



September 15, 2023
GPGT-21-119

TO: Richland Acquisition Fund, LLC.
555 Winderly Place
Maitland, Florida 32751

Attention: Mr. Matt Young, P.E.

SUBJECT: Preliminary Hydrogeologic Study, Proposed Mount Dora North Residential Development, State Road 46, Mount Dora, Lake County, Florida

Dear Mr. Young:

Per your request and authorization, Andreyev Engineering, Inc. (AEI) has completed a preliminary hydrogeologic evaluation for the subject project location. We understand the proposed Mount Dora North site improvements will include a planned unit development (PUD) with residential, commercial, and mixed uses for the developable areas of the 260± acre property. The purpose of this investigation was to review available data and gather basic hydrologic and hydrogeologic information for the property in order to provide recommendations on planning, design, and development strategies.

For this study AEI reviewed available published information for the site vicinity. In addition, AEI previously performed general studies as part of a preliminary due diligence evaluation of the project site, this included eleven (11) shallow and deep soil borings, fifteen (15) CPT soundings, and a visual survey of the site. This site-specific information has also been incorporated into our study, and this summary report.

The following scope of work was conducted as part of this analysis and evaluation:

- Performed literature review of available published data, including the Lake County Soil Survey, the National Resources Conservation Service (NRCS) Soil Map, U.S.G.S. Topographical Map, a regional Geologic Map of Lake County, Florida Geological Society (FGS) Florida Subsidence Incident Report Map, St. Johns River Water Management District (SJRWMD) Regulatory Permit Search, and other available published data.
- Conducted a site visit to observe existing site conditions, including areas around wetlands, topographic features, and surface vegetative cover to provide insight as to the expected soil and groundwater conditions across the site.
- Drilled nine (9) Standard Penetration Test (SPT) borings across the site to assess the shallow soil conditions for preliminary evaluation and characterization of the shallow subsurface soil conditions for the presence or absence of semi-confining soil layers that can affect on-site recharge of the aquifer systems.

- Performed fifteen (15) Cone Penetration Test (CPT) soundings to evaluate subsurface conditions and estimate geotechnical properties of the encountered soils, including soil type and strength.
- Performed two (2) machine auger borings for preliminary evaluation and characterization of the shallow subsurface soil and groundwater conditions.

Additional investigations and testing will be needed to develop recommendations for the final design of foundations, pavement section design, stormwater retention system design, and other aspects of the planned development.

We trust that this report is sufficient for your initial planning of this project. If you have any questions or if you need additional details concerning the contents of this report, please do not hesitate to contact the undersigned.

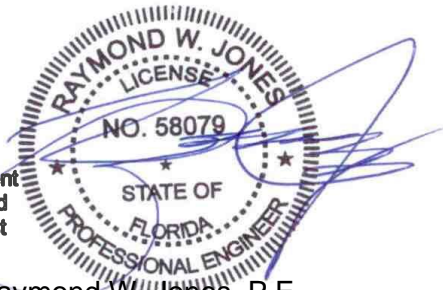
Sincerely,
ANDREYEV ENGINEERING, INC.



Mark Livingston
Project Manager

This item has been digitally signed and sealed by Ray Jones, P.E. on 9/15/23.

Printed copies of this document are not considered signed and sealed and the signature must be verified on any electronic copies.



Raymond W. Jones, P.E.
Vice President
Florida Registration No.58079

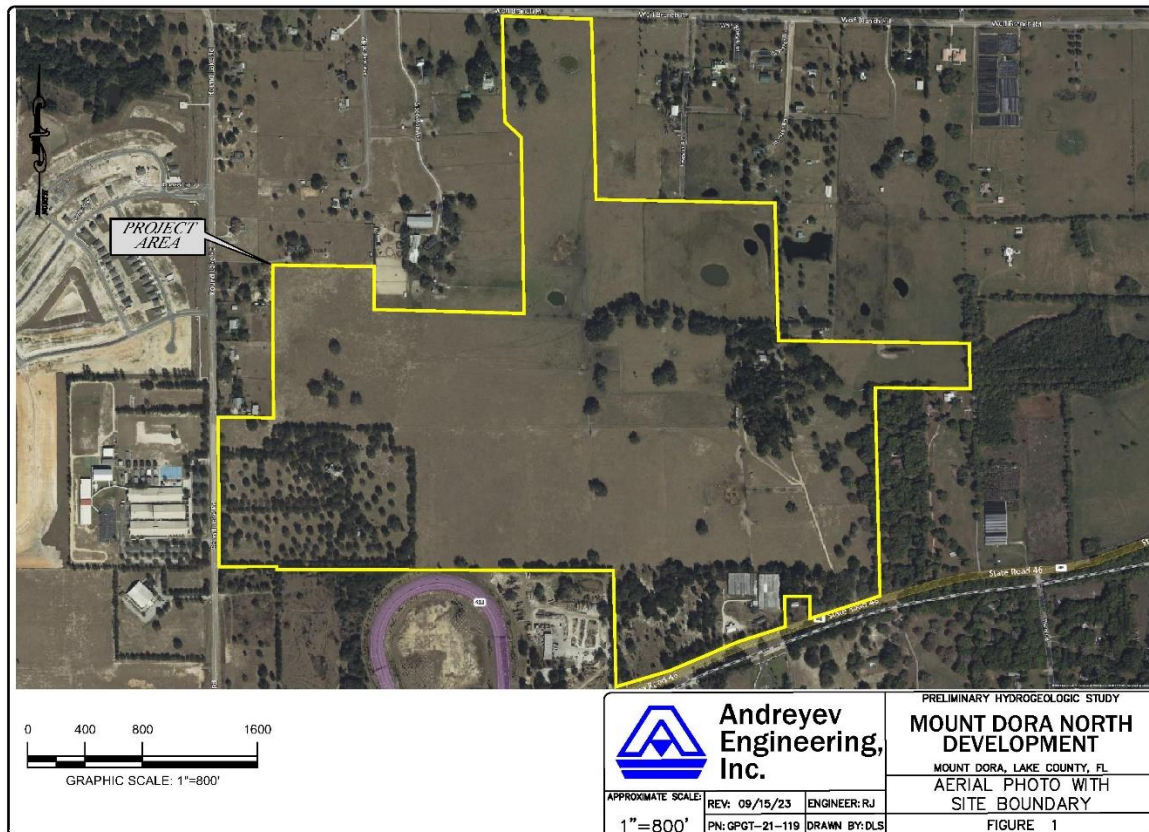
PUBLISHED DATA REVIEW AND FIELD INVESTIGATIONS

A preliminary desktop evaluation and field investigation has been completed to evaluate the subsurface soil and groundwater conditions for preliminary planning and design of the development. The study included review of available published information as well as site specific soil borings and soundings to preliminarily evaluate existing site soil and groundwater conditions.

Aerial Photograph Review

An aerial photograph of the site from available satellite imagery was obtained, a site boundary was over-laid and is presented below. In general, the site is undeveloped pasture lands with small oak hammocks, primarily in the eastern portion and south-southwest areas of the site. The site is situated between three primary roads (State Road 46, Round Lake Road, and Wolf Branch Road) bordering the proposed development area.

