

Geophysical Application

Subsidence & Sinkhole Investigations

Geophysics is a valuable tool for investigating subsidence features associated with coal mining or sinkholes related to karst geology. A variety of geophysical methods permit detailed evaluation of an area to pinpoint features of concern. **To acquire the same density of information, traditional soil borings are too costly to provide a comprehensive assessment.** For example, when looking for a 23-foot diameter subsidence feature within a 1-acre area, the number of borings required is much higher than one would expect as shown on the attached table.

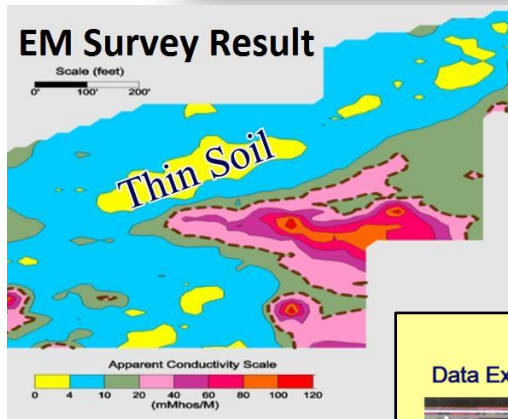
Detection Probability over 1-acre	Number of Borings
4.6%	5
17%	20
49%	50
75%	80
90%	100
100%	160

Geophysics provides an efficient approach to evaluate a site cost-effectively, with an improved probability of detecting features of interest. ASTM 6429, The Guide to Selecting Surface Geophysical Methods recognizes five consensus methods to detect sinkholes and voids.



Quality Geophysics is capable of performing all five surface geophysical methods, and a number of borehole methods. Surface geophysical methods used to detect sinkholes and voids include:

- Seismic Refraction
- Electrical Resistivity
- Frequency Domain Electromagnetic
- Ground Penetrating Radar
- Gravity



Each geophysical method has advantages and disadvantages that require site evaluation to design an efficient geophysical survey. Method resolution and depth to suspected features are key components to prepare a cost-efficient investigation and effective solution design. In complex geological environments, multiple geophysical methods may be used to complement a focused drilling program to appropriately investigate subsidence features.

