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NAVSTA NEWPORT RI
5090.3a

TETRA TECH NUS, INC.
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C-NAVY-03-05-1826W

March 16, 2005

Project Number GN1611

Mr. Curtis Frye
Remedial Project Manager
EFA Northeast, Naval Facilities Engineering Command
10 Industrial Highway, Mail Stop 82
Lester, Pennsylvania 19113

Reference: CLEAN Contract No. N62472-03-D-0057
Contract Task Order No. 008

Subject: Technical Memorandum for Supplemental Soil Investigation
Additional Borings, Old Firefighting Training Area, Site 09
Naval Station Newport, Newport Rhode Island

Dear Mr. Frye:

Enclosed for your records, you will find two copies of the Technical Memorandum prepared to describe the Supplemental Soil Investigation at the OFFTA site at NAVSTA. In accordance with the task order, copies of this information have been provided to the persons on the distribution list below.

Please be advised that we anticipate conducting this work between March 28, 2005 and April 1, 2005.

If you have any questions regarding this material, please do not hesitate to contact me.

Very truly yours,

Stephen S. Parker, LSP
Project Manager

SSP/rp

Enclosure

c: K. Keckler, USEPA (w/encl. – 3)
P. Kulpa, RIDEM (w/encl. – 3)
C. Mueller, NAVSTA (w/encl. – 1)
J. Stump, Gannett Fleming (w/encl. – 2)
J. Trepanowski/G. Glenn, TtNUS (w/o encl.)
File GN1611-3.2 (w/o encl.)/File GN1611-8.0 (w/encl.)

TECHNICAL MEMORANDUM
FIELD SAMPLING PLAN FOR SUPPLEMENTAL SOIL INVESTIGATION
OLD FIRE FIGHTING TRAINING AREA
NAVAL STATION NEWPORT, NEWPORT, RHODE ISLAND
March 11, 2005

1.0 INTRODUCTION

A second phase of soil sampling has been scoped in order to better define the extent of soil exceeding PRGs at the OFFTA site. Locations for additional sampling have been identified by the Navy after review of data collected and reported in the Soil Predesign Investigation Report (TtNUS July 2004), after review of comments on that report, and after mound removal at the site has been completed.

Figure 1 depicts the location of the site. The procedures to be used for this Supplemental Soil Investigation shall be those described in the Work Plan for Soil Predesign Investigations, document no. W5203290D (Work Plan), prepared by Tetra Tech NUS, Inc, dated November 2003, except as modified in this document.

Additionally, soil and debris mounds were present at the site until their removal between October 2004 and March 2005. During the removal of the mounds, foundations were found under the central mound, which seem to correspond with the former locations of some of the historical structures at the site. Figure 2 presents the possible configuration of the former structures on the site. In the absence of the mounds, additional borings can be placed around the foundations present to better determine depth of soil exceeding PRGs in this area.

2.0 FIELD DATA COLLECTION

The data will be collected and samples will be analyzed in accordance with the Work Plan, as referenced above, with the exceptions described in this section. In general, samples will be collected continuously at two foot intervals and soil conditions will be evaluated. Soil samples will be selected for laboratory analysis based on the conditions encountered.

Specifics on the Supplemental Soil Investigation are described below:

- Three piezometers will be installed at the western portion of the site to augment the groundwater well network and to identify the water table in this area. Piezometers will consist of direct push

pre-pack well screens minimum one inch inside-diameter, screened in ten foot lengths across the water table.

- Eleven DPT borings will be installed at the site. The borings will be installed using direct push sampling, with continuous samples collected at two foot intervals between 4 and 10 feet below ground surface.

- Based on field observations, two samples will be selected from each boring for laboratory analyses: One from above the water table, determined by measurement of nearby wells and piezometers, and one from below the water table. The third sample will be discarded.

- The samples selected from above the water table will be analyzed for PAHs, TPH (GRO and DRO by GC, to quantify hydrocarbons between the C-5 and C-36 range) and TAL metals, in order to determine presence of contaminants in excess of the preliminary remediation goals for the site as described in the feasibility Study for the site (TtNUS April 2002).

