I-15 Express Lanes Project Southern Extension

LOCATION HYDRAULIC STUDY

Project Limits:
Riverside 15, PM20.3/PM40.1
Project ID: *08-18000063*

EA: RIV 08-0J0820

December 2021

Amended December 2022

Prepared for:

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RIVERSIDE COUNTY TRANSPORTATION COMMISSION

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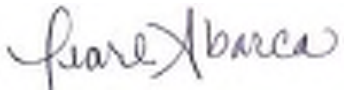
Caltrans

REGISTERED CIVIL ENGINEER CERTIFICATION

This Location Hydraulic Study Report has been prepared under the direction of the following registered civil engineer. The registered civil engineer attests to the technical information contained herein and the engineering data upon which recommendations, conclusions, and decisions are based.



12/21/22

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1.0 INTRODUCTION

This report is the Location Hydraulic Study and floodplain evaluation for the proposed improvements associated with the I-15 Express Lanes Project Southern Extension [ELPSE] (the Project). Executive Order 11988 (Floodplain Management) directs all federal agencies to refrain from conducting, supporting, or allowing actions in floodplains unless it is the only practicable alternative. Federal financial assistance and/or issuance of a federal permit(s) required for a proposed state/local project constitute federal support and/or allowing actions. The Federal Highway Administration (FHWA) requirements for compliance are outlined in 23 CFR 650 Subpart A.

To comply with 23 CFR 650 Subpart A by determining if an encroachment itself is "minimal" or "significant", the following must be analyzed:

- Practicability of alternatives to any longitudinal encroachments
- Risks of the action (to life and property)
- Impacts on natural and beneficial floodplains values
- Incompatible floodplain development (inconsistencies with existing watershed and floodplain management programs)
- Measures to minimize floodplain impacts and to preserve/restore any beneficial floodplain values impacted by the Project.

The purpose of this evaluation is to examine the potential impacts to the 1% Annual Chance Special Flood Hazard Areas (SFHA) A, AE and AO, and 0.2% Annual Chance Flood Hazard Zone X at the locations below resulting from the Project:

- Bedford Wash
- Temescal Wash
- Stovepipe Canyon Wash
- Arroyo Del Toro

And pursuant to Ordinance 458 adopted by Riverside County, this evaluation will also examine potential impacts to the State of California Department of Water Resources (DWR) Awareness Floodplains and Special Study Floodplains, Federal Emergency Management Agency (FEMA) Zone A SFHA subject to inundation by the 1% annual chance flood event at the locations below, resulting from the Project:

- Coldwater Wash
- Mayhew Wash

1.1 Project Description

The Riverside County Transportation Commission (RCTC), in cooperation with the California Department of Transportation (Caltrans), is proposing to construct new lanes along Interstate 15 (I-15) between Post Mile (PM) 21.2 and PM 38.1 in Riverside County, California. The primary component of the I-15 Express Lanes Project Southern Extension (Project) would be the addition of two tolled express lanes[1] in both the northbound and southbound directions within the median of I-15 from State Route 74 (SR-74) (Central Avenue) (PM 22.3) in the City of Lake Elsinore, through the unincorporated Riverside County community of Temescal Valley, to El Cerrito Road (PM 38.1) in the City of Corona, for a distance of approximately 15.8 miles. The proposed Project would also add a southbound auxiliary lane between both the Main Street (PM 21.2) off-ramp and SR-74 (Central Avenue) on-ramp (approximately 0.75 mile), and the SR-74 (Central Avenue) off-ramp and Nichols Road on-ramp (PM 23.9) (approximately 1 mile). Along with the lane additions, which would extend from PM 21.2 to 38.1, the proposed Project would include widening of up to 15 bridges, potential construction of noise barriers, retaining walls, drainage systems, and implementation of electronic toll collection equipment and signs. In addition, due to the southbound express lanes access between the Cajalco Road and Weirick Road interchanges, the southbound I-15 Weirick Road off-ramp would be configured as a dual lane exit. Associated improvements for the toll lanes, including advance signage and transition striping, would extend approximately 2 miles from each end of the express lane limits to PM 20.3 in the south and PM 40.1 in the north. The proposed lane additions and supporting infrastructure are expected to be constructed primarily within the existing State right of way. This Project is included in the 2019 Federal Transportation Improvement Program (FTIP) as Project ID RIV170901. It is also included in the Southern California Association of Governments' (SCAG) Connect SoCal 2020–2045 Regional Transportation Plan (RTP)/Sustainable Communities Strategy (SCS) as Project ID 3160001.

The FTIP and RTP listings for this Project were amended in April 2021 to accurately reflect the scope and limits of the Project as currently proposed. The amended FTIP and RTP listings will state the following:

> *IN WESTERN RIVERSIDE COUNTY - ON I-15, ADD 2 EXPRESS LANES IN EACH DIRECTION, GENERALLY IN THE MEDIAN, FROM SR-74 (CENTRAL AVENUE) (PM 22.3) IN THE CITY OF LAKE ELSINORE TO EL CERRITO ROAD (PM 38.1) IN THE CITY OF CORONA. CONSTRUCT SOUTHBOUND AUXILIARY LANE FROM MAIN STREET (PM 21.2) TO SR-74 (CENTRAL AVENUE) (PM 22.3) AND FROM SR-74 (CENTRAL AVENUE) (PM 22.3) TO NICHOLS ROAD (PM 23.9). SIGNAGE AND TRANSITION STRIPING EXTENDS TO PM 20.3 TO THE SOUTH AND PM 40.1 TO THE NORTH.*

[1] Express lanes are traffic lanes that are separated from general purpose lanes where users are charged a toll to use the lanes.

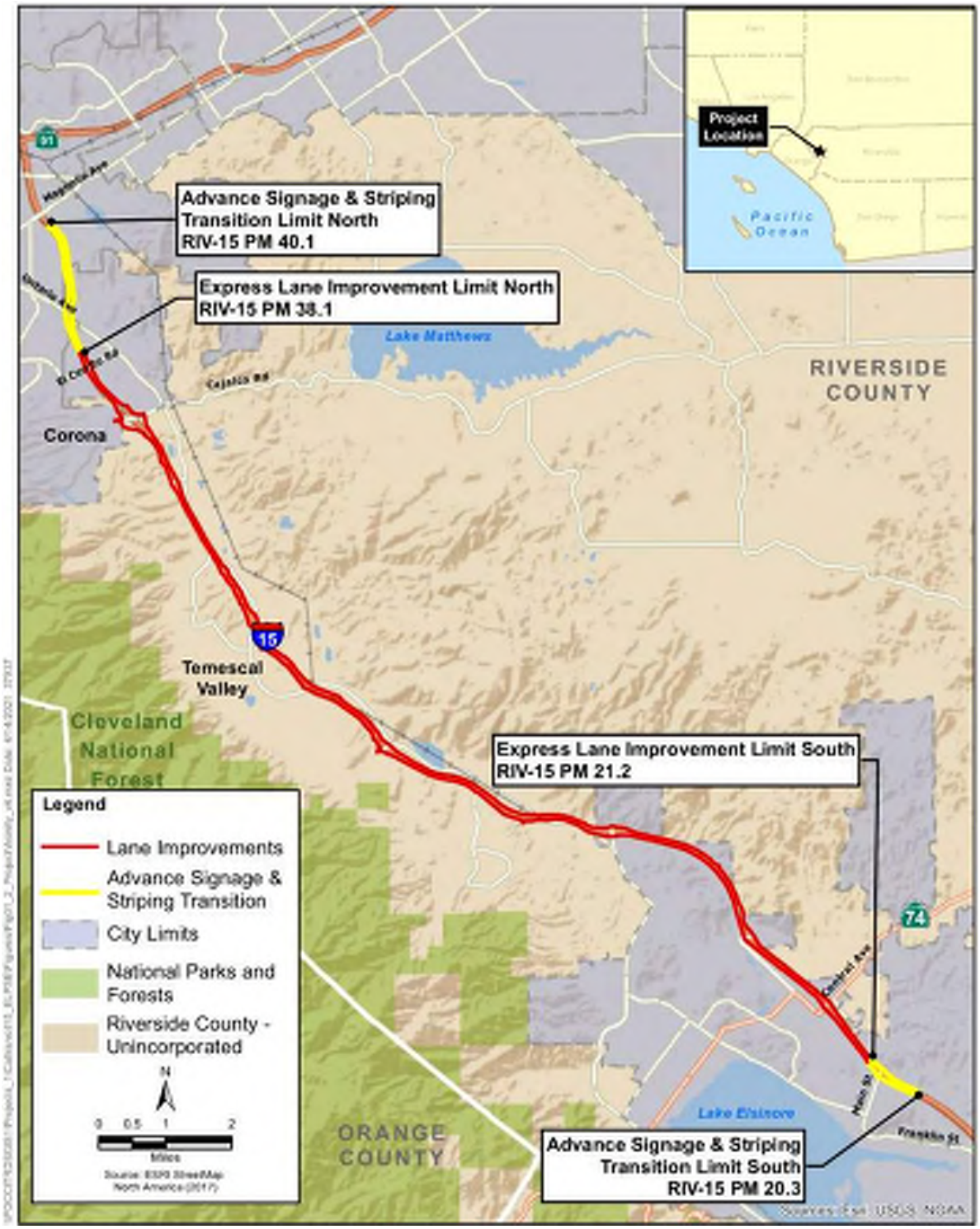

Figure 1: I-15 ELPSE Location Map

1.2 Purpose and Need

Purpose

The purpose of this Project is to:

- Improve and manage traffic operations, congestion, and travel times along the corridor
- Expand travel mode choice along the corridor
- Provide an option for travel time reliability
- Provide a cost-effective mobility solution
- Expand and maintain compatibility with the express lane network in the region

Need

Existing traffic volumes often exceed current highway capacity along several segments of I-15 between SR-74 (Central Avenue) and El Cerrito Road. Due to forecasted population growth and the continued development to support the projected growth in the region, the I-15 corridor is expected to continue to experience increased congestion and longer commute times that are projected to negatively affect traffic operations along the freeway mainline.

The adopted SCAG 2016 RTP Growth Forecast estimates a 36.7% increase in population in Riverside County between 2015 and 2040. SCAG's recently adopted *Connect SoCal* (2020–2045 RTP/SCS) Growth Forecast estimates a 38.3% increase in population in Riverside County between 2020 and 2045, with the number of households and employment increasing by approximately 30.5% and 34.02%, respectively. In the City of Corona, the 2020–2045 RTP/SCS Growth Forecast estimates an 11.6% increase in population from 2016 to 2045 and an 11.7% increase in households. According to the same source, the City of Lake Elsinore is projected to see a 76.8% increase in population. This projected growth is expected to place a high demand on existing transportation facilities and services.

Currently, north-south mobility options for motorists are limited through this portion of Riverside County. Besides local streets, the only parallel route for motorists is Interstate 215, which is over 10 miles east of I-15 and generally serves a different region within Riverside County. As demonstrated in the traffic analyses performed for the project, northbound I-15 currently operates at an unacceptable level of service (LOS)[2] (i.e., LOS E or F) during the AM and/or PM peak hour along 6 out of the 15 segments evaluated between the Cajalco Road off-ramp and the Indian Truck Trail on-ramp. This is projected to climb to 8 of 18 segments evaluated by 2030 between the El Cerrito Road on-ramp and the Indian Truck Trail on-ramp, and to 19 of 20 locations evaluated within the project limits by 2050. Southbound I-15 currently operates at an unacceptable LOS (i.e., LOS E or F) during the AM and/or PM peak periods at 3 of 15 mainline segment locations evaluated between the El Cerrito Road off-ramp and the Weirick Road/Dos Lagos Drive off-ramp. This is projected to increase to five locations by 2030, and then decrease to four locations by 2050, also between the El Cerrito Road off-ramp and the Weirick Road/Dos Lagos Drive off-ramp.

[2] The ability of a highway to accommodate traffic is typically measured in terms of LOS. Traffic flow is classified by LOS, ranging from LOS A (traffic is free flowing, with low volumes and high speeds) to LOS F (traffic volume exceeds design capacity, with forced flow and substantial delays). The LOS for signalized and unsignalized intersections is based on delay time per vehicle.

The expected increase in congestion during peak periods and worsening traffic conditions, particularly during AM and PM peak periods, are expected to result in additional local and regional traffic congestion. Existing heavy peak-period congestion and traffic delays, as evidenced by the poor LOS, are expected to continue to negatively affect traffic operations along mainline I-15.

Based on the traffic analyses performed, along both northbound and southbound I-15 vehicle volume served is projected to continue to increase during the AM and PM peak periods from the existing year through 2050, as is the total distance traveled. In addition, the total travel time during the PM peak period in particular is anticipated to more than double by the Design Year (2050), with total travel time during the PM peak period forecasted to rise by 167% compared to the existing (2019) travel time condition. Furthermore, average delay per vehicle and total delay are projected to increase from Existing Year (2019) to Design Year (2050) during the AM and PM peak periods, at least tripling on both northbound and southbound I-15 during this timeframe.

Under Existing Conditions (2019) average speeds for northbound and southbound I-15 during the AM and PM peak hours are projected to decrease between the Existing Conditions (2019) and Design Year (2050) in all instances except during the PM peak hour in the southbound direction. These projected reductions are most pronounced on northbound I-15, ranging from a reduction of 25.5 miles per hour (mph) to 52.6 mph. The projected average delay per vehicle during this same period is expected to increase, with the northbound I-15 delay projected to increase from 774 seconds and 102 seconds during the AM and PM peak hours, respectively, under Existing Conditions (2019), to 3,828 seconds and 6,224 seconds during the AM and PM peak hours, respectively, in the Design Year (2050).

Based on the above existing and forecasted traffic data, recurring daily congestion due to continuing population growth, development, and travel demand exceeding available highway capacity is expected to continue to result in slower travel speeds, reduced throughput, and increased travel times along mainline I-15.

1.3 Permits and Approvals Needed

Table 1 shows agency permits and status of required permits for the Project.

Table 1: Regulatory Permits/Approvals

Agency	Permit/Approval	Status
USACE	Section 404 Nationwide Permit	A Section 404 Nationwide permit will be required for this project
	Section 408 Approval Process	No alterations to ACOE facilities are anticipated, therefore the 408 Permit is not expected to be required
SARWQCB and SWRCB	Section 401 Water Quality Certification	A Section 401 Water Quality Certification will be required for this project
	Section 402 NPDES (Construction Activity)/Caltrans NPDES Permit CAS000003 and CAS000002 (General Permit)	Caltrans District 8 to obtain permit, as the applicant for the NOI
CDFW	Section 1602 Approval Process	A Section 1602 application will be required for this project

Caltrans = California Department of Transportation
CDFW = California Department of Fish and Wildlife
NOI = Notice of Intent
NPDES = National Pollutant Discharge Elimination System
SARWQCB = Santa Ana Regional Water Quality Control Board
SWRCB = State Water Resources Control Board
USACE = US Army Corps of Engineers

1.4 Definitions

1.4.1 Base Flood

The term “base flood” shall mean that flood which has a 1% or greater chance of occurrence in any given year.

- Executive Order 11988 Floodplain Management, Section 6 (b)

The 1% or greater chance of occurrence flood is commonly referenced as the “100-year” flood.

1.4.2 Floodplain

The term “floodplain” shall mean the lowland and relatively flat areas adjoining inland and coastal waters including flood prone areas of offshore islands, including at a minimum, that area subject to a 1% or greater chance of flooding in any given year.

- Executive Order 11988 Floodplain Management, Section 6 (c)

1.4.3 Special Flood Hazard Areas – High Risk

SFHA represent the area subject to inundation by 1% annual chance flood. The land area covered by the floodwaters of the base flood is the SFHA on the National Flood Insurance Program (NFIP) maps. The SFHA is the area where the NFIP's floodplain management regulations must be enforced and the area where the mandatory purchase of flood insurance applies. The SHFA includes Zones A, AO, AH, A1-30, AE, A99, AR, AR/A1-A30, AE, A99, AR, AR/A1-30, AR/AE, AR/AO, AR/AH, AR/A, VO, V1-30, VE, and V.

1.4.4 DWR Awareness Map

Awareness Map refers to those floodplain maps produced by the DWR that initially identify flood hazard areas using approximate assessment procedures to map 100-year floodplains for both riverine and alluvial fan conditions. Such "awareness floodplains" will be shown simply as flood prone areas without specific depth and other flood hazard data. Awareness Floodplains are considered as FEMA Zone A Special Flood Hazard Area subject to inundation by the 1% annual chance flood event.

1.4.5 Special Studies

The flood hazard areas shown on the maps prepared by Riverside County. Special Studies floodplains will be shown simply as flood prone areas without specific depth and other flood hazard data. Awareness Floodplains are considered as FEMA Zone A Special Flood Hazard Area subject to inundation by the 1% annual chance flood event.

2.0 AFFECTED ENVIRONMENT

2.1 Introduction

The Affected Environment analysis is a description of the environmental characteristics within the Project limits, such as geography, topography, receiving water bodies, groundwater conditions, precipitation and climate, floodplain classification, erosion potential, biological, water quality standards, beneficial uses, and available existing water quality data.

The Project is within the Santa Ana River Watershed. A review of the FEMA Flood Insurance Rate Map (FIRM) panels, DWR Floodplain and Special Studies Floodplain Maps revealed there are 100-year floodplains associated with Arroyo Del Toro, Stovepipe Canyon Creek, Temescal Wash, Bedford Wash, Coldwater Wash and Mayhew Wash. Essentially there are six floodplain areas within the Project footprint. See **Appendix C** for FEMA FIRM panels and DWR/Special Studies Floodplain Map.

2.2 General Setting

The Project is located along the I-15 between the cities of Corona and Lake Elsinore in Riverside County in Caltrans District 8. The Project crosses over a series of channels included in Table 2, traversing valleys and rolling terrain bounded by the Estelle Mountain to the east and the Santa Ana Mountains to the west.

2.2.1 Land Use

According to the *City of Corona 2020-2040 General Plan* Land Use map adopted in 2018, the Project is located adjacent to agricultural, commercial, and residential land uses. According to the *City of Lake Elsinore General Plan*, the Project is located mainly within vacant land use and adjacent to commercial, manufacturing/industrial, and residential land uses. Within the Temescal Valley, the Project runs adjacent to residential, light industrial, and mining land. (TVDG, 2007)

2.2.2 Topography

The existing topography within the Project generally slopes from its southeast extent to its northwest extent. At the northern extent of the Project along I-15, the elevation is approximately 900 feet, and increases to approximately 1,320 feet near the SR-74 interchange overpass.

2.2.3 Regional Hydrology

2.2.3.1 Hydrologic Unit

The climate of the Santa Ana Region is classified as Mediterranean: generally dry in the summer with mild, wet winters. The average annual rainfall in the region is about 15 inches, most of which occurs between November and March. Much of the area would be near-desert were it not for the influence of modern civilization, which has developed master planned communities and provided and maintained landscapes for aesthetics that are generally inconsistent with a desert/Mediterranean environment.

Bedford Wash, Coldwater Wash, Mayhew Wash, Stovepipe Canyon Wash and Arroyo Del Toro discharge to Temescal Wash. Temescal Wash then discharges to the Santa Ana River within the Santa Ana River Watershed, classified as the Santa Ana River Hydrologic Unit (801.0).

2.2.3.2 Hydrologic Area

The Santa Ana River's headwaters are the eastern San Gabriel Mountains and a majority of the San Bernardino Mountains. Runoff from these mountains and foothills drains through a network of surface streams, collects on the valley floor, flows southwest, and ultimately confluences with the Santa Ana River. The Santa Ana River flows southwest from Riverside County into Orange County toward the Pacific Ocean.

2.2.3.3 Hydrologic Subarea

Temescal Wash begins at the outlet from Lake Elsinore near the Seaport Boat Launch on West Lakeshore Drive. From the outlet, Temescal Wash flows northwest generally for about 23 miles before its confluence with Santa Ana River Reach 3 and Prado Dam near the cities of Norco and Corona. The Project is within the Terra Colta, Lee Lake, Bedford, and Coldwater Hydrologic Subareas.

The Terra Colta (801.35) area is 14,217 acres and drains to Arroyo Del Torro and Temescal Wash. The Lee Lake (801.34), Bedford (801.32), and Coldwater (801.31) subareas drain to the Temescal Wash and are 25,729, 31,761 and 10,441 acres, respectively.

2.2.4 Local Hydrology

2.2.4.1 Precipitation and Climate

The average annual precipitation near the Project is 16.57 inches (Caltrans Water Quality Planning Tool, 2020). California's south inland region has a Hot Summer Mediterranean type climate; the region typically has long summers with intense thunderstorms, and brief, rainy winters. Most rainfall occurs in the region during winter and early spring. The average annual high temperature is 80.8 degrees Fahrenheit (F) and the average low temperature is 49.8 degrees F (U.S. Climate Data, 2020).

2.2.4.2 Surface Streams

The Project crosses the channels listed in Table 2. These channels are tributary to the Temescal Wash that conveys its waters to the Santa Ana River and ultimately to the Pacific Ocean. There are several other channels in the vicinity that the Project does not cross but are tributary to these channels. The bolded stream crossings in Table 2 have floodplains directly impacted by the Project and are discussed further in this report. The locations of the bolded stream crossings covered in this report are shown in Figure 2.

Table 2: Channel Crossings

Channels	I-15 Crossing Post Marker
Bedford Wash	**PM 36.58**
Brown Canyon Wash	PM 34.72
Coldwater Wash	**PM 32.96**
Mayhew Wash	**PM 31.97**
Indian Wash	PM 30.09
Horsethief Canyon Wash	PM 29.13
Temescal Wash	**PM 28.04**
Gavilan Wash	PM 25.55
Stovepipe Canyon Wash	**PM 23.50**
Arroyo Del Toro	**PM 22.60**

Table 2: Channel Crossings

Channels	I-15 Crossing Post Marker
Wasson Canyon Wash	PM 21.57

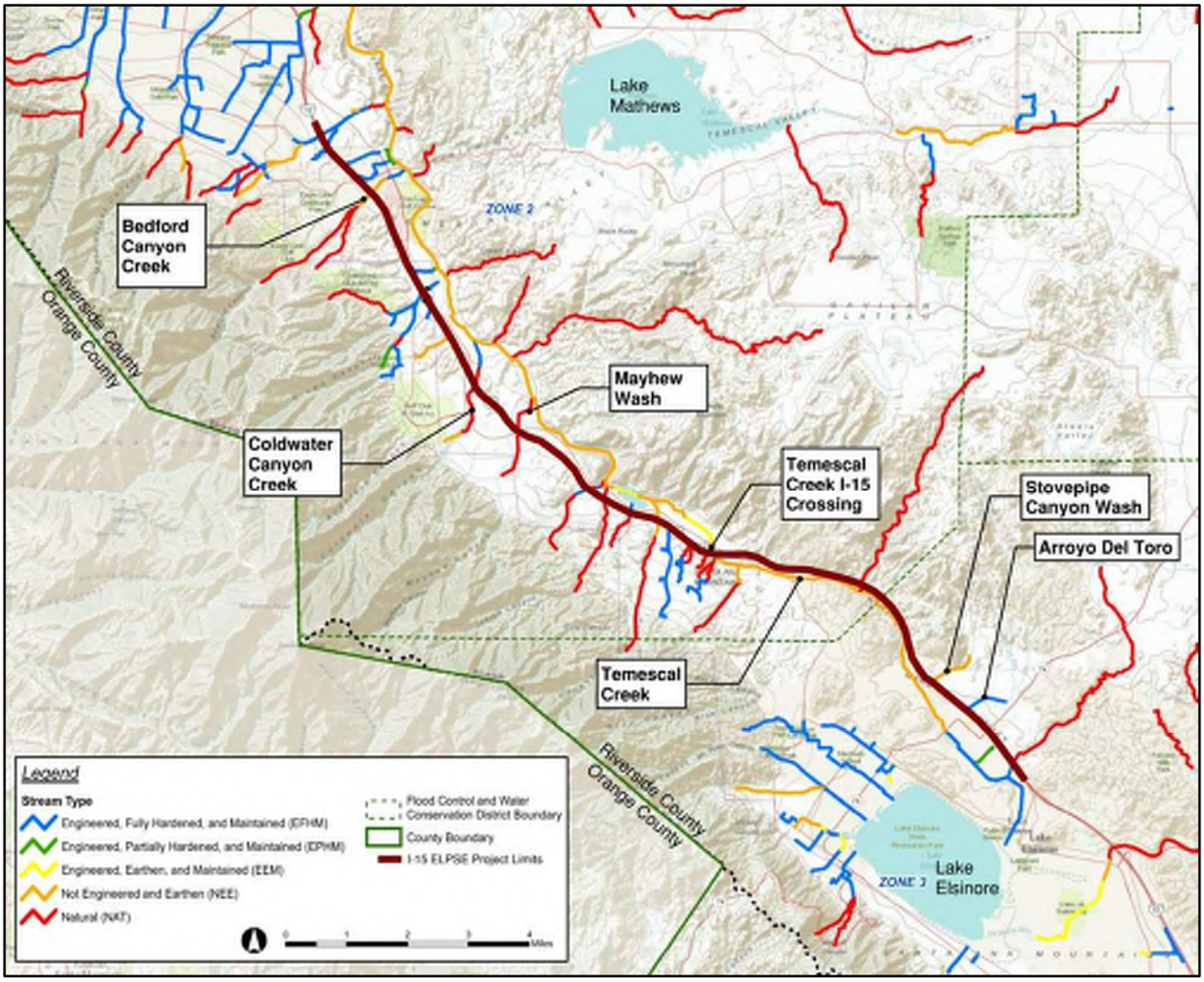

Figure 2: I-15 ELPSE Stream Crossings Map

2.2.4.3 Municipal Water Supply

According to the Caltrans *2020-2021 District 8 Work Plan*, there are no high-risk areas (highway locations where spills or other releases from District-owned ROW, roadways, or facilities may discharge directly to municipal or domestic water supply reservoirs or groundwater percolation facilities) located within the Project.

2.2.5 Ground Water Hydrology

The Project site is within the Upper Santa Ana Valley – Temescal, Elsinore – Bedford-Coldwater, and Elsinore – Elsinore Valley Groundwater Basins; basin numbers 8-002.09, 8-004.02, and 8-004.01, respectively. The groundwater basins are used for water storage in drought years and dry seasons.

The Upper Santa Ana Valley Subbasin is located within the Temescal Groundwater Basin and it covers approximately 36 square miles. It is bounded on the north by the Chino Subbasin, separated by low hills of crystalline rock near Norco and the Santa Ana River. The east side of the Subbasin is bounded by non-water bearing crystalline rocks of the El Sobrante de San Jacinto and La Sierra Hills, and the west is bounded by the Santa Ana Mountains. The south is bounded by the Elsinore Basin at a constriction of alluvium of Temescal Wash. Per the DWR Water Data Library (WDL), the nearest groundwater well with current groundwater level data is located approximately 3.5 miles north of the start of the Project. It is an observation well that is operated by Elsinore Valley Municipal Water District and located on the corner of Tenth Street and Lincoln Avenue in the City of Corona. The depth of groundwater in April 2020 was approximately 196 feet (California Department of Water Resources, 2020). According to California's Groundwater Bulletin 118, groundwater in the Temescal Basin typically has high levels of sodium bicarbonate with an average total dissolved solids (TDS) concentration of approximately 790 milligrams per liter (mg/L) (California Department of Water Resources, 2006). In addition, groundwater typically flows towards the center of the Subbasin and then northeast towards the Santa Ana River (SBVWCD 2000).

The Bedford – Coldwater Groundwater Subbasin is located within the Elsinore Groundwater Basin and it covers approximately 11 square miles. It is bounded on: the northwest by Temescal Subbasin, with a groundwater divide near Bedford Wash; the east and west by consolidated rocks of Estelle Mountain and the Santa Ana Mountains; and the south by the jurisdictional boundary of the Elsinore Valley Subbasin (California Department of Water Resources, 2018). Per the DWR WDL, the nearest groundwater well with current groundwater level data is located approximately 0.3 miles east of the Project. It is an irrigation well that is operated by the Temescal Valley Water District and located adjacent to Leroy Road in the Temescal Valley. The depth to groundwater in April 2020 was approximately 32 feet (California Department of Water Resources, 2020). According to California's Groundwater Bulletin 118, groundwater in the Elsinore Groundwater Basin typically has high levels of dissolved minerals, or salts, with an average total dissolved solids (TDS) concentration of approximately 808 milligrams per liter (mg/L) (California Regional Water Quality Control Board, 2014). Groundwater flows towards the center and northwest of the Subbasin. (EVMWD, 2014).

The Elsinore Valley Subbasin is located within the Elsinore Groundwater Basin and it covers approximately 40 square miles. It is bounded on the east by consolidated rocks of the Gavilan Plateau and Estelle Mountain, and is bound on the south by the Elsinore watershed boundary (California Department of Water Resources, 2018). Per the DWR/WDL, the nearest groundwater well with current groundwater level data is located approximately 1.6 miles south of the Project. Moreover, it is an observation well that is operated by the Elsinore Valley Municipal Water District and located on Wisconsin Street in the City, between Lakeshore Drive to the north and Lehr Drive to the east. The depth to groundwater in November 2019 was approximately 299 feet (California Department of Water Resources, 2020). According to *California's Groundwater Bulletin 118*, groundwater in the Elsinore Groundwater Basin typically has high levels of sodium

sulfate with an average total dissolved solids (TDS) concentration of approximately 460 milligrams per liter (mg/L) (California Department of Water Resources, 2006). Groundwater flows towards the center of the Subbasin.

2.2.6 Geology/Soils/Soil Erosion Potential

Natural Resources Conservation Services (NRCS) Web Soil Survey Maps indicate that soils in the area are characterized by high infiltration capacity with gravelly and sandy loam. Most of the soil is sloped and well drained. A detailed site-specific survey is still required for the Project for design level analysis.

Field visits and research will be conducted as part of the Rapid Assessment of Stream Crossings (RSA) by Michael Baker International for the Project. The RSA will help determine if Temescal Wash and Mayhew Wash are susceptible to hydromodification since these channels meet the criteria for an RSA. An RSA will not be performed for Bedford Wash, Coldwater Wash, Stovepipe Canyon Wash, or Arroyo Del Toro since they do not meet all the criteria for an RSA.

2.3 Natural and Beneficial Floodplain Values

Natural and beneficial floodplain values include, but are not limited to fish, wildlife, plants, open space, natural beauty, scientific study, outdoor recreation, agriculture, forestry, natural moderation of floods, water quality maintenance, and ground water recharge.

2.3.1 Open Space

There are no open spaces within the Project limits.

2.3.2 Natural Beauty

This Project is within the Temescal Valley. According to the Temescal Valley Design Guidelines (TVDG) (2007), the Valley is surrounded by the Santa Ana Mountains and gentle Gavilan Hills, and is filled with citrus groves and palm trees. The area has several community and regional trails to provide recreational access to locals and guests. However, there are no natural beauty areas within or surrounding the Project limits since the Project limits is the I-15 and surrounding land uses consist of commercial, industrial, and residential land use, as discussed in **Section 2.2.1 Land Use**.

2.3.3 Scientific Study

Scientific studies within the Caltrans ROW require specific encroachment permits. A possible list of studies in the Project area could include studies on pollution, traffic, water quality, endemic species, and invasive species.

2.3.4 Outdoor Recreation

According to the Temescal Valley Design Guidelines Trail Plan, several plans are outlined for regional trails, bike paths, and historic trails that will cross through the Project site and are to be built along waterways, railroads, and utility corridors. Bike paths shall adhere to Caltrans Design Standards. There are no existing or planned outdoor recreational amenities located within the Project limits in the cities of Corona or Lake Elsinore.

2.3.5 Agriculture

Agriculture land use is in the vicinity of, but not within, the Project area.

2.3.6 Forestry

Projects within California State and National Forests warrant precautions to assure that they conform to design guidelines from those agencies. This Project is not within a California State or National Forest.

2.3.7 Natural Moderation of Floods

Natural floodplains create beneficial storage areas of flood water. They serve to protect downstream areas from excessive flooding and expand the base of the flow hydrograph in a stream. A review of the FEMA FIRM panels for Riverside County revealed that there are 100-year floodplains associated with Arroyo Del Toro, Stovepipe Canyon Wash, Temescal Wash, and Bedford Wash (see **Appendix C** for FEMA FIRM panels). Floodplains are primarily located adjacent to the Project location along the I-15.

2.3.8 Water Quality Maintenance

A Stormwater Data Report (SWDR) will be prepared for this Project but has not been completed yet.

There are receiving water bodies listed for pollutants on the U.S. Clean Water Act (CWA) Section 303(d) List of Impaired Waters. They are not the streams that immediately cross the Project but precipitation that falls within the Project limits will discharge into Temescal Wash. Temescal Wash is not listed on the 2016 303(d)/305(b) Integrated List as impaired, nor have TMDLs been established. Temescal Wash confluences with Santa Ana River Reach 3, which is listed for Copper and Lead, and TMDLs have been established for Indicator Bacteria and Nitrate.

Water quality maintenance features within the Caltrans ROW include Caltrans-defined best management practices (BMPs). Recommended water quality features from the Caltrans Project Planning and Design Guide (PPDG), April 2019, will be used. The total treatment area and proposed BMPs are still pending the completion of the SWDR.

2.3.9 Groundwater Recharge

The Temescal Valley Water District's *2015 Urban Water Management Plan* indicates that the Temescal Wash is a contributor to groundwater recharge through infiltration. Engineered groundwater recharge facilities are not present within the Project limits.

2.4 Watershed Characteristics and Beneficial Uses

The watershed characteristics and beneficial uses of Temescal Wash and its tributaries are outlined in Riverside County's *Santa Ana Region Watershed Action Plan*. The watershed drains into the Santa Ana River that eventually outlets to the Pacific Ocean. The tributaries in the Project area contribute to the Temescal Wash Watershed. This watershed is used mainly for groundwater recharge.

The Temescal Wash Watershed drains about 1,000 square miles and is a tributary to the Santa Ana River. The watershed is predominantly open space with some single family residential, multi-family residential, and commercial land uses. The Temescal Wash is not designated as a

wild or scenic river. The nearest wild and scenic river is Bautista Creek of the San Jacinto Mountains in San Bernardino County.

A beneficial use identifies the ways that water can be used for the benefit of people and/or wildlife. A beneficial use may be classified as intermittent when water conditions do not allow the beneficial use to occur year-round. The Santa Ana Region recognizes 23 beneficial uses that are listed and described as:

- Municipal and Domestic Supply (**MUN**) – Includes uses of water for community, military, or individual water supply systems including, but not limited to, drinking water supply.
- Agricultural Supply (**AGR**) – Includes uses of water for farming, horticulture, or ranching including, but not limited to, irrigation, stock watering, or support of vegetation for range grazing.
- Industrial Process Supply (**PROC**) – Includes uses of water for industrial activities that depend primarily on water quality.
- Industrial Service Supply (**IND**) – Includes uses of water for industrial activities that do not depend primarily on water quality including, but not limited to, mining, cooling water supply, hydraulic conveyance, gravel washing, fire protection, or oil well re-pressurization.
- Groundwater Recharge (**GWR**) – Includes uses of water for natural or artificial recharge of groundwater for purposes of future extraction, maintenance of water quality, or halting of saltwater intrusion into freshwater aquifers.
- Freshwater Replenishment (**FRSH**) – Includes uses of water for natural or artificial maintenance of surface water quantity or quality.
- Navigation (**NAV**) – Includes uses of water for shipping, travel, or other transportation by private, military, or commercial vessels.
- Hydropower Generation (**POW**) – Includes uses of water for hydropower generation.
- Contact Water Recreation (**REC1**) – Includes uses of water for recreational activities involving body contact with water, where ingestion of water is reasonably possible. These uses include, but are not limited to, swimming, wading, water-skiing, skin and SCUBA diving, surfing, white water activities, fishing, or use of natural hot springs.
- Non-contact Water Recreation (**REC2**) – Includes uses of water for recreational activities involving proximity to water, where ingestion of water is reasonably possible. These uses include, but are not limited to, picnicking, sunbathing, hiking, beachcombing, camping, boating, tidepool and marine life study, hunting, sightseeing, or aesthetic enjoyment in conjunction with the above activities.
- Commercial and Sport Fishing (**COMM**) – Includes uses of water for commercial or recreational collection of fish, shellfish, or other organisms including, but not limited to, uses involving organisms intended for human consumption or bait purposes.
- Aquaculture (**AQUA**) – Includes uses of water for aquaculture or mariculture operations including, but not limited to, propagation, cultivation, maintenance, or harvesting of aquatic plants and animals for human consumption or bait purposes.
- Warm Freshwater Habitat (**WARM**) – Includes uses of water that support warm water ecosystems including, but not limited to, preservation or enhancement of aquatic habitats, vegetation, fish or wildlife, including invertebrates.
- Limited Warm Freshwater Habitat (**LWARM** or **LWRM**) – Includes use of water that support warmwater ecosystems which are severely limited in diversity and abundance as the result of concrete-lined watercourses and low, shallow dry weather flows which result

in extreme temperature, pH, and/or dissolved oxygen conditions. Naturally reproducing finfish populations are not expected to occur in LWRM waters.

- Cold Freshwater Habitat (**COLD**) – Includes uses of water that support cold water ecosystems including, but not limited to, preservation or enhancement of aquatic habitats, vegetation, fish or wildlife, including invertebrates.
- Inland Saline Water Habitat (**SAL**) – Includes uses of water that support inland saline water ecosystems including, but not limited to, preservation or enhancement of aquatic saline habitats, vegetation, fish or wildlife, including invertebrates.
- Estuarine Habitat (**EST**) – Includes uses of water that support estuarine ecosystems including, but not limited to, preservation or enhancement of estuarine habitats, vegetation, fish, shellfish, wildlife, mammals, or waterfowl.
- Marine Habitat (**MAR**) – Includes uses of water that support marine ecosystems including, but not limited to, preservation or enhancement of marine habitats, vegetation such as kelp, fish, shellfish, or wildlife.
- Wildlife Habitat (**WILD**) – Includes uses of water that support terrestrial ecosystems including, but not limited to, preservation and enhancement of terrestrial habitats, vegetation, wildlife, or wildlife water and food sources.
- Preservation of Biological Habitats of Special Significance (**BIOL**) – Includes uses of water that support designated areas or habitat, such as established refuges, parks, sanctuaries, ecological reserves, or Areas of Special Biological Significance, where the preservation or enhancement of natural resources requires special protection.
- Migration of Aquatic Organisms (**MIGR**) – Includes uses of water that support habitats necessary for migration, acclimatization between fresh and salt water, or other temporary activities by aquatic organisms, such as anadromous fish.
- Spawning, Reproduction, and/or Early Development (**SPWN**) – Includes uses of water that support high quality habitats suitable for reproduction, early development and sustenance of marine fish and/or cold freshwater fish.
- Shellfish Harvesting (**SHELL**) – Includes uses of water that support habitats suitable for the collection of filter-feeding shellfish for human consumption, commercial, or sport purposes.
- Rare, Threatened, or Endangered Species (**RARE**) – Includes uses of water that support habitats necessary, at least in part, for the survival and successful maintenance of plant or animal species established under state or federal law as rare, threatened, or endangered.

The characteristics and beneficial uses of the channels within the Project vicinity are described in the following sections. Exhibits and corresponding referenced FEMA FIRM panels are included in **Appendix C**.

2.4.1 Bedford Wash

Bedford Wash originates south of I-15 at the base of the Santa Ana Mountains. From the origin Bedford Wash flows north easterly as a natural channel and as an improved channel of various heights and widths. Bedford Wash confluences with a regulatory floodway leading to Temescal Wash. Bedford Wash is within a 1% Annual Chance SFHA Zone A region up to the Project extent with a portion of the NB Bedford Wash Bridge located within SFHA Zone A region and the rest of the bridge located within Zone X. This corresponds to the FEMA FIRM Panel 06065C1360G.

Intermittent Beneficial Uses – GWR, REC1, REC2, WARM, WILD

Beneficial Uses – No beneficial uses for Bedford Wash are defined in the Santa Ana Regional Water Quality Control Board Basin Plan.

2.4.2 Coldwater Wash

Coldwater Wash originates southwest of I-15 within Coldwater Canyon off Clay Canyon Drive. From the origin Coldwater Wash flows north via natural channel. After it crosses I-15, the channel travels west adjacent to Temescal Canyon Road and north along Dawson Canyon Road until it reaches Temescal Wash. Coldwater Wash is tributary to the Temescal Wash. The Temescal Wash is tributary to the Santa Ana River. The portion of Coldwater Wash within the Project extent lies in a Zone X region. The outlet of the channel onto Temescal Wash is a 1% Annual Chance SFHA Zone AE. This corresponds to the FEMA FIRM Panel 06065C1390G. In addition, Coldwater Wash is within a Special Study Floodplain as defined by Ordinance 458 adopted by Riverside County.

Beneficial Uses: MUN, AGR, GWR, REC1, REC2, WARM, WILD

2.4.3 Mayhew Wash

Mayhew Wash originates north of Temescal Canyon Road west of I-15. From the origin Mayhew Wash flows east towards and underneath I-15 via natural channel. After it crosses I-15, the channel crosses under Mayhew Road and crosses through a floodplain, where it eventually confluences with Temescal Wash. Mayhew Wash is tributary to Temescal Wash. The portion of Mayhew Wash within the Project extent lies in a Zone X region. The outlet of the channel onto Temescal Wash is a 1% Annual Chance SFHA Zone AE. This corresponds to the FEMA FIRM Panel 06065C1390G. In addition, Mayhew Wash is within a DWR Awareness Floodplain as defined by Ordinance 458 adopted by Riverside County.

Intermittent Beneficial Uses – AGR, IND, GWR, REC1, REC2, LWARM, WILD

Beneficial Uses – No beneficial uses for Mayhew Wash are defined in the Santa Ana Regional Water Quality Control Board Basin Plan.

2.4.4 Temescal Wash

Temescal Wash originates at Lake Elsinore as an emergency outlet for large storm events, occurring only once every 15 years. From the origin, Temescal Wash flows northwest through Temescal Valley and north towards Corona where it reaches a floodplain and confluences with the Santa Ana River. The portion of Temescal Wash (Reach 4) within the Project extent lies within a 1% Annual Chance SFHA Zone AE and is classified as a regulatory floodway. The area surrounding the channel and the SFHA Zone AE are 0.2% Annual Chance Flood Hazard Zone X. The portion within the Project vicinity corresponds to the following FEMA FIRM Panels: 06065C1360G, 06065C1390G, 06065C2005G, 06065C2006G, 06065C2007G, 06065C2026G, 060652028G, 06065C2029G.

The portion crossing the I-15 corresponds to FEMA FIRM Panel 06065C2006G.

Reach 2 –Beneficial Uses – AGR, IND, GWR, REC1, REC2, WARM, WILD

Reach 4 – Beneficial Uses — AGR, GWR, REC1, REC2, WARM, WILD

Reach 5 – Beneficial Uses – AGR, GWR, REC1, REC2, WARM, WILD, RARE

2.4.5 Stovepipe Canyon Wash

Stovepipe Canyon Wash originates north of I-15 above Temescal Canyon High School. The stream moves south towards I-15 via natural channel. A 14 -feet by 7-feet reinforced concrete box (RCB) conveys the stream across the I-15 and then the culvert ultimately confluences with Temescal Wash. Stovepipe Canyon Wash is tributary to Temescal Wash. The portion of Stovepipe Canyon Wash within the Project limits is in a 1% Annual Chance SFHA Zone AO and 0.2% Annual Chance Flood Hazard Zone X. This portion corresponds to FEMA FIRM Panels 06065C2028G.

Intermittent Beneficial Uses – GWR, REC1, REC2, WARM, WILD

Beneficial Uses – No beneficial uses for Stovepipe Canyon Wash are defined in the Santa Ana Regional Water Quality Control Board Basin Plan.

2.4.6 Arroyo Del Toro

East of the Project, Arroyo Del Toro is an engineered concrete rectangular channel that crosses Dexter Avenue through a quintuple 14-feet by 9.5-feet RCB. The RCB's outlet into a detention basin between Dexter Avenue and the I-15 NB roadway. From the detention basin, ten 36-inch and five 48-inch culverts convey the flow under the I-15, to a rectangular concrete channel parallel to the I-15 SB roadway. From the concrete channel, Arroyo Del Toro outlets into Collier Marsh within Temescal Wash. The portion of Arroyo Del Toro within the Project limits is in a 1% Annual Chance SFHA Zone A per FEMA Panel 06065C2029G revised August 28th, 2008.

Beneficial Uses – No beneficial uses for Arroyo Del Toro are defined in the Santa Ana Regional Water Quality Control Board Basin Plan.

2.5 Support of Incompatible Floodplain Development

The Project will not adversely impact the hydraulics of Bedford Wash, Coldwater Wash, Mayhew Wash, Temescal Wash, Stovepipe Canyon Wash and Arroyo Del Toro, or negatively affect the floodplains within its area. Refer to **Section 3.0 Hydraulic Analysis** for Hydraulic analysis results. According to the Temescal Canyon Area Plan land use plan, the preservation and enhancement of Temescal Wash is a vital element in the Western Riverside County Multiple Species Habitat Conservation Plan (MSHCP). The Project does not require drastic changes to Temescal Wash and will have no effect on the Land Use or MSHCP. The Project does not support incompatible floodplain development.

3.0 HYDRAULIC ANALYSIS

3.1 Introduction

The proposed conditions as they relate to the existing floodplains are described in this section. There are six floodplain sources in the Project area; Bedford Wash, Coldwater Wash, Mayhew Wash, Temescal Wash, Arroyo Del Toro and Stovepipe Canyon Wash. Location Hydraulic Study Forms and Summary Flood Plain Encroachment Reports are attached in **Appendix A** and **Appendix B** respectively. No significant impacts are anticipated.

A data request form was faxed to FEMA on December 11, 2019 by Michael Baker International to obtain Flood Insurance Study (FIS) Data in the area surrounding the Project. The FEMA Engineering Library was contacted to receive the information requested.

The flowrates and velocities for Temescal, Bedford, Mayhew, and Coldwater Washes were obtained from their corresponding Preliminary Hydraulics Reports (PHRs) prepared by Michael Baker International in February 2021, September 2022, April 2021, and May 2021, respectively. Per the Temescal Wash PHR, a Q100 of 10,400 cubic feet per second (cfs), was provided by FEMA to HDR. Per the Bedford Wash PHR, a Q100 of 4,372 cfs, was provided by Riverside County Flood Control and Water Conservation District (RCFCWCD) to HDR. Per the Mayhew Wash PHR, a Q100 of 4,048 cfs, was provided by RCFCWCD to HDR. Per the Coldwater Wash PHR, a Q100 of 12,300 cfs, was provided by RCFCWCD to HDR.

The flowrates for the Arroyo Del Toro and Stovepipe Canyon Wash were obtained from FEMA FIS effective March 6, 2018 and the velocities were unavailable.

Table 3 outlines which flow rates and velocities were determined to be most accurate.

Table 3: Drainage Channel Flow and Velocity

Drainage Channel	100-year Flow in cubic feet per second (cfs)	Velocity in feet per second (fps)
Arroyo Del Toro	2,300	-
Stovepipe Canyon Wash	750	-
Temescal Wash	10,400	7.0
Bedford Wash	4,372	13.4
Coldwater Wash	12,300	17.1
Mayhew Wash	4,048	11.9

3.1.1 Flood Insurance Study Data

The data for the existing floodplain condition within Riverside County was taken from the Countywide FIS 06065CV004D, written by FEMA, revised March 6, 2018 for Riverside County. A preliminary FIS was issued on May 25, 2022 with a pending revision date to be determined. FEMA FIRM panels are included in **Appendix C**.

Bedford Wash was most recently studied for Letter of Map Revision (LOMR) 07-09-1194P effective August 28, 2008. This LOMR affects FEMA FIRM Panel 0602451360C, effective February 7, 2008.

Coldwater Wash is located within FEMA FIRM panel 06065C1390G, effective August 28, 2018. Pursuant to Ordinance 458 adopted by Riverside County, Coldwater Wash is within a Special Study Floodplain, last updated on September 27,2012.

Mayhew Wash is located within FEMA FIRM panel 06065C1390G, effective August 28, 2018. Pursuant to Ordinance 458 adopted by Riverside County, Mayhew Wash is within a DWR Awareness Floodplain, last updated on September 27,2012.

Temescal Wash was most recently studied for LOMR 07-09-0879P effective May 31, 2007. This LOMR affects FEMA FIRM panels 0602451360C, 0602451370B, 0602451380B, 0602451390B,0602451390B,0602451360, 0602451370, 0602451380, and 0602451390, effective August 28, 2008. Historic FEMA models show that Temescal Wash was also modeled in 1976 using the HEC-2 Program. The current model was made available from the FEMA Data Request.

Stovepipe Canyon Wash is located within FEMA FIRM panel 06065C2028G, effective August 28, 2018.

Arroyo Del Toro was most recently studied for LOMR 19-09-1886P effective April 7, 2020. This LOMR affects FEMA FIRM panels 06064C2029G and 06065C2028G, effective August 28, 2008.

3.2 Hydraulic Analysis

3.2.1 Existing and Proposed Condition Analysis

The design criteria outlined in Caltrans Highway Design Manual (HDM) for culverts, channels, and bridges was followed to confirm requirements, such as freeboard, are met. The proposed conditions are analyzed in this section to show the effect that the widening of the roadway may have on the described existing floodplain conditions. Location Hydraulic Study Forms and Summary Flood Plain Encroachment Report are available in **Appendix A** and **Appendix B**, respectively.

The HEC-RAS Hydraulic Reference Manual (USACE, 2016) was used to select the appropriate modeling scenario for Temescal Wash, Bedford Wash, Coldwater Wash, and Mayhew Wash. According to the manual, the two options available to calculate the water surface at the bridges are the Momentum method or the Energy method.

The Momentum method is used to model the existing left and right bridge crossings of each stream as two separate bridges using the HEC-RAS Bridge Routine, which yields the most conservative estimate of freeboard. However, in review of the proposed condition model, having the two bridges in the analysis where the Hydraulic Reference Manual recommends combining them compounds the bridge losses and causes unexpected changes in water surface elevations (WSE) elsewhere in the model.

The Energy method is used to develop a separate set of models depicting left and right bridges as series of reaches with lids and blocked obstructions for piers. This method allows the model to evaluate more cross sections in a channel between the existing bridges and below the proposed bridge. These additional cross sections create a more detailed model of a channel below the bridge and provide a clearer view of the Project impacts to the changes in WSE but yield slightly less conservative results for bridge freeboard.

Because the hydraulic model using the Energy Method yields slightly less conservative results for bridge freeboard, the Momentum method was used for the PHR. However, because this report is a study of the floodplain impact comparison due to proposed improvements, the Energy Method is a better option because it is more stable and comparable for evaluating the changes in WSE.

3.2.2 Bedford Wash

Bedford Wash is in the City of Corona between Cajalco Road and Weirick Road and crosses I-15 at "C" Line Station 1931+07 (PM 36.58). From the I-15 crossing of Bedford Wash, its upstream reach is a natural, meandering channel that runs perpendicular to I-15; its downstream reach is a natural, meandering channel that flows into an engineered channel under Temescal Canyon Road. The area consists of open space with cultivated farmland along the floodplain.

The proposed improvements will result in widening within the median in the NB and SB directions along the respective Bedford Wash Bridges, as well as outside widening of the NB bridge. Deck widening between the NB and SB bridges will leave a six-inch gap between the bridges. The proposed widening will be on a straight alignment and in order to line up with the existing deck joint seals and bent columns, both widenings will contain span and total structure lengths that match the existing bridges. The proposed widenings, superstructure depths, cross-slopes, and abutments will be constructed to match the existing bridges.

A hydraulic model showing proposed and existing conditions of Bedford Wash Bridge was developed for this report. According to the model, the maximum difference in proposed and existing WSE occurs at cross section 2079. At this cross section, the change in WSE for the 100-year recurrence storm flow is 0.49 feet (see Table 4 and **Appendix H**).

A PHR for Bedford Wash Bridge was prepared by Michael Baker International in September 2022. According to the PHR, the minimum freeboard for Bedford Wash Bridge occurs at the upstream edge of the SB Bridge and is 3.3 feet (see Table 5). Selected as-built plans and general plan for Bedford Wash Bridge are made available in **Appendix D** of this report.

3.2.3 Coldwater Wash

Coldwater Wash is in the City of Temescal Valley, just east of Temescal Canyon Road and crosses I-15 at "C" Line Station 1740+58 (PM 32.96). Coldwater Wash is a trapezoidal channel with a sandy bottom and minor vegetation. The embankments are protected by rocks with concrete slurry side slope protection.

The proposed improvements will result in widening the inside of the NB and SB Coldwater Wash Bridges by 25-feet and will leave approximately six inches of clear space between the two bridges. Bridge improvements will be completed structurally similar to existing spans and alignment, with no impacts to the general channel geometry beneath the structures.

A hydraulic model showing proposed and existing conditions of Coldwater Wash Bridge was developed for this report. According to the model, the maximum difference in proposed and existing WSE occurs at cross section 882. At this cross section, the change in WSE for the 100-year recurrence storm flow is -0.13 feet (see Table 4 and **Appendix J**).

A PHR for Coldwater Wash Bridge has been prepared by Michael Baker International in May 2021. According to the PHR, the minimum freeboard for Coldwater Wash Bridge occurs at the

downstream edge of the SB Bridge and is 19.9 feet (see Table 5). Selected as-built plans and general plan for Coldwater Wash Bridge are made available in **Appendix F** of this report.

3.2.4 Mayhew Wash

Mayhew Wash is in the City of Temescal Valley, just north of Temescal Canyon Road and crosses I-15 at "C" Line Station 1687+76 (PM 31.97). Mayhew Wash is a trapezoidal channel with a soft sandy bottom and minor vegetation. The south embankment has approximately 6.6 feet of exposed partial concrete-lined slope protection, while the north embankment has approximately 6.6 feet of exposed partial rock with concrete slurry side slope protection.

The proposed improvements will consist of inside widening to the existing NB and SB bridges to accommodate two additional express lanes in each direction (NB and SB). Bridge improvements will be completed structurally similar to the existing spans and alignment, with no impacts to the general channel geometry beneath the structures.

A hydraulic model showing proposed and existing conditions of Mayhew Wash Bridge was developed for this report. According to the model, the maximum difference in proposed and existing WSE occurs at cross section 1342. At this cross section, the change in WSE for the 100-year recurrence storm flow is 0.02 feet (see Table 4 and **Appendix K**).

A PHR for Mayhew Wash Bridge has been prepared by Michael Baker International in April 2021. According to the PHR, the minimum freeboard for Mayhew Wash Bridge occurs at the upstream edge of the SB Bridge and is 18.2 feet (see Table 5). Selected as-built plans and general plan for Mayhew Wash Bridge are made available in **Appendix G** of this report.

3.2.5 Temescal Wash

Temescal Wash extends from Lake Elsinore to the Santa Ana River in the City of Corona. Specifically, the south crossing of Temescal Wash is between Horsethief Canyon Road and Temescal Canyon Road (south crossing) and crosses I-15 at "C" Line Station 1481+63 (PM 28.04). The upstream and downstream reaches are unimproved wash area covered with dense vegetation surrounded with open area except for a downstream and upstream commercial/industrial development site. Temescal Wash is a trapezoidal channel with a soft sandy bottom and moderate trees and vegetation. There is no side slope protection along the channel as it crosses under the Temescal Wash Bridge.

The proposed improvements will result in widening the inside of both the NB and SB Temescal Wash Bridges, each by 25 feet. The new bridges will be founded on driven steel piles and will be located adjacent to existing bents and aligned to reduce disruption of the Temescal Wash flow. Open end diaphragm-type abutments founded on driven steel piles are proposed to match the existing abutment type. General channel geometry beneath the bridges will not be altered.

A hydraulic model showing proposed and existing conditions of Temescal Wash Bridge was developed for this report. According to the model, the maximum difference in proposed and existing WSE occurs at cross section 17978. At this cross section, the change in WSE for the 100-year recurrence storm flow is 0.51 feet (see Table 4 and **Appendix I**).

A PHR for Temescal Wash Bridge has been prepared by Michael Baker International in February 2021. According to the PHR, the minimum freeboard for Temescal Wash Bridge occurs at the downstream edge of the SB Bridge and is 18.8 feet (see Table 5). Selected as-built

plans and general plan for Temescal Wash Bridge are made available in **Appendix E** of this report.

3.2.6 Stovepipe Canyon Wash

Stovepipe Canyon Wash is located just south of Nichols Road and crosses via a 14 -feet by 7-feet reinforced concrete box (RCB) I-15 at approximately PM 23.50. The Stovepipe Canyon Wash crosses the Project not as a bridge, but as culverts underneath the I-15. The upstream reach from the I-15 crossing of Stovepipe Canyon Wash is a natural, meandering channel that runs perpendicular to I-15. The downstream reach of Stovepipe Canyon Wash outfalls from the culverts into Temescal Wash. The channel cover for the upstream section consists of light vegetation.

In the proposed condition, the existing drainage facilities at the I-15 crossing for Stovepipe Canyon Wash will remain the same. The proposed work in the roadway is in the median; no outside widening is proposed. The Stovepipe Canyon Wash hydraulics will not be impacted, because the cross culverts are not being improved.

3.2.7 Arroyo Del Toro

Arroyo Del Toro is located just north of SR-74 and is located at approximately PM 22.60 along the I-15. From a detention basin east of the Project, ten 36-inch and five 48-inch culverts convey the flow under the I-15, to a rectangular concrete channel parallel to the I-15 SB roadway.

In the proposed condition, the existing drainage facilities at the I-15 crossing for Arroyo Del Toro will remain the same. The proposed work in the roadway is in the median; no outside widening is proposed. The Arroyo Del Toro hydraulics will not be impacted, because the cross culverts are not being improved.

3.3 Results of Hydraulic Analysis

Temescal Wash, Bedford Wash, Coldwater Wash and Mayhew Wash are associated with bridges that are being widened. In the proposed condition, Stovepipe Canyon Wash and Arroyo Del Toro drainage structures at the I-15 crossing will remain the same since hydraulics will not be impacted.

There is minimal impact to the hydraulics from the existing to proposed conditions for Temescal Wash, Bedford Wash, Coldwater Wash and Mayhew Wash. The proposed improvements meet Caltrans requirements listed in Caltrans Highway Design Manual, Section 821.3 (1). The models show that under proposed conditions, the WSE still match the existing conditions within a foot, as shown in Tables 4. Furthermore, as shown in Table 5, they provide sufficient waterway area to pass the 1% probability base flood Q100 without freeboard under proposed conditions.

Table 4: Impact to Water Surface Elevation from Existing to Proposed Conditions (100-YR)

	Q (cfs)	Existing Condition	Proposed Condition	Max. Change in Water Surface Elev. (ft)
		Water Surface Elev. (ft)	Water Surface Elev. (ft)	
Bedford Wash (Sta. 2079)	4,372	888.69	889.18	0.49
Coldwater Wash (Sta. 882)	12,300	1022.82	1022.69	-0.13
Mayhew Wash (Sta. 1342)	4,048	1048.62	1048.64	0.02
Temescal Wash (Sta. 17978)	10,400	1190.31	1190.82	0.51

Note: The LHS hydraulic model applies the Energy Method to obtain the table values shown above.

Table 5: Minimum Freeboard Under Proposed Conditions (100-YR)

	Water Surface Elev. (ft)	Low Chord Elev. (ft)	Min. Freeboard (ft)
Bedford Wash (upstream edge of SB Bridge)	891.9	895.17	3.3
Coldwater Wash (downstream edge of SB Bridge)	1024.59	1044.46	19.9
Mayhew Wash (upstream edge of SB Bridge)	1051.0	1069.17	18.2
Temescal Wash (downstream edge of SB Bridge)	1191.1	1209.92	18.8

Note: The PHR hydraulic model applies the Momentum Method to obtain the table values shown above.

Hydraulic models for Bedford Wash, Temescal Wash, Coldwater Wash and Mayhew Wash were developed for this report based on existing and proposed conditions and are included in **Appendices H** through **K**. There is low impact to the hydraulics from the existing to proposed conditions for Temescal Wash, Bedford Wash, Mayhew Wash, and Coldwater Wash. However, the roadway improvements should be reanalyzed during the Plans, Specifications & Estimate (PS&E) phase to prepare a Conditional Letter of Map Revision (CLOMR) as a result of the possible Regulatory Floodway encroachment to Temescal Wash and Bedford Wash. Proposed improvements can be classified as low risk.

4.0 RISKS AND IMPACTS

4.1 Potential Risk from Longitudinal Encroachment

The Caltrans Standard Environmental Reference defines a longitudinal encroachment as an encroachment that is parallel to the direction of flow. A transverse encroachment is an encroachment that is perpendicular or skewed to the direction of flow. The Bedford Wash Bridge, Temescal Wash Bridge, Coldwater Wash Bridge, and Mayhew Wash Bridge encroachments on the floodplains are transverse encroachments. Stovepipe Canyon Wash and Arroyo Del Toro cross underneath the I-15 and will not be impacted by the Project; therefore, there is no impact to the longitudinal encroachment.

4.2 Potential Risk to Life and Property

The risk to life and property is evaluated by a potential Q100 backwater (Base Flood) for residences, other buildings, crops. The potential risk to life and property remains unchanged as a result of these improvements.

The Highway Design Manual, Chapter 804, evaluates the potential for traffic disruptions by a potential Q100 backwater (Base Flood) for:

1. Emergency Supply or Evacuation routes
2. Emergency Vehicle Access
3. Whether a Practicable Detour is available
4. School Bus or Mail Routes

Because the Project does not alter the existing flooding source, there are no changes to the existing potential for traffic disruptions.

The Project will result in minimal increases in WSE, which will continue to be contained in the channels and meet freeboard requirements.

Therefore, the potential for traffic disruptions due to the influences of the Build Alternative on the hydraulics is deemed NOMINAL.

4.3 Potential Risk to Natural and Beneficial Floodplain Values

The land being impacted by the Project is within the median, which is Caltrans ROW. Furthermore, Bridge improvements will be completed structurally similar to existing spans and alignment, with no impacts to the general channel geometry beneath the structures; therefore, there is no risk to the natural and beneficial floodplain values.

4.3.1 Biological Resources

A Natural Environment Study (NES) (2022) is being prepared to analyze potential impacts to the biological study area (BSA) for the Project (consisting of the Project area limits plus a 500-foot buffer). The preliminary results from the NES are discussed in the sections below.

4.3.2 Wildlife

Animals considered to be of special-status include those listed or proposed for listing as threatened or endangered under:

- Federal Endangered Species Act (FESA)

- California Endangered Species Act (CESA),
- California Department of Fish and Wildlife (CDFW) fully protected species, such as the Bald and Golden Eagle Protection Act for raptors and the species of special concern (SSC)

Potential presence of special-status species within the BSA was determined based on direct observation of individuals or their sign during field surveys, known documented occurrences in California Natural Diversity Database, and/or presence of species suitable habitat. The NES (2022) evaluated for habitat suitability across the BSA. Focused studies that were performed for species of plants and wildlife are provided in the NES.

All other special-status wildlife that could occur in the BSA are fully covered under the MSHCP and do not require additional investigation and are not discussed further. These species are considered adequately conserved through participation by RCTC in the MSHCP. Additional surveys, avoidance and minimization measures, and compensatory mitigation are not required for these species.

The NES lists five special-status animals (least Bell's vireo, coastal California gnatcatcher, orange-throated whiptail, yellow-breasted chat and yellow warbler) that were observed within the BSA. With the exception of least Bell's vireo, all of these special-status animals are fully covered species in the MSHCP, with no additional survey requirements. Habitat requirements, survey results and project impacts for these species are provided in this section.

4.3.2.1 Invertebrates

Listed Fairy Shrimp

What follows are the analysis for survey results and project impacts for Vernal Pool Fairy Shrimp.

Survey Results:

According to the NES (2022), the BSA supports several shallow, seasonally inundated depressions that provide suitable habitat. Wet season surveys were completed in 2020 and dry season surveys were completed in 2021 for Riverside fairy shrimp, vernal pool fairy shrimp, and San Diego fairy shrimp for portions of the BSA during which these species were not observed. However, not all potentially suitable habitat could be surveyed due to access constraints.

Project Impacts:

No listed fairy shrimp were found during wet and dry season focused surveys, therefore no impacts would occur.

4.3.2.2 Fish

There are no special-status fish in the Project area.

4.3.2.3 Amphibians

There are no special-status amphibians in the Project area.

4.3.2.4 Reptiles

What follows are the analysis for survey results and project impacts for reptiles.

Survey Results:

The BSA has suitable habitat to support six reptile species that are not afforded coverage under the MSHCP: 1) southern California legless lizard; 2) California glossy snake; 3) coastal whiptail; 4) Coronado skink; 5) coast patch-nosed snake; and 6) two-striped garter snake. Generally, suitable habitat is comprised of sage scrub, chaparral, grasslands and some riparian vegetation communities. None of these species were observed in the BSA during surveys in 2020, but may be present in suitable habitat in the BSA. These species are not expected to occur in numbers that would pose a constraint to the Project.

Project Impacts:

There is potential for impacts on the six reptile species where suitable habitat is present.

4.3.2.5 Birds

Focused studies were conducted for least Bell's vireo, southwestern willow flycatcher, and burrowing owl. Several other special-status species were incidentally observed within the BSA, however, these species are fully covered under the MSHCP. Three special-status birds were observed within the BSA, coastal California gnatcatcher, yellow-breasted chat, and yellow warbler, however, these are fully covered under the MSHCP, with no additional survey requirements; they will not be addressed further.

The BSA has suitable habitat to support three special-status bird species not covered by the MSHCP including the long-eared owl and grasshopper sparrow. Grasshopper sparrow has specific MSCHP Conservation Objectives. Surveys specific for the long-eared owl and the grasshopper sparrow were not conducted. Observations of these species would occur concurrently with other surveys. Project impacts for these species would be similar to those for burrowing owl (see analysis below).

Burrowing Owl

What follows are the analysis for survey results and project impacts for Burrowing Owls.

Survey Results:

An evaluation was performed to determine whether potentially suitable habitat for burrowing owl was present. The Project overlaps with the MSHCP Burrowing Owl Survey Area; as such, surveys were only conducted within the boundaries of the MSHCP-designated survey area for this species on parcels where access was provided by the property owners. Within the MSHCP Burrowing Owl Survey Area, surveys were conducted within the limits of disturbance plus a 500-foot buffer. No burrowing owls were observed during 2020 focused studies. Surveys within the remaining accessible properties were conducted in 2021 and the species was not found. Therefore, burrowing owl are absent from the BSA.

Project Impacts:

Potential burrowing owl burrows were observed during focused studies. Although this species has not been found to date, this species is highly mobile and may migrate to the site at any time. Potential direct impacts to burrowing owls may include the loss of foraging habitat, death due to vehicle strikes, or the passive relocation of owls off-site. Indirect impacts may include: increased noise due to the Project; nest abandonment due to noise and vibrations from construction; increased trash leading owls to the road; and night lighting during construction interfering with behavior.

Southwestern Willow Flycatcher

What follows are the analysis for survey results and project impacts for Southwestern Willow Flycatchers.

Survey Results:

A habitat assessment was performed to determine whether potentially suitable habitat for the southwestern willow flycatcher was present. The Project contains riparian habitat within the BSA suitable for this species. Focused surveys were conducted within the limits of disturbance plus a 300-foot buffer. No southwestern willow flycatchers were observed during focused studies, therefore it is absent.

Project Impacts:

Based on the focused survey results, no impacts on southwestern willow flycatcher would occur.

Least Bell's Vireo

What follows are the analysis for survey results and project impacts for Least Bell's Vireo.

Survey Results:

An evaluation was performed to determine whether potentially suitable habitat for the least Bell's vireo was present. The Project contains riparian habitat suitable for the least Bell's vireo within the BSA. Within suitable habitat, surveys were conducted within the limits of disturbance plus a 300-foot buffer. Numerous least Bell's vireo were observed in 2020 throughout the BSA.

Project Impacts:

Least bell's vireo were observed in numerous riparian areas in 2020. There is a potential for the direct removal of suitable habitat, including 100 meters of undeveloped landscape adjacent to the conserved habitat area.

Potential direct impacts to the least Bell's vireos may include the loss of foraging or nesting habitat or death due to vehicle strikes. Indirect impacts may include: increased noise due to the Project; nest abandonment due to noise and vibrations from construction; and night lighting during construction, disrupting behavior within the conservation area. In conformance with the MSHCP, 90 percent of the areas providing long-term conservation value within the Project site must be avoided. As the majority of project work is anticipated to occur within the highway

median, avoidance of 90 percent of the occupied area with long-term conservation value is feasible.

4.3.2.6 Mammals

The BSA has suitable habitat to support nine mammal species not covered by the MSHCP: 1) pallid bat; 2) Townsend's big-eared bat; 3) California western mastiff bat; 4) western red bat; 5) western yellow bat; 6) pocketed free-tailed bat; 7) big free-tailed bat; 8) Dulzura pocket mouse; and 9) Southern grasshopper mouse. No special-status bats were identified during focused studies. Surveys for Dulzura pocket mouse and Southern grasshopper mouse were not conducted as a part of the Project, as the presence of these species was expected to be very low with minimal impacts.

Bats

What follows are the analysis for survey results and project impacts for Bats.

Survey Results:

A habitat assessment for roosting bats was conducted in 2020 to determine the potential for bat foraging and roosting activity within the BSA within the Project limits of disturbance plus a 100-foot buffer. Where suitable habitat was identified, bat emergence surveys were conducted in 2020. Emergence surveys were combined with acoustic analysis where echolocation calls were recorded to identify bat species during emergence. During 2020/2021 bat surveys, no special-status bat species were identified.

Project Impacts:

No special-status bats were observed during focused surveys. Project activities conducted adjacent to roost or foraging areas could result in indirect impacts on bats due to: light during nighttime work; noise due to construction; vibrations to bridge structures and suitable habitat; and changes in noise patterns during operations.

4.3.3 Plants

Plants are considered to be of special-status if they are listed or proposed for listing as threatened or endangered under FESA and/or CESA or have a California Rare Plant Ranking (CRPR) under the California Native Plant Society. Potential presence of special-status species within the BSA was determined based on direct observation of individual specimens during field surveys, known documented occurrences in California Natural Diversity Database, and/or presence of species suitable habitat. Portions of the Project would occur in the following MSHCP survey areas:

Narrow Endemic Plant Survey Areas (NEPSA)

- NEPSA 1– Munz's onion (*Allium munzii*), San Diego ambrosia (*Ambrosia pumila*), slender-horned spineflower (*Dodecahema leptoceras*), many-stemmed dudleya (*Dudleya multicaulis*), spreading navarretia (*Navarretia fossalis*), California orcutt grass (*Orcuttia californica*), San Miguel savory (*Satureja chandleri*), Hammitt's claycress (*Sibaropsis hammittii*), and Wright's trichocoronis (*Trichocoronis wrightii* var. *wrightii*)

- NEPSA 7– San Diego ambrosia, Brand's phacelia (*Phacelia stellaris*), and San Miguel savory

Criteria Area Species Survey Area (CASSA)

- CASSA 1– Thread-leaved brodiaea (*Brodiaea filifolia*), Davidson's saltscale (*Atriplex serenana* var. *davidsonii*), Parish's saltscale (*Atriplex parishii*), round-leaved filaree (*Erodium macrophyllum*), smooth tarplant (*Centromadia pungens* spp. *laevis*), and little mousetail (*Myosaurus minimus*), and Coulter's goldfields (*Lasthenia glabrata* var. *coulteri*)

In addition to conducting habitat assessments for the NEPSA and CASSA plant species, suitable habitat was present for more than 50 other rare plant species that could potentially occur regionally.

What follows are the survey results and project impacts for plants.

Survey Results:

Focused rare plant surveys were conducted in 2020 and 2021. Special focus was made on the NEPSA, CASSA, and any non-MSHCP covered species that would potentially occur.

Two special-status plant species – long-spined spineflower (*Chorizanthe polygonoides* var. *longispina*) and Coulter's matilija poppy (*Romneya coulteri*) – were observed within the BSA. However, both species are fully covered under the MSHCP and are not addressed further. No federal or state listed species have been detected.

Project Impacts:

No impacts on special-status species that would constrain the project would occur.

4.3.4 Open Space

There is no open space within the Project limits; therefore, there is no risk of negatively impacting open space.

4.3.5 Natural Beauty

The Project does not propose to alter the natural beauty of the Project site; therefore, there are no measures needed to restore natural beauty lost from this Project.

4.3.6 Scientific Study

The areas impacted by the Project are within the Caltrans ROW. Study spaces will still be accessible after Project completion; therefore, there are no measures needed to restore scientific study space lost due to the Project.

4.3.7 Outdoor Recreation

The land being impacted by the Project is the Caltrans ROW. There is no potential for outdoor recreation in the Caltrans ROW.

4.3.8 Agriculture

The land being impacted by the Project is within the median and Caltrans ROW. There is no potential for agriculture in the Caltrans ROW.

4.3.9 Forestry

The Project is not within any California State or Federal Forest.

4.3.10 Natural Moderation of Floods

The hydraulic models show that the floodplain elevations are not adversely impacted for the Temescal Wash Bridge, Bedford Wash Bridge, Coldwater Wash Bridge, and Mayhew Wash Bridge; therefore, the natural moderation of floods remains effective. The Project does not propose to alter the existing structure for Stovepipe Canyon Wash and Arroyo Del Toro.

4.3.11 Water Quality Maintenance

The SWDR will document the existing and proposed BMPs. Water quality will be maintained.

4.3.12 Groundwater Recharge

Temescal Creek is a contributor to groundwater recharge through infiltration. Engineered groundwater recharge facilities are not present within the Project limits, so there are no risks to the groundwater recharge beneficial use. There is a potential for groundwater to be encountered during construction activities. If groundwater is encountered, the contractor will detain, treat, or discharge the groundwater in accordance with the requirements of the Waste Discharge Requirements (WDRs) or the project's National Pollutant Discharge Elimination System (NPDES) permits. Adherence to the WDRs & NPDES Permit requirements will prevent risks to groundwater recharge because all water that does not meet the minimum standards for discharge to surface waters may not be discharged; therefore, the project will not pose a temporary or permanent impact to groundwater as a result of construction activities.

4.4 Potential Risk for Support of Incompatible Floodplain Development

The Project consists of permanent improvements within floodplain Zones A, AE and AO and X. In addition, the Project consists of permanent improvements within DWR Awareness and Special Studies Floodplains as defined by Ordinance 458 adopted by Riverside County. The Project improvements that occur within these floodplains do not pose potential risks to the beneficial uses defined for Temescal Wash and Coldwater Wash in the Santa Ana Regional Water Quality Control Board Basin Plan. The Project improvements that occur within these floodplains do not pose potential risks to the intermittent beneficial uses defined for Bedford Wash, Mayhew Wash, or Stovepipe Canyon Wash in the Santa Ana Regional Water Quality Control Board Basin Plan. No beneficial uses or intermittent beneficial uses for Arroyo Del Toro are defined in the Santa Ana Regional Water Quality Control Board Basin Plan.

Measures to minimize potential impacts to beneficial uses and intermittent beneficial uses are provided in **Section 4.6.11 Beneficial Uses**. A temporary measure that will be taken to minimize impact to REC1 and REC2 during construction includes staging. Staging consists of implementing a plan to provide safe and efficient construction operations, as well as to minimize community impacts during construction.

The Project proposes to widen an existing freeway within the Caltrans ROW. There is no direct incompatible floodplain development.

4.5 Measures to Minimize Floodplain Impacts

Measures to minimize floodplain impacts are not required. The proposed improvements do not adversely impact the floodplains. Flood conveyance is maintained, see **Section 3 Hydraulic Analysis**.

4.6 Measures to Restore/Preserve Natural Beneficial Floodplain Values Impacted by the Project

4.6.1 Wildlife

4.6.1.1 MSHCP Covered Species

Species that are fully covered under the MSHCP do not require additional surveys.

Avoidance and Minimization Measures

Refer to the NES (2022) for avoidance and minimization measures. These measures are consistent with the MSHCP and would ensure compliance within it.

Compensatory Mitigation

No compensatory mitigation is required for MSHCP covered species.

Cumulative Impacts

The MSHCP is designed to mitigate for impacts on covered species and habitat on a regional scale. With participation in the MSHCP and implementation of the measures identified in the final NES, no substantial cumulative impacts are anticipated to occur on the MSHCP species that could occur in the BSA.

4.6.1.2 Invertebrates

Listed Fairy Shrimp

What follows is the avoidance and minimization efforts, compensatory mitigation, and cumulative impacts for the listed fairy shrimp.

Avoidance and Minimization Efforts

Refer to the NES (2022) for avoidance and minimization measures.

Compensatory Mitigation

Since no listed fairy shrimp would be impacted by the proposed project, there is no compensatory migration required.

Cumulative Impacts

No cumulative impacts are present.

4.6.1.3 Fish

There are no special-status fish in the Project area.

4.6.1.4 Amphibians

There are no special-status amphibians in the Project area.

4.6.1.5 Reptiles

What follows is the avoidance and minimization efforts, compensatory mitigation, and cumulative impacts for the special-status reptiles that may occur adjacent to the LOD during construction.

Avoidance and Minimization Measures

Although avoidance and minimization measures are not specifically required, the measures identified in the NES (2022) would provide protection for special-status reptiles that may occur adjacent to the LOD during construction.

Compensatory Mitigation

No compensatory mitigation is required.

Cumulative Impacts

Cumulative effects are not anticipated.

4.6.1.6 Birds

Burrowing Owl

Although burrowing owl were not found during focused studies, the species is highly mobile and could occur prior to construction. What follows is the avoidance and minimization efforts, compensatory mitigation, and cumulative impacts for the burrowing owl.

Avoidance and Minimization Measures

Refer to the NES (2022) for avoidance and minimization measures.

Compensatory Mitigation

No compensatory mitigation is required.

Cumulative Impacts

The MSHCP is designed to mitigate for impacts on covered species and habitat on a regional scale. With participation in the MSHCP and implementation of species avoidance and minimizations described in the NES (2022), no substantial cumulative impacts are anticipated to occur on the special-status species that could occur in the BSA.

Southwestern Willow Flycatcher

What follows is the avoidance and minimization efforts, compensatory mitigation, and cumulative impacts for the southwestern willow flycatcher.

Avoidance and Minimization Measures

SWFL is not present in the BSA. No avoidance and minimization measures are required.

Compensatory Mitigation

No compensatory mitigation is required.

Cumulative Impacts

No cumulatively considerable impacts on the species would occur.

Least Bell's Vireo

What follows is the avoidance and minimization efforts, compensatory mitigation, and cumulative impacts for the least bell's vireo.

Avoidance and Minimization Measures

Refer to the NES (2022) for avoidance and minimization measures.

Compensatory Mitigation

Refer to the NES (2022) for compensatory mitigation requirements.

Cumulative Impacts

Because proposed direct impacts would be fully mitigated, the potential for cumulative effects rests on evaluating the incremental increase in potential cumulative effects from operation of the Build Alternative against the existing operational effects of the I-15 facility and other future projects. The Build Alternative may incrementally increase pollution and noise, although having the HOV lanes may reduce air pollution through less traffic congestion. It is expected that the Build Alternative would not result in a cumulatively considerable contribution to a regional decline in LBV numbers.

4.6.1.7 Mammals

Bats

What follows is the avoidance and minimization efforts, compensatory mitigation, and cumulative impacts for bats.

Avoidance and Minimization Measures

Refer to the NES (2022) for avoidance and minimization measures.

Compensatory Mitigation

No compensatory mitigation is required.

Cumulative Impacts

Project impacts on potentially suitable bat habitat within the BSA is minimal and is not expected to substantially contribute to cumulative impacts on these habitats in the vicinity of the Project.

