REPORT OF RECONNAISSANCE LEVEL GEOTECHNICAL EXPLORATION

DARLINGTON COUNTY I-20 INDUSTRIAL PARK
DARLINGTON COUNTY, SOUTH CAROLINA
S&ME PROJECT NO. 1611-09-392

Prepared By:

S&ME, Inc.
134 Suber Road
Columbia, South Carolina 29210

November 16, 2009
November 16, 2009

Reference: REPORT OF RECONNAISSANCE LEVEL GEOTECHNICAL EXPLORATION
Darlington County I-20 Industrial Park
Darlington County, South Carolina
S&ME Project No. 1611-09-392

As requested, S&ME, Inc. has performed a reconnaissance level geotechnical exploration at the above referenced site. This work was performed in general accordance with S&ME Proposal No. 1614-6550-08 Rev. 1 dated September 17, 2009. The purpose of this exploration was to characterize the general surface and subsurface conditions of the site, to provide the recommended seismic site classification according to IBC 2006, as well as preliminary recommendations regarding site preparation, suitability of on-site soils for use in construction and potential foundation types. This investigation was performed to aid in evaluation of the site’s suitability for development. The recommendations contained herein are not valid for design without the confirmation of an additional subsurface investigation after the locations of proposed development are determined.

S&ME appreciates this opportunity to work with Alliance Consulting Engineers as your geotechnical engineering consultant on this project. Please contact us at (803) 561-9024 if you have any questions or need any further information regarding this geotechnical report.

Sincerely,

S&ME, Inc.

Melissa Quinton, P.E.
Geotechnical Engineer
mquinton@smeinc.com

John C. Lessley, P.E.
Vice President/Technical Principal
jlessley@smeinc.com
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EXECUTIVE SUMMARY

The information provided in this executive summary is intended to be a brief overview of project information and recommendations from the geotechnical report. Information in the executive summary should not be used without first reading the geotechnical report and the recommendations described therein.

Our subsurface exploration was performed on an approximately 160 acre tract, which is located south of Interstate 20 and west of Parallel Road and SC Highway 340, several miles north of Timmonsville, South Carolina. The project site is currently undeveloped and partially wooded. Standing water was observed in a small portion of the site between borings B-3 and B-5. The topography of the site appears to be relatively flat by observation. USGS topographic quadrangle mapping indicate relief across the site to be approximately 3 to 5 feet.

Approximately 6 to 8 inches of topsoil were encountered at the surface of borings B-2, B-3 and B-5. Approximately 10 inches of plow zone material was encountered at the surface of boring B-4. Beneath the surface materials, our borings typically encountered clayey sands and sandy lean clays. Most of the site has ground water within 3 to 7 feet of the ground surface.

The clayey sands and sandy clays encountered in our borings appear generally suitable for re-use as structural fill. These soils will have a tendency to retain moisture and may be difficult to dry and work if they are allowed to become wet.

The soil profiles encountered appear generally suitable for development of this site for light industrial or commercial use. The use of shallow foundations for support of column loads up to 500 kips appears feasible with little risk of excessive settlement for typical light to medium structural column configurations, provided footings are properly constructed. Borings should be conducted within each building footprint prior to design of foundations.

Soil test boring data indicate IBC 2006 Seismic Site Class D to be appropriate for this site. Design spectral values for the project area indicate the site to be Design Category D according to IBC 2006.
1. PROJECT INFORMATION

Information about the project was obtained through e-mails from David Winburn with Alliance Consulting Engineers and Marty Baltzegar with S&ME on December 8, 2008 and September 14, 2009. Site maps indicating a 160-acre tract consisting of five tax parcels was included with the September 14th e-mail. A site vicinity map is included as Figure 1. The tract is being proposed for certification under the South Carolina Department of Commerce’s Site Certification Program.

The purpose of this exploration was to characterize the general surface and subsurface conditions of the site, to provide the recommended seismic site classification according to IBC 2006, as well as preliminary recommendations regarding site preparation, suitability of on-site soils for use in construction and potential foundation types. This investigation was performed to aid in evaluation of the site’s suitability for development. The recommendations contained herein are not valid for design without the confirmation of an additional subsurface investigation after the locations of proposed development are determined.

