BAY AREA SINKHOLE INVESTIGATION & CIVIL ENGINEERING

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August 4th, 2022

Mr. Jonathan Sands
Stress Free Construction, LLC
4501 E Columbus Dr
Tampa, Florida 33605

RE: Subsurface Exploration and Geotechnical Evaluation Services Report
New Construction
90 Biscayne Ave
Tampa, Florida 33606
B.A.S.I.C. Engineering Project No. B2022-050

Dear Mr. Sands:

Bay Area Sinkhole Investigation and Civil (B.A.S.I.C.) Engineering, Inc., is pleased to provide the results of our subsurface exploration for the proposed new construction of a single-family home. Described below are the methods and results of our subsurface exploration and evaluation of the subsurface conditions encountered at the project site. Based on our interpretation of the subsurface conditions from the soil boring data and our understanding of the proposed new construction; a recommendation regarding site preparation and foundation design are included herein.

B.A.S.I.C. Engineering appreciates the opportunity to be of service to you on this project. If you have any questions or comments or need additional information, please feel free to contact us.

Sincerely,

B.A.S.I.C. Engineering, Inc.
Florida Engineering License No. EB25869

08/04/2022

Justin D. James, PE
Principal Engineer
Florida License No. 60886

Table of Contents

Purpose and Scope of Services 2

Project Description 2

Subsurface Exploration and Testing 3

Subsurface Conditions 3

Conclusions and Recommendations 5

Foundation Design Recommendations 5

Limitations 7

Closure 7

Appendix A - Field Data

- Site Location Map – Figure 1
- Boring Location Plan – Figure 2
  Footer Detail Figure 3
- Classification Chart – Figure 4
- SPT Borings – Figure 5

Purpose and Scope of Services

Geotechnical engineering services were requested to provide exploration and assessment of subsurface conditions pertaining to foundation system selection and design for the proposed structures. Accordingly, the scope of work for this study included the following:

- Conducted a visual reconnaissance of the site from a geotechnical standpoint.
- Mobilized drilling equipment to the site and performed two (2) Standard Penetration Test (SPT) borings to depths up to 30 feet below ground surface within the anticipated building footprint of the new home.
- Documented soil and groundwater conditions encountered in the borings and collected soil samples for laboratory review and classification.
- Reviewed the Hillsborough County Soil Survey pertaining to the shallow soils and groundwater at the site.
- Provided soil classifications per the Unified Soil Classification System (USCS) utilizing ASTM D2487/2488. A soil profile for each boring was created.
- Presented the results of this subsurface exploration in an engineering report, including discussions regarding potential geotechnical impacts to the proposed building and field area, foundation design information and recommendations, general site preparation recommendations and seasonal groundwater level fluctuations.

The field exploration was performed by qualified engineering technicians and/or staff geologists. The evaluations were performed, and the report prepared by licensed professional engineers specializing in geotechnical engineering.

Project Description

The proposed Single-Family Home is planned for a soon to be vacant lot on Davis Island in Tampa, Florida, located at 90 Biscayne Ave, Tampa, Florida. The lot is currently being occupied by a single-family structure that is schedule to be demolish. The lot is located north of Hillsborough Bay.

Based on limited provided topographic survey information, ground elevations within the existing property is approximately EL. 5 feet (NGVD 1929) based on review of USGS topographic quadrangle maps. It is anticipated that site grades will be raised approximately 3 to 5 feet within the building footprint. Ground floor slabs are anticipated to have live loads of up to 200 psf. B.A.S.I.C. Engineering performed SPT borings based on the anticipated building footprint.

Subsurface Exploration and Testing

The subsurface exploration program for this study included two (2) SPT borings that were performed to a depth of 30 feet below existing grades. The boring locations are presented on the attached Figure 2. These boring locations were established based on a Google Earth aerial overlay with the property lines defined. Accordingly, the boring locations are considered approximate.