Dulzura Pocket Mouse and Southern Grasshopper Mouse

What follows is the avoidance and minimization efforts, compensatory mitigation, and cumulative impacts for the Dulzura pocket mouse and southern grasshopper mouse that may occur adjacent to the LOD during construction.

Avoidance and Minimization Measures

Although avoidance and minimization measures are not specifically required, the measures identified in the NES (2022) would provide protection for special-status reptiles that may occur adjacent to the LOD during construction.

Compensatory Mitigation

No compensatory mitigation is required.

Cumulative Impacts

Project impacts on potentially suitable special-status small mammal habitat within the BSA are minimal and are not expected to substantially contribute to cumulative impacts on these habitats in the vicinity of the Project.

4.6.2 Plants

What follows is the avoidance and minimization efforts, compensatory mitigation, and cumulative impacts for plants.

Avoidance and Minimization Measures

Because no special-status plants are present, no avoidance and/or minimization measures are required.

Compensatory Mitigation

No compensatory mitigation is required.

Cumulative Impacts

Cumulative impacts would not occur.

4.6.3 Natural Beauty

The Project does not propose to alter the natural beauty of its site; therefore, there are no measures needed to restore natural beauty lost from this Project.

4.6.4 Scientific Study

A possible list of scientific studies in the Project area could include studies on pollution, traffic, water quality, endemic species, and invasive species. These study spaces will still be accessible after Project completion; therefore, there are no measures needed to restore scientific study space lost due to the Project.

4.6.5 Outdoor Recreation

The Project does not propose to alter the outdoor recreation facilities of the Project site; therefore, there are no measures needed to restore outdoor recreational area lost due to this Project.

4.6.6 Agriculture

The Project does not propose to alter agriculture in the vicinity of the Project site; therefore, there are no measures needed to restore agricultural area lost due to this Project.

4.6.7 Forest

The Project does not propose to alter the forest areas in the vicinity of the Project site; therefore, there are no measures needed to restore natural beauty lost due to this Project.

4.6.8 Natural Moderation of Floods

The Project does not propose to alter the natural moderations for floods; therefore, there are no measures needed to restore natural moderations of floods lost due to this Project.

4.6.9 Water Quality Maintenance

Water quality BMPs are proposed in conjunction with this Project. Existing BMPs are being maintained, and additional BMPs would be added. The SWDR will document the existing and proposed BMPs. Water quality will be maintained.

4.6.10 Groundwater Recharge

Engineered groundwater recharge facilities are not present within the Project limits, so there are no risks to the groundwater recharge beneficial use. There is a potential for groundwater to be encountered during construction activities. If groundwater is encountered, the contractor will detain, treat, or discharge the groundwater in accordance with the requirements of the WDRs or the project's NPDES permits. Adherence to the WDRs & NPDES Permit requirements will prevent risks to groundwater recharge because all water that does not meet the minimum standards for discharge to surface waters may not be discharged; therefore, the project will not pose a temporary or permanent impact to groundwater as a result of construction activities.

4.6.11 Beneficial Uses

Per the I-15 ELPSE –NES (2022) Section 4, there are no temporary or permanent impacts to WARM, LWARM, WILD, and RARE. The purpose of this study is to identify all mitigation, monitoring, and compliance measures related to biological resources that may be impacted during project construction.

The impacts to the watershed characteristics and beneficial uses are described below.

4.6.11.1 Bedford Wash

Intermittent Beneficial Uses: GWR, REC1, REC2, WARM, WILD

Bedford Wash crosses the I-15 in the vicinity of the proposed project improvements. Bedford Wash is a trapezoidal channel with soft sandy bottom and rock riprap side slope protections. The

channel bottom is natural with a dirt road running beneath the bridges along the channel bottom on the north side of the bents. The beneficial uses of Bedford Wash are not impacted because:

- GWR – The channel conveyance is unchanged; therefore, any groundwater recharge that occurs within the channel remains unchanged.
- REC1 & REC2 – The area in the immediate vicinity of the Project is not open to public access. The channel conveyance remains unchanged as a result of the Project; therefore, any contact or non-contact water recreation activities elsewhere within the floodplain are not impacted.
- WARM – The channel in the vicinity of the Project is an unlined flood control channel. No warm freshwater habitat was observed near I-15 within the channel. The channel conveyance is unchanged; therefore, any warm freshwater habitat upstream or downstream of the Project site is unchanged.
- WILD – The channel in the vicinity of the Project is an unlined flood control channel. The channel conveyance is unchanged; therefore, any wildlife habitat upstream or downstream of the Project site is unchanged.

4.6.11.2 **Coldwater Wash**

Beneficial Uses: MUN, AGR, GWR, REC1, REC2, WARM, WILD

Coldwater Wash crosses the I-15 in the vicinity of the proposed project improvements. Coldwater Wash is a trapezoidal channel with a sandy bottom and minor vegetation. The embankments are partially protected with rocks and the side slopes are protected with concrete slurry. The beneficial uses of Coldwater Wash are not impacted because:

- MUN – The channel conveyance is unchanged; therefore, any use for municipal and domestic supply are unchanged.
- AGR – The channel conveyance is unchanged; therefore, any agricultural supply downstream is not impacted.
- GWR – The channel conveyance is unchanged; therefore, any groundwater recharge that occurs within the channel remains unchanged.
- REC1 & REC2 – The area in the immediate vicinity of the Project is not open to public access. The channel conveyance remains unchanged as a result of the Project; therefore, any contact or non-contact water recreation activities elsewhere within the floodplain are not impacted.
- WARM – The channel in the vicinity of the Project is an unlined flood control channel. No warm freshwater habitat was observed near I-15 within the channel. The channel conveyance is unchanged; therefore, any warm freshwater habitat upstream or downstream of the Project site is unchanged.
- WILD – The channel in the vicinity of the Project is an unlined flood control channel. The channel conveyance is unchanged; therefore, any wildlife habitat upstream or downstream of the Project site is unchanged.

4.6.11.3 **Mayhew Wash**

Intermittent Beneficial Uses –AGR, IND, GWR, REC1, REC2, LWARM, WILD

Mayhew Wash is a trapezoidal channel with a soft sandy bottom and minor vegetation. The south embankment has approximately 6.6 feet of exposed partial concrete-lined slope protection,

while the north embankment has approximately 6.6 feet of exposed partial rock with concrete slurry side slope protection. The beneficial uses of Mayhew Wash are not impacted because:

- AGR – The channel conveyance is unchanged; therefore, any agricultural supply downstream is not impacted.
- IND – The channel conveyance is unchanged; therefore, any industrial activity supply downstream is not impacted.
- GWR – The channel conveyance is unchanged; therefore, any groundwater recharge that occurs within the channel remains unchanged.
- REC1 & REC2 – The area in the immediate vicinity of the Project is not open to public access. The channel conveyance remains unchanged as a result of the Project; therefore, any contact or non-contact water recreation activities elsewhere within the floodplain are not impacted.
- LWARM – The channel in the vicinity of the Project is an unlined flood control channel. No limited warm freshwater habitat was observed near I-15 within the channel. The channel conveyance is unchanged; therefore, any limited warm freshwater habitat upstream or downstream of the Project site is unchanged.
- WILD – The channel in the vicinity of the Project is an unlined flood control channel. The channel conveyance is unchanged; therefore, any wildlife habitat upstream or downstream of the Project site is unchanged.

4.6.11.4 **Temescal Wash**

Reach 4 – Beneficial Uses –AGR, GWR, REC1, REC2, WARM, WILD

Temescal Wash (Reach 4) crosses the I-15 in the vicinity of the proposed project improvements. Temescal Wash is a trapezoidal channel with a soft sandy bottom and moderate trees and vegetation. There is no side slope protection along the channel as it crosses under the Temescal Wash Bridge. The beneficial uses are not impacted because:

- AGR – The channel conveyance is unchanged; therefore, any agricultural supply downstream is not impacted.
- GWR – The channel conveyance is unchanged; therefore, any groundwater recharge that occurs within the channel remains unchanged.
- REC1 & REC2 – The area in the immediate vicinity of the Project is not open to public access. The channel conveyance remains unchanged as a result of the Project; therefore, any contact or non-contact water recreation activities elsewhere within the floodplain are not impacted.
- WARM –No warm freshwater habitat was observed near I-15 within the channel. The channel conveyance is unchanged; therefore, any warm freshwater habitat upstream or downstream of the Project site is unchanged.
- WILD – The channel conveyance is unchanged; therefore, any wildlife habitat upstream or downstream of the Project site is unchanged.

4.6.11.5 **Stovepipe Canyon Wash**

Intermittent Beneficial Uses –GWR, REC1, REC2, WARM, WILD

Stovepipe Canyon Wash originates north of I-15 above Temescal Canyon High School. The stream moves south towards I-15 via natural channel. A 14 -feet by 7-feet reinforced concrete box (RCB) takes the stream across the I-15. The beneficial uses are not impacted because:

- GWR – The channel conveyance is unchanged; therefore, any groundwater recharge that occurs within the channel remains unchanged.
- REC1 & REC2 – The area in the immediate vicinity of the Project is not open to public access. The channel conveyance remains unchanged as a result of the Project; therefore, any contact or non-contact water recreation activities elsewhere within the floodplain are not impacted.
- WARM – The channel in the vicinity of the Project is an unlined flood control channel. No warm freshwater habitat was observed near I-15 within the channel. The channel conveyance is unchanged; therefore, any warm freshwater habitat upstream or downstream of the Project site is unchanged.
- WILD – The channel in the vicinity of the Project is an unlined flood control channel. The channel conveyance is unchanged; therefore, any wildlife habitat upstream or downstream of the Project site is unchanged.

4.6.11.6 **Arroyo Del Toro**

Beneficial Uses – No beneficial uses for Arroyo Del Toro are defined in the Santa Ana Regional Water Quality Control Board Basin Plan.

From the detention basin, Arroyo Del Toro (ten 36-inch and five 48-inch culverts) convey flow under the I-15, to a rectangular concrete channel parallel to the I-15 SB roadway.

4.7 Assessment of Level of Risk

The risk to life and property is low because there is no change to the current risk to life and property as a result of the proposed action within the SFHA. The proposed risks to natural and beneficial floodplain values are minimal, the impairments to the beneficial uses are temporary due to construction activities. There is no support for further incompatible floodplain development.

Therefore, the combined Assessed Risk Level is LOW.

5.0 CONCLUSION

The Project lies within Zones A, AE, AO, and X floodplains. Bedford Wash is within a 1% Annual Chance SFHA Zone A region up to the Project extent, with a portion of the NB Bedford Wash Bridge located within SFHA Zone A region and the rest of the bridge is located within Zone X. The highway improvements cross a mapped Regulatory Floodway for Temescal Wash. The flood hazard and flood depths in Temescal Wash will be insignificantly impacted as a result of the Project. The highway improvements cross a Special Studies/DWR Awareness mapped floodplain for Coldwater Wash and Mayhew Wash. The flood hazard and flood depths in Coldwater Wash and Mayhew Wash will be insignificantly impacted as a result of the Project.

At Bedford Wash, there is a FEMA 100-year floodplain, Zone A, on the north side of I-15 along Bedford Canyon Wash. A portion of the NB Bedford Wash Bridge is located within SFHA Zone A region. The hydraulic analysis indicates that the maximum change in water surface that occurs along the stream is a 0.49-foot increase in water surface as a result of the proposed improvements. A CLOMR submission may be requested if the project is found to increase the base flood elevations more than 1.0 foot at any point in the vicinity of the proposed project. Therefore, it is recommended that the roadway improvements be reanalyzed during the PS&E phase to confirm whether a CLOMR is required.

At Temescal Wash, the existing Zone AE floodplain is already confined to the limits of the Regulatory Floodway. The widening of the bridge and mainline will place fill within the Regulatory Floodway. The analysis indicates that the maximum change in water surface that occurs along the stream is a 0.51-foot increase in water surface as a result of the proposed improvements. This exceeds the 0.0-foot rise allowed within a Regulatory Floodway. It is recommended that a CLOMR be prepared during the PS&E phase of the Project with a hydraulic analysis and the floodplain remapped.

Coldwater Wash is in a SFHA as defined by the Riverside County Special Study Floodplain. The analysis indicates that the maximum change in water surface that occurs along the stream is a 0.13-foot decrease in water surface as a result of the proposed improvements.

Mayhew Wash is in a SFHA as defined by the Riverside County DWR Awareness Floodplain. The analysis indicates that the maximum change in water surface that occurs along the stream is a 0.02-foot increase in water surface as a result of the proposed improvements.

The proposed improvements meet Caltrans requirements listed in Caltrans Highway Design Manual, Section 821.3 (1). The models show that under proposed conditions, the WSE still match the existing conditions within a foot of the channels, and there would be sufficient waterway area to pass the 1 percent probability base flood Q100 without freeboard under proposed conditions.

The proposed improvements in the vicinity of the Stovepipe Canyon Wash and Arroyo Del Toro will not impact the drainage cross culverts or floodplains. The proposed roadway work is in the median; no outside widening is proposed.

There is low risk to open space, natural beauty, scientific study, outdoor recreation, agriculture, forestry, natural moderation of floods, water quality maintenance, and groundwater recharge in agriculture due to this Project. Engineering assessment of the Project condition improvements in these areas reveal that it does not introduce additional risk for traffic disruptions or loss of life and property.

The Project does not support incompatible floodplain development; the area is not fully developed but is participating in the NFIP. The need for temporary measures during construction to minimize floodplain impacts associated with the proposed improvements has been evaluated and determined to be feasible. However, through analysis and evaluation, there would be no permanent impacts due to the proposed improvements; therefore, no permanent mitigation measures would be necessary.

The Caltrans Standard Environmental Reference Chapter 17 criteria are met in Bedford Wash, Temescal Wash, Coldwater Wash, Mayhew Wash, Stovepipe Canyon Wash and Arroyo Del Toro, because the proposed actions in these areas would not affect the boundaries of the mapped floodplain. Summary Floodplain Encroachment Reports can be found in **Appendix B**. These areas constitute MINIMAL ENCROACHMENT.

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7.0 SUMMARY OF PREPARERS' EXPERIENCE

This Location Hydraulic Study Report has been prepared under the direction of the following registered civil engineer and consultant environmental specialist.

Pearl Abarca is a Registered Civil Engineer in the State of California, License Number C66884. Ms. Abarca holds a Bachelor of Science in Civil Engineering from the University of California, Irvine, and has 19 years of flood control experience related to roadways, bridges, hydrology, and channel hydraulics.

Marisa Flores holds a Bachelor of Science in Evolution and Ecology and has 15 years of experience conducting biological assessment, focused studies, and preparing biological technical documents for Caltrans and various clients. She is also experienced with ensuring her clients' project comply with the requirements of the MSHCP.

APPENDIX A: LOCATION HYDRAULIC STUDY FORMS

LOCATION HYDRAULIC STUDY FORM[1]

DIST-CO-RTE: 8_Riverside_I-15 **PM/PM:** 36.58
EA/Project No.: 08-0J0820 **Bridge No.:** 56-0540 R/L
Floodplain Description: Bedford Wash – Located in City of Corona between Cajalco Rd and Weirick Rd. Bedford Wash flows northeasterly towards Temescal Wash. There is a FEMA 100-year floodplain, Zone A, on the north side of I-15 along Bedford Canyon Wash. A portion of the NB Bedford Wash Bridge is located within SFHA Zone A region resulting in a transverse encroachment on the floodplain. The floodplain is perpendicular to the project site, so there is no longitudinal encroachment.

1. Description of Proposal: The proposed improvements include widening within the median in the NB and SB directions along the respective Bedford Wash Bridges, as well as outside widening of the NB bridge. Deck widening between the northbound and southbound bridges will leave a six-inch gap between the bridges. General channel geometry beneath the bridges will not be altered. There are no anticipated impacts to the floodplain from this Project. The hydraulic analysis indicates the proposed improvements will result in a maximum increase in water surface elevation of 0.49-ft in the channel. A CLOMR submission may be requested if the project is found to increase the base flood elevations more than 1.0 foot at any point in the vicinity of the proposed project. Therefore, it is recommended that the roadway improvements be reanalyzed during the PS&E phase to confirm whether a CLOMR is required.

2. Current ADT: 76,700 NB, SB (2006) Projected ADT: 199,500 NB, SB (2030)

3. Hydraulic Data: Base Flood Q_{100}= 4,372 CFS
   WSE_{100}= 889.2 feet (southbound/left Bridge)
   885.6 feet (northbound/right Bridge)

   The flood of record, if greater than Q_{100}: N/A
   Q= N/A CFS WSE= N/A
   Overtopping flood Q= N/A CFS WSE= N/A
   Are NFIP maps available? ☒ YES ☐ NO
   Are NFIP studies available? ☒ YES ☐ NO

4. Is the highway location alternative within a regulatory floodway? ☒ YES ☐ NO

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

   Potential Q_{100} backwater damages:
   A. Residences? ☐ YES ☒ NO
   B. Other Bldgs? ☐ YES ☒ NO
   C. Crops? ☐ YES ☒ NO

[1] Form adapted from Figure 804.7A Technical Information for Location Hydraulic Study located in Chapter 804 of the Highway Design Manual.

D. Natural and beneficial floodplain values? ☐ YES ☒ NO

6. Type of Traffic:

A. Emergency supply or evacuation route? ☒ YES ☐ NO
B. Emergency vehicle access? ☒ YES ☐ NO
C. Practicable detour available? ☒ YES ☐ NO
D. School bus or mail route? ☒ YES ☐ NO

7. Estimated duration of traffic interruption for 100-year event: 0 hours.

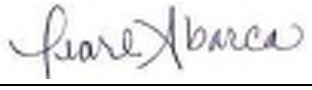
8. Estimated value of Q_{100} flood damages (if any) – moderate risk level.

A. Roadway $ 0
B. Property $ 0
Total $ 0

9. Assessment of Level of Risk ☒ Low ☐ Moderate ☐ High

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

PREPARED BY:



9/22/22

Signature- Consultant Hydraulic Engineer (Item numbers 3,4,5,7,9) — Date

Is there any longitudinal encroachment, significant encroachment, or any support of incompatible Floodplain development? ☐ YES ☒ NO

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.

9/22/22

Signature- Consultant Project Engineer (Item numbers 1,2,6,8) — Date

LOCATION HYDRAULIC STUDY FORM[2]

DIST-CO-RTE: 8_Riverside_I-15 **PM/PM:** 32.96
EA/Project No.: 08-0J0820 **Bridge No.:** 56-0543 R/L
Floodplain Description: Coldwater Wash – Located between Temescal Canyon Rd Interchange (north crossing) and Temescal Canyon Rd Interchange (middle crossing). There is no FEMA 100-year floodplain. The area is designated as Zone X and pursuant to Ordinance 458 adopted by Riverside County, Coldwater Wash is within a Special Study Floodplain, evaluated in the same manner as FEMA Zone A Special Flood Hazard Areas subject to inundation by the 1-percent-annual-chance flood event. There is grass, vegetation, and open space on the downstream end (east side of freeway), with a mixture of open space and commercial development on the upstream end (west side of the freeway).

1. Description of Proposal: The proposed bridge improvements will expand both the downstream and upstream sides of the northbound bridge and southbound bridge. Deck widening between the northbound and southbound bridges will extend to within three inches of the I-15 centerline and will leave a six-inch gap between the bridges. Bridge deck improvements will be constructed structurally similar to the existing bridges. One additional concrete column will be added to each pier bent to support the widened bridge deck on the downstream side of the southbound bridge or the upstream side of the northbound bridge. Bridge deck widening on the upstream side of the southbound bridge and the downstream side of the northbound bridge will be constructed without additional columns. The analysis indicates the proposed improvements will not result in any increase in water surface elevation, however, will result in a decrease of 0.13-ft in the channel. Bridge improvements are not anticipated to alter the channel geometry below the decks and through the crossing.

2. Current ADT: 64,400 NB, SB (2006) Projected ADT: 199,500 NB, SB (2030)

3. Hydraulic Data: Base Flood Q_{100}= 12,300 CFS
   WSE_{100}= 1028.3 feet (southbound/left Bridge)
   1024.3 feet (northbound/right Bridge)

   The flood of record, if greater than Q_{100}: N/A
   Q= N/A CFS WSE= N/A
   Overtopping flood Q= N/A CFS WSE= N/A
   Are NFIP maps available? ☒ YES ☐ NO
   Are NFIP studies available? ☐ YES ☒ NO

4. Is the highway location alternative within a regulatory floodway? ☐ YES ☒ NO

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

   Potential Q_{100} backwater damages:

[2] Form adapted from Figure 804.7A Technical Information for Location Hydraulic Study located in Chapter 804 of the Highway Design Manual.

A. Residences? ☐ YES ☒ NO
B. Other Bldgs? ☐ YES ☒ NO
C. Crops? ☐ YES ☒ NO
D. Natural and beneficial floodplain values? ☐ YES ☒ NO

6. Type of Traffic:

A. Emergency supply or evacuation route? ☒ YES ☐ NO
B. Emergency vehicle access? ☒ YES ☐ NO
C. Practicable detour available? ☒ YES ☐ NO
D. School bus or mail route? ☒ YES ☐ NO

7. Estimated duration of traffic interruption for 100-year event: 0 hours.

8. Estimated value of Q_{100} flood damages (if any) – moderate risk level.

A. Roadway $ 0
B. Property $ 0
Total $ 0

9. Assessment of Level of Risk ☒ Low ☐ Moderate ☐ High

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

PREPARED BY:

Signature- Consultant Hydraulic Engineer (Item numbers 3,4,5,7,9) — Date: 7/28/2021

Is there any longitudinal encroachment, significant encroachment, or any support of incompatible Floodplain development? ☐ YES ☒ NO

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- Consultant Project Engineer (Item numbers 1,2,6,8) — Date: 7/29/2021

LOCATION HYDRAULIC STUDY FORM[3]

DIST-CO-RTE: 8_Riverside_I-15 **PM/PM:** 31.97
EA/Project No.: 08-0J0820 **Bridge No.:** 56-0674 R/L
Floodplain Description: Mayhew Wash – Located between Temescal Canyon Rd Interchange (north crossing) and Temescal Canyon Rd Interchange (middle crossing). The area is not located in a FEMA 100-year floodplain. It is designated as Zone X and pursuant to Ordinance 458 adopted by Riverside County, Mayhew Wash is within a DWR Awareness Floodplain, evaluated in the same manner as FEMA Zone A Special Flood Hazard Areas subject to inundation by the 1-percent-annual-chance flood event. The downstream end (east side of freeway) is disturbed open area with a commercial development on the north side of the wash. The upstream end (west side of the freeway) is open vegetated area with pockets of non-vegetated areas.

1. Description of Proposal: The proposed improvements will consist of inside widening to the existing northbound and southbound bridges to accommodate two additional express lanes in each direction (NB and SB). Bridge improvements will be completed structurally similar to the existing spans and alignment, with no impacts to the general channel geometry beneath the structures. The analysis indicates the proposed improvements will result in a maximum increase of 0.02-ft in the channel.

2. Current ADT: 64,400 NB, SB (2006) Projected ADT: 199,500 NB, SB (2030)

3. Hydraulic Data: Base Flood Q_{100}= 4,048 CFS
   WSE_{100}= 1051.0 feet (southbound/left Bridge)
   1048.5 feet (northbound/right Bridge)

   The flood of record, if greater than Q_{100}: N/A
   Q= N/A CFS WSE= N/A
   Overtopping flood Q= N/A CFS WSE= N/A
   Are NFIP maps available? ☒ YES ☐ NO
   Are NFIP studies available? ☐ YES ☒ NO

4. Is the highway location alternative within a regulatory floodway? ☐ YES ☒ NO

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

   Potential Q_{100} backwater damages:
   A. Residences? ☐ YES ☒ NO
   B. Other Bldgs? ☐ YES ☒ NO
   C. Crops? ☐ YES ☒ NO
   D. Natural and beneficial floodplain values? ☐ YES ☒ NO

[3] Form adapted from Figure 804.7A Technical Information for Location Hydraulic Study located in Chapter 804 of the Highway Design Manual.

6. Type of Traffic:

A. Emergency supply or evacuation route?	☒ YES	☐ NO
B. Emergency vehicle access?	☒ YES	☐ NO
C. Practicable detour available?	☒ YES	☐ NO
D. School bus or mail route?	☒ YES	☐ NO

7. Estimated duration of traffic interruption for 100-year event: 0 hours.

8. Estimated value of Q_{100} flood damages (if any) – moderate risk level.

A. Roadway	$ 0
B. Property	$ 0
Total	$ 0

9. Assessment of Level of Risk ☒ Low ☐ Moderate ☐ High

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

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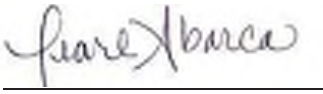

7/28/2021

Signature- Consultant Hydraulic Engineer (Item numbers 3,4,5,7,9) — Date

Is there any longitudinal encroachment, significant encroachment, or any support of incompatible Floodplain development? ☐ YES ☒ NO

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.

7/29/2021

Signature- Consultant Project Engineer (Item numbers 1,2,6,8) — Date

LOCATION HYDRAULIC STUDY FORM[4]

DIST-CO-RTE: 8_Riverside_I-15 **PM/PM:** 28.04
EA/Project No.: 08-0J0820 **Bridge No.:** 56-0680 R/L
Floodplain Description: Temescal Wash (south crossing) is located between Horsethief Canyon Road and Temescal Canyon Road (south crossing). The portion of Temescal Wash (Reach 4) within the Project extent lies within a 1% Annual Chance SFHA Zone AE and is classified as a regulatory floodway. The floodplain is perpendicular to the project site, so there is no longitudinal encroachment.

1. Description of Proposal: The proposed improvements will result in widening the inside of both the northbound and southbound Temescal Wash Bridges, each by 25 feet. The new bridges will be founded on driven steel piles and will be located adjacent to existing bents, aligned to reduce disruption of the Temescal Wash flow. Open end diaphragm-type abutments founded on driven steel piles are proposed to match the existing abutment type. General channel geometry beneath the bridges will not be altered. At Temescal Wash, the existing Zone AE floodplain is already confined to the limits of the Regulatory Floodway. The widening of the bridge and mainline will place fill within the Regulatory Floodway. The analysis indicates the proposed improvements will result in a maximum increase of 0.51-ft in the channel. This exceeds the 0.0-ft rise allowed within a Regulatory Floodway. It is recommended that a CLOMR be prepared during the PS&E phase of the project with a hydraulic analysis and the floodplain remapped.

2. Current ADT: 60,400 NB, SB (2006) Projected ADT: 199,500 NB, SB (2030)

3. Hydraulic Data: Base Flood Q_{100}= 10,400 CFS
   WSE_{100}= 1192.6 feet (southbound/left Bridge)
   1191.0 feet (northbound/right Bridge)

   The flood of record, if greater than Q_{100}: N/A
   Q= N/A CFS WSE= N/A
   Overtopping flood Q= N/A CFS WSE= N/A
   Are NFIP maps available? ☒ YES ☐ NO
   Are NFIP studies available? ☒ YES ☐ NO

4. Is the highway location alternative within a regulatory floodway? ☒ YES ☐ NO

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

   Potential Q_{100} backwater damages:
   A. Residences? ☐ YES ☒ NO
   B. Other Bldgs? ☐ YES ☒ NO
   C. Crops? ☐ YES ☒ NO

[4] Form adapted from Figure 804.7A Technical Information for Location Hydraulic Study located in Chapter 804 of the Highway Design Manual.

D. Natural and beneficial floodplain values? ☐ YES ☒ NO

6. Type of Traffic:

A. Emergency supply or evacuation route? ☒ YES ☐ NO
B. Emergency vehicle access? ☒ YES ☐ NO
C. Practicable detour available? ☒ YES ☐ NO
D. School bus or mail route? ☒ YES ☐ NO

7. Estimated duration of traffic interruption for 100-year event: 0 hours.

8. Estimated value of Q_{100} flood damages (if any) – moderate risk level.

A. Roadway $ 0
B. Property $ 0
Total $ 0

9. Assessment of Level of Risk ☒ Low ☐ Moderate ☐ High

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

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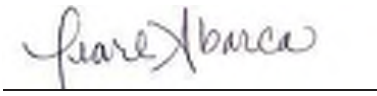

7/28/2021

Signature- Consultant Hydraulic Engineer (Item numbers 3,4,5,7,9) — Date

Is there any longitudinal encroachment, significant encroachment, or any support of incompatible Floodplain development? ☐ YES ☒ NO

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.

7/29/2021

Signature- Consultant Project Engineer (Item numbers 1,2,6,8) — Date

LOCATION HYDRAULIC STUDY FORM[5]

DIST-CO-RTE: 8_Riverside_I-15 **PM/PM:** 23.50
EA/Project No.: 08-0J0820 **Bridge No.:** N/A
Floodplain Description: Stovepipe Canyon Wash originates north of I-15 above Temescal Canyon High School. The stream moves south towards I-15 via natural channel. A 14 -feet by 7-feet reinforced concrete box (RCB) takes the stream across the I-15 and then the culvert ultimately confluences with Temescal Wash. Stovepipe Canyon Wash is tributary to Temescal Wash. The portion of Stovepipe Canyon Wash within the Project limits is in a 1% Annual Chance SFHA Zone AO and 0.2% Annual Chance Flood Hazard Zone X.

1. Description of Proposal: In the proposed condition, the existing drainage facilities at the I-15 crossing for Stovepipe Canyon Wash will remain the same. The proposed work in the roadway is in the median; no outside widening is proposed. The Stovepipe Canyon Wash hydraulics will not be impacted, because the cross culverts are not being improved. There are no floodplain impacts.

2. Current ADT: 57,300 NB, SB (2006) Projected ADT: 199,500 NB, SB (2030)

3. Hydraulic Data: Base Flood Q_{100}= 750 CFS
   WSE_{100}= Unk The flood of record, if greater than Q_{100}: N/A
   Q= N/A CFS WSE= N/A
   Overtopping flood Q= N/A CFS WSE= N/A
   Are NFIP maps available? ☒ YES ☐ NO
   Are NFIP studies available? ☒ YES ☐ NO

4. Is the highway location alternative within a regulatory floodway? ☐ YES ☒ NO

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

   Potential Q_{100} backwater damages:

A. Residences?	☐ YES	☒ NO
B. Other Bldgs?	☐ YES	☒ NO
C. Crops?	☐ YES	☒ NO
D. Natural and beneficial floodplain values?	☐ YES	☒ NO

6. Type of Traffic:

A. Emergency supply or evacuation route?	☒ YES	☐ NO
B. Emergency vehicle access?	☒ YES	☐ NO
C. Practicable detour available?	☒ YES	☐ NO

[5] Form adapted from Figure 804.7A Technical Information for Location Hydraulic Study located in Chapter 804 of the Highway Design Manual.

D. School bus or mail route? ☒ YES ☐ NO

7. Estimated duration of traffic interruption for 100-year event: 0 hours.

8. Estimated value of Q_{100} flood damages (if any) – moderate risk level.

A. Roadway	$ 0
B. Property	$ 0
Total	$ 0

9. Assessment of Level of Risk ☒ Low ☐ Moderate ☐ High

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

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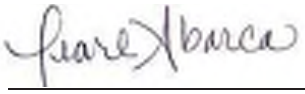


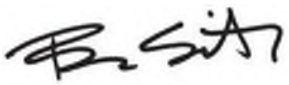
7/28/2021

Signature- Consultant Hydraulic Engineer (Item numbers 3,4,5,7,9) — Date

Is there any longitudinal encroachment, significant encroachment, or any support of incompatible Floodplain development? ☐ YES ☒ NO

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.



7/29/2021

Signature- Consultant Project Engineer (Item numbers 1,2,6,8) — Date

LOCATION HYDRAULIC STUDY FORM[6]

DIST-CO-RTE: 8_Riverside_I-15 **PM/PM:** 22.60
EA/Project No.: 08-0J0820 **Bridge No.:** N/A
Floodplain Description: East of the Project, Arroyo del Toro is an engineered concrete rectangular channel that crosses Dexter Avenue through a quintuple 14-feet by 9.5-feet RCB. The RCB's outlet into a detention basin between Dexter Avenue and the I-15 Northbound roadway. From the detention basin, ten 36-inch and five 48-inch culverts convey the flow under the I-15, to a rectangular concrete channel parallel to the I-15 Southbound roadway. From the concrete channel, Arroyo del Toro outlets into Collier Marsh within Temescal Wash. The portion of Arroyo Del Toro within the Project limits is in a 1% Annual Chance SFHA Zone A.

1. Description of Proposal: In the proposed condition, the existing drainage facilities at the I-15 crossing for Arroyo Del Toro will remain the same. The proposed work in the roadway is in the median; no outside widening is proposed. The Arroyo Del Toro hydraulics will not be impacted, because the cross culverts are not being improved. There are no floodplain impacts.

2. Current ADT: 57,300 NB, SB (2006) Projected ADT: 199,500 NB, SB (2030)

3. Hydraulic Data: Base Flood Q_{100}= 2,300 CFS
   WSE_{100}= Unk The flood of record, if greater than Q_{100}: N/A
   Q= N/A CFS WSE= N/A
   Overtopping flood Q= N/A CFS WSE= N/A
   Are NFIP maps available? ☒ YES ☐ NO
   Are NFIP studies available? ☒ YES ☐ NO

4. Is the highway location alternative within a regulatory floodway? ☐ YES ☒ NO

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

   Potential Q_{100} backwater damages:
   A. Residences? ☐ YES ☒ NO
   B. Other Bldgs? ☐ YES ☒ NO
   C. Crops? ☐ YES ☒ NO
   D. Natural and beneficial floodplain values? ☐ YES ☒ NO

6. Type of Traffic:

   A. Emergency supply or evacuation route? ☒ YES ☐ NO
   B. Emergency vehicle access? ☒ YES ☐ NO
   C. Practicable detour available? ☒ YES ☐ NO

[6] Form adapted from Figure 804.7A Technical Information for Location Hydraulic Study located in Chapter 804 of the Highway Design Manual.

D. School bus or mail route? ☒ YES ☐ NO

7. Estimated duration of traffic interruption for 100-year event: 0 hours.

8. Estimated value of Q_{100} flood damages (if any) – moderate risk level.

A. Roadway	$ 0
B. Property	$ 0
Total	$ 0

9. Assessment of Level of Risk ☒ Low ☐ Moderate ☐ High

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

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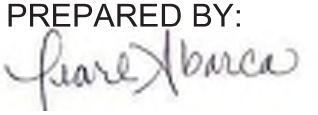


7/28/2021

Signature- Consultant Hydraulic Engineer (Item numbers 3,4,5,7,9) — Date

Is there any longitudinal encroachment, significant encroachment, or any support of incompatible Floodplain development? ☐ YES ☒ NO

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.

7/29/2021

Signature- Consultant Project Engineer (Item numbers 1,2,6,8) — Date

APPENDIX B: SUMMARY FLOODPLAIN ENCROACHMENT REPORTS

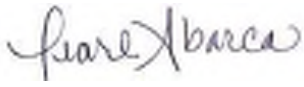
SUMMARY FLOODPLAIN ENCROACHMENT REPORT[1]

DIST-CO-RTE: 8_Riverside_I-15 **PM/PM:** 36.58
EA/Project No.: 08-0J0820 **Bridge No.:** 56-0540 R/L
Limits: Bedford Wash
Floodplain Description: Bedford Wash – Located in City of Corona between Cajalco Rd and Weirick Rd. Bedford Wash flows northeasterly towards Temescal Wash. There is a FEMA 100-year floodplain, Zone A, on the north side of I-15 along Bedford Canyon Wash. A portion of the NB Bedford Wash Bridge is located within SFHA Zone A region resulting in a transverse encroachment on the floodplain. The floodplain is perpendicular to the project site, so there is no longitudinal encroachment.

Question	Yes	No
1. Is the proposed action a longitudinal encroachment of the base floodplain?	☐	☒
2. Are the risks associated with the implementation of the proposed action significant?	☐	☒
3. Will the proposed action support probable incompatible floodplain development?	☐	☒
4. Are there any significant impacts on natural and beneficial floodplain values?	☐	☒
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.	☐	☒
6. Does the proposed action constitute a significant floodplain encroachment as defined in 23 CFR, Section 650.105(q)?	☐	☒
7. Are Location Hydraulic Studies that document the above answers on file? If not explain.	☒	☐

[1] Form adapted from Figure 804.7B Floodplain Evaluation Report Summary located in Chapter 804 of the Highway Design Manual.

PREPARED BY:

	9/22/22
Signature- Consultant Hydraulic Engineer	Date
	9/22/22
Signature- Consultant Environmental Specialist	Date
	9/22/22
Signature- Consultant Project Engineer	Date

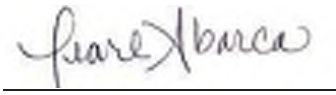
SUMMARY FLOODPLAIN ENCROACHMENT REPORT[2]

DIST-CO-RTE: 8_Riverside_I-15 **PM/PM:** 32.96
EA/Project No.: 08-0J0820 **Bridge No.:** 56-0543 R/L
Limits: Coldwater Wash
Floodplain Description: Coldwater Wash – Located between Temescal Canyon Rd Interchange (north crossing) and Temescal Canyon Rd Interchange (middle crossing). There is no FEMA 100-year floodplain. The area is designated as Zone X and pursuant to Ordinance 458 adopted by Riverside County, Coldwater Wash is within a Special Study Floodplain, evaluated in the same manner as FEMA Zone A Special Flood Hazard Areas subject to inundation by the 1-percent-annual-chance flood event. There is grass, vegetation, and open space on the downstream end (east side of freeway), with a mixture of open space and commercial development on the upstream end (west side of the freeway).

Question	Yes	No
1. Is the proposed action a longitudinal encroachment of the base floodplain?	☐	☒
2. Are the risks associated with the implementation of the proposed action significant?	☐	☒
3. Will the proposed action support probable incompatible floodplain development?	☐	☒
4. Are there any significant impacts on natural and beneficial floodplain values?	☐	☒
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.	☐	☒
6. Does the proposed action constitute a significant floodplain encroachment as defined in 23 CFR, Section 650.105(q)?	☐	☒
7. Are Location Hydraulic Studies that document the above answers on file? If not explain.	☒	☐

[2] Form adapted from Figure 804.7B Floodplain Evaluation Report Summary located in Chapter 804 of the Highway Design Manual.

PREPARED BY:

	7/28/2021
Signature- Consultant Hydraulic Engineer	Date
	8/2/2021
Signature- Consultant Environmental Specialist	Date
	7/29/2021
Signature- Consultant Project Engineer	Date

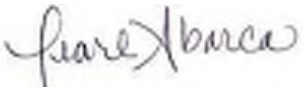
SUMMARY FLOODPLAIN ENCROACHMENT REPORT[3]

DIST-CO-RTE: 8_Riverside_I-15 **PM/PM:** 31.97
EA/Project No.: 08-0J0820 **Bridge No.:** 56-0674 R/L
Limits: Mayhew Wash
Floodplain Description: Mayhew Wash – Located between Temescal Canyon Rd Interchange (north crossing) and Temescal Canyon Rd Interchange (middle crossing). The area is not located in a FEMA 100-year floodplain. It is designated as Zone X and pursuant to Ordinance 458 adopted by Riverside County, Mayhew Wash is within a DWR Awareness Floodplain, evaluated in the same manner as FEMA Zone A Special Flood Hazard Areas subject to inundation by the 1-percent-annual-chance flood event. The downstream end (east side of freeway) is disturbed open area with a commercial development on the north side of the wash. The upstream end (west side of the freeway) is open vegetated area with pockets of non-vegetated areas.

Question	Yes	No
1. Is the proposed action a longitudinal encroachment of the base floodplain?	☐	☒
2. Are the risks associated with the implementation of the proposed action significant?	☐	☒
3. Will the proposed action support probable incompatible floodplain development?	☐	☒
4. Are there any significant impacts on natural and beneficial floodplain values?	☐	☒
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.	☐	☒
6. Does the proposed action constitute a significant floodplain encroachment as defined in 23 CFR, Section 650.105(q)?	☐	☒
7. Are Location Hydraulic Studies that document the above answers on file? If not explain.	☒	☐

[3] Form adapted from Figure 804.7B Floodplain Evaluation Report Summary located in Chapter 804 of the Highway Design Manual.

PREPARED BY:

	7/28/2021
Signature- Consultant Hydraulic Engineer	Date
	8/2/2021
Signature- Consultant Environmental Specialist	Date
	7/29/2021
Signature- Consultant Project Engineer	Date

SUMMARY FLOODPLAIN ENCROACHMENT REPORT[4]

DIST-CO-RTE: 8_Riverside_I-15 **PM/PM:** 28.04
EA/Project No.: 08-0J0820 **Bridge No.:** 56-0680 R/L
Limits: Temescal Wash – South Crossing
Floodplain Description: Temescal Wash (south crossing) is located between Horsethief Canyon Road and Temescal Canyon Road (south crossing). The portion of Temescal Wash (Reach 4) within the Project extent lies within a 1% Annual Chance SFHA Zone AE and is classified as a regulatory floodway.

Question	Yes	No
1. Is the proposed action a longitudinal encroachment of the base floodplain?	☐	☒
2. Are the risks associated with the implementation of the proposed action significant?	☐	☒
3. Will the proposed action support probable incompatible floodplain development?	☐	☒
4. Are there any significant impacts on natural and beneficial floodplain values?	☐	☒
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.	☐	☒
6. Does the proposed action constitute a significant floodplain encroachment as defined in 23 CFR, Section 650.105(q)?	☐	☒
7. Are Location Hydraulic Studies that document the above answers on file? If not explain.	☒	☐

[4] Form adapted from Figure 804.7B Floodplain Evaluation Report Summary located in Chapter 804 of the Highway Design Manual.

PREPARED BY:

7/28/2021

Signature- Consultant Hydraulic Engineer | Date

8/2/2021

Signature- Consultant Environmental Specialist | Date

7/29/2021

Signature- Consultant Project Engineer | Date

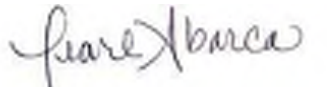
SUMMARY FLOODPLAIN ENCROACHMENT REPORT[5]

DIST-CO-RTE: 8_Riverside_I-15 **PM/PM:** 23.50
EA/Project No.: 08-0J0820 **Bridge No.:** N/A
Limits: Stovepipe Canyon Wash at I-15
Floodplain Description: Stovepipe Canyon Wash originates north of I-15 above Temescal Canyon High School. The stream moves south towards I-15 via natural channel. A 14 -feet by 7-feet reinforced concrete box (RCB) takes the stream across the I-15 and then the culvert ultimately confluences with Temescal Wash. Stovepipe Canyon Wash is tributary to Temescal Wash. The portion of Stovepipe Canyon Wash within the Project limits is in a 1% Annual Chance SFHA Zone AO and 0.2% Annual Chance Flood Hazard Zone X.

Question	Yes	No
1. Is the proposed action a longitudinal encroachment of the base floodplain?	☐	☒
2. Are the risks associated with the implementation of the proposed action significant?	☐	☒
3. Will the proposed action support probable incompatible floodplain development?	☐	☒
4. Are there any significant impacts on natural and beneficial floodplain values?	☐	☒
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.	☐	☒
6. Does the proposed action constitute a significant floodplain encroachment as defined in 23 CFR, Section 650.105(q)?	☐	☒
7. Are Location Hydraulic Studies that document the above answers on file? If not explain.	☒	☐

[5] Form adapted from Figure 804.7B Floodplain Evaluation Report Summary located in Chapter 804 of the Highway Design Manual.

PREPARED BY:

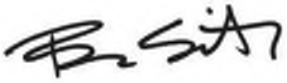


7/28/2021

Signature- Consultant Hydraulic Engineer | Date

8/2/2021

Signature- Consultant Environmental Specialist | Date



7/29/2021

Signature- Consultant Project Engineer | Date

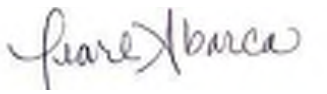
SUMMARY FLOODPLAIN ENCROACHMENT REPORT[6]

DIST-CO-RTE: 8_Riverside_I-15 **PM/PM:** 22.60
EA/Project No.: 08-0J0820 **Bridge No.:** N/A
Limits: Arroyo Del Toro Crossing at I-15
Floodplain Description: East of the Project, Arroyo del Toro is an engineered concrete rectangular channel that crosses Dexter Avenue through a quintuple 14-feet by 9.5-feet RCB. The RCB's outlet into a detention basin between Dexter Avenue and the I-15 Northbound roadway. From the detention basin, ten 36-inch and five 48-inch culverts convey the flow under the I-15, to a rectangular concrete channel parallel to the I-15 Southbound roadway. From the concrete channel, Arroyo del Toro outlets into Collier Marsh within Temescal Wash. The portion of Arroyo Del Toro within the Project limits is in a 1% Annual Chance SFHA Zone A.

Question	Yes	No
1. Is the proposed action a longitudinal encroachment of the base floodplain?	☐	☒
2. Are the risks associated with the implementation of the proposed action significant?	☐	☒
3. Will the proposed action support probable incompatible floodplain development?	☐	☒
4. Are there any significant impacts on natural and beneficial floodplain values?	☐	☒
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.	☐	☒
6. Does the proposed action constitute a significant floodplain encroachment as defined in 23 CFR, Section 650.105(q)?	☐	☒
7. Are Location Hydraulic Studies that document the above answers on file? If not explain.	☒	☐

[6] Form adapted from Figure 804.7B Floodplain Evaluation Report Summary located in Chapter 804 of the Highway Design Manual.

PREPARED BY:

	7/28/2021
Signature- Consultant Hydraulic Engineer	Date
	8/2/2021
Signature- Consultant Environmental Specialist	Date
	7/29/2021
Signature- Consultant Project Engineer	Date

APPENDIX C: FEMA FIRM PANELS AND DWR AWARENESS/SPECIAL STUDIES FLOODPLAIN MAP

NOTES TO USERS

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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, N/NGS12
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.

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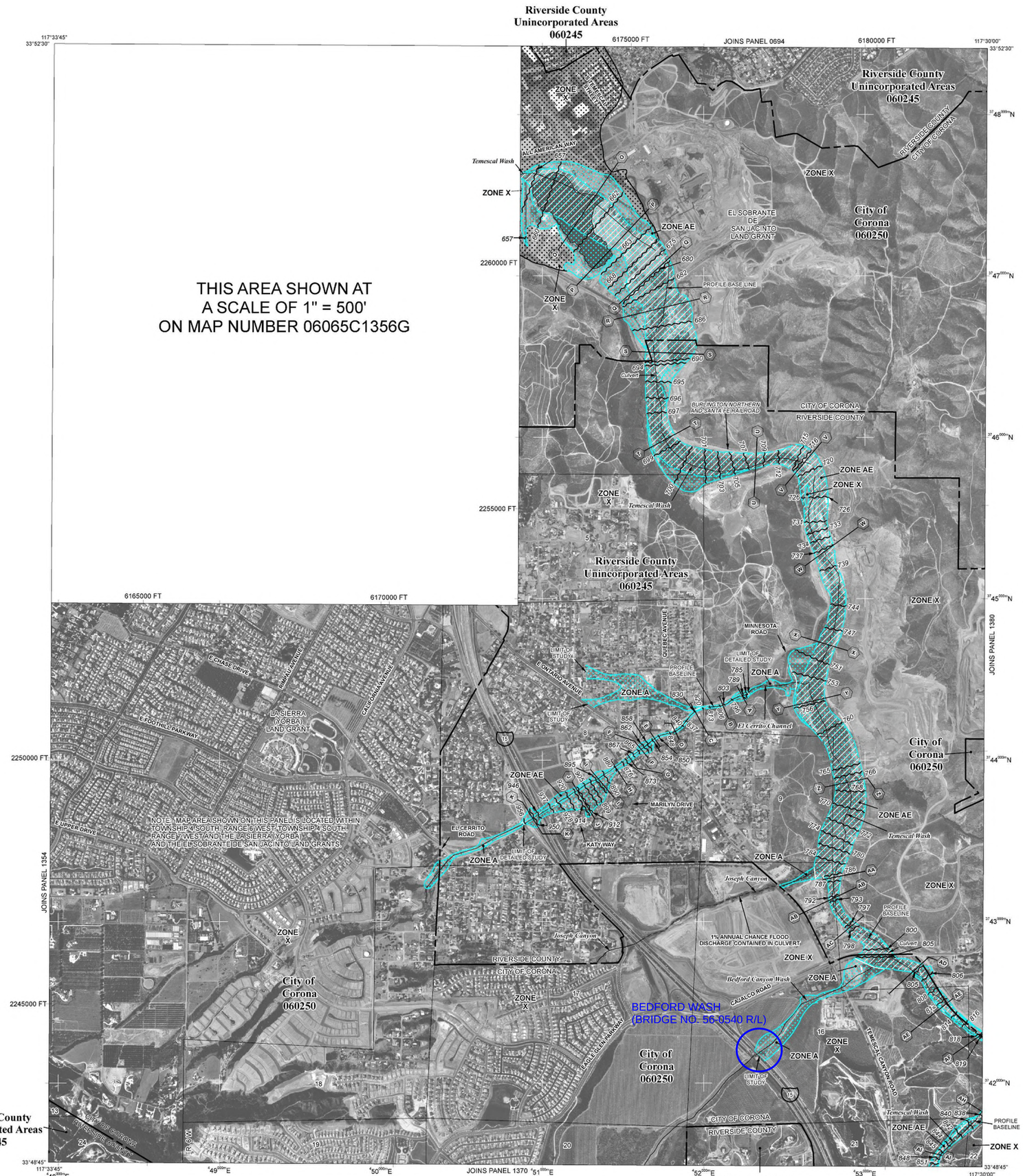
Please refer to the separately printed **Map Index** for an overview map of the county showing the layout of map panels; community map repository addresses; and a Listing of Communities table containing National Flood Insurance Program dates for each community as well as a listing of the panels on which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

THIS AREA SHOWN AT
A SCALE OF 1" = 500'
ON MAP NUMBER 06065C1356G



Riverside County
Unincorporated Areas
060245

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 decertified. 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.
- 513 — 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

- A — A — Cross section line
- 23 — 23 — Transect line
- 87°07'45", 32°22'30" — Geographic coordinates referenced to the North American Datum of 1983 (NAD 83), Western Hemisphere
- 2776000mN — 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
- DX5510 × — 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.

MAP SCALE 1" = 1000'

500 0 1000 2000 FEET
300 0 300 600 METERS

NFIP

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 1360G

FIRM

FLOOD INSURANCE RATE MAP

RIVERSIDE COUNTY, CALIFORNIA AND INCORPORATED AREAS

PANEL 1360 OF 3805

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
CORONA, CITY OF	060250	1360	G
RIVERSIDE COUNTY	060245	1360	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
06065C1360G

EFFECTIVE DATE
AUGUST 28, 2008

Federal Emergency Management Agency

NOTES TO USERS

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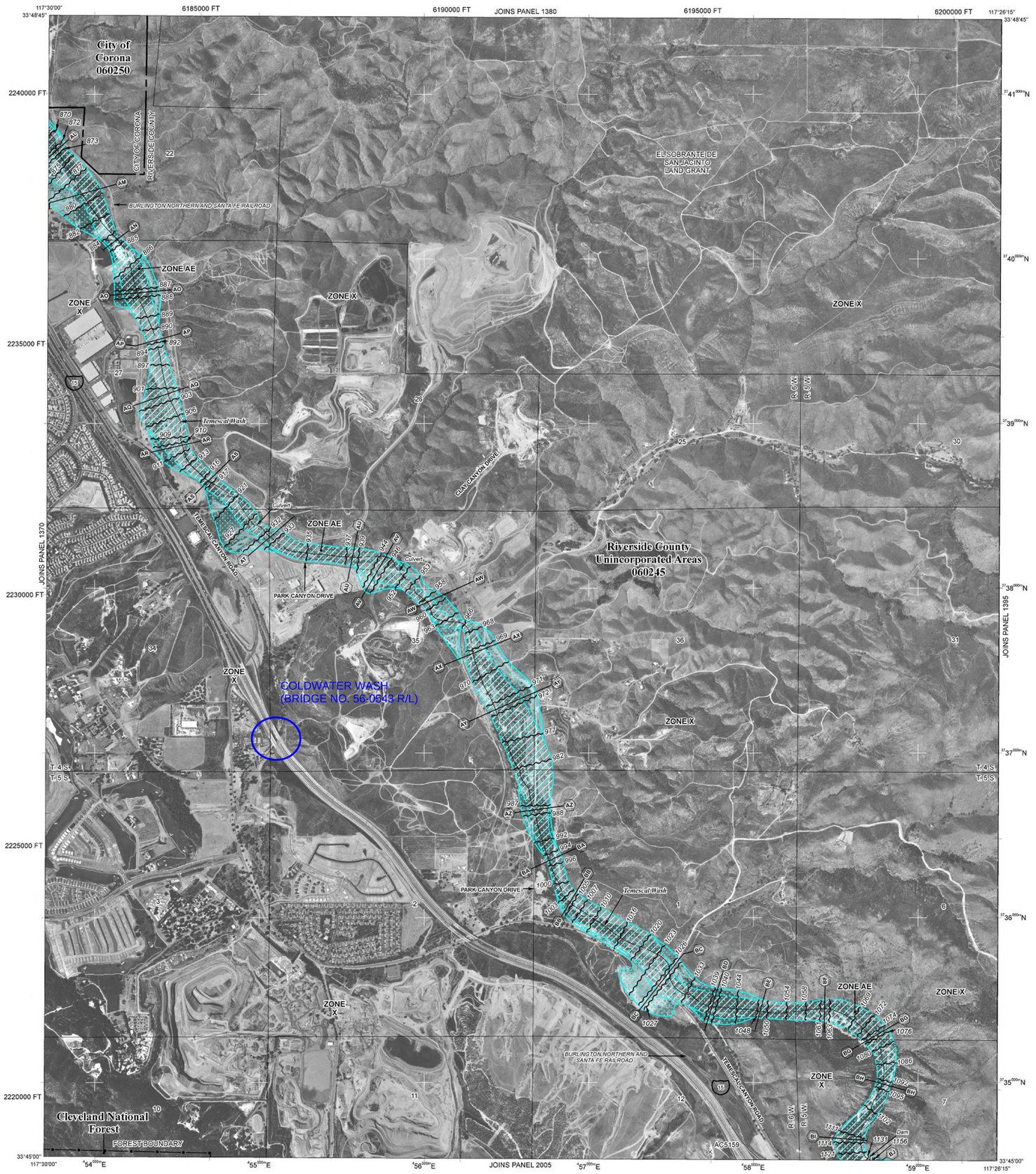

LEGEND

SPECIAL FLOOD HAZARD AREAS SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD

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ZONE A	No Base Flood Elevations determined.
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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

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OTHER AREAS

ZONE X	Areas determined to be outside the 0.2% annual chance floodplain.
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- 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.
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- ●M1.5 — River Mile

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EFFECTIVE DATE OF COUNTYWIDE FLOOD INSURANCE RATE MAP
August 28, 2008

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300 0 300 600 METERS

NFIP

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 1390G

FIRM

FLOOD INSURANCE RATE MAP

RIVERSIDE COUNTY, CALIFORNIA AND INCORPORATED AREAS

PANEL 1390 OF 3805

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
CORONA, CITY OF	060250	1390	G
RIVERSIDE COUNTY	060245	1390	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
06065C1390G

EFFECTIVE DATE
AUGUST 28, 2008

Federal Emergency Management Agency

NOTES TO USERS

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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, N/NGS12
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.

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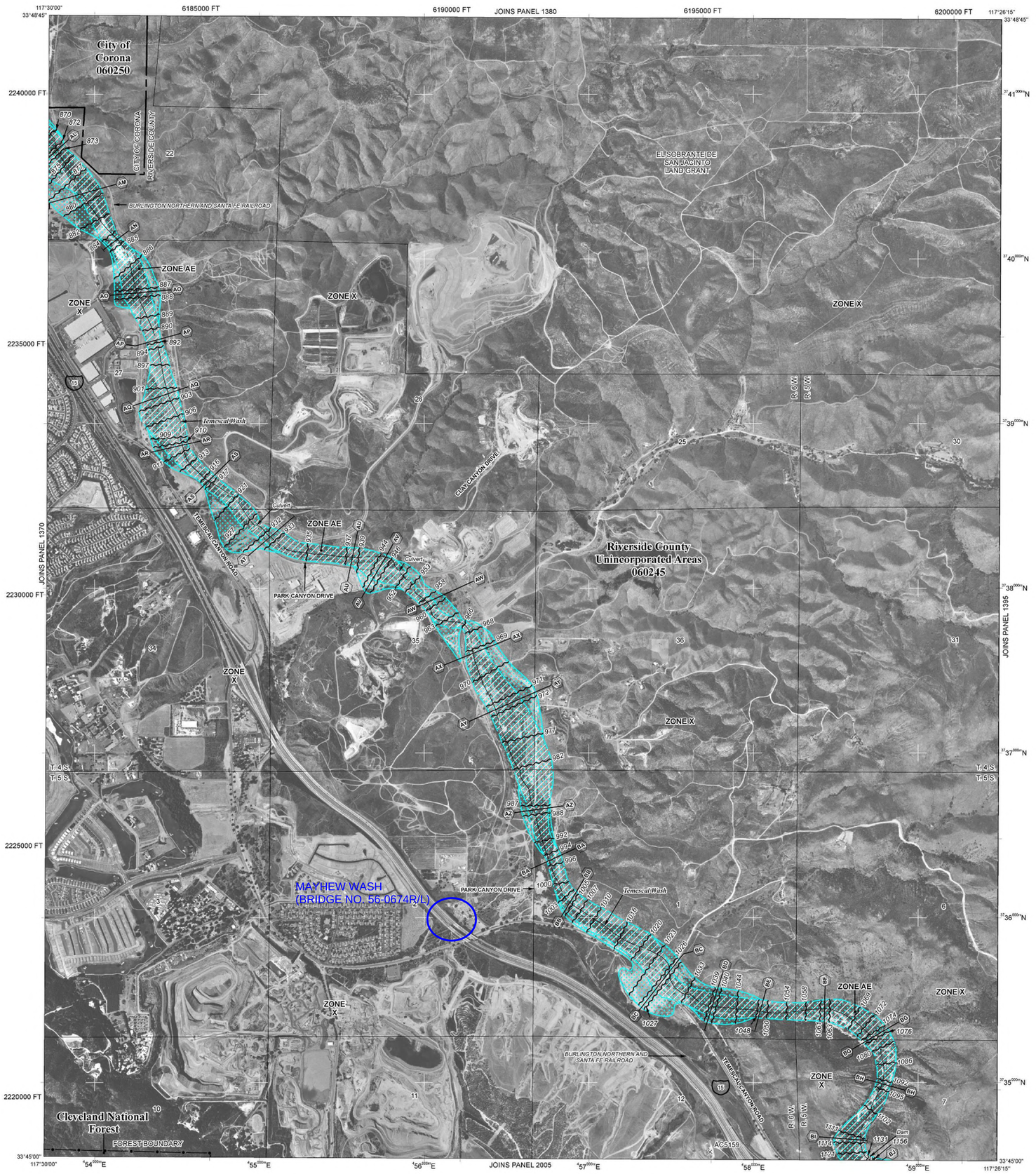

LEGEND

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 decertified. 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.
- 513 — 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

- A — A — Cross section line
- 23 — 23 — Transect line
- 87°07'45", 32°22'30" — Geographic coordinates referenced to the North American Datum of 1983 (NAD 83), Western Hemisphere
- 4 276 000mN — 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
- DX5510 × — 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.

MAP SCALE 1" = 1000'

500 0 1000 2000 FEET

300 0 300 600 METERS

NFIP

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 1390G

FIRM

FLOOD INSURANCE RATE MAP

RIVERSIDE COUNTY, CALIFORNIA
AND INCORPORATED AREAS

PANEL 1390 OF 3805
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
CORONA, CITY OF	060250	1390	G
RIVERSIDE COUNTY	060245	1390	G

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MAP NUMBER
06065C1390G

EFFECTIVE DATE
AUGUST 28, 2008

Federal Emergency Management Agency

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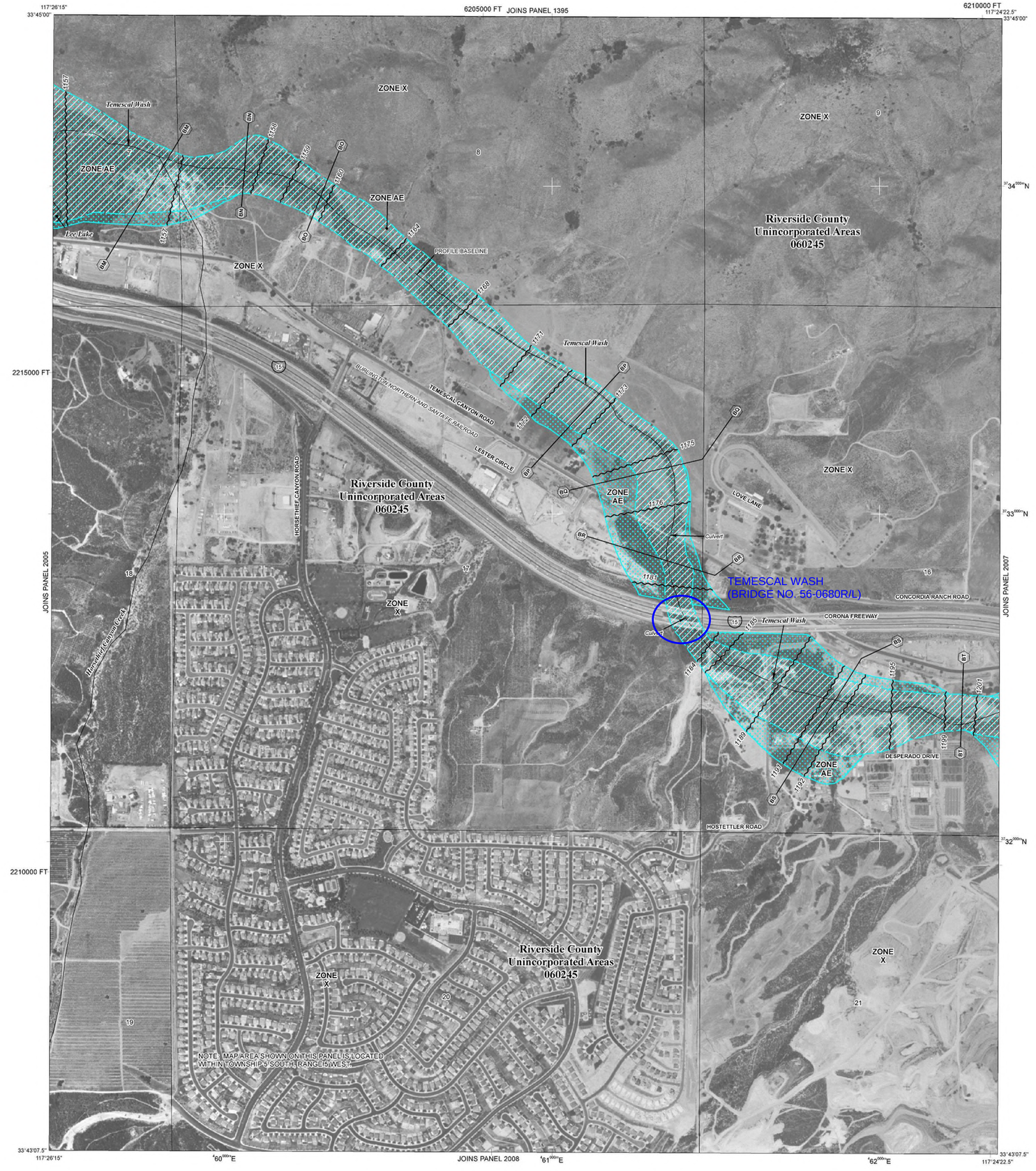

LEGEND

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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

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COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

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	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.
513	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

A A	Cross section line
23 23	Transect line
87°07'45", 32°22'30"	Geographic coordinates referenced to the North American Datum of 1983 (NAD 83), Western Hemisphere
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600000 FT	5000-foot grid ticks: California State Plane coordinate system, zone VI (FIPSZONE 0406), Lambert Conformal Conic projection
DX5510 ×	Bench mark (see explanation in Notes to Users section of this FIRM panel)
M1.5	River Mile

MAP REPOSITORY
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EFFECTIVE DATE OF COUNTYWIDE
FLOOD INSURANCE RATE MAP
August 28, 2008

EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL

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MAP SCALE 1" = 500'

250 0 500 1000 FEET

150 0 150 300 METERS

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 2006G

FIRM

FLOOD INSURANCE RATE MAP

RIVERSIDE COUNTY, CALIFORNIA AND INCORPORATED AREAS

PANEL 2006 OF 3805

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
RIVERSIDE COUNTY	060245	2006	G

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MAP NUMBER
06065C2006G

EFFECTIVE DATE
AUGUST 28, 2008

Federal Emergency Management Agency

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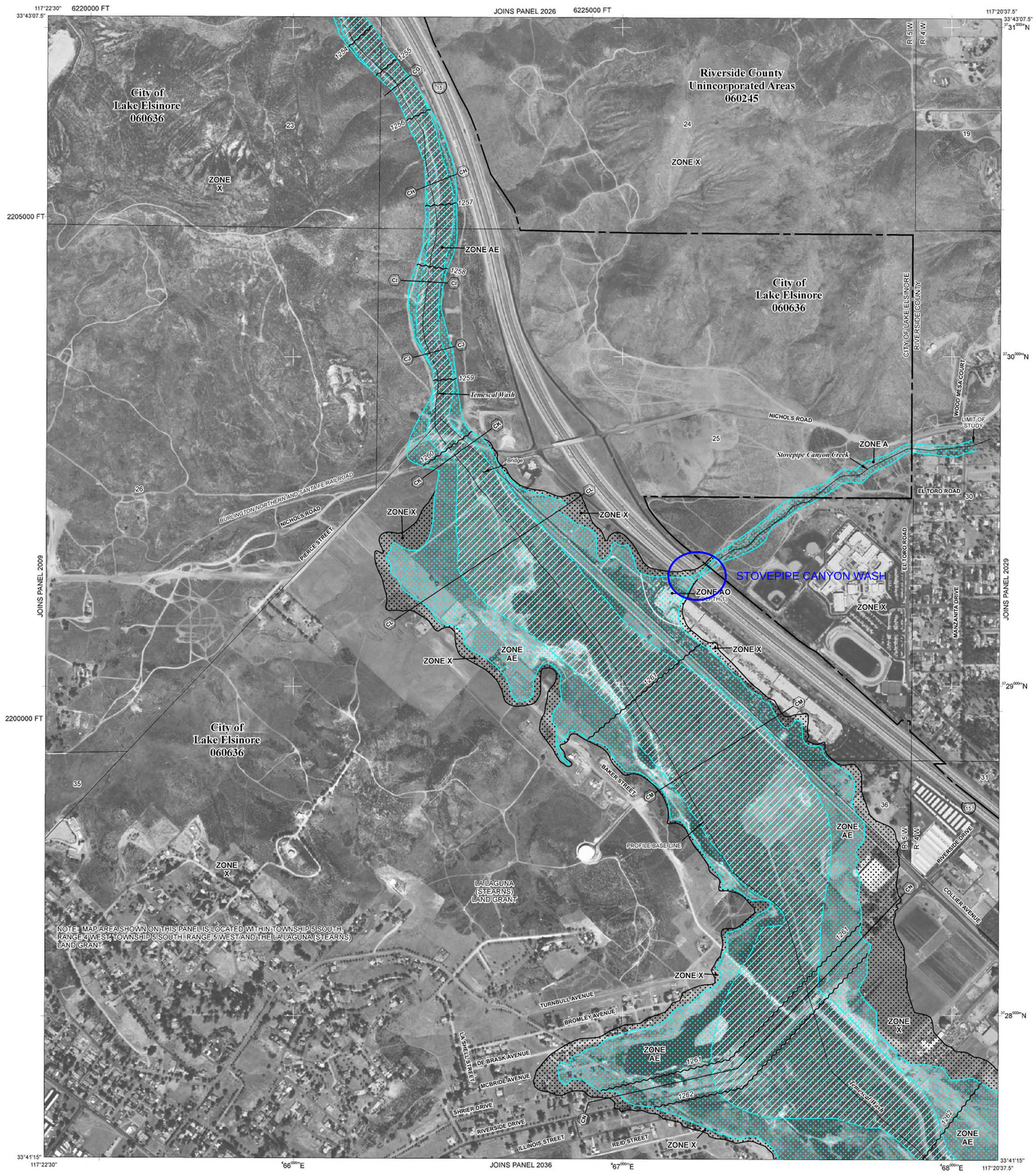

LEGEND

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FLOODWAY AREAS IN ZONE AE

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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

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August 28, 2008

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250 0 500 1000 FEET
150 0 150 300 METERS

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 2028G

FIRM

FLOOD INSURANCE RATE MAP

RIVERSIDE COUNTY, CALIFORNIA AND INCORPORATED AREAS

PANEL 2028 OF 3805

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
LAKE ELSINORE, CITY OF	060636	2028	G
RIVERSIDE COUNTY	060245	2028	G

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MAP NUMBER
06065C2028G

EFFECTIVE DATE
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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, N/NGS12
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.

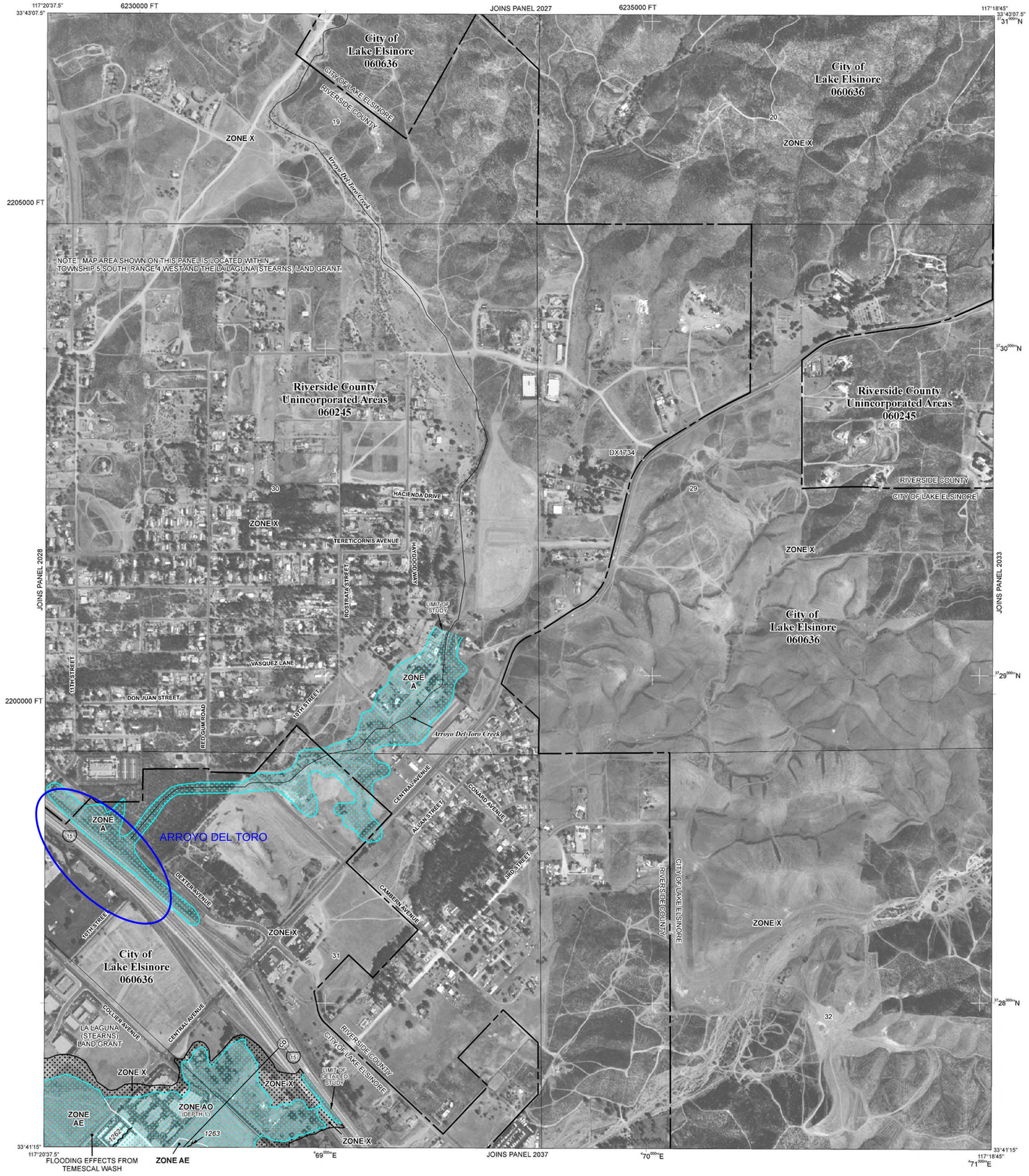
This map may reflect more detailed and up-to-date **stream channel configurations** than those shown on the previous FIRM for this jurisdiction. The floodplains and floodways that were transferred from the previous FIRM may have been adjusted to conform to these new stream channel configurations. As 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 decertified. 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.
513	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

A — A	Cross section line
23 — 23	Transect line
87°07'45", 32°22'30"	Geographic coordinates referenced to the North American Datum of 1983 (NAD 83), Western Hemisphere
4276000mN	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
DX5510 ×	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.

MAP SCALE 1" = 500'
250 0 500 1000 FEET
150 0 150 300 METERS

NFIP
NATIONAL FLOOD INSURANCE PROGRAM

PANEL 2029G

FIRM

FLOOD INSURANCE RATE MAP

RIVERSIDE COUNTY, CALIFORNIA AND INCORPORATED AREAS

PANEL 2029 OF 3805

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
LAKE ELSINORE, CITY OF	060636	2029	G
RIVERSIDE COUNTY	060045	2029	G

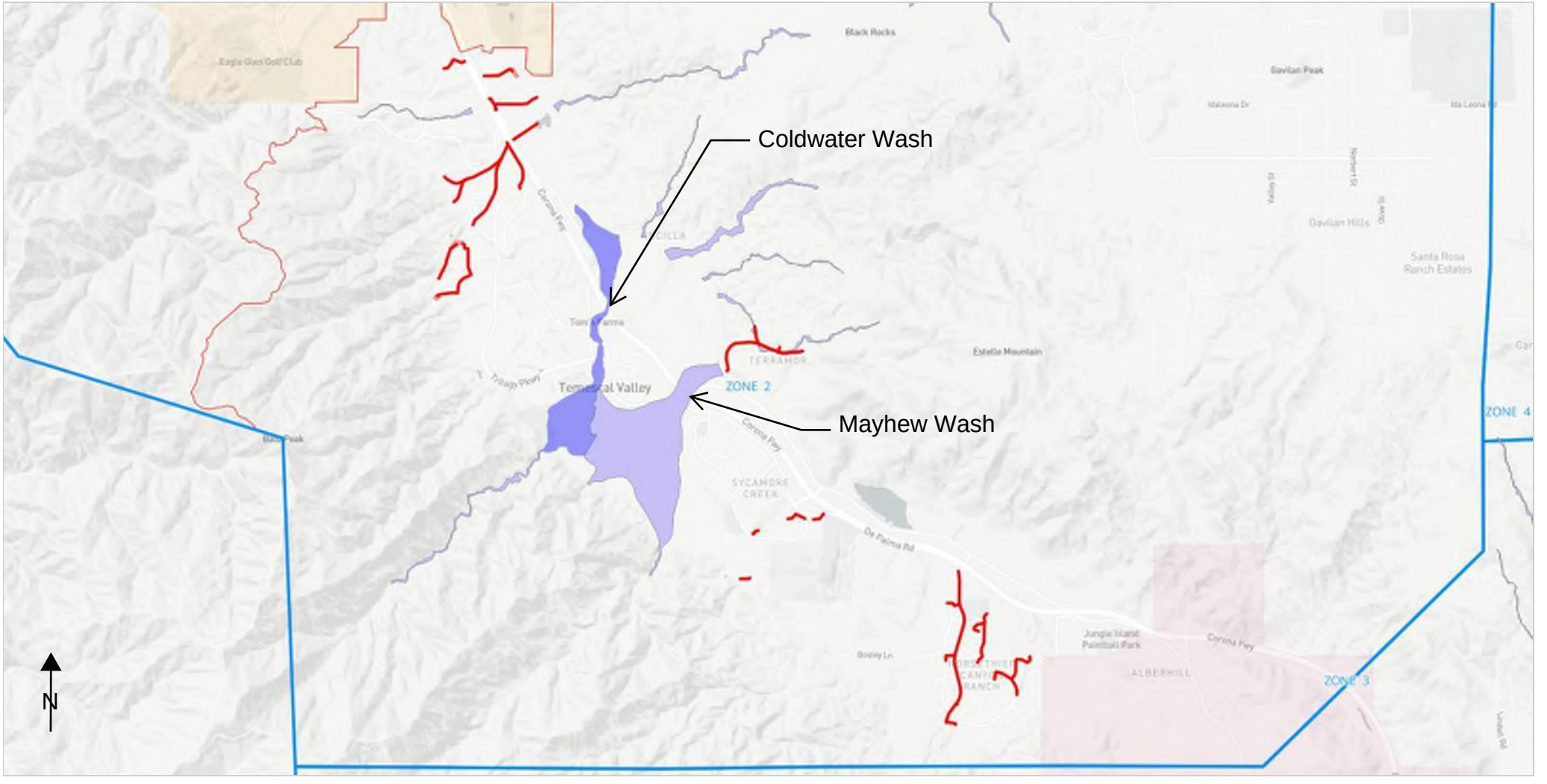
Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER
06065C2029G

EFFECTIVE DATE
AUGUST 28, 2008

Federal Emergency Management Agency

Riverside County Ordinance 458 Floodplains



RCFC Operating Zone
Bottom Layers
RCFC Area Facilities
DWR Awareness 458
RCFC Line Facilities
Special Studies
Supervisory Districts 2011

DWR AWARNESS/SPECIAL STUDIES FLOODPLAIN MAP

Source: Riverside County Flood Control WebMap

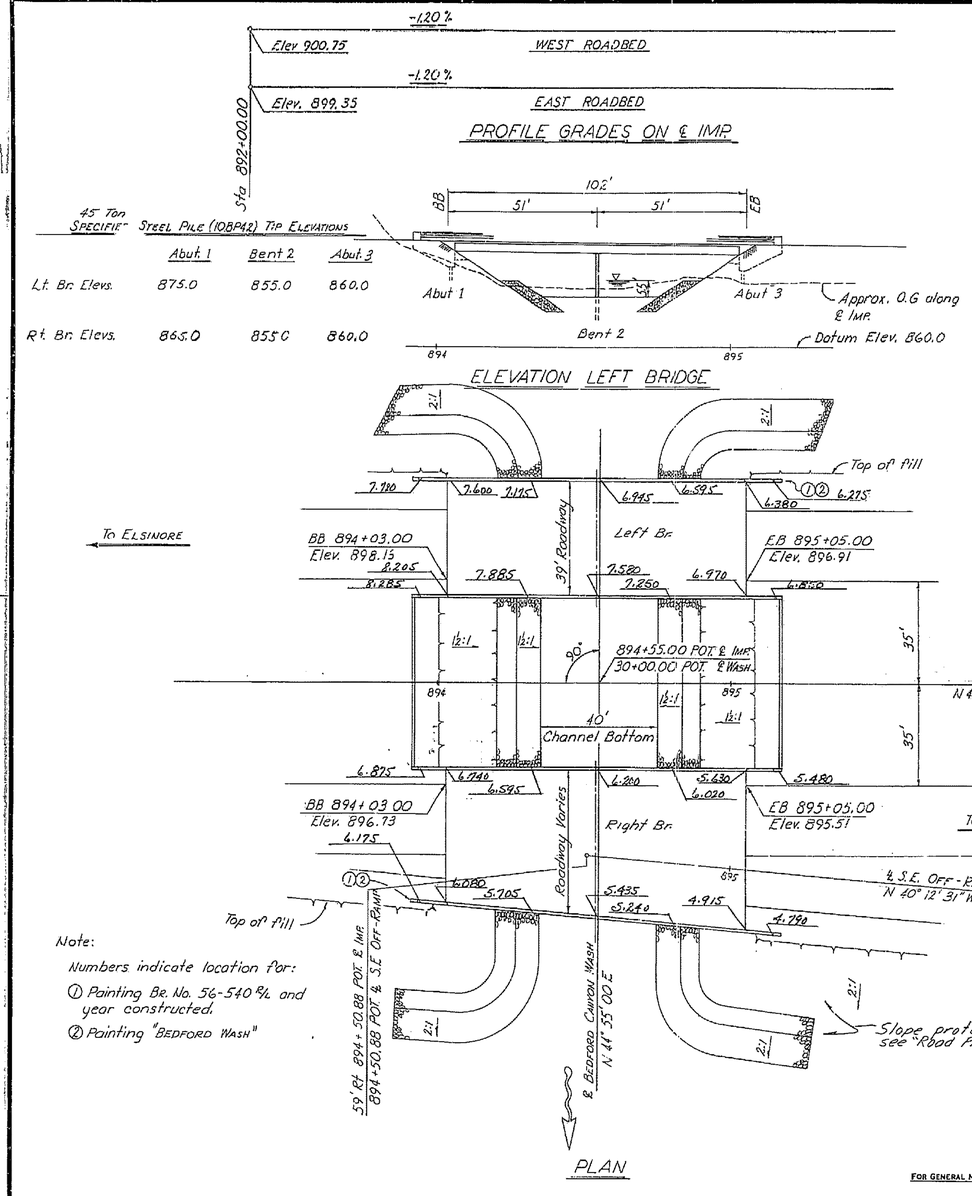
APPENDIX D: BEDFORD WASH BRIDGE AS-BUILTS AND GENERAL PLAN

(As-built) Bedford Wash Bridge
Selected Plan Sheets

FED. ROAD DIV. NO.	STATE	F. A. PROJECT No.	SHEET NO.	TOTAL SHEETS
7	CALIF.			

