

**Meeting of the Central Valley Flood Protection Board  
February 26, 2016**

**Staff Report**

**Union Pacific Railroad Bridge (No. 145.57) Replacement**

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**1.0 – ITEM**

Consider approval of Permit No. 19062. (Attachment B)

**2.0 – APPLICANT**

Union Pacific Railroad Company (UPRR)

**3.0 – LOCATION**

The project is located north of the Southern Pacific Avenue, where Highway 99 crosses Canal Creek (regulated stream) in the town of Buhach, Merced County (Attachment A).

**4.0 – DESCRIPTION**

UPRR is proposing to replace the existing timber string trestle bridge to meet UPRR's safety standards. The new bridge will be 120 feet in length, consisting of one 30-foot span and six (6) approximate 15-foot spans of prestressed concrete slab girder bridge. The proposed bridge will be supported by eight bent rows with three steel piles per bent row.

**5.0 – PROJECT ANALYSIS**

The existing bridge provides commuter and freight-rail service near the City of Merced. The purpose of the proposed project is to replace the existing ten (10) span timber stringer trestle-ballast deck bridge that crosses Canal Creek (regulated stream) to meet UPRR's current safety standards. The bridge is nearing the end of its useful lifespan and must be replaced because of its deteriorating condition.

UPRR is proposing a 120-foot long replacement bridge, consisting of one (1) 30-foot span and six (6) approximate 15-foot spans of pre-stressed concrete slab girder bridge. The proposed bridge will be supported by eight bent rows (three steel piles per bent

row), see Attachment C. The existing low-chord elevation is 156.77 feet. The proposed low chord for the approach spans is 157.6 feet for a total of 90 feet. The lowest low chord is 156.25 feet for a total of 30 feet.

The majority of the replacement bridge will be .83 feet above the existing elevation, with one 30 foot span that will be .52 feet lower than the existing bridge. The applicant has stated that the lower elevation span is needed to provide adequate structural stability for the increases in railroad tonnage. However, this proposed 30 foot long concrete box girder design also will result in one less bent within the channel, thereby reducing the risk of debris accumulation along the upstream face. The overall elevation increase, combined with one less bent within the channel, will result in approximately 27% more flowage area under the new bridge. This increase is reflected in a water surface elevation decrease on the upstream face of the new bridge.

The bridge will be constructed using an off-track crane that will utilize a temporary access road over Canal Creek consisting of temporary culverts and fill material, which will be returned to existing conditions upon project completion. The staging areas, southwest of the tracks, will be cleared and graded for equipment access and mobility. The temporary work area will be confined to the UPRR Right of Way. Bridge materials will be transported to the site by rail. The existing bents and spans will be cut subgrade, removed, and hauled offsite.

### **5.1 – Hydraulic Analysis**

Bridge 145.57 crosses Canal Creek which primarily conveys flows from Castle Dam. The 100-year design discharge of 970 cfs was taken from the Caltrans Study for Canal Creek along the newly constructed Atwater-Merced Expressway/State Route 99 Interchange Project, a short distance upstream. The project was designed to have no rise in the water surface elevation (WSE) during both 100 and 200- year events. Due to the decrease in bents, excavation underneath the bridge, and a raise in the low chord along the approach spans, the proposed bridge will have a total opening area that is 27% greater than the existing conditions. The WSE for existing conditions for a 100 year event is 157.71 feet. The WSE with the proposed project is 157.46 feet, a decrease of 0.25 feet (Attachment D).

The lowest low chord of the proposed bridge is 156.27 feet and the WSE for the proposed project is 157.46 feet, resulting in the low chord being submerged 1.19 feet. However, because this is a replacement railroad bridge there is no requirement of clearance above the design flood plain. Therefore, the hydraulics of the proposed project meets Title 23 standards.

## **5.2 – Geotechnical Analysis**

There are no levees associated with this project; therefore, a geotechnical analysis is not required

## **6.0 – AGENCY COMMENTS AND ENDORSEMENTS**

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

- Merced County endorsed the application on October 5, 2015 with no conditions.
- The U.S. Army Corps of Engineers (USACE) Sacramento District non-fed letter was received December 30, 2015, and indicated that the proposed work does not affect a federally constructed project. This letter has been incorporated into the permit as Exhibit A.

## **7.0 – CEQA ANALYSIS**

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

The Board determined that 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.

## **8.0 –SECTION 8610.5 CONSIDERATIONS**

1. 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 staff has evaluated this application based upon the material submitted by the applicant, conducted its own investigation as to the material facts, and exercised independent professional judgment in its recommendation. As of the date of this report, staff has received no other source material or comments from stakeholders or the public, other than noted in this Staff Report.

