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October 3, 2014

Sabal Trail Pipeline Project
Evaluation of Karst Topography and Sinkhole Potential for Pipeline and Facilities

Gulf Interstate Engineering
Attention: Mr. Denys Stavnychyi - Project Engineer

RE: Evaluation of Karst Feature - Spread 2
Milepost 159.8 to 161.3
Parcel GA-DO-044.004
Dougherty County, Georgia

Mr. Stavnychi,

In general accordance with our proposal dated September 23, 2013 and subsequent agreement, Professional Service Industries, Inc. (PSI) has been carrying out geotechnical services directed at evaluating Karst Topography and sinkhole potential for the pipeline and facilities that will be constructed in connection with the Sabal Trail Pipeline Project.

As part of our work on the assignment, we have performed further evaluation of karst features identified from the desktop study performed or field observations. This report addresses the karst features identified between Mileposts (MP) 159.8 and 161.3 in Spread 2. The approximate coordinates of the feature are 31 30' 28.84" N, 84 11' 24.46" W.

Feature Identification

The proposed pipeline alignment is adjacent to the southern boundary of the Albany Georgia Well-field. Approximately 30 documented sinkholes have occurred at the well-field, including 12 in 2007 during a period of heavy pumping. Based on the desktop study and documented sinkholes in the vicinity of the proposed pipeline alignment, the area was classified as having a moderate potential for sinkhole development and a MEDIUM risk ranking and further evaluation of the area was recommended. Ground surface elevations at the site are on the order of 180 to 200 feet above mean sea level.

Area Geology

Overall the sinkhole risk in Dougherty County is considered medium along the alignment. Historical occurrences of sinkhole are common, there are a number of springs, flowing wells and subterranean streams. Limestone can be found at relatively shallow depths throughout the county. Even so the sinkhole potential would generally be considered low if not for human influences such as pumping. Cover-collapse sinkholes are most common.

Although sinkhole occurrence and risk is believed to be higher than surrounding counties, it is most likely contributed to groundwater pumping. We would not expect any significant impacts to shallow pipeline construction due to the presence of a significantly thick overburden atop the rock. The risk of deeper directional drill installations triggering sinkhole activity is also believed to be relatively low unless performed during periods of significant groundwater pumping.

Geophysical Testing Results

Geophysical testing consisting of Ground Penetrating Radar and Electrical Resistivity Imaging was conducted by GeoView on September 17, 2014 and the results were transmitted in a September 24, 2014 report, a copy of which is attached. No observed areas of significant down warping or other indicators of possible sinkhole activity were observed by the GPR survey.

One ERI anomaly that may be associated with sinkhole activity was observed. The ERI anomaly was characterized by the localized occurrence of relatively more resistive soil materials at depth. These relatively more resistive sediments occurred at an estimated depth range of 50 to 60 feet.

Recommendations

Based on the results of the geophysical testing and documented occurrences of sinkholes in the area, we recommend soil borings be performed at the identified ERI anomaly to further assess the risk of sinkhole development in this area. To evaluate the sinkhole potential, soil borings should be extended to competent limestone. The limestone formation is expected to be 50 to 60 feet below the existing ground surface, therefore a maximum boring depth of about 70 feet is anticipated.

In addition to evaluating the identified anomalous area, we recommend relatively closely spaced soil borings (500 feet) be performed along the proposed pipeline alignment in this area to provide critical information for developing remedial recommendations for support of the proposed pipeline, as necessary. These additional borings should be extended to a minimum depth of 5 feet below the proposed pipe elevation. It may be of further benefit to extend some of the borings to competent bearing materials, should the soil conditions warrant ground improvement or alternative foundation recommendations for support of the proposed pipeline.

Typically, wet rotary drilling methods with Standard Penetration Tests (SPT) performed at regular intervals are used to identify sinkhole or solution activity. Loss of fluid circulation during drilling, decreasing soil resistance with depth or very loose or very soft zones encountered during the drilling process are all indications of potential sinkhole activity. Evaluating the results of nearby soil borings within unaffected areas can also provide a means to assess differences in limestone depth as well as soil strength and consistency.

We appreciate the opportunity to be of service on this project and we trust that the foregoing and accompanying attachments are of assistance to you at this time. In the event that you have any questions or if you require additional information, please call.

Respectfully submitted,
PROFESSIONAL SERVICE INDUSTRIES, INC.
Certificate of Authorization No. 3684

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Chief Geotechnical Engineer
Florida License No. 32614

Attachments: Report of Geophysical Testing – GeoView

FINAL REPORT
GEOPHYSICAL INVESTIGATION
SABAL TRAIL PROJECT – KARST SITES MP159.8 TO 161.3
DOUGHERTY COUNTY, GA

Prepared for Professional Service Industries, Inc.
Orlando, FL

Prepared by GeoView, Inc.
St. Petersburg, FL

September 24, 2014

Mr. Ian Kinnear, P.E.
Professional Service Industries, Inc.
1748 33rd Street
Orlando, FL 32839

**Subject: Transmittal of Final Report for Geophysical Investigation
Sabal Trail Project – Karst Sites MP159.8 to 161.3
Dougherty County, GA
GeoView Project Number 21154.13**

Dear Mr. Kinnear,

GeoView, Inc. (GeoView) is pleased to submit the final report that summarizes and presents the results of the geophysical investigation conducted at the Sabal Trail Project – Karst Sites MP159.8 to 161.3. Ground penetrating radar and electrical resistivity were used to evaluate near-surface geological conditions. GeoView appreciates the opportunity to have assisted you on this project. If you have any questions or comments about the report, please contact us.