- Samples selected from below the water table will be analyzed for PAHs and TPH (GRO and DRO by GC, to quantify hydrocarbons between the C-5 and C-36 range), in order to determine if petroleum related compounds are present below the water table in this area.

- All samples collected will be evaluated through visual and through field screening instruments in order to select samples to be sent to the laboratory for analysis. Samples exhibiting the highest potential for contamination (one above the water table and one below the water table) will be selected for laboratory analysis.

- Horizontal and vertical positions of the borings and piezometers will be located by a professional land surveyor. The surveyor will work off existing benchmarks and site control.

DPT drilling and piezometer installation will be conducted in accordance with TtNUS SOP SA-2.5, attached to this addendum. DPT piezometers are only anticipated to be used for identifying water table and water table fluctuations at the site.

3.0 ANALYSIS

Up to 22 field soil samples will be collected for analysis, as well as three duplicate samples, one rinsate blank and one field blank, for a total of 27 samples. QC samples are selected based on the QA/AC procedures described in the Work Plan.

Figure 3 presents the planned locations of 11 of the proposed sample stations. Sample stations were selected based on comments to the draft soil PDI report.

Analytical methods, sample container, preservatives and holding time requirements are presented in the Soil Predesign Investigation Work Plan. QC samples, including one duplicate and associated blank samples will also be collected in accordance with the work plan. The analytical laboratories will provide method blanks as required per the analytical methods. Data quality objectives for the effort are provided in the Work Plan.

4.0 REPORTING

A brief data report will be prepared to describe the findings of the sample collection and analysis. The data report will be issued as an addendum to the Final Soil Predesign Investigation Report, yet to be completed. The data report will provide a visual description of the soils, a justification for the samples selected for chamical analysis, chemical analytical results from samples collected, and a map of the stations showing soil PRGs exceeded.

BASE MAP IS A PORTION OF THE FOLLOWING 7.5 X 15 MINUTE U.S.G.S. QUADRANGLE:
PRUDENCE ISLAND, RHODE ISLAND, 1955, PHOTOREVISED 1970 AND 1975

GRAPHIC SCALE
0 0.5 MILE 1 MILE

QUADRANGLE LOCATION

SITE LOCUS

OLD FIRE FIGHTING TRAINING AREA

NAVSTA NEWPORT – NEWPORT, RHODE ISLAND

FIGURE 1

DRAWN BY:	D.W. MACDOUGALL	REV.:	0
CHECKED BY:	J. FORRELLI	DATE:	MAY 19, 2004
SCALE:	AS NOTED	ACAD NAME:	DWG\4152\1230\FIG_1.DWG

