

**Meeting of the Central Valley Flood Protection Board
March 25, 2016**

Staff Report – Encroachment Permit

**Union Pacific Railroad
Bear River Bridge, Placer County**

1.0 – ITEM

Consider approval of Permit No. 18278-1. (Attachment B)

2.0 – APPLICANT

Union Pacific Railroad (UPRR)

3.0 – LOCATION

The project is located at MP 126.77 on the Valley Subdivision of UPRR, and crosses the Bear River (regulated stream) approximately 1.3 miles southeast of the City of Wheatland, Placer County, and runs parallel to State Highway 65. (Attachment A)

4.0 – PROJECT DESCRIPTION

UPRR proposes to replace segments B and C of the existing 1-span, 12 foot long and pre-stressed concrete box bridge (Segment B) and 10-span, 352 foot long and deck plate girder (Segment C) over the Bear River. Segment A of the existing bridge is structurally adequate and will remain in place. The proposed replacement of segment's B and C consists of a 9-span, 398 foot long bridge. The new segments will be 6 spans and 190 feet in length for Segment B and 3 spans and 208 feet in length for Segment C, each consisting of steel beam span, precast concrete riser block, bent cap and bents.

5.0 – AUTHORITY OF THE BOARD

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

California Code of Regulations Title 23 (Title 23)

- § 6, Need for a Permit

- § 112, Streams Regulated and Nonpermissible Work Periods
- § 121 Erosion Control
- § 128, Bridges

6.0 – PROJECT ANALYSIS

The existing bridge provides service for both passenger and freight trains just south of the City of Wheatland. UPRR proposes to remove and replace segments B and C of the existing bridge that crosses the Bear River due to deteriorated concrete piers and steel spans. Segment B will be 190 feet in length with 6-spans and Segment C will be 208 feet in length with 3-spans. Both segments will be constructed with steel beam spans, precast concrete riser blocks, bents, and bent caps. The proposed replacement segments will be supported by the bents. (Attachment C)

Construction vehicles and equipment will gain access to the project site from two access roads off Levee Road, immediately southeast and southwest of the existing bridge. There will be three temporary construction staging areas for replacing Segments B and C. One staging area will be located on the west side of the bridge and the other two will be located on the east side. The staging areas are located in UPRR's right-of-way (ROW).

Riprap will be placed along the north sloping abutment for the bridge. The Bear River is a component of the State Plan of Flood Control (SPFC) and is bounded by Federal Flood Control Project levees (Project Levees).

6.1 – Hydraulic Analysis

The U.S. Army Corps of Engineers' (USACE) design flow for the Bear River is 30,000 cubic feet per second. A HEC-RAS model was created in order to analyze the existing and post project conditions. (Attachment D)

The bridge freeboard, with a proposed low chord elevation of 101.44 feet, is 6.29 feet and 1.02 feet increase when compared to the existing condition at the upstream of the proposed bridge. The HEC-RAS analysis showed all computed water surface elevation changes due to the replacement of the bridge segments are negligible, with a slight decrease of 0.10 feet at the upstream of the proposed bridge. The velocity at the upstream of the proposed bridge is 5.38 feet per second which remains constant for both the existing and proposed conditions (Attachment D).

Based on Board staff's review, the proposed project is expected to result in no

Sungho Lee, PE

significant adverse hydraulic impacts to the Bear River channel or floodway and that the proposed project complies with all applicable Title 23 standards.

6.2 – Geotechnical Analysis

UPRR did not conduct a detailed geotechnical study for this project. They based their design on geotechnical information gathered from several other nearby bridge projects along UPRR's Valley Subdivision line. The proposed bridge is supported by nine (9) H pile bents. The proposed bents consist of 80 foot long H piles that will be driven to the point of refusal. The estimated maximum scour depth is 3.4 feet.

Board staff has reviewed the geotechnical information provided by UPRR and has determined that the proposed project is expected to cause no adverse geotechnical impacts to the Bear River channel or floodway due to the proposed bents design.

7.0 – AGENCY COMMENTS AND ENDORSEMENTS

The comments and endorsements associated with the project from all pertinent agencies are as follows:

- The USACE 33 USC 408 decision letter has not yet been received for this application. Staff anticipates receipt of a letter indicating that the USACE District Engineer has no objection to the project, subject to conditions. Upon receipt of the letter, board staff will review to ensure its conformity with the permit language and incorporate it into the permit as Exhibit A.
- RD 1001 endorsed the project with conditions on September 30, 2015. The conditions have been incorporated into the permit.
- RD 2103 endorsed the project without conditions on September 17, 2015.

8.0 – CEQA ANALYSIS

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

The Board has 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.

The documents and other materials which constitute the record of the Board's proceedings in this matter are in the custody of Leslie Gallagher, Executive Officer, Central Valley Flood Protection Board, 3310 El Camino Ave., Rm. 151, Sacramento, California 95821.

9.0 – CALIFORNIA WATER CODE § 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 will make its decision based on the evidence in the permit application and attachments, this staff report, and any other evidence presented by any individual or group.

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 an existing USACE HEC-RAS hydraulic model to create a hydraulic model for this project. This model is considered by experts as one of the best available scientific tools for the purpose of evaluating water surface elevation changes anticipated to occur as a result of the proposed project.

3. Effects of the decision on the facilities of the 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:

The proposed project crosses the Bear River, which is a component of the SPFC and is bounded by Project Levees. The proposed UPRR bridge segment replacements are expected to result in a decrease in water surface elevation, no increase in channel velocities, and no adverse geotechnical impacts to the Bear River or any SPFC facilities. Therefore, the proposed project is expected to result in no adverse effects on any SPFC facility(ies) and is consistent with the CVFPP and current Title 23 standards.

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 100 and 200 year flood events and has designed the proposed replacement of the bridge segments such that it results in the low chord elevation being 0.92 feet higher than the existing low chord elevation. Therefore, there are no expected adverse effects to the proposed project from reasonable projected future events.

10.0 – STAFF RECOMMENDATION

Staff recommends that the Board:

Find:

- The project to be statutorily exempt from CEQA;

Approve:

- Encroachment Permit No. 18278-1, 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.