The SPT borings were performed in general accordance with ASTM D1586 (Standard Test Method for Penetration Test and Split Barrel Sampling of Soils) using the rotary wash method, where a bentonite (clay) slurry ("drill mud" or "drill fluid") was used to flush and stabilize the borehole. Following the advancement of a hand auger to a depth of 4 feet to check for possible unidentified buried utilities, Standard Penetration sampling was performed at closely spaced intervals in the balance of the upper 10 feet and at 5-foot intervals for the remainder of the boring. After seating the sampler 6 inches into the bottom of the borehole, the number of blows required to drive the sampler one foot further with a standard 140-pound hammer dropped 30 inches is known as the "N" value or blow count. The blow count has been empirically correlated to soil properties. Penetration resistance is an index of the soil strength and density that is used in engineering design. The recovered samples were placed into containers and returned to our office for visual review and will be retained for one year for future reference.

Subsurface Conditions

Soil Survey

The shallow soils in this area of Hillsborough County have been mapped by the U.S. Department of Agriculture – Soil Conservation Service (SCS) and are outlined in a report titled *The Soil Survey of Hillsborough County*. The survey indicates that the soils underlying the site are St. Augustine – Urban land complex (45).

This complex consists of St. Augustine soil that is nearly level and somewhat poorly drained and of areas of Urban land. This complex is on flats and slight ridges bordering Tampa Bay. These soils are subject to flooding for very brief periods during hurricane season. The slope is 0 to 2 percent.

Typically, the surface layer of St. Augustine soil is dark gray fine sand about 3 inches thick. The upper part of the underlying material, to a depth of about 20 inches, is brown fine sand. The middle part, to a depth of 37 inches, is light brownish gray, mottled fine sand. The lower part to a depth of 80 inches is gray, mottled fine sand. In some areas, the surface layer is loamy sand.

The Urban land part of this complex is covered by concrete, asphalt, buildings, or other impervious surfaces that obscure or alter the soils so that their identification is not feasible.

The USDA Soil Survey is based on aerial maps and shallow borings and is not necessarily an exact representation of the soils that exist at the site.

Soil Borings

The soil profiles encountered in our borings are presented on the attached Figures 4 through 5. The profile information was developed from the field boring logs and visual review/manual classification of the recovered soil samples by a geotechnical engineer in our laboratory in general accordance with ASTM D2488 (Standard Practice for Description and Identification of Soil (Visual-Manual Procedure)). The transition between the strata may be gradual and the indicated boundary approximate. Soil strata boundaries were estimated when they occurred between sample intervals. Small variations not considered important to engineering evaluation may have been omitted or abbreviated for clarity. Differences in subsurface conditions can and should be expected between the boring locations.

SPT boring B-1 was advanced to a completion depth of approximately 30 feet. SPT boring B-1 initially encountered dark grayish brown and dark gray fine SAND with silt overlying medium dense to loose, light gray and light brownish gray fine SAND. SPT boring B-1 then penetrated medium dense, light brownish gray and light gray fine SAND. Below this, SPT boring B-1 was completed in medium dense, light gray fine SAND. The groundwater table was measured at an approximate depth of 6 feet.

SPT boring B-2 was advanced to a completion depth of approximately 30 feet. SPT boring B-2 initially encountered dark gray fine SAND with silt overlying very loose to loose, dark gray, light brownish gray, and light gray fine SAND. Below this, SPT boring B-2 encountered medium dense, light gray fine SAND. SPT boring B-2 was completed in dense, light gray fine SAND. The groundwater table was measured at an approximate depth of 6 feet.

Groundwater Information

The shallow groundwater table was encountered at 6 feet in the SPT borings. The surface of the groundwater table will fluctuate in response to variation in rainfall, to surface drainage features, and other factors. A seasonal effect will occur such that groundwater level fluctuations can be expected between the drier winter and spring months as compared to the summer months or the wet season.

Conclusions and Recommendations

The following conclusions and recommendations are based on the project characteristics previously described, the data obtained in our field exploration and our experience with similar subsurface conditions. If final site planning is significantly different from previously described and as indicated in the report, or if subsurface conditions different from those disclosed by the borings are encountered during construction, B.A.S.I.C. Engineering should be notified so that we might review the following recommendations.