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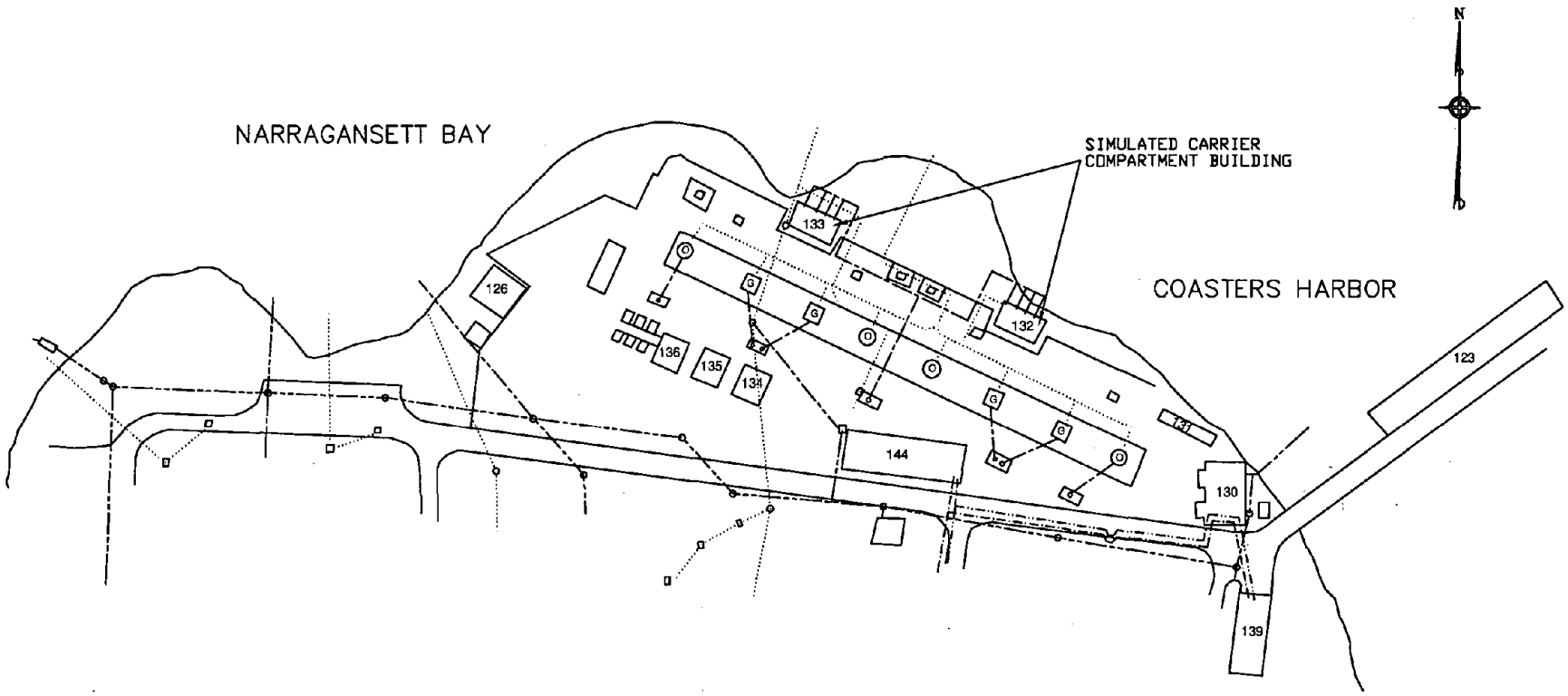

LEGEND

- 135 — BUILDING AND BUILDING ID
- STEAM LINE RETURN
- STEAM LINE SUPPLY
- STORM SEWER LINE
- SANITARY SEWER LINE
- OIL LINE
- O — OIL TANKS
- G — GAS TANKS

SOURCE: MASTER SHORE STATION DEVELOPMENT PLANS, US NAVAL STATION NEWPORT, R. I., 1953

HISTORIC FEATURES			
OLD FIRE FIGHTING TRAINING AREA			
NAVSTA NEWPORT – NEWPORT, RHODE ISLAND			
DRAWN BY:	D.W. MACDOUGALL	REV.:	0
CHECKED BY:	J. FORRELLI	DATE:	MAY 19, 2004
SCALE:	NOT TO SCALE	FILE NO.:	DWG\4152\1230\FIG_2.DWG