2. The best available science 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:

The accepted industry standards for the work proposed under this permit as regulated by Title 23 have been applied to the review of this permit. On the issue of hydraulic impacts UPRR used HEC-RAS one-dimensional flow models. These models are considered by experts as the best available scientific tools for the purpose of modeling river hydraulics in this region.

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

There are no federal project levees in the vicinity of this project. The proposed UPRR bridge replacement is expected to result in no adverse hydraulic impacts on the facilities of the SPFC (as described in Sections 5.1 herein) and is consistent with the CVFPP and current Title 23 standards because the new bridge improves the overall free flow of water under the bridge. The replacement bridge design results in 27% more flowage area under the bridge, a decrease in water surface elevation and provides less opportunity for debris accumulation during high flow events.

Based upon the above, Board staff, in consultation with legal counsel, has recommended and the Executive Officer has agreed that there is no legitimate reason for the application of Section 128(a)(16) requiring replacement railroad bridges to have the soffit members no lower than those of the replaced bridge and thus, has waived that standard in this particular instance pursuant to the authority in Section 11(d).

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

UPRR has analyzed both 100 and 200 year events and designed the bridge such that it results in a no-rise to the water surface elevations during such events. Therefore, there will be no effects to the proposed project from reasonable projected future events.

## **9.0 – STAFF RECOMMENDATION**

Staff recommends that the Board:

### **Find:**

- the project to be statutorily exempt from CEQA;

### **Approve:**

- Encroachment Permit No. 19062, 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 pursuant to CEQA with the State Clearinghouse.

## **10.0 – LIST OF ATTACHMENTS**

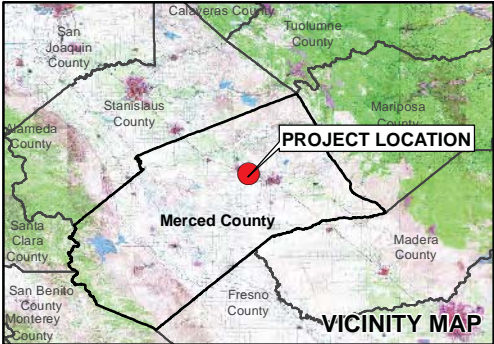
A – Location Maps and photos

B – Draft Permit No. 19062

C – Design Plans

D – Hydraulic Summary

Prepared By:	Ilene Wellman-Barbree, PE, Senior Engineer
Environmental Review:	James Herota, Senior Environmental Scientist (Specialist)
Staff Report Review:	Gary Lemon, PE, Chief Permitting Section Mitra Emami, PE, Operation Branch Chief Leslie Gallagher, Executive Officer
Legal Review	Nicole Rinke, Attorney General

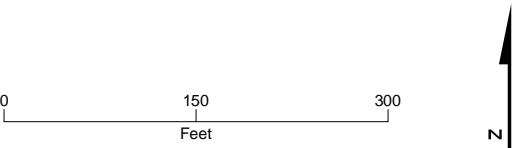


**LEGEND**

- ##### MP 145.57 BRIDGE LOCATION
- ➔ ACCESS ROUTE
- ==== UNION PACIFIC RAILROAD RIGHT-OF-WAY
- TEMPORARY PIPE
- - - TEMPORARY FILL
- ▭ PROJECT AREA
- ▭ TEMPORARY WORK AREA

**NOTE:**

SERVICE LAYER CREDITS: SOURCE: ESRI, DIGITALGLOBE, GEOEYE, EARTHSTAR GEOGRAPHICS, CNES/AIRBUS DS, USDA, USGS, AEX, GETMAPPING, AEROGRIID, IGN, IGP, SWISSTOPO, AND THE GIS USER COMMUNITY.



**FIGURE 1**  
**PROJECT LOCATION AND AREA**  
 MP 145.57 FRESNO SUBDIVISION BRIDGE PROJECT  
 UNION PACIFIC RAILROAD  
 MERCED COUNTY, CALIFORNIA



*Photograph 1. View of the western ROW and bridge from North Southern Pacific Avenue looking northwest.*



*Photograph 2. View to the southwest within the western ROW.*





*Photograph 4. North view of the eastern ROW.*

**DRAFT**

STATE OF CALIFORNIA  
THE RESOURCES AGENCY  
**THE CENTRAL VALLEY FLOOD PROTECTION BOARD**

**PERMIT NO. 19062 BD**

**This Permit is issued to:**

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

To replace an existing timber string trestle bridge with a new 8-span, 120 foot long bridge deck, precast caps and girders supported by H-piles.