DIST.	COUNTY	ROUTE	SECTION	SHEET NO.	TOTAL SHEETS
08	RIV	71	19.5	112	153

February 1, 1965



Note:
Numbers indicate location for:
① Painting Br. No. 56-540 R/L and year constructed.
② Painting "Bedford Wash"

APPROXIMATE QUANTITIES

*STRUCTURE EXCAVATION (BRIDGE)	305 C.Y.
*STRUCTURE BACKFILL (BRIDGE)	115 C.Y.
FURNISHING CONCRETE PILING (CLASS 1)	330 L.F.
FURNISHING STEEL PILING (10BP42)	920 L.F.
DRIVING STEEL PILES	40 EA.
*CLASS "A" CONCRETE (BRIDGE)	535 C.Y.
*BAR REINFORCING STEEL (BRIDGE)	127,000 LBS.
BARRIER RAILING (TYPE 1)	498 L.F.
METAL SAFETY RAILING (SINGLE PIPE)	116 L.F.

*FINAL QUANTITIES

INDEX TO PLANS

See Brown Canyon Wash Bridge - Br. No. 56-559 R/L for:
Standard Details No. 1 (T-Beam)
Barrier Railing Sheet 1
Barrier Railing Sheet 2

AS BUILT PLANS
Contract No. 08-074214
Date Completed 8-24-66
Document No. 80000043

THIS SET OF PLANS HAS BEEN CORRECTED TO CORRESPOND TO THE "AS BUILT" PRINTS DATED 4-7-67, AS SUBMITTED BY RESIDENT ENGINEER R.D. HALTMAN
TRACINGS CORRECTED BY CCC DATE: 5-25-67

SHEET	OF
1	7

BRIDGE DEPARTMENT
DESIGN SECTION 15
Section Supervisor R.C. Blank
Project Designer C. Jan Olsen 2/64

DESIGN	by C. Jan Olsen 5-64	Checked L.L.	5-64
DETAILS	by NISHITANI 5-64	Checked L.L.	5-64
LAYOUT	by CSH	Checked DLC	5-64
QUANTITIES	by J.K. Moore 9/64	Checked DLC	1-65
SPECIFICATIONS	by	Plans and Specs Compared	
Approved Recommended by		Chief Engr. Effective Date	8-1-65

STATE OF CALIFORNIA
DEPARTMENT OF PUBLIC WORKS
DIVISION OF HIGHWAYS

BEDFORD WASH BRIDGE

LOCATED IN RIVERSIDE COUNTY APPROX. 0.5 MI. SOUTHWESTERLY OF EXISTING INTERSECTION OF CAJALCO ROAD AND ROUTE 71

GENERAL PLAN

Except as noted Scale 1" = 20' | BRIDGE 56-540 R/L | FILE | DRAWING 56540-1

63-08V10H0742.1
08203 074211 Disregard prints bearing earlier revision dates

PRELIMINARY DRAWING No. P-56-540-1-1 | REVISION DATES

For General Notes See "Foundation Plan"
Live Loading H20-S16-44 and Alternative

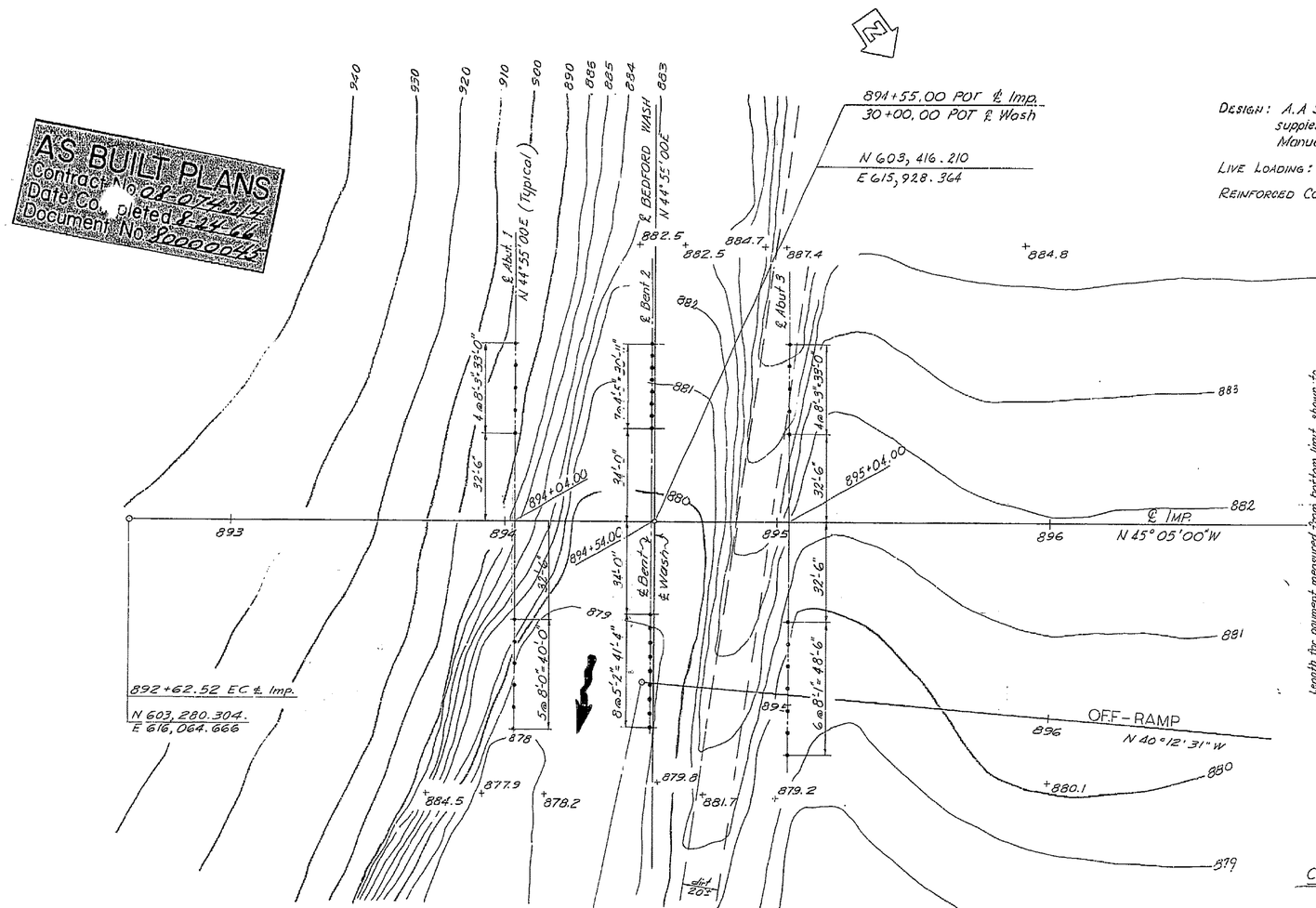
112

A-2

FED. AID PROJ. DIV. No.	STATE	PROJ. No.	FISCAL YEAR	SHEET No.	TOTAL SHEETS
7	CALIF.				

DIST.	COUNTY	ROUTE	SECTION	POST MILE	SHEET No.	TOTAL SHEETS
08	RIV	71	13.4/14.1	113	133	

Date Approved: February 1, 1965



BENCH MARKS

BM# 35-A-58 Elev. 885.22
Set 2" x 2" H & Sp. Hd. Nail 0.5 deep
130' Lt. 913+86.2 ℄ Imp. "64"

BM# 35-B-58 Elev. 909.44
Set 2" x 2" H & Sp. Hd. Nail 0.5' deep
76.5' Rt. 922+77.5 ℄ Imp "64"

894+50.88 P.O.T. 5 E Off-Ramp
59' Rt. 894+50.88 POT ℄ Imp

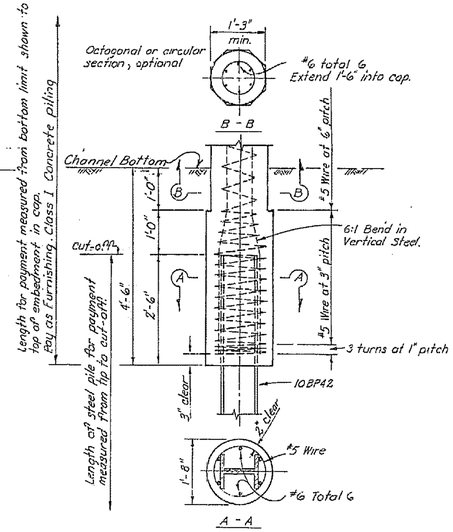
Note: + Denotes spot Elev

GENERAL NOTES

DESIGN: A.A.S.H.O. dated 1961 with revisions and as supplemented by Bridge Planning and Design Manual.

LIVE LOADING: H20-S16-44 and alternative.

REINFORCED CONCRETE: F_s = 20,000 P.S.I., N=10
F_c = 1,200 P.S.I.



CONCRETE PILE EXTENSION FOR 10BP42

Note: ∘ Denotes vertical piles

CONTOURS CHECKED & VERIFIED INSPECTED
DATE: 5/5/64
By: Jim Hooker

THIS SET OF PLANS HAS BEEN CORRECTED TO CORRESPOND TO THE 'AS BUILT' PRINTS DATED _____, AS SUBMITTED BY RESIDENT ENGINEER
TRACINGS CORRECTED BY: _____ DATE: _____

SHEET	OF
2	7

Drawn By: E. ROQUE	6-5-64		
Checked: E.R. BANKSTON	6-8-64		

BRIDGE DEPARTMENT
DESIGN SECTION ... 15
Project Designer: CSH 8/64
Chief Designer: RC Blake

SIGN	W.C. Hamilton 7-64	Checked	
DETAILS	N. MILITANI 6-64	Checked	
QUANTITIES	C.P. Williams 9-64	Checked	
SPECIFICATIONS	By	Plans and Blue-Prints Compared	

Approval Recommended by: _____ Engineer of Design — Chief and Principal Highway Bridge Engineer

STATE OF CALIFORNIA
DEPARTMENT OF PUBLIC WORKS
DIVISION OF HIGHWAYS

BEDFORD WASH BRIDGE

FOUNDATION PLAN

SCALE: 1" = 20' | BRIDGE 56-540 R/L | FILE | DRAWING 56-540-2

PREL. DRAWING No. P-

113

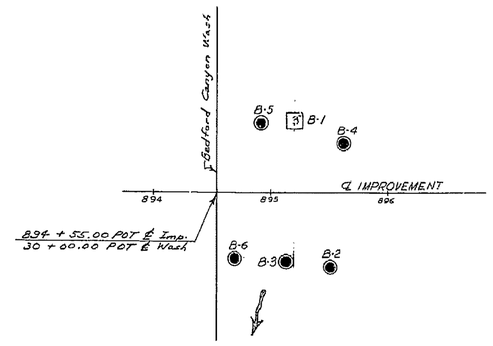
FED. ROAD DIV. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
7	CAL.				

DIST. NO.	COUNTY	ROUTE	SECTION	SHEET NO.	TOTAL SHEETS
08	RIV.	71	13.5/27	118	133

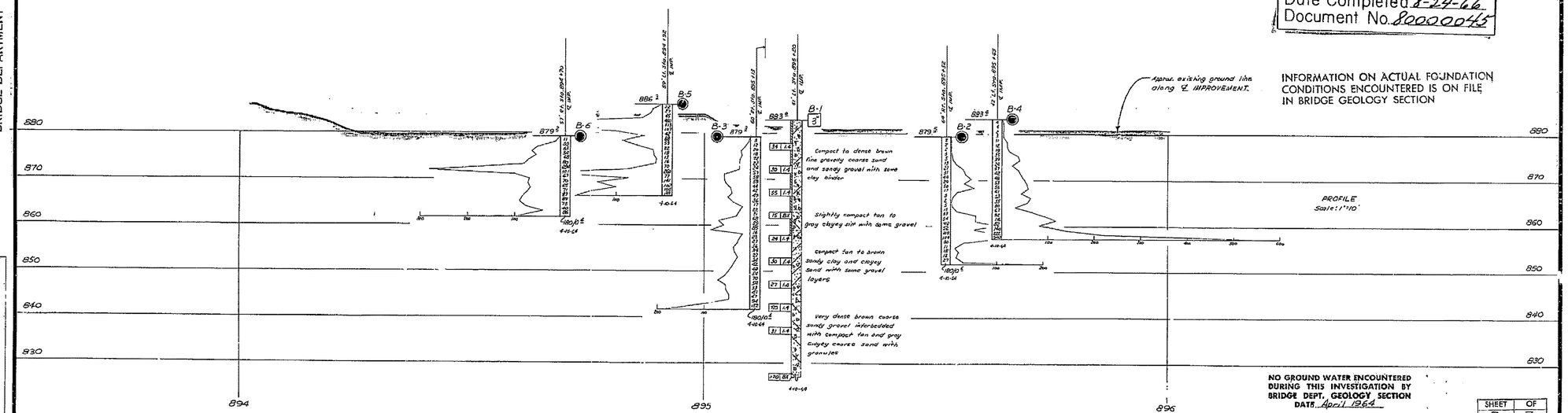
DATE APPROVED February 1, 1965

BM # 35-A-SB Elev. 885.22
Set 2"x2" H & Sp. Hd. Nail 0.5 deep 130'
Lt. 913 + 86.5 ℄ IMP. "64"

TBM set by Preliminary Elev. 881.67
2"x2" Stake at Sta. 895 +20 POT ℄ IMP.



PLAN
Scale : 1" = 50'



AS BUILT PLANS
Contract No. 08-074214
Date Completed 8-24-66
Document No. 800000445

INFORMATION ON ACTUAL FOUNDATION CONDITIONS ENCOUNTERED IS ON FILE IN BRIDGE GEOLOGY SECTION

NO GROUND WATER ENCOUNTERED DURING THIS INVESTIGATION BY BRIDGE DEPT. GEOLOGY SECTION
DATE April 1964

SHEET	OF
7	7

FIELD STUDY	H. S. L. Chaplin 4/10/64
DESIGN	H. S. L. Chaplin 4/28/64
DRAWN	H. S. L. Chaplin 5/5/64
CHECKED	

Alignment Earliest Survey

Approved Recommended By: [signature] Engineering Geologist

CLASSIFICATION OF MATERIAL BASED ON STANDARD GRADE SIZE LIMITS

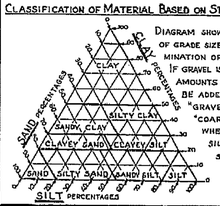


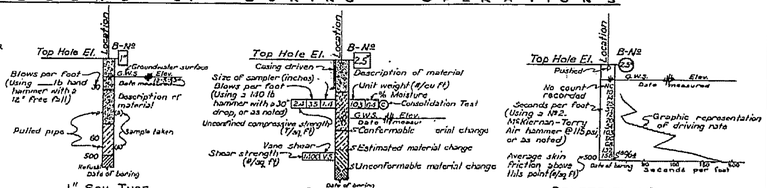
DIAGRAM SHOWING THE BASIS FOR ESTIMATES OF GRADE SIZE DISTRIBUTION USED IN DETERMINATION OF CLASS NAMES. IF GRAVEL IS PRESENT IN APPRECIABLE AMOUNTS THE TERM "GRAVELLY" MAY BE ADDED TO THE CLASS NAME, VIZ. "GRAVELLY SAND." THE TERMS "COARSE", "MEDIUM" AND "FINE" WHEN USED TO DESCRIBE SAND, SILT AND GRAVEL REFER TO STANDARD GRADE SIZE LIMITS.

LEGEND OF EARTH MATERIALS

- GRAVEL
- SAND
- SILT
- CLAY
- SANDY CLAY OR CLAYEY SAND
- SANDY SILT OR SILTY SAND
- SILTY CLAY OR CLAYEY SILT
- PEAT AND/OR ORGANIC MATTER
- FILL MATERIAL
- IGNEOUS ROCK
- SEDIMENTARY ROCK
- METAMORPHIC ROCK

LEGEND OF BORING OPERATIONS

- PENETROMETER
- 2½" CONE PENETROMETER
- SAMPLER BORING (DRY)
- ROTARY BORING (WET)
- AUGER BORING (DRY)
- JET BORING
- CORE BORING
- TEST PIT



NOTE

Classification of earth material as shown on this sheet is based upon field inspection and is not to be construed to imply mechanical analysis.

STATE OF CALIFORNIA
DEPARTMENT OF PUBLIC WORKS
DIVISION OF HIGHWAYS

BEDFORD WASH

LOG OF TEST BORINGS

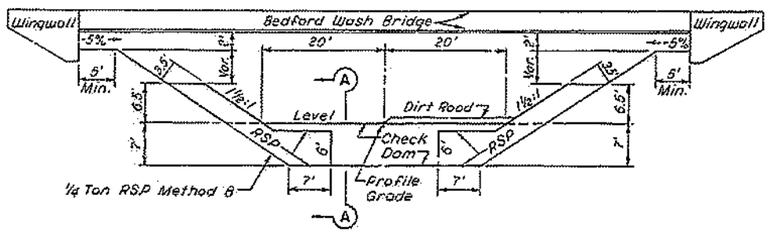
SCALE	AS Noted	BRIDGE	56-540 S/L	FILE		DRAWING	56540-7

PREL. DRAWING NO. P-

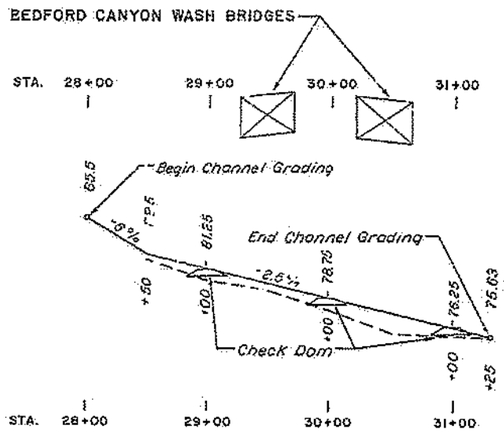
Dist.	County	Route	Post Mile / Kilo Marker	Sheet No.	Total Sheets
08	Riv	15	32.4/38.3	51	133

PROJECT ENGINEER — REGISTERED CIVIL ENGINEER NO. 36286

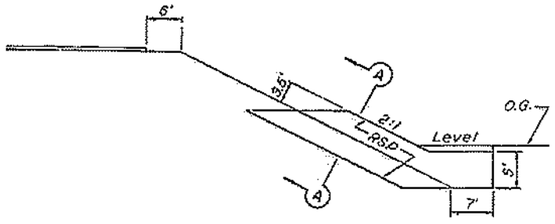
DATE APPROVED January 27, 1986



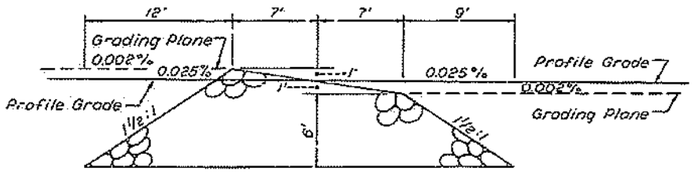
ROCK SLOPE PROTECTION
BEDFORD CANYON WASH



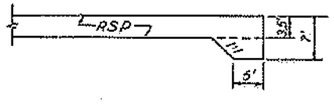
PROFILE GRADE
BEDFORD CANYON WASH



ROCK SLOPE PROTECTION
ON ROADWAY EMBANKMENT
BEDFORD CANYON WASH



SECTION A-A



SECTION A-A

ROCK SLOPE PROTECTION
CUT OFF WALL

AS BUILT PLANS
Contract No. 08-268504
Date Completed 09/01/88
Document No.

NOTE:
FOR DETAILS NOT SHOWN SEE
STANDARD PLAN B13-2.

AS BUILT

DRAINAGE DETAILS
BEDFORD CANYON WASH
RSP DETAILS
NO SCALE

DD
7

Project Engineer	Date	Designed By	Date	Checked By	Date	Approved By	Date
G. W. EDWARDS		K. L. HURST		K. D. DANDOW			

51

FOR REDUCED PLANS ORIGINAL SCALE IS IN INCHES 0 1 2 3

08201 268501

I HEREBY CERTIFY THAT THIS IS A TRUE AND ACCURATE COPY OF THE ABOVE DOCUMENT TAKEN UNDER MY DIRECTION AND CONTROL ON THIS DATE IN SACRAMENTO, CALIFORNIA PURSUANT TO AUTHORIZATION BY THE DIRECTOR OF TRANSPORTATION.

DATE 1-23-89 SIGNATURE SUPERVISOR OF MICROFILM SERVICES

DIST.	COUNTY	ROUTE	POST MILE/TOTAL PROJECT	SHT.	TOTAL SHTS.
08	Riv	15	22.4/38.8	10	199

James E. Pulley — January 27, 1986

LEGEND:
- Structures to be removed.
- Existing structure
- * 3'-0" Closure Pour
- ** Match existing P.C.C.

PILE DATA
70 Ton HP 10x57 Steel Pile

Average Tip Elev.		A B-1	B-2	A B-3
	L	858.80	835.10	835.80
	R	848.40	846.50	841.80

PROFILE GRADE

Sta 892+03.00
Elev. 900.58 Left Bridge
Elev. 899.18 Right Bridge
-1.2 %

Steel Piles

	Abut 1	Bent 2	Abut 3
Size	HP 10x57	HP10x57	HP 10x57
Design Loading	70 Ton	70 Ton	70 Ton
Specified Tip Elev.	L 859 R 845	L 845 R 845	L 845 R 842

Abut 1 — For hydraulic data, see "Foundation Plan"
Bent
Abut 3 — Slope Protection See Road Plans

Datum Elev. 860.0

ELEVATION LEFT BRIDGE
1" = 20'

Retaining Wall B See Road Plans
(Top PK Nail on Rail) Elev. 900.16
Top of P.C.C.
Temporary Railing Type K
Elev. 900.10 Elev. 899.80 Elev. 899.52 Elev. 898.26 Elev. 898.89 Elev. 898.76
To Elsinore
BD 894+05.00 Elev. 897.96
Left Br.
ED 895+05.00 Elev. 899.74
80'-0"
N 45°05'00"W
894+55.00 POT ℄ Rte 15
50+00.00 POT ℄ Wash
WASH
CANYON
Dirt Road
℄ BEDFORD
BD 894+03.00 Elev. 896.56
Right Br.
ED 895+05.00 Elev. 895.34
To Corona
LOL SE off-Ramp N 40°12'52" W 296
294+79.02 POT SE off Ramp = 71' Rt. 894+79.99 ℄ Imp. Rte 15
Top of Fill
Elev. 898.70 Elev. 898.38 Elev. 898.02 Elev. 897.77 Elev. 897.28 Elev. 897.15
N 44°35'00"E
(Top PK Nail on Rail) Elev. 898.80
E.R.
℄ Rte 15

Notes:
1. Point 'Bedford Wash Bridge'
2. Point Br. No. 56-540 R/L
3. M D G R - See Road Plans

PLAN
1" = 20'

RIGHT BRIDGE

53'-0" ±
12'-0" ± Widening
41'-0" ± Existing
35'-0"
1'-9"
9'-3"
36'-0" ±
5'-0"
1'-0"
23'-0"
Match exist. AC
4'-0"
Temporary Railing Type K
-1.5%
Conc. Barrier Railing Type 25
Profile Grade Top of P.C.C.
6" Dia 15

TYPICAL SECTION
Scale: 3/16" = 1'-0"

LEFT BRIDGE

Temporary Railing Type K
Varies
35'-0"
23'-0"
12'-0"
1'-0"
Exist. Width Varies
36'-0"
Varies
12'-0" ± Varies
10'-3" ± Widening
8'-0"
1'-9"
LOL SE. off-ramp
-1.5%
Match (Exist. AC
Conc. Barrier Railing Type 25
R.C. T Beam
Profile Grade Top of P.C.C.
5'-0" ±

INDEX TO PLANS

SHEET NO.	TITLE
1	GENERAL PLAN
2	FOUNDATION PLAN
3	ABUTMENT DETAILS
4	TYPICAL SECTION & GIRDER LAYOUT
5	GIRDER REINFORCEMENT
6	LOG OF TEST BORINGS

STANDARD PLANS DATED JULY 1984

A62-C	EXCAVATION AND BACKFILL - BRIDGE
B0-1	BRIDGE DETAILS
B0-5	BRIDGE DETAILS
B2-5	PILE DETAILS - CLASS 45 AND CLASS 70
B6-1	T-BEAM DETAILS
B11-30	TEMPORARY RAILING (TYPE K)
B11-53	CONCRETE BARRIER TYPE 25

GENERAL NOTES
LOAD FACTOR DESIGN

DESIGN: BRIDGE DESIGN SPECIFICATIONS (1977 AASHTO with Interims and Caltrans Supplements)

DEAD LOAD: Includes 35 psf for future wearing surface.

LIVE LOADING: HS20-44 and alternative and permit design load.

REINFORCED CONCRETE: f_y = 60,000 psi; f'_c = 3,250 psi; n = 9

Transverse deck slabs (working Stress Design): f_s = 20,000 psi; f_c = 1,200 psi; n = 10

APPROXIMATE QUANTITIES

TEMPORARY RAILING (TYPE K)	400 LF
BRIDGE REMOVAL (PORTION)	LUMP SUM
FURNISH STEEL PILING (HP 10 x 57)	440 LF
DRIVE STEEL PILE (HP 10 x 57)	12 EA
DRILL AND GROUT DOWEL	12 EA
CONCRETE BARRIER (TYPE 25)	246 LF

FINAL PAY QUANTITIES

STRUCTURE EXCAVATION (BRIDGE)	65 CY
STRUCTURE BACKFILL (BRIDGE)	35 CY
STRUCTURAL CONCRETE, BRIDGE	100 CY
BAR REINFORCING STEEL (BRIDGE)	31,400 LB

NOTE:
THE CONTRACTOR SHALL VERIFY ALL CONTROLLING FIELD DIMENSIONS BEFORE ORDERING OR FABRICATING ANY MATERIAL.

Standard Plan Sheet No.
Detail No.

D.K.IM
08-268504
8-20-87

Ted Rauk C38130
PO Manager 1/86 13523

DESIGN	William R. Powell 1/86	LOAD FACTOR STUDY	LIVE LOADING: HS20-44 AND ALTERNATIVE AND PERMIT DESIGN LOAD
QUANTITIES	Robert Paulson	LAYOUT	Robert Paulson
	Robert Paulson	SPECIFICATIONS	Ron Vaughn
	Robert Paulson		Dan Jew
	Linda Miller		J. Stenberg 3/87

State of CALIFORNIA
DEPARTMENT OF TRANSPORTATION

STRUCTURES - DESIGN 1
Dan Jew 36647 6-20-87
PROJECT ENGINEER REGISTRATION NUMBER AND DATE SIGNED

BRIDGE NO. 56-540 R/L
POST MILE 36.58

BEDFORD WASH BRIDGE (WIDEN)
GENERAL PLAN

ORIGINAL SCALE IN INCHES FOR REDUCED PLANS: 0 1 2 3
CU 08201
WD 268501
Standard prime bearing value on rock ——→
SHEET 1 OF 6

AS BUILT PLANS
Contract No. 08-268504
Date Completed 8-19-87
Document No.

I HEREBY CERTIFY THAT THIS IS A TRUE AND ACCURATE COPY OF THE ABOVE DOCUMENT TAKEN UNDER MY DIRECTION AND CONTROL ON THIS DATE IN SACRAMENTO, CALIFORNIA PURSUANT TO AUTHORIZATION BY THE DIRECTOR OF TRANSPORTATION.
1/29/01 Ronald Blackford SUPERVISOR OF MICROFILM SERVICES

MICROFILM - STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION - MICROFILM

HYDROLOGIC SUMMARY

DRAINAGE AREA: 8 square miles

	DESIGN FLOOD	BASE FLOOD
FREQUENCY (Years)	50	100
DISCHARGE (Cubic feet per second)	2350	2830
WATER SURFACE (Elevation at bridge)	8842	8847

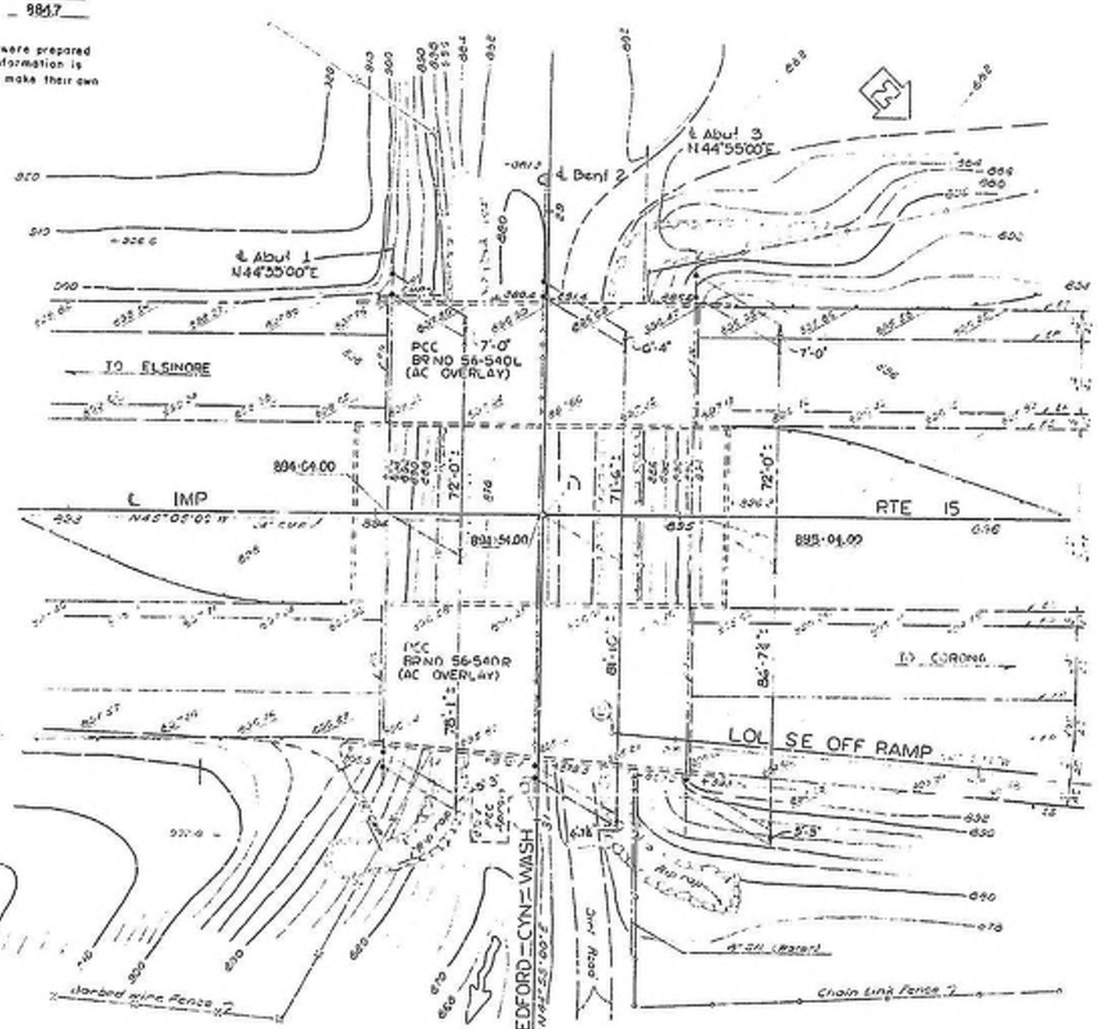
Flood plain data are based upon information available when the plans were prepared and are shown to meet Federal requirements. The accuracy of said information is not warranted by the State and interested or affected parties should make their own investigation.

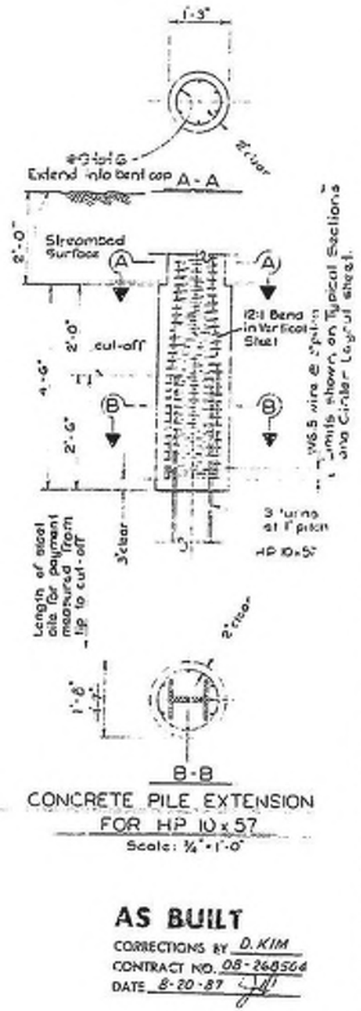
		NORTH	EAST
1	894+00.00 POT & RT'N 15 30 + 00 Abut 3 Bedford Cyn Wash	002 418.210	615,388.354
2	894+17.00 POT & RT'N 15 896+17.00 P.C. & SE OFF-R'MP	001,486.754	615,301.877

DIST.	COUNTY	ROUTE	POST MILES—TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
08	Riv	15	37.4/38.3	107	122

Tied Bench CTWO

January 27 1986





CONCRETE PILE EXTENSION
FOR HP 10 x 57
Scale: ¼"=1'-0"

BENCH MARKS

NOTES

1. Derived geod elevation
Underground utilities as shown are approximate
Deck grades are top of AC
• Denotes vertical piles.

AS BUILT
CORRECTIONS BY D. KIM
CONTRACT NO. 08-268504
DATE 8-20-87

AS BUILT PLANS
Contract No 08-268504
Date Completed 8-19-87
Document No

PRELIMINARY INVESTIGATION SECTION

SCALE 1"=20'	DATUM S.L. 1929 NGS ADJ 1934	PHOTOGRAMMETRY AS OF:	DESIGN	Wm. R. Hirschi '85	Checked Robert Peplow '85	State of CALIFORNIA DEPARTMENT OF TRANSPORTATION	STRUCTURES - DESIGN 1 Brian Gee 35547	BRIDGE NO. 56-540R/L POST MILE 36.58	BEDFORD WASH BRIDGE (WIDEN) FOUNDATION PLAN
ALIGNMENT TIES		SURVEYED	DETAILS	Ramirez '85	Checked Robert Peplow '85				
		DRAWN	TRACED	Robert Perkins	Checked Lowell Wilson				
		CHECKED	QUANTITIES						

ORIGINAL SCALE IN INCHES FOR REDUCED PLANS: 0 1 2 3

CU 08201
WO 266501

Designed prior to using earliest revision dates: 9/86 7/86

REVISION DATES (PRELIMINARY STAGE ONLY)

SHEET 2 OF 6

I HEREBY CERTIFY THAT THIS IS A TRUE AND ACCURATE COPY OF THE ABOVE DOCUMENT TAKEN UNDER MY DIRECTION AND CONTROL ON THIS DATE IN SACRAMENTO, CALIFORNIA PURSUANT TO AUTHORIZATION BY THE DIRECTOR OF TRANSPORTATION.

DATED: 1/30/90 SIGNED: Donald Blackford SUPERVISOR OF MICROFILM SERVICES

DIST.	COUNTY	ROUTE	POST MILE/KILOMETER PREFIX	PROJECT NUMBER	TOTAL SHEETS
08	SBd	15	37.6/38.5	08120	135

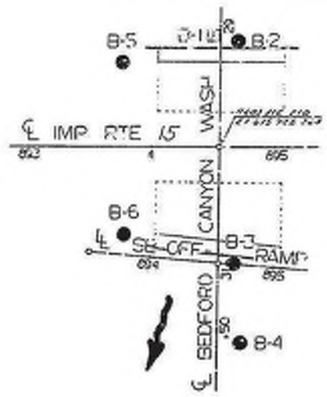
Contract No. 08-268504
January 27, 1986

BENCH MARK

B.M. #892-62.56 Elev. 899.39
Cross chisel in conc. bottom of brg. #62.56 Ahead Leg

PLAN

Scale 1" = 50'

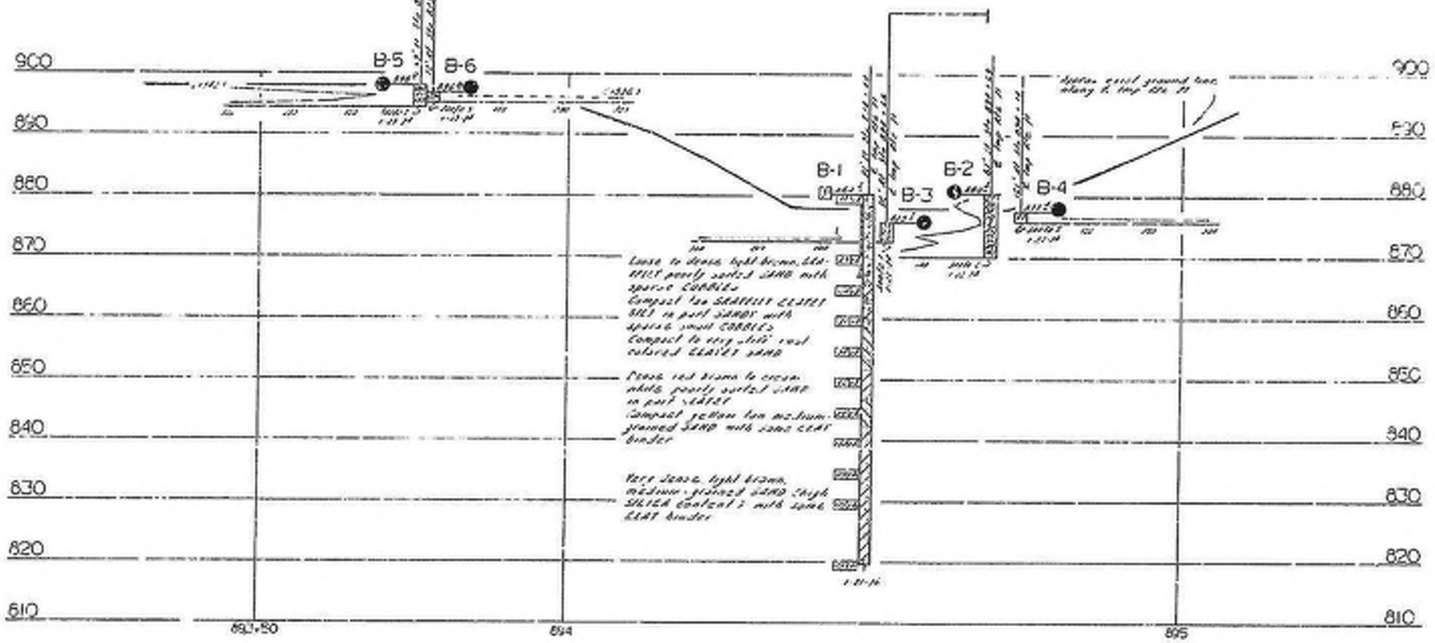


AS BUILT PLANS
Contract No. 08-268504
Date Completed 8-19-87
Document No.

NO GROUND WATER ENCOUNTERED
[illegible] THIS INVESTIGATION BY OFFICE OF STRUCTURES
GEOLOGIC STUDIES SECTION
DATE January 1987

PROFILE

Scale Horiz 1" = 10'
Vert 1" = 10'



NO AS BUILT CORRECTION
AS BUILT
CORRECTIONS BY D. KIM
CONTRACT NO. 08-268504
DATE 8-20-87

I HEREBY CERTIFY THAT THIS IS A TRUE AND ACCURATE COPY OF THE ABOVE DOCUMENT TAKEN UNDER MY DIRECTION AND CONTROL ON THIS DATE IN SACRAMENTO, CALIFORNIA PURSUANT TO AUTHORIZATION BY THE DIRECTOR OF TRANSPORTATION.
1/22/88 Donald Blackhurst, SUPERVISOR OF DOCUMENT SERVICES

ENGINEERING GEOLOGY SECTION
FIELD STUDY by J. A. Crawford 1-13-86
DRAWN by J. Lee 1-29-86
CHECKED by E. Abbott 2-10-86
ENGINEER RESPONSIBLE A. T. Champlin

State of CALIFORNIA
DEPARTMENT OF TRANSPORTATION

BRIDGE DEPARTMENT
DESIGN SECTION 1
PROJECT ENGINEER Brian Jon

BRIDGE NO. 56-0540-R/L
POST MILE 36.58

CU 08201
WO 26850

BEDFORD WASH BRIDGE (WIDEN)
LOG OF TEST BORINGS

SHEET 6 OF 6

ORIGINAL SCALE IN INCHES FOR AS-BUILT PLANS 0 1 2 3

(General Plan) Bedford Wash Bridge

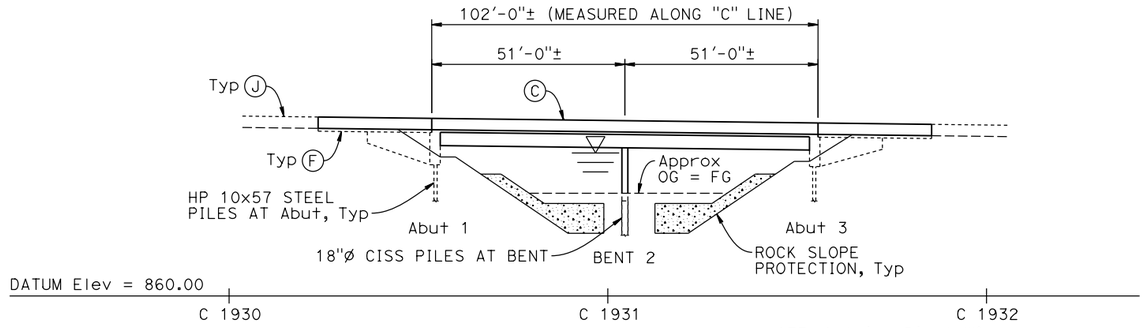
PREPARED FOR THE STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION

Dist	COUNTY	ROUTE	POST MILE
08	RIV	15	36.58

RIVERSIDE COUNTY
TRANSPORTATION COMMISSION
4080 LEMON STREET
RIVERSIDE, CA 92502

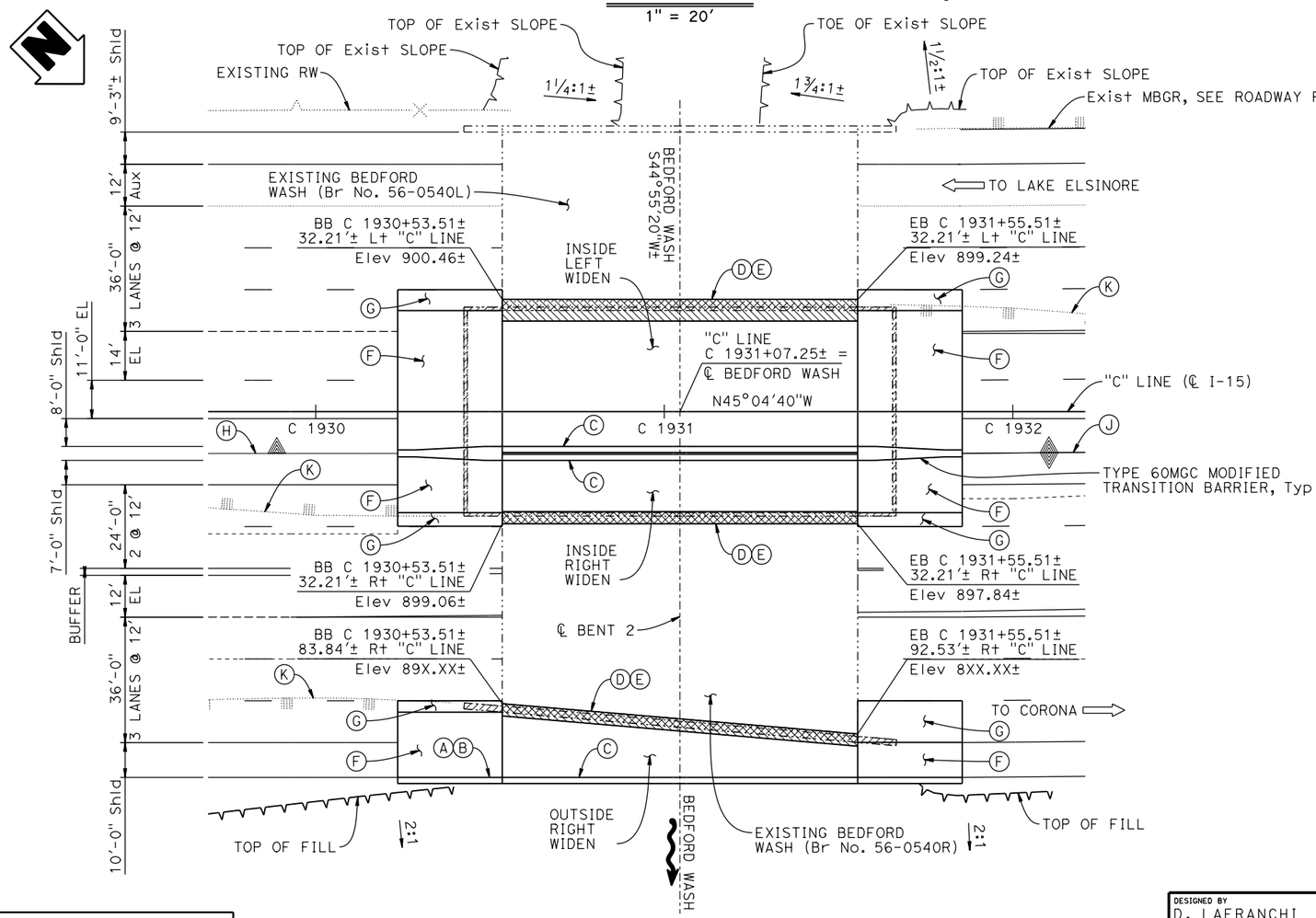
HDR ENGINEERING, INC.
3230 EL CAMINO REAL, SUITE 200
IRVINE, CA 92602-1377

Note: Profile Grade to match existing.



ELEVATION
1" = 20'

NOTE: Outside Right Widen shown.
Inside Right and Inside Left Widen similar.



PLAN
1" = 20'

NOTE: Existing and Proposed Rock Slope Protection not shown.

LEGEND:
- Existing structure
- Bridge Removal (Portion)
- Direction of Traffic
- Direction of flow
- High water surface elevation (Right Bridge = 889.8±) (Left Bridge = 892.5±)

NOTES:
- (A) Paint "Br No. 56-0540 R/L"
- (B) Paint "BEDFORD WASH" and Year Constructed
- (C) Concrete Barrier (Type 836)
- (D) Bridge Removal (Portion)
- (E) Closure Pour
- (F) Structure Approach Type N (30)
- (G) Structure Approach Type R (30)
- (H) Retaining Wall, see ROADWAY PLANS
- (I) Temporary Barrier System, see ROADWAY PLANS
- (J) Median Barrier, see ROADWAY PLANS
- (K) Remove Existing MBGR, see ROADWAY PLANS

ASSUMPTIONS:
1. Vehicular traffic will not pass through the construction site. No falsework openings required.
2. Existing elevations shown have been adjusted from the As-Built datum to the NAVD 88 datum by +2.5-feet.
3. Seismic retrofit assessment for this structure will be considered in the design phase of the Project.
4. Scour analysis and determination for need of scour countermeasure shall be considered in the design phase of the Project.
5. The following existing utilities may require removal, relocation, or coordination with the utility owner:
   - 5"Ø Fiber Optic Conduit (Left Inside Bridge)
   - 24"Ø CSP (between Abut 1)
   - Fiber Optic Conduit (Right Outside Bridge)
   - 12" x 28' CSP Downdrain (Right Outside Bridge)

DATE OF ESTIMATE	08/2022
BRIDGE REMOVAL	= 978 SQFT
STRUCTURE DEPTH	= 3'-6"
LENGTH	= 102'-0"
WIDTH	= 73'-7½" Avg
AREA	= 7,510 SQFT
COST/ft² INCLUDING TRO, MOBILIZATION & 25% CONTINGENCY	= $XXX
TOTAL COST	= $X,XXX,000

DESIGN OVERSIGHT

SIGN OFF DATE

ADVANCE PLANNING STUDY SHEET (ENGLISH) (REVISION 4/19/2018)

DATE PLOTTED => 09-AUG-2022 TIME PLOTTED => 15:27
FILE => 56-0540r1-a-gp01.dgn USERNAME => svc_in_pwservice

DESIGNED BY D. LAFRANCHI	DATE 08/2022	D. LAFRANCHI PROJECT ENGINEER	PLANNING STUDY
DRAWN BY D. LAFRANCHI	DATE 08/2022		BEDFORD WASH (WIDEN)
CHECKED BY J. WANG	DATE 08/2022		UNIT: 0000 / BRIDGE No.: 56-0540 R/L
APPROVED J. WANG	DATE 08/2022		CONTRACT No.: 08-0J0820 / PROJECT No. & PHASE: 08-18000063 & 0

PREPARED FOR THE STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION

Dist	COUNTY	ROUTE	POST MILE
08	RIV	15	36.58

RIVERSIDE COUNTY
TRANSPORTATION COMMISSION
4080 LEMON STREET
RIVERSIDE, CA 92502

HDR ENGINEERING, INC.
3230 EL CAMINO REAL, SUITE 200
IRVINE, CA 92602-1377

NOTES:

Ⓒ Concrete Barrier (Type 836)

Ⓓ Bridge Removal (Portion)

Ⓔ Closure Pour

Ⓘ Temporary Barrier System, see ROADWAY PLANS

NOTES (Cont):

Ⓛ Existing Concrete Barrier Railing Type 1

Ⓜ Existing Concrete Barrier Railing Type 25

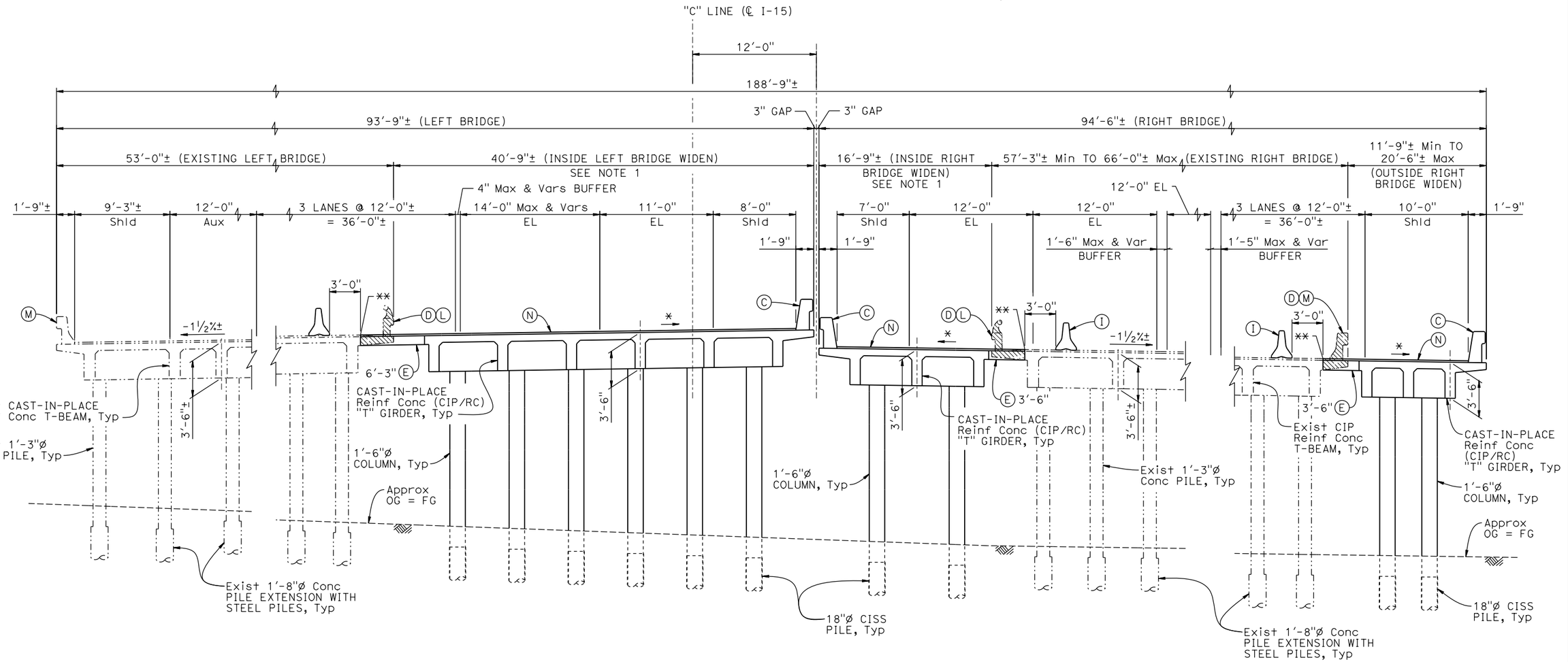
Ⓝ Polyester Concrete Overlay

1. Widening can be advanced in sister project (EA 08-0J0830)
2. "EL" indicates Express Lane

LEGEND:

Existing structure

Bridge Removal (Portion)



TYPICAL SECTION

1" = 5'

* Match existing cross slope
** Match existing profile grade

DESIGN OVERSIGHT

SIGN OFF DATE

ADVANCE PLANNING STUDY SHEET (ENGLISH) (REVISION 4/19/2018)

DATE PLOTTED => 09-AUG-2022 TIME PLOTTED => 15:26
FILE => 56-0540r1-a-gp02.dgn USERNAME => svc_in_pwservice

DESIGNED BY D. LAFRANCHI	DATE 08/2022	D. LAFRANCHI PROJECT ENGINEER
DRAWN BY D. LAFRANCHI	DATE 08/2022	
CHECKED BY J. WANG	DATE 08/2022	
APPROVED J. WANG	DATE 08/2022	

PLANNING STUDY

BEDFORD WASH (WIDEN)

UNIT: 0000	BRIDGE No.: 56-0540 R/L
CONTRACT No.: 08-0J0820	PROJECT No. & PHASE: 08-18000063 & 0

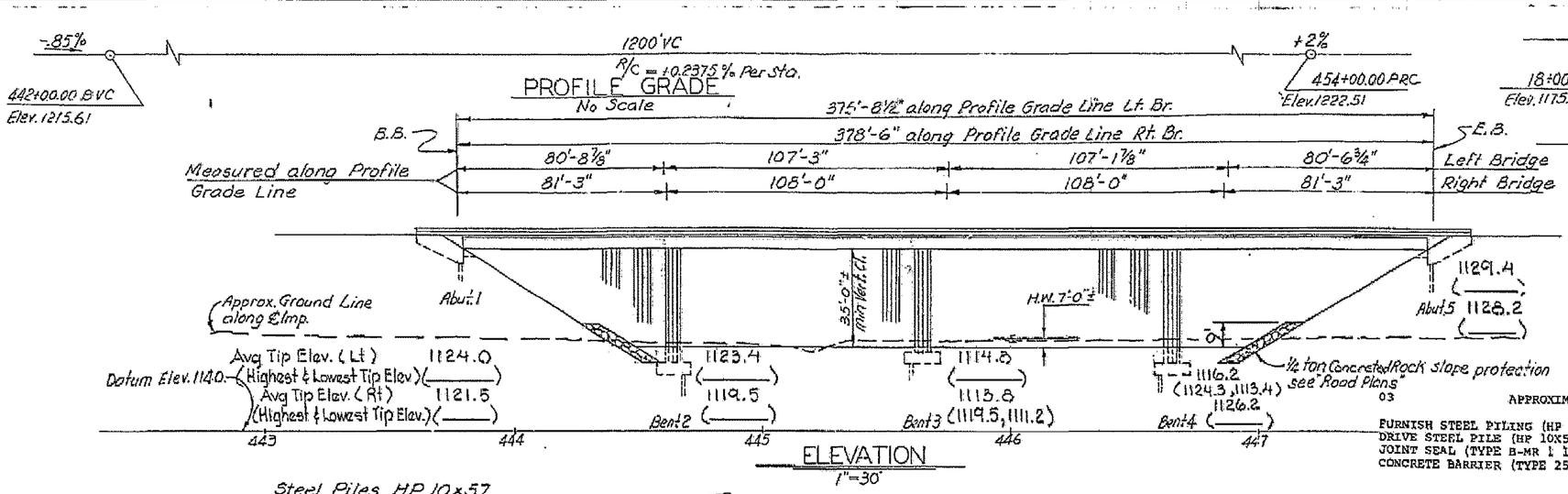
APPENDIX E: TEMESCAL WASH BRIDGE AS-BUILTS AND GENERAL PLAN

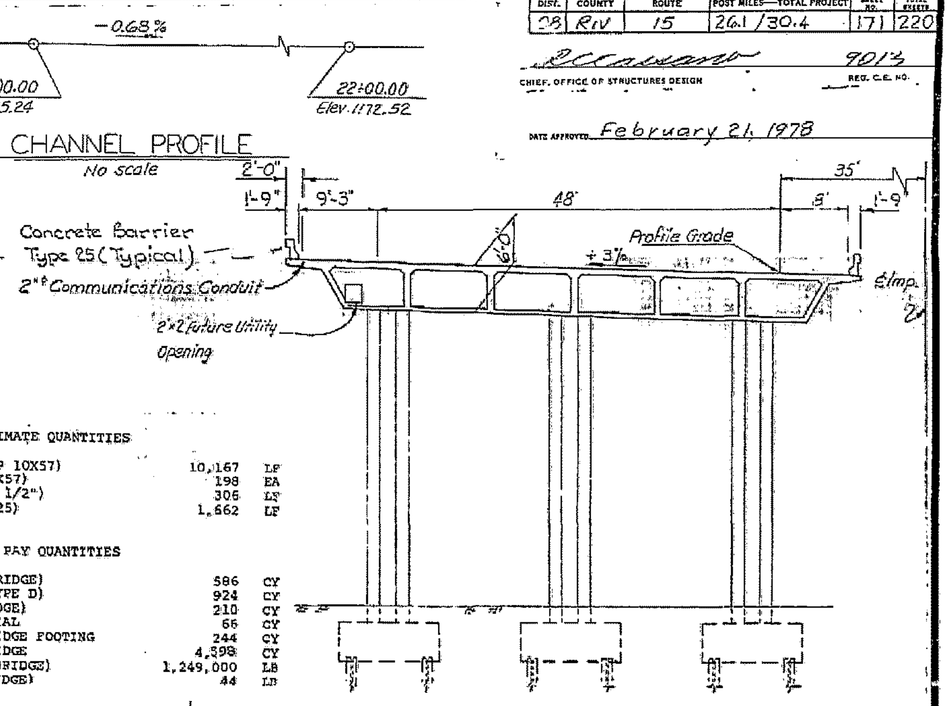
(As-built) Temescal Wash Bridge

DIST.	COUNTY	ROUTE	POST MILES — TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
08	Riv	15	26.1/30.4	171	220

CHIEF, OFFICE OF STRUCTURES DESIGN — REG. C.E. NO. 9013

DATE APPROVED: February 21, 1978



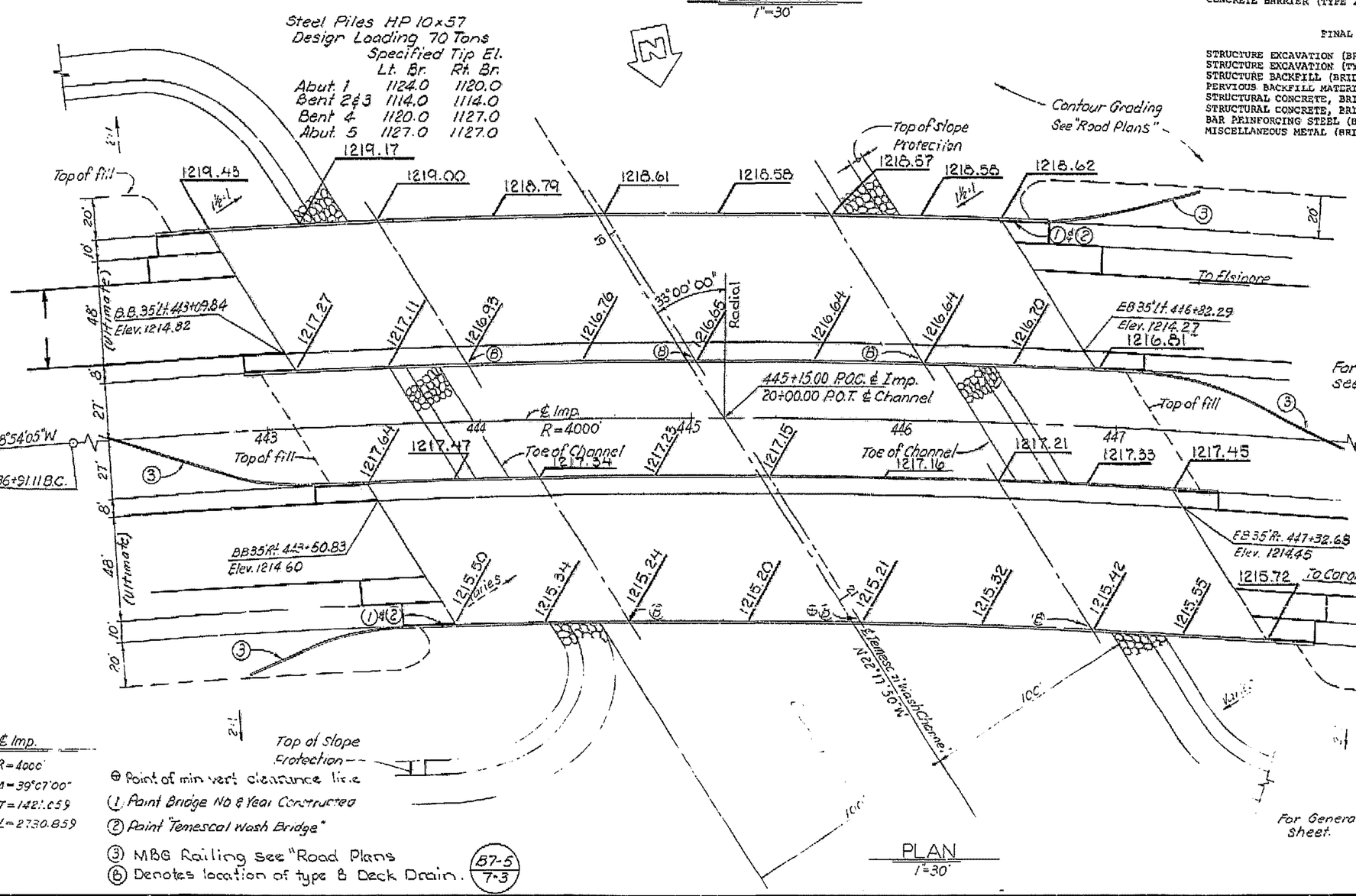


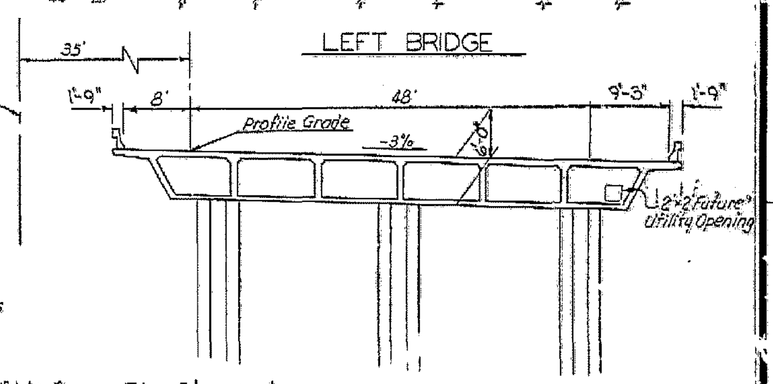
APPROXIMATE QUANTITIES

FURNISH STEEL PILING (HP 10X57)	10,167	LF
DRIVE STEEL PILE (HP 10X57)	198	EA
JOINT SEAL (TYPE A-MR 1 1/2")	306	LF
CONCRETE BARRIER (TYPE 25)	1,562	LF

FINAL PAY QUANTITIES

STRUCTURE EXCAVATION (BRIDGE)	586	CY
STRUCTURE EXCAVATION (TYPE D)	924	CY
STRUCTURE BACKFILL (BRIDGE)	210	CY
PERVIOUS BACKFILL MATERIAL	66	CY
STRUCTURAL CONCRETE, BRIDGE FOOTING	244	CY
STRUCTURAL CONCRETE, BRIDGE	4,598	CY
BAR REINFORCING STEEL (BRIDGE)	1,249,000	LB
MISCELLANEOUS METAL (BRIDGE)	44	LB





BM: Brass Disc Stamped "BM 45-A-78" Set in PCC buried 0.9' 22½° Lt 449+76 ℄ Imp Rte 71 (I-15) Elev. 1203.92

RIGHT BRIDGE

TYPICAL SECTION

1"=10'

INDEX TO PLANS

SHEET NO.	TITLE
1	GENERAL PLAN
2	DECK CONTOURS
3	FOUNDATION PLAN NO. 1
4	FOUNDATION PLAN NO. 2
5	ABUTMENT 1
6	ABUTMENT 5
7	BENTS
8	TYPICAL SECTION
9	GIRDER LAYOUT NO. 1
10	GIRDER LAYOUT NO. 2
11	TOP GIRDER REINFORCEMENT
12	BOTTOM GIRDER REINFORCEMENT
13	LOG OF TEST BORINGS

STANDARD PLANS DATED MARCH, 1977

A62-BB	EXCAVATION AND BACKFILL - LIMITS OF PAYMENT (BRIDGE)
B0-1	BRIDGE DETAILS
B0-3	BRIDGE DETAILS
B0-5	BRIDGE DETAILS
B2-5	PILE DETAILS - CLASS 70
B6-21	JOINT SEAL DETAILS
B7-1	BOX GIRDER DETAILS
B7-5	DRAIN DETAILS
B7-10	UTILITY OPENING BOX GIRDER
B11-53	CONCRETE BARRIER TYPE 25

AS BUILT
Contract No. 08-170504
Date Completed 4-4-80
Document No.
CC J. Wheeler
Contract No. 170504
DATE 4-4-80

Submitted By: F. R. Adams 12/77 — 8909 (Bridge Section Supervisor, Registered Civil Engineer Number)	DESIGN	By K. Strunen	Checked R. J. Mellon 12/77	LOAD FACTOR DESIGN / LIVE LOADING: HS20-44 AND ALTERNATIVE AND PERMIT DESIGN LOAD	
Approved/Recommended By: Donald Maneuso 8198 (Design Engineer, Registered Civil Engineer Number)	DETAILS	By C W TAM 1-72	Checked R. J. Mellon 12/77	LAYOUT By C W TAM 1-72	Checked R. J. Mellon
HBD D 130	QUANTITIES	By Gonzalez 12/77	Checked R Kwoko 12/77	SPECIFICATIONS By H K Jensen 2-78	Checked H.K.J. 2-78

State of CALIFORNIA DEPARTMENT OF TRANSPORTATION

OFFICE OF STRUCTURES DESIGN GROUP
PROJECT ENGINEER R. J. Mellon

BRIDGE No. 56-680 R/L
POST MILE R28.1

CU 08203
WO 170501

ORIGINAL SCALE IN INCHES FOR REDUCED PLANS 0 1 2 3

Disregard prints bearing earlier revision dates →

REVISION DATES (PRELIMINARY STAGE ONLY)

SHEET 1 OF 13

TEMESCAL WASH BRIDGE
GENERAL PLAN

171

I HEREBY CERTIFY THAT THIS IS A TRUE AND ACCURATE COPY OF THE ABOVE DOCUMENT TAKEN UNDER MY DIRECTION AND CONTROL ON THIS DATE IN SACRAMENTO, CALIFORNIA PURSUANT TO AUTHORIZATION BY THE DIRECTOR OF TRANSPORTATION.

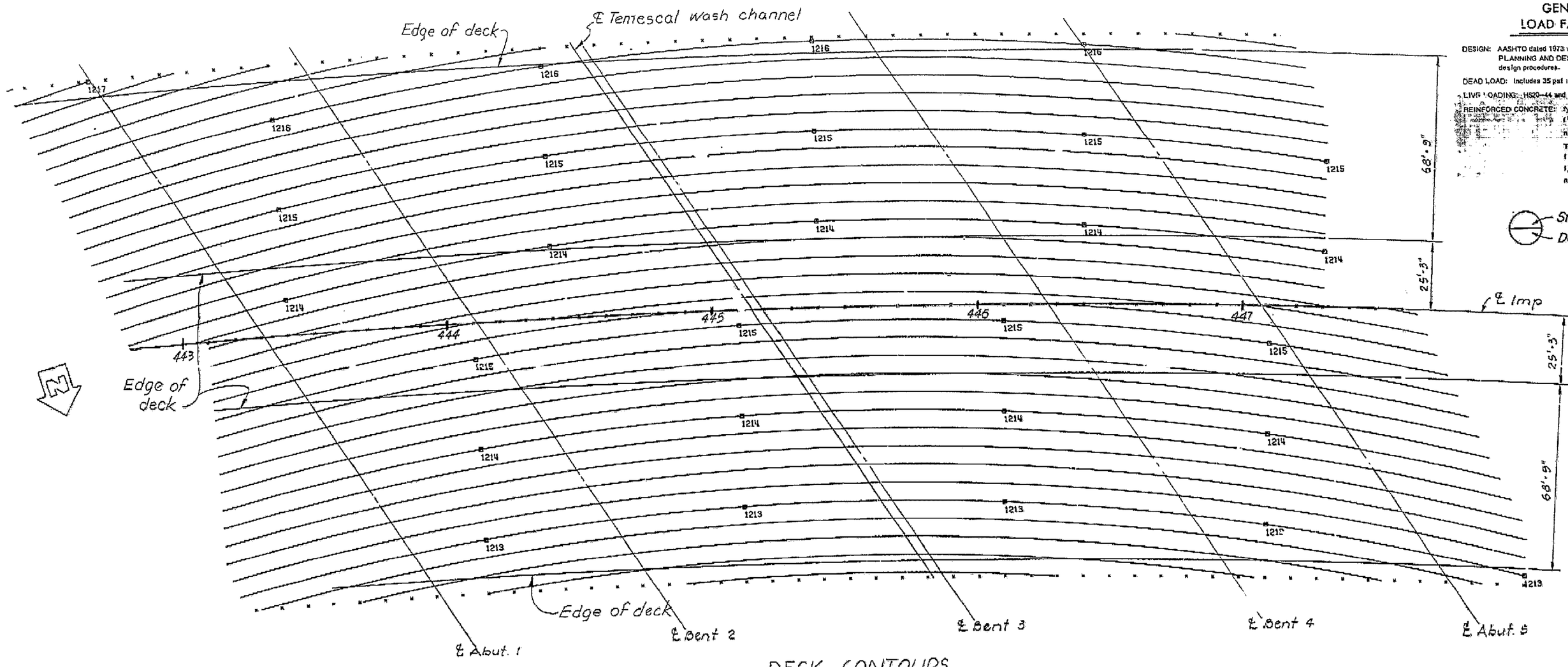
DATE 7-16-80 SIGNATURE Joseph M Lata TITLE SUPERVISOR OF MICROFILM SERVICES

DAS-93-78

DIST.	COUNTY	ROUTE	POST MILES—TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
08	RIV.	15	26.1 / 30.4	172	220

DESIGN ENGINEER SUPERVISOR — REGISTERED CIVIL ENGINEER NUMBER

DATE APPROVED February 21, 1978



DECK CONTOURS
1"= 20'

X indicates 10' intervals along ℄ Imp.
□ indicates even 1' contours.
Contour interval is 0.2'.
Contours do not include camber.

GENERAL NOTES
LOAD FACTOR DESIGN

DESIGN: AASHTO dated 1973 with revisions and as supplemented by BRIDGE PLANNING AND DESIGN MANUAL including interim load factor design procedures.

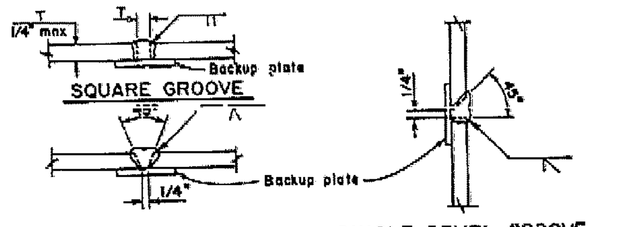
DEAD LOAD: Includes 35 psf for future wearing surface.

LIVE LOADING: HS20-44 and alternative and permit design load.

REINFORCED CONCRETE: f_y = 60,000 psi
f'_c = 3,250 psi
n = 10

Transverse deck slabs (working Stress Design):
f_s = 20,000 psi
f_c = 1,200 psi
n = 10

Standard Plan Sheet No.
Detail No.



PILE WELDING DETAIL - BUTT JOINTS

Notes:
1. Single Vee-Groove and Square Groove permitted for all positions.
2. Single Bevel-Groove permitted for horizontal joints only.

No Changes
AS BUILT
C: J. Wheeler nd 6-80
CO: 170504
DATE 4-4-80

DESIGN	By A. Stroeman	Checked R. Miller	State of CALIFORNIA DEPARTMENT OF TRANSPORTATION	BRIDGE DEPARTMENT DESIGN SECTION	BRIDGE No. 56-680 R/L	TEMESCAL WASH BRIDGE
DETAILS	By J. Hinton 12-77	Checked R. Miller		PROJECT ENGINEER R. Miller	POST MILE R 28.1	DECK CONTOURS
QUANTITIES	By [illegible] 12/77	Checked R. Kuntz				SHEET 2 OF 13

ORIGINAL SCALE IN INCHES FOR REDUCED PLANS 0 1 2 3 — CU WO — Disregard prints bearing earlier revision dates → REVISION DATES (PRELIMINARY STAGE ONLY)

172

AS BUILT PLANS
Contract No. 08-170504
Date Completed 4-7-80
Document No.

I HEREBY CERTIFY THAT THIS IS A TRUE AND ACCURATE COPY OF THE ABOVE DOCUMENT TAKEN UNDER MY DIRECTION AND CONTROL ON THIS DATE IN SACRAMENTO, CALIFORNIA PURSUANT TO AUTHORIZATION BY THE DIRECTOR OF TRANSPORTATION.

DATE 7-16-80 SIGNATURE Joseph M Costa TITLE SUPERVISOR OF MICROFILM SERVICES

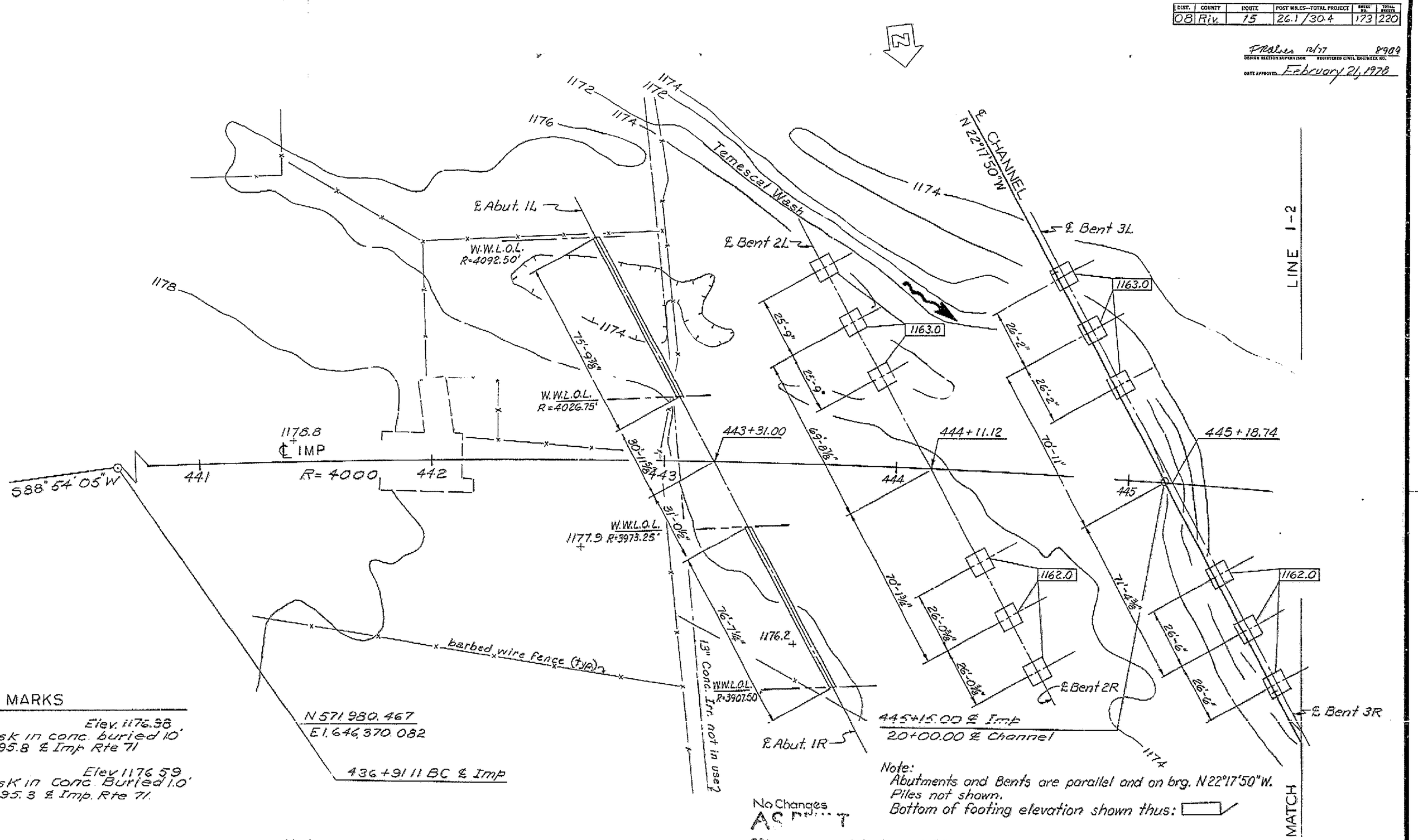
MICROFILM - STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION - MICROFILM

DIST.	COUNTY	ROUTE	POST MILES—TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
08	Riv.	15	26.1/30.4	173	220

F Walker 12/77 — DESIGN SECTION SUPERVISOR

8909 — REGISTERED CIVIL ENGINEER NO.

