REPORT OF RECONNAISSANCE LEVEL
GEOTECHNICAL EXPLORATION

Chester Technology Park
Chester County, South Carolina
S&ME Project No. 1611-10-268

Prepared For:

Alliance Consulting Engineers, Inc.
PO Box 8147
Columbia, South Carolina 29202-8147

Prepared By:

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

July 28, 2010

July 28, 2010

Alliance Consulting Engineers, Inc.
PO Box 8147
Columbia, South Carolina 29202-8147

Attention: Kyle Clampitt, PE, Project Manager

Reference: **REPORT OF RECONNAISSANCE LEVEL GEOTECHNICAL EXPLORATION**
Chester Technology Park
Chester County, South Carolina
S&ME Project No. 1611-10-268

Dear Mr. Clampitt:

As requested, S&ME, Inc. has conducted a reconnaissance level geotechnical exploration at the above referenced site. This work was performed in general accordance with S&ME Proposal No. 1611-7606-10 dated July 5, 2010, and under the Master Service Agreement (MSA) contract with Alliance Consulting Engineers.

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 industrial development. The recommendations contained herein are not valid for design without the confirmation of an additional design level subsurface investigation after the locations of the proposed structures are determined.

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

Sincerely,
S&ME, Inc.

SOUTH CAROLINA LICENSED PROFESSIONAL ENGINEER No. 25467 MICHAEL D. HARRIS, JR. 07/28/10

SOUTH CAROLINA CERTIFICATE OF AUTHORIZATION S&ME, INC. No. C00473

Michael (Trapp) Harris, PE
Geotechnical Dept. Manager

James T. Palmer, PE
Engineering Manager

PROJECT INFORMATION

Information about the project was obtained through e-mail correspondence between you and Mr. Chris Daves and Mr. Trapp Harris of S&ME on July 2, 2010. Vicinity, topographic, and aerial maps with approximate parcel boundaries were provided on the same date.

We understand the site consists of approximately 163 acres and located south of S.C. Highway 9 and both east and west of Ballymena Road just east of the Town of Chester in Chester County, South Carolina. The site consists primarily of farmland, small patches of forestland, and a pond. The property is bordered to the south by Beltline Road, to the northwest and east by additional farmland, and to the north by farmland and SC Highway 9. Some small strips of woods border the fields and a large wooded portion is located in the northeastern portion of the site. The pond is located within the southeastern corner of the site. A portion of the L&C Rail Line runs along the southern border of the property and also crosses the southeaster corner. Some dirt access roads border the fields.

Potential proposed construction would likely consist of light to medium industrial facilities and the associated parking and drive areas. Maximum column loads are expected to be less than 250 kips with wall loads of 3 to 4 kips per linear ft. Finished floor elevations are yet to be determined and will likely vary by building.

EXPLORATION PROCEDURES

Prior to the subsurface exploration, aerial photos of the property and available topographic maps were reviewed to develop the proposed testing plan. On July 14, 2010, a representative of S&ME visited the site to perform the following tasks:

- Observe topography, ground cover, and surface soils in the proposed project area.
- Lay out locations for five soil test borings by rough measurement from site features.

Using an ATV-mounted rig, four soil test borings were proposed to depths of 25 feet each at the site and one boring was proposed to a depth of 50 feet for a total proposed soil test boring footage of 150 feet at the site. Only one boring could be extended to its proposed depth of 25 feet, while the remaining four borings encountered auger refusal at depths ranging from 14 to 18 feet below the ground surface. Groundwater, if encountered, was measured at the time of boring and prior to leaving the site.

Subsurface Exploration

The subsurface exploration of this project included Standard Penetration Test (SPT) borings. The methods used to perform these tasks are described below. The locations of each of the tests detailed below are shown in the attached Boring Location Plan (Figure 2).

Soil Test Boring with Hollow-Stem Auger

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"*. Shallow borings are made by mechanically twisting a continuous steel hollow stem auger into the soil. At regular intervals, soil samples were obtained with a standard 1.4 inch I. D., two-inch O. D., split barrel sampler. The sampler was first seated six inches to penetrate any loose cuttings, and then driven an additional 12 inches with blows of a 140-pound hammer falling approximately 30 inches. The number of hammer blows required to drive the sampler through the two final six inch increments was recorded as the penetration resistance (SPT N) value. The N-value, when properly interpreted by qualified professional staff, is an index of the soil strength and foundation support capability. The soil test boring data is attached in the Appendix.

SITE CONDITIONS

Surface Conditions

The majority of the site is primarily open field and appears to have been used for agricultural purposes. Some small strips of woods border the fields and a large wooded portion is located in the northeastern portion of the site. A pond is located within the southeastern corner of the site. Some dirt access roads and drainage ditches border the fields. The site is gently to moderately sloping downward generally from west to east with approximately 30 feet of elevation change according to the provided topographical map. A portion of the L&C Rail Line runs along the southern border of the property and also crosses the southeaster corner. Some standing water was noted in the drainage ditches and within the field in the general area of boring B-5. No rock outcrops were noted during our site visit.