FIGURE 2

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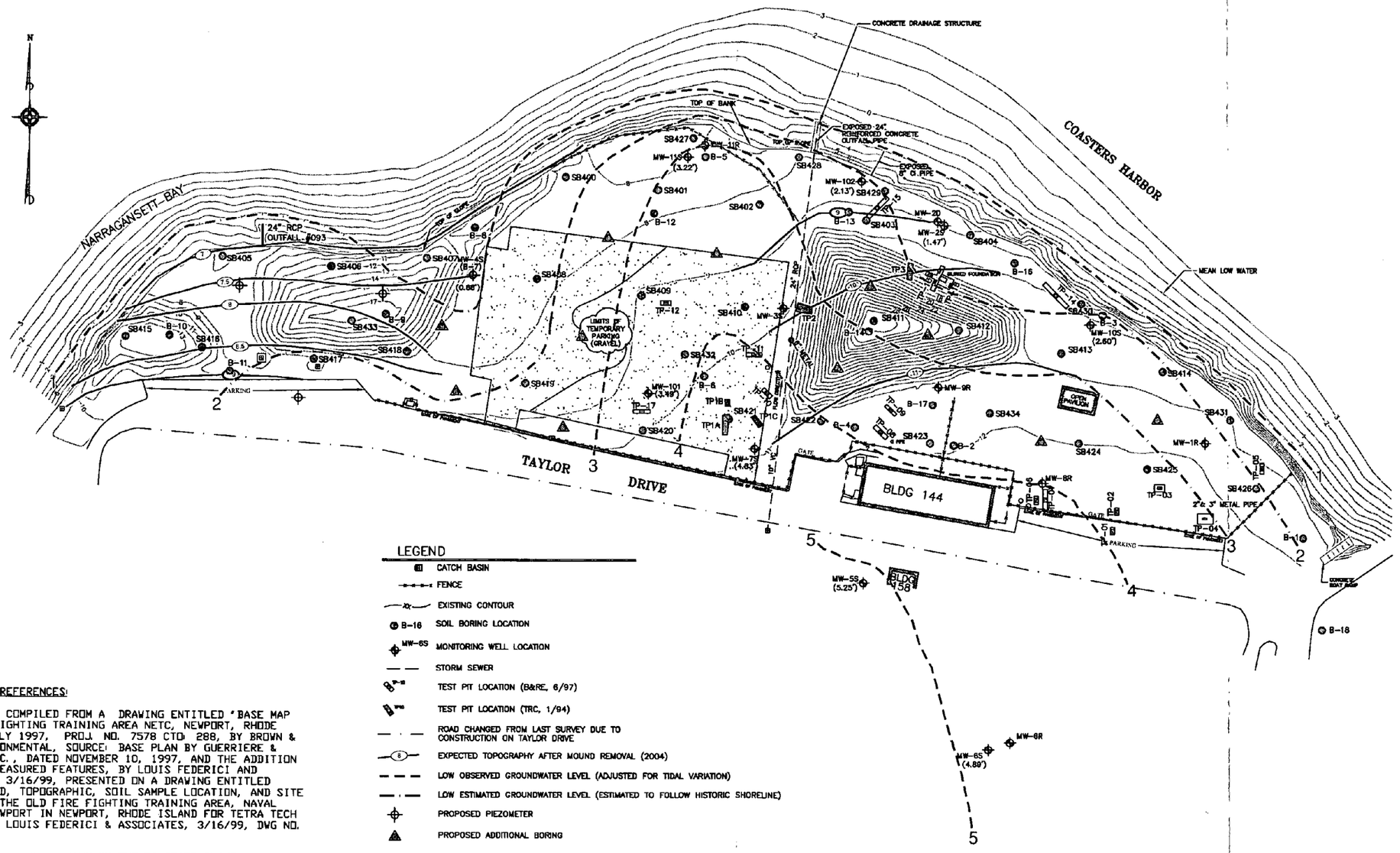

LEGEND

- CATCH BASIN
- FENCE
- EXISTING CONTOUR
- B-16 SOIL BORING LOCATION
- MW-6S MONITORING WELL LOCATION
- STORM SEWER
- TEST PIT LOCATION (B&RE, 6/97)
- TEST PIT LOCATION (TRC, 1/94)
- ROAD CHANGED FROM LAST SURVEY DUE TO CONSTRUCTION ON TAYLOR DRIVE
- EXPECTED TOPOGRAPHY AFTER MOUND REMOVAL (2004)
- LOW OBSERVED GROUNDWATER LEVEL (ADJUSTED FOR TIDAL VARIATION)
- LOW ESTIMATED GROUNDWATER LEVEL (ESTIMATED TO FOLLOW HISTORIC SHORELINE)
- PROPOSED PIEZOMETER
- PROPOSED ADDITIONAL BORING

