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:

- "Supplemental Unregulated Heating Oil Tank (UHOT) Work Plan, Fort Monmouth, New Jersey" (15 August 2017)

PERSON RESPONSIBLE FOR CONDUCTING THE REMEDIATION INFORMATION AND CERTIFICATION

Full Legal Name of the Person Responsible for Conducting the Remediation: William R. Colvin
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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: 15 August 2017

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

Completed form should be sent to:

Mr. Ashish Joshi
New Jersey Department of Environmental Protection
Division of Remediation Management & Response
Bureau of Northern Field Operations
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OFFICE OF ASSISTANT CHIEF OF STAFF FOR INSTALLATION MANAGEMENT
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15 August 2017

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

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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)

REFERENCES CITED:

1. Department of the Army. 2015. *Underground Storage Tanks Within Parcel 68, Fort Monmouth, New Jersey*. Prepared by the Office of Assistant Chief of Staff for Installation Management, U.S. Army Fort Monmouth. April 14.
2. Department of the Army. 2015. *Underground Storage Tanks Within ECP Parcel 79, Fort Monmouth, New Jersey*. Prepared by the Office of Assistant Chief of Staff for Installation Management, U.S. Army Fort Monmouth. April 22.
3. Department of the Army. 2015. *No Further Action Request, Site Investigation Report Addendum for the 800 Area Including, ECP Parcels 55 and 56, Fort Monmouth, New Jersey*. Prepared by the Office of Assistant Chief of Staff for Installation Management, U.S. Army Fort Monmouth. June 12.
4. Department of the Army. 2016. *Parcel 68 Work Plan Addendum for a Former UST Site, Fort Monmouth, Oceanport, Monmouth County, New Jersey*. Prepared by the Office of Assistant Chief of Staff for Installation Management, U.S. Army Fort Monmouth. March 2.
5. Department of the Army. 2016. *No Further Action Request, Site Investigation Report Addendum for the Howard Commons Underground Storage Tanks, Fort Monmouth, New Jersey*. Prepared by the Office of Assistant Chief of Staff for Installation Management, U.S. Army Fort Monmouth. April 26.
6. Department of the Army. 2016. *No Further Action Request, Site Investigation Report Addendum for the Building 750 Motor Pool Area Including Underground Storage Tanks, Fort Monmouth, New Jersey*. Prepared by the Office of Assistant Chief of Staff for Installation Management, U.S. Army Fort Monmouth. October 28.
7. Department of the Army. 2016. *Clarification of Underground Storage Tanks at Howard Commons, Fort Monmouth, New Jersey*. Prepared by the Office of Assistant Chief of Staff for Installation Management, U.S. Army Fort Monmouth. December 6.
8. Department of the Army. 2016. *No Further Action Request, Site Investigation Report Addendum, ECP Parcel 72 Underground Storage Tanks, Fort Monmouth, New Jersey*. Prepared by the Office of Assistant Chief of Staff for Installation Management, U.S. Army Fort Monmouth. December 13.
9. Department of the Army. 2017. *Request for No Further Action at Multiple 800 Area Underground Storage Tanks, Site Investigation Report Addendum, Fort Monmouth, New Jersey*. Prepared by the Office of Assistant Chief of Staff for Installation Management, U.S. Army Fort Monmouth. January 23.
10. Department of the Army. 2017. *Request for No Further Action at Multiple Parcel 79 Storage Tank Site Investigation Report Addendum, Fort Monmouth, Oceanport, New Jersey*. Prepared by the Office of Assistant Chief of Staff for Installation Management, U.S. Army Fort Monmouth. February 8.

11. New Jersey Department of Environmental Protection (NJDEP). 2007. Letter to the Army, RE: *Underground Storage Tank Closure & Remedial Investigation Reports, 800 Area UST No. 9, 800 Area UST No. 12, Fort Monmouth, NJ.* December 31.

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

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

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

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

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

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

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

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

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

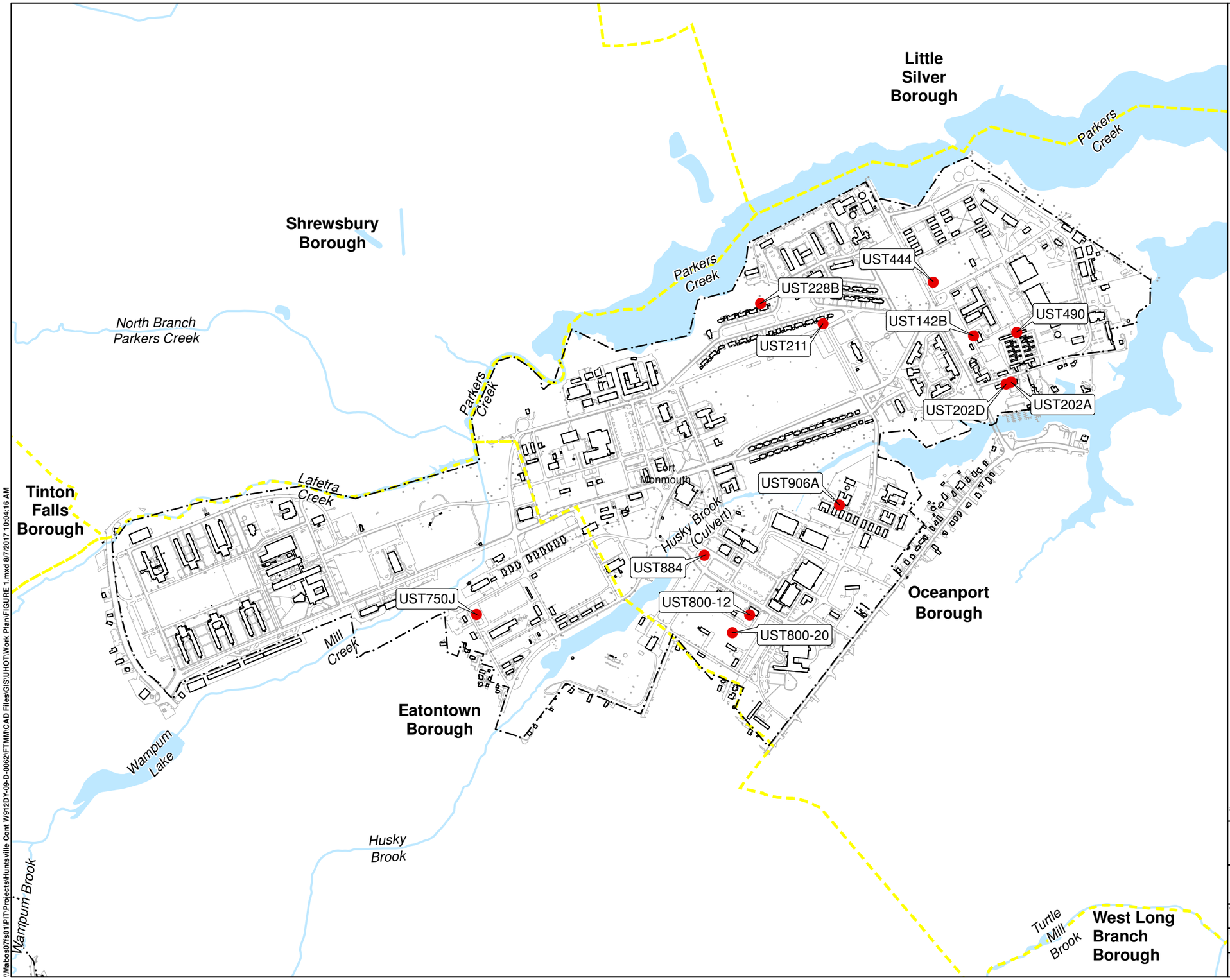
21. New Jersey Department of Environmental Protection (NJDEP). 2017. Letter to the Army, RE: *No Further Action Request Site Investigation Report Addendum for the Building 750 Motor Pool Area Including Underground Storage Tanks, Fort Monmouth, Oceanport, Monmouth County.* April 4.

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

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

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

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



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

\\Mabos07fs01\PIT\Projects\Huntsville Cont W912DY-09-D-0062\FTMM\CAD Files\GIS\UHOT\Work Plan\FIGURE 1.mxd 8/7/2017 10:04:16 AM

LEGEND:

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

N

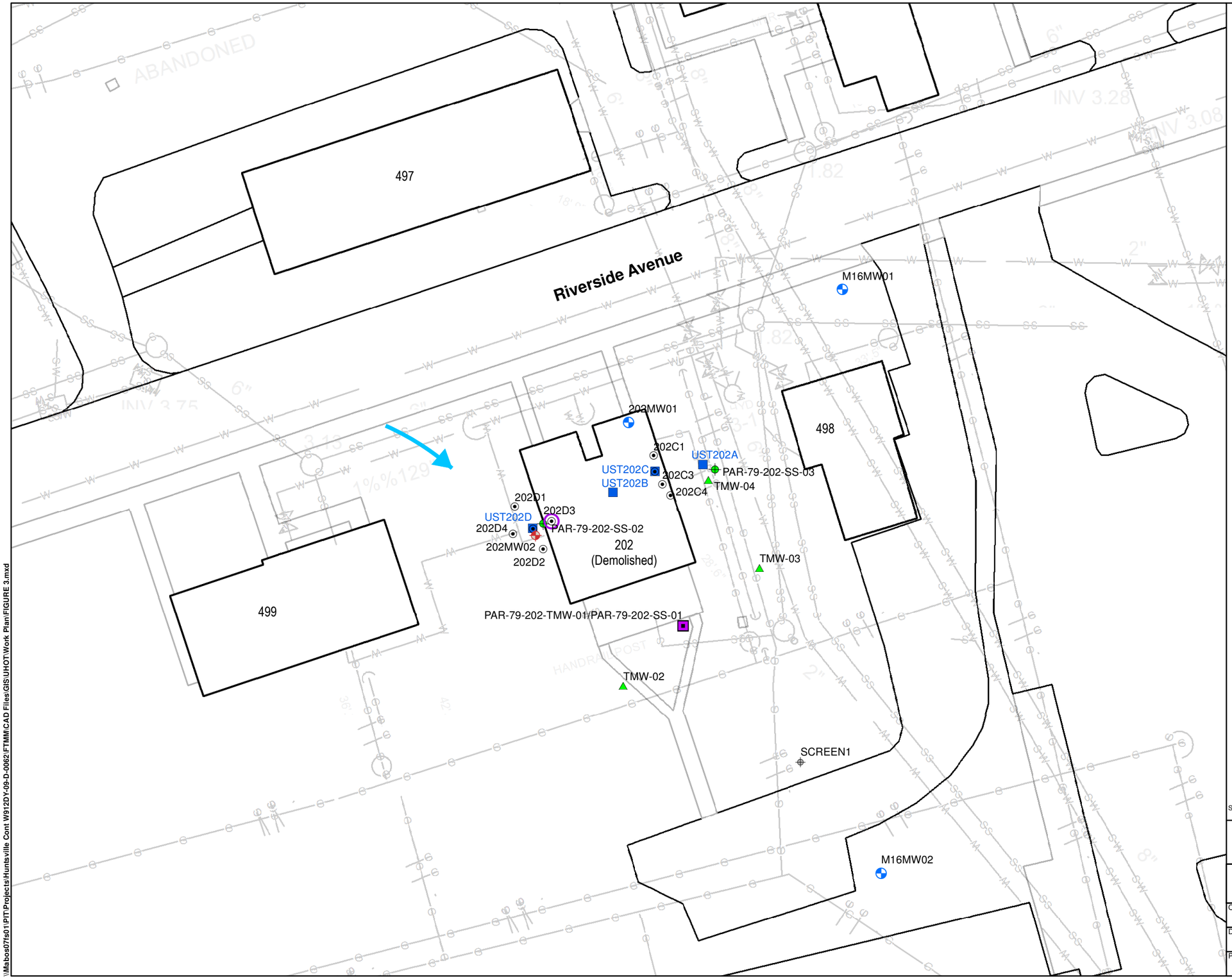
1 inch = 40 feet

0 20 40 80 Feet

Source: FTMM Supplied CAD, 2013; U.S. Army BRAC, 2008; 2008 SI Report; USGS NHD, 2012.

