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

17 May 2018

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

SUBJECT: Request for Unrestricted Use, No Further Action Approval
UST 800-12 Site Investigation Report
Fort Monmouth, Monmouth County, Oceanport, New Jersey
PI G000000032

Dear Mr. Joshi:

The U.S. Army Fort Monmouth (FTMM) Team has prepared this Site Investigation (SI) Report to summarize previous investigations and present the results of additional field sampling at former Underground Storage Tank (UST) 800-12 in Parcel 55.

1.0 OBJECTIVES

Field screening borings and groundwater sampling was conducted in 2017 and 2018 to address New Jersey Department of Environmental Protection (NJDEP) comments on UST 800-12 (**Attachment A, Correspondence 3**). Proposed field investigation activities were documented in the Unregulated Heating Oil Tank (UHOT) Work Plan (WP) (August 2017), which was approved in October 2017 by NJDEP (**Attachment A, Correspondences 1 and 2**).

2.0 SITE DESCRIPTION

Former UST 800-12 was a steel 1,000-gallon No. 2 fuel oil UST (without a Registration ID) that was removed in May 2004. Former UST 800-12 was located in the parking lot of the former First Atlantic Credit Union (Building 1006) in the southern portion of the Main Post (MP) of FTMM as shown on **Figure 1**. Holes were observed in the tank and potentially contaminated soils were observed surrounding the tank during the removal; approximately 18 cubic yards of contaminated soil were excavated. Discharge Investigation and Corrective Action Report (DICAR) No. 04-05-25-1623-31 was submitted to NJDEP in May 2004.

2.1 Site Land Use

UST 800-12 is located adjacent to existing Building 1006, which is currently unoccupied. Adjacent land to the south and east are currently unoccupied open fields, and to the north and west are paved roads and parking areas. Future land use for the former UST 800-12 area as described in the Fort Monmouth Reuse and Redevelopment Plan (EDAW, 2008) is low density residential.

2.2 Site Geology and Hydrogeology

The Hornerstown Formation underlies much of the MP including the former UST 800-12 area and is approximately 25 to 30 feet (ft) thick based on other MP soil borings. This formation is distinguished by varying proportions of glauconitic clay, silty clay, and minor sand. The Tinton Formation underlies the Hornerstown Formation and consists of dense fine sand and trace silt, glauconite, and clay.

During the November 2017 field investigation at former UST 800-12, soil borings encountered primarily brown, coarse to fine sand with some clay and gravel. Deeper soils below approximately 10 ft typically consisted of brown to orange brown fine-grained sand. Soil borings logs are provided in **Attachment B**. The depth to groundwater at former UST 800-12 from approximately 10 to 12 ft below ground surface (bgs) in the soil borings, and 9.5 to 11.5 ft bgs in monitoring wells (**Table 1**). Groundwater was typically encountered in the brown sands and flows north-northeast towards Oceanport Creek (**Figure 3).**

3.0 PREVIOUS INVESTIGATIONS

As previously documented (**Attachment A, Correspondences 4** and **6**), the tank was removed in May 2004, and post-excavation soil samples were collected along the sidewalls and bottom of the excavation and analyzed for total petroleum hydrocarbons (TPH). The initial post-excavation soil samples contained TPH concentrations above the then-current NJDEP criterion of 10,000 milligrams per kilogram (mg/kg) for total organic contaminants (N.J.A.C. 7:26E and revisions dated February 3, 1994). Subsequently, after further soil excavation, the post-excavation soil sample results were non-detect (ND) for TPH. NFA approval was requested by the Army in 2015 for former UST 800-12. However, NJDEP concluded (letter dated 10 November 2015) that a groundwater investigation was required (**Attachment A, Correspondence 5 and 6**).

In April 2016, the Army performed initial groundwater investigation work in response to NJDEP comments on the 3 March 2016 work plan (**Attachment A, Correspondence 4 and 5**). Temporary well ARE-800-TMW-07 was installed downgradient from former UST 800-12, sampled, and subsequently abandoned. As shown on **Table 2** of **Attachment B**, two SVOCs (2-methylnapthalene and benzo[a]anthracene) and the total sum SVOC tentatively identified compounds (TICs) exceeded the respective NJDEP Ground Water Quality Criteria (GWQC).

Based on the April 2016 results, further investigation was requested by NJDEP (**Attachment A, Correspondence 3**). The Army conducted additional soil and groundwater investigations in 2017 and 2018 to confirm and delineate groundwater contamination as described below.

4.0 2017 AND 2018 SITE INVESTIGATION RESULTS

NJDEP approved the installation of six borings, four temporary wells, and three permanent wells surrounding the area of former UST 800-12 (**Attachment A, Correspondence 1**).

In November 2017, six field screening borings (PAR-55-800-12-Screen1 through PAR-55-800-12-Screen6) were logged visually and with a PID. Soil staining, petroleum odors and elevated PID readings were observed during the boring operations for PAR-55-800-12-Screen3 and PAR-55-800-12-Screen4 near the groundwater at depths from 11 to 12 ft bgs (**Attachment B**). The field results

were used to verify the field locations for subsequent temporary wells in order to assist with delineation of the groundwater plume.

Along with the soil borings, four temporary monitor wells (PAR-55-800-12-TMW-01 through 04) were installed, sampled and abandoned downgradient of former UST 800-12. Temporary monitor wells PAR-55-800-12-TMW-01 through PAR-55-800-12-TMW-03 were installed approximately 80 ft downgradient of the former tank to verify the direction and lateral boundaries of the plume. The fourth temporary monitor well (TMW-04) was installed approximately 80 ft farther downgradient to establish the extent of the plume prior to installing a permanent downgradient sentry well. As with the field screening borings, the borings for temporary wells were logged visually and with a PID to estimate the extent of the plume in the field. Soil staining, petroleum odors and elevated PID readings were observed during the boring operations for PAR-55-800-12-TMW-01 and -02 near the groundwater at depths from 10 to 13 ft bgs (**Attachment B**). Field indications of contamination from these temporary wells suggested contaminant migration towards the northwest away from the former tank.

In December 2017, four permanent monitoring wells were installed (**Figure 2**). One permanent well (PAR-55-800-12-MW-01) was placed in the vicinity of the former UST and screened from 10 to 20.5 ft bgs. The second well (PAR-55-800-12-MW-02) was placed approximately 100 ft northwest of the former UST area and screened from 8 to 18.5 ft bgs. The third well (PAR-55-800-12-MW-03) was placed approximately 100 ft farther northwest of the former UST area and screened from 10 to 20.5 ft bgs. The fourth well (PAR-55-800-12-MW-04) was placed approximately 100 ft west of the former UST area and screened from 10 to 20.5 ft bgs; this well was intended to provide lateral (side-gradient) delineation of the groundwater contamination detected in temporary well PAR-55-800-12-TMW-01 (discussed further in Section 4.1.2). Contamination was not observed during the permanent monitoring well installations and MW-02 was the only monitoring well that had elevated PID readings in soil cuttings (approximately 10 to 15 ft bgs) noted on the boring logs (**Attachment B**). Field notes are provided in **Attachment C**. The four new permanent wells were sampled in January 2018 and groundwater samples were analyzed for VOCs and SVOCs (**Table 3**) in accordance with the NJDEP requirements for No. 2 fuel oil. Monitoring well PAR-55-800-12-MW-03 was sampled at two different depths in accordance with NJDEP well profiling requirements (3 and 12.5 ft bgs and 3 and 17.5 ft bgs).

4.1 Groundwater Results

Groundwater sampling was performed in November 2017 (temporary wells) and January 2018 (permanent wells) at the locations shown on **Figure 2**. Potentiometric surface elevation contours are also presented on **Figure 3.**

4.1.1 Exceedances of NJDEP Comparison Criteria

Bis(2-ethylhexyl)phthalate, 2-methylnaphthalene, phenanthrene, and the total sum SVOC TICs exceeded the GWQC in the temporary wells samples during the 2017 temporary well sampling event (see **Table 2**).

As described below, no analytes exceeded the GWQC during the 2018 permanent well sampling event.

4.1.2 Constituents of Potential Concern (COPCs)

Bis(2-ethylhexyl)phthalate and phenanthrene are not typically related to fuel oil contamination and therefore are not considered COPCs in groundwater at former UST 800-12. Bis(2-ethylhexyl)phthalate is also a common field- or laboratory-induced contaminant. The slight exceedances of bis(2-ethylhexyl)phthalate and phenanthrene at PAR-55-800-12-TMW-02 may also be the result sample turbidity, which is common with temporary well grab groundwater samples.

2-Methylnaphthalene and Total TICs exceeded the NJDEP GWQC at temporary wells PAR-55-800-12-TMW-01 and -02 (see **Table 2**).

Permanent well PAR-55-800-12-MW-02 was subsequently installed between these two temporary well locations in 2017, but there were no exceedances of these analytes at either this permanent well PAR-55-800-12-MW-02 or at the downgradient permanent well PAR-55-800-12-MW-03. In comparison to temporary well results, the results from permanent wells are much more representative of groundwater conditions because permanent wells are properly developed and purged prior to low flow groundwater sampling.

5.0 SUMMARY AND RECOMMENDATIONS

No COPCs associated with fuel oil were identified in groundwater at former UST 800-12. Given the results of the groundwater investigation, an Unrestricted Use, NFA determination is requested for former UST 800-12.

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

Sincerely,

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

cc: Ashish Joshi (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)

Attachments:

Figure 1 – UST 800-12 Site Location
Figure 2 –Parcel 55 - UST 800-12 Site Layout and Sample Locations
Figure 3 – Parcel 55 – UST 800-12 Groundwater Contours – January 15, 2018

Table 1 - Groundwater Gauging Data and Elevations (January 15, 2018)
Table 2 – Ground Water Sampling Results for Temporary Wells – Comparison to NJDEP Ground Water Quality Criteria
Table 3 – Ground Water Sampling Results for Permanent Wells – Comparison to NJDEP Ground Water Quality Criteria

Attachment A - Regulatory Correspondence
Attachment B – Soil Boring Logs and Well Construction Details
Attachment C – Field Notes

REFERENCES CITED:

EDAW, Inc., 2008. *Fort Monmouth Reuse and Redevelopment Plan, Final Plan.* Prepared for Fort Monmouth Economic Revitalization Planning Authority. August 22.

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:

- "Request for Unrestricted Use, No Further Action Approval, UST 800-12 Site Investigation Report, Fort Monmouth, Monmouth County, Oceanport, New Jersey" (17 May 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: 17 May 2018

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

Completed form should be sent to:

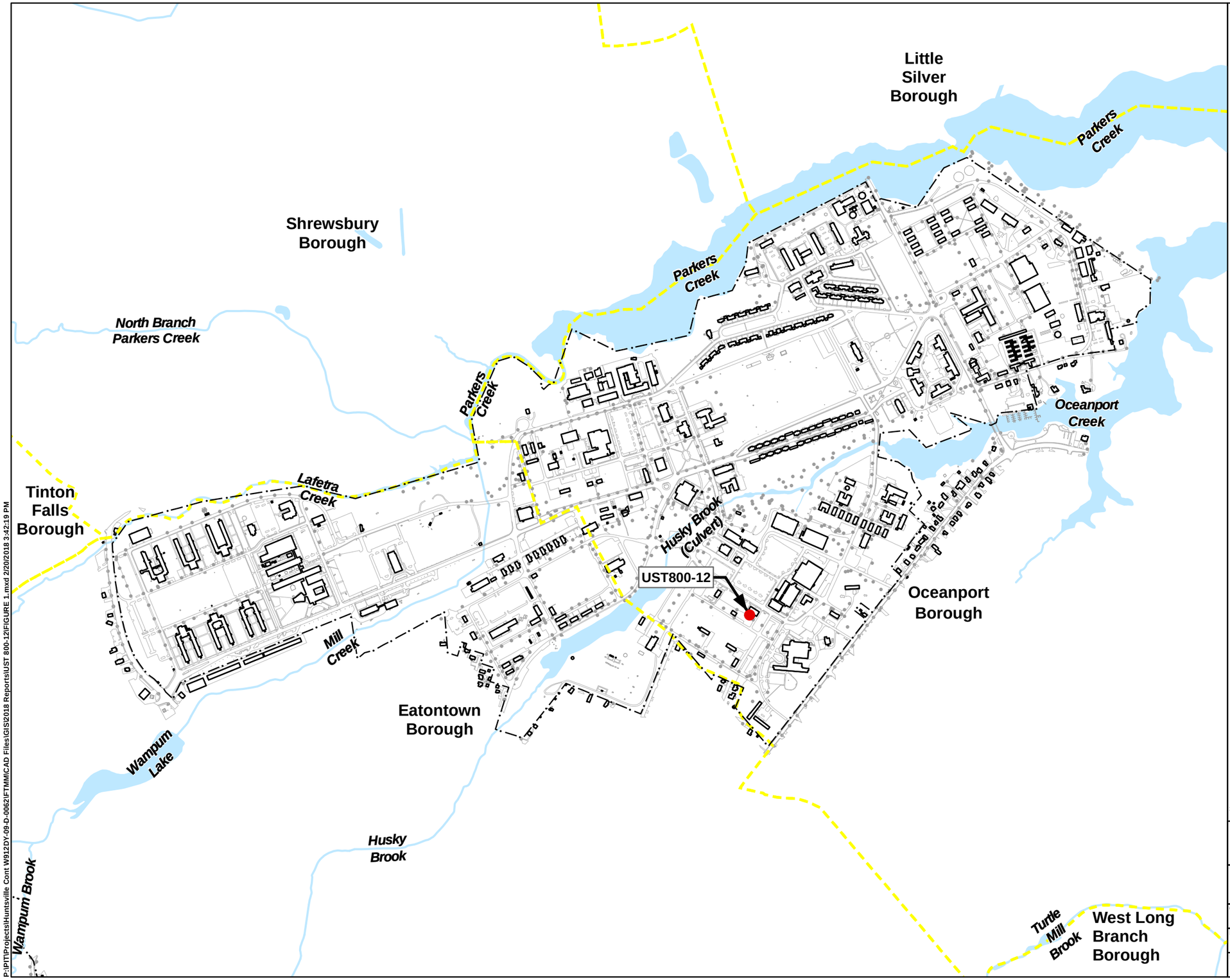
Mr. Ashish Joshi
New Jersey Department of Environmental Protection
Division of Remediation Management & Response
Bureau of Northern Field Operations
7 Ridgedale Avenue (2nd Floor)
Cedar Knolls, New Jersey 07927-1112

FIGURES

Figure 1 –UST 800-12 Site Location

Figure 2 – Parcel 55 UST 800-12 Site Layout and Sampling Location

Figure 3 – Parcel 55 – UST 800-12 Groundwater Contours – January 15, 2018



LEGEND:

- UHOT Location
- 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**

UST800-12 SITE LOCATION

CREATED BY: RR	REVIEWED BY: JC
DATE: FEB. 2018	FIGURE NUMBER: FIGURE 1
PROJECT NUMBER: 748810-02130	FILE: FIGURE 1.mxd

P:\PIT\Projects\Huntsville Cont W912DY-09-D-0062\FTMM\CAD Files\GIS\2018 Reports\UST 800-12\FIGURE 1.mxd 2/20/2018 3:42:19 PM

PAR-55-800-12-TMW-04

PAR-55-800-12-MW-03

Alexander Avenue

PAR-55-800-12-TMW-03

PAR-55-800-12-TMW-02

UST800-9

ARE-800-TMW-06

PAR-55-800-12-TMW-01

PAR-55-800-12-MW-02

1001

Stephenson Avenue

1006

PAR-55-800-12SCREEN4

PAR-55-800-12SCREEN3

PAR-55-800-12SCREEN5

ARE-800-TMW-07

826

PAR-55-800-12-MW-04

PAR-55-800-12-MW-01

PAR-55-800-12SCREEN2

PAR-55-800-12SCREEN6

UST800-12

PAR-55-800-12SCREEN1

38

37

36

29

28

PAR-55-800-20-TMW-01

LEGEND:

- Temporary Monitoring Well
- Soil Boring
- Groundwater Sample (2016)
- Former UST Location
- Shallow Monitoring Well
- W Water Line
- S Sanitary Sewer Line
- SW Storm Sewer Line
- G Gas Line
- Estimated Groundwater Flow Direction

N

1 inch = 30 feet

0 15 30 60 Feet

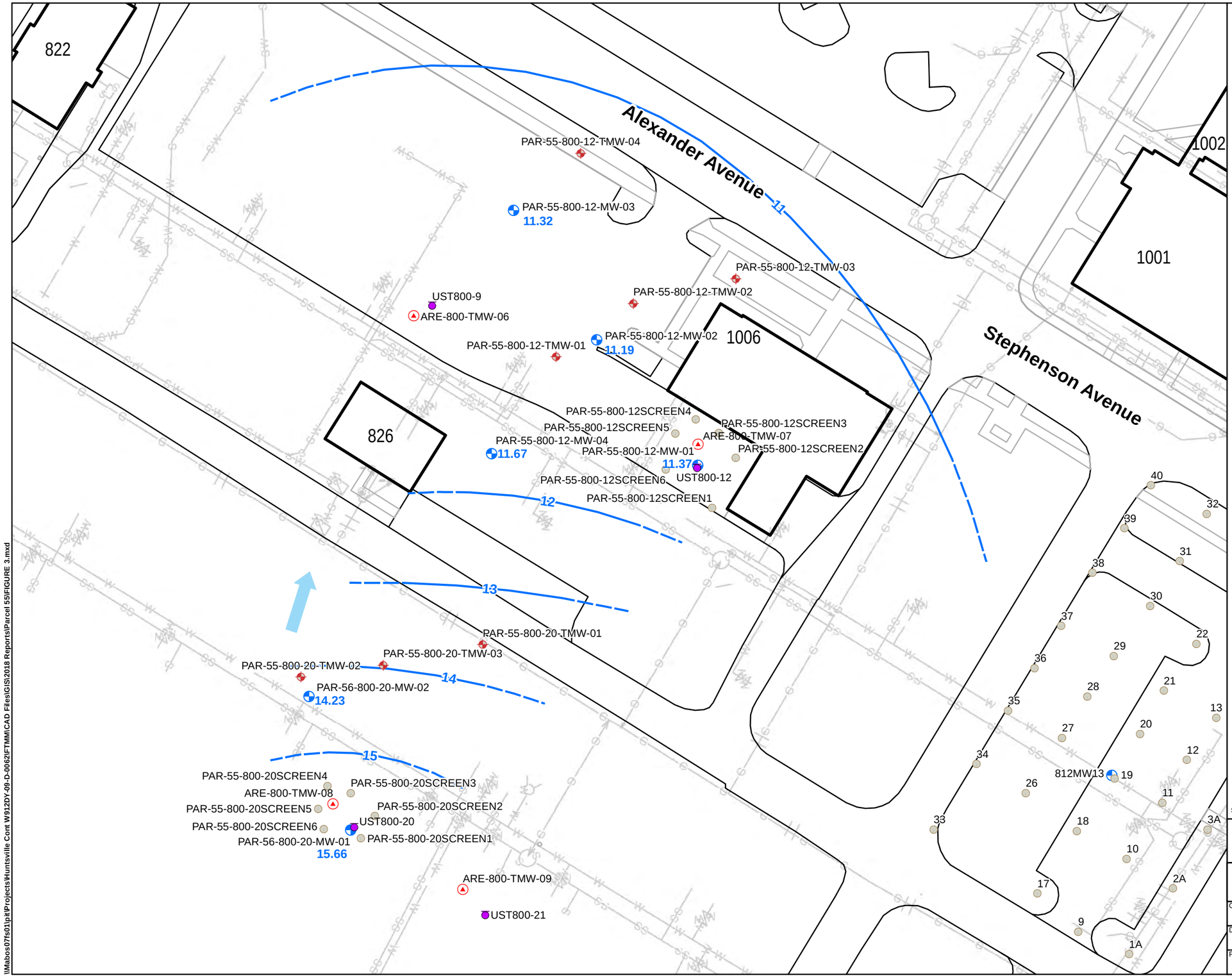
Source: FTMM Supplied CAD, 2013.

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

PARCEL 55 UST800-12 SITE LAYOUT AND SAMPLING LOCATION

CREATED BY: RR	REVIEWED BY: JC
DATE: APR. 2018	FIGURE NUMBER: FIGURE 2
PROJECT NUMBER: 748810-06031	FILE: FIGURE 2.mxd

\\mabos07fs01\PITProjects\Huntsville Cont W912DY-09-D-0062\FTMM\CAD Files\GIS\2018 Reports\Parcel 55\FIGURE 2.mxd



LEGEND:

- Temporary Monitoring Well
- Soil Boring
- Groundwater Sample (2016)
- Former UST Location
- Shallow Monitoring Well
- W Water Line
- S Sanitary Sewer Line
- SW Storm Sewer Line
- G Gas Line
- Groundwater Flow Direction
- Potentiometric Surface Elevation Contour
- Inferred Potentiometric Surface Elevation Contour
- 11.32 Groundwater Elevation Recorded on January 15, 2018 (NAD88) (ft)

Source: FTMM Supplied CAD, 2013.

