ERT FAQs

What is an ERT survey?

Electrical resistivity tomography (ERT) is a geophysical technique for imaging the distribution of subsurface electrical resistivity in a cross-sectional format. The electrical resistivity of a given geological unit is related to the pore-fluid conductivity, clay content, liquid saturation, temperature, and matrix composition, and is used to map the extent of geologic units through the electrical properties of the subsurface materials. The final products of an ERT survey are two-dimensional cross-sections plotting electrical resistivity versus depth, which can then be interpreted to generate three dimensional characterization of subsurface stratigraphy and water quality conditions.

Why do we need to do an ERT survey in Carpinteria?

The Sentinel Well project recently completed by the Carpinteria Valley Water District generated important hydrogeologic information from a previously unexplored portion of the Carpinteria Groundwater Basin. The ERT survey will supplement and enhance information acquired through the recently completed Sentinel Well project by providing three dimensional characterization of CGB stratigraphy and water quality. The ERT survey is a key element of the CGB GSP and will be an important tool in developing the hydrogeologic conceptual model for the GSP.

Have similar surveys been completed elsewhere in California?

Yes, ERT surveys have been used successfully in groundwater basin characterizations and seawater intrusion investigations throughout coastal California, in particular in Orange, Los Angeles, Monterey, and Santa Cruz counties. The geophysical team for the CGB project is the same team that successfully completed a regional ERT survey project in Monterey County investigating seawater intrusion into the Salinas Groundwater Basin.

What is the process for doing an ERT survey?

A survey crew lays out lines of insulated copper wire cables on the ground and electrodes (stainless steel rods) are driven into the ground and attached to the cables at intervals of between 30 and 80 feet. A 12 volt car battery is used to inject small amounts of electrical current into two electrodes at any one time. The injected current is then measured at two receiver electrodes, and the measured differences are used to determine the electrical resistivity of subsurface materials at different depths and distances beneath each profile. The model of electrical resistivities can then be used to interpret geologic units and identify water quality conditions within each unit.

Is ERT surveying safe for humans and wildlife?

Yes, the power source is a 12 volt car battery and the electrical current injected is relatively low (typically less than 200 milliamps). The electrodes are flagged so that they are clearly visible, and the periods during which current is induced are brief (less than 1 second). An electric shock would be equivalent to that from an electric fence used to corral livestock. For additional safety, survey personnel

communicating with walkie-talkies monitor all portions of the cable along each survey line to ensure that no human or animal contact is made with the electrodes while the current is induced.

Where will the ERT survey be conducted?

The ERT survey will be conducted in the vicinity of the Carpinteria Salt Marsh. Three survey lines will be performed. The longest survey line will be conducted on the beach, approximately one mile northwest of the mouth of the Carpinteria Salt Marsh, and one-half mile southeast of the mouth of the salt marsh. A second line measuring approximately 1.25 miles will be surveyed along the northern boundary of the salt marsh. A third survey line measuring approximately one-third mile will be surveyed within the Salt Marsh, perpendicular to the other two lines. The Sentinel Monitoring Wells are located at the northwest corner of the survey area.

Is the survey a one-time occurrence, or will it be repeated in the future?

It is anticipated that the ERT survey will be repeated on a prescribed schedule similar to the monitoring of the Sentinel Wells to allow for the tracking of groundwater quality changes over time within the CGB survey area.

When will the survey be performed?

The ERT survey is scheduled to take place the week starting Monday, April 5, 2021.

How long will the survey take?

One work week is being allotted for the ERT survey. It is estimated that each of the three survey lines will require one 8-hour day to complete. The two additional days are intended to accommodate any unexpected delays.

Will the results of the survey be available to the general public?

Yes, a technical report will be prepared by the survey team presenting the results and findings of the ERT survey. The report will be made available to the public through the GSA website: carpgsa.org.