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LETTER REPORT REGARDING SAMPLING AND ANALYSIS PLAN FOR SOLID WASTE  
MANAGEMENT UNITS 6 AND 7 NS MAYPORT FL  
8/11/2006  
TETRA TECH NUS



**TETRA TECH NUS, INC.**

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Document No. 06JAX0084

August 11, 2006

Project Number 112G00436

Naval Facilities Engineering Command  
Southeast  
ATTN: Adrienne Wilson (Code EV4)  
2155 Eagle Drive  
North Charleston, South Carolina 29406

Reference: CLEAN Contract Number N62467-04-D-0055  
Contract Task Order Number 0033

Subject: Sampling and Analysis Plan  
SWMUs 6 and 7  
Naval Station (NAVSTA) Mayport, Mayport, Florida

Dear Ms. Wilson:

Tetra Tech NUS, Inc. (TtNUS) is pleased to submit the Sampling and Analysis Plan (SAP) for Solid Waste Management Units (SWMUs) 6 and 7, the waste oil pit and oily water treatment plant (OWTP) sludge drying beds. This work plan was prepared for the United States Navy (Navy), Naval Facilities Engineering Command Southeast under Contract Task Order (CTO) 0033 for the Comprehensive Long-term Environmental Action Navy (CLEAN) Contract Number N62467-04-D-0055. This SAP outlines supplemental soil and groundwater sampling requirements at SWMUs 6 and 7. The objectives of the field activities outlined in this SAP are as follows:

- Delineate the extent of total recoverable petroleum hydrocarbon (TRPH) contaminated soil present in exceedance of industrial and residential soil cleanup target levels (SCTLs).
- Determine if contaminated groundwater is present within and around the SWMUs.
- If contaminated groundwater is identified, delineate the extent of groundwater contamination present in excess of groundwater cleanup target levels (GCTLs).

These activities are being conducted in support of a future interim measure (IM) to remove contaminated soil and to complete the extent of contamination that will be addressed in the corrective measure study (CMS) for SWMUs 6 and 7.

**SITE BACKGROUND**

SWMUs 6 and 7 are located just west of the OWTP (SWMU 9) and about 200 feet south of the St. Johns River. SWMU 6, located directly adjacent to SWMU 7 on the west (Figure 1), served as a waste oil pit and sludge drying bed prior to the installation of SWMU 7 in 1979. SWMU 7 is made up of the OWTP sludge drying beds, which are enclosed by earthen berms. The sludge drying beds received sludge from the OWTP clarifiers and bilge water from receiving tanks. The easternmost drying bed was excavated in 1989, at which time a lined, diked enclosure and three bilge water receiving tanks were constructed. Records indicate that approximately 1,500 gallons of sludge were transferred to the drying beds on an average of twice per week until late 1994 when operations were discontinued.



Significant free product (in excess of 0.5 feet) in the form of light non-aqueous phase liquid (LNAPL) was found to be present within and downgradient of the SWMUs during the Resource Conservation and Recovery Act (RCRA) Facility Investigation initiated in 1994. Two separate IMs (sumps with skimmer pumps and a bioventing/bioslurping system) were implemented in 1995 and 1998, respectively, to remove LNAPL before it could migrate into the St. Johns River. The first IM (sumps with skimmer pumps) was shut down shortly after installation due to ineffectiveness. The second IM (bioventing/bioslurping system) was shut down in 2000 after removing significant quantities of LNAPL. Historical Figures 4-7 and 4-9 (Battelle, 2001) (provided in Attachment 1) illustrate free product contours for July 1997 and July 2000, respectively, for the SWMU 6 and 7 areas. Periodic bailing of wells containing LNAPL had to be performed after the last IM as small quantities of LNAPL continued to appear in select wells. Small quantities of LNAPL are still being removed from several site wells through the use of absorbent socks. Site wells monitored for free product are listed on historical Table 2-5 (Free Product Levels; TtNUS, 2002), included in Attachment 1. Absorbent socks are currently in MW02S, MW07S and several bioventing wells (VW71, VW77, VW78, VW99, VW119, VW135 and VW136) that are shown on historical Figure 4-7 in Attachment 1. Locations MW02S and EW77 have consistently had free product removed from them. The LNAPL is believed to be releasing from the soil/water interface (smear zone) and accumulating in these wells.

Areas of TRPH contaminated soil were previously identified within and around the SWMUs and are contributing to the ongoing occurrence of LNAPL. Several soil samples were collected in 2002 and analyzed for TRPH speciation. The results indicated that TRPH impacted soils were highly weathered and that most of the TRPH impacted soil did not exceed Florida Department of Environmental Protection (FDEP) default SCTLs. Two subsequent soil sampling events were conducted in 2003 and 2005 for TRPH speciation. The first event conducted in 2003 was to determine if the TRPH contaminated soils in and around the former pits were in exceedance of FDEP default SCTLs for speciated TRPH fractions. Ten soil samples (SB01 through SB10) were collected during the 2003 event. A summary of the results is provided as historical Table 2-4 (TtNUS, 2004) in Attachment 1. The soil sample locations from the 2003 and 2005 events are shown on historical Figure 1-3 in Attachment 1. A second event was conducted in 2005 to further determine the aerial and vertical extent of TRPH contaminated soils around the former pits using default SCTLs. Thirteen soil samples [SB11 through SB24 (no SB21)] were collected during the 2005 event. TRPH speciation results for this event are provided as historical Table 2-5 (Soil TRPH Speciation) in Attachment 1.

Two soil samples (SB02 and SB03) collected during the 2003 event were found to have TRPH fractions in exceedance of the SCTLs. One soil sample (SB16), same pit that SB02 and SB03 were collected in, was found to have TRPH fractions in exceedance of criteria. It was noted by field personnel that contaminated soil was easily identified during each of these two soil sampling events as it was stained black and exerted a strong petroleum odor. Contaminated soil was collected immediately above the water table during the 2003 event. Several other samples (SB01, SB05, and SB09) collected just above the water table did not exceed criteria but did contain TRPH fractions. Soil samples (SB13, SB14, and SB24) collected north of the pits during the 2005 event were not collected at the same depth (shallower) as the 2003 event. This inconsistency (collected above the smear zone) may be the reason why no TRPH fractions were detected in these samples. It is possible that the area north of SWMUs 6 and 7 may contain TRPH contaminated soils because of the previous LNAPL contour data for this area. For this reason, soil samples will be collected in this area during this sampling event.