DATE APPROVED: February 21, 1978



BENCH MARKS

B.M.# 45-B-71 Elev. 1176.38
Brass Disk in conc. buried 10'
159.9' Lt. 441+95.8 ℄ Imp. Rte 71

B.M.# 45-A-71 Elev. 1176.59
Brass Disk in conc. Buried 1.0'
224.4 Rt. 442+95.3 ℄ Imp. Rte 71.

Note:
Abutments and Bents are parallel and on brg. N22°17'50"W.
Piles not shown.
Bottom of footing elevation shown thus: ▭

℄ Channel revised 3-20-72 R.T.

Notes:
†Denotes Spot Elev
Underground Utilities are as shown on District Bridge Site Map.

CURVE DATA
R=4000
Δ=39°07'00"
T=1,421.059
L=2,730.859
N 575 979.732
E 1,646,293.389

No Changes
AS BUILT
CC J. Wheeler nd 6-80
CC 170504
DATE 4-4-80

SCALE 1"=20'
LEVEL DATUM
FOR ALINEMENT TIES SEE
CONTOURS AS OF
UTILITIES AS OF
SITE PLAN DISTRICT DATA
BY R. White DATE 11-24-71
DRAWN BY R.A. Peterson DATE 11-24-71
CHECKED BY H.R. Aguilera DATE 11-24-71

BRIDGE DEPARTMENT
DESIGN SECTION 8
Project Engineer R.L. Miller
DESIGN by R. Strumm
Checked R.L. Miller
DETAILS by R. Svoboda 8-72
Checked R.L. Miller
QUANTITIES by 100 percheck 12/77
Checked R. Kuwata

STATE OF CALIFORNIA
TRANSPORTATION AGENCY
DEPARTMENT OF PUBLIC WORKS
DIVISION OF HIGHWAYS

TEMESCAL WASH BRIDGE

FOUNDATION PLAN NO. 1

BRIDGE NO.	POST MILE	WO CU	SHEET	OF
56-680 R/L	R28.1		2	13

Discard prints bearing earlier revision dates →

REVISION DATES	(PRELIMINARY PLANS ONLY)						
7/15/80	9/5/80	9/22/80					

173

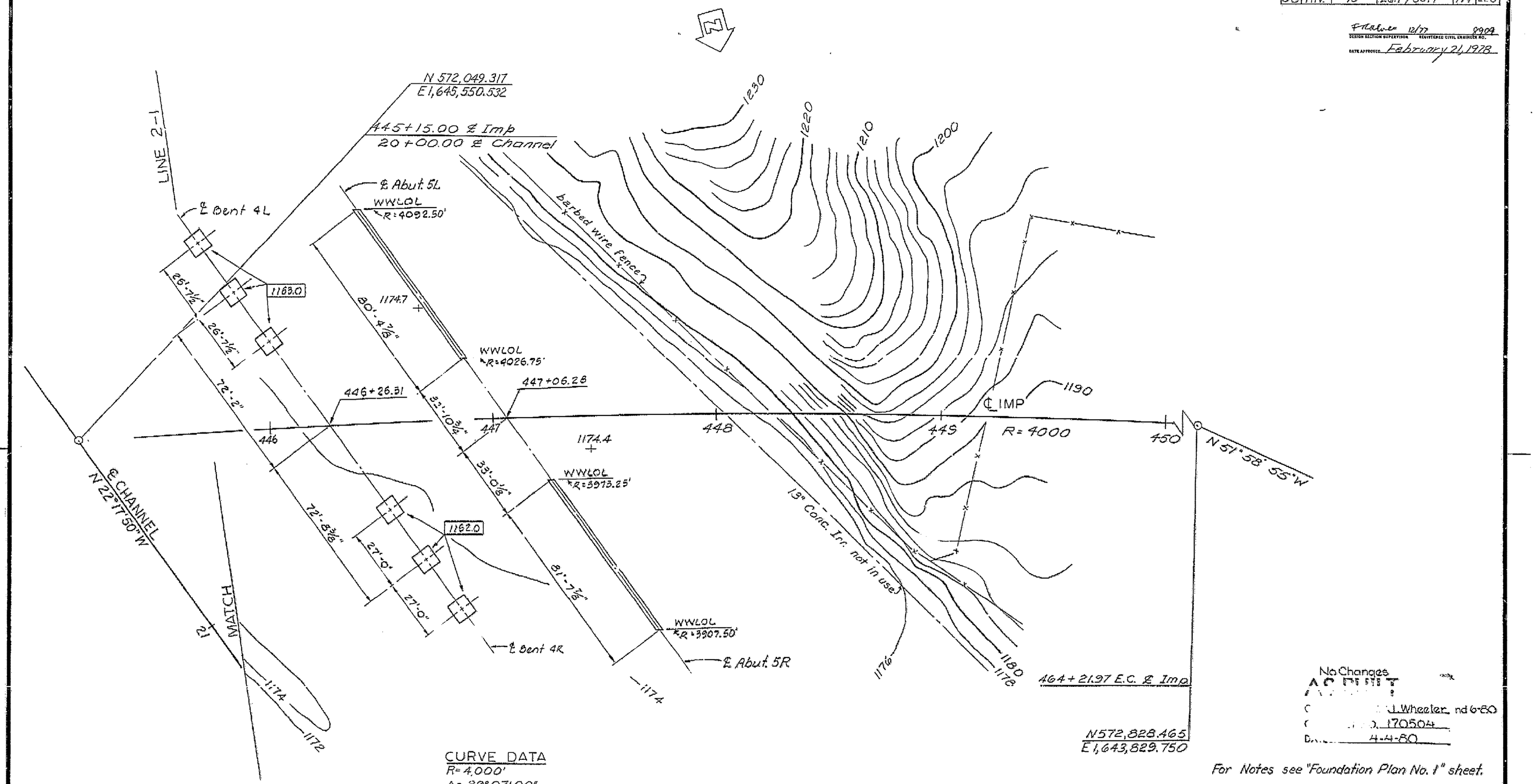
AS BUILT PLANS
Contract No. 08-170504
Date Completed 4-7-80
Document No.

I HEREBY CERTIFY THAT THIS IS A TRUE AND ACCURATE COPY OF THE ABOVE DOCUMENT TAKEN UNDER MY DIRECTION AND CONTROL ON THIS DATE IN SACRAMENTO, CALIFORNIA PURSUANT TO AUTHORIZATION BY THE DIRECTOR OF TRANSPORTATION.

DATE 7-16-80 SIGNATURE Joseph M Cota TITLE SUPERVISOR OF MICROFILM SERVICES

DIST.	COUNTY	ROUTE	POST MILES—TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
08	Riv.	15	26.1/30.4	174	220

Prelim 12/77 8909
SECTION SUPERVISOR REGISTERED CIVIL ENGINEER NO.
DATE APPROVED February 21, 1978



CURVE DATA
R= 4,000'
Δ= 39°07'00"
T= 1,421.059'
L= 2,730.859'
N575,979.732
E 1,646,293.389

℄ Channel revised 3-20-72 R.T.

SCALE 1" = 20'
LEVEL DATUM
FOR ALINEMENT TIES SEE
CONTOURS AS OF
UTILITIES AS OF
SITE PLAN DISTRICT DATA
BY L. C. Ashton DATE 11-24-71
DRAWN BY R. A. Petersen DATE 11-24-71
CHECKED BY H. R. Marrison DATE 11-24-71

BENCH MARKS
See "Foundation Plan No. 1" sheet.

NOTES
+ Denotes spot elevation
Underground Utilities are as shown on District Bridge Site Map.

No Changes
AS BUILT
C J. Wheeler nd 6-80
C 170504
D 4-4-80

For Notes see "Foundation Plan No. 1" sheet.

BRIDGE DEPARTMENT
DESIGN SECTION 8
Project Engineer R. Miller
DESIGN By [illegible] Checked R. Miller
DETAILS By [illegible] 8-72 Checked R. Miller
QUANTITIES By [illegible] 12,'77 Checked [illegible]

STATE OF CALIFORNIA
TRANSPORTATION AGENCY
DEPARTMENT OF PUBLIC WORKS
DIVISION OF HIGHWAYS

TEMESCAL WASH BRIDGE

FOUNDATION PLAN NO. 2

BRIDGE NO. 56-680 R/L	POST MILE R 28.1	WO CU	SHEET 4	OF 13

Disregard prints bearing earlier revision dates →

REVISION DATES (PRELIM. ONLY STAGE ONLY)
11-24-71 | 12-15-71 | 12-27-71

174

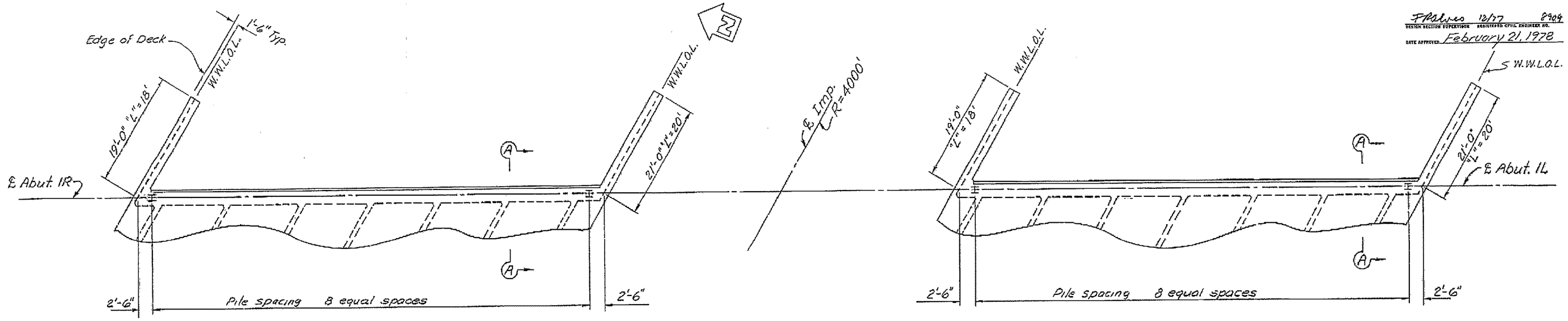
AS BUILT PLANS
Contract No. 08-170504
Date Completed 4-7-80
Document No.

I HEREBY CERTIFY THAT THIS IS A TRUE AND ACCURATE COPY OF THE ABOVE DOCUMENT TAKEN UNDER MY DIRECTION AND CONTROL ON THIS DATE IN SACRAMENTO, CALIFORNIA PURSUANT TO AUTHORIZATION BY THE DIRECTOR OF TRANSPORTATION.
DATE 7-16-80 SIGNATURE Joseph M Costa TITLE SUPERVISOR OF MICROFILM SERVICES

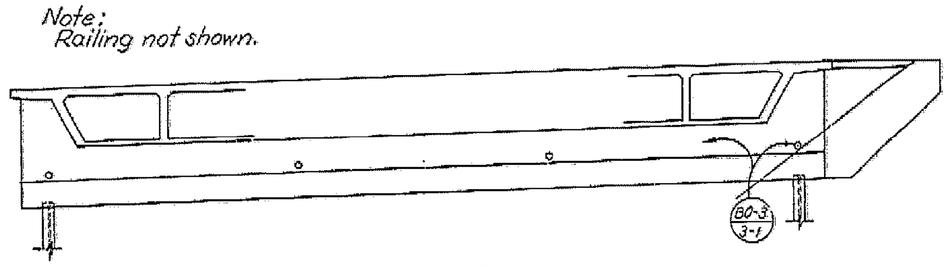
SCALE 1"= 50' MICROFILM - STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION - MICROFILM
SCALE 1"= 20' MICROFILM - STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION - MICROFILM

DIST.	COUNTY	ROUTE	POST MILES—TOTAL PROJECT	Sheet No.	Total Sheets
08	Riv	15	26.1/30.4	175	220

F Mathes 12/17 8904
DESIGN SECTION SUPERVISOR — REGISTERED CIVIL ENGINEER NO.
DATE APPROVED February 21, 1978



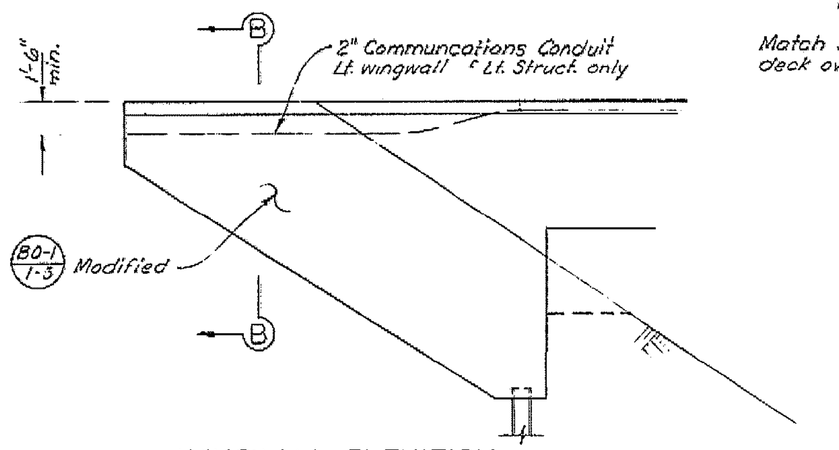
PLAN
1/8"=1'-0"



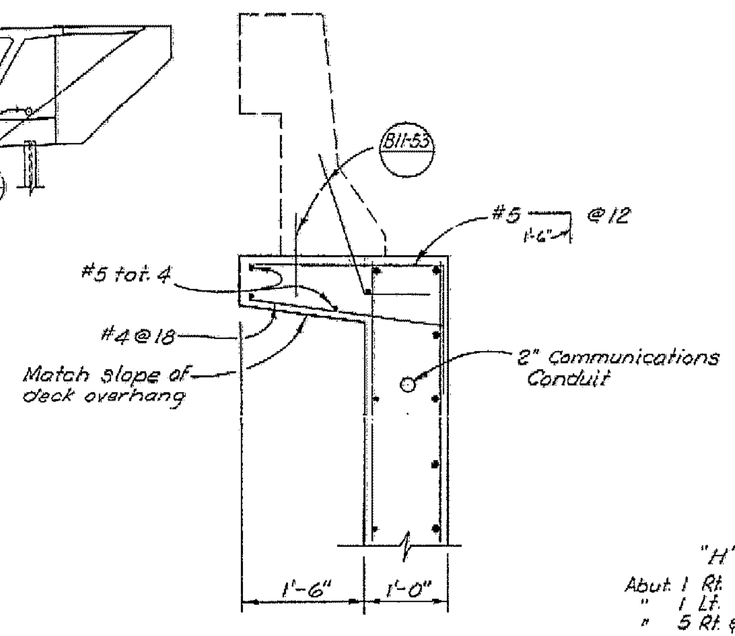
Note:
Railing not shown.

Note:
All piles not shown

ELEVATION
1/8"=1'-0"



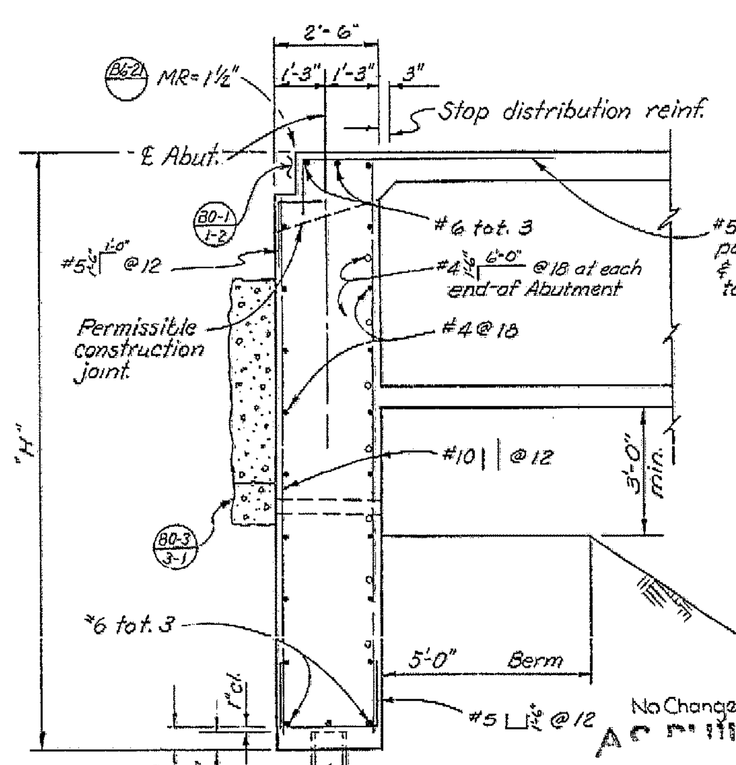
WINGWALL ELEVATION
1/4"=1'-0"



SECTION B-B
1"=1'-0"

for details not shown see B0-1 1-5

"H"
Abut. 1 Rt. = 15'-6"
" 1 Lt. = 14'-4"
" 5 Rt. & Lt. = 14'-0"



SECTION A-A
½"=1'-0"

No Changes
AS BUILT
J. Wheeler rd 6-80
170504
4-4-80

BRIDGE DEPARTMENT
DESIGN SECTION
Project Engineer T.E. Mellon
DESIGN by A. Hamamoto
Checked T.E. Mellon
DETAILS by W. Lumbatis 7-72
Checked T.E. Mellon
QUANTITIES by W. Lumbatis 12/77
Checked R. Kuroko

STATE OF CALIFORNIA
TRANSPORTATION AGENCY
DEPARTMENT OF PUBLIC WORKS
DIVISION OF HIGHWAYS

TEMESCAL WASH BRIDGE

ABUTMENT 1

BRIDGE NO. 56-680 R/L | POST MILE 28.1 | W.O. CU | SHEET 5 | OF 13

REVISION DATES (PRELIMINARY STAGE ONLY)
7-1-80 | 5-6-80 | 4-4-80 | 3-24-78

ORIGINAL SCALE IN INCHES 0 1 2 3 4 | WO CU

Disregard prints bearing earlier revision dates →

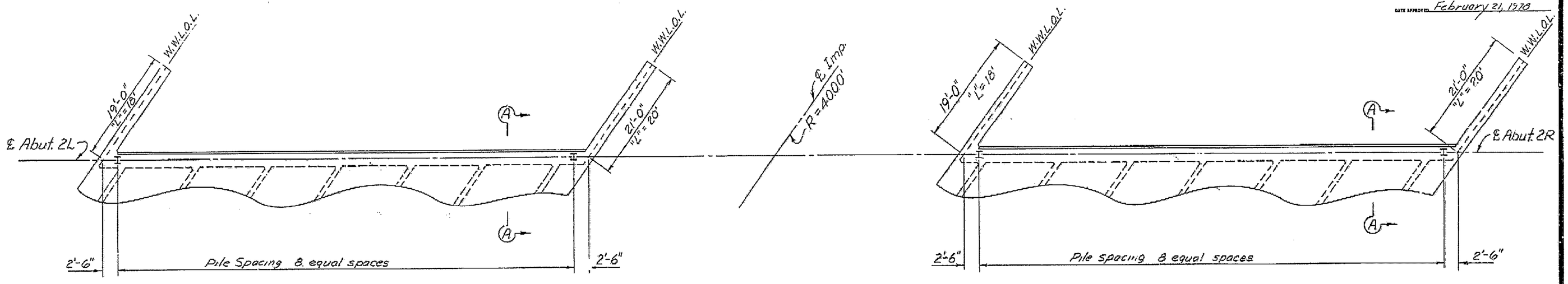
175

AS BUILT PLANS
Contract No. 08-170504
Date Completed 4-7-80
Document No.

I HEREBY CERTIFY THAT THIS IS A TRUE AND ACCURATE COPY OF THE ABOVE DOCUMENT TAKEN UNDER MY DIRECTION AND CONTROL ON THIS DATE IN SACRAMENTO, CALIFORNIA PURSUANT TO AUTHORIZATION BY THE DIRECTOR OF TRANSPORTATION.
DATE 7-16-80 | SIGNATURE Joseph M Lota | TITLE SUPERVISOR OF MICROFILM SERVICES

DIST.	COUNTY	ROUTE	POST MILES—TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
08	Riv.	15	26.1 / 30.4	176	220

Frahms 12/77 8909
DESIGN SECTION SUPERVISOR REGISTERED CIVIL ENGINEER NO.
DATE APPROVED February 21, 1978



PLAN
1/8"=1'-0"

Note:
For Elevation view and "Section A-A" see "Abutment 1" sheet.

No Changes
AS BUILT
C J. Wheeler nd 6-80
C 170504
DATE 4-4-80

BRIDGE DEPARTMENT DESIGN SECTION		
Project Engineer	F.C. Mello	
DESIGN	By A. Stevenson	
	Checked F.C. Mello	
DETAILS	By Ted Sackosky 7-72	
	Checked F.C. Mello	
QUANTITIES	By Darrell Wilson 12/77	
	Checked K. Kurko	

STATE OF CALIFORNIA
TRANSPORTATION AGENCY
DEPARTMENT OF PUBLIC WORKS
DIVISION OF HIGHWAYS

TEMESCAL WASH BRIDGE

ABUTMENT 5

BRIDGE NO. 56-680 R/L | POST MILE 28.1 | WO CU | SHEET 6 | OF 13

REVISION DATES (PRELIMINARY STAGE ONLY)

ORIGINAL SCALE IN INCHES 0 1 2 3 4

Disregard prints bearing earlier revision dates →

176

AS BUILT PLANS
Contract No. 08-170504
Date Completed 4-7-80
Document No.

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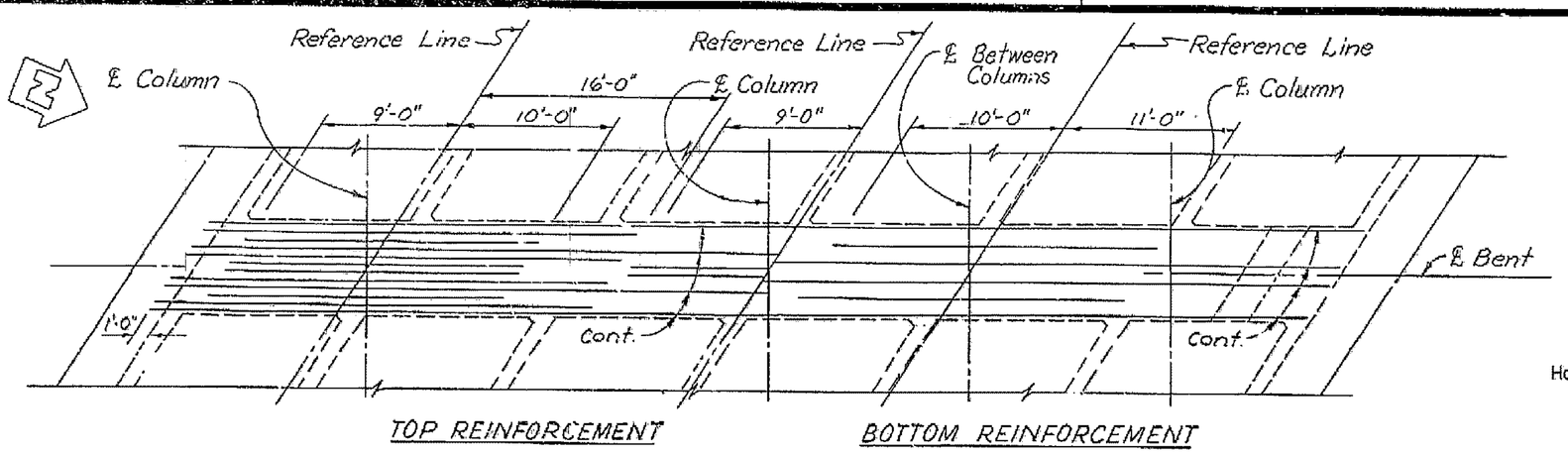
DATE 7-16-80 SIGNATURE Joseph M Costa TITLE SUPERVISOR OF MICROFILM SERVICES

DIST.	COUNTY	ROUTE	POST MILES—TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
08	Riv.	15	26.1/30.4	177	220

Flatness 12/77 8709
STATE ENGINEER REGISTRATION NUMBER

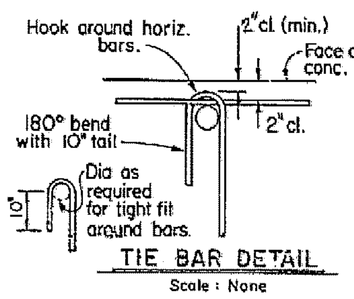
DATE APPROVED February 21, 1978



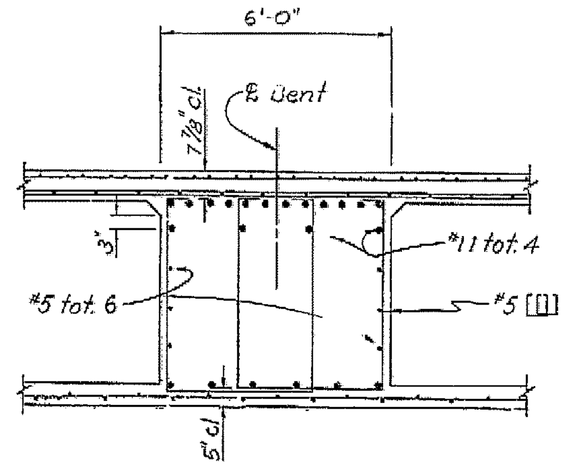
TOP REINFORCEMENT BOTTOM REINFORCEMENT

PLAN OF CAP
3/16"=1'-0"

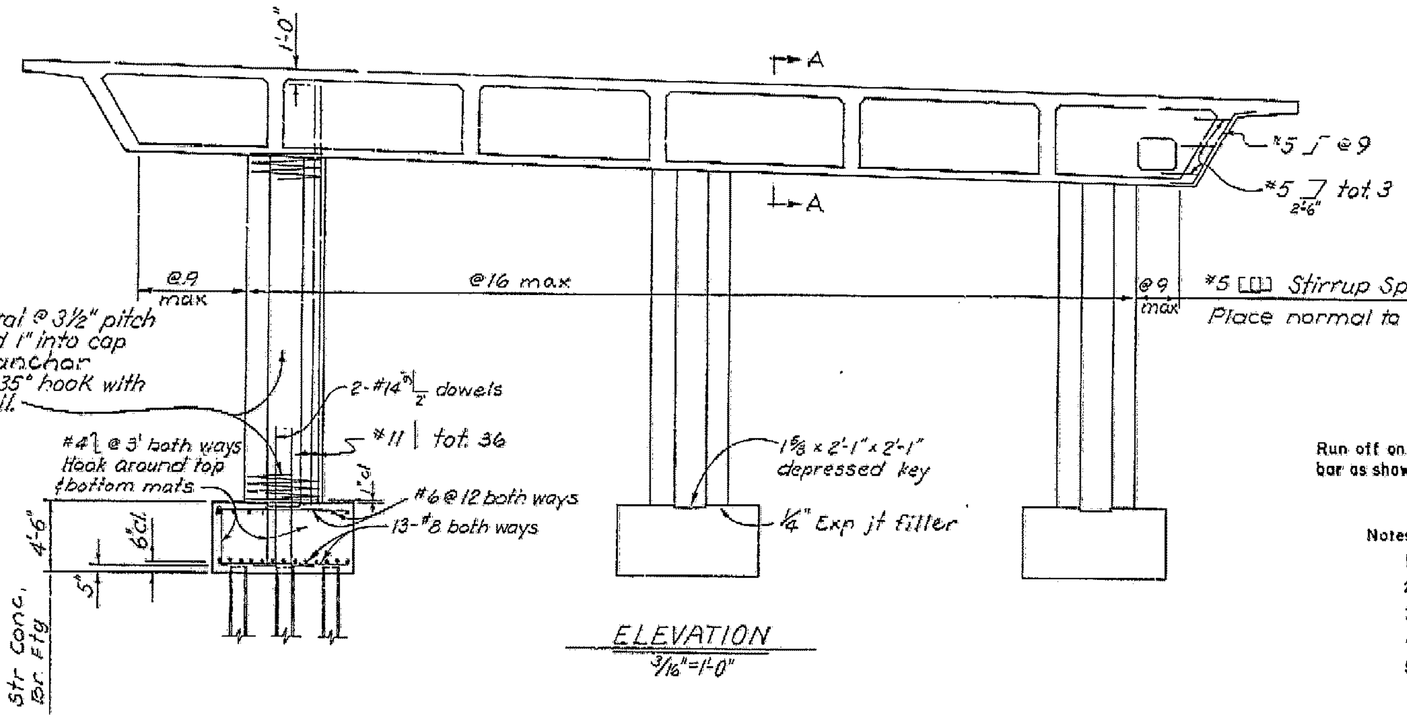
Note:
Top & bottom reinf. sym about ℄ interior column.



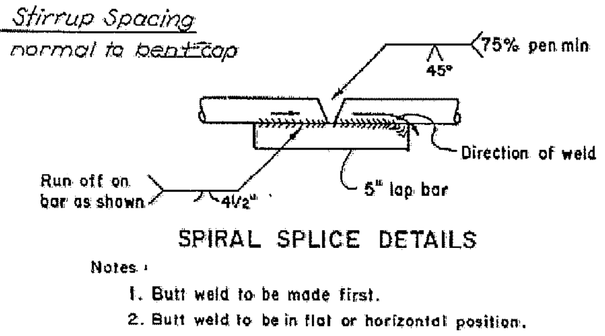
TIE BAR DETAIL
Scale : None



SECTION A A
1/2"=1'-0"

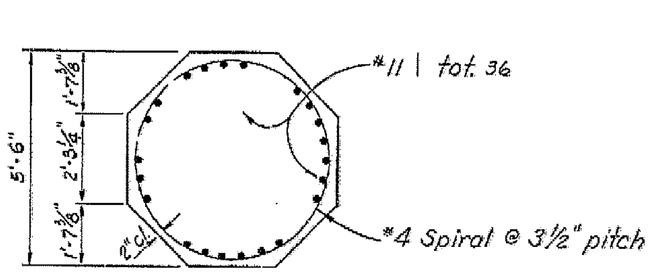


ELEVATION
3/16"=1'-0"

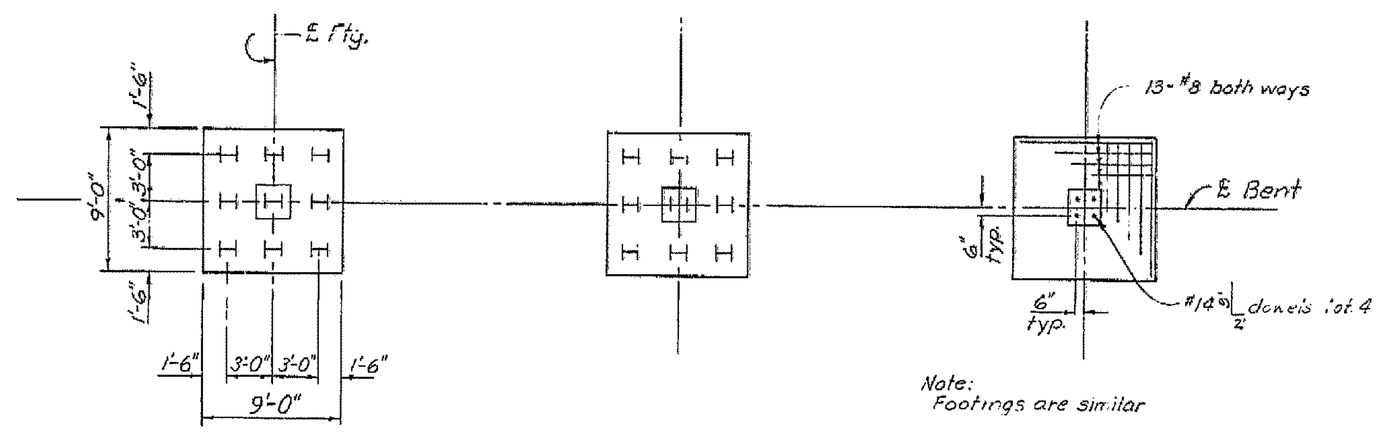


SPIRAL SPLICE DETAILS

Notes :
1. Butt weld to be made first.
2. Butt weld to be in flat or horizontal position.
3. Lap bar centered on splice.
4. Flare weld to be made in direction shown.
5. Lap bar equal in size to spiral bar.



SECTION B-B
1/2"=1'-0"



Note:
Footings are similar

FOOTING PLAN
3/16"=1'-0"

Note:
All bars #11 unless otherwise noted.
Bent 3R shown, other bents are similar.

No Changes
AS BUILT
J. Wheeler nd 6-80
C. . . . J. 170504
DATE 4-4-80

BRIDGE DEPARTMENT
DESIGN SECTION 8
Project Engineer E.C. Miller
DESIGN by A. Sfrontzos
Checked E.C. Miller
DETAILS by Rob Sandoval 8-72
Checked E.C. Miller
QUANTITIES by Jerry Wright 12/77
Checked R. Kuroda

STATE OF CALIFORNIA
TRANSPORTATION AGENCY
DEPARTMENT OF PUBLIC WORKS
DIVISION OF HIGHWAYS

TEMESCAL WASH BRIDGE

BENTS

BRIDGE NO. 56-680 R/L | POST MILE R 28.1 | WO CU | SHEET 7 | OF 13

REVISION DATES (PRELIMINARY STAGE ONLY)
7/4/78 | 8/4/78 | 10/2/78

ORIGINAL SCALE IN INCHES 0 1 2 3 4

Disregard prints bearing earlier revision dates →

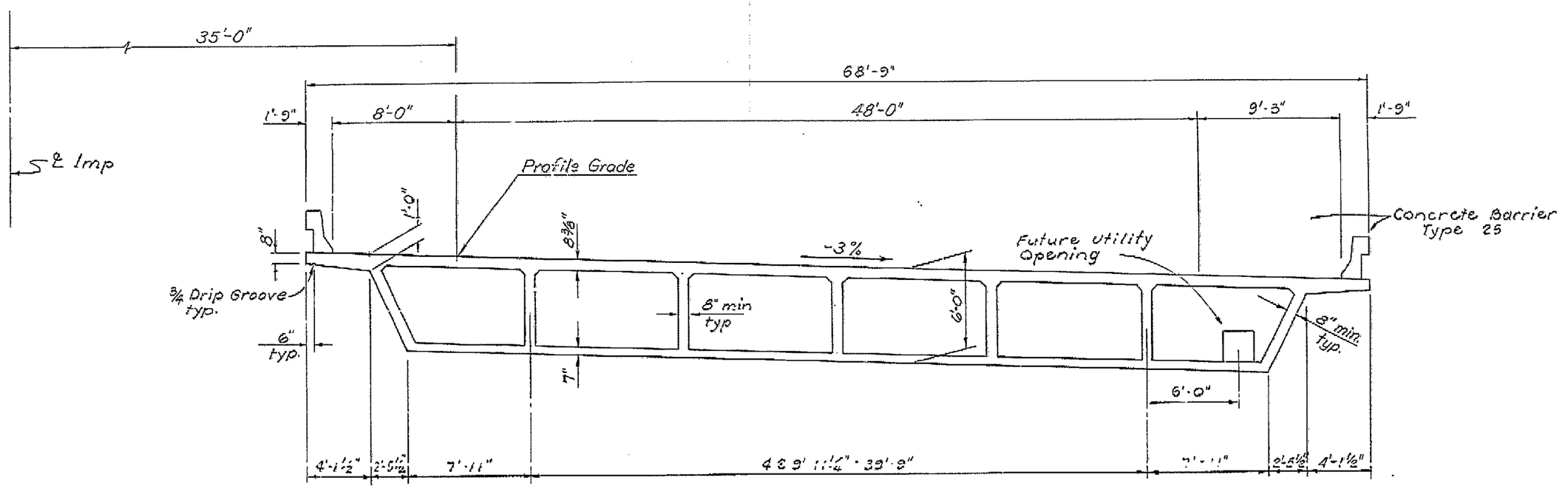
177

AS BUILT PLANS
Contract No. 08-170504
Date Completed 4-7-80
Document No.

I HEREBY CERTIFY THAT THIS IS A TRUE AND ACCURATE COPY OF THE ABOVE DOCUMENT TAKEN UNDER MY DIRECTION AND CONTROL ON THIS DATE IN SACRAMENTO, CALIFORNIA PURSUANT TO AUTHORIZATION BY THE DIRECTOR OF TRANSPORTATION.
DATE 7-16-80 SIGNATURE Joseph M Costa TITLE SUPERVISOR OF MICROFILM SERVICES

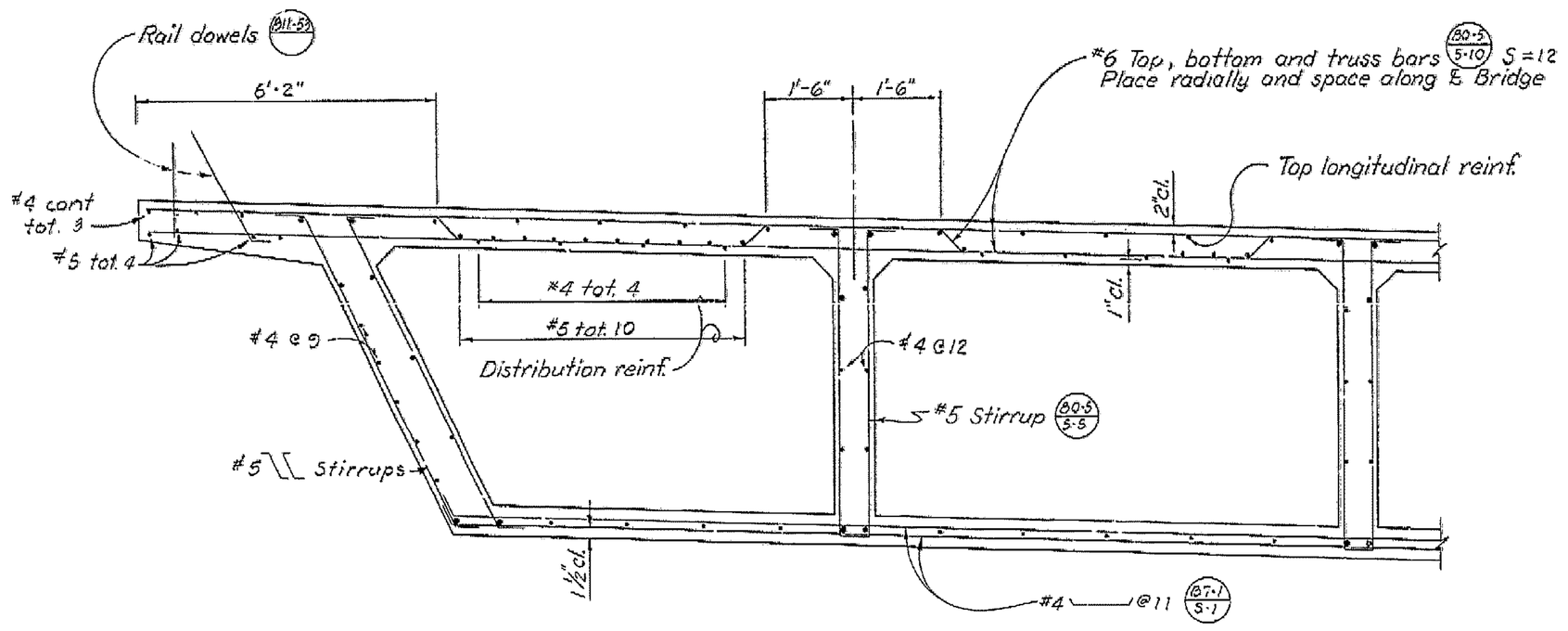
DIST.	COUNTY	ROUTE	POST MILES—TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
08	Riv.	15	26.1/30.4	178	220

Fralen 12/77 8309
DESIGN SECTION SUPERVISOR REGISTERED CIVIL ENGINEER NO.
DATE APPROVED February 21, 1978



TYPICAL SECTION
1/4"=1'-0"

Note:
Right bridge shown,
left bridge similar.



PART TYPICAL SECTION (87-1 B-1)
No Scale

No Changes
AS BUILT
CONTRACT NO. 170504
DATE 4-4-80
J. Wheeler nd 6-80

BRIDGE DEPARTMENT DESIGN SECTION		
Project Engineer	F. M. Miller	
DESIGN	By F. Stevens	
	Checked F. M. Miller	
DETAILS	By W. Lindsay 7-72	
	Checked F. M. Miller	
QUANTITIES	By Joseph 12/77	
	Checked R. Kuntz	

STATE OF CALIFORNIA
TRANSPORTATION AGENCY
DEPARTMENT OF PUBLIC WORKS
DIVISION OF HIGHWAYS

TEMESCAL WASH BRIDGE

TYPICAL SECTION

BRIDGE NO.	POST MILE	WO	SHEET	OF
56-680 R/L	R28.1	CU	8	13

ORIGINAL SCALE IN INCHES 0 1 2 3 4 — WO CIJ
Disregard prints bearing earlier revision dates →
REVISION DATES (PRELIMINARY STAGE ONLY)

178

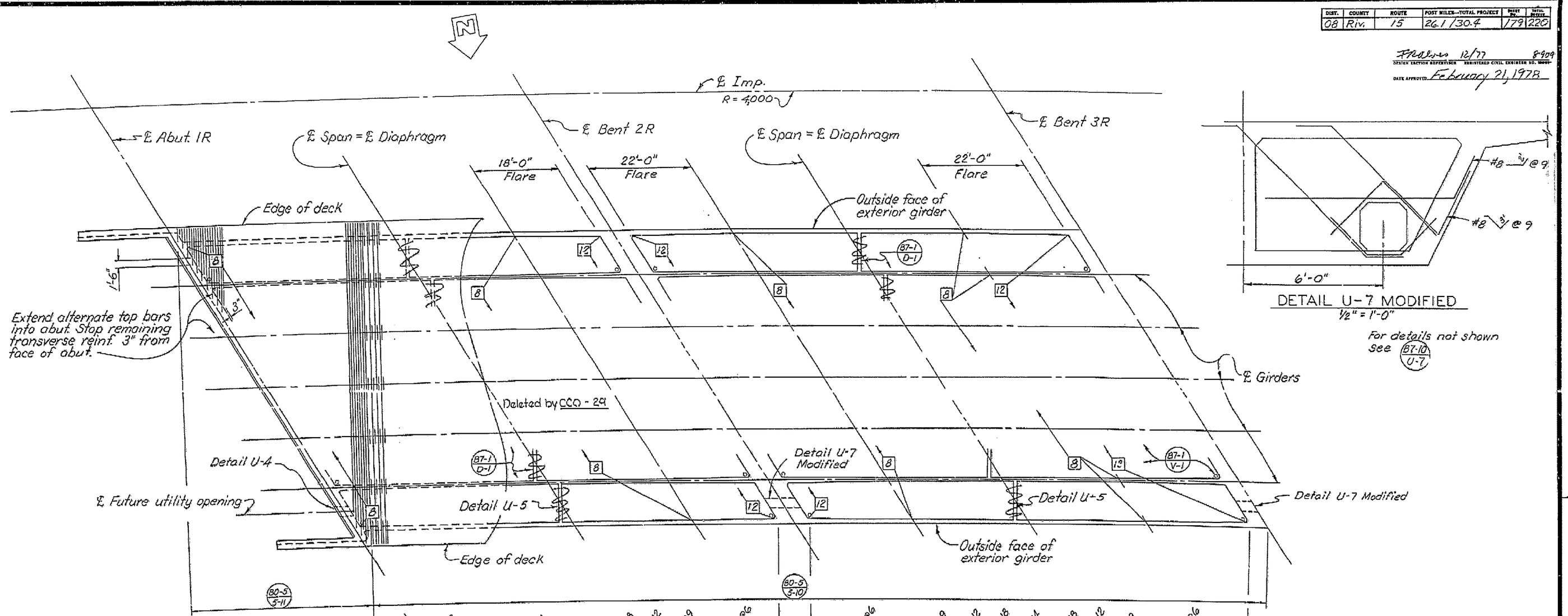
AS BUILT PLANS
Contract No. 08-170504
Date Completed 4-7-80
Document No.

I HEREBY CERTIFY THAT THIS IS A TRUE AND ACCURATE COPY OF THE ABOVE DOCUMENT TAKEN UNDER MY DIRECTION AND CONTROL ON THIS DATE IN SACRAMENTO, CALIFORNIA PURSUANT TO AUTHORIZATION BY THE DIRECTOR OF TRANSPORTATION.
DATE 7-16-80 SIGNATURE Joseph M Lata TITLE SUPERVISOR OF MICROFILM SERVICES

MICROFILM - STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION - MICROFILM SCALE 1"= 50' SCALE 1"= 20' MICROFILM - STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION - MICROFILM SCALE 1"=20'

DIST.	COUNTY	ROUTE	POST MILES—TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
08	Riv.	15	26.1/30.4	179	220

Plans 12/77 8-909
DESIGN SECTION REGISTERED CIVIL ENGINEER
DATE APPROVED February 21, 1978



Typ. all bents

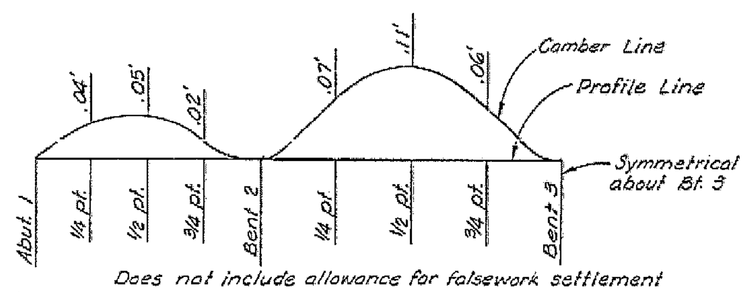
PLAN
1" = 10'

Note:
Right Br. shown, Left Br. similar

Girder stem width in inches shown thus □

DETAIL U-7 MODIFIED
1/2" = 1'-0"

For details not shown see B7-10 U-7



Does not include allowance for falsework settlement

CAMBER DIAGRAM
No Scale
Lt. & Rt. Structures

J. Wheeler nd 6-80
170504
4-4-80

BRIDGE DEPARTMENT
DESIGN SECTION 8
Project Engineer R. E. Miller
DESIGN by A. L. Simmons Checked R. E. Miller
DETAILS by W. Swanson 7-72 Checked R. E. Miller
QUANTITIES by Steven Lay 12/77 Checked R. Lewis

STATE OF CALIFORNIA
TRANSPORTATION AGENCY
DEPARTMENT OF PUBLIC WORKS
DIVISION OF HIGHWAYS

TEMESCAL WASH BRIDGE

GIRDER LAYOUT NO. 1

BRIDGE NO. 56-680 R/L | POST MILE R28.1 | WO CU | SHEET 9 | OF 13

ORIGINAL SCALE IN INCHES 0 1 2 3 4

Disregard prints bearing earlier revision dates

REVISION DATES (PRELIMINARY STAGE ONLY)

179

AS BUILT PLANS
Contract No. 08-170504
Date Completed 4-7-80
Document No.

I HEREBY CERTIFY THAT THIS IS A TRUE AND ACCURATE COPY OF THE ABOVE DOCUMENT TAKEN UNDER MY DIRECTION AND CONTROL ON THIS DATE IN SACRAMENTO, CALIFORNIA PURSUANT TO AUTHORIZATION BY THE DIRECTOR OF TRANSPORTATION.

DATE 7-16-80 SIGNATURE Joseph M Lata TITLE SUPERVISOR OF MICROFILM SERVICES

MICROFILM - STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION - MICROFILM

SCALE 1"= 50' 0 50 100 200 50 300 50 400 50 500 50 600 50 700

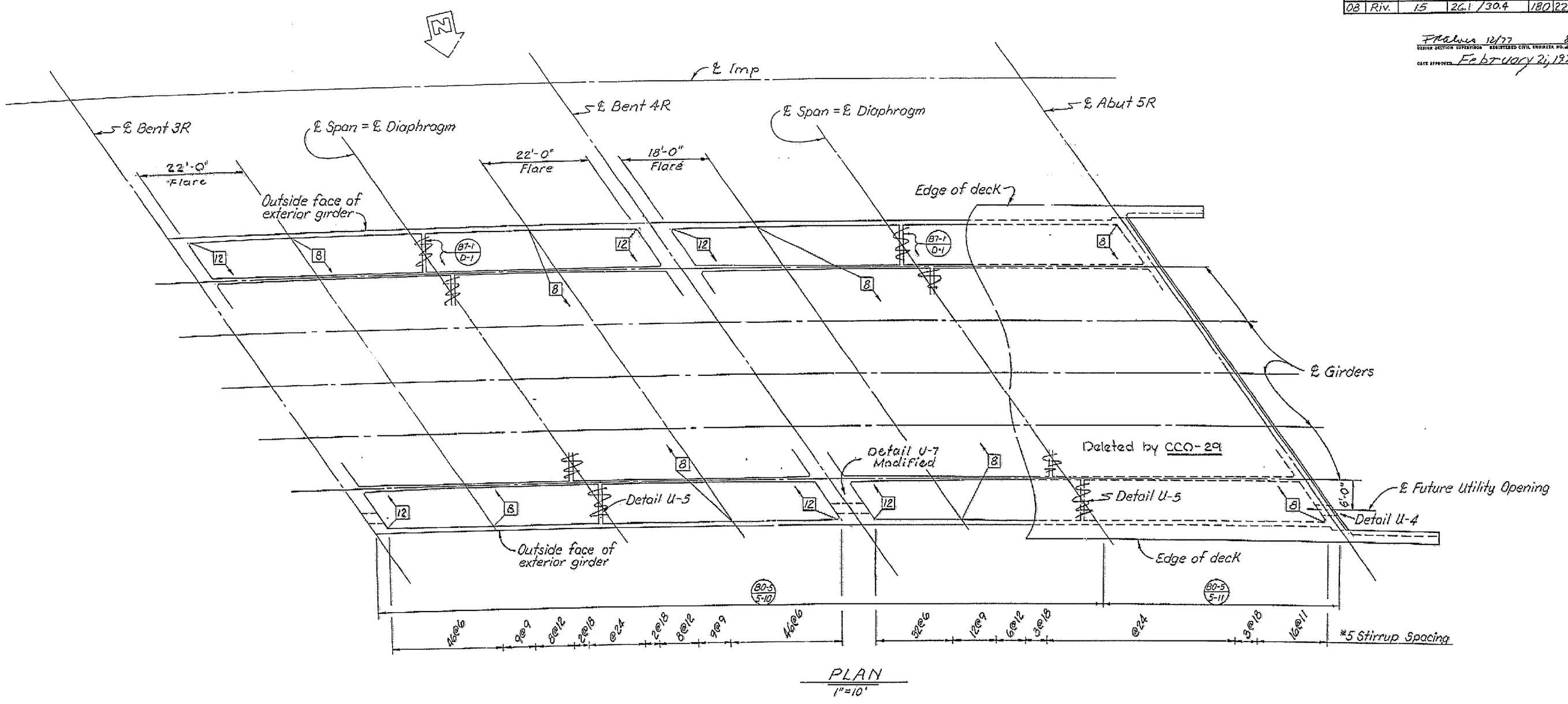
SCALE 1"= 20' 0 10 20 30 40 50 60 70 80 90 100

SCALE 1"= 20' 0 10 20 30 40 50 60 70 80 90 100 200

SCALE 1"= 20' 0 10 20 30 40 50 60 70 80 90 100 300

DIST.	COUNTY	ROUTE	POST MILES—TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
08	Riv.	15	26.1 / 30.4	180	220

Plotted 12/27 8:09
DESIGN SECTION SUPERVISOR REGISTERED CIVIL ENGINEER NO.
DATE APPROVED February 24, 1978



PLAN
1"=10'

AS BUILT
nd 6-80
J. Wheeler
...170504
DATE 4-4-80

BRIDGE DEPARTMENT
DESIGN SECTION 8
Project Engineer R. Mellon
DESIGN By A. Sh... Checked R. Mellon
DETAILS By Rhodes 7-72 Checked R. Mellon
QUANTITIES By Louis Phyu 12/77 Checked R. Rhodes

STATE OF CALIFORNIA
TRANSPORTATION AGENCY
DEPARTMENT OF PUBLIC WORKS
DIVISION OF HIGHWAYS

TEMESCAL WASH BRIDGE

GIRDER LAYOUT NO. 2

BRIDGE NO. 56-680 R/L | POST MILE R28.1 | WO CU | SHEET 10 | OF 13

REVISION DATES (PRELIMINARY STAGE ONLY)
7/16/80 S. S.

180

ORIGINAL SCALE IN INCHES 0 1 2 3 4 | WO CU

Disregard prints bearing earlier revision dates →

AS BUILT PLANS
Contract No. 08-170504
Date Completed 4-7-80
Document No.

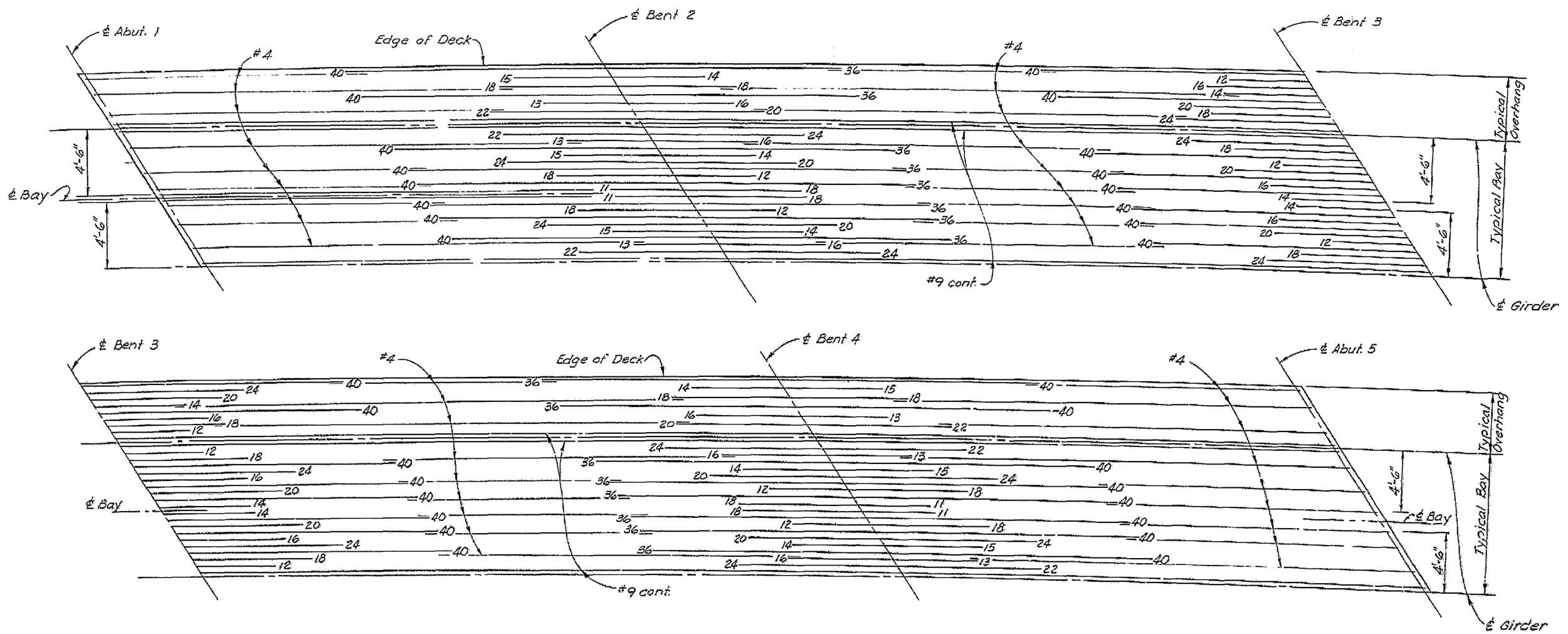
I HEREBY CERTIFY THAT THIS IS A TRUE AND ACCURATE COPY OF THE ABOVE DOCUMENT TAKEN UNDER MY DIRECTION AND CONTROL ON THIS DATE IN SACRAMENTO, CALIFORNIA PURSUANT TO AUTHORIZATION BY THE DIRECTOR OF TRANSPORTATION.
DATE 7-16-80 SIGNATURE Joseph M Costa TITLE SUPERVISOR OF MICROFILM SERVICES

MICROFILM - STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION - MICROFILM
SCALE 1"= 50' SCALE 1"= 50' SCALE 1"= 20' SCALE 1"= 20'

DIST.	COUNTY	ROUTE	POST MILES—TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
08	Riv	15	26.1/30.4	181	220

Plans 12/77 8909
DESIGN ENGINEER REGISTERED CIVIL ENGINEER NUMBER

DATE APPROVED February 26, 1978



Note:
All bars #9 except as noted.
Numbers at ends of bars indicate distance in feet from ℄ Bent.

TOP REINFORCEMENT
Vert. 1/4" = 1'-0"
Horiz. 1/8" = 1'-0"

AS BUILT
No Changes
nd 6-80
J. Wheeler
170504
DATE 4-4-80

DESIGN	By A. Hammon	Checked R.M. Mellon	State of CALIFORNIA DEPARTMENT OF TRANSPORTATION	STRUCTURES - DESIGN 8	BRIDGE NO. 56-680 R/L
DETAILS	By J. H. Eakes 9/77	Checked R.M. Mellon		PROJECT ENGINEER R.M. Mellon	POST MILE R 28.1
QUANTITIES	By Spreadsheet 12/77	Checked R Kuroko			

TEMESCAL WASH BRIDGE
TOP GIRDER REINFORCEMENT

ORIGINAL SCALE IN INCHES FOR REDUCED PLANS 0 1 2 3
CU WO
Disregard prints bearing earlier revision dates →
REVISION DATES (PRELIMINARY STAGE ONLY)
SHEET 11 OF 13

181

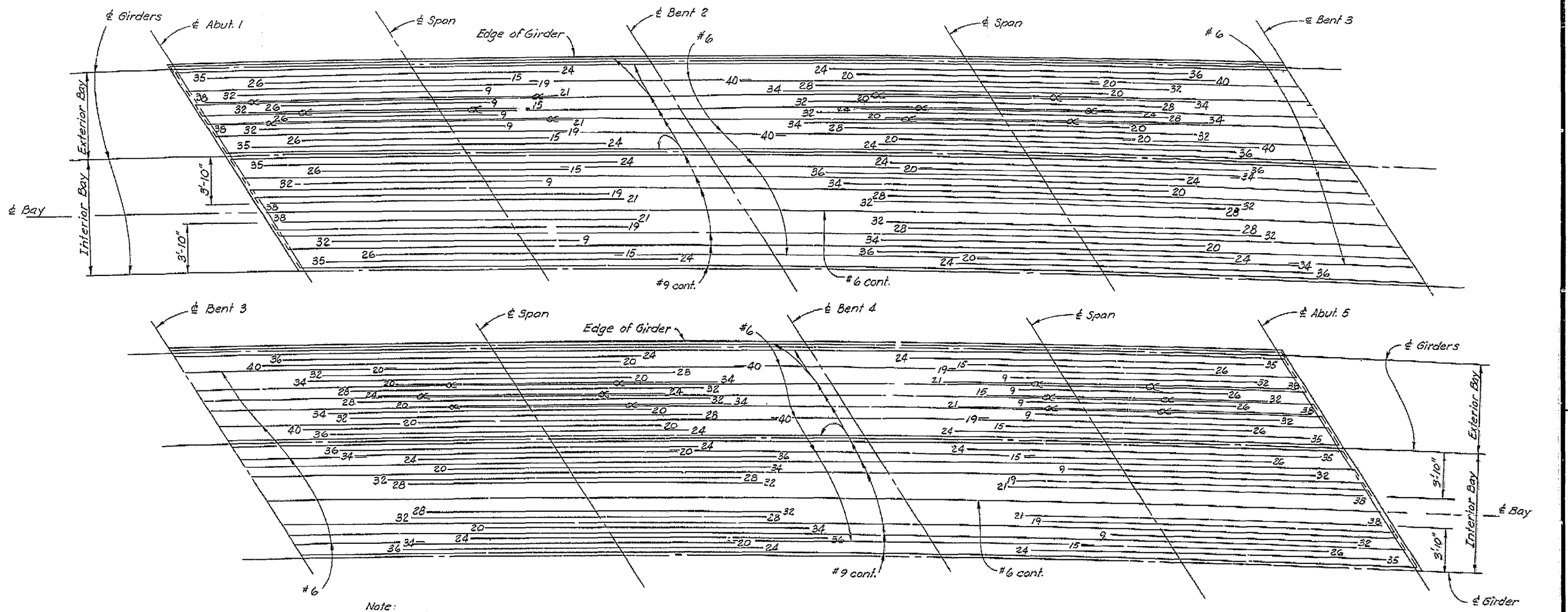
AS BUILT PLANS
Contract No. 08-170504
Date Completed 4-7-80
Document No.

I HEREBY CERTIFY THAT THIS IS A TRUE AND ACCURATE COPY OF THE ABOVE DOCUMENT TAKEN UNDER MY DIRECTION AND CONTROL ON THIS DATE IN SACRAMENTO, CALIFORNIA PURSUANT TO AUTHORIZATION BY THE DIRECTOR OF TRANSPORTATION.
DATE 7-16-80 SIGNATURE Joseph M Costa TITLE SUPERVISOR OF MICROFILM SERVICES

DIST.	COUNTY	ROUTE	POST MILES—TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
08	Riv	15	26.1/30.4	182	220

Plans 12/77 — 2909
DESIGN ENGINEER — REGISTERED CIVIL ENGINEER NUMBER

DATE APPROVED February 21, 1978



Note:
All bars #9 except as noted.
Numbers at ends of bars indicate distance in feet from ℄ Span.
Bundled bars shown thus ⊂⊂⊂

BOTTOM REINFORCEMENT
Vert. 1/4" = 1'-0"
Horiz. 1/8" = 1'-0"

No Changes
AS BUILT
C J. Wheeler nd 6-80
C 170504
DATE 4-4-80

DESIGN	By [illegible]	Checked R.M. Mellon	State of CALIFORNIA DEPARTMENT OF TRANSPORTATION	STRUCTURES - DESIGN	BRIDGE NO. 56-680 S/L	TEMESCAL WASH BRIDGE
DETAILS	By F.H. Eakes 9/77	Checked R.M. Mellon		PROJECT ENGINEER R. Mellon	POST MILE R23.1	BOTTOM GIRDER REINFORCEMENT
QUANTITIES	By [illegible] 12/77	Checked R. Kuroko				

182

05 0120

ORIGINAL SCALE IN INCHES FOR REDUCED PLANS 0 1 2 3

CU
WO

Disregard prints bearing earlier revision dates →

REVISION DATES (PRELIMINARY STAGE ONLY) 3/4/78 4/5/78

SHEET 12 OF 13

AS BUILT PLANS
Contract No. 08-170504
Date Completed 4-7-80
Document No.

I HEREBY CERTIFY THAT THIS IS A TRUE AND ACCURATE COPY OF THE ABOVE DOCUMENT TAKEN UNDER MY DIRECTION AND CONTROL ON THIS DATE IN SACRAMENTO, CALIFORNIA PURSUANT TO AUTHORIZATION BY THE DIRECTOR OF TRANSPORTATION.

DATE 7-16-80 SIGNATURE Joseph M Costa TITLE SUPERVISOR OF MICROFILM SERVICES

CAD-04-78

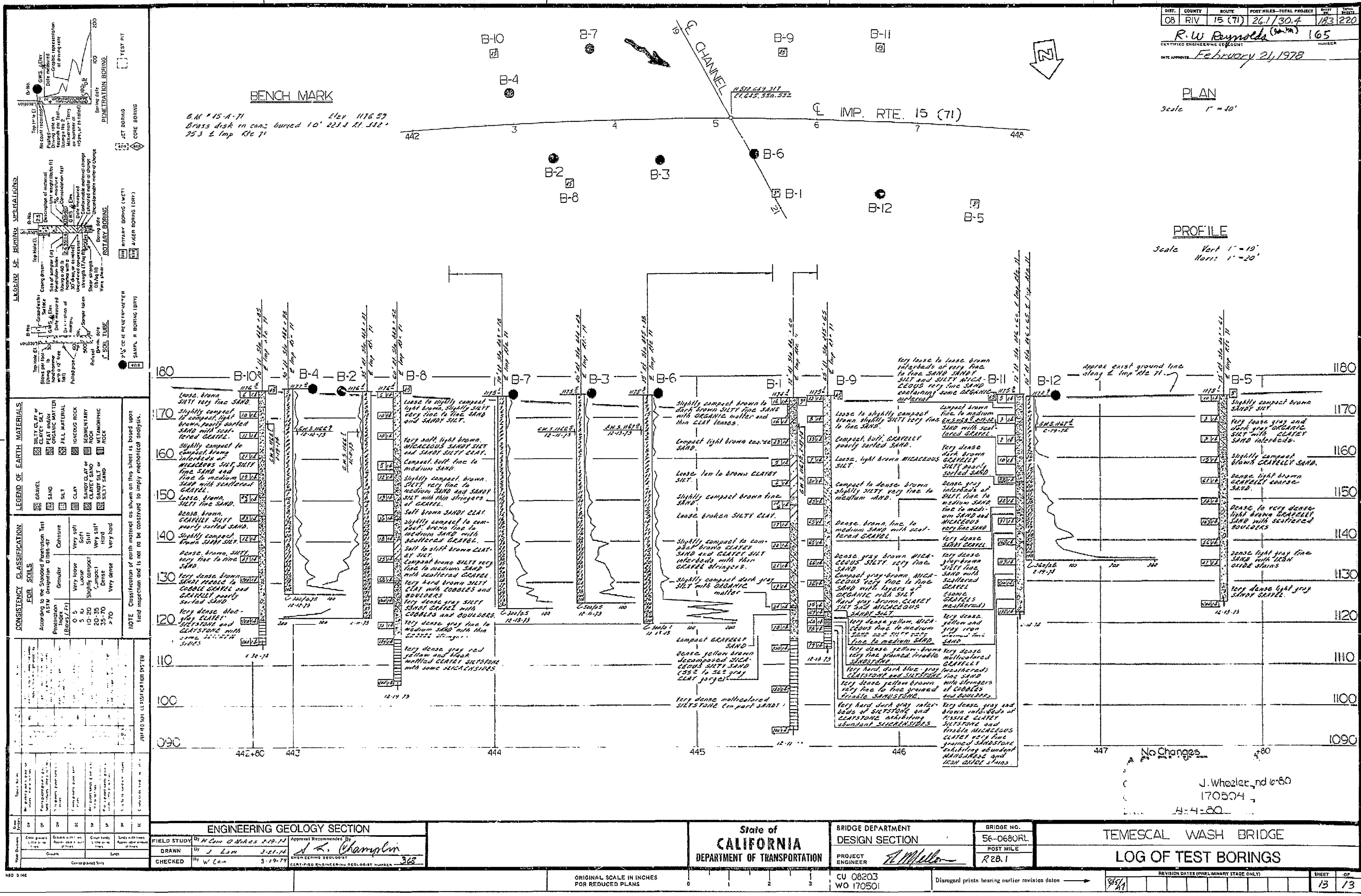
MICROFILM - STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION - MICROFILM

SCALE 1"=50' 0 200 400 600

SCALE 1"=20' 0 50 100

MICROFILM - STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION - MICROFILM

SCALE 1"=20' 50 200 300



AS BUILT PLANS
Contract No. 08-170504
Date Completed 4-7-80
Document No.

I HEREBY CERTIFY THAT THIS IS A TRUE AND ACCURATE COPY OF THE ABOVE DOCUMENT TAKEN UNDER MY DIRECTION AND CONTROL ON THIS DATE IN SACRAMENTO, CALIFORNIA PURSUANT TO AUTHORIZATION BY THE DIRECTOR OF TRANSPORTATION.

DATE 7-16-80 SIGNATURE Joseph M. Cota TITLE SUPERVISOR OF MICROFILM SERVICES

NOTES: (APPLY TO THIS SHEET ONLY)

Indicates limits of clean and treat bridge deck with high molecular weight methacrylate. Prior to bridge deck treatment remove unsound concrete and patch with rapid setting concrete.

Indicates location of existing joint seal removal and placement of new joint seal.

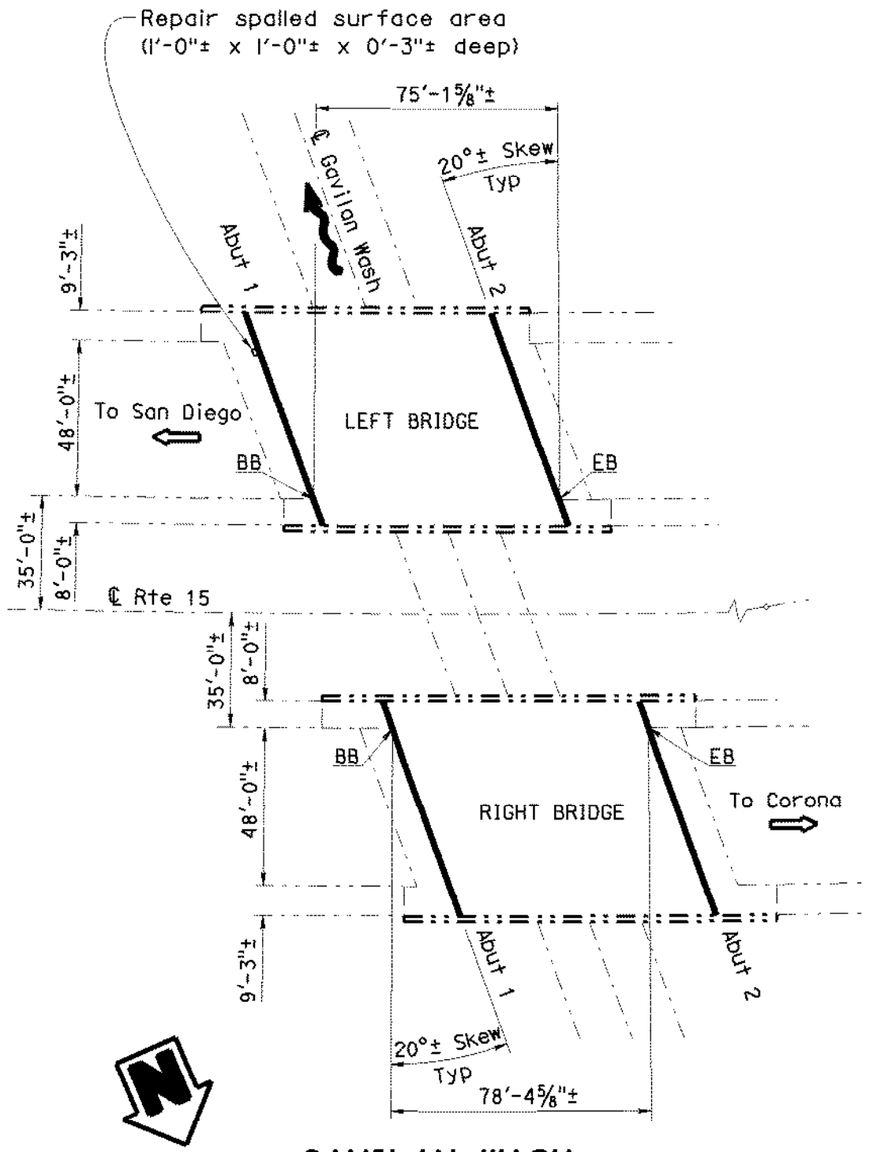
DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No	TOTAL SHEETS
08	Riv	15	2.9/51.9	39	56

11-17-10
REGISTERED CIVIL ENGINEER DATE

3-7-11
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER — DIOSDADO ACOBA — No. 52003 — Exp. 12-31-10 — CIVIL — STATE OF CALIFORNIA

The State of California or its officers or agents shall not be responsible for the accuracy or completeness of electronic copies of this plan sheet.

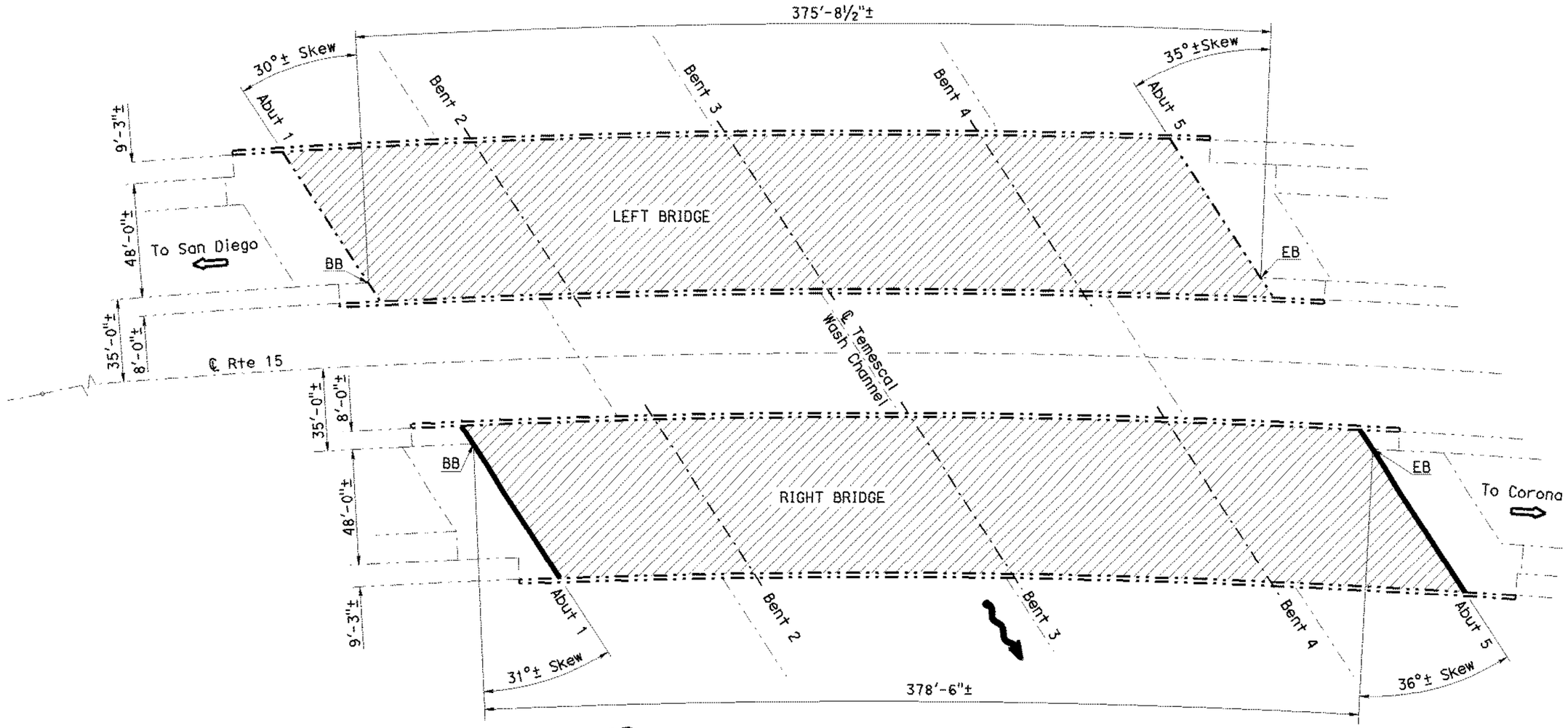


GAVILAN WASH

Br. No. 56-0726R/L, ROUTE 15, PM 25.55
1" = 30'

11 - GAVILAN WASH 56-0726 L/R
QUANTITIES

CLEAN EXPANSION JOINT	280	LF
REPAIR SPALLED SURFACE AREA	1	SQFT
JOINT SEAL (MR 1/2")	280	LF



TEMESCAL WASH

Br. No. 56-0680R/L, ROUTE 15, PM 28.04
1" = 30'

12 - TEMESCAL WASH 56-0680 L/R
QUANTITIES

REMOVE UNSOUND CONCRETE	123	CF
CLEAN BRIDGE DECK	49,215	SQFT
CLEAN EXPANSION JOINT	161	LF
RAPID SETTING CONCRETE (PATCH)	123	CF
JOINT SEAL (MR 1 1/2")	161	LF
TREAT BRIDGE DECK	49,215	SQFT
FURNISH BRIDGE DECK TREATMENT MATERIAL	547	GAL

NOTE:
THE CONTRACTOR SHALL VERIFY ALL CONTROLLING FIELD DIMENSIONS BEFORE ORDERING OR FABRICATING ANY MATERIAL.

CORRECTIONS TRANSFERRED BY: HS
FIELD CORRECTIONS BY: RAVINDER SINGH
TRANSFER DATE: 04-30-2013
FIELD CORRECTION DATE: 09-25-2012
CONTRACT NO: 08-0M6604

NO AS BUILT CORRECTIONS

11-17-10 DESIGN ENGINEER	DESIGN	BY M. Hashimoto	CHECKED Don Acoba	LAYOUT	BY Dale Kubochi	CHECKED M. Hashimoto	STATE OF CALIFORNIA DEPARTMENT OF TRANSPORTATION	DIVISION OF MAINTENANCE STRUCTURE MAINTENANCE DESIGN	BRIDGE NO. VARIOUS
	DETAILS	BY Dale Kubochi	CHECKED Don Acoba	SPECIFICATIONS	BY Jennifer Ramirez	PLANS AND SPECS COMPARED Jennifer Ramirez			POST MILE VARIES
	QUANTITIES	BY M. Hashimoto	CHECKED Don Acoba						

ROUTE 15 BRIDGES
GENERAL PLAN NO. 7

STRUCTURES MAINTENANCE GENERAL PLAN SHEET (ENGLISH) (REV. 10/25/05)

ORIGINAL SCALE IN INCHES FOR REDUCED PLANS 0 1 2 3

CU 08608
EA 0M6601

DISREGARD PRINTS BEARING EARLIER REVISION DATES →

REVISION DATES										SHEET	OF
5-4-10	6-17-10	7-16-10	8-19-10	11-30-10						7	24

FILE => 08-0m6601-ggp-07.dgn

DATE PLOTTED => 02-JUL-2013 TIME PLOTTED => 11:05
USERNAME => smg048

JOINT SEAL TABLE

BRIDGE NAME	BRIDGE NUMBER	LOCATION		MINIMUM "MR" (INCHES)	APPROXIMATE LENGTH (FEET)	EXISTING WATERSTOP	APPROX DEPTH TO CLEAN EXP JOINT (INCHES)	APPROX DEPTH OF JOINT SPALLS (INCHES)	APPROX WIDTH OF JOINT SPALLS (INCHES)	APPROX LENGTH OF JOINT SPALLS (FEET)
TEMECULA RIVER	56-0047R	Abut 1	BB	1	73.3	NO	12			
OLIVE STREET UNDERCROSSING	56-0719L	Abut 1	BB	½	51.5	NO	12			
		Abut 2	EB	½	51.5	NO	12	3	6	3
ROUTE 15/74 SEPARATION	56-0723L	Abut 2	EB	1	67.0	YES	15			
GAVILAN WASH	56-0726R	Abut 1	BW	½	70.0	NO	12			
		Abut 2	BW	½	69.7	NO	12			
	56-0726L	Abut 1	BW	½	70.2	NO	12	3	12	1
		Abut 2	BW	½	69.9	NO	12			
TEMESCAL WASH	56-0680R	Abut 1	BB	1½	81.0	NO	12			
		Abut 2	EB	1½	81.0	NO	12			
INDIAN WASH	56-0677R	Abut 1	BB	1	71.1	NO	12			
		Abut 2	EB	1	70.4	NO	12			
INDIAN TRUCK TRAIL UNDERCROSSING	56-0676L	Abut 1	BB	1	69.5	NO	12			
		Abut 2	EB	1	69.0	NO	12	3	36	3
MAYHEW WASH	56-0674R	Abut 1	BB	1	70.0	NO	12	3	12	9.6
		Abut 2	EB	1	70.0	NO	12	3	12	25.5
COLDWATER WASH	56-0543R	Abut 1	BB	1	82.8	NO	12			
		Abut 4	EB	1	86.6	NO	12			
	56-0543L	Abut 1	BB	1	82.8	NO	12			
		Abut 4	EB	1	86.6	NO	12			
TEMESCAL CANYON ROAD UNDERCROSSING	56-0542L	Abut 1	BB	1	72.8	NO	12			
OLD TEMESCAL ROAD UNDERCROSSING	56-0644R	Abut 1	BB	½	66.1	NO	12			
		Abut 2	EB	½	65.5	NO	12			
N15-E&W91 CONNECTOR OVERHEAD	56-0495G	Abut 1	BB	1½	52.8	NO	12	3	12	1
		Abut 6	EB	1½	70.9	NO	12			
RIVERSIDE AVENUE UNDERCROSSING	56-0693L	Abut 1	BB	1	67.6	NO	14			
		Abut 2	EB	1	70.7	NO	14			
S15-E60 CONNECTOR	56-0689F	Hinge near Bent 5	H	4½	39.0	YES	14			

LEGEND:
BB - Paving Notch at beginning of bridge
EB - Paving Notch at end of bridge
BW - Abutment backwall joint
H - Hinge Joint

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No	TOTAL SHEETS
08	Riv	15	2.9/51.9	52	56

11-17-10
REGISTERED CIVIL ENGINEER DATE

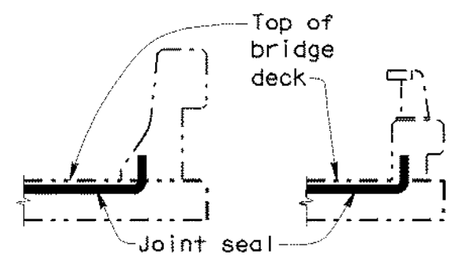
REGISTERED PROFESSIONAL ENGINEER
DIOSDADO ACOBA
No. 52003
Exp. 12-31-10
CIVIL
STATE OF CALIFORNIA

3-7-11
PLANS APPROVAL DATE

The State of California or its officers or agents shall not be responsible for the accuracy or completeness of electronic copies of this plan sheet.

