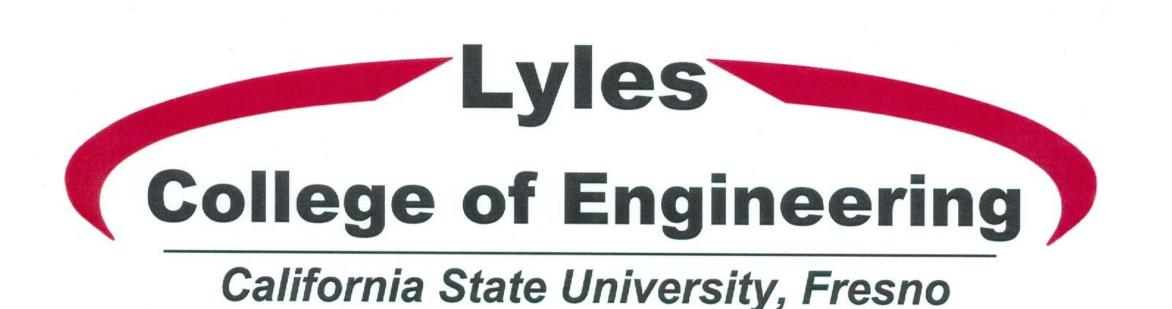


# SR 140 Ferguson Landslide Permanent Restoration

Civil Engineering

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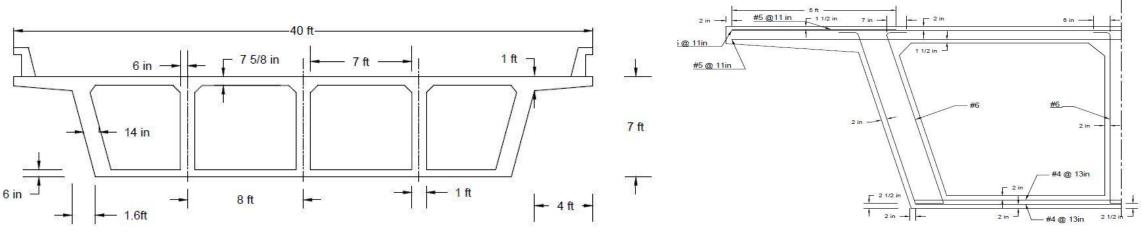
#### **Abstract**

In April of 2006, a massive rockslide (the Ferguson Slide) occurred on State Route 140 covering the entire highway with debris. The Ferguson landslide blocked all through traffic by depositing approximately 798,000 tons of rock onto State Route 140 and into the Merced River between post miles 42.0 and 42.7 directly 7.6 miles west of El Portal, Ca. From El Portal, Highway 140 continues eastbound into Yosemite National Park, where it merges with State Routes 41 and 120. Because it is at a lower elevation than the other routes leading to Yosemite, State Route 140 is the primary entrance into Yosemite during the winter season and is also known as, "The All Year Highway." In August 2006, a temporary bypass was completed to restore the use of State Route 140 within the project area. This bypass project detoured traffic to the hillside directly east of the Ferguson Slide by adding two temporary bridges from SR 140 to span across the Merced River and connect to a one lane roadway therefore creating a single 15 mph traffic lane between the bridges. While this temporary project restored through traffic, it did not completely restore State Route 140's level of service prior to the rockslide therefore a delay is still present within the area.

Earthwork International has designed a permanent restoration bypass that will restore State Route 140's original level of service. The design will completely bypass the Ferguson Landslide therefore creating a safe commute for Yosemite tourists as well as locals traveling within the area. This permanent bypass consists of two concrete bridges that will span across the Merced River and connect to an elevated roadway excavated into the hillside directly east of the Ferguson Landslide. The roadway will consist of two 12 foot lanes traveling in both directions with 8 foot shoulders that will be capable of supporting full size trucks, tour busses, and commuter traffic. The bridges will connect to the existing alignment of SR 140 by excavating the adjacent hillside to allow for the proper design speed. Since this project takes place in the Sierra National Forest, Earthwork International has taken into consideration the most environmentally friendly design that minimizes the amount of excavation and environmental impact while still preserving the surrounding