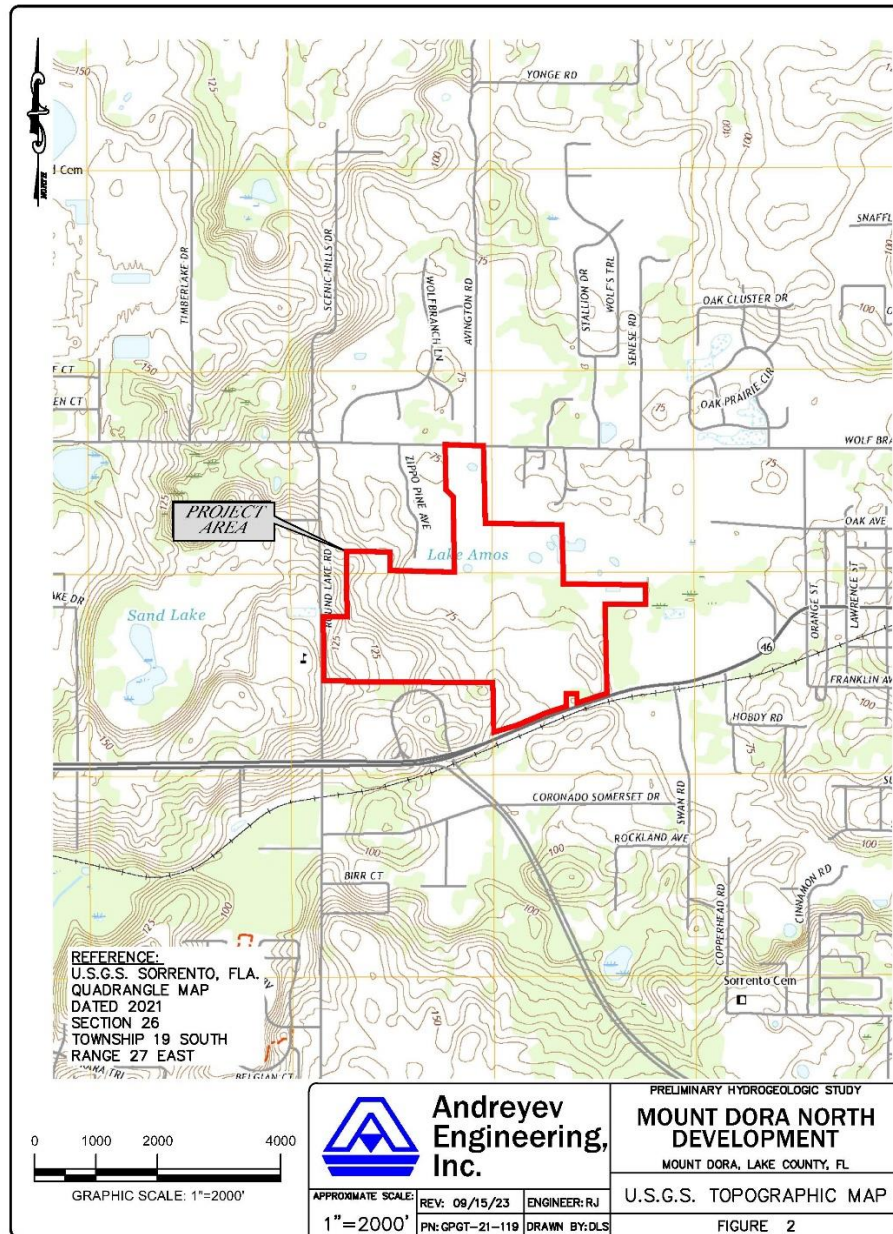
Figure 1 – Aerial Imagery



USGS Topographic Map

The USGS topographic map was obtained and overlaid with the site boundary and is presented below. Notable information obtained from the USGS map is that the site elevation ranges from approximately EL. 128 (NAVD88) in the southwestern portion of the site to an elevation of approximately EL. 52 (NAVD88) in the northeastern portion of the site. There are several small, isolated water body areas noted in the eastern portions of the site and Lake Amos in the northern portion of the project site.

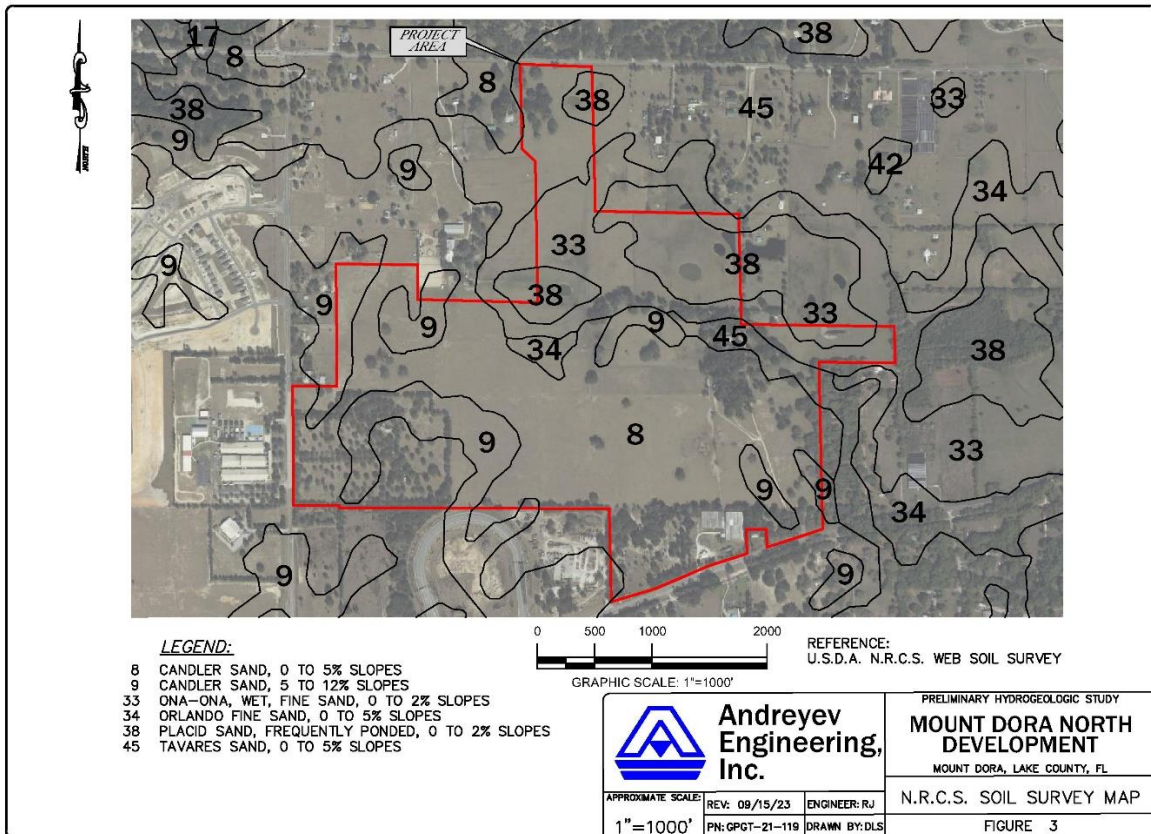
Figure 2 – USGS Topographical Map



NRCS/USDA Soil Survey Review

Based on review of the NRCS Soil Survey of Lake County, the following descriptions of the predominant on-site soil types are presented below. A copy of the soil survey map is presented below, showing the approximate extents of the soil types.

Figure 3 – NRCS Soil Survey Map



Short descriptions of the soil types identified on the map are presented below:

***Soil Map Unit 8: Candler Sand, 0 to 5 Percent Slopes**

Brief Description: *"This soil is nearly level to gently sloping and is excessively drained. It is on ridges, knolls, and broad uplands. The slopes range from smooth to broken. Typically, the surface layer is dark grayish brown sand about 6 inches thick. The subsurface layer, to a depth of about 63 inches is light yellowish brown and yellowish brown sand. The next layers to a depth of 80 inches or more are yellow sand that has thin strong textural bands. This soil does not have a high water table within 80 inches of the surface. The available water capacity is very low throughout. Permeability is high to very high."*

***Soil Map Unit 9: Candler Sand, 5 to 12 Percent Slopes**

Brief Description: *"This soil is a sloping to strongly sloping, excessively drained soil found on rolling uplands of the central ridge. Typically, the surface layer of this soil type*

consists of sand about 5 inches thick. The next layer is sand about 62 inches thick followed by a layer of sand about 13 inches thick. The water table for this soil type is at a depth of more than 80 inches. Available water capacity is very low and permeability is considered to be rapid to very rapid throughout the profile of this soil type.”

