APPENDIX 11

PRELIMINARY GEOTECHNICAL EXPLORATION / SEISMIC EVALUATION

ENGINEERS
PLANNERS
ECONOMISTS

Wilbur Smith Associates

June 22, 2005

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Wilbur Smith Associates
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Attn: Mr. Kevin R. Krick, P.E.
Project Manager, Site Development Division

Re: Report of Preliminary Geotechnical Engineering Investigation
South Carolina Site Certification Program
Thomason II Industrial Site, Laurens County
Clinton, South Carolina
WSA Project No. 516931

Gentlemen:

The Wilbur Smith Associates (WSA) Geotechnical Engineering Division has performed a preliminary geotechnical investigation for the referenced project. This investigation is a component of an overall preliminary site evaluation and characterization being performed by WSA for the South Carolina Department of Commerce (SCDOC) for several sites that are being considered for industrial development.

The purpose of this preliminary study was to preliminarily assess the site subsurface conditions in regard to the impact that these conditions would have on the design and construction of light industrial facilities. This report gives a summary of the type of potential development that is expected, outlines the investigation that was performed, presents the data that was obtained in the field and laboratory, and provides our preliminary geotechnical engineering assessment for future industrial development.

Potential Development of Site and Design Assumptions

It is understood that the property could potentially be developed for use by several companies. It is expected that the site master plan would provide for a system of roads, underground utilities and stormwater detention facilities. Development of the overall site infrastructure systems would serve individual facilities that may typically occupy 5 to 20 acres. It is probably that development of individual sites would primarily consist of one story warehouse buildings with paved truck drive and parking areas around the buildings.

It is anticipated that warehouse buildings would be steel-frame structures that have walls consisting of either precast or cast-in-place concrete, concrete block or metal. The expected maximum column and walls loads for this type of construction would probably be on the order of 150 kips and 6 klf, respectively. Loads of this magnitude would be supported on shallow spread footing foundations. It is assumed that maximum floor live loads will be on the order of 200 psf.

The floor slabs for the anticipated warehouse structures would be supported on either in-situ or structural fill soils. It is anticipated that a balanced earthwork condition for individual sites may typically result in up to 5 feet or cut or fill under building slabs and in areas to be paved.

Site Location and Surface Features

The Thomason II Industrial Site is located about 4 miles southwest of the City of Clinton, as shown on the attached Site Location map. The site is bounded on the east by Charlotte's Road and is less that one mile north of SC72. A CSX track generally extends along the northern and western perimeter of the site.

The approximate 113 acre site is heavily wooded with a relatively small cleared area along the southeast perimeter, which was cultivated in the past. A dirt trail generally extends in an east-west direction through the long axis of the site. The property generally has a gently sloping surface with elevations that vary from about 580 feet near the western end of the site to about 645 feet near the southeast corner along Charlotte's Road. The datum for these elevations is 1929 NGVD with the indicated maximum and minimum elevations obtained from the 1971 USGS Clinton Quadrangle Map.

Heavy rain at the site immediately prior to the June 2, 2005, start of drilling caused ponding of water at the surface and made movement of the ATV drill carrier difficult and the movement of the 4-wheel drive support truck very difficult in some areas. It is also noted that based on the USGS Quad map that an intermittent stream flows under the CSX track about in the middle of the north boundary of the site and that it exits the site near the western limit.

Regional Geology and Soil Survey Mapping

Geologic information for the site was obtained from USGS geologic maps, USDA soil survey data and The Geology of the Carolinas, 1991, 1st edition, edited by J. W. Horton Jr. and V.A. Zullo. The site is in the Piedmont physiographic province and has underlying rock formations consisting of granite, gneiss, schist and gabbro diorite.

The overlying residual soils appear to be of the Cecil-Appling association which are typically a reddish brown sandy clay loam. These soils typically are classified by the Unified Soil Classification System (USCS) as micaceous sandy clayey silts (ML, MH and CL). The classification of the upper materials by the AASHTO system would be A-4, A-5, A-6 and A-7.

Scope of Subsurface Investigation and Results

The subsurface conditions at the site were explored by drilling four widely spaced soil test borings. The boring locations were determined by WSA and were selected to be at locations that were reasonably accessible to the ATV drill carrier. Because of the heavily wooded nature of the site these locations were limited to near the site perimeter and along the dirt trail that bisects the site in an east-west direction.

The test borings were drilled in general accordance with ASTM D1586, Penetration Test and Split-Barrel Sampling of Soils and the bore holes were advanced using hollow-stem augers. The four soil test boring locations are approximately shown on the attached Boring Location Plan.

