

**ADDENDUM NO. 3  
TELECOMMUNICATION SYSTEMS RELOCATION  
AT THE  
DELAWARE ARMY NATIONAL GUARD RIVER ROAD TRAINING FACILITY  
1197 RIVER ROAD, NEW CASTLE DE 19720  
DEARNG CONTRACT NO. 05-2014  
FE&ES Comm.: 14-1129A  
Date of Issue: September 12, 2014**

- 1.0 This Addendum, Addendum No. 3, shall be made part of the Project Manual and Drawings dated August 8, 2014 for the Telecommunication Systems Relocation at the Delaware Army National Guard River Road Training Facility.
- 2.0 Any provision in any of the Contract Documents which may be in conflict or be inconsistent with the contents of this Addendum shall be void to the extent of such conflicts or inconsistency.
- 3.0 Bid Date has not changed. Sealed bids for DEARNG **Contract No. 05-2014** – Telecommunication Systems Relocation At The Delaware Army National Guard River Road Training Facility 1197 River Road, New Castle De 19720 will be received by the Delaware Army National Guard at the Security Officers desk in the Main Lobby of the Armed Forces Reserve Center located at 250 Airport Road, New Castle, Delaware, 19720-1502, until **1:00 PM local time on Thursday, September 18, 2014**, at which time they will be publicly opened and read aloud in the Multipurpose Room located next to the main lobby. Valid driver's license will be required for site access, front desk where all visitors are required to sign in at the Security Desk. Bidder bears the risk of late delivery. Any bids received after the stated time will be returned unopened. **Contractors are reminded to provide ample time to gain access to this secure site.**
- 4.0 Changes to prior Addenda
  - 4.1. There are no Changes to prior Addenda.
- 5.0 Changes to Specifications
  - 5.1 Appendix E: **Add** new Appendix E containing the Geotechnical Report.

A geotechnical report has been prepared for this Project and is available for information only. The opinions expressed in this report are those of the geotechnical engineer and represent interpretations of subsoil conditions, tests, and results of analyses conducted by the geotechnical engineer. Owner will not be responsible for interpretations or conclusions drawn from this data. Contractor shall make additional test borings and conduct other exploratory operations necessary for dewatering.

In the event of a conflict between the recommendations identified in the report and the project specifications, not clarified by Addendum, refer to Specification Section 00 73 13 Article 1.2.4.

- 6.0 Changes to Drawings:
  - 6.1 There are no Changes to Drawings.

## 7.0 Questions/Clarifications

- Q1: There is no work designated for Bldg.# 24A on the matrix on sheet E-6. Are we to assume that there is sufficient rack and housing space for the terminations of the copper, coax and fiber? Will the terminations be done as part of a cutover by others or shall we provide time and material for the terminations?
- A1: Provide new rack and housing space for new equipment being terminated in this Building. All terminations will be completed as part of this contract.
- Q2: Could you please clarify the work to be completed in Bldg. # 24a. Are there any racks, fiber panels or copper termination protection to be installed or will new cables be terminated on existing facilities? There is no work shown on the matrix found on page E-6.
- A2: Refer to Q1 above.
- Q3: I cannot find anything in the DTI document (Addendum A) that deals with coax 625 hard line cable or it's termination.
- A3: Refer to Addendum #2, A1. Coaxial 625 services are required by UFC-3-580-01 and can be found on PDF Page 20 of Appendix B. All terminations must be compatible with this cable.
- Q4: Per the chart on drawing E-6 the multimode fiber for the 12 strand is listed as 50/125 but there is no listing for the 72 multimode fiber. Due to the distance called out approx. 3300 feet could you please clarify what type of multi-mode is required on the run? The last page of section 27-53 33 Appendix A list the 72 strand multi-mode to be 50um 10gig@550 meters which is correct?
- A4: The 12 strand and 72 strand multimode is to be of the same material, 50/125 micron to comply with UFC-3-580-01.
- Q5: Will there be a location onsite for the disposal of excess soil?
- A5: Refer to Addendum #1.
- Q6: Would there be flexibility in the pipe alignment? Specifically the run from CMH 6 to CMH 9 and CMH 9 to CMH 9A would be difficult to have concrete delivered with the pipe alignment per the plans?
- A6: Conduit routing shall be as shown on the drawings.

- Q7: Addendum 1 states that upon completion a two year warranty is required on work and materials beginning on the date of substantial completion. For the State of Delaware Certified cabling Contractors that must be used for the fiber and cabling portions of this contract will the 25 year performance and 15 year manufacturer's parts and labor warranty apply as it does under the State of Delaware Contract NO GSS13441-DATA-Cabling?
- A7: The required warranty to be provided by the telecommunication contractor under Contract GSS13441-DATA-Cabling will be strictly enforced. The 2 year warranty is for all work under the project. The 25/15 year warranties will commence concurrently on the date of Substantial Completion.

**END OF ADDENDUM #3**

**Note: No further addenda will be issued unless the bid date is extended.**

EF/ef  
14-1129A Add No 3

cc: All Registered Plan Holders  
P File

September 11, 2014

CPT. Eugene Bledsoe  
AFRC  
DEARNG/FMO  
250 Airport Road  
New Castle, DE 19720

RE: Project No. 2487.GW  
Subsurface Evaluation  
Telecommunication Systems Relocation  
River Road Training Facility  
New Castle, Delaware

Dear CPT. Bledsoe:

Duffield Associates, Inc. (Duffield Associates) has completed our subsurface evaluation for the proposed underground communication duct banks at the Delaware Army National Guard (DEARNG) River Road Training Facility (RRTF) in New Castle, Delaware. The following report summarizes the data obtained by our field program in the vicinity of the proposed communication duct banks. These services were provided in general accordance with our agreement dated June 10, 2014, revised August 28, 2014.

To assist with the preparation of this proposal, Duffield Associates was provided with a set of drawings titled "State of Delaware, Delaware Army National Guard, Telecommunication Systems Relocation at the River Road Training Facility, 1197 River Road, New Castle, Delaware 19720, DEARNG Project No.: 05-2014," prepared by Davis, Bowen & Friedel, Inc., dated August 8, 2014. Based on the information provided and our understanding of the project, the project includes the construction of approximately 5,500 linear feet of duct bank for communication lines prior to the proposed construction of two structures. Based on recent discussions with Fayda Engineering & Engineering Solutions, LLC, we understand that several of the below-grade duct bank and manhole structures are proposed to be installed to depths of up to 12 feet below the existing ground surface. The site of the proposed development is at the RRTF, located on Route 9 in New Castle, Delaware.