PARSONS 401 Diamond Drive NW, Huntsville AL	Fort Monmouth New Jersey
UST142B SAMPLE LOCATION	
CREATED BY: RR	REVIEWED BY: KF
DATE: AUG. 2017	FIGURE NUMBER: FIGURE 2
PROJECT NUMBER: 748810-06031	FILE: FIGURE 2.mxd

\\Mabos07fs01\PIT\Projects\Huntsville Cont W912DY-09-D-0062\FTMM\CAD Files\GIS\UHOT\Work Plan\FIGURE 2.mxd



LEGEND:

- Proposed Permanent Monitoring Well
- Proposed Groundwater Sample (Temporary Well)
- Proposed Field Screening Boring
- Soil Sample (2016)
- Soil and Groundwater Sample (2016)
- Shallow Monitoring Well
- Historic Soil/Groundwater Sample
- Former UST Location
- Exceedance of Groundwater Quality Criteria (2011)
- 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; U.S. Army BRAC, 2008; 2008 SI Report; USGS NHD, 2012.

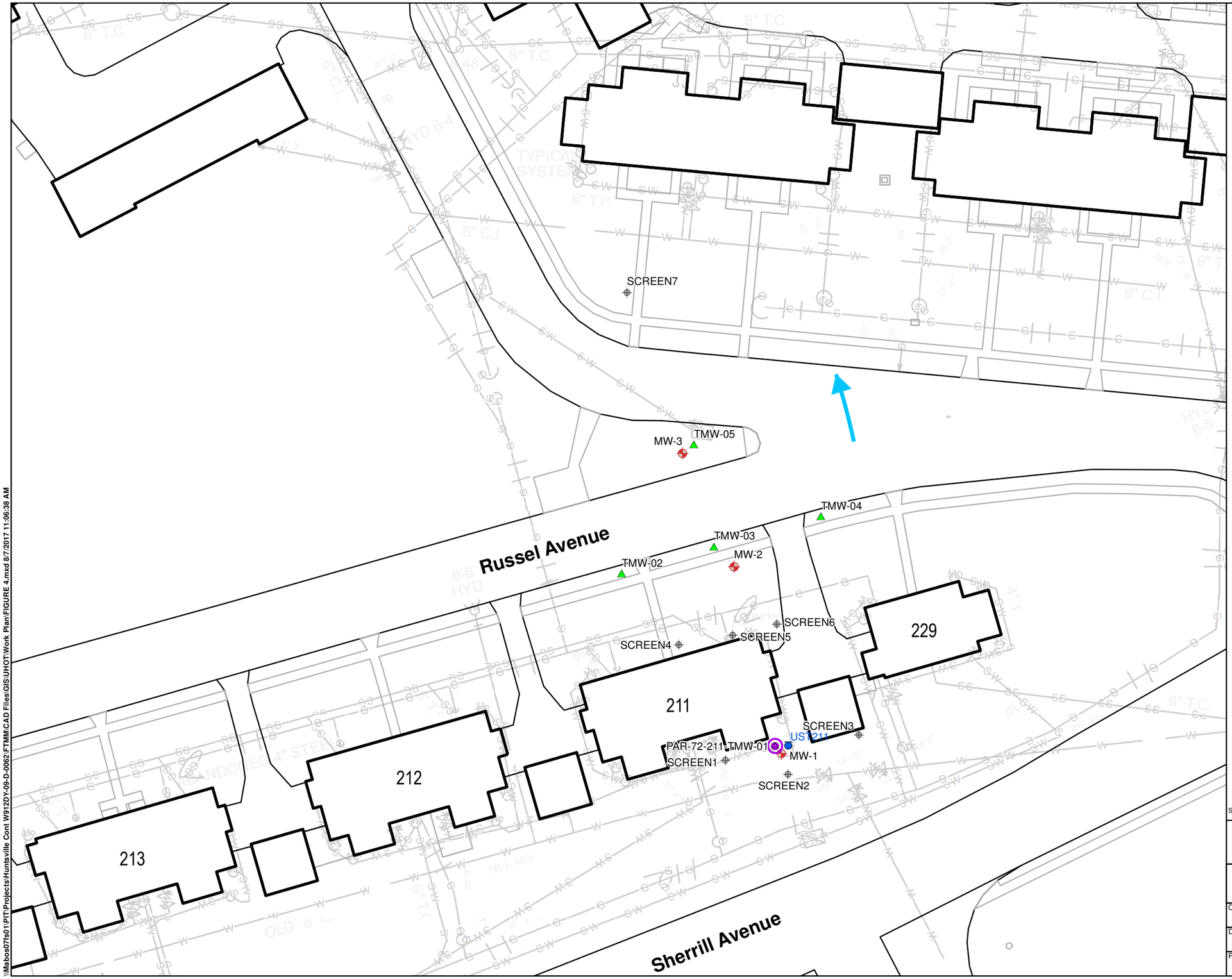
PARSONS
401 Diamond Drive NW,
Huntsville AL

Fort Monmouth
New Jersey

UST202A AND UST202D SAMPLE LOCATIONS

CREATED BY:	REVIEWED BY:
RR	KF
DATE: AUG. 2017	FIGURE NUMBER: FIGURE 3
PROJECT NUMBER: 748810-06031	FILE: FIGURE 3.mxd

\\Mabos07fs01\PIT\Projects\Huntsville Cont W912DY-09-D-0062\FTMM\CAD Files\GIS\UHOT\Work Plan\FIGURE 3.mxd



LEGEND:

- Proposed Permanent Monitoring Well
- Proposed Groundwater Sample (Temporary Well)
- Proposed Field Screening Boring
- Groundwater Sample (2016)
- Former UST Location
- Exceedance of Groundwater Quality Criteria
- Shallow Monitoring Well
- Installation Boundary
- W Water Line
- S Sanitary Sewer Line
- SW Storm Sewer Line
- G Gas Line
- Generalized Groundwater Flow Direction

N

1 inch = 40 feet

0 20 40 80 Feet

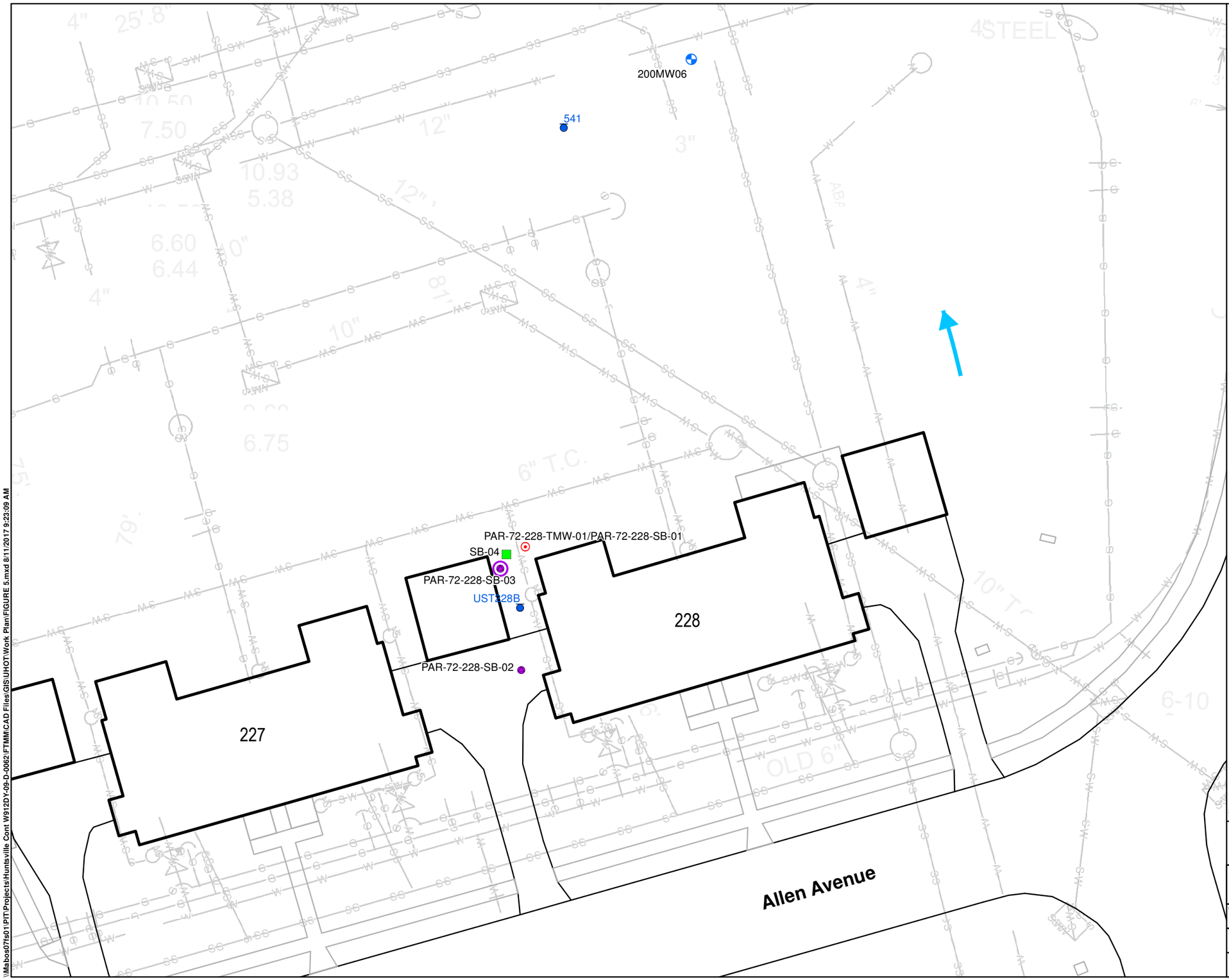
Source: FTMM Supplied CAD, 2013.

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

UST 211
SAMPLE LOCATIONS

CREATED BY: RR	REVIEWED BY: KF
DATE: AUG. 2017	FIGURE NUMBER: FIGURE 4
PROJECT NUMBER: 748810-06031	FILE: FIGURE 4.mxd

\\Mabos07fs01\PIT\Projects\Huntsville Cont W912DY-09-D-0062\FTMM\CAD Files\GIS\UHOT\Work Plan\FIGURE 4.mxd 8/7/2017 11:06:38 AM



LEGEND:

- Proposed Soil Sample
- Soil Boring/Temporary Well (2016)
- Soil Boring (2016)
- Exceedance of Soil Screening Level
- Former UST Location
- Shallow Monitoring Well
- W Water Line
- S Sanitary Sewer Line
- SW Storm Sewer Line
- G Gas Line
- Generalized Groundwater Flow Direction

NOTE:

1. Steel tank UST228B was still present at Building 228.
2. Field located final sample locations based on site features to sample within 10 feet of former or existing tanks.