The materials encountered in the borings were relatively uniform generally consisting of a mix of fine sand, silt and clay soils. The consistency of the strata encountered typically ranged from firm to very stiff with standard penetration resistance or N values generally varying from 5 to 14 blows per foot (bpf). Slightly silty fine sand (SM) strata were encountered in boring B-1 from 62 to 70 feet and from 12 to 20 feet in B-4. N values in these layers ranged from 19 to 35 bpf.

The groundwater level was recorded at the time of drilling at two boring locations. In boring B-1 it was measured at a depth of 39 feet and in boring B-2 it was at a depth of 19 feet, both of which correspond to elevation 601 feet. It is noted that the silt clay soils have a relatively low permeability rate therefore longer term readings may indicate a somewhat higher groundwater level. As stated above surface water ponding occurred at the time of the investigation and such perched water conditions should be expected during periods of moderate to heavy rainfall.

The detailed description of the soils encountered in each of the borings and groundwater level readings are provided on the attached Boring Logs. The surface elevations at each of the boring locations were estimated using the USGS Quad map. The accuracy of these surface elevation estimates is on the order of 5 to 10 feet.

Preliminary Geotechnical Engineering Evaluation and Recommendations

Based on the results of the four widely spaced soil test borings during this investigation, the site observations that were performed and our experience with similar conditions the anticipated development as outlined above should be possible without undue difficulties. The only major restriction that appears likely will be the placement of the clay silt soils as structural fill beneath the buildings and for the roadway subgrade. The fines content (percent passing the no. 200 mesh sieve) and the sensitivity of these soils to moisture content will make them very difficult to work. Such materials are not uncommon in the Piedmont; therefore experienced earth moving contractors would have placed similar materials for prior developments in the area.

Roadway and site development should initially require the removal of all trees, vegetation and other deleterious materials from within the footprint of all structures, and from roadways and other areas to be paved. Means to control surface water runoff should then be established to prevent surface ponding. Assuming that a balanced cut and fill grading plan is developed for the roadways and each of the building sites the cut soils should be placed in a uniform and controlled manner. Placement of the cut soils as structural fill should be in lifts of 6 to 8 inches and within 2 to 3 percent of the soils optimum moisture content. Compaction of each fill lift to a minimum in-place density of

95 percent of the standard Proctor (ASTM D698) should be achieved. In order to achieve the required density in the upper two feet of structural fill beneath shallow foundations, floor slabs and the upper one foot of roadway subgrade material it may be beneficial to either place less cohesive import materials or to blend in such soils with the on-site materials. The blending of lime into the upper foot of clay silt soils would also reduce the plasticity and improve the stability of these materials.

Shallow spread footings designed using allowable soil bearing pressures of 2000 to 3000 psf can be utilized for individual column and wall footings. These footings can bear on either in-situ or compacted fill soils. Settlement of the building columns, walls and slabs should be controlled by proper placement of structural fill and consolidation monitoring of significant fill areas.

The site seismic classification based on the standard penetration test values is an E, however, a more detailed analysis at the time of building design could improve the site class to a D. A very low probability of liquefaction exists due to the high fines content of the upper soils and the relatively high density of the fine sand strata that were encountered in two of the borings.

At the time of detailed design site studies that includes the roadways and individual structures additional subsurface investigations should be performed to develop specific design parameters. The scope of such investigations should be determined at that time and based on facility layout and specific design requirements.

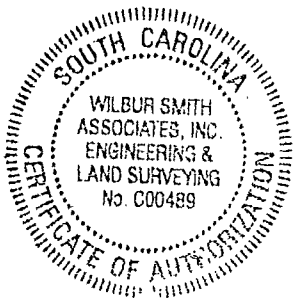
If there are any questions at this time regarding the findings of this investigation or our preliminary geotechnical engineering recommendations please contact the undersigned.

