Meeting of the Central Valley Flood Protection Board
August 28, 2015

Staff Report

Union Pacific Railroad Fresno Subdivision Bridge Replacement (Milepost 148.33), Merced County

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1.0 – ITEM

Consider Central Valley Flood Protection Board (Board) approval to replace the existing Union Pacific Railroad bridge over Merced Irrigation District's El Capitan Canal with a 94-foot long, 5-span prestressed concrete slab (PCS) bridge (Attachment A) by Draft Permit No. 19024 (Attachment B).

2.0 – APPLICANT

Union Pacific Railroad Company (UPRR)

3.0 – PROJECT LOCATION

The project site is located at UPRR Milepost (MP) 148.33 on the railroad's Fresno Subdivision (hereafter referred to as Bridge 148.33), which provides commuter and freight-rail service through this rural location, near the city of Merced in Merced County, California. The bridge is south of State Route 99 and north of North Southern Pacific Avenue near the confluence the canal and Black Rascal Creek (Attachment A).

4.0 – PROJECT DESCRIPTION

The bridge and rail line at MP 148.33 Fresno Subdivision support Amtrak passenger and freight rail service, and this bridge replacement is necessary to maintain and improve this passenger service. The proposed project would replace the existing 74-foot-long, 5-span stringer trestle-ballast deck bridge. UPRR is proposing a 94-foot-long replacement bridge to be constructed with one (1) 22-foot span and four (4) 18-foot spans of PCS girder bridge. The proposed bridge would be supported by six bents (three steel piles per bent) (Attachment C).

In a normal water year the canal is full or nearly full to capacity during the water delivery season (March through October). During the winter months the canal is a tributary to

Black Rascal Creek and can be subject to substantial runoff flows during large rain events. Hence, UPRR has selected a construction schedule to minimize potential construction risks and to impact on Merced Irrigation District (MID) operations, and will build a work bridge allowing all work to occur from above the MID canal prism.

Based on UPRR's planned construction approach and consultant CH2M HILL's wetland delineation, it has been determined that the only work that would occur below the ordinary high water mark (OHWM) and within waters of the United States is pile driving and pile removal associated with the existing and proposed bridge, and the temporary work bridge.

The bridge would be constructed using an off-track crane. Staging areas, south of the tracks, would be cleared and graded for equipment access and mobility. Bridge materials (piles, caps, and girders to create the bridge span) would be transported to the project site by rail. The existing bents and spans would be removed and hauled offsite.

5.0 – AUTHORITY OF THE BOARD

California Water Code § 8534, 8590 – 8610.5, and 8700 – 8710

2012 California Code of Regulations, Title 23 (Title 23):

- § 6 - Need for a Permit
- § 108 - Existing Encroachments
- § 112 - Streams Regulated and Nonpermissible Work Periods
- § 128 - Bridges

6.0 – AGENCY COMMENTS AND ENDORSEMENTS

The comments and endorsements associated with this project from all pertinent agencies are given below:

- The U.S. Army Corps of Engineers (USACE) Sacramento District non-fed letter was received on June 16, 2015, and indicated that the USACE District Engineer has no comments or recommendations regarding flood control because the proposed work does not affect a federally constructed project. This letter has been incorporated into the permit as Exhibit A.
- Merced County has endorsed this project without conditions. Therefore, no additional special conditions were incorporated into the permit.

7.0 – PROJECT ANALYSIS

7.1 – Hydraulic Analysis

The applicant conducted a hydrologic and hydraulic investigation to determine if the proposed structure meets or exceeds local, State, and federal environmental and floodplain regulations, as well as UPRR's standards for passing the 100-year flood event.

The 100-year design discharge of 5,720 cfs was taken directly from the published regulatory discharges used in the Merced County Flood Insurance Study (FIS) for Black Rascal Creek. Bridge 148.33 provides drainage to Black Rascal Creek as well as providing irrigation flows for the MID canal. The drainage area consists primarily of a mixture of urban and agricultural land uses. Runoff reaches the bridge in the form of channel flow.

Bridge 148.33 is located within a FEMA-designated Zone AE floodplain. During hydraulic design and analysis care was given not to increase the 100-year flood elevations. The hydraulic analysis was based on converting the latest FEMA Flood Insurance Study (FIS) HEC-2 model to HEC-RAS, and incorporated Olsson's bridge survey information.

Based on the hydrologic and hydraulic evaluation, the 100-year water surface elevation (WSE) at the upstream face of the existing bridge was computed to be 165.13 feet (North American Vertical Datum 1988). The corresponding computed 100-year WSE associated with the proposed bridge is also 165.13 feet, meeting the regulatory no-WSE increase requirement at the design discharge (Attachment D). It is noted that the lowest low chord (soffit) elevation of the existing bridge is 161.54 feet, and the lowest base-of-rail elevation is 164.52 feet. The proposed bridge soffit elevation is 161.54, equal to that of the existing bridge. Additionally the proposed bridge opening area of 417 square feet is 2 percent greater than the existing bridge due to the longer bridge length.

In summary both the existing and proposed railroad bridges at MP 148.33 are submerged at the designed 100-year flood event, and both existing and replacement bridge soffit elevations are the same (161.54 feet). Per Title 23, §128 (a) (16) replacement railroad bridges must have soffit members not lower than those of the replaced bridge, but are not required to provide a specified amount of clearance above the design flood plane. Therefore, no variances to Board standards are needed to approve the proposed bridge design.

Based on the hydraulic analysis provided, Board staff has determined that the proposed project is expected to result in no adverse hydraulic impacts to the El Capitan Canal / Black Rascal Creek floodway.

7.2 – Geotechnical Analysis

UPRR has driven H piling for several bridges along the Fresno Subdivision in the past and are confident of their piling depths. As a result UPRR decided not to conduct a geotechnical study. The proposed H pile bents shall be driven to refusal, if possible, or to a minimum of 112 ton capacity as determined by the Modified Engineering News Record formula, with a factor of safety of 5 as per the UPRR Engineering Instruction. The estimated H pile depth is 80 feet.

Board staff has reviewed geotechnical information provided by the UPRR and has determined that the proposed project is expected to result in no adverse geotechnical impacts to canal / Black Rascal Creek floodway.

8.0 – CEQA ANALYSIS

The Board staff has prepared the following California Environmental Quality Act (CEQA) determination:

The Board determined the proposed action is statutorily exempt under the provisions of CEQA and the State CEQA Guidelines. The overall activities involve issuing a permit for replacement of an existing railroad bridge under a Statutory Exemption (Public Resources Code § 21080(b)(10); CEQA Guidelines Section 15275 (a)) covering the institution or increase of passenger or commuter service on rail lines, including modernization of existing stations and parking facilities.

9.0 – WATER CODE SECTION 8610.5 CONSIDERATIONS

- Evidence that the Board admits into its record from any party, Federal, State or local public agency, or nongovernmental organization with expertise in flood or flood plain management:

  The Board has considered all available evidence, including the application for Permit No. 19024, supporting technical documentations provided by UPRR, and comments and endorsements from relevant agencies in regard to this proposed project, as well as any evidence that will be submitted up to the date of the decision on this application.

- The best available science that related to the scientific issues presented by the Executive Officer, legal counsel, the Department of Water Resources or other parties that raise credible scientific issues:

  In making its findings, the Board has used the best available science relating to the issues presented by all parties. On the important issue of hydraulic impacts UPRR used the HEC-RAS one-dimensional flow model. This model is considered by many experts as one of the best available and applicable scientific tools for the purpose of modeling river hydraulics in this region.

- Effects of the decision on the facilities of the State Plan of Flood Control, and consistency of the proposed project with the Central Valley Flood Protection Plan as adopted by Board Resolution 2012-25 on June 29, 2012:

  This project is expected to result in no adverse impacts on facilities of the State Plan of Flood Control, and is consistent with the adopted 2012 Central Valley Flood Protection Plan and current Title 23 standards because the proposed project is predicted to result in no increase in water surface elevation, substantial increase in channel velocities, or adverse geotechnical impacts to the system.

