



Fort Goff Creek Bridge R04 ABC Project

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U.S. Department of Transportation
Federal Highway Administration



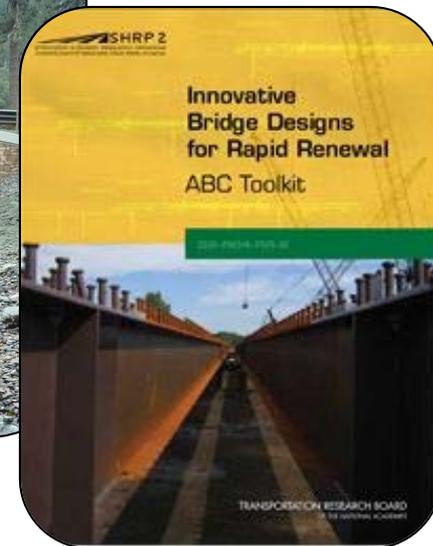
TRANSPORTATION RESEARCH BOARD
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Fort Goff Creek Bridge



Lead Adopter

SHRP2 Solutions Innovative Bridge Designs for Rapid Renewal



Fort Goff Creek Bridge



Fort Goff Creek Bridge Streambed Restoration Project

- California law requires unimpaired passage for all anadromous fish at stream crossings
- Replace 60-year-old culvert with 60' long single span bridge



Fort Goff Bridge

Funding Sources

Fisheries Restoration Grant Program (FRGP) [capital]

Cal Department of Fish & Wildlife (CDFW)

National Oceanic & Atmospheric

Administration (NOAA) Fisheries

National Marine Fisheries Service (NMFS)

Caltrans SHOPP (Minor fund) [support]

Office of Traffic Safety [capital]

SHRP2 (Strategic Highway Research Program #2) [support & capital]

American Association of State Highway & Transportation Officials (AASHTO)

Federal Highway Administration (FHWA)

United States Fish & Wildlife Service (USFWS) [support]

PacifiCorp Coho Enhancement Fund (CEF) [capital]



Fort Goff Creek Bridge

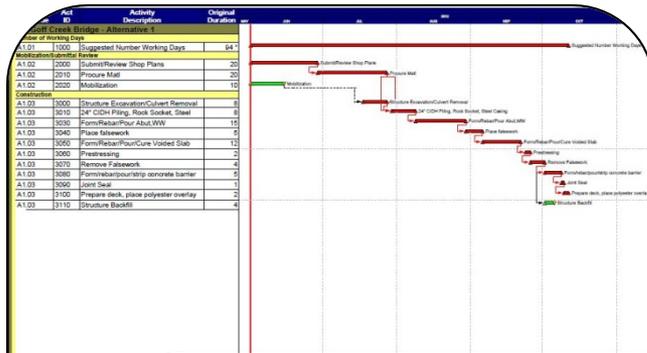
Fort Goff Creek Bridge



Challenges:

- Project in severe climate area
- Freeze-thaw cycles and heavy salting
- Nearest batch plant located 90 minutes away from site

