

# **LOCATION HYDRAULIC STUDY AND SUMMARY FLOODPLAIN ENROACHMENT REPORT**

FOR THE

## **RAILROAD AVENUE BRIDGES PROJECT**

Over Fornat Wash (Br. No. 56C0099)  
(Federal Aid Project No. BRLO-5956(228))

Over East Channel Stubbe Wash (Br. No. 56C0101)  
(Federal Aid Project No. BRLO-5956(229))

*Submitted to:*

**CALIFORNIA DEPARTMENT OF TRANSPORTATION, DISTRICT 8**  
464 W. 4th Street  
San Bernardino, CA 92401

*Prepared for:*

**COUNTY OF RIVERSIDE DEPARTMENT OF TRANSPORTATION**  
3525 14<sup>th</sup> Street  
Riverside, CA 92501

*Prepared by:*

**AGUILAR CONSULTING, INC.**  
2155 Chicago Avenue, Suite 304  
Riverside, CA 92507  
(951) 300-1431

February 2020

**LOCATION HYDRAULIC STUDY AND SUMMARY FLOODPLAIN  
ENROACHMENT REPORT FOR THE RAILROAD AVENUE BRIDGES PROJECT  
RIVERSIDE COUNTY, CALIFORNIA**

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This report has been prepared by or under the direction of the following registered civil engineer who attests to the technical information contained herein. The registered civil engineer has also judged the qualifications of any employees that have provided data and calculations upon which the recommendations, conclusions, and decisions are based.



Ceazar V. Aguilar, PE 41679

A handwritten signature in black ink, appearing to read "C. Aguilar", written over a horizontal line.

# Memorandum

*Making Conservation  
a California Way of Life.*

**To:** AARON P. BURTON  
SENIOR ENVIRONMENTAL PLANNER  
LOCAL ASSISTANCE - ENVIRONMENTAL SUPPORT

**Date:** March 27, 2020

**File:** FPN: 5956(225-228 & 239)  
LHS-SFER Report for  
Railroad Ave Bridge Project  
08-Riv-10 near PM 107-110  
Fornat Wash - Stubbe Wash

**From:** ALAN BISI   
Office Chief  
Hydraulics, MS 1065

**Subject:** LOCATION HYDRAULIC STUDY REPORT WITH SUMMARY FLOODPLAIN ENCROACHMENT REPORT

District 8 Hydraulics Unit has reviewed the revised Location Hydraulic Study and Summary Floodplain Encroachment Report for above mentioned project, prepared by Aguilar Consulting, Inc., dated February 2020. The document appears to address all hydraulic information adequately. We concur with the response provided and recommend acceptance of the report as an IGR supporting document.

If you have any questions or would like to discuss any of the above items further, please feel free to contact the Project Engineer, Michael Huynh, at (909) 806-2524 or myself, at (909) 383-4624

**LOCATION HYDRAULIC STUDY AND SUMMARY FLOODPLAIN  
ENCROACHMENT REPORT FOR THE RAILROAD AVENUE BRIDGES PROJECT  
RIVERSIDE COUNTY, CALIFORNIA**

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- ATTACHMENT A:** LOCATION HYDRAULIC STUDY FORM
- ATTACHMENT B:** SUMMARY FLOODPLAIN ENCROACHMENT REPORT

# LOCATION HYDRAULIC STUDY AND SUMMARY FLOODPLAIN ENROACHMENT REPORT FOR THE RAILROAD AVENUE BRIDGES PROJECT RIVERSIDE COUNTY, CALIFORNIA

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## I. INTRODUCTION

Aguilar Consulting Inc. has prepared the Location Hydraulic Study (LHS) and Summary Floodplain Encroachment Report (SFER) in support of the proposed Railroad Avenue Bridges Project.

The County of Riverside (County), in cooperation with California Department of Transportation (Caltrans), proposes to replace the following two (2) existing scour critical and structurally deficient timber bridges along Railroad Avenue near Whitewater in Riverside County, California (see Exhibit "A" and Exhibit "B"):

- Railroad Avenue Bridge over Fornat Wash (Br. No. 56C0099) (Federal Aid Project No. BRLO-5956(228))
- Railroad Avenue Bridge over East Channel Stubbe Wash (Br. No. 56C0101) (Federal Aid Project No. BRLO-5956(229))

## II. PROJECT DESCRIPTION

Railroad Avenue is an approximately 5-mile stretch of road that runs parallel to Interstate 10 (I-10) and the Union Pacific Railroad (UPRR). It connects the Haugen-Lehmann Way and I-10 at the east end and Main Street and I-10 at the west end. It mostly serves the sparsely populated Cabazon community. The average daily traffic (ADT) volume is approximately 339 vehicles. Periodically, the road carries detoured traffic from the heavily traveled I-10 when the freeway is temporarily closed for construction or emergency incidents. The road also serves as an access route for UPRR and utility maintenance crews. Therefore, it is important to maintain this frontage road in sound condition at all times.

The existing timber bridges carry two lanes (one lane in each direction) of traffic over Fornat and East Channel Stubbe Washes. The timber bridges are approximately 59 feet long and are 32 feet wide from curb-to-curb. The County proposes replacing the existing two 2-lane timber bridges along Railroad Avenue with new 2-lane modern bridges with a curb-to-curb roadway width of 32 feet at the same locations.

The bridges are listed in the federal Eligible Bridge List (EBL), as "Structurally Deficient (SD)" with a low Sufficiency Rating (SR) between 59.1 and 62.9. A sufficiency rating is essentially an overall rating of a bridge's fitness for the duty that it performs. The rating is based on a bridge's structural evaluation, functional/geometric obsolescence, and its essentiality to the public. A low sufficiency rating may be due to structural defects, narrow lanes, low vertical clearance, or any of many possible issues. A bridge is healthy when its SR is more than 80.0. Bridges with SR equal to or less than 80.0 and more than 50.0 require rehabilitation or widening. When the SR falls less than 50.0, bridge replacement shall be considered for public safety. Although the Railroad Avenue bridges carry a status flag of SD with SR ratings between 50 and 80 (qualifying for major rehabilitation), it was determined that the bridges are well beyond their 50-year service life and it would be more cost-efficient to replace the bridges. Additionally, a scour Plan of Action (POA) was

# LOCATION HYDRAULIC STUDY AND SUMMARY FLOODPLAIN ENROACHMENT REPORT FOR THE RAILROAD AVENUE BRIDGES PROJECT RIVERSIDE COUNTY, CALIFORNIA

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performed on the bridges by the County in 2013. The POA recommended total replacement of the bridges as the most cost-effective option due to the extent of the scour, structural instability and deterioration of various timber bridge elements.

The proposed project would replace the existing 2-lane timber bridges with new 2-lane modern bridges. The proposed road width would consist of two 12-foot-wide travel lanes, one lane in each direction, and a 4-foot-wide shoulder on each side. Modern traffic barriers/railings meeting current CALTRANS safety design standards would be constructed. The proposed bridges would be approximately 60 feet long depending on the channel hydraulic capacity and water surface freeboard requirements. Potentially the elevation of Fornat Wash Bridge may increase, but by no more than two feet to meet freeboard requirements. The East Channel Stubbe Wash Bridge elevation would remain the same. Additionally, approach roadway improvements would be provided and channel improvements would be administered to avoid future scour problems. It is envisioned that the channel bottom will remain earthen.

Existing underground utilities along the north side of Railroad Avenue and suspended utilities (a 4-inch gas line and a telephone line) along the north side of the East Channel Stubbe Wash bridge would be affected by construction and may require relocation.

All construction activities would be conducted within the existing roadway right of way with construction staging and material laydown areas on the roadway itself. Railroad Avenue between the two bridges to be replaced would be closed for continuous traffic during construction. The construction duration will be further determined during the project development. It is envisioned that the two bridges will be constructed one at a time to allow access to UPRR facilities and adjacent utilities from the Haugen-Lehmann Way/I-10 Interchange or the Main Street/I-10 Interchange. A Traffic Management Plan (TMP) would be prepared to address closure of the road and access to local utilities and properties.

The proposed construction would require a temporary construction easement (TCE) from UPRR for access to the channel bottom. However, construction activities are expected to stay at least 50 feet from the live rail tracks to eliminate any effects on railroad operations. The Railroad Avenue bridges abut adjacent State Bridges (Br. No. 56-166 and Br. No. 56-168) that carry I-10 traffic over the same washes. Structural modifications to the State Bridges are not anticipated; however, this will be evaluated during design. An encroachment permit from Caltrans District 8 would be obtained prior to construction.

### III. FLOODPLAIN ENCROACHMENT

The FEMA definition of **encroachment** states that “construction, placement of fill, or similar alteration of topography in the floodplain that reduces the area available to convey floodways.” The Federal Highway Administration (FHWA) defines it as “an action within the limits of the base floodplain”. Review of the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map (FIRM) Number 06065C0865G effective August 28, 2008 (Exhibit “D”), the following has been found:

**LOCATION HYDRAULIC STUDY AND SUMMARY FLOODPLAIN  
ENROACHMENT REPORT FOR THE RAILROAD AVENUE BRIDGES PROJECT  
RIVERSIDE COUNTY, CALIFORNIA**

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- It is indicated that the Fornat Wash Bridge is within a designated Zone “X” (unshaded), which means the area is outside the 0.2% annual chance floodplain. Therefore, the Fornat Wash Bridge **does not encroach** into any defined floodplains or floodways as shown on Exhibit “D”.
- It is indicated that the East Channel Stubbe Wash Bridge is within a designated Special Flood Hazard Zone “A” known as the Stubbe Canyon Wash, which means that the area is subject to the 1% annual chance floodplain, with no known base flood elevations. Therefore, the East Stubbe Wash Bridge **encroaches** into the 1% annual chance flood hazard zone as shown on Exhibit “D”, and thus subject to inundation by the 100-year flood event. Construction of the bridge **will not** have any impact to the existing floodplain.

