Geotechnical Technical Memorandum

Reconstruction of Old Lake Wilson Road (Urban Minor Arterial)

Osceola County, Florida

Osceola County Contract No. PS-20-11842-DG

Inwood Project No. OSC-009-01

Project Development and Environment Study

Osceola County
Transportation and Transit Department

January 2021

TIERRA, Inc.
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January 11, 2021

Inwood Consulting Engineers, Inc.
3000 Dovera Drive, Suite 200
Oviedo, FL 32765

Attn: Mr. Jesse A. Blouin, AICP

RE: Geotechnical Technical Memorandum
Project Development and Environment (PD&E) Soil Survey Study
Reconstruction of Old Lake Wilson Road (Urban Minor Arterial)
Osceola County, Florida
Osceola County Contract No. PS-20-11842-DG
Tierra Project No. 5511-20-059

Mr. Blouin:

Tierra, Inc. (Tierra) has completed Geotechnical Engineering Services for the referenced project. The results of the study are enclosed herein.

Tierra appreciates the opportunity to provide our services to Inwood Consulting Engineers, Inc. (Inwood) and Osceola County on this project. If you have any questions regarding this report, please contact us at (407) 877-1354.

Respectfully Submitted,

TIERRA, INC.

Luis Almodovar

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No 62951
STATE OF
FLORIDA
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Jeremy A. Sewell, P.E.
Senior Geotechnical Engineer
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This item has been digitally signed and sealed by Jeremy A. Sewell, 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.

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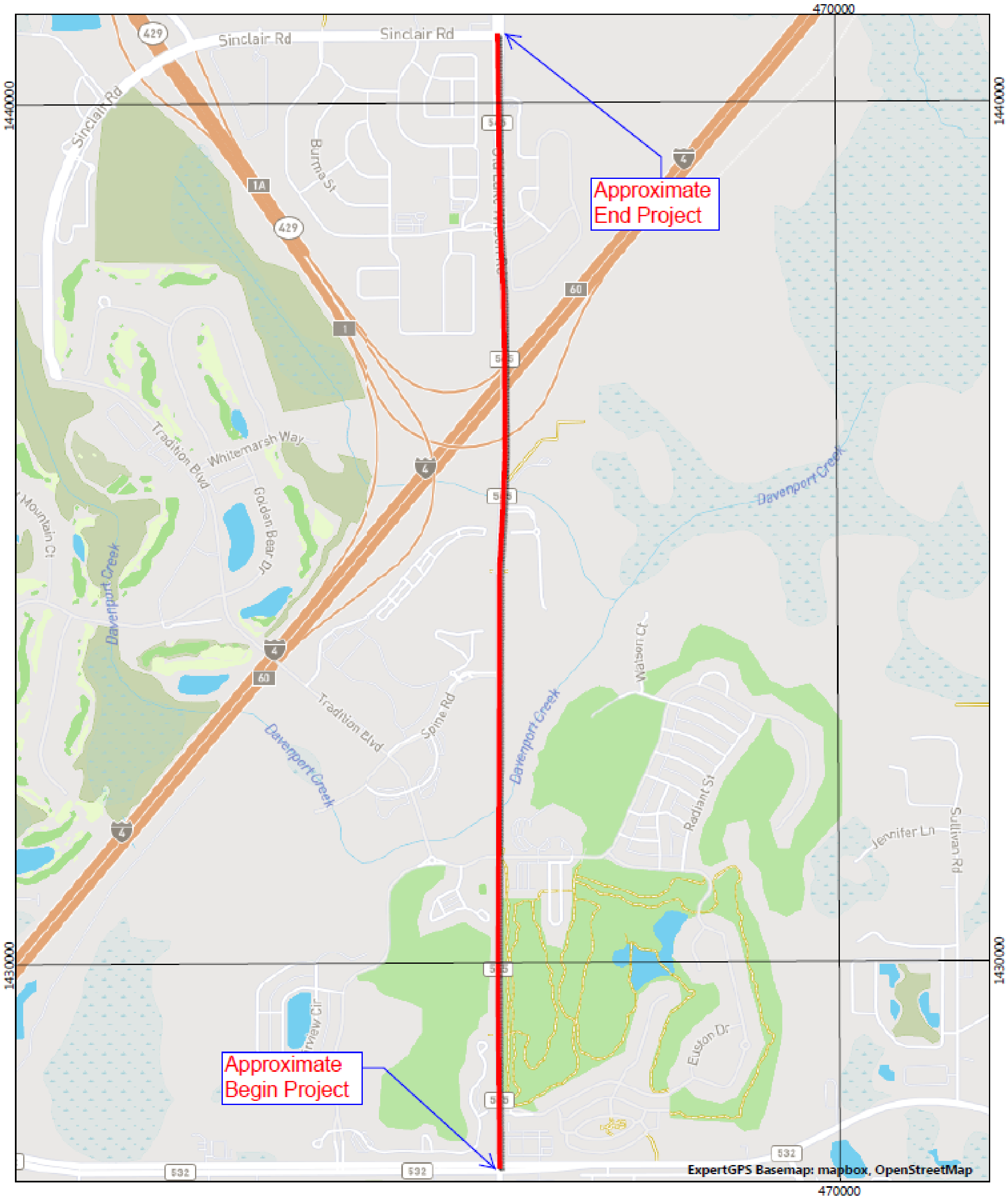
1.0 PROJECT SUMMARY