***Soil Map Unit 33: Ona-Ona, Wet, Fine Sand, 0 to 2 Percent Slopes**

Brief Description: “The Ona series consists of nearly level, poorly drained sandy soils that have a layer stained by organic materials just below the surface later. These soils are mainly in the flatwoods. There are a few areas in small depressions on the upland ridge. These soils formed in sandy marine sediments. In a representative profile, the surface layer is very dark gray fine sand about 6 inches thick. The subsoil is about 14 inches thick. The uppermost 4 inches is very dark brown fine sand, weakly cemented with organic material. The next 8 inches is mainly black fine sand weakly cemented with organic material. This is underlain by 38 inches of grayish-brown fine sand mottled with very dark gray, dark gray, dark grayish brown, and light brownish gray. Below this is 10 inches of white fine sand and 14 inches of grayish-brown fine sand. The water table is at a depth of 10 to 40 inches for about 6 months, within a depth of 10 inches for 1 to 2 months, and below a depth of 40 inches the rest of the year. Ona fine sand is moderately rapidly permeable in the weakly cemented organic layers, between depths of 6 and 18 inches, and is rapidly permeable in all other layers. Available water capacity is medium.”

Soil Map Unit 34: Orlando Fine Sand, 0 to 5 Percent Slopes

Brief Description: “This is a nearly level to gently sloping, well-drained soils on the upland ridge. The water table is at a depth of more than 80 inches. Orlando fine sand is rapidly permeable throughout. It has medium available water capacity and moderate organic matter content to a depth of 30 inches. Below this depth, available water capacity and organic matter content are very low. In a representative profile, the plow layer is fine sand about 8 inches thick. Below this, to a depth of 30 inches, is very dark brown fine sand. Brown fine sand extends to a depth of 80 inches.”

***Soil Map Unit 38: Placid Sand, Frequently Ponded, 0 to 2 Percent Slopes**

Brief Description: “This soil is nearly level, very poorly drained. It has a profile described as representative of the series. Typically, 0 to 18 inches is very dark gray to black fine sand. From 18 to 80 inches is grayish brown to light brownish gray fine sand. The water table is at the surface to depths of 12 inches for most of the year. Placid sand is rapidly to very rapidly throughout. It had moderate available water capacity.”

Soil Map Unit 45: Tavares Sand, 0 to 5 Percent Slopes

Brief Description: “This is a nearly level to gently sloping, moderately well drained soil. It has a very dark grayish-brown sand surface layer about 7 inches thick. Below this is a layer of very pale brown sand that has faint yellowish-brown mottles to a depth of 25 inches. The next layer, to a depth of 34 inches, is a light yellowish-brown sand. Very pale brown sand that has faint yellow mottles is at depth between 34 and 61 inches. Below this is white sand mottled with very pale brown. The water table is at a depth of 40 to 60 inches for more than 6 months of the year. During periods of drought, it is below 60 inches. Tavares sand is very rapidly permeable. Available water capacity and organic matter content are low. This soil has slight limitations for use as foundations for low buildings, roads, airports, and paved parking areas. This soil has slight limitations for use as septic tank filter fields as possible contamination of ground water supplies can occur.”

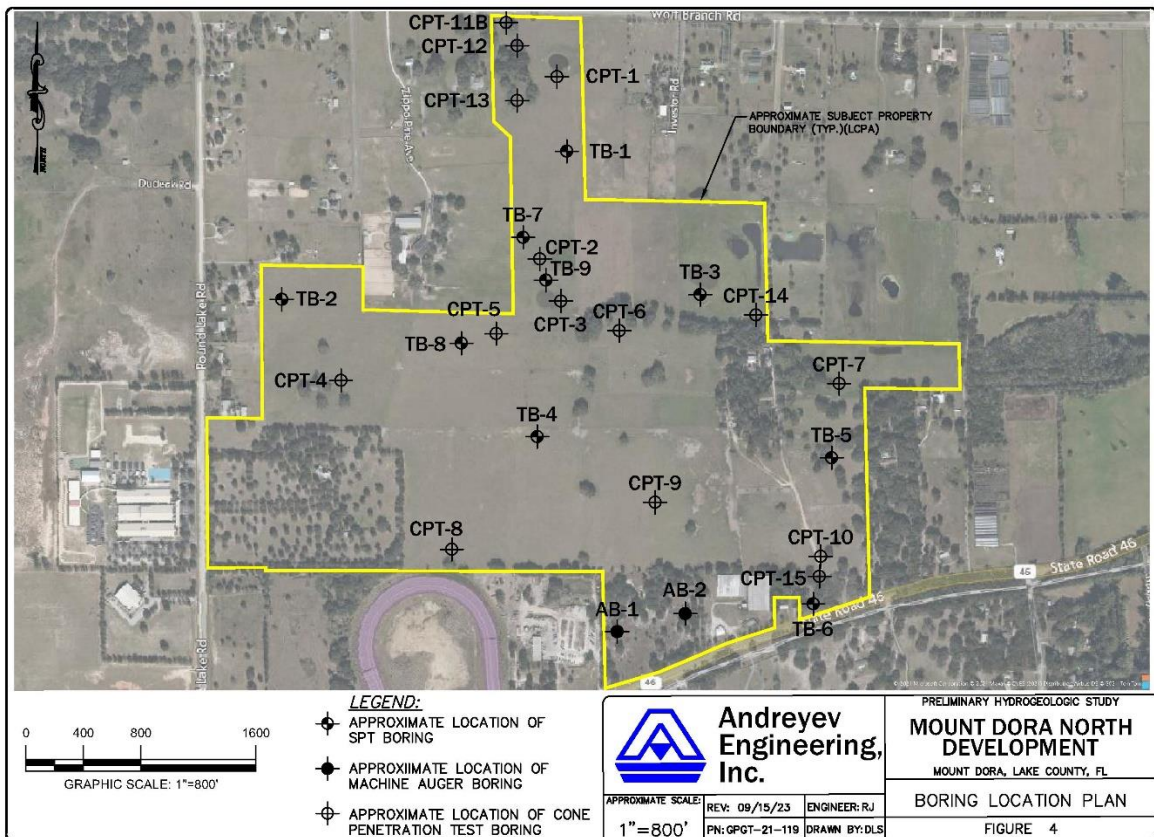
* This soil map unit description is not presented in the 1975 NRCS "Soil Survey of Lake County, Florida" publication including revisions made to soil descriptions in 2004. These soil descriptions are interpreted from corresponding soil survey map units published for nearby counties.

Subsurface Exploration Program

The subsurface exploration program performed at this site included: drilled nine (9) Standard Penetration Test (SPT) borings to depths of 25 to 75 feet below the existing ground surface, designated at TB-1 through TB-9; drilled two (2) machine auger borings to a depth of 20 feet below the existing ground surface; and performed fifteen (15) Cone Penetration Test (CPT) soundings to depths of 19.42 to 116.67 feet below the existing ground surface, designated as CPT-1 through CPT-15, as part of the soil and groundwater evaluation. The locations of the borings are shown on the attached **Figure** below.

The recovered soil samples were visually classified in the field with representative portions of the samples placed in jars and transported to our office for review and classification by the geotechnical engineer.

Figure 4 – Boring Location Plan



The results of our subsurface exploration program including the stratification profiles and groundwater levels are graphically presented on the **Figures** below. Soil stratification is based on review of recovered soil samples and interpretation of field boring logs by a geotechnical engineer. The stratification lines represent the approximate boundaries between soil types. The actual transition may be gradual. Minor variations not considered important to our engineering evaluations may have been abbreviated or omitted for clarity.

