Eagle Valley Quarry Water Supply and Distribution Project

Jeffrey Aguilar, Luis Arevalo, Rafael Avila, Alejandro Cardenas, David Cardenas, Siu Yip Chan, Victor Cuevas, Tigist Desta, John Grefiel, Eduard Kirakosyan, Hao Lam, Alexis Lopez, Michael Mafonde, Ramez Mikhil, Israel Mota, Samer Najjar, Tan Nguyen, Son Pham, Ruby Rodriguez, Angelika Sonne, Jasmine Valle, Bryan Villegas, Sabastian Wamwati, Zilin Xiao

Faculty Advisors: Dr. John Shamma, Dr. Howard Lum, and Dr. Jason Song

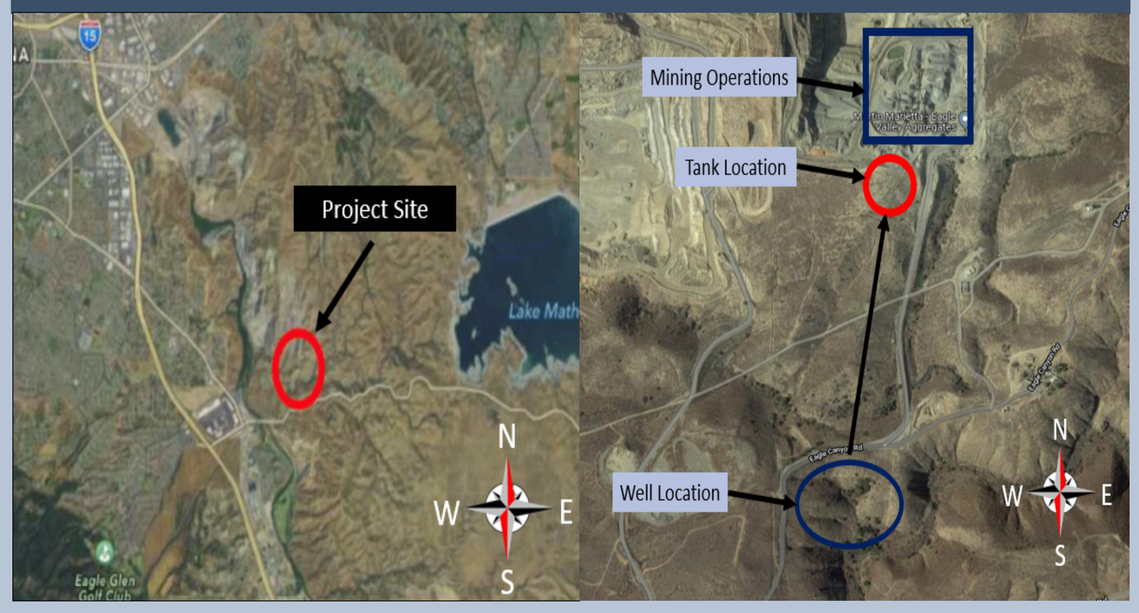
Department of Civil Engineering: California State University, Los Angeles

PROJECT DESCRIPTION

Our engineers have used their knowledge and expertise, which spans across all Civil Engineering disciplines, to thoughtfully design water storage and transportation infrastructure that meets all applicable code and zoning requirements, which ensure proper quality assurance and control.

After considering all technical and non-technical constraints, our team has designed an efficient, sustainable, and ecologically sound, and economically feasible infrastructure system that safely moves water north from the Cajalco Creek aquifer to two large storage tanks via an underground pipe system. These routes and locations have been optimized in order to provide the client with a sufficient water supply for their operational needs.

PROJECT SITE



OBJECTIVES

- ❑ Hanson Aggregates has a water storage/supply issue in Corona, CA
- ❑ Meet client demand of 1.25 cfs per 9-hr workday
- ❑ Supply water from point A (creek) to B (delivery point) to C (mining operations)
- ❑ Storage Capacity to meet demand

ACKNOWLEDGEMENTS

Special thanks from our team to Aztec Engineering, Cal State LA Civil Engineering Department and Department Chair, Dr. Tufenkjian for their support throughout the project.

