Western Bridge Engineers' Seminar 2009

Western
Bridge
Engineers'
Seminar

COSUMNES RIVER PEDESTIRAN BRIDGE
RANCHO MURIETA, CA

Presented by:
James L. Foster, P.E
Quincy Engineering, Inc.
Paul C. Gilham, P.E., S.E.
Western Wood Structures, Inc.
Working Wonders with Wood

In cooperation with

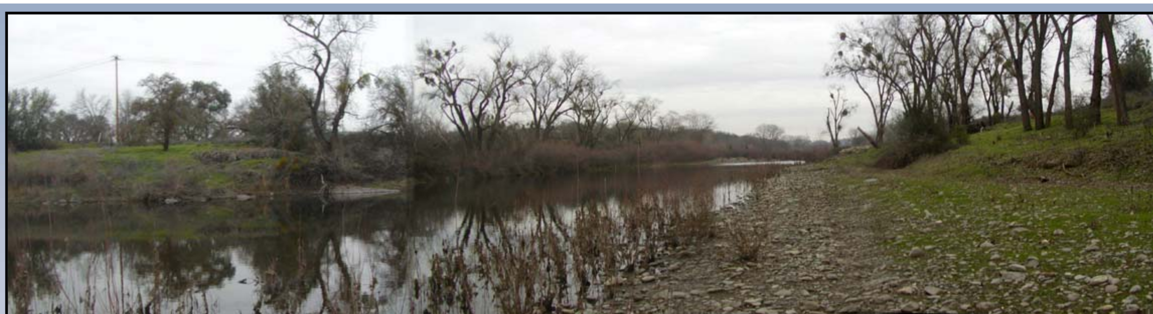
Viking Construction

Rancho Murieta Association and Community Services District

County of Sacramento

Project Location

Western Bridge Engineers' Seminar



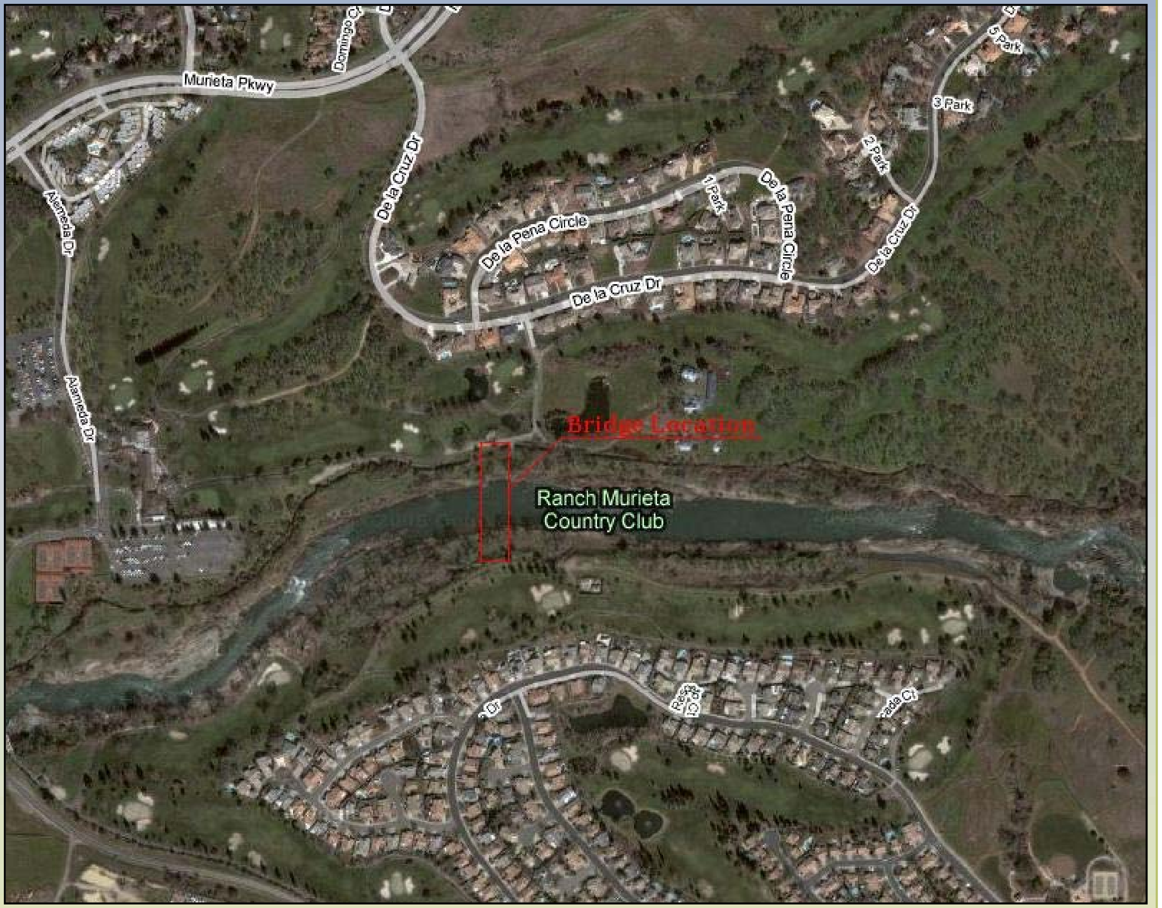
The project is located within the community of Rancho Murieta approximately 25 miles southeast of Sacramento, California. The new pedestrian bridge crosses the Cosumnes River to connect the north community to the south community.

