REPORT OF PRELIMINARY GEOTECHNICAL ENGINEERING EVALUATION

GAGNE PARCEL

Pasco County, Florida

PREPARED FOR:

MERITAGE HOMES

10117 Princess Palm Avenue
Tampa, Florida 33610

FES PROJECT NO.: 21-5093

June 22, 2021

PREPARED BY:

FAULKNER ENGINEERING SERVICES, Inc.

2734 Causeway Center Drive
Tampa, Florida 33619

June 22, 2021

Ms. Erika Filotas
Meritage Homes
10117 Princess Palm Avenue,
Tampa, Florida 33610

RE: Report of Preliminary Geotechnical Engineering Evaluation
Gagne Parcel
Pasco County, Florida
FES Project No.: 21-5093

Dear Ms. Filotas:

Faulkner Engineering Services, Inc. (FES) has completed a preliminary geotechnical engineering evaluation of the referenced project. We provided our services in general accordance with our proposal number 21-7702, dated April 21, 2021. The purpose of our preliminary geotechnical evaluation was to assess the capacity of a limited sampling of the subsurface soils at the property to support residential development and generally satisfy the Pasco County Land Development Code, Section 807.4 relating to a Geotechnical/Geological Engineering Report. This report summarizes the field evaluation performed by FES and presents our findings, conclusions, and preliminary geotechnical engineering recommendations.

PROJECT INFORMATION

Existing Site

Gagne parcel is a 139± acre property located at the north and southwest corners of Chancey Road and Paul S. Buchman Road in Zephyrhills, Pasco County, Florida. Our geotechnical engineering evaluation was concentrated south of Chancey Road. The property south of Chancey Road is generally open and grass covered with scattered trees. There is a pond near the center of the property and wetlands to the east and south. The site topography slopes down from north to south with an elevation change of 10± feet. A general site location map is shown on **Figure 1**.

Soil Survey Review

Soil survey information from "Soil Survey of Pasco County, Florida", as prepared by the U.S. Department of Agriculture Natural Resource Conservation Service (NRCS, formerly the Soil Conservation Service) for the subject property was reviewed as part of the investigation. The soil unit identified within the project area is described below:

- *Wauchula fine sand, 0 to 5 percent slopes (Map Unit Symbol 1)* – The NRCS describes this soil unit as poorly drained, located on flats on marine terraces. The NRCS indicates this soil unit typically has a surface layer of fine sand to a depth of 34 inches below ground surface (bgs) underlain by sandy clay loam to a depth of 80 inches bgs. The NRCS indicates the seasonal high groundwater table (SHGWT) within this soil unit ranges from about 6 to 18 inches bgs.
- *Pomona fine sand (Map Unit Symbol 2)* – The NRCS describes this soil unit as poorly drained, located on flatwoods on marine terraces. The NRCS indicates this soil unit typically has a surface layer of fine sand to a depth of 52 inches below ground surface (bgs) followed by a layer of fine sandy loam to a depth of 60 inches bgs underlain by a layer of fine sand from 60 to 80 inches bgs. The NRCS indicates the seasonal high groundwater table (SHGWT) within this soil unit ranges from about 6 to 18 inches bgs.

- *Wabasso-Wabasso, wet, fine sand, 0 to 2 percent slopes (Map Unit Symbol 10)* – The NRCS describes this soil unit as poorly drained, located on flatwoods on marine terraces. The NRCS indicates this soil unit typically has a surface layer of fine sand to a depth of 39 inches below ground surface (bgs) followed by a layer of fine sandy clay loam to a depth of 80 inches bgs. The NRCS indicates the seasonal high groundwater table (SHGWT) within this soil unit ranges from about 6 to 18 inches bgs.
- *Zephyr muck (Map Unit Symbol 16)* – The NRCS describes this soil unit as very poorly drained, located on depressions on marine terraces. The NRCS indicates this soil unit typically has a surface layer of muck to a depth of 13 inches below ground surface (bgs) followed by a layer of fine sand from 13 inches to 31 inches bgs underlain by a layer of sandy clay loam from 31 inches to 61 inches bgs followed by a layer of fine sandy loam from 61 inches to 80 inches bgs. The NRCS indicates the seasonal high groundwater table (SHGWT) within this soil unit ranges from about 0 inches bgs.
- *Electra Variant fine sand, 0 to 5 percent slopes (Map Unit Symbol 18)* – The NRCS describes this soil unit as somewhat poorly drained, located on rises and flats on marine terraces. The NRCS indicates this soil unit typically has a surface layer of fine sand to a depth of 70 inches below ground surface (bgs) followed by a layer of sandy clay loam from 70 inches to 78 inches bgs underlain by a layer of weathered bedrock from 78 inches to 80inches bgs. The NRCS indicates the seasonal high groundwater table (SHGWT) within this soil unit ranges from about 24 inches to 42 inches bgs.
- *Lochloosa fine sand, 0 to 5 percent slopes (Map Unit Symbol 48)* – The NRCS describes this soil unit as somewhat poorly drained, located on ridges and knolls on marine terraces. The NRCS indicates this soil unit typically has a surface layer of fine sand to a depth of 25 inches below ground surface (bgs) followed by a layer of sandy clay loam from 25 inches to 30 inches bgs underlain by a layer of sandy clay from 30 inches to 52 inches bgs followed by a layer of sandy clay loam from 52 inches to 74 inches bgs. The NRCS indicates the seasonal high groundwater table (SHGWT) within this soil unit ranges from about 15 inches to 60 inches bgs.

The NRCS soil classifications are based on interpretation of a combination of factors including but not limited to aerial photographs and widely spaced hand auger borings. Borders shown on the map included in **Appendix A**, between mapping units are approximate, and the transitions between soil units will be gradual. In addition to various minor inclusions within a mapped soil unit, areas of dissimilar soils can also occur. However, the soil survey provides a good basis for an initial evaluation of shallow soil conditions in the area, and can provide an indication of various historic activities such as development, mining and filling operations at the site.

SUBSURFACE SOILS EVALUATION

Field Evaluation

During our field evaluation, twelve (12) standard penetration test (SPT) soil borings were advanced to depths of approximately 25 feet bgs at generally equal intervals across the property. The fieldwork was performed on May 20-21, 2021 using an off-road vehicle mounted CME-550 drill rig, operated by J&R Precision Drilling, Inc. The procedures used by FES for field sampling and testing were in general accordance with ASTM procedures, industry standards of care, and established geotechnical engineering practice.

A senior geotechnical engineering technician from FES, experienced in soil sampling and classifications, was onsite during the fieldwork to monitor the drilling and also perform a brief cursory site reconnaissance, noting pertinent site and topographic features as well as surface indicators of soil conditions. The borings (B-1 to B-12) were located in the field by FES personnel using a handheld GPS unit. The GPS coordinates of the boring locations were obtained by superimposing the survey plan prepared by Florida Design Consultants, Inc. (FDC), over an aerial image using Google Earth. Because of the methods used in locating the borings, the boring locations shown on the boring location plan (**Figure 2**) should be considered approximate.

