OUTSTANDING LOCAL STREETS & ROADS AWARD PROGRAM
2023 NOMINATION

Marsh Drive Bridge Replacement

Contra Costa County
Public Works
Department

January 31, 2023

1. Project Description

1a. PROJECT OVERVIEW

The $10.1 Million Marsh Drive Bridge Replacement over Walnut Creek Project replaced the existing reinforced concrete slab bridge originally constructed in 1938 as a 6-span bridge, and subsequently lengthened in 1965 by adding 4 additional reinforced concrete spans, creating a 10-span bridge. The existing bridge was 325 feet long by 34 feet wide. The new bridge was designed to address and correct all of the existing bridge deficiencies and handle the seismic loads as well as the increased hydraulic flows within the channel.

The objective of this project was to replace the existing structurally deficient and geometrically obsolete bridge with a new 5-span, pre-stressed, voided concrete slab bridge structure measuring approximately 340 feet long and 55 feet wide, supported by 36-inch diameter drilled holed cast-in-placed concrete piles. The new bridge elevation was raised approximately seven feet with fewer supports in the channel to improve and meet hydraulic standards. The roadway approaches to the bridge were realigned slightly to the north while utilizing a larger horizontal curve on the east in order to improve safety. To improve the roadway alignment and horizontal curve at the bridge, there was approximately 350 to 500 linear feet of roadway approach work at each end of the bridge.

In its final configuration the bridge accommodates two lanes of vehicular traffic (one in each direction) with pedestrian facilities on each side of the road, including a separated path along the south side of the bridge that ties into the existing East Bay Regional Parks District Iron Horse Trail at the southeastern side of the bridge and will serve as a connector to the future trail expansion to the north.

The project utilized staged construction to avoid closing the bridge to traffic and requiring traffic detours. Two lanes of vehicular traffic (one in each direction) and a pedestrian access route were maintained during

each stage of construction. Standard traffic control devices were deployed during construction. Work occurred in the creek and dewatering and stream diversion systems were needed. The project's environmental regulatory permits stipulated in-creek work windows, restricting when work within the creek could occur.

The most important objective of this project was to complete all work in two-seasons due to public, environmental and third-party stakeholder exposure. Construction began in April 2021 and was substantially completed within the allocated 320 working days (two construction seasons) window.

The major elements of work for this project were the following:

- Constructed new two-stage bridge with Class 1 pedestrian facility
- Completely demolished and removed the existing bridge
- Realigned and reconstructed bridge approaches
- Constructed new Contra Costa County Flood Control and Water Conservation District access driveways
- Relocated Contra Costa Water District waterline and adjusted water main shutoff valves
- Relocated AT&T and PG&E utilities from the existing bridge to the new bridge
- Installed rock slope protection under the new bridge on flood channel banks

Contra Costa County, in cooperation with the California Department of Transportation and the Federal Highway Administration, replaced the existing bridge and constructed the approach roadway improvements necessary to accommodate the bridge replacement. Dewberry was the project designer addressing PA&ED, PS&E, and construction bidding and support phases. Dewberry assisted the County with preparation of the programming and authorizing paperwork to secure Highway Bridge Program (HBP) funds. Bridgeway Civil Constructors Inc. (BCCI) was the Prime Construction Contractor for bridge and roadway construction. PreScience Inc. was the Prime Consultant Construction Manager on this project providing Resident Engineer/Structure Representative, inspection and office engineering services. Inspection Services Inc. was the Sub- Consultant providing materials testing and Sub- Consultant Ecorp Inc. provided SWPPP oversight inspection services. Contra Costa Water District (CCWD), played a significant role in coordination for the permanent waterline relocation.

1b. SCHEDULE

Originally, the County anticipated a schedule of 320 working days. The most important aspect of this project was to be able to start and finish Stage 1 and Stage 2 in-creek work within the work window stipulated by the environmental permits each construction season to avoid costly winterization and additional permit agency coverage. In order to be successful, the Contractor had to hit the ground running on the first working day of May 17, 2021.