Sincerely,

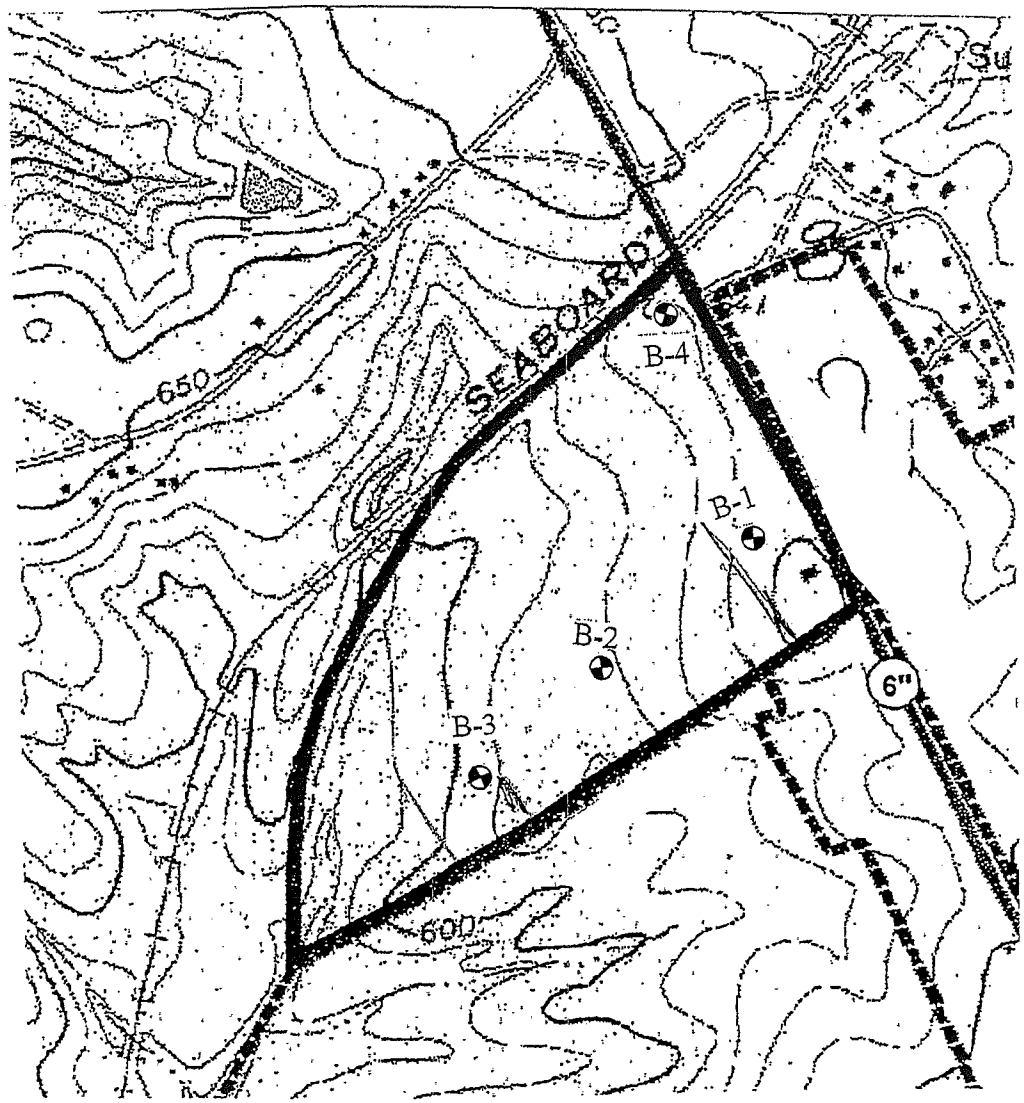
Wilbur Smith Associates

E. Woody Lingo, P.E.
Principal Engineer

Jamal Daas, P.E.
Senior Geotechnical Engineer



SITE LOCATION		ENGINEERS PLANNERS ECONOMISTS Wilbur Smith Associates	
Thomason II Industrial Site			
Laurens County, South Carolina			
Scale		Figure No.	1
WSA Project No.	516931	Date	6/20/2005



APPROXIMATE BORING LOCATION

BORING LOCATION PLAN		Wilbur Smith Associates	
Thomason II Industrial Site			
Laurens County, South Carolina			
Approx. Scale		Figure No.	2
WSA Project No.	516931	Date	6/20/2005

ENGINEERS PLANNERS ECONOMISTS

Wilbur Smith Associates

Project: Thomason II Industrial Site

Project No.: 516931

Alignment:

BORING NO. B-1

Equipment:	Method:	Casing Length:	Date Begun: 6/2/05
ATV 550	HSA	---	
WSA Representative:	**Hammer Type:**	**Casing Diameter:**	**Date Completed:** 6/2/05
W. Lingo	AUTOMATIC	---	

Groundwater Levels (feet)

0 hour: 39 (ELEV 601)