The following notes apply to JOINT SEAL TYPE B:

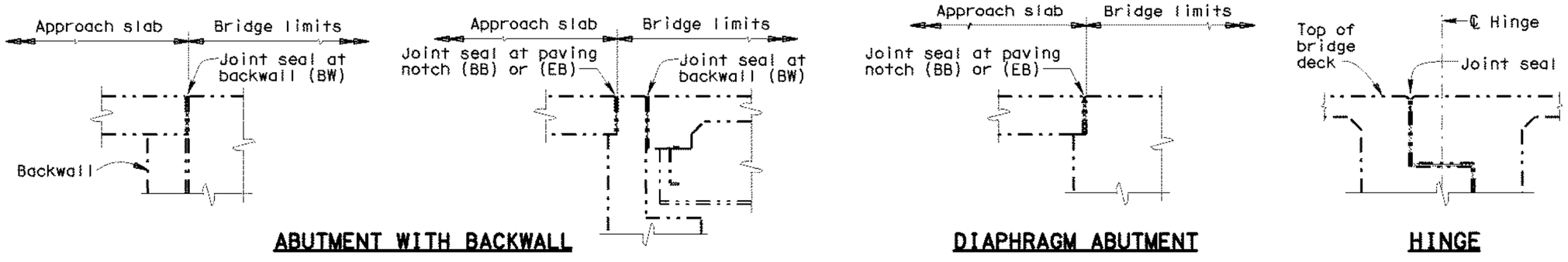
1) Seal must satisfy both minimum Movement Rating (MR) and minimum W1 requirements.
2) Minimum W1 is the calculated maximum width of the joint based on field measurements. After the joints have been cleaned, minimum W1 is to be calculated by the Engineer.
3) W1 shall be the smaller of the values determined as follows:
   A) 0.85 times the manufacturer's designed minimum uncompressed width of the seal.
   B) The width of the seal on the third successive test cycle of the pressure deflection test, when compressed to an average pressure of 3 psi.
4) Bend Type B joint seal 6" up into curb or rail on the low side of the deck where deck joint matches curb or rail joint.
5) For details not shown, see RSP B6-21



BARRIER RAIL — SIDEWALK OR CURB

JOINT SEAL AT LOW SIDE OF DECK

Notes: Details shown for illustration purposes only. For use only where deck joint matches the sidewalk, curb or barrier rail joint.



ABUTMENT WITH BACKWALL — DIAPHRAGM ABUTMENT — HINGE

JOINT SEAL LOCATION

NOTE:
THE CONTRACTOR SHALL VERIFY ALL CONTROLLING FIELD DIMENSIONS BEFORE ORDERING OR FABRICATING ANY MATERIAL.

NO SCALE

	BY	CHECKED
DESIGN	M. Hashimoto	Don Acoba
DETAILS	Dale Kubochi	Don Acoba
QUANTITIES	M. Hashimoto	Don Acoba

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

DIVISION OF MAINTENANCE
STRUCTURE MAINTENANCE DESIGN

CU 08608
EA 0M6601

BRIDGE NO. VARIOUS
POST MILE VARIES

ROUTE 15 BRIDGES
JOINT SEAL DETAILS NO. 1

STRUCTURES MAINTENANCE GENERAL PLAN & DETAIL SHEET (ENGLISH) (REV. 5/17/06)

ORIGINAL SCALE IN INCHES FOR REDUCED PLANS 0 1 2 3

DISREGARD PRINTS BEARING EARLIER REVISION DATES

REVISION DATES: 2-11-10 | 5-4-10 | 7-2-10 | 8-12-10

SHEET 20 OF 24

FILE => 08-0m6601-g-jts-det01.dgn

NO AS BUILT CORRECTIONS
CORRECTIONS TRANSFERRED BY: MS
FIELD CORRECTIONS BY: RAVINDER SINGH
TRANSFER DATE: 04-30-2013
FIELD CORRECTION DATE: 09-25-2012
CONTRACT NO: 08-0M6604

USERNAME => sraq48 DATE PLOTTED => 02-JUL-2013 TIME PLOTTED => 11:07

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No	TOTAL SHEETS
08	Riv	15	2.9/51.9	53	56

11-17-10
REGISTERED CIVIL ENGINEER DATE

3-7-11
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER — DIOSDADO ACOBA — No. 52003 — Exp. 12-31-10 — CIVIL — STATE OF CALIFORNIA

The State of California or its officers or agents shall not be responsible for the accuracy or completeness of electronic copies of this plan sheet.

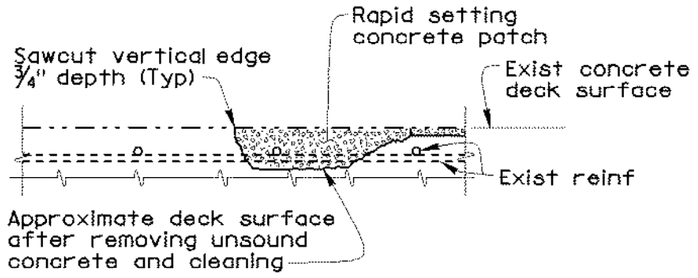
CONTRACT NO: 08-0M6601
TRANSFER DATE: 04-30-2013
FIELD CORRECTION DATE: 05-25-2012
CORRECTIONS TRANSFERRED BY: HS
FIELD CORRECTIONS BY: RAWINDER SINGH

NO AS BUILT CORRECTIONS

DECK REPAIR TABLE
REMOVE UNSOUND CONCRETE AND RAPID SETTING CONCRETE (PATCH)

BRIDGE NAME	BRIDGE NUMBER	APPROXIMATE AREA DAMAGED (PERCENT)	APPROXIMATE DEPTH (INCHES)
TEMECULA RIVER	56-0047R	1	3
	56-0047L	1	3
ROUTE 15/79 SEPARATION	56-0653R	1	3
	56-0653L	1	3
RANCHO CALIFORNIA ROAD OVERCROSSING	56-0655	1	3
SANTA GERTRUDIS CREEK	56-0271S	1	3
CLINTON KEITH ROAD OVERCROSSING	56-0721	1	3
BUNDY CANYON ROAD UNDERCROSSING	56-0717L	1	3
OLIVE STREET UNDERCROSSING	56-0719R	1	3
	56-0719L	1	3
SAN JACINTO RIVER	56-0728L	1	3
WASSON CANYON WASH	56-0739R	1	3
	56-0739L	1	3
ROUTE 15/74 SEPARATION	56-0723L	1	3
TEMESCAL WASH	56-0680R	1	3
	56-0680L	1	3
MAYHEW WASH	56-0674R	1	3
	56-0674L	1	3
COLDWATER WASH	56-0543R	1	3
	56-0543L	1	3
MAGNOLIA AVENUE OVERCROSSING	56-0497	1	3
TEMESCAL WASH	56-0499R	1	3
	56-0499L	1	3
N15-E&W91 CONNECTOR OVERHEAD	56-0495G	1	3
EAST CORONA OVERHEAD	56-0495R	1	3
	56-0495L	1	3
PARKRIDGE AVENUE UNDERCROSSING	56-0673L	1	3
CORONA AVENUE UNDERCROSSING	56-0697R	1	3
HIDDEN VALLEY PARKWAY OVERCROSSING	56-0665	1	3
SECOND STREET UNDERCROSSING	56-0667L	1	3
THIRD STREET UNDERCROSSING	56-0668L	1	3
FOURTH STREET OVERCROSSING	56-0669	1	3
FIFTH STREET OVERCROSSING	56-0667	1	3
SIXTH STREET OVERCROSSING	56-0671	1	3
LIMONITE AVENUE OVERCROSSING	56-0663	1	3
BELLEGRAVE AVENUE OVERCROSSING	56-0664	1	3
ROUTE 15/60 SEPARATION	56-0691R	1	3
S15-E60 CONNECTOR OVERCROSSING	56-0689F	1	3
MISSION BOULEVARD OVERHEAD	56-0695R	1	3
	56-0695L	1	3

Locations to be determined by the Engineer. For details see "DECK REPAIR DETAIL".



DECK REPAIR DETAIL

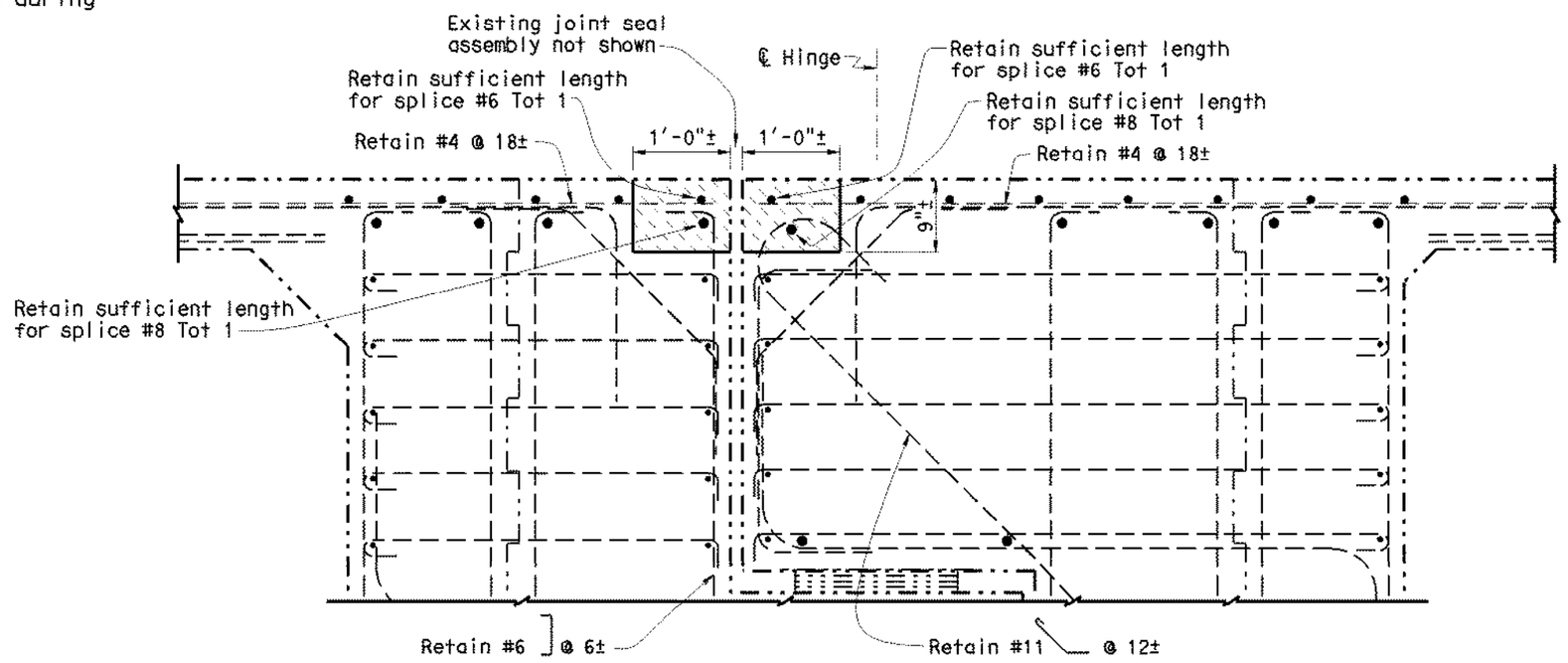
Note: Locations to be determined by the Engineer. Reinforcement may be encountered during deck concrete removal.

NOTES: (APPLY TO THIS SHEET ONLY)

Indicates limits of remove existing concrete and joint seal assembly. Retain existing reinforcing steel.

"a" Reconstructed gap width as determined by the Engineer.

- For additional details, see "JOINT SEAL ASSEMBLY (MAXIMUM MOVEMENT RATING = 4")" sheet.



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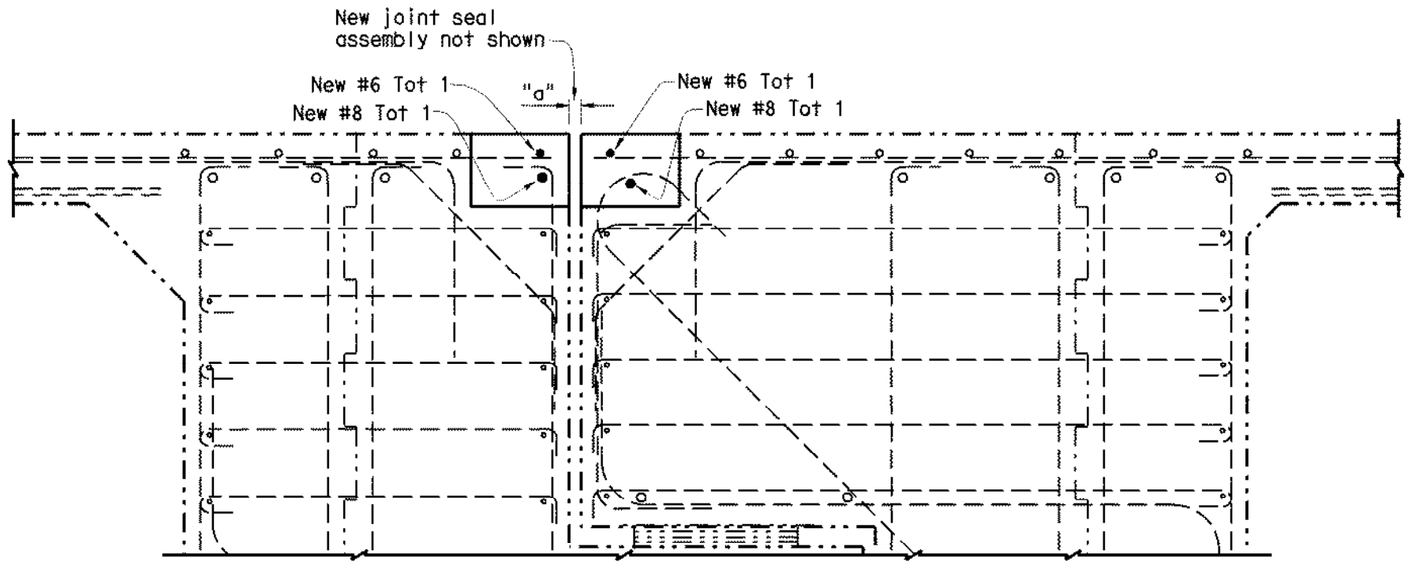


RECONSTRUCTION

SECTION A-A
1" = 1'-0"

NOTE:
THE CONTRACTOR SHALL VERIFY ALL CONTROLLING FIELD DIMENSIONS BEFORE ORDERING OR FABRICATING ANY MATERIAL.

DESIGN	BY M. Hashimoto	CHECKED Don Acoba	
DETAILS	BY Dale Kubochi	CHECKED Don Acoba	
QUANTITIES	BY M. Hashimoto	CHECKED Don Acoba	

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

DIVISION OF MAINTENANCE
STRUCTURE MAINTENANCE DESIGN

BRIDGE NO. VARIOUS
POST MILE VARIES

ROUTE 15 BRIDGES
JOINT SEAL DETAILS NO. 2

STRUCTURES MAINTENANCE GENERAL PLAN & DETAIL SHEET (ENGLISH) (REV. 5/17/06)

ORIGINAL SCALE IN INCHES FOR REDUCED PLANS 0 1 2 3

CU 08608
EA 0M6601

DISREGARD PRINTS BEARING EARLIER REVISION DATES → REVISION DATES: 2-24-10 | 5-4-10 | 11-29-10

SHEET 21 OF 24

DGNNAME => shaq08 DATE PLOTTED => 02-JUL-2013 TIME PLOTTED => 11:10:07

FILE => 08-0m6601-a-jts-det02.dgn

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No	TOTAL SHEETS
08	Riv	15	2.9/51.9	54	56

11-17-10
REGISTERED CIVIL ENGINEER — DATE

3-7-11
PLANS APPROVAL DATE

DIOSDADO ACOBA No. 52003 Exp. 12-31-10 CIVIL — REGISTERED PROFESSIONAL ENGINEER — STATE OF CALIFORNIA

The State of California or its officers or agents shall not be responsible for the accuracy or completeness of electronic copies of this plan sheet.

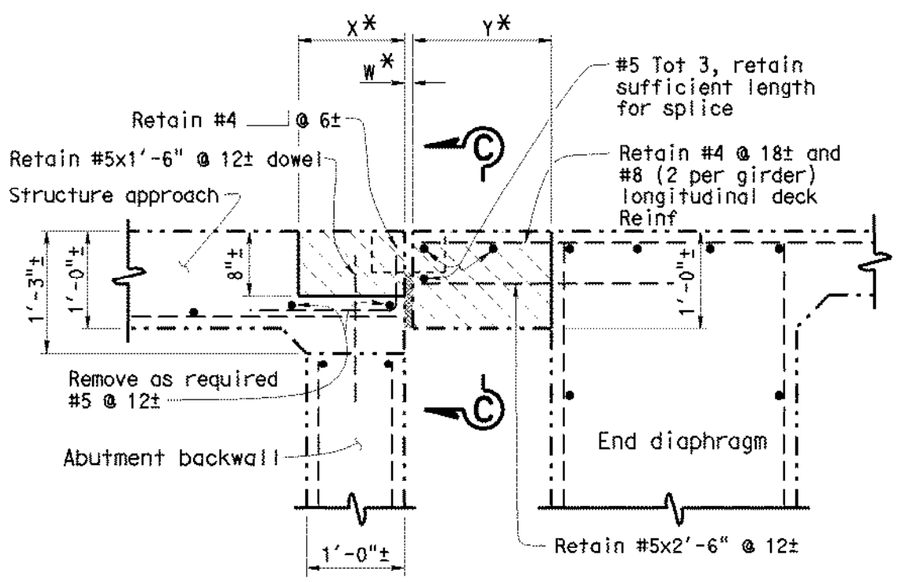
JOINT SEAL TABLE

BRIDGE NUMBER	LOCATION	MINIMUM "MR" (in)	Skew	APPROX LENGTH (Ft)	EXISTING JOINT OPENING		BLOCKOUT (in)		EXISTING WATERSTOP
					W (in)	TEMP (°f)	X	Y	
56-0695L	Abut 1 (Ramp)	3	27°±	37.76±	2½	68	14±	17±	No
	Abut 1 (Gore)	3	30°±	22.46±	2½	68	12±	17±	No
	Abut 1 (Main)	3	30°±	47.63±	2½	68	14±	17±	No

NOTES: (Notes apply to this sheet only)

Indicates limits of remove existing PCC and joint seal assembly.

Indicates limits of place new PCC and steel joint seal assembly.



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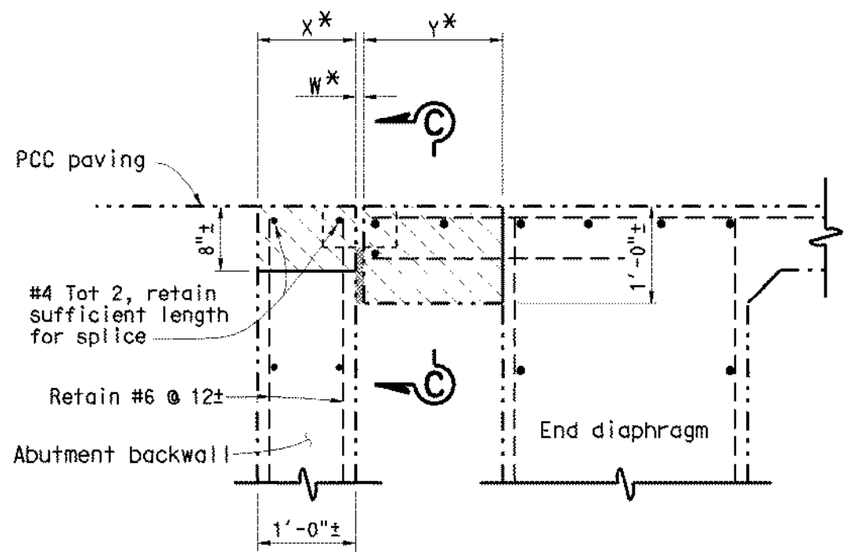

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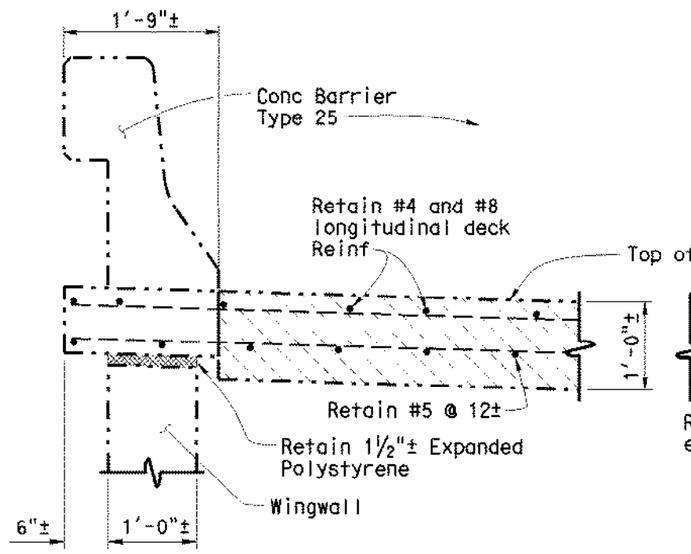
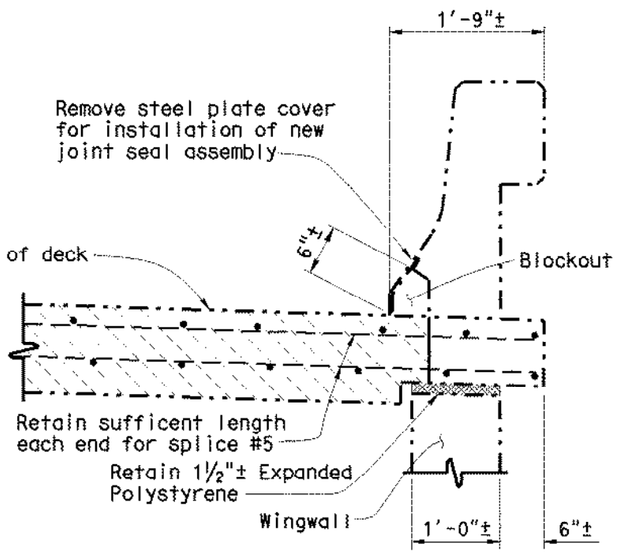
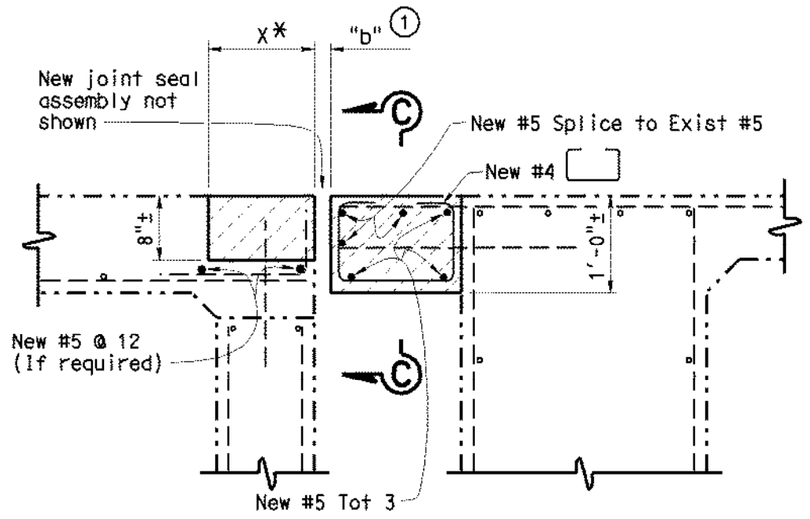


HIGH SIDE OF DECK



LOW SIDE OF DECK

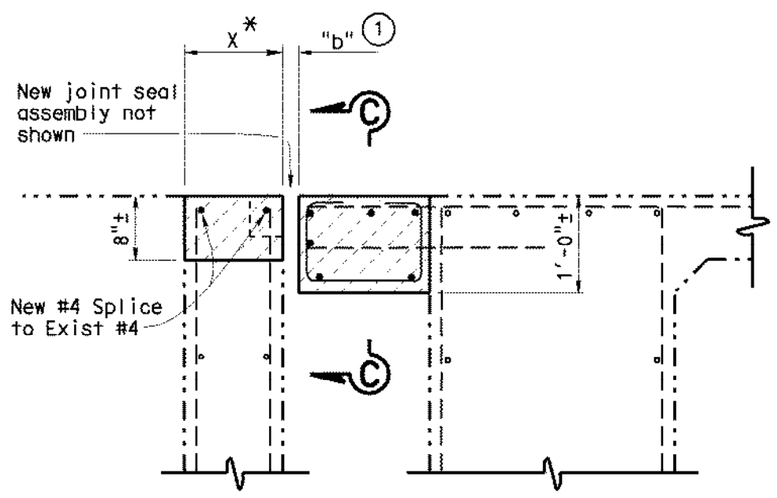
EXISTING



RECONSTRUCTION

DETAIL A

1" = 1'-0"



RECONSTRUCTION

DETAIL B

1" = 1'-0"

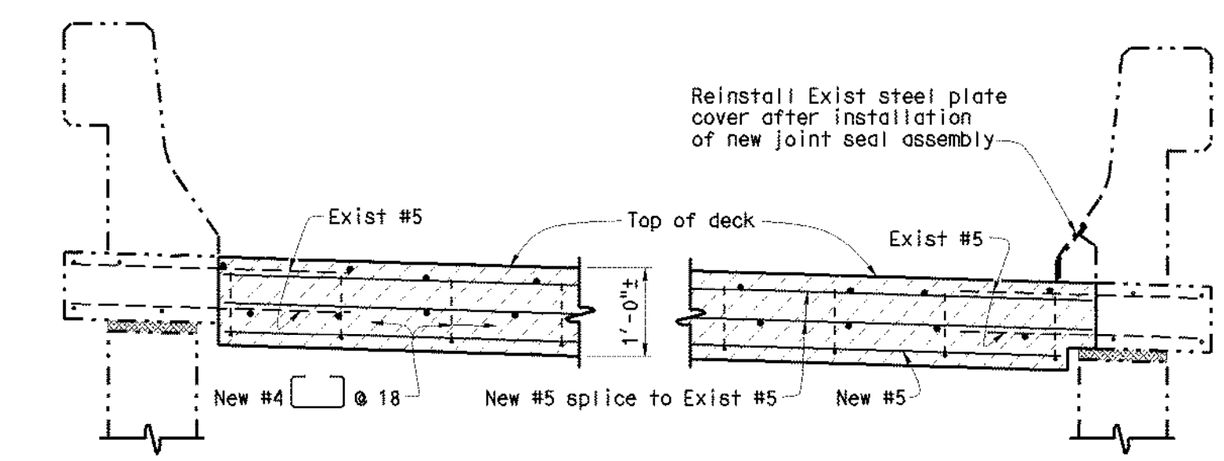
Notes:

(1) New joint width "b" varies with temperature, to be determined by the Engineer.

-For details not noted in "Detail B", see "Detail A".

* -See "JOINT SEAL TABLE" for dimension.

EXISTING



HIGH SIDE OF DECK

LOW SIDE OF DECK

RECONSTRUCTION

SECTION C-C

¾" = 1'-0"

NOTE:
THE CONTRACTOR SHALL VERIFY ALL CONTROLLING FIELD DIMENSIONS BEFORE ORDERING OR FABRICATING ANY MATERIAL.

	BY	CHECKED
DESIGN	M. Hashimoto	Don Acoba
DETAILS	Dale Kubochi	Don Acoba
QUANTITIES	M. Hashimoto	Don Acoba

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

DIVISION OF MAINTENANCE
STRUCTURE MAINTENANCE DESIGN

CU 08608
EA 0M6601

BRIDGE NO. VARIOUS
POST MILE VARIES

ROUTE 15 BRIDGES
JOINT SEAL DETAILS NO. 3

STRUCTURES MAINTENANCE GENERAL PLAN & DETAIL SHEET (ENGLISH) (REV. 5/17/06)

ORIGINAL SCALE IN INCHES FOR REDUCED PLANS 0 1 2 3

DISREGARD PRINTS BEARING EARLIER REVISION DATES

REVISION DATES: 5-13-10

SHEET 22 OF 24

FILE => 08-0m6601-q-jts-det03.dgn

NO AS BUILT CORRECTIONS

CORRECTIONS TRANSFERRED BY: MS
FIELD CORRECTIONS BY: RAVINDER SINGH

TRANSFER DATE: 04-30-2013
FIELD CORRECTION DATE: 09-25-2012

CONTRACT NO: 08-0M6604

DATE PLOTTED => 02-JUL-2013 TIME PLOTTED => 11:10:07

USERNAME => shaq048

NO AS BUILT CORRECTIONS
CORRECTIONS TRANSFERRED BY: HS
FIELD CORRECTIONS BY: RAVINDER SINGH
TRANSFER DATE: 04-30-2015
FIELD CORRECTION DATE: 09-25-2012
CONTRACT NO: 08-0M6604

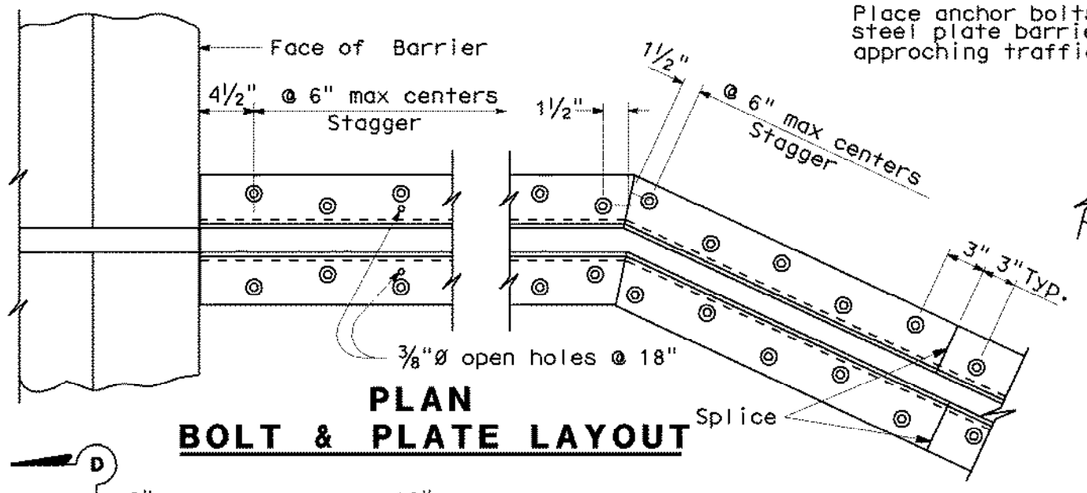
DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No	TOTAL SHEETS
08	Riv	15	2.9/51.9	55	56

11-17-10
REGISTERED CIVIL ENGINEER DATE

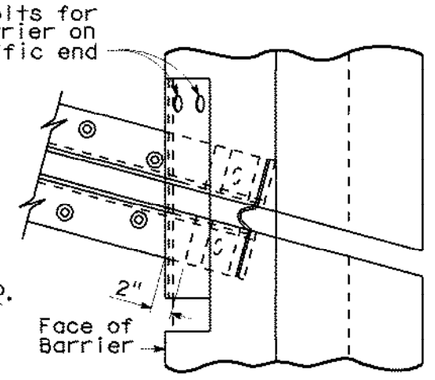
3-7-11
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER
DIOSDADO ACOBA
No. 52003
Exp. 12-31-10
CIVIL
STATE OF CALIFORNIA

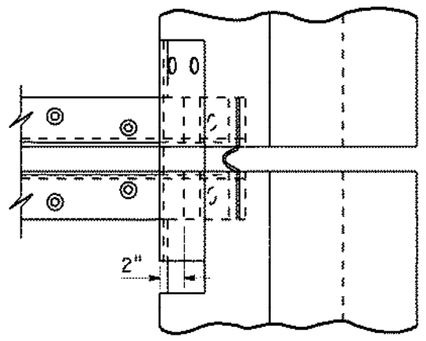
The State of California or its officers or agents shall not be responsible for the accuracy or completeness of electronic copies of this plan sheet.



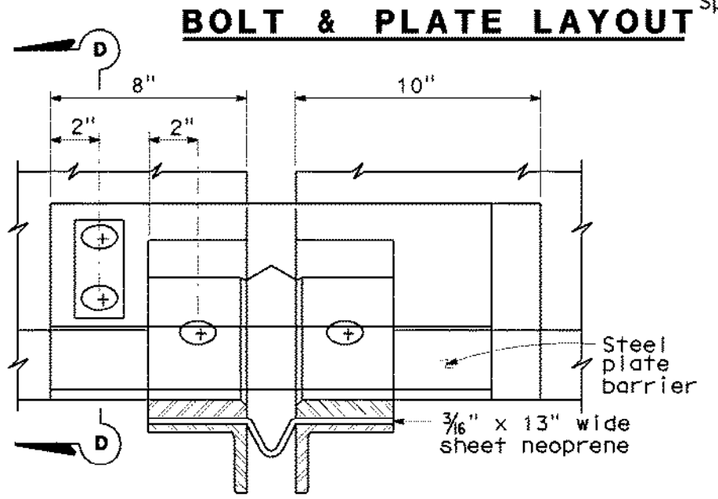
PLAN
BOLT & PLATE LAYOUT



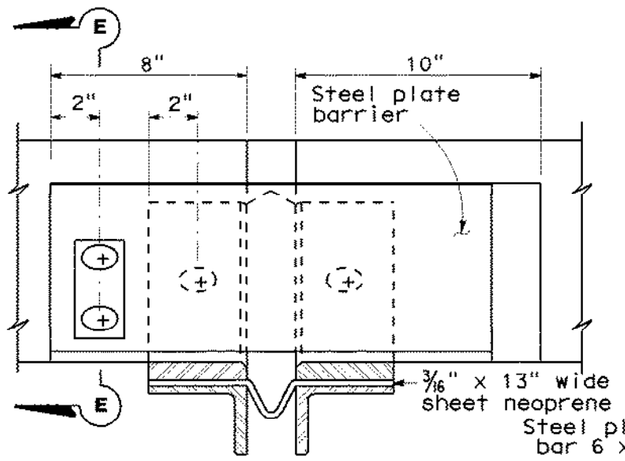
SKEW ≤ 20°



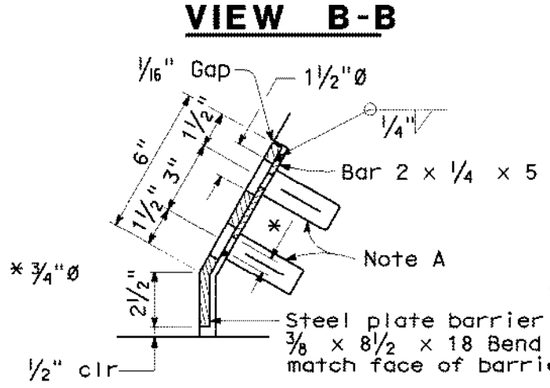
SKEW > 20°



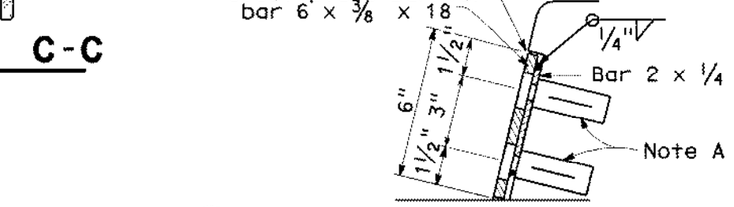
VIEW B-B



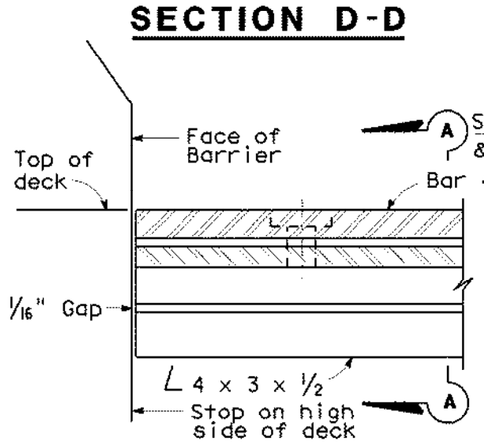
VIEW C-C



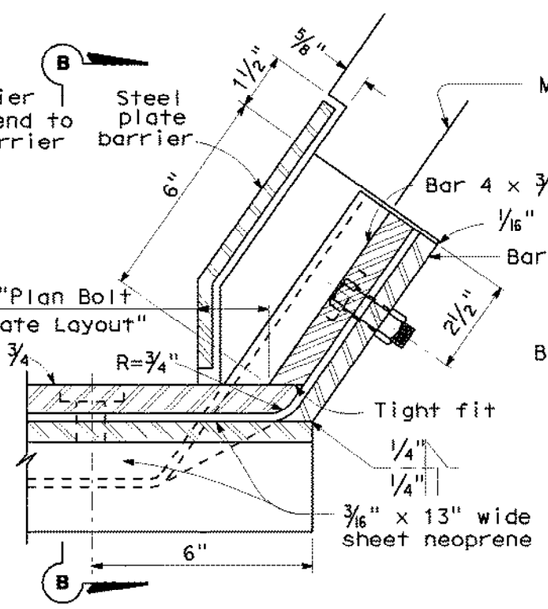
SECTION D-D



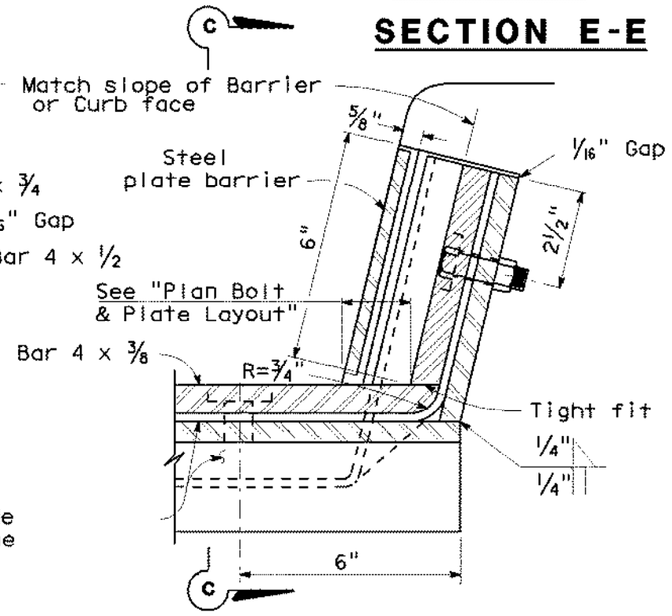
SECTION E-E



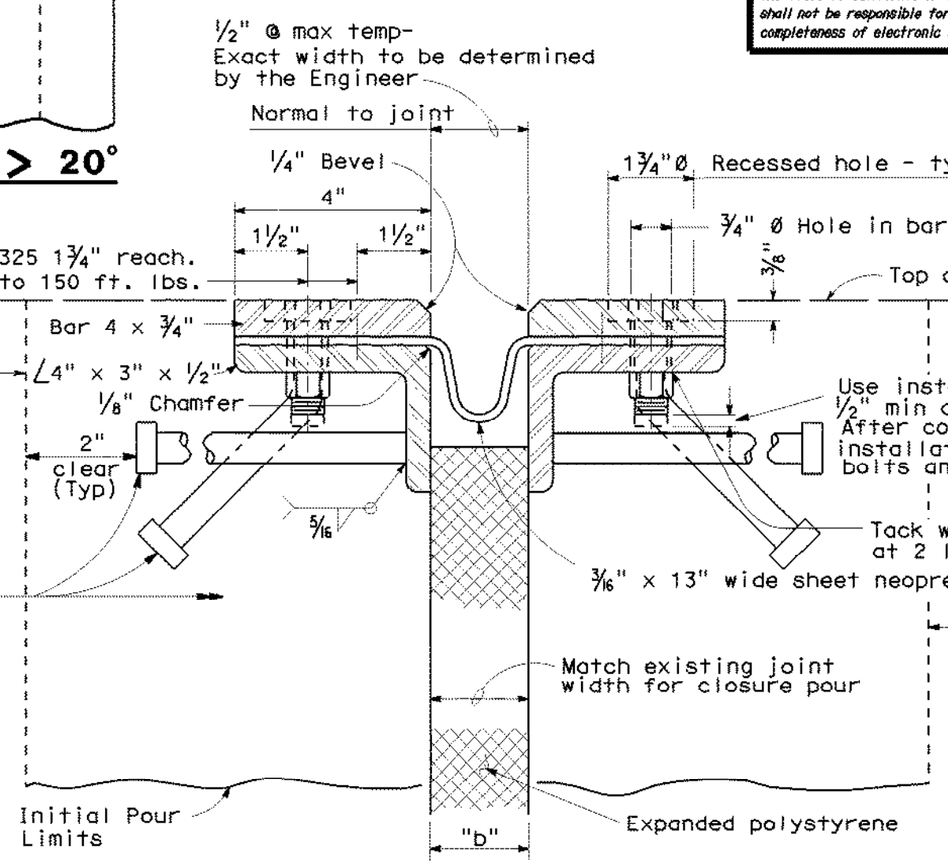
HIGH SIDE BARRIER DETAIL



LOW SIDE BARRIER DETAIL
(See Note B)

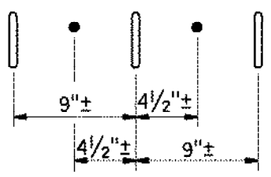


SIDEWALK DETAIL
(See Note B)



SECTION A-A

Note :
Stagger anchor studs @ 4½"± on centers thus:



JOINT INFORMATION		"b" DIMENSIONS (Inches)		
BRIDGE NUMBER	LOCATION	Winter	Spring & Fall	Summer
56-0695L	Abut 1 (Ramp)	3½	2	½
	Abut 1 (Gore)	3½	2	½
	Abut 1 (Main)	3½	2	½

NOTES:

Full penetration butt welds may be substituted for fillet welds on all anchor studs.

Alternate types of anchor studs may be permitted subject to the approval by the Engineer.

Joint seal assembly to be used in conjunction with closure pour. (See other sheets for limits). Closure pour shall not be placed until final deck surface is within the tolerances specified.

Use joint at crown of roadway, at any change in traverse slope in deck and at changes in horizontal direction. Place other joints at or near lanes. All metal parts to be painted or galvanized after fabrication.

Sheet neoprene shall be fabricated in one continuous piece or joints shall be vulcanized. Neoprene shall be fabricated to bend around corners. 1" holes in neoprene sheets shall be drilled or punched so that the neoprene is not distorted at the time of installation.

NOTE A

Insert assembly or expansion anchorage for ⅝" x 1¾" A325 bolt.

NOTE B

Use the sidewalk Detail at all sidewalk joints. Use the Barrier Detail at both sides if the roadway is crowned or if the difference in elevation between the ends of the seal is 0.5" or less.

NO SCALE

DESIGN	BY M. Hashimoto	CHECKED Don Acoba	STATE OF CALIFORNIA DEPARTMENT OF TRANSPORTATION	DIVISION OF MAINTENANCE STRUCTURE MAINTENANCE DESIGN
DETAILS	BY Dale Kubochi	CHECKED Don Acoba		
QUANTITIES	BY M. Hashimoto	CHECKED Don Acoba		

STRUCTURES MAINTENANCE GENERAL PLAN & DETAIL SHEET (ENGLISH) (REV. 5/17/06)

ORIGINAL SCALE IN INCHES FOR REDUCED PLANS 0 1 2 3

CU 08608
EA 0M6601

BRIDGE NO. VARIOUS
POST MILE VARIES

ROUTE 15 BRIDGES
JOINT SEAL ASSEMBLY (MAXIMUM MOVEMENT RATING = 4")

DISREGARD PRINTS BEARING EARLIER REVISION DATES →
REVISION DATES: 5-17-10 11-30-10

SHEET 23 OF 24

FILE => 08-0m6601-r-jtsassem.dgn

DATE PLOTTED => 02-JUL-2013 TIME PLOTTED => 11:08
USERNAME = shaq48

DIST.	COUNTY	ROUTE	MILE POST TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
08	Riv	15	2.9/51.9	56	56

11-17-10
REGISTERED ENGINEER - CIVIL

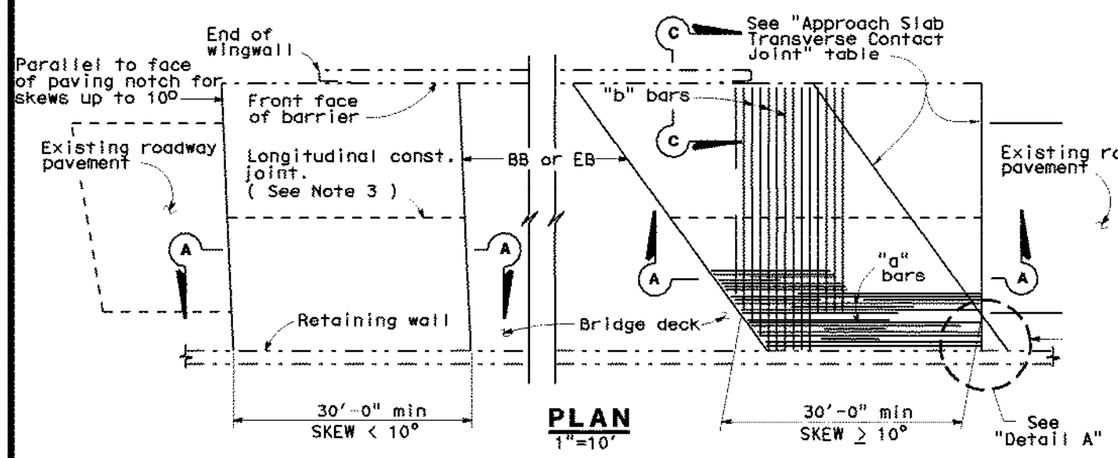
REGISTERED PROFESSIONAL ENGINEER
DIOSDADO ACOBA
No. 52003
Exp. 12-31-10
CIVIL
STATE OF CALIFORNIA

3-7-11
PLANS APPROVAL DATE

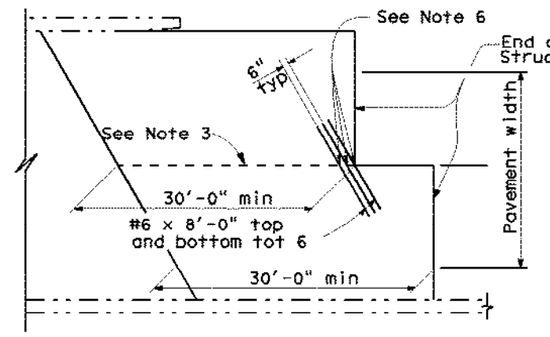
The State of California or its officers or agents shall not be responsible for the accuracy or completeness of electronic copies of this plan sheet.

CONTRACT NO. 08-0M6604
TRANSFER DATE: 04-30-2009
FIELD CORRECTION DATE: 09-25-2002
CORRECTIONS TRANSFERRED BY: RS
FIELD CORRECTIONS BY: RAHMED SHAH

NO AS BUILT CORRECTIONS

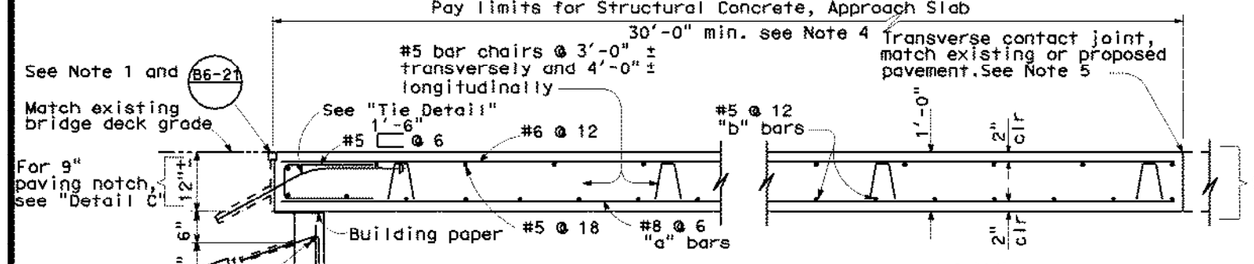


PLAN
1"=10'

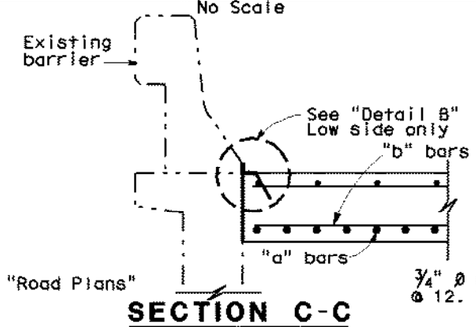


STRUCTURE APPROACH - END STAGGER DETAIL
No Scale

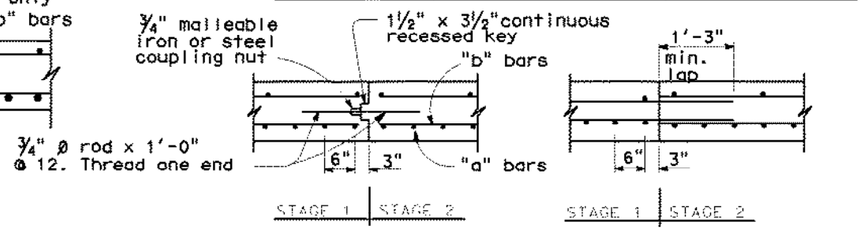
APPROACH SLAB TRANSVERSE CONTACT JOINT		
APPROACH SKEW	WITH AC ROADWAY PAVEMENT	WITH PCC ROADWAY PAVEMENT
< 10°	Parallel to face of paving notch	Parallel to face of paving notch
10° - 45°	Parallel to face of P N use (Detail A)	Stagger lines 24' to 36' apart
> 45°	Parallel to face of P N use (Detail A)	Stagger at each lane line

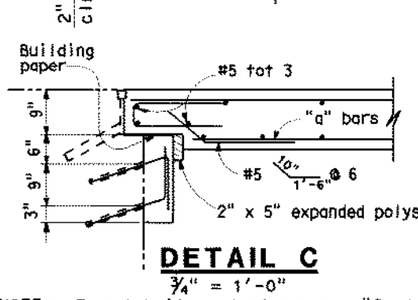


SECTION A-A
¾" = 1'-0"

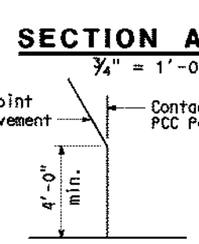


SECTION C-C
¾" = 1'-0"

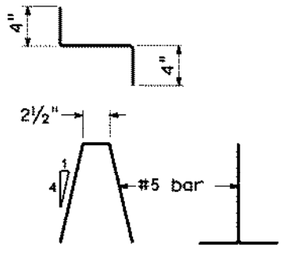




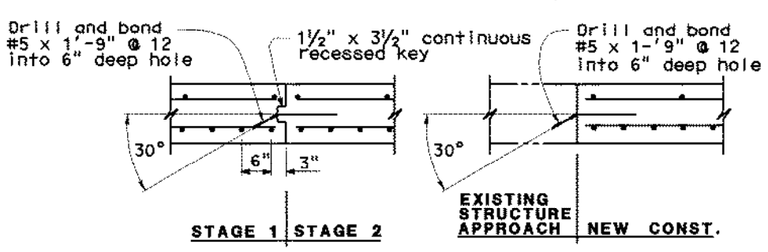
DETAIL C
¾" = 1'-0"



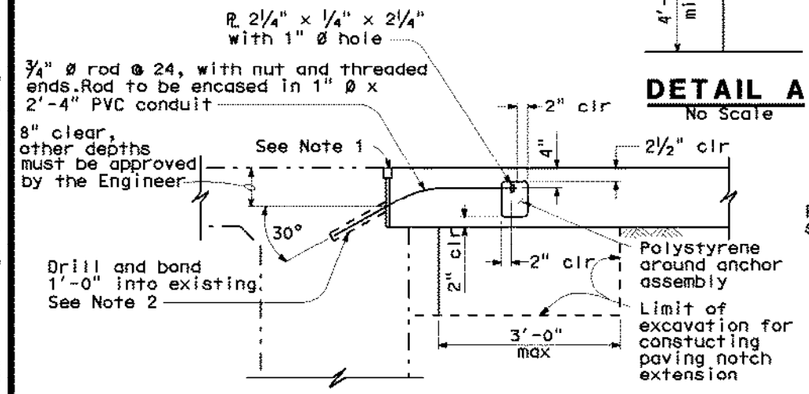
DETAIL A
No Scale



BAR CHAIR DETAIL
1½" = 1'-0"

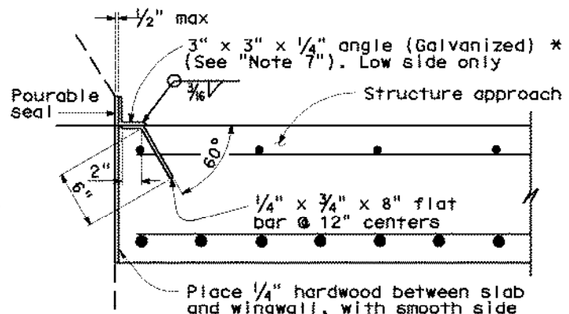


LONGITUDINAL CONSTRUCTION JOINT ALTERNATIVES
¾" = 1'-0"

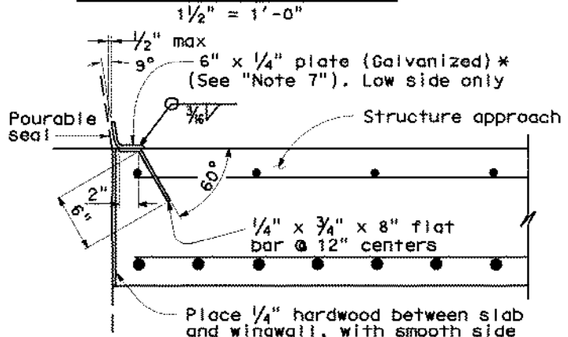


TIE DETAIL
¾" = 1'-0"

NOTE:
THE CONTRACTOR SHALL VERIFY ALL CONTROLLING FIELD DIMENSIONS BEFORE ORDERING OR FABRICATING ANY MATERIAL.



*(TO BE USED WITH TYPE 25 OR TYPE 27 CONCRETE BARRIER)



*(TO BE USED WITH TYPE 732 OR TYPE 736 CONCRETE BARRIER)

DETAIL B
1½" = 1'-0"

NOTE: For details not shown, see "Section A-A".

NOTES:

1. For details not shown or noted, see Structure Plans. Adjust bar reinforcement to clear a sawcut for sealed joint, when required.
2. Space to avoid existing prestress anchorages and main reinforcement.
3. Longitudinal construction joints, when permitted by the Engineer, shall be located on lane lines.
4. Transverse contact joint shall be a minimum of 5'-0" from an existing or constructed weakened plane joint.
5. For transverse contact joint with new PCC paving, refer to Standard Plan P10.
6. Couplers are required for stage construction.
7. End angle or plate at beginning of barrier transition, end of wingwall or end of structure approach as applicable.

STATE PRINTED BY 02-JUL-2013 TIME PRINTED BY 11:36

STANDARD DRAWING

RELEASE DATE	3/14/05	DESIGN	BY M.TRAFFALIS	CHECKED E.THORKILDSEN	RELEASED BY
FILE NO.	xs3-140e	DETAILS	BY R.YEE	CHECKED E.THORKILDSEN	
		SUBMITTED	BY M.HA	DRAWING DATE 8/92	DATE ENTERED

DS 050 2147A (ENGLISH) (REV. X/XX/XX)

ORIGINAL SCALE IN INCHES FOR REDUCED PLANS 0 1 2 3

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

DIVISION OF ENGINEERING SERVICES

CU 08608
EA 0M6601

BRIDGE NO.	VARIOUS
MILE POST	VARIES

ROUTE 15 BRIDGES
STRUCTURE APPROACH TYPE R(30D)

DISREGARD PRINTS BEARING EARLIER REVISION DATES → 5-4-10

REVISION DATES (PRELIMINARY STAGE ONLY)

USERNAME => srv2048

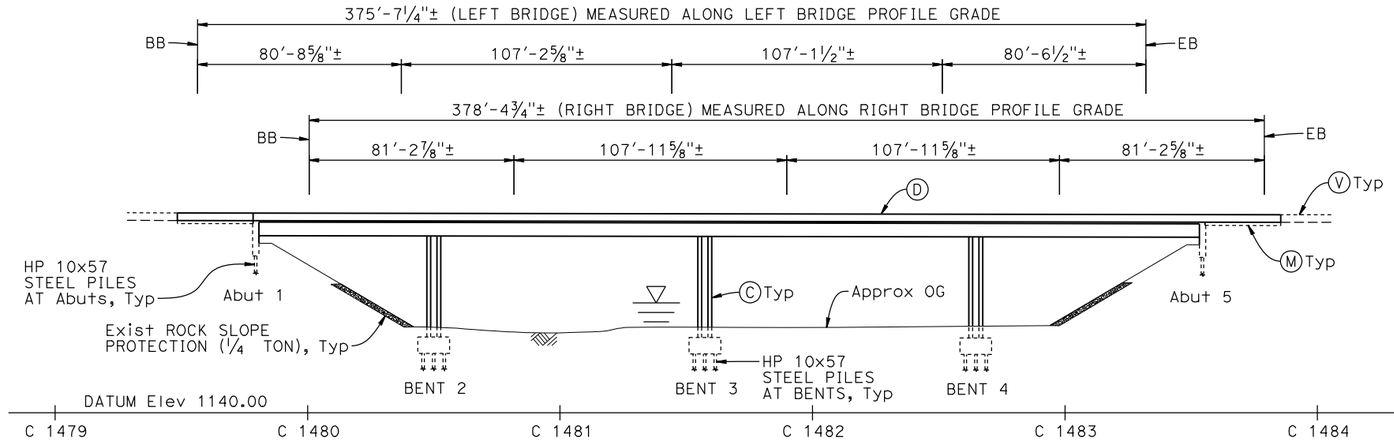
SHEET 24 OF 24

08-0M6601-5-STR-app.dgn

(General Plan) Temescal Wash Bridge

PREPARED FOR THE STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION

Note: Profile Grade to match existing.



DEVELOPED ELEVATION ALONG "C" LINE

1" = 30'

CURVE DATA				
MARK	R	Δ	T	L
(8)	3999.70'	39°07'07"	1421.03'	2730.80'

Dist	COUNTY	ROUTE	POST MILE
08	RIV	15	28.04

RIVERSIDE COUNTY
TRANSPORTATION COMMISSION
4080 LEMON STREET
RIVERSIDE, CA 92502

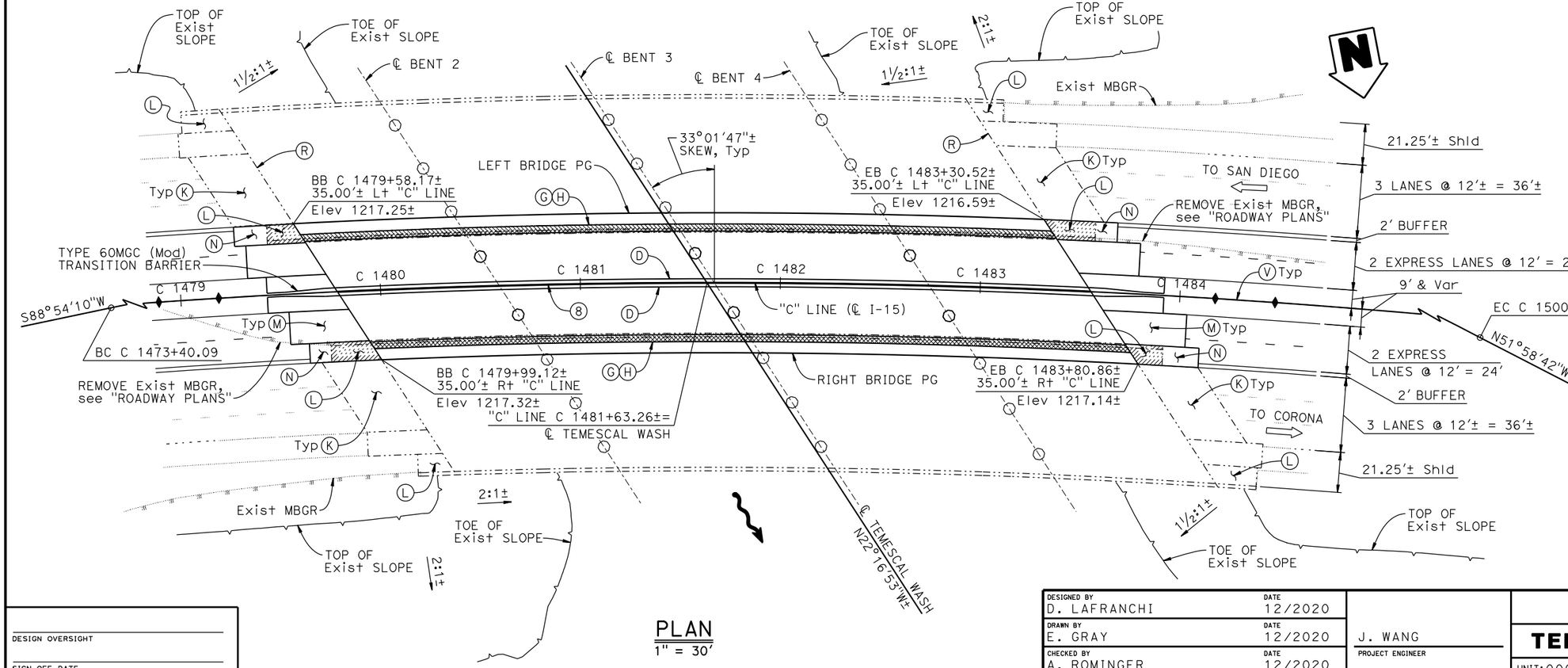
HDR ENGINEERING, INC.
3230 EL CAMINO REAL, SUITE 200
IRVINE, CA 92602-1377

NOTES:

(C) Paint Bent Number
(D) Concrete Barrier (Type 836)
(G) Bridge Removal (Portion)
(H) Closure Pour (3'-6")
(K) Existing Structure Approach
(L) Existing Shoulder Slab
(M) Structure Approach Type N(30)
(N) Structure Approach Type R(30)
(R) Clean expansion joint and place new joint seal
(V) Median Barrier, see "ROADWAY PLANS"

LEGEND:

- New structure
- Existing structure
- Bridge Removal (Portion)
- Closure Pour
- Direction of traffic
- Direction of flow
- High water surface elevation (1183.53±)



PLAN

1" = 30'

ASSUMPTIONS:

1. Vehicular traffic will not pass through the construction site. No falsework openings required.
2. No existing utilities conflict with bridge improvements and require relocation.

DATE OF ESTIMATE	12/2020
BRIDGE REMOVAL	= 3,111 SQFT
STRUCTURE DEPTH	= 6'-0"
LENGTH	= 377'-0" (Avg)
WIDTH	= 50'-0"
AREA	= 18,850 SQFT
COST/ft² INCLUDING TRO, MOBILIZATION & 25% CONTINGENCY	= $294
TOTAL COST	= $5,547,000

DESIGN OVERSIGHT

SIGN OFF DATE

ADVANCE PLANNING STUDY SHEET (ENGLISH) (REVISION 4/19/2018)

DATE PLOTTED => 05-DEC-2020 TIME PLOTTED => 15:41
FILE => (S04) Temescal Wash (Br No 56-0680 R/L)-General Plan No. 1

DESIGNED BY D. LAFRANCHI	DATE 12/2020	J. WANG PROJECT ENGINEER	PLANNING STUDY
DRAWN BY E. GRAY	DATE 12/2020		TEMESCAL WASH (WIDEN)
CHECKED BY A. ROMINGER	DATE 12/2020		UNIT: 0000 / BRIDGE No.: 56-0680 R/L
APPROVED J. WANG	DATE 12/2020		CONTRACT No.: 08-0J0820 / PROJECT No. & PHASE: 08-18000063 & 0

PREPARED FOR THE STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION

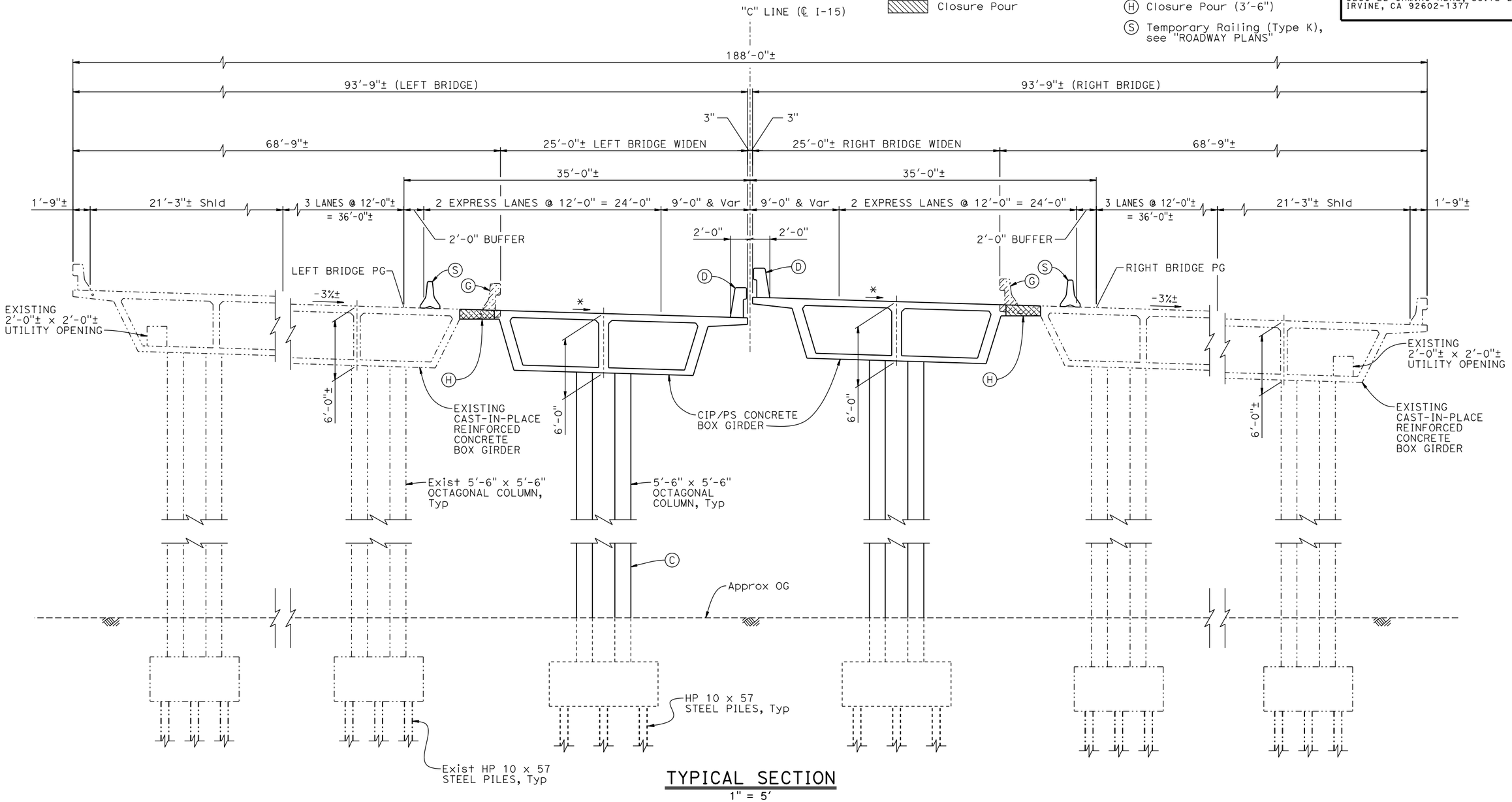
Dist	COUNTY	ROUTE	POST MILE
08	RIV	15	28.04

RIVERSIDE COUNTY
TRANSPORTATION COMMISSION
4080 LEMON STREET
RIVERSIDE, CA 92502

HDR ENGINEERING, INC.
3230 EL CAMINO REAL, SUITE 200
IRVINE, CA 92602-1377

LEGEND:
- New structure
- Existing structure
- Bridge Removal (Portion)
- Closure Pour

NOTES:
- (C) Paint Bent Number
- (D) Concrete Barrier (Type 836)
- (G) Bridge Removal (Portion)
- (H) Closure Pour (3'-6")
- (S) Temporary Railing (Type K), see "ROADWAY PLANS"



TYPICAL SECTION

1" = 5'

* Match existing grade and cross slope

DESIGN OVERSIGHT

SIGN OFF DATE

ADVANCE PLANNING STUDY SHEET (ENGLISH) (REVISION 4/19/2018)

DATE PLOTTED => 05-DEC-2020 TIME PLOTTED => 15:37
FILE => (S04) Temescal Wash (Br No 56-0680 R-L)-General Plan.dgn

DESIGNED BY D. LAFRANCHI	DATE 12/2020	J. WANG, PROJECT ENGINEER
DRAWN BY E. GRAY	DATE 12/2020	
CHECKED BY A. ROMINGER	DATE 12/2020	
APPROVED J. WANG	DATE 12/2020	

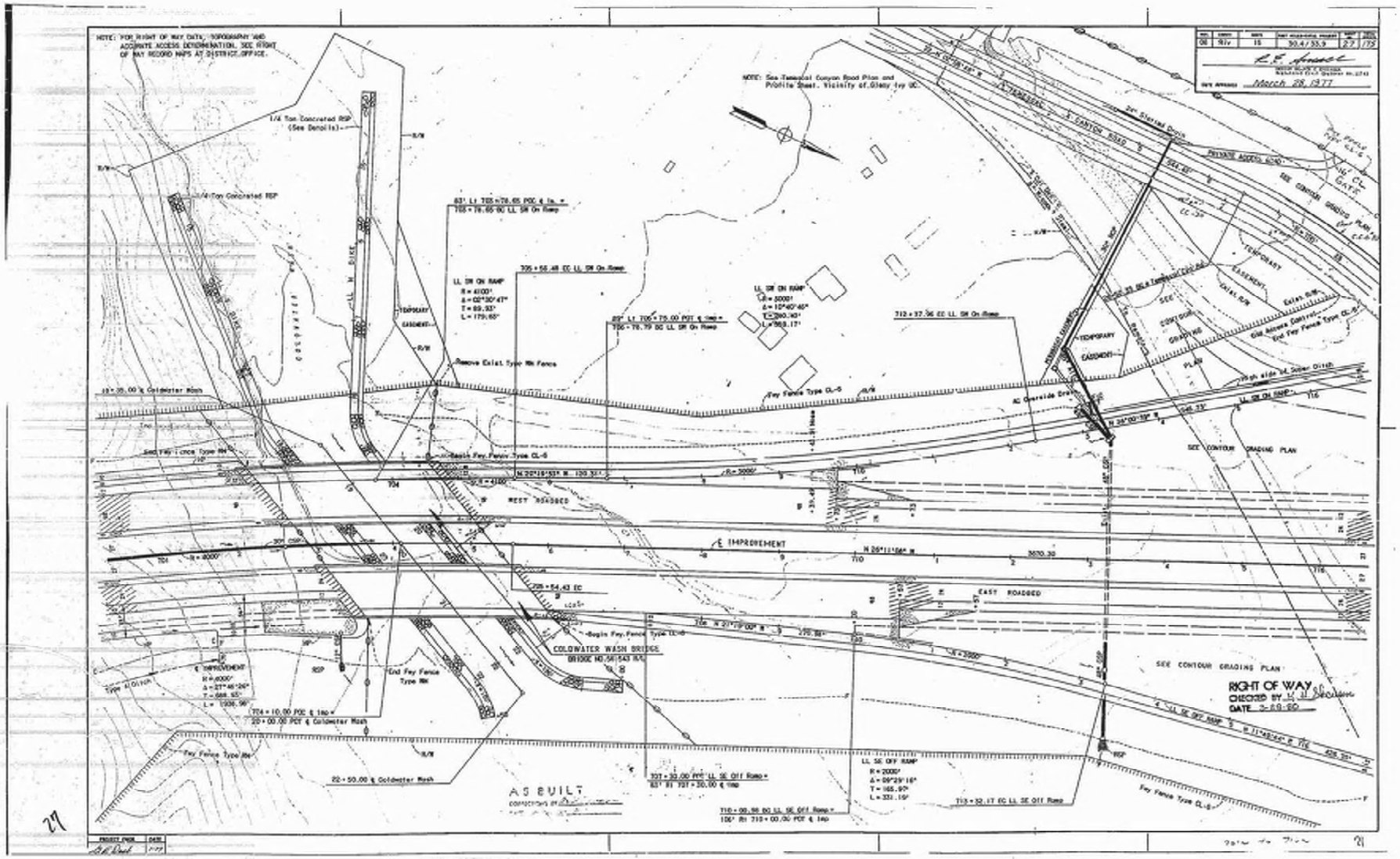
PLANNING STUDY

TEMESCAL WASH (WIDEN)

UNIT: 0000	BRIDGE No.: 56-0680 R/L
CONTRACT No.: 08-0J0820	PROJECT No. & PHASE: 08-18000063 & 0

APPENDIX F: COLDWATER WASH BRIDGE AS-BUILTS AND GENERAL PLAN

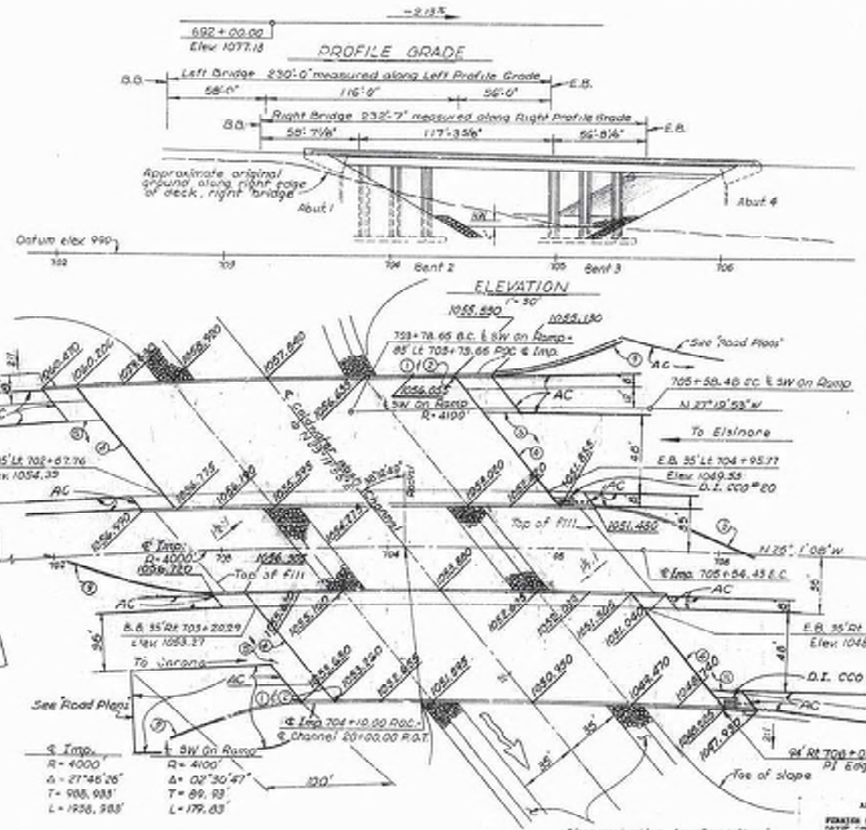
(As-built) Coldwater Wash Bridge Plans

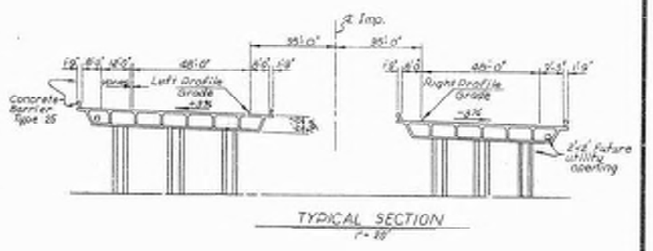

NOTE: FOR RIGHT OF WAY DATA, TOPOGRAPHY AND ACCURATE ACCESS DETERMINATION, SEE RIGHT OF WAY RECORD MAPS AT DISTRICT OFFICE.
NOTE: See Tunnelcut Canyon Road Plan and Profile Sheet. Vicinity of Olney Ivy OC.
1/4 Ton Concreted RSP (See Details)
1/4 Ton Concreted RSP
Remove Exist Type WM Fence
Fey Fence Type CL-6
Begin Fey Fence Type CL-6
End Fey Fence Type WM
End Fey Fence Type CL-6
Type 210 Inlet
COLORADO WASH BRIDGE
BRIDGE NO. 56-0543 R/L
AS BUILT
CORRECTIONS BY
RIGHT OF WAY
CHECKED BY
DATE 3-19-80
AS BUILT PLANS
Contract No. 08-136604
Date Completed 3-28-80
Document No.
I HEREBY CERTIFY THAT THIS IS A TRUE AND EXACT COPY OF THE ABOVE DOCUMENT TAKEN UNDER MY DIRECTION AND CONTROL ON THIS DATE IN SACRAMENTO, CALIFORNIA PURSUANT TO AUTHORIZATION BY THE DIRECTOR OF TRANSPORTATION
3-18-80
SUPERVISOR OF MICROFILM SERVICES
March 28, 1977

DIST	COUNTY	ROUTE	POST MILE/TOTAL PROJECT	NO.	SHEET NO.
08	RIV	15	80.4/88.9	152	115

PG Caussens 2/27 1978
March 28, 1977

AS BUILT PLANS
Contract No. 08-170604
Date Completed
Document No. Exc 4999





TYPICAL SECTION
1" = 10'

PILE INFORMATION
40 10.45T Piles - 70 Ton Loads
Specified Tip Elev.

