



## WHITAKER LABORATORY, INC.

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April 10, 2020

Thompson Engineering  
517 E. Congress Street  
Savannah, GA 31401

Attention: George "Geep" Bockhold, P.E.  
O (912) 335-4933  
C (251) 490-6755  
[gbockhold@thompsonengineering.com](mailto:gbockhold@thompsonengineering.com)

Referencing: Report of Geotechnical Evaluation Services for  
Existing Residential Structure – 2<sup>nd</sup> Floor Addition  
66 Moon River Court | Burnside Island  
Savannah, Georgia  
Report No.: 04-10-20-1

Dear Mr. Bockhold,

As requested, WHITAKER LABORATORY, INC. has conducted geotechnical evaluation services at the above referenced site. Authorization to perform this evaluation was provided by your acceptance of our proposal dated January 23, 2020.

We understand that a second floor will be added to the existing residential structure residing at the above referenced address. We further understand that the first floor will be converted to a non-climate controlled, open area, garage/storage level.

This evaluation was performed in an effort to identify support characteristics of near surface bearing subgrade soils adjacent to existing perimeter footings. In an effort to identify support characteristics of near surface bearing subgrade soils, hand auger borings, incorporating Dynamic Cone Penetrometer (DCP) testing, were performed adjacent to existing foundation elements at four locations around the perimeter of the existing structure. DCP auger borings are identified as DCP-1, DCP-2, HE-1 and HE-2. DCP testing is done with a 15 pound hammer falling 20 inches, driving a 1.5 inch diameter cone point, in accordance with ASTM STP-339. Results of DCP testing provide an indication of the relative consistency, density and in-situ strengths of the tested soils. Hand auger borings were advanced to depths reaching 5 to 6 feet below the ground surface elevation. DCP testing was performed at one-foot intervals throughout the depths of the hand auger borings.

This evaluation was also performed to identify the existing foundation type and dimensions. In an effort to identify existing foundation type and dimensions, hand excavations were performed adjacent to the exterior foundation wall at two of the auger boring locations. We have attached photographs of each hand excavation to this report for your information.

This evaluation also incorporated the advancement of one deep cone penetration test (CPT) sounding for providing deep foundation recommendations, if needed, for support of foundation elements.

We have attached a boring location plan, boring records and existing footing detail to this report for your information.

### **Findings:**

- Near surface bearing subgrade soils consist of very loose to firm sands (SP-SM) extending to depths reaching 3 to 5 feet below the ground surface.
- Soft sand clays and clays (SC and CL) were encountered bracketing elevations 4 to 6 feet below existing grades.
- Thin organic soil layer was encountered bracketing elevations 2.5 to 3 feet below existing grades within DCP-1.
- Groundwater was encountered at a depth of 5 ½ feet below the ground surface elevation at the time of testing.
- Visual inspection of the existing residence identified areas of distress (possible settlement) in the form of minor cracks within brick mortar joints predominately at the front right corner of the residential structure (area of DCP-2 – garage area).

The foundation system supporting the existing residential structure appears to be a stem wall foundation system. Stem wall foundation systems incorporate conventional spread footings with perimeter CMU block walls extending above finished exterior ground surface elevations. Backfill is placed inside the perimeter CMU block walls to incorporate an elevated slab on-grade.

Based upon results of hand excavations, existing foundations at HE-1 and HE-2 locations appear to consist of conventional spread footing foundations that are 12 inches thick and 22 to 24 inches wide (edge of footing protrudes outward 3 to 4 inches from the brick veneer). Bottom of footing elevations reside approximately 3 feet below the existing ground surface elevation. The slab-on-grade resides approximately 12 inches above surrounding exterior ground surface elevations.

### **Concerns:**

After evaluation of data collected on this site, it appears that foundation elements having a width of 22 – 24 inches and a depth of 3 feet below existing grades exhibit an allowable bearing capacity of only 1200 psf utilizing an aggressive factor of safety of 2.0. This low bearing capacity is due to footings residing within close proximity to the soft sand clay / clay layer bracketing elevations 4 to 6 feet below existing grades on this site.