Foundation Design Recommendations

The following recommendations are made based on the two (2) Standard Penetration Test (SPT) borings performed at the proposed new home construction. B.A.S.I.C. Engineering has created a preliminary foundation design based on proposed new two-story single family Residence built to a maximum height of 35 feet above the base flood elevation consisting of masonry and wood frame construction. B.A.S.I.C. Engineering recommends a strip footing with a minimum embedment of 28 inches below finished grade, a minimum strip footing width of 30 inches with a minimum thickness of 16 inches, (Figure 3). B.A.S.I.C. Engineering recommends an isolated square column footing of 30 inches by 30 inches with a minimum thickness of 16 inches and a minimum embedment of 28 inches. The slab areas may use conventional slab on grade over compacted fill as described in this report. Structural and Architectural drawings should be provided to B.A.S.I.C. Engineering for a comprehensive foundation design.

Site Preparation

Provisions should be made to relocate any interfering utility lines within the construction area to appropriate locations. In this regard, it should be noted that if abandoned underground pipes are not properly removed or plugged, they may serve as conduits for subsurface erosion, which subsequently may result in settlement and/or ground depressions.

The site should be cleared of surface materials/debris and grubbed of roots, stumps and organic laden topsoil; this primarily includes the removal of any surface vegetation, buried root mats, tree stumps or other deleterious materials encountered on and near the ground surface. As a minimum, the clearing operations should extend at least 5 feet beyond the development perimeters. Any excavation or cavities formed by the removal of existing/foundation, organic material, tree stumps, or ground brush should be filled with clean structural fill placed and compacted in lifts as described below.

The resulting cleared subgrade should then be checked for adequate stripping/grubbing by the engineer and then compacted with a medium vibratory roller to at least 95% of the soil's modified

Proctor dry density (ASTM D1557) at a depth of 1 foot below the compacted surface, as determined by in-place density tests. The fill required to achieve the placed finished grades should consist of fine sand with less than 20% passing the No. 200 sieve (fine sand, slightly silty fine sand or silty fine sand), free of rubble, organics, clay, debris and other unsuitable material. Most of the on-site sandy soil will meet this requirement, excluding topsoil and any organic soils associated with the existing wetland. Off-site fill should be tested for acceptance prior to acquisition. The structural fill should be placed in loose lifts no thicker than 9 to 12 inches (according to the compactor effectiveness), with each lift compacted to at least 95% of the soil's modified Proctor dry density, as determined by in-place density tests. Field density tests should be performed for each left to confirm compaction on a frequency of one test per 1,500 square feet in the building area.

Prior to beginning compaction of the stripped/cut subgrade and fill, soil moisture contents may need to be controlled to facilitate proper compaction. If additional moisture is necessary to achieve compaction objectives, then water should be applied in such a way that it will not cause erosion or removal of the subgrade soil. Conversely, if the material being compacted is too moist, drying through aeration and/or deep raking may be necessary. The moisture content within the natural ground or fill soil should be controlled to within ±2 percentage points of optimum as established in ASTM D1557 to help ensure development of both density and stability during compaction operations.

The foundation subgrade soils should be compacted after excavation using a light compactor to density soil loosened in the excavation. Footing subgrade soils should be tested to verify compaction to at least 95% of the modified Proctor maximum dry density (ASTM D1557) to a minimum depth of 1 foot below the foundation subgrade prior to placement of concrete. In-place density tests should be performed by an experienced geotechnical engineering technician working under the direction of a licensed Geotechnical Engineer to verify the required degree of compaction. A testing frequency of at least one test within every 1,500 square feet of floor slab area and within representative column and wall foundation areas is recommended. Backfill soils placed adjacent to footings or walls or over/around buried utilities under floor slabs should be carefully compacted with a vibratory plate compactor or tamp to avoid damaging the footings or walls. Approved sand fills to provide foundation embedment constraint should be placed in loose lifts not exceeding 6 inches and should be compacted to a minimum 95% of the modified Proctor maximum dry density.

