***Resolving Buried Fault Structures and Interpreting Stratigraphy With Limited Data;  
A Phased Investigation Beginning with Surface Seismic and Electrical Resistivity Data***

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# **Abstract**

Characterizing faults and geologic structures hidden beneath alluvium in areas with sparse historic geologic mapping information and lithologic data requires a combination of surface geophysical imaging; quantitative borehole geophysical imaging and logging; lithology from alluvial and bedrock borings, and geologic and hydrostratigraphic conceptual site modeling (CSM). This presentation summarizes results of a phased investigation beginning with seismic reflection, seismic refraction, seismic surface waves, and electrical resistivity surface geophysical surveys. Investigation data include approximately eight linear miles of seismic reflection, refraction and MASW, and approximately six miles of electrical resistivity surveys spanning an approximate 8-square-mile area confidential groundwater investigation site in the North American Southwest. Initial results from the seismic data resolved bedrock structures in time, later to be converted to depth from future borehole logging surveys; delineated lateral extents and improved continuity of alluvial and sub-alluvial stratigraphic interpretations; improved accuracy of interpretations of faults and sub-alluvial geologic structures; reduced sitescale uncertainties to enhance CSM, and optimize locations of future alluvial and bedrock boring investigations. The resistivity data resolved shallow groundwater-bearing units, improved the hydro-stratigraphic CSM, and were used to better target borehole measurements for upcoming phases of the investigation.