Caltrans has prepared a hydrology study for Fornat Wash and East Channel Stubbe Wash showing the following flow rates for the 100-year and 50-year flood events (Ref. 2):

- Fornat Wash
  - $Q_{100} = 2,500$  CFS
  - $Q_{50} = 1,800$  CFS
- East Channel Stubbe Wash
  - $Q_{100} = 4,200$  CFS
  - $Q_{50} = 3,100$  CFS

The flow rates were determined using the “Troxell method”, an outdated hydrologic calculation method. A floodplain analysis using the HEC-RAS model was performed for Fornat Wash and East Channel Stubbe Wash using Caltrans’ flow rates based on the proposed bridge footprint at Railroad Avenue. The results indicate that the 100-year and 50-year flow rates are contained within the cross section of the channel and the proposed bridge section with the following bridge freeboard:

- Fornat Wash
  - For  $Q_{100} = 2,500$  CFS, the average freeboard at the upstream side of the bridge is approximately 0.13 feet with a maximum freeboard of 0.26 feet at the northwest bridge abutment while at the downstream side of the bridge, it is approximately 0.72 feet with a maximum freeboard of 1.28 feet at the southwest bridge abutment.
  - For  $Q_{50} = 1,800$  CFS, the average freeboard at the upstream side of the bridge is approximately 0.82 feet with a maximum freeboard of 1.31 feet at the northwest bridge abutment while at the downstream side of the bridge, it is

**LOCATION HYDRAULIC STUDY AND SUMMARY FLOODPLAIN  
ENROACHMENT REPORT FOR THE RAILROAD AVENUE BRIDGES PROJECT  
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approximately 1.60 feet with a maximum freeboard of 2.16 feet at the southwest bridge abutment.

- East Channel Stubbe Wash
  - For  $Q_{100} = 4,200$  CFS, the average freeboard at the upstream side of the bridge is approximately 5.54 feet with a maximum freeboard of 5.93 feet at the northeast bridge abutment while at the downstream side of the bridge, it is approximately 7.74 feet with a maximum freeboard of 8.18 feet at the southeast bridge abutment.
  - For  $Q_{50} = 3,100$  CFS, the average freeboard at the upstream side of the bridge is approximately 6.91 feet with a maximum freeboard of 7.33 feet at the northeast bridge abutment while at the downstream side of the bridge, it is approximately 8.91 feet with a maximum freeboard of 9.34 feet at the southeast bridge abutment.

The overtopping flow rates at the two bridges were determined to be approximately 3,550 CFS for Fornat Wash and 12,800 CFS for East Channel Stubbe Wash using a flood frequency curve (FFC) as shown on Exhibit “E.1” and “E.2”. These flows are equivalent to approximately 188-year and 840-year flood events, respectively.

#### **IV. REFERENCES**

1. Federal Emergency Management Agency (FEMA) Map Services.
2. Caltrans; *“Drainage Report for the Design Project on State Highway Route 26 in Riverside County from East City Limits of Cabazon to West Junction of Route 187”*, VIII-Riv-26-C, 8V10H446.1, April 27, 1962.



## **EXHIBITS**

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**EXHIBIT “A”: REGIONAL LOCATION MAP**

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# EXHIBIT "A" - REGIONAL LOCATION MAP



**EXHIBIT “B”: PROJECT LOCATION MAP**

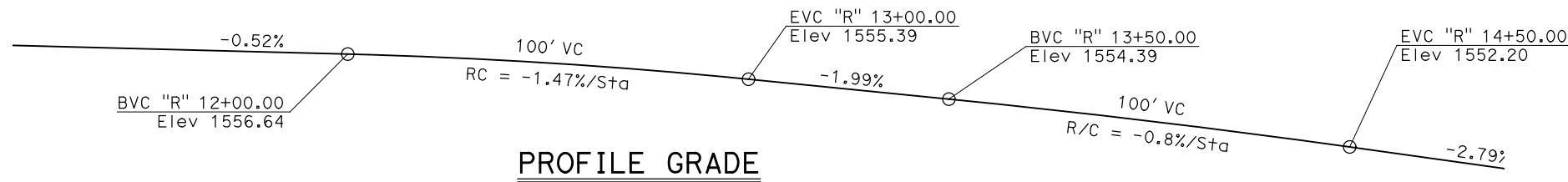
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# EXHIBIT "B" - PROJECT LOCATION MAP

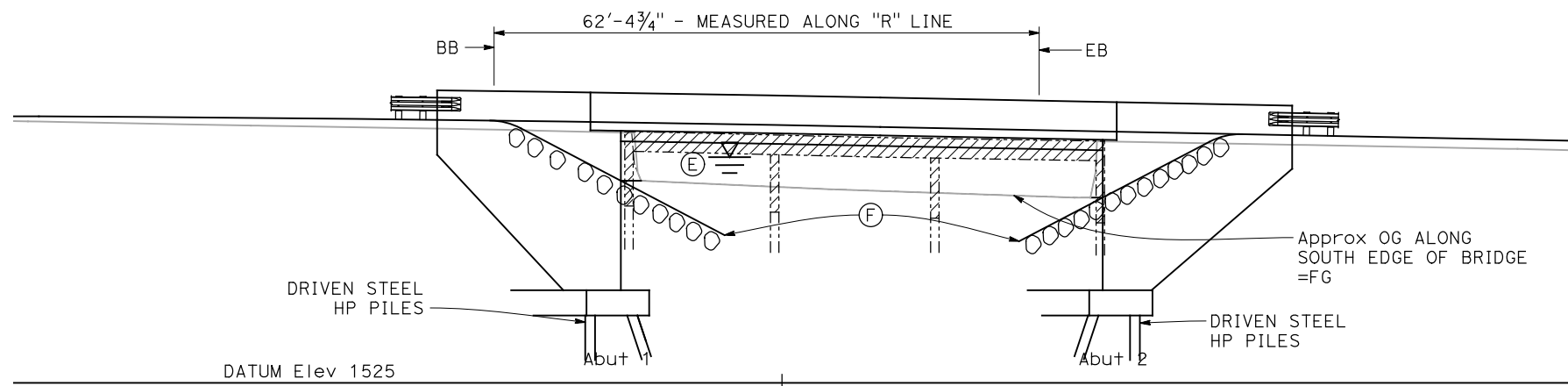


**EXHIBIT “C”: BRIDGE GENERAL PLANS AND BRIDGE  
GEOMETRIC APPROVAL DRAWINGS FOR THE  
PROPOSED RAILROAD AVENUE BRIDGES**

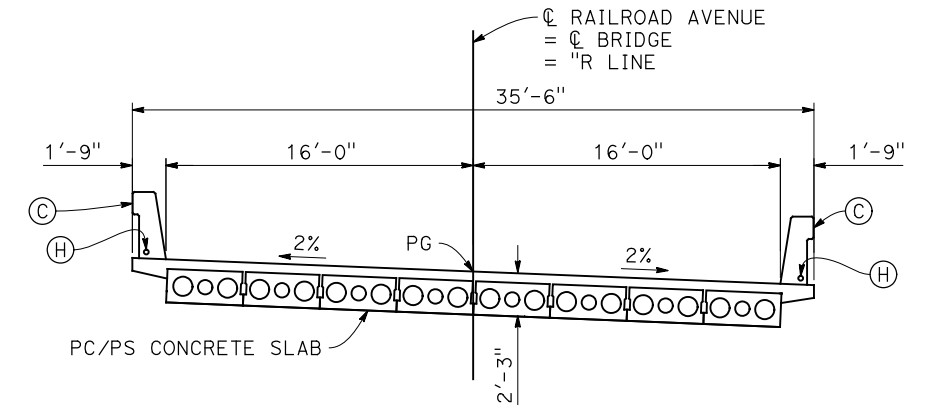
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**PROFILE GRADE**

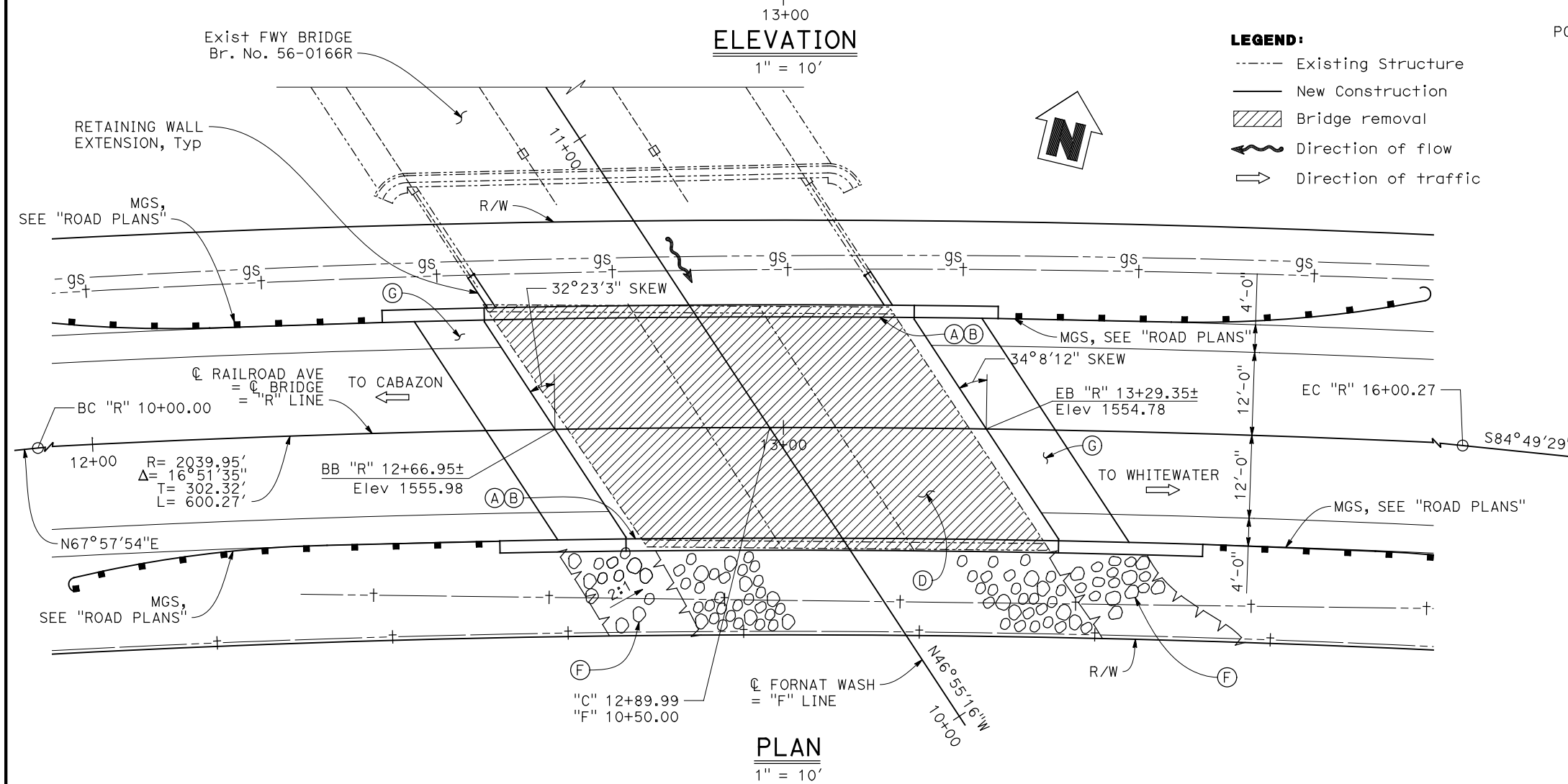


- KEY NOTES:**
- (A) Paint "Bridge No. XX-XXXX"
  - (B) Paint "Fornat Wash Bridge"
  - (C) Concrete Barrier (Type 842)
  - (D) Remove Existing Bridge (Bridge No. 56C0099)
  - (E) Water surface elevation, see "FOUNDATION PLAN"
  - (F) Rock slope protection, see "ROAD PLANS"
  - (G) Structure Approach Type EQ (10)
  - (H) 3" Conduit (Future Utility)



