

ORANGE COUNTY PUBLIC WORKS

SANTA ANA, CALIFORNIA

JESS A. CARBAJAL, DIRECTOR

PLANS FOR THE
CONSTRUCTION OF

BLACK STAR CANYON ROAD BRIDGES

W.O. # ER03676

SEPTEMBER 2011

FUNDED BY: Orange County Development Agency Fund

DEVIATIONS FROM STANDARDS	
1. 4-INCH MAXIMUM CLEARANCE SPACE BETWEEN RAILS	
APPROVED:	6/29/11
IGNACIO G. OCHOA, P.E. DIRECTOR / CHIEF ENGINEER, OC ENGINEERING	

OC PUBLIC WORKS	
SUBMITTED:	6/30/11
JAVIER SOTO, P.E. MANAGER, ROAD / CAPITAL PROJECTS	
RECOMMENDED:	6/30/11
KHALID BAZMI, P.E. MANAGER, ROAD	
APPROVED:	6/29/11
IGNACIO G. OCHOA, P.E. DIRECTOR / CHIEF ENGINEER, OC ENGINEERING	



INDEX OF SHEETS	
SHEET	DESCRIPTION
1	TITLE SHEET
2	GENERAL PLAN - BRIDGE BS-5
3	GENERAL PLAN - BRIDGE BS-4
4	GENERAL PLAN - BRIDGE BS-3
5	DECK CONTOURS
6	FOUNDATION PLAN
7	ABUTMENT DETAILS
8	TYPICAL SECTION AND SLAB REINFORCEMENT
9	TIE ROD DETAILS
10	RAILING - WEATHERING STEEL TYPE 115
11	RAILING DETAILS
12	BAT HABITAT DETAILS
13	LOG OF TEST BORINGS - BRIDGE BS-5
14	LOG OF TEST BORINGS - BRIDGE BS-4
15	LOG OF TEST BORINGS - BRIDGE BS-3

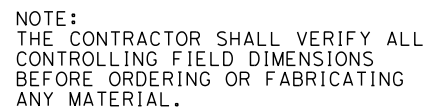
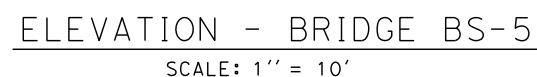
UTILITY OWNER	PHONE NO.	CONTACT

BASIS OF BEARINGS:
The basis of bearings for this survey is the California Coordinate System, Zone VI, NAD 83, Epoch 1991.35, as determined locally by a line between continuous global positioning stations (CGPS) "CCCS" and "MJPB" being N59°44'52"W as derived from geodetic values published and on file in the office of the Orange County Surveyor.

HORIZONTAL DATUM
Coordinates shown are based on the California Coordinate System (CCS83), Zone VI, 1983 North American Datum (1991.35 Epoch).
All distances shown are ground, unless otherwise noted.
Multiply a ground distance by 0.99993790 to obtain a grid distance.
All distances are based on the U.S. Survey Foot.




VERTICAL DATUM
O.C.S. BM. # 3D-108-71 ELEV. = 1029.713 LEVELED 1991
O.C.S. BM. # W-567 ELEV. = 1000.355 LEVELED 1991
NGVD 1929 (1995 O.C.S. ADJUSTMENT)

NO.	DESCRIPTION	SHT.	APPROVED	DATE
REVISIONS				



PLAN - BRIDGE BS-5

SCALE: 1" = 10'

- ① Protect in place
② Remove
-  Remove existing superstructure including MBGR
-  See Note 3
- Existing Structure
- Proposed Structure
-  Direction of Flow

1. For general notes and index to plans, see "Deck Contours" sheet.
2. For pile data table, see "Foundation Plan" sheet.
3. Sawcut and remove 12" Thick AC (or other material) to 1'-0" depth below Finished Surface within 10 feet of BB or EB and fill with 12" Thick AC to provide a smooth transition to new BB or EB elevation.



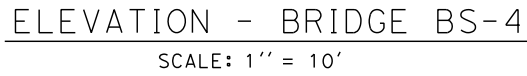
ORANGE COUNTY PUBLIC WORKS	DESIGNED BY: LARRY QUACH	CHECKED B. HOBINGTON
	DRAWN B. HOBINGTON L.Q.	R. HOBINGTON
PREPARED BY: BRIDGE DESIGN SECTION	DRAWING CODE:	
	FILE NAME:	
	PLOT DATE:	SCALE: AS SHOWN

BLACK STAR CANYON ROAD BRIDGES

GENERAL PLAN
BRIDGE BS-5




SHEET
REFERENCE
NUMBER

2

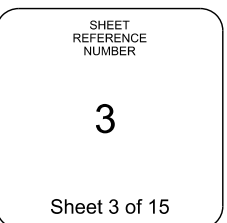


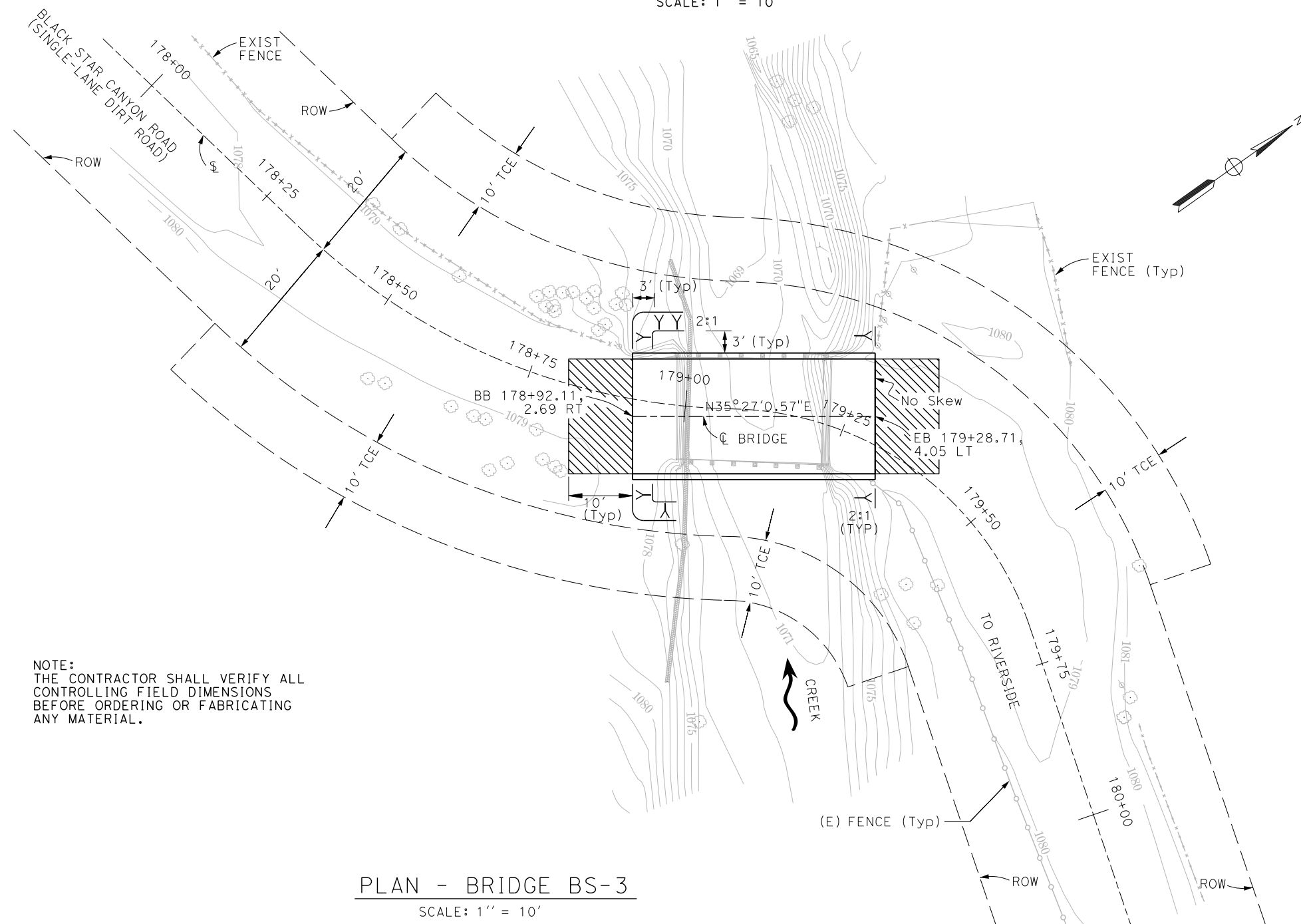
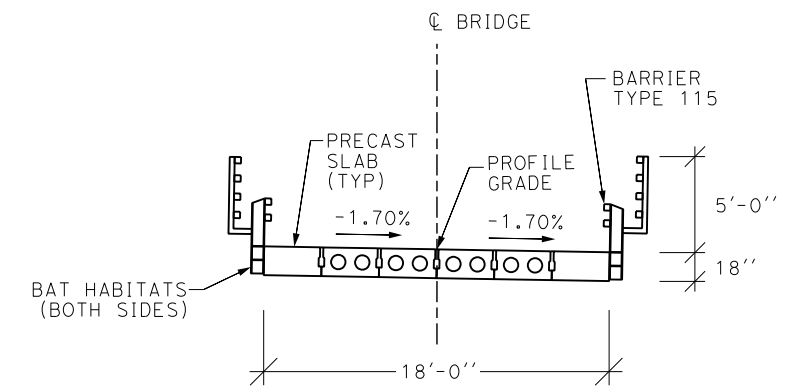
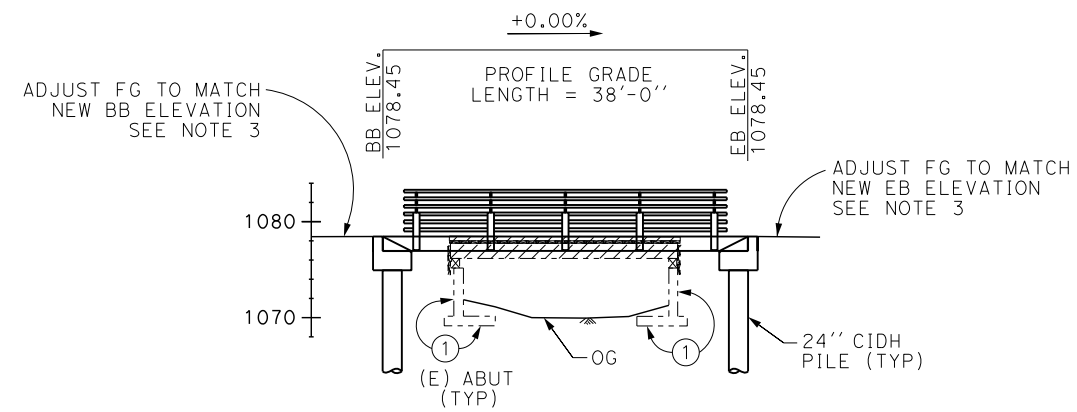
NOTE:
THE CONTRACTOR SHALL VERIFY ALL
CONTROLLING FIELD DIMENSIONS
BEFORE ORDERING OR FABRICATING
ANY MATERIAL.

PLAN - BRIDGE BS-4
SCALE: 1" = 10'




- ① Protect in place
 ② Remove
 Remove existing superstructure including MBGR
 See Note 3
 - - - - Existing Structure
 ——— Proposed Structure
 Direction of Flow

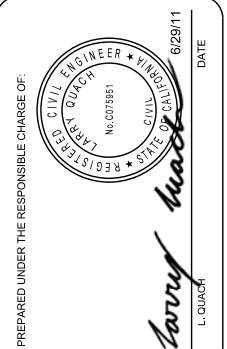
1. For general notes and index to plans, see "Deck Contours" sheet.
2. For pile data table, see "Foundation Plan" sheet.
3. Sawcut and remove 12" Thick AC (or other material) to 1'-0" depth below Finished Surface within 10 feet of BB or EB and fill with 12" Thick AC to provide a smooth transition to new BB or EB elevation.





