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August 19, 2022

Mr. Hayes Christenbury LENNAR 6701 Carmel Commons Road, Suite 425 Charlotte, NC 28226

Email: <u>Joseph.Christenbury@Lennar.com</u>

Subject: Estimated Seasonal High Water Table (ESHWT) Determinations

Carolina Reserve Commons Charlotte Highway (Hwy 621) Indian Land, South Carolina SUMMIT Project No. 1506.G0277

Dear Mr. Christenbury:

SUMMIT Engineering, Laboratory and Testing, Inc. **(SUMMIT)** is pleased to submit this letter summarizing our observations of the soil test borings as related to Estimated Seasonal High Water Table Elevation (ESHWT) determinations in the proposed stormwater BMP ponds to be constructed for the proposed project listed above. This report contains a brief description of the project information provided to us, general site and subsurface conditions revealed during this exploration.

PURPOSE OF EXPLORATION

The primary purpose of this exploration was to obtain information regarding the subsurface conditions in the proposed stormwater BMP ponds, assess the engineering characteristics of the subsurface materials, and determination of the estimated seasonal high water table mark (if evident).

This report contains the following items:

- Site Vicinity Map and Boring Location Plan,
- Summary of Test Boring Observations, visual soil classifications and descriptions,
- A general review of the subsurface soils and estimated seasonal high water table depth from existing ground surface (if evident),
- Groundwater level measurements.

EXPLORATION PROCEDURES

SUMMIT visited the site on August 8th and 9th, 2022 and performed four (4) soil test borings (identified as SW-21 through SW-24) in the proposed stormwater BMP ponds. The approximate location of the boring is shown on Figure 2 – "Boring Location Plan" provided in Appendix 2. The client (LENNAR) provided **SUMMIT** a plan sheet titled "Conceptual Site Plan" prepared by MPV that indicated the approximate locations of the proposed stormwater BMP ponds. The borings were located by professionals from our office using the provided plan, recreation-grade handheld GPS, existing topography, and aerial maps as reference. Since the boring locations were not surveyed, the location of the borings should be considered approximate. We recommend the actual boring location be surveyed to determine the actual boring location and existing ground elevation.

The soil test borings were performed using an ATV-mounted CME 550X drill rig. Borings SW-21, SW-22, SW-23, and SW-24 were extended to approximate depths of 7.3, 16, 16, and 6 feet below the existing ground surface, respectively. Hollow-stem, continuous flight auger drilling techniques were used to advance the boring into the ground. Standard Penetration Tests (SPT) were performed within the mechanical boring continuously to the termination depth in general accordance with ASTM D 1586. When properly evaluated, the SPT results can be used as an index for estimating soil strength and density. In conjunction with the penetration testing, representative soil samples were obtained from the test location and returned to our laboratory for visual classification and potential laboratory testing. The soil samples collected were visually examined and classified in general accordance with ASTM D-2488. The Munsell Soil Color Charts (2009 Revision) were used to identify the hue, value, and chroma of soil samples. Water level

measurements were attempted at the termination of drilling. The classification symbols are depicted on the "Boring Log" provided in Appendix 2.

GENERALIZED SUBSURFACE STRATIGRAPHY

General subsurface conditions observed during our geotechnical exploration are described herein. For more detailed soil descriptions and stratifications at the test location, the respective "Boring Log" provided in Appendix 2 should be reviewed. The horizontal stratification lines designating the interface between various strata represents approximate boundaries. Transitions between different strata in the field may be gradual in both the horizontal and vertical directions.

Beginning from the ground surface, a layer of topsoil (surficial organic soils) was observed with thicknesses of approximately 3 inches. Beneath the topsoil layer, residual (undisturbed) soils were encountered that consisted of elastic silts (MH) and sandy silts (ML). Partially weathered rock (PWR) conditions were encountered in Boring SW-21 and SW-24 at approximate depth of 6 feet below the existing ground surface (bgs). Auger refusal conditions were encountered in Borings SW-21 and SW-24 at approximate depths of 7.3 and 6 feet bgs, respectively.

GROUNDWATER LEVEL MEASUREMENTS

At the time of drilling, groundwater was not observed in the borings. After waiting more than 24 hours, water was not observed in the borings. It should also be noted that groundwater levels tend to fluctuate with seasonal and climatic variations, as well as with some types of construction operations. Therefore, water may be encountered during construction at depths not indicated in the borings performed for this exploration.