### **Recommendations:**

Based upon this low bearing pressure for existing footings combined with visually apparent distress to the existing structure (cracking in mortar joints), Whitaker does not recommend adding new load to the existing foundation elements in an effort to support of the 2<sup>nd</sup> floor addition. Adding new load to the existing footings puts the existing footings at risk of experiencing shear failure and therefore possible major damage to the structure.

In an effort to adequately support the 2<sup>nd</sup> floor addition, existing spread footing foundation elements should be enhanced utilizing helical piers and/or new interior shallow spread footing foundation elements should be installed to support the additional load of the 2<sup>nd</sup> floor addition. Edges of new interior footings shall not reside within 2 feet of the edge of an existing footing unless the new footing is enhanced with helical piers.

### **New Interior Shallow Spread Footing Foundation Elements:**

The following recommendations assume that individual strip loads will not exceed 2 kips per linear foot for strip footings and/or 30 kips per column for individual column footings. The following recommendations also assume that bearing elevations for new interior spread footing foundation elements will not reside deeper than 24 inches below the top of slab-on-grade elevation.

Assuming the above bearing elevations and/or loading conditions are not exceeded and below recommended footings inspections are performed as recommended, soil bearing pressures of 2,000 psf may be used in new interior footing design. New footings shall have a minimum plan width of 24 inches. As mentioned above, edges of new interior footings shall not reside within 2 feet of the edge of an existing footing unless the new footing is enhanced with helical piers. Overall settlement on the order of ½ inch is anticipated for new footings.

Due to near surface soft clays and organics encountered below the ground surface on this site, footing inspections shall be conducted by performing dynamic cone penetrometer testing within hand auger holes to minimum depths reaching 3 feet below bottom of footing elevations to verify adequate bearing material is present. Subsurface bearing soils deemed unsuitable based upon visual inspection and/or dynamic cone penetrometer testing should be undercut to a competent material and backfilled with an approved compacted material. Footing inspections shall be performed in each column footing and/or every 30 linear feet of strip footing.

Lateral loads can be resisted by passive earth pressure due to compacted structural fill placed against the sides of the footings (new or existing). The upper 1-foot of resistance should be neglected unless the fill is confined by a pavement or floor slab. A soil unit weight of 110 pcf and passive earth pressure coefficient of 3.0 can be utilized in the analysis. Additionally, a friction coefficient of 0.35 between the concrete footings and underlying soil can be used in combination with passive earth pressures to resist lateral loads. The coefficient of friction should be applied to dead normal loads only.

Based upon the location of this site, this site would be defined as a seismic design category B in accordance with figure R301.2(2) from the IRC 2012.

Helical Pier Enhanced Existing or New Footings:

If existing spread footing foundation elements would like to be utilized to support additional load applied to existing footings from the 2<sup>nd</sup> floor addition and/or new interior footings require residing within 2 feet (edge to edge) of an existing footing, existing footings and/or new footings shall be enhanced with a helical pier system.

Helical piers, incorporating an 18-inch diameter single lead helix and extending to depths reaching 7 - 8 feet below the current ground surface elevation, could be designed for working loads not to exceed 16 kips (8 tons) per pier. Helical pier tip elevations should not extend below a depth of 8 feet below existing grades. These shallow helical piers will not provide any appreciable up-lift or lateral load carrying capability.

Helical pier type foundations are designed, installed and warranted by specialty contractors. A specialty contractor should be contacted to initiate this process. We will be pleased to recommend contractors in the area if you desire.

It is a pleasure to serve you and we look forward to further opportunities to assist you on this and other projects.

Respectfully submitted  
WHITAKER LABORATORY, INC.