## **I. PREVIOUS SUBSURFACE EVALUATION**

Duffield Associates previously performed a Geotechnical Evaluation for the 1049<sup>th</sup> Parking Lot located to the south of the Recruiting Building, as summarized in our report titled "Geotechnical Evaluation, 1049<sup>th</sup> Parking Lot, River Road Facility," dated June 11, 2012. A total of six test pits (TP-1 to TP-6) were performed, extending to depths of up to 10 feet below the ground surface. The previous test pit locations are indicated on the location sketch enclosed with this report. Test pit logs from the previous evaluation are also included.

## II. FIELD TESTING PROGRAM

Ten test borings (TB-1 to TB-10) were performed in the general vicinity of the proposed communications duct banks at locations marked in the field by Duffield Associates' representative, as shown on the provided test boring location sketch. Duffield Associates contacted Miss Utility for delineation of utilities in the public "right-of-way" prior to drilling.

The following table summarizes the test borings performed.

Test Boring No.	Approximate Depth of Test Boring (feet)	Approximate Groundwater Depth During Drilling (feet) <sup>[1]</sup>	Approximate Groundwater Depth at Completion (feet) <sup>[2]</sup>
TB-1	10	Not Observed	Caved and Dry
TB-2	30	Not Observed	Caved and Dry
TB-3	10	4.4	5.7
TB-4	10	Not Observed	Caved and Dry
TB-5	25	Not Observed	Caved and Dry <sup>[3]</sup>
TB-6	10	8.8	Caved and Dry
TB-7	10	Not Observed	Caved and Dry
TB-8	25	Not Observed	Caved and Dry <sup>[3]</sup>
TB-9	10	Not Observed	Caved and Dry
TB-10	30	17.8	17.2

- Notes:
1. Groundwater levels during drilling were measured through the augers.
  2. Groundwater levels at completion were measured after removal of the augers.
  3. Boreholes for TB-5 and TB-8 were left open for approximately 20 hours, and no groundwater was observed prior to backfilling.

The test borings were performed by CGC Geoservices, LLC, an affiliate company of Duffield Associates, utilizing a truck-mounted drill rig. Duffield Associates' representative reviewed the samples obtained by the drillers. Conditions encountered during the performance of the test borings are summarized on the enclosed test boring logs. At completion of the excavations, the test borings were backfilled with the auger cuttings. Further restoration of the test boring locations was beyond the scope of work performed for this evaluation. However, additional settlement of the materials backfilled in the test borings may occur, resulting in a depression or hole in the ground surface. Consequently, future maintenance and restoration of the site may be required.

### III. SUBSURFACE CONDITIONS

Beneath a surficial layer of topsoil and fill, the underlying stratum observed in the test borings generally consisted of soft to stiff consistency silt with varying amounts of sand and organics. This layer was generally observed to depths of 3 to 10 feet below the existing ground surface (b.e.g.s.). Below the silt layer, varicolored stiff clay was observed to the extent of the borings with the exception of TB-1 to TB-3, TB-5, and TB-8. In test borings TB-1 to TB-3, an approximately 2 to 5-foot-thick medium density sand layer was observed between the silt and clay layers. In test borings TB-5 and TB-8, medium density sand with varying amounts of silt was observed beneath the silt layer and extended to the extent of the borings.

Groundwater was observed in the test borings at depths ranging from 4.4 to 17.8 feet b.e.g.s. in test borings TB-3, TB-6, and TB-10, and was not observed in the remaining test borings. The boreholes for test borings TB-5 and TB-8 were each extended to depths of up to 25 feet below the ground surface and allowed to remain open for approximately 20 hours. Groundwater was not observed in the boreholes after approximately 20 hours.

Groundwater levels at the site will be affected by seasonal and annual variations in precipitation. It is estimated that variations in groundwater levels several feet higher or lower than those observed during this evaluation could be experienced during extreme variations in precipitation. Groundwater mapping by DGS and the current State of Delaware, Department of National Resources and Environmental Control (DNREC) well permit database indicates average groundwater levels in "normal" or "dry" conditions may be in the range of approximately 3 to 20 feet b.e.g.s., and in the range of 3 to 16 feet b.e.g.s. in "wet" conditions. The reported depth to groundwater decreases closer to the Delaware River. Where groundwater was encountered in the test borings, the conditions observed generally appeared consistent with the available data under "dry" conditions. However, the conditions were variable and groundwater was not observed in seven of the ten test borings. Due to the presence of silt lenses and shallow silt soils, it is likely that localized perched or confined groundwater conditions at shallower depths than those observed may be encountered during excavations.

### IV. RECOMMENDATIONS

Based on the information provided and data obtained in the field, the following recommendations are presented:

#### A. DESIGN

1. **Subsurface Conditions.** Based on the subsurface data obtained during this evaluation, it is Duffield Associates' opinion that the site soils are generally suitable for supporting the proposed communication duct banks. Structural fill, placed over firm soils and compacted, is also considered suitable for supporting the duct bank.



2. **Site Grading.** Site grading should be designed to provide positive drainage away from the proposed utility excavation. Positive site drainage should be maintained throughout the construction activities.

B. CONSTRUCTION

1. **Construction Review.** It is recommended that all earthworks, including backfill placement and compaction, be reviewed by a qualified geotechnical engineer familiar with the recommendations of this report.
2. **Trench Subgrade Review.** All duct banks should be poured on firm, dry, non-frozen subgrade. Trench excavations should be reviewed by a qualified technician working under the supervision of a geotechnical engineer who is familiar with the recommendations of this report. Subgrade review should be performed prior to the placement of the duct bank bedding material and concrete, and should verify the presence of medium density sand or stiff consistency clay or silt, and uniform load supporting conditions. If these conditions are not encountered at the proposed utilities elevations, additional excavation should be performed until they are uniformly encountered across the base, if acceptable to the project geotechnical engineer, densified in place. Subgrade undercut areas should be backfilled with structural fill, as recommended herein.
3. **Re-Use of On-Site Soils for Backfill.** Based on the results of our field program, it is Duffield Associates' opinion that on-site soils free of organic material, debris, rock fragments in excess of 1 inch in their largest dimension, and containing less than 25% by dry weight passing a No. 200 sieve may be considered suitable for use as DelDOT Type C Borrow. The shallow silt soils, sand soils containing more than 25% by dry weight passing the No. 200 sieve, and the deeper clay soils layer do not meet the specification for DelDOT Type C Borrow. Onsite soils free of organic material, debris, and rock fragments in excess of 6 inches in their longest dimension may be considered suitable for use as DelDOT Type F Common Borrow. Soils containing perched surficial water or deep soil excavated near the groundwater table may be too wet to compact and, therefore, may require some drying.