Limited groundwater contamination [polynuclear aromatic hydrocarbons (PAHs)] was documented in a 2001 Annual Monitoring Report (TtNUS, 2001) for SWMUs 6 and 7. Select perimeter wells were sampled as part of a quarterly groundwater monitoring program conducted in 1999 and 2000. However, wells MW16S, MW03S, and MW07S (immediately downgradient of pits and near areas of known LNAPL) were not sampled as part of the monitoring program. A single groundwater sampling event was conducted as part of a natural attenuation treatability



study in November 2002, but wells MW02S, MW03S, and MW16S (MW07S was not included) could not be sampled due to the presence of free product in them. No exceedances of GCTLs were reported for the perimeter wells during the November 2002 event. A shallow 4-inch recovery well (RW01) was installed within the center pit (between SB02 and SB03) in 2003 because measurable free product was detected in several old bioventing wells located in that area. Recovery well RW01 has never been sampled. Therefore, it is unknown if impacted groundwater is currently present at SWMUs 6 and 7 because no groundwater samples have been collected and analyzed from within or immediately downgradient of the pits since the RFI activities were conducted in 1994.

An IM to remove contaminated soils is planned to occur following this delineation effort and will be based upon the data collected. It is anticipated that removing the remaining TRPH-contaminated soils will eliminate both the contaminated soil and free product problem associated with SWMUs 6 and 7. If contaminated groundwater is identified, it will be addressed in the CMS for these SWMUs.

### **Sampling Program Objectives**

The objectives of the sampling program detailed in this plan are as follows:

1. Delineate (vertically and horizontally) TRPH contaminated soil within and around the former SWMUs that have or have had LNAPL present. The data will then be used to support an excavation to eliminate the LNAPL and TRPH contaminated soil exceeding industrial SCTLs.
2. Delineate soils to residential criteria to support a corrective action plan.
3. Evaluate the potential presence of groundwater contamination.

To accomplish this TtNUS will perform the following proposed sampling activities.

### **PROPOSED SITE ACTIVITIES**

To support site assessment activities at SWMUs 6 and 7, TtNUS will collect soil and groundwater samples using the techniques discussed below. Samples will be submitted to a fixed-base laboratory for select analysis. Soil samples will be collected with a direct push technology (DPT) rig at approximately 34 locations. Soil sample locations are shown on Figure 1. Groundwater samples will be collected from 12 existing monitoring wells and 8 temporary well locations. Groundwater sample locations are shown on Figure 2. The field activities described above will be conducted during an approximate three week sampling event. If required, a second field sampling event may be conducted to complete the delineation of soil and groundwater contamination. Prior to the field activities, mobilization activities will be conducted. Tasks associated with mobilization include:

- Field Coordination (i.e., coordinating for site access, obtaining field equipment and consumables, etc.)
- Subcontractor Procurement and Coordination (DPT subcontractor and fixed-base laboratory)
- Utility Clearance
- Project “Kick-off” and Health and Safety Daily “Tailgate” Meetings

### **Health and Safety**

All field activities should be completed in accordance with the Health and Safety Plan (HASP) for SWMU 6 and 7 (dated July 2006). A copy of the HASP will be kept on site at all times during field

activities. Additional copies are available upon request for both TtNUS field personnel and subcontractors.

### **Groundwater Monitoring Well Sampling**

Prior to collecting groundwater samples from existing monitoring wells, groundwater elevations will be measured and recorded on a groundwater level form (Attachment 2). Expansive plugs from each monitoring well will be removed and each well will be allowed a minimum of 15 minutes to equilibrate prior to obtaining the measurement. Depth to potentiometric surface will be measured from the north side of the top of well casing to the nearest 0.01 foot with an oil/water interface probe. Free product thickness, if present, will also be recorded.

Groundwater samples will be collected from 12 existing monitoring wells (MPT-08-MW01S, -RW01S, -MW02S, -MW03s, -MW04S, -MW06S, -MW07S, -MW15SR, -MW16S, -MW17S, -MW18S, and MPT-S-MW02S). See Figure 2 for monitoring well locations. Groundwater sampling will be conducted in strict accordance with FDEP Standard Operating Procedure (SOP) 001/01 FS2200. During monitoring well purging (not applicable to DPT groundwater sampling) field measurements of pH, temperature, specific conductance, and dissolved oxygen will be recorded using an YSI 556 water quality multimeter, or equivalent, for each purge volume. Turbidity will be measured using a Lamotte 2020 Turbidimeter or equivalent. Stabilization protocol, as defined in FDEP SOP 001/01 FS2200, will be conducted for each parameter prior to sample collection.

Groundwater samples will be submitted to a FDEP certified laboratory for analyses of volatile organic compounds (VOCs) [United States Environmental Protection Agency (EPA) Method 8260B], PAHs (EPA 8310), ethylene dibromide (EDB) (EPA 8011), and TRPH [Florida Petroleum Range Organics (FL-PRO)]. Groundwater samples to be analyzed for VOCs will be collected using the “straw method” and discharged into the appropriate sample bottles for analysis. Groundwater samples to be analyzed for extractable organics (PAHs and TRPH) will be collected using the pump and vacuum trap method.

Sampling data for each well will be recorded on the appropriate FDEP groundwater sample log sheet (included in Attachment 2) and the field logbook. Groundwater sampling activities are summarized on Table 1. All purge water collected during the investigation will be containerized in 55-gallon drums and properly labeled.

### **Temporary Well Installation and Sampling**

TtNUS will install and sample eight temporary wells at SWMUs 6 and 7. The temporary well locations are shown on Figure 2. The temporary wells will be used to further assess (in addition to the 12 permanent wells) shallow groundwater contamination in and around SWMUs 6 and 7. The temporary wells will be installed using either hollow-stem auguring or DPT.

Shallow temporary wells will be installed with 10-foot screens that bracket the top of the water table. Depth to water varies from approximately 3 feet bls within the pits to approximately 10 feet bls north of the pits. Water levels from existing shallow wells will be checked to determine the optimal placement of the well screen. The casing of each well will be constructed of 2-inch diameter polyvinyl chloride (PVC) with a 0.010-mil slotted screen. Each well will have a standard sand filter pack surrounding it and will have a grade 20/30 fine sand seal above the screen. The rest of the boring will not be grouted until it is determined if the temporary well will be made permanent or be abandoned following the analysis of the groundwater it has produced. The wells that are converted to permanent groundwater monitoring wells will be finished with a grout seal, a flush mounted concrete pad, and an 8-inch diameter manhole. Bolt-down manhole lids will be installed to allow access during future groundwater monitoring events.

Following installation, temporary wells will be developed until they are relatively sediment free and permitted to sit for 24 hours prior to sampling. Sampling techniques, methods, and analytical requirements are the same as those defined for the permanent groundwater wells referenced above.

Each temporary well location will be surveyed with a Trimble global positioning system (GPS) unit (or equivalent) that is capable of achieving an accuracy of less than 1 meter. It is anticipated that a Trimble GPS unit will be kept on site for the duration of the project. Horizontal datum should be surveyed in feet relative to the Florida State Plane Coordinate System, Florida State Plane North [North American Datum 1983 (NAD83)]. If any temporary wells are converted to permanent wells, they will be surveyed by a licensed professional surveyor. Following completion of the field sampling event, the survey data will be transferred to TtNUS' environmental geographical information system (EGIS) department to be entered into the EGIS database for NAVSTA Mayport.

