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 March 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: UST 228B Site Investigation Report
Request for Unrestricted Use, No Further Action Approval
Fort Monmouth, Monmouth County, Oceanport, New Jersey
PI G000000032

Dear Mr. Joshi:

The U.S. Army Fort Monmouth (FTMM) Team prepared this Site Investigation (SI) Report to summarize existing file information and present the results of additional field sampling at Underground Storage Tank (UST) 228B (**Figure 1**), located in Parcel 72. Based on this information, we request an Unrestricted Use, No Further Action (NFA) determination for UST 228B.

UST 228B Background

UST 228B (without a Registration ID) is a steel 1,000-gallon heating oil UST that was partially uncovered in December 2010 and then re-buried and left in place, as presented in Reference 4 of **Attachment A**. In 2010, the Army also conducted soil sampling along the fuel line to the tank to determine if a release had occurred, and Total Petroleum Hydrocarbon (TPH) results ranged from ND to 555 mg/kg (Attachment G in Reference 4 of **Attachment A**). UST 228B was not removed and therefore has not been administratively closed.

In 2016, the Army performed additional soil sampling from three soil borings (PAR-72-228-SB-01, PAR-72-228-SB-02, and PAR-72-228-SB-03) at Parcel 72 (Attachment D in Reference 4 of **Attachment A**). The locations of the samples are shown on **Figure 2.** There were elevated PID readings in two of three borings, and a total Extractable Petroleum Hydrocarbon (EPH) concentration of 3,100 mg/kg was reported in one sample (from the 7 to 7.5 feet [ft] below ground surface [bgs] boring collected at PAR-72-228-SB-03). Due to the exceedance of the contingency analysis threshold of 1,000 mg/kg, this sample was also analyzed for 2-methylnapthalene and naphthalene. The 2-methynapthalene concentration was 23.9 mg/kg, which exceeded the New Jersey Department of Environmental Protection (NJDEP) Impact to Groundwater (IGW) screening level (**Table 1**). There were no exceedances of the NJDEP Residential Direct Contact Soil Remediation Standards (RDCSRS). A single temporary groundwater monitoring well (PAR-72-228-TMW-01) was also installed and sampled during this investigation in boring PAR-72-228-SB-01. The well was located about 10 ft

downgradient of PAR-72-228-03 and 2-methylnapthalene was notably absent in the groundwater analytical results (**Table 2**).

The soil boring log for PAR-72-228-SB-03 shows that groundwater was encountered at approximately 7 ft bgs, indicating that this sample was from the saturated zone. If so, the NJDEP IGW screening levels would not apply and therefore there would be no soil exceedances (NJDEP 2014). Additional field investigation was proposed by the Army in August 2017 (Reference 2 of **Attachment A**) to further assess the potential for impacts to groundwater by Synthetic Precipitation Leachate Procedure (SPLP) analysis, in accordance with NJDEP's (2010) EPH protocol document. The Work Plan was approved by NJDEP in October 2017 (Reference 1 of **Attachment A**).

Recent Investigation Results

To address the data need described above, a Geoprobe boring (PAR-72-228-SB-04) was advanced near the location of the previous boring (PAR-72-228-SB-03) (**Figure 2**). An unsaturated soil sample (from above the water table) was collected from 7.5 to 8 ft. bgs. Field notes and soil boring logs are provided in **Attachment B** and **Attachment C**. The SPLP extract from this soil sample was analyzed for 2-methylnapthalene by ALS Environmental (ALS). Naphthalene and 2-methylnaphthalene were not detected in the sample at concentrations exceeding the current NJDEP GWQC (**Table 3**).

Summary

Based on the information in this SI Report, the Army has determined that no further action is warranted at UST 228B and an Unrestricted Use, NFA determination is requested for UST 228B. 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

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

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)
Joseph Fallon, FMERA (e-mail)
Cris Grill, Parsons (e-mail)

Figures:

Figure 1 UST 228B Site Location
Figure 2 UST 2228B Site Layout and Sampling Locations

Tables:

Table 1 – 2016 Soil Sampling Results – Comparison to NJDEP Soil Remediation Standards
Table 2 – 2016 Ground Water Sampling Results – Comparison to NJDEP Ground Water Quality Criteria
Table 3 - 2017 Synthetic Precipitation Leachate Procedure (SPLP) Results– Comparison to NJDEP Ground Water Quality Criteria

Attachments:

A. UST 228B Correspondence
   1. New Jersey Department of Environmental Protection (NJDEP). 2017. Letter to the Army, *Supplemental Unregulated Heating Oil Tank (UHOT) Work Plan, Fort Monmouth, New Jersey*. Prepared by the Office of Assistant Chief of Staff for Installation Management, U.S. Army Fort Monmouth. October 13.
   2. Department of the Army. 2017. *Supplemental Unregulated Heating Oil Tank (UHOT) Work Plan, Fort Monmouth, New Jersey*. Prepared by the Office of Assistant Chief of Staff for Installation Management, U.S. Army Fort Monmouth. August 15.
   3. New Jersey Department of Environmental Protection (NJDEP). 2017. Letter to the Army, *RE: No Further Action Request Site Investigation Report Addendum ECP Parcel 72 Underground Storage Tanks dated December 2016. Fort Monmouth, Oceanport, Monmouth County*. February 7.
   4. Department of the Army. 2016. *No Further Action Request Site Investigation Report Addendum ECP Parcel 72 Underground Storage Tanks dated December 2016, Fort Monmouth, New Jersey*. Prepared by the Office of Assistant Chief of Staff for Installation Management, U.S. Army Fort Monmouth. December 13.
   5. New Jersey Department of Environmental Protection (NJDEP). 2016. Letter to the Army, *RE: Parcel 72 Select Underground Heating Oil Tanks (UHOTs) Work Plan Addendum. Fort Monmouth, Oceanport, Monmouth County*. July 12.
   6. Department of the Army. 2016. *Parcel 72 Select Underground Heating Oil Tanks (UHOTs) Work Plan Addendum. Fort Monmouth, Oceanport, Monmouth County*. Prepared by the Office of Assistant Chief of Staff for Installation Management, U.S. Army Fort Monmouth. July 1.

B. Field Notes
C. Soil Boring Logs

References:

NJDEP, 2010. Protocol for Addressing Extractable Petroleum Hydrocarbons. Version 5.0, August 9.

NJDEP, 2014. Frequently Asked Questions for the Impact to Groundwater Pathway in Soil Remediation Standards. Version 2.0, March 25.

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:

- "UST 228B Site Investigation Report, Request for Unrestricted Use, No Further Action Approval, Fort Monmouth, Monmouth County, Oceanport, New Jersey" (22 March 2018)

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: 22 March 2018

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

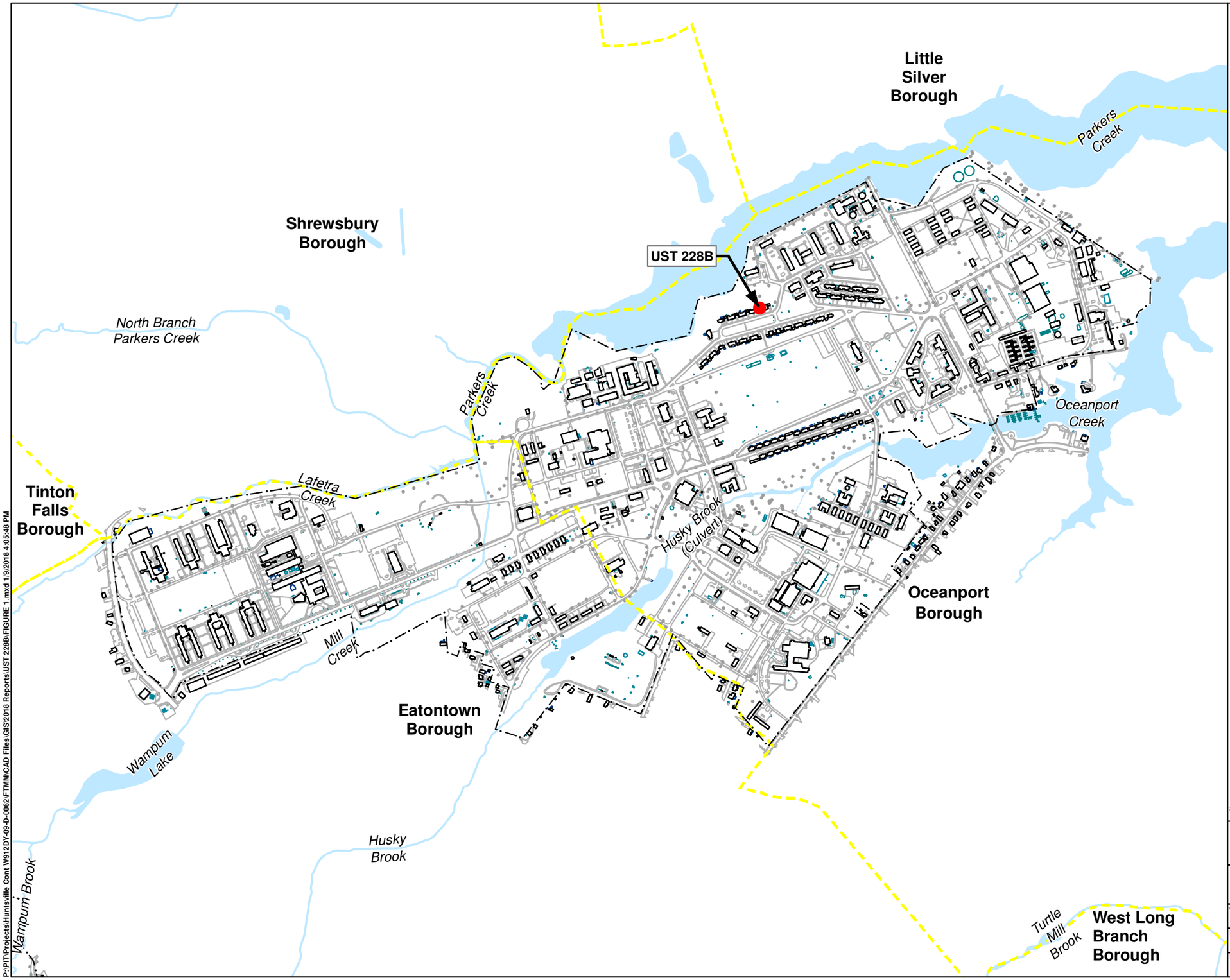
Completed form should be sent to:

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

FIGURES

Figure 1 –UST 228B Location

Figure 2 – UST 228B Site Layout and Sampling Locations



LEGEND:

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

N

1 inch = 1,000 feet

0 500 1,000 2,000 Feet

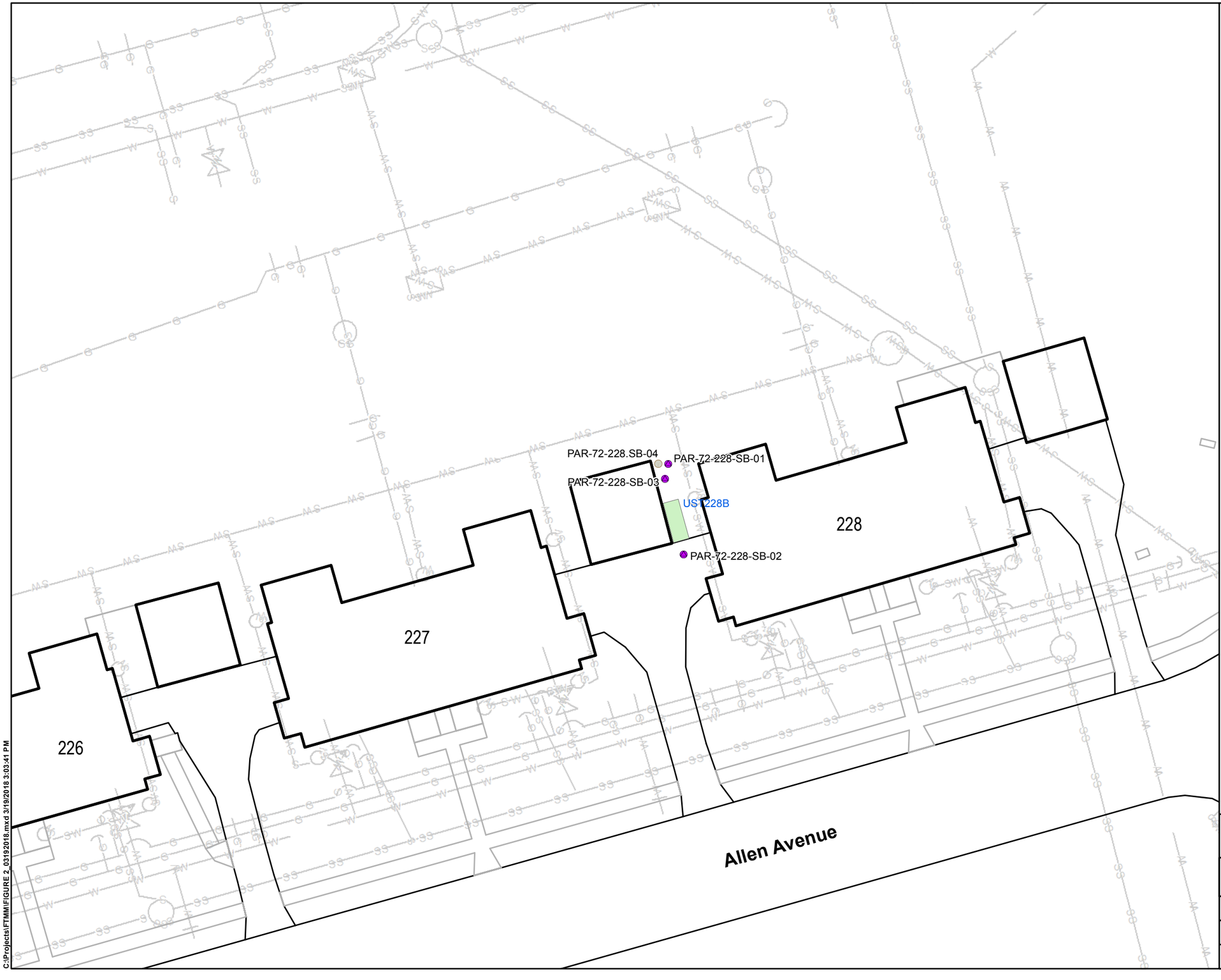
Source: FTMM Supplied CAD, 2013; ESRI Data and Maps, 2011; USGS NHD, 2012.

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

UST 228B SITE LOCATION

CREATED BY: RR	REVIEWED BY: AM
DATE: MAR. 2018	FIGURE NUMBER: FIGURE 1
PROJECT NUMBER: 748810-06031	FILE: FIGURE 1.mxd

P:\PIT\Projects\Huntsville Cont W912DY-09-D-0062\FTMM\CAD Files\GIS\2018 Reports\UST 228B\FIGURE 1.mxd 1/9/2018 4:05:48 PM



LEGEND:

- Soil Boring (2017)
- Soil Boring (2016)
- Installation Boundary
- 1000 Gallon Tank
- W Water Line
- S Sanitary Sewer Line
- SW Storm Sewer Line
- G Gas Line

N

1 inch = 25 feet

0 5 10 20 Feet

Source: FTMM Supplied CAD, 2013.

