

October 12, 2016

## Subsurface Exploration & Geotechnical Engineering Evaluation

For: Slattery and Associates  
Project: Proposed Child Development Center  
Location: 10130 185 Street South  
Boca Raton, Florida

Gentlemen:

As per your request we initiated a geotechnical investigation at the above location on October 5, 2016 with four standard penetration borings. We are herein submitting the results of our findings.

### **SITE EVALUATION**

The proposed structure is a single story child development center with grade bearing foundations proportioned for an allowable bearing capacity of 2500 psf. The site was relatively level with no standing water noted. It was overgrown and some surface saturated soils were noted. The site appeared to be slightly below the existing crown of road.

### **SUBSOIL INVESTIGATION**

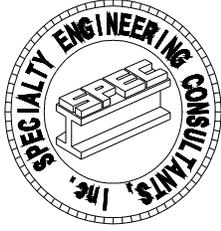
The subsoil investigation consisted of 4 standard penetration tests conducted to a maximum depth of 10 feet beneath the existing ground surface. For specific locations please refer to the boring logs which are included here in.

A review of the boring logs shows that the site is overlain with a surface layer of compressible organic sand and muck. This muck strata extended to a depth of +/- 2.5 feet beneath the existing ground surface. Underlying this muck was a layer of medium dense to loose light tan to brown fine to medium grained sand. These sand strata were found to extend beyond the terminal depth of our investigation, 10 feet maximum penetration. The natural ground water was found to exist at approximately +/- 2.0 feet beneath the existing ground surface.

### **FOUNDATION RECOMMENDATIONS**

The structure may bear on spread footings or monolithic foundations and slab on grade proportioned for an allowable soil bearing capacity of 2500 psf. In order to prepare the site to support construction designed for an allowable soil bearing capacity of 2500 psf, we recommend the following procedures be implemented.

1. Clear and grub the proposed building pad area plus an extended perimeter of five feet beyond any proposed wall footing or foundation element. Care should be taken so as to insure the complete removal of any deleterious materials encountered including all vegetation, stumps, roots, foreign material, debris, silts, clays or muck.



2. Once this has been accomplished excavate the building site plus its extended perimeter making sure to remove all of the deleterious materials encountered.

3. Once the site has been excavated to the specified depth, and inspected by a representative of this laboratory, the site may be leveled with clean granular fill to an elevation of 18 inches above the existing water table. Once this has been accomplished utilize a large vibratory roller, +40,000 #, to compact the bottom of the site until the bottom of the excavation has been compacted in excess of 95% of the material's modified proctor density as per AASHTO-T-180.

4. Once this has been accomplished the site may be brought to construction grade in compacted lifts. The fill shall be placed in lifts not to exceed 12 inches in compacted thickness and compacted in excess of 95% of its modified proctor density as per AASHTO T-180. Test each lift with a minimum of 1 density test per 2000 sf of pad area, and no less than 4 per lift.

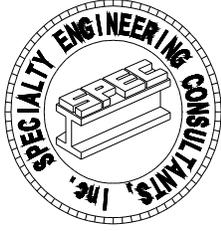
5. Following and during the excavation and compaction operations the area shall be witnessed by an inspector from this laboratory for approval prior to selective backfilling. The Contractor shall minimize the vibration in the vicinity of any existing structure as excessive vibration may cause localized damage to nearby existing structures. The excavated surface and each 12" loose lift of replaced fill material within the footing and slab areas shall be tested in accordance with these specifications and to within 95% of the Soils Modified Maximum Dry Density as per AASHTO DESIGNATION T-180.

Footing embedment shall be of sufficient depth below the adjacent grade so as to comply with all local and area building codes. Minimum footing widths of 18" and 36" are recommended for continuous wall footings and individual column pads respectfully, although they may not develop the full allowable bearing pressures. For purposes of this report we have anticipated that the proposed bottom of footing elevation will be approximately 12 inches below the elevation of the site at the time of our investigation.

Foundation elements may be designed as isolated footings or as a monolithic type of foundation/slab system, as long as ample consideration is given to the increased shear stresses inherent in monolithic systems at the slab to footing interface. Surface compaction specifications shall be verified utilizing in place density tests at the frequency of 1 test per 100 lf of wall footing, and 1 test per column pad. Slab areas and undisturbed pad lifts may be tested at the frequency of one test per 2500 sf, but in no case less than 3 per lift.