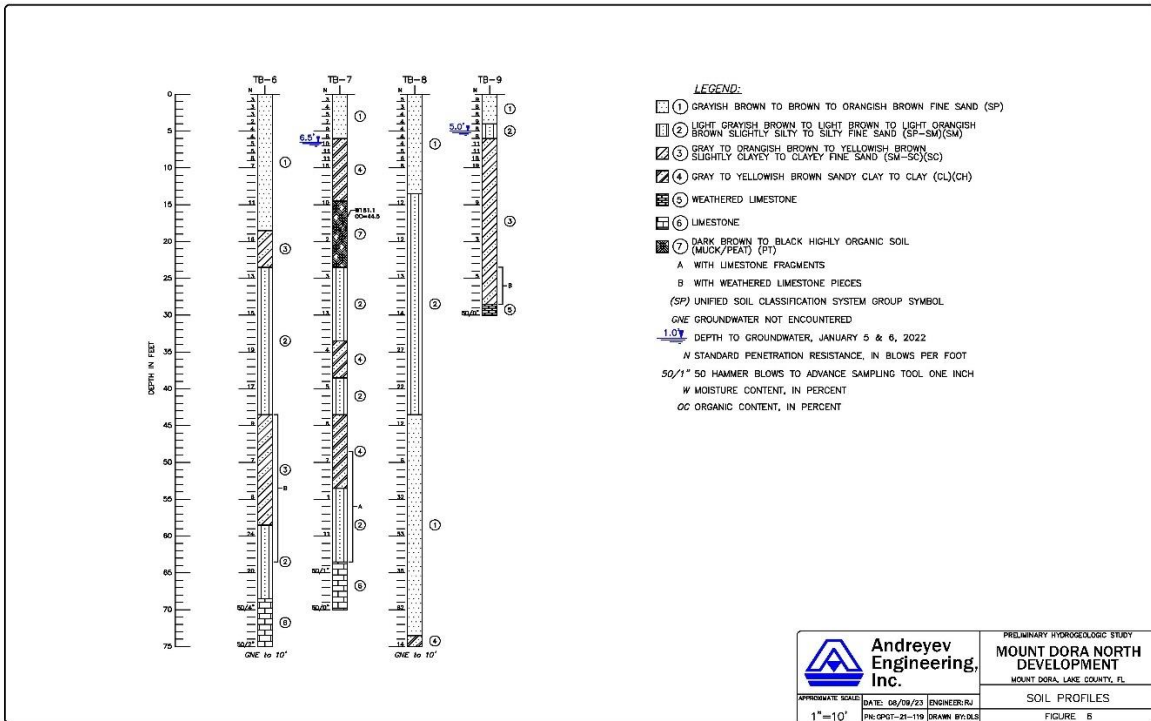
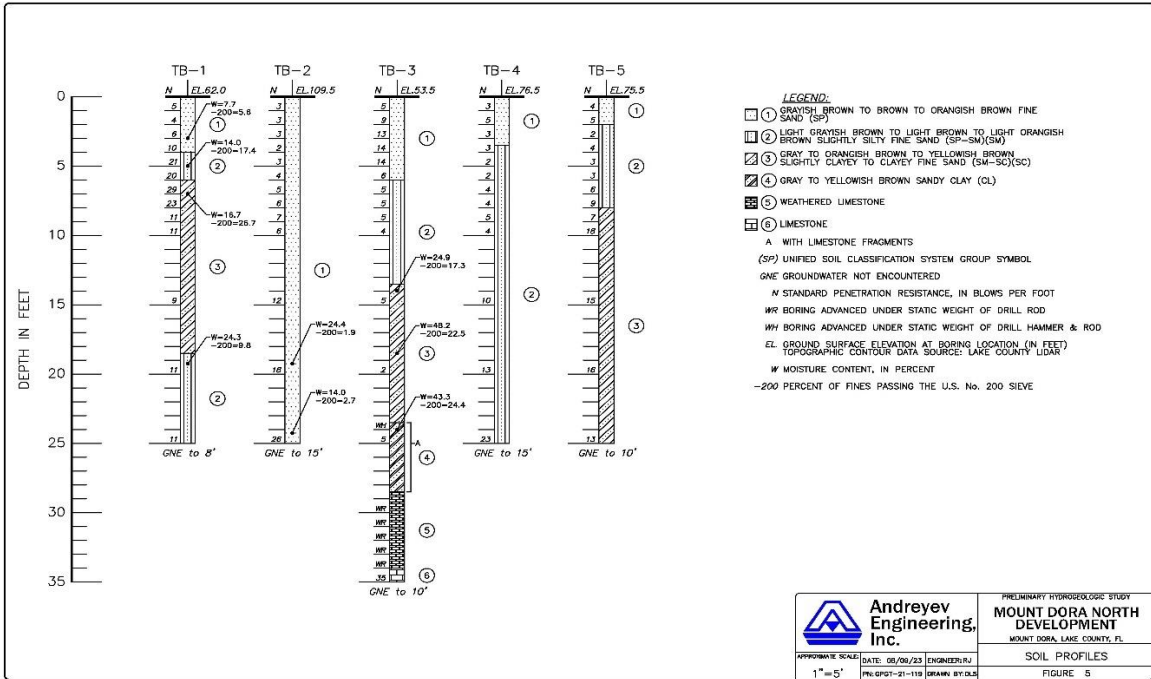
The predominant shallow soil types encountered in the borings consist of fine sand and slightly silty fine sand (SP, SPSM, and SM materials) and clayey fine sand to sandy clay soils (SP-SC, SC, SC-CL materials). The deeper soil types consist of sandy clay to clay (CL, CH) soils, also identified at shallower depths at boring location TB-7. These clay soils will tend to create a semi-confining soil layer retarding vertical leakage of water where these soil types are encountered. Some borings encountered limestone material at varying depths which are believed to be part of the underlying Floridan aquifer formation.

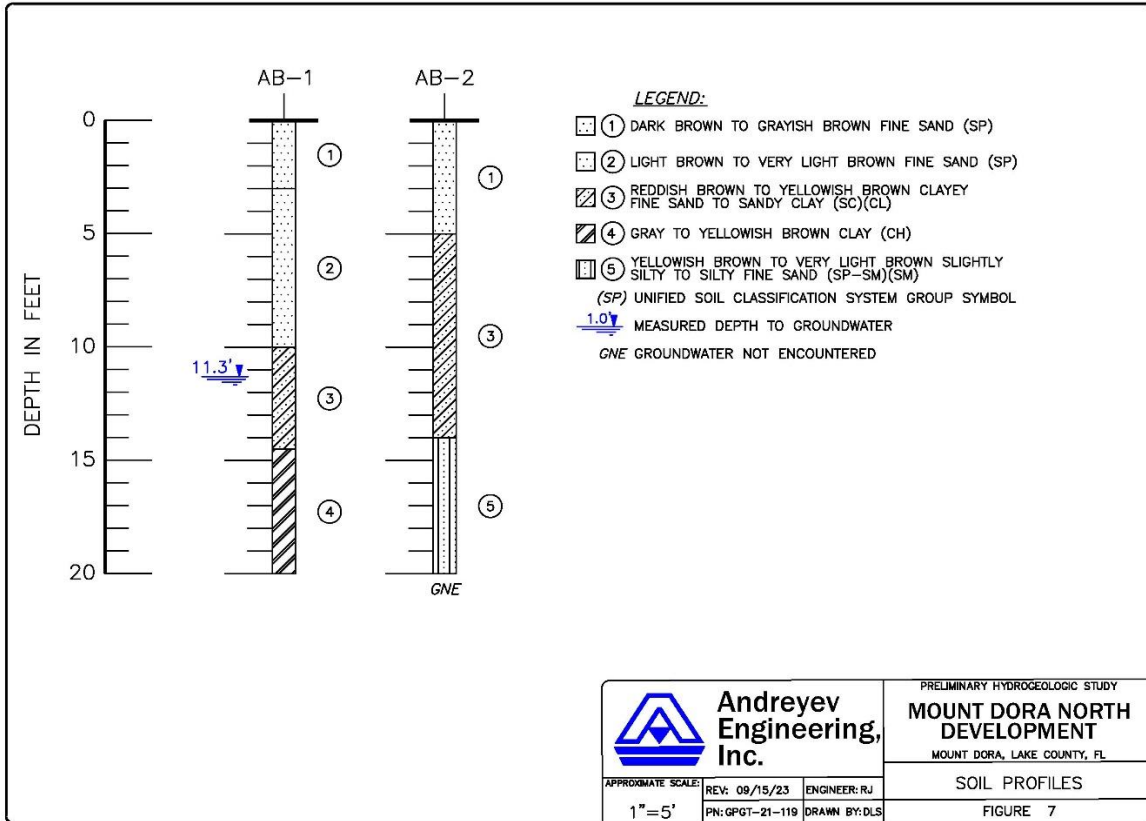
In general, a surficial layer of sandy soil exists in the upper 2 to 25 feet, primarily followed by slightly silty to silty sands to depths of 5 to 25 feet below the existing ground surface. Below these are soils of increasing fines content (i.e. clayey fine sands to sandy clays and clays) which were underlain by limestone identified to the boring termination depths at TB-3, TB-6, TB-7, and TB-9. The surficial sandy soils will be suitable for general fill purposes. The deeper clayey soils will be more difficult to be used for general fill purposes due to its higher fines content and difficulty in handling and compacting.