Subsurface Conditions

Site Geology

The site lies within the Piedmont Physiographic Province of South Carolina, an area underlain by soils weathered in place from the parent crystalline bedrock material. Residual soils of the Carolina Piedmont consist of stiff or very stiff micaceous silts and clays, grading to firm sands with depth. These soils have been completely weathered in place from the parent bedrock material, but below depths of a few feet retain most of the relict rock structure. Soil strength derives largely from relict intermolecular bonding and remolded materials generally less exhibit lower shear strength than do undisturbed samples. Piedmont soils are normally consolidated to slightly overconsolidated.

The term *partially weathered rock (PWR)* is applied to very dense micaceous sands or silty sands of the Carolina Piedmont, which register SPT N-values in excess of 100 blows per foot. PWR generally varies widely within even small areas owing to minute differences in the chemical properties of the parent bedrock, which results in widely varying rates of weathering. Isolated lenses or seams of PWR often are present within Piedmont Residuum well above the overall PWR level within a given area. PWR is considered excellent bearing material for foundations and is relatively incompressible except in highly stressed deep foundations.

USDA Soil Survey Information

USDA Soils Conservation Service soils mapping for Chester and Fairfield Counties indicate predominantly Iredell fine sandy loam series to be located within the site with smaller areas of Wilkes sandy loam and Armenia loam located within the site. Soil map units are also described in terms of some relevant engineering properties or in terms of relative suitability for use in land development. A description of the soils series mapped within the proposed site is summarized in Table 1.

Table 1 – USDA Soil Survey Soil Series

Soil Group	Soil Type	Depth to Seasonal GWT	Depth to Rock	Remarks
Iredell sandy loam (IdB)	<7" SM 7-24" CH 24-27" CL,CH,SC <27" variable	1 – 2 ft. (perched, Nov. – Mar.)	> 60 in.	Gently sloping soil on broad ridges, moderately well-drained, slow permeability, medium to neautral acidity, high to very high shrink-swell potential.
Wilkes sandy loam (WkD)	<7" ML, SM 7-19" CH,MH >19" weathered bedrock	> 6 ft.	40 – 60 in. (hard)	Sloping to strongly sloping soil on narrow ridges and side slopes, moderately deep, well-drained, moderately slow permeability, strong to slight acidity, low to moderate shrink-swell potential.
Armenia loam (Ar)	<7" ML, SM 7-19" CH,MH >19" weathered bedrock	0.5 – 1.5 ft. (apparent, Nov. – Apr.)	> 60 in.	Nearly level soil in narrow depressed areas and along drainageways and intermittent streams, deep, poorly-drained, slow permeability, medium to neutral acidity, low to high shrink-swell potential.

Groundwater elevations recorded in our borings are generally lower than those indicated by the Soil Survey; however, high water elevations are generally given for the winter and spring months (November thorough April) and groundwater elevations at the site may be higher during these months. The near-surface soils encountered on site tend to inhibit the downward infiltration of surface water. Therefore, the potential exists that perched water may be encountered at higher elevations than indicated on the boring logs during wet weather. Some ponded water was noted on site during our exploration.

Iredell soils are present across the majority of the site according to the Soil Survey. These soils have a high to very high shrink-swell hazard potential associated with them when exposed to significant changes in moisture content. The moderate to highly plastic clays are indicated by the USDA Soil Survey to extend to depths of about 7 to 27 inches below the existing ground surface. They appear to extend slightly deeper than the depths indicated by the Soil Survey, based on the results of our borings on site.

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.

Surface Soils

Topsoil and plow zone thicknesses encountered at our boring locations were typically 8 to 10 inches. Organic plow zone material is likely present across much of the open field portions of the site since the primary use of the property has been for farming. Topsoil and plow zone thicknesses may be greater in areas not explored by our borings.

Subsurface Soils

Below the topsoil, borings B-2 through B-5 encountered firm to stiff sandy clays to depths of between 4 and 4.5 feet. These soils exhibited SPT N-values ranging from 5 to 9 blows per foot (bpf), were moist, and were brown, tan, light orange, greenish gray, or a combination of these colors. The clays sampled in boring B-5 exhibited low to moderate plasticity when remolded by hand while the clays sampled in borings B-2, B-3, and B-4 exhibited moderate to high plasticity when remolded by hand.

Boring B-1 encountered silty sands below the topsoil to a depth of about 4.5 feet below the ground surface. The silty sands exhibited an SPT N-values of 15 blows per foot (bpf) and were tan and white with a trace of black. Few fine to coarse quartz gravel pieces were also present within the silty sand sample.

The sandy clays and silty sands were underlain by very dense partially weathered rock (PWR). The PWR was encountered at depths of 4 to 4.5 feet and extended to auger refusal in borings B-1, B-2, B-4, and B-5 at depths ranging from about 14 to 18 feet and to termination of boring B-3 at depth of about 25 feet below the ground surface. These soils were generally sampled as silty sands and exhibited SPT N-values in excess of 100 blows per foot (bpf), were dry to moist, and were red, orange, tan, white, brown, yellow or a combination these colors. A seam of very dense silty sand was encountered within the PWR stratum in boring B-1 between depths of approximately 8 and 12 feet. The silty sand was very similar to the PWR stratum.