If laboratory results indicate that additional "step-out" wells are needed, a second event will be conducted to complete the delineation. The number and location of any additional temporary wells will be determined, based upon the first event results, by the project manager.

### **DPT Soil Sampling**

Soil samples will be collected from the 34 locations depicted on Figure 1. The first 4 feet of each boring will be hand augured or post-holed by the DPT subcontractor to clear for underground utilities. Continuous soil samples will be collected using a stainless steel Macro-Core<sup>®</sup> soil sampler (4-foot section) beginning at 4 feet below land surface (bls) and continuing in 4-foot vertical intervals until the water table is encountered. A closed-piston sampling method will be used to avoid cross contamination between sampling intervals. Samples will be collected every 2 feet (2, 4, 6, 8, etc.) until the water table is reached. Each sample will be screened for the presence of hydrocarbon contamination using an organic vapor analyzer (OVA) equipped with a flame ionization detector (FID). FID screening will be performed for each sample interval in accordance with the headspace screening method described in Chapter 62-770.200(2) Florida Administrative Code (FAC). The Macro-Core<sup>®</sup> soil sampler will be decontaminated in between each sample collection. Decontamination will be conducted in accordance to FDEP SOP FC1000: General Sampling Procedures. A sample from the interval exhibiting the highest FID measurement, or olfactory or visual evidence (i.e., odor or staining) will be submitted to a fixed-base laboratory for analyses of TRPH speciation [Massachusetts Department of Environmental Protection (MADEP) extractable petroleum hydrocarbon (EPH)]. If no evidence of contamination is observed, an unsaturated soil sample will be collected directly above the water table.

Soil sampling procedures will be conducted in accordance with FDEP SOPs 001/01: FS3000: Soil Sampling and FS1000: General Sampling Procedures. Equipment rinsate and/or field blank samples will also be collected. A summary of soil sampling activities is provided in Table 1. A copy of the soil boring and soil sampling logs are provided in Attachment 2. Soil displaced during each boring will be backfilled in the boring from which it was collected.

Each DPT soil sample location will be surveyed with a Trimble GPS unit (or equivalent) that is capable of achieving an accuracy of less than 1 meter. It is anticipated that a Trimble GPS unit will be kept on site for the duration of the project. Horizontal datum should be surveyed in feet relative to the Florida State Plane Coordinate System, Florida State Plane North (NAD83). After evaluating the site data and defining areas of contamination (TRPH contaminated soil exceeding industrial SCTLs or LNAPL presence), a licensed professional surveyor will be contracted to survey soil sample points that define contamination. Following completion of the field sampling event, the survey data will be entered into the EGIS database for NAVSTA Mayport.

**Additional Soil and Groundwater Delineation**

If laboratory results indicate that additional “step-out” samples are needed to complete the delineation of extent of soil and/or groundwater contamination, a second field sampling event will be conducted. The media (soil or groundwater), number, and locations of samples will be determined after reviewing the first event results. Any additional sampling will follow the protocol set up in this work plan.

**Sample Handling**

Sample handling includes the selection of sample containers, preservatives, allowable holding times, and the analyses requested. Sample handling procedures will be in accordance with FDEP SOP 001/01 FS1000 and FS2200.

**TABLE 1  
 SUMMARY OF SAMPLING ACTIVITIES:  
 SWMUs 6 and 7**

Sample Type	Aqueous Samples	Soil Samples	Trip Blanks <sup>1</sup>	Rinsate Blanks <sup>2</sup>	Field Blanks	Total Samples	Parameter	Analysis Method
DPT Soil Samples	--	34	--	2	1	37	TRPH Speciation	MADEP VPH + EPH
Groundwater Samples	20	--	2	2	1	25	BTEX + MTBE	EPA 8260B
			--	2	1	23	PAHs	EPA 8310
			--	2	1	23	EDB	EPA 8011
			--	2	1	23	TRPH	FL-PRO

<sup>1</sup> = One trip blank will be included with each cooler containing VOCs

<sup>2</sup> = A pre- and post-equipment rinsate blank will be collected

EPH = Extractable Petroleum Hydrocarbon

MADEP = Massachusetts Department of Environmental Protection

VPH = Volatile Petroleum Hydrocarbon

**Sampling Identification System**

Each sample will be assigned a unique codified sample identification number. The unique nomenclature established for this sampling event is as follows:

1	2	3	4	5
MPT-6/7	-	SB	-	DPTXXX
			-	008
				-
				MMDDYY

DPT Sample Nomenclature for soil and groundwater samples:

- MPT-6/7 = NAVSTA Mayport, SWMUs 6 and 7
- SB or GW = SB represents a subsurface soil sample and GW a groundwater sample
- DPTXXX = DPT location beginning with DPT001
- 008 = Bottom depth (feet bls) of sample interval (7 to 8 feet bls)
- MMDDYY = Month and Year of sample collection

Examples of the above are:

A soil sample collected on August 21, 2006 from DPT005 at 8 feet bls would be represented by MPT-6/7-SB-DPT005-008-082106.

A groundwater sample collected from DPT005 at 12 feet bls on August 21, 2006 would be represented by MPT-6/7-GW-DPT005-012-082106.

**\*\*EXCEPTION\*\*** A groundwater sample collected from monitoring well MW16S on August 21, 2006 would be represented by MPT-6/7-GW-MW16S-082106 (no sample depth required).

### **Sample Custody, Packaging, and Shipping**

Custody of samples must be maintained and documented at all times. Chain-of-custody begins with the collection of the samples in the field. FDEP SOP 001/01 FS 1000 and TtNUS SOP SA-6.3 provide a description of the chain-of-custody procedures to be followed.

Samples will be packaged and shipped in accordance with FDEP SOP 001/01 FS1000: General Sampling and applicable sections of FS2200 and FS3000. The field operations leader (FOL) will be responsible for completion of the following forms when samples are collected for shipping:

1. Sample labels
2. Chain-of-custody labels
3. Appropriate labels applied to shipping coolers
4. Chain-of Custody forms
5. Federal Express air bills

FS1000 also addresses the topics of containers, holding times, and sample preservations.

### **Quality Control Samples**

Quality control samples will be collected during the soil and groundwater assessment event in general accordance to FDEP SOP 001/01 FQ1000: Field Quality Control Requirements. In general, rinsate blanks will be collected on any sampling equipment (hand auger, DPT soil sampler, and vacuum trap bottles, etc.) that is brought to the field that and is not certified clean or that is field cleaned between samples. This will be done to document that they were clean when brought to the site and that no cross contamination is occurring between samples. At a minimum, blanks will be collected at 5 percent for each analysis to be performed. In addition, one trip blank sample will accompany each cooler containing VOC samples.

### **Equipment Calibration**

The field instruments including the OVA-FID, YSI 556 Water Quality Multimeter, and Lamotte 2020 Turbidity Meter will be calibrated daily and/or according to FDEP SOP FT1000: General Field Testing and Measurement. Specific FDEP SOPs to be consulted for each parameter are provided in Table 2 listed below.

