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Circeo
Geotechnical
Engineering, P.C.

Geotechnical Engineering Exploration

Belmont Property
State Route 696 & Karnes Road
Low Moor, Alleghany County, Virginia

CGE Project No. G-326
June 22, 2007

CIRCEO GEOTECH

Geotechnical Explorations - Foundation Evaluations - Retaining Wall Design

Circeo Geotechnical Engineering, P.C.

Geotechnical Explorations - Foundation Evaluations - Retaining Wall Design

CIRCEO GEOTECH
5956 Buckland Mill Road
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June 22, 2007

Mr. Vance H. Spilman
Commonwealth Commercial
7130 Glen Forest Drive, Suite 110
Richmond, Virginia 23226

Re: Report of Geotechnical Engineering Exploration
Belmont Property - State Route 696 & Karnes Road
Low Moor, Alleghany County, Virginia
CGE Project No. G-326

Dear Vance:

As requested, Circeo Geotechnical Engineering, P.C. (CGE) has completed the geotechnical engineering exploration for the Belmont Property off I-64, Exit 21, in Low Moor, Virginia.

Purpose and Scope

The purpose of the geotechnical exploration was to explore the subsurface conditions beneath the future development with soil test borings and to provide geotechnical engineering recommendations for foundation design of proposed building(s) and associated pavement areas. The scope of services included:

- Mobilizing a drill rig and drilling ten (10) soil borings across the property and performing Standard Penetration Testing (SPT) at regular intervals to a maximum depth of 20 feet below existing grades at the approximate locations as indicated on the Boring Location Plan (Sheet 1).

- Conducting soil laboratory testing on selected soil samples for engineering classification purposes including plasticity, moisture-density relationship (Standard Proctor) and CBR tests and moisture content determination of all soil samples. Also, Expansion Index tests were performed on remolded soil samples to determine the shrink-swell potential of the soil for foundation design.

- The engineering report includes the soil boring logs, a discussion of the subsurface conditions encountered, laboratory test results and engineering recommendations regarding allowable bearing capacity for foundation design. The report also includes recommendations for subgrade preparation, foundation undercuts and soil compaction requirements for engineered fill.

Project Information

The proposed site is located on the west side of State Route 696 between Karnes Road and I-64 at Exit 21 in Low Moor, Alleghany County, Virginia. The overall project encompasses an approximate 4.87-acre tract. The scope of this project was limited to the north side of the existing Karnes Creek where the future development is planned.

The site is approximately 10 to 15 feet lower than the roadway along State Route 696 and slopes gradually from northeast to southwest toward Karnes Creek. The site is wooded with some mature trees, saplings and undergrowth. Piles of miscellaneous fill material, primarily blast-furnace slag, have been scattered across the site. Based on the vegetative growth over the piles, it appears that there has not been any recent dumping and the slag piles were probably placed several years ago.

It is anticipated that the site will be a hospitality development with a possible 80-room hotel and convenience market. No specific buildings have been planned; however, it is anticipated that engineered fill on the order of 10 to 15 feet may be required to elevate the site to match the frontage road along State Route 696. No development is expected to occur along Karnes Creek to the south. Construction of a site retaining wall along Karnes Creek may be required to maximize the building and parking areas.

A shallow foundation system and a concrete slab-on-grade will support the proposed buildings. The buildings will likely be wood-framed or masonry structures with steel columns. Maximum wall and column loads are estimated to be 6 to 8 kips per linear foot and 150 kips, respectively.

Geotechnical Exploration

Ten (10) soil borings, designated Boring B-1 to Boring B-10, were drilled with a CME-45 drill rig equipped with 2-1/4" I.D. hollow stem augers. The borings were located a selected location across site in the proposed areas to be developed, and drilled to a maximum depth of 20 feet below existing grades (See Boring Location Plan, Drawing No. 1). The borings were drilled to auger refusal, and several offset borings were required due to shallow auger refusal depths at the locations noted on the Boring Location Plan.

During the soil drilling operation, Standard Penetration Testing was performed at regular intervals throughout the depth of the borings in general accordance with ASTM D-1586. This test method involves a 140-pound weight dropped freely from a height of 30 inches to advance the split-spoon sampler (1-3/8" I.D., 2" O.D.) into the soil. The number of blows for each 6-inch increment is recorded for a sample distance of 18 inches. The sum of the second and third increments of blowcounts is the Standard Penetration Resistance (N-value). The N-value is a measure of the in-situ soil conditions and has been correlated with certain engineering properties of soils.

A representative of the Geotechnical Engineer recorded the soil descriptions of the various soil strata encountered, engineering classification and the SPT N-values. The final boring logs presented in this report, as well as the laboratory test results, represent the soil conditions in the

borings. The lines of demarcation between soil strata are presumed to be approximate. Some variation in the soil conditions should be expected.

Soil Conditions

The results of the borings indicated that the site is covered by approximately 4 to 9 inches of topsoil and forest litter, and averaged approximately 8 inches in thickness. Beneath the surface, existing fill (slag) and alluvial deposits were encountered.

FILL- Existing fill consisted of dark brown to black, fine to coarse, blast-furnace slag was encountered in eight (8) of the soil borings to depths ranging from 3 feet to 8 feet, and averaged 4.5 feet in depth. The fills were in piles as opposed to a consistent layer throughout. No slag was encountered in two (2) soil borings B-1 and B-9. The slag material, while covered by the undergrowth in the wooded areas, may have been dumped by nearby industrial facilities or the hospital to depose of slag, which is a generated by-product from high temperature furnaces.