The moderate to high plasticity clays present on-site may require removal (undercutting) or other means of stabilization for site development. The extent and depth of stabilization would generally need to be evaluated during design phase geotechnical explorations and determined in the field during construction. The need for stabilization should be based on the nature of the soils encountered during construction and their performance during grading and proofrolling operations. Based on our borings stabilization depths will likely be on the order of 4 to 5 feet below the ground surface, but could be greater in other areas of the site not explored by our borings. Undercut material would generally not be suitable for re-use as fill and would need to be wasted in non-structural areas of the site, stockpiled, or trucked off-site.

Refusal to Drilling

Borings B-1, B-2, B-4, and B-5 were terminated in PWR upon encountering auger refusal at depths ranging from 14 and 18 feet. Auger refusal is defined as material that could not be penetrated with the drill rig equipment used on the project. Auger refusal material may consist of large boulders, rock ledges, lenses, seams or the top of parent bedrock. Core drilling techniques would be required to evaluate the character and continuity of the refusal material. Auger refusal was not encountered in boring B-3. However, depth to rock can vary greatly within the Piedmont, even over short distances, and the potential exists that rock will be encountered at higher elevations in areas on the site not explored by our borings.

Groundwater

Groundwater was not encountered at the time of our borings. By comparing estimated groundwater elevations to existing site grades, the presence of groundwater will likely not significantly impact proposed construction across the majority of the site. Control of perched water may be necessary in some areas. In lower lying areas where standing water was noted and where drainage tends to be slow, construction may be impacted by shallow groundwater and surface water depending on planned site grades. In these areas, it may be desirable to raise site grades to reduce potential impact of shallow groundwater. 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.

SEISMIC CONSIDERATIONS

Seismic induced ground shaking at the foundation is the effect taken into account by seismic-resistant design provisions of the 2006 International Building Code (IBC). Other effects, including soil liquefaction, are not addressed in building codes but must also be considered.

IBC Site Class

This site has been classified according to one of the Site Classes defined in IBC Section 1613.5 (Table 1613.5.2) using the procedures described in Section 1613.5.5.1. 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).

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. Soils vulnerable to potential failure under item 1) including quick and highly sensitive clays or collapsible weakly cemented soils, were not observed in the soundings. Three other conditions, 2) peats and highly organic clays; 3) very high plasticity clays; and 4) very thick soft/medium stiff clays, were also not evident in the soundings performed.

Liquefaction appears unlikely at this site because liquefaction has not been known to occur within the Piedmont Physiographic Province.

We then compared site conditions to the three conditions described for Site Class E. These are soft soils vulnerable to large strains under seismic motion. Borings did not include at least 10 feet having 1) plasticity index greater than 20, 2) moisture content greater than 40 percent, and 3) undrained shear strength less than 500 psf.

The site was then categorized using the method described in section 1613.5.5.1, paragraph 3.2 (SPT N method). Boring data available at this site only extends to 25 feet. We estimated properties of the soils between termination of the borings and a depth of 100 feet based on our knowledge of the general geologic profile of this area. Based on this approach, the Seismic Site Class according to the 2006 IBC is **Site Class C**. The site class should be established for each individual site development within the park during the design level geotechnical exploration.

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 2006 International Building Code seismic provisions of Section 1613 use the 2002 Seismic Hazard Maps published by the National Earthquake Hazard Reduction Program

(NEHRP) to define the base rock motion spectra. The 2002 seismic hazard maps used in Section 1613 of the 2006 IBC have been updated several times since their original publication, reflecting updated knowledge of the probabilistic hazard in different parts of the country as well as advances in the understanding of seismic wave propagation and damping through the various soil and rock strata. As of July 1, 2008, the USGS 2002 updated gridded spectral values in computation of the bedrock spectral response at this site may be used.

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). For purposes of computation, the Code includes mapped induced acceleration at frequencies of 5 hertz (S_S) and 1 hertz (S_1), which are then used to derive the remainder of the response spectra at all other frequencies. Mapped S_S and S_1 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 2 – Design Spectral Values

Value	2002 Seismic Hazard Maps Site Class D
S_{DS}	0.32 g
S_{D1}	0.13 g
PGA	0.13 g

For a structure having an Occupancy Category classification of I, II, or III, the S_{DS} and S_{D1} values obtained from the 2006 IBC (2002 Seismic Hazard Maps) are consistent with Seismic Design Category C as defined in section 1613.5.6.

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 may 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.

Site Preparation and Earthwork

Stripping depths will likely be about 6 to 12 inches over the majority of the site. In drainage features, stripping depths may be considerably greater. We recommend conducting organic content tests within the building and pavement footprints. Organically stained soils with organic contents of 3 percent or less may be left in place but may need stabilization (compaction).

