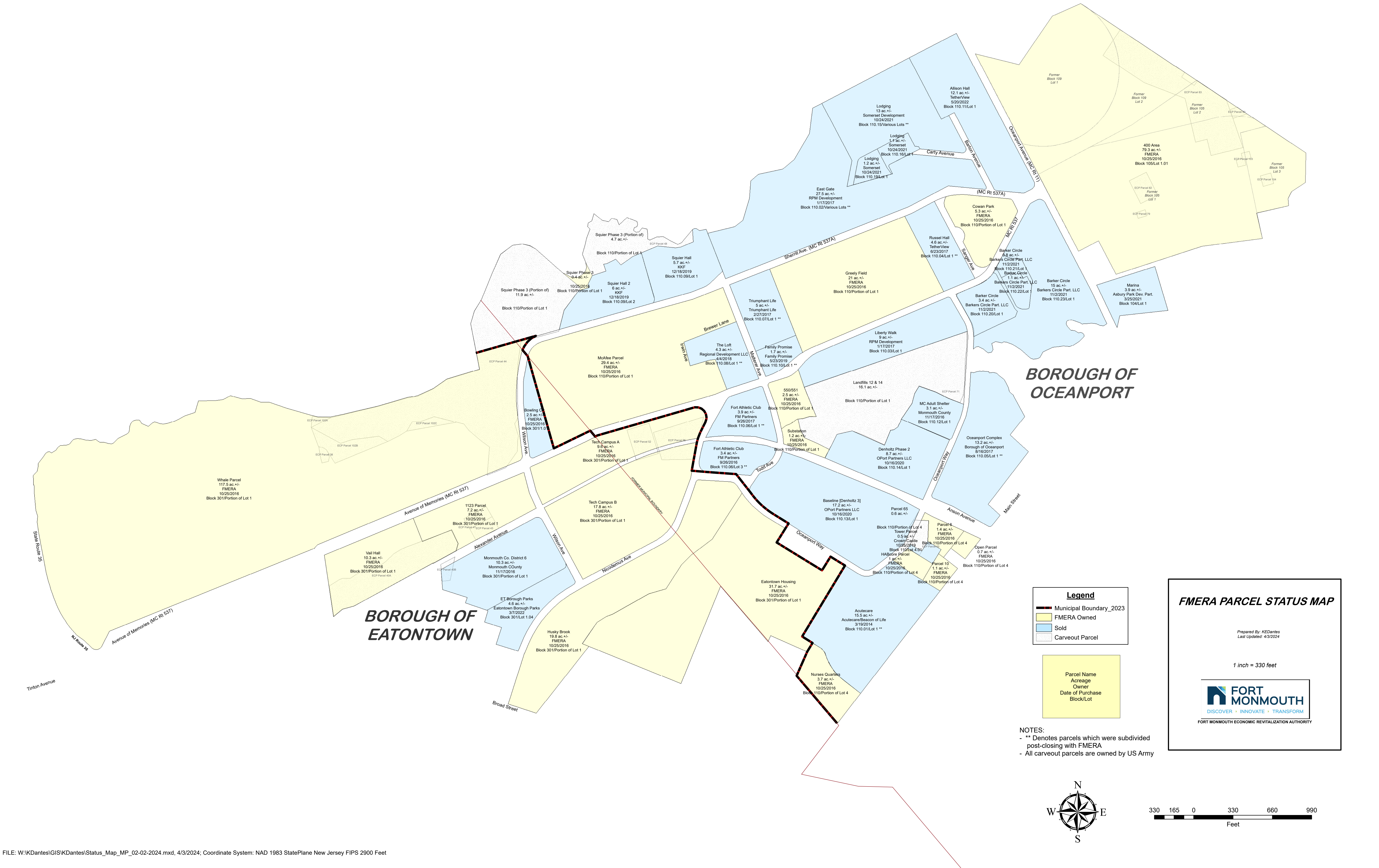


Exhibit A-2B: Property Metes and Bounds

DESCRIPTION OF RESTRICTED AREA (M5-OP) PORTION OF PARCEL 44
BOROUGH OF OCEANPORT
MONMOUTH COUNTY, NEW JERSEY
PROJECT NO. 24005753A
OCTOBER 20, 2025

All that certain lot, tract or parcel of land situate, lying and being in the Borough of Oceanport, in the County of Monmouth and the State of New Jersey, and being a portion of Parcel 44, Lot 4, Block 110, as shown on a map entitled: "Fort Monmouth Economic Revitalization Authority, Portion of Lot 1, Block 301 (Borough of Eatontown) and Portion of Lot 4, Block 110 (Borough of Oceanport) Borough of Eatontown and Borough of Oceanport, Monmouth County, New Jersey, Exhibit Map Showing a Portion of Environmental Carveout Parcel 44(M5), dated July 8. 2025, prepared by T and M, and being more particularly bounded and described as follows, to wit:

Beginning at a point in the southwesterly corner of the herein described restricted area, said point having the following New Jersey State Plane NAD83 coordinates, N 539744.67, E 617430.25, and running, thence –

1. **N 57° 12' 39" E, 16.48 feet**, through a portion of aforementioned Parcel 44, along the northwesterly line of the herein described restricted area, to a point in the northwesterly line of the same, thence –
2. **N 52° 47' 21" E, 33.39 feet**, still through the same, along the aforesaid northwesterly line of the herein described restricted area, to a point in the northerly line of the same, thence –
3. **N 71° 02' 38" E, 20.69 feet**, still through the same, along the aforesaid northerly line of the herein described restricted area, to a point in same, thence –
4. **N 77° 33' 42" E, 95.42 feet**, still through the same, still along the aforesaid northerly line of the herein described restricted area, to a point in the same, thence –
5. **N 72° 03' 06" E, 85.49 feet**, still through the same, still along the aforesaid northerly line of the herein described restricted area, to a point in the same, thence –
6. **N 76° 21' 56" E, 69.60 feet**, still through the same, still along the aforesaid northerly line of the herein described restricted area, to a point in the same, thence –

7. **N 82° 11' 28" E, 33.36 feet**, still through the same, still along the aforesaid northerly line of the herein described restricted area, to a point in the easterly line of the same, thence –
8. **S 06° 32' 16" W, 9.22 feet**, still through the same, along the aforesaid easterly line of the herein described restricted area, to a point in the southerly line of the same, thence –
9. **S 74° 12' 25" W, 347.28 feet**, along the aforesaid southerly line of the herein described restricted area, to the Point and Place of **Beginning**.

Bearings sited hereon are based on New Jersey State Plane Datum NAD83

CONTAINING: 4,765 square feet, of land more or less.

The foregoing description was prepared by the undersigned surveyor for the firm of Colliers Engineering & Design based on plan entitled, "Remedial Action Report Landfill Capping at Fort Monmouth, FTMM-05 Deed Restriction Exhibit, dated October 2025, prepared by Colliers Engineering & Design," and based on the aforesaid "Fort Monmouth" map stated above.



R. THOMAS HUGG, PLS
NEW JERSEY PROFESSIONAL LAND SURVEYOR
LICENSE NUMBER GS36737

10/20/25

DATE

Exhibit A-2C: Restricted Area Metes and Bounds

DESCRIPTION OF RESTRICTED AREA (M5-OP) PORTION OF PARCEL 44
BOROUGH OF OCEANPORT
MONMOUTH COUNTY, NEW JERSEY
PROJECT NO. 24005753A
OCTOBER 20, 2025

All that certain lot, tract or parcel of land situate, lying and being in the Borough of Oceanport, in the County of Monmouth and the State of New Jersey, and being a portion of Parcel 44, Lot 4, Block 110, as shown on a map entitled: "Fort Monmouth Economic Revitalization Authority, Portion of Lot 1, Block 301 (Borough of Eatontown) and Portion of Lot 4, Block 110 (Borough of Oceanport) Borough of Eatontown and Borough of Oceanport, Monmouth County, New Jersey, Exhibit Map Showing a Portion of Environmental Carveout Parcel 44(M5), dated July 8. 2025, prepared by T and M, and being more particularly bounded and described as follows, to wit:

Beginning at a point in the southwesterly corner of the herein described restricted area, said point having the following New Jersey State Plane NAD83 coordinates, N 539744.67, E 617430.25, and running, thence –

1. **N 57° 12' 39" E, 16.48 feet**, through a portion of aforementioned Parcel 44, along the northwesterly line of the herein described restricted area, to a point in the northwesterly line of the same, thence –
2. **N 52° 47' 21" E, 33.39 feet**, still through the same, along the aforesaid northwesterly line of the herein described restricted area, to a point in the northerly line of the same, thence –
3. **N 71° 02' 38" E, 20.69 feet**, still through the same, along the aforesaid northerly line of the herein described restricted area, to a point in same, thence –
4. **N 77° 33' 42" E, 95.42 feet**, still through the same, still along the aforesaid northerly line of the herein described restricted area, to a point in the same, thence –
5. **N 72° 03' 06" E, 85.49 feet**, still through the same, still along the aforesaid northerly line of the herein described restricted area, to a point in the same, thence –
6. **N 76° 21' 56" E, 69.60 feet**, still through the same, still along the aforesaid northerly line of the herein described restricted area, to a point in the same, thence –

7. **N 82° 11' 28" E, 33.36 feet**, still through the same, still along the aforesaid northerly line of the herein described restricted area, to a point in the easterly line of the same, thence –
8. **S 06° 32' 16" W, 9.22 feet**, still through the same, along the aforesaid easterly line of the herein described restricted area, to a point in the southerly line of the same, thence –
9. **S 74° 12' 25" W, 347.28 feet**, along the aforesaid southerly line of the herein described restricted area, to the Point and Place of **Beginning**.

Bearings sited hereon are based on New Jersey State Plane Datum NAD83

CONTAINING: 4,765 square feet, of land more or less.

The foregoing description was prepared by the undersigned surveyor for the firm of Colliers Engineering & Design based on plan entitled, "Remedial Action Report Landfill Capping at Fort Monmouth, FTMM-05 Deed Restriction Exhibit, dated October 2025, prepared by Colliers Engineering & Design," and based on the aforesaid "Fort Monmouth" map stated above.



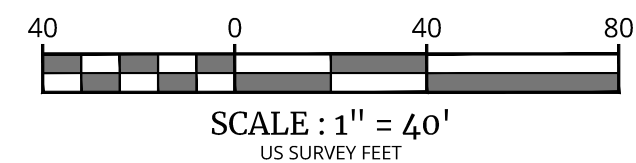
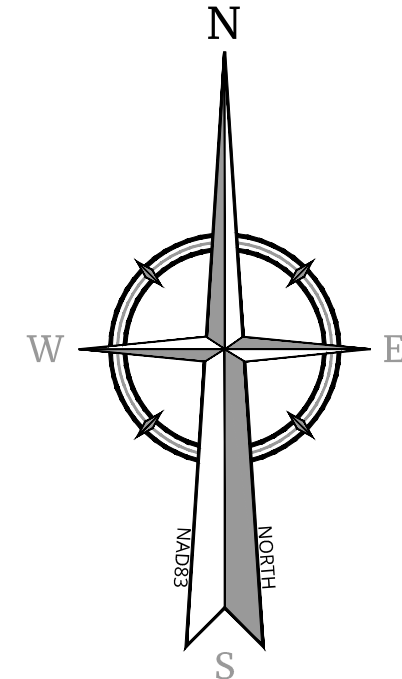
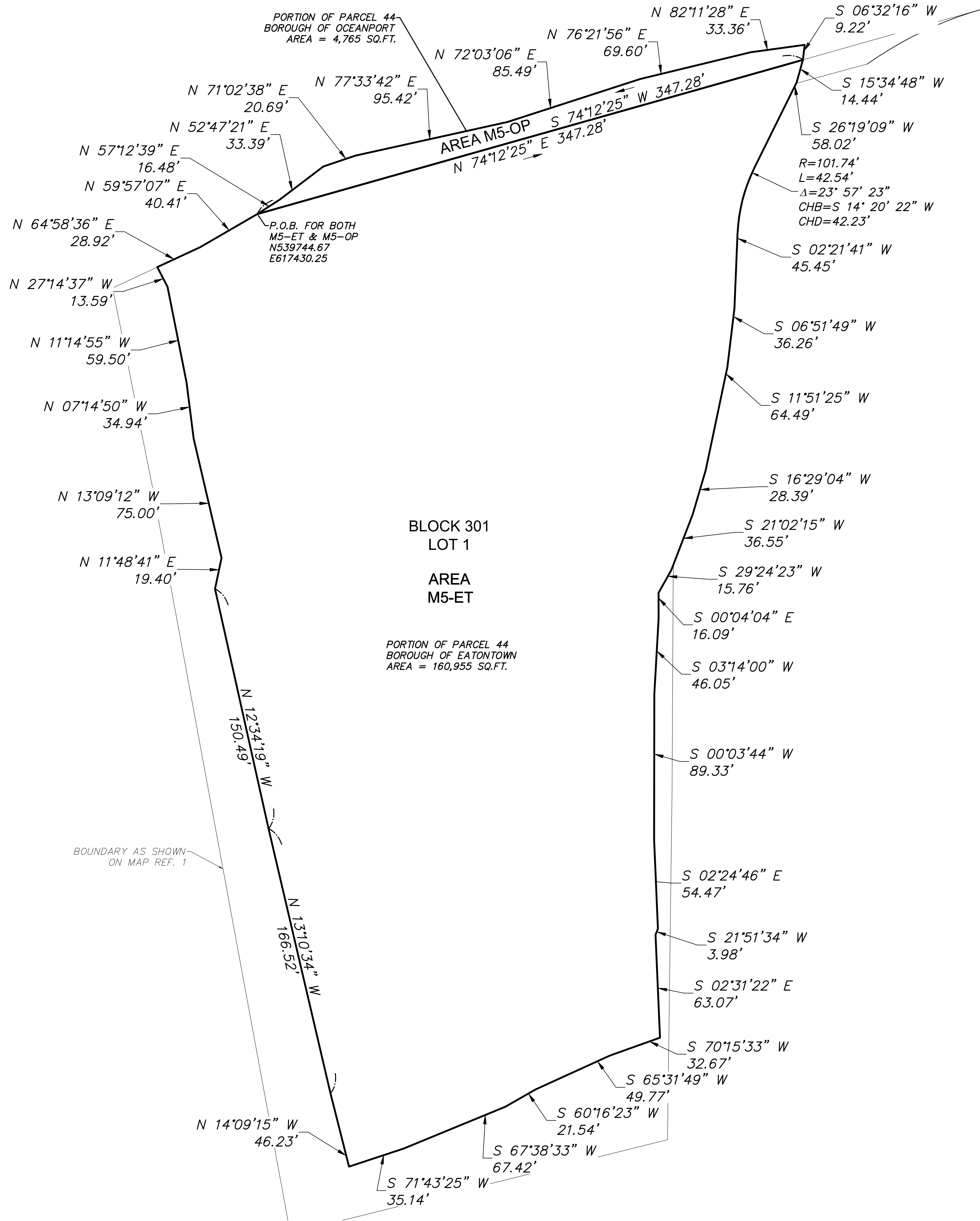
R. THOMAS HUGG, PLS
NEW JERSEY PROFESSIONAL LAND SURVEYOR
LICENSE NUMBER GS36737

10/20/25

DATE

Exhibit A-2D: Survey drawing of the Property and the restricted area

R:\Projects\2024\4005753A\Drawings\CD\DEED RESTRICTION.dwg - Standard\ACDT - Standard\ACDT.dwg 11/01/2025 11:05:46 AM By: T.HUGG



GENERAL NOTES

- THE SOLE PURPOSE OF THIS PLAN IS TO SHOW THE DEED RESTRICTION AREAS WITHIN LANDFILL FTMM-05.
- BOUNDARIES SHOWN HEREON ARE BASED ON THE REFERENCE MAPS LISTED BELOW
- HORIZONTAL DATUM IS RELATIVE TO NAD83, VERTICAL DATUM IS RELATIVE TO NAVD88.
- BOUNDARY AND EXISTING TOPOGRAPHY OUTSIDE OF COLLIERS ENGINEERING & DESIGN FIELD SURVEY LIMITS ARE SHOWN PER MAP REFERENCE 1.

REFERENCES

- PLANS ENTITLED:
 - "Fort Monmouth Economic Revitalization Authority, Portion of Lot 1, Block 301 (Borough of Eatontown) and Portion of Lot 4, Block 110 (Borough of Oceanport) Borough of Eatontown and Borough of Oceanport, Monmouth County, New Jersey, Exhibit Map Showing a Portion of Environmental Carveout Parcel 44(M5)", dated July 8, 2025, prepared by T and M
 - "FTMM-05 Encroachment Exhibit, Oceanport & Eatontown Borough, Monmouth County, New Jersey" dated March 23, 2023, prepared by SAM
 - "Remedial Action Report Landfill Capping at Fort Monmouth, Oceanport, Monmouth County, New Jersey" dated August 2022, prepared by AECOM.

Colliers

Engineering
& Design

www.colliersengineering.com

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EA ENGINEERING,
SCIENCE &
TECHNOLOGY, INC., PBC

REMEDIAL ACTION
REPORT LANDFILL
CAPPING AT FORT
MONMOUTH

OCEANPORT, FORT
MONMOUTH, NJ

R Thomas Hugg

NEW JERSEY LICENSED PROFESSIONAL LAND SURVEYOR
LICENSE NUMBER: G536737
COLLIERS ENGINEERING & DESIGN, INC.
N.J. C.O.A. #: 24GA27986500

EGG HARBOR
500 Scarborough Drive,
Suite 108
Egg Harbor Township, NJ 08234
Phone: 609.910.4068
COLLIERS ENGINEERING & DESIGN, INC.

Colliers
Engineering
& Design

SCALE: AS SHOWN	DRAWN BY: DMS
DESIGNED BY:	REVIEWED BY: RTH
DATE ISSUED: OCT., 2025	PROJECT NUMBER: 24005753A
SHEET NAME:	

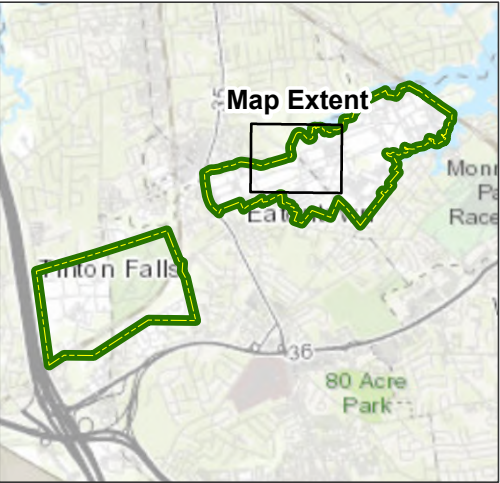
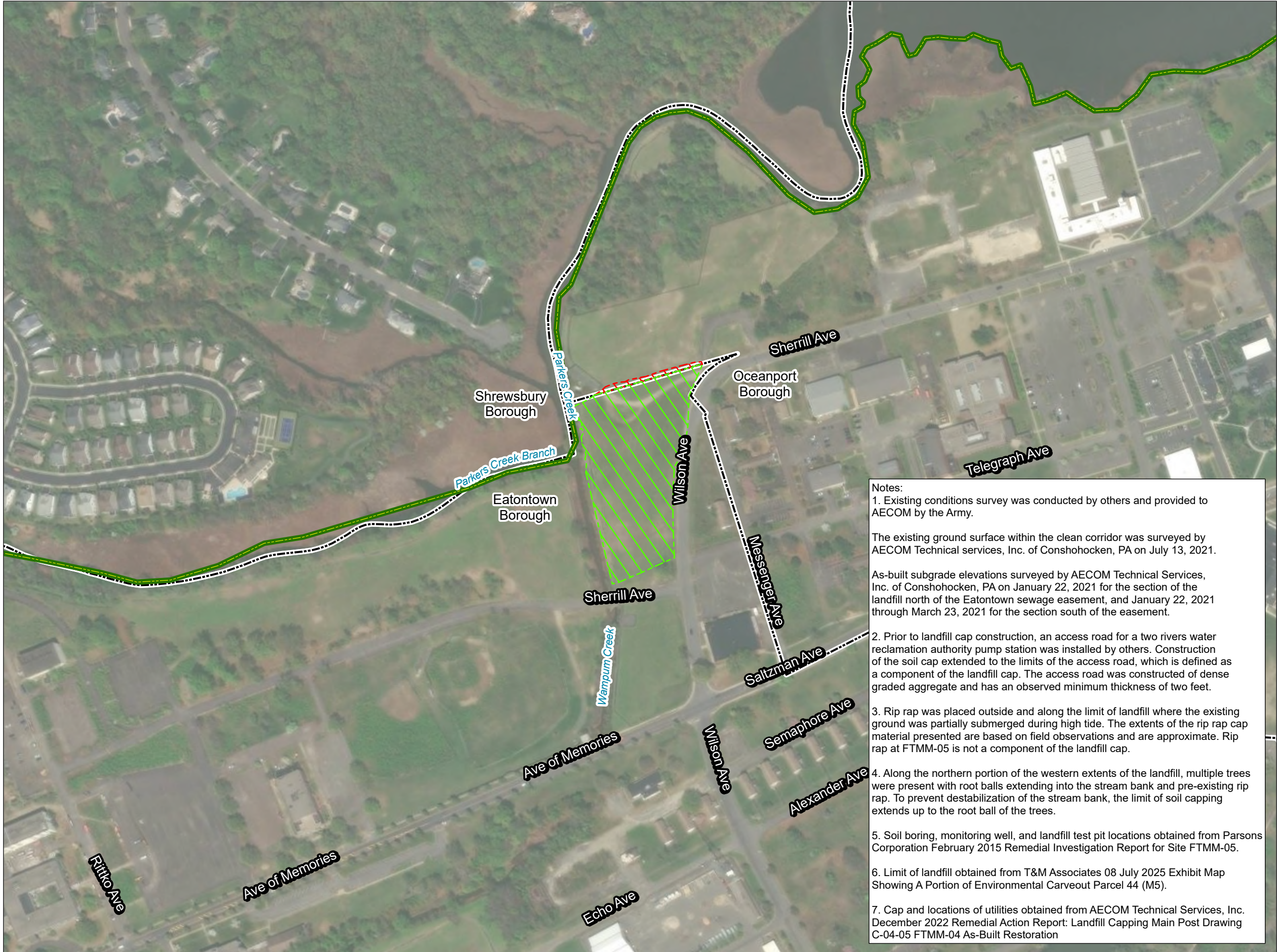
FTMM-05
DEED RESTRICTION
EXHIBIT

DRAWING NUMBER:

01 of 01

NOTE: DO NOT SCALE DRAWINGS FOR CONSTRUCTION.

Exhibit A-3A and Exhibit A-3B: Property Maps



- Legend**
- Limit of As-Built Landfill Cap FTMM-05 within Oceanport
 - Limit of As-Built Landfill Cap FTMM-05 within Eatontown
 - Municipality Boundary
 - Installation Boundary

Notes:

1. Existing conditions survey was conducted by others and provided to AECOM by the Army.

The existing ground surface within the clean corridor was surveyed by AECOM Technical services, Inc. of Conshohocken, PA on July 13, 2021.

As-built subgrade elevations surveyed by AECOM Technical Services, Inc. of Conshohocken, PA on January 22, 2021 for the section of the landfill north of the Eatontown sewage easement, and January 22, 2021 through March 23, 2021 for the section south of the easement.

2. Prior to landfill cap construction, an access road for a two rivers water reclamation authority pump station was installed by others. Construction of the soil cap extended to the limits of the access road, which is defined as a component of the landfill cap. The access road was constructed of dense graded aggregate and has an observed minimum thickness of two feet.

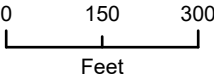
3. Rip rap was placed outside and along the limit of landfill where the existing ground was partially submerged during high tide. The extents of the rip rap cap material presented are based on field observations and are approximate. Rip rap at FTMM-05 is not a component of the landfill cap.

4. Along the northern portion of the western extents of the landfill, multiple trees were present with root balls extending into the stream bank and pre-existing rip rap. To prevent destabilization of the stream bank, the limit of soil capping extends up to the root ball of the trees.

5. Soil boring, monitoring well, and landfill test pit locations obtained from Parsons Corporation February 2015 Remedial Investigation Report for Site FTMM-05.

6. Limit of landfill obtained from T&M Associates 08 July 2025 Exhibit Map Showing A Portion of Environmental Carveout Parcel 44 (M5).

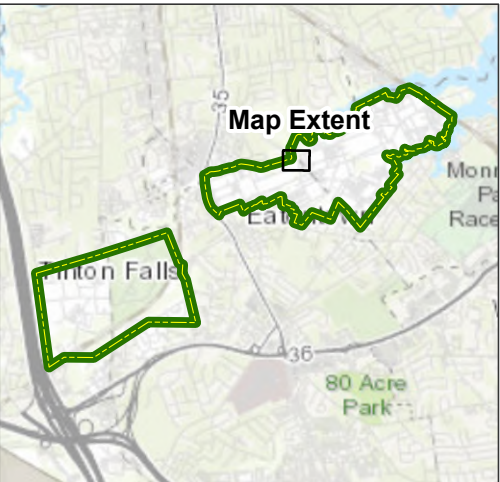
7. Cap and locations of utilities obtained from AECOM Technical Services, Inc. December 2022 Remedial Action Report: Landfill Capping Main Post Drawing C-04-05 FTMM-04 As-Built Restoration



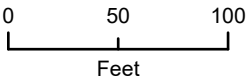
Data Sources: ESRI, AECOM

Landfill FTMM-05
Oceanport, Monmouth County, New Jersey
PI Number G000000032

Deed Notice - Property Map



- Legend**
- Limit of As-Built Landfill Cap FTMM-05 within Oceanport
 - Limit of As-Built Landfill Cap FTMM-05 within Eatontown
 - Municipality Boundary
 - Walking Path
 - Previously Installed Access Road
 - Riprap
 - Installation Boundary



Data Sources: ESRI, AECOM

Landfill FTMM-05
Oceanport, Monmouth County, New Jersey
PI Number G000000032

Deed Notice - Property Map

Exhibit A-3B



EXHIBIT B

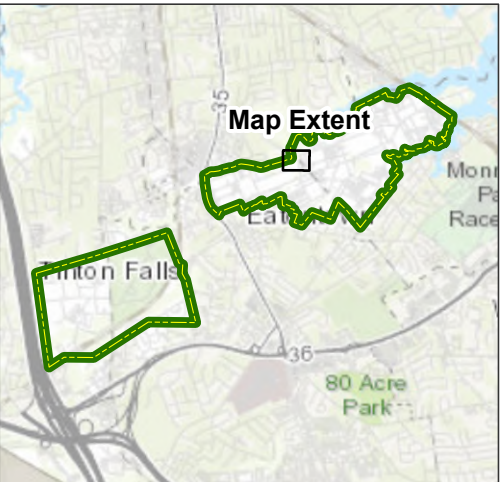
EXHIBIT B

Exhibit B includes the following map and tables for the restricted area, as specified in per New Jersey Department of Environmental Protection (NJDEP) in Appendix B of the Administrative Requirements for the Remediation of Contaminated Sites (ARRCS) in N.J.A.C. 7:26C.

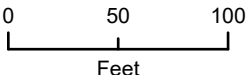
- (A) Exhibit B-1A: Restricted area maps which shows the locations of previously observed soil impacts; however, regrading and compaction of the preexisting landfill cover, landfill material, and other soils within the restricted area may have redistributed these impacts within the restricted area's limits.
- (B) Exhibit B-1B: Cap construction details for the restricted area map.
- (C) Exhibit B-2: Restricted Area Data Tables – Table for the restricted area are provided in Exhibit B-2, which includes sample names, sample location designations, chemical abstract service registry number for contaminants, and the concentrations of each contaminant observed. Contaminants are compared to their respective May 2021 NJDEP Soil Remediation Standards (N.J.A.C. 7:26D, last amended May 17, 2021).

The information in Exhibit B-2 provides a comparison of the previously reported results to the 2021 Soil SRS to facilitate remedial action permitting and long-term O&M and prevents the need for an order of magnitude analysis at this time. Previously reported results included the full Target Analyte List/Target Compound List, and sample results were compared to the NJDEP standards and criteria current at the time of the data's publication. Only those analytes exceeding at one or more sample locations the NJDEP standards and criteria current at the time were reported and, therefore, only those analytes are presented in Exhibit B-2.

Exhibit B-1A



- Legend**
- Soil Boring Location
 - Monitoring Well
 - Limit of As-Built Landfill Cap FTMM-05 within Oceanport
 - Limit of As-Built Landfill Cap FTMM-05 within Eatontown
 - Landfill Test Pit - Debris Not Present
 - Landfill Test Pit - Debris Present
 - Walking Path
 - Previously Installed Access Road
 - Riprap
 - Municipality Boundary
 - Installation Boundary



Data Sources: ESRI

Landfill FTMM-05
Oceanport, Monmouth County, New Jersey
PI Number G000000032

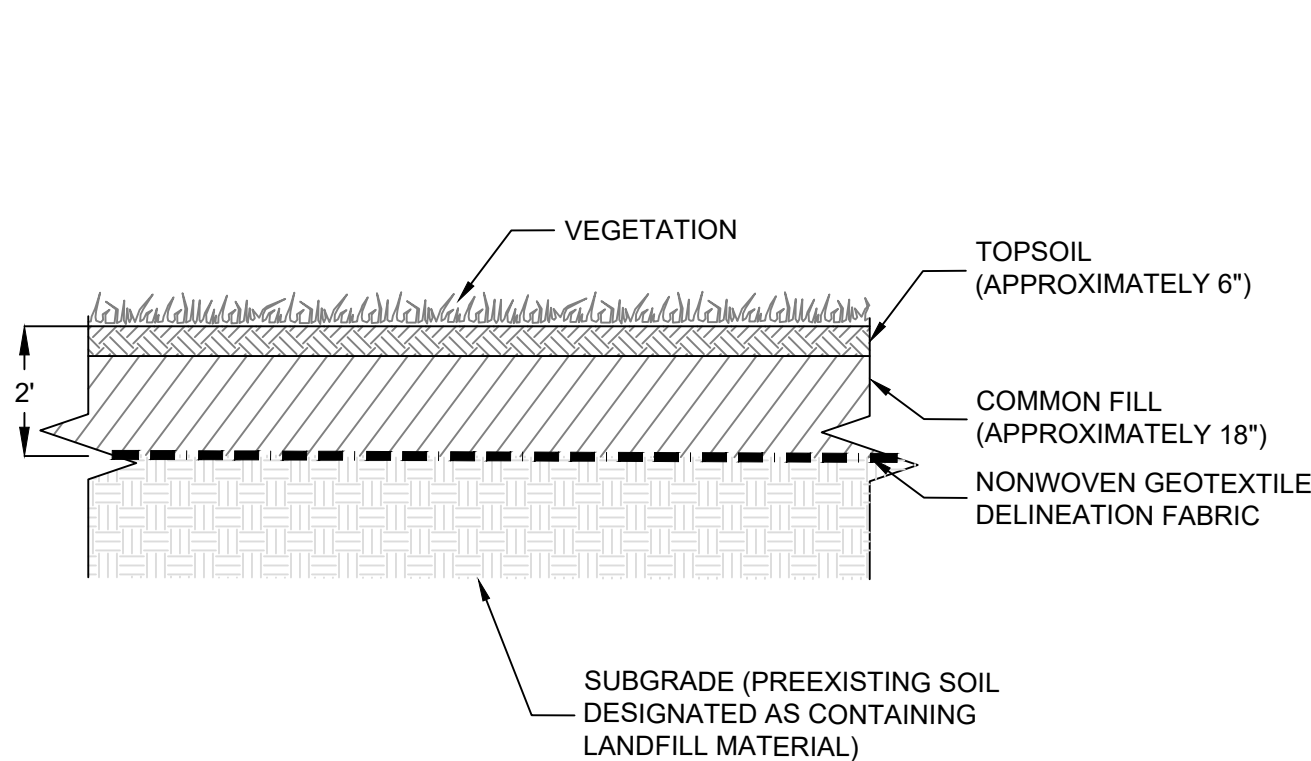
Deed Notice - Locations of Engineering Controls and Soil Sample Locations

- Notes:
- Existing conditions survey and utility survey was conducted by others and provided to AECOM by the Army. Not all utilities are shown, and locations of utilities are for information purposes only.
 - The existing ground surface within the clean corridor was surveyed by AECOM Technical services, Inc. of Conshohocken, PA on July 13, 2021.
 - As-built subgrade elevations surveyed by AECOM Technical Services, Inc. of Conshohocken, PA on January 22, 2021 for the section of the landfill north of the Eatontown sewage easement, and January 22, 2021 through March 23, 2021 for the section south of the easement.
 - Prior to landfill cap construction, an access road for a two rivers water reclamation authority pump station was installed by others. Construction of the soil cap extended to the limits of the access road, which is defined as a component of the landfill cap. The access road was constructed of dense graded aggregate and has an observed minimum thickness of two feet.
 - Rip rap was placed outside and along the limit of landfill where the existing ground was partially submerged during high tide. The extents of the rip rap cap material presented are based on field observations and are approximate. Rip rap at FTMM-05 is not a component of the landfill cap.
 - Along the northern portion of the western extents of the landfill, multiple trees were present with root balls extending into the stream bank and pre-existing rip rap. To prevent destabilization of the stream bank, the limit of soil capping extends up to the root ball of the trees.
 - Soil boring, monitoring well, and landfill test pit locations obtained from Parsons Corporation February 2015 Remedial Investigation Report for Site FTMM-05.
 - Limit of landfill obtained from T&M Associates 08 July 2025 Exhibit Map Showing A Portion of Environmental Carveout Parcel 44 (M5).
 - Cap and locations of utilities obtained from AECOM Technical Services, Inc. December 2022 Remedial Action Report: Landfill Capping Main Post Drawing C-04-05 FTMM-04 As-Built Restoration

Exhibit B-1B

File: C:\AECOM\AECOM\FTM - General\900 CAD\910 CAD\20 Sheets\AS-BUILTS\MP Details.dwg Layout: 01 User: carlsona1 Plotfile: Aug 19, 2022 - 4:59pm AECOM Project Number: 60589072

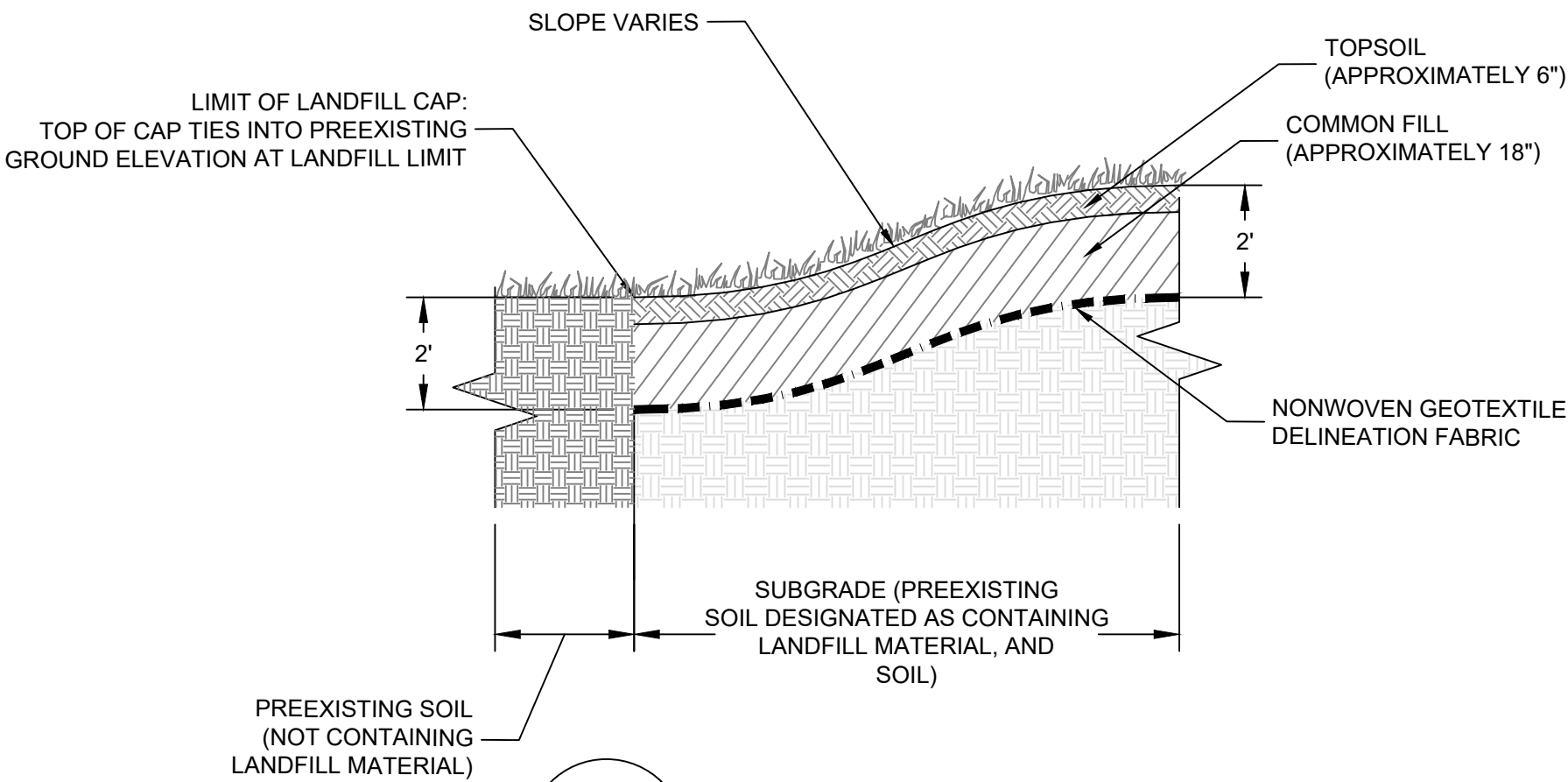
Access Road: Prior to landfill cap construction, an access road for a two rivers water reclamation authority pump station was installed by others. Construction of the soil cap extended to the limits of the access road, which is defined as a component of the landfill cap. The access road was constructed of dense graded aggregate and has an observed minimum thickness of two feet. See Figure B-1A.