If loose pockets or woody materials are encountered in the footing excavations, the unsuitable materials should be removed, replaced, and compacted with acceptable material. This backfilling may be completed with a well-compacted, suitable fill such as clean sand. Sand backfill should be compacted to a dry density of at least 95% of the modified Proctor maximum dry density (ASTM D1557), as previously described.

Utility trench backfill should follow the appropriate city or county requirements, or product manufacturer's specifications.

Limitations

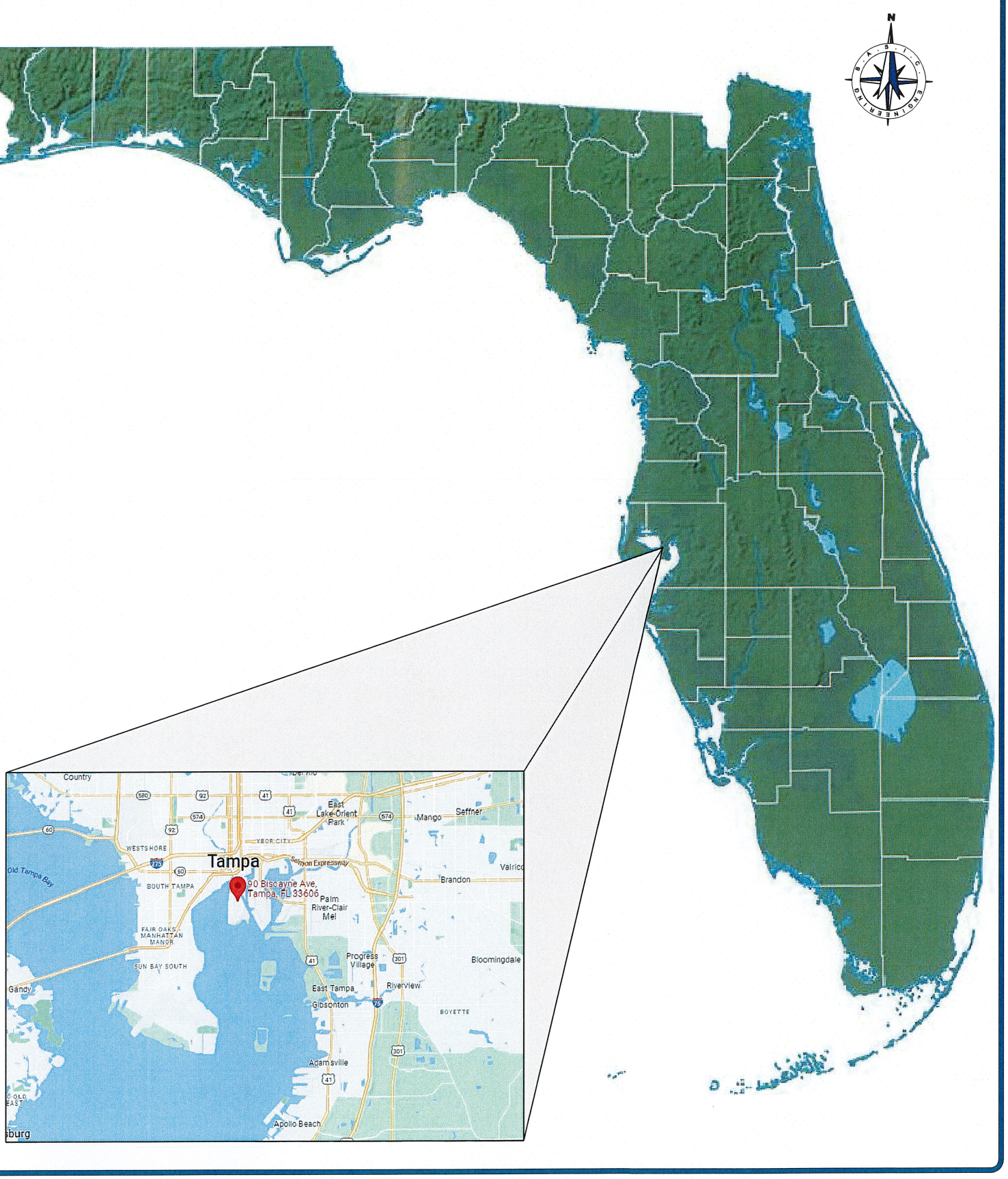
This report is for the exclusive use of Stress Free Construction, LLC and the other professionals and designers involved with this project. Our professional services have been performed, our findings obtained, and our opinions prepared in accordance with generally accepted geotechnical engineering principles and practices. All testing was performed in general accordance with recognized methods and guidelines; minor procedural variation that are not expected to affect the conclusions reached herein may have been taken. B.A.S.I.C. Engineering is not responsible for the conclusion, opinions or recommendations made by others based on these data.