Moderate to highly plastic clay soils were encountered to depths of about 4 to 5 feet below the existing ground surface in several of our borings. These soils have the potential to shrink or swell with significant changes in moisture content and can adversely affect foundations, floor slabs and pavements if left in place in their current condition. Where encountered within a depth of about 5 feet below footing or grade slab bearing elevations, the moderate to high plasticity clays will likely need to be undercut and removed from beneath any structural and pavement areas or stabilized by other means, such as cement or lime stabilization.

The volume of soils requiring stabilization will be dependent on final grading plans. It should also be noted that the moderate to highly plastic soils removed from cut areas or undercut excavations will generally not be suitable for use as structural fill within building footprints, but could potentially be used in deep (below about 10 feet) fill areas below pavements. However, these soils will likely be very difficult to work during site grading.

Detention/retention ponds may be constructed to provide borrow material for site construction. The silty sands encountered in our soil test borings appear suitable for use as structural fill. However, sands containing high fines contents may be difficult to work if allowed to become wet and could require extensive drying. The clays and sandy clays encountered in our borings are not recommended for reuse as structural fill.

Foundations

The soil profiles encountered appear generally suitable for development for industrial use considering static loading. The use of shallow foundations for support of column loads up to 250 kips appears feasible for typical light to medium industrial structural column configurations, provided footings are properly constructed and settlements of about 1 inch can be tolerated. Area loads imposed by stacked materials or large vessels or tanks can likely be supported by mat or strip footings, provided that several inches of settlement can be withstood by the structure. Footings extended to bear on partially weathered rock will generally provide higher bearing values than those bearing in the upper soils on the site.

Once building locations are established, borings should be conducted within each building footprint prior to design of foundations.

Control of Groundwater and Surface Runoff

Groundwater was not encountered in our borings at the time of drilling. Firm to very stiff fine grained soils similar to those encountered in the upper 5 to 10 feet of the soil profile may inhibit downward infiltration of rainfall, and formation of a perched water table at relatively shallow depths is possible 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. In areas were machine pits may be constructed, ditching or excavation of sumps and pumping may be necessary to control potential perched water conditions. Capacity of sediment or detention ponds may also be limited in areas where shallow groundwater is encountered. In areas of proposed construction where shallow groundwater is encountered, it may be desirable to raise site grades to help reduce the impact of groundwater on construction.

During normal rainfall periods, ditching or other provisions for drainage should be provided prior to stripping and 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.

Grade Slab Support and Construction

It is likely that grade slabs will be supported by virgin on-site soils or on-site borrow soils.

1 The silty sands and sandy clays similar to those penetrated by our borings will generally provide adequate support to soil-supported slabs-on-grade, assuming proper preparation, moisture control, and compaction of the subgrade for static load conditions.

2 The moderate to high plasticity clays similar to those encountered in our borings may not provide sufficient support to soil-supported slabs-on-grade. These soils will likely require removal or some other form of stabilization.

3 A capillary break of at least 4 inches of clean sand or crushed stone placed below floor slabs will be required.

4 We recommend you place a vapor barrier such as "Visqueen," or the equivalent, to limit moisture infiltration into finished space, or other areas where moisture infiltration

will potentially cause problems. The vapor barrier should be placed below the capillary break material.

Pavement Subgrade and Base Material Preparation

The silty sands encountered in the soil test borings will likely provide adequate bearing for pavements. However, the silty sands may be difficult to work if allowed to become wet and will not provide good bearing if proper moisture control is not used. The sandy clays encountered in our borings are less desirable for support of pavement sections and will likely require some form of stabilization such as undercutting and removal or cement or lime stabilization.

Drainage of subgrade material plays an important role in the performance of pavement sections. Site preparation should allow for drainage that results in groundwater elevations being maintained at least 2 ft. below the top of the pavement section. At least one laboratory California Bearing Ratio (CBR) test should be performed upon representative soil samples of each soil type, which is proposed for use as subgrade material. This is to establish the relationship between relative compaction and CBR for the soil in question. This will also confirm that the CBR value of the soils used at the required level of compaction is equal to or greater than the CBR value assumed during design of the pavement section.