**TYPICAL SECTION**

- LEGEND:**
- Existing Structure
  - New Construction
  - ▨ Bridge removal
  - ~ Direction of flow
  - ➔ Direction of traffic



**PLAN**

**VEHICULAR TRAFFIC**

- \_\_\_ New alignment. No traffic at the site.
- Traffic will be detoured away from the site.
- \_\_\_ Traffic will be carried on the structure. Stage construction will/will not be required.
- \_\_\_ Traffic will pass under the structure on \_\_\_\_\_ XXXX (Name of St. or Hwy.)

A. \_\_\_ No falsework allowed over traffic.  
 B. \_\_\_ Falsework opening(s) required:

Temporary Vertical Clearance	Width of Traffic Opening
___ Bnd. _____	___
___ Bnd. _____	___
___ Two-way _____	___

C. \_\_\_ Temporary traffic lane reduction needed for footing excavation.

**PEDESTRIAN TRAFFIC**  
 Falsework opening(s) required on \_\_\_\_\_ N/A \_\_\_\_\_ (Name of St.)

Location	Height	Width
_____	_____	_____

**RAILROAD TRAFFIC**  
 Falsework opening(s) required over \_\_\_\_\_ N/A \_\_\_\_\_ (Name of RR)

Vertical Clearance	Horizontal Clear Width
_____	_____

PLOT DRIVER => #PLTRV#  
PEN TABLE => #PENTBL#

REVISIONS				
MARK	DATE	DESCRIPTION	BY	APP'D

DESIGN BY:	CHECKED BY:	LOAD & RESISTANCE FACTOR DESIGN	LIVE LOADING: HL93 W/"LOW-BOY"; PERMIT DESIGN VEHICLE
DETAILS BY:	CHECKED BY:	LAYOUT BY:	CHECKED BY:
QUANTITIES BY:	CHECKED BY:	SPECIFICATIONS BY:	PLANS AND SPECS COMPARED BY:
THE COUNTY OF RIVERSIDE OR ITS OFFICERS OR AGENTS SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OR COMPLETENESS OF ELECTRONIC OR SCANNED COPIES OF THIS PLAN SHEET.			

BRIDGE NO.	ORIGINAL SCALE IN INCHES FOR REDUCED PLANS
	0 1 2 3

**COUNTY OF RIVERSIDE TRANSPORTATION DEPARTMENT**

Approved to conformance with County Standards and Practices.