- LEGEND:

- ① Protect in place
- ② Remove
-  Remove existing superstructure including MBGR
-  See Note 3
- Existing Structure
- Proposed Structure
-  Direction of Flow

[illegible]

<p>ORANGE COUNTY PUBLIC WORKS</p>	DESIGNED BY:	
	LARRY QUACH	
	DRAWN BY:	CHECKED BY:
	LQ	R. HOSINGTON
<p>PREPARED BY: BRIDGE DESIGN SECTION</p>	DRAWING CODE:	
	FILE NAME:	
	PLOT DATE:	SCALE: AS SHOWN

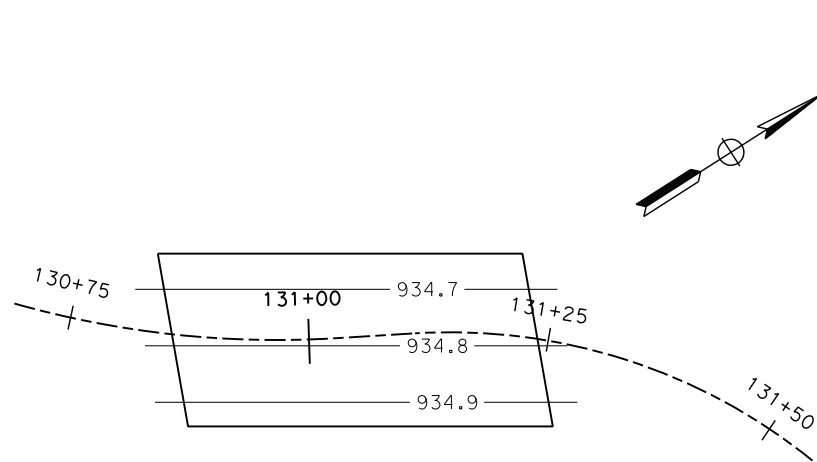
BLACK STAR CANYON ROAD BRIDGES

GENERAL PLAN
BRIDGE BS-3

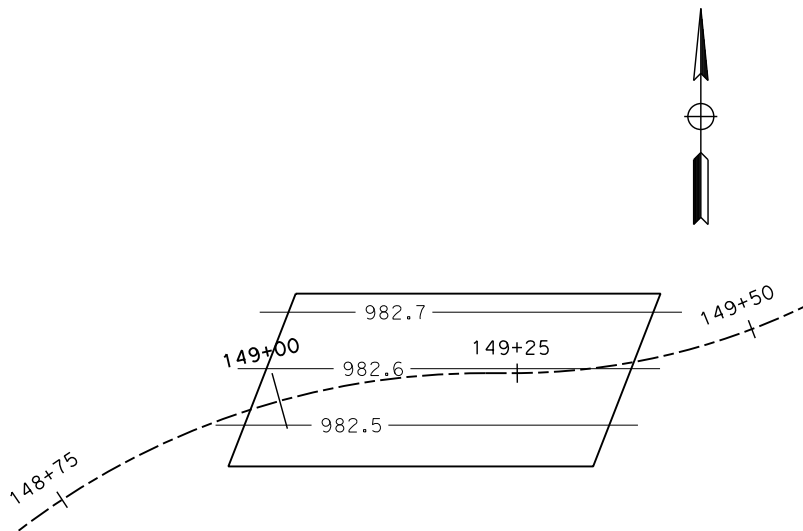
SHEET
REFERENCE
NUMBER

4

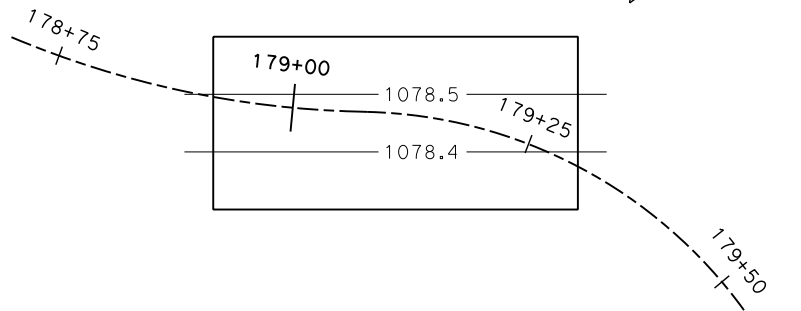
Sheet 4 of 15



BRIDGE BS-5



BRIDGE BS-4



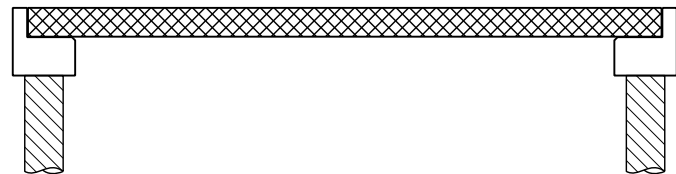
BRIDGE BS-3

PLAN

SCALE: 1" = 10'

NOTES:

1. Contour interval is 0.1'
2. Contours do not include camber



- PRESTRESSED CONCRETE, BRIDGE (SEE SLAB DETAILS)
 ABUTMENT (4 ksi @ 28 DAYS)
 CAST-IN-DRILLED-HOLE CONCRETE PILING (4 ksi @ 28 DAYS)

CONCRETE STRENGTH AND TYPE LIMITS

NO SCALE

GENERAL NOTES
LOAD AND RESISTANCE FACTOR DESIGN

DESIGN:

AASHTO LRFD Bridge Design Specifications, 4th edition with Caltrans Amendments; except that geotechnical design of deep foundations, and Standard Bridge Details XS Sheets, are designed using Caltrans Bridge Design Specifications (2000), dated November 2003.

SEISMIC DESIGN:

Caltrans Seismic Design Criteria (SDC), Version 1.6 Dated November 2010.

DEAD LOAD:

Includes 35 psf for future wearing surface.

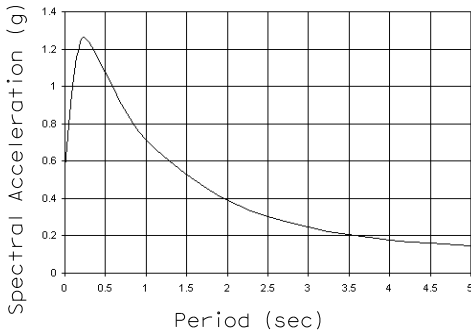
LIVE LOAD:

HL93, Permit Design Load, and D9 Bulldozer (as Permit Load).

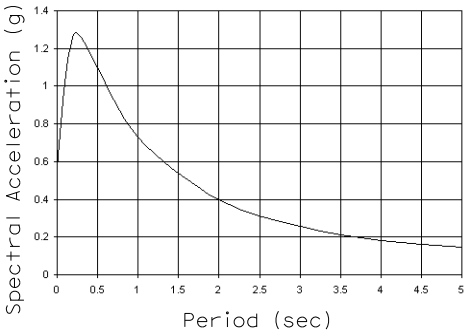
SEISMIC LOADING:

Soil Profile Type D.

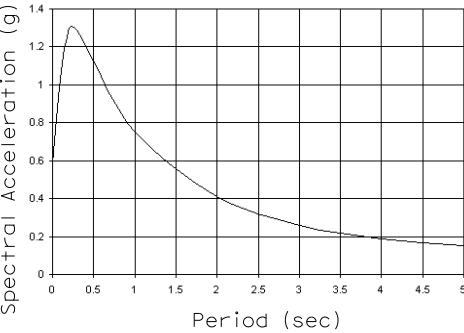
Design Spectrum for Bridge BS-5 (PGA = 0.56)



Design Spectrum for Bridge BS-4 (PGA = 0.58)



Design Spectrum for Bridge BS-3 (PGA = 0.59)



REINFORCED CONCRETE:

$f_y = 60$ ksi
 $f'_c =$ See "Concrete Strength and Type Limits"
 $n = 8$

PRESTRESSED CONCRETE:

See Prestressing Notes

INDEX TO PLANS

- 1 TITLE SHEET
2 GENERAL PLAN - BRIDGE BS-5
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6 FOUNDATION PLAN
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11 RAILING DETAILS
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13 LOG OF TEST BORINGS - BRIDGE BS-5
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15 LOG OF TEST BORINGS - BRIDGE BS-3

STANDARD PLANS DATED 2006

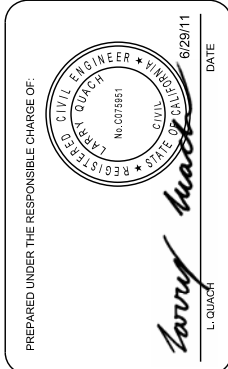
- A10A/B ABBREVIATIONS
A62C LIMITS OF PAYMENT FOR EXCAVATION AND BACKFILL - BRIDGE
B0-13 BRIDGE DETAILS
B2-3 24" CAST-IN-DRILLED-HOLE CONCRETE PILE (MOD)
B6-21 JOINT SEALS (MAXIMUM MOVEMENT RATING = 2")
(RSP)
B11-51 TUBULAR HAND RAILING

- Standard Plan Sheet No.
 Detail No.

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

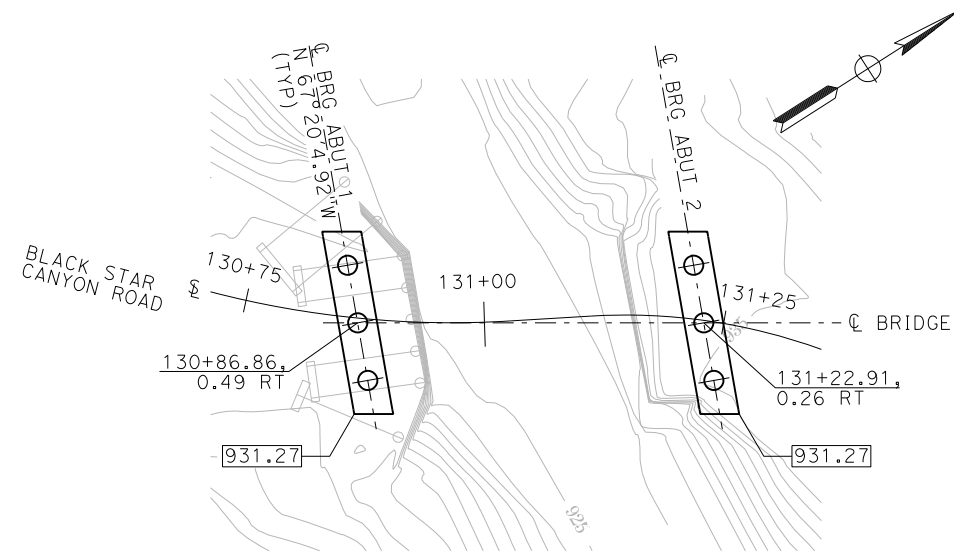


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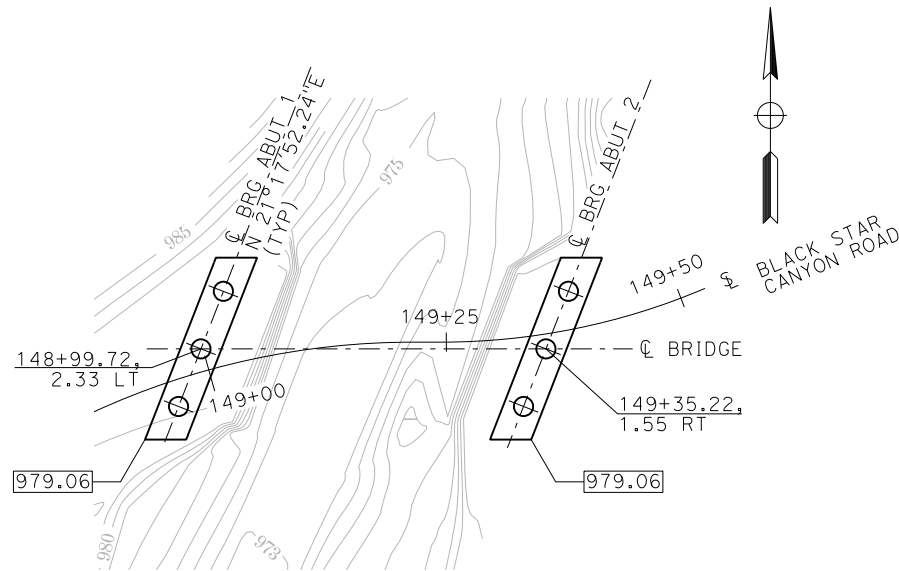