The analysis and opinions submitted in this report are based upon the data obtained from the soil borings performed at the locations indicated. If site plans change and any subsurface variations become evident during subgrade preparation, a re-evaluation of the opinions contained in this report will be necessary after we have had an opportunity to observe the characteristics of the conditions encountered. The scope of our services does not include any environmental assessment or investigation for the presence or absence of hazardous or toxic materials in the soil, groundwater, or surface water within or beyond the site studied. Any statements in this report regarding odors, staining of soils, or other unusual conditions observed are strictly for the information of our client.

Closure

We trust the information in this report meets Stress Free Construction's requirements. Samples will be retained in our laboratory for one year. We appreciate the opportunity to continue our involvement in this project. Should you have any questions, or require additional information, please do not hesitate to contact us at your convenience.

APPENDIX A



BASIC ENGINEERING
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STRESS FREE CONSTRUCTION
90 BISCAYNE AVE; TAMPA, FL 33606
HILLSBOROUGH COUNTY

SITE LOCATION MAP

FIGURE NO.: 1
FILE NO.: B2022-050
DATE: 08/04/2022
CHECKED BY: JJ

TECHNICAL NOTES:

- B.A.S.I.C. SPT BORING LOCATIONS

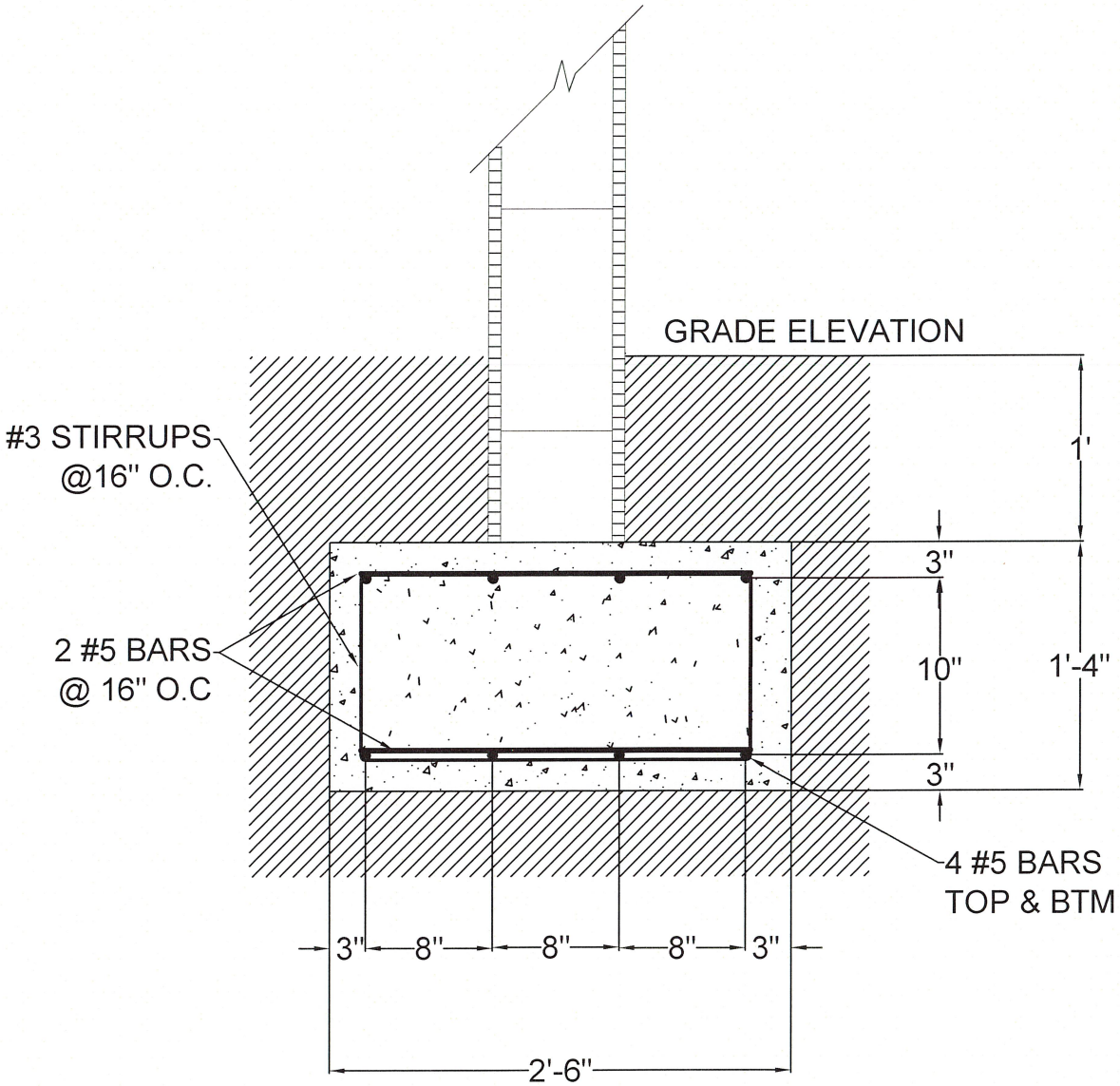


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SPT BORING LOCATION PLAN

FIGURE NO.: 2
FILE NO.: B2022-050
DATE: 08/04/2022
CHECKED BY: JJ



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FOOTER DETAIL

FIGURE NO.: 3
FILE NO.: B2022-050
DATE: 08/04/2022
CHECKED BY: JJ

Classification

MAJOR DIVISIONS			USCS	Sym.	Typical Description