XXX XXX COUNTY OVERSIGHT ENGINEER      XX-XX-XX DATE

**CNS ENGINEERS, INC.**

REGISTERED PROFESSIONAL ENGINEER  
 QUYET TRONG NGUYEN  
 No. C 71743  
 Exp. 12/31/21  
 CIVIL

PROJECT ENGINEER      01-28-20 DATE

11870 PIERCE ST., STE. 265  
 RIVERSIDE, CA 92505 PH: (951) 687-1005

**RAILROAD RD BRIDGE OVER FORNAT WASH BRIDGE (REPLACE) Br. No. 56C0099, FPN BRLO-5956(228)**

**GENERAL PLAN**

SHEET NO.	<b>X</b>
SHEET X OF X	
PROJECT SHEET NO.	X
TOTAL SHEETS	X

USERNAME => Quy+Nguyen

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WO 00000

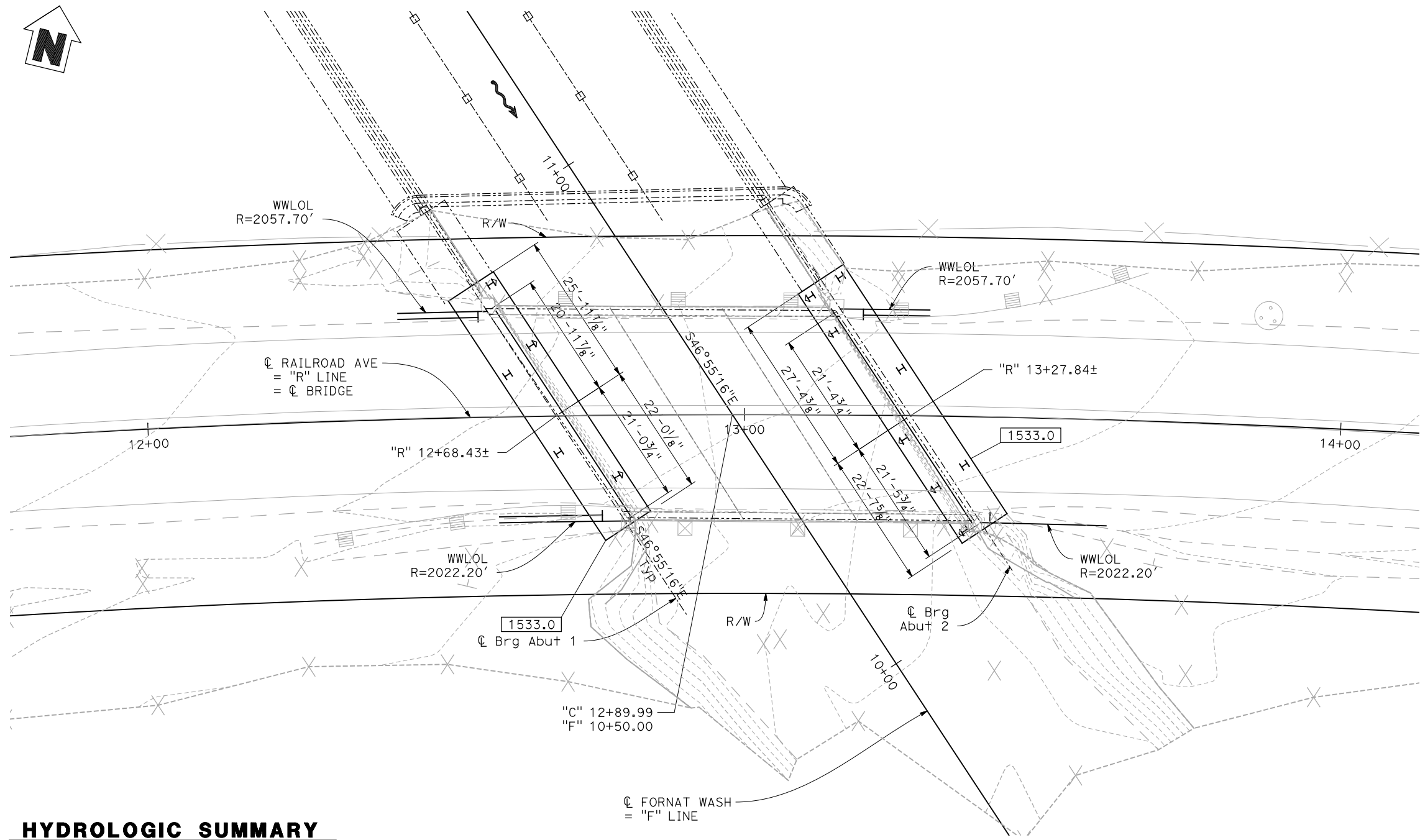
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- LEGEND:**
- Existing Structure
  - New Construction
  - ~~~~~ Direction of Flow
  - XXXX.X Bottom of Footing Elevation
  - H Plumb Pile
  - H Battered Pile

**NOTE:**  
1. Not all piles shown.



**HYDROLOGIC SUMMARY**

DRAINAGE AREA: X.XXX ACRES

DESIGN FLOOD

FREQUENCY (YEARS)	100
DISCHARGE (CUBIC FEET PER SECOND)	XXXX
WATER SURFACE (ELEVATION AT BRIDGE)	XXXX

FLOOD PLAIN DATA ARE BASED UPON INFORMATION AVAILABLE WHEN THE PLANS WERE PREPARED AND ARE SHOWN TO MEET FEDERAL REQUIREMENTS. THE ACCURACY OF SAID INFORMATION IS NOT WARRANTED BY THE STATE AND INTERESTED OR AFFECTED PARTIES SHOULD MAKE THEIR OWN INVESTIGATION.

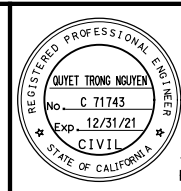
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PEN TABLE => \$PENTBL

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PHOTOGRAMMETRY AS OF:	ALIGNMENT TIES	DETAILS BY:	CHECKED BY:
SURVEYED BY:	DRAFTED BY:	QUANTITIES BY:	CHECKED BY:
FIELD CHECKED BY:	CHECKED BY:	BRIDGE NO.	

ORIGINAL SCALE IN INCHES FOR REDUCED PLANS



**CNS ENGINEERS, INC.**  
PROJECT ENGINEER  
DATE 01-28-20  
11870 PIERCE ST., STE. 265  
RIVERSIDE, CA 92505 PH: (951) 687-1005

**RAILROAD RD BRIDGE OVER FORNAT WASH BRIDGE (REPLACE) Br. No. 56C0099, FPN BRLO-5956(228)**  
**FOUNDATION PLAN**

SHEET NO.	X
SHEET X OF X	
PROJECT SHEET NO.	X
TOTAL SHEETS	X

USERNAME => QuyetNguyen

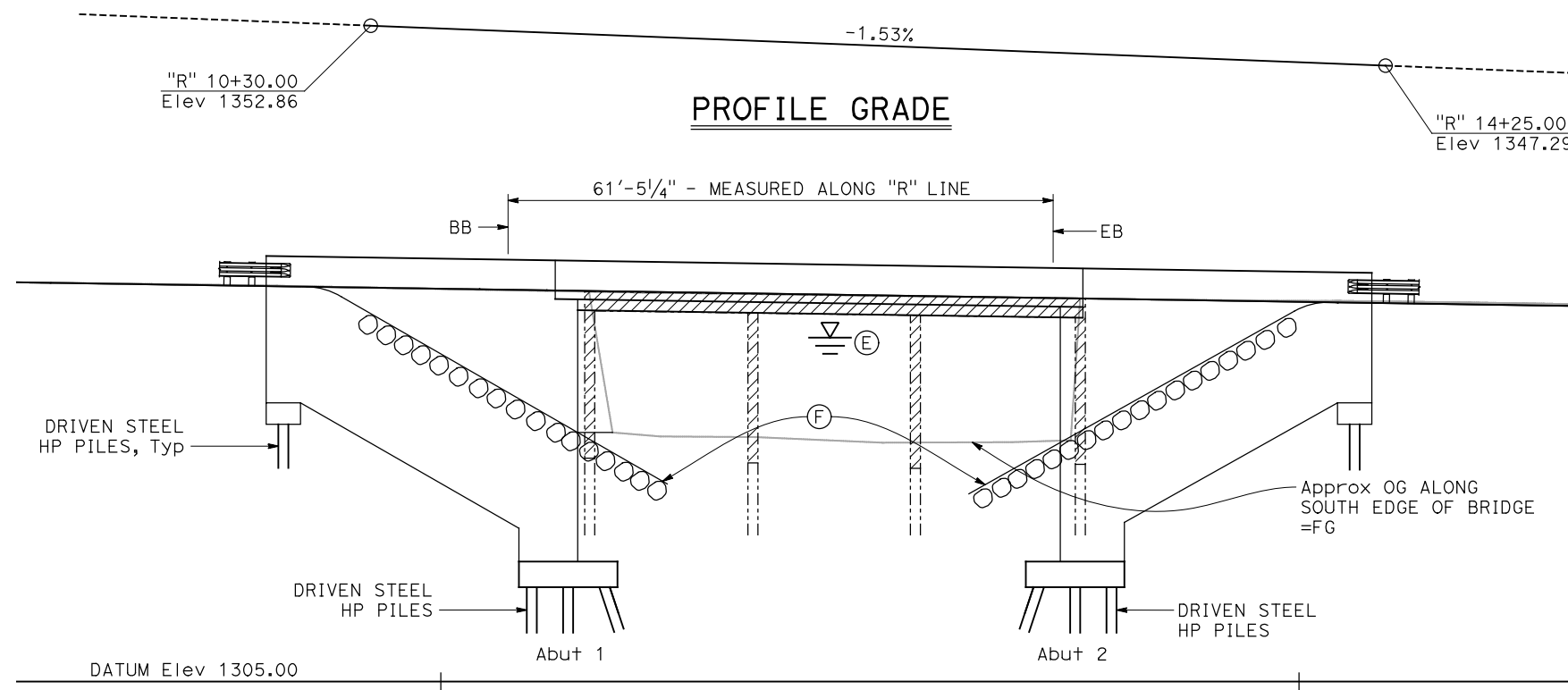
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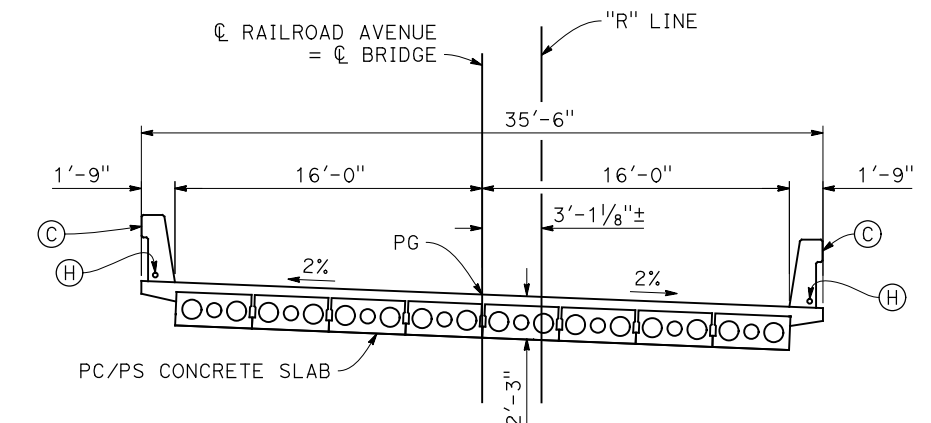


**LEGEND:**

- Existing Structure
- New Construction
- ▨ Bridge removal
- ~ Direction of flow
- ➔ Direction of traffic

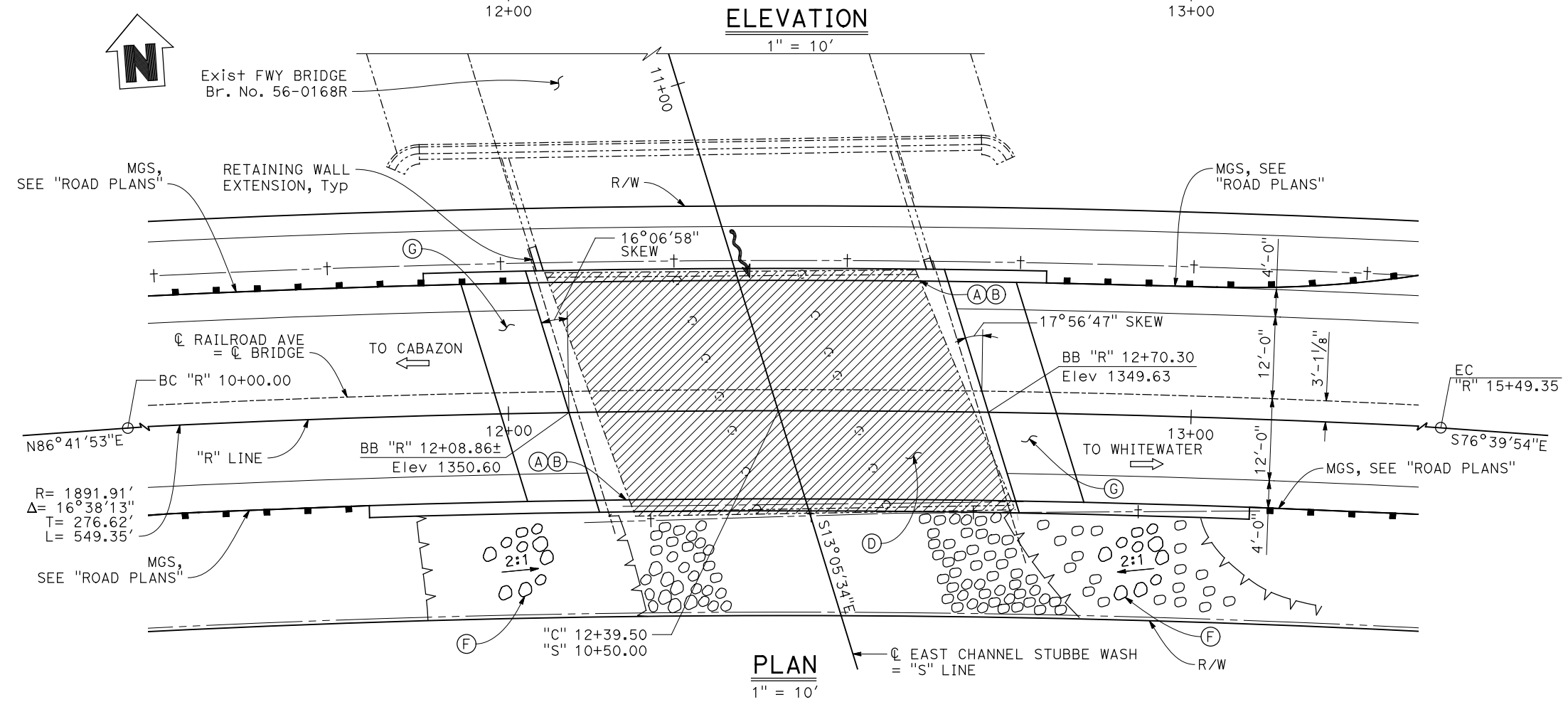
**KEY NOTES:**

- (A) Paint "Bridge No. XX-XXXX"
- (B) Paint "East Channel Stubbe Wash Bridge"
- (C) Concrete Barrier (Type 842)
- (D) Remove Existing Bridge (Bridge No. 56C0101)
- (E) Water surface elevation, see "FOUNDATION PLAN"
- (F) Rock slope protection, see "ROAD PLANS"
- (G) Structure Approach Type EQ (10)
- (H) 3" Conduit (Future Utility)



**TYPICAL SECTION**

1" = 5'



**PLAN**

1" = 10'

**VEHICULAR TRAFFIC**

- \_\_\_ New alignment. No traffic at the site.
- Traffic will be detoured away from the site.
- \_\_\_ Traffic will be carried on the structure. Stage construction will/will not be required.
- \_\_\_ Traffic will pass under the structure on \_\_\_\_\_ (Name of St. or Hwy.)

A. \_\_\_ No falsework allowed over traffic.  
 B. \_\_\_ Falsework opening(s) required:

	Temporary Vertical Clearance	Width of Traffic Opening
___ Bnd.	_____	_____
___ Bnd.	_____	_____
___ Two-way	_____	_____

C. \_\_\_ Temporary traffic lane reduction needed for footing excavation.

**PEDESTRIAN TRAFFIC**  
 Falsework opening(s) required on \_\_\_\_\_ (Name of St.)  
 Location Height Width

\_\_\_\_\_  
 \_\_\_\_\_

**RAILROAD TRAFFIC**  
 Falsework opening(s) required over \_\_\_\_\_ (Name of RR)  
 Vertical Clearance Horizontal Clear Width

\_\_\_\_\_  
 \_\_\_\_\_

PLOT DRIVER => #PLTRV#  
PEN TABLE => #PENTBL#

REVISIONS				
MARK	DATE	DESCRIPTION	BY	APP'D

DESIGN BY:	CHECKED BY:	LOAD & RESISTANCE FACTOR DESIGN	LIVE LOADING: HL93 W/"LOW-BOY"; PERMIT DESIGN VEHICLE
DETAILS BY:	CHECKED BY:	LAYOUT BY:	CHECKED BY:
QUANTITIES BY:	CHECKED BY:	SPECIFICATIONS BY:	PLANS AND SPECS COMPARED BY:
THE COUNTY OF RIVERSIDE OR ITS OFFICERS OR AGENTS SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OR COMPLETENESS OF ELECTRONIC OR SCANNED COPIES OF THIS PLAN SHEET.			
BRIDGE NO.		ORIGINAL SCALE IN INCHES FOR REDUCED PLANS	

COUNTY OF RIVERSIDE TRANSPORTATION DEPARTMENT	
Approved to conformance with County Standards and Practices.	
XXX XXX	XX-XX-XX
COUNTY OVERSIGHT ENGINEER	DATE

**CNS ENGINEERS, INC.**

11870 PIERCE ST., STE. 265  
 RIVERSIDE, CA 92505 PH: (951) 687-1005

PROJECT ENGINEER \_\_\_\_\_ DATE 01-28-20

REGISTERED PROFESSIONAL ENGINEER  
 QUYET TRONG NGUYEN  
 No. C 71743  
 Exp. 12/31/21  
 CIVIL  
 STATE OF CALIFORNIA

**RAILROAD RD BRIDGE OVER E CHANNEL STUBBE WASH BRIDGE (REPLACE) Br. No. 56C0101, FPN BRLO-5956(229)**

**GENERAL PLAN**

SHEET NO. **X** OF **X**

PROJECT SHEET NO. **X** TOTAL SHEETS **X**

USERNAME => Quye+Nguyen

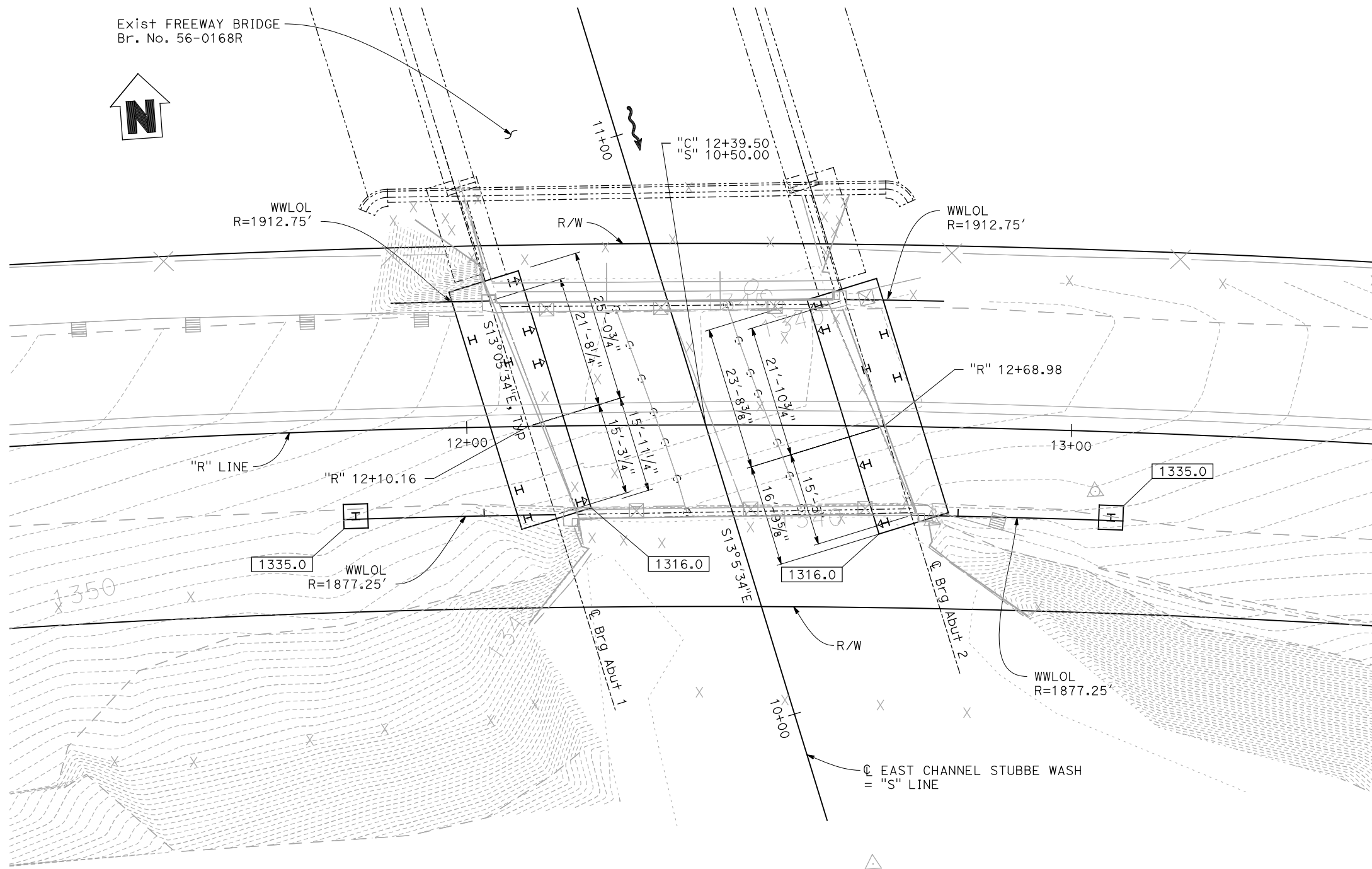
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04-21-15 TIME PLOTTED => 4:57:43 PM

Exist FREEWAY BRIDGE  
Br. No. 56-0168R



- LEGEND:**
- Existing Structure
  - New Construction
  - ~~~~~ Direction of Flow
  - XXXX.X Bottom of Footing Elevation
  - H Plumb Pile
  - H Battered Pile