This material was determined to be non-plastic and granular, and exhibits low swell potential as determined by the short-term Expansion Index Test (See Expansion Index Test, Sheet 5) which is typically performed on soil to determine the shrink-swell potential. It should be noted, however, that slag may exhibit long-term expansion due to the chemical composition and crystallization of slag, and could potentially cause foundation movement to occur if left beneath the proposed buildings.

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ALLUVIUM - Beneath the topsoil and slag, alluvial deposits were encountered which consisted of brown, medium dense, Clayey SAND (SC) and Silty SAND (SM). Standard Penetration Test (SPT) N-values ranged from 11 to 20 blows per foot (bpf), and averaged 15 bpf. Higher SPT N-values of 59 bpf or greater are believed to be associated with dense gravel, cobbles or boulders within the alluvium to the underlying weathered rock. All borings were terminated at auger refusal at depths ranging from 4 feet to 12 feet.

The soils exhibit low plasticity based on Atterberg Limits tests from representative soil samples from Borings B-2, B-6 and B-8. Natural moisture contents (Mc) varied from 16.6% (moist) to 6.8% (slightly moist). The higher moisture contents typically occurred in the soils near the surface and lower moisture contents within the gravel or cobble matrix. The results of soil laboratory tests are tabulated below.

Soil Parameters

Boring No.	Depth (ft)	USCS Soil Type	Liquid Limit (LL)	Plastic Limit (PL)	Plasticity Index (PI)	% Passing No. 200 Sieve	Expansion Index (EI_{50})	Foundation Expansion Potential
B-2	3.5-5.0	SC-SM	18	14	4	35.4	No Test	Very Low
B-6	1.0-8.0	SC-SM	20	14	6	35.0	18	Very Low
B-8	6.0-7.5	SC	31	19	12	35.5	No Test	Low

Groundwater Conditions

At completion of the borings, the boreholes were dry and no groundwater was encountered. It should be noted the an existing spring house is located on the south side of Karnes Creek with groundwater emerging from embankment along Karnes Road at a moderate flowrate and flowed to the west toward the Jackson River. The portion of the creek above the springhouse to the east remained dry. It is possible that seepage could occur through the alluvial deposits and within rock fractures along the rock surface due to infiltration of surface water during periods of precipitation. Fluctuation in subsurface water levels and soil moisture can be anticipated with changes in precipitation, runoff, and seasonal variations.

Construction Recommendations

Based on the subsurface conditions encountered in the borings, laboratory testing and review of the available geologic maps, any topsoil and tree roots (wooded areas) should be stripped prior to fill placement for the building pad and pavement areas. The existing slag can remain in place beneath pavement areas with a minimum of 4 feet of soil cover over the slag; however, any slag beneath proposed building areas should be removed in its entirety to prevent potential foundation movement to expansion of slag. Stripping should extend a minimum horizontal distance of 10 feet beyond the limits of the building areas.

Soil fill, free of organics and debris materials meeting the Unified Soil Classification System (USCS) types GW, GP, GM, GC, SW, SP, SM, SC, ML or CL are recommended for engineered fill beneath the proposed building and pavement areas. Highly plastic clays and silts (CH-MH) should not be used for engineered fill. It may be prudent to consider a granular soil if work will be performed in the winter or early spring months to avoid construction delays. Rock fragments should be limited to 4 inches in diameter or less. Engineered fill should consist of clean soil fill, compacted in 6" to 8" lifts to a minimum compactive effort of 95% of Standard Proctor maximum dry density (ASTM D-698). Moisture content should be maintained within 2 to 3 percentage points of optimum moisture content to facilitate compaction. Each lift of fill should be tested in order to confirm that the recommended degree of compaction is achieved.

Based on the subsurface conditions encountered and laboratory tests, fill and cut slopes should not be graded any steeper than 3H:1V. New fill should be benched into the cut to create a positive soil bond between the natural soils and the new fill. Compaction of the outer face of the slopes using tracked equipment or portable compactors is critical to maintaining a stable slope and to minimize sloughing. If possible, the slopes should be over filled at least 2 feet beyond the limits of the fill slope, compacted and clipped (cut) with a track dozer to the design grades to ensure that the outer edge of the slope is properly compacted. If steeper grades are desired, consideration should be given to using geosynthetic reinforcement or geogrids to stabilize the slopes or constructing of site retaining walls where slopes are not practical. Erosion protection, such as erosion matting, can help to establish grass and other vegetative growth.

building official determines that Site Class E or F is likely to be present." Therefore, and in general accordance Section 1615.1 of the 2000 IBC, a Site Class D should be used for seismic design.

Floor Slab

The floor slab can be constructed as a ground-supported concrete slab on properly compacted engineered fill. Consideration should be given to placement of a minimum 4 to 6-inch thick layer of dense-graded aggregate, such as VDOT No. 21A stone, to protect the building pad during footing excavation and floor slab preparation. The dense-graded aggregate will provide a working surface and tend to shed water as opposed to an open-graded stone, such as VDOT No. 57 stone, which would allow water pond and saturate the subsoils. Additional stone may be necessary to fill in ruts prior to final slab preparation.

A vapor barrier (6 mil poly) should be placed between the stone and the concrete slab for moisture protection.

A modulus of subgrade reaction (E_s) of 150 pci can be used for design of the concrete floor slab. The floor slab should have a minimum concrete thickness of 4 inches with welded wire fabric in the middle third of the slab to control shrinkage cracks. Proper jointing of the ground floor slab is also essential to reduce cracking.