**TABLE 2  
SOP REFERENCES FOR SELECT FIELD PARAMETERS**

<b>Parameter</b>	<b>FDEP SOP Title</b>	<b>FDEP SOP No.</b>
pH	Field Measurement of Hydrogen Ion Activity (pH)	FT1100
Specific Conductance	Field Measurement of Specific Conductance	FT1200
Temperature	Field Measurement of Temperature	FT1400
Dissolved Oxygen	Field Measurement of Dissolved Oxygen	FT1500
Turbidity	Field Measurement of Turbidity	FT1600

Calibration will be documented on an Equipment Calibration Log. During calibration, an appropriate maintenance check will be performed on each piece of equipment. If damaged or defective parts are identified during the maintenance check and it is determined that the damage could have an impact on the instrument's performance, the instrument will be removed from service until defective parts are repaired or replaced. A copy of the Equipment Calibration Log is included in Attachment 2.

### **Record Keeping**

In addition to chain-of-custody records associated with sample handling, packaging, and shipping, certain standard forms will be completed for sample description and documentation. These shall include sample log sheets (for soil and groundwater samples), daily activities record, and logbooks.

The FOL will maintain a bound/weatherproof field notebook. The FOL, or designee, will record pertinent information related to sampling or field activities. This information may include sampling time, weather conditions, unusual events (e.g., well tampering), field measurements, site visitors, descriptions of photographs, etc. At the completion of field activities, the FOL shall submit to the TtNUS Task Order Manager (TOM) all field records, data, field notebooks, logbooks, chain-of-custody receipts, sample log sheets, daily logs, etc.

### **Investigative Derived Waste (IDW) Management**

Purge water and decontamination water will be collected and containerized in Department of Transportation (DOT) approved (Specification 17C) 55-gallon drums. Each drum will be sealed, labeled and transported to a pre-designated staging area designated by NAVSTA Mayport personnel (behind Building 1613) located within NAVSTA Mayport pending groundwater analytical results. Soil remaining from DPT borings will be backfilled into the borehole from which it was collected. A temporary waste staging area will be established at the site to temporarily store IDW generated during the sampling activities until it can be transported to Building 1613. All decontamination materials generated during the site investigation will be containerized for proper disposal. TtNUS will also conduct weekly drum inspections (submitted to Diane Racine of the NAVSTA Mayport Environmental Department) until the IDW is disposed. It is the responsibility of TtNUS to set up a contract with Naval Air Station Jacksonville's Public Works Center (PWC) for disposal of the IDW following completion of the field sampling. Appropriate IDW documentation will be maintained in the project field log book.

### **Decontamination**

The equipment involved in field sampling activities will be decontaminated prior to and during sampling activities in accordance to FDEP SOP FC1000: Cleaning/Field Decontamination Procedures. Non-disposable equipment used for collecting samples will be decontaminated prior to beginning field sampling and between sample locations.

### **Reporting**

Information obtained from field activities detailed in this SAP will be incorporated into the CMS for SWMUs 6 and 7.



**TETRA TECH NUS, INC.**

Ms. Adrienne Wilson  
NAVFAC Southeast  
August 11, 2006 – Page 9 of 9

If you have any questions with regard to this submittal, please contact me at (904) 636-6125 or via e-mail at [gregory.roof@ttnus.com](mailto:gregory.roof@ttnus.com).

Sincerely,

A handwritten signature in black ink, appearing to read 'Gregory S. Roof'.

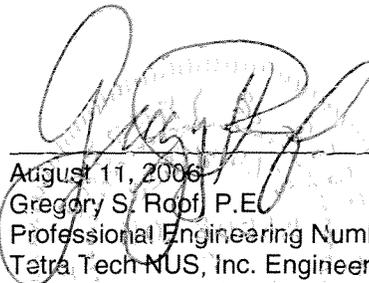
Gregory S. Roof, P.E.  
Task Order Manager

GR/cm

- c: Mr. J. Cason P.G., FDEP (2 copies)
- Mr. C. Benedikt, USEPA
- Ms. D. Racine, NAVSTA Mayport
- Mr. M. Halil P.E., CH2MHill
- Ms. D. Humbert, TtNUS (cover letter only)
- Mr. M. Perry, TtNUS (unbound copy)



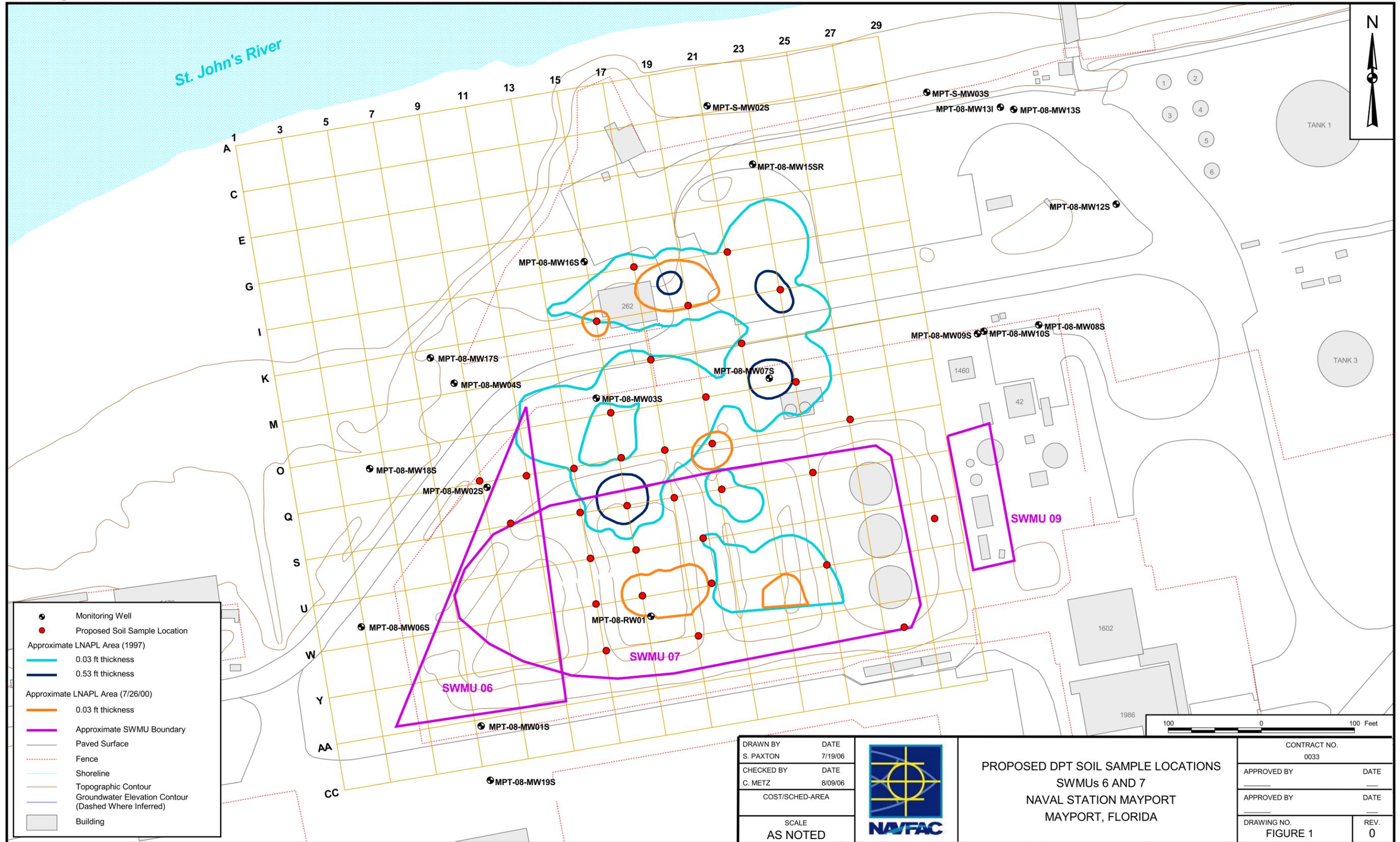
The professional opinions rendered in this document identified as Sampling and Analysis Plan for Solid Waste Management Units 6 and 7, Naval Station Mayport, Mayport, Florida were developed in accordance with commonly accepted procedures consistent with applicable standards of practice. This document was prepared under the supervision of the signing engineer and is based on information obtained from others. If conditions are determined to exist differently than those described in this document, then the undersigned professional engineer should be notified to evaluate the effects of any additional information on the project described in this document.