DESIGNED BY: LARRY QUACH	CHECKED BY: R. HOISINGTON	DRAWING CODE:	FILE NAME:	PLOT DATE:	SCALE: AS SHOWN
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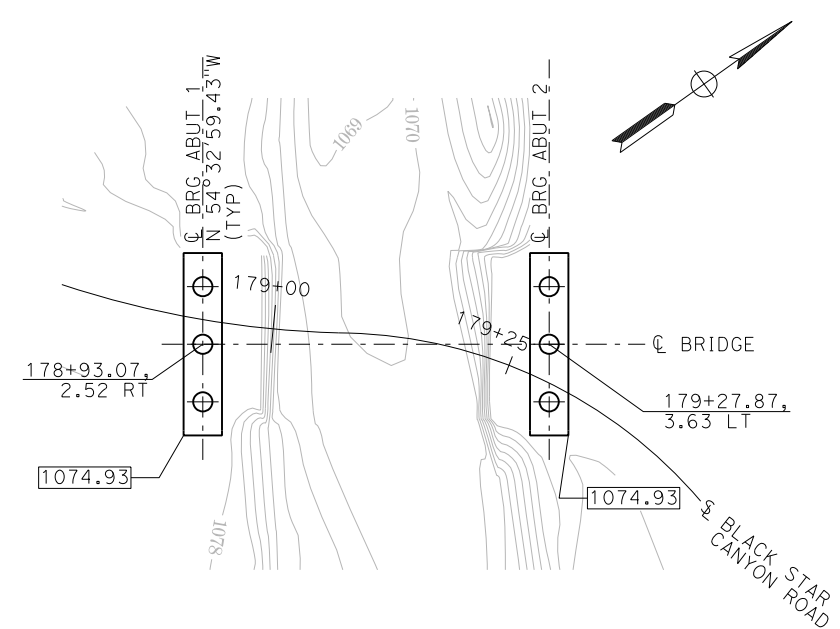
BLACK STAR CANYON ROAD BRIDGES	DECK CONTOURS
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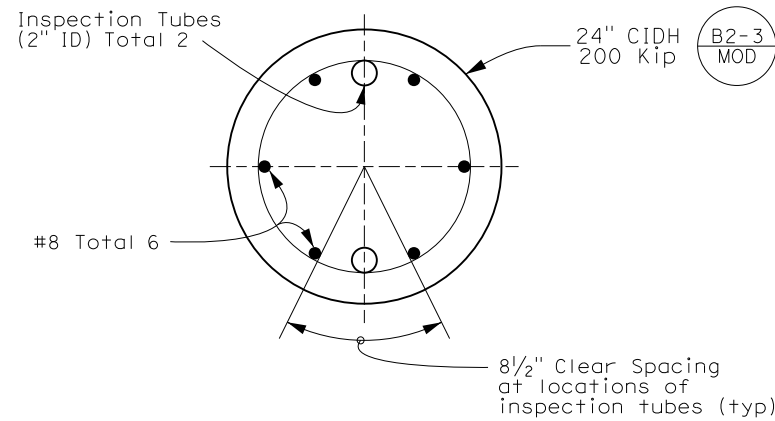
BRIDGE BS-5



BRIDGE BS-4



BRIDGE BS-3



Inspection Tubes for 200 Kip 24" CIDH Pile
MODIFIED FOR INSPECTION TUBES
NTS

PLAN
SCALE: 1" = 10'

LEGEND:

- INDICATES BOTTOM OF PILE CAP
- INDICATES 200 KIP 24"Ø CIDH PILING PER CALTRANS STD PLAN B2-3

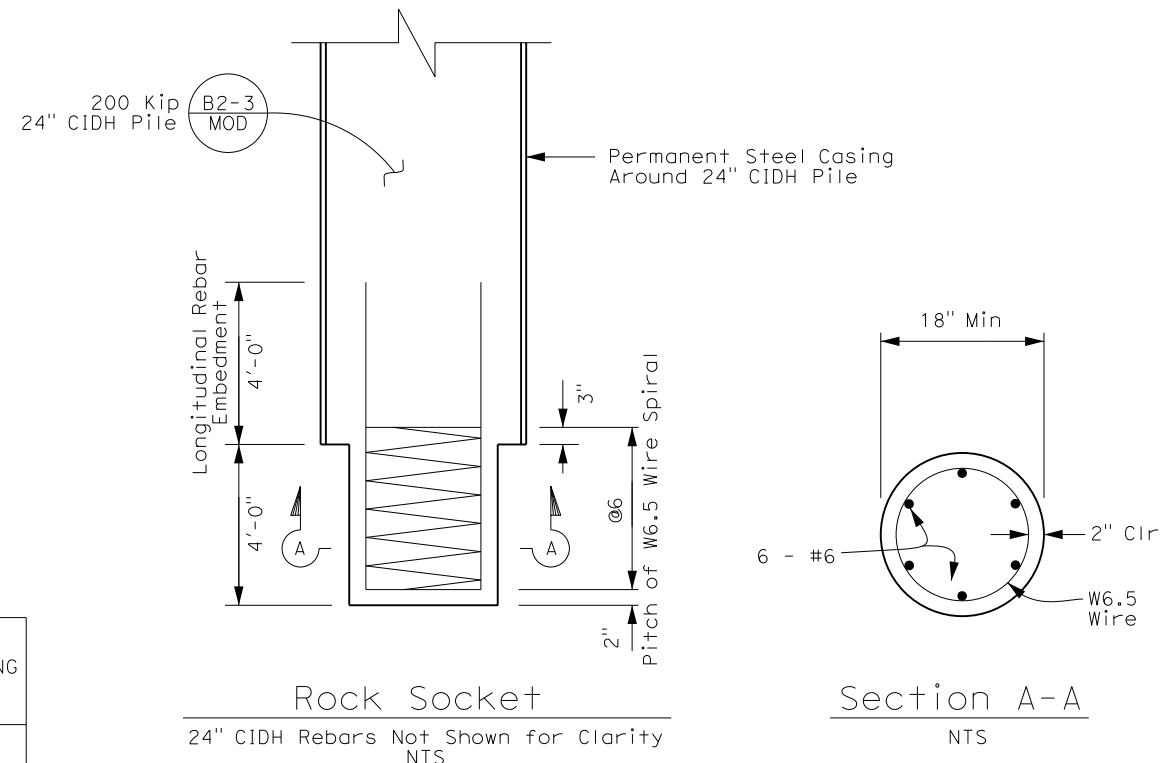
HYDROLOGIC SUMMARY
HYDROLOGY NOT AVAILABLE

PILE DATA TABLE

BRIDGE	LOCATION	PILE TYPE	NOMINAL RESISTANCE (KIPS)		DESIGN TIP ELEVATION (FT)	SPECIFIED TIP ELEVATION (FT)	PERMANENT STEEL CASING TIP ELEVATION (FT)
			COMPRESSION	TENSION			
BS-5	SOUTH ABUT	200 Kip/24" CIDH	180	0	916	916	N/A
	NORTH ABUT	200 Kip/24" CIDH	180	0	916	916	N/A
BS-4	WEST ABUT	200 Kip/24" CIDH & Rock Socket	180	0	967	967	971
	EAST ABUT	200 Kip/24" CIDH	180	0	965	965	N/A
BS-3	SOUTH ABUT	200 Kip/24" CIDH	310	0	1048	1048	N/A
	NORTH ABUT	200 Kip/24" CIDH	400	0	1041	1041	N/A

NOTES:

- Design tip elevations are controlled by: (a) Compression, (b) Settlement, (d) Lateral Load.
- The CIDH specified tip elevation shall not be raised.
- No splices in longitudinal rebar allowed.



Bridge BS-4 West Abutment
NTS

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



MARK	DESCRIPTION	DATE	APPR.

PREPARED UNDER THE RESPONSIBLE CHARGE OF:

CIVIL ENGINEER • LARRY QUACH • No. 073851 • REGISTERED

DATE: 6/29/11

LARRY QUACH

DESIGNED BY: LARRY QUACH

CHECKED BY: R. HOSINGTON

DRAWN BY: LQ

DRAWING CODE:

FILE NAME:

PLOT DATE:

SCALE: AS SHOWN

ORANGE COUNTY PUBLIC WORKS

PREPARED BY: BRIDGE DESIGN SECTION

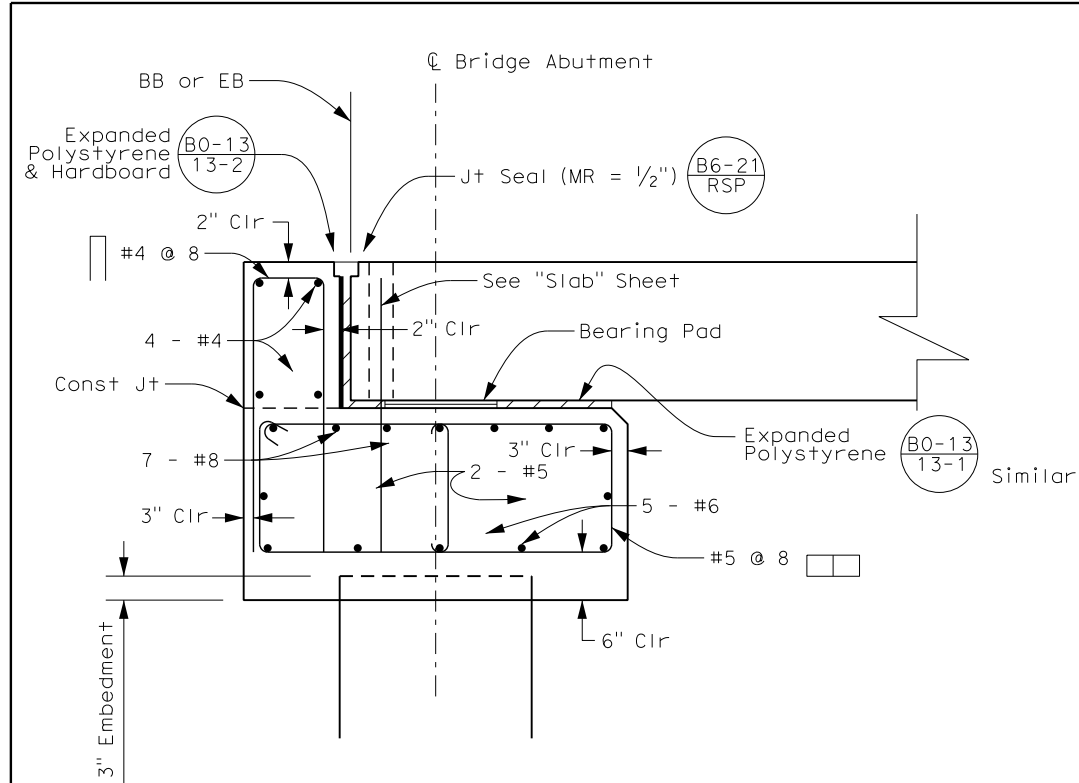
BLACK STAR CANYON ROAD BRIDGES

FOUNDATION PLAN

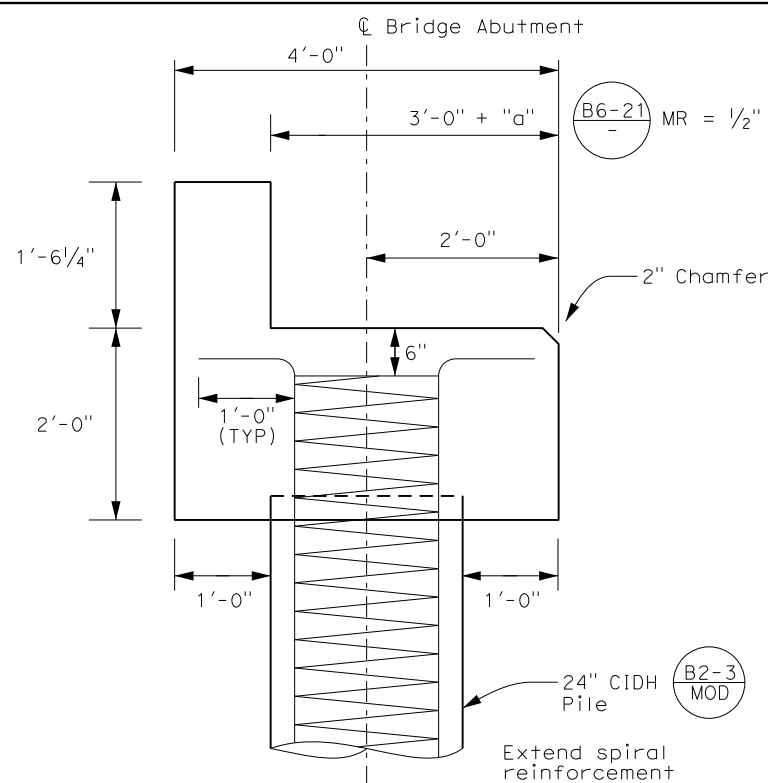
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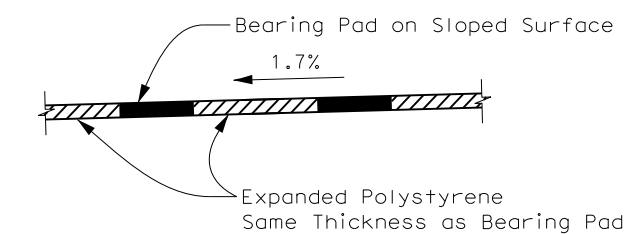
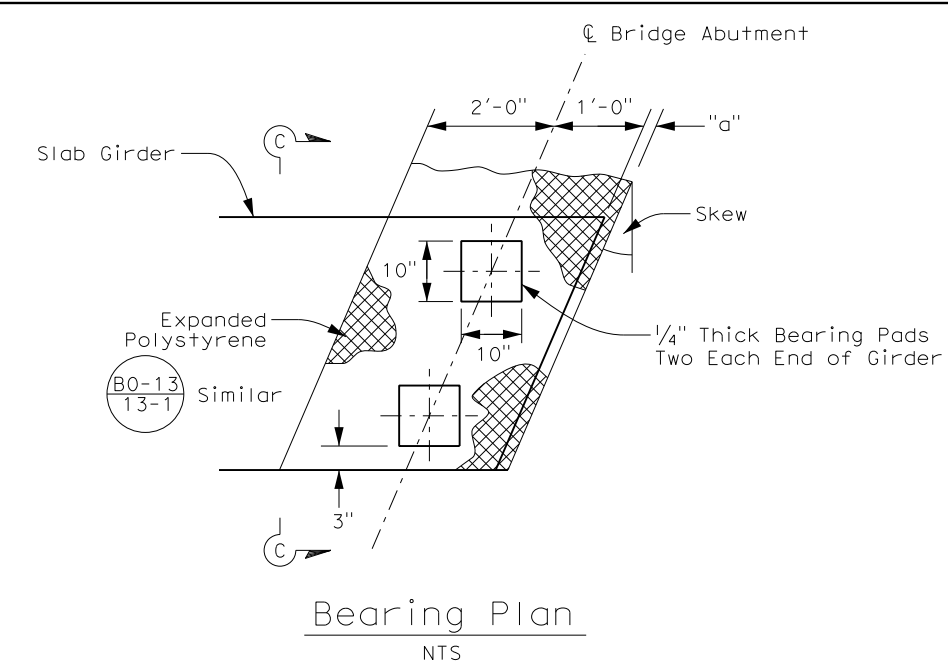
Sheet 6 of 15



