MTSU FULLERTON LABORATORY for SPATIAL TECHNOLOGY

Evergreen Cemetery GPR Results Report for October 18, 2021 GPR Survey

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Project Narrative

On October 18, 2021, Dr. Joe Collins, then-faculty member of MTSU's Geosciences Department conducted a GPR survey of the African American portion of Evergreen Cemetery located at 519 Greenland Drive Murfreesboro, Tennessee (Figure 1).

Figure 1 Dr. Collins and students conducting the GPR survey.

Dr. Collins has since left the university. Zada Law was contacted about following up on this project in 2022. She assigned the project to post-graduate employee Wes Cobb, who converted the raw GPR data into a usable form. He then created a map showing all GPR returns less than 3 meters in depth.

Due to communications issues resulting from Dr. Collins' departure, the timeframe and purpose of the GPR survey was not relayed to current MTSU Geosciences faculty. Therefore, the results were not returned in time to inform the placement of the monument. However, the results of the survey still have significant potential for usefulness to the African American Heritage Society of Rutherford County.

Project Methodology

While the particulars of the data collection are not available, it is a safe assumption that standard GPR collection methodology would have been used. This would consist of moving the GPR unit in rows, which is often referred to as “mowing the lawn” as GPR data collection closely resembles pushing a lawnmower around a yard. The GPR (Ground Penetrating Radar) unit sends radar pulses into the ground and registers the time it takes for each signal to return. This creates a one-dimensional “slice” of the ground beneath the GPR unit as it traverses the study area (Figure 2).

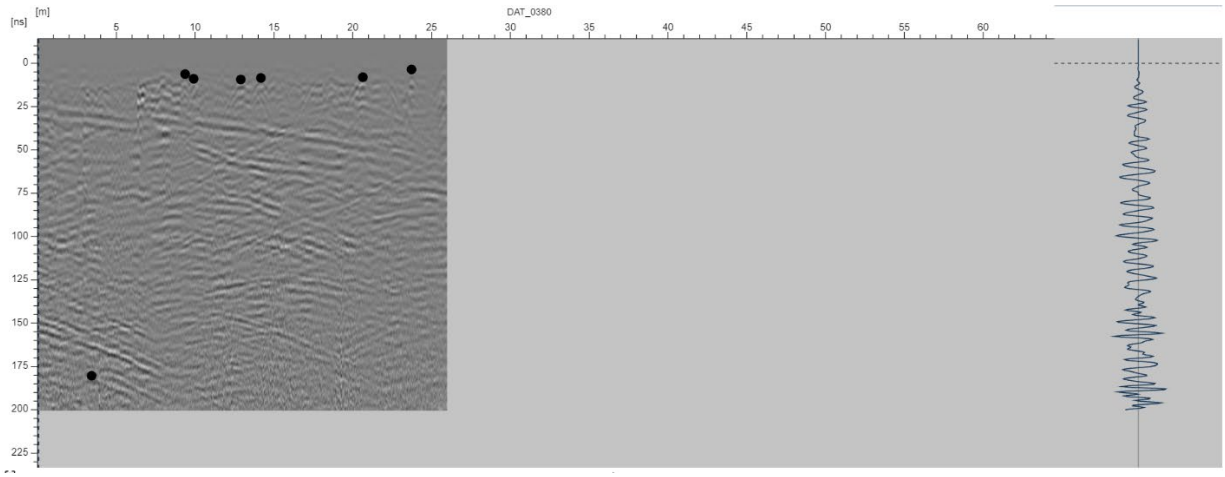

Figure 2 Raw GPR returns with likely graves marked with points.

These slices are pieced together in the lab to form a two- or three-dimensional image of the returns.

The data was processed in the over a year later by Wes Cobb. He used software to pick out returns likely to be gravesites and converted these returns into points which can be viewed on a standard map. He then removed all points that registered a depth greater than 3 meters, as it is highly unlikely there would be any burials deeper than this. He used these remaining return points to create a point density “heat” map, where the map shows “hotter” where there are more

points closer together (Figure 3). This resulting cloud indicates likely locations of gravesites.

Figure 3 Return points indicating likely graves overlaid with the resulting heat map cloud.

Project Results

The results imply a positive correlation between the GPR results and known grave sites, giving a high degree of confidence that the returns that are not in close proximity to a grave marker indicate an unmarked grave.

Evergreen African-American Cemetery GPR Project

On October 18, 2023, MTSU faculty and students conducted a GPR survey of potential African American gravesites at Evergreen Cemetery in Murfreesboro, Tennessee. This resulting data was processed with software that picks out returns likely to be gravesites and converts these returns into points which can be viewed on a standard map. All points that registered a depth greater than 3 meters were removed, as it is highly unlikely there would be any burials deeper than this. These remaining return points were used to create a point density "heat" map, where the map shows "hotter" where there are more points closer. This resulting cloud indicates likely locations of gravesites.

The GPR (Ground Penetrating Radar) unit sends radar pulses into the ground and registers the time it takes for each signal to return. This creates a one-dimensional "slice" of the ground beneath the GPR unit as it traverses the study area. These slices are pieced together in the lab to form a two- or three-dimensional image of the returns.

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GPR Returns Shallower Than -3 Meters

N
W E
S

Sparse

Dense

Scale: 1:200

Feet

0 25 50 100 150