	Abut 1	Abut 4
Lt. Br.	Varies Skr. Line 1008.0 outside Lt to 997.0 inside Lt	995.0
Rt Br.	995.0	Varies Skr. Line 990.0 inside Rt to 980.0 outside Rt

Tip Elev.	Abut 1 Rt	℄ Rt	1 Lt	℄ Lt
Avg.	996.5	984.8	1000.6	991.1
Min.		988.9		
Max.		981.2		

Permanent Reference Elevations
Copper Nails in Barrier Railing
Bench Mark: BM 71-A-77, Brass Disk in Concrete 180' Lt. 700+65 ℄ Imp. buried 0.4' Elev: 1054.960
BM 71-A-71 Br. D. in Conc. 201.4' Lt. 704+55.4 ℄ Imp. buried 1.0' Elev: 1029.03 ✱ 1029.005 ✓

APPROXIMATE QUANTITIES

FURNISH STEEL PILING (80 LOCS)	1,350 LF
DRIVE STEEL PILE (80 LOCS)	30 EA
PILOT HOLE (TYPE B-60 1/2)	355 LF
CONCRETE BARRIER (TYPE 25)	1,000 LF
ROADWAY EXCAVATION	575 CY
STRUCTURE EXCAVATION (BRIDGE)	8,385 CY
STRUCTURE EXCAVATION (TYPE D)	1,900 CY
STRUCTURE BACKFILL (BRIDGE)	165 CY
REVERSE BACKFILL MATERIAL	335 CY
STRUCTURAL CONCRETE, BRIDGE FOOTING	2,250 CY
STRUCTURAL CONCRETE, BRIDGE	686,060 LB
BAR REINFORCING STEEL (BRIDGE)	

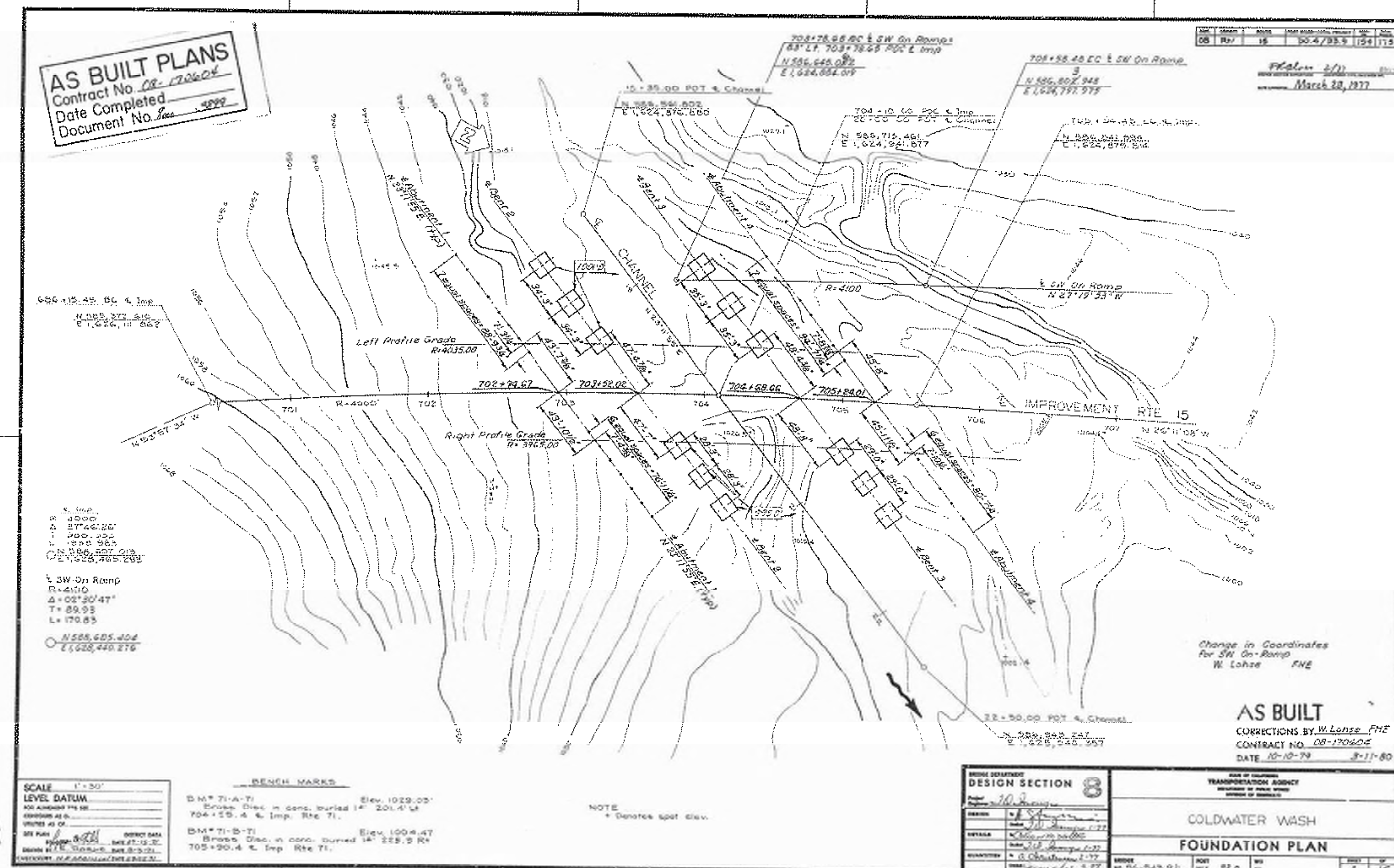
AS BUILT
CORRECTIONS BY W. Lohse, FHE
CONTRACT NO. 08-170604
DATE 10-10-79 3-11-80

Submitted By: F. Lohse 2/77	DESIGN	By: R. O'Neal	Checked: J.D. Lange 1-77	LOAD FACTOR DESIGN	LIVE LOADING HS20-44 AND ALTERNATIVE AND PERMIT DESIGN LOAD	State of CALIFORNIA DEPARTMENT OF TRANSPORTATION	BRIDGE DEPARTMENT DESIGN SECTION
Approved: Dwight Hannah 1/78	DETAILS	By: 3.40-Hon 9-78	Checked: J.D. Lange 1-79	LAYOUT By: J. Horton	Checked: J.D. Lange 1-79		BRIDGE NO. 56-545 ½ POST MILE 88.0
	QUANTITIES	By: A. Christensen 2-77	Checked: [illegible] 2-77	SPECIFICATIONS By: [illegible]	Plans and Specs Completed: [illegible] 1/80		PROJECT ENGINEER J.D. Lange
		ORIGINAL SCALE IN INCHES FOR REDUCED PLANS 0 1 2 3				CU 08203 WO 170601	Changed prints bearing earlier revision dates

COLDWATER WASH BRIDGE
GENERAL PLAN

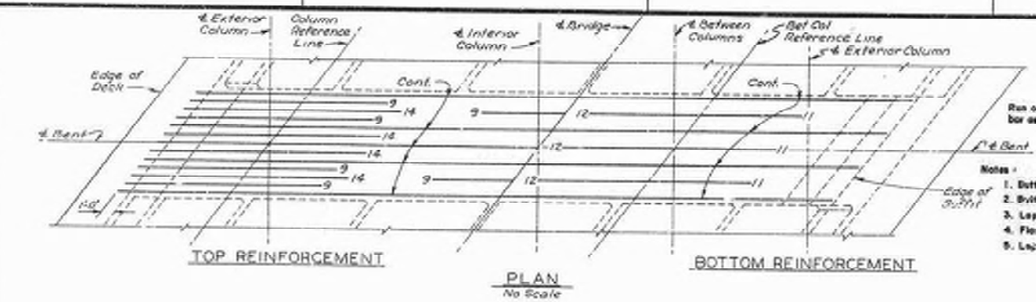
SHEET 1 OF 15

I HEREBY CERTIFY THAT THIS IS A TRUE AND ACCURATE COPY OF THE ABOVE DOCUMENT TAKEN UNDER MY DIRECTION AND CONTROL ON THIS DATE IN SACRAMENTO, CALIFORNIA PURSUANT TO AUTHORIZATION BY THE DIRECTOR OF TRANSPORTATION.
DATE 3-28-80 SIGNED Joseph M. Lohse TITLE SUPERVISOR OF DRAFTING SERVICES



154

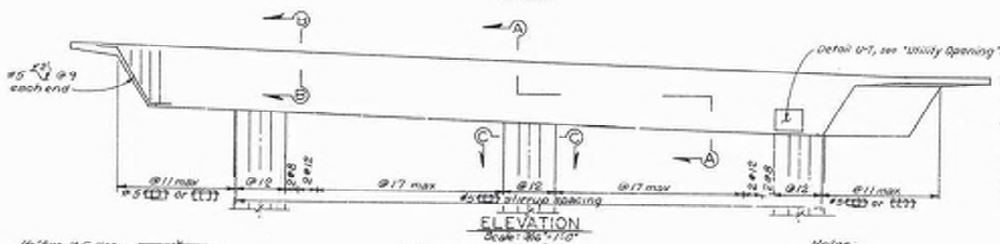
I HEREBY CERTIFY THAT THIS IS A TRUE AND ACCURATE COPY OF THE ABOVE DOCUMENT TAKEN UNDER MY DIRECTION AND CONTROL ON THIS DATE IN SACRAMENTO, CALIFORNIA PURSUANT TO AUTHORIZATION BY THE DIRECTOR OF TRANSPORTATION.
3-28-80 Joseph M. Cate SUPERVISOR OF MICROFILM SERVICES



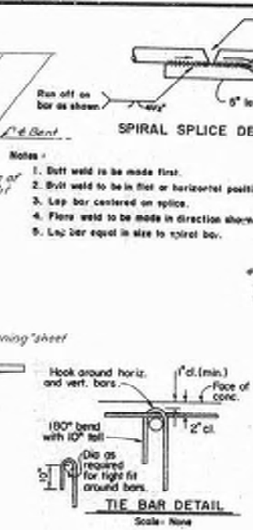
TOP REINFORCEMENT

PLAN
No Scale

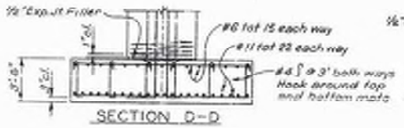
BOTTOM REINFORCEMENT



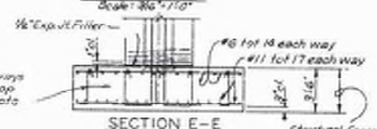
ELEVATION
Scale: 3/16" = 1'-0"



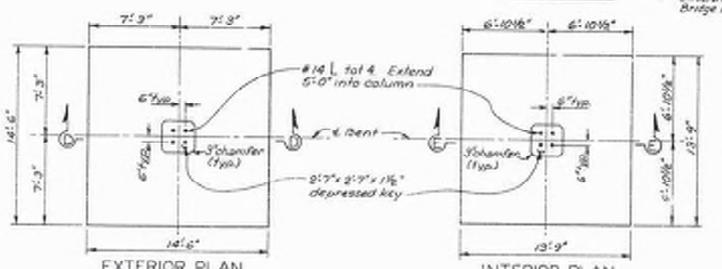
TIE BAR DETAIL
Scale: None



SECTION D-D



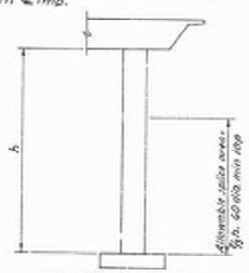
SECTION E-E



EXTERIOR PLAN

INTERIOR PLAN

FOOTING DETAILS
Scale: ¼" = 1'-0"

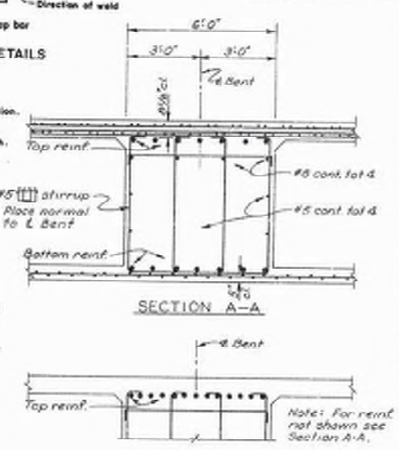


SPLICE DIAGRAM
No Scale

Notes:
Numbers at ends of bars in top reinforcement indicate distance in feet from Column Reference Line or ℄ Bridge.
Numbers at ends of bars in bottom reinforcement indicate distance in feet from Bat Col Reference Line
All bars #11 unless otherwise noted.
Details symmetrical about ℄ Bridge.
All reference lines and ℄ Bridge are concentric with ℄ Imp.

SPIRAL SPLICE DETAILS

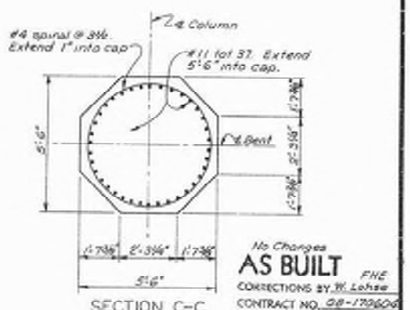
Notes:
1. Butt weld to be made first.
2. Butt weld to be in flat or horizontal position.
3. Lap bar centered on splice.
4. Fillet weld to be made in direction shown.
5. Lap bar equal in size to spiral bar.



SECTION A-A

SECTION B-B

BENT CAP DETAILS
Scale: ¾" = 1'-0"



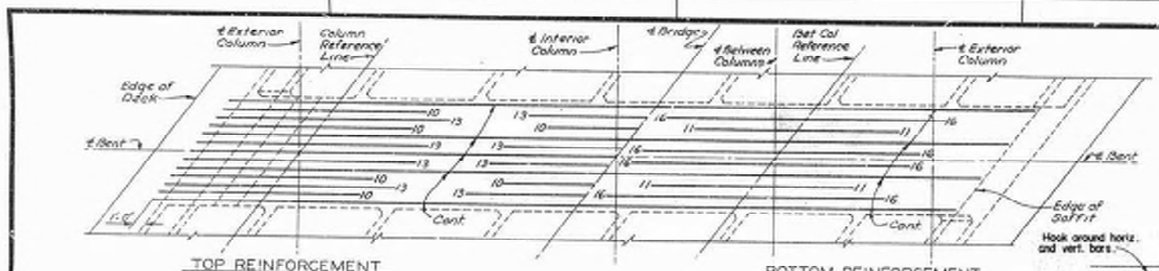
SECTION C-C
COLUMN DETAIL

No Changes
AS BUILT FHE
CORRECTIONS BY W. Lohse
CONTRACT NO. 08-170604
DATE 10-10-79 3-11-80

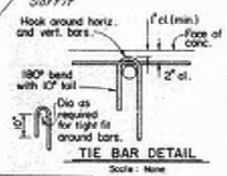
DESIGN	By R. Schmeiser	Checked J.D. Jones 1-77	State of CALIFORNIA DEPARTMENT OF TRANSPORTATION	BRIDGE DEPARTMENT DESIGN SECTION	8	BRIDGE NO. 56-345 R/L	COLDWATER WASH BRIDGE
DETAILS	By Kathy Zschiesche 3/76	Checked J.D. Jones 1-77		PROJECT ENGINEER J.D. Jones		POST MILE 33.0	BENTS—RIGHT BRIDGE
QUANTITIES	By A. Christensen 1-77	Checked Grimsley 2-77					
ORIGINAL SCALE IN INCHES FOR REVISED PLANS	0 1 2 3 4		CU WO	Changed plans bearing earlier revision date →			SHEET 7 OF 15

AS BUILT PLANS
Contract No. 08-170604
Date Completed
Document No. Rec 5899

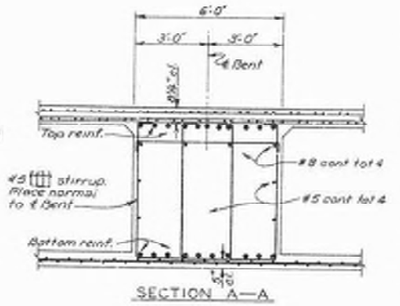
I HEREBY CERTIFY THAT THIS IS A TRUE AND ACCURATE COPY OF THE ABOVE DOCUMENT TAKEN UNDER MY DIRECTION AND CONTROL ON THIS DATE IN SACRAMENTO, CALIFORNIA PURSUANT TO AUTHORITY BY THE DIRECTOR OF TRANSPORTATION.
DATE 3-28-80 SIGNATURE Joseph M. Ott TITLE SUPERVISOR OF MICROFILM SERVICES



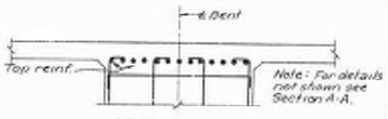
PLAN
No Scale



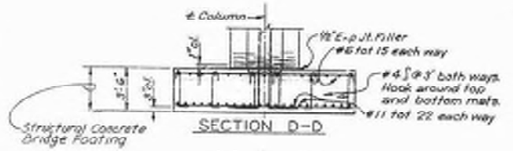
TIE BAR DETAIL
Scale: None



SECTION A—A

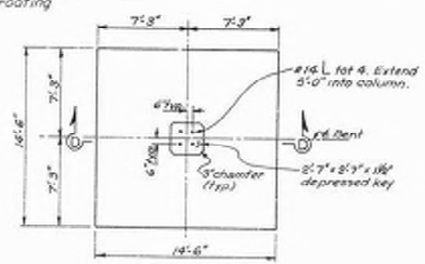


SECTION B—B

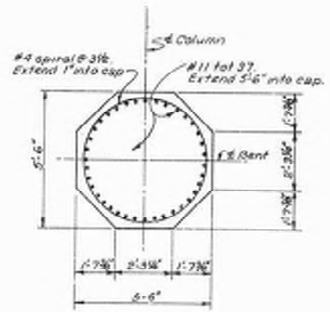


ELEVATION
Scale: ⅜"= 1'-0"

SECTION D-D



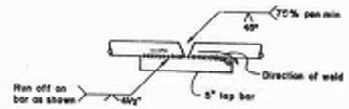
PLAN
TYPICAL FOOTING DETAILS
Scale: ¼"= 1'-0"



SECTION C-C
COLUMN DETAIL
Scale: ½"= 1'-0"

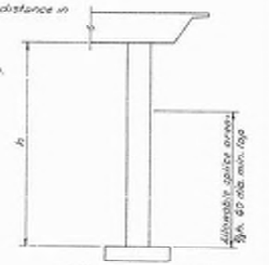
No Changes
AS BUILT
CORRECTIONS BY W. Lohse RME
CONTRACT NO. 08-170604
DATE 12-10-79 3-11-80

Notes:
Numbers at ends of bars in top reinforcement indicate distance in feet from Column Reference Line or ℄ Bridge.
Numbers at ends of bars in bottom reinforcement indicate distance in feet from Bet Col Reference.
All bars #11 unless otherwise noted.
Details symmetrical about ℄ Bridge.
All reference lines and ℄ Bridge are concentric with ℄ Imp.



SPIRAL SPLICE DETAILS

Notes:
1. Butt weld to be made first.
2. Butt weld to be in flat or horizontal position.
3. Lap bar centered on splice.
4. Flare weld to be made in direction shown.
5. Lap bar equal in size to spiral bar.



SPLICE DIAGRAM
No Scale

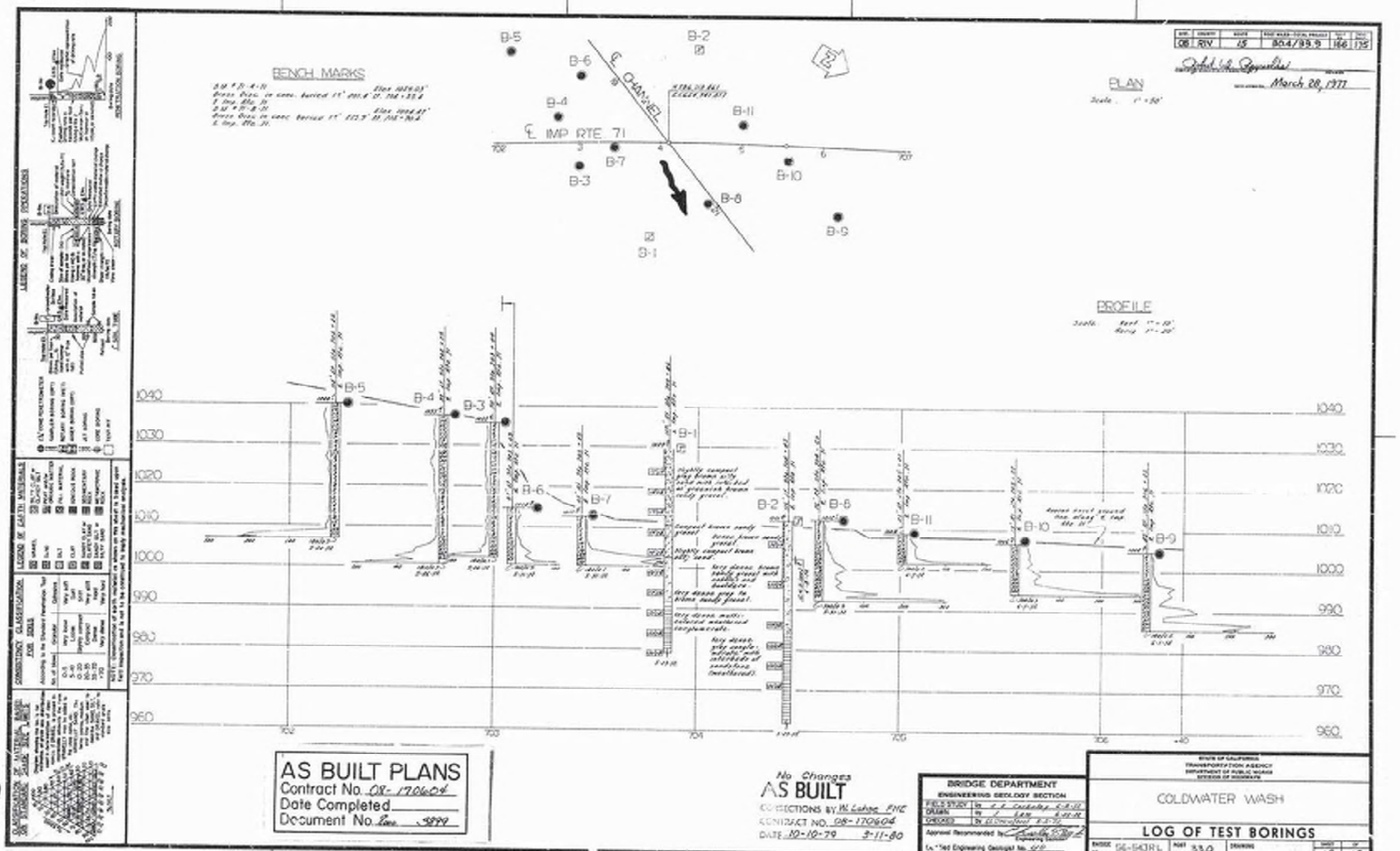
DESIGN	A.S.K.		J.D. Jessup 1-77	State of CALIFORNIA DEPARTMENT OF TRANSPORTATION	OFFICE OF STRUCTURES DESIGN GROUP 8	BRIDGE NO. 56-545 R/L	COLDWATER WASH BRIDGE		
DETAILS	Cathy Wilcox 2/14		J.D. Jessup 1-77		PROJECT ENGINEER J.D. Jessup	POST MILE 33.0	BENTS—LEFT BRIDGE		
QUANTITIES	D. Christensen 2-77		Designed 2-77		CU WO	Disregard prior bearing seat revision dates ——→			

ORIGINAL SCALE IN INCHES FOR REDUCED PLANS

DIST.	COUNTY	ROUTE	POST MILE-TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
08	Riv	18	30.4/33.9	159	178

Filed 3/77
March 28, 1977

159



DIST.	COUNTY	ROUTE	POST MILES-TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
08	RIV	15	80.4/89.9	166	175

March 28, 1977

AS BUILT PLANS
Contract No. 08-170604
Date Completed
Document No. Rec. 3899

No Changes
AS BUILT
CORRECTIONS BY W. Lehne PHC
CONTRACT NO. 08-170604
DATE 10-10-79 3-11-80

BRIDGE DEPARTMENT
ENGINEERING GEOLOGY SECTION
FIELD STUDY by C.F. Cassady 6-21-77
DRAWN by J.R.W. 6-21-77
CHECKED by D.D. Woodland 9-27-77
Approved Recommended by [signature]
Engineering Geologist
Ex. Tech Engineering Geologist No. 410

STATE OF CALIFORNIA
TRANSPORTATION AGENCY
DEPARTMENT OF PUBLIC WORKS
DIVISION OF HIGHWAYS

COLDWATER WASH

LOG OF TEST BORINGS

BRIDGE NO. 56-0431L | POST MILE 33.0 | DRAWING NO. | SHEET 15 | OF 15

WO 170600
OU 08203

I HEREBY CERTIFY THAT THIS IS A TRUE AND ACCURATE COPY OF THE ABOVE DOCUMENT TAKEN UNDER MY DIRECTION AND CONTROL ON THIS DATE IN SACRAMENTO, CALIFORNIA PURSUANT TO AUTHORITY GIVEN BY THE DIRECTOR OF TRANSPORTATION.

DATED 3-28-80 Joseph M Tate SUPERVISOR OF MICROFILM SERVICES

166

(General Plan) Coldwater Wash Bridge

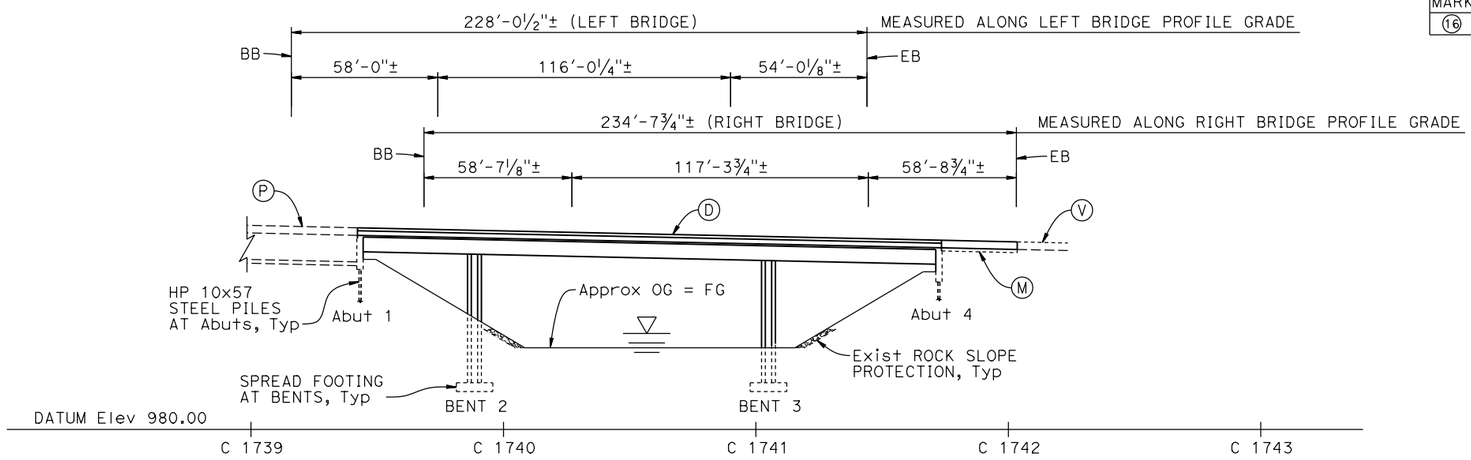
PREPARED FOR THE STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION

Dist	COUNTY	ROUTE	POST MILE
08	RIV	15	32.96

RIVERSIDE COUNTY
TRANSPORTATION COMMISSION
4080 LEMON STREET
RIVERSIDE, CA 92502

HDR ENGINEERING, INC.
3230 EL CAMINO REAL, SUITE 200
IRVINE, CA 92602-1377

NOTE: Profile Grade to match existing



DEVELOPED ELEVATION ALONG "C" LINE

1" = 30′

CURVE DATA				
MARK	R	Δ	T	L
(16)	3999.74′	27°46′23"	988.83′	1938.79′

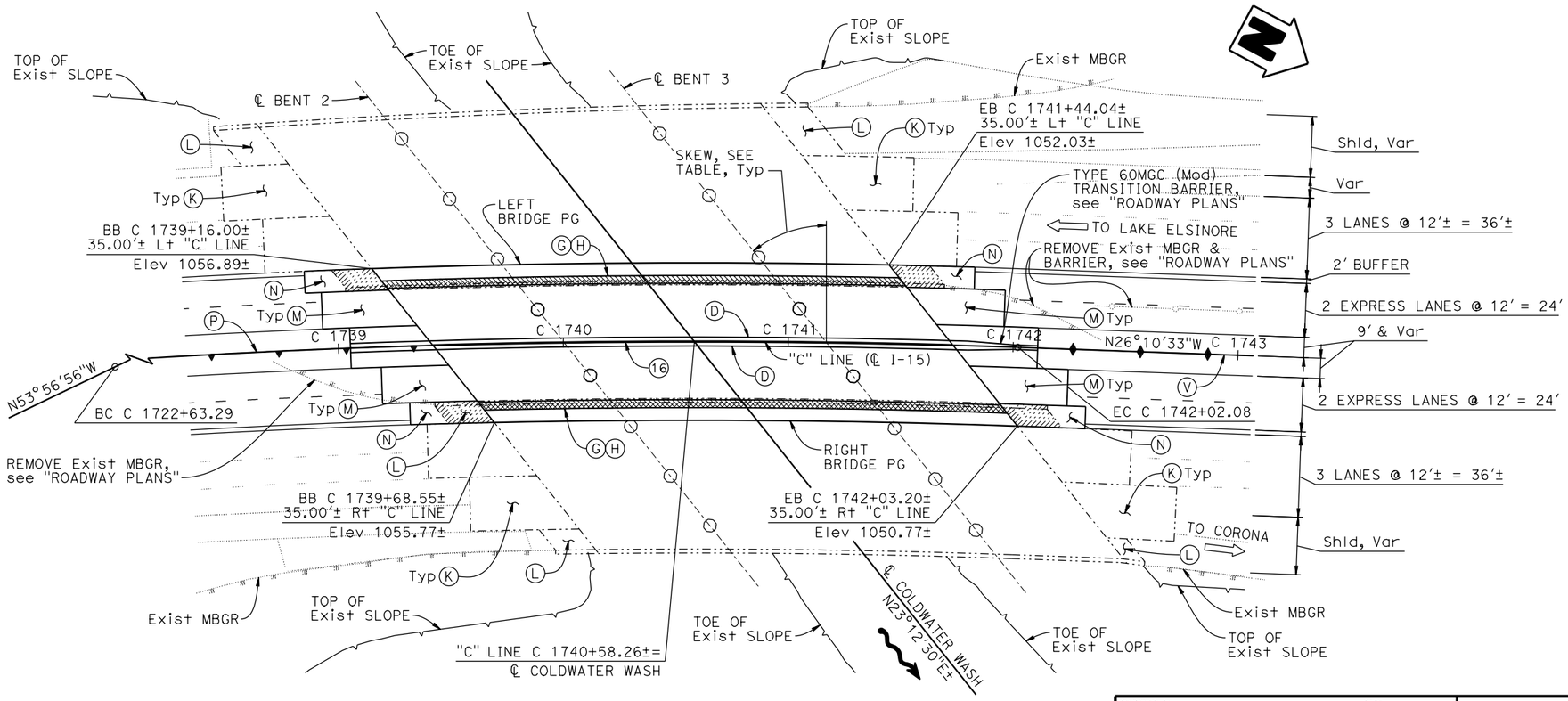
SKEW DATA	
SUPPORT	SKEW
Abut 1	36°53′24"±
BENT 2	37°43′30"±
BENT 3	39°23′46"±
Abut 4	40°12′11"±

NOTES:

(D) Concrete Barrier (Type 836)
(G) Bridge removal (portion)
(H) Closure pour (3′-6")
(K) Existing Structure Approach
(L) Existing Shoulder Slab
(M) Structure Approach Type N(30)
(N) Structure Approach Type R(30)
(P) Retaining Wall, see "ROADWAY PLANS"
(V) Median Barrier, see "ROADWAY PLANS"

LEGEND:

- New structure
- Existing structure
- Bridge Removal (Portion)
- Closure Pour
- Direction of traffic
- Direction of flow
- High water surface elevation (Left Bridge 1XXX.X±) (Right Bridge 1XXX.X±)



PLAN

1" = 30′

ASSUMPTIONS:

1. Vehicular traffic will not pass through the construction site. No falsework openings required.
2. No existing utilities conflict with bridge improvements and require relocation.
3. Existing elevations shown have been adjusted from the As-Built datum to the NAVD 88 datum by +2.5 feet.
4. Seismic retrofit assessment for this structure will be considered in the design phase of the project.

DATE OF ESTIMATE	05/2021
BRIDGE REMOVAL	= 1908 SQFT
STRUCTURE DEPTH	= 6′-6"
LENGTH	= 231′-4 ⅛" (Avg)
WIDTH	= 50′-0"
AREA	= 11567 SQFT
COST/ft² INCLUDING TRO, MOBILIZATION & 25% CONTINGENCY	= $XXX
TOTAL COST	= $X,XXX,000

DESIGN OVERSIGHT

SIGN OFF DATE

ADVANCE PLANNING STUDY SHEET
(ENGLISH) (REVISION 4/19/2018)

DATE PLOTTED => 22-MAR-2021 TIME PLOTTED => 12:33
FILE => 56-0543r1-a-gp01.dgn USERNAME => DLAFRANCHI

DESIGNED BY	D. LAFRANCHI	DATE	05/2021
DRAWN BY	E. GRAY	DATE	05/2021
CHECKED BY	W. PEERY	DATE	05/2021
APPROVED	J. WANG	DATE	05/2021

J. WANG
PROJECT ENGINEER

PLANNING STUDY

COLDWATER WASH (WIDEN)

UNIT: 0000	BRIDGE No.: 56-0543 R/L
CONTRACT No.: 08-0J0820	PROJECT No. & PHASE: 08-18000063 & 0

PREPARED FOR THE STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION

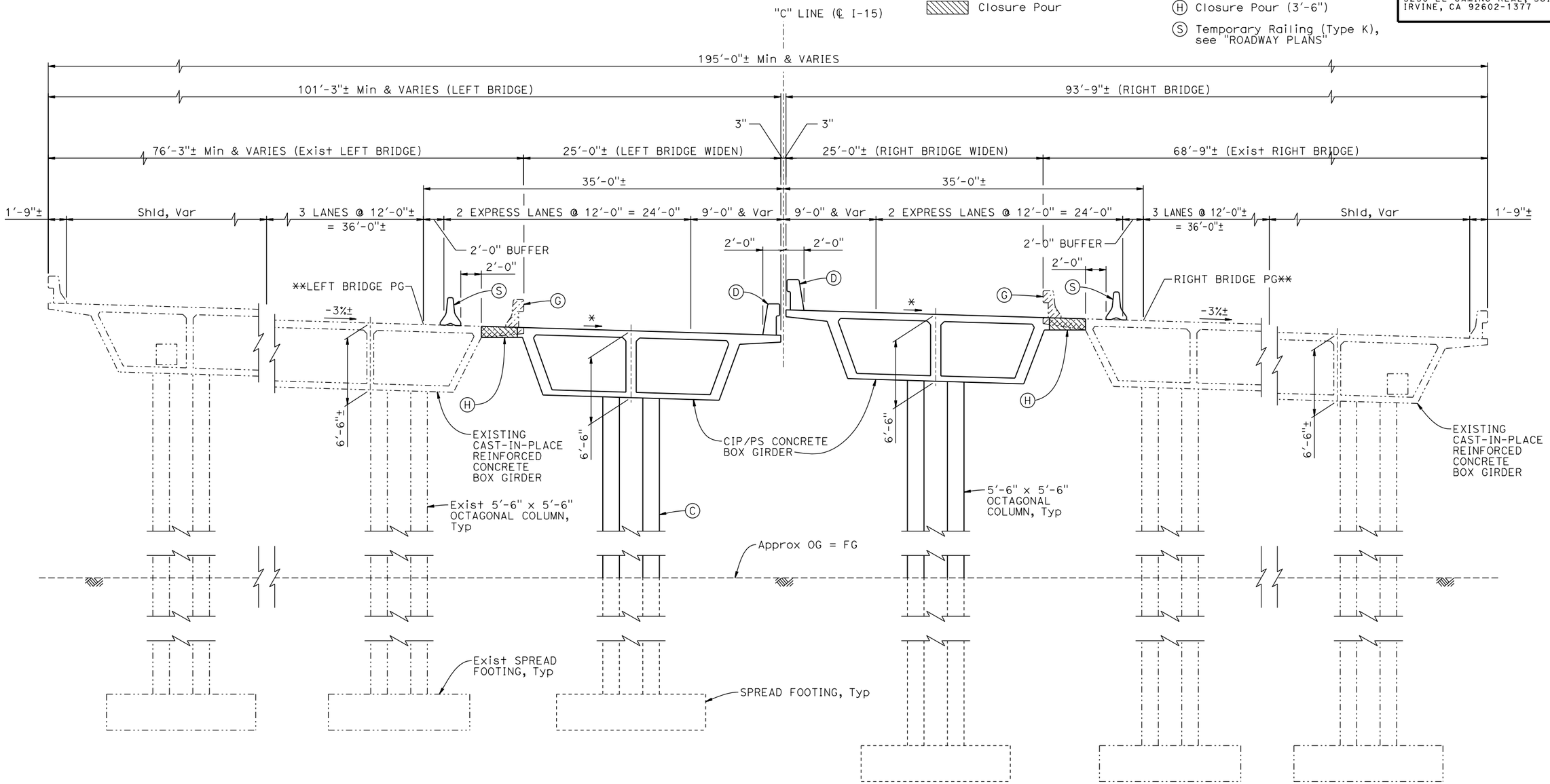
Dist	COUNTY	ROUTE	POST MILE
08	RIV	15	32.96

RIVERSIDE COUNTY
TRANSPORTATION COMMISSION
4080 LEMON STREET
RIVERSIDE, CA 92502

HDR ENGINEERING, INC.
3230 EL CAMINO REAL, SUITE 200
IRVINE, CA 92602-1377

LEGEND:
- New structure
- Existing structure
- Bridge Removal (Portion)
- Closure Pour

NOTES:
- (C) Paint Bent Number
- (D) Concrete Barrier (Type 836)
- (G) Bridge Removal (Portion)
- (H) Closure Pour (3'-6")
- (S) Temporary Railing (Type K), see "ROADWAY PLANS"



TYPICAL SECTION

1" = 5'

* Match existing cross slope
** Match existing profile grade

DESIGNED BY D. LAFRANCHI	DATE 05/2021	
DRAWN BY E. GRAY	DATE 05/2021	J. WANG, PROJECT ENGINEER
CHECKED BY X. XX	DATE 05/2021	
APPROVED J. WANG	DATE 05/2021	

DESIGN OVERSIGHT

SIGN OFF DATE

ADVANCE PLANNING STUDY SHEET (ENGLISH) (REVISION 4/19/2018)

DATE PLOTTED => 22-MAR-2021 TIME PLOTTED => 12:51
FILE => 56-0543r1-a-gp02.dgn USERNAME => DLAFRANCHI

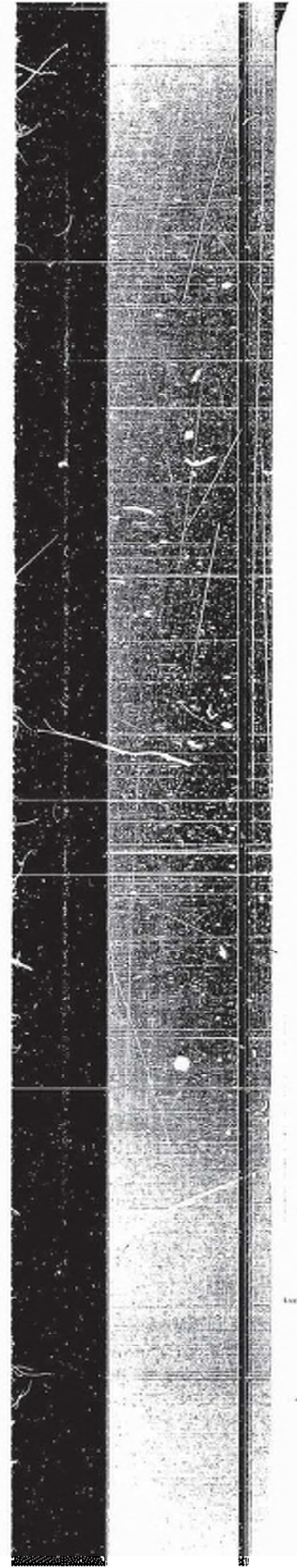
PLANNING STUDY

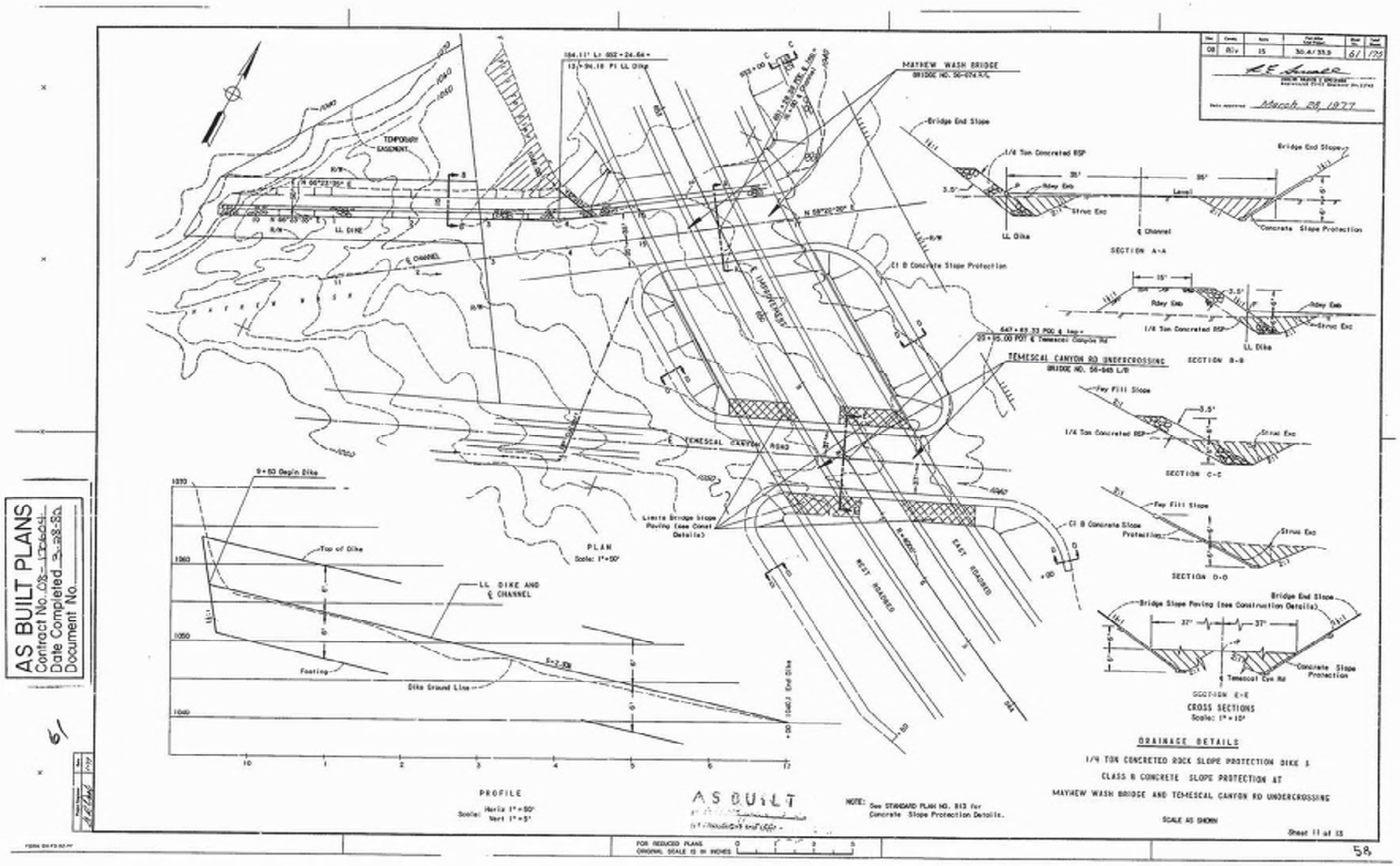
COLDWATER WASH (WIDEN)

UNIT: 0000	BRIDGE No.: 56-0543 R/L
CONTRACT No.: 08-0J0820	PROJECT No. & PHASE: 08-18000063 & 0

APPENDIX G: MAYHEW WASH BRIDGE AS-BUILTS AND GENERAL PLAN

(As-builts) Mayhew Wash Bridge Plans



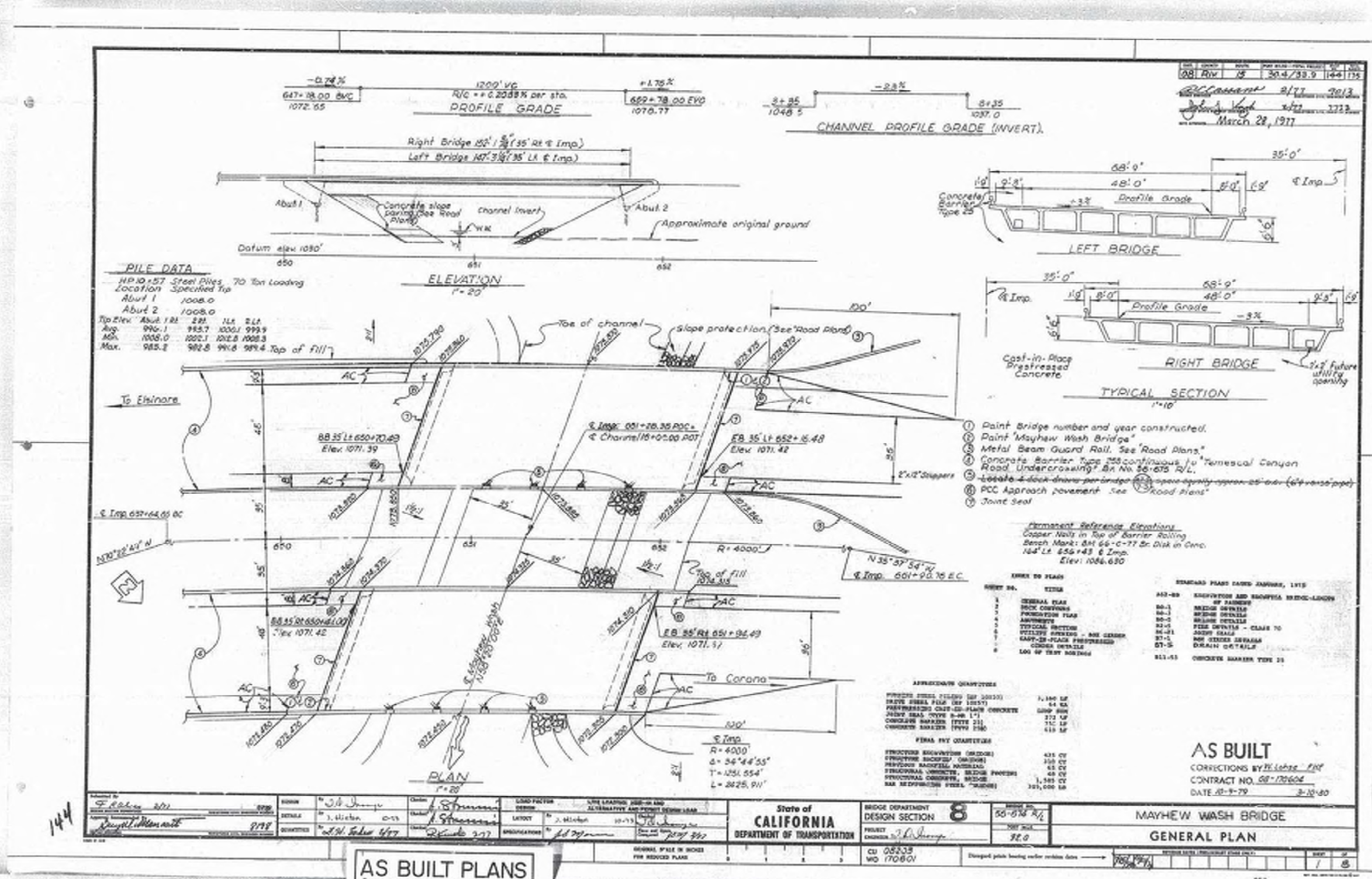


AS BUILT PLANS
Contract No. 08-172604
Date Completed 3-28-80
Document No.

61

58

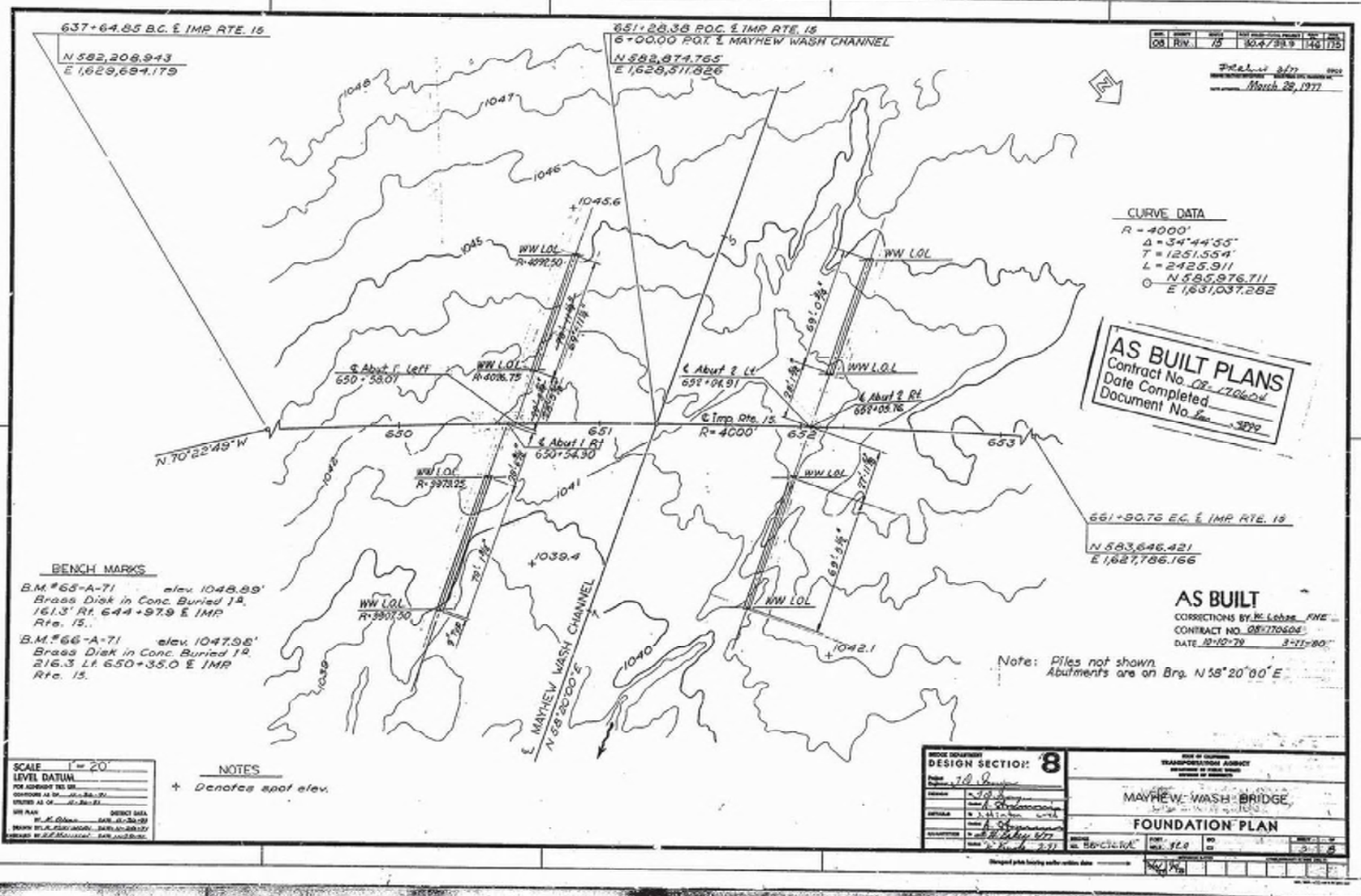
I HEREBY CERTIFY THAT THIS IS A TRUE AND ACCURATE COPY OF THE ABOVE DOCUMENT THIBS UNDER MY DIRECTION AND CONTROL ON THIS DATE IN SACRAMENTO, CALIFORNIA PURSUANT TO AUTHORIZATION BY THE DIRECTOR OF TRANSPORTATION.
5-15-80 Joseph M Cote CHIEF DIVISION OF HIGHWAY SERVICES



AS BUILT PLANS
Contract No. 08-170604
Date Completed
Document No.

I HEREBY CERTIFY THAT THIS IS A TRUE AND ACCURATE COPY OF THE ABOVE DOCUMENT TAKEN UNDER MY DIRECTION AND CONTROL ON THIS DATE IN SACRAMENTO, CALIFORNIA PURSUANT TO AUTHORIZATION BY THE DIRECTOR OF TRANSPORTATION.

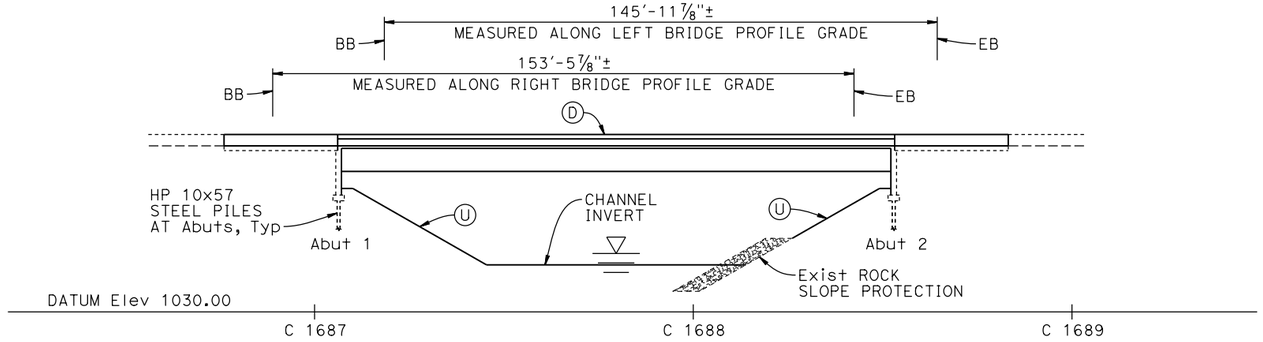
3-28-80 Joseph M. Cote — SUPERVISOR OF MICROFILM SERVICES


637+64.85 B.C. ℄ IMP RTE. 15
N 582,208.943
E 1,629,694.179
651+28.38 POC. ℄ IMP RTE. 15
6+00.00 P.O.T. ℄ MAYHEW WASH CHANNEL
N 582,874.765
E 1,628,511.826
CURVE DATA
R = 4000'
Δ = 34°44'55"
T = 1251.554'
L = 2425.911
N 585,976.711
E 1,631,037.282
WW LOL
℄ Abut 2 Left
650+38.01
℄ Abut 1 Rt
650+54.30
℄ Abut 2 Rt
652+09.76
℄ Imp Rte. 15
R = 4000'
650
651
652
653
N 70°22'49" W
1045.6
1045
1046
1047
1048
1041
1040
1039.4
1042.1
1039
MAYHEW WASH CHANNEL
N 58°20'00" E
661+90.76 E.C. ℄ IMP RTE. 15
N 583,646.421
E 1,627,786.166
AS BUILT PLANS
Contract No. 08-170604
Date Completed
Document No.
AS BUILT
CORRECTIONS BY W. Lobue FINE
CONTRACT NO. 08170604
DATE 10-10-79 3-11-80
Note: Piles not shown
Abutments are on Brg. N 58°20'00" E
BENCH MARKS
B.M. #65-A-71 elev. 1048.89'
Brass Disk in Conc. Buried 1ft.
161.3' Rt. 644+97.9 ℄ IMP.
Rte. 15.
B.M. #66-A-71 elev. 1047.98'
Brass Disk in Conc. Buried 1ft.
216.3 Lt. 650+35.0 ℄ IMP
Rte. 15.
NOTES
+ Denotes spot elev.
SCALE 1" = 20'
LEVEL DATUM
DESIGN SECTION 8
MAYHEW WASH BRIDGE
FOUNDATION PLAN
08-CLM
146
I HEREBY CERTIFY THAT THIS IS A TRUE AND ACCURATE COPY OF THE ABOVE DOCUMENT TAKEN UNDER MY DIRECTION AND CONTROL ON THIS DATE IN SACRAMENTO, CALIFORNIA PURSUANT TO AUTHORITY VESTED IN THE DIRECTOR OF TRANSPORTATION
3-28-80 Joseph M Lobue SUPERVISOR OF

(General Plan) Mayhew Wash Bridge

PREPARED FOR THE STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION

NOTE: Profile Grade to match existing



DEVELOPED ELEVATION ALONG "C" LINE

1" = 20'

CURVE DATA				
MARK	R	Δ	T	L
(14)	3999.74'	34°45'02"	1251.55'	2425.89'

Dist	COUNTY	ROUTE	POST MILE
08	RIV	15	31.97

RIVERSIDE COUNTY
TRANSPORTATION COMMISSION
4080 LEMON STREET
RIVERSIDE, CA 92502

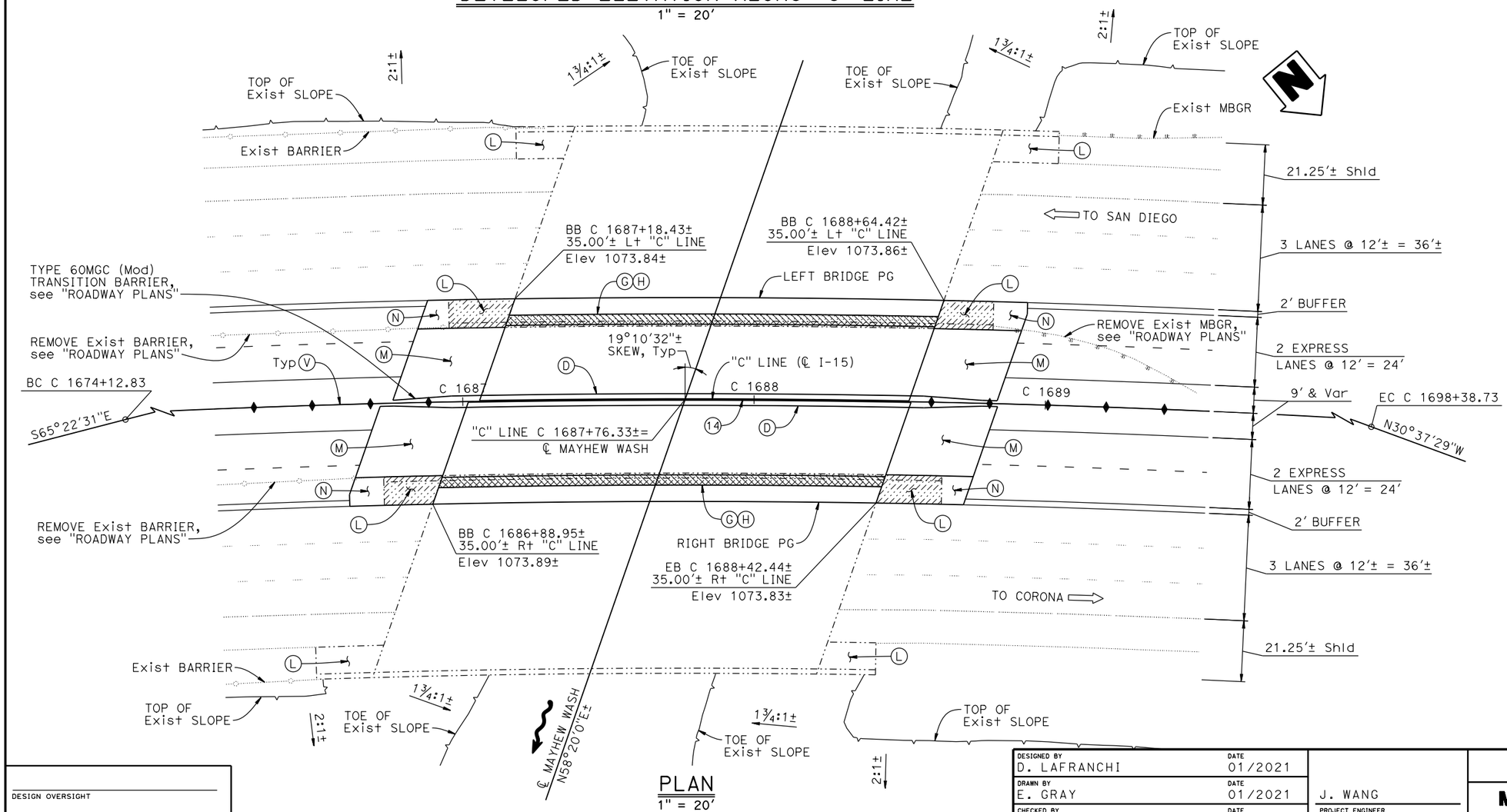
HDR ENGINEERING, INC.
3230 EL CAMINO REAL, SUITE 200
IRVINE, CA 92602-1377

NOTES:

(D) Concrete Barrier (Type 836)
(G) Bridge removal (portion)
(H) Closure pour (3'-6")
(K) Existing Structure Approach
(L) Existing Shoulder Slab
(M) Structure Approach Type N(30)
(N) Structure Approach Type R(30)
(U) Slope Paving
(V) Median Barrier, see "ROADWAY PLANS"

LEGEND:

- New structure
- Existing structure
- Bridge Removal (Portion)
- Closure Pour
- Direction of traffic
- Direction of flow
- High water surface elevation (1XXX.XX±)



PLAN

1" = 20'

ASSUMPTIONS:

1. Vehicular traffic will pass through the construction site. Falsework openings are required. Falsework depth assumed to be 3'-0" (48'-0" opening).
2. No existing utilities conflict with bridge improvements and require relocation.

DATE OF ESTIMATE	01/2021
BRIDGE REMOVAL	= X,XXX SQFT
STRUCTURE DEPTH	= 6'-9" & 7'-0"
LENGTH	= XXX'-X" (Avg)
WIDTH	= ###'-##" Avg
AREA	= ##,### SQFT
COST/ft² INCLUDING TRO, MOBILIZATION & 25% CONTINGENCY	= $###.00
TOTAL COST	= $#,###.00

DESIGN OVERSIGHT

SIGN OFF DATE

ADVANCE PLANNING STUDY SHEET
(ENGLISH) (REVISION 4/19/2018)

DATE PLOTTED => 12-OCT-2020 TIME PLOTTED => 16:20
FILE => 56-0674ri-a-gp01.dgn USERNAME => svc_in_pwservice

DESIGNED BY	D. LAFRANCHI	DATE 01/2021
DRAWN BY	E. GRAY	DATE 01/2021
CHECKED BY	W. PEERY	DATE 01/2021
APPROVED	J. WANG	DATE 01/2021

J. WANG
PROJECT ENGINEER

PLANNING STUDY

MAYHEW WASH (WIDEN)

UNIT: 0000	BRIDGE No.: 56-0674 R/L
CONTRACT No.: 08-0J0820	PROJECT No. & PHASE: 08-18000063 & 0

PREPARED FOR THE STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION

Dist	COUNTY	ROUTE	POST MILE
08	RIV	15	31.97

RIVERSIDE COUNTY
TRANSPORTATION COMMISSION
4080 LEMON STREET
RIVERSIDE, CA 92502

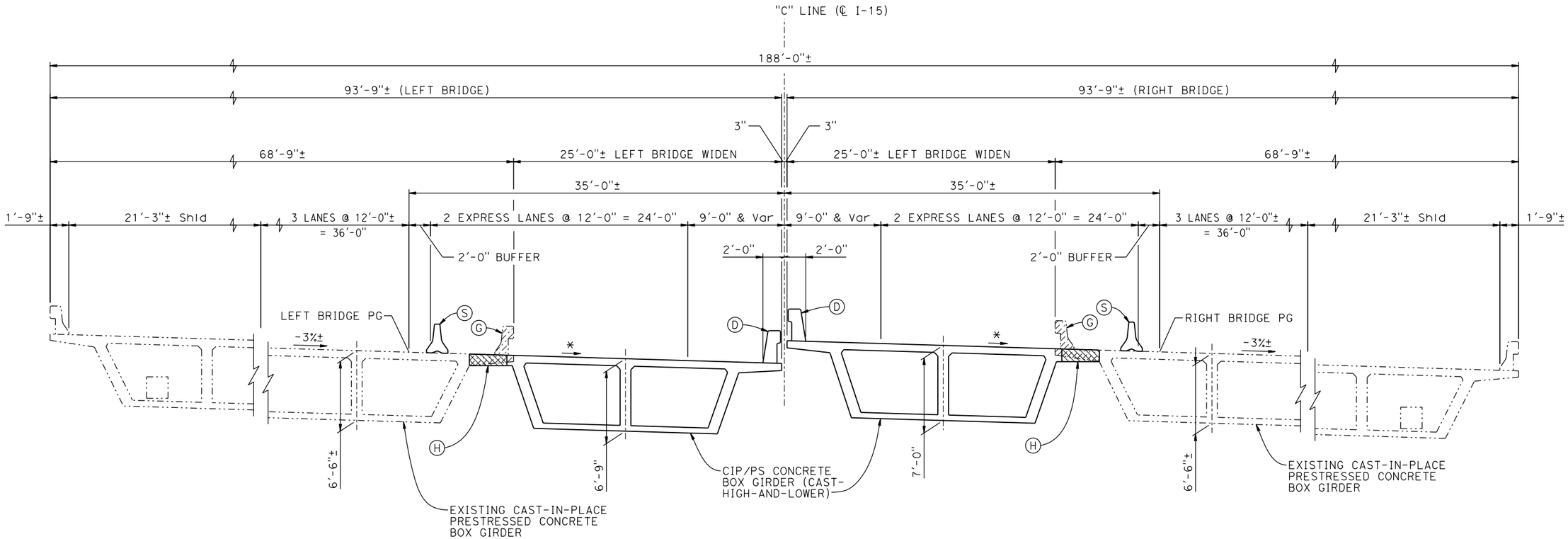
HDR ENGINEERING, INC.
3230 EL CAMINO REAL, SUITE 200
IRVINE, CA 92602-1377

LEGEND:

- New structure
- Existing structure
- Bridge Removal (Portion)
- Closure Pour

NOTES:

- (D) Concrete Barrier (Type 836)
- (G) Bridge Removal (Portion)
- (H) Closure Pour (3'-6")
- (S) Temporary Railing (Type K), see "ROADWAY PLANS"



TYPICAL SECTION

1" = 5'

* Match existing grade and cross slope

DESIGN OVERSIGHT

SIGN OFF DATE

ADVANCE PLANNING STUDY SHEET
(ENGLISH) (REVISION 4/19/2018)

DATE PLOTTED => 20-JUN-2020 TIME PLOTTED => 18:49
FILE => 56-0674r1-a-gp02.dgn USERNAME => svc_in_pwservice

DESIGNED BY D. LAFRANCHI	DATE 01/2021	J. WANG PROJECT ENGINEER	PLANNING STUDY
DRAWN BY E. GRAY	DATE 01/2021		MAYHEW WASH (WIDEN)
CHECKED BY W. PEERY	DATE 01/2021		UNIT: 0000 / BRIDGE No.: 56-0674 R/L
APPROVED J. WANG	DATE 01/2021		CONTRACT No.: 08-0J0820 / PROJECT No. & PHASE: 08-18000063 & 0

DIST	COUNTY	ROUTE	POST MILE/TOTAL PROJECT	SHEET	TOTAL SHEETS
08	RIV	15	30.4/33.9	151	175

Joseph W. Zappulla #1845
March 28, 1977

BENCH MARK

PLAN

PROFILE

NO GROUND WATER ENCOUNTERED
DIVISION OF MINES AND GEOLOGY
DATE March 1980

AS BUILT PLANS
Contract No. 08-170604
Date Completed
Document No. Rec 9899

No Changes
AS BUILT
CORRECTIONS BY W. Lokke PE
CONTRACT NO. 08-170604
DATE 10-10-79 9-11-80

BRIDGE DEPARTMENT
ENGINEERING GEOLOGY SECTION
FIELD STUDY by G. Marks 2-2-77
DRAWN by J. Lee 2-27-79
CHECKED by G. Marks 4-7-79
Approval Recommended by Duke Siegel
Certified Engineering Geologist No. 998

STATE OF CALIFORNIA
TRANSPORTATION AGENCY
DEPARTMENT OF PUBLIC WORKS
DIVISION OF HIGHWAYS

MAYHEW WASH

LOG OF TEST BORINGS

BRIDGE No. 56-674 R/L | POST MILE 16.4 | DRAWING NO. | SHEET 8 | OF 8

WD 170601
Dp 08000

I HEREBY CERTIFY THAT THIS IS A TRUE AND ACCURATE COPY OF THE ABOVE DOCUMENT TAKEN UNDER MY DIRECTION AND CONTROL ON THIS DATE IN SACRAMENTO, CALIFORNIA PURSUANT TO AUTHORIZATION BY THE DIRECTOR OF TRANSPORTATION.
DATE 3-28-80 SIGNED Joseph W. Lee TITLE SUPERVISOR OF DRAFTING SERVICES

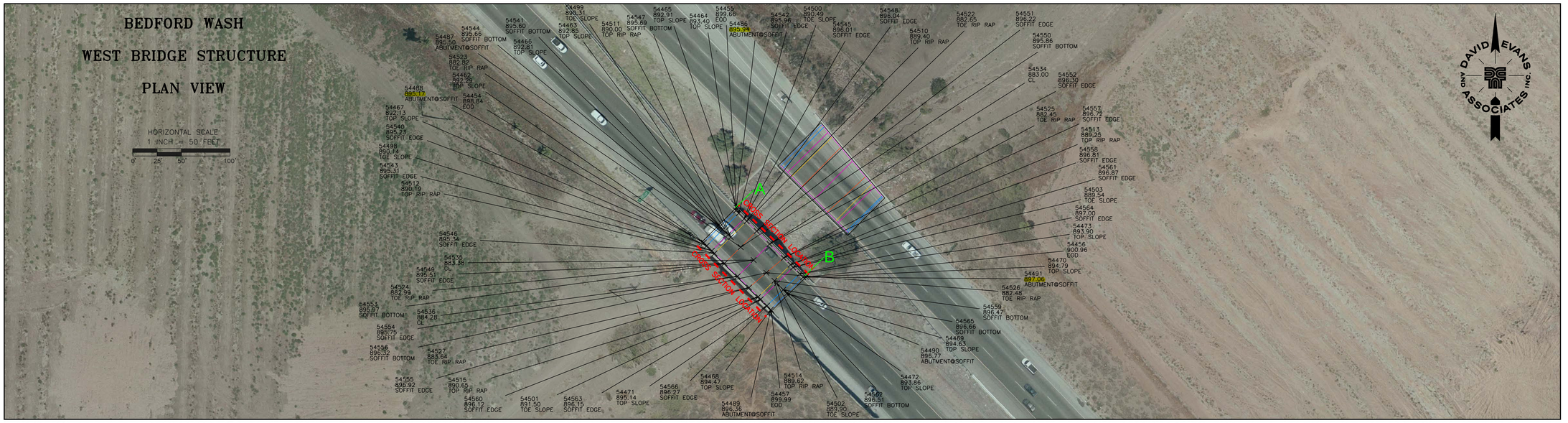
APPENDIX H: HYDRAULICS MODEL OF BEDFORD WASH

BEDFORD WASH

WEST BRIDGE STRUCTURE

PLAN VIEW

HORIZONTAL SCALE
1 INCH = 50 FEET
0' 25' 50' 100'



BEDFORD WASH

WEST SIDE

PANORAMIC IMAGE

(NOT TO SCALE)

BEDFORD WASH

EAST SIDE

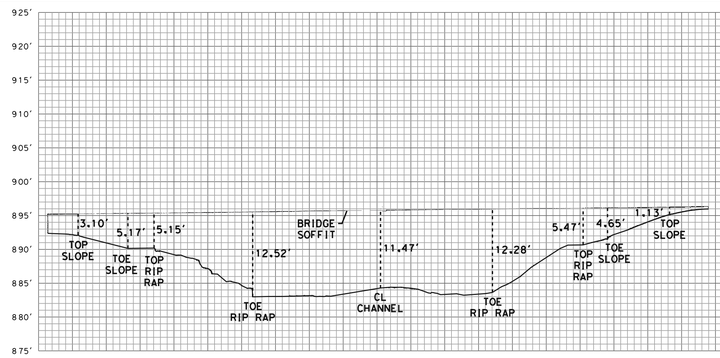
PANORAMIC IMAGE

(NOT TO SCALE)

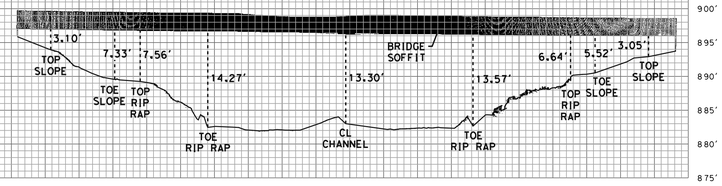
BEDFORD WASH

WEST BRIDGE STRUCTURE

BRIDGE CROSS SECTIONS



WEST SIDE



EAST SIDE

INTERSECTION OF I-15 AND BEDFORD WASH
DRAINAGE CHANNEL
CROSS SECTION

HORIZONTAL AND VERTICAL SCALE
1 INCH = 10 FEET
0' 5' 10' 20'

BRIDGE OVER DRAINAGE CHANNEL

LASER SCANNING SURVEY

DAVID EVANS AND ASSOCIATES INC.
4200 Concours, Suite 200
Ontario, CA 91764
Phone: (909) 481-5750

REVISIONS: APPD.

DATE: MAY 1, 2009
DESIGN:
DRAWN: ELZ
CHECKED:
REVISION NUMBER:

SCALE: VARIES

PROJECT NUMBER:
HDRX00000031

DRAWING FILE:
BEDFORD WASH

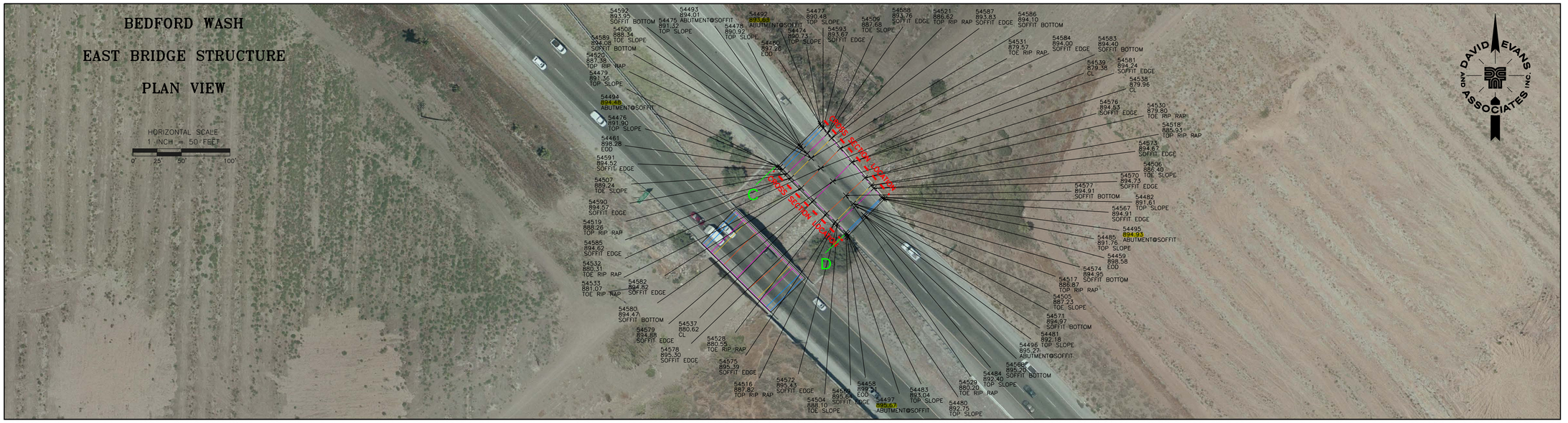
SHEET NO.
82
OF

BEDFORD WASH

EAST BRIDGE STRUCTURE

PLAN VIEW

HORIZONTAL SCALE
1 INCH = 50 FEET
0' 25' 50' 100'



BEDFORD WASH

WEST SIDE

PANORAMIC IMAGE

(NOT TO SCALE)

BEDFORD WASH

EAST SIDE

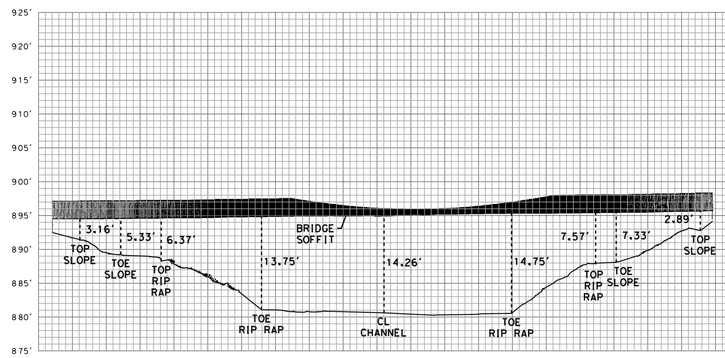
PANORAMIC IMAGE

(NOT TO SCALE)

BEDFORD WASH

EAST BRIDGE STRUCTURE

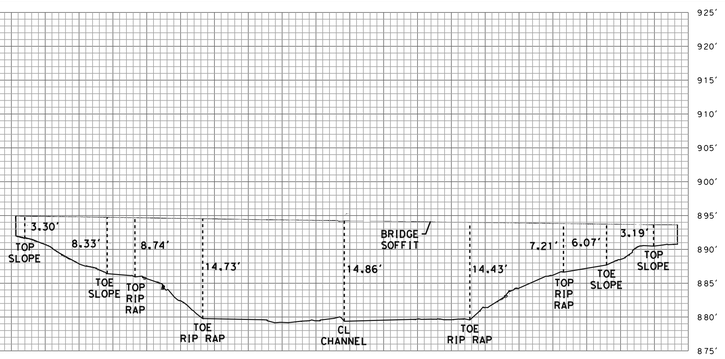
BRIDGE CROSS SECTIONS



WEST SIDE

INTERSECTION OF I-15 AND BEDFORD WASH
DRAINAGE CHANNEL
CROSS SECTION

HORIZONTAL AND VERTICAL SCALE
1 INCH = 10 FEET
0' 5' 10' 20'



EAST SIDE

BRIDGE OVER DRAINAGE CHANNEL

LASER SCANNING SURVEY

DAVID EVANS AND ASSOCIATES INC.
4200 Concours, Suite 200
Ontario, CA 91764
Phone: (909) 481-5750

REVISIONS: APPD.