1
D-01 **VEGETATIVE CAP**
(TYPICAL, NOT TO SCALE)

NOTES

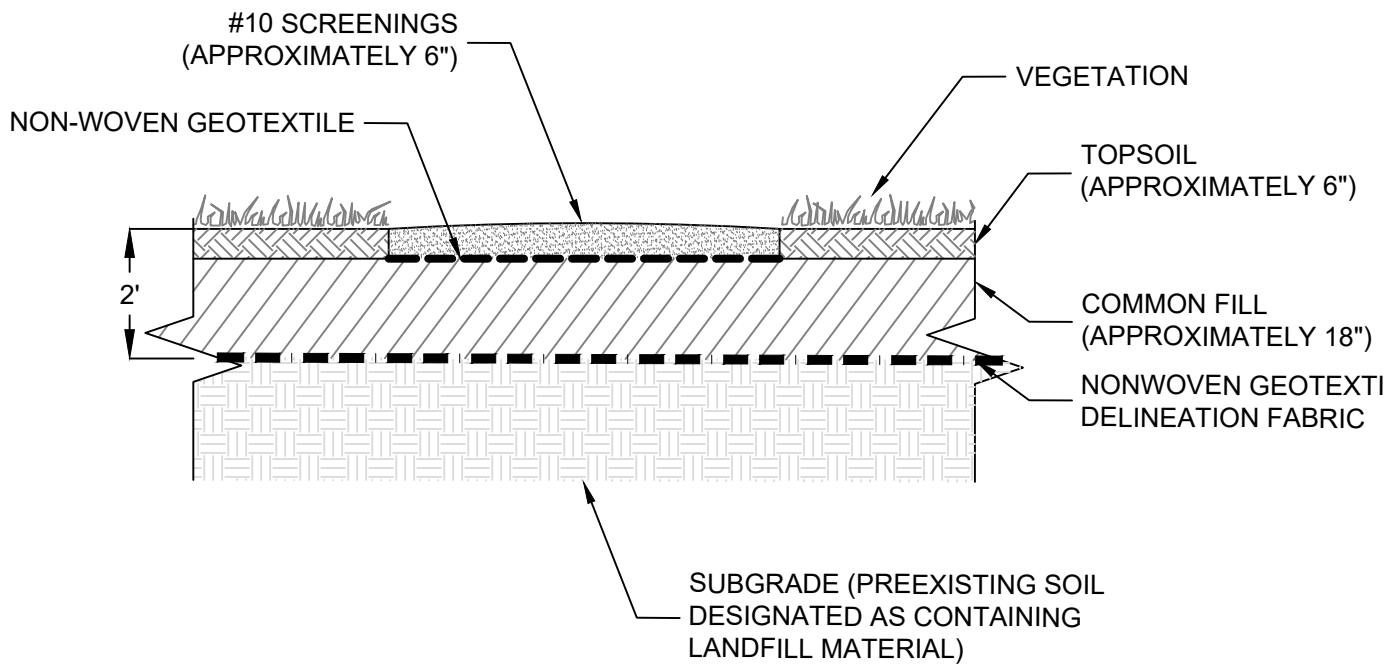
- SUBGRADE IS COMPACTED TO 90 PERCENT STANDARD PROCTOR PRIOR TO PLACEMENT OF NONWOVEN GEOTEXTILE DELINEATION FABRIC, COMMON FILL, AND TOPSOIL.
- COMMON FILL IS PLACED IN THREE LIFTS, EACH COMPACTED TO A THICKNESS OF APPROXIMATELY 6". TOPSOIL IS PLACED IN ONE 6" THICK LIFT.
- CAP IS PLANTED WITH THE SEED MIXES SHOWN IN DRAWING G-03.
- SUBGRADE SLOPE VARIES AND IS AS SHOWN ON THE AS-BUILT SUBGRADE CONTOURS FOR EACH LANDFILL.



2
D-01 **TOE-IN TRENCH**
(TYPICAL, NOT TO SCALE)

NOTES

- SUBGRADE IS COMPACTED TO 90 PERCENT STANDARD PROCTOR PRIOR TO PLACEMENT OF NONWOVEN GEOTEXTILE DELINEATION FABRIC, COMMON FILL, AND TOPSOIL.
- COMMON FILL IS PLACED IN THREE LIFTS, EACH COMPACTED TO A THICKNESS OF APPROXIMATELY 6". TOPSOIL IS PLACED IN ONE 6" THICK LIFT.
- CAP IS PLANTED WITH THE SEED MIXES SHOWN IN DRAWING G-03.
- TO TIE THE VEGETATIVE CAP INTO THE PREEXISTING GROUND SURFACE, A TWO-FOOT DEEP TOE-IN TRENCH WAS EXCAVATED ALONG THE LANDFILL'S LIMIT. MATERIAL EXCAVATED ALONG THE LANDFILL'S LIMIT WAS PULLED BACK INTO THE LANDFILL INTERIOR AND GRADED TO FACILITATE DRAINAGE.



3
D-01 **WALKING PATH**
(TYPICAL, NOT TO SCALE)

NOTES

- SUBGRADE IS COMPACTED TO 90 PERCENT STANDARD PROCTOR PRIOR TO PLACEMENT OF NONWOVEN GEOTEXTILE DELINEATION FABRIC, COMMON FILL, AND TOPSOIL.
- COMMON FILL IS PLACED IN THREE LIFTS, EACH COMPACTED TO A THICKNESS OF APPROXIMATELY 6". TOPSOIL IS PLACED IN ONE 6" THICK LIFT.
- WALKING PATH IS CONSTRUCTED USING #10 SCREENING, WHICH WERE PLACED IN ONE LIFT AND COMPACTED TO A THICKNESS OF APPROXIMATELY 6". THE WALKING PATH IS CROWNED SLIGHTLY TO PREVENT PONDING.

7							
6							
5							
4							
3							
2							
1							
0	MAG	AUGUST 2022	SUBMITTAL TO CLIENT	ALC	AUGUST 2022	PPH	AUGUST 2022
NO	DRWN	DATE	REVISION	CHKD	DATE	APPVD	DATE

Prepared by:
AECOM
30 Knightsbridge Road
Piscataway, NJ 08854

AECOM

Prepared for:
U.S. Army Engineering
& Support Center
Huntsville, Alabama

REMEDIAL ACTION REPORT
LANDFILL CAPPING AT FORT MONMOUTH
OCEANPORT, MONMOUTH COUNTY, NEW JERSEY

PROJECT NUMBER: 60589072

DATE: AUGUST 2022

DETAILS (SHEET 1 OF 4)

DRAWING NUMBER:

D-01

REVISION 0

Exhibit B-2

TABLE 4.1
SOIL SAMPLING SUMMARY RESULTS - COMPARISON TO NJDEP STANDARDS
SITE FTMM-05
FORT MONMOUTH, NEW JERSEY

Field Sample Location	NJDEP Residential Direct Contact Soil Remediation Standard ⁽¹⁾	NJDEP Non- Residential Direct Contact Soil Remediation Standard ⁽¹⁾	NJDEP Impact to Groundwater Screening Level ⁽²⁾	Weston 1995 Background ⁽³⁾	B-1		B-2		B-3		B-4		B-5		B-6		B-7		B-8		B-9		B-10		B-11	
Sample Date					04/08/98		04/08/98		04/08/98		04/09/98		04/09/98		04/09/98		04/09/98		04/10/98		04/10/98		04/10/98		04/11/98	
Volatile Organic Compounds (VOCs, µg/kg)																										
Lab Sample ID (VOCs only collected at approximately 24 in. bgs)					3465.04		3465.08		3465.12		3470.04		3470.08		3470.12		3470.17		3472.04		3472.08		3472.12		3473.04	
Methylene Chloride	34,000	97,000	10	-	<560		<580		<580		<560		<550		<550		<670		<640		<670		<540		<540	
Benzene	2,000	5,000	5	-	<280		<290		<290		<280		<280		<280		<330		<320		<340		<270		<270	
Tetrachloroethene	2,000	5,000	5	-	<280		<290		<290		<280		<280		<280		<330		<320		<340		<270		<270	
Chloroform	600	2,000	400	-	<280		<290		<290		<280		<280		<280		<330		<320		<340		<270		<270	
Ethylbenzene	7,800,000	110,000,000	13,000	-	<560		<580		<580		<560		<550		<550		<670		<640		<670		<540		<540	
TICs	NLE	NLE	NLE	-	ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
Semivolatile Organic Compounds (SVOCs, µg/kg)																										
Lab Sample ID (All analyses except VOCs collected at approximately 6-12 in. bgs)					3465.03		3465.07		3465.11		3470.03		3470.07		3470.11		3470.15		3472.03		3472.07		3472.11		3473.03	
Naphthalene	6,000	17,000	25,000	-	<250		<1300		<280		<270		<270		<520		<580		<310		<300		130	J	<270	
n-Nitrosodiphenylamine	99,000	390,000	400	-	<190		<1000		<210		<200		<200		<390		<440		<240		<220		<200		<200	
2-Methylnaphthalene	230,000	2,400,000	8,000	-	<280		<1500		<310		<300		<310		<590		<650		<350		140	J	150	J	<300	
4-Methylphenol	31,000	340,000	NLE	-	<270		<1500		<300		<290		<300		<570		<640		<340		<330		<290		<290	
Acenaphthylene	NLE	3.00E+08	NLE	-	<190		<1000		<220		<210		<210		<410		<460		<250		<240		<210		<210	
Acenaphthene	3,400,000	37,000,000	110,000	-	<180		<950		<200		<190		<200		<380		<420		<220		<210		<190		<190	
Dibenzofuran	NLE	NLE	NLE	-	<190		<1000		<210		<200		<210		<400		<440		<240		<230		<200		<200	
Diethylphthalate	49,000,000	550,000,000	88,000	-	<210		<1100		<230		<220		<230		<440		<480		<260		<250		<220		<220	
Fluorene	2,300,000	24,000,000	170,000	-	<190		<1000		<220		<210		<210		<410		<460		<250		<230		<210		<210	
Phenanthrene	NLE	300,000,000	NLE	-	160	J	<1100		<220		<210		280		<410		1700		150	J	680		410		<210	
Anthracene	17,000,000	30,000,000	2,400,000	-	<200		<1100		<220		<210		<220		<410		300		<250		<240		<210		<210	
Dimethylphthalate	NLE	NLE	NLE	-	<150		<820		<170		<260		<170		<320		<360		<190		<190		<170		<170	
Di-n-butylphthalate	6,100,000	68,000,000	760,000	-	3900	B	26000	BD	1500	B	2100	B	7900	B	14000	BD	16000	BD	2000	B	5200	B	640	JB	900	JB
Fluoranthene	2,300,000	24,000,000	1,300,000	-	170	J	<1100		<220		<210		310		<420		2100		<250		1100		300		<210	
Pyrene	1,700,000	18,000,000	840,000	-	280		<1200		<260		<250		410		<490		1600		150	J	880		440		<250	
Pyridine	NLE	NLE	NLE	-	<300		<1600		<340		<320		<330		<320		<360		<380		<370		770		<330	
Butylbenzylphthalate	1,200,000	14,000,000	230,000	-	<250		<1400		<280		<270		<280		<540		<600		<320		<310		<280		<270	
Benzo(a)anthracene	600	2,000	800	-	120	J	<1100		<220		<210		180	J	<420		990		360		200	J	180	J	<210	
3,3'-Dichlorobenzidine	1,000	4,000	200	-	<350		<1900		<390		<370		<380		<740		<820		<440		<420		<380		<380	
Chrysene	62,000	230,000	80,000	-	230	J	<1400		<280		<270		370		<540		1500		490		280	J	410		<270	
bis(2-Ethylhexyl)phthalate	35,000	140,000	1,200,000	-	100	JB	730	JBD	110	JB	110	J	<310		170	J	<660		150	JB	<340		180	JB	180	JB
Benzo(b)fluoranthene	600	2,000	2,000	-	<250		<1300		<280		<270		170	J	<530		890		160	J	600		150	J	<270	
Benzo(k)fluoranthene	6,000	23,000	25,000	-	<180		<990		<210		<200		150	J	<390		860		<230		690		150	J	<200	
Benzo(a)pyrene	200	200	200	-	110	J	<1000		<210		<200		170	J	<400		820		140	J	570		140	J	<200	
Indeno(1,2,3-cd)pyrene	600	2,000	7,000	-	<210		<1100		<230		<220		<230		<440		580		<260		390		<220		<220	
Dibenz(a,h)anthracene	200	200	800	-	<240		<1300		<270		<260		<270		<510		240	J	<310		<290		<260		<260	
Benzo(g,h,i)perylene	380,000,000	30,000,000	NLE	-	<240		<1300		<270		<260		<270		<510		420	JD	<310		310		<260		<260	
Total TICs	NLE	NLE	NLE	-	4000		5500		3100		7520		25460		2800		2600		48400		249600		8500		61100	
Pesticides / PCBs (mg/kg)																										
Heptachlor	0.1	0.7	0.5	-	<0.0006		<0.0006		<0.0006		<0.0006		<0.0006		<0.0006		<0.0006		<0.0006		<0.0007		<0.0006		<0.0006	
Heptachlor Epoxide	0.07	0.3	0.01	-	<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0006		<0.0006		<0.0006		<0.0005		<0.0005	
4,4'-DDE	2	9	18	-	<0.0007		0.001		0.001		0.001		<0.0007		<0.0007		<0.0008		0.006		0.021		<0.0008		<0.0007	
Dieldrin	0.04	0.2	0.003	-	<0.0004		<0.0004		<0.0004		<0.0004		<0.0004		<0.0004		<0.0004		<0.0005		<0.0005		<0.0004		<0.0004	
Endrin	23	340	1	-	<0.0006		<0.0006		<0.0007		<0.0006		<0.0006		<0.0006		<0.0007		<0.0007		<0.0007		<0.0007		<0.0006	
4,4'-DDD	3	13	4	-	<0.0014		<0.0014		<0.0015		<0.0014		<0.0014		<0.0014		<0.0015		0.006		<0.0016		0.003		<0.0014	
Endrin Aldehyde	NLE	NLE	NLE	-	<0.0011		<0.0011		<0.0012		<0.0011		<0.0011		<0.0011		<0.0012		<0.0012		<0.0013		<0.0012		<0.0011	
4,4'-DDT	2	8	11	-	<0.0003		<0.0003		<0.0003		<0.0003		<0.0003		<0.0003		<0.0004		0.01		<0.0004		0.006		<0.0003	
Endosulfan I	470	6,800	4	-	<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0006		<0.0006		<0.0006		<0.0005		<0.0005	
Endosulfan II	470	6,800	4	-	0.008		<0.0006		<0.0006</																	

TABLE 4.1
SOIL SAMPLING SUMMARY RESULTS - COMPARISON TO NJDEP STANDARDS
SITE FTMM-05
FORT MONMOUTH, NEW JERSEY

Field Sample Location	NJDEP Residential Direct Contact Soil Remediation Standard ⁽¹⁾	NJDEP Non- Residential Direct Contact Soil Remediation Standard ⁽¹⁾	NJDEP Impact to Groundwater Screening Level ⁽²⁾	Weston 1995 Background ⁽³⁾	B-1		B-2		B-3		B-4		B-5		B-6		B-7		B-8		B-9		B-10		B-11	
Sample Date					04/08/98		04/08/98		04/08/98		04/09/98		04/09/98		04/09/98		04/09/98		04/10/98		04/10/98		04/10/98		04/11/98	
Metals (mg/kg)																										
Aluminum	78,000	NA	6,000	15,200	4632		13450		10970		10250		6368		8343		13830		3691		4474		9667		10420	
Antimony	31	450	6	ND	0.891		2.881		1.599		1.421		1.159		0.71		2.079		0.486		1.098		1.569		2.011	
Arsenic	19	19	19	22.9	4.12		20.13		32.33		10.22		9.054		8.85		11.54		19.98		15.98		11.87		11.44	
Barium	16,000	59,000	2,100	32.3	13.03		32.88		30.43		21.25		40.37		18.58		116.04		31.68		58.82		23.16		23.76	
Beryllium	16	140	0.7	2	0.4862		1.611		1.102		1.015		0.737		0.7328		1.32		0.7184		0.4577		1.055		1.1	
Cadmium	78	78	2	ND	<0.055		0.201		0.1798		0.2656		0.1551		0.0579		0.541		0.2736		0.5314		0.1708		0.1037	
Calcium	NLE	NLE	NLE	921	276		748.3		928.7		707.8		459.9		561.5		3956		1373		1105		453		555.8	
Chromium	NLE	NLE	NLE	269	46.4		152.8		83.07		84.62		42.42		53.53		75.63		13.02		14.93		82.74		104.3	
Cobalt	1,600	590	90	2.5	1.692		5.048		3.708		4.383		1.834		3.863		6.127		4.926		4.535		4.224		5.456	
Copper	3,100	45,000	11,000	8	2.887		5.284		6.87		2.717		30.09		2.421		254.1		43.77		2837		14.52		6.138	
Iron	NLE	NLE	NLE	55,800	18680		59460		41330		44130		22150		30210		29220		10980		9325		40700		44300	
Lead	400	800	90	19.5	14.35		24.96		59.27		8.682		135.1		16.31		370.1		57.95		383.9		17.36		8.172	
Magnesium	NLE	NLE	NLE	7,230	623.7		1468		1548		1250		1222		1051		1571		373.7		423.7		1019		1049	
Manganese	11,000	5,900	65	90.7	47.18		69.84		76.15		83.14		50.43		104.4		146		30.67		484.3		97.99		86.4	
Mercury	23	65	0.1	ND	0.018		0.084		0.949		<0.011		0.228		<0.011		0.687		1.257		0.236		0.091		0.017	
Nickel	1,600	23,000	48	8.4	5.762		18.8		11.78		12.74		6.33		10.08		16.79		1.257		10.39		12.34		17.5	
Potassium	NLE	NLE	NLE	15400	1412		3255		4106		2577		3614		2171		4423		690		1241		2288		2328	
Selenium	390	5,700	11	1.9	<0.330		<0.380		<0.362		<0.330		<0.369		<0.353		<0.363		0.785		1.534		<0.348		<0.352	
Silver	390	5,700	1	1.1	<0.330		<0.380		<0.362		<0.330		<0.369		<0.353		<0.363		<0.412		<0.351		<0.348		<0.352	
Sodium	NLE	NLE	NLE	51.6	39.52		37.37		66.18		95.95		124.8		109		969.8		259.8		227.5		68.42		142.9	
Thallium	5	79	3	ND	<0.330		<0.380		<0.362		<0.330		<0.369		<0.353		<0.363		<0.412		<0.351		<0.348		<0.352	
Vanadium	78	1,100	NLE	94.1	53.06		200.1		103.1		115.4		37.5		76.97		76.13		24		19.41		118.7		141	
Zinc	23,000	110,000	930	81.4	36.18		90.91		71.52		62.01		58.64		44.99		178		22.14		942.9		64.9		65.8	

Notes:

Historically, there have been up to 318 soil boring locations associated with FTMM-05. This analysis looks at only those boring locations that fall within the footprint of FTMM-05.

(1) New Jersey Department of Environmental Protection (NJDEP) Residential Direct Contact Soil Remediation Standards (RDCSRS) and Non-Residential Direct Contact Soil Remediation Standards (NRDCSRS) (N.J.A.C 7:26D; amended May 7, 2012). Available at: <http://www.state.nj.us/dep/srp/regs/rs/>.

(2) NJDEP Impact to Groundwater (NJDEP guidance document; Nov 2013).

(3) Weston, 1995. Final Site Investigation - Main Post and Charles Wood Areas, Fort Monmouth, New Jersey, December.

NJDEP criteria for total xylenes are used for xylene isomers (m+p, o).

NJDEP criteria for endrin is used for endrin aldehyde.

NJDEP criteria for 4,4'-DDD and 4,4'-DDT are for total DDD and total DDT, respectively.

There are no NJDEP soil standards for individual PCB Arcolors; the total PCB NJDEP standards were used for individual Arcolors

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

B = Analyte detected in both sample and associated laboratory blank.

D = Result from dilution of sample.

DUP = field duplicate sample.

E = Estimated value.

J = Analyte detected between MDL and practical quantitation limit (PQL).

NA = not analyzed.

ND = not detected.

NLE = No limit established.

< = analyte not detected above method detection limit (MDL).

µg/kg = micrograms per kilogram.

mg/kg = milligrams per kilogram.

VOCs = volatile organic compounds.

in. = inches.

bgs = below ground surface.

Detections are bolded.

Shaded cells = concentration exceeds NJDEP Impact to Groundwater Criterion.

Shaded cells = concentration exceeds one or both NJDEP Direct Contact Criteria.

Shaded cells = concentration exceeds all NJDEP criteria.

Shaded cells = concentration exceeds Weston (1995) background concentration.

TABLE 4.1
SOIL SAMPLING SUMMARY RESULTS - COMPARISON TO NJDEP STANDARDS
SITE FTMM-05
FORT MONMOUTH, NEW JERSEY

Field Sample Location	NJDEP Residential Direct Contact Soil Remediation Standard ⁽¹⁾	NJDEP Non- Residential Direct Contact Soil Remediation Standard ⁽¹⁾	NJDEP Impact to Groundwater Screening Level ⁽²⁾	Weston 1995 Background ⁽³⁾	B-12		B-13		B-14		B-15		B-16		B-17		B-18		B-19		B-20		B-20 Dup		B-21	
Sample Date					04/11/98		04/11/98		04/11/98		04/11/98		04/13/98		04/13/98		04/13/98		04/13/98		04/14/98		04/14/98		04/14/98	
Volatile Organic Compounds (VOCs, µg/kg)																										
Lab Sample ID (VOCs only collected at approximately 24 in. bgs)					3473.08		3473.12		3473.16		3473.20		3477.04		3477.08		3477.12		3477.16		3479.04		3479.16		3479.08	
Methylene Chloride	34,000	97,000	10	-	<550		<550		<520		<650		<730		<790		<710		<560		<530		<540		<520	
Benzene	2,000	5,000	5	-	<270		<270		<260		<320		<360		<400		<350		<280		<260		<270		<260	
Tetrachloroethene	2,000	5,000	5	-	<270		<270		<260		5000		<360		<400		<350		<280		<260		<270		<260	
Chloroform	600	2,000	400	-	<270		<270		<260		<320		<360		<400		<350		<280		<260		<270		<260	
Ethylbenzene	7,800,000	110,000,000	13,000	-	<550		<550		<520		<650		<730		<790		<710		<560		<530		<540		<520	
TICs	NLE	NLE	NLE	-	ND		ND		ND		ND		19200		2600		5800		ND		ND		2800		ND	
Semivolatile Organic Compounds (SVOCs, µg/kg)																										
Lab Sample ID (All analyses except VOCs collected at approximately 6-12 in. bgs)					3473.07		3473.11		3473.15		3473.19		3477.03		3477.07		3477.11		3477.15		3479.03		3479.15		3479.07	
Naphthalene	6,000	17,000	25,000	-	<280		<260		<280		<1400		<270		300		<270		<260		<300		<280		<260	
n-Nitrosodiphenylamine	99,000	390,000	400	-	<210		<190		<210		<1000		<200		<200		<210		<200		<220		<210		<190	
2-Methylnaphthalene	230,000	2,400,000	8,000	-	<310		<290		<310		<1600		<300		520		<310		<300		<330		<310		<290	
4-Methylphenol	31,000	340,000	NLE	-	<310		<280		<300		<1500		<290		<300		<300		<290		<320		<300		<280	
Acenaphthylene	NLE	3.00E+08	NLE	-	<220		<200		<220		<1100		<210		<210		<220		<210		<230		<220		<200	
Acenaphthene	3,400,000	37,000,000	110,000	-	<200		<180		<200		<1000		<190		<190		<200		<190		<210		<200		<190	
Dibenzofuran	NLE	NLE	NLE	-	<210		<200		<210		<1100		<200		160	J	<210		<200		<230		<210		<200	
Diethylphthalate	49,000,000	550,000,000	88,000	-	<230		<210		<230		<1200		<220		<220		<230		<220		<250		<230		<210	
Fluorene	2,300,000	24,000,000	170,000	-	<220		<200		<220		<1100		<210		<210		<210		<210		<230		<220		<200	
Phenanthrene	NLE	300,000,000	NLE	-	<220		300		<220		<1100		200	J	310		<220		560		<230		<220		<200	
Anthracene	17,000,000	30,000,000	2,400,000	-	<220		290		<220		<1100		<210		<210		<220		<210		<230		<220		<200	
Dimethylphthalate	NLE	NLE	NLE	-	<170		<160		<170		<860		<170		<170		<170		<160		<180		<170		<160	
Di-n-butylphthalate	6,100,000	68,000,000	760,000	-	780	JB	300	JB	330	JB	27000	BD	820	JB	1000	B	590	JB	660	JB	740	JB	590	JB	750	JB
Fluoranthene	2,300,000	24,000,000	1,300,000	-	<220		260		<220		<1100		430		<210		180	J	340		<240		<220		<210	
Pyrene	1,700,000	18,000,000	840,000	-	<260		450		<250		<1300		420		<250		220	J	680		<270		<260		<240	
Pyridine	NLE	NLE	NLE	-	<340		<310		<340		780	JD	<330		<330		<340		<320		<360		<340		<320	
Butylbenzylphthalate	1,200,000	14,000,000	230,000	-	<290		<260		<280		<1400		<270		<280		<280		<270		<300		<280		<270	
Benzo(a)anthracene	600	2,000	800	-	<220		180	J	<220		<1100		270		<220		250		240		<240		<220		<210	
3,3'-Dichlorobenzidine	1,000	4,000	200	-	<390		<360		<390		<2000		<380		<380		<390		<370		<420		<390		<360	
Chrysene	62,000	230,000	80,000	-	<290		350		<280		<1400		460		250	J	410		440		<300		<280		<270	
bis(2-Ethylhexyl)phthalate	35,000	140,000	1,200,000	-	180	JB	160	JB	170	JB	<1600		180	JB	250	JB	190	JB	180	JB	400		130	J	190	JB
Benzo(b)fluoranthene	600	2,000	2,000	-	<280		120	J	<280		<1400		270		<270		410		140	J	<300		<280		<260	
Benzo(k)fluoranthene	6,000	23,000	25,000	-	<210		140	J	<210		<1000		260		<200		310		150	J	<220		<210		<190	
Benzo(a)pyrene	200	200	200	-	<210		150	J	<210		<1100		270		<210		350		170	J	<230		<210		<200	
Indeno(1,2,3-cd)pyrene	600	2,000	7,000	-	<230		<210		<230		<1200		200	J	<230		270		110	J	<250		<230		<220	
Dibenz(a,h)anthracene	200	200	800	-	<270		<250		<270		<1400		<260		<260		<270		<260		<290		<270		<250	
Benzo(g,h,i)perylene	380,000,000	30,000,000	NLE	-	<270		<250		<270		<1400		180	J	<260		220	J	120	J	<290		<270		<250	
Total TICs	NLE	NLE	NLE	-	56100		39300		51500		ND		36700		39950		43300		33800		35800		41850		18900	
Pesticides / PCBs (mg/kg)																										
Heptachlor	0.1	0.7	0.5	-	<0.0006		<0.0006		<0.0006		0		<0.0003		<0.0003		<0.0003		<0.0003		<0.0003		<0.0003		<0.0003	
Heptachlor Epoxide	0.07	0.3	0.01	-	<0.0005		<0.0005		<0.0005		0		<0.0003		<0.0003		<0.0003		<0.0003		<0.0003		<0.0003		<0.0003	
4,4'-DDE	2	9	18	-	<0.0007		<0.0008		<0.0008		0		<0.0004		<0.0004		<0.0004		<0.0004		<0.0004		0.001		0.001	
Dieldrin	0.04	0.2	0.003	-	<0.0004		<0.0004		<0.0004		0		<0.0002		<0.0002		<0.0002		<0.0002		<0.0002		<0.0002		<0.0002	
Endrin	23	340	1	-	<0.0006		<0.0007		<0.0007		0		<0.0003		<0.0003		<0.0004		<0.0003		<0.0003		<0.0003		<0.0003	
4,4'-DDD	3	13	4	-	<0.0014		<0.0015		<0.0015		<0.001		<0.0007		<0.0007		<0.0008		<0.0007		<0.0007		<0.0007		0.001	
Endrin Aldehyde	NLE	NLE	NLE	-	0.01		<0.0012		<0.0012		<0.001		<0.0006		<0.0006		<0.0006		<0.0006		<0.0006		<0.0006		<0.0006	
4,4'-DDT	2	8	11	-	<0.0003		<0.0003		<0.0003		0		0.003		<0.0002		<0.0002		<0.0002		<0.0002		<0.0002		<0.0002	
Endosulfan I	470	6,800	4	-	0.008		<0.0005		<0.0005		0		<0.0003		<0.0003		<0.0003		<0.0003		<0.0003		<0.0003		<0.0003	
Endosulfan II	470	6,800	4	-	0.002		0.009		<0.0006		0		<0.0003		<0.0003		<0.0003									

TABLE 4.1
SOIL SAMPLING SUMMARY RESULTS - COMPARISON TO NJDEP STANDARDS
SITE FTMM-05
FORT MONMOUTH, NEW JERSEY

Field Sample Location	NJDEP Residential Direct Contact Soil Remediation Standard ⁽¹⁾	NJDEP Non- Residential Direct Contact Soil Remediation Standard ⁽¹⁾	NJDEP Impact to Groundwater Screening Level ⁽²⁾	Weston 1995 Background ⁽³⁾	B-12		B-13		B-14		B-15		B-16		B-17		B-18		B-19		B-20		B-20 Dup		B-21	
Sample Date					04/11/98		04/11/98		04/11/98		04/11/98		04/13/98		04/13/98		04/13/98		04/13/98		04/14/98		04/14/98		04/14/98	
Metals (mg/kg)																										
Aluminum	78,000	NA	6,000	15,200	10180		10770		10610		12770		12110		2705		5034		10530		12710		6500		12310	
Antimony	31	450	6	ND	1.568		1.548		2.184		2.339		1.504		2.11		0.716		1.411		1.18		0.811		1.586	
Arsenic	19	19	19	22.9	11.02		13.28		12.94		14.03		12.91		7.747		10.67		1030		14.23		6.743		12.38	
Barium	16,000	59,000	2,100	32.3	22.06		28.75		21.51		29.59		77.62		19.8		57.41		28.22		26.01		18.78		34.1	
Beryllium	16	140	0.7	2	0.9966		1.09		1.376		1.187		1.463		0.3558		0.5955		0.9895		1.228		0.72		1.182	
Cadmium	78	78	2	ND	0.0837		0.0925		0.3648		0.2357		0.3385		0.482		1.934		1.258		1.41		<0.050		<0.059	
Calcium	NLE	NLE	NLE	921	1110		1749		1224		600.2		1370		746.9		1947		533.2		750.3		1079		4851	
Chromium	NLE	NLE	NLE	269	86.63		83.47		117.3		98.72		70.59		5.603		13.86		83.08		106.7		53.19		109.2	
Cobalt	1,600	590	90	2.5	5.389		3.82		5.631		5.412		5.138		3.41		5.639		2.785		3.228		2.142		5.048	
Copper	3,100	45,000	11,000	8	4.719		7.043		4.11		2.605		132.3		191.4		504.4		6.488		4.663		4.971		5.5	
Iron	NLE	NLE	NLE	55,800	39710		39530		56290		47940		33680		4204		8125		33280		38800		19270		44760	
Lead	400	800	90	19.5	9.266		32.8		8.331		8.012		288.8		1793		305.2		10.63		16.25		11.83		9.176	
Magnesium	NLE	NLE	NLE	7,230	1442		2317		1445		1278		1392		184.9		348.8		2199		3160		2083		3428	
Manganese	11,000	5,900	65	90.7	105.6		85.88		115.4		87.25		110.8		24.55		50.34		59.32		76.21		67.71		81.37	
Mercury	23	65	0.1	ND	0.055		0.467		0.024		0.012		0.437		0.0062		0.133		<0.012		0.019		0.011		<0.013	
Nickel	1,600	23,000	48	8.4	14.2		12.04		19.62		15.27		15.51		8.915		15.97		8.234		10.4		5.72		15.46	
Potassium	NLE	NLE	NLE	15400	2392		4990		2466		3631		3944		375.3		907.7		4763		5588		4347		3221	
Selenium	390	5,700	11	1.9	<0.357		<0.314		<0.358		<0.353		<0.301		0.438		0.78		<0.295		<0.360		<0.302		<0.351	
Silver	390	5,700	1	1.1	<0.357		<0.314		<0.358		<0.353		<0.301		<0.361		1.519		<0.295		<0.360		<0.302		<0.351	
Sodium	NLE	NLE	NLE	51.6	66.2		67.71		79.89		83.87		248		152.2		246.7		37.78		48.64		33.37		235.5	
Thallium	5	79	3	ND	<0.357		<0.314		<0.358		<0.353		<0.301		<0.361		<0.397		<0.295		<0.360		<0.302		<0.351	
Vanadium	78	1,100	NLE	94.1	120.3		104.6		166.2		146.2		90.73		10.9		17.17		66.69		67.64		34.59		135.8	
Zinc	23,000	110,000	930	81.4	59.62		66.81		108.8		79.64		120.7		46.07		627.4		42.6		56.35		32.86		74.92	

Notes:

Historically, there have been up to 318 soil boring locations associated with FTMM-05. This analysis looks at only those boring locations that fall within the footprint of FTMM-05.