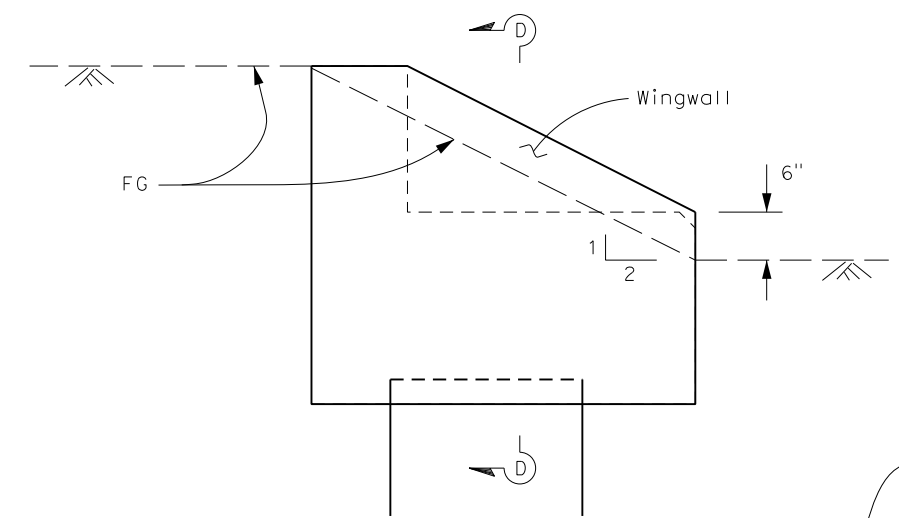
Section A-A
Abutment Reinforcement
1" = 1'-0"



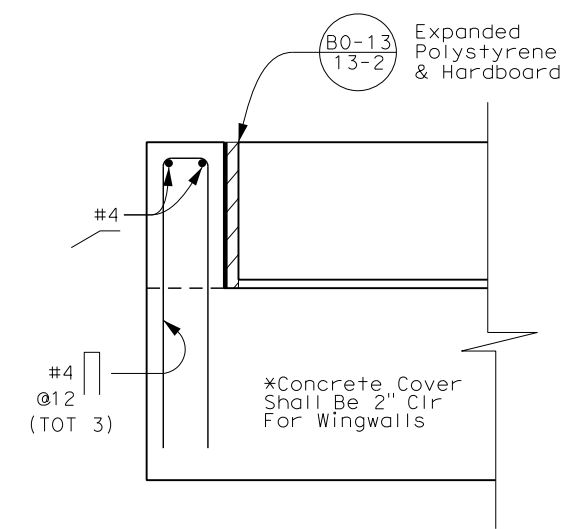
Section A-A
Abutment Dimensions
1" = 1'-0"



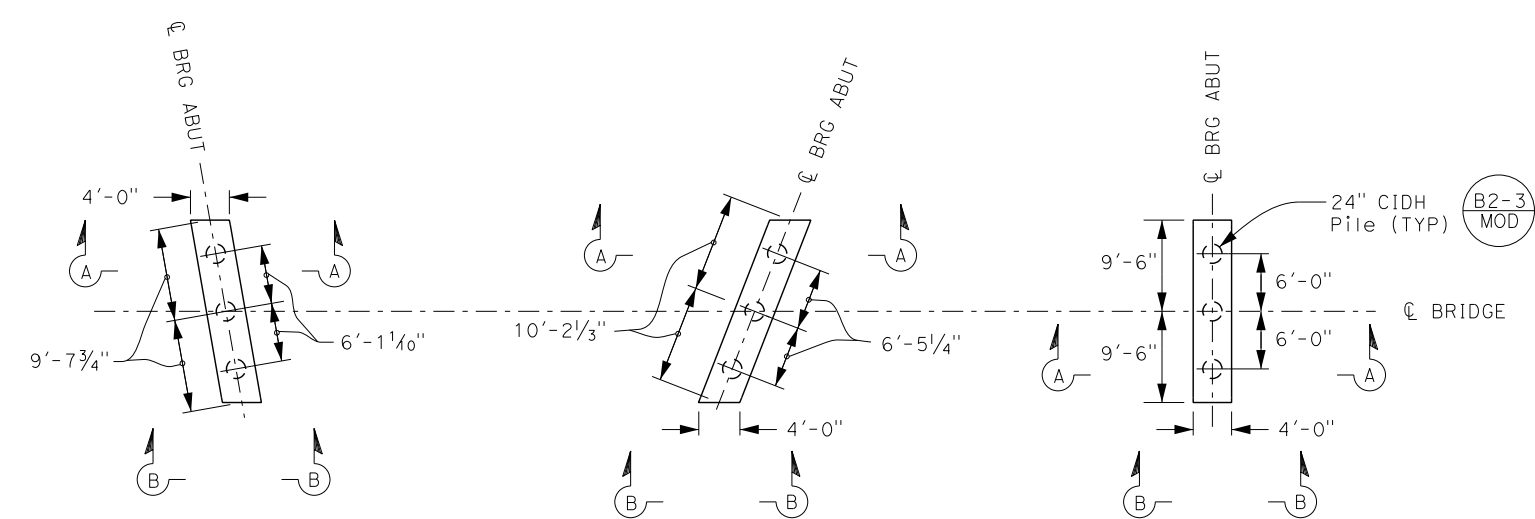
View C-C
NTS



Elevation B-B
Wingwall
NTS



Section D-D
NTS



Bridge BS-5
Abutment 1
(Abutment 2 Similar)

Bridge BS-4
Abutment 1
(Abutment 2 Similar)

Bridge BS-3
Abutment 1
(Abutment 2 Similar)

Footings and Pile Layout
NTS

LEGEND:

INDICATES 200 KIP 24"Ø CIDH PILING PER CALTRANS STD PLAN B2-3

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



APPR.	DATE	DESCRIPTION	MARK

PREPARED UNDER THE RESPONSIBLE CHARGE OF:

CIVIL ENGINEER • WINSTON-SALEM, N.C. 6/29/11

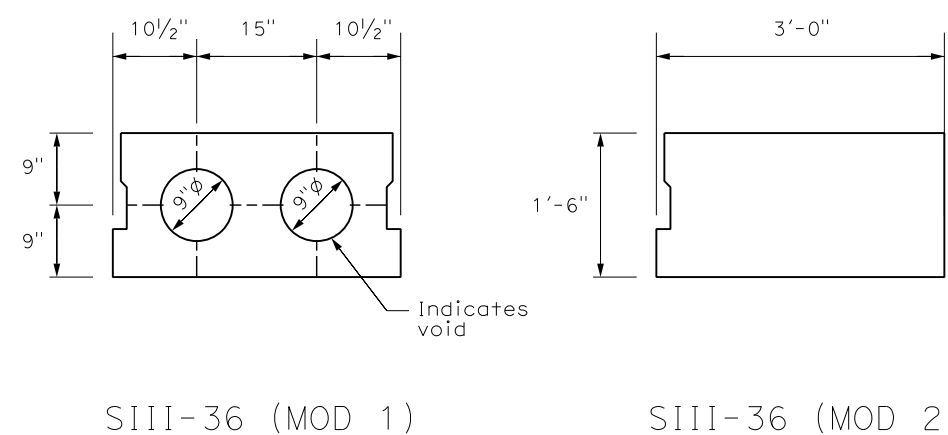
LARRY QUACH

DATE

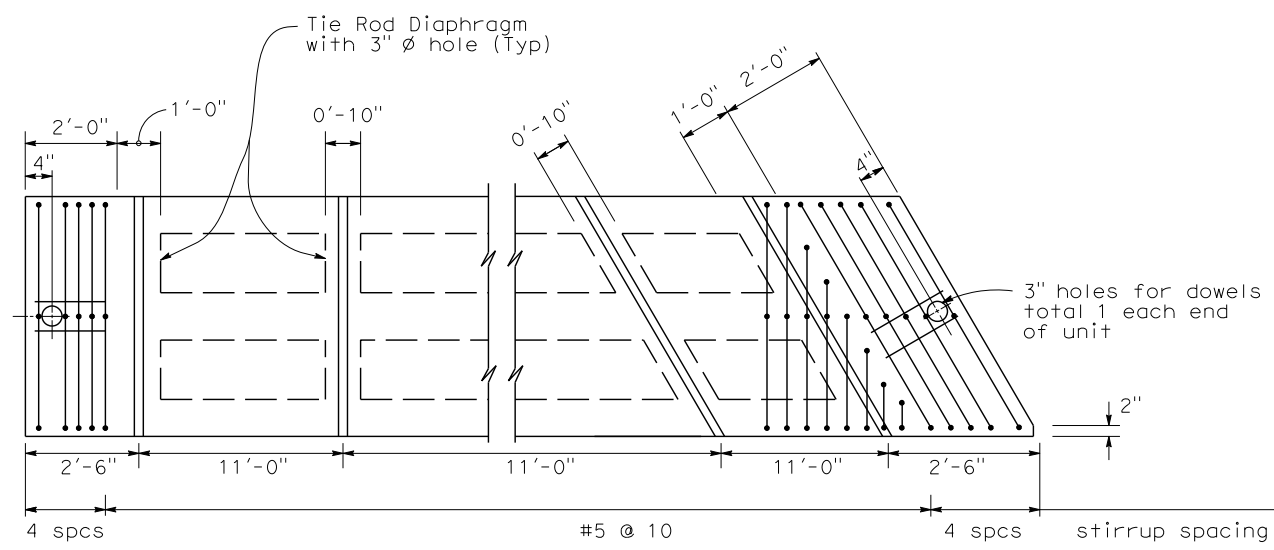
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PREPARED BY: BRIDGE DESIGN SECTION					

BLACK STAR CANYON ROAD BRIDGES

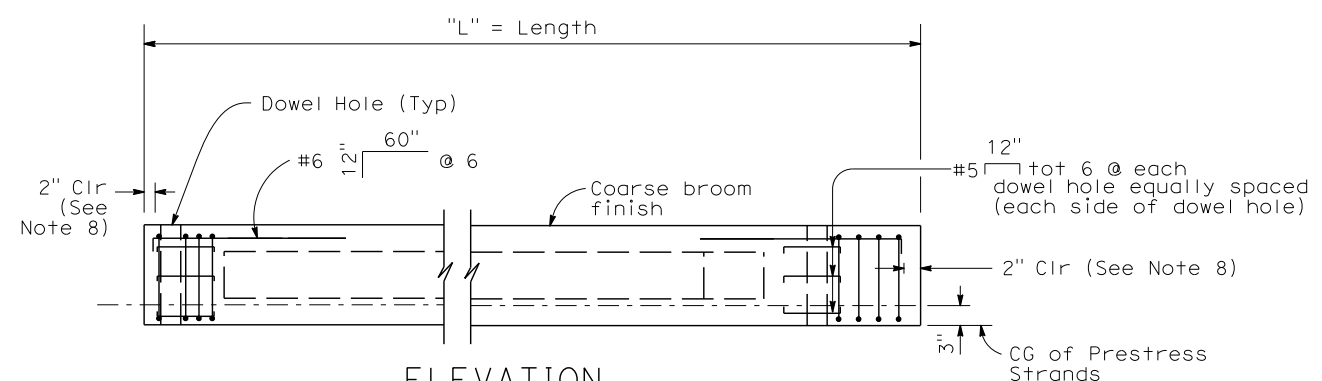
ABUTMENT DETAILS



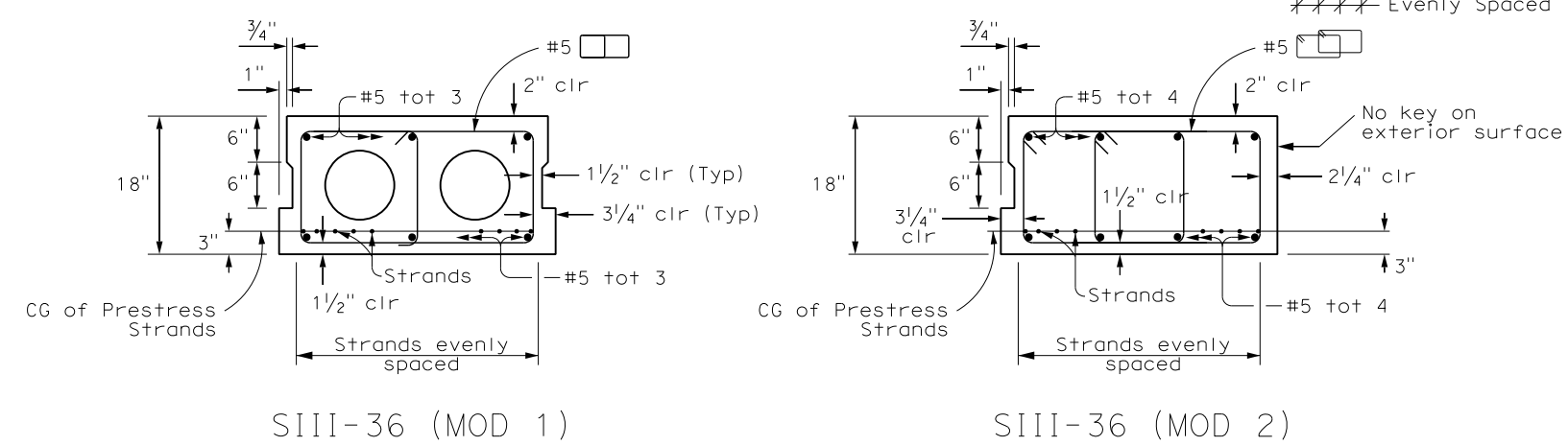
TYPICAL SECTIONS
SCALE: 1" = 1'



