

**FINAL REPORT
GEOPHYSICAL INVESTIGATION
SW 1ST STREET SITE
LAKE BUTLER, FLORIDA**

Prepared for PPM Consultants, Inc.
Altamonte Springs, FL

Prepared by GeoView, Inc.
St. Petersburg, FL



December 10, 2024

Ms. Jenny Black
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**Subject: Transmittal of Final Report for Geophysical Investigation
SW 1st Street Site
Lake Butler, Florida
GeoView Project Number 42034**

Ms. Black,

GeoView Associates, Inc. (GeoView) is pleased to submit the final report that summarizes and presents the results of the geophysical investigation performed at the above referenced site. Geophysical testing methods were used to help determine the presence of utilities and underground storage tanks that may be present within the project site. GeoView appreciates the opportunity to have assisted you on this project. If you have any questions or comments about the report, please contact us.

Sincerely,

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1.0 Introduction

A geophysical investigation was conducted at the SW 1st Street Site located southwest of SW 1st Street and SW 1st Avenue in Lake Butler, Florida. Of concern was the possible presence of underground utilities and underground storage tanks (USTs) that may be present within the study area. The geophysical investigation was conducted using ground penetrating radar (GPR) and electronic utility locators. The investigation was performed on September 17, 2024.

2.0 Site Description

The site was approximately 0.2 in size (Figure 1). Ground cover across the site consisted primarily of grass and concrete. A concrete pad was located at the site.

3.0 Description of Geophysical Investigation

The survey grids for the geophysical investigation were established along transect lines spaced 10 feet (ft) apart.

3.1 Ground Penetrating Radar Survey

The GPR survey was conducted along perpendicular transects spaced 10 ft apart. The GPR data was collected using a GSSI radar system with a 350-megahertz antenna. The locations of the GPR lines are shown in red on Figure 1. A time range setting of 66 nanoseconds was used. This time range setting provided information to an estimated depth of 6 to 8 ft below land surface (bls). A description of the GPR technique and the methods employed for shallow buried objects studies is provided in Appendix A2.

3.2 Conventional and Cable Locators

The electronic utility locate (EUL) survey was conducted using Radiodetection RD8200, Maghorn and Pipehorn locators. The survey was used to identify any underground utilities that were either carrying electrical power or could be energized by an induced electrical current. The GPR was used to help identify both electrical and non-electrical underground utilities within the survey area.

A combination of two geophysical methods was used for the site investigation. The two selected methods are complementary, in that, the EUL can accurately and rapidly detect many types of underground utilities. GPR, which is slower, can then be used to confirm the results of the EUL survey and to identify other underground utilities that are non-detectable by the EUL. It is typically possible to evaluate the burial depth of the underground utilities using both methods. A description of the geophysical methods is provided as Appendix 2.

4.0 Survey Results

The results of the geophysical investigation are presented in Figure 1. The geophysical survey did not identify any suspected USTs or other large areas of debris. The geophysical survey identified multiple underground utilities within the survey area. These included water, communication and environmental lines. The utilities were marked in the field with marking paint and are shown on Figure 1.






An example of the GPR data collected at the site is provided in Appendix 1. A discussion of the limitations of the geophysical methods used in this investigation is provided in Appendix 2.

APPENDIX 1
FIGURE AND EXAMPLE OF GPR DATA
COLLECTED AT THE PROJECT SITE



FDOT AERIAL 2021

EXPLANATION

-  SUSPECTED UNDERGROUND WATER LINE
-  SUSPECTED UNDERGROUND COMMUNICATION LINE
-  SUSPECTED UNDERGROUND REMEDIATION SYSTEM
-  COULD NOT LOCATE FURTHER
-  GPR TRANSECT