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

UST 228B
Site Layout and Sampling Locations

CREATED BY: RR	REVIEWED BY: KF
DATE: MAR. 2018	FIGURE NUMBER: FIGURE 2
PROJECT NUMBER: 748810-06031	FILE: FIGURE 2_03192018.mxd

C:\Projects\FTMM\FIGURE 2_03192018.mxd 3/19/2018 3:03:41 PM

TABLES

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

Table 2 – 2016 Ground Water Sampling Results – Comparison to NJDEP Ground Water Quality Criteria

Table 3 - 2017 Synthetic Precipitation Leachate Procedure (SPLP) Results– Comparison to NJDEP Ground Water Quality Criteria

TABLE 1
2016 SOIL SAMPLING RESULTS - COMPARISON TO NJDEP SOIL REMEDIATION STANDARDS
SITE PARCEL 72 UST 228B
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-72-BLD-228-SB-01				PAR-72-BLD-228-SB-02				PAR-72-BLD-228-SB-03			
Sample ID				PAR-72-228-SB-01-5-5.5		PAR-72-228-SB-01-8.5-9		PAR-72-228-SB-02-10.5-11		PAR-72-228-SB-02-12-12.5		PAR-72-228-SB-03-6.5-7		PAR-72-228-SB-03-7-7.5	
Sample Date				8/9/2016		8/9/2016		8/9/2016		8/9/2016		8/9/2016		8/9/2016	
Semivolatile Organic Compounds (mg/kg)															
2-Methylnaphthalene	230	2,400	8	NA		NA		NA		NA		NA		**23.9**	
Naphthalene	6	17	25	NA		NA		NA		NA		NA		**3.8**	
Extractable/Volatile Petroleum Hydrocarbons (mg/kg)															
C10-C12 Aromatics	NLE	NLE	NLE	**0.86**	**J**	**0.84**	**J**	**5.8**		**0.64**	**J**	**0.67**	**J**	**71**	
C12-C16 Aliphatics	NLE	NLE	NLE	< 1.1	UJ	< 1.2	UJ	**75.7**		**12.2**	**J**	**15.8**	**J**	**829**	
C12-C16 Aromatics	NLE	NLE	NLE	**0.35**	**J**	**0.28**	**J**	**34.3**		**1.6**	**J**	**4**		**409**	
C16-C21 Aliphatics	NLE	NLE	NLE	**0.5**	**J**	**0.65**	**J**	**55.5**		**10.4**	**J**	**16.3**	**J**	**627**	
C16-C21 Aromatics	NLE	NLE	NLE	**1.2**	**B**	**1.2**	**B**	**73.8**		**3.5**	**BJ**	**15.7**		**744**	
C21-C36 Aromatics	NLE	NLE	NLE	**0.6**	**J**	**0.39**	**J**	**10.6**		**0.33**	**J**	**3.6**		**109**	
C21-C40 Aliphatics	NLE	NLE	NLE	**0.97**	**JB**	**14.2**	**J**	**10.7**	**J**	**2.9**	**J**	**3.9**	**J**	**128**	
C9-C12 Aliphatics	NLE	NLE	NLE	**0.52**	**J**	**0.52**	**J**	**17.7**	**J**	**2.7**	**J**	**2.3**	**J**	**180**	**J**
Total Aliphatics	NLE	NLE	NLE	**2.3**	**J**	**15.8**	**J**	**160**		**28.1**	**J**	**38.2**	**J**	**1,760**	
Total Aromatics	NLE	NLE	NLE	**3**	**J**	**2.8**	**J**	**137**		**6.1**	**J**	**23.9**		**1,330**	
Total EPH	5,100	NLE	NLE	**5.2**	**J**	**18.5**		**296**		**34.2**	**J**	**62.1**		**3,100**	

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.

a) DELETE THIS NOTE BEFORE GOING FINAL: Refer to the NJDEP Protocol for Addressing Extractable Petroleum Hydrocarbons (Version 5.0, August 9, 2010) and the NJDEP Health Based end Ecological Screening Criteria for Petroleum Hydrocarbons (Version 4.0, August 9, 2010) to determine the category of tank being investigated and the appropriate cleanup standards or screening levels for that category of tank.

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

TABLE 2
2016 GROUND WATER SAMPLING RESULTS - COMPARISON TO NJDEP
Ground Water Quality Criteria
SITE PARCEL 72
FORT MONMOUTH, NEW JERSEY

Loc ID	NJ Ground Water Quality Criteria	PAR-72-BLD-228-TMW-01
Sample ID		PAR-72-228-TMW-01
Sample Date		8/10/2016
Sample Round		
Filtered		Total
Volatile Organic Compounds (µg/l)		
1,1,1,2-Tetrachloroethane	1	< 0.75
1,1,1-Trichloroethane	30	< 0.75
1,1,2,2-Tetrachloroethane	1	< 0.75
1,1,2-Trichloroethane	3	< 0.75
1,1-Dichloroethane	50	< 0.75
1,1-Dichloroethene	1	< 0.75
1,1-Dichloropropene	100	< 0.75
1,2,3-Trichlorobenzene	100	< 0.75
1,2,3-Trichloropropane	0.03	< 2.5
1,2,4-Trichlorobenzene	9	< 0.75
1,2,4-Trimethylbenzene	100	< 0.75
1,2-Dibromo-3-chloropropane	0.02	< 2.5
1,2-Dibromoethane	0.03	< 0.75
1,2-Dichlorobenzene	600	< 0.75
1,2-Dichloroethane	2	< 0.75
1,2-Dichloropropane	1	< 0.75
1,3,5-Trimethylbenzene	100	< 0.75
1,3-Dichlorobenzene	600	< 0.75
1,3-Dichloropropane	100	< 0.75
1,4-Dichlorobenzene	75	< 0.75
2,2-Dichloropropane	100	< 0.75
2-Chlorotoluene	100	< 0.75
Acetone	6,000	**8 B**
Benzene	1	< 0.75
Bromobenzene	100	< 0.75
Bromochloromethane	100	< 0.75
Bromodichloromethane	1	< 0.75
Bromoform	4	< 0.75
Carbon tetrachloride	1	< 0.75
Chlorobenzene	50	< 0.75
Chlorodibromomethane	1	< 0.75
Chloroethane	5	< 0.75
Chloroform	70	< 0.75
Cis-1,2-Dichloroethene	70	< 0.75
Cis-1,3-Dichloropropene	1	< 0.75
Cymene	100	< 0.75
Dichlorodifluoromethane	1,000	< 0.75
Ethyl benzene	700	< 0.75
Hexachlorobutadiene	1	< 0.75
Isopropylbenzene	700	< 0.75
Meta/Para Xylene	1,000	< 1.5
Methyl bromide	10	< 0.75
Methyl butyl ketone	300	< 3.8
Methyl chloride	100	< 0.75
Methyl ethyl ketone	300	< 3.8
Methyl isobutyl ketone	100	< 3.8
Methyl Tertbutyl Ether	70	< 0.75
Methylene chloride	3	< 0.75
Naphthalene	300	< 0.75
n-Butylbenzene	100	< 0.75
Ortho Xylene	1,000	< 0.75
p-Chlorotoluene	100	< 0.75
Propylbenzene	100	< 0.75
sec-Butylbenzene	100	< 0.75
Styrene	100	< 0.75
Tert Butyl Alcohol	100	< 12.5
tert-Butylbenzene	100	< 0.75
Tetrachloroethene	1	< 0.75
Toluene	600	< 0.75
Trans-1,2-Dichloroethene	100	< 0.75
Trans-1,3-Dichloropropene	1	< 0.75
Trichloroethene	1	< 0.75
Trichlorofluoromethane	2,000	< 0.75
Vinyl chloride	1	< 0.75

TABLE 2
2016 GROUND WATER SAMPLING RESULTS - COMPARISON TO NJDEP
Ground Water Quality Criteria
SITE PARCEL 72
FORT MONMOUTH, NEW JERSEY

Semivolatile Organic Compounds (µg/l)		
1,2,4-Trichlorobenzene	9	< 1
1,2-Dichlorobenzene	600	< 1
1,2-Diphenylhydrazine	20	< 1
1,3-Dichlorobenzene	600	< 1
1,4-Dichlorobenzene	75	< 1
2,4,5-Trichlorophenol	700	< 3
2,4,6-Trichlorophenol	20	< 1
2,4-Dichlorophenol	20	< 1
2,4-Dimethylphenol	100	< 5.1
2,4-Dinitrophenol	40	< 8.1
2,4-Dinitrotoluene	10	< 1
2,6-Dinitrotoluene	10	< 1
2-Chloronaphthalene	600	< 1
2-Chlorophenol	40	< 2
2-Methylnaphthalene	30	< 1
2-Methylphenol	100	< 1
2-Nitroaniline	100	< 1
2-Nitrophenol	100	< 2
3,3'-Dichlorobenzidine	30	< 3
3-Nitroaniline	100	< 2
4,6-Dinitro-2-methylphenol	1	< 5.1
4-Bromophenyl phenyl ether	100	< 1
4-Chloro-3-methylphenol	100	< 1
4-Chloroaniline	30	< 1
4-Chlorophenyl phenyl ether	100	< 1
4-Nitroaniline	5	< 1
4-Nitrophenol	100	< 5.1
Acenaphthene	400	< 1
Acenaphthylene	100	< 1
Anthracene	2,000	**0.22 J**
Benzidine	20	< 30.5
Benzo(a)anthracene	0.1	< 1
Benzo(a)pyrene	0.1	< 1
Benzo(b)fluoranthene	0.2	< 1
Benzo(ghi)perylene	100	< 1
Benzo(k)fluoranthene	0.5	< 1
Benzyl alcohol	2,000	< 2
Bis(2-Chloroethoxy)methane	100	< 1
Bis(2-Chloroethyl)ether	7	< 1
Bis(2-Chloroisopropyl)ether	300	< 1
Bis(2-Ethylhexyl)phthalate	3	< 1
Butyl benzyl phthalate	100	< 1
Carbazole	100	< 1
Chrysene	5	< 1
Cresol	NLE	< 1
Dibenz(a,h)anthracene	0.3	< 1
Dibenzofuran	100	**0.16 J**
Diethyl phthalate	6,000	**0.22 J**
Dimethyl phthalate	100	< 1
Di-n-butylphthalate	700	< 1
Di-n-octylphthalate	100	< 1
Fluoranthene	300	< 1
Fluorene	300	**0.21 J**
Hexachlorobenzene	0.02	< 1
Hexachlorobutadiene	1	< 1
Hexachlorocyclopentadiene	40	< 2
Hexachloroethane	7	< 1
Indeno(1,2,3-cd)pyrene	0.2	< 1
Isophorone	40	< 1
Naphthalene	300	< 1
Nitrobenzene	6	< 2
N-Nitrosodimethylamine	0.8	< 2
N-Nitroso-di-n-propylamine	10	< 1
N-Nitrosodiphenylamine	10	< 2
Pentachlorophenol	0.3	< 8.1
Phenanthrene	100	**0.29 J**
Phenol	2,000	< 1
Pyrene	200	**0.17 J**
TIC SVOCs (µg/l)		
Total TICS	500	**50.1 JN**

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.

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

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

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

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

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 Ground Water Quality Criteria ####

NJDEP Interim Specific GWQC values are presented for the NJ GWQS where there is not a Specific Ground Water Quality Criteria. A full list of compounds is available at (http://www.nj.gov/dep/wms/bwqsa/gwqs_interim_criteria_table.htm).

NJDEP Interim Generic GWQC values are presented for the NJ GWQS where there is not a XXXXX or a NJDEP Interim Specific GWQC. Available at (http://www.nj.gov/dep/wms/bwqsa/gwqs_interim_criteria_table.htm).

10) Criteria action level source document and web address.

- The NJ Ground Water Quality Criteria refers to the NJDEP Groundwater Quality Standards - Adopted July 22, 2010

http://www.state.nj.us/dep/wms/bwqsa/docs/njac79C.pdf

TABLE 3
2017 SYNTHETIC PRECIPITATION LEACHATE PROCEDURE (SPLP) RESULTS --
COMPARISION TO NJDEP GROUND WATER QUALITY CRITERIA
SITE PARCEL 72 UST 228 B
FORT MONMOUTH, NEW JERSEY

Loc ID	NJ Ground Water Quality Criteria	PAR-72-228-SB-04	
Sample ID		PAR-72-228-SB-04-7.5-8.0	
Sample Date		11/6/2017	
Sample Round			
Semivolatile Organic Compounds (µg/l)			
2-Methylnaphthalene	30	< 1.6	
Naphthalene	300	< 1.6	

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 Ground Water Quality Criteria ####

NJDEP Interim Specific GWQC values are presented for the NJ GWQS where there is not a Specific Ground Water Quality Criteria. A full list of compounds is available at (http://www.nj.gov/dep/wms/bwqsa/gwqs_interim_criteria_table.htm).

NJDEP Interim Generic GWQC values are presented for the NJ GWQS where there is not a XXXXX or a NJDEP Interim Specific GWQC. Available at (http://www.nj.gov/dep/wms/bwqsa/gwqs_interim_criteria_table.htm).

10) Criteria action level source document and web address.

- The NJ Ground Water Quality Criteria refers to the NJDEP Groundwater Quality Standards - Adopted July 22, 2010

http://www.state.nj.us/dep/wms/bwqsa/docs/njac79C.pdf

Attachment A
Correspondence

1. New Jersey Department of Environmental Protection (NJDEP). 2017. Letter to the Army, *Supplemental Unregulated Heating Oil Tank (UHOT) Work Plan, Fort Monmouth, New Jersey*. Prepared by the Office of Assistant Chief of Staff for Installation Management, U.S. Army Fort Monmouth. October 13.
2. Department of the Army. 2017. *Supplemental Unregulated Heating Oil Tank (UHOT) Work Plan, Fort Monmouth, New Jersey*. Prepared by the Office of Assistant Chief of Staff for Installation Management, U.S. Army Fort Monmouth. August 15.
3. New Jersey Department of Environmental Protection (NJDEP). 2017. Letter to the Army, *RE: No Further Action Request Site Investigation Report Addendum ECP Parcel 72 Underground Storage Tanks dated December 2016. Fort Monmouth, Oceanport, Monmouth County*. February 7.
4. Department of the Army. 2016. *No Further Action Request Site Investigation Report Addendum ECP Parcel 72 Underground Storage Tanks dated December 2016, Fort Monmouth, New Jersey*. Prepared by the Office of Assistant Chief of Staff for Installation Management, U.S. Army Fort Monmouth. December 13.
5. New Jersey Department of Environmental Protection (NJDEP). 2016. Letter to the Army, *RE: Parcel 72 Select Underground Heating Oil Tanks (UHOTs) Work Plan Addendum. Fort Monmouth, Oceanport, Monmouth County*. July 12.
6. Department of the Army. 2016. *Parcel 72 Select Underground Heating Oil Tanks (UHOTs) Work Plan Addendum. Fort Monmouth, Oceanport, Monmouth County*. Prepared by the Office of Assistant Chief of Staff for Installation Management, U.S. Army Fort Monmouth. July 1.

State of New Jersey

CHRIS CHRISTIE
Governor

KIM GUADAGNO
Lt. Governor

DEPARTMENT OF ENVIRONMENTAL PROTECTION
Bureau of Northern Field Operations
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BOB MARTIN
Commissioner

October 13, 2017

Mr. William Colvin
BRAC Environmental Coordinator
OACSIM – U.S. Army Fort Monmouth
P. O. Box 148
Oceanport, NJ 07757

Re: Supplemental Unregulated Heating Oil Tank Work Plan
Fort Monmouth
Oceanport, Monmouth County
PI G000000032

Dear Mr. Colvin,

The New Jersey Department of Environmental Protection (Department) has completed review of the Supplemental Unregulated Heating Oil Tank Work Plan (UST Workplan). The UST Workplan included proposal for further investigation(s) at various Underground Storage Tank (UST) locations. The Department offers the following comments:

- **UST 142B, UST 202A, UST 202D** – The proposal to install monitor wells (MWs) is approved. Please ensure that all approved sampling methodologies are utilized. Please also document field observations, including the presence of free product and/or sheen in any of the MWs. Please note that the proposal to install additional MW, as needed, is also approved as this may assist in further delineating the extent of ground water contamination.
- **UST 211** – Further investigation is approved as proposed. However, the Department recommends installing one temporary well south of boring locations SCREEN 5 and SCREEN 6.
- **UST 228B** – Further investigation is approved as proposed. Based on the findings from previous investigation(s) and subsequent sampling results (soils and ground water), the Department may recommend removing the UST.
- **UST 444** – The installation of borings (6), temporary wells (3) and permanent monitor wells (3) is approved. However, as other USTs were present in the area, please ensure that results from UST 444 and other USTs' results are not co-mingled.
- **UST 490** – Further investigation is approved as proposed. However, please indicate if any previous soil remediation in the form of soil removal was performed when this UST was removed in 1990 or thereafter.
- **UST 750J, UST 800-12, UST 800-20, UST 884, UST 906A** and **UST 3035** – Further investigations are approved as proposed at these locations.