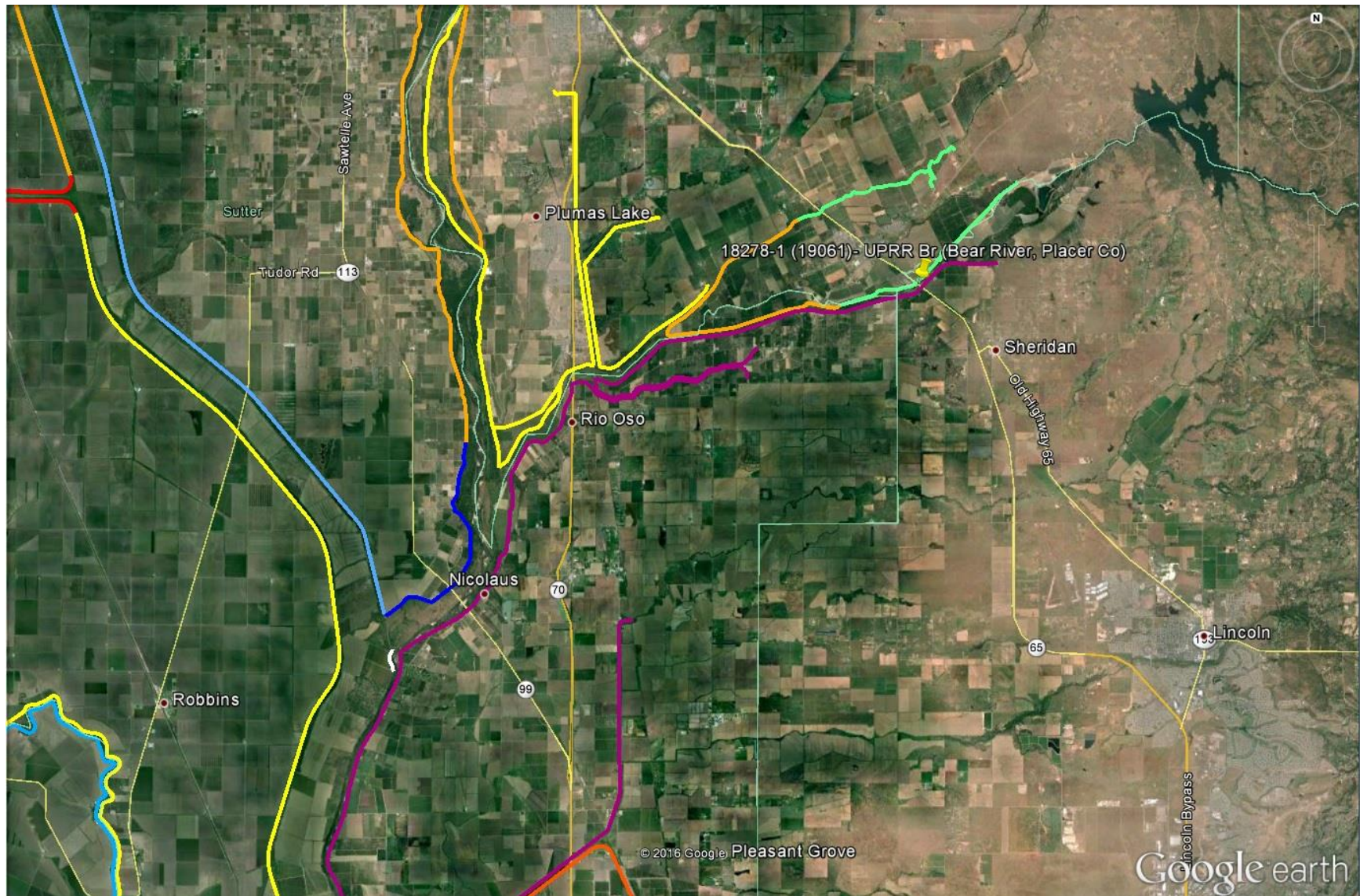
11.0 – LIST OF ATTACHMENTS

- A. Project Vicinity and Location Maps
- B. Draft Permit No. 18278-1
- C. Project Drawings
- D. Hydraulic Profile Information

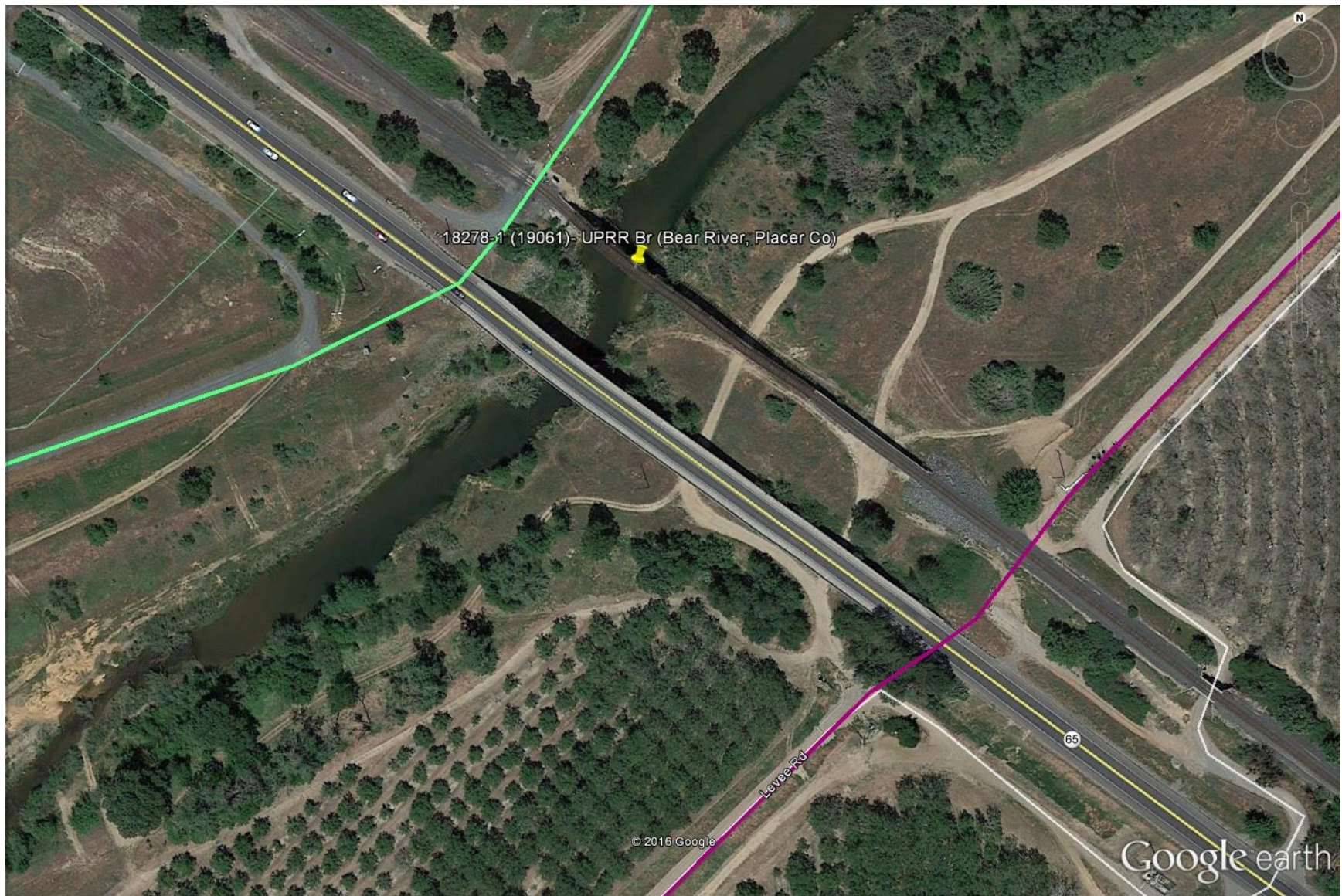
Prepared by:	Sungho Lee, PE, Water Resources Engineer, Permitting Section
Document Review:	James Herota, Senior Environmental Scientist (Specialist) Gary Lemon, PE, Permitting Section Chief
Legal Review:	Kanwarjit Dua, Board Counsel

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ATTACHMENT A – VICINITY AND LOCATION MAPS



ATTACHMENT A – VICINITY AND LOCATION MAPS



DRAFT

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

PERMIT NO. 18278-1 BD

This Permit is issued to:

Union Pacific Railroad (UPRR)
1400 Douglas St., Stop 0910
Omaha, Nebraska 68179-0910

To replace segment's B and C of existing Union Pacific Railroad Bridge (UPRR) over the Bear River. The segment A of the existing bridge is structurally adequate and will remain in place. The proposed replacement of segment's B and C consists of a 9-span and 398 foot long bridge.

The project is located at MP 126.77 on the Valley Subdivision of Union Pacific Railroad (UPRR) approximately 1.3 miles southeast of Wheatland and parallel to State Highway 65. (Section 3, T13N, R5E, MDB&M, Reclamation District 2103, Bear River, Placer 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. 18278-1 BD

LIABILITY AND INDEMNIFICATION

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 (DWR) 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 xxxx, 2016, 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 April 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 April 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 April 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: Backfill material for excavations within the bank section and within 10 feet of bridge supports within the floodway shall be placed in 4- to 6-inch layers and compacted to a minimum of 90 percent relative compaction per ASTM Method D1557-91, or 97 percent per ASTM D 698-91, and above optimum moisture content.

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

POST-CONSTRUCTION

TWENTY-SIX: 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-SEVEN: 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-EIGHT: 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-NINE: 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, DWR, or any other agency responsible for maintenance.

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

THIRTY-TWO: The permitted encroachment(s) shall not interfere with the flood conveyance capacity of the Bear River 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-THREE: 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.