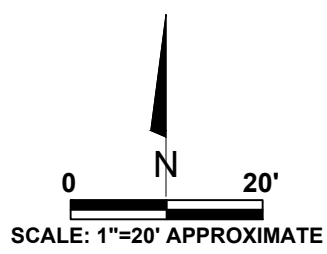
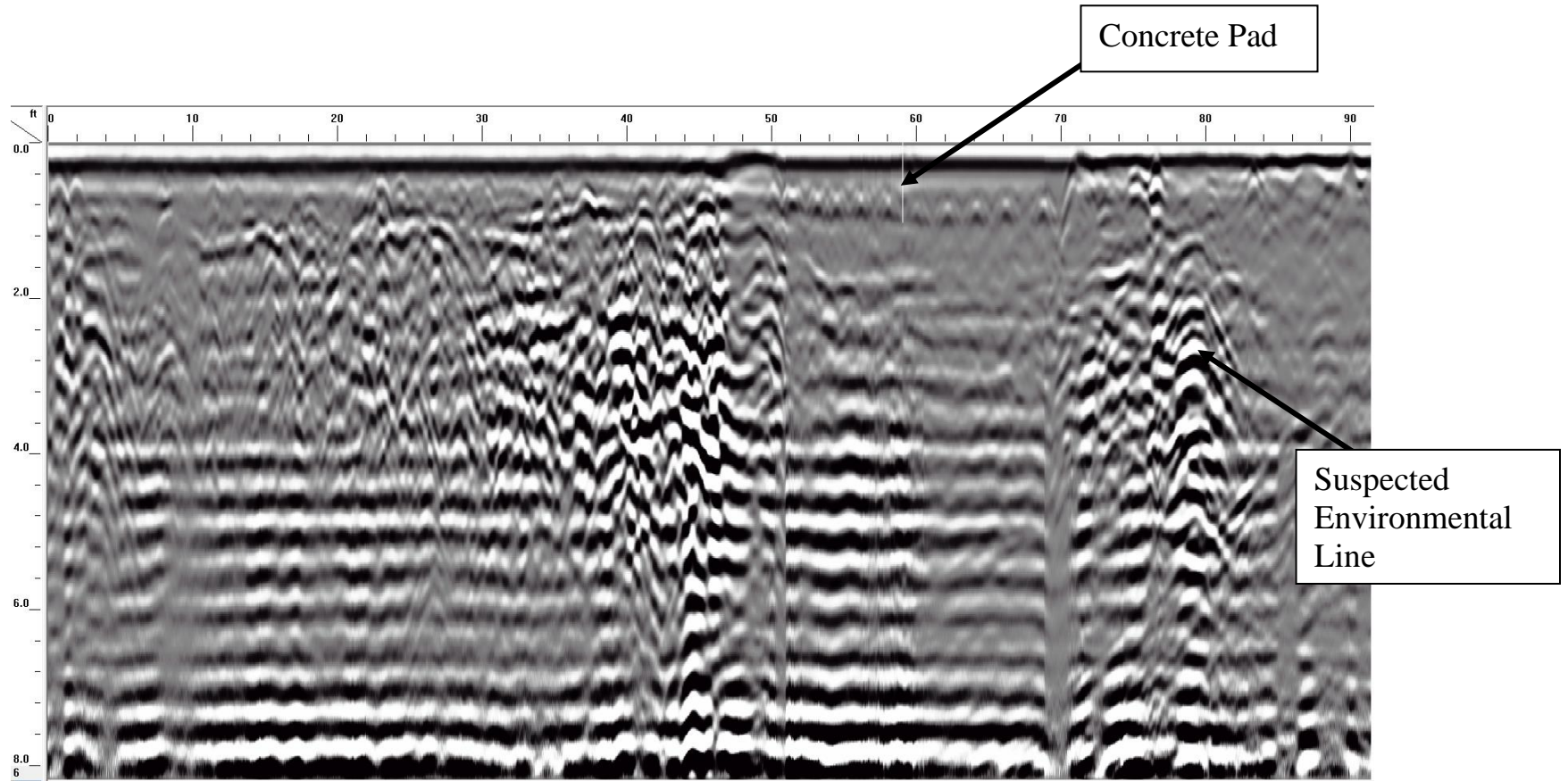


FIGURE 1
SITE MAP
 SHOWING RESULTS
 OF GEOPHYSICAL
 INVESTIGATION

SW 1ST STREET SITE LAKE BUTLER, FLORIDA	
PPM CONSULTANTS, INC. ALTAMONTE SPRINGS, FLORIDA	PROJECT: XXXXX DATE: 09/01/23



GPR TRANSECT COLLECTED EAST TO WEST
ACROSS SITE

APPENDIX 2

DESCRIPTION OF GEOPHYSICAL METHODS, SURVEY METHODOLOGIES AND LIMITATIONS

A2.1 On Site Measurements

The measurements that were collected and used to create the site map were made using a fiberglass measuring tape and a Trimble Geo7x GPS. The degree of accuracy of such an approach is typically +/- 1-2 % for lengths and +/- 1-2 degrees for angles.

A2.2 Ground Penetrating Radar

Ground Penetrating Radar (GPR) consists of a set of integrated electronic components which 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 GSSI and Mala GPR systems.

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, rebar or geological features.

The greater the electrical contrast between the surrounding materials (earth or concrete) 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.

A GPR survey is conducted along survey lines (transects), which are measured paths along which the GPR antenna is moved. Electronic marks are placed in the data by the operator at designated points along the GPR transects. These marks allow for a correlation between the GPR data and the position of the GPR antenna on the

ground.

Depth estimates to the top of the debris is determined by dividing the time of travel of the GPR signal from the land surface to the top of the GPR signal reflection associated with the debris by the velocity of the GPR signal. The velocity of the GPR signal is usually obtained from published tables of the GPR signal traveling through unsaturated soils (4 to 6 nano-seconds per foot two-way travel time). The accuracy of GPR-derived depths typically ranges from 20 to 40 percent of the total depth.

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. Interpretative skills for debris studies are developed by having the opportunity to compare GPR data collected in numerous settings to the results from confirmatory studies performed at the same locations.

The ability of GPR to collect interpretable information at a project site is limited by the attenuation (absorption) of the GPR signal within subsurface soil materials. Once the GPR signal has been attenuated at a particular depth, information regarding deeper features will not be obtained. 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.

A2.4 Limitations

GeoView can make no warranties or representations of the 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.