PARSONS
401 Diamond Drive NW,
Huntsville AL

Fort Monmouth
New Jersey

PARCEL 55 - UST800-12 GROUNDWATER CONTOURS - JANUARY 15, 2018

CREATED BY:	REVIEWED BY:
RR	JC
DATE:	FIGURE NUMBER:
APR. 2018	FIGURE 3
PROJECT NUMBER:	FILE:
748810-06031	FIGURE 3.mxd

\\Mabos07fs01\pit\Projects\Huntsville Cont W912DY-09-D-0062\FTMM\CAD Files\GIS\2018 Reports\Parcel 55\FIGURE 3.mxd

TABLES

Table 1 - Groundwater Gauging Data and Elevations (January 15, 2018)

Table 2 – Ground Water Sampling Results for Temporary Wells – Comparison to NJDEP Ground Water Quality Criteria

Table 3 – Ground Water Sampling Results for Permanent Wells – Comparison to NJDEP Ground Water Quality Criteria

Table 1
Groundwater Gauging Data and Elevations (January 15, 2018)
Parcel 55 UST 800-12
Fort Monmouth, New Jersey

Site	Well Permit #	Y Coord. (North)	X Coord. (East)	Installation Date	Depth	Well Riser Pipe Casing Length	Well Screen Length	Top of PVC Well Casing (elevation)	Slot Size	Flush Mount or Upright Protective Casing	Protective Casing Elevation	Ground Surface Elevation	Gauge Time	Gauged Depth to Water	Gauged Depth to Bottom	Calculated Groundwater Elevation	Sampling Date
					(ft.)				inches	(FM or UR)				(ft. TOC)	(ft. TOC)	(ft.)	
PAR-55-800-12-MW-01	E201713117	537959.7	620172.9	11/17/2017	20.00	10.00	10.00	22.79	0.01	FM	23.09	23.04	13:24	11.42	19.96	11.37	1/17/2018
PAR-55-800-12-MW-02	E201713781	538024.4	620120.9	12/14/2017	18.00	8.00	10.00	21.56	0.01	FM	22.00	21.99	13:27	10.37	18.00	11.19	1/17/2018
PAR-55-800-12-MW-03	E201713782	538091	620078.1	12/13/2017	20.00	10.00	10.00	20.67	0.01	FM	21.14	21.10	13:32	9.35	19.67	11.32	1/17/2018
PAR-55-800-12-MW-04	E201713783	537965.7	620066.8	12/13/2017	23.00	13.00	10.00	25.52	0.01	UR	25.82	22.79	13:21	13.85	22.80	11.67	1/17/2018

Notes:

- The synoptic round of water levels in the wells was collected on January 15, 2018.
- Well information were provided by FTMM for all wells installed before June 2013.
- ft = feet
- TOC = Top of Casing
- Elevation = feet above mean sea level
- N/A = information not available
- NS = Not Sampled
- **Bolded** top of casing elevations represent a mathematical adjustment between earlier NAD systems and the NAD 88 spatial system: the wells were reduced 1.09 feet to reflect the changes in the NAD systems.

TABLE 2
GROUND WATER SAMPLING RESULTS for TEMPORARY WELLS - COMPARISON TO NJDEP GROUND WATER QUALITY CRITERIA
SITE AREA 800, PARCEL 55 800-12 USTAREA 800, PARCEL 55 800-12 USTAREA 800, PARCEL 55 800-12 UST
FORT MONMOUTH, NEW JERSEY

Loc ID	NJ Ground Water Quality Criteria	A800-TMW-07	PAR-55-800-12-TMW-01	PAR-55-800-12-TMW-02		PAR-55-800-12-TMW-03	PAR-55-800-12-TMW-04
Sample ID		ARE-800-TMW-07	PAR-55-800-12-TMW-01-13	PAR-55-800-12-TMW-02-12.5	PAR-55-800-12-TMW-102-12.5	PAR-55-800-12-TMW-03-13	PAR-55-800-12-TMW04-12.5
Sample Date		8/4/2016	11/9/2017	11/9/2017	11/9/2017	11/9/2017	11/9/2017
Sample Round							
Filtered		Total	Total	Total	Total	Total	Total
Volatile Organic Compounds (µg/L)							
1,1,1,2-Tetrachloroethane	1	< 0.75	< 3.8	< 0.75 UJ	< 0.75	< 0.75	< 3.8 UJ
1,1,1-Trichloroethane	30	< 0.75	< 3.8	< 0.75 UJ	< 0.75	< 0.75	< 3.8 UJ
1,1,2,2-Tetrachloroethane	1	< 0.75	< 3.8	< 0.75 UJ	< 0.75	< 0.75	< 3.8 UJ
1,1,2-Trichloroethane	3	< 0.75	< 3.8	< 0.75 UJ	< 0.75	< 0.75	< 3.8 UJ
1,1-Dichloroethane	50	< 0.75	< 3.8	< 0.75 UJ	< 0.75	< 0.75	< 3.8 UJ
1,1-Dichloroethene	1	< 0.75	< 3.8	< 0.75 UJ	< 0.75	< 0.75	< 3.8 UJ
1,1-Dichloropropene	100	< 0.75	< 3.8	< 0.75 UJ	< 0.75	< 0.75	< 3.8 UJ
1,2,3-Trichlorobenzene	100	< 0.75	< 3.8	< 0.75 UJ	< 0.75 UJ	< 0.75	< 3.8 UJ
1,2,3-Trichloropropane	0.03	< 2.5	< 12.5	< 2.5 UJ	< 2.5	< 2.5	< 12.5 UJ
1,2,4-Trichlorobenzene	9	< 0.75	< 3.8	< 0.75 UJ	< 0.75	< 0.75	< 3.8 UJ
1,2,4-Trimethylbenzene	100	**73.9**	< 3.8	**50.9 J**	**60**	< 0.75	**2.4 J**
1,2-Dibromo-3-chloropropane	0.02	< 2.5	< 12.5	< 2.5 UJ	< 2.5	< 2.5	< 12.5 UJ
1,2-Dibromoethane	0.03	< 0.75	< 3.8	< 0.75 UJ	< 0.75	< 0.75	< 3.8 UJ
1,2-Dichlorobenzene	600	< 0.75	< 3.8	< 0.75 UJ	< 0.75	< 0.75	< 3.8 UJ
1,2-Dichloroethane	2	< 0.75	< 3.8	< 0.75 UJ	< 0.75	< 0.75	< 3.8 UJ
1,2-Dichloropropane	1	< 0.75	< 3.8	< 0.75 UJ	< 0.75	< 0.75	< 3.8 UJ
1,3,5-Trimethylbenzene	100	**10.9**	< 3.8	**11.6 J**	**14**	< 0.75	< 3.8 UJ
1,3-Dichlorobenzene	600	< 0.75	< 3.8	< 0.75 UJ	< 0.75	< 0.75	< 3.8 UJ
1,3-Dichloropropane	100	< 0.75	< 3.8	< 0.75 UJ	< 0.75	< 0.75	< 3.8 UJ
1,4-Dichlorobenzene	75	< 0.75	< 3.8	< 0.75 UJ	< 0.75	< 0.75	< 3.8 UJ
2,2-Dichloropropane	100	< 0.75	< 3.8	< 0.75 UJ	< 0.75	< 0.75	< 3.8 UJ
2-Chlorotoluene	100	< 0.75	< 3.8	< 0.75 UJ	< 0.75	< 0.75	< 3.8 UJ
Acetone	6,000	**6.3**	< 18.8	**6.6 J-**	**5.8**	< 3.8	< 18.8 UJ
Benzene	1	< 0.75	< 3.8	< 0.75 UJ	< 0.75	< 0.75	< 3.8 UJ
Bromobenzene	100	< 0.75	< 3.8	< 0.75 UJ	< 0.75	< 0.75	< 3.8 UJ
Bromochloromethane	100	< 0.75	< 3.8	< 0.75 UJ	< 0.75	< 0.75	< 3.8 UJ
Bromodichloromethane	1	< 0.75	< 3.8	< 0.75 UJ	< 0.75	< 0.75	< 3.8 UJ
Bromoform	4	< 0.75	< 3.8	< 0.75 UJ	< 0.75	< 0.75	< 3.8 UJ
Carbon tetrachloride	1	< 0.75	< 3.8	< 0.75 UJ	< 0.75	< 0.75	< 3.8 UJ
Chlorobenzene	50	< 0.75	< 3.8	< 0.75 UJ	< 0.75	< 0.75	< 3.8 UJ
Chlorodibromomethane	1	< 0.75	< 3.8	< 0.75 UJ	< 0.75	< 0.75	< 3.8 UJ
Chloroethane	5	< 0.75	< 3.8	< 0.75 UJ	< 0.75	< 0.75	< 3.8 UJ
Chloroform	70	< 0.75	< 3.8	< 0.75 UJ	< 0.75	< 0.75	< 3.8 UJ
Cis-1,2-Dichloroethene	70	< 0.75	< 3.8	< 0.75 UJ	< 0.75	< 0.75	< 3.8 UJ
Cis-1,3-Dichloropropene	1	< 0.75	< 3.8	< 0.75 UJ	< 0.75	< 0.75	< 3.8 UJ
Cymene	100	**22.3**	**3.9 J**	**5.3 J-**	**5.7**	< 0.75	< 3.8 UJ
Dichlorodifluoromethane	1,000	< 0.75	< 3.8	< 0.75 UJ	< 0.75	< 0.75	< 3.8 UJ
Ethyl benzene	700	**0.55 J**	< 3.8	**0.75 J**	**0.91 J**	< 0.75	< 3.8 UJ
Hexachlorobutadiene	1	< 0.75	< 3.8	< 3.8 UJ	< 3.8	< 0.75	< 18.8 UJ
Isopropylbenzene	700	**10.3**	< 3.8	**4.1 J-**	**5.1**	< 0.75	< 3.8 UJ
Meta/Para Xylene	1,000	< 1.5	< 7.5	< 1.5 UJ	< 1.5	< 1.5	< 7.5 UJ
Methyl bromide	10	< 0.75	< 3.8	**0.4 JB**	**0.42 JB**	**0.53 JB**	**2 J**
Methyl butyl ketone	300	< 3.8	< 18.8	< 3.8 UJ	< 3.8	< 3.8	< 18.8 UJ
Methyl chloride	100	< 0.75	< 3.8	< 0.75 UJ	< 0.75	< 0.75	< 3.8 UJ
Methyl ethyl ketone	300	< 3.8	< 18.8	< 3.8 UJ	< 3.8	< 3.8	< 18.8 UJ
Methyl isobutyl ketone	100	< 3.8	< 18.8	< 3.8 UJ	< 3.8	< 3.8	< 18.8 UJ
Methyl Tertbutyl Ether	70	< 0.75	< 3.8	< 0.75 UJ	< 0.75	< 0.75	< 3.8 UJ
Methylene chloride	3	< 0.75	< 3.8	< 0.75 UJ	< 0.75	< 0.75	< 3.8 UJ
Naphthalene	300	**68.7**	**8.5 J+**	**30.8 J-**	**35.8 J-**	**1**	**22.9 J-**
n-Butylbenzene	100	**18.1**	**3.5 J**	**3.1 J**	< 0.75 UJ	< 0.75	< 3.8 UJ
Ortho Xylene	1,000	< 0.75	< 3.8	< 0.75 UJ	< 0.75	< 0.75	< 3.8 UJ
p-Chlorotoluene	100	< 0.75	< 3.8	< 0.75 UJ	< 0.75	< 0.75	< 3.8 UJ
Propylbenzene	100	**12.9**	**5.2 J+**	**5.5 J**	**6.5**	< 0.75	< 3.8 UJ
sec-Butylbenzene	100	**25.6**	**6.9 J+**	**8.6 J**	**8.7**	**0.75 J**	< 3.8 UJ
Styrene	100	< 0.75	< 3.8	< 0.75 UJ	< 0.75	< 0.75	< 3.8 UJ
Tert Butyl Alcohol	100	< 12.5	< 62.5	< 12.5 UJ	< 12.5	< 12.5	< 62.5 UJ
tert-Butylbenzene	100	< 0.75	< 3.8	< 0.75 UJ	**0.8 J**	< 0.75	< 3.8 UJ
Tetrachloroethene	1	< 0.75	< 3.8	< 0.75 UJ	< 0.75	< 0.75	< 3.8 UJ
Toluene	600	< 0.75	< 3.8	< 0.75 UJ	< 0.75	< 0.75	< 3.8 UJ
Total Xylenes	1,000	NA	< 11.3	< 2.3 UJ	< 2.3	< 2.3	< 11.3 UJ
Trans-1,2-Dichloroethene	100	< 0.75	< 3.8	< 0.75 UJ	< 0.75	< 0.75	< 3.8 UJ
Trans-1,3-Dichloropropene	1	< 0.75	< 3.8	< 0.75 UJ	< 0.75	< 0.75	< 3.8 UJ
Trichloroethene	1	< 0.75	< 3.8	< 0.75 UJ	< 0.75	< 0.75	< 3.8 UJ
Trichlorofluoromethane	2,000	< 0.75	< 3.8	< 0.75 UJ	< 0.75	< 0.75	< 3.8 UJ
Vinyl chloride	1	< 0.75	< 3.8	< 0.75 UJ	< 0.75	< 0.75	< 3.8 UJ
TIC VOCs (µg/L)							
Total TICs	500	NA	**203.6 JN**	**239.3 JN**	**334.8 JN**	**35.9 JN**	**19.4 JN**
Semivolatile Organic Compounds (µg/L)							
1,2,4-Trichlorobenzene	9	< 1	< 5	< 5	< 5	< 5	< 5
1,2-Dichlorobenzene	600	< 1	< 5	< 5 UJ	< 5	< 5	< 5
1,2-Diphenylhydrazine	20	< 1	< 5	< 5	< 5	< 5	< 5
1,3-Dichlorobenzene	600	< 1	< 5 UJ	< 5 UJ	< 5 UJ	< 5 UJ	< 5 UJ
1,4-Dichlorobenzene	75	< 1	< 5	< 5	< 5	< 5	< 5
2,4,5-Trichlorophenol	700	< 3.1	< 15	< 15	< 15	< 15	< 15
2,4,6-Trichlorophenol	20	< 1	< 5	< 5	< 5	< 5	< 5
2,4-Dichlorophenol	20	< 1	< 5	< 5	< 5	< 5	< 5
2,4-Dimethylphenol	100	< 5.2	< 25	< 25	< 25	< 25	< 25
2,4-Dinitrophenol	40	< 8.3	< 40	< 40	< 40	< 40	< 40
2,4-Dinitrotoluene	10	< 1	< 5	< 5	< 5	< 5	< 5
2,6-Dinitrotoluene	10	< 1	< 5	< 5	< 5	< 5	< 5
2-Chloronaphthalene	600	< 1	< 5	< 5	< 5	< 5	< 5
2-Chlorophenol	40	< 2.1	< 10	< 10	< 10	< 10	< 10
2-Methylnaphthalene	30	**148**	**379**	**20.8 J**	**54.2 J**	**1.2 J**	< 5
2-Methylphenol	100	< 1	< 5	< 5	< 5	< 5	< 5

TABLE 2
GROUND WATER SAMPLING RESULTS for TEMPORARY WELLS - COMPARISON TO NJDEP GROUND WATER QUALITY CRITERIA
SITE AREA 800, PARCEL 55 800-12 USTAREA 800, PARCEL 55 800-12 USTAREA 800, PARCEL 55 800-12 UST
FORT MONMOUTH, NEW JERSEY

Loc ID	NJ Ground Water Quality Criteria	A800-TMW-07	PAR-55-800-12-TMW-01	PAR-55-800-12-TMW-02		PAR-55-800-12-TMW-03	PAR-55-800-12-TMW-04
Sample ID		ARE-800-TMW-07	PAR-55-800-12-TMW-01-13	PAR-55-800-12-TMW-02-12.5	PAR-55-800-12-TMW-102-12.5	PAR-55-800-12-TMW-03-13	PAR-55-800-12-TMW04-12.5
Sample Date		8/4/2016	11/9/2017	11/9/2017	11/9/2017	11/9/2017	11/9/2017
Sample Round							
Filtered		Total	Total	Total	Total	Total	Total
Semivolatile Organic Compounds (µg/L)							
2-Nitroaniline	100	< 1	< 5	< 5	< 5	< 5	< 5
2-Nitrophenol	100	< 2.1	< 10	< 10	< 10	< 10	< 10
3,3'-Dichlorobenzidine	30	< 3.1	< 15	< 15	< 15	< 15	< 15
3-Nitroaniline	100	< 2.1	< 10	< 10	< 10	< 10	< 10
4,6-Dinitro-2-methylphenol	1	< 5.2	< 25	< 25	< 25	< 25	< 25
4-Bromophenyl phenyl ether	100	< 1	< 5	< 5	< 5	< 5	< 5
4-Chloro-3-methylphenol	100	< 1	< 5	< 5	< 5	< 5	< 5
4-Chloroaniline	30	< 1	< 5	< 5	< 5	< 5	< 5
4-Chlorophenyl phenyl ether	100	< 1	< 5	< 5	< 5	< 5	< 5
4-Nitroaniline	5	< 1	< 5	< 5	< 5	< 5	< 5
4-Nitrophenol	100	< 5.2	< 25 UJ	< 25 UJ	< 25 UJ	< 25 UJ	< 25 UJ
Acenaphthene	400	< 1	< 5	< 5 UJ	**39.8 J**	**1.5 J**	< 5
Acenaphthylene	100	< 1	< 5	< 5	< 5	< 5	< 5
Anthracene	2,000	**1.8 J**	< 5	< 5 UJ	**16.8 J**	< 5	< 5
Benzidine	20	< 31.3 UJ	< 150	< 150	< 150	< 150	< 150
Benzo(a)anthracene	0.1	**0.2 J**	< 5	< 5	< 5	< 5	< 5
Benzo(a)pyrene	0.1	< 1	< 5	< 5	< 5	< 5	< 5
Benzo(b)fluoranthene	0.2	< 1	< 5	< 5	< 5	< 5	< 5
Benzo(ghi)perylene	100	< 1	< 5	< 5	< 5	< 5	< 5
Benzo(k)fluoranthene	0.5	< 1	< 5	< 5	< 5	< 5	< 5
Benzyl alcohol	2,000	< 2.1	< 10	< 10	< 10	< 10	< 10
Bis(2-Chloroethoxy)methane	100	< 1	< 5	< 5	< 5	< 5	< 5
Bis(2-Chloroethyl)ether	7	< 1	< 5	< 5	< 5	< 5	< 5
Bis(2-Chloroisopropyl)ether	300	< 1	< 5	< 5	< 5	< 5	< 5
Bis(2-Ethylhexyl)phthalate	3	< 1	**1.2 J**	**2.9 J**	**5.1 J**	< 5	**3.6 J**
Butyl benzyl phthalate	100	< 1	< 5	< 5	< 5	< 5	< 5
Carbazole	100	< 1	< 5	< 5	< 5	< 5	< 5
Chrysene	5	< 1	< 5	< 5	< 5	< 5	< 5
Cresol	NLE	< 1	< 5	< 5	< 5	< 5	< 5
Dibenz(a,h)anthracene	0.3	< 1	< 5	< 5	< 5	< 5	< 5
Dibenzofuran	100	**4.5 J**	**21.6 J**	**8.6 J**	**29.9 J**	**1 J**	< 5
Diethyl phthalate	6,000	< 1	< 5	< 5	< 5	< 5	< 5
Dimethyl phthalate	100	< 1	< 5	< 5	< 5	< 5	< 5
Di-n-butylphthalate	700	< 1	< 5	< 5	< 5	< 5	< 5
Di-n-octylphthalate	100	< 1	< 5	< 5	< 5	< 5	< 5
Fluoranthene	300	< 1	< 5	< 5	< 5	< 5	< 5
Fluorene	300	< 1	**39**	**16.9 J**	**65.1 J**	**2.1 J**	< 5
Hexachlorobenzene	0.02	< 1	< 5	< 5	< 5	< 5	< 5
Hexachlorobutadiene	1	< 1	< 5 UJ	< 5 UJ	< 5 UJ	< 5 UJ	< 5 UJ
Hexachlorocyclopentadiene	40	< 2.1	< 10 UJ	< 10 UJ	< 10 UJ	< 10 UJ	< 10 UJ
Hexachloroethane	7	< 1	< 5 UJ	< 5 UJ	< 5 UJ	< 5 UJ	< 5 UJ
Indeno(1,2,3-cd)pyrene	0.2	< 1	< 5	< 5	< 5	< 5	< 5
Isophorone	40	< 1	< 5	< 5	< 5	< 5	< 5
Naphthalene	300	**15.5**	< 5	**9.8 J**	**20.8 J**	< 5	< 5
Nitrobenzene	6	< 2.1	< 10	< 10	< 10	< 10	< 10
N-Nitrosodimethylamine	0.8	< 2.1	< 10 UJ	< 10 UJ	< 10 UJ	< 10 UJ	< 10 UJ
N-Nitroso-di-n-propylamine	10	< 1	< 5	< 5	< 5	< 5	< 5
N-Nitrosodiphenylamine	10	< 2.1	< 10	< 10	< 10	< 10	< 10
Pentachlorophenol	0.3	< 8.3	< 40	< 40	< 40	< 40	< 40
Phenanthrene	100	**20.5**	**85.2**	**29.1 J**	**107 J**	**4 J**	< 5
Phenol	2,000	< 1	< 5 UJ	< 5 UJ	< 5 UJ	< 5 UJ	< 5 UJ
Pyrene	200	**3.3**	**7 J**	**1.5 J**	**5.6 J**	< 5	< 5
TIC SVOCs (µg/L)							
Total TICs	500	**510.5 JN**	**8649 JN**	**740.3 JN**	**2784.8 JN**	**28.3 JN**	**100.9 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.