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August 11, 2006  
Gregory S. Roof P.E.  
Professional Engineering Number 50842  
Tetra Tech-NUS, Inc. Engineering No. 7988

## FIGURES

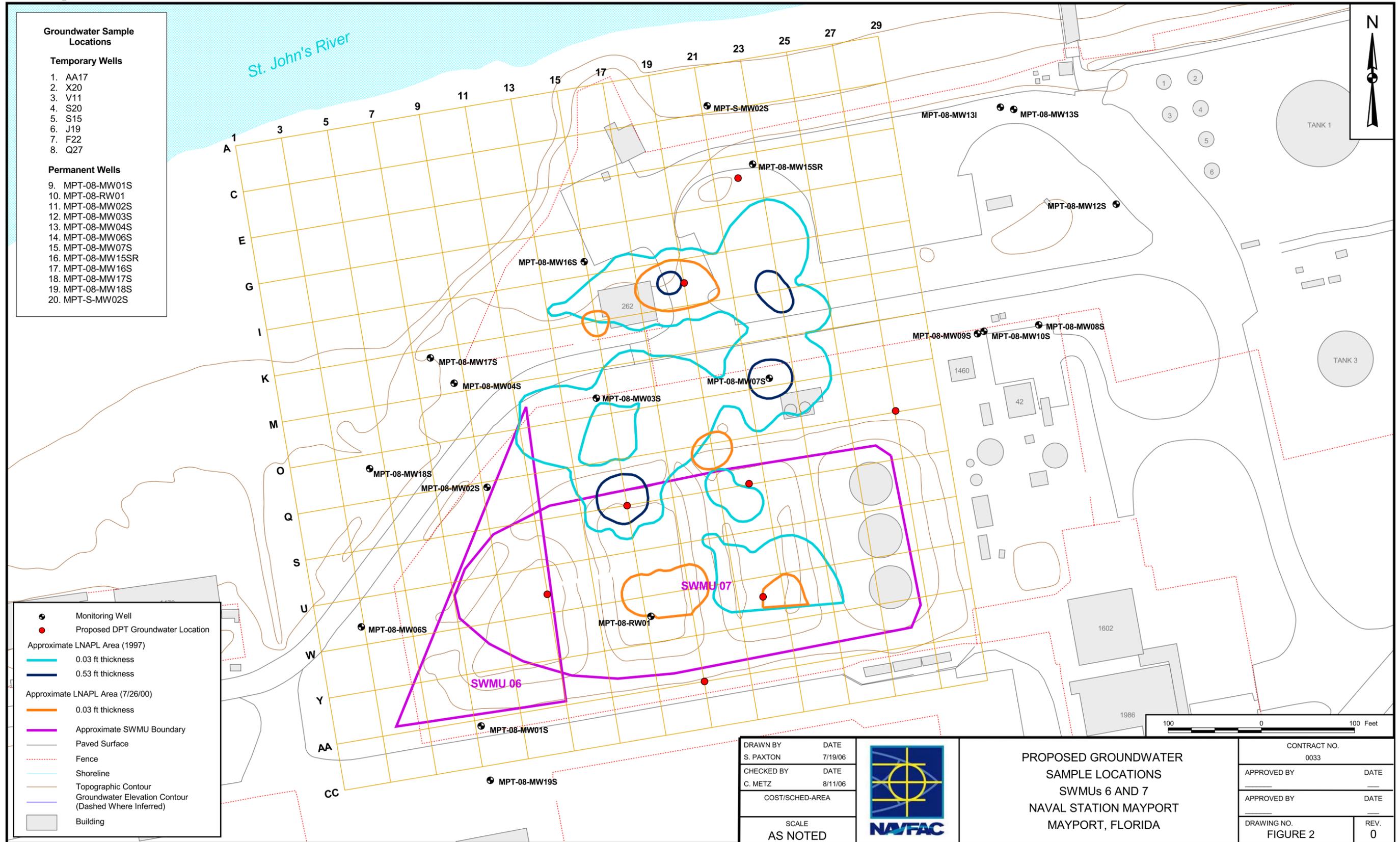


DRAWN BY S. PAXTON	DATE 7/19/06
CHECKED BY C. METZ	DATE 8/09/06
COST/SCHED-AREA	
SCALE AS NOTED	



PROPOSED DPT SOIL SAMPLE LOCATIONS  
SWMUs 6 AND 7  
NAVAL STATION MAYPORT  
MAYPORT, FLORIDA

CONTRACT NO. 0033	
APPROVED BY	DATE
APPROVED BY	DATE
DRAWING NO. FIGURE 1	REV. 0



**Groundwater Sample Locations**

**Temporary Wells**

1. AA17
2. X20
3. V11
4. S20
5. S15
6. J19
7. F22
8. Q27

**Permanent Wells**

9. MPT-08-MW01S
10. MPT-08-RW01
11. MPT-08-MW02S
12. MPT-08-MW03S
13. MPT-08-MW04S
14. MPT-08-MW06S
15. MPT-08-MW07S
16. MPT-08-MW15SR
17. MPT-08-MW16S
18. MPT-08-MW17S
19. MPT-08-MW18S
20. MPT-S-MW02S