GRAPHIC SCALE

0' 100' 200'

NOTES AND REFERENCES:

1. DRAWING COMPILED FROM A DRAWING ENTITLED "BASE MAP OLD FIRE FIGHTING TRAINING AREA NETC, NEWPORT, RHODE ISLAND, JULY 1997, PROJ. NO. 7578 CTO 288, BY BROWN & ROOT ENVIRONMENTAL, SOURCE: BASE PLAN BY GUERRIERE & HALNON, INC., DATED NOVEMBER 10, 1997, AND THE ADDITION OF FIELD MEASURED FEATURES, BY LOUIS FEDERICI AND ASSOCIATES 3/16/99, PRESENTED ON A DRAWING ENTITLED "KADY FIELD, TOPOGRAPHIC, SOIL SAMPLE LOCATION, AND SITE SURVEY AT THE OLD FIRE FIGHTING TRAINING AREA, NAVAL STATION NEWPORT IN NEWPORT, RHODE ISLAND FOR TETRA TECH NUS, INC., LOUIS FEDERICI & ASSOCIATES, 3/16/99, DWG NO. 990205-01.

2. HORIZONTAL DATUM BASE ON THE RI STATE PLANE COORDINATE SYSTEM NAD 1927. VERTICAL DATUM BASED ON NAVAL BASE MEAN LOW WATER.

3. ALL LOCATIONS ARE TO BE CONSIDERED APPROXIMATE.

4. PLAN NOT TO BE USED FOR DESIGN.

5. TOPOGRAPHY SHOWN PRE-DATES MOUND REMOVAL CONDUCTED IN 2004 AND 2005. SURFACE TOPOGRAPHY SHOULD BE CONSIDERED ESTIMATED.

PROPOSED ADDITIONAL BORINGS
OLD FIRE FIGHTING TRAINING AREA
NAVAL STATION NEWPORT, RHODE ISLAND

DRAWN BY:	D.W. MACDOUGALL	REV.:	0
CHECKED BY:	S. PARKER	DATE:	MARCH 10, 2005
SCALE:	AS NOTED	FILE NO.:	DWG\4152\3553\FIG_3.DWG

FIGURE 3

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TETRA TECH NUS, INC.	STANDARD OPERATING PROCEDURES	Number SA-2.5	Page 1 of 6
		Effective Date 09/03	Revision 3
		Applicability Tetra Tech NUS, Inc.	
		Prepared Earth Sciences Department	
Subject DIRECT PUSH TECHNOLOGY (GEOPROBE®/HYDROPUNCH™)		Approved D. Senovich	

TABLE OF CONTENTS

1.0 PURPOSE

The purpose of this procedure is to provide general reference information on Direct Push Technology (DPT). DPT is designed to collect soil, groundwater, and soil gas samples without using conventional drilling techniques. The advantage of using DPT over conventional drilling includes the generation of little or no drill cuttings, sampling in locations with difficult accessibility, reduced overhead clearance requirements, no fluid introduction during probing, and typical lower costs per sample than with conventional techniques. Disadvantages include a maximum penetration depth of approximately 15 to 40 feet in dense soils (although it may be as much as 60 to 80 feet in certain types of geological environments), reduced capability of obtaining accurate water-level measurements, and the inability to install permanent groundwater monitoring wells. The methods and equipment described herein are for collection of surface and subsurface soil samples and groundwater samples. Soil gas sampling is discussed in SOP SA-2.4.

2.0 SCOPE

This procedure provides information on proper sampling equipment and techniques for DPT. Review of the information contained herein will facilitate planning of the field sampling effort by describing standard sampling techniques. The techniques described shall be followed whenever applicable, noting that site-specific conditions or project-specific plans may require adjustments in methodology.