## PAVEMENT DESIGN RECOMMENDATIONS

The following are our generalized recommendations for the proposed pavement design. The project Civil Engineer should review these general recommendations in order to provide final construction recommendations for the proposed pavement for the site. Additional information pertaining to LBR testing of the upper one foot of the In-situ soils should be performed before development and may benefit in reducing the amount of fill needed to develop the pavement sections of the site.



### **Flexible Pavement Recommendations**

The proposed pavement structure is anticipated to be semi-flexible asphaltic concrete section. Upon completion of the above area, specific site preparation procedures, the following would apply with in proposed pavement areas. A stabilized subgrade having a minimum LBR of 40 shall be placed to a depth of at least 12 inches below the base course.

The base course will range from 6 inches within parking stall areas to 8 inches within drive areas, and should have a minimum LBR of 100. The minimum 12 inches of stabilized subgrade should be compacted to an equivalent of 98 percent of the modified Proctor maximum dry density. The base material should also be compacted to 98 percent of the modified Proctor maximum dry density. The base course should also have a minimum carbonate content of 70%. The entire pavement should have a minimum of 1.5 inches of asphaltic concrete over the base materials. The asphaltic concrete should be compacted and tested with backscatter densities equivalent to the Marshall value.

### **Rigid Pavement Recommendations**

Where concrete pavement is used, a minimum concrete pavement thickness of 6 inches is recommended for the standard and heavy duty pavement design. The minimum thickness is based upon concrete with a compressive strength of 3,500 psi, and a modulus of rupture of 550 psi. The pavement section should bear on properly compacted subgrade as recommended in this report. Reinforcement for the rigid pavement should be provided by the civil engineer.

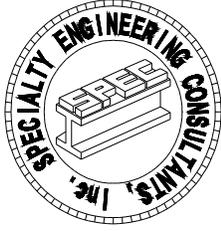
## **The Standard Penetration Test ASTM D-1586**

The Standard Penetration Test is the most commonly employed tool utilized to identify in-situ subsurface soil conditions. The "N" values obtained from the boring provide an accurate estimation of internal soil characteristics such as relative density, internal shear strength, angle of internal friction, and the approximate range of the soil's unit weight. These "N" values represent the resistance of a 2 inch diameter split spoon sampler driven by a 140 pound hammer free falling 30 inches. Each drive of the 24 inch long split spoon is divided into four six inch increments. The second and third increments are totaled to produce the "N" value found on your report.

The Standard Penetration Test also allows for the recovery of soil samples which are returned to our laboratory and visually examined and classified. The SPT samples are available for laboratory testing if requested. Samples are generally held for 90 days unless otherwise directed by the client.

An approximate ground water table is obtained from the borehole upon completion of the drilling procedures. This water table is useful in the general evaluation of particular soil conditions, and may give the contractor some insight into what can be anticipated during construction. It should be noted that the ground water level will fluctuate seasonally. This level may also be affected by local drawdowns, soil conditions, and the watersheds contribution to the underlying aquifer. It should not be construed to be a measure of the soils permeability, or of the dewatering characteristics of the site.

Although the standard penetration test is one of the most reliable methods used to identify soil characteristics and types, it may only represent a small fraction of the materials actually deposited at the site. As is common industry practice, we have assumed a uniformity of profile between borings to provide a subsoil profile for engineering



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purposes. This profile is strictly based on the data obtained from the borings, and if unusual or varying conditions are found we should be notified immediately.

A test is expressly representative of the immediate location tested, and the reliability of the conclusions are a direct result of the quantity of tests performed. Any variation in location may reveal similarly some changes in the depth, thickness, texture, and conditions of the stratum encountered .

Unless specifically stated otherwise, and specifically directed and prearranged by the client, all elevations are taken with respect to the existing ground surface at the time of testing. Boring locations are usually obtained in the field by pacing off distances and approximating right angles to landmarks and property corners. More precise locations may be obtained from on site surveys and placement of the boring locations by a Land Surveyor, Registered in the State of Florida. These services are provided at additional costs and are beyond the scope of this report.

The data presented herein was obtained for the specific purposes stated in this report, and should not be misconstrued to apply to any other circumstance, project, or ancillary use unless so specified and addressed by the engineer of record.