- Monitoring Well
- Proposed DPT Groundwater Location
- Approximate LNAPL Area (1997)
  - 0.03 ft thickness
  - 0.53 ft thickness
- Approximate LNAPL Area (7/26/00)
  - 0.03 ft thickness
- Approximate SWMU Boundary
- Paved Surface
- - - Fence
- Shoreline
- Topographic Contour
- - - Groundwater Elevation Contour (Dashed Where Inferred)
- Building

DRAWN BY S. PAXTON	DATE 7/19/06
CHECKED BY C. METZ	DATE 8/11/06
COST/SCHED-AREA	
SCALE AS NOTED	

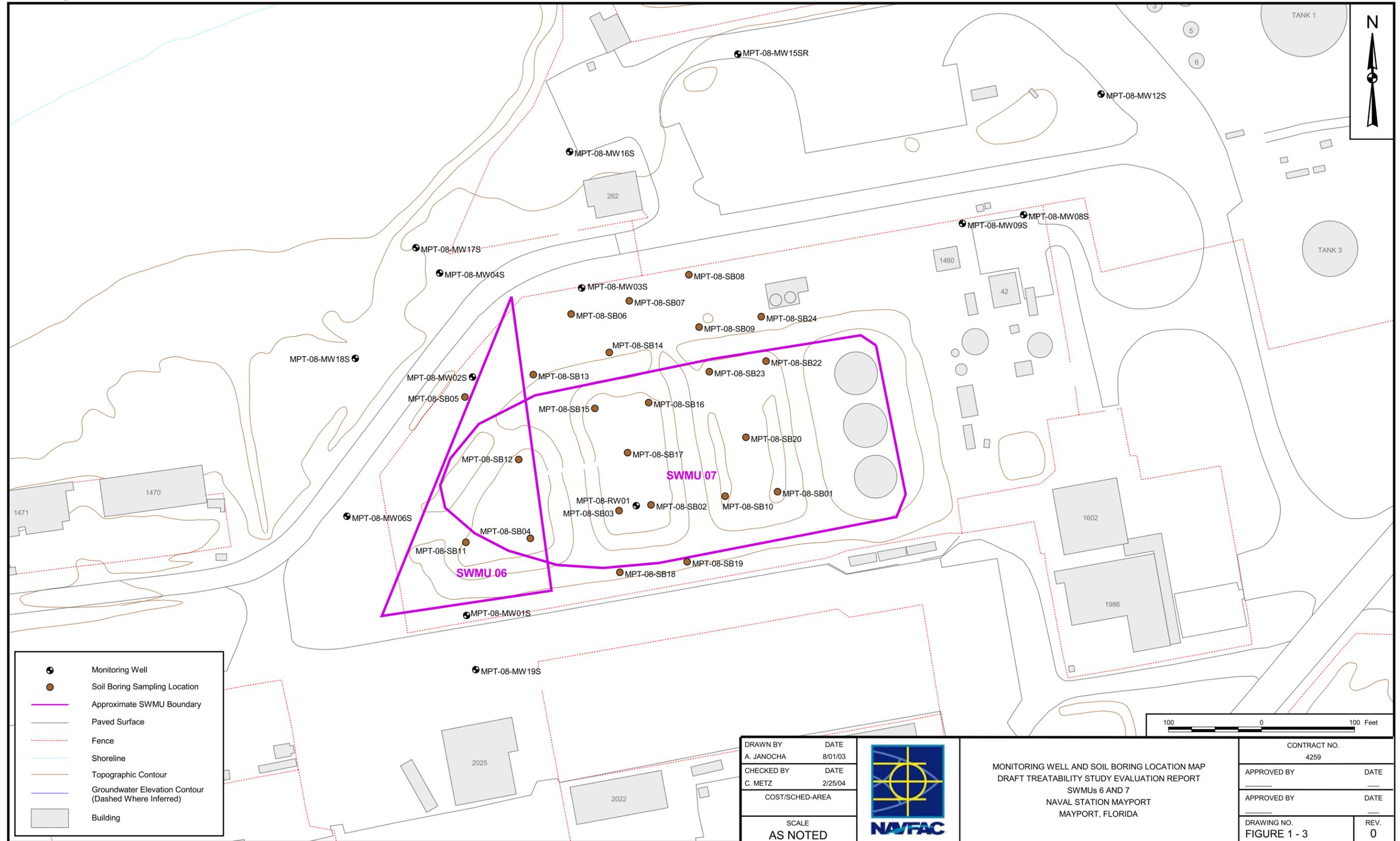


**PROPOSED GROUNDWATER  
SAMPLE LOCATIONS  
SWMUs 6 AND 7  
NAVAL STATION MAYPORT  
MAYPORT, FLORIDA**

CONTRACT NO. 0033	
APPROVED BY	DATE
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**ATTACHMENT 1**  
**HISTORICAL FIGURES AND TABLES**



	Monitoring Well
	Soil Boring Sampling Location
	Approximate SWMU Boundary
	Paved Surface
	Fence
	Shoreline
	Topographic Contour
	Groundwater Elevation Contour (Dashed Where Inferred)
	Building

DRAWN BY	DATE
A. JANOCHA	8/01/03
CHECKED BY	DATE
C. METZ	2/25/04
COST/SCHED-AREA	
SCALE	
AS NOTED	



MONITORING WELL AND SOIL BORING LOCATION MAP  
 DRAFT TREATABILITY STUDY EVALUATION REPORT  
 SWMUs 6 AND 7  
 NAVAL STATION MAYPORT  
 MAYPORT, FLORIDA