Lateral Earth Pressures

The alluvial SC-SM soils, as encountered in the borings, excluding the slag fill, can be used provided moisture contents can be controlled to facilitate compaction. Lateral earth pressures based on on-site SC-SM soils should be analyzed based on an estimated angle of internal friction (ϕ') of 30 degrees. The recommended lateral earth pressure coefficients for the active condition (K_a) of 0.33 and the "at rest" condition (K_o) of 0.50 with a moist soil unit weight (γ_m) of 120 pcf can be used for design. To resist sliding, the ultimate coefficient of sliding (f_s) of 0.35 should be used for soil/concrete interface. If a shear key below the footing is provided, the recommended lateral earth pressure coefficient for the passive condition (K_p) of 2.00 can be used. Passive earth pressures in front of the wall face block should be ignored.

Proper foundation drainage is recommended to prevent build up of hydrostatic pressures behind the walls. This may include with a minimum 12" thick layer of free-draining aggregate along the back of wall, such as VDOT No. 57 Stone, and a 4" diameter, slotted drain pipe to daylight. The upper 12 inches of the ground surface should be capped with impervious soil fill to prevent surface water infiltration.

Pavement Consideration

The proposed parking areas will likely be asphalt pavement over a minimum of 6 to 8 inches of compacted crusher run depending on the traffic volume. All engineered fill should be placed in 6" to 8" lifts and compacted to a minimum of 95 percent of Standard Proctor dry density (ASTM D-698).

The existing slag fill can be left in place beneath pavement areas where fill depths of 4 feet or more are planned. The existing piles can be spread out over the lower elevations of the pavement areas provided that the slag is placed and compacted in a controlled manner.

The pavement design for the parking lot should be based on the use of the on-site SC-SM soil or other suitable engineered fill. A laboratory CBR value of 12.5 was determined from a bulk soil sample obtained from Boring B-6. For design purposes, a design CBR of 8 (which is approximately 2/3 of the laboratory CBR value) is recommended to evaluate the subgrade to account for some variability in soil types and densities.

Closing

Circeo Geotechnical Engineering, P.C. appreciates the opportunity to assist you with the geotechnical exploration for the proposed buildings and pavement areas. This report has been prepared in accordance with generally accepted soil and foundation engineering practices. No other warranty, expressed or implied, is made. The conclusions and recommendations do not reflect variations in subsurface conditions, which could exist in unexplored areas of the property.

Please call Mike Circeo at (540) 366-2379 if you have any questions concerning the engineering recommendations.

Sincerely,

Circeo Geotechnical Engineering, P.C.

Michael R. Circeo, P.E.
President

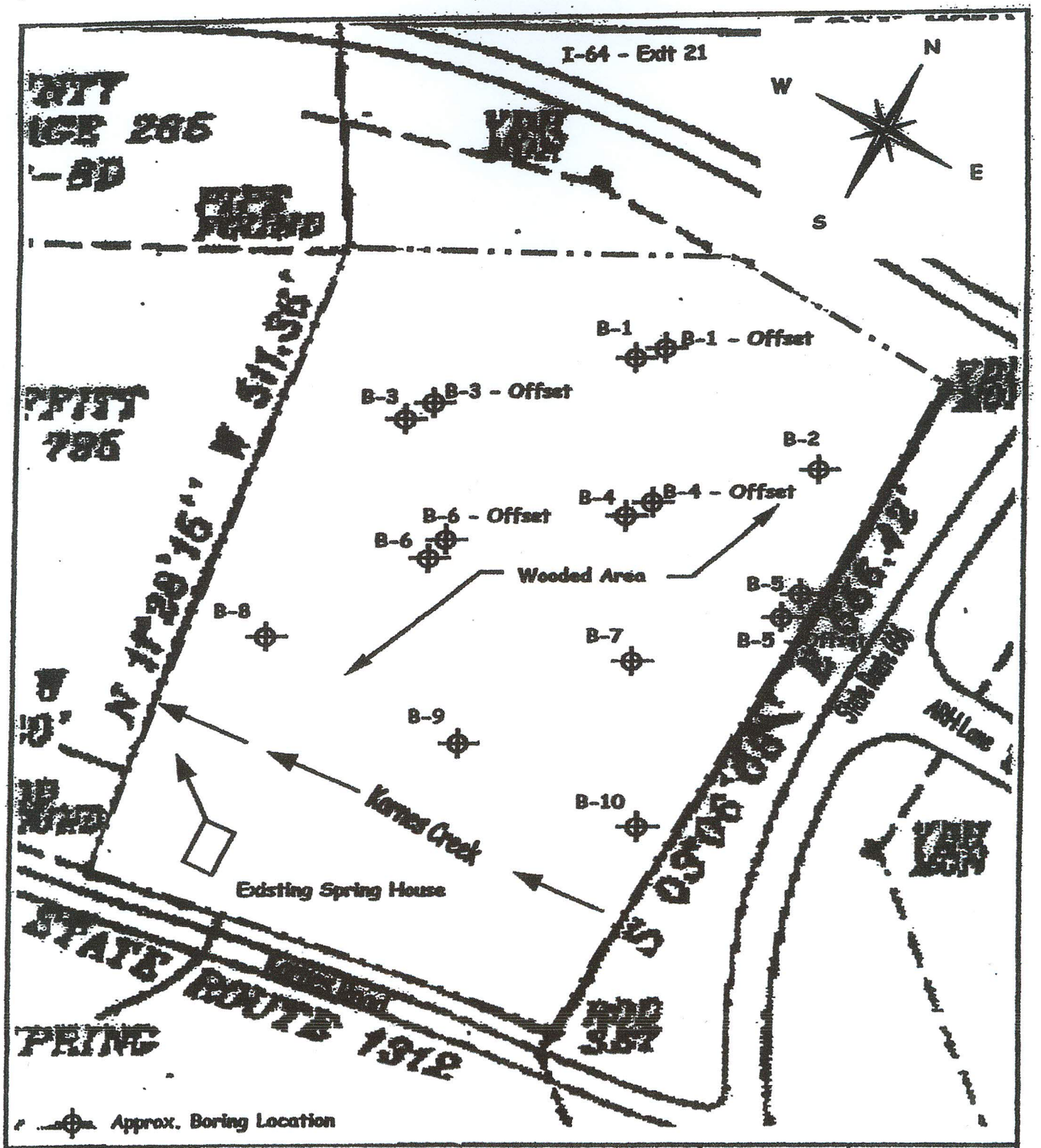
APPENDIX

COMMONWEALTH OF VIRGINIA
MICHAEL R. CIRCEO
No. 021245
6/22/07
PROFESSIONAL ENGINEER

Circeo
Geotechnical
Engineering, P.C.