2. EXPLORATION PROCEDURES

On October 30, 2009, a representative of S&ME visited the site to layout boring locations. Our field exploration was performed on November 3, 2009. Boring locations indicated on the attached Figure 2 “Boring Location Plan” must be considered as approximate.

Using an ATV-mounted rig, five soil test borings were performed to depths of approximately 30 to 50 feet below the ground surface. Total soil test boring footage at the site was approximately 185 feet. Ground water encountered in our borings, was measured at the time of drilling and again at 24 hours after completion of drilling. Soil sampling and penetration testing were performed in general accordance with ASTM D1586, “Standard Test Method for Penetration Test and Split Barrel Sampling of Soils”. Borings were backfilled with auger cutting at completion of drilling and groundwater measurement. The soil test boring data is attached in the Appendix.

3. SITE CONDITIONS

S&ME’s assessment of the geotechnical conditions began with a reconnaissance of the topography and physical features of the site. We also consulted available topographic and geologic maps, for relevant information.

3.1 Surface Conditions

Our subsurface exploration was performed on an approximately 160 acre tract, which is located south of Interstate 20 and west of Parallel Road and SC Highway 340, several miles north of Timmonsville, South Carolina. The project site is currently undeveloped. A portion of the site near SC Highway 340 was previously used for agricultural purposes. The northern portion of the site, which borders Interstate 20 is moderately to densely wooded. A large portion of the site adjacent to the agricultural field has been cleared of trees since aerial photographs of the area were taken.
Standing water was observed in a small portion of the site between borings B-3 and B-5. This portion of the site has been cleared of trees, and water was standing in deep ruts that were likely left by heavy clearing equipment. The topography of the site appears to be relatively flat by observation. USGS topographic quadrangle mapping indicate relief across the site to be approximately 3 to 5 feet.

3.2 Subsurface Conditions

Recovered field samples and field boring records were reviewed in the laboratory by the geotechnical professional. Soil test boring records and other field data are assembled in the Appendix.

3.2.1 Site Geology

The site lies within the Atlantic Flatwoods Region of the Lower Coastal Plain of South Carolina. The Atlantic Flatwoods comprises most of the Lower Coastal Plain, lying between the Citronelle and Surry escarpments, and ranging from 15 to 100 miles inland from the sea. The topography of this region is dominated by up to six archaic marine terraces, exposed by uplifting of the local area above sea level over the last one million years.

The lower coastal plain terraces are relatively young features, exhibit only minor surface erosion, and can be traced large distances on the basis of surface elevation. Each terrace forms a thin veneer over older, underlying Coastal Plain marls or limestones. Materials comprising the terraces typically consist of a strand or beach ridge deposit of clean sands at the seaward margin. Between the strand and the toe of the next inland terrace are mainly finely interlayered clays and sands termed backbarrier deposits.

Old swamp deposits, stumps and buried trees have in some areas been covered by the backbarrier deposits and are usually not evident at the surface. Though in most areas they are suitable for development, many of the soils are highly compressible under light to moderate structural loads, are susceptible to liquefaction, or exhibit moderate to high plasticity.

3.2.2 USDA Soil Survey Information

USDA Soils Conservation Service soils mapping for Darlington County indicate the site to be located within the Goldsboro, Rains, Coxville and Noboco Soil Series. Information taken from the USDA Soil Survey is given in more detail in Table 1 below.
Table 1: USDA Soil Survey Soil Series

<table>
<thead>
<tr>
<th>Soil Series</th>
<th>Soil Type</th>
<th>Depth to Seasonal High Groundwater Table</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Goldsboro sandy loam</td>
<td>SM, SC, CL</td>
<td>2 – 3 ft. (December to April)</td>
<td>Soils have low shrink-swell potential and pH ranges between 3.5 and 6.0.</td>
</tr>
<tr>
<td>(GoA)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rains sandy loam</td>
<td>SM, SC, ML, CL</td>
<td>0 – 1 ft. (November to April)</td>
<td>Soils have low shrink-swell potential and pH ranges between 3.6 and 6.5.</td>
</tr>
<tr>
<td>(RaA)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Coxville sandy loam</td>
<td>CL, ML, CH</td>
<td>0 – 1 ft. (November to April)</td>
<td>Soils have low to moderate shrink-swell potential and pH ranges between 3.5 and 5.5.</td>
</tr>
<tr>
<td>(CxA)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Noboco loamy sand</td>
<td>SM, SC, CL</td>
<td>2½ – 4 ft. (December to March)</td>
<td>Soils have low shrink-swell potential and pH ranges between 3.6 and 6.5.</td>
</tr>
<tr>
<td>(NcA)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

