DRAFT

Geophysical Evaluation Report

DFSS Bronzeville Regional Senior Center

4711 – 4755 South Calumet Avenue
Chicago, Cook County, Illinois 60615
PBC Project Number 10030

August 22, 2025 | Project Number: 11257129

Prepared for: Public Building Commission of Chicago
50 West Washington Street, Room 200
Chicago, Illinois 60602

Terracon

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August 22, 2025

Public Building Commission of Chicago
Richard J. Daley Center
50 West Washington Street, Room 200
Chicago, Illinois 60602

Attn: Kerl LaJeune
E: kerl.lajeune@cityofchicago.org

RE: Geophysical Evaluation Report - DRAFT
DFSS Bronzeville Regional Senior Center
4711 – 4755 South Calumet Avenue
Chicago, Cook County, Illinois 60615
PBC Project Number 10030
Terracon Report Number 11257129

Dear Mr. Kerl LaJeune

We have completed the scope of services for the above-referenced project as part of our environmental engineering consultant services per our proposal (Terracon Proposal No. P11257129) dated July 3, 2025. This report presents the findings and interpretations of the geophysical exploration for the above-referenced project.

We appreciate the opportunity to be of service to you on this project. If you have any questions concerning this report or if we may be of further service, please contact us.

Sincerely,
Terracon

Omar Sanchez
Staff Geophysicist

Ryan M. Korth
Geophysical Department Manager

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Introduction

This report presents the results of our Geophysical Evaluation Survey performed for the DFSS Bronzeville Regional Senior Center project located at 4711 – 4755 South Calumet Avenue in Chicago, Cook County, Illinois. The purpose of these services was to provide geophysical information relative to:

- Possible USTs and/or other subsurface obstructions

The geophysical exploration Scope of Services for this project included ground penetrating radar (GPR), frequency-domain electromagnetics (FDEM), geophysical interpretation, and preparation of this report.

Drawings showing the site and geophysical locations are shown on the Site Location and Geophysical Exploration Plan, respectively. More in-depth information on the methods used can be found in the Exploration and Testing Procedures.

1.0 Site Conditions

The following description of site conditions is derived from our site visit in association with the geophysical exploration and our review of publicly available geologic and topgoraphic maps.

Item	Description
Parcel Information	The proposed project is located at 4711-4755 South Calumet Avenue, Chicago, Cook County, Illinois 60615. Northern Portion of Parent Parcel #20-10-105-002 Approximate Latitude/Longitude 41.8086°, -87.6177° (See Site Location Map)
Existing Improvements	No existing improvements at the site. Currently vacant land. Previously used as residential (1928-1960); national liquors (1952); supermarket (1952); Kare Drugs (1971)
Current Ground Cover	Former building foundations, gravel drives, grassy areas.
Existing Topography	Using Illinois Elevation Finder portal, the site appears relatively flat with surface elevation of about 600 feet above mean sea level.

2.0 Project Description

Item	Description
Project Description	We understand the project is currently a vacant lot, with remnants of a former building foundation covering most of the site. Terracon has been tasked to perform a geophysical survey to delineate the extent of the building foundation and detect possible USTs and construction debris.

3.0 Geophysical Exploration Methodology

The surface geophysics consisted of:

- 0.7 acres of frequency domain electromagnetics (FDEM) terrain conductivity with exploration area depicted in the Geophysical Exploration Plan.
- 0.7 acres of ground penetrating radar (GPR) with explanation area depicted in the Geophysical Exploration Plan.
- 0.7 acres of metal detection (MD) with exploration area depicted in the Geophysical Exploration Plan.

FDEM Terrain Conductivity: Terracon collected data using a Geonics EM31 frequency domain profiler oriented in the vertical dipole direction that collected both terrain conductivity (quad-phase) and magnetic susceptibility (in-phase) data with perpendicular transect spacings of 10 feet and a sampling interval of 10 feet. Data was processed using Surfer by Golden Software to yield a 2D plan view map of the terrain conductivity and magnetic susceptibility data.

Ground Penetrating Radar: Terracon collected data using a cart-mounted system consisting of an ImpulseRadar 400 MHz and 800 MHz dual-channel antenna oriented in the vertical/horizontal dipole direction with perpendicular transect spacings (grid spacing) of 5 feet. Data was processed using Geolitix to yield 2D cross sections/a pseudo 3D (consisting of assembled 2D cross sections) top-down view of the radar data. Based on the methodology and site conditions, we estimate that the maximum depth of investigation ranged from approximately 0 to 5 feet below the ground surface.