24 hours: Not Measured

DEPTH (ft)	SOIL CLASSIFICATION AND REMARKS SEE KEY SYMBOL SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS BELOW	LEGEND	ELEV (ft)	SAMPLES IDENT	TYPE	N-COUNT 1st 6" 2nd 6" 3rd 6" / RQD % REC
0	**SANDY SILTY CLAY (CL-ML)**, reddish brown, stiff		640	SPT-1		2-3-5 (N = 8)
				SPT-2		3-3-6 (N = 9)
5	**SANDY SILT (ML)**, mottled reddish tan, micaceous, stiff		635	SPT-3		4-5-6 (N = 11)
				SPT-4		6-6-8 (N = 14)
10			630	SPT-5		5-6-7 (N = 13)
15	**CLAYEY SAND (SC)**, mottled reddish brown, tan, orange, micaceous, medium dense		625	SPT-6		3-6-8 (N = 14)
	SANDY CLAY (CL), mottled reddish brown, tan, orange, micaceous, stiff					
20			620	SPT-7		3-4-7 (N = 11)
25			615	SPT-8		3-5-7 (N = 12)
30			610	SPT-9		3-4-6 (N = 10)
35			605	SPT-10		3-4-6 (N = 10)
40			600	SPT-11		3-5-6 (N = 11)

PL (%) NM (%) LL (%)

▲ FINES (%)

● SPT (bpf)

10 20 30 40 50 60 70 80 90 100

WS_____G THOMPSON II.GPJ NATCHEZ.GDT 6/23/05

Interpretations provided are based on the intervals sampled at the time of drilling. Actual conditions between sampling intervals may differ as a result of gradual or abrupt changes.

Wilbur Smith Associates — ENGINEERS PLANNERS ECONOMISTS

Project: Thomason II Industrial Site

Project No.: 516931

Alignment:

BORING NO. B-1

Equipment:	Method:	Casing Length:	Date Begun: 6/2/05
ATV 550	HSA	---	
WSA Representative:	**Hammer Type:**	**Casing Diameter:**	**Date Completed:** 6/2/05
W. Lingo	AUTOMATIC	---	

Groundwater Levels (feet)
0 hour: 39 (ELEV 601)
24 hours: Not Measured

DEPTH (ft)	SOIL CLASSIFICATION AND REMARKS	LEGEND	ELEV (ft)	SAMPLES IDENT	SAMPLES TYPE	SAMPLES N-COUNT 1st 6" 2nd 6" 3rd 6" / RQD % REC
40	**SANDY CLAY (CL)**, mottled reddish brown, tan, orange, micaceous, stiff *(continued)*		600			
45			595	SPT-12		2-5-7 (N = 12)
50			590	SPT-13		2-5-7 (N = 12)
55			585	SPT-14		4-8-6 (N = 14)
60			580	SPT-15		3-4-7 (N = 11)
65	**SLIGHTYLY SILTY SAND (SM)**, tan, fine to cemented, dense		575	SPT-16		6-8-11 (N = 19)
70	**End of Boring at 70 feet.**		570	SPT-17		8-13-22 (N = 35)
75			565			
80			560			

PL (%) NM (%) LL (%)
▲ FINES (%)
● SPT (bpf)
10 20 30 40 50 60 70 80 90 100

Interpretations provided are based on the intervals sampled at the time of drilling. Actual conditions between sampling intervals may differ as a result of gradual or abrupt changes.

Wilbur Smith Associates — ENGINEERS PLANNERS ECONOMISTS

Project: Thomason II Industrial Site

Project No.: 516931 | **Alignment:**

BORING NO. B-2

Equipment:	Method:	Casing Length:	Date Begun: 6/2/05
ATV 550	HSA	---	
WSA Representative:	**Hammer Type:**	**Casing Diameter:**	**Date Completed:** 6/2/05
W. Lingo	AUTOMATIC	---	

Groundwater Levels (feet)
0 hour: 19 (ELEV 601)
24 hours: Not Measured

DEPTH (ft)	SOIL CLASSIFICATION AND REMARKS	LEGEND	ELEV (ft)	SAMPLES IDENT	TYPE	N-COUNT 1st 6" 2nd 6" 3rd 6" / RQD % REC
0	**SANDY SILTY CLAY (CH)**, orange, tan, micaceous, firm to stiff		620	SPT-1		4-3-4 (N = 7)
				SPT-2		3-5-7 (N = 12)
5			615	SPT-3		3-5-7 (N = 12)
				SPT-4		2-3-5 (N = 8)
10			610	SPT-5		0-2-3 (N = 5)
	SLIGHTLY SANDY SILTY CLAY (CL), tan, orange, firm, thin dark brown organic lense					
15			605	SPT-6		2-2-3 (N = 5)
	SILTY CLAY (CL-ML), light yellow, tan, firm ▽					
20	**End of Boring at 20 feet.**		600	SPT-7		2-2-3 (N = 5)
25			595			
30			590			
35			585			
40			580			

