GEOPHYSICAL ENGINEERING SURVEY REPORT

Commercial Property
650 Southern Boulevard,
Bronx, New York 10455

NOVA PROJECT NUMBER:
23-3068

DATED:
March 6, 2023

PREPARED FOR:

HALEY ALDRICH

237 West 35th Street, 16th Floor
New York, NY 10123
www.haleyaldrich.com

PREPARED BY:

NOVA
GEOPHYSICAL
ENGINEERING
Subsurface Mapping Solutions
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March 6, 2023

Suzanne M. Bell, P.E. (AZ, NY)
Senior Project Manager
Haley & Aldrich of New York
237 West 35th Street, 16th Floor
New York, NY 10123
T: (602) 760-2435 C: (480) 261-0004
Email: SBell@HaleyAldrich.com

Re: Geophysical Engineering Survey (GES) Report
Commercial Property
650 Southern Boulevard,
Bronx, New York 10455

Dear Ms. Bell;

Nova Geophysical Services (NOVA) is pleased to provide the findings of the geophysical engineering survey (GES) at the above referenced project site: 650 Southern Boulevard, New York, New York (the "Site")

INTRODUCTION TO GEOPHYSICAL ENGINEERING SURVEY (GES)

NOVA performed a geophysical engineering survey (GES) consisting of a Ground Penetrating Radar (GPR) and Electromagnetic (EM) survey at the site. The purpose of this survey is to locate and identify utilities, underground storage tanks (USTs) and other substructures in the vicinity of proposed boring locations on February 28th, 2023.

The equipment selected for this investigation was a Sensors and Software Noggin 250 MHz ground penetrating radar (GPR) with a shielded antenna and a RadioDetection RD7100 Electromagnetic utility locator.

A GPR system consists of a radar control unit, control cable, and transducer (antenna). The control unit transmits a trigger pulse at a normal repetition rate of 250 MHz. The trigger pulse is sent to the transmitter

electronics in the transducer via the control cable. The transmitter electronics amplify the trigger pulse into bipolar pulses that are radiated to the surface. The transformed pulses vary in shape and frequency according to the transducer used. In the subsurface, variations of the signal occur at boundaries where there is a dielectric contrast (void, steel, soil type, etc.). Signal reflections travel back to the control unit and are represented as color graphic images for interpolation.

A typical electromagnetic (EM) utility locating system consists of a transmitter unit and a receiver unit. The receiver unit can be used independently of the transmitter unit in order to detect utility lines with an inherent EM signature (electric utility lines, water lines, etc.). If needed a current at a specific frequency can also be placed on a utility that is being located. This can be done via the transmitter unit by either direct connection or induction via an EM field varying at specific frequency. The receiver unit is then set to the selected frequency and the electromagnetic field created by the current running through the utility can be located allowing the utility to be marked.

GEOPHYSICAL METHODS

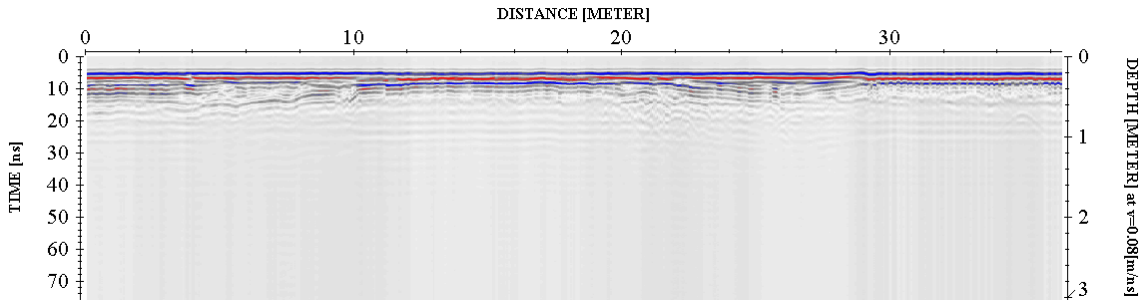
The project site was screened using GPR to search the specified area and inspected for reflections, which could be indicative of substructures and utilities within the subsurface. An EM utility locator was used to help determine the locations of utilities within the survey area.