Please submit all results of the findings to my attention for review. If possible, please have each UST findings, tables, figures and maps individually prepared. Thank you and please feel free to contact me if you have any questions.

Sincerely,

A.J. Joshi

C: James Moore, USACE
Rich Harrison, FMERA
Joe Fallon, FMERA
Joe Pearson, Calibre
File

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

15 August 2017

Mr. Ashish Joshi
New Jersey Department of Environmental Protection
Northern Bureau of Field Operations
7 Ridgedale Avenue
Cedar Knolls, NJ 07927

SUBJECT: Supplemental Unregulated Heating Oil Tank (UHOT) Work Plan
Fort Monmouth, New Jersey
PI G000000032

Figures:

Figure 1 – UHOT Locations
Figure 2 – UST 142B Sample Location
Figure 3 – UST 202A and UST 202D Sample Locations
Figure 4 – UST 211 Sample Locations
Figure 5 – UST 228B Sample Location
Figure 6 – UST 444 Sample Locations
Figure 7 – UST 490 Sample Locations
Figure 8 – UST 750J Sample Location
Figure 9 – UST 800-12 Sample Locations
Figure 10 – UST 800-20 Sample Locations
Figure 11 – UST 884 Sample Locations
Figure 12 – UST 906A Soil Sample Locations
Figure 13 – UST 906A Groundwater Sample Locations
Figure 14 – UST 3035 Sample Locations

Tables:

Table 1 – Sampling Summary
Table 2 – UST 906A Soil Sample Results
Table 3 – UST 906A Groundwater Sample Results

Attachments:

A. Groundwater Flow Direction Maps

Dear Mr. Joshi:

The U.S. Army Fort Monmouth (FTMM) Team has prepared this Work Plan to describe the proposed sampling and analyses activities to support environmental investigations at select unregulated heating oil tanks (UHOTs; also referred to as underground storage tanks [USTs] in this submittal) at FTMM (Figure 1).

The UHOTs described in this Work Plan are being evaluated in accordance with the New Jersey Administrative Code (NJAC) 7:26E *Technical Requirements for Site Remediation*. Most of these UHOTs require a remedial investigation (RI) in accordance with NJAC 7:26E-4.3 for delineation of an identified release of fuel oil constituents in groundwater. However, additional USTs have been included in this Work Plan that only require site investigation (SI) soil or groundwater sampling (NJAC 7:26E-3.4 or -3.5) to determine if a release has occurred, as designated below:

- UST 142B (SI)
- UST 202A (SI)
- UST 202D (RI)
- UST 211 (RI)
- UST 228B (SI)
- UST 444 (RI)
- UST 490 (RI)
- UST 750J (SI)
- UST 800-12 (RI)
- UST 800-20 (RI)
- UST 884 (RI)
- UST 906A (RI)
- UST 3035 (SI)

Specific data needs and proposed sampling at each UHOT site are described in the subsections below. Groundwater flow directions in the area where delineation in groundwater is required are generally not well established due to the distances to other nearby monitor wells. Therefore, regional groundwater flow directions from previous documents (Attachment A) were used as a basis for initial planning of groundwater sampling at each site.

The proposed groundwater assessment strategy includes a combination of field screening and groundwater sampling and analysis to delineate the groundwater plume. For a typical UHOT site without any previous plume assessment, Geoprobe soil borings will be placed in a ring around the former tank site, and each boring will be advanced to a depth below the shallow groundwater. Field screening using a photoionization detector (PID) and visual observation of the Geoprobe soil cores will be used to identify and assess areas impacted by fuel oil downgradient of the source area. Previous Geoprobe assessments at FTMM have successfully identified fuel oil contamination in areas downgradient of former UHOTs using these field screening techniques. The field screening results will be used to verify the contaminant migration direction (and by implication, the groundwater flow direction) for each UHOT site. Temporary groundwater monitoring wells will then be placed within and outside of the plume at each tank site using a Geoprobe, and the groundwater will be sampled to verify the nature and extent of groundwater contamination. Following receipt of analytical data from the temporary wells, permanent monitoring wells will be installed to establish a monitoring network with a minimum of three wells at each site: a source area well near the former tank site, a well downgradient of the source but within the plume, and a downgradient sentry well beyond the plume. Select existing monitoring wells will also be used for water level measurements to complement the monitoring network. All new permanent monitoring wells and the existing monitoring wells to be used for water level measurements will be surveyed by a New Jersey-licensed surveyor in accordance with the Sampling and Analysis Plan (SAP; Reference 23).

Sampling and analytical procedures will follow the protocols established for previous FTMM Work Plan submittals (Reference 24). All Site personnel will be required to read, understand, and comply with the safety guidelines in the Accident Prevention Plan (APP) including the Site Health and Safety Plan (SHASP), which is included as Appendix A of the APP (Reference 25). The detailed field procedures to be used for the activities described in this sampling plan are described in the SAP (Reference 23). Please let me know if you need these or any other documents referred to in this Work Plan to be sent to you.

Specific sampling and analytical requirements are summarized in Table 1, and are described for each UHOT in the subsections below.

1. UST 142B

UST 142B was a steel 550-gallon No. 2 fuel oil UST that was removed in July 1994, along with approximately 30 cubic yards of contaminated soil, as presented in Attachment H of *USTs Within ECP Parcel 79* (Reference 2). Subsequently, NJDEP required a groundwater investigation to be performed (Reference 13); a temporary well was installed, sampled and abandoned in August 2016. Multiple polynuclear aromatic hydrocarbons (PAHs) were detected in the groundwater sample, which was attributed to sample turbidity rather than a release of fuel oil to groundwater (as reported in Reference 10). NJDEP (Reference 22) then recommended resampling using a method to reduce turbidity due to the high concentrations for PAHs detected.

To address this data need, a 2-inch diameter permanent monitoring well will be installed at the former UST 142B tank location, as shown on Figure 2. This approach is expected to result in a low-turbidity groundwater sample without PAH exceedances. The well will be installed within a Geoprobe boring and will be completed with a 10-foot well screen to approximately 7 feet (ft) below the water table (estimated at approximately 4 ft below ground surface [bgs]). The well will be developed to meet the criteria specified in NJDEP's most recent *Field Sampling Procedures Manual*. Low-flow sampling methods will be used to sample this well and the sample will be analyzed for volatile organic compounds (VOCs) and semivolatile organic compounds (SVOCs) in accordance with the requirements for No. 2 fuel oil in Table 2-1 of the NJAC 7:26E *Technical Requirements for Site Remediation*. The Field Geologist will note any indications of fill within the soil column such as cinders, coal, or other debris. A letter report will be prepared for UST 142B that either requests a No Further Action (NFA) determination or recommends additional investigation or action, as warranted from the analytical data.

2. UST 202A

UST 202A was a fiberglass 1,000-gallon heating oil UST that was removed in October 2001, along with an unspecified quantity of contaminated soil, as presented in Attachment J of *USTs Within ECP Parcel 79* (Reference 2). NJDEP (Reference 13) subsequently required a groundwater investigation for the UST 202A and UST 202D area. One temporary well and two existing permanent wells were sampled in May and August 2016 (Reference 10). NJDEP then recommended installation of a permanent well nearby to assess UST 202D (Reference 22); at the same time, NFA was not approved for UST 202A. Additional data are needed to delineate groundwater contamination associated with UST 202A and to delineate groundwater contamination at nearby UST 202D (described in Section 3 below).

To address the UST 202A data need, one temporary monitoring well will be installed at the former UST 202A tank location, as shown on Figure 3. The well will be installed within a Geoprobe boring and will be completed with a 5-foot well screen to approximately 4 ft below the water table (estimated at approximately 2 ft bgs). This well will be sampled and the sample will be analyzed for VOCs and SVOCs in accordance with the requirements for No. 2 fuel oil in Table 2-1 of NJAC 7:26E. The Army may also install and sample additional permanent wells based on the temporary well results. A letter report will be prepared for UST 202A that either requests a No Further Action (NFA) determination or recommends additional investigation or action.

3. UST 202D

UST 202D was a steel 500-gallon heating oil UST that was removed in May 2005 along with approximately 20 cubic yards of contaminated soil (Attachment L of Reference 2). A temporary well was sampled at the former UST 202D location in June 2011; benzene (1.61 µg/L) and 2-methylnaphthalene (109 to 233 µg/L) were detected at concentrations greater than NJDEP Ground Water Quality Criteria (GWQC). NJDEP subsequently required a groundwater investigation for UST 202D (Reference 13). One temporary well and two existing permanent wells were sampled in May and August 2016 (Reference 10). NJDEP then recommended installation of a permanent well to assess UST 202D with low-flow sampling and analysis for VOCs and SVOCs (Reference 22).

To address this data need, one permanent monitoring well and at least three temporary wells will be installed at the former UST 202D tank location, as shown on Figure 3. Recent temporary well results (Reference 10) suggest that fuel oil constituents have not migrated more than approximately 50 ft downgradient of the former tank location (Figure 3). Therefore, two additional downgradient temporary wells and one field screening boring will be installed for verification at offset locations approximately 50 feet downgradient of the former tank location to verify that the plume was not missed. A third temporary well will be installed at the former UST 202A location as described in Section 2.0 above. These temporary wells will be installed within a Geoprobe boring and will typically be completed with a 5-foot well screen to approximately 4 ft below the water table (estimated to be 2 ft bgs). Samples will be collected from the temporary wells for VOCs and SVOCs analyses, in accordance with the requirements for No. 2 fuel oil in Table 2-1 of NJAC 7:26E. Additional temporary wells may be installed as needed based on the groundwater sampling described above.

It is anticipated that existing well M16MW02 will be utilized as a downgradient sentry monitor well for the UST 202D site. New well 202MW02 will be developed. Both new well 202MW02 and existing well M16MW02 will be sampled using low-flow methods; the samples will be analyzed for VOCs and SVOCs in accordance with the requirements for No. 2 fuel oil in Table 2-1 of NJAC 7:26E.

Water level measurements will be collected from monitoring wells 202MW01, 202MW02, M16MW01, and M16MW02 (Figure 3) to determine the local groundwater flow direction. It is anticipated that a remedial investigation report will be prepared for UST 202D.

4. UST 211

UST 211 was a fiberglass 2000-gallon No. 2 fuel oil UST that was removed in November 2001. As presented in Attachment F.1 of Reference 8, one closure soil sample contained 3,968 mg/kg Total Petroleum Hydrocarbons (TPH). A temporary well was sampled at the former UST 211 location in August 2016; multiple analytes were detected at concentrations greater than the GWQCs including 1,2,4-trimethylbenzene (543 J µg/L), benzene (2.8 µg/L), naphthalene (1,450 µg/L), 2-methylnaphthalene (6,680 µg/L), total VOC Tentatively Identified Compounds (TICs; 1,302 µg/L) and total SVOC TICs (14,322 µg/L) (Attachment D of Reference 8). NJDEP stated that additional remedial efforts were required for this site (Reference 19). Additional data are needed to delineate groundwater contamination at UST 211.

To address this data need, multiple field screening borings, temporary monitoring wells and permanent monitoring wells will be installed near the former UST 211 tank location, as shown on Figure 4. Field screening Geoprobe borings SCREEN1 through SCREEN6 (Figure 4) will be advanced at locations around the former UST 211 location to provide field verification of the groundwater flow direction, which is assumed to be towards the north-northwest based on regional groundwater maps (Attachment A). These borings will be advanced past the water table, which is assumed to be approximately 12 ft bgs based on previous drilling at PAR-72-211-TMW-01. The field screening borings will be logged visually and with a PID, which has proven useful for identifying fuel oil contamination at FTMM. The field results will be used to validate the locations for subsequent temporary wells to assist with delineating the groundwater plume.

A total of four additional temporary monitor wells are proposed at UST 211. A line of three temporary monitor wells (TMW-02 through TMW-04) will be installed along Russel Avenue (approximately 60 ft downgradient of the tank) to verify the direction and lateral boundaries of the plume. A fourth temporary monitor well (TMW-05) will be installed further downgradient to establish the downgradient extent of the plume prior to installing a downgradient permanent sentry well. As with the field screening borings, the borings for temporary wells will be logged visually and with a PID to estimate the extent of the plume in the field. Additional field screening borings (like SCREEN7 on Figure 4) may be used to determine the downgradient extent of the plume. The temporary wells will be installed within Geoprobe borings and will typically be completed with a 5-foot well screen to approximately 4 ft below the water table (estimated at approximately 12 ft bgs). Samples will be collected from each temporary well and analyzed for VOCs and SVOCs in accordance with the requirements for No. 2 fuel oil in Table 2-1 of NJAC 7:26E.

Based on the analytical results of the temporary well samples, three permanent monitoring wells will be installed for groundwater monitoring: one at the source area (MW-01); one within the plume (MW-02); and one downgradient sentry location (MW-03). The new wells will be developed and sampled using low-flow methods, and the groundwater samples will be analyzed for VOCs and SVOCs, in accordance with the requirements for No. 2 fuel oil in Table 2-1 of NJAC 7:26E.

Water level measurements will be collected from the three new monitoring wells, and from nearby wells 200MW01 (located south of Building 216; see Attachment A), 200MW06 (located north of Building 228; Figure 5), and B5MW05B (located southeast of Building 261), to determine the local groundwater flow direction. It is anticipated that a remedial investigation report will be prepared for UST 211.

5. UST 228B

UST 228B is a steel 1,000-gallon No. 2 fuel oil UST that was partially uncovered in December 2010, and then re-buried and left in place. Therefore, UST 228B has not been administratively closed. The Army has conducted soil sampling along the tank to determine if a release has occurred at UST 228B, and the results were described in Attachment G.4 of Reference 8. One soil sample from the 7 to 7.5 foot interval of boring PAR-72-228-SB-03 had a 2-methylnaphthalene concentration of 23.9 mg/kg which exceeded the NJDEP Impact to Ground Water (IGW) screening level, but not the Residential Direct Contact Soil Remediation Standard (RDCSRS). Synthetic Precipitation Leachate Procedure (SPLP) analysis for 2-methylnaphthalene was not performed (as prescribed by NJDEP guidance) on this soil sample due to exceedance of holding times. However, a temporary well located about 10 ft downgradient of boring PAR-72-228-SB-03 was sampled and 2-methylnaphthalene was notably absent in this sample. NJDEP agreed that additional remedial efforts were required (Reference 19). Further evaluation of the soil boring log for PAR-72-228-SB-03 indicates that groundwater was encountered at approximately 7 ft bgs, and therefore this sample may have been from the saturated zone and, if so, IGW screening levels would not apply, and there would be no soil exceedances at this site. Additional data, as described below, are needed to assess the potential for unsaturated soil to exceed the SPLP criteria for 2-methylnaphthalene.

To address this data need, one Geoprobe soil boring (SB-04) will be advanced at the location of the previous boring PAR-72-228-SB-03 where the IGW screening level for 2-methylnaphthalene was exceeded (Figure 5). An unsaturated soil sample (from above the water table) will be collected from approximately 7 to 7.5 ft bgs for 2-methylnaphthalene analysis using the SPLP procedure. A letter report will be prepared for UST 228B that reports the results of this additional investigation.