PL (%) NM (%) LL (%) ▲ FINES (%) ● SPT (bpf)
10 20 30 40 50 60 70 80 90 100

Interpretations provided are based on the intervals sampled at the time of drilling. Actual conditions between sampling intervals may differ as a result of gradual or abrupt changes.

Wilbur Smith Associates — ENGINEERS PLANNERS ECONOMISTS

Project: Thomason II Industrial Site

Project No.: 516931

Alignment:

BORING NO. B-3

Equipment:	Method:	Casing Length:	Date Begun: 6/2/05
ATV 550	HSA	---	
WSA Representative:	**Hammer Type:**	**Casing Diameter:**	**Date Completed:** 6/2/05
W. Lingo	AUTOMATIC	---	

Groundwater Levels (feet)
0 hour: Not Measured
24 hours: Not Measured

SOIL CLASSIFICATION AND REMARKS

SEE KEY SYMBOL SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS BELOW.

DEPTH (ft)	ELEV (ft)	SOIL CLASSIFICATION AND REMARKS	SAMPLES IDENT	SAMPLES TYPE	SAMPLES N-COUNT 1st 6" 2nd 6" 3rd 6" RQD % REC
0	610	**SILTY CLAY (CL-ML)**, dark brown, with grass roots			
		CLAYEY SAND (SC), orange, tan, micaceous, fine to moderate sand, sand seam around 1.5 feet, loose to medium dense	SPT-1		2-4-3 (N = 7)
			SPT-2		4-5-5 (N = 10)
5	605		SPT-3		3-9-11 (N = 20)
			SPT-4		3-4-4 (N = 8)
10	600	**SILTY CLAYEY SAND (SC-SM)**, orange, tan, fine to moderate sand, medium dense	SPT-5		8-11-12 (N = 23)
		SILTY SAND (SM), brown, tan, moderate to coarse sand, dense			
15	595		SPT-6		7-15-17 (N = 32)
		SILTY SAND (SM), tan, brown, slightly cemented, medium dense			
20	590	**End of Boring at 20 feet.**	SPT-7		10-15-14 (N = 29)
25	585				
30	580				
35	575				
40	570				

PL (%) NM (%) LL (%)
▲ FINES (%)
● SPT (bpf)
10 20 30 40 50 60 70 80 90 100

Interpretations provided are based on the intervals sampled at the time of drilling. Actual conditions between sampling intervals may differ as a result of gradual or abrupt changes.

Wilbur Smith Associates — ENGINEERS PLANNERS ECONOMISTS

Project: Thomason II Industrial Site

Project No.: 516931

Alignment:

BORING NO. B-4

Equipment:	Method:	Casing Length:	Date Begun: 6/4/05
ATV 550	HSA	---	
WSA Representative:	**Hammer Type:** AUTOMATIC	**Casing Diameter:** ---	**Date Completed:** 6/4/05

Groundwater Levels (feet)
0 hour: Not Measured
24 hours: Not Measured

DEPTH (ft)	SOIL CLASSIFICATION AND REMARKS (SEE KEY SYMBOL SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS BELOW)	LEGEND	ELEV (ft)	SAMPLES IDENT	SAMPLES TYPE	N-COUNT 1st 6" 2nd 6" 3rd 6" / RQD % REC
0	CLAY (CL), light brown, red, moist, firm		640			
	SILT (ML), orange, firm to very stiff			SPT-1		5-13-9 (N = 22)
				SPT-2		5-5-7 (N = 12)
5			635	SPT-3		4-3-4 (N = 7)
	CLAY (CL), mottled white, gray, orange, stiff, moist			SPT-4		3-4-5 (N = 9)
	SILTY CLAY (CL-ML), mottled reddish brown, gray, white, firm, moist			SPT-5		2-3-3 (N = 6)
10			630			
	SILT (ML), white and gray, firm, moist			SPT-6		1-2-3 (N = 5)
15			625			
				SPT-7		
20	**End of Boring at 20 feet.**		620			
25			615			
30			610			
35			605			
40			600			

PL (%) NM (%) LL (%)
▲ FINES (%)
● SPT (bpf)
10 20 30 40 50 60 70 80 90 100

WSA LOG THOMPSON II.GPJ NATCHEZ.GDT 6/22/05

Interpretations provided are based on the intervals sampled at the time of drilling. Actual conditions between sampling intervals may differ as a result of gradual or abrupt changes.