EM data was collected and interpreted on site and suspected utilities marked as needed. GPR data profiles were collected for the areas of the Site specified by the client and processed as specified below.

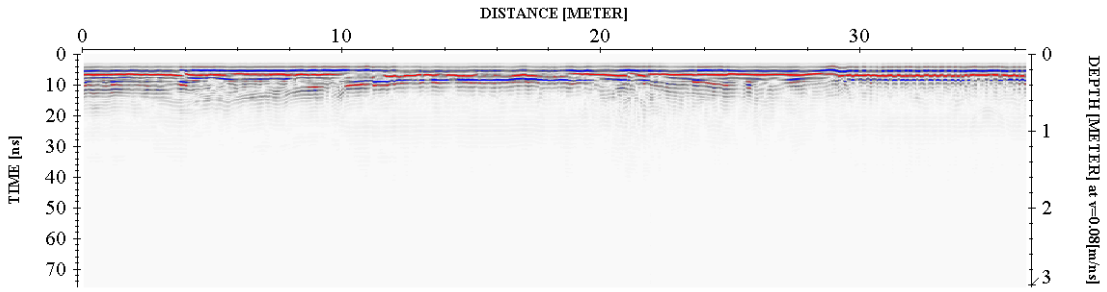
DATA PROCESSING

To improve the quality of the results and to better identify anomalies NOVA processed the collected data. The processing workflow is briefly described in this section.

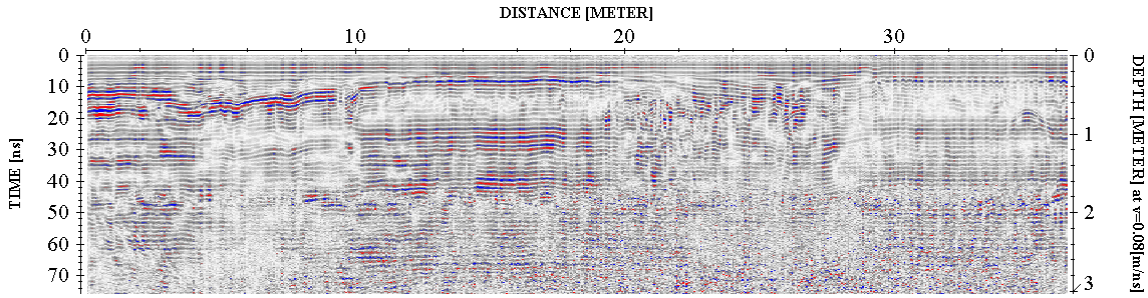
Step 1. Import Raw RAMAC data to standard processing format



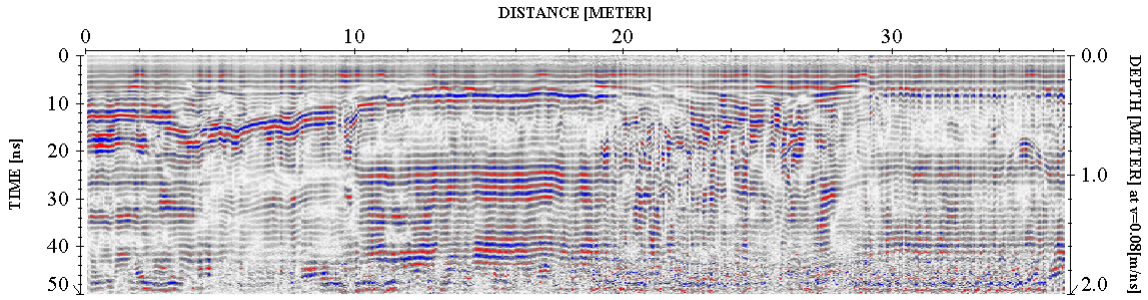
Step 2. Remove instrument noise *(dewow)*