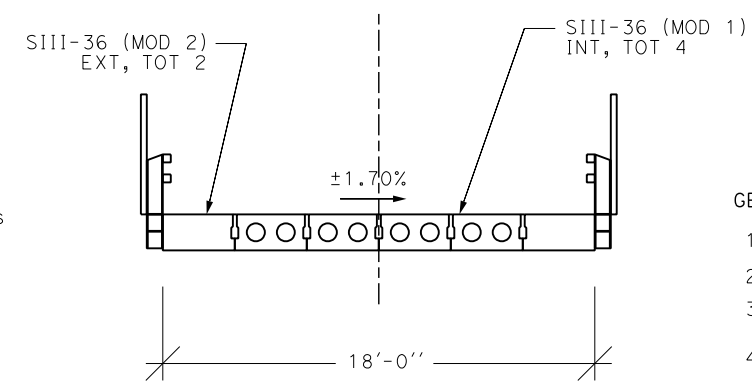
PLAN
NO SCALE



ELEVATION
NO SCALE



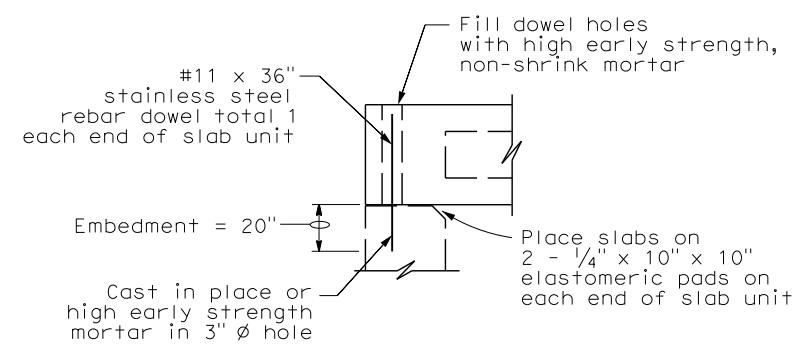
TYPICAL REINFORCEMENT
(See Note 7)
SCALE: 1" = 1'-0"



TYPICAL SECTION
SCALE: 1/4" = 1'

- GENERAL NOTES:
1. P_f is the force required at center of span after all losses.
 2. Slabs designed for pretensioning.
 3. Concrete strength at time of stressing 4 ksi f' - 5 ksi at 28 days
 4. Keyways to be filled with Class I concrete.
 5. See other sheets for railing and bat habitat requirements.
 6. Number of bottom prestressing strands based on 1/2" ϕ F_{pu} = 270 ksi, Low relaxation strand.
 7. For details showing connections to bridge railing and bat habitats, please see other sheets: "Tie Rod Details," "Metal Tube Bridge Railing," & "Bat Habitat Details".
 8. Specified clearance includes 1/2" for Type A Joint Seal sawcut

LOCATION OR LENGTH	TYPICAL SECTION	P_f = WORKING FORCE IN KIPS	NO. OF STRANDS
38 feet (Interior)	SIII-36 (MOD 1)	252	10
38 feet (Exterior)	SIII-36 (MOD 2)	275	11



SUPPORT DETAILS
NO SCALE

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

COUNTY OF ORANGE
CALIFORNIA

APPR.	DATE	DESCRIPTION	MARK

CIVIL ENGINEER - MINOR CIVIL
No. C075851
LARRY QUACH

PREPARED UNDER THE RESPONSIBLE CHARGE OF: LARRY QUACH 6/29/11 DATE

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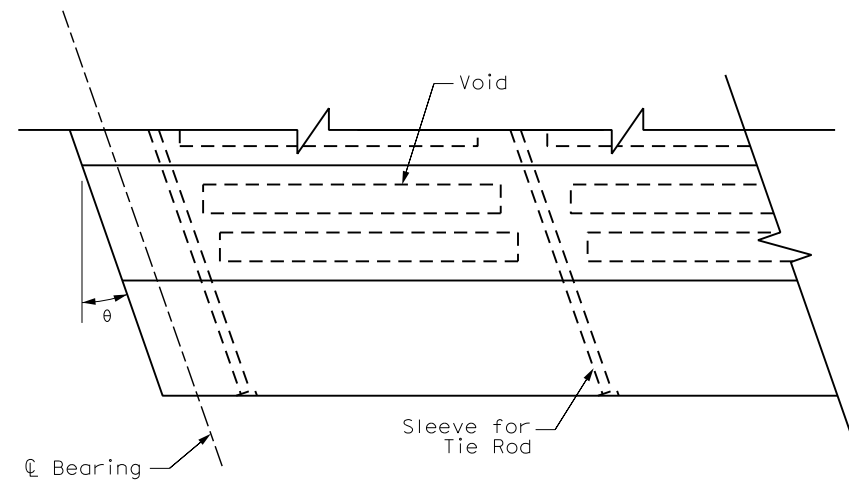
BLACK STAR CANYON ROAD BRIDGES

TYPICAL SECTION AND SLAB REINFORCEMENT

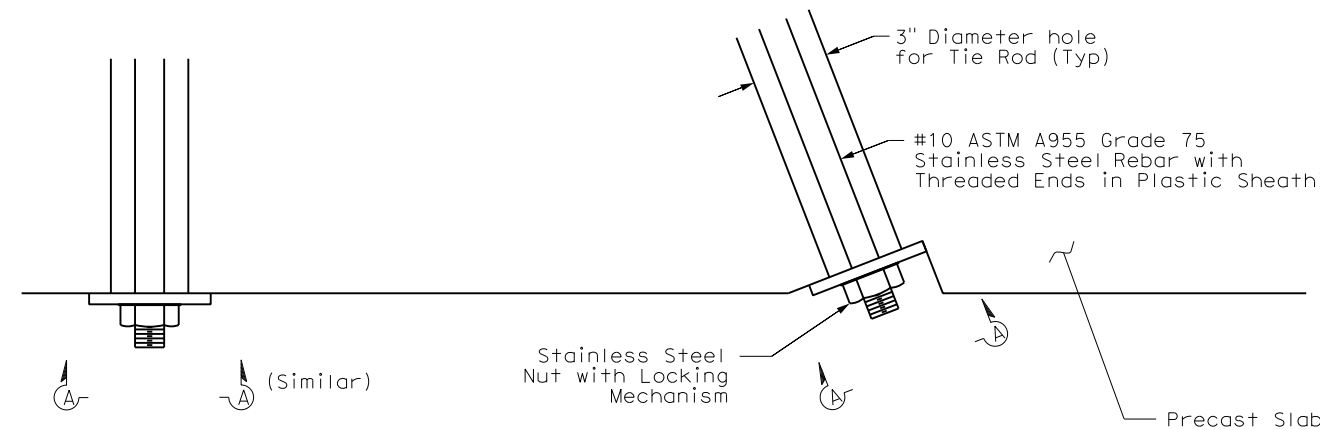
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Sheet 8 of 15



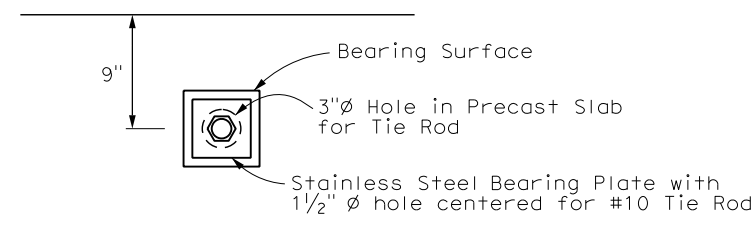
PLAN - SKEWED CONDITION
(Non-Skewed Similar)
NO SCALE



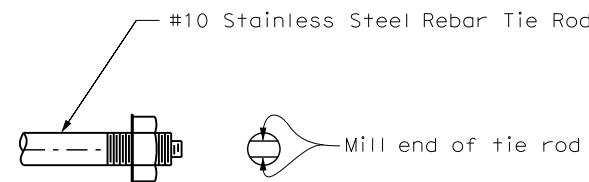
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TIE ROD
Plan View

Skew

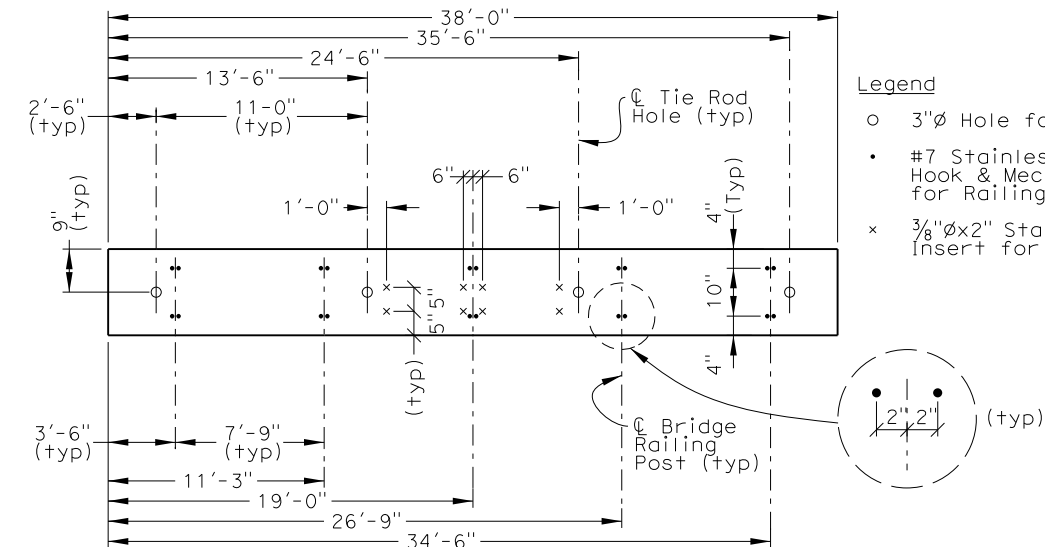


TIE ROD
Elevation A-A

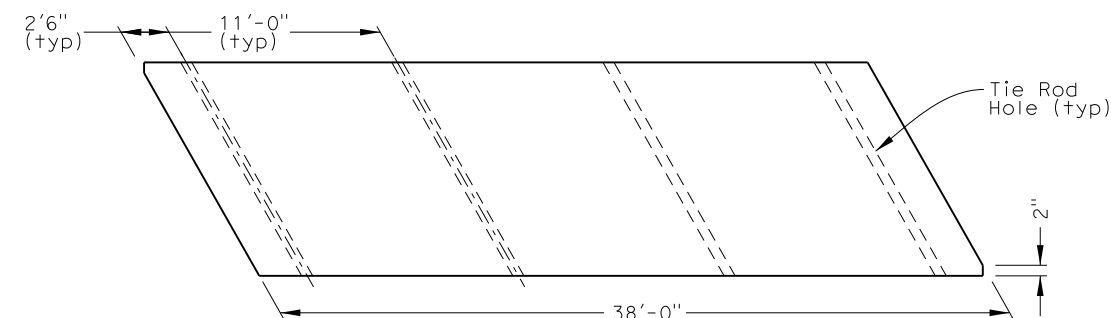


TIE ROD END

NOTE:
Prevent tie rod from turning during tensioning by using a wrench on milled end