3.2.3 Interpreted Subsurface Profile

The generalized subsurface conditions at the site are described below. Subsurface conditions between the borings will likely vary. The nature and extent of variations between the sampling points will not become evident until construction, and stratification lines shown are not warranted. For detailed descriptions and stratification at a particular boring location, the respective boring record should be reviewed. Soil test boring logs are attached in the Appendix.

Top-of-ground elevations shown on the boring logs are assumed and were interpolated from USGS topographic quadrangle maps for demonstration purposes only. Soil test boring locations and elevations were not surveyed.

Surface Materials

Approximately 6 to 8 inches of topsoil were encountered at the surface of borings B-2, B-3 and B-5. Approximately 10 inches of plow zone material was encountered at the surface of boring B-4. Plow zone material consists of near-surface soils which appear to be extensively disturbed by agricultural plowing. Boring B-1 was performed in a dirt path, and neither topsoil nor plow zone material was encountered at the surface.

These measurements are likely representative of conditions at the site. However, the potential exists that greater topsoil or plow zone depths may be encountered in other areas of the site.

Immediate Bearing Zone Soils

Soils comprising the immediate bearing zone extend from the finished floor elevation to a depth approximately equal to the anticipated footing width below the anticipated bearing elevation. These soils would be typically stressed by vertical loads ranging from the applied bearing pressure at the base of the footing, to approximately 40 percent of the applied stress near the bottom of the zone. These soils would also provide most of the resistance to lateral loading of shallow foundations. For purpose of describing soil behavior, we have considered this zone to extend to approximately 15 feet depth across the site. Soils in this zone consisted mainly of clayey sands, and sandy clay.
Clayey sands were encountered in the upper 15 feet of the soil profile in boring all borings performed at the site. These soils were generally brown and gray in color and were moist, with mostly fine to medium sands and some low plasticity fines. An Standard Penetration Test (SPT) N-values recorded for clayey sands in this zone ranged from 4 to 28 blows per foot, indicating a very loose to medium dense relative density. Clayey sands were typically very loose to loose near the surface and becoming medium dense with depth.

Sandy lean clays were encountered at depths ranging from about 6 feet to 13 feet below the ground surface in borings B-2, B-3 and B-5. These soils were generally gray in color and were moist, with mostly low plasticity fines and some fine to medium sands. SPT N-values recorded for sandy lean clays in this zone ranged from 15 to 17 blows per foot, indicating a stiff to very stiff consistency.

**Intermediate Bearing Zone Soils**

Soils comprising the intermediate bearing zone lie within a depth of approximately one to two times the anticipated footing width below the anticipated bearing elevation. Distribution of stresses below the footings would be relatively wide in this zone compared to the overlying soils. In terms of practical settlement computations, the base of this zone is typically considered the limit of the compressible zone for individual footings. While foundation loads and configurations likely vary from area to area across the site, we have considered this zone to extend from approximately 15 feet to 25 feet.

Soils in this zone consisted mainly of clayey sands similar to those described above. SPT N-values recorded for the sands encountered in this zone ranged from 6 to 23 blows per foot, indicating a loose to medium dense relative density. Sands in this zone were typically medium dense throughout, with few loose layers.

**Deep Bearing Zone Soils**

Soils comprising the deep bearing zone lie within a depth of greater than two times the anticipated footing width below the anticipated bearing elevation. Soils deeper than twice the maximum footing width are considered to be only lightly loaded by distributed loads from individual footings; however, the behavior of these soils may influence design of large area loads such as stockpiles or embankments. These soils would also provide most of the support for axially loaded deep foundations, if required, for structures. We have considered this zone to extend from approximately 25 feet to 50 feet below the ground surface.