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.

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

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 = 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 high.

NA = Not Applicable

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

µg/L = micrograms per Liter

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
GROUND WATER SAMPLING RESULTS for PERMANENT WELLS - COMPARISON TO NJDEP GROUND WATER QUALITY CRITERIA
SITE AREA 800, PARCEL 55 800-12 USTAREA 800, PARCEL 55 800-12 USTAREA 800, PARCEL 55 800-12 UST
FORT MONMOUTH, NEW JERSEY

Loc ID	NJ Ground Water Quality Criteria	PAR-55-800-12--MW-01	PAR-55-800-12-MW-02	PAR-55-800-12-MW-03		PAR-55-800-12-MW-04
Sample ID		PAR-55-800-12-GW-MW-01-15.7	PAR-55-800-12-GW-MW-02-14.2	PAR-55-800-12-GW-MW-03-12.5	PAR-55-800-12-GW-MW-03-17.5	PAR-55-800-12-GW-MW-04-18.3
Sample Date		1/17/2018	1/17/2018	1/17/2018	1/17/2018	1/17/2018
Sample Round						
Filtered		Total	Total	Total	Total	Total
Volatile Organic Compounds (µg/L)						
1,1,1,2-Tetrachloroethane	1	< 0.75 UJ	< 0.75	< 0.75 UJ	< 0.75	< 0.75
1,1,1-Trichloroethane	30	< 0.75 UJ	< 0.75	< 0.75 UJ	< 0.75	< 0.75
1,1,2,2-Tetrachloroethane	1	< 0.75 UJ	< 0.75	< 0.75 UJ	< 0.75	< 0.75
1,1,2-Trichloroethane	3	< 0.75 UJ	< 0.75	< 0.75 UJ	< 0.75	< 0.75
1,1-Dichloroethane	50	< 0.75 UJ	< 0.75	< 0.75 UJ	< 0.75	< 0.75
1,1-Dichloroethene	1	< 0.75 UJ	< 0.75	< 0.75 UJ	< 0.75	< 0.75
1,1-Dichloropropene	100	< 0.75 UJ	< 0.75	< 0.75 UJ	< 0.75	< 0.75
1,2,3-Trichlorobenzene	100	< 0.75 UJ	< 0.75	< 0.75 UJ	< 0.75	< 0.75
1,2,3-Trichloropropane	0.03	< 2.5 UJ	< 2.5	< 2.5 UJ	< 2.5	< 2.5
1,2,4-Trichlorobenzene	9	< 0.75 UJ	< 0.75	< 0.75 UJ	< 0.75	< 0.75
1,2,4-Trimethylbenzene	100	< 0.75 UJ	**3.8**	< 0.75 UJ	< 0.75	< 0.75
1,2-Dibromo-3-chloropropane	0.02	< 2.5 UJ	< 2.5	< 2.5 UJ	< 2.5	< 2.5
1,2-Dibromoethane	0.03	< 0.75 UJ	< 0.75	< 0.75 UJ	< 0.75	< 0.75
1,2-Dichlorobenzene	600	< 0.75 UJ	< 0.75	< 0.75 UJ	< 0.75	< 0.75
1,2-Dichloroethane	2	< 0.75 UJ	< 0.75	< 0.75 UJ	< 0.75	< 0.75
1,2-Dichloropropane	1	< 0.75 UJ	< 0.75	< 0.75 UJ	< 0.75	< 0.75
1,3,5-Trimethylbenzene	100	< 0.75 UJ	**1.9**	< 0.75 UJ	< 0.75	< 0.75
1,3-Dichlorobenzene	600	< 0.75 UJ	< 0.75	< 0.75 UJ	< 0.75	< 0.75
1,3-Dichloropropane	100	< 0.75 UJ	< 0.75	< 0.75 UJ	< 0.75	< 0.75
1,4-Dichlorobenzene	75	< 0.75 UJ	< 0.75	< 0.75 UJ	< 0.75	< 0.75
2,2-Dichloropropane	100	< 0.75 UJ	< 0.75	< 0.75 UJ	< 0.75	< 0.75
2-Chlorotoluene	100	< 0.75 UJ	< 0.75	< 0.75 UJ	< 0.75	< 0.75
Acetone	6,000	< 3.8 UJ	**5 J**	< 3.8 UJ	< 3.8	< 3.8
Benzene	1	< 0.75 UJ	< 0.75	< 0.75 UJ	< 0.75	< 0.75
Bromobenzene	100	< 0.75 UJ	< 0.75	< 0.75 UJ	< 0.75	< 0.75
Bromochloromethane	100	< 0.75 UJ	< 0.75	< 0.75 UJ	< 0.75	< 0.75
Bromodichloromethane	1	< 0.75 UJ	< 0.75	< 0.75 UJ	< 0.75	< 0.75
Bromoform	4	< 0.75 UJ	< 0.75	< 0.75 UJ	< 0.75	< 0.75
Carbon tetrachloride	1	< 0.75 UJ	< 0.75	< 0.75 UJ	< 0.75	< 0.75
Chlorobenzene	50	< 0.75 UJ	< 0.75	< 0.75 UJ	< 0.75	< 0.75
Chlorodibromomethane	1	< 0.75 UJ	< 0.75	< 0.75 UJ	< 0.75	< 0.75
Chloroethane	5	< 0.75 UJ	< 0.75	< 0.75 UJ	< 0.75	< 0.75
Chloroform	70	< 0.75 UJ	< 0.75	< 0.75 UJ	< 0.75	< 0.75
Cis-1,2-Dichloroethene	70	< 0.75 UJ	< 0.75	< 0.75 UJ	< 0.75	< 0.75
Cis-1,3-Dichloropropene	1	< 0.75 UJ	< 0.75	< 0.75 UJ	< 0.75	< 0.75
Cymene	100	< 0.75 UJ	**2.1**	< 0.75 UJ	< 0.75	< 0.75
Dichlorodifluoromethane	1,000	< 0.75 UJ	< 0.75	< 0.75 UJ	< 0.75	< 0.75
Ethyl benzene	700	< 0.75 UJ	< 0.75	< 0.75 UJ	< 0.75	< 0.75
Hexachlorobutadiene	1	< 3.8 UJ	< 3.8	< 3.8 UJ	< 3.8	< 3.8
Isopropylbenzene	700	< 0.75 UJ	**1.8**	< 0.75 UJ	< 0.75	< 0.75
Meta/Para Xylene	1,000	< 1.5 UJ	< 1.5	< 1.5 UJ	< 1.5	< 1.5
Methyl bromide	10	< 0.75 UJ	< 0.75	< 0.75 UJ	< 0.75	< 0.75
Methyl butyl ketone	300	< 3.8 UJ	< 3.8	< 3.8 UJ	< 3.8	< 3.8
Methyl chloride	100	< 0.75 UJ	< 0.75	< 0.75 UJ	< 0.75	< 0.75
Methyl ethyl ketone	300	< 3.8 UJ	< 3.8	< 3.8 UJ	< 3.8	< 3.8
Methyl isobutyl ketone	100	< 3.8 UJ	< 3.8	< 3.8 UJ	< 3.8	< 3.8
Methyl Tertbutyl Ether	70	< 0.75 UJ	< 0.75	< 0.75 UJ	< 0.75	< 0.75
Methylene chloride	3	< 0.75 UJ	< 0.75	< 0.75 UJ	< 0.75	< 0.75
Naphthalene	300	< 0.75 UJ	**1.9**	< 0.75 UJ	< 0.75	< 0.75
n-Butylbenzene	100	< 0.75 UJ	**8.7**	< 0.75 UJ	< 0.75	< 0.75
Ortho Xylene	1,000	< 0.75 UJ	< 0.75	< 0.75 UJ	< 0.75	< 0.75
p-Chlorotoluene	100	< 0.75 UJ	< 0.75	< 0.75 UJ	< 0.75	< 0.75
Propylbenzene	100	< 0.75 UJ	**2**	< 0.75 UJ	< 0.75	< 0.75
sec-Butylbenzene	100	< 0.75 UJ	**3.6**	< 0.75 UJ	< 0.75	< 0.75
Styrene	100	< 0.75 UJ	< 0.75	< 0.75 UJ	< 0.75	< 0.75
Tert Butyl Alcohol	100	< 12.5 UJ	< 12.5	< 12.5 UJ	< 12.5	< 12.5
tert-Butylbenzene	100	< 0.75 UJ	< 0.75	< 0.75 UJ	< 0.75	< 0.75
Tetrachloroethene	1	< 0.75 UJ	< 0.75	< 0.75 UJ	< 0.75	< 0.75
Toluene	600	< 0.75 UJ	< 0.75	< 0.75 UJ	< 0.75	< 0.75
Total Xylenes	1,000	< 2.3 UJ	< 2.3	< 2.3 UJ	< 2.3	< 2.3
Trans-1,2-Dichloroethene	100	< 0.75 UJ	< 0.75	< 0.75 UJ	< 0.75	< 0.75
Trans-1,3-Dichloropropene	1	< 0.75 UJ	< 0.75	< 0.75 UJ	< 0.75	< 0.75
Trichloroethene	1	< 0.75 UJ	< 0.75	< 0.75 UJ	< 0.75	< 0.75
Trichlorofluoromethane	2,000	< 0.75 UJ	< 0.75	< 0.75 UJ	< 0.75	< 0.75
Vinyl chloride	1	< 0.75 UJ	< 0.75	< 0.75 UJ	< 0.75	< 0.75
TIC VOCs (µg/L)						
Total TICs	500	NA	**142.9 JN**	NA	NA	NA
Semivolatile Organic Compounds (µg/L)						
1,2,4-Trichlorobenzene	9	< 0.99	< 0.98	< 0.99	< 1	< 1
1,2-Dichlorobenzene	600	< 0.99	< 0.98	< 0.99	< 1	< 1
1,2-Diphenylhydrazine	20	< 0.99	< 0.98	< 0.99	< 1	< 1
1,3-Dichlorobenzene	600	< 0.99	< 0.98	< 0.99	< 1	< 1
1,4-Dichlorobenzene	75	< 0.99	< 0.98	< 0.99	< 1	< 1
2,4,5-Trichlorophenol	700	< 3	< 2.9	< 3	< 3	< 3
2,4,6-Trichlorophenol	20	< 0.99	< 0.98	< 0.99	< 1	< 1
2,4-Dichlorophenol	20	< 0.99	< 0.98	< 0.99	< 1	< 1
2,4-Dimethylphenol	100	< 4.9	< 4.9	< 4.9	< 5	< 5.1
2,4-Dinitrophenol	40	< 7.9	< 7.8	< 7.9	< 8	< 8.1
2,4-Dinitrotoluene	10	< 0.99	< 0.98	< 0.99	< 1	< 1
2,6-Dinitrotoluene	10	< 0.99	< 0.98	< 0.99	< 1	< 1
2-Chloronaphthalene	600	< 0.99	< 0.98	< 0.99	< 1	< 1
2-Chlorophenol	40	< 2	< 2	< 2	< 2	< 2
2-Methylnaphthalene	30	< 0.99	**0.77 J**	< 0.99	< 1	< 1

TABLE 3
GROUND WATER SAMPLING RESULTS for PERMANENT WELLS - COMPARISON TO NJDEP GROUND WATER QUALITY CRITERIA
SITE AREA 800, PARCEL 55 800-12 USTAREA 800, PARCEL 55 800-12 USTAREA 800, PARCEL 55 800-12 UST
FORT MONMOUTH, NEW JERSEY

Loc ID	NJ Ground Water Quality Criteria	PAR-55-800-12--MW-01	PAR-55-800-12-MW-02	PAR-55-800-12-MW-03		PAR-55-800-12-MW-04
Sample ID		PAR-55-800-12-GW-MW-01-15.7	PAR-55-800-12-GW-MW-02-14.2	PAR-55-800-12-GW-MW-03-12.5	PAR-55-800-12-GW-MW-03-17.5	PAR-55-800-12-GW-MW-04-18.3
Sample Date		1/17/2018	1/17/2018	1/17/2018	1/17/2018	1/17/2018
Sample Round						
Filtered		Total	Total	Total	Total	Total
Semivolatile Organic Compounds (µg/L)						
2-Methylphenol	100	< 0.99	< 0.98	< 0.99	< 1	< 1
2-Nitroaniline	100	< 0.99	< 0.98	< 0.99	< 1	< 1
2-Nitrophenol	100	< 2	< 2	< 2	< 2	< 2
3,3'-Dichlorobenzidine	30	< 3	< 2.9	< 3	< 3	< 3
3-Nitroaniline	100	< 2	< 2	< 2	< 2	< 2
4,6-Dinitro-2-methylphenol	1	< 4.9	< 4.9	< 4.9	< 5	< 5.1
4-Bromophenyl phenyl ether	100	< 0.99	< 0.98	< 0.99	< 1	< 1
4-Chloro-3-methylphenol	100	< 0.99	< 0.98	< 0.99	< 1	< 1
4-Chloroaniline	30	< 0.99	< 0.98	< 0.99	< 1	< 1
4-Chlorophenyl phenyl ether	100	< 0.99	< 0.98	< 0.99	< 1	< 1
4-Nitroaniline	5	< 0.99	< 0.98	< 0.99	< 1	< 1
4-Nitrophenol	100	< 4.9	< 4.9	< 4.9	< 5	< 5.1
Acenaphthene	400	< 0.99	**1.8 J**	< 0.99	< 1	< 1
Acenaphthylene	100	< 0.99	< 0.98	< 0.99	< 1	< 1
Anthracene	2,000	< 0.99	< 0.98	< 0.99	< 1	< 1
Benzidine	20	< 29.6	< 29.4	< 29.6	< 29.9	< 30.3
Benzo(a)anthracene	0.1	< 0.99	< 0.98	< 0.99	< 1	< 1
Benzo(a)pyrene	0.1	< 0.99	< 0.98	< 0.99	< 1	< 1
Benzo(b)fluoranthene	0.2	< 0.99	< 0.98	< 0.99	< 1	< 1
Benzo(ghi)perylene	100	< 0.99	< 0.98	< 0.99	< 1	< 1
Benzo(k)fluoranthene	0.5	< 0.99	< 0.98	< 0.99	< 1	< 1
Benzyl alcohol	2,000	< 2	< 2	< 2	< 2	< 2
Bis(2-Chloroethoxy)methane	100	< 0.99	< 0.98	< 0.99	< 1	< 1
Bis(2-Chloroethyl)ether	7	< 0.99	< 0.98	< 0.99	< 1	< 1
Bis(2-Chloroisopropyl)ether	300	< 0.99	< 0.98	< 0.99	< 1	< 1
Bis(2-Ethylhexyl)phthalate	3	< 0.99	< 0.98	**0.5 J**	< 1	**0.3 J**
Butyl benzyl phthalate	100	< 0.99	< 0.98	< 0.99	< 1	**0.24 J**
Carbazole	100	< 0.99	< 0.98	< 0.99	< 1	< 1
Chrysene	5	< 0.99	< 0.98	< 0.99	< 1	< 1
Cresol	NLE	< 0.99	< 0.98	< 0.99	< 1	< 1
Dibenz(a,h)anthracene	0.3	< 0.99	< 0.98	< 0.99	< 1	< 1
Dibenzofuran	100	< 0.99	**1.7 J**	< 0.99	< 1	< 1
Diethyl phthalate	6,000	< 0.99	< 0.98	< 0.99	< 1	< 1
Dimethyl phthalate	100	< 0.99	< 0.98	< 0.99	< 1	< 1
Di-n-butylphthalate	700	< 0.99	**0.18 J**	**0.17 J**	**0.25 J**	< 1
Di-n-octylphthalate	100	< 0.99	< 0.98	< 0.99	< 1	< 1
Fluoranthene	300	< 0.99	< 0.98	< 0.99	< 1	< 1
Fluorene	300	< 0.99	**2.7**	< 0.99	< 1	< 1
Hexachlorobenzene	0.02	< 0.99	< 0.98	< 0.99	< 1	< 1
Hexachlorobutadiene	1	< 0.99	< 0.98	< 0.99	< 1	< 1
Hexachlorocyclopentadiene	40	< 2	< 2	< 2	< 2	< 2
Hexachloroethane	7	< 0.99	< 0.98	< 0.99	< 1	< 1
Indeno(1,2,3-cd)pyrene	0.2	< 0.99	< 0.98	< 0.99	< 1	< 1
Isophorone	40	< 0.99	< 0.98	< 0.99	< 1	< 1
Naphthalene	300	< 0.99	**0.79 J**	< 0.99	< 1	< 1
Nitrobenzene	6	< 2	< 2	< 2	< 2	< 2
N-Nitrosodimethylamine	0.8	< 2	< 2	< 2	< 2	< 2
N-Nitroso-di-n-propylamine	10	< 0.99	< 0.98	< 0.99	< 1	< 1
N-Nitrosodiphenylamine	10	< 2	< 2	< 2	< 2	< 2
Pentachlorophenol	0.3	< 7.9	< 7.8	< 7.9	< 8	< 8.1
Phenanthrene	100	< 0.99	**1 J**	< 0.99	< 1	< 1
Phenol	2,000	< 0.99	< 0.98	< 0.99	< 1	< 1
Pyrene	200	< 0.99	< 0.98	< 0.99	< 1	< 1
TIC SVOCs (µg/L)						
Total TICs	500	**5.9 JN**	**159.1 JN**	**17.6 JN**	**4.9 J**	**4.4 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.

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.

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

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

NA = Not Applicable

µg/L = micrograms per Liter

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: *Request for No Further Action at Multiple 800 Area Underground Storage Tanks, Site Investigation Report Addendum, Fort Monmouth, Oceanport, Monmouth County.* March 16.
4. 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.
5. 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.
6. 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.

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

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)

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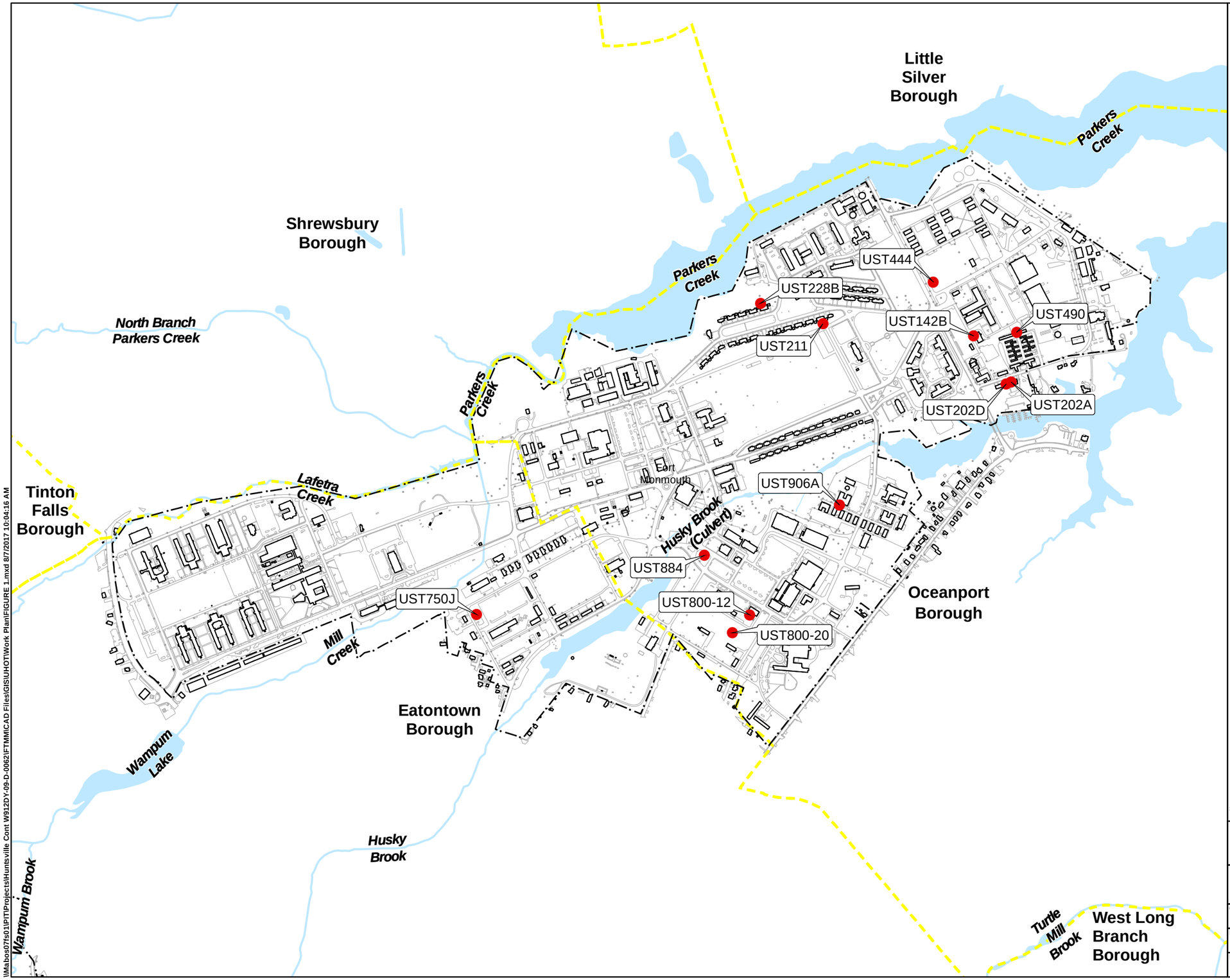

LEGEND:

- UHOT Location
- Installation Boundary
- Municipal Boundary
- Surface Water Feature

NOTE:

UST3035 is located within the Charles Woods area, see text.