CONTRACT NO. 4259	
APPROVED BY	DATE
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DRAWING NO. FIGURE 1 - 3	REV. 0

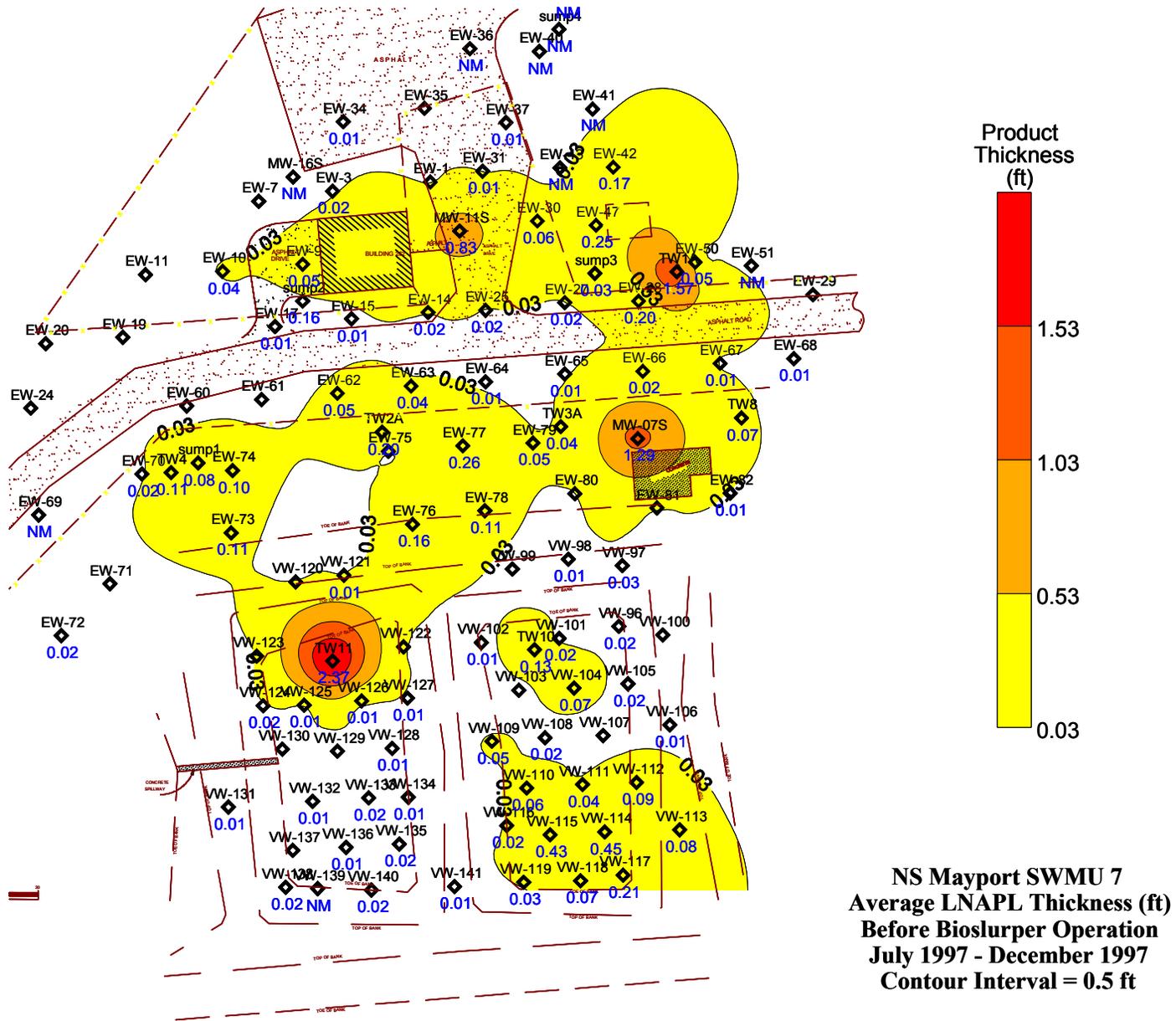


Figure 4-7. Average LNAPL Thickness Before Bioslurper Operation



**TABLE 2-5  
FREE-PRODUCT LEVELS  
SWMUs 6 AND 7**

**TREATABILITY STUDY EVALUATION REPORT  
NAVAL STATION MAYPORT  
MAYPORT, FLORIDA**

<b>Measurement Date</b>	June 2002	November 2002	December 2002	January 2003	February 2003	May 2003	September 2003*	February 2004
<b>Free-Product Level</b>	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)
<b>Location</b>								
MPT-8-MW01S	0.50	--	--	--	--	--	--	--
MPT-8-MW02S	0.05	0.54	0.40	0.45	0.40	0.63	--	0.01
MPT-8-MW03S	0.01	0.01	--	0.02	0.10	--	--	--
MPT-8-MW04S	--	--	--	--	0.02	--	--	--
MPT-8-MW06S	0.30	--	--	--	--	--	--	--
MPT-8-MW16S	--	--	--	--	--	0.01	--	--
MPT-8-MW17S	--	--	--	--	--	0.01	--	--
MPT-8-EW-71	NM	NM	NM	NM	NM	NM	--	0.08
MPT-8-EW-77	NM	NM	NM	NM	NM	NM	--	0.04
MPT-8-EW-78	NM	NM	NM	NM	NM	0.28	--	0.03
MPT-8-VW-99	NM	NM	NM	NM	NM	NM	--	0.01
MPT-8-VW-119	NM	NM	NM	NM	NM	NM	--	0.01
MPT-8-VW-134	NM	NM	NM	NM	NM	NM	--	0.01
MPT-8-VW-120	NM	NM	NM	NM	NM	0.11	--	--
MPT-8-VW-135	NM	NM	NM	NM	NM	0.34	--	--
MPT-8-VW-136	NM	NM	NM	NM	NM	0.93	--	0.01
MPT-8-VW-140	NM	NM	NM	NM	NM	0.03	--	--

## Notes:

EW = Extraction well  
MPT = Mayport  
MW = Monitoring well

NM = Not measured  
VW = Venting well  
-- = Free-product not detected

\*Absorbent socks were installed in wells containing free-product from June until September 2003. This measurement was made within 5 minutes of removing the sock. Therefore, disturbance of the water in the well may have affected the free product thickness.

**TABLE 2-4**  
**SUMMARY OF ANALYTES DETECTED IN SOIL - SWMUs 6 AND 7**  
**NAVAL STATION MAYPORT**  
**PAGE 1 OF 2**

Sample No.		MPT-8-SB01-3	MPT-8-SB02-3	MPT-8-SB03-3	MPT-8-SB04-2.5	MPT-8-SB05-8	MPT-8-SB06-8.5
Sample Depth (ft bls)		3 ft	3 ft	3 ft	2.5 ft	8 ft	8.5 ft
Collect Date		2/12/2003	2/12/2003	2/12/2003	2/12/2003	2/12/2003	2/12/2003
	Default SCTL <sup>1</sup> DE1 <sup>2</sup> /DE2 <sup>3</sup> /LE <sup>4</sup> (mg/kg)						
<b>TPHCWG<sup>5</sup> (mg/kg)</b>							
C5-C7 Aromatics	340/1800/34	--	--	--	--	--	--
C7-C8 Aromatics	490/3700/59	--	--	--	--	--	--
C8-C10 Aromatics	460/2700/340	--	51	--	--	--	--
C10-C12 Aromatics	900/5900/520	--	<b>600</b>	--	--	100	--
C12-C16 Aromatics	1500/12000/1000	17 J	<b>2000</b>	260	--	800	--
C16-C21 Aromatics	1300/11000/3200	4.1 J	<b>1500</b>	320	--	670	--
C21-C35 Aromatics	2300/40000/25000	--	32 J	5.8 J	1.5 J	20 J	--
C6-C8 Aliphatics	8700/46000/1300	--	--	--	--	--	--
C8-C10 Aliphatics	850/4800/7000	--	390	73	--	95	--
C10-C12 Aliphatics	1700/10000/51000	42 J	<b>1900</b>	730	--	500	--
C12-C16 Aliphatics	2900/21000/***	870	<b>4200</b>	<b>3200</b>	--	1900	--
C16-C21 Aliphatics	NL	840	2200	2300	--	1500	--
C21-C35 Aliphatics	NL	26 J	80	91	1.5 J	19 J	--
C16-C35 Aliphatics <sup>6</sup>	4200/280000/***	866 J	2280	2391	1.5 J	1519 J	--

See notes at end of table.

