American River Flood Control District
Central Valley Flood Protection Board Permit Application
American River Bridge Widening (CalTrans)

Staff Report

Discussion:
The California Department of Transportation submitted an encroachment permit application to widen the existing Business 80 Bridge crossing of the American River. The proposed work includes adding lanes to the east and west bound spans of the bridge and adding an additional pedestrian lane with access ramps to the levees.

The work will include modification to existing bridge piers in the channel and to the abutments. The hydraulic analysis conducted for the proposed modified channel conditions show a negligible impact to the river hydraulics.

The addition of the pedestrian access ramps will require modification to the American River South Levee. Additional fill will be required to create the ramp connection from the levee crown to the bridge deck. The ramp proposed for the American River North Levee indicates connection to a waterside toe access that is not currently developed. This may be for future trails proposed by others.

The work as currently configured will not greatly affect the current operations and maintenance regimen of the District. The inclusion of the pedestrian access ramps will necessitate the expansion of CalTrans' maintenance boundary to extend farther away from the current bridge footprint. The District will work with CalTrans to identify the boundary of their maintenance and any overlap with District responsibilities.

Recommendation:

The General Manager recommends that the Board of Trustees endorse the permit application.

DEPARTMENT OF TRANSPORTATION
DISTRICT 3
703 B STREET
MARYSVILLE, CA 95901
PHONE: (530) 741-4534

December 29, 2020

EA: 03-3F070
Prj. ID: 0312000054
Loc: 03-Sac-51
PM 2.0/3.5

Mr. Michael Wright
Chief Engineer
Central Valley Flood Protection Board
3310 El Camino Avenue, Suite 170
Sacramento, California 95821

Subject: Draft Central Valley Protection Board (CVFPB)/ Section 408 United States Army Corps of Engineers (USACE) Permit Application regarding project EA. 03-3F070

Dear Michael Wright:

Enclosed are two (2) copies of the Encroachment Permit Application (DWR 3615) and Environment Questionnaire (DWR 3615a) with supporting documentation.

In addition, the following below include background information, scope of work, project alternatives, and project vicinity to show where work is going to occur:

Background & History

An original Project Scope Summary Report (PSSR) was completed in November 2011 for Structure Rehabilitation of three bridges including 21st Avenue Undercrossing, Sawmill Undercrossing, and American River Bridge. A Supplemental PSSR was completed in June 2015 to separate the American River Bridge from the other two structures, to replace the deck and widen the bridge to accommodate traffic handling during construction. In October 2015, the project was programmed as an amendment to the 2016 SHOPP as a Long Lead project. The project is currently programmed in the 2020 SHOPP as a Contingency (G-13) Project.

Scope of work

Project EA. 03-3F070 proposes to rehabilitate the American River Bridge (Br. No. 24-0003) by removing and replacing the existing concrete deck, removing and replacing the steel girder post-tensioning systems in spans 1 and 2, modify existing soundwall, install sheet piling around piers for scour mitigation, construct concrete catcher blocks, widen the bridge to accommodate traffic during construction, add a Class I bike/pedestrian path, and plan for future transportation needs on State Route (SR) 51.

Proposed Alternatives

Due to the large volume of traffic that uses SR 51, the Traffic Management Plan (TMP) recommends keeping 3 lanes of traffic open in each direction of travel during construction. In order to accommodate this recommendation, the bridge must be widened permanently to keep three lanes open for traffic during construction and to allow the space for the contractor to work.

Alternative 1:

The project scope for Alternative 1 includes the following elements:

- Remove and replace the existing concrete bridge deck (Bridge number 24-0003), with a 1¼" thicker deck than existing.
- Widen the American River Bridge (Br. No. 24-0003) to maintain 3 lanes of traffic in each direction during construction.
- Provide a 14' bike/pedestrian path on the northbound side of the bridge separated from the traffic by a concrete barrier.
- Widen the substructure and superstructure by 54'-11"± on the northbound side of the structure.
- Widen the approaches of SR 51 to accommodate the widening of the American River Bridge.
- Modification of an existing soundwall on the southeast side of the American River bridge.
- Construct 30' approach slabs.
- Strengthen existing girders
- Lengthen a box culvert to the East, North of the American River Bridge
- Widen bridge abutments, footings, bents, and piers supported by piles.
- Install permanent sheet piles at piers 4-6 for scour mitigation.
- Construct temporary construction access trestles and cofferdams to facilitate construction on in-water piers.
- Install lighting on the proposed bike/pedestrian path.
- Create a temporary construction access road across a wetland area or/and use existing dirt road to access the construction site
- Construct median barrier (Type 60) and bridge barrier (Type 842).
- Replace steel girder post-tensioning system at spans 1 & 2.
- Construct concrete catcher blocks underneath existing girders.
- Install new joint seals.
- Near abutment 1, construct a retaining wall and soundwall from the modified soundwall along the Northbound side of the highway, near the Southeast quadrant of the American River Bridge and extend the retaining wall down the bike/pedestrian path.
- Remove vegetation and trees to accommodate widening of SR 51 (CapCity) for bridge deck construction staging.
- Widen Cal Expo Undercrossing (Br. No. 24-0133) on the Northbound side
- Modify the Exposition Boulevard Off-ramp in the Northbound direction

Alternative 2:

In addition to the project scope common to Alternative 1, this alternative adds the following elements:

- Widen the substructure to the ultimate width by 38' -11"± on the southbound side to accommodate the future widening of SR 51.
- Alternatives 2 is contingent on obtaining additional construction capital funding (SHOPP & Non-SHOPP) prior to RTL.

Alternative 3:

In addition to the project scope common to Alternative 1, this alternative adds the following elements:

- Widen superstructure and substructure by 38' -11"± on the southbound side to accommodate the future widening of SR 51.
- Requires no girder strengthening
- Alternative 3 is contingent on obtaining additional construction capital funding (Non-SHOPP) prior to RTL.
- Re-align the portion of the American River bicycle trail, which runs below and parallel to the bridge to be further from the edge of deck.

Project Vicinity

"Provide a safe, sustainable, integrated and efficient transportation system to enhance California's economy and livability"

The following items are included in the application package:

Item Number	Document
1	Transmittal Letter
2	3615 Form
3	3615a Form
4	Environmental Document
5	HPSR Signed
6	401 WQC Application
7	404 Application
8	Standard Specifications - Earthwork
9	Standard Specifications - Aggregate Base
10	Standard Specifications - Asphalt Concrete
11	Hazardous Waste ISA
12	Standard Specifications - Treated Woodwaste
13	Project Title Sheet
14	American River Bridge Photo Summary & Index
15	Typical Cross Sections
16	Overview of Proposed Work
17	Barge Alternative Method of Construction (Instead of Trestle)
18	Layouts
19	Proposed Modification to Levee Exhibit
20	Profile & Superelevation Diagram
21	Structures General Plan
22	Parcels within project vicinity
23	Draft Preliminary Geotechnical Report
24	Draft Final Hydraulic Report
25	Riparian Planting Map
26	Riparian Planting Plan Summary
27	Preliminary Foundation Report
28	Project Schedule

Should the (CVFPB) or the (USACE) staff have any questions regarding this permit application submission or required additional information, please contact me at (530) 741-4534 or by email at Andrew.Huang@dot.ca.gov.

Sincerely,

ANDREW HUANG, P.E.,
Design M7
Caltrans District 3

APPLICATION FOR A CENTRAL VALLEY FLOOD PROTECTION BOARD
ENCROACHMENT PERMIT

Application No. _____
(For Office Use Only)

1. Description of proposed work being specific to include all items that will be covered under the issued permit.

This project proposes to rehabilitate the American River Bridge (Br. No. 24-0003) by removing and replacing the existing concrete deck, removing and replacing the steel girder post-tensioning systems in spans 1 and 2, install sheet piling around piers for scour mitigation, construct concrete catcher blocks, and widen the bridge superstructure permanently to accommodate traffic during construction.

2. Project Location: Sacramento County, in Section Sacramento

Township: T9N (N) (S), Range: R5E (E) (W), M. D. B. & M.

Latitude: 38° 35' 12.12" N Longitude: 121° 26' 52.04" W

Stream : American River (29.3 mil) , Levee : U04(10.86)&U03(2.86) Designated Floodway: 115000 cfs

APN: _____

3. Chris A Rockey / District 3 CVFPB liaison (Name of Applicant / Land *Owner*) of 703 B St (Address)

Marysville (City) California (State) 95901 (Zip Code) (530) 741-4517 (Telephone Number)

chris.rockey@dot.ca.gov (E-mail)

4. Jason Mcomber / District 3 CVFPB liaison (Name of Applicant's Representative) of 703 B St (Company)

Marysville (City) California (State) 95901 (Zip Code) (530) 741-4480 (Telephone Number)

jason.mcomber@dot.ca.gov (E-mail)

5. Endorsement of the proposed project from the Local Maintaining Agency (LMA):

We, the Trustees of American River Flood Control District (NA0001) (Name of LMA) approve this plan, subject to the following conditions:

☐ Conditions listed on back of this form ☑ Conditions Attached ☐ No Conditions

Trustee Date Trustee Date

Trustee Date Trustee Date

APPLICATION FOR A CENTRAL VALLEY FLOOD PROTECTION BOARD
ENCROACHMENT PERMIT

6. Names and addresses of adjacent property owners sharing a common boundary with the land upon which the contents of this application apply. If additional space is required, list names and addresses on back of the application form or an attached sheet.

Name	Address	Zip Code
See parcels within vicinity exhibit		

7. Has an environmental determination been made of the proposed work under the California Environmental Quality Act of 1970? ☐ Yes ☑ No ☐ Pending

If yes or pending, give the name and address of the lead agency and State Clearinghouse Number:

SCH No.

8. When is the project scheduled for construction? 07/2022

9. Please check exhibits accompanying this application.

A. ☑ Regional and vicinity maps showing the location of the proposed work.

B. ☑ Drawings showing plan view(s) of the proposed work to include map scale.

C. ☑ Drawings showing the cross section dimensions and elevations (vertical datum?) of levees, berms, stream banks, flood plain,

D. ☑ Drawings showing the profile elevations (vertical datum?) of levees, berms, flood plain, low flow, etc.

E. ☑ A minimum of four photographs depicting the project site.

Signature of Applicant Date

Include any additional information:

ENVIRONMENTAL ASSESSMENT QUESTIONNAIRE FOR APPLICATIONS FOR CENTRAL VALLEY FLOOD PROTECTION BOARD ENCROACHMENT PERMITS

This environmental assessment questionnaire must be completed for all Central Valley Flood Protection Board applications. Please provide an explanation where requested. Incomplete answers may result in delays in processing permit applications. Failure to complete the questionnaire may result in rejection of the application.

1. Has an environmental assessment or initial study been made or is one being made by a local or State permitting agency in accordance with the California Environmental Quality Act? ☑ Yes ☐ No

   If yes, identify the Lead Agency, type of document prepared or which will be prepared, and the State Clearinghouse Number:
   An Initial Study with a Mitigated Negative Declaration (IS-MND), in compliance with the California Environmental Quality Act (CEQA), was prepared for the project.

2. Will the project require certification, authorization or issuance of a permit by any local, State or federal environmental control agency? ☑ Yes ☐ No

   List all other governmental permits or approvals necessary for this project or use, including U.S. Army Corps of Engineer' 404and Section 10 permits, State Water Quality Certification, Department of Fish and Game 1600 agreement, etc. Attach copies of all applicable permits.
   The project will adhere to the conditions of the Statewide National Pollutant Discharge Elimination System (NPDES) permit issued by the State Water Resources Control Board (Order No. 2012-0011-DWQ), NPDES Permit No CAS000003 along with the NPDES General Permit No. CAS000002 (Order No. 2009-0009-DWQ). The contractor will be required to prepare a Storm Water Pollution Prevention Plan (SWPPP) or a Water Pollution Control Plan (WPCP), 408 Permit, Clean Water Act Section 404

3. Give the name and address of the owner of the property on which the project or use is located. Please submit a copy of your current Title Report (Grant Deed), if your proposed project includes a private residence.
   See Parcel Exhibit for property owner information.

4. Will the project or use require issuance of a variance or conditional use permit by a city or county?

   ☑ Yes ☐ No

   Explain:
   Due to the high traffic volumes on SR 51 and commercial truck traffic, work will be limited to nighttime hours and no lane or shoulder closure will be allowed during daytime and peak commute hours on weekdays until K-Rails are installed permitting for daytime work

5. Is the project or use currently operating under an existing use permit issued by a local agency?

   ☐ Yes ☐ No

   Explain:

6. Describe all types of vegetation growing on the project site, including trees, brush, grass, etc.
The project limits contains common vegetation communities and natural communities of special concern. The common vegetation community within the project limits are Ruderal/Developed communities. The natural vegetation communities in the project area include Riparian Forest/Shrub and Oak Woodland Savanna. Other areas included in the project are Riverine, consisting of the American River and Linda Creek which flows outside the project area.

7. Describe what type of wildlife or fish may use the project site or adjoining areas for habitat, food source, nesting sites, source of water, etc.
The following fish and wildlife within the project sites and adjoining areas are listed as follows: Valley Elderberry Longhorn Beetle (Desmocerus californicus dimorphus), Green Sturgeon (Acipenser medirostris), California Central Valley Steelhead (Oncorhynchus mykiss), Central Valley Spring-Run and Winter-Run Chinook Salmon (Oncorhynchus tshawytsha), Brewer's Blackbird (Euphagus cyanocephalus), House Finch (Haemorhous mexicanus), European Starling (Sturnus vulgaris), Fox squirrel (Sciurus niger), Striped Skunk (Mephitis mephitis), Pacific Chorus Frog (Pseudacris regilla), common bullfrog (Lithobates catesbeianus), and raccoon (Procyon lotor)

8. Has the Department of Fish and Game, U.S. Fish and Wildlife Service, or National Marine Fisheries Service been consulted relative to the existence of, or impacts to, threatened or endangered species on or near the project site?
☑ Yes ☐ No
Explain:
Section 7 formal consultation with NMFS and USFWS has been initiated and is currently ongoing.

9. Will the project or use significantly change present uses of the project area?
☐ Yes ☑ No
Explain:
Biological habitat use will not significantly change in the project area. Visual cultural etc.

10. Will the project result in changes to scenic views or existing recreational opportunities?
☐ Yes ☑ No
Explain:
The project will not result in changes to scenic view or changes to existing recreational opportunities in the final conditions.

11. Will the project result in the discharge of silt or other materials into a body of water?
☐ Yes ☑ No
Explain:
There will be no discharge of silt or other materials during construction in to a body of water.

12. Will the project involve the application, use, or disposal of hazardous materials? ☑ Yes ☐ No

If yes, list the types of materials, proposed use, and disposal plan. Provide copies of all applicable hazardous material handling plans.
See SSP 14-11.14 – Treated Wood Waste.

See Hazardous Waste Site Investigation (ISA)

13. Will construction activities or the completed project generate significant amounts of noise?

☐ Yes ☑ No

Explain:
No adverse noise impacts from construction are anticipated because construction would be conducted in accordance with Caltrans Standard Specifications Section 14.8-02. Construction noise would be short-term and intermittent.

14. Will construction activities or the completed project generate significant amounts of dust, ash, smoke, fumes, or odors?

☐ Yes ☑ No

Explain:
The proposed project anticipates temporary short term air quality impacts during construction; however, these impacts will be reduced with incorporation of minimization methods using 2018 Caltrans Standards Specifications. This project is not a traffic capacity increasing project therefore, air quality impacts will not be substantial.

15. Will the project activities or uses involve the burning of brush, trees, or construction materials, etc?

☐ Yes ☑ No

Explain, and identify safety and air pollution control measures:
The proposed project does not include activities that involve burning of brush, trees, or construction materials.

16. Will the project affect existing agricultural uses or result in the loss of existing agricultural lands?

☐ Yes ☑ No

Explain:
The project limits do not encroach on any agricultural use lands.

17. Have any other projects similar to the proposed project been planned or completed in the same general area as the proposed project?

☑ Yes ☐ No

Explain and identify any other similar projects:
Two projects are within the vicinity but do not have similar scope.
State Route 51 from J Street to El Camino Avenue to add managed lanes and auxillary lanes in each direction
State Route 51 from E Street to Arden there is a worker safety proejct, adding Maintenance Vehicle Pullouts (MVP), Vegetation control (asphalt composite), replacing Metal Beam Guardrail (MBGR) with Midwest Guardrail.

18. Will the project have the potential to encourage, facilitate, or allow additional or new growth or development?

☑ Yes ☐ No

Explain:
Replacement of the American River Bridge deck (Bridge No. 24-0003) would allow for a longer service life of the bridge and acts as a connection from Sacramento City to Roseville. Improving the service life of the bridge will facilitate and assist in growth of neighboring cities/counties.

19. Will materials be excavated from the floodplain? ☐ Yes ☐ No If yes, please answer the remaining questions.

THE REMAINING QUESTIONS MUST ONLY BE ANSWERED IF THE ANSWER TO QUESTION NO. 19 WAS "YES". IF THE ANSWER TO QUESTION NO. 19 WAS "NO", YOU DO NOT NEED TO COMPLETE THE REMAINING QUESTIONS.

A. What is the volume of material to be excavated?

Annually 7000 CY Total 14000 CY

B. What types of materials will be excavated?
Material to be excavated will be existing ground earthen material

C. Will the project site include processing and stockpiling of material on site?

☑ Yes ☐ No

Explain:
Stock Piling will occur between the floodplain during June 1 to October 15 and all stock piling will be done outside of the floodplain during months that are not within the said duration.

D. What method and equipment will be used to excavate material?
Excavator or similar equipment.

E. What is the water source for the project?

F. How will waste materials wash water, debris, and sediment be disposed of?

G. What is the proposed end land use for the project site?

H. Has a reclamation plan been prepared for this site in accordance with the Surface Mining and Reclamation Act of 1975?

☐ Yes ☐ No If yes, please attach a copy.

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
03	Sac	51	2.0/3.5		

STATE OF CALIFORNIA

DEPARTMENT OF TRANSPORTATION

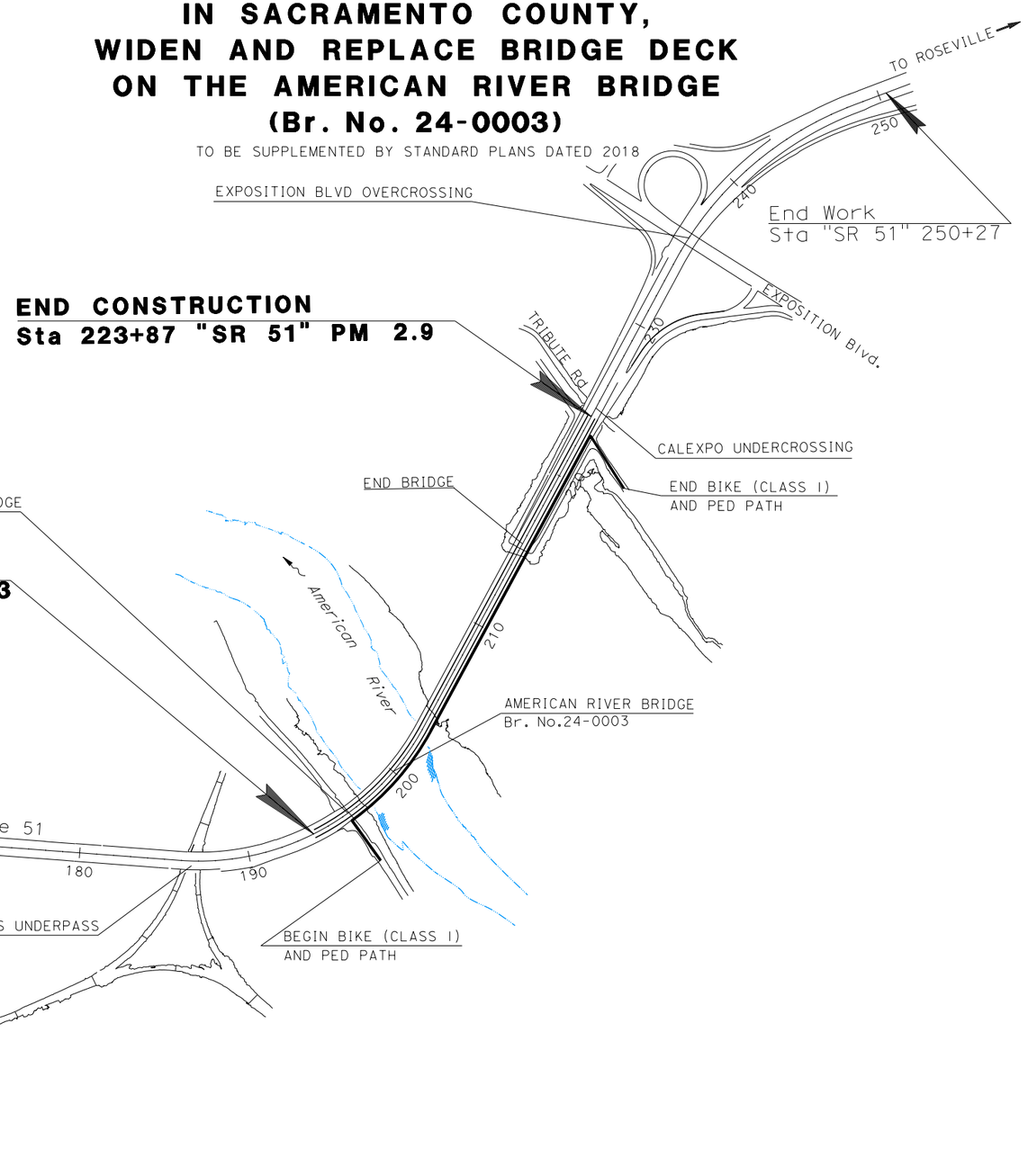
PROJECT PLANS FOR CONSTRUCTION ON

STATE HIGHWAY

IN SACRAMENTO COUNTY, WIDEN AND REPLACE BRIDGE DECK ON THE AMERICAN RIVER BRIDGE (Br. No. 24-0003)

TO BE SUPPLEMENTED BY STANDARD PLANS DATED 2018

LOCATION MAP



THE CONTRACTOR SHALL POSSESS THE CLASS (OR CLASSES) OF LICENSE AS SPECIFIED IN THE "NOTICE TO BIDDERS."

PROJECT ENGINEER
REGISTERED CIVIL ENGINEER
DATE

REGISTERED PROFESSIONAL ENGINEER
No.
Exp.
CIVIL
STATE OF CALIFORNIA

PLANS APPROVAL DATE

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C03-3F070	**03-3F070**
PROJECT ID	**0316000113**

PROJECT MANAGER: CLARK PERI
DESIGN MANAGER: ANAND MAGANTI

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TIME PLOTTED => $TIME
LAST REVISION 00-00-00

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Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
03	Sac	51	2.0/3.5		

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

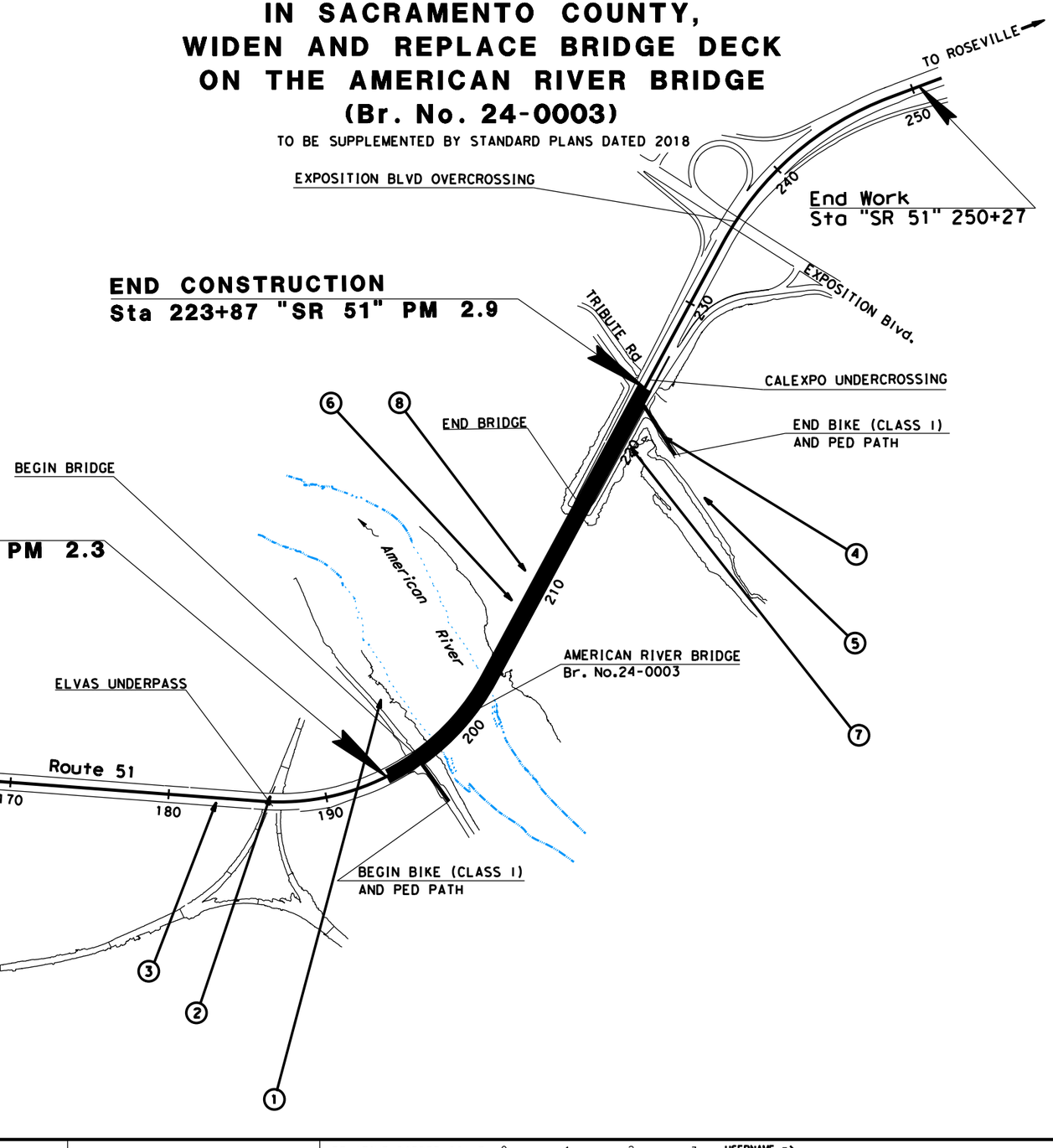
PROJECT PLANS FOR CONSTRUCTION ON
STATE HIGHWAY
IN SACRAMENTO COUNTY,
WIDEN AND REPLACE BRIDGE DECK
ON THE AMERICAN RIVER BRIDGE
(Br. No. 24-0003)

TO BE SUPPLEMENTED BY STANDARD PLANS DATED 2018

LEGEND:

(X) SITE VISIT PHOTO
(SEE SITE VISIT PHOTO REPORT)

LOCATION MAP



THE CONTRACTOR SHALL POSSESS THE CLASS (OR CLASSES) OF LICENSE AS SPECIFIED IN THE "NOTICE TO BIDDERS."

PROJECT MANAGER: CLARK PERI
DESIGN MANAGER: ANAND MAGANTI

PROJECT ENGINEER — DATE
REGISTERED CIVIL ENGINEER

PLANS APPROVAL DATE

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REGISTERED PROFESSIONAL ENGINEER — No. — Exp. — CIVIL — STATE OF CALIFORNIA

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C03-3F070	03-3F070
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Sac 51 American River Bridge Deck Widening

Site Visit Photo Report – 4/26/2017 to 10/19/2017

1: GROUND LEVEL PHOTO LOOKING AT AMERICAN RIVER BRIDGE FROM THE RIVER LEVEE.

2: GROUND LEVEL PHOTO LOOKING TOWARDS SR 51 FROM UNION PACIFIC RAILROAD UNDERCROSSING.

3: GROUND LEVEL PHOTO LOOKING AT MCKINLEY SOUNDWALL AND NB SR 51.

4: GROUND LEVEL PHOTO LOOKING TOWARDS TRIBUTE ROAD OVERCROSSING FROM THE RIVER LEVEE.

Sac 51 American River Bridge Deck Widening

Site Visit Photo Report – 4/26/2017 to 10/19/2017

5: GROUND LEVEL PHOTO LOOKING AT CALIFORNIA EXPOSITION CENTER LOT FROM THE RIVER LEVEE.

6: GROUND LEVEL PHOTO LOOKING AT EXISTING BIKE PATH UNDER SR 51.

7: GROUND LEVEL PHOTO LOOKING AT DRAINAGE BASIN EAST OF NB SR 51.