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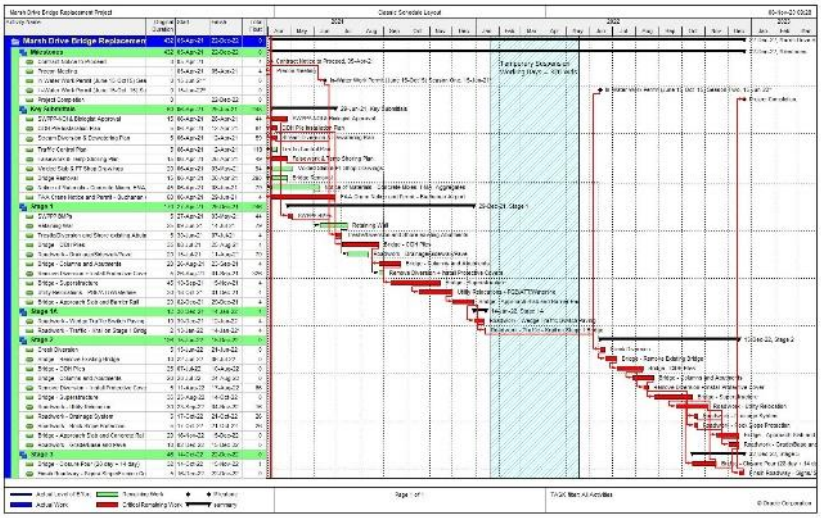
Shortly after the award of the project, PreScience and BCCI discussed various strategies to help deliver this project in two construction seasons. The entire project team (PreScience, BCCI, Dewberry, and the County) sat together and brainstormed ideas to streamline the project. Based on that preliminary meeting and later meetings, the team was able to shave valuable days off the project schedule.



Although there were several project challenges and setbacks, the team was able to deliver the project within the originally planned second season. According to the approved baseline schedule the project would be substantially complete on December 1, 2022. The actual substantial completion date is projected as December 31, 2022.

The following is a list of mitigation efforts that were done to meet schedule and save time:

- Reduced Stage 1 abutment settlement period from 30 days to 15 days by increasing the embankment surcharge load height
- Deleted the entire Stage 3 Construction (10 days) by realigning the westbound approach and shifting the face of curb by 1.5-feet.
- Waived Stage 2 abutment settlement period since Stage 1 settlement monitoring results were negligible, the new abutment was located within the same foot print of the old abutment and within the highly compacted flood control levee.
- Worked premium time and Saturdays.

These innovative methods shaved critical weeks off the schedule, which were all required to help the team account for various setbacks on the project due to:

- PG&E transformer relocation (Stage 1) first order of work delays
- AT&T Stage 1A relocation from existing bridge to new bridge delays
- Kinder Morgan pipeline retrofit

Other scheduling elements became problematic due to supply chain impacts, shortage of cement and fly ash, COVID sicknesses, bird nesting periods, and the October 24, 2021, storm event. Each of these schedule impacts was mitigated by the team's ability to work together and develop work around solutions to keep the project moving forward. These solutions involved value engineering and partnering efforts to align schedule predecessor and successor activities and their durations to reflect focus points and mitigate delays mentioned above.

2. CONSTRUCTION MANAGEMENT

The Marsh Drive Bridge Replacement Project over Walnut Creek required a construction management team that was extremely technical, had relevant experience working on complicated bridge projects within environmentally sensitive areas, and was able to coordinate with various stakeholders. As such, the PreScience Team was selected to administer this project on the behalf of Contra Costa County.

The Construction Management (CM) team applied a basic partnering philosophy as an element to the successful delivery of this project with the Contractor. As a result, the CM staff took part in delivering this project successfully for the County. Throughout the construction of the project, it was the intent to be open with the Contractor and work alongside them helping to proactively manage and minimize any unforeseen tribulations. The overall goal was to avoid unnecessary costs and delays in order to assure forward progress was always maintained. With the various challenges and obstacles faced throughout the duration of the project, the project team managed to overcome all issues and delivered the project on schedule.

Project elements included: cast-in-place - post tensioned - reinforced concrete, cast-in-drilled-hole (CIDH) pile (wethole) construction, bridge demolition, complex temporary shoring, utility relocations, stream diversions, detailed traffic handling, SWPPP implementation and monitoring, multiple agency coordination, and coordination with the local businesses. Due to the unique features of this bridge replacement project, specialized construction expertise was necessary to manage and successfully deliver this project. The project required expertise in particular construction methods such as CIDH, in-creek work, dewatering operations, supporting falsework from columns, and experience with technical construction stages and extensive coordination with various permitting agencies and stakeholders.

One of the main challenges for the project was ensuring environmental protection and environmental agency coordination. Had these challenges not been handled properly, the likelihood of delays, additional costs, and schedule disruption would have increased significantly.

Another significant challenge was to ensure the safety of the travelling public. Approximately, 6,000 vehicles per day that travel along Marsh Drive and over the Marsh Drive Bridge. These users maneuvered around 2.5 stages of traffic control, which required extensive coordination with the City of Concord and County Emergency Services, public notification via numerous press releases, and the use of two portable changeable message boards at each end of the project that communicated project changes to the commuters on a daily basis. At each stage of the project, enhancements were made on a regular basis to ensure line of sight, adequate stopping sight distance, visibility, and general traffic safety, including adding traffic devices or signs as needed for clarity.

Finally, since this project was schedule-driven due to the extensive environmental commitment and utility agreements each action taken by the project team fell in line with meeting these agreements.