6. UST 444

UST 444 was a steel 1,000-gallon No. 2 fuel oil UST that was removed in January 2010; an unreported quantity of contaminated soil was removed the following month (Attachment U of Reference 2). NJDEP required a groundwater investigation for the UST 444 area (Reference 13). A temporary well was sampled at the former UST 444 location in August 2016; multiple analytes were detected at concentrations greater than the GWQCs, including benzene (1.7 J µg/L), 2-methylnaphthalene (30.6 J µg/L), and total SVOC TICs (1,758 µg/L) (Reference 10). NJDEP commented that further investigation was necessary for this site (Reference 22). Additional data are needed to delineate groundwater contamination at UST 444.

To address this data need, multiple field screening borings, temporary monitoring wells and permanent monitoring wells will be installed around the former UST 444 tank location, as shown on Figure 6. Field screening Geoprobe borings SCREEN1 through SCREEN6 (Figure 6) will be advanced at locations around the former UST 444 location to determine the groundwater flow direction which is assumed to be towards the north based on regional groundwater maps (Attachment A). These borings will be advanced past the water table, which is assumed to be at approximately 6 ft bgs based on previous drilling at PAR-79-MP-TMW-02. The field screening borings will be logged visually and with a PID, which has proven useful for identifying fuel oil contamination at FTMM. The field results will be used to verify the field locations for subsequent temporary wells to assist with delineating the groundwater plume.

A total of three additional temporary monitor wells are proposed at UST 444. A line of two additional temporary monitor wells (TMW-01 and TMW-02) will be installed approximately 100 ft downgradient of the tank to verify the direction and lateral boundaries of the plume. Results from a temporary well (PAR-79-MP-TMW03) installed in August 2016 for another former UST investigation will be used to complete this line of temporary wells (there were no exceedances of GWQC in this well). A third temporary monitor well (TMW-03) will be installed approximately 100 feet farther downgradient to establish the downgradient extent of the plume prior to installing a permanent downgradient sentry well. As with the field screening borings, the borings for temporary wells will be logged visually and with a PID to estimate the extent of the plume in the field. Additional field screening borings may be used to determine the downgradient extent of the plume. The temporary wells will be installed within Geoprobe borings and will be completed with a 5-foot well screen to approximately 4 feet below the water table (estimated at approximately 6 ft bgs). Each temporary well will be sampled and the groundwater samples will be analyzed for VOCs and SVOCs, in accordance with the requirements for No. 2 fuel oil in Table 2-1 of NJAC 7:26E.

Three new permanent monitoring wells will be installed for groundwater monitoring at the source area (MW-01), within the plume (MW-02), and at a downgradient sentry location (MW-03). These wells will be installed after the analytical data for the temporary wells have been evaluated; therefore the actual locations may be adjusted from those shown on Figure 6 based on these data. The new wells will be developed and sampled using low-flow methods, and the groundwater samples will be analyzed for VOCs and SVOCs, in accordance with the requirements for No. 2 fuel oil in Table 2-1 of NJAC 7:26E.

Water level measurements will be collected from the three new monitoring wells and from nearby well 430MW-1 (Figure 6) to determine the local groundwater flow direction. It is anticipated that a remedial investigation report will be prepared for UST 444.

7. UST 490

UST 490 was a steel 1,000-gallon No. 2 fuel oil UST that was removed in May 1990 (Attachment CC of Reference 2). NJDEP subsequently required additional characterization of groundwater contamination for the UST 490 area (Reference 13). Multiple rounds of Geoprobe soil sampling performed from 2005 through 2016 verified the presence of petroleum contaminated soils near the former UST location. Groundwater was sampled in August 2016 from a temporary well (PAR-79-490-TMW-03) located downgradient of the former UST location and just south of Building 490; 2-methylnaphthalene (63.5 µg/L) and total SVOC TICs (1,323 µg/L) were detected at concentrations greater than the GWQCs (Reference 10). NJDEP commented that additional groundwater investigations must also include analyses for PAHs (Reference 22). As described below, additional data are needed to estimate the nature and extent of groundwater contamination at UST 490.

Previous sampling results have been used to select additional field screening borings, temporary monitoring wells and permanent monitoring wells which will be installed downgradient of the former UST 490 location (Figure 7). Field screening Geoprobe borings will be advanced at two locations (SCREEN1 and SCREEN2; Figure 7) south of Building 490 to determine the groundwater flow direction which is assumed to be towards the southeast based on regional groundwater maps (Attachment A). The field screening borings will be advanced past the water table, which is assumed to be at approximately 3 ft bgs based on previous drilling at PAR-79-490-TMW-03. The field

screening borings will be logged visually and with a PID, which has proven useful for identifying fuel oil contamination at FTMM. The field results will be used to select the field locations of temporary wells to be installed to delineate the groundwater plume.

A total of four additional temporary monitor wells are proposed at UST 490. Two temporary monitor wells (TMW-04 and TMW-05) will be installed approximately 50 ft from the previous PAR-79-490-TMW-03 location to locate the lateral (cross-gradient) boundaries of the plume. Two temporary monitor wells (TMW-06 and TMW-07) will be installed approximately 70 and 120 ft farther downgradient from Building 490 to establish the downgradient extent of the plume, prior to installing a permanent downgradient sentry well. As with the field screening borings, the borings for temporary wells will be logged visually and with a PID to estimate the extent of the plume in the field. Additional field screening borings may be used to determine the downgradient extent of the plume. The temporary wells will be installed within Geoprobe borings and will typically be completed with a 5-ft well screen to approximately 4 ft below the water table (estimated at approximately 3 ft bgs). Samples will be collected from each temporary well for VOC and SVOC analyses, in accordance with the requirements for No. 2 fuel oil in Table 2-1 of NJAC 7:26E.

Existing well 490MW01 will be maintained as a source area well at the former UST 490 location. Two new permanent monitoring wells will be installed for groundwater monitoring within the plume (MW-02) and at a downgradient sentry location (MW-03). These wells will be installed after the analytical data for the temporary wells have been evaluated; therefore the actual locations may be adjusted from those shown on Figure 7. The two new wells will be developed. These two new wells and existing well 490MW01 will be sampled using low-flow methods and the groundwater samples will be analyzed for VOCs and SVOCs, in accordance with the requirements for No. 2 fuel oil in Table 2-1 of NJAC 7:26E.

Water level measurements will be collected from the three new monitoring wells, from the new well at former UST 142B (Figure 2), and from existing well M16MW01 (Figure 3) to determine the local groundwater flow direction. It is anticipated that a remedial investigation report will be prepared for UST 490.

8. UST 750J

UST 750J was a steel 1,000-gallon heating oil UST that was removed in August 2009, along with approximately 24 cubic yards of contaminated soil (Attachment M of Reference 6). NJDEP commented that a groundwater investigation was warranted (Reference 21).

One temporary monitoring well (TMW-01) will be installed at the former UST 750J tank location (Figure 8). The well will be installed within a Geoprobe boring and will be completed with a 5 foot well screen to approximately 4 ft below the water table (approximately 6.5 ft bgs). A sample from this well will be analyzed for VOCs and SVOCs, in accordance with the requirements for No. 2 fuel oil in Table 2-1 of NJAC 7:26E. A letter report will be prepared for UST 750J that either requests a NFA determination or recommends additional investigation or action.

9. UST 800-12

UST 800-12 was a steel 1,000-gallon No. 2 fuel oil UST located in the parking lot of the former First Atlantic Credit Union (Building 1006). This UST was removed in May 2003 along with

approximately 18 cubic yards of contaminated soil (Attachment J of Reference 3). NJDEP commented that a groundwater investigation for the UST 800-12 area was necessary (Reference 15). Temporary well ARE-800-TMW-07 was installed and sampled at the former UST 800-12 location in August 2016; 2-methylnaphthalene (148 µg/L) and total SVOC TICs (510 µg/L) were detected at concentrations greater than the GWQCs (Reference 9). Based on these groundwater results, NJDEP (Reference 20) commented that further groundwater investigation was necessary. Further delineation of groundwater contamination at UST 800-12 will be performed as described below.

Multiple field screening borings, temporary monitoring wells and permanent monitoring wells will be installed around the former UST 800-12 tank location (Figure 9). Field screening Geoprobe borings SCREEN1 through SCREEN6 (Figure 9) will be advanced at locations around the former UST 800-12 location to determine the local groundwater flow direction, which is assumed to be towards the north-northwest based on regional groundwater maps (Attachment A). These borings will be advanced past the water table, which is assumed to be approximately 8.5 ft bgs based on previous drilling at ARE-800-TMW-07 (Reference 9). The field screening borings will be logged visually and the soils will be monitored with a PID which has proven useful for identifying fuel oil contamination at FTMM. The field results will be used to select the field locations for temporary wells to assist with delineating the groundwater plume.

A total of four temporary monitor wells are proposed at UST 800-12. A line of three temporary monitor wells (TMW-01 through TMW-03) will be installed approximately 80 ft downgradient of the location of the former tank to determine the direction and lateral boundaries of the plume. A fourth temporary monitor well (TMW-04) will be installed approximately 80 ft farther downgradient to establish the downgradient extent of the plume; this temporary well will be installed and sampled prior to installing a permanent downgradient sentry well. As with the field screening borings, the borings for temporary wells will be logged visually and with a PID to estimate the extent of the plume in the field. Additional field screening borings may be used to determine the downgradient extent of the plume. The temporary wells will be installed within Geoprobe borings and will typically be completed with a 5 foot well screen to approximately 4 ft below the water table (approximately 8.5 ft bgs). Each temporary well will be sampled and the groundwater samples will be analyzed for VOCs and SVOCs, in accordance with the requirements for No. 2 fuel oil in Table 2-1 of NJAC 7:26E.

Three new permanent monitoring wells will be installed to monitor groundwater at the source area (MW-01), within the plume (MW-02), and at a downgradient sentry location (MW-03). These wells will be installed after the analytical data for the temporary wells have been evaluated; the actual locations may be adjusted from those shown on Figure 9 based on these data. The new permanent wells will be developed and sampled using low-flow methods. The groundwater samples will be analyzed for VOCs and SVOCs, in accordance with the requirements for No. 2 fuel oil in Table 2-1 of NJAC 7:26E.

Water level measurements will be collected from the three new monitoring wells and from nearby existing wells 812MW05 and 812MW13 (Figure 2 of Attachment A) to determine the local groundwater flow direction. It is anticipated that a remedial investigation report will be prepared for UST 800-12.

10. UST 800-20

UST 800-20 was a steel 1,000-gallon No. 2 fuel oil UST that was removed in July 2003 along with approximately 80 cubic yards of contaminated soil (Attachment O of Reference 3). NJDEP commented that a groundwater investigation for the UST 800-20 area was necessary (Reference 15). A temporary well was sampled at the former UST 800-20 location in August 2016; 1,1,2-trichloroethane (5.5 µg/L), 2-methylnaphthalene (41 µg/L) and total SVOC TICs (724 µg/L) were detected at concentrations greater than the GWQCs (Reference 9). Based on these groundwater results, NJDEP commented that additional groundwater investigation was necessary for this site (Reference 20). Further delineation of groundwater contamination at UST 800-20 will be performed as described below.

Multiple field screening borings, temporary monitoring wells and permanent monitoring wells will be installed around the former UST 800-20 tank location (Figure 10). Field screening Geoprobe borings SCREEN1 through SCREEN6 (Figure 10) will be advanced at locations around the former UST 800-20 location to determine the local groundwater flow direction, which is assumed to be towards the north-northwest based on regional groundwater maps (Attachment A). These borings will be advanced past the water table which is assumed to be at approximately 7 ft bgs based on previous drilling at ARE-800-TMW-08 (Reference 9). The field screening borings will be logged visually and with a PID which has proven useful for identifying fuel oil contamination at FTMM. The field results will be used to select the locations for temporary wells to assist with delineating the groundwater plume.

A total of four additional temporary monitor wells are proposed at former UST 800-20. A line of three temporary monitor wells (TMW-01 through TMW-03) will be installed approximately 60 ft downgradient of the former tank to verify the direction and lateral boundaries of the plume. A fourth temporary monitor well (TMW-04) will be installed approximately 80 ft farther downgradient to establish the downgradient extent of the plume, prior to installing a downgradient permanent sentry well. As with the field screening borings, the borings for temporary wells will be logged visually and with a PID to estimate the extent of the plume in the field. Additional field screening borings may be used to determine the downgradient extent of the plume. The temporary wells will be installed within Geoprobe borings and will typically be completed with a 5 foot well screen approximately 4 ft below the water table (approximately 7 ft bgs). Samples from each temporary well will be analyzed for VOCs and SVOCs, in accordance with the requirements for No. 2 fuel oil in Table 2-1 of NJAC 7:26E.

Three new permanent monitoring wells will be installed to monitor groundwater at the source area (MW-01), within the plume (MW-02), and at a downgradient sentry location (MW-03). These wells will be installed after the analytical data for the temporary wells have been evaluated; the actual locations may be adjusted from those shown on Figure 10 based on these data. The new wells will be developed and sampled using low-flow methods. The groundwater samples will be analyzed for VOCs and SVOCs, in accordance with the requirements for No. 2 fuel oil in Table 2-1 of NJAC 7:26E.

Water level measurements will be collected from the three new monitoring wells, and from nearby existing wells 812MW05 and 812MW13 (Figure 2 of Attachment A), to determine the local

groundwater flow direction. It is anticipated that a remedial investigation report will be prepared for UST 800-20.

11. UST 884

UST 884 was a steel 1,000-gallon No. 2 fuel oil UST that was removed in October 2003 along with an unspecified amount of contaminated soil (Attachment U of the Reference 3). NJDEP commented that a groundwater investigation was necessary for the UST 884 area (Reference 15). A temporary well was sampled at the former UST 884 location in April 2016; 2-methylnaphthalene (150 µg/L) and total VOC TICs (981 µg/L) were detected at concentrations greater than the GWQCs (Reference 9). Based on these groundwater results, NJDEP commented additional groundwater investigation was necessary (Reference 20). Further delineation of groundwater contamination at UST 884 will be performed as described below.

Multiple field screening borings, temporary monitoring wells and permanent monitoring wells will be installed around the former UST 884 tank location (Figure 11). Field screening Geoprobe borings SCREEN1 through SCREEN6 (Figure 11) will be advanced at locations around the former UST 884 location to determine the local groundwater flow direction, which is assumed to be towards the northwest based on regional groundwater maps (Attachment A). These borings will be advanced past the water table, which is assumed to be at approximately 6 ft bgs based on previous drilling at ARE-800-TMW-05 (Reference 9). The field screening borings will be logged visually and with a PID which has proven useful for identifying fuel oil contamination at FTMM. The field results will be used to select the locations for temporary wells to assist with delineating the groundwater plume.

A total of four additional temporary monitor wells are proposed at UST 884. A line of three temporary monitor wells (TMW-01 through TMW-03) will be installed approximately 60 ft downgradient of the tank to verify the direction and lateral boundaries of the plume. A fourth temporary monitor well (TMW-04) will be installed approximately 60 ft farther downgradient to establish the downgradient extent of the plume, prior to installing a downgradient permanent sentry well. As with the field screening borings, the borings for temporary wells will be logged visually and with a PID to estimate the extent of the plume in the field. Additional field screening borings may be used to determine the downgradient extent of the plume. The temporary wells will be installed within Geoprobe borings and will typically be completed with a 5-foot well screen to approximately 4 ft below the water table (approximately 6 ft bgs). Samples will be collected from each temporary well and analyzed for VOCs and SVOCs in accordance with the requirements for No. 2 fuel oil in Table 2-1 of NJAC 7:26E.

Three new permanent monitoring wells will be installed to monitor groundwater at the source area (MW-01), within the plume (MW-02), and at a downgradient sentry location (MW-03). These wells will be installed after the analytical data for the temporary wells have been evaluated; based on these data, the actual locations may be adjusted from those shown on Figure 11. The new wells will be developed, and sampled using low-flow methods. The samples will be analyzed for VOCs and SVOCs, in accordance with the requirements for No. 2 fuel oil in Table 2-1 of NJAC 7:26E.