DATE: MAY 1, 2009
DESIGN:
DRAWN: ELZ
CHECKED:
REVISION NUMBER:

SCALE: VARIES

PROJECT NUMBER:
HDRX00000031

DRAWING FILE:
BEDFORD WASH

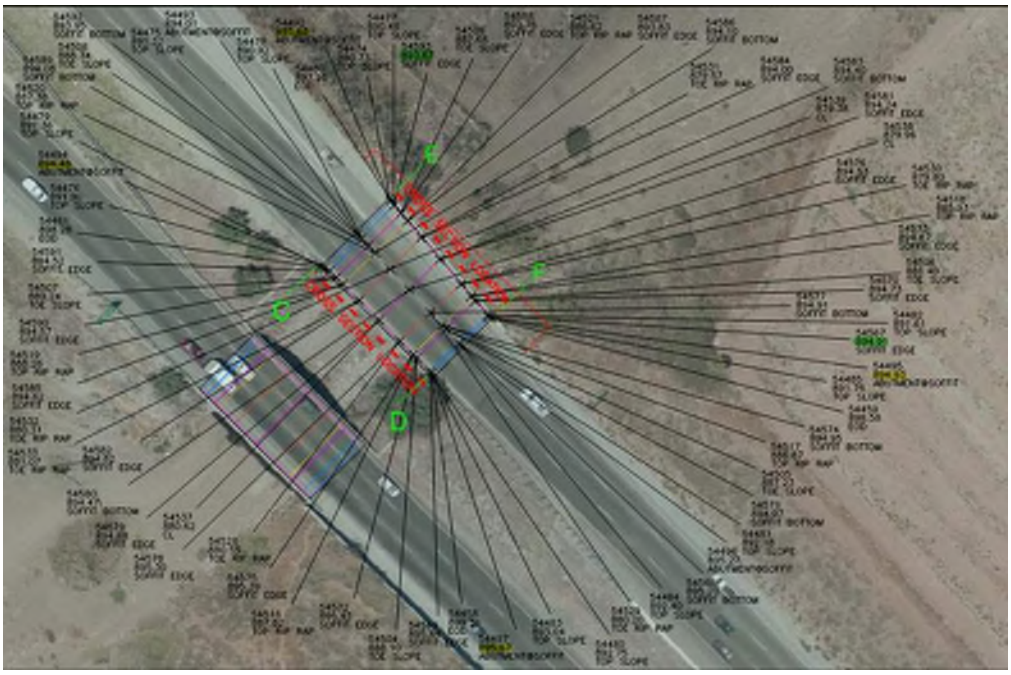
SHEET NO.
81
OF

Bedford Deck Elevation

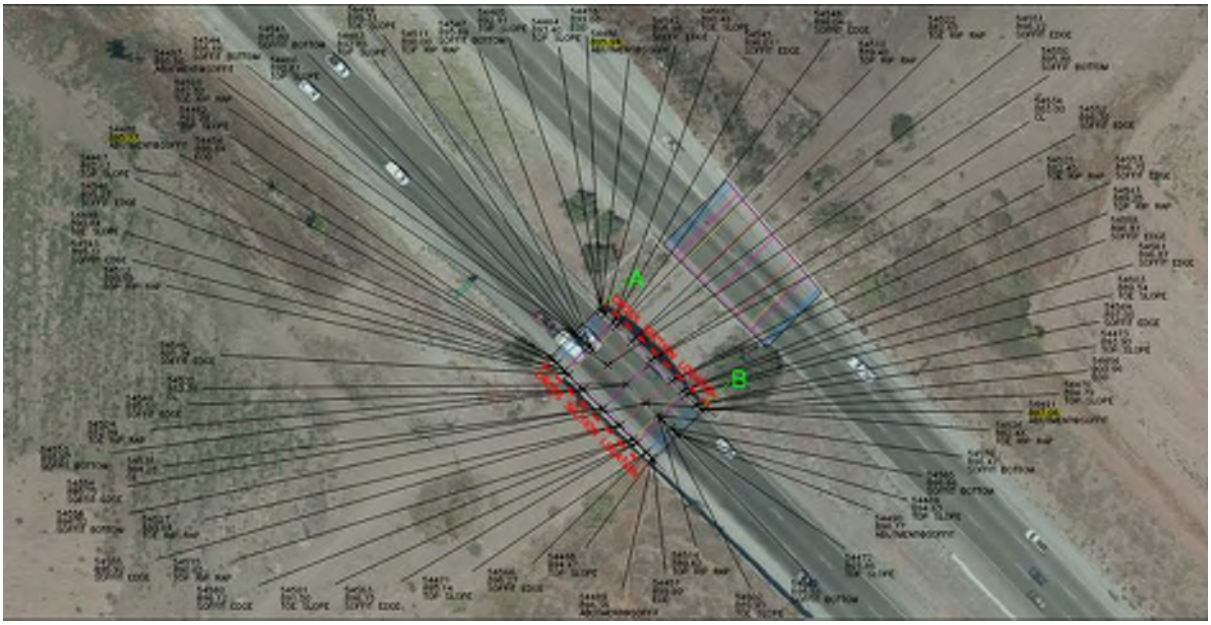
Existing Condition is from 2009 LIDAR. Elevations are assumed to be NAVD 88

Proposed Condition

Northbound



Southbound




```
clear; clc;
format bank
```

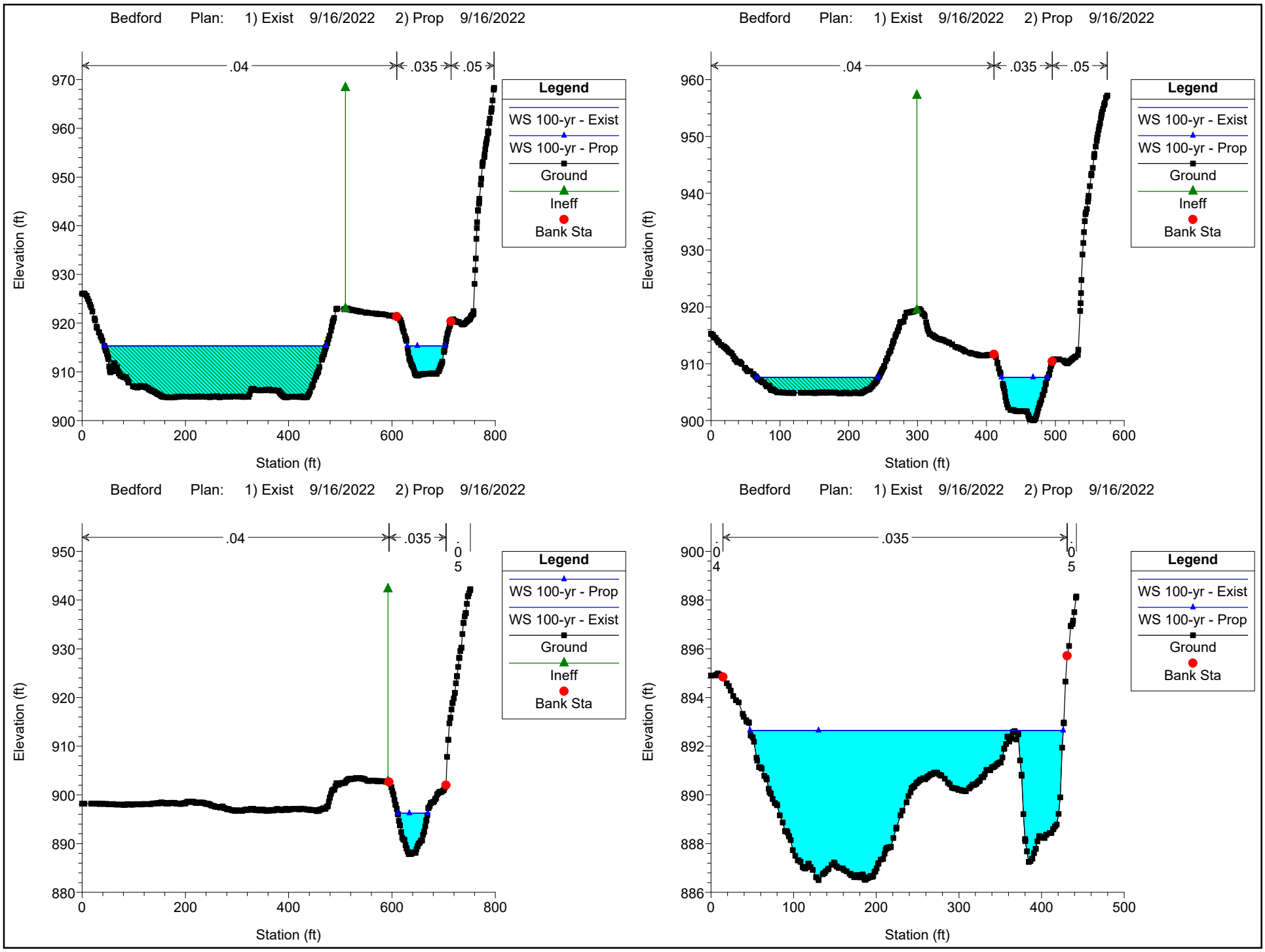
```
rxs = 1.5/100; % Southbound and Northbound cross slope

% Extrapolated Elevations
SElev = [895.5, 897.06, 894.48, 895.67, 893.67, 894.91]; % Start Elevations for points A,B,C,D
ABelev = SElev(:,1:2)+32.55*rxs;
CDelev = SElev(:,3:4)+32.21*rxs;
Eelev = SElev(:,5)-12.35*rxs;
Felev = SElev(:,6)-20.81*rxs;
elev = [ABelev CDelev Eelev Felev];
% Create table
prows = {'A','B','C','D','E','F'};
varn = {'Point','Elevation NAVD88'};
T = table(prows', elev', 'VariableNames',varn)
```

T = 6×2 table

	Point	Elevation NAVD88
1	'A'	895.99
2	'B'	897.55
3	'C'	894.96
4	'D'	896.15
5	'E'	893.48
6	'F'	894.60

HEC-RAS River: Bedford Wash Reach: Reach 1 Profile: 100-yr

Reach	River Sta	Profile	Plan	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
				(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Reach 1	3042	100-yr	Exist	4372.00	909.24	915.33	915.33	917.71	0.010982	12.38	353.16	503.75	1.00
Reach 1	3042	100-yr	Prop	4372.00	909.24	915.33	915.33	917.71	0.010982	12.38	353.16	503.75	1.00
Reach 1	2721	100-yr	Exist	4372.00	900.08	907.61	907.61	910.14	0.010996	12.78	342.04	244.34	1.00
Reach 1	2721	100-yr	Prop	4372.00	900.08	907.61	907.61	910.14	0.010996	12.78	342.04	244.34	1.00
Reach 1	2448	100-yr	Exist	4372.00	887.82	896.22	896.22	899.03	0.010962	13.44	325.29	58.17	1.00
Reach 1	2448	100-yr	Prop	4372.00	887.82	896.22	896.22	899.03	0.010961	13.44	325.30	58.17	1.00
Reach 1	2253	100-yr	Exist	4372.00	886.50	892.65	890.07	892.82	0.001130	3.28	1332.63	379.14	0.31
Reach 1	2253	100-yr	Prop	4372.00	886.50	892.65	890.07	892.82	0.001130	3.28	1332.63	379.14	0.31
Reach 1	2176	100-yr	Exist	4372.00	884.21	892.44	889.15	892.73	0.001135	4.34	1006.65	187.48	0.33
Reach 1	2176	100-yr	Prop	4372.00	884.21	892.44	889.18	892.73	0.001135	4.34	1006.65	187.48	0.33
Reach 1	2132	100-yr	Exist	4372.00	881.11	889.70	889.70	892.48	0.014932	13.39	326.57	60.22	1.00
Reach 1	2132	100-yr	Prop	4372.00	881.11	889.70	889.70	892.48	0.014932	13.39	326.57	60.22	1.00
Reach 1	2079	100-yr	Exist	4372.00	880.73	888.69	888.39	891.04	0.009365	12.30	355.46	65.13	0.93
Reach 1	2079	100-yr	Prop	4372.00	880.73	889.18	888.52	891.26	0.010195	11.57	378.10	66.72	0.85
Reach 1	2050	100-yr	Exist	4372.00	880.35	888.06	888.06	890.71	0.010998	13.06	334.76	63.06	1.00
Reach 1	2050	100-yr	Prop	4372.00	880.35	888.22	888.22	890.86	0.014515	13.02	335.73	63.76	1.00
Reach 1	2020	100-yr	Exist	4372.00	879.72	887.58	887.58	890.26	0.014310	13.13	333.03	62.18	1.00
Reach 1	2020	100-yr	Prop	4372.00	879.72	887.58	887.58	890.26	0.014310	13.13	333.03	62.18	1.00
Reach 1	1959	100-yr	Exist	4372.00	878.56	886.20	886.20	888.66	0.011231	12.58	347.64	70.61	1.00
Reach 1	1959	100-yr	Prop	4372.00	878.56	886.29	886.29	888.78	0.014038	12.65	345.52	69.62	1.00
Reach 1	1940	100-yr	Exist	4372.00	878.56	885.60	885.60	888.01	0.011243	12.44	351.36	73.37	1.00
Reach 1	1940	100-yr	Prop	4372.00	878.56	885.63	885.63	888.01	0.011126	12.39	352.99	73.66	1.00
Reach 1	1878	100-yr	Exist	4372.00	876.75	882.41	882.41	883.11	0.009594	8.90	755.20	459.45	0.88
Reach 1	1878	100-yr	Prop	4372.00	876.75	882.41	882.41	883.11	0.009594	8.90	755.20	459.45	0.88
Reach 1	1600	100-yr	Exist	4372.00	868.97	873.69	873.69	874.90	0.009061	9.26	553.09	402.48	0.87
Reach 1	1600	100-yr	Prop	4372.00	868.97	873.69	873.69	874.90	0.009061	9.26	553.09	402.48	0.87
Reach 1	1488	100-yr	Exist	4372.00	864.88	870.56	870.56	872.00	0.008500	9.74	486.14	370.55	0.86
Reach 1	1488	100-yr	Prop	4372.00	864.88	870.56	870.56	872.00	0.008500	9.74	486.14	370.55	0.86


Bedford Plan: 1) Exist 9/16/2022 2) Prop 9/16/2022
.04
.035
.05
Legend
WS 100-yr - Exist
WS 100-yr - Prop
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Bedford Plan: 1) Exist 9/16/2022 2) Prop 9/16/2022
.04
.035
.05
Legend
WS 100-yr - Exist
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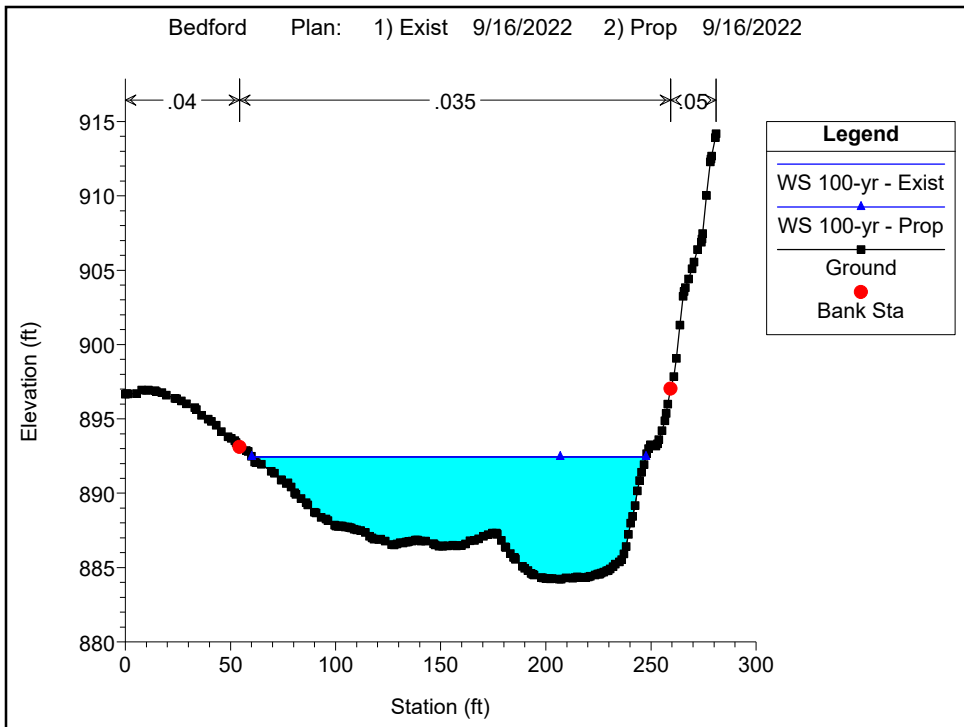
Elevation (ft)
Station (ft)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.035
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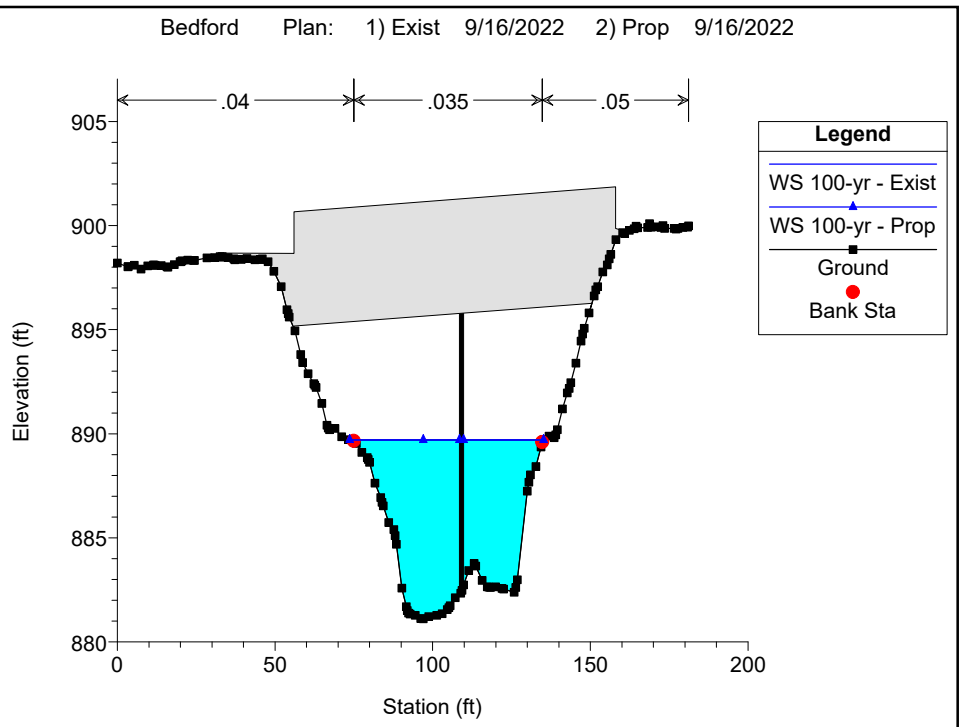
Legend
WS 100-yr - Exist
WS 100-yr - Prop
Ground
Bank Sta
Elevation (ft)
Station (ft)


Bedford Plan: 1) Exist 9/16/2022 2) Prop 9/16/2022
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.035
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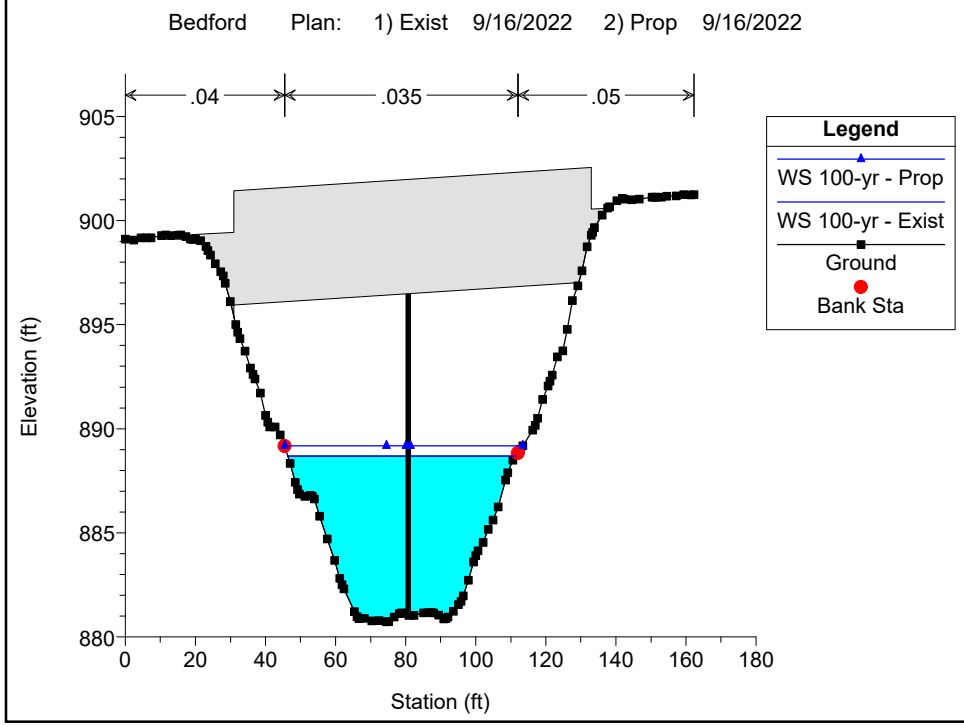
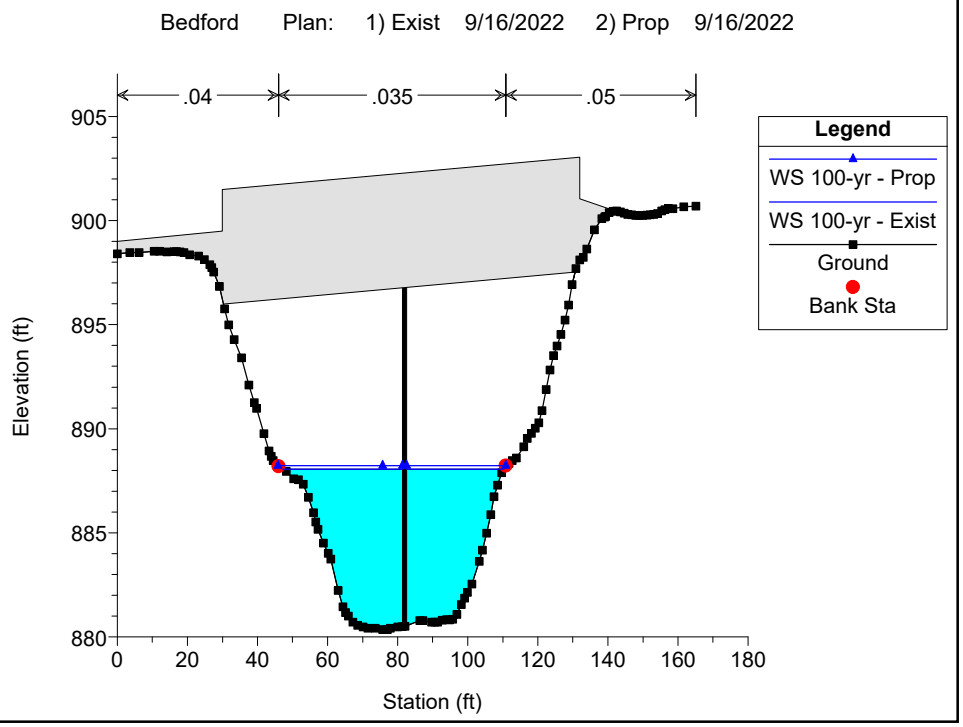
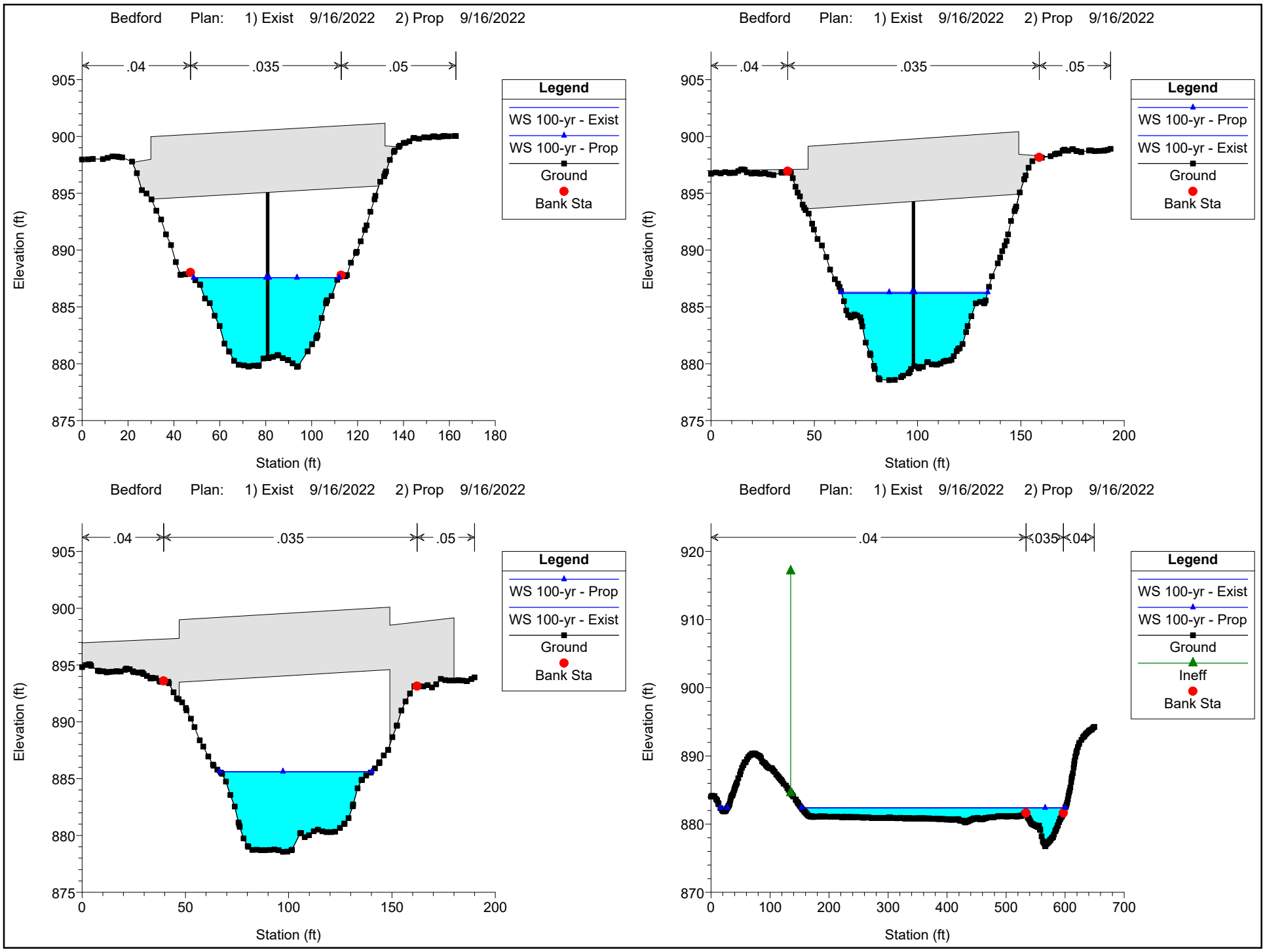
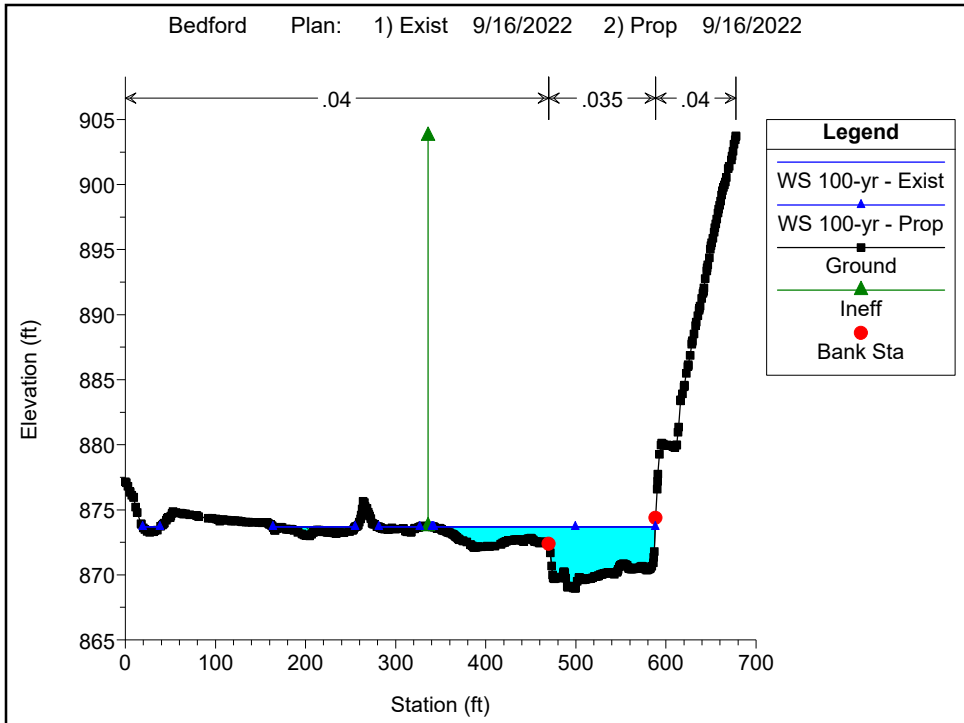
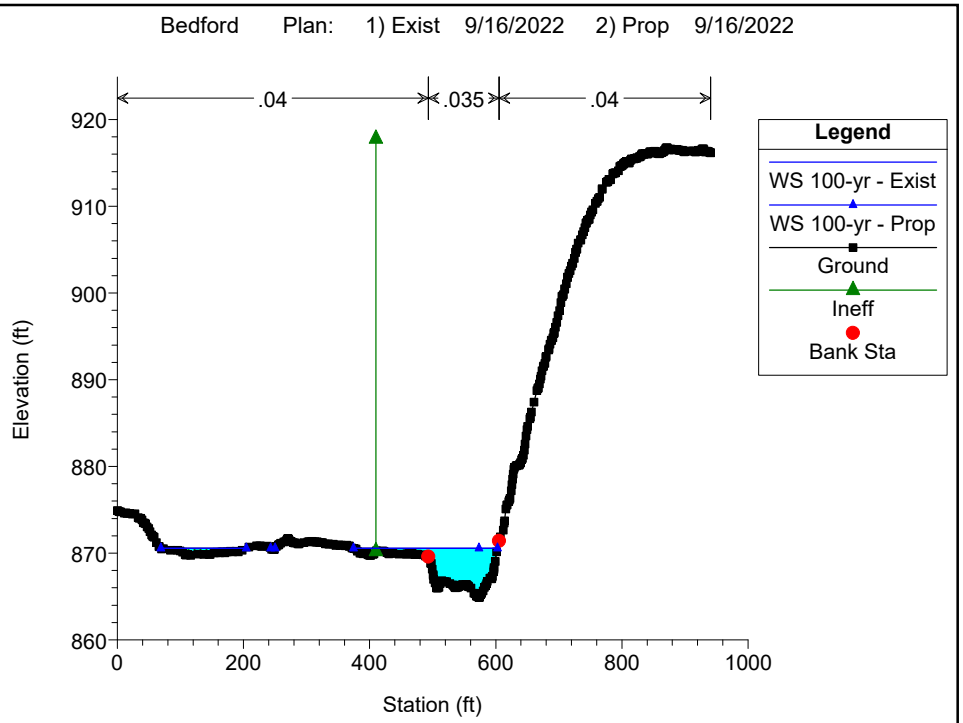
Legend
WS 100-yr - Exist
WS 100-yr - Prop
Ground
Bank Sta
Elevation (ft)
Station (ft)


Bedford Plan: 1) Exist 9/16/2022 2) Prop 9/16/2022
.04
.035
.05
Legend
WS 100-yr - Prop
WS 100-yr - Exist
Ground
Bank Sta
Elevation (ft)
Station (ft)


Bedford Plan: 1) Exist 9/16/2022 2) Prop 9/16/2022
.04
.035
.05
Legend
WS 100-yr - Prop
WS 100-yr - Exist
Ground
Bank Sta
Elevation (ft)
Station (ft)


Bedford Plan: 1) Exist 9/16/2022 2) Prop 9/16/2022
.04
.035
.05
Legend
WS 100-yr - Exist
WS 100-yr - Prop
Ground
Bank Sta
Elevation (ft)
Station (ft)
905
900
895
890
885
880
875
0
20
40
60
80
100
120
140
160
180
Bedford Plan: 1) Exist 9/16/2022 2) Prop 9/16/2022
.04
.035
.05
Legend
WS 100-yr - Prop
WS 100-yr - Exist
Ground
Bank Sta
Elevation (ft)
Station (ft)
905
900
895
890
885
880
875
0
50
100
150
200
Bedford Plan: 1) Exist 9/16/2022 2) Prop 9/16/2022
.04
.035
.05
Legend
WS 100-yr - Prop
WS 100-yr - Exist
Ground
Bank Sta
Elevation (ft)
Station (ft)
905
900
895
890
885
880
875
0
50
100
150
200
Bedford Plan: 1) Exist 9/16/2022 2) Prop 9/16/2022
.04
035
04
Legend
WS 100-yr - Exist
WS 100-yr - Prop
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
920
910
900
890
880
870
0
100
200
300
400
500
600
700


Bedford Plan: 1) Exist 9/16/2022 2) Prop 9/16/2022
.04
.035
.04
Legend
WS 100-yr - Exist
WS 100-yr - Prop
Ground
Ineff
Bank Sta
Elevation (ft)
905
900
895
890
885
880
875
870
865
0
100
200
300
400
500
600
700
Station (ft)

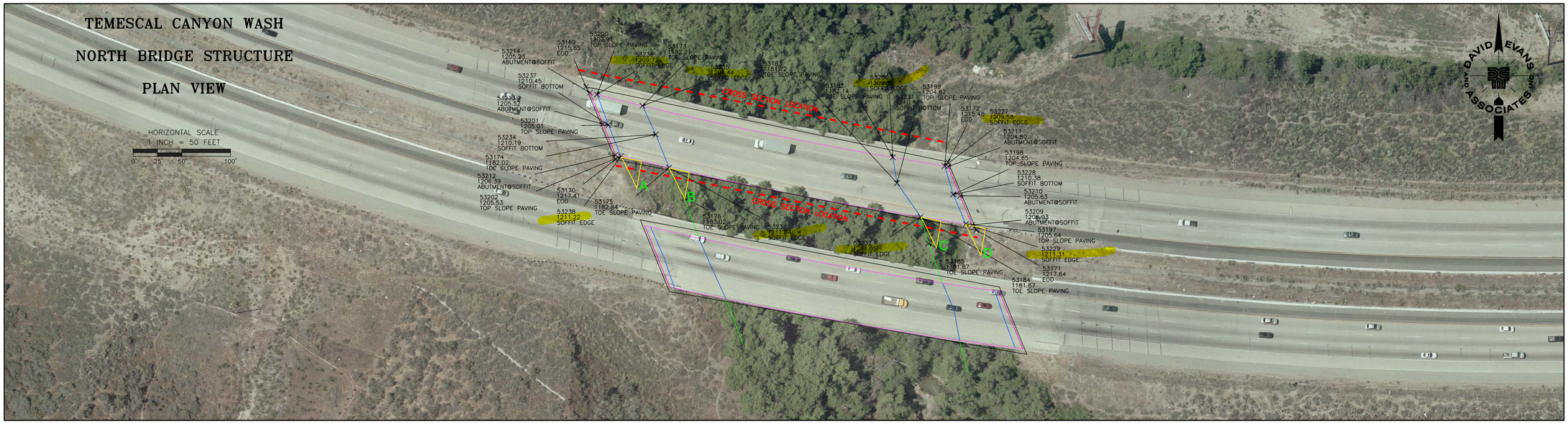

Bedford Plan: 1) Exist 9/16/2022 2) Prop 9/16/2022
.04
.035
.04
Legend
WS 100-yr - Exist
WS 100-yr - Prop
Ground
Ineff
Bank Sta
Elevation (ft)
920
910
900
890
880
870
860
0
200
400
600
800
1000
Station (ft)

APPENDIX I: HYDRAULICS MODEL OF TEMESCAL WASH

TEMESCAL CANYON WASH

NORTH BRIDGE STRUCTURE

PLAN VIEW



TEMESCAL CANYON WASH

SOUTH SIDE

PANORAMIC IMAGE

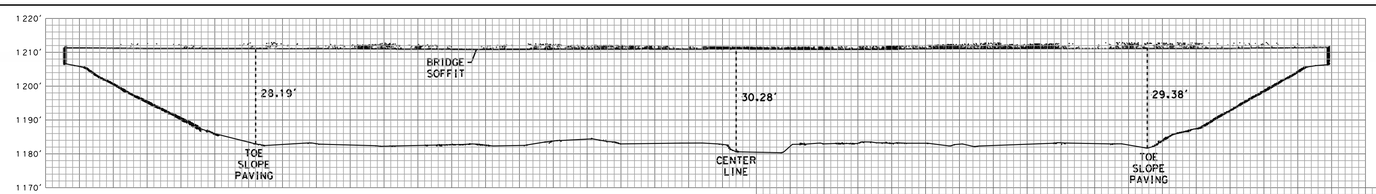
(NOT TO SCALE)

TEMESCAL CANYON WASH

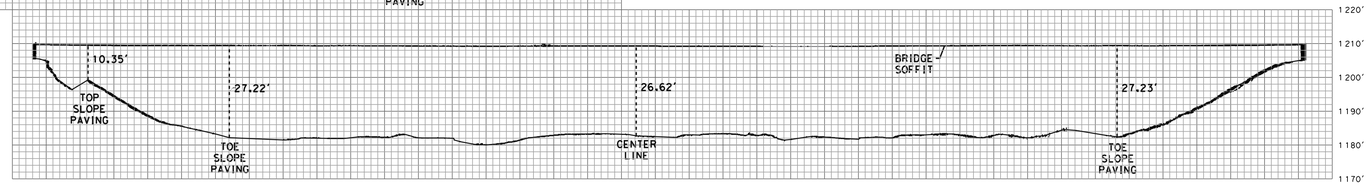
NORTH SIDE

PANORAMIC IMAGE

(NOT TO SCALE)



SOUTH SIDE



NORTH SIDE

INTERSECTION OF I-15 AND TEMESCAL CANYON WASH
DRAINAGE CHANNEL
CROSS SECTION

HORIZONTAL AND VERTICAL SCALE
1 INCH = 20 FEET
0' 10' 20' 40'

TEMESCAL CANYON WASH

NORTH BRIDGE STRUCTURE

BRIDGE CROSS SECTIONS

BRIDGE OVER DRAINAGE CHANNEL

LASER SCANNING SURVEY

DAVID EVANS AND ASSOCIATES INC.
4200 Concours, Suite 200
Ontario, CA 91764
Phone: (909) 481-5750

REVISIONS: APPD.

DATE: MAY 1, 2009
DESIGN:
DRAWN: ELZ
CHECKED:
REVISION NUMBER:

SCALE: VARIES

PROJECT NUMBER:
HDRX00000031

DRAWING FILE:
TEMESCAL CANYON WASH

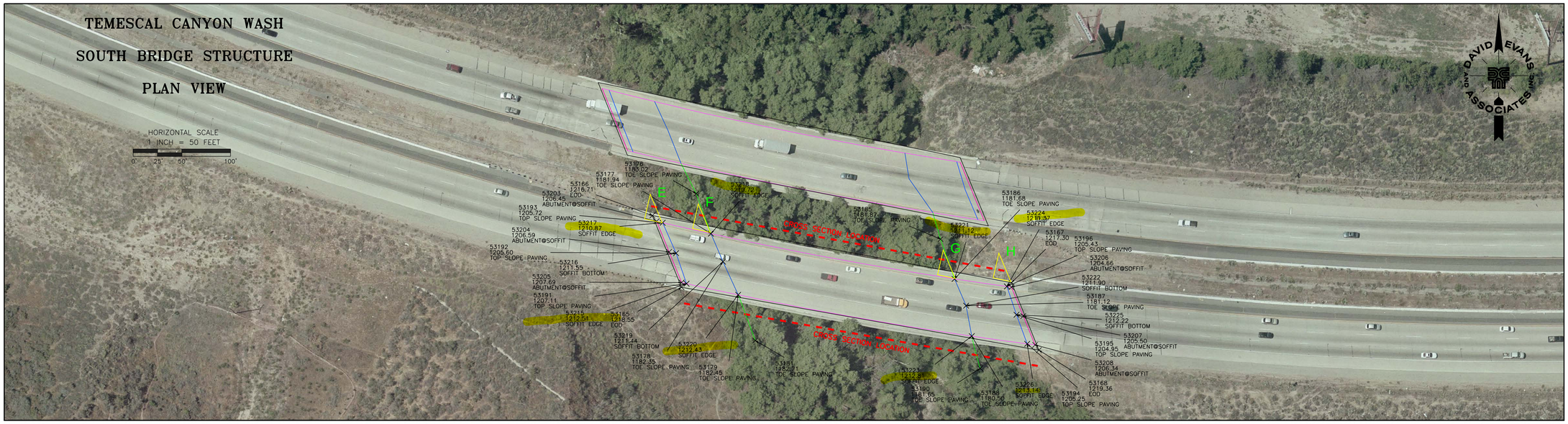
SHEET NO.
59

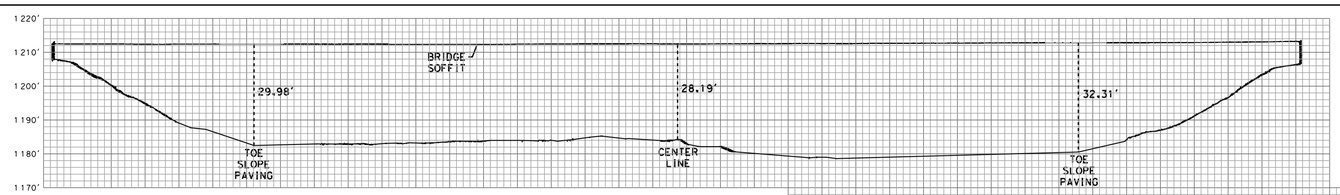
OF

TEMESCAL CANYON WASH

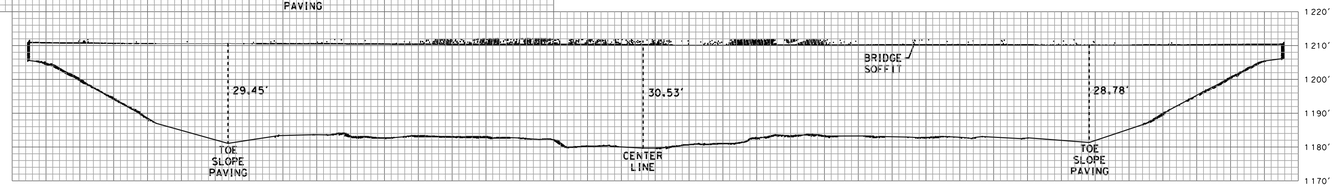
SOUTH BRIDGE STRUCTURE

PLAN VIEW





SOUTH SIDE



NORTH SIDE

INTERSECTION OF I-15 AND TEMESCAL CANYON WASH
DRAINAGE CHANNEL
CROSS SECTION

HORIZONTAL AND VERTICAL SCALE
1 INCH = 20 FEET
0' 10' 20' 40'

TEMESCAL CANYON WASH

SOUTH BRIDGE STRUCTURE

BRIDGE CROSS SECTIONS

BRIDGE OVER DRAINAGE CHANNEL

LASER SCANNING SURVEY

DAVID EVANS AND ASSOCIATES INC.
4200 Concours, Suite 200
Ontario, CA 91764
Phone: (909) 481-5750

REVISIONS: APPD.

DATE: MAY 1, 2009
DESIGN:
DRAWN: ELZ
CHECKED:
REVISION NUMBER:

SCALE: VARIES

PROJECT NUMBER:
HDRX00000031

DRAWING FILE:
TEMESCAL CANYON WASH

SHEET NO.
60

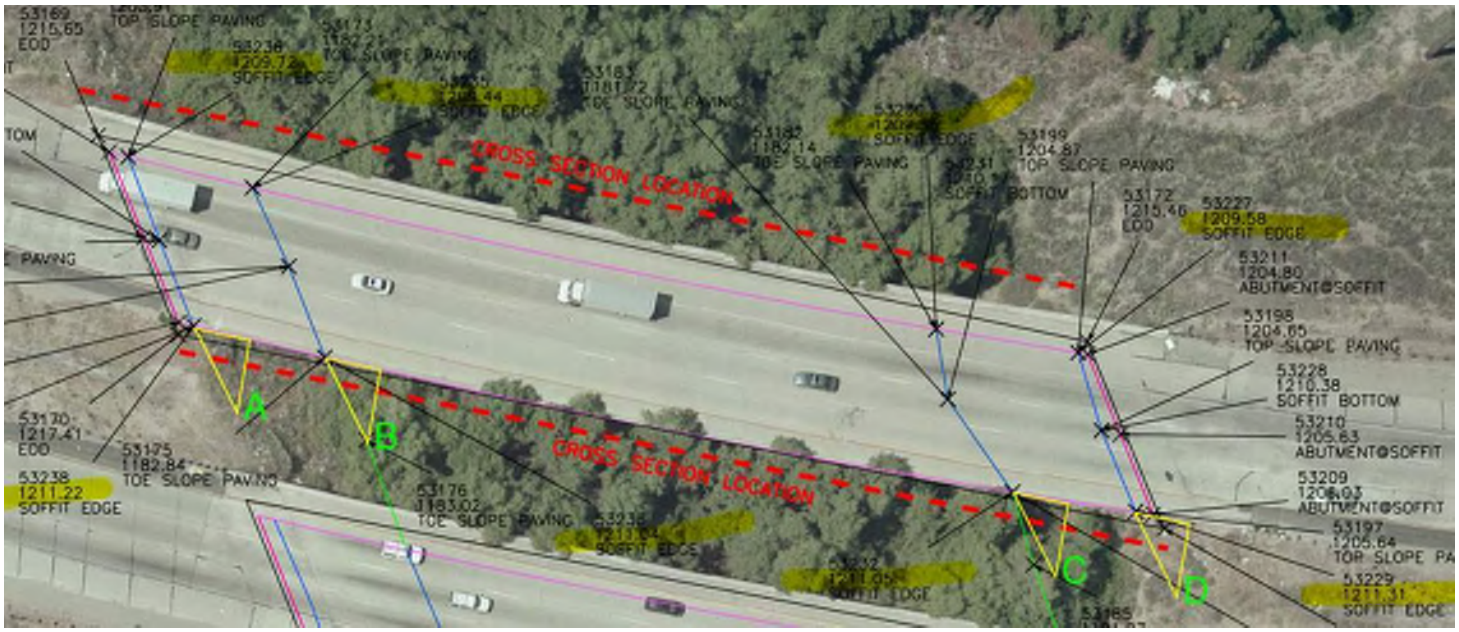
OF

Temesecal Deck Elevation

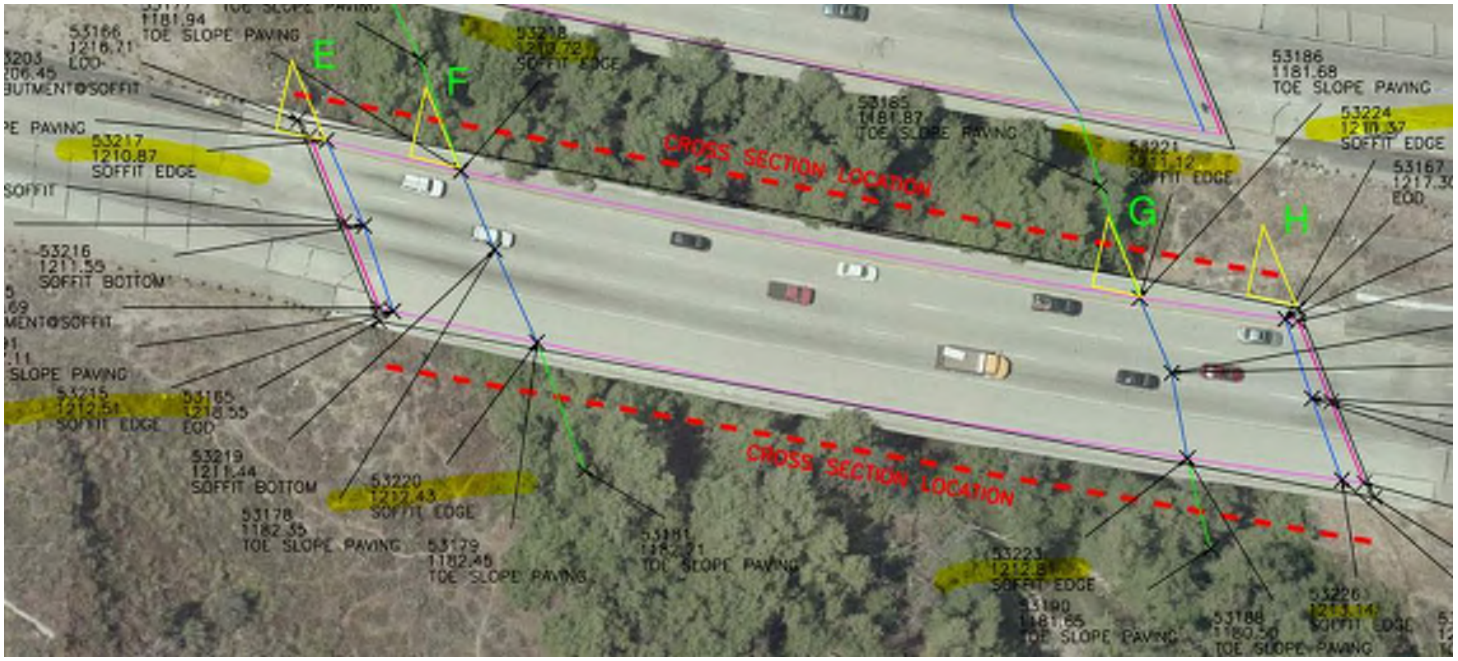
Existing Condition is from 2009 LIDAR elevations are assumed to be NAVD 88

Proposed Condition

Northbound



Southbound




```
clear; clc;
format bank
```

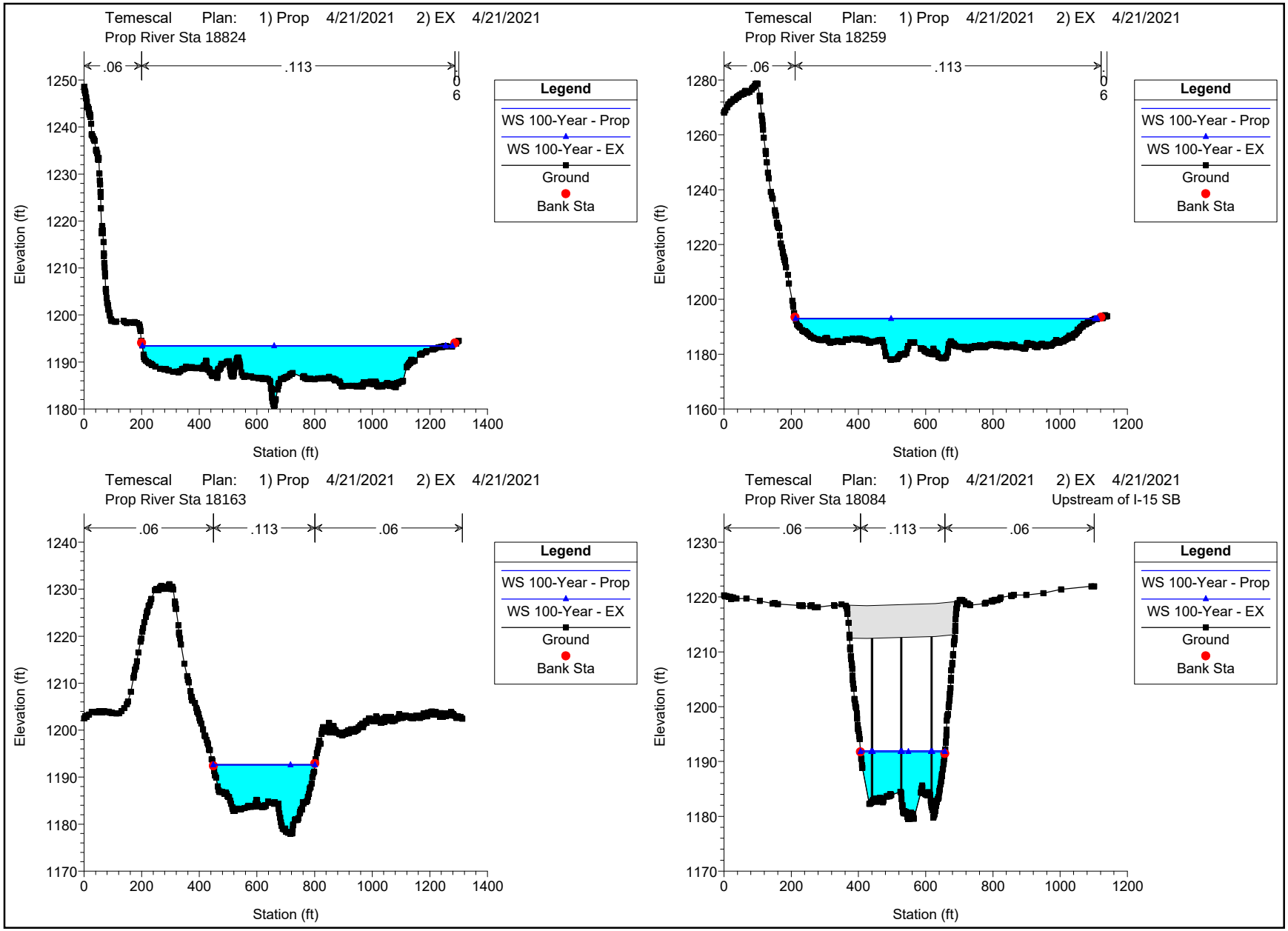
```
nbrps = (1214.60-1214.45)/(44350.83-44782.68); % Northbound profile slope (Elevations
% are NGVD29 from asbuilts) slope is from right to left
rxs = 3/100; % Southbound and Northbound cross slope
sbrps = (1214.82-1214.27)/(44369.84-44682.29);% Southbound profile slope (Elevations
% are NGVD29 from asbuilts) slope is from right to left

% Extrapolated Elevations
Aelev = (1211.22 - (25/cosd(20)*(nbrps)))+ (rxs*25);
Belev = (1211.04 - (25/cosd(20)*(nbrps)))+ (rxs*25);
Celev = (1211.05 - (25/cosd(20)*(nbrps)))+ (rxs*25);
Delev = (1211.31 - (25/cosd(20)*(nbrps)))+ (rxs*25);
Eelev = (1210.87 + (25/cosd(20)*(sbrps)))- (rxs*25);
Felev = (1210.72 + (25/cosd(20)*(sbrps)))- (rxs*25);
Gelev = (1211.12 + (25/cosd(20)*(sbrps)))- (rxs*25);
Helev = (1211.37 + (25/cosd(20)*(sbrps)))- (rxs*25);

elev = [Aelev, Belev, Celev, Delev, Eelev, Felev, Gelev, Helev];

% Create table
prows = {'A','B','C','D','E','F','G','H'};
varn = {'Point','Elevation NAVD88'};
T = table(prows', elev', 'VariableNames',varn)
```

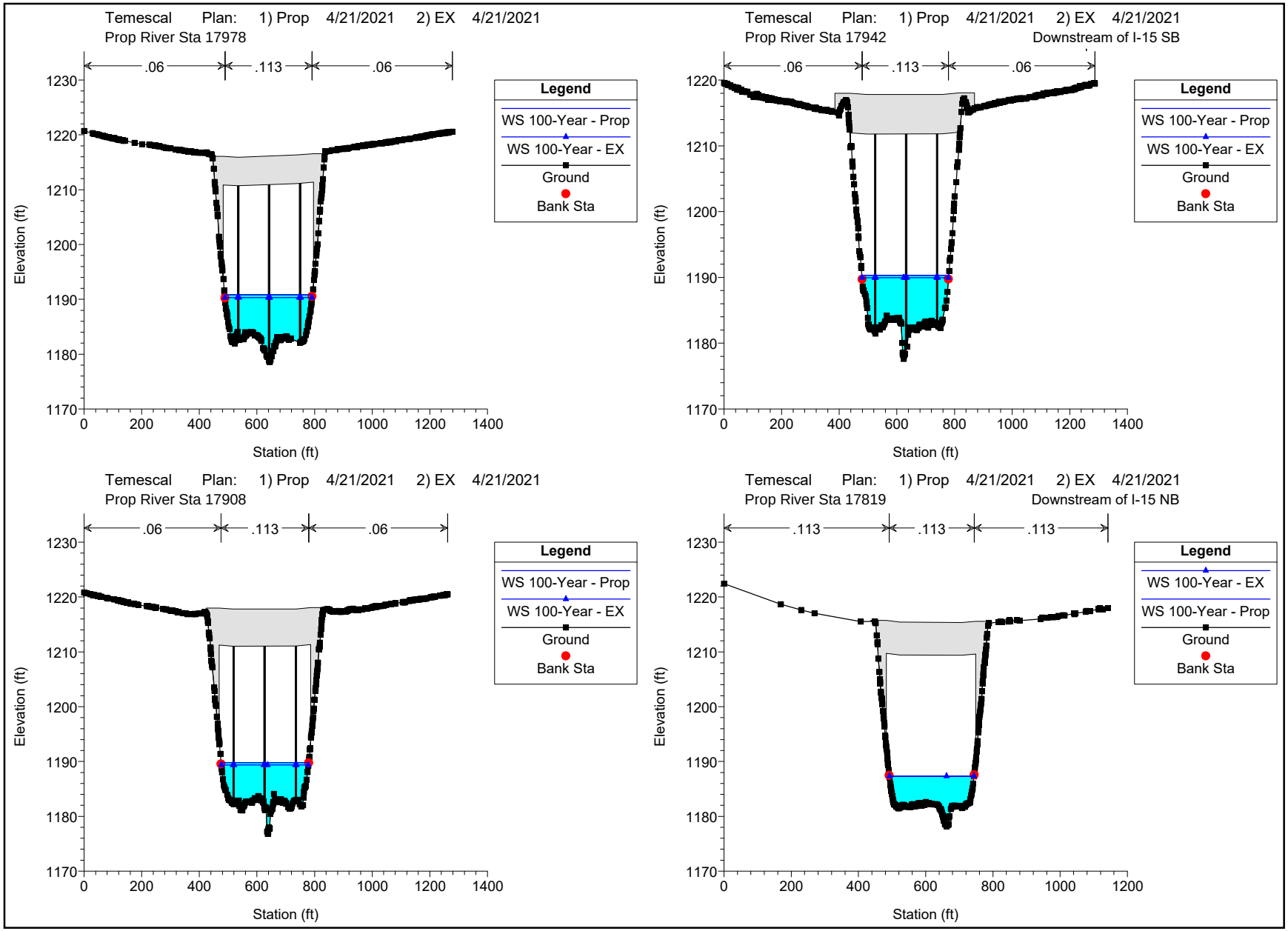
T = 8×2 table

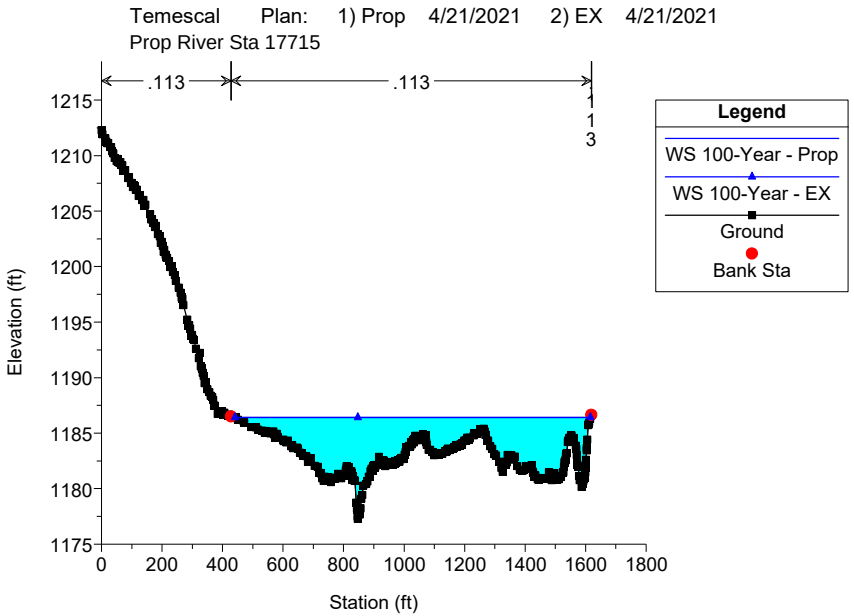
	Point	Elevation NAVD88
1	'A'	1211.98
2	'B'	1211.80
3	'C'	1211.81
4	'D'	1212.07
5	'E'	1210.07
6	'F'	1209.92
7	'G'	1210.32
8	'H'	1210.57

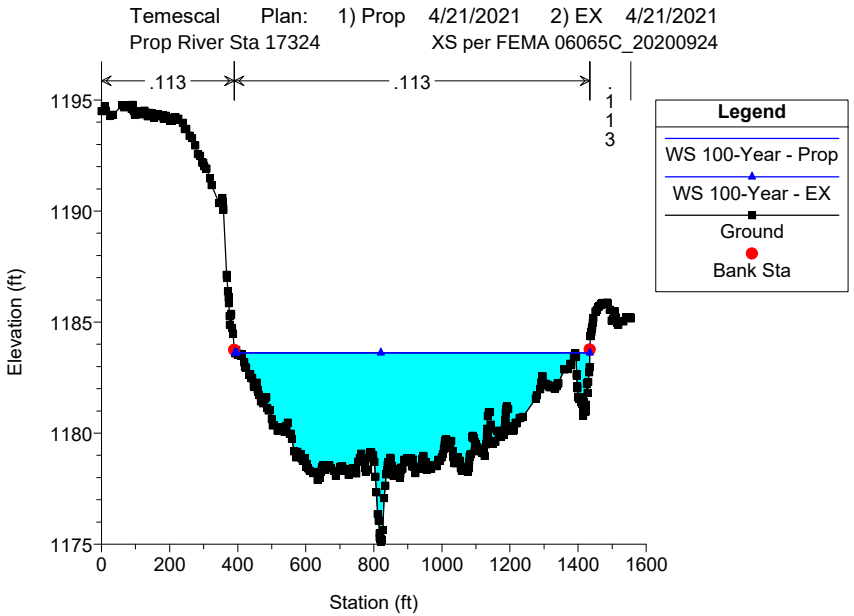
HEC-RAS River: Temescal Wash Reach: Temescal Wash Profile: 100-Year

Reach	River Sta	Profile	Plan	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
				(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Temescal Wash	18824	100-Year	Prop	10400.00	1180.68	1193.47		1193.51	0.001630	1.69	6160.38	1078.27	0.12
Temescal Wash	18824	100-Year	EX	10400.00	1180.68	1193.34		1193.39	0.001751	1.73	6024.27	1076.08	0.13
Temescal Wash	18259	100-Year	Prop	10400.00	1177.96	1192.99		1193.02	0.000530	1.29	8049.47	901.17	0.08
Temescal Wash	18259	100-Year	EX	10400.00	1177.96	1192.84		1192.87	0.000557	1.31	7911.26	896.13	0.08
Temescal Wash	18163	100-Year	Prop	10400.00	1177.95	1192.72		1192.90	0.003731	3.38	3080.62	353.19	0.20
Temescal Wash	18163	100-Year	EX	10400.00	1177.95	1192.55		1192.74	0.003972	3.44	3021.96	352.40	0.21
Temescal Wash	18084	100-Year	Prop	10400.00	1179.51	1191.97	1187.10	1192.39	0.012182	5.16	2014.14	238.42	0.31
Temescal Wash	18084	100-Year	EX	10400.00	1179.51	1191.75	1187.10	1192.19	0.013208	5.30	1962.30	237.71	0.32
Temescal Wash	17978	100-Year	Prop	10400.00	1178.62	1190.82	1186.29	1191.16	0.010664	4.69	2219.26	287.81	0.30
Temescal Wash	17978	100-Year	EX	10400.00	1178.62	1190.32	1186.48	1190.80	0.012957	5.58	1863.35	253.47	0.36
Temescal Wash	17942	100-Year	Prop	10400.00	1177.62	1190.30	1186.38	1190.71	0.014120	5.11	2033.94	285.17	0.34
Temescal Wash	17942	100-Year	EX	10400.00	1177.62	1189.95		1190.34	0.011255	5.01	2077.46	300.24	0.34
Temescal Wash	17908	100-Year	Prop	10400.00	1176.79	1189.81	1186.07	1190.22	0.014411	5.17	2013.57	287.67	0.34
Temescal Wash	17908	100-Year	EX	10400.00	1176.79	1189.38	1186.07	1189.85	0.017473	5.50	1892.35	286.18	0.38
Temescal Wash	17819	100-Year	Prop	10400.00	1178.17	1187.31	1185.66	1188.23	0.037211	7.70	1350.50	251.94	0.59
Temescal Wash	17819	100-Year	EX	10400.00	1178.17	1187.34	1185.23	1187.98	0.025601	6.42	1618.83	300.54	0.49
Temescal Wash	17715	100-Year	Prop	10400.00	1177.27	1186.42		1186.53	0.007305	2.56	4060.47	1175.18	0.24
Temescal Wash	17715	100-Year	EX	10400.00	1177.27	1186.42		1186.53	0.007305	2.56	4060.47	1175.18	0.24
Temescal Wash	17324	100-Year	Prop	10400.00	1175.12	1183.62	1180.72	1183.73	0.007005	2.66	3910.52	1037.26	0.24
Temescal Wash	17324	100-Year	EX	10400.00	1175.12	1183.62	1180.72	1183.73	0.007005	2.66	3910.52	1037.26	0.24

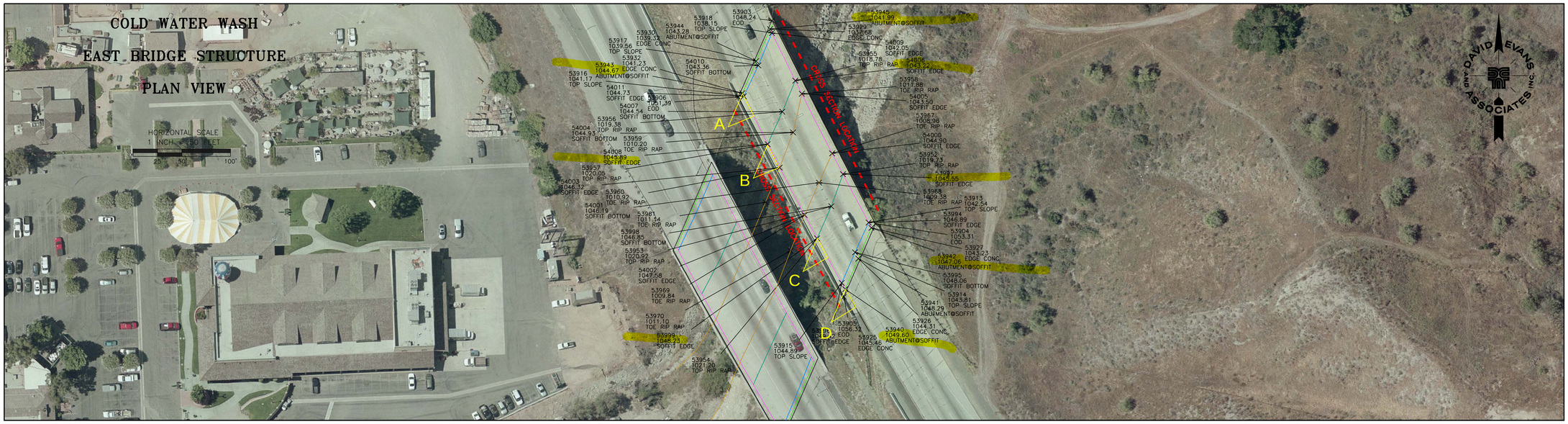

Temescal Plan: 1) Prop 4/21/2021 2) EX 4/21/2021
Prop River Sta 18824
.06
.113
0.06
Legend
WS 100-Year - Prop
WS 100-Year - EX
Ground
Bank Sta
Elevation (ft)
Station (ft)
Temescal Plan: 1) Prop 4/21/2021 2) EX 4/21/2021
Prop River Sta 18259
.06
.113
0.06
Legend
WS 100-Year - Prop
WS 100-Year - EX
Ground
Bank Sta
Elevation (ft)
Station (ft)
Temescal Plan: 1) Prop 4/21/2021 2) EX 4/21/2021
Prop River Sta 18163
.06
.113
.06
Legend
WS 100-Year - Prop
WS 100-Year - EX
Ground
Bank Sta
Elevation (ft)
Station (ft)
Temescal Plan: 1) Prop 4/21/2021 2) EX 4/21/2021
Prop River Sta 18084
Upstream of I-15 SB
.06
.113
.06
Legend
WS 100-Year - Prop
WS 100-Year - EX
Ground
Bank Sta
Elevation (ft)
Station (ft)

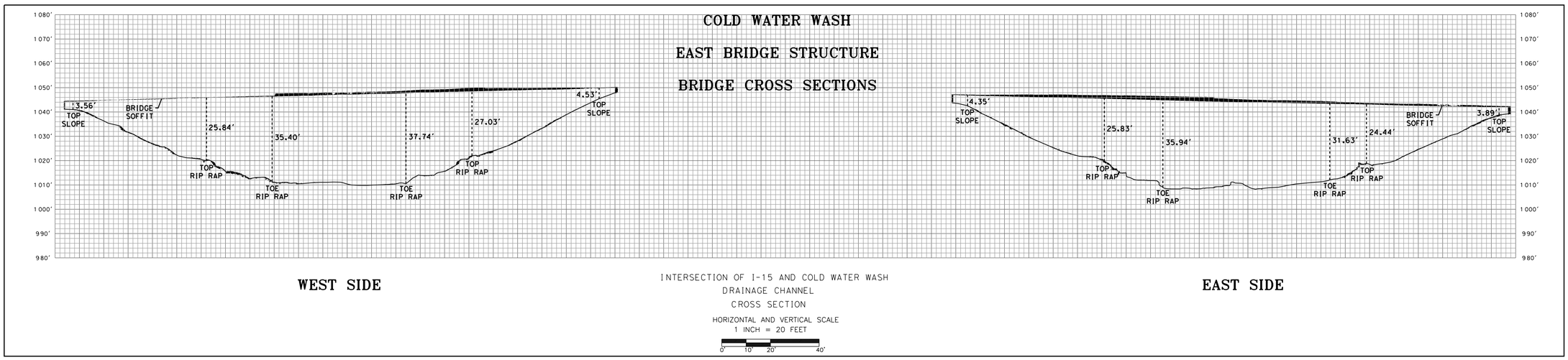

Temescal Plan: 1) Prop 4/21/2021 2) EX 4/21/2021
Prop River Sta 17978
.06
.113
.06
Legend
WS 100-Year - Prop
WS 100-Year - EX
Ground
Bank Sta
Elevation (ft)
Station (ft)
Temescal Plan: 1) Prop 4/21/2021 2) EX 4/21/2021
Prop River Sta 17942
Downstream of I-15 SB
Temescal Plan: 1) Prop 4/21/2021 2) EX 4/21/2021
Prop River Sta 17908
Temescal Plan: 1) Prop 4/21/2021 2) EX 4/21/2021
Prop River Sta 17819
Downstream of I-15 NB


Temescal Plan: 1) Prop 4/21/2021 2) EX 4/21/2021
Prop River Sta 17715
.113
.113
.113
Legend
WS 100-Year - Prop
WS 100-Year - EX
Ground
Bank Sta
Elevation (ft)
Station (ft)
1215
1210
1205
1200
1195
1190
1185
1180
1175
0
200
400
600
800
1000
1200
1400
1600
1800


Temescal Plan: 1) Prop 4/21/2021 2) EX 4/21/2021
Prop River Sta 17324
XS per FEMA 06065C_20200924
.113
.113
.113
Legend
WS 100-Year - Prop
WS 100-Year - EX
Ground
Bank Sta
Elevation (ft)
Station (ft)
1195
1190
1185
1180
1175
0
200
400
600
800
1000
1200
1400
1600

APPENDIX J: HYDRAULICS MODEL OF COLDWATER WASH





BRIDGE OVER DRAINAGE CHANNEL

LASER SCANNING SURVEY

DAVID EVANS AND ASSOCIATES INC.
4200 Concours, Suite 200
Ontario, CA 91764
Phone: (909) 481-5750

REVISIONS: APPD.

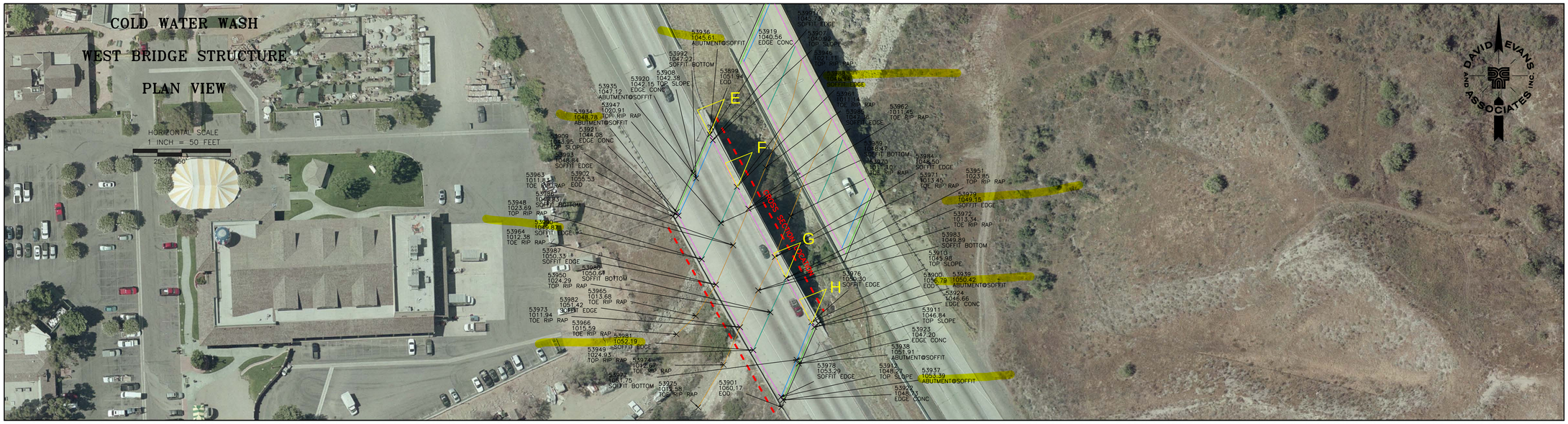
DATE: MAY 1, 2009
DESIGN:
DRAWN: ELZ
CHECKED:
REVISION NUMBER:

SCALE: VARIES

PROJECT NUMBER:
HDRX00000031

DRAWING FILE:
COLD WATER WASH

SHEET NO.
73
OF

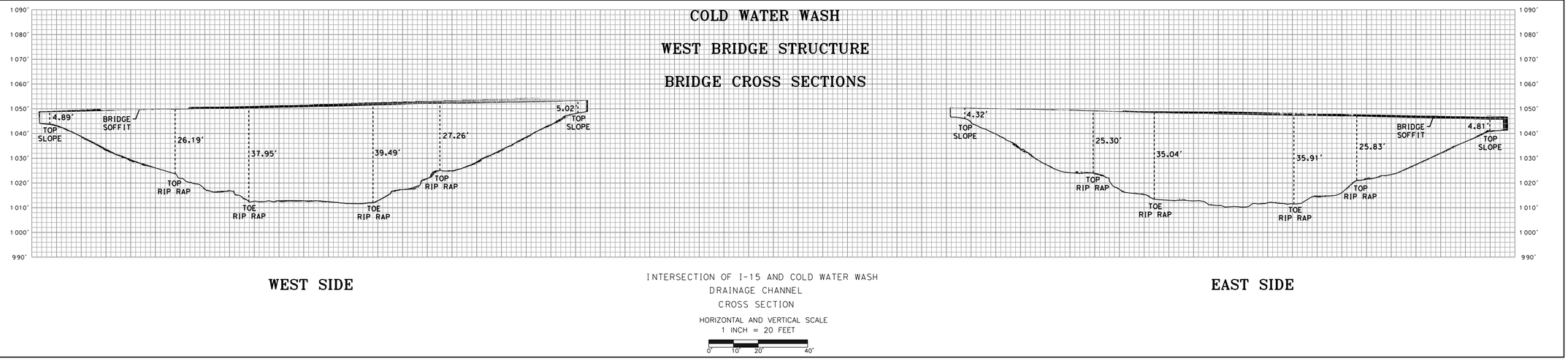


COLD WATER WASH

EAST SIDE

PANORAMIC IMAGE

(NOT TO SCALE)



WEST SIDE

EAST SIDE

INTERSECTION OF I-15 AND COLD WATER WASH
DRAINAGE CHANNEL
CROSS SECTION

HORIZONTAL AND VERTICAL SCALE
1 INCH = 20 FEET
0' 10' 20' 40'

BRIDGE OVER DRAINAGE CHANNEL

LASER SCANNING SURVEY

DAVID EVANS AND ASSOCIATES INC.
4200 Concours, Suite 200
Ontario, CA 91764
Phone: (909) 481-5750

REVISIONS: APPD.