- Effects of reasonable projected future events, including, but not limited to, changes in hydrology, climate, and development within the applicable watershed:

  UPRR has determined that the proposed project does not conflict with any future foreseeable projects, nor are there any calculated and known foreseeable impacts anticipated to affect the proposed project.

10.0 – STAFF RECOMMENDATION

Staff recommends that the Board:

Adopt the CEQA findings;

Approve the Encroachment Permit No. 19024 in substantially the form provided; and

Direct the Executive Officer to take the necessary actions to execute the permit and file a Notice of Exemption with the State Clearinghouse.

11.0 – LIST OF ATTACHMENTS

A – Project Maps

B – Draft Permit No. 19024

Exhibit A: USACE 408 Decision Letter

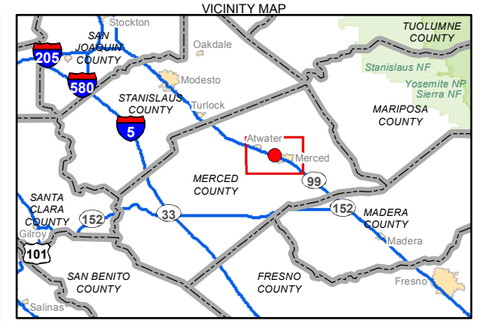
C – Project Drawings

D – Hydraulic Summary Information

Report/Technical Review:	Deb Biswas, PhD, PE, Engineer, WR
Environmental Review:	Andrea Buckley, Senior Environmental Scientist (Specialist)
Document Review:	Nancy Moricz, PE, Senior Engineer
	Eric Butler, PE, Projects and Environmental Branch Chief
	Len Marino, PE, Chief Engineer
	Nicole Rinke, Deputy Attorney General

Fresno MP 148.33

VICINITY MAP



LEGEND

- MP 148.33 Bridge Replacement Location
- 5-mile buffer

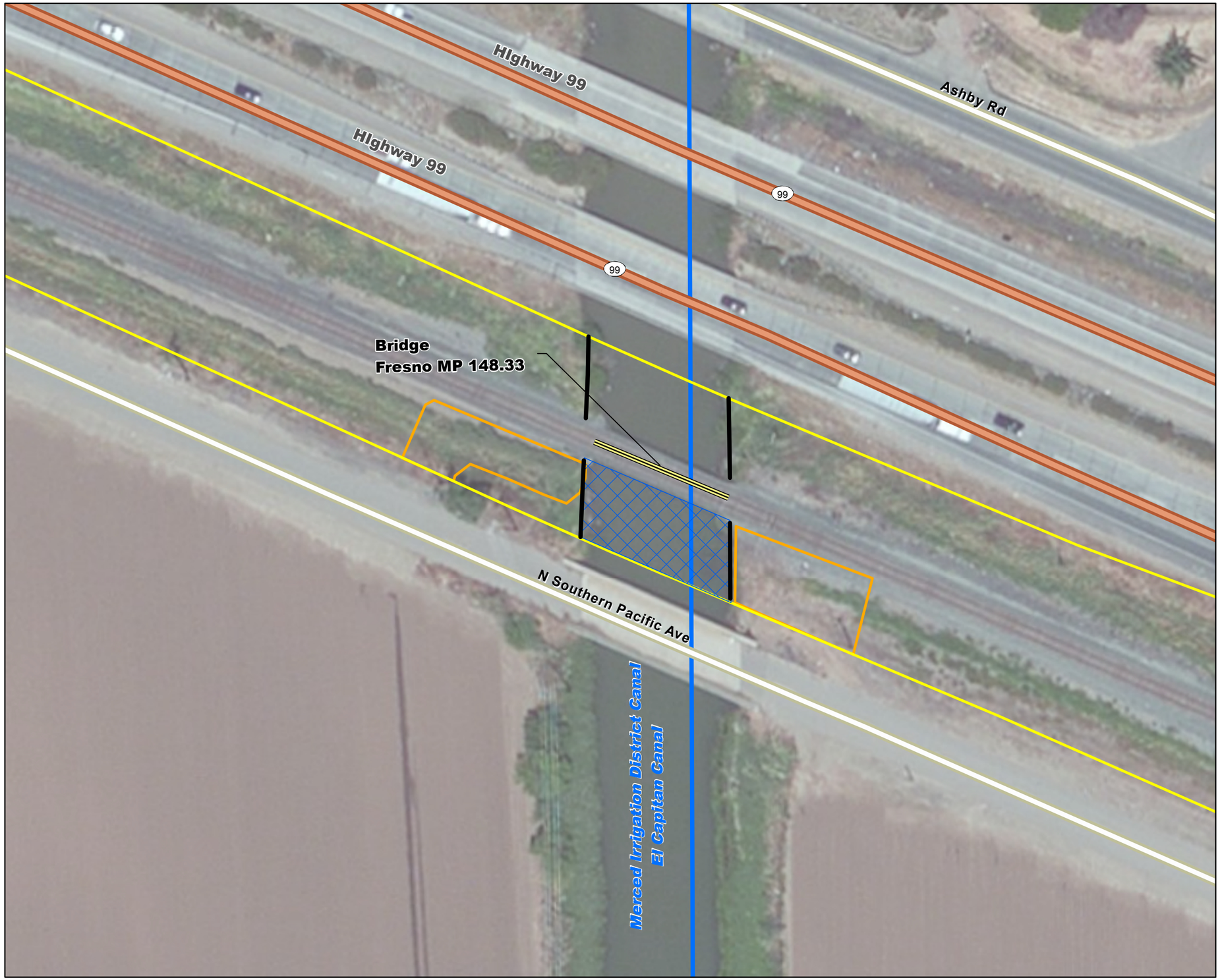
N

0 0,5 1

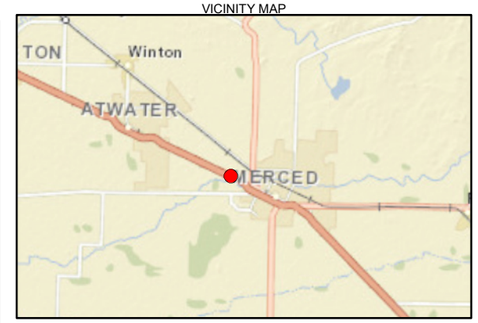
Miles

FIGURE 1
Local Area Overview Map
MP 148.33
Fresno Subdivision
Merced County, California

CH2MHILL.



VICINITY MAP



LEGEND

- OHWM
- Bridge MP 148.33
- Perennial Waters
- UPRR Right-Of-Way
- Staging Area (0.13 acre)

N

0 25 50
Feet

FIGURE 2
UPRR Fresno MP 148.33
Temporary Work Area
Bridge Replacement
Merced County, California

CH2MHILL

DRAFT

STATE OF CALIFORNIA
THE RESOURCES AGENCY

THE CENTRAL VALLEY FLOOD PROTECTION BOARD

PERMIT NO. 19024 BD

This Permit is issued to:

Union Pacific Railroad
1400 Douglas Street, Stop 0910
Omaha, Nebraska 68179-0910

Union Pacific Railroad Company (UPRR) is proposing to replace the existing (1929) 74-foot-long, 5-span stringer trestle-ballast deck bridge located at MP 148.33 with a 94-foot-long, 5-span prestressed concrete slab girder bridge. The proposed replacement bridge would be supported by six (6) bents (three steel piles per bent).

The project is located at MP 148.33 south of State Route 99 (Section 23, T7S, R13E, MDB&M, Merced County Public Works, El Capitan Canal, Merced County).

NOTE: Special Conditions have been incorporated herein which may place limitations on and/or require modification of your proposed project as described above.

(SEAL)

Dated: _____

_____
Executive Officer

GENERAL CONDITIONS:

ONE: This permit is issued under the provisions of Sections 8700 – 8723 of the Water Code.

TWO: Only work described in the subject application is authorized hereby.

THREE: This permit does not grant a right to use or construct works on land owned by the Sacramento and San Joaquin Drainage District or on any other land.