Water level measurements will be collected from the three new monitoring wells and from nearby existing wells 800MW01 and 800MW02 (located west and north of Building 800), to determine the

local groundwater flow direction. It is anticipated that a remedial investigation report will be prepared for UST 884.

12. UST 906A

UST 906A was a steel 1,000-gallon No. 2 fuel oil UST that was removed in June 1990 (Attachment D of Reference 1). NJDEP did not approve the Army's NFA request for UST 906A due to elevated TPH levels in soil and 2-methylnaphthalene in groundwater at a concentration greater than the GWQC (Reference 14). The Army subsequently prepared a Work Plan for the UST 906A area (Reference 4), which was approved by NJDEP (Reference 16).

Field work at the UST 906A site was performed in April, May, and August 2016 and consisted of Geoprobe soil sampling near the former tank area and temporary well sampling from within and downgradient of the former UST 906A tank area. Soil sample results are presented in Table 2 and Figure 12, and as indicated, Extractable Petroleum Hydrocarbons (EPH) concentrations were greater than the NJDEP cleanup criteria of 5,100 mg/kg are present near the former tank area. The soil EPH exceedance has not been delineated in the northwest direction from the former tank site. One soil sample from boring PAR-68-SB-04 (Figure 12) was also analyzed for SVOCs and 2-methylnaphthalene in this sample (35 mg/kg) exceeded the NJDEP IGW screening level.

Groundwater analyses are presented in Table 3 and Figure 13. The groundwater sample at PAR-68-TMW-01 from the former UST 906A source area exceeded the GWQC for 1,2,2-trichloroethane (present at 4.6 µg/L) and total SVOC TICs (present at 2,719 µg/L). The groundwater sample further downgradient at PAR-68-TMW-02 exceeded the GWQC for 1,2,4-trimethylbenzene (102 µg/L), 2-methylnaphthalene (386 µg/L) and total SVOC TICs (2,319 µg/L). Based on these groundwater results, it is apparent that a groundwater plume associated with UST 906A has migrated in the north-northwest direction below Building 906 and farther downgradient an unknown distance. Therefore, additional data, as described below, are needed to delineate groundwater contamination at former UST 906A.

Multiple soil borings, temporary monitoring wells and permanent monitoring wells will be installed around the former UST 906A tank location, as shown on Figures 12 and 13. Field screening Geoprobe borings (locations PAR-68-TMW-2-1 through TMW-2-4 shown on Figure 13) were previously used in April 2016 to verify the north-northwest direction of plume migration; therefore, additional field screening borings are not proposed for the future work.

One additional soil boring (SB-07 on Figure 12) will be advanced to the northwest of the former UST 906A excavation for collection of soil samples to delineate the EPH exceedances in this direction. Three soil samples will be collected from this boring to characterize the soil with depth: one from above, one from within, and one from below the most contaminated soil interval within the boring. The soil samples will be analyzed for EPH and the sample with the highest field indications of contamination will be analyzed for the SVOCs 2-methylnaphthalene and naphthalene, in accordance with the requirements for No. 2 fuel oil in Table 2-1 of NJAC 7:26E.

A total of three temporary monitoring wells will be installed. A line of two temporary monitoring wells (TMW-03 and TMW-04 on Figure 13) will be installed approximately 100 ft downgradient of the tank to verify the lateral boundaries of the plume. The previous temporary well PAR-68-TMW-02 established the plume migration direction. An additional temporary monitoring well (TMW-05)

will be installed approximately 70 ft further downgradient to verify the downgradient extent of the plume, prior to installing a permanent downgradient sentry well. The borings for temporary wells will be logged visually and with a PID to estimate the extent of the plume in the field. Additional field screening borings may be used to determine the downgradient extent of the plume. The temporary wells will be installed within Geoprobe borings and will typically be completed with a 5 foot well screen to approximately 4 ft below the water table (approximately 5 ft bgs). Groundwater samples will be collected from each temporary well and will be analyzed for VOCs and SVOCs, in accordance with the requirements for No. 2 fuel oil in Table 2-1 of NJAC 7:26E.

Three new permanent monitoring wells will be installed to monitor groundwater at: the source area (MW-01, same location as new soil boring SB-07); within the plume (MW-02, same location as previous temporary well PAR-68-TMW-02); and at a downgradient sentry location (MW-03). These wells will be installed after the analytical data from the new temporary wells have been evaluated; the actual locations may be adjusted from those shown on Figure 13 based on these data. The new wells will be developed and sampled using low-flow methods and the groundwater samples will be analyzed for VOCs and SVOCs, in accordance with the requirements for No. 2 fuel oil in Table 2-1 of NJAC 7:26E.

Water level measurements will be collected from the three new monitoring wells and from nearby existing well M12MW14 (Figure 13) to determine the local groundwater flow direction. It is anticipated that a remedial investigation report will be prepared for UST 906A.

13. UST 3035

UST 3035 was a steel 5,000-gallon No. 2 fuel oil UST that was removed in 1989. The location of former UST 3035 is not well documented and has been estimated based on the location of the former boiler room at Building 3035 (Figure 14).

As described in Reference 5, closure soil samples were not collected when former UST 3035 was removed. The SI Report Addendum was submitted to NJDEP along with a request for a NFA determination NJDEP was unable to approve the NFA request without analytical data (Reference 17) and the Army proposed additional sampling (Reference 7) which was approved by NJDEP (Reference 18) and is the basis of the work described below.

Soil samples will be collected from three borings (SB-01, SB-02, and SB-03) (Figure 14) to support a future NFA request. Two soil samples will be collected from each boring. At each boring, a sample will be collected from approximately 8.0-8.5 ft bgs (or another interval representative of the soil below the removed tank) and from a 6-inch interval just above the water table (approximately 2 ft bgs). One of these two soil samples will be collected from the most contaminated interval encountered based on field evidence (visual, olfactory, or PID screening). If there is no field evidence of petroleum contamination, then the two soil samples will be collected from 8.0-8.5 ft bgs and from just above the water table (approximately 3 ft bgs). Each soil sample will be analyzed for total EPH with additional contingency SVOCs analyses (25 percent) for naphthalene and 2-methylnaphthalene if EPH concentrations exceed 1,000 mg/kg. These soil analyses are consistent with the requirements for No. 2 fuel oil in Table 2-1 of NJAC 7:26E. A letter report will be prepared for UST 3035 that reports the results of this investigation.

14. SUMMARY

We look forward to your review of this Work Plan and approval or comments. 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) 380-7064 or by email at william.r.colvin18.civ@mail.mil.

Sincerely,

William R. Colvin, PMP, PG, CHMM
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)
Cris Grill, Parsons (e-mail)

REFERENCES CITED:

1. Department of the Army. 2015. *Underground Storage Tanks Within Parcel 68, Fort Monmouth, New Jersey*. Prepared by the Office of Assistant Chief of Staff for Installation Management, U.S. Army Fort Monmouth. April 14.
2. Department of the Army. 2015. *Underground Storage Tanks Within ECP Parcel 79, Fort Monmouth, New Jersey*. Prepared by the Office of Assistant Chief of Staff for Installation Management, U.S. Army Fort Monmouth. April 22.
3. Department of the Army. 2015. *No Further Action Request, Site Investigation Report Addendum for the 800 Area Including, ECP Parcels 55 and 56, Fort Monmouth, New Jersey*. Prepared by the Office of Assistant Chief of Staff for Installation Management, U.S. Army Fort Monmouth. June 12.
4. Department of the Army. 2016. *Parcel 68 Work Plan Addendum for a Former UST Site, Fort Monmouth, Oceanport, Monmouth County, New Jersey*. Prepared by the Office of Assistant Chief of Staff for Installation Management, U.S. Army Fort Monmouth. March 2.
5. Department of the Army. 2016. *No Further Action Request, Site Investigation Report Addendum for the Howard Commons Underground Storage Tanks, Fort Monmouth, New Jersey*. Prepared by the Office of Assistant Chief of Staff for Installation Management, U.S. Army Fort Monmouth. April 26.
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7. Department of the Army. 2016. *Clarification of Underground Storage Tanks at Howard Commons, Fort Monmouth, New Jersey*. Prepared by the Office of Assistant Chief of Staff for Installation Management, U.S. Army Fort Monmouth. December 6.
8. Department of the Army. 2016. *No Further Action Request, Site Investigation Report Addendum, ECP Parcel 72 Underground Storage Tanks, Fort Monmouth, New Jersey*. Prepared by the Office of Assistant Chief of Staff for Installation Management, U.S. Army Fort Monmouth. December 13.
9. Department of the Army. 2017. *Request for No Further Action at Multiple 800 Area Underground Storage Tanks, Site Investigation Report Addendum, Fort Monmouth, New Jersey*. Prepared by the Office of Assistant Chief of Staff for Installation Management, U.S. Army Fort Monmouth. January 23.
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11. New Jersey Department of Environmental Protection (NJDEP). 2007. Letter to the Army, RE: *Underground Storage Tank Closure & Remedial Investigation Reports, 800 Area UST No. 9, 800 Area UST No. 12, Fort Monmouth, NJ.* December 31.

12. New Jersey Department of Environmental Protection (NJDEP). 2010. *Protocol for Addressing Extractable Petroleum Hydrocarbons.* Site Remediation Program. Version 5.0. August 9.

13. New Jersey Department of Environmental Protection (NJDEP). 2015. Letter to the Army, RE: *Underground Storage Tanks Within ECP Parcel 79 dated April 2015, Fort Monmouth, Oceanport, Monmouth County.* August 25.

14. New Jersey Department of Environmental Protection (NJDEP). 2015. Letter to the Army, RE: *Underground Storage Tanks Within ECP Parcel 68, 74, and 77 dated April 2015, Fort Monmouth, Oceanport, Monmouth County.* September 24.

15. New Jersey Department of Environmental Protection (NJDEP). 2015. Letter to the Army, RE: *Site Investigation Report Addendum for the 800 Area Including ECP Parcels 55 & 56, Fort Monmouth, Oceanport, Monmouth County.* November 10.

16. New Jersey Department of Environmental Protection (NJDEP). 2016. Letter to the Army, RE: *Parcel 68 Work Plan Addendum and Response to NJDEP's September 24, 2015 Comments on the April 2015 Underground Storage Tanks Within ECP Parcels 68, 74 and 77, Fort Monmouth, New Jersey & Parcel 68 Work Plan Addendum for a Former UST Site (March 2016).* March 29.

17. New Jersey Department of Environmental Protection (NJDEP). 2016. Letter to the Army, RE: *No Further Action Request Site Investigation Report Addendum for the Howard Commons Underground Storage Tanks dated April 2016, Fort Monmouth, Oceanport, Monmouth County.* November 28.

18. New Jersey Department of Environmental Protection (NJDEP). 2016. Letter to the Army, RE: *Clarification of Underground Storage Tanks at Howard Commons dated December 6, 2016, Fort Monmouth, Oceanport, Monmouth County.* December 20.

19. New Jersey Department of Environmental Protection (NJDEP). 2017. Letter to the Army, RE: *No Further Action Request Site Investigation Report Addendum ECP Parcel 72 Underground Storage Tanks dated December 13, 2016, Fort Monmouth, Oceanport, Monmouth County.* February 7.

20. New Jersey Department of Environmental Protection (NJDEP). 2017. Letter to the Army, RE: *Request for No Further Action at Multiple 800 Area Underground Storage Tanks, Site Investigation Report Addendum, Fort Monmouth, Oceanport, Monmouth County.* March 16.

21. New Jersey Department of Environmental Protection (NJDEP). 2017. Letter to the Army, RE: *No Further Action Request Site Investigation Report Addendum for the Building 750 Motor Pool Area Including Underground Storage Tanks, Fort Monmouth, Oceanport, Monmouth County.* April 4.

22. New Jersey Department of Environmental Protection (NJDEP). 2017. Letter to the Army, RE: *Request for No Further Action at Multiple Parcel 79 Storage Tanks Site Investigation Report Addendum, Fort Monmouth, Oceanport, Monmouth County.* May 8.

23. Parsons. 2013. *Final Sampling and Analysis Plan, Remedial Investigation/Feasibility Study/Decision Documents, Fort Monmouth, Oceanport, Monmouth County, New Jersey.* Prepared for the U.S. Army Engineering and Support Center, Huntsville, AL. Revision 0. March.

24. Parsons. 2015. *Final Environmental Condition of Property Supplemental Phase II Site Investigation Work Plan for Parcels 28, 38, 39, 49, 57, 61 and 69.* Prepared for the U.S. Army Engineering and Support Center, Huntsville, AL. Revision 1. August.

25. Parsons. 2016. *Final Accident Prevention Plan, Remedial Investigation/Feasibility Study/Decision Documents, Fort Monmouth, Oceanport, Monmouth County, New Jersey.* Prepared for the U.S. Army Engineering and Support Center, Huntsville, AL. Revision 1. November.

State of New Jersey

CHRIS CHRISTIE
Governor

KIM GUADAGNO
Lt. Governor

DEPARTMENT OF ENVIRONMENTAL PROTECTION
Bureau of Case Management
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BOB MARTIN
Commissioner

February 7, 2017

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

Re: *No Further Action Request Site Investigation Report Addendum ECP Parcel 72 Underground Storage Tanks* dated December 13, 2016
Fort Monmouth
Oceanport, Monmouth County
PI G000000032

Dear Mr. Colvin,

The New Jersey Department of Environmental Protection (Department) has completed review of the referenced report, received December 15, 2016, prepared by the Department of the Army's Office of Assistant Chief of Staff for Installation Management to provide information sufficient to request No Further Action (NFA) determination for all USTs identified as formerly located within Parcel 72. As indicated in the submittal, two USTs require additional efforts to attain NFA. This office agrees with the proposed designation of each UST; comments are as follows:

USTs Requiring No Additional Action

Following review of the referenced information, it is agreed no further action is necessary for the following former fiberglass (unless otherwise stated) USTs removed from within Parcel 72, as referenced in the above submittal:

USTs along Russel Avenue

- UST 212 aka 212-10 – Registration #81533-10 – removed March 29, 2001
- UST 213 aka 213-11 – Registration #81533-11 – removed April 30, 2001
- UST 214 aka 214-12 – Registration #81533-12 – removed June 13, 2001
- UST 219 aka 219-13 – Registration #81533-13 – removed June 19, 2001
- UST 220B aka 220-14 – Registration #81533-14 – removed June 21, 2001
- UST 222 aka 222-15 – Registration #81533-15 – removed June 25, 2001

- UST 223 aka 223-16 – Registration #81533-16 – removed June 29, 2001

USTs along Allen Avenue

- UST 225 aka 225-17 - Registration #81533-17 - removed February 14, 2001
- UST 226 aka 226-18 - Registration #81533-18 - removed April 28, 2000
- UST 227 aka 227-19 - Registration #81533-19 - removed November 7, 2000
- UST 228 aka 228-20 - Registration # 81533-20 - removed November 1, 2000

USTs along Gosselin

- UST 234 aka 234-22 - Registration #81533-22 – removed February 5, 1999
- UST 235 aka 235-23 – Registration #81533-23 – removed January 6, 1999
- UST 236 aka 236-24 – Registration #81533-24 – removed February 5, 1999
- UST 238 aka 238-26 – Registration #81533-26 – removed January 22, 1999
- UST 239 aka 239-27 – Registration #81533-27 -removed January 4, 1999
- UST 240 aka 240-28 – Registration #81533-28 – removed January 22, 1999
- UST 241 aka 241-29 – Registration #85133-29 – removed September 23, 1998
- UST 242 aka 242-30 – Registration #81533-30 – removed October 26, 1998
- UST 243 aka 243-31 – Registration #81533-31 – removed September 28, 1998
- UST 244 aka 244-32 – Registration #81533-32 – removed October 20, 1998 - steel
- UST 245 aka 245-33 – Registration #81533-33 – removed October 6, 1998
- UST 247 aka 247-34 – Registration #81533-34 – removed October 7, 1998
- UST 248 aka 248-35 – Registration #81533-35 – removed October 15, 1998
- UST 249 aka 249-36 – Registration #81533-36 – removed November 12, 1998
- UST 250 aka 250-37 – Registration #81533-37 – removed November 16, 1998
- UST 251 aka 251-38 – Registration #81533-38 – removed November 2, 1998
- UST 252 aka 252-39 - Registration #81533-39 – removed December 9, 1998
- UST 253 aka 253-40 – Registration #81533-40 – removed November 2, 1998
- UST 254 aka 254-41 – Registration #81533-41 – removed November 20, 1998
- UST 255 aka 255-42 – Registration #81533-42 – removed October 28 1998
- UST 256 aka 256-43 – Registration #81533-43 – removed November 20, 1998
- UST 258 aka 258-44 – Registration #81533-44 – removed December 8, 1998

USTs Previously Granted NFA

- UST 233 aka 233-21 – Registration #81533-21 – NFA January 10, 2003
- UST 237 aka 237-25 – Registration #81533-25 - NFA January 10, 2003
- UST 246 – steel – Incident #98-10-20-1459-24 – NFA January 10, 2003

USTs Requiring Additional Remedial Efforts (as indicated on page D-4)

- UST 211 aka 211-9 - ground water contains elevated levels of VOs and SVOCs.