(1) New Jersey Department of Environmental Protection (NJDEP) Residential Direct Contact Soil Remediation Standards (RDCSRS) and Non-Residential Direct Contact Soil Remediation Standards (NRDCSRS) (N.J.A.C 7:26D; amended May 7, 2012). Available at: <http://www.state.nj.us/dep/srp/regs/rs/>.

(2) NJDEP Impact to Groundwater (NJDEP guidance document; Nov 2013).

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NJDEP criteria for total xylenes are used for xylene isomers (m+p, o).

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NJDEP criteria for 4,4'-DDD and 4,4'-DDT are for total DDD and total DDT, respectively.

There are no NJDEP soil standards for individual PCB Arcolors; the total PCB NJDEP standards were used for individual Arcolors

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

B = Analyte detected in both sample and associated laboratory blank.

D = Result from dilution of sample.

DUP = field duplicate sample.

E = Estimated value.

J = Analyte detected between MDL and practical quantitation limit (PQL).

NA = not analyzed.

ND = not detected.

NLE = No limit established.

< = analyte not detected above method detection limit (MDL).

µg/kg = micrograms per kilogram.

mg/kg = milligrams per kilogram.

VOCs = volatile organic compounds.

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bgs = below ground surface.

Detections are bolded.

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Shaded cells = concentration exceeds all NJDEP criteria.

Shaded cells = concentration exceeds Weston (1995) background concentration.

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SOIL SAMPLING SUMMARY RESULTS - COMPARISON TO NJDEP STANDARDS
SITE FTMM-05
FORT MONMOUTH, NEW JERSEY

Field Sample Location	NJDEP Residential Direct Contact Soil Remediation Standard ⁽¹⁾	NJDEP Non- Residential Direct Contact Soil Remediation Standard ⁽¹⁾	NJDEP Impact to Groundwater Screening Level ⁽²⁾	Weston 1995 Background ⁽³⁾	B-22		B-23		B-24		B-25		B-26		B-27		B-28		B-29		B-30		B-31		B-32	
Sample Date					04/14/98	04/15/98	04/15/98	04/15/98	04/15/98	04/20/98	04/20/98	04/20/98	04/20/98	04/21/98	04/21/98											
Volatile Organic Compounds (VOCs, µg/kg)																										
Lab Sample ID (VOCs only collected at approximately 24 in. bgs)					3479.12		3485.04		3485.08		3485.12		3485.16		3498.04		3498.08		3498.12		3498.16		3500.03		3500.07	
Methylene Chloride	34,000	97,000	10	-	<540		<560		<620		<570		<650		<670		<570		<530		<570		<520		<530	
Benzene	2,000	5,000	5	-	<270		<280		<310		<290		<330		<340		<290		<260		<280		<260		<270	
Tetrachloroethene	2,000	5,000	5	-	<270		4800		3200		<290		<330		<340		<290		<260		<280		<260		<270	
Chloroform	600	2,000	400	-	<270		<280		<310		<290		<330		<340		<290		<260		<280		<260		<270	
Ethylbenzene	7,800,000	110,000,000	13,000	-	<540		<560		<620		<570		<650		<670		<570		<530		<570		<520		<530	
TICs	NLE	NLE	NLE	-	2700		ND		ND		ND		ND		3800		ND		ND		ND		ND		ND	
Semivolatile Organic Compounds (SVOCs, µg/kg)																										
Lab Sample ID (All analyses except VOCs collected at approximately 6-12 in. bgs)					3479.11		3485.03		3485.07		3485.11		3485.15		3498.03		3498.07		3498.11		3498.15		3500.02		3500.06	
Naphthalene	6,000	17,000	25,000	-	<250		<270		<250		<280		<280		170	J	130	J	<260		<270		<1300		<270	
n-Nitrosodiphenylamine	99,000	390,000	400	-	<180		<200		<190		<210		<210		<220		<200		<200		<200		<990		<210	
2-Methylnaphthalene	230,000	2,400,000	8,000	-	<270		<300		<280		<310		<310		210	J	160	J	<290		<300		<1500		<310	
4-Methylphenol	31,000	340,000	NLE	-	<270		<300		<280		<300		<300		<320		<290		<290		<290		<1400		<300	
Acenaphthylene	NLE	3.00E+08	NLE	-	<190		<210		<200		<220		<220		<230		<210		<210		<210		<1000		<220	
Acenaphthene	3,400,000	37,000,000	110,000	-	<180		<190		<180		<200		<200		<210		<190		<190		<190		<940		<200	
Dibenzofuran	NLE	NLE	NLE	-	<190		<210		<190		<210		<210		<220		<200		<200		<200		<1000		<210	
Diethylphthalate	49,000,000	550,000,000	88,000	-	<200		<230		<210		<230		<230		200	JB	<220		120	JB	120	JB	150	J	140	J
Fluorene	2,300,000	24,000,000	170,000	-	<190		<210		<200		<220		<220		<230		<210		<200		<210		<1000		<210	
Phenanthrene	NLE	300,000,000	NLE	-	140	J	<210		<200		190	J	390		1300		480		150	J	<210		130	J	170	J
Anthracene	17,000,000	30,000,000	2,400,000	-	140	J	<210		<200		<220		<220		210	J	<210		<210		<210		<1000		<220	
Dimethylphthalate	NLE	NLE	NLE	-	<150		<170		<160		<170		<170		<180		<160		<160		<170		<810		<170	
Di-n-butylphthalate	6,100,000	68,000,000	760,000	-	520	JB	11000	B	1100	B	5700	B	4600	B	6600	B	890	JB	1600	B	1000	B	26000	BD	2500	B
Fluoranthene	2,300,000	24,000,000	1,300,000	-	150	J	<220		<200		330		910		2800		380		140	J	<210		120	J	250	
Pyrene	1,700,000	18,000,000	840,000	-	220	J	<250		<240		310		770		2500		600		240	J	<250		190	J	270	
Pyridine	NLE	NLE	NLE	-	<300		<330		<310		<340		<340		<360		<330		<320		<330		<1600		<340	
Butylbenzylphthalate	1,200,000	14,000,000	230,000	-	<250		<280		<260		<290		120	J	<300		<270		<270		<270		<270		<280	
Benzo(a)anthracene	600	2,000	800	-	<200		<220		<200		250		540		1500		230		<210		<210		<1100		170	J
3,3'-Dichlorobenzidine	1,000	4,000	200	-	<350		<380		<360		<390		<390		<410		<380		<370		<380		<1900		<390	
Chrysene	62,000	230,000	80,000	-	190	J	<280		<260		410		830		2300		530		190	J	<270		150	J	300	
bis(2-Ethylhexyl)phthalate	35,000	140,000	1,200,000	-	640		130	JB	510	B	230	JB	1300	B	290	JB	140	JB	180	JB	170	JB	130	JB	160	JB
Benzo(b)fluoranthene	600	2,000	2,000	-	<250		<270		<260		290		690		1600		190	J	<260		<270		<1300		160	J
Benzo(k)fluoranthene	6,000	23,000	25,000	-	<180		<200		<190		260		560		1400		190	J	<190		<200		<980		150	J
Benzo(a)pyrene	200	200	200	-	<190		<210		<190		250		670		1600		220		<200		<200		<1000		170	J
Indeno(1,2,3-cd)pyrene	600	2,000	7,000	-	<210		<230		<210		190	J	580		1200		150	J	<220		<220		<1100		120	J
Dibenz(a,h)anthracene	200	200	800	-	<240		<270		<250		<270		<270		420		<260		<260		<260		<1300		<270	
Benzo(g,h,i)perylene	380,000,000	30,000,000	NLE	-	<240		<270		<250		170	J	510		950		160	J	<260		<260		<1300		<270	
Total TICs	NLE	NLE	NLE	-	9900		57400		47900		56800		39240		48800		33500		50100		54500		6500		17700	
Pesticides / PCBs (mg/kg)																										
Heptachlor	0.1	0.7	0.5	-	<0.0003		<0.0003		<0.0003		<0.0003		<0.0003		<0.0004		<0.0003		<0.0003		<0.0003		<0.0003		<0.0003	
Heptachlor Epoxide	0.07	0.3	0.01	-	<0.0002		<0.0003		<0.0003		<0.0003		<0.0003		<0.0007		<0.0006		<0.0006		<0.0007		<0.0007		<0.0007	
4,4'-DDE	2	9	18	-	<0.0004		<0.0004		<0.0004		0.007		0.001		0.092		0.016		0.009		0.004		<0.0004		<0.0004	
Dieldrin	0.04	0.2	0.003	-	<0.0002		<0.0002		<0.0002		<0.0002		<0.0002		<0.0006		<0.0005		<0.0005		<0.0005		<0.0006		<0.0005	
Endrin	23	340	1	-	<0.0003		<0.0003		<0.0003		<0.0003		<0.0004		<0.0006		<0.0005		<0.0005		<0.0005		<0.0006		<0.0005	
4,4'-DDD	3	13	4	-	<0.0007		<0.0007		<0.0007		0.002		0.002		0.008		0.001		<0.0006		<0.0007		<0.0007		<0.0007	
Endrin Aldehyde	NLE	NLE	NLE	-	<0.0005		<0.0006		<0.0006		<0.0006		<0.0006		<0.0006		<0.0005		<0.0005		<0.0005		<0.0006		<0.0005	
4,4'-DDT	2	8	11	-	<0.0002		<0.0002		<0.0002		0.015		0.001		0.03		0.004		0.001		<0.0012		<0.0012		<0.0012	
Endosulfan I	470	6,800	4	-	<0.0002		<0.0003		<0.0003		<0.0003		<0.0003		<0.0006		<0.0005		<0.0005		<0.0005		<0.0006		<0.0005	
Endosulfan II	470	6,800	4	-	0.002		<0.0003		<0.0003		0.005															

TABLE 4.1
SOIL SAMPLING SUMMARY RESULTS - COMPARISON TO NJDEP STANDARDS
SITE FTMM-05
FORT MONMOUTH, NEW JERSEY

Field Sample Location	NJDEP Residential Direct Contact Soil Remediation Standard ⁽¹⁾	NJDEP Non- Residential Direct Contact Soil Remediation Standard ⁽¹⁾	NJDEP Impact to Groundwater Screening Level ⁽²⁾	Weston 1995 Background ⁽³⁾	B-22		B-23		B-24		B-25		B-26		B-27		B-28		B-29		B-30		B-31		B-32			
Sample Date					04/14/98		04/15/98		04/15/98		04/15/98		04/15/98		04/20/98		04/20/98		04/20/98		04/20/98		04/21/98		04/21/98			
Metals (mg/kg)																												
Aluminum	78,000	NA	6,000	15,200	6500		10230		8798		5973		3987		4737		10510		3825		11450		9478		9374			
Antimony	31	450	6	ND	0.811		1.933		2.019		0.535		1.402		0.609		2.536		0.562		1.41		1.835		1.035			
Arsenic	19	19	19	22.9	6.743		11.27		11.08		9.377		12.45		14.28		11.12		5.409		10.21		12.89		11.15			
Barium	16,000	59,000	2,100	32.3	18.78		18.63		22.06		54.85		93.31		102.3		27.13		21.8		27.58		26		36.46			
Beryllium	16	140	0.7	2	0.72		1.132		1.003		0.5943		0.5401		0.5059		1.382		0.4842		0.9559		1.034		0.8538			
Cadmium	78	78	2	ND	<0.050		0.2331		0.4323		0.5041		1.011		1.863		0.2193		0.0786		0.1311		0.1635		0.2132			
Calcium	NLE	NLE	NLE	921	1079		672.4		645.4		2380		1670		2181		775.9		715.5		1593		705.5		1054			
Chromium	NLE	NLE	NLE	269	53.19		106.8		92.13		43.8		24.87		25.25		141.4		28.13		78.5		102.1		70.22			
Cobalt	1,600	590	90	2.5	2.142		3.946		4.48		3.881		3.974		3.495		3.636		0.8424		4.455		1.878		3.774			
Copper	3,100	45,000	11,000	8	4.971		37.2		11.34		102.8		484.1		566.7		7.552		7.933		4.673		8.222		32.05			
Iron	NLE	NLE	NLE	55,800	19270		50900		41650		23110		17000		14330		51640		11250		36530		39390		31220			
Lead	400	800	90	19.5	11.83		17.2		10.74		207.2		921.5		708.5		21.74		39.12		10.71		34.73		70.19			
Magnesium	NLE	NLE	NLE	7,230	2083		1176		958.6		1409		378.7		1019		1088		844.5		1847		1751		1360			
Manganese	11,000	5,900	65	90.7	67.71		74.58		86.61		104.8		97.11		73.72		52.63		39.55		87.83		38.07		123.3			
Mercury	23	65	0.1	ND	0.011		<0.012		<0.011		0.201		0.485		0.512		0.064		0.056		0.012		0.184		0.025			
Nickel	1,600	23,000	48	8.4	5.72		13.06		12.94		10.85		13.33		10.33		11.45		3.095		12.99		8.486		12.04			
Potassium	NLE	NLE	NLE	15400	4347		2592		1592		1725		684		1454		2371		1592		2876		4834		3626			
Selenium	390	5,700	11	1.9	<0.302		<0.331		<0.381		<0.305		0.888		0.881		<0.302		<0.372		<0.365		<0.290		<0.299			
Silver	390	5,700	1	1.1	<0.302		<0.331		<0.381		<0.305		1.574		0.419		<0.302		<0.372		<0.365		<0.290		<0.299			
Sodium	NLE	NLE	NLE	51.6	33.37		35.27		58.67		95.4		333.1		159.7		49.69		35.99		77.41		39.97		81.26			
Thallium	5	79	3	ND	<0.302		<0.331		<0.381		<0.305		<0.373		<0.366		<0.302		<0.372		<0.365		<0.290		<0.299			
Vanadium	78	1,100	NLE	94.1	34.59		138.4		126.7		51.98		34.2		28.86		191.7		19.39		109.7		79.23		76.03			
Zinc	23,000	110,000	930	81.4	32.86		86.32		67.07		163.9		303.7		179.4		70.69		55.47		56.71		62.43		82.33			

Notes:

Historically, there have been up to 318 soil boring locations associated with FTMM-05. This analysis looks at only those boring locations that fall within the footprint of FTMM-05.

(1) New Jersey Department of Environmental Protection (NJDEP) Residential Direct Contact Soil Remediation Standards (RDCSRS) and Non-Residential Direct Contact Soil Remediation Standards (NRDCSRS) (N.J.A.C 7:26D; amended May 7, 2012). Available at: <http://www.state.nj.us/dep/srp/regs/rs/>.

(2) NJDEP Impact to Groundwater (NJDEP guidance document; Nov 2013).

(3) Weston, 1995. Final Site Investigation - Main Post and Charles Wood Areas, Fort Monmouth, New Jersey, December.

NJDEP criteria for total xylenes are used for xylene isomers (m+p, o).

NJDEP criteria for endrin is used for endrin aldehyde.

NJDEP criteria for 4,4'-DDD and 4,4'-DDT are for total DDD and total DDT, respectively.

There are no NJDEP soil standards for individual PCB Arcolors; the total PCB NJDEP standards were used for individual Arcolors

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

B = Analyte detected in both sample and associated laboratory blank.

D = Result from dilution of sample.

DUP = field duplicate sample.

E = Estimated value.

J = Analyte detected between MDL and practical quantitation limit (PQL).

NA = not analyzed.

ND = not detected.

NLE = No limit established.

< = analyte not detected above method detection limit (MDL).

µg/kg = micrograms per kilogram.

mg/kg = milligrams per kilogram.

VOCs = volatile organic compounds.

in. = inches.

bgs = below ground surface.

Detections are bolded.

Shaded cells = concentration exceeds NJDEP Impact to Groundwater Criterion.

Shaded cells = concentration exceeds one or both NJDEP Direct Contact Criteria.

Shaded cells = concentration exceeds all NJDEP criteria.

Shaded cells = concentration exceeds Weston (1995) background concentration.

TABLE 4.1
SOIL SAMPLING SUMMARY RESULTS - COMPARISON TO NJDEP STANDARDS
SITE FTMM-05
FORT MONMOUTH, NEW JERSEY

Field Sample Location	NJDEP Residential Direct Contact Soil Remediation Standard ⁽¹⁾	NJDEP Non- Residential Direct Contact Soil Remediation Standard ⁽¹⁾	NJDEP Impact to Groundwater Screening Level ⁽²⁾	Weston 1995 Background ⁽³⁾	B-33		B-34		B-35		B-36		B-37		B-38		B-39		B-40		B-41		B-42		B-43	
Sample Date					04/21/98		04/21/98		04/21/98		04/22/98		04/22/98		04/22/98		04/22/98		04/22/98		05/01/98		05/01/98		05/04/98	
Volatile Organic Compounds (VOCs, µg/kg)																										
Lab Sample ID (VOCs only collected at approximately 24 in. bgs)					3500.11		3500.15		3500.19		3501.03		3501.07		3501.11		3501.15		3501.19		3539.03		3539.07		3543.03	
Methylene Chloride	34,000	97,000	10	-	<620		<890		<680		<520		<520		<690		<570		<630		<680		<580		<630	
Benzene	2,000	5,000	5	-	<310		<450		<340		<260		<260		<340		<280		<320		<340		<290		<310	
Tetrachloroethene	2,000	5,000	5	-	<310		<450		<340		<260		<260		410		<280		3100		<340		<290		<310	
Chloroform	600	2,000	400	-	<310		<450		<340		<260		<260		<340		<280		<320		<340		<290		<310	
Ethylbenzene	7,800,000	110,000,000	13,000	-	<620		<890		<680		<520		<520		<690		<570		<630		<680		<580		<630	
TICs	NLE	NLE	NLE	-	ND		ND		ND		ND		ND		ND		ND		ND		22700		ND		ND	
Semivolatile Organic Compounds (SVOCs, µg/kg)																										
Lab Sample ID (All analyses except VOCs collected at approximately 6-12 in. bgs)					3500.10		3500.14		3500.18		3501.02		3501.06		3501.10		3501.14		3501.18		3539.02		3539.06		3543.02	
Naphthalene	6,000	17,000	25,000	-	<270		<280		<260		<250		<250		<270		<1300		<260		180	J	310		<310	
n-Nitrosodiphenylamine	99,000	390,000	400	-	<200		<210		<200		<190		<190		<200		<990		<190		<210		<200		<230	
2-Methylnaphthalene	230,000	2,400,000	8,000	-	110	J	<310		120	J	<280		<280		<310		<1500		<290		260	J	260	J	<350	
4-Methylphenol	31,000	340,000	NLE	-	<290		<300		<290		<280		<270		<300		<1400		<280		<300		<290		<340	
Acenaphthylene	NLE	3.00E+08	NLE	-	<210		<220		<210		<200		<200		<210		<1000		<200		<220		<210		<240	
Acenaphthene	3,400,000	37,000,000	110,000	-	<190		<200		<190		<180		<180		<200		<940		<190		<200		<190		<220	
Dibenzofuran	NLE	NLE	NLE	-	<200		<210		<200		<190		<190		<210		<1000		<200		<210		<200		<240	
Diethylphthalate	49,000,000	550,000,000	88,000	-	300		180	J	<220		<210		<210		<230		<1100		<220		<230		<220		<260	
Fluorene	2,300,000	24,000,000	170,000	-	<210		<220		<200		<200		<200		<210		<1000		<200		<210		<210		<240	
Phenanthrene	NLE	300,000,000	NLE	-	350		280		670		210		<200		<220		<1000		<210		350		640		<250	
Anthracene	17,000,000	30,000,000	2,400,000	-	<210		<220		<210		<200		<200		<220		<1000		<210		<220		<210		<250	
Dimethylphthalate	NLE	NLE	NLE	-	<170		<170		<160		<160		<160		<170		<810		<160		<170		<170		<190	
Di-n-butylphthalate	6,100,000	68,000,000	760,000	-	1000	B	1400	B	6800	B	3300	B	4700	B	6100	B	35000	BD	4200	B	1100	B	800	JB	400	JB
Fluoranthene	2,300,000	24,000,000	1,300,000	-	550		570		1300		220		<200		<220		<1000		<210		340		1300		<250	
Pyrene	1,700,000	18,000,000	840,000	-	520		460		1100		330		<230		<250		<1200		<240		310		960		<290	
Pyridine	NLE	NLE	NLE	-	<330		<340		<320		<310		<310		<330		<1600		<320		<340		<330		<380	
Butylbenzylphthalate	1,200,000	14,000,000	230,000	-	<280		<290		<270		<260		<260		<280		<1400		<270		<280		<280		<320	
Benzo(a)anthracene	600	2,000	800	-	320		350		690		140	J	<200		<220		<1100		<210		150	J	650		<250	
3,3'-Dichlorobenzidine	1,000	4,000	200	-	<380		<390		<370		<350		<350		<380		<1900		<370		<390		<380		<440	
Chrysene	62,000	230,000	80,000	-	600		570		1200		280		<260		<280		<1400		<270		410		980		130	J
bis(2-Ethylhexyl)phthalate	35,000	140,000	1,200,000	-	150	JB	360	B	130	JB	130	JB	130	JB	150	JB	<1500		<290		150	JB	<300		<350	
Benzo(b)fluoranthene	600	2,000	2,000	-	350		420		840		110	J	<250		<270		<1300		<260		250	J	720		<310	
Benzo(k)fluoranthene	6,000	23,000	25,000	-	360		340		700		120	J	<190		<200		<980		<190		180	J	590		<230	
Benzo(a)pyrene	200	200	200	-	370		390		720		120	J	<190		<210		<1000		<200		160	J	670		<240	
Indeno(1,2,3-cd)pyrene	600	2,000	7,000	-	260		300		490		<210		<210		<230		<1100		<220		130	J	580		<260	
Dibenz(a,h)anthracene	200	200	800	-	<260		<270		200	J	<250		<250		<270		<1300		<250		<270		200	J	<300	
Benzo(g,h,i)perylene	380,000,000	30,000,000	NLE	-	230	J	250	J	400		<250		<250		<270		<1300		<250		120	J	500		<300	
Total TICs	NLE	NLE	NLE	-	11560		32020		5920		6000		7100		7300		ND		5800		19190		19310		12400	
Pesticides / PCBs (mg/kg)																										
Heptachlor	0.1	0.7	0.5	-	<0.0003		<0.0003		<0.0003		<0.0003		<0.0003		<0.0003		<0.0003		<0.0003		<0.0003		<0.0003		<0.0004	
Heptachlor Epoxide	0.07	0.3	0.01	-	<0.0007		<0.0007		<0.0006		<0.0006		<0.0006		<0.0006		<0.0007		<0.0007		<0.0006		<0.0007		<0.0007	
4,4'-DDE	2	9	18	-	0.037		0.009		0.153		0.003		<0.0004		0		<0.0005		0.001		0.028		0.007		<0.0005	
Dieldrin	0.04	0.2	0.003	-	<0.0006		<0.0006		<0.0005		<0.0005		<0.0005		<0.0005		<0.0006		<0.0006		<0.0005		<0.0006		<0.0006	
Endrin	23	340	1	-	<0.0006		<0.0006		0.023		<0.0005		<0.0005		<0.0005		<0.0006		<0.0006		<0.0005		<0.0006		<0.0006	
4,4'-DDD	3	13	4	-	0.003		<0.0007		0.02		0.001		<0.0006		<0.0006		<0.0007		0.001		0.003		0.003		<0.0007	
Endrin Aldehyde	NLE	NLE	NLE	-	<0.0006		<0.0006		<0.0005		<0.0005		<0.0005		<0.0005		<0.0006		<0.0006		<0.0005		<0.0006		<0.0006	
4,4'-DDT	2	8	11	-	0.02		0.003		0.051		0.006		<0.0011		<0.0012		<0.0012		0.003		0.044		0.033		<0.0013	
Endosulfan I	470	6,800	4	-	<0.0006		<0.0006		<0.0005		<0.0005		<0.0005		<0.0005		<0.0006		<0.0006		<0.0005		<0.0006		<0.0006	
Endosulfan II	470	6,800	4	-	<0.0004		<0.0004		0.01		<0.0004		<0.0004		<0.0004		<0.0005		<0.0004		<0.0004		0.004			

TABLE 4.1
SOIL SAMPLING SUMMARY RESULTS - COMPARISON TO NJDEP STANDARDS
SITE FTMM-05
FORT MONMOUTH, NEW JERSEY

Field Sample Location	NJDEP Residential Direct Contact Soil Remediation Standard ⁽¹⁾	NJDEP Non- Residential Direct Contact Soil Remediation Standard ⁽¹⁾	NJDEP Impact to Groundwater Screening Level ⁽²⁾	Weston 1995 Background ⁽³⁾	B-33		B-34		B-35		B-36		B-37		B-38		B-39		B-40		B-41		B-42		B-43	
Sample Date					04/21/98		04/21/98		04/21/98		04/22/98		04/22/98		04/22/98		04/22/98		04/22/98		05/01/98		05/01/98		05/04/98	
Metals (mg/kg)																										
Aluminum	78,000	NA	6,000	15,200	5404		6652		12810		8275		10070		9616		9833		7769		6479		3951		6390	
Antimony	31	450	6	ND	1.754		2.403		5.962	ND	0.964		1.965		1.819		1.916		1.55		1.413		1.104		<0.280	
Arsenic	19	19	19	22.9	32.71		13.11		62.27		9.445		10.42		9.688		13.1		10.04		12.52		8.959		4.218	
Barium	16,000	59,000	2,100	32.3	150		203.9		354.6		22.98		24.73		26.09		30.29		20		107.8		181.9		258.9	
Beryllium	16	140	0.7	2	0.6234		0.689		10.89		0.8057		1.032		1.058		1.159		0.8691		0.759		0.4586		0.764	
Cadmium	78	78	2	ND	2.087		1.975		7.431	ND	0.5596		0.1855		0.2547		0.1541		0.1502		0.959		0.489		<0.070	
Calcium	NLE	NLE	NLE	921	4974		3063		2477		635.6		1015		839		612.5		577.6		2137		962.9		1200	
Chromium	NLE	NLE	NLE	269	38.59		44.4		72.25		61.12		96.84		99.42		106.1		83.34		56.36		36.34		21.06	
Cobalt	1,600	590	90	2.5	5.207		5.537		55.97		3.707		4.522		4.232		4.975		4.022		4.604		4.035		5.369	
Copper	3,100	45,000	11,000	8	409.3		428		442.8		8.111		3.796		3.185		3.559		1.854		412.9		207.3		38.4	
Iron	NLE	NLE	NLE	55,800	32440		23380		13500		29820		43400		42240		49440		36490		27420		21350		8584	
Lead	400	800	90	19.5	810.3		1090		2851		16.68		8.622		8.58		10.66		5.945		629.1		502.5		39.9	
Magnesium	NLE	NLE	NLE	7,230	2213		878.7		1112		1019		1311		1022		899.6		789.1		1009		485		331.2	
Manganese	11,000	5,900	65	90.7	179.6		153.2		174.9		76.98		103.8		85.25		110.2		86.79		193.3		102.6		68.44	
Mercury	23	65	0.1	ND	0.979		0.662		1.562		0.059		0.025		0.014		0.037		0.013		0.891		0.754		0.085	
Nickel	1,600	23,000	48	8.4	18.98		22.35		69.97		10.12		14.97		15.78		15.84		10.83		19.73		10.93		13.84	
Potassium	NLE	NLE	NLE	15400	1348		1615		3185		2115		2342		1607		1726		1611		1890		864.1		525.2	
Selenium	390	5,700	11	1.9	0.602		1.104		50.7		0.584	<0.347	<0.341		<0.376		<0.320		0.627		0.859		0.859		1.417	
Silver	390	5,700	1	1.1	2.78		3.345		9.425		<0.353	<0.347	<0.341		<0.376		<0.320		0.945		<0.357		2.362			
Sodium	NLE	NLE	NLE	51.6	245.1	NLE	186.7	NLE	343.3		38.72		40.28		45.41		62.79		32.38		154.9		103.4		216.8	
Thallium	5	79	3	ND	<0.377		<0.380		47.42		<0.353	<0.347	<0.341		<0.376		<0.320		<0.363		<0.357		<0.420			
Vanadium	78	1,100	NLE	94.1	44.85		52.39		84.39		84.38		131.4		139		159.7		103.5		59.51		43.68		20.79	
Zinc	23,000	110,000	930	81.4	743		828		658.1		45.25		64.17		70.04		71.88		58.82		433.1		250.3		48.22	

Notes:

Historically, there have been up to 318 soil boring locations associated with FTMM-05. This analysis looks at only those boring locations that fall within the footprint of FTMM-05.

(1) New Jersey Department of Environmental Protection (NJDEP) Residential Direct Contact Soil Remediation Standards (RDCSRS) and Non-Residential Direct Contact Soil Remediation Standards (NRDCSRS) (N.J.A.C 7:26D; amended May 7, 2012). Available at: <http://www.state.nj.us/dep/srp/regs/rs/>.

(2) NJDEP Impact to Groundwater (NJDEP guidance document; Nov 2013).

(3) Weston, 1995. Final Site Investigation - Main Post and Charles Wood Areas, Fort Monmouth, New Jersey, December.

NJDEP criteria for total xylenes are used for xylene isomers (m+p, o).

NJDEP criteria for endrin is used for endrin aldehyde.

NJDEP criteria for 4,4'-DDD and 4,4'-DDT are for total DDD and total DDT, respectively.

There are no NJDEP soil standards for individual PCB Arcolors; the total PCB NJDEP standards were used for individual Arcolors

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

B = Analyte detected in both sample and associated laboratory blank.

D = Result from dilution of sample.

DUP = field duplicate sample.

E = Estimated value.

J = Analyte detected between MDL and practical quantitation limit (PQL).

NA = not analyzed.

ND = not detected.

NLE = No limit established.

< = analyte not detected above method detection limit (MDL).

µg/kg = micrograms per kilogram.

mg/kg = milligrams per kilogram.

VOCs = volatile organic compounds.

in. = inches.

bgs = below ground surface.

Detections are bolded.

Shaded cells = concentration exceeds NJDEP Impact to Groundwater Criterion.

Shaded cells = concentration exceeds one or both NJDEP Direct Contact Criteria.

Shaded cells = concentration exceeds all NJDEP criteria.

Shaded cells = concentration exceeds Weston (1995) background concentration.