Recommendations for Additional Exploration

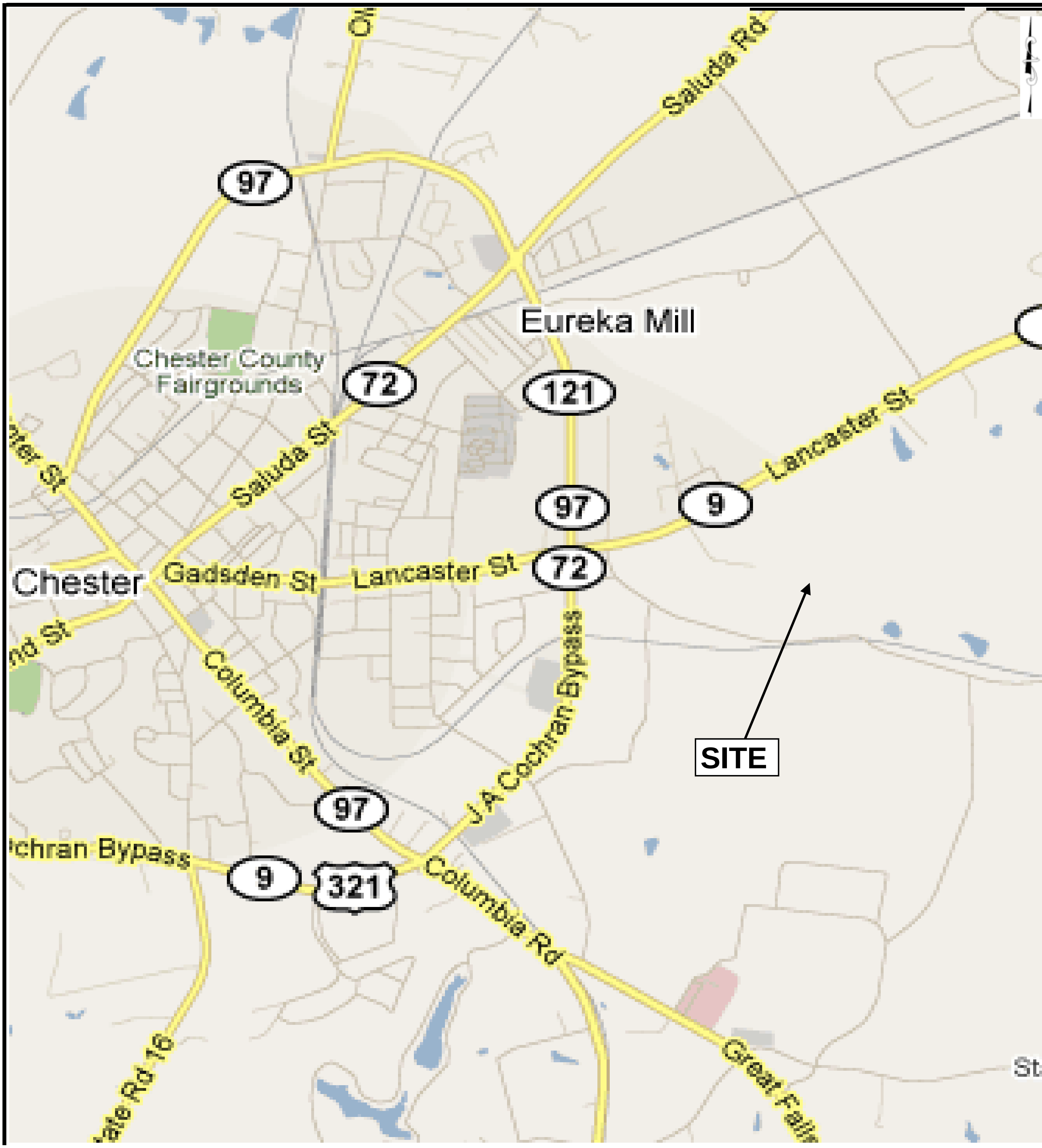
The current number of borings provides some indication of the range of conditions that may be encountered at the site. However, the spacing and number of borings does not provide a reliable basis for design of building foundations. Once building, possible railway, parking and access drive locations are decided, we recommend additional soil test borings be performed in the proposed footprints.

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.