Purpose and Need

The purpose of this project was to connect the North and South residential area pedestrian trails in the Rancho Murieta Community.

The connection was required by a development specific Sacramento County ordinance.

The project was funded by the community developers.



Constraints and Challenges

Western Bridge Engineers' Seminar

Fish – Salmon and Steelhead

Hydraulics – High flood flows

Birds – Hawk nesting site

Archeology – Native American mortar site

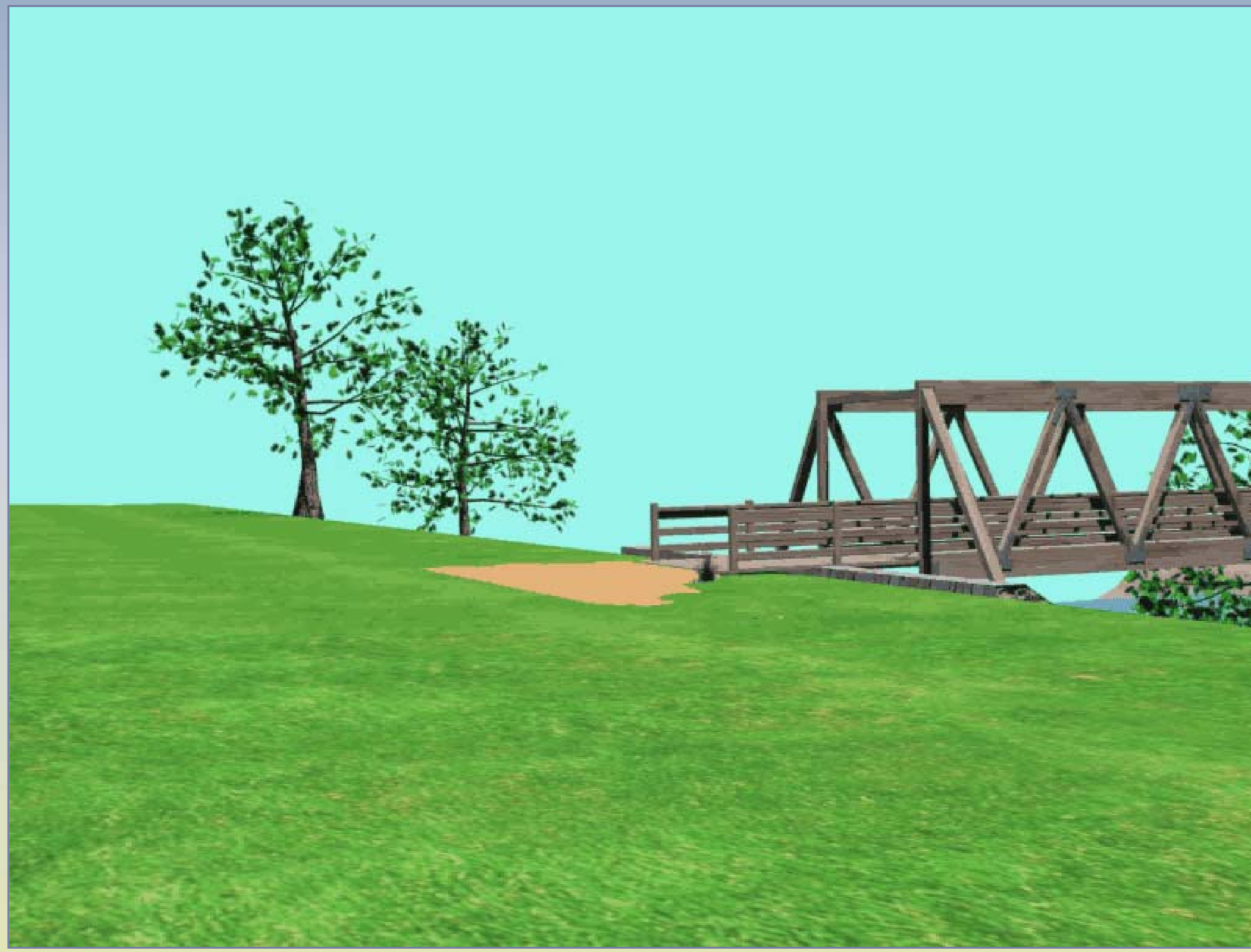
Foundations – near surface bedrock

Process – Public Outreach

Western Bridge Engineers' Seminar

Quincy Engineering developed a virtual 3-dimensional computer model to demonstrate what the proposed bridge would like after it was constructed.