This project was primarily funded by Federal Highway Bridge Program (HBP) funding, Local Road funds, and Prop 1B funds.

Construction Cost: $10,100,000.00 (no claims)

Stage 1 - Completed

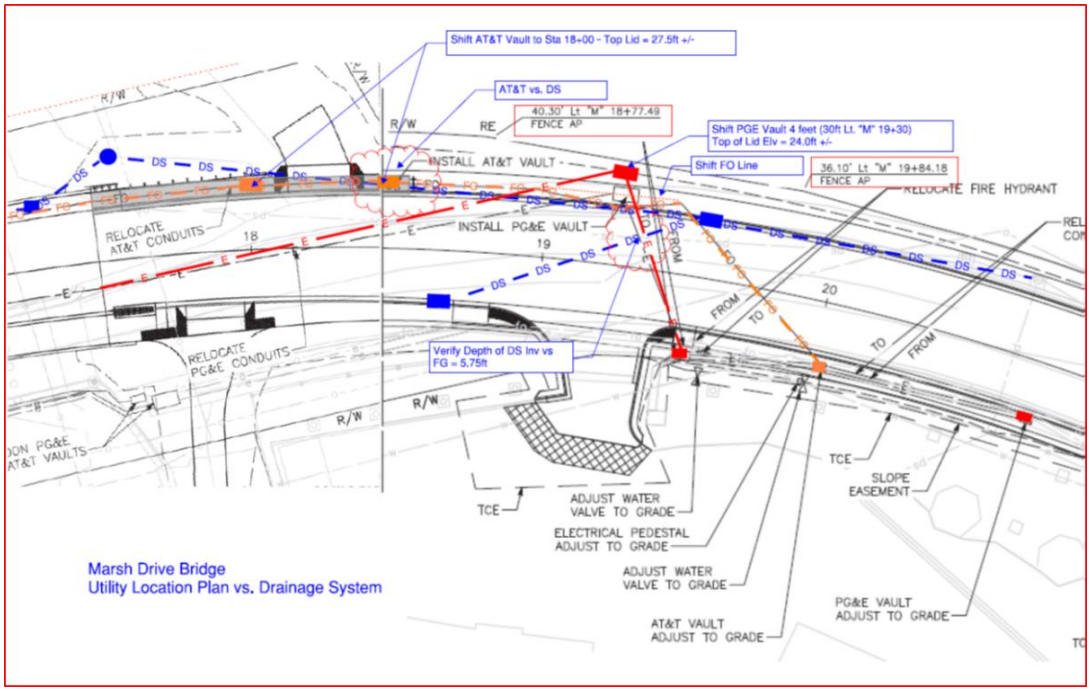
2a. Utility Relocations vs. Project Schedule

This bridge replacement project required extensive utility coordination and relocation. PG&E 12KV and AT&T Fiber Optic Communication Lines were suspended on the existing bridge and required relocation in advance of bridge demolition and before other Stage 2 road/civil work could start. Other High Priority utilities which paralleled Marsh Drive bridge such as Kinder Morgan 8-inch Oil Pipeline and Phillips 66 16-inch Oil Pipeline required protection-in-place and extensive coordination when working within 25 feet of those lines.

This coordination effort was mainly borne by the PreScience, AT&T and PG&E. In advance of starting utility relocation work, PreScience's Resident Engineer mapped the relocations verses stage construction. This gave the project team a conceptual understanding of the phased utility relocation per each construction stage. This effort by the project's RE afforded both the Contractor and Utility Owner an understanding of the schedule to relocate each utility based on the other work phases before moving their utility lines. For example: 1) Embankment fills needed to be constructed under Stage 1 before installing the new AT&T vault, 2) Only a portion of the PG&E line could be completed under Stage 1 and temporary lines were required to relocate the new transformer. It is noted that both AT&T and PG&E utility relocations were not accurately identified in the project stage construction plans.