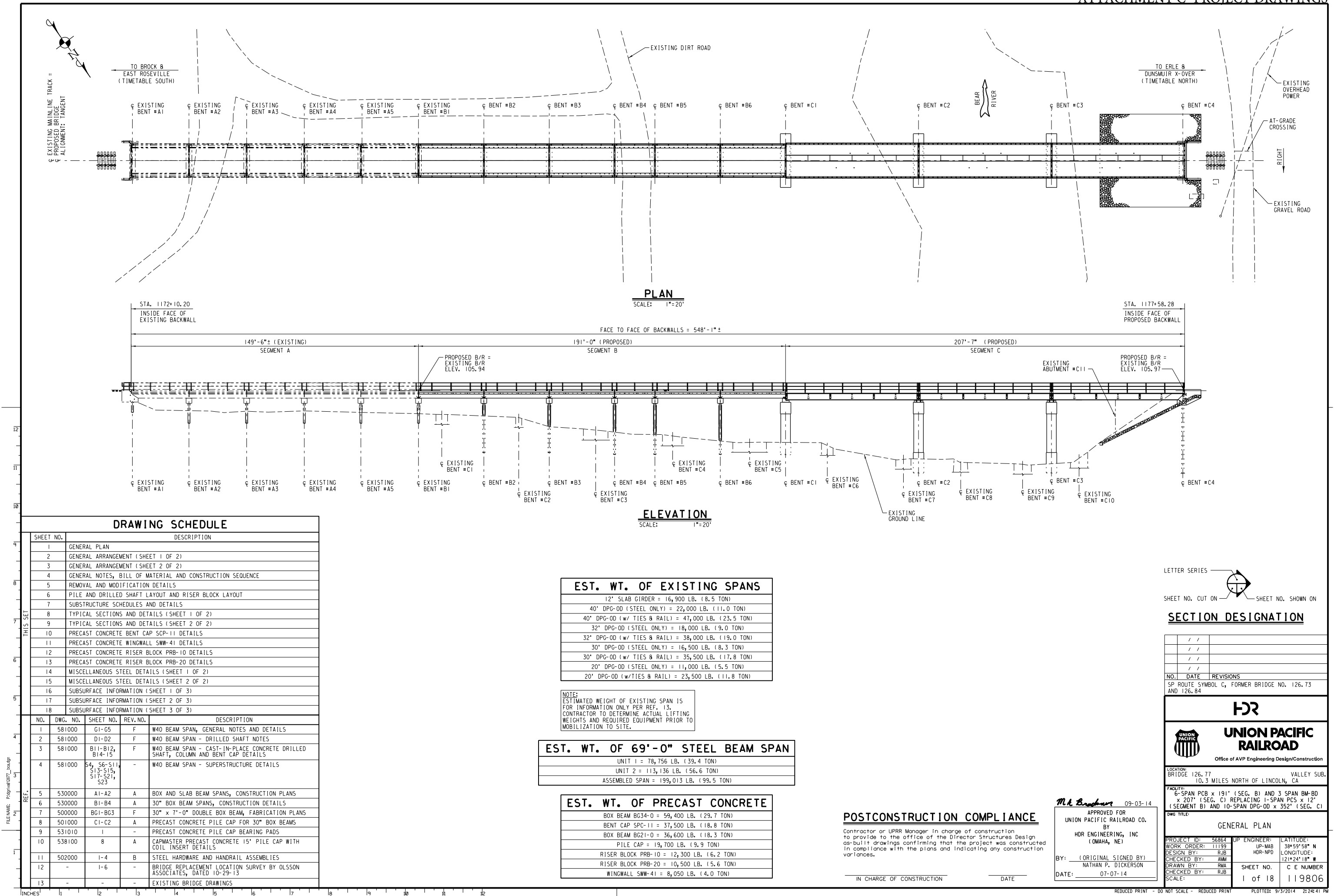
THIRTY-FOUR: The permittee may be required, at permittee's cost and expense, to remove, alter, relocate, or reconstruct all or any part of the permitted encroachment(s) if removal, alteration, relocation, or reconstruction is necessary as part of or in conjunction with any present or future flood control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

ATTACHMENT B – Exhibit A: USACE Comment Letter

This letter has not yet been received by Board staff; however, it is expected to arrive prior to the Board Meeting on March 25, 2016

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EST. WT. OF EXISTING SPANS	
12' SLAB GIRDER	= 16,900 LB. (8.5 TON)
40' DPG-OD (STEEL ONLY)	= 22,000 LB. (11.0 TON)
40' DPG-OD (w/ TIES & RAIL)	= 47,000 LB. (23.5 TON)
32' DPG-OD (STEEL ONLY)	= 18,000 LB. (9.0 TON)
32' DPG-OD (w/ TIES & RAIL)	= 38,000 LB. (19.0 TON)
30' DPG-OD (STEEL ONLY)	= 16,500 LB. (8.3 TON)
30' DPG-OD (w/ TIES & RAIL)	= 35,500 LB. (17.8 TON)
20' DPG-OD (STEEL ONLY)	= 11,000 LB. (5.5 TON)
20' DPG-OD (w/ TIES & RAIL)	= 23,500 LB. (11.8 TON)

NOTE:
ESTIMATED WEIGHT OF EXISTING SPAN IS
FOR INFORMATION ONLY PER REF. 13.
CONTRACTOR TO DETERMINE ACTUAL LIFTING
WEIGHTS AND REQUIRED EQUIPMENT PRIOR TO
MOBILIZATION TO SITE.

EST. WT. OF 69'-0" STEEL BEAM SPAN	
UNIT 1	= 78,756 LB. (39.4 TON)
UNIT 2	= 113,136 LB. (56.6 TON)
ASSEMBLED SPAN	= 199,013 LB. (99.5 TON)

EST. WT. OF PRECAST CONCRETE	
BOX BEAM BG34-0	= 59,400 LB. (29.7 TON)
BENT CAP SPC-11	= 37,500 LB. (18.8 TON)
BOX BEAM BG21-0	= 36,600 LB. (18.3 TON)
PILE CAP	= 19,700 LB. (9.9 TON)
RISER BLOCK PRB-10	= 12,300 LB. (6.2 TON)
RISER BLOCK PRB-20	= 10,500 LB. (5.6 TON)
WINGWALL SSW-41	= 8,050 LB. (4.0 TON)

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.

IN CHARGE OF CONSTRUCTION

DATE

M.A. Brachman 09-03-14

APPROVED FOR
UNION PACIFIC RAILROAD CO.
BY
HDR ENGINEERING, INC
(OMAHA, NE)

BY: (ORIGINAL SIGNED BY)
NATHAN P. DICKERSON
DATE: 07-07-14



SECTION DESIGNATION

NO.	DATE	REVISIONS
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UNION PACIFIC RAILROAD
Office of AVP Engineering Design/Construction

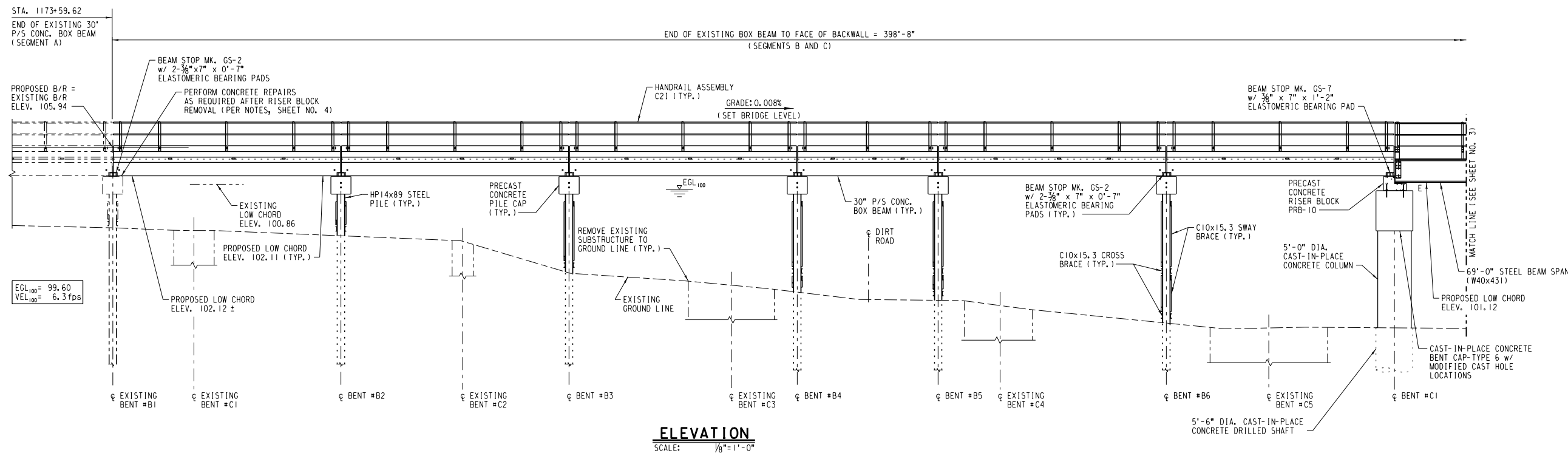
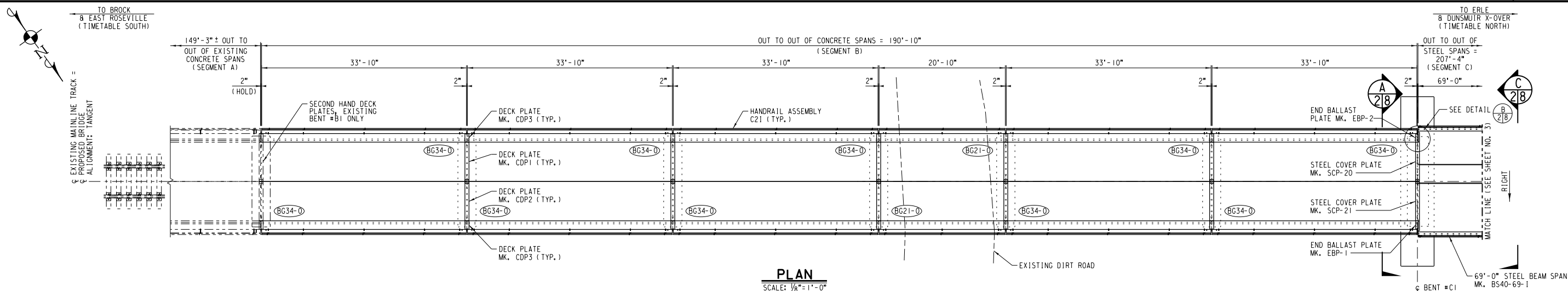
LOCATION: BRIDGE 126.77 VALLEY SUB.
10.3 MILES NORTH OF LINCOLN, CA