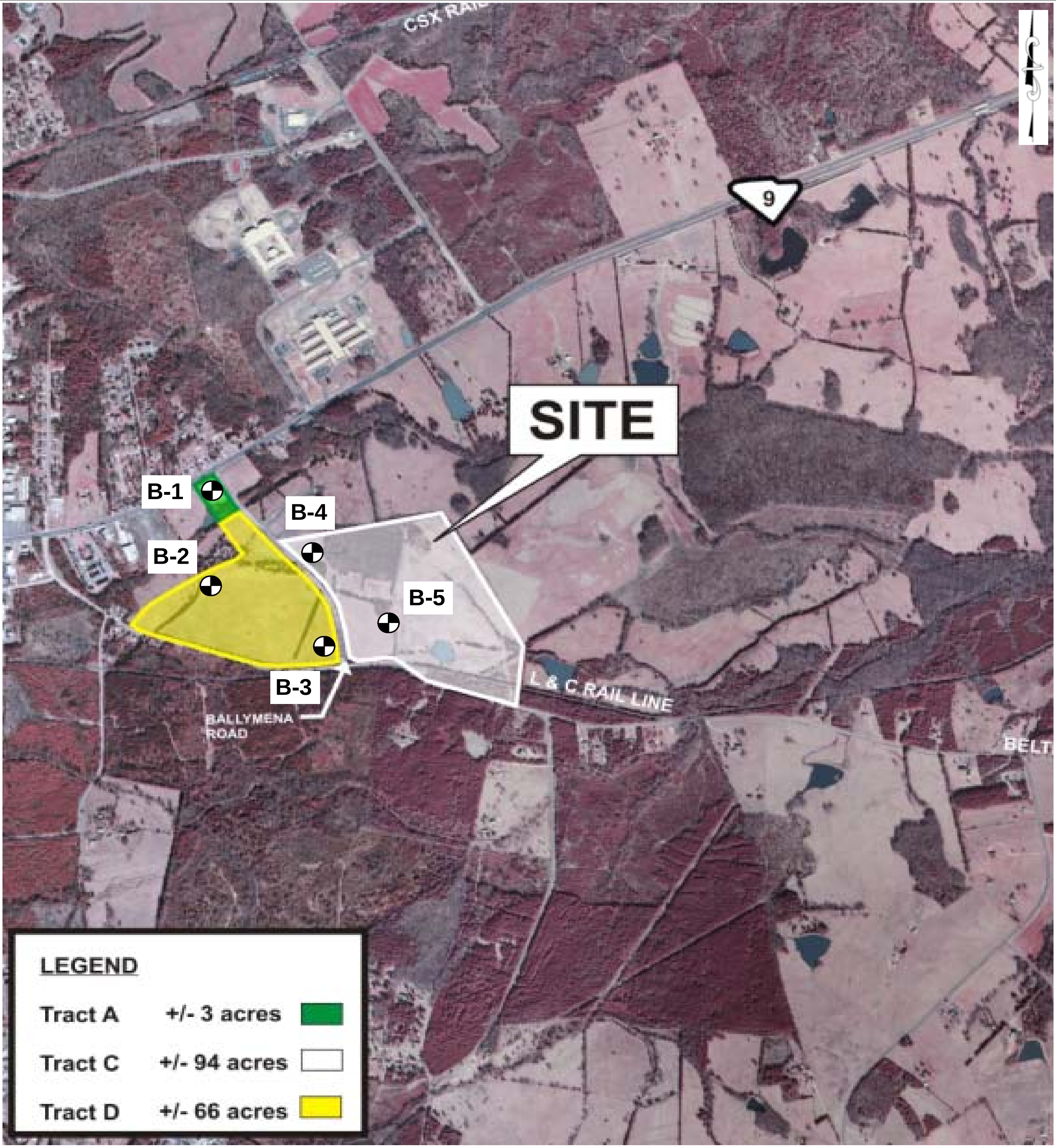
Due to the distance between each boring, subsurface conditions can be expected to vary from the conditions described herein. This report was intended to give general information about overall site conditions only. Additional geotechnical explorations should be conducted for each proposed structure, railway, pavement area or roadway.

Under Section 1705 of the International Building Code, a formal Quality Assurance Plan is required for most structures described as Seismic Design Category D as defined in Section 1613. While some of the Special Inspection required under sections 1706-1713 involve soils or foundations, preparation of the Quality Assurance Plan was beyond the scope of this preliminary report.



SOURCE: MAPQUEST.COM 2010

SCALE: NTS	S&ME	SITE LOCATION MAP CHESTER TECHNOLOGY PARK CHESTER COUNTY, SOUTH CAROLINA	FIGURE NO:
CHECKED BY: JTP			1
DRAWN BY: TH			
DATE: 07/28/10		JOB NO. 1611-10-268	



Source: Alliance Consulting Engineers' aerial site plan dated June 7, 2010 and SCDNR 2006.

SCALE: NTS CHECKED BY: JTP DRAWN BY: TH DATE: 07/28/10	S&ME	BORING LOCATION PLAN CHESTER TECHNOLOGY PARK CHESTER COUNTY, SOUTH CAROLINA JOB NO. 1611-10-268	FIGURE NO: 2

LEGEND TO SOIL CLASSIFICATION AND SYMBOLS

SOIL TYPES

(Shown in Graphic Log)

- Fill
- Asphalt
- Concrete
- Topsoil
- Gravel
- Sand
- Silt
- Clay
- Organic
- Silty Sand
- Clayey Sand
- Sandy Silt
- Partially Weathered Rock (PWR)
- Sandy Clay
- Rock
- Incompetent Rock
- Boulder

WATER LEVELS

(Shown in Water Level Column)

- ▽ = Water Level At Termination of Boring
- ▼ = Water Level Taken After 24 Hours
- ◄ = Loss of Drilling Water
- HC = Hole Cave

CONSISTENCY OF COHESIVE SOILS

CONSISTENCY	STD. PENETRATION RESISTANCE BLOWS/FOOT
Very Soft	0 to 2
Soft	3 to 4
Firm	5 to 8
Stiff	9 to 15
Very Stiff	16 to 30
Hard	31 to 50
Very Hard	Over 50

RELATIVE DENSITY OF COHESIONLESS SOILS

RELATIVE DENSITY	STD. PENETRATION RESISTANCE BLOWS/FOOT
Very Loose	0 to 4
Loose	5 to 10
Medium Dense	11 to 30
Dense	31 to 50
Very Dense	Over 50

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 Times 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%.