ESTIMATED SEASONAL HIGH WATER TABLE

ESHWT is defined as the shallowest depth to a wet soil layer as a result of "true" or "permanent" groundwater at any time during the year. The ESHWT is typically identified with a change in the color of the soil layer due to water staining (typically, gray redoximorphic depletions and mottling). Spots or blotches of different color or shades of color interspersed with a dominant color in soil, commonly referred to as mottling. Mottling is a historic indication for the presence of groundwater caused by intermittent periods of saturation and drying, and may be indicative of poor aeration and impeded drainage. Mottling is a "general indication of groundwater" flow through this layer, but it is not known whether the groundwater flow was recent.

CONCLUSIONS

Based on our observations, ESHWT indicators were evident in soils sampled in Borings SW-22 and SW-23, and were not evident in soils sampled in Borings SW-21 and SW-24. Please note that even though ESHWT indicators were not evident in Borings SW-21 and SW-24, perched water conditions can develop above a low permeable material such as partially weathered rock (PWR). Perched water conditions differ from the "true" or "permanent" water table. A perched water table is water standing above an unsaturated zone and is often influenced by soil conditions, and occurrence of less permeable soils. Where the ESHWT is defined as the shallowest depth to a wet soil layer as a result of "true" or "permanent" groundwater at any time during the year. The BMP designer should take into consideration that perched water conditions may exist above the low permeable PWR stratum.

The following table summarizes the results of the borings and our observations.

Summary Table of the Boring Results and Our Observations

Test Location	Boring Depth (Feet) ¹	ESHWT Depth (Feet) ¹	GW Depth ATD (Feet) ¹	GW Depth After 24 Hours (Feet) ¹	Approx. PWR Depth (Feet) 1	Approx. Auger Refusal Depth (Feet) ¹
SW-21	7.3	NE	NE	NE	6	7.3
SW-22	16	9	NE	NE	NE	NE
SW-23	16	9	NE	NE	NE	NE
SW-24	6	NE	NE	NE	6	6

¹ Depths from existing ground surface.

NE - Not Encountered in boring

The analyses submitted in this report were based, in part, on data obtained from this exploration. If the above-described project conditions are incorrect or changed after the issuing of this report, or subsurface conditions encountered during construction are different from those reported, **SUMMIT** should be notified and these recommendations should be re-evaluated based on the changed conditions to make appropriate revisions. We have prepared this report according to generally accepted geotechnical engineering practices. No warranty, express or implied, is made as to the professional advice included in this report.

CLOSING

SUMMIT appreciates the opportunity to provide our professional services for you on this project. If you have any questions concerning the information in this proposal or if we may be of further service, please contact us at 704.504.1717.

Sincerely,

SUMMIT ENGINEERING, LABORATORY & TESTING, INC.



SUMMIT ENGINEERING, LABORATORY & TESTING, INC.