APPENDIX

Boring Location Plan
Boring Logs (10)
Moisture-Density Relationship Test (1)
CBR Test (1)
Expansion Index Test (2)



Project:	Belmont Property	Project No.:	G-326
Location:	State Route 696 & Karnes Road Low Moor, Alleghany County, Virginia	Date:	5/31/2007
Cheo Geotechnical Engineering, P.C.	BORING LOCATION PLAN	Approx. Scale	1" = 100 FT
		Drawing No.	1

BORING LOG

CIRCEO GEOTECH

Geotechnical Explorations - Foundation Evaluations - Retaining Wall Design

5956 Buckland Mill Road
Roanoke, Virginia 24019

Circeo Geotechnical Engineering, P.C.

B-1

Project:	Belmont Property Geotechnical Exploration	Project No.:	G-326	Date:	5/31/2007
		Total Depth (ft):	7.0	Surface Elevation (ft):	
Location:	Low Moor, Virginia	Cave In Depth (ft):	5.5		
		Groundwater Depth (ft):	N/A	Groundwater Elevation (ft):	N/A
Drilling Method	2-1/4" Hollow Stem Auger	Rig Type:	CME-45	Driller:	J. Jones

Elevation (ft)	Depth (ft)	Sample Depth (ft)	Description of Materials	Mc (%)	SPT N-Value* (bpf)
	0		TOPSOIL - 7"		
		1.0-2.5	ALLUVIUM - Brown, Moist, Medium Dense Clayey SAND (SC-SM) With Cobbles and Rock Fragments	6.8	50/0"
	5.0	3.5-5.0		11.9	72
		6.0-7.5		NR	50/0"
	10.0		Auger Refusal at 7 Feet Offset Refusal 6 feet		
	15.0				
	20.0				
	25.0				
	30.0				

The stratification lines represent the approximate boundary lines between soil types. In-situ, the transition may be gradual.

* N-value is the number of blows required for a 140-pound hammer falling 30 inches to drive a 2" O.D., 1-3/8" I.D. split-spoon sampler a total of 18 inches in three 6" increments. The sum of the 2nd and 3rd increments of penetration is termed the Standard Penetration Resistance, N.

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Geotechnical Explorations - Foundation Evaluations - Retaining Wall Design

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Roanoke, Virginia 24019

B-2

Project:	Belmont Property Geotechnical Exploration	Project No.:	6-326	Date:	5/31/2007
		Total Depth (ft):	12.0	Surface Elevation (ft):	
Location:	Low Moor, Virginia	Cave In Depth (ft):	9.0		
		Groundwater Depth (ft):	N/A	Groundwater Elevation (ft):	N/A
Drilling Method	2-1/4" Hollow Stem Auger	Rig Type:	CME-45	Driller:	J. Jones

Elevation (ft)	Depth (ft)	Sample Depth (ft)	Description of Materials	Mc (%)	SPT N-Value* (bpf)
	0		TOPSOIL - 8"		
		1.0-2.5	FILL - Dark Brown and Black, Moist, Fine to Coarse Silty SAND (SLAG)	5.6	50/1"
		3.5-5.0	ALLUVIUM - Brown, Moist, Medium Dense Clayey SAND (SC-SM) With Cobbles and Rock Fragments	14.0	11
	5.0		Jar Sample: 3.5' to 5'		
		6.0-7.5	LL = 18, PL = 14, PI = 4	12.9	16
			#200 Sieve = 35.4% (SC-SM)		
		8.5-10.0		6.3	59
	10.0				
			Auger Refusal at 12 Feet		
	15.0				
	20.0				
	25.0				
	30.0				

The stratification lines represent the approximate boundary lines between soil types. In-situ, the transition may be gradual.

*N-value is the number of blows required for a 140-pound hammer falling 30 inches to drive a 2" O.D., 1-3/8" I.D. split-spoon sampler a total of 18 inches in three 6" increments. The sum of the 2nd and 3rd increments of penetration is termed the Standard Penetration Resistance, N.

BORING LOG

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Geotechnical Explorations - Foundation Evaluations - Retaining Wall Design

5956 Buckland Mill Road

Roanoke, Virginia 24019

B-3

Project:	Belmont Property Geotechnical Exploration	Project No.:	G-326	Date:	5/31/2007
		Total Depth (ft):	8.0	Surface Elevation (ft):	
Location:	Low Moor, Virginia	Cave In Depth (ft):	6.5		
		Groundwater Depth (ft):	N/A	Groundwater Elevation (ft):	N/A
Drilling Method	2-1/4" Hollow Stem Auger	Rig Type:	CME-45	Driller:	J. Jones

Elevation (ft)	Depth (ft)	Sample Depth (ft)	Description of Materials	Mc (%)	SPT N-Value* (bpf)
	0		TOPSOIL - 4"		
		1.0-2.5	FILL - Dark Brown and Black, Moist, Fine to Coarse, Silty SAND (SLAG)	10.0	50/2"
		3.5-5.0		16.1	66
	5.0		ALLUVIUM - Brown, Moist,		
		6.0-7.5	Medium Dense Clayey SAND (SC-SM)	7.2	50/3"
			With Cobbles and Rock Fragments		
			Auger Refusal at 8 Feet		
			Offset Refusal 7.5 feet		
	10.0				
	15.0				
	20.0				
	25.0				
	30.0				

The stratification lines represent the approximate boundary lines between soil types. In-situ, the transition may be gradual.