N

1 inch = 25 feet

0 12.5 25 50 Feet

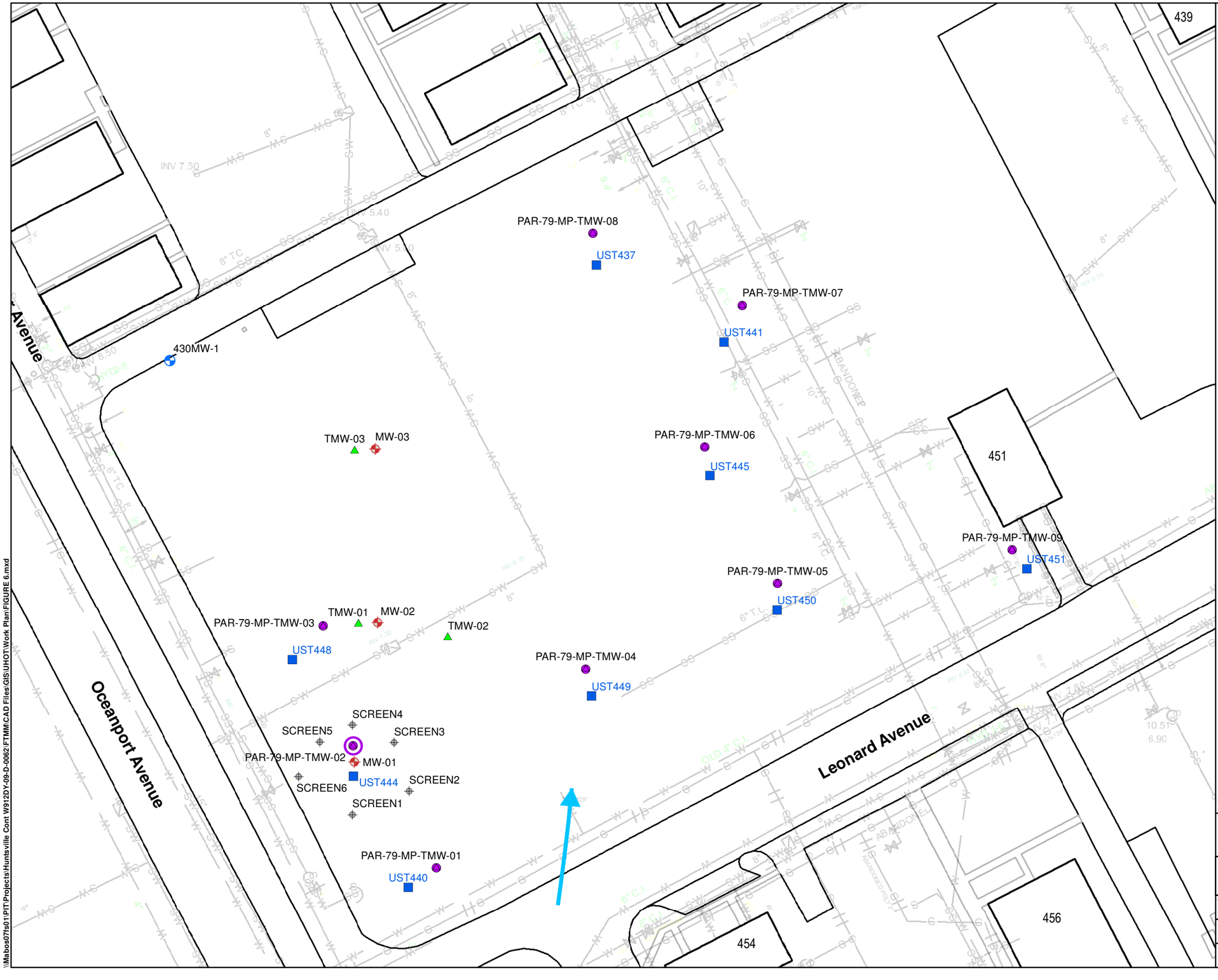
Source: FTMM Supplied CAD, 2013.

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

UST 228B
SAMPLE LOCATION

CREATED BY: RR	REVIEWED BY: KF
DATE: AUG. 2017	FIGURE NUMBER: FIGURE 5
PROJECT NUMBER: 748810-06031	FILE: FIGURE 5.mxd

\\Mabos07fs01\PIT\Projects\Huntsville Cont W912DY-09-D-0062\FTMM\CAD Files\GIS\UHOT\Work Plan\FIGURE 5.mxd 8/11/2017 9:23:09 AM



LEGEND:

- Proposed Permanent Monitoring Well
- Proposed Groundwater Sample (Temporary Well)
- Proposed Field Screening Boring
- Groundwater Sample (2016)
- Exceedance of Groundwater Quality Criteria
- Former UST Location
- W Water Line
- S Sanitary Sewer Line
- SW Storm Sewer Line
- G Gas Line
- Estimated Groundwater Flow Direction

N

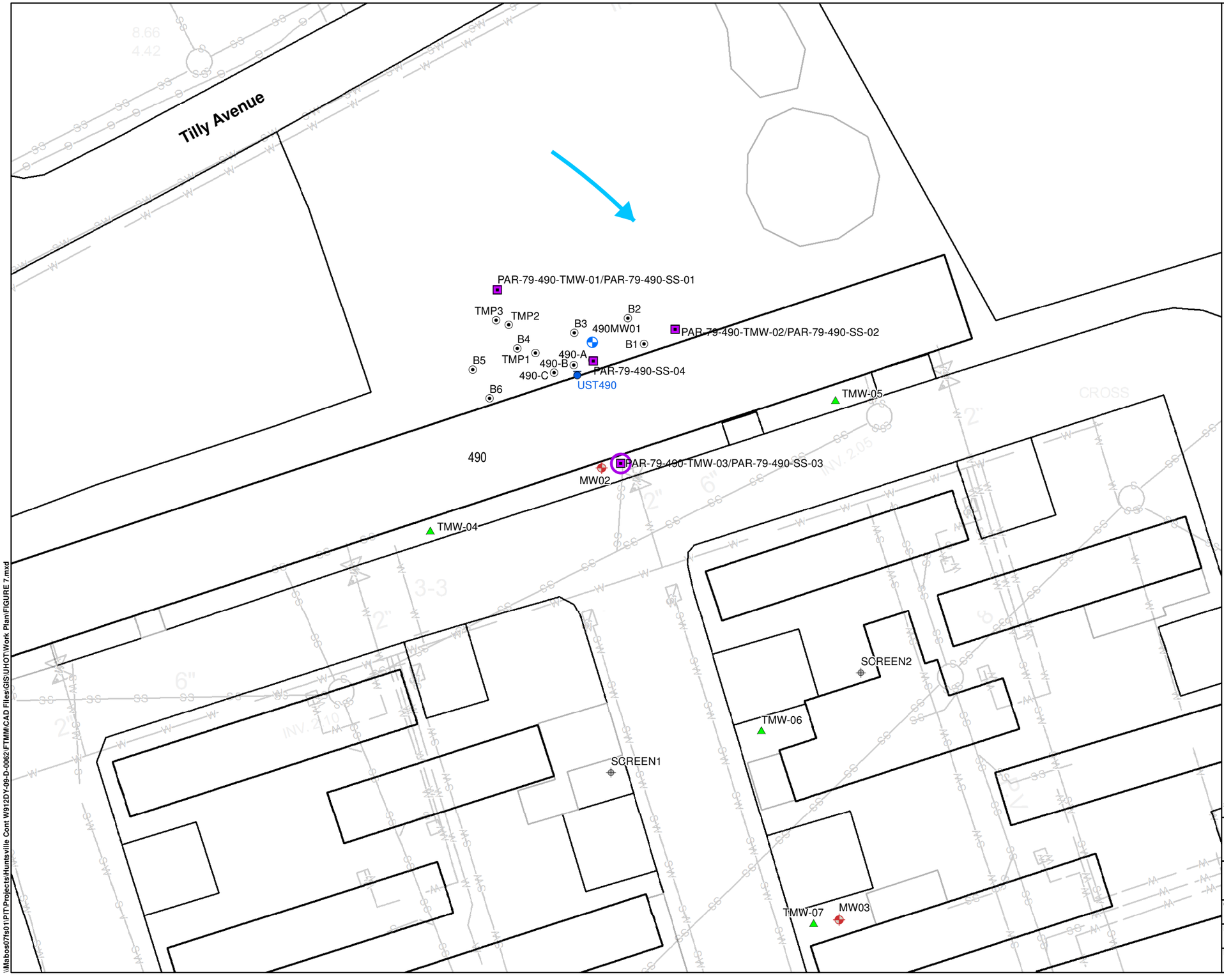
1 inch = 60 feet

0 30 60 120 Feet

Source: FTMM Supplied CAD, 2013; U.S. Army BRAC, 2008; 2008 SI Report; USGS NHD, 2012.

PARSONS 401 Diamond Drive NW, Huntsville AL	Fort Monmouth New Jersey
UST 444 SAMPLE LOCATIONS	
CREATED BY: **RR**	REVIEWED BY: **KF**
DATE: **AUG. 2017**	FIGURE NUMBER: **FIGURE 6**
PROJECT NUMBER: **748810-06031**	FILE: **FIGURE 6.mxd**

\\Mabos07fs01\PIT\Projects\Huntsville Cont W912DY-09-D-0062\FTMM\CAD Files\GIS\UHOT\Work Plan\FIGURE 6.mxd



LEGEND:

- Proposed Permanent Monitoring Well
- Proposed Groundwater Sample (Temporary Well)
- Proposed Field Screening Boring
- Shallow Monitoring Well
- Soil and Groundwater Sample (2016)
- Former UST Location (Estimated)
- Historic Soil/Groundwater Sample
- Exceedance of Groundwater Criteria Standard
- W Water Line
- S Sanitary Sewer Line
- SW Storm Sewer Line
- G Gas Line
- Estimated Groundwater Flow Direction

N

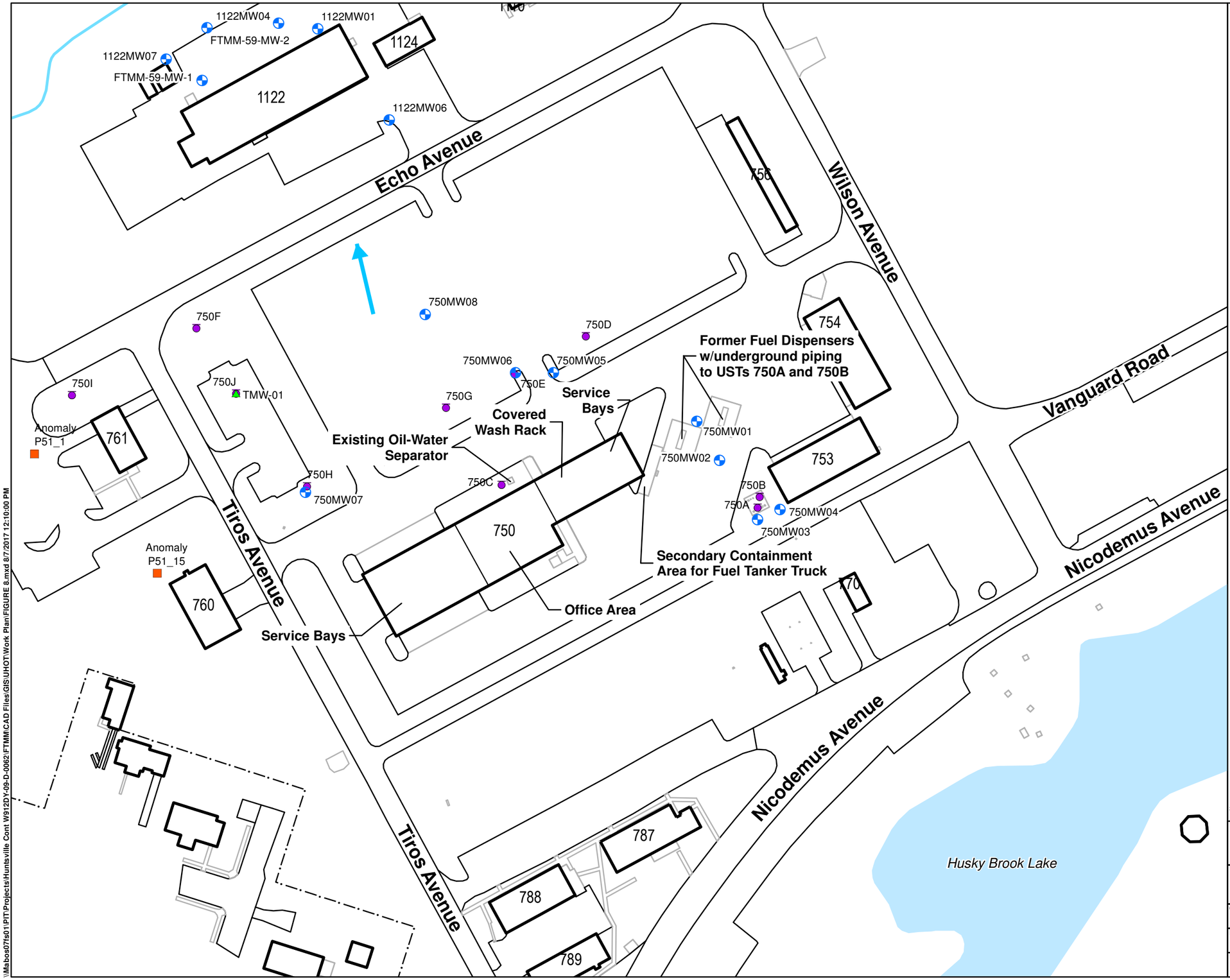
1 inch = 25 feet

0 12.5 25 50 Feet

Source: FTMM Supplied CAD, 2013; U.S. Army BRAC, 2008; 2008 SI Report; USGS NHD, 2012.