  
Jason H. Follo, P.E.  
GA Registered Engineer  
#31031



  
Blake L. Jones, P.E.  
GA Registered Engineer  
#44657



# **Attachments**

**Site Vicinity Map**

**Boring Location Plan**

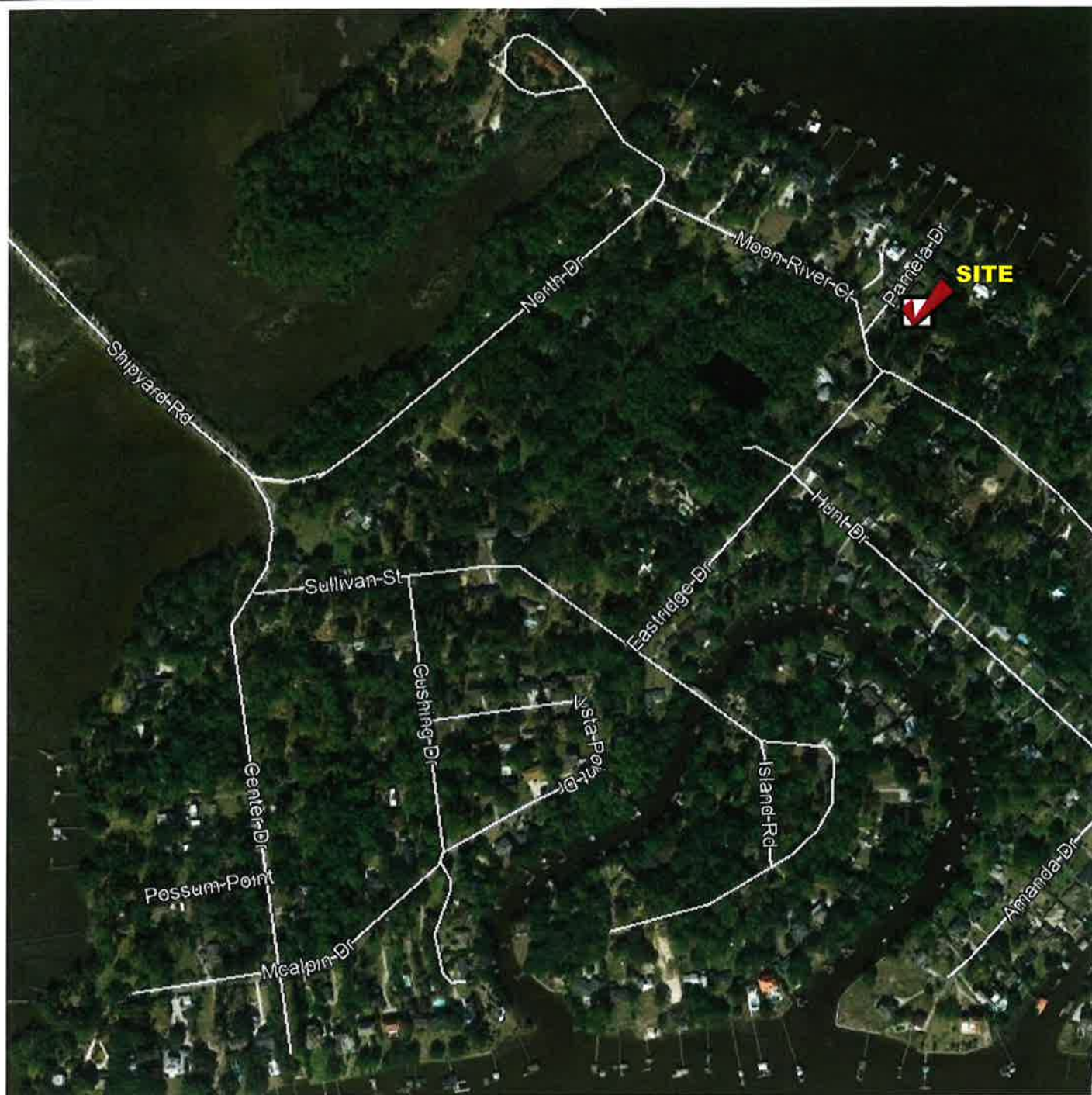
**Photographs of Hand Excavations**

**Excavation Detail (Existing Footing Dimensions)**

**CPT Log**

**DCP Auger