ELECTROMAGNETIC TERRAIN CONDUCTIVITY (TC)

Methodology

The electromagnetic method is used to measure variations in subsurface electrical conductivity. The electromagnetic system utilizes two coils separated by a specified distance. One of these coils transmits a time-varying electromagnetic signal (primary magnetic field) which induces current flow in the earth. This in turn creates a secondary magnetic field which is detected by the receiver coil. The secondary signal is complex and has both quadrature and in-phase components. The amplitude of the quadrature component is proportional to the electrical conductivity of the subsurface materials. The in-phase component is proportional to conductivity, but is also affected by electrical properties associated with metal objects. The instrument displays the quadrature component in units of milliSiemens/meter (mS/m). Since this measurement represents the conductivity of the volume of material sampled, rather than individual layers, it is an apparent value and is referred to as terrain conductivity (TC).

Data Acquisition

We usE a Geonics EM31-DL ground conductivity meter connected to an Omnidata data recorder. The EM31 has a fixed coil separation of 12 feet. This results in a total depth of investigation of approximately 10 to 15 feet, depending upon local site conditions. The data recorder automatically stores the TC values as well as station locations and annotations regarding cultural features.

Data Analysis

We down load the TC data to a computer and contour the data sets using the software package SURFER (Version 7.0) by Golden Software. This program calculates an evenly spaced array of values (grid) based on the observed field data. The grid values were then contoured to produce the TC Contour Maps.