* N-value is the number of blows required for a 140-pound hammer falling 30 inches to drive a 2" O.D., 1-3/8" I.D. split-spoon sampler a total of 18 inches in three 6" increments. The sum of the 2nd and 3rd increments of penetration is termed the Standard Penetration Resistance, N.

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Geotechnical Explorations - Foundation Evaluations - Retaining Wall Design

5956 Buckland Mill Road
Roanoke, Virginia 24019

B-4

Project:	Belmont Property Geotechnical Exploration	Project No.:	6-326	Date:	5/31/2007
		Total Depth (ft):	5.0	Surface Elevation (ft):	
Location:	Low Moor, Virginia	Cave In Depth (ft):	4.0		
		Groundwater Depth (ft):	N/A	Groundwater Elevation (ft):	N/A
Drilling Method:	2-1/4" Hollow Stem Auger	Rig Type:	CME-45	Driller:	J. Jones

Elevation (ft)	Depth (ft)	Sample Depth (ft)	Description of Materials	Mc (%)	SPT N-Value* (bpf)
	0		TOPSOIL - 9"		
		1.0-2.5	FILL - Dark Brown and Black, Moist, Fine to Coarse, Silty SAND (SLAG)	NR	50/0"
		3.5-5.0	ALLUVIUM - Brown, Moist, Medium Dense Clayey SAND (SC-SM) With Cobbles and Rock Fragments	8.4	50/3"
	5.0		Auger Refusal at 4 Feet Offset Refusal 5 feet		
	10.0				
	15.0				
	20.0				
	25.0				
	30.0				

The stratification lines represent the approximate boundary lines between soil types. In-situ, the transition may be gradual.

*N-value is the number of blows required for a 140-pound hammer falling 30 inches to drive a 2" O.D., 1-3/8" I.D. split-spoon sampler a total of 18 inches in three 6" increments. The sum of the 2nd and 3rd increments of penetration is termed the Standard Penetration Resistance, N.

BORING LOG

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Geotechnical Explorations - Foundation Evaluations - Retaining Wall Design

5956 Buckland Mill Road
Roanoke, Virginia 24019

B-5

Project:	Belmont Property Geotechnical Exploration	Project No.:	6-326	Date:	5/31/2007
		Total Depth (ft):	9.0	Surface Elevation (ft):	
Location:	Low Moor, Virginia	Cave In Depth (ft):	7.5		
		Groundwater Depth (ft):	N/A	Groundwater Elevation (ft):	N/A
Drilling Method	2-1/4" Hollow Stem Auger	Rig Type:	CME-45	Driller:	J. Jones

Elevation (ft)	Depth (ft)	Sample Depth (ft)	Description of Materials	Mc (%)	SPT N-Value* (bpf)
	0		TOPSOIL - 4"		
		1.0-2.5	FILL - Dark Brown and Black, Moist, Fine to Coarse Silty SAND (SLAG)	5.6	50/1"
	5.0	3.5-5.0	ALLUVIUM - Brown, Moist, Medium Dense to Very Dense, Silty SAND (SM) With Cobbles and Rock Fragments	12.7	12
		6.0-7.5	Jar Sample: 3.5' to 5'	NR	50/0"
	10.0		Non-Plastic -#200 = 36.5% (SM)		
			Auger Refusal at 9 Feet Offset Refusal 8.5 feet		
	15.0				
	20.0				
	25.0				
	30.0				

The stratification lines represent the approximate boundary lines between soil types. In-situ, the transition may be gradual.

* N-value is the number of blows required for a 140-pound hammer falling 30 inches to drive a 2" O.D., 1-3/8" I.D. split-spoon sampler a total of 18 inches in three 6" increments. The sum of the 2nd and 3rd increments of penetration is termed the Standard Penetration Resistance, N.

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Geotechnical Explorations - Foundation Evaluations - Retaining Wall Design

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Roanoke, Virginia 24019

B-6

Project:	Belmont Property Geotechnical Exploration	Project No.:	6-326	Date:	5/31/2007
		Total Depth (ft):	9.0	Surface Elevation (ft):	
Location:	Low Moor, Virginia	Cave In Depth (ft):	7.5		
		Groundwater Depth (ft):	N/A	Groundwater Elevation (ft):	N/A
Drilling Method	2-1/4" Hollow Stem Auger	Rig Type:	CME-45	Driller:	J. Jones

Elevation (ft)	Depth (ft)	Sample Depth (ft)	Description of Materials	Mc (%)	SPT N-Value* (bpf)
	0		TOPSOIL - 8"		
		1.0-2.5	FILL - Dark Brown and Black, Moist, Fine to Coarse, Silty SAND (SLAG)	23.2	36
	5.0	3.5-5.0	ALLUVIUM - Brown, Moist, Medium Dense Clayey SAND (SC-SM) With Cobbles and Rock Fragments	10.5	41
		6.0-7.5	Bulk Sample: 1' to 9' LL = 20, PL = 14, PI = 6 #200 Sieve = 35.0% (SC-SM)	11.5	60
	10.0		Auger Refusal at 9 Feet Offset Refusal 7.5 feet		
	15.0				
	20.0				
	25.0				
	30.0				

The stratification lines represent the approximate boundary lines between soil types. In-situ, the transition may be gradual.