The SPT borings were performed utilizing continuous sampling methods within the first 10 feet and every 5 feet thereafter until reaching the termination depths of the borings, employing wet rotary drilling techniques to keep the boreholes from collapsing due to groundwater intrusion. The drillers collected soil samples using a 1.4-inch I.D. split barrel sampler driven by an automatic hammer system with a 140-pound hammer falling a distance of 30 inches, in general accordance with standard penetration test procedures (ASTM D1586). Upon completion, each borehole was backfilled to surface with borehole cuttings.

Detailed descriptions of the soils encountered during the field exploration are presented on the attached SPT boring logs in **Appendix B**.

Soil Sample Handling, Classification, and Laboratory Testing

FES field personnel classified the soils obtained from the field sampling techniques using standard visual manual methods in accordance with ASTM D2488. The samples recovered from the SPT borings were placed in sealed containers to retain moisture and transported to the FES soils laboratory accredited by Construction Materials Engineering Council, Inc., (CMEC) for further evaluation and testing. To further aid in classification and evaluation of geotechnical engineering properties, laboratory testing was performed on representative soil samples collected during the field sampling. The laboratory testing was performed in general accordance with appropriate sections of ASTM D1140, material finer than the No. 200 mesh sieve. The laboratory test results were in general accordance with field classification of the soils except some soils were reclassified based on the fines content from laboratory testing. The laboratory test results and the soil classifications were reviewed by a professional geotechnical engineer. The results from the laboratory testing are presented on the boring logs contained in **Appendix B**.

FINDINGS

Subsurface Conditions

General Soil Profile

The subsurface stratigraphy at the project site is illustrated in the SPT boring logs shown in **Appendix B**. The logs were developed using field and laboratory data from the SPT borings. The computer generated soil logs should imply no increased accuracy. Based on this data, four subsurface units, or strata, were identified at the site as described below.

Stratum 1 SAND, SAND with clay, SAND with silt; very loose to medium dense, fine grained quartz with clay, silt

USCS classification = SP, SP-SC, SP-SM

Stratum 2	CLAYEY SAND, SILTY SAND; loose to medium dense, fine grained quartz, variably clayey, silty
	USCS classification = SC, SM
Stratum 3	CLAY; medium to very stiff, clay, variably sandy, occasional cementation
	USCS classification = CL
Stratum 4	LIMESTONE; limestone bedrock

Stratum 1 occurred as the surficial stratum in borings B-1 to B-11 at the site and occasionally interbedded with Stratum 2 and extended with varying thicknesses to depths ranging from about 2 to 18 feet bgs. The SPT “N” values within this stratum ranged from 4 to 27 blows per foot indicating very loose to medium dense relative density.

Stratum 2 occurred below Stratum 1 for borings B-1 through B-11 and at the ground surface for boring B-12 and extended with varying thicknesses to depths ranging from about 4 feet to boring termination depths of 25 feet bgs. The SPT “N” values within this stratum ranged from 6 to 25 blows per foot indicating loose to medium dense relative density. The results of laboratory testing performed on representative samples of this stratum indicated fines contents ranging from 15.9 percent to 45.6 percent.

Stratum 3 occurred in most of the SPT borings below Strata 1 and 2 and extended with varying thicknesses to depths ranging from about 13 feet to boring termination depths of 25 feet bgs. The SPT “N” values within this stratum ranged from 8 to 24 blows per foot indicating medium to very stiff consistency. The results of laboratory testing performed on representative samples of this stratum indicated fines contents ranging from 56.8 percent to 69.9 percent.

Stratum 4 occurred below Strata 1, 2 and 3 in 6 of the 12 SPT borings. The SPT “N” values within this stratum ranged from 7 blows per foot to 50 blows per 0 inches. The limestone layer in boring 11 had a very high density and prevented the SPT drill from advancing beyond 23.5 feet bgs.

The conditions presented above highlight the major subsurface stratifications encountered during our field evaluation of the site. More detailed descriptions of the materials encountered are provided in **Appendix B**. A soil classification key sheet is also included as **Appendix C**. It should be understood that subsurface conditions will vary across this site and between our boring locations. Changes in subsurface strata may be more gradual than indicated.

Groundwater

Groundwater was not encountered in our SPT borings within the first 10 feet at the time of drilling, after which, drilling fluid was introduced to keep the boreholes from collapsing. Groundwater levels will fluctuate with time due to seasonal rainfall and locally heavy precipitation events; therefore, future groundwater levels may be encountered at depths different from those indicated by our borings.

The SHGWT is typically encountered during late summer following the rainy season. Several factors can affect the seasonal high groundwater level such as drainage characteristics of the soils; land surface elevation; and relief points such as lakes, rivers and swamps. Based on our experience, evaluation of existing groundwater levels, (soil indicators were not encountered), and review of the soil survey for Pasco County, we estimate the SHGWT at this site may likely be encountered perched above the higher fines content soils at depths ranging from about 0.0 to 4.0 feet bgs.

PRELIMINARY CONCLUSIONS

From our cursory site reconnaissance, no indication of bury pits was apparent at the property explored nor was trash, debris or other deleterious material encountered in our borings except for possibly the top 4 feet of boring B-5 were non-homogenous soil appeared to have been placed . The soil borings generally encountered fine sand (SP), sand with clay (SP-SC), sand with silt (SP-SM) (Stratum 1), clayey sand (SC), silty sand (SM) (Stratum 2), clay (CL) (Stratum 3) and limestone (LS) from ground surface to SPT boring termination depths of about 25 feet bgs. Stratum 1 soils will provide a good source of structural fill or backfill, if excavated during site development. Stratum 2 soils can also be used as structural fill or backfill provided these soils conform to the criteria specified in the **Preliminary Earthwork Recommendations** section below. Stratum 3 and Stratum 4 soils are unsuitable for use as structural fill or backfill.

Based on the SPT blow counts recorded during our field evaluation, the subsurface coarse-grained soils at the site are generally very loose to medium dense within the upper 10 feet with penetration resistances (N values) ranging from 4 to 25 blows per foot. The subsurface fine-grained soils had penetration resistances (N values) ranging from 9 to 24 blows per foot indicating stiff to very stiff consistency. Below the upper 10 feet to the termination of the borings, the coarse-grained soils were generally loose to dense with penetration resistances (N values) ranging from 6 to 37 blows per foot and the fine-grained soils are generally medium to very stiff with penetration resistances (N values) ranging from 8 to 23 blows per foot. In-place densification of the surface and near surface soils with a heavy vibratory roller compactor will be required subsequent to site clearing and prior to beginning construction. Any additional fill required to bring the site to final design grade shall meet the criteria specified in the **Preliminary Earthwork Recommendations** section below.

Most of the borings encountered Stratum 2 and Stratum 3 near or at the ground surface. The Stratum 3 soils and some Stratum 2 soils with fines contents greater 35 percent are unsuitable bearing soils. Where these soils are present at the ground surface or at shallow depths we recommend undercutting these soils and replacing with suitable compacted structural fill such than a minimum of 3 feet of separation is maintained between the bottom of the planned footings and the fine-grained soils.