Soils in this zone consisted mainly of clayey sands and sandy lean clays. Borings B-2 through B-5 encountered clayey sands to termination of drilling at depths ranging from 30 to 40 feet. Clayey sands in this zone were generally dark gray in color and were saturated, with mostly fine to medium sands, some low plasticity fines and few shell fragments. SPT N-values recorded for clayey sands in this zone ranged from 2 to 18 blows per foot, indicating a very loose to medium dense relative density. SPT N-values were likely influenced (reduced) due to water intrusion into the boring at a depth of approximately 30 to 35 feet in borings B-2 and B-3.
A trace of organics was observed in a split spoon sample taken at a depth of about 30 feet in boring B-4.

Sandy lean clay was encountered from a depth of about 30 feet to termination of drilling at a depth of 35 feet in boring B-1. Sandy lean clays encountered in this zone were generally dark gray in color and were wet, with mostly low plasticity fines and some fine sands. SPT N-values recorded for sandy lean clays in this zone ranged from 2 to 5 blows per foot, indicating a very soft to firm consistency.

**Ground Water**

Ground water was encountered at the time of drilling ranged from approximately 6 to 9 feet below the ground surface (elevation 145 to 151 feet). Ground water was re-measured 24 hours after completion of drilling at approximately 3 to 7 feet below the ground surface (elevation of 149 to 154 feet) in borings B-1 through B-3, and B-5. Boring B-4 had caved in at approximately 3 feet below the ground surface (elevation 151 feet) at 24 hours after drilling. Hole caving often occurs within a few feet of groundwater elevations.

Due to the nature of the soils encountered in our borings it is possible that perched seams or lenses of water may occur. These seams or lenses of perched water generally occur on layers of medium dense sands or stiff clays during wet periods. We note that groundwater levels are influenced by precipitation, long term climatic variations, and nearby construction. Groundwater measurements made at different times than our exploration may indicate groundwater levels substantially different than indicated on the boring records in the Appendix.

4. **BUILDING CODE SEISMIC PROVISIONS**

Seismic induced ground shaking at the foundation is the effect taken into account by building code seismic-resistant design provisions. Other effects, such as soil liquefaction, are not addressed in building codes but must also be considered.

4.1 **IBC Site Class**

We attempted to classify the site as one of the Site Classes defined in the 2006 IBC Section 1613 (Table 1613.5.2) using the procedures described in Section 1613.5.2. The Site Class is used in conjunction with mapped spectral accelerations S_s and S_1 to determine Site Coefficients F_A and F_V in IBC Section 1613.5.3, tables 1613.5.3(1) and 1613.5.3(2).

Determining Site Class involves several steps. The initial step in site class definition is a check for the four conditions described for Site Class F which would require a site specific evaluation to determine site coefficients F_A and F_V. Site Class F as defined in Section 1613 includes sites with soils under any of the following conditions:

1. Soils vulnerable to potential failure including quick and highly sensitive clays or collapsible weakly cemented soils;
2. peats and highly organic clays;
3. very high plasticity clays; and,
4. very thick soft/medium stiff clays.

Boring data available at this site extend to termination of drilling at 50 feet. None of the conditions described in items 1 – 4 above pertaining to Site Class F were evident in the soil test borings performed. Based on the soil test boring data, shear wave velocity data and knowledge of the general geologic profile of this area, Site Class D appears to generally represent conditions in and around the site.

4.2 Design Spectral Values

S&ME determined the spectral response parameters for the site using the general procedures outlined under the 2006 International Building Code Section 1613.5. This approach utilizes a mapped acceleration response spectrum corresponding to an earthquake having a 2 percent statistical probability of exceedance in 50 years to determine the spectral response acceleration at the top of seismic bedrock for any period.

The Site Class is used in conjunction with mapped spectral accelerations $S_S$ and $S_I$ to determine Site Coefficients $F_A$ and $F_V$ in IBC Section 1615.1.2, tables 1615.1.2(1) and 1615.1.2(2). For purposes of computation, the Code includes mapped induced acceleration at frequencies of 5 hertz ($S_S$) and 1 hertz ($S_I$), which are then used to derive the remainder of the response spectra at all other frequencies. Mapped $S_S$ and $S_I$ values represent motion at the top of bedrock. The surface ground motion response spectrum, accounting for inertial effects within the soil column overlying rock, is then determined for the design earthquake using spectral coefficients $F_A$ and $F_V$ for the appropriate Site Class.