No. 5545

OF AUTHORITA

L. Brian Cantrell

L. Brian Cantrell Geotechnical Dept. Manager Christian Payne Assistant Project Manager

LIST OF APPENDICES

Appendix 1 Figure No. 1 – Site Vicinity Map

Figure No. 2 – Boring Location Plan

Appendix 2 Boring Logs



APPENDIX 1

Figures

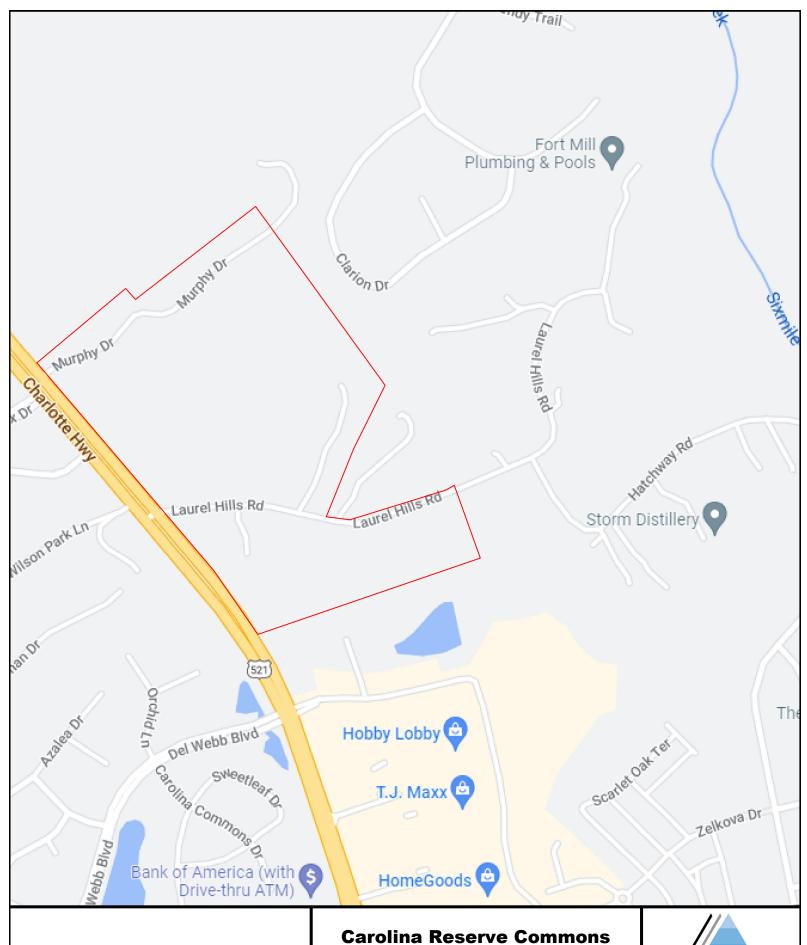


Figure 1
Site Location Plan

Carolina Reserve Commons
Charlotte Highway (Hwy 621)
Indian Land, South Carolina

SUMMIT Project No.: 1506.G0277



SCALE: NTS



Figure 2 Boring Location Plan

Approx. Soil Test Boring Location

SCALE: NTS

Carolina Reserve Commons Charlotte Highway (Hwy 621) Indian Land, South Carolina

SUMMIT Project No.: 1506.G0277



3575 Centre Circle Fort Mill, South Carolina 29715 (803) 504-1717



APPENDIX 2

Boring Logs



SUMMIT ENGINEERING 3575 CENTRE CIRCLE FORT MILL, SC 29715 704-504-1717

KEY TO SYMBOLS

CLIENT Lennar

CPAYNE@SUMMIT-COMPANIES.COM

PROJECT NAME Carolina Reserve Commons PROJECT NUMBER 1506.G0277 PROJECT LOCATION Indian Land, South Carolina

LITHOLOGIC SYMBOLS (Unified Soil Classification System)

BLANK

MH: USCS Elastic Silt

MLS: USCS Sandy Silt

TOPSOIL: Topsoil



PWR: Partially Weathered Rock

SAMPLER SYMBOLS



Standard Penetration Test

WELL CONSTRUCTION SYMBOLS

ABBREVIATIONS

LL - LIQUID LIMIT (%)

Ы - PLASTIC INDEX (%)

W - MOISTURE CONTENT (%)

DD - DRY DENSITY (PCF)

NP - NON PLASTIC

-200 - PERCENT PASSING NO. 200 SIEVE

PP - POCKET PENETROMETER (TSF)

TV - TORVANE

PID - PHOTOIONIZATION DETECTOR

UC - UNCONFINED COMPRESSION

ppm - PARTS PER MILLION

Water Level at Time

Drilling, or as Shown

Water Level at End of

Drilling, or as Shown Water Level After 24

Hours, or as Shown



BORING NUMBER SW-21

CLIENT Lennar			PROJECT NAME Carolina Reserve Commons									
PROJECT NUMBER _1506.G0277		PROJECT LOCATION Indian Land, South Carolina										
DATE	STAR	RTED <u>8/8/22</u> COMPLETED <u>8/8/22</u>	GROUND ELEVATION HOLE SIZE 6 inches									
DRILL	JING C	CONTRACTOR SUMMIT	GROUND WATER/CAVE-IN:									
DRILL	JING M	METHOD Hollow Stem Auger	AT TIME OF DRILLING GW NE ATD / Caved in Depth NE									
		Y C. Whitener CHECKED BY N. Sacks	AT END OF DRILLING GW NE > 24 hrs									
NOTE	. S _Ser	ee Figure 2 "Boring Location Plan" for Approx. Boring Location	on AFTER DRILLING									
ELEVATION (ft.)	GRAPHIC LOG	MATERIAL DESCRIPTION		SAMPLE TYPE NUMBER	RECOVERY % (RQD)	_oz	0 2 □ I	PL PL 20 4 FINES (0 6	60 8 60 8 ENT (%)	30 100	
	12. 14.						-			:		
		(ML) RESIDUUM: Stiff White (2.5Y, 8/1) and Pale Brown (2.5Y, 8/3) Sandy SI	LT	SPT 1		4-4-6-8 (10)	•					
2.5		(ML) Very Stiff Very Pale Brown (10YR, 8/4), Reddish Yello (7.5YR, 7/8), and Light Red (2.5YR, 6/8) Sandy SILT		SPT 2	-	8-10-11-13 (21)						
5.0		(ML) Very Stiff White (2.5Y, 8/1), Brownish Yellow (10YR, 6 and Light Gray (10YR, 7/2) Sandy SILT		SPT 3		7-9-9-11 (18)						
		(ML) Partially Weathered Rock When Sampled Becomes W (2.5Y, 8/1) and Yellow (10YR, 8/6) Sandy SILT	√hite	SPT 4	_	12-50 (50/4")	-				>>	
7.5		Bottom of Boring at 7.3 feet bgs, Auger Refusal						:	:			