GEOVIEW, INC.

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1.0 Introduction

A geophysical investigation was conducted at the Sabal Trail Project – Karst Sites MP159.8 to 161.3 located in Dougherty County, Georgia. The site consisted of a series of three transects, each 550 feet (ft). The transects were centered about possible karst features that were identified by others. The investigation was performed on September 17, 2014.

The objective of the geophysical investigation was to help characterize near-surface geological conditions in the survey area and to identify subsurface features that may be associated with sinkhole activity. The location of the geophysical survey area is provided on Figures 1 through 4. A discussion of the field methods used to generate the report figure is provided in Appendix A2.1.

2.0 Description of Geophysical Investigation

2.1 Ground Penetrating Radar Survey

A GPR survey was conducted along the three ERI transects. The locations of the GPR lines are shown on Figures 1 through 4. The GPR data was collected with a Mala radar system. The GPR settings used for the survey are presented in Table 1.

Table 1
GPR Equipment Settings Used for GPR Surveys

Antenna Frequency	Time Range (nano-seconds)	Estimated Depth of GPR Signal Penetration
250 MHz [1/]	120	8 to 17 ft bls

1/ MHz means mega-Hertz and is the mid-range operating frequency of the GPR antenna.

A description of the GPR technique and the methods employed for geological characterization studies is provided in Appendix A2.2.

2.2 Electrical Resistivity Imaging Survey

The ERI survey was conducted using the Advanced Geosciences, Inc. Sting R8 automatic electrode resistivity system. A total of three ERI transects were performed using 56 electrodes on each line with an “a spacing” of 10 ft. A dipole-dipole combined with an inverse Schlumberger electrode configuration was used with a maximum “n value” of six. The ERI data was analyzed using EarthImager 2D, a computer inversion program, which provides two-dimensional vertical cross-sectional resistivity model (pseudo-section) of the subsurface. A description of the ERI method and the methods employed for geotechnical characterization studies is provided in Appendix A2.2. A discussion of the modeling process used to create the ERI results is provided in Appendix A2.2.1.

3.0 Identification of Possible Sinkhole Features Using GPR and ERI Methods

3.1 Identification of Possible Sinkhole Features Using GPR

The features observed on GPR data that are most commonly associated with sinkhole activity are:

- A downwarping of GPR reflector sets, that are associated with suspected lithological contacts, towards a common center. Such features typically have a bowl or funnel shaped configuration and can be associated with a deflection of overlying sediment horizons caused by the migration of sediments into voids in the underlying limestone. If the GPR reflector sets are sharply downwarping and intersect, they can create "bow-tie" shaped GPR reflection feature, which often designates the apparent center of the GPR anomaly.
- A localized significant increase in the depth of the penetration and/or amplitude of the GPR signal response. The increase in GPR signal penetration depth or amplitude is often associated with either a localized increase in sand content at depth or decrease in soil density.
- An apparent discontinuity in GPR reflector sets, that are associated with suspected lithological contacts. The apparent discontinuities and/or disruption of the GPR reflector sets may be associated with the downward migration sediments.

The greater the severity of these features or a combination of these features the greater the likelihood that the identified feature is a sinkhole. It is not possible based on the GPR data alone to determine if an identified feature is a sinkhole or, more important, whether that feature is an active sinkhole.

3.2 Identification of Possible Sinkhole Features Using ERI

Sinkhole features are typically characterized by one of the following conditions on the ERI profile:

1. The occurrence of highly resistive material that extends to depth in a columnar fashion towards the top of the limestone. Such a feature may indicate the presence of a sand-filled depression or raveling zone.
2. The localized presence of low-resistivity material extending below the interpreted depth to the top of limestone. Such a feature may indicate

the presence of a clay-filled void or fracture with the limestone or the presence of highly weathered limestone rock.

3. Any significant localized increase in the depth to limestone. Such a feature may indicate the presence of an in-filled depression (paleo-sink).

When comparing the results of the ERI method, the following considerations should be given. The ERI method, for example, describes the transition from clay to limestone as a transition, rather than a discrete depth. This transition is due to several factors including: a) The vertical density of the resistivity data decreasing with depth and b) The possibility that the upper portion of the limestone is weathered which would create a physical transition zone in terms of resistivity between the clay and competent (non-weathered) limestone and c) The limitations in the modeling process.

4.0 Survey Results

4.1 Discussion of GPR Survey Results

Results of the GPR survey indicated the presence of a relatively continuous sets of GPR reflector at a depth range of 2 to 4 ft bls. This reflector set is most likely associated with some change in lithological conditions at that depth range.

No observed areas of significant downwarping or other indicators of possible sinkhole activity were observed by the GPR data along the three transects. However, it is noted that the maximum signal penetration did increase from approximately 8 ft bls on the west transect (Transect 1) to approximately 17 ft bls on the east transect (Transect 3). This suggests that the near surface soils likely increase in sand content from west to east as soils with a high ion concentration (e.g. clay) will attenuate or absorb the radar signal.