Boring Logs**



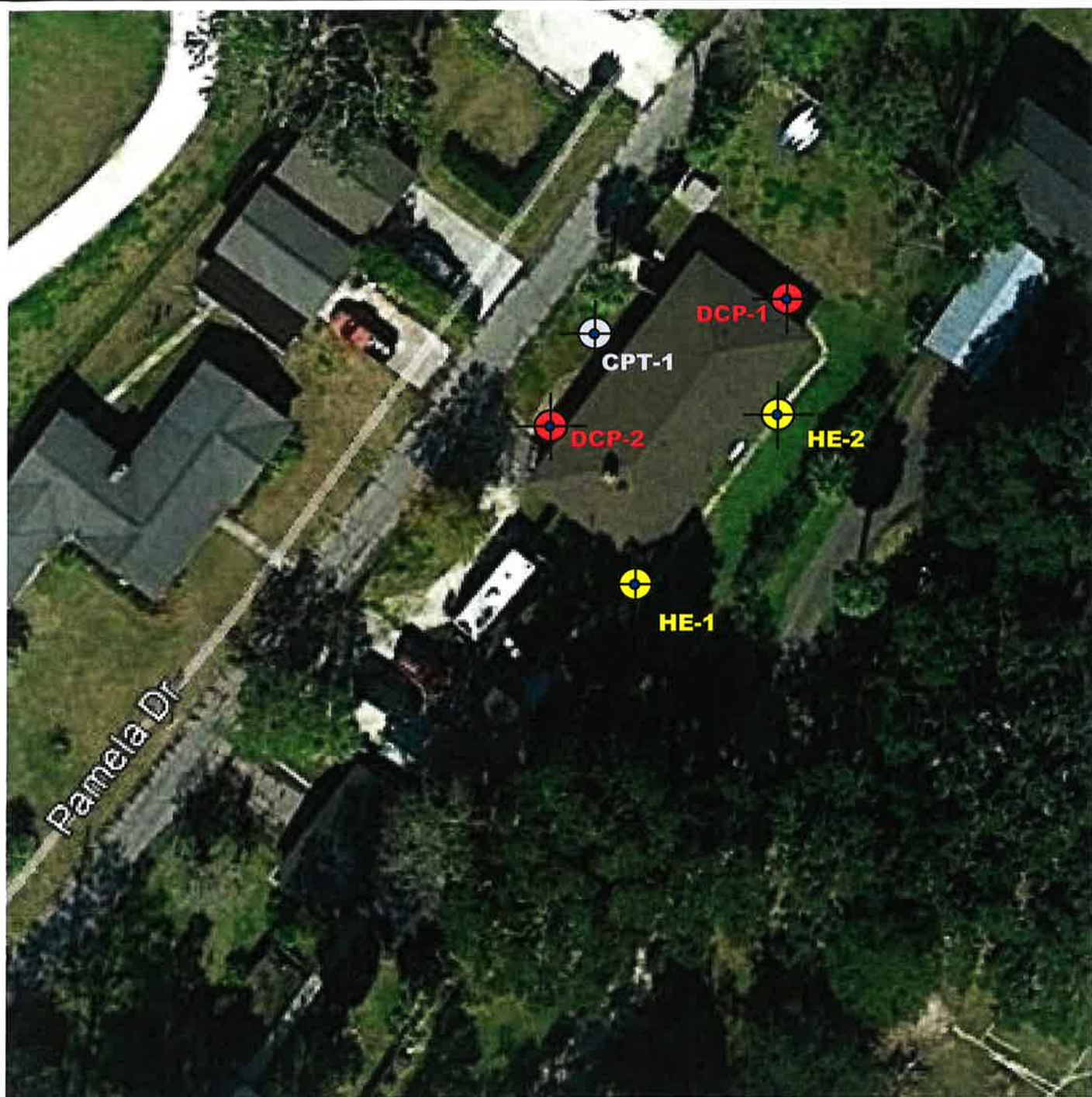


## Site Vicinity Map

66 Moon River Court  
Burnside Island  
Savannah, Chatham County, Georgia







## Boring Location Plan

66 Moon River Court  
Burnside Island  
Savannah, Chatham County, Georgia



ALL BORING LOCATIONS ARE APPROXIMATE, & ARE BASED ONLY ON FIELD ESTIMATES.