FOUR: The approved work shall be accomplished under the direction and supervision of the State Department of Water Resources, and the permittee shall conform to all requirements of the Department and The Central Valley Flood Protection Board.

FIVE: Unless the work herein contemplated shall have been commenced within one year after issuance of this permit, the Board reserves the right to change any conditions in this permit as may be consistent with current flood control standards and policies of The Central Valley Flood Protection Board.

SIX: This permit shall remain in effect until revoked. In the event any conditions in this permit are not complied with, it may be revoked on 15 days' notice.

SEVEN: It is understood and agreed to by the permittee that the start of any work under this permit shall constitute an acceptance of the conditions in this permit and an agreement to perform work in accordance therewith.

EIGHT: This permit does not establish any precedent with respect to any other application received by The Central Valley Flood Protection Board.

NINE: The permittee shall, when required by law, secure the written order or consent from all other public agencies having jurisdiction.

TEN: The permittee is responsible for all personal liability and property damage which may arise out of failure on the permittee's part to perform the obligations under this permit. If any claim of liability is made against the State of California, or any departments thereof, the United States of America, a local district or other maintaining agencies and the officers, agents or employees thereof, the permittee shall defend and shall hold each of them harmless from each claim.

ELEVEN: The permittee shall exercise reasonable care to operate and maintain any work authorized herein to preclude injury to or damage to any works necessary to any plan of flood control adopted by the Board or the Legislature, or interfere with the successful execution, functioning or operation of any plan of flood control adopted by the Board or the Legislature.

TWELVE: Should any of the work not conform to the conditions of this permit, the permittee, upon order of The Central Valley Flood Protection Board, shall in the manner prescribed by the Board be responsible for the cost and expense to remove, alter, relocate, or reconstruct all or any part of the work herein approved.

SPECIAL CONDITIONS FOR PERMIT NO. 19024 BD

LIABILITIES / IMDEMNIFICATION

THIRTEEN: The permittee shall defend, indemnify, and hold the Central Valley Flood Protection Board (Board) and the State of California, including its agencies, departments, boards, commissions, and their respective officers, agents, employees, successors and assigns (collectively, the "State"), safe and harmless, of and from all claims and damages related to the Board's approval of this permit, including but not limited to claims filed pursuant to the California Environmental Quality Act. The State expressly reserves the right to supplement or take over its defense, in its sole discretion.

FOURTEEN: The permittee is responsible for all liability and shall defend, indemnify, and hold the Board and the State of California; including its agencies, departments, boards, commissions, and their respective officers, agents, employees, successors and assigns (collectively, the "State"), safe and harmless, of and from all claims and damages arising from the project undertaken pursuant to this permit, all to the extent allowed by law. The State expressly reserves the right to supplement or take over its defense, in its sole discretion.

FIFTEEN: The Board and Department of Water Resources (DWR) shall not be held liable for damages to the permitted project resulting from releases of water from reservoirs, flood fight, operation, maintenance, inspection, or emergency repair.

SIXTEEN: If the permittee does not comply with the conditions of the permit and enforcement by the Board is required, the permittee shall be responsible for bearing all costs associated with the enforcement action, including reasonable attorney's fees. Permittee acknowledges that State law

allows the imposition of fines in enforcement matters.

PERMITTING AND AGENCY CONDITIONS

SEVENTEEN: A letter from the U.S. Army Corps of Engineers (USACE) District Engineer dated June 16, 2015 is attached to this permit as Exhibit A in reference to the project.

EIGHTEEN: The permittee agrees to incur all costs for compliance with local, State, and Federal permitting. If any conditions issued by other agencies conflict with any of the conditions of this permit, then the permittee shall resolve conflicts between any of the terms and conditions that agencies might impose under the laws and regulations it administers and enforces.

NINETEEN: Access roads shall be kept open at all times for maintenance activities.

PRE-CONSTRUCTION

TWENTY: The permittee shall contact the Board by telephone at (916) 574-0609, and submit the enclosed postcard to schedule a preconstruction conference. Failure to do so at least 10 working days prior to start of work may result in delay of the project.

TWENTY-ONE: The permittee shall provide construction supervision and inspection services acceptable to the Board.

TWENTY-TWO: Prior to commencement of work, the permittee shall create a photo record, including associated descriptions, of the existing site conditions. The photo record shall be certified (signed and stamped) by a licensed land surveyor or licensed civil engineer registered in the State of California and submitted to the Board within thirty (30) calendar days of beginning the project.

TWENTY-THREE: Thirty (30) calendar days prior to the start of any demolition and / or construction activities within the floodway or within the existing levee prism, the permittee shall submit two sets of detailed plans and specifications and supporting geotechnical and / or hydraulic impact analyses to the Board's Chief Engineer, for any and all temporary, in channel, or levee prism work that may have an impact during the flood season from November 1 through April 15. The Board may request additional information as needed and will seek comment from the USACE and / or the local maintaining agency when necessary. The Board will provide written notification to the permittee if the review period is likely to exceed thirty (30) working days.

CONSTRUCTION

TWENTY-FOUR: All work approved by this permit shall be in accordance with the submitted drawings and specifications except as modified by special permit conditions herein. No further work, other than that approved by this permit, shall be done in the area without prior approval of the Board.

TWENTY-FIVE: No construction work of any kind shall be done during the flood season from November 1 to April 15 without prior approval of the Board.

TWENTY-SIX: All addenda and contract change orders made to the approved plans and / or specifications by the permittee after Board approval of this permit shall be submitted to the Board's Chief Engineer for review and approval prior to incorporation into the permitted project. The submittal shall include all supplemental plans, specifications, and necessary supporting geotechnical, hydrology and hydraulics, or other technical analyses. The Board shall acknowledge receipt of the addendum or change submittal in writing within ten (10) working days of receipt, and shall work with the permittee to review and respond to the request as quickly as possible. Time is of the essence. The Board may request additional information as needed and will seek comment from the U.S. Army Corps of Engineers and / or local maintaining agencies when necessary. The Board will provide written notification to the permittee if the review period is likely to exceed thirty (30) calendar days. Upon approval of submitted documents the permit shall be revised, if needed, prior to construction related to the proposed changes.

TWENTY-SEVEN: The bridge shall be constructed parallel to the direction of flow.

TWENTY-EIGHT: The soffit of the bridge shall be no lower than that of the replaced bridge.

TWENTY-NINE: The abandoned or dismantled bridge shall be completely removed and disposed of outside the limits of the levee section and floodway.

THIRTY: Piers, bents, and abutments being dismantled shall be removed to at least 1 foot below the natural ground line and at least 3 feet below the bottom of the low-water channel.

THIRTY-ONE: Temporary staging, formwork, stockpiled material, equipment, and temporary buildings shall not remain in the floodway during the flood season from November 1 to April 15.

THIRTY-TWO: Drainage from the bridge shall not be discharged onto the streambank.

THIRTY-THREE: If erosion occurs adjacent to the permitted encroachment(s), the permittee shall repair the eroded areas and place adequate revetment on the affected areas to prevent further erosion.

THIRTY-FOUR: Bridge piers and bents placed within the floodway to support a widened portion of an existing bridge shall be constructed in line with the existing bents and piers.

THIRTY-FIVE: If the bridge is damaged to the extent that it may impair the channel or floodway capacity, it shall be repaired or removed prior to the next flood season.

THIRTY-SIX: No material stockpiles, temporary buildings, or equipment shall remain in the floodway during the flood season from November 1 to April 15 unless otherwise approved by the Board, and shall be removed after completion of the project.

THIRTY-SEVEN: All debris generated by this project shall be disposed of outside of the Littlejohns Creek floodway.

THIRTY-EIGHT: The permittee shall be responsible for all damages due to any construction-induced activities.

VEGETATION / ENVIRONMENTAL MITIGATION

THIRTY-NINE: Trees, brush, sediment, and other debris shall be kept cleared from the site and disposed of outside the floodway to maintain the design flow capacity and flowage area.

FORTY: No further work, other than that covered by this application, shall be performed in the area without prior approval of the Board.

POST-CONSTRUCTION

FORTY-ONE: The work area shall be restored to the condition that existed prior to start of work.

