DEPARTMENT OF THE ARMY

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

22 February 2018

Mr. Ashish Joshi
New Jersey Department of Environmental Protection
Division of Remediation Management & Response
Northern Bureau of Field Operations
7 Ridgedale Avenue (2nd Floor)
Cedar Knolls, NJ 07927-1112

SUBJECT: Request for Unrestricted Use, No Further Action Approval
Site Investigation Report for Parcel 98 (Building 787, 788 and 789 Area)
Fort Monmouth, Monmouth County, Oceanport, New Jersey
PI G000000032

Dear Mr. Joshi:

The Fort Monmouth (FTMM) Team has prepared this site investigation report to describe the occurrence of Polychlorinated Biphenyls (PCBs) in Parcel 98 soil and to request an Unrestricted Use, No Further Action (NFA) determination for Parcel 98.

Parcel 98 Background

Parcel 98 is part of the 700 area (along with Parcel 53 and the southern portion of Parcel 51) and includes Buildings 787, 788, and 789. The currently unoccupied buildings were used for civilian personnel office space and training prior to FTMM closure in 2011. Extensive soil borings and full-suite analyses were conducted in the Parcel 53 and 98 areas as part of the Army's Residential Communities Initiatives (RCI) and Enhanced Use Leasing (EUL) programs (Tetra Tech, 2005). Parcel 98, a triangular shaped parcel, was designated in 2015. It is located in the southwestern portion of the Main Post bounded by Tiros Avenue to the west, Nicodemus Avenue to the south and east, and Parcel 51 to the north (**Figure 1**).

Soil samples collected during the 2005 investigation identified the PCB Aroclor-1260 in shallow soils above the New Jersey Department of Environmental Protection (NJDEP) Residential Direct Contact Soil Remediation Standard (RDCSRS) of 0.2 mg/kg at three sample locations (B44, B46, and B49). Excerpts of correspondence and previous documentation concerning Parcel 98 are provided in **Attachment A**.

A field investigation was conducted at Parcel 98 in 2016 to delineate the PCB Aroclor-1260 in surface and subsurface soil. Parcel 98 was designated as an environmental carve-out that required additional evaluation in the Phase 2 Finding of Suitability of Transfer (FOST) and associated ECP Report Update (Calibre Systems, 2016).

Soil samples were collected in April 2016 from 6 locations at Parcel 98 to delineate PCBs in shallow soil. Samples were collected from 0 to 6 inches (0 to 0.5 feet below ground surface [bgs]),

18 to 24 inches (1.5 to 2 feet bgs), and 30 to 36 inches (2.5 to 3 feet bgs) from borings PAR-98-SS-01 through PAR-98-SS-06 (**Figure 2**). Confirmation samples PAR-98-SS-01 and PAR-98-SS-03 were collected from the same locations (B44 and B46, respectively) where exceedances of the RDCSRS for PCBs were encountered in the 2005 sampling. Field notes and soil boring logs are provided in **Attachment B and Attachment C**. The samples were analyzed for PCBs (Aroclor-1260 only) by ALS Environmental (ALS). Aroclor-1260 was not detected in any of the soil samples at concentrations exceeding the RDCSRS, non-residential direct contact soil remediation standards (NRDCSRS) or NJDEP Impact to Ground Water (IGW) Soil Screening Levels (SSLs) (**Table 1**). The deeper samples (2.5 to 3 feet bgs) were submitted on hold to the laboratory, but were not analyzed because there were no exceedances of the overlying sample intervals.

Recent Investigation Results

Soil represented by sample B49 was previously excavated to a depth of 1.5 feet bgs and removed during the 2005 RCI project due to exceedances of the NRDCSRS for polynuclear aromatic hydrocarbons (PAHs) in soil at that location. However, post-excavation sampling and analysis for PCBs at B49 were not performed. Therefore, as described in the 8 September 2017 Letter Work Plan for Parcel 98 (**Attachment A**), one additional Geoprobe boring (PAR-98-SB-07) was installed in October 2017 for vertical delineation of PCBs at the previous location of Boring 49 (**Figure 2**). Field notes and soil borings logs are provided in **Attachment B** and **Attachment C**. Samples were collected at 0 to 6 inches (0 to 0.5 feet), 18 to 24 inches (1.5 to 2 feet), and 30 to 36 inches (2.5 to 3 feet bgs) and analyzed for Aroclor-1260 by ALS. The results of the sampling are presented in **Table 1**. There were no RDCSRS or Impact to Groundwater (IGW) Soil Screening Level (SSL) exceedances.

Conclusions

In summary, an Unrestricted Use, NFA determination is requested for Parcel 98. Thank you for reviewing this request; we look forward to your approval and/or comments. Our technical Point of Contact is Kent Friesen at (732) 383-7201; kent.friesen@parsons.com. I can be reached at (732) 380-7064; william.r.colvin18.civ@mail.mil.

Sincerely,

William R. Colvin, PMP, CHMM, PG
BRAC Environmental Coordinator

cc: Ashish Joshi, NJDEP (e-mail and 2 hard copies)
William Colvin, BEC (e-mail and 1 hard copy)
Joseph Pearson, Calibre (e-mail)
James Moore, USACE (e-mail)
Jim Kelly, USACE (e-mail)
Joseph Fallon, FMERA (e-mail)
Cris Grill, Parsons (e-mail)

Figures:

Figure 1 Parcel 98 Site Location
Figure 2 Parcel 98 Site Layout, Sampling Locations, and Results

Tables:

Table 1 –2017 and 2016 Parcel 98 Soil Sampling Results – Comparison to NJDEP Soil Remediation Standards

Attachments:

A. Parcel 98 Correspondence
B. Field Notes
C. Soil Boring Logs

REFERENCES CITED:

Calibre Systems, Inc. 2016. *Environmental Condition of Property Report Update, Fort Monmouth, New Jersey, Phase 2 Parcels*. Prepared for the U.S. Army Base Realignment and Closure Office. March.

Department of the Army. 2015. *Underground Storage Tanks and Response to NJDEP Comments for ECP Parcel 53 (700 Area), Fort Monmouth, New Jersey*. Prepared by the Office of Assistant Chief of Staff for Installation Management, U.S. Army Fort Monmouth. May 21.

Tetra Tech, 2005. *Final Remedial Action Report for the 800, 700, and 400 Areas, U.S. Army Installation Fort Monmouth, Fort Monmouth, New Jersey.* Final. October.

FIGURES

Little Silver Borough

Shrewsbury Borough

Tinton Falls Borough

Eatontown Borough

Oceanport Borough

West Long Branch Borough

Parkers Creek

North Branch Parkers Creek

Lafetra Creek

Mill Creek

Husky Brook (Culvert)

Oceanport Creek

Wampum Lake

Wampum Brook

Husky Brook

Turtle Mill Brook

Parcel 98

LEGEND:

- Parcel Boundary
- Installation Boundary
- Municipal Boundary
- Surface Water Feature

N

1 inch = 1,000 feet

0 500 1,000 2,000 Feet

Source: FTMM Supplied CAD, 2013; ESRI Data and Maps, 2011; USGS NHD, 2012.

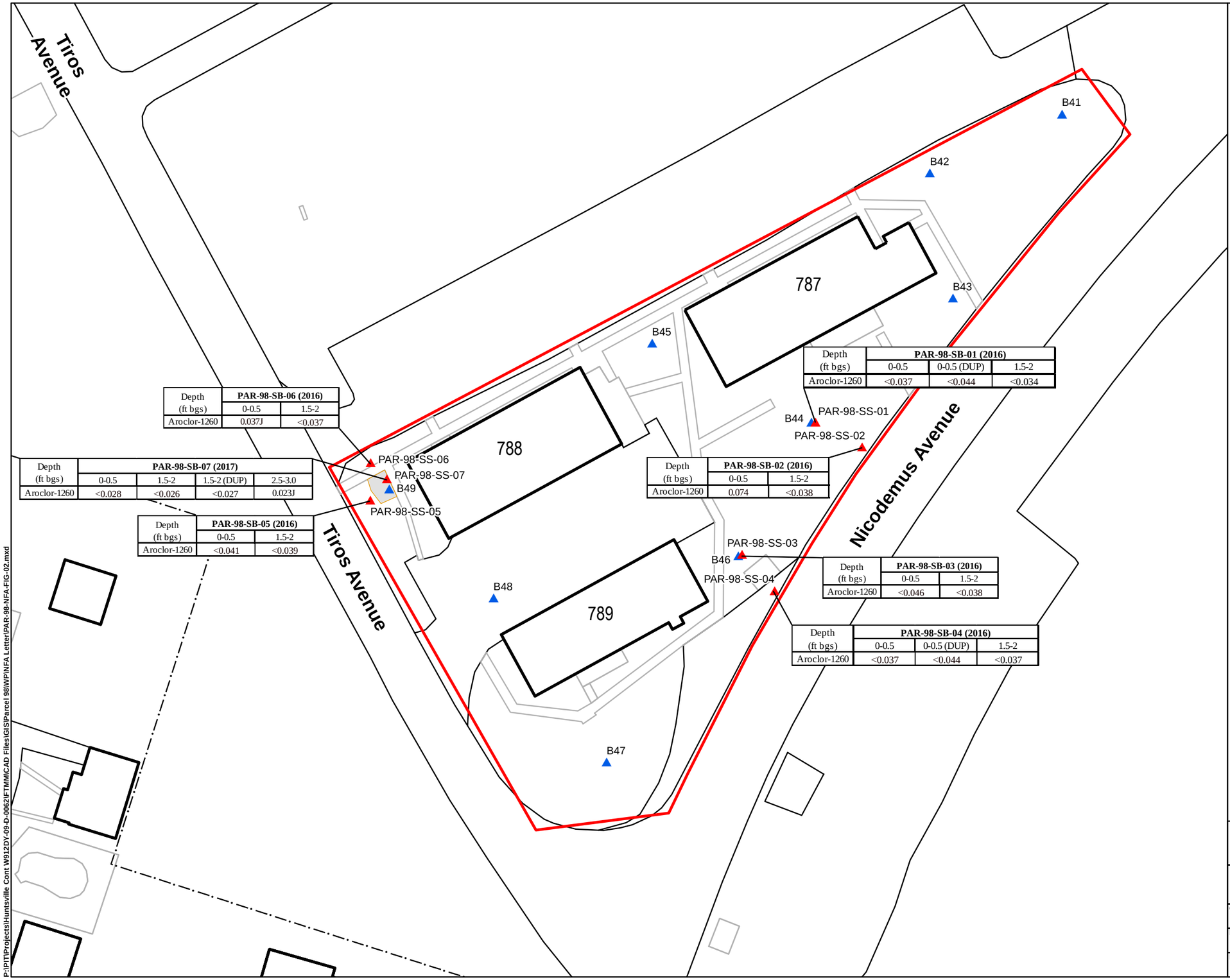
PARSONS
401 Diamond Drive NW,
Huntsville AL

**Fort Monmouth
New Jersey**

PARCEL 98 SITE LOCATION

CREATED BY: RR	REVIEWED BY: AM
DATE: JAN. 2018	FIGURE NUMBER: FIGURE 1
PROJECT NUMBER: 748810-02130	FILE: PAR-98-NFA-FIG-01.mxd

P:\PIT\Projects\Huntsville Cont W912DY-09-D-0062\FTMM\CAD Files\GIS\Parcel 98\WP\NFA Letter\PAR-98-NFA-FIG-01.mxd 1/2/2018 8:11:44 AM



LEGEND:

- Soil Boring (2016, 2017)
- Historical Soil Boring Location (2004)
- Parcel 98 Boundary
- Installation Boundary
- 2005 Excavation Area (1.5' Depth)

NOTES:

Results shown in milligrams/kilograms (mg/kg)
U = Analyte was analyzed for but not detected

Analyte	NJDEP RDCSRS (mg/kg)	NJDEP NRDCSRS (mg/kg)
Aroclor-1260	0.2	2

N

1 inch = 40 feet

0 20 40 80 Feet

Source: FTMM Supplied CAD, 2013.

