United States Department of Agriculture

Natural Resources Conservation Service

11 Campus Boulevard, Suite 200 Newtown Square, PA 19073

Subject: SOI -- Geophysical Assistance --

Date: 22 December 1999

To: Margo L. Wallace,
State Conservationist
USDA-NRCS,
16 Professional Park Road
Storrs, Connecticut 06268-1299

PURPOSE:
The purpose of this investigation was to use ground-penetrating radar (GPR) to locate several statues buried at the Long Hill Estate Mansion in Middletown, Connecticut. This project was carried out at the request of the Connecticut State Archaeologist and the City of Middletown.

PARTICIPANTS:
Jim Doolittle, Research Soil Scientist, USDA-NRCS, Newtown Square, PA
Nicholas Bellantoni, Connecticut State Archaeologist, University of Connecticut, Storrs, CT
Howard Denslow, Resource Conservationist, USDA-NRCS, Storrs, CT
Debbie Frigon, Soil Scientist, USDA-NRCS, Storrs, CT
Shawn McVey, Asst. State Soil Scientist, USDA-NRCS, Storrs, CT
Donald Parizek, Soil Scientist, Inventory Team, USDA-NRCS, Windsor, CT
James Sipperly, Environmental Specialist, City of Middletown, Middletown, CT
Jim Turenne, Soil Survey Project Leader, USDA-NRCS, W. Wareham, MA

ACTIVITIES:
All field activities were completed on 16 December 1999.

EQUIPMENT:
The radar unit was the Subsurface Interface Radar (SIR) System-2000, manufactured by Geophysical Survey Systems, Inc.[1] The SIR System-2000 consists of a digital control unit (DC-2000) with keypad, VGA video screen, and connector panel. The model 5103 (400 mHz) antenna was used in this investigation. A 12-volt battery powered the radar system. Scanning time of 60 nanoseconds and a scanning rate of 32 scans/sec were used.

BACKGROUND:
The Long Hill Estate Mansion is being restored by the City of Middletown. The mansion was built in the early 1900s for Colonel Clarence S. Wadsworth. In 1947, the mansion was sold to the Religious Order of Our Lady of Cenacle. The mansion was bought by the City of Middletown in 1994. The City has begun a five million dollar project to restore the mansion. The mansion will be use as a conference center and banquet hall.

When the Religious Order of Our Lady of Cenacle acquired the property, several Greco-Roman style statues of nude women lined the mansion's back exterior wall. The nuns were embarrassed by these statues and supposedly had them buried near the "tennis house." This information was derived from a former nun who told a friend that the statues were buried "to the left of the tennis house."

[1] Trade names have been used in this report to provide specific information. Their use does not constitute endorsement.

This story interested the State Archaeologist, Nick Bellantoni, who visited the site and conducted a reconnaissance search of the site. Nick Bellantoni requested the aid of NRCS to more comprehensively investigate this fairly large site with ground-penetrating radar.

FIELD PROCEDURES:
The survey site is located in an area of Wethersfield loam, 3 to 8 percent slopes (Reynolds, 1979). The very deep, well drained Wethersfield soil formed in dense till on uplands. It is moderately deep to dense till. Wethersfield soil is a member of the coarse-loamy, mixed, active, mesic Oxyaquic Dystrudepts family.

A "wild-cat" survey was conducted through areas that were overgrown with small trees and debris. A grid was set up across an open area that was located to the west of the tennis house. The dimensions of the grid were about 100 by 80 ft with a grid line spacing of about 5 feet.

Each radar traverse was stored as a separate file on a hard disc. Preliminary field interpretations produced no significant subsurface anomaly. The identities of several anomalies that appeared on the radar profile were verified through soil borings. These anomalies included an ash layer, stone, and animal burrow. Later, the radar file was reviewed and additional subsurface interfaces were identified.

CALIBRATION:
The radar was calibration during fieldwork. During calibration, the dielectric constant and velocity of propagation were determined. These values were used to establish a depth scale for the radar imagery.

The depth to a known subsurface reflector was used to determine the dielectric constant and velocity of propagation. This information was used to scale (depth) the radar imagery. Based on the round-trip travel time to this buried reflector, the averaged velocity of propagation was estimated to be 0.0832 m/ns. The dielectric constant was estimated to be 13.0. Based on an average velocity of propagation of 0.0832 m/ns and a scanning time of 60 ns, the 400 mHz antenna provided a maximum observation depth of about 2.5 meters. This antenna provided highly resolved profiles of the subsurface.

RESULTS:
Because of limited time and my illness on the day of the survey, radar profiles were hastily reviewed in the field. A more comprehensive review of these profiles was conducted in my office on 21 December 1999. This review disclosed a trench-like feature near the southwestern corner of the grid site. The imagery within this "trench-like" feature suggests buried objects and not just layers of refilled soil materials. As this feature is to the left of the tennis house, its location agrees with the oral history concerning the burial site.

Because of the thick undergrowth and fallen trees, a complete survey of the site was impossible. James Sipperly has agreed to clear the area of brush. If cleared of brush, I would volunteer to complete this survey at a later date. I am presently scheduled to conduct fieldwork in New Hampshire (14 to 18 February 2000) and Maine (28 February to 3 April 2000). Perhaps the survey could be completed while I am in travel to these states.

With kind regards,

James A. Doolittle
Research Soil Scientist

cc:
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References

Reynolds, C. 1979. Soil Survey of Middlesex County Connecticut. USDA-Soil Conservation Service. U. S. Government Printing Office, Washington, DC.