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**

UHOT LOCATIONS

CREATED BY: RR	REVIEWED BY: KF
DATE: AUG. 2017	FIGURE NUMBER: FIGURE 1
PROJECT NUMBER: 748810-06031	FILE: FIGURE 1.mxd

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TABLE 1
SAMPLING SUMMARY FOR SUPPLEMENTAL UHOT WORK PLAN
FORT MONMOUTH, NEW JERSEY

Parcel	Location and General Rationale (see text)	Field Installation				Field Meter Readings [a/]	VOCs + TICs by Method 8260C [b/]	SVOCs + TICs by Method 8270D [c/]	Non-Fractionated EPH [d/ e/]
		SCRN	TMW	MW	SB				
Groundwater									
79	UST 142B (Figure 2) - 1 permanent well for low turbidity groundwater sample for release detection	--	--	1	--	1	1	1	0
81	USTs 202A and 202D (Figure 3) - Multiple groundwater samples for release detection (UST 202A) and delineation (UST 202D)	1	3	1	--	5	5	5	0
72	UST 211 (Figure 4) - multiple field screening borings and groundwater samples for delineation	7	4	3	--	14	7	7	0
79	UST 444 (Figure 6) - multiple field screening borings and groundwater samples for delineation	6	3	3	--	12	6	6	0
79	UST 490 (Figure 7) - multiple field screening borings and groundwater samples for delineation	2	4	2	--	7	7	7	0
51	UST 750J (Figure 8) - One groundwater sample for release detection	--	1	--	--	1	1	1	0
55	UST 800-12 (Figure 9) - multiple field screening borings and groundwater samples for delineation	6	4	3	--	13	7	7	0
56	UST 800-20 (Figure 10) - multiple field screening borings and groundwater samples for delineation	6	4	3	--	13	7	7	0
54	UST 884 (Figure 11) - multiple field screening borings and groundwater samples for delineation	6	4	3	--	13	7	7	0
68	UST 906A (Figure 13) - multiple groundwater samples for delineation	0	3	3	--	6	6	6	0
Soil									
72	UST 228B (Figure 5) - 1 soil sample for 2-methylnaphthalene analysis by SPLP [f/]	--	--	--	1	1	0	1 (SPLP)	0
68	UST 906A (Figure 12) - 1 additional soil boring for delineation	--	--	--	1	1	0	1	3
1	UST 3035 (Figure 14) - 3 soil borings for release detection	--	--	--	3	3	0	2	6
QA/QC samples (see SAP for additional details) [g/]									
Field Duplicates (5% Sampling Frequency per media)		NA [h/]	NA	NA	NA	NA	3	4	1
Matrix Spike (5% Sampling Frequency per media)		NA	NA	NA	NA	NA	3	4	1
Matrix Spike Duplicate (5% Sampling Frequency per m		NA	NA	NA	NA	NA	3	4	1
Trip Blank (1 per cooler of VOCs per media)		NA	NA	NA	NA	NA	3	0	0
QA Split (5% per media)		NA	NA	NA	NA	NA	3	4	1
Equipment Blank (5% Sampling Frequency per media)		NA	NA	NA	NA	NA	3	4	1
	TOTAL	**34**	**30**	**22**	**10**	**NA**	**72**	**77**	**14**

Notes:

[a/] SCRN = Geoprobe boring for field screening; TMW = temporary monitor well; MW = Permanent monitor well; SB = soil boring for soil analyses

[a/] Field meter readings include, in soil samples: photoionization detector (PID) readings along entire soil column; and in groundwater: PID headspac pH, temperature, electrical conductivity, dissolved oxygen (DO), oxidation-reduction potential (ORP), and turbidity.

[b/] VOCs = volatile organic compounds; TICs = tentatively identified compounds.

[c/] SVOCs = semivolatile organic compounds; TICs = tentatively identified compounds.

[d/] EPH = extractable petroleum hydrocarbons.

[e/] If any EPH concentrations in soil exceed 1000 mg/kg in any of the site samples, then minimum 25% of the samples where EPH exceeds 1000 m

[f/] SPLP = Synthetic Precipitation Leachate Procedure method SW1312

[g/] QA/QC = quality assurance/quality control; SAP = Sampling and Analysis Plan.

[h/] NA = not applicable.

State of New Jersey

CHRIS CHRISTIE
Governor

KIM GUADAGNO
Lt. Governor

DEPARTMENT OF ENVIRONMENTAL PROTECTION
Bureau of Case Management
401 East State Street
P.O. Box 420/Mail Code 401-05F
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Phone #: 609-633-1455
Fax #: 609-292-2117

BOB MARTIN
Commissioner

March 16, 2017

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

Re: *Request for No Further Action at Multiple 800 Area Underground Storage Tanks, Site Investigation Report 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 report, received January 25, 2017, prepared by the Department of the Army's Office of Assistant Chief of Staff for Installation Management in response to the NJDEP letter correspondence of November 10, 2015 and to present the results of additional field sampling at nine former underground storage tanks (USTs). A ground water investigation was performed at each of the nine former UST locations, as required. The report is approved; comments are as follows:

USTs Requiring No Additional Action

Following review of the information provided in the referenced submittal, it is agreed no further action is necessary for the following #2 fuel USTs:

UST 800-1
UST 800-9
UST 800-21
UST 813
UST 814
UST 888

USTs Requiring Additional Remedial Efforts

The ground water analytical results from temporary well points at each of the following former UST locations exceed applicable Ground Water Quality Standards, N.J.A.C. 7:9-6. As indicated in the submittal, additional remediation is necessary at each of the following USTs:

UST 800-12
UST 800-20
UST 884

This office looks forward to receipt of your anticipated course of action to address the elevated levels of ground water.

Please contact this office if you have any questions.

Sincerely,

Linda S. Range

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

23 January 2017

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

Re: Request for No Further Action at Multiple 800 Area Underground Storage Tanks
Site Investigation Report Addendum
Fort Monmouth, New Jersey

Attachments:

A. Figure 1 Study Area Location (800 Area) and Figure 2 – Study Area 800 Sample Locations (showing exceedances)
B. Tables: Validated Laboratory Data Results for Groundwater, Area 800
C. Field Notes
D. Boring Logs
E. Analytical Data

Previous Correspondence (not attached):

1. Army letter to NJDEP dated 12 June 2015, re: *No Further Action Request Site Investigation Report Addendum for the 800 Area Including ECP Parcels 55 and 56, Fort Monmouth, New Jersey.*
2. NJDEP letter to the Army dated 10 November 2015, re: *Site Investigation Report Addendum for the 800 Area Including ECP Parcels 55 & 56 Fort Monmouth, Oceanport, Monmouth County.*
3. Army letter to NJDEP dated 3 March 2016, Subject: *800 Area Work Plan Addendum and Response to NJDEP's November 10, 2015 Comments on the June 2015 No Further Action Request, Site Investigation Report Addendum for the 800 Area Including ECP Parcels 55 and 56, Fort Monmouth, New Jersey.*
4. NJDEP letter to Army dated 4 April 2016, re: *800 Area Work Plan Addendum and Response to NJDEP's November 10, 2015 Comments on the June 2015 No Further Action Request, Site Investigation Report Addendum for the 800 Area Including ECP Parcels 55 and 56, Fort Monmouth, New Jersey.*

Dear Ms. Range:

The U.S. Army Fort Monmouth (FTMM) Team has prepared this addendum to present the results of additional field sampling at nine former Underground Storage Tanks (USTs) 800-1, 800-9, 800-12, 800-20, 800-21, 813, 814, 884, and 888). These USTs were unregulated heating oil tanks (UHOTs) and were located within Environmental Condition of Property (ECP) Parcels 54, 55, 56 and 57 (designated as the 800 Area). In the previous 1993 through 2011 field investigations, soil contamination was found to extend within the proximity of the groundwater table. The Army's 03 March 2016 Work Plan (Correspondence 3) that described the groundwater investigation to be performed in April 2016 was determined to be acceptable by the NJDEP (Correspondence 4). The Work Plan did not include additional soil sampling at the nine UST locations.

One temporary groundwater monitoring well was installed with a Geoprobe® rig immediately downgradient of the limits of excavation at each of the nine UST locations. Temporary monitoring wells ARE-800-TMW05 and ARE-800-TMW06 were sampled on 18 and 19 April 2016. Temporary monitoring wells ARE-800-TMW01, ARE-800-TMW02, ARE-800-TMW03, ARE-800-TMW04, ARE-800-TMW07, ARE-800-TMW08, and ARE-800-TMW09 were sampled on 1, 2, and 4 August 2016. A groundwater sample was collected from each temporary well and analyzed for volatile organic compounds (VOCs) and semivolatile organic compounds (SVOCs) plus tentatively identified compounds (TICs), in accordance with the requirements for No. 2 fuel oil in Table 2-1 of the New Jersey Administrative Code (NJAC) 7:26E Technical Requirements for Site Remediation.

The locations of the field samples are presented in **Attachment A**. The analytical results and exceedances of applicable NJDEP criteria are provided in **Attachment B**. Field notes are provided in **Attachment C**, and boring logs are provided in **Attachment D**. The samples were analyzed by ALS Environmental; analytical data packages are provided in **Attachment E**.

The results of the groundwater sampling and analyses are provided below for each of the nine UST sites.

UST 800-1

UST 800-1 was a residential fuel oil tank that was removed in 2003 as described in Attachment F of Correspondence 1. Temporary well ARE-800-TMW-04 was installed, sampled, and subsequently abandoned (**Attachment A**). Groundwater was encountered at approximately 4 feet below ground surface (bgs); please see **Attachment D.** As shown on Table 2 of **Attachment B**, there were no exceedances of the NJDEP Ground Water Quality Criteria (GWQC).

UST 800-9

UST 800-9 was a residential fuel oil tank that was removed in 2004 as described in Attachment H of Correspondence 1. Temporary well ARE-800-TMW-06 was installed, sampled, and subsequently abandoned (**Attachment A**). As indicated in **Attachment D**, groundwater was

encountered at approximately 9 feet below ground surface (bgs). As shown on Table 2 of **Attachment B**, there were no exceedances of the GWQC.

UST 800-12

UST 800-12 was a residential fuel oil tank that was removed in 2004 as described in Attachment J of Correspondence 1. Temporary well ARE-800-TMW-07 was installed, sampled, and subsequently abandoned (**Attachment A**). As indicated in **Attachment D**, groundwater was encountered at approximately 8.5 feet bgs. As shown on Table 2 of **Attachment B**, two SVOCs (2-methylnaphthalene and benzo[a]anthracene) exceeded the GWQC. SVOC TICs also exceeded the GWQC.

UST 800-20

UST 800-20 was a residential fuel oil tank that was removed in 2003 as described in Attachment O of Correspondence 1. Temporary well ARE-800-TMW-08 was installed, sampled, and subsequently abandoned (**Attachment A**). As indicated in **Attachment D,** groundwater was encountered at approximately 7 feet bgs. As shown on Table 2 of Attachment B, one VOC (1,1,2-trichloroethane) and six SVOCs (2-methylnaphthalene, benzo[a]anthracene, benzo[a]pyrene, benzo[ghi]perylene, benzo[k]fluoranthene, and indeno[1,2,3-cd]pyrene) exceeded the GWQC. SVOC TICs also exceeded the GWQC.

UST 800-21

UST 800-21 was a residential fuel oil tank that was removed in 2003 as described in Attachment P of Correspondence 1. Temporary well ARE-800-TMW-09 was installed, sampled, and subsequently abandoned (**Attachment A**). As indicated in **Attachment D**, groundwater was encountered at approximately 8.5 feet bgs. As shown on Table 2 of **Attachment B**, there were no exceedances of the GWQC.

UST 813

UST 813 was a residential fuel oil tank that was removed in 2010 as described in Attachment R of Correspondence 1. Temporary well ARE-800-TMW-02 was installed, sampled, and subsequently abandoned (**Attachment A**). As indicated in **Attachment D**, groundwater was encountered at approximately 5.5 feet bgs. As shown on Table 2 of **Attachment B**, the SVOC benzo(a)anthracene (0.2 µg/l) and benzo(a)pyrene (0.11 µg/l) slightly exceeded the GWQC (0.1 µg/l). However, this detection was estimated ("J" flagged) due to the low concentrations encountered. These analytes are polycyclic aromatic hydrocarbons (PAHs) that have been encountered at other FTMM locations within surficial soils and fill. These low level groundwater exceedances are considered to have resulted from entrainment of soil from other anthropogenic, non-UST related sources (such as surficial soils or fill) resulting in sample turbidity which is common with temporary well groundwater samples. There were no exceedances of the GWQC indicative of fuel oil.

UST 814

UST 814 was a residential fuel oil tank that was removed in 1990 as described in Attachment S of Correspondence 1. Temporary well ARE-800-TMW-01 was installed, sampled, and subsequently abandoned (**Attachment A**). As indicated in **Attachment D**, groundwater was encountered at approximately 5 feet bgs. As shown on Table 2 of **Attachment B**, there were no exceedances of the GWQC.

UST 884

UST 884 was a residential fuel oil tank that was removed in 2003 as described in Attachment U of Correspondence 1. Temporary well ARE-800-TMW-05 was installed, sampled, and subsequently abandoned (**Attachment A**). As indicated in **Attachment D**, groundwater was encountered at approximately 6 feet bgs. As shown on Table 2 of **Attachment B**, the sum of VOC TICs concentrations (981 µg/l) and the SVOC 2-methynapthalene (150 µg/l) exceeded the GWQC (500 and 30 µg/l, respectively). The SVOC naphthalene was also detected (86 µg/l), but it did not exceed the GWQC (300 µg/l).

UST 888

UST 888 was a residential fuel oil tank that was removed in 2011 as described in Attachment V of Correspondence 1. Temporary well ARE-800-TMW-03 was installed, sampled, and subsequently abandoned (**Attachment A**). As indicated in **Attachment D**, groundwater was encountered at approximately 5 feet bgs. As shown on Table 2 of **Attachment B**, there were no exceedances of the GWQC.

In summary, we request No Further Action determinations for USTs 800-1, 800-9, 800-21, 813, 814, and 888. Additional work would be needed for NFA determinations to be made for USTs 800-12, 800-20, and 884. Our technical Point of Contact (POC) is Kent Friesen; (732) 383-7201 or 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 A
Figure 1 Study Area Location (800 Area) and Figure 2 Study Area 800 Sample Locations (showing exceedances)

Little Silver Borough

Shrewsbury Borough

Tinton Falls Borough

Eatontown Borough

Oceanport Borough

West Long Branch Borough

Parkers Creek

North Branch Parkers Creek

Lafetra Creek

Mill Creek

Oceanport Creek

Wampum Lake

Wampum Brook

Husky Brook

Turtle Mill Brook

Study Area

LEGEND:

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

N

1 inch = 1,000 feet

0 500 1,000 2,000 Feet

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

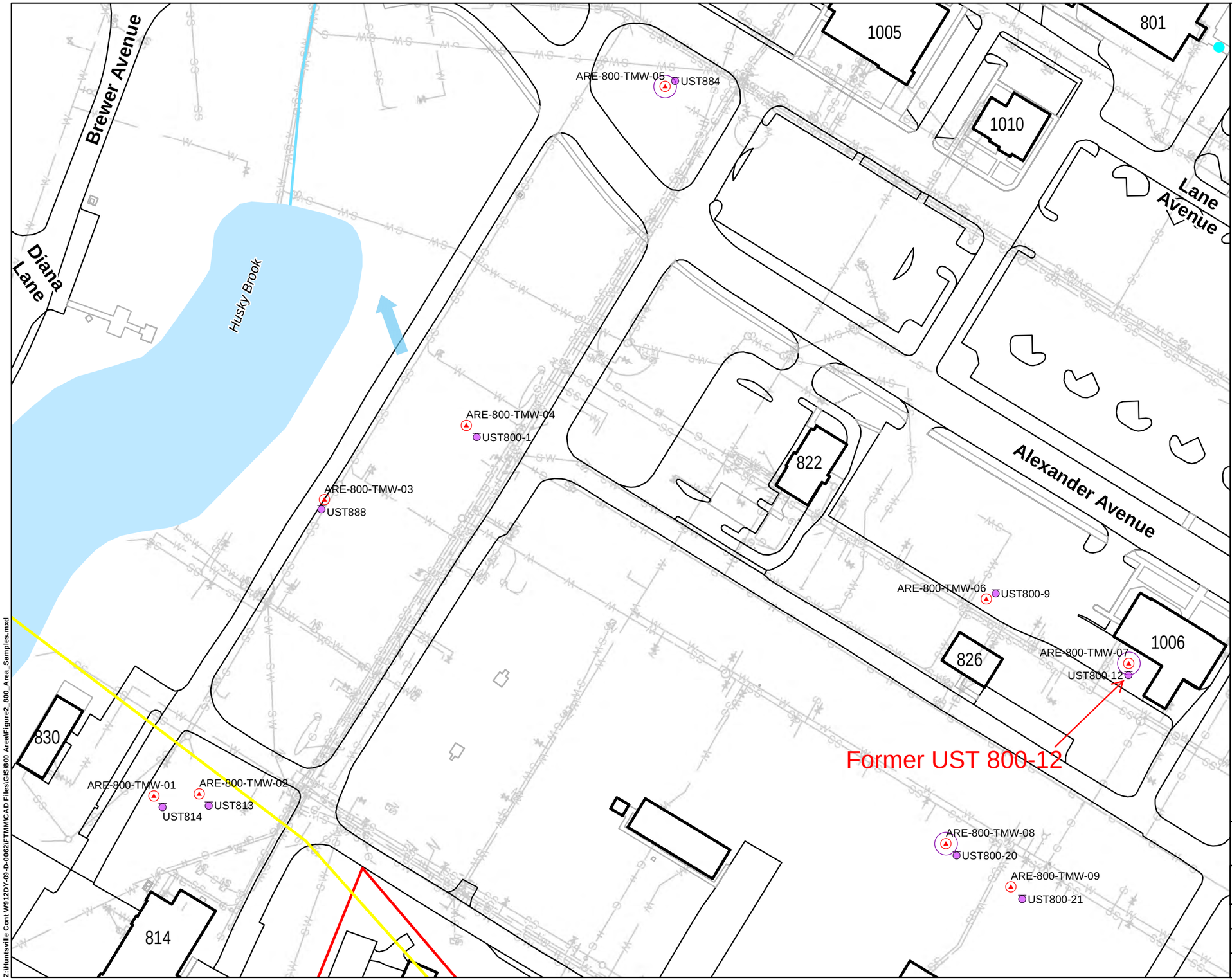
PARSONS
401 Diamond Drive NW, Huntsville AL

Fort Monmouth
New Jersey

STUDY AREA LOCATION (800 AREA)

CREATED BY:	REVIEWED BY:
RR	KF
DATE:	FIGURE NUMBER:
FEB. 2016	FIGURE 1
PROJECT NUMBER:	FILE:
748810-01000	Figure1_800_Area.mxd

P:\PIT\Projects\Huntsville Cont W912DY-09-D-0062\FTMM\CAD Files\GIS\800 Area\Figure1_800_Area.mxd 2/11/2016 1:10:09 PM



LEGEND:

- Groundwater Sample
- Exceedance of Groundwater Quality Criteria
- Former UST Location
- Shallow Monitoring Well
- Municipal Boundary
- Installation Boundary
- W Water Line
- S Sanitary Sewer Line
- SW Storm Sewer Line
- G Gas Line
- Estimated Groundwater Flow Direction

NOTE:

1. Groundwater samples will be collected from temporary wells.

N

1 inch = 100 feet

0 50 100 200 Feet

Source: FTMM Supplied CAD, 2013.

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

STUDY AREA 800
SAMPLE LOCATIONS

CREATED BY: TS	REVIEWED BY: KF
DATE: JAN. 2017	FIGURE NUMBER: FIGURE 2
PROJECT NUMBER: 748810-02060	FILE: Figure2_800_Area_Samples.mxd

Z:\Huntsville Cont W912DY-09-D-0062\FTMM\CAD Files\GIS\800 Area\Figure2_800_Area_Samples.mxd

State of New Jersey

CHRIS CHRISTIE
Governor

KIM GUADAGNO
Lt. Governor

DEPARTMENT OF ENVIRONMENTAL PROTECTION
Bureau of Case Management
401 East State Street
P.O. Box 420/Mail Code 401-05F
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Phone #: 609-633-1455
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BOB MARTIN
Commissioner

November 10, 2015

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

Re: *Site Investigation Report Addendum for the 800 Area Including ECP Parcels 55 & 56*
Fort Monmouth
Oceanport, Monmouth County
PI G000000032

Dear Mr. Occhipinti:

The New Jersey Department of Environmental Protection (Department) has completed review of the referenced report, received June 22, 2015, prepared by the Department of the Army's Office of Assistant Chief of Staff for Installation Management to provide responses to NJDEP letters of September 5, 2007 and December 31, 2007.

