



## Oakdale Irrigation District

Condor Earth Technologies, Inc. (Condor) was selected by Oakdale Irrigation District (OID) as their Engineer/Designer, Construction Manager, and Construction Inspection and Testing Services provider for their Main Canals and Tunnels Rehabilitation Project. The OID Main Canals and Tunnels were originally completed in 1912 and were enlarged in 1947.

Condor addressed this project in phases, starting with the identification and documentation of hazards and areas needing improvement. This task included reviewing published documents regarding geologic features of the area, existing aerial photos, OID documentation of hydraulics of the existing canals, required diversion points, flow requirements, etc. Site reconnaissance was performed to locate areas of deterioration, potential instability, geohazards, prior problems/repairs, etc. and was basemap-linked using GPS. Identified hazards included severe canal erosion, concrete cracking and voids, slope instability at portals, loose rock blocks and unstable rock slopes above canals, unstable rock blocks and slabs within tunnels, block and slab failures, and severe tunnel erosion problems. The hazards were rated on a low, medium and high severity level. Condor prepared a hazards identification report to present to OID in preparation for the next phase - Evaluation of Findings.

Following OID's review of Condor's findings, Condor proceeded to the

design phase of repairs to high severity hazard areas that were identified. Condor developed repair designs, construction plans and specifications, and engineer's cost estimates for short- and long-term solutions for slope instability, canal embankment instability, canal leakage, and tunnel liner and portals. Once approved by OID, Condor moved onto the next phase - Construction Management.



Condor prepared all bid documents, including project drawings, specifications, and time frames necessary to complete the fast-track \$5M repair project. Condor assisted OID with the selection of the lowest qualified bid, which consisted of extensive review of bids and qualifications submitted by each Contractor. Condor provided a Project Manager and Resident Engineer to track various aspects of the project, such as: technical field work performed, financial and budget aspects, and reviewing of submittals during the course of construction for completeness and necessity. Condor provided support to the field engineering process by providing engineering staff to respond to design modifications in the field including



engineering reviews, calculations, and design modifications.

Condor's Materials Testing and Special Inspection Division provided field observation and testing services during the course of construction improvements. Testing and inspections included: concrete and shotcrete placement, compressive strength, core grades, placement and pull test observation of soil nails/rock dowels, and quantities verification.

During the course of construction, a total of 1,400 cubic yards of shotcrete was applied, 1,000 cubic yards of concrete invert was laid, and 4,500 linear feet of soil nails/rock dowels were installed. Throughout the four-month fast track job, there were no lost time man hours, reportable incidents, first aid/medical cases or near misses, or violations to regulations.

**Condor Earth Technologies, Inc.**  
*An Employee Owned Company*

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