This model was presented at public meetings with great success.



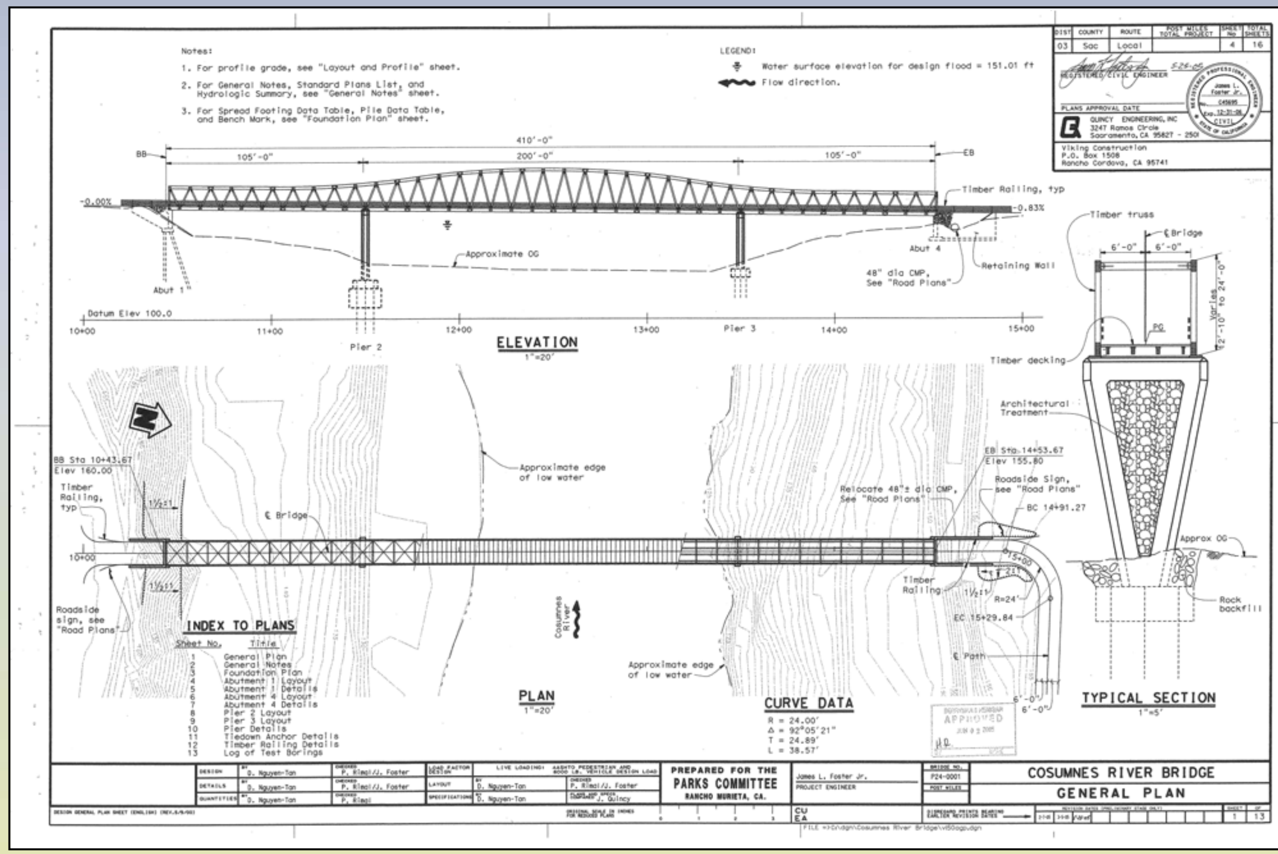
Process - Design

Bridge Description

410' total length (105'-200'-105'), 3-span timber truss, with 12' clear width

Supported on reinforced concrete seat style abutments founded on steel H-piles at Abutment 1 and spread footing on bedrock at Abutment 4