It appears that non-homogenous soils were place in the area of boring B-5 to a depth of about 4 feet bgs. The soils generally appear to be suitable for use as structural fill, however we recommend additional testing in this area (possibly test pits) to ensure and non-homogenous soils place are suitable to support residential development.

Loss of drilling fluid circulation was observed in borings B-5 to B-7 and B-9 to B-12 at or near the limestone bedrock at the time of drilling. Florida limestone is generally porous and loss of drilling fluid circulation is common within the limestone or near limestone interface with other strata and does not indicate sinkhole activity without other indicators such as presence of voids, raveling of surficial soils, etc.

Groundwater was not encountered at the time of fieldwork. Dewatering of borrow excavations should be anticipated for groundwater control.

If development of this property is to proceed, at a minimum, shallow auger borings should be performed along planned roadway alignments to develop appropriate pavement sections. Borings should also be performed in planned stormwater ponds and structure areas to provide information for pond design, further evaluate the suitability of encountered soils for use as structural fill, and provide foundation design recommendations.

Use of Information

It should be noted that subsurface conditions can vary across this site and between boring locations. Conditions can also vary in areas not explored by our borings. Contractors bidding earthwork requirements are urged to conduct their own borings, test pits or other studies to determine those conditions that may affect their specific work requirements. FES cannot be responsible for interpretations made by others based on the information contained in this report and the attachments.

PRELIMINARY EARTHWORK RECOMMENDATIONS

Site Preparation

Site Stripping/Undercutting

Before earthwork and construction activities begin, all existing topsoil, vegetation, surface debris, large roots down to finger-size, and any other deleterious material should be removed from within the construction limits. Site stripping should extend at least ten feet beyond the construction area. Any pockets of organics, organic laden soils and/or deleterious material should be undercut to competent soil. The resulting excavations should be backfilled with structural fill placed in maximum one-foot thick lifts. Backfill soils should be of the same composition and be compacted to the same criteria as structural fill soils. This process should be observed by a representative of FES to check that all organics, organic laden soils and/or deleterious material has been removed.

Proof-Rolling / In-Place Densification

Following site stripping and prior to any fill placement or beginning construction, proof-rolling / in-place densification of the ground surface with a heavy vibratory roller should be performed within the construction area. Based on experience, vibratory rollers should be operated in the static mode within 100 feet of existing structures to avoid transmission of vibrations that could cause structural distress.

Compaction within the construction area should continue until the soils appear relatively firm and unyielding and the soils have achieved a relative compaction of at least 95 percent of the modified Proctor maximum dry density (ASTM D1557) to a depth of at least 2 feet below the present ground surface. The subgrade soils 1-foot below the roadway pavement shall be compacted to at least 98 percent. The moisture content of the soils during placement and compaction should be maintained within 2 percent of the optimum moisture content as determined by ASTM D1557.

Proof-rolling and densification efforts should be closely monitored by an FES engineering technician to observe any unusual or excessive deflection of the soils beneath the compacting equipment used. If unusual or excessive deflection is observed, then the areas should be undercut to firm soil and backfilled with compacted structural fill placed in maximum one-foot thick loose lifts.

Borrow Areas

Structural Fill Suitability

Definition

The preferred soil used for structural fill and backfill can be defined as clean fine sand containing less than twelve percent material by weight that is finer than a number 200 sieve (material conforming to SP to SP-SM or SP-SC in the Unified Soils Classification System).

Encountered soils containing up to 35 percent fines (materials conforming to SC, SM or SC-SM in the Unified Soil Classification System) may also be utilized as structural fill, provided the working subgrade is above the existing groundwater level. However, Florida Building Code (Chapter 18, Section 1803.5.3) states that soils with plasticity index of 15 or greater are considered expansive and hence are unsuitable for use as structural fill. Please note that soils conforming to SC, SM, or SC-SM are difficult to work with and will require additional time and effort for either drying or moisture conditioning during placement and compaction.

Any muck or organic soil if encountered on site will not be suitable for use as structural fill and should be disposed of offsite or placed in landscape areas and used for planting purposes. In addition, soils containing organic content, as determined by ASTM D2974, of more than 5 percent shall not be used as structural fill. Because of the variability of the subsurface soils encountered, additional laboratory testing should be performed on the excavated material during grading and earthwork activities to evaluate its suitability for use as fill material.

Placement

Structural fill with less than 12 percent fines should be placed in lifts not to exceed one foot thick. Materials with fines content greater than 12 percent should be placed in maximum 6-inch loose lifts.

The fill material should be compacted to at least 95 percent of its modified Proctor maximum dry density and the moisture content should be maintained within 2 percent of the optimum moisture content (ASTM D1557). Confined areas, such as utility trenches, should be compacted with manually operated portable vibratory compaction equipment. Field density testing to verify compaction should be performed for each lift of structural fill placed for each 2,000 square feet of area below structures and for each 5,000 square feet below pavements. In pavement areas, the subbase and base materials should be tested to the same frequency.

Depending on the time of year construction occurs, materials excavated containing clay fines may exist in a saturated condition. These soils will require processing and drying to achieve a moisture content to allow placement and proper compaction. Spreading the clayey material in thin lifts (6 inches loose thickness) and aerating by disking can facilitate and hasten the drying process. Disking will also be useful to breakdown larger clods of clayey soils. Specialty equipment typically associated with clayey soils such as a sheep's foot roller will also be required to achieve proper compaction.

The placement and compaction of moisture sensitive soils of this type will require time and effort beyond that typically associated with sandy soils. A grading contractor experienced with placing and compaction of clayey soils can likely reduce costly project delays due to soil conditions.

POTENTIAL FOR SINKHOLE DEVELOPMENT

Most of Florida is prone to sinkhole formation because it is underlain by carbonate deposits that are susceptible to dissolution by circulating ground water. The soluble limestone and dolomites that constitute the carbonate deposits are altered by dissolution and weathering processes to a distinct geomorphology known as "Karst". Where the carbonate rock is covered by relatively insoluble deposits such as the sand and clay deposits that exist in west-central Florida, the buried Karst features form a distinctive type of terrain known as "mantled Karst". In mantled Karst regions, the carbonate rock is not exposed at the land surface; however the presence may be indicated by sinkholes or surface depressions that result when the overburden materials take the shape of the underlying Karst features. [Tihansky, A.B., 1999, *Sinkholes, West-Central Florida*, in Galloway, Devin, Jones, D.R., and Ingebritsen, S.E., eds., Land Subsidence in the United States: *USGS Circular 1182*.].

At the time of our fieldwork, we observed no strong visual evidence to suggest that active sinkhole conditions exist on the property explored nor were suggestive near surface conditions observed in our borings. A review of a map titled “Pasco County Sinkholes” published in 2008 by the Florida Center for Instructional Technology (FCIT) indicates that the area in the vicinity of the planned Gagne Parcel development site is not an area of reported excessive sinkhole activity. Furthermore, we assess that the risk of sinkhole occurrence at the property explored is no greater or less than that of the surrounding area. However, because Florida is underlain by limestone bedrock that is susceptible to dissolution and the subsequent development of karst features such as voids and sinkholes in the natural soil overburden, construction in Pasco and surrounding counties is accompanied by some risk that internal soil erosion and ground subsidence could affect new structures in the future. It is not possible to investigate or design to completely eliminate the possibility of future sinkhole related problems. In any event, the Owner must understand and accept this risk.