FORTY-TWO: Within 120 days of completion of the project, the permittee shall submit to the Board as-built drawings and a certification report, stamped and signed by a licensed civil engineer registered in the State of California, certifying the work was performed and inspected in accordance with the Board permit conditions and submitted drawings and specifications.

OPERATIONS AND MAINTENANCE

FORTY-THREE: The permittee shall be responsible for repair of any damages to the channel, banks, floodway, or any other flood control facilities due to construction, operation, or maintenance of the proposed project.

FORTY-FOUR: The permittee shall maintain the permitted project within the utilized area in accordance with applicable current or future local, State, and federal standards in the manner required as requested by an authorized representative of the Board, DWR, or any other agency responsible for maintenance.

FORTY-FIVE: The permitted project shall not interfere with operation and maintenance of the flood control project. If the permitted project is determined by any agency responsible for operation or maintenance of the flood control project to interfere, the permittee shall be required, at permittee's cost and expense, to modify or remove the permitted project under direction of the Board. If the permittee does not comply, the Board may modify or remove the project at the permittee's expense.

FORTY-SIX: If the permitted structure results in any adverse hydraulic impact or scouring the permittee shall provide appropriate mitigation measures subject to review and approval of the Board.

FORTY-SEVEN: At the request of either the permittee or Board the permittee and Board shall conduct joint inspections of the project and floodway after significant flood events or flood seasons to assess the integrity and operation of the project, and to assess and respond to any adverse impacts on the floodway or adjacent properties.

PROJECT ABANDONMENT, CHANGE IN PLAN OF FLOOD CONTROL

FORTY-EIGHT: If the project works, or any portion thereof, is significantly damaged or is to be abandoned in the future, the permittee shall abandon or repair the project under direction of the Board at the permittee's cost and expense.

FORTY-NINE: The permittee may be required, at permittee's cost and expense, to remove, alter, relocate, or reconstruct all or any part of the permitted project if removal, alteration, relocation, or reconstruction is necessary as part of or in conjunction with implementation of the Central Valley Flood Protection Plan or other future flood control plan or project, or if damaged by any cause. If the permittee does not comply, the Board may perform this work at the permittee's expense.

END OF CONDITIONS

Attachment B - Exhibit A - USACE 408 Decision Letter

DEPARTMENT OF THE ARMY
U.S. ARMY CORPS OF ENGINEERS, SACRAMENTO DISTRICT
1325 J STREET
SACRAMENTO CA 95814-2922

REPLY TO
ATTENTION OF

Flood Protection and Navigation Section (19024)

JUN 16 2015

Ms. Leslie M. Gallagher, Acting Executive Officer
Central Valley Flood Protection Board
3310 El Camino Avenue, Room 151
Sacramento, California 95821

Dear Ms. Gallagher:

We have reviewed permit application number 19024 by Union Pacific Railroad. This project includes replacing an existing timber stringer trestle bridge, with a 94 foot long prestressed concrete slab girder bridge. The project is located south of Highway 99 at El Capitan Canal/Black Rascal Creek, in Merced, at 37.314056°N 120.523222°W NAD83, Merced County, California.

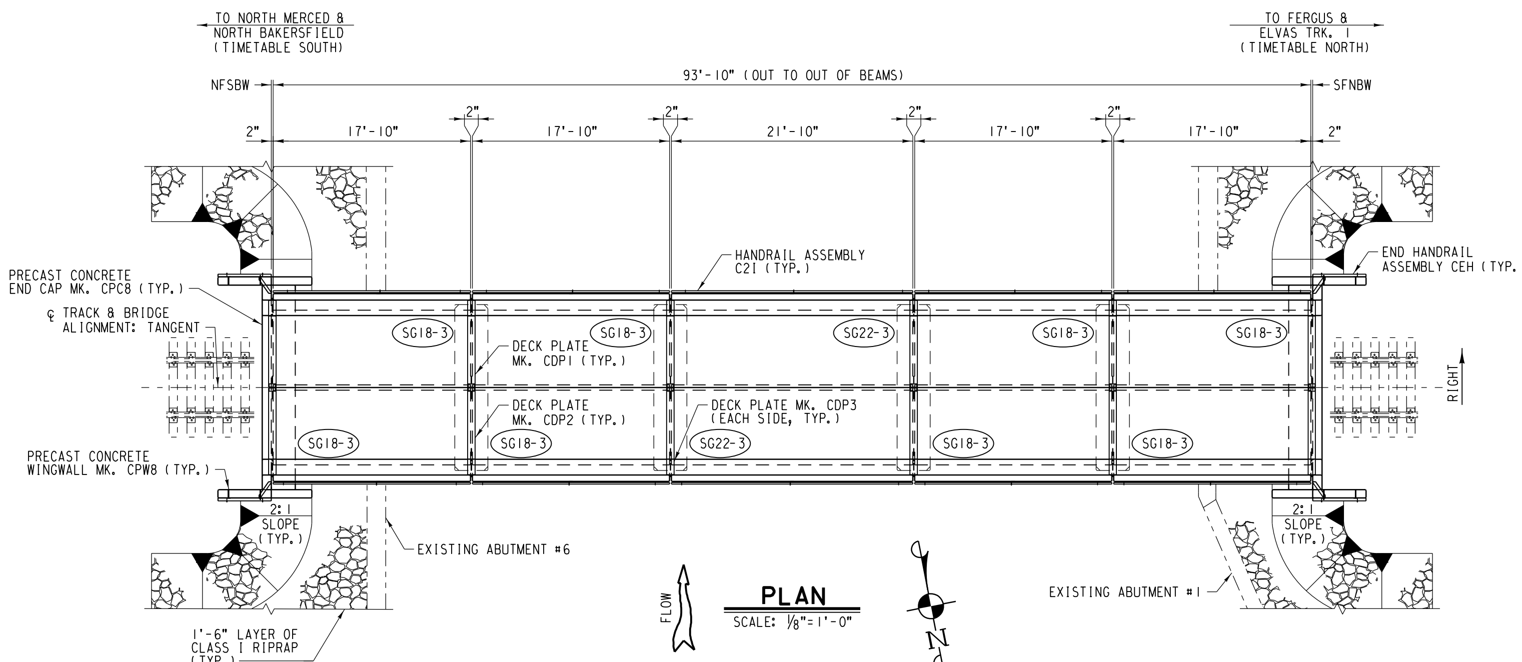
The District Engineer has no comments or recommendations regarding flood control because the proposed work does not affect a federally constructed project.

Additional information is needed in order to determine if a Section 10 and/or Section 404 permit is required. A letter was sent to the applicant on June 15, 2015, requesting the additional information that is needed. A regulatory action (SPK-2015-00512) has been opened.

A copy of this letter is being furnished to Mr. Don Rasmussen, Chief, Flood Project Integrity and Inspection Branch, 3310 El Camino Avenue, Suite 200, Sacramento, California 95821.