- UST 228B – the unused 1000 gallon steel tank remains in place; soil sampling near the UST noted the presence of 2-methylnaphthalene above the DIGWSSL. Sampling was not performed through the bottom of the UST, therefore, it is possible higher levels may be present directly beneath the UST. It is agreed additional efforts are required.

Please contact this office if you have any questions.

Sincerely,

Linda S. Range

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

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.

Documents:

- "No Further Action Request, Site Investigation Report Addendum, ECP Parcel 72 Underground Storage Tanks, Fort Monmouth, New Jersey" (December 2016)

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: 13 December 2016

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

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

13 December 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

SUBJECT: No Further Action Request
Site Investigation Report Addendum
ECP Parcel 72 Underground Storage Tanks
Fort Monmouth, New Jersey

Attachments:

A. Correspondence
B. Site Layout Drawings of Parcel 72 (Recent and Historical)
C. Summary Table of Parcel 72 Underground Storage Tanks
D. Summary Narrative for Parcel 72 Select Unregulated Heating Oil Tanks (UHOTS) Investigation Results, Fort Monmouth, NJ
   - D.1 Tables: Soil and Groundwater Results
   - D.2 Figures: Sample Locations and Exceedances
   - D.3 Field Notes
   - D.4 Boring Logs
   - D.5 Analytical Data
E. Cross Reference of Residential Building Numbers with Street Addresses
F. Unregulated Heating Oil Tanks Along Russel Avenue
   - F.1 UST 211 File Review and Analyses
   - F.2 UST 212 File Review
   - F.3 UST 213 File Review and Analyses
   - F.4 UST 214 File Review and Analyses
   - F.5 UST 219 File Review and Analyses
   - F.6 UST 220B File Review and Analyses
   - F.7 UST 222 File Review and Analyses
   - F.8 UST 223 File Review and Analyses
G. Unregulated Heating Oil Tanks Along Allen Avenue
   - G.1 UST 225 File Review and Analyses
   - G.2 UST 226 File Review and Analyses
   - G.3 UST 227 File Review and Analyses
   - G.4 UST 228 and File Review and Analyses (includes UST 228B)

H. Unregulated Heating Oil Tanks Along Gosselin Avenue
- H.1 UST 233 File Review and NFA Letter
- H.2 UST 234 File Review and Analyses
- H.3 UST 235 File Review and Analyses
- H.4 UST 236 File Review and Analyses
- H.5 UST 237 File Review and NFA Letter
- H.6 UST 238 File Review and Analyses
- H.7 UST 239 File Review and Analyses
- H.8 UST 240 File Review and Analyses
- H.9 UST 241 File Review and Analyses
- H.10 UST 242 File Review and Analyses
- H.11 UST 243 File Review and Analyses
- H.12 UST 244 File Review and Sketch Map
- H.13 UST 245 File Review and Analyses
- H.14 UST 246 File Review and NFA Letter
- H.15 UST 247 File Review and Analyses
- H.16 UST 248 File Review and Analyses
- H.17 UST 249 File Review and Analyses
- H.18 UST 250 File Review and Analyses
- H.19 UST 251 File Review and Analyses
- H.20 UST 252 File Review and Analyses
- H.21 UST 253 File Review and Analyses
- H.22 UST 254 File Review and Analyses
- H.23 UST 255 File Review and Analyses
- H.24 UST 256 File Review and Analyses
- H.25 UST 258 File Review and Analyses

Previous Correspondence (provided in Attachment A):

1. Army letter to NJDEP dated July 1, 2016, re: *Parcel 72 Select Unregulated Heating Oil Tanks (UHOTs) Work Plan Addendum, Fort Monmouth, New Jersey.*
2. NJDEP letter to the Army dated July 12, 2016, re: *Parcel 72 Select Unregulated Heating Oil Tanks (UHOTs) Work Plan Addendum*.

Dear Ms. Range:

The U.S. Army Fort Monmouth (FTMM) team has reviewed existing file information for underground storage tank (UST) sites associated with existing Officer Housing residential buildings located along Russel Avenue, Allen Avenue, and Gosselin Avenue at Fort Monmouth in New Jersey. These residential buildings are located within Environmental Condition of Property (ECP) Parcel 72. Each of these UST sites were located at residences that formerly stored No. 2 fuel oil for heating in a UST; therefore, they are considered as unregulated heating oil tanks (UHOTs) in accordance with N.J.A.C. 7:14B-1.4(b). The purpose of this submittal is to provide comprehensive documentation of the closure status of all UHOTs identified within this parcel, and to request a No Further Action (NFA) determination for qualifying UHOTs. Previous correspondence regarding select Parcel 72 Officer Housing UHOTs is provided in **Attachment A**.

Parcel 72 is located within the central portion of the Main Post. The Officer Housing area described in this submittal is generally bounded by Parcel 76 to the north and east, Parcel 51 to the west, Parcel

71 (the FTMM-12 and FTMM-14 landfills) to the south, and Parcel 74 to the east. The locations of the UHOTs within the Officer Housing area of Parcel 72 are presented in **Attachment B**, and a summary table of the UHOTs is provided in **Attachment C**. All of the UHOTs identified within Parcel 72 have been removed, except UST 228B which is empty and remains in place.

Five former UHOTs (USTs 211, 212, 220B, 226, and 228B) were previously identified as requiring additional field sampling to satisfy data needs, as described in Correspondence 1 (**Attachment A**). The results of these additional investigations are presented in **Attachment D**, which support an NFA determination for USTs 212, 220B, and 226. These results also indicate additional work would be needed for NFA determinations to be made for UST 211 and UST 228B.

Not all of the Officer Housing buildings along Russel Avenue, Allen Avenue and Gosselin Avenue had an associated fuel oil UST. Specifically, no UHOTs have been found at Buildings 215, 216, 218, 221 or 229 on Russel Avenue, or Building 224 on Allen Avenue, or the Building 230 Generals Quarters. In some cases, two UHOTs that serviced adjoining buildings were removed from the same excavation, and one set of closure soil samples were collected to represent both tanks (for example, UST 237 and UST 239). In general, these UHOTs were removed from 1990 to 2001 as the residential heating systems were converted to natural gas. Typically, the Army's records reflect removal of fiberglass tanks, which may be second generation tanks that replaced earlier steel USTs used for fuel oil storage. At Building 228, both a fiberglass UST (UST 228 which was removed) and a steel UST (UST 228B which remains in place) were documented to be present.

In some cases, UST closure documentation such as field notes and analytical reports may reference the street address of the residence, rather than the building number. Therefore, a table summarizing the building numbers and corresponding street addresses for the Officer Housing area is provided in Attachment E, for cross reference.

We are submitting the following documentation for the multiple UHOTs that were previously removed from the Parcel 72 Officer Housing area, and we request a No Further Action determination for each site unless otherwise explained further below (sites that have been previously approved for NFA by NJDEP are highlighted in green).

Along Russel Avenue (**Attachment F**):

- UST 211 file review summary and earlier (pre-2016) soil analyses are presented in Attachment F.1, and recent groundwater analyses are presented in Attachment D, which indicates an impact to groundwater by fuel oil.
- UST 212 file review summary is presented in Attachment F.2, and recent soil and groundwater analyses are presented in Attachment D.
- UST 213 file review summary and analyses are presented in Attachment F.3.
- UST 214 file review summary and analyses are presented in Attachment F.4.
- UST 219 file review summary and analyses are presented in Attachment F.5.
- UST 220B file review summary and analyses are presented in Attachment F.6, and recent groundwater analyses are presented in Attachment D.
- UST 222 file review summary and analyses are presented in Attachment F.7.
- UST 223 file review summary and analyses are presented in Attachment F.8.

Along Allen Avenue (**Attachment G**):

- UST 225 file review summary and analyses are presented in Attachment G.1.

- UST 226 file review summary and analyses are presented in Attachment G.2, and recent groundwater analyses are presented in Attachment D.
- UST 227 file review summary and analyses are presented in Attachment G.3.
- UST 228 file review summary and analyses are presented in Attachment G.4.
- Recent soil and groundwater analyses for the existing UST 228B steel tank are presented in Attachment D; additional work would be needed for a NFA determination to be made for UST 228B . NJDEP has previously indicated (Correspondence 1 of **Attachment A**) that this tank requires closure in accordance with applicable regulations.

Along Gosselin Avenue (**Attachment H**):

- UST 233 file review summary and analyses are presented in Attachment H.1; NFA was approved by NJDEP on 1/10/2003.
- UST 234 file review summary and analyses are presented in Attachment H.2.
- UST 235 file review summary and analyses are presented in Attachment H.3.
- UST 236 file review summary and analyses are presented in Attachment H.4.
- UST 237 file review summary is presented in Attachment H.5; NFA was approved by NJDEP on 1/10/2003.
- UST 238 file review summary and analyses are presented in Attachment H.6.
- UST 239 file review summary and analyses are presented in Attachment H.7; this tank was removed and sampled from the same excavation as UST 237, which was approved for NFA by NJDEP on 1/10/2003.
- UST 240 file review summary and analyses are presented in Attachment H.8.
- UST 241 file review summary and analyses are presented in Attachment H.9.
- UST 242 file review summary and analyses are presented in Attachment H.10.
- UST 243 file review summary and analyses are presented in Attachment H.11.
- UST 244 file review summary and analyses are presented in Attachment H.12; Building 244 was serviced by the same tank as Building 246, and UST 246 was approved for NFA by NJDEP on 1/10/2003.
- UST 245 file review summary and analyses are presented in Attachment H.13.
- UST 246 file review summary and analyses are presented in Attachment H.14; NFA was approved by NJDEP on 1/10/2003.
- UST 247 file review summary and analyses are presented in Attachment H.15.
- UST 248 file review summary and analyses are presented in Attachment H.16.
- UST 249 file review summary and analyses are presented in Attachment H.17.
- UST 250 file review summary and analyses are presented in Attachment H.18.
- UST 251 file review summary and analyses are presented in Attachment H.19.
- UST 252 file review summary and analyses are presented in Attachment H.20.
- UST 253 file review summary and analyses are presented in Attachment H.21.
- UST 254 file review summary and analyses are presented in Attachment H.22.
- UST 255 file review summary and analyses are presented in Attachment H.23.
- UST 256 file review summary and analyses are presented in Attachment H.24.
- UST 258 file review summary and analyses are presented in Attachment H.25.

This information supports the conclusion that multiple UHOTs identified within Parcel 72 have been adequately addressed by previous environmental activities under the FTMM tank removal and assessment program. In summary, we submit that the Army has provided adequate due diligence with regards to the environmental condition of UHOTS within the Parcel 72 Officer Housing Area, and we request that NJDEP approve No Further Action for Parcel 72 UHOTs with the exception of UST 211 and UST 228B.

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) 380-7064 or by email at william.r.colvin18.civ@mail.mil.

Sincerely,

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

cc: Linda Range, NJDEP (3 hard copies)
Delight Balducci, HQDA ACSIM (CD)
Joseph Pearson, Calibre (CD)
James Moore, USACE (CD)
Jim Kelly, USACE (CD)
Cris Grill, Parsons (CD)

ATTACHMENT D

Parcel 72 Select UHOTs Investigation Results

Contents:

Summary Narrative for Parcel 72 Select Unregulated Heating Oil Tanks (UHOTs) Investigation Results, Fort Monmouth, NJ

Enclosures:

D.1 Figure: Sample Locations and Exceedances for Parcel 72
D.2 Tables: Soil and Groundwater Analytical Results
D.3 Field Notes
D.4 Boring Logs
D.5 Analytical Data

Previous Correspondence (provided in Attachment A):

1. Army letter to NJDEP dated 1 July 2016, re: *Parcel 72 Select Unregulated Heating Oil Tanks (UHOTs) Work Plan Addendum, Fort Monmouth, New Jersey.*
2. NJDEP letter to the Army dated 12 July 2016, re: *Parcel 72 Select Unregulated Heating Oil Tanks (UHOTs) Work Plan Addendum.*

The U.S. Army Fort Monmouth (FTMM) has prepared this report to present the results of additional field sampling and analyses of soil and groundwater performed at five former Underground Storage Tanks (USTs) within Environmental Condition of Property (ECP) Parcel 72: UST 211, UST 212, UST 220B, UST 226, and UST 228B. These USTs were identified as requiring additional data, as described in the Work Plan Addendum (Correspondence 1) which was approved by the New Jersey Department of Environmental Protection (Correspondence 2).

One temporary groundwater monitoring well was installed with a Geoprobe® rig within 10 feet of each of the former USTs. A groundwater sample was collected from each well to determine if a fuel oil release had impacted groundwater. The groundwater samples were analyzed for volatile organic compounds (VOCs) and semivolatile organic compounds (SVOCs) plus tentatively identified compounds (TICs), in accordance with the analytical requirements for a petroleum storage area containing No. 2 fuel oil (Table 2-1 of the New Jersey Administrative Code (NJAC) 7:26E Technical Requirements for Site Remediation). Soil samples were also collected from borings advanced with a Geoprobe® rig at former USTs 212 and 228B to assess concentrations and vertical extent of extractable petroleum hydrocarbons (EPH) in soil. Select soil samples were also analyzed for two SVOCs (naphthalene and 2-methylnaphthalene).

The locations of the field samples are presented in **Enclosure D.1** and a summary of the analytical results and exceedances of applicable NJDEP criteria is provided in **Enclosure D.2**. Field sampling was completed on 9 and 10 August 2016; field notes are provided in **Enclosure D.3** and boring logs are provided in **Enclosure D.4**. The field crew observed that the groundwater level was routinely difficult to determine by observation during drilling at Parcel 72, due to tight soils and potential perched water layers. Therefore groundwater levels were measured within the temporary wells with a water level probe after installation. The samples were analyzed by ALS Environmental; analytical data packages are provided in **Enclosure D.5**.

The results of the sampling and analyses are provided below for each of the five UST sites. The UST numbers correspond to the building numbers shown on Figure 1 (**Enclosure D.1**).

UST 211 at Building 211, 4 and 6 Russel Avenue

UST 211 was a residential fuel oil tank that was removed in 2001 as described in **Attachment F.1**. A single temporary well PAR-72-211-TMW-01 was installed, sampled, and subsequently abandoned at the former location of UST 211 (**Enclosure D.1**). Groundwater was encountered at approximately 11 feet below ground surface (bgs) (see **Enclosure D.3)** and petroleum odor and elevated photoionization detector (PID) readings were encountered at approximately 7 to 13 feet bgs (**Enclosure D.4**). As shown on Table 2 of **Enclosure D.2**, the following VOC and SVOC analytes in groundwater exceeded the NJDEP Ground Water Quality Criteria (GWQC): 1,2,4-trimethylbenzene, benzene, naphthalene, 2-methylnaphthalene, dibenzofuran, fluorene, phenanthrene, and TICs. The results of the groundwater analyses at former UST 211 are consistent with a fuel oil release to groundwater.