TESTING AND MONITORING

Construction testing and monitoring are essential to proper site construction and performance. Observation and testing of site preparation and earthwork activities is an integral part of the engineering recommendations contained in this report. Having FES provide the construction materials testing and inspection services provides continuity and increases the potential that our recommendations will be properly implemented.

LIMITATIONS

This report has been prepared for the exclusive use of **Meritage Homes,** for the specific application to the project previously discussed. Our conclusions and recommendations have been rendered using generally accepted standards of geotechnical engineering and geology practice in the state of Florida. No other warranty is expressed or implied.

Our conclusions and recommendations are based on the design information furnished to us, the data obtained from the previously described subsurface exploration, and our experience. They do not reflect variations in the subsurface conditions that are likely to exist in the region of our borings and in unexplored areas of the site. These variations are due to the inherent variability of the subsurface conditions in this geologic region. Should variations become apparent during construction, it will be necessary to re-evaluate our conclusions and recommendations based upon our on-site observations of the conditions.

The scope of our services does not include any environmental assessments or studies for the possible presence of hazardous or toxic materials in the soil, groundwater or surface water within or in the general vicinity of the site studied. Any statements made in this report or shown on the test boring logs regarding unusual subsurface conditions and/or composition, odor, staining, origin or other characteristics of the surface and/or subsurface materials are strictly for the information of our client and may or may not be indicative of an environmental problem.

CLOSING

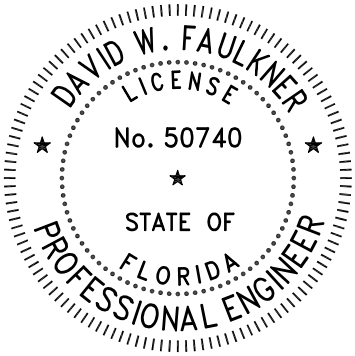
Faulkner Engineering Services, Inc. appreciates the opportunity to be of service to **Meritage Homes,** by providing these geotechnical consulting services and we look forward to assisting you through project completion. If you have any questions concerning this report, please do not hesitate to contact the undersigned.

Sincerely,

Faulkner Engineering Services, Inc.

Matthew Reinhart

Matthew J. Reinhart, E.I
Staff Geotechnical Engineer



Digitally signed by David W Faulkner
DN: c=US, o=Faulkner Engineering Services Inc., ou=A01427E0000016939EA31720000763B, cn=David W Faulkner
Date: 2021.06.22 16:56:07 -04'00'

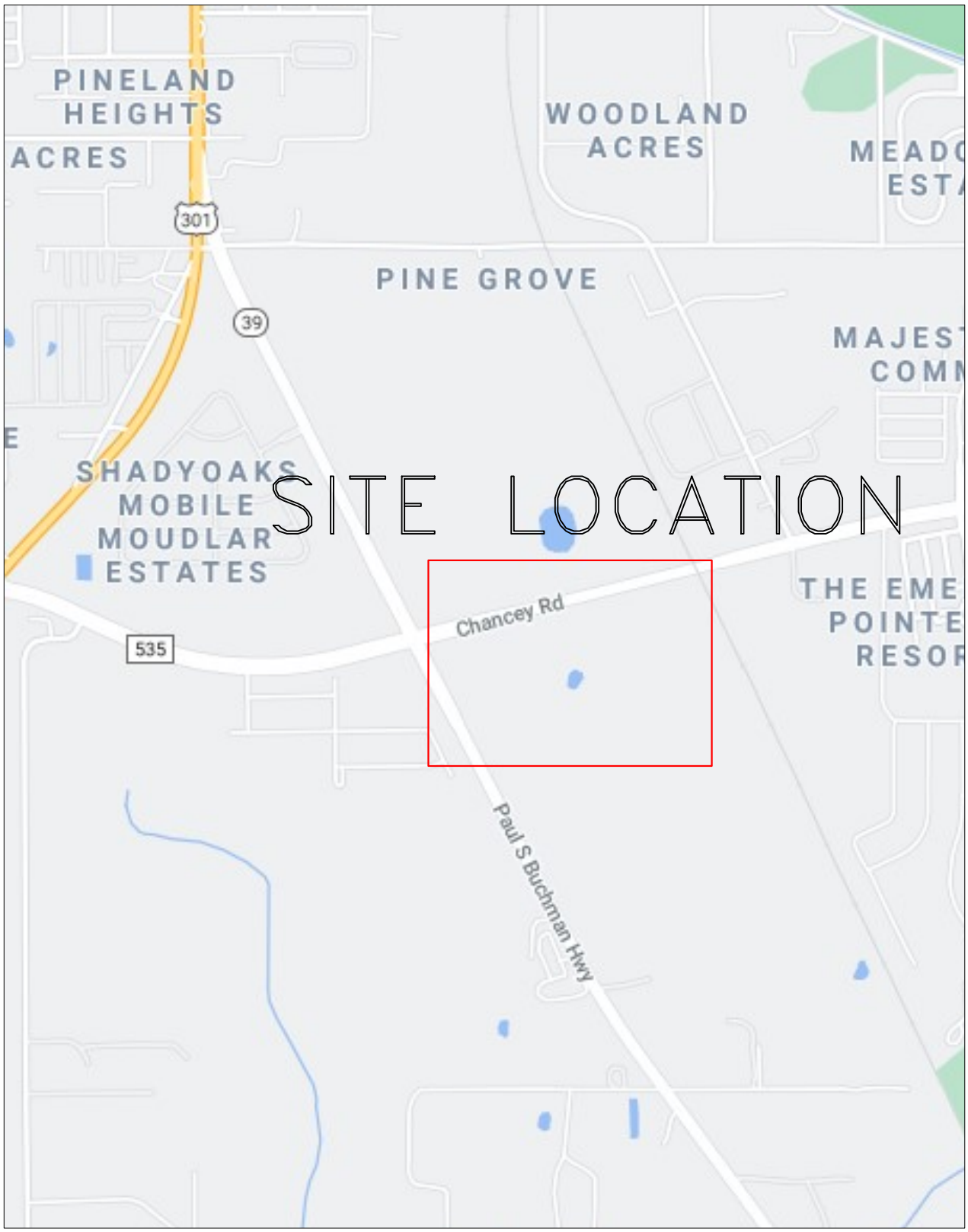
David W. Faulkner, P.E.
Geotechnical Engineer
Florida License No. 50740

This item has been digitally signed and sealed by David W. Faulkner, P.E. on the date adjacent to the seal. Printed copies of this document are not considered signed and sealed and the signature must be verified on any electronic copies.