WHITAKER LABORATORY, INC.





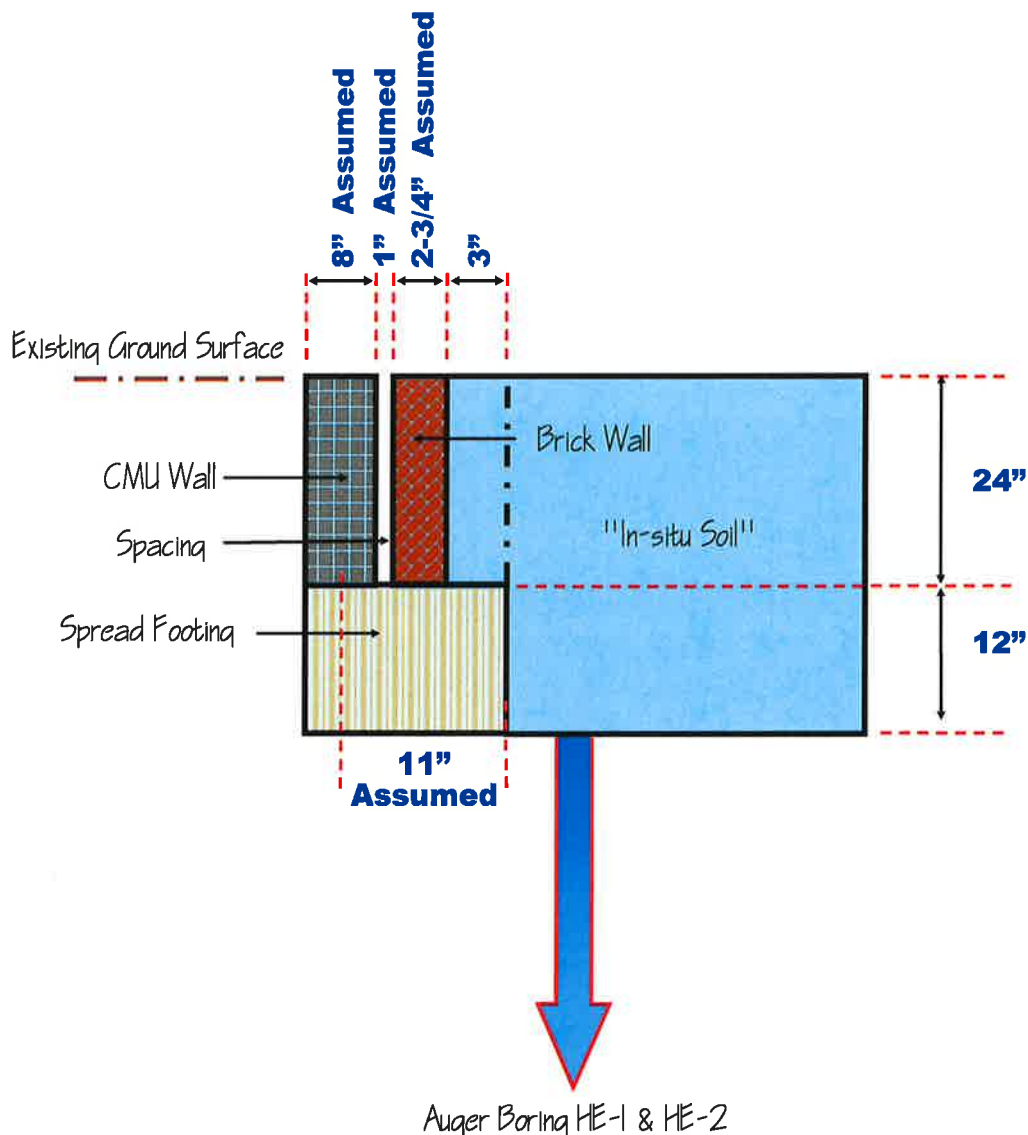




HE-2



(Excavation HE-1 & HE-2)