Reinforced concrete piers founded on bedrock using tie-down anchors



Process - Construction

Western Bridge Engineers' Seminar

Abutments





Process - Construction

Piers

Process - Construction

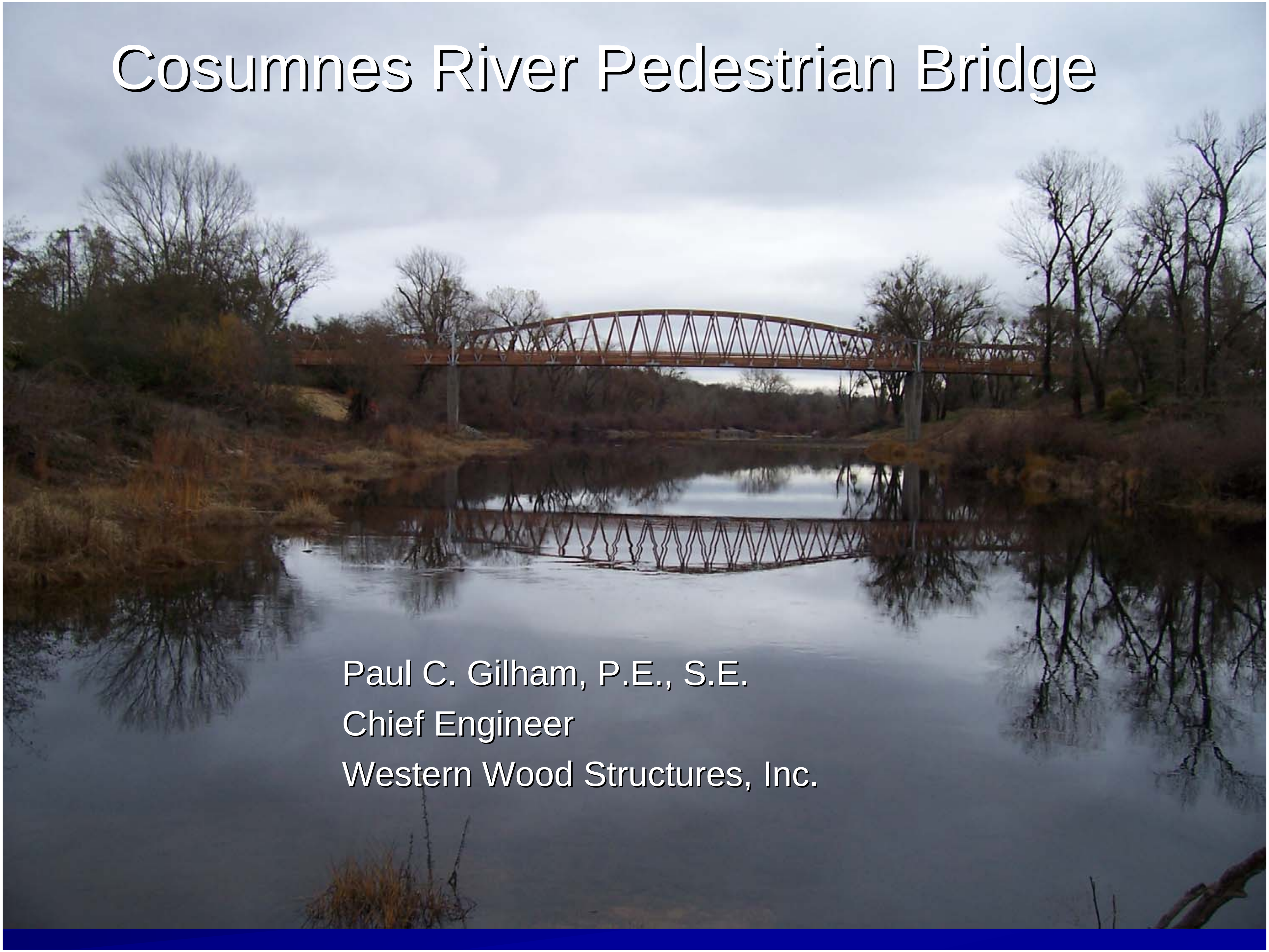
Piers

Process - Construction

Superstructure

Presented by:
Paul C. Gilham

Cosumnes River Pedestrian Bridge



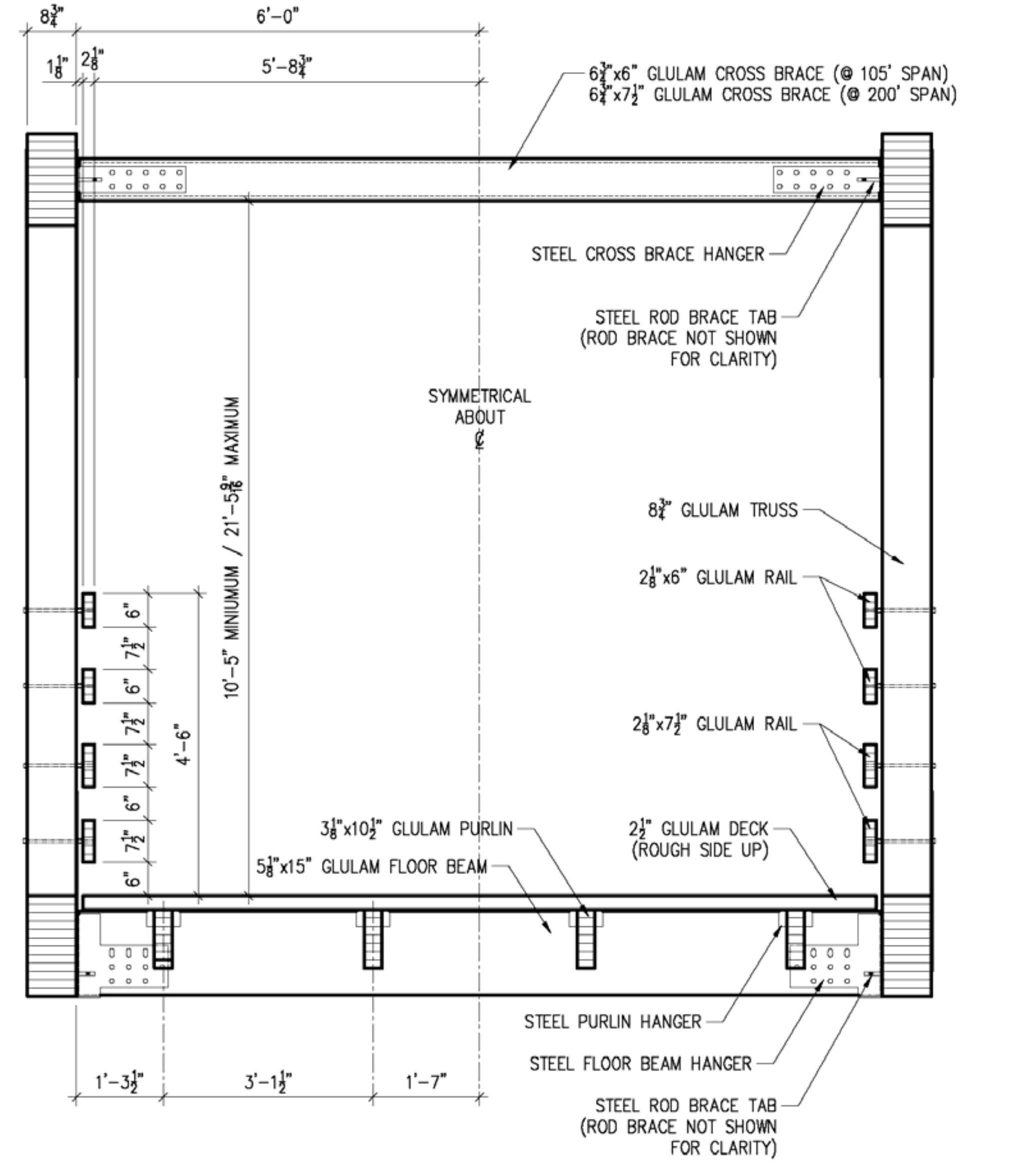
Paul C. Gilham, P.E., S.E.
Chief Engineer
Western Wood Structures, Inc.

Cosumnes River Pedestrian Bridge

Design Criteria

- Span: 410'-0" out to out.
- Main Span: 200'-0".
- Side spans: 105'-0" each.
- Minimum vertical clearance: 10'-5"
- Width: 12'-0" inside face of trusses.
- Live Load: 85 psf. Reducible per AASHTO.
- $\Delta(LL) \leq L/500$
- Vehicle Load: 10 ton maintenance vehicle.
- Wind Load: 75 psf. of projected area
- Seismic Loading: A=0.3g, Soil Profile Type D