BORING NUMBER SW-22

CLIENT Lennar		PROJECT NAME Carolina Reserve Commons										
PROJECT NUMBER 1506.G0277												
			_ GROUND WATER/CAVE-IN: AT TIME OF DRILLING GW NE ATD / Caved in Depth NE									
	DRILLING METHOD Hollow Stem Auger							aved in i	Jeptn INI	=		
		C. Whitener CHECKED BY N. Sacks				I NG GW NI	E > 24 Nrs					
NOIE	3 <u>se</u>	e Figure 2 "Boring Location Plan" for Approx. Boring Location	AFII	ER DRII	LLING						_	
Z		MATERIAL DESCRIPTION		SAMPLE TYPE NUMBER	%	🙃		SPT N			100	
ELEVATION (ft.)	¥ ₀			ZHZ.	RECOVERY (RQD)	N ZTS	0 20 40 60 80 100					
EVA (ft.	GRAPHIC LOG			1PLE IUMI		BLOW COUNTS (N VALUE)	0 20	40	60	⊣ 80	100	
日	٥			SAN	REC	02	□FI	NES CO	NTENT	` '		
: :	71 12. 11	Approx. 3" of TOPSOIL		,			0 20	<u>40</u>	60 :	<u>80</u> :	100	
		(ML) Firm Yellow (10YR, 7/6) Sandy SILT		SPT		2-2-4-4		:	:	:		
		(MH) Firm Yellowish Red (5YR, 5/8) Sandy Elastic SILT (MH) Very Stiff Yellowish Red (5YR, 5/8) Sandy Elastic SILT		1		(6)	1	:	:	:		
			\	SPT		7-8-11-13				:		
				2	(19)	}						
		(MI) Chiff Vallaniah Dad (EVD E/O) Climbili Clause Candu Cl										
5.0		(ML) Stiff Yellowish Red (5YR, 5/8) Slightly Clayey Sandy SI		SPT		3-6-7-11		:	:	:		
5.0		(ML) Stiff Moist Yellowish Red (5YR, 5/8) and Pink (2.5YR, 8 Sandy SILT	3/4)	3		(13)	†					
		(ML) Stiff Moist Reddish Yellow (5YR, 7/6) and Yellow (10YF	_		1 1							
		8/8) Sandy SILT	,	SPT		4-5-7-8		:	:	:		
				4		(12)	1		:	:		
		(ML) Stiff Moist Light Reddish Brown (2.5YR, 6/4), Yellow (1										
		7/8), and White (2.5Y, 8/1) Sandy SILT with Manganese Sta	ins	SPT		5-5-6-7						
				5		(11)	1					
10.0		(ML) Stiff Moist Reddish Yellow (5YR, 6/4) and Strong Brown										
		(7.5YR, 5/8) Sandy SILT with Manganese Stains		SPT		6-6-7-9						
			6		(13)	1 7						
		(ML) Stiff Moist Light Reddish Brown (2.5YR, 7/4) and Yellov										
		(10YR, 7/8) Sandy SILT with Manganese Stains		SPT		3-4-6-7		:	:	:		
				7		(10)	1					
							-					
15.0			\	SPT		2-5-8-10						
15.0				8		(13)		!	!			
		Pottom of Daving at 16 fact has Daving Tarminated					<u>:</u>			<u>i</u>		
		Bottom of Boring at 16 feet bgs, Boring Terminated										
20.0												