The project is located north of Southern Pacific Avenue, where Highway 99 crosses Canal Creek in Buhach (Section 17, T7S, R13E, MDB&M, Merced County Public Works, Canal Creek, 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. 19062 BD**

**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 associated with construction, operation, and maintenance of the permitted facilities 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 the Department of Water Resources shall not be held liable for damages to the permitted encroachment(s) resulting from releases of water from reservoirs, flood fight, operation, maintenance, inspection, or emergency repair.

#### **AGENCY CONDITIONS**

**SIXTEEN:** Board staff received a letter, dated December 29, 2015, from the U.S. Army Corps of Engineers (USACE) District Engineer stating that the District Engineer has no comments or recommendations regarding flood control because the proposed work does not affect a federally

constructed project. This letter is attached to this permit as Exhibit A and is incorporated by reference.

## **PRE-CONSTRUCTION**

SEVENTEEN: 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.

## **CONSTRUCTION**

EIGHTEEN: 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.

NINETEEN: No construction work of any kind shall be done during the flood season from November 1 to July 15 without prior approval of the Board, and shall be removed after completion of the project.

TWENTY: No material stockpiles, temporary buildings, access ramps, or equipment shall remain in the floodway during the flood season from November 1 to July 15.

TWENTY-ONE: Cleared trees and brush shall be completely burned or removed from the floodway, and downed trees or brush shall not remain in the floodway during the flood season from November 1 to July 15.

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

TWENTY-THREE: Backfill material for excavations shall be placed in four (4) to six (6) inch layers and compacted to at least the density of the adjacent, firm, undisturbed material.

TWENTY-FOUR: All debris generated by this project shall be disposed of outside the floodway.

## **POST-CONSTRUCTION**

TWENTY-FIVE: Except with respect to the activities expressly allowed under this permit, the work area shall be restored to the condition that existed prior to start of work.

TWENTY-SIX: Within 120 days of completion of the project, the permittee shall submit to the Board and DWR a copy of as-built drawings, 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**

TWENTY-SEVEN: The permittee shall be responsible for repair of any damages to the channel, banks, and floodway due to construction, operation, or maintenance of the proposed project.

TWENTY-EIGHT: The permittee shall maintain the permitted encroachment(s) within the utilized area in the manner required and as requested by the authorized representative of the Board, Department of Water Resources, or any other agency responsible for maintenance.

TWENTY-NINE: All debris that may accumulate around the bridge supports and abutments within the floodway shall be completely removed from the floodway following each flood season.

THIRTY: If the permitted encroachment(s) result in any adverse hydraulic impact or scouring the permittee shall provide appropriate mitigation acceptable to the Board.

THIRTY-ONE: The permitted encroachment(s) shall not interfere with the flood conveyance capacity of the Canal Creek Channel. If the permitted encroachment(s) are 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 encroachment(s) under direction of the Board. If the permittee does not comply, the Board may modify or remove the encroachment(s) at the permittee's expense.

**PROJECT ABANDONMENT, CHANGE IN PLAN OF FLOOD CONTROL**

THIRTY-TWO: If the project, or any portion thereof, is to be abandoned in the future, the permittee shall abandon the project under direction of the Board, at the permittee's cost and expense.

THIRTY-THREE: The permittee may be required, at permittee's cost and expense, to remove, alter, relocate, or reconstruct all or any part of the permitted encroachment(s) if removal, alteration, relocation, or reconstruction is necessary as part of or in conjunction with any present or 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**



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 (19062)

DEC 30 2015

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

Dear Ms. Gallagher:

We have reviewed permit application number 19062 submitted by Union Pacific Railroad. This project includes replacing an existing timber string trestle bridge over Canal Creek with a new 7-span, 120 foot long bridge deck with precast caps and girders supported by H-piles. The project is located north of Southern Pacific Avenue, where Highway 99 crosses Canal Creek, at 37.330758°N 120.568761°W NAD83, Merced County, CA.

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

A Section 10 and/or Section 404 permit application (SPK-2015-00902) is in process for this work.

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, CA 95821.

Sincerely,

A handwritten signature in blue ink, appearing to read "Ryan Larson".

