



MITIGATION OF NATURAL AND MAN-MADE OIL SEEPAGE DURING PLANNING AND DEVELOPMENT of the Olinda Ranch Residential Project City of Brea, California

PROJECT DESCRIPTION

Located in moderately to gently sloping hillside terrain, this project includes 660 new homes, community sports park, historic preservation site, and trail corridors. Surrounded by state and county parklands, the project offers panoramic views to the Pacific Ocean, nearly 20 miles away. In addition to new homes, the project included the widening of the adjacent state highway and county roads, construction of large detention basins for storm water control, and improvements to nearby Carbon Canyon Regional Park. Sited within the Brea-Olinda Oil Field, development also required cleanup and abandonment of oil production facilities dating back more than 100 years. Selected oil-field facilities, including wells, storage tanks and infrastructure, remain in operation and were incorporated into the design of the community. The development area lies adjacent to the main trace of the active Whittier fault and encompasses several inactive, subsidiary faults. In addition, prior to development, surface seepage of naturally occurring oil and methane gas impacted approximately 10 percent of this 280-acre site. Thick deposits of compressible alluvium were present in natural stream courses that traversed the property, and stability of the natural slopes adjacent to the new homes was a concern.



Crude oil seeping from fractured bedrock

SOLUTION

This site was particularly challenging to the design and earthwork construction teams because of the natural and man-made conditions that were present. During the design and grading phases, over 50 excavations were mapped, logged, and evaluated in order to precisely locate the active strands of Whittier fault zone and provide structural setback limits for the homes. Multiple strategies were used to monitor and reduce the potential for oil and methane to impact graded lots. This included detailed geologic mapping and soil gas testing during grading, installation of subsurface venting and collection systems, placement of methane barriers in building foundations, and installation of gas monitoring wells throughout the project. The simultaneous abandonment of oil wells and oil field infrastructure, as well as the treatment and placement of crude oil-bearing fills had severe impacts on the logistics and efficiency of grading operations.

Compressible soils were also treated during grading by removal and recompaction prior to fill placement. Several natural slopes along the perimeter of the project were identified as potentially hazardous with respect to shallow slope failure and debris/mud flows. Debris impact walls were constructed in these areas to protect the development. Because of these complex issues, the planning, investigation, and analysis of this site required a strong, cooperative relationship with federal, state, county, and city regulatory agencies, the developer, the civil engineer, the earthwork contractor, and the oil field operator.



Olinda Ranch