If sufficient quantities of suitable on-site soils are not available as structural fill, imported borrow consisting of predominately granular soils should be utilized. AASHTO SP 57 stone could also be utilized as structural fill where approved by the project engineer, and should be considered for localized relatively deep fills, such as undercuts or where drainage fill is required.

4. **Compaction Requirements.** Structural fill utilized for backfill of the trenches excavation should be placed in loose lifts with a maximum thickness of 8 inches. Each lift of fill, placed within the duct bank trench excavation should be compacted in accordance with the project specifications. DelDOT's "Standard Specifications for Construction and Materials," dated August 2001 (revised July 21, 2014), indicates fill placed in pavement areas should be compacted at least 95% of the maximum dry density and fill for utility trenches located outside of pavement areas should be compacted to at least 90% of the maximum dry density, as determined by the Standard Proctor Test, as determined by the Standard Proctor Test (ASTM D 698).

The placement and compaction of structural fill should be monitored on a full-time basis by a qualified technician under the supervision of a geotechnical engineer.

5. **Groundwater Control.** Groundwater was encountered in three test borings at varying depths and, in some locations, above the proposed utility invert elevations. It is recommended that groundwater be controlled during construction to maintain a groundwater level of a minimum of 2 feet below the base of the excavations. Typical groundwater control methods may include a localized sumping and well point systems. The actual method of groundwater control selected by the contractor should be established prior to excavation.
6. **Protection of Subgrade Soils.** If duct bank trench excavations are left open, precipitation may result in the collection of water within the excavation. Provisions for removal of water by drainage or sumping are recommended. Subgrade soils disturbed by precipitation and construction traffic should be either scarified and recompacted or undercut and replaced with structural fill, as previously discussed.
7. **Excavation Safety.** All utility excavations should be performed in accordance with OSHA guidelines. Typically, predominately granular soils can be characterized by OSHA CFR Part 1926 Excavation Standards as Type C soils. Silt soils can be characterized by OSHA CFR Part 1926 Excavation Standards as Type B soils. Should it be required, all temporary sheeting and shoring should be designed by a qualified engineer registered in the State of Delaware.
8. **Subsurface Data.** All contractors interested in bidding on phases of this work, which involve subsurface conditions, should be given full access to this report so that they can develop their own interpretations of the available data.



These observations and recommendations have been prepared according to generally accepted soil engineering standards and are based on the conditions encountered by the sampling performed at the site. It is noted that, although soil quality has been inferred from the interpolation of the sampling data, subsurface conditions beyond the sampling points are, in fact, unknown. As a result, these observations may require modifications based on the conditions encountered and exposed during further field exploration or construction. Should any conditions encountered during construction differ from those described in this report, this office should be notified immediately in order to review, and possibly modify, these observations.

We appreciate this opportunity to be of service to you. Should you have any questions concerning this evaluation, please do not hesitate to contact us.

Very truly yours,

DUFFIELD ASSOCIATES, INC.



Joseph Jakubowski, P.E., LEED AP  
Geotechnical Section Manager

MAE/JJ:jst

WORD\2487GW.0914-DEARNG\_COMMDUCTBANK.RPT

Enclosures: DEARNG Proposed 1049<sup>th</sup> Parking Lot Test Pit Location Sketch  
DEARNG Proposed 1049<sup>th</sup> Parking Lot Test Pit Logs (6)  
Telecommunication Systems Relocation Test Boring Location Sketch  
Telecommunication Systems Relocation Test Boring Logs (10)  
General Notes

# **DEARNG PROPOSED 1049<sup>TH</sup> PARKING LOT TEST PIT LOCATION SKETCH**


**KEY:**

TP-1

APPROXIMATE TEST PIT LOCATION

**NOTE:**

1. THIS SKETCH ADAPTED FROM A 2002 MR. SID AERIAL IMAGE.

DATE: 2 JUNE 2008	TEST PIT LOCATION SKETCH	DESIGNED BY: DMA	 5400 LIMESTONE ROAD WILMINGTON, DE 19808-1232 TEL. (302)239-6634 FAX (302)239-8485 OFFICES IN PHILADELPHIA, PA AND GEORGETOWN, DE E-MAIL: DUFFIELD@DUFFNET.COM
SCALE: NTS	<b>DEARNG PROPOSED 1049TH PARKING LOT</b>	DRAWN BY: MAS	
PROJECT NO. 2487.GI		CHECKED BY:	
SHEET: FIGURE 2		FILE: A-2487GI-02	

Addendum No. 3  
 NEW CASTLE ~ NEW CASTLE COUNTY ~ DELAWARE  
 Telecommunication Systems Relocation

At The Delaware Army National Guard River Road Training Facility

# **DEARNG PROPOSED 1049<sup>TH</sup> PARKING LOT TEST PIT LOGS (6)**



## TEST PIT DESCRIPTIVE LOG

PROJECT: Proposed 1049<sup>th</sup> Parking Lot

PROJECT NO.: 2487.GI

CLIENT: Delaware Army National Guard

DATE: 05/21/08

LOGGED BY: GRM

<u>Test Pit No.</u>	<u>Depth Range (feet below existing ground surface)</u>	<u>Generalized Soil Description</u>
TP – 1	0 – 1	Dark brown, sandy TOPSOIL
	1 – 6½	Brown, orange-brown, gray clayey SILT, trace fine sand, (moist), (slightly mottled throughout); USCS: ML <u>Sample Depth = 2 feet:</u> <ul style="list-style-type: none"> <li>Percent Passing #200 Sieve: 98.6%</li> <li>Moisture Content: 19.2%</li> </ul>
	6½ – 8	Orange-brown, orange, gray fine to medium SAND, little to some silt, (moist); USCS" SM
	8 – 9	Orange-brown, orange, gray clayey SILT, some to "and" fine sand, trace gravel (moist); USCS: ML
	9 – ---	Gray, purple, orange, brown silty CLAY, trace fine sand, (moist); USCS: CL

**NOTES:**

- (1) Ground surface elevation not provided.
- (2) Test pit excavated by rubber-tired backhoe provided and operated by Feldmann Brothers, Inc.
- (3) Test pit terminated approximately 10 feet below the existing ground surface (b.e.g.s.).
- (4) Groundwater seepage not observed.
- (5) Sidewall caving not observed.
- (6) Soil descriptions & classifications according to ASTM D2488 (Visual-Manual Procedure).