S&ME
ENGINEERING • TESTING
ENVIRONMENTAL SERVICES

PROJECT:	Chester Technology Park Chester County, South Carolina S&ME Project No. 1611-10-268	**BORING LOG** **B-1**

DATE DRILLED: 7/15/2010	ELEVATION:	NOTES:
DRILLING METHOD: 2¼" H.S.A.	BORING DEPTH: 18	
LOGGED BY: WMJ	WATER LEVEL: Not encountered	
DRILLER: Howard Wessinger	DRILL RIG: CME 550	

DEPTH (feet)	GRAPHIC LOG	MATERIAL DESCRIPTION	WATER LEVEL	ELEVATION (feet-MSL)	SAMPLE NO. / SAMPLE TYPE	STANDARD PENETRATION TEST DATA (blows/ft) 10 20 30 60 80	N VALUE
		TOPSOIL - approximately 10 inches of topsoil.					
		SILTY SAND (SM) - mostly fine to coarse sands, few fine to coarse quartz gravel, little low plasticity fines, dry, tan, white, trace black, medium dense to very dense.			1		15
5					2	>>	50/ 4"
		PARTIALLY WEATHERED ROCK (PWR) - sampled as Silty Sand (SM), mostly fine sand, some low plasticity fines, tan, greenish gray, mottled, very dense.			3	>>	50/ 5"
10		**SILTY SAND (SM)** - mostly fine sand, some low plasticity fines, tan, greenish gray, very dense.			4		84
15		**PARTIALLY WEATHERED ROCK (PWR)** - sampled as Silty Sand (SM), mostly fine sand, some low plasticity fines, tan, greenish gray, mottled, very dense.			5	>>	50/ 5"
		AUGER REFUSAL AT 18 FEET.					

BORING LOG 10-268LOGS.GPJ WITH CPT.GDT 7/29/10

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.*

S&ME
ENGINEERING • TESTING
ENVIRONMENTAL SERVICES

PROJECT:	Chester Technology Park Chester County, South Carolina S&ME Project No. 1611-10-268	BORING LOG B-2

DATE DRILLED:	7/15/2010	ELEVATION:	
DRILLING METHOD:	2¼" H.S.A.	BORING DEPTH:	11.5
LOGGED BY:	WMJ	WATER LEVEL:	Not encountered
DRILLER:	Howard Wessinger	DRILL RIG:	CME 550

NOTES:

DEPTH (feet)	MATERIAL DESCRIPTION
0 – 0.7	**TOPSOIL** - approximately 8 inches of topsoil.
0.7 – 5	**SANDY FAT CLAY (CH)** - mostly medium to high plasticity fines, some fine to medium sands, trace fine roots, tan, light orange, greenish gray, stiff.
5 – 12	**PARTIALLY WEATHERED ROCK (PWR)** - sampled as Silty Sand (SM), mostly fine to medium sand, some low plasticity fines, tan, greenish/gray, mottled, very dense. - gray, tan, white.
12	AUGER REFUSAL AT 12 FEET.

WATER LEVEL | ELEVATION (feet-MSL) | SAMPLE NO. SAMPLE TYPE | STANDARD PENETRATION TEST DATA (blows/ft) | N VALUE

SAMPLE NO.	N VALUE
1	9
2	50/ 4"
3	50/ 3"
4	50/ 0"

NOTES:

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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.*

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PROJECT:	Chester Technology Park Chester County, South Carolina S&ME Project No. 1611-10-268	**BORING LOG**	**B-3**

DATE DRILLED:	7/15/2010	ELEVATION:	
DRILLING METHOD:	2¼" H.S.A.	BORING DEPTH:	25
LOGGED BY:	WMJ	WATER LEVEL:	Not encountered
DRILLER:	Howard Wessinger	DRILL RIG:	CME 550

NOTES:

DEPTH (feet)	MATERIAL DESCRIPTION	WATER LEVEL	ELEVATION (feet-MSL)	SAMPLE NO.	N VALUE
0	**TOPSOIL** - approximately 8 inches of topsoil.				
	SANDY FAT CLAY (CH) - mostly medium to high plasticity fines, some fine to medium sands, trace fine roots, moist, dark brown, firm.			1	6
5	**PARTIALLY WEATHERED ROCK (PWR)** - sampled as Silty Sand (SM), mostly fine to medium sand, little low plasticity fines, dry to moist, tan, brown, mottled, very dense.			2	50/ 3"
	- with gray.			3	50/ 4"
10				4	50/ 5"
15	- some fine gravel, very little recovery.			5	50/ 1"
20				6	50/ 0"
25				7	50/ 1"
	BORING TERMINATED AT 25 FEET.				