**Earthwork International Design Team** 

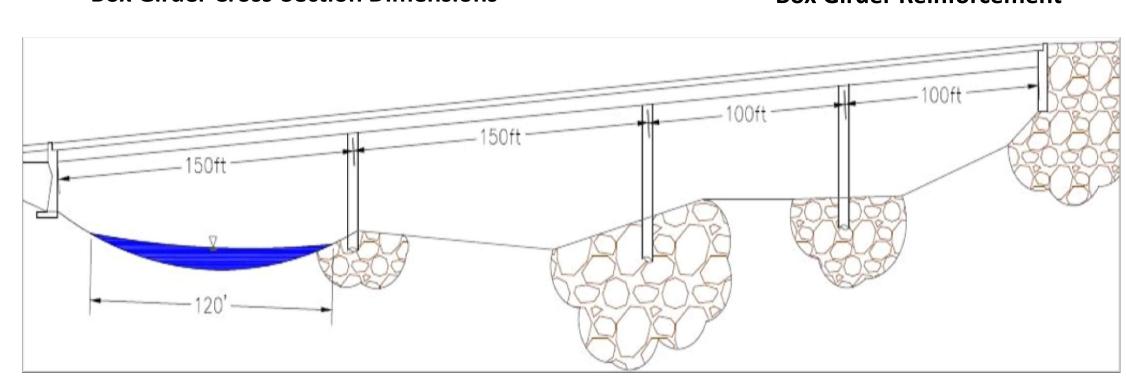




Structural Design Bridge and Box Girder

**Box Girder Cross-Section Dimensions** 

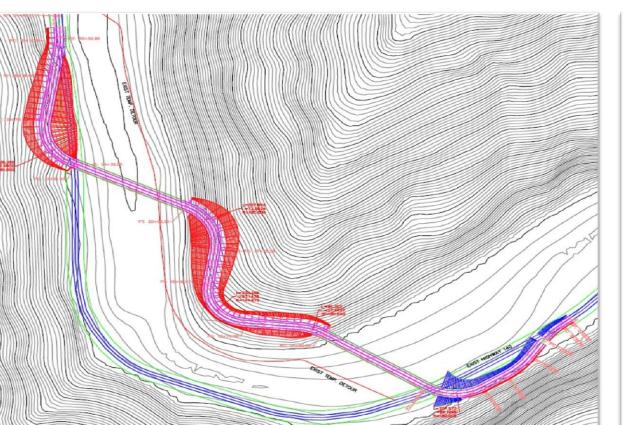
**Box Girder Reinforcement** 



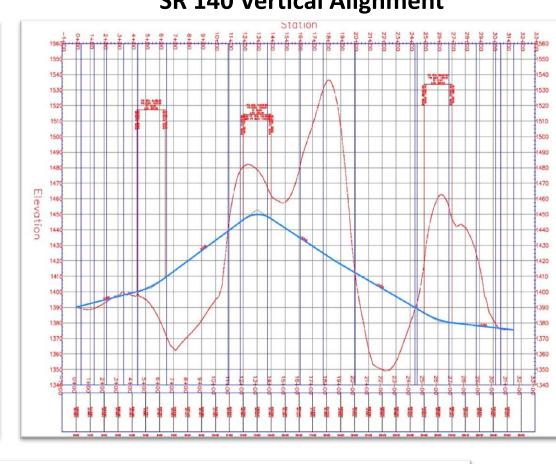
**Upstream Bridge Profile** 

## **Transportation Design**

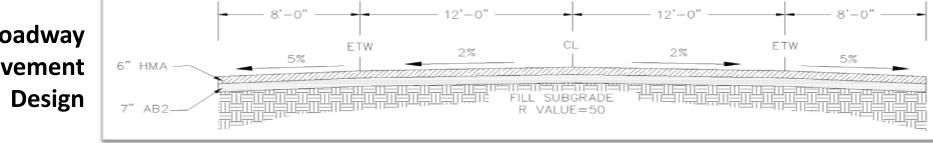