PRECAST SLAB EMBED LAYOUT
ELEVATION VIEW
(Same for Skewed/Non-Skewed)
NO SCALE



PRECAST SLAB EMBED LAYOUT
PLAN VIEW
(Skewed Shown, Non-Skewed Similar)
NO SCALE

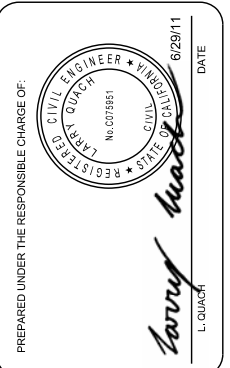
NOTES

1. Tension rod to 75 kips (80% Fy).
2. All hardware shall be stainless steel.
3. Anchorage system (bearing plate, nut, washer and dimensions thereof) is shown for illustration only, to depict the general system. Actual Post-Tensioned Tie Rod Anchorage System shall be designed and detailed by the post-tensioning specialty subcontractor. All hardware shall be stainless steel. Rods shall be 1 1/4" diameter ASTM A955 Grade 75 (Fy = 75 ksi) stainless steel rebar (#10), total 4 tie rod locations per bridge, as shown on plans. System shall include and specify the following:
 1. Adequate thread length at ends of bars
 2. Nuts (with locking mechanism) & Washers
 3. Bearing plate
 4. Tensioning system and procedure, including any special hardware such as direct tensioning indicating washers
 5. Reinforcement in the voided slabs to conform with AASHTO Bridge Design Specifications Article 5.10.9, "Post-Tensioned Anchorage Zones"

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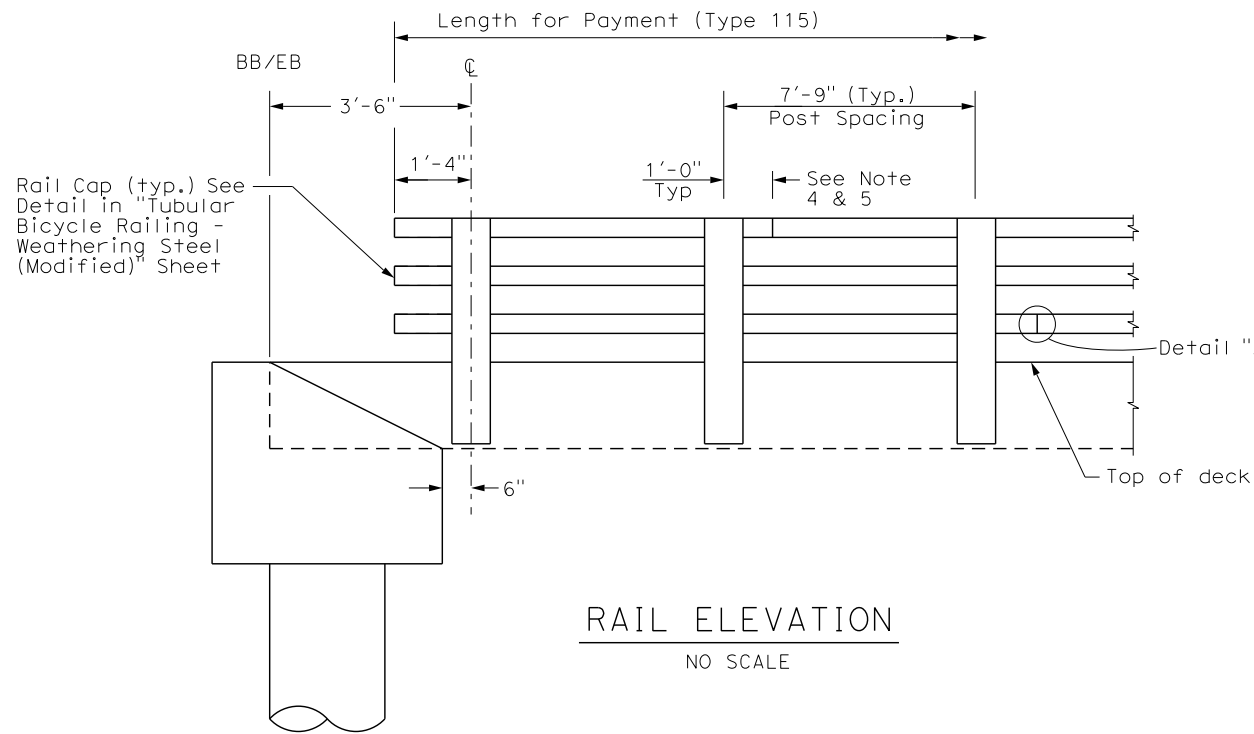
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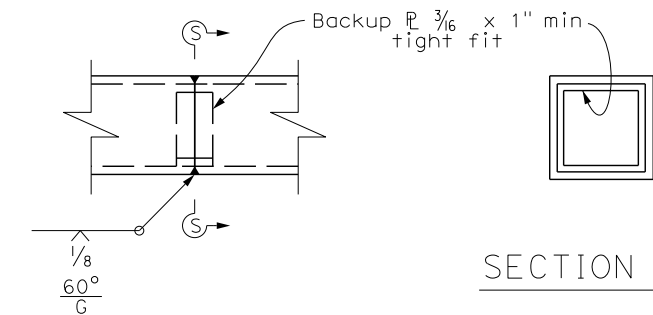
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DRAWN BY: LQ					
ORANGE COUNTY PUBLIC WORKS		PREPARED BY: BRIDGE DESIGN SECTION			

BLACK STAR CANYON ROAD BRIDGES	TIE ROD DETAILS
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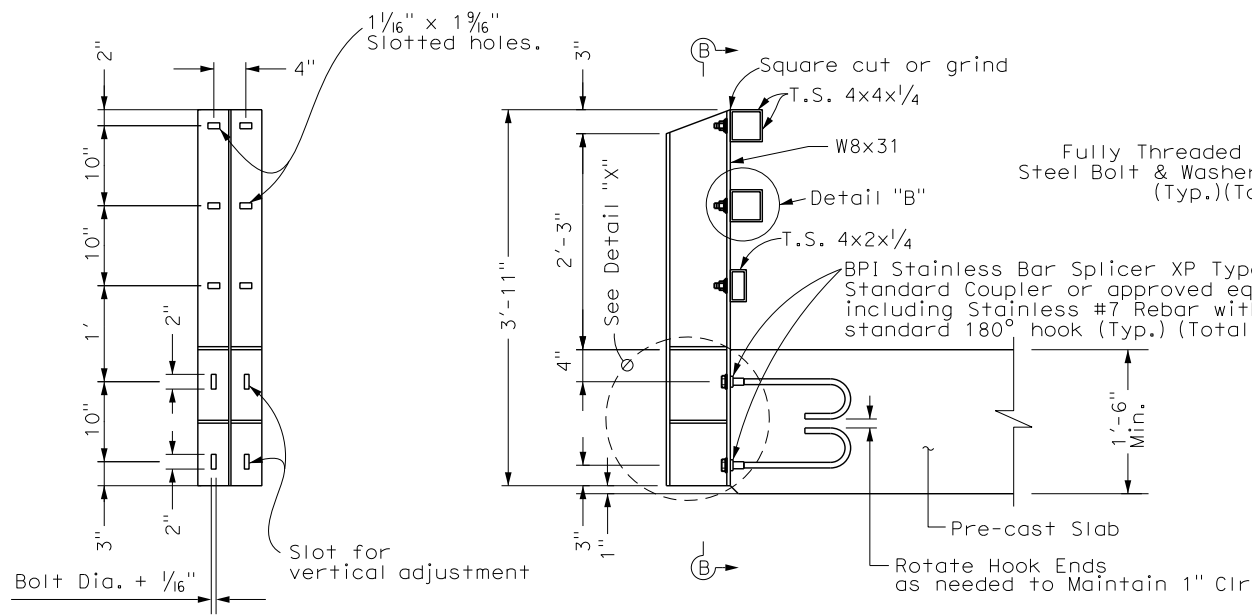
SHEET REFERENCE NUMBER
9
Sheet 9 of 15



RAIL ELEVATION
NO SCALE



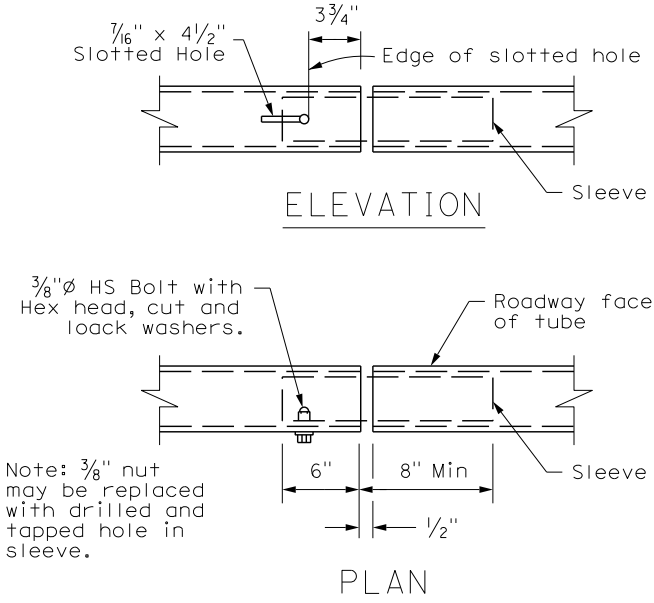
SECTION S-S
SHOP FABRICATION-WELDED TUBE SPLICE
NO SCALE



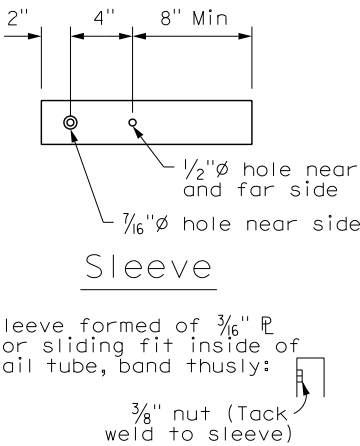
SECTION B-B

RAIL POST DETAILS
NO SCALE

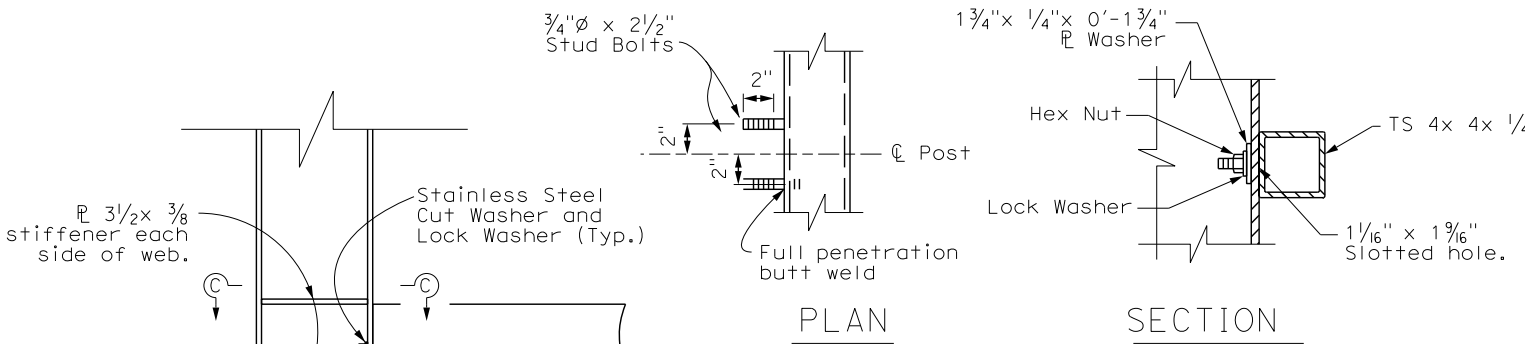
NOTE:
THE CONTRACTOR SHALL VERIFY ALL
CONTROLLING FIELD DIMENSIONS
BEFORE ORDERING OR FABRICATING
ANY MATERIAL.



