

Geology and sustainable development: multiple techniques to locate and mitigate potentially active faults in a rapidly urbanizing area, City of Lake Elsinore, California, USA

¹SHLEMON, ROY J., and ²GINTER, DAVID H. ¹P.O. Box 3066, Newport Beach, CA 92659, USA; ²Neblett & Associates, Inc., 4911 Warner Avenue, Suite 218, Huntington Beach, CA 92649, USA.

A 1200-ha urban development of homes and recreation (lakes and golf courses) is planned at Lake Elsinore in southern California. However, several inferred active (Holocene) faults traverse the area impacting proposed high-density landuse for ~10 ha. Multiple exploration techniques were therefore used to locate and date these faults.

First, 6400-linear m of deep and shallow seismic refraction lines were run to locate subsurface faults, right-stepping segments of the Elsinore fault system. Second, the horizontal extent of the faults was delimited by placement of 60, ~35-m deep continuous-cored borings and water wells. Third, 48 cone penetrometer test (CPT) soundings, on 8 to 15-m centers and to depths of 30 m, delimited the upper (vertical) extent of the faults. Fourth, three, 60-m long and up to 11-m deep, excavator trenches exposed an overlying, unbroken stratigraphy dated by radiocarbon and soil-stratigraphy as being at least 30 ka old.

These subsurface faults are demonstrated to be "nonactive," according to State of California criteria. The cost of all geotechnical exploration was approximately US one-half million dollars. Now, however, without setbacks or other constraints imposed by active faults, the value of the land increased about US \$20 million. This yields a benefit/cost ratio of 40:1, a classic example of the potential value of geologic investigations to maximize landuse in a rapidly urbanizing area.