Early Analysis for Structure Type

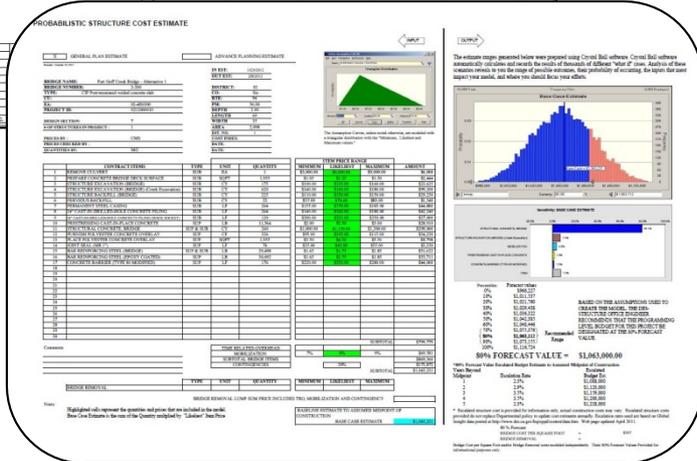


Advance Planning Study
Alternatives

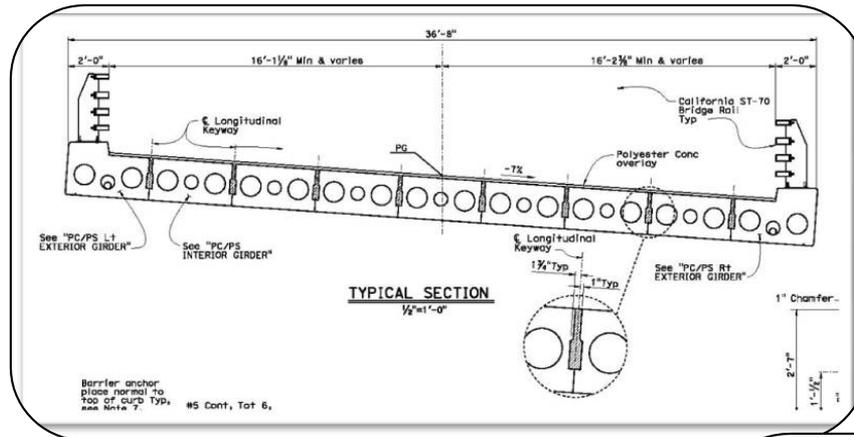
Cast-in-place
\$1,043,000

Precast Superstructure
\$937,000

All Precast Elements
\$928,000



Type Selection

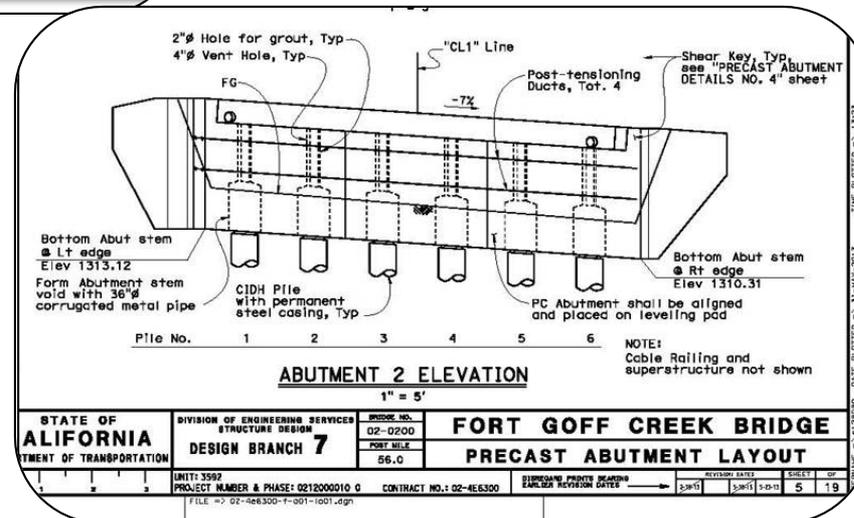


Prefabricated Elements

- PC Voided Deck Slabs
- PC Abutment Elements
- PC Wingwalls
- Prefabricated Rail

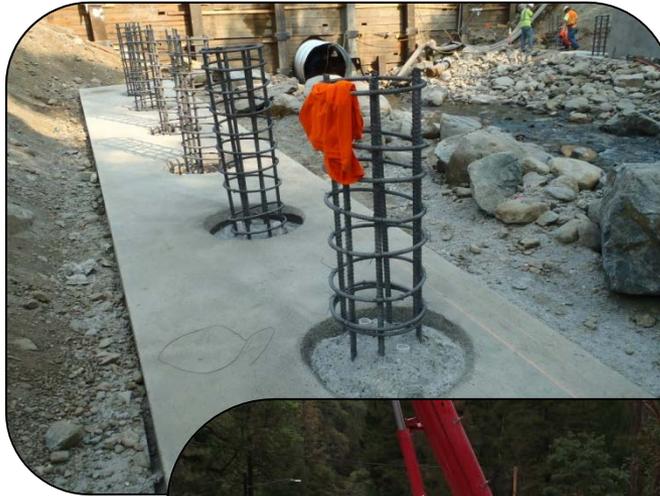
Advantages

- Ensure concrete quality
- Reduce MOT
- Reduce creek impacts
- Reduce risk of extending to second season