The design ground motion at any period is taken as 2/3 of the smoothed spectral acceleration as allowed in section 1613.5.4. The design spectral response acceleration values at short periods $S_{DS}$ and at one second periods $S_{D1}$ are tabulated below for the unimproved soil profile. Peak ground acceleration (PGA) was obtained by dividing the $S_{DS}$ value by 2.5.

<table>
<thead>
<tr>
<th>Value</th>
<th>2006 International Building Code</th>
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<tr>
<td>$S_{DS}$</td>
<td>0.58 g</td>
</tr>
<tr>
<td>$S_{D1}$</td>
<td>0.26 g</td>
</tr>
<tr>
<td>PGA</td>
<td>0.23 g</td>
</tr>
</tbody>
</table>

These values correspond with Design Category D as defined in Section 1613.5.6 for Use Group I, II III, and IV structures,
4.3 Liquefaction

The effect of geologic age on the liquefaction susceptibility of a geologic formation was addressed in 1978 by Youd and Perkins\(^1\). Liquefaction potential decreases with increasing age of a soil deposit. Pre-Holocene (<11,000 years) generally do not liquefy, though liquefaction has noted in the upper Pleistocene-age (250,000 years) deposits of the lower coastal plain in South Carolina in connection with the 1886 Charleston earthquake. Soils encountered at this site are “pre-pleistocene” age sedimentary deposits as described by Youd and Perkins. Liquefaction appears unlikely at this site due to the age of the materials encountered.

5. CONCLUSIONS AND RECOMMENDATIONS

The conclusions and recommendations included in this section are based on the data obtained during our exploration. The following recommendations are given only to present a general idea of the soil conditions that can be anticipated at the site. More in-depth subsurface investigations should be performed in future building pads and parking areas. We recommend that S&ME be retained to perform these additional subsurface explorations.

5.1 Site Preparation and Earthwork

Strip and grub all vegetation (including organic plow zone material), topsoil, and trees and dispose of outside the building and pavement footprints. Large stumps and tree root bulbs should be completely removed. The stripped surface should be proofrolled using a heavily loaded truck or pan to identify soft areas. Any soft areas encountered should be stabilized prior to fill placement.

After stripping and cutting to grade, the upper 12 inches of existing soils should be compacted to at least 98 percent of standard Proctor maximum dry density. In cut areas and in areas that will receive more than 12 inches of new fill the exposed surface should be proofrolled using a heavily loaded truck or pan to identify soft areas.

Areas which rut or pump excessively under the proofrolling operation will need to be stabilized prior to placement of new fill soil, base course layers or slabs. Soft, wet or unstable soils may make it difficult to achieve the required compaction and will exhibit substantially lower bearing for floor slabs, foundations, or pavements. Stabilization, if required, may consist of scarifying and/or drying and recompacting any soft or wet surface soils or removing and replacing unstable material. Additional stabilization may be required if surface soils are heavily reworked or allowed to become saturated during construction.

5.2 Fill Placement and Compaction

The clayey sands and sandy clays encountered in the upper strata of our borings appear generally suitable for re-use as structural fill. These soils will have a tendency to retain moisture and may be difficult to dry and work if they are allowed to become wet. All materials desirable for use as compacted fill should be properly tested to determine their suitability for use as fill.

All fill placed in building, pavement, and embankment areas should be comprised of soils free of organic matter and other deleterious materials. The fill should be uniformly spread in relatively thin lifts (8 inches, loose) and compacted to at least 98 percent of the soil’s maximum dry density as determined by a laboratory standard Proctor compaction test (ASTM D-698). The moisture content should be controlled to within plus to minus 3 percent of optimum. In addition to meeting the compaction requirement, fill material should be stable under movement of the construction equipment and should not exhibit rutting or pumping. Placement of fill on slopes should be benched in to avoid formation of a slip plane.

5.3 Shallow Foundations
The soil profiles encountered appear generally suitable for development for commercial use considering static loading. The use of shallow foundations for support of column loads up to 500 kips appears feasible with little risk of excessive settlement for typical light to medium structural column configurations, provided footings are properly constructed. Borings should be conducted within each building footprint prior to design of foundations.