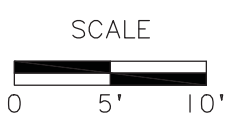
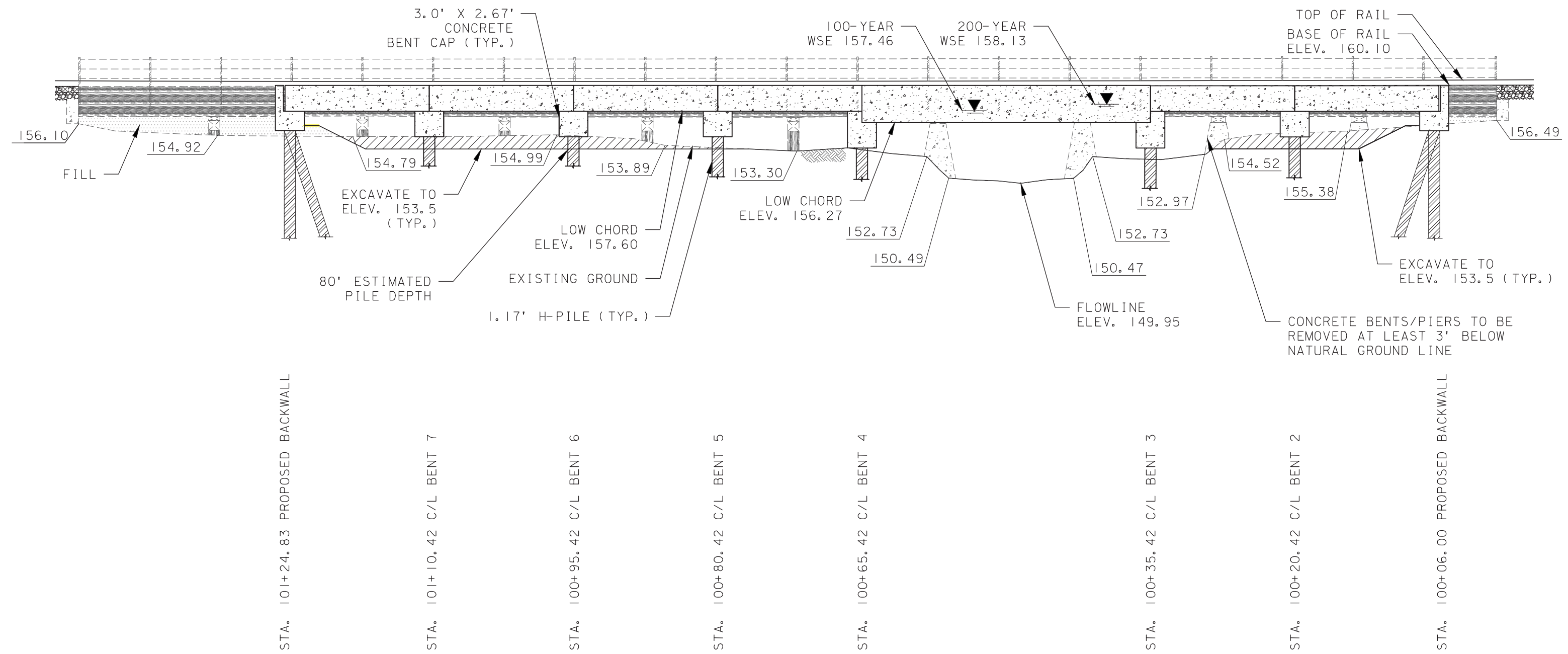
Ryan Larson, P.E.  
Chief, Flood Protection and Navigation Section

← TO FERGUS &  
NORTH BAKERSFIELD  
(TIMETABLE SOUTH)

TO ARENA &  
ELVAS  
(TIMETABLE NORTH) →

# BRIDGE 145.57 - FRESNO SUBDIVISION

PROPOSED: 7-SPAN, 120' LONG, PRESTRESSED CONCRETE BOX GIRDER



1. ELEVATION NAVD 1988
2. Q<sub>100</sub> 970 cfs  
Q<sub>200</sub> 1,250 cfs
3. CANAL CREEK
4. BRIDGE MODELED AT 39° SKEW

PROJECT: 015-0828  
DRAWN BY: DC/BS  
DATE: 8/26/15

## PROPOSED BRIDGE - UPSTREAM FACE PROFILE



FIGURE  
F-4

## **Hydrology**

Bridge 145.57 provides drainage to Canal Creek with flows controlled by upstream Castle Dam. The 100-year design discharge of 970 cfs was taken directly from the Caltrans Study for Canal Creek along the newly constructed Atwater-Merced Expressway/SR 99 Interchange Project, a short distance upstream which includes several bridges over Canal Creek. The 200-year discharge was calculated using a statistical relationship. Bridge 145.57 provides drainage to Canal Creek as well as providing irrigation flows for the Merced Irrigation District (MID) Drainage Improvement District No. 1. The drainage area consists primarily of a mixture of urban and agricultural land uses. Runoff reaches the bridge in the form of channel flow and approaches the track from the geographic north.