Attachments: Figure 1: Site Location Map
Figure 2: Boring Location Plan

Appendix A: Soil Survey Map
Appendix B: Logs of Soil Borings
Appendix C: Key to soil Classification

SITE LOCATION MAP



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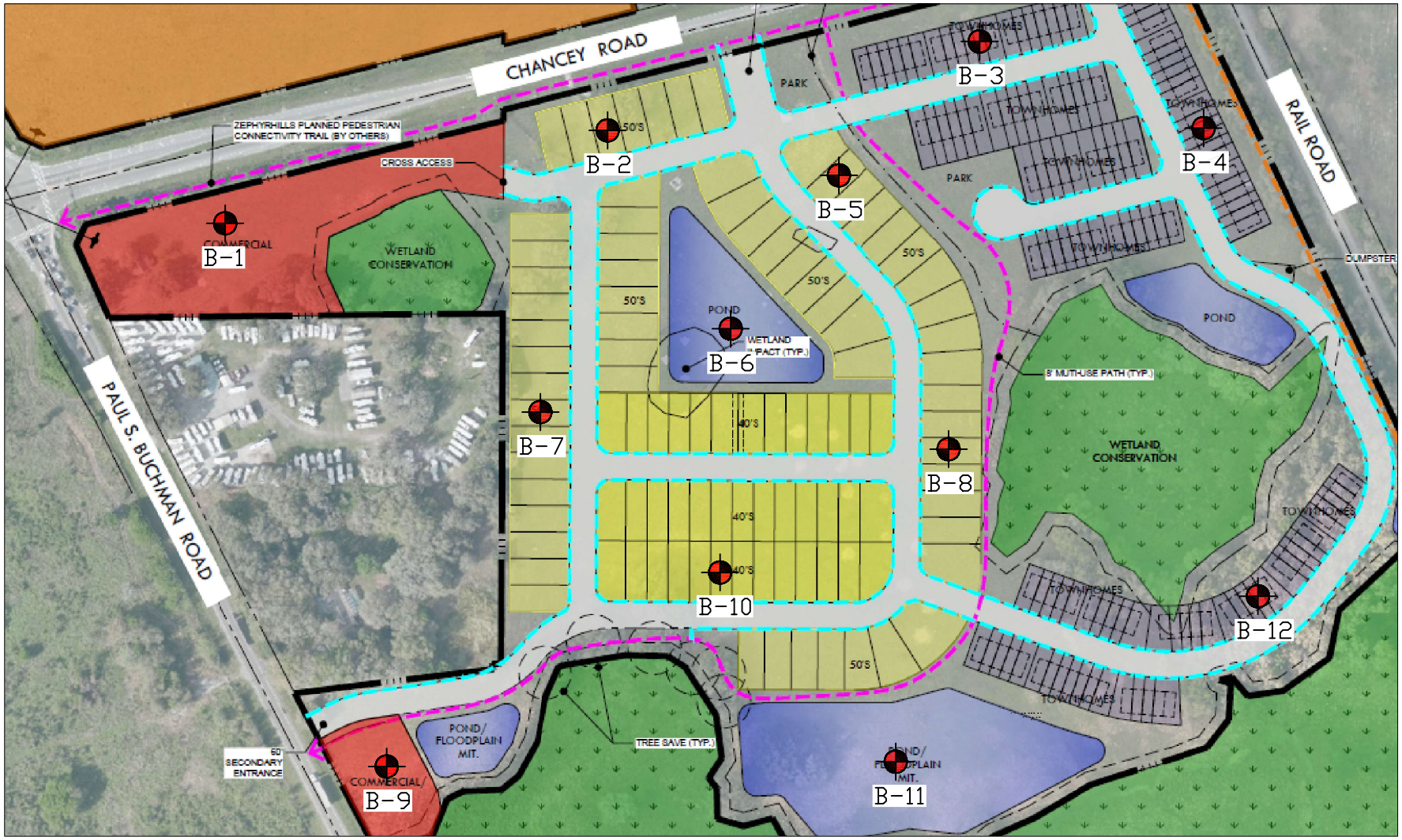
Gagne Parcel	N.T.S.	DATE 06.10.21	JOB NO. 21-5093
	DRAWN: MR CHKD: DF	FIGURE 1	

TEST LOCATION PLAN



LEGEND

SPT BORING

Notes:
Basemap provided by
Florida Design Consultants INC.

FAULKNER ENGINEERING SERVICES, Inc.

Geotechnical Engineers
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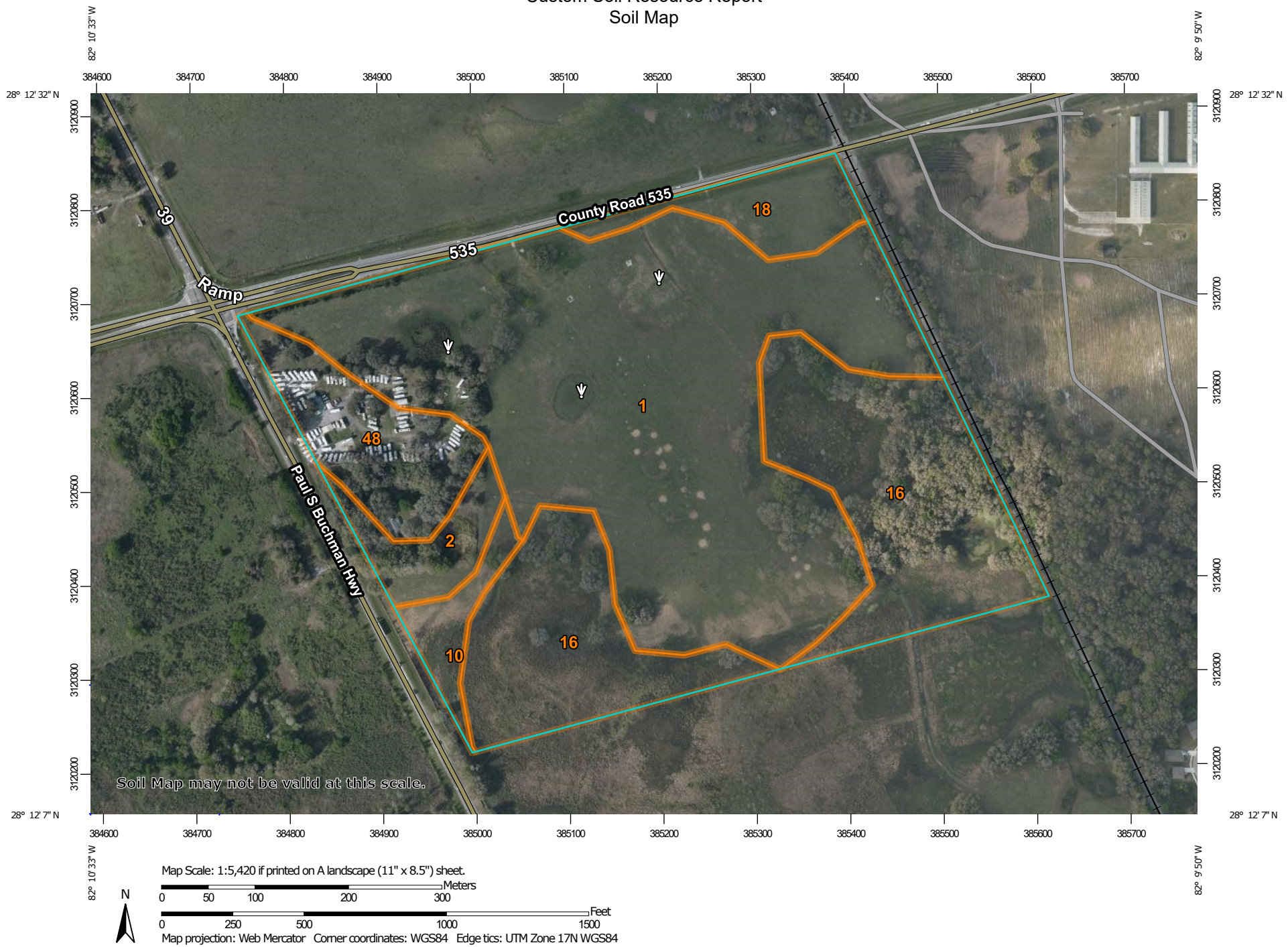
Gagne Parcel