8: GROUND LEVEL PHOTO LOOKING TOWARDS AMERICAN RIVER BRIDGE FROM THE EXISTING BIKE TRAIL

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
03	Sac	51			

Item 4

REGISTERED CIVIL ENGINEER DATE

PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER No. Exp. CIVIL STATE OF CALIFORNIA

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0.35′ LCB
0.70′ AB (Class II)

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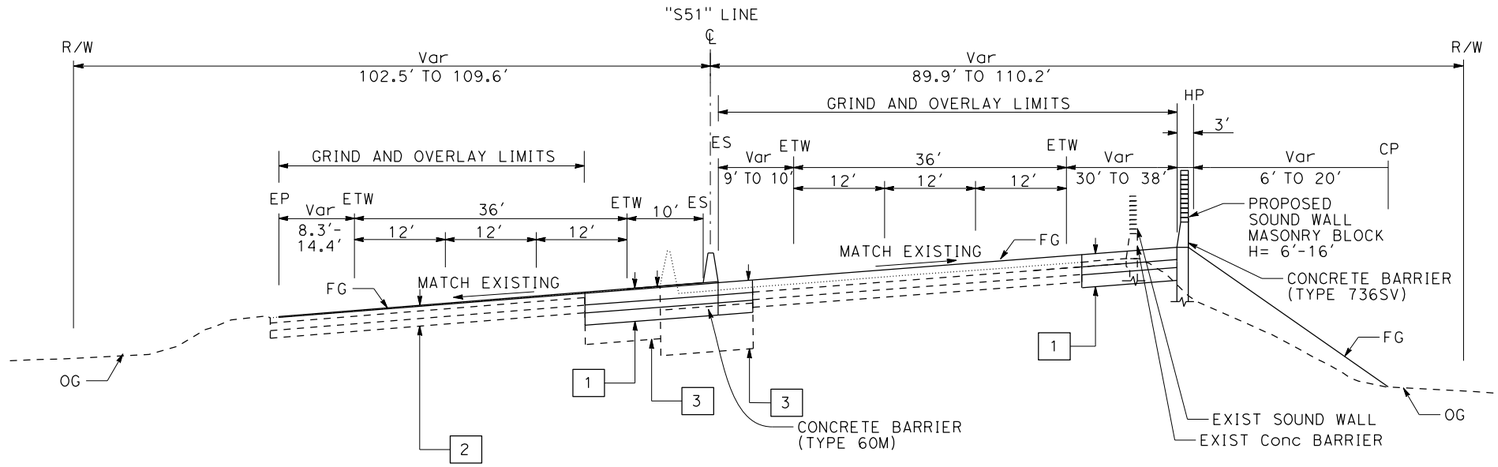
0.33′CTB
0.33′AS

3 — Exist
0.85′ AC (TYPE A)
3.00′ CLASS 2 AB



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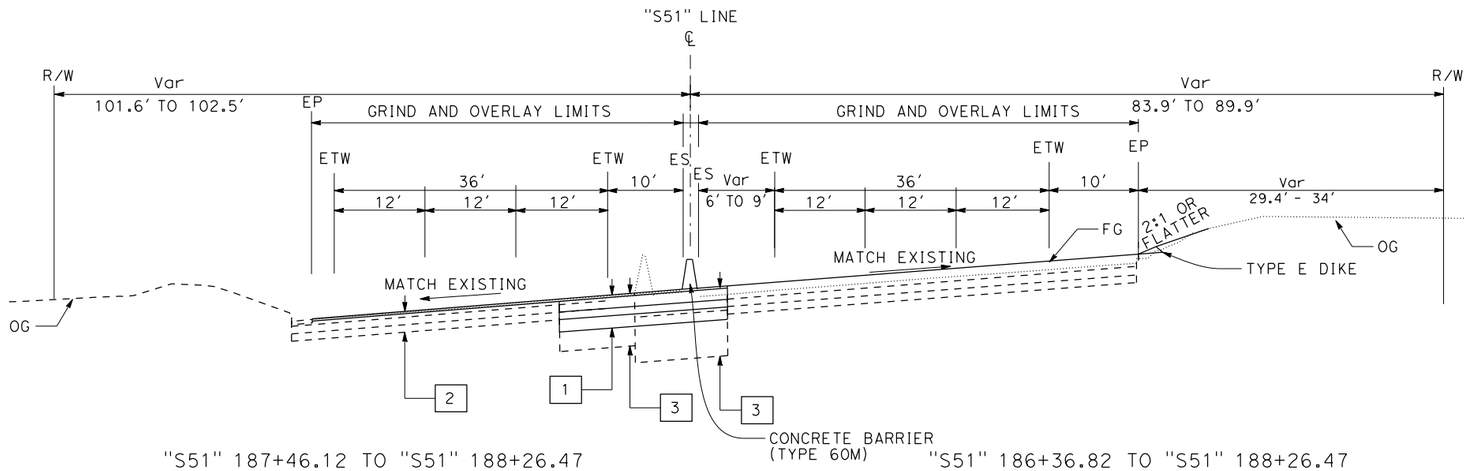
"S51" 188+26.47 TO "S51" 196+38.87



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STATE ROUTE 51

TYPICAL CROSS SECTIONS

NO SCALE

Page 18

X-1

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION
Caltrans® DESIGN

FUNCTIONAL SUPERVISOR

CALCULATED-DESIGNED BY SAYED NOORBAKHSH

CHECKED BY ANDREW HUANG

REVISED BY

DATE REVISED

LAST REVISION 00-00-00

DATE PLOTTED => 9/28/2020
TIME PLOTTED => 8:56:28 AM

BORDER LAST REVISED 7/2/2010

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UNIT 0334

PROJECT NUMBER & PHASE 0312000054

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
03	Sac	51	Item 4		

REGISTERED CIVIL ENGINEER DATE

PLANS APPROVAL DATE

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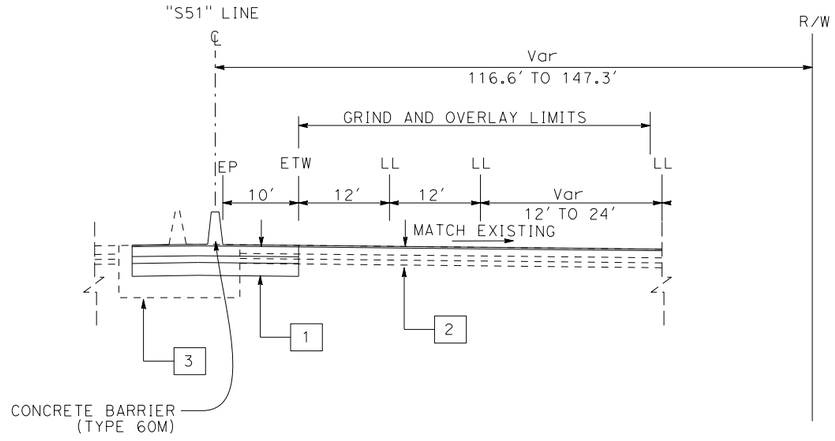

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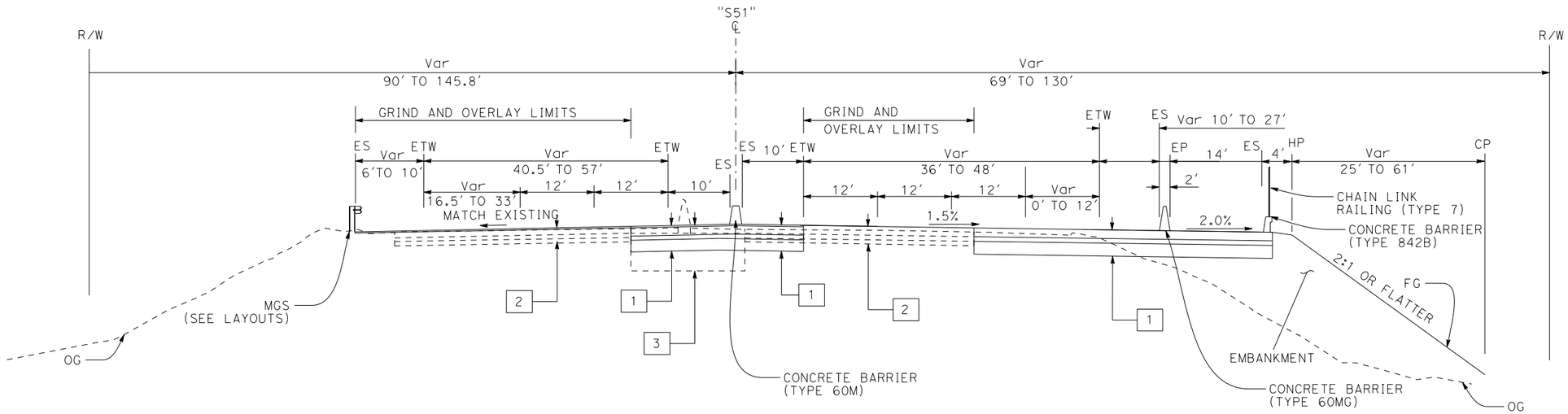

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STATE ROUTE 51

TYPICAL CROSS SECTIONS

NO SCALE

X-2

REVISED BY | DATE REVISED

CALCULATED-DESIGNED BY | CHECKED BY

FUNCTIONAL SUPERVISOR

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION

Caltrans® **DESIGN**

LAST REVISION 00-00-00 | DATE PLOTTED => 9/28/2020 TIME PLOTTED => 7:09:38 PM

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Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
03	Sac	51			

Item 4

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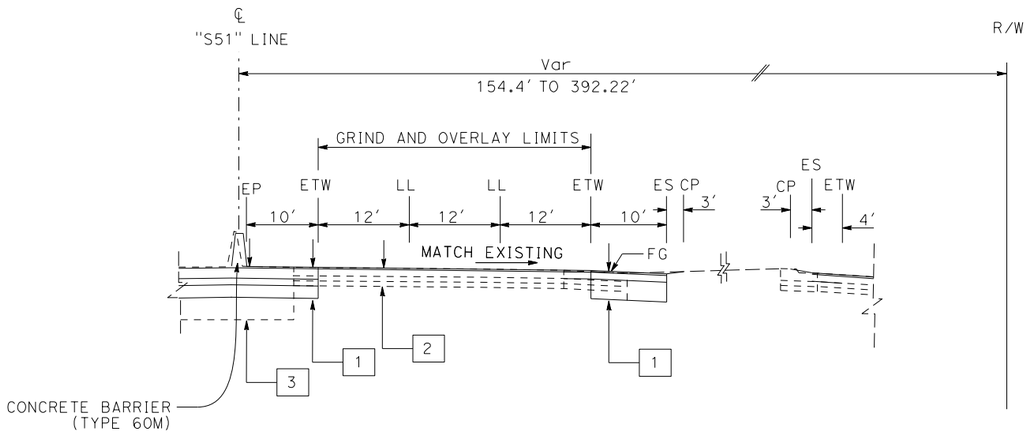
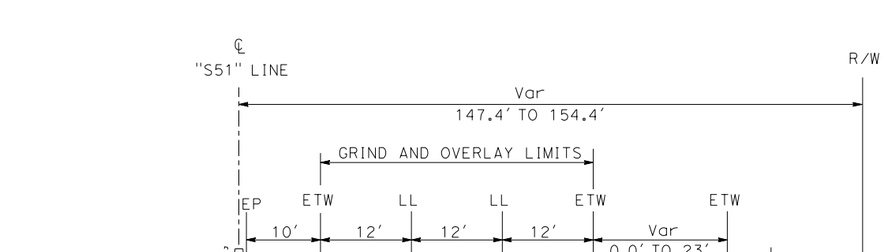


"S51" 227+10.60 TO "S51" 232+04.82



"S51" 224+41.32 TO "S51" 227+10.64

STATE ROUTE 51

TYPICAL CROSS SECTIONS

NO SCALE

X-3

REVISED BY | DATE REVISED

CALCULATED-DESIGNED BY | CHECKED BY

FUNCTIONAL SUPERVISOR

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION

Caltrans® **DESIGN**

LAST REVISION 00-00-00 | DATE PLOTTED => 9/28/2020 TIME PLOTTED => 8:58:43 AM

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Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
03	Sac	51			

REGISTERED CIVIL ENGINEER DATE

PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER No. Exp. CIVIL STATE OF CALIFORNIA

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LEGEND:
- WIDENED BRIDGE DECK
- ITEMS OF WORK ON ROUTE 51
- EXISTING FACILITIES

UNION PACIFIC RAILROAD

RELOCATE EXISTING SOUNDWALL EAST FROM IT'S CURRENT LOCATION

REMOVE AND REPLACE THE EXISTING CONCRETE BRIDGE DECK (BRIDGE NUMBER 24-0003) AND CONSTRUCT NEW A MEDIAN BARRIER

CONSTRUCT A TEMPORARY TRESTLE STRUCTURE FOR CONSTRUCTION ACCESS TO BUILD THE AMERICAN RIVER BRIDGE

AMERICAN RIVER BIKE TRAIL

REALIGN THE BIKE PATH AWAY FROM THE AMERICAN RIVER BRIDGE

TRIBUTE ROAD

CONSTRUCT A RETAINING WALL AND SOUNDWALL FOR BIKEWAY

WIDEN BRIDGE ABUTMENTS, FOOTINGS, BENTS, AND PIERS

LENGTHEN CAL EXPO UNDERCROSSING

PROVIDE LIGHTING ON THE AMERICAN RIVER BRIDGE

CONSTRUCT A TEMPORARY TRESTLE STRUCTURE FOR CONSTRUCTION ACCESS TO BUILD THE AMERICAN RIVER BRIDGE

TWO RIVERS TRAIL

PROVIDE A 14' BIKE AND PEDESTRIAN INFRASTRUCTURE TO ALLOW ACCESS FROM SOUTHERN TOP OF LEVEE TO NORTHERN TOP OF LEVEE

AMERICAN RIVER BIKE TRAIL

AMERICAN RIVER

PROPOSED WORK NEAR AMERICAN RIVER BRIDGE

NO SCALE

REVISED BY | DATE REVISED
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STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION
DESIGN
Caltrans

LAST REVISION | DATE PLOTTED => 10/14/2020
00-00-00 | TIME PLOTTED => 7:02:56 PM

BORDER LAST REVISED 7/2/2010 | USERNAME => | DGN FILE => ...\Public Meeting 03-3F070_ah.dgn | RELATIVE BORDER SCALE IS IN INCHES 0 1 2 3 | UNIT 0334 | PROJECT NUMBER & PHASE 03120000540

FLOATING WORK PLATFORM ALTERNATIVE

As an alternative to a trestle, floating work platforms (barges) would be used to facilitate construction activities within the American River. Use of barges would eliminate the need for a trestle along the entire width of the American River (700 piles spanning approximately 3,200') at this location for the duration of the project. In addition, use of barges would eliminate approximately two construction seasons associated with installation and removal of the trestle.

In order to facilitate the use of barges, a number of preparatory steps would be necessary:

1. Construct access roads on the north side of the American River from CalExpo to the temporary access pier locations on the east and west sides of the bridge. See Figure 1, Temporary Access Roads.

2. Construct temporary access piers. Each pier would require 20 piles 12" in diameter, which would be driven using vibratory or impact hammers. 18 piles would support the temporary access piers and the two (2) additional piles would serve as mooring points. For each pier, 9 piles will be placed in water and 9 piles will be placed on land in the floodplain. Incidental fill may be placed on land within the floodplain to enable the access road to match the grade of the access piers. See Figure 2, Temporary Access Piers and Barge Mooring Points.

3. The barges generally require 2' of clearance between the bottom of the barge and the riverbed for safe operation. Based on a recent bathymetric survey, approximately 23,800 cubic yards of material would be dredged in the work zone (225' from the extents of the bridge widening both upstream and downstream) to create adequate vertical clearance. See Figure 3, Dredge Work Zone. Dredging activities would take place from the temporary access piers and barges using an excavator. Assuming use of a single excavator, approximately 600 cubic yards of material would be dredged per day. With the use of small boats, barges would transport the dredged material to the access pier, where it would be directly loaded into trucks, using an excavator located on the pier, and hauled either off-site or to a temporary storage location within the project limits. The temporary storage location would be determined in coordination with the regulatory agencies. Periodic maintenance dredging may be performed in subsequent seasons to maintain adequate clearance.

The barges would support heavy equipment and construction materials for the purposes of pier installation and associated bridge widening activities. Barges would be tied to the mooring points during periods of inactivity, and would remain in the American River through the duration of the work. Water quality protection measures will be implemented, which may include a turbidity curtain and a skirted oil boom, subject to input from the regulatory agencies.

Temporary Access Pier

Jedediah Smith Memorial Trail

Tribute Rd

Business 80

Exposition Blvd

Cal Expo Parking Lot

New Crossing

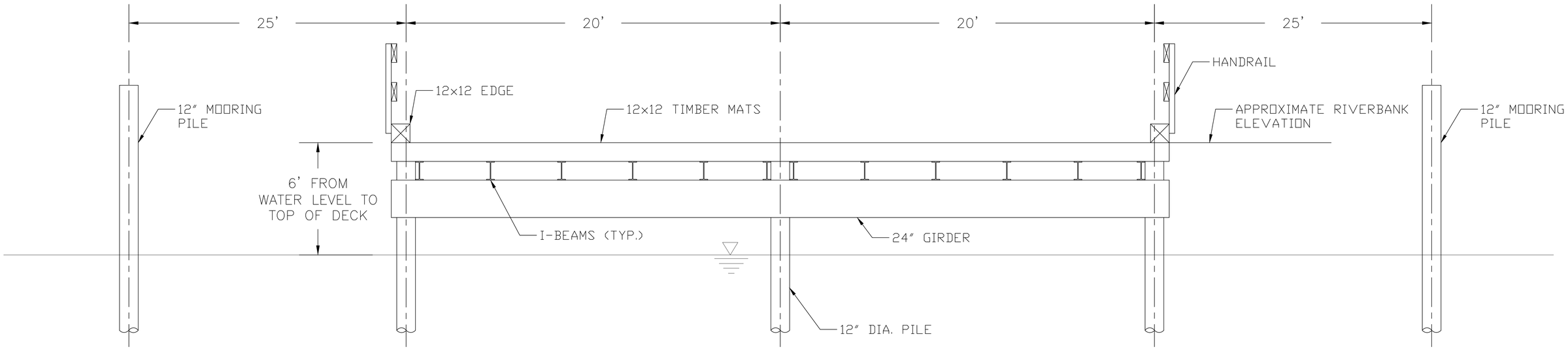
Legend:

- Primary Access Road
- Secondary Access Road
- Connector to / from Piers
- TCE Area

Floating Work Platform Alternative Temporary Access Roads Figure 1

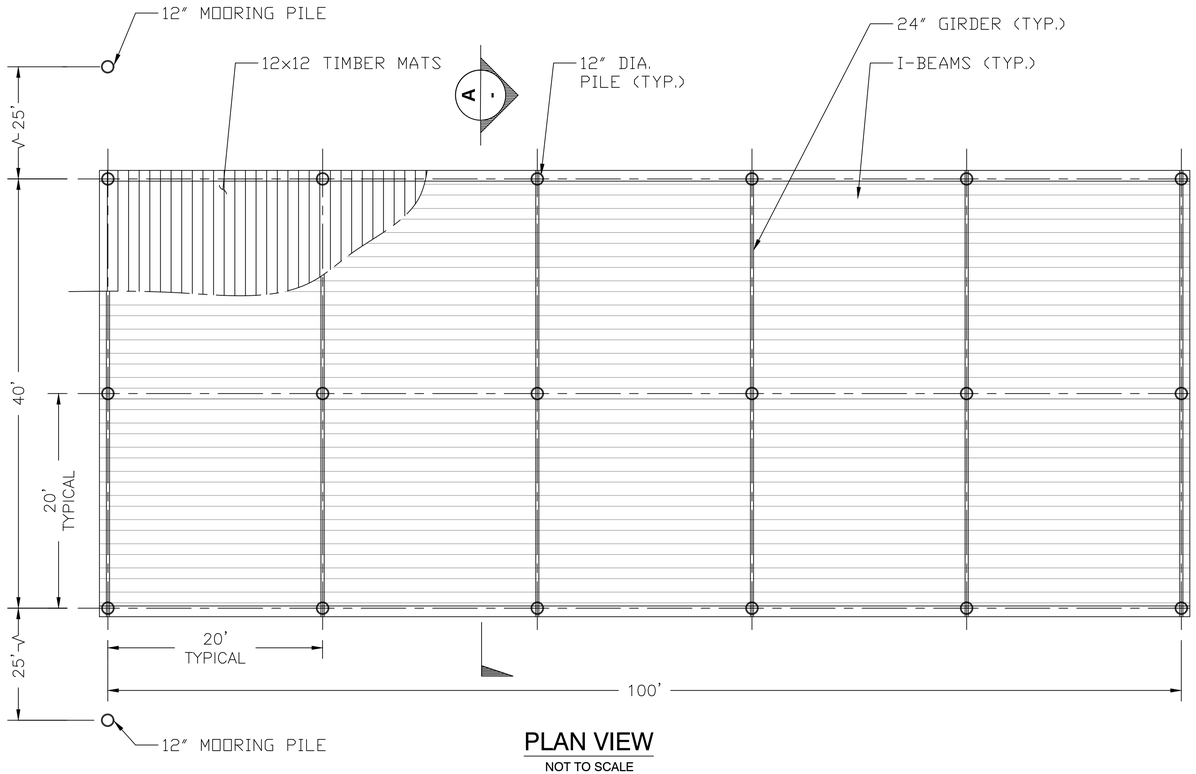
The features are shown for illustrative purposes only, locations subject to change based on field conditions.

12/18/20



TYPICAL SECTION

NOT TO SCALE



PLAN VIEW

NOT TO SCALE

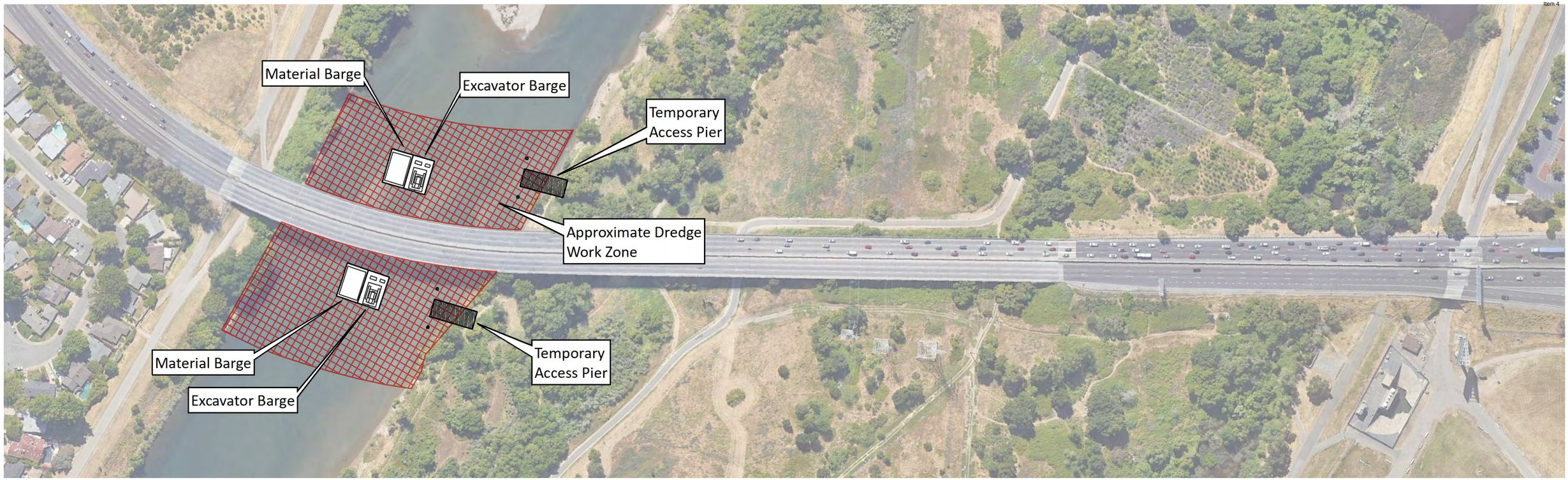
PIER

(APPROXIMATELY 40' x 100')

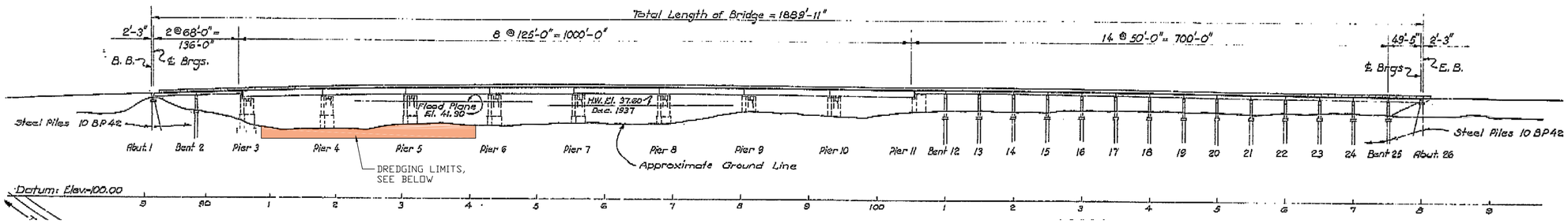
Floating Work Platform Alternative
Temporary Access Piers and Barge Mooring Points
Figure 2

Note: The features are shown for illustrative purposes only, locations subject to change based on field conditions.

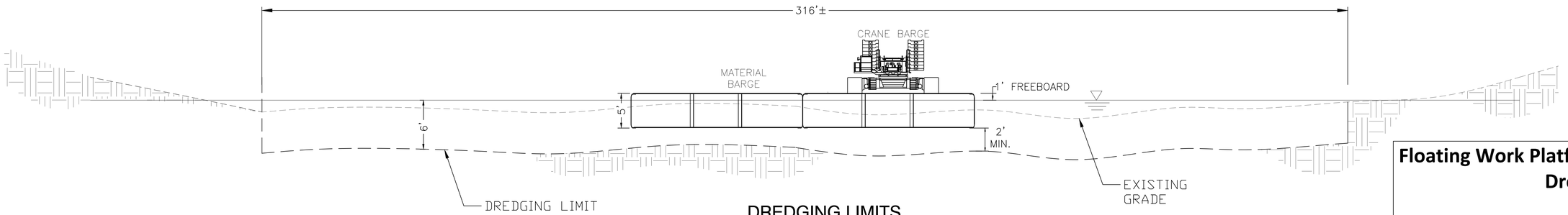
12/18/20



PLAN VIEW
NOT TO SCALE



ELEVATION VIEW
NOT TO SCALE



DREDGING LIMITS
NOT TO SCALE

Floating Work Platform Alternative
Dredge Work Zone
Figure 3

Note: The features are shown for illustrative purposes only, locations subject to change based on field conditions.

12/18/20

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
03	Sac	51	2.0/3.5		

Item 4

REGISTERED CIVIL ENGINEER DATE

PLANS APPROVAL DATE

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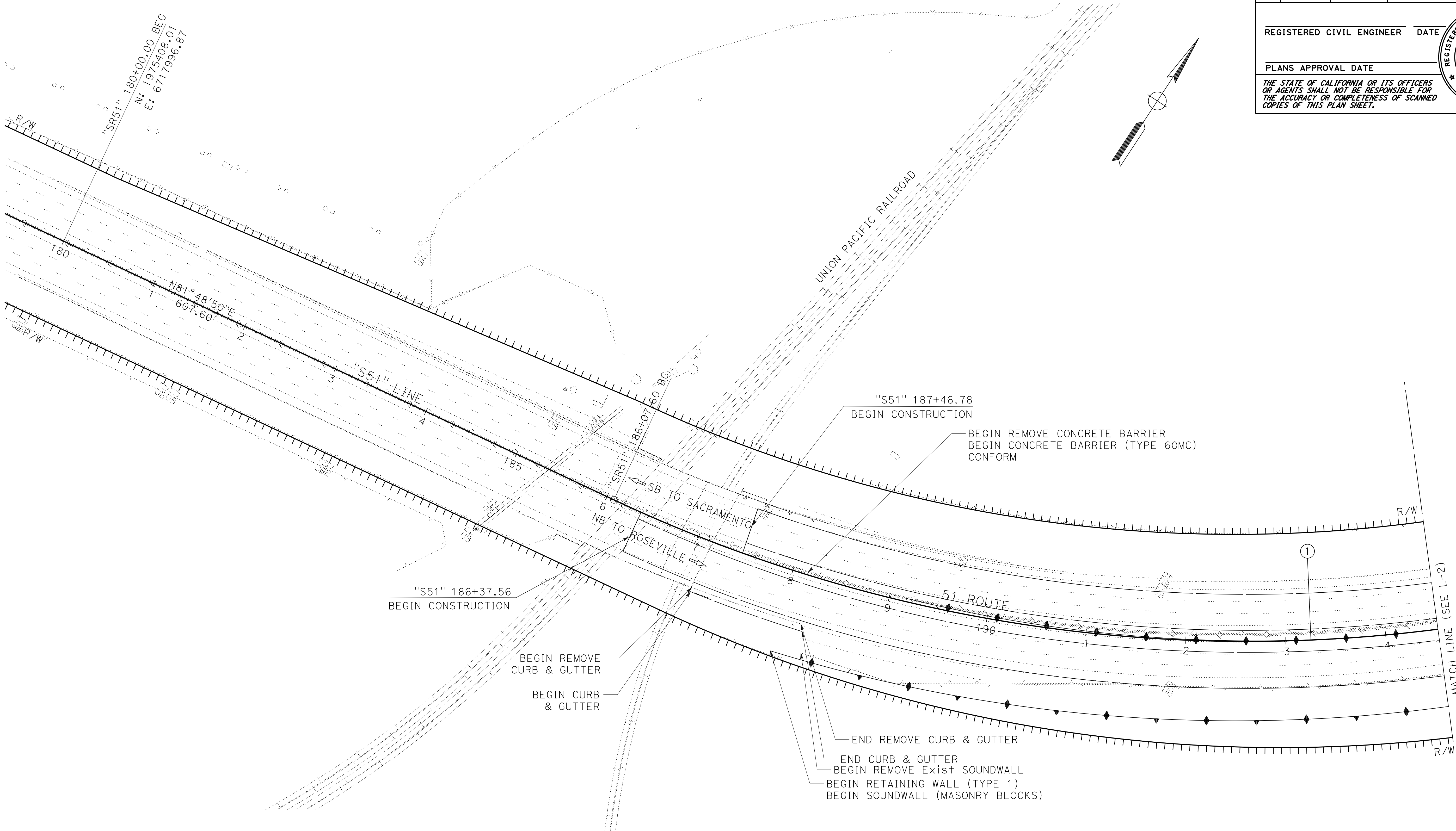

CURVE DATA

No. ⊕	R	Δ	T	L
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LAYOUT

SCALE: 1"=50'

L-1

REVISED BY | DATE REVISED | CALCULATED-DESIGNED BY | CHECKED BY | FUNCTIONAL SUPERVISOR | ANAND MAGANTI

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION

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Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
03	Sac	51	2.0/3.5		

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PLANS APPROVAL DATE

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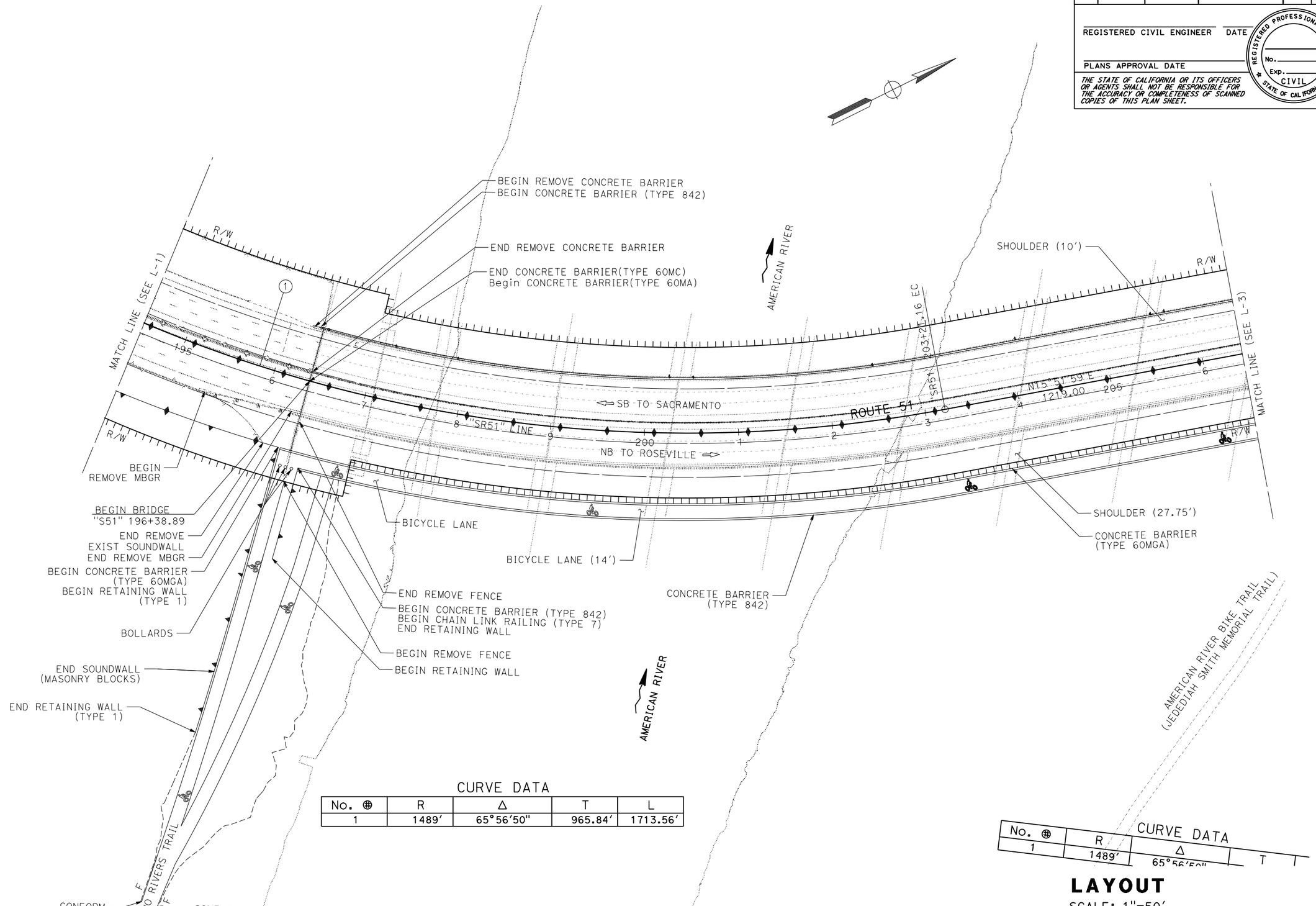