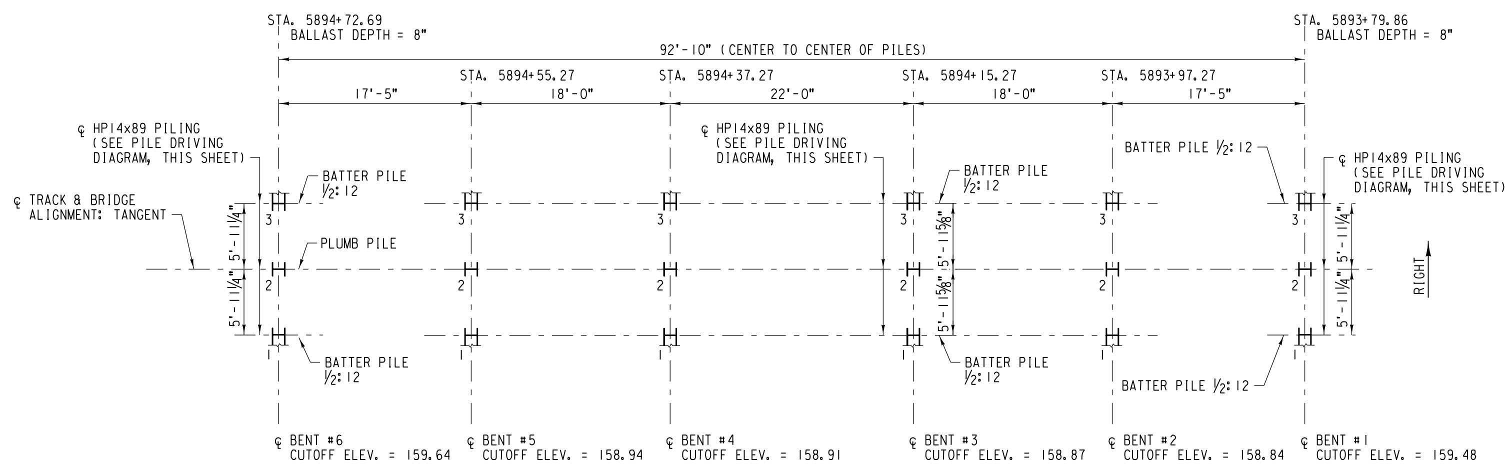
Sincerely,

Ryan Larson, P.E.
Chief, Flood Protection and Navigation Section



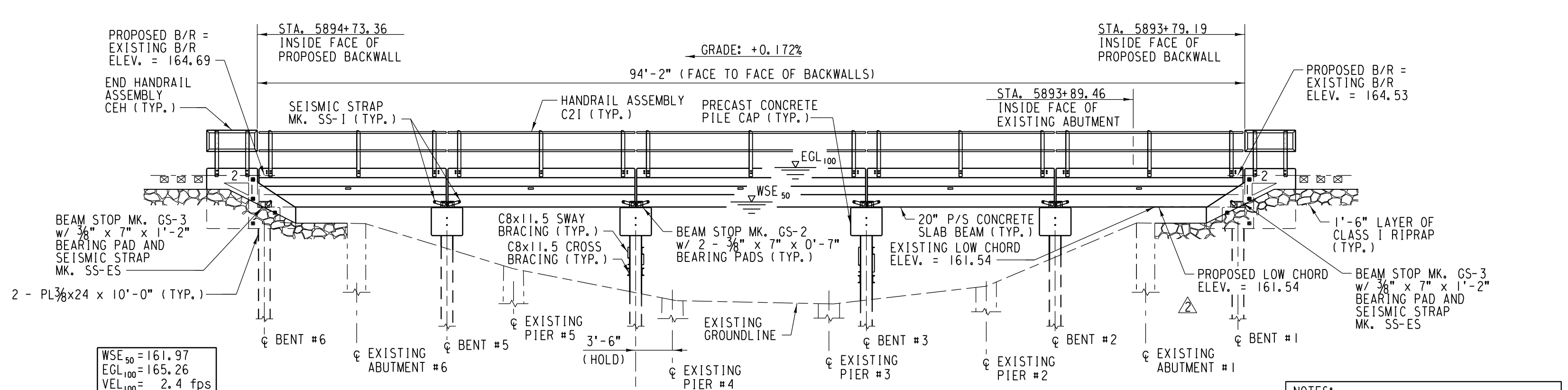
PLAN

SCALE: 1/8"=1'-0"



PILE LAYOUT

SCALE: 1/8"=1'-0"
AT PILE CUTOFF

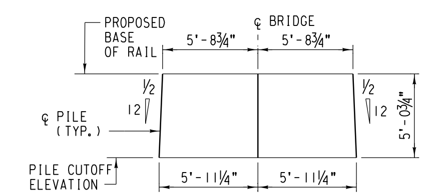


ELEVATION

SCALE: 1/8"=1'-0"

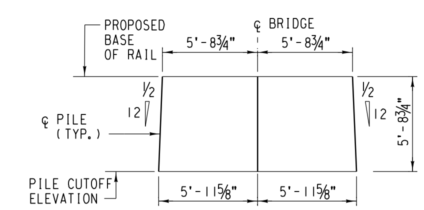
NOTES:

1. SAW CUT AND REMOVE EXISTING ABUTMENTS AND EXISTING PIERS TO EXISTING GROUNDLINE.
2. AFTER WELDING OF CAPS AND BRACING, REAPPLY EPOXY COATING TO WELDED AREAS OF ALL PILES.
3. EXISTING UTILITY CONNECTED TO SIDE OF EXISTING BRIDGE. RELOCATE UTILITY PRIOR TO CONSTRUCTION.



PILE DRIVING DIAGRAM

SCALE: NO SCALE
@ BENTS #1 & #6



PILE DRIVING DIAGRAM

SCALE: NO SCALE
@ BENTS #2 THROUGH #5

POSTCONSTRUCTION COMPLIANCE

Contractor or UPRR Manager in charge of construction to provide to the office of the Director Structures Design as-built drawings confirming that the project was constructed in compliance with the plans and indicating any construction variances.

SIGNED

In Charge of Construction | Date

11/19/2014

APPROVED FOR
UNION PACIFIC RAILROAD CO.
BY
OLSSON ASSOCIATES

BY: K.H. Jennison

DATE: NOVEMBER 4, 2014

BILL OF MATERIAL

REQ'D.	UNIT	DESCRIPTION	STORE ITEM NO.	ORDERED BY
2	EA.	20" x 21'-10" PRESTRESSED CONCRETE SLAB BEAM MK. SG22-3, TYPE I w/ SLOPED CURB (PER DETAILS, SHEET NO. 2 AND REF. 3)	515-2053	MANAGER TRACK PROJECTS
8	EA.	20" x 17'-10" PRESTRESSED CONCRETE SLAB BEAM MK. SG18-3, TYPE I w/ SLOPED CURB (REF. 3)	511-7815	
2	EA.	PRECAST CONCRETE END CAP MK. CPC8 FOR 20" CONCRETE SLAB BEAM (REF. 4 & 6)	511-8207	
4	EA.	PRECAST CONCRETE WINGWALL MK. CPW8 FOR 20" CONCRETE SLAB BEAM (REF. 4)	511-8208	
4	EA.	15'-0" PRECAST CONCRETE PILE CAP FOR USE WITH CAPMASTER w/ BEARING PADS FOR SLAB BEAMS (REF. 5, 6 & 8)	511-0353	
18	EA.	HP14x89 x 60'-0" STEEL PILE (ASTM A572 GR. 50, COAL TAR EPOXY COATED)	510-7560	
18	EA.	HP14x89 x 60'-0" STEEL PILE w/ POINTS (ASTM A572 GR. 50, PLAIN)	510-7596	
18	EA.	PILE SPLICER FOR HP14x89 STEEL PILE	510-8065	
8	EA.	C8x11.5 x 15'-0" BRACE (ASTM A572 GR. 50, PLAIN) (FIELD CUT TO LENGTH)	247-6361	
8	EA.	BEAM STOP MK. GS-2 (REF. 7)	510-0595	
4	EA.	BEAM STOP MK. GS-3 (REF. 7)	510-0596	
16	EA.	SEISMIC STRAP MK. SS-1 (REF. 7)	510-0601	
4	EA.	SEISMIC STRAP MK. SS-ES (REF. 7)	510-0603	
2	EA.	HANDRAIL ASSEMBLY C21 FOR 21'-10" CONCRETE INTERIOR SPAN (REF. 7)	510-0440	
8	EA.	HANDRAIL ASSEMBLY C21 FOR 17'-10" CONCRETE INTERIOR SPAN (REF. 7)	510-0424	
4	EA.	END HANDRAIL ASSEMBLY CEH FOR CONCRETE SPAN (REF. 7)	513-3020	
6	EA.	DECK PLATE MK. CDP1, GALVANIZED (REF. 7)	510-0590	
6	EA.	DECK PLATE MK. CDP2, GALVANIZED (REF. 7)	510-0591	
12	EA.	DECK PLATE MK. CDP3, GALVANIZED (REF. 7)	510-0592	
16	EA.	3/8" x 7" x 0'-7" ELASTOMERIC BEARING PAD	510-3635	
4	EA.	3/8" x 7" x 1'-2" ELASTOMERIC BEARING PAD	510-3637	
4	EA.	PL3/8x24 x 10'-0" (ASTM A36, PLAIN)	510-7650	
50	EA.	1/2" x 18" x 6'-4" PREMOLDED EXPANSION JOINT FILLER PER ASTM D1751	511-8212	
125	TON	RIPRAP, CLASS I	562-2764	
1	EA.	BRIDGE MARKER AND NO TRESPASSING SIGNS, MOUNTING POSTS AND MOUNTING HARDWARE PER ENGINEERING STANDARD DRAWINGS 0502, 0507, 0538 AND 0599	P00-2616	
1	LOT	EPOXY COATING		MANAGER BRIDGE CONST.
1	LOT	PL 400 HEAVY DUTY CONSTRUCTION ADHESIVE		
28	TON	WELL-GRADED 1 1/2" MINUS CRUSHED ROCK		

EST. WT. OF STEEL PILING = 192,240 LB.
EST. WT. OF STEEL BRACING = 1,380 LB.
EST. WT. OF MISCELLANEOUS STEEL (NOT INCL. BOLTS) = 5,540 LB.