PARSONS
401 Diamond Drive NW, Huntsville AL

Fort Monmouth
New Jersey

PARCEL 98 SITE LAYOUT, SAMPLING LOCATIONS, AND RESULTS

CREATED BY:	REVIEWED BY:
RR	AM
DATE: JAN. 2018	FIGURE NUMBER: FIGURE 2
PROJECT NUMBER: 748810-02130	FILE: PAR-98-NFA-FIG-02.mxd

P:\PIT\Projects\Huntsville Cont W912DY-09-D-0062\FTMM\CAD Files\GIS\Parcel 98\WP\NFA Letter\PAR-98-NFA-FIG-02.mxd

TABLES

Table 1 – 2017 and 2016 Soil Sampling Results – Comparison to NJDEP Soil Remediation Standards

TABLE 1
SOIL SAMPLING RESULTS - COMPARISON TO NJDEP SOIL REMEDIATION STANDARDS
SITE PARCEL 98
FORT MONMOUTH, NEW JERSEY

Loc ID	NJ Residential Direct Contact SRS	NJ Non-Residential Direct Contact SRS	NJ Impact to GW Soil Screening Level	PAR-98-SB-01			PAR-98-SB-02		PAR-98-SB-03		PAR-98-SB-04		
Sample ID				PAR-98-SB-01-0-0.5	PAR-98-SB-101-0-0.5	PAR-98-SB-01-1.5-2	PAR-98-SB-02-0-0.5	PAR-98-SB-02-1.5-2	PAR-98-SB-03-0-0.5	PAR-98-SB-03-1.5-2	PAR-98-SB-04-0-0.5	PAR-98-SB-104-0-0.5	PAR-98-SB-04-1.5-2
Sample Date				4/25/2016	4/25/2016	4/25/2016	4/26/2016	4/26/2016	4/25/2016	4/25/2016	4/25/2016	4/25/2016	4/25/2016
PCBs (mg/kg)													
Aroclor-1260	0.2	1	0.2	< 0.037	< 0.044	< 0.034	**0.074**	< 0.038	< 0.046	< 0.038	< 0.037	< 0.044	< 0.037

TABLE 1
SOIL SAMPLING RESULTS - COMPARISON TO NJDEP SOIL REMEDIATION STANDARDS
SITE PARCEL 98
FORT MONMOUTH, NEW JERSEY

Loc ID	NJ Residential Direct Contact SRS	NJ Non-Residential Direct Contact SRS	NJ Impact to GW Soil Screening Level	PAR-98-SB-05		PAR-98-SB-06		PAR-98-SB-07			
Sample ID				PAR-98-SB-05-0-0.5	PAR-98-SB-05-1.5-2	PAR-98-SB-06-0-0.5	PAR-98-SB-06-1.5-2	PAR-98-SB-07-0-0.5	PAR-98-SB-07-1.5-2.0	PAR-98-SB-107-1.5-2.0	PAR-98-SB-07-2.5-3.0
Sample Date				4/26/2016	4/26/2016	4/26/2016	4/26/2016	11/10/2017	11/10/2017	11/10/2017	11/10/2017
PCBs (mg/kg)											
Aroclor-1260	0.2	1	0.2	< 0.041	< 0.039	**0.037** **J**	< 0.037	< 0.028	< 0.026	< 0.027	**0.023** **J**

Footnote:

1) All historical data collected prior to 2013 are reported as provided by others.

2) Number of Analyses is the number of detected and non-detected results excluding rejected results. Sample duplicate pairs have not been averaged.

3) NLE = no limit established.

4) ND = not detected in any background sample, no background concentration available.

5) Bold chemical dectection

6) SS = Site Specific action level, see "Specific Chemical Class (or Parameter)" footnote for details.

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

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

B =Compound detected in the sample at a concentration less than or equal to 5 times (10 times for common lab contaminants) the blank concentration.

R = Rejected, data validation rejected the results.

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

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

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

J = estimated detected value due to a concetration below the reporting limit or due to discrepancies in meeting certain analyte-specific quality control.

E (or ER) = Estimated result.

D = Results from dilution of sample.

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

JN = Tentatively identified compound, estimated concentration.

UJ=The compound was not detected: however, the results is estimated because of discrepancies in meeting certain analyte-specific QC criteria.

J+ = The result is an estimated quantity, but the result may be biased high.

J- = The result is an estimated quantity, but the result may be biased low.

8) Specific Chemical Classes (or Parameters) comments or notes regarding how data is displayed, compared to Action Levels, or represented in this table.

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

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

There are no NJDEP soil standards for individual PCB Aroclors, therefore the total PCB NJDEP standards were used for individual Aroclors.

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

- Cell Shade values represent a result that is above the NJ Impact to GW Soil Screening Level ###

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

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

10) Criteria action level source document and web address.

- The NJ Residential Direct Contact Soil Remediation Standard refers to the NJDEP's Sept 18, 2017 Remediation Standards

http://www.nj.gov/dep/rules/rules/njac7_26d.pdf

- The NJ Non-Residential Direct Contact Soil Remediation Standard refers to the NJDEP's Sept 18, 2017 Remediation Standards

http://www.nj.gov/dep/rules/rules/njac7_26d.pdf

- The NJ Impact to GW Soil Screening Level criteria refers to the Development of Site Specific Impact to Ground Water Soil Remediation Standards - Nov 2013 revised

http://www.nj.gov/dep/srp/guidance/rs/partition_equation.pdf

Attachment A
Correspondence

1. Army Letter to NJDEP dated 8 September 2017, re: Letter Work Plan for Parcel 98 Building 787, 788.and 789 Area, Fort Monmouth, New Jersey.
2. Army Letter to NJDEP dated 14 January 2016, re: Response to NJDEP's 22 July 2015 Comments on the May 2015 Underground Storage Tanks and Response to Comments for ECP Parcel 53 (700 Area), Fort Monmouth, New Jersey.
3. NJDEP Letter to the Army dated 22 July 2015, re: Underground Storage Tanks and Response to NJDEP Comments for ECP Parcel 53 (700 Area) dated May 2015.
4. Army letter to the NJDEP dated 21 May 2015, re: Underground Storage Tanks and Response to NJDEP Comments for ECP Parcel 53 (700 Area).

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. For those sites that are required or opt to use a Licensed Site Remediation Professional (LSRP) the report must also be certified by the LSRP using the "Licensed Site Remediation Professional Information and Statement". For additional guidance regarding the requirement for LSRPs at RCRA GPRA 2020, CERCLA and Federal Facility Sites see http://www.nj.gov/dep/srp/srra/training/matrix/quick_ref/rcra_cercla_fed_facility_sites.pdf.

Document:

- "Letter Work Plan for Parcel 98, Fort Monmouth, New Jersey" (08 September 2017)

PERSON RESPONSIBLE FOR CONDUCTING THE REMEDIATION INFORMATION AND CERTIFICATION

Full Legal Name of the Person Responsible for Conducting the Remediation: William R. Colvin
Representative First Name: William Representative Last Name: Colvin
Title: Fort Monmouth BRAC Environmental Coordinator (BEC)
Phone Number: (732) 380-7064 Ext: Fax:
Mailing Address: P.O. Box 148
City/Town: Oceanport State: NJ Zip Code: 07757
Email Address: william.r.colvin18.civ@mail.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: William R Colvin Date: 08 September 2017

Name/Title: William R. Colvin, PMP, CHMM, PG
BRAC Environmental Coordinator

Completed form should be sent to:

Mr. Ashish Joshi
New Jersey Department of Environmental Protection
Division of Remediation Management & Response
Bureau of Northern Field Operations
7 Ridgedale Avenue (2nd Floor)
Cedar Knolls, New Jersey 07927-1112

DEPARTMENT OF THE ARMY

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

8 September 2017

Mr. Ashish Joshi
New Jersey Department of Environmental Protection
Division of Remediation Management & Response
Northern Bureau of Field Operations
7 Ridgedale Avenue (2nd Floor)
Cedar Knolls, NJ 07927-1112

Re: Letter Work Plan for Parcel 98 Building 787, 788 and 789 Area, Fort Monmouth, New Jersey
PI G000000032

Dear Mr. Joshi:

The Fort Monmouth (FTMM) Team has provided this work plan to summarize the results of historical and recent soil sampling at Parcel 98, and to propose additional soil sampling to fulfill data needs.

Parcel 98 Background

Parcel 98 is part of the 700 area (along with ECP Parcel 53 and the southern portion of Parcel 51) and includes Buildings 787, 788, and 789. The buildings are currently unoccupied but were used for civilian personnel office space and training prior to FTMM closure in 2011. Extensive soil borings and full-suite analyses were conducted in the Parcels 53 and 98 areas as part of the Army's Residential Communities Initiatives (RCI) and Enhanced Use Leasing (EUL) programs within the 700 Area of Main Post (Tetra Tech, 2005). Parcel 98, a triangular shaped parcel, was designated in 2015. It is located in the southwestern portion of the Main Post bounded by Tiros Avenue to the west, Nicodemus Avenue to the south and east, and Parcel 51 to the north (Figure 1). The general soil profile at Parcel 98 consists of a layer of top soil overlaying orange-brown, medium to fine sands to eight feet bgs. A clay lens was identified in several borings from approximately 2 to 6 feet bgs (Tetra Tech, 2005).

Soil samples collected during the 2005 investigation identified the polychlorinated biphenyl (PCB) Aroclor-1260 in shallow soils above the New Jersey Department of Environmental Protection (NJDEP) Residential Direct Contact Soil Remediation Standard (RDCSRS) of 0.2 mg/kg at three sample locations (B44, B46, and B49).

A No Further Action (NFA) determination based on compliance averaging of the 2005 results was initially requested for the 700 Area, including the area now designated as Parcel 98 (Department of the Army, 2015). The NJDEP (2015) rejected the NFA request and required that all

exceedances above the RDCSRS be delineated and addressed. Regulatory and Army correspondence associated with Parcel 98 are provided in **Attachment A.**

Additional sampling was completed at Parcel 98 to satisfy the requirement for delineation of exceedances, as reported below.

Recent Investigation Results

A 2016 field investigation was conducted at Parcel 98 to delineate the PCB Aroclor-1260 in surface and subsurface soil within Parcel 98. Parcel 98 was designated as an environmental carve-out that required additional evaluation in the Phase 2 Finding of Suitability of Transfer (FOST) and associated ECP Report Update (Calibre Systems, 2016). Excerpts of correspondence and previous documentation concerning Parcel 98 are provided in Attachment A.

Soil samples were collected in April 2016 from 6 locations (PAR-98-SS-01 through PAR-98-SS-06) at Parcel 98 to delineate PCBs in shallow soil. Samples were collected from 0 to 6 inches (0 to 0.5 feet below ground surface [bgs]), 18 to 24 inches (1.5 to 2 feet bgs), and 30 to 36 inches (2.5 to 3 feet bgs) from borings PAR-98-SS-01 through PAR-98-SS-06 (Figure 2). Confirmation samples PAR-98-SS-01 and PAR-98-SS-03 were collected from the same locations (B44 and B46, respectively) where exceedances of the RDCSRS for PCBs were encountered in the 2005 sampling. Field notes and soil boring logs from this SI Addendum are provided in Attachment B and Attachment C. The samples were analyzed for PCBs (Aroclor-1260 only) by ALS Environmental (ALS) (Attachment D). Aroclor-1260 was not detected in any of the soil samples at concentrations exceeding the RDCSRS, NRDCSRS or NJDEP Impact to Ground Water Soil Screening Levels (SSLs) (Table 1). The deeper samples (2.5 to 3 feet bgs) were submitted on hold to the laboratory, but were not analyzed because there were no exceedances of the overlying sample intervals.

Proposed Sampling at Parcel 98

Soil represented by sample B49 was excavated to a depth of 1.5 feet bgs and removed during the 2005 RCI project due to exceedances of the Nonresidential Direct Contact Soil Remediation Standard (NRDCSRS) for polycyclic aromatic hydrocarbons (PAHs) in soil at that location. However, there has been no post excavation sampling performed to provide vertical PCB delineation at B49. Therefore, one primary Geoprobe boring (PAR-98-SB-07) will be installed for vertical delineation of PCBs at the previous location of Boring 49 (**Figure 3**). Analysis of soil samples for PCBs (specifically Aroclor 1260) is proposed, and the results of this sampling will be presented in a letter report.

The Geoprobe boring will be advanced to assess current concentrations and vertical extent of PCBs above and below the previous excavation. Three soil samples will be collected at 0 to 6 inches (0 to 0.5 feet), 18 to 24 inches (1.5 to 2 feet), and 30 to 36 inches (2.5 to 3 feet bgs). The deeper sample (2.5 to 3 feet bgs) will be submitted on hold to the laboratory pending analysis of the overlying sample intervals.

Thank you for reviewing this work plan. We look forward to your comments and approval prior to implementing this plan (currently scheduled to begin on 2 October 2017). Our technical Point of Contact is Kent Friesen who you may contact directly at (732) 383-7201; kent.friesen@parsons.com. I can be reached at (732) 380-7064; william.r.colvin18.civ@mail.mil.

Sincerely,

William R. Colvin, PMP, CHMM, PG
BRAC Environmental Coordinator

Figures:

Figure 1 Parcel 98 Location
Figure 2 Parcel 98 Sampling Locations and PCB Exceedances
Figure 3 Parcel 98 Proposed Sampling Locations

Tables:

Table 1 – 2016 Parcel 98 Soil Sampling Results – Comparison to NJDEP Soil Remediation Standards
Table 2 – Summary of Proposed Sampling for Parcel 98

Attachments:

A. Parcel 98 Correspondence and Historical Information
B. 2016 Field Notes
C. 2016 Soil Boring Logs
D. 2016 Analytical Lab Package

Previous Correspondence (provided in Attachment A):

1. Army Letter to NJDEP dated 14 January 2016, re: Response to NJDEP's 22 July 2015 Comments on the May 2015 Underground Storage Tanks and Response to Comments for ECP Parcel 53 (700 Area), Fort Monmouth, New Jersey.
2. NJDEP Letter to the Army dated 22 July 2015, re: Underground Storage Tanks and Response to NJDEP Comments for ECP Parcel 53 (700 Area) dated May 2015.
3. Army letter to the NJDEP dated 21 May 2015, re: Underground Storage Tanks and Response to NJDEP Comments for ECP Parcel 53 (700 Area).

REFERENCES CITED:

Calibre Systems, Inc. 2016. *Environmental Condition of Property Report Update, Fort Monmouth, New Jersey, Phase 2 Parcels*. Prepared for the U.S. Army Base Realignment and Closure Office. March.

Department of the Army. 2015. *Underground Storage Tanks and Response to NJDEP Comments for ECP Parcel 53 (700 Area), Fort Monmouth, New Jersey*. Prepared by the Office of Assistant Chief of Staff for Installation Management, U.S. Army Fort Monmouth. May 21.