**SR 140 Horizontal Alignment** 



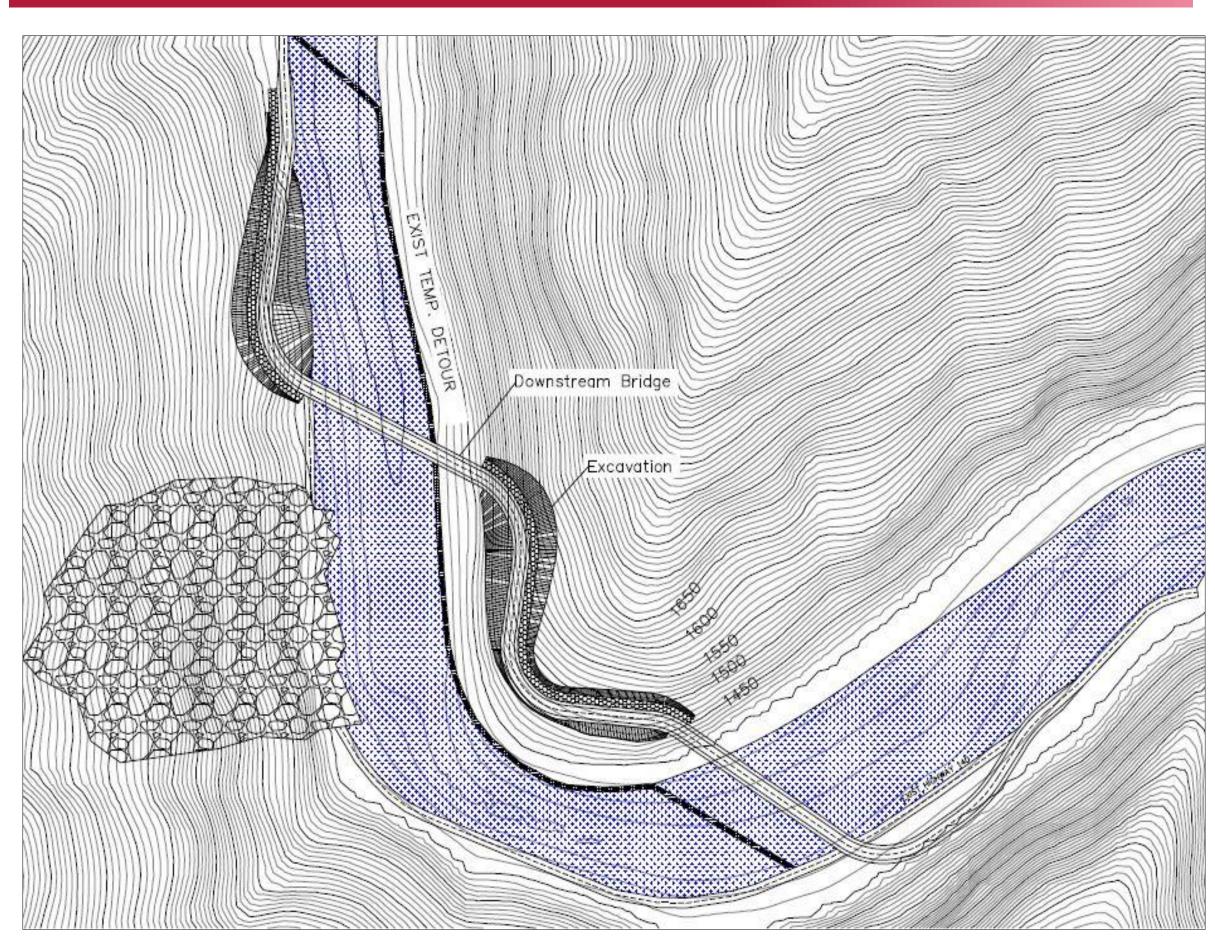
**SR 140 Vertical Alignment** 



Roadway **Pavement** Design

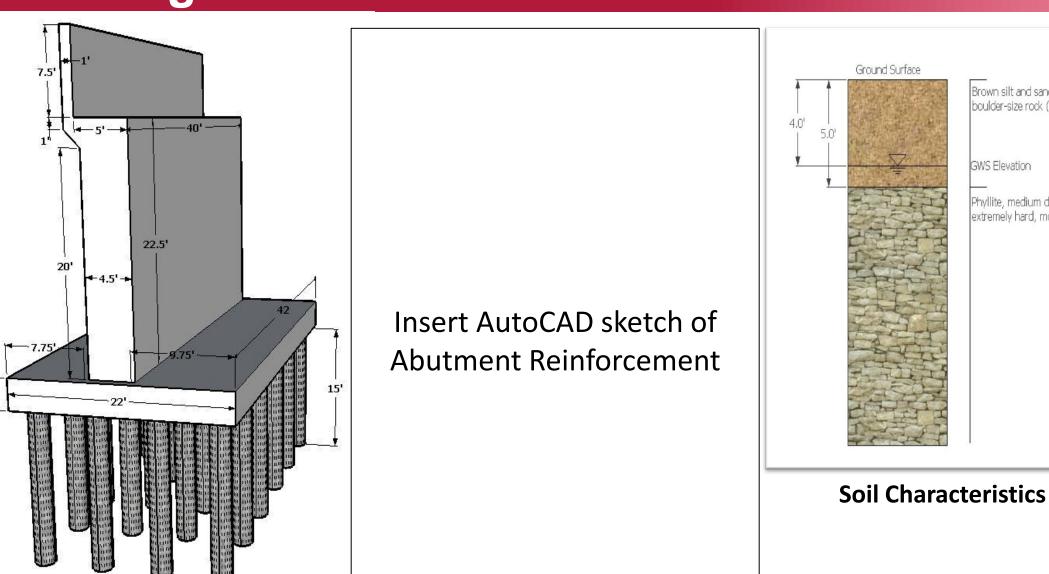


#### **Overall Site Plan**



**Topographic Site Plan** 

### **Bridge Abutment and Soils Characteristics**



## Sponsors/Conclusion



John Rowland, PE, TE