A discussion of the limitations of the GPR technique in geological characterization studies is provided in Appendix 2.

4.2 Discussion of ERI Survey Results

Results from the three ERI surveys are presented in Appendix 1. The ERI transects are of acceptable quality (a discussion of the criteria used to determine the quality of an ERI inversion model is provided in Appendix A2.3.1).

Analysis of the ERI Transects indicate the presence of high resistivity near-surface soil materials across the majority of the project site to a depth range of 15 ft bls on ERI Transect 1 to approximately 60 ft bls on ERI Transect 3 (represented in yellow to red on the ERI transects). This high resistivity layer likely corresponds to sandy soil materials. The surficial high resistivity layer is underlain by a moderate to low resistivity layer (represented in green to blue) to the maximum depth of investigation of the ERI transects which ranged from approximately 76 to 131 ft bls. The decrease in the apparent resistivity values with respect to depth are most likely associated with an increase in the clay content of the soil materials.

Discussion of ERI Anomalies

One ERI anomaly that may be associated with sinkhole activity was observed on ERI Transect 3. The ERI anomaly was characterized by the localized occurrence of relatively more resistive soil materials at depth. These relatively more resistive sediments occurred at an estimated depth range of 50 to 60 ft bls.

4.3 Correlation of GPR and ERI Survey Results

The GPR and ERI methods are in agreement that the near-surface sandy soils likely increase in thickness to the east. The ERI was able to map this high resistivity layer from approximately 15 ft thick in the west to approximately 60 ft thick in the east.

The ERI method identified one suspect anomaly area. This anomaly is characterized by a localized increase in the resistivity of sediments at a depth range of 50 to 60 ft bls on ERI Transect 3. This anomaly area is below the depth range of the GPR survey. The GPR method did, however, provide information to a depth of approximately 17 ft bls in the area of the ERI anomaly. The lack of any observed downwarping or other type of disturbance to the sediments overlying the ERI anomaly could indicate that the ERI anomaly is likely associated with naturally-occurring lateral variations in resistivity not related to sinkhole activity.

APPENDIX 1
FIGURE AND ERI TRANSECTS

N

0 400'