CURVE DATA

No. ⊕	R	Δ	T	L
1	1489′	65°56′50"	965.84′	1713.56′

CURVE DATA

No. ⊕	R	Δ	T
1	1489′	65°56′50"	

LAYOUT

SCALE: 1"=50′

L-2

REVISED BY | DATE REVISED

CALCULATED-DESIGNED BY | CHECKED BY

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03	Sac	51	2.0/3.5		

Item 4

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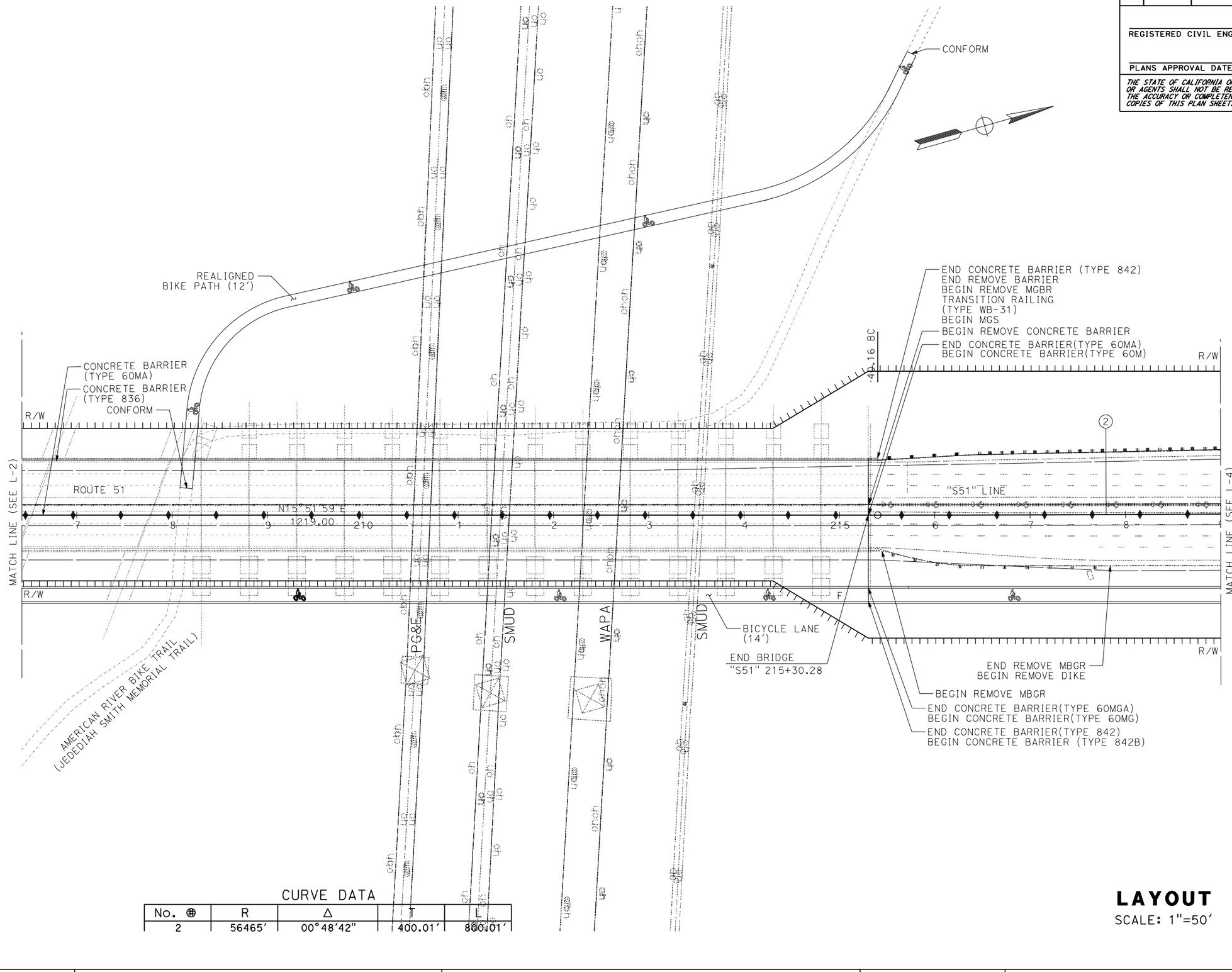

CURVE DATA

No. ⊕	R	Δ	T	L
2	56465′	00°48′42"	400.01′	800.01′

LAYOUT

SCALE: 1"=50′

L-3

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION
DESIGN
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DATE REVISED
DATE PLOTTED => 03-NOV-2020
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RELATIVE BORDER SCALE IS IN INCHES 0 1 2 3
UNIT 0334
PROJECT NUMBER & PHASE 03120000541

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
03	Sac	51	2.0/3.5		

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PLANS APPROVAL DATE

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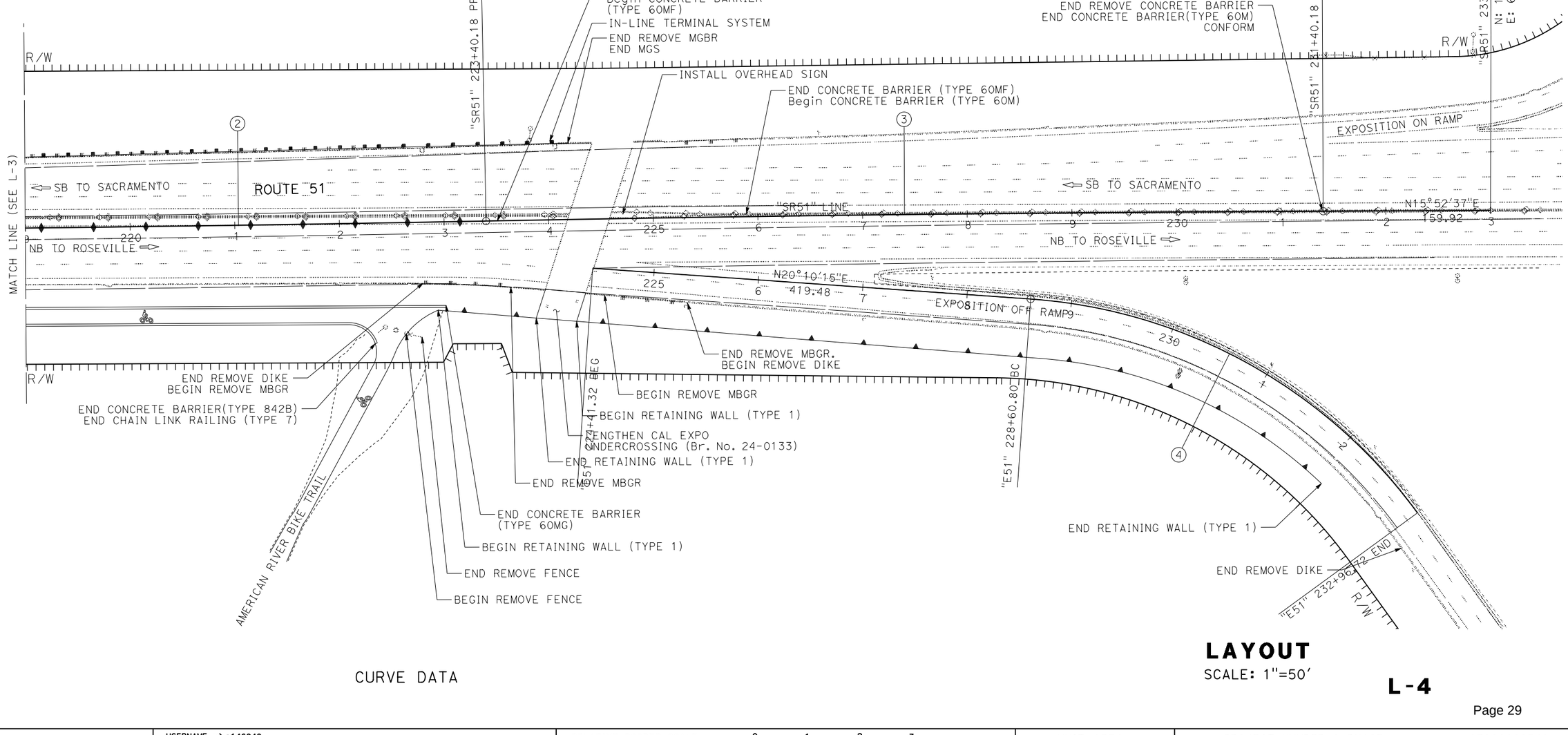

CURVE DATA

LAYOUT

SCALE: 1"=50'

L-4

Page 29

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03	Sac	51	2.0/3.5		

REGISTERED CIVIL ENGINEER DATE

PLANS APPROVAL DATE

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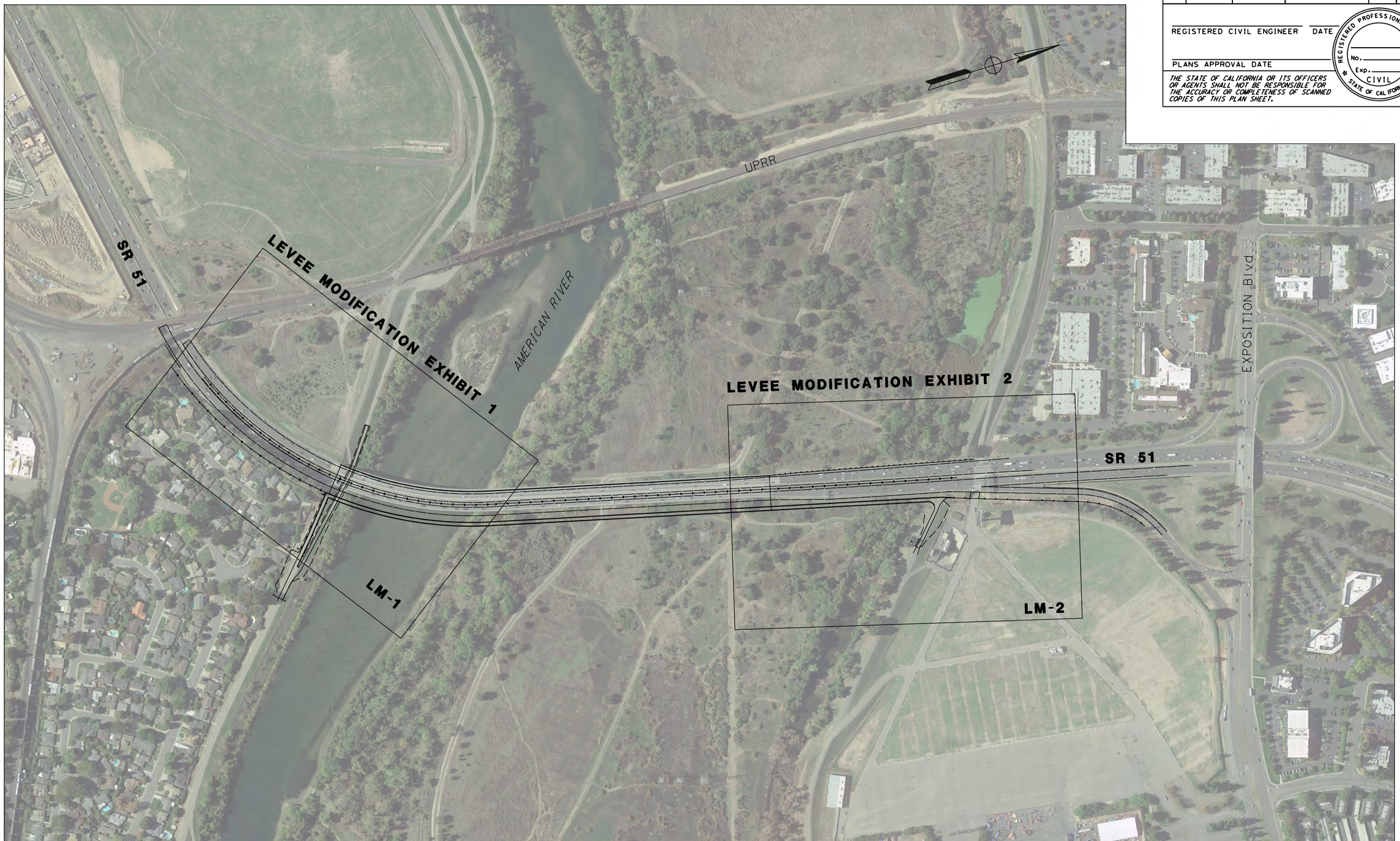

LEVEE MODIFICATION OVERVIEW

SCALE: 1"=200'

Page 30

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USERNAME =>
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RELATIVE BORDER SCALE IS IN INCHES 0 1 2 3

UNIT 0334

PROJECT NUMBER & PHASE 03120000541

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
03	Sac	51	2.0/3.5		

REGISTERED CIVIL ENGINEER DATE

PLANS APPROVAL DATE

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LAND SIDE LEVEE TOE

30' OFFSET LAND SIDE LEVEE TOE

30'

PROPOSED BIKE PATH

NEW BRIDGE DECK EXTENTS

AMERICAN RIVER

LAND SIDE LEVEE TOE

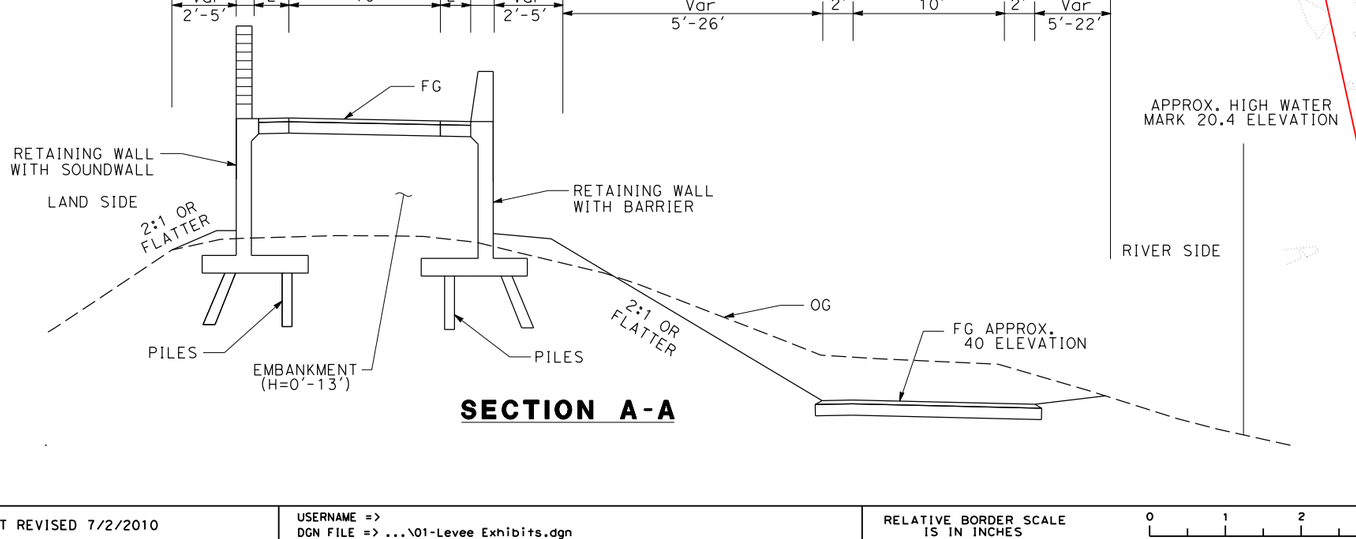
30' OFFSET LAND SIDE LEVEE TOE

PROPOSED BIKE PATH

PROPOSED BIKE PATH

APPROX. HIGH WATER MARK 20.4 ELEVATION

APPROX. HIGH WATER MARK 20.4 ELEVATION



SECTION A-A

LEVEE MODIFICATION EXHIBIT

LM-1

SCALE: 1"=50'

Page 31

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION

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FUNCTIONAL SUPERVISOR: ANAND MAGANTI

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DATE PLOTTED => 11/16/2020

TIME PLOTTED => 7:28:52 AM

BORDER LAST REVISED 7/2/2010

USERNAME =>

DGN FILE => ...\01-Levee Exhibits.dgn

RELATIVE BORDER SCALE IS IN INCHES 0 1 2 3

UNIT 0334

PROJECT NUMBER & PHASE 03120000541

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
03	Sac	51	2.0/3.5		

REGISTERED CIVIL ENGINEER DATE

PLANS APPROVAL DATE

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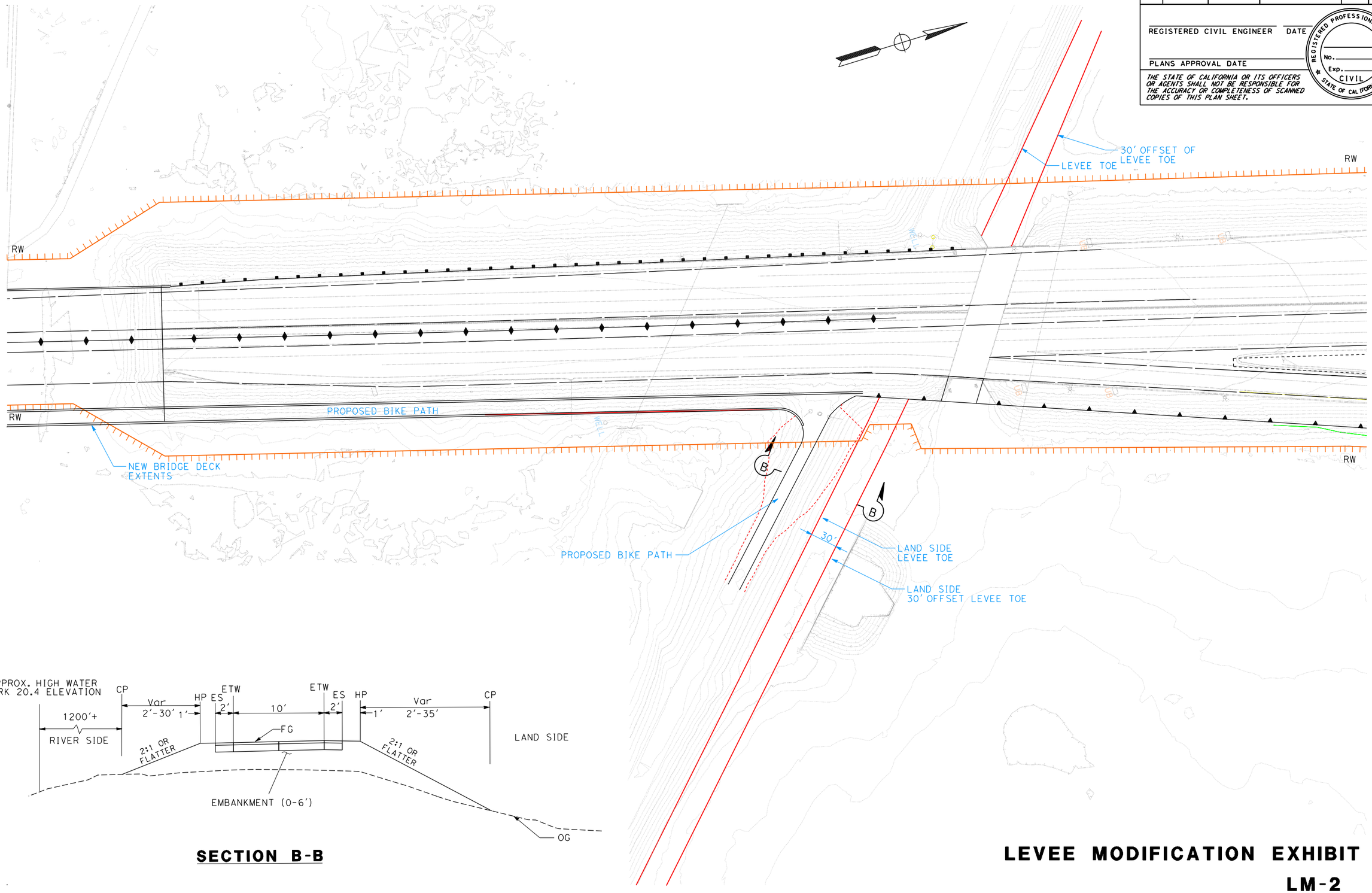

SECTION B-B

LEVEE MODIFICATION EXHIBIT

LM-2

SCALE: 1"=50'

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Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
03	Sac	51	2.0/3.5		

Item 4

REGISTERED CIVIL ENGINEER DATE

PLANS APPROVAL DATE

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Caltrans DESIGN

CURVE 1 R=1488.76'

186+07.60 BC

+00.00

CONFORM TO EXIST R+ TRAVELED WAY

R+ TRAVELED WAY & Shldr (8.00%)

AXIS OF ROTATION ("S51" LINE)

CONFORM TO EXIST L+ TRAVELED WAY

L+ TRAVELED WAY & Shldr (-8.00%)

MATCH LINE PS-2

10% 5% 0% -5% -10%

190 1 2 3 4 195 6 7 8 9 200

SUPERELEVATION DIAGRAM

+78.20 VPI
Elev 68.46

+78.20 BVC
Elev 56.75

PG

600' VC

MATCH LINE PS-2

OG

3.90%

+63.88 POT
Elev 29.10

3.610%

+14.30 POT
Elev 30.92

3.755%

+69.28 POT
Elev 32.98

75 70 65 60 55 50 45 40 35 30 25

STATION 190 1 2 3 4 195 6 7 8 9 200 TOTAL

CY Exc Emb

PROFILE

"S51" LINE
SAC 51

PROFILE AND SUPERELEVATION DIAGRAM

SCALE: Horiz 1'' = 100'
Vert 1'' = 10'

PS-1

LAST REVISION 00-00-00 | DATE PLOTTED => 9/28/2020 | TIME PLOTTED => 7:36:03 PM

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Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
03	Sac	51	2.0/3.5		

Item 4

REGISTERED CIVIL ENGINEER DATE

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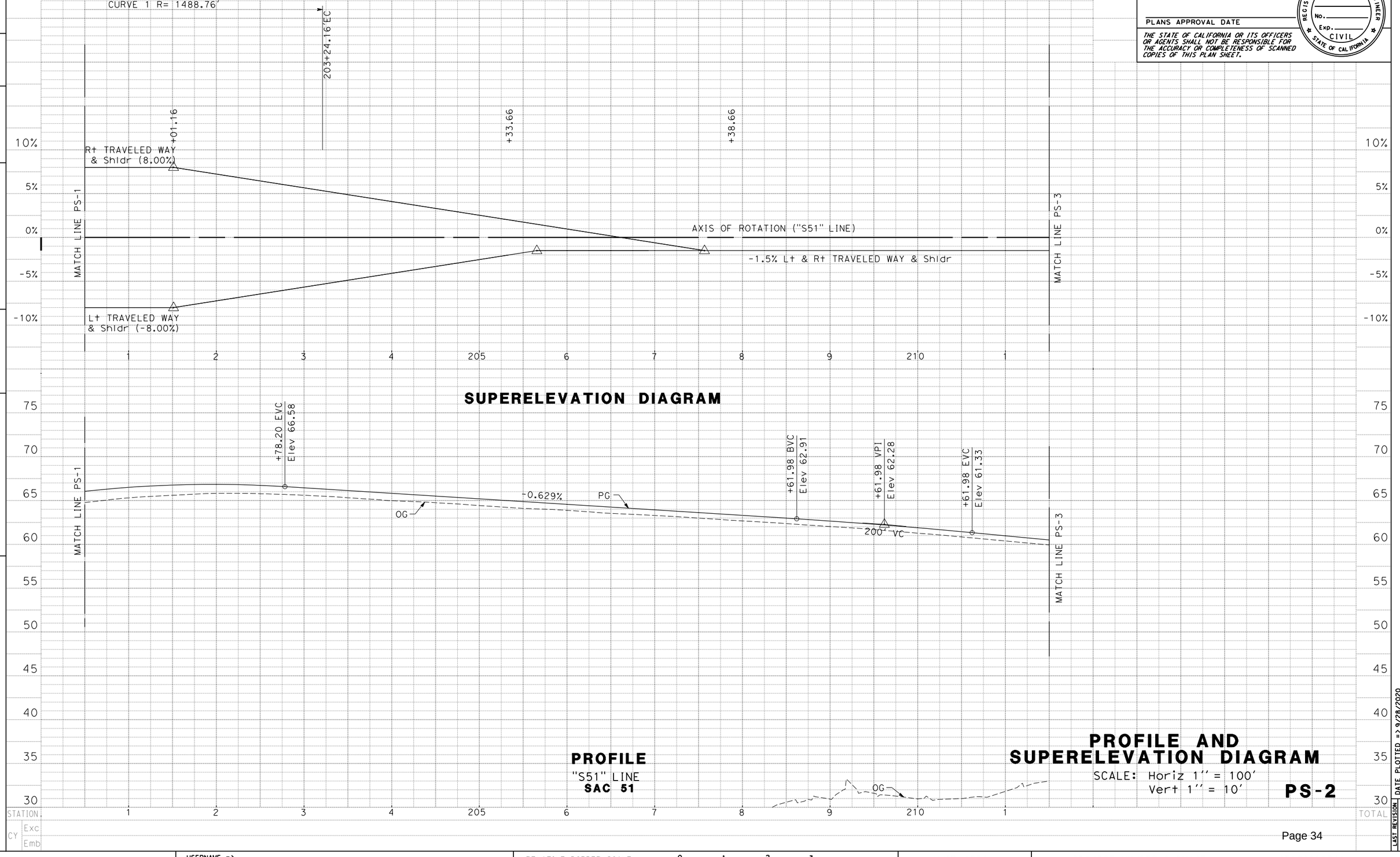

PROFILE AND SUPERELEVATION DIAGRAM

SCALE: Horiz 1'' = 100'
Vert 1'' = 10'

PS-2

LAST REVISION 00-00-00 | DATE PLOTTED => 9/28/2020 | TIME PLOTTED => 7:39:45 PM

BORDER LAST REVISED 7/2/2010 | USERNAME => | DGN FILE => ...\3F070_SP_2.dgn | RELATIVE BORDER SCALE IS IN INCHES 0 1 2 3 | UNIT 0334 | PROJECT NUMBER & PHASE 03120000541

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
03	Sac	51	2.0/3.5		

REGISTERED CIVIL ENGINEER DATE

PLANS APPROVAL DATE

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FUNCTIONAL SUPERVISOR: ANAND MAGANTI

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION

Caltrans DESIGN

MATCH LINE PS-2

CONFORM TO EXIST Lt TRAVELED WAY

AXIS OF ROTATION ("S51" LINE)

-1.50% Lt & Rt TRAVELED WAY & Shldr

-1.50% Rt TRAVELED WAY & Shldr

CONFORM TO EXIST 1%

+00.00

+18.10

CURVE 2 R= 56465.26'

215+40.16' BC

223+40.18' PRC

231+40.18' EC

SUPERELEVATION DIAGRAM

MATCH LINE PS-2

-0.95%

OG

+27.40 BVC Elev 57.88

300' VC PG

+77.40 VPI Elev 56.47

+27.40 EVC Elev 55.74

-0.48%

+62.38 BVC Elev 55.09

300' VC

+12.38 VPI Elev 54.36

+62.38 EVC Elev 54.15

-0.14%

+68.22 POT Elev 53.85

STATION

CY Exc Emb

TOTAL

PROFILE

"S51" LINE
SAC 51

PROFILE AND SUPERELEVATION DIAGRAM

SCALE: Horiz 1'' = 100'
Vert 1'' = 10'

PS-3

LAST REVISION 00-00-00 | DATE PLOTTED => 9/28/2020 | TIME PLOTTED => 7:41:21 PM

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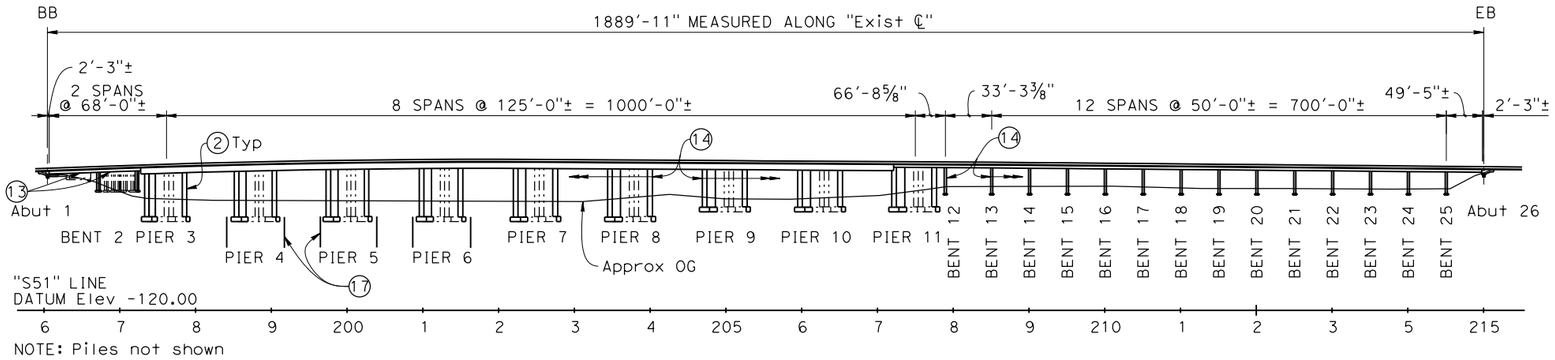
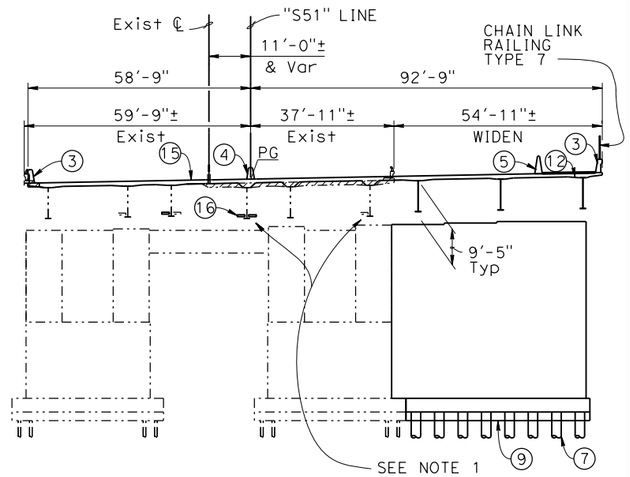
Dist	COUNTY	ROUTE	POST MILE
03	SAC	51	2.61