FACILITY: 6-SPAN PCB x 191' (SEG. B) AND 3 SPAN BM-BD x 207' (SEG. C) REPLACING 1-SPAN PCS x 12' (SEGMENT B) AND 10-SPAN DPG-OD x 352' (SEG. C)

DWG TITLE: GENERAL PLAN

PROJECT ID: 56864	UP ENGINEER: UP-MAB	LATITUDE: 38°59'58" N
WORK ORDER: 11199	HDR-NPD	LONGITUDE: 121°24'18" W
DESIGN BY: RJB		
CHECKED BY: AMM		
DRAWN BY: RMA		
CHECKED BY: RJB		
SCALE:		

SHEET NO. 1 of 18
C E NUMBER 119806



- NOTES:
1. FOR ESTIMATED LIFTING WEIGHTS, SEE SHEET NO. 1.
 2. E = EXPANSION

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NO.	DATE	REVISIONS	

HDR

**UNION PACIFIC
RAILROAD**

Office of AVP Engineering Design/Construction

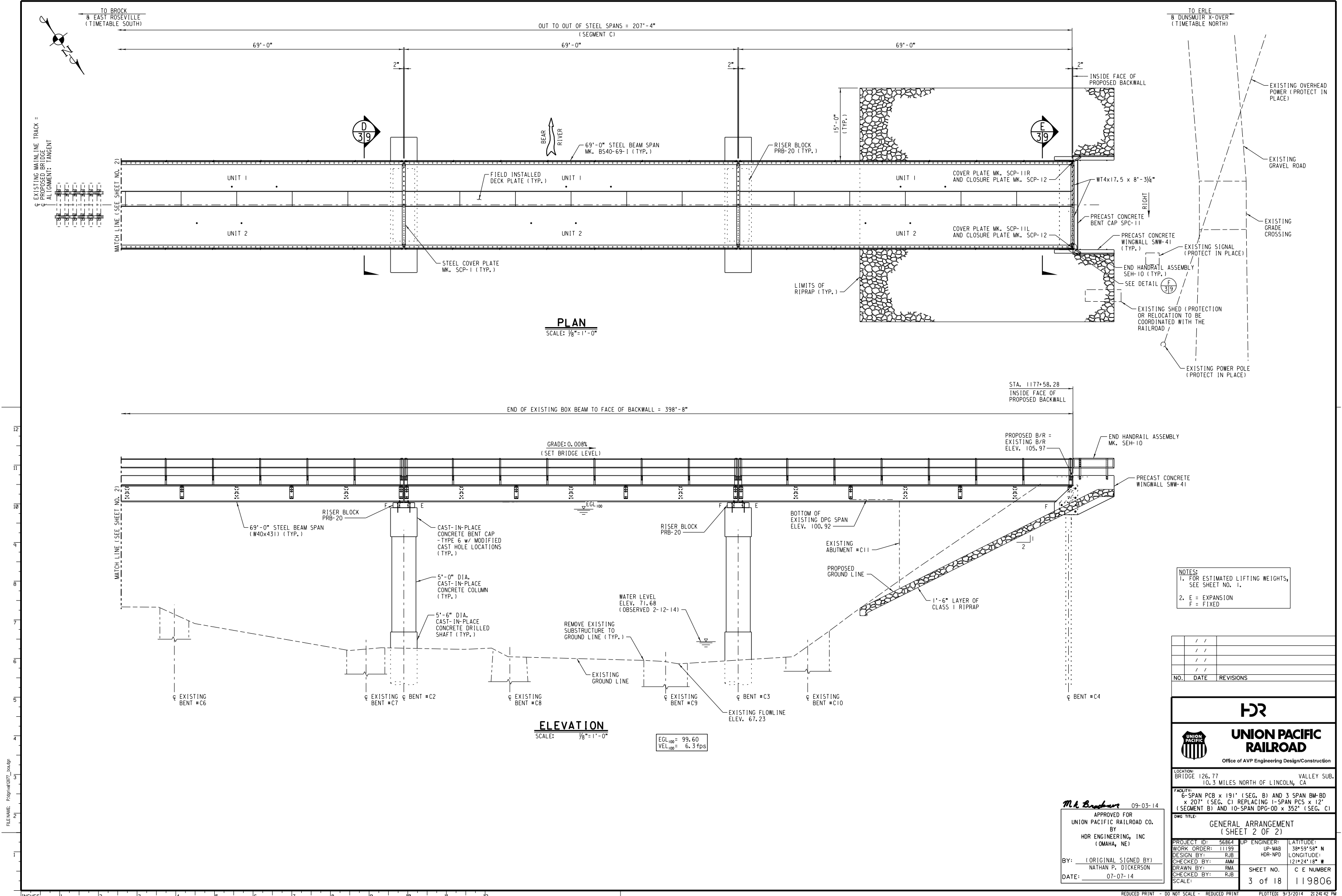
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BRIDGE 126.77 VALLEY SUB.
10.3 MILES NORTH OF LINCOLN, CAFACILITY:
6-SPAN PCB x 191' (SEG. B) AND 3 SPAN BM-BD
x 207' (SEG. C) REPLACING 1-SPAN PCS x 12'
(SEGMENT B) AND 10-SPAN DPG-OD x 352' (SEG. C)DWG TITLE:
**GENERAL ARRANGEMENT
(SHEET 1 OF 2)**