SCALE: 1"=400' APPROXIMATE

EXPLANATION

S3 E3 PATH GEOPHYSICAL TRANSECT LINES WITH START AND END POINTS

LOCATION OF ERI ANOMALY

STAKE ⊕ LOCATION STAKED BY OTHERS

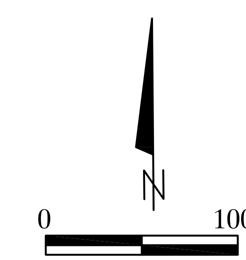
GeoView

FIGURE 1
SITE MAP
SHOWING
LOCATION OF
GEOPHYSICAL
INVESTIGATION

SABAL TRAIL PROJECT
KARST SITES MP 159.8 TO MP 161.3
DOUGHERTY COUNTY, GEORGIA

PROFESSIONAL SERVICE
INDUSTRIES, INC.
ORLANDO, FLORIDA

PROJECT:
21154.13
DATE:
09/24/14



SCALE: 1"=100' APPROXIMATE

EXPLANATION

S3 E3 PATH GEOPHYSICAL TRANSECT LINES WITH START AND END POINTS

LOCATION OF ERI ANOMALY

STAKE LOCATION STAKED BY OTHERS

GeoView

FIGURE 2

SITE MAP
SHOWING RESULTS
OF LINE 1

SABAL TRAIL PROJECT
KARST SITES MP 159.8 TO MP 161.3
DOUGHERTY COUNTY, GEORGIA