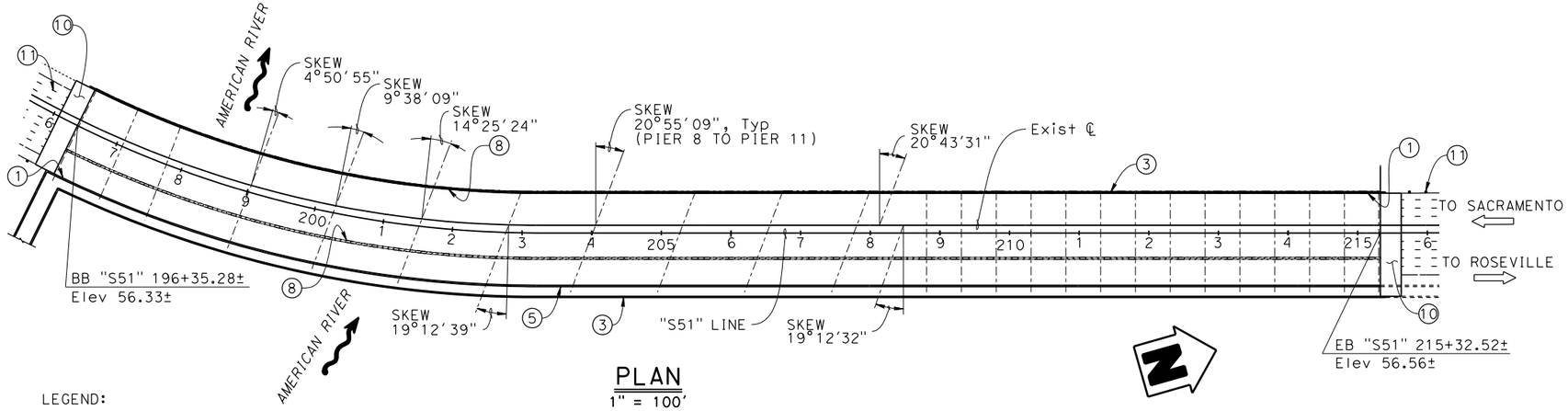
STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION - DIVISION OF ENGINEERING SERVICES



DEVELOPED ELEVATION
1" = 100'



SPANS 3 TO 10 TYPICAL SECTION
1" = 20'



PLAN
1" = 100'

LEGEND:

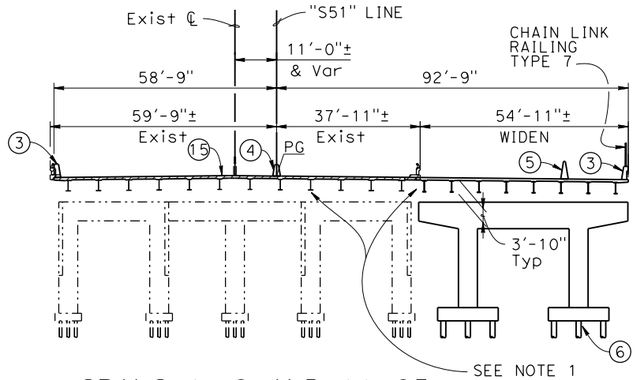
1. Paint "AMERICAN RIVER BRIDGE BRIDGE No. 24-0003" Year Constructed
2. Paint Pier and Bent number
3. Concrete Barrier Type 842
4. Concrete Barrier (Type 60MA Mod)
5. Concrete Barrier (Type 60MGA Mod)
6. Class 200 Alternative "W" Piles at Bents and Piers 8 to 11
7. 30" CISS at Piers
8. Closure Pour
9. Seal Course at Piers 3 to 8
10. Approach Slab (Type 30(S) Mod) with Paving Notch Extension
11. MGS, see ROADWAY PLANS
12. Temporary AC on Bike Lane to produce 2% Max cross slope
13. Detension existing post tensioning at Spans 1 and 2 prior to deck removal. Place new prestressing steel and tension after new deck is in place
14. Catcher Blocks at all existing Piers and Bents
15. Replace existing Deck
16. New Catwalk, total 3
17. Sheet pile scour mitigation at Piers 4 to 6

Existing Structure

Existing Deck, Barrier and Overhang removal

NOTES AND ASSUMPTIONS:

1. This APS assumes girder strengthening will be required due to additional deck weight required to raise the NB profile to match the SB profile. The need for strengthening, scope, and proper strengthening strategy will be determined during final design phase.



SPANS 1, 2 AND 11-25 TYPICAL SECTION
1" = 20'

DESIGNED BY: Mark Okimura	DATE: 9/22/20	STRUCTURE DESIGN	ALTERNATIVE 1
DRAWN BY: Pauline Tong/R.Darsara	DATE: 9/22/20	DESIGN BRANCH 11	PLANNING STUDY
CHECKED BY: X	DATE: X		AMERICAN RIVER BRIDGE (WIDEN)
APPROVED: X	DATE: X		UNIT: 3587 / BRIDGE No.: 24-0003
			PROJECT EA: 03-3F070 / PROJECT No. & PHASE: 0320000054

STRUCTURES DESIGN ADVANCE PLANNING STUDY SHEET (ENGLISH) (REVISION 1/11/2019)

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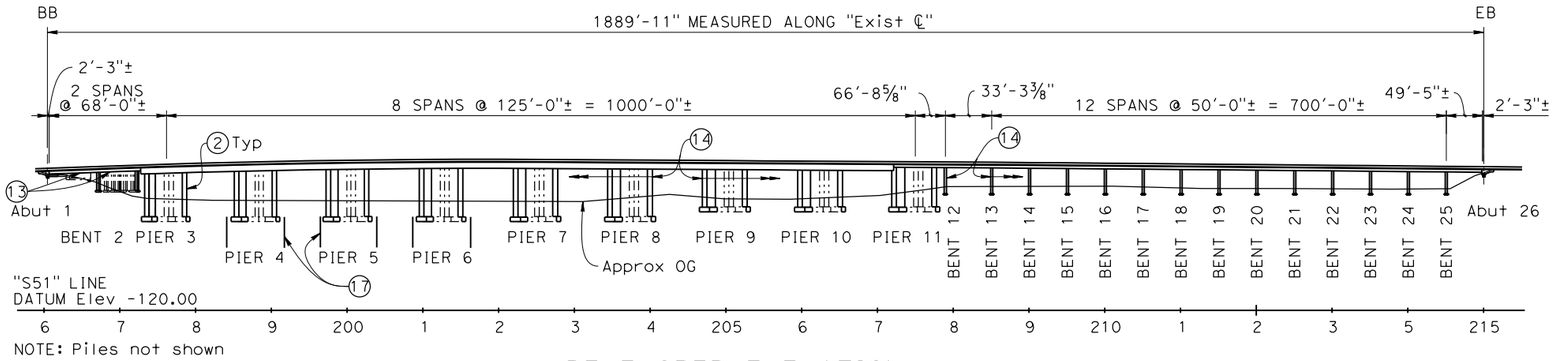
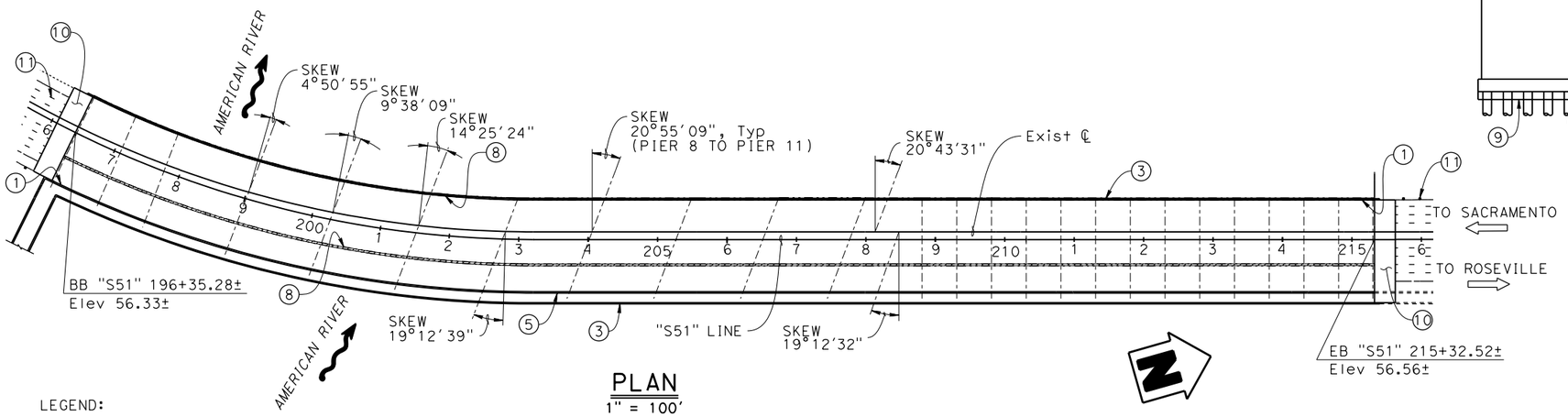
Dist	COUNTY	ROUTE	POST MILE
03	SAC	51	2.61

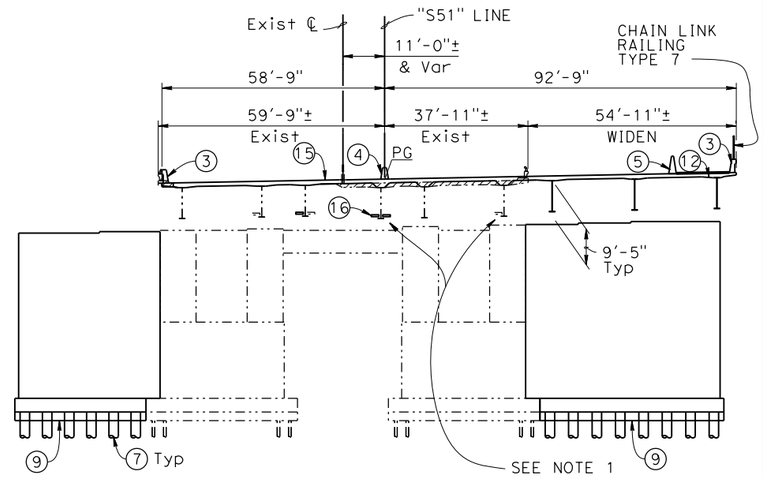
STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION - DIVISION OF ENGINEERING SERVICES



DEVELOPED ELEVATION
1" = 100'



PLAN
1" = 100'



SPANS 3 TO 10 TYPICAL SECTION
1" = 20'

LEGEND:

1. Paint "AMERICAN RIVER BRIDGE BRIDGE No. 24-0003" Year Constructed
2. Paint Pier and Bent number
3. Concrete Barrier Type 842
4. Concrete Barrier (Type 60MA Mod)
5. Concrete Barrier (Type 60MGA Mod)
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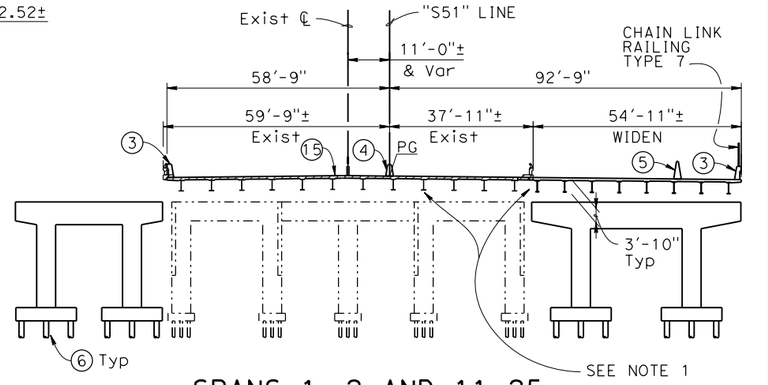

SPANS 1, 2 AND 11-25 TYPICAL SECTION
1" = 20'

DESIGNED BY: Mark Okimura	DATE: 9/22/20	STRUCTURE DESIGN	ALTERNATIVE 2
DRAWN BY: Pauline Tong/R.Darsara	DATE: 9/22/20	DESIGN BRANCH 11	PLANNING STUDY
CHECKED BY: X	DATE: X		AMERICAN RIVER BRIDGE (WIDEN)
APPROVED: X	DATE: X		UNIT: 3587 / BRIDGE No.: 24-0003
			PROJECT EA: 03-3F070 / PROJECT No. & PHASE: 0320000054

STRUCTURES DESIGN ADVANCE PLANNING STUDY SHEET (ENGLISH) (REVISION 1/11/2019)

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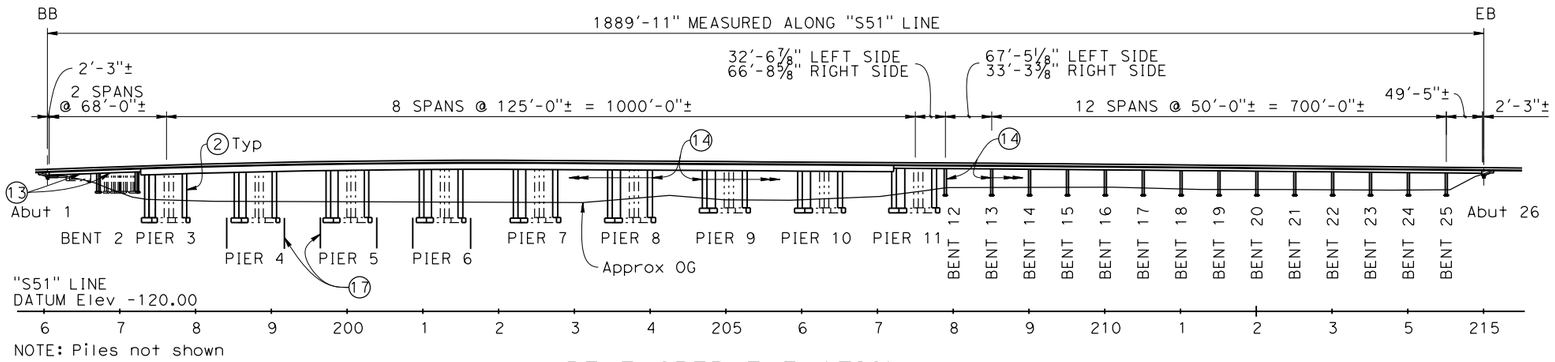
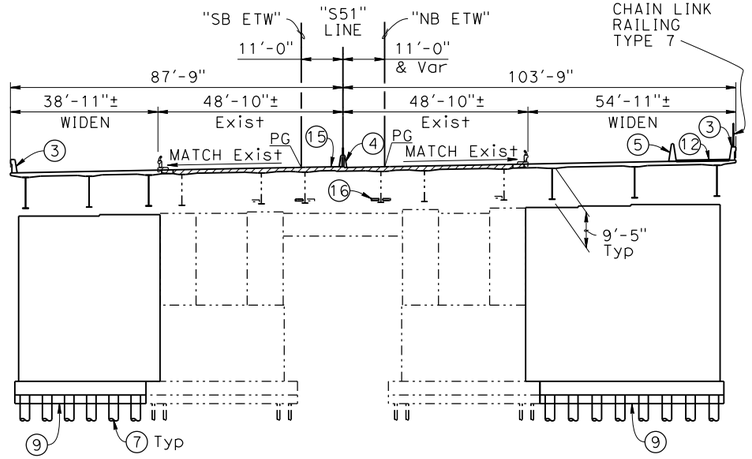
Dist	COUNTY	ROUTE	POST MILE
03	SAC	51	2.61

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION - DIVISION OF ENGINEERING SERVICES

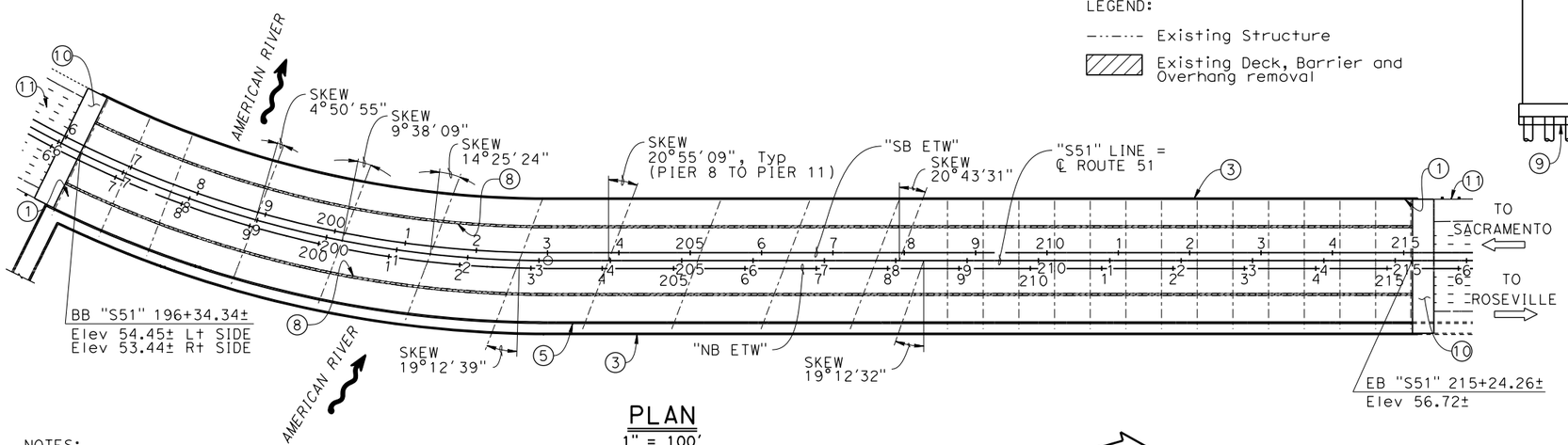


NOTE: Piles not shown

DEVELOPED ELEVATION
1" = 100'



SPANS 3 TO 10 TYPICAL SECTION
1" = 20'



PLAN
1" = 100'

NOTES:

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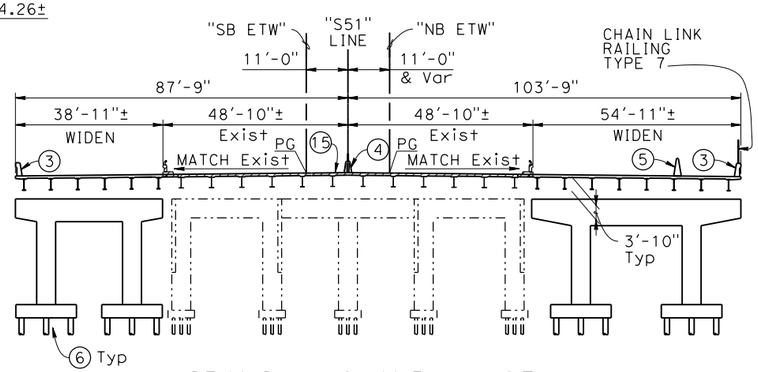

SPANS 1, 2 AND 11-25 TYPICAL SECTION
1" = 20'

DESIGNED BY: Mark Okimura	DATE: 9/21/20	STRUCTURE DESIGN	ALTERNATIVE 3
DRAWN BY: Pauline Tong/R.Darsara	DATE: 9/21/20	DESIGN BRANCH 11	PLANNING STUDY
CHECKED BY: X	DATE: X		AMERICAN RIVER BRIDGE (WIDEN)
APPROVED: X	DATE: X		UNIT: 3587 / BRIDGE No.: 24-0003
			PROJECT EA: 03-3F070 / PROJECT No. & PHASE: 0320000054

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Dist	COUNTY	ROUTE	POST MILE
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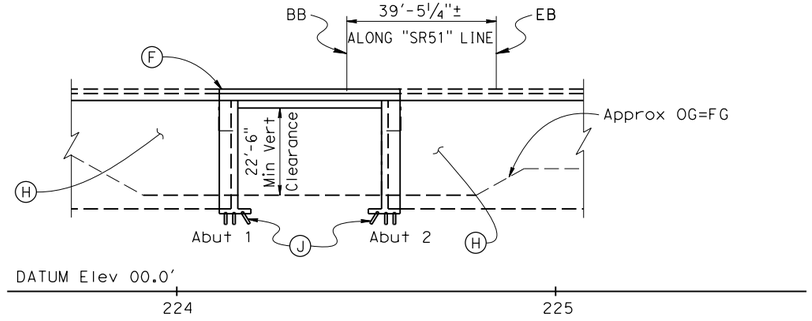
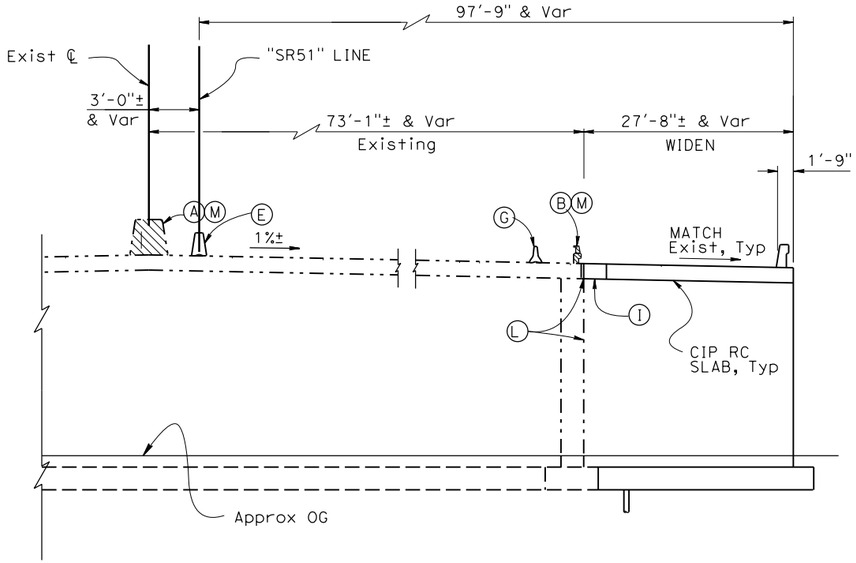
STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION - DIVISION OF ENGINEERING SERVICES

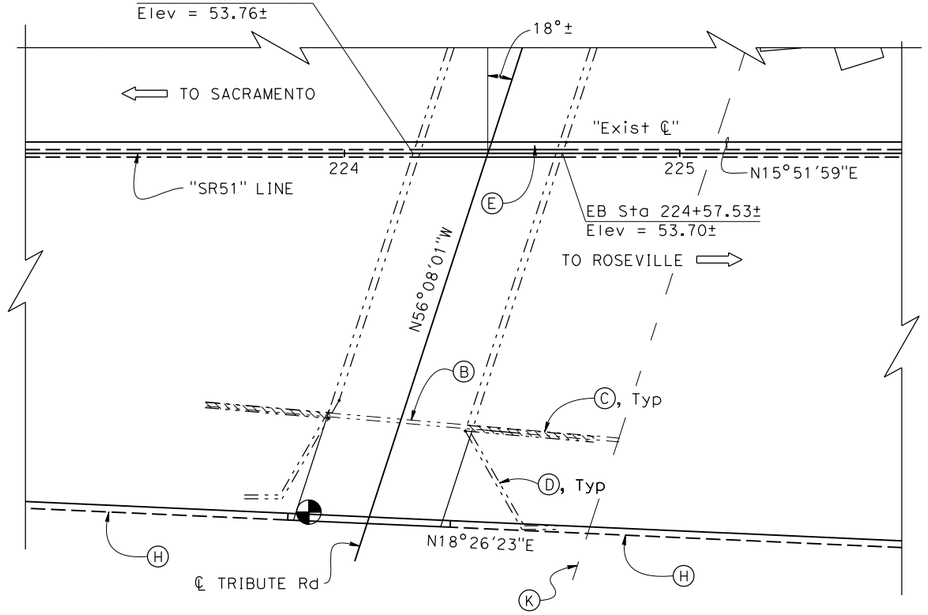


ELEVATION
1" = 20'-0"



NOTE:Not all piles shown

TYPICAL SECTION
1" = 10'-0"



PLAN
1" = 20'-0"

LEGEND

- (A) Remove Exist conc barrier Type 60G modified for overhead sign support.
- (B) Remove Exist conc barrier Type 9.
- (C) Remove Exist barrier and wingwalls 3' min below FG
- (D) Remove Exist walls and footings as needed
- (E) Conc Barrier Type 60MA Mod
- (F) Concrete Barrier Type 836
- (G) Temporary Rail Type K
- (H) Retaining Wall, see "ROADWAY PLANS"
- (I) 3'-0" Closure Pour
- (J) Piles, Class 90 Pipes. CIDH may be used to minimize impact to sewer lines in front of abutments.
- (K) Exist 30" RCP, Location approximate
- (L) Drill and Bond Dowel
- (M) Refinish Deck

Indicates Removal

Indicates Point of Minimum Vertical Clearance

DESIGNED BY: Mark Okimura	DATE: 9/25/20	STRUCTURE DESIGN	ALTERNATIVE 1 & 2
DRAWN BY: Loren Goldthwait	DATE: 9/25/20	DESIGN BRANCH 11	PLANNING STUDY
CHECKED BY: X	DATE: X		CAL EXPO UC WIDENING
APPROVED: X	DATE: X		UNIT: 3587 / BRIDGE No.: 24-133
			CONTRACT No.: 03-3F070 / PROJECT No. & PHASE: 0320000054

STRUCTURES DESIGN ADVANCE PLANNING STUDY SHEET (ENGLISH) (REVISION 3/17/2017)
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ORIGINAL SCALE IN INCHES 0 1 2 3

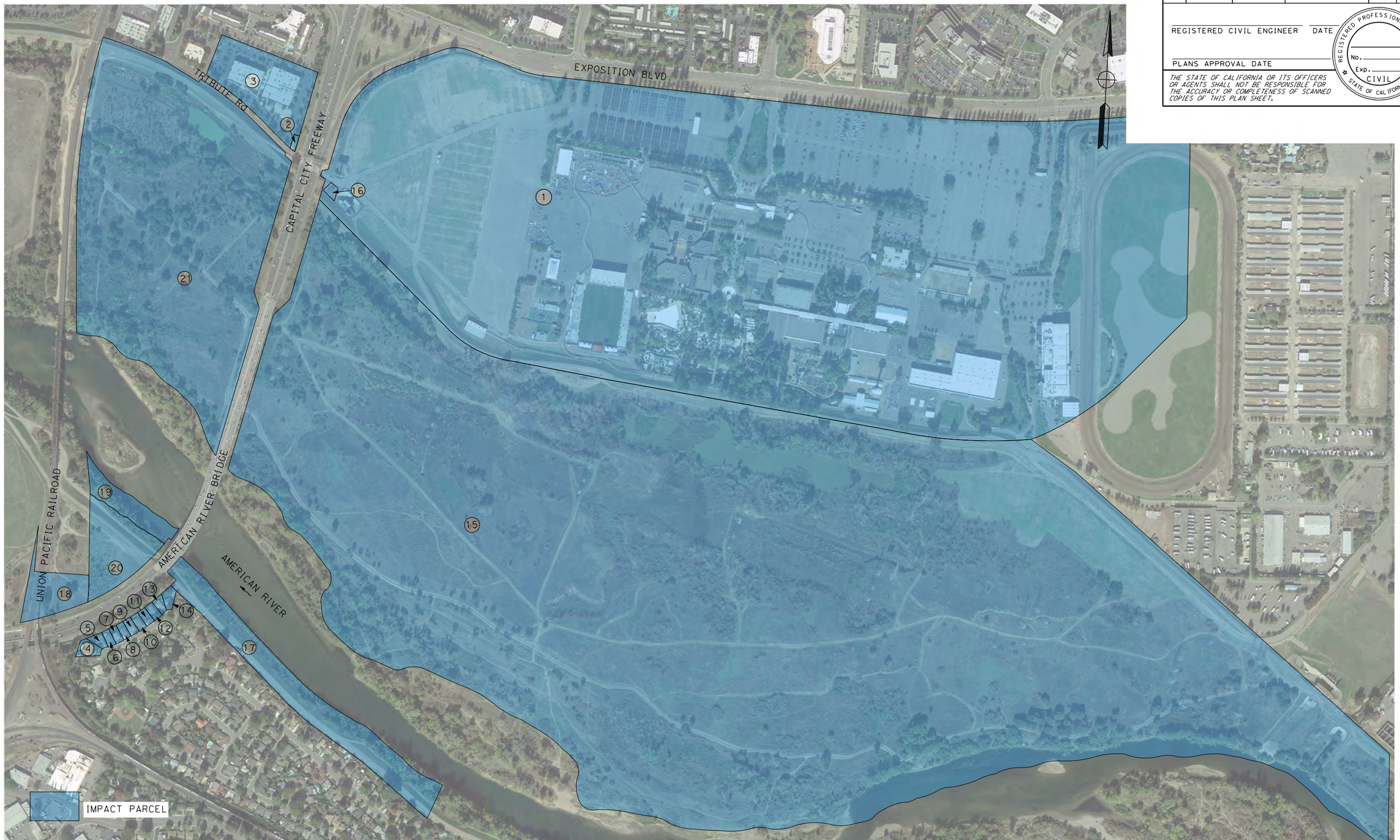
Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
03	Sac	51			

REGISTERED CIVIL ENGINEER DATE

PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER No. Exp. CIVIL STATE OF CALIFORNIA

THE STATE OF CALIFORNIA OR ITS OFFICERS OR AGENTS SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OR COMPLETENESS OF SCANNED COPIES OF THIS PLAN SHEET.



PARCELS ALONG PROJECT LIMITS

NOSCALE

REVISED BY | DATE REVISED

CALCULATED-DESIGNED BY

CHECKED BY

FUNCTIONAL SUPERVISOR

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION

Caltrans® DESIGN

LAST REVISION 00-00-00 | DATE PLOTTED => 5/13/2020 | TIME PLOTTED => 11:12:37 AM

BORDER LAST REVISED 7/2/2010 | USERNAME => "s147754" | DGN FILE => ...\Sayed\Form Army\Property.dgn | RELATIVE BORDER SCALE IS IN INCHES 0 1 2 3 | UNIT 0334 | PROJECT NUMBER & PHASE 0312000054

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
03	Sac	51			

Item 4

REGISTERED CIVIL ENGINEER DATE

PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER No. Exp. CIVIL STATE OF CALIFORNIA

THE STATE OF CALIFORNIA OR ITS OFFICERS OR AGENTS SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OR COMPLETENESS OF SCANNED COPIES OF THIS PLAN SHEET.