WORD\2487GI.0508-Test Pit Logs



## TEST PIT DESCRIPTIVE LOG

PROJECT: Proposed 1049<sup>th</sup> Parking Lot

PROJECT NO.: 2487.GI

CLIENT: Delaware Army National Guard

DATE: 05/21/08

LOGGED BY: GRM

<u>Test Pit No.</u>	<u>Depth Range (feet below existing ground surface)</u>	<u>Generalized Soil Description</u>
TP – 2	0 – ¾	TOPSOIL and apparent No. 57 stone
	¾ – 6	Orange-brown, brown, gray clayey SILT, trace fine sand, (moist), (slightly mottled throughout), (sandy lenses); USCS: ML <u>Sample Depth = 2 feet:</u> <ul style="list-style-type: none"> <li>• Percent Passing #200 Sieve: 98.3%</li> <li>• Moisture Content: 20.1%</li> <li>• Liquid Limit = 28</li> <li>• Plasticity Index = 5</li> </ul>
	6 – 8	Gray, purple orange, brown silty CLAY, trace fine sand, (moist); USCS: CL
	8 – ---	Red, brown, orange, white, black CLAY and ROCK FRAGMENTS, trace fine to coarse sand, (moist to wet), (2' diameter boulder at 8' b.e.g.s.); USCS: CL

## NOTES:

- (1) Ground surface elevation not provided.
- (2) Test pit excavated by rubber-tired backhoe provided and operated by Feldmann Brothers, Inc.
- (3) Test pit terminated approximately 10 feet below the existing ground surface (b.e.g.s.).
- (4) Groundwater seepage observed at approximately 7 feet b.e.g.s.
- (5) Sidewall caving not observed.
- (6) Soil descriptions & classifications according to ASTM D2488 (Visual-Manual Procedure).

WORD\2487GI.0508-Test Pit Logs





## TEST PIT DESCRIPTIVE LOG

PROJECT: Proposed 1049<sup>th</sup> Parking Lot

PROJECT NO.: 2487.GI

CLIENT: Delaware Army National Guard

DATE: 05/21/08

LOGGED BY: GRM

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<u>Test Pit No.</u>	<u>Depth Range (feet below existing ground surface)</u>	<u>Generalized Soil Description</u>
TP – 3	0 – ¾	TOPSOIL and apparent crushed aggregate
	¾ – 3	Orange-brown clayey SILT and fine sand, (possible fill), (moist); USCS: ML <u>Sample Depth = 2 feet:</u> <ul style="list-style-type: none"> <li>• Percent Passing #200 Sieve: 55.2%</li> <li>• Moisture Content: 16.9%</li> </ul>
	3 – 6	Orange-brown, orange, gray clayey SILT, trace fine sand, (moist); USCS: ML
	6 – ---	Orange, light orange fine SAND, trace to little silt, trace gravel, (moist to wet)USCS: SM

**NOTES:**

- (1) Ground surface elevation not provided.
- (2) Test pit excavated by rubber-tired backhoe provided and operated by Feldmann Brothers, Inc.
- (3) Test pit terminated approximately 10½ feet below the existing ground surface (b.e.g.s.).
- (4) Groundwater seepage observed at approximately 7 feet b.e.g.s.
- (5) Sidewall caving observed at approximately 6 feet b.e.g.s.
- (6) Soil descriptions & classifications according to ASTM D2488 (Visual-Manual Procedure).

WORD\2487GI.0508-Test Pit Logs



## TEST PIT DESCRIPTIVE LOG

PROJECT: Proposed 1049<sup>th</sup> Parking Lot

PROJECT NO.: 2487.GI

CLIENT: Delaware Army National Guard

DATE: 05/21/08

LOGGED BY: GRM

<u>Test Pit No.</u>	<u>Depth Range (feet below existing ground surface)</u>	<u>Generalized Soil Description</u>
TP – 4	0 – 1	Dark brown, sandy TOPSOIL
	1 – 4	FILL: Brown, orange-brown, clayey silt, some fine sand, trace cobbles, trace debris (metal wire at approximately 2' b.e.g.s.), (moist to wet); USCS: ML <u>Sample Depth = 2 feet:</u> <ul style="list-style-type: none"> <li>Percent Passing #200 Sieve: 77.8%</li> <li>Moisture Content: 23.4%</li> </ul>
	4 – 6	Red, orange, gray, brown SILT, some to "and" rock fragments, little fine to coarse sand, (moist); USCS: ML
	6 – 9	Red, orange, gray, fine SAND, little to some silt, (moist); USCS: SM
	9 – ---	Light gray, orange silty CLAY, trace fine sand, (moist); USCS: CL

## NOTES:

- (1) Ground surface elevation not provided.
- (2) Test pit excavated by rubber-tired backhoe provided and operated by Feldmann Brothers, Inc.
- (3) Test pit terminated approximately 10 feet below the existing ground surface (b.e.g.s.).
- (4) Groundwater seepage observed at approximately 9 feet b.e.g.s.
- (5) Sidewall caving not observed.
- (6) Soil descriptions & classifications according to ASTM D2488 (Visual-Manual Procedure).

WORD\2487GI.0508-Test Pit Logs



## TEST PIT DESCRIPTIVE LOG

PROJECT: Proposed 1049<sup>th</sup> Parking Lot

PROJECT NO.: 2487.GI

CLIENT: Delaware Army National Guard

DATE: 05/21/08

LOGGED BY: GRM

<u>Test Pit No.</u>	<u>Depth Range (feet below existing ground surface)</u>	<u>Generalized Soil Description</u>
TP – 5	0 – ½	Dark brown, sandy TOPSOIL
	½ – 3½	Orange-brown, orange clayey SILT, trace fine sand, (moist); USCS: ML <u>Sample Depth = 2 feet:</u> <ul style="list-style-type: none"> <li>• Percent Passing #200 Sieve: 94.5%</li> <li>• Moisture Content: 25.5%</li> </ul>
	3½ – 6	Orange, light orange, gray, brown fine SAND, little gravel, trace to little silt, (wet); USCS: SM
	6 – 7	Light gray, white fine SAND, trace silt, (wet); USCS: SP, SP-SM
	7 – ---	Light gray, light orange fine SAND, trace silt, (wet); USCS: SP, SP-SM

**NOTES:**

- (1) Ground surface elevation not provided.
- (2) Test pit excavated by rubber-tired backhoe provided and operated by Feldmann Brothers, Inc.
- (3) Test pit terminated approximately 10 feet below the existing ground surface (b.e.g.s.).
- (4) Groundwater seepage observed at approximately 4½ feet b.e.g.s.
- (5) Sidewall caving observed at approximately 4½ feet b.e.g.s.
- (6) Soil descriptions & classifications according to ASTM D2488 (Visual-Manual Procedure).