**TABLE 2-4**  
**SUMMARY OF ANALYTES DETECTED IN SOIL - SWMUs 6 AND 7**  
**NAVAL STATION MAYPORT**  
**PAGE 2 OF 2**

Sample No.		MPT-8-SB07-7	MPT-8-SB08-7.5	MPT-8-SB09-6.5	MPT-8-SB010-3	MPT-8-SB010-3 (Duplicate)
Sample Depth (ft bls)		7 ft	7.5 ft	6.5 ft	3 ft	3 ft
Collect Date		2/12/2003	2/12/2003	2/12/2003	2/12/2003	2/12/2003
	<b>Default SCTL<sup>1</sup></b> <b>DE1<sup>2</sup>/DE2<sup>3</sup>/LE<sup>4</sup> (mg/kg)</b>					
<b>TPHCWG<sup>5</sup> (mg/kg)</b>						
C5-C7 Aromatics	340/1800/34	--	--	--	--	--
C7-C8 Aromatics	490/3700/59	--	--	--	--	--
C8-C10 Aromatics	460/2700/340	--	--	--	--	--
C10-C12 Aromatics	900/5900/520	--	--	23 J	--	--
C12-C16 Aromatics	1500/12000/1000	14 J	15 J	270	16 J	16 J
C16-C21 Aromatics	1300/11000/3200	4.9 J	3.2 J	190	4.6 J	3.4 J
C21-C35 Aromatics	2300/40000/25000	--	--	--	--	--
C6-C8 Aliphatics	8700/46000/1300	--	--	--	--	--
C8-C10 Aliphatics	850/4800/7000	--	17 J	100	--	--
C10-C12 Aliphatics	1700/10000/51000	--	150	780	13 J	23 J
C12-C16 Aliphatics	2900/21000/***	77	370	2700	290	260
C16-C21 Aliphatics	NL	48 J	110	2000	62	48 J
C21-C35 Aliphatics	NL	31 J	12 J	130	--	16 J
C16-C35 Aliphatics <sup>6</sup>	4200/280000/***	79 J	122 J	2130	62	64 J
<b>Notes:</b>						
<sup>1</sup> SCTL = Default Soil Cleanup Target Levels referenced in Chapter 62-777, FAC. These default SCTLs were selected only for comparison purposes of this treatability study.						
<sup>2</sup> DE1 = Direct Exposure Scenario 1 - Residential						
<sup>3</sup> DE2 = Direct Exposure Scenario 2 - Commercial/Industrial						
<sup>4</sup> LE = Leachability Exposure						
<sup>5</sup> TPHCWG = Total Petroleum Hydrocarbon Criteria Working Group method						
<sup>6</sup> C16-C35 Aliphatics = Sum of C16-C21 + C21-C35 Aliphatics						
<b>Notes:</b> mg/kg = milligrams per kilogram						
-- = analyte not detected						
NL = Not Listed						
<b>bold</b> = exceedance of default SCTL						
J = compound detected at an estimated concentration						
ft bls = feet below land surface						
*** = not a health risk for this exposure scenario						

Table 2-5  
Soil TRPH Speciation  
SWMUs 6 and 7  
Naval Station Mayport

Volatile Organics (mg/kg)	FDEP SCTL			MPT-8-SB11-3.5	MPT-8-SB12-3.5	MPT-8-SB13-04	MPT-8-SB14-04
	res (ppm)	ind (ppm)	leach (ppm)	04/04/05	04/04/05	04/04/05	04/04/05
C5-C8 ALIPHATICS-UNADJ	7100	38000	960	2.9 U	2.9 U	2.9 U	3.3 U
C11-C22 AROMATICS-UNADJ	1800	15000	1000	7.2 U	7.3 U	6.9 U	6.9 U
C19-C36 ALIPHATICS	42000	280000	1000000	7.2 U	7.3 U	6.9 U	6.9 U
C9-C10 AROMATICS-UNADJ	560	3400	380	0.74 U	0.74 U	0.73 U	0.82 U
C9-C12 ALIPHATICS-UNADJ	1700	11000	31000	2.2 U	2.2 U	2.2 U	2.5 U
C9-C18 ALIPHATICS	2900	21000	140000	7.2 U	7.3 U	6.9 U	6.9 U

Volatile Organics (mg/kg)	FDEP SCTL			MPT-8-SB15-03	MPT-8-SB16-03	MPT-8-SB17-03
	res (ppm)	ind (ppm)	leach (ppm)	04/04/05	04/04/05	04/04/05
C5-C8 ALIPHATICS-UNADJ	7100	38000	960	3.3 U	3.0 U	4.1 U
C11-C22 AROMATICS-UNADJ	1800	15000	1000	36 U	2880	800
C19-C36 ALIPHATICS	42000	280000	1000000	128	2250	788
C9-C10 AROMATICS-UNADJ	560	3400	380	0.83 U	66.4	1 U
C9-C12 ALIPHATICS-UNADJ	1700	11000	31000	2.5 U	94.1	3.1 U
C9-C18 ALIPHATICS	2900	21000	140000	36 U	4340	1050

Volatile Organics (mg/kg)	FDEP SCTL			MPT-8-SB18-03	MPT-8-SB19-03	MPT-8-SB20-03
	res (ppm)	ind (ppm)	leach (ppm)	04/04/05	04/04/05	04/04/05
C5-C8 ALIPHATICS-UNADJ	7100	38000	960	3.2 U	3.0 U	3.1 U
C11-C22 AROMATICS-UNADJ	1800	15000	1000	38 U	7.4 U	191
C19-C36 ALIPHATICS	42000	280000	1000000	38 U	7.4 U	285
C9-C10 AROMATICS-UNADJ	560	3400	380	0.81 U	0.75 U	1.54
C9-C12 ALIPHATICS-UNADJ	1700	11000	31000	2.4 U	2.3 U	2.3 U
C9-C18 ALIPHATICS	2900	21000	140000	38 U	7.4 U	101

Volatile Organics (mg/kg)	FDEP SCTL			MPT-8-SB22-03	MPT-8-SB23-03	MPT-8-SB24-03
	res (ppm)	ind (ppm)	leach (ppm)	04/04/05	04/04/05	04/04/05
C5-C8 ALIPHATICS-UNADJ	7100	38000	960	2.8 U	3.9 U	4.2 U
C11-C22 AROMATICS-UNADJ	1800	15000	1000	7.0 U	129	8.2 U
C19-C36 ALIPHATICS	42000	280000	1000000	25.8	250	8.2 U
C9-C10 AROMATICS-UNADJ	560	3400	380	0.69 U	0.97 U	1 U
C9-C12 ALIPHATICS-UNADJ	1700	11000	31000	2.1 U	2.9 U	3.1 U
C9-C18 ALIPHATICS	2900	21000	140000	7.0 U	49.8	8.2 U

**ATTACHMENT 2**  
**FIELD DATA SHEETS**