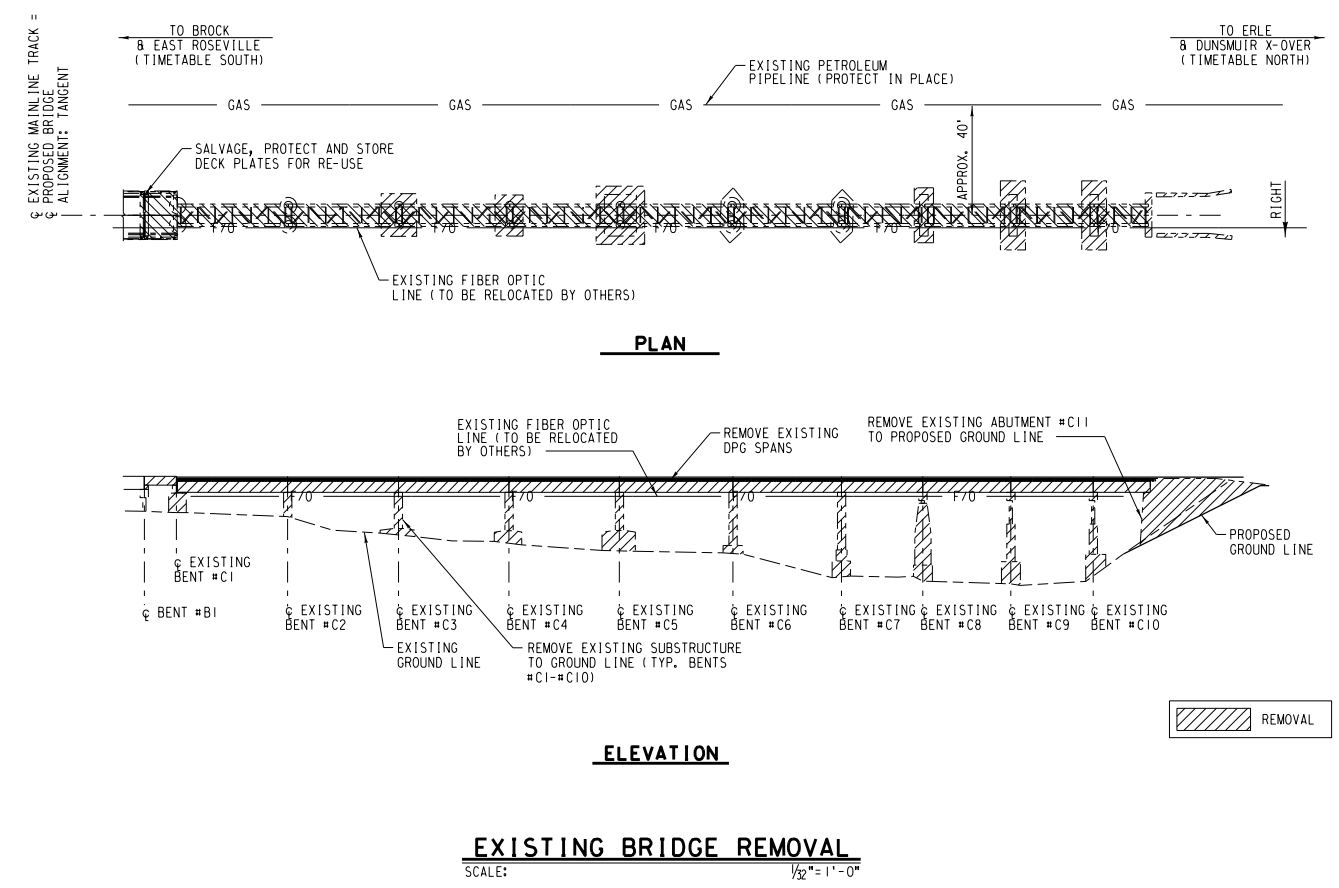
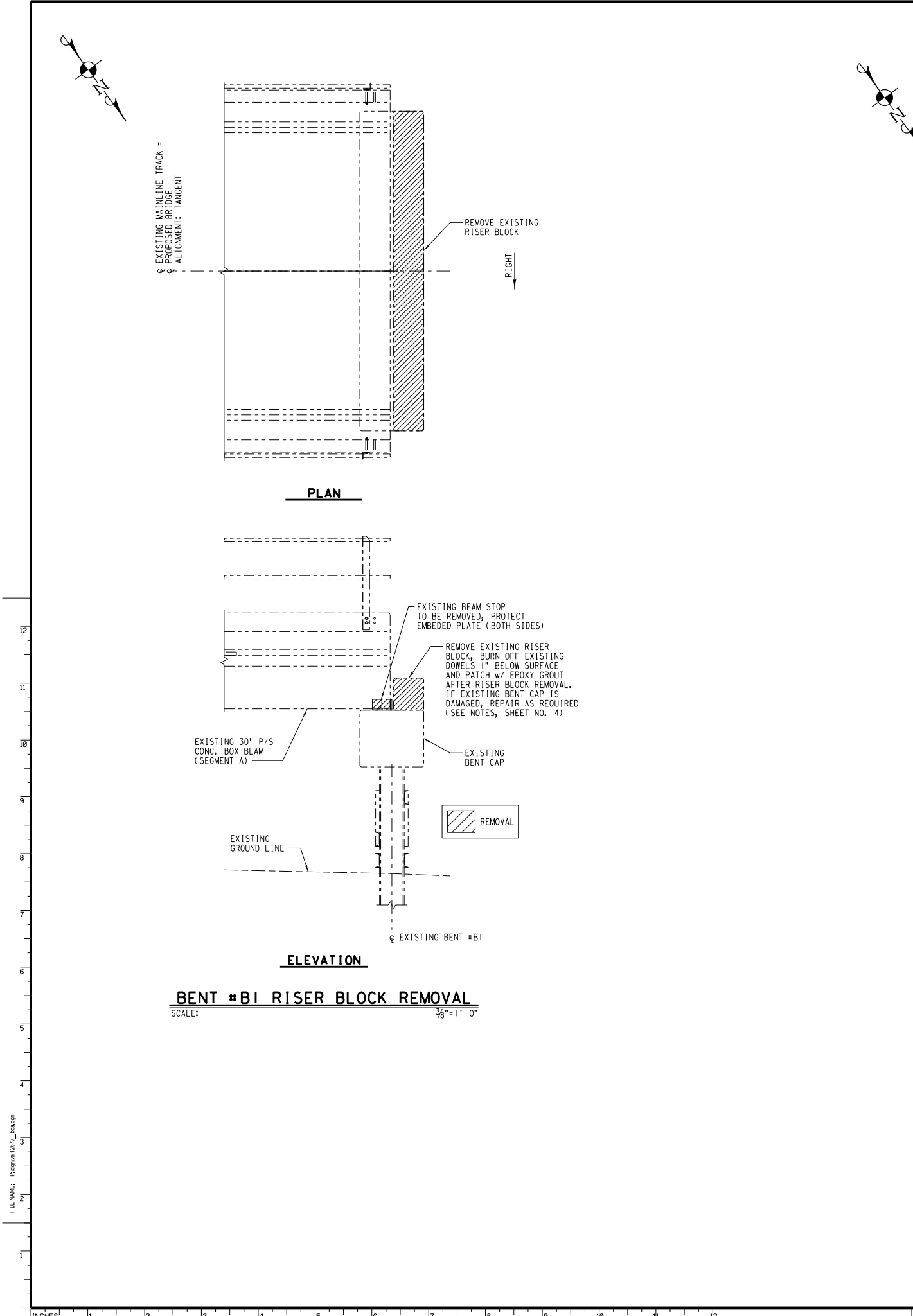
PROJECT ID: 56864	UP ENGINEER: UP-MAB	LATITUDE: 38°59'58" N
WORK ORDER: 11199	HDR-NPD	LONGITUDE: 121°24'18" W
DESIGN BY: RJB		
CHECKED BY: AMM		
DRAWN BY: RMA	SHEET NO. 2 of 18	C E NUMBER 119806
CHECKED BY: RJB		
SCALE:		

M.A. Brubaker 09-03-14

APPROVED FOR
UNION PACIFIC RAILROAD CO.
BYHDR ENGINEERING, INC
(OMAHA, NE)BY: (ORIGINAL SIGNED BY)
NATHAN P. DICKERSON

DATE: 07-07-14





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NO.	DATE	REVISIONS	

UNION PACIFIC RAILROAD
Office of AVP Engineering Design/Construction

LOCATION:
BRIDGE 126.77 VALLEY SUB.
10.3 MILES NORTH OF LINCOLN, CA

FACILITY:
6-SPAN PCB x 191' (SEG. B) AND 3 SPAN BM-BD x 207' (SEG. C) REPLACING 1-SPAN PCS x 12' (SEGMENT B) AND 10-SPAN DPG-OD x 352' (SEG. C)

DWG TITLE:
REMOVAL AND MODIFICATION DETAILS

PROJECT ID: 56864	UP ENGINEER: UP-MAB	LATITUDE: 38°59'58" N
WORK ORDER: 11199	HDR-NPD	LONGITUDE: 121°24'18" W
DESIGN BY: RJB		
CHECKED BY: AMM	SHEET NO. 5 of 18	C E NUMBER 119806
DRAWN BY: RMA		
CHECKED BY: RJB		
SCALE:		