WORD\2487GI.0508-Test Pit Logs



## TEST PIT DESCRIPTIVE LOG

PROJECT: Proposed 1049<sup>th</sup> Parking Lot

PROJECT NO.: 2487.GI

CLIENT: Delaware Army National Guard

DATE: 05/21/08

LOGGED BY: GRM

<u>Test Pit No.</u>	<u>Depth Range (feet below existing ground surface)</u>	<u>Generalized Soil Description</u>
TP – 6	0 – 1	Dark brown, sandy TOPSOIL
	1 – 1½	Dark brown, black sandy TOPSOIL
	1½ – 3	Brown clayey SILT, trace fine sand, (moist); USCS: ML <u>Sample Depth = 2 feet:</u> <ul style="list-style-type: none"> <li>• Percent Passing #200 Sieve: 94.7%</li> <li>• Moisture Content: 25.8%</li> <li>• Liquid Limit = 35</li> <li>• Plasticity Index = 11</li> </ul>
	3 – ---	Orange-brown, gray clayey SILT, trace fine sand, (moist), (slightly mottled throughout); USCS: ML

**NOTES:**

- (1) Ground surface elevation not provided.
- (2) Test pit excavated by rubber-tired backhoe provided and operated by Feldmann Brothers, Inc.
- (3) Test pit terminated approximately 10 feet below the existing ground surface (b.e.g.s.).
- (4) Groundwater seepage not observed.
- (5) Sidewall caving not observed.
- (6) Soil descriptions & classifications according to ASTM D2488 (Visual-Manual Procedure).

WORD\2487GI.0508-Test Pit Logs

# **TELECOMMUNICATION SYSTEMS RELOCATION TEST BORING LOCATION SKETCH**



Appendix E



KEY:



APPROXIMATE TEST BORING LOCATION

NOTE:

THIS SKETCH IS ADAPTED FROM A DRAWING TITLED "TELECOMMUNICATION SYSTEMS RELOCATION AT THE DELAWARE NATIONAL GUARD RIVER ROAD TRAINING FACILITY," PREPARED BY FAYDA ENGINEERING & ENERGY SOLUTIONS, LLC, DATED AUGUST 8, 2014. Addendum No. 3

Telecommunication Systems Relocation

At The Delaware Army National Guard River Road Training Facility

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DESIGNED BY:	JJ
DRAWN BY:	MAE
CHECKED BY:	JJ
FILE:	B-2487GW-01

TEST BORING LOCATION SKETCH  
SUBSURFACE EVALUATION  
RIVER ROAD TRAINING FACILITY  
NEW CASTLE ~ NEW CASTLE COUNTY ~ DELAWARE  
TELECOMMUNICATION SYSTEMS RELOCATION

DATE:	11 SEPTEMBER 2014
SCALE:	1" = 200'
PROJECT NO.	2487GW
SHEET:	FIGURE 1



# **TELECOMMUNICATION SYSTEMS RELOCATION TEST BORING LOGS (10)**



Subsurface Evaluation  
Telecommunication Systems Relocation  
River Road Training Facility  
New Castle, Delaware

Date Started : September 9, 2014  
Date Completed : September 9, 2014  
Logged by : DW  
Weather : Cloudy, 70s  
Driller/Agency : D. Wilson/CGCG

Drilling Equipment : Truck-mounted Diedrich D-50  
Drilling Methods : HSA (SPT, ASTM D 1586)

Depth in feet	Layer Depth feet	GRAPHIC	USCS	Sample Condition	Water Levels	SAMPLES	Sample Number	Blows per 6 inches	Recovery (ft)	Moisture Content (%)	Percent Passing 200 Sieve	WATER LEVEL
				<div><div></div> Remolded</div>								
DESCRIPTION												
0												
			ML	Tan, orange, gray clayey SILT, trace fine sand, trace organics (roots) (dry)		S-1	5-5-5	1.1				
				Gray and brown mottled clayey SILT, trace fine sand (dry)		S-2	6-8-13	0.8				
5	5.5		SP	Orange fine SAND, little to some gravel, trace medium to coarse sand (dry)		S-3	8-13-13	1.3				
	8.0		CL	Red, orange, gray CLAY, little silt, trace fine sand		S-4	6-8-8	0.5				
10	10.0											
15												
20												
25												
30												

**NOTES:**

1. Test boring terminated at ± 10.0 feet below existing ground surface (b.e.g.s.).
2. Wet-on-spoon conditions not observed.
3. Borehole caved and dry at ± 5.9 feet b.e.g.s. upon removal of augers.
4. Soil descriptions performed in general accordance with ASTM D 2488, the Practice for Description and Identification of Soils (Visual-Manual Procedure).

Addendum No. 3

Telecommunication Systems Relocation






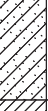







At The Delaware Army National Guard River Road Training Facility



Subsurface Evaluation  
Telecommunication Systems Relocation  
River Road Training Facility  
New Castle, Delaware

Date Started : September 9, 2014  
Date Completed : September 9, 2014  
Logged by : DW  
Weather : Cloudy, 70s  
Driller/Agency : D. Wilson/CGCG

Drilling Equipment : Truck-mounted Diedrich D-50  
Drilling Methods : HSA (SPT, ASTM D 1586)

Depth in feet	Layer Depth feet	GRAPHIC	USCS	Sample Condition	Water Levels	SAMPLES	Sample Number	Blows per 6 inches	Recovery (ft)	Moisture Content (%)	Percent Passing 200 Sieve	WATER LEVEL
				 Remolded								
0			ML	Brown clayey SILT, trace fine sand, trace organics (roots) (dry)			S-1	2-4-7	1.5			
3.0			SP	Orange fine SAND, trace silt (moist)			S-2	9-12-12	1.4			
5.5			SC	Orange fine SAND, trace to little medium to coarse sand, little gravel, little clay (moist)			S-3	6-9-10	1.4			
8.0			CL	Orange, gray, red CLAY, little silt, trace fine sand (dry)			S-4	6-10-14	1.5			
15				Red, gray, orange CLAY, little silt, trace fine sand (dry)			S-5	7-14-17	1.5			
20				Orange, gray, red CLAY, little silt, trace fine sand (dry)			S-6	4-9-9	0.8			
25				Red, gray CLAY, little silt, trace fine sand (dry)			S-7	5-9-10	1.0			
30	30.0			Gray, red CLAY, little silt, trace fine sand (dry)			S-8	6-7-9	1.2			

**NOTES:**

1. Test boring terminated at ± 30.0 feet below existing ground surface (b.e.g.s.).
2. Wet-on-spoon conditions not observed.
3. Borehole caved and dry at ± 24.3 feet b.e.g.s. upon removal of augers.
4. Soil descriptions performed in general accordance with ASTM D 2488, the Practice for Description and Identification of Soils (Visual-Manual Procedure).