1.1 Project Description

The Reconstruction of Old Lake Wilson Road PD&E Study is to develop a proposed improvement strategy that is technically sound, environmentally sensitive, and publicly acceptable. The study evaluated the reconstruction and widening (2-lane to 4-lane) of an existing 2.49 mile segment of N. Old Lake Wilson Road from CR 532 (Osceola-Polk County Line Road) to Sinclair Road. The project is anticipated to be built in phases, which will be assessed in the Preliminary Engineering Report (PER). The first phase will include a 0.65 mile portion of N. Old Lake Wilson Road (Urban Minor Arterial) from Sinclair Road to the north end of the existing bridge approach over Interstate 4. There will be a second 2-lane bridge crossing Interstate 4 parallel to the existing 2-lane bridge. The typical section will include 5-foot sidewalks, evaluation of potential bicycle facilities, 16’-22’ median, streetlights, and closed drainage system. The proposed travel lanes will be 10’-12’ in width in accordance with the Florida Design Manual Standards. The four-lane roadway will then continue 1.65 miles south to the terminus of the project at CR 532.

Figure 1-1
Project Location Map



2.0 SCOPE OF SERVICES

2.1 Purpose of Report

The purpose of the geotechnical portion of the PD&E study is to evaluate the existing subsurface conditions along the project alignment to assist in the preparation of the PD&E Report for the project. The following services were provided to achieve the preceding objective:

- Reviewed published soils information. This published information was obtained from the Web Soil Survey of Osceola County, Florida published by the United States Department of Agriculture (USDA) – Natural Resources Conservation Service (NRCS).

- Prepared this Preliminary Soil Survey Study for the project.

3.0 REVIEW OF PUBLISHED DATA

3.1 USGS Quadrangle Map

Based on a review of the “Intercession City, Florida” USGS Quadrangle Map, it appears that the project site elevations are on the order of approximately +100 to +140 feet, National Geodetic Vertical Datum of 1929 (NGVD). A **USGS Quadrangle Map** of the project area is illustrated in attachments.

4.0 SUBSURFACE CONDITIONS

4.1 Osceola County Soil Survey

Based on a review of the Osceola County Soil Survey published by the USDA-NRCS, it appears that there are five (5) soil-mapping units noted within the project limits. A detailed soil survey map is shown on the **USDA Soil Survey** in the attachments. The general soil descriptions are presented in the sub-sections below, as described in the Web Soil Survey.

4.1.1 Candler Sand, 0 to 5 percent slopes (Unit 7)

The Candler component makes up 90 percent of the map unit. Slopes are 0 to 5 percent. This component is on ridges on marine terraces on coastal plains. The parent material consists of eolian or sandy marine deposits. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is excessively drained. Water movement in the most restrictive layer is high. Available water to a depth of 60 inches is very low. Shrink-swell potential is low. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 1 percent. Non-irrigated land capability classification is 4s. This soil does not meet hydric criteria. The soil has a slightly spodic horizon within 30 inches of the soil surface.

4.1.2 Candler Sand, 5 to 12 percent slopes (Unit 8)

The Candler component makes up 95 percent of the map unit. Slopes are 5 to 12 percent. This component is on ridges on marine terraces on coastal plains. The parent material consists of eolian or sandy marine deposits. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is excessively drained. Water movement in the most restrictive layer is high. Available water to a depth of 60 inches is very low. Shrink-swell potential is low. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 1 percent. Non-irrigated land capability classification is 6s. This soil does not meet hydric criteria. The soil has a slightly spodic horizon within 30 inches of the soil surface.