PROFESSIONAL SERVICE
INDUSTRIES, INC.
ORLANDO, FLORIDA

PROJECT: 21154.13
DATE: 09/23/14

EXPLANATION

S3 E3 PATH GEOPHYSICAL TRANSECT LINES WITH START AND END POINTS

LOCATION OF ERI ANOMALY

STAKE LOCATION STAKED BY OTHERS

GeoView

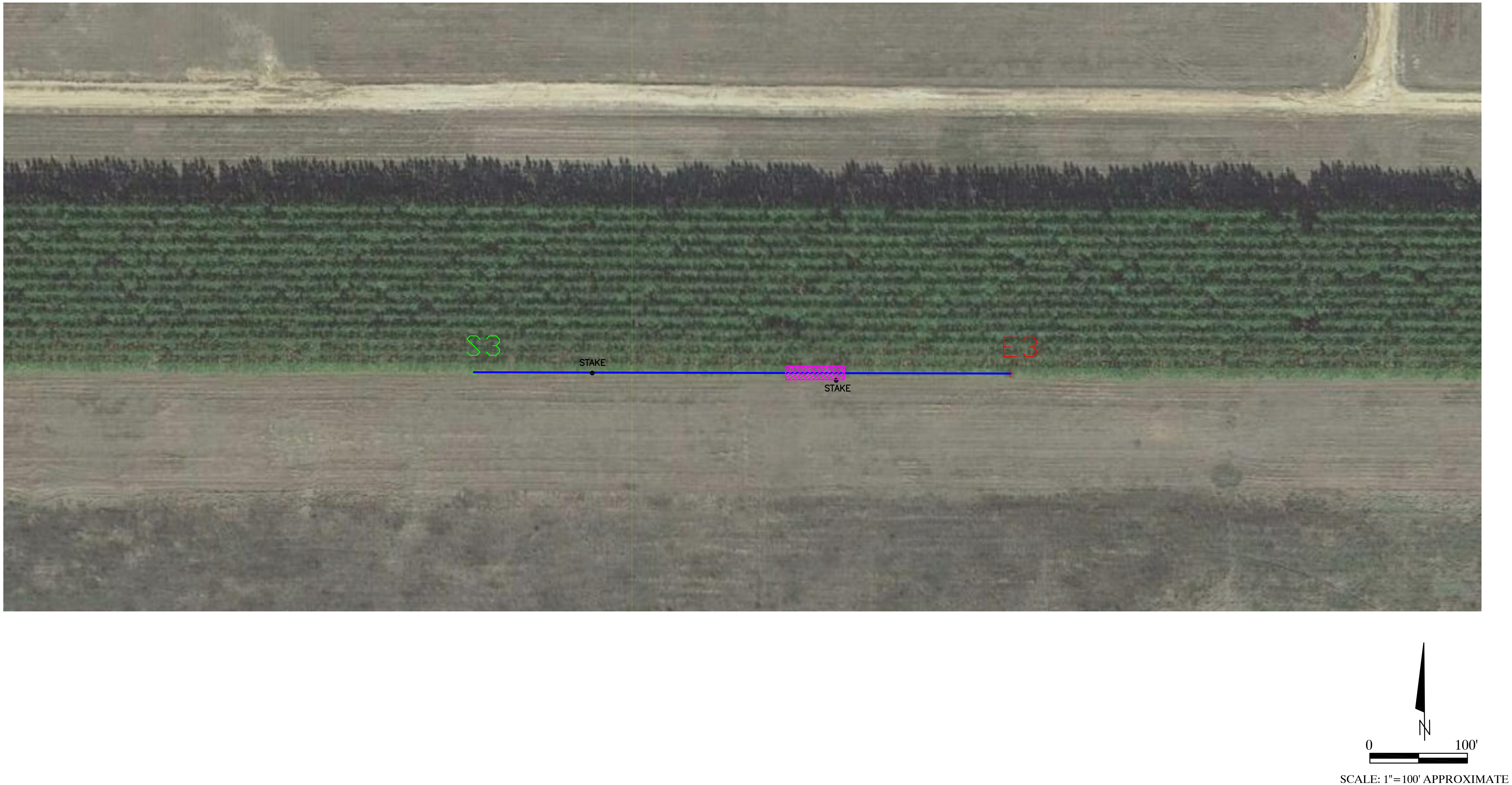
FIGURE 3

SITE MAP
SHOWING RESULTS
OF LINE 2

SABAL TRAIL PROJECT
KARST SITES MP 159.8 TO MP 161.3
DOUGHERTY COUNTY, GEORGIA

PROFESSIONAL SERVICE
INDUSTRIES, INC.
ORLANDO, FLORIDA

PROJECT:
21154.13
DATE:
09/23/14



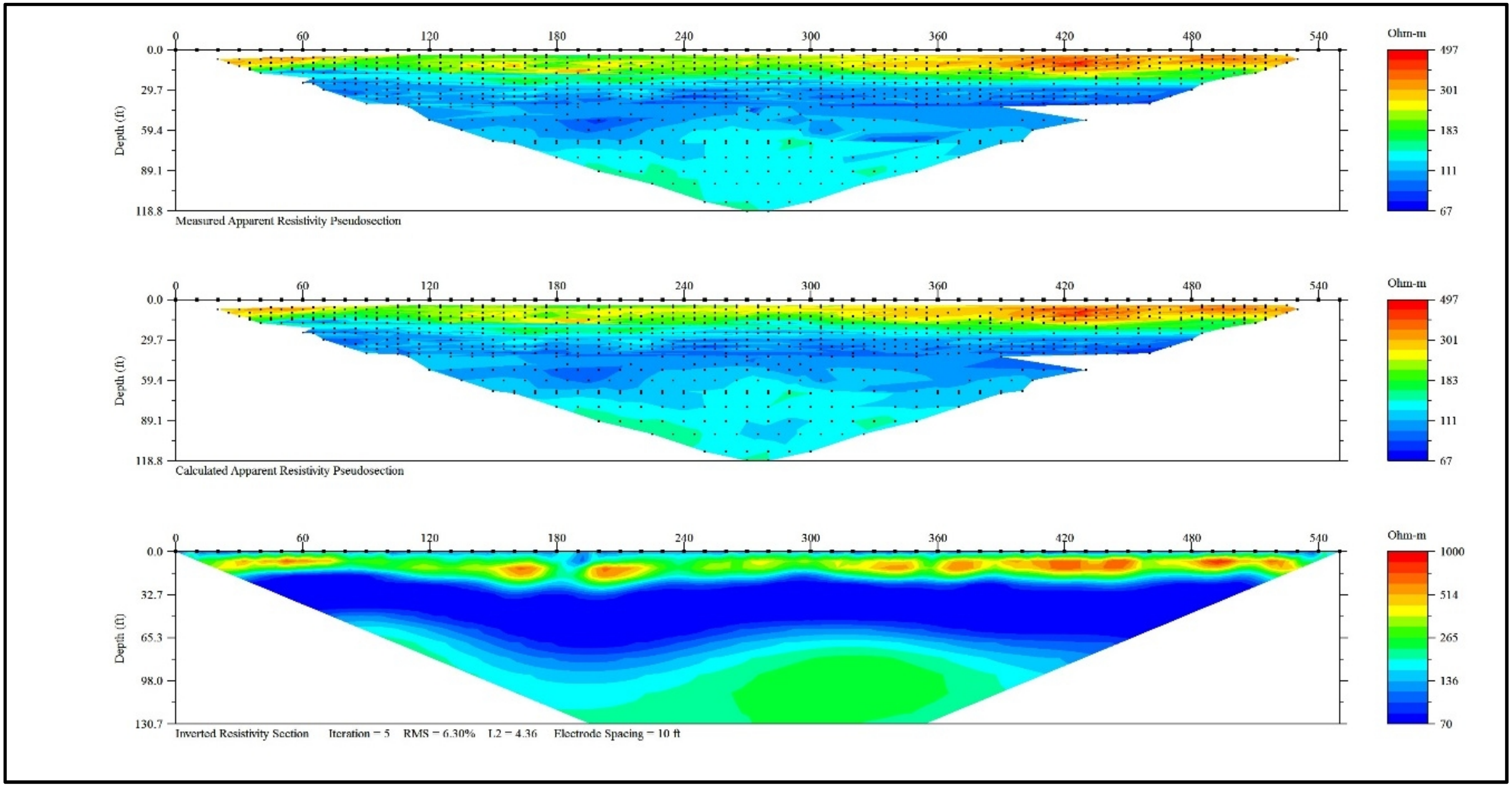
EXPLANATION

S3 E3 PATH GEOPHYSICAL TRANSECT LINES WITH START AND END POINTS

LOCATION OF ERI ANOMALY

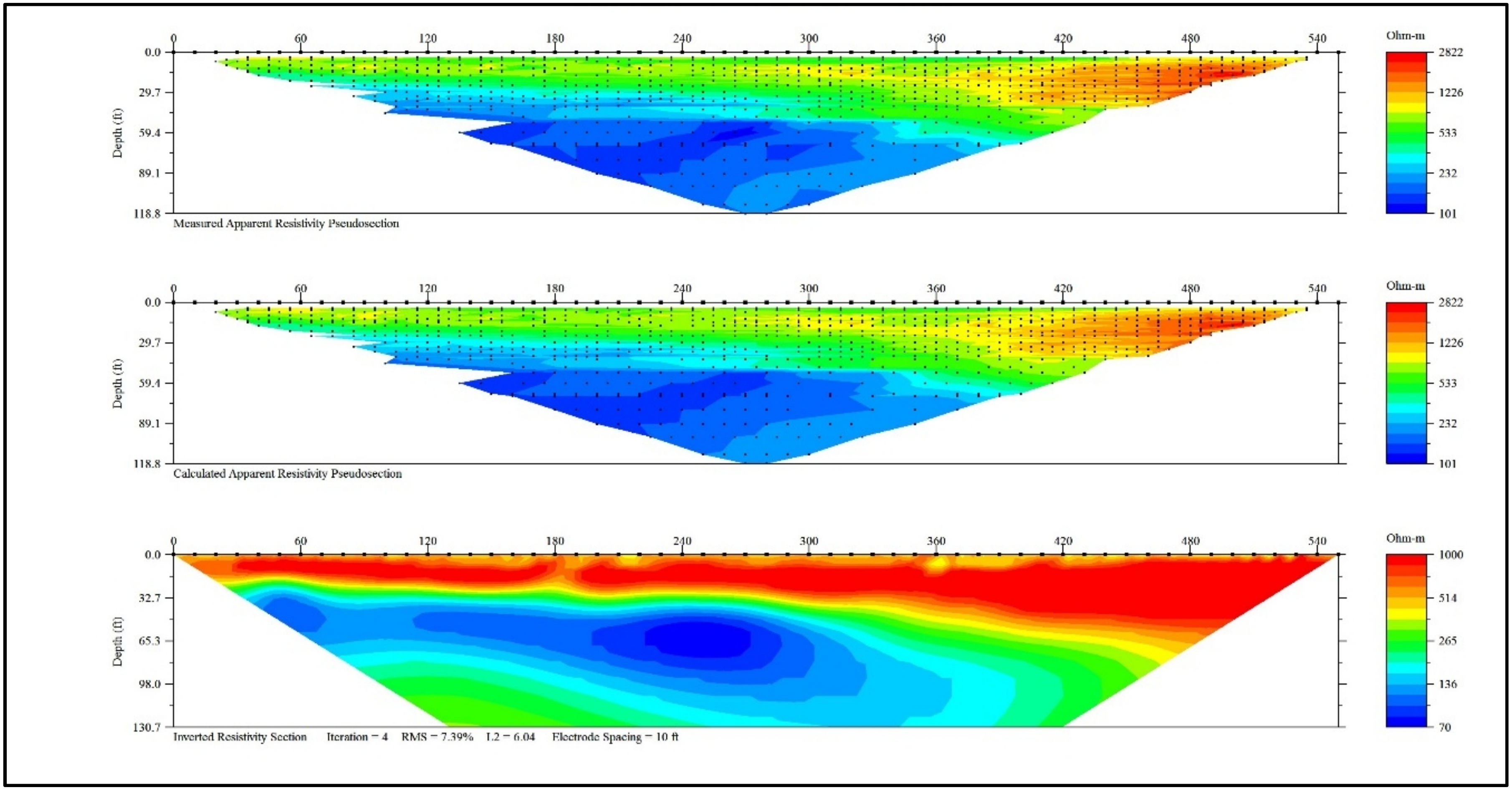
STAKE LOCATION STAKED BY OTHERS