3.0 GLOSSARY

Direct Push Technology (DPT) - DPT refers to sampling tools and sensors that are driven directly into the ground without the use of conventional drilling equipment. DPT typically utilizes hydraulic pressure and/or percussion hammers to advance the sampling tools. A primary advantage of DPT over conventional drilling techniques is that DPT results in the generation of little or no investigation derived waste.

Geoprobe® - Geoprobe® is a manufacturer of a hydraulically-powered, percussion/probing machines utilizing DPT to collect subsurface environmental samples. Geoprobe® relies on a relatively small amount of static weight (vehicle) combined with percussion as the energy for advancement of a tool string. The Geoprobe® equipment can be mounted in a multitude of vehicles for access to all types of environmental sites.

HydroPunch™ - HydroPunch™ is a manufacturer of stainless steel and Teflon® sampling tools that are capable of collecting representative groundwater and/or soil samples without requiring the installation of a groundwater monitoring well or conventional soil boring. HydroPunch™ is an example of DPT sampling equipment.

Flame Ionization Detector (FID) - A portable instrument for the measurement of many combustible organic compounds and a few inorganic compounds in air at parts-per million levels. The basis for the detection is the ionization of gaseous species utilizing a flame as the energizing source.

Photo Ionization Detector (PID) - A portable instrument for the measurement of many combustible organic compounds and a few inorganic compounds in air at parts-per million levels. The basis for the detection is the ionization of gaseous species utilizing ultraviolet radiation as the energizing source.

4.0 RESPONSIBILITIES

Project Manager - The Project Manager is responsible for selecting and/or reviewing the appropriate DPT drilling procedure required to support the project objectives.

Field Operations Leader (FOL)- The FOL is primarily responsible for performing the DPT in accordance with the project-specific plan.

5.0 SOIL SAMPLING PROCEDURES

5.1 General

The common methodology for the investigation of the vadose zone is soil boring drilling and soil sampling. However, drilling soil borings can be very expensive. Generally the advantage of DPT for subsurface soil sampling is the reduced cost of disposal of drilling cuttings and shorter sampling times.

5.2 Sampling Equipment

Equipment needed for conducting DPT drilling for subsurface soil sampling includes, but is not limited to, the following:

- Geoprobe® Sampling Kit
- Cut-resistant gloves
- 4-foot x 1.5-inch diameter macrocore sampler
- Probe sampling adapters
- Roto-hammer with 1.5-inch bit
- Disposable acetate liners for soil macrocore sampler
- Cast aluminum or steel drive points
- Geoprobe® AT-660 Series Large Bore Soil Sampler, or equivalent
- Standard decontamination equipment and solutions

For health and safety equipment and procedures, follow the direction provided in the Safe Work Permit in Attachment 1, or the more detailed directions provided in the project's Health and Safety Plan.

5.3 DPT Sampling Methodology

There are several methods for the collection of soil samples using DPT drilling. The most common method is discussed in the following section. Variations of the following method may be conducted upon approval of the Project Manager in accordance with the project-specific plan.

- Macrocore samplers fitted with detachable aluminum or steel drive points are driven into the ground using hydraulic pressure. If there is concrete or pavement over a sampling location, a Roto-hammer is used to drill a minimum 1.5-inch diameter hole through the surface material. A Roto-hammer may also be used if very dense soils are encountered.

- The sampler is advanced continuously in 4-foot intervals or less if desired. No soil cuttings are generated because the soil which is not collected in the sampler is displaced within the formation.

- The sampler is retracted from the hole, and the 4-foot continuous sample is removed from the outer coring tube. The sample is contained within an inner acetate liner.

- Attach the metal trough from the Geoprobe® Sampling Kit firmly to the tail gate of a vehicle. If a vehicle with a tail gate is not available, secure the trough on another suitable surface.

- Place the acetate liner containing the soils in the trough.

- While wearing cut-resistant gloves (constructed of leather or other suitable material), cut the acetate liner through its entire length using the double-bladed knife that accompanies the Geoprobe® Sampling Kit. Then remove the strip of acetate from the trough to gain access to the collected soils. Do not attempt to cut the acetate liner while holding it in your hand.