DATE: MAY 1, 2009
DESIGN:
DRAWN: ELZ
CHECKED:
REVISION NUMBER:

SCALE: VARIES

PROJECT NUMBER:
HDRX00000031

DRAWING FILE:
COLD WATER WASH

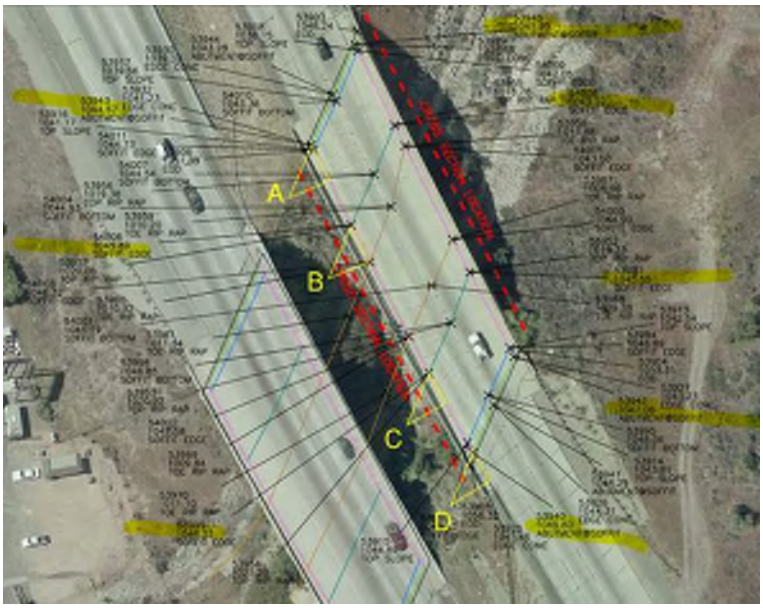
SHEET NO.
74

OF

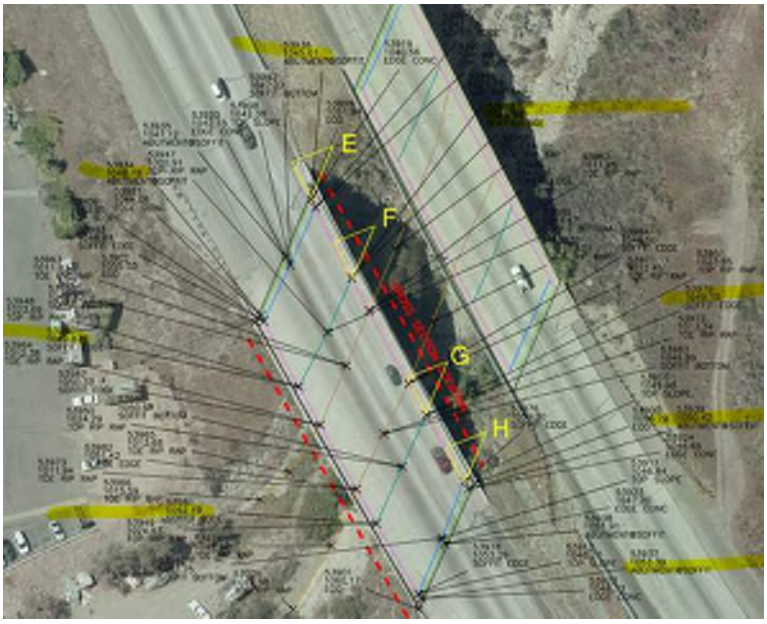
Coldwater Deck Elevation

Existing Condition is from 2009 LIDAR. Elevations are assumed to be NAVD 88

Northbound



Southbound




```
clear; clc;
format bank
```

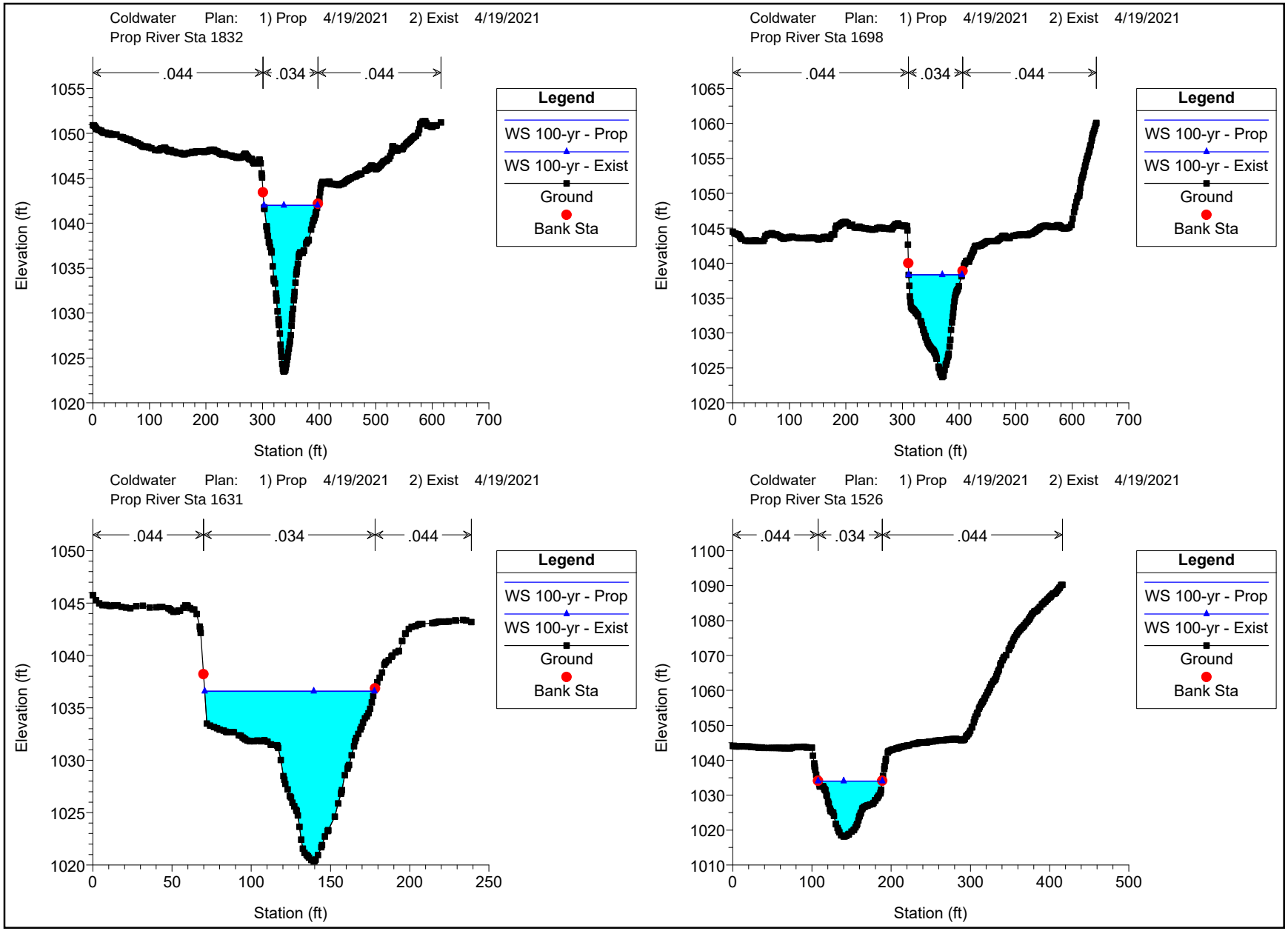
```
nbrps = (1053.27-1048.27)/(70320.29-70554.92); % Northbound profile slope (Elevations
% are NGVD29 from asbuilts) slope is from right to left
sbrps = (1054.39-1049.53)/(70267.76-70495.77);% Southbound profile slope (Elevations
% are NGVD29 from asbuilts) slope is from right to left

rxs = 3/100; % Southbound and Northbound cross slope

% Extrapolated Elevations
SElev = [1044.67, 1045.89, 1048.23, 1049.60;...
   1045.61, 1046.94, 1049.15, 1050.42]; % Start Elevations for points A,B,C,D;E,F,G,H
ABCDelev = (SElev(1,1:4) - (25*tand(40)*(nbrps))) + (rxs*25);
EFGHelev = (SElev(2,1:4) + (25*tand(40)*(nbrps))) - (rxs*25);
elev = [ABCDelev EFGHelev];

% Create table
prows = {'A','B','C','D','E','F','G','H'};
varn = {'Point','Elevation NAVD88','Start Elevation NAVD 88' };
T = table(prows', elev',[SElev(1,1:4),SElev(2,1:4)]', 'VariableNames',varn)
```

T = 8×3 table

	Point	Elevation NAVD88	Start Elevation NAVD 88
1	'A'	1045.87	1044.67
2	'B'	1047.09	1045.89
3	'C'	1049.43	1048.23
4	'D'	1050.80	1049.60
5	'E'	1044.41	1045.61
6	'F'	1045.74	1046.94
7	'G'	1047.95	1049.15
8	'H'	1049.22	1050.42

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

Reach	River Sta	Profile	Plan	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
				(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Reach 1	1832	100-yr	Prop	12300.00	1023.48	1041.99	1041.99	1046.04	0.009580	16.14	762.22	94.77	1.00
Reach 1	1832	100-yr	Exist	12300.00	1023.48	1041.99	1041.99	1046.04	0.009580	16.14	762.22	94.77	1.00
Reach 1	1698	100-yr	Prop	12300.00	1023.69	1038.32	1038.32	1042.40	0.009310	16.19	759.54	94.02	1.00
Reach 1	1698	100-yr	Exist	12300.00	1023.69	1038.32	1038.32	1042.40	0.009310	16.19	759.54	94.02	1.00
Reach 1	1631	100-yr	Prop	12300.00	1020.35	1036.58	1036.58	1040.38	0.009966	15.62	787.34	107.12	1.02
Reach 1	1631	100-yr	Exist	12300.00	1020.35	1036.58	1036.58	1040.38	0.009966	15.62	787.34	107.12	1.02
Reach 1	1526	100-yr	Prop	12300.00	1018.15	1034.04	1034.04	1038.57	0.009603	17.07	720.59	81.10	1.01
Reach 1	1526	100-yr	Exist	12300.00	1018.15	1034.04	1034.04	1038.57	0.009603	17.07	720.59	81.10	1.01
Reach 1	1406	100-yr	Prop	12300.00	1019.43	1031.37	1031.37	1034.34	0.009863	13.82	889.73	151.15	1.00
Reach 1	1406	100-yr	Exist	12300.00	1019.43	1031.37	1031.37	1034.34	0.009863	13.82	889.73	151.15	1.00
Reach 1	1365	100-yr	Prop	12300.00	1018.54	1031.16	1030.18	1032.69	0.005610	9.91	1241.66	228.12	0.75
Reach 1	1365	100-yr	Exist	12300.00	1018.54	1031.16	1030.18	1032.69	0.005610	9.91	1241.66	228.12	0.75
Reach 1	1272	100-yr	Prop	12300.00	1016.06	1029.35	1029.35	1031.89	0.010817	12.79	961.56	195.63	1.02
Reach 1	1272	100-yr	Exist	12300.00	1016.06	1029.35	1029.35	1031.89	0.010817	12.79	961.56	195.63	1.02
Reach 1	1189	100-yr	Prop	12300.00	1014.48	1028.88	1027.34	1030.66	0.004779	10.71	1148.72	165.33	0.72
Reach 1	1189	100-yr	Exist	12300.00	1014.48	1028.88	1027.34	1030.66	0.004779	10.71	1148.72	165.33	0.72
Reach 1	1113	100-yr	Prop	12300.00	1013.39	1028.95	1025.20	1030.29	0.002175	9.29	1332.90	138.47	0.51
Reach 1	1113	100-yr	Exist	12300.00	1013.39	1028.95	1025.20	1030.29	0.002175	9.29	1332.90	138.47	0.51
Reach 1	996	100-yr	Prop	12300.00	1011.73	1024.50	1024.50	1028.91	0.009102	16.85	730.60	82.73	1.00
Reach 1	996	100-yr	Exist	12300.00	1011.73	1024.50	1024.50	1028.91	0.009102	16.85	730.60	82.73	1.00
Reach 1	882	100-yr	Prop	12300.00	1010.60	1022.69	1022.69	1027.00	0.009266	16.66	738.89	88.86	1.00
Reach 1	882	100-yr	Exist	12300.00	1010.60	1022.82	1022.82	1026.92	0.008806	16.26	759.13	95.80	0.99
Reach 1	853	100-yr	Prop	12300.00	1009.69	1021.87	1021.87	1026.18	0.009254	16.65	738.55	85.03	1.00
Reach 1	853	100-yr	Exist	12300.00	1009.69	1021.97	1021.97	1026.13	0.009155	16.35	752.21	90.67	1.00
Reach 1	823	100-yr	Prop	12300.00	1009.47	1021.33	1021.33	1025.67	0.009296	16.71	736.02	85.03	1.00
Reach 1	823	100-yr	Exist	12300.00	1009.47	1021.33	1021.33	1025.67	0.009296	16.71	736.02	85.03	1.00
Reach 1	743	100-yr	Prop	12300.00	1007.58	1020.01	1020.01	1024.13	0.008990	16.28	755.86	92.54	1.00
Reach 1	743	100-yr	Exist	12300.00	1007.58	1020.01	1020.01	1024.13	0.008990	16.28	755.86	92.54	1.00
Reach 1	631	100-yr	Prop	12300.00	999.36	1013.39	1013.39	1017.68	0.009247	16.61	740.70	86.95	1.00
Reach 1	631	100-yr	Exist	12300.00	999.36	1013.39	1013.39	1017.68	0.009247	16.61	740.70	86.95	1.00
Reach 1	535	100-yr	Prop	12300.00	996.97	1011.86	1011.86	1015.62	0.009432	15.56	790.31	105.22	1.00
Reach 1	535	100-yr	Exist	12300.00	996.97	1011.86	1011.86	1015.62	0.009432	15.56	790.31	105.22	1.00
Reach 1	454	100-yr	Prop	12300.00	995.99	1006.49	1006.49	1010.01	0.009550	15.05	817.03	117.05	1.00
Reach 1	454	100-yr	Exist	12300.00	995.99	1006.49	1006.49	1010.01	0.009550	15.05	817.03	117.05	1.00
Reach 1	384	100-yr	Prop	12300.00	993.82	1004.94	1004.94	1007.97	0.009901	13.96	880.83	147.72	1.01
Reach 1	384	100-yr	Exist	12300.00	993.82	1004.94	1004.94	1007.97	0.009901	13.96	880.83	147.72	1.01
Reach 1	323	100-yr	Prop	12300.00	992.55	1002.88	1002.88	1005.82	0.009935	13.75	894.65	154.92	1.01
Reach 1	323	100-yr	Exist	12300.00	992.55	1002.88	1002.88	1005.82	0.009935	13.75	894.65	154.92	1.01
Reach 1	188	100-yr	Prop	12300.00	989.56	1001.05	1001.05	1004.11	0.010077	14.05	875.51	146.20	1.01
Reach 1	188	100-yr	Exist	12300.00	989.56	1001.05	1001.05	1004.11	0.010077	14.05	875.51	146.20	1.01
Reach 1	115	100-yr	Prop	12300.00	986.99	998.49	998.49	1002.03	0.009763	15.08	815.41	117.86	1.01
Reach 1	115	100-yr	Exist	12300.00	986.99	998.49	998.49	1002.03	0.009763	15.08	815.41	117.86	1.01
Reach 1	42	100-yr	Prop	12300.00	985.87	997.03	997.03	1000.17	0.009767	14.20	865.91	141.01	1.01
Reach 1	42	100-yr	Exist	12300.00	985.87	997.03	997.03	1000.17	0.009767	14.20	865.91	141.01	1.01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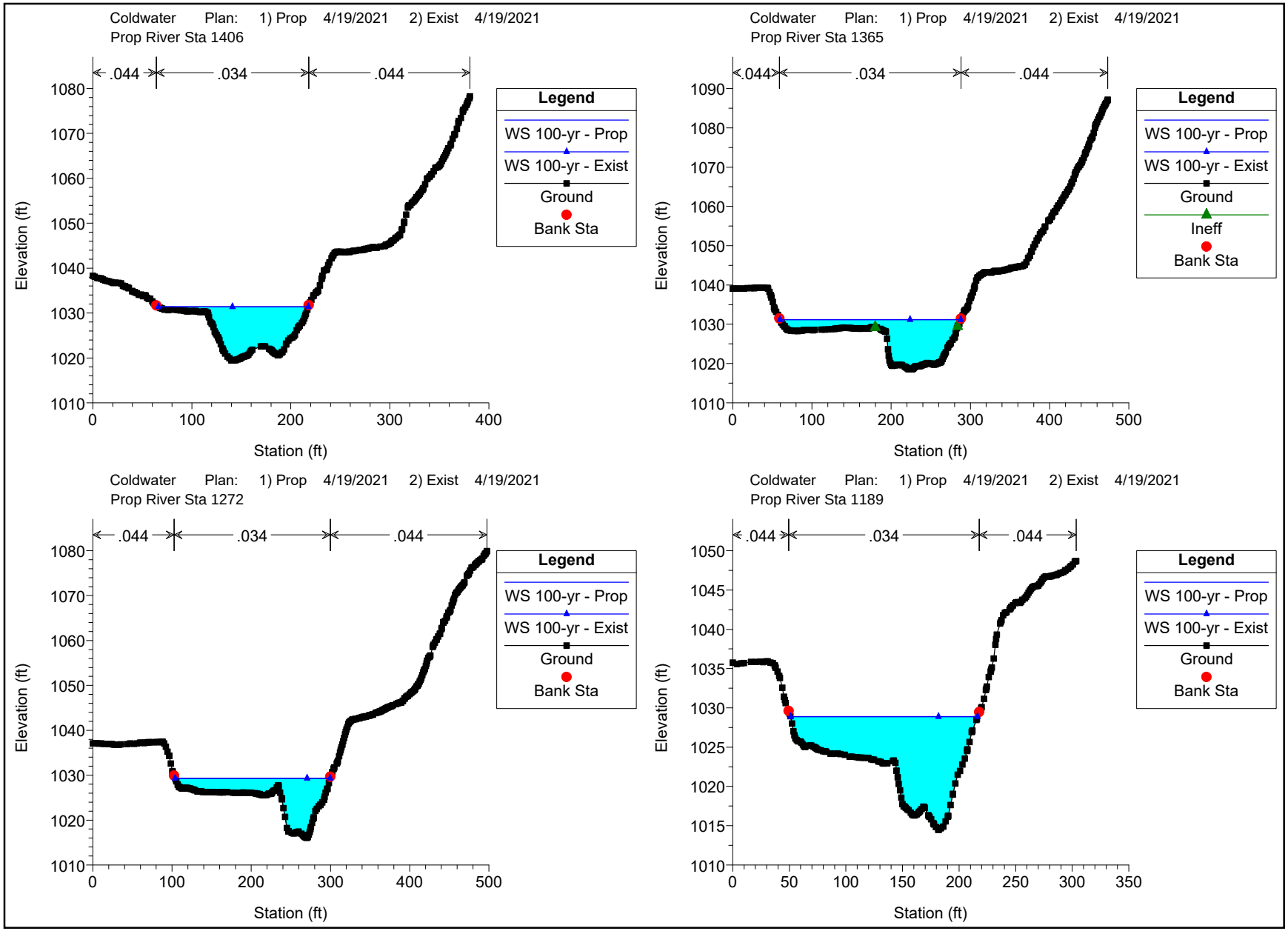
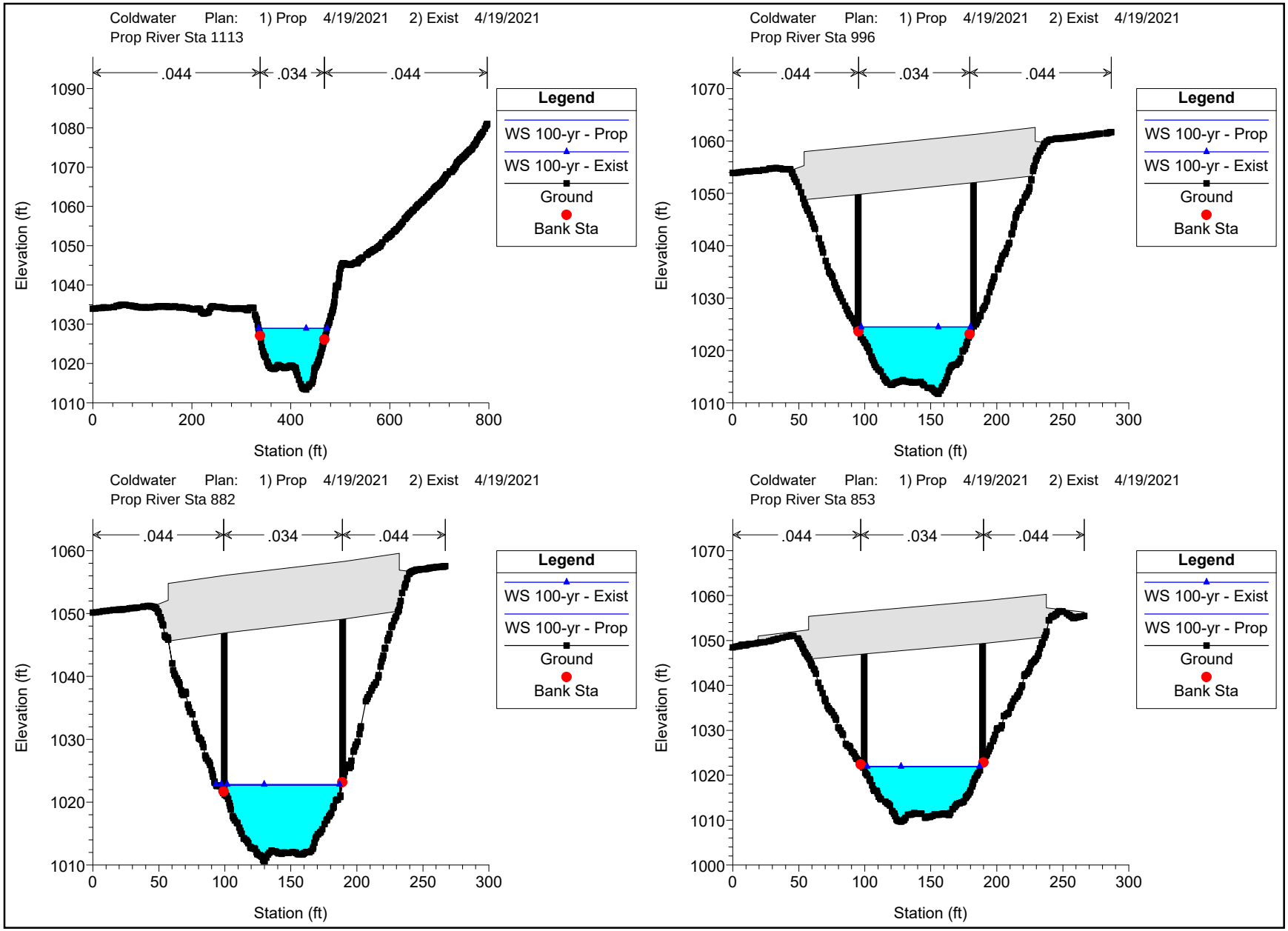
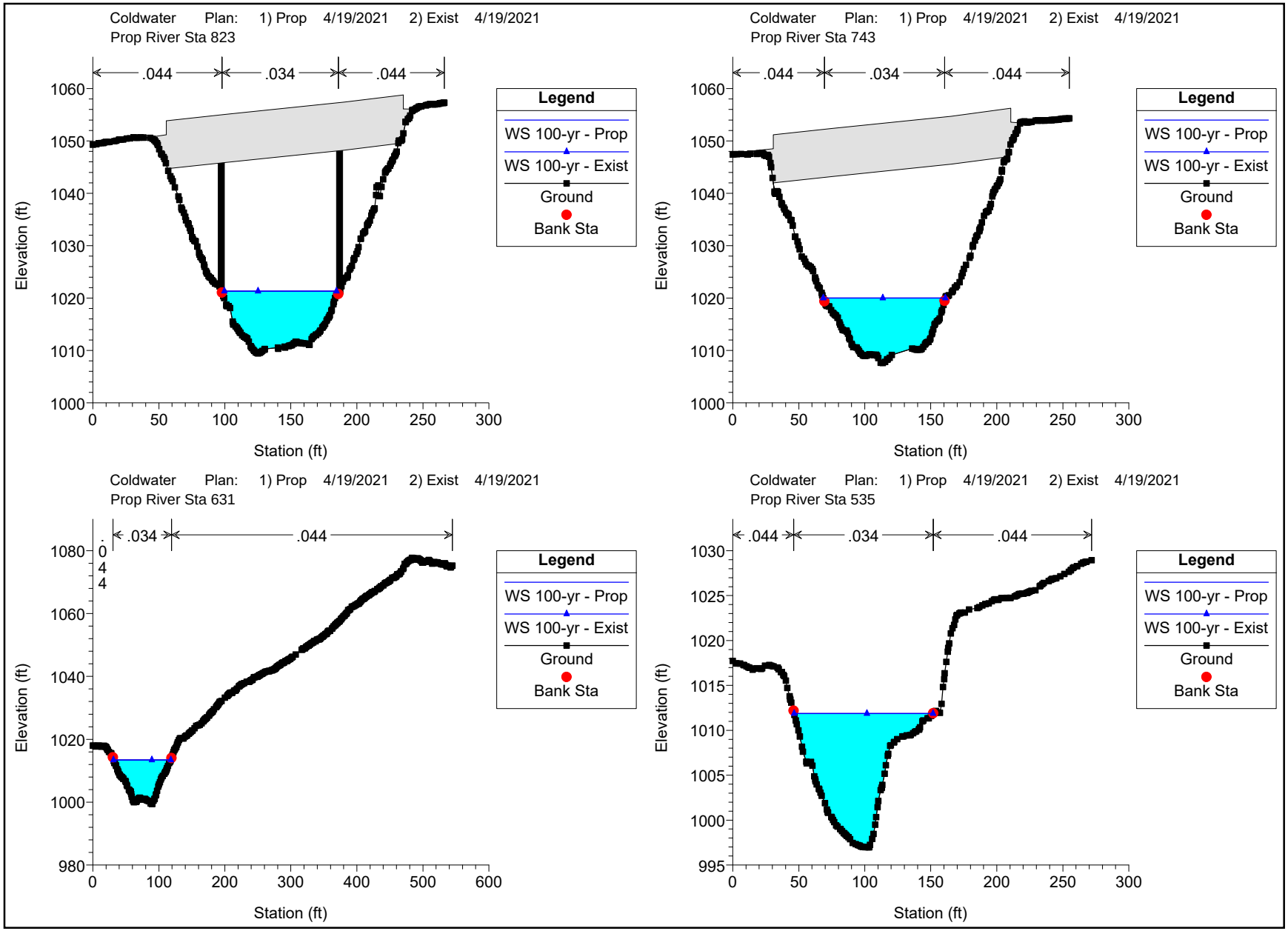
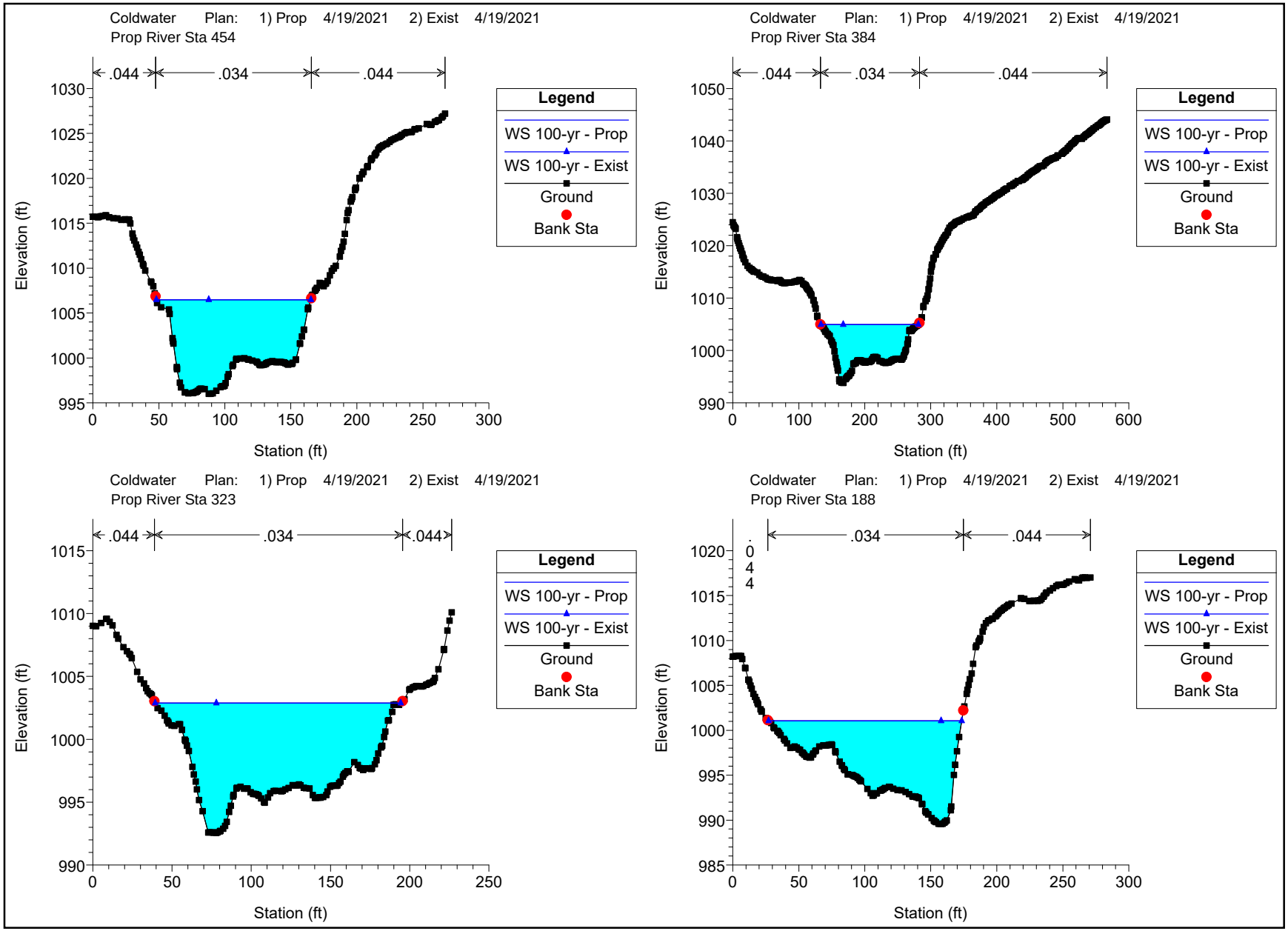
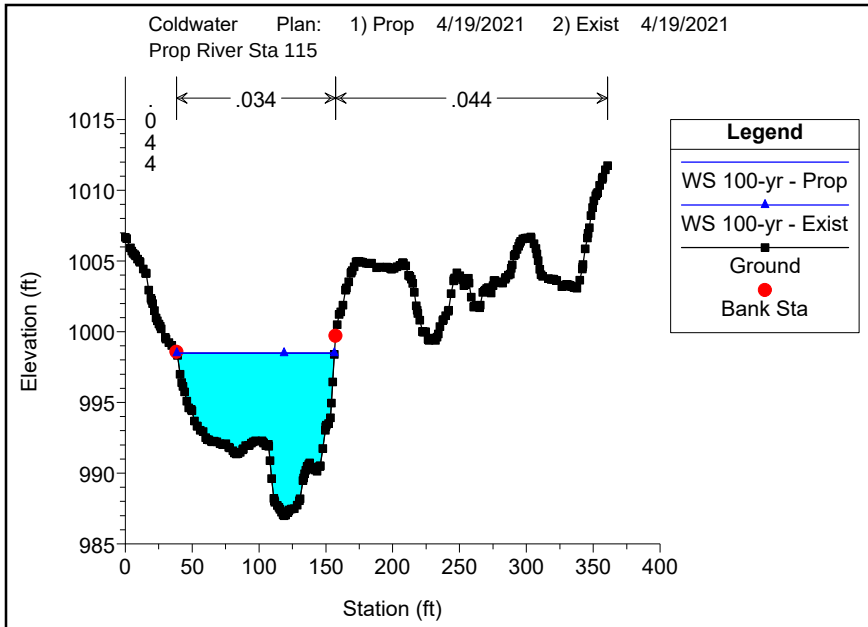
Prop River Sta 1832
.044
.034
.044
Legend
WS 100-yr - Prop
WS 100-yr - Exist
Ground
Bank Sta
Elevation (ft)
Station (ft)
Coldwater Plan: 1) Prop 4/19/2021 2) Exist 4/19/2021
Prop River Sta 1698
Coldwater Plan: 1) Prop 4/19/2021 2) Exist 4/19/2021
Prop River Sta 1631
Coldwater Plan: 1) Prop 4/19/2021 2) Exist 4/19/2021
Prop River Sta 1526

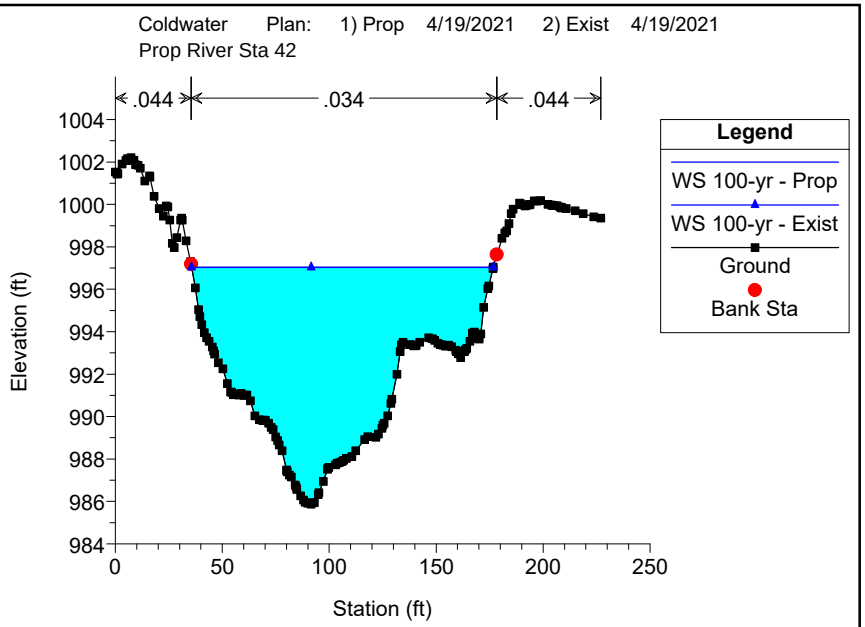

Coldwater Plan: 1) Prop 4/19/2021 2) Exist 4/19/2021
Prop River Sta 1406
.044
.034
.044
Elevation (ft)
Station (ft)
Legend
WS 100-yr - Prop
WS 100-yr - Exist
Ground
Bank Sta
Coldwater Plan: 1) Prop 4/19/2021 2) Exist 4/19/2021
Prop River Sta 1365
.044
.034
.044
Elevation (ft)
Station (ft)
Legend
WS 100-yr - Prop
WS 100-yr - Exist
Ground
Ineff
Bank Sta
Coldwater Plan: 1) Prop 4/19/2021 2) Exist 4/19/2021
Prop River Sta 1272
.044
.034
.044
Elevation (ft)
Station (ft)
Legend
WS 100-yr - Prop
WS 100-yr - Exist
Ground
Bank Sta
Coldwater Plan: 1) Prop 4/19/2021 2) Exist 4/19/2021
Prop River Sta 1189
.044
.034
.044
Elevation (ft)
Station (ft)
Legend
WS 100-yr - Prop
WS 100-yr - Exist
Ground
Bank Sta


Coldwater Plan: 1) Prop 4/19/2021 2) Exist 4/19/2021
Prop River Sta 1113
.044
.034
.044
Legend
WS 100-yr - Prop
WS 100-yr - Exist
Ground
Bank Sta
Elevation (ft)
Station (ft)
Coldwater Plan: 1) Prop 4/19/2021 2) Exist 4/19/2021
Prop River Sta 996
Coldwater Plan: 1) Prop 4/19/2021 2) Exist 4/19/2021
Prop River Sta 882
Coldwater Plan: 1) Prop 4/19/2021 2) Exist 4/19/2021
Prop River Sta 853


Coldwater Plan: 1) Prop 4/19/2021 2) Exist 4/19/2021
Prop River Sta 823
.044
.034
.044
Elevation (ft)
Station (ft)
Legend
WS 100-yr - Prop
WS 100-yr - Exist
Ground
Bank Sta
Coldwater Plan: 1) Prop 4/19/2021 2) Exist 4/19/2021
Prop River Sta 743
.044
.034
.044
Elevation (ft)
Station (ft)
Legend
WS 100-yr - Prop
WS 100-yr - Exist
Ground
Bank Sta
Coldwater Plan: 1) Prop 4/19/2021 2) Exist 4/19/2021
Prop River Sta 631
.044
.034
.044
Elevation (ft)
Station (ft)
Legend
WS 100-yr - Prop
WS 100-yr - Exist
Ground
Bank Sta
Coldwater Plan: 1) Prop 4/19/2021 2) Exist 4/19/2021
Prop River Sta 535
.044
.034
.044
Elevation (ft)
Station (ft)
Legend
WS 100-yr - Prop
WS 100-yr - Exist
Ground
Bank Sta


Coldwater Plan: 1) Prop 4/19/2021 2) Exist 4/19/2021
Prop River Sta 454
.044
.034
.044
Elevation (ft)
Station (ft)
Legend
WS 100-yr - Prop
WS 100-yr - Exist
Ground
Bank Sta
Coldwater Plan: 1) Prop 4/19/2021 2) Exist 4/19/2021
Prop River Sta 384
.044
.034
.044
Elevation (ft)
Station (ft)
Legend
WS 100-yr - Prop
WS 100-yr - Exist
Ground
Bank Sta
Coldwater Plan: 1) Prop 4/19/2021 2) Exist 4/19/2021
Prop River Sta 323
.044
.034
.044
Elevation (ft)
Station (ft)
Legend
WS 100-yr - Prop
WS 100-yr - Exist
Ground
Bank Sta
Coldwater Plan: 1) Prop 4/19/2021 2) Exist 4/19/2021
Prop River Sta 188
.044
.034
.044
Elevation (ft)
Station (ft)
Legend
WS 100-yr - Prop
WS 100-yr - Exist
Ground
Bank Sta

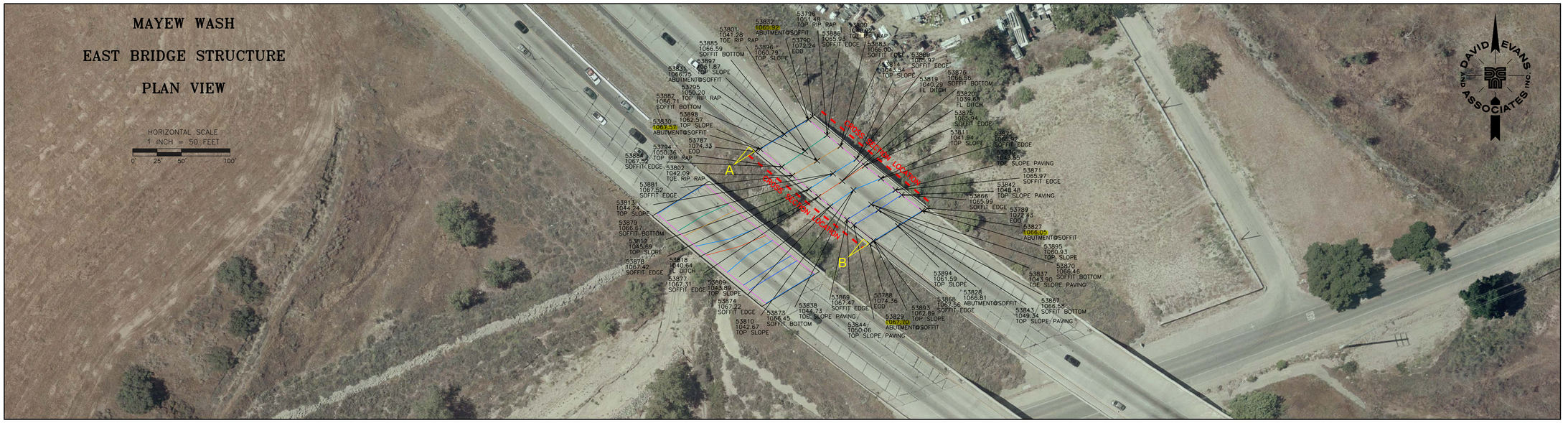

Coldwater Plan: 1) Prop 4/19/2021 2) Exist 4/19/2021
Prop River Sta 115
.044
.034
.044
Elevation (ft)
Station (ft)
Legend
WS 100-yr - Prop
WS 100-yr - Exist
Ground
Bank Sta


Coldwater Plan: 1) Prop 4/19/2021 2) Exist 4/19/2021
Prop River Sta 42
.044
.034
.044
Elevation (ft)
Station (ft)
Legend
WS 100-yr - Prop
WS 100-yr - Exist
Ground
Bank Sta

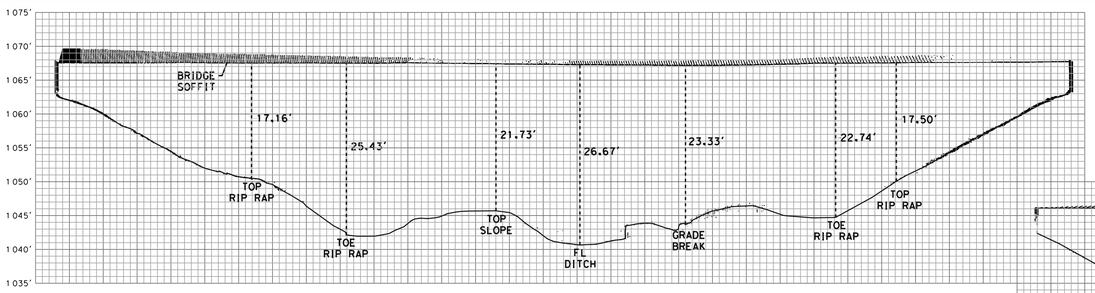
APPENDIX K: HYDRAULICS MODEL OF MAYHEW WASH

MAYEW WASH
EAST BRIDGE STRUCTURE
PLAN VIEW

HORIZONTAL SCALE
1 INCH = 50 FEET
0' 25' 50' 100'



MAYEW WASH
EAST SIDE
PANORAMIC IMAGE
(NOT TO SCALE)

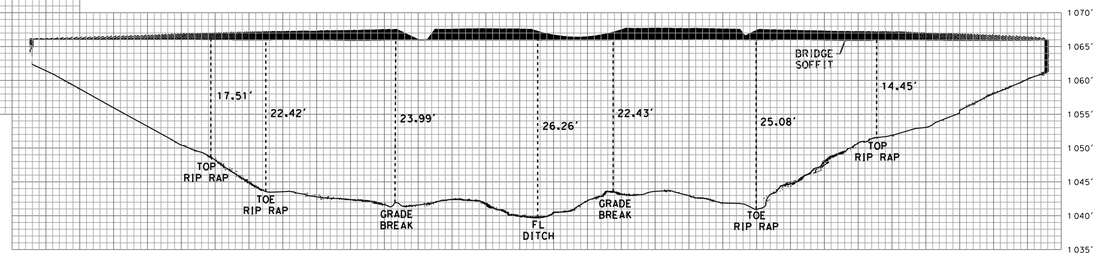


WEST SIDE

INTERSECTION OF I-15 AND MAYEW WASH
DRAINAGE CHANNEL
CROSS SECTION

HORIZONTAL AND VERTICAL SCALE
1 INCH = 10 FEET
0' 5' 10' 20'

MAYEW WASH
EAST BRIDGE STRUCTURE
BRIDGE CROSS SECTIONS



EAST SIDE

BRIDGE OVER DRAINAGE CHANNEL
LASER SCANNING SURVEY

DAVID EVANS AND ASSOCIATES INC.
4200 Concours, Suite 200
Ontario, CA 91764
Phone: (909) 481-5750

REVISIONS: APPD.

DATE: MAY 1, 2009
DESIGN:
DRAWN: ELZ
CHECKED:
REVISION NUMBER:

SCALE: VARIES

PROJECT NUMBER:
HDRX00000031

DRAWING FILE:
MAYEW WASH

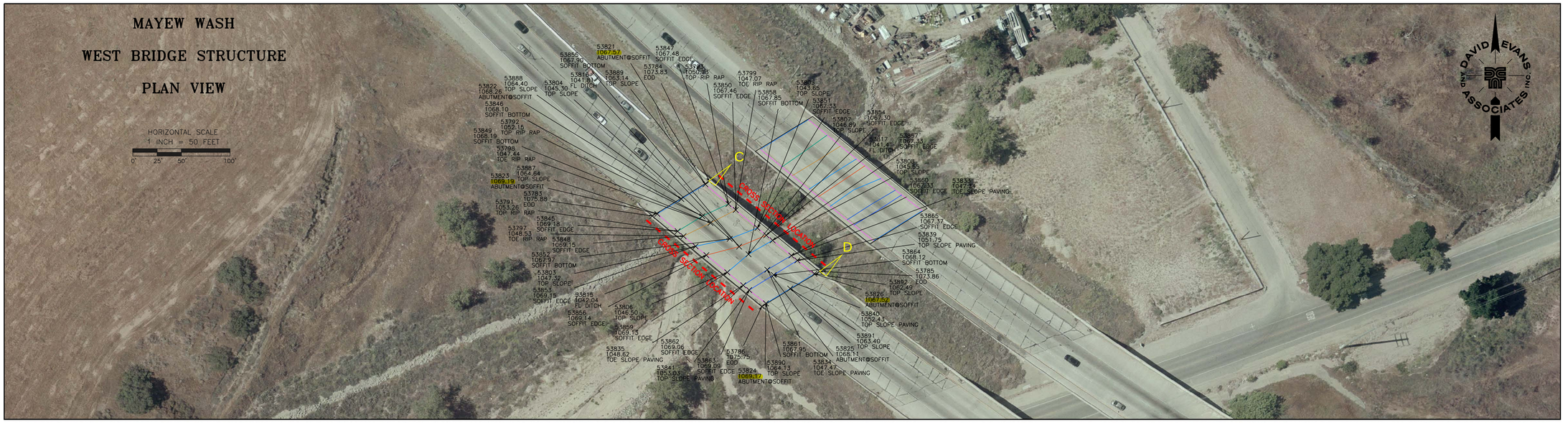
SHEET NO.
71
OF

MAYEW WASH

WEST BRIDGE STRUCTURE

PLAN VIEW

HORIZONTAL SCALE
1 INCH = 50 FEET
0' 25' 50' 100'

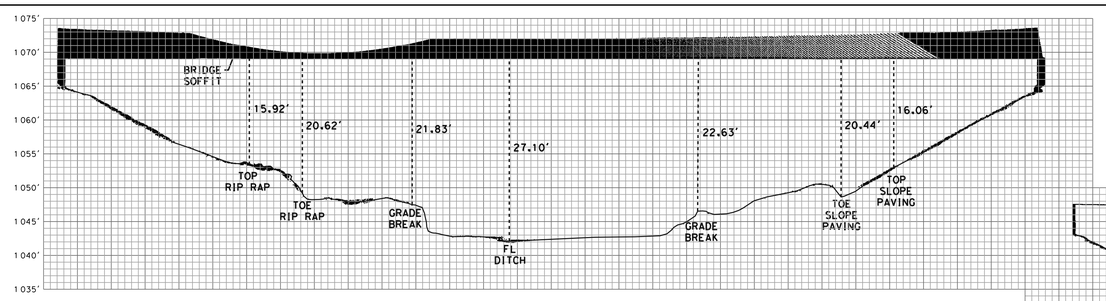


MAYEW WASH

WEST SIDE

PANORAMIC IMAGE

(NOT TO SCALE)



WEST SIDE

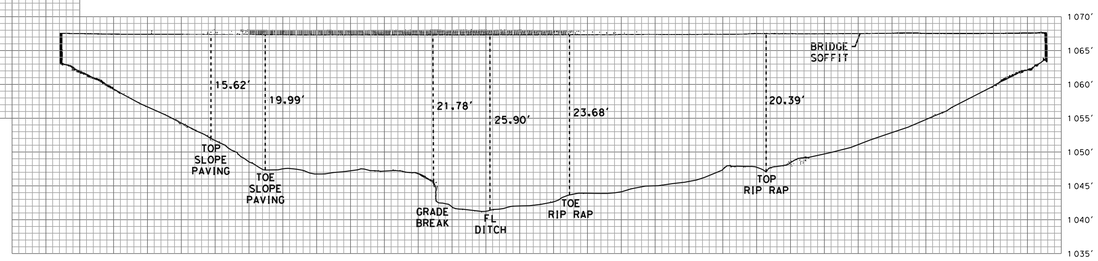
INTERSECTION OF I-15 AND MAYEW WASH
DRAINAGE CHANNEL
CROSS SECTION

HORIZONTAL AND VERTICAL SCALE
1 INCH = 10 FEET
0' 5' 10' 20'

MAYEW WASH

WEST BRIDGE STRUCTURE

BRIDGE CROSS SECTIONS



EAST SIDE

BRIDGE OVER DRAINAGE CHANNEL

LASER SCANNING SURVEY

DAVID EVANS AND ASSOCIATES INC.
4200 Concours, Suite 200
Ontario, CA 91764
Phone: (909) 481-5750

REVISIONS: APPD.

DATE: MAY 1, 2009
DESIGN:
DRAWN: ELZ
CHECKED:
REVISION NUMBER:

SCALE: VARIES

PROJECT NUMBER:
HDRX00000031

DRAWING FILE:
MAYEW WASH

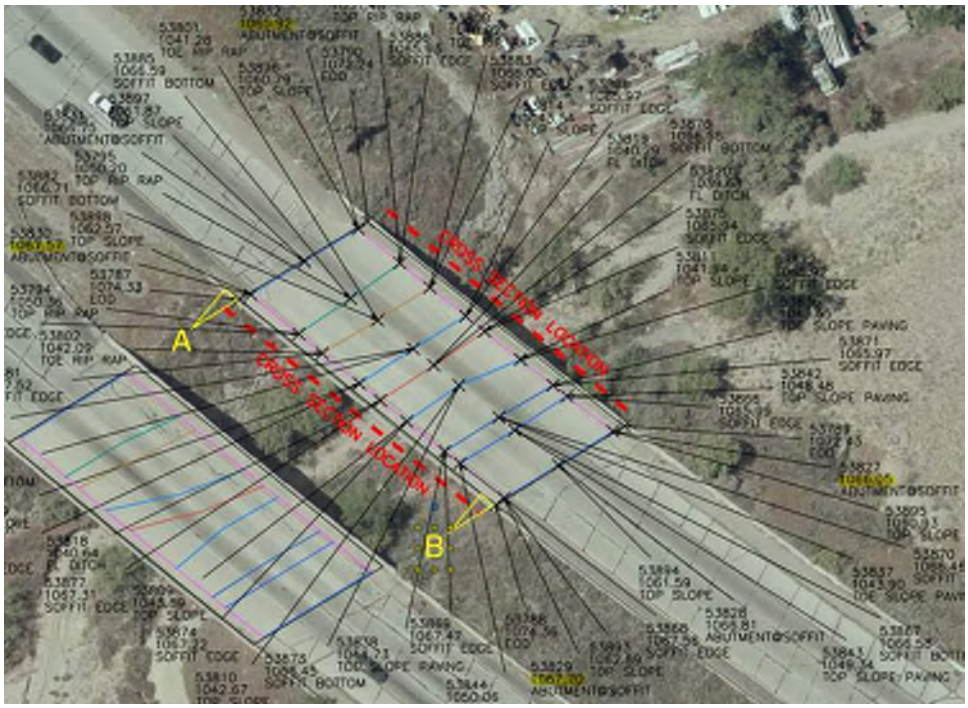
SHEET NO.
72

OF

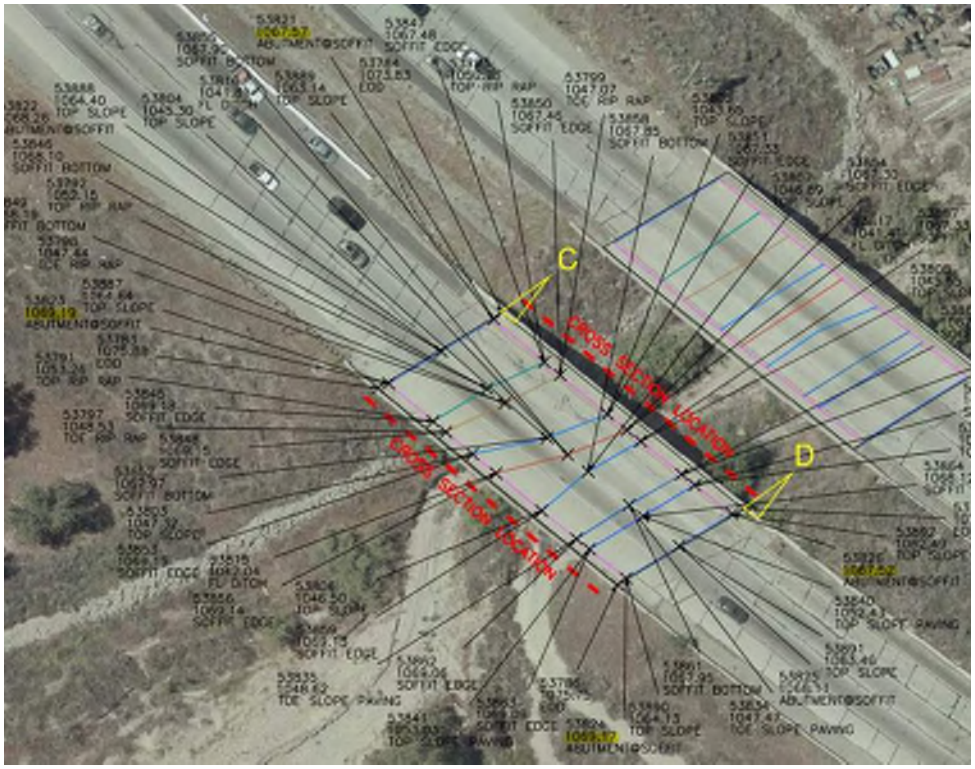
Mayhew Deck Elevation

Existing Condition is from 2009 LIDAR. Elevations are assumed to be NAVD 88

Northbound



Southbound



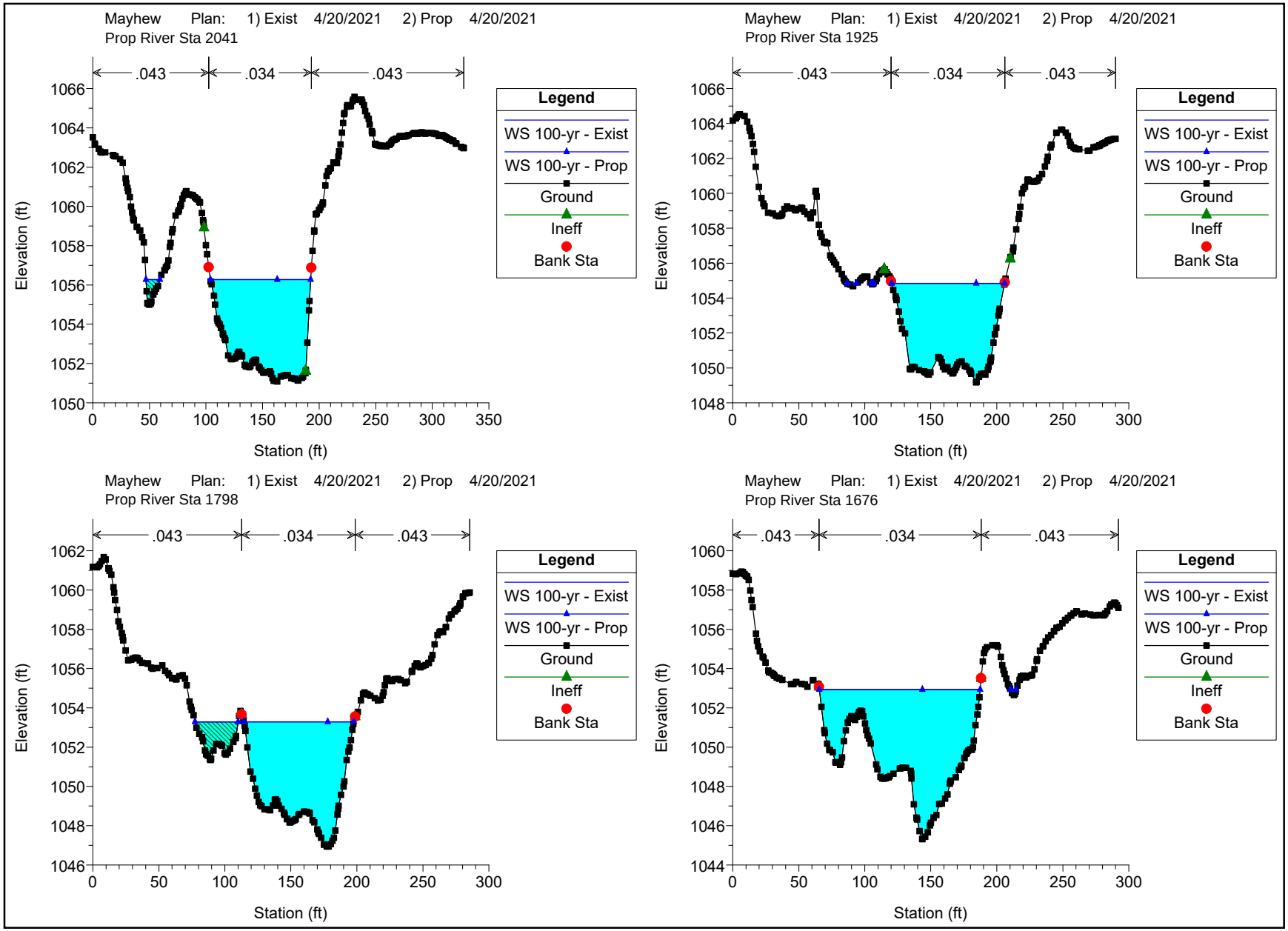
```
clear; clc;
format bank

nbrps = (1071.42-1071.57)/(65041.00-65194.49); % Northbound profile slope (Elevations
% are NGVD29 from asbuilts) slope is from right to left
sbrps = (1071.39-1071.42)/(65070.49-65216.48);% Southbound profile slope (Elevations
% are NGVD29 from asbuilts) slope is from right to left

rxs = 3/100; % Southbound and Northbound cross slope

% Extrapolated Elevations
SElev = [1067.57, 1067.70, 1067.57, 1067.52]; % Start Elevations for points A,B,C,D
ABelev = (SElev(1,1:2) + (25*tand(25)*(nbrps))) + (rxs*25) - 6/12;
CDelev = (SElev(1,3:4) - (25*tand(25)*(nbrps))) - (rxs*25) - 3/12;
elev = [ABelev CDelev];

% Create table
prows = {'A','B','C','D'};
varn = {'Point','Elevation NAVD88'};
T = table(prows', elev', 'VariableNames',varn)
```

T = 4×2 table

	Point	Elevation NAVD88
1	'A'	1067.83
2	'B'	1067.96
3	'C'	1066.56
4	'D'	1066.51

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

Reach	River Sta	Profile	Plan	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
				(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
1	2041	100-yr	Exist	4048.00	1051.08	1056.27	1056.27	1058.27	0.010932	11.33	357.31	101.01	1.00
1	2041	100-yr	Prop	4048.00	1051.08	1056.27	1056.27	1058.27	0.010932	11.33	357.31	101.01	1.00
1	1925	100-yr	Exist	4048.00	1049.18	1054.84	1054.84	1056.89	0.010821	11.48	352.71	94.67	1.00
1	1925	100-yr	Prop	4048.00	1049.18	1054.84	1054.84	1056.89	0.010821	11.48	352.71	94.67	1.00
1	1798	100-yr	Exist	4048.00	1046.94	1053.29	1053.24	1055.33	0.010413	11.47	353.02	115.91	0.98
1	1798	100-yr	Prop	4048.00	1046.94	1053.29	1053.24	1055.33	0.010413	11.47	353.01	115.90	0.98
1	1676	100-yr	Exist	4048.00	1045.31	1052.93	1052.28	1054.07	0.006523	8.55	473.27	126.26	0.77
1	1676	100-yr	Prop	4048.00	1045.31	1052.93	1052.28	1054.07	0.006524	8.55	473.25	126.26	0.77
1	1593	100-yr	Exist	4048.00	1044.63	1051.59	1051.44	1053.20	0.016826	10.19	397.34	115.52	0.96
1	1593	100-yr	Prop	4048.00	1044.63	1051.59	1051.44	1053.20	0.016824	10.19	397.35	115.55	0.96
1	1520	100-yr	Exist	4048.00	1043.16	1051.62	1050.60	1052.26	0.005430	6.42	630.86	219.63	0.67
1	1520	100-yr	Prop	4048.00	1043.16	1051.62	1050.62	1052.26	0.005429	6.42	630.92	219.63	0.67
1	1443	100-yr	Exist	4048.00	1042.64	1050.18	1049.39	1051.76	0.006545	10.07	401.93	80.98	0.80
1	1443	100-yr	Prop	4048.00	1042.64	1050.18	1049.39	1051.76	0.006545	10.07	401.93	80.98	0.80
1	1366	100-yr	Exist	4048.00	1040.78	1048.85	1048.85	1050.95	0.011095	11.63	348.10	82.09	1.00
1	1366	100-yr	Prop	4048.00	1040.78	1048.85	1048.85	1050.95	0.011095	11.63	348.10	82.09	1.00
1	1342	100-yr	Exist	4048.00	1039.91	1048.62	1048.21	1050.33	0.008236	10.48	386.31	86.73	0.87
1	1342	100-yr	Prop	4048.00	1039.91	1048.64	1048.23	1050.33	0.008158	10.45	387.47	86.77	0.87
1	1315	100-yr	Exist	4048.00	1040.74	1048.05	1048.05	1050.07	0.010788	11.41	354.69	86.73	0.99
1	1315	100-yr	Prop	4048.00	1040.74	1048.05	1048.05	1050.07	0.010788	11.41	354.69	86.73	0.99
1	1241	100-yr	Exist	4048.00	1039.49	1046.13	1046.13	1048.15	0.010874	11.40	354.96	86.71	0.99
1	1241	100-yr	Prop	4048.00	1039.49	1046.13	1046.13	1048.15	0.010874	11.40	354.96	86.71	0.99
1	1192	100-yr	Exist	4048.00	1037.70	1044.86	1044.86	1047.03	0.010918	11.82	342.59	88.34	1.00
1	1192	100-yr	Prop	4048.00	1037.70	1044.86	1044.86	1047.03	0.010918	11.82	342.59	88.34	1.00
1	1072	100-yr	Exist	4048.00	1036.33	1041.63	1041.63	1042.16	0.008440	7.61	786.74	452.60	0.82
1	1072	100-yr	Prop	4048.00	1036.33	1041.63	1041.63	1042.16	0.008440	7.61	786.74	452.60	0.82
1	1010	100-yr	Exist	4048.00	1036.27	1040.83	1040.83	1041.05	0.003428	4.72	1072.09	432.84	0.51
1	1010	100-yr	Prop	4048.00	1036.27	1040.83	1040.83	1041.05	0.003428	4.72	1072.09	432.84	0.51
1	953	100-yr	Exist	4048.00	1035.74	1038.92	1038.92	1039.59	0.015354	6.57	616.40	471.44	1.00
1	953	100-yr	Prop	4048.00	1035.74	1038.92	1038.92	1039.59	0.015354	6.57	616.40	471.44	1.00
1	906	100-yr	Exist	4048.00	1026.41	1034.49	1032.89	1035.66	0.004160	8.70	465.52	80.54	0.64
1	906	100-yr	Prop	4048.00	1026.41	1034.49	1032.89	1035.66	0.004160	8.70	465.52	80.54	0.64
1	722	100-yr	Exist	4048.00	1022.26	1032.15	1032.15	1034.37	0.011268	11.96	338.58	273.68	1.00
1	722	100-yr	Prop	4048.00	1022.26	1032.15	1032.15	1034.37	0.011268	11.96	338.58	273.68	1.00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Prop River Sta 2041
.043
.034
.043
Elevation (ft)
Station (ft)
Legend
WS 100-yr - Exist
WS 100-yr - Prop
Ground
Ineff
Bank Sta
Mayhew Plan: 1) Exist 4/20/2021 2) Prop 4/20/2021
Prop River Sta 1925
.043
.034
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Elevation (ft)
Station (ft)
Legend
WS 100-yr - Exist
WS 100-yr - Prop
Ground
Ineff
Bank Sta
Mayhew Plan: 1) Exist 4/20/2021 2) Prop 4/20/2021
Prop River Sta 1798
.043
.034
.043
Elevation (ft)
Station (ft)
Legend
WS 100-yr - Exist
WS 100-yr - Prop
Ground
Ineff
Bank Sta
Mayhew Plan: 1) Exist 4/20/2021 2) Prop 4/20/2021
Prop River Sta 1676
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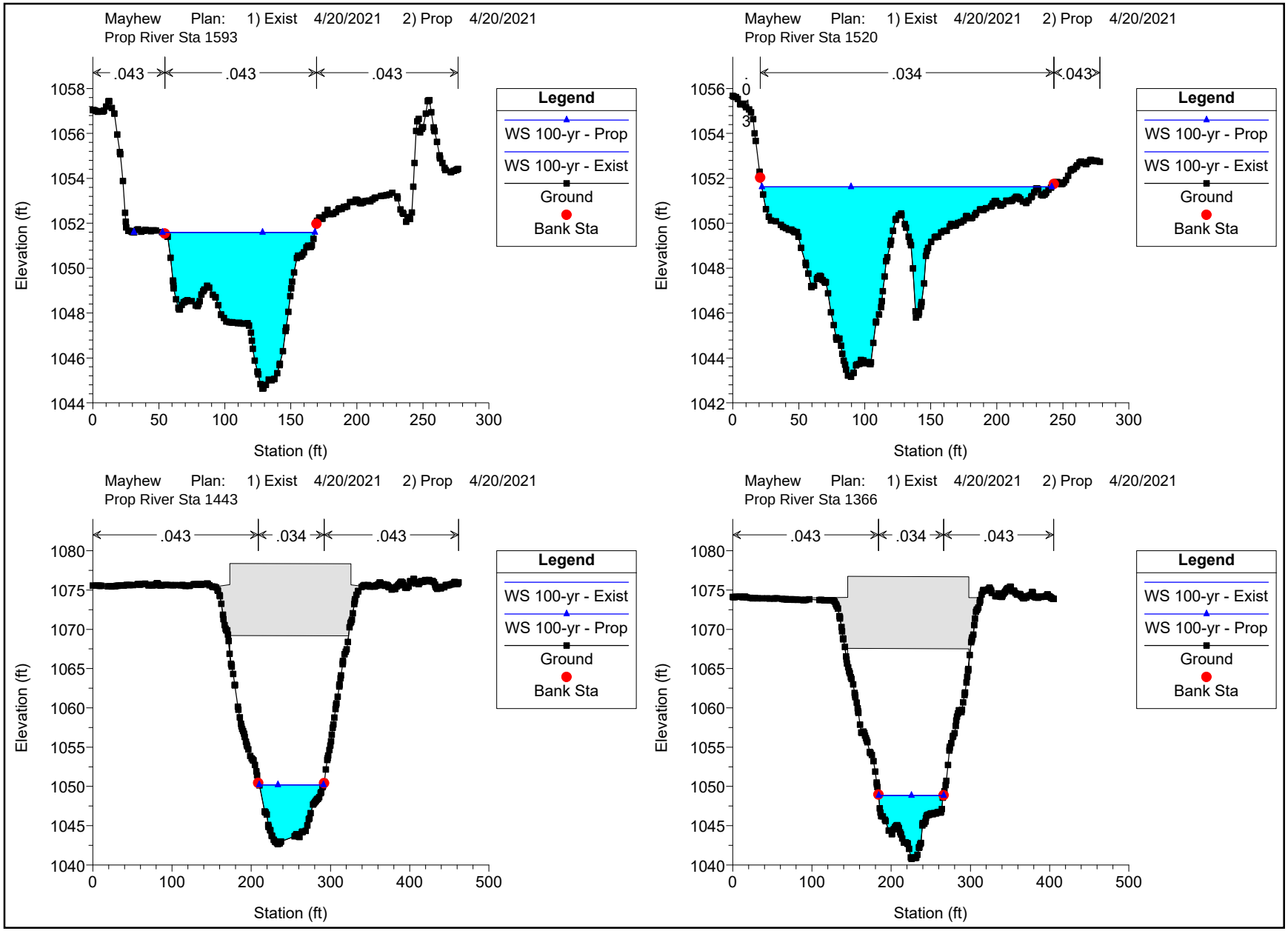
Elevation (ft)
Station (ft)
Legend
WS 100-yr - Exist
WS 100-yr - Prop
Ground
Ineff
Bank Sta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Prop River Sta 1593
.043
.043
.043
Elevation (ft)
Station (ft)
Legend
WS 100-yr - Prop
WS 100-yr - Exist
Ground
Bank Sta
Mayhew Plan: 1) Exist 4/20/2021 2) Prop 4/20/2021
Prop River Sta 1520
.034
.043
Elevation (ft)
Station (ft)
Legend
WS 100-yr - Prop
WS 100-yr - Exist
Ground
Bank Sta
Mayhew Plan: 1) Exist 4/20/2021 2) Prop 4/20/2021
Prop River Sta 1443
.043
.034
.043
Elevation (ft)
Station (ft)
Legend
WS 100-yr - Exist
WS 100-yr - Prop
Ground
Bank Sta
Mayhew Plan: 1) Exist 4/20/2021 2) Prop 4/20/2021
Prop River Sta 1366
.043
.034
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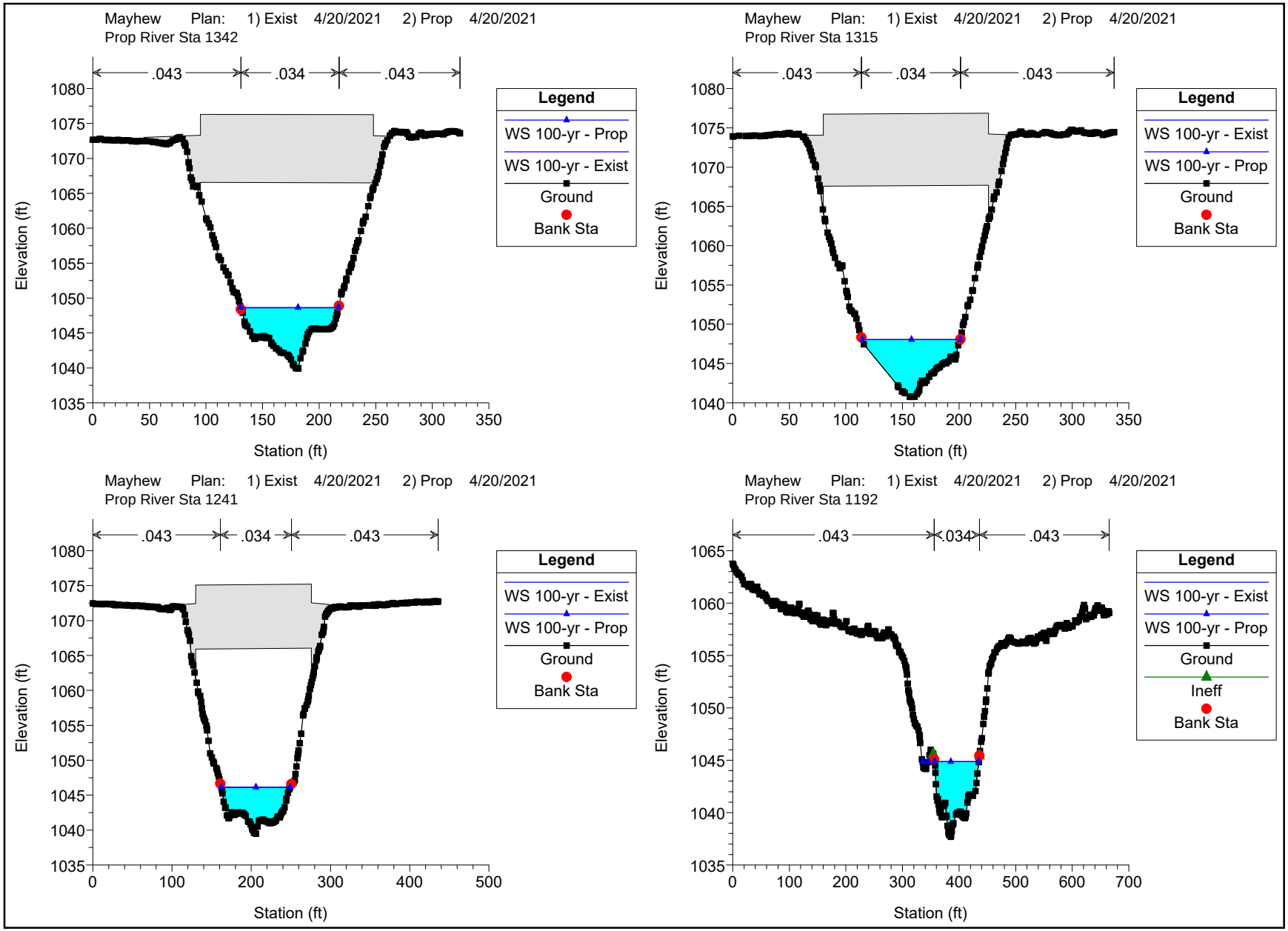
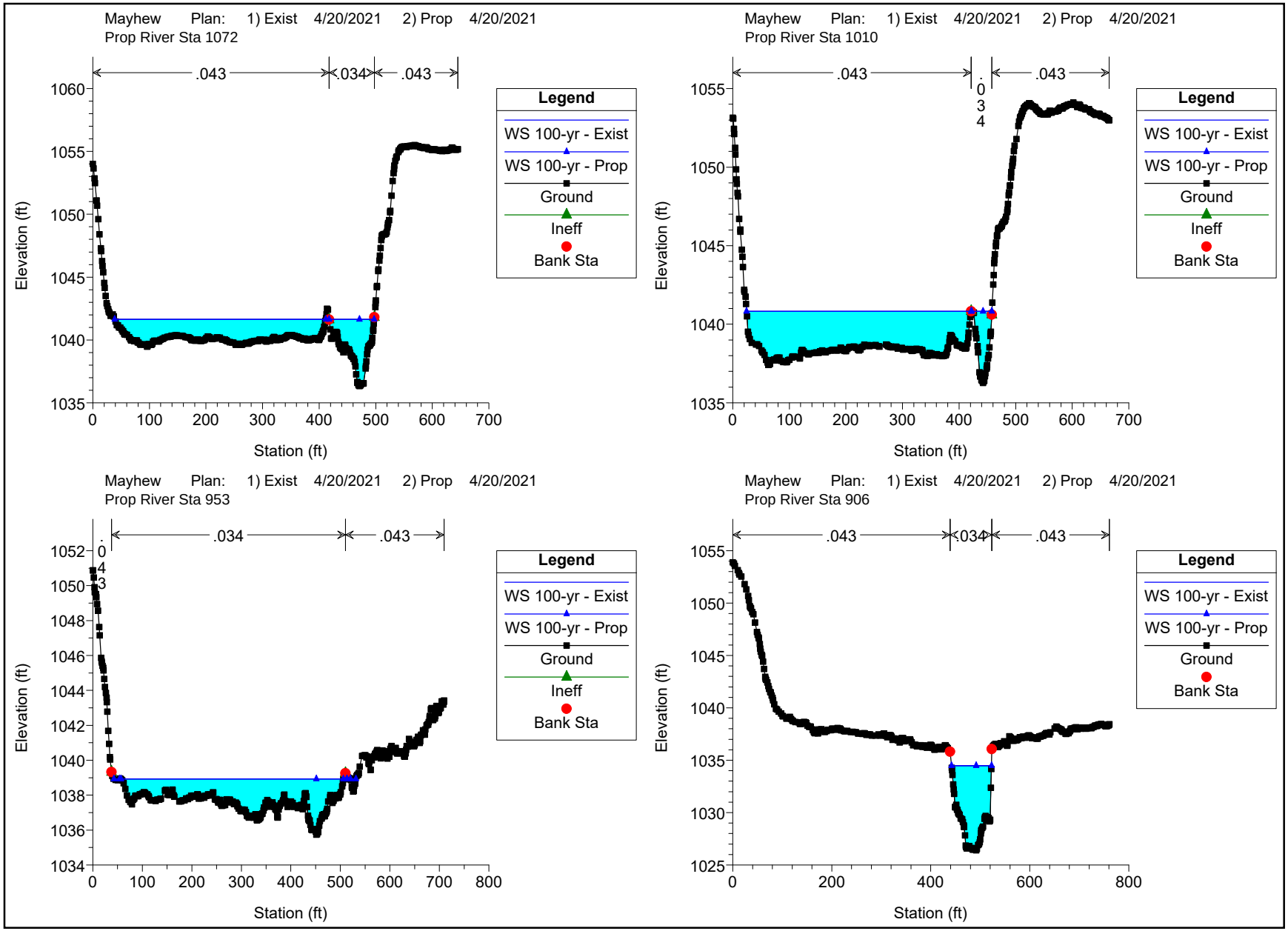
Elevation (ft)
Station (ft)
Legend
WS 100-yr - Exist
WS 100-yr - Prop
Ground
Bank Sta


Mayhew Plan: 1) Exist 4/20/2021 2) Prop 4/20/2021
Prop River Sta 1342
.043
.034
.043
Elevation (ft)
Station (ft)
Legend
WS 100-yr - Prop
WS 100-yr - Exist
Ground
Bank Sta
Mayhew Plan: 1) Exist 4/20/2021 2) Prop 4/20/2021
Prop River Sta 1315
.043
.034
.043
Elevation (ft)
Station (ft)
Legend
WS 100-yr - Exist
WS 100-yr - Prop
Ground
Bank Sta
Mayhew Plan: 1) Exist 4/20/2021 2) Prop 4/20/2021
Prop River Sta 1241
.043
.034
.043
Elevation (ft)
Station (ft)
Legend
WS 100-yr - Exist
WS 100-yr - Prop
Ground
Bank Sta
Mayhew Plan: 1) Exist 4/20/2021 2) Prop 4/20/2021
Prop River Sta 1192
.043
.034
.043
Elevation (ft)
Station (ft)
Legend
WS 100-yr - Exist
WS 100-yr - Prop
Ground
Ineff
Bank Sta


Mayhew Plan: 1) Exist 4/20/2021 2) Prop 4/20/2021
Prop River Sta 1072
.043
.034
.043
Elevation (ft)
Station (ft)
Legend
WS 100-yr - Exist
WS 100-yr - Prop
Ground
Ineff
Bank Sta
Mayhew Plan: 1) Exist 4/20/2021 2) Prop 4/20/2021
Prop River Sta 1010
.043
.034
.043
Elevation (ft)
Station (ft)
Legend
WS 100-yr - Exist
WS 100-yr - Prop
Ground
Ineff
Bank Sta
Mayhew Plan: 1) Exist 4/20/2021 2) Prop 4/20/2021
Prop River Sta 953
.043
.034
.043
Elevation (ft)
Station (ft)
Legend
WS 100-yr - Exist
WS 100-yr - Prop
Ground
Ineff
Bank Sta
Mayhew Plan: 1) Exist 4/20/2021 2) Prop 4/20/2021
Prop River Sta 906
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.034
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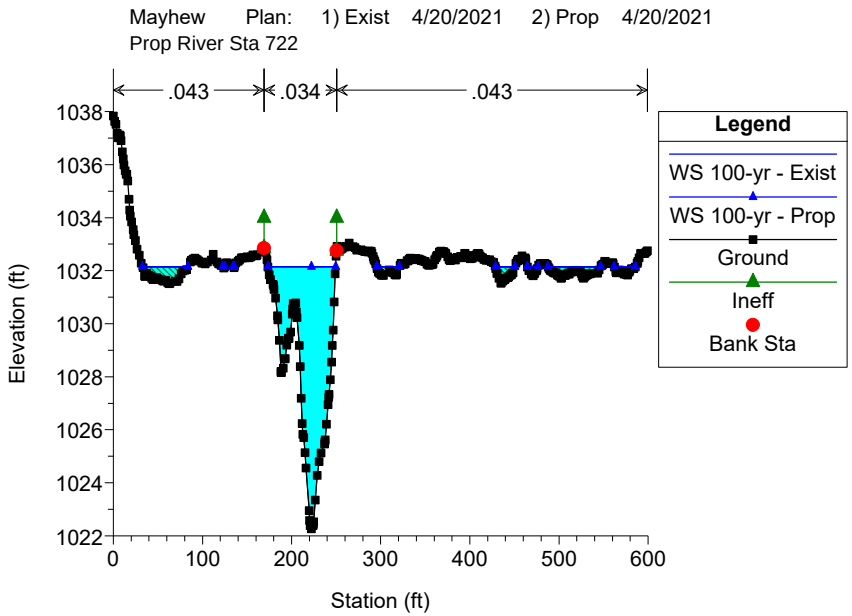
Elevation (ft)
Station (ft)
Legend
WS 100-yr - Exist
WS 100-yr - Prop
Ground
Bank Sta


Mayhew Plan: 1) Exist 4/20/2021 2) Prop 4/20/2021
Prop River Sta 722
.043
.034
.043
Elevation (ft)
1038
1036
1034
1032
1030
1028
1026
1024
1022
0
100
200
300
400
500
600
Station (ft)
Legend
WS 100-yr - Exist
WS 100-yr - Prop
Ground
Ineff
Bank Sta