TABLE 4.1
SOIL SAMPLING SUMMARY RESULTS - COMPARISON TO NJDEP STANDARDS
SITE FTMM-05
FORT MONMOUTH, NEW JERSEY

Field Sample Location	NJDEP Residential Direct Contact Soil Remediation Standard ⁽¹⁾	NJDEP Non- Residential Direct Contact Soil Remediation Standard ⁽¹⁾	NJDEP Impact to Groundwater Screening Level ⁽²⁾	Weston 1995 Background ⁽³⁾	B-43 Dup		B-44		B-45		B-46		B-47		B-48		B-49		B-50		B-51		B-52		B-53	
Sample Date					05/04/98		05/04/98		05/04/98		05/04/98		05/05/98		05/05/98		05/05/98		05/05/98		05/05/98		05/05/98		05/06/98	
Volatile Organic Compounds (VOCs, µg/kg)																										
Lab Sample ID (VOCs only collected at approximately 24 in. bgs)					3543.19		3543.07		3543.11		3543.15		3547.03		3547.07		3547.11		3547.15		3547.19		3550.04		3550.08	
Methylene Chloride	34,000	97,000	10	-	<640		<690		<650		<680		<510		<530		<540		<540		<560		<620		<540	
Benzene	2,000	5,000	5	-	<320		<340		<330		<340		<250		<270		<270		<270		<280		<310		<270	
Tetrachloroethene	2,000	5,000	5	-	<320		<340		<330		450		<250		<270		<270		<270		<280		<310		<270	
Chloroform	600	2,000	400	-	<320		<340		<330		<340		<250		<270		<270		<270		<280		<310		<270	
Ethylbenzene	7,800,000	110,000,000	13,000	-	<640		<690		<650		<680		<510		<530		<540		<540		<560		<620		<540	
TICs	NLE	NLE	NLE	-	ND		ND		1800		1500		ND		2300		14500		7600		ND		ND		37700	
Semivolatile Organic Compounds (SVOCs, µg/kg)																										
Lab Sample ID (All analyses except VOCs collected at approximately 6-12 in. bgs)					3543.18		3543.06		3543.10		3543.14		3547.02		3547.06		3547.10		3547.14		3547.18		3550.03		3550.07	
Naphthalene	6,000	17,000	25,000	-	<310		190	J	<250		<260		<240		<260		<270		<260		<260		<260		<250	
n-Nitrosodiphenylamine	99,000	390,000	400	-	<230		<210		<190		<190		<180		<190		<200		<200		<200		<190		<190	
2-Methylnaphthalene	230,000	2,400,000	8,000	-	<350		160	J	<280		<290		<270		<290		<300		<290		<300		<290		<280	
4-Methylphenol	31,000	340,000	NLE	-	<340		<310		<280		160	J	<270		<280		<300		<290		<290		<280		<270	
Acenaphthylene	NLE	3.00E+08	NLE	-	<250		<220		<200		<200		<190		<200		<210		<200		<210		<200		<200	
Acenaphthene	3,400,000	37,000,000	110,000	-	<220		<200		<180		<180		<170		<180		<200		<190		<190		<190		<180	
Dibenzofuran	NLE	NLE	NLE	-	<240		<220		<190		<200		<190		<190		<210		<200		<200		<200		<190	
Diethylphthalate	49,000,000	550,000,000	88,000	-	<260		<240		<210		<210		110	JB	<210		<230		<220		<220		<220		<210	
Fluorene	2,300,000	24,000,000	170,000	-	<240		<220		<200		<200		<190		<200		<210		<200		<210		<200		<190	
Phenanthrene	NLE	300,000,000	NLE	-	140	J	1300		300		320		<190		<200		<220		<210		140	J	110	J	240	
Anthracene	17,000,000	30,000,000	2,400,000	-	<250		190	J	<200		<200		<190		<200		<220		<210		130	J	<200		240	
Dimethylphthalate	NLE	NLE	NLE	-	<190		<180		<160		<160		<150		<160		<170		<160		<160		<160		<150	
Di-n-butylphthalate	6,100,000	68,000,000	760,000	-	870	JB	370	JB	290	JB	1000	B	960	B	630	JB	490	JB	260	JB	910	B	<880		350	JB
Fluoranthene	2,300,000	24,000,000	1,300,000	-	180	J	2800		710		560		<190		120	J	<220		170	J	160	J	<210		260	
Pyrene	1,700,000	18,000,000	840,000	-	140	J	2500		700		530		<230		<240		<250		130	J	230	J	170	J	410	
Pyridine	NLE	NLE	NLE	-	<380		<350		<310		<320		<300		<310		580		<320		<320		<320		<310	
Butylbenzylphthalate	1,200,000	14,000,000	230,000	-	<320		<290		<260		<260		<250		<260		<280		<270		<270		<270		<260	
Benzo(a)anthracene	600	2,000	800	-	<250		1500		440		310		<200		<210		<220		<210		<210		<210		190	J
3,3'-Dichlorobenzidine	1,000	4,000	200	-	<440		<400		<360		<360		<340		<360				<370		<370		<360		<350	
Chrysene	62,000	230,000	80,000	-	130	J	2400		690		510		<250		<260		<280		130	J	180	J	140	J	370	
bis(2-Ethylhexyl)phthalate	35,000	140,000	1,200,000	-	<350		<320		<290		2900	B	<280		<290		140	J	120	J	140	J	<290		<280	
Benzo(b)fluoranthene	600	2,000	2,000	-	<310		1600		480		330		<240		<260		<270		<260		<270		<260		110	J
Benzo(k)fluoranthene	6,000	23,000	25,000	-	<230		1500		470		350		<180		<190		<200		<190		<200		<190		140	J
Benzo(a)pyrene	200	200	200	-	<240		1600		500		360		<190		<200		<210		<200		<200		<200		170	J
Indeno(1,2,3-cd)pyrene	600	2,000	7,000	-	<260		1300		470		310		<200		<210		<230		<220		<220		<220		110	J
Dibenz(a,h)anthracene	200	200	800	-	<310		470		160	J	<250		<240		<250		<270		<260		<260		<250		<240	
Benzo(g,h,i)perylene	380,000,000	30,000,000	NLE	-	<310		1200		420		280		<240		<250		<270		<260		<260		<250		110	J
Total TICs	NLE	NLE	NLE	-	15700		26870		12290		60570		13020		40900		ND		49200		28000		14200		28900	
Pesticides / PCBs (mg/kg)																										
Heptachlor	0.1	0.7	0.5	-	<0.0004		<0.0004		<0.0003		<0.0003		<0.0003		<0.0003		<0.0003		<0.0003		<0.0003		<0.0003		<0.0003	
Heptachlor Epoxide	0.07	0.3	0.01	-	<0.0008		<0.0007		<0.0007		<0.0007		<0.0002		<0.0002		<0.0003		<0.0002		<0.0003		<0.0007		<0.0006	
4,4'-DDE	2	9	18	-	<0.0005		<0.0005		0.084		0.052		0.004		<0.0003		<0.0004		0.004		<0.0004		<0.0004		0.027	
Dieldrin	0.04	0.2	0.003	-	<0.0006		<0.0006		<0.0006		<0.0006		<0.0002		<0.0002		<0.0002		<0.0002		<0.0002		<0.0006		<0.0005	
Endrin	23	340	1	-	<0.0006		<0.0006		<0.0006		<0.0006		<0.0003		<0.0003		<0.0003		<0.0003		<0.0003		<0.0006		<0.0005	
4,4'-DDD	3	13	4	-	<0.0008		<0.0007		0.007		0.008		<0.0007		<0.0007		0.001		0.001		<0.0007		<0.0007		<0.0006	
Endrin Aldehyde	NLE	NLE	NLE	-	<0.0006		<0.0006		<0.0006		<0.0006		<0.0005		<0.0005		<0.0005		<0.0005		<0.0006		<0.0006		<0.0005	
4,4'-DDT	2	8	11	-	<0.0014		<0.0013		0.105		0.075		0.004		<0.0002		<0.0002		0.01		<0.0002		<0.0012		<0.0012	
Endosulfan I	470	6,800	4	-	<0.0006		<0.0006		<0.0006		<0.0006		<0.0002		<0.0002		<0.0003		<0.0002		<0.0003		<0.0006		<0.0005	
Endosulfan II	470	6,800	4	-	<0.0005		<0.0005		<0.0004		<0.0005		<0.0003		<0.0003		<0									

TABLE 4.1
SOIL SAMPLING SUMMARY RESULTS - COMPARISON TO NJDEP STANDARDS
SITE FTMM-05
FORT MONMOUTH, NEW JERSEY

Field Sample Location	NJDEP Residential Direct Contact Soil Remediation Standard ⁽¹⁾	NJDEP Non- Residential Direct Contact Soil Remediation Standard ⁽¹⁾	NJDEP Impact to Groundwater Screening Level ⁽²⁾	Weston 1995 Background ⁽³⁾	B-43 Dup		B-44		B-45		B-46		B-47		B-48		B-49		B-50		B-51		B-52		B-53			
Sample Date					05/04/98		05/04/98		05/04/98		05/04/98		05/05/98		05/05/98		05/05/98		05/05/98		05/05/98		05/06/98		05/06/98			
Metals (mg/kg)																												
Aluminum	78,000	NA	6,000	15,200	4159		8077		1961		4464		1986		3363		4876		3699		8596		8267		4460			
Antimony	31	450	6	ND	0.732		1.203		0.382		0.639		0.388		0.95		0.791		0.497		1.713		1.263		0.547			
Arsenic	19	19	19	22.9	9.162		11.66		2.255		8.122		1.719		8.626		12.79		3.172		27.93		14.36		4.293			
Barium	16,000	59,000	2,100	32.3	105.3		513.9		16.6		69.01		10.23		113.8		76.99		16.51		27.23		29.54		25.47			
Beryllium	16	140	0.7	2	0.565		0.8622		0.166		0.4403		10.23		0.4112		0.6963		0.7032		1.108		0.9403		0.412			
Cadmium	78	78	2	ND	2.775		0.6777		0.4876		0.9829		<0.054		0.2786		0.1114		<0.051		0.1293		<0.068		<0.064			
Calcium	NLE	NLE	NLE	921	1607		2670		10360		2705		277		933.3		1111		476.2		943.5		664.1		452.9			
Chromium	NLE	NLE	NLE	269	11.39		70.59		17.96		36.61		21.36		23.73		52.57		30.82		108.5		87.14		31.37			
Cobalt	1,600	590	90	2.5	3.668		2.42		1.223		2.495		0.3853		2.388		1.731		0.3871		3.129		6.072		1.335			
Copper	3,100	45,000	11,000	8	55.16		346.7		28.23		262.8		2.913		532.4		60.76		4.304		7.103		15.39		17.84			
Iron	NLE	NLE	NLE	55,800	9241		21940		6391		18840		7617		20580		22280		10500		47660		40040		10340			
Lead	400	800	90	19.5	165.5		275.5		228.1		273.5		8.632		845.1		226.7		6.099		40.53		55.83		22.07			
Magnesium	NLE	NLE	NLE	7,230	318.6		2943		5665		928.1		534.1		574.5		1066		602.6		963.9		1089		698.6			
Manganese	11,000	5,900	65	90.7	185.6		84.22		52.05		725.6		10.21		107.1		71.47		20.24		65.67		153.5		74.62			
Mercury	23	65	0.1	ND	0.389		0.164		10.194		5.04		0.039		0.51		5.141		0.074		0.225		0.588		0.037			
Nickel	1,600	23,000	48	8.4	9.258		13.28		4.67		7.3		2.299		7.715		6.521		3.713		12.48		11.51		2.826			
Potassium	NLE	NLE	NLE	15400	379.1		3791		722.3		1955		1048		1422		2485		918.9		2085		2466		1529			
Selenium	390	5,700	11	1.9	0.996		0.473		<0.359		<0.361		0.372		0.4		<0.401		<0.303		<0.397		<0.408		<0.383			
Silver	390	5,700	1	1.1	0.564		0.993		<0.359		0.512		<0.326		1.123		<0.401		<0.303		<0.397		<0.408		<0.383			
Sodium	NLE	NLE	NLE	51.6	870.9		221.4		174.2		312.4		144.3		96.56		71.52		266.9		393.3		52.66		40.01			
Thallium	5	79	3	ND	<0.433		<0.358		<0.359		<0.361		<0.326		<0.314		<0.401		<0.303		<0.397		<0.408		<0.383			
Vanadium	78	1,100	NLE	94.1	15.84		30.96		14.38		33.38		16.22		17.18		39.23		26.17		126.4		79.15		18.81			
Zinc	23,000	110,000	930	81.4	75.11		1598		62.64		1809		46.14		209.5		100.6		49.56		68.26		91.96		35.88			

Notes:

Historically, there have been up to 318 soil boring locations associated with FTMM-05. This analysis looks at only those boring locations that fall within the footprint of FTMM-05.

(1) New Jersey Department of Environmental Protection (NJDEP) Residential Direct Contact Soil Remediation Standards (RDCSRS) and Non-Residential Direct Contact Soil Remediation Standards (NRDCSRS) (N.J.A.C 7:26D; amended May 7, 2012). Available at: <http://www.state.nj.us/dep/srp/regs/rs/>.

(2) NJDEP Impact to Groundwater (NJDEP guidance document; Nov 2013).

(3) Weston, 1995. Final Site Investigation - Main Post and Charles Wood Areas, Fort Monmouth, New Jersey, December.

NJDEP criteria for total xylenes are used for xylene isomers (m+p, o).

NJDEP criteria for endrin is used for endrin aldehyde.

NJDEP criteria for 4,4'-DDD and 4,4'-DDT are for total DDD and total DDT, respectively.

There are no NJDEP soil standards for individual PCB Arcolors; the total PCB NJDEP standards were used for individual Arcolors

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

B = Analyte detected in both sample and associated laboratory blank.

D = Result from dilution of sample.

DUP = field duplicate sample.

E = Estimated value.

J = Analyte detected between MDL and practical quantitation limit (PQL).

NA = not analyzed.

ND = not detected.

NLE = No limit established.

< = analyte not detected above method detection limit (MDL).

µg/kg = micrograms per kilogram.

mg/kg = milligrams per kilogram.

VOCs = volatile organic compounds.

in. = inches.

bgs = below ground surface.

Detections are bolded.

Shaded cells = concentration exceeds NJDEP Impact to Groundwater Criterion.

Shaded cells = concentration exceeds one or both NJDEP Direct Contact Criteria.

Shaded cells = concentration exceeds all NJDEP criteria.

Shaded cells = concentration exceeds Weston (1995) background concentration.

TABLE 4.1
SOIL SAMPLING SUMMARY RESULTS - COMPARISON TO NJDEP STANDARDS
SITE FTMM-05
FORT MONMOUTH, NEW JERSEY

Field Sample Location	NJDEP Residential Direct Contact Soil Remediation Standard ⁽¹⁾	NJDEP Non- Residential Direct Contact Soil Remediation Standard ⁽¹⁾	NJDEP Impact to Groundwater Screening Level ⁽²⁾	Weston 1995 Background ⁽³⁾	B-54		B-55		B-56		B-57		B-58		B-59		B-60		B-60 Dup		B-61		B-62		B-63	
Sample Date					05/06/98		05/06/98		05/11/98		05/11/98		05/11/98		05/11/98		05/14/98		05/14/98		05/14/98		05/14/98		05/14/98	
Volatile Organic Compounds (VOCs, µg/kg)																										
Lab Sample ID (VOCs only collected at approximately 24 in. bgs)					3550.12		3550.16		3561.03		3561.07		3561.11		3561.15		3567.03		3567.24		3567.07		3567.11		3567.15	
Methylene Chloride	34,000	97,000	10	-	<580		<620		<640		<720		<560		<530		<550		<540		<540		<560		<520	
Benzene	2,000	5,000	5	-	<290		<310		<320		<360		<280		<270		<270		<270		<270		<280		<260	
Tetrachloroethene	2,000	5,000	5	-	<290		<310		<320		<360		<280		<270		<270		<270		<270		<280		<260	
Chloroform	600	2,000	400	-	<290		<310		<320		<360		<280		<270		<270		<270		<270		<280		<260	
Ethylbenzene	7,800,000	110,000,000	13,000	-	<580		<620		<640		<720		<560		<530		<550		<540		<540		<560		<520	
TICs	NLE	NLE	NLE	-	ND		ND		ND		ND		ND		ND		1700		9100		ND		ND		ND	
Semivolatile Organic Compounds (SVOCs, µg/kg)																										
Lab Sample ID (All analyses except VOCs collected at approximately 6-12 in. bgs)					3550.11		3550.15		3561.02		3561.06		3561.10		3561.14		3567.02		3567.23		3567.06		3567.10		3567.14	
Naphthalene	6,000	17,000	25,000	-	<260		<280		<280		<270		<260		<270		<280		<260		<270		<270		<260	
n-Nitrosodiphenylamine	99,000	390,000	400	-	<190		<210		<210		<200		<190		<210		<210		<190		<200		<200		<190	
2-Methylnaphthalene	230,000	2,400,000	8,000	-	<290		<310		<310		<300		<290		<310		<310		<290		<300		<300		<290	
4-Methylphenol	31,000	340,000	NLE	-	<280		<300		<300		<290		<280		<300		<300		<280		<300		<300		<280	
Acenaphthylene	NLE	3.00E+08	NLE	-	<200		<220		<220		<210		<200		<220		<220		<200		<210		<210		140	J
Acenaphthene	3,400,000	37,000,000	110,000	-	<190		<200		<200		<190		<180		<200		<200		<180		<190		<190		<180	
Dibenzofuran	NLE	NLE	NLE	-	<200		<210		<210		<210		<200		<210		<210		<200		<210		<210		<200	
Diethylphthalate	49,000,000	550,000,000	88,000	-	<220		<230		<230		<220		<210		<230		<230		<210		<230		<230		<210	
Fluorene	2,300,000	24,000,000	170,000	-	<200		<220		<220		<210		<200		<210		<220		<200		<210		<210		<200	
Phenanthrene	NLE	300,000,000	NLE	-	110	J	<220		NLE		250		<200		<220		440		<200		<210		<210		540	
Anthracene	17,000,000	30,000,000	2,400,000	-	<200		<220		<220		<210		<200		<220		<220		<200		<210		<210		<200	
Dimethylphthalate	NLE	NLE	NLE	-	<160		<170		<170		<170		<160		<170		<170		<160		<170		<170		<160	
Di-n-butylphthalate	6,100,000	68,000,000	760,000	-	1600	B	900	JB	360	JB	570	JB	970	B	430	JB	610	JB	1300	B	880	JB	450	JB	380	JB
Fluoranthene	2,300,000	24,000,000	1,300,000	-	160	J	<220		<220		300		<200		140	J	710		<200		140	J	<220		890	
Pyrene	1,700,000	18,000,000	840,000	-	240		<260		<260		450		<240		120	J	530		<240		150	J	<250		1300	
Pyridine	NLE	NLE	NLE	-	<320		420		<340		<330		<310		<340		<340		<320		<330		<330		<310	
Butylbenzylphthalate	1,200,000	14,000,000	230,000	-	<270		<290		<280		<280		<260		<280		<280		<260		<280		<280		<260	
Benzo(a)anthracene	600	2,000	800	-	170	J	<220		<220		210	J	<210		<220		280		<210		<220		<220		560	
3,3'-Dichlorobenzidine	1,000	4,000	200	-	<360		<390		<390		<380		<360		<390		<390		<360		<380		<380		<360	
Chrysene	62,000	230,000	80,000	-	230	J	<290		<280		290		<260		<280		300		<260		130	J	<280		880	
bis(2-Ethylhexyl)phthalate	35,000	140,000	1,200,000	-	220	J	130	J	<310		140	J	200	J	<310		200	JB	270	JB	220	JB	110	JB	210	JB
Benzo(b)fluoranthene	600	2,000	2,000	-	<260		<280		<280		<270		<260		<280		220	J	<260		<270		<270		410	
Benzo(k)fluoranthene	6,000	23,000	25,000	-	110	J	<210		<210		130	J	<190		<200		240		<190		<200		<200		520	
Benzo(a)pyrene	200	200	200	-	110	J	<210		<210		150	J	<200		<210		260		<200		<210		<210		580	
Indeno(1,2,3-cd)pyrene	600	2,000	7,000	-	<220		<230		<230		<220		<210		<230		180	J	<210		<230		<230		370	
Dibenz(a,h)anthracene	200	200	800	-	<250		<270		<270		<260		<250		<270		<270		<250		<270		<270		<250	
Benzo(g,h,i)perylene	380,000,000	30,000,000	NLE	-	<250		<270		<270		<260		<250		<270		170	J	<250		<270		<270		440	
Total TICs	NLE	NLE	NLE	-	40500		9400		15300		34700		16400		9580		50710		38600		25130		6900		14940	
Pesticides / PCBs (mg/kg)																										
Heptachlor	0.1	0.7	0.5	-	<0.0003		<0.0003		<0.0004		<0.0003		<0.0003		0.014		<0.0003		<0.0003		<0.0003		<0.0003		<0.0003	
Heptachlor Epoxide	0.07	0.3	0.01	-	<0.0006		<0.0006		<0.0007		<0.0006		<0.0006		0.261		<0.0007		<0.0006		<0.0007		<0.0007		<0.0007	
4,4'-DDE	2	9	18	-	0.009		0.006		0.227		0.039		0.004		2.058		0.003		0.002		0.005		0.001		0.007	
Dieldrin	0.04	0.2	0.003	-	<0.0005		<0.0005		<0.0006		<0.0005		<0.0005		<0.0005		<0.0006		<0.0005		<0.0006		<0.0006		<0.0006	
Endrin	23	340	1	-	<0.0005		<0.0005		<0.0006		<0.0005		<0.0005		<0.0005		<0.0006		<0.0005		<0.0006		<0.0006		<0.0006	
4,4'-DDD	3	13	4	-	0.019		0.002		<0.0007		<0.0006		<0.0006		2.68		<0.0007		<0.0006		<0.0007		<0.0007		<0.0007	
Endrin Aldehyde	NLE	NLE	NLE	-	<0.0005		<0.0005		<0.0006		<0.0005		<0.0005		<0.0005		<0.0006		<0.0005		<0.0006		<0.0006		<0.0006	
4,4'-DDT	2	8	11	-	0.092		0.012		0.17		0.06		0.007		11.182		0.002		<0.0012		0.007		<0.0012		0.01	
Endosulfan I	470	6,800	4	-	<0.0005		<0.0005		<0.0006		<0.0005		<0.0005		<0.0005		<0.0006		<0.0005		<0.0006		<0.0006		<0.0006	
Endosulfan II	470	6,800	4	-	<0.0004		<0.0004		<0.0005		<0.0004		<0.0004		<0.0004		<0.0004		<0.000							

TABLE 4.1
SOIL SAMPLING SUMMARY RESULTS - COMPARISON TO NJDEP STANDARDS
SITE FTMM-05
FORT MONMOUTH, NEW JERSEY

Field Sample Location	NJDEP Residential Direct Contact Soil Remediation Standard ⁽¹⁾	NJDEP Non- Residential Direct Contact Soil Remediation Standard ⁽¹⁾	NJDEP Impact to Groundwater Screening Level ⁽²⁾	Weston 1995 Background ⁽³⁾	B-54		B-55		B-56		B-57		B-58		B-59		B-60		B-60 Dup		B-61		B-62		B-63	
Sample Date					05/06/98		05/06/98		05/11/98		05/11/98		05/11/98		05/11/98		05/14/98		05/14/98		05/14/98		05/14/98		05/14/98	
Metals (mg/kg)																										
Aluminum	78,000	NA	6,000	15,200	6246		7988		11380		10290		1884		2975		13190		3373		9246		5436		7195	
Antimony	31	450	6		1.532		1.149		1.246		1.868		0.326		0.48		1.266		0.739		0.86		0.921		1.01	
Arsenic	19	19	19	22.9	147.5		10.36		16.81		14.94		1.201		7.456		10.76		3.77		7.677		5.493		8.63	
Barium	16,000	59,000	2,100	32.3	14.72		101.2		44.19		88.58		5.948		27.13		34.64		11.22		21.61		18.86		111.8	
Beryllium	16	140	0.7	2	0.7216		0.9041		1.233		0.9952		0.3044		0.3715		1.496		0.4787		1.056		0.6189		0.8207	
Cadmium	78	78	2	ND	<0.066		<0.066		<0.069		0.2176		0.1125		0.2638		<0.062		<0.057		<0.051		0.7023		0.2273	
Calcium	NLE	NLE	NLE	921	440.1		950.6		1662		1169		152.9		400.1		1188		91.75		491.6		181.1		1930	
Chromium	NLE	NLE	NLE	269	81.6		58.97		90.25		78.52		14.29		18.99		100.1		37.19		82.22		49.99		57.85	
Cobalt	1,600	590	90	2.5	0.8229		2.301		2.645		4.073		0.2267		1.23		2.967		0.057		1.778		0.5732		1.54	
Copper	3,100	45,000	11,000	8	6.733		14.76		15.96		83.51		3.742		9.851		5.622		3.553		3.459		20.54		50.68	
Iron	NLE	NLE	NLE	55,800	30770		24580		32850		34590		5510		7582		36290		12740		26710		15460		22510	
Lead	400	800	90	19.5	14.64		45.25		108.8		2379		8.725		71.13		10.39		34.32		9.338		94.89		673.7	
Magnesium	NLE	NLE	NLE	7,230	2093		2144		3720		1506		335.4		664.8		3941		498.5		2704		948.3		1648	
Manganese	11,000	5,900	65	90.7	30.56		147.5		76.07		118.1		5.243		21.19		95.3		9.593		47.43		18.48		144	
Mercury	23	65	0.1	ND	0.036		0.213		0.9		0.459		0.039		17.584		0.671		0.104		0.058		0.161		0.115	
Nickel	1,600	23,000	48	8.4	3.717		7.104		8.858		13.31		1.59		4.389		7.747		2.124		5.302		3.305		8.803	
Potassium	NLE	NLE	NLE	15400	6333		5418		7138		4203		460.3		1084		7084		839.2		5398		2311		3715	
Selenium	390	5,700	11	1.9	0.599		<0.397		<0.411		<0.373		<0.352		<0.371		<0.369		<0.341		<0.307		<0.337		<0.315	
Silver	390	5,700	1	1.1	<0.377		<0.397		<0.411		<0.373		<0.352		<0.371		<0.369		<0.341		<0.307		<0.337		<0.315	
Sodium	NLE	NLE	NLE	51.6	229.7		159.4		71.89		110.9		25.7		57.27		81.7		7.482		49.79		51.48		439.1	
Thallium	5	79	3	ND	<0.377		<0.397		<0.411		<0.373		<0.352		<0.371		<0.369		<0.341		<0.307		<0.337		<0.315	
Vanadium	78	1,100	NLE	94.1	32.76		29.63		42.8		82.13		13.82		18.5		44.53		33.17		37.72		39.39		27.81	
Zinc	23,000	110,000	930	81.4	28.84		58.2		81.92		178.4		26.47		73.37		59.43		20.2		41.41		32.25		338.9	

Notes:

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(1) New Jersey Department of Environmental Protection (NJDEP) Residential Direct Contact Soil Remediation Standards (RDCSRS) and Non-Residential Direct Contact Soil Remediation Standards (NRDCSRS) (N.J.A.C 7:26D; amended May 7, 2012). Available at: <http://www.state.nj.us/dep/srp/regs/rs/>.

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NJDEP criteria for total xylenes are used for xylene isomers (m+p, o).

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NJDEP criteria for 4,4'-DDD and 4,4'-DDT are for total DDD and total DDT, respectively.

There are no NJDEP soil standards for individual PCB Arcolors; the total PCB NJDEP standards were used for individual Arcolors

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

B = Analyte detected in both sample and associated laboratory blank.

D = Result from dilution of sample.

DUP = field duplicate sample.

E = Estimated value.

J = Analyte detected between MDL and practical quantitation limit (PQL).

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ND = not detected.

NLE = No limit established.

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VOCs = volatile organic compounds.

in. = inches.

bgs = below ground surface.

Detections are bolded.

Shaded cells = concentration exceeds NJDEP Impact to Groundwater Criterion.

Shaded cells = concentration exceeds one or both NJDEP Direct Contact Criteria.

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Shaded cells = concentration exceeds Weston (1995) background concentration.

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SOIL SAMPLING SUMMARY RESULTS - COMPARISON TO NJDEP STANDARDS
SITE FTMM-05
FORT MONMOUTH, NEW JERSEY

Field Sample Location	NJDEP Residential Direct Contact Soil Remediation Standard ⁽¹⁾	NJDEP Non- Residential Direct Contact Soil Remediation Standard ⁽¹⁾	NJDEP Impact to Groundwater Screening Level ⁽²⁾	Weston 1995 Background ⁽³⁾	B-64		B-65		B-66		B-67		B-68		B-69		B-70		B-71		B-72		B-73		B-74				
Sample Date					05/14/98	05/15/98	05/15/98	05/15/98	05/15/98	05/15/98	05/18/98	05/18/98	05/18/98	05/18/98	05/19/98														
Metals (mg/kg)																													
Aluminum	78,000	NA	6,000	15,200	15670		8058		3044		7248		6761		7952		11120		9388		8881		8643		2868				
Antimony	31	450	6	ND	1.059		0.997		0.443		0.35		1.209		1.305		1.249		0.789		0.724		1.158		0.57				
Arsenic	19	19	19	22.9	14.6		7.83		3.083		7.19		11.44		10.21		10.11		9.62		8.338		7.981		4.511				
Barium	16,000	59,000	2,100	32.3	52.75		28.5		21.9		15.88		44.56		125.5		25.88		51.51		58.95		25.84		12.69				
Beryllium	16	140	0.7	2	1.179		0.8404		0.4444		0.604		0.8332		0.8544		1.128		0.9041		0.6764		0.867		0.4361				
Cadmium	78	78	2	ND	<0.065		<0.055		2		<0.059		ND		<0.057		0.1382		1.154		<0.056		<0.057		0.1899		<0.056		<0.061
Calcium	NLE	NLE	NLE	921	969		744.4		266.5		518.3		1209		1407		586.5		1169		1570		691		327.2				
Chromium	NLE	NLE	NLE	269	81.95		68.44		23.91		42.72		57.83		51.07		114.5		77.94		46.85		85.23		27.92				
Cobalt	1,600	590	90	2.5	4.367		3.136		0.5376		2.701		4.179		5.826		4.8		3.255		3.326		5.769		0.7721				
Copper	3,100	45,000	11,000	8	8.773		5.669		7.449		3.409		42.05		1544		2.028		39.85		46.73		6.715		5.597				
Iron	NLE	NLE	NLE	55,800	34010		29740		8577		25900		27790		27860		47050		33340		17160		34570		10120				
Lead	400	800	90	19.5	20.2		30.1		37.51		9.825		90.71		852.3		11.87		122.6		58.5		75.52		18.46				
Magnesium	NLE	NLE	NLE	7,230	2740		1237		710.2		895.3		730.7		817.3		1074		1435		1940		941		664.5				
Manganese	11,000	5,900	65	90.7	175.4		76.07		29.05		79.87		54.71		195.3		103.5		76.53		89.7		168.8		30.3				
Mercury	23	65	0.1	ND	0.17		0.074		0.088		0.0068		0.268		<0.044		<0.024		0.079		0.115		0.053		0.041				
Nickel	1,600	23,000	48	8.4	13.41		9.24		2.565		7.65		10.39		17.71		16.38		10.52		8.935		11.23		2.749				
Potassium	NLE	NLE	NLE	15400	5202		3399		1602		1460		1202		1922		2684		3817		4607		2201		1340				
Selenium	390	5,700	11	1.9	<0.389		<0.329		<0.356		<0.340		<0.366		<0.328		<0.336		<0.340		<0.335		<0.339		<0.366				
Silver	390	5,700	1	1.1	<0.389		<0.329		<0.356		<0.340		<0.366		1.082		<0.336		<0.340		<0.335		<0.339		<0.366				
Sodium	NLE	NLE	NLE	51.6	287.7		56.68		11.9		43.74		72.72		175.9		92.7		92.75		262.7		62.74		61.08				
Thallium	5	79	3	ND	<0.389		<0.329		<0.356		<0.340		<0.366		<0.328		<0.336		<0.340		<0.335		<0.339		<0.366				
Vanadium	78	1,100	NLE	94.1	74.48		74.42		NLE		14.64		56.21		74.83		52.52		148.9		82.7		34.6		101.9		22.17		
Zinc	23,000	110,000	930	81.4	73.04		55.34		43.34		42.07		49.92		455		81.93		117.6		123.4		104.7		25.57				

Notes:

Historically, there have been up to 318 soil boring locations associated with FTMM-05. This analysis looks at only those boring locations that fall within the footprint of FTMM-05.

(1) New Jersey Department of Environmental Protection (NJDEP) Residential Direct Contact Soil Remediation Standards (RDCSRS) and Non-Residential Direct Contact Soil Remediation Standards (NRDCSRS) (N.J.A.C 7:26D; amended May 7, 2012). Available at: <http://www.state.nj.us/dep/srp/regs/rs/>.

(2) NJDEP Impact to Groundwater (NJDEP guidance document; Nov 2013).

(3) Weston, 1995. Final Site Investigation - Main Post and Charles Wood Areas, Fort Monmouth, New Jersey, December.

NJDEP criteria for total xylenes are used for xylene isomers (m+p, o).

NJDEP criteria for endrin is used for endrin aldehyde.

NJDEP criteria for 4,4'-DDD and 4,4'-DDT are for total DDD and total DDT, respectively.

There are no NJDEP soil standards for individual PCB Arcolors; the total PCB NJDEP standards were used for individual Arcolors

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

B = Analyte detected in both sample and associated laboratory blank.

D = Result from dilution of sample.

DUP = field duplicate sample.

E = Estimated value.

J = Analyte detected between MDL and practical quantitation limit (PQL).

NA = not analyzed.

ND = not detected.

NLE = No limit established.

< = analyte not detected above method detection limit (MDL).

µg/kg = micrograms per kilogram.

mg/kg = milligrams per kilogram.

VOCs = volatile organic compounds.

in. = inches.

bgs = below ground surface.

Detections are bolded.

Shaded cells = concentration exceeds NJDEP Impact to Groundwater Criterion.

Shaded cells = concentration exceeds one or both NJDEP Direct Contact Criteria.

Shaded cells = concentration exceeds all NJDEP criteria.

Shaded cells = concentration exceeds Weston (1995) background concentration.