3.1 Geophysical Data Quality

Geophysical data quality was generally considered good on this project with adequate signal to noise ratios.

4.0 Geophysical Results

4.1 Discussion

Terracon completed the geophysical survey on Tuesday, July 29, 2025, between the hours of 8:00 a.m. and 4:00 p.m. In areas accessible to the equipment, a series of scans were conducted, and the data was processed to produce both GPR amplitude and FDEM response maps. The data has been overlain onto an aerial image and 1950 Sanborn map as shown on exhibits 7.1 through 7.3. GPR data focused on the upper 4 to 5 feet of the subsurface while FDEM records responses of the subsurface to a depth of about 15 feet.

Terracon also performed a scan of the entire site with a Fisher TW-6 Pipe & Cable metal detector. The metal detector identified reinforced concrete at the site, which indicates remnants of a former building foundation. The extent of the suspected building foundation is shown on the Exhibits.

The GPR survey resulted in two anomalous areas (See Exhibit 7.1). Anomaly #1 appears to be associated with the storm sewer system. Anomaly #2 appears to be associated with the possible vault of unknown use identified at the property. No anomalies indicating a UST at the site were discovered during our survey.

The FDEM survey resulted in the collection of both terrain conductivity (quad-phase) data and magnetic susceptibility (in-phase) data. The FDEM shows areas of higher magnetic susceptibility and conductivity in green to red coloring, identified as Anomalies #3 and #4 on Exhibits 7.2 and 7.3. The areas identified as Anomaly #3 appear to be associated with remnants of former building foundations as the data lines up with the outlines of residential buildings shown on the 1950 Sanborn map. Anomaly #4 indicates possible construction debris.

The results of the Geophysical Survey indicate remnants of former building foundations and possible construction debris are located at the site. The data collected does not appear to indicate the presence of a UST.

Based on the results of the Geophysical Survey, we recommend test pits if PBC desires further clarity on the nature of the on-site vault of unknown use to facilitate construction. In addition, test pits could be completed in the area of possible construction debris to facilitate disposal of the materials.

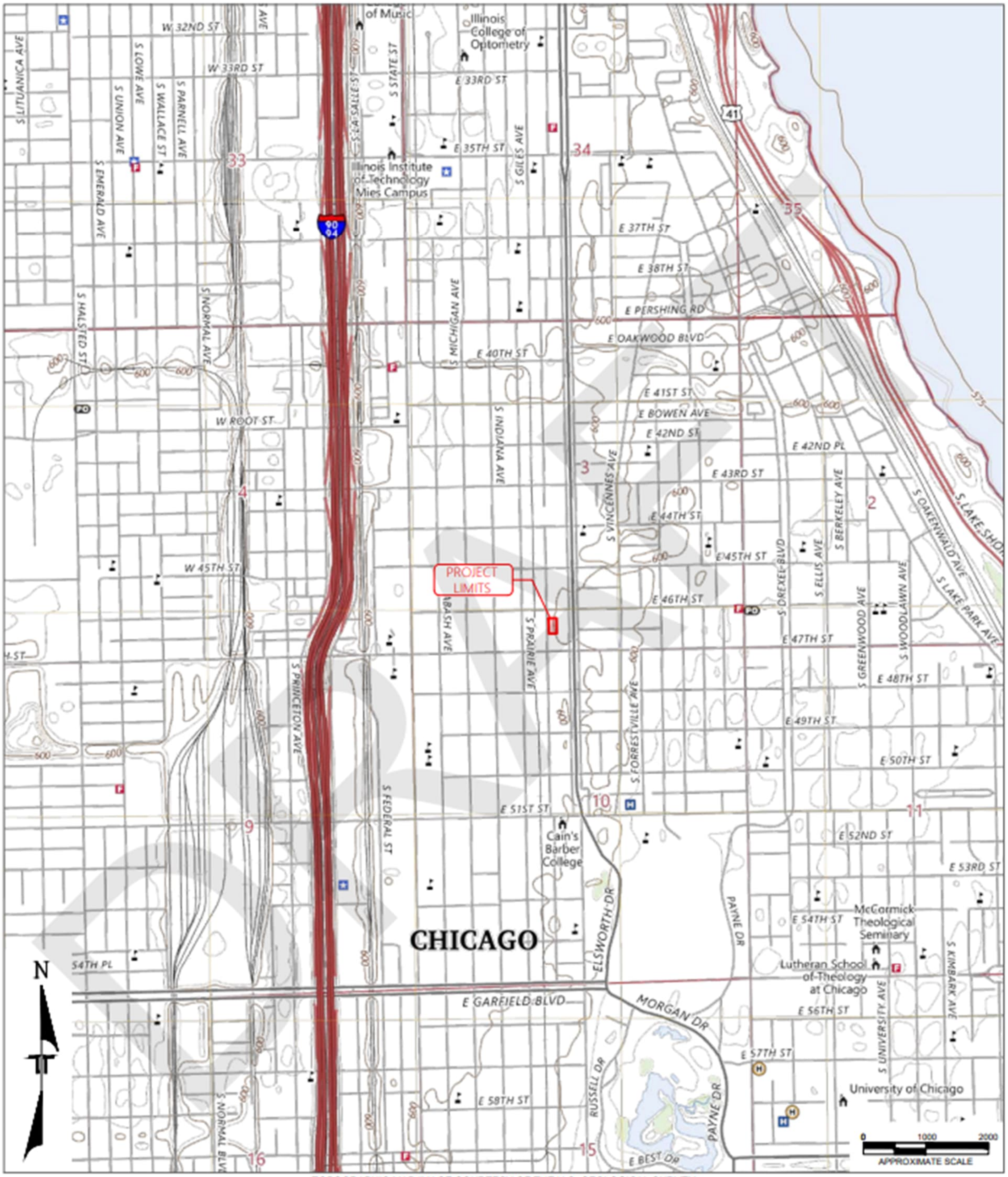
Anomaly Number	Description	LAT	LONG
1	Storm Sewer	41°48'32.32"N	87°37'4.58"W
2	Possible Vault	41°48'30.47"N	87°37'3.22"W
3	Possible Former Building Foundation	Throughout Site	
4	Possible Construction Debris	Throughout Site	