**NOTE:**  
1. Not all piles shown.

**HYDROLOGIC SUMMARY**

DRAINAGE AREA: X.XXX ACRES

DESIGN FLOOD

FREQUENCY (YEARS)	100
DISCHARGE (CUBIC FEET PER SECOND)	XXXX
WATER SURFACE (ELEVATION AT BRIDGE)	XXXX

FLOOD PLAIN DATA ARE BASED UPON INFORMATION AVAILABLE WHEN THE PLANS WERE PREPARED AND ARE SHOWN TO MEET FEDERAL REQUIREMENTS. THE ACCURACY OF SAID INFORMATION IS NOT WARRANTED BY THE STATE AND INTERESTED OR AFFECTED PARTIES SHOULD MAKE THEIR OWN INVESTIGATION.

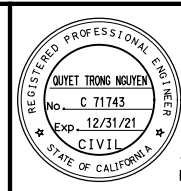
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GEO TECHNICAL PROFESSIONAL: X

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PEN TABLE => \$PENTBL\$

REVISIONS				
MARK	DATE	DESCRIPTION	BY	APP'D

VERT. DATUM	HORZ. DATUM	DESIGN BY:	CHECKED BY:
PHOTOGRAMMETRY AS OF:	ALIGNMENT TIES	DETAILS BY:	CHECKED BY:
SURVEYED BY:	DRAFTED BY:	QUANTITIES BY:	CHECKED BY:
FIELD CHECKED BY:	CHECKED BY:	BRIDGE NO.	

ORIGINAL SCALE IN INCHES FOR REDUCED PLANS



**CNS ENGINEERS, INC.**  
PROJECT ENGINEER  
DATE 01-28-20  
11870 PIERCE ST., STE. 265  
RIVERSIDE, CA 92505 PH: (951) 687-1005

**RAILROAD RD BRIDGE OVER  
E CHANNEL STUBBE WASH BRIDGE (REPLACE)  
Br. No. 56C0101, FPN BRLO-5956(229)**

**FOUNDATION PLAN**

SHEET NO.		<b>X</b>	
SHEET	X	OF	X
PROJECT SHEET NO.	X	TOTAL SHEETS	X

USERNAME => QuyetNguyen

DGN FILE => RR and Chuckwalla Avenue Bridge FPs.dgn

WO 00000

COUNTY FILE No.

LAST REVISION: DATE PLOTTED => 2/5/2020  
04-21-15 TIME PLOTTED => 4:37:51 PM

**EXHIBIT “D”: FEDERAL INSURANCE RATE MAP  
NO. 06065C0865G**

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**NOTES TO USERS**

This map is for use in administering the National Flood Insurance Program. It does not necessarily identify all areas subject to flooding, particularly from local drainage sources of small size. The community map repository should be consulted for possible updated or additional flood hazard information.

To obtain more detailed information in areas where **Base Flood Elevations (BFEs)** and/or **floodways** have been determined, users are encouraged to consult the Flood Profiles and Floodway Data and/or Summary of Stillwater Elevations tables contained within the Flood Insurance Study (FIS) report that accompanies this FIRM. Users should be aware that BFEs shown on the FIRM represent rounded whole-foot elevations. These BFEs are intended for flood insurance rating purposes only and should not be used as the sole source of flood elevation information. Accordingly, flood elevation data presented in the FIS report should be utilized in conjunction with the FIRM for purposes of construction and/or floodplain management.

**Coastal Base Flood Elevations** shown on this map apply only landward of 0.0' North American Vertical Datum of 1988 (NAVD 88). Users of this FIRM should be aware that coastal flood elevations are also provided in the Summary of Stillwater Elevations tables in the Flood Insurance Study report for this jurisdiction. Elevations shown in the Summary of Stillwater Elevations tables should be used for construction and/or floodplain management purposes when they are higher than the elevations shown on this FIRM.

Boundaries of the **floodways** were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations with regard to requirements of the National Flood Insurance Program. Floodway widths and other pertinent floodway data are provided in the Flood Insurance Study report for this jurisdiction.

Certain areas not in Special Flood Hazard Areas may be protected by **flood control structures**. Refer to Section 2.4 "Flood Protection Measures" of the Flood Insurance Study report for information on flood control structures for this jurisdiction.

The **projection** used in the preparation of this map was Universal Transverse Mercator (UTM) zone 11. The **horizontal datum** was NAD 83, GRS80 spheroid. Differences in datum, spheroid, projection or UTM zones used in the production of FIRMs for adjacent jurisdictions may result in slight positional differences in map features across jurisdiction boundaries. These differences do not affect the accuracy of this FIRM.