TABLE 4.1
SOIL SAMPLING SUMMARY RESULTS - COMPARISON TO NJDEP STANDARDS
SITE FTMM-05
FORT MONMOUTH, NEW JERSEY

Field Sample Location	NJDEP Residential Direct Contact Soil Remediation Standard ⁽¹⁾	NJDEP Non- Residential Direct Contact Soil Remediation Standard ⁽¹⁾	NJDEP Impact to Groundwater Screening Level ⁽²⁾	Weston 1995 Background ⁽³⁾	B-75		B-76		B-77		B-78		B-79		B-80		B-80 Dup		B-81		B-82		B-83		B-84	
Sample Date					05/19/98	05/19/98	05/19/98	05/19/98	05/19/98	05/19/98	05/19/98	05/19/98	05/19/98	05/19/98	05/19/98	05/19/98	05/19/98	05/19/98	05/19/98	05/19/98	05/19/98	05/19/98	05/19/98	05/19/98	05/19/98	05/19/98
Volatile Organic Compounds (VOCs, µg/kg)																										
Lab Sample ID (VOCs only collected at approximately 24 in. bgs)					3580.06		3580.09		3580.12		3580.15		3580.19		3580.23		3580.39		3580.27		3580.31		3580.35		3584.03	
Methylene Chloride	34,000	97,000	10	-	<530		<580		<730		<560		<580		<560		<570		<560		<540		<510		<510	
Benzene	2,000	5,000	5	-	<270		<290		<370		<280		<290		<280		<290		<280		<270		<250		<260	
Tetrachloroethene	2,000	5,000	5	-	<270		770		<370		<280		<290		<280		<290		<280		<270		<250		<260	
Chloroform	600	2,000	400	-	<270		<290		<370		<280		<290		<280		<290		<280		<270		<250		<260	
Ethylbenzene	7,800,000	110,000,000	13,000	-	<530		<580		<730		<560		<580		<570		<560		<560		<540		<510		<510	
TICs	NLE	NLE	NLE	-	ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
Semivolatile Organic Compounds (SVOCs, µg/kg)																										
Lab Sample ID (All analyses except VOCs collected at approximately 6-12 in. bgs)					3580.05		3580.08		3580.11		3580.14		3580.18		3580.22		3580.38		3580.26		3580.30		3580.34		3584.02	
Naphthalene	6,000	17,000	25,000	-	<250		<240		<270		<250		<270		<270		<280		400		<250		<240		2300	
n-Nitrosodiphenylamine	99,000	390,000	400	-	<180		<180		<200		<190		<200		<200		<210		150	J	<180		<180		<190	
2-Methylnaphthalene	230,000	2,400,000	8,000	-	<270		<270		<300		<280		<300		<300		<320		660		<280		<270		4900	
4-Methylphenol	31,000	340,000	NLE	-	<270		<270		<300		<280		<300		<290		<310		<270		<270		<270		<280	
Acenaphthylene	NLE	3.00E+08	NLE	-	<190		<190		<210		<200		<210		<210		<220		110	J	<190		<190		4400	
Acenaphthene	3,400,000	37,000,000	110,000	-	<180		<180		<190		<180		<190		<190		<200		<180		<180		<170		1900	
Dibenzofuran	NLE	NLE	NLE	-	<190		<190		<210		<190		<210		<210		<220		250		<190		<190		540	
Diethylphthalate	49,000,000	550,000,000	88,000	-	<200		<200		<230		<210		<220		<220		<230		170	J	<210		<200		<210	
Fluorene	2,300,000	24,000,000	170,000	-	<190		<190		<210		<200		<210		<210		<220		110	J	<190		<190		5300	
Phenanthrene	NLE	300,000,000	NLE	-	480		720		170	J	130	J	<210		<210		<220		570		<200		<190		29000	E
Anthracene	17,000,000	30,000,000	2,400,000	-	<190		<190		<210		<200		<210		<210		<220		160	J	<200		<190		3200	
Dimethylphthalate	NLE	NLE	NLE	-	<150		<150		<170		<160		<170		<170		<170		120	J	<150		<150		<160	
Di-n-butylphthalate	6,100,000	68,000,000	760,000	-	760	JB	780	JB	380	JB	670	JB	600	JB	270	JB	220	JB	840	JB	170	JB	180	JB	270	JB
Fluoranthene	2,300,000	24,000,000	1,300,000	-	300		500		190	J	<200		<210		<210		<220		400		<200		<190		16000	E
Pyrene	1,700,000	18,000,000	840,000	-	510		820		120	J	120	J	<250		<250		<260		580		<230		<230		30000	E
Pyridine	NLE	NLE	NLE	-	<300		<300		<330		<310		<330		<330		<350		<300		<300		<300		<310	
Butylbenzylphthalate	1,200,000	14,000,000	230,000	-	<250		<250		<280		<260		<280		<280		<280		<260		<250		<250		<260	
Benzo(a)anthracene	600	2,000	800	-	180	J	310		<220		<200		<220		<220		<230		300		<200		<200		13000	E
3,3'-Dichlorobenzidine	1,000	4,000	200	-	<350		<350		<380		<350		<380		<380		<400		<350		<350		<340		1000	
Chrysene	62,000	230,000	80,000	-	300		520		<280		<260		<280		<280		<290		510		<250		<250		21000	E
bis(2-Ethylhexyl)phthalate	35,000	140,000	1,200,000	-	280	J	100	J	<310		<290		<310		<310		<320		<280		<280		<280		120	J
Benzo(b)fluoranthene	600	2,000	2,000	-	110	J	200	J	<270		<250		<270		<270		<280		180	J	<250		<240		9200	
Benzo(k)fluoranthene	6,000	23,000	25,000	-	130	J	220		<200		<190		<200		<200		<210		220		<180		<180		8800	
Benzo(a)pyrene	200	200	200	-	130	J	290		<210		<190		<210		<210		<220		240		<190		<190		11000	
Indeno(1,2,3-cd)pyrene	600	2,000	7,000	-	<200		160	J	<230		<210		<230		<220		<240		150	J	<210		<200		4900	
Dibenz(a,h)anthracene	200	200	800	-	<240		<240		<260		<250		<260		<260		<280		<240		<240		<240		2900	
Benzo(g,h,i)perylene	380,000,000	30,000,000	NLE	-	<240		190	J	<260		<250		<260		<260		<280		190	J	<240		<240		5800	
Total TICs	NLE	NLE	NLE	-	10100		9860		5400		9600		10400		7400		1400		9820		1900		2500		72000	
Pesticides / PCBs (mg/kg)																										
Heptachlor	0.1	0.7	0.5	-	<0.0003		<0.0003		<0.0003		<0.0003		<0.0003		<0.0003		<0.0003		<0.0003		<0.0003		<0.0003		<0.0003	
Heptachlor Epoxide	0.07	0.3	0.01	-	<0.0006		<0.0006		<0.0007		<0.0006		<0.0007		<0.0006		<0.0007		<0.0006		<0.0006		<0.0006		<0.0006	
4,4'-DDE	2	9	18	-	<0.0004		<0.0004	18	<0.0005		<0.0004		0.002		0.005		0.002		<0.0004		0.001		0.018		0.208	
Dieldrin	0.04	0.2	0.003	-	<0.0005		<0.0005		<0.0006		<0.0005		<0.0005		<0.0005		<0.0006		<0.0005		<0.0005		<0.0005		<0.0005	
Endrin	23	340	1	-	<0.0005		<0.0005	1	<0.0006		<0.0005		<0.0005		<0.0005		<0.0006		<0.0005		<0.0005		<0.0005		<0.0005	
4,4'-DDD	3	13	4	-	<0.0006		<0.0006		<0.0007		<0.0006		<0.0007		<0.0006		<0.0007		<0.0006		<0.0006		<0.0006		<0.0006	
Endrin Aldehyde	NLE	NLE	NLE	-	<0.0005		<0.0005		<0.0006		<0.0005		<0.0005		<0.0005		<0.0006		<0.0005		<0.0005		<0.0005		<0.0005	
4,4'-DDT	2	8	11	-	<0.0011		<																			

TABLE 4.1
SOIL SAMPLING SUMMARY RESULTS - COMPARISON TO NJDEP STANDARDS
SITE FTMM-05
FORT MONMOUTH, NEW JERSEY

Field Sample Location	NJDEP Residential Direct Contact Soil Remediation Standard ⁽¹⁾	NJDEP Non- Residential Direct Contact Soil Remediation Standard ⁽¹⁾	NJDEP Impact to Groundwater Screening Level ⁽²⁾	Weston 1995 Background ⁽³⁾	B-75		B-76		B-77		B-78		B-79		B-80		B-80 Dup		B-81		B-82		B-83		B-84			
Sample Date					05/19/98		05/19/98		05/19/98		05/19/98		05/19/98		05/19/98		05/19/98		05/19/98		05/19/98		05/19/98		05/19/98		05/20/98	
Metals (mg/kg)																												
Aluminum	78,000	NA	6,000	15,200	1781		6780		8537		10590		10590		10450		10910		2577		2449		1275		9216			
Antimony	31	450	6	ND	<0.219		0.686		1.309		1.531		1.531		1.642		1.6		0.308		0.356		0.255		1.288			
Arsenic	19	19	19	22.9	1.452		6.874		8.003		10.88		10.88		10.26		11.24		5.594		1.387		0.858		11.23			
Barium	16,000	59,000	2,100	32.3	5.525		26.72		24.35		24.94		24.94		24.91		21.68		36.08		15.13		4.896		29.34			
Beryllium	16	140	0.7	2	0.2615		0.6806		0.9024		1.19		1.19		1.143		1.322		0.2973		0.3248		0.1492		0.634			
Cadmium	78	78	2	ND	<0.055		2		<0.055		<0.058		<0.058		<0.054		<0.064		0.0968		<0.056		<0.052		<0.061			
Calcium	NLE	NLE	NLE	921	117.9		510		440.1		809.2		908.2		611.8		297		865.2		316.7		134.9		817.1			
Chromium	NLE	NLE	NLE	269	18.67		61.92		97.55		96.08		96.08		112.3		149.7		11.66		19.27		12.27		62.61			
Cobalt	1,600	590	90	2.5	0.4013		2.925		2.623		5.587		5.587		5.818		4.822		1.554		0.4012		0.2038		1.854			
Copper	3,100	45,000	11,000	8	2.002		8.638		3.266		27.74		27.74		4.975		<0.386		17.64		1.524		1.995		43.09			
Iron	NLE	NLE	NLE	55,800	6671		28090		36430		56400		56400		47360		65860		6221		6563		4284		24830			
Lead	400	800	90	19.5	5.525		48.57		16.89		33.19		33.19		65.52		8.234		36.85		4.79		6.115		126.8			
Magnesium	NLE	NLE	NLE	7,230	334.2		887.6		863.8		1385		1385		1003		848.1		318.6		568.3		317.3		1392			
Manganese	11,000	5,900	65	90.7	13.35		67.87		62.27		160.5		160.5		141.4		68.32		17.63		12.37		8.873		40			
Mercury	23	65	0.1	ND	<0.023		0.028		0.029		<0.021		<0.021		<0.023		<0.022		0.061		<0.022		<0.020		0.123			
Nickel	1,600	23,000	48	8.4	1.679		8.334		10.82		13.68		13.68		15.43		17.24		4.848		1.503		0.8202		7.483			
Potassium	NLE	NLE	NLE	15400	614.6		1966		2023		3911		3911		2351		1996		648.6		1045		490		4076			
Selenium	390	5,700	11	1.9	<0.329		<0.331		<0.331		<0.350		<0.350		<0.325		<0.386		0.385		<0.338		<0.315		<0.365			
Silver	390	5,700	1	1.1	<0.329		<0.331		<0.331		<0.350		<0.350		<0.325		<0.386		<0.345		<0.338		<0.315		<0.365			
Sodium	NLE	NLE	NLE	51.6	27.75		32.16		31.08		150.5		150.5		27.11		90.62		138.3		13.7		23.19		61.43			
Thallium	5	79	3	ND	<0.329		<0.331		<0.331		<0.350		<0.350		<0.325		<0.386		<0.345		<0.338		<0.315		<0.365			
Vanadium	78	1,100	NLE	94.1	16.56		73.25		103		123		123		154.8		183.2		18.03		13.74		9.388		58.91			
Zinc	23,000	110,000	930	81.4	12.77		53.92		58.91		72.31		72.31		70.89		74.82		29.27		12.57		7.018		46.59			

Notes:

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(1) New Jersey Department of Environmental Protection (NJDEP) Residential Direct Contact Soil Remediation Standards (RDCSRS) and Non-Residential Direct Contact Soil Remediation Standards (NRDCSRS) (N.J.A.C 7:26D; amended May 7, 2012). Available at: <http://www.state.nj.us/dep/srp/regs/rs/>.

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

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D = Result from dilution of sample.

DUP = field duplicate sample.

E = Estimated value.

J = Analyte detected between MDL and practical quantitation limit (PQL).

NA = not analyzed.

ND = not detected.

NLE = No limit established.

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µg/kg = micrograms per kilogram.

mg/kg = milligrams per kilogram.

VOCs = volatile organic compounds.

in. = inches.

bgs = below ground surface.

Detections are bolded.

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Shaded cells = concentration exceeds one or both NJDEP Direct Contact Criteria.

Shaded cells = concentration exceeds all NJDEP criteria.

Shaded cells = concentration exceeds Weston (1995) background concentration.

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SITE FTMM-05
FORT MONMOUTH, NEW JERSEY

Field Sample Location	NJDEP Residential Direct Contact Soil Remediation Standard ⁽¹⁾	NJDEP Non-Residential Direct Contact Soil Remediation Standard ⁽¹⁾	NJDEP Impact to Groundwater Screening Level ⁽²⁾	Weston 1995 Background ⁽³⁾	B-85		B-86		B-87		B-88		B-89	B-90		B-91		B-92		B-93		B-94		B-95	B-96	
Sample Date					05/20/98		05/20/98		05/20/98		05/20/98		05/20/98	05/20/98		05/20/98		05/20/98		05/21/98		05/21/98		05/21/98	05/21/98	
Volatile Organic Compounds (VOCs, µg/kg)																										
Lab Sample ID (VOCs only collected at approximately 24 in. bgs)					3584.07		3584.11		3584.15		3584.19		3584.23	3584.27		3584.31		3584.35		3588.03		3588.07		3588.11	3588.15	
Methylene Chloride	34,000	97,000	10	-	<510		<560		<580		<630		<620	<610		<500		<540		<570		<570		<550	<610	
Benzene	2,000	5,000	5	-	<260		<280		<290		<310		<310	<300		<250		<270		<280		<280		<270	<300	
Tetrachloroethene	2,000	5,000	5	-	<260		<280		<290		<310		<310	<300		<250		<270		<280		<280		<270	<300	
Chloroform	600	2,000	400	-	<260		<280		<290		<310		<310	<300		<250		<270		<280		<280		<270	<300	
Ethylbenzene	7,800,000	110,000,000	13,000	-	<510		<560		<580		<630		<620	<610		<500		<540		<570		<570		<550	<610	
TICs	NLE	NLE	NLE	-	ND		ND		ND		ND		ND	ND		ND		ND		ND		ND		ND	ND	
Semivolatile Organic Compounds (SVOCs, µg/kg)																										
Lab Sample ID (All analyses except VOCs collected at approximately 6-12 in. bgs)					3584.06		3584.10		3584.14		3584.18		3584.22	3584.26		3584.30		3584.34		3588.02		3588.06		3588.10	3588.14	
Naphthalene	6,000	17,000	25,000	-	<240		<260		<240		<270		<280	130	J	<240		<250		<260		<250		<250	<260	
n-Nitrosodiphenylamine	99,000	390,000	400	-	<180		<190		<180		<210		<210	<200		<180		<190		<200		<190		<190	<190	
2-Methylnaphthalene	230,000	2,400,000	8,000	-	<270		<290		<270		<310		<320	170	J	<270		<280		<290		<280		<280	<290	
4-Methylphenol	31,000	340,000	NLE	-	<270		<280		<270		<300		<310	<290		<270		<280		<280		<270		<280	<280	
Acenaphthylene	NLE	3.00E+08	NLE	-	<190		<200		<190		<220		<220	<210		<190		<200		<200		<190		<200	<200	
Acenaphthene	3,400,000	37,000,000	110,000	-	<180		<190		<180		<200		<200	<190		<170		590		<190		<180		<180	<180	
Dibenzofuran	NLE	NLE	NLE	-	<190		<200		<190		<210		<220	<200		<180		640		<200		<190		<190	<200	
Diethylphthalate	49,000,000	550,000,000	88,000	-	<200		<220		<200		<230		<240	<220		<200		<210		<220		<210		<210	<210	
Fluorene	2,300,000	24,000,000	170,000	-	<190		<200		<190		<210		<220	<210		<190		1100		<200		<190		<200	<200	
Phenanthrene	NLE	300,000,000	NLE	-	<190		<200		<190		<220		<220	480		<190		<200		<210		<200		<200	<200	
Anthracene	17,000,000	30,000,000	2,400,000	-	<190		<200		<190		<220		<220	<210		<190		3300		<210		<200		<200	<200	
Dimethylphthalate	NLE	NLE	NLE	-	<150		<160		<150		<170		<180	<160		<150		<160		<160		<150		<160	<160	
Di-n-butylphthalate	6,100,000	68,000,000	760,000	-	640	JB	870	JB	660	JB	290	JB	<970	510	JB	320	JB	280	JB	470	JB	270	JB	<860	430	JB
Fluoranthene	2,300,000	24,000,000	1,300,000	-	<190		<210		<190		<220		<230	480		<190		<200		<210		<200		<200	<200	
Pyrene	1,700,000	18,000,000	840,000	-	140	J	<240		<230		<250		<260	840		<220		11000		<240		<230		<230	<240	
Pyridine	NLE	NLE	NLE	-	<300		<320		<300		<340		<350	<320		<300		<310		<320		<300		<310	<320	
Butylbenzylphthalate	1,200,000	14,000,000	230,000	-	<250		<270		<250		<280		<290	<270		<250		<260		<270		<250		<260	<270	
Benzo(a)anthracene	600	2,000	800	-	<200		<210		<200		<220		<230	360		<190		7200		<210		<200		<200	<210	
3,3'-Dichlorobenzidine	1,000	4,000	200	-	<340		<370		<340		<390		<400	<370		<340		<360		<370		<350		<360	<360	
Chrysene	62,000	230,000	80,000	-	120	J	<270		<250		<280		<290	590		<250		9700		<270		<250		<260	<270	
bis(2-Ethylhexyl)phthalate	35,000	140,000	1,200,000	-	110	J	150	J	160	J	<310		<320	120	J	110	J	<290		<300		<280		<290	<290	
Benzo(b)fluoranthene	600	2,000	2,000	-	<250		<260		<250		<270		<290	250	J	<240		5600		<260		<250		<250	<260	
Benzo(k)fluoranthene	6,000	23,000	25,000	-	<180		<190		<180		<200		<210	340		<180		3900		<190		<180		<190	<190	
Benzo(a)pyrene	200	200	200	-	<190		<200		<190		<210		<220	410		<190		5300		<200		<190		<190	<200	
Indeno(1,2,3-cd)pyrene	600	2,000	7,000	-	<200		<220		<200		<230		<240	200	J	<200		3000		<220		<210		<210	<220	
Dibenz(a,h)anthracene	200	200	800	-	<240		<250		<240		<270		<280	<260		<240		640		<250		<240		<250	<250	
Benzo(g,h,i)perylene	380,000,000	30,000,000	NLE	-	<240		<250		<240		<270		<280	230	J	<240		2800		<250		<240		<250	<250	
Total TICs	NLE	NLE	NLE	-	17900		9900		11650		16700		8600	1100		8400		47930		9080		9500		223800	8700	
Pesticides / PCBs (mg/kg)																										
Heptachlor	0.1	0.7	0.5	-	<0.0003		<0.0003		<0.0003		<0.0003		<0.0003	<0.0003		<0.0003		<0.0003		<0.0003		<0.0003		<0.0003	<0.0003	
Heptachlor Epoxide	0.07	0.3	0.01	-	<0.0006		<0.0006		<0.0006		<0.0007		<0.0007	<0.0006		<0.0006		<0.0006		<0.0006		<0.0006		<0.0006	<0.0006	
4,4'-DDE	2	9	18	-	<0.0004		0.002		0.007		<0.0005		0.006	0.001		0.002		<0.0004		0.008		0.002		<0.0004	0.003	
Dieldrin	0.04	0.2	0.003	-	<0.0005		<0.0005		<0.0005		<0.0006		<0.0006	<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005	<0.0005	
Endrin	23	340	1	-	<0.0005		<0.0005		<0.0005		<0.0006		<0.0006	<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005	<0.0005	
4,4'-DDD	3	13	4	-	<0.0006		<0.0006		<0.0006		<0.0007		<0.0007	<0.0006		<0.0006		<0.0006		0.004		<0.0006		<0.0006	<0.0006	
Endrin Aldehyde	NLE	NLE	NLE	-	<0.0005		<0.0005		<0.0005		<0.0006		<0.0006	<0.0005		<0.0005		<0.0005</								

TABLE 4.1
SOIL SAMPLING SUMMARY RESULTS - COMPARISON TO NJDEP STANDARDS
SITE FTMM-05
FORT MONMOUTH, NEW JERSEY

Field Sample Location	NJDEP Residential Direct Contact Soil Remediation Standard ⁽¹⁾	NJDEP Non-Residential Direct Contact Soil Remediation Standard ⁽¹⁾	NJDEP Impact to Groundwater Screening Level ⁽²⁾	Weston 1995 Background ⁽³⁾	B-85		B-86		B-87		B-88		B-89		B-90		B-91		B-92		B-93		B-94		B-95		B-96	
Sample Date					05/20/98		05/20/98		05/20/98		05/20/98		05/20/98		05/20/98		05/20/98		05/20/98		05/21/98		05/21/98		05/21/98		05/21/98	
Metals (mg/kg)																												
Aluminum	78,000	NA	6,000	15,200	6650		7711		7796		5870		4347	4758		2982		2424		6587		7273		6776	1231			
Antimony	31	450	6	ND	0.52		1.219		0.834	ND	0.834		0.237	0.945		0.542		0.305		0.864		0.705		0.293	1.11			
Arsenic	19	19	19	22.9	4.61		8.103		10.68		12.43		2.981	15.53		4.745		1.092		9.735		9.53		7.075	12.33			
Barium	16,000	59,000	2,100	32.3	14.66		14.57		29.97		192.3		25.61	8.797		21.03		12.71		18.68		21.47		50.99	96.83			
Beryllium	16	140	0.7	2	0.3893		0.9604		0.9373		4.787		0.3072	0.4409		0.3972		0.3802		0.49		0.7067		0.591	0.1224			
Cadmium	78	78	2	ND	<0.060		<0.059		<0.060	ND	0.674		<0.067	<0.053		<0.055		<0.053		<0.060		<0.058		<0.061	<0.061			
Calcium	NLE	NLE	NLE	921	590.2		646.2		1477		1547		1663	181.2		987.9		168.5		393.2		502.8		1605	383.6			
Chromium	NLE	NLE	NLE	269	37.09		91.08		88.9		54.19		7.984	58.29		27.55		16.35		56.44		57.07		28.21	11.51			
Cobalt	1,600	590	90	2.5	2.493		2.845		3.717		7.393		3.526	0.5178		0.9371		0.4263		1.026		3.164		4.892	1.152			
Copper	3,100	45,000	11,000	8	3.002		0.413		4.648		2314		46.74	139.2		10.16		2.46		11.74		2.615		19.37	26.15			
Iron	NLE	NLE	NLE	55,800	13010		41350		41280		12220		5168	15660		12860		6114		21140		28210		10070	7920			
Lead	400	800	90	19.5	6.786		7.797		90.95		1267		15.43	19.27		50.74		5.981		30.17		131.3		18.73	78.99			
Magnesium	NLE	NLE	NLE	7,230	974.8		780.5		1019		614.5		359.5	1090		748		517.9		879		895		1135	286			
Manganese	11,000	5,900	65	90.7	85.56		49.43		101.9		175.7		97.42	9.783		28.45		22.4		16.42		67.3		32.46	15.55			
Mercury	23	65	0.1	ND	0.024		<0.023		0.034		0.044		0.039	0.044		0.053		0.036		0.051		0.024		0.05	0.184			
Nickel	1,600	23,000	48	8.4	3.728		12.44		14.15		22.36		10.93	2.453		3.39		1.526		4.015		8.536		14.98	4.765			
Potassium	NLE	NLE	NLE	15400	1656		1321		1580		1654		633.6	3985		1988		1086		2804		2075		2495	472.2			
Selenium	390	5,700	11	1.9	<0.363		<0.355		<0.359		1.379		<0.405	1.146		<0.329		<0.318		<0.363		<0.349		0.627	3.91			
Silver	390	5,700	1	1.1	<0.363		<0.355		<0.359		3.472		<0.405	<0.319		<0.329		<0.318		<0.363		<0.349		<0.364	<0.367			
Sodium	NLE	NLE	NLE	51.6	38.89		40.52		116.5		335.1		440.7	186.3		128.8		22.98		91.43		37.29		216.6	58.66			
Thallium	5	79	3	ND	<0.363		<0.355		<0.359		<0.381		<0.405	<0.319		<0.329		<0.318		<0.363		<0.349		<0.364	<0.367			
Vanadium	78	1,100	NLE	94.1	32.18		108.4		113.1		18.83		9.574	11.28		11.94		9.943		51.64		75.4		25.26	9.353			
Zinc	23,000	110,000	930	81.4	20.41		57.83		79.89		500.7		26.7	35.88		76.22		14.81		27.7		41.81		27.54	13.94			

Notes:

Historically, there have been up to 318 soil boring locations associated with FTMM-05. This analysis looks at only those boring locations that fall within the footprint of FTMM-05.

(1) New Jersey Department of Environmental Protection (NJDEP) Residential Direct Contact Soil Remediation Standards (RDCSRS) and Non-Residential Direct Contact Soil Remediation Standards (NRDCSRS) (N.J.A.C 7:26D; amended May 7, 2012). Available at: <http://www.state.nj.us/dep/srp/regs/rs/>.

(2) NJDEP Impact to Groundwater (NJDEP guidance document; Nov 2013).

(3) Weston, 1995. Final Site Investigation - Main Post and Charles Wood Areas, Fort Monmouth, New Jersey, December.

NJDEP criteria for total xylenes are used for xylene isomers (m+p, o).

NJDEP criteria for endrin is used for endrin aldehyde.

NJDEP criteria for 4,4'-DDD and 4,4'-DDT are for total DDD and total DDT, respectively.

There are no NJDEP soil standards for individual PCB Arcolors; the total PCB NJDEP standards were used for individual Arcolors

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

B = Analyte detected in both sample and associated laboratory blank.

D = Result from dilution of sample.

DUP = field duplicate sample.

E = Estimated value.

J = Analyte detected between MDL and practical quantitation limit (PQL).

NA = not analyzed.

ND = not detected.

NLE = No limit established.

< = analyte not detected above method detection limit (MDL).

µg/kg = micrograms per kilogram.

mg/kg = milligrams per kilogram.

VOCs = volatile organic compounds.

in. = inches.

bgs = below ground surface.

Detections are bolded.

Shaded cells = concentration exceeds NJDEP Impact to Groundwater Criterion.

Shaded cells = concentration exceeds one or both NJDEP Direct Contact Criteria.

Shaded cells = concentration exceeds all NJDEP criteria.

Shaded cells = concentration exceeds Weston (1995) background concentration.

TABLE 4.1
SOIL SAMPLING SUMMARY RESULTS - COMPARISON TO NJDEP STANDARDS
SITE FTMM-05
FORT MONMOUTH, NEW JERSEY

Field Sample Location	NJDEP Residential Direct Contact Soil Remediation Standard ⁽¹⁾	NJDEP Non- Residential Direct Contact Soil Remediation Standard ⁽¹⁾	NJDEP Impact to Groundwater Screening Level ⁽²⁾	Weston 1995 Background ⁽³⁾	B-97		B-98		B-99	B-158		B-159		B-160		B-160 Dup		B-161		B-162		B-163		B-164		B-164	
Sample Date					05/21/98	05/21/98	05/26/98	06/17/98	06/17/98	06/17/98	06/17/98	06/17/98	06/17/98	06/26/98	06/26/98	06/26/98	06/26/98	06/26/98	06/26/98	06/26/98	06/26/98	06/26/98	06/26/98	06/26/98	06/26/98	06/26/98	06/26/98
Volatile Organic Compounds (VOCs, µg/kg)																											
Lab Sample ID (VOCs only collected at approximately 24 in. bgs)					3588.19		3588.22		3593.03		3665.13		3665.17		3665.20		3665.26		3665.23		3686.05		3686.08		3686.11		3688.03
Methylene Chloride	34,000	97,000	10	-	<580		<660		<610	<560		<570		<560		<550		<570		<630		<650		<530		<620	
Benzene	2,000	5,000	5	-	<290		<330		<300	<280		<290		<280		<280		<280		<310		<330		<270		<310	
Tetrachloroethene	2,000	5,000	5	-	<290		<330		<300	<280		<290		<280		<280		<280		<310		<330		<270		<310	
Chloroform	600	2,000	400	-	<290		<330		<300	<280		<290		<280		<280		<280		<310		<330		<270		<310	
Ethylbenzene	7,800,000	110,000,000	13,000	-	<580		<660		<610	<560		<570		<560		<550		<570		<630		<650		<530		<620	
TICs	NLE	NLE	NLE	-	ND		ND		ND	ND		ND		ND		ND		ND		1400		ND		ND		ND	
Semivolatile Organic Compounds (SVOCs, µg/kg)																											
Lab Sample ID (All analyses except VOCs collected at approximately 6-12 in. bgs)					3588.18		3588.22		3593.02		3665.12		3665.16		3665.19		3665.25		3665.22		3686.04		3686.07		3686.10		
Naphthalene	6,000	17,000	25,000	-	<230		<290		<2600	<240		<270		<260		<270		<250		<310		<270		<260			
n-Nitrosodiphenylamine	99,000	390,000	400	-	<170		<220		<1900	<180		<210		<190		<200		<190		<230		<200		<190			
2-Methylnaphthalene	230,000	2,400,000	8,000	-	<260		<320		<2900	<270		<310		<290		<300		<280		<340		<300		<290			
4-Methylphenol	31,000	340,000	NLE	-	<250		<320		<2800	<260		<300		<280		<290		<280		<330		<300		<280			
Acenaphthylene	NLE	3.00E+08	NLE	-	<180		<230		<2000	<190		<220		<200		<210		<200		<240		<210		<200			
Acenaphthene	3,400,000	37,000,000	110,000	-	<170		<210		<1800	<170		<200		<180		<190		<180		<220		<190		<180			
Dibenzofuran	NLE	NLE	NLE	-	<180		<220		<2000	<180		<210		<200		<210		<190		<230		<210		<190			
Diethylphthalate	49,000,000	550,000,000	88,000	-	<190		<240		<2100	<200		<230		<210		<220		<210		<250		<220		<210			
Fluorene	2,300,000	24,000,000	170,000	-	<180		<230		<2000	<190		<210		<200		<210		<200		<240		<210		<200			
Phenanthrene	NLE	300,000,000	NLE	-	<180		160	J	<2000	<190		<220		<200		<210		<200		<240		230		<200			
Anthracene	17,000,000	30,000,000	2,400,000	-	<180		<230		<2000	<190		<220		<200		<210		<200		<240		<210		<200			
Dimethylphthalate	NLE	NLE	NLE	-	<140		<180		<1600	<150		<170		<160		<170		<160		<190		<170		<160			
Di-n-butylphthalate	6,100,000	68,000,000	760,000	-	730	JB	500	JB	<8800	230	JB	210	JB	900	B	490	JB	180	JB	460	JB	1100	B	380	JB		
Fluoranthene	2,300,000	24,000,000	1,300,000	-	240		210	J	<2000	<190		<220		300		150	J	<200		<240		830		<200			
Pyrene	1,700,000	18,000,000	840,000	-	160	J	200	J	<2400	<220		<250		400		170	J	<230		<280		1100		<240			
Pyridine	NLE	NLE	NLE	-	<280		<350		<3100	<290		<340		<310		<330		<310		<370		<330		<310			
Butylbenzylphthalate	1,200,000	14,000,000	230,000	-	<2409		<300		<2600	<250		<280		<260		<280		<260		<310		<280		<260			
Benzo(a)anthracene	600	2,000	800	-	120	J	140	J	<2100	<190		<220		150	J	<220		<200		<250		590		<210			
3,3'-Dichlorobenzidine	1,000	4,000	200	-	<330		<410		<3600	<340		<390		<360		<380		<360		<430		<380		<360			
Chrysene	62,000	230,000	80,000	-	170	J	290	J	<2600	<250		<280		340		180	J	<260		<310		1100		<260			
bis(2-Ethylhexyl)phthalate	35,000	140,000	1,200,000	-	100	J	<330		<2900	<270		<310		<290		<310		<290		<350		13000		<290			
Benzo(b)fluoranthene	600	2,000	2,000	-	110	J	160	J	<2600	<240		<270		140	J	<270		<250		<310		610		<260			
Benzo(k)fluoranthene	6,000	23,000	25,000	-	<170		<220		<1900	<180		<200		130	J	<200		<190		<230		630		<190			
Benzo(a)pyrene	200	200	200	-	110	J	<220		<2000	<180		<210		130	J	<210		<190		<230		530		<200			
Indeno(1,2,3-cd)pyrene	600	2,000	7,000	-	<190		<240		<2100	<200		<230		<210		<220		<210		<260		290		<210			
Dibenz(a,h)anthracene	200	200	800	-	<230		<280		<2500	<230		<270		<250		<260		<250		<300		<260		<250			
Benzo(g,h,i)perylene	380,000,000	30,000,000	NLE	-	<230		<280		<2500	<230		<270		<250		<260		<250		<300		310		<250			
Total TICs	NLE	NLE	NLE	-	10620		8500		105300	1700		1600		1200		ND		ND		ND		18520		940			
Pesticides / PCBs (mg/kg)																											
Heptachlor	0.1	0.7	0.5	-	<0.0003		<0.0003		<0.0003	<0.0003		<0.0003		0.003		<0.0003		<0.0003		<0.0004		<0.0003		<0.0003			
Heptachlor Epoxide	0.07	0.3	0.01	-	0.001		<0.0007		<0.0006	<0.0006		<0.0006		<0.0006		<0.0006		<0.0006		<0.0007		<0.0007		<0.0006			
4,4'-DDE	2	9	18	-	0.008		0.166	18	0.008	<0.0004		0.003		0.011		0.011		<0.0004		<0.0005		<0.0005		<0.0004			
Dieldrin	0.04	0.2	0.003	-	<0.0005		<0.0006		<0.0005	<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0006		<0.0006		<0.0005			
Endrin	23	340	1	-	<0.0005		<0.0006		<0.0005	<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0006		<0.0006		<0.0005			
4,4'-DDD	3	13	4	-	0.003		0.02		<0.0006	<0.0006		<0.0006		<0.0006		<0.0006		<0.0006		<0.0007		<0.0007		<0.0006			
Endrin Aldehyde	NLE	NLE	NLE	-	<0.0005		<0.0006		<0.0005	<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0006		<0.0006		<0.0005			
4,4'-DDT	2	8	11	-	0.014		0.077																				

TABLE 4.1
SOIL SAMPLING SUMMARY RESULTS - COMPARISON TO NJDEP STANDARDS
SITE FTMM-05
FORT MONMOUTH, NEW JERSEY

Field Sample Location	NJDEP Residential Direct Contact Soil Remediation Standard ⁽¹⁾	NJDEP Non-Residential Direct Contact Soil Remediation Standard ⁽¹⁾	NJDEP Impact to Groundwater Screening Level ⁽²⁾	Weston 1995 Background ⁽³⁾	B-97		B-98		B-99		B-158		B-159		B-160		B-160 Dup		B-161		B-162		B-163		B-164		B-164	
Sample Date					05/21/98		05/21/98		05/26/98		06/17/98		06/17/98		06/17/98		06/17/98		06/26/98		06/26/98		06/26/98		06/26/98		06/26/98	
Metals (mg/kg)																												
Aluminum	78,000	NA	6,000	15,200	8665		2673		3319	2715		6285				6418		5319		2685		7000		1807				
Antimony	31	450	6	ND	0.813		0.397		1.522	0.349		0.487				0.678		0.579		0.337		4.693		0.31				
Arsenic	19	19	19	22.9	9.33		7.349		4.823	1.328		8.398				8.753		4.368		5.292		67.77		0.977				
Barium	16,000	59,000	2,100	32.3	35.87		108.4		25.33	15.24		16.27				18.2		11.72		35.73		180.7		8.533				
Beryllium	16	140	0.7	2	0.6407		0.2846		0.2113	0.401		0.5945				0.7039		0.4884		0.2658		0.562		0.3014				
Cadmium	78	78	2	ND	<0.060		0.415		8.552	0.1991		<0.062				<0.061		<0.053		0.4376		<0.065		0.4001				
Calcium	NLE	NLE	NLE	921	1533		1042		1011	230.8		705.6				604.4		395		1154		9589		211.4				
Chromium	NLE	NLE	NLE	269	41.47		11.65		20.07	20.65		48.92				53.4		41.48		13.87		65.41		14.53				
Cobalt	1,600	590	90	2.5	3.802		2.666		2.289	0.3999		2.458				2.825		1.602		2.082		14.15		0.2978				
Copper	3,100	45,000	11,000	8	14.07		48.11		1168	1.01		7.446				5.783		1.858		23.12		433		1.341				
Iron	NLE	NLE	NLE	55,800	21290		4878		7295	7173		25200				28760		13430		5905		131900		5494				
Lead	400	800	90	19.5	46.73		69.52		4549	3.345		22.86				17.83		4.473		46.83		98.63		2.754				
Magnesium	NLE	NLE	NLE	7,230	1372		342.3		783.4	712.5		914.9				859.9		1036		494.8		1008		363.8				
Manganese	11,000	5,900	65	90.7	78.04		59.09		2581	20.15		50.78				63.65		36.64		24.99		623.9		17.74				
Mercury	23	65	0.1	ND	0.099		0.34		4.465	<0.022		<0.025				<0.024		<0.021		0.031		0.067		<0.022				
Nickel	1,600	23,000	48	8.4	11.81		8.137		6.487	1.697		6.746				7.369		2.982		5.629		67.18		1.4				
Potassium	NLE	NLE	NLE	15400	3002		456		1426	1740		1640				1671		2860		716.6		1579		587.3				
Selenium	390	5,700	11	1.9	<0.358		1.474		0.504	<0.288		<0.369				<0.365		<0.317		<0.430		<0.389		<0.333				
Silver	390	5,700	1	1.1	<0.358		0.421		37.83	<0.288		<0.369				<0.365		<0.317		<0.430		<0.389		<0.333				
Sodium	NLE	NLE	NLE	51.6	183.9		177.3		235.1	61.53		62.96				34.22		<2.112		134.2		953.4		4.653				
Thallium	5	79	3	ND	<0.358		<0.380		<0.363	<0.288		<0.369				<0.365		<0.317		<0.430		<0.389		<0.333				
Vanadium	78	1,100	NLE	94.1	50.3		10.97		16.76	11.98		58.35				66.43		30.25		17.05		15.28		10.23				
Zinc	23,000	110,000	930	81.4	43.54		73.52		9772	15.95		39.62				41.11		17.6		29.63		457.1		13.81				

Notes:

Historically, there have been up to 318 soil boring locations associated with FTMM-05. This analysis looks at only those boring locations that fall within the footprint of FTMM-05.