- Field screen the sample with an FID or PID, and observe/examine the sample (according to SOP GH-1.3). If appropriate, transfer the sample to sample bottles for laboratory analysis. If additional volume is required, push an additional boring adjacent to the first and composite/mix the same interval. Field compositing is usually not acceptable for sample requiring volatile organics analysis.

- Once sampling has been completed, the hole is backfilled with bentonite chips or bentonite cement grout, depending upon project requirements. Asphalt or concrete patch is used to cap holes through paved or concrete areas. All holes should be finished smooth to existing grade.

- In the event the direct push van/truck cannot be driven to a remote location or a sampling location with difficult accessibility, sampling probes may be advanced and sampled manually or with air/electric operated equipment (e.g., jack hammer).

- Sampling equipment is decontaminated prior to collecting the next sample.

6.0 GROUNDWATER SAMPLING PROCEDURES

6.1 General

The most common methodology for the investigation of groundwater is the installation and sampling of permanent monitoring wells. If only groundwater screening is required, the installation and sampling of temporary well points may be performed. The advantage of temporary well point installation using DPT is reduced cost due to no or minimal disposal of drilling cuttings and well construction materials, and shorter installation/times sampling.

Two disadvantages of DPT drilling for well point installation are:

- In aquifers with low yields, well points may have to be sampled without purging or development.
- If volume requirements are high, this method can be time consuming for low yield aquifers.

6.2 Sampling Equipment

Equipment needed for temporary well installation and sampling using DPT includes, but is not limited, to the following:

- 2-foot x 1-inch diameter mill-slotted (0.005 to 0.02-inch) well point
- Connecting rods
- Roto-hammer with 1.5-inch bit
- Mechanical jack
- 1/4-inch OD polyethylene tubing
- 3/8-inch OD polyethylene tubing
- Peristaltic pump
- Standard decontamination equipment and solutions

6.3 DPT Temporary Well Point Installation and Sampling Methodology

There are several methods for the installation and sampling of temporary well points using DPT. The most common methodology is discussed below. Variations of the following method may be conducted upon approval of the Project Manager in accordance with the project specific plan.

- A 2-foot x 1-inch diameter mill-slotted (0.005 to 0.02-inch) well point attached to connecting rods is driven into the ground to the desired depth using a rotary electric hammer or other direct push drill rig. If there is concrete or pavement over a sampling location, a Roto-hammer or electric coring machine is used to drill a hole through the surface material.

- The well point will be allowed to equilibrate for at least 15 minutes, after which a measurement of the static water level will be taken. The initial measurement of the water level will be used to assess the amount of water which is present in the well point and to determine the amount of silt and sand infiltration that may have occurred.

- The well point will be developed using a peristaltic pump and polyethylene tubing to remove silt and sand which may have entered the well point. The well point is developed by inserting polyethylene tubing to the bottom of the well point and lifting and lowering the tubing slightly while the pump is operating. The pump will be operated at a maximum rate of approximately 2 liters per minute. After removal of sediment from the bottom of the well point, the well point will be vigorously pumped at maximum capacity until discharge water is visibly clear and no further sediments are being generated. Measurements of pH, specific conductance, temperature, and turbidity shall be recorded every 5 to 10 minutes during the purging process. After two consistent readings of pH, specific conductance, temperature and turbidity (± 10 percent), the well may be sampled.

- A sample will be collected using the peristaltic pump set at the same or reduced speed as during well development. Samples (with the exception of the samples to be analyzed for volatile organic compounds, VOCs) will be collected directly from the pump discharge. Sample containers for VOCs will be filled by (first shutting off the pump) crimping the discharge end of the sample tubing when filled, removing the inlet end of the sample tubing from the well, suspending the inlet tubing above the vial, and allowing water to fill each vial by gravity flow.