Flood elevations on this map are referenced to the North American Vertical Datum of 1988. These flood elevations must be compared to structure and ground elevations referenced to the same vertical datum. For information regarding conversion between the National Geodetic Vertical Datum of 1929 and the North American Vertical Datum of 1988, visit the National Geodetic Survey website at <http://www.ngs.noaa.gov> or contact the National Geodetic Survey at the following address:

NGS Information Services  
NOAA, NINGS 12  
National Geodetic Survey  
SSMC-3, #9202  
1315 East-West Highway  
Silver Spring, Maryland 20910-3282  
(301) 713-3242

To obtain current elevation, description, and/or location information for **bench marks** shown on this map, please contact the Information Services Branch of the National Geodetic Survey at (301) 713-3242, or visit its website at <http://www.ngs.noaa.gov>.

**Base map** information shown on this FIRM was derived from U.S. Geological Survey Digital Orthophoto Quadrangles produced at a scale of 1:12,000 from photography dated 1994 or later.

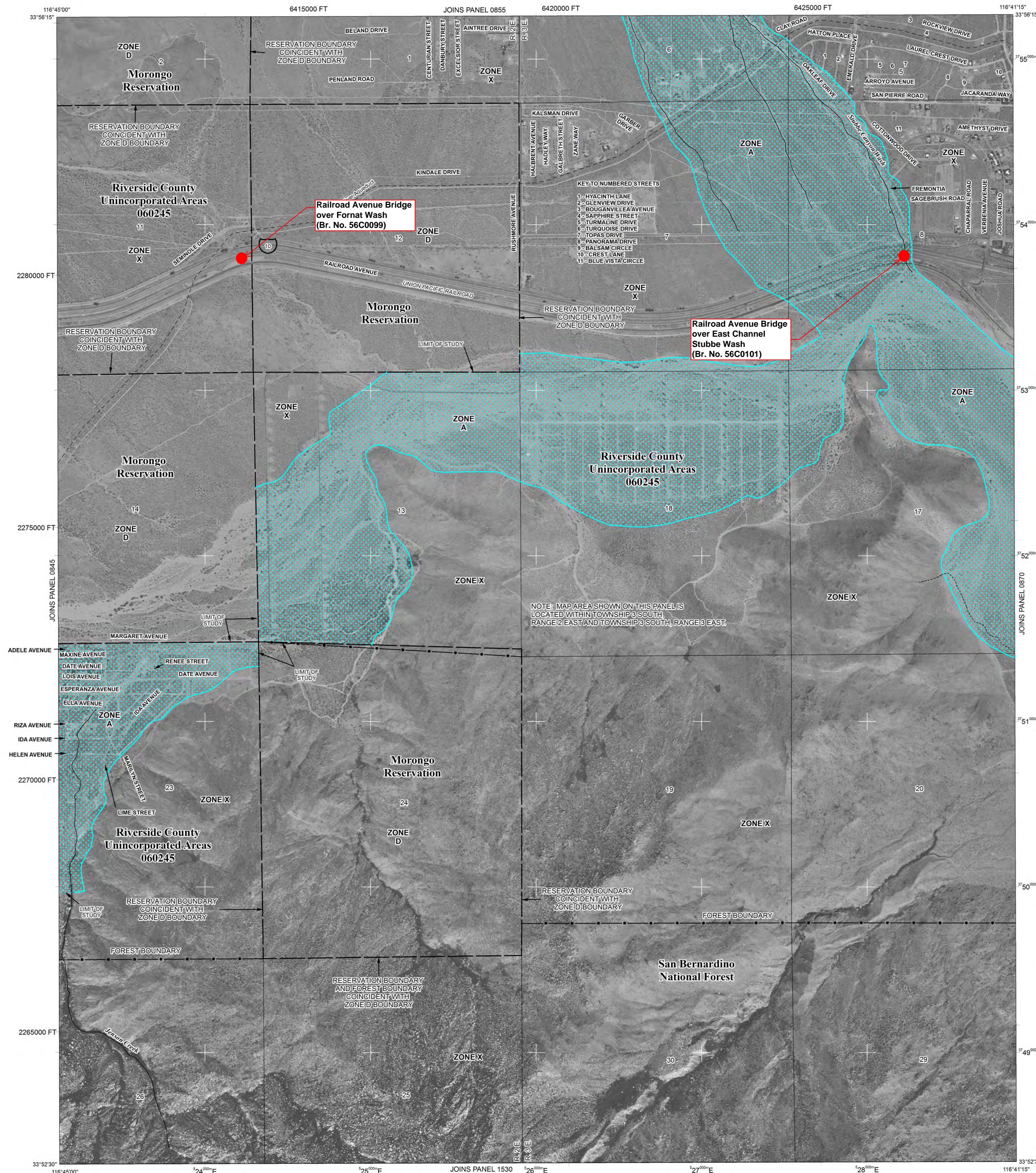
This map may reflect more detailed and up-to-date **stream channel configurations** than those shown on the previous FIRM for this jurisdiction. The floodplains and floodways that were transferred from the previous FIRM may have been adjusted to conform to these new stream channel configurations. As a result, the Flood Profiles and Floodway Data in the Flood Insurance Study Report (which contains authoritative hydraulic data) may reflect stream channel distances that differ from what is shown on this map.

**Corporate limits** shown on this map are based on the best data available at the time of publication. Because changes due to annexations or de-annexations may have occurred after this map was published, map users should contact appropriate community officials to verify current corporate limit locations.

Please refer to the separately printed **Map Index** for an overview map of the county showing the layout of map panels; community map repository addresses; and a Listing of Communities table containing National Flood Insurance Program dates for each community as well as a listing of the panels on which each community is located.

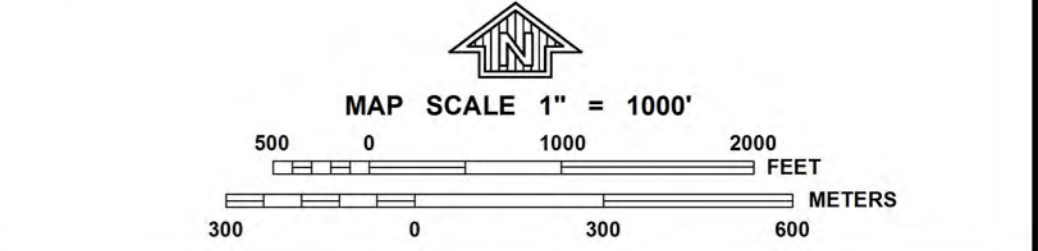
Contact the **FEMA Map Service Center** at 1-800-358-9616 for information on available products associated with this FIRM. Available products may include previously issued Letters of Map Change, a Flood Insurance Study report, and/or digital versions of this map. The FEMA Map Service Center may also be reached by Fax at 1-800-358-9620 and its website at <http://msc.fema.gov>.

If you have **questions about this map** or questions concerning the National Flood Insurance Program in general, please call 1-877-FEMA MAP (1-877-336-2627) or visit the FEMA website at <http://www.fema.gov>.



**LEGEND**

- SPECIAL FLOOD HAZARD AREAS SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD
- The 1% annual flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, AR, A99, V, and VE. The Base Flood Elevation is the water-surface elevation of the 1% annual chance flood.
- ZONE A** No Base Flood Elevations determined.
- ZONE AE** Base Flood Elevations determined.
- ZONE AH** Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.
- ZONE AO** Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.
- ZONE AR** Special Flood Hazard Area formerly protected from the 1% annual chance flood by a flood control system that was subsequently identified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.
- ZONE A99** Area to be protected from 1% annual chance flood by a Federal flood protection system under construction; no Base Flood Elevations determined.
- ZONE V** Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.
- ZONE VE** Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.
- FLOODWAY AREAS IN ZONE AE
- The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.
- OTHER FLOOD AREAS
- ZONE X** Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.
- OTHER AREAS
- ZONE X** Areas determined to be outside the 0.2% annual chance floodplain.
- ZONE D** Areas in which flood hazards are undetermined, but possible.
- COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS
- OTHERWISE PROTECTED AREAS (OPAs)
- CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.
- 1% annual chance floodplain boundary
- 0.2% annual chance floodplain boundary
- Floodway boundary
- Zone D boundary
- CBRS and OPA boundary
- Boundary dividing Special Flood Hazard Area Zones and boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths or flood velocities.
- Base Flood Elevation line and value; elevation in feet\* (EL 987)
- Base Flood Elevation value where uniform within zone; elevation in feet\*
- \* Referenced to the North American Vertical Datum of 1988
- Cross section line
- Transect line
- Geographic coordinates referenced to the North American Datum of 1983 (NAD 83), Western Hemisphere
- 1000-meter Universal Transverse Mercator grid values, zone 11N
- 600000 FT 5000-foot grid ticks; California State Plane coordinate system, zone VI (FIPSZONE 0406), Lambert Conformal Conic projection
- Bench mark (see explanation in Notes to Users section of this FIRM panel)
- M1.5 River Mile
- MAP REPOSITORY Refer to listing of Map Repositories on Map Index
- EFFECTIVE DATE OF COUNTYWIDE FLOOD INSURANCE RATE MAP August 28, 2008
- EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL
- For community map revision history prior to countywide mapping, refer to the Community Map History table located in the Flood Insurance Study report for this jurisdiction.
- To determine if flood insurance is available in this community, contact your Insurance agent or call the National Flood Insurance Program at 1-800-638-6620.



**EXHIBIT "D"**

PANEL 0865G

**FIRM**  
FLOOD INSURANCE RATE MAP

**RIVERSIDE COUNTY, CALIFORNIA AND INCORPORATED AREAS**

**PANEL 865 OF 3805**  
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:	COMMUNITY	NUMBER	PANEL	SUFFIX
	RIVERSIDE COUNTY	060245	0865	G

Notice to User: The Map Number shown below should be used when placing map orders; the Community Number shown above should be used on insurance applications for the subject community.