## Excavation Detail

66 Moon River Court, Savannah, Georgia

(Not To Scale)

ALL BORING LOCATIONS ARE APPROXIMATE, & ARE BASED ONLY ON FIELD ESTIMATES.





# Whitaker Laboratory, Inc.

Job Name 66 Moon River Court

Location Savannah GA

Client Thompson Engineering

Date & Time 3/31/2020 9:07:46 AM

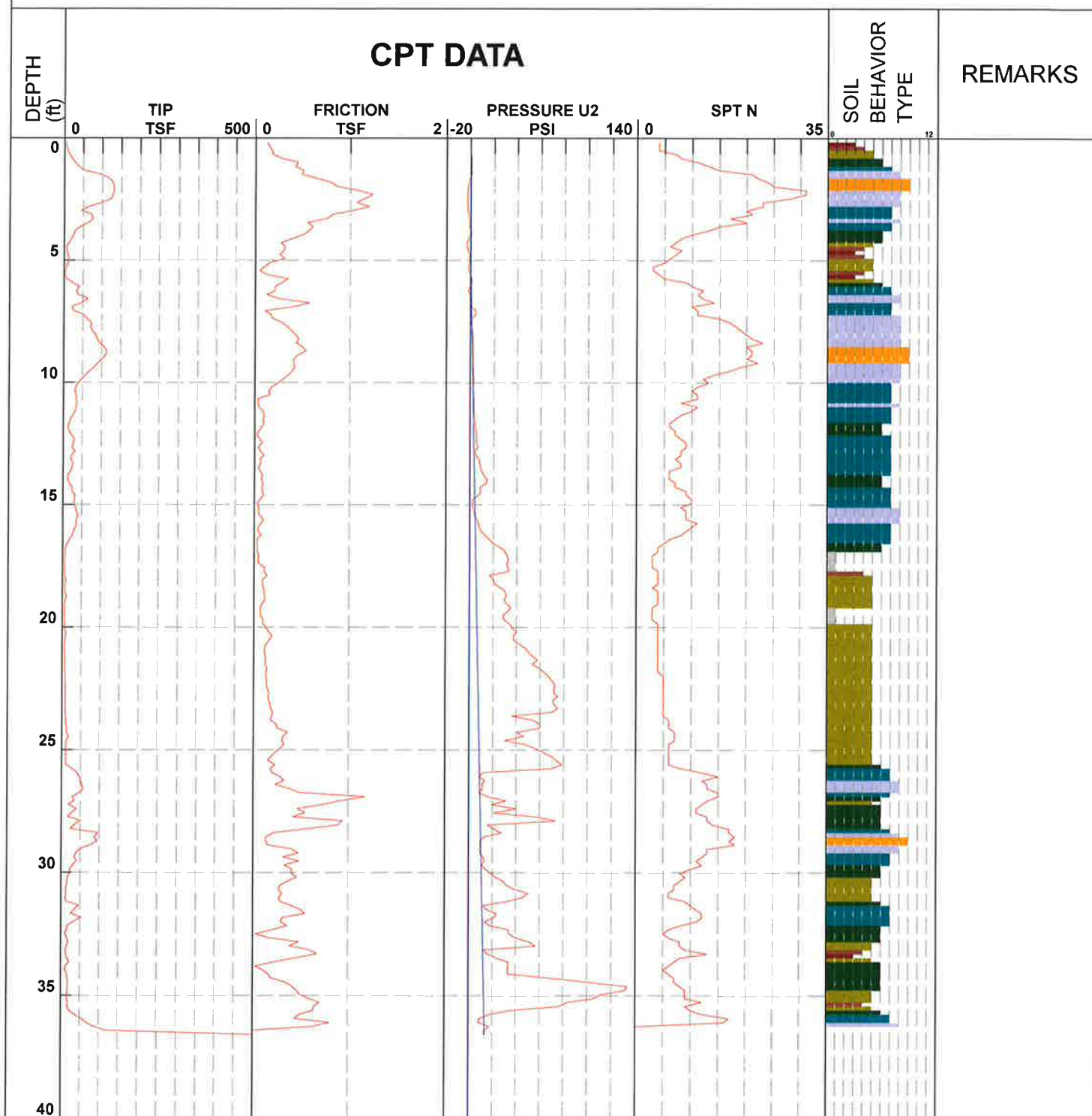
Hole Number CPT- 1

Cone Number DSG1024

Operator Kicklighter

Job Number 66 Moon River

Groundwater = 5 feet approx.



- |                            |                               |                              |                                  |
|----------------------------|-------------------------------|------------------------------|----------------------------------|
| 1 - sensitive fine grained | 4 - silty clay to clay        | 7 - silty sand to sandy silt | 10 - gravelly sand to sand       |
| 2 - organic material       | 5 - clayey silt to silty clay | 8 - sand to silty sand       | 11 - very stiff fine grained (*) |
| 3 - clay                   | 6 - sandy silt to clayey silt | 9 - sand                     | 12 - sand to clayey sand (*)     |



**WHITAKER LABORATORY, INC.**  
**P.O. BOX 7078**  
**SAVANNAH, GEORGIA 31418**

Project Name 66 Moon River Court Date 3/31/2020

Project Location Savannah, GA

Boring Number \_\_\_\_\_ Field Engineer Blake Jones