DRAWING SCHEDULE

THIS SET	SHEET NO.	DESCRIPTION
	1	GENERAL ARRANGEMENT AND BILL OF MATERIAL
	2	SLAB BEAM MODIFICATION DETAILS AND GENERAL NOTES

REF.	NO.	DWG. NO.	SHEET NO.	REV. NO.	DESCRIPTION
	1	530000	A1-A7	B	BOX AND SLAB BEAM, CONSTRUCTION PLANS
	2	530000	S61-S64	A	20" SLAB BEAM, CONSTRUCTION DETAILS
	3	530020	SG1, SG2	D	14" TO 20" SLAB BEAM, FABRICATION PLANS
	4	531000	4	A	PRECAST END CAP FOR 20" SLAB BEAM
	5	501000	C1, C2	A	PRECAST CONCRETE PILE CAP
	6	531010	1	A	PRECAST CONCRETE PILE CAP BEARING PADS
	7	502000	1-4	B	STEEL HARDWARE AND HANDRAIL ASSEMBLIES
	8	531800	8	A	CAPMASTER PRECAST CONCRETE 15' PILE CAP WITH COIL INSERT DETAILS

EST. WT. OF PRECAST CONCRETE

BEAM MK. SG22-3 = 42,700 LB. EA. (21.4 TON)
BEAM MK. SG18-3 = 34,500 LB. EA. (17.3 TON)
END CAP MK. CPC8 = 22,600 LB. EA. (11.3 TON)
WINGWALL MK. CPW8 = 4,440 LB. EA. (2.2 TON)
15'-0" PILE CAP = 19,700 LB. EA. (9.9 TON)

NO.	DATE	REVISIONS
	/ /	
	/ /	
2	01/30/15	REVISED LOW CHORD & PILE CUTOFF ELEV.
1	01/09/15	B.O.M. PILING LENGTH

SP ROUTE SYMBOL B, FORMER BRIDGE NO. 148.33

OLSSON ASSOCIATES

UNION PACIFIC RAILROAD
Office of AVP Engineering Design/Construction

LOCATION:
BRIDGE 148.32 FRESNO SUB.
1.0 MILES NORTH OF MERCED, CA

FACILITY:
5-SPAN PCS x 94'
REPLACING 5-SPAN TSTBD x 76'

DWG TITLE:
GENERAL ARRANGEMENT AND
BILL OF MATERIAL

PROJECT ID: 68684	UP ENGINEER: UP-MAB OLSSON-KHJ	LATITUDE: 37° 18' 51" N
WORK ORDER: 05316		LONGITUDE: 120° 31' 24" W
DESIGN BY: TMS	SHEET NO.	C E NUMBER
CHECKED BY: CWT	1 of 2	119874
DRAWN BY: JEJ		
CHECKED BY: TMS		
SCALE: AS NOTED		

DESIGN NOTES

This structure was designed for Cooper E80 Live Load with 30" ballast and impact.

Design Pile Load: End Bent = 72 Ton
Interior Bent = 105 Ton

This plan is for 8" (min.) ballast under timber ties.

CONSTRUCTION NOTES

GENERAL:

Field verify all dimensions, stations and elevations prior to start of construction.

Contact the Union Pacific "Call Before You Dig" number 90 days (not less than 60 days) prior to proposed construction start date. Prior to construction, confirm that all necessary relocations have been completed. The CBYD number is: 1-800-336-9193.

Profile: No change in track elevation.

Elevations: Based on field survey data prepared by Olsson Associates, dated 3/27/2014.

Datum: Base of East rail at Sta. 5893+89.46, Elev. = 164.52.

TBM: Established by a chiseled square in North Southern Pacific Avenue, West of existing Bridge 148.33, 62.68' right of track centerline, Sta. 5894+00.13, Elev. = 167.74.

Stationing: Based on Precision Measurement Vehicle (PMV) run dated 12/03/2010, South face of North abutment of existing Bridge 148.33, Sta. 5893+89.46.

Right of Way: 50' both sides of track centerline.

PILE DRIVING:

All numbered piles shall be driven to 105 ton capacity.

Estimated capacity of driven piles shall be calculated using the Modified ENR formula, with Factor of Safety of 5. Direct questions to the Structures Design Group, Office of AVP Engineering Design/Construction.

If any numbered pile cannot be driven to this capacity the Structures Design Group, Office of AVP Engineering Design/Construction must be notified.

Splice pile per standard drawing Plan No. 530000, Sheet No. A2. Pile splices shall be located a minimum of 15' below the proposed or existing ground surface, whichever is lower.

Mark every pile with a dimension indicating the pile depth from cut-off to point of pile. The dimension shall be rounded to the nearest foot. The mark shall be welded on the outside face, low milepost side of the pile flange, approximately 1' below the bottom of the cap, and in numbers of approximately 3" in height. If a pile is not exposed, no mark is required.

After pile driving is complete, provide pile driving logs to the Structures Design Group, Office of AVP Engineering Design/Construction.

FIELD WELDING:

Welding must be accomplished with the SMAW or FCAW process.

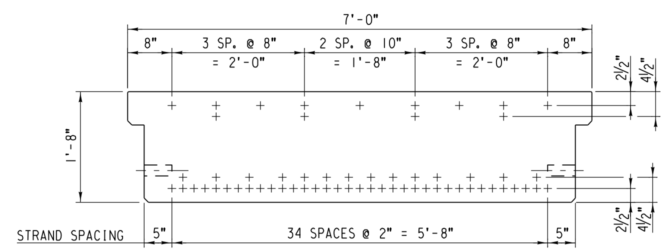
Welding must be in compliance with the requirements specified in AWS D1.5-95, except 5/16 in. fillet welds may be made with a single pass.

Welding electrodes must be E7018 for SMAW or E70T-1 or E70T-5 for FCAW.

Welders must possess valid certification.

RIPRAP - CLASS I:

Riprap shall be placed in such a manner as to avoid segregation of the various sizes of rock. Individual rocks shall be placed in tight contact with one another in such a way to produce the least amount of void spaces. Riprap shall be solid, unfractured rock or concrete, bulky in shape with sharp angular edges. Weight of individual rocks shall vary from a minimum of 50 lb. to a maximum of 200 lb. for Class I, UPRR Item No. 562-2764.



PRESTRESSED CONCRETE SLAB BEAM MK. SG22-3 STRAND PATTERN

SCALE: ¾"=1'-0"

+(62 - ½" DIA. 270 KSI STRANDS)

REQUIRED MINIMUM BEAM CONCRETE COMPRESSIVE STRENGTHS (PSI)			
TYPE	LENGTH	AT TRANSFER	AT 28 DAYS
I	22'-0"	6,000	8,500

NOTE:
FOR ADDITIONAL FABRICATION DETAILS AND NOTES, SEE REF. 3.