GeoView	FIGURE 4 SITE MAP SHOWING RESULTS OF LINE 3	SABAL TRAIL PROJECT KARST SITES MP 159.8 TO MP 161.3 DOUGHERTY COUNTY, GEORGIA PROFESSIONAL SERVICE INDUSTRIES, INC. ORLANDO, FLORIDA PROJECT: 21154.13 DATE: 09/23/14

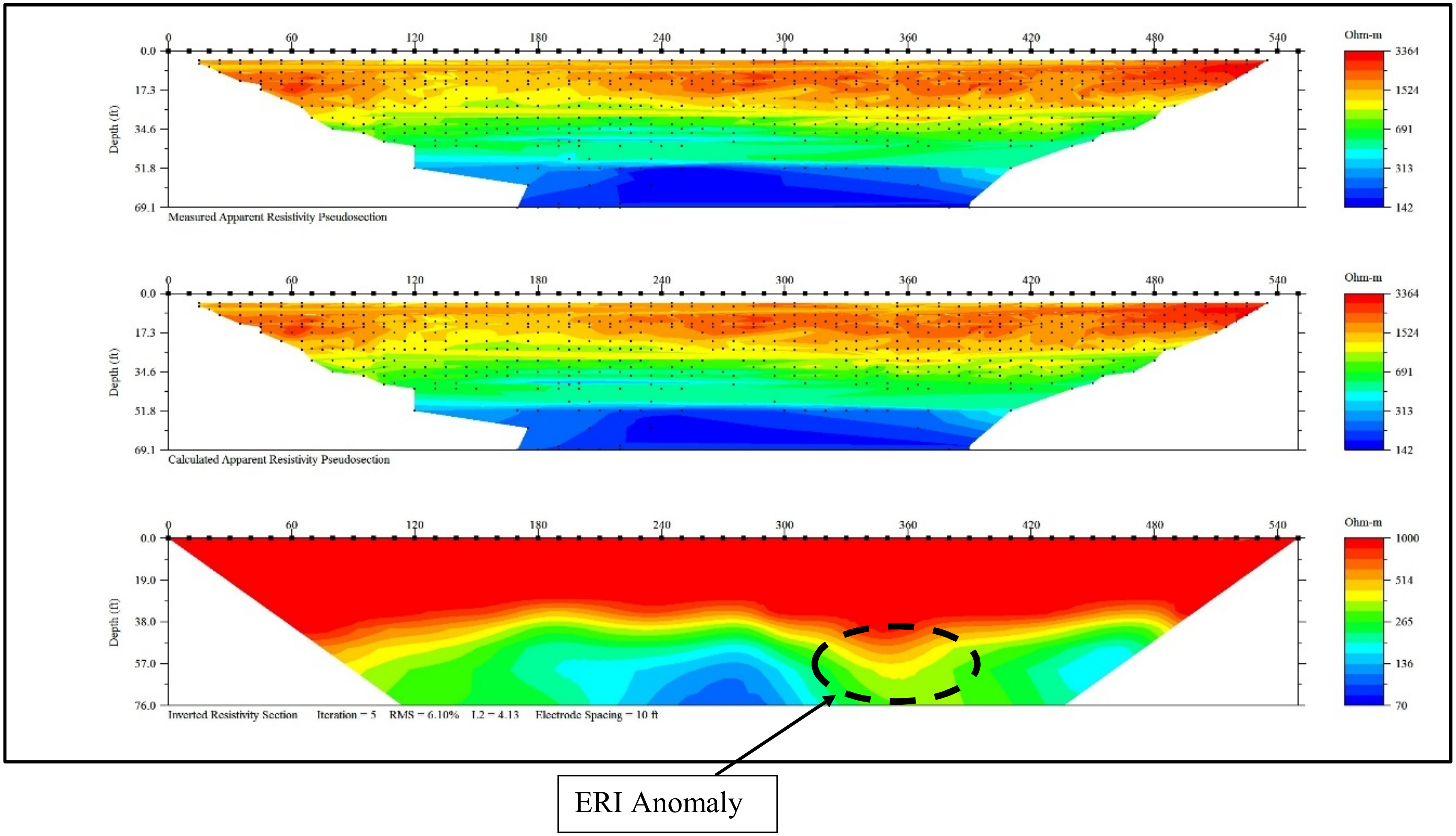


Depth (ft)
Ohm-m
Measured Apparent Resistivity Pseudosection
Calculated Apparent Resistivity Pseudosection
Inverted Resistivity Section Iteration = 5 RMS = 6.30% L2 = 4.36 Electrode Spacing = 10 ft

ERI Line 1


Measured Apparent Resistivity Pseudosection
Calculated Apparent Resistivity Pseudosection
Inverted Resistivity Section Iteration = 4 RMS = 7.39% L2 = 6.04 Electrode Spacing = 10 ft
Depth (ft)
Ohm-m
0 60 120 180 240 300 360 420 480 540
0.0 29.7 59.4 89.1 118.8
0.0 32.7 65.3 98.0 130.7
2822 1226 533 232 101
1000 514 265 136 70