* N-value is the number of blows required for a 140-pound hammer falling 30 inches to drive a 2" O.D., 1-3/8" I.D. split-spoon sampler a total of 18 inches in three 6" increments. The sum of the 2nd and 3rd increments of penetration is termed the Standard Penetration Resistance, N.

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Geotechnical Explorations - Foundation Evaluations - Retaining Wall Design

5956 Buckland Mill Road
Roanoke, Virginia 24019

B-7

Project:	Belmont Property Geotechnical Exploration	Project No.:	G-326	Date:	5/31/2007
		Total Depth (ft):	8.0	Surface Elevation (ft):	
Location:	Low Moor, Virginia	Cave In Depth (ft):	6.0		
		Groundwater Depth (ft):	N/A	Groundwater Elevation (ft):	N/A
Drilling Method	2-1/4" Hollow Stem Auger	Rig Type:	CME-45	Driller:	J. Jones

Elevation (ft)	Depth (ft)	Sample Depth (ft)	Description of Materials	Mc (%)	SPT N-Value* (bpf)
	0		TOPSOIL - 8"		
		1.0-2.5	FILL - Dark Brown and Black, Moist, Fine to Coarse, Silty SAND (SLAG)	3.8	50/4"
		3.5-5.0		3.3	50/3"
	5.0	6.0-7.5		NR	50/1"
			Auger Refusal at 8 Feet		
	10.0				
	15.0				
	20.0				
	25.0				
	30.0				

The stratification lines represent the approximate boundary lines between soil types. In-situ, the transition may be gradual.

* N-value is the number of blows required for a 140-pound hammer falling 30 inches to drive a 2" O.D., 1-3/8" I.D. split-spoon sampler a total of 18 inches in three 6" increments. The sum of the 2nd and 3rd increments of penetration is termed the Standard Penetration Resistance, N.

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Geotechnical Explorations - Foundation Evaluations - Retaining Wall Design

5956 Buckland Mill Road
Roanoke, Virginia 24019

B-8

Project:	Belmont Property Geotechnical Exploration	Project No.:	G-326	Date:	5/30/2007
		Total Depth (ft):	8.0	Surface Elevation (ft):	
Location:	Low Moor, Virginia	Cave In Depth (ft):	6.5		
		Groundwater Depth (ft):	N/A	Groundwater Elevation (ft):	N/A
Drilling Method	2-1/4" Hollow Stem Auger	Rig Type:	CME-45	Driller:	J. Jones

Elevation (ft)	Depth (ft)	Sample Depth (ft)	Description of Materials	Mc (%)	SPT N-Value* (bpf)
	0		TOPSOIL - 8"		
		1.0-2.5	FILL - Dark Brown and Black, Moist, Fine to Coarse, Silty SAND (SLAG)	NR	50/1"
		3.5-5.0	ALLUVIUM - Brown, Moist, Medium Dense Clayey SAND (SC-SM) With Cobbles and Rock Fragments	5.9	20
	5.0	6.0-7.5	Jar Sample: 6' to 7.5'	15.9	50/1"
			LL = 31, PL = 19, PI = 12		
			-#200 Sieve = 35.5%		
			Auger Refusal at 8 Feet		
	10.0				
	15.0				
	20.0				
	25.0				
	30.0				

The stratification lines represent the approximate boundary lines between soil-types. In-situ, the transition may be gradual.

* N-value is the number of blows required for a 140-pound hammer falling 30 inches to drive a 2" O.D., 1-3/8" I.D. split-spoon sampler a total of 18 inches in three 6" increments. The sum of the 2nd and 3rd increments of penetration is termed the Standard Penetration Resistance, N.

BORING LOG

Circeo Geotechnical Engineering, P.C.

CIRCEO GEOTECH

Geotechnical Explorations - Foundation Evaluations - Retaining Wall Design

5956 Buckland Mill Road
Roanoke, Virginia 24019

B-9

Project:	Belmont Property Geotechnical Exploration	Project No.:	G-326	Date:	5/30/2007
		Total Depth (ft):	6.0	Surface Elevation (ft):	
Location:	Low Moor, Virginia	Cave In Depth (ft):	4.5		
		Groundwater Depth (ft):	N/A	Groundwater Elevation (ft):	N/A
Drilling Method	2-1/4" Hollow Stem Auger	Rig Type:	CME-45	Driller:	J. Jones

Elevation (ft)	Depth (ft)	Sample Depth (ft)	Description of Materials	Mc (%)	SPT N-Value* (bpf)
	0		TOPSOIL - 8"		
		1.0-2.5	ALLUVIUM - Brown, Moist to Wet, Medium Dense Clayey SAND (SC-SM) With Cobbles and Rock Fragments	25.6	50/1"
		3.5-5.0		16.6	50/3"
	5.0		Auger Refusal at 6 Feet		
	10.0				
	15.0				
	20.0				
	25.0				
	30.0				

The stratification lines represent the approximate boundary lines between soil types. In-situ, the transition may be gradual.

* N-value is the number of blows required for a 140-pound hammer falling 30 inches to drive a 2" O.D., 1-3/8" I.D. split-spoon sampler a total of 18 inches in three 6" increments. The sum of the 2nd and 3rd increments of penetration is termed the Standard Penetration Resistance, N.