EST. WT. OF PRECAST CONCRETE
BEAM MK. SG22-3 = 42,700 LB. EA. (21.4 TON)

NO.	DATE	REVISIONS
	/ /	
	/ /	
	/ /	
	/ /	

M.A. Bradner 11/19/2014

APPROVED FOR
UNION PACIFIC RAILROAD CO.
BY
OLSSON ASSOCIATES

BY: K.H. Jennison

DATE: NOVEMBER 4, 2014

OLSSON ASSOCIATES

UNION PACIFIC RAILROAD
Office of AVP Engineering Design/Construction

LOCATION: BRIDGE 148.32 FRESNO SUB.
1.0 MILES NORTH OF MERCED, CA

FACILITY: 5-SPAN PCS x 94'
REPLACING 5-SPAN TSTBD x 76'

DWG TITLE: SLAB BEAM MODIFICATION DETAILS AND GENERAL NOTES

PROJECT ID: 68684	UP ENGINEER: UP-MAB OLSSON-KHJ	LATITUDE: 37° 18' 51" N
WORK ORDER: 05316		LONGITUDE: 120° 31' 24" W
DESIGN BY: TMS		
CHECKED BY: CWT		
DRAWN BY: JEJ	SHEET NO.	C E NUMBER
CHECKED BY: TMS	2 of 2	119874
SCALE: AS NOTED		

REDUCED PRINT - DO NOT SCALE - REDUCED PRINT PLOTTED: 01/30/15 06:56:35 AM

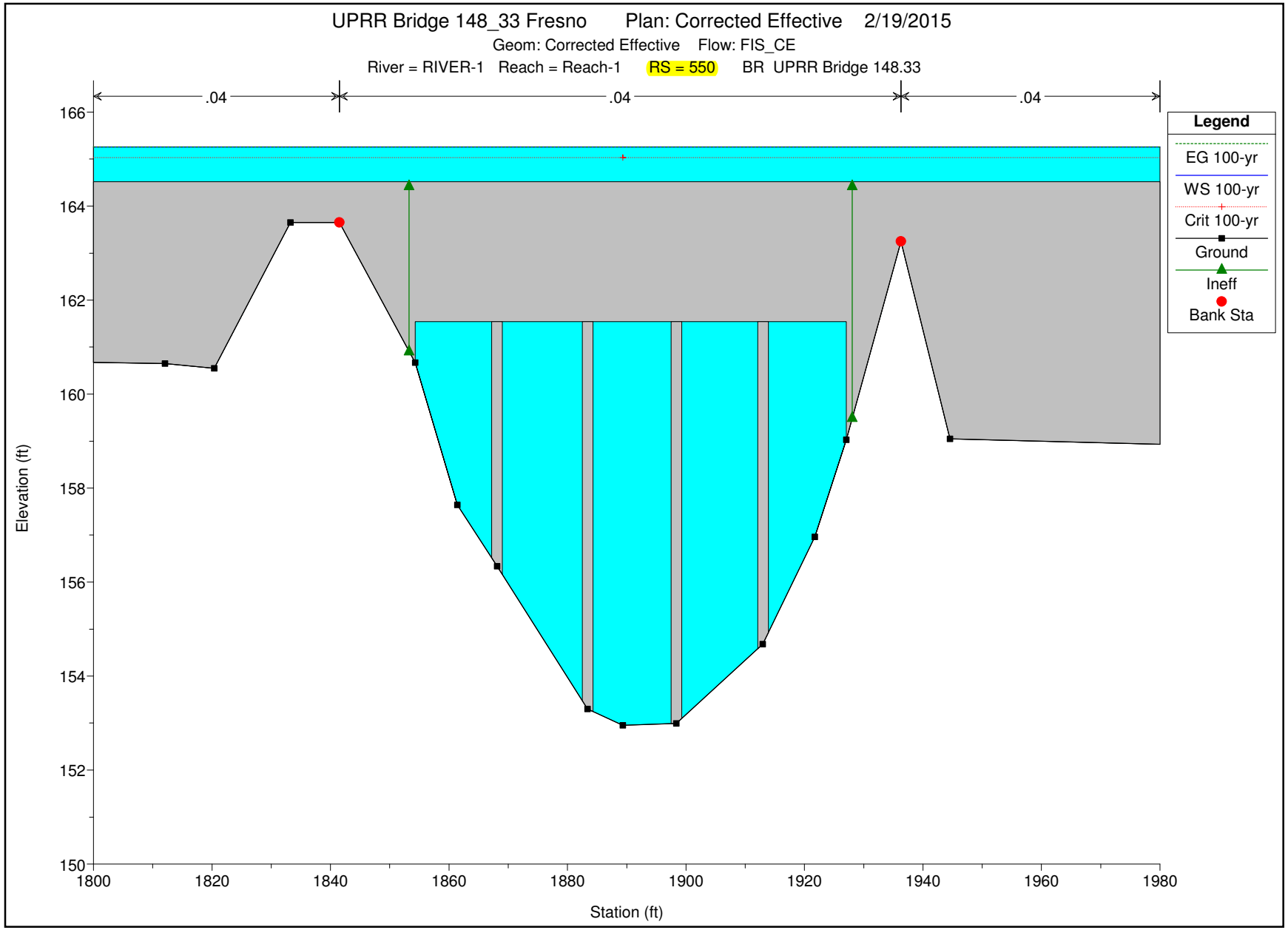
HEC-RAS River: RIVER-1 Reach: Reach-1 Profile: 100-yr

Reach	River Sta	Profile	Plan	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
				(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Reach-1	1060	100-yr	CE	5720.00	152.25	166.08	158.12	166.09	0.000010	0.54	12417.41	1589.00	0.03
Reach-1	1060	100-yr	Post_Project	5720.00	152.25	166.08	158.12	166.09	0.000010	0.54	12417.46	1589.00	0.03
Reach-1	830	100-yr	CE	5720.00	151.45	166.08	159.41	166.08	0.000011	0.55	12122.59	1564.00	0.03
Reach-1	830	100-yr	Post_Project	5720.00	151.45	166.08	159.41	166.08	0.000011	0.55	12122.64	1564.00	0.03
Reach-1	807.5			Bridge									
Reach-1	785	100-yr	CE	5720.00	151.45	165.91	160.12	165.91	0.000011	0.57	11854.71	1564.00	0.03
Reach-1	785	100-yr	Post_Project	5720.00	151.45	165.91	160.12	165.91	0.000011	0.57	11854.95	1564.00	0.03
Reach-1	745	100-yr	CE	5720.00	151.35	165.91	159.25	165.91	0.000003	0.29	22768.46	3072.80	0.02
Reach-1	745	100-yr	Post_Project	5720.00	151.35	165.91	159.25	165.91	0.000003	0.29	22768.92	3072.80	0.02
Reach-1	722.5			Bridge									
Reach-1	700	100-yr	CE	5720.00	151.35	165.90		165.90	0.000003	0.29	22744.31	3072.80	0.02
Reach-1	700	100-yr	Post_Project	5720.00	151.35	165.90		165.90	0.000003	0.29	22744.78	3072.80	0.02
Reach-1	670	100-yr	CE	5720.00	151.25	165.90	160.79	165.90	0.000003	0.29	23051.42	3072.80	0.02
Reach-1	670	100-yr	Post_Project	5720.00	151.25	165.90	160.79	165.90	0.000003	0.29	23051.89	3072.80	0.02
Reach-1	647.5			Bridge									
Reach-1	625	100-yr	CE	5720.00	151.25	165.26	160.78	165.26	0.000004	0.32	21077.02	3072.55	0.02
Reach-1	625	100-yr	Post_Project	5720.00	151.25	165.26	160.78	165.26	0.000004	0.32	21077.49	3072.55	0.02
Reach-1	560	100-yr	CE	5720.00	152.95	165.26	161.03	165.26	0.000015	0.58	13216.51	2727.80	0.04
Reach-1	560	100-yr	Post_Project	5720.00	152.95	165.26	161.09	165.26	0.000015	0.58	13216.93	2727.80	0.04
Reach-1	550			Bridge									
Reach-1	540	100-yr	CE	5720.00	152.95	165.13	161.00	165.14	0.000016	0.60	12877.16	2727.80	0.04
Reach-1	540	100-yr	Post_Project	5720.00	152.95	165.13	161.09	165.14	0.000016	0.60	12877.16	2727.80	0.04
Reach-1	480	100-yr	CE	5720.00	151.05	165.13	160.08	165.13	0.000015	0.63	13182.63	2727.80	0.04
Reach-1	480	100-yr	Post_Project	5720.00	151.05	165.13	160.08	165.13	0.000015	0.63	13182.63	2727.80	0.04
Reach-1	457.5			Bridge									
Reach-1	435	100-yr	CE	5720.00	151.05	165.00	160.07	165.00	0.000016	0.65	12823.46	2727.80	0.04
Reach-1	435	100-yr	Post_Project	5720.00	151.05	165.00	160.07	165.00	0.000016	0.65	12823.46	2727.80	0.04