APPROVED FOR
UNION PACIFIC RAILROAD CO.
BY
HDR ENGINEERING, INC
(OMAHA, NE)

BY: (ORIGINAL SIGNED BY)
NATHAN P. DICKERSON

DATE: 07-07-14

M.A. Brubaker 09-03-14



APPROVED FOR
UNION PACIFIC RAILROAD CO.
BY
HDR ENGINEERING, INC
(OMAHA, NE)

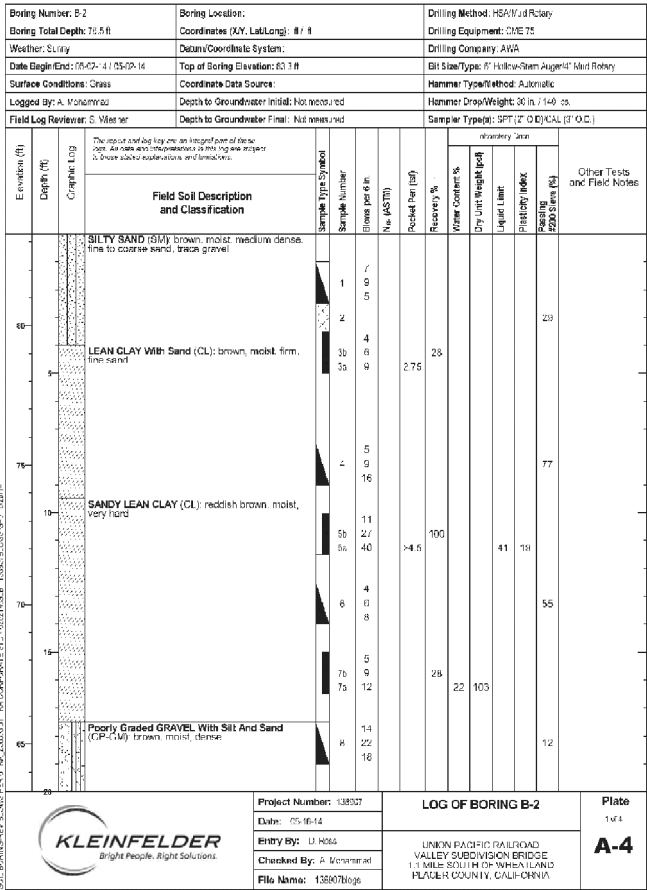
BY: (ORIGINAL SIGNED BY)
NATHAN P. DICKERSON

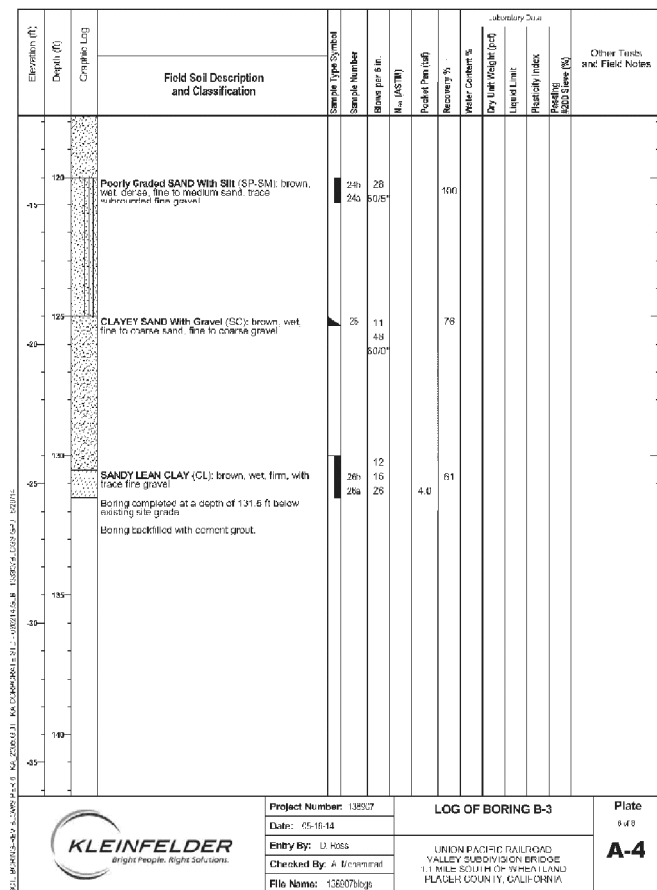
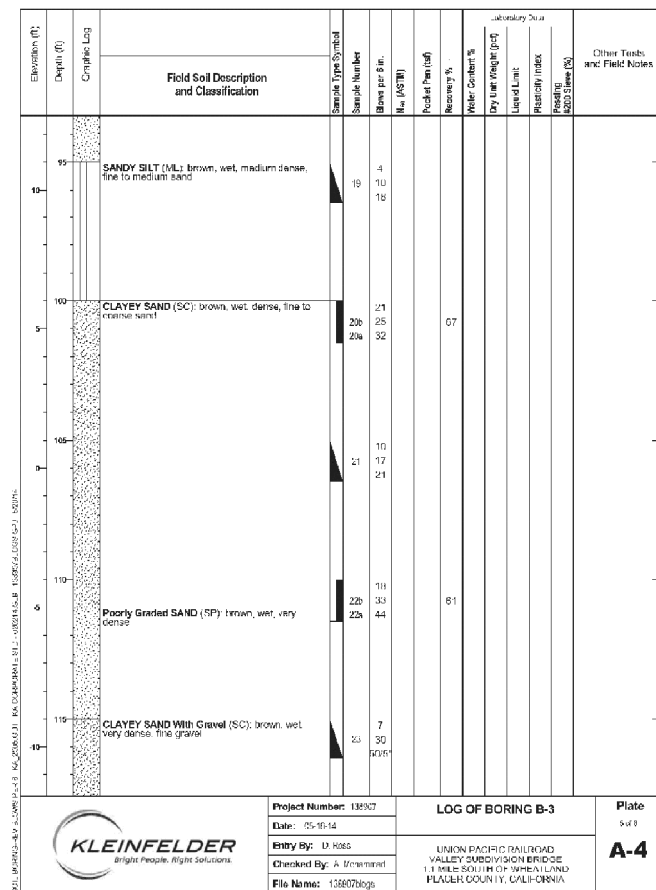
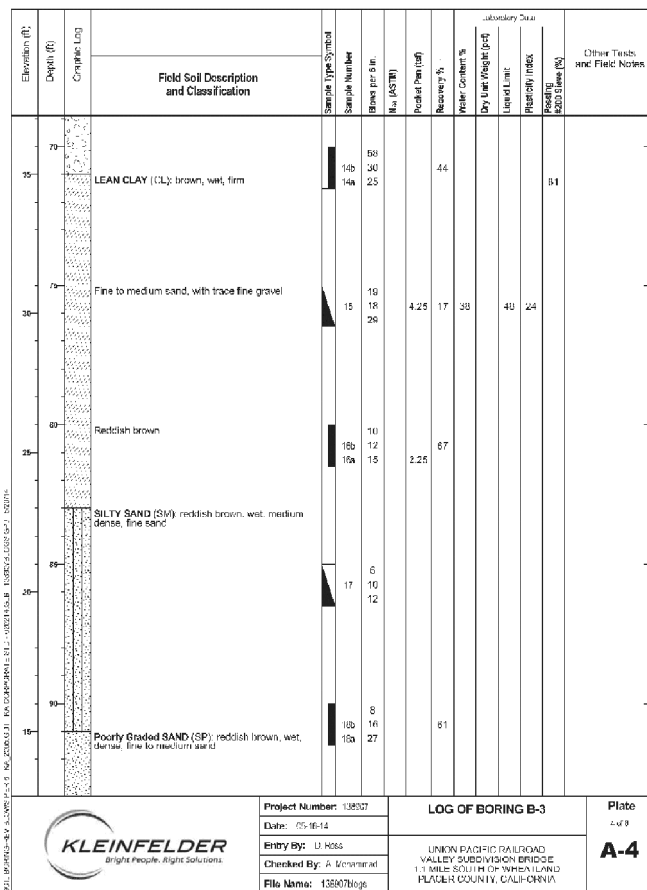
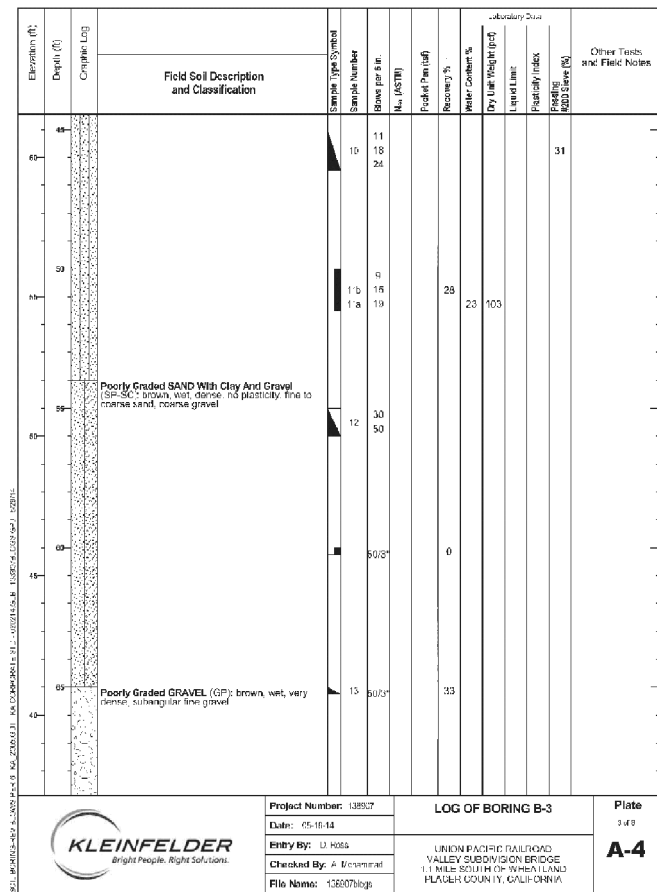
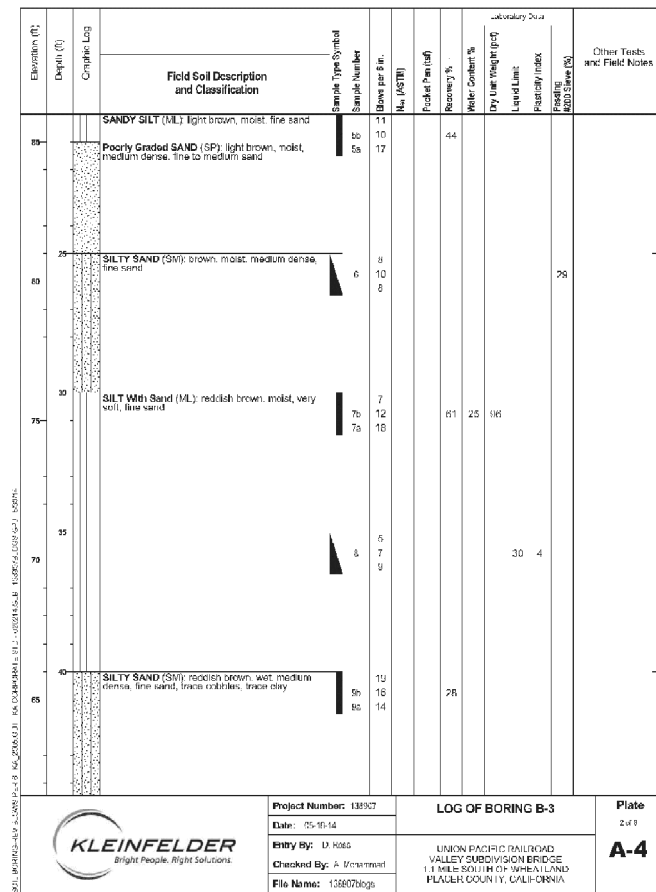
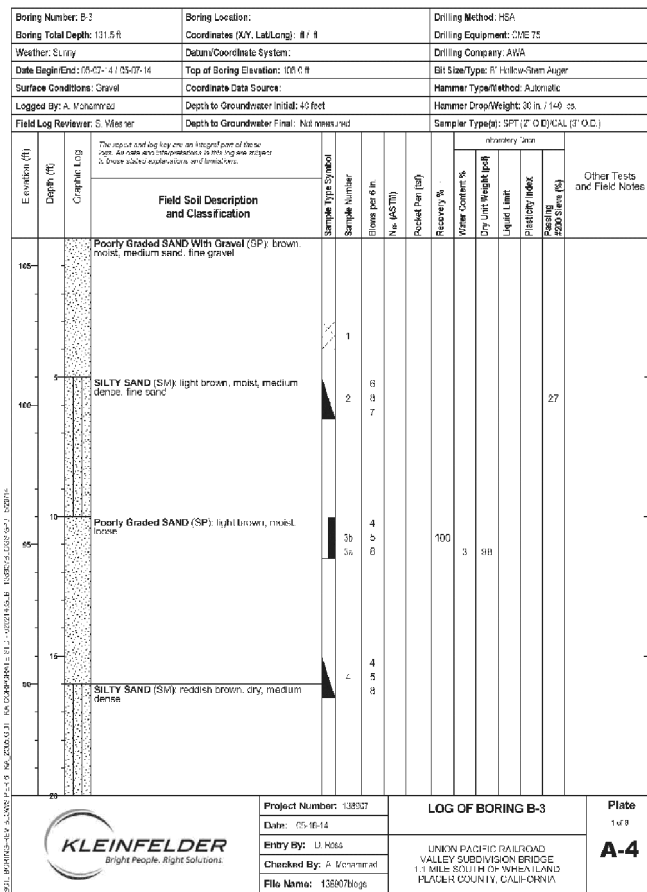
DATE: 07-07-14