The purpose of this project was not intended to locate utilities and does not follow ASCE 38-22. Unidentified utilities may still exist in the scanned areas. A private utility locate should be performed prior to construction.

5.0 Attachments

5.1 Site Location

Figure 1: Site Location Map



TOPOGRAPHIC MAP IMAGE COURTESY OF THE U.S. GEOLOGICAL SURVEY
QUADRANGLES INCLUDE: ENGLEWOOD, JACKSON PARK, BLUE ISLAND, LAKE CALUMET (7.5-MINUTE TOPO, IL 2025)

5.2 Exploration and Testing Procedures

Terracon utlized the following test methods in our investigation.

Metal Detection (MD) Method

The MD method is used to detect buried metal objects such as pipelines, utilities, underground storage tanks, buried drums, rebar, manhole covers, and metallic debris. The transmitter unit emits a time varying electromagnetic signal (primary field) as the instrument is carried along a traverse. The primary field induces current flow in nearby metallic objects which then radiate a secondary field that is detected by the receiver unit. The strength of the secondary field is directly proportional to the size of the metallic object and inversely proportional to the distance of the object from the receiver.

Limitations: A MD survey is used to detect buried metal objects that contain ferrous metal. The detection capabilities of a magnetometer are directly proportional to the volume of ferrous metal the object contains and inversely proportional to its depth of burial. Consequently, the deeper an object is buried, the larger it must be to be detected. Furthermore, data quality can be affected by interference from other nearby ferromagnetic objects (aboveground or buried), surficial metallic structures or utilities.

Ground Penetrating Radar (GPR) Surveys (ASTM D6432)

Ground penetrating radar (GPR) is a method that provides a continuous, high resolution graphical cross-section depicting variations in the electrical properties of the shallow subsurface. The method involves repeatedly radiating an electromagnetic pulse (radar signal) into the ground from a transducer (antenna) as it is moved along a traverse. Radar signals reflected by subsurface objects or horizons are detected by an antenna (often the same one used to generate the signal) and sent to a control unit for processing. The control unit then converts the varying amplitude of the reflected radar signals as a function of time into a cross-sectional image showing signal amplitude as a function of distance and depth.