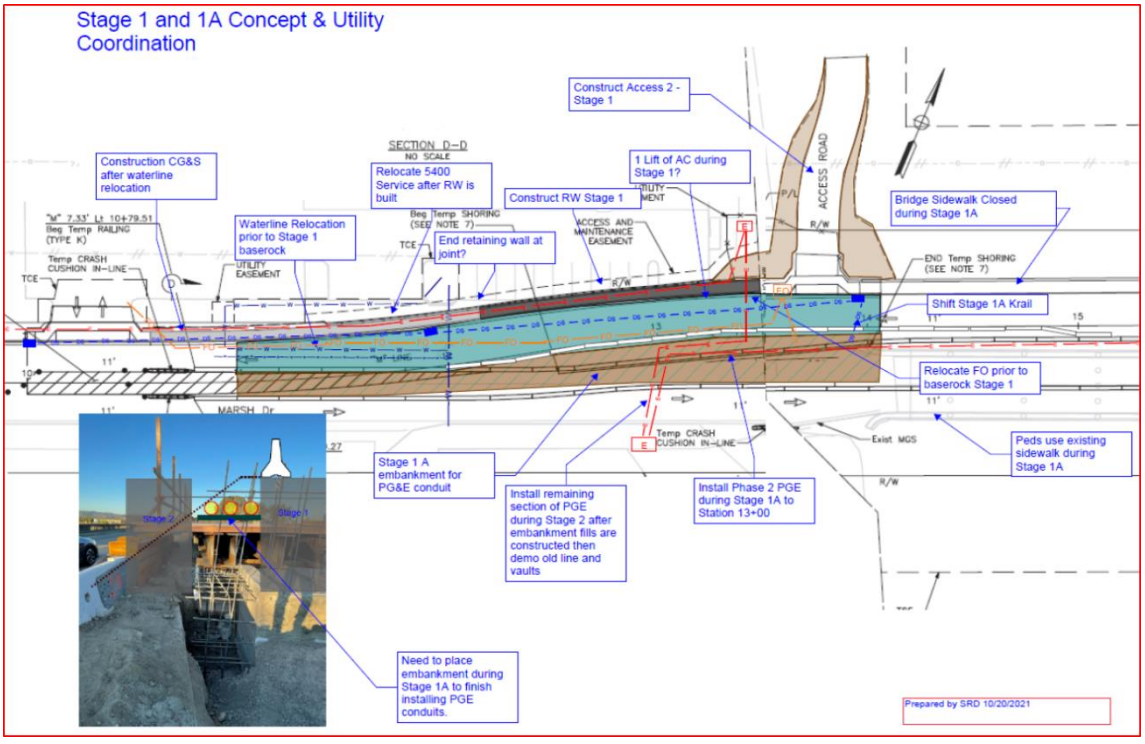
By preparing these conceptual stage utility relocation plans as they relate to the other road and drainage system improvements the project's RE was able to ascertain and avoid potential utility conflicts to Drainage System 2.

For Example: 1) The exhibit shows by shifting the AT&T vault from Station 18+50 (L) to Station 18+00 (L), the conflict with Drainage System 2 was avoided. 2) The exhibit also shows by shifting the PG&E vault from Station 19+25 to 19+60 the conflict with Drainage System 2 was also avoided.



These preconstruction measures taken by PreScience's RE saved the project from an estimated 3-month delay and over $150k in extra work costs.

Other utility relocation work included relocating an 8-inch water service line. This work was required in advance of constructing the new Retaining Wall 1. Extensive coordination between PreScience, the Contractor and Contra Costa Water District was required. The new waterline cut over was performed at night to avoid impacts to the customers as water service needed to be cut off for a period of time.



As part of the waterline relocation work a new 4-inch fire line service was installed to an adjacent commercial property that also required extensive coordination with the Contra Costa County Fire District, Contra Costa Water District, and the property owner.

During the fire line relocation a temporary line was installed to maintain the building's fire protection service while the new line was installed.

3. SAFETY PERFORMANCE

The Contractor and the Construction Management Team emphasized safety through communication, responsibility, accountability, safety procedures, training, and education. Additionally, the Contractor and Construction Management Team continually strived to improve the quality of existing safety programs, such as using job hazard analyses (JHAs), work plans and risk assessments, including mandatory subcontractor safety orientation.

Public Safety – Safety of the travelling public was of Number 1 importance to the project team, especially related to the two and one-half (2.5) stages of traffic control, which required ensuring traffic safety devices were installed per plan and per manufacturer's recommendations.

Additional safety measures included: site security fencing, fall protection, and requiring additional shoring measures to ensure the new bridge road approaches were securely shored during Stage 2 bridge construction.

Worker Safety – In line with Construction Safety and Illness Prevention Programs, the project team established measurable goals for safety programs and safety training for this project. Health and Safety standards and initiatives in the overall Construction Safety Plan included:

- Providing a workplace free from serious recognized hazards and compliant with standards, rules and regulations issued under Title 8 Cal-Osha.
- Examine workplace conditions to make sure they conform to applicable OSHA standards
- Make sure employees have and use safe tools and equipment and properly maintain equipment.
- Use signs to warn the public and workers of potential hazards.

- Enforce operating procedures and communicate them so that employees follow safety and health requirements through tailgate safety meetings.

Through these efforts, there were no recordable incidents during project construction.

Total Hours Worked – Contractor (Including Subs) + CM + Owner	***25,000***
Number of Recordable Accidents	*0*
TRIR – Total Recordable Incident Rate (# of Recordable x Working Hours) 200,000	*0%*
DART – Days Away From Work, Day of Restricted Work Activities, or Job Transfer	*0*
Near Misses Recorded on Site	*0*

4. ENVIRONMENTAL CONSIDERATIONS

With the in-creek activities, regulated species protection, nesting birds, and storm water quality, full consideration was given to this environmentally sensitive work area during construction while at the same time maintaining project progress. Defining timelines for work being performed (working days), implementation of pertinent requirements (exclusion fences, jobsite surveys, and employee training, etc.) had to be considered prior to the execution of the work.