(1) New Jersey Department of Environmental Protection (NJDEP) Residential Direct Contact Soil Remediation Standards (RDCSRS) and Non-Residential Direct Contact Soil Remediation Standards (NRDCSRS) (N.J.A.C 7:26D; amended May 7, 2012). Available at: <http://www.state.nj.us/dep/srp/regs/rs/>.

(2) NJDEP Impact to Groundwater (NJDEP guidance document; Nov 2013).

(3) Weston, 1995. Final Site Investigation - Main Post and Charles Wood Areas, Fort Monmouth, New Jersey, December.

NJDEP criteria for total xylenes are used for xylene isomers (m+p, o).

NJDEP criteria for endrin is used for endrin aldehyde.

NJDEP criteria for 4,4'-DDD and 4,4'-DDT are for total DDD and total DDT, respectively.

There are no NJDEP soil standards for individual PCB Arcolors; the total PCB NJDEP standards were used for individual Arcolors

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

B = Analyte detected in both sample and associated laboratory blank.

D = Result from dilution of sample.

DUP = field duplicate sample.

E = Estimated value.

J = Analyte detected between MDL and practical quantitation limit (PQL).

NA = not analyzed.

ND = not detected.

NLE = No limit established.

< = analyte not detected above method detection limit (MDL).

µg/kg = micrograms per kilogram.

mg/kg = milligrams per kilogram.

VOCs = volatile organic compounds.

in. = inches.

bgs = below ground surface.

Detections are bolded.

Shaded cells = concentration exceeds NJDEP Impact to Groundwater Criterion.

Shaded cells = concentration exceeds one or both NJDEP Direct Contact Criteria.

Shaded cells = concentration exceeds all NJDEP criteria.

Shaded cells = concentration exceeds Weston (1995) background concentration.

TABLE 4.1
SOIL SAMPLING SUMMARY RESULTS - COMPARISON TO NJDEP STANDARDS
SITE FTMM-05
FORT MONMOUTH, NEW JERSEY

Field Sample Location	NJDEP Residential Direct Contact Soil Remediation Standard ⁽¹⁾	NJDEP Non- Residential Direct Contact Soil Remediation Standard ⁽¹⁾	NJDEP Impact to Groundwater Screening Level ⁽²⁾	Weston 1995 Background ⁽³⁾	B-165		B-166		B-167		B-168		B-169		B-178		B-179		B-180		B-180 Dup		B-181		B-197
Sample Date					06/29/98	06/29/98	06/29/98	06/29/98	06/29/98	07/13/98	07/13/98	07/13/98	07/13/98	07/13/98	07/13/98	07/13/98	08/12/98								
Volatile Organic Compounds (VOCs, µg/kg)																									
Lab Sample ID (VOCs only collected at approximately 24 in. bgs)					3688.07		3688.10		3688.13				3688.16		3722.13		3722.16		3722.19		3722.25		3722.22		3805.03
Methylene Chloride	34,000	97,000	10	-	<560		<670		<660		NA		<670		<520		<540		<520		<540		<560		<600
Benzene	2,000	5,000	5	-	<280		<340		<330		NA		<340		<260		<270		<260		<270		<280		<300
Tetrachloroethene	2,000	5,000	5	-	<280		3200		<330		NA		<340		<260		<270		<260		<270		<280		<300
Chloroform	600	2,000	400	-	<280		<340		<330		NA		<340		<260		<270		<260		<270		<280		<300
Ethylbenzene	7,800,000	110,000,000	13,000	-	<560		<670		<660		NA		<670		<520		<540		<520		<540		<560		<600
TICs	NLE	NLE	NLE	-	ND		ND		ND		NA		ND		ND		ND		ND		ND		ND		ND
Semivolatile Organic Compounds (SVOCs, µg/kg)																									
Lab Sample ID (All analyses except VOCs collected at approximately 6-12 in. bgs)					3688.02		3688.06		3688.09		3688.12		3688.15		3722.12		3722.15		3722.18		3722.24		3722.21		3805.02
Naphthalene	6,000	17,000	25,000	-	<270		<260		<260		<280		<320		<260		<240		<250		<240		<280		<260
n-Nitrosodiphenylamine	99,000	390,000	400	-	<200		<190		<200		<210		<240		<190		<180		<190		<180		<210		<200
2-Methylnaphthalene	230,000	2,400,000	8,000	-	<300		<290		<290		<310		<360		<290		<270		<280		<270		<310		<290
4-Methylphenol	31,000	340,000	NLE	-	<290		<280		<290		<310		<350		<280		<270		<270		<260		<300		<290
Acenaphthylene	NLE	3.00E+08	NLE	-	<210		<200		<210		<220		<250		<200		<190		<200		<190		<220		<210
Acenaphthene	3,400,000	37,000,000	110,000	-	<190		<190		<190		<200		<230		<180		<170		<180		<170		<200		<190
Dibenzofuran	NLE	NLE	NLE	-	<200		<200		<200		<210		<240		<190		<180		<190		<180		<210		<200
Diethylphthalate	49,000,000	550,000,000	88,000	-	<220		<210		<220		<230		<270		<210		<200		<210		<200		<230		<220
Fluorene	2,300,000	24,000,000	170,000	-	<210		<200		<210		<220		<250		<200		<190		<190		<190		<220		<210
Phenanthrene	NLE	300,000,000	NLE	-	<210		<200		740		<220		<250		<200		<190		250		330		<220		<210
Anthracene	17,000,000	30,000,000	2,400,000	-	<210		<200		<210		<220		<250		<200		<190		<200		<190		<220		<210
Dimethylphthalate	NLE	NLE	NLE	-	<170		<160		<160		<170		<200		<160		<150		<150		<150		<170		<160
Di-n-butylphthalate	6,100,000	68,000,000	760,000	-	240	JB	290	JB	120	JB	480	JB	190	JB	580	JB	310	JB	610	JB	520	JB	760	JB	<900
Fluoranthene	2,300,000	24,000,000	1,300,000	-	<210		<210		470		<220		<260		<200		<190		230		360		<220		<210
Pyrene	1,700,000	18,000,000	840,000	-	110	J	<240		920		<260		<300		<240		<220		370		580		<260		<240
Pyridine	NLE	NLE	NLE	-	<330		<320		<320		<340		<390		<310		<300		<300		<300		<340		<320
Butylbenzylphthalate	1,200,000	14,000,000	230,000	-	<280		<270		<270		<290		<330		<260		<250		<260		<260		<280		<270
Benzo(a)anthracene	600	2,000	800	-	<220		<210		280		<230		<260		<210		<190		140	J	190		<220		<210
3,3'-Dichlorobenzidine	1,000	4,000	200	-	<380		<360		<370		<400		<450		<360		<340		<350		<350		<390		<370
Chrysene	62,000	230,000	80,000	-	<280		160	J	580		<290		<330		<260		<250		390		600		<280		<270
bis(2-Ethylhexyl)phthalate	35,000	140,000	1,200,000	-	<310		<290		<300		<320		<360		<290		110	J	<280		100	J	<310		<300
Benzo(b)fluoranthene	600	2,000	2,000	-	<270		170	J	200	J	<280		<320		<260		<240		110	J	130	J	<280		<260
Benzo(k)fluoranthene	6,000	23,000	25,000	-	<200		140	J	220		<210		<240		<190		<180		<190		190		<210		<200
Benzo(a)pyrene	200	200	200	-	<210		<200		210		<210		<250		<200		<190		<190		220		<210		<200
Indeno(1,2,3-cd)pyrene	600	2,000	7,000	-	<220		120	J	120	J	<230		<270		<210		<200		<210		<200		<230		<220
Dibenz(a,h)anthracene	200	200	800	-	<260		<250		<260		<270		<310		<250		<240		<240		<240		<270		<260
Benzo(g,h,i)perylene	380,000,000	30,000,000	NLE	-	<260		<250		140	J	<270		<310		<250		<240		<240		<240		<270		<260
Total TICs	NLE	NLE	NLE	-	2990		2500		3000		3100		ND		15500		14830		16310		18820		18450		12130
Pesticides / PCBs (mg/kg)																									
Heptachlor	0.1	0.7	0.5	-	<0.0003		<0.0003		<0.0003		<0.0003		<0.0004		<0.0003		<0.0003		<0.0003		<0.0003		<0.0003		<0.0003
Heptachlor Epoxide	0.07	0.3	0.01	-	<0.0006		<0.0006		<0.0006		<0.0007		<0.0008		<0.0006		<0.0006		<0.0006		<0.0006		<0.0007		<0.0007
4,4'-DDE	2	9	18	-	0.011		0.003		0.067		0.003		<0.0005		<0.0004		0.002		0.006		0.008		<0.0004		0.033
Dieldrin	0.04	0.2	0.003	-	<0.0005		<0.0005		<0.0005		<0.0006		<0.0007		<0.0005		<0.0005		<0.0005		<0.0005		<0.0006		<0.0005
Endrin	23	340	1	-	<0.0005		<0.0005		<0.0005		<0.0006		<0.0007		<0.0005		<0.0005		<0.0005		<0.0005		<0.0006		<0.0005
4,4'-DDD	3	13	4	-	<0.0006		<0.0006		0.016		<0.0007		<0.0008		<0.0006		<0.0006		<0.0006		<0.0006		<0.0007		0.001
Endrin Aldehyde	NLE	NLE	NLE	-	<0.0005		<0.0005		<0.0005		<0.0006		<0.0007		<0.0005		<0.0005		<0.0005		<0.0005		<0.0006		<0.0005
4,4'-DDT	2	8	11	-	0.01		0.01		0.091		0.002		<0.0014		<0.0011		0.002		0.009		0.009		<0.0012		0.015
Endosulfan I	470	6,800	4	-	<0.0005		<0.0005		<0.0005		<0.0006		<0.0007		<0.0005		<0.0005		<0.0005		<0.0005		<0.0006		<0.0005
Endosulfan II	470	6,800	4	-	<0.0004		<0.0004		<0.0004		<0.0005		<0.0005		<0.0004		<0.0004		<0.0004		<0.0004		<0.0004		<0.0004
Endosulfan-Sulfate	470	6,800	2	-	<0.0004		<0.0004		<0.0004		<0.0005		<0.0005		<0.0004		<0.0004		<0.0004		<0.0004		<0.0004		<0.0004
gamma-Chlordane	0.2	1	0.05	-	<0.0005		<0.0005																		

TABLE 4.1
SOIL SAMPLING SUMMARY RESULTS - COMPARISON TO NJDEP STANDARDS
SITE FTMM-05
FORT MONMOUTH, NEW JERSEY

Field Sample Location	NJDEP Residential Direct Contact Soil Remediation Standard ⁽¹⁾	NJDEP Non- Residential Direct Contact Soil Remediation Standard ⁽¹⁾	NJDEP Impact to Groundwater Screening Level ⁽²⁾	Weston 1995 Background ⁽³⁾	B-165		B-166		B-167		B-168		B-169		B-178		B-179		B-180		B-180 Dup		B-181		B-197			
Sample Date					06/29/98		06/29/98		06/29/98		06/29/98		06/29/98		07/13/98		07/13/98		07/13/98		07/13/98		07/13/98		07/13/98		08/12/98	
Metals (mg/kg)																												
Aluminum	78,000	NA	6,000	15,200	5053		9267		6171		3375		1764		5330		1710		10000		3330		12500		5970			
Antimony	31	450	6	ND	0.822		1.298		0.638		<0.261		0.368		0.54		0.391		0.537		<0.226		1.16		0.253			
Arsenic	19	19	19	22.9	6.525		17.45		9.463		4.215		3.946		6.39		1.55		9.99		3.72		11.6		4.98			
Barium	16,000	59,000	2,100	32.3	15.48		14.34		54.63		31.47		45.13		21.4		5.27		42.8		21.7		14.2		47.1			
Beryllium	16	140	0.7	2	0.4805		0.5758		0.5529		0.3019		0.1749		0.728		0.255		1.35		0.492		1.8		0.53			
Cadmium	78	78	2	ND	0.2383		<0.061		0.3187		0.3736		0.3013		<4.182		<0.057		<0.050		<0.057		<0.062		<0.058			
Calcium	NLE	NLE	NLE	921	665		441.5		1435		1273		624.1		851		127		1240		668		86.4		1720			
Chromium	NLE	NLE	NLE	269	55.07		72.9		47.49		10.58		3.82		58.8		19.6		110		34.5		139		17.1			
Cobalt	1,600	590	90	2.5	0.9522		0.8807		2.798		4.252		1.702		1.22		0.247		1.97		1.34		1.1		5.69			
Copper	3,100	45,000	11,000	8	12.07		7.172		38.89		20.07		14.28		4.95		1		7.44		9.92		<0.374		37.8			
Iron	NLE	NLE	NLE	55,800	18160		30120		21260		4301		2469		19400		7740		35100		12100		48800		7220			
Lead	400	800	90	19.5	42.83		14.31		94.14		20.43		18.74		7.58		7.32		14.6		13.5		6.18		40			
Magnesium	NLE	NLE	NLE	7,230	983.2		902.7		1306		468.3		159.2		1620		436		4220		975		1660		791			
Manganese	11,000	5,900	65	90.7	30.92		12.46		59.92		34.87		17.16		38.7		4.3		45.3		44.3		17.6		47.8			
Mercury	23	65	0.1	ND	0.051		0.064		0.101		0.025		<0.026		1.68		0.013		0.042		0.019		0.028		0.063			
Nickel	1,600	23,000	48	8.4	3.563		4.461		8.902		11.23		4.544		3.57		1.14		5.91		3.9		6.24		14.9			
Potassium	NLE	NLE	NLE	15400	2960		2850		3105		598.3		193.8		3980		774		9010		2050		3210		1300			
Selenium	390	5,700	11	1.9	<0.339		0.371		0.342		<0.392		<0.399		<25.092		<0.343		<0.300		<0.340		<0.374		<0.348			
Silver	390	5,700	1	1.1	<0.339		<0.365		<0.333		<0.392		<0.399		<25.092		<0.343		<0.300		<0.340		<0.374		<0.348			
Sodium	NLE	NLE	NLE	51.6	46.52		7.854		690		226.4		147.4		84.8		42.6		109		59.2		56.6		290			
Thallium	5	79	3	ND	<0.339		<0.365		<0.333		<0.392		<0.399		<25.092		<0.343		<0.300		<0.340		<0.374		<0.348			
Vanadium	78	1,100	NLE	94.1	43.13		62.26		41.98		14.73		9.161		18.3		17		40.3		21.7		92.1		23.2			
Zinc	23,000	110,000	930	81.4	37.72		32.28		61.39		28.85		11.74		48.4		10.5		51.5		34.8		44.9		31.9			

Notes:

Historically, there have been up to 318 soil boring locations associated with FTMM-05. This analysis looks at only those boring locations that fall within the footprint of FTMM-05.

(1) New Jersey Department of Environmental Protection (NJDEP) Residential Direct Contact Soil Remediation Standards (RDCSRS) and Non-Residential Direct Contact Soil Remediation Standards (NRDCSRS) (N.J.A.C 7:26D; amended May 7, 2012). Available at: <http://www.state.nj.us/dep/srp/regs/rs/>.

(2) NJDEP Impact to Groundwater (NJDEP guidance document; Nov 2013).

(3) Weston, 1995. Final Site Investigation - Main Post and Charles Wood Areas, Fort Monmouth, New Jersey, December.

NJDEP criteria for total xylenes are used for xylene isomers (m+p, o).

NJDEP criteria for endrin is used for endrin aldehyde.

NJDEP criteria for 4,4'-DDD and 4,4'-DDT are for total DDD and total DDT, respectively.

There are no NJDEP soil standards for individual PCB Arcolors; the total PCB NJDEP standards were used for individual Arcolors

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

B = Analyte detected in both sample and associated laboratory blank.

D = Result from dilution of sample.

DUP = field duplicate sample.

E = Estimated value.

J = Analyte detected between MDL and practical quantitation limit (PQL).

NA = not analyzed.

ND = not detected.

NLE = No limit established.

< = analyte not detected above method detection limit (MDL).

µg/kg = micrograms per kilogram.

mg/kg = milligrams per kilogram.

VOCs = volatile organic compounds.

in. = inches.

bgs = below ground surface.

Detections are bolded.

Shaded cells = concentration exceeds NJDEP Impact to Groundwater Criterion.

Shaded cells = concentration exceeds one or both NJDEP Direct Contact Criteria.

Shaded cells = concentration exceeds all NJDEP criteria.

Shaded cells = concentration exceeds Weston (1995) background concentration.

TABLE 4.1
SOIL SAMPLING SUMMARY RESULTS - COMPARISON TO NJDEP STANDARDS
SITE FTMM-05
FORT MONMOUTH, NEW JERSEY

Field Sample Location	NJDEP Residential Direct Contact Soil Remediation Standard ⁽¹⁾	NJDEP Non- Residential Direct Contact Soil Remediation Standard ⁽¹⁾	NJDEP Impact to Groundwater Screening Level ⁽²⁾	Weston 1995 Background ⁽³⁾	B-198		B-199		B-200		B-200 Dup	B-201	B-202		B-203		B-204		B-205		B-206		B-207	B-208	
Sample Date					08/12/98		08/12/98		08/12/98		08/12/98	08/12/98	08/12/98		08/12/98		08/12/98		08/12/98		08/12/98		08/12/98	08/12/98	
Volatile Organic Compounds (VOCs, µg/kg)																									
Lab Sample ID (VOCs only collected at approximately 24 in. bgs)					3805.05		3805.07		3805.09		3805.33	3805.11	3805.13		3805.15		3805.17		3805.19		3805.21		3805.23	3805.25	
Methylene Chloride	34,000	97,000	10	-	<910		<600		<740		<920	<660	<590		<560		<680		<640		<580		<630	<650	
Benzene	2,000	5,000	5	-	<460		<300		<370		<460	<330	<290		<280		<340		<320		<290		<310	<320	
Tetrachloroethene	2,000	5,000	5	-	<460		<300		<370		<460	<330	<290		780		<340		<320		<290		<310	<320	
Chloroform	600	2,000	400	-	<460		<300		<370		760	<330	<290		<280		<340		<320		<290		<310	<320	
Ethylbenzene	7,800,000	110,000,000	13,000	-	<910		<600		<740		<920	<660	<590		<560		<680		<640		<580		<630	<650	
TICs	NLE	NLE	NLE	-	ND		ND		ND		ND	ND	ND		ND		ND		ND		ND		ND	ND	
Semivolatile Organic Compounds (SVOCs, µg/kg)																									
Lab Sample ID (All analyses except VOCs collected at approximately 6-12 in. bgs)					3805.04		3805.06		3805.08		3805.32	3805.10	3805.12		3805.14		3805.16		3805.18		3805.20		3805.22	3805.24	
Naphthalene	6,000	17,000	25,000	-	<260		<300		<250		<260	<280	130	J	<240		<270		<270		<280		<270	<290	
n-Nitrosodiphenylamine	99,000	390,000	400	-	<190		<220		<190		<200	<210	<180		<180		<210		<200		<210		<200	<220	
2-Methylnaphthalene	230,000	2,400,000	8,000	-	<290		<330		<290		<290	<320	<270		<270		<310		<300		<310		<300	<320	
4-Methylphenol	31,000	340,000	NLE	-	<280		<330		<280		<290	<310	<260		<260		<300		<300		<310		<300	<320	
Acenaphthylene	NLE	3.00E+08	NLE	-	<200		78	J	<200		<210	<220	530		<190		<220		<210		<220		<210	<230	
Acenaphthene	3,400,000	37,000,000	110,000	-	<180		<210		<180		<190	<200	<170		<170		<200		<190		<200		<190	<210	
Dibenzofuran	NLE	NLE	NLE	-	<190		<230		<190		<200	<220	<180		<180		<210		<210		<210		<210	<220	
Diethylphthalate	49,000,000	550,000,000	88,000	-	<210		<250		<210		<220	<240	<200		<200		<230		<220		<230		<220	<240	
Fluorene	2,300,000	24,000,000	170,000	-	<200		<230		<200		<210	<220	<190		<190		<210		<210		<220		<210	<230	
Phenanthrene	NLE	300,000,000	NLE	-	<200		260		<200		<210	1000	2100		380		<220		<210		<220		<210	<230	
Anthracene	17,000,000	30,000,000	2,400,000	-	<200		<240		<200		<210	280	390		<190		<220		<210		<220		<210	<230	
Dimethylphthalate	NLE	NLE	NLE	-	<160		<190		<160		<160	<170	<150		<150		<170		<170		<170		<170	<180	
Di-n-butylphthalate	6,100,000	68,000,000	760,000	-	720	J	700	J	630	J	1100	1200	570	J	210	J	210	J	270	J	240	J	<920	250	J
Fluoranthene	2,300,000	24,000,000	1,300,000	-	<200		400		170	J	<210	1100	4500		510		140	J	<210		<220		<210	<230	
Pyrene	1,700,000	18,000,000	840,000	-	<240		560		260		<240	950	5100		740		260		<250		<260		<250	<270	
Pyridine	NLE	NLE	NLE	-	<310		<370		<310		<320	<350	<290		<290		<340		<330		<340		<330	<350	
Butylbenzylphthalate	1,200,000	14,000,000	230,000	-	<260		<310		<260		<260	<290	<250		<250		<280		<280		<290		<280	<300	
Benzo(a)anthracene	600	2,000	800	-	<210		230	J	130	J	<210	470	2700		260		120	J	<220		<230		<220	<230	
3,3'-Dichlorobenzidine	1,000	4,000	200	-	<360		<420		<360		<360	<400	<340		<340		<390		<380		<400		<380	<410	
Chrysene	62,000	230,000	80,000	-	<260		460		290		<270	670	4900		490		240	J	<280		<290		<280	<300	
bis(2-Ethylhexyl)phthalate	35,000	140,000	1,200,000	-	<290		<340		<290		<300	<320	<270		<270		<310		<310		<320		<310	<330	
Benzo(b)fluoranthene	600	2,000	2,000	-	<260		220	J	160	J	<260	360	3100		230	J	<280		<270		<280		<270	<290	
Benzo(k)fluoranthene	6,000	23,000	25,000	-	<190		230		170	J	<200	360	2800		250		<200		<200		<210		<200	<220	
Benzo(a)pyrene	200	200	200	-	<200		240		130	J	<200	390	2900		260		<210		<210		<210		<210	<220	
Indeno(1,2,3-cd)pyrene	600	2,000	7,000	-	<210		<250		<210		<220	<240	2100		150	J	<230		<230		<230		<230	<240	
Dibenz(a,h)anthracene	200	200	800	-	<250		<290		<250		<260	<280	1500		<240		<270		<260		<270		<260	<280	
Benzo(g,h,i)perylene	380,000,000	30,000,000	NLE	-	<250		<290		<250		<260	<280	2200		140	J	<270		<260		<270		<260	<280	
Total TICs	NLE	NLE	NLE	-	9880		8800		ND		8200	16400	15260		4600		2500		2780		10400		ND	2200	
Pesticides / PCBs (mg/kg)																									
Heptachlor	0.1	0.7	0.5	-	<0.0003		<0.0004		<0.0003		<0.0003	<0.0003	<0.0003		<0.0003		<0.0003		<0.0003		<0.0004		<0.0003	<0.0004	
Heptachlor Epoxide	0.07	0.3	0.01	-	<0.0006		<0.0007		<0.0007		<0.0006	<0.0007	<0.0006		<0.0006		<0.0007		<0.0006		<0.0007		<0.0007	<0.0008	
4,4'-DDE	2	9	18	-	0.017		0.26		0.01		<0.0004	0.047	0.016		0.102		0.024		<0.0004		0.004		<0.0005	0.005	
Dieldrin	0.04	0.2	0.003	-	<0.0005		<0.0006		<0.0005		<0.0005	<0.0006	<0.0005		<0.0005		<0.0006		<0.0005		<0.0006		<0.0006	<0.0006	
Endrin	23	340	1	-	<0.0005		<0.0006		<0.0005		<0.0005	<0.0006	<0.0005		<0.0005		<0.0006		<0.0005		<0.0006		<0.0006	<0.0006	
4,4'-DDD	3	13	4	-	0.001		0.116		<0.0007		<0.0006	<0.0007	<0.0006		0.031		0.004		<0.0006		0.003		<0.0007	<0.0008	
Endrin Aldehyde	NLE	NLE	NLE	-	<0.0005		<0.0006		<0.0005		<0.0005	<0.0006	<0.0005		<0.0005		<0.0006		<0.0005		<0.0006		<0.0006	<0.0006	
4,4'-DDT	2	8	11	-	0.019		1.321		0.01		<0.0011	<0.0013	0.054		0.34		0.019		<0.0011		0.003		<0.0013	0.006	
Endosulfan I	470	6,800	4	-	<0.0005		<0.0006		<0.0005		<0.0005	<0.0006	<0.0005		<0.0005	</									

TABLE 4.1
SOIL SAMPLING SUMMARY RESULTS - COMPARISON TO NJDEP STANDARDS
SITE FTMM-05
FORT MONMOUTH, NEW JERSEY

Field Sample Location	NJDEP Residential Direct Contact Soil Remediation Standard ⁽¹⁾	NJDEP Non- Residential Direct Contact Soil Remediation Standard ⁽¹⁾	NJDEP Impact to Groundwater Screening Level ⁽²⁾	Weston 1995 Background ⁽³⁾	B-198		B-199		B-200		B-200 Dup	B-201	B-202		B-203		B-204		B-205		B-206		B-207	B-208	
Sample Date					08/12/98		08/12/98		08/12/98		08/12/98	08/12/98	08/12/98		08/12/98		08/12/98		08/12/98		08/12/98		08/12/98	08/12/98	
Metals (mg/kg)																									
Aluminum	78,000	NA	6,000	15,200	4720		9820		10500		2490	5920	5990		6500		3940		4920		12300		3020	3420	
Antimony	31	450	6	ND	1.48		6.56		0.35		<0.245	0.617	0.751		0.359		<0.250		<0.245		<0.255		0.411	0.737	
Arsenic	19	19	19	22.9	59.1		11.5		8.59		4.96	5.5	7.11		6.34		5.27		7.61		8.46		6.07	10.7	
Barium	16,000	59,000	2,100	32.3	68.6		363		147		50.1	84.6	113		25.5		35.5		61.6		99.6		22.3	71.1	
Beryllium	16	140	0.7	2	0.548		0.9		0.743		0.266	0.92	0.58		0.428		0.389		0.354		0.985		0.288	0.525	
Cadmium	78	78	2	ND	<0.051		<0.057		0.543		823	0.929	<0.059		<0.059		<0.062		<0.061		<0.064		<0.057	<0.070	
Calcium	NLE	NLE	NLE	921	918		537		1390		823	1500	455		2470		1100		1010		1270		670	714	
Chromium	NLE	NLE	NLE	269	19.5		77.4		25.8		5.31	37.8	49.8		36		19.8		12.9		26.4		18.4	32	
Cobalt	1,600	590	90	2.5	11.4		5.14		7.57		1.77	5.81	1.98		4.27		4.61		4.8		9.39		3.91	2.42	
Copper	3,100	45,000	11,000	8	92.6		122		38.6		23.6	47.3	77.4		36.4		35		18.1		110		31.8	58	
Iron	NLE	NLE	NLE	55,800	38400		33400		15300		4580	12600	23300		14600		8620		5100		10200		15100	14800	
Lead	400	800	90	19.5	119		494		37.6		11.2	62.8	268		23.8		35		28.6		39.9		12.6	135	
Magnesium	NLE	NLE	NLE	7,230	491		1700		900		256	1430	1680		2450		630		342		540		329	995	
Manganese	11,000	5,900	65	90.7	121		143		126		19.3	332	39.1		83.9		61.8		21.1		63.2		65.6	36.2	
Mercury	23	65	0.1	ND	0.029		0.153		0.044		0	0.391	0.115		0.602		0.064		<0.035		<0.034		0.047	0.075	
Nickel	1,600	23,000	48	8.4	18.2		23.6		19.6		5.28	10.5	5.95		11		8.78		14.5		24.5		11.9	7.99	
Potassium	NLE	NLE	NLE	15400	1330		4160		3580		488	3670	3720		3560		1470		989		2280		852	3150	
Selenium	390	5,700	11	1.9	<0.303		<0.345		<0.327		<0.367	<0.386	<0.352		<0.352		<0.375		1.24		<0.382		0.606	<0.419	
Silver	390	5,700	1	1.1	<0.303		<0.345		<0.327		<0.367	<0.386	<0.352		<0.352		<0.375		<0.368		<0.382		<0.340	<0.419	
Sodium	NLE	NLE	NLE	51.6	393		535		485		278	526	566		411		207		339		460		252	404	
Thallium	5	79	3	ND	<0.303		<0.345		<0.327		0.513	<0.386	0.498		<0.352		<0.375		<0.368		<0.382		<0.340	0.505	
Vanadium	78	1,100	NLE	94.1	17.5		43.5		30.9		11.8	25.3	31.2		36.7		22.9		23.7		31.5		17.1	21.1	
Zinc	23,000	110,000	930	81.4	114		116		80.2		34.2	514	38.1		39.2		29.2		27.2		31.8		165	48.9	

Notes:

Historically, there have been up to 318 soil boring locations associated with FTMM-05. This analysis looks at only those boring locations that fall within the footprint of FTMM-05.

(1) New Jersey Department of Environmental Protection (NJDEP) Residential Direct Contact Soil Remediation Standards (RDCSRS) and Non-Residential Direct Contact Soil Remediation Standards (NRDCSRS) (N.J.A.C 7:26D; amended May 7, 2012). Available at: <http://www.state.nj.us/dep/srp/regs/rs/>.

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NJDEP criteria for total xylenes are used for xylene isomers (m+p, o).

NJDEP criteria for endrin is used for endrin aldehyde.

NJDEP criteria for 4,4'-DDD and 4,4'-DDT are for total DDD and total DDT, respectively.

There are no NJDEP soil standards for individual PCB Arcolors; the total PCB NJDEP standards were used for individual Arcolors

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

B = Analyte detected in both sample and associated laboratory blank.

D = Result from dilution of sample.

DUP = field duplicate sample.

E = Estimated value.

J = Analyte detected between MDL and practical quantitation limit (PQL).

NA = not analyzed.

ND = not detected.

NLE = No limit established.

< = analyte not detected above method detection limit (MDL).

µg/kg = micrograms per kilogram.

mg/kg = milligrams per kilogram.

VOCs = volatile organic compounds.

in. = inches.

bgs = below ground surface.

Detections are bolded.

Shaded cells = concentration exceeds NJDEP Impact to Groundwater Criterion.

Shaded cells = concentration exceeds one or both NJDEP Direct Contact Criteria.

Shaded cells = concentration exceeds all NJDEP criteria.

Shaded cells = concentration exceeds Weston (1995) background concentration.