Thomason II, Laurens Co. SC

Client : Wilbur Smith PROJECT: Thomason II, Laurens Co. SC Project number: GTX G0841

Boring number	Sample No.	Depth (ft.)	% moisture	Percent fines (silt and clay)	Liquid limit	Plastic limit	Plasticity index
B-1							
	Bag	0-1.5 Ft.	24.2	59.1			
	Bag	3.5-5.0 Ft.	22.0		NV	NP	NP
	Bag	3.5-5.0 Ft.	22.2	39.9			
B-2							
	Bag	1.5-3.0 Ft.	30.9	53.9	38	31	7
B-3							
	Bag	1.5-3.0 Ft.	17.3	40.8			

MAJOR DIVISIONS			GROUP SYMBOLS		TYPICAL NAMES
COARSE GRAINED SOILS (More than 50% of material is LARGER than No. 200 sieve size)	GRAVELS (More than 50% of coarse fraction is LARGER than the No. 4 sieve size)	CLEAN GRAVELS (Little or no fines)		GW	Well graded gravels, gravel - sand mixtures, little or no fines.
				GP	Poorly graded gravels or gravel - sand mixtures, little or no fines.
		GRAVELS WITH FINES (Appreciable amount of fines)		GM	Silty gravels, gravel - sand - silt mixtures.
				GC	Clayey gravels, gravel - sand - clay mixtures.
	SANDS (More than 50% of coarse fraction is SMALLER than the No. 4 Sieve Size)	CLEAN SANDS (Little or no fines)		SW	Well graded sands, gravelly sands, little or no fines.
				SP	Poorly graded sands or gravelly sands, little or no fines.
		SANDS WITH FINES (Appreciable amount of fines)		SM	Silty sands, sand - silt mixtures
				SC	Clayey sands, sand - clay mixtures.
FINE GRAINED SOILS (More than 50% of material is SMALLER than No. 200 sieve size)	SILTS AND CLAYS (Liquid limit LESS than 50)			ML	Inorganic silts and very fine sands, rock flour, silty or clayey fine sands or clayey silts and with slight plasticity.
				CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays.
				OL	Organic silts and organic silty clays of low plasticity.
	SILTS AND CLAYS (Liquid limit GREATER than 50)			MH	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts.
				CH	Inorganic clays of high plasticity, fat clays
				OH	Organic clays of medium to high plasticity, organic silts.
HIGHLY ORGANIC SOILS				PT	Peat and other highly organic soils.

BOUNDARY CLASSIFICATIONS: Soils possessing characteristics of two groups are designated by combinations of group symbols.

SILT OR CLAY	SAND			GRAVEL		Cobbles	Boulders
	Fine	Medium	Coarse	Fine	Coarse		

No.200 No.40 No.10 No.4 3/4" 3" 12"

U.S. STANDARD SIEVE SIZE

Reference: The Unified Soil Classification System, Corps of Engineers, U.S. Army Technical Memorandum No. 3-357, Vol. 1, March, 1953 (Revised April, 1960)

Shelby Tube (SH)	Auger Cuttings
Split Spoon Sample (SS)	Bulk Sample
Rock Core (RC)	Crandall Sampler
Dilatometer	Pressure Meter
Packer	No Recovery
Water Table at time of drilling	Water Table after 24 hours
WOH - Weight of Hammer	

LEGEND FOR DRILLING METHODS
HSA - Hollow Stem Auger
CFA - Continuous Flight Auger
DC - Driving Casing
RW - Rotary Wash
AWG - Rock Core, 1-1/8"
NQ - Rock Core, 1-7/8"

CONSISTENCY OF COHESIVE SOILS	
N-Value	Consistency
0-1	Very Soft
2-4	Soft
5-8	Firm
9-15	Stiff
15-30	Very Stiff
Over 30	Hard

RELATIVE DENSITY OF SAND	
N-Value	Density
0-4	Very Loose
5-10	Loose
10-30	Medium Dense
31-50	Dense
Over 50	Very Dense

KEY TO SYMBOLS AND DESCRIPTIONS

ENGINEERS PLANNERS ECONOMISTS

Wilbur Smith Associates