At the time of drilling, stabilized groundwater levels were encountered at depths of 5.0 to 6.5 in the northern portion of the site around wetland areas, to greater than 10 feet across the project area. The measured groundwater levels are shown adjacent to the soil profiles in the figures below. Fluctuation of the groundwater table should be anticipated throughout the year due to variations in seasonal rainfall. Based on the time of year, the encountered groundwater levels, the amount of rainfall received to date, the predominant and somewhat varying clay soils encountered, we estimate that the normal wet season high groundwater table will exist about one to two feet above measured levels, or in a temporary perched condition slightly above the encountered Strata 3 and 4 clay confining soils layers.

Please refer to the soil profile **Figures** below for specific boring data.

Figures 5, 6, & 7 – Soil Profiles





Cone Penetration Testing (CPT) is a geotechnical investigation technique designed to evaluate subsurface conditions and geotechnical soil properties. Cone penetrometer tests are a quasi-static penetration test, meaning that the cone is pushed at a slow rate rather than driven with a hammer or rotary drilling. During a Cone Penetration Test, an instrumented cylindrical metal cone is advanced below land surface at a constant and slow rate, normally by a hydraulic press. As the cone is advanced, computerized measurements are made and data is recorded that indicate the various soil properties encountered by the cone.

The locations of the fifteen (15) CPT soundings (CPT-1 thru CPT-15) are shown on **Figure 4**. The basic field measurements of the test, cone penetration resistance (q_c), friction resistance (f_s) and pore water pressure (U) were re-analyzed using the CPT interpretation software CPeT-IT developed by GeoLogismiki. Samples are not retrieved during CPT soundings, but stratification, strength and compressibility characteristics of the soil layers can be interpreted based on correlations of the field parameters measured during the soundings. CPT-1 thru CPT-3, CPT-5, CPT-10, CPT-11B, and CPT-14 locations indicated very soft/loose raveled soils with very low correlated Constrained Modulus (M) values of less than 20 tsf. Based on our local experience, the site topography and the encountered variable depth to limestone at this site, the very soft/loose/raveled conditions are not unexpected, and therefore should be carefully considered during future planning and design of site improvements in these areas.

REGIONAL GEOLOGY

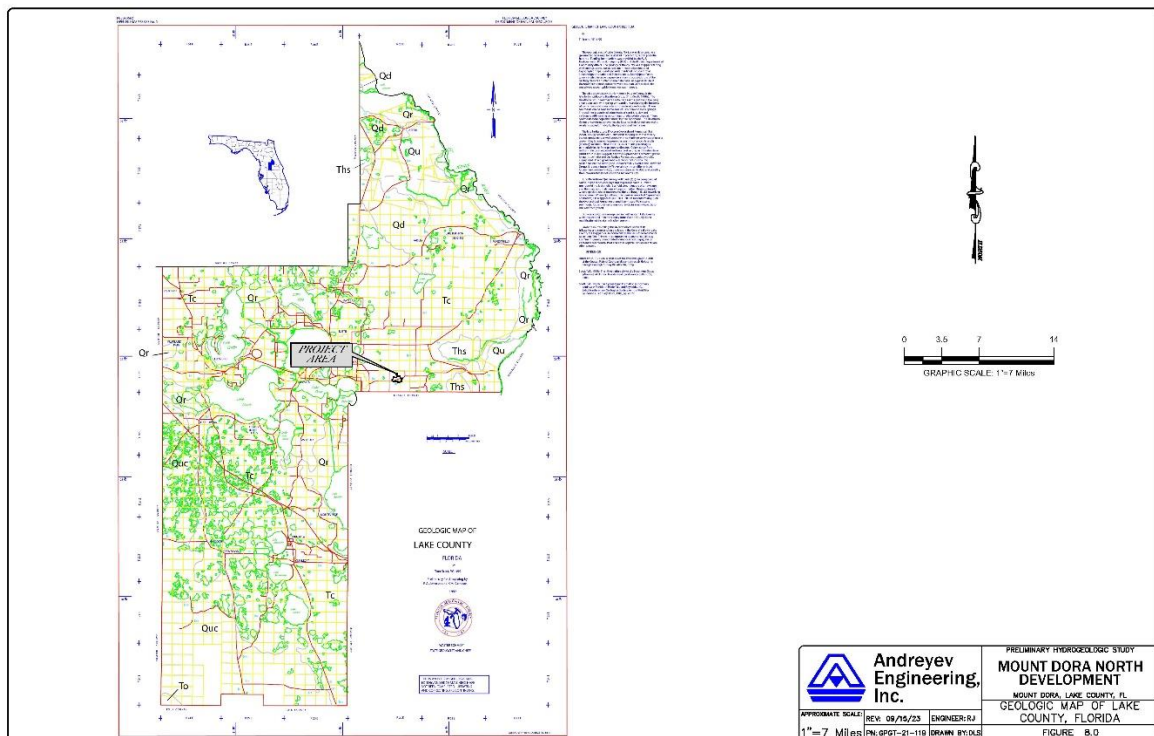
The geologic formation exposed at the surface in this site is the Late Pliocene Cypresshead Formation (Tc) and consists of quartz sands ranging from fine to very coarse, moderately to well sorted with common occurrences of quartz gravel. Clay is commonly present in very minor amounts. The Cypresshead was deposited in a shallow, nearshore, marine setting and unconformably overlies the Hawthorn Group. The Hawthorn Group unconformably overlies the Eocene Ocala Limestone. (Geologic Map of Lake County, Florida, FGS Open File Map Series No. 9, 1992). The geologic map of Lake County published by the Florida Geological Society (FGS) is shown on **Figure 8** below.

The Cypresshead Formation (Tc) was deposited during the Pliocene Epoch when there were several sea level changes. The Cypresshead Formation was deposited along the beaches that were formed along various shorelines during these sea level changes. Many commercial sand deposits are present in the Cypresshead Formation, and these are related to these old beach lines.

Below the Cypress Formation and Hawthorn group is the upper Floridan aquifer, consisting of Ocala Group limestone. Based on the published information, the Ocala Group limestone is about 100 feet thick and is followed by the Avon Park limestone (400 to 10,000 feet thick).

The location of the project site is referenced on the Geologic Map of Lake County, shown on the **Figure** below.