Tetra Tech, 2005. *Final Remedial Action Report for the 800, 700, and 400 Areas, U.S. Army Installation Fort Monmouth, Fort Monmouth, New Jersey.* Final. October.

cc: Ashish Joshi (e-mail and 2 hard copies)
William Colvin, BEC (e-mail and 1 hard copy)
Joseph Pearson, Calibre (e-mail)
James Moore, USACE (e-mail)
Jim Kelly, USACE (e-mail)
Cris Grill, Parsons (e-mail)

FIGURES

Figure 1 – Parcel 98 Location

Figure 2 – Parcel 98 Sampling Locations and PCB Exceedances

Figure 3 – Parcel 98 Proposed Sampling Locations

Little Silver Borough

Shrewsbury Borough

Tinton Falls Borough

Eatontown Borough

Oceanport Borough

West Long Branch Borough

Parkers Creek

North Branch Parkers Creek

Lafetra Creek

Mill Creek

Husky Brook (Culvert)

Oceanport Creek

Wampum Lake

Wampum Brook

Husky Brook

Turtle Mill Brook

Parcel 98

LEGEND:

- Parcel Boundary
- Installation Boundary
- Municipal Boundary
- Surface Water Feature

N

1 inch = 1,000 feet

0 500 1,000 2,000 Feet

Source: FTMM Supplied CAD, 2013; ESRI Data and Maps, 2011; USGS NHD, 2012.

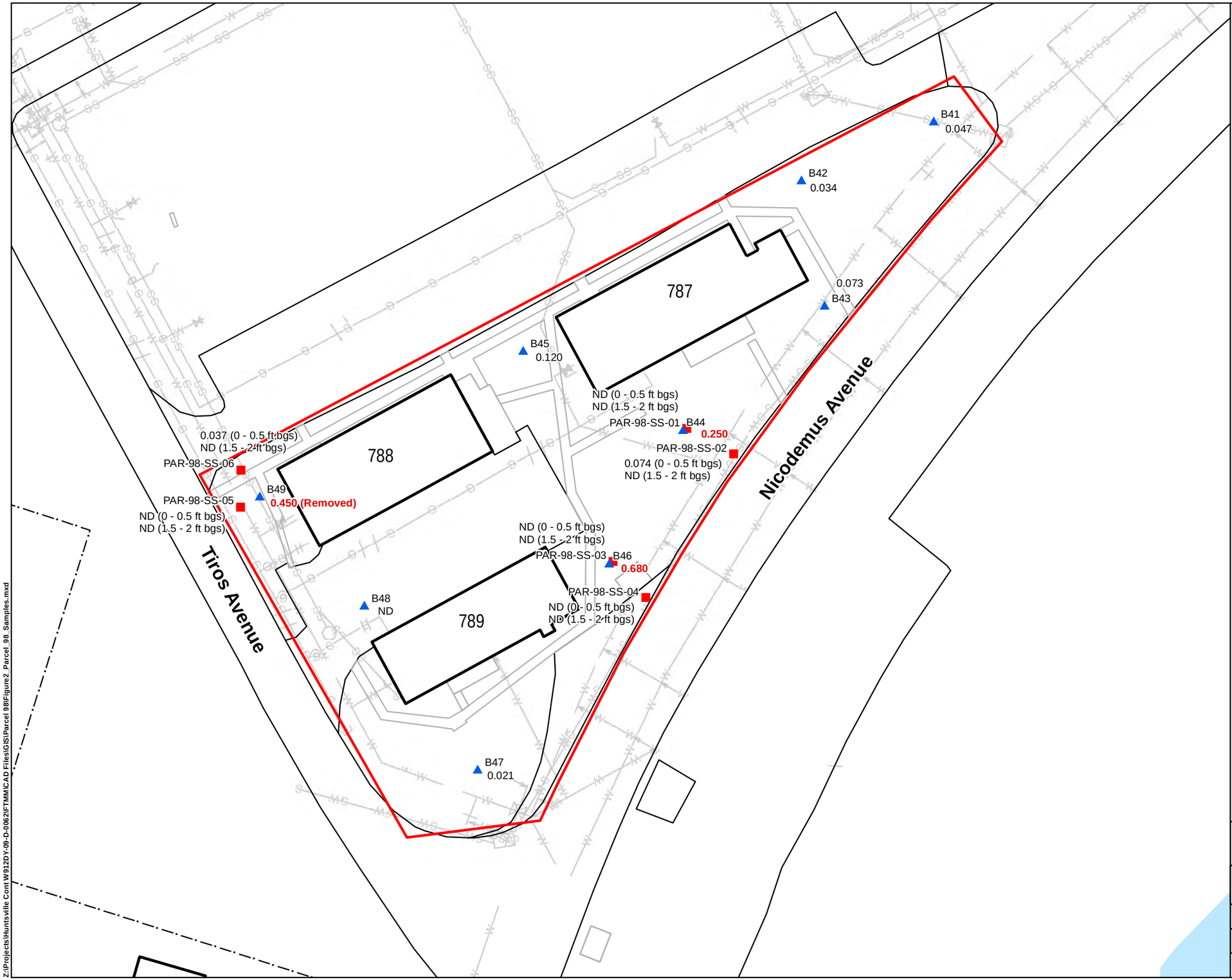
PARSONS
401 Diamond Drive NW,
Huntsville AL

Fort Monmouth
New Jersey

PARCEL 98 LOCATION

CREATED BY: RR	REVIEWED BY: KF
DATE: FEB. 2016	FIGURE NUMBER: FIGURE 1
PROJECT NUMBER: 748810-01000	FILE: Figure1_Parcel_98.mxd

P:\PIT\Projects\Huntsville Cont W912DY-09-D-0062\FTMM\CAD Files\GIS\Parcel 98\Figure1_Parcel_98.mxd 2/25/2016 11:49:39 AM



LEGEND:

- 2016 Soil Boring
- Historical Soil Boring Location
- Parcel 98 Boundary
- Installation Boundary
- Surface Water Body
- W Water Line
- S Sanitary Sewer Line
- SW Storm Sewer Line
- G Gas Line

Aroclor 1260 concentration (mg/kg) in 0 to 0.5 ft bgs sample unless noted otherwise.

RDCSRS = 0.2 mg/kg

Exceedances are identified in bold red.

N

1 inch = 40 feet

0 20 40 80 Feet

Source: FTMM Supplied CAD, 2013.

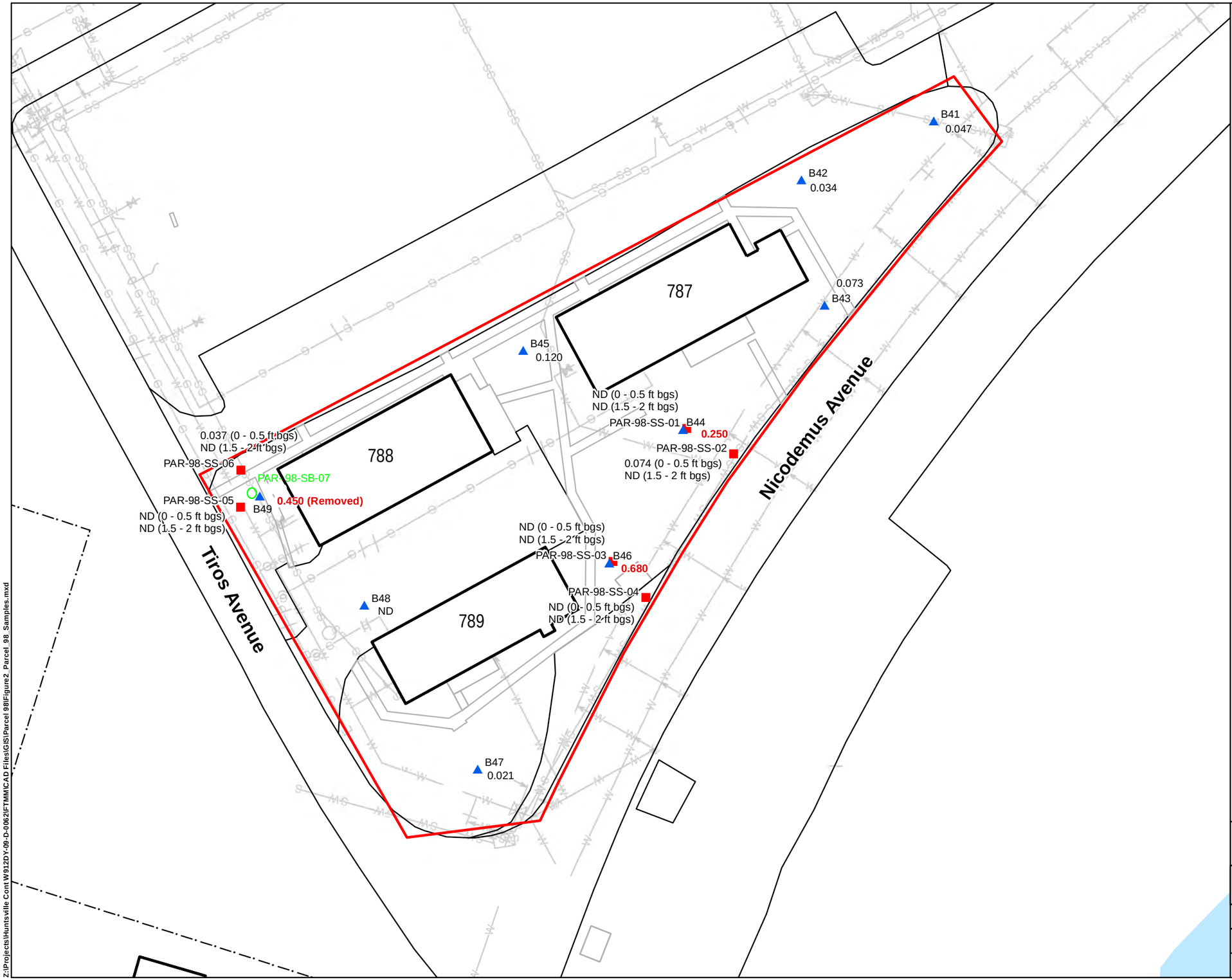
PARSONS
401 Diamond Drive NW,
Huntsville AL

Fort Monmouth
New Jersey

PARCEL 98 SAMPLING LOCATIONS AND PCB EXCEEDANCES

CREATED BY: RR	REVIEWED BY: KF
DATE: JUN. 2017	FIGURE NUMBER: FIGURE 2
PROJECT NUMBER: 748810-02060	FILE: Figure2_Parcel_98_Samples.mxd

Z:\Projects\Huntsville Cont\W912DY-09-D-0062\FTMM\CAD Files\GIS\Parcel 98\Figure2_Parcel_98_Samples.mxd



LEGEND:

- Proposed Sampling Location
- 2016 Soil Boring
- Historical Soil Boring Location
- Parcel 98 Boundary
- Installation Boundary
- Surface Water Body
- W Water Line
- S Sanitary Sewer Line
- SW Storm Sewer Line
- G Gas Line

Aroclor 1260 concentration (mg/kg) in 0 to 0.5 ft bgs sample unless noted otherwise.

RDCSRS = 0.2 mg/kg

Exceedances are identified in bold red.

N

1 inch = 40 feet

0 20 40 80 Feet

Source: FTMM Supplied CAD, 2013.

PARSONS 401 Diamond Drive NW, Huntsville AL	**Fort Monmouth** **New Jersey**

PARCEL 98 PROPOSED SAMPLING LOCATIONS

CREATED BY: RR	REVIEWED BY: KF
DATE: JUN. 2017	FIGURE NUMBER: FIGURE 2
PROJECT NUMBER: 748810-02060	FILE: Figure2_Parcel_98_Samples.mxd

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TABLES

Table 1 – 2016 Soil Sampling Results – Comparison to NJDEP Soil Remediation Standards

Table 2 – Summary of Proposed Sampling for Parcel 98

Table 1 - 2016 Parcel 98 Soil Sampling Results - Comparision to NJDEP Soil Remediation Standards

Loc ID	NJ Residential Direct Contact SRS	NJ Non-Residential Direct Contact SRS	NJ Impact to GW Soil Screening Level	SB01			SB02	
Sample ID				PAR-98-SB-01-0-0.5	PAR-98-SB-01-1.5-2	PAR-98-SB-101-0-0.5	PAR-98-SB-02-0-0.5	PAR-98-SB-02-1.5-2
Sample Date				4/25/2016	4/25/2016	4/25/2016	4/26/2016	4/26/2016
PCBs (µg/kg)								
Aroclor-1260	200	1,000	NLE	< 19	< 18	< 23	**74**	< 20
Wet Chemistry - Solids								
Percent Solids (percent)	NLE	NLE	NLE	**90.2**	**96.2**	**74.9**	**91.3**	**87.7**

Table 1 - 2016 Parcel 98 Soil Sampling Results - Comparision to NJDEP Soil Remediation Standards

Loc ID	NJ Residential Direct Contact SRS	NJ Non-Residential Direct Contact SRS	NJ Impact to GW Soil Screening Level	SB03		SB04		
Sample ID				PAR-98-SB-03-0-0.5	PAR-98-SB-03-1.5-2	PAR-98-SB-04-0-0.5	PAR-98-SB-04-1.5-2	PAR-98-SB-104-0-0.5
Sample Date				4/25/2016	4/25/2016	4/25/2016	4/25/2016	4/25/2016
PCBs (µg/kg)								
Aroclor-1260	200	1,000	NLE	< 24	< 20	< 20	< 20	< 23
Wet Chemistry - Solids								
Percent Solids (percent)	NLE	NLE	NLE	**72.1**	**86.8**	**88.5**	**88.4**	**74.5**

Table 1 - 2016 Parcel 98 Soil Sampling Results - Comparision to NJDEP Soil Remediation Standards

Loc ID	NJ Residential Direct Contact SRS	NJ Non-Residential Direct Contact SRS	NJ Impact to GW Soil Screening Level	SB05		SB06	
Sample ID				PAR-98-SB-05-0-0.5	PAR-98-SB-05-1.5-2	PAR-98-SB-06-0-0.5	PAR-98-SB-06-1.5-2
Sample Date				4/26/2016	4/26/2016	4/26/2016	4/26/2016
PCBs (µg/kg)							
Aroclor-1260	200	1,000	NLE	< 22	< 20	**37 J**	< 19
Wet Chemistry - Solids							
Percent Solids (percent)	NLE	NLE	NLE	**80.7**	**85.3**	**81.3**	**90.3**

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

6) Chemical result qualifiers are assigned by the laboratory and are evaluated and modified (if necessary) during the data validation.
[blank] = detect, i.e. detected chemical result value.
B =Compound detected in the sample at a concentration less than or equal to 5 times (10 times for common lab co
R = Rejected, data validation rejected the results.
U = non-detect, i.e. not detected at or above this value.
U-DL = Elevated sample detection limit due to difficult sample matrix.
U-ND = Analyte not detected in sample, but no detection or reporting limit provided.
J = estimated detected value due to a concetration below the reporting limit or due to discrepancies in meeting certain analyte-specific quality control.
E (or ER) = Estimated result.
D = Results from dilution of sample.
J-DL = Elevated sample detection limit due to difficult sample matrix.
JN = Tentatively identified compound, estimated concentration.