BORING NUMBER SW-23

		PROJECT NAME Carolina Reserve Commons										
PROJECT NUMBER 1506.G0277												
			GROUND WATER/CAVE-IN: AT TIME OF DRILLING GW NE ATD / Caved in Depth NE									
	LOGGED BY C. Whitener CHECKED BY N. Sacks							rea in De	pui ne	<u>=</u>		
		e Figure 2 "Boring Location Plan" for Approx. Boring Location	AT END OF DRILLING GW NE > 24 hrs AFTER DRILLING									
14012	<u> </u>	e rigure 2 Bonnig Location Fran Tol Approx. Bonnig Location			LLING							
ELEVATION (ft.)	GRAPHIC LOG	MATERIAL DESCRIPTION		SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	0 20 PL 0 20	SPT N V 40 40 ES CON	60 60 ITENT	80 100 -LL 80 100 (%) \square		
	74 15. 1	Approx. 3" of TOPSOIL					0 20	40	60	80 100 :		
		(ML) RESIDUUM: Firm Yellowish Red (5YR, 5/6) Slightly Clayey Sandy SILT		SPT 1		2-3-3-4 (6)						
		(ML) Very Stiff Moist Dark Reddish Brown (5YR, 3/4) Slightly Clayey Sandy SILT	,	SPT 2		6-8-9-11 (17)						
5.0		(ML) Stiff Moist Dark Reddish Brown (5YR, 3/4) and Yellowis Brown (10YR, 5/6) Sandy SILT	sh ——	SPT 3		2-4-6-6 (10)	-					
		(ML) Stiff Yellowish Red (5YR, 4/6), Yellowish Brown (10YR and Light Gray (10YR, 7/2) Sandy SILT	, 5/8),	SPT 4	-	6-9-6-8 (15)						
		(ML) Stiff Brownish Yellow (10YR, 6/6), Light Gray (10YR, 7/6) and Reddish Yellow (7.5YR, 6/6) Sandy SILT with Sand Sea and Manganese Stains	(Z), ams	SPT 5		2-4-5-6 (9)	+					
10.0		(ML) Stiff Moist Brownish Yellow (10YR, 6/8), Yellow (10YR, and White (2.5Y, 8/1) Sandy SILT	7/6),	SPT 6		4-5-6-6 (11)						
				SPT 7		3-5-9-11 (14)	A					
15.0		(ML) Very Stiff Moist Very Pale Brown (10YR, 7/4), Yellow (7/6), and White (2.5Y, 8/1) Sandy SILT with Manganese Sta	10YR, ins	SPT 8		3-8-11-15 (19)						
20.0		Bottom of Boring at 16 feet bgs, Boring Terminated										



BORING NUMBER SW-24

CLIENT Lennar													
PROJECT NUMBER 1506.G0277													
DATE STARTED 8/10/22 COMPLETED 8/10/22			GROUND ELEVATION HOLE SIZE 6 inches										
				GROUND WATER/CAVE-IN:									
	DRILLING METHOD Hollow Stem Auger			AT TIME OF DRILLING GW NE ATD / Caved in Depth NE									
	LOGGED BY C. Whitener CHECKED BY N. Sacks					NG GW NE	> 24 hrs						
NOTE	S <u>Sec</u>	e Figure 2 "Boring Location Plan" for Approx. Boring Location	AFTE	R DRII	LLING								
ELEVATION (ft.)	GRAPHIC LOG	MATERIAL DESCRIPTION		SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	0 20 4 0 20 4 0 FINES	T N VALUE 0 60 0 60 CONTENT 0 60	80 100 LL 80 100				
	71 1 ^N 7 _f	Approx. 3" of TOPSOIL					:		:				
		(ML) RESIDUUM: Firm Brownish Yellow (10YR, 6/8) Sandy SILT		SPT		2-3-4-6	A						
		(MH) Firm Yellowish Red (5YR, 5/8) Sandy Elastic SILT		1		(7)	Ţ						
2.5		(MH) Very Stiff Red (2.5YR, 4/8) and Yellow (10YR, 7/8) Sa Elastic SILT		SPT 2		5-7-13-17 (20)							
5.0		(MH) Very Stiff Red (2.5YR, 4/8) and Yellow (10YR, 7/8) Sa Elastic SILT with Rock Fragments	ndy	SPT 3		4-8-27-50 (12)			>>				
		Partially Weathered Rock No Sample Recovery		SPT		50			····>>:				
				4		(50/0")							
7.5		Bottom of Boring at 6.4 feet bgs, Auger Refusal											