4.1.3 Hontoon Muck, freq. ponded, 0 to 1 percent slopes (Unit 15)

The Hontoon component makes up 90 percent of the map unit. Slopes are 0 to 1 percent. This component is on depressions on marine terraces on coastal plains. The parent material consists of herbaceous organic material. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is very poorly drained. Water movement in the most restrictive layer is high. Available water to a depth of 60 inches is very high. Shrink-swell potential is low. This soil is not flooded. It is frequently ponded. A seasonal zone of water saturation is at 0 inches during January, February, March, April, May, June, July, August, September, October, November, December. Organic matter content in the surface horizon is about 80 percent. Non-irrigated land capability classification is 7w. This soil meets hydric criteria. The soil has a slightly spodic horizon within 30 inches of the soil surface.

4.1.4 Pomello Fine Sand, 0 to 5 percent slopes (Unit 34)

The Pomello component makes up 85 percent of the map unit. Slopes are 0 to 5 percent. This component is on knolls on marine terraces on coastal plains, ridges on marine terraces on coastal plains. The parent material consists of sandy marine deposits. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is moderately well drained. Water movement in the most restrictive layer is high. Available water to a depth of 60 inches is low. Shrink-swell potential is low. This soil is not flooded. It is not ponded. A seasonal zone of water saturation is at 33 inches during July, August, September, October, November. Organic matter content in the surface horizon is about 1 percent. Non-irrigated land capability classification is 6s. This soil does not meet hydric criteria. The soil has a slightly spodic horizon within 30 inches of the soil surface.

4.1.5 Pompano Fine Sand, freq. ponded, 0 to 1 percent slopes (Unit 37)

The Pompano, depressional component makes up 92 percent of the map unit. Slopes are 0 to 1 percent. This component is on depressions on marine terraces on coastal plains. The parent material consists of sandy marine deposits. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is very poorly drained. Water movement in the most restrictive layer is high. Available water to a depth of 60 inches is very low. Shrink-swell potential is low. This soil is not flooded. It is frequently ponded. A seasonal zone of water saturation is at 0 inches during June, July, August, September, October, November, December. Organic matter content in the surface horizon is about 3 percent. Non-irrigated land capability classification is 7w. This soil meets hydric criteria. The soil has a slightly spodic horizon within 30 inches of the soil surface.

4.2 General Soil Properties

Additional information regarding the soils and groundwater conditions for the above soil mapping units was obtained from the Osceola County Soil Survey published by USDA-NRCS and the Web Soil Survey and is presented in **Tables 4-1** and **4-2** as follows:

Table 4-1
Osceola County USDA NRCS Soil Survey Information

Map No.	Soil Name	Hydrologic Soil Group	Depth to High Water Table (ft.)	Typical Soil Types (Profile from Ground Surface to depth of approximately 80 inches)
7	Candler sand, 0 to 5 percent slopes	A	>6.0	Fine Sand to Sand
8	Candler sand, 5 to 12 percent slopes	A	>6.0	Fine Sand to Sand
15	Hontoon muck, frequently ponded, 0 to 1 percent slopes	A/D	+2.0 to 1.0	Muck to Mucky Peat
34	Pomello fine sand, 0 to 5 percent slopes	A	2.0 to 3.5	Fine Sand
37	Pompano fine sand, frequently ponded, 0 to 1 percent slopes	A/D	+2.0 to 1.0	Fine Sand

Table 4-2
Osceola County USDA NRCS Soil Survey Information

Map Number	Soil Name	Soil Classification			
		Depth (in)	USCS	AASHTO	Permeability (in/hr.)
7	Candler sand, 0 to 5 percent slopes	0-6	SP, SP-SM	A-3	6.0 - 50.0
		6-63	SP, SP-SM	A-3, A-2-4	6.0 - 50.0
		63-80	SP-SM	A-3, A-2-4	6.0 - 20.0
8	Candler sand, 5 to 12 percent slopes	0-67	SP, SP-SM, SM	A-3, A-2-4	20.0 - 50.0
		67-80	SP-SM, SM-SC	A-3, A-2-4	6.0 - 20.0
15	Hontoon muck, frequently ponded, 0 to 1 percent slopes	0-60	PT	A-8	6.0 - 20.0
		60-65	PT	A-8	6.0 - 20.0
34	Pomello fine sand, 0 to 5 percent slopes	0-47	SP-SM	A-3	20.0 - 50.0
		47-58	SP-SM	A-2-4	0.6 - 6.0
		58-65	SP-SM	A-3	0.6 - 6.0
		65-80	SP	A-3	6.0 - 20.0
37	Pompano fine sand, frequently ponded, 0 to 1 percent slopes	0-80	SP-SM, SM	A-3, A-2-4	6.0 - 20.0