N.T.S.	DATE 06.10.21	JOB NO. 21-5093
DRAWN: MR CHKD: DF	FIGURE 2	

APPENDIX A

Soil Survey Map

Custom Soil Resource Report
Soil Map



Map Scale: 1:5,420 if printed on A landscape (11" x 8.5") sheet.

N

Meters: 0 50 100 200 300

Feet: 0 250 500 1000 1500

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 17N WGS84

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:20,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Pasco County, Florida
Survey Area Data: Version 19, Jun 9, 2020

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Feb 8, 2019—Feb 28, 2019

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
1	Wauchula fine sand, 0 to 5 percent slopes	43.5	52.3%
2	Pomona fine sand	3.0	3.7%
10	Wabasso-Wabasso, wet, fine sand, 0 to 2 percent slopes	2.2	2.6%
16	Zephyr muck	24.1	29.0%
18	Electra Variant fine sand, 0 to 5 percent slopes	3.8	4.5%
48	Lochloosa fine sand, 0 to 5 percent slopes	6.6	7.9%
Totals for Area of Interest		**83.1**	**100.0%**

APPENDIX B

Logs of Soil Borings

DRILL HOLE LOG
BORING NO.: B-1

Project No.: 21-5093
Date: 5/21/2021

Project: Gagne Parcel
Client: Meritage Homes
Location: Zephyrhills, Pasco County, Florida
Driller: J&R Precision Drilling, Inc.
Drill Rig: CME 550

Elevation: NA
Logged By: MR

Depth to Water> **Initial** ▽ : **At Completion** ▼ : * NE

Depth/ Elevation (ft)	Soil Symbols	USCS	Description	Sample Type	Sample No.	Standard Penetration Test Blows	N	Penetration Resistance (10 20 30 40 60 80)
0								
		SP	Very Loose, light brown, fine SAND with roots		1	2 2 2	4	
		SP-SM	Loose, brown, fine SAND with silt with roots		2	2 3 3	6	
5		SC	Loose, orange brown, clayey SAND (-200 = 30.5%)		3	3 4 4	8	
			Medium-Dense, gray brown, with roots		4	5 6 7	13	
					5	7 8 9	17	
10								
		CL	Stiff, orange gray, CLAY with cementation		6	7 7 7	14	
15								
			Very Stiff		7	8 9 9	18	
20								
					8	9 11 12	23	
25			End of Boring					
30								
35								

**Groundwater not encountered at first 10 feet*

DRILL HOLE LOG
BORING NO.: B-2

Project No.: 21-5093
Date: 5/21/2021

Project: Gagne Parcel
Client: Meritage Homes
Location: Zephyrhills, Pasco County, Florida
Driller: J&R Precision Drilling, Inc.
Drill Rig: CME 550
Depth to Water> Initial ▽ :

Elevation: NA
Logged By: MR
At Completion ▼ : * NE

Depth/ Elevation (ft)	Soil Symbols	USCS	Description	Sample Type	Sample No.	Standard Penetration Test Blows	N	Penetration Resistance 10 20 30 40 60 80
0		SP	Loose, brown, fine SAND		1	2 3 3	6	
		SP-SC	Loose, brown, fine SAND with clay with wood pieces		2	3 3 4	7	
5		SC	Medium-Dense, dark orange brown, clayey SAND		3	5 7 9	16	
			(-200 = 33.8%)		4	7 9 8	17	
			Dark brown		5	7 12 13	25	
10								
		SP-SC	Medium-Dense, gray brown, fine SAND with clay		6	11 15 12	27	
15								
		SC	Medium-Dense, light brown, clayey SAND		7	7 8 9	17	
20								
			Gray		8	8 9 11	20	
25			End of Boring					
30								
35								

**Groundwater not encountered at first 10 feet*

DRILL HOLE LOG
BORING NO.: B-3

Project No.: 21-5093
Date: 5/20/2021

Project: Gagne Parcel
Client: Meritage Homes
Location: Zephyrhills, Pasco County, Florida
Driller: J&R Precision Drilling, Inc.
Drill Rig: CME 550
Depth to Water> Initial ▽ :

Elevation: NA
Logged By: MR
At Completion ▼ : * NE

Depth/ Elevation (ft)	Soil Symbols	USCS	Description	Sample Type	Sample No.	Standard Penetration Test Blows	N	Penetration Resistance 10 20 30 40 60 80
0								
		SP-SM	Loose, dark brown, fine SAND with silt with roots		1	3 3 4	7	
		SC	Loose, dark orange brown, clayey SAND		2	3 4 5	9	
5			Medium-Dense, orange gray		3	4 7 6	13	
					4	8 10 9	19	
		SP-SC	Medium-Dense, orange brown, fine SAND with clay		5	10 10 13	23	
10								
		SM	Dense, brown, silty SAND (-200 = 15.9%)		6	11 16 21	37	
15								
					7	19 22 26	48	
20								
		SC	Medium-Dense, light brown, clayey SAND		8	9 10 12	22	
25			End of Boring					
30								
35								

**Groundwater not encountered at first 10 feet*

DRILL HOLE LOG
BORING NO.: B-4

Project No.: 21-5093
Date: 5/20/2021

Project: Gagne Parcel
Client: Meritage Homes
Location: Zephyrhills, Pasco County, Florida
Driller: J&R Precision Drilling, Inc.
Drill Rig: CME 550

Elevation: NA
Logged By: MR

Depth to Water> **Initial** ▽ **:** **At Completion** ▼ **:** * NE

Depth/ Elevation (ft)	Soil Symbols	USCS	Description	Sample Type	Sample No.	Standard Penetration Test Blows	N	Penetration Resistance (10 20 30 40 60 80)
0								
		SP	Very Loose, light gray brown, fine SAND		1	2 2 2	4	
		SC	Loose, dark orange brown, clayey SAND		2	3 4 6	10	
5			Medium-Dense		3	4 6 9	15	
					4	7 10 13	23	
			Orange brown		5	9 12 11	23	
10								
			Gray,with roots (-200 = 39.7%)		6	5 6 6	12	
15								
		CL	Stiff, grey, CLAY		7	4 5 7	12	
20								
					8	6 6 6	12	
25			End of Boring					
30								
35								

**Groundwater not encountered at first 10 feet*

This information pertains only to this boring and should not be interpreted as being indicative of the site.