COARSE GRAINED SOILS	GRAVEL AND GRAVELLY SOILS	Clean Gravels (LITTLE TO NO FINES)	GW		Well graded gravels, gravel - sand mixtures, little to no fines
			GP		Poorly graded gravels, gravel - sand mixtures, little to no fines
	MORE THAN 50 OF COARSE FRACTION RETAINED ON NO. 4 SIEVE	Gravels with Fines (APPRECIABLE AMOUNT OF FINES)	GM		Silty gravels, gravel - sand - silt mixtures
			GC		Clayey gravels, gravel - sand - clay mixtures
	SAND AND SANDY SOILS	Clean Sands (LITTLE TO NO FINES)	SW		Well graded sand, little to no fines
			SP		Poorly graded sand, little to no fines
MORE THAN 50% OF MATERIAL IS LARGER THAN NO. 200 SIEVE	MORE THAN 50% COARSE FRACTION PASSING NO. 4 SIEVE	Sands with Fines (APPRECIABLE AMOUNT OF FINES)	SP-SM		Slightly silty sand, 5 to 12% fines by weight
			SM		Silty sand, 12 to 50% fines by weight
			SP-SC		Slightly clayey sand, 5 to 12% fines by
			SC		Clayey sand, 12 to 50% fines by weight
FINE GRAINED SOILS	SILTS AND CLAYS	LIQUID LIMIT LESS THAN 60	ML		Inorganic, sandy silt to silt, >50% fines by
			CL or CH		Inorganic sandy clay, 50 to 75% fines by
			CL		Inorganic clay, low to medium plasticity, > 75% fines by weight
			OL		Organic clay or silt, low plasticity, >50% fines by weight
MORE THAN 50% OF MATERIAL IS SMALLER THAN NO. 200 SIEVE	SILTS AND CLAYS	LIQUID LIMIT GREATER THAN 60	CH		Inorganic clay, medium to high plasticity, 50 to 75% fines by weight
			CH		Inorganic clay, medium to high plasticity, > 75% fines by weight
			OH		Organic clay or silt, medium to hgihg plasticity, >50% fines by weight
HIGHLY ORGANIC SOIL			PT		Peat, Humus, Swamp Soils with High Organic Content, etc.
BURIED MATERIALS					Wood (Buried tree wood, tree stumps, etc.)
					Buried Debris (Concrete fragments, construction materials, etc.)
ROCK					Limestone
					Dolostone
					Chert