7) Chemical results greater than or equal to the action level (depending on criteria) are highlighted based on the Criteria that are present.
- Cell Shade values represent a result that is above the NJ Residential Direct Contact Soil Remediation Standard. ####
  There are no NJDEP soil standards for individual PCB Aroclors, therefore the total PCB NJDEP standards were used for individual Aroclors.
- Cell Shade values represent a result that is above the NJ Non-Residential Direct Contact Soil Remediation Standard. ###
  There are no NJDEP soil standards for individual PCB Aroclors, therefore the total PCB NJDEP standards were used for individual Aroclors.
- Cell Shade values represent a result that is above the NJ Impact to GW Soil Screening Level ###
Remediation Standard. ###
- Cell Shade values represent a result that is above both the NJ Residential and Non-Residential Direct Contact Soil Remediation Standard. ###

8) Criteria action level source document and web address.
- The NJ Residential Direct Contact Soil Remediation Standard refers to the NJDEP's May 7, 2012 Remediation Standards
  http://www.nj.gov/dep/rules/rules/njac7_26d.pdf
- The NJ Non-Residential Direct Contact Soil Remediation Standard refers to the NJDEP's May 7, 2012 Remediation Standards.
  http://www.nj.gov/dep/rules/rules/njac7_26d.pdf
- The NJ Impact to GW Soil Screening Level criteria refers to the Development of Site Specific Impact to Ground Water Soil Remediation Standards - Nov 2013 revised
  http://www.nj.gov/dep/srp/guidance/rs/partition_equation.pdf

TABLE 2
SUMMARY OF PROPOSED SAMPLING FOR PARCEL 98
FORT MONMOUTH, NEW JERSEY

Location ID	Location	PCBs (Aroclor 1260 only)	Rationale
Soil			
PAR-98-SB-07	See Figure 1: 1 soil boring, 3 samples.	3	Purpose: post excavation vertical delineation of PCBs (Aroclor 1260) at boring 49. Collect soil samples from 0 to 0.5 ft bgs, 1.5 to 2.0 ft bgs, and 2.0 to 2.5 ft bgs. Submit PCBs samples collected from deeper interval (2.0-2.5 ft bgs) to HOLD.
QA/QC samples (see SAP for additional details) [a/ b/]			
Field Duplicates (5% Sampling Frequency per media)		1	--
Matrix Spike (5% Sampling Frequency per media)		1	--
Matrix Spike Duplicate (5% Sampling Frequency per media)		1	--
Trip Blank (1 per cooler of VOCs per media)		0	--
QA Split (5% per media)		1	--
Equipment Blank (5% Sampling Frequency per media)		1	--
	TOTAL	**14**	

Notes:

[a/] QA/QC = quality assurance/quality control; SAP = Sampling and Analysis Plan. The requirement for QA/QC samples may be fulfilled with samples from other parcels.

DEPARTMENT OF THE ARMY

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

January 14, 2016

Ms. Linda Range
New Jersey Department of Environmental Protection
Bureau of Case Management
401 East State Street
PO Box 420/Mail Code 401-05F
Trenton, NJ 08625-0028

Text discussing the area currently designated as Parcel 98 are outlined below.

Re: Response to NJDEP's July 22, 2015 Comments on the May 2015 *Underground Storage Tanks and Response to NJDEP Comments for ECP Parcel 53 (700 Area), Fort Monmouth, New Jersey*
PI G000000032

Dear Ms. Range:

Fort Monmouth and Parsons have reviewed the New Jersey Department of Environmental Protection (NJDEP) comments on the subject submittal for ECP Parcel 53 (also known as the 700 Area), as documented in your letter dated July 22, 2015. We appreciate this opportunity to work with you on Parcel 53. Responses to your comments are provided below, for your review and concurrence or further comments.

A. General Comment/Statement:

The New Jersey Department of Environmental Protection (Department) has completed review of the referenced report, received May 28, 2015, prepared by Parsons Government Services Inc. (Parsons). Parcel 53, also generally known as the 700 Area as indicated in the submittal, was included within a report previously submitted in 2005 which summarized the results of remedial activities within three areas of the Fort. Comments generated by the NJDEP in September of 2007 included the requirement for documentation regarding UST activities, delineation of soil to residential criteria, and the performance of a ground water investigation. The referenced submittal provides documentation as to the status of "all USTs identified within this parcel", and responds to the September 2007 NJDEP comment letter as regarding RCI 700 Area (generally, Parcel 53).

A. RESPONSE: Acknowledged.

B. Underground Storage Tanks

B1. COMMENT: *The submittal states the parcel is noted as previously containing sixteen (16) underground storage tanks (USTs), all of which have been removed. Nine of USTs had previously received designations of no further action necessary from the Department, as indicated on page 3 and in Appendix D. Based upon receipt and review of the required documentation, it is agreed no additional action is necessary for the following seven USTs:*

***UST 700-2** aka 700-BI 2 – steel 1000 gallon #2 fuel UST removed 4/2/04*

UST 700-3 *aka 700-BI 3 – steel 1000 gallon #2 fuel UST removed 4/4/04*
UST 700-5 *aka 700-T05 – steel 1000 gallon #2 fuel UST removed 12/24/04*
UST 700-17 *aka 700-BI 17; #04-04-05-1357-41 – 1000 gallon #2 fuel UST removed 4/2/04*
700-18 *aka 700-BI 18; #04-04-14-1305-4-04 – steel 1000 gallon #2 fuel UST removed 4/12/04*
746B *– steel 1000 gallon #2 fuel UST removed 12/13/10*
747B *– steel 1000 gallon #2 fuel UST removed 12/9/10*

B1. RESPONSE: Acknowledged.

B2. COMMENT: *It is unclear, however, how the statement on page 2 of 8, "all of the USTs identified within Parcel 53 have been removed", is reconciled with the potential UHOT locations represented on Figure 2 of May 2014 Addendum 1 – Environmental Condition of Property Report Unregulated Heating Oil Tank Investigation Report, which appears to indicate the continued potential presence of additional USTs at several locations within the parcel?*

B2. RESPONSE: Previous field verification of UST removal at FTMM included geophysical surveys, test trenches, physical evidence of tanks, and the results of soil sampling and analysis, which provides a higher measure of certainty than the "Potential UHOTs" shown on the May 2014 UHOT Addendum Report. The UHOT Addendum Report was only an assessment of available information (such as real property records and historical maps) that may provide collaborative information in the event that a future tank is found, but is not considered a definitive source of information on yet-to-be discovered UHOTs.

C. Section 2.0: Residential Communities Initiative Activities at the 700 Area

C1. COMMENT: *The report indicates one rationale previously provided for not addressing elevated levels of heptachlor was the exceedances were "only one order of magnitude (OOM) above the non-residential cleanup criteria". This is not an acceptable argument; see below (Appendix M) for additional detail.*

C1. RESPONSE: Acknowledged; note that the intent of this statement was only to report the Army's rationale used in the 2007 report. Please see additional response F1 below.

D. Section 3.0: Additional Comparison of Soil Results with Residential Cleanup Criteria

D1. COMMENT: *Additional comparisons were made of existing analytical results to residential standards, however, it is not agreed delineation is "generally" complete. The delineation as required in the Department's September 2007 correspondence was not performed. As acknowledged in the submittal, delineation along the parcel boundaries remains incomplete. See additional comments immediately below and under Appendix N.*

D1. RESPONSE: Acknowledged; additional soil sampling is proposed to delineate PCBs to the parcel boundary, as described below.

D2. COMMENT: *SVOCs - As has been indicated in previous emails and correspondence, the 1995 Weston background study was not accepted by the Department, for several reasons, and should no longer be referenced.*

D2. RESPONSE: Acknowledged; future submittals for Parcel 53 will no longer reference the 1995 Weston background study.

D3. COMMENT: *It is agreed the source of the PAH exceedences are not yet known. It does not seem likely, however, the source was incomplete burning of cigarettes, wood, food or fossil fuels. The referenced possibility of former asphaltic pavement may be feasible; review of historic aerials should reveal their historic presence, but not whether the analytical results are definitively present due to that asphaltic material. The report also speculates PAHs are perhaps present due to historic fill used to develop Fort Monmouth. Although this is certainly a viable possibility, historic fill is considered an area of concern (AOC) under the Technical Requirements for Site Remediation, N.J.A.C. 7:26E, and must be investigated and addressed accordingly.*

D3. RESPONSE: Parcel 53 sampling results for PAHs to date have not revealed evidence of a release. The wide variety of potential sources referenced in the May 2015 submittal demonstrates that these PAHs have come to be located at the site over time due to site conditions (e.g., runoff from asphalt surfaces) and not due to a CERCLA release. Since there is no indication of a CERLCA release, the Army has no further obligation to address PAHs at this site.

D4. COMMENT: *Although it is stated compliance averaged results of both benzo(a)pyrene and benzo(b)fluoranthene were less than the applicable Residential Direct Contact Soil Remediation Standards (RDCSRS), the averaging was performed incorrectly. Delineation to residential criteria was required in September of '07 but was not performed; current regulations [N.J.A.C. 7:26E-4.2(a)] and guidance ("Technical Guidance for the Attainment of Remediation Standards and Site-Specific Criteria") require delineation to not only residential standards, but to the impact to ground water soil remediation standards as well. Additionally, the arithmetic mean method is only for use when there are 9 or fewer samples (rather than the 57 samples at Parcel 53) or two or fewer distinct values, neither of which applies in this situation.*

D4. RESPONSE: Agreed; future reporting of compliance averaging results for FTMM soil data will conform to the current technical guidance document referenced above and future project-specific agreements with NJDEP. Future data will also be compared to the default impact to groundwater soil screening levels as provided in the November 2013 NJDEP guidance document entitled "Development of Impact to Ground Water Soil Remediation Standards Using the Soil-Water Partition Equation."

D5. COMMENT: *Although delineation remains incomplete, PAHs have been identified in several areas of the parcel above RDCSRS. Delineation to all applicable standards is required, and exceedences must be addressed.*

D5. RESPONSE: See response D3, above.

D6. COMMENT: *Pesticides- As above, the background study included in the 1995 Weston report was not accepted by the Department; the study should no longer be referenced.*

D6. RESPONSE: Acknowledged; future submittals for Parcel 53 will no longer reference the 1995 Weston background study.

D7. COMMENT: *Elevated levels of heptachlor, heptachlor epoxide, chlordane and 4,4-DDE were noted within the parcel. Although it is stated compliance averaged results of all but heptachlor were less than the applicable RDCSRS, as above, the averaging was incorrectly performed. Delineation to residential criteria was required in September of '07; current regulations [N.J.A.C. 7:26E-4.2(a)] and guidance ("Technical Guidance for the Attainment of Remediation Standards and Site-Specific Criteria") require delineation to not only residential standards, but to the impact to ground water soil remediation standards (IGWSRS) as well. Also, as above, the arithmetic mean method is only for use when there are 9 or fewer samples.*

D7. RESPONSE: Agreed; future reporting of compliance averaging results for FTMM soil data will conform to the current technical guidance document referenced above and future project-specific agreements with NJDEP.

D8. COMMENT: *Although delineation remains incomplete, pesticides have been identified in several areas of the parcel above applicable standards. All exceedances must be delineated and addressed.*

D8. RESPONSE: All results from sampling for pesticides are consistent with levels that would be found from the regular use of properly applied pesticides. Additionally, there is no historic evidence of pesticide storage or a spill within Parcel 53. Therefore, there is no release of pesticides that is the responsibility of the Army.