FILE NAME: P:\dcm\w\12577_bcg.dgn

NOTE:
SUBSURFACE INFORMATION IS PROVIDED FOR INFORMATION ONLY FROM KLEINFELDER REPORT DATED JUNE 2, 2014. THE CONTRACTOR SHALL OBTAIN AND REVIEW A COMPLETE COPY OF THE KLEINFELDER REPORT FROM THE OFFICE OF THE AVP ENGINEERING DESIGN.

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NO.	DATE	REVISIONS
		
		
UNION PACIFIC RAILROAD		
Office of AVP Engineering/Design/Construction		
LOCATION: BRIDGE 126.77 VALLEY SUB. 10.3 MILES NORTH OF LINCOLN, CA		
FACILITY: 6-SPAN PCB x 191' (SEG. B) AND 3 SPAN BM-BD x 207' (SEG. C) REPLACING 1-SPAN PCS x 12' (SEGMENT B) AND 10-SPAN PGD-OD x 352' (SEG. C)		
DWG. TITLE: SUBSURFACE INVESTIGATION (SHEET 1 OF 3)		
PROJECT ID: 56864	UP ENGINEER:	LATITUDE:
WORK ORDER: 11199	UP-MAB	38°59'58" N
DESIGN BY:	HRD-NPD	LONGITUDE:
CHECKED BY:		121°24'18" W
DRAWN BY:	SHEET NO.	C E NUMBER
CHECKED BY:	16 of 18	119806
SCALE:		