BORING LOG

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Geotechnical Explorations - Foundation Evaluations - Retaining Wall Design

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Roanoke, Virginia 24019

B-10

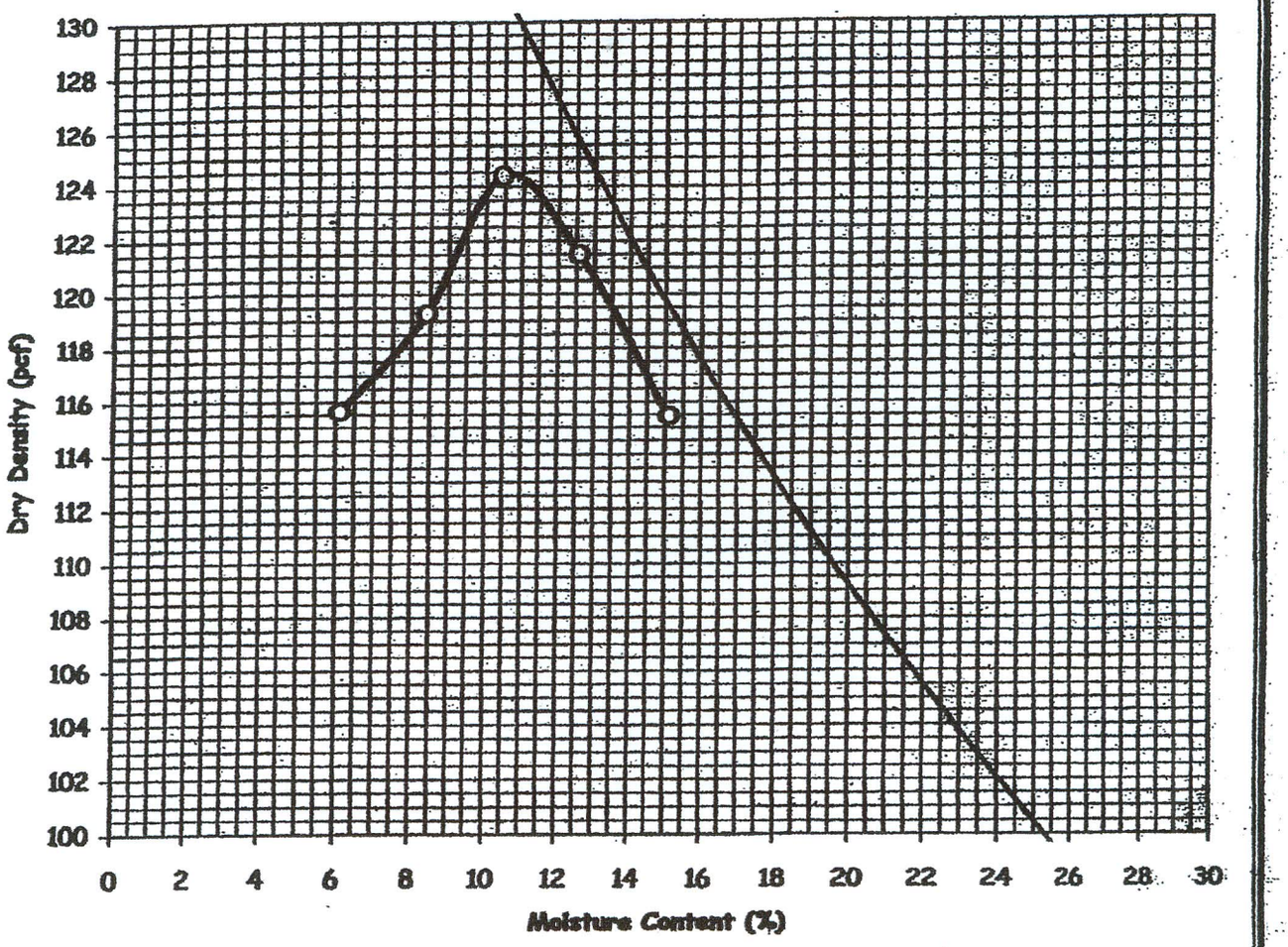
Project:	Belmont Property Geotechnical Exploration	Project No.:	G-326	Date:	5/30/2007
		Total Depth (ft):	8.0	Surface Elevation (ft):	
Location:	Low Moor, Virginia	Cave In Depth (ft):	6.0		
		Groundwater Depth (ft):	N/A	Groundwater Elevation (ft):	N/A
Drilling Method	2-1/4" Hollow Stem Auger	Rig Type:	CME-45	Driller:	J. Jones

Elevation (ft)	Depth (ft)	Sample Depth (ft)	Description of Materials	Mc (%)	SPT N-Value* (bpf)
	0		TOPSOIL - 8"		
		1.0-2.5	FILL - Dark Brown and Black, Moist, Silty SAND and Slag and Rock Fragments	5.8	17
		3.5-5.0		7.4	50/5"
	5.0	6.0-7.5		NR	50/1"
			Auger Refusal at 8 Feet		
	10.0				
	15.0				
	20.0				
	25.0				
	30.0				

The stratification lines represent the approximate boundary lines between soil types. In-situ, the transition may be gradual.

* N-value is the number of blows required for a 140-pound hammer falling 30 inches to drive a 2" O.D., 1-3/8" I.D. split-spoon sampler a total of 18 inches in three 6" increments. The sum of the 2nd and 3rd increments of penetration is termed the Standard Penetration Resistance, N.

Moisture-Density Relationship



MOISTURE-DENSITY RELATIONSHIP TEST			
ASTM D-698, Method B	Rammer Type: Manual	Preparation Method:	Dry
Boring No.:	B-6	Depth (ft):	1' - 8'
Soil Description:	Brown Clayey Sand With Cobbles, Trace Slag Fragments		
USCS Classification:	SC-SM		

Liquid Limit (LL):	20	Max. Dry Density, $\gamma_{d\,max}$ (pcf):	124.4
Plastic Limit (PL):	14	Optimum Moisture Content, $w_{c\,opt}$ (%):	10.5
Plastic Index (PI):	6	Assumed Specific Gravity, G_s:	2.70
% Passing No. 200 Sieve:	35.0	Test Fraction, P_F (%)	90.7
Received Moisture Content (%)	11.5	Oversize Fraction, P_c (%)	9.3