No.	APN	OWNER NAME	OWNER_ADDRESS	CITY, STATE	ZIPCODE
1	277-0250-018-0000	STATE OF CALIFORNIA	PO BOX 15649	SACRAMENTO, CA	95852
2	277-0285-002-0000	STATE OF CALIFORNIA	PO BOX 911	MARYSVILLE, CA	95901
3	277-0285-007-0000	UA 393 A HOLDINGS LLC	2450 CABRILLO HWY S STE 200	HALF MOON BAY, CA	94019
4	005-0251-028-0000	SUSAN C GORSUCH	3743 ERLEWINE CIR	SACRAMENTO, CA	95819
5	005-0251-027-0000	MARTIN J & JOAN M AROZ REVOCAB	3749 ERLEWINE CIR	SACRAMENTO, CA	95819
6	005-0251-026-0000	RUSSELL HOCKING	3751 ERLEWINE CIR	SACRAMENTO, CA	95819
7	005-0251-025-0000	BOBBY ELINOR OLWELL	3755 ERLEWINE CIR	SACRAMENTO, CA	95819
8	005-0251-024-0000	CARLA SUE DUCRAY	3759 ERLEWINE CIR	SACRAMENTO, CA	95819
9	005-0251-023-0000	JASON M BROWN	3763 ERLEWINE CIR	SACRAMENTO, CA	95819
10	005-0251-022-0000	ANTHONY F MORA	3767 ERLEWINE CIR	SACRAMENTO, CA	95819
11	005-0251-021-0000	CARMELA RAY	3771 ERLEWINE CIR	SACRAMENTO, CA	95819
12	005-0251-020-0000	MARK L STREGE	10086 CRISTO DR	SACRAMENTO, CA	95829
13	005-0251-019-0000	JEANNIE C LITTLE	3779 ERLEWINE CIR	SACRAMENTO, CA	95819
14	005-0251-018-0000	CHRISTINA ESPINOSA	4971 QUONSET DR	SACRAMENTO, CA	95820
15	277-0250-024-0000	STATE OF CALIFORNIA	PO BOX 15649	SACRAMENTO, CA	95852
16	277-0250-017-0000	SACRAMENTO REGIONAL COUNTY SAN	10060 GOETHE RD	SACRAMENTO, CA	95827
17	005-0010-026-0000	COUNTY OF SACRAMENTO	10361 ROCKINGHAM DR STE 100	SACRAMENTO, CA	95827
18	001-0170-029-0000	SOUTHERN PACIFIC TRANSPORTATIO	1400 DOUGLAS ST # 1640	OMAHA, NE	68179
19	001-0170-005-0000	COUNTY OF SACRAMENTO	10361 ROCKINGHAM DR STE 100	SACRAMENTO, CA	95827
20	001-0170-006-0000	CITY OF SACRAMENTO	915 I ST	SACRAMENTO, CA	95814
21	277-0250-019-0000	STATE OF CALIFORNIA	PO BOX 15649	SACRAMENTO, CA	95852

PARCELS ALONG PROJECT LIMITS

NOSCALE

REVISED BY | DATE REVISED

CALCULATED-DESIGNED BY | CHECKED BY

FUNCTIONAL SUPERVISOR

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION

DESIGN

LAST REVISION 00-00-00 | DATE PLOTTED => 5/13/2020 | TIME PLOTTED => 11:20:45 AM

BORDER LAST REVISED 7/2/2010

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RELATIVE BORDER SCALE IS IN INCHES 0 1 2 3

UNIT 0334 | PROJECT NUMBER & PHASE 0312000054

Memorandum

Making Conservation
a California Way of Life

To: MR. ANAND MAGANTI – D3
Branch Chief
Office Design Branch M7
North Region Project Development

Date: February 20, 2020

File: 03-SAC-51-PM2.0/3.5
Project ID: 0312000054
EA: 03-3F070

AMERICAN RIVER BRIDGE #24-0003
(Widen and Deck Replacement)

Attention: Mr. Andrew Huang

From: DEPARTMENT OF TRANSPORTATION
Division of engineering services
Geotechnical Services
Office of Geotechnical Design - North
Design Branch D

Subject: DISTRICT PRELIMINARY GEOTECHNICAL REPORT FOR AMERICAN RIVER BRIDGE (WIDEN AND DECK REPLACEMENT)

Introduction

The Office of Geotechnical Design North has prepared a District Preliminary Geotechnical Report (DPGR) for the proposed American River Bridge (Widen and Deck Rehabilitation) project. In a request letter dated September 6, 2019, District North Region Division of Project Development, Office of Design B requested a DPGR for the proposed American River Bridge (Widen and Deck Rehabilitation). The following recommendations are based on the 2019 subsurface investigation performed at the site and the design information provided by the District Office.

With regards to the current geotechnical recommendations, all elevations referenced within this report and shown on the draft Log of Test Boring sheets are based on the NAVD 1988 vertical datum, unless otherwise noted.

Project Description

The American River Bridge (Widen and Deck Replacement) project proposes to add one travel lane at each side and a bike lane on the right side of the bridge. The district requested to provide a DPGR for four fill slopes and one overhead sign.

Based on the information provided, roadway improvements are proposed south of Abutment 1 and north of Abutment 26. The existing two post overhead sign-truss, located on northbound near STA 224+70, is planned to be replaced.

Geotechnical Investigation

A geotechnical investigation was conducted in 2019 for the Capital City Project in which included various bridges south and north of the American River Bridge (24-0003). Soil borings drilled within the project limits include five mud rotary borings (RW-19-020, RW-19-024, RW-19-025, RW-19-036, RW-19-037, RW-19-038 and RW-19-040) and one auger boring (A-19-042). Also, there is an existing soil boring from the Levee program from the Department of Water Resources, WCSBAR_003B.

There is sufficient subsurface soil information available from the above mentioned soil investigation and **NO** additional soil borings are needed for this request. The Log of Test Borings (LOTBs) are being prepared during the preparation of this report.

Geotechnical Conditions

Geology

According to the Preliminary Geologic Map of the Sacramento Quadrangle, the materials that underlie the project site are mapped as Holocene aged alluvium deposits (Qha). Materials associated with alluvium typically consist of silt, clay, sand, gravels and cobbles deposited by river currents. North of Exposition Blvd (approximate) the project site is mapped as Holocene aged basin deposits (Qhb). Materials associated with basin deposits typically consist of fine-grained sediments with horizontal stratification deposited by standing or slow-moving water in topographic lows.

Surface Conditions

The existing highway within the project area generally trends north/south along a relatively flat valley floor. The elevation along the current alignment is approximately 55 feet. The elevation of native ground along the toe of the embankments are approximately 30 feet in elevation. The project site spans the American River which flows east-west. Within the project limits, local drainage is generally south towards the American River which flows west.

The American River Levees cross underneath the highway at about STA 196+00, on the south and STA 223+00, on the north.

South of Abutment 1, the north slope appears to have a 2H:1V grade or flatter. The south slope appeared to have 1H:1V grade, having a soundwall at the hinge. Vegetation consists mainly of weeds and grass. There are medium and large threes near toe of slope. There is a drain outlet at toe of each slope.

North of Abutment 26, the slopes appeared to be 1H:1V. Vegetation consists mainly of weeds and grass. There are few small and large size trees near toe of slope. There are light post fixtures along the southbound shoulder. There are few small trees near toe of slope.

On northbound, there is a One Post Overhead Sign-Truss (about STA 217+50) that it is planned to be removed. Further north, there is a two post Overhead sign-truss (about STA 224+70) that is planned to be replaced.

Based on our review our Office has identified an abandoned sewer line that possibly runs underneath parallel to the existing embankment, north of the project.

Subsurface Conditions

Based on Soil Boring WCSBAR_003B, Abutment 1 is supported on the American River levee. The levee fill consists of very stiff Fat Clay (CH) to elevation 44.0 feet overlaying a dense Silty Clayey Sand (SC-SM) to elevation 42.0 feet. Below the Silty Clayey Sand, Poorly-Graded medium dense Sand with Silt (SP-SM) extends to about elevation 33.0 feet. Then, medium dense Silty Sand (SM), Poorly-Graded Sand with Silt (SP-SM), Silty Clayey Sand (SC-SM) and Silty Sand extend to elevation 0.0 feet. Dense to very dense Well-Graded Gravel (extended to the maximum explored depth of elevation -18.0 feet.

The south and north embankment fills (about elevations 55.0 to 30.0 feet) consist mainly of medium dense to very dense Poorly-Graded Sand with Silt (SP-SM), Silty Sand (SM), Poorly-Graded Sand (SP), Poorly-Graded Sand with Clay (SP-SC) and Clayey Sand (SC).

Below the embankment fills, the subsurface soils predominately consist of alluvial deposits generally interbedded layers of gravels, sand, silty sand, sandy silts, silts, and clays. Alternating layers of loose to very dense Silty Sand (SM), Poorly-Graded Sand (SP) and Sandy Silt (ML) were encountered to about elevation -5.0 feet. Then, very dense Poorly-Graded Gravels were predominately encountered to about elevation -25.0 feet. Below the gravels, dense to very dense Poorly-Graded Sand (SP), Poorly-Graded Sand with Silt (SP-SM), Silt (ML) and Sandy Silt were

encountered to the maximum explored depth of elevation -144.0 feet. Bedrock was not encountered in any of the borings. The LOTBs are been drafted during the preparation of this report. Please referred to the attached draft boring records for more details.

Groundwater

The 2019 subsurface investigation showed that groundwater is typically encountered at elevations between 14.0 to 11.0 feet. The American River surface water was at about elevation 10.0 feet. Groundwater elevations will fluctuate through the year due to variations in seasonal rainfall.

Geotechnical Design Evaluation

Corrosion

Corrosion tests were conducted on soil samples taken from soil borings. Test results indicate the soil sample is considered **non-corrosive** by current Caltrans standards.

Location	SIC Number	pH	Minimum Resistivity (Ohm-cm)	Sulfate Content (ppm)	Chloride Content (ppm)
Water	CR20190498	5.98	30326	4	4
RW-19-026 85' -120'	CR20190493	7.26	1781	N/A	N/A
RW-19-029 35' - 60'	CR20190494	6.99	4196	N/A	N/A
RW-19-031 45' - 100'	CR20190495	7.03	4083	N/A	N/A
RW-19-034 0' - 30'	CR20190496	7.68	5655	N/A	N/A
RW-19-034 30' - 80'	CR20190497	7.15	5296	N/A	N/A

Preliminary Recommendations and Conclusions

Embankments (Fill Slopes)

Based on our review, portions of this project will require widening existing fills. At the time of this report, no information was available from the District regarding the volume of fills to be constructed or slope ratio to be utilized for the proposed fill construction.

Based on our site reconnaissance, most of the existing fills throughout the project limits were noted to be 1H:1V. The Abutment 1 north slope appeared to be 2H:1V and flatter. The existing fills range in vertical height up to approximately 25ft. During our field reconnaissance, it did not appear that there were any slope instabilities on or below the existing fill areas reviewed. The new slopes are recommended to have a 2H:1V grade. All earthwork shall be in conformance with Section 19 of the 2018 Standard Specifications.

The proposed earthwork for the road widening may extend near Caltrans property line. If right of way is a constrain, Type 1 Retaining Wall or MSE wall may be considered.

Excavations

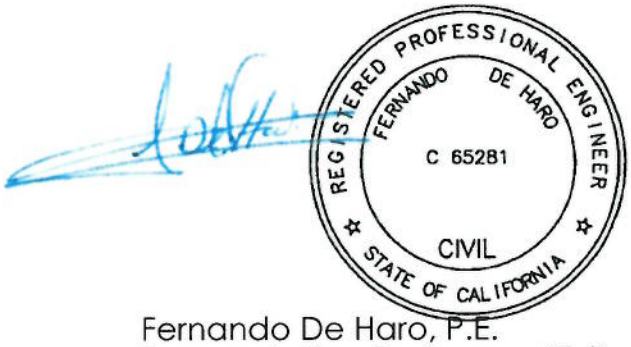
Based on our review of provided layouts and proposed cross-sections, no excavation work is identified in the documents. However, it is anticipated that some excavation work will be required for the proposed widening and preparing the existing fills and native ground for fill placement. The excavations can be completed utilizing conventional earthwork equipment.

Overhead Sign

The proposed foundation will be mainly embedded on the compacted granular dense to very dense embankment fills. Therefore, the proposed two post sign-truss may be supported by a standard plan foundation, presented on Sheets S15 or S116 of the 2018 Standard Plans.

This DPGR is based on specific project information regarding proposed work and location that have been provided by the Office of North Region Division Project Development, Design Branch M7. Once the project plans are available, the Office of Geotechnical Design North, Design Branch D should review the information to determine if this DPGR is still applicable. Any questions regarding the above recommendations should be directed to the attention of Shawn Wei, (916) 227-1079 or Fernando De Haro, (916) 227-1069, at the Office of Geotechnical Design North, Branch D.

Prepared by:



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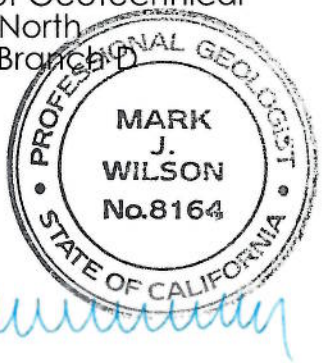

Reviewed by:

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cc: Clark Peri – District 3 (Project Manager)
Steve Culley – District 3 (District Materials Engineer)
Deline Hunter – Project Liaison
Ruth Fernandes – Structures Office Engineer
Geotechnical Archive

Attachment I Vicinity Map
Attachment II Draft Boring Records

Attachment I

Vicinity Map

CALTRANS Division of Engineering Services Geotechnical Services Geotechnical Design – North	EA: 03-3F070 Date: 02/20/ 2020	**Vicinity Map**
	03-SAC-51-PM 3.0 American River Bridge (Br. No. 24-0003)	Plate 1

Attachment II

Draft Boring Records

LOGGED BY	BEGIN DATE	COMPLETION DATE	BOREHOLE LOCATION (Lat/Long or North/East and Datum)	HOLE ID
B. Rousseau	**3-26-19**	**3-28-19**	**38.58536° / -121.45023°**	**RW-19-020**
DRILLING CONTRACTOR			BOREHOLE LOCATION (Offset, Station, Line)	SURFACE ELEVATION
Gregg Drilling				**30.80 ft NAVD88**
DRILLING METHOD			DRILL RIG	BOREHOLE DIAMETER
Mud Rotary			**MARL M10 XLC**	**4.63 in**
SAMPLER TYPE(S) AND SIZE(S) (ID)			SPT HAMMER TYPE	HAMMER EFFICIENCY, ERi
SPT (1.4")/CAL (2.5")/Punch Core (2.5")			**Auto; 140 lbs / 30-inch drop**	**87%**
BOREHOLE BACKFILL AND COMPLETION			GROUNDWATER READINGS DURING DRILLING **Not Measured** AFTER DRILLING (DATE)	TOTAL DEPTH OF BORING
Neat cement grout				**161.5 ft**

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method / Casing Depth	Remarks
30.00	0		SILTY SAND (SM); yellow; moist; fine SAND; some fines; non-plastic.											Hand Auger to 5 feet
25.00	5		SANDY SILT (ML); loose; olive brown; moist; some fine SAND.		S01	2 2 3	5	66						Switch to Mud Rotary WA
					C02			24						
20.00	10		SILTY SAND (SM); medium dense; brown; wet; fine SAND; some fines; non-plastic.		S03	4 5 5	10	66						WA
					C05			19						
15.00	15		SILT with Sand (ML); brown; moist; little fine SAND.		S06	2 3 3	6	100						WA
			bluish gray; wet.		C07			28						
10.00	20		SANDY SILT (ML)/SILTY SAND (SM); medium dense; bluish gray; fine SAND; non-plastic.		S08	2 2 5	7	100						WA
					C09			NR						
5.00	25		SILTY SAND (SM); medium dense; bluish gray; moist; medium to fine SAND; some fines; non-plastic.		S10	5 5 5	10	77						WA
			laminated organic matter.		C11			28						
0.00	30		POORLY GRADED SAND with Silt (SP-SM); medium dense; bluish gray; moist; medium to fine SAND.		S12	7 11 9	20	77						WA
			POORLY GRADED GRAVEL (GP).		C13			NR						Rig chatter
-5.00	35		very dense.		S14	16 15 22	37	NR						
					C15			NR						Rig chatter
	40													

(continued)

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REPORT TITLE				HOLE ID
BORING RECORD				**RW-19-020**
DIST.	COUNTY	ROUTE	POSTMILE	EA
03	**Sacramento**	**51**	**1.05-2.6**	**03-1600-0113-0**
PROJECT OR BRIDGE NAME				
Caltrans TO946183 C-57 SR51 Sac				
BRIDGE NUMBER	PREPARED BY		DATE	SHEET
	D. Ross		**7-15-19**	**1 of 4**

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method / Casing Depth	Remarks
-10.00	40		POORLY GRADED GRAVEL (GP); dense.		S16	8 11 12	23	NR						
					C17			NR						Rig chatter
-15.00	45		POORLY GRADED GRAVEL with Silt and Sand (GP-GM); very dense; gray; moist; fine to coarse GRAVEL, 1.5 in. max. dia.; some medium to fine SAND; few fines; non-plastic.		S18	26 50 50	100	33						PA
					C19			NR						Rig chatter
-20.00	50		7 inch thick lens of SANDY SILT (ML).		S20	20 33 32	65	39						WA
					C21			NR						Rig chatter
-25.00	55				S22	30 38 50	88	NR						
					C23			NR						Light rig chatter
-30.00	60		POORLY GRADED SAND (SP); very dense; light gray; moist; fine SAND.		S24	7 38 50	88	100						
					C25			NR						
-35.00	65		LEAN CLAY (CL); mottled olive and yellow; moist; trace fine SAND; medium plasticity.		S26	11 21 24	45	66						
					C27			NR						
-40.00	70		olive; few fine SAND.		S28	13 18 26	44	100						
					C29			NR						
-45.00	75				S30	21 30 36	66	72						
					C31			NR						
-50.00	80		SILTY SAND (SM); very dense; multicolored red and olive; moist; fine SAND; little fines; low plasticity.		S32	22 50/5"	50/5	100						Light rig chatter
					C33									
			POORLY GRADED SAND (SP); olive; medium to fine SAND.											
-55.00	85		SANDY LEAN CLAY (CL); hard; yellowish brown; moist; some fine SAND; medium plasticity.		S34	13 21 21	42							
					C35			100				PP=>4.5		

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REPORT TITLE				HOLE ID
BORING RECORD				**RW-19-020**
DIST.	COUNTY	ROUTE	POSTMILE	EA
03	**Sacramento**	**51**	**1.05-2.6**	**03-1600-0113-0**
PROJECT OR BRIDGE NAME				
Caltrans TO946183 C-57 SR51 Sac				
BRIDGE NUMBER	PREPARED BY		DATE	SHEET
	D. Ross		**7-15-19**	**2 of 4**

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks
			CLAYEY SAND (SC); yellowish brown; moist; fine SAND; some fines.		C35			100							
-60.00	90		POORLY GRADED SAND (SP); very dense; olive gray; moist; medium to fine SAND.		S36	25 22 28	50	66							
					C37			26							
-65.00	95		SANDY LEAN CLAY (CL); red; moist; fine SAND; medium plasticity.		S38	15 12 40	52	100							
			POORLY GRADED SAND (SP); dense; yellowish brown; moist; fine SAND.		C39			43							
-70.00	100		olive gray; medium to fine SAND.		S40	21 25 32	57	89							
			reddish brown; fine SAND.		C41			NR							
-75.00	105		SANDY LEAN CLAY (CL); hard; olive; moist; some fine SAND; medium plasticity.		S42	10 20 37	57	100				PP=4.0			
			POORLY GRADED SAND with Silt (SP-SM); olive gray; moist; fine SAND.		C43			100							
-80.00	110				S44	15 22 28	50	83							
			olive.		C45			100							
-85.00	115		SILTY SAND (SM); very dense; yellowish brown; moist; fine SAND; some fines; non-plastic.		S46	12 19 25	44	100							
					C47			100							
-90.00	120		POORLY GRADED SAND with Silt (SP-SM); very dense; olive gray; moist; fine SAND; non-plastic.		S48	18 19 21	40	89							
			SILTY SAND (SM); very dense; olive gray; moist; fine SAND; little fines; non-plastic.		C49			100							
-95.00	125				S50	24 42 50	92	66							
					C51			100							
			LEAN CLAY with Sand (CL); hard; yellow; moist; little fine SAND; medium plasticity.									PP=>4.5			
-100.00	130		SILT (ML); hard; bluish gray; moist; few fine SAND; low plasticity.		S52	10 12 19	31	100				PP=>4.5			
					C53			100							
			POORLY GRADED SAND with Silt (SP-SM); olive yellow; moist; medium to fine SAND; non-plastic.												
	135				S54		52	100							

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REPORT TITLE				HOLE ID
BORING RECORD				**RW-19-020**
DIST.	COUNTY	ROUTE	POSTMILE	EA
03	**Sacramento**	**51**	**1.05-2.6**	**03-1600-0113-0**
PROJECT OR BRIDGE NAME				
Caltrans TO946183 C-57 SR51 Sac				
BRIDGE NUMBER	PREPARED BY		DATE	SHEET
	D. Ross		**7-15-19**	**3 of 4**

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks
			SILTY SAND (SM); very dense; yellow; moist; fine SAND; some fines; non-plastic.		C55	19 20 32		57							
			POORLY GRADED SAND with Silt (SP-SM); very dense; olive yellow; moist; medium to fine SAND; non-plastic.												
-110.00	140		3 inch thick lens of SILTY SAND (SM).		S56	22 36 41	77	77							
					C57			64							
-115.00	145		olive gray.		S58	15 28 33	61	77							
					C59			9							
-120.00	150				S60	25 32 39	71	77							
					C61			24							
-125.00	155				S62	23 28 35	63	66							
			LEAN CLAY with Sand (CL); yellow; moist; fine SAND; medium plasticity; calcite veins.		C63										
-130.00	160				S64	24 42 50	92								
			Bottom of borehole at 161.5 ft bgs Borehole was terminated at proposed depth. Borehole was backfilled with neat cement grout via tremie pipe and topped with native soil.												
-135.00	165														
-140.00	170														
-145.00	175														
-150.00	180														

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REPORT TITLE				HOLE ID
BORING RECORD				**RW-19-020**
DIST.	COUNTY	ROUTE	POSTMILE	EA
03	**Sacramento**	**51**	**1.05-2.6**	**03-1600-0113-0**
PROJECT OR BRIDGE NAME				
Caltrans TO946183 C-57 SR51 Sac				
BRIDGE NUMBER	PREPARED BY		DATE	SHEET
	D. Ross		**7-15-19**	**4 of 4**

LOGGED BY	BEGIN DATE	COMPLETION DATE	BOREHOLE LOCATION (Lat/Long or North/East and Datum)	HOLE ID
E. Peirce	**5-13-19**	**5-13-19**	**38.58673° / -121.44831°**	**RW-19-024**
DRILLING CONTRACTOR			BOREHOLE LOCATION (Offset, Station, Line)	SURFACE ELEVATION
Gregg Drilling				**45.50 ft NAVD88**
DRILLING METHOD			DRILL RIG	BOREHOLE DIAMETER
Hollow Stem Auger/Mud Rotary			**Mobile B-80**	**6.0 in/4.63 in**
SAMPLER TYPE(S) AND SIZE(S) (ID)			SPT HAMMER TYPE	HAMMER EFFICIENCY, ERi
SPT (1.4")/Punch Core (2.5")			**Auto; 140 lbs / 30-inch drop**	**95.5%**
BOREHOLE BACKFILL AND COMPLETION			GROUNDWATER READINGS DURING DRILLING **21.5 ft.** AFTER DRILLING (DATE)	TOTAL DEPTH OF BORING
Neat cement grout				**42.5 ft**

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks
45.00	0		SILTY SAND (SM); brown; moist; fine SAND; some fines; non-plastic.												Hollow Stem Auger to 10 feet
			POORLY GRADED GRAVEL (SP); moist; fine to coarse subrounded to rounded GRAVEL; few fine SAND.												
40.00	5		POORLY GRADED SAND (SP); medium dense; brown; moist; fine SAND.		S01	5 5 6	11	33							
35.00	10		SILTY SAND (SM); medium dense; brown; moist; fine SAND; little fines; non-plastic; few fine, rounded GRAVEL.		S02	6 4 3	7	44							Switch to Mud Rotary
			no GRAVEL.		C03			89							
30.00	15				S04	3 4 6	10	55							
					C05			100							
25.00	20		wet; some fines.		S06	2 5 8	13	100							
					C07			100							
20.00	25		very loose.		S08	1 0 3	3	100							
			SILT (ML); soft; reddish brown; wet; few fine SAND.		C09			100				PP=0.25			
15.00	30		POORLY GRADED SAND (SP); dark brown; wet; medium to fine SAND.												
			SILTY SAND (SM); medium dense; dark brown; wet; medium to fine SAND; little fines.		S10	6 8 9	17	100							
	35				C11			14							

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REPORT TITLE				HOLE ID
BORING RECORD				**RW-19-024**
DIST.	COUNTY	ROUTE	POSTMILE	EA
03	**Sacramento**	**51**	**1.05-2.6**	**03-1600-0113-0**
PROJECT OR BRIDGE NAME				
Caltrans TO946183 C-57 SR51 Sac				
BRIDGE NUMBER	PREPARED BY		DATE	SHEET
	D. Ross		**10-9-19**	**1 of 2**

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks
10.00	35		SILTY SAND (SM); medium dense; dark brown; wet; medium to fine SAND; little fines.		C11			14							
					S12	4 5 6	11	100							
					C13			14							
5.00	40		SILTY SAND with Gravel (SM); medium dense; brown; wet; coarse to fine SAND; some fines; few coarse, subangular to subrounded GRAVEL.		S14	4 5 6	11	100							
0.00	45		Bottom of borehole at 42.5 ft bgs Borehole was terminated at proposed depth. Borehole was backfilled with neat cement grout placed via tremie pipe and topped with native soil.												
-5.00	50														
-10.00	55														
-15.00	60														
-20.00	65														
-25.00	70														
-30.00	75														

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REPORT TITLE				HOLE ID
BORING RECORD				**RW-19-024**
DIST.	COUNTY	ROUTE	POSTMILE	EA
03	**Sacramento**	**51**	**1.05-2.6**	**03-1600-0113-0**
PROJECT OR BRIDGE NAME				
Caltrans TO946183 C-57 SR51 Sac				
BRIDGE NUMBER	PREPARED BY		DATE	SHEET
	D. Ross		**10-9-19**	**2 of 2**

LOGGED BY	BEGIN DATE	COMPLETION DATE	BOREHOLE LOCATION (Lat/Long or North/East and Datum)	HOLE ID
E Santos	**3-18-19**	**3-22-19**	**38.58637° / -121.44791° WGS 1984**	**RW-19-025**
DRILLING CONTRACTOR			BOREHOLE LOCATION (Offset, Station, Line)	SURFACE ELEVATION
Gregg Drilling				**32.30 ft NAVD88**
DRILLING METHOD			DRILL RIG	BOREHOLE DIAMETER
Hollow Stem Auger/Mud Rotary			**Mobile B-53**	**6.0 in/4.63 in**
SAMPLER TYPE(S) AND SIZE(S) (ID)			SPT HAMMER TYPE	HAMMER EFFICIENCY, ERi
SPT (1.4")/CAL (2.5")/Punch Core (2.5")			**Auto; 140 lbs / 30-inch drop**	**87%**
BOREHOLE BACKFILL AND COMPLETION			GROUNDWATER READINGS DURING DRILLING **21.0 ft** AFTER DRILLING (DATE)	TOTAL DEPTH OF BORING
Neat cement grout to 5 ft then native to surface				**176.0 ft**

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks
30.00	0		POORLY GRADED SAND with Silt (SP-SM); olive brown; moist; fine SAND; non-plastic.												Hand Auger to 5 feet
25.00	5		SANDY SILT (ML); loose; yellowish brown; moist; some fine SAND; low plasticity.		S01	1 2 3	5	83							Switch to Hollow Stem Auger PA
20.00	10		medium dense; multicolored olive brown and olive.		S02	4 4 5	9	66							PA
15.00			SILTY SAND (SM); loose; olive brown; moist; fine SAND; little fines; non-plastic.												
	15				S03	5 2 3	5	44							PA
10.00			SANDY SILT (ML); loose; olive brown; moist; some fine SAND.												
	20		wet.		S04	0 2 4	6	22							PA
5.00	25		SILTY SAND (SM); medium dense; multicolored olive and olive brown; wet; fine SAND; little fines; non-plastic.		S05	3 5 8	13	100							Switch to Mud Rotary PA
			gray.		C06			100							
0.00	30				S07	0 5 7	12	89							PA
					C08			100							
	35														

(continued)

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REPORT TITLE				HOLE ID
BORING RECORD				**RW-19-025**
DIST.	COUNTY	ROUTE	POSTMILE	EA
03	**Sacramento**	**51**	**1.05-2.6**	**03-1600-0113-0**
PROJECT OR BRIDGE NAME				
Caltrans TO946183 C-57 SR51 Sac				
BRIDGE NUMBER	PREPARED BY		DATE	SHEET
	E Santos / D. Ross		**7-23-19**	**1 of 5**

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method / Casing Depth	Remarks
	35		POORLY GRADED SAND with Silt and Gravel (SP-SM); dense; gray; wet; few fine to coarse subrounded GRAVEL; medium to fine SAND; few fines; non-plastic.		S09	8 9 14	23	44						PA Rig chatter
-5.00			POORLY GRADED GRAVEL with Silt and Sand (GP-GM); very dense; gray; wet; fine to coarse subangular to subrounded GRAVEL, 2 in. max. dia.; some coarse to fine SAND.		C10			NR						
	40				S11	16 25 18	43	33						WA
-10.00					C12			NR						
	45				S13	47 50/3"	50/3	44						
-15.00														
	50				S14	36 50/5"	50/5	54						
-20.00														
			SILT with Sand (ML); very dense; olive; moist; little fine SAND; medium plasticity; some cemented nodules.											End of rig chatter
	55				S15	48 50/3"	50/3	NR						PI
-25.00			moderate cementation.		C16			100						
			POORLY GRADED SAND with Silt (SP-SM); olive; wet; medium to fine SAND.											
	60		SILT with Sand (ML); very dense; olive; wet; little fine SAND; non-plastic.		S17	17 32 50/3"	82/9	100						
-30.00			POORLY GRADED SAND (SP); olive; wet; medium to fine SAND; little fines.		C18			100				PP=4.5		
			ELASTIC SILT (MH); hard; olive; moist; few fine SAND; high plasticity; weak to moderate cementation.											
	65		pale olive.		S19	16 26 27	53	100						PI
-35.00					C20			100				PP=>4.5		
			weak cementation.											
			SILTY SAND (SM); very dense; olive; moist; fine SAND; some fines; low plasticity.											
	70				S21	17 26 32	58	100						
-40.00					C22			100						
	75		LEAN CLAY with Sand (CL); very stiff; pale olive; moist; little fine SAND; low plasticity.		S23	26 31 32	63	83				PP=3.25		

(continued)