DENSITY AND CONSISTENCY

SANDY SOIL		CLAYEY SOIL		ROCK	
> 3	Very Loose	>1	Very Soft	0 - 20	Very Soft
3 - 8	Loose	1 - 3	Soft	21 - 40	Soft
8 - 24	Medium Dense	3 - 6	Firm	41 - 100	Moderately Hard
24 - 40	Dense	6 - 12	Stiff	50/5" - 50/3"	Hard
40+	Very Dense	12 - 24	Very Stiff	50/2" - 50/0"	Very Hard
		24+	Hard		

LABORATORY LEGEND

LL	LIQUID LIMIT
PL	PLASTIC LIMIT
PI	PLASTICITY INDEX
-200	PERCENT PASSING NO. 200 SIEVE
NMC	NATURAL MOISTURE CONTENT
OC	ORGANIC CONTENT

Depth (ft)	Description	Blow Count	N-Value	Notes
	Dark grayaish brown fine SAND with silt (SP-SM)	HA	HA	
	Dark gray fine SAND with silt (SP-SM)	HA	HA	
5	Medium dense, light gray fine SAND (SP)	2-4-4-6	8	No reaction to HCL
				Ground water measured at 6 feet
	Loose, light brownish gray fine SAND (SP)	8-2-4-4	6	No reaction to HCL
	Medium dense, light brownish gray fine SAND (SP)	3-5-6-2	11	No reaction to HCL
10				
	Medium dense, light gray fine SAND (SP)	4-6-10	16	No reaction to HCL
15				
	Medium dense, light gray fine SAND (SP)	2-4-6	10	No reaction to HCL
20				
	Medium dense, light gray fine SAND (SP)	4-2-7	9	No reaction to HCL
25				
	Medium dense, light gray fine SAND (SP)	18-10-12	22	No reaction to HCL
30				Boring completed at 30 feet
35				

N-Value blows/ft: 1 – 100

BASIC ENGINEERING	Drawn by:	BFB	Project Name:	Stress Free	SPT BORING LOG
	Checked by:	JDJ	Project No.:	B2022-050	Boring No.: B-1
	Approved by:	JDJ	Location:	Tampa, FL	Boring Date: 7-29-22

Depth (ft)	Description	Blow Count	N-Value	Notes
	Dark gray fine SAND with silt (SP-SM)	HA	HA	
	Dark gray fine SAND with silt (SP-SM)	HA	HA	
5	Very loose, dark gray fine SAND (SP)	1-1-1-1	2	No reaction to HCL
				Ground water measured at 6 feet
	Loose, light brownish gray fine SAND (SP)	1-1-2-1	3	No reaction to HCL
	Loose, light gray fine SAND (SP)	1-1-2-2	3	No reaction to HCL
10				
	Medium dense, light gray fine SAND (SP)	4-4-4	8	No reaction to HCL
15				
	Medium dense, light gray fine SAND (SP)	4-4-4	8	No reaction to HCL
20				
	Medium dense, light gray fine SAND (SP)	7-4-4	8	No reaction to HCL
25				
	Dense, light gray fine SAND (SP)	16-12-16	28	No reaction to HCL
30				Boring completed at 30 feet
35				

N-Value blows/ft: 1 — 100

BASIC ENGINEERING

Drawn by:	BFB	**Project Name:**	Stress Free	**SPT BORING LOG**	
Checked by:	JDJ	**Project No.:**	B2022-050	**Boring No.:**	B-2
Approved by:	JDJ	**Location:**	Tampa, FL	**Boring Date:**	7-29-22