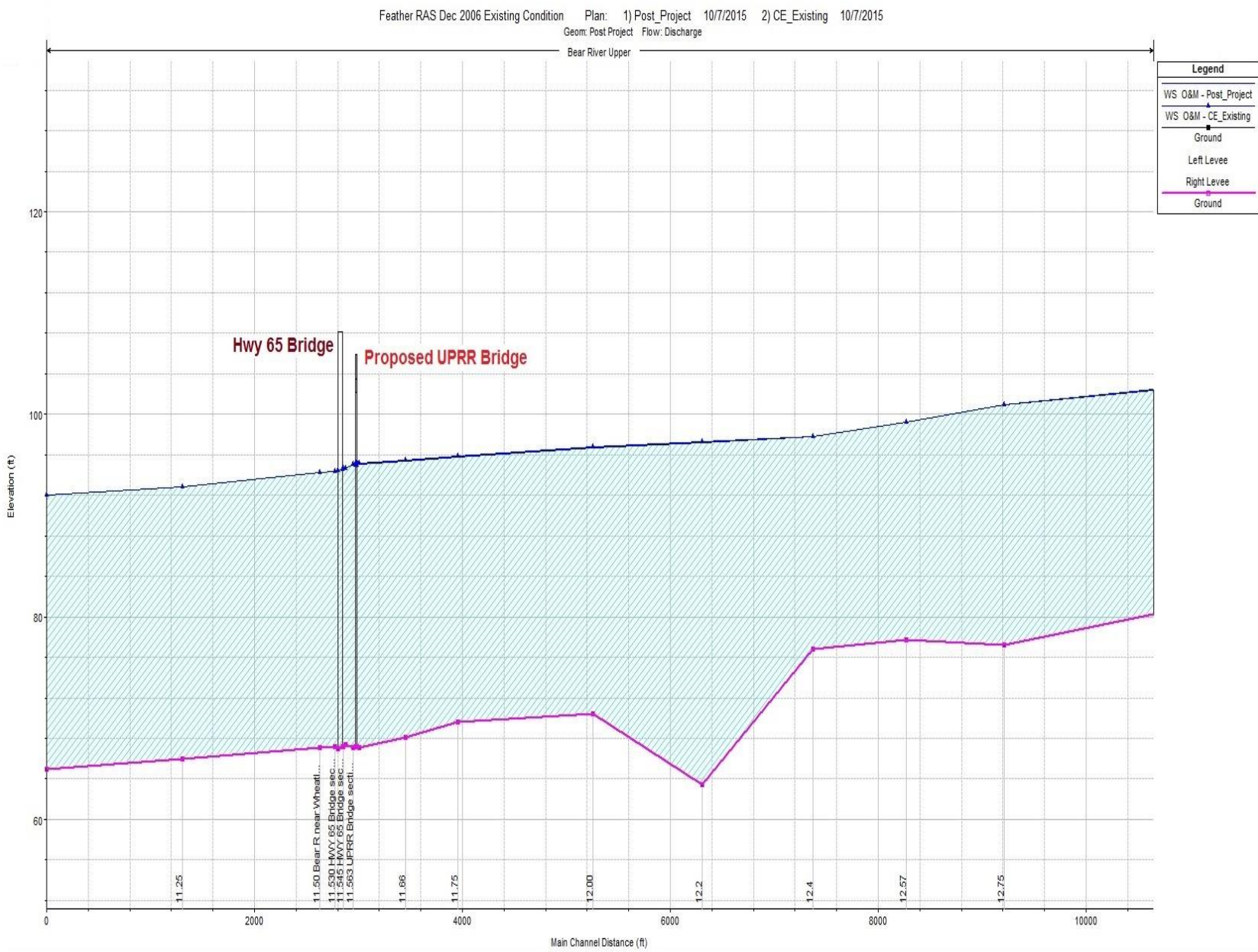




NOTE:
SUBSURFACE INFORMATION IS PROVIDED FOR INFORMATION ONLY FROM KLEINFELDER REPORT DATED JUNE 2, 2014. THE CONTRACTOR SHALL OBTAIN AND REVIEW A COMPLETE COPY OF THE KLEINFELDER REPORT FROM THE OFFICE OF THE AVP ENGINEERING DESIGN.

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NO.	DATE	REVISIONS

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ATTACHMENT D – HYDRAULIC PROFILE INFORMATION

Profile Output Table - Standard Table 1													
File Options Std. Tables User Tables Locations Help													
HEC-RAS River: Bear River Reach: Upper Profile: OM													
Reach	River Sta	Profile	Plan	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Upper	12.57	O&M	Post_Project	30000.00	77.70	99.19	90.87	100.40	0.001860	9.02	3943.76	534.38	0.42
Upper	12.57	O&M	CE_Existing	30000.00	77.70	99.22	90.87	100.42	0.001844	8.99	3962.47	538.40	0.42
Upper	12.4	O&M	Post_Project	30000.00	76.83	97.77	90.20	98.80	0.001599	8.26	4095.65	639.32	0.40
Upper	12.4	O&M	CE_Existing	30000.00	76.83	97.82	90.20	98.85	0.001574	8.22	4131.75	642.99	0.40
Upper	12.2	O&M	Post_Project	30000.00	63.42	97.19	83.29	97.75	0.000534	6.25	5699.29	442.72	0.24
Upper	12.2	O&M	CE_Existing	30000.00	63.42	97.25	83.29	97.80	0.000528	6.22	5727.42	450.79	0.24
Upper	12.00	O&M	Post_Project	30000.00	70.48	96.68	87.18	97.14	0.000564	5.77	6754.05	657.83	0.25
Upper	12.00	O&M	CE_Existing	30000.00	70.48	96.76	87.18	97.20	0.000554	5.74	6801.74	659.33	0.24
Upper	11.75	O&M	Post_Project	30000.00	69.61	95.74	86.84	96.28	0.000752	6.33	5753.16	567.61	0.28
Upper	11.75	O&M	CE_Existing	30000.00	69.61	95.83	86.84	96.37	0.000734	6.28	5806.61	572.09	0.28
Upper	11.66	O&M	Post_Project	30000.00	68.11	95.40	85.31	95.94	0.000625	5.90	5527.16	651.20	0.26
Upper	11.66	O&M	CE_Existing	30000.00	68.11	95.51	85.31	96.03	0.000610	5.86	5593.31	652.66	0.25
Upper	11.574	O&M	Post_Project	30000.00	67.06	95.07	84.57	95.64	0.000686	6.13	5318.43	589.40	0.27
Upper	11.574	O&M	CE_Existing	30000.00	67.06	95.18	84.57	95.74	0.000669	6.08	5383.58	591.25	0.26
Upper	11.569	O&M	Post_Project	30000.00	67.23	95.15	82.47	95.59	0.000459	5.38	5811.96	462.93	0.22
Upper	11.569	O&M	CE_Existing	30000.00	67.23	95.25	82.47	95.69	0.000455	5.38	5732.24	468.67	0.22
Upper	11.568	UPRR Bridge		Bridge									
Upper	11.567	O&M	Post_Project	30000.00	67.23	95.06	82.47	95.51	0.000732	5.41	5771.28	452.34	0.23
Upper	11.567	O&M	CE_Existing	30000.00	67.23	95.05	82.47	95.51	0.000740	5.44	5646.43	445.60	0.23
Upper	11.563	O&M	Post_Project	30000.00	67.06	95.05	82.58	95.49	0.000745	5.36	5810.46	496.42	0.23
Upper	11.563	O&M	CE_Existing	30000.00	67.06	95.05	82.58	95.49	0.000745	5.36	5810.46	496.42	0.23
Upper	11.549	O&M	Post_Project	30000.00	67.36	94.63	84.12	95.39	0.001242	7.03	4572.23	430.92	0.29
Upper	11.549	O&M	CE_Existing	30000.00	67.36	94.63	84.12	95.39	0.001242	7.03	4572.23	430.92	0.29
Upper	11.545	O&M	Post_Project	30000.00	67.21	94.63	84.02	95.35	0.001312	6.81	4610.03	449.88	0.30
Upper	11.545	O&M	CE_Existing	30000.00	67.21	94.63	84.02	95.35	0.001312	6.81	4610.03	449.88	0.30
Upper	11.540	Bridge		Bridge									
Upper	11.535	O&M	Post_Project	30000.00	67.00	94.50	83.96	95.22	0.001231	6.85	4693.90	471.09	0.29
Upper	11.535	O&M	CE_Existing	30000.00	67.00	94.50	83.96	95.22	0.001231	6.85	4693.90	471.09	0.29
Upper	11.530	O&M	Post_Project	30000.00	67.21	94.36	84.73	95.18	0.001423	7.31	4560.37	556.50	0.31
Upper	11.530	O&M	CE_Existing	30000.00	67.21	94.36	84.73	95.18	0.001423	7.31	4560.37	556.50	0.31
Upper	11.50	O&M	Post_Project	30000.00	67.06	94.22	82.88	94.94	0.001437	6.83	4578.59	351.83	0.31
Upper	11.50	O&M	CE_Existing	30000.00	67.06	94.22	82.88	94.94	0.001437	6.83	4578.59	351.83	0.31
Upper	11.25	O&M	Post_Project	30000.00	65.98	92.81	83.62	93.35	0.000980	6.88	6869.29	809.29	0.26
Upper	11.25	O&M	CE_Existing	30000.00	65.98	92.81	83.62	93.35	0.000980	6.88	6869.29	809.29	0.26

Total flow in cross section.