Meeting the Challenges of Characterizing Subsurface Conditions in Bouldery Terrain

CULTURAL MUSEUM

Cultural History and Geologic Setting

A geotechnical and flood hazard investigation was performed to support construction of the Agua Caliente Cultural Museum at Andreas Canyon. The fan (Qf) is formed at the mouth of Andreas Canyon within the Salton Depression several miles north-east of Palm Springs, California. The Museum site is located on a debris flow fan at the mouth of Andreas Canyon. The fan is entrenched, eroded, and has mature plant communities established on their surfaces. The extensive fan head is about 3,000 to 4,000 feet wide and 0.5 to 1 mile long. Most of the fan debris is from the Agua Caliente region. The Museum site is located in the Palm Canyon area, at the base of the San Jacinto Mountains, just south of Palm Springs, California. As currently envisioned, the Museum site will be a cultural center, with exhibit galleries, gift shop and food service, education and meeting facilities. The Museum will showcase the culture and history of the Agua Caliente Cahuilla people. The site is approximately 1.5 acres, and parking will be provided for approximately 110 vehicles.

GEOLOGY

Not including the Agua Caliente region, the Andreas Canyon fan is predominately granitic boulders and metamorphic rock types. The interpretation of soil samples taken from the site beneath a surficial layer of fine-grained alluvium up to 2 feet thick indicates that coarse-grained debris flow deposits occur throughout the Andreas Canyon drainage basin. These deposits are typically about 3 to 5 times longer than they are wide, and thin to about 5 to 8 feet thick near the fan apex, and thin to about 1.5 to 4 feet at the toe. They measure about 300 to 600 feet wide and generally range from 0.5 to 1 mile in length. Most of the deposits are highly weathered granite, with some developing as a result of deposition of large, infrequent, overlapping debris flows disgorged from the Salton Depression. Some debris flows are embedded boulders, and the debris flow deposits consist of lightly cemented, dry, silty sand and sandy silt, with common pinhole desert varnish formation. The debris flow deposits are generally most well developed on the fan surface. In the area beneath the site, these deposits are likely to be extensively weathered and cemented granite. The debris flow deposits are underlain by older, less well-developed deposits throughout the Andreas Canyon drainage basin.

FLOOD HAZARD

Exponent Failure Analysis Associates Civil Group 1 Irvine, CA, 2 Menlo Park, CA, 3 Los Angeles, CA

Exponent performed a site investigation consisting of fourteen test pits (TP-1 to TP-14) at the northern edge of the site adjacent to Andreas Canyon. Test pit excavations were performed to approximately 10 feet below the surface, with fan deposits typically ranging from 0.5 to 1.0 feet in thickness. Soils from the pit during the two-hour test. Most of the settlement occurred within the first 45 minutes. A total of approximately 0.0 to 0.2 inch of settlement during the two-hour test. The settlement measurements were made using three linear displacement transducers placed on the fan surface. The water level in the test pit was maintained at about 1 foot deep in the test pit by intermittent addition of water from the north side of the site. Water was added to the test pit and the settlement recorded over a two-hour period using three linear displacement transducers placed on the fan surface. The water level in the test pit was maintained at about 1 foot deep in the test pit by intermittent addition of water from the north side of the site.

FIELD INVESTIGATION

Exponent Failure Analysis Associates Civil Group 1 Irvine, CA, 2 Menlo Park, CA, 3 Los Angeles, CA

Exponent performed a field investigation consisting of fourteen test pits (TP-1 to TP-14) at the northern edge of the site adjacent to Andreas Canyon. Test pit excavations were performed to approximately 10 feet below the surface, with fan deposits typically ranging from 0.5 to 1.0 feet in thickness. Soils from the pit during the two-hour test. Most of the settlement occurred within the first 45 minutes. A total of approximately 0.0 to 0.2 inch of settlement during the two-hour test. The settlement measurements were made using three linear displacement transducers placed on the fan surface. The water level in the test pit was maintained at about 1 foot deep in the test pit by intermittent addition of water from the north side of the site.