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REPORT TITLE				HOLE ID
BORING RECORD				**RW-19-025**
DIST.	COUNTY	ROUTE	POSTMILE	EA
03	**Sacramento**	**51**	**1.05-2.6**	**03-1600-0113-0**
PROJECT OR BRIDGE NAME				
Caltrans TO946183 C-57 SR51 Sac				
BRIDGE NUMBER	PREPARED BY		DATE	SHEET
	E Santos / D. Ross		**7-23-19**	**2 of 5**

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks
-45.00			SILTY SAND (SM); multicolored olive and yellowish brown; moist; medium to fine SAND; some fines; non-plastic.		C24			100				PP=3.25			
	80		LEAN CLAY with Sand (CL); hard; pale olive and mottled yellowish brown; moist; little fine SAND; medium plasticity; oxidation.		S25	8 28 32	60	83				PP=>4.5			
-50.00			POORLY GRADED SAND with Silt (SP-SM); medium dense; multicolored yellowish brown and dark gray; moist to wet; fine SAND.		C26			100							
	85		12 inch thick lenses of LEAN CLAY (CL); hard; pale olive; wet; few fine SAND; low plasticity; moderate to strong cementation.		S27	16 10 6	16	72							
-55.00			POORLY GRADED SAND (SP); multicolored olive, yellowish brown and dark gray; wet; medium to fine SAND.		C28			100							
			SILTY SAND (SM); olive; wet; fine SAND; little fines; non-plastic; moderate to strong cementation.												
	90		SANDY SILT (ML); hard; olive; moist; some fine SAND; low plasticity.		S29	26 30 50/5"	80/11	88				PP=>4.5			
-60.00			POORLY GRADED SAND with Silt (SP-SM); multicolored olive and olive brown; wet; fine SAND; non-plastic.		C30			28							
	95		POORLY GRADED SAND (SP); very dense; olive; wet; medium to fine SAND; mica flakes.		S31	20 26 30	56	72							
-65.00					C32			100							
	100		SILT with Sand (ML); hard; multicolored olive and yellowish brown; moist; little fine SAND; low plasticity.		S33	17 28 50	78	100				PP=>4.5			
-70.00			LEAN CLAY (CL); hard; pale olive and mottled yellowish brown; wet; few fine SAND; low plasticity; weak to moderate cementation.		C34			100				PP=>4.5			
	105				S35	20 20 42	62	100							PI
-75.00					C36			85				PP=>4.5			
	110		SILTY SAND (SM); very dense; multicolored olive brown and yellowish brown; wet; fine SAND; little fines; non-plastic; weak to moderate cementation.		S37	29 50/6"	50/6	100							
-80.00			POORLY GRADED SAND (SP); very dense; multicolored brown, yellowish brown, and olive gray; wet; medium to fine SAND; weak to moderate cementation.		C38			100							
	115		olive brown.		S39	22 24 34	58	77							
-85.00					C40			100							

(continued)

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REPORT TITLE				HOLE ID
BORING RECORD				**RW-19-025**
DIST.	COUNTY	ROUTE	POSTMILE	EA
03	**Sacramento**	**51**	**1.05-2.6**	**03-1600-0113-0**
PROJECT OR BRIDGE NAME				
Caltrans TO946183 C-57 SR51 Sac				
BRIDGE NUMBER	PREPARED BY		DATE	SHEET
	E Santos / D. Ross		**7-23-19**	**3 of 5**

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks
	120		POORLY GRADED SAND (SP); dense; olive brown; wet; medium to fine SAND; weak to moderate cementation.		C40			100							
			dense.		S41	13 14 17	31	72							
-90.00					C42			100				PP=>4.5			
	125		LEAN CLAY (CL); hard; pale olive mottled black; wet; few fine SAND; medium plasticity; moderate to strong cementation.		S43	12 22 27	49	66							
-95.00			very stiff to hard; weak cementation.		C44			64				PP=3.25 4.25, 4.25			
	130				S45	16 26 33	59	100							
-100.00			hard; weak to moderate cementation.		C46			100				PP=4.25 4.5			
	135		SILT with Sand (ML); very dense; yellowish brown; moist; little fine SAND; non-plastic.		S47	18 27 42	69	100							
-105.00			POORLY GRADED SAND with Silt (SP-SM); very dense; yellowish brown; wet; fine SAND.		C48			85							
	140		POORLY GRADED SAND (SP); very dense; olive brown; wet; medium to fine SAND.		S49	23 50/5"	50/5	100							
-110.00					C50			100							
	145				S51	12 24 44	68	77							
-115.00			multicolored brown and yellowish brown.		C52			100							
			olive gray.												
	150		fine SAND.		S53	14 17 30	47	100							
-120.00			1 inch thick lenses of LEAN CLAY (CL); olive and pale olive; moist at 151.0' and 151.5'. medium to fine SAND; weak cementation.		C54			100							
	155				S55	8 14 23	37	50							
-125.00			coarse to fine SAND; no cementation.		C56			100							
	160		fine SAND.		S57		87	77							

(continued)

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REPORT TITLE				HOLE ID
BORING RECORD				**RW-19-025**
DIST.	COUNTY	ROUTE	POSTMILE	EA
03	**Sacramento**	**51**	**1.05-2.6**	**03-1600-0113-0**
PROJECT OR BRIDGE NAME				
Caltrans TO946183 C-57 SR51 Sac				
BRIDGE NUMBER	PREPARED BY		DATE	SHEET
	E Santos / D. Ross		**7-23-19**	**4 of 5**

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks
-130.00			POORLY GRADED SAND (SP); very dense; olive gray; wet; fine SAND.			26 41 46									
	165				S58	24 32 41	73	83							
-135.00															
	170				S59	28 40 40	80	89							
-140.00			SILT (ML); hard; pale olive mottled white and olive yellow; wet; few fine SAND; low plasticity.												
	175		weak to moderate cementation.		S60	23 50/6"	50/6	100				PP=>4.5			
-145.00			Bottom of borehole at 176.0 ft bgs Borehole was terminated at proposed depth. Borehole was backfilled with neat cement grout placed via tremie pipe and topped with native soil.												
	180														
-150.00															
	185														
-155.00															
	190														
-160.00															
	195														
-165.00															
	200														
-170.00															

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REPORT TITLE				HOLE ID
BORING RECORD				**RW-19-025**
DIST.	COUNTY	ROUTE	POSTMILE	EA
03	**Sacramento**	**51**	**1.05-2.6**	**03-1600-0113-0**
PROJECT OR BRIDGE NAME				
Caltrans TO946183 C-57 SR51 Sac				
BRIDGE NUMBER	PREPARED BY		DATE	SHEET
	E Santos / D. Ross		**7-23-19**	**5 of 5**

LOGGED BY	BEGIN DATE	COMPLETION DATE	BOREHOLE LOCATION (Lat/Long or North/East and Datum)	HOLE ID
R Schmidt	8-5-19	8-9-19	38° 35' 29.6" / -121° 26' 43.4"	RW-19-036
DRILLING CONTRACTOR			BOREHOLE LOCATION (Offset, Station, Line)	SURFACE ELEVATION
Gregg			52.9' Rt Sta 215+54 SR51	55.6 ft
DRILLING METHOD			DRILL RIG	BOREHOLE DIAMETER
Rotary Wash			Mobile D83	4.5 in
SAMPLER TYPE(S) AND SIZE(S) (ID)			SPT HAMMER TYPE	HAMMER EFFICIENCY, ERi
SPT (1.4")			AUTO	96%
BOREHOLE BACKFILL AND COMPLETION			GROUNDWATER READINGS DURING DRILLING / AFTER DRILLING (DATE)	TOTAL DEPTH OF BORING
8/9/2019			Not measured	101.0 ft

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks
	0		ASPHALT CONCRETE 5".												
			CLAYEY SAND (SC); dense; redding brown; moist; fine SAND ; 20% fines.												
50.60	5			X		5 7 7	14	100							
45.60	10			X		6 9 10	19	89							
40.60	15			X		11 13 14	27	78							
			Poorly graded SAND with CLAY (SP-SC); dense; dark yellowish brown; moist; medium to find SAND ; few fines.												
35.60	20			X		10 17 23	40	89							
30.60	25			X		13 17 25	42	67							
25.60	30		SILT (ML); stiff; dark brown; moist; low plasticity fines ; PP=2.0tsf.	X		5 4 8	12	78							
20.60	35			X		3 5 6	11	67							
15.60	40		SILT with SAND (ML); brown; moist; little fine SAND.												
10.60	45		SANDY SILT (ML); dense; brown; moist; some fine SAND.	X		5 7 8	15	89							
5.60	50		SILT with SAND (ML); medium dense; dark yellowish brown; moist; little fine SAND.	X		4 5 6	11	56							
	55														

(continued)

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REPORT TITLE				HOLE ID
BORING RECORD				RW-19-036
DIST.	COUNTY	ROUTE	POSTMILE	PROJECT ID
03	SAC	51	2.6/2.9	0312000054
PROJECT OR BRIDGE NAME				
American River Bridge (Widen)				
BRIDGE NUMBER	PREPARED BY		DATE	SHEET
24-0003	Y ZAKA		9-18-19	1 of 2

ELEVATION (ft)	DEPTH (ft)	DESCRIPTION	Sample Location	Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method / Casing Depth	Remarks
	55	SILT with SAND (ML) *(continued)*.	X		2 50/5"	8	100						
-4.40	60	Poorly graded SAND (SP); dense; dark grayish brown; moist.	X		6 8 9	17	89						
		Poorly graded GRAVEL (GP).											
-9.40	65		X		47 50/4"	50/4	0						
-14.40	70	SILTY SAND (SM); very dense; moist; medium to fine SAND ; little fines.	X		17 22 33	55	78						
-19.40	75	SILT (ML); hard; olive; moist; PP>4.5tsf.	X		36 50/5"	50/5	91						
-24.40	80		X		22 29 50/2"	79/8	100						
-29.40	85		X		14 23 19	42	100						
		Poorly graded SAND with SILT (SP-SM); very dense; yellowish brown; moist; fine SAND ; few fines.											
-34.40	90		X		22 31 50	81	89						
-39.40	95		X		15 23 32	55	89						
-44.40	100		X		20 33 37	70	0						
		Bottom of borehole at 101.0 ft bgs											
-49.40	105												
-54.40	110												
-59.40	115												
-64.40	120												

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REPORT TITLE **BORING RECORD**				HOLE ID **RW-19-036**
DIST. **03**	COUNTY **SAC**	ROUTE **51**	POSTMILE **2.6/2.9**	PROJECT ID **0312000054**
PROJECT OR BRIDGE NAME **American River Bridge (Widen)**				
BRIDGE NUMBER **24-0003**	PREPARED BY **Y ZAKA**		DATE **9-18-19**	SHEET **2 of 2**

LOGGED BY	BEGIN DATE	COMPLETION DATE	BOREHOLE LOCATION (Lat/Long or North/East and Datum)	HOLE ID
R Schmidt	8-16-19	8-16-19	38° 35' 34.4" / -121° 26' 42.9"	A-19-037
DRILLING CONTRACTOR			BOREHOLE LOCATION (Offset, Station, Line)	SURFACE ELEVATION
Gregg			45.1' Lt Sta 220+28.6 SR51	53.7 ft
DRILLING METHOD			DRILL RIG	BOREHOLE DIAMETER
Hollow-Stem Auger			Mobile B57	6 in
SAMPLER TYPE(S) AND SIZE(S) (ID)			SPT HAMMER TYPE	HAMMER EFFICIENCY, ERi
SPT (1.4")			AUTO	87%
BOREHOLE BACKFILL AND COMPLETION			GROUNDWATER READINGS DURING DRILLING AFTER DRILLING (DATE)	TOTAL DEPTH OF BORING
8/16/2019			Not Encountered	41.5 ft

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks
	0		ASPHALT CONCRETE 5".												
			AGGREGATE BASE 11".												
			Poorly graded SAND with SILT (SP-SM); very dense; dark yellowish brown; moist; fine SAND ; few fines.												
48.70	5			X		2 20 28	48	78							
43.70	10			X		9 12 18	30	100							
38.70	15			X		32 19 22	41	89							
			SILTY SAND (SM); very dense; dark yellowish brown; moist; fine SAND ; some fines.												
33.70	20			X		7 12 17	29	89							
28.70	25			X		11 19 20	39	100							
23.70	30			X		6 15 24	39	100							
18.70	35			X		10 9 9	18	100							
13.70	40			X		4 6 9	15	100							
			Bottom of borehole at 41.5 ft bgs												
8.70	45														
3.70	50														
	55														

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REPORT TITLE				HOLE ID
BORING RECORD				A-19-037
DIST.	COUNTY	ROUTE	POSTMILE	PROJECT ID
03	SAC	51	2.6/2.9	0312000054
PROJECT OR BRIDGE NAME				
American River Bridge (Widen)				
BRIDGE NUMBER	PREPARED BY		DATE	SHEET
24-0003	Y ZAKA		9-25-19	1 of 1

LOGGED BY	BEGIN DATE	COMPLETION DATE	BOREHOLE LOCATION (Lat/Long or North/East and Datum)	HOLE ID
R Schmidt	8-8-19	8-9-19	38° 35' 35.2" / -121° 26' 41.1"	A-19-038
DRILLING CONTRACTOR			BOREHOLE LOCATION (Offset, Station, Line)	SURFACE ELEVATION
Gregg			66.3' Rt Sta 221+50.2 SR51	53.4 ft
DRILLING METHOD			DRILL RIG	BOREHOLE DIAMETER
Hollow-Stem Auger			Mobile D83	6 in
SAMPLER TYPE(S) AND SIZE(S) (ID)			SPT HAMMER TYPE	HAMMER EFFICIENCY, ERi
SPT (1.4")			AUTO	96%
BOREHOLE BACKFILL AND COMPLETION			GROUNDWATER READINGS DURING DRILLING / AFTER DRILLING (DATE)	TOTAL DEPTH OF BORING
8/9/2019			Not measured	41.5 ft

ELEVATION (ft)	DEPTH (ft)	DESCRIPTION	Sample Location	Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks
	0	ASPHALT CONCRETE 5". AGGREGATE BASE 19". SANDY lean CLAY (CL); stiff; dark brown; moist; fine SAND ; some low plasticity fines ; 3.25.												
48.40	5				5 9 15	24	67							
43.40	10	CLAYEY SAND (SC); dense; stiff; dark yellowish brown; moist; fine SAND ; some fines ; 1.75.			6 10 12	22	78							
38.40	15	Poorly graded SAND (SP); very dense; dark yellowish brown; moist; fine to medium sand SAND ; trace fines.			12 14 14	28	67							
33.40	20				13 17 20	37	78							
28.40	25				16 25 28	53	78							
23.40	30				10 14 16	30	67							
18.40	35	SILT (ML); medium stiff; dark brown; moist; low plasticity fines ; 3.1.			7 5 6	11	100							
13.40	40				3 2 3	5	100							
		Bottom of borehole at 41.5 ft bgs												
8.40	45													
3.40	50													
	55													

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REPORT TITLE				HOLE ID
BORING RECORD				A-19-038
DIST.	COUNTY	ROUTE	POSTMILE	PROJECT ID
03	SAC	51	2.6/2.9	0312000054
PROJECT OR BRIDGE NAME				
American River Bridge (Widen)				
BRIDGE NUMBER	PREPARED BY		DATE	SHEET
24-0003	Y ZAKA		9-18-19	1 of 1

LOGGED BY	BEGIN DATE	COMPLETION DATE	BOREHOLE LOCATION (Lat/Long or North/East and Datum)	HOLE ID
Yusuf Zaka	6-5-19	6-6-19	38° 35' 38.77" / -121° 26' 41.36" NAD83	RW-19-040
DRILLING CONTRACTOR			BOREHOLE LOCATION (Offset, Station, Line)	SURFACE ELEVATION
Gregg			60.0' Rt Sta 266+36.2 SR 51	52.8 ft NAVD88
DRILLING METHOD			DRILL RIG	BOREHOLE DIAMETER
Rotary Wire-Line			Mobile B83	4.6 in
SAMPLER TYPE(S) AND SIZE(S) (ID)			SPT HAMMER TYPE	HAMMER EFFICIENCY, ERi
SPT			Auto	96%
BOREHOLE BACKFILL AND COMPLETION			GROUNDWATER DURING DRILLING AFTER DRILLING (DATE) READINGS	TOTAL DEPTH OF BORING
Backfill Neat Cement				141.5 ft

ELEVATION (ft)	DEPTH (ft)	DESCRIPTION	Sample Location	Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks
	0	ASPHALT CONCRETE (4"). CONCRETE (8"). Poorly graded SAND (SP); medium dense; olive brown; moist; fine to medium, subangular SAND ; few fines.		1	5 5 9	14	28							
42.80	10	Little GRAVEL. Coarse GRAVEL.		2	8 9 9	18	0							
		Poorly graded GRAVEL with SAND (GP); gray; moist; mostly fine GRAVEL ; some fine to coarse SAND.		3	3 3 3	6	0		1					PA
32.80	20			4			0							
				5										
22.80	30	Poorly graded SAND (SP); loose; brown; moist; fine to medium SAND ; trace fines.		6	2 3 3	6	39							
		Lean CLAY (CL); stiff; gray; moist; high plasticity fines ; PP = 1.5 tsf.		7	3 5 9	14	100							PI
12.80	40	SILT (ML); very dense; yellowish brown; moist; low plasticity fines ; strong cementation.		8	12 26 47	73	100							
		SANDY lean CLAY (CL); very dense; yellowish brownish gray; moist; some fine to medium SAND.		9	16 31 43	74	100							
2.80	50	SANDY SILT (ML); very dense; grayish green; moist; some fine SAND ; mostly nonplastic fines.		10	14 17 17	34	100		22					PA
		Poorly graded SAND with SILT (SP-SM); gray; moist; fine to medium SAND ; little fines.												
		SILTY SAND (SM); very dense; gray; moist; fine SAND ; some fines.		11	14 22 24	46	100							
-7.20	60			12	10 16 26	42	100							
		SILT with SAND (ML); very dense; brownish gray; moist; little fine SAND.		13	17 27 39	66	100							
-17.20	70	SILT (ML); very dense; brownish gray; moist; trace fine SAND.		14	23 50/5"	50/5	109							
		Low plasticity fines. Hard; medium plasticity fines ; PP = + 4.5 tsf.		15	20 33 50/4"	83/10	75							
	80													

(continued)

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REPORT TITLE				HOLE ID
BORING RECORD				RW-19-040
DIST.	COUNTY	ROUTE	POSTMILE	PROJECT ID
03	SAC	51	2.5/4.3	0H931
PROJECT OR BRIDGE NAME				
SR 51 Capital City Corridor				
BRIDGE NUMBER	PREPARED BY		DATE	SHEET
	Genevieve Ryder		9-5-19	1 of 2

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ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks
	80		SILT (ML) *(continued)*.	X	16	20 35 40	75	100							
			SANDY SILT (ML); dark brown; moist; some fine SAND ; mostly fines.	X	17	31 50/5"	50/5	118		25					PA
-37.20	90		SILT (ML); very dense; yellowish brown; moist; few fine SAND ; moderate cementation; alternating layers of SILT (ML) and SILTY SAND (SM).	X	18	23 31 39	70	100							
			SILTY SAND (SM); very dense; brown; moist; little fine SAND.	X	19	15 47 47	94	100							
-47.20	100		SANDY SILT (ML); very dense; yellow brown; moist; some fine SAND ; mostly nonplastic fines.	X	20	15 21 25	46	100		23					PA
			SILTY SAND (SM); very dense; moist; medium SAND ; medium plasticity fines.	X	21	18 26 27	53	100							
-57.20	110			X	22	15 23 24	47	100							
			Fat CLAY (CH); moist; high plasticity fines.	X	23	10 14 27	41	100							
-67.20	120			X	24	17 27 30	57	100							
			SILTY SAND (SM); very dense; brown; moist; some fine SAND.	X	25	15 25 45	70	100							
-77.20	130		Gray.	X	26	19 40 33	73	100							
				X	27	12 26 32	58	100							
-87.20	140		Fat CLAY (CH); hard; gray; moist; high plasticity fines ; PP = + 4.5 tsf.	X	28	12 28 31	59	100							
			Bottom of borehole at 141.5 ft bgs												
-97.20	150		This Boring Record was developed in accordance with the Caltrans Soil & Rock Logging, Classification, and Presentation Manual (2010) except as noted on the Soil or Rock Legend or below.												
-107.20	160														
-117.20	170														

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Office of Geotechnical Design - North

REPORT TITLE				HOLE ID
BORING RECORD				**RW-19-040**
DIST.	COUNTY	ROUTE	POSTMILE	PROJECT ID
03	**SAC**	**51**	**2.5/4.3**	**0H931**
PROJECT OR BRIDGE NAME				
SR 51 Capital City Corridor				
BRIDGE NUMBER	PREPARED BY		DATE	SHEET
	Genevieve Ryder		**9-5-19**	**2 of 2**

LOGGED BY	BEGIN DATE	COMPLETION DATE	BOREHOLE LOCATION (Lat/Long or North/East and Datum)	HOLE ID
Genevieve Ryder	**6-4-19**	**6-4-19**	**38° 35' 42.04" / -121° 26' 40.37" NAD83**	**A-19-042**
DRILLING CONTRACTOR			BOREHOLE LOCATION (Offset, Station, Line)	SURFACE ELEVATION
Gregg			**50.2' Lt Sta 224+87.9 SR 51**	**48.4 ft NAVD88**
DRILLING METHOD			DRILL RIG	BOREHOLE DIAMETER
Hollow-Stem Auger			**Mobile B53**	**6 in**
SAMPLER TYPE(S) AND SIZE(S) (ID)			SPT HAMMER TYPE	HAMMER EFFICIENCY, ERi
SPT			**Auto**	**87%**
BOREHOLE BACKFILL AND COMPLETION			GROUNDWATER READINGS DURING DRILLING / AFTER DRILLING (DATE)	TOTAL DEPTH OF BORING
Backfill Neat Cement			**50.0 ft**	**51.5 ft**

ELEVATION (ft)	DEPTH (ft)	DESCRIPTION	Sample Location	Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method / Casing Depth	Remarks
	0	ASPHALT CONCRETE (4"). CONCRETE (8.5"). AGGREGATE BASE (18").											
43.40	5	CLAYEY SAND (SC); dense; dark brown; dry; fine to medium SAND ; (FILL).	X	1	13 13 14	27	44		12				PA
38.40	10	SANDY lean CLAY (CL); dark brown; moist; some fine to medium SAND ; (FILL).	X	2	9 14 21	35	81		15				PA
33.40	15	CLAYEY SAND (SC); very dense; dark brown; moist; mostly fine to medium SAND ; little fines ; (FILL).	X	3	16 26 25	51	72		8				PA
28.40	20	SANDY lean CLAY (CL); very stiff; light reddish brown; some fine SAND ; high plasticity fines ; PP = 3.0 tsf; (NATIVE).	X	4	5 4 8	12	100						Perched groundwater encountered at 20'
23.40	25	Light brown; dry.	X	5	12 18 26	44	100		21				PA, PI
18.40	30	Poorly graded SAND (SP); very dense; light reddish brown; fine to medium SAND ; trace mica.	X	6	9 24 34	58	100						
13.40	35	Light brown; fine to coarse SAND.	X	7	17 37 43	80	100						
8.40	40	Light olive brown; fine to medium SAND.	X	8	19 27 29	56	78						
3.40	45	Light grayish brown; moist.	X	9	21 19 21	40	94						
-1.60	50	Well-graded SAND (SW); dense; dark grayish brown; wet; trace GRAVEL ; trace fines ; micaceous.	X	10	9 9 19	28	100						
		Bottom of borehole at 51.5 ft bgs											
-6.60	55												
-11.60	60	This Boring Record was developed in accordance with the Caltrans Soil & Rock Logging, Classification, and Presentation Manual (2010) except as noted on the Soil or Rock Legend or below.											
-16.60	65												
	70												

5 BR - STANDARD SR51.GPJ CALTRANS LIBRARY (FEB 2013).GLB 2/20/20

Department of Transportation
Division of Engineering Services
Geotechnical Services
Office of Geotechnical Design - North

REPORT TITLE				HOLE ID
BORING RECORD				**A-19-042**
DIST.	COUNTY	ROUTE	POSTMILE	PROJECT ID
03	**SAC**	**51**	**2.5/4.3**	**0H931**
PROJECT OR BRIDGE NAME				
SR 51 Capital City Corridor				
BRIDGE NUMBER	PREPARED BY		DATE	SHEET
	Genevieve Ryder		**9-5-19**	**1 of 1**

DATE STARTED	DATE COMPLETED	GROUND ELEVATION	ELEVATION DATUM	TOTAL DEPTH OF BORING
6/3/08	6/3/08	48.07 ft	NAVD 88	70.0 ft

DRILLING CONTRACTOR	DRILLER'S NAME	HELPER'S NAME	TOTAL DEPTH OF FILL
Gregg Drilling & Testing, Inc.	E. Santellan	R. Ryon/M. Ageev	13.2 ft

DRILLING METHOD	DRILL RIG MAKE AND MODEL	CONSULTANT COMPANY
0 - 3 ft: HA, 3 - 16.5 ft: HSA, 16.5 - 70 ft: Rotary Wash	MARL M-10 (Gregg Rig No. D-44)	GEI Consultants, Inc.

DRILL BIT SIZE AND TYPE (HOLE DIAMETER)	DRILLING ROD TYPE AND DIAMETER	FIELD LOGGER
5-inch drag bit; tricone drill through bit	6" HSA, 94mm	M. Horse

☒ VERTICAL ☐ INCLINED	CASING TYPE, DIAMETER, INSTALLATION DEPTH	FIELD LOG REVIEWER
	Surface, 6-in., 15 ft	G. Bradner

SAMPLER TYPE(S)	HAMMER TYPE, MAKE/MODEL, WEIGHT/DROP	HAMMER EFFICIENCY
Bag, DCore(2.5"), MCal(2"), PCore(2.5"), SPT(1.375"), Tricone Bit	Marl, automatic, 140 lbs / 30-inch drop	83%

BOREHOLE BACKFILL OR COMPLETION	GROUNDWATER READING: DURING DRILLING	AFTER DRILLING (DATE-TIME)
5% bentonite grout	N/A due to rotary wash drilling method	

Elevation, feet	Depth, feet	Material Graphics	CLASSIFICATION OF MATERIALS (Description)	Sample Location	Sample Number	Recovery, %	Blows per 6 in. [Blows per ft]	N_{60}(ASTM)	PP or TV, tsf	LABORATORY DATA: Water Content, %	Liquid Limit	Plasticity Index	Fines, % < #200	Other Lab Tests	REMARKS
	0		Gravel Road Base.												
	1		[LEVEE FILL] FAT CLAY (CH); very stiff; greenish black (5G 2.5/1); moist; 95% high plasticity, high dry strength, high toughness fines; 5% sand; 0% gravel.		1				3.0P						S01A_001_002B
	2				2										No Recovery; cobble removed
45	3		1-foot thick Fat Clay with Sand (CH) lense; 5% gravel, max. 1/2 in.; 10% fine to medium sand; 85% high plasticity fines.		3	100									S03B_003_004P S03A_004_005P
	4		[LEVEE FILL] SILTY CLAYEY SAND (SC-SM); dense; dark brown (7.5YR 3/4); moist; 75% fine to medium sand; 25% low plasticity fines; 0% gravel.												
	5				4	44	12 16 13	40					25	HD	S04A_005_007S
	6														
	7		[LEVEE FILL] Poorly Graded SAND with Silt (SP-SM); medium dense; olive brown (2.5Y 4/4); dry; 91% fine to medium sand; 9% fines; 0% gravel.		5	71	[29]			3			9		S05A_007_008P
40	8														
	9				6	0	9 9 10	26							No Recovery; soft material
	10		As above except moist.				[19]								S07A_011_011P Driller notes very soft material
	11														
	12				7	40									Driller notes very easy drilling
FILL 35	13		[Approximate bottom of Levee Fill 13.2'].												
	14														
	15		SANDY SILT (ML); loose; dark yellowish brown (10YR 3/6); moist; 50% fine sand; 50% low plasticity fines; 0% gravel.		8	50	3 3 4 [7]	10					50	HD	S08A_016_016S
	16														
	17				9	0									No Recovery Very soft material; easy drilling
30	18														
	19														
	20														

Final Report Version 5/21/2010

Borehole Location: South Bank Crest **County:** Sacramento
Coordinates: Northing: 1,976,188.21 **Easting:** 6,719,198.27
Latitude: 38.58732 **Longitude:** -121.44887
Levee Station or Milepost: 1200+59 **Levee Mile:** 3.79
Levee Segment
Survey Method: GIS/LiDAR **Coord. System:** CA State Plane Zone II
Channel / River Name / Feature: American River

LOG OF BORING
WCSBAR_003B
Sheet 1 of 4

Urban Levee Geotechnical Evaluations Program
Engineering Support Services

DWR LEVEE U/NU SOIL LOG REV1; AMERICAN RIVER LEVEE BORINGS 6-16-2010.GPJ; DWR OFFICIAL LIBRARY 032210.GLB; 6/16/10

Elevation, feet	Depth, feet	Material Graphics	CLASSIFICATION OF MATERIALS (Description)	Sample Location	Sample Number	Recovery, %	Blows per 6 in. [Blows per ft]	N_{60}(ASTM)	PP or TV, tsf	LABORATORY DATA: Water Content, %	LABORATORY DATA: Liquid Limit	LABORATORY DATA: Plasticity Index	LABORATORY DATA: Fines, % < #200	LABORATORY DATA: Other Lab Tests	REMARKS
	20		SANDY SILT (ML); as above except medium dense.		10	0	5 6 6 [12]	17							No Recovery Rock stuck in hole
	21														
	22		SANDY SILT (ML); medium dense; very dark brown (7.5YR 2.5/3); moist; 65% low plasticity fines; 35% fine to medium sand; 0% gravel.		11	0	7 8 11								No Recovery Sandy Silt observed in cuttings
25	23				12	0	[19]	15							No Recovery Driller notes rock still present in hole
	24						5 4 7								
	25		Poorly Graded SAND with Silt (SP-SM); medium dense; dark brown (7.5YR 3/4); moist; 91% fine to medium sand; 9% low plasticity fines; 0% gravel; predominantly fine sand.		13	100	[11]								S13A_025_025P 2.25-inch cobble fragment on top of sample S14A_025_027M
	26				14	100	7 10 10						9		
	27				15	44	[20]	19		11				SG	S15A_027_028S
20	28						5 5 9								
	29				16	42	[14]								S16A_028_029P
	30		SILTY CLAYEY SAND (SC-SM); medium dense; dark brown (7.5YR 3/4); moist; 77% fine sand; 23% low plasticity fines; 0% gravel.		17	56	7 5 11	22					23	HD	S17A_030_032S
	31						[16]								
	32				18	50									S18A_032_033P
15	33														
	34														
	35		SILTY SAND (SM); dense; dark yellowish brown (10YR 3/6); moist; 80% fine to medium sand; 20% fines; 0% gravel.		19	56	9 12 13	35		12			20		S19A_035_037S
	36						[25]								
	37				20	79									Box 1 Representative S20A_038_038P
10	38														
	39														
	40				21	61	9 11 11	30							S21A_040_042P
	41		As above except medium dense.				[22]								
	42		As above except very dark greenish gray (5G 3/1).		22	45									S22A_042_043P
5	43														
	44														
	45														

Final Report Version 5/21/2010

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LOG OF BORING
WCSBAR_003B
Sheet 2 of 4

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Elevation, feet	Depth, feet	Material Graphics	CLASSIFICATION OF MATERIALS (Description)	Sample Location	Sample Number	Recovery, %	Blows per 6 in. [Blows per ft]	N_{60}(ASTM)	PP or TV, tsf	LABORATORY DATA: Water Content, %	LABORATORY DATA: Liquid Limit	LABORATORY DATA: Plasticity Index	LABORATORY DATA: Fines, % < #200	LABORATORY DATA: Other Lab Tests	REMARKS
	45		SILTY SAND (SM); as above.		23	67	7 8 8 [16]	22							S23A_045_047S
	46														
	47														S24B_047_047P S24A_048_048P
0	48		Well-Graded GRAVEL (GW); dense; dark olive gray (5Y 3/2); moist; 85% fine to coarse, subrounded gravel, max. 2 1/4 in.; 10% fine to medium sand; 5% fines.		24	36									Driller notes change; rig chatter
	49														
	50		3-inch thick Poorly Graded Sand (SP) lense; 96% fine to medium sand; 4% fines.		25	50	10 11 13 [24]	33		20			4		S25B_050_051S S25A_051_052S
	51														
	52				26	0									No Recovery Rig chatter and shaking
-5	53														
	54														
	55		3-inch thick Poorly Graded Sand (SP) lense; 95% fine to medium sand; 5% fines.		27	39	32 40 30 [70]	97							S27B_055_056S S27A_056_057S
	56		As above except very dense.												
	57				28	0									No Recovery Rig chatter; gravel and cobble fragments present in slough
-10	58														
	59														
	60		Well-Graded GRAVEL with Sand (GW); very dense; dark olive gray (5Y 3/2); moist; 70% fine to coarse, subrounded gravel; 25% fine to medium sand; 5% fines.		29	67	50/6" [REF]								S29A_060_061S
	61				30	0									No Recovery Rig chatter and shaking; driller notes gravels/cobbles
-15	62														
	63														Use tricone bit; rig chatter and shaking; driller notes cobbles
	64														
	65		Gravel and cobble fragments, max. 1 1/2 in., present in slough.		31	0	50/3" [REF]								No Recovery Use tricone bit
	66														
	67														Driller notes gravels/cobbles
-20	68														
	69														
	70														

Final Report Version 5/21/2010

Borehole Location: South Bank Crest **County:** Sacramento
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WCSBAR_003B
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	70		Borehole terminated at 70 feet. Backfilled with 5% bentonite grout.								Refusal due to gravel/cobbles
	71										
	72										
-25	73										
	74										
	75										
	76										
	77										
-30	78										
	79										
	80										
	81										
	82										
-35	83										
	84										
	85										
	86										
	87										
-40	88										
	89										
	90										
	91										
	92										
-45	93										
	94										
	95										

Final Report Version 5/21/2010

DEPARTMENT OF WATER RESOURCES — STATE OF CALIFORNIA

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WCSBAR_003B
Sheet 4 of 4

Urban Levee Geotechnical Evaluations Program
Engineering Support Services

DWR LEVEE U/NU SOIL LOG REV1; AMERICAN RIVER LEVEE BORINGS 6-16-2010.GPJ; DWR OFFICIAL LIBRARY 032210.GLB; 6/16/10

Memorandum

To: Madhwesh Raghavendrachar
Office of Bridge Design North
Structure Design Branch 11
At: Mark Okimura

Date: November 26, 2019

File: American River
Br. No. 24-0003
03-Sac-51-PM 2.6
EA 03-3F0700
Project ID: 03-1200-0054

From: **Department of Transportation**
Engineering Service Center MS #9
Structure Hydraulics and Hydrology

Subject: Revised Draft Final Hydraulic Report

Attached is the revised Draft Final Hydraulic Report for the proposed deck replacement and widening for the American River Bridge. If you have any questions please call me at (916) 227-0444 or my mobile at (916) 224-9640.