D9. COMMENT: *PCBs - The PCBs exceedences are located in Parcel 51, rather than Parcel 53; please confirm this portion of Parcel 51 is to be considered in this review? As such, the above comments remain applicable to these areas as well. The compliance averaging was incorrectly performed. PCBs are present at 0.25 ppm and 0.68 ppm, above the RDCSRS ; delineation to the south, toward the parcel boundary, is incomplete. Delineation to RDCSRS/IGWSRS is required. PCBs were reported analyzed in 49 samples, greater than the 9 or fewer samples allowed for use of the average mean method of compliance averaging. All exceedances must be delineated and addressed.*

D9. RESPONSE: The area with PCBs exceedances in soil near Buildings 787, 788 and 789 is actually within Parcel 51 (instead of Parcel 53, as NJDEP has noted). This area has subsequently been designated as Parcel 98 to minimize future confusion. For clarification, the Army requested the NJDEP's review of analytical data within Parcel 98; data from this area was included in the 2005 RCI Report and designated (along with data from Parcel 53) as the "700 Area." However, PCB data from Parcel 98 will be grouped separately from Parcel 53 data during future compliance averaging. The Army proposes additional soil sampling to delineate PCBs in soil within the Parcel 98 area; sample locations and a tabulated summary for proposed sampling will be provided under separate cover. We anticipate that PCBs exceedances will be addressed using compliance averaging, which will conform to the current technical guidance document and future project-specific agreements with NJDEP.

E. Section 4.0: Groundwater Investigation at 700 Area

E1. COMMENT: *See comments under Appendix P.*

E1. RESPONSE: Acknowledged; see Response I1.

F. Appendix M: 700 Area Excerpts from the 2005 RCI Remedial Action Report

F1. COMMENT: *Attachment M contains excerpts from the October '05 RAR referenced above. Page 18 appears to indicate the March 1999 Historic Pesticide Contamination Task Force document exempts heptachlor from remediation as the exceedances are only one order of magnitude above the NRDCSCC. Heptachlor is not exempted from remediation by the referenced March 1999 (which includes no reference to order of magnitude/OOM), and the statement is an inappropriate application of OOM.*

F1. RESPONSE: Concur. The 2005 RAR will not be revised; however, future submittals will not include this argument.

F2. COMMENT: *As stipulated by N.J.A.C. 7:26E-3.2(a)5 – "An evaluation to determine if there is an order of magnitude difference between the concentration of any contaminant in any area of concern and any remediation standard applicable at the time of comparison to the area of concern if there is a prior final remediation document for the area of concern. If there is an order of magnitude difference, then the person responsible for conducting the remediation shall evaluate the protectiveness of any existing engineering or institutional controls on the area of concern and otherwise determine whether additional remediation may be required at the area of concern to ensure the area of concern remains protective of the public health, safety and the environment."*

The analytical results are greater than an OOM above both the former NRDCSCC as well as the current NRDCSRS, and more importantly, this area had no final remediation document (neither approved RAW or NFA).

F2. RESPONSE: Since the levels of pesticides are consistent with properly applied pesticides, and therefore not a CERCLA release for which the Army is responsible, there is no need for remedial action here or a final remedial document.

G. Appendix N: Comparison of RCI Area 700 Soil Results with Residential Cleanup Criteria

G1. COMMENT: *In the Department's September 2007 comment letter, it was stated contamination must be delineated to the residential criteria. No additional delineation efforts, however, have been performed. Rather, a comparison of previously existing data to current RDCSRS was made. Figures 6 and 7 note numerous areas which exceed the RDCSRS for various constituents, several of which locations are situated proximate to the various boundaries of Parcel 53. Based upon a review of the sample locations and results (plotted by this office), and as stated on Page 5 of Section 3.0, it is unclear that contamination above RDCSRS is limited to Parcel 53 boundaries. Delineation to RDCSRS remains incomplete; specifically delineation is incomplete at all perimeter boundaries, including but not necessarily limited to benzo(a)pyrene to the north of B2; heptachlor to*

the north and east of B1; heptachlor, heptachlor epoxide and chlordane to the west of B20; DDE to the south of B39; benzo(a)pyrene to the south of B38; heptachlor, heptachlor epoxide and chlordane to the east of B13; and benzo(a)pyrene to the east of B7.

G1. RESPONSE: See responses D3 and D8, above.

G2. COMMENT: *Page 5 references location B49, and Enclosure 1 includes data from sample locations B44, B46 and B49, however, Figure 19 of the January '07 ECP, titled "ECP Parcels", indicates these locations, while in the 700 Area, are actually located in Parcel 51, west of Parcel 53. As the Report is titled Parcel 53, please clarify.*

G2. RESPONSE: See response D9 above.

H. Attachment O: Compliance Averaging of RCI Area 700 Soil Results

H1. COMMENT: *As indicated in the comments above, the compliance averaging was not performed in accordance with the Department's Technical Guidance for the Attainment of Remediation Standards and Site-Specific Criteria, and is therefore not approved.*

H1. RESPONSE: Noted.

I. Attachment P: Area 700 Groundwater Monitoring Results

I1. COMMENT: *Attachment P includes a large scale contour map with monitor well locations, with Parcel 53 outlined, indicating the presence of several monitor wells along northern and eastern borders of the parcel, as well as ground water flow maps and analytical results of sampling collected from five monitor wells in 2009 and 2010 for VOA+15 only. Very minimal discussion was included in Section 4.0, stating the wells were installed in December 2009 to assess the potential for ground water contamination from the USTs in the area, however, it is unclear what specific USTs or other areas of concern the wells were to assess. Nor was there any discussion as to triggers for the performance of a ground water investigation present at the various areas of soil contamination noted throughout the parcel, e.g. was ground water encountered within 2' of contamination, what type of soils were encountered.*

I1. RESPONSE: The Parcel 53 monitor wells were installed to assess the potential for groundwater contamination from USTs formerly present within the Parcel as a whole. Of the USTs that were recently approved for NFA by NJDEP, only two had reported releases (700-17 and 700-18), and of those two, groundwater was sampled only from UST 700-17. The following observations from UST 700-17 are provided as further support that additional groundwater assessment is not required:

- Contaminated soil was observed and removed from the excavation in 2004 prior to soil sampling;
- Soil samples were collected from a depth of 5.0 to 5.5 feet below ground surface (ft bgs), and were all non-detected (ND) for Total Petroleum Hydrocarbons (TPH);

- Groundwater was encountered at 11 ft bgs and sampled from the excavation, and results were ND for TPH;
- Fine- to medium-grained sandy soils were encountered, as is typical for the Main Post.

Given the uniformity of site conditions across Parcel 53, it is concluded that any residual soil contamination from Parcel 53 USTs would be located considerably higher than 2 ft above the groundwater surface. Based on these observations, there were no indications of a contaminant release to groundwater, and therefore additional groundwater evaluation for the 700 Area is not warranted.

We look forward to your review of these responses and approval or additional comments. As previously indicated, a work plan for additional field soil sampling for PCBs at the Parcel 98 area will be provided under separate cover.

The technical Point of Contact (POC) for this matter is Kent Friesen at (732) 383-7201 or by email at kent.friesen@parsons.com. Should you have any questions or require additional information, please contact me by phone at (732) 383-5104 or by email at john.e.occhipinti.civ@mail.mil.

Sincerely,

John E. Occhipinti
Fort Monmouth Site Manager

cc: Delight Balducci, HQDA ACSIM
Joseph Pearson, Calibre
James Moore, USACE
Jim Kelly, USACE
Cris Grill, Parsons

State of New Jersey

CHRIS CHRISTIE
Governor

KIM GUADAGNO
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BOB MARTIN
Commissioner

July 22, 2015

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

Re: *Underground Storage Tanks and Response to NJDEP Comments for ECP Parcel 53 (700 Area) dated May 2015*
Fort Monmouth
Oceanport, Monmouth County
PI G000000032

Dear Mr. Occhipinti:

The New Jersey Department of Environmental Protection (Department) has completed review of the referenced report, received May 28, 2015, prepared by Parsons Government Services Inc. (Parsons). Parcel 53, also generally known as the 700 Area as indicated in the submittal, was included within a report previously submitted in 2005 which summarized the results of remedial activities within three areas of the Fort. Comments generated by the NJDEP in September of 2007 included the requirement for documentation regarding UST activities, delineation of soil to residential criteria, and the performance of a ground water investigation. The referenced submittal provides documentation as to the status of "all USTs identified within this parcel", and responds to the September 2007 NJDEP comment letter as regarding RCI 700 Area (generally, Parcel 53).

Underground Storage Tanks

The submittal states the parcel is noted as previously containing sixteen (16) underground storage tanks (USTs), all of which have been removed. Nine of USTs had previously received designations of no further action necessary from the Department, as indicated on page 3 and in Appendix D. Based upon receipt and review of the required documentation, it is agreed no additional action is necessary for the following seven USTs:

UST 700-2 aka 700-BI 2 – steel 1000 gallon #2 fuel UST removed 4/2/04
UST 700-3 aka 700-BI 3 – steel 1000 gallon #2 fuel UST removed 4/4/04
UST 700-5 aka 700-T05 – steel 1000 gallon #2 fuel UST removed 12/24/04

UST 700-17 aka 700-BI 17; #04-04-05-1357-41 – 1000 gallon #2 fuel UST rem oved 4/2/04
700-18 aka 700-BI 18; #04-04-14-1305-4-04 – steel 1000 gallon #2 fuel UST removed 4/12/04
746B – steel 1000 gallon #2 fuel UST removed 12/13/10
747B – steel 1000 gallon #2 fuel UST removed 12/9/10

It is unclear, however, how the statement on page 2 of 8, "all of the USTs identified within Parcel 53 have been removed", is reconciled with the potential UHOT locations represented on Figure 2 of May 2014 Addendum 1 – Environmental Condition of Property Report Unregulated Heating Oil Tank Investigation Report, which appears to indicate the continued potential presence of additional USTs at several locations within the parcel?

Section 2.0

The report indicates one rationale previously provided for not addressing elevated levels of heptachlor was the exceedances were "only one order of magnitude (OOM) above the non-residential cleanup criteria". This is not an acceptable argument; see below (Appendix M) for additional detail.

Section 3.0

Additional comparisons were made of existing analytical results to residential standards, however, it is not agreed delineation is "generally" complete. The delineation as required in the Department's September 2007 correspondence was not performed. As acknowledged in the submittal, delineation along the parcel boundaries remains incomplete. See additional comments immediately below and under Appendix N.

SVOCs
As has been indicated in previous emails and correspondence, the 1995 Weston background study was *not accepted* by the Department, for several reasons, and should no longer be referenced.

It is agreed the source of the PAH exceedences are not yet known. It does not seem likely, however, the source was incomplete burning of cigarettes, wood, food or fossil fuels. The referenced possibility of former asphaltic pavement may be feasible; review of historic aerials should reveal their historic presence, but not whether the analytical results are definitively present due to that asphaltic material. The report also speculates PAHs are perhaps present due to historic fill used to develop Fort Monmouth. Although this is certainly a viable possibility, historic fill is considered an area of concern (AOC) under the Technical Requirements for Site Remediation, N.J.A.C. 7:26E, and must be investigated and addressed accordingly.

Although it is stated compliance averaged results of both benzo(a)pyrene and benzo(b)fluoranthene were less than the applicable Residential Direct Contact Soil Remediation Standards (RDCSRS), the averaging was performed incorrectly. Delineation to residential criteria was required in September of '07 but was not performed; current regulations [N.J.A.C. 7:26E-4.2(a)] and guidance ("Technical Guidance for the Attainment of Remediation Standards

and Site-Specific Criteria") require delineation to not only residential standards, but to the impact to ground water soil remediation standards as well. Additionally, the arithmetic mean method is only for use when there are 9 or fewer samples (rather than the 57 samples at Parcel 53) or two or fewer distinct values, neither of which applies in this situation.

Although delineation remains incomplete, PAHs have been identified in several areas of the parcel above RDCSRS. Delineation to all applicable standards is required, and exceedences must be addressed.

Pesticides
As above, the background study included in the 1995 Weston report was not accepted by the Department; the study should no longer be referenced.

Elevated levels of heptachlor, heptachlor epoxide, chlordane and 4,4-DDE were noted within the parcel. Although it is stated compliance averaged results of all but heptachlor were less than the applicable RDCSRS, as above, the averaging was incorrectly performed. Delineation to residential criteria was required in September of '07; current regulations [N.J.A.C. 7:26E-4.2(a)] and guidance ("Technical Guidance for the Attainment of Remediation Standards and Site-Specific Criteria") require delineation to not only residential standards, but to the impact to ground water soil remediation standards (IGWSRS) as well. Also, as above, the arithmetic mean method is only for use when there are 9 or fewer samples.

Although delineation remains incomplete, pesticides have been identified in several areas of the parcel above applicable standards. All exceedances must be delineated and addressed.

Now designated as Parcel 98

PCBs
The PCBs exceedences are located in Parcel 51, rather than Parcel 53; please confirm this portion of Parcel 51 is to be considered in this review? As such, the above comments remain applicable to these areas as well. The compliance averaging was incorrectly performed. PCBs are present at 0.25 ppm and 0.68 ppm, above the RDCSRS ; delineation to the south, toward the parcel boundary, is incomplete. Delineation to RDCSRS/IGWSRS is required. PCBs were reported analyzed in 49 samples, greater than the 9 or fewer samples allowed for use of the average mean method of compliance averaging. All exceedances must be delineated and addressed.

Section 4.0
See comments under Appendix P

Appendix M

Attachment M contains excerpts from the October '05 RAR referenced above. Page 18 appears to indicate the March 1999 *Historic Pesticide Contamination Task Force* document exempts

heptachlor from remediation as the exceedances are only one order of magnitude above the NRDCSCC. Heptachlor is not exempted from remediation by the referenced March 1999 (which includes no reference to order of magnitude/OOM), and the statement is an inappropriate application of OOM.