5.4 Deep Foundations
Very heavy columns (500 kips or greater) may require the use of deep foundations consisting of cast in place augered piles. These piles are typically most cost effective and lengths and diameters can be varied to achieve the most economic configuration. Alternately, large displacement piles such pre-stressed pre-cast concrete piles may be used. Placement of large displacement piles may require pre-augering through the dense material encountered at some of our boring locations. Large displacement piles also tend to refuse at varying elevations as subsurface materials are compressed during placement of adjacent piles.

5.5 Control of Groundwater and Surface Runoff
Ground water was encountered at elevations ranging from approximately 149 feet to 154 feet in our borings at the site.

It is possible that groundwater may be encountered at higher elevations in other areas of the site. Due to the nature of the soils encountered in our borings it is possible that perched seams or lenses of water may occur. These seams or lenses of perched water generally occur on layers of medium dense sands or stiff clays during wet periods. If perched water or groundwater is encountered during grading, ditching will be necessary to provide a stable bearing surface for foundations or pavements.

During normal rainfall periods, ditching or other provisions for drainage should be provided prior to grading in low areas. If subsurface water or infiltrating surface water is not properly controlled during construction, the subgrade soils that will support foundations, as well as pavements or floor slabs, may be damaged. Furthermore, construction equipment mobility may be impaired.
5.6 Grade Slab and Pavement Support

The soils similar to those encountered in our borings generally provide relatively good soil support values for grade slabs and pavements. This is assuming proper preparation and compaction of the subgrade. On site poorly graded sands may be used as capillary break material under floor slabs. In addition, an impervious layer of a vapor barrier such as "Visqueen," or the equivalent, may be desired below grade slabs to limit moisture infiltration into finished spaces.

6. RECOMMENDATION FOR FUTURE WORK

The current number of borings provides some indication of the range of conditions that may be encountered at the site. However, the spacing and number of borings does not provide a reliable basis for design of building foundations. We recommend additional soil test borings be performed in the proposed footprints of structures and pavement areas prior to design of foundations and pavement sections.

7. QUALIFICATIONS OF REPORT

This report has been prepared in accordance with generally accepted geotechnical engineering practice for specific application to this project. The conclusions and recommendations contained in this report were based on the applicable standards of our profession at the time this report was prepared. No other warranty, express or implied is made.

The analyses and recommendations submitted herein are based, in part, upon the data obtained from the subsurface exploration. Due to the distance between each boring, subsurface conditions can be expected to vary from the conditions described herein. This report was intended to give general information about overall site conditions only. Additional geotechnical explorations should be conducted for each proposed structure and pavement area or roadway. We recommend that S&ME be retained to perform these additional subsurface explorations.
APPENDIX
### SOIL TYPES
(Shown in Graphic Log)

- Fill
- Asphalt
- Concrete
- Topsoil
- Gravel
- Sand
- Silt
- Clay
- Organic
- Silty Sand
- Clayey Sand
- Sandy Silt
- Clayey Silt
- Sandy Clay
- Silty Clay
- Partially Weathered Rock
- Cored Rock

### CONSISTENCY OF COHESIVE SOILS

<table>
<thead>
<tr>
<th>CONSISTENCY</th>
<th>STD. PENETRATION RESISTANCE</th>
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<tbody>
<tr>
<td></td>
<td>BLOWS/FOOT</td>
</tr>
<tr>
<td>Very Soft</td>
<td>0 to 2</td>
</tr>
<tr>
<td>Soft</td>
<td>3 to 4</td>
</tr>
<tr>
<td>Firm</td>
<td>5 to 8</td>
</tr>
<tr>
<td>Stiff</td>
<td>9 to 15</td>
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<tr>
<td>Very Stiff</td>
<td>16 to 30</td>
</tr>
<tr>
<td>Hard</td>
<td>31 to 50</td>
</tr>
<tr>
<td>Very Hard</td>
<td>Over 50</td>
</tr>
</tbody>
</table>