RESEARCH

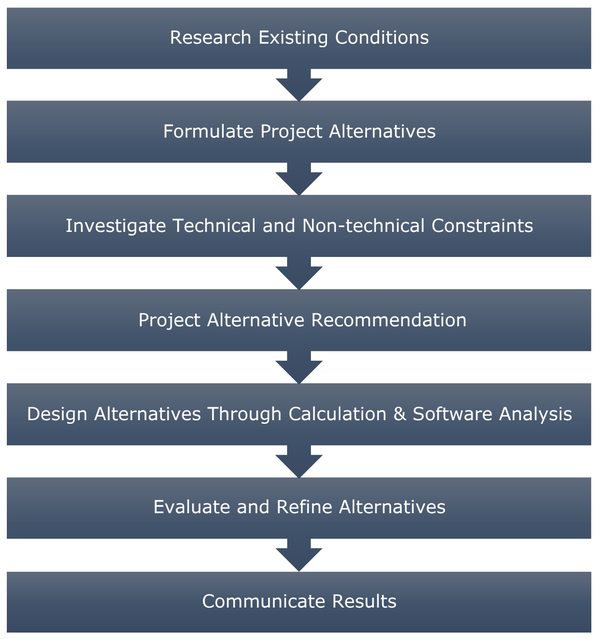
Non-Technical Constraints

- ❑ Environmental
  - ✓Area of Conservation
  - ✓CEQA Checklist
  - ✓Mitigation Measures
- ❑ Permits and Easements
  - ✓Request permission to build across properties

Technical Constraints

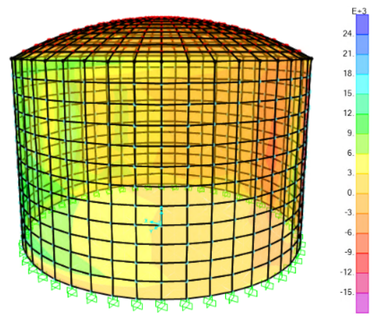
- ❑ Topography
  - ✓Used Google Earth and Civil 3D
- ❑ Geotechnical Reports
  - ✓Soil Classification
  - ✓Seismic analysis
- ❑ State and Local Regulations
  - ✓Cal Trans Design Standards
  - ✓Riverside building codes
  - ✓California Building Codes (CBC)

METHODOLOGY

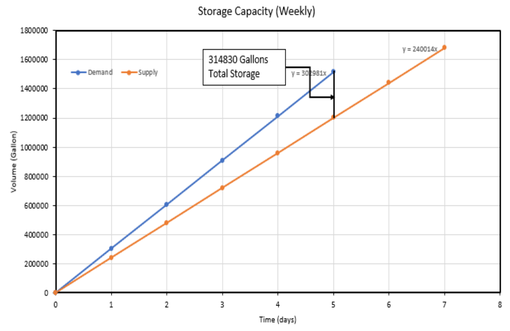


DESIGN

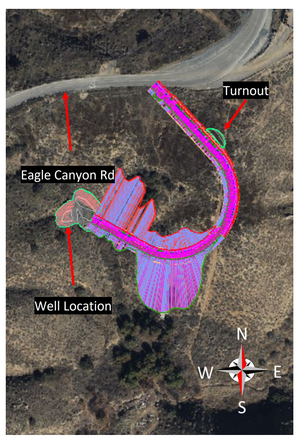
Seismic Analysis (SAP2000)