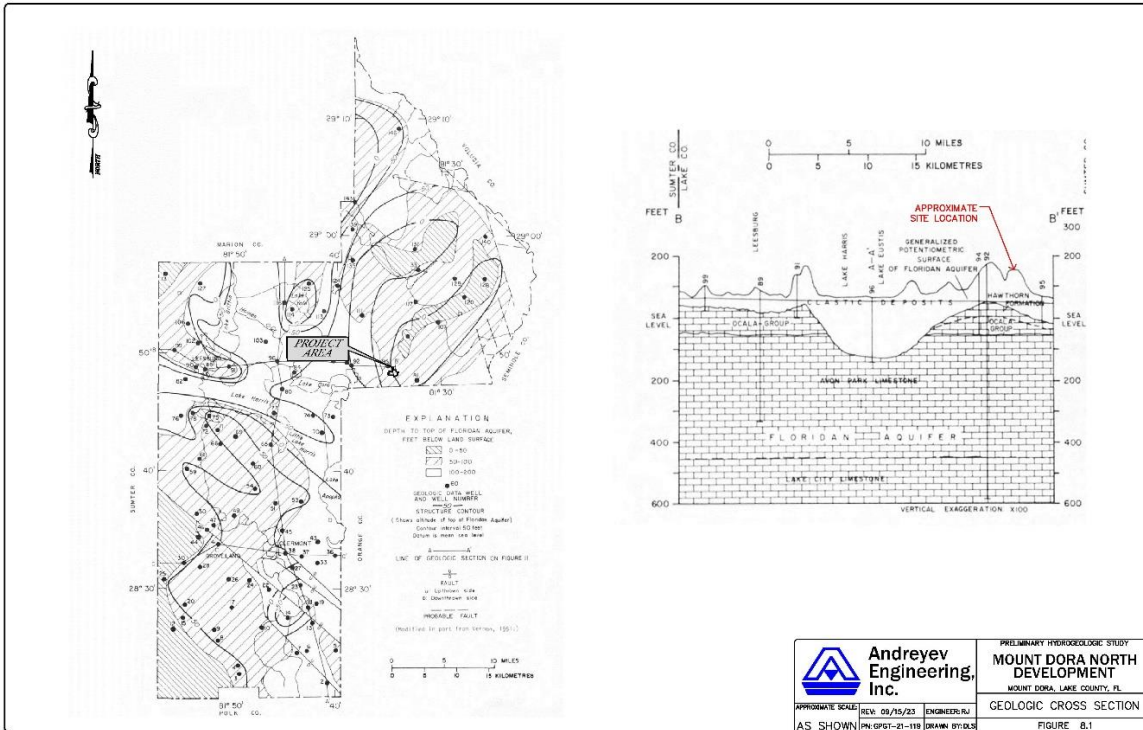
Figure 8.0 – Geologic Map of Lake County, Florida



Lake County - Regional Cross-Section Map

A regional cross-section map of Lake County, obtained from the publication “Hydrology of Lake County, Florida”, provides an overview of the county geology. The cross-section map illustrates the project location within the county. In general, the map shows the “Depth to Top of Floridan Aquifer” is approximately 50-100 feet below land surface in the region of the site. The cross-section provides a visual reference to the geologic make-up at the site.

Figure 8.1 – Regional Cross-Section

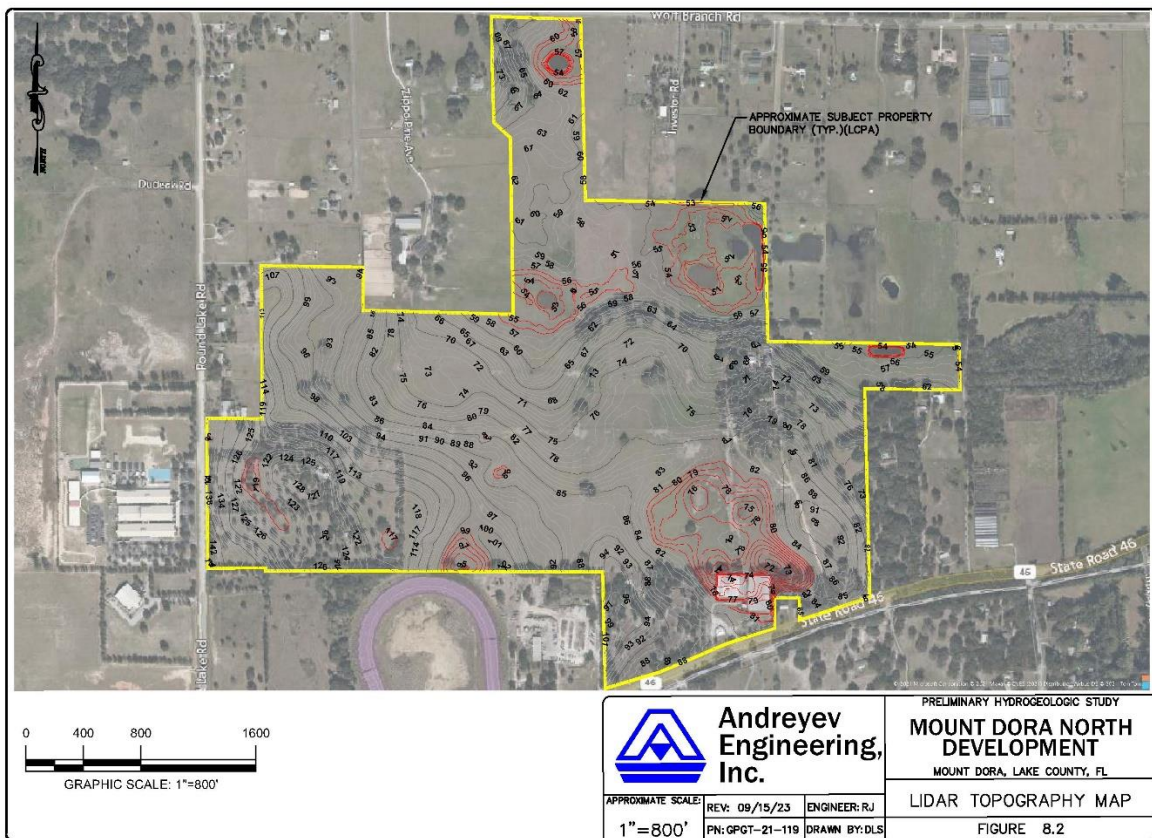


1-Foot LIDAR Topography Map

The topography of the site was further evaluated utilizing a 1-foot topographic map created utilizing LIDAR technology, obtained from the Lake County GIS Open Data Portal. A copy of the map is included as **Figure 8.2** below. Based on the LIDAR map the site is characterized by gently to moderately sloping knolls throughout sparsely wooded areas. Higher elevations that max out at about 140 feet (NAVD88) are observed over the southwestern portions of the project area with lower elevations generally towards the northeastern portions of the site where elevations dip to approximately 51 feet (NAVD88).

A close inspection of the map reveals several anomalous features characterized by steep gradients and closed contour depressions. Most of the features have been previously identified in our initial studies of the site. The most significant closed form depressional feature on the site was noted to exist near the northern property boundary adjacent to Wolf Branch Road.