## **Hydraulics**

A hydrologic and hydraulic investigation was conducted 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. Where possible, the proposed waterway opening was designed to meet these criteria and withstand expected high flows and prohibit restriction of low flows. Since Bridge 145.57 is located within the jurisdiction of the CVFPB care was given not to increase the 100-year flood elevation. The hydraulic analysis was based on utilizing the hydrology from the Caltrans Study and incorporating Bridge & Stream Engineering, Inc. bridge survey information.

Based on the hydrologic and hydraulic evaluation, the  $WSE_{100}$  and  $WSE_{200}$  at the upstream face of the existing bridge was computed to be 157.71 ft and 158.54 ft, respectively. It is noted that the lowest low chord elevation of the existing bridge is 156.77 ft, and the lowest base-of-rail elevation is 160.10 ft. The proposed bridge low chord elevation is 156.27 ft, and the lowest base-of-rail elevation is 160.10. The corresponding computed  $WSE_{100}$  and  $WSE_{200}$  associated with the proposed bridge is 157.46 ft and 158.13 ft, respectively. See Table I below for a summary comparing water surface elevations (WSE) between the existing and proposed conditions.



**Table 1: 100-year and 200-year WSE Summary – Canal Creek**

HEC-RAS Cross Section	Frequency	Discharge (cfs)	WSE <sub>CORR-EFF</sub> (Existing Condition)	WSE <sub>PROP</sub> (Proposed Condition)	Δ WSE <sub>CORR-EFF - PROP</sub>
1684	100-year	970	157.86	157.64	-0.22
1684	200-year	1,250	158.84	158.39	-0.45
1636	<b>South Bound Highway 99 Bridge</b>				
1608	100-year	970	157.72	157.43	-0.29
1608	200-year	1,250	158.54	158.11	-0.43
1596	100-year	970	157.71	157.46	-0.25
1596	200-year	1,250	158.54	158.13	-0.45
1595	<b>UPRR Bridge 145.57: Fresno Subdivision</b>				
1553	100-year	970	157.16	157.17	+0.01
1553	200-year	1,250	157.54	157.54	0.00
1529	100-year	970	157.21	157.21	0.00
1529	200-year	1,250	157.61	157.61	0.00
1528	<b>S.P. Avenue Bridge</b>				
1459	100-year	970	157.10	157.10	0.00
1459	200-year	1,250	157.49	157.49	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.

**Geotechnical Report**

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 Instructions. The estimated H pile depth is 80 feet.

The following information is provided for your review and concurrence.

1. Topographic Location Map, Figure F-1, showing the location of Bridge 145.57 and surrounding vicinity.
2. Aerial Location Map, Figure F-2, depicting important features in the vicinity of the structure.

3. Existing Bridge - Upstream Face Profile, Figure F-3, depicting the upstream face profile of the existing bridge and relevant features/elevations.
4. Proposed Bridge - Upstream Face Profile, Figure F-4, showing the upstream face profile of the proposed bridge as well as important bridge elevations.
5. Post Project Work Map – Figure F-5, showing important features in the vicinity of the structure.
6. FEMA Flood Insurance Rate Map (FIRM) and HEC-RAS output tables/cross sections.
7. Site photographs showing various views of Bridge 145.57 and vicinity.
8. Any debris and excavated material from construction will be hauled off and disposed of off-site, away from the stream channel on an upland area. The disturbed area will be returned to pre-project conditions or better.
9. All work will be performed with UPRR right of way (ROW).
10. The Applicant's contact person is:

Mr. Mike Freeman  
Director Structures Design  
Union Pacific Railroad  
1400 Douglas Street, STOP 0910  
Omaha, NE 68179-0910  
(402) 544-8830

In summary the proposed bridge results in a no-rise during both the 100-year and 200-year runoff event.

Your timely response to this application will be appreciated. If you have any questions concerning this project or need additional information, please contact me at (402) 458-5015 or [bstrahm@olssonassociates.com](mailto:bstrahm@olssonassociates.com) at your earliest convenience. Please refer your future correspondence to **Bridge 145.57, Fresno Subdivision**.

Sincerely,



Branden Strahm, PE, CFM  
Encls.

cc: Mr. Mike Freeman, UPRR

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