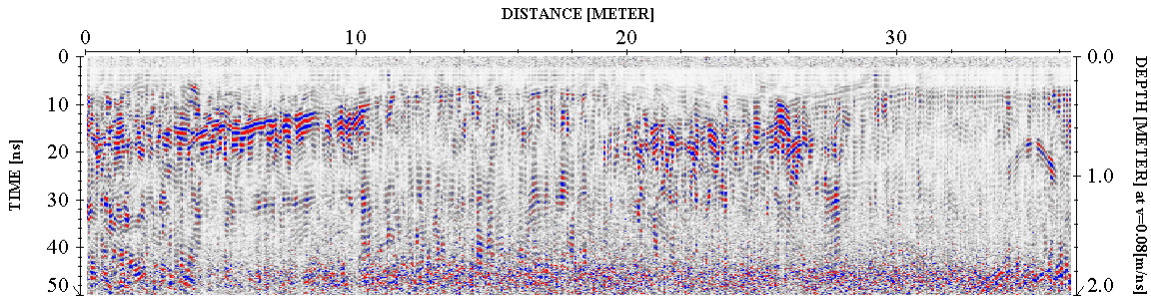
Step 3. Correct for attenuation losses *(energy decay function)*



Step 4. Remove static from bottom of profile *(time cut)*



Step 5. Mute horizontal ringing/noise *(subtracting average)*



The above example shows the significance of data processing. The last image (step 5) has higher resolution than the starting image (raw data – step 1) and represents the subsurface anomalies much more accurately.

PHYSICAL SETTINGS

NOVA observed the following physical conditions at the time of the survey.

Weather: Overcast

Temperature: 40° F

Surface: Concrete, Turf, Paving Bricks, Soil

Survey Parameters: A GPR grid scan was conducted within the survey areas as shown on the survey plan. The approximate line spacing of the grid survey was approximately 2'. Additional GPR data was collected over features of interest. An EM utility locator was used in conjunction with GPR throughout the survey area.

Limitations: The geophysical noise level (GNL) at the site was high due to being in an urban environment and other unknown anthropogenic noise sources.

RESULTS

The results of the geophysical engineering survey (GES) identified the following at the project site:

- Anomalies resembling potential subsurface utilities (such as sewer) were identified within the surveyed areas. The approximate locations are shown in the survey plan.
- No large geophysical anomalies resembling a potential underground storage tank (UST) were identified during the GES.
- All cleared boring locations were marked in the onsite mark out.

If you have any questions, please do not hesitate to contact the undersigned.

Sincerely,

NOVA Geophysical Services

Levent Eskicakit, P.G., E.P.