PARSONS 401 Diamond Drive NW, Huntsville AL	Fort Monmouth New Jersey
UST490 SAMPLE LOCATIONS	
CREATED BY: RR	REVIEWED BY: KF
DATE: AUG. 2017	FIGURE NUMBER: FIGURE 7
PROJECT NUMBER: 748810-06031	FILE: FIGURE 7.mxd

\\Mabos07fs01\PIT\Projects\Huntsville Cont W912DY-09-D-0062\FTMM\CAD Files\GIS\UHOT\Work Plan\FIGURE 7.mxd



LEGEND:

- Proposed Permanent Monitoring Well
- Proposed Groundwater Sample (Temporary Well)
- Proposed Field Screening Boring
- Shallow Monitoring Well
- Former UST Location
- Geophysical Anomaly
- Installation Boundary
- Estimated Groundwater Flow Direction

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**

UST 750J
SAMPLE LOCATION

CREATED BY: RR	REVIEWED BY: KF
DATE: AUG. 2017	FIGURE NUMBER: FIGURE 8
PROJECT NUMBER: 748810-06031	FILE: FIGURE 8.mxd

\\Mabos07fs01\PIT\Projects\Huntsville Cont W912DY-09-D-0062\FTMM\CAD Files\GIS\UHOT\Work Plan\FIGURE 8.mxd 8/7/2017 12:10:00 PM

LEGEND:

- Proposed Permanent Monitoring Well
- Proposed Groundwater Sample (Temporary Well)
- Proposed Field Screening Boring
- Groundwater Sample (2016)
- Exceedance of Groundwater Quality Criteria
- 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

UST 800-12
SAMPLE LOCATIONS

CREATED BY: RR	REVIEWED BY: KF
DATE: AUG. 2017	FIGURE NUMBER: FIGURE 9
PROJECT NUMBER: 748810-06031	FILE: FIGURE 9.mxd

\\Mabos07fs01\PIT\Projects\Huntsville Cont W912DY-09-D-0062\FTMM\CAD Files\GIS\UHOT\Work Plan\FIGURE 9.mxd

LEGEND:

- Proposed Permanent Monitoring Well
- Proposed Groundwater Sample (Temporary Well)
- Proposed Field Screening Boring
- Groundwater Sample (2016)
- Exceedance of Groundwater Quality Criteria
- 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

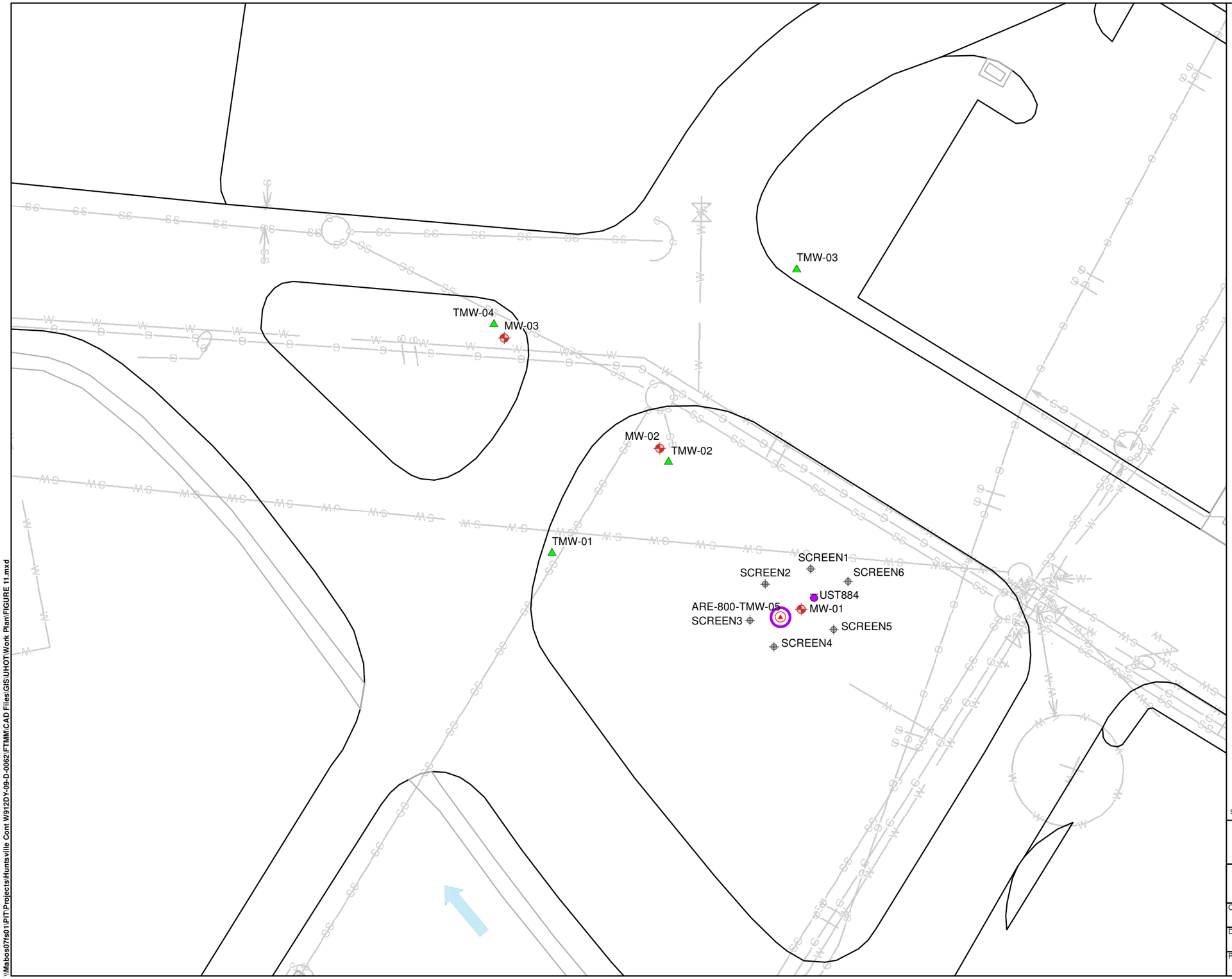
1 inch = 30 feet

0 15 30 60 Feet

Source: FTMM Supplied CAD, 2013.

\\Mabos07fs01\PIT\Projects\Huntsville Cont W912DY-09-D-0062\FTMM\CAD Files\GIS\UHOT\Work Plan\FIGURE 10.mxd

PARSONS 401 Diamond Drive NW, Huntsville AL	Fort Monmouth New Jersey
UST 800-20 SAMPLE LOCATIONS	
CREATED BY: RR	REVIEWED BY: KF
DATE: AUG. 2017	FIGURE NUMBER: FIGURE 10
PROJECT NUMBER: 748810-06031	FILE: FIGURE 10.mxd



LEGEND:

- Proposed Permanent Monitoring Well
- Proposed Groundwater Sample (Temporary Well)
- Proposed Field Screening Boring
- Groundwater Sample (2016)
- Exceedance of Groundwater Quality Criteria
- 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

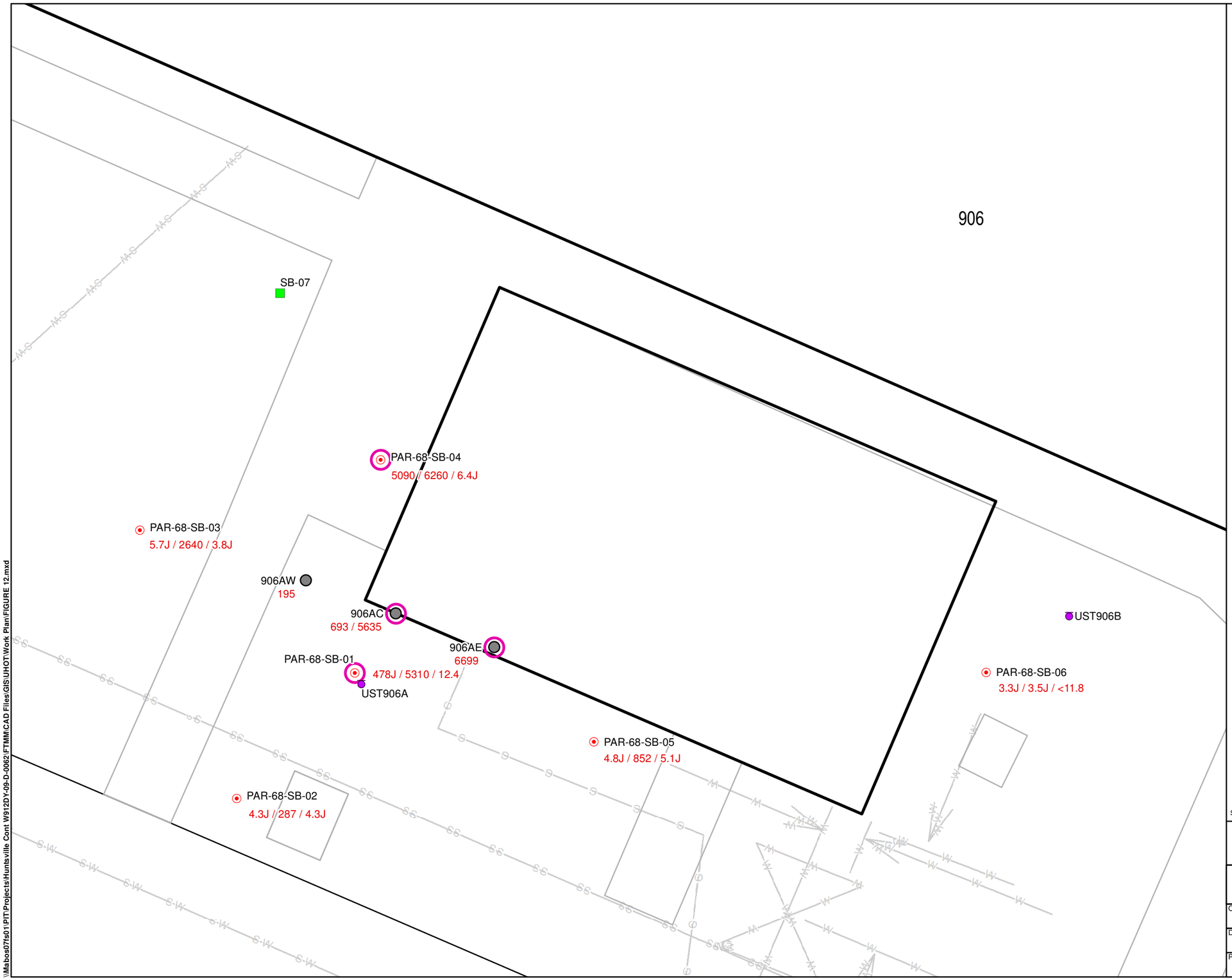
Source: FTMM Supplied CAD, 2013.

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

UST 884
SAMPLE LOCATIONS

CREATED BY: RR	REVIEWED BY: KF
DATE: AUG. 2017	FIGURE NUMBER: FIGURE 11
PROJECT NUMBER: 748810-06031	FILE: FIGURE 11.mxd

\\Mabos07\s01\PIT\Projects\Huntsville Cont W912DY-09-D-0062\FTMM\CAD Files\GIS\UHOT\Work Plan\FIGURE 11.mxd



LEGEND:

- Proposed Soil Sample
- 2016 Soil Sample
- RDCSRS Exceedance
- Historic Sample Location (prior to 2016)
- Former UST Location
- W Water Line
- S Sanitary Sewer Line
- SW Storm Sewer Line
- G Gas Line

NOTE:

Total EPH or TPH concentrations shown in mg/kg at discrete depths from shallow to deepest.