TABLE 4.1
SOIL SAMPLING SUMMARY RESULTS - COMPARISON TO NJDEP STANDARDS
SITE FTMM-05
FORT MONMOUTH, NEW JERSEY

Field Sample Location	NJDEP Residential Direct Contact Soil Remediation Standard ⁽¹⁾	NJDEP Non- Residential Direct Contact Soil Remediation Standard ⁽¹⁾	NJDEP Impact to Groundwater Screening Level ⁽²⁾	Weston 1995 Background ⁽³⁾	B-209		B-210		B-211		B-212		B-213		B-214		B-215		B-216		B-217		B-218		B-219		
Sample Date					08/12/98		08/12/98		08/12/98		08/13/98		08/13/98		08/13/98		08/13/98		08/13/98		08/13/98		08/13/98		08/13/98		08/13/98
Volatile Organic Compounds (VOCs, µg/kg)																											
Lab Sample ID (VOCs only collected at approximately 24 in. bgs)					3805.27		3805.29		3805.31		3809.03		3809.05		3809.07		3809.09		3809.11		3809.13		3809.15		3809.17		
Methylene Chloride	34,000	97,000	10	-	<510		<580		<660		<710		<770		<580		<560		<560		<550		<640		<650		
Benzene	2,000	5,000	5	-	<250		<290		<330		<350		<390		<290		<280		<280		<270		<320		<320		
Tetrachloroethene	2,000	5,000	5	-	<250		<290		<330		<350		<390		<290		<280		<280		<270		<320		<320		
Chloroform	600	2,000	400	-	450		490		550		460		520		410		430		390		460		440		440		
Ethylbenzene	7,800,000	110,000,000	13,000	-	<510		<580		<660		<710		<770		<580		<560		<560		<550		<640		<650		
TICs	NLE	NLE	NLE	-	ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		
Semivolatile Organic Compounds (SVOCs, µg/kg)																											
Lab Sample ID (All analyses except VOCs collected at approximately 6-12 in. bgs)					3805.26		3805.28		3805.30		3809.02		3809.04		3809.06		3809.08		3809.10		3809.12		3809.14		3809.16		
Naphthalene	6,000	17,000	25,000	-	120	J	<240		<250		<1200		<1200		<1100		<970		<980		<1000		<1100		<1100		
n-Nitrosodiphenylamine	99,000	390,000	400	-	<180		60	J	<190		<1200		<1200		<1100		<970		<980		<1000		<1100		<1100		
2-Methylnaphthalene	230,000	2,400,000	8,000	-	120	J	<270		<280		<1200		<1200		<1100		<970		<980		<1000		<1100		<1100		
4-Methylphenol	31,000	340,000	NLE	-	<260		<260		<280		<1200		<1200		<1100		<970		<980		<1000		<1100		<1100		
Acenaphthylene	NLE	3.00E+08	NLE	-	260		<190		<200		<1200		<1200		<1100		<970		<980		<1000		480	J	<1100		
Acenaphthene	3,400,000	37,000,000	110,000	-	<170		<170		<180		<1200		<1200		<1100		<970		<980		<1000		<1100		<1100		
Dibenzofuran	NLE	NLE	NLE	-	<180		<180		<190		<1200		<1200		<1100		<970		<980		<1000		<1100		<1100		
Diethylphthalate	49,000,000	550,000,000	88,000	-	<200		<200		<210		<1200		<1200		<1100		<970		<980		<1000		<1100		<1100		
Fluorene	2,300,000	24,000,000	170,000	-	<190		<190		<200		<1200		<1200		<1100		<970		<980		<1000		<1100		<1100		
Phenanthrene	NLE	300,000,000	NLE	-	760		<190		NLE	150	J	140	J	280	J	190	J	160	J	<980		140	J	1300		110	J
Anthracene	17,000,000	30,000,000	2,400,000	-	200		<190		<200		<1200		<1200		<1100		<970		<980		<1000		250	J	<1100		
Dimethylphthalate	NLE	NLE	NLE	-	<150		<150		<160		<1200		<1200		<1100		<970		<980		<1000		<1100		<1100		
Di-n-butylphthalate	6,100,000	68,000,000	760,000	-	540	J	840		580	J	330	JB	670	JB	260	JB	660	JB	250	JB	190	JB	650	JB	380	JB	
Fluoranthene	2,300,000	24,000,000	1,300,000	-	1400		190	J	160	J	370	J	370	J	220	J	160	J	280	J	190	J	2900		220	J	
Pyrene	1,700,000	18,000,000	840,000	-	1100		260		270		400	J	560	J	310	J	270	J	340	J	180	J	3500		280	J	
Pyridine	NLE	NLE	NLE	-	<290		<290		<310		<1200		<1200		<1100		<970		<980		<1000		<1100		<1100		
Butylbenzylphthalate	1,200,000	14,000,000	230,000	-	<250		<250		<260		<1200		<1200		<1100		<970		<980		<1000		<1100		<1100		
Benzo(a)anthracene	600	2,000	800	-	<190		110	J	<200		230	J	200	J	120	J	<970		140	J	<1000		1000	J	110	J	
3,3'-Dichlorobenzidine	1,000	4,000	200	-	<340		<340		<350		<1200		<1200		<1100		<970		<980		<1000		<1100		<1100		
Chrysene	62,000	230,000	80,000	-	<250		240	J	<260		360	J	460	J	240	J	<970		280	J	<1000		2500		280	J	
bis(2-Ethylhexyl)phthalate	35,000	140,000	1,200,000	-	<270		<270		<290		<1200		<1200		<1100		<970		<980		<1000		<1100		120	J	
Benzo(b)fluoranthene	600	2,000	2,000	-	530		<240		<250		180	J	190	J	<1100		<970		<980		<1000		1100		170	J	
Benzo(k)fluoranthene	6,000	23,000	25,000	-	<180		<180		<190		220	J	240	J	<1100		<970		<980		<1000		1200		<1100		
Benzo(a)pyrene	200	200	200	-	400		<180		<190		200	J	240	J	<1100		<970		<980		<1000		1000	J	<1100		
Indeno(1,2,3-cd)pyrene	600	2,000	7,000	-	190	J	<200		<210		120	J	140	J	<1100		<970		<980		<1000		550	J	<1100		
Dibenz(a,h)anthracene	200	200	800	-	170	J	<230		<250		<1200		<1200		<1100		<970		<980		<1000		<1100		<1100		
Benzo(g,h,i)perylene	380,000,000	30,000,000	NLE	-	190	J	<230		<250		210	J	<1200		<1100		<970		<980		<1000		490	J	<1100		
Total TICs	NLE	NLE	NLE	-	ND		3400		3400		1200		11700		25710		1200		1200		2300		11430		880		
Pesticides / PCBs (mg/kg)																											
Heptachlor	0.1	0.7	0.5	-	<0.0003		<0.0003		<0.0003		<0.0004		<0.0035		<0.0034		<0.0003		<0.0003		0.004		<0.0030		<0.0030		
Heptachlor Epoxide	0.07	0.3	0.01	-	<0.0006		<0.0006		<0.0006		<0.0007		<0.0070		<0.0067		<0.0006		<0.0006		<0.0006		<0.0059		<0.0060		
4,4'-DDE	2	9	18	-	0.028		0.057		0.057		<0.0005		0.473		0.313		0.013		0.088		0.013		0.315		0.233		
Dieldrin	0.04	0.2	0.003	-	<0.0005		<0.0005		<0.0005		<0.0006		<0.0058		<0.0056		<0.0005		<0.0005		0.004		<0.0049		<0.0050		
Endrin	23	340	1	-	<0.0005		<0.0005		<0.0005		<0.0006		<0.0058		<0.0056		<0.0005		<0.0005		<0.0005		<0.0049		<0.0050		
4,4'-DDD	3	13	4	-	0.025		0.014		0.008		<0.0007		0.814		0.214		0.004		0.008		0.012		0.17		0.082		
Endrin Aldehyde	NLE	NLE	NLE	-	<0.0005		<0.0005		<0.0005		<0.0006		<0.0058		<0.0056		<0.0005		<0.0005		<0.0005		<0.0049		<0.0050		
4,4'-DDT	2	8	11	-	0.167		0.025		0.014		<0.0013		1.042		0.463		0.015		0.106		0.039		0.444		0.472		
Endosulfan I	470	6,800	4	-	<0.0005		<0.0005		<0.0005		<0.0006		<0.0058		<0.0056		<0.0005		<0.0005		<0.0005		<0.0049		<0.0050		
Endosulfan II	470	6,800	4	-	<0.0004		<0.0004		<0.0004		<0.0005																

TABLE 4.1
SOIL SAMPLING SUMMARY RESULTS - COMPARISON TO NJDEP STANDARDS
SITE FTMM-05
FORT MONMOUTH, NEW JERSEY

Field Sample Location	NJDEP Residential Direct Contact Soil Remediation Standard ⁽¹⁾	NJDEP Non- Residential Direct Contact Soil Remediation Standard ⁽¹⁾	NJDEP Impact to Groundwater Screening Level ⁽²⁾	Weston 1995 Background ⁽³⁾	B-209		B-210		B-211		B-212		B-213		B-214		B-215		B-216		B-217		B-218		B-219			
Sample Date					08/12/98		08/12/98		08/12/98		08/13/98		08/13/98		08/13/98		08/13/98		08/13/98		08/13/98		08/13/98		08/13/98		08/13/98	
Metals (mg/kg)																												
Aluminum	78,000	NA	6,000	15,200	6840		5330		958		3050		3690		6270		7680		10900		8370		2150		3880			
Antimony	31	450	6	ND	0.87		0.665		<0.229		<0.249		0.466		1.24		0.827		1.7		<0.229		<0.189		0.285			
Arsenic	19	19	19	22.9	8.17		9.51		1.23		9		10.5		10.9		6.37		18.5		5.26		5.78		7.42			
Barium	16,000	59,000	2,100	32.3	59.7		43.6		129		55.3		70.3		42.5		28.8		9.95		25		24.4		98.9			
Beryllium	16	140	0.7	2	0.671		0.525		0.0934		0.423		0.492		0.591		0.885		1.27		0.422		0.227		0.804			
Cadmium	78	78	2	ND	<0.047		<0.055		<0.057		<0.062		<0.069		<0.057		<0.057		<0.052		<0.057		<0.047		0.115			
Calcium	NLE	NLE	NLE	921	1740		2000		405		1440		777		320		747		511		774		901		1700			
Chromium	NLE	NLE	NLE	269	43.7		36.8		2.75		5.38		26.1		67.3		78.2		122		28.8		12.9		21.4			
Cobalt	1,600	590	90	2.5	3.08		2.66		1.56		2.47		2.82		0.937		1.07		0.799		1.68		1.77		2.73			
Copper	3,100	45,000	11,000	8	36.6		26.3		12.1		14.6		33.1		7.75		4.39		3.87		4.41		24.9		30.3			
Iron	NLE	NLE	NLE	55,800	18600		15500		2220		5180		16000		36000		24600		36400		11900		6370		10700			
Lead	400	800	90	19.5	289		73.8		7.32		25.3		146		20.2		11.8		12.6		23.4		54.3		117			
Magnesium	NLE	NLE	NLE	7,230	1800		1850		136		316		918		2080		2350		3600		1120		443		2390			
Manganese	11,000	5,900	65	90.7	72.7		73.2		25.5		23.1		105		13		31.9		26.6		48.9		30		103			
Mercury	23	65	0.1	ND	0.072		0.036		<0.020		0.041		0.645		0.244		0.061		0.042		0.095		0.159		0.236			
Nickel	1,600	23,000	48	8.4	10.4		7.49		3.63		5.3		11		4.41		4.35		4.77		4.55		4.61		6.11			
Potassium	NLE	NLE	NLE	15400	2920		3840		248		369		2690		4850		4890		6900		3200		882		2270			
Selenium	390	5,700	11	1.9	<0.282		<0.331		<0.343		<0.373		0.618		<0.331		<0.342		<0.312		<0.343		0.582		<0.359			
Silver	390	5,700	1	1.1	<0.282		<0.331		<0.343		<0.373		<0.411		<0.331		<0.342		<0.312		<0.343		<0.284		<0.359			
Sodium	NLE	NLE	NLE	51.6	294		327		159		349		412		650		132		101		95.2		142		491			
Thallium	5	79	3	ND	<0.282		<0.331		0.422		0.437		<0.411		0.564		0.531		0.738		<0.343		0.348		<0.359			
Vanadium	78	1,100	NLE	94.1	38.1		32.7		5.82		11.2		21.5		38.4		48.5		45.5		24.2		16		20.5			
Zinc	23,000	110,000	930	81.4	197		48		11.7		22.3		178		27.8		43.1		34		28.6		30.6		67.3			

Notes:

Historically, there have been up to 318 soil boring locations associated with FTMM-05. This analysis looks at only those boring locations that fall within the footprint of FTMM-05.

(1) New Jersey Department of Environmental Protection (NJDEP) Residential Direct Contact Soil Remediation Standards (RDCSRS) and Non-Residential Direct Contact Soil Remediation Standards (NRDCSRS) (N.J.A.C 7:26D; amended May 7, 2012). Available at: <http://www.state.nj.us/dep/srp/regs/rs/>.

(2) NJDEP Impact to Groundwater (NJDEP guidance document; Nov 2013).

(3) Weston, 1995. Final Site Investigation - Main Post and Charles Wood Areas, Fort Monmouth, New Jersey, December.

NJDEP criteria for total xylenes are used for xylene isomers (m+p, o).

NJDEP criteria for endrin is used for endrin aldehyde.

NJDEP criteria for 4,4'-DDD and 4,4'-DDT are for total DDD and total DDT, respectively.

There are no NJDEP soil standards for individual PCB Arcolors; the total PCB NJDEP standards were used for individual Arcolors

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

B = Analyte detected in both sample and associated laboratory blank.

D = Result from dilution of sample.

DUP = field duplicate sample.

E = Estimated value.

J = Analyte detected between MDL and practical quantitation limit (PQL).

NA = not analyzed.

ND = not detected.

NLE = No limit established.

< = analyte not detected above method detection limit (MDL).

µg/kg = micrograms per kilogram.

mg/kg = milligrams per kilogram.

VOCs = volatile organic compounds.

in. = inches.

bgs = below ground surface.

Detections are bolded.

Shaded cells = concentration exceeds NJDEP Impact to Groundwater Criterion.

Shaded cells = concentration exceeds one or both NJDEP Direct Contact Criteria.

Shaded cells = concentration exceeds all NJDEP criteria.

Shaded cells = concentration exceeds Weston (1995) background concentration.

TABLE 4.1
SOIL SAMPLING SUMMARY RESULTS - COMPARISON TO NJDEP STANDARDS
SITE FTMM-05
FORT MONMOUTH, NEW JERSEY

Field Sample Location	NJDEP Residential Direct Contact Soil Remediation Standard ⁽¹⁾	NJDEP Non- Residential Direct Contact Soil Remediation Standard ⁽¹⁾	NJDEP Impact to Groundwater Screening Level ⁽²⁾	Weston 1995 Background ⁽³⁾	B-220		B-220 Dup		B-221		B-222		B-223		B-224		B-225		B-226		B-227		B-228		B-229	
Sample Date					08/13/98	08/13/98	08/13/98	08/13/98	08/14/98	08/14/98	08/14/98	08/14/98	08/14/98	08/14/98	08/14/98	08/14/98	08/14/98	08/14/98	08/14/98							
Volatile Organic Compounds (VOCs, µg/kg)																										
Lab Sample ID (VOCs only collected at approximately 24 in. bgs)					3809.19		3809.25		3809.21		3809.23		3812.03		3812.05		3812.07		3812.09		3812.11		3812.13		3812.15	
Methylene Chloride	34,000	97,000	10	-	<1100		<700		<690		<840		<530		<470		<500		<490		<600		<510		<540	
Benzene	2,000	5,000	5	-	<540		<350		<340		<420		<260		<240		<250		<240		<300		<260		<270	
Tetrachloroethene	2,000	5,000	5	-	<540		<350		<340		<420		<260		<240		<250		<240		<300		<260		<270	
Chloroform	600	2,000	400	-	<540		410		400		480		<260		<240		<250		<240		<300		<260		<270	
Ethylbenzene	7,800,000	110,000,000	13,000	-	<1100		56	J	<690		<840		<530		<470		<500		<490		<600		<510		<540	
TICs	NLE	NLE	NLE	-	ND		ND		ND		2700		ND		ND		ND		ND		ND		ND		ND	
Semivolatile Organic Compounds (SVOCs, µg/kg)																										
Lab Sample ID (All analyses except VOCs collected at approximately 6-12 in. bgs)					3809.18		3809.24		3809.20		3809.22		3812.02		3812.04		3812.06		3812.08		3812.10		3812.12		3812.14	
Naphthalene	6,000	17,000	25,000	-	4000	JD	<1000		<1100		<1100		<1100		<950		<1000		<1000		<1200		<1000		<1100	
n-Nitrosodiphenylamine	99,000	390,000	400	-	<9800		<1000		<1100		<1100		<1100		<950		<1000		<1000		<1200		<1000		<1100	
2-Methylnaphthalene	230,000	2,400,000	8,000	-	7600	JD	<1000		<1100		<1100		<1100		<950		<1000		<1000		<1200		<1000		<1100	
4-Methylphenol	31,000	340,000	NLE	-	<9800		<1000		<1100		<1100		<1100		<950		<1000		<1000		<1200		<1000		<1100	
Acenaphthylene	NLE	3.00E+08	NLE	-	6100	JD	170	J	120	J	<1100		260	J	<950		120	J	110	J	<1200		<1000		<1100	
Acenaphthene	3,400,000	37,000,000	110,000	-	<9800		<1000		<1100		<1100		<1100		<950		<1000		<1000		<1200		<1000		<1100	
Dibenzofuran	NLE	NLE	NLE	-	<9800		<1000		<1100		<1100		<1100		<950		<1000		<1000		<1200		<1000		<1100	
Diethylphthalate	49,000,000	550,000,000	88,000	-	<9800		<1000		<1100		<1100		<1100		<950		<1000		<1000		<1200		<1000		<1100	
Fluorene	2,300,000	24,000,000	170,000	-	<9800		<1000		<1100		<1100		<1100		<950		<1000		<1000		<1200		<1000		<1100	
Phenanthrene	NLE	300,000,000	NLE	-	55000	D	490	J	560	J	220	J	1000	J	<950		420	J	360	J	<1200		170	J	280	J
Anthracene	17,000,000	30,000,000	2,400,000	-	6700	JD	<1000		<1100		<1100		150	J	<950		<1000		<1000		<1200		<1000		<1100	
Dimethylphthalate	NLE	NLE	NLE	-	<9800		<1000		<1100		<1100		<1100		<950		<1000		<1000		<1200		<1000		<1100	
Di-n-butylphthalate	6,100,000	68,000,000	760,000	-	<9800		580	JB	220	JB	1000	JB	310	JB	490	JB	210	JB	530	JB	210	JB	670	JB	710	JB
Fluoranthene	2,300,000	24,000,000	1,300,000	-	23000	D	620	J	640	J	270	J	1300		95	J	710	J	500	J	<1200		160	J	290	J
Pyrene	1,700,000	18,000,000	840,000	-	44000	D	990	J	900	J	370	J	1900		110	J	890	J	700	J	140	J	270	J	430	J
Pyridine	NLE	NLE	NLE	-	<9800		<1000		<1100		<1100		<1100		<950		<1000		<1000		<1200		<1000		<1100	
Butylbenzylphthalate	1,200,000	14,000,000	230,000	-	<9800		<1000		<1100		<1100		<1100		<950		<1000		<1000		<1200		<1000		<1100	
Benzo(a)anthracene	600	2,000	800	-	14000	D	350	J	320	J	160	J	700	J	<950		240	J	280	J	<1200		<1000		160	J
3,3'-Dichlorobenzidine	1,000	4,000	200	-	<9800		<1000		<1100		<1100		<1100		<950		<1000		<1000		<1200		<1000		<1100	
Chrysene	62,000	230,000	80,000	-	25000	D	850	J	680	J	290	J	1500		<950		720	J	610	J	<1200		200	J	340	J
bis(2-Ethylhexyl)phthalate	35,000	140,000	1,200,000	-	<9800		<1000		<1100		<1100		<1100		<950		<1000		<1000		<1200		<1000		<1100	
Benzo(b)fluoranthene	600	2,000	2,000	-	4700	JD	380	J	330	J	140	J	670	J	<950		320	J	310	J	<1200		<1000		130	J
Benzo(k)fluoranthene	6,000	23,000	25,000	-	9000	JD	400	J	430	J	180	J	720	J	<950		380	J	360	J	<1200		<1000		200	J
Benzo(a)pyrene	200	200	200	-	8900	JD	380	J	360	J	130	J	770	J	<950		280	J	320	J	<1200		<1000		150	J
Indeno(1,2,3-cd)pyrene	600	2,000	7,000	-	19000	D	<1000		<1100		<1100		550	J	<950		200	J	200	J	<1200		<1000		<1100	
Dibenz(a,h)anthracene	200	200	800	-	25000	D	<1000		<1100		<1100		<1100		<950		<1000		<1000		<1200		<1000		<1100	
Benzo(g,h,i)perylene	380,000,000	30,000,000	NLE	-	22000	D	<1000		<1100		<1100		490	J	<950		210	J	190	J	<1200		<1000		<1100	
Total TICs	NLE	NLE	NLE	-	87910		32430		32510		41840		24000		8810		13740		25150		ND		6050		15710	
Pesticides / PCBs (mg/kg)																										
Heptachlor	0.1	0.7	0.5	-	<0.0003		<0.0003		<0.0003		<0.0003		<0.0003		<0.0003		<0.0003		<0.0003		<0.0037		<0.0033		<0.0032	
Heptachlor Epoxide	0.07	0.3	0.01	-	<0.0006		<0.0006		<0.0007		<0.0007		<0.0006		0.01		<0.0006		<0.0006		<0.0074		<0.0066		<0.0064	
4,4'-DDE	2	9	18	-	0.104		0.457		0.433		0.068		0.644		0.024		0.422		0.612		0.241		0.262		0.169	
Dieldrin	0.04	0.2	0.003	-	<0.0005		<0.0005		<0.0006		<0.0006		<0.0005		0.003		<0.0005		<0.0005		<0.0062		<0.0055		<0.0053	
Endrin	23	340	1	-	<0.0005		<0.0005		<0.0006		<0.0006		<0.0005		<0.0005		<0.0005		<0.0005		<0.0062		<0.0055		<0.0053	
4,4'-DDD	3	13	4	-	0.021		0.069		2.225		0.03		<0.0006		0.004		0.048		0.164		0.276		0.419		0.179	
Endrin Aldehyde	NLE	NLE	NLE	-	<0.0005		<0.0005		<0.0006		<0.0006		0.061		<0.0005		<0.0005		<0.0005		<0.0062		<0.0055		<0.0053	
4,4'-DDT	2	8	11	-	0.15		0.491		5.604		0.427		1.237		0.05		1		0.973		0.859		<0.0121		1.07	
Endosulfan I	470	6,800	4	-	<0.0005		<0.0005	</																		

TABLE 4.1
SOIL SAMPLING SUMMARY RESULTS - COMPARISON TO NJDEP STANDARDS
SITE FTMM-05
FORT MONMOUTH, NEW JERSEY

Field Sample Location	NJDEP Residential Direct Contact Soil Remediation Standard ⁽¹⁾	NJDEP Non- Residential Direct Contact Soil Remediation Standard ⁽¹⁾	NJDEP Impact to Groundwater Screening Level ⁽²⁾	Weston 1995 Background ⁽³⁾	B-220		B-220 Dup		B-221		B-222		B-223		B-224		B-225		B-226		B-227		B-228		B-229			
Sample Date					08/13/98		08/13/98		08/13/98		08/13/98		08/14/98		08/14/98		08/14/98		08/14/98		08/14/98		08/14/98		08/14/98		08/14/98	
Metals (mg/kg)																												
Aluminum	78,000	NA	6,000	15,200	4400		4200		7220		6310		8000		8920		3360		5370		6730		8520		4570			
Antimony	31	450	6	ND	0.763		0.382		1.38		0.483		0.759		<0.200		0.444		0.648		<0.220		1.17		1.06			
Arsenic	19	19	19	22.9	10		7.26		9.59		10.2		8.04		4.76		6.16		7.7		6.64		8.79		11			
Barium	16,000	59,000	2,100	32.3	70.6		36		55.2		26		40.3		25.7		28.3		47.9		38.5		39.9		31.5			
Beryllium	16	140	0.7	2	0.534		0.449		1.1		0.446		0.764		0.399		0.336		0.719		0.916		1.43		0.514			
Cadmium	78	78	2	ND	<0.053		<0.054		<0.060		<0.059		<0.056		<0.050		<0.054		<0.059		<0.055		<0.056		<0.057			
Calcium	NLE	NLE	NLE	921	983		779		654		314		1210		606		631		1020		519		395		344			
Chromium	NLE	NLE	NLE	269	37.5		25.5		74.3		69		60.4		27.1		22.4		44.1		73.2		92.1		51.5			
Cobalt	1,600	590	90	2.5	2.52		2.24		1.09		1.08		2.47		1.6		1.47		2.1		0.94		1.42		0.718			
Copper	3,100	45,000	11,000	8	29.8		30		32.9		4.04		22		3.7		23.1		32.9		8.81		5.93		17.7			
Iron	NLE	NLE	NLE	55,800	19400		14500		28900		17800		21500		11300		10800		18800		25700		30100		30800			
Lead	400	800	90	19.5	122		162		137		12.9		67.7		15.3		81.2		111		21.4		23.9		18.8			
Magnesium	NLE	NLE	NLE	7,230	1440		839		2280		1680		2160		1040		748		1470		2690		2940		1530			
Manganese	11,000	5,900	65	90.7	49.5		43.7		20.7		12.9		69.5		46.6		29.2		40		11.5		26.8		10.5			
Mercury	23	65	0.1	ND	2.341		31.452		0.392		0.197		0.096		0.351		0.301		0.283		0.198		0.212		0.182			
Nickel	1,600	23,000	48	8.4	6.6		6.3		5.86		4.76		8.15		4.31		5.43		7.43		4.49		5.39		3.49			
Potassium	NLE	NLE	NLE	15400	4340		2170		4950		5820		4300		3180		1920		4750		5430		6580		3610			
Selenium	390	5,700	11	1.9	<0.315		<0.327		<0.360		0.353		<0.335		<0.300		<0.325		<0.355		<0.329		<0.336		<0.344			
Silver	390	5,700	1	1.1	<0.315		<0.327		<0.360		<0.352		<0.335		<0.300		<0.325		<0.355		<0.329		<0.336		<0.344			
Sodium	NLE	NLE	NLE	51.6	386		218		723		572		168		94.2		262		448		483		315		565			
Thallium	5	79	3	ND	0.54		<0.327		<0.360		0.527		<0.335		<0.300		0.457		0.457		0.898		0.567		0.69			
Vanadium	78	1,100	NLE	94.1	28.3		25.1		34.4		38.7		41.8		23.5		23.1		28.9		24.8		32.1		34			
Zinc	23,000	110,000	930	81.4	57.2		31.1		62		25.8		79.5		23.5		48		50.3		34.3		50.8		43.5			

Notes:

Historically, there have been up to 318 soil boring locations associated with FTMM-05. This analysis looks at only those boring locations that fall within the footprint of FTMM-05.

(1) New Jersey Department of Environmental Protection (NJDEP) Residential Direct Contact Soil Remediation Standards (RDCSRS) and Non-Residential Direct Contact Soil Remediation Standards (NRDCSRS) (N.J.A.C 7:26D; amended May 7, 2012). Available at: <http://www.state.nj.us/dep/srp/regs/rs/>.

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NJDEP criteria for total xylenes are used for xylene isomers (m+p, o).

NJDEP criteria for endrin is used for endrin aldehyde.

NJDEP criteria for 4,4'-DDD and 4,4'-DDT are for total DDD and total DDT, respectively.

There are no NJDEP soil standards for individual PCB Arcolors; the total PCB NJDEP standards were used for individual Arcolors

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

B = Analyte detected in both sample and associated laboratory blank.

D = Result from dilution of sample.

DUP = field duplicate sample.

E = Estimated value.

J = Analyte detected between MDL and practical quantitation limit (PQL).

NA = not analyzed.

ND = not detected.

NLE = No limit established.

< = analyte not detected above method detection limit (MDL).

µg/kg = micrograms per kilogram.

mg/kg = milligrams per kilogram.

VOCs = volatile organic compounds.

in. = inches.

bgs = below ground surface.

Detections are bolded.

Shaded cells = concentration exceeds NJDEP Impact to Groundwater Criterion.

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TABLE 4.1
SOIL SAMPLING SUMMARY RESULTS - COMPARISON TO NJDEP STANDARDS
SITE FTMM-05
FORT MONMOUTH, NEW JERSEY

Field Sample Location	NJDEP Residential Direct Contact Soil Remediation Standard ⁽¹⁾	NJDEP Non- Residential Direct Contact Soil Remediation Standard ⁽¹⁾	NJDEP Impact to Groundwater Screening Level ⁽²⁾	Weston 1995 Background ⁽³⁾	B-230		B-231		B-232		B-233		B-234		B-235		B-236		B-237		B-238		B-239		B-240	
Sample Date					08/14/98		08/14/98		08/25/98		08/25/98		08/25/98		08/25/98		08/25/98		08/26/98		08/26/98		08/26/98		08/26/98	
Volatile Organic Compounds (VOCs, µg/kg)																										
Lab Sample ID (VOCs only collected at approximately 24 in. bgs)					3812.17		3812.19		3827.03		3827.05		3827.07		3827.09		3827.11		3836.03		3836.05		3836.07		3836.09	
Methylene Chloride	34,000	97,000	10	-	<480		<480		<510		<530		<580		<520		<550		<550		<610		<840		<760	
Benzene	2,000	5,000	5	-	<240		<240		<250		<260		<290		<260		340		<270		<300		<420		<380	
Tetrachloroethene	2,000	5,000	5	-	<240		<240		<250		<260		<290		<260		<280		<270		<300		<420		<380	
Chloroform	600	2,000	400	-	<240		<240		<250		<260		<290		<260		<280		<270		<300		<420		<380	
Ethylbenzene	7,800,000	110,000,000	13,000	-	<480		<480		<510		<530		<580		<520		<550		<550		<610		<840		<760	
TICs	NLE	NLE	NLE	-	ND		ND		ND		1600		1900		ND		ND		ND		ND		ND		ND	
Semivolatile Organic Compounds (SVOCs, µg/kg)																										
Lab Sample ID (All analyses except VOCs collected at approximately 6-12 in. bgs)					3812.16		3812.18		3827.02		3827.04		3827.06		3827.08		3827.10		3836.02		3836.04		3836.06		3836.08	
Naphthalene	6,000	17,000	25,000	-	<960		<970		<1000		<1100		<1200		<1000		<1100		<1100		<1000		<1100		<1000	
n-Nitrosodiphenylamine	99,000	390,000	400	-	<960		<970		<1000		<1100		<1200		<1000		<1100		<1100		<1000		<1100		<1000	
2-Methylnaphthalene	230,000	2,400,000	8,000	-	<960		<970		<1000		<1100		<1200		<1000		<1100		<1100		<1000		<1100		<1000	
4-Methylphenol	31,000	340,000	NLE	-	<960		<970		<1000		<1100		<1200		<1000		<1100		<1100		<1000		<1100		<1000	
Acenaphthylene	NLE	3.00E+08	NLE	-	<960		<970		<1000		230	J	<1200		<1000		200	J	<1100		<1000		340	J	260	J
Acenaphthene	3,400,000	37,000,000	110,000	-	<960		<970		<1000		<1100		210	J	<1000		<1100		<1100		<1000		<1100		<1000	
Dibenzofuran	NLE	NLE	NLE	-	<960		<970		<1000		<1100		<1200		<1000		<1100		<1100		<1000		<1100		<1000	
Diethylphthalate	49,000,000	550,000,000	88,000	-	<960		<970		<1000		<1100		<1200		<1000		<1100		<1100		<1000		<1100		<1000	
Fluorene	2,300,000	24,000,000	170,000	-	<960		<970		<1000		<1100		260	J	<1000		<1100		<1100		<1000		<1100		<1000	
Phenanthrene	NLE	300,000,000	NLE	-	310	J	<970		<1000		590	J	3200		370	J	670	J	300	J	440	J	1000	J	990	J
Anthracene	17,000,000	30,000,000	2,400,000	-	<960		<970		<1000		170	J	750	J	<1000		120	J	<1100		<1000		<1100		<1000	
Dimethylphthalate	NLE	NLE	NLE	-	<960		<970		<1000		<1100		<1200		<1000		<1100		<1100		<1000		<1100		<1000	
Di-n-butylphthalate	6,100,000	68,000,000	760,000	-	470	JB	160	JB	420	J	450	J	580	J	410	J	280	J	320	J	<1000		190	J	440	J
Fluoranthene	2,300,000	24,000,000	1,300,000	-	360	J	250	J	130	J	950	J	5100		410	J	700	J	310	J	350	J	950	J	850	J
Pyrene	1,700,000	18,000,000	840,000	-	550	J	380	J	200	J	1200		4700		570	J	1100		610	J	580	J	1800		1600	
Pyridine	NLE	NLE	NLE	-	<960		<970		<1000		<1100		<1200		<1000		<1100		<1100		<1000		<1100		<1000	
Butylbenzylphthalate	1,200,000	14,000,000	230,000	-	<960		<970		<1000		<1100		<1200		<1000		<1100		<1100		<1000		<1100		<1000	
Benzo(a)anthracene	600	2,000	800	-	190	J	130	J	<1000		570	J	2100		220	J	380	J	220	J	200	J	550	J	510	J
3,3'-Dichlorobenzidine	1,000	4,000	200	-	<960		<970		<1000		<1100		<1200		<1000		<1100		<1100		<1000		<1100		<1000	
Chrysene	62,000	230,000	80,000	-	450	J	350	J	<1000		1000	J	3100		450	J	860	J	490	J	410	J	1300		1100	
bis(2-Ethylhexyl)phthalate	35,000	140,000	1,200,000	-	<960		<970		<1000		<1100		130	J	<1000		<1100		<1100		<1000		<1100		<1000	
Benzo(b)fluoranthene	600	2,000	2,000	-	180	J	140	J	<1000		450	J	1600		200	J	340	J	<1100		<1000		500	J	410	J
Benzo(k)fluoranthene	6,000	23,000	25,000	-	210	J	160	J	<1000		620	J	1500		240	J	420	J	<1100		<1000		520	J	470	J
Benzo(a)pyrene	200	200	200	-	210	J	150	J	<1000		570	J	1600		210	J	400	J	<1100		<1000		560	J	510	J
Indeno(1,2,3-cd)pyrene	600	2,000	7,000	-	120	J	<970		<1000		330	J	880	J	<1000		180	J	<1100		<1000		240	J	210	J
Dibenz(a,h)anthracene	200	200	800	-	<960		<970		<1000		<1100		<1200		<1000		<1100		<1100		<1000		<1100		<1000	
Benzo(g,h,i)perylene	380,000,000	30,000,000	NLE	-	130	J	<970		<1000		290	J	650	J	120	J	190	J	<1100		<1000		230	J	220	J
Total TICs	NLE	NLE	NLE	-	22080		3400		7200		5400		16500		20710		15570		4500		4950		ND		44620	
Pesticides / PCBs (mg/kg)																										
Heptachlor	0.1	0.7	0.5	-	<0.0015		<0.0015		<0.0032		<0.0007		<0.0017		<0.0016		<0.0033		<0.0003		<0.0003		<0.0003		<0.0003	
Heptachlor Epoxide	0.07	0.3	0.01	-	<0.0031		<0.0031		<0.0064		<0.0013		<0.0034		<0.0032		<0.0066		<0.0006		<0.0006		<0.0006		<0.0007	
4,4'-DDE	2	9	18	-	0.483		0.366		<0.0043		0.104		0.08		0.204		0.272		0.275		0.412		0.592		0.445	
Dieldrin	0.04	0.2	0.003	-	<0.0026		<0.0025		<0.0053		<0.0011		<0.0028		<0.0026		<0.0055		<0.0005		<0.0005		0.049		<0.0006	
Endrin	23	340	1	-	<0.0026		<0.0025		<0.0053		<0.0011		<0.0028		<0.0026		<0.0055		<0.0005		<0.0005		<0.0005		<0.0006	
4,4'-DDD	3	13	4	-	0.127		0.089		0.181		0.068		0.143		0.209		0.158		0.021		0.033		0.779		0.287	
Endrin Aldehyde	NLE	NLE	NLE	-	<0.0026		<0.0025		<0.0053		<0.0011		<0.0028		<0.0026		<0.0055		<0.0005		<0.0005		<0.0005		<0.0006	
4,4'-DDT	2	8	11	-	0.833		0.626		1.344		0.345		1.143		1.028		1.28		0.65		1.438		2.914		1.636	
Endosulfan I	470	6,800	4	-	<0.0026		<0.0025		<0.0053		<0.0011		<0.0028		<0.0026		<0.0055		<0.0005		<0.0005		<0.0005		<0.0006	
Endos																										

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SOIL SAMPLING SUMMARY RESULTS - COMPARISON TO NJDEP STANDARDS
SITE FTMM-05
FORT MONMOUTH, NEW JERSEY