PLAN



DETAIL "A"-TUBE SPLICE
NO SCALE

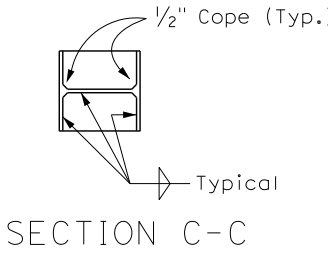


PLAN

SECTION

DETAIL "B"
NO SCALE

- NOTES:
1. Posts shall be vertical.
 2. Tubing shall be shop bent to fit horizontal curve when curve radius is less than 950'.
 3. Tubing shall be parallel to vertical alignment.
 4. Tubing shall be continuous over not less than 3 intermediate posts, with a minimum length of 3 panels.
 5. No more than one tube splice per panel is permitted.
 6. Space posts to provide 1'-6" min clear between expansion joints and CL of post.
 7. Rail joints in top and bottom tubes at deck expansion joints shall provide allowance for movement equal to width of deck joint with corresponding increase in length of sleeve.
 8. Stud bolt nuts shall be torqued to 175 ft lbs.
 9. Anchor bolt nuts shall be wrench tight.
 10. Rail shall be weathering steel. All others shall be galvanize steel.
 11. Designed by AASHTO dated 1977 and interim Specifications dated 1979 and 1980.
 12. Design height of rail is based on a future overlay of 3 inches maximum.
 13. Tubular Bicycle Handrailing not shown. See "Tubular Bicycle Handrailing" Sheet



SECTION C-C



APPR.	DATE	DESCRIPTION	MARK

PREPARED UNDER THE RESPONSIBLE CHARGE OF:

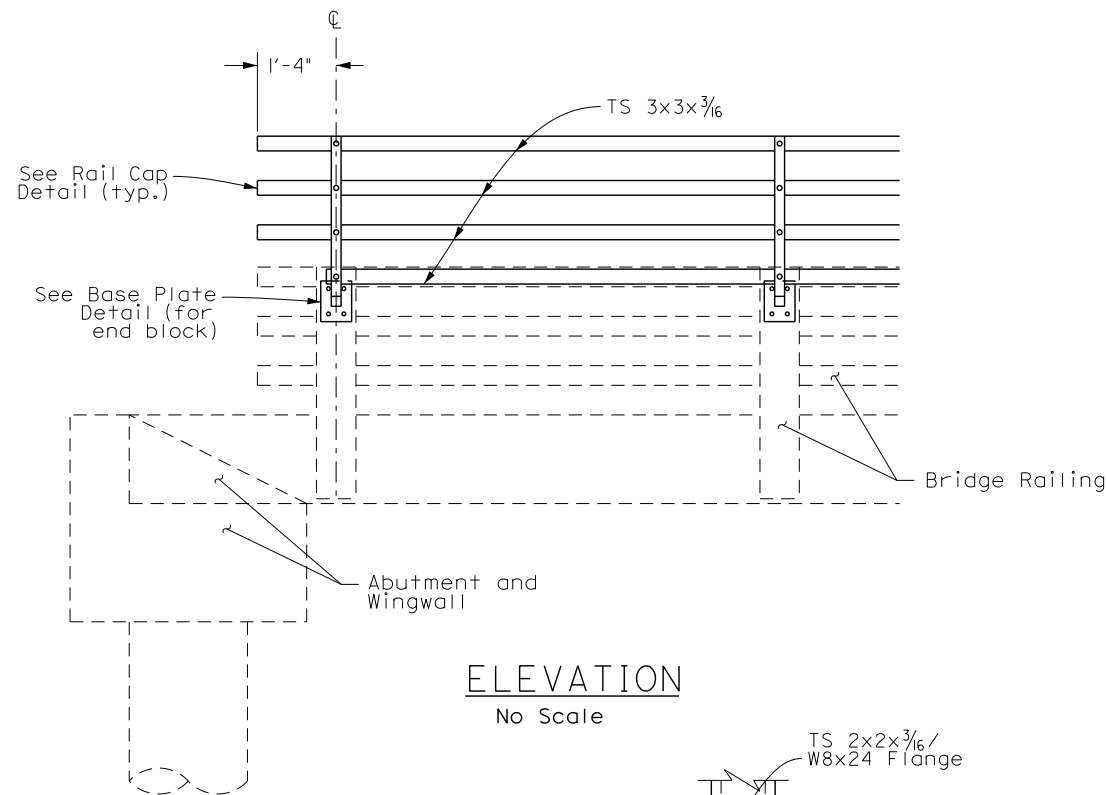
REGISTERED PROFESSIONAL ENGINEER
No. 13945
Exp. 12/31/11
DATE OF EXPIRATION: 12/31/11

DATE: 8/20/11

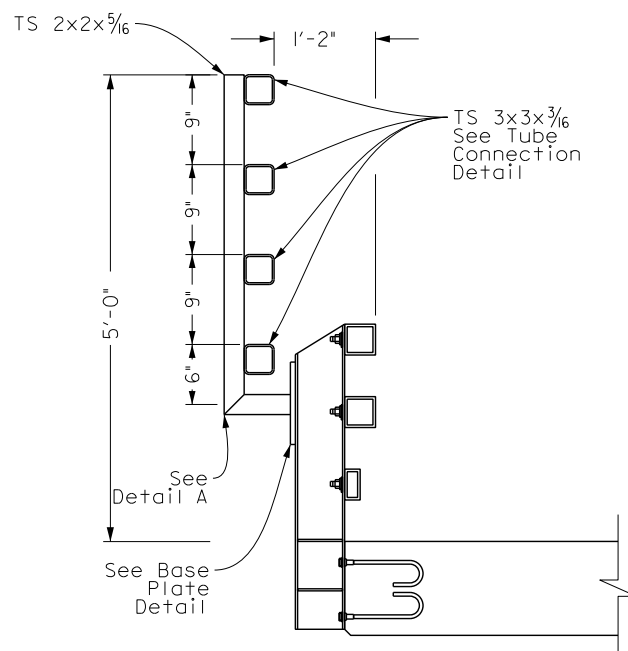
DESIGNED BY: LARRY QUACH	CHECKED BY: R. HOSINGTON	DRAWING CODE:	FILE NAME:	PLOT DATE:	SCALE: AS SHOWN
DRAWN BY: LQ					
ORANGE COUNTY PUBLIC WORKS		PREPARED BY: BRIDGE DESIGN SECTION			

BLACK STAR CANYON ROAD BRIDGES

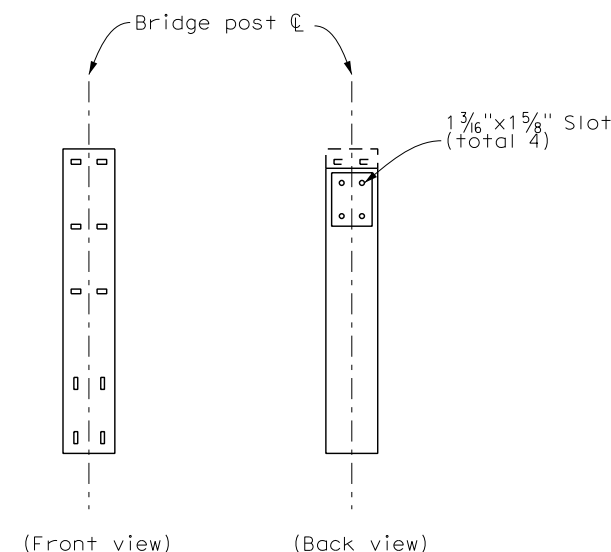
METAL TUBE BRIDGE
RAILING TYPE 115-
WEATHERING STEEL
(MODIFIED)



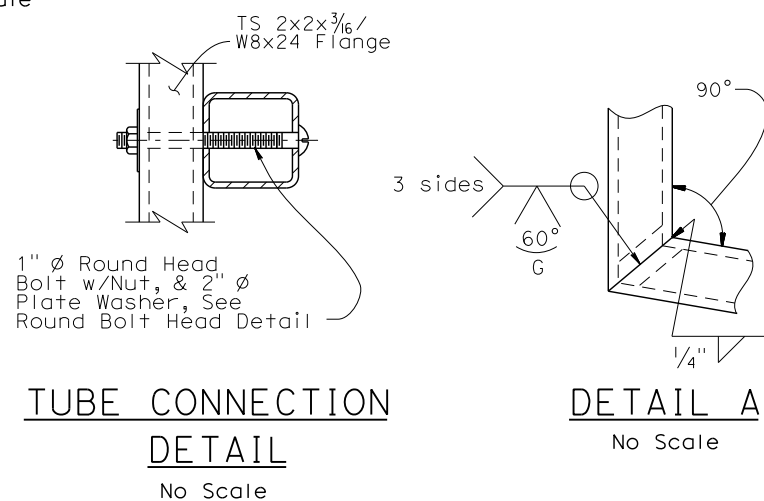
ELEVATION
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TYPICAL SECTION
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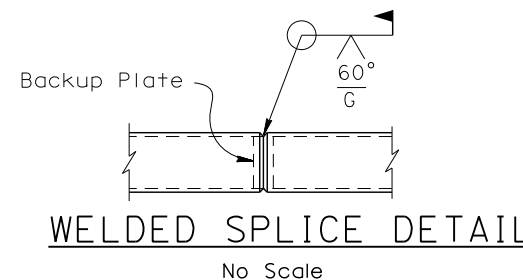


BRIDGE POST ELEVATION
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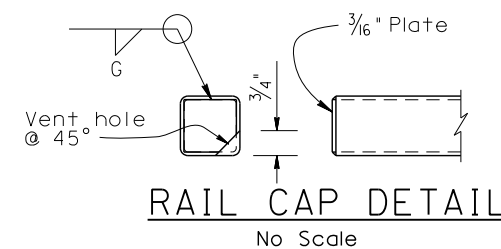


TUBE CONNECTION DETAIL
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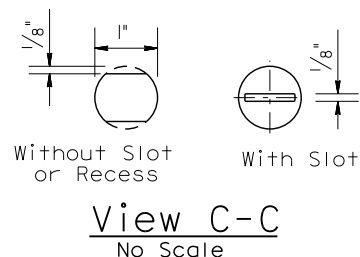
DETAIL A
No Scale



WELDED SPLICE DETAIL
No Scale



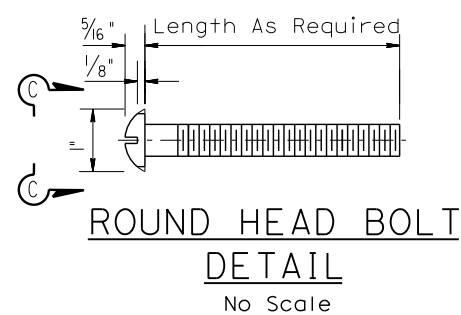
RAIL CAP DETAIL
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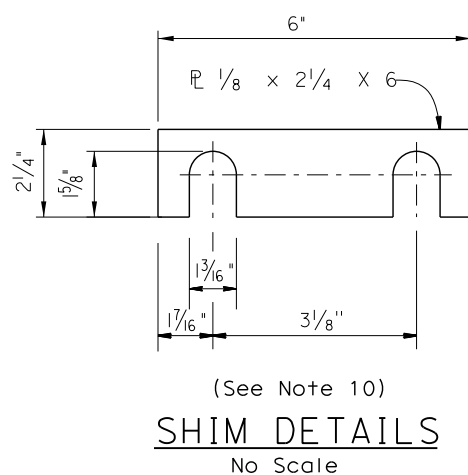
View C-C
No Scale

NOTES:

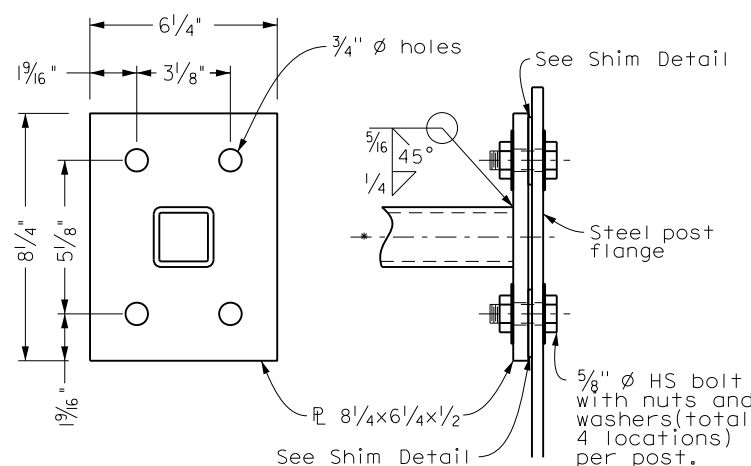
1. ALL CA TYPE 115 BRIDGE RAIL COMPONENTS EXCEPT HARDWARE SHALL BE WEATHERING STEEL. ALL HARDWARE SHALL BE GALVANIZED AFTER FABRICATION.
2. Weathering be normal to railing.
3. Rail tubes shall be shop bent or fabricated to fit horizontal curve when radius is less than 1000 feet.
4. Tube splices shall be located in the tubes spanning deck or wall joints. Increase joint width in tubes to match expansion joint width and increase sleeve length correspondingly.
5. Top rail tube shall be continuous over not less than two posts except a short post spacing is permitted near deck or wall joints, electroliers, or other rail discontinuities as noted.
6. For details and reinforcement not shown see Standard Plan B11-65.
7. See project plans for limits of tubular hand railing.
8. Tube rails shall be capped at the ends.
9. Details shown are modification/addition to Caltrans Standard Plan B11-65.
10. Shim is OPTIONAL, as needed for post plumbness and fitting rail to post/end block alignment.