ERI Line 2



0 60 120 180 240 300 360 420 480 540
0.0 17.3 34.6 51.8 69.1
Depth (ft)
Ohm-m
3364 1524 691 313 142
Measured Apparent Resistivity Pseudosection
0 60 120 180 240 300 360 420 480 540
0.0 17.3 34.6 51.8 69.1
Depth (ft)
Ohm-m
3364 1524 691 313 142
Calculated Apparent Resistivity Pseudosection
0 60 120 180 240 300 360 420 480 540
0.0 19.0 38.0 57.0 76.0
Depth (ft)
Ohm-m
1000 514 265 136 70
Inverted Resistivity Section Iteration = 5 RMS = 6.10% L2 = 4.13 Electrode Spacing = 10 ft
ERI Anomaly

ERI Line 3

APPENDIX 2
DESCRIPTION OF GEOPHYSICAL METHODS, SURVEY METHODOLOGIES AND LIMITATIONS

A2.1 On Site Measurements

The positions of the geophysical transect lines were recorded using a Trimble GeoXH Global Positioning System (GPS). These GPS systems typically have an accuracy of 1 to 3 ft.

A2.2 Ground Penetrating Radar

Ground Penetrating Radar (GPR) consists of a set of integrated electronic components that transmits high frequency (200 to 1500 megahertz [MHz]) electromagnetic waves into the ground and records the energy reflected back to the ground surface. The GPR system consists of an antenna, which serves as both a transmitter and receiver, and a profiling recorder that both processes the incoming signal and provides a graphic display of the data. The GPR data can be reviewed as both printed hard copy output or recorded on the profiling recorder's hard drive for later review. GeoView uses a Mala GPR system.

A GPR survey provides a graphic cross-sectional view of subsurface conditions. This cross-sectional view is created from the reflections of repetitive short-duration electromagnetic (EM) waves that are generated as the antenna is pulled across the ground surface. The reflections occur at the subsurface contacts between materials with differing electrical properties. The electrical property contrast that causes the reflections is the dielectric permittivity that is directly related to conductivity of a material. The GPR method is commonly used to identify such targets as underground utilities, underground storage tanks or drums, buried debris, voids or geological features.

The greater the electrical contrast between the surrounding earth materials and target of interest, the greater the amplitude of the reflected return signal. Unless the buried object is metal, only part of the signal energy will be reflected back to the antenna with the remaining portion of the signal continuing to propagate downward to be reflected by deeper features. If there is little or no electrical contrast between the target interest and surrounding earth materials it will be very difficult if not impossible to identify the object using GPR.

The depth of penetration of the GPR signal is very site specific and is controlled by two primary factors: subsurface soil conditions and selected antenna frequency. The GPR signal is attenuated (absorbed) as is passes through earth materials. As the energy of the GPR signal is diminished due to attenuation, the energy of the reflected waves is reduced, eventually to the level that the reflections can no longer be detected. As the conductivity of the earth materials increases, the attenuation of the GPR signal increases thereby reducing the signal penetration depth. In Florida, the typical soil conditions that severely limit GPR signal penetration are near-surface clays and/or organic materials.

The depth of penetration of the GPR signal is also reduced as the antenna frequency is increased. However, as antenna frequency is increased the resolution of the GPR data is improved. Therefore, when designing a GPR survey a tradeoff is made between the required depth of penetration and desired resolution of the data. As a rule, the highest frequency antenna that will still provide the desired maximum depth of penetration should be used. A low-frequency (250 MHz) antenna is used which allows for maximum signal penetration and thereby maximum depth from which information will be obtained.

A GPR survey is conducted along survey lines (transects) that are measured paths along which the GPR antenna is moved. An integrated survey wheel electronically records the distance of the GPR system along the transect lines.

For geological characterization surveys, the GPR survey is conducted along a set of perpendicularly orientated transects. The survey is conducted in two directions because subsurface features such as sinkholes are often asymmetric. Spacing between the transects typically ranges from 10 to 50 ft. Closely spaced grids are used when the objective of the GPR survey is to identify all sinkhole features within a project site. Coarser grids are used when the objective is to provide a general overview of site conditions. After completion of a survey using a given grid spacing, additional more-closely spaced GPR transects are often performed to better characterize sinkhole features identified by the initial survey. This information can be used to provide recommended locations for geotechnical borings.

Depth estimates to the top of lithological contacts or sinkhole features are determined by dividing the time of travel of the GPR signal from the ground surface to the top of the feature by the velocity of the GPR signal. The velocity of the GPR signal is usually obtained from published tables of velocities for the type and condition (saturated vs. unsaturated) of soils underlying the site. The accuracy of GPR-derived depths typically ranges from 20 to 40 percent of the total depth.

Interpretation and Limitations of GPR data

The analysis and collection of GPR data is both a technical and interpretative skill. The technical aspects of the work are learned from both training and experience. Having the opportunity to compare GPR data collected in numerous settings to the results from geotechnical studies performed at the same locations develops interpretative skills for geological characterization studies.