- Once the groundwater sample has been collected, the connecting rods and well point will be removed from the hole with the direct push rig hydraulics. The hole will be backfilled with bentonite chips or bentonite cement grout, depending upon project requirements. Asphalt or concrete patch will be used to cap holes through paved or concrete areas. All holes will be finished smooth to existing grade.

- In the event the direct push van/truck cannot be driven to a remote location or sampling location with difficult accessibility, sampling probes may be advanced and sampled manually or with air/electric-operated equipment (e.g., jack hammer).

- Decontaminate the equipment before moving to the next location.

7.0 RECORDS

A record of all field procedures, tests, and observations must be recorded in the field logbook, boring logs, and sample log sheets, as needed. Entries should include all pertinent data regarding the investigation. The use of sketches and field landmarks will help to supplement the investigation and evaluation.

ATTACHMENT 1
SAFE WORK PERMIT FOR DPT OPERATIONS

Permit No. _____ Date: _____ Time: From _____ to _____

SECTION I: General Job Scope

I. Work limited to the following (description, area, equipment used): **Monitoring well drilling and installati n through direct push technology**

II. Required Monitoring Instruments: _____

III. Field Crew: _____

_____

IV. On-site Inspection conducted ☒ Yes ☐ No Initials of Inspector _____ _____
TtNUS

SECTION II: General Safety Requirements (To be filled in by permit issuer)

V. Protective equipment required

Level D ☒ Level B ☐
Level C ☐ Level A ☐
Detailed on Reverse

Respiratory equipment required

Full face APR	☐	Escape Pack	☐
Half face APR	☐	SCBA	☐
SKA-PAC SAR	☐	Bottle Trailer	☐
Skid Rig	☐	None	☒

Level D Minimum Requirements: Sleeved shirt and long pants, safety footwear, and work gloves. Safety glasses, hard hats, and hearing protection will be worn when working near or sampling in the vicinity of the DPT rig.

_____

Modifications/Exceptions.

VI. Chemicals of Concern _____ Action Level(s) _____ Response Measures _____

VII. Additional Safety Equipment/Procedures

Hard-hat	☒ Yes	☐ No	Hearing Protection (Plugs/Muffs)	☒ Yes	☐ No
Safety Glasses	☒ Yes	☐ No	Safety belt/harness	☐ Yes	☒ No
Chemical/splash goggles	☐ Yes	☒ No	Radio	☐ Yes	☒ No
Splash Shield	☐ Yes	☒ No	Barricades	☒ Yes	☐ No
Splash suits/coveralls	☐ Yes	☐ No	Gloves (Type - _____)	☐ Yes	☐ No
Steel toe Work shoes or boots	☒ Yes	☐ No	Work/warming regimen	☐ Yes	☐ No

Modifications/Exceptions: Reflective vests for high traffic areas.

VIII. Procedure review with permit acceptors

	Yes	NA		Yes	NA
Safety shower/eyewash (Location & Use)	☐	☒	Emergency alarms	☐	☐
Daily tail gate meetings	☒	☐	Evacuation routes	☐	☐
Contractor tools/equipment/PPE inspected	☐	☐	Assembly points	☐	☐

IX. Site Preparation

Utility Clearances obtained for areas of subsurface investigation	☐ Yes	☐ No
Physical hazards removed or blockaded	☐ Yes	☐ No
Site control boundaries demarcated/signage	☐ Yes	☐ No

X. Equipment Preparation

	Yes	NA
Equipment drained/depressurized	☐	☒
Equipment purged/cleaned	☐	☒
Isolation checklist completed	☐	☒
Electrical lockout required/field switch tested	☐	☒
Blinds/misalignments/blocks & bleeds in place	☐	☒
Hazardous materials on walls/behind liners considered	☐	☒

XI. Additional Permits required (Hot work, confined space entry) ☐ Yes ☐ No
If yes, complete permit required or contact Health Sciences, Pittsburgh Office

XII. Special instructions, precautions:

_____

_____

Permit Issued by: _____ Permit Accepted by: _____