Thank you for using SPECIALTY ENGINEERING CONSULTANTS, INC., for your geotechnical needs. Should you need further assistance with this or any other project, please contact this office.

Respectfully Submitted;  
SPECIALTY ENGINEERING CONSULTANTS, INC.,

D. Mark Le Blanc, P.E.  
State of Florida #35683  
Special Insp. No. 1177

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1599 SW 30TH AVE, SUITE 20  
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(561) 752-5440\* FAX (561) 752-5542

**TEST BORING REPORT**

<b>LABORATORY NUMBER:</b> 2211097 A	<b>BORING NUMBER:</b> 1
<b>CLIENT:</b> SLATTERY & ASSOCIATES	<b>DRILLER:</b> TE
<b>PROJECT:</b> FLORENCE FULLER CHILD DEVELOPMENT CENTER	<b>DRILL RIG:</b> F-350
<b>PROJECT LOCATION:</b> 10130 185 STREET SOUTH, BOCA RATON, FLORIDA	<b>DATE OF BORING:</b> 10/5/2016
<b>BORING LOCATION:</b> APPROX. SW CORNER OF PROPOSED BUILDING	
<b>GROUND WATER:</b> 2'2"	<b>ELEVATION:</b> N/F

DEPTH FEET	SAMPLE NUMBER	VISUAL SOIL CLASSIFICATION	N VALUES	BLOWS ON SAMPLER	
1	1	VERY DARK GRAY ORGANIC SILT LITTLE SAND & ROOT, (OH) - MUCK	2	1	1
2				1	5
3	2	LIGHT BROWN FINE-MEDIUM GRAINED & LIMESTONE FRAGMENTS TRACE SILT, (SP-GP)	72	22	35
4				37	24
5	3	WHITE LIMESTONE FRAGMENTS SOME FINE-MEDIUM GRAINED SAND, (GP)	25	12	10
6				15	18
7	4	WHITE LIMESTONE FRAGMENTS SOME FINE-MEDIUM GRAINED SAND, (GP)	32	19	16
8				16	13
9	5	WHITE FINE-MEDIUM GRAINED SAND TRACE LIMESTONE FRAGMENTS, (SP)	22	11	11
10				11	12
11		<b>BOTTOM OF BORING @ 10.0 FEET</b>			
12					
13					
14					
15					
16					

SOIL INVESTIGATIONS AND SAMPLING BY AUGER BORINGS: ASTM D 1452 OR STANDARD PENETRATION TEST BORINGS: ASTM D 1586. THE ABOVE TEST BORING WAS CONDUCTED IN GENERAL ACCORDANCE WITH ASTM DESIGNATION D 1586. THE SAMPLES COLLECTED CONSTITUTE A SMALL PERCENTAGE OF THE SUBSOILS AT THE SITE. THE SOILS WILL BE STORED IN OUR FACILITIES FOR A MAXIMUM OF 3 MONTHS. THE OWNER, ARCHITECT OR ENGINEER IS ENCOURAGED TO VISUALLY INSPECT THESE SAMPLES. THE INFORMATION CONTAINED HERE IN IS PROVIDED FOR THE SPECIFIC PROJECT AND PURPOSE. LOCATIONS WERE APPROXIMATED IN THE FIELD USING PACED DISTANCES UNLESS SPECIFICALLY STATED OTHERWISE.

**RESPECTFULLY SUBMITTED**  
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**TEST BORING REPORT**

<b>LABORATORY NUMBER:</b> 2211097 B	<b>BORING NUMBER:</b> 2
<b>CLIENT:</b> SLATTERY & ASSOCIATES	<b>DRILLER:</b> TE
<b>PROJECT:</b> FLORENCE FULLER CHILD DEVELOPMENT CENTER	<b>DRILL RIG:</b> F-350
<b>PROJECT LOCATION:</b> 10130 185 STREET SOUTH, BOCA RATON, FLORIDA	<b>DATE OF BORING:</b> 10/5/2016
<b>BORING LOCATION:</b> APPROX. NW CORNER OF PROPOSED BUILDING	
<b>GROUND WATER:</b> 2'6"	<b>ELEVATION:</b> N/F