N

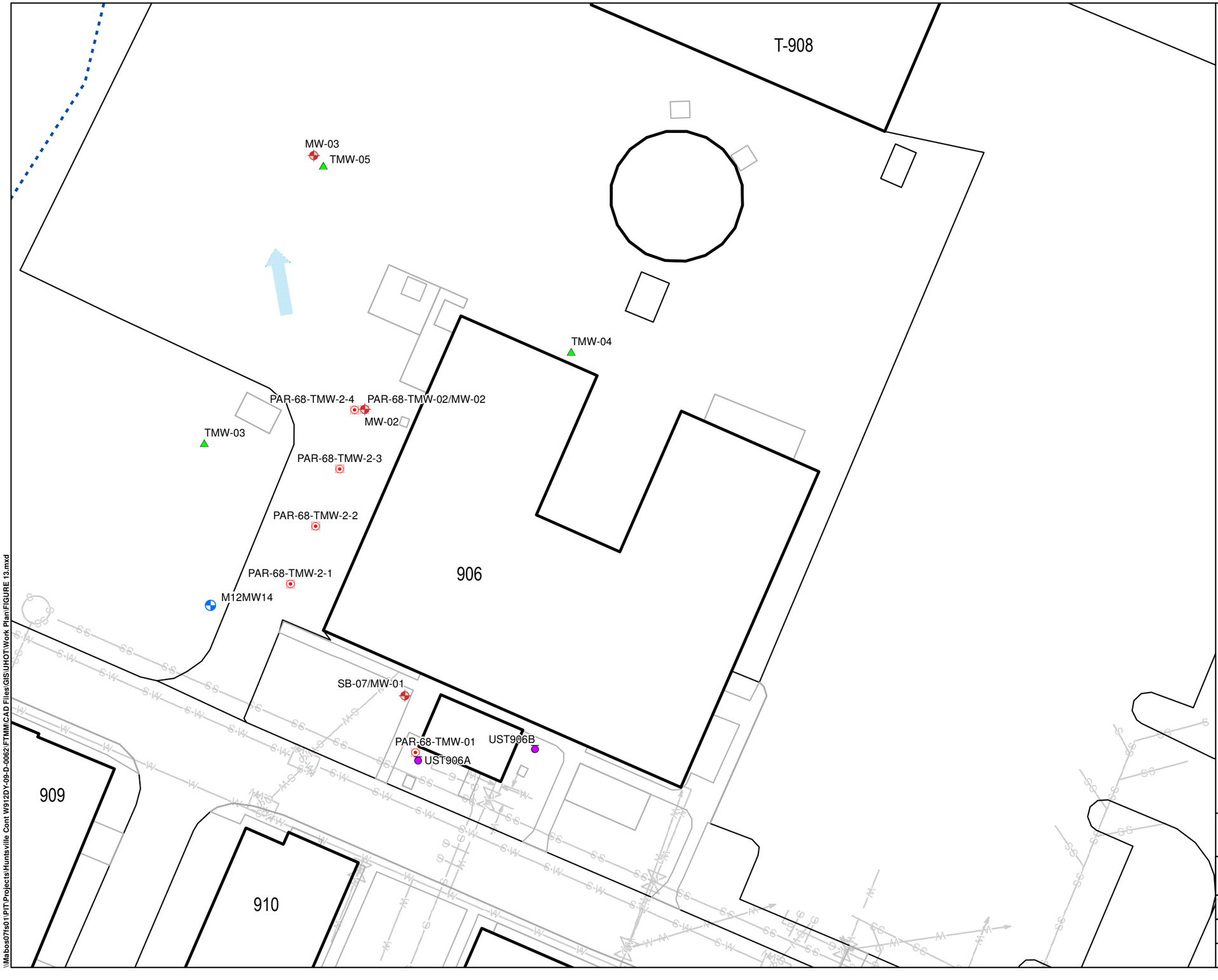
1 inch = 5 feet

0 2.5 5 10 Feet

Source: FTMM Supplied CAD, 2013.

PARSONS 401 Diamond Drive NW, Huntsville AL	Fort Monmouth New Jersey
UST906A SOIL SAMPLE LOCATIONS	
CREATED BY: RR	REVIEWED BY: KF
DATE: AUG. 2017	FIGURE NUMBER: FIGURE 12
PROJECT NUMBER: 748810-06031	FILE: FIGURE 12.mxd

\\Mabos07fs01\PIT\Projects\Huntsville Cont W912DY-09-D-0062\FTMM\CAD Files\GIS\UHOT\Work Plan\FIGURE 12.mxd



\\Mabos07fs01\PIT\Projects\Huntsville Cont W912DY-09-D-0062\FTMM\CAD Files\GIS\UHOT\Work Plan\FIGURE 13.mxd

LEGEND:

- Proposed Permanent Monitoring Well
- Proposed Groundwater Sample (Temporary Well)
- Proposed Field Screening Boring
- Screening Location (2016)
- Exceedance of Groundwater Quality Criteria
- Shallow Monitoring Well
- Former UST Location
- Approximate FTMM-12 Landfill Boundary
- W Water Line
- S Sanitary Sewer Line
- SW Storm Sewer Line
- G Gas Line
- Estimated Groundwater Flow Direction

NOTE:

1. Temporary monitoring well PAR-68-TMW-02 was installed at the screening location along the west side of Building 906 with the greatest field indication of petroleum contamination.

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

UST906A GROUNDWATER SAMPLE LOCATIONS

CREATED BY: RR	REVIEWED BY: KF
DATE: AUG. 2017	FIGURE NUMBER: FIGURE 13
PROJECT NUMBER: 748810-06031	FILE: FIGURE 13.mxd

LEGEND:

- Proposed Soil Boring
- Former UST Location (Estimated 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 = 40 feet

0 20 40 80 Feet

Source: FTMM Supplied CAD, 2013.

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

UST 3035
SAMPLE LOCATIONS

CREATED BY: RR	REVIEWED BY: KF
DATE: AUG. 2017	FIGURE NUMBER: FIGURE 14
PROJECT NUMBER: 748810-06031	FILE: FIGURE 14.mxd

\\Mabos07fs01\PIT\Projects\Huntsville Cont W912DY-09-D-0062\FTMM\CAD Files\GIS\UHOT\Work Plan\FIGURE 14.mxd

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.

TABLE 2
UST 906A SOIL SAMPLE RESULTS
FORT MONMOUTH, NEW JERSEY

Loc ID	NJ Residential Direct Contact SRS	NJ Non-Residential Direct Contact SRS	NJ Impact to GW Soil Screening Level	SB01				SB02
Sample ID				PAR-68-SB-01-3-3.5	PAR-68-SB-01-4-4.5	PAR-68-SB-01-9.5-10	PAR-68-SB-101-3-3.5	PAR-68-SB-02-3-3.5
Sample Date				4/14/2016	4/14/2016	4/14/2016	4/14/2016	4/14/2016
Semivolatile Organic Compounds (mg/kg)								
2-Methylnaphthalene	230	2,400	8	NA	NA	NA	NA	NA
Naphthalene	6	17	25	NA	NA	NA	NA	NA
Extractable/Volatile Petroleum Hydrocarbons (mg/kg)								
C10-C12 Aromatics	NLE	NLE	NLE	**0.81 JB**	**33.9**	**0.85 JB**	**0.86 JB**	**0.81 JB**
C12-C16 Aliphatics	NLE	NLE	NLE	**56.7 J**	**1,250**	**1 J**	**14.2 J**	< 1.1 UJ
C12-C16 Aromatics	NLE	NLE	NLE	**1.2**	**831**	**0.76 J**	**0.63 J**	**0.39 J**
C16-C21 Aliphatics	NLE	NLE	NLE	**227 J**	**1,200**	**3.1 J**	**81.5 J**	**0.64 J**
C16-C21 Aromatics	NLE	NLE	NLE	**75.8**	**1,440**	**2.8**	**35.7**	< 1.1
C21-C36 Aromatics	NLE	NLE	NLE	**49.8**	**224**	**1 JB**	**28.8**	**0.37 JB**
C21-C40 Aliphatics	NLE	NLE	NLE	**66 J**	**240**	**2.4 JB**	**31.8 J**	**1.2 JB**
C9-C12 Aliphatics	NLE	NLE	NLE	**0.39 J**	**97.4 J**	**0.61 J**	**0.51 J**	**0.41 J**
Total Aliphatics	NLE	NLE	NLE	**350 J**	**2,780**	**7.1 J**	**128 J**	**2.6 J**
Total Aromatics	NLE	NLE	NLE	**128**	**2,530**	**5.4**	**66.1**	**1.7 J**
Total EPH	5,100	54,000	SS	**478 J**	**5,310**	**12.4**	**194 J**	**4.3 J**
Wet Chemistry - Solids								
Percent Solids (percent)	NLE	NLE	NLE	**87.2**	**88.1**	**77**	**87.4**	**89.2**

SB02		SB03			SB04		
PAR-68-SB-02-6-6.5	PAR-68-SB-02-9.5-10	PAR-68-SB-03-13.5-14	PAR-68-SB-03-3-3.5	PAR-68-SB-03-8-8.5	PAR-68-SB-04-3.5-4	PAR-68-SB-04-3-3.5	PAR-68-SB-04-9.5-10
4/14/2016	4/14/2016	4/14/2016	4/14/2016	4/14/2016	4/14/2016	4/14/2016	4/14/2016
NA	NA	NA	NA	NA	**35**	NA	NA
NA	NA	NA	NA	NA	**2.9**	NA	NA
1 JB	**0.85 JB**	**0.64 JB**	**0.79 JB**	**30.1**	**60.8**	**38.7**	**1.1 JB**
59.4	< 1.3 UJ	< 1.4 UJ	**0.52 J**	**652**	**1,600**	**1,300**	< 1.4 UJ
12.7	**0.25 J**	**0.37 J**	**0.6 J**	**356**	**920**	**843**	**0.95 J**
106	< 1.3 UJ	< 1.4 UJ	**0.51 J**	**629**	**1,430**	**1,060**	< 1.4 UJ
65.9	< 1.3	< 1.4	**0.49 J**	**631**	**1,530**	**1,310**	**1 J**
15.6	**0.37 JB**	< 1.4	**0.94 J**	**124**	**276**	**203**	**0.48 J**
25.5 J	**1.9 JB**	**1.4 JB**	**1.2 JB**	**124**	**263**	**178**	**1.2 JB**
1.4 J	**0.34 J**	**0.55 J**	**0.65 J**	**95.1 J**	**185 J**	**160 J**	**0.65 J**
192 J	**2.7 J**	**2.5 J**	**2.9 J**	**1,500**	**3,480**	**2,700**	**2.8 J**
95.3	**1.6 J**	< 5.4	**2.8 J**	**1,140**	**2,780**	**2,390**	**3.6 J**
287	**4.3 J**	**3.8 J**	**5.7 J**	**2,640**	**6,260**	**5,090**	**6.4 J**
82.9	**75.1**	**70.8**	**86.8**	**80.6**	**83.8**	**87.5**	**70**

SB05			SB06		
PAR-68-SB-05-3-3.5	PAR-68-SB-05-6.5-7	PAR-68-SB-05-9.5-10	PAR-68-SB-06-3-3.5	PAR-68-SB-06-4.5-5	PAR-68-SB-06-9.5-10
4/14/2016	4/14/2016	4/14/2016	4/14/2016	4/14/2016	4/14/2016
NA	NA	NA	NA	NA	NA
NA	NA	NA	NA	NA	NA
0.79 JB	**1.1 JB**	**1.1 JB**	**0.81 JB**	**0.78 JB**	**0.78 JB**
< 1.2 UJ	**193**	< 1.3 UJ	< 1.2 UJ	< 1.1 UJ	< 1.5 UJ
0.65 J	**46.7**	**0.66 J**	**0.26 J**	**0.35 J**	< 1.5
< 1.2 UJ	**256**	< 1.3 UJ	< 1.2 UJ	< 1.1 UJ	< 1.5 UJ
0.56 J	**245**	**0.25 J**	**0.55 J**	**0.31 J**	**0.52 J**
0.46 J	**53.9**	< 1.3	**0.48 J**	**0.49 J**	**0.39 J**
1.3 JB	**51.1 J**	**1.4 JB**	**0.64 J**	**0.72 J**	< 1.5 UJ
0.47 J	**5.4 J**	**0.66 J**	**0.29 J**	**0.45 J**	**0.28 J**
2.3 J	**506 J**	**2.9 J**	< 4.9 UJ	< 4.5 UJ	< 5.9 UJ
2.5 J	**346**	**2.2 J**	**2.1 J**	**1.9 J**	**1.9 J**
4.8 J	**852**	**5.1 J**	**3.3 J**	**3.5 J**	< 11.8
86.5	**79.6**	**73.8**	**80.4**	**85.8**	**66.4**