ABC Toolkit Implementation

- Single row of piles
- Repeatable elements
- Pick weight under 95K
- Pre-assemble substructure elements prior to shipping
- Fabrication tolerances in specifications



Bid Process

Design-Bid-Build/Low Bidder

Structure estimate at time of bid: \$978,572

Successful bid: \$1,309,843

Final Cost: \$1,400,303 (\$660/sqft)

Difference due to

- Award to 3rd bidder
- Remote location
- Aesthetics
- 7 bidders but only 1 prefab subcontractor

Construction: Detour



One way signalized traffic

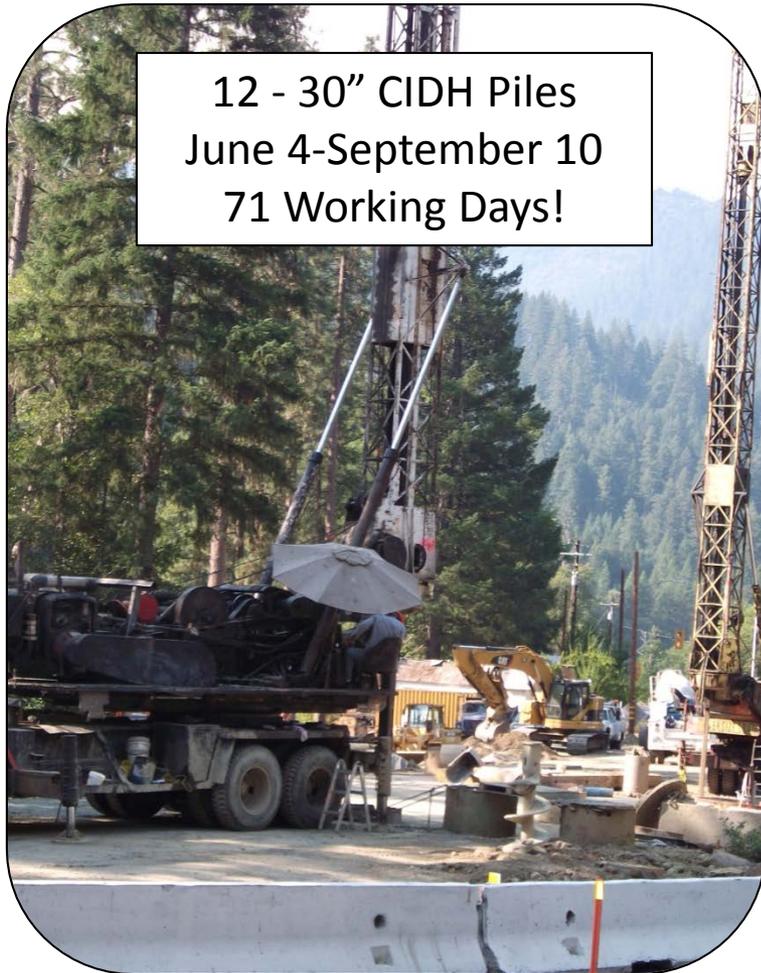


Temporary culvert for detour



Construction: Foundation

12 - 30" CIDH Piles
June 4-September 10
71 Working Days!



Construction: Foundation



4 sac slurry for abutment bearing pad proved an effective leveling pad.

Construction: Abutments



- 6 precast abutment elements, 85kips each
- Voids formed with 36" diameter corrugated metal pipe

Construction: Abutments



Sept 16 & 17, 2014



Construction: Abutments



September 18 & 19, 2014

Construction: Precast Erection



Construction: Precast Erection



September 23, 2014



Construction: Connections



Construction: Rail & Aesthetics



Completed Project



Foundation
71 days

Structure
23 days

Road
21 days

Lessons Learned: CIDH Piling



1. Take foundation risk into account when developing schedule
2. Consider drilling system submittal to ensure drilling contractor shows up with the right equipment for the job.
3. Use spread footing or driven piles when possible to control schedule.