ROUND HEAD BOLT DETAIL
No Scale



SHIM DETAILS
No Scale



BASE PLATE DETAIL
No Scale

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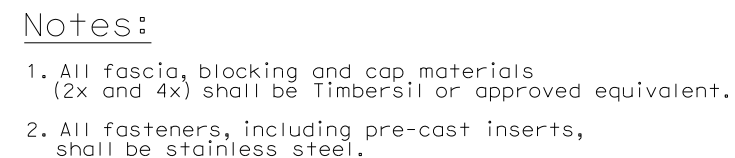
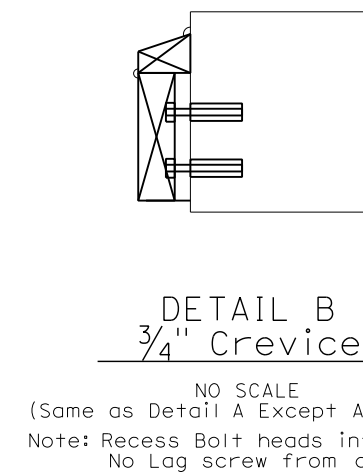
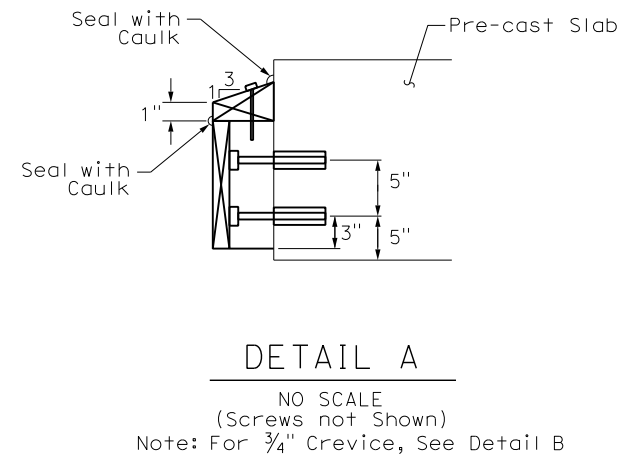
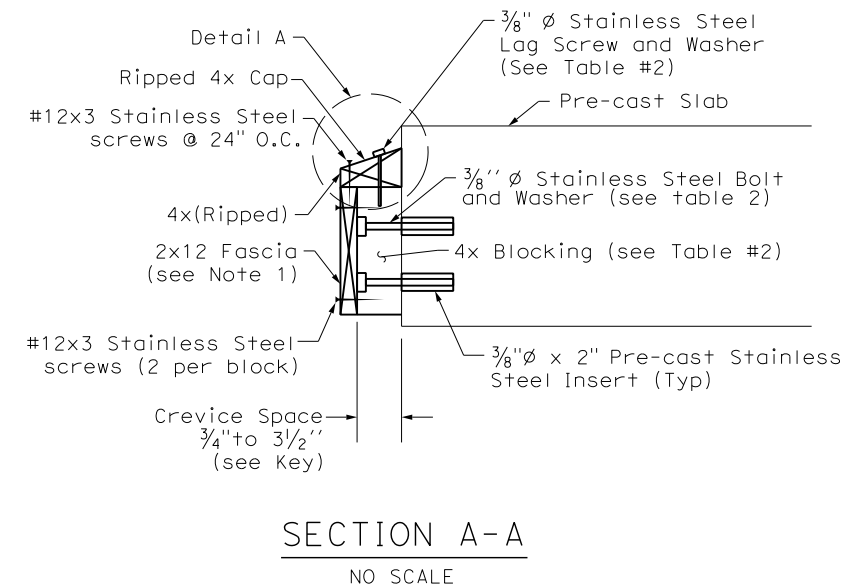
MARK	DESCRIPTION	DATE	APPR.

PREPARED UNDER THE RESPONSIBLE CHARGE OF:	DATE: 6/30/11
REGISTERED PROFESSIONAL ENGINEER No. 13945 Exp. 12/31/11 STATE OF CALIFORNIA	

DESIGNED BY: LARRY QUACH	CHECKED BY: R. HOSINGTON	SCALE: AS SHOWN
DRAWN BY: LO	DRAWING CODE:	FILE NAME:
ORANGE COUNTY PUBLIC WORKS	PREPARED BY: BRIDGE DESIGN SECTION	PLOT DATE:

BLACK STAR CANYON ROAD BRIDGES	TUBULAR BICYCLE RAILING - WEATHERING STEEL (MODIFIED)
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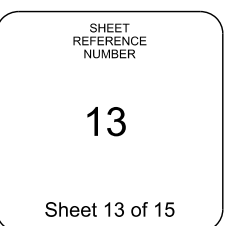
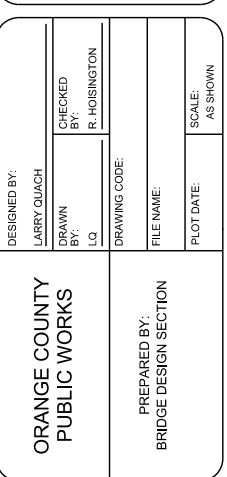
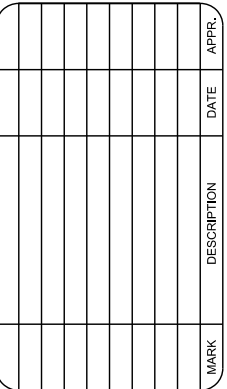
SHEET REFERENCE NUMBER
11
Sheet 11 of 15



	Pilot Hole Size - Surface Member	Pilot Hole Size - Substrate Member
#12 Screws	$\frac{7}{32}$ "	$\frac{5}{32}$ "
$\frac{3}{8}$ " \varnothing Lag Screws	$\frac{3}{8}$ "	$\frac{9}{32}$ "
$\frac{3}{8}$ " \varnothing Bolts	$\frac{3}{8}$ "	N/A

Crevice Size	3/4"	1 1/2"	2 1/2"	3 1/2"
Blocking: Nominal Size	4x1	4x2	4x3	4x4
Bolt Length	3"	3"	4"	5"
Lag Screw Length	N/A	4"	4 1/2"	5"

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ANY MATERIAL.



FOR REDUCED FILING		0	1	2	3	EARLIER REVISION DATES	
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NOTES

- Contractor should be aware of the difficult drilling conditions through cobbles and boulders and potential caving.
- Contractor should be equipped with appropriate drilling tools for drilling through cobbles, and hard boulders and bedrock.

DIST	COUNTY	ROUTE	SHEET No	TOTAL SHEETS
	OC	BLACK STAR CANYON RD		

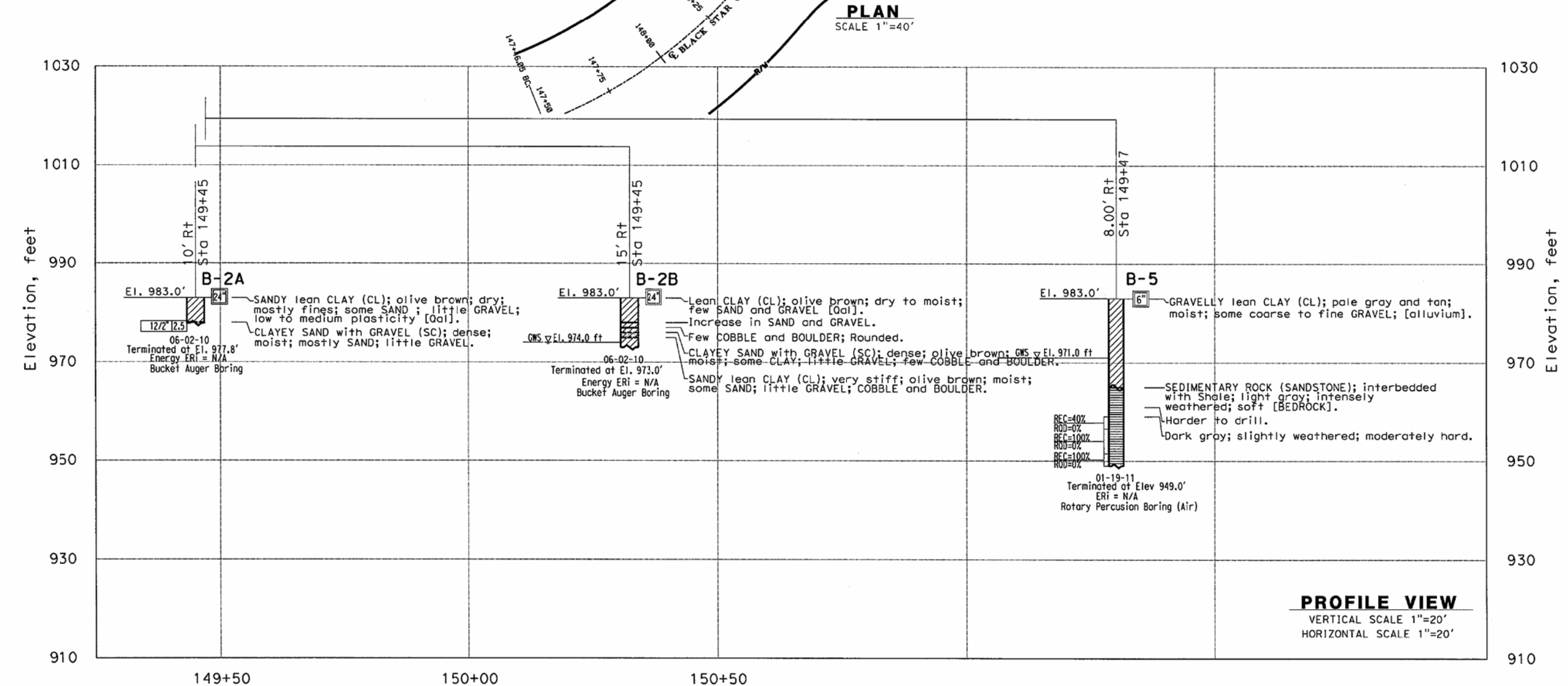
REGISTERED GEOTECHNICAL ENGINEER DATE

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.

URS CORPORATION
2020 EAST FIRST STREET, SUITE 400
SANTA ANA, CA 92705

This LOTB sheet was prepared in accordance with the Caltrans Soil & Rock Logging, Classification, and Presentation Manual (2010).



ENGINEERING SERVICES		GEOTECHNICAL SERVICES		STATE OF CALIFORNIA		DIVISION OF ENGINEERING SERVICES		BLACK STAR CANYON BRIDGE BS-4	
FUNCTIONAL SUPERVISOR		DRAWN BY: P. QUACH		FIELD INVESTIGATION BY:		STRUCTURE DESIGN		BRIDGE NO. BS-4	
NAME: F. MOTAMED		CHECKED BY: E. JEON		D. ORRIS/E. PINTARD		DESIGN BRANCH		POST MILE X	
OCS CIVIL LOG OF TEST BORINGS SHEET		ORIGINAL SCALE IN INCHES FOR REDUCED PLANS		0 1 2 3		DISREGARD PRINTS BEARING EARLIER REVISION DATES		REVISION DATES	



APPR.	DATE	DESCRIPTION	MARK

PREPARED UNDER THE RESPONSIBLE CHARGE OF:

CIVIL ENGINEER - PROFESSIONAL SEAL

LARRY QUACH

DATE 6/29/11

DESIGNED BY: LARRY QUACH

CHECKED BY: R. HOUSINGTON

DRAWN BY: LQ

DRAWING CODE:

FILE NAME:

PLOT DATE:

SCALE: AS SHOWN

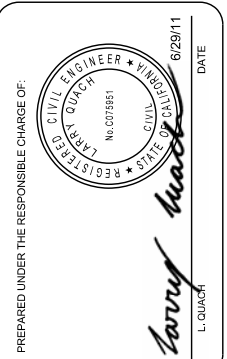
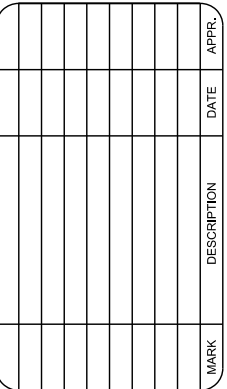
ORANGE COUNTY PUBLIC WORKS

PREPARED BY: BRIDGE DESIGN SECTION

BLACK STAR CANYON ROAD BRIDGES

LOG OF TEST BORINGS

BRIDGE BS-4



<div> <div>ORANGE COUNTY</div> <div>PUBLIC WORKS</div> </div>	DESIGNED BY:		LARRY QUACH	
	DRAWN BY:	CHECKED BY:		
			R. HOISINGTON	
	LQ			
<div> <div>PREPARED BY:</div> <div>BRIDGE DESIGN SECTION</div> </div>	DRAWING CODE			
	FILE NAME:			
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BLACK STAR CANYON ROAD BRIDGES

LOG OF TEST BORINGS
BRIDGE BS-3

SHEET
REFERENCE
NUMBER

15

Sheet 15 of 15

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