

Substrate's Marsh Creek Road Bridge Replacement Goes on to Win the 2019 National APWA Public Works Project of the Year

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The Marsh Creek Road Bridge Replacement project has gone on from being the Northern California American Public Works Association (APWA) project of the year to now being selected as the National APWA Public Works Project of the Year for 2019 in the Category of Transportation for less than \$5 million.

According to Rhonda Wilhite from APWA Kansas City, “Your selection puts you in a very elite group of winners and APWA is proud to have those on this project epitomize the public works profession and our association.”

This ceremony will be held in conjunction with the 2019 Public Work Expo (PWX) Convention in Seattle, Washington and is scheduled for Monday, September 9, at 5:00 p.m. at the Washington State Convention Center.

Substrate (Prime CM consultant) provided comprehensive construction management services for the award-winning Marsh Creek Road Bridge Replacement for Contra Costa County. Substrate provided the Resident Engineer/Structure's Representative and oversaw the entire project from pre-construction to post-construction and successful Caltrans Audit. The CM team also consisted of sub-consultants Hill International – who provided

an Inspector and part-time Office Engineer; BSK Associates, who provided material and source inspection; and Thunder Mountain Enterprises who provided SWPPP QA inspections. The team Biologist, employed by the contractor, was Gallaway Enterprises.

This project was originally intended to be a two-season project, but by utilizing Accelerated Bridge Construction (ABC) techniques, it was completed in one construction season. The public outreach component on this project was critical as there was significant local opposition. This project won the 2019 APWA Project of the Year Award in the \$5 million dollar category.

“It was very gratifying when Marsh Creek Bridge Replacement won the National 2019 APWA Project of the Year Award, as we considered this a high-risk project starting in May 2018; knowing of complex shoring issues, critical path waterline work, and the limited in-creek work window. It really was team effort with Bridgeway, Gallaway, Mark Thomas, Contra Costa Water District, Contra Costa County and the CM team that made this project successful.” – Sunny Jhutti, PE, SE – Resident Engineer/Structure’s Representative – Substrate, Inc

The project, approximately 5 miles east of Clayton, CA, consisted of a constructing a new 91 ft long new California Bulb-Tee Girder bridge replacing the old bridge spanning over Marsh Creek that was deemed “Geometrically Intolerable”. Project Elements included: temporary stream diversion, drilling and installing soldier-pile wall, soil nail wall shoring, roadway and channel excavation, rock slope protection, concrete bridge approach slab, Type 742 concrete barriers, tubular hand-railing, aggregate base, Hot Mix Asphalt, cold-planing AC, signing, striping, drainage, fencing, and MBGR.

This \$5 million dollar project had significant complexities on a small footprint – accelerated project delivery, multi-stage bridge construction over environmentally sensitive Marsh Creek, limited access and laydown areas, multi-stage traffic control over busy Marsh Creek Rd, complex temporary shoring, local opposition, in creek permit restrictions, soil stockpile management, and significant exposure to wildlife. It had all the challenges of a \$30 million dollar bridge replacement project over a waterway.” – Sunny Jhutti, PE, SE – Substrate, Inc

Some of the wildlife concerns at Marsh Creek were: Alameda Whipsnake, Red-Legged Frog, Giant Garter Snake, San Joaquin Kit Fox, Vernal Pool Fairy Shrimp, Longhorn Fairy Shrimp, Vernal Pool Western Pond Turtle, Pallid Bat, Western Burrowing Owl, and Golden Eagle to name a few.

- **PROJECT: Marsh Creek Bridge Replacement**
- **LOCATION: Clayton, CA**
- **OWNER: Contra Costa County**
- **PROJECT MANAGER: Mr. Neil Leary, PE**

- **DESIGNER: Mark Thomas, Parikh, WRECO**
- **ENVIR CONSULTANTS: LSA, Anchor QEA, Balance Hydraulics**
- **CONTRACTOR: Bridgeway Civil Constructors, Inc**
- **CM Team: Prime – Substrate, Inc;**
- **Subconsultants – Hill International, BSK Associates, Thunder Mountain Enterprises, Inc.**
- **COST: \$4.9 million**
- **FIRST WORKING DAY: April 30, 2019**
- **SUBSTANTIAL COMPLETION: January 4, 2019**
- **COMPLETION DATE: February 2019**

“The project team employed various innovative methods to help accelerate the project such as using high-early strength concrete, deleting an entire stage of construction by over building the previous stage, utilizing soil-cement backfill, and reducing the closure pour settlement time from 60 days to 15 day – all of this required a willingness to participate and being flexible by both the designer – Mark Thomas, and the contractor – Bridgeway.” – Sunny Jhutti, PE, SE – Substrate, Inc

Other unique aspects of the project include the construction of COIR Block MSE Walls for creek bank stabilization.

The first working day was April 30, 2018 and Marsh Creek Bridge Replacement was Substantially Completed on January 4th, 2018. Full completion occurred in February 2019.

“Due to agency, team member, and local cooperation and coordination, this high quality project was delivered safely in one construction season, which is significant given the late start and project complexity. Though this project had only informal Partnering, it very well can be a case study for Partnering for a project of it size.” – Sunny Jhutti, PE, SE

Interesting Facts about MCB

- The bridge consists of six – 4ft wide by 4ft deep by 88’9” long California Bulb Tee girders weighing 87,100 lbs each and had to be delivered on independent special permit P-9 trucks and a designate special permit route from the casting facility in Lathrop (Confab).
- The Stage 2 girders (Total 4) were placed utilizing two 265 ton telescoping crane in three hours, taking approximately 30 minutes per girder (subtracting setup time) and delaying traffic for only 15 minutes.
- The use of high early strength concrete mixes were employed, some reaching 4,200 psi in 3 days.

- During the Stage 2 Bridge construction, the Contractor installed a complex soil-nail and tieback shoring system that utilized the existing bridge abutments to help restrain the soil during the deep cuts required to build the new bridge footings. This shoring design which utilizes, tieback, walers, soil-nails, and compression struts accommodated the 6,000 vehicles/day that travel along Marsh Creek Road.
- The soil-cement MSE wall proposal by the Contractor allowed for rapid Stage 2 backfill and the elimination of additional shoring in the next stage, which saved weeks off the schedule.
- The project was a safe one. There were ZERO recorded jobsite accidents or incidents in over 17,500 total hours work (Contract+CM+Owner)

About Substrate, Inc

Substrate, Inc is a unique Bay Area based firm providing full service structural engineering and construction management services to bridge, building, and roadway clients.