Lesson Learned: PC Abutments

Impact of abutment segment connection method on working days



Fort Goff Creek Bridge

Lessons Learned: PC Abutments

Grouting keyways and post tensioning ducts proved challenging



Lessons Learned: Review & Inspection



- Increased lead time for shop plan review
- Develop guidance for shop plan review
- Allocate adequate resources for source inspections
- Abutment seat grades require close review on shop plans
- Precast QC/QA needs to be closely monitored and enforced
- Review all shop plans concurrently to avoid conflict (precast, post-tension, and prefab rail)

Lesson Learned: Rebar Congestion

Pay close attention to steel congestion, particularly in skewed elements.



Lessons Learned: Deck Overlay

Differential girder elevations are smoothed over with deck overlay



Best Practices

- Clearly define fabrication and erection tolerances
- Use slurry pad for setting abutment
- Be proactive to ensure fit-up in the field
- Keep PC elements reasonable weights
- Overlay thickness accommodates tolerances

Fish Passage

"The Fort Goff Fish passage project is a big success so far – King salmon got right in there right away and ended up making 64 redds this fall! King salmon probably could not get in there at all before the passage project as determined by spot checking for King salmon adults and juveniles over the years."

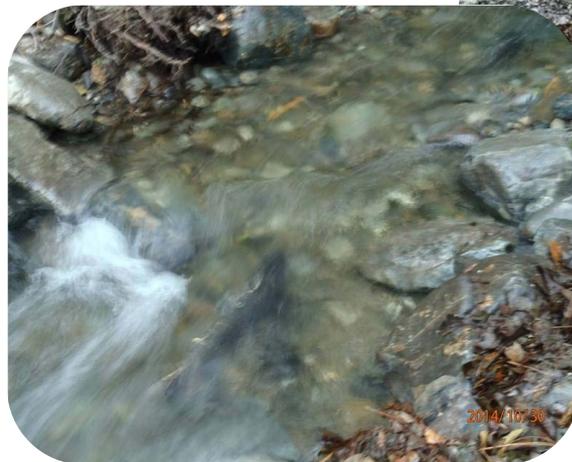
Happy holidays,

Flick

Don Flickinger

NOAA Fisheries West Coast Region

U.S. Department of Commerce



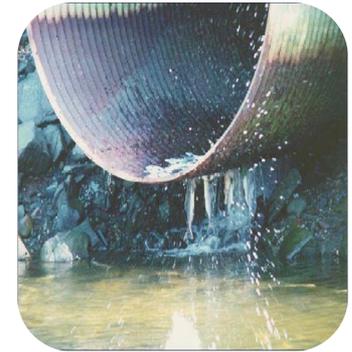
Fish Passage Program

2013 Fish Passage Annual Report to Legislature Coastal Anadromous Fish Passage Assessment and Remediation Progress Report

Caltrans Fish Passage Barriers by District (all future program locations)		
District	Estimated Fish Passage Barriers	2013 Priority Locations
1 – Eureka	322	11
2 - Redding	56	9
3 - Marysville	6	0
4 - Oakland	72	10
5 – San Luis Obispo	87	2
6 – Fresno	0	0
7 – Los Angeles	23	2
10 – Stockton	0	0
11 – San Diego	2	2
12 - Orange	1	0
TOTAL	569	36

* Per the Passage Assessment Database (PAD)

**569 estimated
Caltrans fish passage barriers!**



In Review

- Successfully implemented SHRP2 ABC Toolkit
- Gathered Lessons Learned to further develop ABC Toolkit
- CT Construction and Program Managers have already targeted multiple projects for similar ABC approach
- Potential for widespread application in fish passage projects
- Caltrans is pursuing ABC on a larger scale

Thank you