Cosumnes River Pedestrian Bridge



TYPICAL BRIDGE SECTION

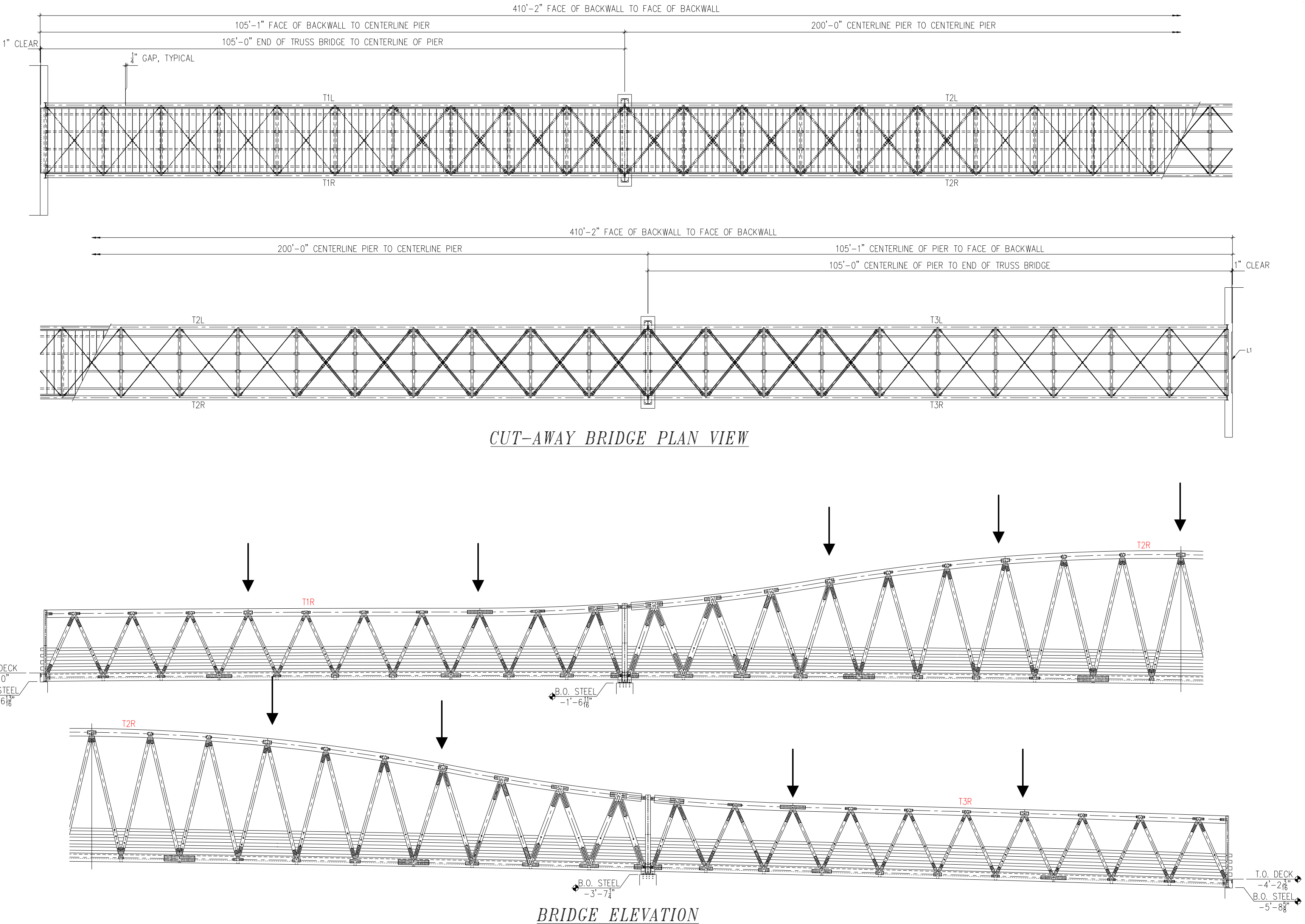
Cosumnes River Pedestrian Bridge

Design Constraints and Issues

- 4’-0” Elevation change from end to end
- Continuous 10,000 ft. radius bottom chord curvature
  - Adjusted for long term deflections.
    - 1.5*Δ(DL) + 1/8” for each 10’ of span.
    - 4 ½” (5715’R) camber at main span, 1 5/8” (5044’R) camber at side spans
- Continuous reverse curve on top chord.

