Senior Canyon Tunnel Improvements Study

Owner:
Senior Canyon Mutual Water Company (SCMWC)
Ojai, CA

Client:
SCMWC

Role:
Tunnel Condition Inspection
Geological Mapping including Documenting Discontinuities, and Groundwater Inflows
Recommended Methods of Rehabilitation and Improving Water Intake and Discharge Capacity
Prepared Bottom-up Cost Estimate

Key Characteristics:

- 2,400-feet of accessible 8-foot by 8-foot horseshoe shaped rock tunnel by drill and blast.
- Intermittently supported by short concrete liner segments and timber sets.
- A water resource and conveyance tunnel currently collecting and discharging at a minimum rate of 60-gpm.

Professional Services:
From: January 2017
To: May 2017

JCK Underground was contracted by SCMWC to perform inspection and rehabilitation design of the existing Senior Canyon Tunnel. The tunnel is located in the Santa Ynez Mountain, north of the Ojai Valley, and serves as a water resource. In 1929, the tunnel was drilled and blasted 1,555-feet into the sedimentary layers of the bedrock that form the mountains. Sometime after 1929, the tunnel was further advanced to a total length of 3,000- to 3,500-feet.

The 8-foot by 8-foot horse-shoe shaped tunnel is mostly unlined with short stretches of fractured rock requiring cast in place concrete and timber sets for support. A partial collapse of the tunnel was encountered at 2,400-feet making it impassible and limiting the inspection to this distance. Water movement into the tunnel is through a complex series of discontinuities consisting of bedding joints, steep angled fractures, and faults. These geologic discontinuities, depending on fracture infilling, both allow and impede water inflows into the tunnel. The tunnel currently collects water from the surrounding rock and discharges at a minimum flow rate of 60-gpm.

JCK Underground performed a general condition assessment inspection of the tunnel while concurrently performing geological mapping of bedrock, and documenting discontinuities and water inflows. A report was generated based on the collected data, summarizing the inspection method, the inspection results and corresponding condition assessment. The report also recommended solutions for tunnel rehabilitation including improved ground support and overall water resource capacity improvements. Other data collected, included as-built geometries, allowing JCK Underground to provide a bottom-up construction cost estimate for the tunnel rehabilitation, and capacity enhancements.