TABLE 3
UST 906A GROUNDWATER SAMPLE RESULTS
FORT MONMOUTH, NEW JERSEY

Loc ID	NJ Ground Water Quality Criteria	M12MW14		P68-TMW01	P68-TMW02
Sample ID		M12MW14-14.25	M12MW14-19.25	PAR-68-GW-TMW01	PAR-68-GW-TMW02
Sample Date		5/25/2016	5/25/2016	8/1/2016	8/1/2016
Sample Round					
Filtered		Total	Total	Total	Total
Volatile Organic Compounds (µg/l)					
1,1,2-Trichloroethane	3	< 1	< 1	**4.6**	< 0.75
1,2,4-Trimethylbenzene	100	< 1	< 1	**35.5**	**102**
1,3,5-Trimethylbenzene	100	< 1	< 1	**3.4**	**12**
Acetone	6,000	< 5	**3.5 J**	**8.3**	**3.4 J**
Benzene	1	< 1	< 1	< 0.75	**0.41 J**
Cymene	100	< 1	< 1	**4**	**4.1**
Ethyl benzene	700	< 1	< 1	**3.6**	**28.8**
Isopropylbenzene	700	< 1	< 1	**3.7**	**7.8**
Meta/Para Xylene	1,000	< 2	< 2	**1 J**	**4.4**
Methyl bromide	10	< 1	**0.47 J**	< 0.75	< 0.75
Methyl chloride	100	**0.46 J**	**0.49 J**	< 0.75	< 0.75
Naphthalene	300	< 1	< 1	**12.4**	**185**
n-Butylbenzene	100	< 1	< 1	**4.2**	**4.7**
Ortho Xylene	1,000	< 1	< 1	**1.2**	< 0.75
Propylbenzene	100	< 1	< 1	**6.4**	**13.5**
sec-Butylbenzene	100	**1.5**	**1.6**	**6.7**	**7.2**
Toluene	600	< 1	< 1	< 0.75	**0.37 J**
TIC VOCs (µg/l)					
Total TICs, Volatile	500	NA	NA	**286 JN**	**401.7 JN**
Semivolatile Organic Compounds (µg/l)					
2-Methylnaphthalene	30	< 2	< 2.1	**4.7 J**	**386**
Acenaphthene	400	**0.33 J**	**0.72 J**	**19.6**	**18.8**
Anthracene	2,000	**0.24 J**	**0.3 J**	**12.8**	**7.2 J**
Bis(2-Ethylhexyl)phthalate	3	< 8	< 8.3	**1.5 J**	< 5
Carbazole	100	< 8	< 8.3	**3.3 J**	**9.4 J**
Dibenzofuran	100	**0.77 J**	**1.1 J**	**15.8 J**	< 5
Fluorene	300	**0.5 J**	**1 J**	**37.3**	**35.3**
Naphthalene	300	< 2	< 2.1	< 4	**109**
Phenanthrene	100	< 2	< 2.1	**88.9**	**74.5**
Pyrene	200	< 2	< 2.1	**11.2**	**5.7 J**
TIC SVOCs (µg/l)					
Total TICs, Semivolatile	500	NA	NA	**2,719 JN**	**2,319 JN**

Footnote:

1) Not used.

2) Not used.

3) NLE = no limit established.

4) Not used.

5) **Bold** = chemical detection

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.

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

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.

E (or ER) = Estimated result.

R = Rejected, data validation rejected the results.

D = Results from dilution of sample.

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

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

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

JN = Tentatively identified compound, estimated concentration.

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

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.

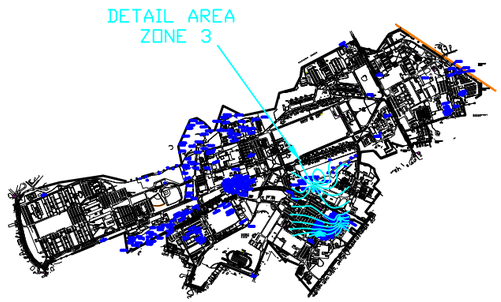
- The NJ Ground Water Quality Criteria refers to the NJDEP Groundwater Quality Standards - Adopted July 22, 2010

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

ATTACHMENT A
Groundwater Flow Direction Maps

Main Post - Groundwater Elevation Contours - Layer 1

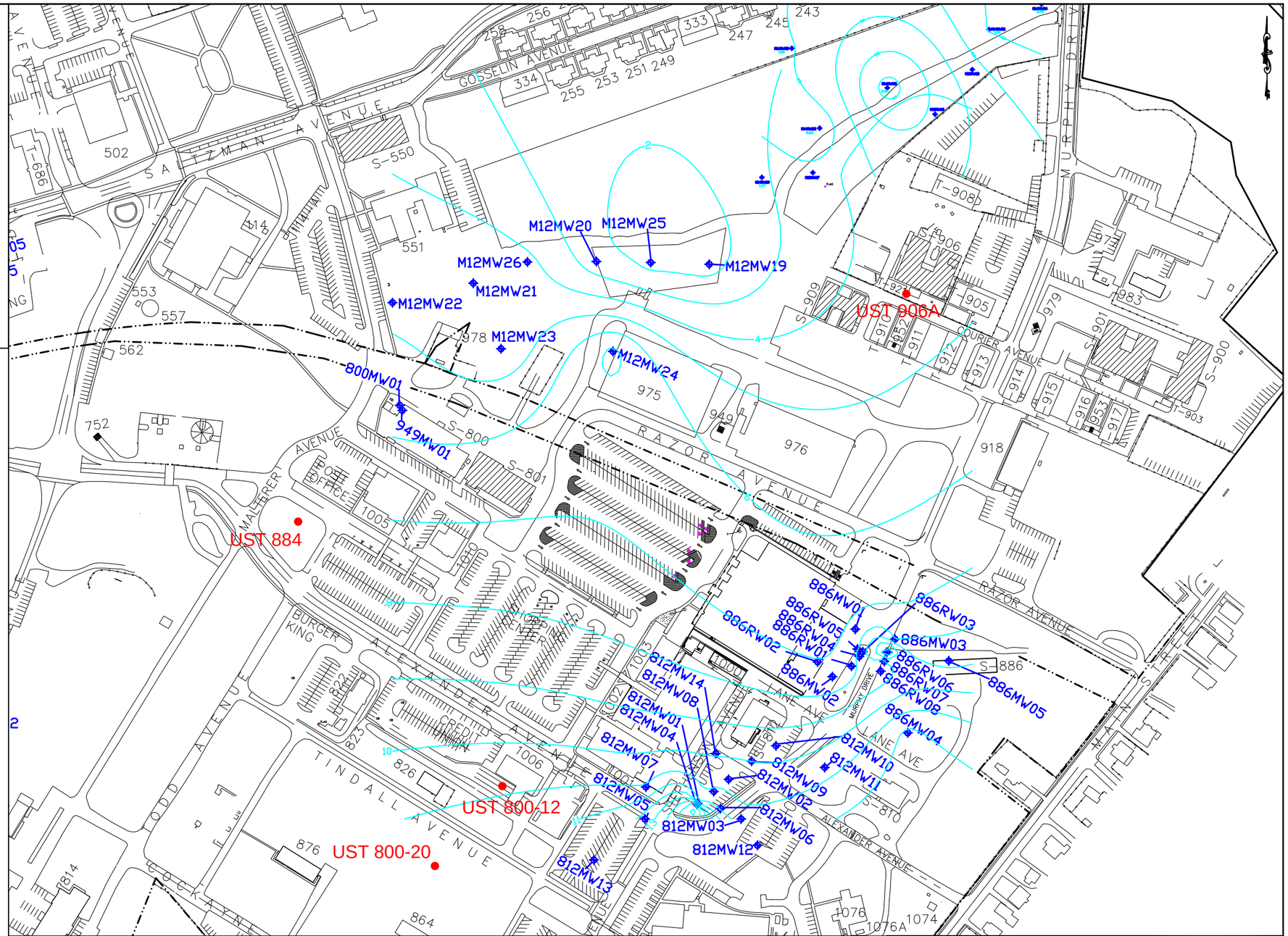
Brinkerhoff Environmental Services, Inc.
1913 Atlantic Avenue, Suite R5
Manasquan, New Jersey 08736



KEY MAP

0′ 1750′ 3500′

SCALE: 1”=3500′



LEGEND

- MONITORING WELL LOCATION
616MW01

0′ 125′ 250′

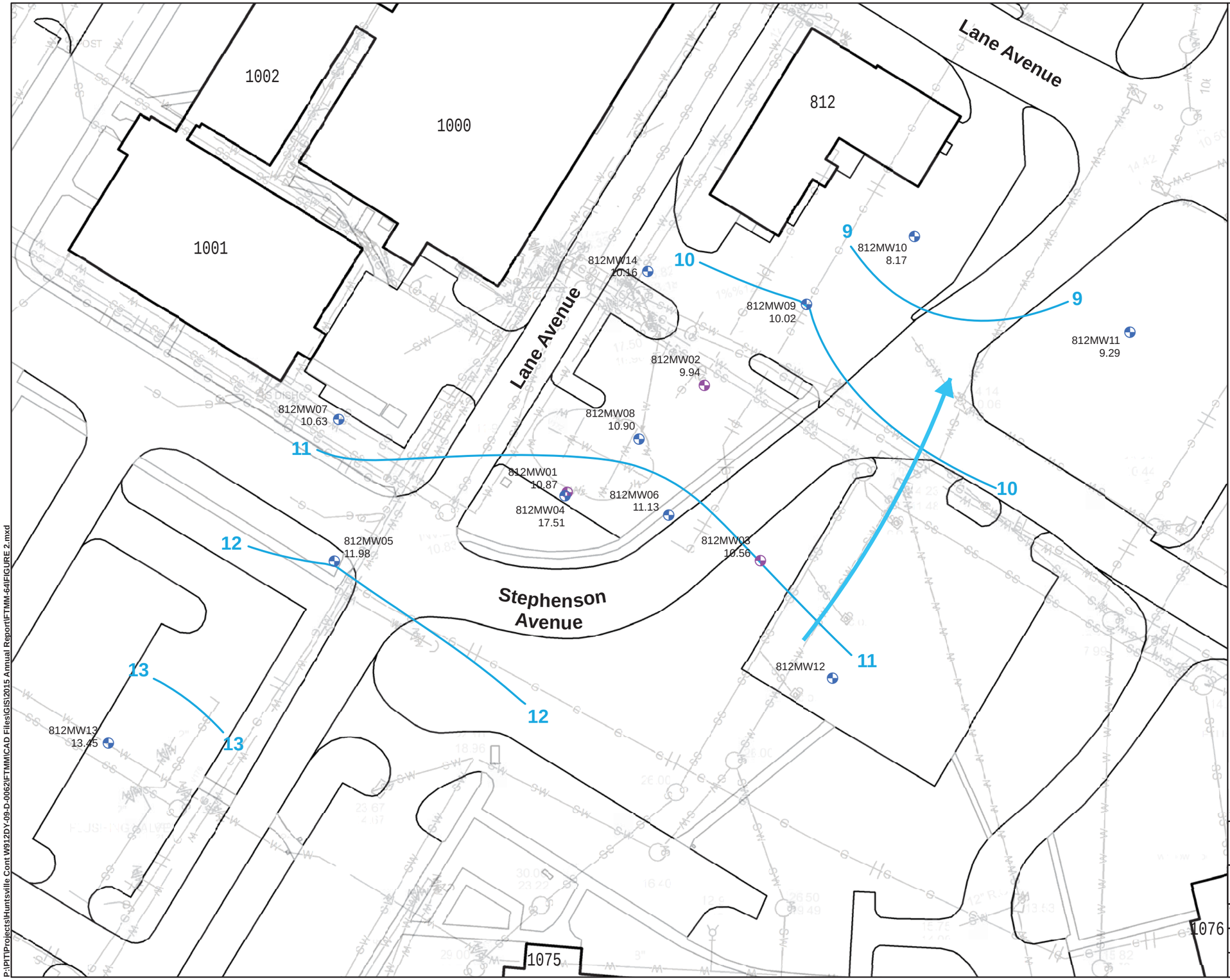
SCALE: 1”=250′

BRINKERHOFF
ENVIRONMENTAL SERVICES, INC.