UST 212 at Building 212, 8 and 10 Russel Avenue

UST 212 was a residential fuel oil tank that was removed in 2001 as described in **Attachment F.2**. Closure soil samples were also collected and analyzed in 2001, but the analytical data package was missing; therefore, two soil borings were sampled in accordance with New Jersey Department of Environmental Protection (NJDEP) comments on the Work Plan Addendum (Correspondence 2). Soil samples from borings PAR-72-212-SB-01 and PAR-72-212-SB-02 were collected from 5.0 to 5.5 feet bgs and from 11.5 to 12 feet bgs and analyzed for EPH. The maximum detected EPH in these soil samples (see Table 1 of **Enclosure D.2**) was 8.3 J ("J" signifies an estimated detected value) milligrams per kilogram (mg/kg), which is well below the 5,100 mg/kg remediation criterion for No. 2 fuel oil in soil. SVOCs were also analyzed in these soil samples, and all detected analytes (see Table 1 of **Enclosure D.2**) were below the respective Residential Direct Contact Soil Remediation Standard (RDCSRS) and the Impact to Ground Water (IGW) Screening Levels.

A single temporary well PAR-72-212-TMW-01 was installed, sampled, and subsequently abandoned at the former location of UST 212 (**Enclosure D.1**). Groundwater was encountered at approximately 12 feet bgs (**Enclosure D.3**) and there were no unusual odors or elevated PID readings encountered in the boring (**Enclosure D.4**). As shown on Table 2 of **Enclosure D.2**, the three groundwater SVOC analytes benzo(a)anthracene, benzo(a)pyrene, and benzo(b)fluoranthene slightly exceeded the GWQC. However, these detections were estimated ("J" flagged) due to the low concentrations encountered and therefore were considered *de minimis* detections that were too minor to merit additional investigation. These analytes are polycyclic aromatic hydrocarbons (PAHs) that have been encountered at other FTMM locations within surficial soils and fill. Therefore these groundwater exceedances may have resulted from entrainment of soil from other anthropogenic, non-UST related sources (such as surficial soils or fill) resulting from sample turbidity, which is common with temporary well groundwater samples. In addition, there were no detections of naphthalene or 2-methylnaphthalene in this groundwater sample, which would be more indicative of a fuel oil release. Finally, the soil sample results for UST 212 did not exceed IGW Screening Levels, which indicates that the soils do not present a significant potential for groundwater contamination. In summary, the results of the investigation at former UST 212 indicate there has not been a release of fuel oil to soil or groundwater.

UST 220B at Building 220, 32 and 34 Russel Avenue

UST 220B was a residential fuel oil tank that was removed in 2001 as described in **Attachment F.6**. In response to NJDEP's question in Correspondence 2, this tank is the same as UST-220-14 as referenced in the 2007 ECP Report (U.S. Army, 2007). A single temporary well PAR-72-220-TMW-01 was installed, sampled, and subsequently abandoned at the former location of UST 220B (**Enclosure D.1**). Groundwater was encountered at approximately 13.5 feet bgs (see **Enclosure D.3**), and there were no unusual odors or elevated PID readings encountered in the boring (**Enclosure D.4**). As shown on Table 2 of **Enclosure D.2**, the SVOC benzo(a)anthracene slightly exceeded the GWQC. However, this detection was estimated ("J" flagged) due to the low concentrations encountered, and therefore were considered a *de minimis* detection that was too minor to merit additional investigation. This analyte is a PAH that has been encountered at other FTMM locations within surficial soils and fill. Therefore this groundwater exceedance may have resulted from entrainment of soil from other anthropogenic, non-UST related sources (such as surficial soils or fill) resulting from sample turbidity, which is common with temporary well groundwater samples. In addition, naphthalene was not detected and only a very low concentration of 2-methylnaphthalene was detected in this groundwater sample; higher concentrations of these analytes would be expected if a fuel oil release had occurred. In summary, the results of the investigation at former UST 220B indicate there has not been a release of fuel oil to groundwater.

UST 226 at Building 226, 9 and 11 Allen Avenue

UST 226 was a residential fuel oil tank that was removed in 2001 as described in **Attachment G.2**. A single temporary well PAR-72-226-TMW-01 was installed, sampled, and subsequently abandoned at the former location of UST 226 (**Enclosure D.1**). Groundwater was encountered at approximately 13 feet bgs (**Enclosure D.3**), and there were no unusual odors or elevated PID readings encountered in the boring (**Enclosure D.4**). As shown on Table 2 of **Enclosure D.2**, there were no exceedances of the GWQC in this groundwater sample. Therefore the results of the investigation at former UST 220B indicate there has not been a release of fuel oil to groundwater.

UST 228B at Building 228, 1 and 3 Allen Avenue

UST 228B is a steel residential fuel oil tank that was discovered in 2010 but remains in place. In response to NJDEP's question in Correspondence 2, this tank is not the same as UST-228-20 as referenced in the 2007 ECP Report (U.S. Army, 2007). UST 228-20 (registration ID 81533-20) was a fiberglass fuel oil tank removed from the Building 228 area in 2000, as described in **Attachment G.4**. There is no registration ID for the existing steel tank that has been designated as UST 228B. UST 228B is empty based on the 2010 observations. Additional sampling was conducted in August 2016 to determine if a release had occurred from UST 228B.

Three soil borings were sampled in response to NJDEP comments on the Work Plan Addendum (Correspondence 2). Due to safety and logistical concerns, the borings were not advanced through the bottom of the tank, but rather were placed as close to the tank as reasonably possible (approximately 24 inches from the tank). Soil samples were collected from the following borings and sample intervals, and analyzed for EPH:

- Boring PAR-72-228-SB-01 was sampled from 5.0 to 5.5 feet bgs and 8.5 to 9.0 feet bgs;
- Boring PAR-72-228-SB-02 was sampled from 10.5 to 11.0 feet bgs and 12.0 to 12.5 feet bgs; and
- Boring PAR-72-228-SB-03 was sampled from 6.5 to 7.0 feet bgs and 7.0 to 7.5 feet bgs.

Groundwater was encountered at approximately 12 feet bgs (**Enclosure D.3**), and there were elevated PID readings encountered in two of the three borings (**Enclosure D.4**). As shown on Table 1 of **Enclosure D.2**, a Total EPH concentration of 3,100 mg/kg was reported in one soil sample (from the 7 to 7.5 ft bgs interval of boring PAR-72-228-SB-03). As the result of exceeding the contingency analysis threshold of 1,000 mg/kg (NJDEP, 2010), this sample was also analyzed for naphthalene and 2-methylnaphthalene. The 2-methylnaphthalene concentration of 23.9 mg/kg in this sample exceeded the NJDEP IGW screening level, but did not exceed the RDCSRS. Synthetic Precipitation Leachate Procedure (SPLP) analysis of this soil sample was not performed.

A single temporary well (PAR-72-228-TMW-01) was installed in boring PAR-72-228-SB-01, sampled, and subsequently abandoned at the location of UST 228B (**Enclosure D.1**). As shown on Table 2 of **Enclosure D.2**, there were no exceedances of the GWQC in this groundwater sample. Although 2-methylnaphthalene in soil exceeded the IGW Screening Level, 2-methylnaphthalene was notably absent in the temporary well groundwater sample.

The results of the investigation at former UST 228B indicate a release of fuel oil to soil that has not impacted groundwater. To address the 2-methylnaphthalene exceedance of the IGW Screening Level in soil, additional work would be needed which could include removal of the tank to address administrative closure, excavation of contaminated soil, or the performance of SPLP analyses.

In summary, this information supports a No Further Action (NFA) determination for UST 212, UST 220B, and UST 226. Additional work would be needed for NFA determinations to be made for UST 211 and UST 228B.

REFERENCES CITED

NJDEP. 2010. *Protocol for Addressing Extractable Petroleum Hydrocarbons.* Site Remediation Program. Version 5.0. August 9.

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

ATTACHMENT G

Unregulated Heating Oil Tanks Along Allen Avenue

PARSONS

Note: red font indicates a December 2016 update to the earlier 2014 file review

UNDERGROUND STORAGE TANK FILE REVIEW
FORT MONMOUTH BRAC 05 FACILITY
OCEANPORT, NEW JERSEY

Date: *December 10, 2014* Review Performed By: *Kent Friesen, Parsons*

Site ID: ***Bldg. 228*** Registration ID: *81533-20*

Recommended Status of Site: ***Case Closed***

UST Probability (from May 2014 "Addendum 1 ECP UHOT Report"): ***High (confirmed)***

Based on the file review, were there indications of a contaminant release? [ ] Yes [X] No

NJDEP Release No. or DICAR (If applicable): *Not Applicable*

Did NJDEP approve No Further Action (NFA) for this site? [ ] Yes [ ] No [X] Not Applicable

Tank Description: [ ] Steel [X] Fiberglass Size: 2000 gals. Contents: No. 2 Fuel Oil

[X] Residential [ ] Commercial/Industrial

Tank Removed? [X] Yes [ ] No If "yes," removal date: 11/1/2000

Were closure soil samples taken? [X] Yes [ ] No Analyses: TPH

Comparison criteria: 5,100 mg/kg TPH

Were closure soil sample results less than comparison criteria? ? [X] Yes [ ] No

Designated as "UST 228B"; no Registration ID

Brief Narrative

Soil samples were collected from the fiberglass tank excavation in 2000 and analyzed by the Fort Monmouth Environmental Laboratory for total petroleum hydrocarbons (TPH). The Building 228 soil sample results were non-detected (ND) for TPH. These results were less than 5,100 mg/kg for TPH, which is the current remediation criterion. Results were also less than 1,000 mg/kg, which is the current NJDEP threshold criterion for additional required analyses. Therefore, no additional sampling or remedial action was warranted.

Additional site evaluation was conducted on December 6, 2010 to confirm or deny the presence of an older steel UST. Fuel lines were exposed, and a 1000 gallon steel UST was uncovered. Soil TPH results from samples collected along the fuel line ranged from ND to 555 mg/kg. This UST was left in place and covered with soil. The confirmed presence of this steel UST suggests that other steel USTs may also be present at the other Allen and Russel Avenue residences.

In conclusion, the analytical results support changing the UST Case Status to "Case Closed," although certain supporting documentation (such as a map with sample locations, field notes, etc.) may not be available. Although the fiberglass tank was removed, an earlier steel UST was confirmed to be present and left in place.

See also Attachment D for recent (2016) analytical results for UST 228B

Recommendations (if any): Change status to "Case closed."

Signed: Kent A. Friesen

Kent A. Friesen, Parsons

State of New Jersey

CHRIS CHRISTIE
Governor

KIM GUADAGNO
Lt. Governor

DEPARTMENT OF ENVIRONMENTAL PROTECTION
Bureau of Case Management
401 East State Street
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BOB MARTIN
Commissioner

July 12, 2016

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

Re: *Parcel 72 Select Unregulated Heating Oil Tanks (UHOTs) Work Plan Addendum*
Fort Monmouth
Oceanport, Monmouth County
PI G000000032

Dear Mr. Colvin:

The New Jersey Department of Environmental Protection (Department) has completed review of the referenced submittal, received on July 7, 2016, prepared by the Department of the Army, to propose soil and/or ground water sampling at four former #2 fuel underground storage tank (UST) areas and one at which the #2 fuel UST remains. Comments are as follows.

UST 211
The collection of a ground water sample as proposed is acceptable.

UST 212
Although sampling was apparently performed when the reported 2000 gallon UST was removed in 2001, the analytical data was reported as unable to be located. A single soil boring is proposed, with a sample to be collected from approximately 5-5.5' below grade (as the base of a 2000 gallon tank would often lie below that depth, perhaps a foot or so deeper should be considered), and a second interval sampled from 0-6" above the water table (which is appropriate). Based upon the former tank size, however, a minimum of two soil boring locations is necessary.

Although the UST is reported as unregulated, and therefore exempt from N.J.A.C. 7:14B, as per Section 3 *Applicability*, of the July 31, 2012 *Technical Guidance for Investigation of Underground Storage Tank Systems*, the exempted USTs must still comply with certain other Department regulations (ARRCs, Tech Rules), and use of the guidance document is appropriate. Section 5.2.1.1 of this guidance document indicates one location for each 5' of tank length is to be collected.

The collection of a ground water sample as proposed is acceptable.

UST 220B
The collection of a ground water sample as proposed is acceptable.

Is UST 220B considered the same tank as that referenced in Appendix G and Figure 15 of the '07 ECP as UST-220-14?

UST 226
The collection of a ground water sample as proposed is acceptable.

UST 228B
UST 228B (is this also known as UST 228-20 in Appendix G & Figure 15?) remains in place, however, appears to be out-of-service. Have the contents been removed? If the tank remains in service, four samples are required (Section 5.1.2 of the above referenced guidance document). If it is out of service, the tank should be closed in accordance with any applicable regulations.

USTs may only be abandoned in place if there is no contamination detected above remediation standards, or when there is evidence of a discharge but removal is not feasible (Section 5.2.2 of the guidance document). Sampling must be performed *through* the bottom of the tank to ensure no contamination is present beneath the UST, at 5' intervals along the center line. As this is a 1000 gallon UST, at least two sample locations through the bottom would be necessary.

Finally, the above comments address only those five USTs included in the work plan, rather than all USTs having been noted (including those of "high potential") within the parcel. This office looks forward to receipt of the request for NFA determination for the former USTs within the parcel as referenced in the submittal.

Please contact this office with any questions.

Sincerely,

Linda S. Range

Linda S. Range

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

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

July 1, 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

SUBJECT: Parcel 72 Select Unregulated Heating Oil Tanks (UHOTs) Work Plan Addendum Fort Monmouth, New Jersey

Attachments:

- Table 1 Summary of Select Parcel 72 UHOTs
- UST Removal Reference Map (Grid C2)
- Table 2 Summary of Proposed Sampling for Parcel 72
- Figure 1 Proposed Sampling for Parcel 72

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 72. The purpose of this review was to ensure that potential environmental issues associated with former UST sites within Parcel 72 have been adequately addressed to facilitate Phase II property transfer.

All of the Parcel 72 USTs are residential unregulated heating oil tanks (UHOTs), such as single family homes, apartments or barracks. Residential UHOTs are exempt from UST regulations (New Jersey Administrative Code [NJAC] 7:14B-1.4 [b][3]). However, the Army anticipates requesting a No Further Action (NFA) determination from the New Jersey Department of Environmental Protection (NJDEP) for Parcel 72 residential UHOTs within a future submittal to facilitate property transfer.

Upon review of Parcel 72 closure sample analytical data, five former UHOTs (USTs 211, 212, 220B, 226, and 228B) were identified with data needs that required additional field sampling, as summarized below. This Work Plan Addendum describes the proposed field sampling for these five Parcel 72 UHOT sites. Detailed field procedures are described in the approved March 2013 *Final Sampling and Analysis Plan* (SAP).