USTs Requiring No Additional Action

Underground storage tanks within these parcels previously granted a designation of no further action (NFA) include the following:

Parcel 55

UST 1006-159
UST 826-134
UST 828-136

Parcel 56

UST 875-234
UST 876-139
UST 876-138
UST 864-136
UST 866-137

Following review of the referenced information, it is agreed no further action is necessary for the following #2 fuel USTs:

UST 800-2 (Attachment G)
UST-800-10 (Attachment I)
UST-800-14 (Attachment K)
UST 800-15 (Attachment L)
UST-800-16 (Attachment M)
UST-800-19 (Attachment N)
UST 800-22 (Attachment Q)
UST 850 (Attachment T)

USTs Requiring Additional Remedial Efforts

Based upon soil contamination extending to within 2' of, and in some cases, into the ground water table (GWT), a ground water investigation in accordance with the Technical Rules for Site Remediation is necessary at the following UST locations. Unless otherwise indicated, analytical parameters are to include VOs+TICs and SVOs+TICs (N.J.A.C. 7:26E-2.1, Table 2-1).

UST 800-1 – Attachment F – Parcel 55 - #03-07-30-1431
UST 800-9 – Attachment H – Parcel 55– #04-05-20-1615-42
UST 800-12 – Attachment J – Parcel 55 - #04-05-25-1623-31
UST-800-20 – Attachment O – Parcel 56 - #03-07-30-1431
UST 800-21 – Attachment P – Parcel 56 - #03-09-11-0906-50
UST 813 – Attachment R – Parcel 54 - #10-12-17-1533-15
UST 814 – Attachment S – Parcel 54 – It is agreed the submitted soil analytical results, which indicate no exceedences are present, were likely collected at Building 814. Although ground water analytical results indicate no exceedances of #2 fuel related constituents, the anomalous Oct '92 GW results cannot be dismissed. Therefore, collection of a ground water sample for VOs+TICs analyses is required.
UST 884 – Attachment U – Parcel 57 - #03-10-07-1347-49
UST 888 – Attachment V – Parcel 56 - #11-01-05-1416-41

Please contact this office if you have any questions.

Sincerely,

Linda S. Range

Linda S. Range

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

DEPARTMENT OF THE ARMY

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

June 12, 2015

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

Re: No Further Action Request
Site Investigation Report Addendum for the 800 Area Including ECP Parcels 55 and 56, Fort Monmouth, New Jersey

Attachments:

A. Correspondence
B. Site Layout Drawings of 800 Area (Recent and Historical)
C. Summary Table of 800 Area Underground Storage Tanks
D. No Further Action Letters from NJDEP
E. Geophysical Survey Reports
F. UST 800-1 Report
G. UST 800-2 File Review and Analyses
H. UST 800-9 Report
I. UST 800-10 File Review and Analyses
J. UST 800-12 Report
K. UST 800-14 File Review and Analyses
L. UST 800-15 File Review and Analyses
M. UST 800-16 File Review and Analyses
N. UST 800-19 File Review and Analyses
O. UST 800-20 File Review and Analyses
P. UST 800-21 Report
Q. UST 800-22 File Review and Analyses
R. UST 813 File Review and Analyses
S. UST 814 File Review and Analyses
T. UST 850 File Review and Analyses
U. UST 884 File Review and Analyses
V. UST 888 File Review and Analyses
W. 800 Area Excerpts from the 2005 Residential Communities Initiative (RCI) Remedial Action Report
X. 800 Area Groundwater Monitoring Results

Previous Correspondence:

1. NJDEP letter to the Army dated September 5, 2007, re: *Remedial Action Report for the 800, 700, and 400 Areas, Ft Monmouth, NJ.*
2. NJDEP letter to the Army dated December 31, 2007, re: *Underground Storage Tank Closure & Remedial Investigation Reports, 800 Area UST No. 9, 800 Area UST No. 12, Ft Monmouth, NJ.*

References Cited:

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

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) Parcels 55, 56, and the surrounding 800 Area (which also includes portions of Parcels 54, 57, 58, 59, 63, 64, and 65). The purpose of this submittal is to provide comprehensive documentation of the location and updated closure status of all USTs identified within this parcel. Previous investigation results associated with the Residential Communities Initiative (RCI) activities within Parcel 56 (also referred to as the RCI 800 Area) have been reviewed, as well as the 2007 New Jersey Department of Environmental Protection (NJDEP) comments on the RCI Report (Correspondence 1; provided in Attachment A). This submittal provides a comprehensive response to NJDEP's previous comments on the RCI 800 Area (Correspondence 1). This information may be useful for the future Phase II property transfer.

The 800 Area includes that portion of the Main Post generally bounded by Razor Avenue to the north, Todd Avenue to the west, Cockayne Avenue and the Base boundary to the south, and Stephenson Avenue to the east (see recent and historical layout drawings presented in Attachment B). There are three designated Installation Restoration Program (IRP) sites located within the 800 Area, including the following:

- FTMM-47 Building 1002 Former PCB Transformer Site (located within Parcel 55),
- FTMM-64 Site 812 Former Leaking UST Site (also designated as Parcel 64), and
- FTMM-66 Site 886 Former Aboveground Storage Tank (also designated as Parcel 65).

These IRP sites are not specifically addressed within this submittal, although reference has been made to the sites as appropriate within the context of the 800 Area USTs.

Extensive soil sampling and numerous UST removals were conducted as part of the Army's RCI and Enhanced Use Leasing (EUL) programs within Parcel 56. Currently there are no buildings within Parcel 56; however, historically there were up to 28 barracks and other buildings within this area (see the historical layout map in Attachment B). The purpose of the RCI and EUL programs was to assess specific Fort Monmouth site areas for privatized housing and associated support buildings; subsequently the program was discontinued after closure of Fort Monmouth was announced in 2005.

A final report was prepared in 2005 under the RCI program that summarized the results of soils investigation and remediation activities within the 400, 700, and 800 Areas of Fort Monmouth, and requested No Further Action (NFA) for all three areas. In 2007, NJDEP commented

(Attachment A) that NFA could not be approved for the following reasons (***current Army responses concerning the 800 Area are provided in bold italics***):

- There was no documentation provided concerning the remediation and closure of USTs removed from the site (***documentation of UST closure activities for the entire 800 Area is presented in Section 1.0 below***); and
- A site investigation for groundwater was required (***a description of the 800 Area groundwater investigations is presented in Section 4.0 below***).

1.0 UNDERGROUND STORAGE TANKS

The locations of the USTs within the 800 Area are presented in Attachment B, and a summary table of these USTs is provided in Attachment C. All of the USTs identified within the 800 Area have been removed. Most of these USTs were either used for residential heating oil, or were less than 2000 gallons in size and used to store heating oil for nonresidential buildings, and are therefore considered unregulated heating oil tanks (UHOTs).

Multiple UHOTs within the 800 Area were previously approved for No Further Action (NFA) by NJDEP; documentation of this approval is provided in Attachment D, and referenced below. In these cases, there is generally a supporting investigation report that was previously submitted to NJDEP and that describes the basis for closure. For the sake of brevity, we have not included these reports for UHOTs where NFA has already been approved. However, these reports are available within the FTMM environmental records.

In the Attachment C table, the term "Case Closed" has been used (consistent with previous FTMM procedures) to indicate the Army determined that no further sampling or remedial actions were warranted for a specific UST site. “Case Open” indicates the Army previously determined that ongoing monitoring, reporting or possibly even remedial action was warranted. In contrast, "No Further Action" has been reserved for NJDEP approval that no further sampling or remedial actions are warranted. “Case Open” sites previously identified within the 800 Area in Attachment C can now be considered as “Closed” by this submittal.

Most of the 800 Area UHOTs were steel fuel oil tanks associated with previously demolished former barracks. Geophysical surveys were performed to locate potential UHOTs that may have remained after the buildings were removed, as described in Attachment E. A combination of geophysical surveys as well as historical maps and field use of metal detectors were used to locate multiple UHOTs within the 800 Area, which were subsequently removed.

We are submitting the following documentation for the multiple UHOTs that were previously removed from the 800 Area, and we request a No Further Action determination for each site (sites that have been previously approved for NFA by NJDEP are highlighted in green):

- UST 800A NFA was approved by NJDEP on 1/10/2003 (Attachment D).
- UST 800-1 investigation report is presented in Attachment F.
- UST 800-2 File Review summary and analyses is presented in Attachment G.
- UST 800-9 investigation report is presented in Attachment H. NJDEP’s comment letter of 12/31/2007 (provided in Attachment A) indicated that additional groundwater analysis was required; see Section 4.0 below.
- UST 800-10 File Review summary and analyses is presented in Attachment I.

- UST 800-12 investigation report is presented in Attachment J. NJDEP's comment letter of 12/31/2007 (provided in Attachment A) indicated that additional groundwater analysis was required; see Section 4.0 below.
- UST 800-14 File Review summary and analyses is presented in Attachment K.
- UST 800-15 File Review summary and analyses is presented in Attachment L.
- UST 800-16 File Review summary and analyses is presented in Attachment M.
- UST 800-19 File Review summary and analyses is presented in Attachment N.
- UST 800-20 File Review summary and analyses is presented in Attachment O.
- UST 800-21 investigation report is presented in Attachment P.
- UST 800-22 File Review summary and analyses is presented in Attachment Q.
- UST 801A NFA was approved by NJDEP on 2/24/2000 (Attachment D).
- UST 801B NFA was approved by NJDEP on 1/10/2003 (Attachment D).
- UST 804A NFA was approved by NJDEP on 1/10/2003 (Attachment D).
- UST 804B NFA was approved by NJDEP on 7/10/1998 (Attachment D).
- UST 810 NFA was approved by NJDEP on 8/29/2000 (Attachment D).
- UST 811 NFA was approved by NJDEP on 8/29/2000 (Attachment D).
- UST 812 NFA was approved by NJDEP on 2/24/2000 (Attachment D).
- UST 813 File Review summary and analyses is presented in Attachment R.
- UST 814 investigation report is presented in Attachment S.
- UST 826 NFA was approved by NJDEP on 7/10/1998 (Attachment D).
- UST 828 NFA was approved by NJDEP on 2/24/2000 (Attachment D).
- UST 850 File Review summary and analyses is presented in Attachment T.
- UST 864 NFA was approved by NJDEP on 2/24/2000 (Attachment D).
- UST 866 NFA was approved by NJDEP on 2/24/2000 (Attachment D).
- UST 875 NFA was approved by NJDEP on 1/10/2003 (Attachment D).
- UST 876A NFA was approved by NJDEP on 2/24/2000 (Attachment D).
- UST 876B NFA was approved by NJDEP on 1/10/2003 (Attachment D).
- UST 884 File Review summary and analyses is presented in Attachment U.
- UST 886 NFA was approved by NJDEP on 1/10/2003 (Attachment D).
- UST 888 File Review summary and analyses is presented in Attachment V.
- UST 1006 NFA was approved by NJDEP on 8/29/2000 (Attachment D).

2.0 RESIDENTIAL COMMUNITIES INITIATIVE ACTIVITIES AT THE 700 AREA

Extensive soil sampling was performed in 2003 under the RCI to support an evaluation of privatized housing (Reference 1; see excerpts of this report pertaining to the 800 Area in Attachment W). Three areas of the Main Post were evaluated: the 400 Area, the 700 Area, and the 800 Area (see Figure 2 of Attachment W). The 800 Area as designated by the RCI program consisted of a 33 acre area that generally corresponds to ECP Parcel 56. The RCI studies included environmental assessment of soil using Geoprobe borings (at 100 ft centers; see Figure 3 of Attachment M), and full-suite analysis of soil samples for VOCs, SVOCs, pesticides, PCBs, and metals (provided in Appendix C of Reference 1). In addition, geophysical investigations were performed to delineate UHOTs historically used for fuel oil from former barracks that had been previously demolished, as discussed in Section 1.0 above (see also Attachment E). As a

result, multiple UHOTs were removed from the 800 Area from 2004 to 2011 with associated site assessment sampling, as discussed in Section 1.0 above.

Under the RCI program, the analytical results from the 75 initial 800 Area Geoprobe soil sampling locations were compared to then-current (2003) NJDEP Residential Direct Contact Soil Cleanup Criteria (RDCSCC), as reported in Attachment W. The rationale for residential criteria was based on the planned future use of the 800 Area for residential housing under the RCI/EUL. SVOCs, pesticides, and PCBs were found to exceed the RDCSCCs in certain discrete areas within the 800 Area (see Figures 4a and 4b in Attachment W), and therefore the impacted soils were excavated and removed for offsite disposal. Multiple rounds of additional step-out characterization sampling, soil excavation, and post-excavation sampling were performed to ensure that adequate soil was removed to meet the RDCSCCs. Final post-excavation soil sample results confirm that soils with SVOCs, pesticides, and PCBs concentrations in excess of the 2003 RDCSCCs were removed for offsite disposal (see Figures 5a and 5b in Attachment W).

The RCI/EUL results confirm that NFA is appropriate for the Parcel 56 soils.

3.0 GROUNDWATER INVESTIGATION AT 800 AREA

As previously described above, a report (Reference 1; see Attachment W) was submitted to NJDEP in 2005 that requested No Further Action for the RCI sites, including Parcel 56 which was designated as the 800 Area under the RCI. In 2007, NJDEP commented (Attachment A) that NFA could not be granted for the 800 Area because the USTs were not adequately addressed (this requirement has been met in Section 1.0), and because additional groundwater monitoring was required for the 800 Area (discussed in this Section). Attachment X includes documentation of previous groundwater monitoring activities for the 800 Area.

Well construction information for two groundwater monitoring wells (800MW01 and 800MW02) located downgradient of the 800 Area is presented in Enclosure 1 of Attachment X. Enclosure 2 of Attachment X presents the result of 2010 groundwater modeling and water elevation measurements for the area of Ft. Monmouth encompassing the 800 Area, which demonstrate that these two wells are located downgradient of the 800 Area. Shallow groundwater flow direction was primarily towards the north-northwest from the 800 Area towards these wells. Monitor well records and boring logs are provided in Enclosure 3 of Attachment X; shallow groundwater was typically encountered at approximately 6 to 9 ft bgs.

Monitoring well 800MW01 was installed in 2000 to evaluate the adequacy of closure of UST 800A. This well was monitored quarterly for VOCs and SVOCs from 2000 to 2001, and UST 800A was subsequently approved for NFA by NJDEP on 1/10/2003 (Attachment D). Well 800MW01 was more recently sampled in May 2010, and analytical results were non-detected for all VOC and SVOC analytes (Enclosure 4 of Attachment X).

Monitoring well 800MW02 was installed in 2010 and was sampled in February 2011. Analytical results were non-detected for all VOCs and for most SVOC analytes. Select Ion Monitoring (SIM) analysis of polynuclear aromatic hydrocarbons (PAHs) was performed for more sensitive detection of PAHs. The only analytes detected by SVOC-SIM were naphthalene (0.150 µg/L) and phenanthrene (0.136 µg/L), which were well below the applicable NJDEP groundwater quality criteria of 300 and 100 µg/L, respectively.

In summary, there were no indications of a contaminant release to groundwater from the 800 area. This conclusion is based on two shallow monitoring wells completed within a UST source area and in a downgradient portion of the parcels. Groundwater contamination associated with USTs 812 (FTMM-64) and 886 (FTMM-66) will be addressed under separate cover.

4.0 SUMMARY

This information supports the conclusion that UHOTs and RCI program issues identified within the 800 Area have been adequately addressed by previous environmental activities. Multiple UHOT sites were identified within Parcels 55 and 56, as well as adjoining areas of Parcels 54, 57, 58, and 59 that comprise the 800 Area, that were addressed under the FTMM tank removal and assessment program. The RCI program identified several areas where individual sample results for PCBs and SVOCs exceeded the residential cleanup criteria in soils; however, the affected soils were subsequently excavated and removed from the site for offsite disposal.

In summary, we submit that the Army has provided adequate due diligence with regards to the environmental condition of the Parcels represented within the 800 Area, and we request that NJDEP approve No Further Action. The technical Point of Contact (POC) for this matter is Kent Friesen at (732) 383-7201 or by email at kent.friesen@parsons.com. Should you have any questions or require additional information, please contact me by phone at (732) 383-5104 or by email at john.e.occhipinti.civ@mail.mil.

Sincerely,

John E. Occhipinti
Fort Monmouth Site Manager

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

Summary Table of 800 Area USTs

Site Name	RESIDENTIAL	RegistrationID	DICAR	Tank Size and Type	Product	Army Case Status	Parcel	Comments on Current or Requested NJDEP Status
800 A	NO	81533-127		2000 gallon fiberglass	#2 FUEL OIL	Case Closed	58	NFA approved per 1/10/2003 NJDEP letter
800 1	YES	-	03-07-30-1431	1000 gallon steel	#2 FUEL OIL	Case Open	56	Submit TVS report and request NFA
800 2	YES	-		500 gallon steel	#2 FUEL OIL	Case Closed	56	Submit review summary and data; request NFA
800 9	YES	-	04-05-20-1615-42	1000 gallon steel	#2 FUEL OIL	Case Open	55	Submit TVS report and request NFA; see also NJDEP's 12/31/07 comment letter (Attachment A)
800 10	YES	-		1000 gallon steel	#2 FUEL OIL	Case Closed	55	Submit review summary and data; request NFA
800 12	YES	-	04-05-25-1623-31	1000 gallon steel	#2 FUEL OIL	Case Open	55	Submit TVS report and request NFA; see also NJDEP's 12/31/07 comment letter (Attachment A)
800 14	YES	-		1000 gallon steel	#2 FUEL OIL	Case Closed	55	Submit review summary and data; request NFA
800 15	YES	-		1000 gallon steel	#2 FUEL OIL	Case Closed	55	Submit review summary and data; request NFA
800 16	YES	-		1000 gallon steel	#2 FUEL OIL	Case Closed	56	Submit review summary and data; request NFA
800 19	YES	-		1000 gallon steel	#2 FUEL OIL	Case Closed	56	Submit review summary and data; request NFA
800 20	YES	-	03-07-30-1431	1000 gallon steel	#2 FUEL OIL	Case Open	56	Submit review summary and data; request NFA. There are two (redundant) 800-20 entries in the FTMM UST database.
800 21	YES	-	03-09-11-0906-50	1000 gallon steel	#2 FUEL OIL	Case Open	56	Submit TVS report and request NFA
800 22	YES	-		1000 gallon steel	#2 FUEL OIL	Case Closed	56	Submit review summary and data; request NFA
801A	NO	81533-128		2000 gallon fiberglass	#2 FUEL OIL	Case Closed	58	NFA approved per 2/24/2000 NJDEP letter
801B	NO	81533-129	95-11-13-1007-23	1000 gallon fiberglass	#2 FUEL OIL	Case Closed	58	NFA approved per 1/10/2003 NJDEP letter
804A	NO	81533-130	95-11-09-1328-28	1000 gallon fiberglass	#2 FUEL OIL	Case Closed	59	NFA approved per 1/10/2003 NJDEP letter
804B	NO	81533-228		1000 gallon fiberglass	#2 FUEL OIL	Case Closed	59	NFA approved per 7/10/1998 NJDEP letter
810	NO	81533-131		1000 gallon steel	#2 FUEL OIL	Case Closed	63	NFA approved per 8/29/2000 NJDEP letter

Attachment B
Soil Boring Logs and Well Construction Details

PARSONS

Soil Boring Log

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

GROUNDWATER OBSERVATIONS
WATER LEVEL: ~8.5
DATE: 8/2/16
TIME: 1130
MEAS. FROM: BGS

INSPECTOR: C. Watson
DRILLER: J. BARNAK
WEATHER: 78°F clear
CONTRACTOR: East Coast Drilling, Inc. (ECDI)
RIG TYPE: Geoprobe(R) 7822DT
DATE/TIME START: 1110
DATE/TIME FINISH: 1120
WEIGHT OF HAMMER: N/A
DROP OF HAMMER: N/A
TYPE OF HAMMER: N/A

BORING/WELL ID: AR-E-300-TMW07
LOCATION DESCRIPTION: AREA 300
LOCATION PLAN: Oceanport, New Jersey

DEPTH (feet)	SAMPLE I.D.	BLOWS per 6"	ADV/ REC.	PID (ppm)	FIELD IDENTIFICATION OF MATERIAL	STRATA	COMMENTS
0			60/45	0	0-6" Asphalt		
					6"-45" moist, Brown, m. dense mf SAND, trace silt, trace f gravel		
1							
2							
3							
4				NR			
				NR			
5			60/44	0	0-15" SAA		
				0	15"-38" Moist, orange/light Brown mc SAND, trace f gravel		
6				0			
				0			
7				0			
				1.2	38"-44" Saturated, Grey, MC SAND, stained, ODOR		
8				7.8			
				64.1			
9				NC			
				NC			
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: ~ 8.5
DATE:
TIME:
MEAS. FROM:

INSPECTOR:
DRILLER: SEE P. 1
WEATHER:
CONTRACTOR: East Coast Drilling, Inc. (ECDI)
RIG TYPE: Geoprobe(R) 7822DT
DATE/TIME START: SEE P. 2
DATE/TIME FINISH:
WEIGHT OF HAMMER: N/A
DROP OF HAMMER: N/A
TYPE OF HAMMER: N/A