4a. Environmental Protection/Compliance

With extensive environmental requirements, wide-ranging work went into complying with permit requirements, and coordinating with permitting agencies, such as the US Army Corps of Engineers (USACE), California Department of Fish & Wildlife (CDFW), State Regional Water Quality Control Board (RWQCB), FHWA, and Caltrans.

Species Protection

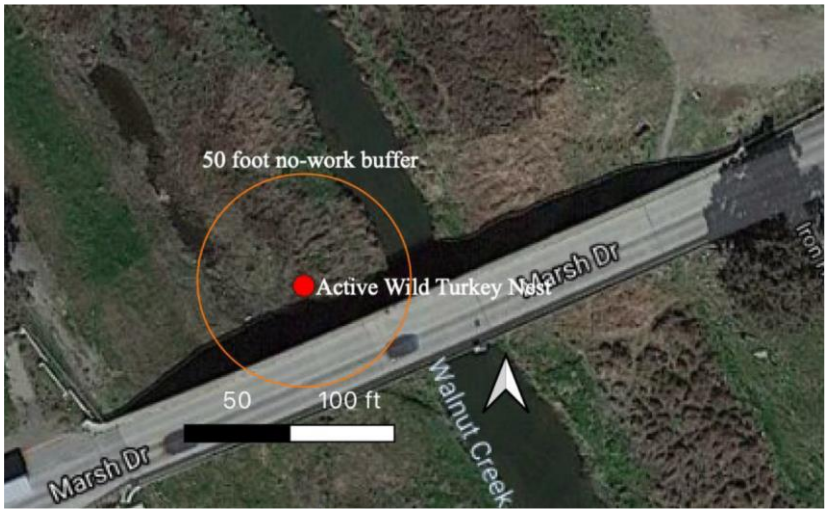
The following endangered or special-status species were located in the area: California Sea Lion, California Coast Steelhead, Chinook Salmon, Western Pond Turtle, Western Burrowing Owl, Roosting Bats and nesting and migratory birds. This includes the following local special status species which include: Red-tailed Hawk, Black Phoebe and the Northern Rough-Winged Swallow. Many other birds were found in the areas such as: Mallard Ducks, Canadian Geese, Snow Cranes and Crows.

Northern Rough-Winged Swallow

Burrowing Owl

California Sea Lion

Western Pond Turtle



The Contractors Sub-consultant, Alluvion Biological Consulting (Alluvion), provided biological monitoring and prepared Monthly Environmental Compliance Reports in accordance with Condition 4.1 of Streambed Alteration Agreement Notification No. 1600-2020-0029-R3. A Qualified Biologist (QB) / Biological Monitor was onsite at all times during work. On several occasions special precautions were taken to enforce "no-work" perimeters until nesting birds cleared their nests. For example, it was discovered that turkeys had nested near the work and Alluvion's biologist established a 50 foot no-work perimeter. Fortunately, this "no-work" perimeter did not result in a project delay since the Contractor was able to continue to install the creek crossing trestle bridge without encroaching into the "no-work" zone limit.

To limit exposure to wildlife within the jobsite, the Contract called for Temporary Wildlife Exclusion Fencing (TWEF) to provide a buffer at the edges of the jobsite. The TWEF specified in this project was the standard Caltrans TWEF, which consisted of silt fence and orange ESA fencing. In addition to TWEF, dripline fencing was provided around tree driplines to ensure their roots were not damaged by heavy equipment.

Starting in February 2021, in advance of the start of construction, the County mowed the tall grasses within the project limits. These grasses provide habitat for nesting birds and advance removal minimized the potential that birds would take up residency in the grasses, causing delays and impacts to the project construction.

4b. Water Pollution Control

The CM team was assisted by sub-consultant, E-Corp Inc., and their intricate working knowledge of the annual permit and the various requirements and time frames within which the requirements needed to be addressed. The Contractor's SWPPP Quality Control Inspector, S Kwok Engineers, Inc., performed timely and detailed inspections and were instrumental in the success of this Risk Level 2 project. Since the project is located over and within Walnut Creek, SWPPP monitoring during rain events was paramount for

the CM team. If not managed properly, the project could have been shut down and both the County and the Contractor could have faced fines. Through the CM team's extensive training, PreScience's Resident Engineer being QSD certified and past experience on reviewing SWPPP's, inspecting BMP's, preparing required reports, and coordinating with Caltrans Storm Water Task Force and the RWQCB, the project was effectively managed.