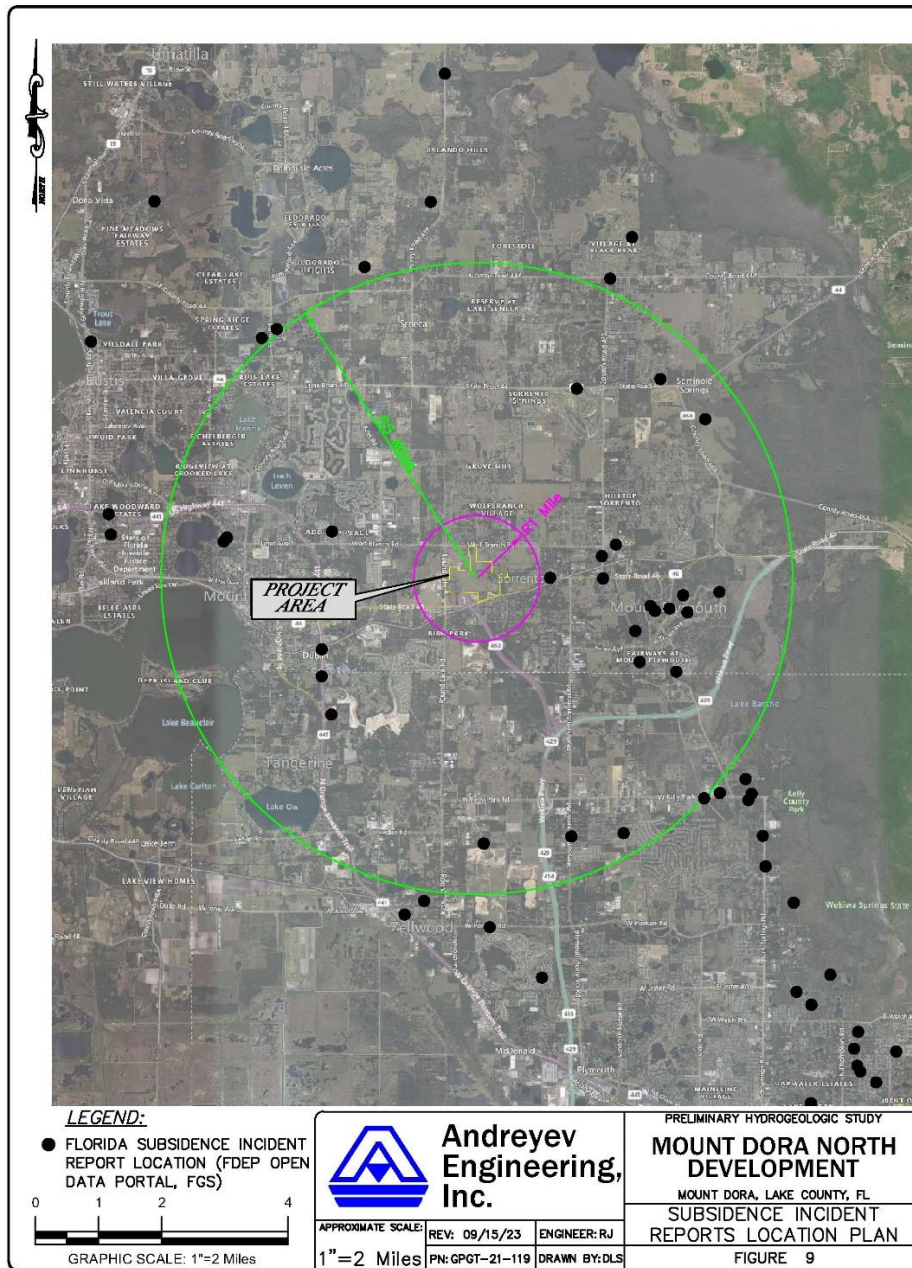
Figure 8.2 LIDAR Topography Map



Preliminary Karst Assessment

The Florida Geological Society (FGS) Florida Subsidence Incident Report data within a 5 mile radius of the site is shown on **Figure 9**. Based on the review of the FGS database, no subsidence events have been reported within a 1-mile radius of the site, and about twenty-six (26) incidents of subsidence have been reported within a 5-mile radius of the site as shown on the **Figure** below. The noted subsidence event occurrences are considered to be low to moderate in comparison with other areas of central Florida.

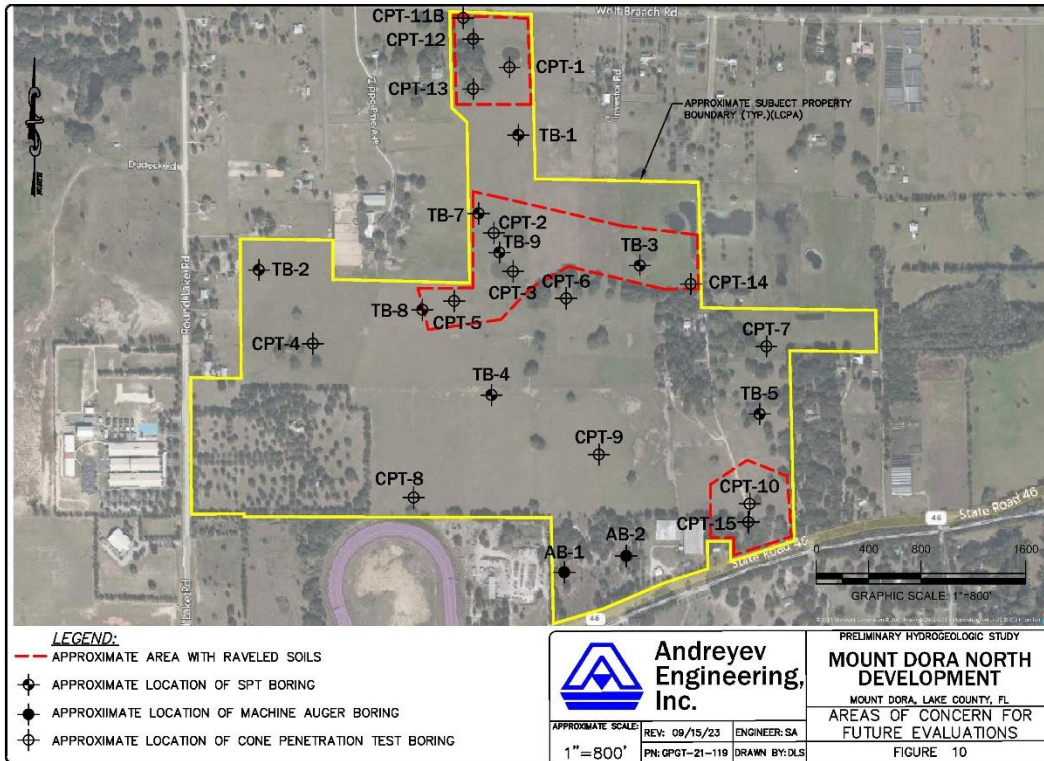
Figure 9 – Subsidence Incident Reports Location Plan



Areas of Concern for Future Evaluations

Based on the preliminary Standard Penetration Test (SPT) borings and Cone Penetration Test (CPT) soundings completed at the site, very soft/loose raveled soil indicating a potential for sinkhole activity was encountered at several CPT locations. Based on these results, several areas containing potentially raveled soils have been identified for further evaluation depending on the planned improvements for these areas. The general areas of concern for future evaluation have been roughly outlined with red dashes as presented on the **Figure** below.