**Bridge Abutment** 



Brown silt and sand with gravel to

Phyllite, medium dark gray, very hard t

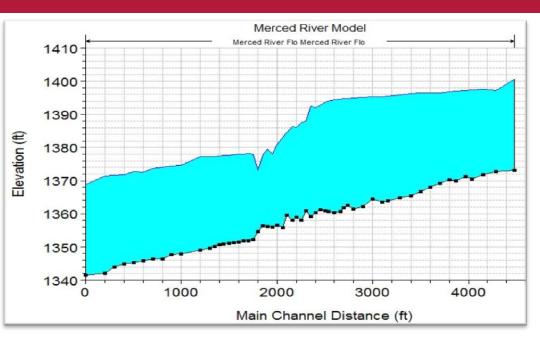
Cordie Qualle, P.E. MCE



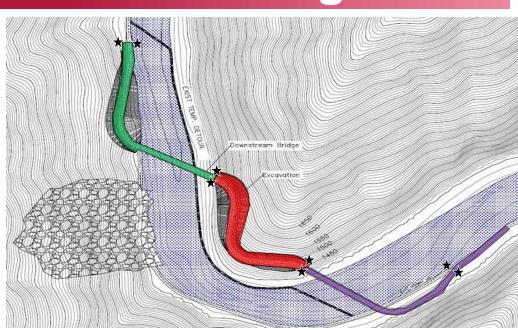


Jonathan Jensen, E.I.T & Mark Weaver P.E.

## **HEC RAS Modeling and Storm Drainage**



Water Surface Profile,  $Q_{50} = 56,534$  cfs



**Inlet Location for Roadway**