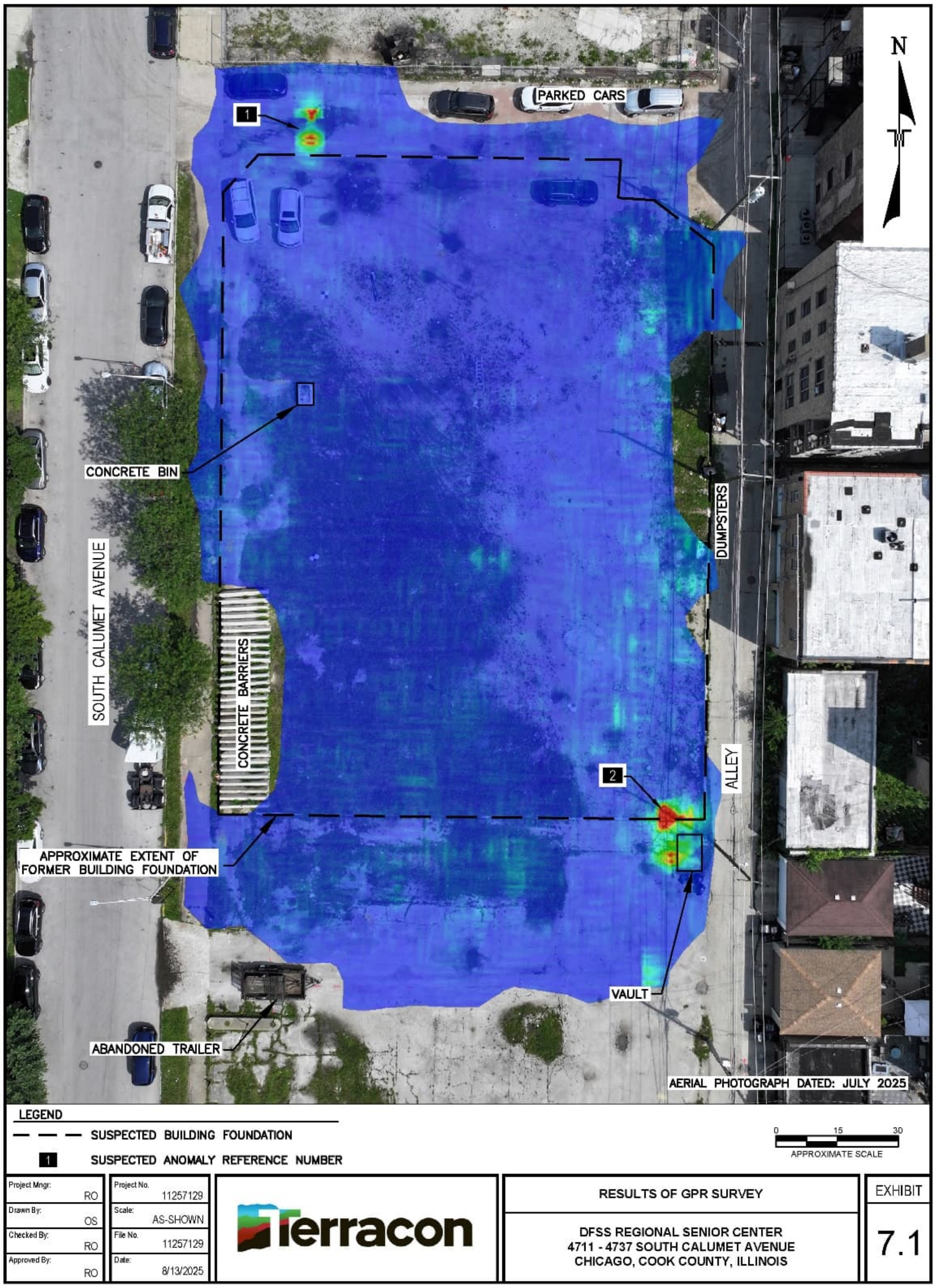
GPR response is governed by two electrical properties; electrical conductivity (σ) and dielectric permittivity (ϵ), also referred to as dielectric constant. Electrical conductivity is the ability of a material to conduct a charge when an electromagnetic field is applied. Dielectric permittivity is the ability of a material to hold a charge when an electromagnetic field is applied. Electrical conductivity governs how far radar signals can propagate through the subsurface before becoming undetectable. The higher the conductivity, the faster the signal attenuates. Consequently, conductivity also affects the strength of radar signals that are reflected from subsurface boundaries. Contrasts in electrical permittivity affect how much of the radar signal is reflected at subsurface boundaries representing a change in permittivity. The greater the contrast, the more energy that is reflected.

Most earthen materials (soil and rock) and even artificial materials (e.g. concrete) have relatively low dielectric permittivity and, therefore, are relatively transparent to electromagnetic energy. This means that only a portion of the radar signal incident upon a subsurface boundary is reflected back to the surface. On the other hand, when the radar signal encounters an object composed of a material that has very high permittivity, such as buried metal, most of the incident energy is reflected.