**MAP NUMBER**  
06065C0865G

**EFFECTIVE DATE**  
AUGUST 28, 2008

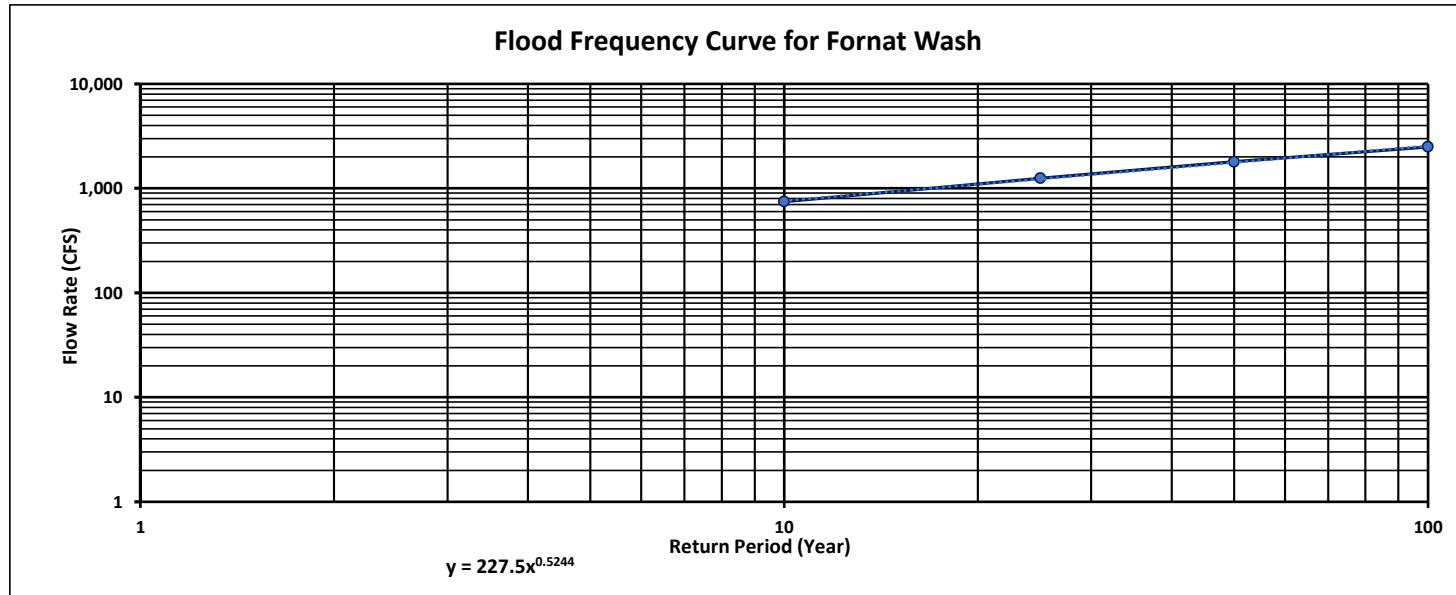
Federal Emergency Management Agency

**EXHIBIT “E”: FLOOD FREQUENCY CURVE FOR FORNAT  
WASH AND EAST CHANNEL STUBBE WASH**

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Exhibit E.1: Flood Frequency Curve for Fornat Wash



FORNAT WASH FLOOD FREQUENCY CURVE (FFC)		
Return Period (Year)	Flow Rate (CFS)	Notes
100	2,500	Calculated flow rate from Caltrans hydrology report
50	1,800	Calculated flow rate from Caltrans hydrology report
25	1,250	Calculated flow rate from Caltrans hydrology report
10	750	Calculated flow rate from Caltrans hydrology report

**Overtopping Flow (CFS)**

3,550

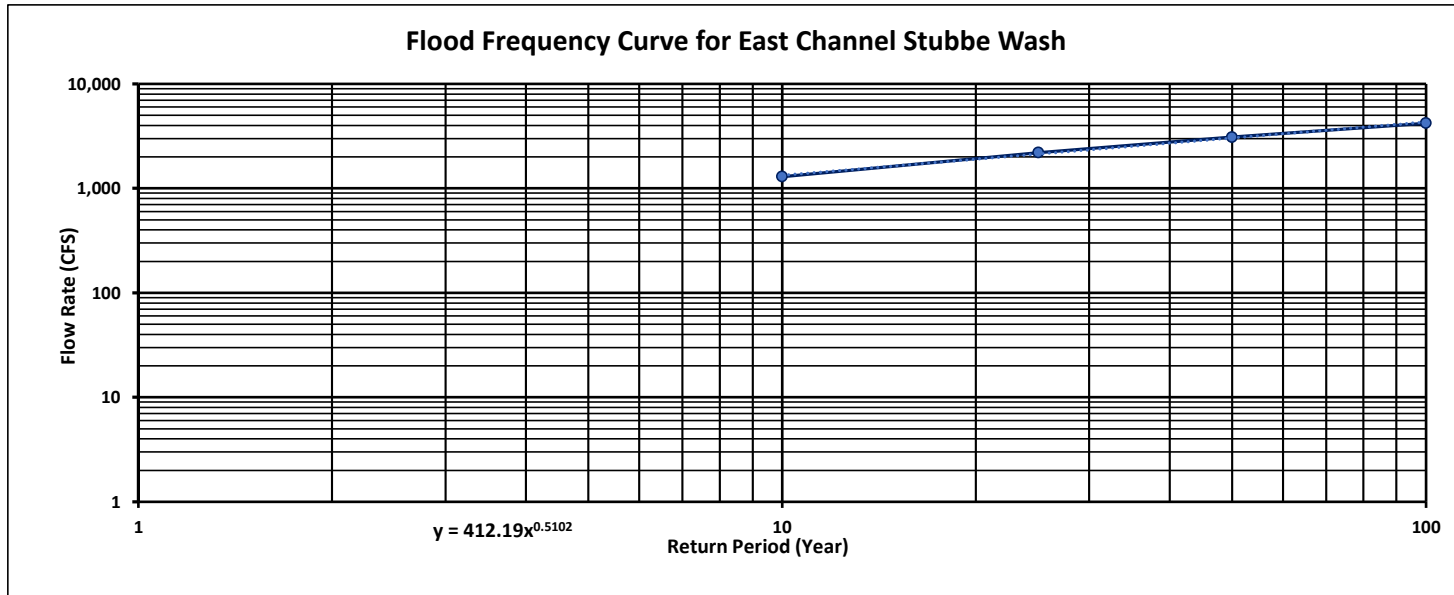
3,544

Resulting flow rate in CFS based on equation for the power equation

**188**

Inputted return period in years (iterative process) to equal flow capacity based on polynomial equati

Exhibit E.2: Flood Frequency Curve for East Channel Stubbe Wash



EAST CHANNEL STUBBE WASH FLOOD FREQUENCY CURVE (FFC)		
Return Period (Year)	Flow Rate (CFS)	Notes
100	4,200	Calculated flow rate from Caltrans hydrology report
50	3,100	Calculated flow rate from Caltrans hydrology report
25	2,200	Calculated flow rate from Caltrans hydrology report
10	1,300	Calculated flow rate from Caltrans hydrology report

**Overtopping Flow (CFS)**

12,800

12,796

**840**

Resulting flow rate in CFS based on equation for the power equation

Inputted return period in years (iterative process) to equal flow capacity based on polynomial equati

## **ATTACHMENTS**

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**ATTACHMENT A: LOCATION HYDRAULIC STUDY FORM**

## LOCATION HYDRAULIC STUDY FORM\*

Dist. 8 Co. Riverside Rte. \_\_\_\_\_ P.M. \_\_\_\_\_

Project No.: BRLO-5956(228) – Fornat Wash , BRLO-5956(229) – East Channel Stubbe Wash

Bridge No.: No. 56C0099 – Fornat Wash, No. 56C0101 – East Channel Stubbe Wash

Limits: The East Channel Stubbe Wash Bridge is located on Railroad Avenue approximately 0.3 miles west of the intersection of Railroad Avenue and Haugen-Lehmann Way. The Fornat Wash Bridge is located approximately 2.45 miles west of the East Channel Stubbe Wash Bridge along Railroad Avenue.

### Floodplain Description:

Review of the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map (FIRM) Number 06065C0865G effective August 28, 2008 (Exhibit “D”), the following has been found:

- It is indicated that the Fornat Wash Bridge is within a designated Zone “X” (unshaded), which means the area is outside the 0.2% annual chance floodplain. Therefore, the Fornat Wash Bridge does not encroach into any defined floodplains or floodways as shown on Exhibit “D”.
- It is indicated that the East Channel Stubbe Wash Bridge is within a designated Special Flood Hazard Zone “A” known as the Stubbe Canyon Wash, which means that the area is subject to the 1% annual chance floodplain, with no known base flood elevations. Therefore, the East Stubbe Channel Wash Bridge encroaches into the 1% annual chance flood hazard zone as shown on Exhibit “D”, and thus subject to inundation by the 100-year flood event. Construction of the bridge **will not** have any impact to the existing floodplain.
- Caltrans has prepared a hydrology study for Fornat Wash and East Channel Stubbe Wash showing the following flow rates for the 100-year and 50-year flood events (Ref. 1):
  - Fornat Wash
    - $Q_{100} = 2,500$  CFS
    - $Q_{50} = 1,800$  CFS
  - East Channel Stubbe Wash
    - $Q_{100} = 4,200$  CFS
    - $Q_{50} = 3,100$  CFS

The flow rates were determined using the “Troxell method”, an outdated hydrologic calculation method. A floodplain analysis using the HEC-RAS model was performed for Fornat Wash and East Channel Stubbe Wash using Caltrans’ flow rates based on the proposed bridge footprint at Railroad Avenue. The results indicate that the 100-year and 50-year flow rates are contained within the cross section of the channel and the proposed bridge section with the following bridge freeboard:

- Fornat Wash
  - For  $Q_{100} = 2,500$  CFS, the average freeboard at the upstream side of the bride is approximately 0.13 feet with a maximum freeboard of 0.26 feet at the northwest bridge abutment while at the downstream side of the bridge, it is approximately

0.72 feet with a maximum freeboard of 1.28 feet at the southwest bridge abutment.

- For  $Q_{50} = 1,800$  CFS, the average freeboard at the upstream side of the bridge is approximately 0.82 feet with a maximum freeboard of 1.31 feet at the northwest bridge abutment while at the downstream side of the bridge, it is approximately 1.60 feet with a maximum freeboard of 2.16 feet at the southwest bridge abutment.
- East Channel Stubbe Wash
  - For  $Q_{100} = 4,200$  CFS, the average freeboard at the upstream side of the bridge is approximately 5.54 feet with a maximum freeboard of 5.93 feet at the northeast bridge abutment while at the downstream side of the bridge, it is approximately 7.74 feet with a maximum freeboard of 8.18 feet at the southeast bridge abutment.
  - For  $Q_{50} = 3,100$  CFS, the average freeboard at the upstream side of the bridge is approximately 6.91 feet with a maximum freeboard of 7.33 feet at the northeast bridge abutment while at the downstream side of the bridge, it is approximately 8.91 feet with a maximum freeboard of 9.34 feet at the southeast bridge abutment.

The overtopping flow rates at the two bridges were determined to be approximately 3,550 CFS for Fornat Wash and 12,800 CFS for East Channel Stubbe Wash. These flows are equivalent to approximately 188-year and 840-year flood events, respectively.