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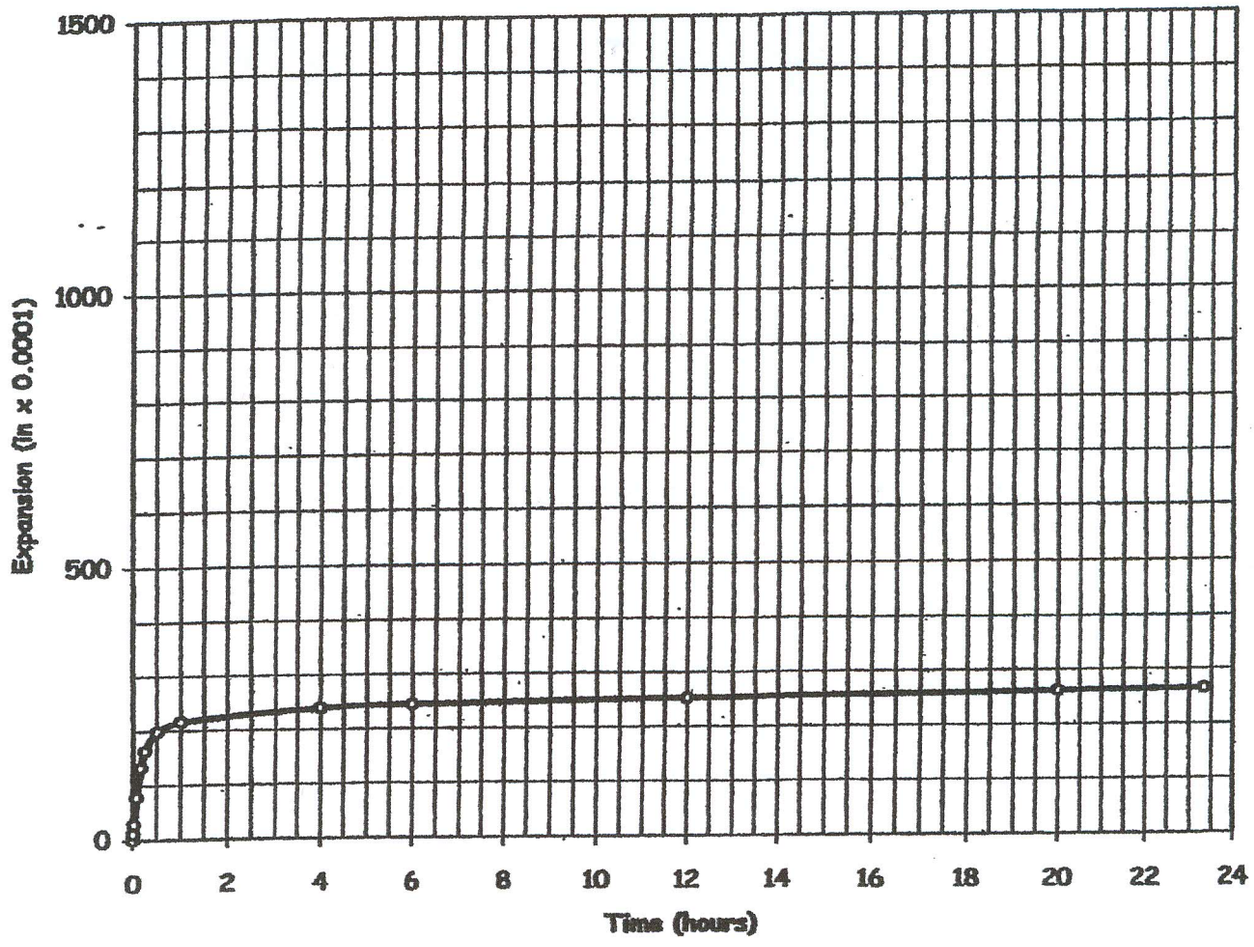
Belmont Property Low Moor, Virginia	
Project No.:	6-326
Date:	6/11/2007
Sheet:	2

Expansion Index of Soils



EXPANSION INDEX OF SOILS (ASTM D-4829)

Boring No.:	B-5	Depth (ft):	1' - 9'
Soil Description:	Brown to Black, Fine To Coarse, Silty SAND (Slag)		
USCS Classification:	SM-GM	Measured Expansion Index, $EI_{measured}$ =	26
Liquid Limit (LL):	NP	Estimated Expansion Index, EI_{50} =	19
Plastic Limit (PL):	NP	Expansion Potential =	Low
Plastic Index (PI):	NP	Initial Dry Density, γ_d (pcf):	77.0
% Passing No. 200 Sieve:	NA	Initial Moisture Content, $m_{c\ initial}$ (%):	15.9
Natural Moisture Content (%)		Degree of Saturation, S (%)	36
Assumed Specific Gravity, G_s:	2.70	Final Moisture Content, $m_{c\ final}$ (%)	34.8

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Belmont Property
Low Moor, Virginia

Project No.:	G-326
Date:	06/12/07
Sheet:	5

IMPORTANT INFORMATION ABOUT COMPLETING AND FAXING YOUR TIME SHEET

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2. ONCE COMPLETED AND APPROVED, USE THIS TOP SHEET FOR FAXING.
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02100

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	MONTH	DAY	HOURS	QTR. HR.	HOURS	QTR. HR.	HOURS	QTR. HR.
SAT								
SUN								
MON								
TUES								
WED								
THUR								
FRI								
TOTAL TIME ▶			REGULAR		OVERTIME		DOUBLE TIME	

CLIENT INFORMATION

CLIENT'S NAME (Print)

REPORT TO

ADDRESS

CITY STATE ZIP CODE

CLIENT TELEPHONE NUMBER

EXT.

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COMPANY

BY

TITLE

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