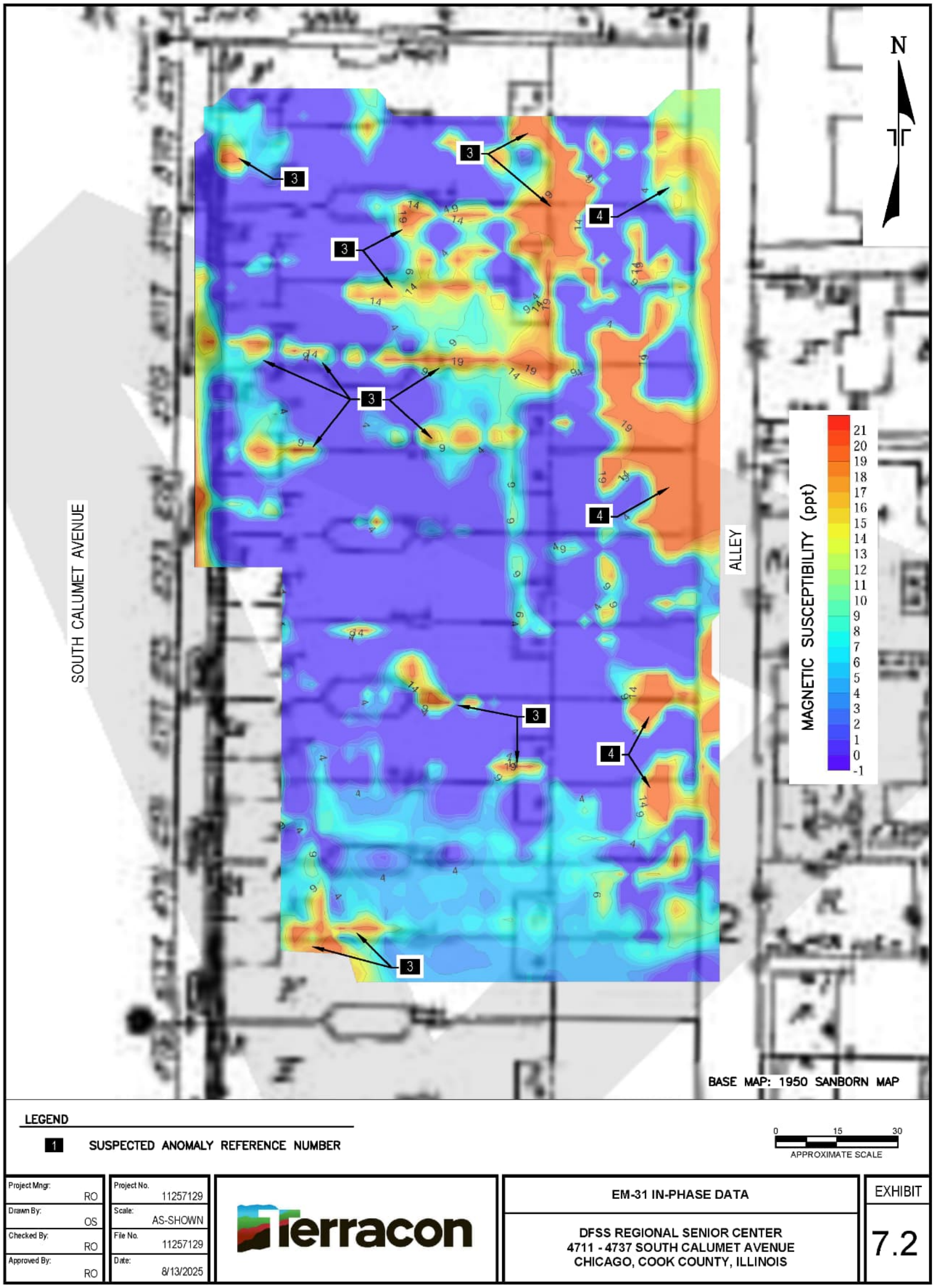
Limitations: The ability to detect subsurface targets with GPR is based on contrasting electrical properties (dielectric) and is dependent on specific site conditions. These conditions include depth of burial, the size (or diameter), the physical condition, the surrounding soils and the surface conditions over the survey target. Typically, the depth of detection will be reduced as the clay and/or moisture content in the subsurface increases (increasing ground conductivity). Further, the estimated depth of a given target is dependent on the assumed dielectric constant of the surrounding soils. Unless a target of known depth is available for calibration of the GPR to the site-specific conditions, the soil dielectric is typically estimated based on the soil type and moisture conditions.

Attachments

7.1 Results of GPR Survey



7.2 EM-31 In-Phase Data



7.3 EM-31 Quadrature Phase Data