This project had several numerical action level exceedance events despite having excellent BMP's. During a large storm event (5-inches of rain in one day), turbid water left the project site downstream. Storm water was tested by the QC Inspector S Kwok, and determined to exceed the NTU threshold. Immediately after this report, the project team installed additional BMP's to correct and prevent another exceedance from happening, as another storm event was on the horizon.

These measures were reported to the Water Board promptly via a NAL Exceedance Report that was uploaded to SMARTs Data Base System, as was the follow-up corrective action. This event did qualify for a Notice of Discharge (NOD) as the storm water did enter the creek. Proactive and immediate corrective actions taken by the CM Team and contractor prevented the project from being shut down.

4c. Commitment to Sustainability and Climate Change

Marsh Drive is a two-lane urban minor arterial road that is widely used by commuters bypassing State Route 4. Marsh Drive bridge spans Walnut Creek Channel, which flows north into Pacheco Creek, and eventually into Suisun Bay. The Project vicinity is urban with commercial and light industrial uses surrounding the Project site. Walnut Creek channel, State Route 4 and industrial uses are located to the north, a vacant lot to the northeast, car dealership (Lithia Dealership) and Iron Horse Trail (IHT) to the southeast, Walnut Creek channel to the south, Buchanan Field Airport to the southwest, and office buildings to the northwest. There are residential developments to the east off Solano Way and Olivera Road, and west of the Buchanan Field Airport off Marsh Drive.

The County focused its project initiative and goals towards a comprehensive transportation solution and partnered with East Bay Regional Park District (EBRPD) to design and construct pedestrian access across Marsh Drive bridge to provide connectivity to the future extension of the IHT.

The Iron Horse Corridor in Contra Costa County stretches 18.5 miles from the Alameda County line northward to Mayette Avenue in Concord. Formerly a Southern Pacific Railroad route, the Iron Horse Corridor features a paved multi-use trail for walking, jogging, and bicycling along with adjacent unpaved or soft trails in some areas. The new bridge provides a long-awaited connection across the bridge for a future extension of the trail to the north.

The Contra Costa County Countywide Bicycle and Pedestrian Plan (Plan) (Contra Costa Transportation Authority 2018), formerly designated a Class I bicycle lane proposed for Marsh Drive, which provided for a completely separated right-of-way designated for the exclusive use of bicycles and pedestrians with crossflows by motorists minimized. Such paths are often located along creeks, canals, and rail lines. However, the current Plan has re-designated it as a low stress bikeway. Considering the EBRPD IHT terminated at the southeastern side of the bridge, the EBPRD and County worked closely together to determine a IHT crossing of Marsh Drive. This project provided an opportunity for EBPRD to close this gap. Connecting to the west side of Walnut Creek is the first crucial step to connecting the IHT westward to Martinez and the San Francisco Bay Trail across the Benicia Bridge.

5. Community Relations

This project involves many stakeholders. The bridge is located half in unincorporated Contra Costa County and half in the City of Concord's jurisdiction. During the planning, design and construction phases extensive coordination between the two agencies was needed. There are adjacent property owners where property rights were needed, both permanent and temporary. There are several environmental agencies who issued permits for the project – CDFW, RWQCB, ACOE. The Buchanan Airport is adjacent, so there are FAA aerial clearance requirements that needed to be met so as not to interfere with the air traffic into and out of the airport. There are several utilities that needed to be relocated and adjusted to accommodate this new bridge – PG&E, AT&T, CCWD. Adjacent properties are being developed, so there was coordination between the projects contractor and the contractors working on those properties. Access needed to be maintained at all times across the bridge and to several adjacent driveways and access roads, impacting how the contractor performed their work. Each of the stakeholders had a significant role in and influence on this project.

At the start of the construction phase, the County and PreScience introduced themselves to the local residents and community members and provided contact information for project inquiries. PreScience performed set-up, and the County Public Information Officer (PIO) implemented and maintained a public outreach program for the project key stakeholders, which included:

- Residents and property owners adjacent to the project area
- Emergency Services
- Commuters
- Caltrans State Route 4
- Buchanan Airport

The project team developed content to be hosted on the County's website (https://www.contracosta.ca.gov/8168/Marsh-Drive-Bridge-Replacement-Project), which displayed accurate and timely updates to inform users of important project information and events throughout the duration of the project. The public was able to access project information, such as RE Weekly Reports, fact sheets, project maps, and schedules, as well as notifications of upcoming delays, detours and/or road closures.

Critical outreach was performed through the County's PIO who sent out information leaflets, updated the County website, and provided real-time updates through various other social media outlets.

In addition to the outreach, the project had two Portable Changeable Message Signs (PCMS) relaying project information.