DRILL HOLE LOG
BORING NO.: B-5

FAULKNER ENGINEERING SERVICES, Inc.

Project No.: 21-5093
Date: 5/21/2021

Project: Gagne Parcel
Client: Meritage Homes
Location: Zephyrhills, Pasco County, Florida
Driller: J&R Precision Drilling, Inc.
Drill Rig: CME 550
Depth to Water> **Initial** ▽ :

Elevation: NA
Logged By: MR
At Completion ▼ : * NE

Depth/ Elevation (ft)	Soil Symbols	USCS	Description	Sample Type	Sample No.	Standard Penetration Test Blows	N	Penetration Resistance 10 20 30 40 60 80
0		SP-SM	Loose, light gray brown, fine SAND with silt with cementation and roots		1	2 4 3	7	
			With roots and cementation		2	5 5 5	10	
5		SP-SM	Medium-Dense, dark brown, fine SAND with silt with clay nodules		3	6 6 8	14	
		SC	Medium-Dense, dark brown, clayey SAND		4	7 9 12	21	
					5	10 9 13	22	
10								
			Loose, dark gray brown		6	3 4 5	9	
15								
		CL	Medium, orange gray, with limestone (-200 = 45.6%)		7	2 3 5	8	
20								
			LIMESTONE		8	5 8 10	18	
25			End of Boring					
30								
35								

**Groundwater not encountered at first 10 feet*
Loss circulation at 20'

DRILL HOLE LOG
BORING NO.: B-6

FAULKNER ENGINEERING SERVICES, Inc.

Project No.: 21-5093
Date: 5/20/2021

Project: Gagne Parcel
Client: Meritage Homes
Location: Zephyrhills, Pasco County, Florida
Driller: J&R Precision Drilling, Inc.
Drill Rig: CME 550
Depth to Water> **Initial** ▽ :

Elevation: NA
Logged By: MR
At Completion ▼ : * NE

Depth/ Elevation (ft)	Soil Symbols	USCS	Description	Sample Type	Sample No.	Standard Penetration Test Blows	N	Penetration Resistance (10 20 30 40 60 80)
0								
		SP-SM	Loose, dark brown, fine SAND with silt with roots		1	2 3 2	5	
		SC	Loose, dark brown, clayey SAND with roots and cementation		2	3 4 5	9	
5			(-200 = 43.2%) Medium-Dense, with roots		3	4 7 6	13	
		CL	Stiff, orange gray, CLAY with cementation		4	7 7 7	14	
			Very Stiff		5	7 10 9	19	
10								
			Medium		6	4 4 4	8	
15								
			Stiff, with cementation		7	3 5 6	11	
20								
			Calcareous, with limestone		8	4 6 4	10	
25			End of Boring					
30								
35								

**Groundwater not encountered at first 10 feet*
Loss circulation at 21'

This information pertains only to this boring and should not be interpreted as being indicative of the site.

DRILL HOLE LOG
BORING NO.: B-7

FAULKNER ENGINEERING SERVICES, Inc.

Project No.: 21-5093
Date: 5/20/2021

Project: Gagne Parcel
Client: Meritage Homes
Location: Zephyrhills, Pasco County, Florida
Driller: J&R Precision Drilling, Inc.
Drill Rig: CME 550
Depth to Water> **Initial** ▽ :

Elevation: NA
Logged By: MR
At Completion ▼ : * NE

Depth/ Elevation (ft)	Soil Symbols	USCS	Description	Sample Type	Sample No.	Standard Penetration Test Blows	N	Penetration Resistance 10 20 30 40 60 80
0								
		SP-SM	Loose, brown, fine SAND with silt with roots and cementation		1	2 2 3	5	
		SC	Loose, orange gray, clayey SAND		2	4 4 4	8	
5			Medium-Dense		3	4 5 8	13	
			With cementation		4	9 8 9	17	
			Dark gray		5	7 10 9	19	
10								
			Loose, gray		6	2 3 3	6	
15								
			LIMESTONE		7	3 11 10	21	
20								
					8	6 9 15	24	
25			End of Boring					
30								
35								

**Groundwater not encountered at first 10 feet*
Loss circulation at 17'

This information pertains only to this boring and should not be interpreted as being indicative of the site.

DRILL HOLE LOG
BORING NO.: B-8

Project No.: 21-5093
Date: 5/21/2021

Project: Gagne Parcel
Client: Meritage Homes
Location: Zephyrhills, Pasco County, Florida
Driller: J&R Precision Drilling, Inc.
Drill Rig: CME 550

Elevation: NA
Logged By: MR

Depth to Water> **Initial** ▽ **:** **At Completion** ▼ **:** * NE

Depth/ Elevation (ft)	Soil Symbols	USCS	Description	Sample Type	Sample No.	Standard Penetration Test Blows	N	Penetration Resistance 10 20 30 40 60 80
0								
		SP-SC	Loose, dark brown, fine SAND with clay with roots		1	3 4 3	7	
		SC	Loose, gray, clayey SAND		2	4 4 5	9	
5		CL	Stiff, orange gray, CLAY (-200 = 56.8%)		3	5 8 7	15	
			Very Stiff		4	8 8 10	18	
					5	9 10 12	22	
10								
		SM	Medium-Dense, brown, silty SAND		6	12 12 15	27	
15								
		SC	Medium-Dense, gray, clayey SAND		7	8 7 9	16	
20								
		CL	Very Stiff, gray, CLAY		8	8 8 9	17	
25			End of Boring					
30								
35								

**Groundwater not encountered at first 10 feet*

This information pertains only to this boring and should not be interpreted as being indicative of the site.

DRILL HOLE LOG
BORING NO.: B-9

FAULKNER ENGINEERING SERVICES, Inc.