As stipulated by N.J.A.C. 7:26E-3.2(a)5 – "An evaluation to determine if there is an order of magnitude difference between the concentration of any contaminant in any area of concern and any remediation standard applicable at the time of comparison to the area of concern *if there is a prior final remediation document for the area of concern.* If there is an order of magnitude difference, then the person responsible for conducting the remediation shall evaluate the protectiveness of any existing engineering or institutional controls on the area of concern and otherwise determine whether additional remediation may be required at the area of concern to ensure the area of concern remains protective of the public health, safety and the environment."

The analytical results are greater than an OOM above both the former NRDCSCC as well as the current NRDCSRS, and more importantly, this area had no final remediation document (neither approved RAW or NFA).

Appendix N

In the Department's September 2007 comment letter, it was stated contamination must be delineated to the residential criteria. No additional delineation efforts, however, have been performed. Rather, a comparison of previously existing data to current RDCSRS was made. Figures 6 and 7 note numerous areas which exceed the RDCSRS for various constituents, several of which locations are situated proximate to the various boundaries of Parcel 53. Based upon a review of the sample locations and results (plotted by this office), and as stated on Page 5 of Section 3.0, it is unclear that contamination above RDCSRS is limited to Parcel 53 boundaries. Delineation to RDCSRS remains incomplete; specifically delineation is incomplete at all perimeter boundaries, including but not necessarily limited to benzo(a)pyrene to the north of B2; heptachlor to the north and east of B1; heptachlor, heptachlor epoxide and chlordane to the west of B20; DDE to the south of B39; benzo(a)pyrene to the south of B38; heptachlor, heptachlor epoxide and chlordane to the east of B13; and benzo(a)pyrene to the east of B7.

Page 5 references location B49, and Enclosure 1 includes data from sample locations B44, B46 and B49, however, Figure 19 of the *January '07 ECP*, titled "ECP Parcels", indicates these locations, while in the 700 Area, are actually located in Parcel 51, west of Parcel 53. As the Report is titled Parcel 53, please clarify.

Attachment O

As indicated in the comments above, the compliance averaging was not performed in accordance with the Department's *Technical Guidance for the Attainment of Remediation Standards and Site-Specific Criteria*, and is therefore not approved.

Attachment P

Attachment P includes a large scale contour map with monitor well locations, with Parcel 53 outlined, indicating the presence of several monitor wells along northern and eastern borders of the parcel, as well as ground water flow maps and analytical results of sampling collected from five monitor wells in 2009 and 2010 for VOA+15 only. Very minimal discussion was included in Section 4.0, stating the wells were installed in December 2009 to assess the potential for ground water contamination from the USTs in the area, however, it is unclear what specific USTs or other areas of concern the wells were to assess. Nor was there any discussion as to triggers for the performance of a ground water investigation present at the various areas of soil contamination noted throughout the parcel, e.g. was ground water encountered within 2' of contamination, what type of soils were encountered.

Please contact this office if you have any questions.

Sincerely,

Linda S. Range

Linda S. Range

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

DEPARTMENT OF THE ARMY

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

May 21, 2015

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

Re: Underground Storage Tanks and Response to NJDEP Comments for ECP Parcel 53 (700 Area), Fort Monmouth, New Jersey

Attachments:

A. Correspondence
B. Site Layout Drawings of Parcel 53 (Recent and Historical)
C. Summary Table of Parcel 53 Underground Storage Tanks
D. No Further Action Letters from NJDEP
E. Geophysical Survey Reports
F. UST 700-2 File Review and Analyses
G. UST 700-3 File Review and Analyses
H. UST 700-5 File Review and Analyses
I. UST 700-17 Report
J. UST 700-18 Report
K. UST 746B File Review and Analyses
L. UST 747B File Review and Analyses
M. 700 Area Excerpts from the 2005 Residential Communities Initiative (RCI) Remedial Action Report
N. Comparison of RCI Area 700 Soil Results with Residential Cleanup Criteria
O. Compliance Averaging of RCI Area 700 Soil Results
P. Area 700 Groundwater Monitoring Results

Previous Correspondence:

1. NJDEP letter to the Army dated September 5, 2007, re: *Remedial Action Report for the 800, 700, and 400 Areas, Ft Monmouth, NJ.*

Dear Ms. Range:

The U.S. Army Fort Monmouth (FTMM) has reviewed existing file information for underground storage tank (UST) sites at Fort Monmouth within Environmental Condition of Property (ECP) Parcel 53. The purpose of this submittal is to provide comprehensive documentation of the location and closure status of all USTs identified within this parcel. Previous investigation

results associated with the Residential Communities Initiative (RCI) activities within Parcel 53 (also known as the 700 Area) have been reviewed, as well as the 2007 New Jersey Department of Environmental Protection (NJDEP) comments on the RCI Report (Correspondence 1; provided in Attachment A). This submittal provides a comprehensive response to NJDEP's previous comments on the RCI 700 Area (Correspondence 1), which generally corresponds to Parcel 53. This information should be useful for the future Phase II property transfer.

The Parcel 53 area includes that portion of the Main Post bounded by Echo Avenue to the north, Wilson Avenue to the west, Nicodemus Avenue to the south, and Radio Avenue to the east (see recent and historical layout drawings presented in Attachment B). There are no designated Installation Restoration Program (IRP) sites located within Parcel 53. Parcel 53 was described in the 2007 ECP Report as former housing in the 700 Area, where extensive soil sampling and numerous UST removals were conducted as part of the Army's RCI and Enhanced Use Leasing (EUL) programs. Currently there are no buildings within Parcel 53; however, historically there were up to 40 barracks and other buildings within this area (see Attachment B2). The purpose of the RCI and EUL programs was to assess specific Fort Monmouth site areas for privatized housing and associated support buildings; subsequently the program was discontinued after closure of Fort Monmouth was announced in 2005.

A final report was prepared in 2005 under the RCI program that summarized the results of soils investigation and remediation activities within the 400, 700, and 800 Areas of Fort Monmouth, and requested No Further Action (NFA) for all three areas. In 2007, NJDEP commented (Attachment A) that NFA could not be approved for the following reasons (***current Army responses concerning the 700 Area are provided in bold italics***):

- There was no documentation provided concerning the remediation and closure of USTs removed from the site (***documentation of UST closure activities for the 700 Area is presented in Section 1.0 below***);
- Although soil remediation was completed to non-residential soil cleanup criteria, NJDEP required soil delineation to residential criteria (***a description of the RCI soil results and comparison to NJDEP's residential direct contact soil remediation standards [RDCSRS] is presented in Section 3.0 below***); and
- A site investigation for groundwater was required (***a description of the 700 Area groundwater investigations is presented in Section 4.0 below***).

1.0 UNDERGROUND STORAGE TANKS

A summary table of USTs identified within Parcel 53 is provided in Attachment C, and the locations of these USTs within Parcel 53 are presented in Attachment B. All of the USTs identified within Parcel 53 have been removed. These USTs were either used for residential heating oil, or were less than 2000 gallons in size and used to store heating oil for nonresidential buildings, and are therefore considered unregulated heating oil tanks (UHOTs).

Multiple UHOTs within Parcel 53 were previously approved for No Further Action (NFA) by NJDEP; documentation of this approval is provided in Attachment D, and referenced below. In these cases, there is generally a supporting investigation report that was previously submitted to NJDEP and that describes the basis for closure. For the sake of brevity, we have not included these reports for UHOTs where NFA has already been approved. However, these reports are available within the FTMM environmental records.

In the Attachment C table, the term "Case Closed" has been used (consistent with previous FTMM procedures) to indicate the Army determined that no further sampling or remedial actions were warranted for a specific UST site. "Case Open" indicates the Army previously determined that ongoing monitoring, reporting or possibly even remedial action was warranted. In contrast, "No Further Action" has been reserved for NJDEP approval that no further sampling or remedial actions are warranted. "Case Open" sites previously identified within Parcel 53 in Attachment C can now be considered as "Closed" by this submittal.

Many of the Parcel 53 UHOTs were steel fuel oil tanks associated with previously demolished former barracks. Geophysical surveys were performed to locate potential UHOTs that may have remained after the buildings were removed, as described in Attachment E. A combination of the geophysical surveys as well as the historical maps and metal detectors were used to locate multiple UHOTs within the Parcel 53 area, which were subsequently removed.

Regarding the multiple UHOTs that were previously removed from Parcel 53, we are submitting the following documentation, and we request a No Further Action determination for each site (sites within Parcel 53 that have been previously approved for NFA by NJDEP are highlighted in green):

- UST 700-2 (also referred to as 700-BI2) File Review summary and analyses is presented in Attachment F.
- UST 700-3 (also referred to as 700-BI3) File Review summary and analyses is presented in Attachment G.
- UST 700-5 (also referred to as 700-T05) File Review summary and analyses is presented in Attachment H.
- UST 700-17 (also referred to as 700-BI17) investigation report is presented in Attachment I.
- UST 700-18 (also referred to as 700-BI18) investigation report is presented in Attachment J.
- UST 707 NFA was approved by NJDEP on 8/29/2000 (Attachment D).
- UST 718 NFA was approved by NJDEP on 10/23/2000 (Attachment D).
- UST 739 NFA was approved by NJDEP on 2/24/2000 (Attachment D).
- UST 744 NFA was approved by NJDEP on 2/24/2000 (Attachment D).
- UST 745 NFA was approved by NJDEP on 8/29/2000 (Attachment D).
- UST 746 (also referred to as 746A) NFA was approved by NJDEP on 8/29/2000 (Attachment D).
- UST 746B File Review summary and analyses is presented in Attachment K.
- UST 747A NFA was approved by NJDEP on 2/24/2000 (Attachment D).
- UST 747B File Review summary and analyses is presented in Attachment L.
- UST 748 NFA was approved by NJDEP on 8/29/2000 (Attachment D).
- UST 749 NFA was approved by NJDEP on 8/29/2000 (Attachment D).

2.0 RESIDENTIAL COMMUNITIES INITIATIVE ACTIVITIES AT THE 700 AREA

Extensive soil sampling was performed in 2004 under the RCI to support an evaluation of privatized housing (see Attachment M). Three areas of the Main Post were evaluated: the 400 Area, the 700 Area, and the 800 Area (see Figure 2 of Attachment M). These studies included

environmental assessment of soil using Geoprobe borings (at 100 ft centers; see Figure 6 of Attachment M), and full-suite analysis of soil samples for VOCs, SVOCs, pesticides, PCBs, and metals (provided in Appendix E of Tetra Tech, 2005; these data are also provided in Enclosure 2 of Attachment N). In addition, geophysical investigations were performed to delineate UHOTs historically used for fuel oil from former barracks that had been previously demolished, as discussed in Section 1.0 above (see also Attachment E). As a result, multiple UHOTs were removed from Parcel 53 from 2004 to 2010 with associated site assessment sampling, as discussed in Section 1.0 above.

Under the RCI program, the analytical results from the 700 Area geoprobe soil sampling were compared to NJDEP's published non-residential cleanup criteria (as reported in Attachment M). The rationale for applying non-residential criteria was based on the planned future use of the 700 Area as the site of an RCI/EUL administration office building. The SVOCs benzo(a)pyrene and benzo(a)anthracene were found to exceed the non-residential cleanup criteria in certain discrete areas within the 700 Area (see Figures 6 and 7 in Attachment M), and therefore the impacted soils were excavated and removed for offsite disposal. Multiple rounds of additional step-out characterization and post-excavation sampling were performed to ensure that adequate soil was removed to meet the applicable non-residential cleanup criteria.

The pesticide heptachlor also exceeded non-residential cleanup criteria in 700 Area soils; however, soils were not remediated. Army policy is to not remediate areas that have been impacted by the application of pesticide products to landscaped areas, which were applied in a manner intended for their beneficial use. Also, Tetra Tech (2005) provided the additional rationale that pesticide contamination in excess of the non-residential criteria only occurred at two of the 49 boring locations, and that the exceedances were only one order of magnitude above the non-residential cleanup criteria.

As previously described above, a report (Attachment M) was submitted to NJDEP in 2005 that requested No Further Action for the RCI sites. In 2007, NJDEP commented (Attachment A) that NFA could not be granted because (among other reasons) Area 700 soils were not delineated to residential cleanup criteria.

3.0 Additional Comparison of Soil Results with Residential Cleanup Criteria

Additional comparison of the RCI soil analytical results with residential cleanup criteria has been performed to address NJDEP's 2007 comments (Attachment A) on the RCI Remedial Action Report (Attachment M). Attachment N includes a summary of analytical results for select SVOCs, pesticides, and PCBs in 700 Area soils, and a comparison of detected results with the RDCSRS, as described in the New Jersey Administrative Code (NJAC) 7:26D. Figures presented in Attachment N indicate specific soil boring locations where the soils remaining in place (that is, not remediated in 2004) exceeded the RDCSRS. The purpose of this screening comparison was to assess the adequacy of the existing RCI data for delineation to residential standards. The results of the screening comparison are discussed below for SVOCs, pesticides, and PCBs.

SVOCs

SVOCs were analyzed in a total of 67 soil samples; 5 samples represent soils that were removed by excavating, leaving 62 remaining soil sample results. The exceedances of single-point

compliance comparisons of soil SVOC results with the applicable RDCSRS included the following:

- Benzo(a)pyrene exceeded the RDCSRS of 200 µg/kg in 14 of the 62 soil samples, at concentrations ranging from 210 µg/kg to 600 µg/kg.
- Benzo(b)fluoranthene exceeded the RDCSRS of 600 µg/kg in 5 of the 62 soil samples, at concentrations ranging from 640 µg/kg to 880 µg/kg.