The ability of GPR to collect interpretable information at a project site is limited by the attenuation (absorption) of the GPR signal by underlying soils. Once the GPR signal has been attenuated at a particular depth, information regarding deeper geological conditions will not be obtained. In addition, GPR data can only resolve subsurface features that have a sufficient electrical contrast between the feature in question and surrounding earth materials. If an insufficient contrast is present, the subsurface feature will not be identified. GeoView can make no warranties or representations of geological conditions that may be present beyond the depth of investigation or resolving capability of the GPR equipment or in areas that were not accessible to the geophysical investigation.

A2.3 Electrical Resistivity

Electrical resistivity surveying is a geophysical method in which an electrical current is injected into the earth; the subsequent response (potential) is measured at the ground surface to determine the resistance of the underlying earth materials. The resistivity survey is conducted by applying electrical current into the earth from two implanted electrodes (current electrodes C_1 and C_2) and measuring the associated potential between a second set of implanted electrodes (potential electrodes P_1 and P_2). Field readings are in volts. Field readings are then converted to resistivity values using Ohm's Law and a geometric correction factor for the spacing and configuration of the electrodes. The calculated resistivity values are known as "apparent" resistivity values. The values are referred to as "apparent" because the calculations for the values assume that the volume of earth material being measured is electrically homogeneous. Such field conditions are rarely present.

Resistivity of earth materials is controlled by several properties including composition, water content, pore fluid resistivity and effective permeability. For this study the properties that had the primary control on measured resistivity values are composition and effective permeability. The general geological setting of this project area is clay overlain by limestone.

For this study a dipole-dipole combined with an inverse Schlumberger resistivity array configuration was used. The dipole-dipole array is different that most other resistivity arrays in that the electrode and current electrodes are kept together using a constant spacing value referred to as an "a spacing". The current and potential electrode sets are moved away from each other using multiples of the "a spacing" value. The number of multiples is referred to as the "n value". For example, an array with an "a spacing" of 5 ft and a "n value" of 6 would have the current and potential electrode sets spaced 30 ft apart with a separation between the two electrodes in the set of 5 ft. By sampling at varying "n values", greater depth measurements can be achieved. Inverse Schlumberger data is collected with the current set of electrodes being kept with a fixed separation (L spacing) and the potential electrodes a minimum distance of 5L from the inner current electrodes. Dipole-dipole resistivity data is usually presented in a two-dimensional pseudo-section format. Inverse Schlumberger data is usually presented as a vertical profile of resistivity distribution below the center point between the two current electrodes. The dipole-dipole and inverse Schlumberger data is combined and presented as either a contour of the individual data points (using the calculated apparent resistivity values) or as a geological model using least squares analysis. Such least squares analysis was used for this study using the computer software program (EarthImager 2D) developed for the equipment manufacturer. Apparent resistivity values are calculated using the following formula for a dipole-dipole configuration: $\gamma_a=\pi(b^3/a^2-b)\nabla V/I$:

Where:

$\gamma_a=$	apparent resistivity
$\pi=$	3.14
a=	"a spacing"
b=	"a spacing" x "n value"
$\nabla V=$	voltage between the two potential electrodes
I=	current (in amps)

For a Schlumberger configuration the apparent resistivity is calculated using: $\gamma_a=\pi([s^2-a^2]/4)\nabla V/aI$:

Where:

$\gamma_a=$	apparent resistivity
$\pi=$	3.14
a=	spacing between the inner set of electrodes"
s=	distance between the outer electrode and nearest inner electrode
$\nabla V=$	voltage between the two potential electrodes
I=	current (in amps)

A2.3.1 Inversion Modeling of ERI Data

The objective for inversion modeling of resistivity data is to create a description of the actual distribution of earth material resistivity based on the subsurface geology that closely matches the resistivity values that are measured by the instrumentation. This modeling is done through the use of EarthImager^{TM}, a proprietary computer program developed by the equipment manufacturer. When evaluating the validity of the inversion model several factors need to be considered. The RMS, or root mean square error, expresses the quality of fit between the actual and modeled resistivity values for the given set of points in the model. The lower the RMS error the higher the quality of fit between the actual and modeled data sets. In general, inversion models with an RMS error of less than 5 to 10 percent are acceptable. The size of the RMS error is dependent upon the number of bad data points within a data set and the magnitude of how bad the data points are. As part of the modeling process bad data points are typically removed, which decreases the RMS error and improves (with limitations) the quality of the model. The quality of fit between the actual and modeled resistivity values is also expressed as the L-2 norm. When the modeled and actual data sets have converged, the L-2 norm reduces to unity (1.0 or smaller).

However, as the number of data points is reduced, the validity of the inversion model is diminished. Accordingly, when interpreting a particular area of an inversion model the number of data points used to create that portion of the model must be taken into consideration. If very few points are within a particular area of the model, then the modeled solution in that area should be considered suspect and possibly rejected.

The entire ERI transect should be considered suspect if a model has a high RMS error and a large number of removed data points. It is likely that sources of interference have affected the field readings and rendered the modeled solution invalid. Such sources of interference can include buried metallic underground utilities, reinforced concrete slabs, septic leach fields or electrical grounding systems. Accordingly, all efforts need to be made in the field to locate, to the degree possible, the ERI transect lines away from such features. The locations of such features also need to be mapped in the field so their potential effects can be considered when interpreting the modeled results.