Ground Surface Elevation \_\_\_\_\_ Ground Water Elevation \_\_\_\_\_

Sample No.	Sample		Stratum		Visual Field Classification	Blows/Foot
	From	To	From	To		
HE-1			0	2'	Organics	-BMF' - 4-9-9
			2'	5.5'	Very Loose to Loose Gray Fine Sand (SP-SM)	-1' - 4-8-10
			5.5'	6'	Stiff Gray Fine Sand Clay (SC)	-2' - 2-4-4
					Groundwater Encountered at 5 feet	-3' - 7-10-12
					Top of Footing 2 Feet below existing ground surface elevation.	
					Footing approximately 12 inches in depth	
HE-2			0	1.5'	Organics	-BMF' - 4-12-14
			1.5'	3'	Firm Gray Fine Sand (SP-SM)	-1' - 5-13-15
			3'	3.5'	Stiff Gray Fine Sand Clay (SC)	-2' - 5-15-17
			3.5'	6'	Firm to Loose Gray Fine Sand (SP-SM)	-3' - 5-4-4
					Groundwater Encountered at 5 ½ feet	
					Top of Footing 2 Feet below existing ground surface elevation.	
					Footing approximately 12 inches in depth	
DCP-1			0	1'	Organics	-1' - 8-14-17
			1'	2.5'	Firm Tan Fine Sand (SP-SM)	-2' - 10-15-20
			2.5'	3'	Organics	-3' - 5-6-5
			3'	5'	Loose Gray Fine Sand (SP-SM)	-4' - 4-7-10
					Groundwater Encountered at 5 ½ feet	-5' -3-5-6
DCP-2			0	1'	Organics	-1' - 5-5-5
			1'	2'	Loose to Firm Brown/Tan Fine Sand (SP-SM)	-2' - 9-15-25+
			2'	4.5'	Firm to Loose Brown Fine Sand (SP-SM)	-3' - 7-11-23
			4.5'	5'	Very Soft Brown Clay (CL)	-4' - 5-7-8
					Groundwater Encountered at 5 ½ feet	-5' -2-2-2

\*BMF= Bottom of Footing