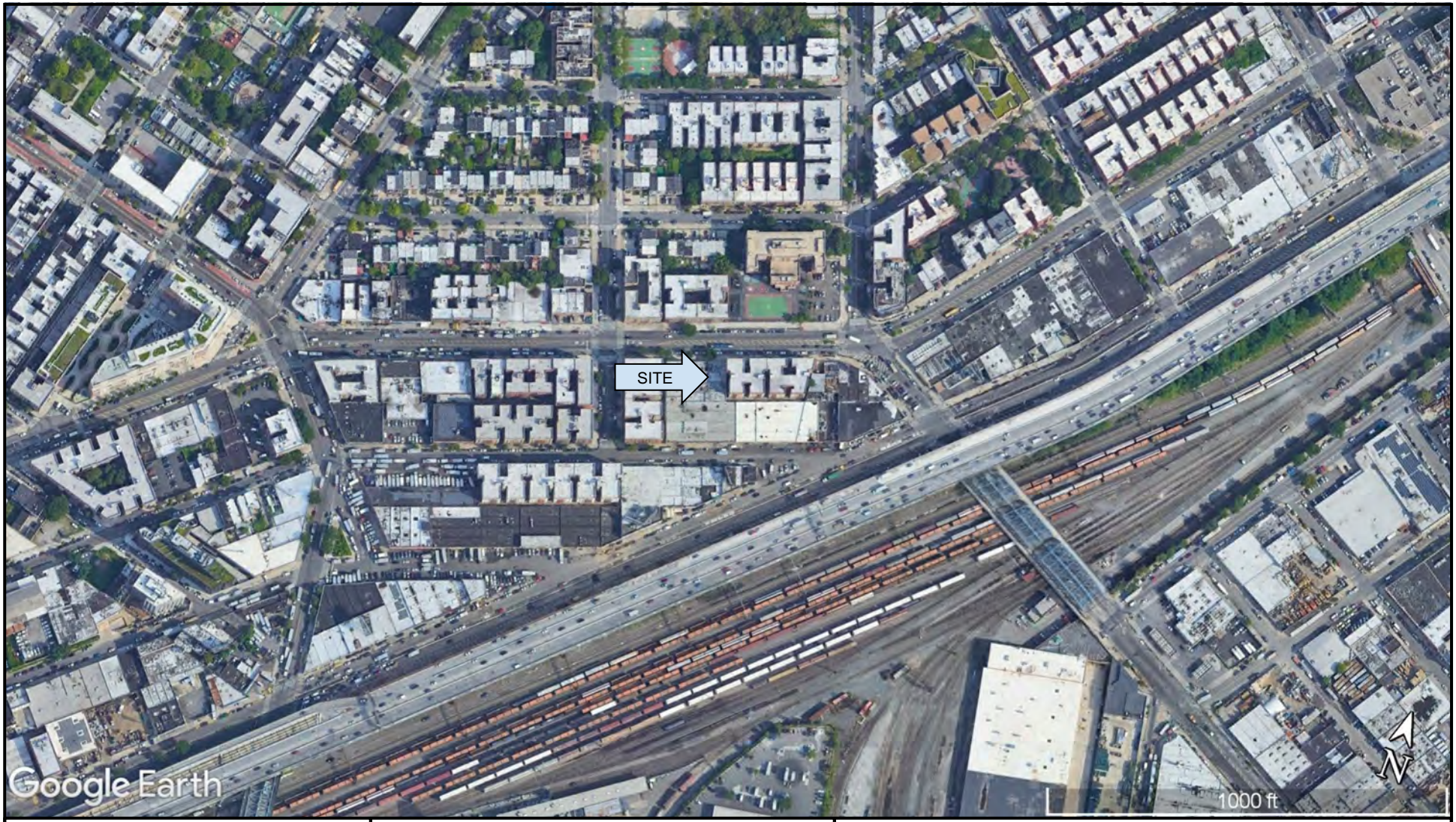
Project Manager

Attachments:

Location Map

Survey Plan

Geophysical Images



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Location Map

SITE:	**Commercial Site** 650 Southern Boulevard, Bronx, New York 10455
CLIENT:	Haley & Aldrich
DATE:	February 28th, 2023
AUTH:	Chris Steinley

LEGEND

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SURVEY PLAN

SITE:	**Commercial Site** 650 Southern Boulevard, Bronx, New York 10455
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DATE:	February 28th, 2023
AUTH:	Chris Steinley

LEGEND

- Survey Area
- Sewer

*Dashed lines could not be confirmed during the GES

GEOPHYSICAL IMAGES

Commercial Site
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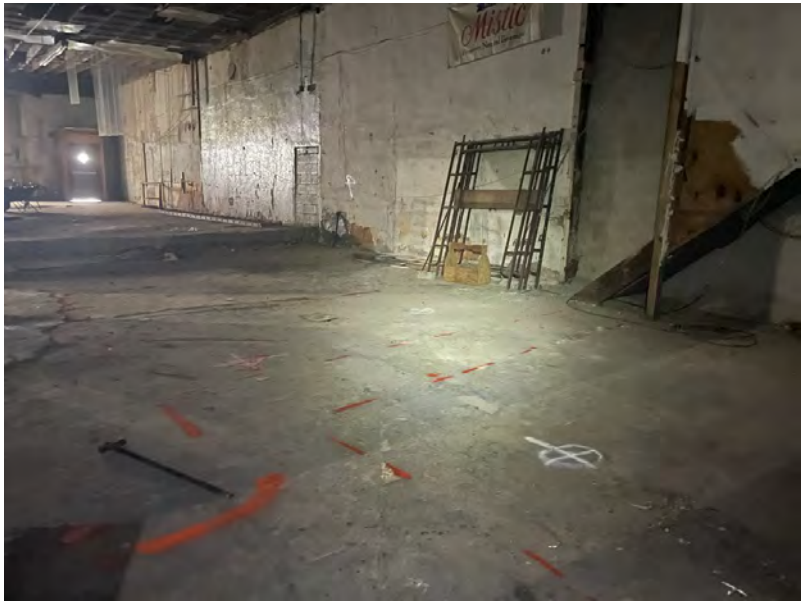
February 28th, 2023



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