

Abstract -- The historic town of Edenton, NC was established in 1712; however there are indications of earlier colonial presence, perhaps dating back to 1658. Recent unauthorized excavation by a utility company on the Edenton Green, Edenton, NC (36° 03' 26" N, 076° 36' 29" W) unearthed the presence of a layer of thin red bricks, presumably the flooring or fireplace apron for a former structure at the site. An early, circa-1767, colonial map depicted a small building on the upper green near the present courthouse; however, no physical aboveground structure remains. The objective of this study was to determine the shape, extent, and depth of any unknown subsurface remnants.

Edenton's historic site manager, Karen Ipock, provided a 1767 map of Edenton. The map was georegistered to an aerial 1998 Digital Ortho-Quarter Quad image of Edenton obtained from United States Geological Survey's Earth Explorer website (earthexplorer.usgs.gov). An image-to-image georegistration was performed using EnviClassic 4.7, where geographic coordinates were assigned to known structures appearing on the old colonial map including the 1767 Courthouse, Cupola House, and the intersection of what is now E King St and Broad St. The images linked allowed a before and after effect to provide GPS coordinates of the buildings used for reference. This process provided correct coordinates for the green. The small structure present on the green, from the 1769 map, coordinates were also determined. The survey area for the GPR was determined by the appearance of the structure.

A 16 x 21m ground penetrating radar survey consisting of 32 half-meter parallel, unidirectional (South to North) transects revealed the presence of significant belowground features. The grid was established using a compass, cordage, measuring tape, and GPS. A baseline to construct the grid from was at 36 03 27 N, 76 36 29 W. Cordage and flags were used to create the base-point and transect paths. Flags were located at the southern start and northern terminus of each transect to provide an aim-point and to insure a clearly defined data collection boundary and accurate data collection.

Data was collected using the Ground Penetrating Radar (GPR) with each pass in a parallel-unidirectional pattern. The Ground Penetrating Radar transmits a tiny pulse of electro-magnetic energy into a material and records the strength and time required for the return of any reflected signal. A series of pulses over a single area make up a scan and there were 32 scans for the survey area of the green that was chosen. After data was collected and stored on the system, it was transferred to the software program RADAN 6.6 for data processing and analysis.

Geophysical Survey System, Inc. (GSSI) developed RADAN 6.6. The individual files were uploaded to a windows laptop PC that provided the RADAN 6.6 software. The data was then processed in four important aspects, which are Zero Point Correction, Background Removal, Velocity Migration, and Gain Normalization.

The Zero Point Correction technique was used to remove the section of data that occurs before the direct wave. This process or technique insured that while doing the analysis of the data, only the data that was obtained from the ground being directed exposed to the waves was used. Then there is the background removal process which removes the signal to noise accuracy throughout the files. The systematic issues were also removed for

consistency in data. After the background removal process, hyperbolic diffraction patterns were reduced or eliminated using the migration feature. Removal of the hyperbola tails represented the location more accurately and in some cases the size of the target. Following migration, the gain equalization. The gain is the amplification of the Radar signal. Equalization process was applied to the data set to ensure the gain throughout each transect is consistent.

Several unique features were in appearance after the data processing. There were 2D slices and a 3D compilation of the data created at different depths and positions to better view the features. Some of them would include a semi circle that appeared at about 0.5 meters located at the top of the Green and a large rectangular shape feature located right below where the brick were discovered from the digging for the gas line. The large feature was still in appearance as the slices were increasing in depth almost to 3 meters where the penetrating beams ended surveying. At 2 meters a linear feature was perceived and the signal of the feature got stronger throughout. Many more features were visible, but there were just a few that stood out from the rest.

Many images of the Green and the transformations it has over gone since the earlier years were viewed. There were three sets of steps on the Green beginning at the top and maneuvering down to the waterfront. There was no conformation whether the steps were removed or simply covered up. In another image, there was a sidewalk in the shape of an "X" on the Green with a monument in the middle. These images provided some insight of what the features from the survey may be.

It will be taken into consideration that some of the visible features may be of tree roots and of some utility components. The data does provide promising results that there are a number of buried artifacts beneath the green. The next step will come from the North Carolina State Archaeologist who will examine and test the surveyed green and possibly the un-surveyed parameter as well to determine if excavation of the green should take place.