Project #

DES Project Brief Fact Sheet

November 2011 Briefing

Project Data

District	2	EA	2C110	County	TEH	Route	99	PM	15.4	to	21.3
Project Coordination Engr.			Eskinder Taddese			Lead Task Manager		Sonny Fereira			
Common Name			Craig Creek Bridge Replacement			Project Currently In		Construction			
Project Scope	Replacement of Craig Creek Bridge and Sunset Canal Bridge on Route 99, near Los Molinos, in Tehama County. Replacement triggered by bridge scour issues.										

Funding

Funding Source	SHOPP-Bridge Preservation

Support Cost Summary $ (x 1000)		Capital Summary Cost $ (x 1000)				DES Resources (PYs)	
Component	Programmed	Component	Programmed	Latest	Date	XPM	Expended
PA&ED	480	Con(CTIPS)	5,849				
PS&E	1,880	Structure		3,000	10/3/11		
R/W	247	District					
Construct	1,220	R/W	820				
Total	3,827	Total	6,669			8.2	5.9

Schedule

	Actual	Target		Actual	Target
PA&ED	6/5/09		District PS&E	9/25/09	
BSS	10/31/07		RTL	12/17/09	
Structure PS&E	9/3/09		CCA		7/15/13

*Not Available.

Legend: Past Due | Due in the Next 60 Days | Delivered

Agency

Task	Lead Agency
PA&ED	Caltrans
PS&E	Caltrans
AAA	Caltrans
Construction Inspection	Caltrans

Delivery Status

The project includes a scour critical bridge replacement over Craig Creek bid 4/20/10. Award was 8/6/10 to second bidder (delayed by No Good Faith Effort for UDBE appealed and lost by low bidder). Contract Approval 9/16/10. Began work 10/11/10. In-Channel work limited to window 7/15 to 10/15 by DFG permit. There is nothing (so far) straight forward about this project. This was a staged ABC (Accelerated Bridge Construction) project that developed into to a "slowly developing bridge construction project" due to unforeseen government red tape. We have now successfully recovered the schedule and avoided the risks & scour consequences of a nasty winter (with half the old bridge temporarily supported signalized to carry both directions of controlled traffic). EE= $2,161,590.60, 2nd bid amount= $1,610,818 ($69,281 over rejected bid).

2 type selections, awarded to the 2nd bidder, completion will take 2 construction seasons rather than the planned 1, however; public impact is significantly reduced; and a cost savings to both the contractor and State is realized.
How was this possible?:
The 2 stage planned construction was converted to a single stage to make up for the delayed award and late approval using a Value Engineering Cost Proposal Change Order- which we partnered with our contractor, excellent bridge design team; district traffic, environmental, right of way, and others, to make work. A flagger controlled single lane temporary bridge detour was used (which OSC had been advocating for use on this corridor for about 15 years!). Yes, it cost less, and the contractor gets to keep 60% of the savings, about $18,200.
Additionally:
CT uses some of the state's portion of the savings to advance construction evaluated research in accelerated bridge deck construction procedures (e.g. using synthetic fibers in the concrete to limit plastic cracking and Shrinkage Reducing Admixtures for longer term drying shrinkage countermeasures, early strength gain mix design and high performance cure methods to reduce construction duration). The results of this research will promote progress towards our quest to develop crack-free decks, using innovations in materials and methods to expedite CIP deck placement, and will provide for a “quiet deck” as well. It is anticipated that the findings from this experimental construction will lead to the adoption of these practices statewide.
So, although the final product will essentially be "The Bridge" as visualized by the designer, how we got there is kind of an improvement on the rough approximation envisioned in the project documents...yet delays and risk to the public and environment are significantly reduced, and our PR image is enhanced! It's a Win-Win-Win project!

Project Risks/Lessons Learned

The first type selection to replace this 3 span R/C structure was held in March 2008, and resulted in a two span precast slab supported on driven steel pipe pile, using stage construction with signalized one-lane traffic control. A single span was argued for by structure design and construction, but would have required a raise in the profile to accommodate structure depth and required freeboard. The district didn't want to deal with the raised profile due to cost and drainage liability with adjacent land owners. In June the district requested studies to reduce construction time, resulting in two alternatives for accelerated construction/ reduced traffic impacts using 2-stage construction. In October, DFG raised concerns about having the center pier in the stream (the old piers were outside the stream, so they did not view this as an improvement.) In November, Structure Hydraulics was able to revise the minimum soffit elevation, gaining an additional 1.9' of structure depth. A single span bridge was now feasible without the need to raise the profile grade; so in January 2009, a Precast, prestressed adjacent box beam bridge with precast abutments and wingwalls, Cast-In-Place PCC deck, on CISS piles was proposed at the second type selection meeting.