BORING/WELL ID: ARE-800-TMW07
LOCATION DESCRIPTION: AREA 800
LOCATION PLAN: Oceanport, New Jersey

DEPTH (feet)	SAMPLE I.D.	BLOWS per 6"	ADV/ REC.	PID (ppm)	FIELD IDENTIFICATION OF MATERIAL	STRATA	COMMENTS
1 0			68/60	37.6	0-18" SAA, saturated		
				54.1	18-60" Saturated, orange/		
1 1				18.9	Brown, mf SAND,		
				26.7	some silt, trace +		
1 2					gravel		
1 3							
1 4							
1 5							
1 6							
1 7							
1 8							
1 9							
2 0							

Remarks:

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

Consistency vs. Blowcount / Foot

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

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

PARSONS

Soil Boring Log

CLIENT: USACE
PRDJECT NAME: FTMM - ECP
PROJECT LOCATION: ~~FTMM~~ Parcel 55-800-12
PROJECT NUMBER: 748810-

GROUNDWATER OBSERVATIONS
WATER LEVEL: ≈ 11'
DATE:
TIME:
MEAS. FROM:

INSPECTOR: E. ACCORSI
DRILLER: S. FOSTER
WEATHER: CLDY, 50°
CONTRACTOR: East Coast Drilling, Inc. (ECDI)
RIG TYPE: Geoprobe(R) 7822DT
DATE/TIME START: 11-9-17
DATE/TIME FINISH: 11-9-17
WEIGHT OF HAMMER: N/A
DROP OF HAMMER: N/A
TYPE OF HAMMER: N/A

BORING/WELL ID: PAR-55 800-12-TMW-01
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" ASPHALT + STONE		
				0	6"-48" moist brn cmf SAND, some mf Gravel, trace		
1				0			
				0			
2				0			
				0			
3				0			
				0			
4							
5			60/54	0	0-42" SAME		
				0			
6				0			
				0			
7				0			
				0			
8				0			
				0			
9				0	42"-54" moist, grn, cmf SAND, little silt		
				2.5			PETROLEUM ODORS
10							

Remarks:

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

PARSONS

Soil Boring Log

CLIENT: USACE
PROJECT NAME: ~~PTMW~~ PAR-55-800-12
PROJECT LOCATION:
PROJECT NUMBER: 748810-

GROUNDWATER OBSERVATIONS
WATER LEVEL: ≈11
DATE:
TIME:
MEAS. FROM:

INSPECTOR: F. ACCORSI
DRILLER: S. FOSTER
WEATHER: CLOUDY, 50°
CONTRACTOR: ~~Cascade~~
RIG TYPE: Geoprobe(R) 7822DT
DATE/TIME START: 11-9-17
DATE/TIME FINISH: 11-9-17
WEIGHT OF HAMMER: N/A
DROP OF HAMMER: N/A
TYPE OF HAMMER: N/A

BORING/WELL ID: PAR-55-800-12-TMW-01
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			60/54	0	0-98 SAND		
				91	V. STRONG PETROLEUM ODORS AND STAINING		WET @ 11
11				162			
				170			
12				101			
				5			
13	PAR-55-800-12-TMW-01-13'			11			
				7			
14				0	48"-54" wet, or. brown SAND, f grave l		
15					END OF BORING @ 15 FT		
					TMW (10FT. SCREEN) SET FROM 5' TO 15'		
16							
17							
18							
19							
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

Soil Boring Log

CLIENT: USACE
PROJECT NAME: FTMM - ECP
PROJECT LOCATION: FTMM Parcel 55-800-12
PROJECT NUMBER: 748810-

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

INSPECTOR: F. ACCORSI
DRILLER: S. FOSTER
WEATHER:
CONTRACTOR: East Coast Drilling, Inc. (ECDI)
RIG TYPE: Geoprobe(R) 7822DT
DATE/TIME START: 11-9-17
DATE/TIME FINISH: 11-9-17
WEIGHT OF HAMMER: N/A
DROP OF HAMMER: N/A
TYPE OF HAMMER: N/A

BORING/WELL ID: PAR-55-800-12-TMW-02
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			60/42	0	0-6" ASPHALT & STONE		
				0	6"-30" moist, gray brn cmf SAND		
1				0			
				0			
2				0			
				0			
3				0	30-36" moist, brn cmf Gravel and cmf SAND		
4							
5			60/60	0	0-9" SAME		
				0	9"-60 moist brn-yel brn-grn cmf SAND, l. f. Gravel		
6				0			
				0			
7				0			
				0			
8				0			
				0			
9				0			
				0			
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

Soil Boring Log

CLIENT: USACE
PROJECT NAME: ~~ETMM~~ PARCEL 55-800-12
PROJECT LOCATION:
PROJECT NUMBER: 748810-

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

INSPECTOR: E. ACCORSI
DRILLER:
WEATHER:
CONTRACTOR: ~~Cascade~~
RIG TYPE: Geoprobe(R) 7822DT
DATE/TIME START: 11-9-17
DATE/TIME FINISH: 11-9-17
WEIGHT OF HAMMER: N/A
DROP OF HAMMER: N/A
TYPE OF HAMMER: N/A

BORING/WELL ID: PAR-55-800-12-TMW-02
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			60/18	0	0-48' (SAME) STRONG PETROLEUM ODORS AND STAINING		WET @ 10.5
				96			
11				72			
				101			
12				4			
	PAR-55-800-12-TMW-02-12.5'			0			
13				0			
				0			
14							
15					END OF BORING @ 15 FT. SET TMW (10 FT, SCREEN) FROM 5' TO 15'		
16							
17							
18							
19							
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

Soil Boring Log

CLIENT: USACE
PROJECT NAME: FTMM - ECP
PROJECT LOCATION: ~~FTMM~~ Parcel 55-800-12
PROJECT NUMBER: 748810-

GROUNDWATER OBSERVATIONS
WATER LEVEL: ≈ 11 FT.
DATE:
TIME:
MEAS. FROM:

INSPECTOR: F. ACCORSI
DRILLER: S. FOSTER
WEATHER: CLOY, 50°
CONTRACTOR: East Coast Drilling, Inc. (ECDI)
RIG TYPE: Geoprobe(R) 7822DT
DATE/TIME START: 11-9-17
DATE/TIME FINISH: 11-9-17
WEIGHT OF HAMMER: N/A
DROP OF HAMMER: N/A
TYPE OF HAMMER: N/A

BORING/WELL ID: PAR-55 800-12-TMW-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			60/58	0	0-4" TOPSOIL		
				0	4"-30" moist, brn-blk cmt SAND some mt Gravel, t. s. lt		
1				0			
				0			
2				0			
				0	30-58" moist brn cmt ~~SAND~~ GRAVEL, and cmt Sand		
3				0			
				0			
4				0			
				0			
5			60/58	0	0-12" SAME		
				0			
6				0	12"-58" moist, brn-yel/brn cmt SAND, tr. silt		
				0			
7				0			
				0			
8				0			
				0			
9				0			
				0			
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
PROJECT NAME: FTMM PARCEL 55-800-12
PROJECT LOCATION:
PROJECT NUMBER: 748810-

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

INSPECTOR: F. ACCORSI
DRILLER: S. FOSTER
WEATHER:
CONTRACTOR: ~~Cascade~~ ECDI
RIG TYPE: Geoprobe(R) 7822DT
DATE/TIME START: 11-9-17
DATE/TIME FINISH: 11-9-17
WEIGHT OF HAMMER: N/A
DROP OF HAMMER: N/A
TYPE OF HAMMER: N/A

BORING/WELL ID: PAR-55 800-12-TMW-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
1 0			60/54	0	0-54" SILTY SAND		
				0			
1 1				0			WET @ 11'
				0			
1 2				0			
				0			
1 3	PAR-55-TMW-03-13'	800-12-		0			
				0			
1 4				0			
1 5					END OF BORING @ 15 FT		
					SET TMW-03 (10 FT. SCREEN)		
6					FROM 5'-15'		
7							
8							
9							
0							

Remarks:

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

Consistency vs. Blowcount / Foot

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

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

Soil Boring Log

CLIENT: USACE
PROJECT NAME: FTMM - ECP
PROJECT LOCATION: ~~FTMM~~ Parcel 55-800-12
PROJECT NUMBER: 748810-

GROUNDWATER OBSERVATIONS
WATER LEVEL: ≥ 9.9
DATE:
TIME:
MEAS. FROM:

INSPECTOR: F. ACCORSI
DRILLER: S. FOSTER
WEATHER: CLDY, 50°
CONTRACTOR: East Coast Drilling, Inc. (ECDI)
RIG TYPE: Geoprobe(R) 7822DT
DATE/TIME START: 11-9-17
DATE/TIME FINISH: 11-9-17
WEIGHT OF HAMMER: N/A
DROP OF HAMMER: N/A
TYPE OF HAMMER: N/A

BORING/WELL ID: PAR-55-800-12-MW-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			60/54	0	ASPHALT/STONE 0-6"		
				0	6"-54" moist brn cmf SAND, some silty clay, L. f Gravel		
1				0			
				0			
2				0			
				0			
3				0			
				0			
4				0			
5			60/54	0	0-12" SAME		
				0			
6				0	12"-54" moist grn-brn cmf SAND, some cmf Gravel, L. silt		
				0			
7				0			
				0			
8				0			
				0			
9				0			
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

Soil Boring Log

CLIENT: USACE
PROJECT NAME: ~~FTHH~~ PARCEL 55-800-12
PROJECT LOCATION:
PROJECT NUMBER: 748810-

GROUNDWATER OBSERVATIONS
WATER LEVEL: ≈ 10'
DATE:
TIME:
MEAS. FROM:

INSPECTOR: F. ACCORSI
DRILLER: S. FOSTER
WEATHER:
CONTRACTOR: ~~Cascade~~, EC D1
RIG TYPE: Geoprobe(R) 7822DT
DATE/TIME START: 11-9-17
DATE/TIME FINISH: 11-9-17
WEIGHT OF HAMMER: N/A
DROP OF HAMMER: N/A
TYPE OF HAMMER: N/A

BORING/WELL ID: PAR-55-800-12-TMW-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			60/60	0	SAME		WET @ 10'
				0			
1				0			
				0			
2				0	becoming brn-or. brn		
	PAR-55-800-12-TMW-04-12.5'			0			
3				0			
				0			
4				0			
				0			
5					END OF BORING @ 15 FT. TMW (10 FT. SCREEN) SET FROM 5' TO 15'		
6							
7							
8							
9							
0							

Remarks:

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

Consistency vs. Blowcount / Foot

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

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

Soil Boring Log

CLIENT: USACE
PROJECT NAME: FTMM - ECP
PROJECT LOCATION: ~~FTMM~~ Parcel 55-900-12
PROJECT NUMBER: 748810-

GROUNDWATER OBSERVATIONS
WATER LEVEL: ≈ 11.5 FT.
DATE:
TIME:
MEAS. FROM:

INSPECTOR: F. ACCORSI
DRILLER: S. FOSTER
WEATHER: CLDY, 40's
CONTRACTOR: East Coast Drilling, Inc. (ECDI)
RIG TYPE: Geoprobe(R) 7822DT
DATE/TIME START: 11-9-17
DATE/TIME FINISH: 11-9-17
WEIGHT OF HAMMER: N/A
DROP OF HAMMER: N/A
TYPE OF HAMMER: N/A

BORING/WELL ID: PAR-55 800-12-SCREEN1
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			60/36	0	0-4" ASPHALT 4"-30" Moist, brn cmt SAND,		
				0			
1				0			
				0			
2				0			
				0	30"-36" moist, brn, cmt Gravel, some cmt Sand		
3							
4							
5			60/36	0	0-6" Same 6"-44" moist brn cmt SAND		
				0			
6				0			
				0			
7				0			
				0			
8				0			
				0	44"-56" moist brn mf SAND, L. silt		
9				0			
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

Soil Boring Log

CLIENT: USACE
PROJECT NAME: ~~FTMM~~ PARCEL-55-800-12
PROJECT LOCATION:
PROJECT NUMBER: 748810-

GROUNDWATER OBSERVATIONS
WATER LEVEL: ≈ 11.5
DATE:
TIME:
MEAS. FROM:

INSPECTOR: F. ACCORSI
DRILLER: S. FOSTER
WEATHER:
CONTRACTOR: ~~Cascade~~ EDI
RIG TYPE: Geoprobe(R) 7822DT
DATE/TIME START: 11-9-17
DATE/TIME FINISH: 11-9-17
WEIGHT OF HAMMER: N/A
DROP OF HAMMER: N/A
TYPE OF HAMMER: N/A

BORING/WELL ID: PAR-55-800-12-SCREEN 1
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
1 0			60/60	0	SAME		
				0			
1 1				0	WET @ 11.5		
				0			
1 2				0			
				0			
1 3				0			
				0			
1 4				0			
				0			
1 5					END OF BORING @ 15 FT		
6							
7							
8							
9							
0							

Remarks:

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

Consistency vs. Blowcount / Foot

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

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

PARSONS

Soil Boring Log

CLIENT: USACE
PROJECT NAME: FTMM - ECP
PROJECT LOCATION: ~~FTMM~~ Parcel 55-800-12
PROJECT NUMBER: 748810-

GROUNDWATER OBSERVATIONS
WATER LEVEL: ≈ 11.5 FT
DATE:
TIME:
MEAS. FROM:

INSPECTOR: F. ACCORSI
DRILLER: S. FOSTER
WEATHER: CLDY, 50°
CONTRACTOR: East Coast Drilling, Inc. (ECDI)
RIG TYPE: Geoprobe(R) 7822DT
DATE/TIME START: 11-9-17
DATE/TIME FINISH: 11-9-17
WEIGHT OF HAMMER: N/A
DROP OF HAMMER: N/A
TYPE OF HAMMER: N/A

BORING/WELL ID: PAR-55 800-12-SCREEN 2
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	0-4" ASPHALT 4"-42" moist, brn, cm f SAND, tr. silt		
				0			
1				0			
				0			
2				0			
				0			
3				0	42"-48" moist, brn cm f SAND, some m f Gravel		
				0			
4				~~0~~			
5			60/60	0	0-6" SAME 6"-60" moist brn/cm f SAND, tr. silt, f, f. gravel		
				0			
6				0			
				0			
7				0			
				0			
8				0			
				0			
9				0			
				0			
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
PROJECT NAME: ~~FTMM~~ PARCEL 55-800-12
PROJECT LOCATION:
PROJECT NUMBER: 748810-

GROUNDWATER OBSERVATIONS
WATER LEVEL: ≈ 11.5
DATE:
TIME:
MEAS. FROM:

INSPECTOR: F. ACCORSI
DRILLER: S. FOSTER
WEATHER: CLDY, 50°
CONTRACTOR: ~~Geoprobe~~ ECDI
RIG TYPE: Geoprobe(R) 7822DT
DATE/TIME START: 11-9-17
DATE/TIME FINISH: 11-9-17
WEIGHT OF HAMMER: N/A
DROP OF HAMMER: N/A
TYPE OF HAMMER: N/A

BORING/WELL ID: PAR-55-800-12-SCREEN 2
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			60/60	0	0-12" SAND		
				0			
1				0	12" ± WET, brn-gr, lm m f SAND,		WET @ 11.5
				0	60" Lt silt		
2				0			
				0			
3				0			
				0			
4				0			
				0			
5					END OF BORING @ 15FT		
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

Soil Boring Log

CLIENT: USACE
PROJECT NAME: FTMM - ECP
PROJECT LOCATION: ~~FTMM~~ Parcel 55-800-12
PROJECT NUMBER: 748810-

GROUNDWATER OBSERVATIONS
WATER LEVEL: ∇ 11.7
DATE:
TIME:
MEAS. FROM:

INSPECTOR: FRANK ACCORSI
DRILLER: S. FOSTER
WEATHER: CLDY, 50°
CONTRACTOR: East Coast Drilling, Inc. (ECDI)
RIG TYPE: Geoprobe(R) 7822DT
DATE/TIME START: 11-9-17
DATE/TIME FINISH: 11-9-17
WEIGHT OF HAMMER: N/A
DROP OF HAMMER: N/A
TYPE OF HAMMER: N/A

BORING/WELL ID: PAR-55-800-12-SCREEN 3
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			60/54	0	0-6" ASPHALT + STONE		
				0	6"-30" moist, blk-gry crs f SAND, some clayey silt		COAL
1				0			
				0			
2				0			
				0	30"-54" moist or brn-brn crs f SAND, some m f Gravel		
3				0			
				0			
4				0			
5			60/60	0	0-12" (SAME AS ABOVE)		
				0			
6				0	12"-60" moist, brn-yel brn crs f SAND, Little f. Gravel		
				0			
7				0			
				0			
8				0			
				0			
9				0			
				0			
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

Soil Boring Log

CLIENT: USACE
PROJECT NAME: ~~FTMM~~ PARCEL 55-800-12
PROJECT LOCATION:
PROJECT NUMBER: 748810-

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

INSPECTOR: F. ACCORSI
DRILLER: S. FOSTER
WEATHER:
CONTRACTOR: ~~Cascade~~ EDI
RIG TYPE: Geoprobe(R) 7822DT
DATE/TIME START: 11-9-17
DATE/TIME FINISH: 11-9-17
WEIGHT OF HAMMER: N/A
DROP OF HAMMER: N/A
TYPE OF HAMMER: N/A

BORING/WELL ID: PAR-55-800-12-SCREEN 3
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			60/60	0	0-42" SAME		
				0			
1				0			
				101			
2				2			PETROLEUM ODORS, STAINING WET @ 12'
				0			
3				0			
				0	42"-60 wet, br m-f SAND, L. silt		
4				0			
				0			
5					END OF BORING AT 15 FT		
6							
7							
8							
9							
0							

Remarks:

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

Consistency vs. Blowcount / Foot

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

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

Soil Boring Log

CLIENT: USACE
PROJECT NAME: FTMM - ECP
PROJECT LOCATION: FTMM (Parcel) 55-800-12
PROJECT NUMBER: 748810-

GROUNDWATER OBSERVATIONS
WATER LEVEL: ≈ 12 FT.
DATE:
TIME:
MEAS. FROM:

INSPECTOR: FIACCORSI
DRILLER: S. FOSTER
WEATHER: CLDY, 50°
CONTRACTOR: East Coast Drilling, Inc. (ECDI)
RIG TYPE: Geoprobe(R) 7822DT
DATE/TIME START: 11-9-17
DATE/TIME FINISH: 11-9-17
WEIGHT OF HAMMER: N/A
DROP OF HAMMER: N/A
TYPE OF HAMMER: N/A

BORING/WELL ID: PAR-55-800-12-SCREEN 4
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			60/36	0	0-6" ASPHALT & STONE		
				0	6"-18" moist, brn crse SAND		
1				0			
				0	18"-24" moist, gray brn ~~silty~~ clayey SAND		
2				0	24"-36" moist, brn crse SAND, L.F gravel		
				0			
3							
4							
5			60/48	0	0-48" (SAME)		
				0			
6				0			
				0			
7				0			
				0			
8				0			
				0			
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

Soil Boring Log

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

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

INSPECTOR: FACCORSI
DRILLER:
WEATHER:
CONTRACTOR: Cascade
RIG TYPE: Geoprobe(R) 7822DT
DATE/TIME START: 11-9-17
DATE/TIME FINISH: 11-9-17
WEIGHT OF HAMMER: N/A
DROP OF HAMMER: N/A
TYPE OF HAMMER: N/A

BORING/WELL ID: PAR-55-800-12-SCREEN4
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	0-36" same		
				0			
1				0			
				1	SLIGHT PETROLEUM ODOR		
2				0			WET @ 12'
				0			
3				0			
				0	36"-48" wet, or. brn mf SAND l. silt		
4							
5					END OF BORING @ 15 FT		
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

Soil Boring Log

CLIENT: USACE
PROJECT NAME: FTMM - ECP
PROJECT LOCATION: ~~FTMM~~ Parcel 55-800-12
PROJECT NUMBER: 748810-

GROUNDWATER OBSERVATIONS
WATER LEVEL: ≈ 12 FT.
DATE:
TIME:
MEAS. FROM:

INSPECTOR: F. ACCOLSI
DRILLER: S. FOSTER
WEATHER:
CONTRACTOR: East Coast Drilling, Inc. (ECDI)
RIG TYPE: Geoprobe(R) 7822DT
DATE/TIME START: 11-09-17
DATE/TIME FINISH: 11-09-17
WEIGHT OF HAMMER: N/A
DROP OF HAMMER: N/A
TYPE OF HAMMER: N/A

BORING/WELL ID: PAR-55-800-12-SCREEN 5
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			60/40	0	0-8" Asphalt + stone		
				0	8"-40" moist, brown SAND, some m-f Gravel, tr. silt		
1				0			
				0			
2				0			
				0			
3				0			
4							
5			60/60	0	0-60 (same as above)		
				0			
6				0			
				0			
7				0			
				0			
8				0			
				0			
9				0			
				0			
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

Soil Boring Log

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

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

INSPECTOR: FIACCORSI
DRILLER:
WEATHER:
CONTRACTOR: ~~Cascade~~ EDI
RIG TYPE: Geoprobe(R) 7822DT
DATE/TIME START: 11-9-17
DATE/TIME FINISH: 11-9-17
WEIGHT OF HAMMER: N/A
DROP OF HAMMER: N/A
TYPE OF HAMMER: N/A