Cosumnes River Pedestrian Bridge

Figure 1. Bridge Cut-Away Plan View & Elevation

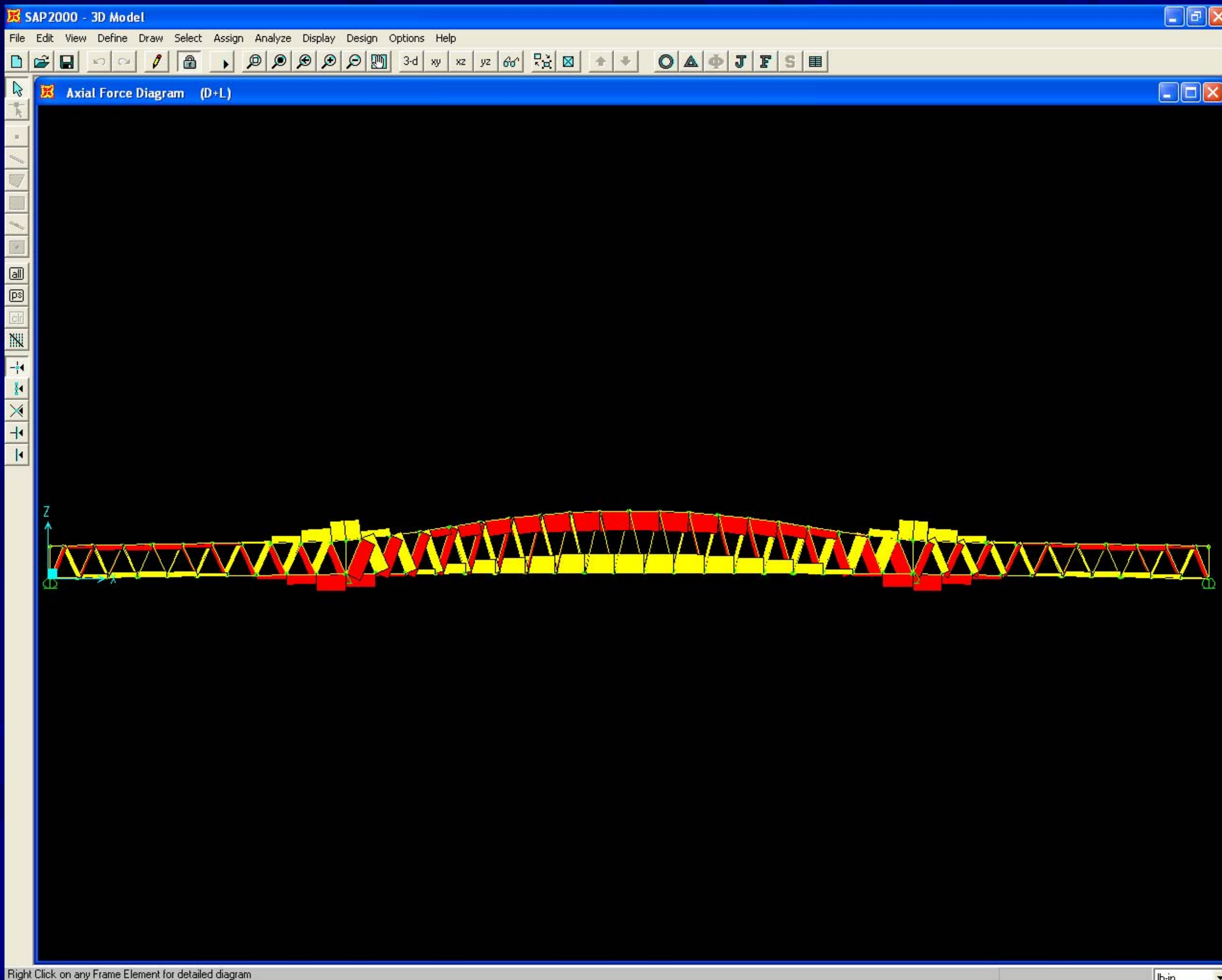


Cosumnes River Pedestrian Bridge

Design Constraints and Issues

- Continuous 10,000 ft. radius bottom chord curvature
- 4’-0” Elevation change from end to end
- Continuous Span to limit member forces & deflections

Cosumnes River Pedestrian Bridge



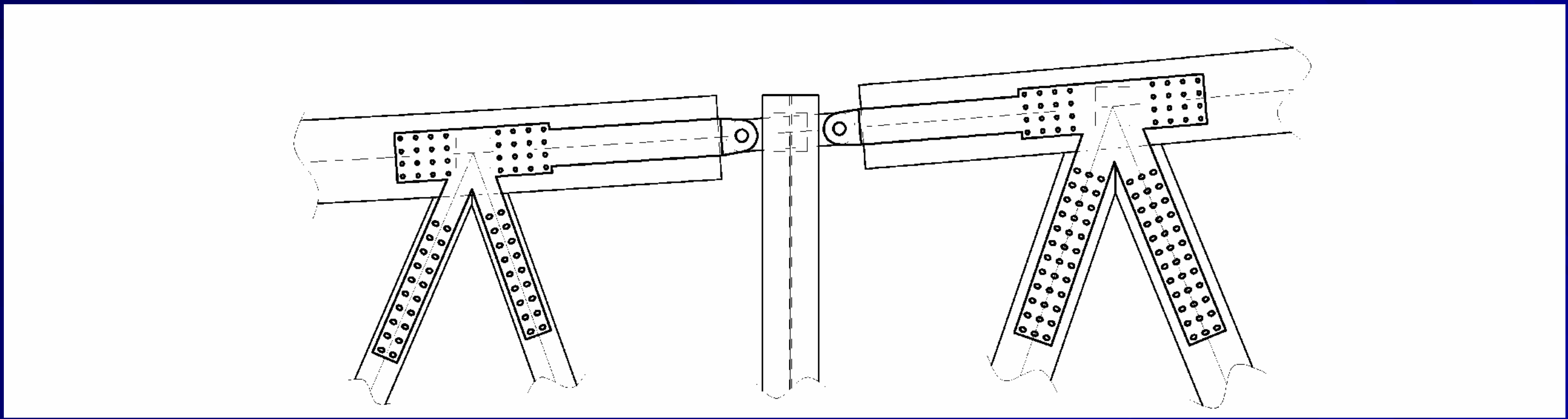
Cosumnes River Pedestrian Bridge

Design Constraints and Issues

- Continuous curvature to provide flowing profile.
- 4’-0” Elevation change from end to end with overall 10000 ft. radius.
- Continuous Span to limit member forces & deflections
- Connection designs account for reversal of truss chord forces and to allow quick jobsite installation.