Sincerely,

Neal Alie, P.E.
Hydrology/Hydraulics Engineer
Structure Hydraulics

State of California – Department of Transportation
Division of Engineering Services
Structure Design Services

Structure Hydraulics and Hydrology

DRAFT FINAL HYDRAULIC REPORT

American River Bridge

Located in Sacramento County
Bride No. 24-0003

03-Sac-51-PM 2.61

EA 03-3F0700
EFIS: 03 1200 0054

November 26, 2019

WRITTEN BY:
Neal Alie

REVIEWED BY:
Ronald McGaugh

This report has been prepared under my direction as the professional engineer in responsible charge of the work, in accordance with the provisions of the Professional Engineers Act of the State of California

The Professional Engineer's (P.E.) seal and signature will be included on the Final Hydraulic Report. **See Note on the following page.**

REGISTERED ENGINEER

C 56398 Exp: 07/15/21

REGISTRATION NUMBER

Note: This is a Draft Final Hydraulic Report which has been completed based on the preferred design alternative and other current information. The information reported in this study is considered valid (checked). However, any changes to the currently proposed bridge design details and/or other study assumptions may require changes to the hydraulic/scour analyses and report; therefore, the information provided in this report is considered "draft" and subject to revision. The Final Hydraulic Report will include the Professional Engineer's (P.E.) seal and signature and will be delivered when all bridge design details have been finalized for Final Structure Plans, Specifications, and Estimates (SPS&E).

Table of Contents

Hydrology/Hydraulic Report

1.0 General

Structure Design in coordination with the District is proposing to replace the existing deck of the American River Bridge, Br. No. 24-0003, due to spalling and severe cracks. An intermediate widening is also proposed to facilitate the deck replacement while keeping all lanes open to traffic. Further future widening in addition to the proposed intermediate widening is proposed as part of a larger corridor project (03-0H931). The following two variants have been proposed:

Variant B- Deck replacement with the intermediate widening plus the substructure for the ultimate widening. (Preferred Variant).

Variant C- Deck replacement with the ultimate widening.

The new supports for the widening will match the existing support locations with pile caps with driven piles. The environmental work window in the river and flood plain is 5 months from May to September.

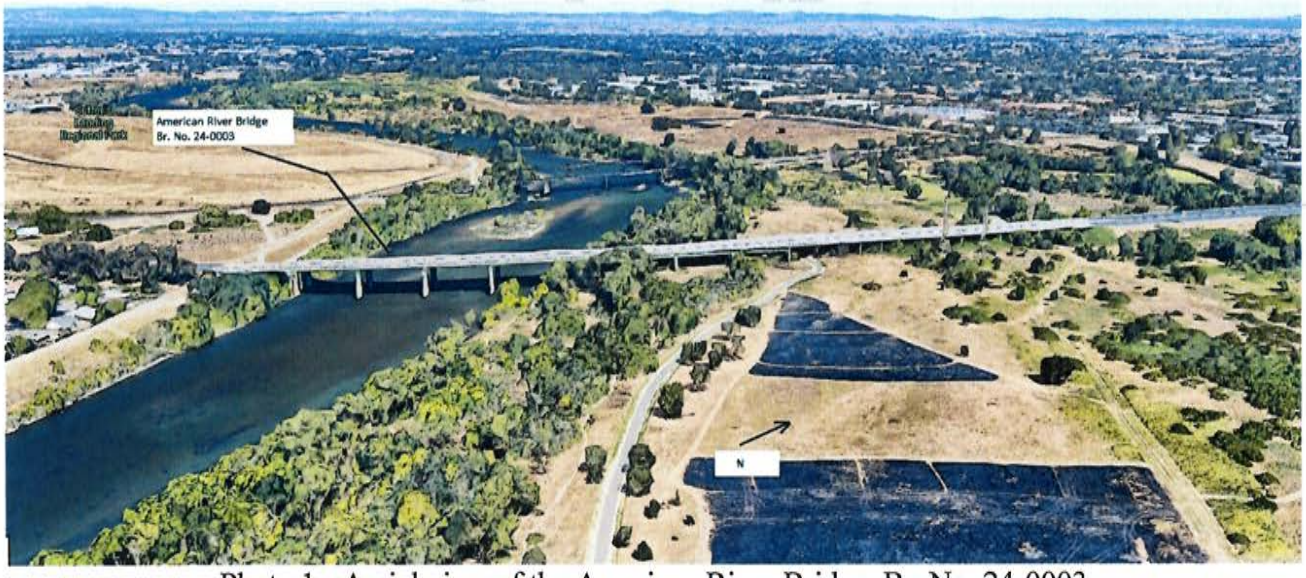


Photo 1 - Aerial view of the American River Bridge, Br. No. 24-0003

The existing American River Bridge is a 25-span, 1890-foot-long, 107.6-foot-wide structure built in 1954, widened in 1961, strengthened in 1988 and seismically retrofitted in 1997. The structure is a

simple span steel welded and riveted girder on RC hollow piers and RC 5-column bents and RC open end seated abutments, all founded on steel piles.

Photo 2 – American River Bridge, Br. No. 24-0003

This report makes extensive reference to the (1) Caltrans Bridge Maintenance Reports, (2) General plans and profiles submitted by structures, (3) Caltrans As-Built Plans (4) Previous Hydrology/Hydraulics Reports (5) FEMA Study, 07/19/2018, (6) FHWA Hydraulic Engineering Circular, (HEC-23), "Bridge Scour and Stream Instability Countermeasures", (7) Stability Rating Memo, 06/11/2002.

All Elevations used in this report are based on the NAVD 88 Datum.

2.0 Drainage Basin

The American River drains a watershed of approximately 1900 square miles of the Tahoe and El Dorado National Forests, including the Granite Chief Wilderness and Desolation Wilderness. The river flows west from the peaks of the northern Sierra Nevada west of Lake Tahoe. Its streams gradually converge into the South, Middle and North Forks of the American River draining into Folsom Dam.

Although it was it was originally authorized by Congress in 1944 as flood control unit, Folsom Dam was reauthorized in 1949 as a multipurpose facility to also store water for irrigation, domestic, municipal and industrial use, hydropower generation, recreation, water quality and maintenance of flows stipulated to protect fish. Folsom Lake features roughly 10,000 surface acres of water when full and has 75 miles of shoreline. It extends about 15 miles up the North Fork American River and about 10 ½ miles up the South Fork.

During a 24-hour period, the releases of water from Folsom Dam can vary greatly to meet changing demands for water and power. Nimbus Dam, 7 miles downstream from Folsom Dam, stores these releases and re-regulates them to a steady flow downstream in the American River and allows Folsom Dam releases and power generation to fluctuate with daily power demands. Nimbus Dam forms Lake Natoma located in the town of Folsom. The Lower American River has levees on its north and south banks for about 13 miles from the Sacramento River to Carmichael on the north end. Portions of the floodplain have been acquired by either the City or County of Sacramento and is managed cooperatively as the American River Parkway.

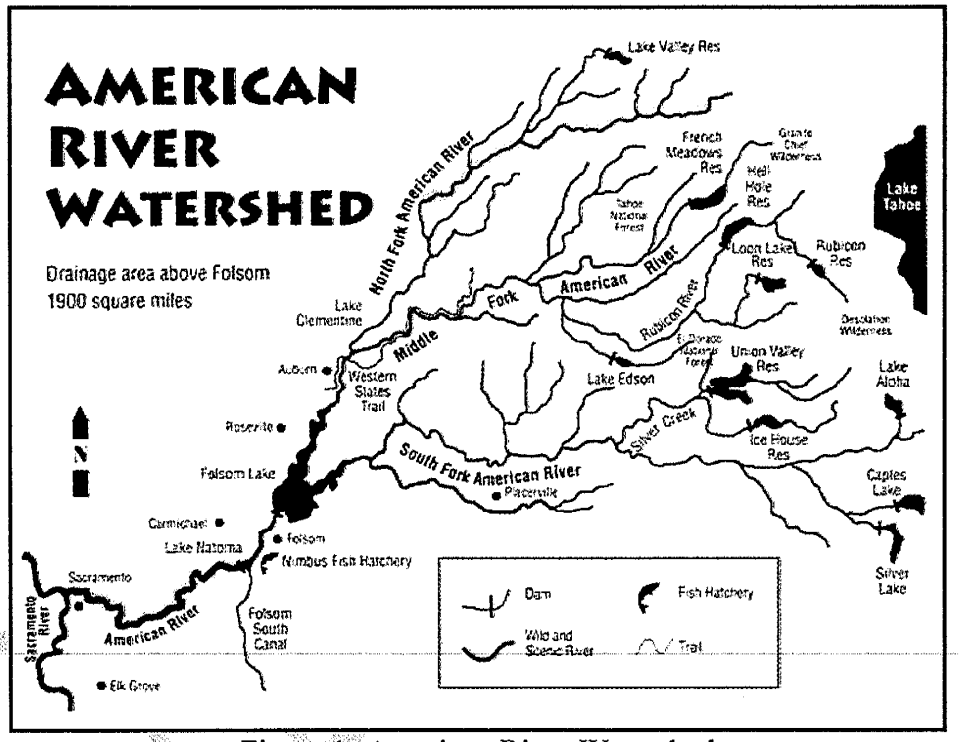


Figure 1- American River Watershed

The Lower American River begins at Folsom Dam and flows approximately 30 miles to its confluence with the Sacramento River near downtown Sacramento. The Lower American River Watershed has a number of contributing streams including Coon Creek, Markham Ravine, Auburn Ravine, pleasant Grove Creek, Curry Creek, Dry Creek, Cordova Creek (aka Clifton's Drain), and Arcade Creek. Most of these creeks enter the floodplain drainage systems of the Natomas Cross Canal and Natomas East Main Drainage Canal in southern Sutter and northern Sacramento Counties. The Natomas Cross Canal drains into the Sacramento River just south of the Feather River, and the Natomas East Main Drainage Canal drains into the Sacramento River just to the north of the American River.

The Lower American River watershed elevations range from approximately 400 feet at Folsom Dam

to approximately 23 feet at the confluence with the Sacramento River. The channel slope at the bridge site is approximately 0.0003. Average annual precipitation based on the Oregon Climate Service Prism Program (Annual normal from 1981 to 2010) is about 23 inches.

The project is located in a FEMA Special Flood Hazard Area (SFHA) designated as a Zone AE, where the Base Flood Elevations have been determined.

3.0 Discharge

The American River levees were originally intended to convey a release from Folsom Dam of 115,000 cfs. During several major storm events since the construction of Folsom Dam, flows have equaled or exceeded the design capacity and caused significant erosion at the levees.

In the 1955 flood event, the peak release form Folsom Dam was 115,000 cfs. Soon after this flood event, the flood magnitude was factored into the hydrology of Folsom Dam operations, which led to the level of protection provided by Folsom Dam being considerably lowered.

In the 1964 flood event, Folsom Dam was again forced to release 115,000 cfs which was the first time the complete American River levee system was tested. This 1964 flood event showed considerable stress on the levee system but no major levee failures.

In the 1986 flood event, Folsom Dam was forced to release 130,000 cfs to avoid a dam failure. The peak flow was passed without any levee failure, but two locations were almost breached. One of the sites upstream from the Capital City Freeway experienced significant erosion and if the discharge was sustained any longer, the levee would have likely failed.

In 1997 Folsom Lake experienced a peak inflow of 255,000 cfs and was able to control it by releasing 115,000 cfs. Significant erosion occurred at five different sites along the American River which required immediate repair.

The objective release from Folsom Dam is currently under review as part of the Folsom dam Reoperations Study and the Joint Federal Project which is currently constructing improvements to the dam for a release of 160,000 cfs.

According to the FEMA Report dated July 19, 2018 the 100-year discharge is 180,000 cfs at Nimbus Dam. For the purpose of this project the FEMA 100-year discharge of **180,000 cfs** will be used.

4.0 Stage, Velocity and Waterway

The U.S. Army Corps of Engineers Surface Water Modeling System (SMS) program was used to

perform a two-dimensional hydraulic analysis to calculate the water surface elevations and velocity for the existing structure and for the proposed widening.

The General Plans submitted by Structure Design was referenced to acquire the planned deck elevation height. The proposed freeboard is measured from the water surface elevation to the lowest chord of the soffit of the structure.

The parameters used to model the existing and proposed widening for the American River Bridge includes, the 100-year discharge of 180,000 cfs, a manning's roughness coefficient of 0.033 and a gradient of 0.0052 ft/ft at the bridge. The model results are as follows:

4.1 Existing Condition

Discharge (cfs)	Minimum Soffit Elevation (ft)	Water Surface Elevation (ft)	Average Channel Velocity (fps)	Available Freeboard (ft)
100 -Year Discharge 180,000	46.30	41.14	6.86	5.14

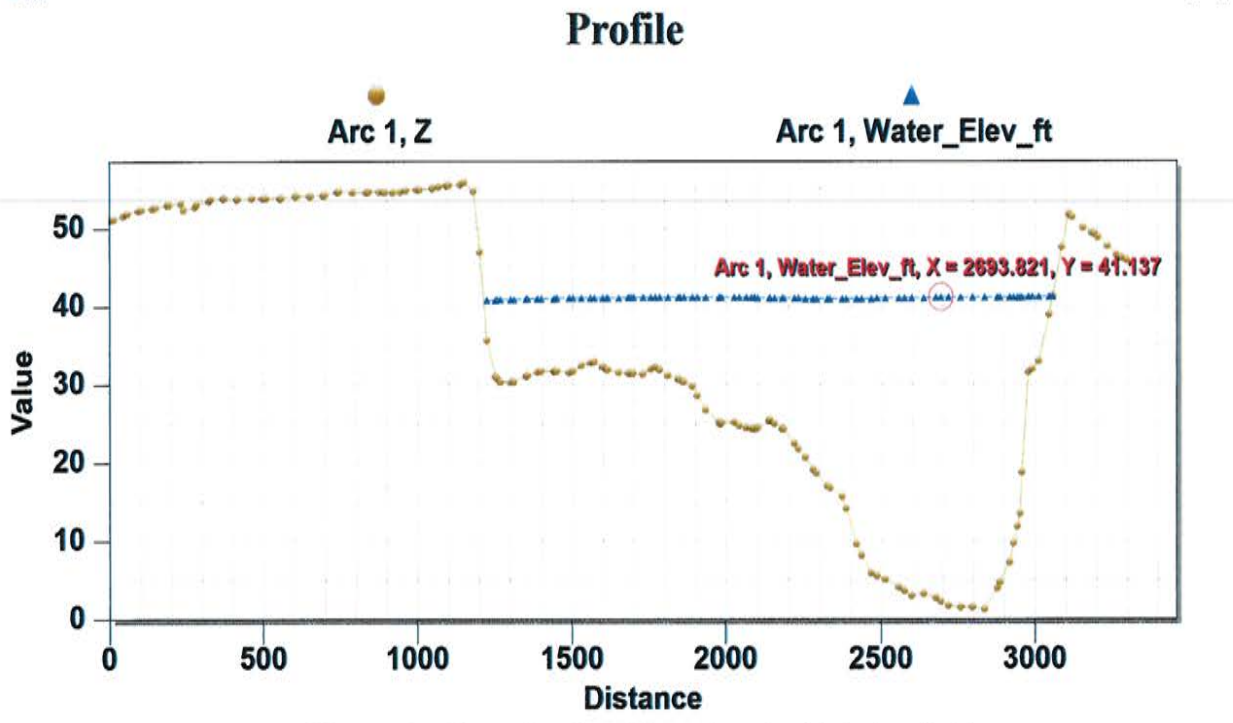


Figure 2- Water Surface Elevation for Existing Bridge

4.2 Proposed Variant B and C Condition

Discharge (cfs)	Soffit Elevation (ft)	Water Surface Elevation (ft)	Avg. Channel Velocity (fps)	Available Freeboard (ft)	Δ Existing to Proposed	
					Δ Water Surface Elevation (ft)	Δ Avg. Channel Velocity (fps)
100 -Year Discharge 180,000	43.20 (for ultimate widening)	41.20	6.80	2.0	0.06	-0.06

The proposed widening will slightly increase the water surface elevation and slightly decrease the velocity for the 100-year discharge. There is adequate freeboard for the 100-year discharge.

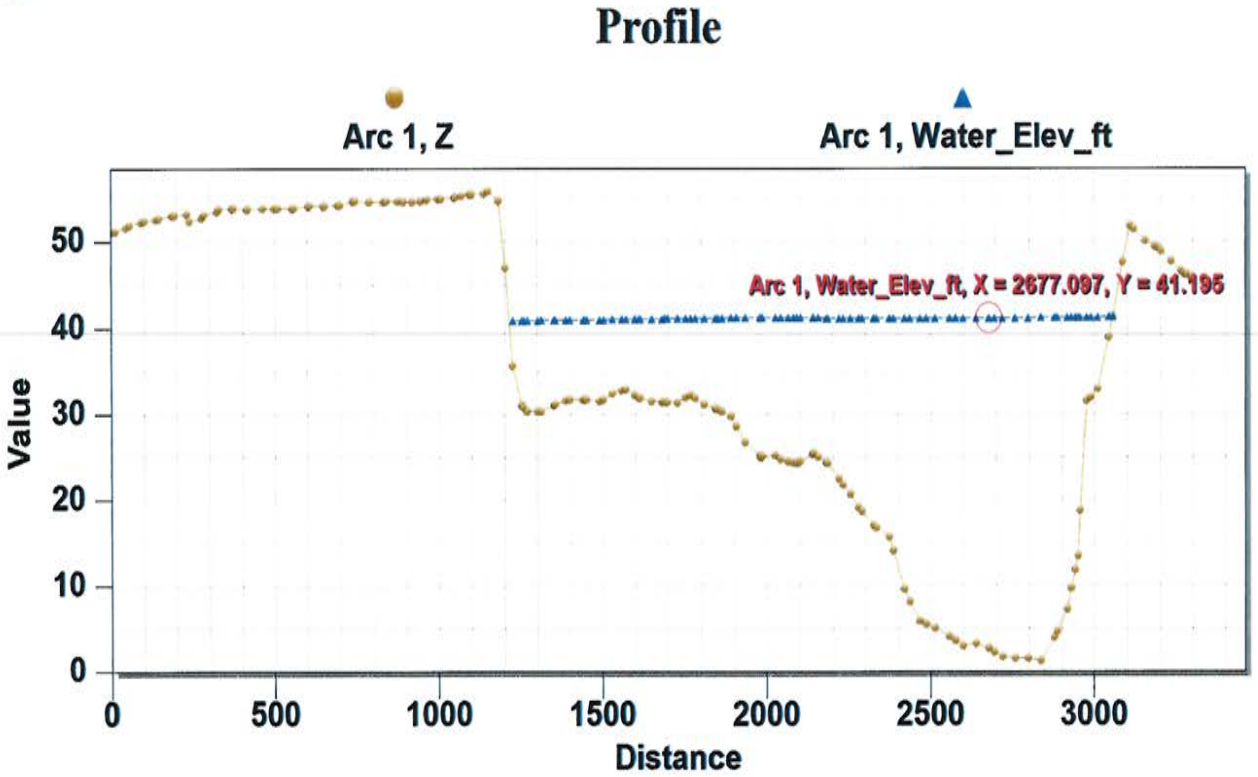


Figure 3- Water Surface Elevation for proposed widening.

5.0 Streambed and Scour

5.1 Scour History

According to the Caltrans Bridge Maintenance Records this bridge has a history of degradation, and local pier scour with various levels of footing exposure at Piers 4, 5, 6 and 7 with Pier 4 being the worst.

In June 2002 a detailed scour analysis was completed with the following results:

The channel had degraded 8.11 feet between 1954 and 2002 from a thalweg elevation of 6.74 feet to elevation -1.37 feet. The rate of degradation was 0.17 feet per year with a 20-year potential degradation of 3.4 feet for the remaining life of the bridge.

The local pier scour was calculated to be 9.4 feet for a total scour of 12.8 feet. This initiated a request for a Stability Analysis by the Structure Ratings Branch. According to a memo dated June 11, 2002 from Structure Ratings, the bridge was determined to be stable under the maximum scour and stream flow conditions. However, it was recommended that Pier 4 should be monitored for any further pile exposure.

The Bridge's scour potential was assessed in accordance with FHWA Technical Advisory T5140.23, "Evaluating Scour at Bridges", and within current Caltrans guidelines. The bridge was determined to be not scour critical, and the item 113 code "Vulnerability to scour", was changed to 5, "Bridge Foundations determined to be stable for calculated scour conditions; scour within limits of footing or piles."

An underwater inspection was completed on 07/10/2012. The pile caps at Pier 4 through 7 were exposed from 2.6 to 5.9 feet. The worst exposure was found at the southeast corner of the left column of Pier 4 with 5.9 feet of exposure. It appeared the scour had not changed significantly since 2002 but should be monitored in case it worsened.

The most recent underwater inspection was completed in 9/12/17 with the following results:

The left pile caps at Piers 4 and 5 are undermined to a maximum height of 1.6 feet along the upstream nose. The undermining has exposed (4) steel piles at each pier. The right pile cap at Pier 4 is undermined by 2.6 feet along the upstream nose. Based on the last underwater inspection performed in 2012, the scour remains stable and essentially unchanged.

5.2 Current Scour Evaluation

The FHWA Hydraulic Engineering Circular, (HEC-18), "Evaluating Scour at Bridges" was used to calculate the potential scour for the existing bridge. The scour evaluation requires an assessment of (1) Channel Bed Degradation, (2) Contraction Scour and (3) Local Pier Scour including the effects of debris and hydraulic skew.

No contraction scour was noted at this location, and a 20-year potential degradation of 3.4 feet for the remaining life of the bridge was used.

A maximum discharge of 180,000 cfs was used to evaluate the potential local abutment and pier scour for the proposed widening of the structure with the following results:

Bridge Item	Pier Scour Depth (ft)	Degradation Depth (ft)	Total Scour Depth (ft)	Total Scour Elev. (ft)
Abutment 1	2.00	3.40	5.40	40.23
Pier 2	3.79	3.40	7.19	22.51
Pier 3	8.58	3.40	11.98	-8.20
Pier 4	9.77	3.40	13.17	-18.14
Pier 5	9.90	3.40	13.30	-18.77
Pier 6	14.49	3.40	17.89	-16.49
Pier 7	8.87	3.40	12.27	-7.67
Pier 8	7.83	3.40	11.23	3.63
Pier 9	7.03	3.40	10.43	10.65
Pier 10	6.89	3.40	10.29	12.07
Pier 11	7.00	3.40	10.40	10.94
Pier 12	6.76	3.40	10.16	11.84
Pier 13	4.03	0.00	4.03	22.97
Pier 14	3.97	0.00	3.97	23.76
Pier 15	3.95	0.00	3.95	23.97
Pier 16	3.94	0.00	3.94	24.15
Pier 17	3.97	0.00	3.97	23.80
Pier 18	3.96	0.00	3.96	23.94
Pier 19	3.98	0.00	3.98	23.66
Pier 20	3.90	0.00	3.90	24.59
Pier 21	3.85	0.00	3.85	23.23
Pier 22	3.84	0.00	3.84	25.34
Pier 23	3.85	0.00	3.85	23.24
Pier 24	3.87	0.00	3.87	22.92

Pier 25	3.24	0.00	3.24	23.78
Abutment 26	2.00	0.00	2.00	46.83

Structure Hydraulics recommends that all new foundations associated with the proposed widening should be designed assuming no ground support (lateral or vertical) as a result of soil loss due to the possible future scour calculated above.

6.0 Drift

There is a moderate potential of drift at the American River Bridge. According to the Bridge Maintenance Records there has been a history of drift including small to medium trees and branches. The existing structure and the proposed widening should have adequate freeboard to pass a moderate amount of drift. Structure Hydraulics recommends the removal of any drift build up on a consistent basis, especially after major storm events.

7.0 Bank Protection

The average velocity has been provided in this report to assist the District Hydraulic Engineers in the design of bank protection if necessary.

8.0 Hydrologic and Scour Summary for Design Engineer

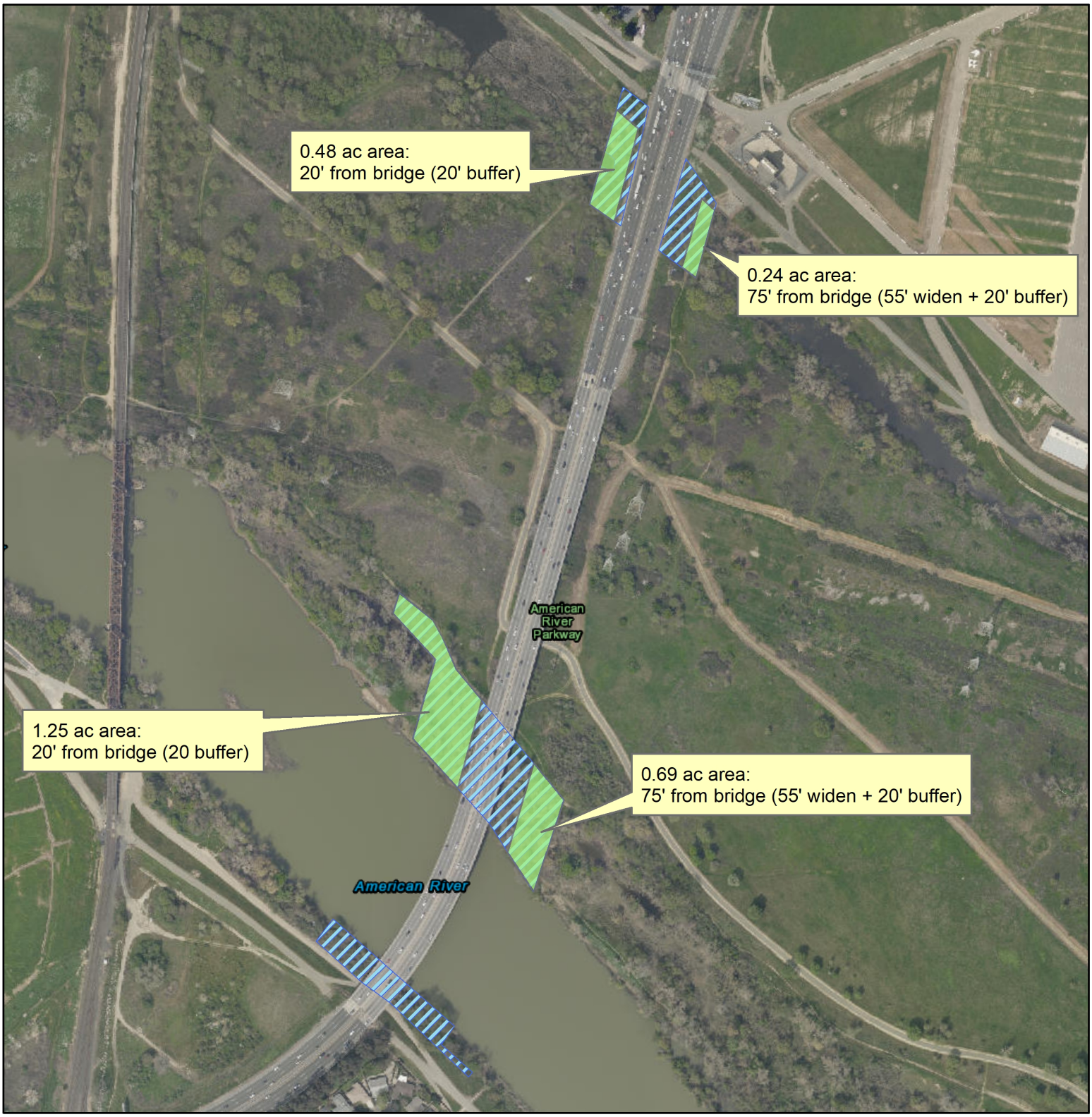
HYDROLOGIC SUMMARY **Br. No. 24-0003**			
Drainage Area: 1875 sqmi			
	Design Flood	**Base Flood**	**Overtopping Flood/Flood of Record**
Frequency	N/A	N/A	N/A
Discharge	180,0000 cfs	N/A	N/A
Water Surface Elevation at Bridge	41.25 ft	N/A	N/A
Flood plain data are based upon information available when the plans were prepared and are shown to meet federal requirements. The accuracy of said information is not warranted by the State and interested or affected parties should make their own investigation.			