BORING/WELL ID: PAR-55-800-12-SCREEN
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
1 0			60/48	0	0-24" same		
				0			
1 1				0			
				0			
1 2				0	24"-48" WET, orgbrn mf SAND, L, Silt		WET@12'
				0			
1 3				0			
				0			
1 4							
1 5					END OF BORING @ 15'		
6							
7							
8							
9							
0							

Remarks:

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

Consistency vs. Blowcount / Foot

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

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

Soil Boring Log

CLIENT: USACE
PROJECT NAME: FTMM - ECP
PROJECT LOCATION: ~~FTMM~~ Parcel 55-800-12
PROJECT NUMBER: 748810-

GROUNDWATER OBSERVATIONS
WATER LEVEL: ≈ 11.5
DATE:
TIME:
MEAS. FROM:

INSPECTOR: F. ACCORSI
DRILLER: S. FOSTER
WEATHER: CLDY, 50°
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: FMR-55 800-12-SCREEN6
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			60/40	0	0-6" ASPHALT + STONE		
				0	6"-24" MOIST gra-brn cmt SAND 40 Lit. Gravel		
1				0			
				0			
2				0	24"-40" ~~moist, brn cmt~~		
				0			
3				0			
4							
5			60/58	0	0-12", moist, brn, cmt Gravel, and cmt SAND		
				0			
6				0	12"-58" moist, brn cmt SAND, tr. Silt		
				0			
7				0			
				0			
8				0			
				0			
9				0			
				0			
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

Soil Boring Log

CLIENT: USACE
PROJECT NAME: FTMM
PROJECT LOCATION: PARCEL 55-800-12
PROJECT NUMBER: 748810-

GROUNDWATER OBSERVATIONS
WATER LEVEL: ≈ 11.5
DATE:
TIME:
MEAS. FROM:

INSPECTOR: E. ACCORSI
DRILLER:
WEATHER:
CONTRACTOR: Cascade
RIG TYPE: Geoprobe(R) 7822DT
DATE/TIME START: 11-9-17
DATE/TIME FINISH: 11-9-17
WEIGHT OF HAMMER: N/A
DROP OF HAMMER: N/A
TYPE OF HAMMER: N/A

BORING/WELL ID: PMP-55-800-12-SCREEN 6
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			60/60	0	0-24 SAME		
				0			
11				0			
				0			WET. 11.5
12				0	24-36 WET ol.brn Comp Gravel and comp Sand		
				0			
13				0	36-60 WET ol.brn mf SAND, tr.silt		
				0			
14				0			
				0			
15					END OF BORING @ 15 FT.		
16							
17							
18							
19							
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

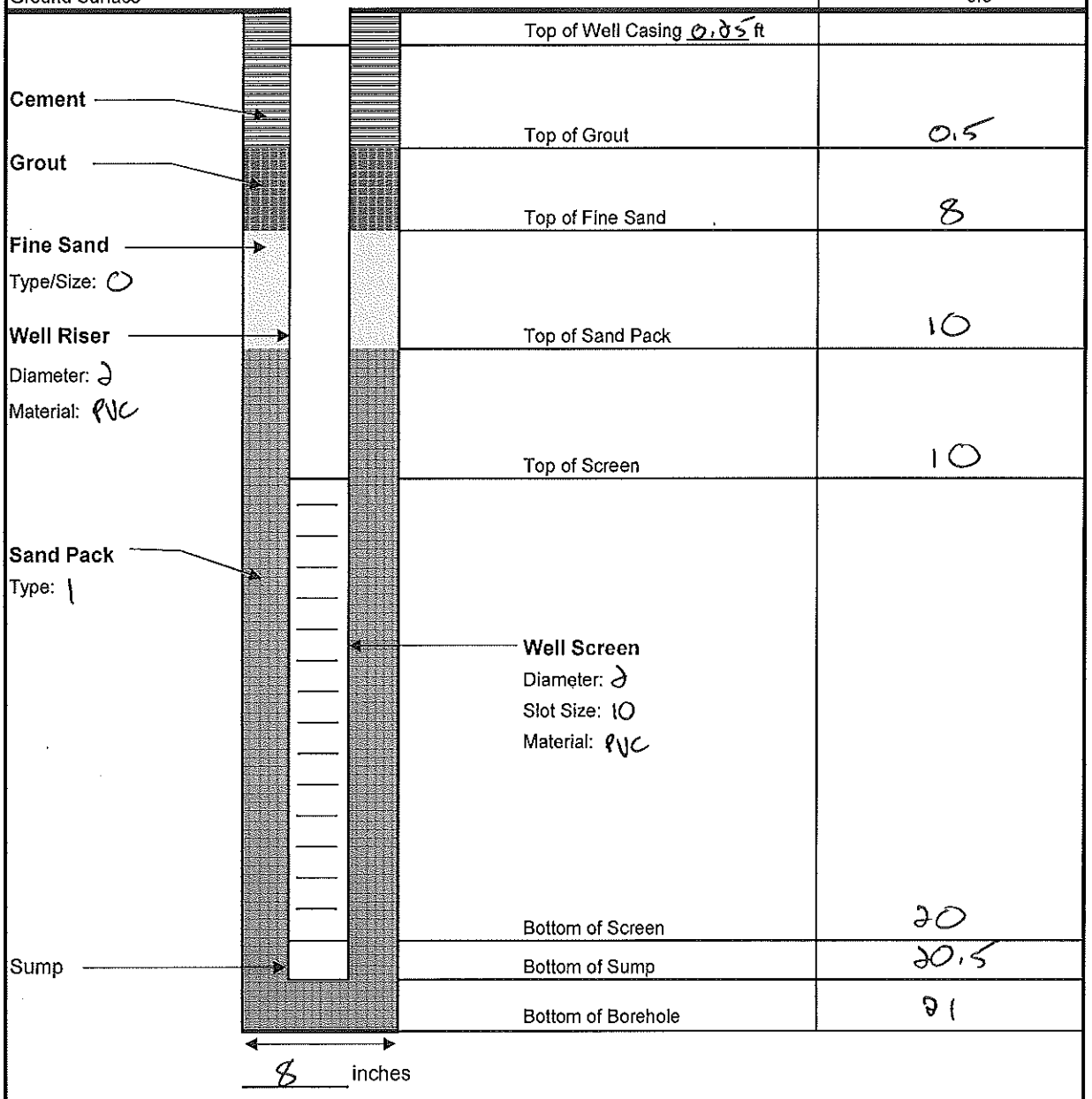
PARSONS

Well Construction Detail (Single Cased - Road Box)

Client: USACE

Well ID: 800-12-MW-01 | NJBWA Permit No.

Date Well Installed: 11/17/17 | Location: PAR-55-800-12-MW-01



PARSONS

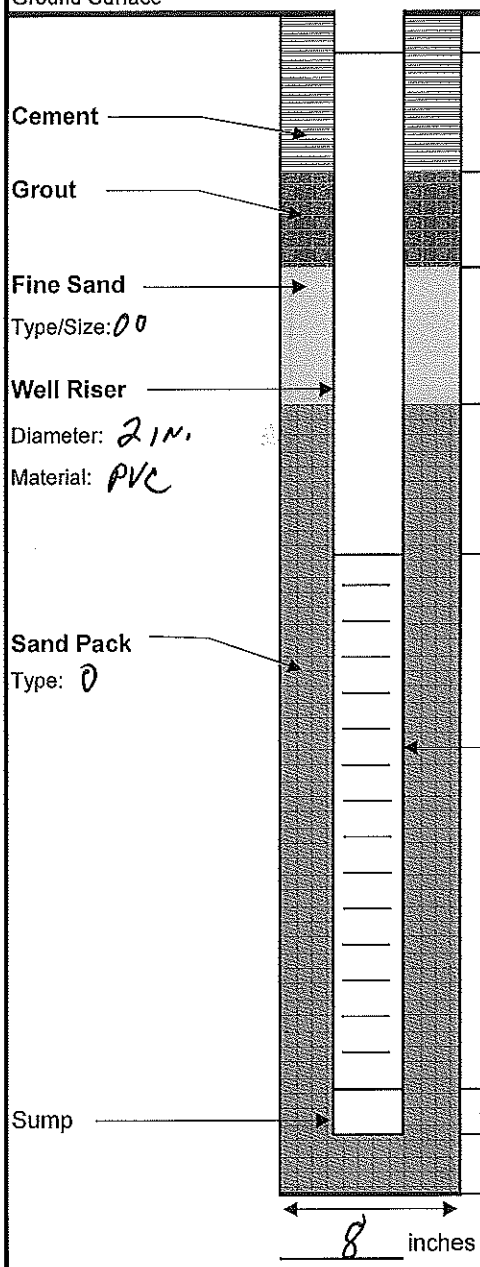
~~Stick up~~

Well Construction Detail (Single Cased - Road Box)

Client: USACE

Well ID: PAR-55-800-12-MW-02 NJBWA Permit No. E201713781

Date Well Installed: 12-14-17 Location: PARCEL 55, UST 800-12



	Depth Below Ground Surface (ft)
Ground Surface	0.0
Top of Well Casing 0.33 ft	
Top of Grout	1.5
Top of Fine Sand	6.0
Top of Sand Pack	7.0
Top of Screen	8.0
Well Screen Diameter: 2 IN Slot Size: .010 IN. Material: PVC	
Bottom of Screen	18.0
Bottom of Sump	18.5
Bottom of Borehole	21

Top of Confining Unit (if present): _____

PARSONS

Soil Boring Log

CLIENT: USACE
PROJECT NAME: FTMM - ECP
PROJECT LOCATION: FTMM Parcel 55-800-12
PROJECT NUMBER: 748810-

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

INSPECTOR: F. ACCORSI
DRILLER: K. ATWOOD, T. McNALLY
WEATHER: 30's, FLURRIES
CONTRACTOR: East Coast Drilling, Inc. (ECDI)
RIG TYPE: Geoprobe(R) 7822DT
DATE/TIME START: 12-14-17 0800
DATE/TIME FINISH: 12-14-17
WEIGHT OF HAMMER: N/A
DROP OF HAMMER: N/A
TYPE OF HAMMER: N/A

BORING/WELL ID: PAR-55-800-12-MW-02
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					HOLLOW STEM AUGER DRILLING TO 21 FT. MOIST BROWN - GREEN BROWN COARSE TO FINE SAND, SOME MED TO FINE GRAVEL, SOME SILTY CLAY PID READINGS FROM SOIL CUTTINGS: 0 PPM TO 135 PPM PETROLEUM ODORS (10' TO 15')		WET ≈ 12'
1							
2							
3							
4							
5					END OF BORING AT 21 FT. SEE WELL CONSTRUCTION DETAIL		
6							
7							
6							
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

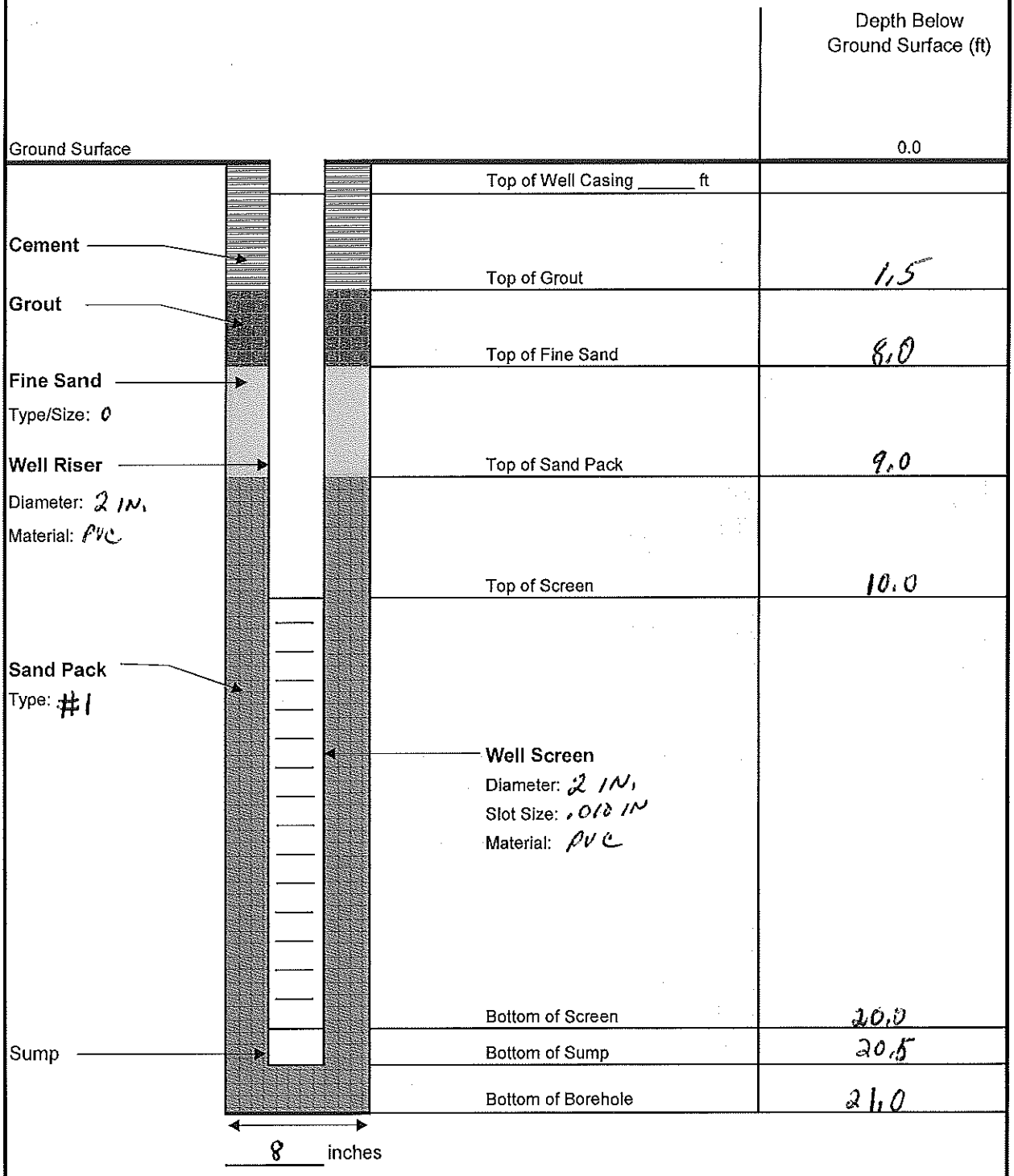
PARSONS

Well Construction Detail (Single Cased - Road Box)

Client: USACE

Well ID: PAR-55-800-12-MW-03 NJBWA Permit No.

Date Well Installed: 12-13-17 Location: FTMM-PARCEL 55



PARSONS

Soil Boring Log

CLIENT: USACE
PROJECT NAME: FTMM - ECP
PROJECT LOCATION: FTMM (Parcel) 55-800-12
PROJECT NUMBER: 748810-

GROUNDWATER OBSERVATIONS
WATER LEVEL: @ 12'
DATE:
TIME:
MEAS. FROM:

INSPECTOR: F. ACCORSI
DRILLER: K. ATWOOD, T. McNALLY
WEATHER: 30°, WINDY, SUNNY
CONTRACTOR: East Coast Drilling, Inc. (ECDI)
RIG TYPE: Geoprobe(R) 7822DT
DATE/TIME START: 12-13-17 1250
DATE/TIME FINISH: 12-13-17
WEIGHT OF HAMMER: N/A
DROP OF HAMMER: N/A
TYPE OF HAMMER: N/A

BORING/WELL ID: PAR-55-800-12-MW-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					HOLLOW STEM AUGER TO MOIST, GREEN BROWN TO YELLOW BROWN COARSE TO FINE SAND SILTY, CLAYEY DRILL CUTTINGS; PID READINGS 0 PPM NO ODORS		WET @ 12'
1							
2							
3							
4							
5					END OF BORING @ 21 FT. SEE WELL CONSTRUCTION DETAIL		
6							
7							
8							
9							
10							

Remarks:

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

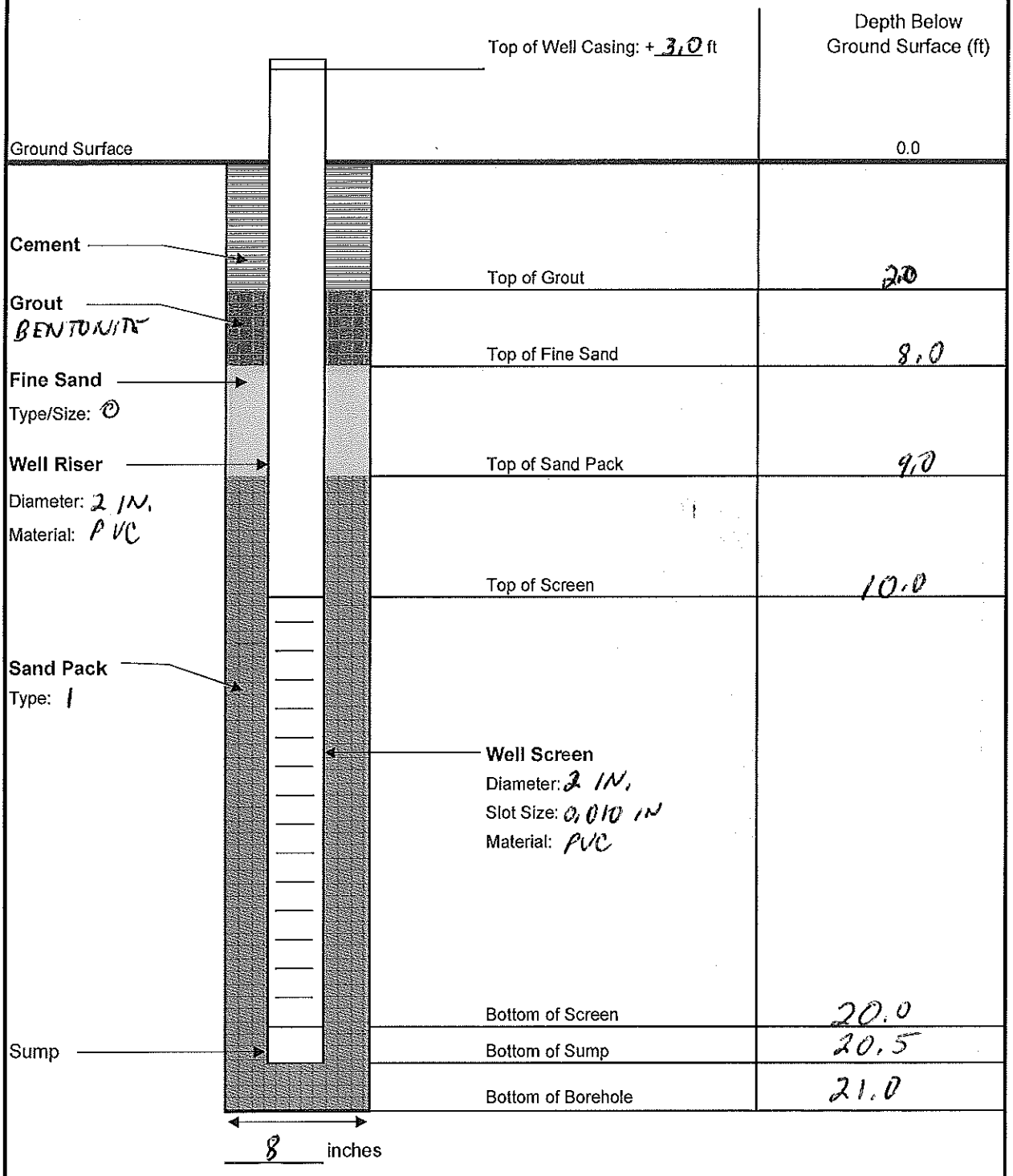
PARSONS

Well Construction Detail (Single Cased - Stickup)

Client: USACE

Well ID: PAR-55-800-12-MW-04 NJBWA Permit No.

Date Well Installed: 12-13-17 Location: FTMM, PARCEL 55, 800-12



Top of Confining Unit (if present): _____

PARSONS

Soil Boring Log

CLIENT: USACE
PROJECT NAME: FTMM - ECP
PROJECT LOCATION: FTMM (Parcel) 55-800-12
PROJECT NUMBER: 748810-

GROUNDWATER OBSERVATIONS
WATER LEVEL: ≈12'
DATE:
TIME:
MEAS. FROM:

INSPECTOR: F. ACCORSI
DRILLER: K. ATWOOD, T. MCNALLY
WEATHER: WINDY, SUNNY, 30°
CONTRACTOR: East Coast Drilling, Inc. (ECDI)
RIG TYPE: Geoprobe(R) 7822DT
DATE/TIME START: 12-13-17 1110
DATE/TIME FINISH: 12-13-17
WEIGHT OF HAMMER: N/A
DROP OF HAMMER: N/A
TYPE OF HAMMER: N/A

BORING/WELL ID: PAR-55-800-12-MW-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					HOLLOW STEM AUGER - TO 20FT		
					MOIST, BROWN - YELLOW BROWN,		
1					COARSE TO FINE SAND, occ.		
					F. GRAVEL,		
2					PID READINGS FROM SOIL		
					CUTTINGS: 0 PPM		WET @ 12'
3					NO ODORS		
4							
5					END OF BORING @ 21 FT.		
					SEE WELL CONSTRUCTION DETAIL		
6							
7							
8							
9							
10							

Remarks:

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

Consistency vs. Blowcount / Foot

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

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

Attachment C
Field Notes

Nov 9 2017 (cont.)

personnel: B. Dietert, F. Accorsi, C. Grill, T. Horn
ECDI

Agenda: GW Sampling + Soil Screening at BD ~~UST~~ site: PAR-SS/BD-800-12

Weather: 40-55° UST, partly cloudy, cold

0730: Discuss today's agenda

0745: ECDI onsite (Justin, Joe, Sean, Roman)

0755: H&S Meeting

0815: Load Equipt, Coolers, Calibrate Mini-Rae PID, Geoprobe (ECDI), Disposable Teflon Bailers, Decon Bags
- All GW samples are collected using disposable teflon bailers

0840: Mob to UST site PAR-SS/BD-800-12. ECDI drill crew Sean + Justin

0845: Warm-up Geoprobe.