Finally, the County coordinated with Caltrans to alert and warn drivers of the changed conditions on the jobsite during those milestone days, especially during traffic switches, since Marsh Drive is frequently used as a State Route (SR) 4 detour route in the event of an accident on SR4. Through the project team and County's public outreach efforts, the website continuously provided updates as to the status of the project and the nature of the Contractor's work which was well received by both the locals and commuters.

5a. Adjacent Neighbor Outreach

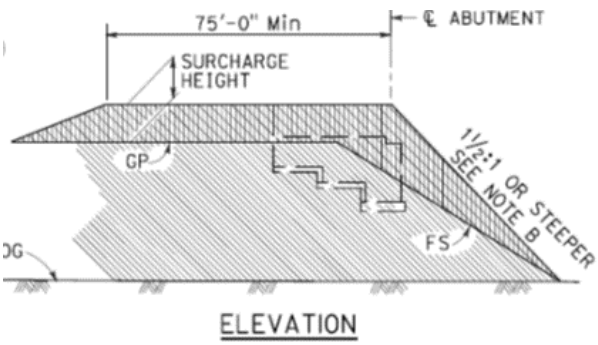
PreScience's Resident Engineer performed a series of outreach efforts with all the neighbors and business adjacent to the project. And for the most part, there was a positive perception of the project in the vicinity and with the commuters. However, the business immediately adjacent to the project proved to be an adamant proponent against the project from early planning and design phases, and this continued through the construction process, as they incurred the most disruptions during the course of the project.

As such, they were and became a significant point of focus and the team ensured appropriate outreach efforts were continued during the project construction. Since this project neighbor was the most impacted on this project, coordination and the management of the expectations of this property owner, timely communication, notification, and cooperation was critical to ensuring the project continued to move forward successfully. Particular attention was paid towards ensuring access and safety, while keeping them informed of potential impacts including apprising them of work that may impact their driveway access or work that would occur around their building causing noise or disruptions to their utility services during the cutovers. This included formal outreach meetings, sharing the Contractor's Baseline Schedule and providing weekly 3-week look ahead schedules.

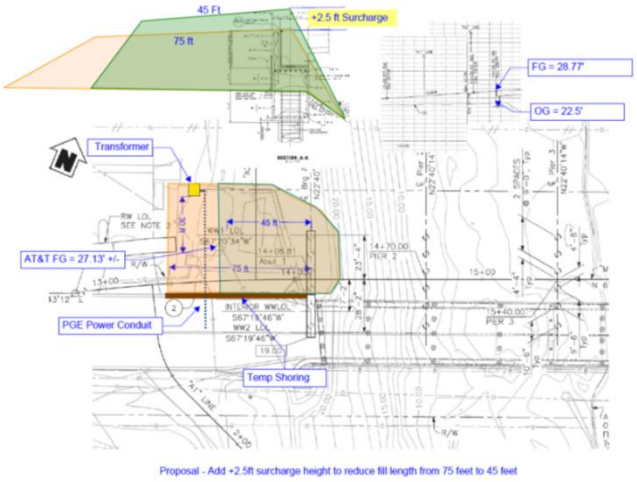
6. Unusual Accomplishments –

PROJECT CHALLENGES AND SOLUTIONS (INNOVATION)

Challenge 1 – Utility Relocation (PG&E)



Several utilities were required to be relocated by the utility owner and before the utility relocation work could occur project improvements needed to be completed by the Contactor to install the utility conduits. From installation and acceptance by the utility provider, in this case PG&E, the new transformer was scheduled for relocation. Unfortunately, PG&E was delayed due to a 1 month advance public notice moratorium for the disruption to the power service to its customers. The one-month delay fell onto the project's critical path schedule as this relocation work proceeded constructing Stage 1 abutment fills and the 30-day settlement period. To mitigate this initial project delay PreScience's Resident Engineer developed a plan to alter the Caltrans Standard Detail A62B Embankment Slope for the Designer and Geotechnical Engineer's review and approval. The revised embankment plan adjusted the surcharge embankment limits from 75 feet to 45 feet by adding 2.5 feet to the surcharge height.



This revision to the Caltrans Standard Detail afforded the project to move forward with abutment construction and offset project cost impacts and delays estimated at $125k and 1 month.

Challenge 2 – Stage 1A Utility Relocations (AT&T)

From the completion of Stage 1, and during Stage 1A, AT&T was required to relocate their fiber optic communication lines from the existing bridge onto the new Stage 1 bridge within the allotted 30-day window. Notification to AT&T was provided by PreScience's Resident Engineer that the AT&T conduits on the new bridge were ready for installation of the new fiber optic cables. Unfortunately, AT&T crews could not meet the 30-day window due to other AT&T project commitments. Eventually after 3 weeks from the

anticipated cutover date of May 15th, AT&T subcontractors finally were able to shift their new line from the old bridge to the new Stage 1 bridge.