Addendum No. 3

Telecommunication Systems Relocation















At The Delaware Army National Guard River Road Training Facility



Subsurface Evaluation  
Telecommunication Systems Relocation  
River Road Training Facility  
New Castle, Delaware

Date Started : September 8, 2014  
Date Completed : September 8, 2014  
Logged by : DW  
Weather : Partly Cloudy, 70s  
Driller/Agency : D. Wilson/CGCG

Drilling Equipment : Truck-mounted Diedrich D-50  
Drilling Methods : HSA (SPT, ASTM D 1586)

Depth in feet	Layer Depth feet	GRAPHIC	USCS	Sample Condition	Water Levels	SAMPLES	Sample Number	Blows per 6 inches	Recovery (ft)	Moisture Content (%)	Percent Passing 200 Sieve	WATER LEVEL
				 Remolded	 At completion  Augers at 6.0 ft							
0	0.5			Topsoil (6 inches ±)								
			ML	Gray and tan mottled clayey SILT, trace fine sand (dry)			S-1	2-4-5	1.5			
				Gray and tan mottled clayey SILT, trace fine sand (dry)			S-2	5-8-13	1.5			
5	5.5		SP	Orange fine to medium SAND, trace gravel, trace silt (wet)			S-3	12-11-10	1.3			
	8.0		CL	Orange, gray, red CLAY, little silt, little fine sand (moist to wet)			S-4	5-8-7	1.4			
10	10.0											
15												
20												
25												
30												

NOTES: for Description and Identification of Soils (Visual-Manual Procedure).

- Test boring terminated at ± 10.0 feet below existing ground surface (b.e.g.s.).
- Wet-on-spoon conditions observed at ± 6.0 feet b.e.g.s.
- Groundwater observed at ± 4.4 feet with augers at ± 6.0 feet b.e.g.s.
- Borehole caved with water level at ± 5.7 feet b.e.g.s. upon removal of augers.
- Soil descriptions performed in general accordance with ASTM D 2488, the Practice

Addendum No. 3

Telecommunication Systems Relocation

At The Delaware Army National Guard River Road Training Facility



Subsurface Evaluation  
Telecommunication Systems Relocation  
River Road Training Facility  
New Castle, Delaware

Date Started : September 8, 2014  
Date Completed : September 8, 2014  
Logged by : DW  
Weather : Partly Cloudy, 70s  
Driller/Agency : D. Wilson/CGCG

Drilling Equipment : Truck-mounted Diedrich D-50  
Drilling Methods : HSA (SPT, ASTM D 1586)

Depth in feet	Layer Depth feet	GRAPHIC	USCS	Sample Condition	Water Levels	SAMPLES	Sample Number	Blows per 6 inches	Recovery (ft)	Moisture Content (%)	Percent Passing 200 Sieve	WATER LEVEL
				<div><div></div>Remolded</div>								
				DESCRIPTION								
0	0.3	<div></div>		Topsoil (4 inches ±)								
		<div></div>		FILL: Brown silt, little gravel, little fine to coarse sand, trace organics (roots) (dry to moist)		<div></div>	S-1	4-7-8	0.4			
	3.0	<div></div>										
		<div></div>	ML	Brown and gray mottled clayey SILT, trace fine sand (dry)		<div></div>	S-2	3-6-8	1.5			
5	5.5	<div></div>										
		<div></div>	CL	Orange, brown, red CLAY/SILT, trace very fine sand (dry)		<div></div>	S-3	5-8-11	1.5			
		<div></div>		Orange, brown, red CLAY/SILT, trace very fine sand (dry)		<div></div>	S-4	8-12-13	1.2			
10	10.0	<div></div>										
15												
20												
25												
30												

**NOTES:**

1. Test boring terminated at ± 10.0 feet below existing ground surface (b.e.g.s.).
2. Wet-on-spoon conditions not observed.
3. Borehole caved and dry at ± 6.9 feet b.e.g.s. upon removal of augers.
4. Soil descriptions performed in general accordance with ASTM D 2488, the Practice for Description and Identification of Soils (Visual-Manual Procedure).

**Addendum No. 3**

Telecommunication Systems Relocation

At The Delaware Army National Guard River Road Training Facility



# TEST BORING TB-5

Subsurface Evaluation  
Telecommunication Systems Relocation  
River Road Training Facility  
New Castle, Delaware

Date Started : September 8, 2014  
Date Completed : September 8, 2014  
Logged by : DW  
Weather : Partly Cloudy, 70s  
Driller/Agency : D. Wilson/CGCG

Drilling Equipment : Truck-mounted Diedrich D-50  
Drilling Methods : HSA (SPT, ASTM D 1586)

Depth in feet	Layer Depth feet	GRAPHIC	USCS	Sample Condition	Water Levels	SAMPLES	Sample Number	Blows per 6 inches	Recovery (ft)	Moisture Content (%)	Percent Passing 200 Sieve	WATER LEVEL
				<div><div></div> Remolded</div>								
0												
			ML	Brown, tan, gray clayey SILT, little fine sand (dry)			S-1	5-7-7	1.5			
				Gray clayey SILT, little fine sand (dry to moist)			S-2	2-2-3	1.3			
5				Tan, brown clayey SILT, some fine sand (dry)			S-3	6-9-11	1.1			
	8.0											
			SM	White very fine SAND, some silt (dry)			S-4	4-7-7	0.9			
10												
				White very fine SAND, trace silt (dry)			S-5	5-7-7	1.4			
15												
				White very fine SAND, little to some silt (dry)			S-6	3-6-10	1.4			
20												
25	25.0			White very fine SAND, trace silt (dry)			S-7	10-12-11	1.5			
30												

- NOTES:
- Test boring terminated at ± 25.0 feet below existing ground surface (b.e.g.s.).
  - Wet-on-spoon conditions not observed.
  - Borehole caved and dry at ± 22.4 feet b.e.g.s. upon removal of augers. Borehole allowed to remain open for approximately 20 hours and groundwater was not observed prior to backfilling.
  - Soil descriptions performed in general accordance with ASTM D 2488, the Practice for Description and Identification of Soils (Visual-Manual Procedure).