UPRR Bridge 148.33: Fresno Subdivision

HEC-RAS River: RIVER-1 Reach: Reach-1 Profile: 100-yr (Continued)

Reach	River Sta	Profile	Plan	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
				(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Reach-1	380	100-yr	CE	5720.00	150.95	165.00	159.55	165.00	0.000013	0.59	14234.66	2965.00	0.03
Reach-1	380	100-yr	Post_Project	5720.00	150.95	165.00	159.55	165.00	0.000013	0.59	14234.66	2965.00	0.03


UPRR Bridge 148_33 Fresno Plan: Corrected Effective 2/19/2015
Geom: Corrected Effective Flow: FIS_CE
River = RIVER-1 Reach = Reach-1 RS = 550 BR UPRR Bridge 148.33
.04
.04
.04
Legend
EG 100-yr
WS 100-yr
Crit 100-yr
Ground
Ineff
Bank Sta
Elevation (ft)
166
164
162
160
158
156
154
152
150
1800
1820
1840
1860
1880
1900
1920
1940
1960
1980
Station (ft)

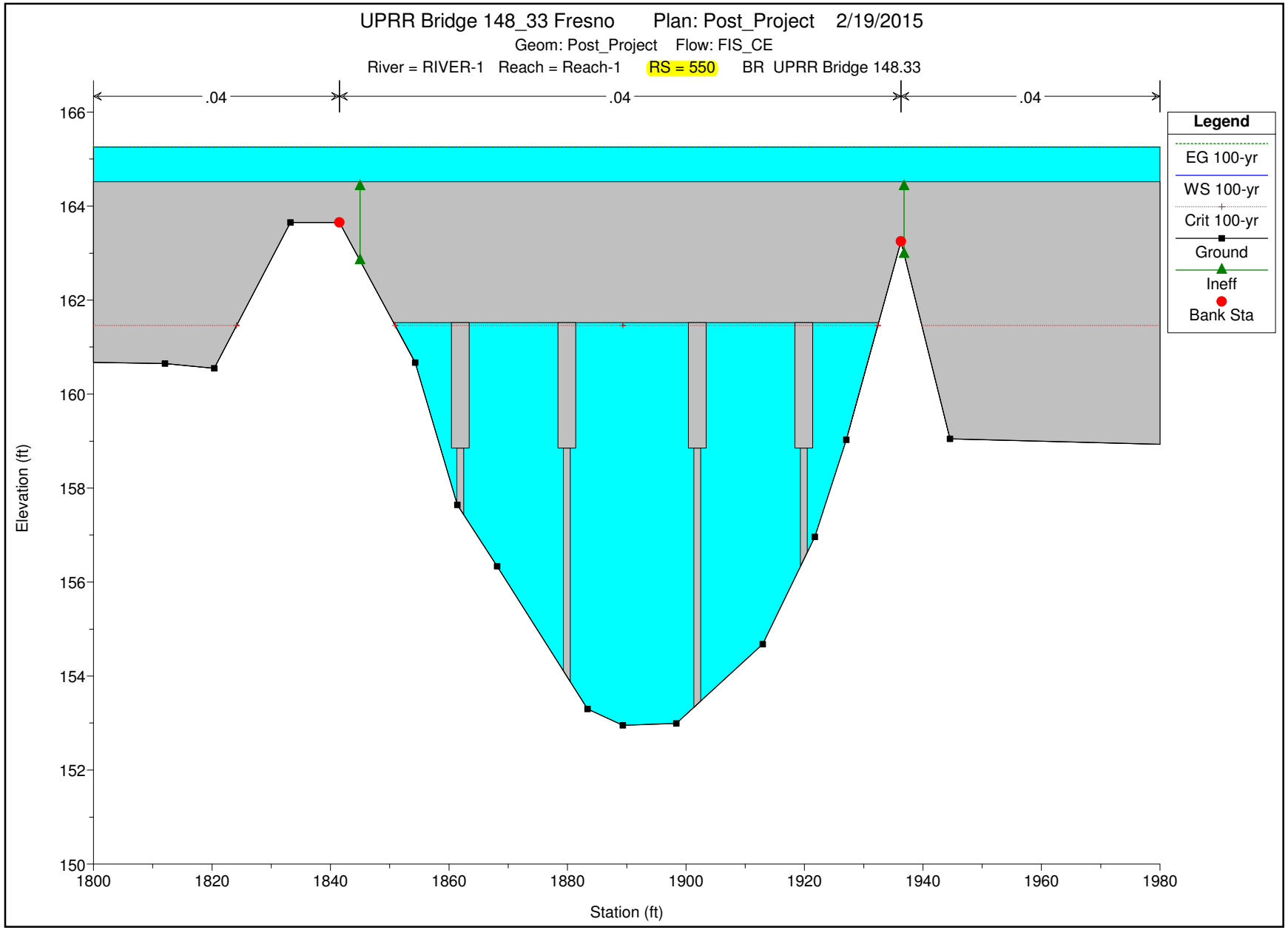

UPRR Bridge 148_33 Fresno Plan: Post_Project 2/19/2015
Geom: Post_Project Flow: FIS_CE
River = RIVER-1 Reach = Reach-1 RS = 550 BR UPRR Bridge 148.33
.04
.04
.04
Legend
EG 100-yr
WS 100-yr
Crit 100-yr
Ground
Ineff
Bank Sta
Elevation (ft)
166
164
162
160
158
156
154
152
150
1800
1820
1840
1860
1880
1900
1920
1940
1960
1980
Station (ft)

Table 1: 100-year WSE Summary – Black Rascal Creek

HEC-RAS Cross Section	Frequency	Discharge (cfs)	$WSE_{CORR-EFF}$ (Existing Condition)	WSE_{PROP} (Proposed Condition)	Δ WSE $_{CORR-EFF - PROP}$
1060	100-year	5,720	166.08	166.08	0.00
830	100-year	5,720	166.08	166.08	0.00
807.5	**Ashby Road**				
785	100-year	5,720	165.91	165.91	0.00
745	100-year	5,720	165.91	165.91	0.00
722.5	**North Bound Highway 99**				
700	100-year	5,720	165.90	165.90	0.00
670	100-year	5,720	165.90	165.90	0.00
647.5	**South Bound Highway 99**				
625	100-year	5,720	165.26	165.26	0.00
560	100-year	5,720	165.26	165.26	0.00
550	**UPRR Bridge 148.33: Fresno Subdivision**				
540	100-year	5,720	165.13	165.13	0.00
480	100-year	5,720	165.13	165.13	0.00
457.5	**SP Avenue**				
435	100-year	5,720	165.00	165.00	0.00
380	100-year	5,720	165.00	165.00	0.00

Additionally the HEC RAS output tables and cross sections have been included in the submittal.

The bridge has structural components capable of resisting hydrostatic and hydrodynamic loads and effects of buoyancy. The bridge has pilings which rely on friction for capacity, as such the piling capacity will not be subject to any flotation, buoyancy, lateral movement, or collapse issues. All components below the base flood elevation shall be constructed with materials and utility equipment resistant to flood damage, and the design and methods of construction are in accord with accepted standards and practice. The bridge will be constructed using methods and practices that minimize flood damages.