STANDARD PENETRATION TEST DATA (blows/ft): 10 20 30 60 80

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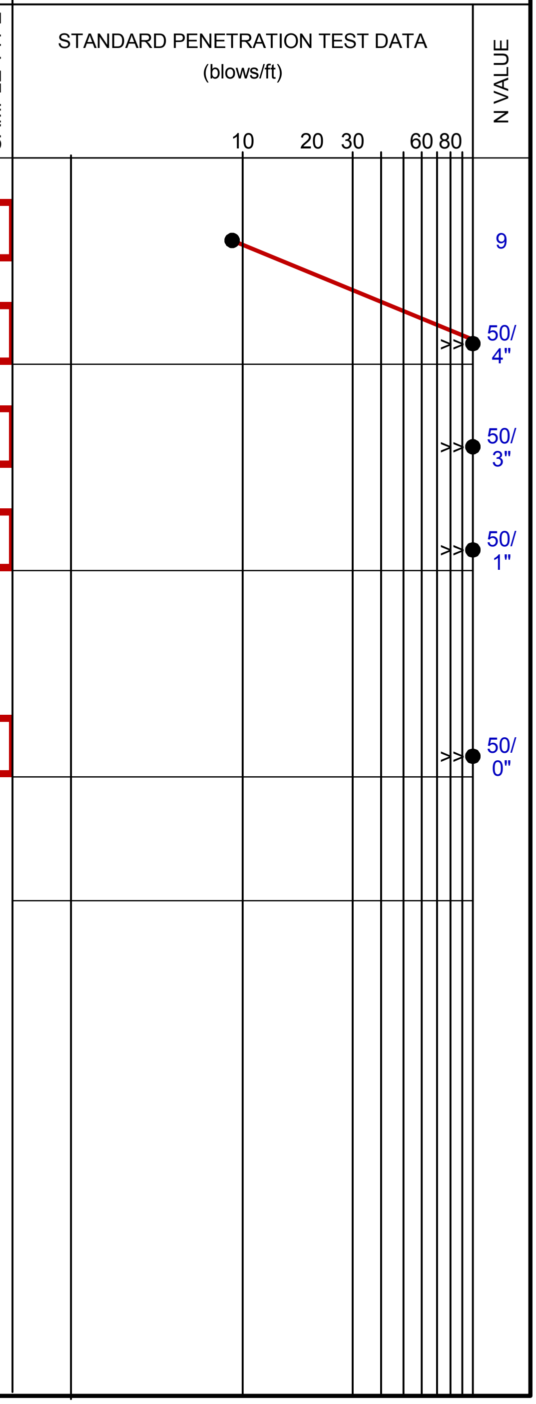
PROJECT:	Chester Technology Park Chester County, South Carolina S&ME Project No. 1611-10-268	**BORING LOG B-4**

DATE DRILLED:	7/15/2010	ELEVATION:	
DRILLING METHOD:	2¼" H.S.A.	BORING DEPTH:	18
LOGGED BY:	WMJ	WATER LEVEL:	Not encountered
DRILLER:	Howard Wessinger	DRILL RIG:	CME 550

NOTES:

DEPTH (feet)	MATERIAL DESCRIPTION	WATER LEVEL	ELEVATION (feet-MSL)	SAMPLE NO.	N VALUE
0	**TOPSOIL** - approximately 10 inches of topsoil.				
	SANDY FAT CLAY (CH) - mostly medium to high plasticity fines, some fine to medium sands, trace fine roots, moist, dark brown, firm.			1	9
5	**PARTIALLY WEATHERED ROCK (PWR)** - sampled as Silty Sand (SM), mostly fine to medium sand, little low plasticity fines, dry to moist, yellowish tan, gray, very dense.			2	50/ 4"
				3	50/ 3"
10	- tan and gray with white.			4	50/ 1"
15	- no sample recovery.			5	50/ 0"
18	AUGER REFUSAL AT 18 FEET.				



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3. *STRATIFICATION AND GROUNDWATER DEPTHS ARE NOT EXACT.*
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PROJECT:	Chester Technology Park Chester County, South Carolina S&ME Project No. 1611-10-268	BORING LOG **B-5**

DATE DRILLED:	7/15/2010	ELEVATION:	
DRILLING METHOD:	2¼" H.S.A.	BORING DEPTH:	14
LOGGED BY:	WMJ	WATER LEVEL:	Not encountered
DRILLER:	Howard Wessinger	DRILL RIG:	CME 550

NOTES:

DEPTH (feet)	GRAPHIC LOG	MATERIAL DESCRIPTION	WATER LEVEL	ELEVATION (feet-MSL)	SAMPLE NO. SAMPLE TYPE	STANDARD PENETRATION TEST DATA (blows/ft)	N VALUE
		TOPSOIL - approximately 10 inches of topsoil.					
		SANDY LEAN CLAY (CL) - mostly low to medium plasticity fines, some fine to medium sands, trace roots, moist, green, brown, with black, firm.			1		5
		PARTIALLY WEATHERED ROCK (PWR) - sampled as Silty Sand (SM), mostly fine to medium sand, some low plasticity fines, dry to moist, tan, brown, gray, very dense.			2	>>	50/ 4"
5		- white and tan with trace greenish brown.			3	>>	50/ 4"
		- tan and brown with trace orange and green.			4	>>	50/ 0"
10							
		AUGER REFUSAL AT 14 FEET.					

BORING LOG 10-268LOGS.GPJ WITH CPT.GDT 7/29/10

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