Figure 10 – Areas of Concern for Future Evaluations

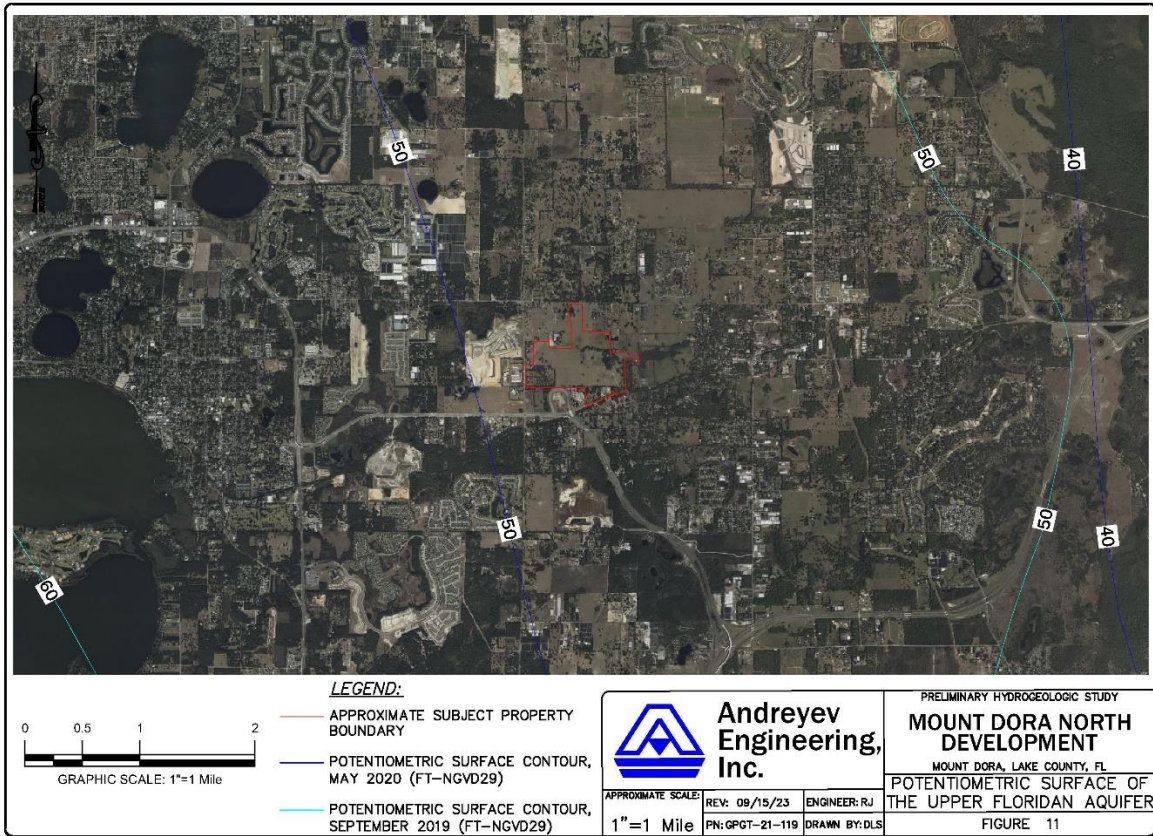


Additional geotechnical investigations will be necessary during the design phase of the project to properly delineate the lateral extent of any raveled zones. Some areas of the site may need to be avoided for planning of future residential structures or provide a set-back to future delineated raveled areas. Additionally, it may also be possible to conduct subsurface stabilization measures to mitigate possible detrimental settlements before the construction of structures in those areas.

Potentiometric Surface Elevation

A review of the map titled Potentiometric Surface of the Upper Floridan Aquifer, Central Florida, May 2020 prepared in cooperation with the Saint Johns River Water Management District (SJRWMD) was reviewed. The elevation of the potentiometric surface in the vicinity of the project site is approximately +50 feet NGVD, which is about 70 feet below the ground surface. The Figure is presented below.

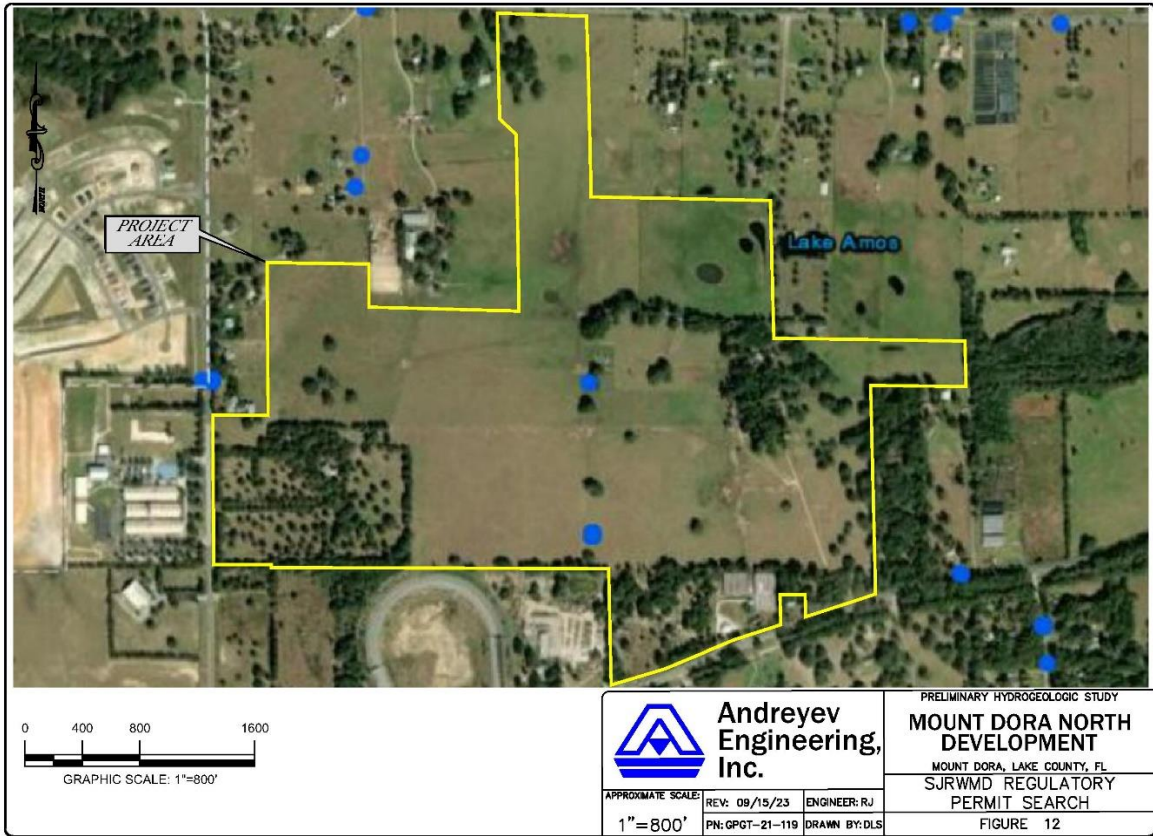
Potentiometric Surface Map – Figure 11



Regulatory Permit Reivew

AEI performed a regulatory permit search for “Water Well Construction Permits” at the proposed project area. According to the St. Johns River Water Management District website, two (2) wells are illustrated on the Permit Map within this project area. A view of the Permit Map is presented on the **Figure** below.

SJRWMD Regulatory Permit Map – Figure 12



CONCLUSIONS AND RECOMMENDATIONS

Based on the results of our preliminary hydrogeologic study, review of available published data, site visit observations, and field investigations, our evaluation and presentation of soil and groundwater results along with preliminary recommendations are summarized below:

1. We understand that this project will consist of mostly residential development with associated commercial centers, and recreational components, as part of the conceptual design.
2. Lacking final design plans, at this stage we have assumed that the development will be designed in a similar manner to other large developments in the region. Once the development plans for this project are available, the results of this study can be used to assist with final planning and design recommendations and specification for the project site.
3. Construction of residential structures, paved roadways, and stormwater water management systems will be possible at this site, provided that site grading provides proper separation from the seasonal high groundwater levels and the occasional shallow clayey sands is maintained.

4. Assuming best management practices and thorough evaluations of the site conditions, the proposed residential development is not expected to have adverse environmental impacts to the adjacent wetlands and/or the aquifer system. However, additional studies will be implemented to confirm this, as required for permitting of the project thru the regulatory oversight entities (FDEP, County, and SJRWMD).
5. In general, based on our review of the available soil and groundwater data, we believe the property is suitable to support the proposed development. However, due to the existence of potential raveling in some areas, the collection of additional geologic and hydrogeologic data, in the form of geotechnical borings and geophysical studies, will be necessary to properly design and construct the residential development in areas of concern.