These SVOCs are polycyclic aromatic hydrocarbons (PAHs), which are common anthropogenic compounds that may result from incomplete burning of organic material, such as cigarettes, wood, food, and fossil fuels (New Jersey Comparative Risk Project, 2003) or historic fill used to develop the former Fort Monmouth. The specific source of the PAHs in the 700 Area soils is not known. PAHs could originate from residual fuel oil releases in soil; however, with the exception of boring B30 (which was located midway between UHOTs 700-17 and 700-18, and was subsequently removed by excavation), the soil sample locations that exceeded the RDCSRS do not coincide spatially with former UHOT locations (see the revised Figure 6 in Attachment N).

PAHs are also commonly associated with asphalt pavement and sealants. Although the 700 Area is currently unpaved, there may have been pavement present during historical use of the area for barracks. Exceedances of the RDCSRS for PAHs are relatively minor (that is, within 3 times the RDCSRS), and generally do not exhibit spatially relevant trends. Benzo(a)pyrene and benzo(b)fluoranthene were also detected at concentrations exceeding the RDCSRS in background soil samples collected from the Main Post (Weston, 1995). Therefore, with the exception of the boring B30 area, the PAH occurrences are likely the result of ubiquitous urban impacts, or historic fill used to develop the former Fort Monmouth rather than point-source contamination from within the 700 Area.

The compliance average concentrations of both benzo(a)pyrene and benzo(b)fluoranthene were lower than the respective RDCSRS, as presented in Attachment O. These compliance averages were calculated in general accordance with NJDEP (2012) guidance, except that the arithmetic mean was calculated rather than the 95 percent upper confidence limit (UCL) of the mean, and the entire Area 700 data set was used instead of designating functional areas. Regardless, the calculated averages provide useful information on the central tendency of SVOC concentrations at the site.

The data indicate generally adequate delineation of SVOCs to the RDCSRS, as previously required by NJDEP (Attachment A). However, there are soil samples that exceed the RDCSRS at the perimeter boundary of the data set (for example, borings B2, B7, B38, and step-out samples at B49), suggesting that exceedances of the RDCSRS could also extend outside of the Parcel 53 area. This observation is also consistent with the interpretation that SVOCs in soil are likely the result of ubiquitous urban impacts, rather than point-source contamination from within the 700 Area.

Pesticides

Pesticides were analyzed in a total of 62 soil samples; 5 samples represent soils that were removed by excavating, leaving 57 remaining soil sample results. The exceedances of single-point compliance comparisons of soil pesticide results with the applicable RDCSRS included the following:

- Heptachlor exceeded the RDCSRS of 0.1 mg/kg in 5 of the 57 soil samples, at concentrations ranging from 0.12 mg/kg to 8.1 mg/kg.

- Heptachlor epoxide exceeded the RDCSRS of 0.07 mg/kg in 5 of the 57 soil samples, at concentrations ranging from 0.13 mg/kg to 1.1 mg/kg.
- gamma-Chlordane exceeded the RDCSRS of 0.2 mg/kg in 5 of the 57 soil samples, at concentrations ranging from 0.35 mg/kg to 5.4 mg/kg.
- alpha-Chlordane exceeded the RDCSRS of 0.2 mg/kg in 2 of the 57 soil samples, at concentrations ranging from 1.0 mg/kg to 1.6 mg/kg.
- 4,4'-DDE exceeded the RDCSRS of 2 mg/kg in 1 of the 57 soil samples, at a concentration of 2.1 mg/kg.

Pesticide results are attributed to historical application of pesticide products in a manner consistent with their intended use, and therefore do not indicate a need for additional remediation or deed restrictions. NJDEP (1999) has previously recognized that the historical use of agricultural pesticides in New Jersey has resulted in pesticide concentrations in excess of the residential soil cleanup criteria. The pesticides 4,4'-DDD, 4,4'-DDE, and 4,4'-DDT were previously detected in background soil samples collected from the Main Post (Weston, 1995).

The compliance average concentrations of heptachlor epoxide, alpha- and gamma-chlordane, and 4,4'-DDE were lower than the respective RDCSRS, as presented in Attachment O. The compliance average concentration of heptachlor exceeded the RDCSRS. These compliance averages were calculated in general accordance with NJDEP (2012) guidance, except that the arithmetic mean was calculated rather than the 95 percent upper confidence limit (UCL) of the mean, and the entire Area 700 data set was used instead of designating functional areas. Regardless, the calculated averages provide useful information on the distribution of pesticide concentrations at the site.

The data indicate an adequate delineation of pesticides to the RDCSRS, as previously required by NJDEP (Attachment A). However, there are soil samples that exceed the RDCSRS at the perimeter boundary of the data set (for example, borings B1, B13, B20, and B39), suggesting that exceedances of the RDCSRS could also extend outside of the Parcel 53 area. This observation is also consistent with the interpretation that pesticides in soil can be attributed to historical application of pesticide products.

PCBs

PCBs were analyzed in a total of 49 soil samples; however, 2 samples represent soils that were removed by excavating, leaving 47 remaining soil sample results. The exceedances of single-point compliance comparisons of soil PCB results with the applicable RDCSRS included the following:

- Aroclor 1260 exceeded the RDCSRS of 0.2 mg/kg in 2 of the 47 soil samples, at concentrations ranging from 0.25 mg/kg to 0.68 mg/kg.

Note that the PCB exceedances of the RDCSRS are located entirely within a 0.75 acre portion of the RCI Study Area that is south of Building 750 within ECP Parcel 51, rather than Parcel 53. The source of the PCBs in soils is not known; however, pole-mounted electrical transformers have been used at FTMM, and so the possibility for a release from a historical PCB-containing transformer cannot be completely discounted.

The compliance average concentration of Aroclor 1260 was lower than the respective RDCSRS, as presented in Attachment O. This compliance average was calculated in general accordance with NJDEP (2012) guidance, and indicates that the average concentration of PCBs within this area is less than the RDCSRS.

The data indicate generally adequate delineation of PCBs to the RDCSRS, as previously required by NJDEP (Attachment A). However, soil results from borings B44 and B46 exceed the RDCSRS at the perimeter boundary of the data set, suggesting that exceedances of the RDCSRS could also extend outside of the study area.

In summary, the RCI data supports the determination of NFA for the 700 Area soils.

4.0 Groundwater Investigation at 700 Area

Five groundwater monitoring wells were installed within the 700 Area in December 2009 to assess the potential for groundwater contamination from the UHOTs located in this area. Monitor wells MW-1, MW-2, MW-3 and MW-5 were each screened from 5 ft to 20 ft below ground surface (bgs), while MW-4 was completed at a deeper screened interval of 50 to 70 ft bgs. Shallow groundwater was typically encountered at approximately 9 ft bgs. Monitor well completion logs for each of these wells and a potentiometric surface map from April 2010 are presented in Attachment P. Shallow groundwater flow direction was primarily towards the northwest in the vicinity of these wells.

Two rounds of groundwater sampling were performed in December 2009 and January 2010, with analysis for VOCs. There were no VOCs detected in these groundwater samples. Therefore, there were no indications of a contaminant release to groundwater from the 700 area.

5.0 Summary

This information supports the conclusion that UHOTs as well as RCI program contamination issues identified within Parcel 53 have been adequately addressed by previous environmental activities. Multiple UHOT sites were identified within this Parcel that were addressed under the FTMM tank removal and assessment program. The RCI program results indicated several areas where individual sample results for SVOCs, pesticides, and PCBs exceed the residential cleanup criteria in soils; however, the average concentrations for these analytes were less than the residential criteria, with the exception of the pesticide heptachlor. Pesticide occurrences have resulted from the application of pesticide products applied in a manner intended for their beneficial use to landscaped areas. Therefore the sample results do not warrant additional remedial activities.

In summary, we submit that the Army has provided adequate due diligence with regards to the environmental condition of this Parcel, and we request that NJDEP approve No Further Action. Should you have any questions or require additional information, please contact me at (732) 383-5104 or by email at john.e.occhipinti.civ@mail.mil.

Sincerely,

John E. Occhipinti
Fort Monmouth Site Manager

ATTACHMENT B
Field Notes

Nov. 10 2017 (cont)

1349: 884-TMW-04 decommisioned, backfilled with soil cuttings.

1359: 884-TMW-03 decommisioned, backfilled with soil cuttings.

1405: 800-12 (PAR-55) - Decommision TMW-01, 02, 03, & 04 from yesterday, backfilled with soil cuttings.

1410: Mob to office, pickup supplies (Soil sampling) for PAR-98

1430: mob to PAR-98, drill 3 borings, 5' each for 0-0.5' bgs, 1.5-2.0' bgs, and 2.5-3.0' bgs (on hold).

~~1515~~ 1510: Collect sample PAR-98-SB-07-0'-0.5', AROCLOR

1515: Collect sample PAR-98-SB-07-1.5'-2.0', AROCLOR

1505: Collect sample PAR-98-SB-07-2.5-3.0', AROCLOR (Hold)

1520: Collect sample PAR-98-SB-107-1.5-2.0', AROCLOR (FD)

1525: Collect sample PAR-98-SB-07-1.5-2.0' (QA/QC Split)

1530: Collect sample PAR-98-SB-07-0'-0.5'-MS, AROCLOR

1535: Collect sample PAR-98-SB-07-0'-0.5'-MSD

1540: Collect sample, PAR-98-EB-11102017

1600: Prepare COCs, coolers, other paperwork

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Location Oceanport, NJ Date 4/25/16

Project / Client Fmm phase II / USACE

Tech: CW, FA, JB, CJ

TASK: Parcel 70 + 98

Weather: 50-65°F clear

0730: on-site + H+S / kick off

0815: gather equipment + mob

0855: Begin Drilling @ Parcel 70

SAMPLE ID			TIME	Analysis
PAR-70-	SB-02-	0-0.5	0915	PCB + mo/mag
"	02-	1-1.5	0918	
"	02-	2-2.5	0920	Hold
"	02-	3-3.5	0923	Hold
PAR-70-	SB-01-	0-0.5	0950	+ Dup
		1-1.5	0953	
		2-2.5	0956	Hold
		3-3.5	0959	Hold
PAR-70-	SB-03-	0-0.5	1020	
		1-1.5	1023	
		2-2.5	1026	
		3-3.5	1029	
PAR-70-	SB-11-	0-0.5	1055	
		1-1.5	1058	
		2-2.5	1100	
		3-3.5	1103	

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Location Oceanport, NJ Date 4/25/16

Project / Client Fmm phase II / USACE

SAMPLE ID		TIME	Analysis
PAR-70-SB-05-	0-0.5	1120	PCB
	1-1.5	1123	
	2-2.5	1126	
	3-3.5	1129	
PAR-70-SB-06-	0-0.5	1148	
	1-1.5	1150	
	2-2.5	1153	
	3-3.5	1156	

LUNCH: ~~1230~~ 1220

1220: LUNCH

1250: Begin Drilling @ 98

SAMPLE ID		TIME	Analysis
PAR-98-SB-03-	0-0.5	1310	PCB
	1.5-2	1315	
	2.5-3	1320	
PAR-98-SB-04-	0-0.5	1345	
	1.5-2	1350	
	2.5-3	1355	
PAR-98-SB-01-	0-0.5	1420	
	1.5-2	1425	
	2.5-3	1430	

1530: off-site to ship

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Location Oceanport NJ Date 4/26/15

Project / Client FTMM Phase II

Tech: CW, FA, JB, CT

TASK: Proal 78 SB's / well Development

Weather: 60°f possible T-storms

0730: on-site H&S tailgate

0820: Mob to Proal 98

SAMPLE ID	TIME	Analysis
PAR-98-SB-02-0-0.5	0900	MS
1.5-2	0905	
2.5-3	0910	Hold
PAR-98-SB-05-0 0.5	0925	MS/
1.5-2	0930	
2.5-3	0935	Hold
PAR-98-SB-06-0-0.5	0940	MS
1.5-2	0945	MSD
2.5-3	0950	Hold

1015: Mob to Charles Wood

1045: Begin developing MW-56

1350: Mob to Main post

1430: Begin developing @ Proal 51

1525: ECDI off-site

1530: start paperwork / pack coolers

1605: off-site to ship samples

ATTACHMENT C
Soil Boring Logs

PARSONS

Soil Boring Log

CLIENT: USACE
PROJECT NAME: FTMM - ECP
PROJECT LOCATION: FTMM (Parcel) 98
PROJECT NUMBER: 748810-

GROUNDWATER OBSERVATIONS
WATER LEVEL: N/A
DATE:
TIME:
MEAS. FROM:

INSPECTOR: F. ACCORSI
DRILLER: S. FOSTER
WEATHER: WINDY, 30's
CONTRACTOR: East Coast Drilling, Inc. (ECDI)
RIG TYPE: Geoprobe(R) 7822DT
DATE/TIME START: 11-10-17
DATE/TIME FINISH: 11-10-17
WEIGHT OF HAMMER: N/A
DROP OF HAMMER: N/A
TYPE OF HAMMER: N/A

BORING/WELL ID: PARCEL 98-SB-07
LOCATION DESCRIPTION:
LOCATION PLAN: Oceanport, New Jersey