DEPTH FEET	SAMPLE NUMBER	VISUAL SOIL CLASSIFICATION	N VALUES	BLOWS ON SAMPLER	
1	1	BROWN-GRAY FINE-MEDIUM GRAINED SAND, TRACE ROOT	11	1	3
2	2	PALE BROWN LIMESTONE FRAGMENTS SOME FINE-MEDIUM SAND, (GP)		8	16
3	3	GRAY-BROWN LEAN CLAY LITTLE ROOT, (CL)	14	10	6
4				8	4
5	4	GRAY-BROWN CLAYEY SAND, (SC)	3	5	2
6				1	1
7			6	1	1
8	5	LIGHT TAN FINE-MEDIUM GRAINED SAND TRACE SHELL FRAGMENTS (SP)		5	9
9			18	11	10
10				8	8
11		<b>BOTTOM OF BORING @ 10.0 FEET</b>			
12					
13					
14					
15					
16					

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**TEST BORING REPORT**

<b>LABORATORY NUMBER:</b> 2211097 C	<b>BORING NUMBER:</b> 3
<b>CLIENT:</b> SLATTERY & ASSOCIATES	<b>DRILLER:</b> TE
<b>PROJECT:</b> FLORENCE FULLER CHILD DEVELOPMENT CENTER	<b>DRILL RIG:</b> F-350
<b>PROJECT LOCATION:</b> 10130 185 STREET SOUTH, BOCA RATON, FLORIDA	<b>DATE OF BORING:</b> 10/5/2016
<b>BORING LOCATION:</b> ~30' W OF THE NE CORNER OF PROPOSED BUILDING	
<b>GROUND WATER:</b> 2'8"	<b>ELEVATION:</b> N/F

DEPTH FEET	SAMPLE NUMBER	VISUAL SOIL CLASSIFICATION	N VALUES	BLOWS ON SAMPLER	
1	1	DK GRAY-GRAY FINE-GRAINED SAND TRACE ORGANIC SILT, (SP)	4	1	1
2	2	GRAY-BROWN FINE-MEDIUM GRAINED SAND LITTLE SILT, (SP-SM)		3	2
3	3	LIGHT BROWN FINE-MEDIUM GRAINED SAND & LIMESTONE FRAGMENTS, (SP-GP)	28	5	11
4				17	19
5	4	WHITE LIMESTONE FRAGMENTS & FINE-MEDIUM GRAINED SAND, (GP SP)	11	12	7
6				4	3
7			4	2	
8			2	8	
9	5	WHITE FINE-MEDIUM GRAINED SAND TRAE LIMESTONE & SHELLS, (GP)	27	12	12
10				15	14
11		<b>BOTTOM OF BORING @ 10.0 FEET</b>			
12					
13					
14					
15					
16					

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**TEST BORING REPORT**

<b>LABORATORY NUMBER:</b> 2211097 D	<b>BORING NUMBER:</b> 4
<b>CLIENT:</b> SLATTERY & ASSOCIATES	<b>DRILLER:</b> TE
<b>PROJECT:</b> FLORENCE FULLER CHILD DEVELOPMENT CENTER	<b>DRILL RIG:</b> F-350
<b>PROJECT LOCATION:</b> 10130 185 STREET SOUTH, BOCA RATON, FLORIDA	<b>DATE OF BORING:</b> 10/5/2016
<b>BORING LOCATION:</b> APPROX. SE CORNER OF PROPOSED BUILDING	
<b>GROUND WATER:</b> 2'11"	<b>ELEVATION:</b> N/F

DEPTH FEET	SAMPLE NUMBER	VISUAL SOIL CLASSIFICATION	N VALUES	BLOWS ON SAMPLER	
1	1	GRAY FINE-GRAINED SAND TRACE ROOT & ORGANICS, (SP)	3	1	1
2	2	LIGHT GRAY FINE-MEDIUM GRAINED SAND, (SP)		2	3
3			8	5	5
4	3	LIGHT BROWN-GRAY LEAN CLAY TRACE ROOT, (CL)		3	3
5			12	6	8
6	4	WHITE LIMESTONE FRAGMENTS & FINE-MEDIUM GRAINED SAND, (GP SP)		4	2
7			12	3	5
8				7	5
9	5	WHITE FINE-MEDIUM GRAINED SAND TRACE LIMESTONE FRAGMENTS, (SP)	20	7	9
10				11	12
11		<b>BOTTOM OF BORING @ 10.0 FEET</b>			
12					
13					
14					
15					
16					

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