Cosumnes River Pedestrian Bridge

Cosumnes River Pedestrian Bridge



Cosumnes River Pedestrian Bridge

Cosumnes River Pedestrian Bridge

Design Constraints and Issues

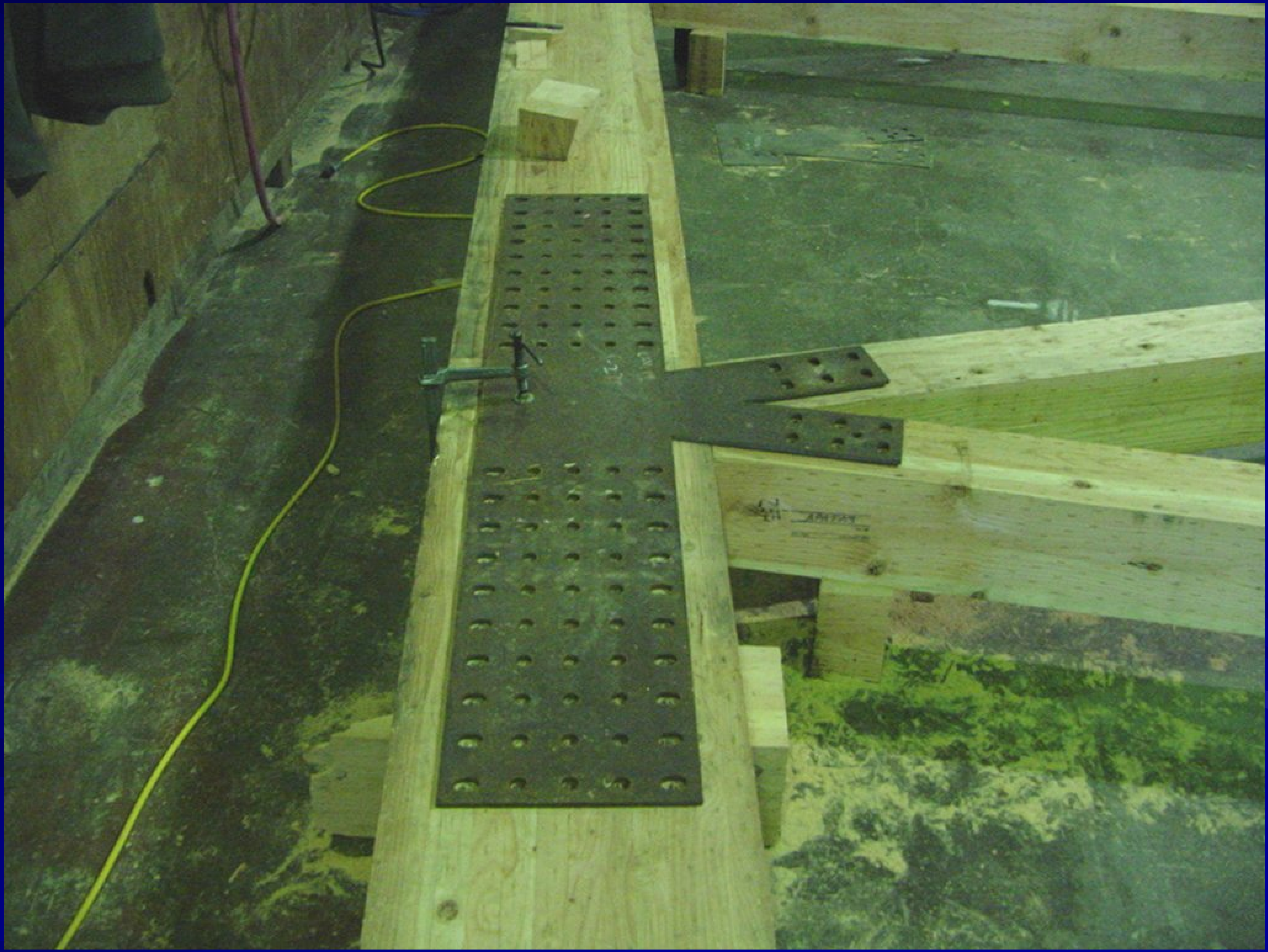
- Continuous curvature to provide flowing profile.
- 4’-0” Elevation change from end to end with overall 10000 ft. radius.
- Continuous Span to limit member forces & deflections
- Connection designs account for reversal of truss chord forces and to allow quick jobsite installation.
- Continuous design resulted in large lateral reactions at interior piers.

Cosumnes River Pedestrian Bridge

Cosumnes River Pedestrian Bridge

Fabrication & Erection

Cosumnes River Pedestrian Bridge
Fabrication & Erection



Cosumnes River Pedestrian Bridge

Fabrication & Erection

Cosumnes River Pedestrian Bridge
Fabrication & Erection

Cosumnes River Pedestrian Bridge
Fabrication & Erection

Cosumnes River Pedestrian Bridge

Fabrication & Erection

Cosumnes River Pedestrian Bridge

Fabrication & Erection

Cosumnes River Pedestrian Bridge

Fabrication & Erection

Cosumnes River Pedestrian Bridge
Fabrication & Erection

Cosumnes River Pedestrian Bridge

Cosumnes River Pedestrian Bridge

QUESTIONS

Rancho Murieta Association and Community Services District

County of Sacramento