0900: Start drilling 800-12-SCREEN1

0910: Begin PID screening SCREEN1 BD ~~[redacted]~~'

0912: ECDI decommissioning PAR-56-800-20-TMW-01, 02, & 03 from yesterday, backfilling with soil cuttings. Decon probe.

0917: Start drilling 800-12-SCREEN2

0920: No PID hits >0 ppm ~0-10' SCREEN1

0935: Begin PID screening SCREEN2. Decon probe

0937: SCREEN1 borehole dry, need to advance to ~15 ft.

0940: SCREEN2 + SCREEN1 advanced to ~15' to get below water table. Decon Geoprobe.

Nov 9 2017 (cont.)

0943: No PID hits >0 ppm ~10-15' SCREEN1 WL = 11.3'

0955: SCREEN2 WL = 11.7'

1010: No PID hits >0 ppm SCREEN2 ~0-15'

1013: Frank BD ~~[redacted]~~ exct. to office for lab coolers.

1030: Start drilling 800-12-SCREEN3

1035: Decommision SCREEN1, backfill with soil cuttings.

1038: Begin PID Screening SCREEN3. Decon Geoprobe

1040: Decommision SCREEN2, backfilled with soil cuttings.

1051: SCREEN3: WL = 11.75'
12' = 101 ppm, 12.5' = 2 ppm, 13-15' = 0 ppm, 0-12' = 0 ppm - Decon Equipt.

1105: Start drilling 800-12-SCREEN4
- Driller hit hard (refusal) concrete approx. 2 1/2 ft, drilling another hole approx. 2' south of existing Decon Geoprobe

1111: Begin PID screening SCREEN4 - WL = 11.6'
12' = 7 ppm, 12.5-15' = 0 ppm, 0-12' = 0 ppm

1115: Start drilling 800-12-SCREEN5 - Decon Equipt.

1120: Begin PID Screening SCREEN5 - WL = 12'

1126: Decommision SCREEN 3 & 4 plus refusal hole, backfill with soil cuttings.

1130: No PID hits >0 ppm SCREEN5 ~0-15'

1134: Start drilling 800-12-SCREEN6

1142: Begin PID screening SCREEN6 - WL = 11.5'

1142: Decon Geoprobe

Nov 9 2017 (cont.)

1146 - Decommision SCREEN 5 (PAR-55 800-12), backfilled with soil cuttings

1150 - ECDI to Lunch

1150 - No PID hits >0 ppm SCREEN 6 ~0-15'

1200 - Contacted Julien to discuss Screen 1-6 findings. Since Screen 3 & 4 are hot, start with drilling TMW-02 & TMW-03 and screen to determine if TMW-01 & 04 need to be relocated or possibly eliminated.

1230 - Lunch

1300 - Decommision SCREEN 6, backfill with soil cuttings.

1310 - Start drilling PAR-55-800-12-TMW02

1320 - Begin PID Screening TMW-02 WL=9.9'
10.5-11' = 96 ppm, 11.5' = 72 ppm,
12' = 101 ppm, 12.5 = 4 ppm, 13-15' = 0 ppm
Decon equipt. & Geoprobe

1345: Start drilling TMW-03

1350 (23). Collect sample, PAR-55-800-12-TMW-02-12.5', VOC+TICs & SVOC+TICs
- Dark grey colored, petroleum odors, sheen.

1405: PID reading all >0 ppm TMW-03 WL=11'

1407: Decon Geoprobe

1410: Start drilling TMW-01, remaining in same location since TMW-02 is dirty & TMW-03 is clean.

1411: TMW-01 refusal at 2.5'. Drilling new hole approx. 3' SE (toward UST)
- refusal - concrete

1415: Collect Field Dup, PAR-55-800-12-TMW-021-12.5' VOC+TICs & SVOC+TICs

1425: Begin PID screening TMW-01 WL=10.9'
10.5-11' = 91 ppm, 11.5' = 162 ppm
12' = 170 ppm, 12.5' = 101 ppm
13' = 5 ppm, 13.5' = 11 ppm, 14' = 7 ppm,
14.5' = 0 ppm
5-9' = 0 ppm, 9.5'-10' = 2.5 ppm,
0-5' = 0 ppm
- Decon Equipt & Geoprobe

1500 - Collect MS, PAR-55-800-12-TMW-02-12.5-MS, VOC+TICs & SVOC+TICs

1505 - Start drilling TMW-04, Julien advised keep in same location since TMW-02 & TMW-01 are dirty.

1513 - Start PID screening TMW-04 WL=9.9'

1520 - No PID hits >0 ppm TMW-04 ~0-15'

1525 - Collect MSD sample, PAR-55-800-12-TMW-02-12.5'-MSD

1535 (24) - Collect samples, PAR-55-800-12-TMW-03-13', SVOC+TICs & VOCs+TICs (High NTU, orange-brown)

1545 - Collect samples, PAR-55-800-12-TMW-02-12.5' QA/QC Split

1550 - Collect samples, PAR-55-EB-11092017 (Equipt. Blank)

Nov 9 2017 (cont)

~~1610~~ 1605: Collect samples, PAB-SS-800-12-TRIW-01-13', VOC + TICs & SVOC + TICs (Dark Grey, Petroleum Odor, Slight Sheen)

1620: Collect samples, PAB-SS-800-12-TRIW-04-12.5', VOCs + TICs & SVOC + TICs (High NTU - ~~orange~~ orange-brown color)

1630: Mob back to office, COCs, Quality Control Report

11/09/2017 BD

Daily Contractor Quality Control Report

Contract Number: W912DY-09-D-0062 (F. Accorsi, B. Dietert)

Delivery Order Number: 12

Project Name: FTMM

Project Number: 748810 PAR-55-800-12 UST Site

Site Location: Oceanport and Monmouth County, NJ

Date: 11/9/2017

Weather: 40-55°, partly cloudy, cold

Field Activities Conducted: PAR-55-800-12: 6 Soil Screening Locations + 4 TMW Soil Screening + GW Sampling + QA/QC

Work Planned next work day: PAR-54-884 UST Site; Soil Screening & GW Samples

Field Instrument Measurements (list or provide attachment): See attached boring logs & field notes

Equipment Calibrations (list or provide attachment): See attached calibration log

List all field and quality control samples collected (list or provide attachment): See below + 2 COCs

Sample ID	Matrix	Collection Date & Time	Analyses	Shipment Date	Lab	Comments
PAR-55-800-12-TMW-01-13'	GW	11/9/17 1605	VOC+TICs SVOC+TICs	11/10/17	ALS	
PAR-55-800-12-TMW-02-12.5'	↓	11/9/17 1350	↓		↓	
PAR-55-800-12-TMW-03-13'		11/9/17 1535				
PAR-55-800-12-TMW-04-12.5'		11/9/17 1620				
PAR-55-800-12-TMW-021-12.5'		11/9/17 1415				
PAR-55-800-12-TMW-02-12.5'-MS		11/9/17 1500				
PAR-55-800-12-TMW-02-12.5'-MSD		11/9/17 1525				
PAR-55-EB-11092017	–	11/9/17 1550	↓			
TB-11092017	–	11/9/17	VOC+TICs		↓	
PAR-55-800-12-TMW-02-12.5'	GW	11/9/17 1545	VOC+TICs SVOC+TICs	11/10/17	Accutest	
TB-11092017	TB	11/9/17	VOC+TICs	11/10/17	Accutest	

✓ Table listing all field/QC samples collected

✓ Field sampling forms (in separate submittal).

✓ Field-generated analytical results

✓ Chain-of-custody forms (signed CoC will be posted to the Denver server).

Signed by: [signature]

Name (print): Bradly Dietert

Date: 11/9/17

Phone Number:

Copies sent to: C. Grill, J. Chambert, L. Weber, K. Friesen

Location FTMM Date 11-16-17

Project / Client USACE

PAC 83

TMW-01 IS ≈ 3' LOWER IN ELEVATION THAN MW-07

1215 DTW IN TMW-01 RISING FROM 11' DEPTH

1230 BREAK FOR LUNCH

1315 CREW LOADS MATERIALS TO RELOCATE TO FTMM-66.

1340 BEGIN ADVANCING BORING AT FTMM-66-886-SB-01 TO 12'

1355 BEGIN PUSHING SB-02

1415 BEGIN PUSHING SB-03

1435 BEGIN PUSHING SB-06

1450 CREW BACKFILLS OPEN BORING HOLES

1505 CREW CLEANS AREA AND LOADS VEHICLE. FA REPORTS 8.1' BGS TO GW AT TMW-01

1510 CREW OFFSITE FOR THE DAY

1530 MEET FRANK A. AT TMW-01 TO ASSIST WITH BACKFILLING BORING AFTER REMOVAL OF TEMPORARY 1" PVC WELL POINT SCREEN AND CASING

1545 RETURN TO THE OFFICE TO COMPLETE COC FORMS.

1605 TH off-site.

1700 AC off-site

Location FTMM Date 11-17-17

Project / Client USACE

FTMM-66-886 SOIL BORINGS

0730 ONSITE, WEATHER CLEAR 50°F, WINDY

0745 CREW ONSITE, PART ARE IN H&S KICKOFF DISCUSSION

0815 CREW TAKES ON WATER TO TANK

0835 HEAD TO FTMM-66-886-SB-05

0855 CREW BEGINS PUSHING AT SB0-5.

0915 CREW PUSHES AT SB-04

0930 CREW PUSHES AT SB-07

1000 CREW PUSHES AT SB-08

1045 CREW LOADS EQUIPMENT TO TRAILER

1115 CREW HEADS TO STAGED MATERIALS AREA TO TRANSFER WELL CONSTRUCTION EQUIPMENT TO TRUCK.

1130 CREW BREAKS FOR LUNCH

1200 CREW SETS UP AT PAC-56-800-20-MW-01 PROPOSED LOCATION AND BEGINS DRILLING VIA 4 1/4 HSA.

1210 CUTTINGS RECOVERED FROM 5' DEPTH APPEAR TO INCLUDE AN OLIVE-GRAY BROWN SANDY SILT.

1215 THOSE FROM ≈ 10' ARE SIMILAR.

BASED UPON INFORMATION GENERATED FROM ADJACENT SOIL BORINGS, WE EXPECT GROUNDWATER TO BE AT A DEPTH OF ≈ 7' BGS.

1220 CUTTINGS FROM A DEPTH OF ≈ [illegible] ARE

11-17-17

Location FTMM Date 11-17-17

Project / Client USACE

PAR-56-800-20 MW INSTALLATIONS

WET AND DARK-TAN-BROWN.

1225 AT 15' ADD FOURTH AUGER TO DRILL TO 18'. PLAN TO SET SCREEN FROM 7-17' WITH AT LEAST 6" OF FILTER PACK BELOW THE BGS.

1230 INSTALL RODS (25') TO PUSH OUT THE PLUG, INSTALL 10' OF 10-SLOT SCREEN AND ADD 4 GALLONS OF WATER INSTALL AND PLUG 10' RISER (2"-DIAMETER) PVC. ADD #1 MORIE AND PULL 1st AUGER. INSTALL 1" TREMIE PIPE FOR INSTALLATION OF REMAINING SAND (FOR USE AS CONTROL AGAINST BRIDGING AND MEASUREMENT OF DEPTH).

1240 ADD THIRD BAG OF #1 MORIE, PULL 3rd AUGER.

1245 6th BAG IS #0 MORIE SAND MEASURED UP TO ~5' BGS

1250 INSTALL 3/8 BENTONITE CHIPS TO 0.5' BGS.

1300 INSTALL PROTECTIVE CASING AND CONCRETE TO GRADE. PROTECTIVE CASING LID IS ~0.5' ABOVE TOIC. CREW CLOSELY DECONS AUGER FLIGHTS.

SKETCH OF WELL CONSTRUCTION PLACED ON WELL CONSTRUCTION FORMS

HEAD TO PAR-55-800-12-MW-01

[initials] 11-17-17

Location FTMM Date 11-17-17

Project / Client USACE

PAR-55-800-12-MW-01 INSTALLATION

1305 BEGIN AUGERING THROUGH ASPHALT AT PAR-55-800-12-MW-01 PROPOSED LOCATION.

1315 THROUGH ASPHALT BEGIN AUGERING TO 21' TO SET THE 2" 10-SLOT SCREEN FROM 10-20' BGS WITH RISER TO GRADE AND FLUSH-MOUNT BOX.

1320 CUTTINGS ARE A GRAYISH-GREEN BROWN SANDY SILT WITH A SLIGHT ORGANIC ODOR.

1330 AT 10' SIMILAR CUTTINGS, MOIST

1335 AT ~12' SLIGHT PETROLEUM-LIKE ODOR AND CHANGE IN COLOR TO LIGHT-ORANGE-BROWN

1340 AT 15' BEGINNING TO BECOME WET.

1345 AT 21' PUSH PLUG WITH RODS INSTALL 10' SCREEN AND RISER TO GRADE. ADD #1 MORIE SAND

1400 5th BAG #0 SAND TO 8' DEPTH.

1405 BENTONITE (3/8") CHIPS ADDED - 7 BAGS - TO ~8' B.G.S. DEPTH TO BENTONITE ~6' BGS.

1420 CREW LOADS EQUIPMENT

1430 FA LEADS CREW TO FTMM-08 LOCATION WHICH WILL BE THE LOCATION FOR PLANNED BORINGS / TEMPORARY WELL INSTALLATIONS ON MONDAY

[initials] 11-17-17

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Location FTMM Date 11-17-17

Project / Client USACE

FTMM-08

1500 FA TAKES NL AND JJH TO FTMM-08 AREA FOR RECON

1520 CHECK BOTTLEWASE AND COMPLETE FORMS

1535 CALL JULIAN CHAMBERS

1600 DEPART SITE

11/17/17

37

Location

Date

Project / Client

Daily Contractor Quality Control Report

Contract Number: W912DY-09-D-0062
Delivery Order Number: 12
Project Name: FTMM
Project Number: 748810
Site Location: Oceanport and Monmouth County, NJ
Date: 11/16/17
Weather: High 60°F, Rain in AM, Partly Cloudy after 0900
Field Activities Conducted: completed soil borings + soil sampling, installed + sampled temp. MW
Work Planned next work day: soil boring + soil sampling, install monitoring wells
Field Instrument Measurements (list or provide attachment): see soil boring logs / well construction forms
Equipment Calibrations (list or provide attachment): see air monitoring calibration log
List all field and quality control samples collected (list or provide attachment): see attached chains of custody

Sample ID	Matrix	Collection Date & Time	Analyses	Shipment Date	Lab	Comments

✓ Table listing all field/QC samples collected
✓ Field sampling forms (in separate submittal).
✓ Field-generated analytical results
✓ Chain-of-custody forms (signed CoC will be posted to the Denver server).

Signed by:
Name (print): Nick Loizos
Date: 11/16/17
Phone Number: (732) 763-1637
Copies sent to: Julien, Chemberet, Cris Grill, Lorraine Weber

Daily Contractor Quality Control Report

Contract Number: W912DY-09-D-0062
Delivery Order Number: 12
Project Name: FTMM
Project Number: 748810
Site Location: Oceanport and Monmouth County, NJ
Date: 11/17/17
Weather: High 50°F, Clear, high winds
Field Activities Conducted: completed soil sampling @ FTMM-66, installed 2 monitoring wells
Work Planned next work day: (monday) complete soil borings + temp. wells @ FTMM-08
Field Instrument Measurements (list or provide attachment): see boring logs + well construction forms
Equipment Calibrations (list or provide attachment): see air monitoring calibration logs
List all field and quality control samples collected (list or provide attachment): see chains of custody

Sample ID	Matrix	Collection Date & Time	Analyses	Shipment Date	Lab	Comments

✓ Table listing all field/QC samples collected
✓ Field sampling forms (in separate submittal).
✓ Field-generated analytical results
✓ Chain-of-custody forms (signed CoC will be posted to the Denver server).

Signed by:
Name (print): Nicole Loizos
Date: 11/17/17
Phone Number: (732) 763-1437
Copies sent to: Chris Grill, Julien Chambert, Lorraine Weber

11-22-17

FIACCORSI - ON-SITE AT PARCEL 34,2567 TO DEVELOP MW-11, WHICH WAS RECENTLY INSTALLED, BUT NOT DEVELOPED.

DEPTH TO WATER: 2.92' FT (T.O.C.)

BEGIN PURGING @ 10:42

END PURGING 11:06

@ APPROX 1 GPM, PUMPED A TOTAL OF APPROX. 25 GAL. SURGED WELL 2 TIMES, FLOW WAS TURBID FREE WHEN STOPPED PUMPING.

12-B-17 - MW INSTALLATION 20's-30's, WINDY SUNNY

0700 ON-SITE W/ECDI, CONDUCTED HEALTH+SAFETY MEETING IN CONF. RM. BLDG. 563, FM, W/ KEN ATWOOD AND TOM McNALLY.

0850 MOBILIZED TO PAR-56-900-20-MW-02 LOCATION, BEGAN DRILLING (HSA ON GEOPROBE 7822) TO 18 FT. DEEP, SCREEN SET FROM 7'-17' STEEL STICK-UP RISER. GRAVEL (MORIE #1, 5 BAGS) PACK FROM 18' TO 6', MORIE #0 (1) BAGS FROM 5'-6'

1010 FINISH WELL EXCEPT FOR STICK-UP RISER AND DEVELOPMENT, WHICH WILL BE DONE BY CREW 2 NEXT WEEK. GENERATED 1 DRUM OF SOIL CUTTINGS. 15 MIN. BREAK

1035 MOBILIZE TO PAR-55-MW-04 LOCATION. SUPPORT TRUCK WENT TO B.699 STAGING AREA TO: UNLOAD (2) DRUM, DECON AUGERS, TAKE DELIVERY OF NEW MW MATERIALS, UNLOAD, STAGE.

1110 BEGAN DRILLING PAR-55-800-12-MW-04 TO 21 FT. BGS. SET SCREEN FROM 10' TO 20'. USED 5 BAGS MORIE #1 TO 1' ABOVE SCREEN, 1 BAG MORIE 0 TO 2' ABOVE SCREEN,

1205-1245 LUNCH BREAK 1 DRUM SOIL

1250 BEGIN DRILLING PAR-55-800-12-MW-03 TO 21 FT. SET SCREEN FROM 10' TO 20', USED 5 BAGS MORIE #1, 1 BAG MORIE #0, 1.5 BAG BENTONITE GROUT GENERATED 1 DRUM SOIL

GW @ 11.8 FT PAR-55-800-12-MW-01

1510 FINISHED DRILLING MOVE RIG TO MW-02 LOCATION CLEAN UP SITES, MOVE DRUM, MATERIALS PREP.

END OF DAY

12-14-[illegible] MW INSTALLATION 30° FLURRIES

0705 ECDI ARRIVED, CONDUCTED H+S MEETING.

0755 MOBILIZE TO PAR-55-800-12-MW-02. HSA DRILLING TO 21 FT BGS. (K. ATWOOD, T. MCNALLY) SCREEN SET FROM ~~10' TO 20'~~. 8' TO 18' BASED ON GW LEVEL TAKEN AT MW-03, WHICH IS 10.2 FT BGS. USED 6 BAGS MORIE #0, 1 BAG #00, ½ BAG BENTONITE GROUT, 0930 DONE

0930-1030 DECON AUGERS, MOBILIZE TO PAR-54-884-MW-03. GW ELEV. IN MW-01 IS 5.9', SCREEN IN THE WELL IS FROM 5' TO 15' BASED ON ~~THAT~~ AND GW IN TMW-02 WAS 5.1' AND GW IN TMW-04 WAS 4.6': DISCUSSED RAISING THE SCREEN INTERVAL IN MW-03 AND MW-02 TO 2'-12' WITH KENT + JULIEN IN WHICH WAS A UNANIMOUS DECISION TO DO SO.

1140 WELL FINISHED (NOT COMPLETED) MOVE 2 DRUMS SOIL TO B.699 STAGING AREA: LUNCH BREAK

1255 MOB. TO PAR-884-MW-02 TO DRILL MW W/SAME SPECS. AS MW-03. EACH USED 6 BAGS #0 MORIE, 1 BAG #00 MORIE, ½ BAG BENT. GROUT.

1440 DONE-WELL FINISHED, CLEAN UP SITE AND PREVIOUS 2 MW INSTALLATION AREAS. MOB. TO 699 STAGING AREA, UNLOAD ½ FULL DRUM, DECON AUGERS, ~~STAGE~~ STAGE MATERIALS FOR 3 MW INSTALLATION. ECDI OFFSITE 1545