**1. Description of Proposal** (include any physical barriers i.e. concrete barriers, soundwalls, etc. and design elements to minimize floodplain impacts):

Railroad Avenue is an approximately 5-mile stretch of road that runs parallel to Interstate 10 (I-10) and the Union Pacific Railroad (UPRR). It connects the Haugen-Lehmann Way and I-10 at the east end and Main Street and I-10 at the west end. It mostly serves the sparsely populated Cabazon community. The average daily traffic (ADT) volume is approximately 339 vehicles. Periodically, the road carries detoured traffic from the heavily traveled I-10 when the freeway is temporarily closed for construction or emergency incidents. The road also serves as an access route for UPRR and utility maintenance crews. Therefore, it is important to maintain this frontage road in sound condition at all times.

The existing timber bridges carry two lanes (one lane in each direction) of traffic over Fornat and East Channel Stubbe Washes. The timber bridges are approximately 59 feet long and are 32 feet wide from curb-to-curb. The County proposes replacing the existing two 2-lane timber bridges along Railroad Avenue with new 2-lane modern bridges with a curb-to-curb roadway width of 32 feet at the same locations.

The bridges are listed in the federal Eligible Bridge List (EBL), as "Structurally Deficient (SD)" with a low Sufficiency Rating (SR) between 59.1 and 62.9. A sufficiency rating is essentially an overall rating of a bridge's fitness for the duty that it performs. The rating is based on a bridge's structural evaluation, functional/geometric obsolescence, and its essentiality to the public. A low sufficiency rating may be due to structural defects, narrow lanes, low vertical clearance, or any of many possible issues. A bridge is healthy when its SR is more than 80.0. Bridges with SR equal to or less than 80.0 and more than 50.0

require rehabilitation or widening. When the SR falls less than 50.0, bridge replacement shall be considered for public safety. Although the Railroad Avenue bridges carry a status flag of SD with SR ratings between 50 and 80 (qualifying for major rehabilitation), it was determined that the bridges are well beyond their 50-year service life and it would be more cost-efficient to replace the bridges. Additionally, a scour Plan of Action (POA) was performed on the bridges by the County in 2013. The POA recommended total replacement of the bridges as the most cost-effective option due to the extent of the scour, structural instability and deterioration of various timber bridge elements.

The proposed project would replace the existing 2-lane timber bridges with new 2-lane modern bridges. The proposed road width would consist of two 12-foot-wide travel lanes, one lane in each direction, and a 4-foot-wide shoulder on each side. Modern traffic barriers/railings meeting current CALTRANS safety design standards would be constructed. The proposed bridges would be approximately 60 feet long depending on the channel hydraulic capacity and water surface freeboard requirements. Potentially the elevation of Fornat Wash Bridge may increase, but by no more than two feet to meet freeboard requirements. The East Channel Stubbe Wash Bridge elevation would remain the same. Additionally, approach roadway improvements would be provided and channel improvements would be administered to avoid future scour problems. It is envisioned that the channel bottom will remain earthen.

Existing underground utilities along the north side of Railroad Avenue and suspended utilities (a 4-inch gas line and a telephone line) along the north side of the East Channel Stubbe Wash bridge would be affected by construction and may require relocation.

All construction activities would be conducted within the existing roadway right of way with construction staging and material laydown areas on the roadway itself. Railroad Avenue between the two bridges to be replaced would be closed for continuous traffic during construction. The construction duration will be further determined during the project development. It is envisioned that the two bridges will be constructed one at a time to allow access to UPRR facilities and adjacent utilities from the Haugen-Lehmann Way/I-10 Interchange or the Main Street/I-10 Interchange. A Traffic Management Plan (TMP) would be prepared to address closure of the road and access to local utilities and properties.

The proposed construction would require a temporary construction easement (TCE) from UPRR for access to the channel bottom. However, construction activities are expected to stay at least 50 feet from the live rail tracks to eliminate any effects on railroad operations. The Railroad Avenue bridges abut adjacent State Bridges (Br. No. 56-166 and Br. No. 56-168) that carry I-10 traffic over the same washes. Structural modifications to the State Bridges are not anticipated; however, this will be evaluated during design. An encroachment permit from Caltrans District 8 would be obtained prior to construction.

2. ADT:      Current     339                          Projected     504    

3. Hydraulic Data:

3a. Fornat Wash

Base Flood Q100=     2,500     CFS  
WSE100: Downstream Encroachment =     1551.86      
Upstream Encroachment =     1553.93    

3b. East Channel Stubbe Wash

Base Flood Q100=     4,200     CFS  
WSE100: Downstream Encroachment =     1339.71      
Upstream Encroachment =     1342.79

The flood of record, if greater than Q100:

Q= N/A CFS      WSE= N/A

Overtopping flood Q for Fornat Wash = 3,550 CFS      WSE= 1556.54

Overtopping flood Q for East Channel Stubbe Wash = 12,800 CFS      WSE= 1351.17

Are NFIP maps and studies available?      YES X      FIRM No. 06065C0865G  
(see Exhibit "D")

NO \_\_\_\_\_

4. Is the highway location alternative within a regulatory floodway?

YES \_\_\_\_\_      NO X

5. Attach map with flood limits outlined showing all buildings or other improvements within the base floodplain.

Potential Q100 backwater damages:

- A. Residences?      NO X      YES \_\_\_\_\_
- B. Other Bldgs?      NO X      YES \_\_\_\_\_
- C. Crops?      NO X      YES \_\_\_\_\_
- D. Natural and beneficial      NO X      YES \_\_\_\_\_
- E. Floodplain values?      NO X      YES \_\_\_\_\_

6. Type of Traffic:

- A. Emergency supply or evacuation route? NO X      YES \_\_\_\_\_
- B. Emergency vehicle access?      NO \_\_\_\_\_      YES X
- C. Practicable detour available?      NO \_\_\_\_\_      YES X
- D. School bus or mail route?      NO X      YES \_\_\_\_\_

7. Estimated duration of traffic interruption for 100-year event hours: N/A

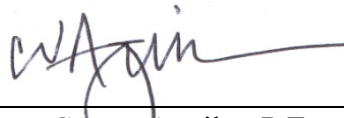
8. Estimated value of Q100 flood damages (if any) – moderate risk level.

- A. Roadway      \$ N/A
- B. Property      \$ N/A
- Total      \$ N/A

9. Assessment of Level of Risk      Low X  
Moderate \_\_\_\_\_  
High \_\_\_\_\_

For High Risk projects, during design phase, additional Design Study Risk Analysis May be necessary to determine design alternative.

Signature – Consulting Hydraulics Engineer  
(Item numbers 3,4,5,7,9)

  
Ceazar Aguilar, P.E.,  
Aguilar Consulting, Inc


Date: 02/24/2020

Is there any longitudinal encroachment, significant encroachment, or any support of incompatible Floodplain development? NO X YES \_\_\_\_\_

If yes, provide evaluation and discussion of practicability of alternatives in accordance with 23 CFR 650.113

Information developed to comply with the Federal requirement for the Location Hydraulic Study shall be retained in the project files.

Signature – County Project Engineer  
(Item numbers 1,2,6,8)

  
Umer Ahmed,  
Sr. Civil Engineer, RCTD

Date 3/3/2020

\* Same as Figure 804.7A Technical Information for Location Hydraulic Study located in Chapter 804 of the Highway Design Manual

**ATTACHMENT B: SUMMARY FLOODPLAIN ENCROACHMENT  
REPORT**

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**SUMMARY FLOODPLAIN ENCROACHMENT REPORT\***

Dist. 8 Co. Riverside Rte. \_\_\_\_\_ P.M. \_\_\_\_\_  
 Project No.: BRLO-5956(228) – Fornat Wash , BRLO-5956(229) – East Channel Stubbe Wash  
 Bridge No.: No. 56C0099 – Fornat Wash, No. 56C0101 – East Channel Stubbe Wash  
 Limits: The East Channel Stubbe Wash Bridge is located on Railroad Avenue approximately 0.3 miles west of the intersection of Railroad Avenue and Haugen-Lehmann Way. The Fornat Wash Bridge is located approximately 2.45 miles west of the East Channel Stubbe Wash Bridge along Railroad Avenue.

**Floodplain Description:**

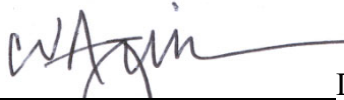
Review of the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map (FIRM) Number 06065C0865G effective August 28, 2008 (Exhibit “D”), the following has been found:

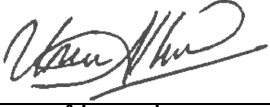
- It is indicated that the Fornat Wash Bridge is within a designated Zone “X” (unshaded), which means the area is outside the 0.2% annual chance floodplain. Therefore, the Fornat Wash Bridge does not encroach into any defined floodplains or floodways as shown on Exhibit “D”.
- It is indicated that the East Stubbe Wash Bridge is within a designated Special Flood Hazard Zone “A” known as the Stubbe Canyon Wash, which means that the area is subject to the 1% annual chance floodplain, with no known base flood elevations. Therefore, the East Stubbe Channel Wash Bridge encroaches into the 1% annual chance flood hazard zone as shown on Exhibit “D”, and thus subject to inundation by the 100-year flood event. Construction of the bridge will not have any impact to the existing floodplain.

	No	Yes
1. Is the proposed action a longitudinal encroachment of the base floodplain?	<u>  x  </u>	___
2. Are the risks associated with the implementation of the proposed action significant?	<u>  x  </u>	___
3. Will the proposed action support probable incompatible floodplain development?	<u>  x  </u>	___
4. Are there any significant impacts on natural and beneficial floodplain values?	<u>  x  </u>	___
5. Routine construction procedures are required to minimize impacts on the floodplain. Are there any special mitigation measures necessary to minimize impacts or restore and preserve natural and beneficial floodplain values? If yes, explain.	<u>  x  </u>	___
6. Does the proposed action constitute a significant floodplain encroachment as defined in 23 CFR, Section 650.105(q).	<u>  x  </u>	___
7. Are Location Hydraulic Studies that document the above answers on file? If not explain.	___	<u>  x  </u>



PREPARED BY:

Signature – Consulting Hydraulics Engineer  Date: 02/24/2020  
Ceazar Aguilar, P.E.,  
Aguilar Consulting, Inc

Signature – County Project Engineer  Date 03/03/2020  
Umer Ahmed,  
Sr. Civil Engineer, RCTD

\* Same as Figure 804.7B Floodplain Evaluation Report Summary located in Chapter 804 of the Highway Design Manual