The value of engineering geologic services during construction The Crafton Hills Reservoir Enlargement 2015 AEG Annual Meeting

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### Background

- Construction Geology Services
- Utilization of Geologic Information
- Discussion and Conclusions



### Background – Site Location



### Background – Regional Geology





## Background – Site Location



# Background – Site Location



### **Construction Geology Services**

- Foundation and cut slope mapping
- Curtain grouting inspection and monitoring
- Instrumentation
- Reporting



## Construction Geology Services-Geologic mapping

#### Foundation mapping

- 1" = 10' on paper
- Structural measurements on 10foot grid
  - Stationing provided by the contractor
- Additional measurements as needed



## Construction Geology Services-Geologic mapping

- Cut slope mapping
  - 1" = 20' on paper
  - Structural measurements on 50foot grid
    - Stationing/locations from grade stakes, GPS stations
  - Additional measurements as needed



## Construction Geology Services-Curtain grouting

- Drilling (verify angle, depths, logged cuttings)
- Grouting (verify stage length, pressures, water testing, grout takes, refusal)
- Batch plant QA
- Data analysis and split spacing determination



## **Construction Geology Services**-Instrumentation

- Drilling
- Installation
- Monitoring



## Construction Geology Services-Reporting

- Analysis of structural data
- Compiling and drafting field maps
- Documenting construction materials and conditions



### Utilization of geologic information

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#### Geologic mapping Curtain grouting



Confirm foundation characteristics





 Slope instability issues and remediation alternatives











## Utilization of geologic information -Curtain Grouting

- Split-spaced holes to target mapped features
- Verification and closure
- Concrete cut-off wall



#### Summary and Conclusions

#### Detailed mapping helped us:

- Confirm foundation conditions
- Refine instrumentation plan
- Prepare a reasonable SOW to determine post-filling seepage pathways and remediation options
- Characterize locations with potential for wedge failures
- Prepare the next generation for problems we don't foresee yet
- Observations and analysis of curtain grouting data led us to install a 10-foot deep concrete cut-off wall



#### Lessons Learned

- Coordinate better with construction staff to avoid duplication of efforts and/or not being clear on the roles and responsibilities
- Rotate staff, rather than having one person do the bulk of the work
- Data management
- Methods of data collection (paper vs electronic)