9.0 Scour Data Table

Support No.	Long Term (Degradation and Contraction) Scour Elevation (ft)	Short Term (Local) Scour Depth (ft)
Abutment 1	45.60	2.00
Pier 2	26.30	3.79
Pier 3	0.380	8.58
Pier 4	-8.37	9.77
Pier 5	-8.87	9.90
Pier 6	-2.00	14.49
Pier 7	1.20	8.87
Pier 8	9.52	7.83
Pier 9	17.68	7.03
Pier 10	18.96	6.89
Pier 11	17.94	7.00
Pier 12	18.60	6.76
Pier 13	27.00*	4.03
Pier 14	27.73*	3.97
Pier 15	27.92*	3.95
Pier 16	28.09*	3.94
Pier 17	27.77*	3.97
Pier 18	27.90*	3.96
Pier 19	27.64*	3.98
Pier 20	28.49*	3.90
Pier 21	27.08*	3.85
Pier 22	29.18*	3.84
Pier 23	27.09*	3.85
Pier 24	26.79*	3.87
Pier 25	27.02*	3.24
Abutment 26	45.65*	2.00

*Although there is no anticipated degradation or contraction scour, the existing approximate ground elevation is noted.

Map of Planting Areas



Map of Proposed Riparian Planting Areas
American River Bridge Project (EA: 03-3F070)
SAC-51: PM-2.0-3.5, Sacramento, CA
11/20/20

Legend

- Planting Areas (2.66 ac)
- Const. Impacts (5.21 ac)

N

300 150 0 300 Feet

Map created by: Michael Clegg

Riparian Planting Plan Summary

SAC-51 Bridge Project (EA: 03-3F070)

Construction access for the proposed SAC-51 Bridge Deck Replacement Project will result in 5.21 ac of impacts to riparian habitat. Caltrans is required under conditions of the project 1602 permit (California Department of Fish and Wildlife) to mitigate for the loss of riparian vegetation cleared for construction access. Caltrans proposes to plant a 'Great Valley Riparian' planting on-site to compensate for project impacts. The proposed planting consists of native California riparian tree species common to the Central Valley planted at thirty (30) foot spacing. Proposed tree Species include Boxelder (*Acer negundo*), California sycamore (*Plantanus racemosa*), Valley oak (*Quercus lobata*), Fremont cottonwood (*Populus freemontii*), Interior live oak (*Quercus wislizeni*), Oregon white ash (*Fraxinus latifolia*) and Western Redbud (*Cercis occidentalis*). Caltrans has identified a 2.66 ac tree planting area (shown on map) within the temporary impact area.

- Tree planting is to replace existing trees removed for construction access.
- No shrubs will be planted to avoid creating low lying, dense vegetation capable of disrupting water flow.
- Planting proposed in floodplain between levees.
- No planting proposed on levees or within twenty (20) feet of toe of levee slopes.
- No planting proposed under bridges or within twenty (20) feet of bridges.

Memorandum

Making Conservation a California Way of Life

To: MR. MADHWESH RAGHAVENDRACHAR
Branch Chief
Bridge Design North and Central, Branch 11
Structure Design

Division of Engineering Services

Attention: Mr. Mark Okimura

Date: November 27, 2019

File: 03-SAC-51-PM2.651/2.97
Project ID: 0312000054
EA: 03-3F070

AMERICAN RIVER BRIDGE #24-0003
Widen and Deck Rehabilitation

From: DEPARTMENT OF TRANSPORTATION
Division of engineering services
Geotechnical Services
Office of Geotechnical Design - North
Design Branch D

Subject: **PRELIMINARY FOUNDATION REPORT FOR AMERICAN RIVER BRIDGE (WIDEN AND DECK REHABILITATION)**

Scope of Work

The Office of Geotechnical Design North has prepared a Preliminary Foundation Report (PFR) for the proposed American River Bridge (Widen and Deck Rehabilitation). In a request letter dated July 7, 2017, Structure Design, Office of Bridge Design Central, Bridge Design Branch 11 (BDC11) requested a Preliminary Foundation Report (PFR) for the proposed American River Bridge (Widen and Deck Rehabilitation). This PFR supersedes all previously generated Structure Preliminary Geotechnical Reports for this structure. The following recommendations are based on the 1954 and 2019 subsurface investigations performed at the site and the design information provided by BDC11.

With regards to the current foundation recommendations, all elevations referenced within this report and shown on the recent Log of Test Boring sheets are based on the NAVD 1988 vertical datum, unless otherwise noted.

Project Description

The American River Bridge (Br. No. 24-0003) is located in the city of Sacramento. It was built in 1954 and widen in 1966. The structure consists of 25 spans, steel girder supported on HP 10x42 piles. The proposed project will add one travel lane on each side and a bike lane on the right side of bridge. The bridge widening will

consist of a steel reinforced concrete deck on steel girder supported on seat type abutments.

Field Investigation and Field Testing Program

The 1954 As-built LOTBs show the subsurface investigation consisted of three auger borings, one 1-inch closed sampler driven boring and nine 1-inch sampler borings with a minimum 25 feet and maximum depth of 75 feet (Elev. – 44.5 feet).

The 2019 subsurface investigation consisted of 2 auger and 11 mud rotary borings with a maximum explored depth of 201 feet (Elev. -185.8 feet).

Laboratory Testing Program

The 2019 laboratory testing consisted of corrosion, particle size analysis and Atterberg limits tests. Corrosion test results were available only during the preparation of this PFR.

Site Geology and Subsurface Conditions

Regional and Local Geology

The project site is located within the Sacramento Valley region of the Great Valley geomorphic province of California. The Great Valley province is an asymmetrical synclinal trough that extends roughly 400 miles north to south and varies up to 50 miles in width separating the Sierra Nevada Mountains on the east from the Coast Range on the west. The surface of the Great Valley is comprised of up to several thousand feet of Quaternary aged, unconsolidated, marine and non-marine alluvial deposited sediments (Geology of California Second Edition, Norris and Webb, 1990).

According to the Geologic Map of the Sacramento Quadrangle, California (C.W. Jennings and D.L. Wagner, 1981), the site is underlain by Quaternary levee and channel deposits (Qa). The levee and channel deposits include the active river and stream channels and their man-made and natural levees as well as adjacent alluvial fans.

Subsurface Conditions

The summary of the project subsurface conditions is based on the subsurface investigation which was conducted in 2019. The project site predominately consists of alluvial deposits. These alluvial deposits generally consist of interbedded layers of gravels, sand, silty sand, sandy silts, silts, and clays. Gravels and some cobbles were predominately encountered within the upper layers of the river channel. The granular layers within the alluvial deposits range in densities from very loose to very dense and the fine layers (silts and clays) range from very stiff to hard. The subsurface material generally increases in density as the depth of the boring increases. The total depth of the deepest boring (RW-19-028) was 216.5 feet below the roadway/bridge surface or elevation -152.8 feet. Bedrock was not encountered in any of the borings. For a more in depth descriptions of the subsurface materials encountered, please see the LOTB sheets (will be sent once finalized) RW-19-026 through RW-19-038 that were completed for this report.

Groundwater

The existing bridge structure spans American River. During the 2019 subsurface investigation, the stream surface water was at about Elevation 10.0 feet. During the drilling operations, groundwater was first encountered from elevation 9.0 to 13.0 feet. No final groundwater readings were conducted at the end of the drilling operations.

Structure Hydraulics has provided a Draft Final Hydraulic Report dated September 18, 2018. The report presents design groundwater estimated at elevation 39.1 feet for the 100-yr event. Groundwater elevations are subject to seasonal fluctuations and may occur higher or lower depending on the conditions and time of construction. For more details, please refer to the LOTB sheets.

"AS-BUILT" FOUNDATION DATA

The American River Bridge is supported on driven steel H-Piles 10x42. Geotechnical Services conducted pile resistance analysis taking into account the design scour presented in the Draft Final Hydraulics Report. The As-built foundation data information and estimated pile resistances are presented below in Table 1.

Table 1 – "As-Built" Foundation Information

Support #	Cutoff Elevation[1] (feet)	Pile Tip Elevation[1] (feet)	Nominal Resistance Kips
1	40.25	-30.00	180
2	24.00	-28.00	180
3	-5.00	-27.00*	95
4	-5.00	-27.00*	85
5	-5.00	-27.00*	85
6	-5.00	-27.00*	90
7	-5.00	-27.00*	95
8	-5.00	-27.00*	95
9	10.00	-27.00*	150
10	10.00	-27.00*	170
11	10.00	-27.00*	130
12	10.00	-27.00	130
13	20.00	-27.00	180
14	20.00	-25.00	180
15	20.00	-26.00	180
16	20.00	-26.00	180
17	20.00	-23.00	180
18	20.00	-18.00	150
19	20.00	-17.00	150
20	20.00	-19.00	150
21	20.00	-19.00	150
22	20.00	-19.00	150
23	20.00	-18.00	150
24	20.00	-19.00	150
25	20.00	-17.00	150
26	46.00	-17.00	180

Note: [1] NGVD 1929 Datum. ***** Assumed Elevation.

Scour Potential

The Draft Final Hydraulic Report stated that American River Bridge has a potential for local scour. The scour data presented in the Hydraulics report is shown in Table 2 below.

Table 2 – Scour Data American River

Support #	Long Term Scour Elevation (ft)	Short Term Scour (Local) Depth (ft)
	Degradation and Contraction	
1	45.60	2.00
2	26.30	3.79
3	0.38	8.58
4	-8.37	9.77
5	-8.87	9.90
6	-2.00	14.49
7	1.20	8.87
8	9.52	7.83
9	17.68	7.03
10	18.96	6.89
11	17.94	7.00
12	18.60	6.76
13	27.00	4.03
14	27.73	3.97
15	27.92	3.95
16	28.09	3.94
17	27.77	3.97
18	27.90	3.96
19	27.64	3.98
20	28.49	3.90
21	27.08	3.85
22	29.18	3.84
23	27.09	3.85
24	26.79	3.87
25	27.02	3.24
26	45.65	2.00

Please refer to the draft final hydraulics report for more specific information.

Corrosion

Corrosion test results are shown below in Table 3. The tested soil samples were taken from various soil borings. Test results indicate the soil sample is considered **non-corrosive** by current Caltrans standards. See Appendix I for more detail information.

Table 3 – Corrosion Test Summary

Location	SIC Number	pH	Minimum Resistivity (Ohm-cm)	Sulfate Content (ppm)	Chloride Content (ppm)
Water	CR20190498	5.98	30326	4	4
RW-19-026 85' -120'	CR20190493	7.26	1781	N/A	N/A
RW-19-029 35' - 60'	CR20190494	6.99	4196	N/A	N/A
RW-19-031 45' - 100'	CR20190495	7.03	4083	N/A	N/A
RW-19-034 0' - 30'	CR20190496	7.68	5655	N/A	N/A
RW-19-034 30' - 80'	CR20190497	7.15	5296	N/A	N/A

Note: Caltrans currently defines a corrosive environment as an area where the soil has either a chloride concentration of 500 ppm or greater, a sulfate concentration of 1500 ppm or greater, or has a pH of 5.5 or less. With the exception of MSE walls, soil and water are not tested for chlorides and sulfates if the minimum resistivity is greater than 1,100 ohm-cm.

Preliminary Seismic Design Information and Recommendations

The bridge site may be subject to strong ground motions from nearby earthquake sources during the design life of the bridge. Based on available subsurface information and Standard Penetration Test correlations for determining shear wave velocity, the average shear wave velocity (V_{S30}) for the upper 100 feet of soil is estimated to be 853 feet/sec (260 m/s). Per the Caltrans Seismic Design Criteria (SDC V.2.0), "Soil Profile Classification", the site should be classified "Class S2 Soil".

The Design Response Spectrum was determined using the Caltrans ARS Online web tool V3.0. The Design Spectrum is the upper envelope of the probabilistic response spectrum, but not less than the Minimum Spectrum for California. The Design Response Spectrum is based on the probabilistic approach. Adjustments for site conditions and near fault effects were implemented when applicable. See Appendix II for more detail information.

Using the USGS Unified Hazard Tool (Dynamic: Conterminous U.S. 2014, V4.2.0), with a shear wave velocity of 260 m/s (closest to calculated site shear wave velocity), the probabilistic fault scenario for the site was determined to have a magnitude (M) of 6.67 (at zero period) and a mean source to site distance (R) of approximately 57.7 miles (at period of 1 second). The peak ground acceleration (PGA) is estimated to be 0.24g.

Fault Rupture

The potential for surface fault rupture at the site is low as there are no known faults Holocene or younger in age that fall within 1000 feet of the proposed structure and the proposed structure does not fall within an Alquist-Priolo fault zone. A fault rupture hazard analysis per MTD 20-10 is not required.

Liquefaction

Laboratory test results were not available at the time this PFR was prepared. A preliminary liquefaction analysis for the project site was performed according to Youd, et al (2001) Liquefaction Resistance of Soils, using soil properties and groundwater information from the borings and a probabilistic earthquake magnitude and PGA from the USGS Unified Hazard Tool. The amount of seismic settlement due to strong ground shaking does not exist. However, localized liquefaction was encountered on soil borings RW-19-033 and RW-19-034 near Bents 23 and 24. The preliminary analysis showed from 2 to 3 inches of seismic induced settlement. Final Seismic Design Recommendations will include an evaluation of the liquefaction potential at the site.

Lateral Spreading Evaluation

Based on the preliminary liquefaction analysis, a lateral spreading analysis is not needed. Final seismic design recommendations will be provided in the final report.

Foundation Recommendations

The following recommendations are for the proposed bridge widening and deck rehabilitation of the American River Bridge (Br. #24-0003), as shown on the General Plan dated October 20, 2017. The following foundation types may be used as foundation support: Driven Open-End Steel Pipe and CISS Piles are the preferred pile type at all support locations for this site. The preference to pipe piles is the ability to handle relatively high driving stresses, and on the ability to mitigate hard driving resistance (prior to reaching the specified pile tip elevation). Driven steel "H" piles may be considered as an alternative pile type at all support locations.

CIDH, Driven Concrete and Close-End piles are not feasible for support due to the high groundwater elevation and the very dense gravel layer at shallow elevation.

Class 200 Alternative "W" piles may be used as foundation support for the proposed bridge widening. Tables 4 and 5 present the foundation information provided by the structure designer.

Table 4 – Foundation Design Data – Right Side

Support	Foundation Type Considered	Estimate of Max Factored Compression Load (Kips)
Abut 1	Class 200 H-Pile or Alt. "W"	280 per pile
		2200 per Abutment
Bent 2	Class 200 Alternative "W"	280 per pile
		2000 per Column
Pier 3-11	Class 200 Alternative "W"	280 per pile
		8200 per Pier
Bents 12-25	Class 200 Alternative "W"	280 per pile
		2000 per Column
Abut 26	Class 200 H-Pile or Alt. "W"	280 per pile
		2200 per Abutment

Note: Max factored loads are estimated based on Strength Limit State.

Table 5 – Foundation Design Data – Left Side

Support	Foundation Type Considered	Estimate of Max Factored Compression Load (Kips)
Abut 1	Class 200 H-Pile or Alt. "W"	280 per pile
		1600 per Abutment
Bent 2	Class 200 Alternative "W"	280 per pile
		1700 per Column
Pier 3-11	Class 200 Alternative "W"	280 per pile
		6400 per Pier
Bents 12-25	Class 200 Alternative "W"	280 per pile
		1700 per Column
Abut 26	Class 200 H-Pile or Alt. "W"	280 per pile
		1600 per Abutment

Note: Max factored loads are estimated based on Strength Limit State.

Abutments, Bents and Piers

At Abutment, Bent and Pier locations Class 200 Alternative "W" piles are recommended for support. The preliminary foundation recommendations are listed in Tables 6 and 7, below.

Table 6 – Foundation Design Recommendations

Support	Pile Type	Finished Grade Elev. (ft)	Cut-off Elev[1] (ft)	Pile Cap Size (ft)		Permissible Settlement [1] (in)	Number of Piles
				B	L		
1	Class 200 Alt. "W"	*	40.25	*	*	1	*
2	Class 200 Alt. "W"	*	24.00	*	*	1	*
3	Class 200 Alt. "W"	*	-5.00	*	*	1	*
4	Class 200 Alt. "W"	*	-5.00	*	*	1	*
5	Class 200 Alt. "W"	*	-5.00	*	*	1	*
6	Class 200 Alt. "W"	*	-5.00	*	*	1	*
7	Class 200 Alt. "W"	*	-5.00	*	*	1	*
8	Class 200 Alt. "W"	*	-5.00	*	*	1	*
9	Class 200 Alt. "W"	*	10.00	*	*	1	*
10	Class 200 Alt. "W"	*	10.00	*	*	1	*
11	Class 200 Alt. "W"	*	10.00	*	*	1	*
12	Class 200 Alt. "W"	*	10.00	*	*	1	*
13	Class 200 Alt. "W"	*	20.00	*	*	1	*
14	Class 200 Alt. "W"	*	20.00	*	*	1	*
15	Class 200 Alt. "W"	*	20.00	*	*	1	*
16	Class 200 Alt. "W"	*	20.00	*	*	1	*
17	Class 200 Alt. "W"	*	20.00	*	*	1	*
18	Class 200 Alt. "W"	*	20.00	*	*	1	*
19	Class 200 Alt. "W"	*	20.00	*	*	1	*
20	Class 200 Alt. "W"	*	20.00	*	*	1	*
21	Class 200 Alt. "W"	*	20.00	*	*	1	*
22	Class 200 Alt. "W"	*	20.00	*	*	1	*
23	Class 200 Alt. "W"	*	20.00	*	*	1	*
24	Class 200 Alt. "W"	*	20.00	*	*	1	*
25	Class 200 Alt. "W"	*	20.00	*	*	1	*
26	Class 200 Alt. "W"	*	46.00	*	*	1	*

Note: * Unknown information. [1] Assumed.

Table 7 – Preliminary Foundation Design Recommendations

Support Location	Pile Type	Cut-off Elev.[1] (ft)	Nominal Resistance per pile (Kips)	Preliminary Pile Tip Elev. (ft)
			Strength Limit State	
			Compression $\phi = 0.7$	
Abut 1	Class 200 Alt. "W"	40.25	400	-14.0
Bent 2	Class 200 Alt. "W"	24.00	400	-64.0
Pier 3	Class 200 Alt. "W"	-5.00	400	-58.0
Pier 4	Class 200 Alt. "W"	-5.00	400	-55.0
Pier 5	Class 200 Alt. "W"	-5.00	400	-50.0
Pier 6	Class 200 Alt. "W"	-5.00	400	-40.0
Pier 7	Class 200 Alt. "W"	-5.00	400	-40.0
Pier 8	Class 200 Alt. "W"	-5.00	400	-40.0
Pier 9	Class 200 Alt. "W"	10.00	400	-40.0
Pier 10	Class 200 Alt. "W"	10.00	400	-40.0
Pier 11	Class 200 Alt. "W"	10.00	400	-40.0
Bent 12	Class 200 Alt. "W"	10.00	400	-40.0
Bent 13	Class 200 Alt. "W"	20.00	400	-40.0
Bent 14	Class 200 Alt. "W"	20.00	400	-40.0
Bent 15	Class 200 Alt. "W"	20.00	400	-40.0
Bent 16	Class 200 Alt. "W"	20.00	400	-40.0
Bent 17	Class 200 Alt. "W"	20.00	400	-40.0
Bent 18	Class 200 Alt. "W"	20.00	400	-53.0
Bent 19	Class 200 Alt. "W"	20.00	400	-53.0
Bent 20	Class 200 Alt. "W"	20.00	400	-53.0
Bent 21	Class 200 Alt. "W"	20.00	400	-53.0
Bent 22	Class 200 Alt. "W"	20.00	400	-53.0
Bent 23	Class 200 Alt. "W"	20.00	400	-53.0
Bent 24	Class 200 Alt. "W"	20.00	400	-53.0
Bent 25	Class 200 Alt. "W"	20.00	400	-53.0
Abut 26	Class 200 Alt. "W"	46.00	400	-10.0

Note: [1] Estimated cut-off elevation as existing piles.

This Preliminary Foundation Report is based on specific project information regarding structure type and location that have been provided by the Office of Bridge Design Central, Bridge Design Branch 11. Once the project plans are available, the Office of Geotechnical Design North, Design Branch D should review the information to determine if this PFR is still applicable. Any questions regarding the above recommendations should be directed to the attention of Shawn Wei, (916) 227-1079 or Fernando De Haro, (916) 227-1069, at the Office of Geotechnical Design North, Branch D.

Prepared by:

Fernando De Haro, P.E.
Transportation Engineer – Civil
Office of Geotechnical Design-North
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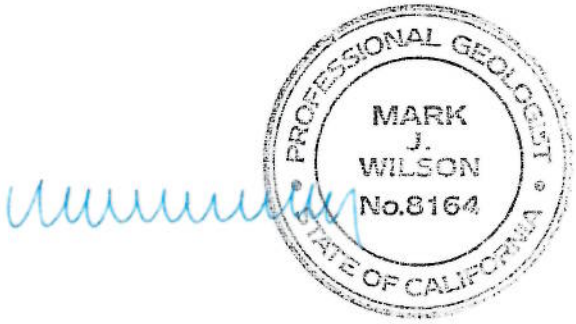
Design Branch D

Prepared by:



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cc: Clark Peri – District 3 (Project Manager)
Steve Culley – District 3 (District Materials Engineer)
Ruth Fernandes – Structures Office Engineer
Geotechnical Archive

Appendix I: Laboratory Test Results
Appendix II: ARS Curve

APPENDIX I

LABORATORY TEST RESULTS

Results sent to: FERNANDO DE HARO

Division of Engineering Services
Materials Engineering and Testing Services
Corrosion Branch

Report Date: 10/18/2019

Reported by Michael Mifkovic

CORROSION TEST SUMMARY REPORT

EA: **03-3F070**

EFIS: **0312000054**

Bridge # **24-0003**

Dist/Co/Rte/PM: **03 / SAC /051/ / 2.61 PM**

Bridge Name **AMERICAN RIVER**

CORROSION LAB #	TL101 #	BORE #	SAMPLE OF	DEPTH (FT) START	DEPTH (FT) END	MINIMUM RESISTIVITY[1] (ohm-cm)	pH[1]	CHLORIDE CONTENT[2] (ppm)	SULFATE CONTENT[3] (ppm)	IS SAMPLE CORROSIVE?
SAMPLE FROM:										
CR20190498	**968985F**		WATER	0	0	30326	5.98	4	4	NO
SAMPLE FROM:										
CR20190493	**968985E**	RW-19-026	SOIL	85	120	1781	7.26			NO
SAMPLE FROM:										
CR20190494	**968985B**	RW-19-029	SOIL	35	60	4196	6.99			NO
SAMPLE FROM:										
CR20190495	**968985A**	RW-19-031	SOIL	45	100	4083	7.03			NO
SAMPLE FROM:										
CR20190496	**968985C**	RW-19-034	SOIL	0	30	5655	7.68			NO
CR20190497	**968985D**	RW-19-034	SOIL	30	80	5296	7.15			NO

This site is not corrosive to foundation elements (see note below).

Note: For Structural Elements, the Department considers a site corrosive if one or more of the following conditions exist: pH is 5.5 or less, chloride concentration is 500 ppm or greater, sulfate concentration is 1500 ppm or greater. Resistivity is not considered for Structural Elements. MSE backfill shall conform to the requirements of section 47-2.02C Structure Backfill in the 2015 Standard Specifications.

[1]CT 643, [2]CT 422, [3]CT 417

APPENDIX II

ARS CURVE

American River Bridge (24-0003)

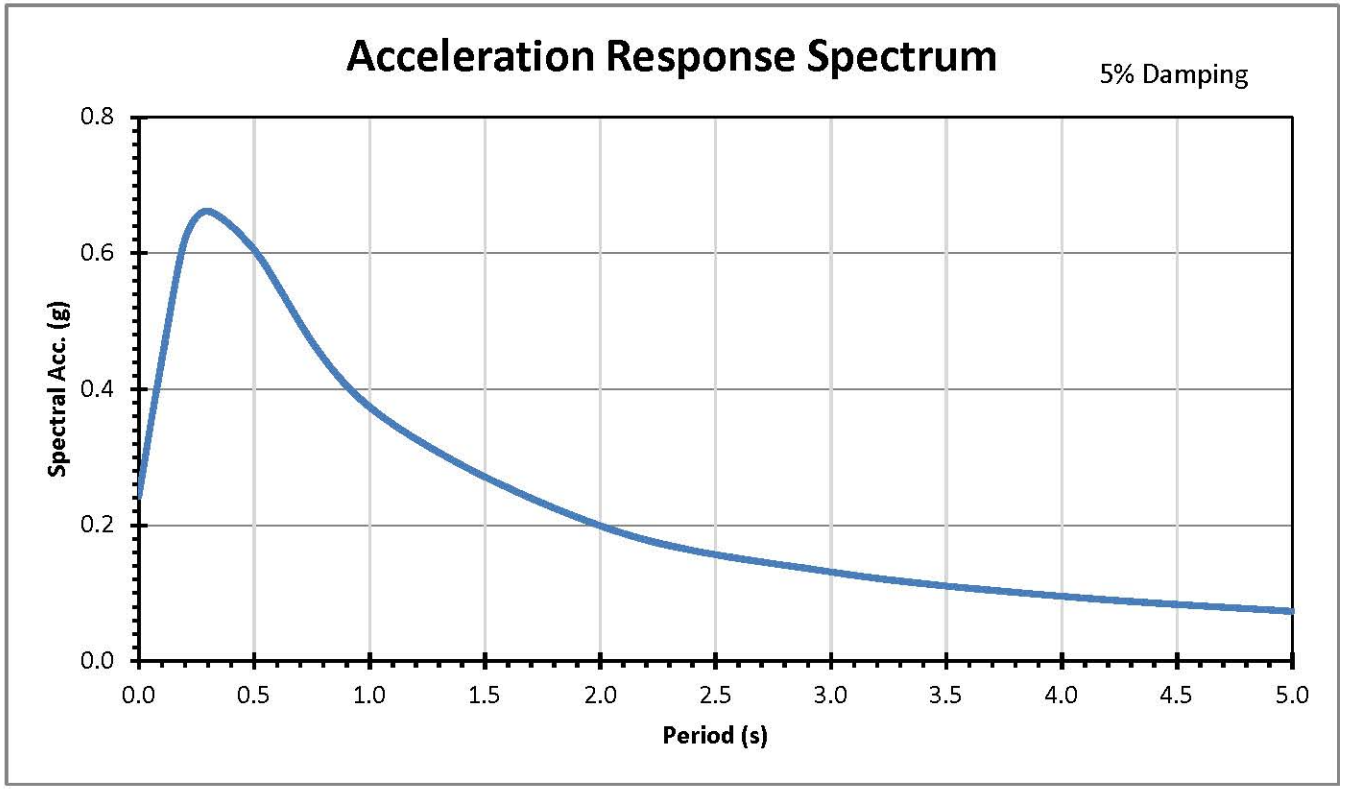
Latitude : 38.587567
Longitud : -121.447009

Date: 11/06/19

EA: 03-3F0700
Proj. ID: 0312000054

Design ARS

Period (s)	Sa (g)
0.0	0.242
0.1	0.443
0.2	0.620
0.3	0.662
0.5	0.605
1.0	0.374
2.0	0.199
3.0	0.131
4.0	0.095
5.0	0.073



The Design ARS was developed using the ARS Online Version 3.0 webtool based on the 2014 USGS Probabilistic Data (Conterminous - Dynamic Model) with a 975 return period.

Seismic Loading Table (per MTD 1-47, Attachment 1)

Soil Profile (V_{s30}) = 853 ft/s
Magnitude : M_{max} = 6.7
PGA = 0.24 g

PROJECT DESCRIPTION

The American River Bridge (Widen and Deck Replacement) project proposes to remove and replace the existing concrete deck and steel girder strengthening post-tensioning systems on the American River Bridge (Br # 24-003) and widen the superstructure of the bridge to accommodate traffic during construction. It also proposes to construct the bridge substructure to accommodate the needed deck widening of State Route (SR) 51 and construct new multi-use facility to provide a levee to levee connection for bicyclists and pedestrians between the City of Sacramento bike network to the American River Bike Trail and the adjacent neighborhoods.

PROJECT SCHEDULE

Project Approval & Environmental Document ..... January 2021
Design Completed..... December 2021
Advertise Project ..... March 2022
Begin Construction ..... July 2022
Complete Construction..... December 2025

Milestone	Milestone Description	Milestone Date
M000	IDENTIFY NEED	08/05/2011
M010	APPROVE PID	06/29/2015
M015	PROGAM PROJECT	10/22/2015
M020	BEGIN ENVIRONMENTAL	09/01/2016
M040	BEGIN PROJECT	12/10/2015
M060	CIRC DPR & DED INTERNALLY	04/20/2020
M100	APPROVE DPR	10/12/2020
M120	CIRC DPR & DED EXTERNALLY	10/22/2020
M160	APPROVE FED	12/01/2020
M200	PA&ED	12/05/2020
M221	RECEIVE COMPLETE	01/23/2020
M224	R/W REQUESTS	02/27/2020
M225	REGULAR R/W	12/01/2020
M275	GENERAL PLANS	03/27/2020
M300	CIRCULATE PLANS IN DISTRICT	09/01/2021
M311	30% CONST REVIEW	12/01/2020
M313	60% CONST REVIEW	04/01/2021
M315	95% CONST REVIEW	09/17/2021
M377	PS&E TO DOE	12/01/2021
M378	DRAFT STRUCTURES PS&E	09/01/2021
M380	PROJ PS&E	09/01/2021
M410	R/W CERTIFICATION	01/21/2022
M430	DCR	01/14/2022
M460	READY TO LIST	01/28/2022
M470	FUND ALLOCATION	03/24/2022
M480	HQ ADVERTISE	03/07/2022
M490	BIDS OPEN	05/05/2022
M495	AWARD	06/06/2022
M500	APPROVE CONTRACT	07/01/2022
M600	CONTRACT ACCEPTANCE	12/01/2025
M700	FINAL REPORT	12/01/2026
M800	END PROJ	12/01/2027
M900	FINAL PROJ CLOSEOUT	12/01/2028