DEPTH (feet)	SAMPLE I.D.	BLOWS per 6"	ADV/ REC.	PID (ppm)	FIELD IDENTIFICATION OF MATERIAL	STRATA	COMMENTS
0	PAR-98-SB-07-0-0.5'		60/42	NA	0-3" Topsoil 3"-24" moist, brn cmt SAND tr. silt		
1							
	PAR-98-SB-07-1.5-2.0'						
2					21"-30" moist, brn, cmt SAND and cmt Gravel		
	PAR-98-SB-07-2.5-3.0'						
3					30"-42 moist brn cmt SAND some f Gravel		
4							
5					END OF BORING @ 5 FT		
6							
7							
8							
9							
10							

Remarks:

Sample Types
S – Split-Spoon
U – Undisturbed Tube
C – Rock Core
A – Auger Cuttings

Consistency vs. Blowcount / Foot

Granular (Sand & Gravel)			Fine Grained (Silt & Clay)	
V. Loose: 0-4	Dense: 30-50		V. Soft: <2	Stiff: 8-15
Loose: 4-10	V. Dense: >50		Soft: 2-4	V. Stiff: 15-30
M. Dense: 10-30			M. Stiff: 4-8	Hard: > 30

and - 35-50%
some - 20-35%
little - 10-20%
trace - <10%
moisture, density, color, gradation

PARSONS

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Soil Boring Log

CLIENT: USACE
PROJECT NAME: FTMM - ECP
PROJECT LOCATION: FTMM Parcel
PROJECT NUMBER: 748810-

GROUNDWATER OBSERVATIONS
WATER LEVEL:
DATE: N/A
TIME:
MEAS. FROM:

INSPECTOR: CW
DRILLER: JB
WEATHER: 68°F
CONTRACTOR: East Coast Drilling, Inc. (ECDI)
RIG TYPE: Geoprobe(R) 7822DT
DATE/TIME START: 4/25/16
DATE/TIME FINISH: 4/25/16
WEIGHT OF HAMMER: N/A
DROP OF HAMMER: N/A
TYPE OF HAMMER: N/A

BORING/WELL ID: PAP-98-SB-01
LOCATION DESCRIPTION: Parcel 98
LOCATION PLAN: Oceanport, New Jersey

DEPTH (feet)	SAMPLE I.D.	BLOWS per 6"	ADV/ REC.	PID (ppm)	FIELD IDENTIFICATION OF MATERIAL	STRATA	COMMENTS
0	0-0.5		60/60	0	0-14" Dry, Brown, Mf SAND, little silt	I	
1					14-28" moist, orange-brown, MC SAND, trace silt, trace f gravel		
1425	1.5-2						
2							
1430	2.5-3				28-60" moist, light tan, mc SAND, trace f gravel	III	
3							
4					end of boring		
5							
6							
7							
8							
9							
10							

Remarks:

Sample Types
S – Split-Spoon
U – Undisturbed Tube
C – Rock Core
A – Auger Cuttings

Consistency vs. Blowcount / Foot

Granular (Sand & Gravel)		Fine Grained (Silt & Clay)	
V. Loose: 0-4	Dense: 30-50	V. Soft: <2	Stiff: 8-15
Loose: 4-10	V. Dense: >50	Soft: 2-4	V. Stiff: 15-30
M. Dense: 10-30		M. Stiff: 4-8	Hard: > 30

and - 35-50%
some - 20-35%
little - 10-20%
trace - <10%
moisture, density, color, gradation

PARSONS Page 1 of 1

Soil Boring Log

CLIENT: USACE
PROJECT NAME: FTMM - ECP
PROJECT LOCATION: FTMM Parcel
PROJECT NUMBER: 748810-

GROUNDWATER OBSERVATIONS
WATER LEVEL:
DATE: N/A
TIME:
MEAS. FROM:

INSPECTOR: CW
DRILLER: JB
WEATHER: 60°F
CONTRACTOR: East Coast Drilling, Inc. (ECDI)
RIG TYPE: Geoprobe(R) 7822DT
DATE/TIME START: 4/25/16
DATE/TIME FINISH: 4/25/16
WEIGHT OF HAMMER: N/A
DROP OF HAMMER: N/A
TYPE OF HAMMER: N/A

BORING/WELL ID: PAP-97-SB-02
LOCATION DESCRIPTION: Parcel 98
LOCATION PLAN: Oceanport, New Jersey

DEPTH (feet)	SAMPLE I.D.	BLOWS per 6"	ADV/ REC.	PID (ppm)	FIELD IDENTIFICATION OF MATERIAL	STRATA	COMMENTS
0900 0	0-6		60/60	0	0-15" Dry, Brown, mf SAND, trace silt		
1					15"-60" Moist, TAN, mc SAND, little f gravel,		
0905	1.5-2.0 ~~1.5-2.4~~						
2							
0910	2.5-3 ~~3.0-3.6~~						
3							
4							
5				6	end of Boring		
6							
7							
8							
9							
10							

Remarks:

Sample Types	Consistency vs. Blowcount / Foot				
S – Split-Spoon	Granular (Sand & Gravel)		Fine Grained (Silt & Clay)		and - 35-50%
U – Undisturbed Tube	V. Loose: 0-4	Dense: 30-50	V. Soft: <2	Stiff: 8-15	some - 20-35%
C – Rock Core	Loose: 4-10	V. Dense: >50	Soft: 2-4	V. Stiff: 15-30	little - 10-20%
A – Auger Cuttings	M. Dense: 10-30		M. Stiff: 4-8	Hard: > 30	trace - <10%
					moisture, density, color, gradation

PARSONS

Soil Boring Log

CLIENT: USACE
PROJECT NAME: FTMM - ECP
PROJECT LOCATION: FTMM Parcel
PROJECT NUMBER: 748810-

GROUNDWATER OBSERVATIONS
WATER LEVEL:
DATE: N/A
TIME:
MEAS. FROM:

INSPECTOR: CW
DRILLER: JB
WEATHER: 62°F
CONTRACTOR: East Coast Drilling, Inc. (ECDI)
RIG TYPE: Geoprobe(R) 7822DT
DATE/TIME START: 4/25/16
DATE/TIME FINISH: 4/25/16
WEIGHT OF HAMMER: N/A
DROP OF HAMMER: N/A
TYPE OF HAMMER: N/A

BORING/WELL ID: PAF-98-SB-03
LOCATION DESCRIPTION: Parcel 98
LOCATION PLAN: Oceanport, New Jersey

DEPTH (feet)	SAMPLE I.D.	BLOWS per 6"	ADV/ REC.	PID (ppm)	FIELD IDENTIFICATION OF MATERIAL	STRATA	COMMENTS
0	0-0.5		60/54	0	0-13" Dry, Brown MF SAND, little silt	I	
					13"-35" Moist, orange-brown, mf SAND, little silt, little f gravel		
1							
	1.5-2						
2							
	2.5-3				35"-54" Moist, light TAN, MC SAND.	III	
3							
4							
5					end of Boring		
6							
7							
8							
9							
10							

Remarks:

Sample Types
S – Split-Spoon
U – Undisturbed Tube
C – Rock Core
A – Auger Cuttings

Consistency vs. Blowcount / Foot

Granular (Sand & Gravel)			Fine Grained (Silt & Clay)		
V. Loose: 0-4	Dense: 30-50		V. Soft: <2	Stiff: 8-15	
Loose: 4-10	V. Dense: >50		Soft: 2-4	V. Stiff: 15-30	
M. Dense: 10-30			M. Stiff: 4-8	Hard: > 30	

and - 35-50%
some - 20-35%
little - 10-20%
trace - <10%
moisture, density, color, gradation

PARSONS

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Soil Boring Log

CLIENT: USACE
PROJECT NAME: FTMM - ECP
PROJECT LOCATION: FTMM Parcel
PROJECT NUMBER: 748810-

GROUNDWATER OBSERVATIONS
WATER LEVEL:
DATE: N/A
TIME:
MEAS. FROM:

INSPECTOR: CW
DRILLER: JB
WEATHER: 65°F
CONTRACTOR: East Coast Drilling, Inc. (ECDI)
RIG TYPE: Geoprobe(R) 7822DT
DATE/TIME START: 4/25/16
DATE/TIME FINISH: 4/25/16
WEIGHT OF HAMMER: N/A
DROP OF HAMMER: N/A
TYPE OF HAMMER: N/A

BORING/WELL ID: PAR-98-SB-04
LOCATION DESCRIPTION: Parcel 98
LOCATION PLAN: Oceanport, New Jersey

DEPTH (feet)	SAMPLE I.D.	BLOWS per 6"	ADV/ REC.	PID (ppm)	FIELD IDENTIFICATION OF MATERIAL	STRATA	COMMENTS
0	0-0.5		60/60	0	0-25" moist, brown, mf SAND, little silt	I	
1					25-38" moist, orange brown, mc SAND, little silt, trace f gravel		
1350	1.5-2						
2							
1355	2.5-3				38"-60" moist, light tan, mc SAND, trace f gravel	II	
3							
4					end of boring		
5							
6							
7							
8							
9							
10							

Remarks:

Sample Types
S – Split-Spoon
U – Undisturbed Tube
C – Rock Core
A – Auger Cuttings

Consistency vs. Blowcount / Foot

Granular (Sand & Gravel)			Fine Grained (Silt & Clay)	
V. Loose: 0-4	Dense: 30-50		V. Soft: <2	Stiff: 8-15
Loose: 4-10	V. Dense: >50		Soft: 2-4	V. Stiff: 15-30
M. Dense: 10-30			M. Stiff: 4-8	Hard: > 30

and - 35-50%
some - 20-35%
little - 10-20%
trace - <10%
moisture, density, color, gradation

PARSONS

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Soil Boring Log

CLIENT: USACE
PROJECT NAME: FTMM - ECP
PROJECT LOCATION: FTMM Parcel
PROJECT NUMBER: 748810-

GROUNDWATER OBSERVATIONS
WATER LEVEL:
DATE:
TIME:
MEAS. FROM:
N/A

INSPECTOR: CW
DRILLER: JB
WEATHER: 60°F
CONTRACTOR: East Coast Drilling, Inc. (ECDI)
RIG TYPE: Geoprobe(R) 7822DT
DATE/TIME START: 4/26/16
DATE/TIME FINISH: 4/26/16
WEIGHT OF HAMMER: N/A
DROP OF HAMMER: N/A
TYPE OF HAMMER: N/A

BORING/WELL ID: PAR-97-SB-05
LOCATION DESCRIPTION: Parcel 97
LOCATION PLAN: Oceanport, New Jersey

DEPTH (feet)	SAMPLE I.D.	BLOWS per 6"	ADV/ REC.	PID (ppm)	FIELD IDENTIFICATION OF MATERIAL	STRATA	COMMENTS
0	0-0.5		60/49	0	0-13" Dry, Brown, mf SAND, little silt, trace f gravel		
1					13"-49" Moist, orange-brown, MC SAND, trace silt, little f gravel		
	1.5-2						
2							
	2.5-3						
3							
4							
5					end of Boring		
6							
7							
8							
9							
0							

Remarks:

Sample Types
S – Split-Spoon
U – Undisturbed Tube
C – Rock Core
A – Auger Cuttings

Consistency vs. Blowcount / Foot

Granular (Sand & Gravel)		Fine Grained (Silt & Clay)	
V. Loose: 0-4	Dense: 30-50	V. Soft: <2	Stiff: 8-15
Loose: 4-10	V. Dense: >50	Soft: 2-4	V. Stiff: 15-30
M. Dense: 10-30		M. Stiff: 4-8	Hard: > 30

and - 35-50%
some - 20-35%
little - 10-20%
trace - <10%
moisture, density, color, gradation

PARSONS

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Soil Boring Log

CLIENT: USACE	INSPECTOR: CW	BORING/WELL ID: ~~Parcel 98~~ P-98-SB-06
PROJECT NAME: FTMM - ECP	DRILLER: JB	LOCATION DESCRIPTION
PROJECT LOCATION: FTMM Parcel	WEATHER: 65°F	Parcel 98
PROJECT NUMBER: 748810-	CONTRACTOR: East Coast Drilling, Inc. (ECDI)	
GROUNDWATER OBSERVATIONS	RIG TYPE: Geoprobe(R) 7822DT	LOCATION PLAN
WATER LEVEL:	DATE/TIME START: 4/26/16	Oceanport, New Jersey
DATE: N/A	DATE/TIME FINISH: 4/25/16	
TIME:	WEIGHT OF HAMMER: N/A	
MEAS. FROM:	DROP OF HAMMER: N/A	
	TYPE OF HAMMER: N/A	

DEPTH (feet)	SAMPLE I.D.	BLOWS per 6"	ADV/ REC.	PID (ppm)	FIELD IDENTIFICATION OF MATERIAL	STRATA	COMMENTS
0	0-0.5		6/5	0	0-14" Dry, Brown, mf SAND, little silt, trace f gravel		
1					14"-60" moist, orange-brown, mc SAND, little f gravel, trace silt		
2	1.5-2						
3	2.5-3						
4							
5					end of Boring		
6							
7							
8							
9							
10							

0940
0945
0950

Remarks:

Sample Types	Consistency vs. Blowcount / Foot				
S – Split-Spoon	Granular (Sand & Gravel)		Fine Grained (Silt & Clay)		and - 35-50%
U – Undisturbed Tube	V. Loose: 0-4	Dense: 30-50	V. Soft: <2	Stiff: 8-15	some - 20-35%
C – Rock Core	Loose: 4-10	V. Dense: >50	Soft: 2-4	V. Stiff: 15-30	little - 10-20%
A – Auger Cuttings	M. Dense: 10-30		M. Stiff: 4-8	Hard: > 30	trace - <10%
					moisture, density, color, gradation