Field Sample Location	NJDEP Residential Direct Contact Soil Remediation Standard ⁽¹⁾	NJDEP Non- Residential Direct Contact Soil Remediation Standard ⁽¹⁾	NJDEP Impact to Groundwater Screening Level ⁽²⁾	Weston 1995 Background ⁽³⁾	B-230		B-231		B-232		B-233		B-234		B-235		B-236		B-237		B-238		B-239		B-240		
Sample Date					08/14/98		08/14/98		08/25/98		08/25/98		08/25/98		08/25/98		08/25/98		08/26/98		08/26/98		08/26/98		08/26/98		
Metals (mg/kg)																											
Aluminum	78,000	NA	6,000	15,200	6620		7420		7250		3370		4870		5200		10200		4020		6180		5840		7580		
Antimony	31	450	6	ND	0.918		1.12		1.28		0.374		0.9		1.04		1.67		0.604		0.948		0.721		1.16		
Arsenic	19	19	19	22.9	9.13		7.76		9.52		6.66		6.23		7.87		9.48		5.11		8.95		9.08		12.6		
Barium	16,000	59,000	2,100	32.3	19		31		45.3		35.5		25.8		36.4		36.3		16.8		20.1		49.4		48.1		
Beryllium	16	140	0.7	2	0.723		0.786		0.958		0.5		0.861		0.887		1.39		0.479		0.733		0.799		0.949		
Cadmium	78	78	2	ND	<0.048		<0.053		<0.060		<0.061		<0.065		<0.057		<0.063		<0.050		<0.054		<0.060		<0.058		
Calcium	NLE	NLE	NLE	921	420		786		862		708		199		442		583		595		290		371		421		
Chromium	NLE	NLE	NLE	269	62.7		59.1		74.3		20.6		55.4		57.3		112		40.3		59.8		61.8		71.4		
Cobalt	1,600	590	90	2.5	1.55		2.61		1.36		3.37		0.88		0.948		1.67		1.79		2.79		1.01		1.26		
Copper	3,100	45,000	11,000	8	11.6		12.9		14.2		11.9		2.95		10.5		5.84		8.44		1.78		17.6		18.4		
Iron	NLE	NLE	NLE	55,800	20200		26600		29600		12200		19900		22900		41300		17300		31700		24100		28500		
Lead	400	800	90	19.5	36.3		47.5		55.9		25.5		14.4		30.7		21.9		26		13.4		50.6		55.8		
Magnesium	NLE	NLE	NLE	7,230	1890		1430		2260		684		1640		1690		4380		928		872		1690		2060		
Manganese	11,000	5,900	65	90.7	45.2		45.2		21.2		61.6		14.7		14.1		15.7		53.3		60.2		13.9		16.9		
Mercury	23	65	0.1	ND	0.067		0.078		0.278		0.22		0.213		0.288		0.217		0.037		0.015		0.38		0.391		
Nickel	1,600	23,000	48	8.4	5.19		9.07		6.07		6.49		3.35		4.77		6.44		5.85		7.59		4.97		6.16		
Potassium	NLE	NLE	NLE	15400	3780		5360		4740		1950		6550		3720		10200		2360		2490		6150		4130		
Selenium	390	5,700	11	1.9	<0.289		<0.317		<0.359		<0.365		<0.390		<0.341		<0.378		<0.298		<0.321		<0.359		<0.345		
Silver	390	5,700	1	1.1	<0.289		<0.317		<0.359		<0.365		<0.390		<0.341		<0.378		<0.298		<0.321		<0.359		<0.345		
Sodium	NLE	NLE	NLE	51.6	135		241		360		297		194		431		582		104		97		320		374		
Thallium	5	79	3	ND	<0.289		0.429		0.725		0.456		0.68		0.475		0.589		0.402		0.57		0.606		1.06		
Vanadium	78	1,100	NLE	94.1	42.3		60.8		40.3		15.7		17.6		22.7		51.8		39.8		74.9		28.9		40.4		
Zinc	23,000	110,000	930	81.4	32.1		36.3		43.4		59.6		28.8		43.8		43.6		39.1		46.3		39.6		43.7		

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SITE FTMM-05
FORT MONMOUTH, NEW JERSEY

Field Sample Location	NJDEP Residential Direct Contact Soil Remediation Standard ⁽¹⁾	NJDEP Non- Residential Direct Contact Soil Remediation Standard ⁽¹⁾	NJDEP Impact to Groundwater Screening Level ⁽²⁾	Weston 1995 Background ⁽³⁾	B-240 Dup		B-241		B-242		B-243		B-244		B-245		B-246		B-247		B-248		B-249		B-250	
Sample Date					08/26/98		08/26/98		08/26/98		08/26/98		08/26/98		08/26/98		08/26/98		08/26/98		08/26/98		08/26/98		08/26/98	
Volatile Organic Compounds (VOCs, µg/kg)																										
Lab Sample ID (VOCs only collected at approximately 24 in. bgs)					3836.39		3836.11		3836.13		3836.15		3836.17		3836.19		3836.21		3836.23		3836.25		3836.27		3836.29	
Methylene Chloride	34,000	97,000	10	-	6400		<1000		<670		<670		<570		<620		<940		<620		<630		<780		<640	
Benzene	2,000	5,000	5	-	<350		<500		<330		<340		<290		<310		<470		<310		<310		<390		<320	
Tetrachloroethene	2,000	5,000	5	-	<350		<500		<330		<340		<290		<310		<470		<310		<310		<390		<320	
Chloroform	600	2,000	400	-	<350		<500		<330		<340		<290		<310		<470		<310		<310		<390		<320	
Ethylbenzene	7,800,000	110,000,000	13,000	-	<700		<1000		<670		<670		<570		<620		<940		<620		<630		<780		<640	
TICs	NLE	NLE	NLE	-	ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
Semivolatile Organic Compounds (SVOCs, µg/kg)																										
Lab Sample ID (All analyses except VOCs collected at approximately 6-12 in. bgs)					3836.38		3836.10		3836.12		3836.14		3836.16		3836.18		3836.20		3836.22		3836.24		3836.26		3836.28	
Naphthalene	6,000	17,000	25,000	-	<1100		<1000		<990		<1400		<1100		<1100		<1100		<1000		<1000		<1000		<1100	
n-Nitrosodiphenylamine	99,000	390,000	400	-	<1100		<1000		<990		<1400		<1100		<1100		<1100		<1000		<1000		<1000		<1100	
2-Methylnaphthalene	230,000	2,400,000	8,000	-	<1100		<1000		<990		<1400		<1100		<1100		<1100		<1000		<1000		<1000		<1100	
4-Methylphenol	31,000	340,000	NLE	-	<1100		<1000		<990		<1400		<1100		<1100		<1100		<1000		<1000		<1000		<1100	
Acenaphthylene	NLE	3.00E+08	NLE	-	280	J	<1000		<990		<1400		210	J	<1100		<1100		<1000		<1000		<1000		<1100	
Acenaphthene	3,400,000	37,000,000	110,000	-	<1100		<1000		<990		<1400		<1100		<1100		<1100		<1000		<1000		<1000		<1100	
Dibenzofuran	NLE	NLE	NLE	-	<1100		<1000		<990		<1400		<1100		<1100		<1100		<1000		<1000		<1000		<1100	
Diethylphthalate	49,000,000	550,000,000	88,000	-	<1100		<1000		<990		<1400		<1100		<1100		<1100		<1000		<1000		<1000		<1100	
Fluorene	2,300,000	24,000,000	170,000	-	<1100		<1000		<990		<1400		<1100		<1100		<1100		<1000		<1000		<1000		<1100	
Phenanthrene	NLE	300,000,000	NLE	-	2800		210	J	<990		<1400		1100		440	J	360	J	<1000		<1000		<1000		400	J
Anthracene	17,000,000	30,000,000	2,400,000	-	440	J	<1000		<990		<1400		<1100		<1100		<1100		<1000		<1000		<1000		<1100	
Dimethylphthalate	NLE	NLE	NLE	-	<1100		<1000		<990		<1400		<1100		<1100		<1100		<1000		<1000		<1000		<1100	
Di-n-butylphthalate	6,100,000	68,000,000	760,000	-	<1100		420	J	<990		290	J	960	J	460	J	960	J	440	J	440	J	350	J	780	J
Fluoranthene	2,300,000	24,000,000	1,300,000	-	2900		250	J	180	J	<1400		720	J	420	J	360	J	190	J	190	J	<1000		310	J
Pyrene	1,700,000	18,000,000	840,000	-	3600		390	J	310	J	<1400		1400		680	J	570	J	310	J	300	J	<1000		560	J
Pyridine	NLE	NLE	NLE	-	<1100		<1000		<990		<1400		<1100		<1100		<1100		<1000		<1000		<1000		<1100	
Butylbenzylphthalate	1,200,000	14,000,000	230,000	-	<1100		<1000		<990		<1400		<1100		<1100		<1100		<1000		<1000		<1000		<1100	
Benzo(a)anthracene	600	2,000	800	-	1200		<1000		<990		<1400		410	J	220	J	<1100		<1000		<1000		<1000		<1100	
3,3'-Dichlorobenzidine	1,000	4,000	200	-	<1100		<1000		<990		<1400		<1100		<1100		<1100		<1000		<1000		<1000		<1100	
Chrysene	62,000	230,000	80,000	-	2100		<1000		<990		<1400		880	J	460	J	<1100		<1000		<1000		<1000		<1100	
bis(2-Ethylhexyl)phthalate	35,000	140,000	1,200,000	-	<1100		<1000		<990		<1400		<1100		<1100		<1100		<1000		<1000		<1000		<1100	
Benzo(b)fluoranthene	600	2,000	2,000	-	1100	J	<1000		<990		<1400		<1100		<1100		<1100		<1000		<1000		<1000		<1100	
Benzo(k)fluoranthene	6,000	23,000	25,000	-	1000	J	<1000		<990		<1400		<1100		<1100		<1100		<1000		<1000		<1000		<1100	
Benzo(a)pyrene	200	200	200	-	1100	J	<1000		<990		<1400		<1100		<1100		<1100		<1000		<1000		<1000		<1100	
Indeno(1,2,3-cd)pyrene	600	2,000	7,000	-	590	J	<1000		<990		<1400		<1100		<1100		<1100		<1000		<1000		<1000		<1100	
Dibenz(a,h)anthracene	200	200	800	-	<1100		<1000		<990		<1400		<1100		<1100		<1100		<1000		<1000		<1000		<1100	
Benzo(g,h,i)perylene	380,000,000	30,000,000	NLE	-	540	J	<1000		<990		<1400		<1100		<1100		<1100		<1000		<1000		<1000		<1100	
Total TICs	NLE	NLE	NLE	-	20300		12700		7250		23700		32940		15450		20700		10500		11300		4500		17500	
Pesticides / PCBs (mg/kg)																										
Heptachlor	0.1	0.7	0.5	-	<0.0003		<0.0003		<0.0003		<0.0004		<0.0003		<0.0003		<0.0003		<0.0003		<0.0003		<0.0003		<0.0003	
Heptachlor Epoxide	0.07	0.3	0.01	-	<0.0007		<0.0006		<0.0006		<0.0008		<0.0007		<0.0007		<0.0006		<0.0006		<0.0006		<0.0006		<0.0007	
4,4'-DDE	2	9	18	-	0.34		0.195		0.036		0.135		1.003		0.164		0.33		0.408		0.083		0.903		3.33	
Dieldrin	0.04	0.2	0.003	-	<0.0006		<0.0005		<0.0005		<0.0007		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0006	
Endrin	23	340	1	-	<0.0006		<0.0005		<0.0005		<0.0007		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0006	
4,4'-DDD	3	13	4	-	0.109		0.077		0.056		0.037		0.178		0.08		0.171		0.145		0.045		0.378		0.729	
Endrin Aldehyde	NLE	NLE	NLE	-	<0.0006		<0.0005		<0.0005		<0.0007		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0006	
4,4'-DDT	2	8	11	-	0.822		0.599		0.07		0.62		2.781		0.789		2.226		1.918		0.525		13.949		23.629	
Endosulfan I	470	6,800	4	-	<0.0006		<0.0005		<0.0005		<0.0007		<0.0005		<0.0006		<0.0005		<0.0005		<0.0005		&			

TABLE 4.1
SOIL SAMPLING SUMMARY RESULTS - COMPARISON TO NJDEP STANDARDS
SITE FTMM-05
FORT MONMOUTH, NEW JERSEY

Field Sample Location	NJDEP Residential Direct Contact Soil Remediation Standard ⁽¹⁾	NJDEP Non- Residential Direct Contact Soil Remediation Standard ⁽¹⁾	NJDEP Impact to Groundwater Screening Level ⁽²⁾	Weston 1995 Background ⁽³⁾	B-240 Dup		B-241		B-242		B-243		B-244		B-245		B-246		B-247		B-248		B-249		B-250	
Sample Date					08/26/98		08/26/98		08/26/98		08/26/98		08/26/98		08/26/98		08/26/98		08/26/98		08/26/98		08/26/98		08/26/98	
Metals (mg/kg)																										
Aluminum	78,000	NA	6,000	15,200	6210		5080		5800		7380		3900		8730		5890		5890		6970		3390		8150	
Antimony	31	450	6	ND	0.999		0.821		0.593		1.15		0.495		1.28		0.94		0.931		1.14		0.654		1.43	
Arsenic	19	19	19	22.9	9.78		7.6		6.45		10		6.62		9.43		8.91		8.61		9.13		5.72		7.84	
Barium	16,000	59,000	2,100	32.3	45.3		46.5		24.5		51		34.5		53.7		53.3		40.9		34.6		25.1		31.1	
Beryllium	16	140	0.7	2	0.775		1.15		0.736		0.927		0.45		1.25		0.811		1.02		0.945		0.538		1.02	
Cadmium	78	78	2	ND	<0.059		<0.059		45.8		<0.079		<0.059		<0.064		<0.059		<0.059		<0.049		<0.058		<0.047	
Calcium	NLE	NLE	NLE	921	508		332		575		427		929		396		306		787		1140		278		389	
Chromium	NLE	NLE	NLE	269	61.9		52.1		45.8		72		31.3		88.1		63.2		60.5		72.5		39.3		90.1	
Cobalt	1,600	590	90	2.5	1.07		1.11		0.951		2.04		1.85		1.68		0.96		0.998		1.55		0.926		1.02	
Copper	3,100	45,000	11,000	8	13.4		6.5		7.62		12.3		27		45.3		22.5		18		10.1		5.01		5.52	
Iron	NLE	NLE	NLE	55,800	25000		21100		17000		33900		13200		33700		28200		24400		30600		17500		32800	
Lead	400	800	90	19.5	43.4		28.5		19.4		17		94.5		50.5		53.2		47.4		21.6		23.1		20.2	
Magnesium	NLE	NLE	NLE	7,230	1810		1470		1420		1930		1090		2980		1660		1830		2730		1160		3380	
Manganese	11,000	5,900	65	90.7	15.2		13		28.1		24.9		53.9		18.8		15		19		33.2		8.41		12.4	
Mercury	23	65	0.1	ND	0.393		0.332		0.19		0.255		0.228		0.355		0.385		0.371		0.229		0.267		0.163	
Nickel	1,600	23,000	48	8.4	5.16		5		431		8.64		5.75		7.73		4.64		4.52		6.14		2.99		4.74	
Potassium	NLE	NLE	NLE	15400	6560		5540		4830		7840		3120		7070		3650		3760		5980		4390		8120	
Selenium	390	5,700	11	1.9	<0.357		<0.355		<0.335		<0.477		<0.354		<0.386		<0.356		<0.351		<0.296		<0.346		<0.282	
Silver	390	5,700	1	1.1	<0.357		<0.355		<0.335		<0.477		<0.354		<0.386		<0.356		<0.351		<0.296		<0.346		<0.282	
Sodium	NLE	NLE	NLE	51.6	463		304		362		898		262		303		310		349		360		336		342	
Thallium	5	79	3	ND	0.945		1.03		0.426		0.71		0.389		0.969		0.665		0.863		0.563		0.681		0.6	
Vanadium	78	1,100	NLE	94.1	34.5		21.3		19.8		59.3		27.8		45.4		28.6		27.3		33		15.9		40	
Zinc	23,000	110,000	930	81.4	38.5		43.8		53.5		35.8		65.6		47.6		181		43.6		69.5		27.2		39.4	

Notes:

Historically, there have been up to 318 soil boring locations associated with FTMM-05. This analysis looks at only those boring locations that fall within the footprint of FTMM-05.

(1) New Jersey Department of Environmental Protection (NJDEP) Residential Direct Contact Soil Remediation Standards (RDCSRS) and Non-Residential Direct Contact Soil Remediation Standards (NRDCSRS) (N.J.A.C 7:26D; amended May 7, 2012). Available at: <http://www.state.nj.us/dep/srp/regs/rs/>.

(2) NJDEP Impact to Groundwater (NJDEP guidance document; Nov 2013).

(3) Weston, 1995. Final Site Investigation - Main Post and Charles Wood Areas, Fort Monmouth, New Jersey, December.

NJDEP criteria for total xylenes are used for xylene isomers (m+p, o).

NJDEP criteria for endrin is used for endrin aldehyde.

NJDEP criteria for 4,4'-DDD and 4,4'-DDT are for total DDD and total DDT, respectively.

There are no NJDEP soil standards for individual PCB Arcolors; the total PCB NJDEP standards were used for individual Arcolors

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

B = Analyte detected in both sample and associated laboratory blank.

D = Result from dilution of sample.

DUP = field duplicate sample.

E = Estimated value.

J = Analyte detected between MDL and practical quantitation limit (PQL).

NA = not analyzed.

ND = not detected.

NLE = No limit established.

< = analyte not detected above method detection limit (MDL).

µg/kg = micrograms per kilogram.

mg/kg = milligrams per kilogram.

VOCs = volatile organic compounds.

in. = inches.

bgs = below ground surface.

Detections are bolded.

Shaded cells = concentration exceeds NJDEP Impact to Groundwater Criterion.

Shaded cells = concentration exceeds one or both NJDEP Direct Contact Criteria.

Shaded cells = concentration exceeds all NJDEP criteria.

Shaded cells = concentration exceeds Weston (1995) background concentration.

TABLE 4.1
SOIL SAMPLING SUMMARY RESULTS - COMPARISON TO NJDEP STANDARDS
SITE FTMM-05
FORT MONMOUTH, NEW JERSEY

Field Sample Location	NJDEP Residential Direct Contact Soil Remediation Standard ⁽¹⁾	NJDEP Non- Residential Direct Contact Soil Remediation Standard ⁽¹⁾	NJDEP Impact to Groundwater Screening Level ⁽²⁾	Weston 1995 Background ⁽³⁾	B-251		B-252		B-253	B-254
Sample Date					08/26/98		08/26/98		08/26/98	08/26/98
Volatile Organic Compounds (VOCs, µg/kg)										
Lab Sample ID (VOCs only collected at approximately 24 in. bgs)					3836.31		3836.33		3836.35	3836.37
Methylene Chloride	34,000	97,000	10	-	<510		<620		<600	<550
Benzene	2,000	5,000	5	-	<250		<310		<300	340
Tetrachloroethene	2,000	5,000	5	-	<250		<310		<300	<280
Chloroform	600	2,000	400	-	<250		<310		<300	<280
Ethylbenzene	7,800,000	110,000,000	13,000	-	<510		<620		<600	<550
TICs	NLE	NLE	NLE	-	ND		ND		ND	ND
Semivolatile Organic Compounds (SVOCs, µg/kg)										
Lab Sample ID (All analyses except VOCs collected at approximately 6-12 in. bgs)					3836.30		3836.32		3836.34	3836.36
Naphthalene	6,000	17,000	25,000	-	<1100		<1000		<1000	<990
n-Nitrosodiphenylamine	99,000	390,000	400	-	<1100		<1000		<1000	<990
2-Methylnaphthalene	230,000	2,400,000	8,000	-	<1100		<1000		<1000	<990
4-Methylphenol	31,000	340,000	NLE	-	<1100		<1000		<1000	<990
Acenaphthylene	NLE	3.00E+08	NLE	-	<1100		<1000		<1000	250
Acenaphthene	3,400,000	37,000,000	110,000	-	<1100		<1000		<1000	<990
Dibenzofuran	NLE	NLE	NLE	-	<1100		<1000		<1000	<990
Diethylphthalate	49,000,000	550,000,000	88,000	-	<1100		<1000		<1000	<990
Fluorene	2,300,000	24,000,000	170,000	-	<1100		<1000		<1000	<990
Phenanthrene	NLE	300,000,000	NLE	-	300	J	240	J	<1000	1800
Anthracene	17,000,000	30,000,000	2,400,000	-	<1100		<1000		<1000	<990
Dimethylphthalate	NLE	NLE	NLE	-	<1100		<1000		<1000	<990
Di-n-butylphthalate	6,100,000	68,000,000	760,000	-	390	J	370	J	<1000	<990
Fluoranthene	2,300,000	24,000,000	1,300,000	-	290	J	300	J	<1000	1300
Pyrene	1,700,000	18,000,000	840,000	-	450	J	570	J	<1000	2400
Pyridine	NLE	NLE	NLE	-	<1100		<1000		<1000	<990
Butylbenzylphthalate	1,200,000	14,000,000	230,000	-	<1100		<1000		<1000	<990
Benzo(a)anthracene	600	2,000	800	-	<1100		220	J	<1000	690
3,3'-Dichlorobenzidine	1,000	4,000	200	-	<1100		<1000		<1000	<990
Chrysene	62,000	230,000	80,000	-	<1100		430	J	<1000	1400
bis(2-Ethylhexyl)phthalate	35,000	140,000	1,200,000	-	<1100		<1000		<1000	<990
Benzo(b)fluoranthene	600	2,000	2,000	-	<1100		<1000		<1000	480
Benzo(k)fluoranthene	6,000	23,000	25,000	-	<1100		<1000		<1000	510
Benzo(a)pyrene	200	200	200	-	<1100		<1000		<1000	520
Indeno(1,2,3-cd)pyrene	600	2,000	7,000	-	<1100		<1000		<1000	310
Dibenz(a,h)anthracene	200	200	800	-	<1100		<1000		<1000	<990
Benzo(g,h,i)perylene	380,000,000	30,000,000	NLE	-	<1100		<1000		<1000	320
Total TICs	NLE	NLE	NLE	-	18050		5100		8840	83770
Pesticides / PCBs (mg/kg)										
Heptachlor	0.1	0.7	0.5	-	<0.0003		<0.0003		<0.0003	<0.0003
Heptachlor Epoxide	0.07	0.3	0.01	-	<0.0006		<0.0006		<0.0006	<0.0006
4,4'-DDE	2	9	18	-	0.742		1.104		0.23	4.185
Dieldrin	0.04	0.2	0.003	-	<0.0005		<0.0005		<0.0005	<0.0005
Endrin	23	340	1	-	<0.0005		<0.0005		<0.0005	<0.0005
4,4'-DDD	3	13	4	-	0.046		0.041		0.043	3.787
Endrin Aldehyde	NLE	NLE	NLE	-	<0.0005		<0.0005		<0.0005	<0.0005
4,4'-DDT	2	8	11	-	2.094		1.746		0.856	56.446
Endosulfan I	470	6,800	4	-	<0.0005		<0.0005		<0.0005	<0.0005
Endosulfan II	470	6,800	4	-	<0.0004		<0.0004		<0.0004	<0.0004
Endosulfan-Sulfate	470	6,800	2	-	<0.0004		<0.0004		<0.0004	<0.0004
gamma-Chlordane	0.2	1	0.05	-	<0.0005		<0.0005		<0.0005	0.021
alpha-Chlordane	0.2	1	0.05	-	<0.0005		<0.0005		<0.0005	0.026
Aroclor 1254	0.2	1	0.2	-	<0.0041		<0.0040		<0.0040	<0.0042

TABLE 4.1
SOIL SAMPLING SUMMARY RESULTS - COMPARISON TO NJDEP STANDARDS
SITE FTMM-05
FORT MONMOUTH, NEW JERSEY

Field Sample Location	NJDEP Residential Direct Contact Soil Remediation Standard ⁽¹⁾	NJDEP Non- Residential Direct Contact Soil Remediation Standard ⁽¹⁾	NJDEP Impact to Groundwater Screening Level ⁽²⁾	Weston 1995 Background ⁽³⁾	B-251		B-252		B-253	B-254	
Sample Date					08/26/98	08/26/98	08/26/98	08/26/98			
Metals (mg/kg)											
Aluminum	78,000	NA	6,000	15,200	6430		5560		4350	6740	
Antimony	31	450	6	ND	1.31		0.774		0.688	0.916	
Arsenic	19	19	19	22.9	11.3		9.19		5.88	10.1	
Barium	16,000	59,000	2,100	32.3	69.6		32.2		17	48.4	
Beryllium	16	140	0.7	2	0.824		0.736		0.84	2.05	
Cadmium	78	78	2	ND	<0.056		<0.053		<0.045	<0.053	
Calcium	NLE	NLE	NLE	921	828		1100		563	143	
Chromium	NLE	NLE	NLE	269	72.6		56.7		46.7	52.8	
Cobalt	1,600	590	90	2.5	1.36		1.43		1.21	2.76	
Copper	3,100	45,000	11,000	8	110		15.8		11.9	10.1	
Iron	NLE	NLE	NLE	55,800	31400		21200		16400	27700	
Lead	400	800	90	19.5	163		69.8		12.4	40.3	
Magnesium	NLE	NLE	NLE	7,230	2210		1920		1330	1130	
Manganese	11,000	5,900	65	90.7	38.5		49.7		15.4	38	
Mercury	23	65	0.1	ND	0.275		0.361		0.069	0.706	
Nickel	1,600	23,000	48	8.4	5.81		5.24		3.33	6.57	
Potassium	NLE	NLE	NLE	15400	4900		3860		5380	4170	
Selenium	390	5,700	11	1.9	<0.336		<0.321		<0.267	<0.316	
Silver	390	5,700	1	1.1	<0.336		<0.321		<0.267	0.413	
Sodium	NLE	NLE	NLE	51.6	388		147		84.6	99.8	
Thallium	5	79	3	ND	0.709		0.535		0.332	0.691	
Vanadium	78	1,100	NLE	94.1	35.1		25.7		13.5	26.8	
Zinc	23,000	110,000	930	81.4	123		115		32.1	51.5	

Notes:

Historically, there have been up to 318 soil boring locations associated with FTMM-05. This analysis looks at only those boring locations that fall within the footprint of FTMM-05.

(1) New Jersey Department of Environmental Protection (NJDEP) Residential Direct Contact Soil Remediation Standards (RDCSRS) and Non-Residential Direct Contact Soil Remediation Standards (NRDCSRS) (N.J.A.C 7:26D; amended May 7, 2012). Available at: <http://www.state.nj.us/dep/srp/regs/rs/>.

(2) NJDEP Impact to Groundwater (NJDEP guidance document; Nov 2013).

(3) Weston, 1995. Final Site Investigation - Main Post and Charles Wood Areas, Fort Monmouth, New Jersey, December.

NJDEP criteria for total xylenes are used for xylene isomers (m+p, o).

NJDEP criteria for endrin is used for endrin aldehyde.

NJDEP criteria for 4,4'-DDD and 4,4'-DDT are for total DDD and total DDT, respectively.

There are no NJDEP soil standards for individual PCB Arcolors; the total PCB NJDEP standards were used for individual Arcolors

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

B = Analyte detected in both sample and associated laboratory blank.

D = Result from dilution of sample.

DUP = field duplicate sample.

E = Estimated value.

J = Analyte detected between MDL and practical quantitation limit (PQL).

NA = not analyzed.

ND = not detected.

NLE = No limit established.

< = analyte not detected above method detection limit (MDL).

µg/kg = micrograms per kilogram.

mg/kg = milligrams per kilogram.

VOCs = volatile organic compounds.

in. = inches.

bgs = below ground surface.

Detections are bolded.

Shaded cells = concentration exceeds NJDEP Impact to Groundwater Criterion.

Shaded cells = concentration exceeds one or both NJDEP Direct Contact Criteria.

Shaded cells = concentration exceeds all NJDEP criteria.

Shaded cells = concentration exceeds Weston (1995) background concentration.

EXHIBIT C

EXHIBIT C

Exhibit C includes the narrative descriptions of the institutional controls and engineering controls for the subject property, as specified in Appendix B of the Administrative Requirements for the Remediation of Contaminated Sites (ARRCS) in N.J.A.C. 7:26C. All current and subsequent owners, operators and lessees will be advised of the conditions and provided copies of the Deed Notice.

- i. Exhibit C-1: Deed Notice as Institutional Control: Exhibit C-1 includes a narrative description of the restriction and obligations of this Deed Notice as follows:

- (A) General Description of this Deed Notice:

This Deed Notice is being established as an institutional control for landfill FTMM-05. The landfill is a 4.227-acre area where landfill material was identified, as well as concentrations of volatile organic compounds, semivolatile organic compounds, polychlorinated biphenyls, and metals exceeding their May 2021 NJDEP Soil Remediation Standards. This Deed Notice is specific to the portion of landfill FTMM-05 that is within the Borough of Oceanport and covers approximately 4,765 square feet of land (Exhibit A – Colliers Engineering & Design FTMM-05 Deed Restriction Exhibit).

The engineering control for the entire landfill is a combination of a 24-inch-thick vegetated soil cap and a cap comprised of a dense grade aggregate (an existing access road) to restrict exposure.

By operation of this Deed Notice the restricted area at the subject property is restricted to non-residential uses that will maintain the current engineering and institutional controls established. For purposes of this deed notice, residential use includes, but is not limited to, single family or multi-family residences; child care facilities; and nursing home or assisted living facilities; and any type of educational facility for children/young adults in grades kindergarten through 12. The objective of these restrictions is to prevent potential exposure to- and/or migration of- landfill material or soil that contains contaminants at concentrations exceeding the NJDEP Soil Remediation Standards.

- (B) Monitoring of Deed Notice and Engineering Controls:

Monitoring of the institutional and engineering control will consist of an annual inspection of the Restricted Areas, at a minimum, and an evaluation of the engineered cap acting as an engineering control. The annual monitoring will be conducted by the Army or its contractor at the subject property to determine whether:

- 1) Any disturbances (including erosion) of the soil in the Restricted Areas resulted in the loss or reduction in protectiveness of the engineering control or an unacceptable exposure to the underlying landfill material or soil;

- 2) There have been any land use changes subsequent to the filing of this Deed Notice or the most recent biennial certification, whichever is more recent;
- 3) The current land use on the property is consistent with the restrictions in this Deed Notice;
- 4) Any newly promulgated or modified requirements of applicable regulations or laws apply to the site; and
- 5) Any new standards, regulations, or laws apply to the site that might necessitate additional sampling in order to evaluate the protectiveness of the remedial action which includes this Deed Notice, so that additional sampling can be conducted, if necessary.

Annual inspections will be documented and maintained at the site, at the primary office location of the owner, the Person Responsible for the Remediation (U.S. Army), and/or the Person with Primary Responsibility for Permit Compliance.

(C) Description of Biennial Certification:

Annual monitoring for compliance and effectiveness of the institutional and engineering control(s) pursuant to (A) and (B), above, shall be documented in support of a biennial certification of the protectiveness of the remedial action that includes the Deed Notice.

The Biennial Certification shall be submitted by the U.S. Army or its contractor to the Department every two years in the format required by the regulations and guidance in effect at the time of submittal.

The Biennial Certification report will include:

- 1) Certification of the protectiveness of the remedial action and Deed Notice;
- 2) Description of how the institutional and engineering controls are being maintained;
- 3) Determination whether the remedial action and deed notice continues to be protective of public health and safety and the environment; and
- 4) Assessment if Land Use at the property remains consistent with the restrictions in the Deed Notice;

ii. Exhibit C-2 – Vegetative Landfill Cap:

(A) Description of engineering controls:

Landfill material and contaminated soil was regraded to facilitate drainage and compacted prior to installation of the vegetated soil cap. The engineered cap consists of the following, as indicated on Exhibit B-1A:

1. Non-woven 8 oz/yd² geotextile filtration fabric placed on top of compacted soil;
2. 18 inches of common borrow soil to provide a vegetative support layer;

3. 6 inches of topsoil; and
4. Vegetation.

(B) Objective of the engineering controls:

The objective of the cap as an engineering control is to limit the potential for exposure and migration of underlying contaminants present in soil at concentrations in excess of the NJDEP Soil Remediation Standards.

(C) How the engineering control is intended to function:

The engineered soil cap is intended to be a physical barrier that would limit the potential for human direct contact to the underlying landfill material and soils that exceed the NJDEP Soil Remediation Standards. In addition, the physical barrier will prevent wind or rain-based erosion forces that could result in migration of contaminants in the underlying soil. The following describes recommended monitoring and maintenance activities that would facilitate long term effectiveness of the engineering control.

- 1) Vegetation should be maintained to prevent succession and establishment of deep-rooted vegetation that could compromise the integrity of the soil cap and/or geotextile delineation fabric. Recommended maintenance is an annual mowing of vegetation at the end of each growing season (November / December).
- 2) The party responsible for remediation (U.S. Army) will conduct annual monitoring of the soil capped areas consisting of inspection and evaluation of the cap to determine its integrity, operability, and effectiveness. The capped area shall be evaluated and maintained on a yearly basis. Areas that show signs of disturbance that reduce the protectiveness of the engineering controls within the Restricted Areas shall be repaired. Inspections and maintenance activities will be logged and photo documented.
- 3) Alterations, excavations, or other disturbance of the engineering controls cap will be conducted in accordance with the Deed Notice and NJDEP regulations in effect at the time of disturbance. Disturbance activities will occur under a Remedial Action Workplan prepared in accordance with N.J.A.C. 7:26E-5.5 and applicable regulations and guidance in effect at the time of disturbance. Disturbance activities will be conducted in a timely manner and shall not result in the unacceptable exposure to contamination present in the underlying soil. Planned disturbances shall be coordinated with the party with Primary Responsibility for Permit Compliance.
- 4) The results of inspections, maintenance, and repair activities of the engineering controls shall be documented in a logbook, which will be made available onsite¹ to the NJDEP upon request. The logbook shall contain dates of activities, name of

¹ If there are no occupants onsite, inspections will be documented and maintained at the primary office location of the owner, the Person Responsible for the Remediation, or the Person with Primary Responsibility for Permit Compliance.

the personnel conducting activities, and the results of activities including documentation of the condition of the cap with photo-documentation as appropriate.

During the biennial certification process, a regulatory review will be conducted to determine if newly promulgated or modified requirements exist in relation to the maintenance of this Engineering Control

iii. Exhibit C-3 – Existing Access Road Cap:

(A) Description of engineering controls:

Landfill material and contaminated soil was regraded to facilitate drainage and compacted prior to installation of the vegetated soil cap. The existing access road cap consists of 24 inches of dense grade aggregate.

(B) Objective of the engineering controls:

The objective of the cap as an engineering control is to limit the potential for exposure and migration of underlying contaminants present in soil at concentrations in excess of the NJDEP Soil Remediation Standards.

(C) How the engineering control is intended to function:

The engineered soil cap is intended to be a physical barrier that would limit the potential for human direct contact to the underlying landfill material and soils that exceed the NJDEP Soil Remediation Standards. In addition, the physical barrier will prevent wind or rain-based erosion forces that could result in migration of contaminants in the underlying soil. The following describes recommended monitoring and maintenance activities that would facilitate long term effectiveness of the engineering control.

- 1) The party responsible for remediation (the Army) will conduct annual monitoring of the Access Road Cap, consisting of inspection and evaluation of the cap to determine its integrity, operability and effectiveness. The capped area shall be evaluated and maintained on a yearly basis. Areas that show signs of disturbance that reduce the protectiveness of the engineering controls within the Restricted Areas shall be repaired. Inspections and maintenance activities will be logged and photo documented.
- 2) Alterations, excavations, or other disturbance of the engineering controls cap will be conducted in accordance with the Deed Notice and NJDEP regulations in effect at the time of disturbance. Disturbance activities will occur under a Remedial Action Workplan prepared in accordance with N.J.A.C. 7:26E-5.5 and applicable regulations and guidance in effect at the time of disturbance. Disturbance activities will be conducted in a timely manner and shall not result in the unacceptable exposure to contamination present in the underlying soil. Planned disturbances

shall be coordinated with the party with Primary Responsibility for Permit Compliance.

- 3) The results of inspections, maintenance, and repair activities of the engineering controls shall be documented in a logbook, which will be made available onsite² to the NJDEP upon request. The logbook shall contain dates of activities, name of the personnel conducting activities, and the results of activities including documentation of the condition of the cap with photo-documentation as appropriate.
- 4) The results of inspections, maintenance, and repair activities of the engineering controls shall be documented in a logbook, which will be made available onsite to the NJDEP upon request. The logbook shall contain dates of activities, name of the personnel conducting activities, and the results of activities including documentation of the condition of the cap with photo-documentation as appropriate.

² If there are no occupants onsite, inspections will be documented and maintained at the primary office location of the owner, the Person Responsible for the Remediation, or the Person with Primary Responsibility for Permit Compliance.