Project No.: 21-5093
Date: 5/20/2021

Project: Gagne Parcel
Client: Meritage Homes
Location: Zephyrhills, Pasco County, Florida
Driller: J&R Precision Drilling, Inc.
Drill Rig: CME 550
Depth to Water> **Initial** ▽ **:**

Elevation: NA
Logged By: MR
At Completion ▼ **:** * NE

Depth/ Elevation (ft)	Soil Symbols	USCS	Description	Sample Type	Sample No.	Standard Penetration Test Blows	N	Penetration Resistance (10 20 30 40 60 80)
0		SP	Very Loose, brown, fine SAND		1	2 2 2	4	
		SC	Loose, dark brown, clayey SAND		2	2 3 5	8	
5		CL	Dark Brown, stiff, CLAY		3	4 4 6	10	
					4	6 7 6	13	
			Dark orange brown, very stiff		5	9 9 11	20	
10								
			LIMESTONE		6	4 6 10	16	
15								
					7	8 7 6	13	
20								
			(50 blows/3 inches)		8	15 19 50	50/3	
25			End of Boring					
30								
35								

**Groundwater not encountered at first 10 feet*
Loss circulation at 13'

DRILL HOLE LOG
BORING NO.: B-10

Project No.: 21-5093
Date: 5/20/2021

Project: Gagne Parcel
Client: Meritage Homes
Location: Zephyrhills, Pasco County, Florida
Driller: J&R Precision Drilling, Inc.
Drill Rig: CME 550

Elevation: NA
Logged By: MR

Depth to Water> **Initial** ▽ : **At Completion** ▼ : * NE

Depth/ Elevation (ft)	Soil Symbols	USCS	Description	Sample Type	Sample No.	Standard Penetration Test Blows	N	Penetration Resistance (10 20 30 40 60 80)
0								
		SP-SM	Very Loose, dark brown, fine SAND with silt		1	2 2 2	4	
		SC	Medium-Dense, dark orange gray, clayey SAND with cementation		2	3 5 7	12	
5					3	7 8 10	18	
		CL	Very Stiff, dark orange gray, CLAY with cementation		4	8 9 9	18	
			With cementation		5	7 11 13	24	
10								
			LIMESTONE		6	5 9 12	21	
15								
					7	15 13 8	21	
20								
					8	6 8 9	17	
25			End of Boring					
30								
35								

**Groundwater not encountered at first 10 feet*
Loss circulation at 12'

This information pertains only to this boring and should not be interpreted as being indicative of the site.

DRILL HOLE LOG
BORING NO.: B-11

FAULKNER ENGINEERING SERVICES, Inc.

Project No.: 21-5093
Date: 5/20/2021

Project: Gagne Parcel
Client: Meritage Homes
Location: Zephyrhills, Pasco County, Florida
Driller: J&R Precision Drilling, Inc.
Drill Rig: CME 550
Depth to Water> **Initial** ▽ :

Elevation: NA
Logged By: MR
At Completion ▼ : * NE

Depth/ Elevation (ft)	Soil Symbols	USCS	Description	Sample Type	Sample No.	Standard Penetration Test Blows	N	Penetration Resistance 10 20 30 40 60 80
0		SP-SM	Loose, brown, fine SAND with silt		1	2 2 3	5	
		CL	Stiff, dark orange gray, CLAY with cementation		2	3 4 5	9	
5					3	5 5 7	12	
			Very Stiff		4	8 7 9	16	
			(-200 = 69.9%)		5	9 12 10	22	
10								
			LIMESTONE		6	4 3 4	7	
15								
					7	5 8 7	15	
20								
			No Recovery (50 blows/0 inch)		8		50/0	
25			End of Boring					
30								
35								

**Groundwater not encountered at first 10 feet*
Loss circulation at 13'

DRILL HOLE LOG
BORING NO.: B-12

Project No.: 21-5093
Date: 5/20/2021

Project: Gagne Parcel
Client: Meritage Homes
Location: Zephyrhills, Pasco County, Florida
Driller: J&R Precision Drilling, Inc.
Drill Rig: CME 550
Depth to Water> **Initial** ▽ **:**

Elevation: NA
Logged By: MR
At Completion ▼ **:** * NE

Depth/ Elevation (ft)	Soil Symbols	USCS	Description	Sample Type	Sample No.	Standard Penetration Test Blows	N	Penetration Resistance (10 20 30 40 60 80)
0								
		SC	Loose, dark gray brown, clayey SAND (-200 = 32.9%)		1	2 3 4	7	
					2	4 5 4	9	
5			Medium-Dense		3	5 5 7	12	
					4	8 9 11	20	
					5	7 8 12	20	
10								
			LIMESTONE		6	4 8 7	15	
15								
					7	5 9 8	17	
20								
			Calcareous		8	7 7 9	16	
25			End of Boring					
30								
35								

**Groundwater not encountered at first 10 feet*
Loss circulation at 13'

This information pertains only to this boring and should not be interpreted as being indicative of the site.

KEY TO SYMBOLS

Symbol Description

Strata symbols

Poorly graded sand

Poorly graded sand with silt

Clayey sand

Low plasticity clay

Poorly graded sand with clay

Silty sand

Limestone

Soil Samplers

Standard penetration test

Notes:

1. Exploratory boring were performed using a 2-inch diameter split barrel sampler driven by a 140 lbs hammer (In accordance with ASTM D1586)

2. These logs are subject to the limitations, conclusions, and recommendations in this report.

APPENDIX C

Key to Soil Classification

UNIFIED SOIL CLASSIFICATION SYSTEM (USCS)

Major Division		Group Symbol	Laboratory Classification Data		Soil Description
			Finer than No. 200 Sieve %	Supplementary Requirements	
Coarse-Grained (Over 50% by Weight Coarser than No. 200 Sieve)	Gravelly Soils (Over Half of Coarse Fraction Larger than No. 4 Sieve)	GW	0 - 5*	$C_u \geq 4$ and $1 \leq C_c \leq 3$	Well-Graded Gravels, Sandy Gravels
		GP	0 - 5*	$C_u < 4$ and / or $1 > C_c > 3$	Gap-Graded or Uniform Gravels, Sandy Gravels
		GM	12 or More*	PI < 4 or Below A-Line	Silty Gravels, Silty Sandy Gravels
		GC	12 of More*	PI ≥ 7 and On or Above A-Line	Clayey Gravels, Clayey Sandy Gravels
	Sandy Soils (Over Half of Coarse Fraction Larger than No. 4 Sieve)	SW	0 - 5*	$C_u \geq 6$ and $1 \leq C_c \leq 3$	Well-Graded Sands, Gravelly Sands
		SP	0 - 5*	$C_u < 6$ and / or $1 > C_c > 3$	Gap-Graded or Uniform Sands, Gravelly Sands
		SM	12 or More*	PI < 4 or Below A-Line	Silty Sands, Silty Gravelly Sands
		SC	12 of More*	PI ≥ 7 and On or Above A-Line	Clayey Sands, Clayey Gravelly Sands
Fine-Grained (Over 50% by Weight Finer than No. 200 Sieve)	LOW Compressibility (Liquid Limit Less Than 50)	ML	Plasticity Chart		Silts, Very Fine Sands, Silty or Clayey Fine Sands, Micaceous Silts
		CL	Plasticity Chart		Low Plasticity Clays, Sandy or Silty Clays
		OL	Plasticity Chart, Organic Odor or Color		Organic Silts and Clays of Low Plasticity
	HIGH Compressibility (Liquid Limit Greater Than 50)	MH	Plasticity Chart		Micaceous Silts, Diatomaceous Silts, Volcanic Ash
		CH	Plasticity Chart		Highly Plastic Clays and Sandy Clays
		OH	Plasticity Chart, Organic Odor or Color		Organic Silts and Clays of High Plasticity
Soils with Fibrous Organic Matter		PT	Fibrous Organic Matter, Will Char, Burn, or Glow		Peat, Sandy Peats, and Clayey Peat

*For Soils having 5 to 12 percent passing the No. 200 Sieve, use a dual symbol such as GW-GC.