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REPORT

City of Clarkston
c/o Collaborative
Infrastructure Services,
Inc.

Ground Penetrating Radar Survey
40 Oaks Nature Preserve House
3803 Market Street
Clarkston, DeKalb County, Georgia

625 Holcomb Bridge Road, Norcross, GA 30071 • 770-209-0029 • unitedconsulting.com

June 5, 2024

Ms. Tammi Saddler Jones
City of Clarkston
1055 Rowland Street
City Hall Annex
Clarkston, GA 30021

c/o Mr. Larry Kaiser
Collaborative Infrastructure Services, Inc.

Via Email: kaiser@co-infra-services.com

RE: Ground Penetrating Radar Survey
40 Oaks Nature Preserve House Project Site
Clarkston, DeKalb County, Georgia
Project Number: CIOCL-24-GA-05308-02

Dear Mr. Chen:

United Consulting is pleased to submit this report of the Ground Penetrating Radar (GPR) survey at the **40 Oaks Nature Preserve House** Project Site. The Project Site is located 3803 Market Street in Clarkston, DeKalb County, Georgia. This report includes a review of the scope of work and a summary of the subsurface conditions encountered.

It has been a pleasure working with you on this project. If you have any questions, or if we can be of further assistance, please feel free to contact us at your convenience.

Sincerely,

UNITED CONSULTING

Christopher M. Cox, P.G.
Project Geologist

Henry C. Esterly, P.G.
Vice President

CMC/HCE/rg

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PURPOSE AND SCOPE

The purpose of this Ground Penetrating Radar (GPR) survey was to attempt to determine if voids or significantly disturbed soils exist beneath the pavement in front of 948 Boulevard Southeast.

The scope of this investigation included:

1. Mobilization to the site and performing a GPR survey along and across the requested portion of the Project Site,

2. Demobilization from the site and analyzing the stored GPR data to evaluate for the presence of anomalous areas, and;

3. Preparing this summary indicating the GPR testing methods and the subsurface conditions encountered.

GROUND PENETRATING RADAR

United Consulting utilized the Ground Penetrating Radar (GPR) method to evaluate the subsurface conditions present at the Project Site. Geophysical Survey Systems, Inc. (GSSI) Subsurface Interface Radar (SIR), SIR 4000 was used for data collection. Radan© for windows, version 7.1, software was utilized for data analysis. After a site reconnaissance, it was determined that a 350 megahertz (MHz) antenna would be used for the investigation. The 350 MHz antenna was utilized at a scanning rate of 89 nanoseconds (ns) providing a possible testing depth of approximately 15 feet.

The GSSI SIR 4000 unit is a self-contained radar system that uses a color LCD display for instant field interpretation and an internal hard drive for post field analysis. This system transmits electromagnetic energy (signals) which propagates throughout the subsurface at a frequency range of 16 to 2000 MHz. The type of antenna being used at a site controls this frequency. The usage of an antenna is dependent on the type of investigation, the dielectric permittivity (a value known as the dielectric constant) of the subsurface, and the type of constituents within the subsurface material and the depth of the investigation. The higher the frequency of an antenna, the shallower the depth of investigation. This is due to higher frequencies having shorter wavelengths in turn causing rapid attenuation of the radar signal.

Once electromagnetic signals encounter materials of dielectric contrast[1], a portion of the signal is caused to return to the antenna while attenuation and/or reflection of the remaining signal occurs at a greater depth. Therefore, objects of variable depths can be detected in one continuous scan. The signals, which return to the antenna, are then shown as graphic profiles on the color matrix LCD display and stored to the internal hard drive of the unit. This data can then be viewed to determine the prevailing subsurface conditions present at the site. Note that electromagnetic signals cannot penetrate

[1] The dielectric values change with every variation of the subsurface medium (i.e., wet/dry sand, clay, rock, metal, water, etc.).

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through metal or salt water. Therefore, if a target of interest is located beneath one of these mediums it will not be detected. Additionally, encountering soils with high moisture contents and/or groundwater can cause attenuation of the GPR signal resulting in poor penetration.

FIELD EXPLORATION AND DISCUSSION

Prior to our arrival at the Project Site, we were contacted via email by Mr. Larry Kaiser of Collaborative Infrastructure Services, Inc. Mr. Kaiser indicated in his email that he wanted the area around the historic farmhouse scanned with GPR in an attempt to identify septic tanks or other underground storage tanks (USTs) before demolition. United Consulting was tasked to perform a GPR survey to evaluate the subsurface for USTs at the Project Site.

Field work was performed on June 3, 2024. Mr. Kaiser met United Consulting representatives at the Project Site. He indicated the areas in which we were to conduct the survey. These areas were: inside the fence around the existing farmhouse, two small areas outside the fencing to the west and south, around a water tank near the southeast corner of the farmhouse, and around two metal pipes coming out of the ground in the garden east of the farmhouse. Figures 1 through 8 are photographs of the GPR Survey areas. Files were collected both along and across the survey area at 2.5 foot intervals. After completing our analysis of the GPR survey data, we did not identify GPR reflections that were consistent with USTs within the GPR survey area.

LIMITATIONS

This report is for the exclusive use of **City of Clarkston and Collaborative Infrastructure Services, Inc.** (Clients), and the designers of the project described herein, and may only be applied to this specific project. The analysis and recommendations presented in this report are based on the preceding project information, as well as our experiences from similar projects. Ground Penetrating Radar signals cannot penetrate through metal or salt water. If either of these mediums is present at the site, deeper features will not be detected. Additionally, encountered soils containing high moisture contents and groundwater will cause attenuation of the GPR signal resulting in poor signal penetration. In some cases, due to the nature of the GPR reflections, dense fields of utilities/structural steel can distort the radar signal thereby “masking” the reflections of additional utilities/structural steel beneath them. PVC, vitrified clay, concrete and terra cotta products have very similar electrical properties to the surrounding soils. Therefore, PVC, vitrified clay, concrete, and terra cotta products can go undetected.

If subsurface conditions encountered during excavation appear to differ from those discussed in this report, this office should be notified at once so that the effects can be determined, and any remedial measures necessary be prescribed. No other warranty is expressed or implied. Our firm is not responsible for conclusions, opinions, or recommendations of others. The right to rely upon this report and the data within may not be assigned without United Consulting’s written permission.

APPENDIX

Figures

Figure 1: Photograph looking east across the north side of the farmhouse, inside the fence.

Figure 2: Photograph looking south across the west side of the farmhouse, inside the fence.

Figure 3: Photograph looking west across the south side of the farmhouse, inside the fence.

Figure 4: Photograph looking south across the east side of the farmhouse, inside the fence.

Figure 5: Photograph looking south showing the small survey area west of the farmhouse, outside the fence.

Figure 6: Photograph looking east showing the small survey area south of the farmhouse, outside the fence and near the water tank.

Figure 7: Photograph of the survey area near the water tank looking southeast.

Figure 8: Photograph of the survey area near the two metal pipes in the garden east of the farmhouse.