Attached Table 1 describes the tank characteristics for each of these five UHOT sites. The Army's recorded locations of these UHOTs are shown in the attached UST Removal Reference Map. All of these UHOTs except UST 228B were previously removed. Following is a summary of these UHOTs and the associated data needs:

- UST 211 was located at 4 Russel Avenue on the east side of Building 211. This tank was removed in 2001, and TPH concentrations up to 3,968 milligrams per kilogram (mg/kg) were reported in closure soil samples, which may indicate a release but is less than the 5,100 mg/kg human health based remedial goal for Extractible Petroleum Hydrocarbons (EPH). Analyses for volatile organic compounds (VOCs) were also performed on the sample with the highest TPH concentrations, in accordance with then-current protocol; the only VOC detected was acetone, which is a common laboratory-derived contaminant. Proposed field sampling will include collection of a groundwater sample from a temporary well installed at the former location of the tank to determine if a fuel oil release has impacted groundwater.
- UST 212 was located at 8 Russel Avenue on the east side of Building 212. This tank was removed in 2001; closure soil samples were collected and analyzed. However, the associated analytical data have not been found, and therefore soil samples will be collected from one boring using a Geoprobe to determine if a release has occurred. Also, a groundwater sample from a temporary well will be collected from the same boring to determine if there has been an impact to groundwater.
- UST 220B was located at 34 Russel Avenue on the west side of Building 220. This tank was removed in 2001. Initial soil TPH concentrations were up to 3,224 mg/kg. After removal of the contaminated soil, TPH was not detected. Analyses for VOCs were also performed on the sample with the highest TPH, in accordance with then-current protocol; no VOCs were detected. Proposed field sampling will include collection of a groundwater sample from a temporary well installed at the former location of the tank to determine if a fuel oil release has impacted groundwater.
- UST 226 was located at 9 and 10 Allen Avenue near Building 226. This tank was removed in 2000 and TPH concentrations up to 3,915 mg/kg were encountered in closure soil samples. Analyses for VOCs were also performed on the sample with the highest TPH, in accordance with then-current protocol; the VOCs ethylbenzene and xylenes were detected, but concentrations were below the NJDEP Residential Direct Contact Soil Remediation Standards (RDCSRS). Proposed field sampling will include collection of a groundwater sample from a temporary well installed at the former location of the tank to determine if a fuel oil release has impacted groundwater.
- UST 228B (a steel UST) is located at 3 Allen Avenue near Building 228. This tank was located and uncovered in 2010, and then (due primarily to resource constraints) was covered with soil and left in place. Soil samples were collected along the service piping but not from the tank vicinity. Therefore, soil samples will be collected using a Geoprobe to determine if a release has occurred. Two soil borings will be placed near the tank (within 3 feet), with adequate spacing away from the tank to ensure that the integrity of the tank is not compromised. Also, a groundwater sample from a downgradient temporary well will be collected from the northern boring location (PAR-72-228-SB-01) to determine if there has been an impact to groundwater.

Proposed soil borings and temporary wells will be sampled and analyzed as summarized in Table 2 and Figure 1. Final sample locations may be adjusted in the field based on site conditions and site-specific understanding of the former locations of the UHOTs, with the intent of placing the boring within the former UST excavation (or within 10 feet downgradient). At each sample location, a Geoprobe® boring will be completed to approximately 4 feet below the water table (groundwater is

estimated at approximately 10 feet below ground surface). Soil and groundwater samples will be collected from the Geoprobe boring as indicated in Table 2 for each UST site.

Soil samples from the UST 212 and UST 228 soil borings will be collected to assess current concentrations and vertical extent of EPH. Two soil samples will be collected from each boring. At each boring, a sample will be collected from approximately 5.0-5.5 feet below ground surface (ft bgs; or another interval representative of the vadose zone below the removed tank), and from a deeper 6-inch interval just above the water table. One of these two soil samples will be collected from the most contaminated interval encountered based on field evidence (visual, olfactory, or photoionization detector [PID] screening). If there is no field evidence of petroleum contamination, then the two soil samples will be collected from 5.0-5.5 ft bgs and from just above the water table (estimated at 10.0-10.5 ft bgs). Each soil sample will be analyzed for total EPH, with additional contingency semivolatile organic compounds (SVOCs) analysis (25 percent) for naphthalene and 2-methylnaphthalene in the event that EPH concentrations exceed 1,000 mg/kg. These soil analyses are consistent with the requirements for No. 2 fuel oil in Table 2-1 of the NJAC 7:26E Technical Requirements for Site Remediation.

Groundwater will be sampled using temporary wells within the Geoprobe borings, and then the borings will be abandoned. Each groundwater sample will be analyzed for VOCs and SVOCs plus tentatively identified compounds (TICs), which is consistent with the requirements for No. 2 fuel oil in Table 2-1 of the NJAC 7:26E Technical Requirements for Site Remediation.

We look forward to your review and approval of or comments on this submittal. The technical Point of Contact (POC) 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) 380-7064 or by email at william.r.colvin18.civ@mail.mil.

Sincerely,

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

cc: Linda Range, NJDEP (e-mail and 3 hard copies)
Delight Balducci, HQDA ACSIM (e-mail)
Joseph Pearson, Calibre (e-mail)
James Moore, USACE (e-mail)
Jim Kelly, USACE (e-mail)
Cris Grill, Parsons (e-mail)

Attachment B
Field Notes

Nov 3 2017 (cont.)

1501: Begin PID screening PAR-72-490-SCREEN2
1505: 4.3 ppm at BD 0.5ft, 13.6 at 1 ft,
170 ppm at 1.5 ft, 302 ppm at 2ft, 57 ppm at 2.5 ft,
505 ppm at 3ft, 452 ppm at 3.5 ft,
32 ppm at 4 ft, 302 ppm at 5 ft,
144 ppm at 5.5 ft, 5 ppm 6ft, 5 ppm 6.5ft,
2 ppm 7ft, 2 ppm 7.5ft, 0.7 ppm 8ft,
0 ppm 8.5-10 ft.
1530: Left hole open for possible GW sampling later.
1535: Back to office.
1550: Unload cooler, COCs, Quality Control Report, clean-up

11/3/17
BD

Nov 6 2017

personnel: F. Accorsi, B. Dietert, ECDI, C. Grill
Task: GW Sampling & Soil Sampling, PID Screening at UHOT, Parcel, & IRP sites.
Weather: 65-75°, partly cloudy, showers possible in afternoon.
0740: ECDI on-site
0800: H&S meeting
0830: Load Equipt + supplies, Calibrate PID (Geoprobe-ECDI, Teflon bailers, mini-Rae 3000 PID)
0845: Mob to Par-72-211 + 228B
0900: Begin drilling PAR-72-228-SB-04
0915: Start PID screening PAR-72-~~228~~ BD 228B
0921: No PID recordings >0.0 ppm ~0-10ft
0927: Collect sample, PAR-72-228-SB-04-7.5'-8.0', SPLP 2-Methyl
0935: PAR-72-228-SB-04 decommissioned, backfilled with soil cuttings.
0940: mob to PAR-72-211
0945: Start drilling PAR-72-211-SCREEN1 (no sample)
0953: Begin PID screening SCREEN1
1010: 11.5' = 3.6 ppm, 12-12.5' = 17 ppm, 0.0 ppm all other intervals to 15ft.
1020: Decommissioned SCREEN1, backfilled w/ soil cuttings.
1027: Start drilling PAR-72-211-SCREEN2 (no sample)

Attachment C
Soil Boring Logs

PARSONS

Soil Boring Log

CLIENT: USACE
PROJECT NAME: FTMM - ECP
PROJECT LOCATION: FTMM Parcel 72-228
PROJECT NUMBER: 748810-

GROUNDWATER OBSERVATIONS
WATER LEVEL: ≈ 8 FT.
DATE:
TIME:
MEAS. FROM:

INSPECTOR: F. ACCORSI
DRILLER: S. FOSTER
WEATHER: CLOY, 60's
CONTRACTOR: East Coast Drilling, Inc. (ECDI)
RIG TYPE: Geoprobe(R) 7822DT
DATE/TIME START: 11-6-17 0915
DATE/TIME FINISH: 11-6-17
WEIGHT OF HAMMER: N/A
DROP OF HAMMER: N/A
TYPE OF HAMMER: N/A

BORING/WELL ID: PAR-72-228-SB-04
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			60/48	0	0-6" TOPSOIL 6"-48" Moist, brn, cm f SAND, lit. Gravel, L silt		
				0			
1				0			
				0			
2				0			
				0			
3				0			
				0			
4							
5			60/54	0	0-42" (SAME)		
				0			
6				0			
				0			
7				0			
	PAR-72-228-SB-04-7.5-8'			0			wet@8'
8				0			
				0	42"-54" Wet, grn-brn, mf SAND, some clayey silt		
9				0			
10					END OF BORING @ 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

Soil Boring Log

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

GROUNDWATER OBSERVATIONS
WATER LEVEL: ~9
DATE:
TIME:
MEAS. FROM:

INSPECTOR: C. Watson
DRILLER: J. BALNAK
WEATHER: 78°F
CONTRACTOR: East Coast Drilling, Inc. (ECDI)
RIG TYPE: Geoprobe(R) 7822DT
DATE/TIME START: 8/9/16 1045
DATE/TIME FINISH: 8/9/16 1055
WEIGHT OF HAMMER: N/A
DROP OF HAMMER: N/A
TYPE OF HAMMER: N/A

BORING/WELL ID: ~~BAF-SB~~ 72.22-SB-01
LOCATION DESCRIPTION: Parcel 72
LOCATION PLAN: Oceanport, New Jersey

DEPTH (feet)	SAMPLE I.D.	BLOWS per 6"	ADV/ REC.	PID (ppm)	FIELD IDENTIFICATION OF MATERIAL	STRATA	COMMENTS
0			60/~~48~~	0	0-19" Dry, loose Brown, mf SAND, some f gravel, trace wood chunks		
1							
2					19"-31" M. Dense, Brown, MF SAND, little f gravel		
3					31"-42" M. Dense, Brown, mf, SAND, little f gravel, little silt		
4							
5			60/~~58~~	0	0-48" SAA,		
6					48"-58" Saturated, mf, Brown/ orange mottled SAND, trace silt, trace f gravel		
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

Soil Boring Log

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

INSPECTOR: C. Wyatson
DRILLER: J. BARNAK
WEATHER:
CONTRACTOR: East Coast Drilling, Inc. (ECDI)
RIG TYPE: Geoprobe(R) 7822DT
DATE/TIME START: 9/6/12
DATE/TIME FINISH:
WEIGHT OF HAMMER: N/A
DROP OF HAMMER: N/A
TYPE OF HAMMER: N/A

BORING/WELL ID: 228->B-01
LOCATION DESCRIPTION:

LOCATION PLAN
Oceanport, New Jersey

GROUNDWATER OBSERVATIONS
WATER LEVEL: ~12.5
DATE:
TIME:
MEAS. FROM:

DEPTH (feet)	SAMPLE I.D.	BLOWS per 6"	ADV/ REC.	PID (ppm)	FIELD IDENTIFICATION OF MATERIAL	STRATA	COMMENTS
1 0			52	20.8	0-15" Moist, gray, f SAND and clay, M. Stiff		
	10.5-11			67.8			
1 1				50.1	15"-29" Moist, gray, V. Stiff clay		
				6.7			
1 2	12-12.5			1.8			
				0	29"-52" saturated, gray/brown/orange, mf, mottled SAND, trace silt, Dense		
1 3				0			
				0			
1 4				0			
				0			
1 5							
6							
7							
8							
9							
0							

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: ~12.5
DATE: 8/9/16
TIME: 1400
MEAS. FROM: bgs

INSPECTOR: C. WASSON
DRILLER: J. BARNAK
WEATHER: 82°F Clear
CONTRACTOR: East Coast Drilling, Inc. (ECDI)
RIG TYPE: Geoprobe(R) 7822DT
DATE/TIME START: 1345
DATE/TIME FINISH: 1355
WEIGHT OF HAMMER: N/A
DROP OF HAMMER: N/A
TYPE OF HAMMER: N/A

BORING/WELL ID: PAR-72-228-SB-02
LOCATION DESCRIPTION: Parcel 72-228
LOCATION PLAN: Oceanport, New Jersey

DEPTH (feet)	SAMPLE I.D.	BLOWS per 6"	ADV/ REC.	PID (ppm)	FIELD IDENTIFICATION OF MATERIAL	STRATA	COMMENTS
0			60/24	0	0-11" Concrete and crushed rock, some mf Brown SAND		
1					11"-20" Dry, Brown, mf SAND, trace f gravel		
2					20"-23" Brick		
3					23"-39" Moist, M. Dense, mf, Brown SAND, little silt		
4							
5			60/24	6	0-16" SAA, Wet		
6					16"-27" SAA, Moist		
7					27"-40" Moist, grey, mf SAND, Some silt, ~~SAA~~ trace Clay		
8					40"-49" Moist, gray/brown/orange, f SAND, Some ~~Silt~~, little Clay, V. Stiff		
9				2.1			
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

Soil Boring Log

CLIENT: USACE	INSPECTOR:	BORING/WELL ID: 228-SB-01
PROJECT NAME: FTMM - ECP	DRILLER:	LOCATION DESCRIPTION
PROJECT LOCATION: FTMM Parcel	WEATHER:	
PROJECT NUMBER: 748810-	CONTRACTOR: East Coast Drilling, Inc. (ECDI)	
GROUNDWATER OBSERVATIONS	RIG TYPE: Geoprobe(R) 7822DT	LOCATION PLAN
	DATE/TIME START:	Oceanport, New Jersey
WATER LEVEL:	DATE/TIME FINISH:	
DATE:	WEIGHT OF HAMMER: N/A	
TIME:	DROP OF HAMMER: N/A	
MEAS. FROM:	TYPE OF HAMMER: N/A	

DEPTH (feet)	SAMPLE I.D.	BLOWS per 6"	ADV/ REC.	PID (ppm)	FIELD IDENTIFICATION OF MATERIAL	STRATA	COMMENTS
0			60/52	0	0-26" SAA, saturated		
					26"-52" moist, Dense, grey/green/ orange/Brown mottled mf SAND, some silt		
1							
2							
3							
4							
				NR			
5							
6							
7							
8							
9							
0							

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: ~7
DATE: 8/9/16
TIME:
MEAS. FROM:

INSPECTOR: C. WATSON
DRILLER: J. BARNAK
WEATHER: 80°F Clear
CONTRACTOR: East Coast Drilling, Inc. (ECDI)
RIG TYPE: Geoprobe(R) 7822DT
DATE/TIME START: 8/9/16 0930
DATE/TIME FINISH: 8/9/16 1000
WEIGHT OF HAMMER: N/A
DROP OF HAMMER: N/A
TYPE OF HAMMER: N/A

BORING/WELL ID: PAR-72-228-SB-03
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			60/26	0	0-5" Dry, loose, mf Brown SAND, some grass, little f gravel		2 attempt + 2 more recovery
1							
2					5"-36" Moist, M. dense, Brown, mf SAND, little f gravel, little wood chunks, little silt		
3				NR			
4							
5			60/54	6.7	0-3" SAA		
				22.8	3-22" wet, M. dense, MF Brown and grey SAND, little silt, trace f gravel		
6				61.9			
1035	6.5-7			66.8			
1050 7	7-7.6			72.5			
				39.4	22"-37" Saturated, M. dense, mf, grey SAND, little f round gravel		
8				50.1			
				22.8			
9				14.9			
				NR	37"-44" Moist, M. stiff, grey clay		
10					44-54" wet, M. stiff, grey clay and f SAND		

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

Soil Boring Log

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

GROUNDWATER OBSERVATIONS
WATER LEVEL:
DATE:
TIME:
MEAS. FROM:

INSPECTOR:
DRILLER:
WEATHER:
CONTRACTOR: East Coast Drilling, Inc. (ECDI)
RIG TYPE: Geoprobe(R) 7822DT
DATE/TIME START:
DATE/TIME FINISH:
WEIGHT OF HAMMER: N/A
DROP OF HAMMER: N/A
TYPE OF HAMMER: N/A

BORING/WELL ID: PAR-228-SB-03
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
10				6.7	0-21" SAA		
				22.9	21"-35" moist, m. stiff, gray and Brown, Clay, some f SAND		
11				51.4			
				49.7	35"-60" saturated, m. dense, Mf, Brown/orange/gray SAND, mottled,		
12				17.6			
				22.1			
13				18.2			
				6.6			
14				8.1			
				1.8			
15				1.2	0-60" SAA		
				1.8			
16				0.2			
				0			
17				0			
				0			
18				0			
				0			
19				0			
				0			
20							

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