### RELATIVE DENSITY OF COHESIONLESS SOILS

<table>
<thead>
<tr>
<th>RELATIVE DENSITY</th>
<th>STD. PENETRATION RESISTANCE</th>
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<tr>
<td></td>
<td>BLOWS/FOOT</td>
</tr>
<tr>
<td>Very Loose</td>
<td>0 to 4</td>
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<tr>
<td>Loose</td>
<td>5 to 10</td>
</tr>
<tr>
<td>Medium Dense</td>
<td>11 to 30</td>
</tr>
<tr>
<td>Dense</td>
<td>31 to 50</td>
</tr>
<tr>
<td>Very Dense</td>
<td>Over 50</td>
</tr>
</tbody>
</table>

### SAMPLER TYPES
(Shown in Samples Column)

- Shelby Tube
- Split Spoon
- Rock Core
- No Recovery

### TERMS

- **Standard Penetration Resistance** - The Number of Blows of 140 lb. Hammer Falling 30 in. Required to Drive 1.4 in. I.D. Split Spoon Sampler 1 Foot. As Specified in ASTM D-1586.
- **REC** - Total Length of Rock Recovered in the Core Barrel Divided by the Total Length of the Core Run 100%.
- **RQD** - Total Length of Sound Rock Segments Recovered that are Longer Than or Equal to 4" (mechanical breaks excluded) Divided by the Total Length of the Core Run Times 100%.
NOTES:
1. THIS LOG IS ONLY A PORTION OF A REPORT PREPARED FOR THE NAMED PROJECT AND MUST ONLY BE USED TOGETHER WITH THAT REPORT.
2. BORING, SAMPLING AND PENETRATION TEST DATA IN GENERAL ACCORDANCE WITH ASTM D-1586.
3. STRATIFICATION AND GROUNDWATER DEPTHS ARE NOT EXACT.
4. WATER LEVEL IS AT TIME OF EXPLORATION AND WILL VARY.
TOPSOIL - Approximately 6 inches of topsoil.

CLAYEY SAND (SC) - mostly fine to medium sands, some low plasticity fines, moist, gray, loose.
- brown, gray, medium dense.

SANDY LEAN CLAY (CL) - mostly low to medium plasticity fines, some fine to medium sands, moist, gray, very stiff.

CLAYEY SAND (SC) - mostly fine to medium sands, some low to medium plasticity fines, moist, gray, medium dense.
- some low plasticity fines, saturated.

- mostly medium to coarse sands, light brown, gray.

- mostly fine to medium sands, gray, very loose.

- few shell fragments.

- loose.

BORING TERMINATED AT 40 FEET.

NOTES:
1. THIS LOG IS ONLY A PORTION OF A REPORT PREPARED FOR THE NAMED PROJECT AND MUST ONLY BE USED TOGETHER WITH THAT REPORT.
2. BORING, SAMPLING AND PENETRATION TEST DATA IN GENERAL ACCORDANCE WITH ASTM D-1586.
3. STRATIFICATION AND GROUNDWATER DEPTHS ARE NOT EXACT.
4. WATER LEVEL IS AT TIME OF EXPLORATION AND WILL VARY.
NOTES:
1. THIS LOG IS ONLY A PORTION OF A REPORT PREPARED FOR THE NAMED PROJECT AND MUST ONLY BE USED TOGETHER WITH THAT REPORT.
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### Material Description

<table>
<thead>
<tr>
<th>Depth (feet)</th>
<th>Graphic Log</th>
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**Topsoil** - Approximately 6 inches of topsoil.

**Clayey Sand (SC)** - Mostly fine to medium sands, some low plasticity fines, wet, gray, brown, loose.
- Trace of roots, moist.
- Gray.

**Sandy Lean Clay (CL)** - Mostly low plasticity fines, some fine sands, moist, gray, stiff.

**Clayey Sand (SC)** - Mostly fine to medium sands, some low plasticity fines, moist, brown, gray, loose.
- Mostly medium sands, saturated, tan.
- Mostly fine to medium sands, medium dense.
- Gray, loose.

**Boring Terminated at 30 Feet.**

### Standard Penetration Test Data (blows/ft)

<table>
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<th>Depth (feet)</th>
<th>Elevation (feet-MSL)</th>
<th>Sample No</th>
<th>Sample Type</th>
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