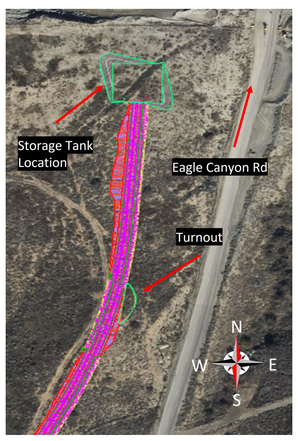
Rippl Method Analysis



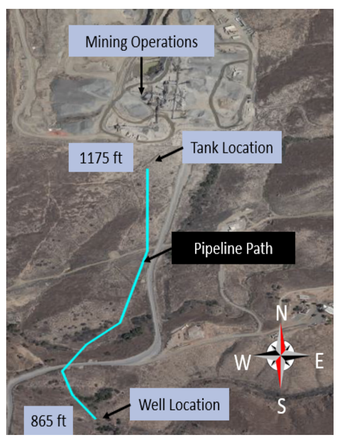
Well Access Road



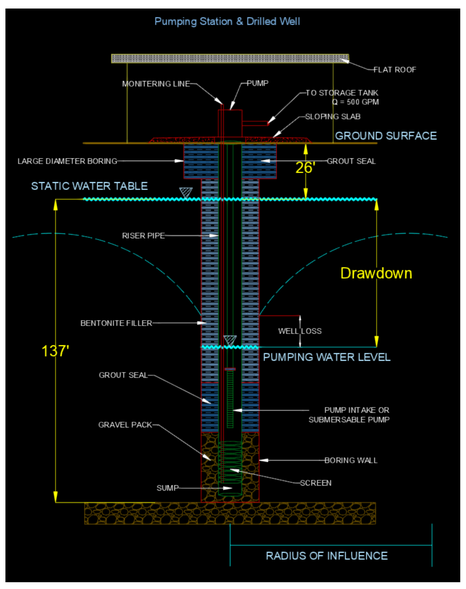
Pipeline Access Road



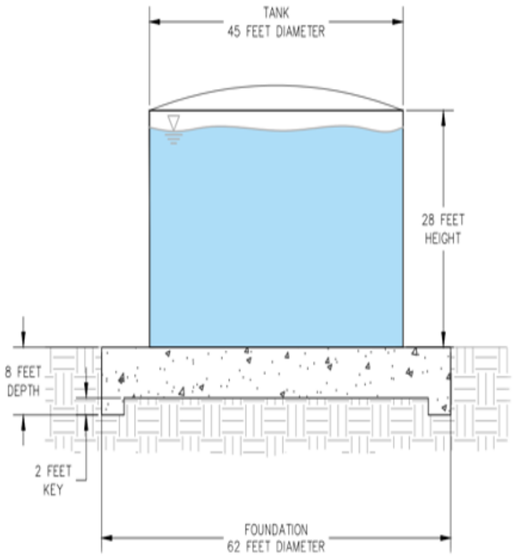
Pipeline Alignment



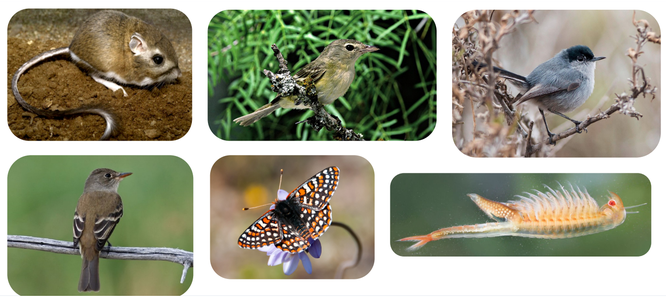
Drilled Well Design



Tank & Foundation Dimensions



ENVIRONMENTAL



Top left: Stephen's Kangaroo Rat; top middle: Least Bell's Vireo; top right: California Coastal Gnatcatcher; bottom left: Southwestern Willow Flycatcher; bottom middle: Quino checkerspot butterfly; bottom right: Riverside fairy shrimp.

These six species have been identified as the most sensitive in the area. Mitigation measures include driven mesh fencing and repelling plants for the kangaroo rats and avoiding nesting trees and scrubs between February and September for the bird species, and from March to winter for the checkerspot butterfly. The Riverside fairy shrimp is the least likely to be affected by the project, but because they are endangered, future in-depth biological reports are needed to ensure that the shrimp will not be harmed.





Prior to January 5th, 1852, when Cession 308 was implemented, the Tongva nation called the Cajalco basin and Gavilan Hills their home. They would use mortar holes, carved in rock (pictured to the left) to grind and water down acorns to harvest tannins for meals. The area is rich in cultural significance and should be treated as such. Tribal leaders and anthropologists must be consulted to ensure that any artifacts or human remains are properly cared for.

Only a few miles from the project site is America's first tin mine, the Cajalco-Temescal Tin Mine (pictured to the right). It began as a sacred underground source of medicine for the indigenous nation living there but became the most important source of tin for the country. It's been closed since 1945, but the history remains.