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Site Characterization of Historical Cemeteries Using Electrical Resistivity Measurement

Historical cemeteries (>1600 CE) must be included in site characterization studies prior to resource extraction, environmental remediation or development. In many states, cemeteries are protected by law, and there is a lively public interest in identifying and restoring old cemeteries that have been obscured or lost through neglect. Two case studies are presented in which electrical resistivity measurement was used to infer the three-dimensional boundaries of cemeteries, and to describe the location of their contents. Surveys with 3m-node spacing have a horizontal accuracy at the surface of 0.75m and a depth range to 12m in typical soils. A calibration study on a nineteenth-century cemetery revealed a densely utilized hillside plot delineated by its sandy lithology. Walls or fence-post traces were absent. A buried sarcophagus was identified by a sharply rectilinear profile, the peaked-roof wave profile from the top of the sarcophagus, and internal high resistivity, interpreted as air space. Areas with presumably decaying wooden coffins were readily apparent, with internal high resistivity, but with blurred rectilinear edges. Peaked-roof wave profiles were absent. The second application involved successfully locating the purported burial of a local Revolutionary War hero beneath a Depression-era homestead. Exacerbating the debate was a conflict between developers, heirs, and the local historical society. These two examples are used to illustrate the benefits of electrical resistivity as a non-destructive, non-invasive method of cultural resource evaluation.