Coastal Environmental Solutions, Inc.

GEOPHYSICAL INVESTIGATION REPORT

5/23/23

2 Shearwood Place, New Rochelle, NY
Date of Investigation: 4/27/2023

Prepared for:

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1.0 INTRODUCTION

On 4/27/2023, Coastal Environmental Solutions, Inc (Coastal) personnel performed a limited geophysical investigation at the site located at 2 Shearwood Place, New Rochelle, NY. The area of interest included soil vapor and/or soil boring locations within an undeveloped fenced in grass lot. Surface conditions consisted of grass/soil.

2.0 SCOPE OF WORK

1. Locate and mark detectable underground utilities near client proposed soil vapor and/or soil boring locations.

3.0 EQUIPMENT

ImpulseRadar PinPointR Ultra-Wide Band (UWB) Penetrating Radar System

Ground Penetrating RADAR (GPR) is a non-destructive geophysical method that produces a continuous cross-sectional profile of subsurface features in real time. GPR operates by transmitting both high and low frequency electromagnetic wave pulses down into the ground through a transmitter in the antenna. The transmitted electromagnetic waves reflect off materials with contrasting dielectric properties from surrounding medium such as underground storage tanks, utilities, distinct contacts between different earth materials, and other various subsurface objects. The antenna receiver collects the reflected electromagnetic waves which are then interpreted by the operator.

The ImpulseRadar PinPointR UWB GPR utilizes a dual band 400/800 MHz HS antenna mounted to a stroller frame which rolls over the surface. The total depth of penetration achieved with the antenna can be up to 10 feet but widely varies based on site-specific subsurface conditions. Conductive materials in the soil attenuate the GPR signal causing a decrease in effective depth of penetration and clarity.

Vivax-Metrotech vLoc3-Pro Receiver/Transmitter

The vLoc3-Pro Receiver is a hand-operated antenna capable of detecting electromagnetic (EM) fields emitted from a source. The EM antenna can detect pipes and cables in the ground at depths of up to 20 feet using active or passive tracing techniques. Passive tracing is the act of locating an underground utility through the detection of electrical or radio signals travelling along conductive utilities. Active tracing is used in conjunction with the Transmitter that is directly connected to the target utility or to a conductive rodder within a non-conductive line. A signal is sent through the utility at a specific frequency that can be detected by the Receiver. The detectability of a target utility depends on many factors including access to the target utility, grounding, depth of utility, conductivity, and other site-specific factors.

TW-6 Pipe and Cable Locator

The TW-6 Pipe and Cable locator is a handheld magnetometer which utilizes a transmitter-receiver pair attached to opposite ends of a handle and carried approximately 1-2ft from the surface. The magnetometer induces an electromagnetic (EM) field into the ground that is generated by the transmitter. Once the induced EM field passes through a buried metallic object, it generates a

secondary EM field which is detected by the receiver, generating an audible tone. Based on the calibration of the magnetometer, the audible tone reflects the strongest response as the highest pitched sound, trailing off on all sides of the peak. This piece of technology can be used to detect subsurface features such as metallic USTs, large diameter conductive pipes, and buried manholes, especially in areas in which traditional GPR methods cannot be utilized, such as overgrown or uneven surfaces.

4.0 METHODOLOGY

1. A subsurface investigation was performed in close proximity to the client proposed soil boring locations. Active and passive detection methods were utilized with the VLoc3-Pro receiver/transmitter. Coastal personnel directly connected to all accessible and traceable pipes, conduits, valve covers, and any other surface feature throughout the site. A passive scan was performed throughout the site to detect any potential underground utilities that could not be located with active scan.
2. (If applicable) The TW-6 was utilized to sweep accessible areas around suspected locations in 3-to-5-foot spacings for readings that may represent a buried metallic anomaly. Upon detection of a reading, the approximate size and shape of the anomalous area was marked on the surface to be investigated further with GPR.
3. GPR was utilized to further characterize the approximate dimensions, depth, and shape of the anomalies located with the TW-6. The remainder of the areas around the suspected locations were scanned with GPR in 3-to-5-foot spacing to locate any anomalous features not previously detected such as non-conductive piping and former excavations.
4. All findings were marked on the surface utilizing the American Public Works Association (APWA) recommended color code, seen below:

WHITE	Proposed Excavation
PINK	Temporary Survey Markings (Approximate UST Locations, Soil Boring Locations)
RED	Electric Power Lines, Cables, Conduit and Lighting Cables
YELLOW	Gas, Oil, Steam, Petroleum or Gaseous Materials
ORANGE	Communication, Alarm or Signal Lines, Cables or Conduit
BLUE	Water (Domestic and Fire Lines)
PURPLE	Irrigation (Not commonly used)
GREEN	Sewers and Drain Lines

5.0 SUMMARY OF FINDINGS

Utility Locate

Coastal personnel conducted a utility locate on all accessible areas within the areas of concern. All proposed soil borings were first identified by SESI field personnel during a walkthrough of the locations. Most of the proposed boring locations were not proximate to utilities and did not have to be field adjusted. All detections were marked with water-based spray paint which allowed for field adjustment if needed. Only one proposed boring location was proximate to a drain line detected on site. All other critical infrastructure was determined to be outside of the areas.

Limitations

The effective depth of GPR penetration was limited to 5 feet. The limiting factor was due to soil conductivity attenuating the GPR signal. The GPR and TW-6 are unable to be utilized within close proximity to parked vehicles, metallic fences and exterior walls.

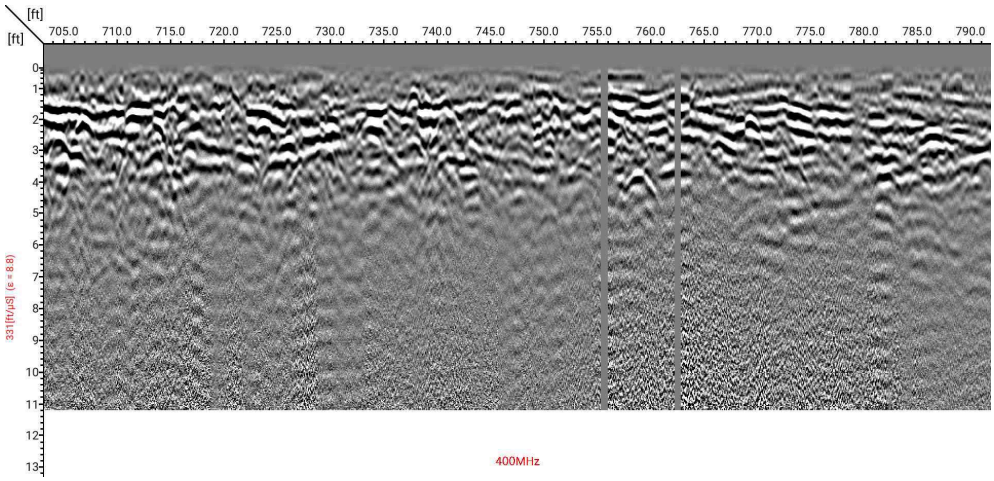
Disclaimer

The subsurface investigation was performed by Coastal after considering the limits of the scope of work and the time constraint for the investigation. The investigation that is described in this report was undertaken in accordance with current accepted standards and practices of the geophysical survey industry. The results and interpretations that are presented are based on professional judgment and are as accurate as can reasonably be achieved. However, no geophysical equipment can accurately depict all subsurface features due to the geology and environmental conditions of the subsurface. Any intrusive work in proximity to identified anomalies should be carefully considered and cross-referenced with all available site-specific documentation. Coastal is not liable for the use, interpretation, or application of the data and information in this report.

PHOTOS & GPR SCREENSHOTS



Photo 1 – View of the drain line located at approximately 3.5-4 feet deep. For visibility, it was marked in white in the field (typically green).



GPR Screenshot 1 - View of the drain line located at approximately 3.5-4 feet deep. Any proposed boring locations were shifted to avoid this line.



Photo 2 – View of the aforementioned drain line detected on site passing though the center of the site from the northeast towards the southwest leading from the drain above to a matching discharge point.



Photo 3 – View of one of the proposed soil boring locations during drilling activities.