GROUNDWATER CONTOUR MAP - ZONE 3

US ARMY FORT MONMOUTH
MAIN POST
FORT MONMOUTH, NEW JERSEY

DATE: 4/26/10	JOB NO.: 09BR116	SCALE: AS SHOWN



LEGEND:

- Deep Monitoring Well
- Shallow Monitoring Well
- W Water Line
- S Sanitary Sewer Line
- SW Storm Sewer Line
- G Gas Line
- Surface Water Feature
- Groundwater Elevation Contour
- Inferred Groundwater Flow Direction

NOTE:

The groundwater elevation at monitoring well 812MW04 was considered anomalous compared to the fluid levels at neighboring wells.

N

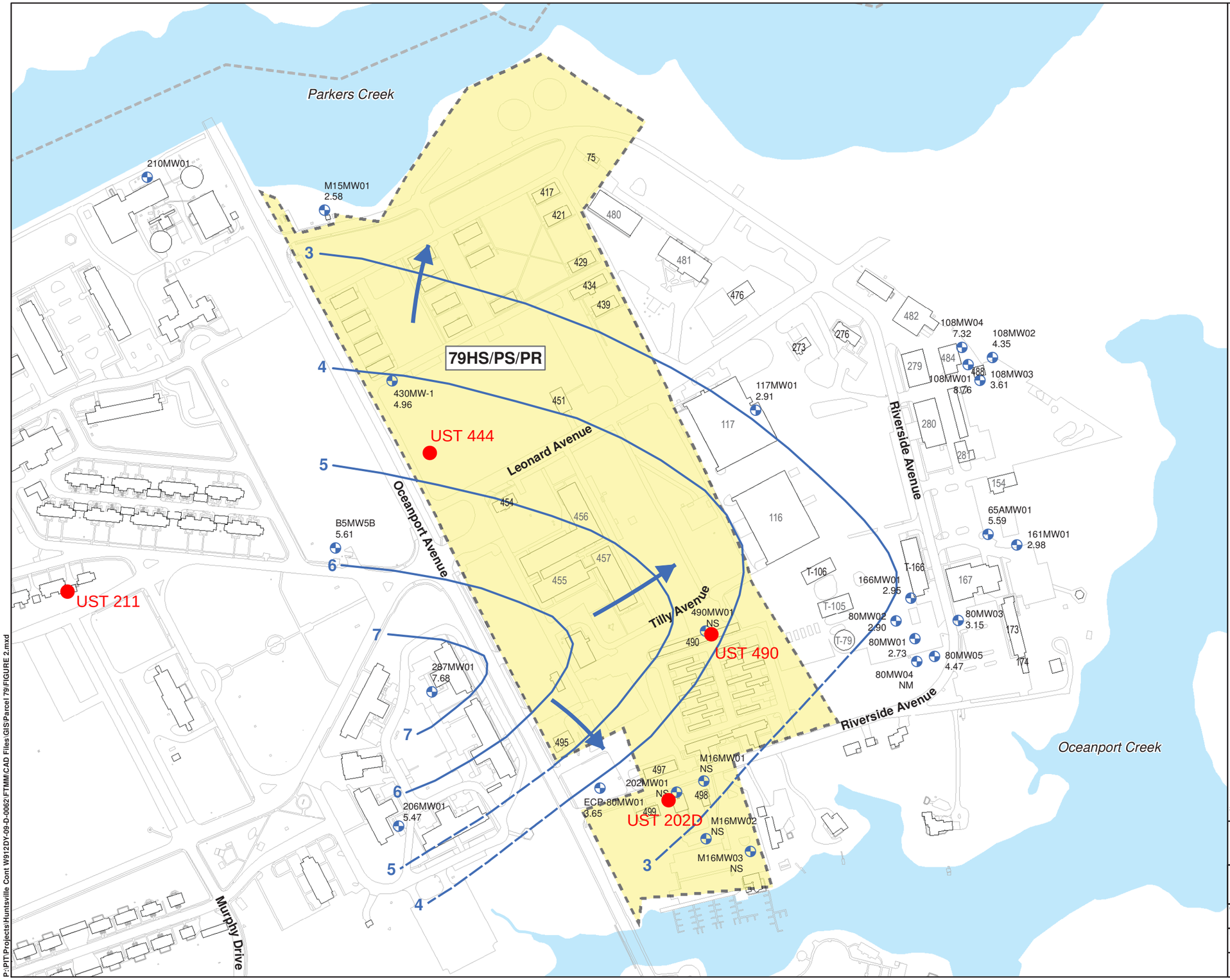
1 inch = 50 feet

0 25 50 100 Feet

Source: FTMM Supplied CAD

PARSONS 401 Diamond Drive NW, Huntsville AL	Fort Monmouth New Jersey
FTMM-64 SHALLOW GROUNDWATER CONTOURS - OCTOBER 7, 2015	
CREATED BY: RR	REVIEWED BY: ME
DATE: MAR. 2016	FIGURE NUMBER: FIGURE 2
PROJECT NUMBER: 748810-03000	FILE: FIGURE 2.mxd

P:\PIT\Projects\Huntsville Cont W912DY-09-D-0062\FTMM\CAD Files\GIS\2015 Annual Report\FTMM-64\FIGURE 2.mxd



LEGEND:

- Shallow Monitoring Well
- Parcel 79 Boundary
- Municipal Boundary
- Surface Water Feature
- Grounwater Elevation Contour
- Inferred Groundwater Elevation Contour
- Estimated Groundwater Flow Direction

NOTES:

Groundwater elevations in monitoring wells 482MW01, 482MW02, 108MW01, 108MW02, 108MW03, 108MW04, 65AM01, 161MW01, 80MW03 and 80MW05 were considered anomalous compared to the fluid levels at neighboring wells and were not used to create groundwater contours.

NS = Not Surveyed

NM = Not Measured

N

1 inch = 300 feet

0 150 300 600 Feet

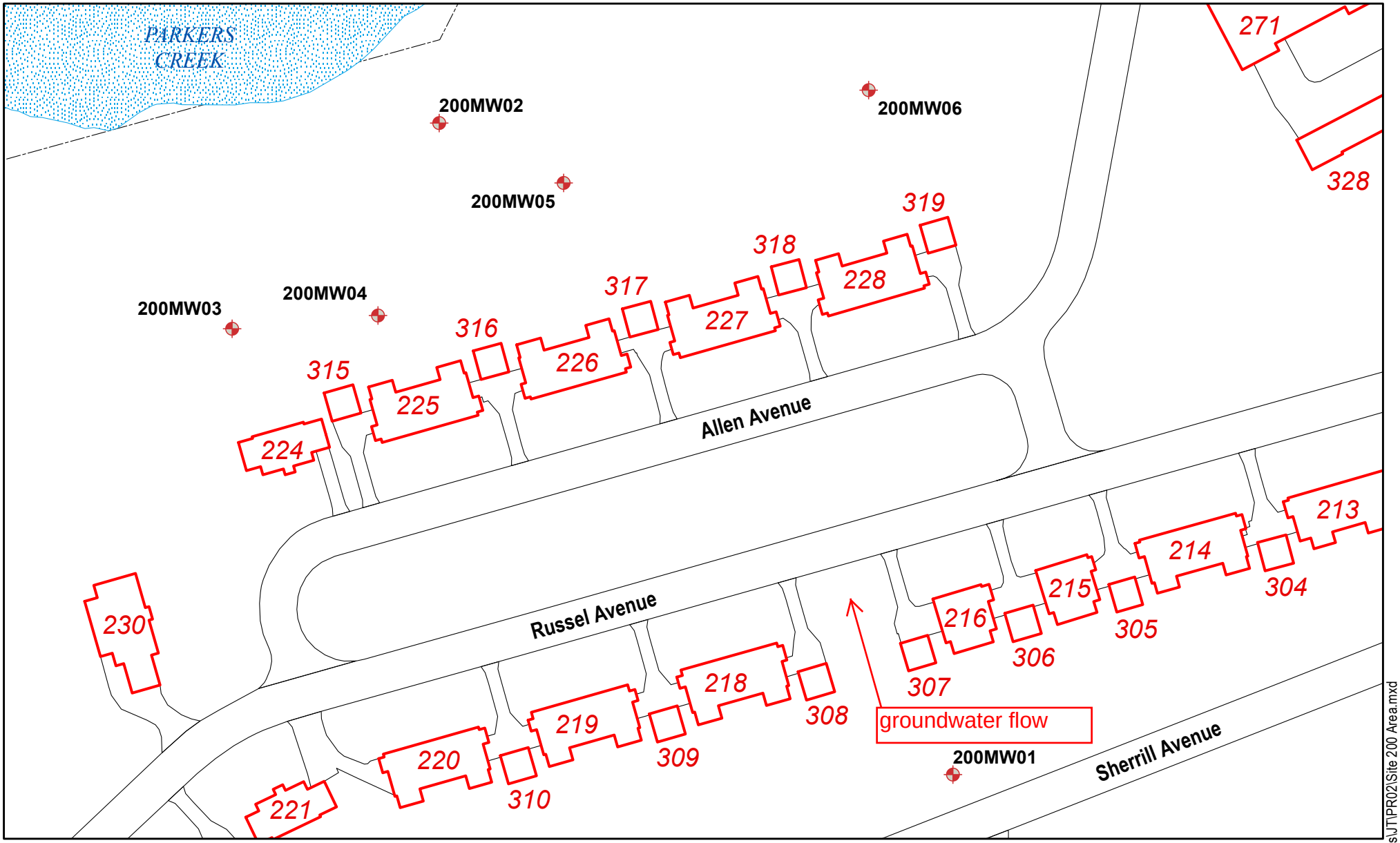
Source: FTMM Supplied CAD, 2013; U.S. Army BRAC, 2008; 2008 SI Report; USGS NHD, 2012.

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

PARCEL 79 SHALLOW GROUNDWATER CONTOURS - OCTOBER 7, 2015

CREATED BY:	REVIEWED BY:
RR	KF
DATE: FEB. 2016	FIGURE NUMBER: FIGURE 2
PROJECT NUMBER: 748810-06010	FILE: FIGURE 2.mxd

P:\PITT\Projects\Huntsville Cont W912DY-09-D-0062\FTMM\CAD Files\GIS\Parcel 79\FIGURE 2.mxd



0 50 100 200 Feet

N W E S

NAD 83, NJ State Plane Feet

Site: 200 Area
Main Post
Fort Monmouth, New Jersey

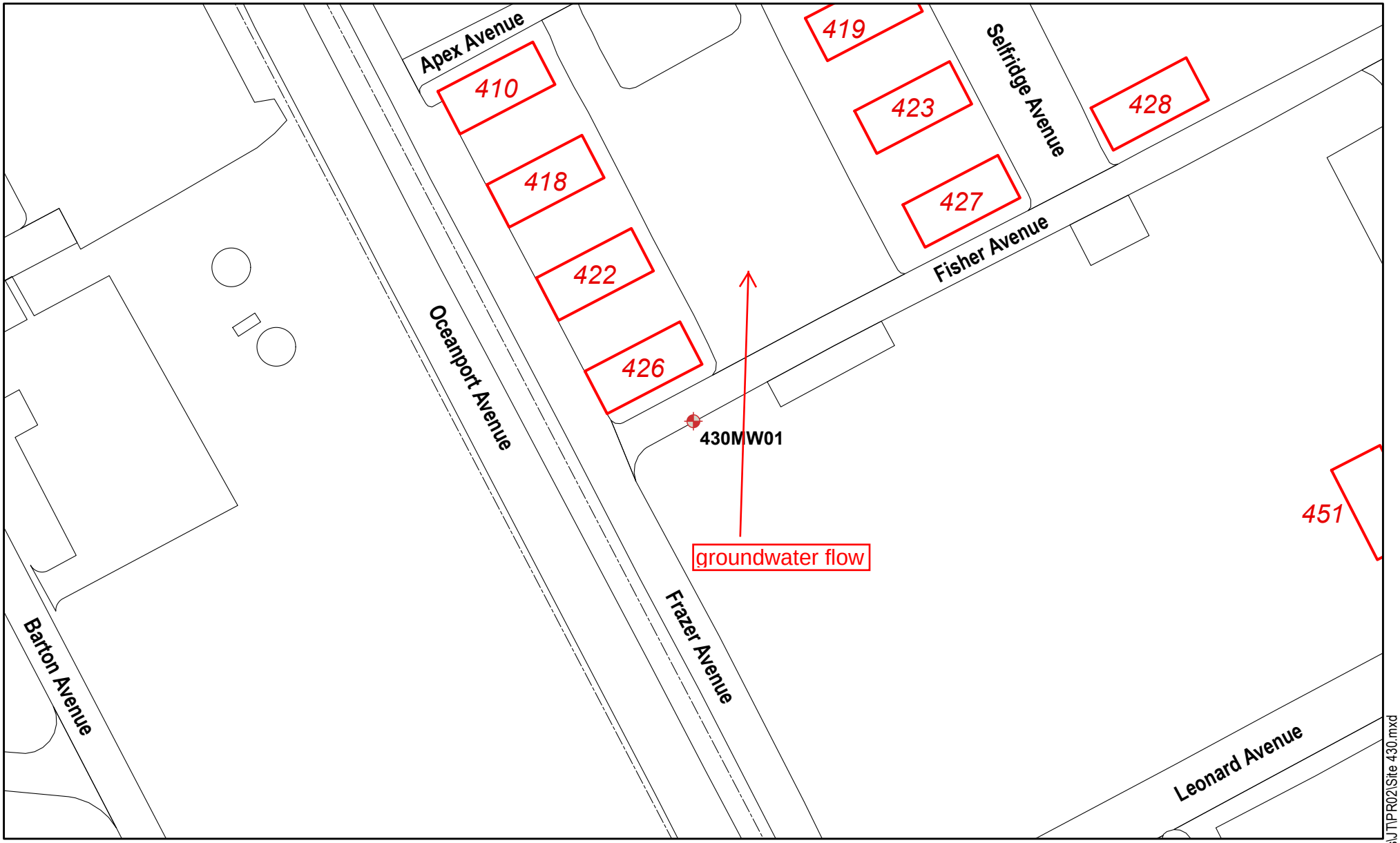
Map Created by:
Fort Monmouth Installation GIO, Environmental Division
Fort Monmouth, New Jersey
Date: August 18, 2010