To mitigate for this 3-week delay to the critical path schedule, PreScience's Resident Engineer proposed to the Designer and Geotechnical Engineer to waive the Stage 2 abutment settlement period. Points for consideration were:

- Stage 1 surcharge results avg = 1/4-inch
- Stage 2 abutments were in the same footprint as the existing bridge, offering a preloaded condition
- Abutments are located within the banks of the existing levee which the Army Corp required > 95% compaction and soil classification of CL

By waiving the 30-day settlement period the County gained back 30 days of float on the CPM schedule which allowed for the project to be constructed in two seasons as opposed to being pushed into three. The initiative taken by the Resident Engineer greatly offset incredible costs and time impacts by avoiding an additional construction season. Not to mention the increased exposure the project would have undergone with all the regulatory permitting agencies.

7. Additional Considerations

7a. Alternative Practices - Temporary Stream Diversion and Dewatering

Culvert System

A major feature of this project involved installation of a temporary stream diversion system to ensure water quality was maintained and the wildlife in the creek were not affected by construction activities. The contract identified a stream diversion system consisting of multiple culverts with upstream and downstream cofferdams to accommodate an anticipated 450 CFS water flow. The work window where the temporary stream diversion could be in place was limited by the environmental permits. The specific work windows varied by permit, and the window for in-water work which was compliant with each permit extended from May 1 to October 15 each construction season. This was a tight timeframe to complete all of the required in-water work, so strong schedule management was needed to ensure work progressed timely. After the cofferdam installation was complete, TWEF was installed over it to create a fully closed

system. All this work was performed under the supervision of a full-time biologist who ensured that no fish, amphibians, or other wildlife were harmed.

The cofferdams were essentially watertight. The creek was lined with plastic below the culverts, and the contractor utilized clean river run gravel over the plastic to fill a few low spots in the creek to create a level surface to place the culverts. After the culverts were placed, clean river run gravel was used to fill around and over the culverts, and crane mats were placed across the top to provide access for construction equipment across the creek and to provide a barrier preventing construction debris from entering the water. Following removal of the temporary stream diversion system, the creek was restored to its pre-existing condition.

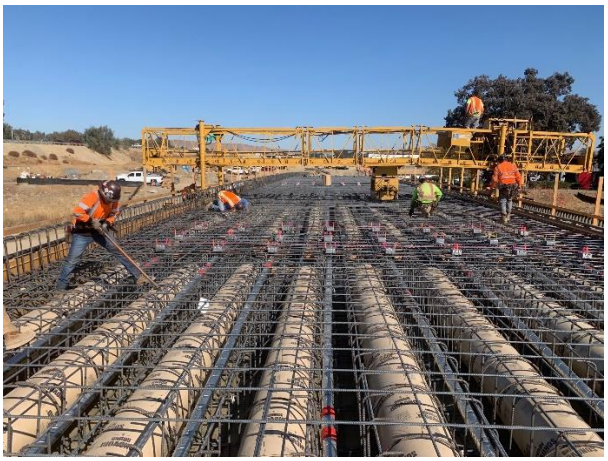
Temporary Trestle Crossing

For the first construction season, the contractor elected to install a temporary trestle spanning the low flow channel. This trestle was constructed at elevation 13 feet (3 feet above top of low flow channel bank) to accommodate creek flows and provide equipment and material access from one side of the creek to the other. The trestle was designed to carry an AF300 Drill Rig, a 200,000 lb load. The trestle concept offered tremendous benefits by avoiding issues with "in-water" work, reducing the project's environmental footprint and the system provided the contractor with time savings for install and removal as opposed to the multi-culvert diversion system option.

7b. Stage Construction / Project Photos

In order to maintain traffic on Marsh Drive during construction, the new bridge was constructed in stages. Constructing the bridge in stages required roadway realignment as the northern half of the new bridge was constructed north of the existing bridge. Traffic was maintained on the existing roadway and bridge during this stage, and once the northern half was complete traffic was rerouted onto that portion of the new bridge. This allowed for the old bridge to be demolished and the southern half of the new bridge to be constructed in its place. Once both halves were in place, a closure pour was needed to join the two longitudinal halves of the bridge.

Stage 1 bridge foundation construction (CIDH) (8.12.21)



Stage 1 deck falsework and Sono-voids placement (9.15.21)

Stage 1 bridge deck pour (10.18.21)

Stage 1 bridge deck post – tensioning (10.28.21)

Stage 1 PG&E hanger and brackets installation (3.18.21)

Stage 1 creek diversion system installation (8.31.22)

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Stage 2 old bridge demo (7.5.22)

Stage 2 bridge foundation construction (CIDH)

Stage 2 bridge deck pour (9.22.22)

PG&E hanger and brackets installed under the 3’ closure pour section

North side view of the new bridge face East (11.8.22)

South side view of the new bridge face West (10.28.22)