Addendum No. 3

Telecommunication Systems Relocation  
At The Delaware Army National Guard River Road Training Facility





Subsurface Evaluation  
Telecommunication Systems Relocation  
River Road Training Facility  
New Castle, Delaware

Date Started : September 8, 2014  
Date Completed : September 8, 2014  
Logged by : DW  
Weather : Partly Cloudy, 70s  
Driller/Agency : D. Wilson/CGCG

Drilling Equipment : Truck-mounted Diedrich D-50  
Drilling Methods : HSA (SPT, ASTM D 1586)

Depth in feet	Layer Depth feet	GRAPHIC	USCS	Sample Condition <div><div></div> Remolded</div>	Water Levels <div><div></div> Augers at 8.5 ft</div>	SAMPLES	Sample Number	Blows per 6 inches	Recovery (ft)	Moisture Content (%)	Percent Passing 200 Sieve	WATER LEVEL
				DESCRIPTION								
0												
			ML	Brown and gray mottled clayey SILT, trace fine sand (dry)	<div></div>	S-1	5-8-10	1.5				
5				Orange, tan SILT, little fine sand, trace clay (moist)	<div></div>	S-2	2-5-5	1.5				
				Gray, orange SILT, trace clay, trace fine sand (moist)	<div></div>	S-3	WH/6"-2-3	1.0				
8.0			CL	Red and gray mottled CLAY, little silt, trace fine sand (moist)	<div></div>	S-4	3-5-7	1.5				<div></div>
10	10.0											
15												
20												
25												
30												

NOTES: for Description and Identification of Soils (Visual-Manual Procedure).

1. Test boring terminated at ± 10.0 feet below existing ground surface (b.e.g.s.).
2. Wet-on-spoon conditions observed at ± 6.0 feet b.e.g.s.
3. Groundwater observed at ± 8.8 feet with augers at ± 8.5 feet b.e.g.s.
4. Borehole caved and dry at ± 4.7 feet b.e.g.s. upon removal of augers.
5. Soil descriptions performed in general accordance with ASTM D 2488, the Practice

Addendum No. 3

Telecommunication Systems Relocation

At The Delaware Army National Guard River Road Training Facility



Subsurface Evaluation  
Telecommunication Systems Relocation  
River Road Training Facility  
New Castle, Delaware

Date Started : September 8, 2014  
Date Completed : September 8, 2014  
Logged by : DW  
Weather : Partly Cloudy, 70s  
Driller/Agency : D. Wilson/CGCG

Drilling Equipment : Truck-mounted Diedrich D-50  
Drilling Methods : HSA (SPT, ASTM D 1586)

Depth in feet	Layer Depth feet	GRAPHIC	USCS	Sample Condition	Water Levels	SAMPLES	Sample Number	Blows per 6 inches	Recovery (ft)	Moisture Content (%)	Percent Passing 200 Sieve	WATER LEVEL
				<div><div></div> Remolded</div>								
				DESCRIPTION								
0				FILL: Black, brown, gray silt, trace fine to coarse sand, trace gravel (dry)		<div></div>	S-1	10-10-5	1.0			
	3.0		ML	Gray and brown mottled clayey SILT, little fine to coarse sand (dry)		<div></div>	S-2	3-4-5	1.4			
5				Gray, orange clayey SILT, trace fine sand, trace gravel (dry to moist)		<div></div>	S-3	5-9-9	1.3			
	8.0		CL	Red, gray, orange CLAY, little silt, trace fine sand (dry)		<div></div>	S-4	6-11-10	1.5			
10	10.0											
15												
20												
25												
30												

**NOTES:**

1. Test boring terminated at ± 10.0 feet below existing ground surface (b.e.g.s.).
2. Wet-on-spoon conditions not observed.
3. Borehole caved and dry at ± 7.2 feet b.e.g.s. upon removal of augers.
4. Soil descriptions performed in general accordance with ASTM D 2488, the Practice for Description and Identification of Soils (Visual-Manual Procedure).

**Addendum No. 3**

Telecommunication Systems Relocation

At The Delaware Army National Guard River Road Training Facility







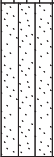

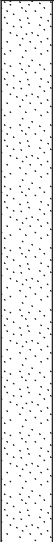





# TEST BORING TB-8

Subsurface Evaluation  
Telecommunication Systems Relocation  
River Road Training Facility  
New Castle, Delaware

Date Started : September 8, 2014  
Date Completed : September 8, 2014  
Logged by : DW  
Weather : Partly Cloudy, 70s  
Driller/Agency : D. Wilson/CGCG

Drilling Equipment : Truck-mounted Diedrich D-50  
Drilling Methods : HSA (SPT, ASTM D 1586)

Depth in feet	Layer Depth feet	GRAPHIC	USCS	Sample Condition	Water Levels	SAMPLES	Sample Number	Blows per 6 inches	Recovery (ft)	Moisture Content (%)	Percent Passing 200 Sieve	WATER LEVEL
				 Remolded								
0				FILL: varicolored silt, some gravel, little medium to coarse sand (dry)		S-1	3-6-8	1.4				
	3.0		ML	Red, orange, gray clayey SILT, trace fine sand (dry)		S-2	6-10-11	1.3				
5				White, orange, red clayey SILT, trace fine sand (dry)		S-3	6-10-11					
	8.0		SM	White, tan very fine SAND and SILT (dry)		S-4	5-7-10	1.0				
10												
	11.8		SP	White, orange fine SAND, trace silt (dry)		S-5	9-17-17	1.5				
15				White, tan fine SAND, trace clayey nodules (dry)		S-6	23-36-50/4"	1.1				
20				White, yellow fine SAND (moist to wet)		S-7	17-42-50/1"	0.9				
25	25.0											
30												

- NOTES:
- Test boring terminated at ± 25.0 feet below existing ground surface (b.e.g.s.).
  - Wet-on-spoon conditions not observed.
  - Borehole caved and dry at ± 22.1 feet b.e.g.s. upon removal of augers. Borehole allowed to remain open for approximately 20 hours and groundwater was not observed prior to backfilling.
  - Soil descriptions performed in general accordance with ASTM D 2488, the Practice for Description and Identification of Soils (Visual-Manual Procedure).