Legend

- Monitoring Well - Abandoned
- Monitoring Well - Active
- Recovery Well
- Soil Vapor Extraction Point
- Sparge Point
- Vapor Point
- Irrigation Well
- Roadway & Parking
- Existing Structure
- Demolished Structure
- Landfill Area
- Water Body
- Post Boundaries

All features in the legend may not appear in the map.

August 18, 2010 X:\GIS\GIS MapsUT\PR02\Site 200 Area.mxd



N
W E
S

0 50 100 200 Feet

NAD 83, NJ State Plane Feet

Bldg 430
Main Post
Fort Monmouth, New Jersey

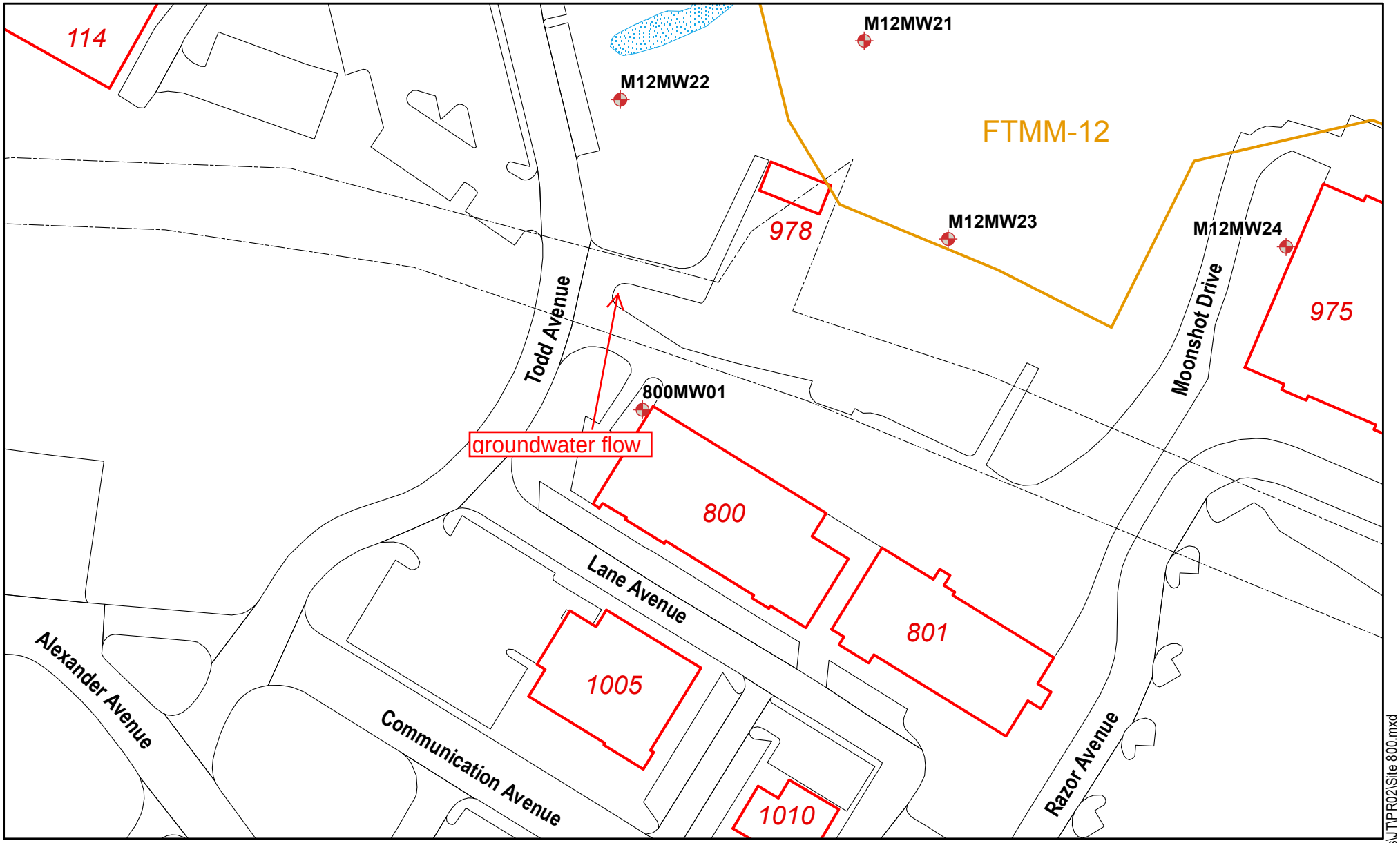
Map Created by:
Fort Monmouth Installation GIO, Environmental Division
Fort Monmouth, New Jersey
Date: March 22, 2010

Legend

- Monitoring Well - Abandoned
- Monitoring Well - Active
- Recovery Well
- Soil Vapor Extraction Point
- Sparge Point
- Vapor Point
- Irrigation Well
- Roadway & Parking
- Existing Structure
- Demolished Structure
- Landfill Area
- Water Body
- Post Boundary

All features in the legend may not appear in the map.

March 22, 2010 U:\GIS\GIS Maps\JTPR02\Site 430.mxd



Bldg 800
Main Post
Fort Monmouth, New Jersey

N
W E
S

0 50 100 200 Feet

NAD 83, NJ State Plane Feet

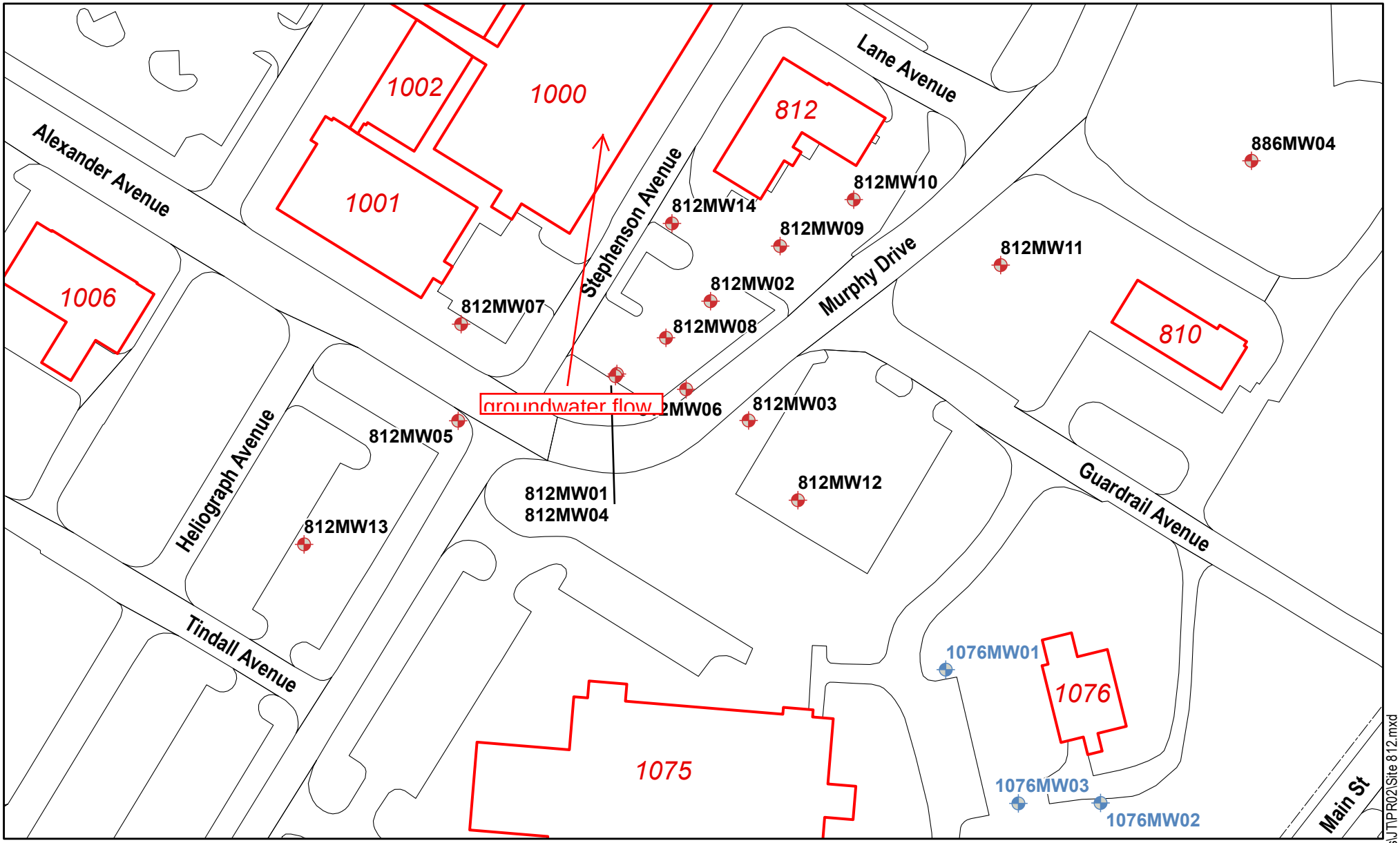
Map Created by:
Fort Monmouth Installation GIO, Environmental Division
Fort Monmouth, New Jersey
Date: March 22, 2010

Legend

- Monitoring Well - Abandoned
- Monitoring Well - Active
- Recovery Well
- Soil Vapor Extraction Point
- Sparge Point
- Vapor Point
- Irrigation Well
- Roadway & Parking
- Existing Structure
- Demolished Structure
- Landfill Area
- Water Body
- Post Boundary

All features in the legend may not appear in the map.

March 22, 2010 U:\GIS\GIS Maps\JT\PR02\Site 800.mxd



N
W E
S

0 50 100 200 Feet

NAD 83, NJ State Plane Feet

FTMM-64
Main Post
Fort Monmouth, New Jersey

Map Created by:
Fort Monmouth Installation GIO, Environmental Division
Fort Monmouth, New Jersey
Date: March 22, 2010

Legend

- Monitoring Well - Abandoned
- Monitoring Well - Active
- Recovery Well
- Soil Vapor Extraction Point
- Sparge Point
- Vapor Point
- Irrigation Well
- Roadway & Parking
- Existing Structure
- Demolished Structure
- Landfill Area
- Water Body
- Post Boundary

All features in the legend may not appear in the map.

March 22, 2010 U:\GIS\GIS Maps\JT\PR02\Site 812.mxd