5.0 PRELIMINARY ENGINEERING EVALUATIONS

5.1 General

Based upon the USDA-NRCS Soil Survey for Osceola County, sandy soils to depths of 80 inches below the natural ground surface are reported along the majority of the project corridor with the exception of isolated areas of organic soils. In general, these soils are suitable for supporting proposed roadway embankments after proper subgrade preparation and removal of unsuitable materials.

Areas along the project corridor where organic soils and/or groundwater conditions may impact the project are detailed below.

5.1.1 Shallow Groundwater

The Seasonal High Groundwater Table (SHGWT) for the soil units is reported to range from at or above the predevelopment natural grade to depths of 3½ feet below the predevelopment natural grade within the project limits. In areas where the existing SHGWT is at or above the predevelopment natural grade and not artificially lowered by the roadside swales/ditches, the SHWGT should be established by the project biologist utilizing biological indicators.

Roadway base to groundwater clearance will need to be evaluated to ensure minimum separation between the base and the SHGWT is maintained or to determine if additional measures are required (i.e., blackbase, underdrains, etc.).

5.1.2 Organic Soils

The following soil mapping unit also noted organic/muck (A-8) soils between the ground surface to within approximately 5½ feet of the ground surface:

- Hontoon muck, frequently ponded, 0 to 1 percent slopes (Unit 15)

This soil mapping unit was noted as an isolated area within the creek crossing just north of Assembly Court. Organic/muck (A-8) soil, if encountered during construction, should be removed in accordance with FDOT Standard Plans Index 120-002 and replaced with backfill in accordance with Standard Plans Index 120-001. As the project progresses beyond the PD&E phase, delineation of the reported organic soils will be required to determine the impact of the organic soils on the proposed design. Additional geotechnical services should be performed to identify the vertical and horizontal limits of the encountered organic soils within the project limits.

5.2 Roadway Construction

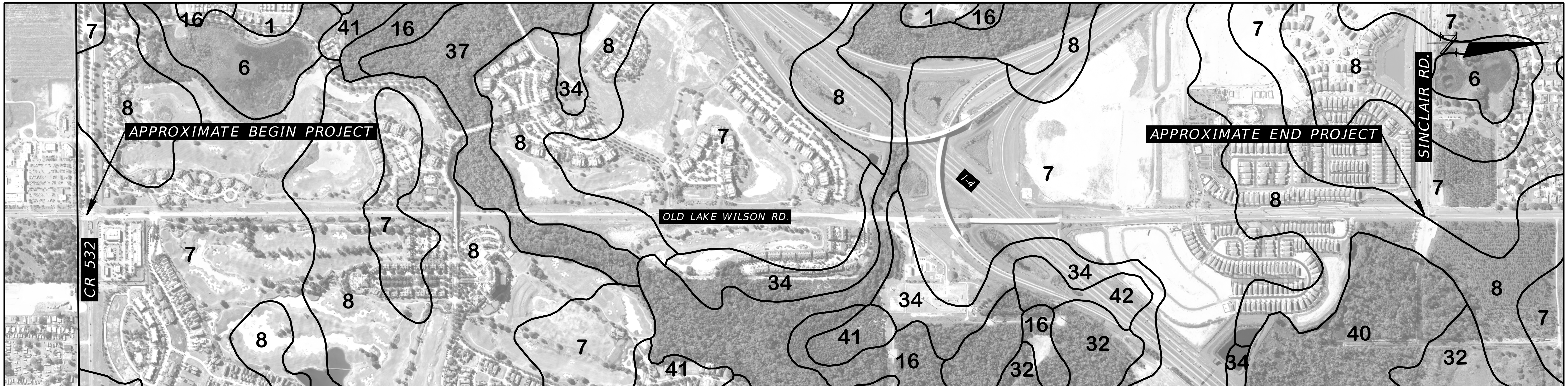
Site preparation should consist of normal clearing and grubbing followed by compaction of subgrade soils. Subgrade preparation should include the removal of plastic soils, top-soils, organic soils, and unsuitable materials in accordance with Osceola County Specifications or FDOT Standard Plans, Index 120-002. Backfill embankment materials should consist of materials conforming to Osceola County Specifications or FDOT Standard Plans, Index 120-001. Clearing and grubbing and compaction should be accomplished in accordance with the latest Osceola County and FDOT Standard Specifications.