Addendum No. 3

Telecommunication Systems Relocation  
At The Delaware Army National Guard River Road Training Facility



Subsurface Evaluation  
Telecommunication Systems Relocation  
River Road Training Facility  
New Castle, Delaware

Date Started : September 9, 2014  
Date Completed : September 9, 2014  
Logged by : DW  
Weather : Cloudy, 70s  
Driller/Agency : D. Wilson/CGCG

Drilling Equipment : Truck-mounted Diedrich D-50  
Drilling Methods : HSA (SPT, ASTM D 1586)

Depth in feet	Layer Depth feet	GRAPHIC	USCS	Sample Condition	DESCRIPTION	SAMPLES	Sample Number	Blows per 6 inches	Recovery (ft)	Moisture Content (%)	Percent Passing 200 Sieve	WATER LEVEL
				<div>  Auger Cuttings   Remolded </div>								
0												
					FILL: varicolored coarse gravel (dry)		S-1					
	3.0											
					Gray, orange clayey SILT, trace fine sand (dry to moist)		S-2	4-8-11	1.5			
5			ML		Gray, orange clayey SILT, trace fine sand (dry)		S-3	7-11-11	1.2			
					Brown clayey SILT, trace fine sand (dry)		S-4	6-10-16	1.0			
10	10.0											
15												
20												
25												
30												

**NOTES:**

1. Test boring terminated at ± 10.0 feet below existing ground surface (b.e.g.s.).
2. Wet-on-spoon conditions not observed.
3. Borehole caved and dry at ± 6.9 feet b.e.g.s. upon removal of augers.
4. Soil descriptions performed in general accordance with ASTM D 2488, the Practice for Description and Identification of Soils (Visual-Manual Procedure).

**Addendum No. 3**

Telecommunication Systems Relocation















At The Delaware Army National Guard River Road Training Facility



Subsurface Evaluation  
Telecommunication Systems Relocation  
River Road Training Facility  
New Castle, Delaware

Date Started : September 9, 2014  
Date Completed : September 9, 2014  
Logged by : DW  
Weather : Cloudy, 70s  
Driller/Agency : D. Wilson/CGCG

Drilling Equipment : Truck-mounted Diedrich D-50  
Drilling Methods : HSA (SPT, ASTM D 1586)

Depth in feet	Layer Depth feet	GRAPHIC	USCS	Sample Condition	Water Levels	SAMPLES	Sample Number	Blows per 6 inches	Recovery (ft)	Moisture Content (%)	Percent Passing 200 Sieve	WATER LEVEL
				 Remolded	 At completion  Augers at 23.5 ft							
0			ML	Gray and orange mottled clayey SILT, trace fine sand (dry)		S-1	4-5-5	1.3				
3.0			CL	Gray, brown, red CLAY, little silt, little fine to medium sand (dry)		S-2	4-11-13	1.5				
5				Gray, orange, red CLAY, little silt, trace fine sand (dry)		S-3	6-9-10	0.9				
8.0			SC	Gray, orange very fine SAND and CLAY, little silt (dry)		S-4	8-9-13	1.5				
10												
11.8			CL	Gray, brown, red CLAY, little silt, trace fine sand (dry)		S-5	6-8-11	1.1				
15				Red, gray CLAY, little silt, trace fine sand (dry)		S-6	7-9-13	1.4				
20				Red, gray CLAY, little silt, little fine sand (wet)		S-7	7-12-16	1.5				
25				Gray, red CLAY, little silt, trace fine sand (moist)		S-8	5-9-11	1.3				
30	30.0											

NOTES: for Description and Identification of Soils (Visual-Manual Procedure).  
1. Test boring terminated at ± 30.0 feet below existing ground surface (b.e.g.s.). 6. Groundwater observed at ± 17.8 feet with augers at ± 23.5 feet b.e.g.s.

2. Wet-on-spoon conditions observed at ± 23.5 feet b.e.g.s.

Addendum No. 3

3. Groundwater observed at ± 17.8 feet with augers at ± 23.5 feet b.e.g.s.

4. Borehole caved with water level at ± 17.2 feet b.e.g.s. upon removal of augers.

5. Soil descriptions performed in general accordance with ASTM D 2488, the Practice

Telecommunication Systems Relocation  
At The Delaware Army National Guard River Road Training Facility

# GENERAL NOTES



## GENERAL NOTES

DUFFIELD ASSOCIATES uses the following definitions and terminology to classify and correlate the field and laboratory samples.

**VISUAL UNIFIED CLASSIFICATIONS:** The soil samples are described by color, major constituent, modifiers (by percentage), and density (or consistency). Coarse Grained or Granular Soils have more than 50% of their dry weight retained on a No. 200 sieve; they are described as: boulders, cobbles, gravel or sand. Fine Grained Soils have less than 50% of their dry weight retained on a No. 200 sieve; they are described as: clays or clayey silts if they are cohesive and silts if they are noncohesive. In addition to gradation, granular soils are defined on the basis of their relative in-place density and fine grained soils on the basis of their strength or consistency and their plasticity.

The Unified Soil Classification symbols are:

### COARSE GRAINED SOILS

GW - Well graded gravels  
 GP - Poorly graded gravels  
 GM - Silty gravels  
 GC - Clayey gravels  
 SW - Well graded sands  
 SP - Poorly graded sands  
 SM - Silty sands  
 SC - Clayey sands

### FINE GRAINED SOILS

ML - Silts of low plasticity  
 CL - Clays of low to medium plasticity  
 OL - Organic silt clays of low plasticity  
 MH - Silts of high plasticity  
 CH - Clays of high plasticity  
 OH - Organic silt clays of high plasticity  
 PT - Peat and highly organic soils

### SIZE DESCRIPTION

F - Fine  
 M - Medium  
 C - Coarse  
 G - Gravel

### MODIFIERS (PERCENTAGE)

Tr - Trace 1 - 10%  
 Ltl - Little 11 - 20%  
 Some 21 - 35%  
 & - And 36 - 50%

### COLOR

Or - Orange	Blk - Black	Vc - Varicolored
Yel - Yellow	Gr - Gray	Dk - Dark
Br - Brown	R - Red	Lt - Light

### DENSITY: COARSE GRAINED SOILS

Very loose	4 blows/ft or less
Loose	5 to 10 blows/ft
Medium	11 to 30 blows/ft
Dense	31 to 50 blows/ft
Very Dense	51 blows/ft or more

### CONSISTENCY: FINE GRAINED SOILS

Very soft	2 blows/ft or less
Soft	3 to 4 blows/ft
Medium	5 to 8 blows/ft
Stiff	9 to 15 blows/ft
Very stiff	16 to 30 blows/ft
Hard	31 blows/ft or more

NOTE: The Standard Penetration Test "N" value is the number of blows per foot of a 140 pound hammer falling 30 inches on a 2 inch O.D. split spoon sampler, except where otherwise noted.