



GEOLOGIC HAZARD MAPPING, FAULT TRENCHING, AND MITIGATION PLAN for the Tejon Mountain Village Master Planned Development, Kern County, California

PROJECT DESCRIPTION

Encompassing about 60 square miles in the Tehachapi Mountains near the town of Lebec, this residential/resort community will be built out over the next 10 to 20 years. This biologically rich site includes oak-studded grasslands, forested mountains, meadows, spring-fed wetlands, and one of the few natural lakes in southern California. The ecologically sensitive plan calls for only a small portion of the property to be developed, primarily as widely spaced estates, clustered homes, vineyards, a commercial center, and recreational facilities. The remainder of the site will be permanently preserved as open space for hiking, horseback riding, and ecological studies. Because the site is topographically and geologically diverse, it is vulnerable to numerous hazards, including ground rupture from the active Garlock fault zone, strong seismic shaking, liquefaction, small to large landslides, debris/mudflow, and thick deposits of compressible soils.



SOLUTION

In order to evaluate the design concept, *Earth Consultants International* undertook an extensive background review of published literature, along with a geomorphic analysis of the landforms using aerial photographs and Landsat imagery. Our geologists then excavated numerous trenches in the hilly terrain to constrain the location of the active traces of the Garlock fault zone. Where the fault crosses the deep, wet, alluvium-filled Castac Valley, trenching was not feasible.

In this area, we used cone penetrometer test soundings, along with several hollow-stem boreholes to define structural setback zones from the active fault strands.



Numerous previously mapped faults and lineaments were found to be nonexistent or not active, and several secondary faults were identified for further study. We also conducted geologic mapping to identify other areas impacted by such hazards as landsliding, debris flows, and the effects of strong seismic shaking. We entered and analyzed the collected data using GIS-based software, and prepared, as a final product, a geological constraints and opportunities map. This map was used by the landowner and the design team to reduce the amount of mitigation needed by avoiding areas with severe geologic impacts, and utilizing those regions with minimal impacts for the majority of the development.