The overall site preparation and mechanical densification work for the construction of the proposed roadway improvements should be in accordance with Osceola County Specifications or FDOT Standard Specifications and Standard Plans Index requirements. In general, the existing subsurface soils appear capable of supporting the construction of the proposed roadway improvements subject to the above geotechnical considerations and after proper subgrade preparation.

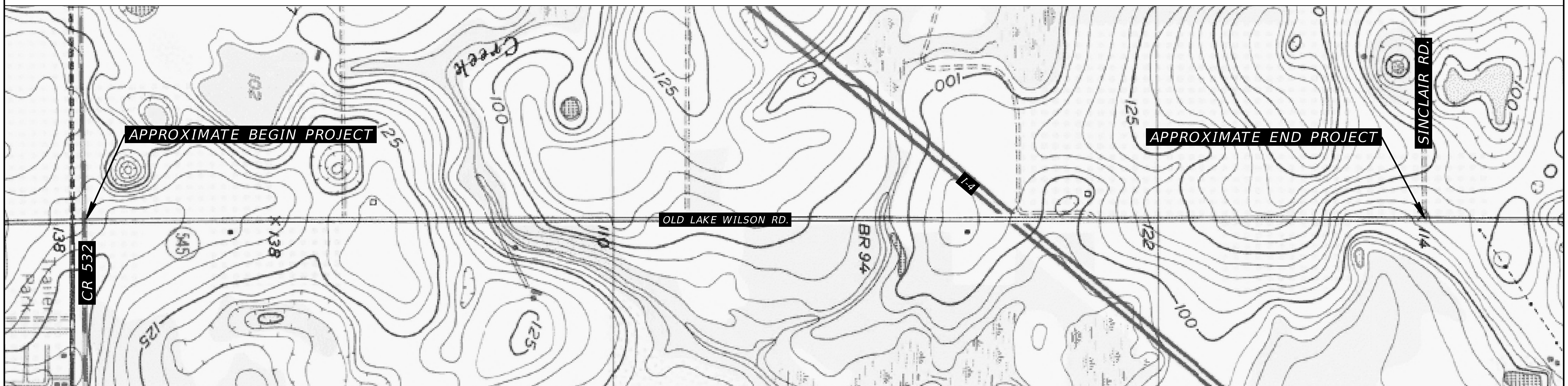
6.0 LIMITATIONS

Our professional services have been performed, our findings obtained and our preliminary evaluations prepared in accordance with generally accepted geotechnical engineering principles and practices at the time of this report. Tierra is not responsible for the conclusions, opinions or recommendations made by others based on this data.

The scope of the geotechnical portion of the PD&E study is to provide information on the existing subsurface conditions along the project alignment based on a review of the Osceola County Soil Survey published by the USDA-NRCS to assist in the preparation of the PD&E Report for the project. The preliminary evaluations submitted in this report are based upon the data obtained from the published information. Should subsoil variations become evident during the course of this project, a re-evaluation will be necessary after we have had an opportunity to observe the characteristics of the conditions encountered. The applicability of the report should also be reviewed in the event significant changes occur in the design, nature or location of the proposed roadway construction and stormwater management areas.



REFERENCE: USDA SOIL SURVEY OF OSCEOLA COUNTY, FLORIDA



REFERENCE: USGS QUADRANGLE MAP OF "INTERCESSION CITY, FLORIDA"

0 200 1000
Feet

TOWNSHIP: 25S
RANGE: 27E
SECTION: 22, 23, 26, 27, 34, 35

REVISIONS			
DATE	DESCRIPTION	DATE	DESCRIPTION

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OSCEOLA COUNTY
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	CONTRACT NO.
545	OSCEOLA	PS-20-11842-DG

USDA SOIL SURVEY & USGS QUADRANGLE MAP

SHEET NO.