A significant amount of effort was put forth by various units during the ever-changing design phase resulting in significant improvements to the original plan. The communication and trust that was built within the project delivery team, as well as a desire to "think outside the box," set the tone and stage allowing for further delivery improvements in the construction phase. Effective communication, trust, good decisions, and timely performance are critical to the delivery of a rapidly evolving, fast track project.

The Bid Opening Date of late April was tactically planned by the PM and PDT to allow time after contract approval for preparation, plan review & approval, and casting of the prefabricated Bridge elements to meet the schedule constraint of the in-stream work window allowed between July 15 and Oct 15 to complete 2 similar stages of work within a very narrow footprint. Due to the unforeseen late processing of the civil rights determination, construction of this project in 1 season was not possible. This delay caused a ripple effect of potential risks to be mitigated: The contractor was at risk of increasingly higher operating costs and commodity prices to construct the bridge in the 2011 season, but was locked into his April 2010 bid prices. The public would have been at risk in a one lane traffic configuration on a half-width temporarily supported bridge for an additional 9 months had the contractor pursued the project as planned. The contractor's engineer would have been exposed to additional risk due to the length of time the existing bridge would have been temporarily supported in place in the channel. The remaining half of the existing bridge (which carries public traffic) would be less stable under high flows, and could risk catastrophic collapse. Wide loads and permit loads would need to be inconvenienced by re-routing for an additional 9 months. Environmental risks associated with storm events would be increased over the winter. These risks, and more, were avoided or ameliorated by changing to a single stage demolition/construction plan using a temporary MABEY bridge to carry traffic. This bridge provided a wider lane than that which was planned, reducing the need to sift out wider loads. The impact to traffic was less than the planned project envisioned; Queues were reduced by using flaggers rather than signals, and over all detour duration was reduced from 40 to 25 days. Impacts to the local's access to streets and driveways adjacent to the project were lessened, and safety entering the highway was improved by use of the flaggers.
Mobility was improved and traffic impacts were reduced by this change. For instance, the signalized control delay costs to the travelling public were calculated by district traffic at $7,800/ day (about twice the calculated flagger delay cost.) For the intended stage construction duration of 40 days, this would have been $312,000. Due to the late award, this delay cost would be over $2,400,000 had the contractor proceeded with half width construction and a winter suspension.

The decision to suspend the project after the CISS piles were installed, but before half width demolition was begun, allowed traffic to continue using this route unaffected by construction delays. This allowed the contractor time to procure pricing and designs for the temporary shoo-fly, and the State had adequate time to complete reviews of the temporary bridge design.

- The MABEY bridge was delivered Sept 14, launched Sept 15, ready for traffic Sept 26 – Oct 24 (traffic switched to new bridge) and shipped out Oct 27, 2011.
- Once the Accelerated Bridge Construction was begun, a few glitches showed up. Some of the subs may not have been on the same page as the rest of us, since their responsiveness seemed slow, and in some cases delivery of materials delayed the work. This may be the result of the performance clauses in the subcontracts to the prime, and if the project documents they bid on reflected the changed work, they may have paid closer attention. Once the industry becomes more aware of the ABC fast-track projects, performance by sub-trades should improve.
- Backfilling behind abutments could speed construction by using a 2 sack lean concrete backfill, instead of compacting small lifts with hand equipment, which takes a comparatively long time.
- Prefabrication of the exterior girder with most of, if not the entire height of the barrier railing would save EOD forming, barrier rebar installation, and the use of heavy steel forms, and cure times associated with the railing. Perhaps, if weight is an issue, a hollow rail could be delivered, to be filled after girder placement.
- Cast-In-Place PCC deck was required as the riding surface over the precast adjacent box units. Polyester Concrete would be able to be placed and cured and ready for traffic in one shift, however design and SMI felt that the conventional thickness would exhibit reflective cracks at the girder seams, so this option was dismissed. OSC has a 2011 research project under way at the Hat Creek bridge #8-0084 SHA-44 PM 59.62 which utilizes an embedded fiberglass reinforcement fabric within the 2 layer varying thickness (¾"– 3 ¼" to create a crowned section) polyester concrete overlay of existing inverted U precast girders to evaluate reflective crack control effectiveness. If this is successful, adoption of a polyester concrete riding surface in ABC applications should be considered. The conventional CIP PCC deck over precast girders requires a curing compound and 7 day water cure; and these decks have a tendency to exhibit drying shrinkage cracks after 6-8 weeks. A construction evaluated research project implemented at Craig Creek to evaluate a faster and better curing method; reduce water curing period (3 days) followed by a second heavy application of spray on curing compound, in conjunction with a Shrinkage Reducing Admixture to counter long term drying shrinkage cracks, and synthetic fiber reinforcement to reduce plastic cracking and improve longer term crack control. In the next weeks, the bridge deck will be re-surfaced by diamond drum grinding to allow "just below surface" crack evaluation and improve the quality of ride and tire noise reduction. If successful, this method of installing decks will be nominated for fast track, if not all, Caltrans bridges.